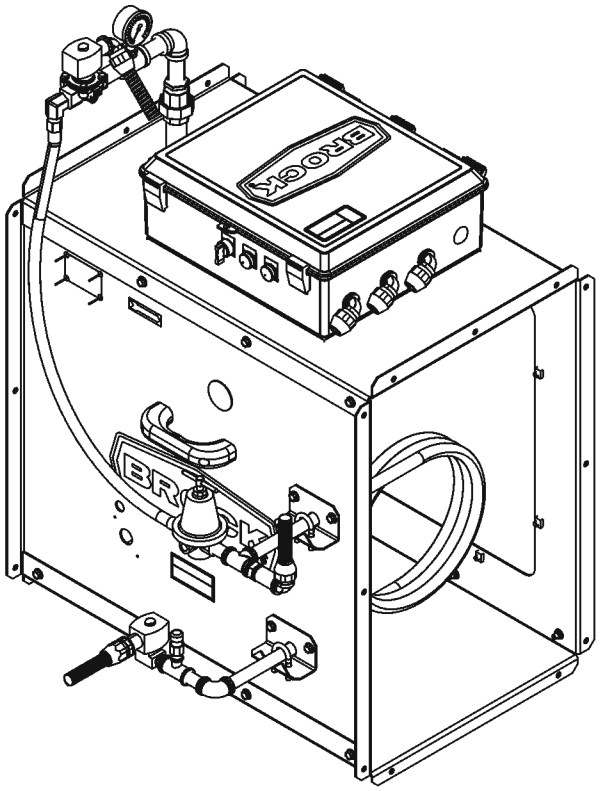
GUARDIAN® Series
CDH Downstream Heater
Installation and Specifications/Owner-Operator's Manual



October 2007 MFH1800C

Warranty

Brock Grain Systems ("Brock") warrants each new Brock Fan or Heater manufactured by it to be free from defects in material or workmanship for two years from and after the date of initial installation by or for the original purchaser. If such a defect is found by the Manufacturer to exist within the two year period, the Manufacturer will, at its option, (a) repair or replace such product free of charge, F.O.B. the factory of manufacture, or (b) refund to the original purchaser the original purchase price, in lieu of such repair of replacement. Labor costs associated with the replacement or repair of the Fan or Heater are not covered by the Manufacturer.

Conditions and Limitations

(a) The product must be installed and operated in accordance with instructions published by the Manufacturer or Warranty will be void.

(b) This product must be purchased from and installed by an authorized Brock Dealer or the Warranty will be void.

(c) Malfunctions or damage resulting from misuse, abuse, negligence, alteration, accident, or lack of proper maintenance shall not be considered defects under this Warranty.

The Manufacturer shall not be liable for any consequential or special damage which any purchaser may suffer or claim to suffer as a result of any defect in the product. "Consequential" or "special damages" as used herein include, but are not limited to, lost or damaged products or goods, costs of transportation, lost sales, lost order, lost income, increased overhead, labor and incidental costs and operational inefficiencies.

THIS WARRANTY CONSTITUTES THE MANUFACTURER'S ENTIRE AND SOLE WARRANTY AND THE MANUFACTURER EXPRESSLY DISCLAIMS ANY AND ALL OTHER WARRANTIES, INCLUDING, BUT NOT LIMITED TO, EXPRESS AND IMPLIED WARRANTIES AS TO MERCHANTABILITY, FITNESS FOR PARTICULLAR PURPOSES SOLD AND DESCRIPTION OR QUALITY OF THE PRODUCT FURNISHED HEREUNDER.

Brock Dealers are not authorized to modify or extend the terms and conditions of this Warranty in any manner or to offer or grant any other warranties for BROCK® products in addition to those terms expressly stated above.

An officer of CTB, Inc., must authorize any exceptions to this Warranty in writing. The Manufacturer reserves the right to change models and specifications at any time without notice or obligation to improve previous models.

Effective October 2007

BROCK GRAIN SYSTEMS
A Division of CTB Inc.
P.O. Box 2000 · Milford, Indiana 46542-2000 · U.S.A.
Phone (574) 658-4191 · Fax (574) 658-4133
e-mail: brock@brockmfg.com · Internet: http//www.brockmfg.com

Thank You

The employees of BROCK GRAIN SYSTEMS would like to thank you for your recent BROCK purchase. If a problem should arise, your BROCK Dealer can supply the necessary information to help you.

Contents

General

Remember! Think SAFETY First!

This symbol is used throughout this Manual to identify particular stages where the bin Contractor and/or Operator need to take special note and precautions regarding the danger described in these Instructions. Please read all the SAFETY information and the instructions completely prior to beginning the construction.

Support Information

Using this equipment for any other purpose or in a way not within the operating recommendations specified in this Manual will void the Warranty and may cause injury or death. This Manual is designed to provide comprehensive planning and construction information for this BROCK® product. The Table of Contents provides a convenient overview of the information in this Manual.

Dealers: Please provide the Customer with the information to complete the easy reference below.

Dealer or Customer: Complete the following information about your BROCK® product. Store this Manual in a safe, dry place for future reference.

Distributor and Installer Information

Please fill in the following information about your Product.
Keep this Manual in a clean, dry place for future reference.

Distributor's Name _____

Distributor's Address _____

Distributor's Phone _____ **Date of Purchase** _____

Installer's Name _____

Installer's Address _____

Installer's Phone _____ **Date of Installation** _____

FAN System Specifications

Model: _____

Serial Number: _____

Fuel Type: _____ **Control:** _____ **Volts:** _____

Input Rate: _____ MAX MMbtu/hr: _____ MIN MMbtu/hr: _____

Burner Pressure: _____ MIN psi: _____ Max psi: _____

Supply Pressure: _____ MIN psi: _____ Max psi: _____

SAFETY

Recognize SAFETY Information

This is the Safety-Alert Symbol. When you see this symbol on your equipment or in this Manual, be alert to the potential for personal injury.

Signal words **DANGER, WARNING**, or **CAUTION**, are used with the Safety-Alert Symbol.

Be sure to follow ALL National and Local Safety Standards governing each installation site.

Understand Signal Words

DANGER indicates an imminently hazardous situation which, if not avoided, **WILL** result in death or serious injury.

WARNING indicates a potentially hazardous situation which, if not avoided, **COULD** result in death or serious injury.

CAUTION indicates a hazardous situation which, if not avoided, **MAY** result in minor or moderate injury.

Follow SAFETY Instructions

BROCK® Heaters are built with your SAFETY in mind. However, accidents can happen with improper installation or use of any ventilation system using moving blades and high voltage. BROCK strives to take every reasonable precaution to design equipment that is safe without compromising or restricting necessary movement of Heater components.

Carefully read all these SAFETY procedures and follow them whenever you are around or operating the Heater.

Also read and follow the SAFETY procedures in your Manuals to supplemental equipment and accessories, and on your equipment SAFETY Decals.

Follow recommended precautions and safe operating practices of all applicable local, state and national codes at each installation site.

Keep this Manual in a safe, dry place where the Heater Operator can easily obtain it.

Contact your BROCK Dealer to replace a Manual should it become lost or damaged.

CAUTION! ***For operation and use of your Heater, read and understand this Manual. Failure to read this Manual by qualified personnel BEFORE Heater assembly, installation or usage, constitutes a misuse of the equipment and could void the Warranty.***

CAUTION! ***Failure to follow proper operational procedures may cause damage to equipment and may result in minor or moderate injury.***

SAFETY Decals

SAFETY information has been provided by the Manufacturer to help insure the safe and proper use of this product. This SAFETY information has been placed on components throughout the Heater to provide proper access to the user.

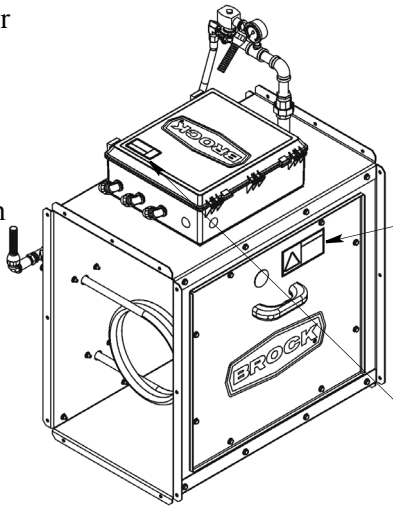
IMPORTANT! ***Carefully read all SAFETY Decals on your Heater and in this Manual. Follow recommended precautions and safe operating practices.***

IMPORTANT! ***Check all equipment for DANGER, WARNING and CAUTION and other Decals and their proper placement, before equipment is OPERATED. Never use equipment if Decals are missing, improperly placed, damaged or altered. If the SAFETY Decals are not properly placed or if they are in any way damaged or altered, call the Manufacturer for immediate replacement. Keep them clean, grease-free and in good condition.***

SAFETY

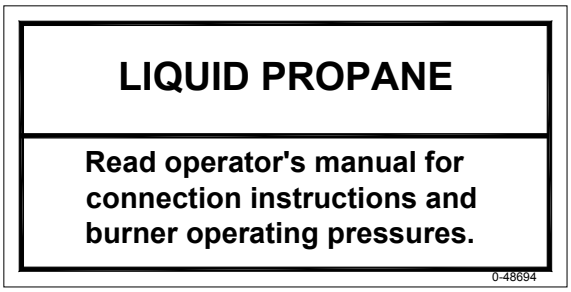
Check all equipment for DANGER and WARNING Decals, and Fuel Labels and their proper placement, before equipment is OPERATED. Never use equipment if Decals are missing, improperly placed, damaged or altered. If the SAFETY Decals are not properly placed or if they are in any way damaged or altered, call the Manufacturer for immediate replacement. Keep them clean and grease-free.

Figure 4 shows the proper location of the SAFETY Decals as shipped from the factory. Replace damaged or missing Decals. Make sure the Decals can be easily seen at all times.

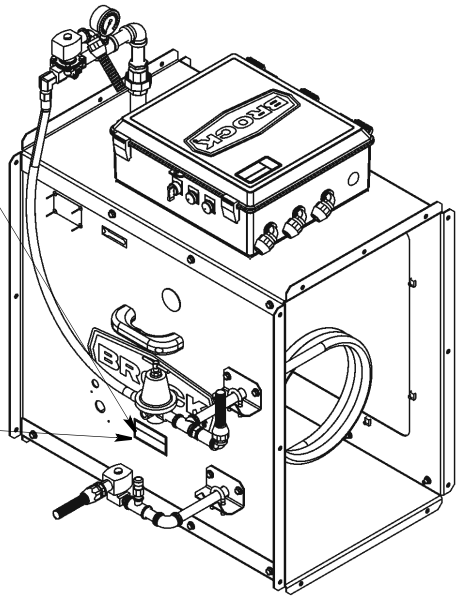


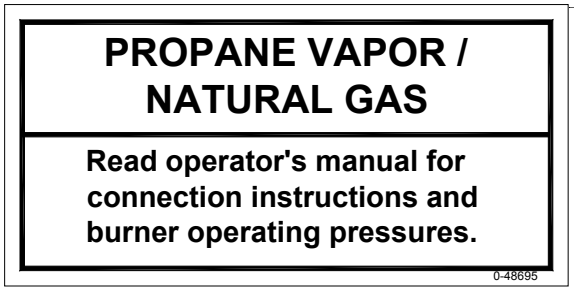
WARNING Decal (0-48693)
Located on the Housing near the front opening of the Heater. It should read exactly as **Figure 3** on Page 9.

DANGER Decal (0-48354)
Located on the Control Box Lid, upper right. It should read exactly as **Figure 2** on Page 7.



LIQUID PROPANE Decal (0-48694)
Located on the Heater Housing near theVaporizer Assembly. It should read exactly as **Figure 4A** on Page 8.





PROPANE VAPOR/NATURAL GAS Decal (0-48695)
Located on the Heater Housing near theVaporizer Assembly. It should read exactly as **Figure 4B** on Page 8.

Figure 1. AXH Heater SAFETY Decal Locations

SAFETY

Operator Electrical SAFETY

DANGER! ***Electricity can KILL! Use extreme CAUTION around electrical components. Failure to follow these instructions will result in death or serious injury.***

DANGER Decal 0-48354 in **Figure 2** is located on the Control Box of the Heater as also shown in **Figure 1.**

Figure 2. Electrical DANGER Decal 0-48354

WARNING! ***DO NOT OPERATE the Heater with any components removed or damaged. Failure to follow these instructions could result in death, serious injury, or equipment damage.***

Never remove, cut, modify or damage any component part of the Heater.

Keep hands, feet, hair, and clothing away from hot parts or parts in motion. Never wear loose-fitting clothing or flowing scarves/jewelry around moving parts or equipment.

DANGER! ***Do not allow the Heater to run while any adjustments are being made. Failure to shut it off will result in personal injury or death. Disconnect electrical power BEFORE inspecting or servicing equipment unless maintenance instructions specifically state otherwise. Failure to do so will result in death or serious injury.***

Before restarting a Heater that has been stopped because of an emergency, an inspection of the Heater shall be made and the cause of the stoppage determined. The starting device shall be locked or tagged out before any attempt is made to remove the cause of the stoppage.

IMPORTANT! ***A LOCKOUT device must be installed at the time of the Heater installation to prevent the machine from starting during a safety check, maintenance, etc. Lockable disconnect switches*** *should open control enclosures containing hazardous voltage wiring.*

All **electrical** equipment shall be **grounded**. Ground all non-current carrying metal parts to guard against electrical shock.

WARNING! ***Under no circumstances should horseplay be permitted near the Heater. Failure to follow these instructions could result in death or serious injury.***

CAUTION! ***Because of the danger of flying debris, protective eyewear/safety glasses MUST be worn during assembly, installation, maintenance or servicing of this Heater. Failure to do so may result in minor or moderate injury.***

SAFETY

Electrical Installation Requirements

WARNING! ***Heater installations shall meet the National Fire Protection Association Standard 61B for the prevention of fires and explosions in grain elevators and facilities handling bulk raw agricultural commodities. Failure to follow this standard could result in death or serious injury.***

In selecting electrical control equipment to be used with any installation, the purchaser must use equipment conforming to the National Electrical Code, the National Electrical Safety Code and other applicable local or national codes.

IMPORTANT! ***All electrical wiring should be done by a qualified electrician and all components must meet the National Fire Protection Association Standard NFPA No. 70, American National Standard Inst. ANSI-C1, and local requirements.***

BROCK assumes no responsibility for the electrical wiring used with this Heater. BROCK will not be liable for damage to the Heater because of improper electrical installation or use.

IMPORTANT! ***All Safety devices, including wiring of electrical devices shall be arranged to operate such that a power failure or failure of the device itself will not result in a hazardous condition.***

CAUTION! ***To prevent a hazardous condition, the Heater MUST be prevented from restarting on its own after a power failure when power returns.***

Heater controls should be so arranged that, in case of emergency stop, **manual resets** or **starts** (at the location where the emergency stop initiated) **shall be required** for the Heater(s) and associated equipment to resume operation.

SAFETY

SAFETY Near Hot Surfaces

WARNING! ***If the Heater has been in operation, avoid contact with the Heater surface, flame and ignition components until these parts have had sufficient time to cool. Failure to follow this WARNING could cause serious injury. Disconnect the power and allow the Heater to COOL BEFORE servicing.***

CAUTION! ***Do not operate the Heater with the Housing removed or damaged. Do not permit any close object or obstruction to affect or restrict the airflow output at the Heater front. To do so could cause equipment damage or personal injury.***

The WARNING Decal 0-48693 in **Figure 3** is located on the Housing hear the front opening of the Heater as shown in **Figure 1**.

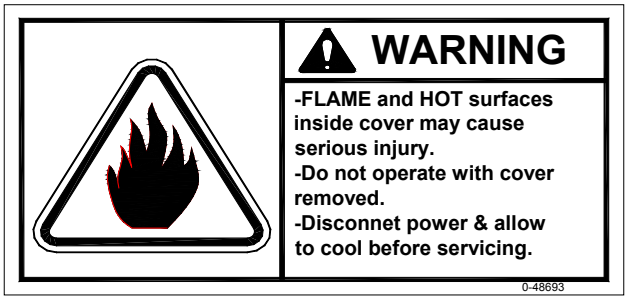


Figure 3. WARNING Decal 0-48693

SAFETY Near Combustible Fuels

WARNING! ***Avoid allowing open flame or lit cigarettes near Heater fuels and the tanks and pipes which supply them to the Heater. Failure to follow this WARNING could cause combustion/fire, equipment damage, and/or serious injury.***

CAUTION! ***Do not operate the Heater if fittings, hoses or other plumbing components have been damaged. To do so may cause combustion/fire leading to equipment damage or personal injury.***

The Decals in **Figures 4A** and **4B** are used to identify the proper fuel for the Heater. They are placed on the heater Housing as shown in **Figure 1**.

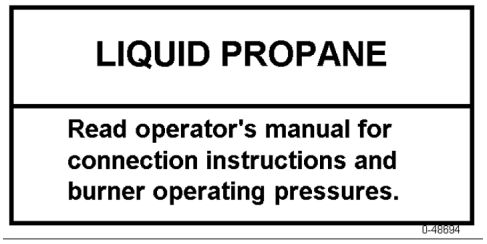


Figure 4A.
LIQUID PROPANE Decal 0-48694

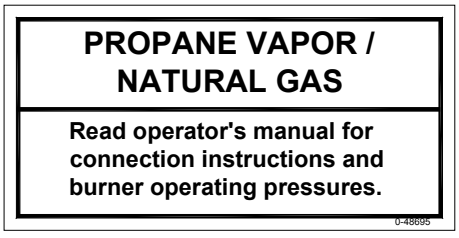


Figure 4B.
PROPANE VAPOR/NATURAL GAS Decal 0-48695

SAFETY

There are Suffocation Hazards in Flowing Grain!

DANGER!

Be aware that where Heaters are installed in conjunction with Grain Bins, there are other hazards involved. ONLY AUTHORIZED PERSONNEL should enter a Heater or Grain Bin area.

You CAN suffocate under material in a grain bin/tank.

Entry into ANY grain bin is a potential hazard.

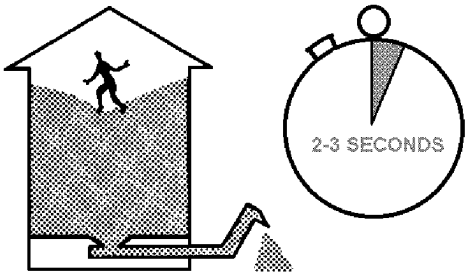
DANGER!

NEVER enter the tank during loading or unloading. Failure to follow these instructions will lead to death or serious injury.

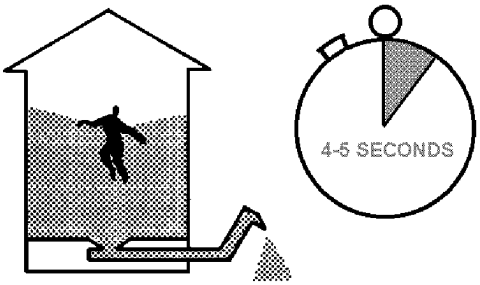
Flowing material may trap and suffocate, as shown in **Figures 5** through **7** below.

Figure 5.
Flowing Material Traps and Suffocates

From the time the auger starts, you have 2-3 seconds to react.



In 4-5 seconds, you are trapped.



After 22 seconds, you are completely covered.

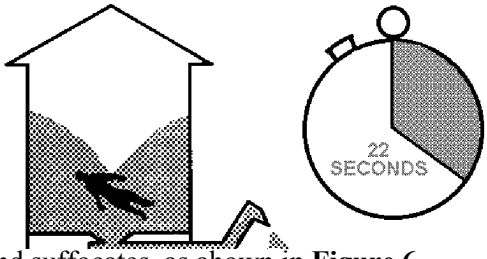


Figure 6.
Suffocation Hazards

Crusted material collapses and suffocates, as shown in **Figure 6**.

Figure 7.
Crusted Material Collapses and Suffocates

About This Manual

The intent of this Manual is to help you follow step-by-step instructions for identification and installation of your BROCK® AXH Heater.

IMPORTANT! ***Pay particular attention to all SAFETY Information in this Manual.***

CAUTION! ***For operation and use of your Heater, read and understand this Manual.***

Failure to follow proper operational procedures may cause personal injury or equipment damage .

Contact your BROCK Dealer to replace this Manual should it become lost or damaged.

Warranty information is included on the inside front cover of this Manual.

Motor choices and specifications are provided in the Parts Listing section at the back of this Manual.

Major changes from the last printing will be listed on the back cover.

Definition of Terms

- This Planning Symbol is used in areas where planning needs to take place **before** assembly and/or installation continue.
- "Horizontal (-)," and "vertical (|)," "bottom," and "top" refer to the Heater as it is **standing**.
- "Right hand" (RH) and "left hand" (LH) terms are determined by facing in the direction of the discharged airflow, *i.e.,* the Inlet would be the RH side of the Heater, the Motor the LH side.
- Names for components and parts which have BROCK® Part Numbers have been **capitalized** throughout this Manual to call attention to them in the installation.
- Photographs may be of prototypes and could vary slightly from actual models.

IMPORTANT! ***Some Heater Guards have been removed for illustrative purposes only.***

Measurements

The symbols (") equals inches and (') equals feet in English measurements.

Metric measurements are shown in millimeters and square brackets **following** the English measurement, unless otherwise specified. For example: 15' *[4 572]* 90' *[27 432]*

Metric equivalents are listed after the English measurement and not always repeated throughout the Manual.

These units of measurement are also used:

- (") or in -inches
- (') or ft -feet
- inlb - inch lb
- ftlb - foot pounds (12 inlbs)
- inlb - inch pounds
- cfm - cubic feet per minute
- inwc - inches water column
- sqft - square feet
- A - amps or amperes
- FLA -full load amps
- V - volts
- Ph - phase
- psi - pounds per square inch
- btu/hr - British thermanl Units per hour
- MMbtu/hr - million btu per hour
- gal/hr - gallons per hour
- cfh - cubic feet per hour

Identification of Parts and Hardware

IMPORTANT! ***No hardware substitutions are permitted unless noted.***

Diagrams are provided throughout this Manual to identify Parts and Hardware used in that application.

- Parts and basic components are identified in **Figures** and their accompanying Tables as "Items" with a black number in white circle.
- Hardware (and hardware **connections** between Parts) are identified with a white number in a **shaded** circle. See **Figure 8**. Hardware Item numbers are listed after the Parts in a **Figure** Table.
- Dimensions and lengths are noted with a white circle **on** an arrow or line, then identified with numeric values in a **Figure** Table.
- Very small numbers near an illustration (*i.e.,* 1257-48) are identification of the **graphic**, not a Part Number.

Item	Description
1	Locking Hex Nut
2	Hex Nut
3	Flange Nut
4	Flange Head Bolt
5	Bin Seal Bolt
6	Gr 8 Hex Head Cap Screw
7	Gr 5 Hex Head Cap Screw
8	Gr 5 Carriage Bolt

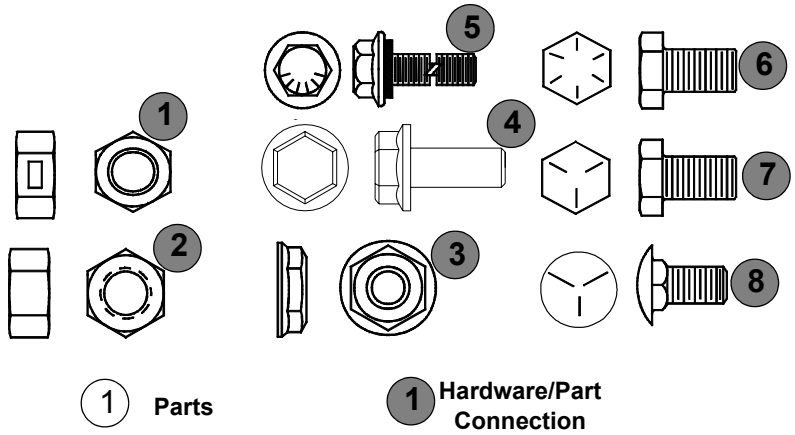
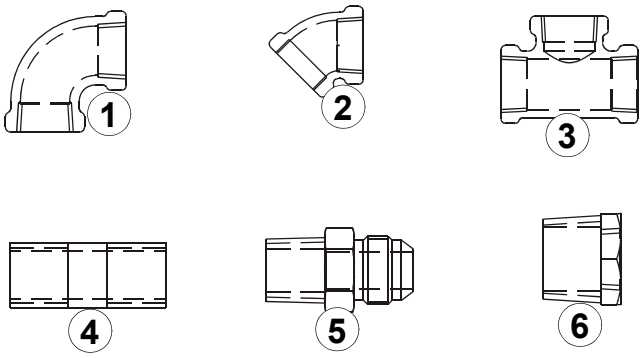


Figure 8. Hardware Identification

Plumbing Fittings Identification

Item	Description
1	Elbow 90°
2	Elbow 45°
3	Tee
4	Nipple
5	Adapter
6	Bushing



Nominal Pipe Size	OD	Schl 40 Wall	Schl 80 Wall
1/8	0.405	0.068	0.095
1/4	0.540	0.088	0.119
3/8	0.675	0.091	0.126
1/2	0.840	0.109	0.147
3/4	1.050	0.113	0.154
1	1.315	0.133	0.179
1 1/4	1.660	0.140	0.191
1 1/2	1.900	0.145	0.200

Figure 9. Plumbing Fittings Identification

Heater Parts Identification

General Heater

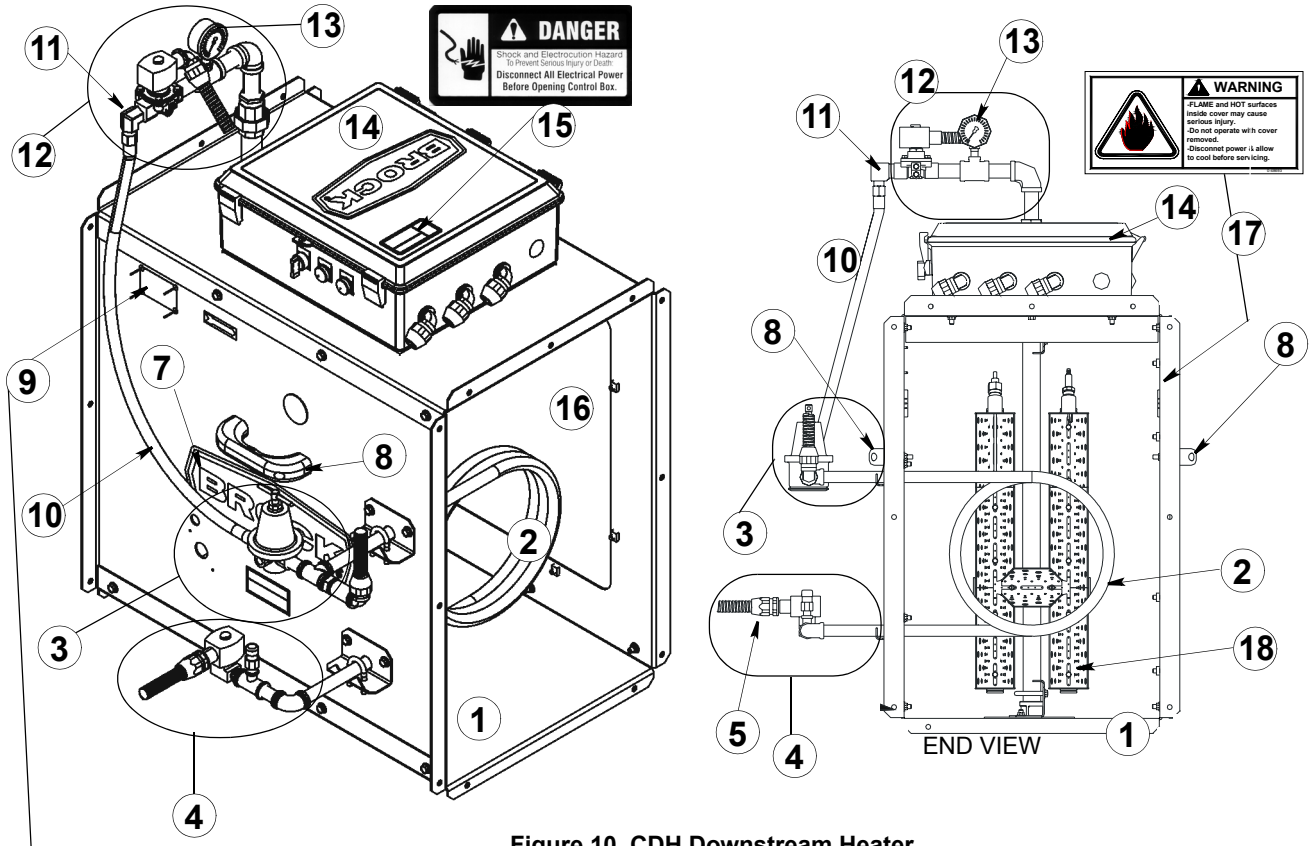
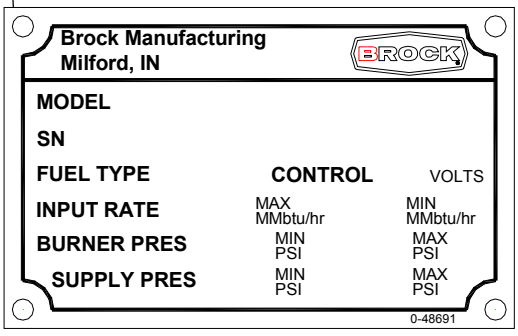


Figure 10. CDH Downstream Heater



Item	Description
1	Housing
2	Coil, Vaporizer (p. 38)
3	Regulator assembly (pp. 37-38)
4	Intake Plumbing Assembly (pp. 37-38)
5	Fitting, Conduit 1/2"
6	Decal, PV/N Fuel Supply (pp. 6,9)
7	Decal, BROCK® 16"
8	Handle, Plastic (pp. 34-35)
9	Plate, Serial Number (pp. 34-35)
10	Hose, LP (p. 38)
11	Adapter, 3/4 npt x 1/2 msae Elbow (p. 38)
12	Assembly, Standard Plumbing (p. 36)
13	Gauge (p. 36)
14	Control Box Assembly (pp. 14, 41)
15	Decal, DANGER 0-48354 (pp. 6,7)
16	Access Panel (pp. 34-35)
17	Decal, WARNING 0-48693 (pp. 6,9)
18	Burner Assembly (pp. 39-40)

Controls

Item	Description
1	Box, Elec Ax
2	Lid, Elec Box 14x16 Blk
3	Panel, Elec. Mounting, AXH
4	Xfmr, Ign 175va 120v-60000v 60h
5	Base, Burner Control
6	Control, Burner 115v Flame Rect LME69
7	Switch, Assy Selector 2nc, 1no
8	Nameplate, OFF/ON
9	Operator, Pilot Light Green
10	Nameplate, Power ON
11	Operator, Pilot Light Red
12	Nameplate, FAULT
13	Lamp, Led 120 V White”
14	Terminal, Fuse 15a 1/4 x 1 1/4"
15	Fuse,5a 250v 1/4 x 1-1/4"
16	Terminial, 20a 26-12ga
17	Barrier, End Terminial
18	Clamp, End *35 mm*
19	Track, 35mm x 3.88"
20	Lug, Ground 6-14ga
21	Plug, Liquid Tight Knock-seal 7/8"
22	Bushing, Snap Heyco 1/2"
23	Thermostat, Hi Limit 200f Man Reset
24	Conduit, Flex 1/2"
25	Fitting, Conduit, 1/2" Elbow
26	Wire 10 Ga Green Thhn
27	Wire 16ga Black Thw
28	Wire 16ga White Thw
29	Label,white Unprinted (10) 5 *mm*
30	Decal, Diagram Heater
31	Decal, Electrical Hazard
32	Decal, BROCK® 12"
33	Screw, Pan #8-32 x 1/2"
34	Screw, Pan 10-32 x 3/8"
35	Latch, Box (Grey)
36	Pivot, Latch (Grey)
37	Seal, Neop Closed Cell .125"
38	Wshr, .203 x .625 x .044 c/z
39	Gasket, 1/4 x 1/2 x 35ft Pvc Foam
40	Wire 16ga White Thw
41	Wire 16ga Red Thw

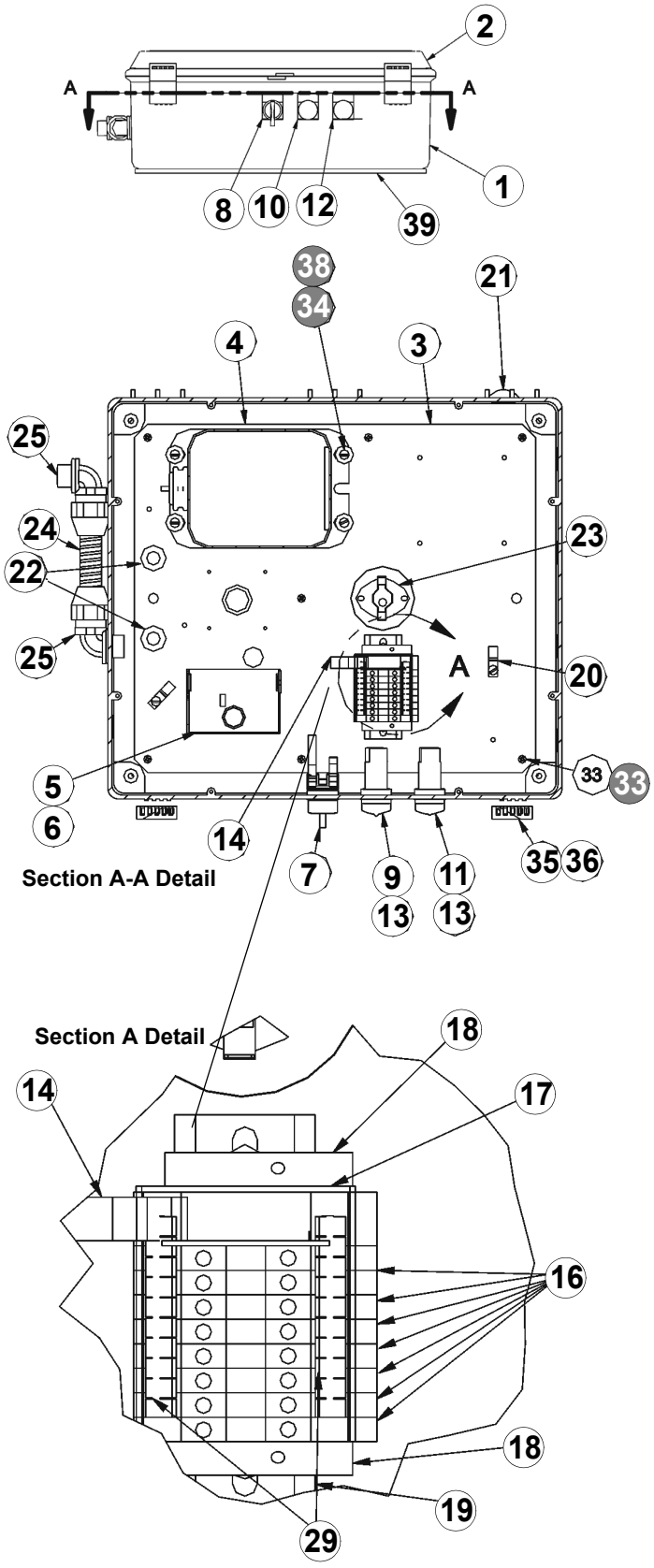


Figure 11.
Heater Controls 0-48779

Pre-Installation Planning

Tools and Equipment Needed

WARNING! ***Inventory all tools and pieces of hardware near the Heater during installation or servicing. Tools left inside in the Heater could cause personal injury or equipment damage.***

- Flat-blade screwdriver
- Saw and blades to cut Heater opening in metal transition
- 1/2" open end wrenches/Socket wrenches with 1/2" socket
- 5/16" open-end wrench or a 12-point 3/8" socket and ratchet
- Hammer
- Wire cutters and wire strippers
- Pipe wrench
- Adjustable wrench
- Pipe sealant
- Leak detection solution (soak solution)
- 12" drift punch for aligning holes with Transition
- Drill bits
- Tape measure

Heater Inspection

DANGER! ***Electricity can kill! Inspections MUST be done with the MAIN POWER LOCKED OUT.***

- Check all fasteners for tightness.
- Check inside the Heater Housing for loose objects.
- Inspect electrical controls and wire connections for tightness.
- Retighten any loose hardware, and/or electrical fittings.
- Make a note of your Serial Number and other specifications for your Heater, found on the Serial Number Identification Plate (Item 9 on Page13). Write the information in the blanks on Page 4 of this Manual for quick reference.

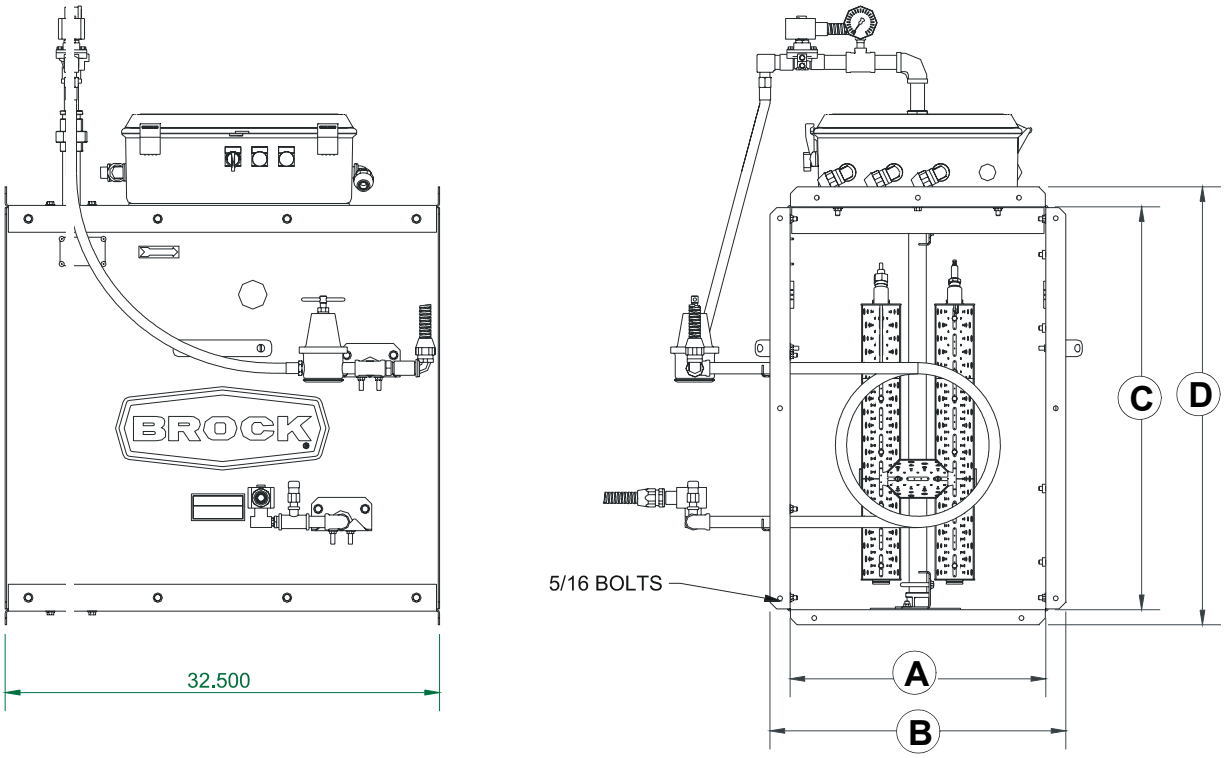
Venting

Adequately vent your Bin roof to prevent Heater back pressure. For good Heater performance, the bin should have an exhausted area equal to 1 sq. ft. for each 1500 cfm airflow rate.

Heater Dimensions

Figure 12 shows dimensions for various Heater sizes. Use these Figures, along with the Heater dimensions, to plan the foundation position before it is installed and before Heater openings in the Transition Panels are cut.

.



	Width				Height			
MODEL	**A**		**B**		**C**		**D**	
	inches *[mm]*		inches *[mm]*		inches *[mm]*		inches *[mm]*	
CDH27-10	16 1/4"	*[413]*	19 1/4"	*[489]*	30 1/8"	*[765]*	32 3/4"	*[832]*
CDH27-15	19 1/8"	*[486]*	22 1/8"	*[562]*	30 1/8"	*[765]*	32 3/4"	*[832]*
CDH27-20	20 3/8"	*[518]*	23 3/8"	*[594]*	30 1/8"	*[765]*	32 3/4"	*[832]*
CDH30	21 3/4"	*[552]*	24 3/4"	*[629]*	33 1/2"	*[851]*	36 1/8"	*[918]*
CDH33-40	22 3/4"	*[578]*	25 3/4"	*[654]*	36 13/16"	*[935]*	39 7/16"	*[1 002]*
CDH33-50	25 1/8"	*[638]*	28 1/8"	*[714]*	36 13/16"	*[935]*	39 7/16"	*[1 002]*

Figure 12. Heater Dimensions

Bin and Transition Inspection

The **bin** should be well sealed to prevent air loss from the plenum or the ductwork below the grain. **Caulk** all joints, seams, and applicable bin foundation connections to prevent air leakage at or under the Heater connection or drying Floor.

The **Heater Transition** should be installed to minimize airflow restriction. The air entrance needs be as clear as possible from Floor Supports. Use all sealant, caulk or gaskets which the manufacturer recommends.

A properly fitting, gradually angled Heater Transition is necessary to connect your Heater to the opening in the Bin.

IMPORTANT! ***Do NOT use anything for a Transition that would severely angle or disrupt airflow from the Heater into the bin.***

Ask your BROCK® Dealer about BROCK® Heater Transitions. If your BROCK® Transition has already been ordered, you will need to assemble it using the one of the following Manuals:

- **LOW Transition** with 38" h x 33" w *[965 x 838]* Heater Backplate: 9-39788 for Narrow (2.67") Corrugated Bins and 9-46450 for (4") Wide Corrugated Bins: BROCK® Instruction MGB1499.
- **AERATION Transition** (9-39786) for Narrow (2.67") Corrugated Bins: BROCK® Instruction MGB1500.
- **HIGH Transition** (9-39787) for Narrow (2.67") Corrugated Bins: BROCK® Instruction MGB1501.

Foundation/Concrete Pad

IMPORTANT!

The Heater (and Fan) should be mounted on a level concrete pad that has been poured at a height determined by the Transition manufacturer's instructions.

DO NOT ATTACH the Fan or Heater to the pad. The Fan and Heater need to have the ability to move freely, therefore not putting the Transition in a bind. See Figure 15.

See the **Heater Dimensions** in **Figure 12** for suggested Foundation size. Note that the foundation is wider on the Motor side of the Heater, not centered on the Transition centerline.

Electrical Installation

Wiring SAFETY Reminders

DANGER! ***Electricity can kill! All electrical wiring MUST be done by a certified/ licensed electrician. All components must meet the National Fire Protection Association Standard NFPA No. 70, American National Standard Inst. ANSI-C1, and applicable national, state and local electrical SAFETY codes.***

WARNING! ***Heater installations shall meet the National Fire Protection Association Standard 61B for the prevention of fires and explosions in grain elevators and facilities handling bulk raw agricultural commodities. Failure to follow this standard could result in death or serious injury.***

In selecting electrical control equipment to be used with any installation, the purchaser must use equipment conforming to the National Electrical Code, the National Electrical Safety Code and other applicable local or national codes. Follow all applicable local, state and national electrical codes for wiring.

Heater controls should be so arranged that, in case of emergency stop, **manual resets** or **starts** (at the location where the emergency stop initiated) **shall be required** for the Heater(s) and associated equipment to resume operation.

BROCK assumes no responsibility for the electrical wiring used with this Heater. BROCK will not be liable for damage to the Heater because of improper electrical installation or use.

IMPORTANT! ***All SAFETY devices, including wiring of electrical devices shall be arranged to operate such that a power failure or failure of the device itself will not result in a hazardous condition.***

CAUTION! ***To prevent a hazardous condition, the Heater MUST be prevented from restarting on its own after a power failure when power returns.***

Install an **electric disconnect** within reach of each Heater.

CAUTION! ***Do not jeopardize your BROCK® Heater Warranty with improper electrical installation!***

Electrical Connection

Control power - The Heater is designed for 115v connections. If the Fan does not have 115v controls, a 250va step-down Transformer may be required to reduce the control voltage. Consult the Fan manufacturer for recommendations.

Control Transformer size - 380, 460v, and 575v GUARDIAN® Series BROCK® Fans are equipped with a 100va control Transformer. It must be changed to a 250va transformer to carry the Heater load.

	Voltage		
	380	460	575
Transformer PN	0-48244	0-48240	0-48876

Power Interlocking

Connect the Heater Power Conduit to the Fan Control Box. In the Fan Control Box, connect the:

- **Black** wire to 115v interlocked power, Terminal #7 in BROCK® Fans.
- **White** neutral wire to neutral, Terminal #2 in BROCK® Fans.
- **Green** ground wire to the ground lug in the Fan Control Box.

WARNING! ***Connect only to a 115v electrical control source, which is interlocked to the Fan Motor. The Heater power must shut off when the Fan Motor is not operating for any reason. If the Fan Motor is wired with internal thermo protection, it must be wired so that the power to the contactor and the Heater is removed when the thermo device trips. If these instructions are not followed, equipment damage and/or personal injury could result.***

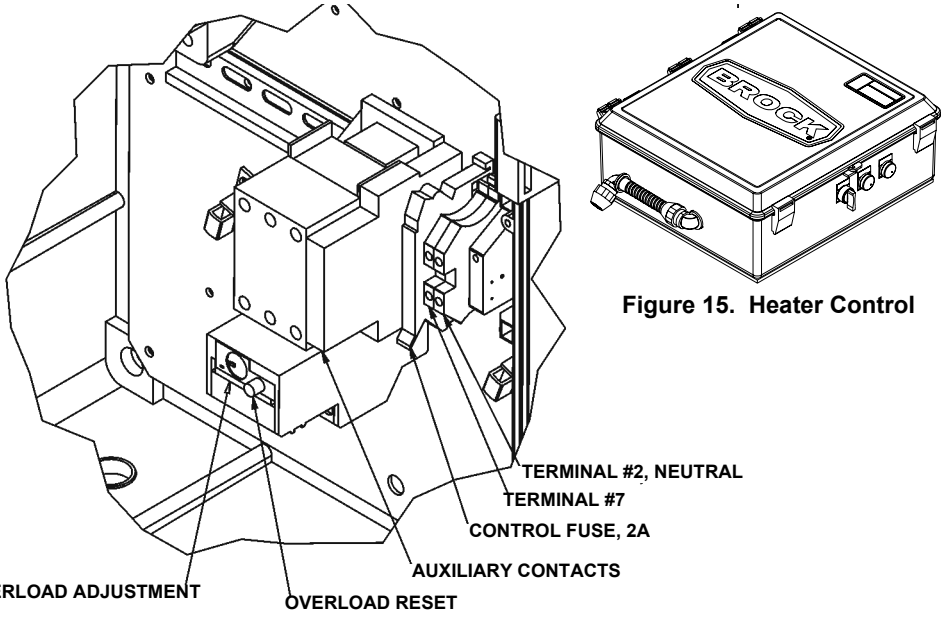


Figure 14. Fan Control

Figure 15. Heater Control

Plenum Thermostat Requirements (Gray Board LME69)

1. A plenum Theromostat device is required to control temperature and operate the Heater safely. Use the recommended BROCK® thermostats and connect them to the terminals as shown in the **Thermostat Chart** below and the Wiring Diagram, **Figure 18**.
2. Mount the Thermostat at a comfortable working height on or near the bin, and run the capillary tube into the drying plenum. The full sensing bulb must be in the plenum, and the sensing capillary tube should be located 2-3 feet *[610 - 914]* to the side of the Transition.
3. Route the power cord from the Thermostat back to the Heater Control and connect to the Heater terminal strip. See the Thermostat Chart below and Wiring Diagrams (**Figure 18**) for connections.

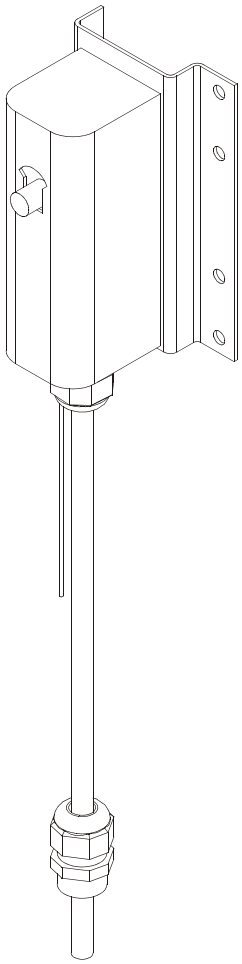
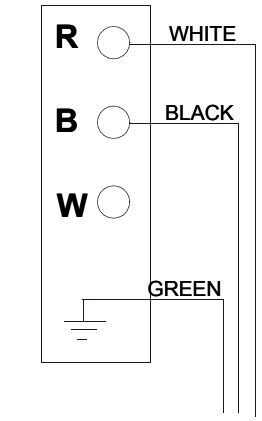


Figure 16.
HT-200 Thermostat

Thermostat Chart

	Temperature Control		Hi Limit Control	
Control	**Part No.**	**Terminal No.**	**Part No.**	**Terminal No.**
ON/OFF	HT-200	11 and 12		
HI/LO	HT-200	18 and 19	HLT-250	11 - 12
Mod Valve	HMV-3/4		HLT-250	11 - 12



R-B OPENS ON TEMP RISE
R-W CLOSES ON TEMP RISE

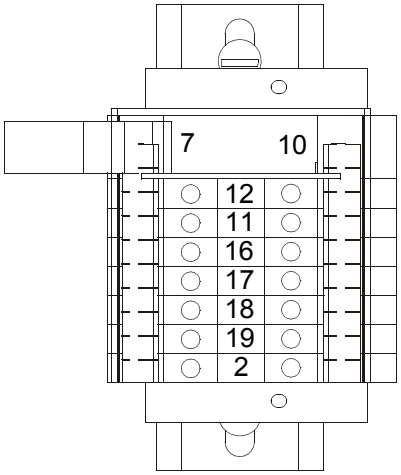


Figure 17.
Heater Control Terminal Strip

Heater Wiring Diagram

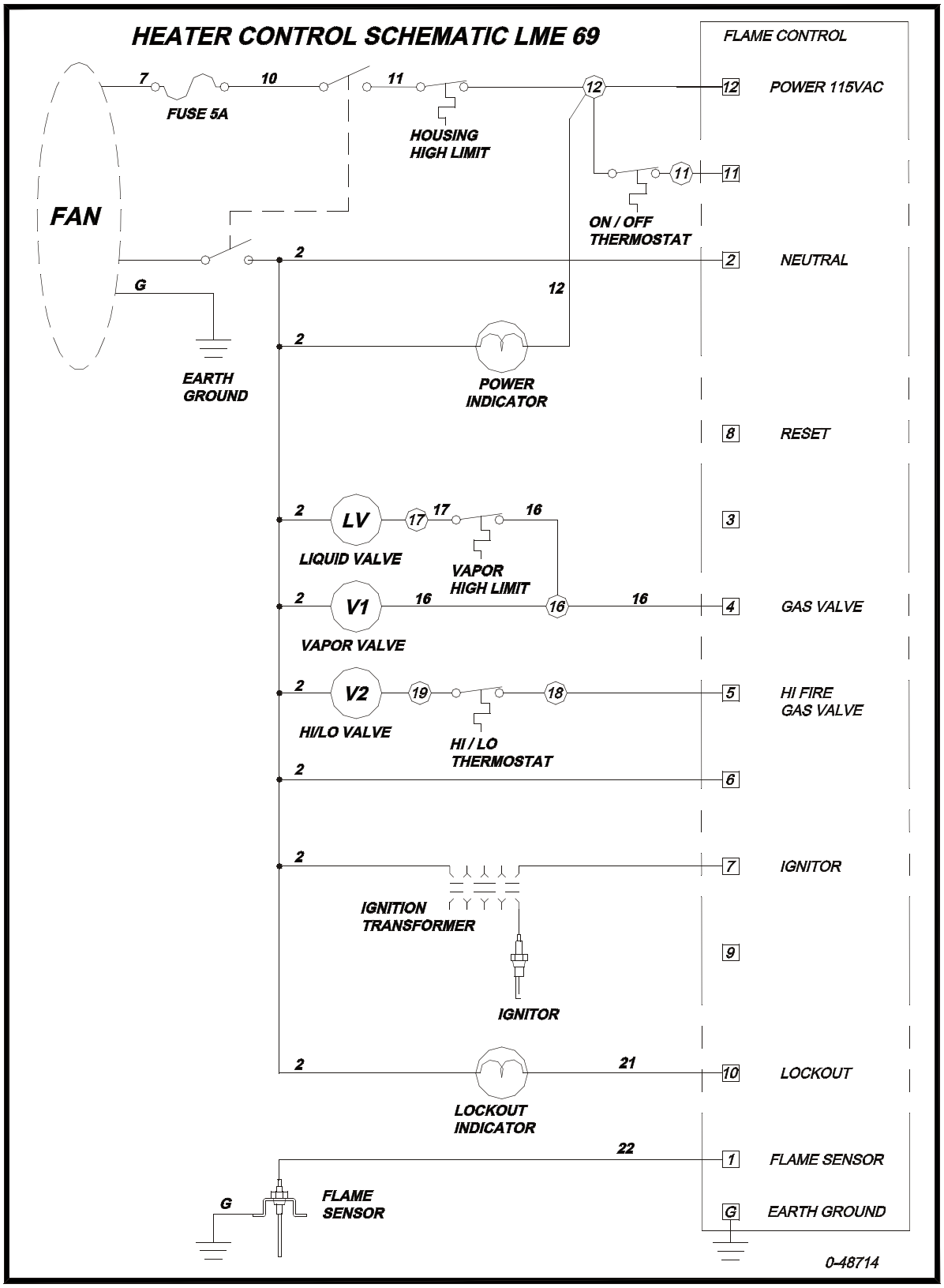


Figure 18. 0-48714 Wiring

Gas Connection

General

1. Gas connections should be made by a qualified gas service person according to local fuel code for the appropriate fuel connection.
2. When using propane fuel, be sure the Tank is located away from the Burner the minimum distance required by all applicable local, state and national codes. Consult your fuel supplier.
3. Check all installations for leaks using a soap solution. Correct problems **before** operating equipment.
4. The Heater unit is equipped with a liquid-filled Gauge. On certain brands, it is necessary to open the Vent Valve on top of the Gauge to obtain accurate readings. Check the instructions on the Gauge for this procedure.

Liquid Propane

1. Liquid propane models are equipped with an internal Vaporizer and should be connected to the propane tank for liquid draw.
2. Be sure that line size is adequate and line restrictions are minimized to prevent pre-vaporization. See fuel specifications in the **Fuel Specifications Chart** on Pages 29-30. Do **not** use a pressure regulator in the liquid supply line.
3. Be sure propane supply tanks are clean. Tanks that have been used for vapor draw may contain oils which must be purged. Tanks that have previously been used for ammonia must be properly purged and converted. Consult your fuel supplier.
4. The customer must supply a fuel shutoff and strainer just ahead of the connection to the 1/4" npt liquid solenoid valve on the Heater.

Propane Vapor

1. N/PV models can be operated on either natural gas or propane vapor. They are shipped from the factory with the propane vapor orifice installed. A larger natural gas orifice is attached to the shutoff valve and should removed from the unit.
2. For propane vapor operation, connect to the propane supply tank for vapor draw or to an external vaporizer unit. The tank size must be large enough to provide adequate fuel vaporization capacity to supply the Burner rate. The vaporization capacity will vary with ambient temperature. Consult your fuel supplier.
3. A fuel pressure regulator must be installed at the tank to reduce pressure to a range of 10-15 psi.
4. A shutoff valve is supplied on the Heater unit. The customer should supply a fuel strainer at the 3/4" npt valve connection.

Natural Gas

1. N/PV models can be operated on either natural gas or propane vapor. They are shipped from the factory with the propane vapor orifice installed. A larger natural gas orifice is attached to the shutoff valve and must be installed before operation.
2. Be sure that line size is adequate and line restrictions are minimized. See fuel specifications in the **Fuel Specifications Chart** on Pages 29-30.
3. A shutoff valve is supplied on the Heater unit. The customer should supply a fuel strainer at the 3/4" npt valve connection.

Operation: Initial Startup Checks

Initial Startup Check

DANGER! ***Electricity can kill! Startup inspections MUST be done with the MAIN POWER LOCKED OUT. Failure to follow these instructions will result in serious injury or death.***

IMPORTANT! ***With MAIN POWER LOCKED OUT, inspect electrical controls and wire connections for TIGHTNESS.***

Turn Main Power ON and check control voltage **before** starting the unit to prevent possible damage to controls.

CAUTION! ***DO NOT OPERATE the Heater on an empty bin. To do so can sometimes dislodge floor supports.***

Disconnect Main Power when tests are completed.

Fan and Heater Pre-Check

1. Initial inspection must be done with the main power locked out and gas supply turned **OFF**.
2. Check Fan and Heater unit for any loose hardware or any obstructions inside or outside the housing.
3. Check electrical controls for any loose wiring.
4. Turn gas **ON** and check for any leaks from the supply to the Heater Solenoid Valve.
5. Be sure that the bin roof vents are open.

CAUTION! ***DO NOT OPERATE the Fan on an empty bin. To do so can sometimes dislodge Floor Supports.***

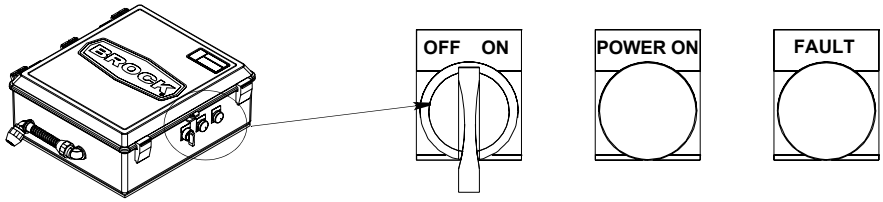


Figure 19.
Heater Control Location

Heater Control Lockout Check

1. Turn main electrical power **ON**. With Heater Selector Switch in the **OFF** position, check the Fan for proper rotation.

WARNING! ***Check the Fan for proper rotation. Refer to your Fan Manual. Incorrect rotation may cause flame to be pulled into the Fan Motor and may cause damage to the Fan and Heater units.***

2. With the gas still OFF, and with the Fan running, turn the Burner Switch to **ON**. The green **POWER ON** light should illuminate, indicating that the Thermostat is connected and the Flame Control is powered.
3. In twenty-five (25) seconds, the Solenoid Valves should open. A spark should be observed through the RH Inspection Port.
4. In ten (10) seconds, the spark should go off, the Solenoid Valves close and the Burner should lockout as indicated by the red **FAULT** light.

Ignition Check

1. Turn the Gas Valve **ON** and reset the Burner by holding down the illuminated button on the LME 69 board. Hold down for one (1) second but less than three (3) seconds. After the button is pressed, the light will change from **solid red to a solid yellow** and will start the purge and trial for ignition cycles. If you hold the button down for three (3) seconds or longer, the LME 69 board will go into a **diagnostic** mode, which is shown by a **fast flashing red light**. To get out of this diagnostic mode, press the button again for three (3) seconds to return to normal cycle.
2. In twenty-five (25) seconds the Solenoids should open; a pressure should be indicated on the Pressure Gauge and ignition should take place. Be sure to immediately set the Burner pressure to the appropriate operating range for the Heater. See the **Fuel Specifications Chart**.

Plenum Temperature Controlling Thermostat Check

1. Turn the Thermostat **down**. The Heater should turn off for ON/OFF control or decrease to low pressure for HI/LO Control. Set the LO pressure to the appropriate value at this time (approximately 1/2 to 1/3 the high pressure setting, but not lower than the minimum operating pressure shown in the **Fuel Specifications Chart** on Pages29-30). Too low of a setting will cause the Burner to lockout or fail to ignite.
2. Turn the Thermostat **up**. The Burner should relight for ON/OFF control or should go to high fire for HI/LO control.

Hi-Limit Thermostat Check

1. On units equipped with HLT-250 High Limit Controls, turn the setting **down**. Then the Heater should shut off.
2. Turn the HLT Thermostat setting **up**. The green POWER **ON** Light should **not** come on, and the Heater will not relight.
3. Push the HLT Thermostat Manual Reset Button. The Heater green POWER ON Light should illuminate and begin a new ignition cycle.

Fan and Heater Shut Down

1. With the Burner operating, shut off the fuel supply at the source. On propane tanks, shut off at the tank and allow the fuel to burn out of the line. The Burner will lockout.
2. Turn the Burner Switch **OFF**.
3. Turn the Fan **OFF**.
4. Disconnect the main electrical power.

Operation

DANGER! ***DO NOT OPERATE the Heater with the Guard off. Failure to follow these instructions will result in death or serious injury.***

Severe personal injury may result if equipment is operated without the Guard properly installed/latched.

DANGER! ***Do not allow the Heater to run while any adjustments are being made. Failure to shut it off will lead to personal injury or death. Disconnect electrical power BEFORE inspecting or servicing equipment unless maintenance instructions specifically state otherwise. Failure to do so will result in death or serious injury.***

Before restarting a Heater that has been stopped because of an emergency, an inspection of the Heater shall be made and the cause of the stoppage determined. The starting device shall be locked or tagged out before any attempt is made to remove the cause of the stoppage.

Flame Control

The Flame Controller (**Figure 20**) sequences the Gas Igniter and Gas Valves for safe ignition and operation. It detects a flame using (flame rectification) by passing a current from the Flame Rod through the flame to the Burner Vanes. A window on top of the Flame Controller indicates that the Motor/timer is running during the purge and trial cycles. A solid red light illuminates when the control is locked out, and will reset the control when pressed for approximately one (1) second but less than three (3) seconds.

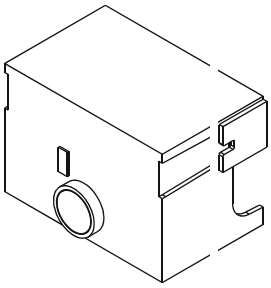


Figure 20. Flame Controller

The Burner Control has the following cycles:

- The **PURGE** time of twenty-five (25) seconds clears any accumulated gas from the Heater and Drying Plenum prior to ignition. It begins when the Fan is running, the Burner Switch is ON, the Housing High Limit Thermostat is closed, and the Thermostat is calling for heat. The green POWER ON Light indicates these conditions are satisfied (Terminal 12 has 115v power). After the temperature requirement has been achieved, the Heater will shut off. When the thermostat again calls for heat, the **PURGE** cycle will be skipped and will go directly into the TRIAL for ignition cycle.
  During the PURGE time the LME 69 board will show a **solid yellow light**.
- The **TRIAL** for ignition is allowed for ten (10) seconds. During this period, the Igniter, Vapor Valve (V1), and Liquid Valve (LV) are powered. Ignition should take place during this period.
  During the **TRIAL** for ignition time, the LME 69 board will show a **flashing yellow light**.
- **LOCKOUT** occurs if a flame is not sensed for any consecutive (10) ten-second period following the TRIAL cycle. The red FAULT Light will indicate a lockout and all Solenoid Valves will close. The green POWER ON Light will still be illuminated. During **LOCKOUT** the LME 69 board will show a **solid red light**.
- **RESET** the Control by holding down the illuminated button on the LME 69 board. Hold down for one (1) second but less than three (3) sconds. After the button is pressed, the light will change from **solid red to a solid yellow** and will start the PURGE and TRIAL for ignition cycles. If you hold down for three (3) seconds or longer, the LME 69 board will go into a diagnostic mode which is shown by a **fast flashing red light**. To get out of his diagnostic mode, press the button again for three (3) seconds to return to normal cycle.

- The **HI-FIRE** Valve (V2) receives power only after the flame is proven and the trial for ignition period is completed (only on Heaters equipped with the hi/lo option).

PURGE (25 sec.)	**TRIAL for ignition**		**LOCKOUT (10 seconds)**	**FAULT Light ON, valves closed**
PURGE (25 sec.)	**TRIAL**	**Burner lights, no flame sensed**	**LOCKOUT (10 seconds)**	**FAULT Light ON, valves closed**
PURGE (25 sec.)	**TRIAL**	**Burner lights, flame sensed, Burner runs**		
			Igniter OFF, Hi-Fire Valve Powered	

Color code table for burner board LME69	
Status	**Color**
Purge time 25 sec	Solid yellow
Ignition phase 10 sec	Flashing yellow
Operation & flame okay	Solid green
Operation good,flame not okay	Flashing green
Sensed flame before ignition	Green-red flash
Under voltage	Yellow-red flash
Fault	Solid red
Error code output (see code table)	Flashing red
Diagnostic mode	Red flicker

Error code table	
Red blink code signal	**Possible cause**
2 blinks	No flame sensed after trial
4 blinks	Sensed flame before ignition
7 blinks	Too many losses of flame during operation
10 blinks	Wiring fault

Operation

IMPORTANT! ***Be sure that the bin roof vents are open.***

1. Turn electrical power ON to the Fan.
2. Turn Gas Supply Valves ON. On LP tanks using liquid draw, open the tank valve slowly to be sure that the Flow Check Valve does not trip, stopping the fuel flow. If it does, close the Valve completely to reset and open it slowly again.
3. Set the Plenum Thermostat to the appropriate operating temperature. **Set Hi-Limit Thermostat temperature if so equipped.**
4. Be sure that the Burner Switch is in the OFF position. Then start the Fan.
5. Turn the Burner Switch to the ON position. The green POWER ON Light should illuminate.
6. The Burner should purge for twenty-five (25) seconds and then try to ignite for a ten (10)-second period. During the trial for ignition period, ignition should take place. During the trial for ignition, be sure that the gas pressure is set in the correct operating range. Set pressure using the Regulator on LP units and the Ball Valve on N/PV units. See **Fuel Specifications Chart** on Pages 29-30. If the Burner locks out, reset the Burner by pressing the illuminated button on the Burner board for one (1) second.
7. When the Burner ignites, set the gas pressure to the appropriate settings. A Burner operating on Fans with static pressure greater than 2 inwc will require a lower maximum fuel pressure setting. Observe several cycles of the Thermostat.
8. For best heat distribution, the Heater should cycle ON 80-90% of the time, and OFF 10-20% of the time. This is the most efficient way to run your Heater. Use the lowest possible gas pressure when trying to achieve this cycle time.
9. It will be necessary to check your Heater several times a day and make gas pressure changes as the ambient temperature changes.

Controls

ON/OFF Control - The Burner should periodically cycle ON and OFF.
Increasing the fuel pressure will reduce the percentage of ON time.
Reducing the fuel pressure will increase the percentage of ON time.
If the Burner is ON all the time, the Thermostat temperature is not being satisfied and the fuel pressure should be increased.

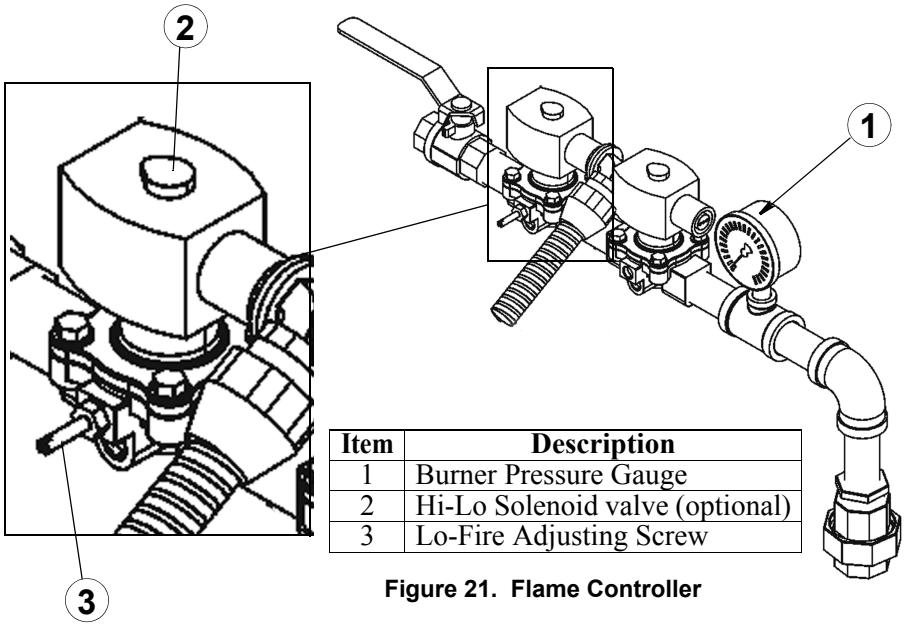
IMPORTANT! ***DO NOT EXCEED the maximum operating fuel pressure shown in the Fuel Specifications Chart beginning on the opposite Page.***

HI-LO Control - The Burner should periodically cycle from a hi-fire to low fire.

- Set the high fire pressure using the regulator on LP units or the Ball Valve on Natural Gas and Propane Vapor units. Increasing the Hi fuel pressure will reduce the percentage of High fire time. Reducing the fuel pressure will increase the percentage of High fire time. If the Burner is in Hi-Fire all the time, the Thermostat temperature is not being satisfied and the high fire fuel pressure should be increased. **Do not exceed the maximum operating fuel pressure shown in the Fuel Specifications Chart**.
- The low fire fuel pressure is set using the Bypass Needle Valve on the Hi-Lo Valve. The typical setting is 1/2 to 1/3 the setting of the high fire pressure. If the Burner is in low fire all the time, the low fire fuel pressure is set too high and should be reduced.

IMPORTANT! ***Do not go below the minimum operating fuel pressure shown in the Fuel Specifications Chart.***

- Observe the flame quality through the Inspection Ports. It should be generally blue with some orange tips at higher firing rates.



Item	Description
1	Burner Pressure Gauge
2	Hi-Lo Solenoid valve (optional)
3	Lo-Fire Adjusting Screw

Figure 21. Flame Controller

Fan and Heater Shut Down

1. With the Burner operating, shut off the fuel supply at the source. On propane tanks, shut off at the tank and allow the fuel to burn out of the line. The Burner will lockout.
2. Turn the Burner Switch OFF.
3. Turn the fan OFF.
4. Disconnect the main electrical power.

Fuel Specifications: Gas Pressure/Orifice Chart

Model	CDH27-10			CDH27-10 LO-TEMP		
Fuel	Liquid Propane	Propane Vapor	Natural Gas	Liquid Propane	Propane Vapor	Natural Gas
Min btu/hr	700,000	700,000	700,000	400,000	400,000	400,000
Max btu/hr	1,800,000	1,800,000	1,800,000	800,000	800,000	800,000
Max gal/hr	19.6	19.6	-		8.7	-
Max cfm/hr	-	715	1,800		318	800
orifice diameter (in) 0-48776-xxx	0.219	0.219	0.281	0.141	0.141	0.172
Burner Min (psi)	1	1	1	2	2	2
Burner Max (psi)	8	8	8	9	9	9
Min line size (100 ft)	3/8"	3/4"	1"	3/8"	1/2"	3/4"
Supply Min (psi)	30	10	10	30	10	10
Supply Max (psi)	180	15	15	180	15	15
Ignitor	I-31 0-48621	I-31 0-48621	I-31 0-48621	I-31 0-48621	I-31 0-48621	I-31 0-48621
Flame Rod	2-48635	2-48635	2-48635	2-48635	2-48635	2-48635

Model	CDH27-15			CDH27-15 LO-TEMP		
Fuel	Liquid Propane	Propane Vapor	Natural Gas	Liquid Propane	Propane Vapor	Natural Gas
Min btu/hr	1,000,000	1,000,000	1,000,000	500,000	500,000	500,000
Max btu/hr	2,800,000	2,800,000	2,800,000	1,100,000	1,100,000	1,100,000
Max gal/hr	30.4	30.4	-		12.0	-
Max cfm/hr	-	1,113	2,800		437	1,100
orifice diameter (in) 0-48776-xxx	0.281	0.281	0.351	0.172	0.172	0.203
Burner Min (psi)	1	1	1	2	2	2
Burner Max (psi)	7	7	7	9	9	9
Min line size (100 ft)	3/8"	3/4"	1"	3/8"	1/2"	3/4"
Supply Min (psi)	30	10	10	30	10	10
Supply Max (psi)	180	15	15	180	15	15
Ignitor	I-31 0-48621	I-31 0-48621	I-31 0-48621	I-31 0-48621	I-31 0-48621	I-31 0-48621
Flame Rod	2-48635	2-48635	2-48635	2-48635	2-48635	2-48635

Model	CDH27-20			CDH27-20 LO-TEMP		
Fuel	Liquid Propane	Propane Vapor	Natural Gas	Liquid Propane	Propane Vapor	Natural Gas
Min btu/hr	1,000,000	1,000,000	1,000,000	500,000	500,000	500,000
Max btu/hr	3,000,000	3,000,000	3,000,000	1,100,000	1,100,000	1,100,000
Max gal/hr	32.6	32.6	-		12.0	-
Max cfm/hr	-	1,192	3,000		437	1,100
orifice diameter (in) 0-48776-xxx	0.281	0.281	0.359	0.172	0.172	0.203
Burner Min (psi)	1	1	1	2	2	2
Burner Max (psi)	8	8	8	9	9	9
Min line size (100 ft)	3/8"	3/4"	1"	3/8"	1/2"	3/4"
Supply Min (psi)	30	10	10	30	10	10
Supply Max (psi)	180	15	15	180	15	15
Ignitor	I-31 0-48621	I-31 0-48621	I-31 0-48621	I-31 0-48621	I-31 0-48621	I-31 0-48621
Flame Rod	2-48635	2-48635	2-48635	2-48635	2-48635	2-48635

Model	CDH30			CDH30 LO-TEMP		
Fuel	Liquid Propane	Propane Vapor	Natural Gas	Liquid Propane	Propane Vapor	Natural Gas
Min btu/hr	1,300,000	1,300,000	1,300,000	800,000	800,000	800,000
Max btu/hr	3,800,000	3,800,000	3,800,000	1,600,000	1,600,000	1,600,000
Max gal/hr	41.3	41.3	-		17.4	-
Max cfm/hr	-	1,510	3,800		636	1,600
orifice diameter (in) 0-48776-xxx	0.312	0.312	0.406	0.203	0.203	0.250
Burner Min (psi)	1	1	1	2	2	2
Burner Max (psi)	8	8	8	9	9	9
Min line size (100 ft)	3/8"	3/4"	1"	3/8"	1/2"	3/4"
Supply Min (psi)	30	10	10	30	10	10
Supply Max (psi)	180	15	15	180	15	15
Ignitor	I-31 0-48621	I-31 0-48621	I-31 0-48621	I-31 0-48621	I-31 0-48621	I-31 0-48621
Flame Rod	2-48635	2-48635	2-48635	2-48635	2-48635	2-48635

Model	CDH33-40			CDH33-40 LO-TEMP		
Fuel	Liquid Propane	Propane Vapor	Natural Gas	Liquid Propane	Propane Vapor	Natural Gas
Min btu/hr	1,600,000	1,600,000	1,600,000	1,000,000	1,000,000	1,000,000
Max btu/hr	4,500,000	4,500,000	4,500,000	2,500,000	2,500,000	2,500,000
Max gal/hr	48.9	48.9	-		27.2	-
Max cfm/hr	-	1,789	4,500		994	2,500
orifice diameter (in) 0-48776-xxx	0.344	0.344	0.438	0.250	0.250	0.312
Burner Min (psi)	1	1	1	1.5	1.5	1.5
Burner Max (psi)	8	8	8	9	9	9
Min line size (100 ft)	3/8"	3/4"	1"	3/8"	1/2"	3/4"
Supply Min (psi)	30	10	10	30	10	10
Supply Max (psi)	180	15	15	180	15	15
Ignitor	I-31 0-48621	I-31 0-48621	I-31 0-48621	I-31 0-48621	I-31 0-48621	I-31 0-48621
Flame Rod	2-48635	2-48635	2-48635	2-48635	2-48635	2-48635

Model	CDH33-50			CDH33-50 LO-TEMP		
Fuel	Liquid Propane	Propane Vapor	Natural Gas	Liquid Propane	Propane Vapor	Natural Gas
Min btu/hr	1,900,000	1,900,000	1,900,000	1,700,000	1,700,000	1,700,000
Max btu/hr	5,300,000	5,300,000	5,300,000	2,500,000	2,500,000	2,500,000
Max gal/hr	57.6	57.6	-		27.2	-
Max cfm/hr	-	2,107	5,300		994	2,500
orifice diameter (in) 0-48776-xxx	0.375	0.375	0.469	0.250	0.250	0.312
Burner Min (psi)	1	1	1	2	2	2
Burner Max (psi)	8	8	8	9	9	9
Min line size (100 ft)	3/8"	3/4"	1"	3/8"	1/2"	3/4"
Supply Min (psi)	30	10	10	30	10	10
Supply Max (psi)	180	15	15	180	15	15
Ignitor	I-31 0-48621	I-31 0-48621	I-31 0-48621	I-31 0-48621	I-31 0-48621	I-31 0-48621
Flame Rod	2-48635	2-48635	2-48635	2-48635	2-48635	2-48635

Maintenance and Service

SAFETY Reminders

Service and maintenance of Heaters must be done only by a **qualified technician**.

DISCONNECT POWER prior to maintaining or cleaning the Heater!

DANGER!

Electricity can kill! Inspections MUST be done with the MAIN POWER LOCKED OUT. Failure to follow these instructions (allowing the Heater to start automatically) will result in serious injury or death.

CAUTION!

Because of the danger of falling or flying debris, protective eyewear/safety glasses MUST be worn during assembly, installation, maintenance or servicing of this Heater. Failure to do so may result in minor or moderate injury.

Yearly Startup Checks

DANGER!

Electricity can kill! Yearly startup checks MUST be done with the MAIN POWER LOCKED OUT. Failure to follow these instructions will result in serious injury or death.

CAUTION!

Because of the danger of falling or flying debris, protective eyewear/safety glasses MUST be worn during assembly, installation, maintenance or servicing of this Heater. Failure to do so may result in minor or moderate injury.

- Check the Heater-transition-bin connection for **proper seal**. Replace any caulking or gasket as needed.
- Check electrical components and connections.
- Check bin roof doors for any obstructions that would cause ventilation restrictions.

Trouble Shooting

1. Green Power ON light does not illuminate.

- Turn ON Burner Selector Switch.
- ON / OFF Thermostat not calling for heat. Increase thermostat setting.
- Plenum Hi Limit tripped on Hi-Lo fired units. Reset.
- Housing High Limit Switch is open. Reset or replace.
- Blown 5a fuse. Replace.
- Faulty Burner Selector Switch.
- Failed bulb in light. Replace.

No 115vac power between;	**Possible Cause**	**Correction**
Black #7 to White neutral wires to Fan		Check Fan connections
Black wire #7 to Terminal #2	Faulty Burner switch NO contacts	Replace Burner Switch
Wire #10 to Terminal #2	Faulty fuse	Replace fuse Check for shorts
Wire #11 to Terminal #2	Faulty Burner switch NO contacts	Replace Burner Switch
Term #13 to Terminal #2	Tripped housing Hi-Limit Switch.	Reset housing Hi-limit Switch - Check for restricted Fan airflow
	Faulty housing Hi-Limit Switch	Replace Hi-Limit Switch
Term #12 to Terminal #2	ON/OFF Thermostat open	Increase setting Replace Thermostat
	Hi-Limit Thermostat open	Reset thermostat Replace Thermostat

2. Flame control cycles, but Burner Does not light, Burner faults.

Check ignition spark through inspection ports. If not present;

1. Check Igniter Wire connections.
2. Check for faulty Ignition Transformer.

Check for correct range of gas pressure. Adjust as required. If no gas pressure;

1. Check that fuel supply valves are open.
2. Check for empty LP fuel tank.
3. Check for restrictions in fuel supply lines. On LP units:
   Check for tripped flow check valve at the tank.
   Check for frosting on LP lines or Fitting, indicating a restriction point.
4. Check for dirty Fuel Strainers.
5. On LP units, check for hot Vaporizer. Allow to cool and try again.
6. Check for faulty Vapor Valve.
7. Check for faulty liquid valve on LP units.
8. Check for obstruction in Orifice Pipe.
9. Check that correct Orifice is installed.

3. Purge cycle completes, and then Burner immediately Faults.

1. Check for shorted Flame Rod. Adjust as required to clear.
2. Check for dirty Flame Rod. Clean or replace.
3. Shorted flame wire. Replace.
4. Poor grounding. Stray voltages sensed. Check earth ground connections.
5. Faulty Flame Controller. Replace.

4. Burner lights, runs 10 (ten) seconds, and then Faults.

1. Burner pressure too low / high to sense fire.
   Adjust pressure to appropriate range.
2. Flame wire not connected. Reconnect.
3. Ground to Burner is poor.
   Check for ground screw connection on Burner Control base.
   Check for loose ground connections on Burner green ground wire.
   Poor flame quality. See below.
   Poor Flame Rod positioning. See illustrations showing proper position.

5. Flame Control runs continuously in the Purge cycle (solid yellow light).

Check the wire connection to Terminal #6.

6. Green Power On Light illuminated, but Flame Control does not run

1. Be sure the Flame Control is fully snapped into the base.
2. Check for good wire connections on Terminal 12 and 2 of the base.
3. Replace the Flame Control.

7. Burner blows a fuse:

1. Immediately when the Burner Switch is turned ON
   - Shorted housing High Limit Switch
   - Shorted ON/OFF or Plenum Hi-Limit Thermostat or Thermostat wires.
   - Shorted Flame Board
2. Immediately following the 25-second Purge cycle
   - Shorted Ignition Transformer
   - Shorted Gas Valve Coil
   - Shorted Vapor Hi-Limit on LP unit.
3. Immediately following the 15-second trial for ignition cycle (35 seconds after turning on)
   - Shorted Hi/Lo Thermostat or Thermostat wires
   - Shorted Hi/Lo Valve Coil

8. Extremely yellow or sooty flame

1. Gas pressure is too high.
   - Reduce gas pressure to an appropriate range.
   - Check that the Vent is open on the Fuel Pressure Gauge.
   - Check for correct orifice sizing.
2. Too low an airflow velocity.
   - High static pressure on the Fan is causing the Fan to stall.
     Reduce gas pressure.
     Reduce grain depth in the in.
     The Fan is too large for bin size and depth.
     Grain crusted over. Core the bin.
     The Drying Floor is plugged.
   - Insufficient airflow performance from the Fan.
3. Restricted airflow in Burner Venturi Casting or Diffuser. Remove the Burner Cup and check for obstructions.
4. Connected to a Fan without air straightening vanes. Install air straightening vanes or replace the Fan.
5. Incorrect Diffuser sizing. Check fuel specifications. See **Fuel Specifications Chart** on Pages 29-30.

Parts List

Housing

CDH Housing Package			CDH27-10-HP	CDH27-15-HP	CDH27-20-HP	CDH30-HP	CDH33-40-HP	CDH33-50-HP
Item	Part No.	Description	Qty.					
1	0-48738	Panel, TOP CDH27-10	1					
	0-48741	Panel, TOP CDH27-15		1				
	0-48744	Panel ,TOP CDH27-20			1			
	0-48749	Panel, TOP CDH30				1		
	0-48754	Panel, TOP CDH33-40					1	
	0-48757	Panel, TOP CDH33-50						1
2	0-48739	Panel, BOTTOM CDH 27-10	1					
	0-48742	Panel, BOTTOM CDH 27-15		1				
	0-48745	Panel, BOTTOM CDH 7-20			1			
	0-48750	Panel, BOTTOM CDH 30				1		
	0-48755	Panel, BOTTOM CDH 33-40					1	
	0-48758	Panel, BOTTOM CDH 33-50						1
3	0-48740	Plate, Deflector CDH 27-10”	1					
	0-48743	Plate, Deflector CDH 27-15		1				
	0-48746	Plate, Deflector CDH 7-20			1			
	0-48751	Plate, Deflector CDH 30				1		
	0-48756	Plate, Deflector CDH 33-40					1	
	0-48759	Plate, Deflector CDH 33-50						1
4	0-48747	Panel, Side CDH 27	1	1	1			
	0-48752	Panel, Side CDH 30				1		
	0-48760	Panel, Side CDH 33					1	1
5	0-48748	Panel, Access Side CDH 27	1	1	1			
	0-48753	Panel, Access Side CDH 30				1		
	0-48761	Panel, Access Side CDH 33					1	1
6	0-48764	Panel, Access CDH	1	1	1	1	1	1
7	0-48762	Bracket, Plumbing Support CDH	2	2	2	2	2	2
8	0-48674	Plug,window 2" Lexan	2	2	2	2	2	2
9	0-48675	Bushing,7/8 Nylon Black	2	2	2	2	2	2
10	0-48691	Plate, Serial Number, Heater	1	1	1	1	1	1
11	0-48421	Gasket, Adapter Plate	3	3	3	3	3	3
12	0-48110	Handle, Plastic	2	2	2	2	2	2
13	0-48711	Decal, Airflow	1	1	1	1	1	1
14	0-48693	Decal, Warning Access Door	1	1	1	1	1	1
15	0-48767	Bolt,U 5/16-18 x 1.38 x 2.19 zc	2	2	2	2	2	2
16	39-48112	Bolt, Hxwh Serrated Gr 5 5/16-18 x 3/4 zc	30	30	30	30	30	30
17	39-48113	Nut, Hex Flange Serrated 5/16"-18 zc	34	34	34	34	34	34
18	39-48114	Nut, Sq Retainer 5/16-18 zc	8	8	8	8	8	8
19	39-48299	Rivet, Pop 1/8 x .126-.187"	4	4	4	4	4	4
20	39-48160	Screw, Round Head Machine 5/16-18 x 1"	4	4	4	4	4	4
21	0-48783	Plate, Slot Cover”	2	2	2	2	2	2
22	39-48269	Bolt, Hxwh Serrated5 5/16-18x1-3/4 zc	2	2	2	2	2	2

Housing Assembly

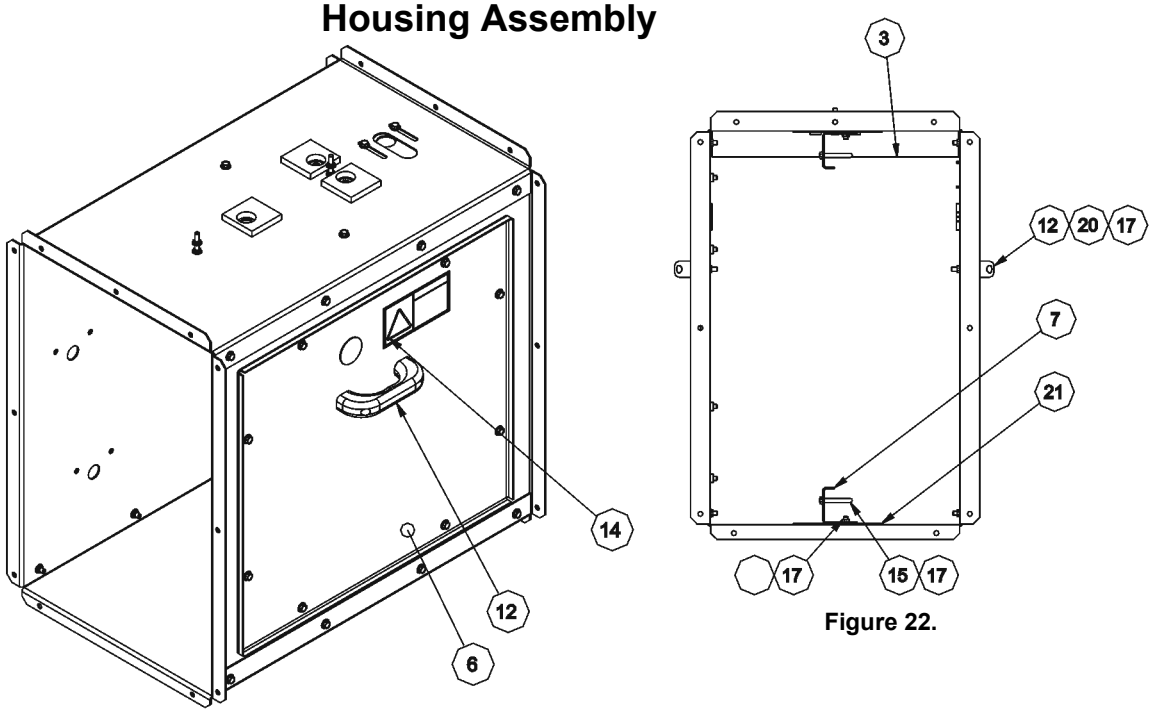


Figure 22.

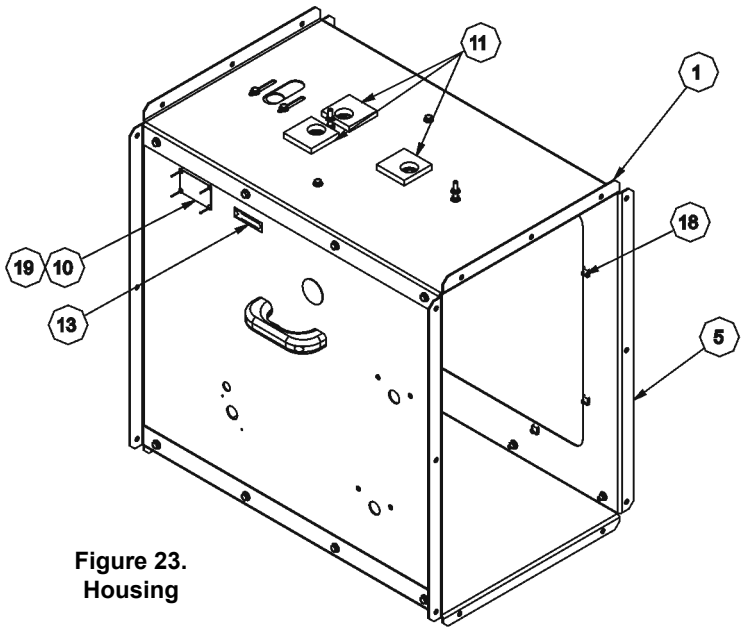


Figure 23.
Housing

Plumbing

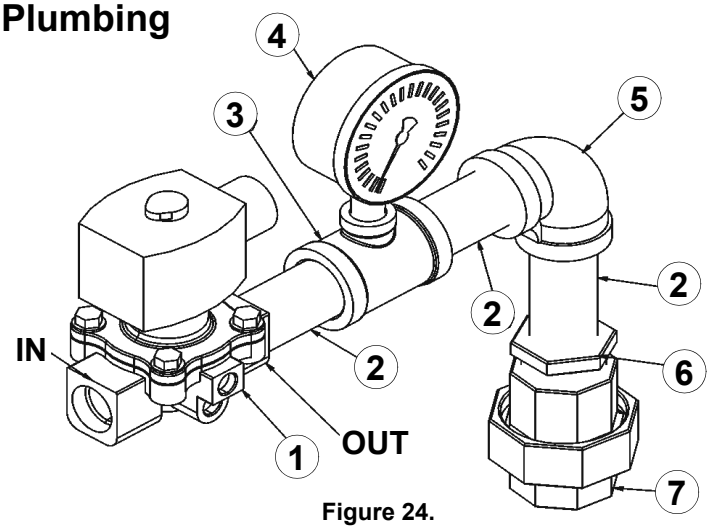


Figure 24.
Standard 3/4" Plumbing Assembly 0-48780

Item	Part No.	Description	Qty.
1	0-48638	Valve, Sol 3/4" Npt 120v	1
2	0-48647	Pipe, 3/4" x 2 1/2" Sch 40	3
3	0-48656	Tee, 3/4" x 3/4 x 1/4 Sch 40	1
4	0-48661	Gauge, 0-15 Psi 1/4npt Liq Filled	1
5	0-48651	Elbow, 3/4" Sch 40	1
6	0-48777	Bushing, 1 To 3/4 Sch 40	1
7	0-48775	Union, 1"	1

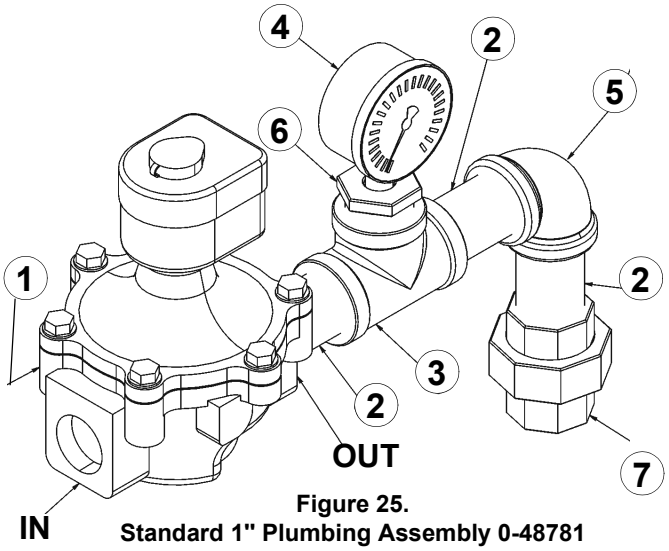


Figure 25.
Standard 1" Plumbing Assembly 0-48781

Item	Part No.	Description	Qty.
1	0-48639	Valve, Sol 1" Npt 120v	1
2	0-48788	Pipe, 1 x 2 1/2 Sch 40	3
3	0-48772	Tee, 1 x 3/4 X1/4 Sch 40	1
4	0-48661	Gauge,0-15 Psi 1/4npt Liq Filled	1
5	0-48765	Elbow, 1" Sch 40	1
6	0-48661	Bushing, 1 To 3/4 Sch 40	1
7	0-48775	Union, 1"	1

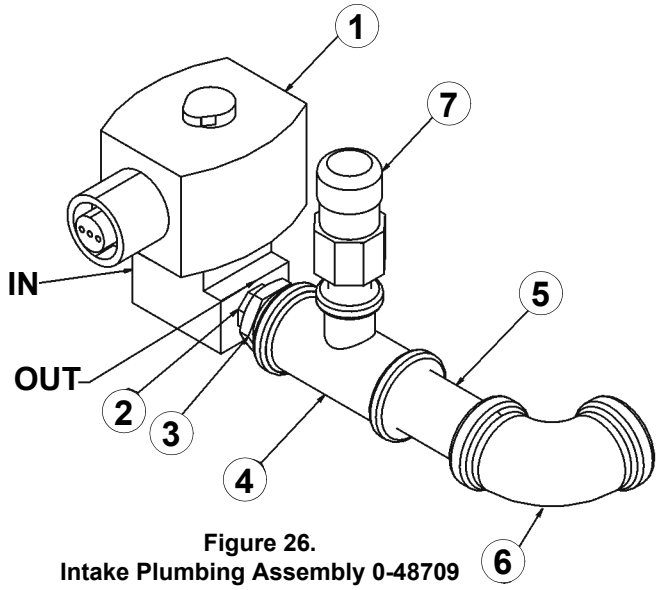


Figure 26.
Intake Plumbing Assembly 0-48709

Item	Part No.	Description	Qty.
1	0-48636	Valve, Sol 1/4 Npt 120v (Liquid)	1
2	0-48658	Nipple, 1/4 X 1 1/2 Sch 80	1
3	0-48654	Bushing, 1/2 To 1/4 Sch 80	1
4	0-48655	Tee, 1/2 X 1/2 X 1/4 Sch 80	1
5	0-48648	Pipe, 1/2 X 2 Sch 80	1
6	0-48652	Elbow, 1/2 Sch 80	1
7	0-48643	Valve, Relief 1/4 Npt 300 psi	1

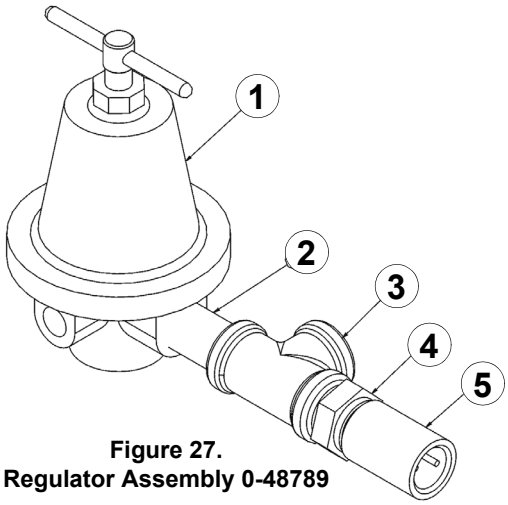


Figure 27.
Regulator Assembly 0-48789

Item	Part No.	Description	Qty.
1	0-48642	Regulator, 1/2 npt 30 psi	1
2	0-48648	Pipe, 1/2 x 2 Sch 80	1
3	0-48657	Tee, 1/2 x 1/2 x 1/2 Sch 080	1
4	0-48680	Thermostat, Hi-Limit 210F 1/2 npt x 1.2 npt	1
5	0-48682	Coupling, 1/2 Sch 40	1

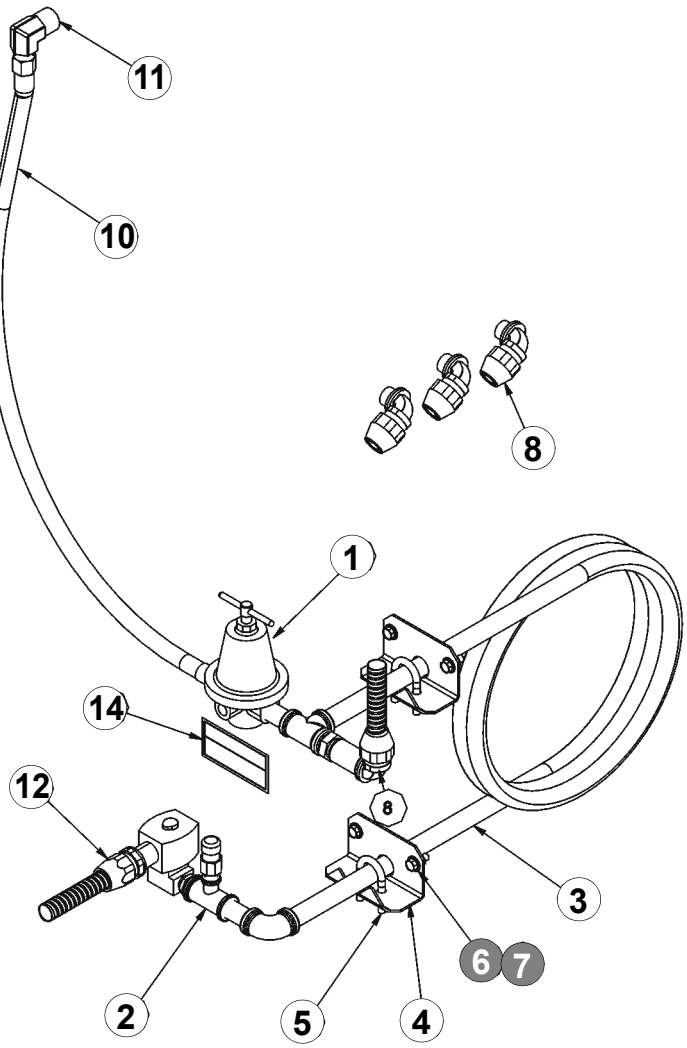


Figure 28.
CDH Vaporizer Package 0-48778

Item	Part No.	Description	Qty
1	0-48708	Assembly, Regulator AXH	1
2	0-48709	Assembly, Intake Plumbing AXH	1
3	0-48561	Coil, Vaporizer	1
4	0-48763	Bracket, Vaporizer Support CDH	2
5	0-48677	Bolt, U 5/16"-18 x 1 x 2.19 zc	2
6	39-48112	Bolt, Hex wh Serrated 5 5/16-18 x 3/4" zc	4
7	39-48113	Nut, Hex Flange Serrated 5/16"-18 zc”	8
8	0-48263	Fitting, Conduit, 1/2”” Elbow	4
9	0-48223	Conduit,flex 1/2" X 29" Lg	1
10	0-48662	Hose, LP 1/2 x 36lg 1/2" mpt x 1/2" Fem Sw	1
11	0-48787	Adapter, 3/4 npt x 1/2msae Elbow 5405 x 8 x 12"	1
12	0-48249	Fitting, Conduit,1/2" Srt	1
13	0-48223	Conduit, Flex 1/2" x 3" Lg	1
14	0-48694	Decal, LP Fuel Supply	1
16	0-48223	Conduit, Flex 1/2"	2

Burner Assemblies

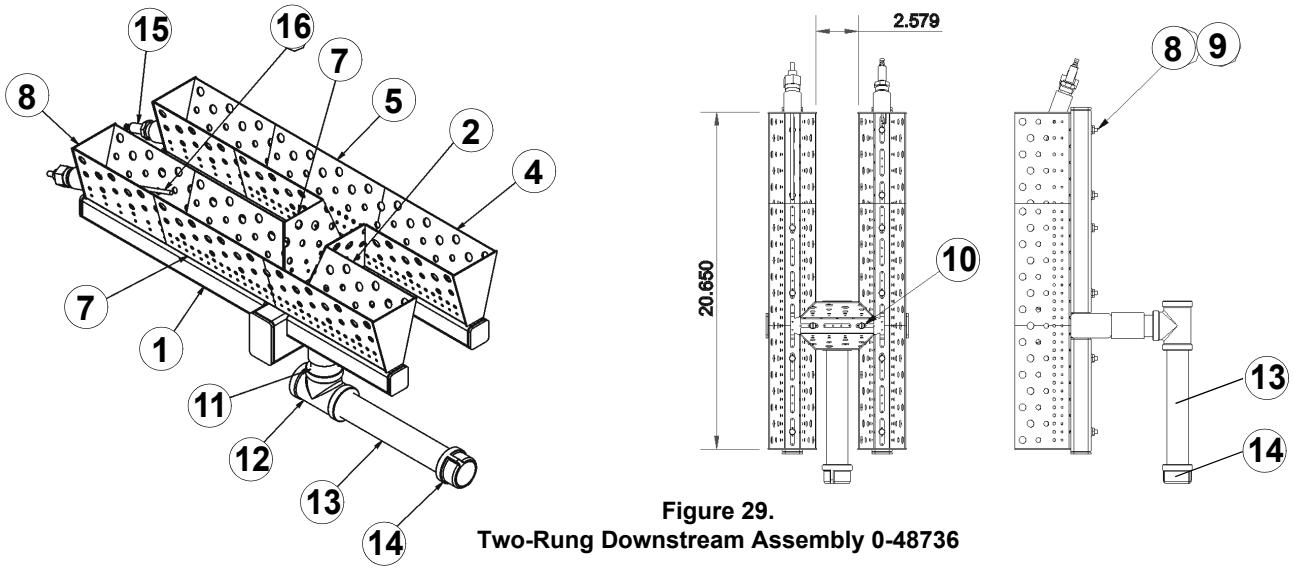
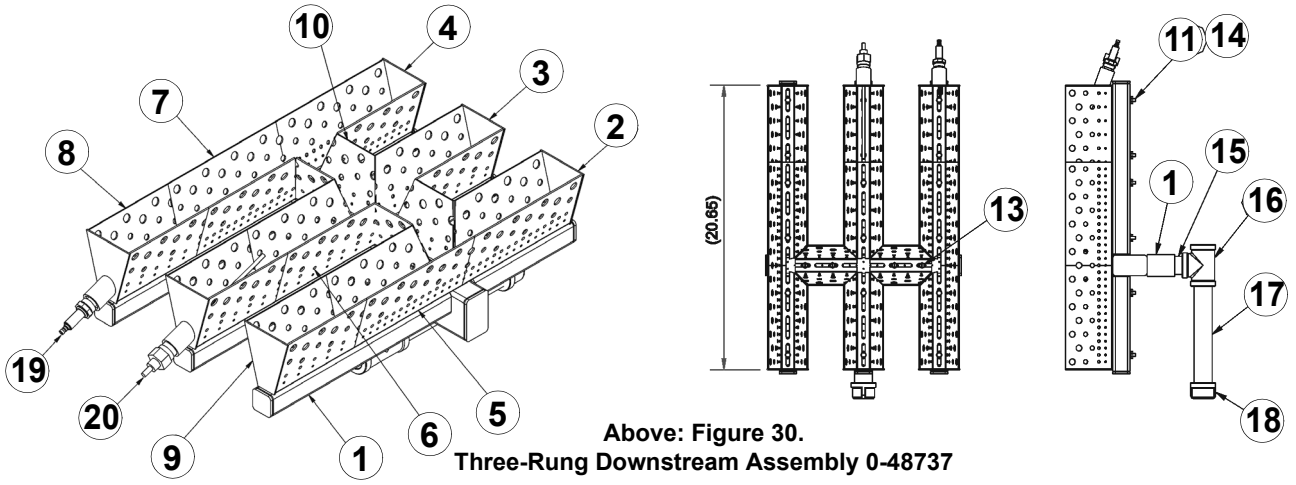


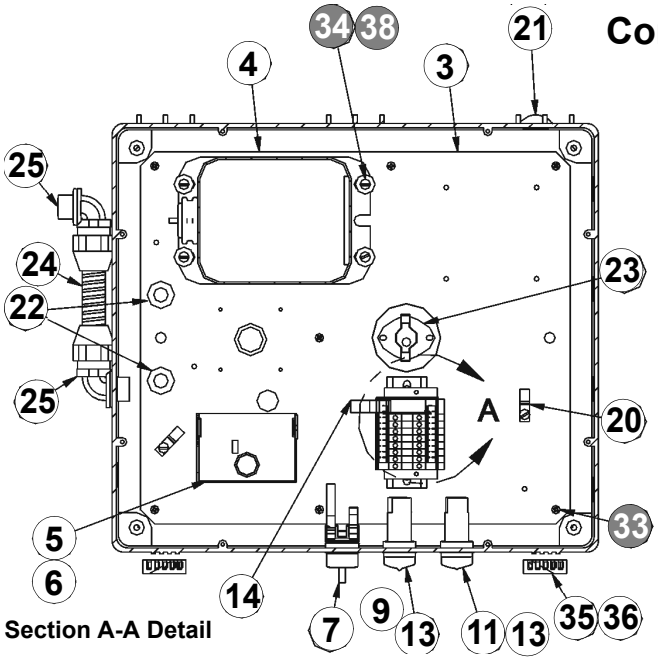
Figure 29.
Two-Rung Downstream Assembly 0-48736

Item	Part No.	Description	Qty
1	0-48734	Weldment, Two-Rung Downstream	1
2	1190-00034	Weldment - Baffle - End - LH	1
3	1190-00035	Weldment - Baffle - End - RH	1
4	1190-00033	Baffle - End - LH - Burner - 7.50 Lg	1
5	1190-00032	Baffle - End - RH - Burner - 7.50 Lg	1
6	0-48784	Weldment, Baffle Top w/Coupling	2
7	1151-00004	Manifold Baffle	1
8	2311-00006	Screw, 10-24 x 1.75"	12
9	2363-00021	Nut, Hex Flg Serrated 10-24	12
10	2331-00013	Screw,12-24 x .1/2" Self Tapping	2
11	0-48773	Nipple, 1 In Cl Sch 40	1
12	0-48772	Tee, 1 x 1 x 1 Sch 40	1
13	0-48770	Pipe, 1 x 8 Sch 40	1
14	0-48769	Cap, 1" Sch 40	1
15	2403-00003	Ignitor,1-64-1 (.5 Npt)	1
16	2-48635	Rod, Flame 1/2" Npt x 6 Fres-2-6	1



Above: Figure 30.
Three-Rung Downstream Assembly 0-48737

Item	Part No.	Description	Qty
1	0-48735	Weldment, Three-Rung Downstream	1
2	1190-00034	Weldment - Baffle - End - LH	1
3	1190-00027	Weldment - Baffle - Short - End	1
4	1190-00035	Weldment - Baffle - End - RH	1
5	1190-00032	Baffle - End - RH - Burner - 7.50 Lg	1
6	1190-00026	Baffle - Short - End - Burner	1
7	1190-00033	Baffle - End - LH - Burner - 7.50 Lg	1
8	0-48784	Weldment, Baffle Top w/Coupling	2
9	0-48786	Weldment, Baffle Top”	1
10	1151-00004	Manifold Baffle	2
11	2311-00006	Screw,10-24 x 1.75"	2
12	2311-00006	Screw,10-24 x 1.75"	16
13	2331-00013	Screw,12-24 x .5 Self Tapping	4
14	2363-00021	Nut, Hx Flg Serrated 10-24	16
15	0-48773	Nipple, 1 In Cl Sch 40	1
16	0-48772	Tee, 1 x 1 x 1 Sch 40	1
17	0-48770	Pipe, 1 x 8 Sch 40”	1
18	0-48769	Cap, 1" Sch 40	1
19	2403-00003	Ignitor,1-64-1 (.5 Npt)	1
20	2-48635	Rod, Flame 1/2 Npt X 6 Fres-2-6	1



Section A-A Detail

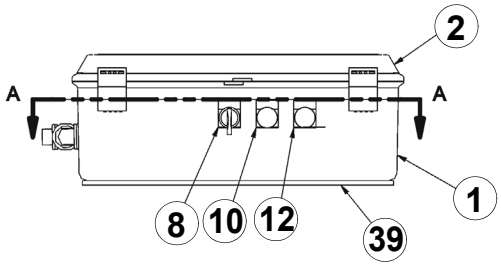
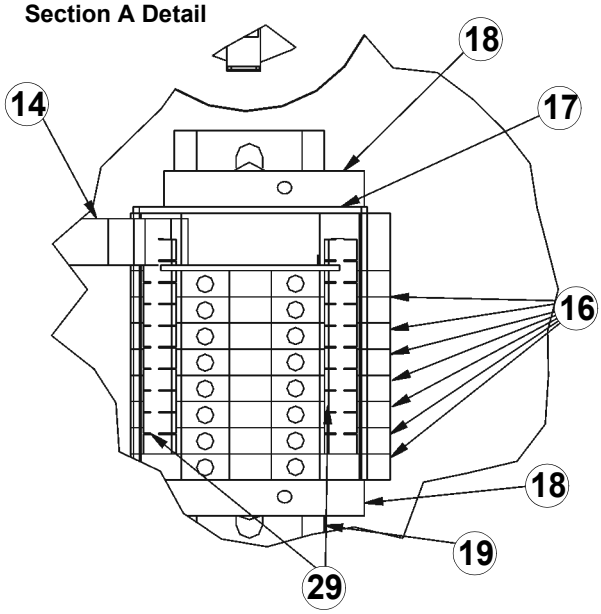


Figure 31.
Control Assembly 0-48779

Section A Detail



Controls

Item	Part No.	Description	Qty
1	0-48094-3	Box, Elec Ax	1
2	0-48095	Lid, Elec Box 14x16 Blk	1
3	0-48627	Panel, Elec. Mounting, AXH	1
4	2502-00001	Xfmr, Ign 175va 120v-60000v 60h	1
5	0-48620	Base, Burner Control	1
6	0-48696	Control, Burner 115v Flame Rect LME69	1
7	0-48698	Switch, Assy Selector 2nc, 1no	1
8	0-48664	Nameplate, OFF/ON	1
9	0-48667	Operator, Pilot Light Green	1
10	0-48665	Nameplate, Power ON	1
11	0-48668	Operator, Pilot Light Red	1
12	0-48666	Nameplate, FAULT	1
13	0-48669	Lamp, Led 120 V White	2
14	0-48233	Terminal, Fuse 15a 1/4 x 1 1/4"	1
15	0-48236	Fuse,5a 250v 1/4 x 1-1/4"	1
16	0-48234	Terminial, 20a 26-12ga	8
17	0-48235	Barrier, End Terminial	1
18	0-48237	Clamp, End *35mm*	2
19	0-48704	Track, 35mm x 3.88"	1
20	0-48328	Lug, Ground 6-14ga	2
21	0-48272	Plug, Liquid Tight Knock-seal 7/8"	1
22	0-48675	Bushing, Snap Heyco 1/2"	2
23	0-48679	Thermostat, Hi Limit 200f Man Reset	1
24	0-48223	Conduit, Flex 1/2"	80"
25	0-48263	Fitting, Conduit, 1/2" Elbow	2
26	0-48357	Wire 10 Ga Green Thhn	100"
27	0-48361	Wire 16ga Black Thw	100"
28	0-48360	Wire 16ga White Thw	100"
29	0-48670	Label,white Unprinted (10) 5 *mm*	2
30	0-48692	Decal, Diagram Heater	1
31	0-48354	Decal, Electrical Hazard	1
32	0-48187	Decal, BROCK® 12"	1
33	39-48300	Screw, Pan #8-32 x 1/2"	8
34	39-48301	Screw, Pan 10-32 x 3/8"	13
35	30862	Latch, Box (Grey)	2
36	30863	Pivot, Latch (Grey)	2
37	34767	Seal, Neop Closed Cell .125"	5 ft
38	6723	Wshr, .203 x .625 x .044 c/z	4
39	0-48502	Gasket, 1/4 x 1/2 x 35ft Pvc Foam	63"
40	0-48360	Wire 16ga White Thw	60"
41	0-48359	Wire 16ga Red Thw	60"

Propane Vapor and Natural Gas CDH Downstream Heaters

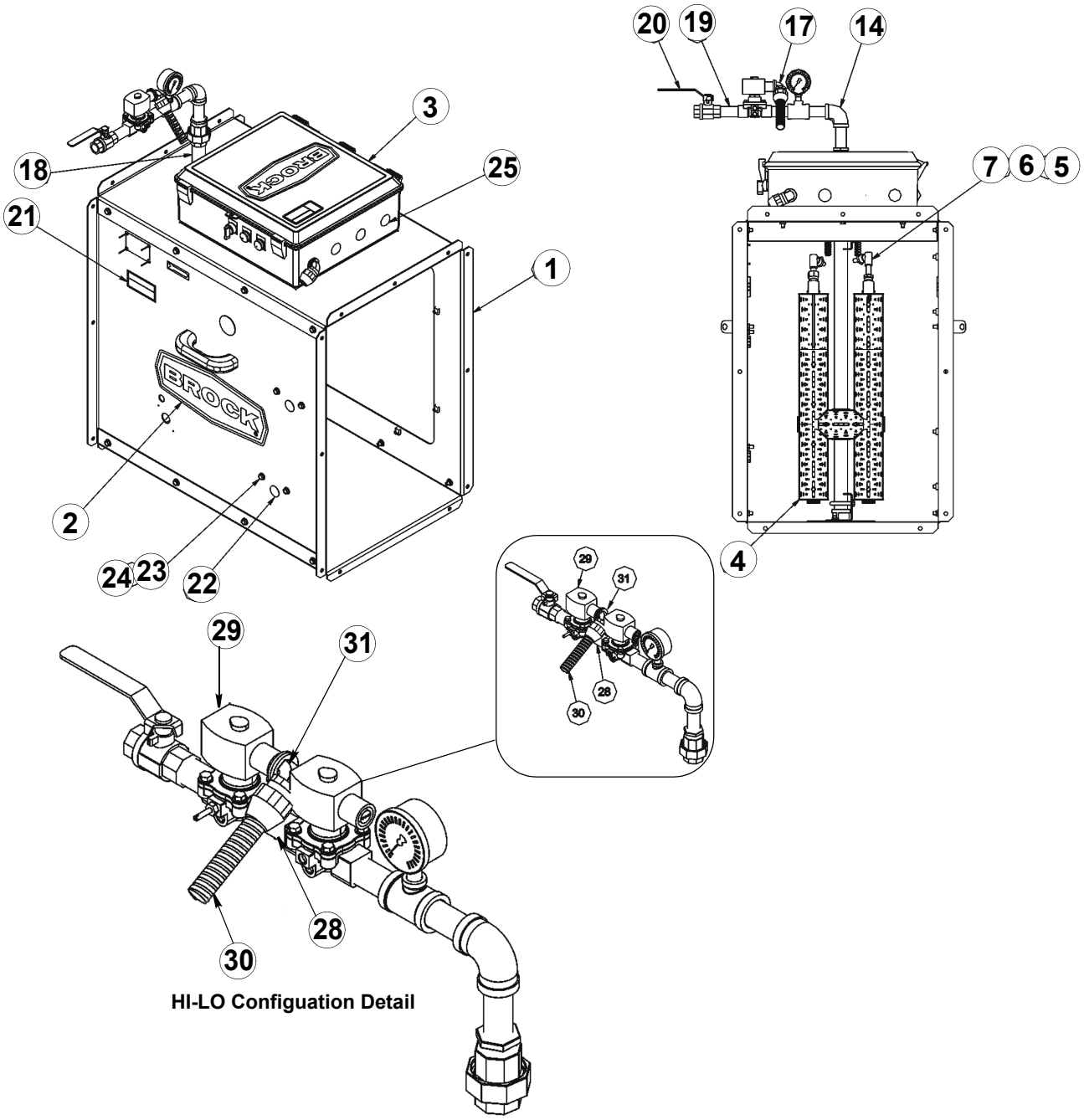


Figure 32.
Propane Vapor and Natural Gas CDH Downstream Heaters

Propane Vapor and Natural Gas CDH Downstream Heaters

Item	Part No.	Description	CDH2-10-N/7PV	CDH27-10-N/PV-HL	CDH27-15-N/PV	CDH27-15-N/PV-HL	CDH27-20-N/PV	CDH27-20-N/PV-HL	CDH30-N/PV	CDH30-N/PV-HL	CDH33-40-N/PV	CDH33-40-N/PV-HL	CDH33-50-N/PV	CDH33-50-N/PV
			Qty.											
1	CDH27-10-HP	Pkg, Heater Housing CDH27-10	1	1										
	CDH27-15-HP	Pkg, Heater Housing CDH27-15			1	1								
	CDH27-20-HP	Pkg, Heater Housing CDH27-20					1	1						
	CDH30-HP	Pkg, Heater Housing CDH30							1	1				
	CDH33-40-HP	Pkg, Heater Housing CDH33-40									1	1		
	CDH33-50-HP	Pkg, Heater Housing CDH33-50											1	1
2	0-48188	Decal, BROCK® 16"	2	2	2	2	2	2	2	2	2	2	2	2
3	0-48779	Assembly, Control Box CDH	1	1	1	1	1	1	1	1	1	1	1	1
4	0-48736	Assembly, Burner Two-rung Downstream	1	1	1	1	1	1						
	0-48737	Assembly, Burner Three-rung Downstream							1	1	1	1	1	1
5	0-48671	Conduit, 3/8" Flex Alum	1.6'	1.6'	1.6'	1.6'	1.6'	1.6'	1.6'	1.6'	1.6'	1.6'	1.6'	1.6'
	0-48671	Conduit, 3/8" Flex Alum	1.6'	1.6'	1.6'	1.6'	1.6'	1.6'	1.6'	1.6'	1.6'	1.6'	1.6'	1.6'
6	0-48672	Fitting, Str 3/8" Flex Alum Conduit	4	4	4	4	4	4	4	4	4	4	4	4
7	2403-00013	Cap, Spark Plug	2	2	2	2	2	2	2	2	2	2	2	2
8	0-48361	Wire 16ga Black Thw	25"	25"	25"	25"	25"	25"	25"	25"	25"	25"	25"	25"
9	2518-00001	Wire, Ignition	2'	2'	2'	2'	2'	2'	2'	2'	2'	2'	2'	2'
10	0-48366	Terminal, Fork #8 18-14ga Insul	1	1	1	1	1	1	1	1	1	1	1	1
11	0-48357	Wire 10 Ga Green Thhn	13"	13"	13"	13"	13"	13"	13"	13"	13"	13"	13"	13"
12	0-48368	Terminal, Ring 5/16 #10-12ga	2	2	2	2	2	2	2	2	2	2	2	2
13	0-48342	Tie, Wire	2	2	2	2	2	2	2	2	2	2	2	2
14	0-48780	Assembly, Standard Plumbing CDH 3/4"	1	1	1	1	1	1						
	0-48781	Assembly, Standard Plumbing CDH 1"							1	1	1	1	1	1
15	0-48776-141	Orifice,.141 x3/4 npt Brass	1	1										
	0-48776-172	Orifice, .172 x 3/4 npt Brass	1	1	1	1	1	1						
	0-48776-203	Orifice, .203 x 3/4 npt Brass			1	1	1	1	1	1				
	0-48776-219	Orifice, .219 x 3/4 npt Brass	1	1										
	0-48776-250	Orifice, .250 x 3/4 npt Brass							1	1	1	1	1	1
	0-48776-281	Orifice, .281 x 3/4 npt Brass	1	1	1	1	1	1						
	0-48776-313	Orifice, .313 x 3/4 npt Brass							1	1	1	1	1	1
	0-48776-344	Orifice, .344 x 3/4 npt Brass									1	1		
	0-48776-359	Orifice, .359 x 3/4 npt Brass			1	1	1	1						
	0-48776-375	Orifice, .375 x 3/4 npt Brass											1	1
	0-48776-406	Orifice, .406 x 3/4 npt Brass							1	1				
	0-48776-438	Orifice, .438 x 3/4 npt Brass									1	1		
	0-48776-469	Orifice, .469 x 3/4 npt Brass											1	1
16	0-48223	Conduit, Flex 1/2"	33"	33"	33"	33"	33"	33"	33"	33"	33"	33"	33"	33"
17	0-48263	Fitting, Conduit, 1/2" Elbow	2	2	2	2	2	2	2	2	2	2	2	2
18	0-48771	Pipe, 1 x 24 Sch 80 3/4" npt Tap One End	1	1	1	1	1	1	1	1				
	0-48785	Pipe, 1 x 30 Sch 80 3/4 HI/LO Tap One End									1	1	1	1
19	0-48647	Pipe, 3/4 x 2 1/2" Sch 40	1	1	1	1	1	1						
	0-48788	Nipple, 1 x 2 1/2 Sch 40							1	1	1	1	1	1
20	0-48684	Valve, Ball 3/4 " Cga	1	1	1	1	1	1						
	0-48746	Valve, Ball 1"Cga							1	1	1	1	1	1
21	0-48695	Decal, PV/N Fuel Supply	1	1	1	1	1	1	1	1	1	1	1	1
22	0-48690	Plug, 1 1/8" Nylon Black	2	2	2	2	2	2	2	2	2	2	2	2
23	39-48112	Bolt, HXWH Serrated 5/16-18 x 3/4" zc Gr.5	4	4	4	4	4	4	4	4	4	4	4	4
24	39-48113	Nut, Hex Flange Serrated 5/16-18 zc”	4	4	4	4	4	4	4	4	4	4	4	4
25	0-48272	Plug, Liquid Tight Knock-seal 7/8"	3	2	3	2	3	2	3	2	3	2	3	2
	HI-LO Fire													
28	0-48647	Pipe, 3/4 x 2 1/2" Sch 40		1		1		1						
	0-48788	Nipple, 1 x 2 1/2" Sch 40								1		1		1
29	0-48640	Valve, Sol HI/LO 3/4 npt 120v		1		1		1						
	0-48641	Valve, Sol HI/LO 1 npt 120v								1		1		1
30	0-48223	Conduit, Flex 1/2"		33"		33"		33"		33"		33"		33"
31	0-48263	Fitting, Conduit, 1/2"Elbow		2		2		2		2		2		2
32	0-48324	Carton, AX24 / AX26 / AX28	1	1	1	1	1	1	1	1	1	1	1	1
33	0-48325	Lid, Ax24 / Ax26 / AX28	1	1	1	1	1	1	1	1	1	1	1	1
34	0-48427	Skid, AX24 / AX26 / AX28	1	1	1	1	1	1	1	1				
35	0-48586	Skid, Centrifugal Fans									1	1	1	1

Liquid Propane
CDH Downstream Heaters

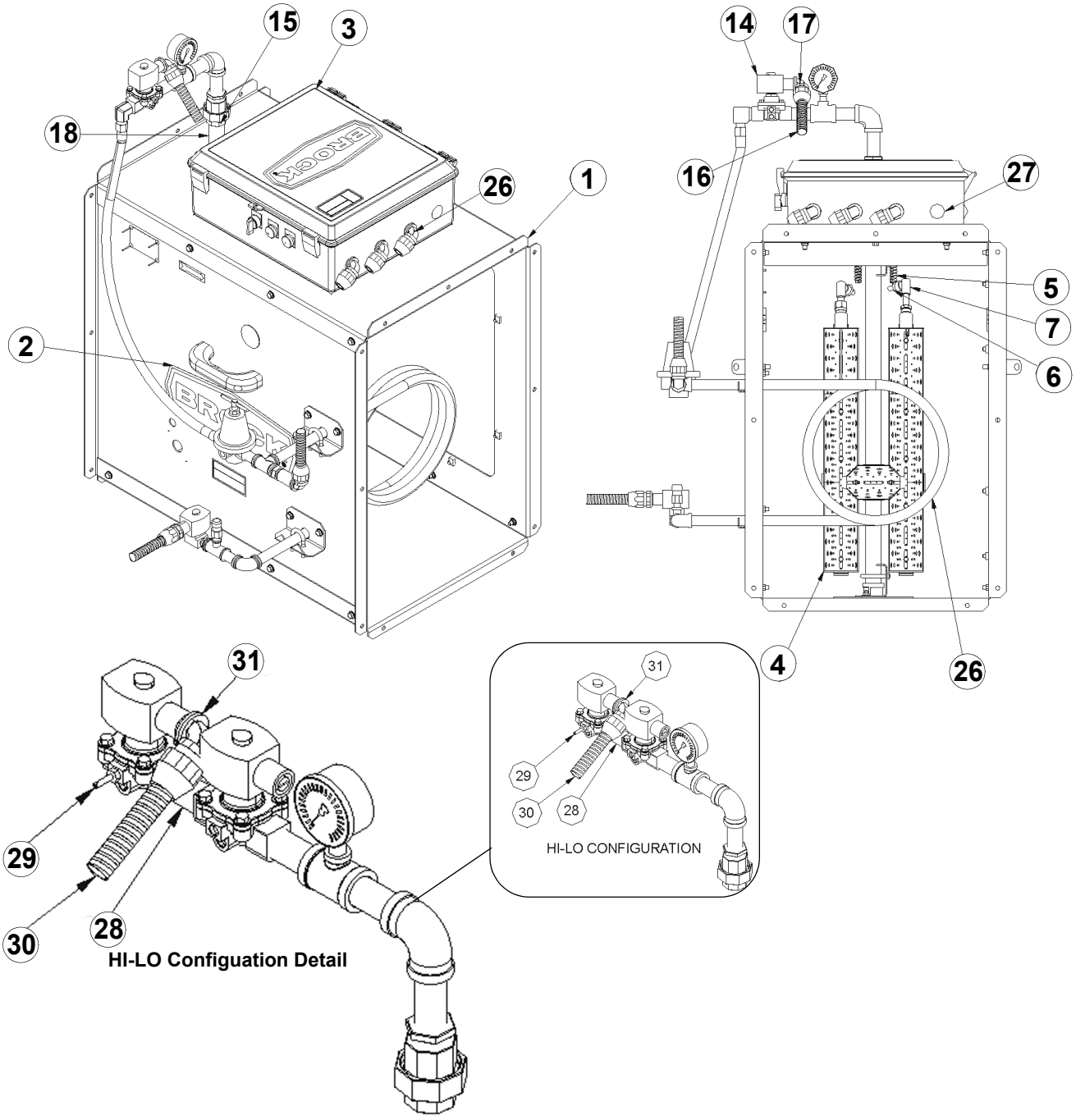


Figure 33.
Liquid Propane CDH Downstream Heaters

4

Liquid Propane
CDH Downstream Heaters

Item	Part No.	Description	Units	CDH27-10-LP	CDH27-10-LP-HL	CDH27-15-LP	CDH27-15-LP-HL	CDH27-20-LP	CDH27-20-LP-HL	CDH30-LP	CDH30-LP-HL	CDH33-40-LP	CDH33-40-LP-HL	CDH33-50-LP	CDH33-50-LP-L
1	CDH27-10-HP	Pkg, Heater Housing CDH27-10		1	1										
	CDH27-15-HP	Pkg , Heater Housing CDH27-15				1	1								
	CDH27-20-HP	Pkg, Heater Housing CDH27-20						1	1						
	CDH30-HP	Pkg, Heater Housing CDH30								1	1				
	CDH33-40-HP	Pkg, Heater Housing CDH33-40										1	1		
	CDH33-50-HP	Pkg, Heater Housing CDH33-50												1	1
2	0-48188	Decal, BROCK® 16"		2	2	2	2	2	2	2	2	2	2	2	2
3	0-48779	Assy, Control Box CDH		1	1	1	1	1	1	1	1	1	1	1	1
4	0-48736	Assembly, Burner Two-Rung Downstream		1	1	1	1	1	1						
	0-48737	Assembly, Burner Three-Rung Downstream								1	1	1	1	1	1
5	0-48671	Conduit, 3/8 Flex Alum	ft	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
	0-48671	Conduit, 3/8 Flex Alum	ft	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
6	0-48672	Fitting, Str 3/8 Flex Alum Conduit		4	4	4	4	4	4	4	4	4	4	4	4
7	2403-00013	Ca, Spark Plug		2	2	2	2	2	2	2	2	2	2	2	2
8	0-48361	Wire 16ga Black Thw	in	25	25	25	25	25	25	25	25	25	25	25	25
9	2518-00001	Wire, Ignition	ft	2	2	2	2	2	2	2	2	2	2	2	2
10	0-48366	Terminal, Fork #8 18-14ga Insul		1	1	1	1	1	1	1	1	1	1	1	1
11	0-48357	Wire 10 Ga Green Thhn	in	13	13	13	13	13	13	13	13	13	13	13	13
12	0-48368	Terminal, Ring 5/16 #10-12ga		2	2	2	2	2	2	2	2	2	2	2	2
13	0-48342	Tie, Wire		2	2	2	2	2	2	2	2	2	2	2	2
14	0-48780	Assembly, Standard Plumbing CDH 3/4"		1	1	1	1	1	1						
	0-48781	Assembly, Standard Plumbing CDH 1"								1	1	1	1	1	1
15	0-48776-141	Orifice, .141 x 3/4npt Brass		1	1										
	0-48776-172	Orifice, .172 x 3/4npt Brass				1	1	1	1						
	0-48776-203	Orifice, .203 x 3/4npt Brass								1	1				
	0-48776-219	Orifice, .219 x 3/4npt Brass		1	1										
	0-48776-250	Orifice, .250 x 3/4npt Brass										1	1	1	1
	0-48776-281	Orifice, .281 x 3/4npt Brass				1	1	1	1						
	0-48776-313	Orifice, .313 x 3/4npt Brass								1	1				
	0-48776-344	Orifice, .344 x 3/4npt Brass										1	1		
	0-48776-375	Orifice, .375 x 3/4npt Brass												1	1
16	0-48223	Conduit, Flex 1/2"	in	33	33	33	33	33	33	33	33	33	33	33	33
17	0-48263	Fitting Conduit, 1/2" Elbow		2	2	2	2	2	2	2	2	2	2	2	2
18	0-48771	Pipe, 1 x 24 Sch 80 3/4 Npt Tap One End		1	1	1	1	1	1	1	1				
	0-48785	Pipe, 1 x 30 Sch 80 3/4 Npt Tap One End										1	1	1	1
26	0-48778	Package, Vaporizer CDH		1	1	1	1	1	1	1	1	1	1	1	1
27	0-48272	Plug, Liquid Tight Knock-seal 7/8"		1		1		1		1		1		1	
	HI-LO Fire														
28	0-48647	Pipe, 3/4 x 2 1/2 Sch 40			1		1		1						
	0-48788	Nipple, 1 x 2 1/2 Sch 40									1		1		1
29	0-48640	Valve, sol Hi/lo 3/4 Npt 120v			1		1		1						
	0-48641	Valve, sol Hi/lo 1 Npt 120v									1		1		1
30	0-48223	Conduit, Flex 1/2"	in		33		33		33		33		33		33
31	0-48263	Fitting, Conduit, 1/2" Elbow			2		2		2		2		2		2
32	0-48324	Carton, AX24 / AX26 / AX28		1	1	1	1	1	1	1	1	1	1	1	1
33	0-48325	Lid, AX24 / AX26 / AX28		1	1	1	1	1	1	1	1	1	1	1	1
34	0-48427	Skid, AX24 / AX26 / AX28		1	1	1	1	1	1	1	1				
35	0-48586	Skid, Centrifugal Fans										1	1	1	1

Models and Specifications

Downstream Heater Model Number	Fuel Type	Centrifugal Fan Model	BTU Range	Weight (lbs.)
CDH27-10-N/PV	Nat Gas & Propane Vapor On/Off	LC27-10	1,200,000-2,100,000	140
CDH27-10-N/PV-HL	Nat Gas & Propane Vapor - Hi-Lo	LC27-10	1,200,000-2,100,000	144
CDH27-10-LP	Liquid Propane - On/Off	LC27-10	1,200,000-2,100,000	179
CDH27-10-LP-HL	Liquid Propane - Hi-Low	LC27-10	1,200,000-2,100,000	183
CDH27-15-N/PV	Nat Gas & Propane Vapor - On/Off	LC27-15	1,600,000-2,800,000	140
CDH2715-N/PV-HL	Nat Gas & Propane Vapor - Hi-Lo	LC27-15	1,600,000-2,800,000	144
CDH2715-LP	Liquid Propane - On/Off	LC27-15	1,600,000-2,800,000	179
CDH2715-LP-HL	Liquid Propane - Hi-Low	LC27-15	1,600,000-2,800,000	183
CDH2720-N/PV	Nat Gas & Propane Vapor - On/Off	LC27-20	1,750,000-3,100,000	140
CDH2720-N/PV-HL	Nat Gas & Propane Vapor - Hi-Lo	LC27-20	1,750,000-3,100,000	144
CDH2720-LP	Liquid Propane - On/Off	LC27-20	1,750,000-3,100,000	179
CDH2720-LP-HL	Liquid Propane - Hi-Low	LC27-20	1,750,000-3,100,000	183
CDH30-N/PV	Nat Gas & Propane Vapor- On/Off	LC30-25/30	2,300,000-4,000,000	156
CDH30-N/PV-HL	Nat Gas & Propane Vapor - Hi-Lo	LC30-25/30	2,300,000-4,000,000	160
CDH30-LP	Liquid Propane - On/Off	LC30-25/30	2,300,000-4,000,000	182
CDH30-LP-HL	Liquid Propane - Hi-Low	LC30-25/30	2,300,000-4,000,000	187
CDH33-40-N/PV	Nat Gas & Propane Vapor On/Off	LC33-40	3,000,000-5,000,000	260
CDH33-40-N/PV-HL	Nat Gas & Propane Vapor- Hi-Low	LC33-40	3,000,000-5,000,000	265
CDH33-40-LP	Liquid Propane-On/Off	LC33-40	3,000,000-5,000,000	280
CDH33-40-LP-HL	Liquid Propane-Hi-Low	LC33-40	3,000,000-5,000,000	285
CDH33-50-N/PV	Nat Gas & Propane Vapor On/Off	LC33-50	3,000,000-5,000,000	265
CDH33-50-N/PV-HL	Nat Gas & Propane Vapor-Hi-Low	LC33-50	3,000,000-5,000,000	270
CDH33-50-LP	Liquid Propane-On/Off	LC33-50	3,000,000-5,000,000	285
CDH33-50-LP-HL	Liquid Propane-Hi-Low	LC33-50	3,000,000-5,000,000	290

*Thermostat Control is required to operate all Heaters.

HT-200 Heater Theromostat Control for all Heater operations

HLT-250 Hi-Limit Thermostat Control
(To be used with Hi-Lo and Modulating Valve Heaters)

HMV-3/4 Moldulating Valves (can be added in the field or factory-installed)
(Add to the list price)

Liquid Propane Heater comes standard with an Internal Vaporizer.
Regulators are **not** included with Natural Gas or Propane Vapor Heaters.
Heaters are designed for a 115-volt connection. If the Fan does not have 115-volt controls, a Step-down Transformer may be required.
BROCK® Fans are equipped with a 100va Control Transformer.
460v and 575v BROCK® Fans: the Transformer must be changed to a 250va.

Heater Dimensions

See Page 16 in this Manual.

Different by Design™

BROCK GRAIN SYSTEMS
A Division of CTB Inc.

Grain Conditioning Division
1750 W. State Road 28 • Frankfort IN 46041
Phone (765) 654-8517 • Fax (765) 654-8510
Toll Free (800) 541-7900
e-mail: beard@graindryers.com • Internet: www.graindryers.com
and
P.O. Box 2000 • Milford, Indiana 46542-2000 • U.S.A.
Phone (574) 658-4191 • Fax (574) 658-4133
e-mail: brock@brockmfg.com • Internet: http//www.brockmfg.com
and
7400 East Thirteenth Street • Kansas City, Missouri 64126 • U.S.A.
Phone (816) 968-6101
Fax (816) 968-6272 TLX: 6841105

Printed in the U.S.A.

All specifications subject to change without notice.

Changes this issue:

Most changes are a result of the new Burner Board 0-48696 LME69.

Changes last issue: updated to Owner/Operator's Manual.