S05-ST User's Manual (ZigBee HA Profile)

Ver. 1.04

Contact Information: Email: zigbeenhr@shop, Website: www.shop-wifi.com/wireless-sensors

Content

Congratulations for choosing NHR's PT1000 temperature sensor using ZigBee wireless transmission technology. This manual is designed to help set up and get the most from the sensor in a few short minutes.
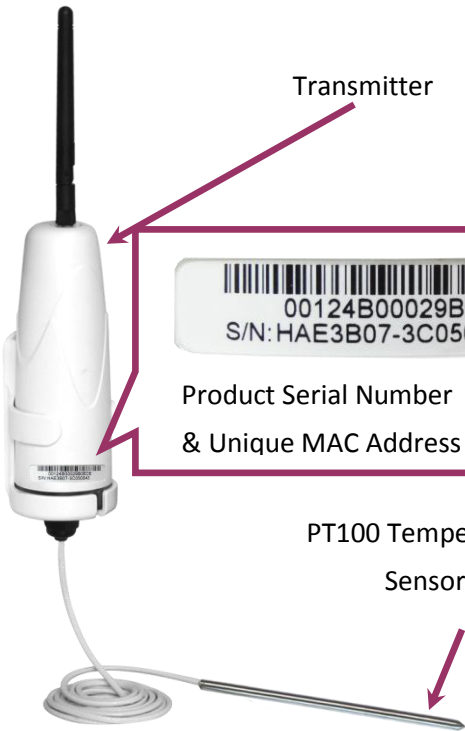
Safety notice: Please read and follow the instructions before using this product

- To prevent electrical shock or fire, do not disassemble or expose the unit to liquids of any kind
- Only use attachments and / or accessories specified by the manufacturer

1 Package Content and S05-ST Views

NHR S05-ST PT100 temperature sensor	Mounting fixtures (mounting cradle, 2 wall plugs, 2 screws)	4 x AA batteries

If any of the above is missing please contact your supplier.

Side	Base
Transmitter 00124B00029B0EDE S/N: HAE3B07-3C050043 Product Serial Number & Unique MAC Address PT100 Temperature Sensor	Battery Compartment Link Switch — Status LED Transmission Interval Setting Switches — Calibration Screw Sensor Cable Connector Internal

2 Installing Mounting for S05-ST

Requirements:

- Mounting fixtures
- Drill with 5mm (0.2 inches) drill bit size (if using wall plugs) or 3.5mm (0.14 inches) drill bit size (if not using wall plugs)
- Size 1 Phillips screwdriver

a) Locate S05-ST with at least 15cm (approx. 6 inches) spacing on each side (except on mounting side) avoiding the following sources of interference: direct sunlight, air flow from vents, fans, doors, windows, heaters, sources of steam, oil vapor, etc.

b) If necessary, pre-drill mounting holes using mounting cradle for alignment, then use appropriate drill bit to drill the holes – 5mm (approx. 0.2 inches) if using wall plugs or 3.5mm (approx. 0.14 inches) if not using wall plugs.

c) If necessary, insert wall plugs into the 2 holes and use size 1 Phillips screwdriver to fasten the screws securing the mounting cradle. Note: pay careful attention to the orientation of the mounting cradle.

d) Install and remove S05-ST by placing it into and lifting it out of the cradle:

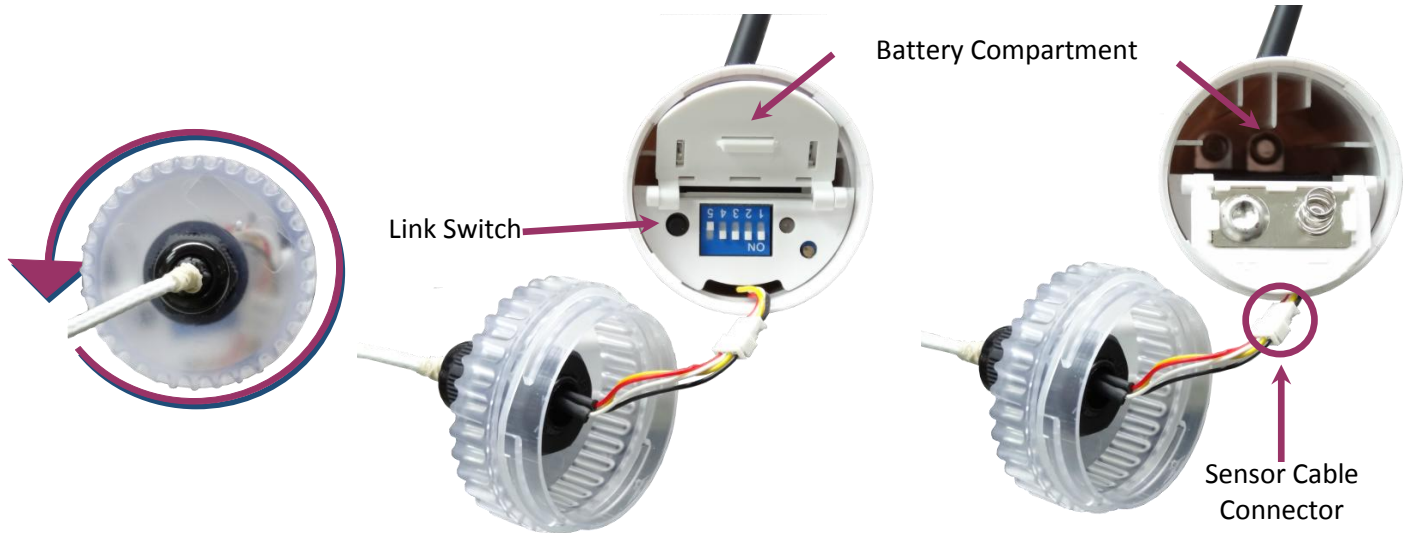Install -   Remove -

Important: To ensure IP66 waterproof and dust tight operations, both the base and the connector must be fully tightened (clockwise).

3 Powering On/Off the S05-ST

Requirements:

- 4 x AA batteries

a) Twist the base counterclockwise to gain internal access to the transmitter, then pull the latch towards the hinge to open the battery compartment door:

Note: When separating the base, be careful to ensure the sensor cable connector stays connected.

b) Remove any existing batteries.

c) Install 4 x AA batteries into the battery compartment ensuring correct polarity.

d) Close the compartment door and push the latch away from the hinge to secure the door in place. Replace the base by twisting it clockwise into S05-ST until it is firmly secured to the transmitter.

e) The status LED on S05-ST should start flashing to indicate its current state:

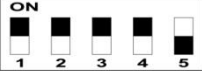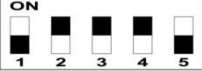| Green LED	Status
1 flash per second	Ready to join a parent device
1 flash every 60 seconds	Already joined a parent device and functioning normally
2 flashes every 5 seconds	Already joined but unable find a parent device in the same network
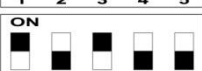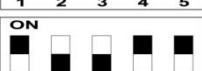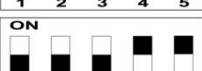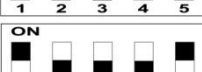
f) To power off S05-ST, remove its batteries.

Recommendation: It is strongly recommended to install batteries into S05-ST **just before** joining to parent device as this will greatly improve battery life. For proper functioning of S05-ST and longer battery life, please install alkaline batteries from reputable suppliers.

Low battery power is indicated by the red LED flashing once every 15 seconds. Replace batteries immediately to prevent potential damage and ensure proper functioning of S05-ST.

4 Setting Transmission Interval for S05-ST

a) If necessary, remove the S05-ST from mounting cradle (see "**Installing Mounting for S05-ST**" section).

b) Twist the base counterclockwise to gain internal access to the transmitter, being careful when separating the base to ensure the sensor cable connector stays connected.

c) Set the transmission interval based on the following DIP switch positions:

Transmit Interval	DIP Switch Setting	Transmit Interval	DIP Switch Setting
1 Second		1 Minute	
5 Seconds		5 Minutes	
10 Seconds		10 Minutes	
15 Seconds		15 Minutes	
20 Seconds		20 Minutes	
25 Seconds		25 Minutes	
30 Seconds		30 Minutes	
35 Seconds		35 Minutes	
40 Seconds		40 Minutes	
45 Seconds		45 Minutes	
50 Seconds		50 Minutes	
55 Seconds		55 Minutes	
60 Seconds		60 Minutes	
65 Seconds		65 Minutes	
70 Seconds		70 Minutes	
75 Seconds		75 Minutes	

d) Ensure that the S05-ST has joined a parent device (see "**Joining S05-ST to the Network**" section).

e) Use software for reading information from coordinator or gateway device (see relevant device's manual) to confirm S05-ST transmissions are being received at the correct interval.

f) Replace the base by twisting it clockwise until it is firmly secured to the transmitter.

g) If necessary, replace S05-ST into mounting cradle (see "**Installing mounting for S05-ST**" section).

Transmission interval setting has been successfully configured.

Note: Transmission interval is read at power on, a power cycle is required to effect interval change.

5 Joining S05-ST to the Network

Requirements:

- Parent device, such as coordinator (eg. WZB-01USBC, WZB-02485C), gateway (eg. G07-W, WZB-05ET), or router (eg. WZB-01USBR, WZB-02485R)
- Sharp pointed tool

a) Ensure parent device is powered on (see relevant device's manual).

b) Power on S05-ST (see "**Powering On/Off the S05-ST**" section) ensuring it is in *Ready to Join* status (green LED flash once every second).

c) Enable *Permit Join* status on parent device (see relevant device's manual) and check S05-ST joined the parent device.

d) If S05-ST has successfully joined the parent device, the green LED should flash 3 times, then once every 60 seconds.

If S05-ST's green LED does not flash once every 60 seconds, then it has not successfully joined. Repeat above steps until S05-ST has joined successfully. If S05-ST has still not joined after a few attempts, check it is within the operational range of 300m from the parent device and away from other 2.4GHz devices that might interfere with its operations.

If S05-ST has joined successfully, but is showing *Disconnected* status (green LED flashes twice every 5 seconds), then check parent device is correctly powered on. If the parent device is functioning correctly, S05-ST may be out of range or experiencing interference, additional router(s) may need to be added to ensure good connections.

6 Removing S05-ST from the Parent's Network

Requirements:

- Sharp pointed tool

a) Ensure parent device (coordinator, gateway, or router) is powered on (see relevant device's manual).

b) If necessary, remove the S05-ST from mounting cradle (see "**Installing Mounting for S05-ST**" section).

c) Ensure S05-ST is powered on (see "**Powering On/Off the S05-ST**" section) and has already joined the parent's network (green LED flash once every 60 seconds).

d) Twist the base counterclockwise to gain internal access to the transmitter, being careful when separating the base to ensure the sensor cable connector stays connected.

e) Use a sharp pointed tool to apply 3 quick presses to the link switch on S05-ST, the red LED will flash rapidly for up to 30 seconds or until successful removal.

f) If S05-ST has been successfully removed, the green LED should show *Ready to Join* status (flash once every second).

Note: Definition of *Removing* – S05-ST will no longer appear in the parent device's wireless group list after removing S05-ST from the parent device's network.

Recommendation: It is strongly recommended to remove the batteries immediately from S05-ST once it has been removed from the parent's network as this will prevent damage and greatly improve battery life.

7 Calibrating S05-ST

Requirements:

- Reference temperature device
- Size 4-5 slot / flat blade screwdriver

a) Ensuring S05-ST is at room temperature (~20°C) and the reporting interval is 1s (see "**Setting Transmission Interval for S05-ST**" – DIP switch setting all set to ON).

b) Place PT100 temperature sensor next to reference temperature device's sensing element, and allow the two to reach steady readings (may take a few minutes depending on previous state).

c) Turn calibration screw using slot / flat blade screwdriver until readings of S05-ST match reference.

8 S05-ST LED Status / S1 Link Switch Actions

The S05-ST LED can be seen through the translucent base. The table below shows the LED status for S05-ST:

S05-ST LED	Status
Green LED: 1 flash every second	*Ready to Join* – ready to join network of parent device (coordinator, gateway, or router)
Green LED: 3 flashes (one time)	*Successfully Joined* – joined network of parent device
Green LED: 1 flash every 60 seconds	*Normal Operations* – joined network of parent device and functioning normally
Green LED: 2 flashes every 5 seconds	*Disconnected* – joined network, but unable to find any parent device of the network

Red LED: Rapid flashing up to 30 seconds	**Removing** – being removed from the network of the parent device
Red LED: 1 flash every 15 seconds	**Low Power** – low battery power, replace batteries immediately
Green & Red LED: ON	**ZigBee Reset** – reset to factory default, remove all ZigBee network linkages

The S05-ST power button / S1 link switch actions are summarized below:

Operation	Power Button / S1 Link Switch Actions
Remove from Network	Press 3 times within 1.5 seconds
ZigBee Reset	Press and hold for 5 seconds

9 ZigBee Reset

In the case where the parent devices (coordinator, gateway, or router) for S05-ST are no longer available or have been reset, S05-ST will need to be reset by applying a 5-second press to the link switch, the green & red LEDs will both come on during the reset, then the green LED should show **Ready to Join** status (flash once every second).

Note: Definition of **Reset** – S05-ST will remain in the parent device network's wireless group list after resetting S05-ST (unless the parent device has been reset).

Recommendation: It is strongly recommended to remove the batteries immediately from S05-ST once it has been reset as this will prevent damage and greatly improve battery life.

10 Product Specifications

Measuring Element	PT1000 temperature sensor
Sensing Type	Soil Temperature
Sensing Range	-40˚C ~120˚C
Measurement Accuracy	Temperature: ±1°C
Addressing	IEEE MAC 64 bit
Wireless Protocol	IEEE 802.15.4, ZigBee2007 / PRO HA Profile
Transmission Range	Up to 300m (984ft)

Operating Frequency	2.4GHz ISM band	
RF Output Power	18dBm	
Receiver Sensitivity	-92dBm	
Waterproof Level	IP66	
Power Consumption	TX: 200mA, Sleep: 6µA	
Transmit Interval	1 second to 75 minutes, based on DIP switch setting	
Network Topology	Star / Tree / Mesh	
Power Supply	DC 6 V 4 x AA alkaline batteries	
Operating Environment	-10˚C ~45˚C/ -14˚F ~ 113˚F, < 95% relative humidity	
Dimensions	130 (H) x 50 (Φ) mm / 5.1 (H) x 1.9 (Φ) inches	
Weight	140.2g / 4.95oz (excluding batteries)	
Certifications	CE / FCC / NCC	
Battery Life	> 1 year @ 10-minute transmission interval (depending on battery quality)	
Parent Devices (Enabling Devices)	Coordinator	WZB-01USBC / WZB-02485C
	Gateway	G07 / WZB-05ET
	Router	S05-R / WZB-01USBR / WZB-02485R
Interoperability	Sentrol Cloud	

Thank you for choosing the S05-ST. We are looking forward to working with you!