

IMPORTANT INSTRUCTIONS - SAVE THESE INSTRUCTIONS

Read all instructions before installing or using the horizontal air curtain for hot box detectors. Please adhere to instructions published in this manual. Failure to do so may be dangerous and may void certain provisions of your warranty.



Horizontal Air Curtain for Hot Box Detectors

HAC/HBD

Installation, Operation, & Maintenance Instructions



TABLE OF CONTENTS

A. Important Notices And Warning Symbols	2	E. Electrical Connections	10
B. HAC/HBD Overview	3	E.1 Electrical Connections.....	10
B.1 Introduction.....	3	E.2 Combination Schematic & Wiring Diagram.....	11
B.2 Specifications.....	3	F. Operation	12
C. Installation Overview	4	F.1 Key Components	12
C.1 Installation Overview.....	4	F.2 General	12
C.2 Recommended Tools.....	4	F.3 Temperature Switch	13
D. Mechanical Installation	4	F.4 Motor Overload Protection	13
D.1 Cross Duct	4	F.5 Delay Start Timer	13
D.2 Foundation Preparation for Fastrax® HAC/HBD.....	4	G. Inspection	14
D.3 Nozzle Assembly & Installation (Servo/Harmon Type Detector).....	6	G.1 General	14
D.5 Nozzle Location (Servo/Hermon Detector)	7	G.2 Prior to Annual Start Up.....	14
D.4 Nozzle Assembly & Installation (Southern Technologies Detector).....	8	H. Maintenance	14
D.6 Nozzle Location (Southern Technologies Detector)	9	H.1 General.....	14
D.7 Mounting Beam & Detector Chassis Space Restriction - Electrical Isolation Kit Add-On.....	10	H.2 Blower Wheel & Motor Removal.....	14
		I. Troubleshooting	15
		J. Parts	15

A. IMPORTANT NOTICES AND WARNING SYMBOLS

Keep this manual with the machine at all times. The purpose of this manual is to provide owners, operators, and installers with the precautions and procedures essential for the safe and proper operation for its intended purpose.



CAUTION. This symbol indicates a potentially hazardous situation, which, if not avoided, may result in personal injury or damage to the equipment.



WARNING. Read and adhere to the following. Failure to do so may result in severe or fatal injury. Warranty will be void.



WARNING. This symbol indicates an imminently hazardous situation, which, if not avoided, can result in serious injury or damage to the equipment.

NOTE: “NOTE:” indicates information or a company policy that relates directly or indirectly to the safety of personnel or protection of property.

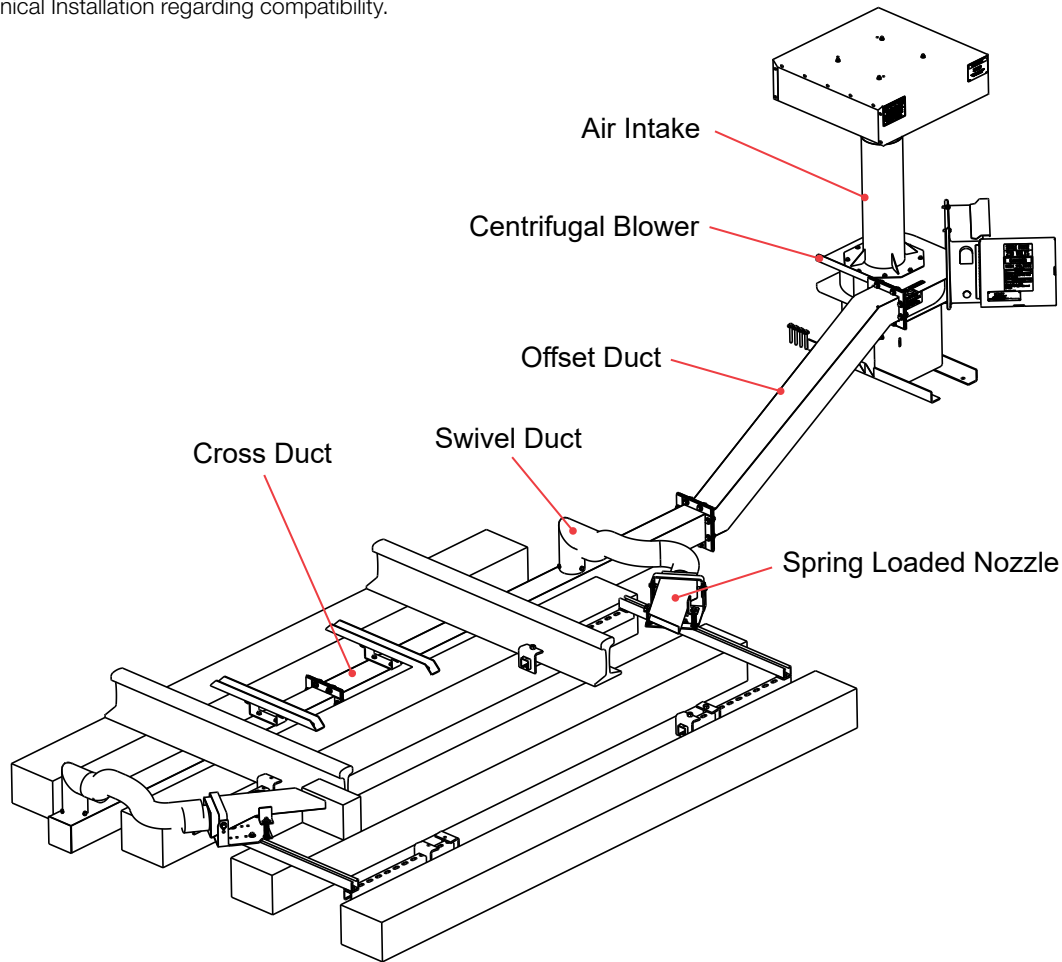
B. HAC/HBD OVERVIEW

B.1 Introduction

The Fastrax® Horizontal Air Curtain for Hot Box Detectors (HAC/HBD) keeps the scanner line of sight clear by preventing the accumulation of snow and freezing rain. It does this by covering the rail mounted hot box detector with a high velocity curtain of air at ambient temperature.

The Fastrax® HAC/HBD is intended for use with hot box detectors mounted straddling a tie. If the hot box detector is to be crib mounted please refer to Section D - Mechanical Installation regarding compatibility.

The Fastrax® HAC/HBD consists of a compact electrically powered centrifugal blower equipped with a low velocity intake, ducting and two nozzles. The air from the blower is ducted below the rails, exits the rail mounted nozzles at approximately 100 mph (160 kph), and is directed over the hot box detector, as shown.



B.2 Specifications

1. Compatibility: Servo and Southern Technologies detectors
2. Performance: 1.5 HP HAC delivers peak nozzle velocity of 100 mph.
3. Construction:
 - 14 gauge cold rolled steel, including nozzles
 - Durable epoxy powder coated blower, intake, and duct work
 - Direct drive centrifugal blower
 - Stainless steel electrical box
 - Match balanced motor and impeller sets, to less than 0.2 ips pk-pk
4. Size & Operating Voltage: 1.5 HP, 240VAC, 8 amp, 1 phase.
5. Controls:
 - Weather-tight NEMA 3R electrical enclosure
 - REMOTE/AUTO/MANUAL modes
 - Magnetic motor starter complete with thermal overload protection
6. Terminal Block Wire Size: #12 to #4 AWG copper
7. Electrical Isolation: Ducting, nozzle connections and unistruts are electrically isolated to eliminate the possibility of short circuiting rails. Connections are designed and tested to withstand a maximum of 1500VAC for 3 seconds.

C. INSTALLATION OVERVIEW

C.1 Installation Overview

The Fastrax® HAC/HBD blower can be conveniently located on either side of the hot box detector. The ducting allows flexibility for various crib and tie dimensions. The following section detail the Fastrax® HAC/HBD installation.

C.2 Recommended Tools

- A source of power to operate power tools (portable generator)
- Impact wrench, 1/2" drive with 1/2", 9/16" and 3/4" sockets
- Drill, 3/8" drive and drill bits
- Two 9/16" wrenches and/or socket wrench
- Lining and tamping bars
- Sledge hammer
- Shovels
- Reciprocating saw
- Cold chisel and hammer
- Measuring tape
- Multimeter
- Clip on ammeter
- 4 foot level

D. MECHANICAL INSTALLATION

NOTE: To install the Fastrax® HAC/HBD ducting, the ballast in the crib which receives the cross duct must be cleared to 8 inches below the bottom of the rail.

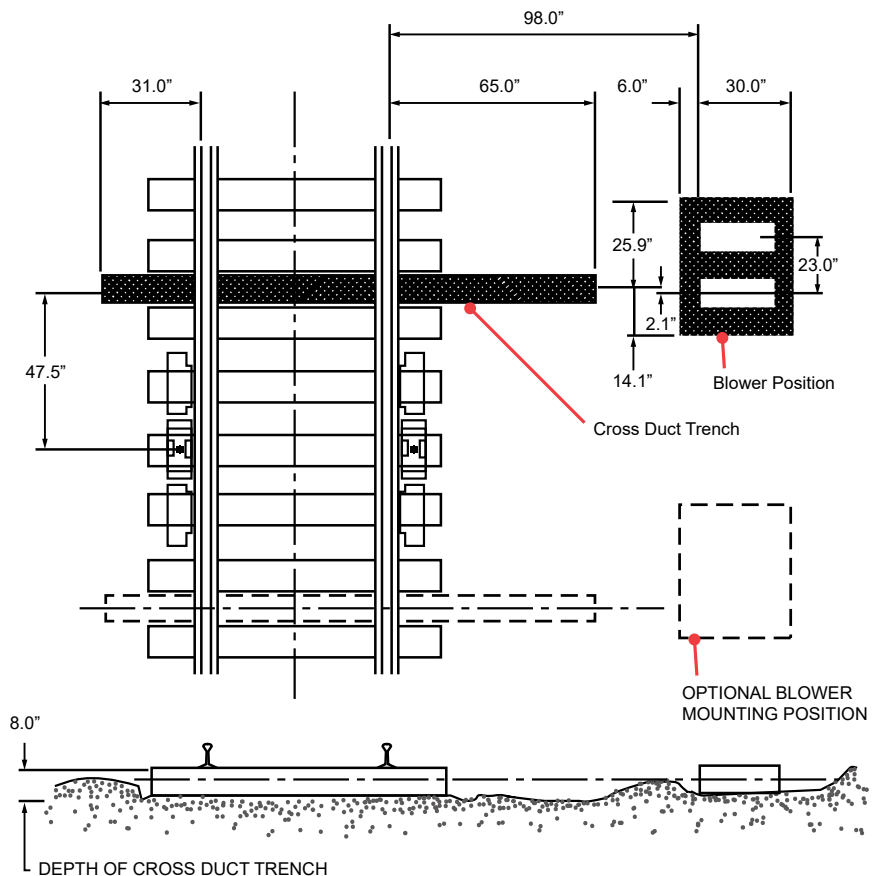
D.1 Cross Duct

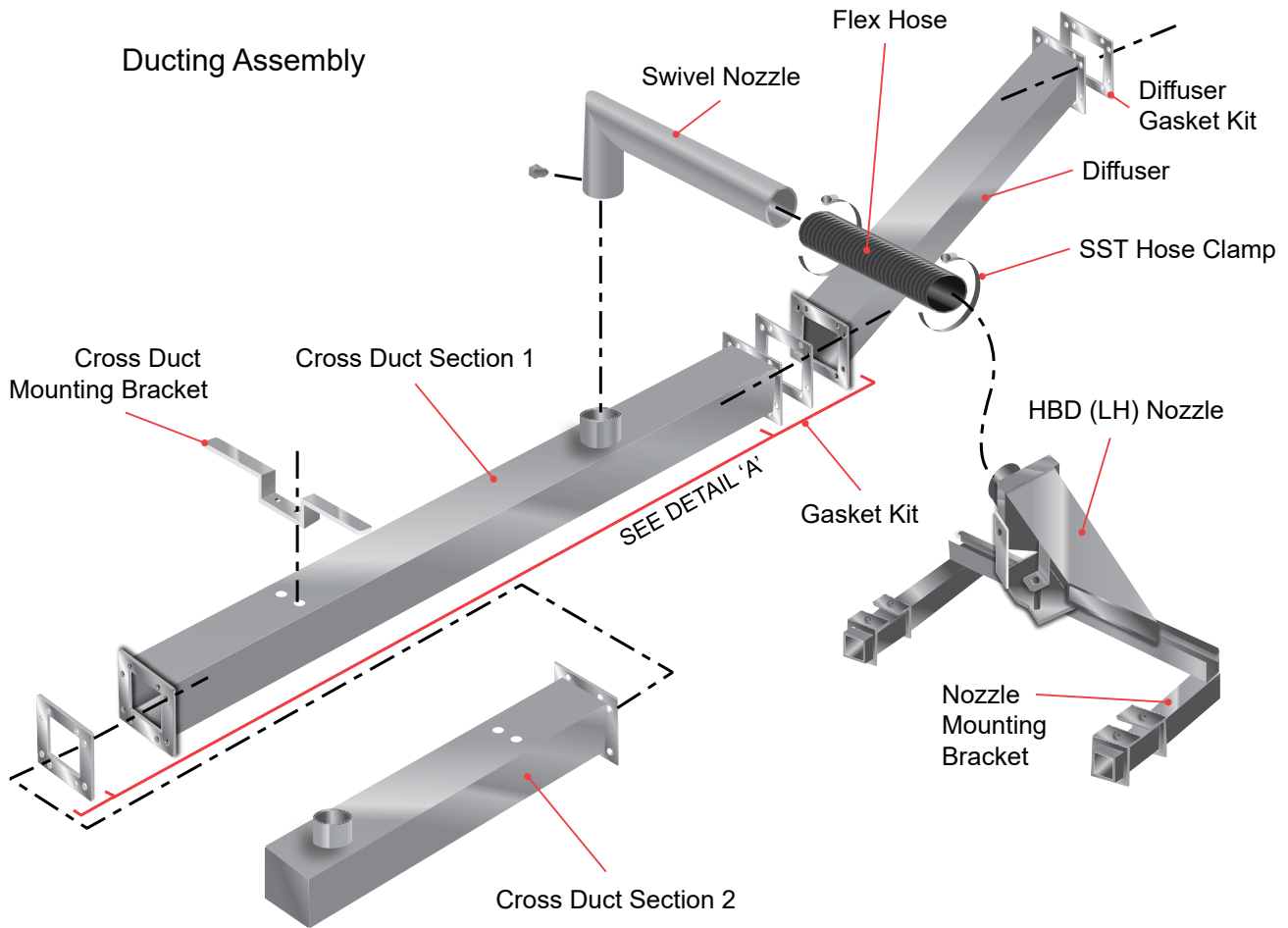
1. Assemble the cross ducts.
2. Install cross duct gasket kits between the flanges and secure together using the fastening hardware supplied. (See Detail 'A').
3. Slide the assembled cross ducts beneath the rails into position, such that the nozzle collars are centered about the track centre line.
4. Fasten the cross duct mounting brackets to the cross duct with the supplied bolts, and to the wood tie with the supplied lag bolts.
5. Attach the offset duct to the cross duct.

D.2 Foundation Preparation for Fastrax® HAC/HBD

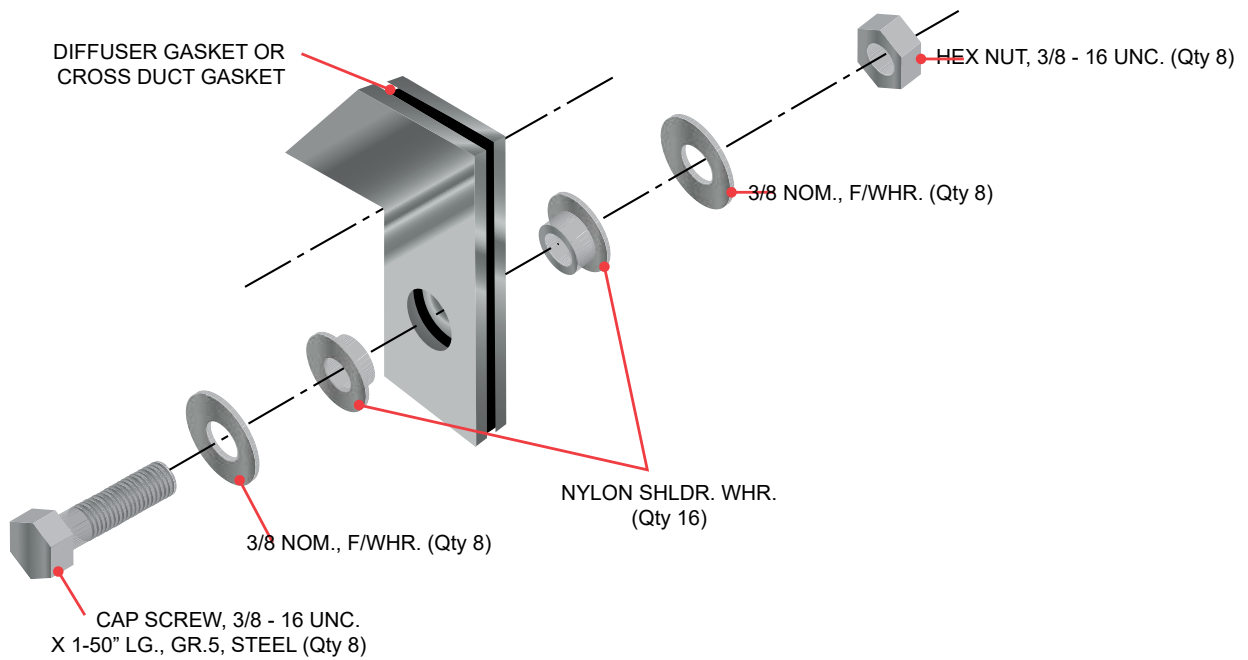
1. Prepare the foundation for the blower, level the ground and provide two 24 inch long sections of solid railroad ties on which to mount and secure the blower.
2. Ensure the ties are level and at the same height as the rail ties so the blower flange aligns with the offset duct flange.

- 2.1 Slide the blower into position and install the offset gasket kit between the two flanges. Fasten together using the hardware supplied (see Detail 'A').
- 2.2 Fasten the blower to the mounting ties with the supplied lag bolts.
- 2.3 Place the swivel ducts over the collars on the cross duct, align, and tighten the collar bolts.



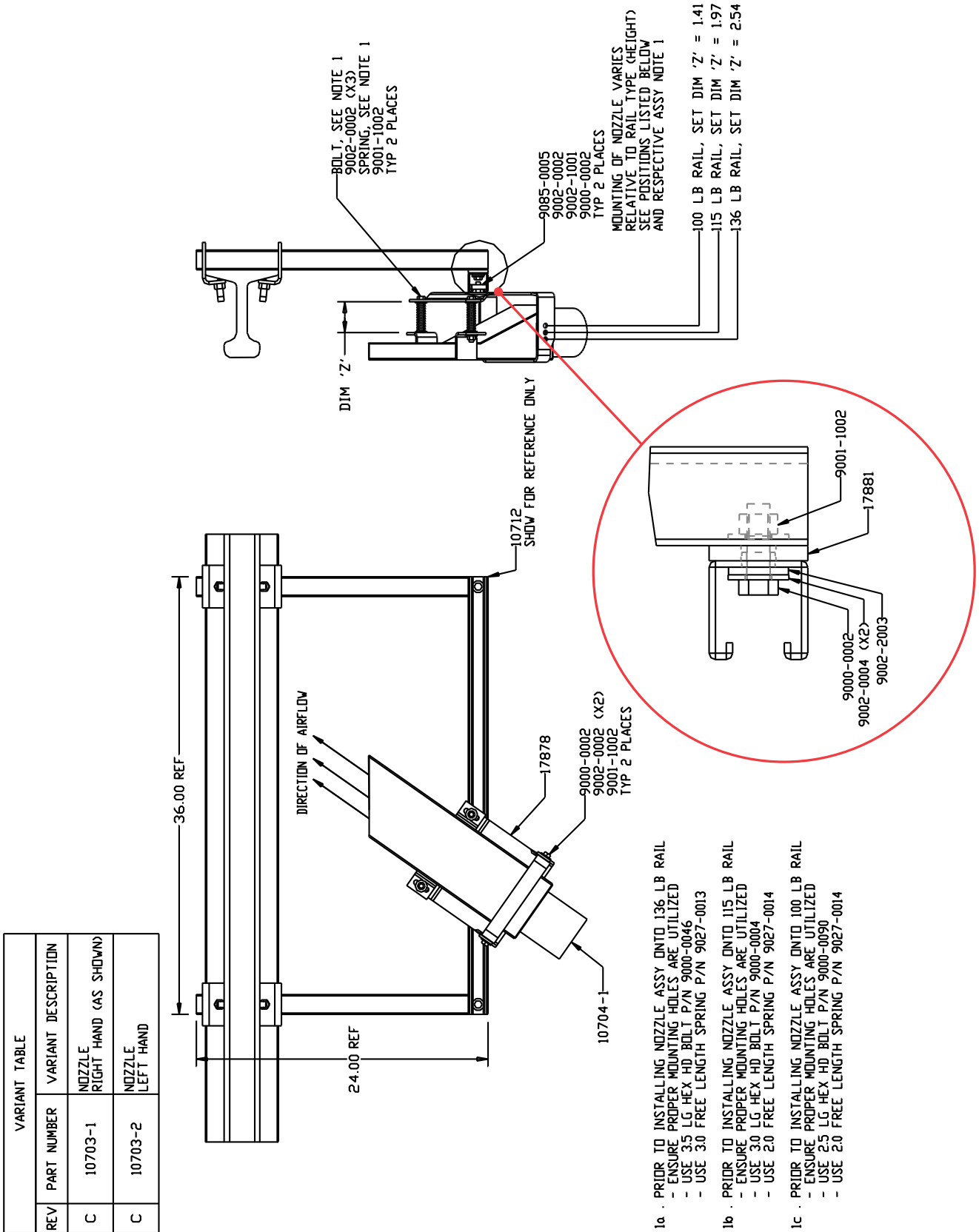


Detail 'A' - Diffuser and Cross Duct Gasket Kit Hardware

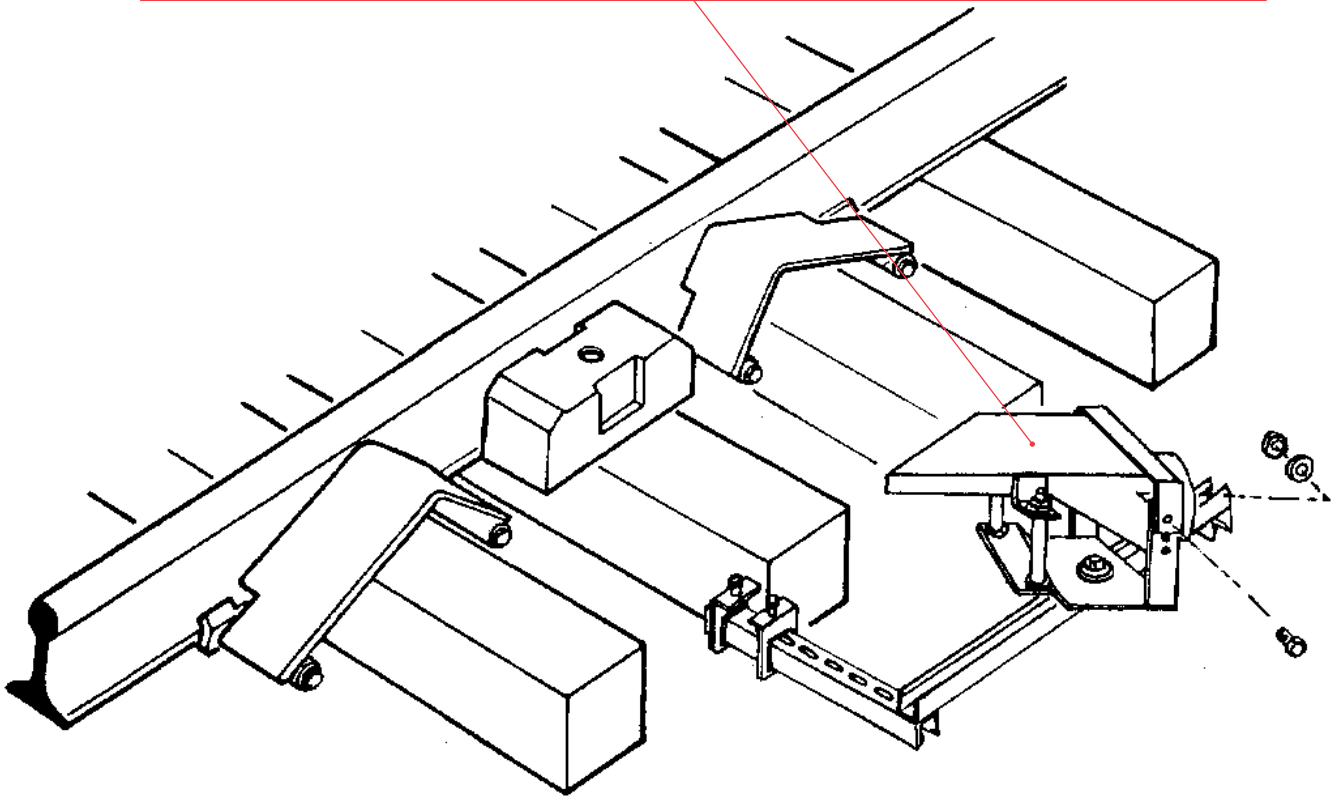
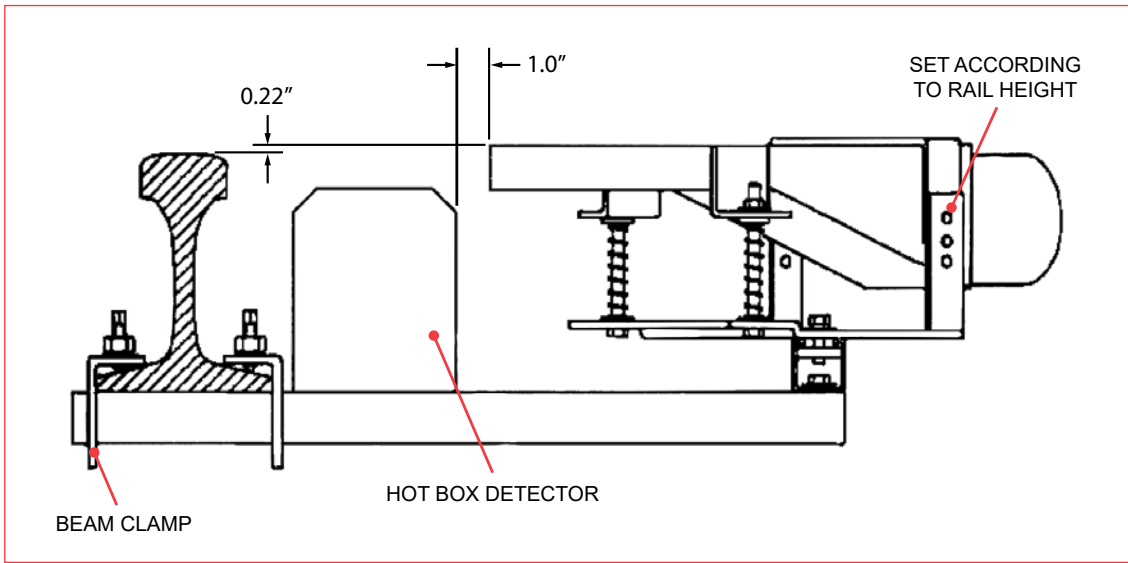


D.3 Nozzle Assembly & Installation (Servo/Harmon Type Detector)

- When mounting the Fastrax® HAC/HBD with a detector that straddles a tie, attach the nozzle mounting brackets to the under side of the rails, as shown below. Tighten the locking nut on each beam clamp.

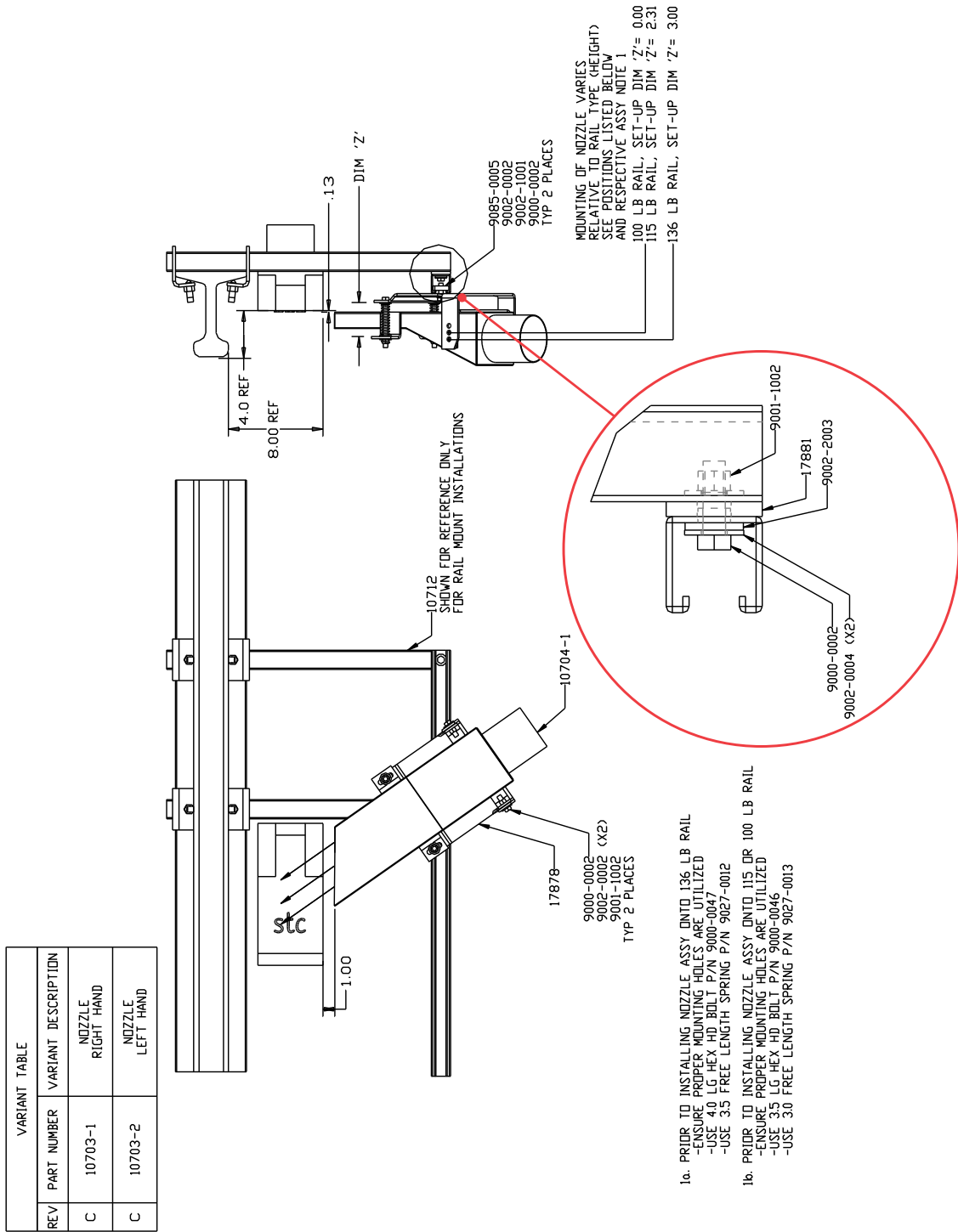


D.5 Nozzle Location (Servo/Hermon Detector)

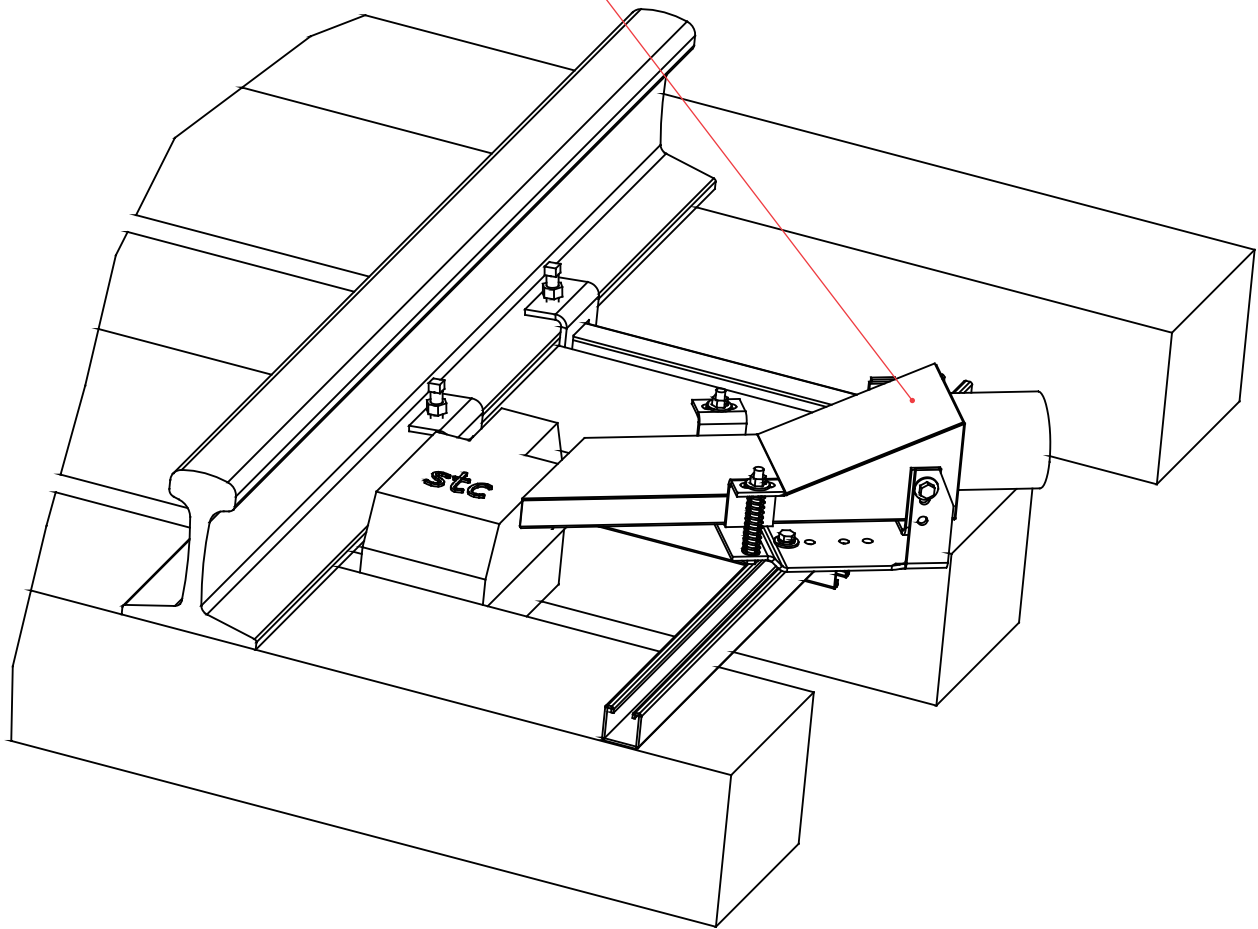
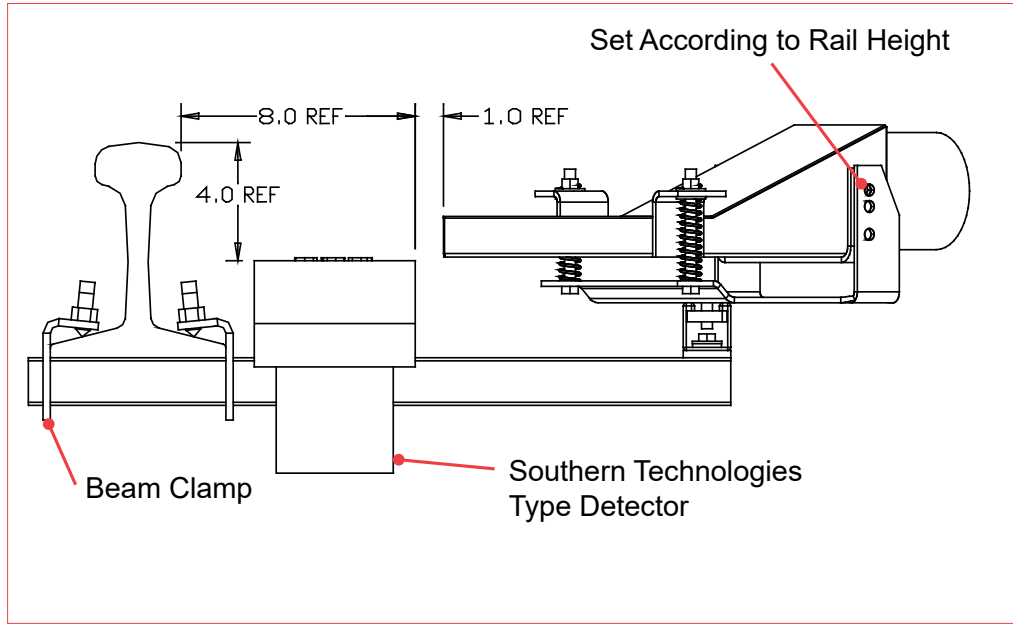


D.4 Nozzle Assembly & Installation (Southern Technologies Detector)

- For crib mounted detectors (Southern Technologies), the nozzles have to be turned upside down (RHS becomes LHS) in the base plate P/N 17878 and mounted in a cantilever manner.



D.6 Nozzle Location (Southern Technologies Detector)



D.7 Mounting Beam & Detector Chassis Space Restriction - Electrical Isolation Kit Add-On

1. In a case where there is little space between the top of the mounting beams and the detector chassis, ensure the necessary electrical isolation by installing an Electrical Isolation Kit, 16974.



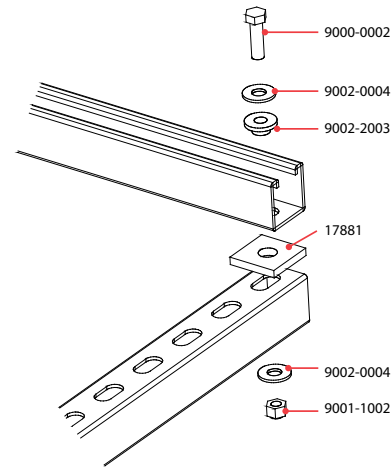
CAUTION. Any contact between the mounting beams and the detector body will defeat the electrical isolation of the detector and can shunt the track circuit.

2. The Electrical Isolation Kit provides isolation for detectors that mount up to 3 inch below the bottom of rail at the lowest point. The kit consists of 1x rail spacer, 1x G10 fiberglass insulating board, and mounting hardware. Installation is best demonstrated in the photo below.



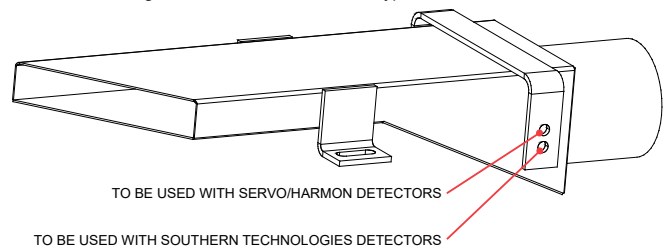
NOTE: Low profile detector mounting brackets, such as the SERVO# 400082-XX series, used in crib applications are not compatible with the supplied Fastrax® HAC/HBD mounting hardware.

3. Install the unistrut electrical insulator (P/N 17881).



4. Assemble and set the nozzles to the specified height above the detectors, as shown for Servo/Harmon or for Southern Technologies detectors using the correct mounting holes on the nozzles.

Nozzle Mounting Holes - Based On Detector Type



5. Attach the flex hose between the swivel ducts and the nozzles, using the supplied hose clamps.
6. Backfill and tamp the crib containing the cross duct and the trenches containing the blower mounting ties.

E. ELECTRICAL CONNECTIONS

E.1 Electrical Connections



CAUTION. Electrical connections are to be performed by personnel approved by the local electrical authority.

1. Power must be brought to the Fastrax® HAC/HBD through a customer supplied fused or breakered power line. The fuse ratings are dependent on the motor full load amps and should be the 'MOTOR START, TIME DELAY' type.
2. Table 1 - Voltage Drop vs Current Draw for Copper Wire & Recommended Circuit Breaker Sizes, can be used as an aid to select the appropriate size wire based on the running amps of the Fastrax® HAC/HBD, the distance to the power supply, and the maximum allowable voltage drop. The recommended maximum voltage drop is 5%.

Table 1 – Voltage Drop vs Current Draw for Copper Wire & Recommended Circuit Breaker Sizes

Wire Size (AWG) ¹	Voltage Drop ² /1000 ft					Recommended Circuit Breaker Size
	12	10	8	6	4	
Ohms/1000 ft	1.65	1.00	0.65	0.41	0.26	As per Canadian Electrical Code, Part 1
Current 8 Amps	13.2	8.0	5.2	3.3	2.1	20

- 1 Standard HAC/HBD power terminal block will accept #12 to #4 AWG copper wire.
- 2 Allowable voltage drop to be determined by local authority.

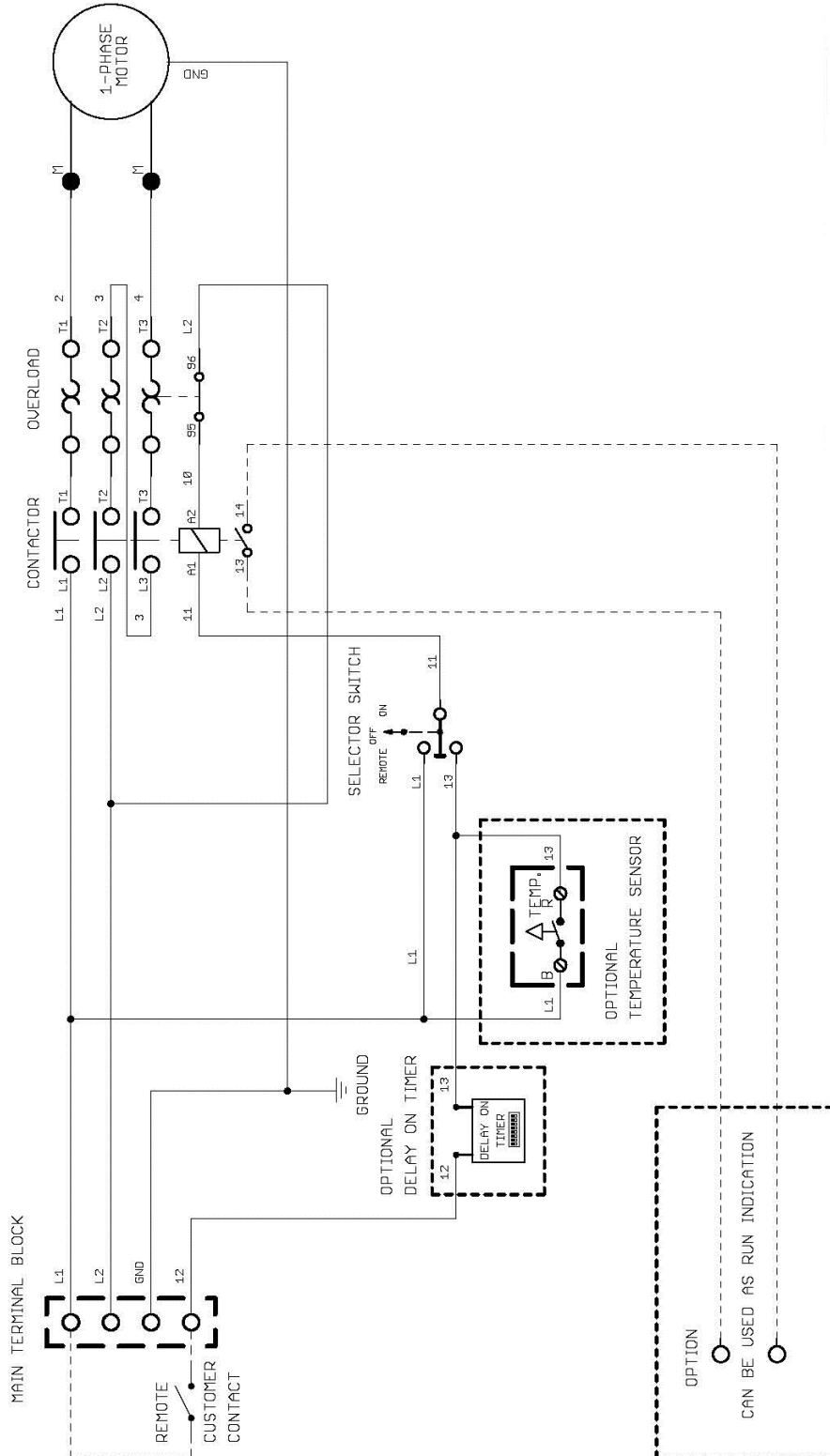


CAUTION. Units must be wired in accordance with local electrical codes.

3. Terminals are provided for all power, control, and ground wires.

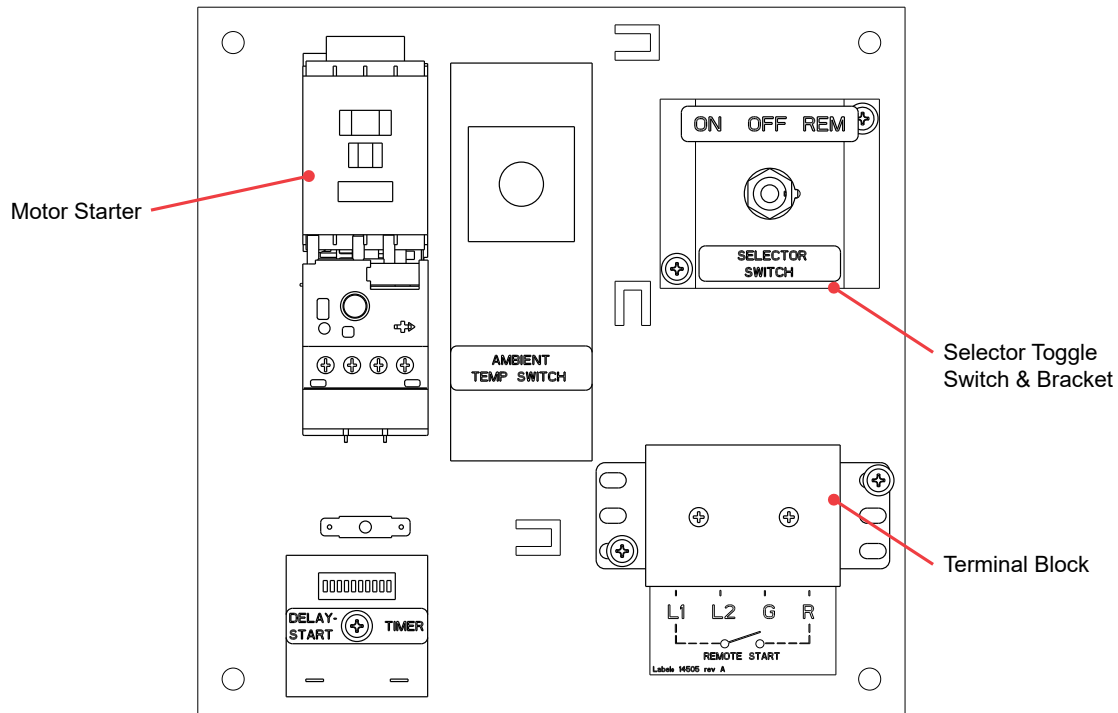
4. For remote control applications, the customer must supply a set of contacts with a minimum rating of 240Vac, 1 amp.
5. Connect the Fastrax® HAC/HBD according to the applicable schematic. One conduit hole is provided, accommodating a 3/4" conduit fitting, for the power and signal wires. This is located on the side of the electrical box. The terminal block will accept #12-#4 AWG copper wires.
6. Energize the circuit, and switch the Fastrax® HAC/HBD 'ON' by turning the selector switch to 'MANUAL'. Ensure that the blower wheel is turning freely and that the motor is rotating in a clockwise direction as viewed from the top. Examine the system for air leaks and ensure that all mountings and connections are secure.
7. Set the selector switch to 'AUTO' for operation using the temperature switch or remote starting.

E.2 Combination Schematic & Wiring Diagram



F. OPERATION

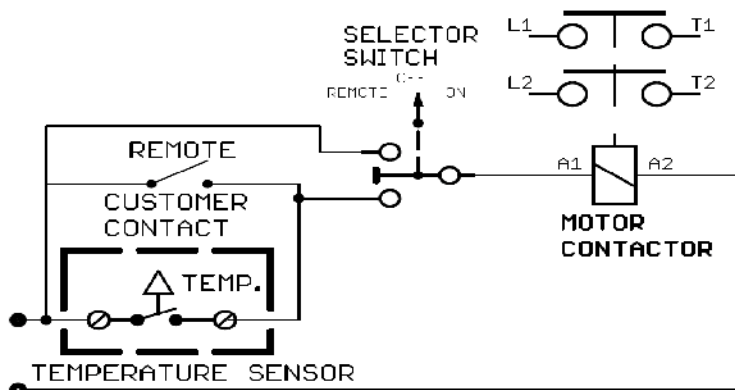
F.1 Key Components



F.2 General

1. Switch on the Fastrax® HAC/HBD whenever there is snow or freezing rain in the vicinity.
 2. There are three methods of starting:
 - MANUALLY, by turning the selector switch to 'ON',
 - REMOTELY, when the selector switch is set on 'AUTO' and the customer supplied contacts are closed,
 - AUTOMATICALLY, on units supplied with a temperature switch, when the selector switch is set to 'AUTO' and the ambient temperature drops below the temperature switch set point.
 3. The Fastrax® HAC/HBD should be turned 'ON' before it starts to snow or rain since its function is to prevent the build up of snow and ice rather than to remove it.
 4. Let the Fastrax® HAC/HBD run for sufficient time after a snowfall to prevent the accumulation of drifting snow or snow dragged in by passing trains.
 5. For maximum switch clearing performance, leave the Fastrax® HAC/HBD running the entire winter. This ensures the Fastrax® HAC/HBD will be 'ON' before any snow can fall onto the detector, and the continuous operation will sublimate any frost build up.

or,
 6. To conserve energy, the Fastrax® HAC/HBD turn 'OFF' when weather conditions permit.
- NOTE:** The 'AUTO' and 'REMOTE' features work in parallel. Therefore, either the 'AUTO' or 'REMOTE' feature will start the Fastrax® HAC/HBD, but both have to be 'OFF', in order for the HAC to turn 'OFF'.



F.3 Temperature Switch

1. The temperature switch is located inside the electrical box.



2. To activate the temperature switch, turn the control panel selector switch to 'AUTO'.
3. For most effective operation, it is recommended that the front dial of the temperature switch be set to 3°C (37.4°F). The differential setting on the unit has been factory set at 2°C (4°F). With these settings the unit will turn on when the temperature drops to 3°C (37.4°F) and continue running until the ambient temperature rises above 5°C (41°F).
4. Operation in 'AUTO' mode with the temperature switch will limit the Fastrax® HAC/HBD running time saving electrical energy and increasing unit life expectancy.

F.4 Motor Overload Protection

1. Inside the electrical cabinet is an "over current" protection device. The purpose of this device is to protect the motor from continuous overload current.



- 1.1 Overload current can occur as a result of repeated starts and stops within a short period of time, low supply voltage, incorrectly installed fan, or bearing failure.

2. The yellow thermal overload dial is set to the motors nameplate full load amperage X 1.0.
3. DO NOT increase dial setting.
4. The 'RESET' selector switch is set to 'MANUAL'.
5. DO NOT set to 'AUTOMATIC'.
6. Once tripped the overload requires 5 to 10 minutes before it can be reset.
7. To reset, push the blue 'MANUAL/AUTO' reset button.

F.5 Delay Start Timer

1. For multiple blower installations controlled by one start relay, a delay start timer can be added to each individual blower. This allows staggered start up, reduces the maximum inrush current and reduces power cable size.
2. Set the delay by toggling the dip switches to 'ON'. The combined total is the delay time.



G. INSPECTION

G.1 General

1. The frequency of inspection is dependent on local conditions, but should not be less than once annually.

G.2 Prior to Annual Start Up

1. Visually inspect the installation to check that all parts are secure, free from damage, and firmly fastened together.
2. Inspect the lag bolts, which fasten the Fastrax® HAC/HBD to its wood tie foundation, and ensure they are firmly fastened.
3. Start the Fastrax® HAC/HBD.
4. Check for any undue vibration or noise at the blower and ensure that air is blowing freely from both nozzles.

Location	Mounting Channel	Motor Bearing
Vibration Level in/sec (rms)	Less than 0.1	0.04 to 0.12 Acceptable
		0.13 to 0.29 Tolerable
		0.30 to 0.71 Excessive
		0.72 or more Extreme

Units leave the plant with no more than 0.20 in/sec (rms)

- 4.1 A vibration PEN may be purchased from Thermon Heating Systems to check the vibration level of the equipment, Part# 9074-0013.
- 4.2 Motor bearing vibration levels can be charted on a graph 'motor bearing vibration levels vs time' to predict when the motor requires replacement or maintenance.
- 4.3 Mark locations on motor to ensure repeatable measurements for trend analysis.
- 4.4 Do not measure on covers or guards.
- 4.5 If vibration levels on the mounting channels exceed 0.1, ensure that mounting ties are fully supported and lag bolts fully tightened.
5. Examine all joints for leaks.
6. Examine exposed duct surfaces for leaks from puncture and/or corrosion holes.
7. Measure the supply voltage at the power terminal block. It is to be within 5% of the motor nameplate voltage.
8. Using a clip on ammeter, measure the running amps. It is to be within 85% to 115% of the motor nameplate running amps. Running amps greater than 115%, the motor rated full load amps, can indicate failed bearings, incorrect fan/intake clearance from an improperly installed fan, excessive air leaks in the duct work, inadequately sized power supply wires, or poor electrical connections.

H. MAINTENANCE

H.1 General

1. All units are supplied with motors with sealed bearings and require no lubrication.
2. Replace all damaged intake ducts, cross ducts, and nozzles since damaged ducts will degrade detector-cleaning ability.
3. With the supply power turned off, tighten all mounting and electrical connections to the recommended tightening torques.

Thread Size	Tightening Torque (in. lbs)
8 - 32	19
10 - 32	31
1/4 - 28, Power Terminal Lugs	56

H.2 Blower Wheel & Motor Removal

1. Turn off power at the local disconnect.
2. Remove the air intake at the blower housing to gain access to the blower wheel.

- 2.1 The blower wheel is fitted with a tapered shaft bushing with three tapped 3/8 - 16 UNC holes. Remove the two hub set screws and insert a set screw into the third hole and tighten. This will drive the blower wheel off of the shaft. It is recommended that the units be returned for factory match balancing to maximize motor bearing life. All units match balanced by Thermon Heating Systems bear the following label on the motor base: IMPELLER/MOTOR SETS NOT MATCH BALANCED BY THERMON HEATING SYSTEMS INC. VOID FUTURE WARRANTY CLAIMS.
3. To remove the motor, open the electrical junction box on the side of the motor and disconnect the wires and the conduit from the box. Remove the four bolts, which fasten the motor to the base, and remove the motor.
4. To install the motor and blower wheel, reverse the sequence for removal. Ensure that the blower wheel is installed at the same position on the shaft as previously.

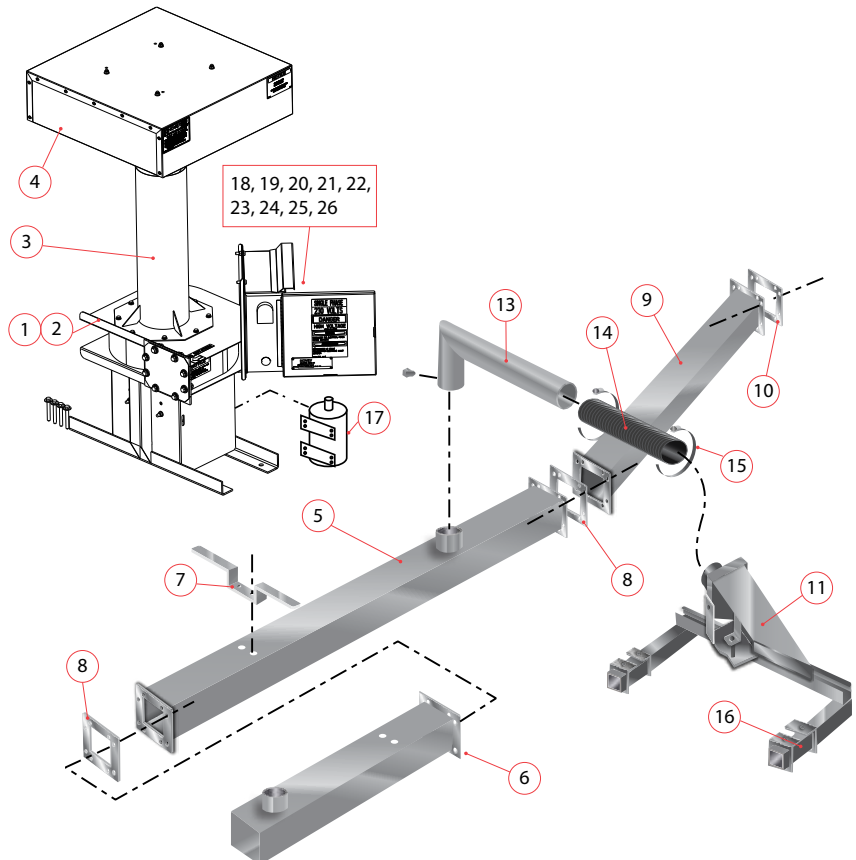
I. TROUBLESHOOTING

The following troubleshooting chart is included as a guide for correcting minor blower problems.

Problem	Probable Cause	Solution
High Amperage Draw	Icing on blower wheel or air intake assembly.	Remove ice.
	Obstruction in blower or cross duct.	Remove obstruction.
	Low operating voltage from undersized wiring.	Increase line voltage, or install heavier gauge wire.
	Defective motor.	Replace motor.
Excessive Vibration or Noise	Ice or other objects adhered to blower wheel creating an imbalance.	Check blower wheel and remove any obstruction.
	High vibration persists.	Return base plate assembly, motor and blower wheel to manufacturer for motor balancing.
	Defective motor.	Replace motor.
Inadequate Air Flow	Nozzle, diffuser, or cross duct obstructed.	Check and clean ducting of any water or debris.
	Poor duct connections.	Check all seals between flanges and replace gasket as required (see Section D - Mechanical Installation).
	Icing or debris on intake screen.	Remove obstruction.
Improper Detector Cleaning	Nozzles are improperly aligned or have been damaged.	Align nozzles as show in Section D - Mechanical Installation.
Overload Tripped	High amperage draw.	Low operating voltage. Increase supply voltage or increase supply wire gauge.
	Loose connection.	Tighten all electrical connections including those between the overload and contactor.
	Improperly set overload relay.	Set overload amperage to motor name plate, full load amps (FLA) X1.0.
	Frequent starts and stops in a short period of time.	Check remote start circuit.

J. PARTS

Item	Part #	Description	Qty/Unit
1	15717	Blower Housing	1
2	15724	Blower Wheel	1
3	15727	Air Stack Assembly	1
4	15734	Hood	1
5	15735	Section 1, Cross Duct	1
6	15736	Section 2, Cross Duct	1
7	15741	Cross Duct Mounting Bracket	2
8	15742	Gasket Kit, Cross Duct	2
9	15743	Diffuser	1
10	15747	Gasket Kit, Diffuser	1
11	10703-2	Nozzle, HBD (LH)	1
12	10703-1	Nozzle, HBD (RH)	1
13	15748	Nozzle, Swivel	2
14	15749	Flex Hose (4"IDx36"LG)	2
15	9022-0004	SST Hose Clamp	4
16	10712	Nozzle Mounting Bracket	2
17	9016-0028	Motor, 1.5HP	1
18	9038-0057	Selector Switch	1
19	9043-0012	Terminal Block, 4 Pole	1
20	15752	Electrical Box	1
21	18425	Temperature Switch Kit	1
22	9080-0003	Temperature Switch only	1
23	18420	Delay Start Timer Kit	1
24	9038-0039	Delay Start Timer only	1
25	9078-0121	Contactar	1
26	9040-0120	Thermal Overload Relay	1



For further assistance, please call 1.855.244.3128

WARRANTY: Under normal use the Company warrants to the purchaser that defects in material or workmanship will be repaired or replaced without charge (from date of shipment) for a period of:

- 84 months - SwitchBlade® Heaters
- 60 months - DC Heaters
- 36 months - DC Control Panels
- 12 months - HELLFIRE Heaters, FEB Heaters
- 12 months - All other Fastrax® Products

Any claim for warranty must be reported to the sales office where the product was purchased for authorized repair or replacement within the contract terms.

Subject to State or Provincial law to the contrary, the Company will not be responsible for any expense for installation, removal from service, transportation, or damages of any type whatsoever, including damages arising from lack of use, business interruptions, or incidental or consequential damages.

The Company cannot anticipate or control the conditions of product usage and therefore accepts no responsibility for the safe application and suitability of its products when used alone or in combination with other products. Tests for the safe application and suitability of the products are the sole responsibility of the user.

This warranty will be void if, in the judgment of the Company, the damage, failure or defect is the result of:

- Vibration, radiation, erosion, corrosion, process contamination, abnormal process conditions, temperature and pressures, unusual surges or pulsation, fouling, ordinary wear and tear, lack of maintenance, incorrectly applied utilities such as voltage, air, gas, water, and others or any combination of the aforementioned causes not specifically allowed for in the design conditions
- Or, any act or omission by the Purchaser, its agents, servants or independent contractors which for greater certainty, but not so as to limit the generality of the foregoing, includes physical, chemical or mechanical abuse, accident, improper installation of the product, improper storage and handling of the product, improper application or the misalignment of parts.

No warranty applies to paint finishes except for manufacturing defects apparent within 30 days from the date of installation.

The Company neither assumes nor authorizes any person to assume for it any other obligation or liability in connection with the product(s).

The Purchaser agrees that all warranty work required after the initial commissioning of the product will be provided only if the Company has been paid by the Purchaser in full accordance with the terms and conditions of the contract.

The Purchaser agrees that the Company makes no warranty or guarantee, express, implied or statutory, (including any warranty of merchantability or warranty of fitness for a particular purpose) written or oral, of the Article or incidental labour, except as is expressed or contained in the agreement herein.

LIABILITY: Technical data contained in the catalog or on the website is subject to change without notice. The Company reserves the right to make dimensional and other design changes as required. The Purchaser acknowledges the Company shall not be obligated to modify those articles manufactured before the formulation of the changes in design or improvements of the products by the Company.

The Company shall not be liable to compensate or indemnify the Purchaser, end user or any other party against any actions, claims, liabilities, injury, loss, loss of use, loss of business, damages, indirect or consequential damages, demands, penalties, fines, expenses (including legal expenses), costs, obligations and causes of action of any kind arising wholly or partly from negligence or omission of the user or the misuse, incorrect application, unsafe application, incorrect storage and handling, incorrect installation, lack of maintenance, improper maintenance or improper operation of products furnished by the Company.



HEATING
SYSTEMS

1500 W. Campus Drive
Littleton, CO 80120 USA

1-855-244-3128
1-303-979-7339
F 303-979-7350