

Model 15700
EnOcean Devices Support Accessory

With
Model 12200C-157
User Guide

FCC PART 15.19 WARNING STATEMENT- (REQUIRED FOR ALL PART 15 DEVICES)

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.

FCC PART 15.21 WARNING STATEMENT

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.

IC RSS-GEN, SEC 8.4 WARNING STATEMENT- (REQUIRED FOR LICENSE-EXEMPT DEVICES)

FCC PART 15.105(B) WARNING STATEMENT- (ONLY REQUIRED FOR 15.109-JBP DEVICES)

NOTE: THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A 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 THIS 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 RECEIVER.
- CONNECT THE EQUIPMENT INTO AN OUTLET ON A CIRCUIT DIFFERENT FROM THAT TO WHICH THE RECEIVER IS CONNECTED.
- CONSULT THE DEALER OR AN EXPERIENCED RADIO/TV TECHNICIAN FOR HELP.

ENGLISH:

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 UNDESIRE OPERATION OF THE DEVICE.

FRENCH:

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.

THE ORIGINAL EQUIPMENT MANUFACTURER (OEM) MUST ENSURE THAT FCC LABELING REQUIREMENTS ARE MET. THIS INCLUDES A CLEARLY VISIBLE LABEL ON THE OUTSIDE OF THE FINAL PRODUCT ENCLOSURE THAT DISPLAYS THE FOLLOWING:

CONTAINS FCC ID: TGD15700/IC: 6120A-15700

INTRODUCTION

The 15700 accessory PCB is a bi-directional wireless gateway device that interconnects EnOcean™ energy-harvesting wireless sensors (e.g. room temperature, motion detection, door switch) to a host control node. It includes an EnOcean™ RF transceiver module for communicating with the sensors. An on-board supervisory microcontroller IC (Silicon Labs EFM8BB2) manages wireless transmission and reception, formats data for use by the host control node and supervises linking and removal of external sensors to form an interconnected system.

The host control Node (e.g. ENERNET 12200C-157 RCN) is wired to comfort conditioning appliances in the room/zone and is attached to the 15700 accessory PCB via ribbon cable. It uses received sensor data to make zone environment control decisions.

MOUNTING

The 15700 has four 0.156" diameter mounting holes. A locking PCB support with adhesive base such as Eagle Plastic Devices 561-LAD187 or 561-LAD250 available from Mouser Electronics 1-800-346-6873 www.mouser.com is suggested although other mounting strategies can be used. See Installation Guidelines later in this manual.

MODEL 15700 / LINK/UNLINK ENOCEAN SENSOR

A function table in the model 15700 EnOcean Devices Accessory Support module manages the Learning-in and Learning-out of select EnOcean set point adjustment temperature display, motion

and door switch sensors. The function table presents five (5) setup options.

MODEL 15700 SETUP MENU

- Page 1: Link/Unlink SR06 (Thermokon)
- Page 2: Link/Unlink motion sensor (EOSCU or EOSW)
- Page 3: Link/Unlink magnetic door switch (EDWS)
- Page 4: Link/Unlink emergency shutdown switch (EDWS)
- Page 5: Reset to factory default

Selections are indicated through the flash-count of PB4 LED (Green) and PB5 LED (Red). PB5 LED flash-count indicates the Page number in the table that is active. PB4 LED flash-count indicates the operational function to be done in the selected page. (*Refer to Figure 1 for button and LED locations.*)

To enter the Sensor Learn Table, press and hold the PB4 until the PB4 LED & PB5 LED flash alternately. Pressing PB5 moves through pages 1 – 5, PB5 LED indicates the page number in the Table you are currently landed on. PB4 selects the action to be taken in that page. Upon entering a page, the PB4 LED will by default flash 3 times indicating the default null setting. (*NOTE: PB4 LED and PB5 LED will flash repeatedly until action is taken.*) When any change is made, i.e. learning or unlearning a sensor or restoring to factory default, you will automatically exit the Sensor Learn table. (*NOTE: To leave the table without making a change, press and hold PB4 until LEDs stop flashing.*)

TO LEARN-IN AN ENOCEAN DEVICE

1. Hold PB4 until PB4 & PB5 LED's are flashing.
2. Press PB5 until its LED (Red) is flashing desired page.
3. Press PB4 until its LED (Green) flashes once.
4. Press and quickly release (do not hold at all) the "learn" button on the EnOcean device. *(NOTE: A long button press could be used to configure parameters of the device you are learning-in. See device data sheet for more information.)*
5. If the Learn-in process is successful, the green LED lights for approximately 2 seconds and you automatically exit the setup menu table. Otherwise the red LED lights for approximately 2 seconds before exiting the setup menu table.

TO LEARN-OUT AN ENOCEAN DEVICE

1. Hold PB4 until PB4 & PB5 LED's are flashing.
2. Press PB5 until its LED (Red) is flashing desired page.
3. Press PB4 until its LED (Green) flashes twice.
4. Press and quickly release (do not hold at all) the "learn" button on the EnOcean device. *(NOTE: A long button press could be used to configure parameters of the device you are learning-in. See device data sheet for more information.)*
5. If the Learn-out process was successful, the green LED lights for approximately 2 seconds and you automatically exit the setup menu table. Otherwise the red LED lights for approximately 2 seconds before exiting the setup menu table.

MODEL 15700 ENOCEAN SENSOR LEARN TABLE				
		PB5 LED	PB4 LED	
PAGE	SENSOR	FLASH COUNT	FLASH COUNT	DESCRIPTION
1	LINK/UNLINK SR06	1	1 - 3	1 = Learn-in, 2 = Learn-out, 3 = Null
2	LINK/UNLINK MOTION SENSOR	2	1 - 3	1 = Learn-in, 2 = Learn-out, 3 = Null
3	LINK/UNLINK DOOR SWITCH	3	1 - 3	1 = Learn-in, 2 = Learn-out, 3 = Null
4	LINK/UNLINK WINDOW/EMER SHUTDOWN SWITCH	4	1 - 3	1 = Learn-in, 2 = Learn-out, 3 = Null
5	RESTORE TO FACTORY DEFAULT	5	1 - 3	1 = Restore Factory Default, 2 = N/A, 3 = Null

SMARTACK DEVICES

An additional step is required when learning-in or out a SmartAck enabled device such as the Thermokon SR06 room sensor.

LEARN-IN SMARTACK ENABLED DEVICES

1. Hold PB4 until PB4 & PB5 LED's are flashing.
2. Press PB5 until its LED (Red) is flashing Page 1.
3. Press PB4 until its LED (Green) flashes once.
4. Press PB3 on the Model 12200C board (see Figure 1).
5. Press and quickly release (do not hold at all) the "learn" button on the EnOcean device. *(NOTE: A long button press could be used to configure parameters of the device you are learning-in. See device data sheet for more information.)*
6. If the Learn-in process is successful, the green LED4 lights for approximately 2 seconds and you automatically exit the setup menu table. Otherwise the red LED4 lights for approximately 2 seconds before exiting the setup menu table.

LEARN-OUT SMARTACK ENABLED DEVICES

1. Hold PB4 until PB4 & PB5 LED's are flashing.
2. Press PB5 until its LED (Red) is flashing Page 1.
3. Press PB4 until its LED (Green) flashes twice.
4. Press PB3 on the Model 12200C board.
5. Press and quickly release (do not hold at all) the "learn" button on the EnOcean device. *(NOTE: A long button press could be used to configure parameters of the device you are learning-in. See device data sheet for more information.)*

6. If the Learn-out process is successful, the green LED4 lights for approximately 2 seconds and you automatically exit the setup menu table. Otherwise the red LED4 lights for approximately 2 seconds before exiting the setup menu table.

122C00-157 SETUP MENU

Page 1: Deadband: ± 1 to ± 5 — default ± 2

Page 2: Emergency Shutdown: 1 = Not Installed, *2 = Installed

Page 3: Occupied: 1 = none, 2 = motion only, *3 = Motion + door

Page 4: Setback from 72°: 1=0°, 2=3°, *3=6°, 4=9°, 5=12°, 6=15°

Page 5: Unocc delay: *2min, 1hr, 4hr, 8hr, 16hr, 24 hr

Page 6: Power on reset: *1 = go occupied, 2 = go unoccupied

12200C-157 Remote Control Node (RCN)

The ENERNET 12200C Remote Control Node (RCN) hardware platform runs a number of firmware builds depending on the control application. Firmware 122C09 Rev. 2.37.0 or higher and 122C09-157 Rev.1.00 or higher supports the Model 15700 EnOcean Devices Support Accessory, with or without SmartAck enabled. *(NOTE: Only the 122C09-157 is discussed in this manual).*

Press and hold the PB3 button 122C09-157 to enter the Configuration Table (see Figure 1) until PB1 & 2 LED's flash alternately. Pressing PB1 moves through pages 1 – 6, PB1 LED indicates configuration page by flash count. PB2 selects the configuration choice in the active page, indicated by a flash count. Press and release PB3 to exit.

MODEL 122C09-157 CONFIGURATION TABLE				
PAGE	CONFIGURATION	PB1 LED	PB2 LED	DESCRIPTION
		FLASH COUNT	FLASH COUNT	
1	DEADBAND	1	1 - 5	1 = $\pm 1^\circ$, *2 = $\pm 2^\circ$, up to $\pm 5^\circ$ (*default $\pm 2^\circ$)
2	WINDOW/EMERGENCY SHUTDOWN	2	1 - 2	1 = Not Installed, *2 = Installed
3	OCCUPANCY SENSOR MODE	3	1 - 3	1 = none, 2 = motion only, *3 = Motion + door
4	SETBACK FROM NOMINAL 72°	4	1 - 6	1 = 0°, 2 = 3°, *3 = 6°, 4 = 9°, 5 = 12°, 6 = 15°
5	UNOCCUPIED DELAY	5	1 - 6	*1 = 2min, 2 = 1hr, 3 = 4hr, 4 = 8hr, 5 = 16hr, 6 = 24 hr
6	POWERUP RESET	5	1 - 2	*1 = Go Occupied, 2 = Go Unoccupied

NOTE: An asterisk (*) denotes what are factory default settings. Both the Window/Emergency shut down and Occupancy sensor mode is set to installed/active. If those items are not installed use and with Power up Reset default = Go Occupied, there is no harm to normal operation.

The 12200C has two input terminals capable of reading contact closures (see Figure 1). Input 1 (HPMASK) can be used to read when heat pump backup electric resistance element current is flowing — contact closure = CURRENT. If there is another source of heat such as hydronic, the 12200C-157 can optimize, using the heat pump as much as possible. Input 2 (COLDPIPE) is intended to read HOT/COLD pipe status — contact closure = COLDPIPE. This is used in concert with Input 1 to allow or not the use of heat pump backup electric resistance heat.

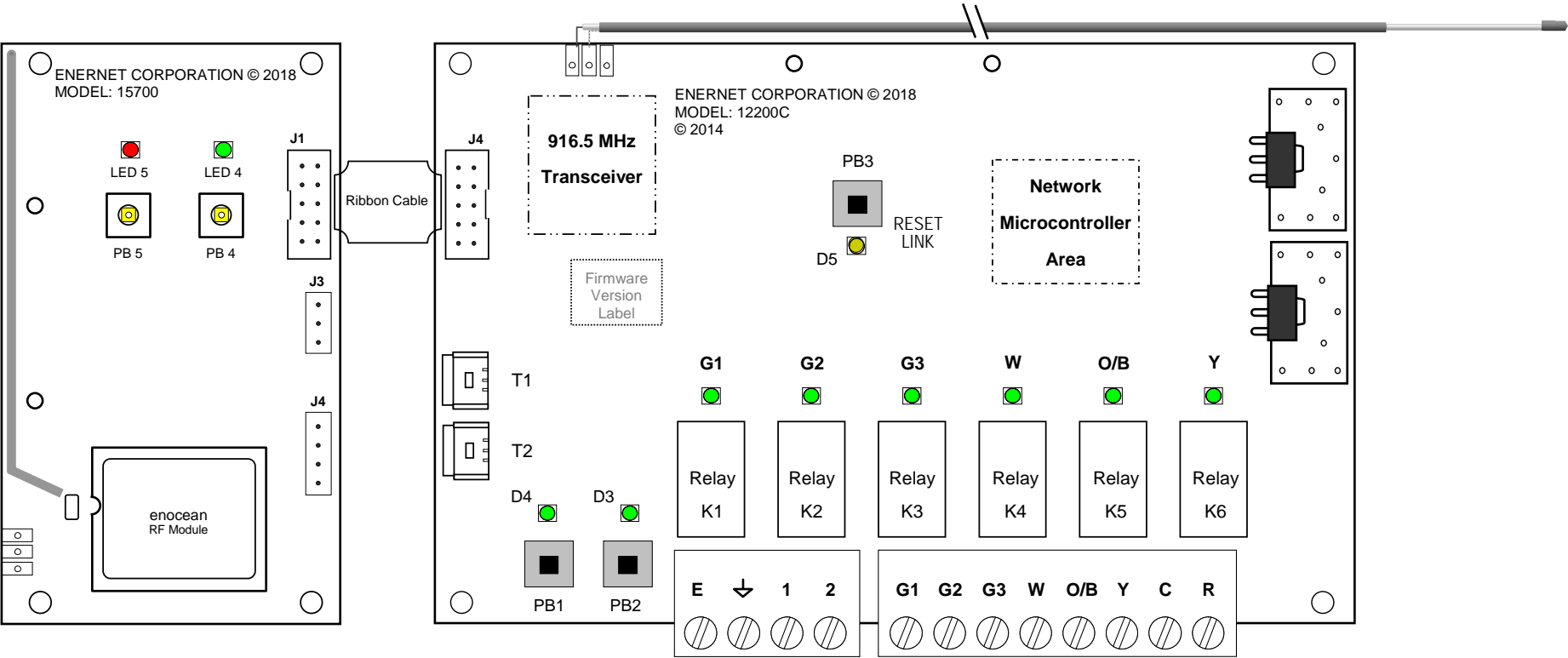


Figure 1 – Model 15700 EnOcean Support Module with 12200C RCN

GENERAL MOUNTING GUIDANCE

This section is intended to provide general guidance to system integrators installing the ENERNET model 12200C Remote Control Node hardware with the model 15700 EnOcean Devices Support Accessory in or near HVAC equipment (HVAC equipment generically referred to herein as appliance). Choosing the right location to mount the model 15700 and 12200C RCN hardware is key to maximizing performance and reliability. It should be accessible to service personnel, where wire terminations and buttons are easy to reach and indicator lights are visible.

Pay attention to environmental limits. Ensure the RCN isn't in the path of condensate, extreme heat, cold or physical interference.

- Do not allow appliance parts or wires to contact the pushbuttons. Unrelated wiring should be at least 2 inches away from the board. More is better.
- Do not Mount the RCN inside a box containing line voltage circuits, wiring or relays.
- Do not pick a mounting point that puts a service technician in contact with line voltage circuits when performing maintenance or linking the thermostat.

ANTENNA POSITIONING GUIDELINES

The 12200C utilizes a 1-meter long coaxial cable antenna, giving installers the ability to locate the 12200C PCB where appropriate and secure, while positioning the antenna in the most optimum position possible for RF performance. In that the 12200C hardware participates in a building-wide mesh network, its antenna

placement can be critical, therefore the coaxial antenna is the default standard. 15700 hardware plugs onto the 12200C with a short length of ribbon cable and while designed to support several antenna styles, the default antenna style is a PCB trace element. Therefore, the 15700 antenna is located at the PCB itself. The 15700 communicates only with close by devices, room, motion, door switches, and does not participate in mesh network traffic. In general, RF performance is less critical. However, if an appliance installation results in poor RF performance of the 15700 due to metal shielding effects, a non metallic satellite enclosure outside the appliance should be considered to house the 12200C/15700 pair.

MODEL 12200C RCN — COAXIAL ANTENNA

The model 12200C control node standard antenna option is a 1-meter long flexible coaxial cable. One end is permanently connected at the circuit board. Approximately 3" of the outside jacket and shield are striped back at the free end — this is the actual antenna. The coaxial antenna option allows the installer to mount the circuit board where most appropriate and secure, while positioning the antenna in the most optimum position possible. Sheet metal, control boxes, ductwork, pipes and other electrical wires can interfere with RF signals to and from the control node. For best performance, installers should location the antenna away from such shielding material to the extent possible. In PTAC equipment, the antenna is often located in front of the indoor coil, between the coil and the PTAC cover if the cover is plastic or near the makeup air opening at the bottom of the unit if it is metal. As is

the case with any RF system, antenna placement and orientation is important. If you experience difficulty maintaining a reliable RF link with your thermostat or mesh network, try relocating the antenna, ensuring it is not blocked by or resting against sheet metal, pipes or wires.

CARDINAL RULE, PART 1

A contiguous solid or screened metal box won't pass radio waves in or out. (This explains why your eyeballs don't melt when you're watching popcorn cook in the microwave.) Best performance requires positioning the antenna tip near an opening in the enclosure. The opening should be as large as possible. A slot shorter than the 3" antenna dimension will not couple well. Opening width should be at least a quarter inch. Again, larger is better.

Optimum antenna location is usually unrealistic. When inside an appliance with plastic facade, look for a mounting point an inch or so in front of chassis metal or indoor coil, between metal and the cover. When a front cover is metal, at or near the makeup air opening at the bottom of the unit is often best.

CARDINAL RULE, PART 2

For best performance the antenna tip should be spaced at least an inch away from sheet metal, control boxes, ductwork, pipes and wires. These can interfere with RF signals to and from the RCN.

Pay attention to how the coaxial cable is routed and attached. It should be run by itself to the mounting point and attached securely with plastic tie wraps or cable clamps. Excess antenna cable can be coiled but make sure to leave at least 6 inches straight and free at the antenna tip.

- Do not bundle the coaxial cable with other wiring.
- Do not allow the antenna tip to contact wires or sheet metal.
- Do not make any electrical connection to the antenna conductor or shield.
- Make sure the coaxial cable is not chafed by vibrating parts.

CONCLUSION

As with any RF system, antenna placement and orientation is important. Since radio waves reflect off objects in the appliance as well as the room or inside the walls where the appliance is in service, there can be sharp signal nulls or "dead spots" between the RCN, particularly when mounted in an appliance and where the user locates a thermostat or other sensors. By example, most people have experienced this phenomenon while using a cordless telephone or cell phone. While the final location and circumstances of the appliance installation are unknown, following the above guidance will improve final RF performance.

SETTING ROOM / NODE / BUILDING NUMBERS

ENERNETWORKS™ is a mesh network connectivity protocol embedded in 12200C-157 firmware. Each 12200C-157 Remote Control Node (RCN) requires a unique identifier for building automation system integration. Generally a room, office or apartment number already exists and is used. 4-digit numbers in the range of 1 - 8999 are loaded into a 12200C-157 RCN along with a node number 0-7 to create a complete number.

Whether a permanent part of the system or not, an ENERNET model 12400H or S thermostat is used to enter room numbers. It must first be linked to a target 12200C-157 RCN. During the process of linking, a node number is assigned.

Refer to Figures 2, 3 & 4 for inside thermostat button locations and functions and display information.

LINKING 12400H & 12200C-157 — STEP ONE

1. Press SW4-INSTALL button inside the 12400H thermostat. *Install* icon will blink (see Figure 2 & 3).
2. Press the HEAT/COOL button on front. Default node number is 00. Change as desired using the UP button.
3. With node number set, press the SW9-LINK button. The “*Please Wait*” message appears on display (Figure 3). Within 5 seconds, press and release PB3 on 12200C-157 PCB (see Figure 1).
4. A response of “*good*” should be displayed.
5. Press the SW4 - INSTALL button inside the thermostat to exit.

ASSIGNING ROOM NUMBER — STEP TWO

1. Simultaneously press SW9-LINK and the DOWN button on front of the 12400x thermostat. Four digits will be displayed in the top left corner of the display (Figure 4).
2. Use UP and DOWN buttons to change blinking digit, HEAT/COOL button to save and advance.
3. When all digits are set, press SW9-LINK (Figure 2) to send number to the 12200C-157. The number you set should remain displayed. If it changes to 9999, repeat steps 2 and 3 above.
4. Press the FAN button on 12400x to exit the room number set up screen.

UNINSTALL 12400H THERMOSTAT — STEP THREE

If the 12400x thermostat is only being used as a field tool to enter room numbers, it must be unlinked from the 12200C-157 RCN before it is linked to the next RCN.

1. Press SW4-INSTALL button inside the 12400H thermostat (Figure 2). Install icon on display will blink.
2. Press UP button, Uninstall icon on display will blink.
3. Press the SW9-LINK button, “*Please Wait*” message appears.
4. Within 5 seconds, press and release PB3 on the 12200C-157.
5. A response of “*good*” should be displayed.

Press the SW4 - INSTALL button inside the thermostat to exit.

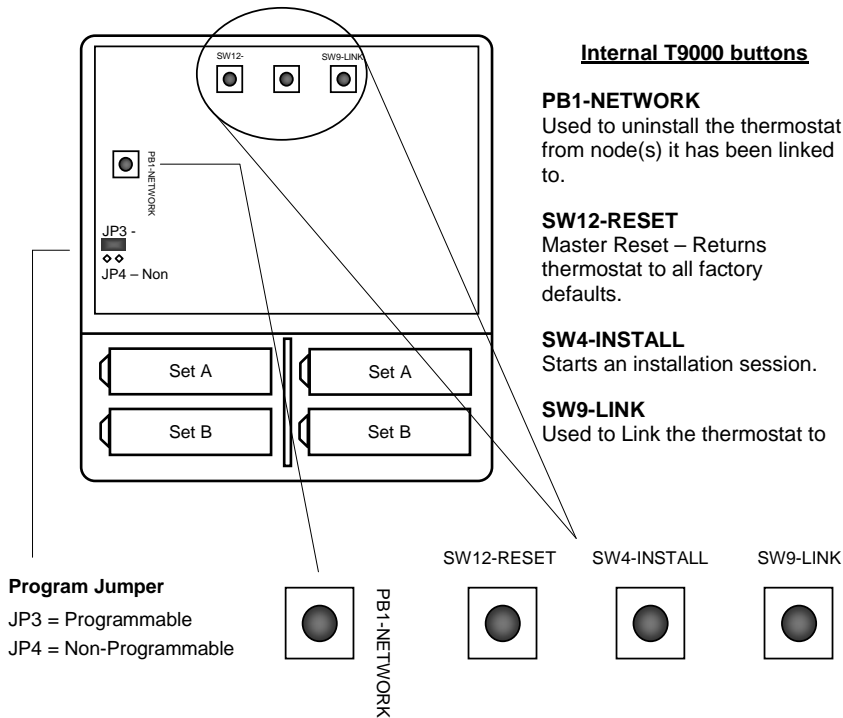


Figure 2 – Internal 12400H Buttons

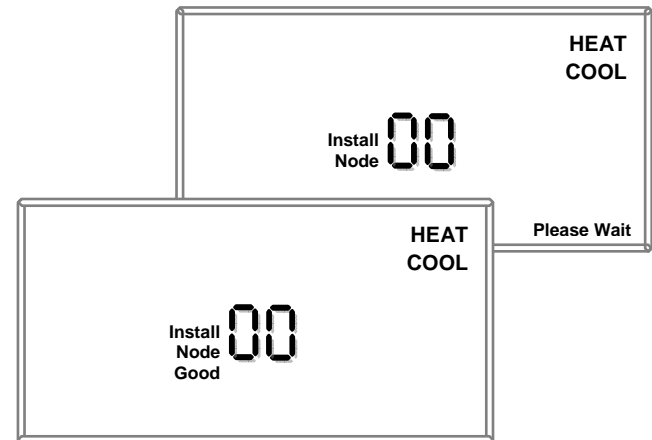


Figure 3 – Install / Link Display

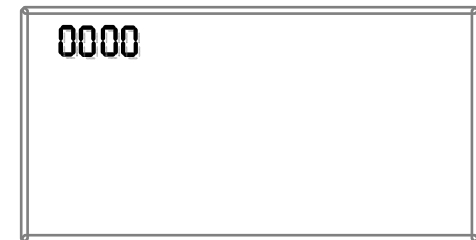


Figure 4 – Room Number Digits

ROOM NUMBERING DISCUSSION

When setting a room number for an office, apartment or any area where a single room number identifies a divided space with more than one thermostat and RCN, use a different node number when linking each RCN.

Example: Consider an office area designated 101 with three individual offices, thermostats and RCN's. Assume the offices are numbered 101A, 101B and 101C. In office 101A, link the RCN as node 00.

(NOTE: Node numbers will automatically be incremented by “1” over the network.) Then, using the procedure above set the room number to 0101. In office 101B, link to that RCN as node 01 and set that room number also to 0101. Finally, in office 101C, link that RCN as node 02 and set that room number to 0101. The resulting room/node numbers you have created will be:

Office 101A	=	0101-01
Office 101B	=	0101-02
Office 101C	=	0101-03

Be sure to document your numbering scheme for BAS integration and reference.

SETTING NETWORK / BUILDING NUMBER

In addition to a Room Number, each RCN in a network must also have a unique Network Number (NetNum) or what is sometimes referred to as a Building Number. DIP switches on the model 13800 gateway (see *Pub No. 13801-022709_User Guide*) set the gateway's NetNum. There are 255 possible network numbers, 1 – 255. Factory default NetNum of both a model 13800 gateway and 12200C-157 is 140.

A single gateway can support 400+ RCN's. If a building has significantly more than 400 nodes, a single network and gateway can be overburdened with network traffic. This may require the use of an additional gateway using a different NetNum.

The following procedure is used to set the desired RCN NetNum:

1. Simultaneously press SW9-LINK button inside the thermostat and the DOWN button on the front. In the upper left corner of the LCD, four digits will appear. The digit that is blinking is the one ready to be changed.
2. Use UP and DOWN buttons to change blinking digit, HEAT/COOL button to save and advance.
3. Network Numbers will always start with '9' followed by the desired three digit NetNum. Example:
9001
9002
.
.
.
9255 (default is 9140)
4. When all digits are set, press SW9-LINK to send the NetNum to the RCN.
5. Press the FAN button to exit the network numbering set up screen.

ATTENTION:

Do not use any '9000' number other than 9001 through 9255 when setting the Network Number — All other 9000 numbers are reserved. Be sure to adjust the gateway NetNum to match what you are putting into the 12200C-157 RCN. Refer to model 13800 gateway Pub No. 13801-022709_User Guide.

SR06 SETUP REQUIREMENTS

The 12200C-157 requires that the SR06 is setup as follows:

Device configuration

Generic Display Temperature Fanstages

WakeUp Time (s) 240

Heartbeat Cycle 10

Hysteresis Temperature 0.8 °C

Hysteresis Humidity 2.0 %

SmartACK active

Checksum CRC8

Auto Occupancy active

Device Info

Device type: SR06 LCD-4T (Fan)

Firmware version: 2.1

Has battery:

Device Control

Factory Reset

Delivery Status

Device configuration

Generic Display Temperature Fanstages

Display Delay (s) 6

Display Occupancy active

Display Toggle Values

Temperature

Humidity

Fanstage

Display State on by button push

Displayed value 'always on' Setpoint

SmartACK

SmartACK can be set to active or not. Be sure to follow the Learn-in procedure for SmartACK if using it.

The user should be aware that there are risks to enabling SmartACK in terms of power consumption. Consult with Thermokon before using this option.

Device configuration

Generic Display **Temperature** Fanstages

Basersetpoint (°C)

Temperature Unit

Setpoint Correction +/- (°C)

Setpoint Type

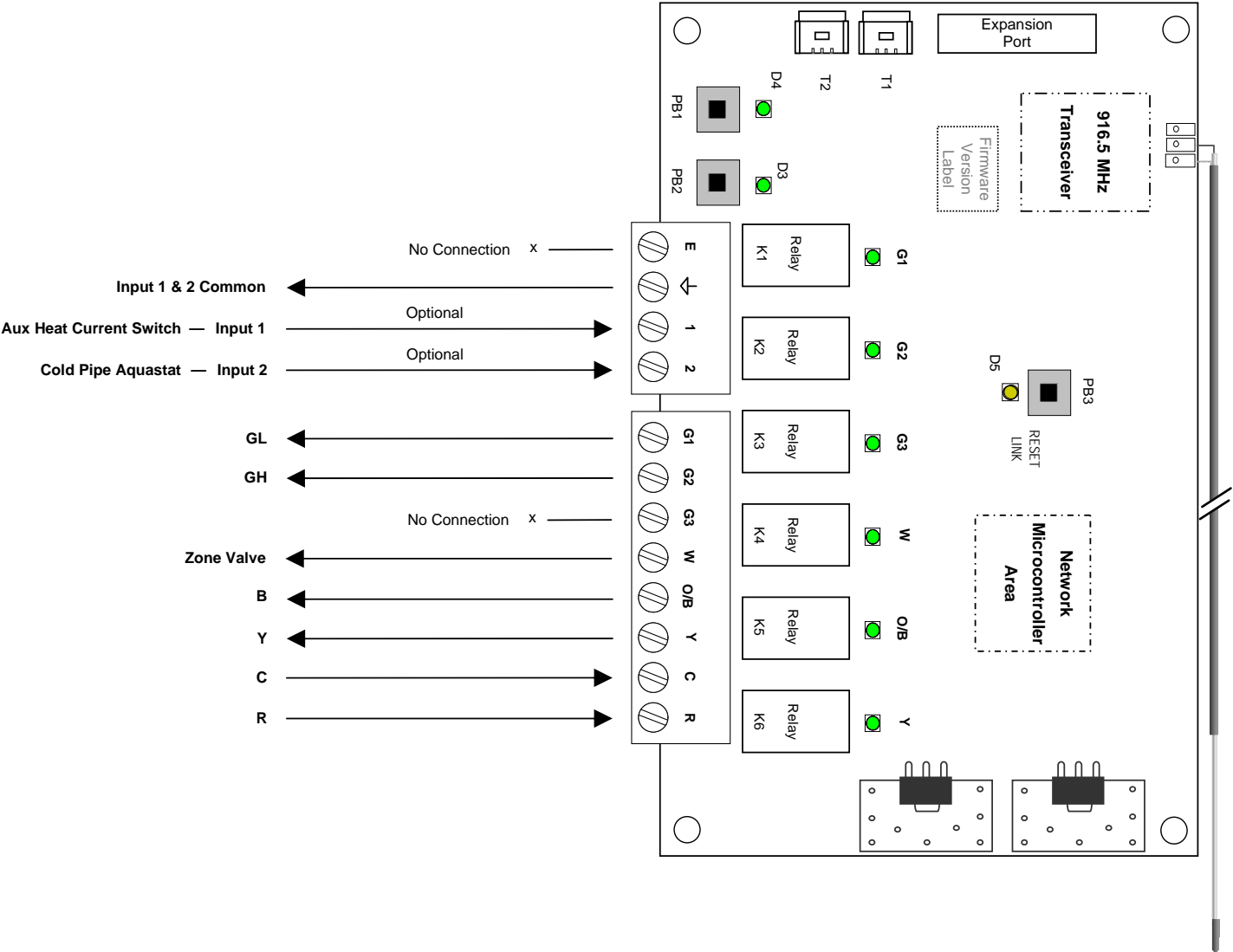
displayed value:

Device configuration

Generic Display Temperature **Fanstages**

- Auto
- Stage 0
- Stage 1
- Stage 2
- Stage 3

EZ26 Connection Diagram



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