

# HELLFIRE Gas Fired Blower

Fastrax™ HELLFIRE 400, HELLFIRE 900 and HELLFIRE 905 series gas fired blowers consist of a blower, combustion chamber, and ducting system that delivers heated air and combustion by-products to the switch mechanism. The blower is an electrically powered centrifugal fan. Air from the blower enters the combustion chamber and is used for combustion and make up air. The heated air exits the combustion chamber and is ducted below the rails to the point nozzles and track duct nozzles mounted within the switch. The air temperature is thermostatically regulated for maximum snow clearing performance without burning ties or excessive softening of the frozen ballast. Recommended for clearing ice and snow from switches with no longer than 40 feet of moving rail from heel to point of switch.

Fastrax™ HELLFIRE blowers can be used for both single and multiple switch applications.

No.	Label	No.	Label	No.	Label
1	Track duct	13	Ambient Temperature Sensor	25	Square to round adapter
2	Track duct elbow	14	Air intake extension	26	Flex duct
3	Rail mounting spring clip and pad	15	Identification tag	27	Track duct deflector
4	Ballast retainer	16	Mode selector switch	28	Insulated tie duct
5	Thermostat box	17	Electrical control access panel	29	Rail thermostat
6	ArcticSense sensor	18	Air intake plenum	30	Point nozzle
7	Burner	19	Leveling leg	31	Track duct mounting bracket
8	Regulator vents	20	Control panel	32	Energy Management System Module

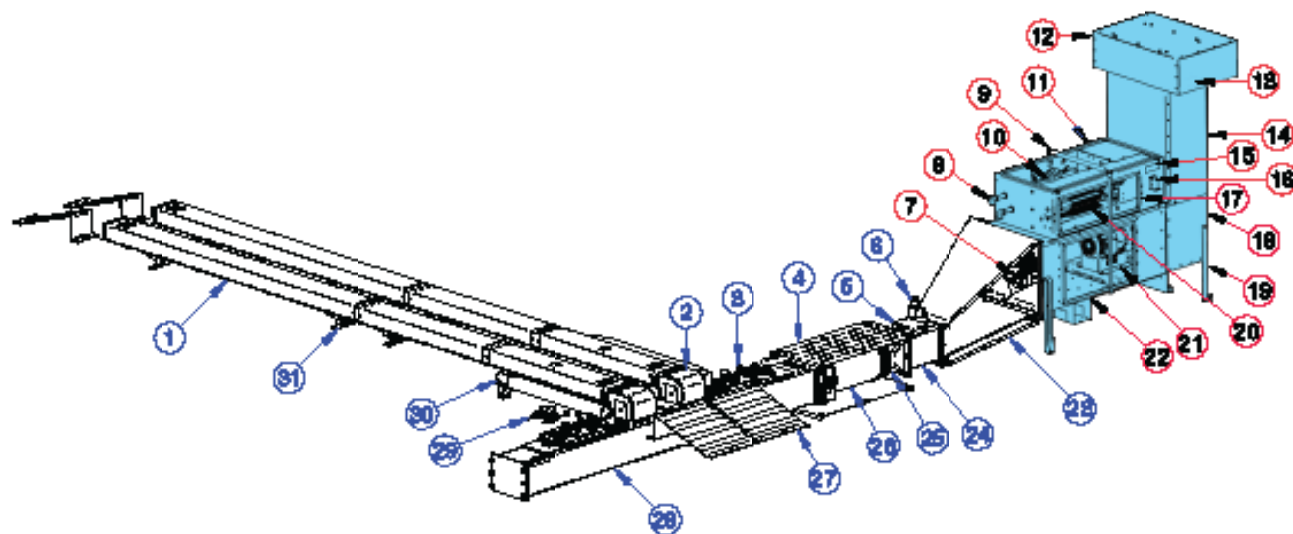


Figure 20 – HELLFIRE 900, 2014, Heater Diagram

## Model Coding

FHF	-	900	3	1	-	L	B	A	-	EMS	-	DG
Gas Input 400 - 400,000 BTU/hr 900 - 900,000 BTU/hr 905 - 900,000 BTU/hr with 5 Hp motor			Phase 1 - 1 Ph** 3 - 3 Ph	Intake H - High L - Low N - Narrow Low			Control Access A - Bolt On Q - Quick Release	Accessories D - Dirt Trap F - 48" Gas Hose G - 72" Dirt Trap L - Locking Bar M - Motor Current Kit R - Second Stage Gas Regulator* B1 - Bungalow with levelling legs B2 - Bungalow with corner mounting plates C - Motor Soft Starter**** P - Powered run indication				
Model Series FHF – Fastrax® HELLFIRE		Voltage 1 - 240V 2 - 208V 3 - 460V 4 - 575V		Leveling Legs B - Bolt On S - Screw Type X - No Leveling Legs			Energy Management System EMS - Snow & Rail Thermostat S - Snow Detection T - Rail Thermostat					

\*HELLFIRE 400 Series Only

\*\*240V - only available option for 1 Phase.

\*\*\*Option available for bunaglow only

\*\*\*\*240V HELLFIRE 905 only

\*\*\*\*\*Soft Starter only available for Hellfire 905. 240V. 1 Phase

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\*\*\*\*\*Soft Starter only available for Hellfire 905, 240V, 1 Phase

Table 15 – Gas Firing Specifications

Series	Fuel	Propane	Natural Gas
HELLFIRE 400	Input Rating BTU/hr (kW)	200,000 - 400,000 (58 - 117)	
	Manifold Pressure " WC (kPa)	1.3 - 5.0 (0.32 - 1.23)	2.3 - 11.0 (0.56 - 2.69)
	Inlet Pressure " WC (kPa)	7 - 14 (1.72 - 3.45)	12 - 14 (2.95 - 3.45)
HELLFIRE 900	Input Rating BTU/hr (kW)	204,000 - 900,000 (60 - 264)	230,000 - 900,000 (67 - 264)
	Manifold Pressure " WC (kPa)	2.5 - 9.0 (0.62 - 2.24)	3.5 - 16.0 (0.87 - 3.99)
	Inlet Pressure psig (kPa)	5 - 20 (34 - 138)	
HELLFIRE 905	Input rating, BTU/hr (KW)	204,000-900,000 (60 - 264)	230,000 - 900,000 (67 - 264)
	Manifold pressure, inches of water (kPa)	5.0 - 11.5 (1.25 - 2.86)	6.0 - 18.0 (1.49 - 4.48)
	Supply pressure, psig <sup>1,2</sup> (kPa)	5-20 (34 - 138)	

Table 16 – Electrical Specifications

Series	Voltage	Phase	Running Amps <sup>123</sup>	Frequency (Hz)
HELLFIRE 400	240	1	7.5	60
	208	3	7.3	
	460	3	3.6	
	575	3	3.0	
HELLFIRE 900	240	1	12.5	
	208	3	10.3	
	460	3	4.8	
	575	3	3.9	
HELLFIRE 905	240	1	27	
	208	3	15.2	
	460	3	7	
	575	3	5.6	

## Construction

- 14 gauge galvanized steel blower, intake and duct work
- Stainless steel combustion chamber and transition duct
- CSA certified, stainless steel proprietary burner design
- Burner defroster kit feature keeps igniter and flame rod clear of frost and condensation
- Direct drive centrifugal fan
- Match balanced motor and impeller set to less than 0.2 ips pk-pk
- Tested to AREMA 11.5.1 Environmental Recommended Requirements
- NEMA 3R enclosure

## Controls

- Direct spark ignition system (HELLFIRE 400), continuous pilot burner system (HELLFIRE 900/905)
- Thermostatically limited track duct nozzle outlet temperature of 380°F (193°C) maximum.
- Programmable delay 'ON' timer, 0 - 99 seconds, allows staggered start up of a series of heaters
- Magnetic motor contactor
- Thermal overload protection
- Network compatible controller, allows operation with Remote Control & Monitoring System (RCMS), multiple heater connection on one RS-485 communication line and incorporates aggressive retry and diagnostics
- Energy Management System (EMS) module provides local control and weather information to centralized EMS RCMS
- Soft Start option to eliminate motor inrush currents (Hellfire 905, 240V, 1 Phase only)

## Gas Conversion

- Heaters are factory set for use with propane gas, with easy field conversion to natural gas

## HELLFIRE 400 Gas Supply

- Recommended supply gas pressure, 12 - 14" WC, with all connected loads operating
- Inlet gas fitting is 3/4" NPT female

## HELLFIRE 900 and 905 Gas Supply

- Allowable nominal supply pressure is 5 - 20 psi
- Recommended supply gas pressure is 5 psi
- Inlet gas fitting is 1" NPT female
- Terminal Block Wire Sizes:
  - Power, #14 to #2 AWG copper
  - Control, 1/4" AAR terminal posts

## Safety Features

- Air pressure (flow) switch: Ignition is disabled until adequate air pressure is developed
- High temperature limit: In the event of thermostat failure and nozzle temperatures exceeding 420°F (216°C), the heater is shut off to avoid tie damage. Heater operation is restored by manual reset
- Loss of flame: The Ignition Module closes the gas valve if after the trial for ignition period of 6 seconds (HELLFIRE 400) and 10 seconds (HELLFIRE 900) no flame is sensed, or if flame detection is lost for more than 1 second during normal operation
- The heater is designed and approved for use as a commercial heater (gas) – railway switch, class 2902 05 in accordance with ANSI Z83.7 / CSA 2.14



Figure 21 – HELLFIRE 400, 2014, Low Intake Shown

# Gas Fired Blower Ductwork

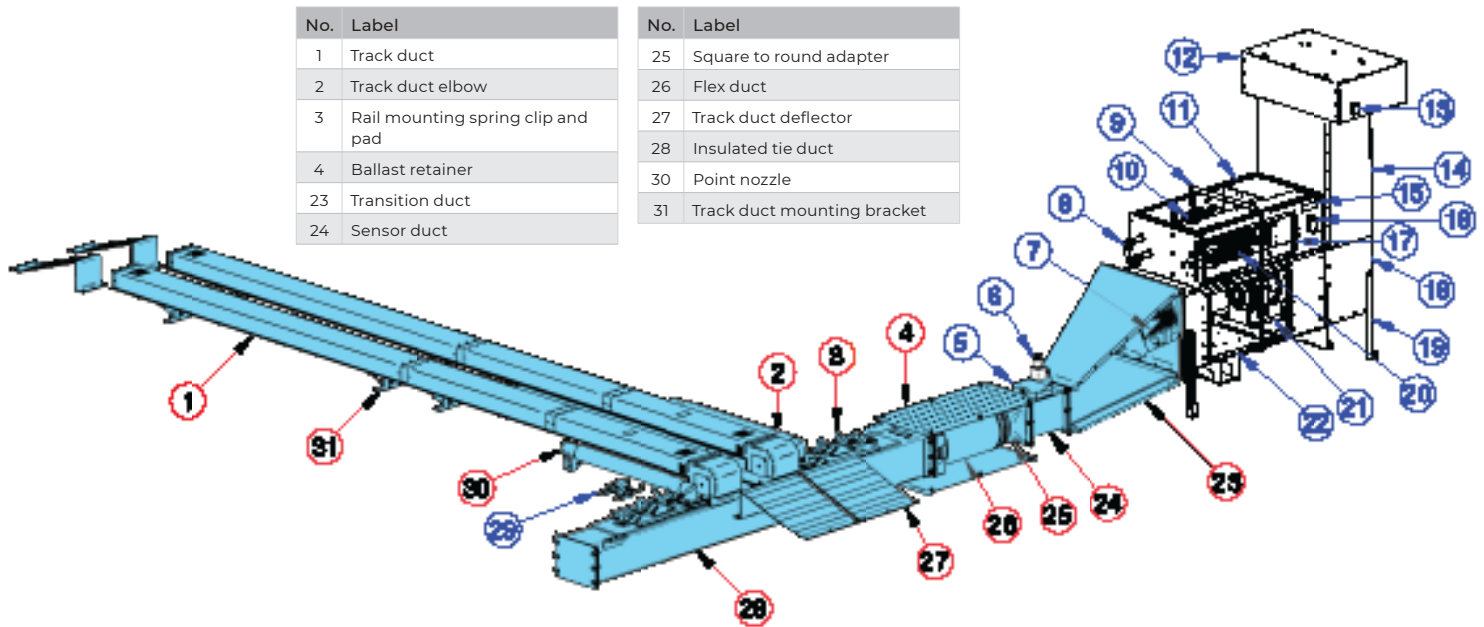


Figure 22 – Ductwork Diagram, refer to HELLFIRE Gas Fired Blower Section for Heater options

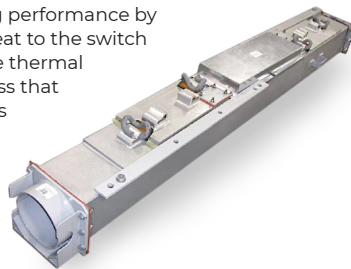
## Tie Duct Assembly (shown above)

### Insulated Tie Duct

The tie duct is a hollow, thermally and electrically insulated structural tie capable of carrying rail loads and efficiently delivering hot or cold air to the duct system of either a gas fired blower or horizontal air curtain. It forms an integral part of our duct systems that can remain in place during automated tamping. Tie ducts not thermally insulated are also available.

### Features

- Hollow structural tie
- Stress analyzed design
- Exceeds the AAR 3000V dielectric requirement for insulated track fittings, with redundant double electrical insulation
- Improves the switch clearing performance by delivering up to 18% more heat to the switch points. At the same time, the thermal insulation minimizes heat loss that causes soft ballast conditions and associated switch point pumping
- For installations that require crossing a mainline track, tie ducts with the appropriate 1:40, 1:30 or 1:20 cants are available with either Pandrol or Safelok rail anchors



### Flex Duct & Ballast Retainer

The flex duct is encased in an anti-slip ballast retainer. It connects the tie duct to the transition duct. The flex hose and ballast retainer are available in multiple lengths to suit most rail heating applications.

## Cross Duct & Tie Duct - Track Duct Assembly

### Transition Duct

The transition duct connects the heater to the duct assembly.

### Point Nozzles

The point nozzles direct air at the switch points to clear snow and ice from between the points and the stock rail.

### Track Duct

The track duct distributes air over the entire length of the switch from point to heel. By opening appropriate pre-slit vents, air is directed at the tieplates or gage rods. Track ducts are available in multiple lengths to suit most rail heating applications. Both wood tie and concrete tie track duct configurations available.

### Sensor Duct

The sensor duct is located between the flex duct and transition duct and is equipped with mounting holes for the precipitation sensor, cycling, high limit thermostats, and thermostat box.

### Switch Rod Crib Heaters (not shown)

Switch Rod Crib Heater is a galvanized steel perforated tube which directs heat within cribs with switch throw or indicating rods to keep them clear of ice and snow. Switch rod crib heater installs to the bottom of the track duct.

## Cross Duct Assembly

### Cross Duct

The cross duct is a 9" x 9" hollow duct made of 11 gauge HDG steel.

# HELLFIRE Accessories

## Dirt Trap

The robust dirt trap meets CSA B149.1 - Natural gas and propane installation code to filter particles of debris from the gas supply before entering the heater. The dirt trap allows for gas line purging, dirt and water inspection, and avoids damage to critical gas manifold components.



## Motor Current Kit

Motor current kit allows for remote monitoring of the motor operation and diagnostics.



## Locking Bar

The locking bar is attached to the front of the heater as a added safety guard against panel tampering and vandalism and allows one pad lock to secure all three access panels.



## Flexible Gas Hose

The CSA certified flexible gas hose completes the piping connection between the gas riser and heater supply inlet, providing vibration isolation and strain relief. The flex hose is available in two sizes - 48" and 72".



## Second Stage Gas Regulator

The second stage gas regulator is used to lower the supply line gas pressure from 2 - 20 psi to the HELLFIRE 400, required inlet pressure of 14" wc.



## Leveling Legs Kit

Leveling legs allow for mounting height adjustment of the heater once installed or after a track lift and ballast tamping.

Two kits available:

- BOLT ON: Bolt on have 1/2" increments and require a jack to lift the heater.
- SCREW TYPE: Screw type raise the heater using a wrench, no jack required.



## Burner Defroster Kit

The burner defroster prevents the build up of frost due to condensation while the heater is idle. This is a standard feature of the 2014 model. Retrofit kits are available for older model heaters.



HF400



HF900 / 905

## Motor Soft Starter

The motor soft starter is an optional component that reduces the inrush and startup amperage to not exceed the full load running amperage under most start up conditions. (Hellfire 905, 240V, 1 phase only)

## Powered Run Indication

Powered run indication is available for those installations that require a 24V DC feedback signal to communicate heater operational status.