PANDUIT™
infrastructure for a connected world


# SynapSense® 2.4GHz Industrial Gateway Model 1167

## Installation & Use Manual

## Trademarks



## Disclaimer

## Regulatory Information

### FCC Statements

**Notice to Users:**

This equipment has been tested and found to comply with the limits for Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If the equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Plug the equipment into an outlet on a circuit different from that which the receiver is plugged.
- Consult the dealer or an experienced radio/TC technician for help. This product works using a radio frequency, so use on an airplane may be restricted due to interference.

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 Panduit could void the user's authority to operate the equipment. The external antenna(s) used for this transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

This equipment complies with the FCC RF Exposure requirements for uncontrolled environments. To maintain compliance with these FCC requirements, this device should be installed to ensure that a minimum separation distance of 20 cm is maintained from the antenna for the general population.

**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 (2014/30/EU) according to EN 55022 Class B. This equipment has also been tested and found to comply with Radio Equipment Directive (2014/53/EU). This equipment complies with the RoHS2 Directive (2011/65/EU) with Added Addendum (EU) 2015/863.
The full EU declaration of conformity is available at https://www.panduit.com/en/support/download-center/certifications.html.

**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 complies with Industry Canada license-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.

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 SynapSense 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.

## Warranty Information

### Limited One Year Warranty

Our company warrants that for one year 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, contact technical support at **https://www.panduit.com/en/support/contact-us.html.**

This replacement is the company's sole obligation under this warranty. Panduit 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.

Although every precaution has been taken in the preparation of this manual, Panduit assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein.

# Table of Contents

# Overview

## About This Installation Guide

The intended audience for this document consists of customers or partners of Panduit.

Customers, partners, or installers should receive training from Panduit prior to installing the hardware detailed in this document.

### Organization

This installation guide describes the tasks for installing the Model 1167 SynapSense® 2.4GHz Industrial Gateway (also referred to as an Industrial Gateway for the remainder of this manual). Table1 lists the chapters in this document with a short summary describing each chapter's content for easy reference.

Table 1 – Chapter Summary

| Chapter | Description |
|---|---|
| Introduction | This chapter provides the scope, overview (application and block diagrams), and kit components for installing and configuring an Industrial Gateways in a plant or data center. |
| Requirements | This chapter lists the hardware, software, tools, and additional material requirements for installing Industrial Gateways. |
| Installation Procedures | This chapter describes general guidelines and specific procedures for configuring and installing Industrial Gateways. |
| Installation Inspection | This chapter describes the inspections needed to ensure that the installation of the Industrial Gateway is correct and functioning properly. |
| Specifications | This chapter describes the technical specifications of the Industrial Gateway. |
| Appendix A | This appendix provides descriptions of the various status LEDs of the Industrial Gateway. |
| Appendix B | This appendix describes any maintenance or troubleshooting activities for the Industrial Gateway. |

## Document Conventions

Table2 defines the style conventions used throughout this document.

Table 2 – Installation Guide Style Conventions

| Item | Description |
|---|---|
| **Bold and Blue** | This style is used for anything a user types, clicks, presses, or taps. The style also highlights SynapSense products. For example, Click **OK**. |
| **NOTE:** | Exceptions to the rule and other important information will be set off with this note style prefix. |
|  This triangular yellow exclamation mark icon denotes a warning. | |
|  This triangular yellow electrical icon denotes a safety warning of a physical or electrical nature. | |

## Document References

The documents listed in this section affect the overall activities in this document. Refer to the appropriate document for user-specific information on installing SynapSense® Software.

- SynapSense™ Software Installation Guide

## Warnings and Precautions

The following warnings and precautions pertain to Gateway installations. Failure to adhere to warnings and precautions could result in physical injury or damage to equipment, which may void the warranty.

 Installation of this equipment must be in accordance with local and national electrical codes.

 Industrial spaces may pose a risk of hearing loss. Use appropriate ear protection prior to entry into high-noise areas.

 Do not touch any electrical equipment without approval from plant operators (including loose cables, push carts, and terminals).

## Avertissements et Precautions

Les avertissements et précautions suivants concernent les installations de passerelle. Le non-respect des avertissements et des précautions peut entraîner des blessures corporelles ou endommager l'équipement, ce qui peut annuler la garantie.

 L'installation de cet équipement doit être conforme aux codes électriques locaux et nationaux.

 Les espaces industriels peuvent présenter un risque de perte auditive. Utilisez une protection auditive appropriée avant d'entrer dans des zones à fort bruit.

 Ne touchez aucun équipement électrique sans l'approbation des opérateurs de l'installation (y compris les câbles desserrés, les chariots de poussée et les bornes).

## Panduit Technical Support

**Severity 1 & 2 Issues:**

Americas: 1-866-721-5302 x86810 during normal Central Standard Time business hours

EMEA: 44-1291-674-661 x22761 during normal U.K. business hours

APAC: 65-8200-3931 or 65-8200-3932 between 8 a.m. and 5 p.m. local time

**Severity 3 & 4 Issues, Email - normal business hours:**

systemsupport@panduit.com

# Introduction

This chapter provides the scope, overview and kit components for installing and configuring a SyapSense® 2.4GHz Industrial Gateway.

## Scope

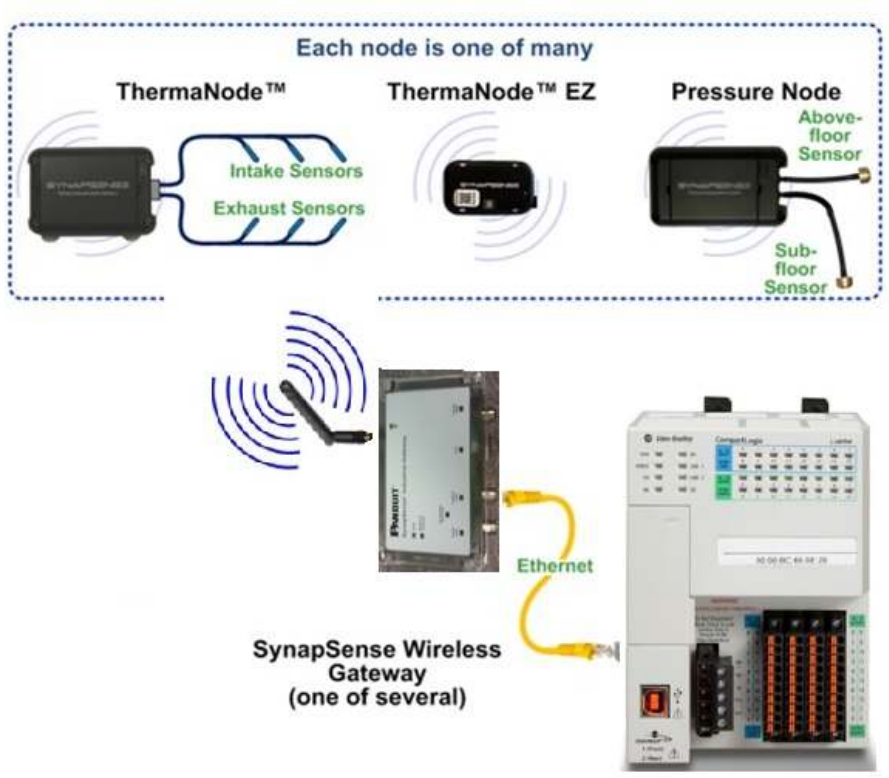
This document provides guidelines and instructions for installing and configuring the Industrial Gateway.

**NOTE**: Installation of SynapSoft™ software (such as MapSense™) occurs prior to hardware installation. This installation order prevents redundancy of hardware verification activities (for example, sensor-to-software communication validation). See Document References section for document list.

## Overview

The Model 1167, SynapSense® 2.4GHz Industrial Gateway, is a wireless, 2.4GHz, 802.15.4 to wired Ethernet gateway that collects data from any of the SynapSense wireless sensors or meter hardware deployed throughout the plant or data center. For example, using SynapSense® ThermaNode™ environmental sensors, data can be acquired across the entire active area of the plant or data center. The Model 1167 Industrial Gateway is powered by either a dedicated 24VDC nominal power supply (10-30Vdcmax) or an IEEE 802.3af Power over Ethernet (POE) compatible network source. Both power supply connections are designed to provide the user with a worry free installation; this allows the power supply wiring to be connected to the Model 1167 Industrial Gateway without worrying about the polarity of the power supply's wiring. If both supplies are connected, the Industrial Gateway will operate with redundant power supplies, allowing one of the power supplies to fail without any noticeable data interruption to the downstream server.

Figure 1 shows a block diagram of a typical installation with wireless data from various sensors arriving at the Industrial Gateway(s), and the Ethernet data path from the Industrial Gateway(s) to the server via wired IEEE 802.3 Ethernet.



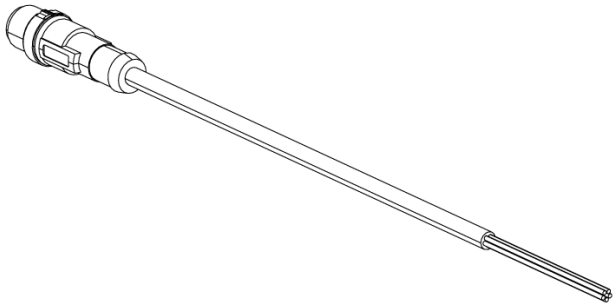

# SynapSense® 2.4GHz Industrial Gateway Kit

The Industrial Gateway Kit contains the following components:

1 ea. SynapSense® 2.4GHz Industrial Gateway (Part Number 100-1167-001)

1 ea. 2.4GHz Dipole Antenna, IP-67Rated. (LSR, Part Number 001-0010)

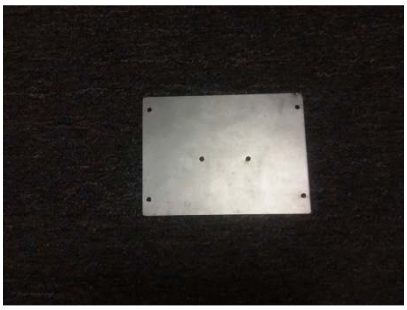
1 ea. M12-4/5, Plug, Cable, 3meter, A Coded, To Connect 10-30Vdc Power to Gateway



The following components are available as additional options for the Industrial Gateway:

## Industrial Gateway Mounting Plate (optional accessory)

Allows Mounting of the Industrial Gateway to DIN rail using Std. Clip



## Industrial Gateway T-Mount Feet (optional accessory)

# Requirements

This chapter lists the hardware, software, tools, and additional material requirements for installing the Industrial Gateway in a data center or plant.

## Hardware

Industrial Gateway kit

### Software

Current version of MapSense™ software.

### Tools and Materials

The following list contains the minimum tool and material requirements installers need to bring to the job site.

- Proper dress and shoes for performing work in a data center or plant (Including areas inside the subfloor and in overhead plenums).
- Ladder or step stool sufficient to reach all Gateway installation locations (typically placed well above the height of all server cabinets in their service radius)
- Spare Industrial Gateway (if desired)
- Laptop
- 3M Command Strips
- Adhesive Cable Clips
- Alcohol wipes
- Drill and Bits (for Industrial Gateway Mounting Plate installations only)
- Flashlight
- Utility Knife
- Screwdrivers
- Label Maker
- M12 Threaded Plastic Caps for Unused Gateway Connectors
- This document and MapSense™ user guides.
- Printed MapSense™ layout of the plant or data center showing cabinets and sensor installation locations

Required Personal identification (driver's license or passport) to present to security personnel

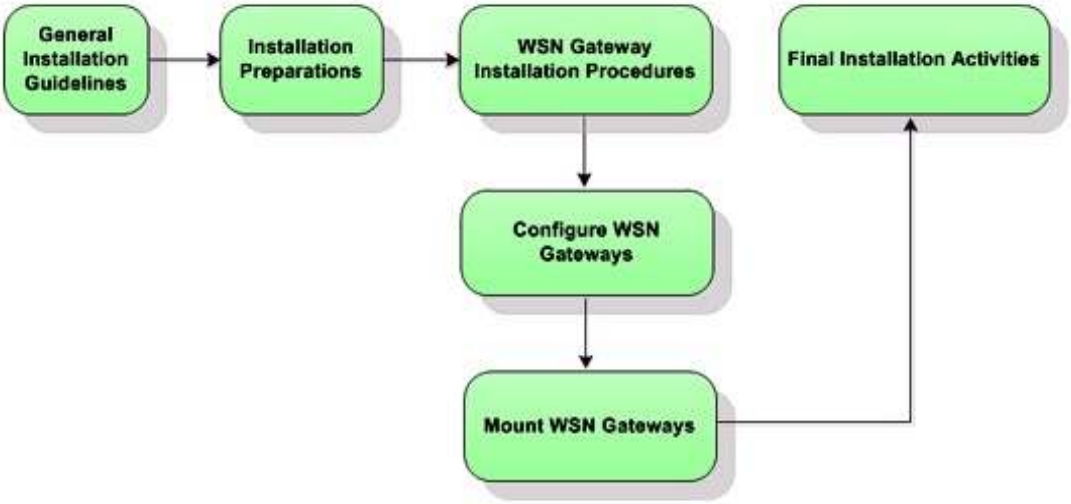
# Installation Procedures

This chapter describes general guidelines and specific procedures for configuring and installing the Industrial Gateway.

## General Installation Guidelines

- Be consistent. All installations should match in appearance where possible (including centering, location, method for securing extra wire, etc.)
- Be neat. Ensure installation is straight and vertical or horizontal as much as possible.
- Install Industrial Gateway on flat smooth surfaces such as the tops of server cabinets.
- Use adhesive cable clips to keep cable and Power wires neat and contained.
- Each installation location should have the desired Ethernet port within 100m of the Industrial Gateway.
- Industrial Gateway installations should not be in areas where concrete walls, support pillars, large cable bundles, air ducting, or other metal enclosures that can block the wireless signal transmission to the sensors. If a wireless line of sight obstruction is immovable, the external dipole Antenna of the Industrial Gateway can be extended by up to 50 ft. by using coaxial extension cable rated for 2.5GHz frequencies or higher. The recommended antenna extension cable for the Industrial Gateway is rigid CNT-240 or equivalent which has less RF loss at 2.4GHz than standard flexible coaxial cables. The extension cable must be environmentally rated for the specific installation area.
- Keep installation area clean during and after installation.

The following sections provide general information and specific installation instructions for installing the Industrial Gateway. The diagram below shows the typical installation process flow.


General Installation Guidelines
Installation Preparations
WSN Gateway Installation Procedures
Final Installation Activities
Configure WSN Gateways
Mount WSN Gateways

# Installation Preparations

Follow the activities in Table 3 to prepare for the Industrial Gateway installation.

Table 3 – Installation Preparation Activities

| Activity | Steps |
|---|---|
| Unpack Kits | Unpack the Industrial Gateway and accessories from boxes.<br><br>Count and verify any other cables/accessories need for job.<br><br>Verify that you have all necessary tools (in pocket or bag), small garbage bag, headlight, heat shrink, alcohol wipes, gloves, etc. |
| Plan and Verify Power Source | Verify that the planned source of Gateway power(one or both potential sources) is available and check power supplies before connecting Industrial Gateway to power source. Use a PoE camera or other PoE device, to test PoE source power to be connected to the Industrial Gateway. |
| Verify Static IP | Verify the plant or data center IT provided one static IP address per Industrial Gateway. |
| Plan and Verify Ethernet Connection | Verify the plant or data center provided one Ethernet cable/connection per Industrial Gateway near the planned installation location. |

# Industrial Gateway Installation

For each Industrial Gateway, the following installation procedures must be performed:

1. Configure the Industrial Gateway
2. Mount the Industrial Gateway & Connect Cables and External Dipole Antenna

**NOTE**: To save time, it is best to configure all Industrial Gateway(s) first, and then mount the Industrial Gateway(s) in the planned location in the plant or data center.

If the Industrial Gateway configuration has been performed, proceed to

**Mount the Industrial Gateway.**

If the Industrial Gateway configuration has not been performed, or if an IP address requires changing, you will need to perform all installation activities.

# Configure Industrial Gateway

Perform the activities in Table4 to configure the Industrial Gateway.

*Static IP addresses and open ports for each of the* Industrial *Gateways should already be assigned by the plant or data center's IT department and ready for use.*

Table 4 – Industrial Gateway Configuration Activities

| Activity | Steps |
|---|---|
| Connect Industrial Gateway to Laptop | 1. Power on Industrial Gateway and wait for Gateway to Boot.<br>2. Plug the M12 D-coded Ethernet cable into the configuration port of the Industrial Gateway.<br>3. The other end of the Ethernet cable should be plugged into the PC. By default, the configuration port of the Gateway will be running DHCP.<br>4. Using the PC's web browser, navigate to the Gateway's User Interface (UI), (i.e. the Gateway's configuration web page) located by typing 192.168.1.1 in the HTML browser.<br>5. Configure the data port to the planned static IP address given by the plant or data center. Apply the change on web page to save the change.<br>6. Disconnect the M12 cable from the configuration port.<br>7. Plug the data port of the Industrial Gateway into the planned data network for the server or PLC.(Network switch of data subnet provided by plant or data center)<br>8. Verify M12 IP67 Caps are installed in all unused connectors of the Industrial Gateway and on the RESET M12 metal shell. |

| | |
|---|---|
| Additional Industrial Gateways | 1. Remove M12 D-coded Ethernet cable from the Industrial Gateway to configure another Gateway.<br>2. Plug the M12 D-coded Ethernet cable into the configuration port of the next Industrial Gateway device to be configured.<br>3. Repeat the activities in the previous table for each Industrial Gateway to be installed.<br>4. Once all Industrial gateways are configured and verified, close the Remote Gateway Manager (logout option or exit the browser window).<br>5. Verify all M12 IP67 Caps are installed in all unused connectors of the Industrial Gateway and on the RESET M12 metal shell. |

# Mount Industrial Gateway

Perform the activities in the table below to mount the Industrial Gateway in the data center.

Table 5 – Mounting the Industrial Gateway Device

| Activity | Steps |
|---|---|
| Determine Industrial Gateway Installation Type | 1. Before installing the Industrial Gateway, determine if the device will be installed with 3M Command Strips, Direct Mount, T-Mounting Feet, or with the optional DIN rail Mounting Plate. If you are installing a Gateway Mounting Plate, consult the site Facilities Manager for possible installation locations on an existing DIN rail or proposed new DIN rail location.<br>2. Install the Industrial Gateway per one of the methods below. |
| Install Gateway (3M™ Command Strip Method) | 1 Clean planned installation surface and Industrial Gateway back with alcohol wipes. Allow both to dry thoroughly.<br>2 Attach four 3M™ Command Strips (double-sided adhesive strips) to the back of the Industrial Gateway. Leave the protection adhesive covers on the command strips on for now.<br>3. Connect the M12, A-coded, Male Plug cable to the Industrial Gateway and the 10-30Vdc designated power supply if using the local 10-30Vdc power option of the Gateway.<br>4. Connect the designated M12 D-coded Ethernet Cable (originating from a PLC or server assigned by the plant or data center's IT department) to the Industrial Gateway.<br>5. Apply Power to Gateway either by PoE or 10-30Vdc Power Supply Radio activity(ϒ) LED will illuminate and blink OFF occasionally indicating ongoing radio communication activity.<br>6. The Status LED of the associated SynapSense™ sensor(i.e. example ThermaNode™ EZ) will remain continuously ON or blinking until the sensor establishes communication with the Industrial Gateway.<br>7. The ThemaNode™ EZ Status LED will eventually turn OFF after a wireless connection is established between the ThermaNode EZ and the Industrial Gateway. |

| Activity | Steps |
|---|---|
| Install Gateway (3M Command Strip Method) (continued) | 8. The Industrial Gateway's Radio Activity(ᛉ) LED will stay green during wireless connection and after the connection is established during normal operation.<br><br>9. Remove adhesive covers from the Command Strips on the back of the Industrial Gateway.<br><br>10. Mount the Industrial Gateway onto an alcohol cleaned surface. Press firmly for 30 seconds.<br><br>11. Secure and route power cable and Ethernet Cable using adhesive Cable Clips.<br><br>Repeat previous steps for remaining Industrial Gateways to be installed.<br><br>When all Industrial Gateways are installed, proceed to the Final Installation Activities section. |

| Activity | Steps |
| --- | --- |
| Install Industrial Gateway (DIN Rail Mounting Plate) | The optional Industrial Gateway DIN Rail Mounting Plate allows the Industrial Gateway to be attached to standard DIN rail with a standard DIN rail clip. A standard DIN rail clip is included with the Mounting Plate.<br><br>**NOTE:** The installation instructions of the DIN Rail Mounting Plate to the Industrial Gateway are included with the optional DIN Rail Industrial Gateway Mounting Plate.. |

| Activity | Steps |
| --- | --- |
| Install Industrial Gateway (T-Mount Feet) | The optional T-Mount Feet allow the Industrial Gateway to be directly installed to a customer supplied plate or wall.<br><br>Each T-Mount is attached to the corner of the Gateway using (1) of the included screws at the T center hole of the T-Mount foot.<br><br>The foot screw is inserted from inside the lid of the Industrial Gateway at each corner access hole of the Gateway.<br><br>The T-Mount holes can then be used to mark the hole locations on the wall or Plate if the Industrial Gateway is temporarily held at the installation location<br><br>  . |

## Final Installation Activities

Perform the activities in Table 6 to complete the activities for the Industrial Gateway installation.

Table 6 – Final Installation Activities

| Activity | Steps |
|---|---|
| Clear Installation Area | Clean installation area of debris (pack- aging etc.).<br>Dispose of trash appropriately.<br>Proceed to Installation Inspection. |

# Installation Inspection

This chapter describes the inspections needed to ensure installations of Industrial WSN Gateway devices are correct and functioning properly.

## General Inspection

Inspections ensure installations are correct and Industrial Gateway devices communicate with the PLC or SynapSoft™ server.

### Inspect Operation and Installation Appearance

1. Verify all installed Industrial Gateway devices are connected properly and receiving power by viewing the PoE and Power LEDs.
2. Verify Industrial Gateway devices are installed in areas in which there is a clear line of sight for wireless sensor's radio transmissions.
3. Verify Ethernet cables and power wires (if needed) are secured.

### EtherNet/IP Configuration

The Industrial WSN Gateway can act as an EtherNet/IP adapter and provide the data of connected nodes via EtherNet/IP. To do this, the Industrial WSN Gateway can establish up to 10 data transfer connections with 10 sensor nodes per connection (maximum 100 sensor nodes).

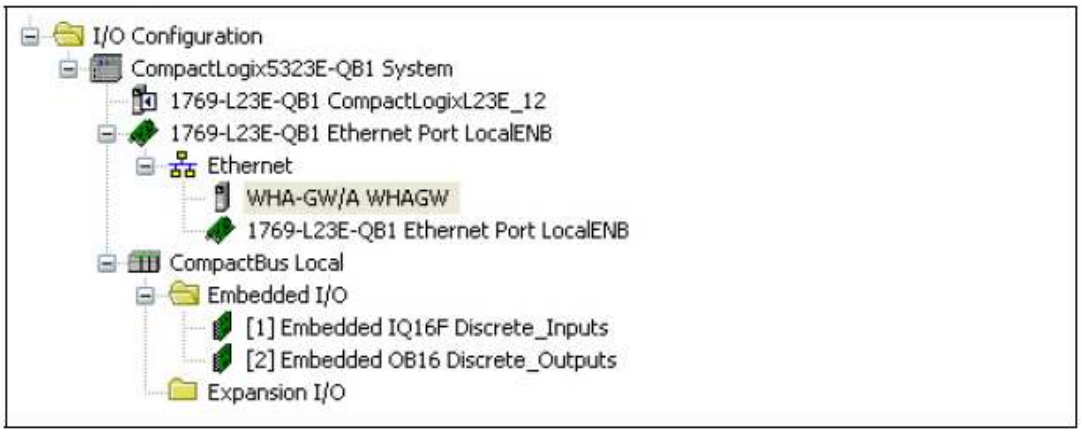
1. Setup the SynapSense™ Network. Use the SynapSoft™ application to connect to all nodes on the wireless sensor network (WSN).
2. Define node number for all nodes using the SynapSoft™ application
3. Integrate the Industrial Gateway into your control system by installing the Add-On Profile (AOP) or EDS file.

## Integration in PLC via EtherNet/IP

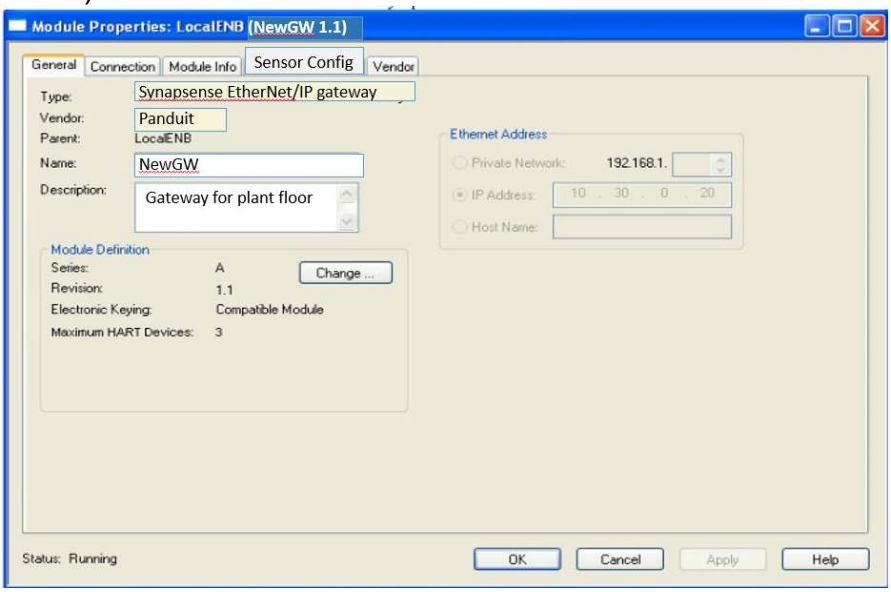
### Rockwell Automation ControlLogix® Control System

Integration of the Industrial WSN Gateway in the Logix Controller is performed via an Add-On Profile (AOP).

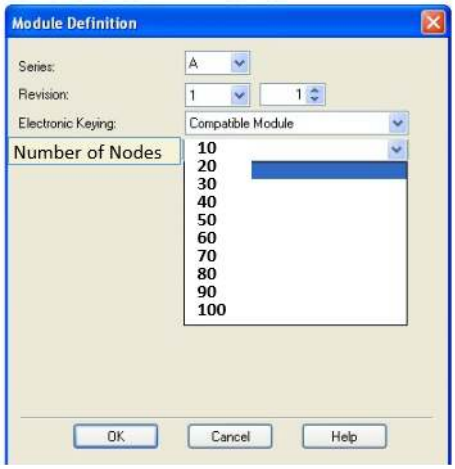
1. Create a new project in the Studio 5000 software which contains the Panduit AOP (if the release being used does not have the Panduit AOP it can be imported manually).
2. Add a new device by right-clicking under “Ethernet” in the design tree on the left side of the screen.



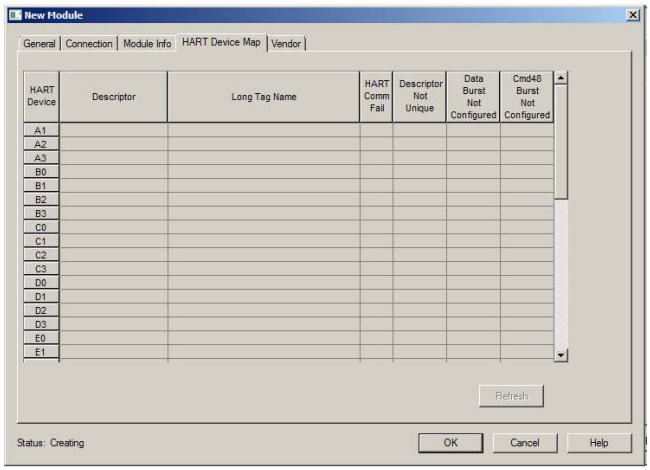

3. Double-click on the Industrial Gateway in the design tree on the left side of the screen to modify the properties of it
    a. Create a unique name for the gateway (“NewGW” in example screen shown below)




    b. Enter the IP address of the Industrial Gateway in the **Ethernet Address** area of the **General** tab.
4. Click on the **Sensor Config** tab to select the number of nodes connected to the Industrial Gateway. Round up to the nearest number if you don’t see your choice in the dropdown (for example if you have 15 sensors, select 20)




Once the nodes are running, data can be viewed in the **Device Map** tab
.



Data in the Device Map tab will be structured as shown below:

| *Name* | *Value* | *Force Mask* | *Style* | *Data Type* | *Description* |
|---|---|---|---|---|---|
| - Gateway:I1 ('Gateway' is name given by user) | | | | | |
| + Gateway:I1.CommStatus | | | Decimal | INT | |
| + Gateway:I1.Diagnostics | | | Decimal | INT | |
| - Gateway:I1.N1 (N1 represents Node 1) | | | | | |
| Gateway:I1.N1.Shortened_MAC_ID | | | Hex | DINT | |
| Gateway:I1.N1.SensorType | | | Decimal | SINT | |
| Gateway:I1.N1.Status | | | Decimal | SINT | |
| Gateway:I1.N1.TimeStamp | | | | | |
| Gateway:I1.N1.BatteryLife | | | Decimal | SINT | |
| Gateway:I1.N1.Value1 | | | Float | REAL | EZH Temp |
| Gateway:I1.N1.Value2 | | | Float | REAL | EZH Humidity |
| Gateway:I1.N1.Value3 | | | Float | REAL | Or name from SS |
| Gateway:I1.N1.Value4 | | | Float | REAL | |
| Gateway:I1.N1.Value5 | | | Float | REAL | |
| Gateway:I1.N1.Value6 | | | Float | REAL | |
| Gateway:I1.N1.Value7 | | | Float | REAL | |
| + Gateway:I1.N2 | | | | | |
| + Gateway:I1.N3 | | | | | |
| + Gateway:I1.N4 | | | | | |
| + Gateway:I1.N5 | | | | | |
| + Gateway:I1.N6 | | | | | |
| + Gateway:I1.N7 | | | | | |
| + Gateway:I1.N8 | | | | | |
| + Gateway:I1.N9 | | | | | |

Depending on the node type, values 1-7 correspond to the information shown in the table below.

| Logix 5000 Data | Sensor type: | | | | | |
|---|---|---|---|---|---|---|
| | **EZ Node (0x82)** | **EZH Node (0x94)** | **EZH Door Contact (0x96)** | **Industrial Node (0x94)** | **Pressure (0x13)** | **ThermaNode (0x11)** |
| Value 1 | Temperature | Temperature | Door Status | Temperature | Differential Pressure | Temp Thermistor 1 |
| Value 2 | N/A | Humidity | N/A | Humidity | N/A | Temp Thermistor 2 |
| Value 3 | N/A | N/A | N/A | N/A | N/A | Temp Thermistor 3 |
| Value 4 | N/A | N/A | N/A | N/A | N/A | Temp Thermistor 4 |
| Value 5 | N/A | N/A | N/A | N/A | N/A | Temp Thermistor 5 |
| Value 6 | N/A | N/A | N/A | N/A | N/A | Temp Thermistor 6 |
| Value 7 | N/A | N/A | N/A | N/A | N/A | Temp Thermistor 7 |

**Other Control Systems**

The Industrial Gateway can also be integrated into a different control system by using an Electronic Data Sheet (EDS). The EDS file is used by the network configuration tools to help identify and commission a product on a network. The EDS file can be exported out of the SynapSoft™ application.

For more information on how to install an EDS file and integrate a new device, see the corresponding documentation of your control system vendor.

# Specifications

This section describes the various technical specifications of the Industrial Gateway.

| | |
|---|---|
| Operating temperature<br>(Non-Operating) temperature | -20°C to 70°C<br>-45°C to 85°C |
| Thermal Shock (Operating) | -20°C to 70°C, 3°C/ Min. |
| Dust, Water Ingress | IP67 |
| Operating humidity<br>Storage humidity | 5% to 85% non-condensing<br>5% to 95% non-condensing |
| Operating altitude | 0 - 6,562 ft. (0 - 2000m) |
| Vibration | 2g @ 57 to 500Hz, Tested at 12milpp Displacement |
| Operating shock<br>(Non-operating) Shock | 30g<br>50g |

| | |
|---|---|
| Radiated Emissions | IEC 61131-2:2007 Edition 3.0<br>EN55011 Class A, IEC/CISPR 32(2015)<br>EN55032, IEC/CISPR 11(2015) |
| Conducted Emissions | IEC 61131-2:2007 Edition 3.0<br>IEC61000-6-4:2011 Edition 2.1<br>EN 55011 Class A, IEC/CISPR 32(2015)<br>EN55032, IEC/CISPR 11(2015) |
| ESD immunity | IEC 61131-2:2007 Edition 3.0<br>IEC 61000-4-2:2008<br>6kV contact discharges<br>8kV air discharges |
| Radiated RF immunity | IEC 61000-6-2-1:2016<br>IEC 61000-4-3:2010<br>10V/m with 1kHz sine-wave 80% AM from 80MHz to 1000MHz<br>3V/m with 1KHz sine-wave 80% AM from 1.0GHz to 6.0GHz |
| EFT/B immunity | IEC 61131-2:2007 Edition 3.0<br>IEC 6100-4-4:2012 Edition 3.0<br>±3kV at 5kHz on Power and Ethernet ports |
| Surge transient immunity | IEC 61131-2-1:2007 Edition 3.0<br>IEC 61000-4-5:2014<br>±1kV line-earth (CM) on Ethernet ports<br>±1kV line-earth (CM) on Local Power port |
| Conducted RF immunity | IEC 61131-2:2007 Edition 3.0<br>IEC 61000-4-6 Edition 4.0:2013<br>10Vrms with 1kHz sine-wave 80% AM from 150kHz to 80MHz |
| Power Ports | M12 Local Power, A-Coded, Port Pinout: CIP™ Networks Library, Volume 1, edition 3.13<br>Input voltage: 10-30VDC (maximum continuous Voltage at port)<br>"Worry Free Polarity Connection"<br>Current draw: 150mA@ 24VDC nominal (no PoE supply)<br><br>M12 Data Port, D-Coded, Power over Ethernet (PoE) M12-D Coded<br><br>PoE: IEEE 802.3.af:2003<br>Required Source voltage: per IEEE 802.3.af<br>Maximum Load of Gateway:4Watt (using PoE supply only) |
| DATA and CONFIG Ethernet Ports | IEEE 802.3, 10/100Mbps, 100meter maximum length of cabling<br><br>M12 Connector Pinouts per Volume 2, EtherNet/IP Adaptation of CIP™. Edition 1.14 |
| Antenna Port | RP-SMA, Rated IP67 ;<br><br>Required External Antenna for FCC & IC Canada (ISED) Certification: LSR 001-0010 or equiv.<br><br>Additional Extension Cable (if needed); Required to Maintain FCC & IC Certification: Type CNT-240 or equiv. |
| FCC Approval<br>ISED Approval | CFR 15.247, FCC ID:U62-1167<br>RSS-247, Issue 2, ISED Canada Id 7265A-1167 |

| | |
|---|---|
| UL Approval | UL 61010-1, UL61010-2-201 |
| RED | IEEE 802.15.4 Wireless Link<br>2405MHz-2480MHz, +10dBm conducted TX power maximum |

# Appendix A – Industrial Gateway Status LED Definitions

This appendix provides descriptions and the LED location for the Industrial Gateway LED(s).

## SynapSense® 2.4GHz Industrial Gateway LEDs

The Industrial Gateway communicates its current status via LEDs (Light Emitting Diodes); the optical windows for the LEDs are located on the top lid of the Gateway as shown below.


Table7 shows the LED Status color definitions after the Industrial Gateway has booted and has reached its steady state operating condition. (<60 seconds).

Table 7 – Industrial Gateway LED Definitions

| Eth. Indicator | Status | Description |
|---|---|---|
| Status | Green | Industrial WSN Gateway is functioning normally. |
| | Red | Industrial WSN Gateway has experienced a fault. |
| | LED Off | All Power is off to Gateway |
| Data Link, | LED Off | No Ethernet link on specific port. Port administratively disabled or cable disconnected. |

| | | |
|---|---|---|
| Config Link | Green | A 100Mbps link exists in network PHY |
| | Flashing Green | A 100Mbps link exists at PHY and there is IEEE 802.3 data activity. |
| | Yellow | Ethernet 10Mbps link established in network PHY. |
| | Flashing yellow | A 10Mbps link exists at PHY and there is IEEE 802.3 data activity. |

| Indicator | Status | Description |
|---|---|---|
| PoE | Green | Gateway is receiving remote power via Ethernet Data Port (i.e. via a remote PoE enabled Network Switch). |
| | Off | Gateway is not receiving remote voltage via PoE. |
| Power | Green | Local 24 VDC nominal power supply is ON |
| | Off | Local power source is not connected to M12 or is powered OFF |
| ᛉ | Red | Wireless sensor network or configuration error. |
| | Green | Wireless sensor network operating normally |
| | Blue Flash | IEEE 802.15.4 Wireless Packet Transmission Active |

**NOTE:** Any remaining LEDs not described are for the manufacturer's use only, specifically Network Status and RUN for the illustrated Industrial Gateway.

# Appendix B – Maintenance and Troubleshooting

This appendix describes any maintenance or troubleshooting activities for the Industrial Gateway.

## Troubleshooting

| | |
|---|---|
|  | Ensure there are two open ports for each Industrial Gateway installation. Installation and testing cannot begin without these address and ports open on the configuration PC. |
| | Port 80 = Configuration via the Industrial Gateway's internal registers. |
| | Port 10001 = Data received from SynapSense® wireless sensors. |

## Network Subnet Mask

The network subnet mask is no longer in "dot notation" (for example 255.255.255.0). It is now in "slash notation" (for example /24). The chart below shows both types of notation. The CIDR Prefix is the new way the Subnet Mask is represented in the Industrial Gateway. The most common notation value is /24.

Table 8 – Subnet Mask/CIDR

| Subnet Mask | CIDR Pre- | Total IPs | Usable IPs | Number of Class C Net-works |
|---|---|---|---|---|
| 255.255.255.255 | /32 | 1 | 1 | 1/256 |
| 255.255.255.254 | /31 | 2 | 0 | 1/128 |
| 255.255.255.252 | /30 | 4 | 2 | 1/64 |
| 255.255.255.248 | /29 | 8 | 6 | 1/32 |
| 255.255.255.240 | /28 | 16 | 14 | 1/16 |
| 255.255.255.224 | /27 | 32 | 30 | 1/8 |
| 255.255.255.192 | /26 | 64 | 62 | 1/4 |
| 255.255.255.128 | /25 | 128 | 126 | 1/2 |
| 255.255.255.0 | /24 | 256 | 254 | 1 |
| 255.255.254.0 | /23 | 512 | 510 | 2 |
| 255.255.252.0 | /22 | 1024 | 1022 | 4 |
| 255.255.248.0 | /21 | 2048 | 2046 | 8 |
| 255.255.240.0 | /20 | 4096 | 4094 | 16 |

| Subnet Mask | CIDR Pre- | Total IPs | Usable IPs | Number of Class C Net-works |
|---|---|---|---|---|
| 255.255.224.0 | /19 | 8192 | 8190 | 32 |
| 255.255.192.0 | /18 | 16,384 | 16,382 | 64 |
| 255.255.128.0 | /17 | 32,768 | 32,766 | 128 |
| 255.255.0.0 | /16 | 65,536 | 65,534 | 256 |
| 255.254.0.0 | /15 | 131,072 | 131,070 | 512 |
| 255.252.0.0 | /14 | 262,144 | 262,142 | 1024 |
| 255.248.0.0 | /13 | 524,288 | 524,286 | 2048 |
| 255.240.0.0 | /12 | 1,048,576 | 1,048,574 | 4096 |
| 255.224.0.0 | /11 | 2,097,152 | 2,097,150 | 8192 |
| 255.192.0.0 | /10 | 4,194,304 | 4,194,302 | 16,384 |
| 255.128.0.0 | /9 | 8,388,608 | 8,388,606 | 32,768 |
| 255.0.0.0 | /8 | 16,777,216 | 16,777,214 | 65,536 |
| 254.0.0.0 | /7 | 33,554,432 | 33,554,430 | 131,072 |
| 252.0.0.0 | /6 | 67,108,864 | 67,108,862 | 262,144 |
| 248.0.0.0 | /5 | 134,217,728 | 134,217,726 | 1,048,576 |
| 240.0.0.0 | /4 | 268,435,456 | 268,435,454 | 2,097,152 |
| 224.0.0.0 | /3 | 536,870,912 | 536,870,910 | 4,194,304 |
| 192.0.0.0 | /2 | 1,073,741,824 | 1,073,741,822 | 8,388,608 |
| 128.0.0.0 | /1 | 2,147,483,648 | 2,147,483,646 | 16,777,216 |
| 0.0.0.0 | /0 | 4,294,967,296 | 4,294,967,294 | 33,554,432 |

### Changing the Industrial Gateway IP Address

1. Perform the activities (configuration) in Table4 (Industrial Gateway Configuration).
2. Change the laptop Host IP Address to a value in the same subnet as the new Industrial Gateway IP address.
3. Confirm that the Industrial Gateway responds with a login dialog box when the newly configured IP address is entered into the browser window on the laptop.

**NOTE**: For convenience, choose a unique address within the same subnet that will not conflict with any of the new Industrial Gateway IP addresses, so the same laptop Host IP Address can be used to test all of them.


4. If the Industrial Gateway does not respond, repeat the configuration activities, reboot the Industrial Gateway, and recheck the response.
5. Upon successful login, the Device Status screen displays with the current information. Click the Logout link to close the Remote Gateway Manager application.

## General Troubleshooting

If the Industrial Gateway is not responding use the following table to help resolve the issue.

Table 9 – Common Troubleshooting Issues

| Test | Result | Possible Solution |
|---|---|---|
| Power or PoE LEDs on Industrial Gateway On or Off? | OFF | Check power to the Industrial WSN Gateway (Link ACT LED will be blinking also when powered). |
| "Setting Time Master Failed" message in dm.log file | | Not an Industrial WSN Gateway issue |
| Issue Ping to Industrial Gateway. Does Gateway respond? | No | Server and Industrial WSN Gateway are not on the same subnet.<br>IP network address or subnet mask not configured correctly during configuration. |
| Web Login successful to Industrial Gateway; (home page at Port 80) from server or PC? | No | Multiple ports (80 and 10001) may be blocked on customer network or server firewall. |
| Ethernet or wireless Communication has Permanently Stopped with No Automatic Recovery Possible? | Yes | Remove M12 Cap from RESET Access on Side of Enclosure and Press and Hold the Reset Pushbutton for 1 or more seconds. The time is not critical as the RESET press is latched. Re-install the M12 plug. |

| Test | Result | Possible Solution |
|---|---|---|
| Tunnel is connected from correct server IP address. Access the Remote Gateway Manager application to troubleshoot the issue | No | From the home page (Device Status screen), select Tunnel 1 from the left navigation pane and then select Statistics. Another SynapSense server or network security vulnerability-scanning software has connected to the Industrial Gateway. |
| Telnet into the Industrial WSN Gateway server (Port 10001). Does the server connect (regardless of the validity of the data shown)? | No | Port 10001 is blocked on customer network or server firewall. |
| Telnet into the Industrial WSN Gateway server (Port 10001). Does the connection result in invalid data? | Yes | Industrial Gateway may be in Diagnostic Mode. See next test. |
| Is the Industrial Gateway radio in Diagnostic Mode? (Both STATUS and Ant.(ᛉ) LEDs are flashing) | Yes | Reset Industrial Gateway by removing M12 RESET Cap and pressing RESET or Turn Off the Industrial Gateway to reset Gateway. Recheck LEDs for Diagnostic Mode. Re-install M12 RESET cap. |
| Does Industrial WSN Gateway intermittently disconnect from the system (Link Status shows as yellow and returns to green status)? | Yes | Check Industrial Gateway Ethernet speed and duplex settings. Change from "Auto" to match the customer's network settings. |

If the issue persists, the Industrial Gateway may be defective.

## Panduit Technical Support

**Severity 1 & 2 Issues:**

Americas: 1-866-721-5302 x86810 during normal Central Standard Time business hours

EMEA: 44-1291-674-661 x22761 during normal U.K. business hours

APAC: 65-8200-3931 or 65-8200-3932 between 8 a.m. and 5 p.m. local time

**Severity 3 & 4 Issues, Email - normal business hours:**

systemsupport@panduit.com