



Installation Guide

NetBotz[®] Wireless Temperature Sensor

NBWS100T
NBWS100H

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Introduction

Product description

The NetBotz[®] Wireless Temperature Sensor connects to a NetBotz wireless sensor network, allowing you to monitor the temperature (NBWS100T) or the temperature and humidity (NBWS100H) in your data center.



Warning: The Wireless Temperature Sensor requires a minimum of BotzWare v4.4 and NetBotz Advanced View v4.4. To upgrade, use the **Upgrade** icon in your NetBotz appliance Advanced View, or visit the APC web site.

ZigBee[®] Certified. The Wireless Temperature Sensor is ZigBee Certified. ZigBee is a wireless mesh networking standard for low-power applications. Schneider Electric is a member of the ZigBee Alliance.

Full information on the ZigBee standard can be found at the ZigBee Alliance website: <http://www.zigbee.org>.

Document overview

The *NetBotz Wireless Temperature Sensor Installation Guide* describes how to install the Wireless Temperature Sensor, and configure its settings. Specific instructions on installing other devices on the wireless sensor network are in the installation instructions for each component.

Additional documentation

Unless otherwise noted, the following documentation is available on the CD provided with the NetBotz appliance, or on the applicable product page on the APC Web site, **www.apc.com**. To quickly find a product page, enter the product name or part number in the Search field.

NetBotz Appliance User's Guide – Includes all details for using, managing, and configuring a NetBotz system with one of the following appliances: NetBotz Room Monitor 455 (NBWL0455, NBWL0456), NetBotz Rack Monitor 450 (NBRK0450), NetBotz Rack Monitor 550 (NBRK0550), or NetBotz Rack Monitor 570 (NBRK0570).

Supported appliances

The Wireless Temperature Sensor, and the other devices in the wireless sensor network, are monitored by a single NetBotz appliance. You can connect the Wireless Temperature Sensor to a wireless sensor network on any of the following appliances:

- NetBotz Rack Monitor 450 (NBRK0450)
- NetBotz Room Monitor 455 (NBWL0455, NBWL0456)
- NetBotz Rack Monitor 550 (NBRK0550)
- NetBotz Rack Monitor 570 (NBRK0570)

The NetBotz Rack Monitor 450 appliance supports a total of **26** wireless devices on the wireless sensor network. The NetBotz Room Monitor 455, NetBotz Rack Monitor 550, and NetBotz Rack Monitor 570 appliances support a total of **48** wireless devices on the wireless sensor network.

Supported devices on the NetBotz wireless network

The Wireless Temperature Sensor is always configured as an End Device in your wireless sensor network.

The following wireless devices can be configured as a Coordinator or Router:

Sensor Name	Range	Part Number
NetBotz USB Coordinator & Router	100 ft - line of sight	NBWC100U
NetBotz Wireless Sensor Pod 180	100 ft - line of sight	NBPD0180

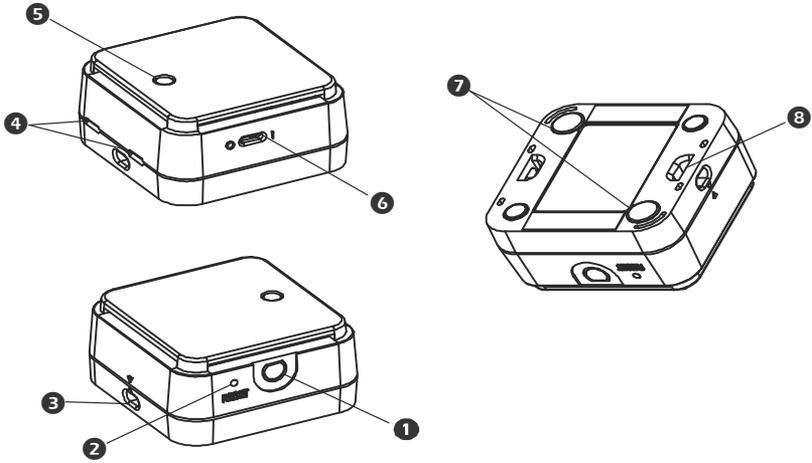
The following wireless devices can be configured as an End Device:

Sensor Name	Range	Part Number
NetBotz Temperature Sensor	100 ft - line of sight	NBWS100T NBWS100H
NetBotz Wireless Sensor Pod 180	100 ft - line of sight	NBPD0180



Warning: Only the devices listed above are compatible with the Wireless Temperature Sensor. Other devices will not function and may damage the device.

Physical Description



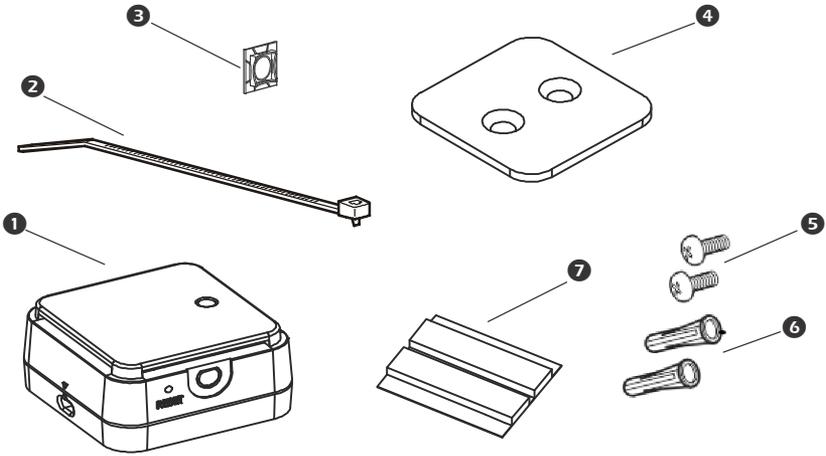
	Item	Description
1	Covered data port	For factory use only
2	Reset button	Used to reboot the sensor or reset the sensor to factory defaults
3	Side mounting slot	Used to secure the sensor with tie wraps
4	Pry slots	Used to separate the case to replace the battery
5	Status LED	Signifies the current state of the sensor
6	Rocker switch	Used to turn the sensor on or off
7	Magnets	Used to mount the sensor
8	Bottom mounting slot	Used to secure the sensor with tie wraps

Inventory

Inspect the contents of the package to ensure that the parts included match those shown below. Report missing or damaged contents to Schneider Electric or your reseller. However, if damage was due to shipping, immediately report the damage to the shipping agent.



The shipping and packaging materials are recyclable. Please save them for later use or dispose of them appropriately.



Item	Description
1	NetBotz Wireless Temperature Sensor
2	Tie wraps (3)
3	3/4-in. x 3/4-in. adhesive cable tie holder (2)
4	Wall-mounting bracket
5	#8 x 3/4-in Phillips head screws (2)
6	Plastic wall anchor (2)
7	Foam adhesive strips (2)
	Literature kit (not shown)

Components of the Wireless Sensor Network

Wireless Sensor Network. A ZigBee wireless network consisting of a host appliance, one Coordinator, and one or more devices in Router or End Device mode.

Host Appliance. A wireless sensor network is monitored by a single NetBotz appliance, listed in “Supported appliances” on page 2. The appliance collects data from the wireless sensor network, and generates alerts based on sensor thresholds.

The host appliance supports a total of **26** or **48** wireless devices on the network, listed in “Supported devices on the NetBotz wireless network” on page 2.

Coordinator. Each NetBotz host appliance and wireless sensor network must have one and only one Coordinator. The Coordinator is connected directly to the host appliance via USB. It reports data from the sensors on the network, and its internal sensors and any attached external sensors (NBSP0180 only), and provides firmware updates to the wireless network, when available.

Router. A wireless sensor configured as a Router extends the range of the wireless sensor network and passes information back and forth from the NetBotz device to the End Devices.

A wireless sensor network can contain multiple Routers; one Router for every three racks is recommended.

End Device. An End Device monitors its internal sensors, and any attached sensors, and sends data back to the monitoring appliance through the network.

The Wireless Temperature Sensor is automatically configured as an End Device.

Adding the Wireless Temperature Sensor to the Network

Overview

The order in which you power and configure your wireless network is important.

For best results, power and configure the Coordinator, and any Routers, on your wireless network before adding the Wireless Temperature Sensor.

Add the Coordinator and Routers to the NetBotz Advanced View.

Add the extended addresses (MAC) of the Coordinator and Routers to the “Add Addresses” dialog, accessed from the Wireless Sensor Setup task in the Advanced View.

For information about configuring your wireless sensor network, see the installation manual that came with the NetBotz Wireless Sensor Pod 180 or the NetBotz Wireless USB Coordinator & Router.

Add the address of the Wireless Temperature Sensor. You can use a hand-held USB QR code scanner with document capture capabilities to scan the extended address (MAC) of the Wireless Temperature Sensor directly into the “Add Addresses” dialog, accessed from the Wireless Sensor Setup task in the Advanced View.

Alternatively, you can use any QR code scanner to save a list of MAC addresses to a text file, one address per line, and copy and paste it into the dialog, or enter the addresses manually.

Some QR code scanners return the part number, serial number, and MAC address on one line:

XN:NBWS100T%SN:XXXXXX123456%MAC:00C0B70000XXXXXX.

To add a sensor to your wireless network, enter **only** the alphanumeric MAC address of each sensor in the “Add Addresses” dialog in the Advanced View.

Once the addresses have been added to the list, you must click **Apply Commission List** to save the list to the NetBotz appliance.

Scanning with a USB QR code scanner. When you use a USB QR code scanner with document capture capabilities, only the extended address (MAC) of each Wireless Temperature Sensor will appear in the list in Advanced View in the correct format.

1. Attach a hand-held USB QR code scanner with document capture capabilities to a computer running the NetBotz Advanced View.
2. With the Advanced View open to the “Add Addresses” dialog in the Wireless Sensor Setup task, scan the QR code on the label of each Wireless Temperature Sensor.
3. Click **Apply Commission List** to save the list to the NetBotz appliance.



Note: Depending on the appliance, you can add up to **26** or up to **48** wireless devices, including the Coordinator and Routers, to your wireless sensor network. For more information, see “Supported devices on the NetBotz wireless network” on page 2.

Mount the sensors. Mount the Wireless Temperature Sensors using the instructions in “Mounting the Wireless Temperature Sensor” on page 11.

Power the sensors. Turn the Wireless Temperature Sensor on using the rocker switch on its side.

The sensor will scan all channels, and wait for a response from the Coordinator. It will then send a request to join the wireless network.

The request to join the network will be accepted or will fail based on whether the sensor’s extended address (MAC) is in the same list in Advanced View as the Coordinator, and whether the device limit on your wireless network has been reached.

Once the request is accepted, the sensor will join the wireless network.

LED activity

The LED on the sensor blinks to indicate certain statuses or alerts.

During the boot process, LED activity on the Wireless Temperature Sensor is as follows:

LED Activity	Meaning
Flashes a quick green, yellow, red sequence	Power on
Alternately flashes green and yellow for about 45 seconds	Runtime check
Flashes green three times	Check OK
Turns solid yellow for 5 seconds	Firmware update check
Flashes a quick green, yellow, green sequence	Ready to attempt to join the network



Note: If the LED flashes red three times, then slowly flashes red, contact Technical Support.

The following table lists possible LED activity and its meaning:

LED Activity	Meaning
Flashes yellow twice every 2 seconds	Searching for network
Turns solid green, then turns off	Joined the network
Off	<ul style="list-style-type: none">• Joined the network• Has not joined the network, and is conserving battery power.

To conserve power, the sensor will attempt to join the network after waiting the following number of seconds: 5, 15, 30, 60, 120, 300, 300, 600, 600, 1200.

If the attempts to rejoin the network fail, the sensor will scan the network every six hours to re-try the connection. If it cannot join the network after approximately 24 hours, it will reboot, and attempt to join the network again, repeating the wait interval starting at 5 seconds, until it joins the network.

To force an attempt to join the network, press the reset button.

Using the Reset Button

Overview

The reset button on the side of the Wireless Temperature Sensor is used to reboot the sensor, or reset the sensor to the factory default settings.

Reboot. When the reset button is given a short press (less than 3 seconds), the Status LED flashes green, and the sensor reboots with the current settings in place.

Reset to factory defaults. Press and hold the reset button for at least 5 seconds. The Status LED flashes green, and after about three seconds, changes to solid red until the button is released. The sensor will reset, erase its current settings, and restore the factory default settings.

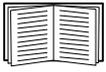


Note: During the initial 45-second startup time, the reset button is disabled. Once startup is complete, the button functions normally.

Monitoring the Wireless Temperature Sensor

Overview

Once your wireless sensor network is installed and receiving power, you can begin monitoring your system using the software interface for the appliance.



See your appliance installation and quick configuration manual for system installation details and for instructions on accessing the software interface of the appliance.

Sensor listing

When a Wireless Temperature Sensor is selected in the Navigation Pane in Advanced View, the following sensors are listed in the Sensor Pane:

Sensor	Description
Temperature	The temperature sensor reading.
Humidity	The humidity sensor reading (NBWS100H only)
Battery	The voltage of the battery.
RSSI	The Received Signal Strength Indicator. This lists the strength of the wireless signal between the sensor and the Router or Coordinator to which it sends data. A reading above 30% is ideal.

Receiving and sending data

The Coordinator on the wireless sensor network passes data back and forth between the host appliance and any Routers or End Devices on the wireless sensor network as necessary.

If there is a change of 1°C or 1% RH or more, each Wireless Temperature Sensor sends its own data every 30 seconds. If there is no change, the Wireless Temperature Sensor waits up to three (3) minutes before sending sensor data to indicate it is still alive.

The Wireless Temperature Sensor does not extend the wireless network or pass data to other Wireless Temperature Sensors, or other End Devices on the network.

Updating the Wireless Temperature Sensor

Firmware updates for the Wireless Temperature Sensor are included in the BotzWare firmware releases. When a BotzWare firmware update is available, you download it from the APC website and install it on the NetBotz appliance.

Once the BotzWare firmware update is applied, and the Coordinator receives the firmware update package from the NetBotz appliance, the Wireless Temperature Sensor receives the update package from the Coordinator over the wireless network.

When all the devices on the network have received the update package, the Firmware Update Available button is activated in the Wireless Sensor Setup task in the Advanced View. You click the button to reboot each Wireless Temperature Sensor to apply the firmware update.

Mounting the Wireless Temperature Sensor

When planning your installation locations, be sure to place each Wireless Temperature Sensor within range of a Router or a Coordinator device. The maximum wireless range of the Wireless Temperature Sensor is 75 ft (line of sight). This range is a best-case scenario and the signal will be strongly affected by environmental interference. Use the RSSI sensor reading (available in the device's sensor listing in Advanced View) to tune device placement.

To improve connection strength, it is recommended to use a Router in every third rack to boost reception.

The recommended minimum distance between wireless devices is 2 ft.

Additional information on device placement may be found on the APC Knowledge Base, <http://www.apc.com/support/answers.cfm>.

Choose the option below that fits your installation location.



Note: Install the Wireless Temperature Sensor in an environment compatible with the environmental specifications on page 13.

Magnetic installation

Mount the Wireless Temperature Sensor in the desired location in the rack using the magnets on its base.

Cable tie installation

The Wireless Temperature Sensor ships with a pair of adhesive cable tie holders and tie wraps used to mount it on a perforated rack door.

To mount the Wireless Temperature Sensor on a rack door:

1. Place the sensor in the desired location on the rack door.
2. Place the cable tie holders in the desired location on the rack door. Press until each tie holder is firmly seated.
3. Insert a tie wrap through the mesh grating and into the mounting slots on one side of the sensor.
4. Gently tighten the tie wrap.
5. Repeat steps 3 and 4 on the other side of the sensor, if desired.

Wall bracket installation

The Wireless Temperature Sensor ships with a wall bracket, and screws or foam adhesive strips, used to mount it outside the rack using the magnets on its base.



Note: To maintain access to the QR code, and to make battery replacement easier, using the foam adhesive strips directly on the Wireless Temperature Sensor is not recommended.

Replacing the Battery

The Wireless Temperature Sensor uses a 3V CR2477 battery. Battery life is estimated at up to 5 years under normal use.

To replace the battery:

1. Turn the Wireless Temperature Sensor off.
2. Insert a thin flat screwdriver into a pry slot on the side of the sensor.
3. Gently twist to open the case.
4. Carefully remove the board, and slide the spent battery out.
5. Insert the new battery with the + sign facing the bottom of the battery holder.
6. Place the board in the cover.
7. Align the arrows on the base and the cover, and press together to close.
8. Turn the sensor on using the rocker switch on its side, and wait for it to join the network.

Cleaning the Wireless Temperature Sensor

To clean the device, gently wipe surfaces with a clean, dry cloth.

Specifications

Electrical

Input voltage, nominal	3V battery, CR2477 non-rechargeable primary cell
Maximum total current draw	33mA USB

Physical

Dimensions (H x W x D)	38.0 x 38.0 x 19.8 mm (1.5 x 1.5 x 0.78 in)
Shipping dimensions (H x W x D)	230.0 x 165.0 x 48.0 mm (9.0 x 6.5 x 2.0 in)
Weight	
with batteries	0.03kg (0.07 lb)
with batteries and bracket	0.05kg (0.11 lb)
Shipping weight	0.18 kg (0.4 lb)

Environmental

Elevation (above MSL)	
Operating	0 to 3000 m (0 to 10,000 ft)
Storage	0 to 15 000 m (0 to 50,000 ft)
Temperature	
Operating	0 to 45°C (32 to 113°F)
Storage	-15 to 65°C (5 to 149°F)
Humidity	
Operating	0 to 95%, non-condensing
Storage	0 to 95%, non-condensing

Compliance

Immunity/Emissions	CE, EMC Directive 2004/108/EC, R&TTE Directive 1999/5/EC, Canadian ICES-003, US FCC 47 CFR Part 15
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Two Year Limited Factory Warranty

Schneider Electric IT Corporation (SEIT), warrants its products to be free from defects in materials and workmanship for a period of two (2) years excluding the batteries. The SEIT obligation under this warranty is limited to repairing or replacing, at its own sole option, any such defective products. Repair or replacement of a defective product or parts thereof does not extend the original warranty period.

This warranty applies only to the original purchaser who must have properly registered the product within 10 days of purchase. Products may be registered online at warranty.apc.com.

SEIT shall not be liable under the warranty if its testing and examination disclose that the alleged defect in the product does not exist or was caused by end user's or any third person's misuse, negligence, improper installation, testing, operation or use of the product contrary to SEIT's recommendations or specifications. Further, SEIT shall not be liable for defects resulting from: 1) unauthorized attempts to repair or modify the product, 2) incorrect or inadequate electrical voltage or connection, 3) inappropriate on site operation conditions, 4) Acts of God, 5) exposure to the elements, or 6) theft. In no event shall SEIT have any liability under this warranty for any product where the serial number has been altered, defaced, or removed.

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NOTHING IN THIS LIMITED WARRANTY SHALL SEEK TO EXCLUDE OR LIMIT SEIT'S LIABILITY FOR DEATH OR PERSONAL INJURY RESULTING FROM ITS NEGLIGENCE OR ITS FRAUDULENT MISREPRESENTATION OF TO THE EXTENT THAT IT CANNOT BE EXCLUDED OR LIMITED BY APPLICABLE LAW.

To obtain service under warranty you must obtain a Returned Material Authorization (RMA) number from customer support. Customers with warranty claims issues may access the SEIT worldwide customer support network through the SEIT Web site: www.apc.com. Select your country from the country selection drop down menu. Open the Support tab at the top of the web page to obtain information for customer support in your region. Products must be returned with transportation charges prepaid and must be accompanied by a brief description of the problem encountered and proof of date and place of purchase.

Obtaining service

To obtain support for problems with your NetBotz Wireless Temperature Sensor:

1. Note the serial number. The serial number is printed on the label on the back of the device.
2. Contact Customer Support using the information on the back cover of this manual. A technician will try to help you solve the problem by phone.
3. If you must return the product, the technician will give you a return material authorization (RMA) number. If the warranty expired, you will be charged for repair or replacement.
4. Pack the unit carefully. The warranty does not cover damage sustained in transit. Enclose a letter with your name, address, RMA number and daytime phone number; a copy of the sales receipt; and a check as payment, if applicable.
5. Mark the RMA number clearly on the outside of the shipping carton.
6. Ship by insured, prepaid carrier to the address provided by the Customer Support technician.

Radio Frequency Interference



Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

USA—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 UNDESIRE OPERATION.

NOTE: THE GRANTEE IS NOT RESPONSIBLE FOR ANY CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE PARTY RESPONSIBLE FOR COMPLIANCE. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

FCC ID: SNSNBWS100

Canada—ICES

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 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.

IC: 3351-NBWS100

European Union

This product's transmitter is in conformity with the requirements of EU Council Directive 199/5/EC on the approximation of the laws of the Member States relating to Radio and Telecommunications Terminal Equipment (R&TTE). This product may cause radio interference in which case the user may be required to take adequate measures.

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. Schneider Electric cannot accept responsibility for any failure to satisfy the protection requirements resulting from an unapproved modification of the product.

Schneider Electric IT Worldwide Customer Support

Customer support for this product is available at no charge in any of the following ways:

- Visit the SEIT web site to access documents in the Knowledge Base and to submit customer support requests.
 - **www.apc.com** (Corporate Headquarters)
Connect to localized web sites for specific countries, each of which provides customer support information.
 - **www.apc.com/support/**
Global support searching the Knowledge Base and using e-support.
- Contact the Customer Care Center by telephone or e-mail.
 - Local, country-specific centers: go to **www.apc.com/support/contact** for contact information.

For information on how to obtain local customer support, contact the Schneider Electric representative or other distributors from whom you purchased your Schneider Electric product.

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