

INLINE CENTRIFUGAL HEATER - CSA



NATURAL GAS

ILCH18-NGE

ILCH24-NGE

ILCH28-NGE

VAPOR PROPANE

ILCH18-VPGE

ILCH24-VPGE

ILCH28-VPGE



INSTALLATION & OPERATING MANUAL

P/N 785968 Rev 0

CHIEF
AGRI

Trusted. Tested. True.®

Installation Manual

WARNING: If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- **Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.**
- **WHAT TO DO IF YOU SMELL GAS**
 - **Do not try to light any appliance.**
 - **Extinguish any open flames.**
 - **Do not touch any electrical switch.**
 - **Immediately call your gas supplier. Follow the gas supplier's instructions.**
 - **If you cannot reach your gas supplier, call the fire department.**
- **Installation and service must be performed by a qualified installer, service agency or the gas supplier.**



WARNING: Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

FOR YOUR SAFETY

The use and storage of gasoline and other flammable vapors and liquids in open containers in the vicinity of this appliance is hazardous.

© Chief Industries, Inc.
4400 East 39th Street • PO Box 848
Kearney, NE 68847
Phone 800.359.7600

For more information about Chief Industries, Inc. and additional products or services please visit our website
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Introduction

Thank you for purchasing a Caldwell Inline Centrifugal Heater compliant to the Canadian Standards Association performance guidelines. Proper installation will ensure you the best overall experience with your heater and guarantee smooth operation. This manual is for the installation and operation of the Caldwell inline centrifugal heater system that has been 100% factory quality control inspected, field simulated and stress tested prior to shipment.

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The technical data contained herein is the most recent available at the time of publication and is subject to modification without notice. Chief Industries, Inc. reserves the right to modify the construction and method of operation of their products at any time without any obligation on their part to modify any equipment previously sold and delivered.

Model Number Description

The heater model nomenclature distinguishes the application of the heater. The information includes a designation of the applicable fan and type of fuel to be utilized (natural gas, vapor propane, or liquid propane). The model number is stamped on the serial number plate and the definition of the model number nomenclature is as follows:

Example: ILCH 28 - NGE

 (a) (b) - (c)

- (a) ILCH = Heater Unit (Canadian)
- (b) 28 = Housing Diameter
- (c) NGE = Type of Fuel to be Utilized

Where

NGE = Natural Gas Fuel (Electric)

VPGE = Vapor Propane Gas Fuel (Electric)

Packing List

The shipment should contain the following items. Check carefully when unpacking and before installing. In case of any shortage, contact your dealer. In case of damage during shipment, file a claim with the carrier.

Quantity	Component	Description
1	Heater	Heater Assembly
1	Warranty Registration Card	Bulletin
1	Manual	Bulletin (1131)
1	Bolt Bag	Assembly
1	Orifice	Package
1	Terminal Block Kit	Package

Note: Before starting the installation of the heater, verify that all items called out on the packing list have been received.

Please note that this manual, part number 785968 includes and references Bulletin 1131. This manual is for the installation, operation and maintenance of heater models with serial numbers 15F and above, and is effective 5/1/2015.



Before You Begin

Read this manual thoroughly before operating this heater. Keep this manual in a location for quick access and reference.

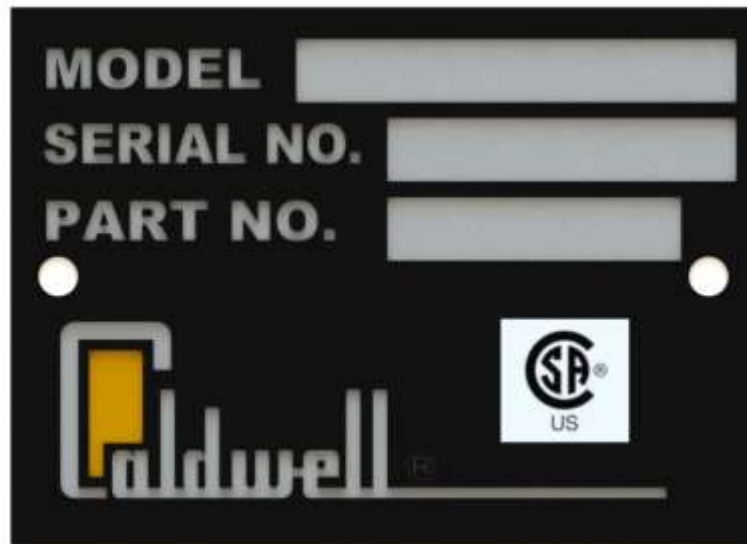
“The equipment shall be installed in accordance with the Natural Gas and Propane Installation Code, CSA B149.1 and the Propane Storage and Handling Code, CSA B149.2, or applicable provincial regulations, which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.”

Your Caldwell heater is designed for safe and reliable operation when properly installed in conjunction with a Caldwell fan. However the heater requires electricity and flammable gas, which when improperly installed or when operated improperly, can be potentially dangerous. Anyone who will operate this unit should read the manual before installing or operating this unit. The following table, provided for your convenience, will aid in verifying that these individuals know the proper operation of the heater. After completely reading the manual, this table should be filled in.

Date	Operator Signature	Owner Signature

Special Service Note: If you are unable to remedy any service problem after thoroughly studying this manual, contact the dealer from whom you purchased the unit. Your dealer is your first line of service. The following information is required for service of any dryer:

1. Heater model number: _____
2. Heater serial number: _____
3. Fan model number: _____
4. Fan serial number: _____
5. Type of fuel: _____
6. Type of external plenum control used: _____
7. Setting of the external plenum control: _____
8. Approximate operating pressure: _____
9. Hours the unit has been in operation: _____
10. Diameter and eave height of bin: _____
11. Grain depth: _____
12. Type of grain stored: _____
13. Moisture content of the grain: _____
14. Dealer purchased from: _____
15. Dealer address and phone number: _____
16. Date purchased: _____
17. Service contractor:
 - a. Name: _____
 - b. Address: _____
 - c. Phone: _____



Safety and Precautions

Your safety and the safety of others is a primary concern to Chief Industries, Inc. This manual was written to assist in the safe installation and operation of the Caldwell heater.

It is your responsibility as the owner, builder, operator, or supervisor to know what specific requirements, precautions and hazards exist and to make these known to all personnel working with equipment or on the jobsite so that they can take any necessary safety precautions.

All personnel, including the installation crew, must read and understand the information contained in this manual before starting construction. Chief Industries, Inc. is not responsible or liable for the misuse of equipment or operation of personnel or equipment in an unsafe manner.

Chief Industries, Inc. assumes no liability with respect to proper construction and inspection, assembly, or use of its products established under applicable laws, all of which is the sole responsibility of the purchaser and those authorized for the installation.

Follow all local and federal safety laws and regulations. Make certain that all equipment and personnel conform to any applicable jurisdiction regulations.

Work Area Safety Statement

To ensure the safety of all individuals in the work area, only authorized and trained persons shall install, maintain and use the Caldwell heater.

Under no circumstances should unauthorized individuals be allowed to trespass or be present in the work area.

It shall be the duty of all operators to verify that the work area is clean, organized and kept free of all debris and tools that might cause an accidental tripping or falling hazard.

Special care should be taken when working from unsafe heights. Common sense dictates that when conditions such as rain or wind prohibit the safe use of equipment, the installation be discontinued.

Chief Industries, Inc. strongly recommends that equipment meeting the current specifications be used, whether the individual operator is required by law to do so or not. Proper climbing equipment and a secured safety harness should be used at all times when performing operations work, installation or maintenance.

Field modifications without the authorization of the manufacturer may present unknown dangers to the operator and must be avoided.

Auxiliary Equipment Safety


You may decide to purchase and install “auxiliary equipment” made by other manufacturers. Chief Industries, Inc. has no control over the design and manufacture of this equipment. In view of this, at a minimum, we suggest you do the following:

1. Obtain, read and understand the instructions and cautions of the auxiliary equipment manufacturer. Be certain that all equipment is installed in agreement with those instructions.
2. Check with Chief Industries, Inc. to verify that your system is designed to support any additional loads supplied by the auxiliary equipment.
3. Obtain any applicable safety decals from the manufacturer and make certain they are displayed in a visible location.
4. Make certain that all electrical equipment is properly installed and grounded by a qualified electrician.
5. Check availability and operation of electrical lock out and emergency stop systems.
6. Be certain that all guards and shields are securely in place.
7. Store all operation / maintenance manuals in a safe place for future use.

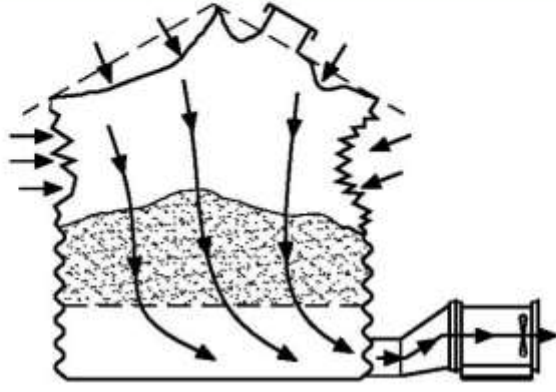
Heater Safety

Before operating the unit, perform the following checks:

1. Verify the fan, heater and transition units are bolted securely together. Verify the screen guard is secured in place.
2. Verify the units are wired in compliance with the national electrical code, and the ground wire is sized large enough to provide lightening protection.
3. Verify the gas supply installation is according to instructions.
4. Provide sufficient bin exhaust vents or fans, and verify that they are open and operational before starting the drying system. These vents or fans are necessary to provide an exhaust path for moisture laden air, thus reducing condensation, and also to prevent pressurization of the bin above the grain mass and causing damaging loads on the bin and roof structure. Do not operate units when conditions are such that freezing of the vents could occur.
 - a. Heed the following warning:



WARNING



TO PREVENT ROOF AND WALL DAMAGE OF STRUCTURE

- 1.) USE POSITIVE AERATION SYSTEM (PUSH SYSTEM)
- 2.) MAKE SURE ALL ROOF VENTS ARE SIZED PROPERLY, OPEN, AND UNOBSTRUCTED.
- 3.) IF USING ROOF EXHAUST FANS, WIRE ROOF AND SUPPLY FANS TO START SIMULTANEOUSLY OR MAKE SURE ROOF FANS ARE STARTED WHEN SUPPLY FANS ARE STARTED.
- 4.) DO NOT OPERATE YOUR AERATION SYSTEM WHEN CONDITIONS EXIST THAT MAY CAUSE ROOF VENT ICING.

(VENT ICING CAN OCCUR WHEN AMBIENT AIR TEMPERATURE IS BELOW 35° (2°C) AND AIR RELATIVE HUMIDITY IS 90% AND ABOVE. FOR ANY QUESTION AS TO POSSIBLE ICING CONDITIONS, SHUT DOWN THE SYSTEM AND CONTACT YOUR LOCAL WEATHER SERVICE.)

DETERMINE THE AIR FLOW FROM FAN PERFORMANCE CHARTS AT FREE AIR AND PROVIDE VENTS ACCORDING TO CHART (A).

CONSULT YOUR CALDWELL EQUIPMENT DEALER FOR AID IN SIZING POWER EXHAUST FANS AND / OR ROOF VENTS.

CHART (A)	
BIN VENT	CFM
LOW PROF	2670
HGBV - 1.75	2670
BBV - 19	3000

XX/XX

740969

Heater and Control Enclosure Components

The following outlines the accessories, general components and replacement part numbers for the Caldwell heater models.

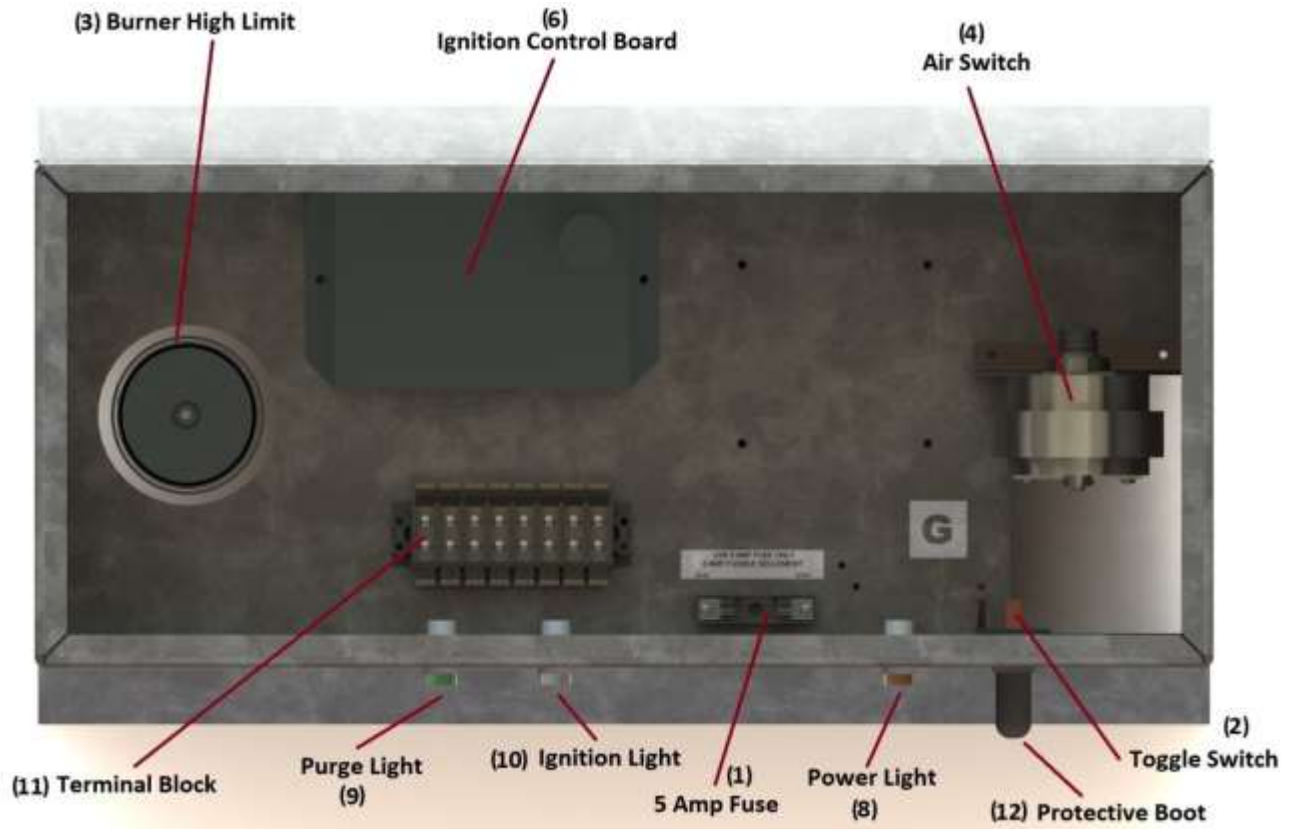
Accessories:

1. A humidistat, thermostat, or thermostat-humidistat control is not included with the standard heater. They are to be ordered separately. A dual humidistat-thermostat kit can be ordered so that one control assembly can be used when two heater units are used on the same bin.
2. Caldwell requires using a fuel line strainer in the fuel line just before the fuel enters the heater plumbing. A line strainer is provided on all units. A line strainer can be obtained from Caldwell, or your gas company. **Caution:** Your warranty could be jeopardized if the heater should malfunction due to foreign material in the heater plumbing lines if the fuel supply line is not fitted with a line strainer.
3. When wiring a heater to a 460 or 575 volt fan, a step down transformer must be used to develop 115 volt, single phase, 60 cycle power (part #9717033 for 460V and part # 9763367 for 575V).

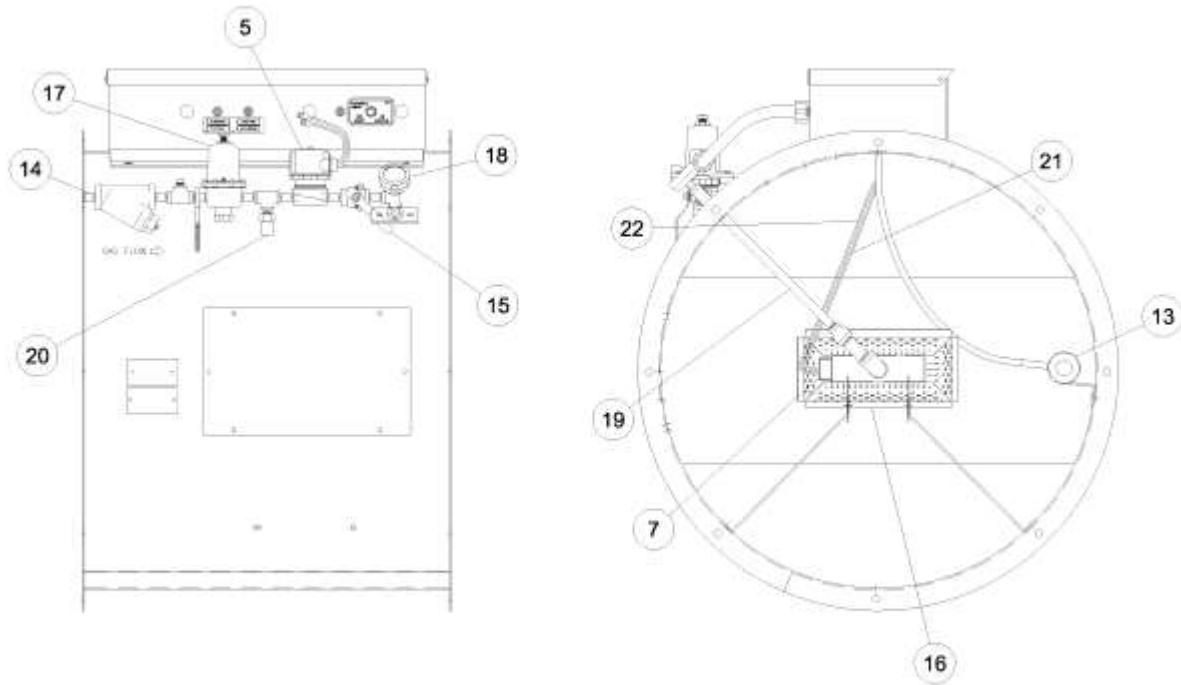
Explanation of Components:

Please note the location and general description of the primary components and their function.

Control Enclosure Components:



Heater Body Components:



The balloon callouts shown in the above illustration specify each component of the heater.

1. **5 Amp Fuse (#850412)** - The fuse protects the heater control circuit from excessive current draw.
2. **Toggle Switch (#710970)** - The toggle switch is the heater "On" and "Off" switch.
3. **Burner High Limit (#785949)** - The burner high limit control, located just downstream of the burner, is a manual resetting temperature limiting control used to limit the exhaust air temperature to protect the heater, not the bin plenum. The burner high limit control is set to shut off the heater if the exhaust air temperature reaches 120° F (49° C). To restart the heater, the operator must manually reset the burner high limit control by pushing the button on top of the heater.
4. **Air Switch (#785691)** - The air switch is a control that senses the flow of air from the fan to the heater. If, for any reason, the air flow is stopped, the air switch will shut off the heater. The air switch will keep the heater shut off until air flow from the fan is re-established. If the air switch cycles off from a lack of air, turn the heater toggle switch off before restarting the fan.

5. **Solenoid Valve (#785808)** - Solenoid valves are shut-off valves that are electrically operated. The valves are opened automatically when energized, and are closed automatically when de-energized.
6. **Ignition Control Board (#718585)** - The ignition control board provides the high voltage needed to create the spark at the electrode for ignition and proof of flame safeguard circuitry of the heater and also controls the opening and closing of the solenoid valve.
7. **Electrode (#788059)** - The electrode is used to ignite the fuel at the end of the burner and also to establish the presence or absence of flame at the burner.
8. **Power Light (#785709)** - The amber power light is used to indicate that the heater toggle switch is in the on position and electrical power is active to the heater control box.
9. **Purge Light (#785717)** - The green purge light is used to indicate that the heater is going through a 30 second delay before trial for ignition. Aft the 30 second delay is complete the green light will turn off.
10. **Ignition Light (#785725)** - The white ignition light is used to indicate that either the heater is in the trial for ignition mode or that flame has been established. The light will remain on as long as there is flame at the burner.
11. **Terminal Block 8 POLE (#749614)** - The terminal block is used as a junction block for connecting the lead wires of the various electrical parts.
12. **Toggle Switch Protective Boot (#712034)** - The toggle switch boot is used to eliminate water entering the heater controls through the toggle switch.
13. **Venturi Weldment (#9415661)** - The venturi weldment creates a high and low pressure area in the airflow, which aids the air switch in measuring air velocity.
14. **Fuel Line Strainer** - The fuel line strainer is used to remove foreign particles from the fuel before the fuel enters the heater plumbing. If these particles are not removed, possible operating difficulties could occur.
15. **Ball Valve (#714949)** - The ball valve is used as a manual shut off valve to stop fuel flow to the burner. The ball valve has 2 positions: Opened and Closed.
16. **Burner (#9784975)** - The ring burner is a rectangular shaped component in the heater where the fuel and air are mixed and then burned.
17. **Regulator** - The regulator is used to regulate the firing rate of the heater. The regulator is not used to regulate the fuel from the fuel sources. A separate regulator should be used for regulating the fuel at the fuel source.
18. **Pressure Gauge** - The pressure gauge is used to indicate the amount of fuel pressure at the orifice. The pressure is used as a tool to set the firing rate.

19. **Orifice** - The orifice is an opening at the end of the heater plumbing that develops a restriction to gas flow, which allows the pressure gauge to develop a pressure reading, so that the firing rate of the heater can be field set.
20. **Pressure Relief Valve (#716878)** - The pressure relief valve is a device that is sized to the pressure regulating pressure rating, to protect the regulator from an over pressure condition.
21. **Humidistat Control (#9850982)** - The humidistat control is an electrical operating control that is wired into the heater to cycle the heater "On" and "Off" with respect to the relative humidity of the drying air. The humidistat control is typically set at about 50% - 60% relative humidity of the drying air. When the relative humidity is higher than the humidistat setting, the heater is cycled "On" and is left on until the relative humidity is below the humidistat setting. If the relative humidity of the drying air is less than the humidistat setting, the heater is cycled "Off" until such time that the relative humidity would become greater than the setting of the humidistat. The humidistat control is for low temperature drying.
22. **Thermostat Control (#9851014)** - The thermostat control is an electrical operating control that is wired into the heater to cycle the heater "On" and "Off" with respect to the temperature of the drying air. The thermostat is set at a desired temperature, and if the temperature is higher than the thermostat setting, the heater is cycled "Off." If the drying air temperature is less than the thermostat setting, the heater is cycled "On," and is left on until such time that the drying air temperature is above the thermostat setting.
23. **Humidistat-Thermostat Control (#9870974)** - The humidistat-thermostat control is an electrical operating control that is wired into the heater to cycle the heater "On" and "Off" with respect to both the drying air relative humidity and temperature. The humidistat-thermostat control will cycle the heater on if either the drying air relative humidity is too high, or the drying air temperature is too low with respect to the humidity setting or temperature setting of the control. **NOTE:** The optional external plenum controls do not function in the same manner as a thermostat in a house. When the bin plenum controls reach the set point the heater is then shut off. In the off mode the bin's plenum temperature will drop below the set point of the control due to the rapid air change in the plenum from the fan. The controls do not sense the instantaneous change in air temperature but take time to reach the plenum control setting before controlling the heater operation. **NOTE:** The firing rate must be set by the operator to verify excessive temperature is not present in the plenum.

Replacement Parts Common to All Models:

ITEM #	PART DESCRIPTION	PART NUMBER
1	5 Amp Fuse	850412
2	Toggle Switch	710970
3	Burner High Limit	785949
4	Air Switch	785691
5	Solenoid Valve	785808
6	Ignition Control Board	718585
7	Electrode	788059
8	Amber Power Light	785709
9	Green Purge Light	785717
10	White Ignition Light	785725
11	Terminal Block (8 pole)	749614
12	Toggle Switch Boot	712034
13	Venturi	9415661
14	Fuel Line Strainer	851634
15	Ball Valve	714949
16	Burner	9784975
23	Nylon Humidistat Control (Not Shown)	9850982
24	Thermostat Control (Not Shown)	9851014
25	Humidistat-Thermostat Control (Not Shown)	9850974

Replacement Parts for Specific Models:

		ILCH18-NGE	ILCH24-NGE	ILCH28-NGE
ITEM #	PART DESCRIPTION	PART #	PART #	PART #
17	Regulator	785832	785832	785832
18	Pressure Gauge	715011	715011	715011
19	Orifice	785881	785881	785881
20	Pressure Relief Valve	717397	717397	717397
21	Ignition Wire H.V.	9785379	9785361	9785353
22	Ignition Wire L.V.	9730499	9730515	9730531

		ILCH18-VPGE	ILCH24-VPGE	ILCH28-VPGE
ITEM #	PART DESCRIPTION	PART #	PART #	PART #
17	Regulator	785824	785824	785824
18	Pressure Gauge	851543	851543	851543
19	Orifice	785873	785873	785873
20	Pressure Relief Valve	785816	785816	785816
21	Ignition Wire H.V.	9785379	9785361	9785353
22	Ignition Wire L.V.	9730499	9730515	9730531

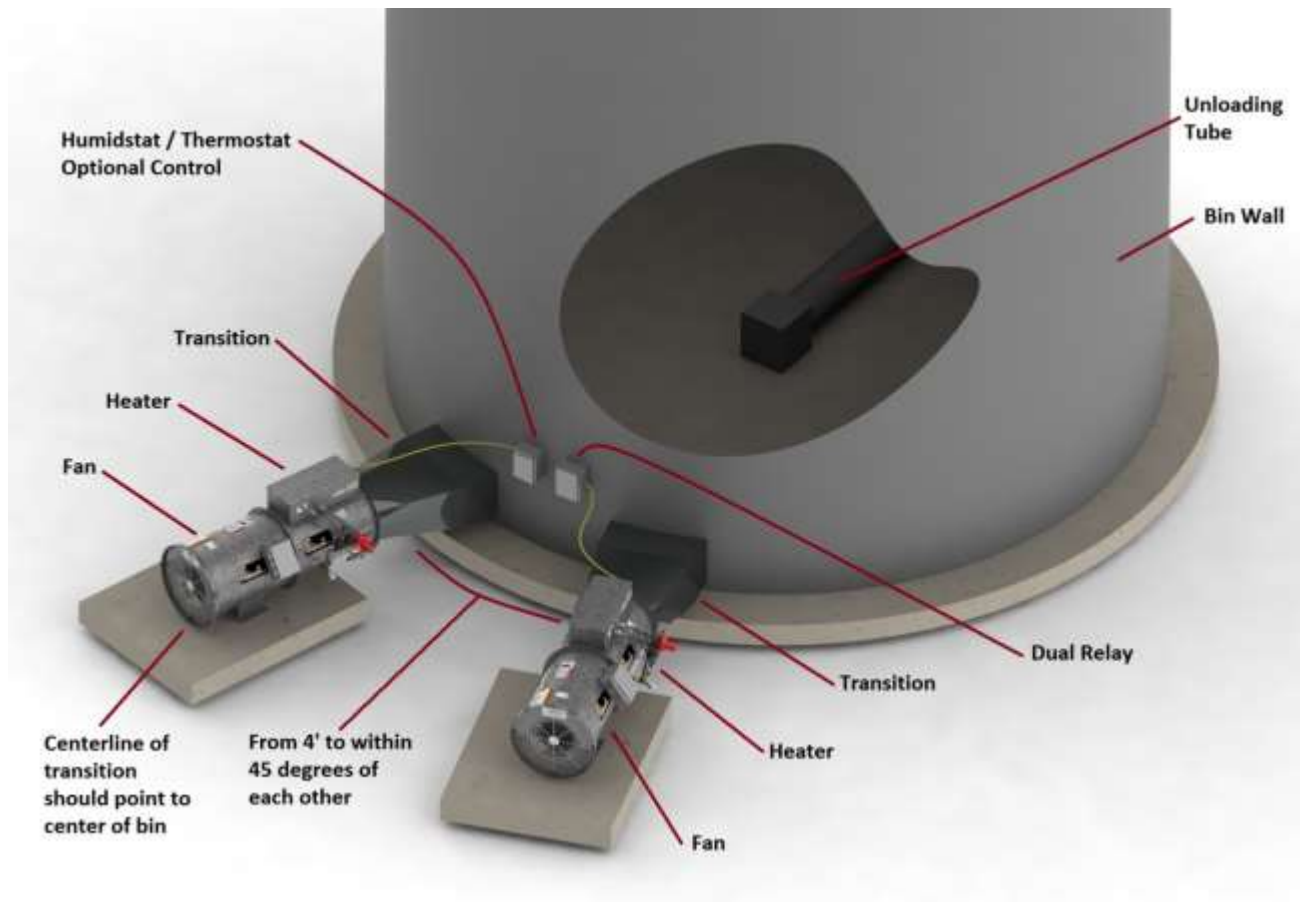
Installation Requirements

The following illustration describes the components necessary for a typical installation. The drying unit (fan, heater, and transition) should be located such that the heated air can enter the bin plenum chamber uniformly. Verify all the components needed for the drying system are present. The fan and heater should be located opposite the unloading tube for best air distribution.

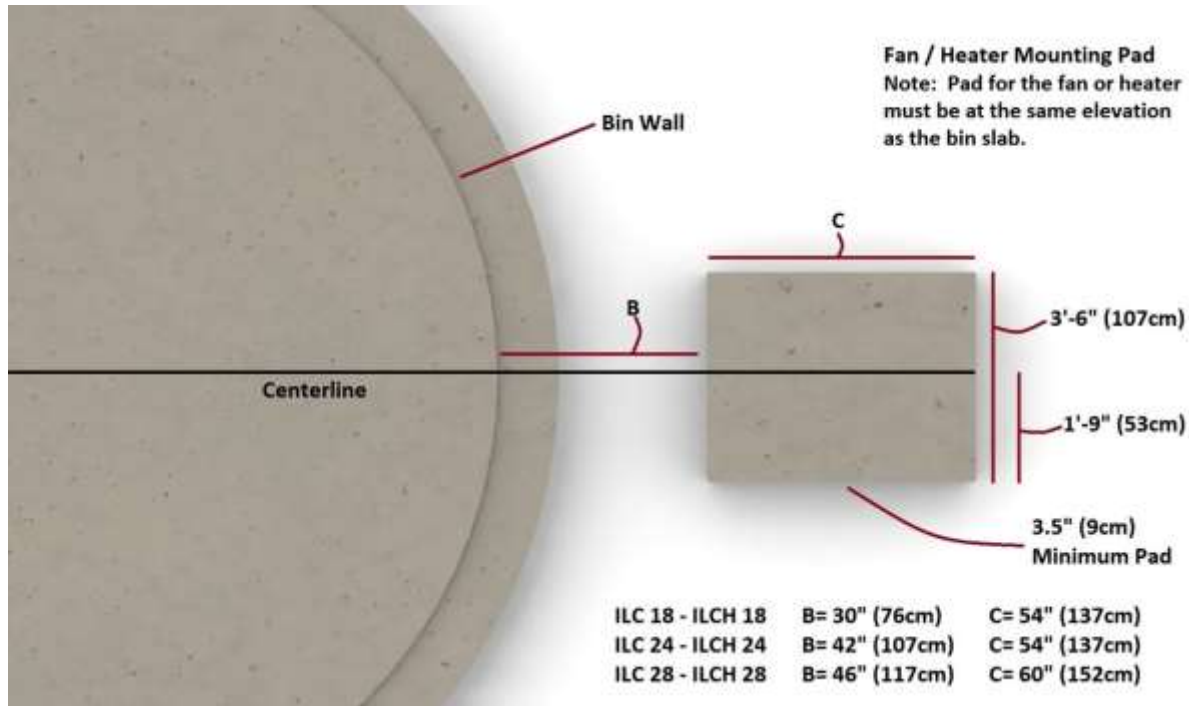


Heater Location and Foundation

The following illustration shows a typical installation of 2 drying units and optional plenum controls. If two drying units are used on the same bin, locate them 4' (1.21m) to within 45° of each other and centered opposite the unloading tube. Locate any humidistat or thermostat control between the two heater units, making sure control senses heat from both units (order kit #9735035).



For proper operation of heater, the fan and heater are to be mounted on a level pad. The pad should be the same height as the concrete floor. The size of the pad should be as indicated in the following illustration.



Before installing heater please verify the following:

1. That the electrode is gapped at 1/8" (.32cm). If not, gap to 1/8" (.32cm).
2. That the high and low voltage ignition wires are attached.
3. That all bolts, including carriage bolts and screws are tight.
4. The heater is installed on the air discharge end of the fan. Check air flow decals on the fan and heater to verify heater is oriented properly. Connect the heater to the transition with bolts provided in the fan bolt bag. The installation should appear as [illustrated previously](#).

Gas Supply Installation

Refer to the dryer rating plate to locate the minimum gas supply pressure for obtaining the maximum gas capacity for which this dryer is specified.

The gas piping installer is to locate a manual emergency shutoff valve in an appropriate location that allows access to this valve to shut off the fuel to the dryer in case of a fire, explosion or other emergency at the dryer.

Propane Gas

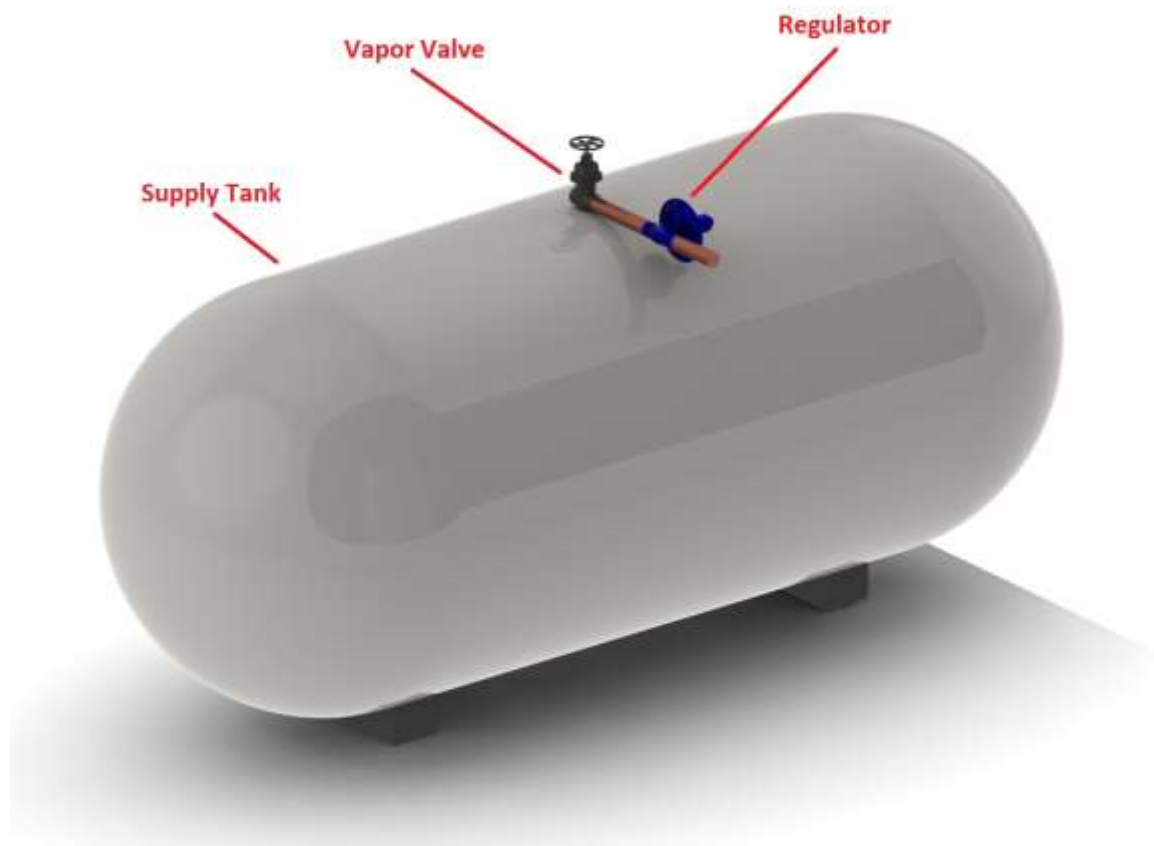
For a typical propane tank installation a 1000 gallon tank is recommended as the minimum size to avoid frequent refilling. (Raising the air temperature 100°F (38°C) on an airflow rate of 10,000 CFM

(283m³/min) would require approximately 300 gallons of liquid propane per day.) Also, the larger tank will aid in the vaporization of the liquid propane.

Note: Never use an anhydrous ammonia tank as your LP gas tank. Contaminants in the tank can be harmful to the heat, and safety devices may not meet liquid propane storage codes.

The supply tank should be placed at least 10' (3.05m) from the heater. Some areas may require a greater distance; consult your local authorities.

A line strainer must be located at the heater (order part #851634).



A minimum 60 psig (414kPa) pressure regulator is recommended to be located as shown. The regulator provides uniform flow, and reduces the pressure on the gas line from the regulator to the heater for added safety. The regulator is required on vapor propane installations. Verify that the supply tank has a relief valve present and that it is properly sized and located.

Natural Gas

The natural gas service should be able to provide a minimum of 5 psig (34kPa) when the heater is operating. Check with your gas supplier to verify that the supply pressure has the pressure potential to deliver natural gas for the length of the service line.

A line strainer must be located at the heater (order part #851634).

The natural gas service should be regulated. Contact your gas supplier. A regulator can be obtained from Caldwell (order part #753905).

Fuel Line Installation

The suggested tubing size to be used from the supply to the heater is 5/8" (1.59cm) O.D. type K copper tubing or 1/2" (1.27cm) black schedule 80 steel pipe. If copper tubing is used, make a loop in the tubing within 3' (0.9m) of the heater to absorb shock. If 1/2" (1.27cm) steel pipe is used, run the plumbing to within about 3' (0.9m) of the heater, and use three feet of 3/8" (.95cm) minimum I.D. high pressure flexible hose, (CGA approved for propane). Be careful not to turn or twist the heater plumbing parts because the proper operation of the heater plumbing parts can be affected and leaks in joints can be developed. Verify all foreign material is out of the gas line before connecting the line to the heater.

Install a pressure gage on the heater plumbing and seal threads using approved pipe thread compound for propane and natural gas.

If your natural gas supply pressure is not adequate to maintain 10 psig (69kPa) at the heater, use a one inch or larger service line and verify that 5 psig (34kPa) natural gas pressure is available when the heater is operating. Install a line strainer between the natural gas heater and the service line.

Check all connections for leaks with a soap test. Open the supply valve at the source and use a liquid detergent and brush all fittings and joints. If bubbles are generated at the fitting, gas is escaping from the joint. With the installation of the service line, inspect all parts added, and heater plumbing parts affected by the installation. Tighten the components if not sealing and replace if cracked or defective.

Note: Do not use galvanized pipe fittings.

Fan Electrical Installation

Connect the fan unit to the electric power source following the recommended wiring procedure indicated in the fan manual. The electrical disconnect switch for the fan shall be sized with adequate ampacity for the fan rating and installed in accordance with the Canadian Electrical Code Part 1 (CSA Standard C22.1) and any local requirements.

Install the fan terminal block kit inside the inline centrifugal fan control box as follows:

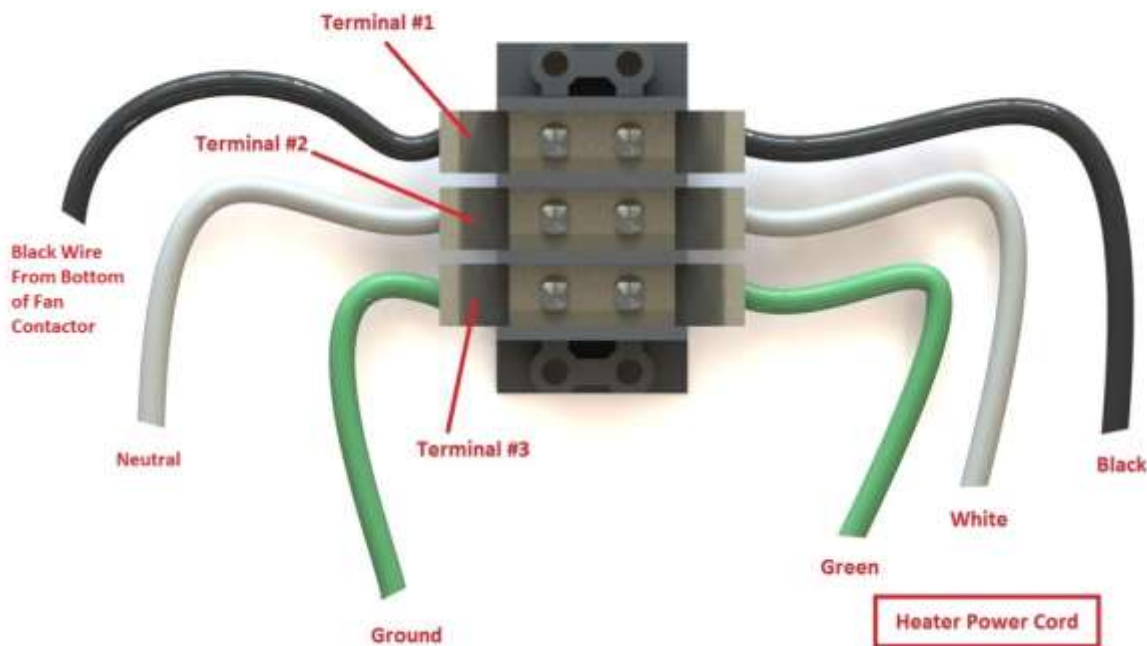
1. Field drill 2 separate 5/32" (.39cm) diameter holes and fasten the terminal block with #5-40 X 5/8" (1.58cm) machine screws, 1/8" (.31cm) star washers, and #5-40 nuts.
2. Wire the black wire into terminal T1 on the contactor.
3. Wire the green wire into the ground terminal.
4. The neutral wire is supplied by the electrician and is field installed.



Heater Electrical Installation

Note: The heater is electrically interlocked with the fan electrical service.

The heater operates on 115 volt, single phase, 60 cycle power. For fans wired for 230 volt, verify that the fan is wired with a neutral wire to the middle terminal of the fan terminal block, (#2), as well as a ground wire linked to the bottom terminal of the fan terminal block 3 as shown. The heater power cord is wired into the fan controls by connecting the black wire to the terminal (#1), the white wire to terminal (#2), and the green wire to terminal (#3) of the fan terminal block, as shown. With the heater wired into the fan circuitry, the fan must be operating before power is available to the heater.



For fans wired for 460 or 575 volt, three phase power and 230 volt, three phase power, a step down transformer must be used to convert the 460 or 575 volt system and 230 volt system to 115 volt, single phase, 60 cycle power for the heater.

When installing a thermostat, humidistat, or thermostat-humidistat control, the control power cord is wired into terminals 4 and 5 of the heater terminal block. Remove the jumper wire linking terminals 4 and 5, and connect one lead of the control power cord to terminal 4 and the other lead to terminal 5. The control leads can be interchanged.

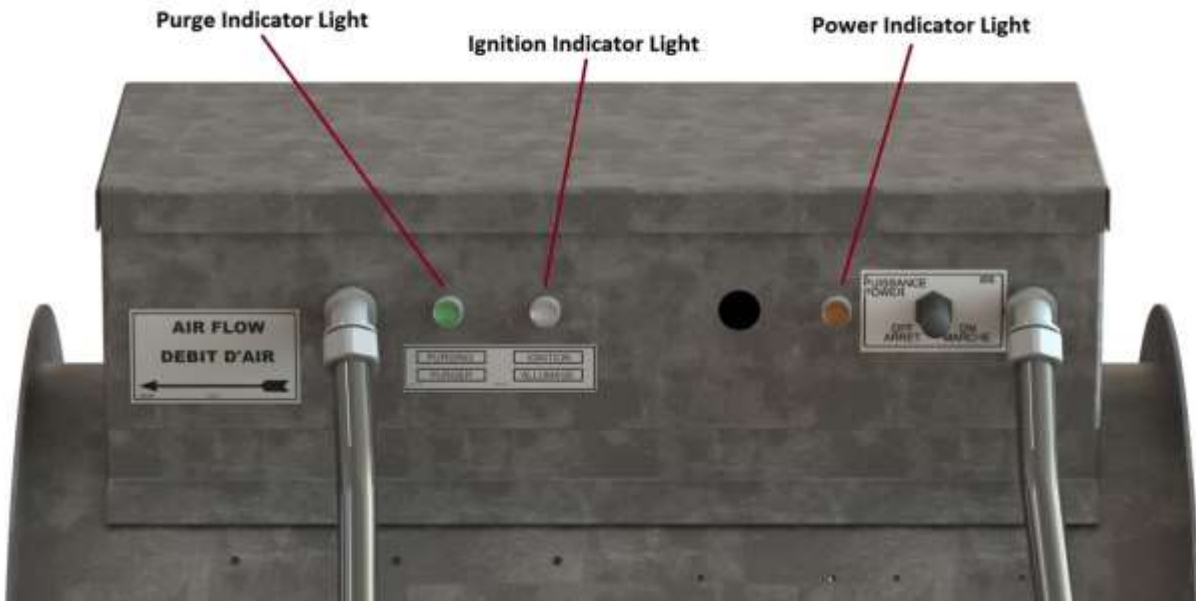
Installation of External Plenum Controls

For the proper installation of a thermostat, humidistat, a thermostat-humidistat control to the bin, or the installation of a dual humidistat-thermostat kit, refer to the installation instruction provided with each accessory.

Operating Instructions

Heater Control:

Information on the operating characteristics of the inline centrifugal heater with a flame sensing system is outlined in the following illustration. The system is reset by de-energizing the heater circuit after a loss of flame condition.



The operating characteristics of the heater are outlined as follows:

1. Once the switch is pushed to the “ON” position the heater begins the purge cycle and illuminates the purge light. At this time the remaining internal and external heater sensors have power available. If all sensors call for heater operation there will be a 30 second time frame to complete the purge cycle.
2. Next the electrode is energized and the ignition light is illuminated. If ignition is not established after 10 seconds the heater will time out and shut off the ignition light. The condition that resulted in the lack of ignition needs to be addressed. The heater is reset by switching the power switch to the “OFF” position.
3. The heater can be restarted by repeating the operating steps.

Start-Up Procedure:

Note: The heater is designed to be used as a low temperature dryer to supplement natural air drying when drying conditions are unfavorable for natural air drying. The operator must adjust the firing rate so the heater outputs a 5°F to 10°F (3°C to 6°C) temperature rise from the outside air temperature.

Refer to the dryer rating plate to locate the minimum gas supply pressure for obtaining the maximum gas capacity for which this dryer is specified.

1. Verify all roof vents are open and unobstructed. **Note:** if freezing of roof vents could occur, do not operate system.
2. Verify all controls are installed correctly. Refer to the ratings plate for determining the minimum gas supply pressure to achieve the maximum gas capacity for which the heater is specified.
3. Turn fan on by placing fan switch in an "On" position.
4. Open supply valve at the regulator.
5. Open vapor valve.
6. Check to verify burner high limit control reset button is "In."
7. Turn heater on by placing toggle switch to the "On" position.
8. Open regulator at heater slowly to 2 psig (14kPa) fuel pressure for low temperature start.
9. Set plenum external controls for desired heater operation. ([See adjustment section of this manual for more information.](#))
10. Wait at least 40 seconds for ignition to occur. The heater has a 30-second pre-purge before ignition.
11. Perform a gas leak check during start up to verify the gas tightness of the gas train components and correct piping under normal operating conditions.
12. If burner fails to ignite in 40 seconds, close regulator and vapor valve and turn off the heater by placing toggle switch to the "Off" position. ([Refer to service section of this manual for trouble shooting of heater.](#))
13. If the burner high limit shuts the burner off, reset heater after cooling down by pushing in the button located on top of the heater. The repeated shutting off of the burner by the burner high limit is caused by excessive static pressure or lack of air flow. Reduce the static pressure or air blockage before re-firing unit.

Adjustments:

The following adjustments will have to be made, depending upon the kind of heater and plenum external controls being used. These adjustments cannot be made at the factory due to the differences in bin setups, drying methods, and weather climates. These adjustments should be checked at least twice a day or 6 hours of operation to verify that the heater is functioning properly, and that the operator is getting the desired results. In using the recommended drying temperatures keep the following considerations in mind:

Regulator Adjustment

The regulator should be set at the firing rate required. This can be done by first setting the heater to the desired firing rate with the vapor valve, then reopening the vapor valve and adjusting the regulator by turning the adjusting screw until the pressure gauge shows the desired pressure at the desired firing rate.

When setting the heater at the desired firing rate, the operator must take into account the heater size, the static pressure the fan is working against, the ambient temperature, orifice size, and fuel used and the type of plenum control. Refer to operation instructions that are supplied with the humidistat, thermostat, or modulating valve.

Humidistat Control Adjustment (Heater Operation)

Set the humidistat control at the desired setting (50% - 60% relative humidity is recommended). To obtain even drying, adjust the firing rate of the heater unit so that the humidistat maintains a constant humidity of the drying air. The heater should be set at a firing rate of approximately 2 psig (14kPa) for propane, or 1 psig (7kPa) for natural gas, and then adjusted to obtain operation of the heater the majority of the time. The heater firing rate must be checked as humidity conditions change.

Thermostat Control Adjustment (Heater Operation)

Set the thermostat control to the desired temperature setting. Initially, set the firing rate of the heater at 2 psig (14kPa) for propane, or 1 psig (7kPa) for natural gas. To obtain even drying, adjust the firing rate of the heater unit so that the thermostat calls for heat 90% of the time. The heater firing rate must be checked as temperature conditions change.

Warning: The plenum thermostat is used as a drying thermostat, not as a plenum high limit.

Humidistat - Thermostat Control Adjustment

1. Humidistat Control Only

Set the thermostat at the lower temperature limit. This is the temperature wanted for heater operation, whether the humidistat is calling for heat or not, 40°F - 50°F (4.4°C - 10°C) is recommended. Set the humidistat and heater according to the humidistat instructions previously given.

2. Thermostat Control Only

Set the humidistat at 100% relative humidity. Then adjust the thermostat and heater controls according to the thermostat instructions given.

3. Humidistat - Thermostat Combination

Set the humidistat and thermostat at the desired operating conditions. Then adjust the firing rate of the heater according to the humidistat and thermostat instructions.

Shut Down Procedures

If the heater is to be shut off for a prolonged period, carry out the following steps:

1. Close the fuel valve at tank.
2. Allow the fuel to be burned out of the fuel line.
3. After the flame burns out, close vapor valve.

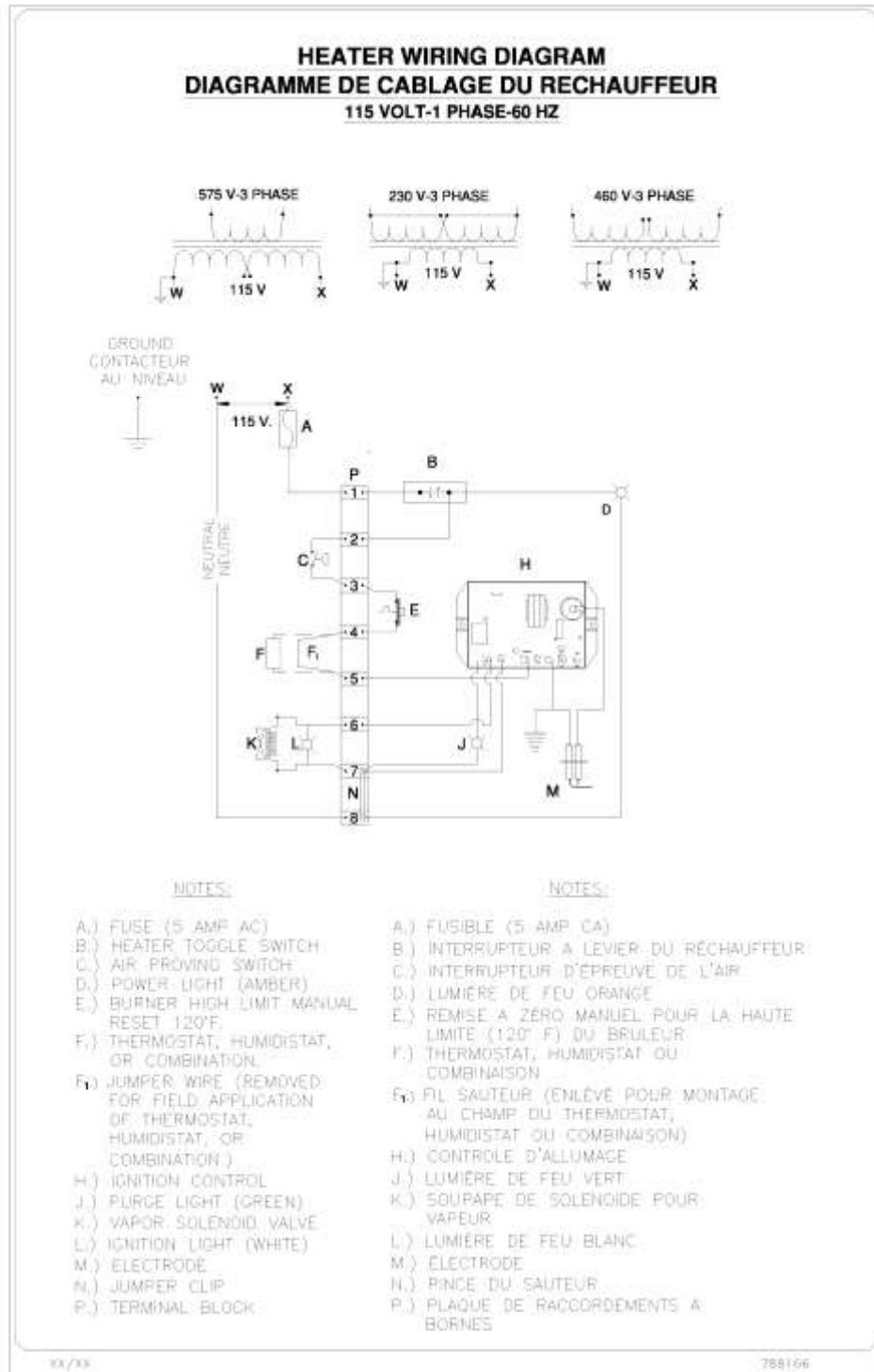
4. Turn off heater, placing toggle switch to "Off" position.
5. Allow fan to run for two minutes in order to cool off heater. Next shut the fan off. Finally shut off the power at the fan service disconnect.
6. The thermostat or humidistat external plenum controls should be removed and stored in a clean, dry place.

Heater Maintenance

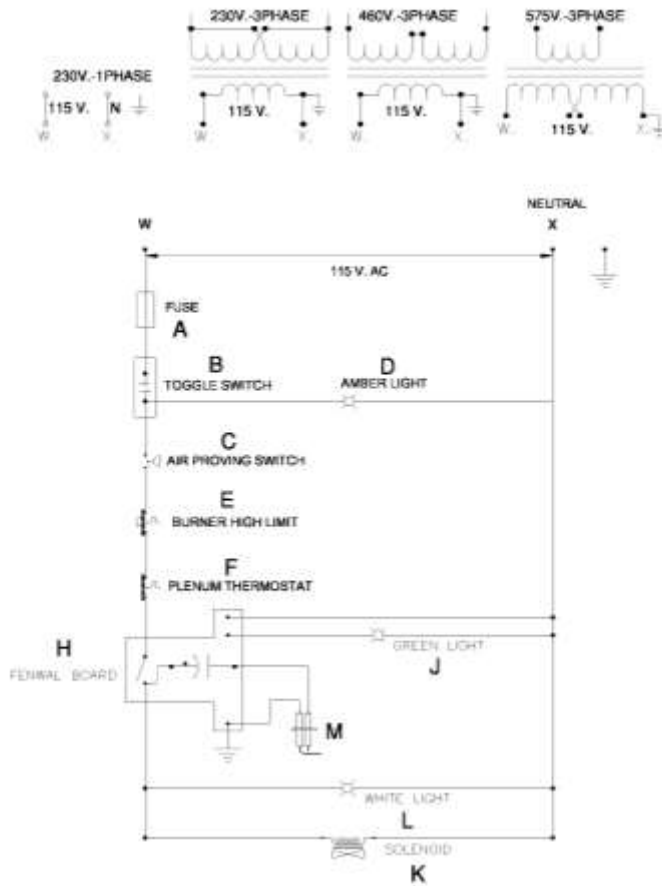
The following procedures should be followed and maintenance performed before starting the unit at the beginning of every season, and also during operation:

1. The fuel line strainers should be taken out and cleaned. A plugged screen will restrict the gas flow to the unit. On liquid propane units, liquid and vapor line strainers both should be checked. Warranty is void if the strainer or screen is removed, and not reinstalled after cleaning.
2. The burner should be checked for obstructions and debris. To check, use a piece of wire or drill bit that will fit the holes in the burner.
3. The air switch venturi should be cleaned. Debris can enter the air switch through the venturi.
4. Check all plumbing joints for leaks using the "soap test." The gas tightness of the gas train should be checked at least on an annual basis. ([See previous installation instructions](#)).
5. Check all wires to verify they are not bare or causing a short. Pests can destroy insulation to wires if protective measures to control rodents are not implemented.
6. Examine electrode gap. Through wear, the electrode can go out of adjustment. Verify during operation every two days. The gap of the plug should be 1/8" (.32cm).
7. Check all wire connections to be sure they are tight.
8. All external plenum controls (nylon humidistat or thermostat combination) should be inspected, cleaned, and checked every three days during operation.
9. Caldwell recommends that external plenum controls be removed and stored in a clean, dry place when not in use.

Heater Wiring Diagram



Note: When used with a 575 volt, 460 volt, or 230 volt fan, a step down transformer must be used to develop 115 volt, 1 phase, 60hz power.



NOTES:

- A.) FUSE (5 AMP AC)
- B.) HEATER TOGGLE SWITCH
- C.) AIR PROVING SWITCH
- D.) POWER LIGHT (AMBER)
- E.) BURNER HIGH LIMIT MANUAL RESET 120°F.
- F.) THERMOSTAT, HUMIDISTAT, OR COMBINATION.
- F₁) JUMPER WIRE (REMOVED FOR FIELD APPLICATION OF THERMOSTAT, HUMIDISTAT, OR COMBINATION.)
- H.) IGNITION CONTROL
- J.) PURGE LIGHT (GREEN)
- K.) VAPOR SOLENOID VALVE
- L.) IGNITION LIGHT (WHITE)
- M.) ELECTRODE

NOTES:

- A.) FUSIBLE (5 AMP CA)
- B.) INTERRUPTEUR A LEVIER DU RÉCHAUFFEUR
- C.) INTERRUPTEUR D'ÉPREUVE DE L'AIR
- D.) LUMIÈRE DE FEU ORANGE
- E.) REMISE A ZÉRO MANUEL POUR LA HAUTE LIMITE (120° F) DU BRULEUR
- F.) THERMOSTAT, HUMIDISTAT OU COMBINAISON
- F₁) FIL SAUTEUR (ENLÉVÉ POUR MONTAGE AU CHAMP DU THERMOSTAT, HUMIDISTAT OU COMBINAISON)
- H.) CONTROLE D'ALLUMAGE
- J.) LUMIÈRE DE FEU VERT
- K.) SOUPEPE DE SOLENOIDE POUR VAPEUR
- L.) LUMIÈRE DE FEU BLANC
- M.) ÉLECTRODE

Sequential Switching Actions:

1. Toggle switch (B) is moved to the "ON" position. With all safety devices in a "closed" electrical condition the control board (H) is engaged.
2. With completion of the purge, the control board (H) monitors the flame (M). The control board (H) locks out the fuel supply and ignition (M) upon the lack of flame. The control board (H) is reset by manually moving the toggle switch (B) to the "OFF" position.

Servicing the Heater:

The following will help you find any problems that may occur in a Caldwell unit and includes tips for repairing the heater. For servicing of electrical systems, open the control box cover. Inside the cover you will find a wiring schematic to help you service the unit. In the checks shown below, locate the symptoms you are experiencing with your unit and follow the list of corresponding possible causes and remedies:

Note: Unless otherwise indicated, checks are made with the power off using a voltmeter on resistance setting.

Generic Sequential Operations Check:

1. Lack of power going to the unit (check made with power on).
 - a. Take a voltmeter or continuity tester, put one lead to ground and the other on the top terminal of terminal block in fan control box. Power lead is the black wire on top terminal on terminal block. When the fan is operating, it should indicate 115 volts on the voltmeter or light should come on with continuity tester.
2. Improper Neutral.
 - a. Verify neutral wire is connected to the terminal block in the fan control box. Neutral to be provided from disconnect to fan control box with the power supply.
3. Fuse may be blown.
 - a. Visually check fuse. If dark in color, replace.
 - b. Check fuse and holder. Put one lead on each side of the fuse on the fuse holder screws. Meter should show continuity through fuse.
4. Check for power at toggle switch in heater (check made with power on).
 - a. Put one lead of voltmeter to toggle switch where power cord is connected and the other lead to ground. If there is not any power, check cord and fuse.
5. Air switch may be defective.
 - a. With the fan running, check continuity across the air switch. If no continuity is present and the fan is delivering air, the problem is in the air switch or in the venturi.
 - b. Verify the screen on the venturi is not plugged. If the fan is working against 4" static pressure or lower, the heater should operate.
6. Thermostat or Humidistat control may be open.
 - a. Use a voltmeter and check continuity across the terminal block where the 2 leads of the control are connected (terminals 4&5).
 - b. If no Continuity is present, check the control setting to call for heater operation. Check for damaged wires to the control. If either wire is damaged replace the wire. Replace entire Thermostat or Humidistat.
7. Check all wires and connectors to verify they are functional and installed correctly.
 - a. See wiring schematic for correct installation.

8. Electrode

- a. Visually inspect the electrode. If there are cracks in the ceramic housing, carbon buildup on the prongs or the prongs have deteriorated from use replace the electrode.
- b. Check the gap between the prongs. The gap should be 1/8" with 1/32" tolerance. If the gap is too big replace the electrode.

Condition Specific Faults:

1. Symptom: No ignition, Lack of ignition spark, Gas is present.

- a. Electrode is defective.
 - i. Check the gap between the prongs. The gap should be 1/8" with 1/32" tolerance. If the gap is too big replace the electrode.
 - ii. Visually inspect the electrode. If there are cracks in the ceramic housing, carbon buildup on the prongs or the prongs have deteriorated from use replace the electrode.
- b. High voltage wire is defective (power on).
 - i. Inspect the high voltage ignition wire for cracks or breaks. If the wire is defective, replace the high voltage wire.
 - ii. Take the high voltage wire off the electrode and with the gas shut off, arc the wire to the heater housing. The arc should be 1/8". **Caution: Do not touch the ring terminal on the wire; hold the wire by the insulation only.** If there is no spark, then check the ignition control board. If the ignition control board is functional, replace the high voltage wire. If there is spark at the wire, replace the electrode.
- c. Ignition control board is defective (power on).
 - i. Remove the high voltage ignition wire from the ignition board. With the gas off, ground an insulated screwdriver and arc to the high voltage terminal on the ignition board. The arc should be 1/8". After the 30 second purging time the spark should be present when the ignition light is illuminated. If there is no spark replace the ignition board. If spark is present, re-check the high voltage ignition wire and the electrode. **Caution: Do not touch the screwdriver shaft when arcing across the high voltage ignition transformer terminal.**

2. Symptom: No ignition, Lack of gas with spark present. **Note:** The check to verify gas is present should be made after all the electrical component checks are made, and the electrical controls are confirmed to be functioning properly. **Note:** that the ignition control board develops a 30 second delay for the solenoid to open.

- a. Lack of gas to the heater.
 - i. Check tank to see if ample pressure is available to start unit. Unit requires 35 psig (241kPa) of propane pressure and 5 psig (34kPa) of natural gas available at the unit for startup.

- ii. Check to see if tank, regulator, or line going to the unit is blocked.
 - b. Check to see if the solenoids are functioning.
 - i. (Power On) Put your hand on the top of the solenoid and turn the heater toggle switch on and allow 30 seconds for the purge. If you feel a click at the top of the solenoid, the coil is okay and the solenoid is functioning electrically. If there is no click, the coil is defective and should be replaced.
 - ii. (Power Off) Check solenoid to see if screen is plugged or the diaphragm is defective. Unscrew the top of the brass fixture, the screen and diaphragm is located just inside. Be sure to reassemble properly. Reversing any parts in the solenoid will cause the solenoid not to function properly. Keep all foreign material out of solenoid.
 - c. Obstruction in the gas line.
 - i. Install pressure gauges at available locations in the plumbing line to determine where a fuel restriction could exist.
 - d. If gas is present at the pressure gage but unit lacks gas for ignition.
 - i. Check orifice size, and be sure it is clean.
 - ii. Check the burner. See that holes are not plugged. See that the tubing isn't plugged by debris.
- 3. Symptom: Heater ignites but ignition control board locks out after 10 seconds or erratic heater operation.
 - a. Check polarity of the ignition control board.
 - i. Check input voltage on terminal L1 of the ignition board, this voltage should be verified as 115 volts. Check the voltage on the neutral or ground wire, this voltage should be zero. If the readings are reversed, then the heater is wired incorrectly and the neutral wire and input voltage wire should be exchanged.
 - ii. Verify that the heater is grounded.
 - iii. Verify the micro amp reading of the heater. Install a micro amp meter into the low voltage line FC= and FC-. The normal micro amp reading should be 8-15 micro amps. If the reading is lower check the low voltage ignition wire and the electrode.
- 4. Symptom: Burner high limit pops out.
 - a. Fan limit may be obstructed. Keep the fan screen clean of all foreign material.
 - b. Fan motor may be failing. Check the motor to verify that it is obtaining full speed.
 - c. Verify that static pressure is not excessive by using a static pressure gage. Verify that roof vents are open and are sufficient in size and quantity. Check the aeration floor for plugged holes. Verify the grain depth, moisture content and fines in the grain. If any of these conditions are high the grain level should be lowered.
 - d. Firing rate may be too high for the application. Reduce the firing rate.
- 5. Symptom: Not enough heat.
 - a. Orifice is too small or dirty.

- i. Remove orifice and check for obstructions then reinstall the orifice.
 - b. Insufficient gas pressure.
 - i. Refer to the [installation section](#) for proper gas supply.
6. Symptom: External plenum control not functioning.
 - a. Check wiring schematic and be sure the control is wired to the heater properly.
 - b. Make a visual check of the external plenum control cord for cuts or shorted wires.
 - c. Check the external plenum control setting. Adjust the control for the desired settings, referencing the [adjustment section](#).

STANDARD LIMITED WARRANTY

Caldwell Aeration Products

1. **Definitions.** The following terms, when they appear in the body of this Standard Limited Warranty for Caldwell Aeration Products in initial capital letters shall have the meaning set forth below:
 - A. Accepted Purchase Order shall mean the Purchase Order identified below.
 - B. Chief shall mean Chief Agri/Industrial, a division of Chief Industries, Inc.
 - C. Original Owner shall mean the original owner identified below.
 - D. Product shall mean the Agri/Industrial Equipment as described in the Accepted Purchase Order.
 - E. Reseller shall mean the authorized Chief Agri/Industrial Equipment dealer identified below.

2. **Limited Product Warranty.** Upon and subject to the terms and conditions set forth below, Chief hereby warrants to the Reseller, and, if different, the Original Owner as follows:
 - A. All new Products delivered to the Reseller or the Original Owner by Chief pursuant to the Accepted Purchase Order will, when delivered, conform to the specifications set forth in the Accepted Purchase Order;
 - B. All new Products delivered pursuant to the Accepted Purchase Order will, in normal use and service, be free from defects in materials or workmanship; and
 - C. Upon delivery, Chief will convey good and marketable title to the Products, free and clear of any liens or encumbrances except for, where applicable, a purchase money security interest in favor of Chief.

3. **Duration of Warranty and Notice Requirements.** Subject to the **Exceptions, Exclusions and Limitations** set forth below, the warranties set forth in Section 2 above shall apply to all covered non-conforming conditions that are discovered within the first twenty-four (24) months following delivery of the Product to the carrier designated by the Reseller and/or the Original Owner at Chief's manufacturing facility in Kearney, Nebraska (the "Warranty Period") and are reported to the Chief as provided in Section 4 below within thirty (30) days following discovery (a "Notice Period").

4. **Notice Procedure.** In order to make a valid warranty claim, the Reseller and/or the Original Owner must provide Chief with a written notice of any nonconforming condition discovered during the Warranty Period within the applicable Notice Period specified in Section 3 above. Said notice must be in writing; be addressed to Chief Industries, Inc., Agri/Industrial Division, Customer Service Department, P.O. Box 848, Kearney, NE 68848; and contain the following information: (a) the Customer's name and address; (b) the Reseller's name and address; (c) the make and model of the Product in question; (d) the current location of the Product; (e) a brief description of the problem with respect to which warranty coverage is claimed; and (f) the date on which the Product was purchased.

5. **Exceptions and Exclusions.** Anything herein to the contrary notwithstanding, the warranties set forth in Section 2 above do **not** cover any of the following, each of which are hereby expressly excluded:
- A. Defects that are not discovered during the applicable Warranty Period;
 - B. Defects that are not reported to the Chief Agri/Industrial Division Customer Service Department in conformity with the notice procedure set forth in Section 4 above within the applicable Notice Period specified in Section 3;
 - C. Any used or pre-owned Products;
 - D. Any Chief manufactured parts that are not furnished as a part of the Accepted Purchase Order;
 - E. Any fixtures, equipment, materials, supplies, accessories, parts or components that have been furnished by Chief but are manufactured by a third party;
 - F. Any Products which have been removed from the location at which they were originally installed;
 - G. Any defect, loss, damage, cost or expense incurred by the Reseller or the Original Owner to the extent the same arise out of, relate to or result, in whole or in part, from any one or more of the following:
 - (i) Usual and customary deterioration, wear or tear resulting from normal use, service and exposure;
 - (ii) Theft, vandalism, accident, war, insurrection, fire or other casualty;
 - (iii) Any damage, shortages or missing parts which result during shipping or are otherwise caused by the Reseller, the Original Owner and/or any third party;
 - (iv) Exposure to marine environments, including frequent or sustained salt or fresh water spray;
 - (v) Exposure to corrosive, chemical, ash, smoke, fumes, or the like generated or released either within or outside of the structure on which the Product is installed, regardless of whether or not such facilities are owned or operated by the Reseller, the Original Owner or an unrelated third party;
 - (vi) Exposure to or contact with animals, animal waste and/or decomposition;
 - (vii) The effect or influence the Product may have on surrounding structures, including, without limitation, any loss, damage or expense caused by drifting snow;
 - (viii) Any Product or portion thereof that has been altered, modified or repaired by the Reseller, the Original Owner or any third party without Chief's prior written consent;
 - (ix) Any Product or portion thereof that has been attached to any adjacent structure without Chief's prior written approval;
 - (x) Any Product to which any fixtures, equipment, accessories, materials, parts or components which were not provided as a part of the original Accepted Purchase Order have been attached without Chief's prior written approval;
 - (xi) The failure on the part of the Reseller, the Original Owner or its or their third party contractors to satisfy the requirements of all applicable statutes, laws, ordinances rules, regulations and codes, (including zoning laws and/or building codes);
 - (xii) The use of the Product for any purpose other than the purpose for which it was designed; and/or

- (xiii) The failure of the Reseller, the Original Owner and/or any third party to:
 - (a) properly handle, transport and/or store the Product or any component part thereof;
 - (b) properly select and prepare a site that is adequate for the installation and/or operation of the Product or any component part thereof;
 - (c) properly design and construct a foundation that is adequate for the installation and/or operation of the Product or any component part thereof;
 - (d) properly set up, erect, construct or install the Product and/or any component part thereof; and/or
 - (e) properly operate, use, service and/or maintain the Product and each component part thereof.

6. **Resolution of Warranty Claims.** In the event any nonconforming condition is discovered within the Warranty Period and Chief is notified of a warranty claim as required by Section 4 prior to the end of the applicable Notice Period set forth in Section 3 above, Chief shall, with the full cooperation of the Reseller and the Original Owner, immediately undertake an investigation of such claim. To the extent Chief shall determine, in its reasonable discretion, that the warranty claim is covered by the foregoing Limited Product Warranty, the following shall apply:

- A. Warranty Claims With Respect to Covered Non-Conforming Conditions Discovered Within the First Three Hundred Sixty Five (365) Days and Reported to Chief Within Thirty (30) Days of Discovery. In the case of a warranty claim which relates to a covered non-conforming condition that is discovered during the first three hundred sixty five (365) days of the Warranty Period and is reported to Chief as required by Section 4 within thirty (30) days of discovery as required by Section 3, Chief will, as Chief's sole and exclusive obligation to the Reseller and the Original Owner, and as their sole and exclusive remedy, work in cooperation with the Reseller and the Original Owner to correct such non-conforming condition, and in connection therewith, Chief will ship any required replacement parts to the "ship to address" set forth in the Accepted Purchase Order FOB Chief's facilities in Kearney, Nebraska, and will either provide the labor or reimburse the Reseller or the Original Owner, as may be appropriate in the circumstances, for any out of pocket expense the Original Owner may reasonably and necessarily incur for the labor that is required to correct such non-conforming condition, provided that if work is to be performed by the Reseller or a third party contractor, Chief may require at least two competitive bids to perform the labor required to repair or correct the defect and reserves the right to reject all bids and obtain additional bids. Upon acceptance of a bid by Chief, Chief will authorize the necessary repairs.
- B. All Other Warranty Claims. Except as is otherwise provided in subsection 6A above, in the case of all other warranty claims which relate to covered non-conforming conditions that are discovered during the Warranty Period and are reported to Chief as required by Section 4 within thirty (30) days following discovery, Chief will, as Chief's sole and exclusive obligation to the Reseller and the Original Owner, and as the Reseller's and the Original Owner's sole and exclusive remedy, ship any required replacement parts to the Original Owner at the "ship to address" specified in the Accepted Purchase Order FOB

Chief's facilities in Kearney, Nebraska; and in such event, Chief shall have no responsibility or liability to either the Reseller or the Original Owner for the cost of any labor required to repair or correct the defect.

7. **Warranty Not Transferable.** This Warranty applies only to the Reseller and the Original Owner and is **not transferable.** As such, this Warranty does **not** cover any Product that is sold or otherwise transferred to any third party following its delivery to the Original Owner.

8. **Limitation on Warranties, Liabilities and Damages.** The Reseller and the Original Owner expressly agree that the allocation of the risk, liability, loss, damage, cost and expense arising from any Product that does not conform to the limited warranty given in Section 2 above are fair and reasonable and acknowledge that such allocation was expressly negotiated by the parties and was reflected in the Purchase Price of the Product. Accordingly the Reseller and the Original Owner expressly agree as follows:
 - A. **Disclaimer of Implied Warranties.** EXCEPT AS IS OTHERWISE EXPRESSLY SET FORTH HEREIN, CHIEF MAKES NO OTHER REPRESENTATIONS OR WARRANTIES OF ANY KIND WHATSOEVER, WHETHER EXPRESS OR IMPLIED, BY OPERATION OF LAW, COURSE OF DEALING OR OTHERWISE WITH RESPECT TO THE PRODUCT, ANY COMPONENT PART THEREOF OR ANY OTHER GOODS OR SERVICES THAT CHIEF MANUFACTURES, FABRICATES, PRODUCES, SELLS OR PROVIDES TO THE DEALER OR THE ORIGINAL OWNER PURSUANT TO THE TERMS OF ANY ACCEPTED PURCHASE ORDER, INCLUDING WITHOUT LIMITATION ANY REPRESENTATION OR WARRANTY WITH RESPECT TO DESIGN, CONDITION, MERCHANTABILITY OR FITNESS OF THE PRODUCT OR ANY OTHER GOODS OR SERVICES FOR ANY PARTICULAR PURPOSE OR USE.

 - B. **Limitation on Liability.** EXCEPT AS IS OTHERWISE EXPRESSLY SET FORTH IN SECTION 6 ABOVE, CHIEF'S LIABILITY TO THE DEALER AND/OR THE ORIGINAL OWNER WITH RESPECT TO ANY DEFECTS IN ANY PRODUCTS OR FOR ANY OTHER GOODS OR SERVICES WHICH DO NOT CONFORM TO THE WARRANTIES SET FORTH ABOVE SHALL NOT, IN ANY EVENT, EXCEED THE ACTUAL COST OF SUCH NON-CONFORMING PRODUCT, GOODS OR SERVICES AS DETERMINED PURSUANT TO THE ACCEPTED PURCHASE ORDER; AND

 - C. **Limitation on the Nature of Damages.** EXCEPT AS EXPRESSLY PROVIDED IN SECTION 6 ABOVE, CHIEF SHALL NOT, UNDER ANY CIRCUMSTANCES, BE LIABLE TO THE DEALER, THE ORIGINAL OWNER OR ANY THIRD PARTY FOR ATTORNEY FEES COURT COSTS OR ANY OTHER SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL, LIQUIDATED OR PUNITIVE DAMAGES OF ANY NAME, NATURE OR DESCRIPTION AS A RESULT OF THE FAILURE OF ANY PRODUCT OR ANY OTHER GOODS OR SERVICES PURCHASED BY THE DEALER OR THE ORIGINAL OWNER FROM CHIEF PURSUANT

TO THE ACCEPTED PURCHASE ORDER TO CONFORM TO THE LIMITED WARRANTIES SET FORTH IN SECTION 2 ABOVE.

- 8. **Applicable Law.** This Limited Product Warranty has been issued, accepted and entered into by the Reseller, the Original Owner and Chief in the State of Nebraska and shall be governed by, and construed in accordance with, the internal laws of the State of Nebraska. Any legal action or proceeding with respect to any goods or services furnished to the Original Owner by Chief in connection herewith, or any document related hereto shall be brought only in the district courts of Nebraska, or the United States District Court for the District of Nebraska, and, by execution and delivery of this Limited Product Warranty, the undersigned Original Owner hereby accept for themselves and with respect to their property, generally and unconditionally, the jurisdiction of the aforesaid courts. Further, the undersigned Original Owner hereby irrevocably waives any objection, including, without limitation, any *forum non conveniens*, which it may now or hereafter have to the bringing of such action or proceeding in such respective jurisdictions.

ACKNOWLEDGMENT OF RECEIPT

By its signature hereto, the undersigned Reseller represents and warrants to Chief that the Reseller has provided a true, correct and complete copy of this Standard Limited Warranty to the Original Owner at the time the product was purchased.

Reseller Name and Address: _____

Original Owner Name and Address: _____

Accepted Purchase Order No. _____

Original Jobsite Address: _____

RESELLER:

By: _____
Date

Print name and title

4821-6088-7329, v. 1



NATURAL GAS

ILCH18-NGE

ILCH24-NGE

ILCH28-NGE

VAPOR PROPANE

ILCH18-VPGE

ILCH24-VPGE

ILCH28-VPGE

Should you have any questions concerning assembly instructions, parts or drawings, please feel free to contact us at any of the following.

© Chief Industries, Inc. Inc.
4400 East 39th Street • PO Box 848
Kearney, NE 68847
Phone 800.359.7600

For more information about Chief Industries, Inc. and additional products or services visit our website
www.agri.chiefind.com