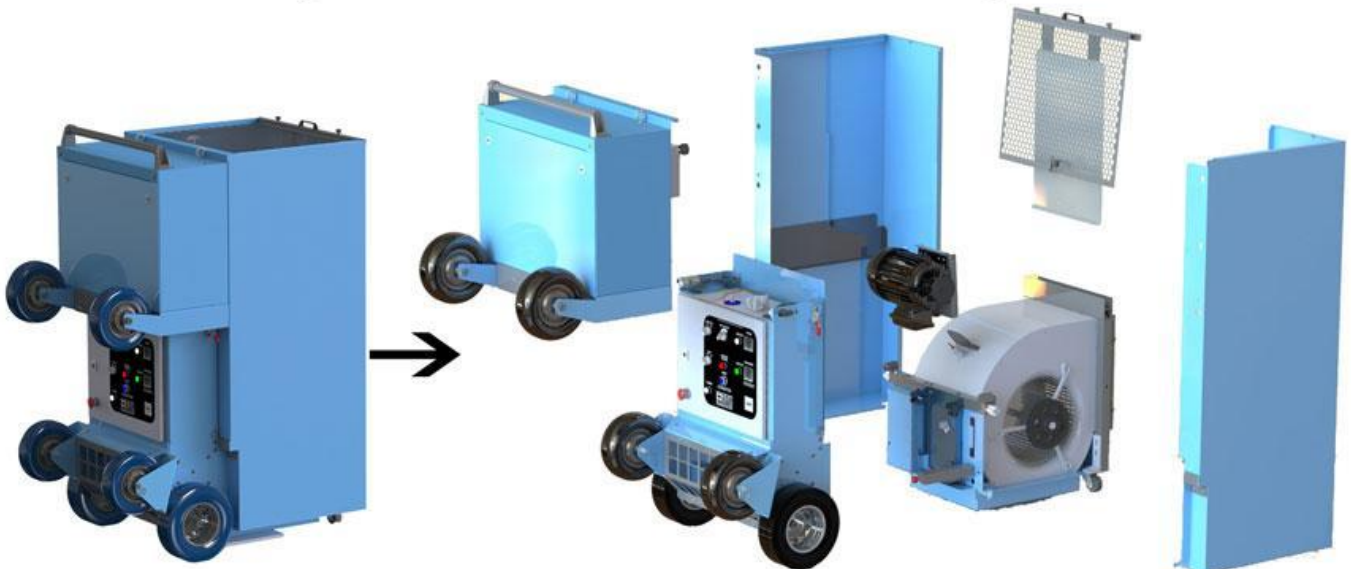


OWNERS MANUAL

Portable Heat Injector System

Model Number M400P-120M

**MODULAR DESIGN
DISASSEMBLES IN MINUTES**



Supply Voltage	115/1 @ 15A
Fuel Type	Propane
BTU per Hour	389,000BTU
Regulated Gas Pressure	6in
Max Inlet Pressure	5PSI

Max Temperature	180°F
Temp Rise	90°F
Air Volume	4,000CFM
Filter Size	20" x 25"
EPA Number	99811-GA-1

Introduction

The patented Heat Injector System™ uses a unique process to heat and distribute the air to produce the most energy-efficient heat treatment for bed bugs. This patented process uses a dedicated combustion blower that supplies fresh air for the combustion process to allow the heated airflow to be recirculated safely within the space.

The Heat Injector™ uses an industrial blower, powered from any home outlet, to move the maximum amount of airflow using the Automatic HP Boost™. This airflow control automatically adjusts the motor's speed when additional lengths of the flexible duct are added to achieve the maximum airflow. The volume of air determines the amount of heat that can be transferred into the structure and its contents.

An onboard microprocessor continuously monitors the discharge temperature and automatically modulates the gas (like cruise control) to achieve and maintain the desired discharge temperature.

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Warnings and Hazards

1. Direct gas-fired heat should not be used in sleeping quarters.
2. An operational CO Monitor should be used when an area is being heated for comfort heat. During elevated heat treatments, the CO level should be monitored to ensure they don't exceed the OSHA Limits (not more than 50 parts per million (ppm) as an eight hour average area level. Employees should be removed from the enclosed space if the carbon monoxide concentration exceeds a ceiling of 100 ppm (0.01%).

The World Health Organization has the following limits when a normal subject engages in light or moderate exercise:

9 ppm for 8 hours
26 ppm for 1 hour
52 ppm for 30 min
87 ppm for 15 min

3. The time spent within the heated environment must be monitored by stopwatch to ensure the maximum times do not exceed the OSHA limits. The time will vary based upon the temperature level.
4. The Heat Injector and the components within the heated environment will become the temperature of the discharge so wear protective clothing and gloves to prevent heat related injuries.
5. Do not block the Air Intake or the Discharge to prevent airflow. Air must be able to pass through the Heat Injector. It can operate vertically or horizontally (transportation mode).
6. Do not operate with the protective grates removed on the Air Intake, the Discharge or the Modulated Air Inlet.

Specifications:

Gas Supply: Propane or Natural gas with gas pressure up to 5psi

Input Power: 120vac from any standard outlet (15 amp)

Blower Motor: 1.5hp Premium Efficiency, TEFC, 208-230/460/3

Airflow and Airflow Control: Adjustable airflow 800 - 4,000 CFM with Variable Frequency Drive with Automatic HP Boost™

Burner: Low Emission Burner (389,000 Btu) with 1/12 HP Combustion Blower Motor

Interlocks and Safety Features:

- Redundant automatic main gas valves controlled by Flame Management System
- Independent high temp limit with automatic cool down reset
- Emergency stop switch on control panel
- Safety switch disconnect on Grate
- Low fire position switch included in combustion interlocks
- Main airflow confirmation switch
- Combustion airflow confirmation switch
- Low gas pressure switch – automatic reset
- High gas pressure switch - manual reset
- Upstream high temp limit

Basic Operation

1. Plug it in: The Heat Injector is designed to not draw more than 15 amps so it can be plugged into any standard receptacle with a ground.

Note: The Portable Heat Injector System is not made to operate from a typical ground fault circuit because it uses a pulse width, modulated output to create the 3 phase power for the main airflow blower, and the RF noise level going to ground is detected as a ground fault.

For safety purposes, the power connection should be made within the heated environment to act as an emergency stop. If an extension cord is required, use the shortest length possible and must be either 12 or 14ga.

2. Turn on the AIRFLOW switch and adjust the AIR VOLUME knob.

3. Turn on the HEAT switch and adjust the DISCHARGE Setpoint Value (SV) using the up/down arrows.

4. Adjust the INTAKE Setpoint Value (SV) for Thermostat Shut-off Temperature.

Sequence of Operation:

Once the Heat Injector is plugged in and the airflow is on, there is a list of operational interlocks that must be met before the burner is ignited to ensure safe operation.

1. The **EMERGENCY STOP pushbutton must not be pushed and the **GRATE SWITCH** is installed.** This prevents both Airflow and Heat. It is located on the front of the Control Panel door (big red pushbutton). Push in to stop, Pull out to put back in operation.

Safety Note: The emergency stop prevents operation but will NOT remove power to all systems so unplug before doing any repair.

2. The fuse in the control panel must be good for the heating section to function. The fuse holder on horizontal terminal strip has a red light to indicate a blown fuse.

3. The High Temperature limit must not be tripped. The High Temp Limit is an automatic action and is located behind the blower access plate. The High Temp Limit is independent from the MPA Flame Management System.

The value for the High Temperature Limit is set to ensure the discharge temperatures do not exceed the safe operational limits. The maximum discharge temperature is 175°F

4. The ignition process will start after all the Combustion Interlocks have been met.

A. The Thermostat must require heat. The INTAKE meter must sense a temperature less than the setpoint (the SV on INTAKE must be greater than PV).

B. The Combustion Blower must be operational as sensed by pressure switch.

C. The Main Airflow Blower must be moving air as sensed by a pressure switch.

D. The Low Gas Pressure Switch must sense gas pressure greater than setpoint. If the regulated gas pressure goes below the set-point, an alarm will be produced which stops ignition process. The low gas pressure switch automatically resets when the gas pressure goes above the low pressure setting.

E. The High Gas Pressure Switch must sense a pressure less than the setpoint. If the regulated gas pressure goes above the set-point, an alarm prevents combustion until the switch is manually reset by pressing in on the plastic cover.

5. Once the interlocks are approved, the Ignition Process will prevent the direct spark ignition if the MV contact is not confirmed as closed.

6. The Burner is started with direct spark ignition and proves the flame with a Flame Rod tied directly to the MPA Flame Management System that continuously monitors the flame to ensure no gas passes when the burner is not burning with double blocking valves.

The MPA will go into Alarm mode and shut the Heat Injector down if flame is not detected or if it fails to start and requires the Alarm Reset Button on the control panel to be pressed.

The MPA Alarm will be triggered if the flame signal is lost during operation or if it fails to start during 10 seconds of "Trial for Ignition". The Red Alarm on the Control Panel is illuminated. A blue Reset is on the Control Panel will restart the ignition process.

7. When the flame starts, the Green light is lit and the Discharge Temperature Controller will turn on and begin to modulate the gas valve to achieve the discharge temperature.

8. When HEAT switch is turned OFF, the Heat Injector shuts down by closing the main gas valves, moving the modulation valve back to low fire and removing power from the combustion blower.

MPA ERROR CODES

Dungs Flame Management System

The Dungs Flame Management, model number MPA-4112, is used with the Heat Injector System. The information regarding the Display along with and the definition of the State and Functions are included in the Owner's Manual. The digital file includes the entire MPA Manual which identifies all the features, parameters, and options.

The following is a listing of the most common Fault Codes. For more information on a specific Fault Code, go to MPA Manual and search (F8) for the 2 digit Fault Code. The following are the most common that might appear.



Fault Codes will be displayed here

Common MPA Fault Codes (F__)

04: If the Reset is used 5 times within a 15 minute window the F 04 fault will appear. You can reset the counter by pressing and holding the Enter button until the display flashes or wait until time passes.

EbC: No ground on circuit. The Flame Rod needs a ground circuit to confirm flame.

A2: The safety chain is broken before the heat enable has been removed. This fault indicates that one of the interlocks in the safety chain “fell out” while the heat was enabled. This might include a momentary bounce in a pressure switch or a tripped high temp limit. The fault alarm might appear after the heat enable was removed.

F 13 error code (*in Manual as 0x13 if doing a search*) If there is a bouncing contact on a pressure switch in the safety chain, it might also produce the F 13 error code which usually means the unit is sensing external voltage on terminal 9 or 10. To test, remove any field wiring and install a jumper between 9 & 10. If the fault continues the internal safety chain circuit of the MPA is damaged and needs to be replaced.

D1: This indicates the safety chain was broken while the “heat enable” signal was present. The safety chain is made of the pre-ignition interlocks that need to be in place before closing the contacts between 9 and 10 on the MPA. These interlocks are typically high temp limits, the confirmation of airflow, and high gas pressure switches. The most likely cause is a bouncing contact on the pressure switch that confirms airflow in the injection chamber.

A6: There is a problem with the confirmation of the combustion air. The power should remain on after the heat enable signal has been removed. The fault will be produced if the pressure switch “falls out” before the heat enable is removed OR if the state of the pressure switch doesn’t change (as in the case of a jumper).

A7: No Flame detected during trial for ignition. Press reset if all safeties are in place and try again.

A8: Flame goes out during operation. This could be the result of air in the line, the low fire is set too low, or the flame rod is producing a poor/intermittent signal (see following Flame Rod Maintenance section).

A9: Flame failure after ignition and before it was stabilized (within first few seconds) which produces the Flame ON signal. This could be the result of air in the line during start-up or the low fire position is too low.

Stored Error Codes – The last 10 error codes can be viewed at the MPA display by pressing the BACK and PLUS Buttons at the same time.

The ENTER Button toggles through the history of error codes, the BACK goes the other direction.

More info on each error can be obtained by pressing:

+ Button (the state is displayed as long as the button is pressed)

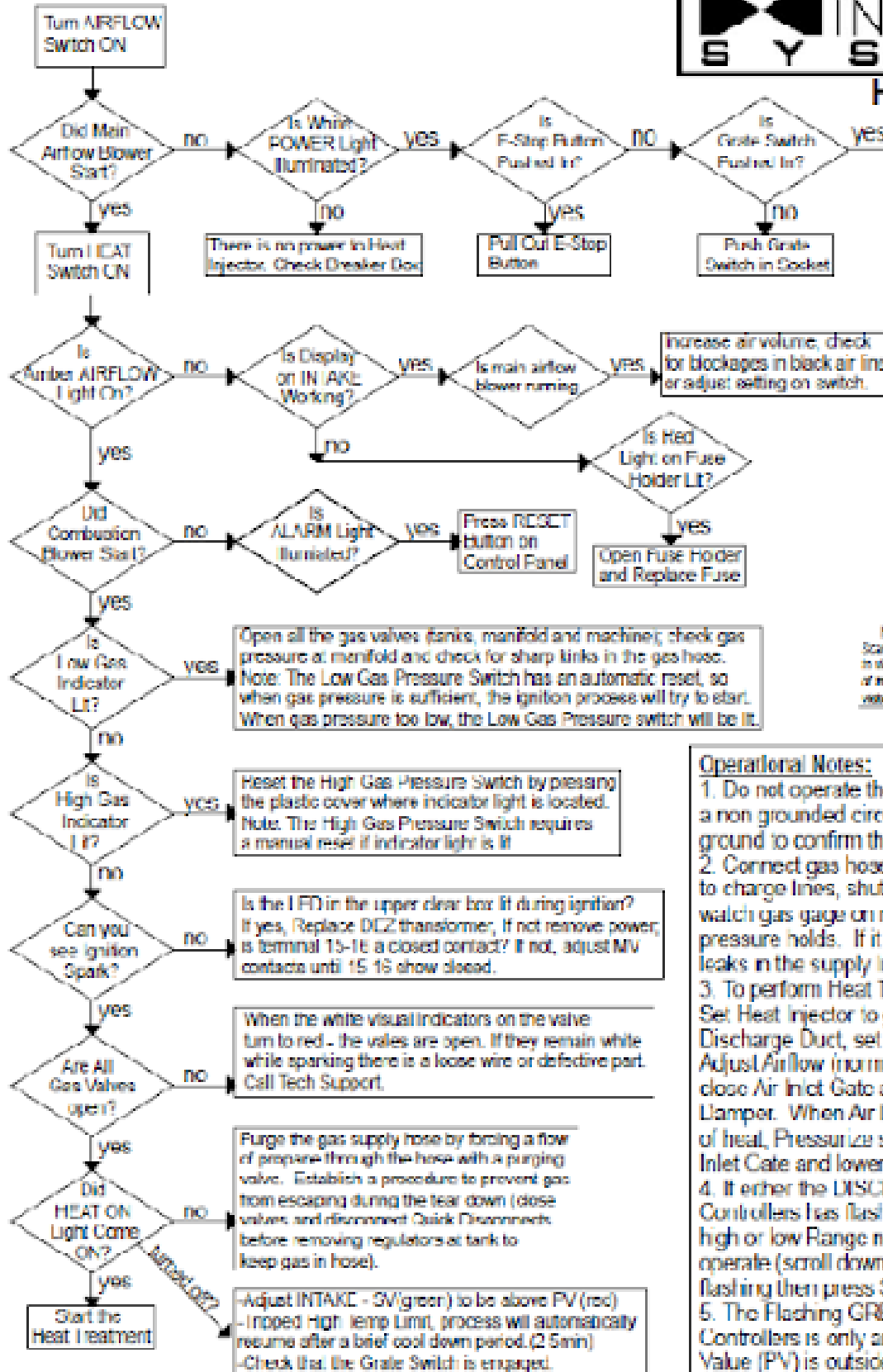
– Button (additional error note is displayed as long as the button is pressed)

Troubleshooting Flowchart - Model M400P-120M

The Process below is to assist in trouble shooting a possible problem. If problem persists, please call Technical Support (770-529-5640).



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Look at Error Code on VFD. If Power Light on and VFD not lit, call Tech Support.

VFD Error Codes that require Manual Reset. To Reset: Unplug for 1 min. & Plug Back In

L uA - Voltage varies too much, plug into a different circuit or use heavier gauge extension cord.

oL - Reduce the AIR VOLUME slightly.

oH - VFD is HOT, reduce AIR VOLUME or Cool Control Panel.



Operational Notes:

1. Do not operate the Heat Injector from a non grounded circuit (The Heat Injector ground to confirm there is flame present.
2. Connect gas hoses, turn on gas supply to charge lines, shut off gas supply and watch gas gage on manifold to ensure the pressure holds. If it falls, check for gas leaks in the supply lines before proceeding.
3. To perform Heat Treatment: Set Heat injector to get fresh air, install Discharge Duct, set Discharge Temp, Adjust Airflow (normally to maximum), close Air Inlet Gate and raise the Modulation Damper. When Air Intake records high levels of heat, Pressurize structure by opening Air Inlet Gate and lowering Modulation Damper.
4. If either the DISCHARGE or the INTAKE Controllers has flashing RED numbers, the high or low Range needs to be changed to operate (scroll down to adjust Range to stop flashing then press Set.)
5. The Flashing GREEN of the Temperature Controllers is only an indication that Present Value (PV) is outside Setpoint Value (SV).
6. The Discharge Controller is powered on while the burner is enabled

For emergencies, please leave a message at the Office and call Dave's mobile 678.454.1443 or Kevin's mobile 678.480.6583