



USER MANUAL

→ **RRSH300 & RRSH500 Series Track Switch Hot Air Blower**

When MAYBE is not an Option



Spectrum Inc.

800 Resource Drive; Suite 8, Brooklyn Heights, Ohio 44131

Toll Free: 800-605-9818

Main: 440-951-6061

Fax: 216-801-4774

www.spectruminfrared.com



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1 Product Description and Features

1.1 Overview

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



*Fig. 1
RRSB 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 RRSB 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 RRSB Hot Air Blower and track duct during and for some time after operation. Portions of the RRSB 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 RRSB 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 RRSB Hot Air Blower as a factory-assembled unit ready for immediate installation. The RRSB 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 RRS300 and RRS500.

	RRSH300	RRSH500
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 31](#).

1.2 Standard Features

Both models of the Hot Air Blower, the RRS300 and RRS500, contain the following components:

- **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.

- **Stainless Steel Hose:** 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 64" and can expand to approximately 70". 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 RRSB 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 RRSB Hot Air Blower, and this green LED blinks when environmental activation conditions are met.

After activating the RRSB 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 RRSB Hot Air Blower.

A second Snow Sensor can be installed remotely from the RRSB 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 RRSB 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 RRSH Hot Air Blower provides access to the unit's interior components.

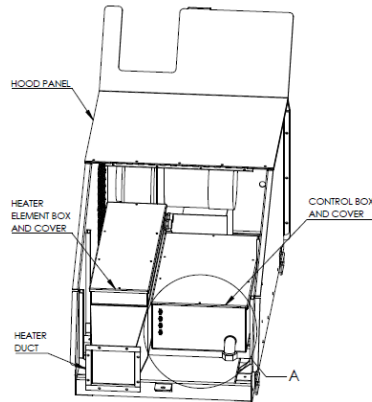


Fig. 5
Interior of Main Housing Unit

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



Fig. 6
Control Switches

Each control switch has either two or three positions.

1.2.2.1 Blower Power

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 RRSH 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

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 RRSH Hot Air Blower. The chart below shows the energy required for each setting of the Heat Setting switch:

	RRSH300 (3.0 HP)	RRSH500 (5.0 HP)
High (default)	19.5kW	45.0kW
Low	9.75kW	22.5kW

1.2.2.3 Cold Air

The Cold Air switch has three positions:

- **Remote** (upper position): If the Remote (Dispatch) Activation feature is used, this setting provides power to the primary heating elements only when the remote switch is activated.
- **On** (middle position): The RRSB 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 Heaters

The Rod – Crib Heaters switch has two positions:

- **On** (upper position): Whenever power is provided to the heating elements, power is also provided to optional equipment such as Crib Heaters or Flat-Jacket Snow Melters.
- **Off** (lower position, set by default): Power is not provided to optional equipment.

1.2.2.5 GFI Fault Reset

The GFI Fault Reset switch is 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

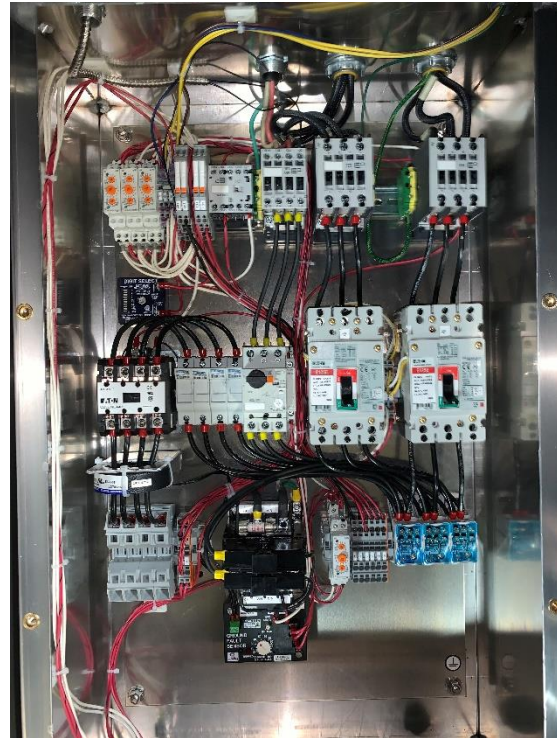


Fig. 7
Circuit Panel

Removing the top panel of the control box provides access to the Circuit Panel. In addition to the primary circuit for the RRSB Hot Air Blower's heating elements and air blower, the Circuit Panel contains 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 blower and rod/crib circuits 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. **Note:** 600V models use fast acting fuses for current protection in place of circuit breakers.

By default, the circuit breaker for the rod/crib circuit is set to the tripped position. If no optional equipment requiring power is installed with the RRSB 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. **Note:** For 600V models, the fuses are factory installed and power is present once power is supplied to the main unit.

1.2.3.2 Individual Ground Fault Protection

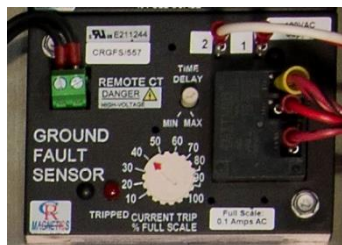


Fig. 9
Ground Fault Sensor

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 provides connection points for optional equipment and accessories for the RRSB Hot Air Blower, as well as remote control and monitoring capabilities.

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 RRSB 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

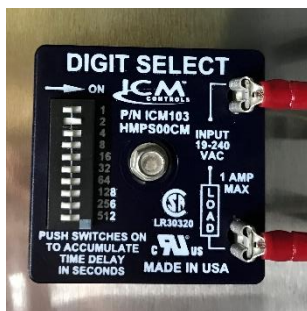


Fig. 12
Delay Timer

The RRSB Hot Air Blower utilizes delay timers on both the blower circuit and the optional rod/crib circuit. The Delay Timers delay the start of each leg of the 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 timers are factory set for a two second delay for each circuit and can be adjusted on site if necessary, for a specific location.

The default delay time of two seconds can be changed. For more information, see [3.2 Adjusting the rod/crib circuit startup delay timer](#) on page 27.

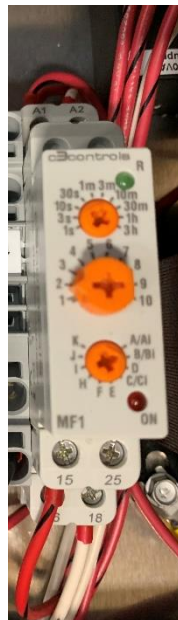


Fig. 13
Delay Timer – Blower Circuit

1.3 Optional Equipment

The following optional features can be added to the RRSB Hot Air Blower as needed.

1.3.1 Remote Snow Sensor

A second Snow Sensor can be 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 RRSB 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 RRSB 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 RRSB 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 RRSB 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 RRSB 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.

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.

The rod/crib circuit in the Circuit Panel provides power for Crib Heaters. If required, Crib Heaters can always be installed after the RRSB Hot Air Blower has been installed.

**NOTE:**

If a Crib Heater is installed, the Rod – Crib Heaters 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.

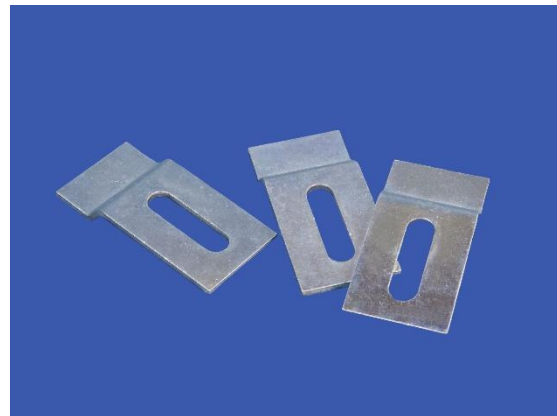


Fig. 178

Bolt-On Clips

**NOTE:**

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*

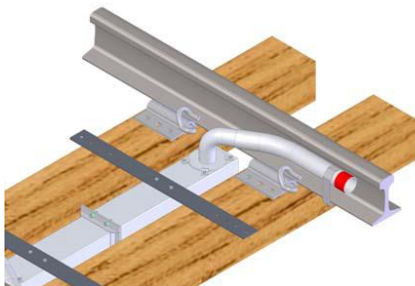
A 12-foot Center Duct can be installed to distribute additional heat along the rails. Center ducts are designed for steel-tie applications to provide heat over the push rods.



NOTES:

1. For information on purchasing and installing a Center Duct, contact Spectrum.
2. The track duct should be modified prior to installation to accommodate the Center Duct.

1.3.5 Flexible Stainless-Steel Nozzle



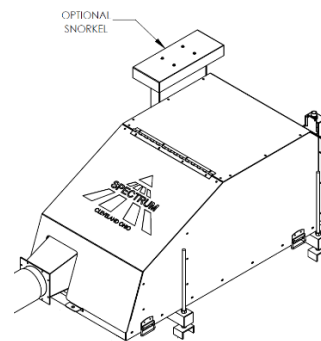
*Fig. 20
Flexible Stainless-Steel Nozzle*

If, due to existing track hardware, the standard rigid nozzles do not adequately direct the heat where it is most needed, they can be replaced with flexible nozzles. The

flexible nozzles are manufactured with aircraft-grade aluminum tubing and a spiral wound interlocked stainless-steel hose. The standard length of this alternate nozzle is 30 inches, with other lengths available on request.

Since the optional flexible nozzles are mounted the same way as the standard rigid nozzles, the two nozzle types can be easily interchanged as needed.

1.3.6 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.



NOTE:

For information on purchasing and installing an Intake Snorkel, contact Spectrum.

1.3.7 Main Circuit Breaker

An additional main circuit breaker can be installed between the power source and the Circuit Panel. This circuit breaker is mounted on the exterior of the main housing unit to allow power to be disconnected prior to opening the RRSB Hot Air Blower for service.



NOTE:

For information on purchasing and installing an additional main circuit breaker, contact Spectrum.



*Fig. 214
Duct Extension*



NOTE:

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

1.4 Accessories

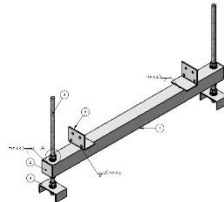


*Fig. 222
Indication
Light*

Accessory equipment is used to place the main housing unit of the RRSB Hot Air Blower in the optimal location relative to the switch area.

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".



*Fig. 203
Height
Adjustment
Legs*

1.4.3 Ground Fault and Power On Indication Lights

An indication light can be mounted outside the main housing unit and configured to provide a visual signal when a ground fault occurs on the rod/crib circuit. Alternatively, the indication light can be configured to illuminate when the RRSB 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.

1.4.2 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.



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 sizes:

Size	Interior Dimensions		
	Width	Depth	Height

WB-2	5"	6.25"	4"
WB-6	12"	12"	4"

Each Wiring Box comes with a weather-tight lid secured with either a hinged and lockable lid or machine screws. A variety of fittings, from cord grips to barbed fittings, can be installed on the box's ports to run wires through the box.

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 27" of 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.

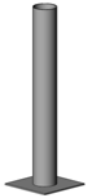


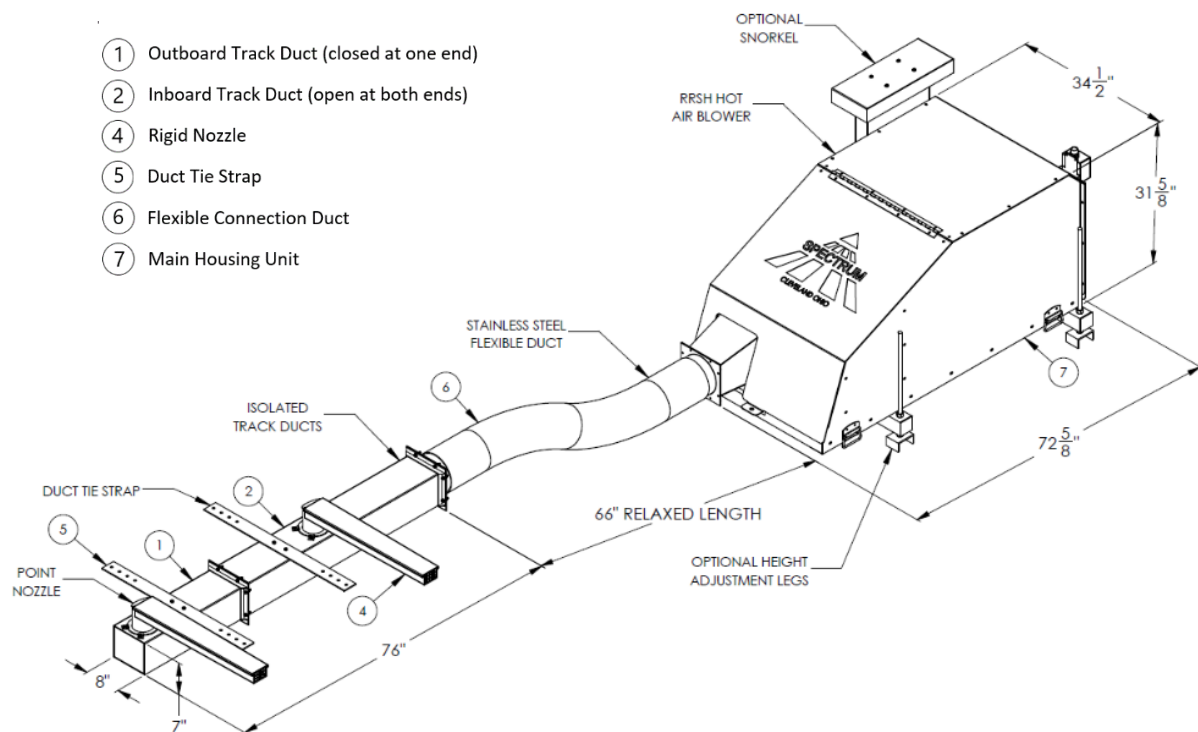
Fig. 246
Wiring Box
Post

2 Installation

The typical installation consists of:

- Installing the RRSH Hot Air Blower at track side
- Wiring the main housing unit
- Installing optional equipment and accessories
- Activating the RRSH Hot Air Blower for the first time

2.1 Installing the RRHS Hot Air Blower



*Fig. 257
Installation Diagram*

Figure 26 identifies the components of the RRSH Hot Air Blower that are installed at track side.

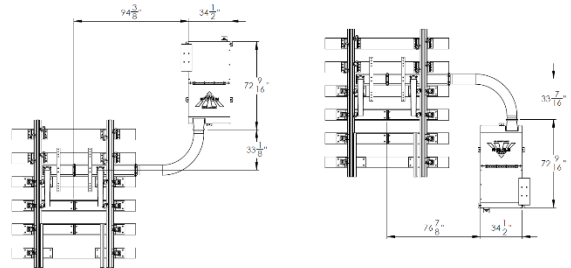
2.1.1 Preparing the installation area

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 27) 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*

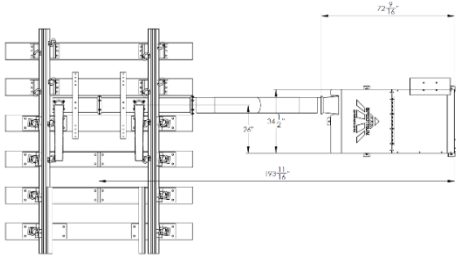


Fig. 30
Perpendicular Installation Example

- For the safety of the internal components and personnel, the RRSB 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.



Fig. 281
Grounding Lug

2.1.2 Routing power to the main housing unit

The power supply was determined before the RRSB Hot Air Blower was ordered. The power supply must deliver the required voltage and load carrying capacity.

- Make sure the power supply cable is sized properly for the RRSB 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.
- Drill holes into the bottom plate of the main housing unit for the main

power cable and the cables for any optional equipment.

- 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.

- Clear the installation area of ballast to allow the track duct to slide in position under the rail.
- Pass both sections of the track duct under the stock rail.
- 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.



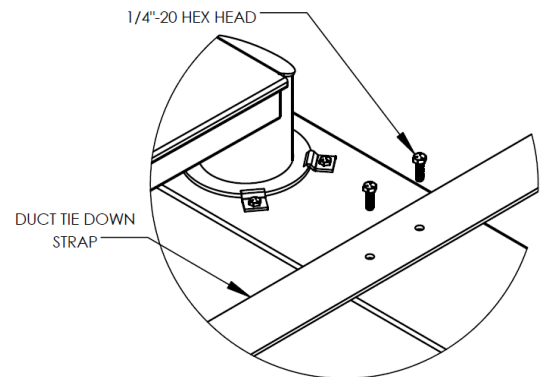
*Fig. 325
Nozzle Installed with Clips Turned In*

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 to the ties

1. Attach the duct tie-down straps to the track duct, using two 1/4"-20 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 and rivet nut inserts, attach the track duct to the flexible connecting duct.

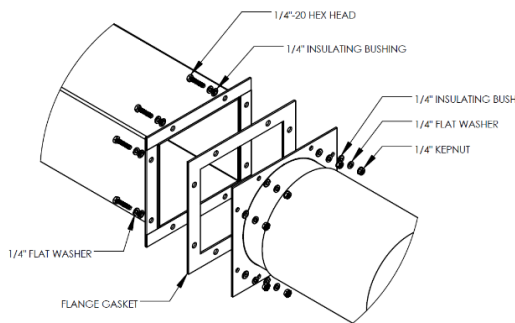


Fig. 347
Track Duct to Flexible
Connecting Duct Assembly

3. Using eight 1/4"-20 stainless bolts and rivet nut inserts, 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.

2.2 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 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 RRSB 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. If the fan wheel rotation is correct, skip steps 5 through 8 of this procedure.
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 RRSB 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 RRSB 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 to a maximum depth of 22".



*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.

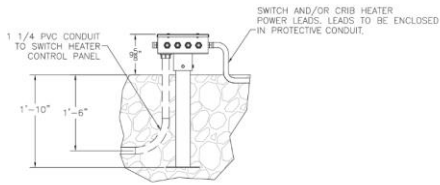


Fig. 40
Wiring Box and
Wiring Box Post Installation

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



NOTE:

Optional AAR terminals and 3-conductor feed through terminal are available.

2.3.2 Remote (track side) Snow Sensor

If ordered, the Remote Snow Sensor has four wires that should be connected as follows:

- Yellow to TB1-1
- Yellow to TB1-4
- Black or Brown to TB1-4
- White or Blue to TB1-2

2.3.3 Fault and Power On Indication Lights

The Ground Fault and Power On lights are connected to the Customer Connection Block. If purchased separately, contact Spectrum for installation instructions.

2.3.4 Height Adjustment Legs

If purchased separately, contact Spectrum for installation instructions.

2.3.5 Crib Heaters

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

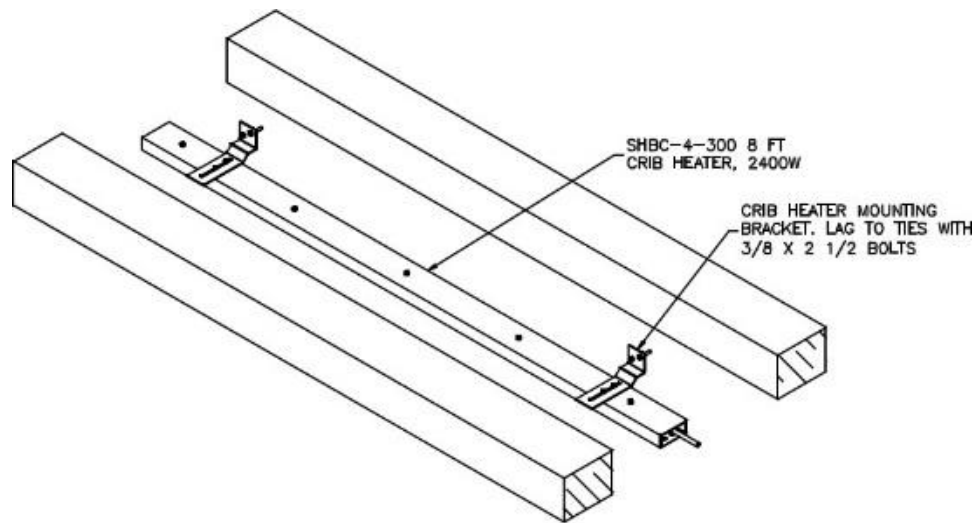


Fig. 371

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.

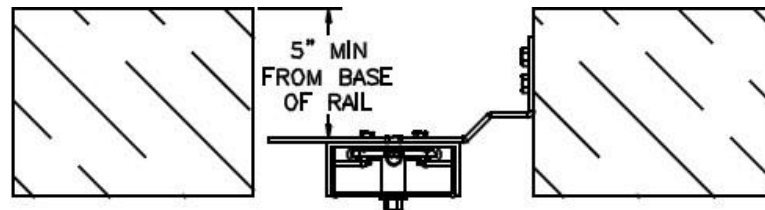


Fig. 382

Crib Heater installation

2.3.6 Flat-Jacket Snow Melters

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.

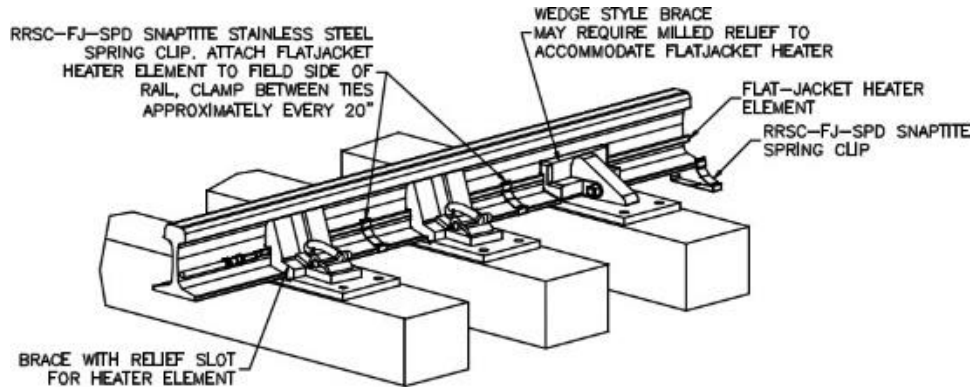


Fig. 393
SnapTite Rail Clip Installation

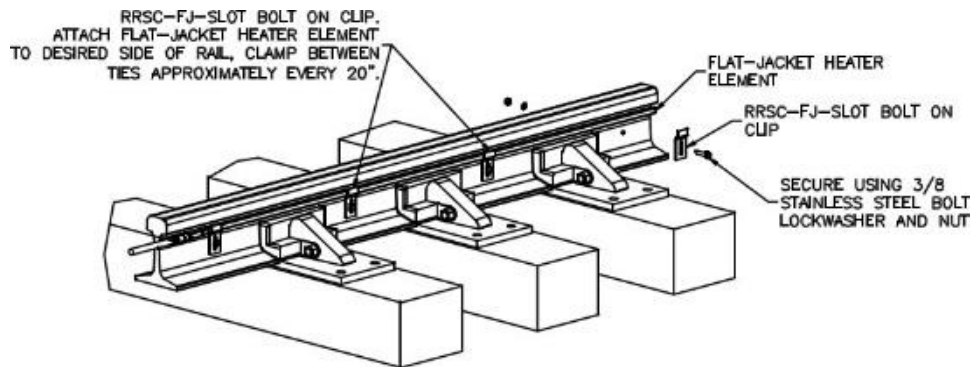


Fig. 404
Bolt-On Clip Installation

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

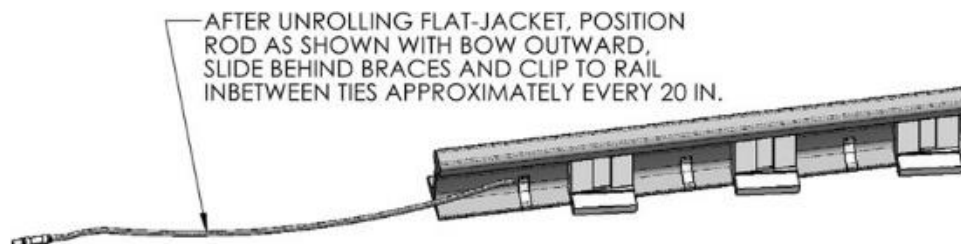


Fig. 415
Flat-Jacket Snow Melter Rod Installation



2.4 Initial Activation of the Hot Air Blower

After the RRSB Hot Air Blower is installed, verify it can be activated by each available method.

2.4.1 Manual Activation

Verify the RRSB 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 RRSB 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 RRSB Hot Air Blower can be activated by Remote (Dispatch) Activation.

1. Request dispatch to activate the RRSB 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 RRSH Hot Air Blower can be adjusted.

3.1 Adjusting Snow Sensor settings

By default, the Snow Sensor activates the RRSH 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 RRSH 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.

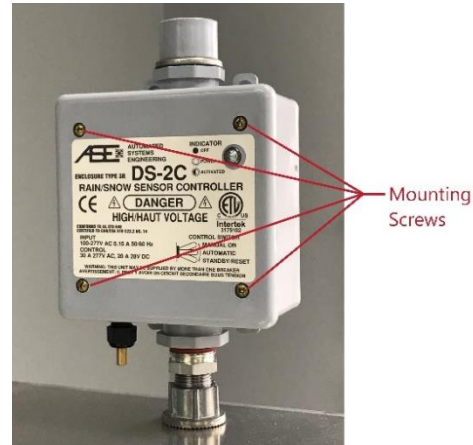


Fig. 426

Snow Sensor Mounting Screws

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

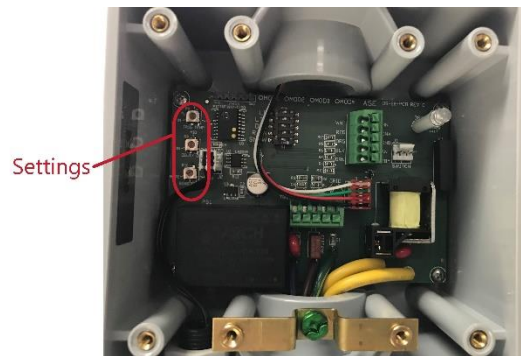


Fig. 437

Snow Sensor Control Panel

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

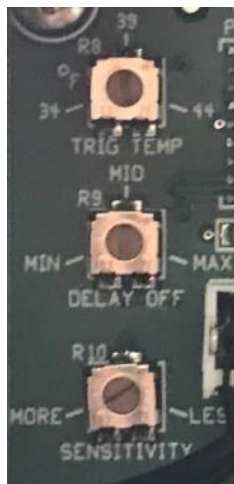


Fig. 448

Snow Sensor Settings

- **TRIG TEMP** – the temperature which activates or de-activates the RRSB Hot Air Blower. The value can be set from 34°F to 44°F.
 - **DELAY OFF** – the amount of time the RRSB 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 RRSB 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 RRSB Hot Air Blowers that also power optional equipment, the Delay Timer function powers the secondary circuit between one second to several minutes after 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 RRSB Hot Air Blower's hinged cover door.
2. Open the cover of the control box.
3. The delay timer has 10 switches, with digital values ranging from 1 to 512. Each switch sets the number of seconds for the delay. Verify the 2 switch is set to the **On** position.



Fig. 459

Delay Timer Switches

4. Set the switches to the desired delay start time for the 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 RRSB Hot Air Blower from its power source.
2. Verify the green LED on the Snow Sensor is not illuminated.
3. Open the RRSB 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

6. Using a flat-head screwdriver, turn the sensitivity dial to the desired setting, from 10 to 100 milliamps.

7. Connect the RRSB Hot Air Blower to its power source.



WARNING:

Power is being supplied to the RRSB 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 RRSB 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.

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, 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 RRSB 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 RRSB Hot Air Blower.
- ☐ Verify the RRSB 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 RRSB 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 RRSB 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 RRSB 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 RRSB 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 RRSB 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 RRSB 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 RRSB 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 RRS300 Specifications

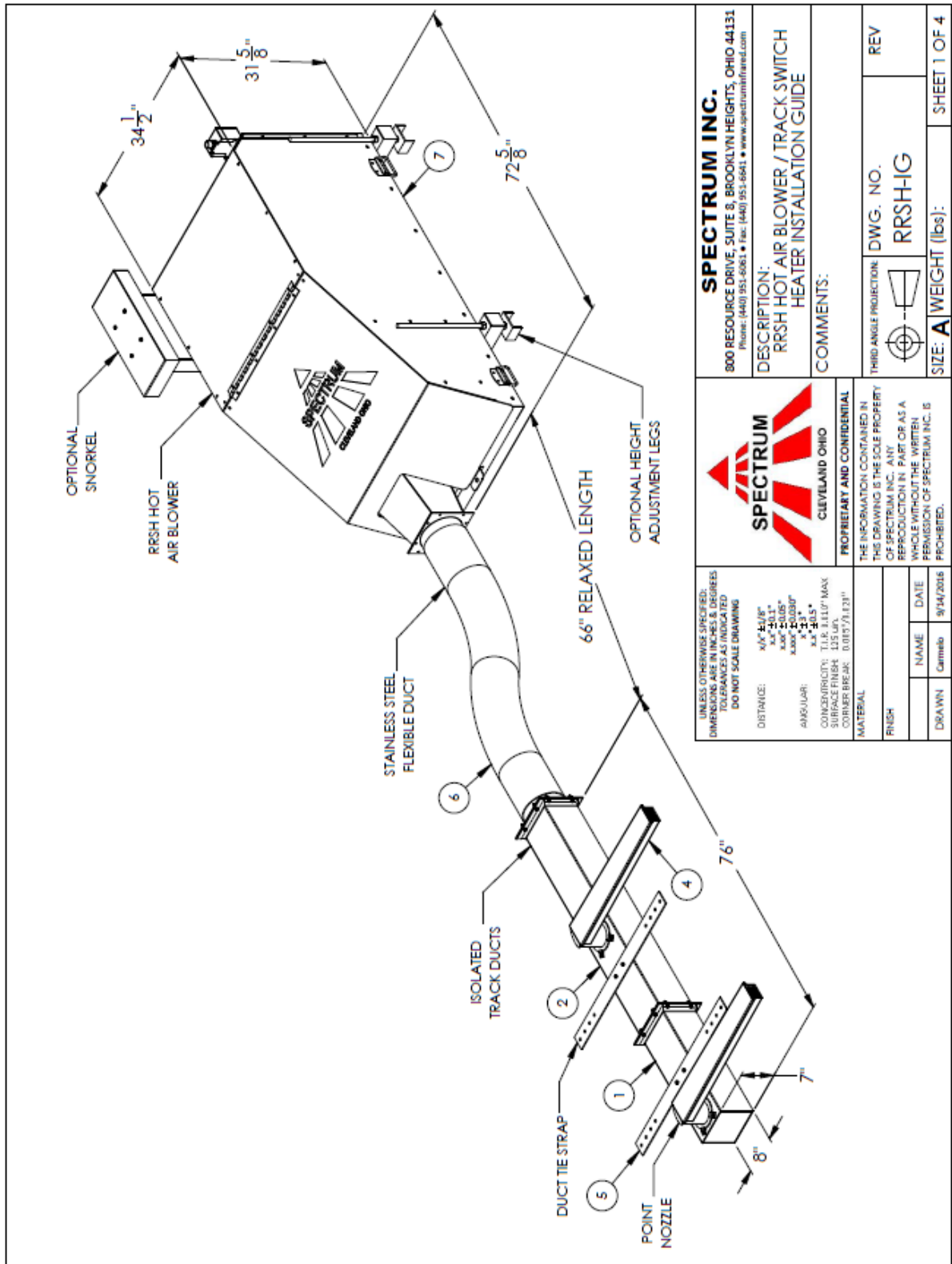
Part Number	HP	V	PH	Element Part Number	Watts / Element	Number of Elements	kW	BTU / Hr	Total Amp Draw	Measured Resistance +/-10%
RRSH321	3	240	1	SHP240W1625	1625	12	19.5	66536	95	2.9
RRSH323			3						55	35.4
RRSH341		480	1	SHP480W1625					47	11.8
RRSH343			3						26	141.8
RRSH361		600	1	SHP600W1625					36	18.5
RRSH363			3						22	221.5

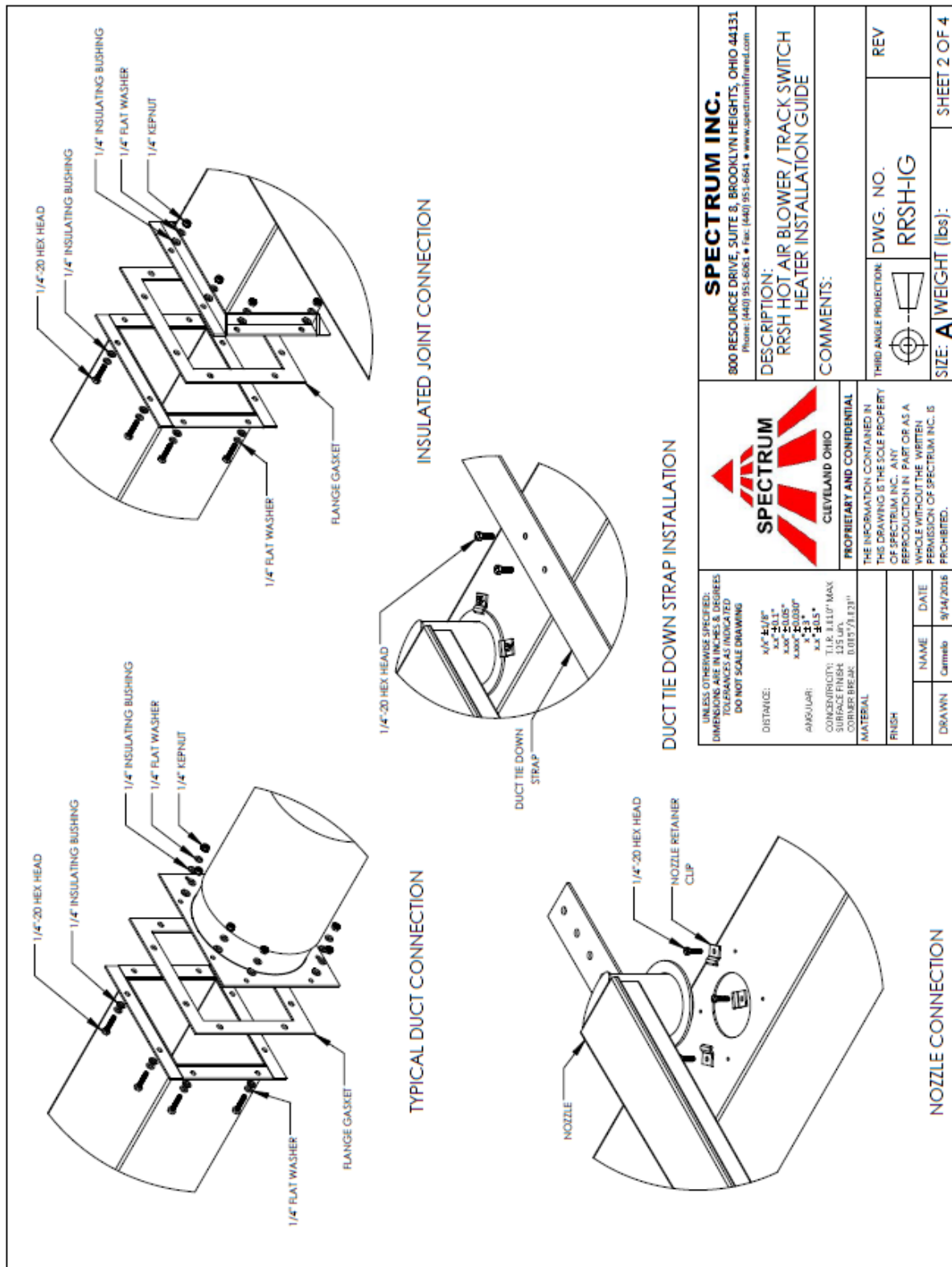
5.2 RRS500 Specifications

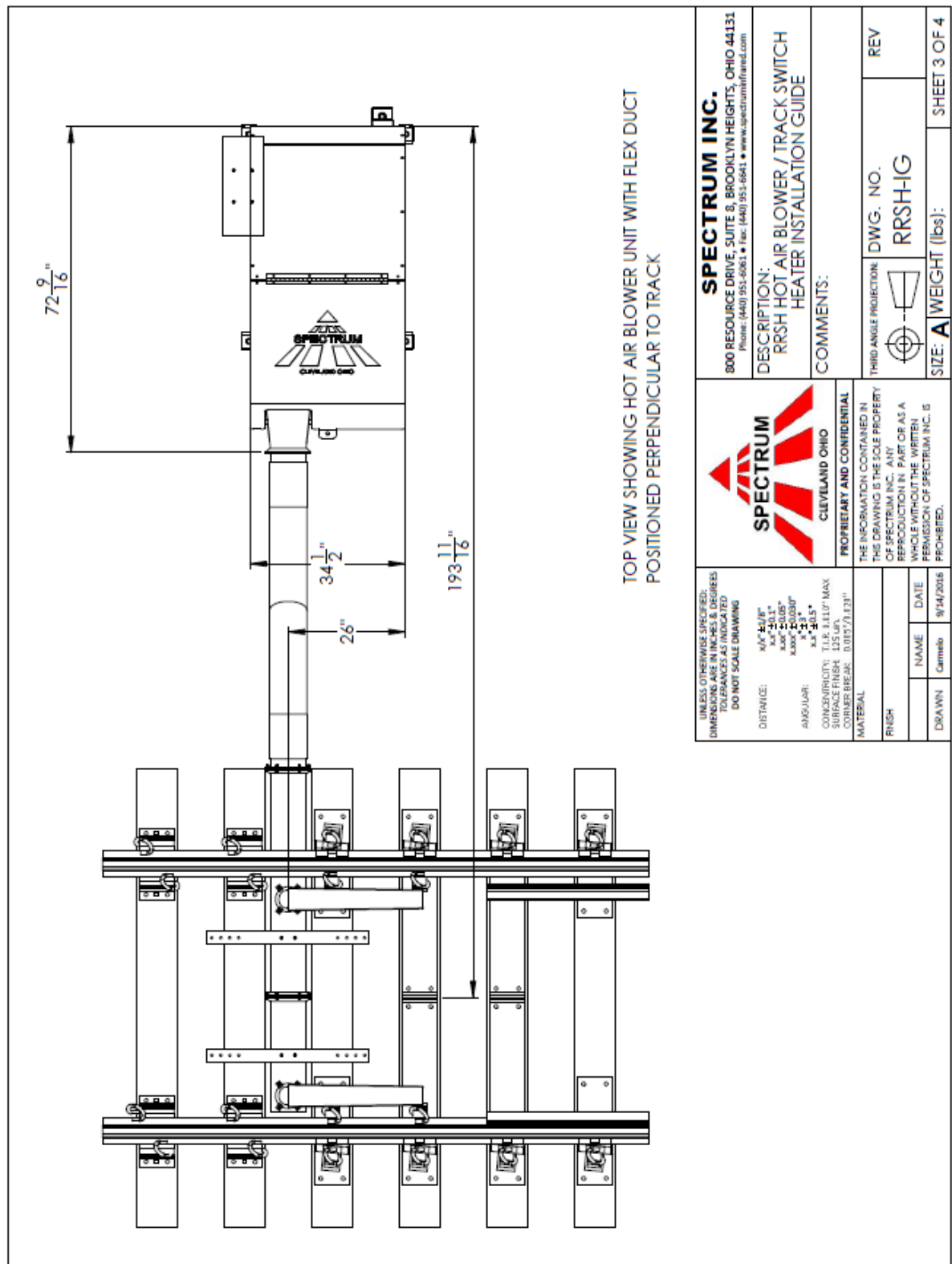
Part Number	HP	V	PH	Element Part Number	Watts / Element	Number of Elements	kW	BTU / Hr	Total Amp Draw	Measured Resistance +/-10%
RRSH521	5	240	1	SHP240W2500	2500	18	45	153546	208	1.3
RRSH523			3						120	15.4
RRSH541		480	1	SHP480W2500					104	5.1
RRSH543			3						60	61.4
RRSH561		600	1	SHP600W2500					81	8.0
RRSH563			3						48	96.0

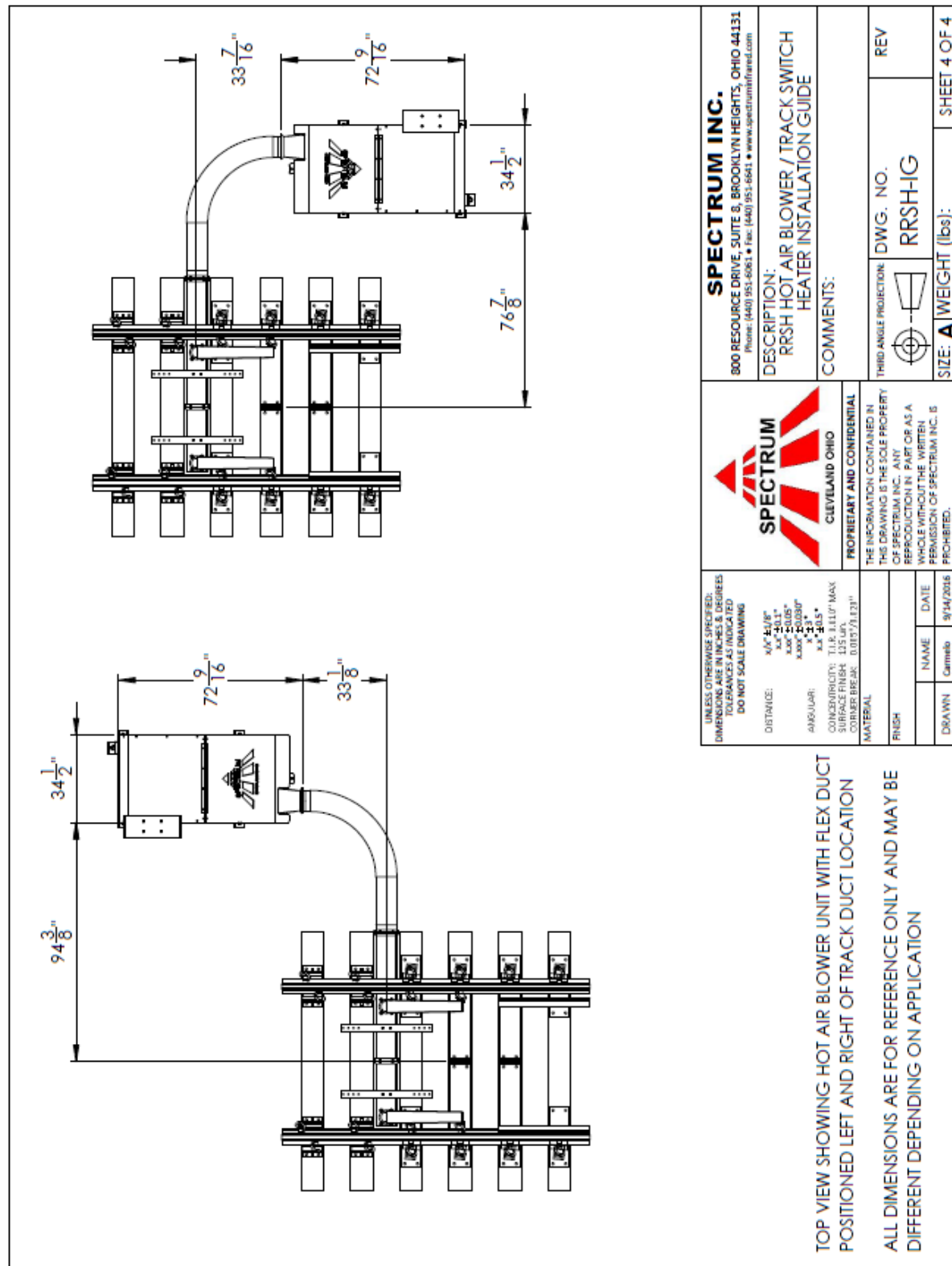


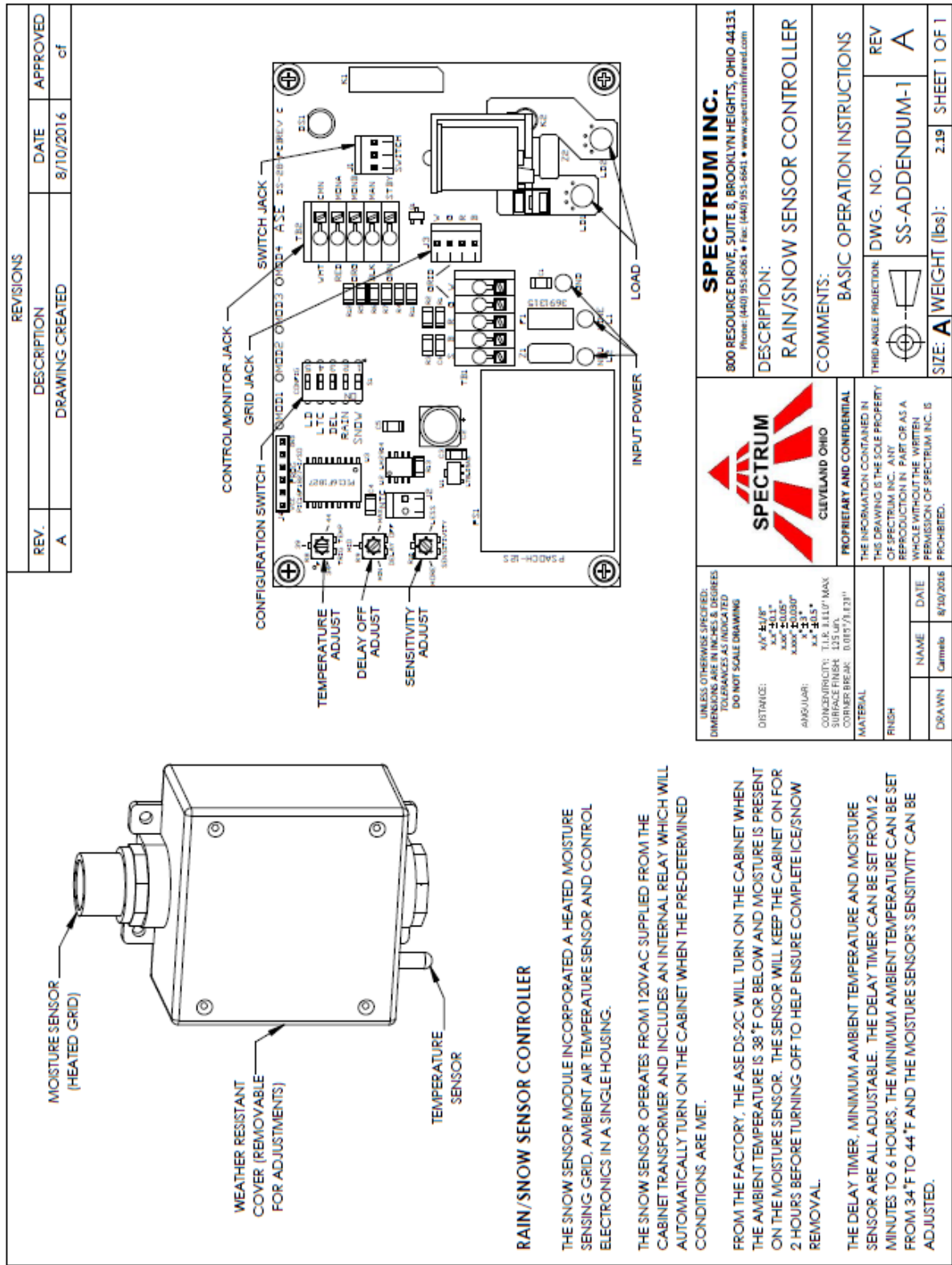
6 Schematics

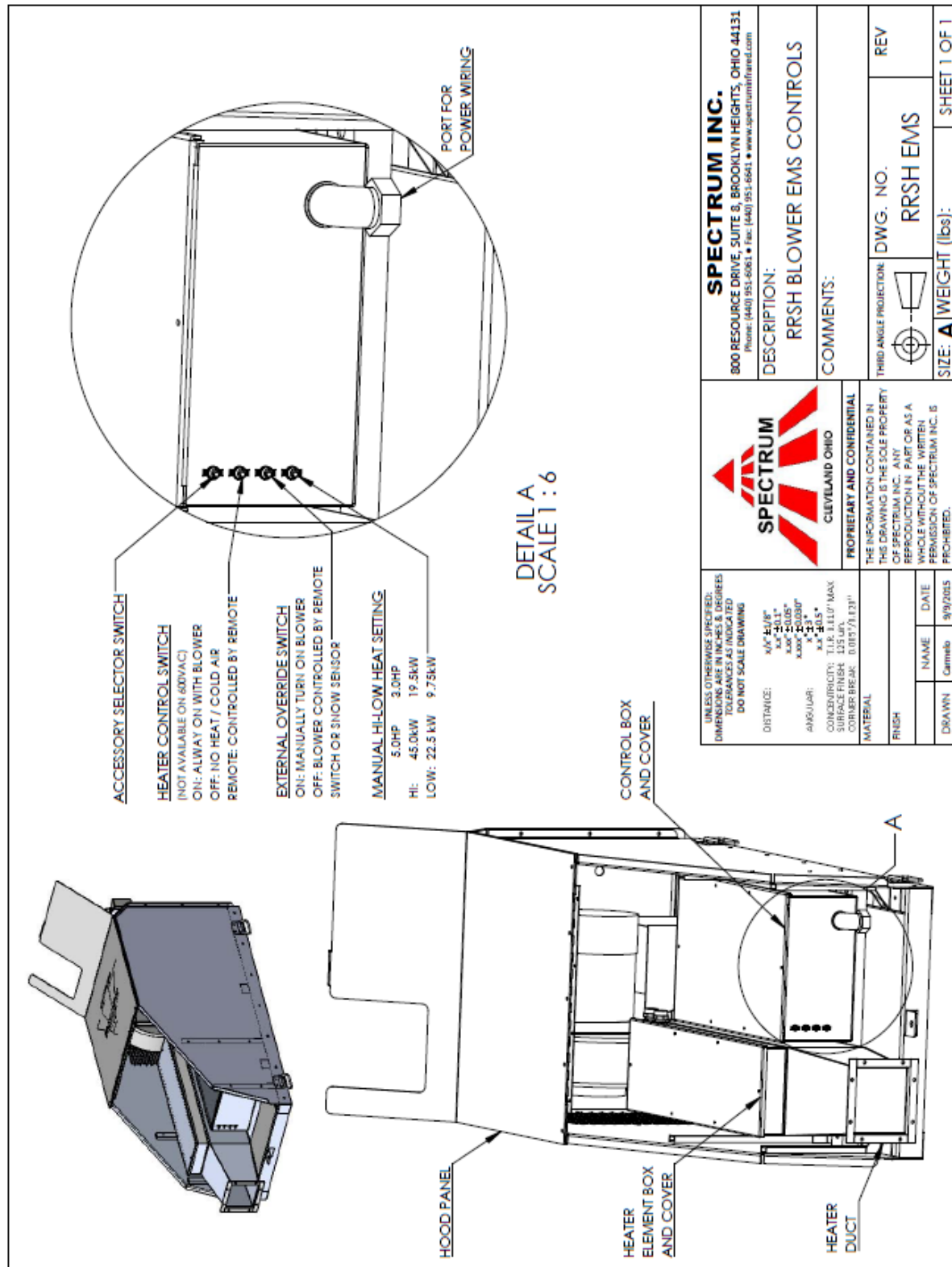














Spectrum Inc. Limited Warranty

Products purchased from Spectrum have the warranties stated below.

Limited Warranty

Company warrants the Equipment manufactured by Company for a period of the lesser of 12 months from initial start-up or 18 months from date of shipment, whichever is less, against failure due to defects in material and manufacture and that it has the capacities and ratings set forth in Company's catalogs and bulletins ("Warranty"). Exclusions from this Warranty include damage or failure arising from: wear and tear; corrosion, erosion, deterioration; modifications made by others to the Equipment; repairs or alterations by a party other than Company that adversely affects the stability or reliability of the Equipment; vandalism; neglect; accident; adverse weather or environmental conditions; abuse or improper use; improper installation; unusual physical or electrical or mechanical stress; operation with any accessory, equipment or part not specifically approved by Company; and/or lack of proper maintenance as recommended by Company. Company's obligations and liabilities under this Warranty are limited to furnishing replacement equipment or parts, at its option, FCA (Incoterms 2000) factory or warehouse (f.o.b. factory or warehouse for US domestic purposes) at Company-designated shipping point, freight-allowed to Company's warranty agent's stock location, for all non-conforming Company-manufactured Equipment (which have been returned by Customer to Company). Returns must have prior written approval by Company. Equipment, material, and/or parts that are not manufactured by Company are not warranted by Company and have such warranties as may be extended by the respective manufacturer. No warranty liability

whatsoever shall attach to Company until Customer's complete order has been paid for in full and Company's liability under this Warranty shall be limited to the purchase price of the Equipment shown to be defective. Additional warranty protection is available on an extra-cost basis and must be in writing and agreed to by an authorized signatory of the Company. Warranty claims must be submitted within 30 days of failure; claims made after the 30 days may not be honored. **EXCEPT FOR COMPANY'S WARRANTY EXPRESSLY SET FORTH HEREIN, COMPANY DOES NOT MAKE, AND HEREBY EXPRESSLY DISCLAIMS, ANY WARRANTIES, EXPRESS OR IMPLIED, CONCERNING ITS PRODUCTS, EQUIPMENT, OR SERVICES, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF DESIGN, MERCHANTABILITY, OR OF FITNESS FOR A PARTICULAR PURPOSE, OR OTHERS THAT ARE ALLEGED TO ARISE FROM COURSE OF DEALING OR TRADE.** NOTWITHSTANDING ANYTHING TO THE CONTRARY, IN NO EVENT SHALL COMPANY BE LIABLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING WITHOUT LIMITATION, PRODUCT LOSS, LOST REVENUE, OR PROFITS), OR PUNITIVE DAMAGES WHETHER CLAIMED UNDER CONTRACT, WARRANTY, NEGLIGENCE, STRICT LIABILITY, OR ANY OTHER LEGAL THEORY OF FACTS.