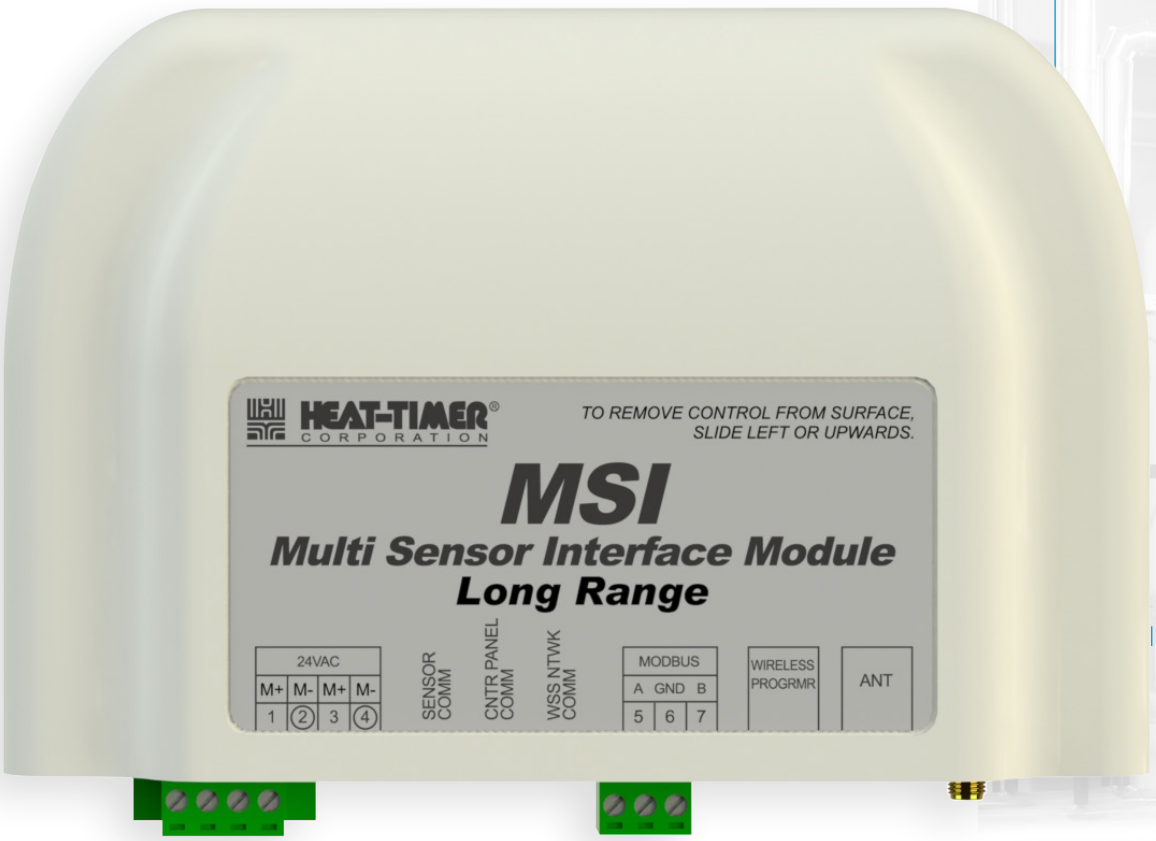
INSTALLATION AND
OPERATION MANUAL

HEAT-TIMER® CORPORATION



LONG RANGE—MSI
MULTI-SENSOR INTERFACE HUB

INTERFACE MODULE FOR ALL SENSORS—NETWORK AND WIRELESS

059410–00 REV. A.03

WARNING

This equipment complies 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. If this equipment does cause harmful interference to radio or television reception, which can be etermined, by turning this equipment OFF and ON, the user may correct the interference by: (1) Reorienting or relocating the receiving antenna, (2) Increasing separation between the equipment and wireless components, (3) Connecting the equipment to a different outlet circuit from that of the wireless components, or (4)Consulting an experienced radio/TV technician for assistance. The antenna supplied by Heat-Timer Corporation must be used (gain <= 6dB). It is recommended not to operate the device (transceiver) with persons closer than 20cm to the antenna. Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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01 CONTROLS, INDICATORS, AND CONNECTIONS

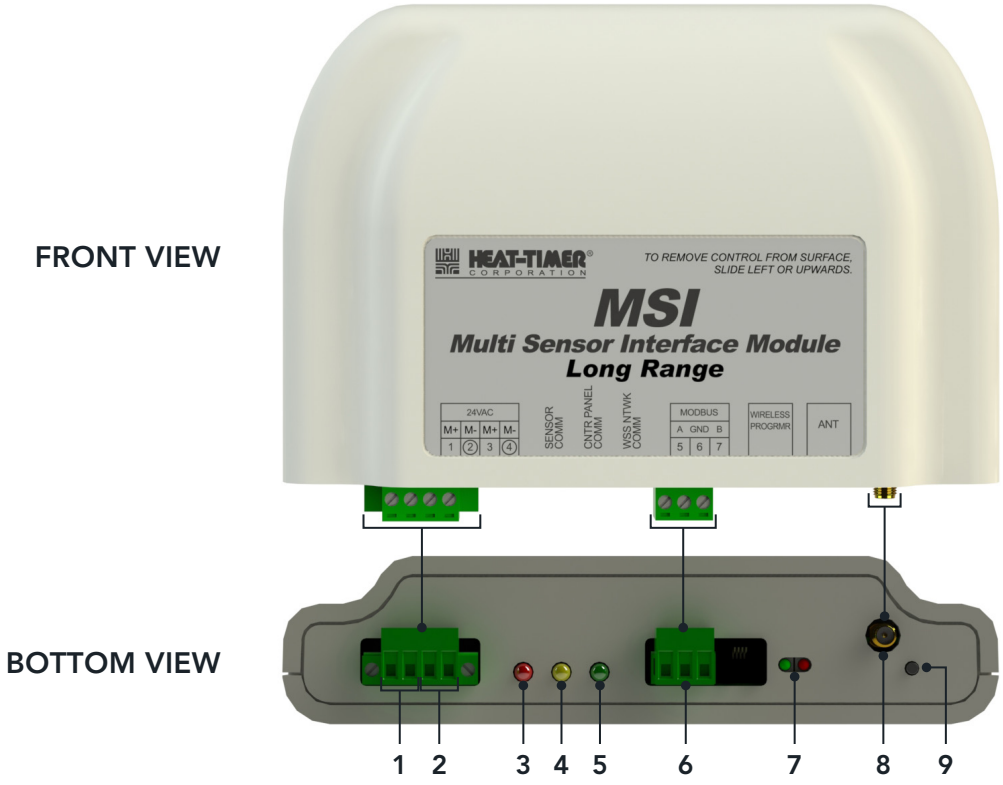


FIGURE 1
MSI HUB CONTROLS, INDICATORS, AND CONNECTIONS

ITEM	DESCRIPTION
1	24Vac Power Input Connection (Terminals 1 & 2)
2	24Vac Sensor Connection (Terminals 3 & 4)
3	Sensor Communication Indicator. When lit, indicates at least one sensor interface is communicating with the MSI Hub.
4	Control Panel Communication Indicator. When lit, indicates the Platinum Control is communicating with the MSI Hub.
5	WSS Network Communication Indicator When lit, indicates the wireless sensors are communicating with the MSI Hub.

ITEM	DESCRIPTION
6	MODBUS Connection. (A-Terminal 5, Ground—Terminal 6, B-Terminal 7)
7	Wireless Status Indicators. When lit, indicates the System ID has been set. The indicators will blink when the System ID has not been set.
8	Antenna Connection
9	System ID Set/Reset Button. Use to set the System ID on the MSI Hub, and to send the System ID to a sensor/transceiver wirelessly.

02 SPECIFICATIONS

Dimensions (W x H x D)	4" x 4" x 2.5" (101.6mm x 101.6mm x 63.5mm)
Weight	1.1 lb (.5kg)
Mounting Locations	Wall/Ceiling Mount
Power Input	24Vac
Transmission/Reception	External T-Antenna
Frequency	RF 900MHz FHSS
Programming Interface	RS485
User Interface	Status Indicators (5 LEDs) System ID Set/Reset Button (1)

The installation process consists of the following basic steps:

1. Selecting appropriate locations and mounting the MSI Hub and its 120V/24V power transformer.
2. Connecting power and sensor wiring.
3. Installing an indoor or outdoor antenna.
4. Performing an initial startup and configuration of the system.

REQUIRED MATERIALS (NOT SUPPLIED)

The following materials/tools are required for installation, but are not supplied:

- General tool kit (screwdrivers, wire strippers, power drill, etc.)
- 18 AWG multi-conductor, shielded twisted-pair cable (Heat-Timer P/N 703001–01 or equivalent #18/2 cable)—used for the 24Vac MSI Hub to MSI sensor interface
- 16 AWG multi-conductor, unshielded twisted-pair cable (Belden P/N 8471, 85102, or equivalent #16/2 cable)—used for the MSI Hub wiring

MOUNTING THE MSI HUB

1. Select an appropriate location to mount the MSI Hub. The location must meet the following minimum requirements:
   - The location should be within 6 feet (1.8 meters) of the Heat-Timer Platinum Control.

     NOTE

     This distance allows the installer to use the provided interface cable. The MSI Hub can be located up to 500 feet (152.4 meters) from the Platinum Control, but requires a special cable (not provided).

   - The mounting surface should be flat and strong enough to hold the weight of the device.
   - DO NOT mount the device in a location where it will be exposed to extreme heat, cold, humidity, or moisture.
2. Using the template provided on page 15, mark the location of the screws that will hold the MSI Hub.
3. Drive the supplied mounting screws into the marked locations. Leave the head of the screws extended approximately 1/8″ (3.2mm) from the mounting surface so the MSI Hub will be held snugly in place.
4. Position the MSI Hub so the screw heads fit into the holes on the back of the device, and then slide the device down or to the right so the screw fits into the mounting slot. Check to ensure the MSI Hub is securely mounted. If it appears loose, remove the MSI Hub and tighten the screws. Repeat as necessary until secure.

MOUNTING THE MSI HUB TRANSFORMER

1. Select an appropriate location to mount the 120V/24V transformer. The location must meet the following minimum requirements:
   - The location must be within 500 feet (152.4 meters) of the MSI Hub.
   - The mounting surface should be flat and strong enough to hold the weight of the device.
   - DO NOT mount the device in a location where it will be exposed to extreme heat, cold, humidity, or moisture.
2. Secure the transformer to the mounting surface using two screws (not supplied).

1 This section covers:

- Connecting the power input wiring to the MSI Hub transformer.
- Connecting the transformer to the MSI Hub.
- Connecting the MSI Hub Modbus wiring.

POWER INPUT WIRING—TRANSFORMER

⚠ WARNING ⚠

ELECTRICAL SHOCK HAZARD! For your safety, to avoid the risk of electric shock, disconnect electrical power to the device before servicing or making any electrical connections. DO NOT re-connect electrical power until ALL wiring to the MSI Hub is completed. Failure to do so may result in severe personal injury or death.

1 De-energize the circuit that will provide power to the MSI Hub transformer by turning off the appropriate circuit breaker.

NOTE

The input power wires must be N.E.C. Class 1.

2 Connect the two black wires from the transformer to the incoming Line and Neutral 120Vac input power supply.

3 Connect ground wiring to the transformer. **DO NOT** use the Neutral line as the earth ground!

MSI HUB WIRING—24VAC

1 Connect the 24Vac power wiring from the low-voltage side of the transformer (marked "24Vac") to the 24Vac Power Input Connection (terminals 1 and 2) on the MSI Hub.

NOTE

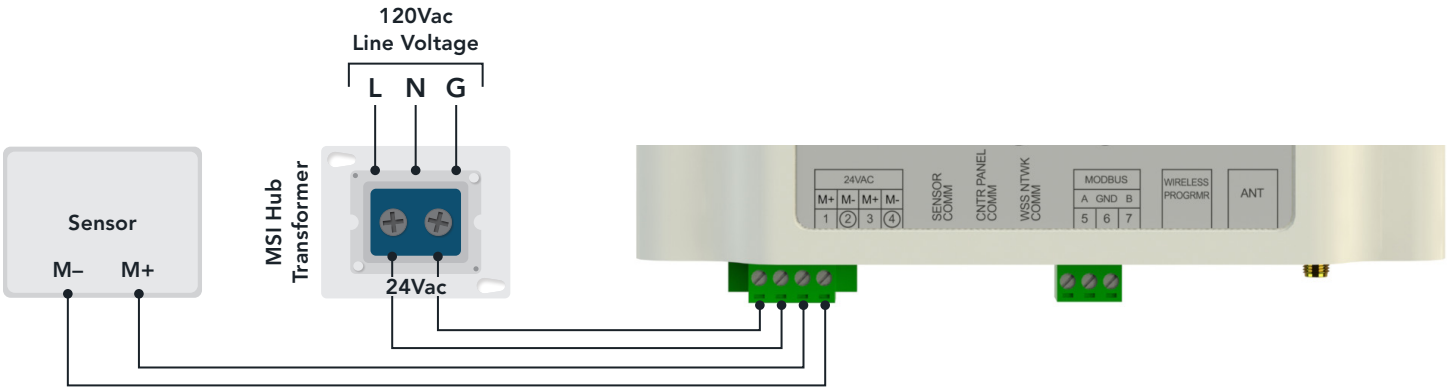
Use 16 AWG multi-conductor, unshielded twisted-pair cable (Belden P/N 8471, 85102, or equivalent #16/2 cable).

2 Connect the 24Vac sensor wiring from:

- MSI Hub terminal 1 and/or 3 to the Sensor Interface Board "M+" terminal.
- MSI Hub terminal 2 and/or 4 to the Sensor Interface Board "M–" terminal.

NOTE

Use 18 AWG multi-conductor, shielded twisted-pair cable (Heat-Timer P/N 703001–01 or equivalent #18/2 cable). Multiple sensors can be wired in parallel to a single MSI Hub.

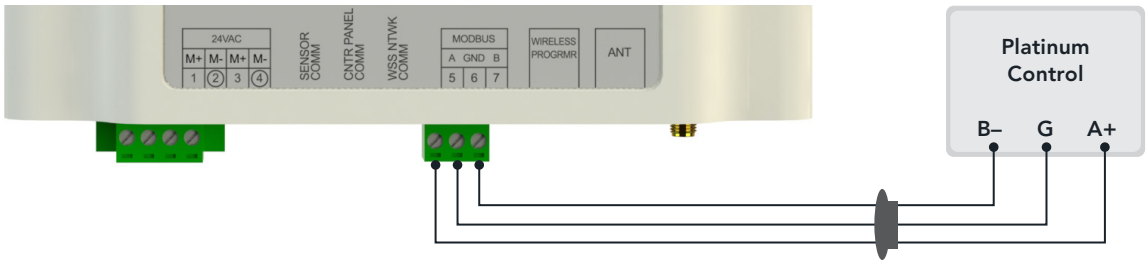


MSI HUB WIRING—MODBUS RS485

1 Connect an RS485 cable from the MSI Hub Modbus connector (terminals 5, 6, and 7) to the green RS485 connector located on the Communications Board on the Heat-Timer Platinum Control. The cable will pass through a knockout on the Platinum Control and secured in place by a plug that fits into the knockout.

NOTE

Use the supplied cable for standard installations where the MSI Hub is located within 6 feet (1.8 meters) of the Platinum Control. For installations where the MSI Hub must be installed greater than 6 feet from the Platinum Control, use an 18 AWG 3-conductor, twisted-pair cable (not supplied). The cable must not exceed 500 feet (152.4 meters).



INSTALLING THE INDOOR T-ANTENNA

The MSI Hub is supplied with an external hinged antenna that is mounted external to the MSI Hub, and is intended only for indoor use.

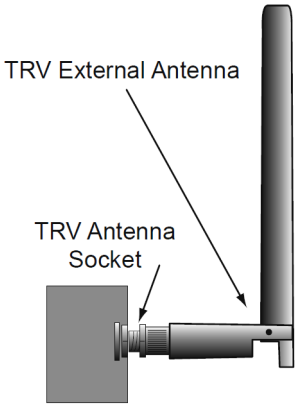
For installations where data transmission covers a large distance, such as between buildings, install an Outdoor Antenna in place of the T-antenna. Refer to *"Installing an Outdoor Antenna (Optional)" on page 12*.

⚠ CAUTION ⚠

The Indoor Antenna must be mounted indoors. Mounting the antenna outdoors may result in damage to the equipment.

NOTE: To achieve the best reception, the antennas of all wireless devices need to be parallel to each other.

1. Screw the antenna onto the external antenna connector on the Wireless TRV.



2. Continue with "Performing the ICMS Configuration" on page 11.

INSTALLING AN OUTDOOR ANTENNA (OPTIONAL)

The Outdoor Antenna can be used to replace the Indoor Antenna, and is primarily used to communicate wireless data between distant points (such as in garden apartment installations where the MSI Hub is in one building wile the first TRV is in another, distant building.

To cover a large distance, use two Outdoor Antennas, each connected to a wireless MSI Hub and transceiver.

1 Find an appropriate mounting location to maximize the signal reception for the Outdoor Antenna.

> **NOTE**
>
> **To achieve the best reception, all antennas of all wireless devices must be parallel to each other.**

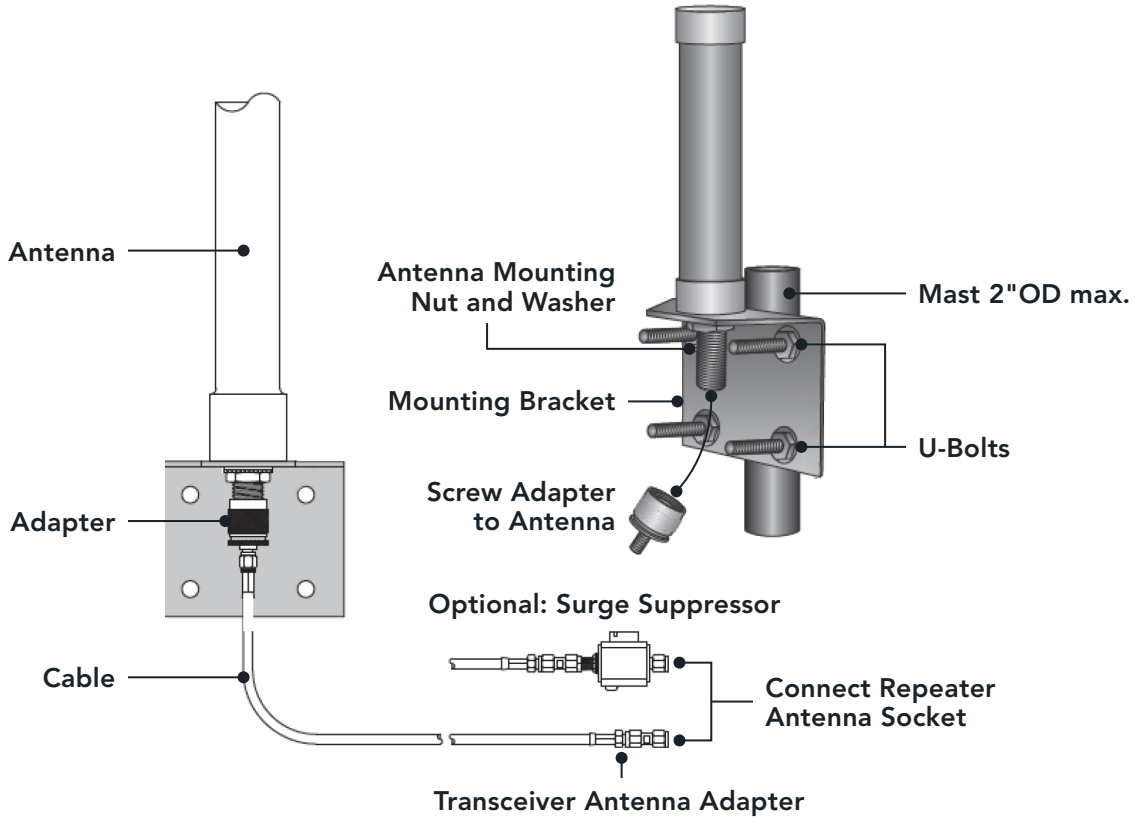
2 Securely mount the antenna mast (2" [5cm] O.D. pipe) in the desired location. The mast must be mounted vertically.

3 Place the threaded portion of the antenna base through the hole located in the mounting bracket. Secure the antenna to the mounting bracket using the supplied washer and mounting nut.

4 Attach the mounting bracket to the antenna mast using two U-bolts and four washers and hex nuts. Ensure the tightened so that the mounting plate does not move.

5 Screw the adapter onto the threaded portion of the antenna base.

6 Attach one end of the antenna cable to the antenna adapter, and then connect the other end of the cable to the external antenna connector on the Wireless Repeater. Note that an optional surge suppressor can be attached to the end of the cable before connecting to the Repeater Antenna Socket.

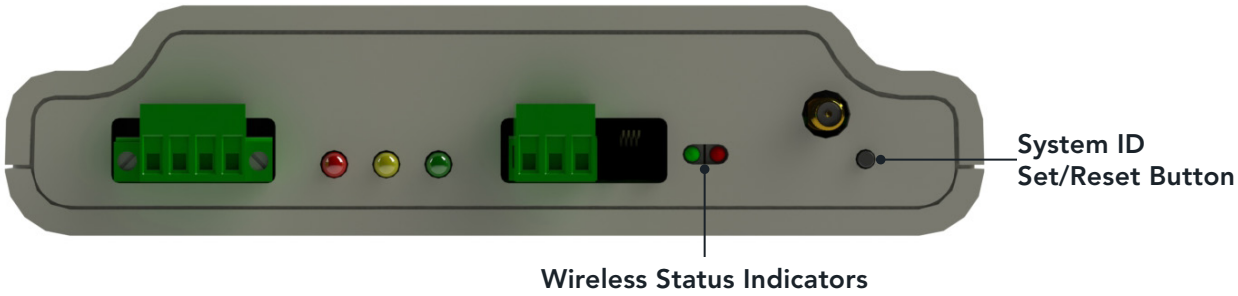


1 Energize the circuit that will provide power to the MSI Hub transformer by turning on the appropriate circuit breaker. The MSI Hub will initialize.

NOTE

Continue with the following steps only if a wireless system was added. If no wireless system is present, stop at this point. There is no programming and no further setup is required.

2 Observe the Wireless Status indicators. If the LEDs are blinking, the System ID is not set (the factory setting is that the System ID is not set).



NOTE

If the Wireless Status indicators are not blinking, the System ID has already been set. If the System ID is known, continue with Step 4 to program the sensors/transceivers. If the System ID is not known, the System ID must be cleared using the following steps:

a **Power-off the MSI Hub.**

b **Press and hold the System ID Set/Reset button while powering-on the MSI Hub. Continue holding the System ID Set/Reset button until the Wireless Status indicators start blinking.**

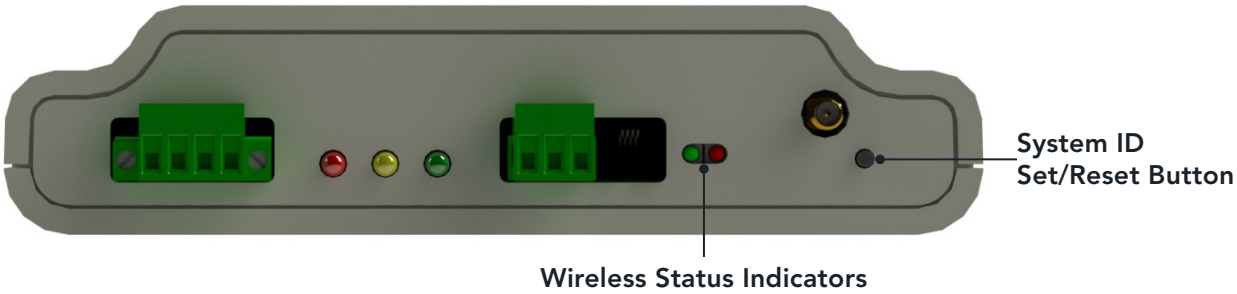
c **Continue with Step 3 to program the System ID.**

3 Program the MSI Hub System ID using one of the following methods:

NOTE

If the System ID has been cleared and a new System ID is being programmed, the rest of the wireless network will need to be configured with the new System ID as well.

- **Auto-Generate the System ID**
  - a Power-off the MSI Hub.
  - b Press and hold the System ID Set/Reset button while powering-on the MSI Hub. Continue holding the System ID Set/ Reset button until the Wireless Status indicators stop blinking. When the LEDs stop blinking, the System ID is set.
- **Program the sensors/transceivers Wirelessly**
  - a Press and hold the System ID Set/Reset button on the MSI Hub for 5 seconds, or until the red Wireless Status Indicator starts blinking.



  - b Turn on the sensor/transceiver close to the MSI Hub.
  - c Observe the sensor/transceiver LEDs. When they stop blinking, the sensor has been programmed.

CONTROL THEORY

The heating system is controlled by the Platinum Control. Through the use of an MSI Hub, the following types of network or wireless sensors can be added to the system:

- Oil Tank Monitor
- Stack Sensor
- 4–20mA Sensor
- Counter (Gas/Oil/Water)
- Conductivity Sensor

The MSI Hub collects all information sent by the sensors and reports that information to the Platinum Control. For a sample connection diagram, *see page 17*.

SYMPTOM	POSSIBLE CAUSE	RECOMMENDED ACTION(S)
Status LEDs are not lighting.	No power to the MSI Hub.	Verify the 24Vac transformer is functioning, that it is receiving power, and that all power cables are in good condition and are connected. Refer to: • *"Mounting the MSI Hub Transformer" on page 7.* • *Power Input Wiring—Transformer" on page 8.*
No sensor communications with the MSI Hub.	MSI Hub not communicating with the Platinum Control.	Check the MSI Hub Control Panel Communication Indicator *(Figure 1 on page 4)*. LED should blink every 15 seconds. If the LED is not blinking, ensure the MSI Hub is properly connected to the Platinum Control. • Refer to *"MSI Hub Wiring—Modbus RS485" on page 9*.

The following figure shows the basic connections between the sensors, MSI Hub, and the Platinum Control. Refer to *"Connecting the Wiring" on page 8* for more information.

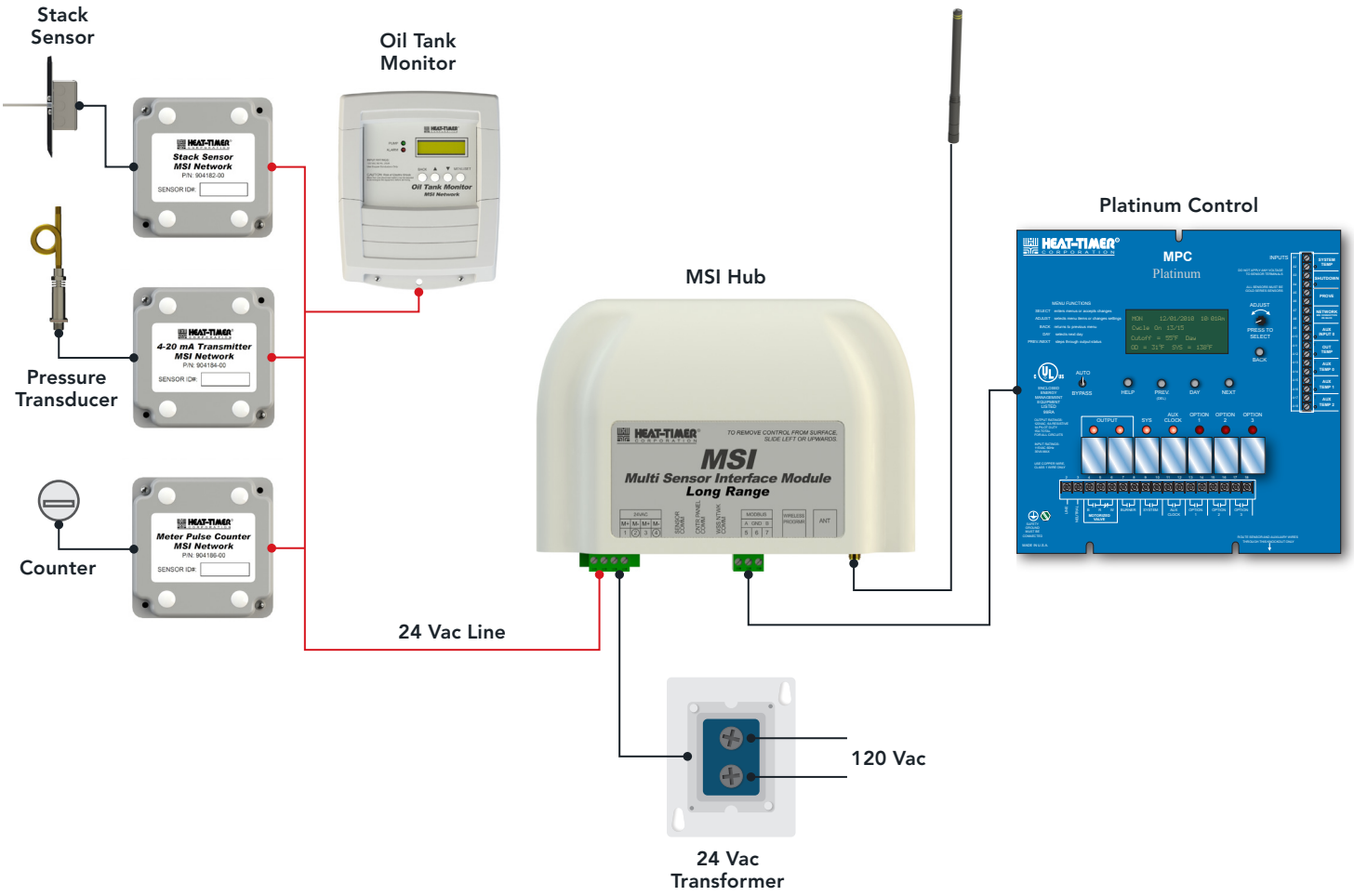


FIGURE 2

MSI HUB—BASIC CONNECTION DIAGRAM

09 WIRELESS SYSTEM INFORMATION

Installation Address: _____

_____

LOCATIONS:

1 Transceiver _____ ID # _____
2 Transceiver _____ ID # _____
3 Transceiver _____ ID # _____
4 Transceiver _____ ID # _____
5 Transceiver _____ ID # _____
6 Transceiver _____ ID # _____
7 Transceiver _____ ID # _____
8 Transceiver _____ ID # _____
9 Transceiver _____ ID # _____
10 Transceiver _____ ID # _____

1 Sensor _____ ID # _____
2 Sensor _____ ID # _____
3 Sensor _____ ID # _____
4 Sensor _____ ID # _____
5 Sensor _____ ID # _____
6 Sensor _____ ID # _____
7 Sensor _____ ID # _____
8 Sensor _____ ID # _____
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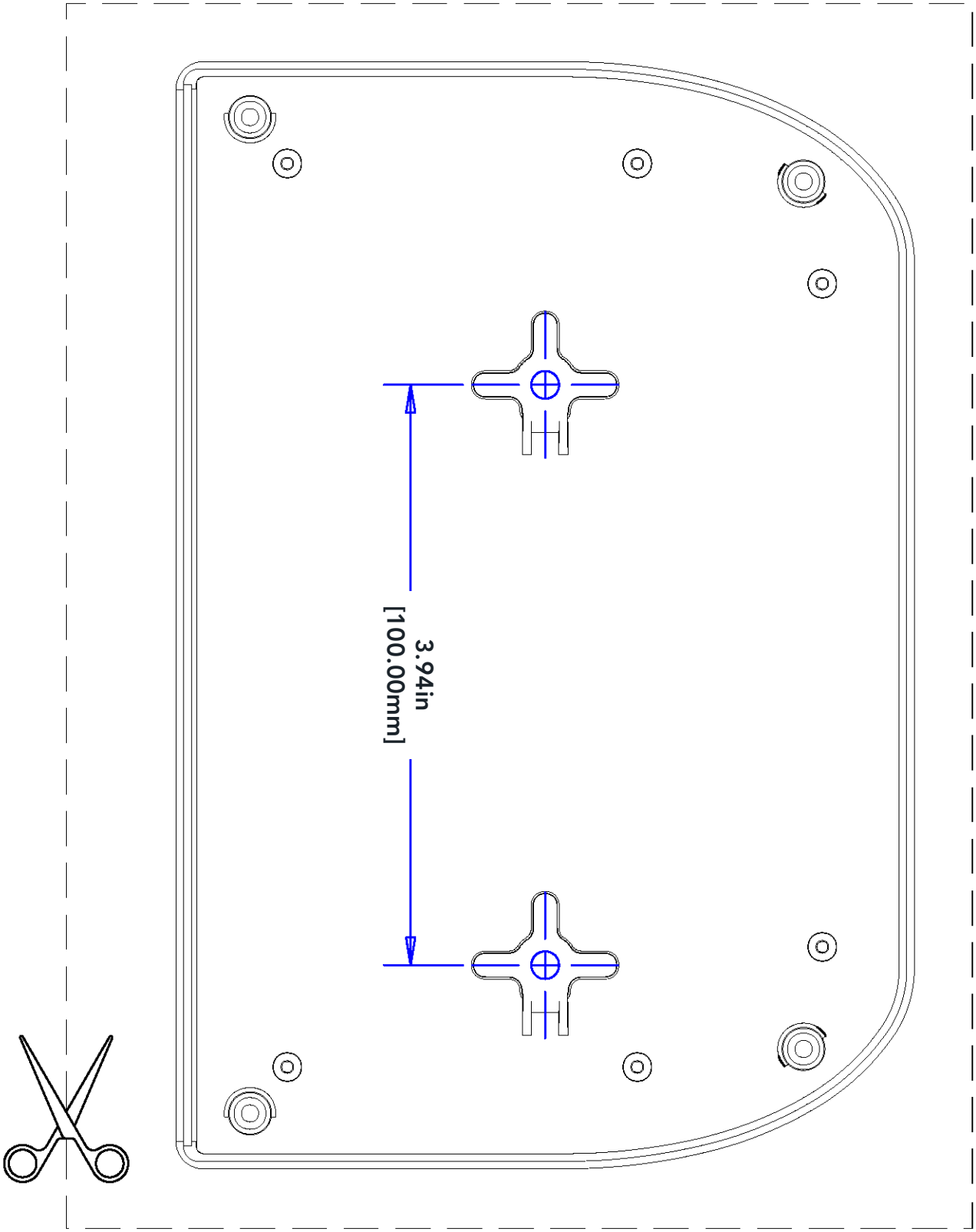
10 MSI HUB MOUNTING TEMPLATE



11 NOTES

WARRANTIES AND LIMITATIONS OF LIABILITY AND DAMAGE: Heat-Timer Corporation warrants that it will replace, or at its option, repair any Heat-Timer Corporation manufactured product or part thereof which is found to be defective in material workmanship within one year from the date of installation only if the warranty registration has been properly filled out and returned within 30 days of the date of installation. Damages to the product or part thereof due to misuse, abuse, improper installation by others or caused by power failure, power surges, fire, flood or lightning are not covered by this warranty. Any service, repairs, modifications or alterations to the product not expressly authorized by Heat-Timer Corporation will invalidate the warranty. Batteries are not included in this warranty. This warranty applies only to the original user and is not assignable or transferable. Heat-Timer Corporation shall not be responsible for any maladjustments of any control installed by Heat-Timer Corporation. It is the users responsibility to adjust the settings of the control to provide the proper amount of heat or cooling required in the premises and for proper operation of the heating or cooling system. Heat-Timer Corporation shall not be required to make any changes to any building systems, including but not limited to the heating system, boilers or electrical power system, that is required for proper operation of any controls or other equipment installed by Heat-Timer Corporation or any contractor. Third Party products and services are not covered by this Heat-Timer Corporation warranty and Heat-Timer Corporation makes no representations or warranties on behalf of such third parties. Any warranty on such products or services is from the supplier, manufacturer, or licensor of the product or service. See separate Terms and Conditions of Internet Control Management System ("ICMS") services, including warranties and limitations of liability and damages, for ICMS services.

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