



USER MANUAL

RRSHA3 & RRSHA5 Series Track Switch Hot Air Blower

Rail heating solutions to keep you on track



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1 Product Description and Features

1.1 Overview

Spectrum's RRSHA Track Switch Hot Air Blower prevents snow and ice from accumulating on railroad track switches. The RRSHA Hot Air Blower supplies high-velocity heated air to critical switch components during inclement weather. The RRSHA Hot Air Blower can also control optional equipment such as Crib Heaters or Flat-Jacket Snow Melters for optimal snow melting capabilities.



*Fig. 1
RRSHA Hot Air Blower
Installed at Track Site*

1.1.1 Safety Considerations

- This is a guidance document for the convenience of the railroad. When installing electrical equipment, it is important that you meet the NFPA 70: National Electric Code requirements to protect people and property from electrical hazards. Follow all railroad safety procedures, related railroad standards, and any applicable third-party standards. Spectrum does not assume the obligation of enforcing National, State, or City electrical code requirements.
- Read the entire manual before operating the RRSHA Hot Air Blower.
- Maintenance personnel must always exercise caution when removing access panels. Personal injury from electrical shock or from the moving blower blade may result if all power sources are not disconnected before servicing. Only qualified personnel should perform maintenance work.
- The operator should avoid contacting the RRSHA Hot Air Blower and track duct during and for some time after operation. Portions of the RRSHA Hot Air Blower and track duct become quite hot and could cause serious burns if the operator contacts them.
- Do not allow objects to enter or block the air intake or exhaust of the RRSHA Hot Air Blower. A blockage will cause overheating. If an object enters the screens, it will damage the resistor elements, possibly shorting them and causing shock and fire hazards. The track duct should be checked periodically for blockages by rodents or debris.

1.1.2 Typical Operation

Spectrum delivers the RRSHA Hot Air Blower as a factory-assembled unit ready for immediate installation. The RRSHA Hot Air Blower is activated in any of the following ways:

- **Automatically**, when the integrated Snow Sensor detects both precipitation and a temperature at or below the preset activation level. The default activation temperature is 38° Fahrenheit, and can be set between 34°F and 44°F.
- **Remotely**, via an external switch such as a three-wire signal interface relay in a control house
- **Manually**, via the Blower Power switch in the main housing unit

1.1.3 Model Comparison

The Hot Air Blower comes in two models, the RRSHA3 and RRSHA5.

	RRSHA3 Series	RRSHA5 Series
Pressure Blower Horsepower	3.0 HP	5.0 HP
Air flow in cubic feet per minute	750 CFM	1476 CFM
Average temperature above ambient air in degrees Fahrenheit	102° F	175° F
Dimensions of main housing unit (approximate)	30" W, 60" L, 25" H	35" W, 77" L, 32" H
Weight in pounds of main housing unit	244 lbs	324 lbs

Both models are available in multiple voltage systems (240V, 480V, and 600V). For complete electronics specifications, see [page 32](#).

1.2 Factory Provided Features

Both models of the Hot Air Blower, the RRSHA3 and RRSHA5 include the following components except where noted otherwise:

- **Main Housing Unit:** Houses the relays, breakers, sensors, and controls to power the heating elements and high-pressure blower.



*Fig. 2
Main Housing Unit*

- **Track Duct:** A rigid aluminum duct mounted to the railroad ties. The track duct is electrically isolated with gaskets and fiberglass bushings that are low in moisture absorption and high in dielectric strength.
- **Directional Nozzles:** Rigid aluminum nozzles attached to the track duct which can be moved to direct airflow onto the switch points.

- **Flex Duct:** Flexible and expandable stainless-steel insulated duct connecting the main housing unit to the track duct. The connecting hose allows for the convenient placement of the main housing unit relative to the rail switch and isolates the track duct from the electronics in the main housing unit. Placement examples for the main housing unit can be found in [2.1.1 Preparing the installation area](#) on page 17.



CAUTION:

Do NOT cut the Stainless Steel Hose. The typical length of the hose is 60" and can expand to approximately 66". Custom lengths are available.

- The main housing unit, track duct, and directional nozzles are manufactured from heavy-wall corrosion-resistant aluminum providing high strength and durability with reduced weight. All fasteners are manufactured from either corrosion-resistant aluminum or plated steel.
- Both the impeller and housing are manufactured from spark-resistant

cast aluminum for corrosion resistance. The impeller contains a self-cleaning radial blade, dynamically balanced for low vibration and long bearing life.

- The high-efficiency National Electrical Manufacturers Association (NEMA) motors are completely enclosed and fan-cooled.
- The connecting flexible duct is manufactured with silicone-packed and spiral-interlocked stainless steel for minimal pressure loss and a high level of corrosion resistance.

1.2.1 Snow Sensor



Fig. 3
Snow Sensor

Attached to the back end of the main housing unit, the Snow Sensor automatically activates the RRS HA Hot Air Blower when precipitation occurs and the temperature falls to a preset activation level (default 38°F). The Snow Sensor is a self-contained unit incorporating a heated precipitation sensing grid, temperature probe, sensor electronics, and internal relay. A green LED on the Snow Sensor illuminates when power is available to the RRS HA Hot Air Blower, and this green LED blinks when environmental activation conditions are met.

After activating the RRS HA Hot Air Blower, the Snow Sensor keeps the unit activated while precipitation continues and temperatures remain below the preset activation level.

When precipitation stops and/or the temperature rises above the preset activation level, the Snow Sensor keeps the Hot Air Blower active for a preset time (default two hours) to ensure complete ice and snow removal. When the preset time has elapsed, the Snow Sensor de-activates the RRS HA Hot Air Blower.

A second Snow Sensor can be installed remotely from the RRS HA Hot Air Blower. This optional second sensor is typically positioned trackside. For more information, see [1.3.1 Remote Snow Sensor](#) on page 11.

The values controlling when the Snow Sensor activates and de-activates the RRS HA Hot Air Blower can be adjusted on a settings panel accessed by removing the Snow Sensor's front cover. For more information, see [3.1 Adjusting Snow Sensor settings](#) on page 26.



Fig. 4
Snow Sensor Settings Panel

1.2.2 Control Switches

Lifting the hinged cover door of the RRSHA Hot Air Blower provides access to the unit's interior components.

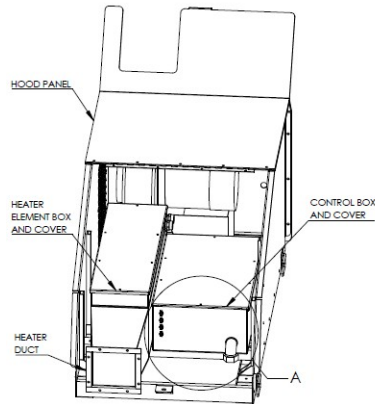


Fig. 5
Interior of Main Housing Unit

The control box on the right side of the interior contains the unit's Circuit Panel. Switches on the front of the control box allow direct control of system functions.



Fig. 6
*Control Switches
Model RRSHA5 Shown
with Optional Rod/Crib Circuit & GFI*

1.2.2.1 Blower Power-On/Auto

The Blower Power switch has two positions:

- **On** (upper position): Power is provided to the air blower and heating elements until the Blower Power switch is set to **Auto**.
- **Auto** (lower position, set by default): Power is only provided to the air blower and heating elements when the RRSHA Hot Air Blower is activated by either the Snow Sensor or Remote (Dispatch) Activation, if the latter optional feature is used.

1.2.2.2 Heat Setting High/Low

The Heat Setting switch has two positions:

- **High** (upper position, set by default): When the primary heating elements are activated, power is provided to all heating elements.
- **Low** (lower position): When the primary heating elements are activated, power is only provided to half of the available heating elements.

The **Low** setting conserves energy at times when environmental conditions are less severe and do not require the full heater output of the RRSHA Hot Air Blower. The chart below shows the energy required for each setting of the Heat Setting switch:

	RRSHA300 (3.0 HP)	RRSHA500 (5.0 HP)
High (default)	19.5kW	45.0kW
Low	9.75kW	22.5kW

1.2.2.3 Cold Air On/Off

The Cold Air switch has two positions:

- **On** (upper position): The RRS HA Hot Air Blower blows cold air only, i.e., power is not provided to the blower heating elements.
- **Off** (lower position, set by default): Whenever power is provided to the air blower, power is also provided to the blower heating elements.

1.2.2.4 Rod – Crib Heater Circuit On/Off (Model with Suffix “R”)

This feature is factory installed only when specified. It can be identified in the model numbering with included **Suffix “R”**. Rod – Crib Heater circuit switch has two positions:

- **On** (upper position): Whenever power is provided to the heating elements, power is also provided to one additional Rod/Crib circuit. This switch can be used to energize optional equipment such as Crib Heaters or Flat-Jacket Snow Melters. **Consult factory if more than one Rod/Crib circuit is required.**
- **Off** (lower position, set by default): Power is not provided to optional equipment.

1.2.2.5 GFI Fault Reset (Model RRS HA5 with Suffix “R” only)

This feature is only factory installed on RRS HA5 series heaters as an additional safety feature when the Rod-Crib Circuit is included (RRSHA5 series with **Suffix “R”**). The GFI Fault Reset switch is a momentary switch set to the down position by default. After the cause of a ground fault is found and corrected, press the switch up for two seconds to reset the circuit.

1.2.3 Circuit Panel

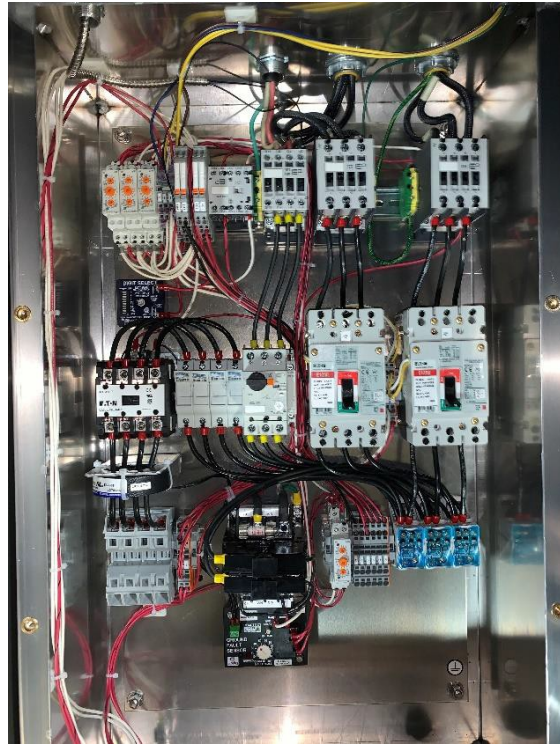


Fig. 7
Circuit Panel

Removing the top panel of the control box provides access to the Circuit Panel. In addition to the primary circuit for the RRS HA Hot Air Blower’s heating elements and air blower, the Circuit Panel may contain a secondary circuit for powering optional equipment, such as a Crib Heater and Flat-Jacket Snow Melter Rods.

1.2.3.1 Individual Circuit Breaker Protection



Fig. 8
Circuit Breakers

The heating circuit(s) and rod/crib circuit are each protected by its own circuit breaker. If the components on a circuit are drawing too much current, only the breaker on that circuit trips, allowing the other circuit to continue operation.

By default, the circuit breaker for the optional rod/crib circuit is set to the tripped position. If no optional equipment requiring power is installed with the RRS HA Hot Air Blower, the rod/crib circuit can remain in the tripped position without affecting the unit's blower circuit. If optional equipment requiring power is later added, the circuit breaker on the rod/crib circuit must be reset.

1.2.3.2 Individual Ground Fault Protection (Model RRS HA5 with Suffix "R" only)

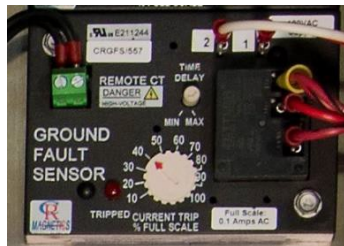


Fig. 9
Ground Fault Sensor

A ground fault sensor protects the rod/crib circuit on the Circuit Panel. If a ground fault is detected on this circuit, the sensing relay trips and illuminates its associated fault indication light. The fault relay can be monitored remotely or connected to an optional external indication light.

The sensitivity (number of milliamps required to trip the sensor) of either ground fault sensor can be adjusted. See [3.3 Adjusting GFI Sensitivity](#) on page 27 for more information.

1.2.3.3 Control Power Transformer



Fig. 10
Control Power Transformer

A transformer connected to the main power distribution block provides 120VAC power to the Circuit Panel's electrical components. The transformer is protected with fuses on the high and low voltage sides.

1.2.3.4 Customer Connection Terminal Block

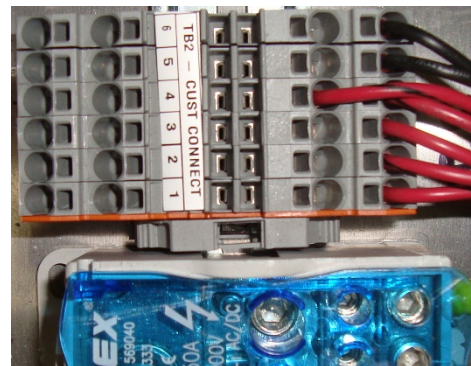


Fig. 11
Customer Connection Terminal Block

The terminal block TB2- has six poles and provides connection points for optional equipment and accessories, as well as remote control and monitoring capabilities for the RRS HA Hot Air Blower

TB2- (pole 1 to pole 2):

Continuity indicates Heater On.

TB2- (pole 3 to pole 4):

For a Remote Heater On Switch

TB2- (pole 5 to pole 6):

Continuity indicates a Fault if Heater is On.

1.2.4 Remote (Dispatch) Activation

Using connections on the Customer Connection Terminal Block, an external switch can be added to activate and de-activate the RRSHA Hot Air Blower from a remote location, such as a control house.



NOTE:

For information on installing a remote switch, contact Spectrum.

1.2.5 Delay Timer

The RRSHA3 and RRSHA5 Hot Air Blower utilizes a Delay-On timer when the optional rod/crib circuit is included (**Suffix “R”**). The Delay Timer delays the start of the rod/crib circuits for between one second to several minutes after power is directed to the primary circuit. This helps reduce the startup current draw, which is especially useful with lower-voltage systems like 240V single-phase systems. The timer is factory set for a Delay-On (A/Ai) with a two second delay (2), (1s) and can be adjusted on site if necessary, for a specific location. The default delay time can be changed. For more information, see [3.2 Adjusting the rod/crib circuit startup delay timer](#) on page 27.



Fig. 12 Delay-On Timer-
Rod/Crib Circuit
(Model Suffix “R”)

The RRSHA5 Series Hot Air Blower additionally utilizes a Delay-Off timer as a standard feature for the blower fan. The Delay-Off Timer maintains airflow across the heating elements to evacuate excess residual heat from the blower compartment and helps to increase product lifespan. The delay is adjustable between one second to three minutes.

The timer is factory set at 120 which indicates 120 second (two minute) delay before the blower fan shuts off and can be adjusted during initial startup testing and on site if necessary, for a specific situation.

For more information, see

[3.4 Adjusting the blower fan circuit startup delay timer](#) on page 28



Fig. 13 Delay -Off Timer
Blower Circuit
(Model RRSHA5 Only)

1.3 Optional Equipment

The following optional features can be purchased to supplement the RRS HA Hot Air Blower as needed.

1.3.1 Remote Snow Sensor

A second Snow Sensor can be ordered and installed separately from the main housing unit. The Remote Snow Sensor can be mounted trackside or any other desired location. Like the integrated Snow Sensor attached to the top of the main housing unit, the Remote Snow Sensor is a self-contained unit incorporating a heated precipitation sensing grid, temperature probe, sensor electronics, and internal relay.

The Remote Snow Sensor activates the Hot Air Blower when precipitation occurs and the temperature falls to a preset activation level (default 38°F). After activating the RRS HA Hot Air Blower, the Remote Snow Sensor keeps the unit activated while precipitation continues and temperatures remain below the preset activation level. When precipitation stops and/or the temperature rises above the preset activation level, the Remote Snow Sensor keeps the RRS HA Hot Air Blower active for a preset time (default two hours) to ensure complete ice and snow removal. When the preset time has elapsed, the Remote Snow Sensor de-activates the RRS HA Hot Air Blower.

For information on installing the Remote Snow Sensor, see [page 22](#).

Values that control when the Remote Snow Sensor activates and de-activates the Hot Air Blower are adjustable. For more information, see [3.1 Adjusting Snow Sensor settings](#) on page 26.



NOTE:

If the Remote Snow Sensor activates the RRS HA Hot Air Blower,

only that sensor can de-activate the unit. If the Remote (Dispatch) Activation feature is used, the remote switch cannot de-activate the RRS HA Hot Air Blower if the Remote Snow Sensor has activated the unit. However, the remote switch can activate the Hot Air Blower after it has been de-activated by the Remote Snow Sensor.

1.3.2 Crib Heater



*Fig. 134
Crib Heater*



*Fig. 145
Crib Heater Mounting Hardware*

In locations that experience heavy snowfall or frequent blowing and drifting, a Crib Heater provides additional heat to critical switch components, such as switch rods.



NOTE:

For additional instructions on the installation, operation, maintenance and troubleshooting of Crib Heaters see Spectrum Document number ENM-3585

Crib Heaters come in multiple sizes, from 4 feet to 10 feet long. Each Crib Heater contains a resistance-heating element within an aluminum housing designed to go under the switch machine rods. Vent holes designed for air flow are placed face down towards the ballast.

If the Rod-Crib Circuit switch, has been included in the RRS HA Hot Air Blower as Model **Suffix "R"**, Flat-Jacket or Crib Heaters can always be installed after the RRS HA Hot Air Blower has been installed.

**NOTE:**

If a Crib Heater is installed, the Rod – Crib Circuit switch must be set to **On** for the equipment to operate.

1.3.3 Flat-Jacket Snow Melters



Fig. 156

Flat-Jacket Snow Melter Rod

Flat-Jacket Snow Melter Rods are resistance-heating elements in a stainless-steel sheath. They attach to the stock rail using SnapTite rail clips or bolt-on clips. The flat-jackets are single ended (both leads come out of one side) and are rated to a specific voltage (+/- 5%).

Use clips between every tie to attach the Flat-Jacket Snow Melter Rod to the rail. This assures proper heating at the switch point and extends the life of the Flat-Jacket Snow Melter.

**NOTE:**

Failure to use these clips properly will result in poor snow clearance and premature element failure.

SnapTite rail clips clamp on to the bottom of the field side of the rail and to the Flat-Jacket Snow Melter Rod.



Fig. 167

SnapTite Rail Clips

Bolt-on clips are bolted directly to the field or gauge side of the rail and clamp on to the Flat-Jacket Snow Melter Rod.

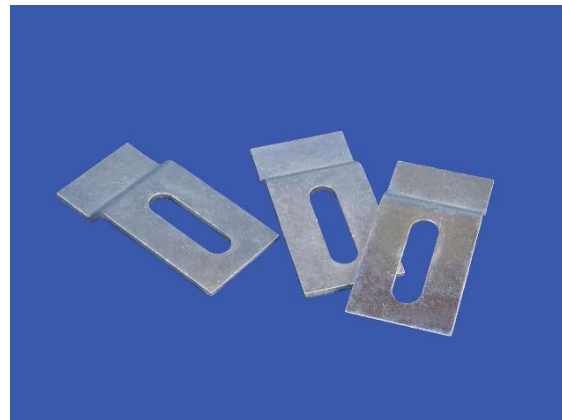


Fig. 178

Bolt-On Clips

**NOTE:**

1. For additional instructions on the installation, operation, maintenance and troubleshooting of Flat-Jacket Snow Melter Rods see Spectrum Document number ENM-2957
2. If Flat-Jacket Snow Melter Rods are installed, the Rod – Crib Heaters switch must be set to **On** for the equipment to operate.

1.3.4 Center Duct



Fig. 189
Center Duct

A 12-foot Center Duct can be installed to distribute additional heat along the rails. Center ducts are designed for steel-tie applications and specifically to provide heat over the push rods. The Center Duct is available when required and will replace the standard Track Duct as described on page 5. The RRS HA Hot Air Blower is provided from the factory with a Center Duct when **Suffix "C"** is identified in the model code during the initial specification process.



NOTES:

1. For information on purchasing and installing an additional Center Duct to replace an existing Track Duct, contact Spectrum.
2. Center Duct Installation is similar to Track Duct Installation as identified in Section 2.1.3, page 18.

1.3.5 Intake Snorkel

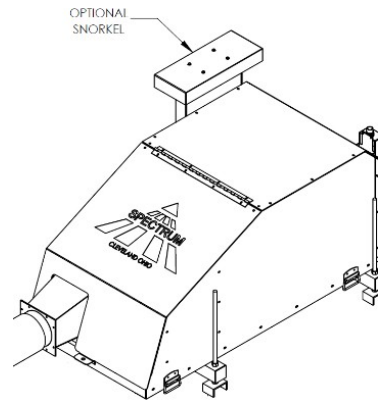


Fig. 191
Intake Snorkel

The optional Intake Snorkel attaches to the outside of the main housing unit and redirects the air intake from the side of the unit to the top.

In areas with large amounts of blowing snow, an Intake Snorkel prevents the air intake from being blocked by snow and the blower from pulling in snow during operation, prolonging the life of the blower motor.

The RRS HA Hot Air Blower Track is provided from the factory with an Intake Snorkel when **Suffix "S"** is identified in the model code during the initial specification process.



NOTE:

For information on purchasing and installing an Intake Snorkel where it was not originally installed contact Spectrum.

1.3.6 Main Circuit Breaker

An additional main circuit breaker can be field installed between the power source and the Circuit Panel. This circuit breaker can be mounted on the exterior of the main housing unit or in a remote location to allow power to be disconnected prior to opening the RRS HA Hot Air Blower for service.



NOTE:

For information on purchasing an additional main circuit breaker for field installation contact Spectrum.

1.4 Accessories

Accessory equipment can be included to place the main housing unit of the RRS HA Hot Air Blower in the optimal location relative to the switch area, to allow greater access or to provide a visual verification of system function.

1.4.1 Height Adjustment Legs

Height Adjustment Legs are recommended in areas where standing water can pool or accumulate. Legs also allow for stable and level footing on an otherwise uneven ground. The main housing unit can be raised to a maximum of 18" with the height adjustment legs. The RRS HA Hot Air Blower is provided from the factory with Height Adjustment Legs when **Suffix "M"** is identified in the model code during the initial specification process.

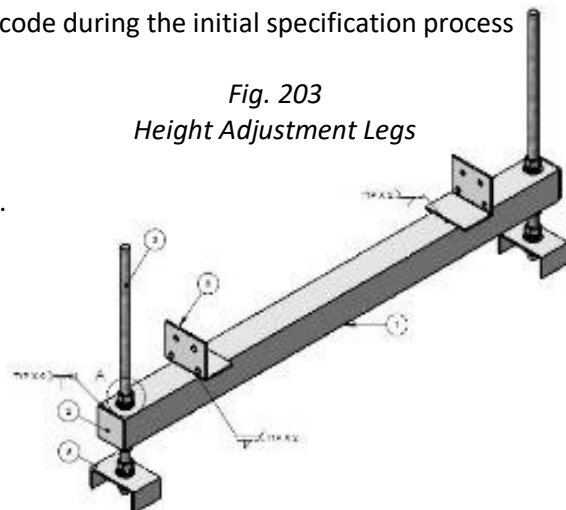


Fig. 203
Height Adjustment Legs

1.4.2 Duct Extensions

The stainless-steel duct connecting the main housing unit to the track duct is flexible and extends up to 66". If the main housing unit must be installed at a greater distance or elevation from the track rails, flexible duct extensions made of stainless steel and high-temperature silicone packing are available.



Fig. 214
Duct Extension



NOTE:

For information on purchasing and installing a duct extension for field installation, contact Spectrum.

1.4.3 Ground Fault and Power-On Indication Lights

Fig. 222
Indication Light



The RRS HA Hot Air Blower can be provided from the factory with indication lights. When **Suffix "P1"** is identified in the model code during the initial specification process the indication light is mounted outside the main housing unit and configured to provide a visual signal when a circuit breaker trips or when a ground fault occurs on the rod/crib circuit. Alternatively, when **Suffix "P2"** is identified in the model code, the indication light can be configured to illuminate when the RRS HA Hot Air Blower is powered. If desired, two separate indication lights can be installed, one for ground faults and the other for power. The default light color is white, with additional colors available on request.

1.4.4 Wiring Box



Fig. 235
Wiring Box (Hinged Lid)

A Wiring Box can be used to connect optional equipment such as a Crib Heater and/or Flat-Jacket Snow Melter Rods to the main housing unit. Using a Wiring Box reduces the number of cables running out of the main housing unit. The Wiring Box comes in two designs:

Interior Dimensions

Part No.	Width	Depth	Height
WB-12TH	12"	12"	4"
WB-12TBO	12"	12"	4"

Each Wiring Box comes with a weather-tight lid with either a hinged and lockable lid (TH) or machine screws (TBO). A variety of fittings, from cord grips to barbed fittings, can be installed on the 12 ports of the wiring box run wires through. Each wiring box also comes with terminal blocks installed for simpler wire connections.

1.4.5 Wiring Box Post

A recommended accessory for the Wiring Box is a Wiring Box Post. This post bolts to the bottom of the box and provides riser pipe that can be buried in the ground for a secure mounting position. Power wires can be run through the bottom of the post and into the Wiring Box. The Wiring Box Post comes in two variations.

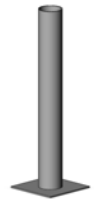


Fig. 246
Wiring Box
Post

Part No.	Description
WB-100	Standard Pipe Post
WB-101	Slotted Pipe Post



NOTE:

For information on purchasing and installing a wiring box or wiring box post for field installation, contact Spectrum.

2 Installation

The typical installation consists of:

- Installing the RRS HA Hot Air Blower (Base Unit, Flex Duct & Track Duct) at track side
- Wiring the heater base unit
- Installing optional equipment and accessories
- Activating the RRS HA Hot Air Blower for the first time

2.1 Installing the RRS HA Hot Air Blower

TRACK DUCT ASSEMBLY (not provided with Model Suffix 'C')

- ① Outboard Track Duct (closed at one end)
- ② Inboard Track Duct (open at both ends)
- ③ Rigid Point Nozzle Assembly (2 REQ'D)
- ④ Duct Tie Strap

CENTER DUCT ASSEMBLY (Only with Model Suffix 'C')

- ⑤ Outboard Center Duct (closed at one end)
- ⑥ Inboard Center Duct (open at both ends)
- ⑦ Center Nozzle Assembly
- ③ Rigid Point Nozzle Assembly (2 REQ'D)
- ④ Duct Tie Strap

FLEXIBLE DUCT ASSEMBLY

HEATER BASE UNIT (Items integral to base unit)

- ⑧ Height Adjustment Legs (Only with Model Suffix 'M')
- ⑨ Pilot Light Fault Indication (Only with Model Suffix 'P1')
- ⑩ Pilot Light Heater On (Only with Model Suffix 'P2')
- ⑪ Intake Snorkel (Only with Model Suffix 'S')

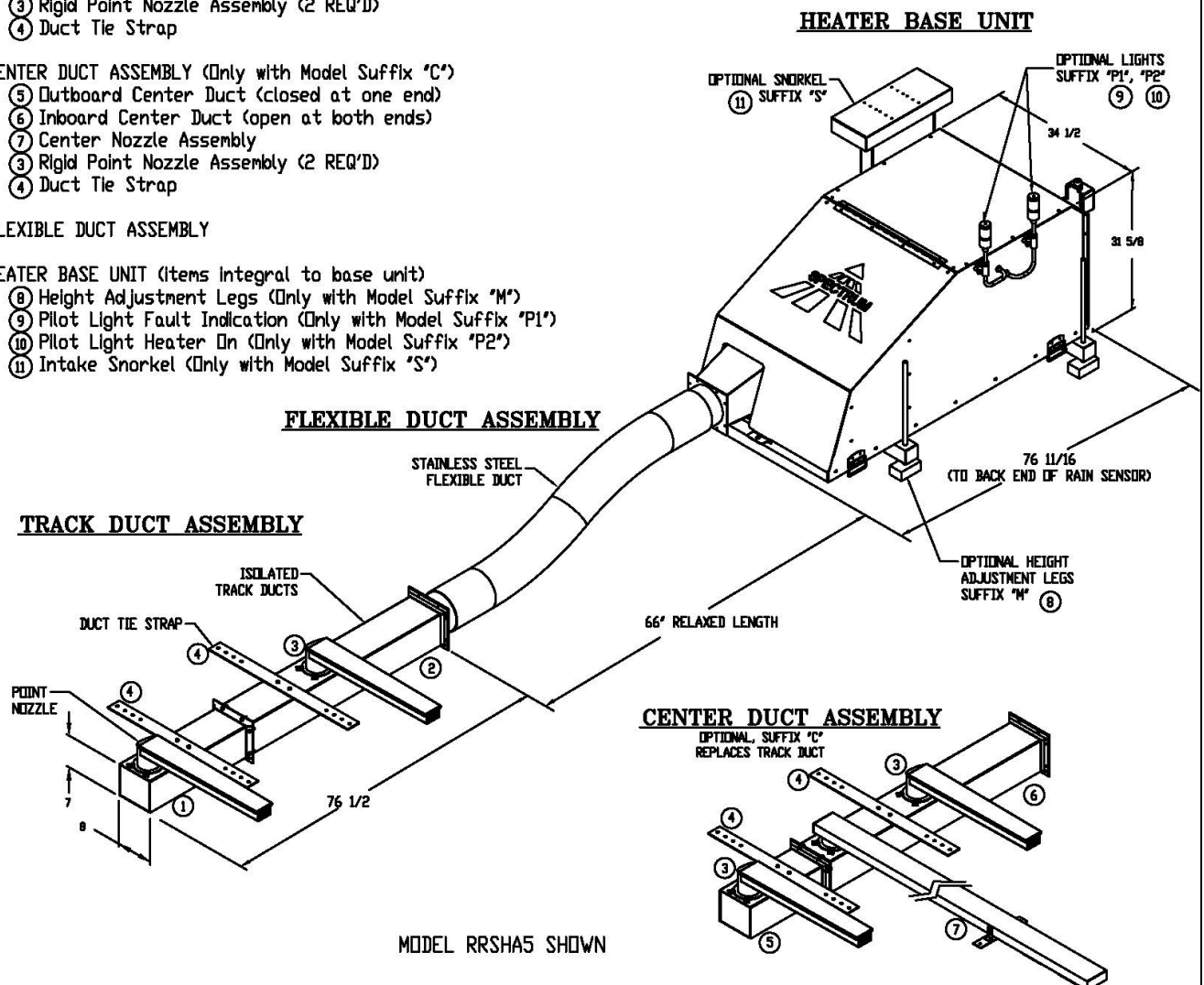


Fig. 257a
Installation Diagram

Figure 257a identifies the components of the RRS HA Hot Air Blower that are installed at track side.

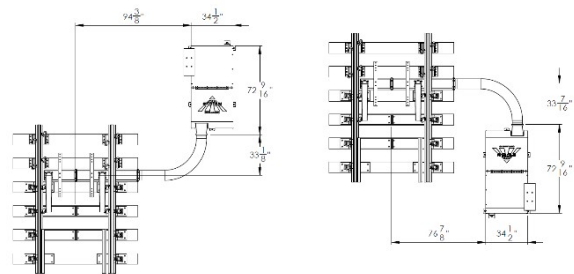
2.1.1 Preparing the installation area

1. Use the following criteria to identify the installation area for the main housing unit.
 - Do not install the main housing unit in any area where standing water can pool or accumulate. Do not install near a drainage basin, surface/ground/roof runoff, sewer collection, or any location where water can back up or collect. If flooding can occur, we recommend the addition of Height Adjustment Legs or a raised platform sufficiently above high-water level. Do not operate if any portion of the main housing unit is submerged. Always install above grade.
 - The installation area must be close enough to connect the main housing unit with the track duct, which is positioned one or two tie spaces in front of the switch point.
 - The installation area must be a compact and stable surface composed of concrete, ballast, or dirt. The surface must also be level, with a tolerance of $\pm 5^\circ$.
 - The recommended installation area is 6' x 6' with no part within the foul zone, the area four feet outside of the nearest rail.
 - Position the main housing unit with a minimum of 36 inches of clearance on the air intake side.



*Fig. 268
Main Housing Unit
Installed on Ballast Surface*

2. It is recommended to use a picker truck or other means to place the main housing unit track-side. Load handles (Figure 268) may be used with lifting straps. Because the connecting duct is flexible and extends up to 66", the main housing unit is typically positioned parallel with the rail. However, a perpendicular position works as well. Ensure no objects are within 18" of motor inlet so there are no obstructions.



*Fig. 279
Parallel Installation Examples*

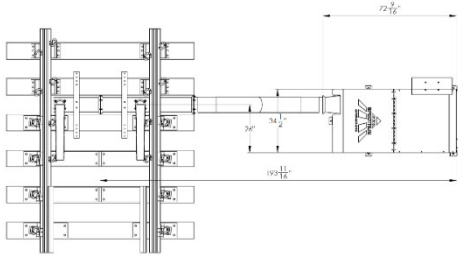


Fig. 30
Perpendicular Installation Example

3. For the safety of the internal components and personnel, the RRS HA Hot Air Blower must be grounded to earth. Install a ground rod and connect it to one of the grounding lugs inside the control box.

2.1.2 Routing power to the main housing unit

The power supply was determined before the RRS HA Hot Air Blower was ordered and is included within the Model numbering. The power supply must deliver the required voltage and load carrying capacity.

1. Make sure the power supply cable is sized properly for the RRS HA Hot Air Blower, and that the electrical service allows the unit to operate properly. Low voltage reduces the unit's effectiveness and shorten its life span.
2. Drill holes into the bottom plate of the main housing unit and into the circuit panel for the main

power cable and for cables of any optional equipment.

3. Route the cables through the holes. Ensure each hole is completely sealed with a water-tight solution.



NOTE:

Do not connect the cable from the power source to the Circuit Panel at this time.

2.1.3 Installing the track duct

The track duct is comprised of two sections. The Outboard Track Duct has one closed end and one open end. The Inboard Track Duct has two open ends. These two sections are connected and tested for electrical isolation prior to shipment.



Fig. 292
Track Duct

Install the track duct one or two tie spaces in front of the switch point, with the nozzle ends five to ten inches from the tip of the switch point.

1. Clear the installation area of ballast to allow the track duct to slide in position under the rail.
2. Pass both sections of the track duct under the stock rail.
3. Position the Outboard Track Duct so that it is approximately 6" from the outside rail and centered between the two existing ties.

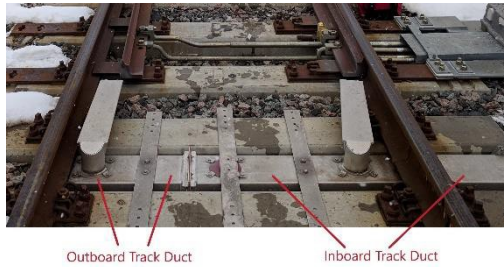


Fig. 303
Track Duct
Assembled at Switch Point

2.1.4 Installing nozzles

The track duct has two 4" nozzle holes, with four nozzle clips around each hole.

1. Turn all nozzle clips outward from the nozzle holes.



Fig. 314
Nozzle Hole with Clips Turned Out

2. Set the nozzles into the holes.
3. Turn all nozzle clips inward, but do not tighten the clips.



Fig. 325
Nozzle Installed with Clips Turned In

4. Turn the nozzles in the holes to maximize the air flow to the web of the rail.

5. Once the nozzles are in the correct position, securely tighten the nozzle clips.
6. Nozzles may be trimmed up to 3" if necessary. Please note that trimming will eliminate the rodent screen on the nozzle.

2.1.5 Attaching the Track Duct or Center Duct to the ties

1. Attach the duct tie-down straps to the track duct, using two 5/16"-18 hex head screws.

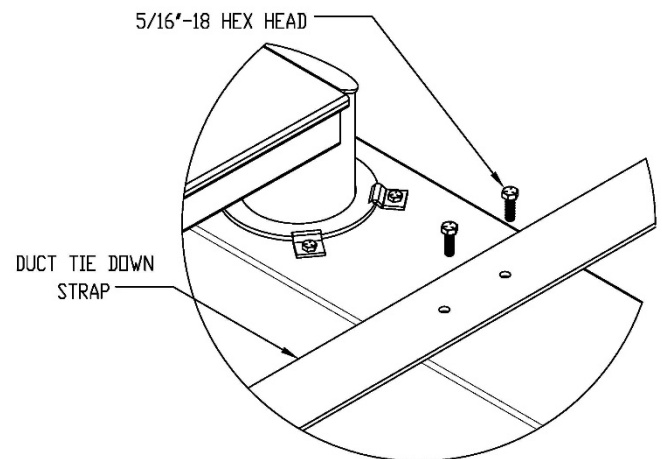


Fig. 336
Connecting the Duct Tie-down Straps

2. Attach duct tie-down straps to the ties on either side of the track duct, using hardware appropriate for the tie material.
 - For wood ties, attach the tie-down straps with the provided lug bolts.
 - For metal or concrete ties, contact Spectrum for recommendations.

2.1.6 Attaching the flexible connecting duct

1. Position a flange gasket between the open end of the track duct and the flexible connecting duct.
2. Using eight 1/4"-20 stainless bolts as shown attach the track duct to the flexible connecting duct.

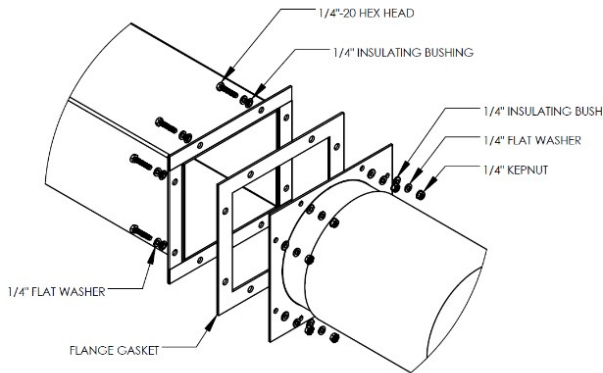


Fig. 347
Track Duct to Flexible
Connecting Duct Assembly

3. Using eight 1/4"-20 stainless bolts as shown above, connect the other end of the flexible connecting duct to the main housing unit at the matching flanged end.



Fig. 358
Flexible Connecting Duct to
Main Housing Unit Assembly

4. Check for lack of continuity where the flexible connecting duct connects to both the track duct and main housing unit.

Wiring the main housing unit

WARNING:



The main circuit breaker feed to the electrical connections in the main housing unit must be locked out and/or tagged out to protect employees against accidental or inadvertent operation during any servicing or maintenance activity. Lockout is the best and preferred method of isolating machines or equipment from energy sources prior to servicing any component within the main housing unit. The lockout/tagout procedure must comply with employee safety rules as defined by local corporate regulation.

2.2.1 Wiring the Circuit Panel

1. Disable the power coming from the main power source.
2. As part of procedure [2.1.2 Routing power to the main housing unit](#), a hole for the cable from the power source should have been drilled at the bottom of the control box, and the cable should have been routed through that hole. Verify steps 2 and 3 of procedure 2.1.2 have been completed, and perform these steps if they have not.
3. Connect the cable from the main power source to the L1, L2, and L3 power distribution blocks.
4. Enable the power coming from the main power source.

2.2.2 Verifying the blower fan rotation

After attaching the incoming power cable to the L1, L2, and L3 power distribution blocks, verify the blower fan rotation. The blower fan must rotate counter-clockwise when viewed facing the inlet grill side of the switch heater.



If the rotation is incorrect, adjust the connection of the incoming power cable to the L1, L2, and L3 power distribution blocks to obtain correct phasing until the blower fan rotates in the proper direction.



WARNING:

Failure to verify the blower fan rotation damages the RRS HA Hot Air Blower's heating elements and voids the warranty.

Follow these steps to verify the blower fan rotation:

1. If necessary, set the Blower Power switch to **Auto** (lower position).
2. Set the Cold Air switch to **On** (middle position).
3. Set the Blower Power switch to **On** (upper position) for two seconds, then switch back to **Auto** (lower position).
4. As the blower slows down, verify that the fan wheel is rotating counter-clockwise when viewed through the grill. Note, RRS HA5 has Delay-Off, see Sec. 1.2.5 on page 10. If the fan wheel rotation is correct, skip steps 5 through 8 of this procedure.



*Fig. 369
Motor Blower Fan
Viewed Through Grill*

5. If the fan wheel rotation was not correct in step 4, disable the power coming from the main power source.

6. Switch any two of the input wires leading to the L1, L2, and L3 power distribution blocks.
7. Enable the power coming from the main power source.
8. Repeat this procedure, beginning with step 3.
9. After verifying the fan wheel rotation is correct, set the Cold Air switch to **Off** (lower position).

2.3 Installing Accessories and Optional Equipment

If purchased, some assembly is required for RRS HA Hot Air Blower accessories and optional equipment.

2.3.1 Wiring Box and Wiring Box Post

The Wiring Box Post and Wiring Box reduce the amount of cables running from the RRS HA Hot Air Blower main housing unit to optional equipment such as a Crib Heater and Flat- Jacket Snow Melter Rods.

1. Connect the wiring for the optional equipment to the Customer Connection Block.
2. Route the wiring for the optional equipment through the bottom of the control box.
3. Route the wiring for the optional equipment through the Wiring Box Post.
4. Bury the bottom of the Wiring Box Post.

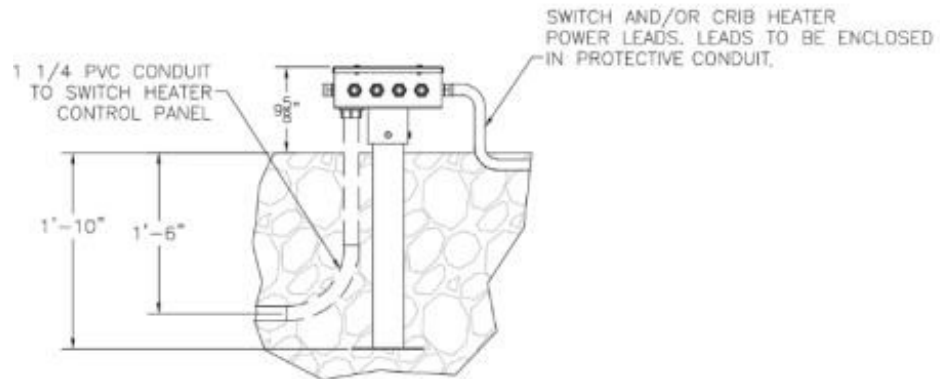


Fig. 40
Wiring Box and
Wiring Box Post Installation

5. Connect the cables for the optional equipment inside the Wiring Box.

2.3.2 Remote (track side) Snow Sensor

If ordered for the RRSHA series hot air blower the Remote Snow Sensor has four wires that should be connected as follows:

- Yellow to TB1-1
- Yellow to TB1-3
- Black or Brown to TB1-1
- White or Blue to TB1-2

2.3.3 Fault and Power-On Indication Lights

When purchased as integral to the RRSHA series heater use model **Suffix "P1"** and/or **Suffix "P2"**.

If purchased separately, contact Spectrum for installation instructions.

2.3.4 Height Adjustment Legs

When purchased as integral to the RRSHA series heater use model **Suffix "M"**

If purchased separately, contact Spectrum for installation instructions.



2.3.5 Crib Heaters (See ENM-3585 for Complete Details)

1. Install mounting brackets on the top side of the Crib Heater.

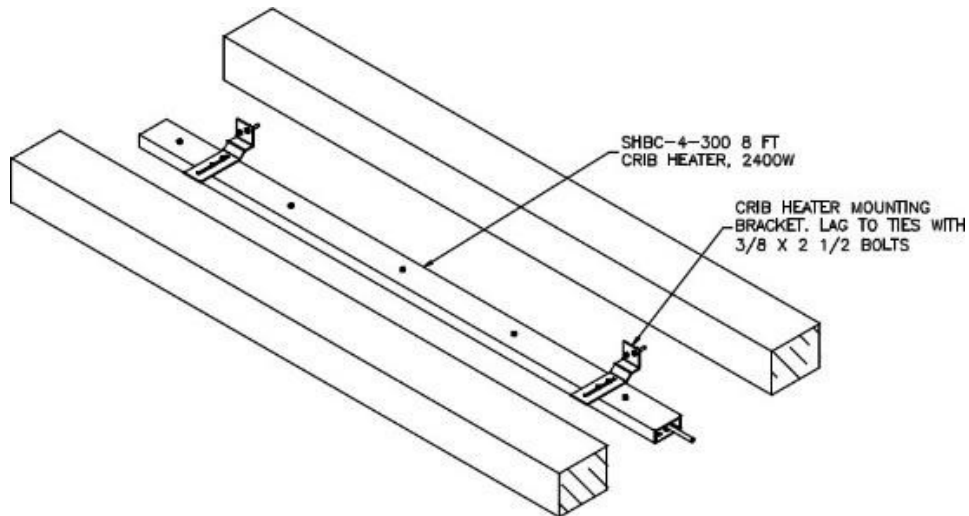


Fig. 371
Crib Heater Mounting Brackets Installation

2. Position the Crib Heater under the switch machine rods. The top of the Crib Heater should be approximately 5" below the base of the rail.
3. Attach the mounting brackets to the nearest tie, using hardware appropriate for the tie material.
 - For wood ties, attach the brackets with the provided lug bolts.
 - For metal and concrete ties, contact Spectrum for installation recommendations.

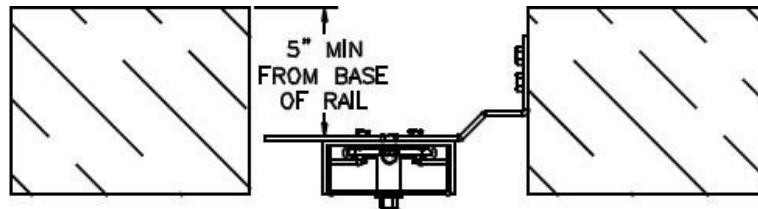


Fig. 382
Crib Heater installation

2.3.6 Flat-Jacket Snow Melters (See ENM-2957 for Complete Details)

1. Uncoil the Flat-Jacket Snow Melter Rod near the switch point.
2. Install mounting clips to the rail between every tie, approximately 20" apart.

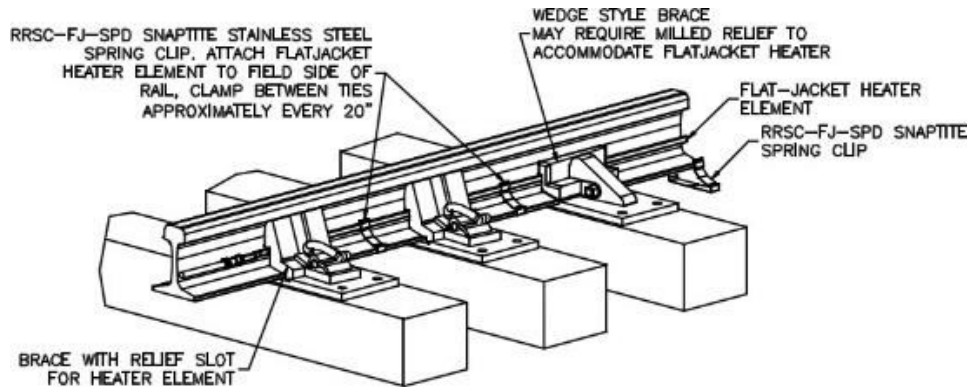


Fig. 393
SnapTite Rail Clip Installation

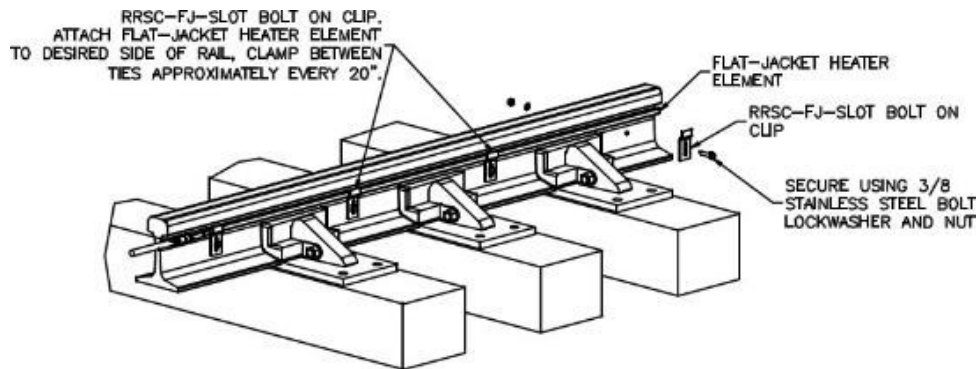


Fig. 404
Bolt-On Clip Installation

3. With the bow facing the outside, route the Flat-Jacket Snow Melter Rod through the mounting clips and any braces.

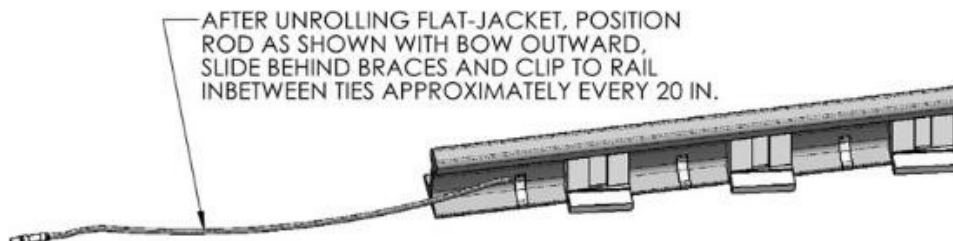


Fig. 415
Flat-Jacket Snow Melter Rod Installation



2.4 Initial Activation of the Hot Air Blower

After the RRS HA Hot Air Blower is installed, verify it can be activated by each available method before putting into Service.

2.4.1 Manual Activation

Verify the RRS HA Hot Air Blower operates when set to manual activation.

1. Set the Blower Power switch to **On**.
2. Verify the green LED is illuminated on the Snow Sensor.
3. Listen for the circuits to engage. For units that also use optional equipment, the rod/crib circuit turns on after the blower circuit according to the rod/crib circuit's Delay Timer setting.
4. With the Cold Air switch in the **On** position, walk to the nozzles and verify the air discharging is ambient air temperature.
5. Return to the control panel and set the Cold Air switch to the **Off** position. Allow the unit to run for 2 – 3 minutes, then walk to the nozzles and verify the air discharging feels warm.
6. Leave the unit activated for 10-15 minutes to allow the heaters to come up to temperature and verify there are no GFI faults on the rod/crib circuit or heater malfunctions.

2.4.2 Snow Sensor Activation

Verify the RRS HA Hot Air Blower can be activated by the Snow Sensor.

1. Verify the green LED is illuminated on the Snow Sensor.

2. Put water on the moisture grid and use freeze spray on the temperature probe of the Snow Sensor.
3. Verify the green LED on the Snow Sensor is blinking.
4. Listen for the circuits to engage. For units that also use optional equipment, the rod/crib circuit turns on after the blower circuit according to the rod/crib circuit's Delay Timer setting.
5. With the Cold Air switch in the **On** position, walk to the nozzles and verify the air discharging is ambient air temperature.
6. Return to the control panel and set the Cold Air switch to the **Off** position. Allow the unit to run for 2 – 3 minutes, then walk to the nozzles and verify the air discharging feels warm.
7. Leave the unit activated for 10-15 minutes to allow the heaters to come up to temperature and verify there are no GFI faults on the rod/crib circuit or heater malfunctions.



NOTE:

If you have installed the optional Remote Snow Sensor, perform the same above procedure, and on step 2, use the remote sensor.

2.4.3 Remote (Dispatch) Activation

If installed, verify the RRS HA Hot Air Blower can be activated by Remote (Dispatch) Activation.

1. Request dispatch to activate the RRS HA Hot Air Blower remotely.
2. Listen for the circuits to engage. For units that also use optional equipment, the rod/crib circuit turns

on after the blower circuit according to the rod/crib circuit's Delay Timer setting.

3. With the Cold Air switch in the **On** position, walk to the nozzles and verify the air discharging is ambient air temperature.
4. Return to the control panel and set the Cold Air switch to the **Off** position. Allow the unit to run for 2 – 3 minutes, then walk to the nozzles and verify the air discharging feels warm.
5. Leave the unit activated for 10-15 minutes to allow the heaters to come up to temperature and verify there are no GFI faults on the rod/crib circuit or heater malfunctions.

3 Adjusting Hot Air Blower Settings

The following settings that control the operation of the RRSHA Hot Air Blower can be adjusted.

3.1 Adjusting Snow Sensor settings

By default, the Snow Sensor activates the RRSHA Hot Air Blower when the temperature falls to 38°F and precipitation is detected on the sensor's moisture grid. The Snow Sensor keeps the RRSHA Hot Air Blower activated for an additional 2 hours after the temperature rises above 38°F and/or precipitation is no longer detected. Follow these steps to adjust these settings:

1. Remove the front cover of the Snow Sensor by unscrewing the four mounting screws holding it in place.

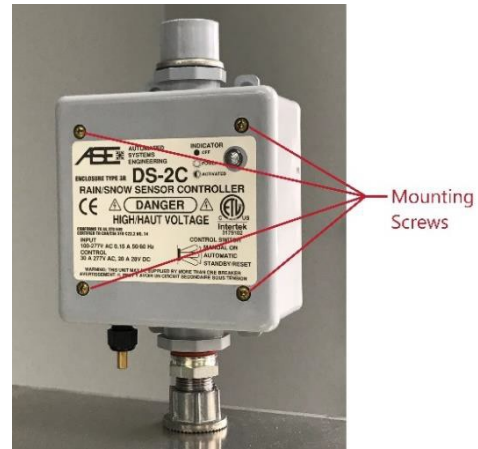


Fig. 426

Snow Sensor Mounting Screws

2. Locate the three adjustable settings on the left side of the control panel.

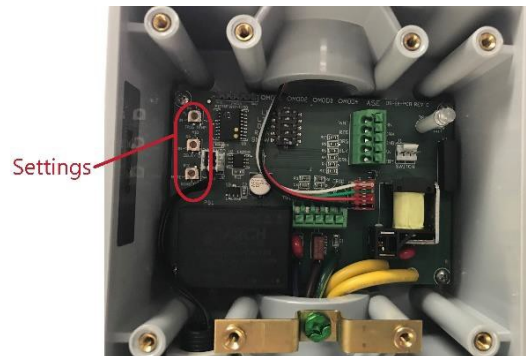


Fig. 437

Snow Sensor Control Panel

3. Using a flat-head screwdriver, adjust the knobs of the three settings as desired:

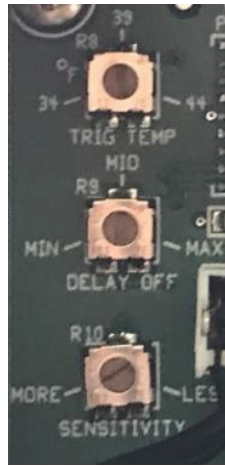


Fig. 448
Snow Sensor Settings

- **TRIG TEMP** – the temperature which activates or de-activates the RRSHA Hot Air Blower. The value can be set from 34°F to 44°F.
 - **DELAY OFF** – the amount of time the RRSHA Hot Air Blower remains active after the temperature rises about the TRIG TEMP setting. The value can be set from MIN (2 hours) to MAX (6 hours).
 - **SENSITIVITY** – the amount of precipitation on the moisture grid required to activate the RRSHA Hot Air Blower. The value can be set from MORE to LESS.
4. When finished, replace the front cover of the Snow Sensor and install the four mounting screws.

3.2 Adjusting the rod/crib circuit startup delay timer

For RRSHA Hot Air Blowers with “Suffix R” that power optional equipment, the Delay Timer function powers the secondary circuit after a short delay from the primary circuit’s start time (default delay time is two seconds). This option helps reduce the startup

current draw, especially useful with lower voltage systems like 240VAC single-phase systems. Follow these steps to adjust the secondary circuit’s delay timer.

1. Open the RRSHA Hot Air Blower’s hinged cover door.
2. Open the cover of the control box.
3. The Rod/Crib circuit delay timer has 3 dials for adjustment. The lower dial is a functional adjust and set to (A/Ai) for Delay-On. The upper dial determines the unit value of time. The middle dial is the unit value time multiplier. Default setting is (A/Ai), (2), (1s): Delay-On of 2 seconds

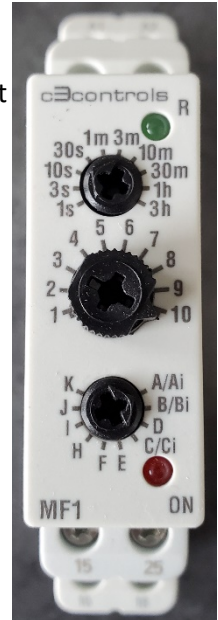


Fig. 459
Rod/Crib Circuit Startup Delay
(Model Suffix “R”)

4. Set the upper and middle dials to the desired delay-on start time for the Rod/Crib circuit.

3.3 Adjusting GFI Sensitivity (rod/crib circuit, only)

By default, each ground fault sensor is set to a sensitivity rating of 40 milliamps. Follow these steps to adjust the ground fault sensor sensitivity for a circuit.

1. Disconnect the RRSHA Hot Air Blower from its power source.
2. Verify the green LED on the Snow Sensor is not illuminated.
3. Open the RRSHA Hot Air Blower’s hinged cover door.
4. Open the cover of the control box.

5. On the Circuit Panel, locate the sensitivity dial at the bottom center of the ground fault sensor.



Fig. 50
Ground Fault Sensor
(Model RRSHA5 with Suffix "R" only)

6. Using a flat-head screwdriver, turn the sensitivity dial to the desired setting, from 10 to 100 milliamps.
 7. Connect the RRSHA Hot Air Blower to its power source.
- WARNING:** Power is being supplied to the RRSHA Hot Air Blower, and the circuits are live. Use extreme caution.
8. Verify the green LED on the Snow Sensor is illuminated.
 9. Allow the RRSHA Hot Air Blower to activate and energize the heating elements for at least 10 minutes.
 10. Using a flat-head screwdriver, adjust the sensitivity dial down towards 0 until the ground fault sensor trips.
 11. Once Tripped, Adjust the sensitivity dial back to the desired setting.

3.4 Adjusting the blower fan circuit shutdown delay timer

The RRSHA5 Series Hot Air Blower additionally utilizes a **delay-off** timer as a standard feature for the blower fan.

The Delay-Off Timer maintains airflow across the heating elements to evacuate excess residual heat from the blower compartment and helps to increase product lifespan.

- 1 Open the RRSHA Hot Air Blower's hinged cover door.
- 2 Open the cover of the control box.
- 3 The Fan circuit Delay-Off timer has 1 dial for adjustment. The dial is factory set for 120 seconds for Delay-Off of the Blower Fan

Delay-Off for 2 minutes



Fig. 460
Fan Circuit
Shutdown Delay Timer
(RRSHA5 Series Only")

- 4 Set the dial to the desired delay-OFF setting start time for the Fan

circuit.



4 Seasonal Maintenance

4.1 Pre-Winter Maintenance

4.1.1 Hot Air Blower Main Housing Unit

- ☐ Inspect the unit's hinged cover door for damage that would prevent it from being shut and locked.
- ☐ If installed as Model Suffix "M", inspect (and tighten if necessary) the bolts attaching the unit to the Height Adjustment Legs.

4.1.2 Circuit Panel

- ☐ Verify the main power source to the RRS HA Hot Air Blower is off.
- ☐ Disconnect the power wires coming into the main housing unit from the main breaker.
- ☐ Open the main housing unit's hinged cover door and reconnect all wires coming from the Wiring Box (or direct from the heating elements) to their respective terminal blocks.
- ☐ Reconnect the power wires coming into the main housing unit from the main breaker.
- ☐ Close the main housing unit's hinged cover door.
- ☐ Turn on the main power source to the RRS HA Hot Air Blower.
- ☐ Verify the RRS HA Hot Air Blower has power by verifying the green LED on the Snow Sensor is illuminated.

4.1.3 Manual Activation

- ☐ Set the Blower Power switch to **On**.
- ☐ Verify the RRS HA Hot Air Blower is activated by verifying the green LED on the Snow Sensor is blinking.
- ☐ Listen for the circuits to engage. For units that also power optional equipment, the secondary circuit turns on after the primary circuit according to the secondary circuit's Delay Timer setting.
- ☐ Walk to the heaters and take the surface temperature to verify heaters are getting power and are heating.
- ☐ Leave the RRS HA Hot Air Blower activated for 10-15 minutes to allow the heaters to come up to temperature and verify there are no GFI faults or heater malfunctions.
- ☐ Verify the element resistance using a multimeter. Take measurements across two phases on the load side of each element contactor. Refer to tables in Section 5 (Specifications). If the results deviate significantly from these tables, this would indicate heater elements are open or have short circuited and need replacement.



4.1.4 Snow Sensor Activation

- ☐ Remove the black sensor cover over the Snow Sensor and store it in a safe place to be reused after winter.
- ☐ Wipe off the moisture grid (located on top of the Snow Sensor) with a damp cloth. If there is an excessive amount of sediment buildup on the grid that cannot be removed with a damp cloth, use a non-metallic scouring pad and LIGHTLY clean off the grid.
- ☐ Verify the RRS HA Hot Air Blower is not activated by verifying the green LED on the Snow Sensor is illuminated, but not blinking.
- ☐ Put water on the moisture grid and use freeze spray on the temperature probe of the Snow Sensor.
- ☐ Verify the green LED on the Snow Sensor is blinking.
- ☐ Listen for the circuits to engage. For units that also power optional equipment, the secondary circuit turns on after the primary circuit according to the secondary circuit's Delay Timer setting.
- ☐ Walk to the heaters and take the surface temperature to verify heaters are getting power and are heating.
- ☐ Leave the RRS HA Hot Air Blower activated for 10-15 minutes to allow the heaters to come up to temperature and verify there are no GFI faults or heater malfunctions.

4.1.5 Remote (Dispatch) Activation (if installed)

- ☐ Verify the green LED on the Snow Sensor is illuminated.
- ☐ Request dispatch to activate the RRS HA Hot Air Blower remotely.
- ☐ Listen for the circuits to engage. For units that also power optional equipment, the secondary circuit turns on after the primary circuit according to the secondary circuit's Delay Timer setting.
- ☐ Walk to the heaters and take the surface temperature to verify heaters are getting power and are heating.
- ☐ Leave the RRS HA Hot Air Blower activated for 10-15 minutes to allow the heaters to come up to temperature and verify there are no GFI faults or heater malfunctions.

4.2 Post-Winter Maintenance

4.2.1 Hot Air Blower Main Housing Unit

- ☐ Inspect the unit's hinged cover door for damage that would prevent it from being shut and locked.
- ☐ If installed, inspect (and tighten if necessary) the bolts attaching the unit to the Height Adjustment Legs.

4.2.2 Circuit Panel

- ☐ Verify the main power source to the RRS HA Hot Air Blower is off.
- ☐ Open the main housing unit's hinged cover door.
- ☐ Label and disconnect all wires coming from the Wiring Box (or direct from the heating elements) from their respective terminal blocks in the Circuit Panel. Lay the wires in the bottom of the control box for reconnection prior to winter.
- ☐ Disconnect the power wires coming into the main housing unit from the main breaker.

4.2.3 Snow Sensor

- ☐ Wipe off the moisture grid (located on top of the Snow Sensor) with a damp cloth. If there is an excessive amount of sediment buildup on the grid that cannot be removed with a damp cloth, use a non-metallic scouring pad and LIGHTLY clean off the grid.
- ☐ Put the black sensor cover over the Snow Sensor to protect it when not in use.



5 Specifications

5.1 RRSHA3 Specifications

Part Number (2)	HP	V	PH	Element Part Number	Watts per Element	Number of Elements	kW	BTU / Hr	Total Amp Draw (1)	Measured Resistance Per Elem Cir. +/-10%
RRSHA32401	3	240	1	SHP240W1625	1625	12	19.5	66536	96	5.9
RRSHA32403			3						56	11.8
RRSHA34801		480	1	SHP240W1625 (3)					48	23.6
RRSHA34803			3						28	47.3
RRSHA36003		600	3	SHP600W1625					23	73.9

(1) Total Amps at incoming wiring connections. If a rod/crib circuit is included then additional amperage applies.

(2) Part Number includes Base Unit, Flex Duct and Track Duct and may include additional suffixes that indicate various options as described below.

(3) Elements Connected Series-Delta

5.2 RRSHA5 Specifications

Part Number (2)	HP	V	PH	Element Part Number	Watts per Element	Number of Elements	kW	BTU / Hr	Total Amp Draw (1)	Measured Resistance Per Elem Cir. +/-10%
RRSHA52401	5	240	1	SHP240W2500	2500	18	45	153546	210	2.6
RRSHA52403			3						122	5.1
RRSHA54801		480	1	SHP480W2500					107	10.2
RRSHA54803			3						61	20.5
RRSHA56003		600	3	SHP600W2500					49	32.0

(1) Total Amps at incoming wiring connections. If a rod/crib circuit is included then additional amperage applies.

(2) Part Number includes Base Unit, Flex Duct and Track Duct and may include additional suffixes that indicate various options as described below.

5.3 RRSHA Part Number Decoder (600VAC only available with 3 Phase)

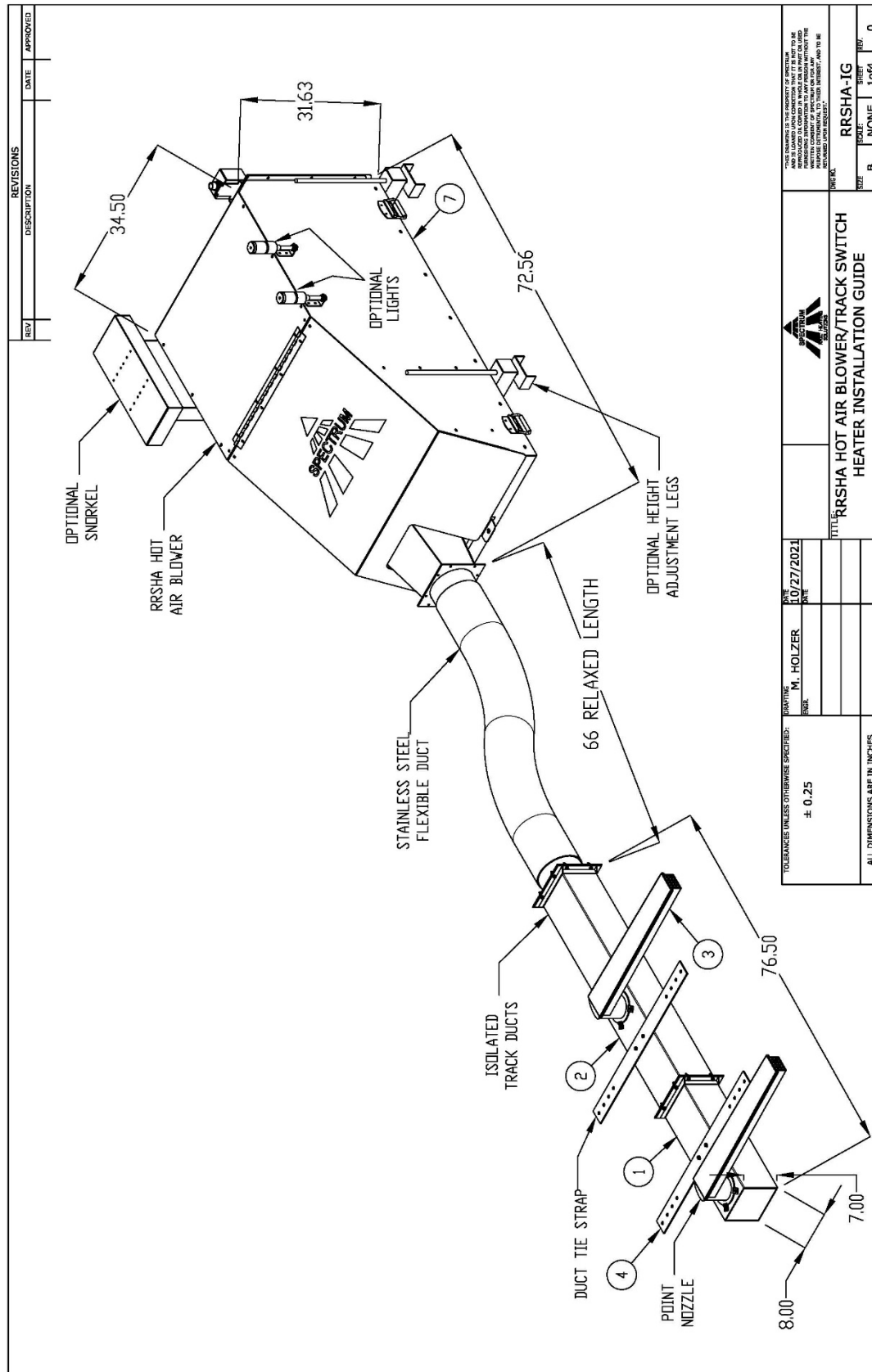
RRSHA	MOTOR HP		SYSTEM VOLTAGE		PHASE		-	Suffix (see below)
	H		V		P			
	3	3 HP	240	240VAC	1	1 Phase		
	5	5 HP	480	480VAC	3	3 Phase		
			600	600VAC				

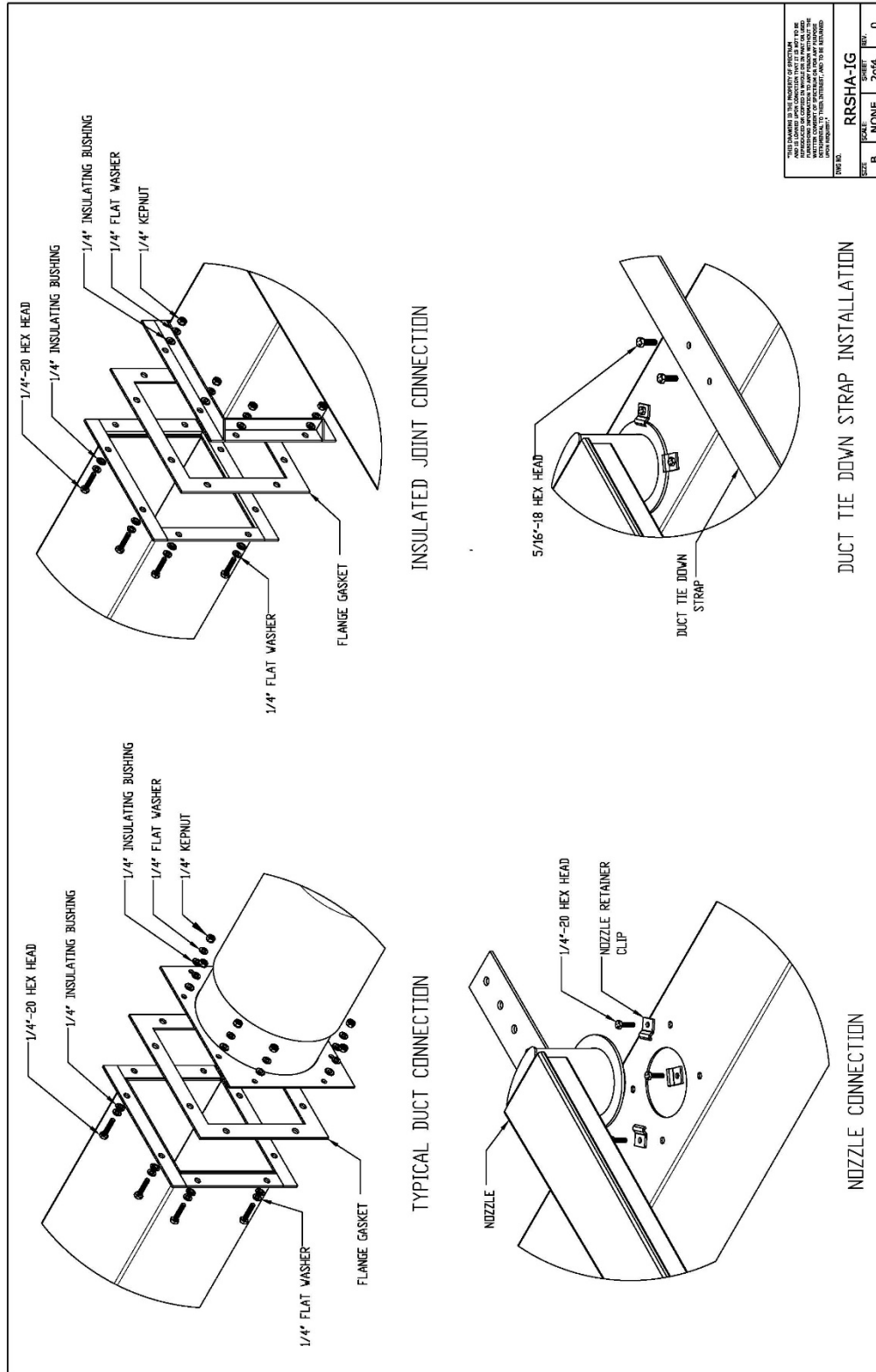
Suffix

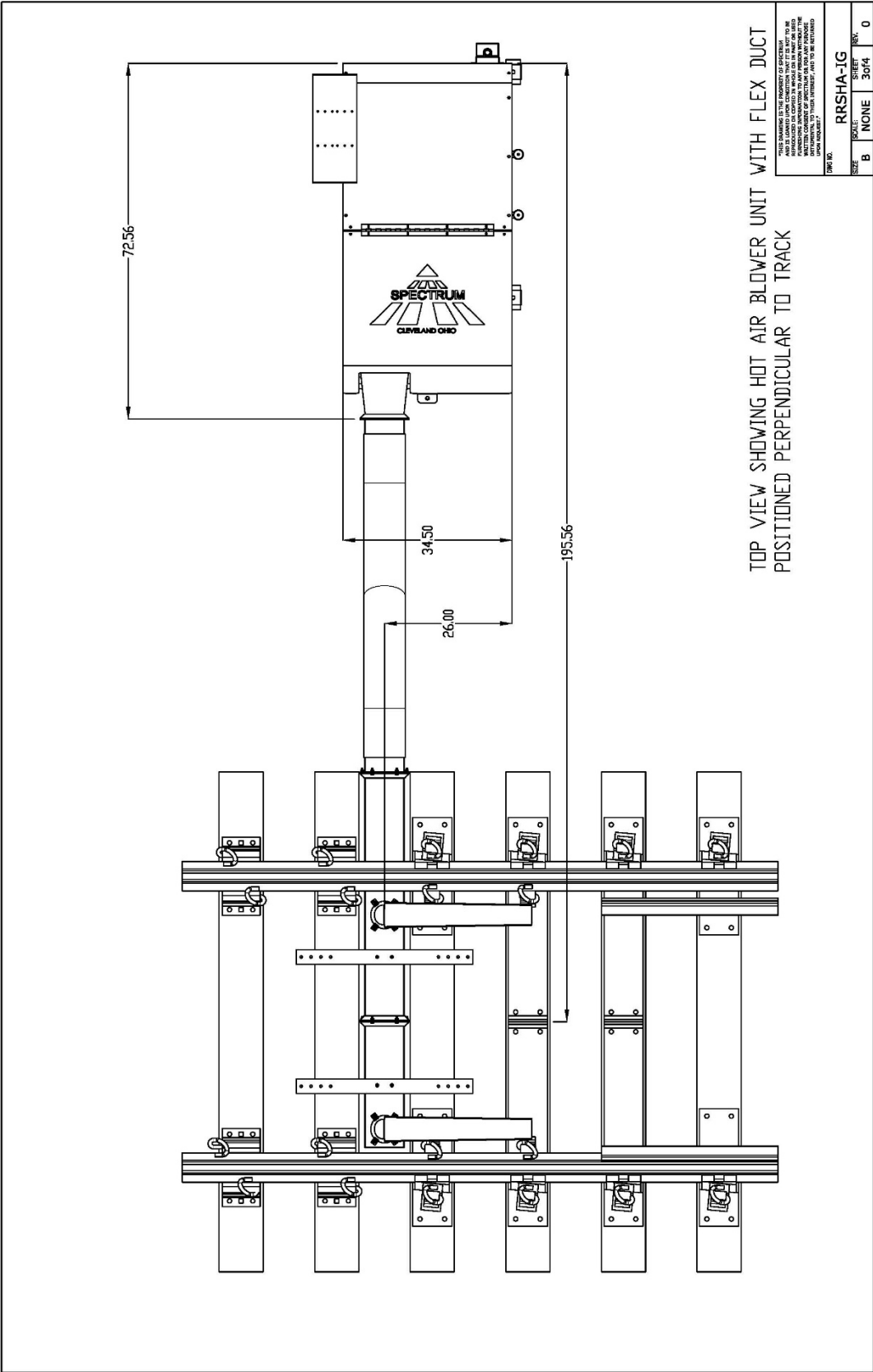
- C Center Duct Type Assembly 12Ft length is included instead of Standard Track Duct
- M Mounting legs included for Blower height adjustment
- P1 external pilot light included - General Fault Alarm (White)
- P2 external pilot light included - Power-On (White)
- R Rod-crib Heater circuit* included.
* 1 circuit, 50A max for 240V or 48A max for 480V, and 600V
Consult factory if more than 1 circuit is required.
Rod-Crib Ground Fault protection is supplied for RRSHA5 series only.
- S Snorkel for Intake is included

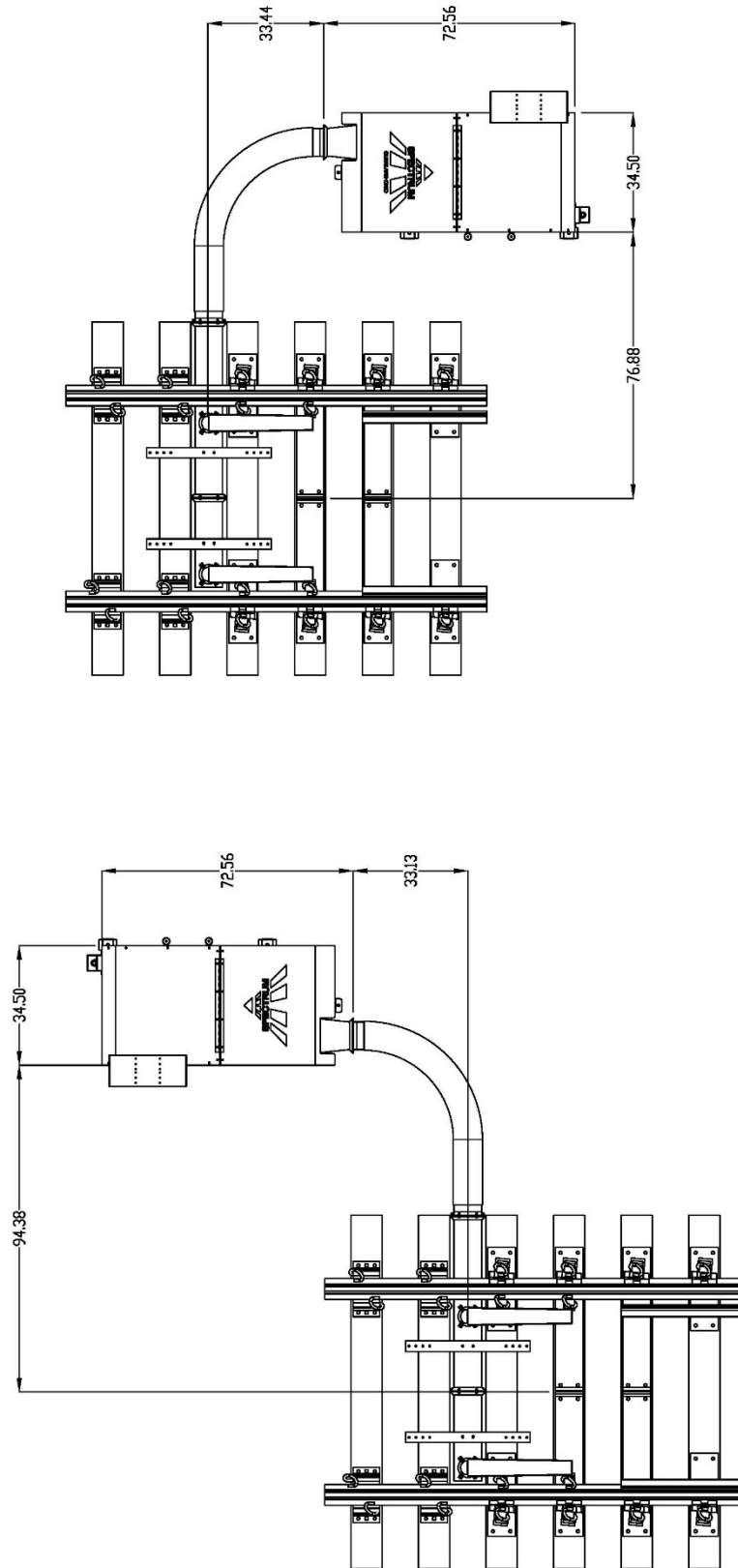
EXAMPLE: RRSHA54803-CMP2R

6 Schematics









TOP VIEW SHOWING HOT AIR BLOWER UNIT WITH FLEX DUCT
POSITIONED LEFT AND RIGHT OF TRACK DUCT LOCATION

ALL DIMENSIONS ARE FOR REFERENCE ONLY AND MAY BE
DIFFERENT DEPENDING ON APPLICATION

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