HELLFIRE Gas Fired Blower

Fastrax™ HELLFIRE 400 and HELLFIRE 900 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.

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**Model Coding**

<table>
<thead>
<tr>
<th>No.</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Burner</td>
</tr>
<tr>
<td>8</td>
<td>Regulator vents</td>
</tr>
<tr>
<td>9</td>
<td>Condensation vent</td>
</tr>
<tr>
<td>10</td>
<td>Gas manifold</td>
</tr>
<tr>
<td>11</td>
<td>Control cabinet lid</td>
</tr>
<tr>
<td>12</td>
<td>Air intake hood</td>
</tr>
<tr>
<td>14</td>
<td>Air intake extension</td>
</tr>
<tr>
<td>15</td>
<td>Identification tag</td>
</tr>
<tr>
<td>16</td>
<td>Mode selector switch</td>
</tr>
</tbody>
</table>

*HELFIRE 400 Series Only
**240V - only available option for 1 Phase.
***Option available for bunaglow only

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**No. | Label**
---|---
17 | Electrical control access panel
18 | Air intake plenum
19 | Leveling leg
20 | Control panel
21 | Motor/Impeller/Base
22 | Combustion chamber access panel

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Figure 20 – HELLFIRE 900, 2014, Heater Diagram, refer to Ductwork Section for Duct Assembly options.
Table 15 – Gas Firing Specifications

<table>
<thead>
<tr>
<th>Series</th>
<th>Fuel</th>
<th>Propane</th>
<th>Natural Gas</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Input Rating</td>
<td>BTU/hr (kW)</td>
<td></td>
</tr>
<tr>
<td>HELLFIRE 400</td>
<td>200,000 - 400,000 (58 - 117)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Manifold Pressure *</td>
<td>WC (kPa)</td>
<td></td>
</tr>
<tr>
<td>HELLFIRE 400</td>
<td>1.3 - 5.0 (0.32 - 1.23)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inlet Pressure *</td>
<td>WC (kPa)</td>
<td></td>
</tr>
<tr>
<td>HELLFIRE 400</td>
<td>7 - 14 (1.72 - 3.45)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Input Rating</td>
<td>BTU/hr (kW)</td>
<td></td>
</tr>
<tr>
<td>HELLFIRE 900</td>
<td>204,000 - 900,000 (60 - 264)</td>
<td></td>
<td>230,000 - 900,000 (67 - 264)</td>
</tr>
<tr>
<td></td>
<td>Manifold Pressure *</td>
<td>WC (kPa)</td>
<td></td>
</tr>
<tr>
<td>HELLFIRE 900</td>
<td>2.5 - 9.0 (0.62 - 2.24)</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Inlet Pressure</td>
<td>psg (kPa)</td>
<td></td>
</tr>
<tr>
<td>HELLFIRE 900</td>
<td>5 - 20 (34 - 138)</td>
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<td></td>
</tr>
</tbody>
</table>

Table 16 – Electrical Specifications

<table>
<thead>
<tr>
<th>Series</th>
<th>Voltage</th>
<th>Phase</th>
<th>Amps</th>
<th>Frequency (Hz)</th>
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<tbody>
<tr>
<td>HELLFIRE 400</td>
<td>240</td>
<td>1</td>
<td>7.5</td>
<td>60</td>
</tr>
<tr>
<td>HELLFIRE 400</td>
<td>208</td>
<td>3</td>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td>HELLFIRE 400</td>
<td>460</td>
<td>3</td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td>HELLFIRE 400</td>
<td>575</td>
<td>3</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>HELLFIRE 900</td>
<td>240</td>
<td>1</td>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td>HELLFIRE 900</td>
<td>208</td>
<td>3</td>
<td>10.3</td>
<td></td>
</tr>
<tr>
<td>HELLFIRE 900</td>
<td>460</td>
<td>3</td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>HELLFIRE 900</td>
<td>575</td>
<td>3</td>
<td>3.9</td>
<td></td>
</tr>
</tbody>
</table>

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 (HELFIRE 400), continuous pilot burner system (HELFIRE 900)
- Thermostatically limited track duct nozzle 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

Gas Conversion

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

HELFIRE 400 Gas Supply

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

HELFIRE 900 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 (HELFIRE 400) and 10 seconds (HELFIRE 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
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.
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 an 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.