

FROST *Fighter* PORTABLE HEATERS

INDIRECT FIRED SPACE HEATERS OIL FIRED



**MODEL IDH400QR
MODEL IDH400QRC**

Installation - Operation/Maintenance Instructions and Parts List

READ INSTRUCTIONS PRIOR TO STARTING HEATERS

FROST *Fighter*
PORTABLE HEATERS



FROST FIGHTER INC.
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REV 1.4.4
Jan. 2021

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FROSTFIGHTER WARRANTY

Frost Fighter Inc. warrants the Frostfighter heater to be free from defects in workmanship and materials for a period of twelve (12) months from date of initial service not to exceed fifteen (15) months from date of shipment.

If during the warranty period, the heat exchanger fails under normal use and service due to a defect in material or workmanship said heat exchanger will be repaired or replaced free of charge F.O.B. the Winnipeg Factory..

All mechanical and electrical components are covered by a one (1) year limited warranty. Normal maintenance items are excluded under the warranty. The warranty does **NOT** include any freight, labor or sales taxes incurred by the purchaser and is subject to the following conditions:

1. The heater shall be operated in accordance with the manufacturer's operating and maintenance manual.
2. The heater shall be subject to normal use in service and shall not have been misused, neglected, altered or otherwise damaged.
3. The unit shall be operated within the rated capacities and with the prescribed fuel.
4. The unit has not been allowed to exceed its proper temperature limits due to control malfunction or inadequate air circulation.
5. There is no evidence that the unit has been subject to tampering or deliberate destruction.
6. The heat exchanger shows no signs of an implosion or explosion.

No representative of Frost Fighter Inc., nor any of its distributors or dealers, is authorized to assume for Frost Fighter Inc. any other obligations or liability in connection with this product, nor alter the terms of the warranty in any way. This warranty is limited to the express provisions contained herein and does not extend to liability for labor costs incurred in replacing defective parts.

Parts can be obtained from Frost Fighter Inc, Winnipeg, Manitoba on the basis that credit will be issued if the defective parts returned qualify for replacement pursuant to the terms and conditions of this warranty. Authorization to return any alleged defective parts must be first obtained from the factory prior to transporting the part. A R.G.A.# must be provided from an Frost Fighter Inc representative. The transportation charges for the alleged defective part must be prepaid by the owner. Frost Fighter Inc. will not accept charges for parts purchased unless the conditions of this warranty have been satisfied and prior authorization to purchase the parts has been received from the factory.



100-1500 NOTRE DAME WINNIPEG, MANITOBA
R3E 0P9, (204) 775-8252

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SPECIFICATIONS

MODEL	IDH400QR	IDH400QRC
INPUT	350,000 BTU/HR	400,000 BTU/HR
MAXIMUM NOZZLE SIZE	2.00 USGPH 45' B (SOLID)	2.25 USGPH 45' B (SOLID)
PUMP PRESSURE	140 P.S.I. MAXIMUM	155 P.S.I. MAXIMUM
FUEL TANK CAP.	35 IMP GALS. 42 US GALS.	35 IMP GALS. 42 US GALS.
ELECTRICAL SUPPLY	115 VOLT 15 AMP	115 VOLT 15 AMP
HEATED AIR (W/O DUCT)	2850 CFM	2850 CFM
APROX. RUN TIME	17 HOURS	15 HOURS
APPROVAL AGENCY		
DRY WEIGHT	510 LBS.	510 LBS.

PLEASE REFER TO PAGE 6 IF KEROSENE IS NOT BEING USED. Flue size-6" on all units

NOTE: -These heaters are intended for use primarily as temporary heating of buildings under construction, alteration or repair

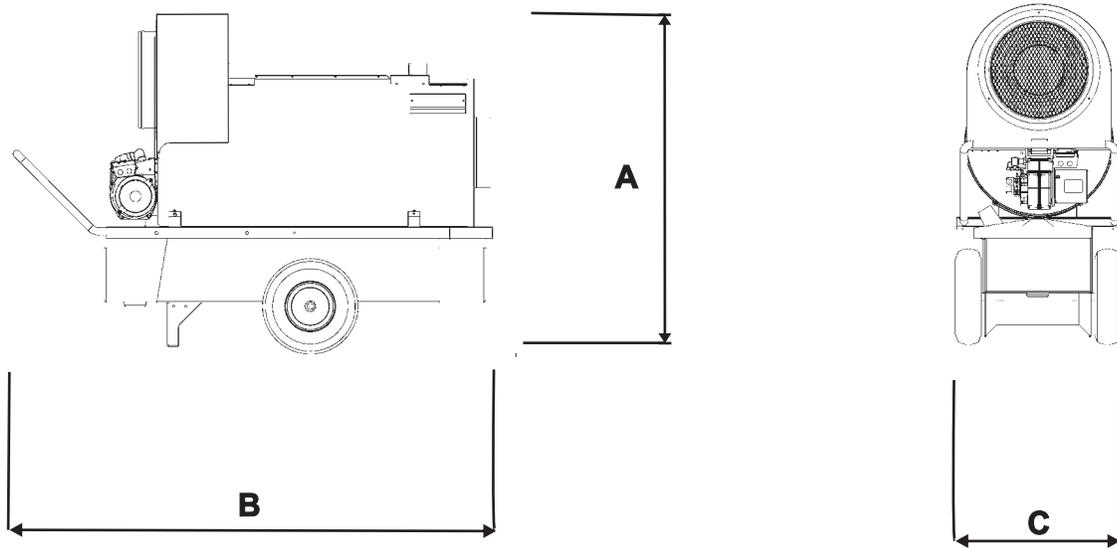
MAXIMUM ALLOWABLE DUCT LENGTHS

IDH400QR / IDH400QRC 75 feet 16" outlet ducting w/ 0 feet 16" inlet ducting

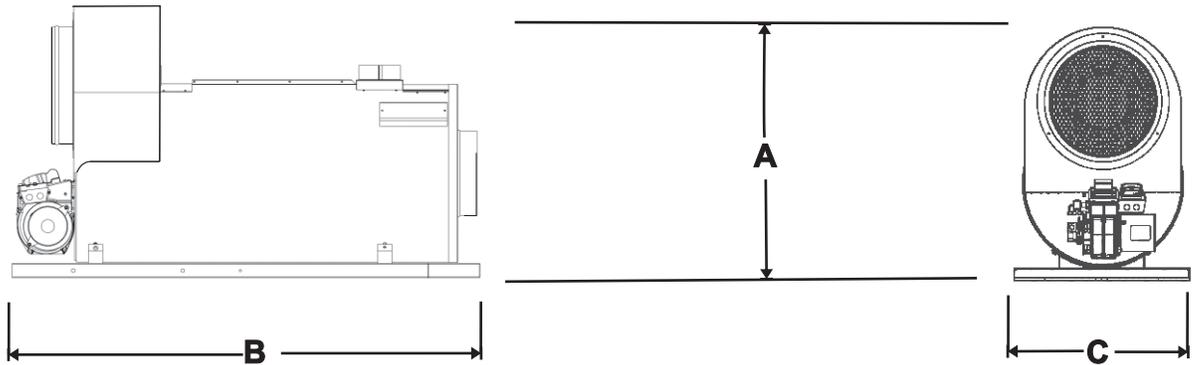
OR

IDH400QR / IDH400QRC 75 feet 2 X 12" outlet ducting w/ 25 feet 16" inlet ducting
50 feet 2 X 12" outlet ducting w/ 50 feet 16" inlet ducting

Dimensions of IDHQR series of heaters



Heater Only				With Packaging				
MODEL	A	B	C	WEIGHT (LBS)	L	W	H	WEIGHT (LBS)
IDF350	51"	76 1/2"	27"	510	83"	38"	52 1/2"	562
IDF500	51"	76 1/2"	27"	510	83"	38"	52 1/2"	562



Heater Only				With Packaging				
MODEL	A	B	C	WEIGHT (LBS)	L	W	H	WEIGHT (LBS)
IDF350	29 1/2"	65 1/2"	25"	325	70 1/2"	32"	35 1/4"	375
IDF500	29 1/2"	65 1/2"	25"	325	70 1/2"	32"	35 1/4"	375

INSTALLATION INSTRUCTIONS

1. The recommendations of local authorities having jurisdiction must be followed. For recommended Installation practices refer to C.S.A. Standard B139 (CANADA) or NFPA 54 (US)
2. When firing the unit in an enclosed area 3 square feet must be provided to allow the free entry of the air required for operation.
3. For electrical supply, use 3 wire receptacle with "U" ground.
4. Do not operate the unit in partly ventilated areas without a flue pipe or in close proximity to combustible surfaces or materials.

NOTE: Installation clearances are as follows:

Top - 3 inches

Sides - inches

Burner End - 4 feet

Discharge End - 10 feet Vent

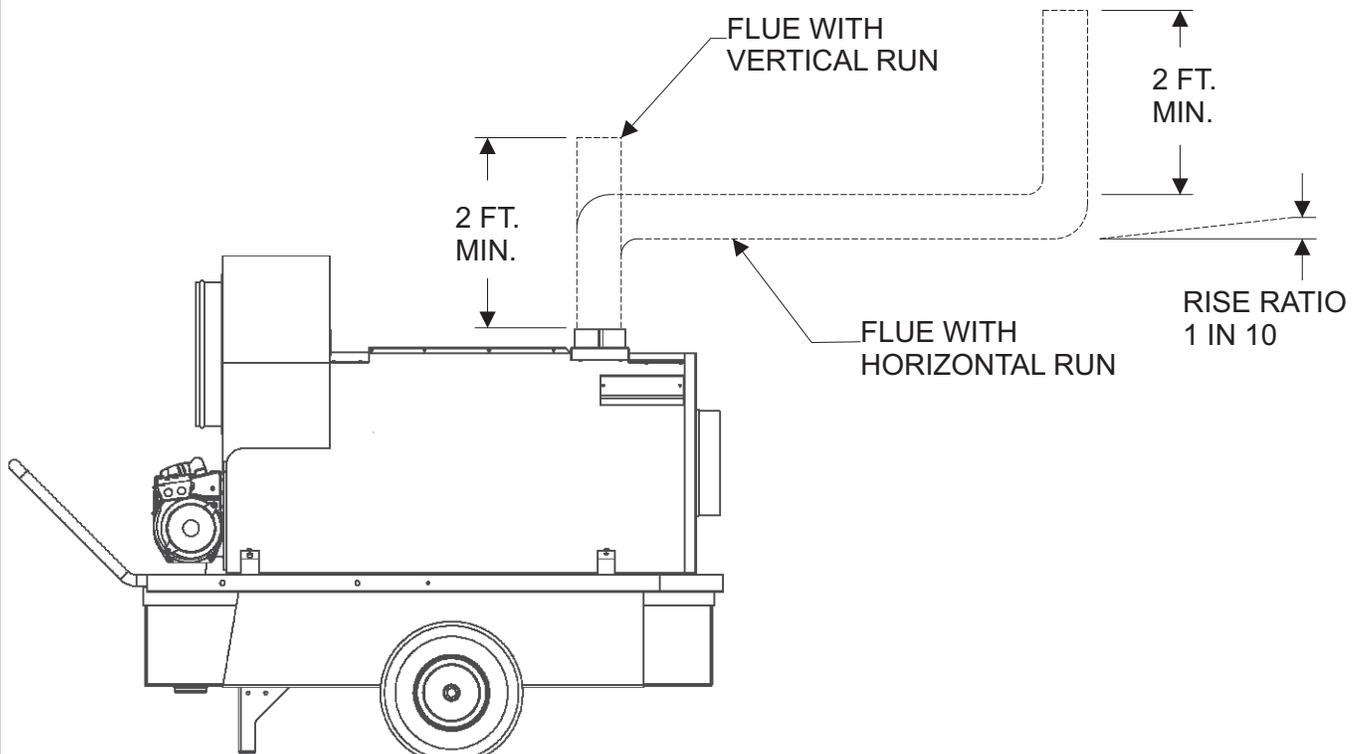
Connector - 24 inches

Floor - Combustible

FLUE PIPE CONNECTIONS

When the heater is connected to a flue pipe the flue pipe shall terminate in a vertical section at least two feet long. Horizontal runs should have rise ratio of 1 in 10 away from the heater. The chimney should have .02" W.C. draft to ensure safe operation of the unit. Where down drafts are liable to occur a vent cap should be used. All venting Should correspond with the CSA B149 (CANADA), NFPA 54 (US) standard or local codes.

INSTALLATION CLEARANCES



OPERATING INSTRUCTIONS

TO START HEAT WITH GENISYS CONTROL

1. Ensure unit is on flat, level ground before starting, canopy and fan guards must be closed.
2. Flip switch to "OFF" position
3. Check fuel level (2-4 gallons to start)
4. Plug in supply cord to 115 volt outlet.
5. Flip switch to "MANUAL" position.
6. For thermostat operation flip switch to "THERM" position.
7. There will be a 5 second safe start check, a 45 second pre purge then the burner will fire.

IF HEATER FAILS TO START

1. Press manual reset button on burner relay.
2. Check for low voltage condition and 115 volt supply.
3. Check fuel filter, suction tubing and nozzle assembly

NOTE: If unit has been reset a number of times without ignition there will be an accumulation of oil in the combustion chamber! Do the Following:

1. Make sure unit is sitting on level ground to ensure excess oil drain out of secondary exchanger (via small drain hole located on outer shell of heat exchanger by burner end).
2. Allow unit to drain for 15-20 minutes or until all oil has drained out.
3. Upon ignition excessive amounts of smoke will be present until all excess oil has been burnt from the heat exchanger.
4. When the unit has stabilized and the burner set up to operate properly, shut off the switch. Let the fan cool down the chamber and stop.

IF UNIT STILL DOES NOT START REFER TO THE TROUBLE SHOOTING GUIDE PAGES 18 - 19

CAUTION

1. Do not start heater when excess oil has accumulated in chamber.
2. Do not fill tank while unit is operating.
3. Do not shut off by disconnecting supply cord. The heat exchanger should be properly cooled before power shutdown.
4. In no case should extension cords be smaller than 12 A.W.G. and no longer than 100 feet.
5. Do not use gasoline, crankcase oil or heavier than No. 2 furnace oil.
6. Always maintain adequate fuel supply.

ELECTRICAL REQUIREMENTS:

15 amp circuit IDH400QR
15 amp circuit IDH400QRC

TO STOP HEATER

Flip switch to "OFF" position. The burner motor will continue to run for 2 minutes to help cool the heat exchanger and electrodes. The supply fan will continue to operate until the heat exchanger has sufficiently cooled. Do not disconnect main power until supply fan has stopped running.

WARNING!: BEFORE MOVING ANY GUARDS OR SAFETIES DISCONNECT THE MAIN POWER AS THE SUPPLY FAN WILL CYCLE AUTOMATICALLY.

IDH MAINTENANCE INSTRUCTIONS

!WARNING!: Heaters should be fully serviced annually to ensure proper performance. Maintenance should be performed by trained personnel only. Incorrect maintenance may result in improper operation and serious injury.

HIGH LIMIT SWITCH

It is recommended that the limit switch should be checked every heating season to ensure the switch limits the temperature to 250°F (IDH400QR) 290°F (IDH400QRC) (This can be done by restricting the airflow through the unit. After tests are complete, remove all restrictions.

FAN SWITCH

The fan switch has been selected to allow for preheating of the heat exchanger to ensure that only heated air is allowed to enter the space. Upon satisfying the need for heat, the fan switch will continue to run the supply fan until the heat exchanger has cooled sufficiently. This feature will help prolong the life of your heat exchanger.

FUEL FILTER

Replace cartridge (48164 or 48164A) once every week of normal usage or sooner, depending upon fuel quality.

FLAME DETECTOR

To test the cad cell, start the burner and before the safety lock-out timing period ends, disconnect the cad cell wires from the F-F terminals on the control. Next, jumper the F-F terminals with a piece of wire. This will allow the burner to continue running so that you will be able to check the cad cell resistance during the run cycle. If you did not get the F-F terminals on the control jumpered before the burner locked out, wait 3-5 minutes before attempting this again. With the burner running, connect the ohmmeter across the cad cell leads. Your signal should be between 250-1200 ohms. If higher, please clean the cad cell eye or replace.

BURNER

The electrode spacing must be checked and adjusted, if necessary after every nozzle change. Nozzle should be replaced annually or sooner if burner cannot be set up to operate properly. Nozzle size and type are marked on the rating plate.

ELECTRICAL

Ensure all conduit (BX) connectors are tight. Check inside connections in control box to ensure good connections. Check marrettes.

FAN

Check for dust or dirt build up on blades. Check for tightness of the set screw. Run heater to check for fan vibration. Replace fan blade if vibration is noticeable.

MOTORS

No lubrication is necessary since the bearings are the sealed type. Clean motor of any dust or dirt.

FUEL SYSTEM

Periodically remove fuel tank drain plug and clean tank. Do not store unit containing furnace oil for long periods. **The quality of fuel oil will affect light off at low ambient temperatures, #1 fuel oil or kerosene are recommended for temperatures below -10°C/8°F** (see page 6 for recommended settings if using #2 fuel oil in cold temperature)

FUEL PUMP

Check fuel pump pressure on a regular basis at the threaded plug at the top of the pump.

IF MEASURING AT THE BLEEDER SCREW ADD 10 PSI TO THIS READING TO GET THE TRUE PRESSURE

There is a pressure loss when fuel passes through solenoid valve. Example: IDH400 pressure should be read at the port as 150 PSI, then the reading at nozzle line will then be 140 PSI..

HEAT EXCHANGER

If a smokey condition continues even after adjusting the air band assembly, the heat exchanger should be thoroughly cleaned as per next page.

CLEANING PROCEDURE

1. Remove front cap. (48205 or 48205A)
2. Remove cover panel (jacket to front). (48119)
3. Remove fan thermostat cover on outer jacket (the one nearest the burner). (48112A)
Loosen thermostat and remove from the jacket. Remove high limit thermostat cover.(48112). Remove the two screws that are on jacket, at the 3'o'clock & 9 o'clock position 8 inches from front of unit.
4. Slide heat exchanger out of jacket and place front face down on floor.
5. Access for combustion chamber and heat exchanger cleaning is obtained through the burner head opening and by removing the heat exchanger cap ring(s) (50115).
6. To reassemble, reverse procedure. If you need assistance, please contact the factory.

Close canopy and ensure fan guards are in proper position before trying to restart the unit..

COMBUSTION AIR ADJUSTMENTS

****For proper combustion air adjustment a calibrated gas analyzer and smoke tester should be used to ensure complete combustion. Air adjustment should be made at the correct input and be adjusted to achieve 10% CO₂. For optimum combustion efficiency the combustion air control should be set to provide no more than a No. 1 smoke (Bacharach Scale). The Beckett burner has a calibrated air band, which will assist in adjusting the primary air for a good oil/air mixture. Adjust air band supply by loosening lock screws and moving air shutter (B48254) and if necessary the bulk air band. Begin by reducing the air until the unit begins to produce smoke. Increase air until no smoke is produced. Check for excessive heat build up in the heat exchanger. Insufficient air will cause flame impingement and reduced heat exchanger life. Increase air until heat build up has been eliminated. Check for proper ignition. Once satisfied re- tighten all screws and locking mechanisms.

This adjustment is to be carried out while the unit is operating and after 5 minutes of firing. Rotating the air bands on the burner housing makes the adjustment.

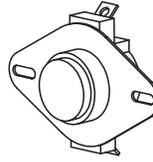
PRELIMINARY AIR SETTINGS			
UNIT MODEL	SHUTTER	BAND	BURNER MODEL
IDH400QR	4 - 6	0	CF 500
IDH400QRC	7 - 10	0	CF 500

***Note: The above settings are approximations based upon clean equipment in proper working order below 1000 ft. elevation. Combustion air adjustments will vary with location, altitude and type of fuel used. Colder ambient conditions may require less air and higher altitudes may require more air.

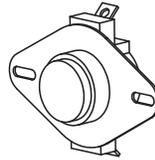
Due to the increased density of #1 & #2 oil at colder temperatures, kerosene fuel should be used or the oil nozzle **may need to be** changed as follows at temperatures of 10°F/-12°C and lower.

Model	Nozzle (USGPH)
IDH400QR	1.75 X 45°B Delevan
IDH400QRC	2.00 X45°B Delevan

LIMITS, FAN SWITCHES AND TEMPERATURE FEELERS



ADJUSTABLE FAN SWITCH 90°-130°F (48111B)
ALL MODELS



MAXIMUM TEMP. HIGH LIMITS

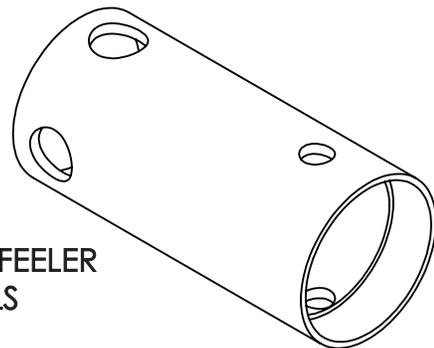
IDH400QR HIGH LIMIT
L250 - 40F (48110C) 250°F
(1331) 610080

IDH400QRC HIGH LIMIT
L300 - 40F (48110C) 300°F
(A1442) 610026



FAN FEELER
ALL MODELS
(48171)

PLEASE NOTE THAT THERE IS A LONGER TEMPERATURE FEELER ON THE AUTOMATIC HIGH LIMIT. THIS SHOULD NOT BE ADJUSTED.



HIGH LIMIT FEELER
ALL MODELS
15030

TEMPERATURE FEELER ADJUSTMENT THAT IS ATTACHED TO THE FAN SWITCH

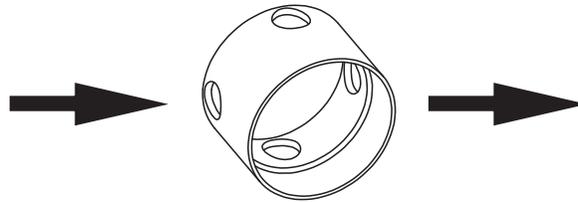
ALWAYS MAKE SURE THAT THE TEMPERATURE FEELER IS TOUCHING THE HEAT EXCHANGER!!

The temperature feeler provides air flow over the fan switch, which regulates the cycling of the fan. The temperature feeler can be adjusted for different outside temperatures, by rotating the location of the temperature feeler holes. This will provide optimum performance of the unit in different applications, and will reduce or eliminate unnecessary fan cycling.

IF SURROUNDING AIR IS WARM (EG., -5°C or 23°F , indoor application):

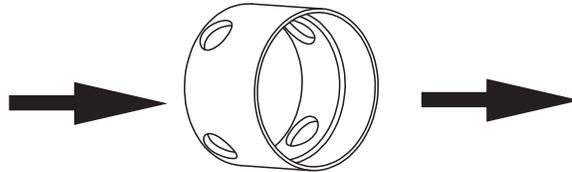
TURN THE TEMPERATURE FEELER SO THAT THE HOLES ARE PARALLEL WITH THE HEAT EXCHANGER, AND ENSURE THAT NOTHING IS BLOCKING THE AIR FLOW (EG., SCREWS). BY DOING THIS THE FAN SWITCH WILL REMAIN COOL AND NOT OVERHEAT. (SEE FOLLOWING)

The fan switch is located under the high limit/fan cover which is mounted on the jacket close to front of unit. The switch can be adjusted by using a flat-headed screw driver and turning it clockwise or counter clockwise to desired temperature.



IF SURROUNDING AIR IS COLD (EG., under -5°C or 23°F)

TURN THE TEMPERATURE FEELER SO THAT THE HOLES ARE CLOSED OFF AS THE AIR GOES OVER THE HEAT EXCHANGER, THIS WILL REDUCE FAN CYCLING, UNIT SHUTDOWN, ETC. (SEE FOLLOWING)

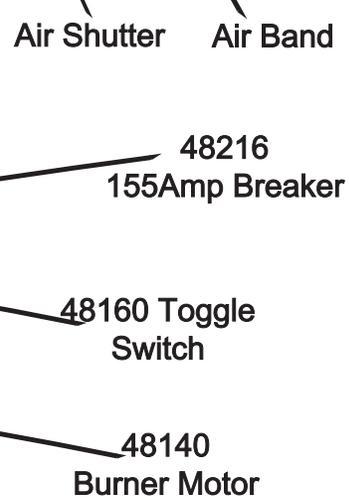
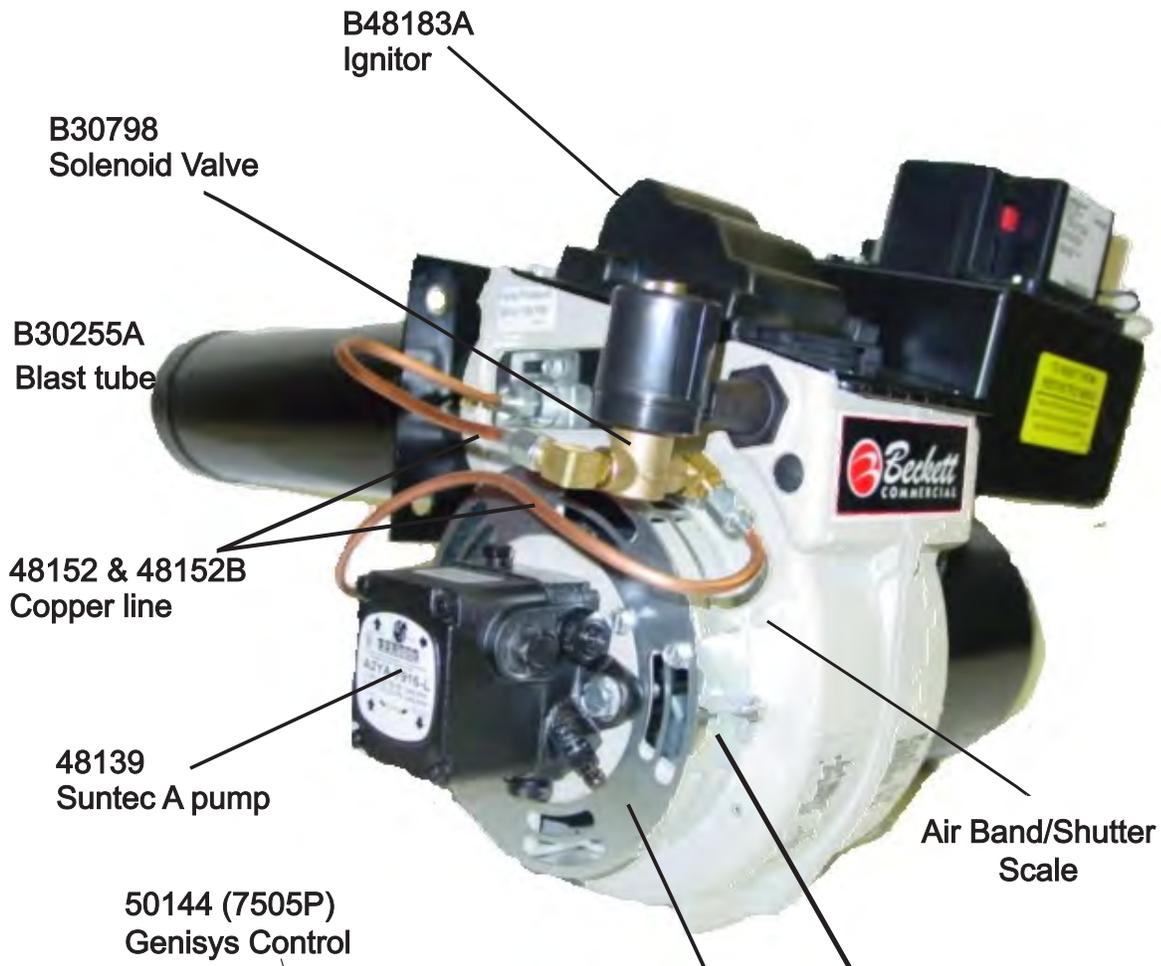


Indoor and outdoor settings of fan switch

Indoors & if surrounding air is warm i.e. $-5^{\circ}\text{C}/23^{\circ}\text{F}$, the fan switch should be set to 115°F so as to shut down unit when heat exchanger is properly cooled, also keeps fan motor from excessive running on when discharging cooler air.

Outdoor-Fan switch should be set between $100^{\circ}\text{-}90^{\circ}\text{F}$. The colder the temperature the lower the setting may need to be to prevent fan cycling.

IDH400QR & IDH400QRC BURNER COMPONENTS



ACCESSING BURNER NOZZLE AND ELECTRODES

1



Remove fuel line connection from burner inlet.

2



Move copper fuel line tube away from burner

3



Removed splined nut from burner inlet connection.

4



Place splined nut in safe location such as on fuel line tube.

ACCESSING BURNER NOZZLE AND ELECTRODES

5



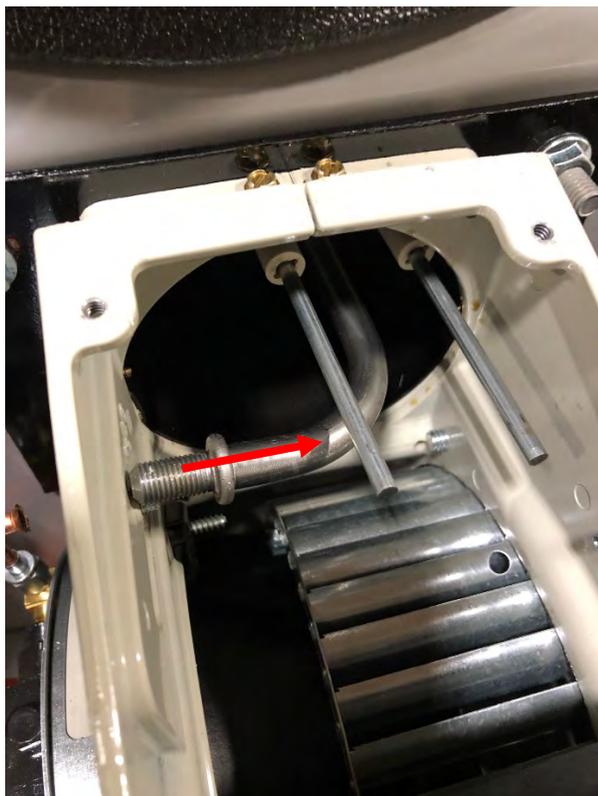
Remove ignitor retaining screws with 5/16" socket or wrench.

6



Swing open hinged ignitor plate.

7



Move drawer assembly to the side in order to slide burner fuel pipe connection out of the housing.

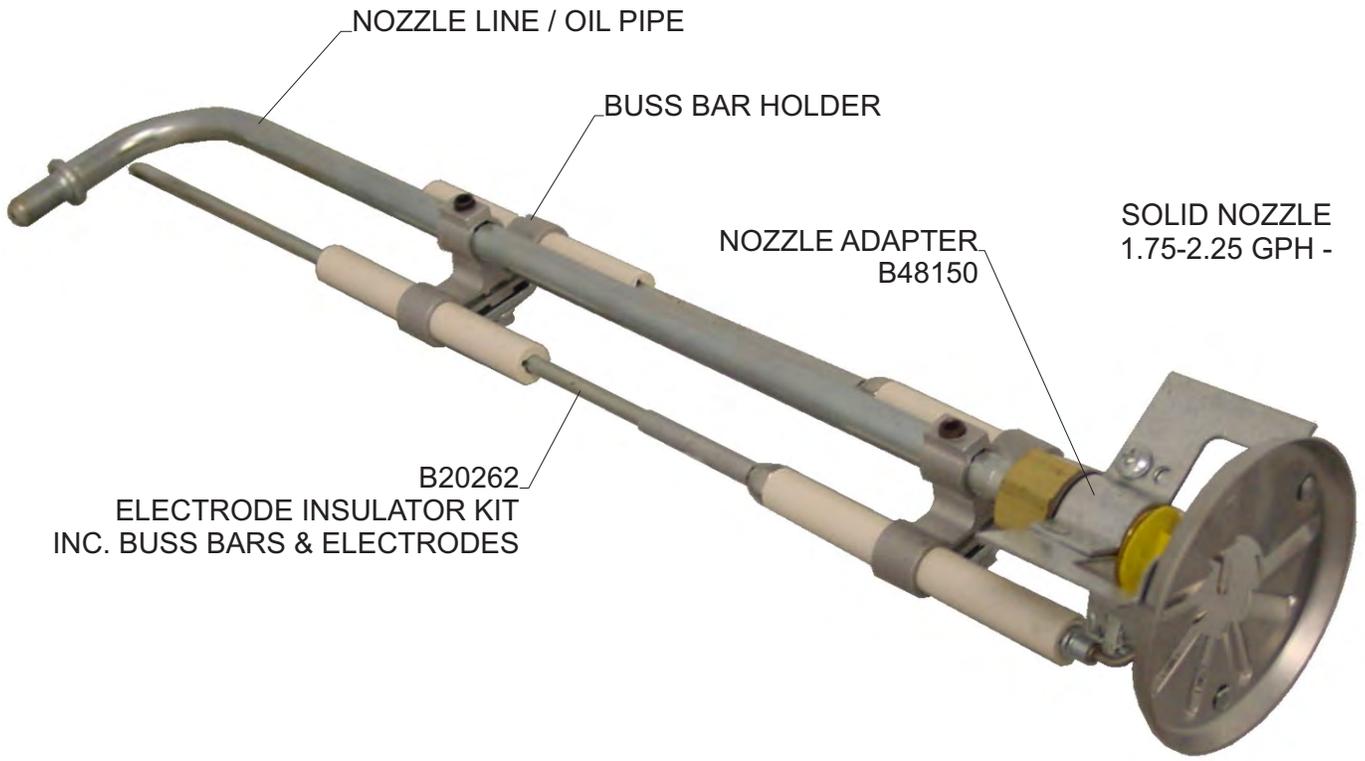
8



Slide entire drawer assembly out of the burner to reveal the fuel nozzle and electrodes.

**IDH400QR/IDH400QRC
CF BURNER
ELECTRODE ASSEMBLY**

(PART #B30268A)



ELECTRODE AND SLIDE PLATE SETTINGS

IDH400QR & IDH400QRC

(CF500 Burner)

(Adjust When Required or After Disassembly)

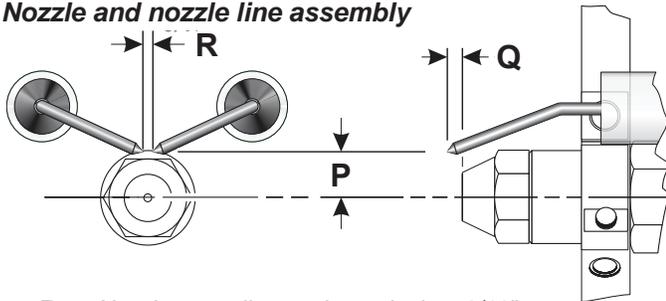
⚠ WARNING Maintain Electrode & Slide Specifications

Failure to properly maintain these specifications could cause ignition malfunction, puff-back of hot gases, heavy smoke, asphyxiation, explosion and fire hazards.

Adjust the electrode gap and position in relation to the nozzle to the following specifications.

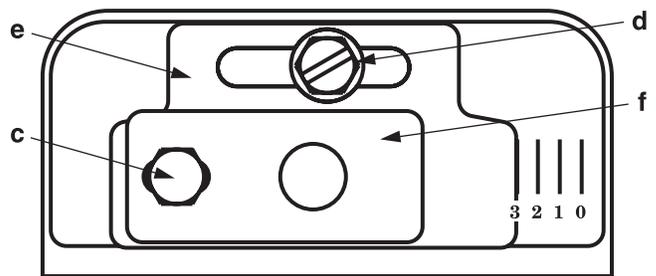
Check, and adjust if necessary. Verify that the oil tube assembly and electrodes are in good condition with no cracks or damage.

Nozzle and nozzle line assembly



- P Nozzle centerline to electrode tip = 3/16"
- Q Nozzle face to electrode tip = 1/4"
- R Electrode spacing = 1/8" - 3/16" gap

SLIDE PLATE ASSEMBLY.



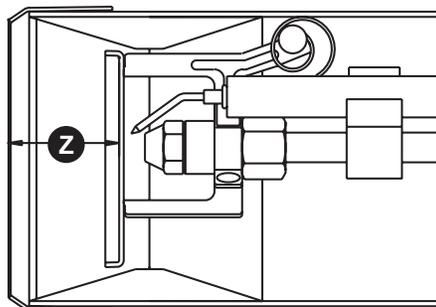
500005

- c Bottom acorn nut
- d Fastener
- e Indicator adjusting plate
- f Secondary adjusting plate

IDH400QR SET TO 4
IDH400QRC SET TO 4

Z Dimension
IDH400QR /
IDH400QRC w/ CF500
See Page 14

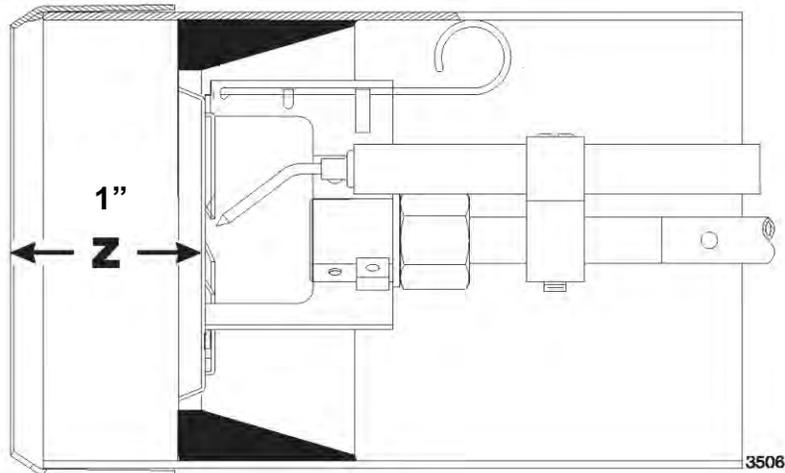
Nozzle line assembly in burner



50004

IDH400QR & IDH400QRC BURNER SETTINGS

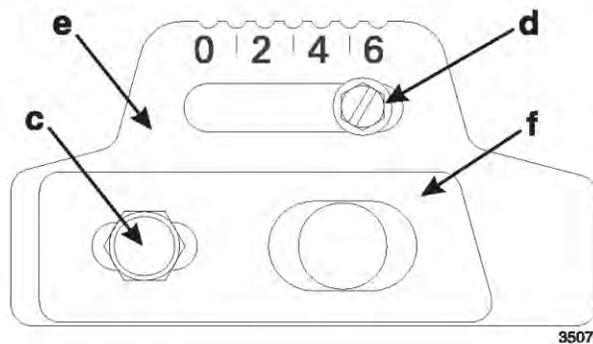
Figure 6 - Nozzle line assembly in burner



□ Set dimension Z

- Loosen fastener **c** in *Figure 7*. Slide the nozzle line and plate assembly until dimension **Z** in *Figure 6* is **1"** $\pm 1/16"$. When dimension **Z** (from end of air tube to flat area of front face of head) is correctly set, tighten acorn nut **c**.
- Attach the oil line from the oil valve to the nozzle line end. Tighten securely.
- Before proceeding, check dimension **Z** once again. Loosen acorn nut **c** if necessary to reposition the nozzle line. Once dimension **Z** is set, **do not loosen the acorn nut c again**. Note that for the setting of fastener **d**, refer to *Initial Head Position* procedure on Page 10.

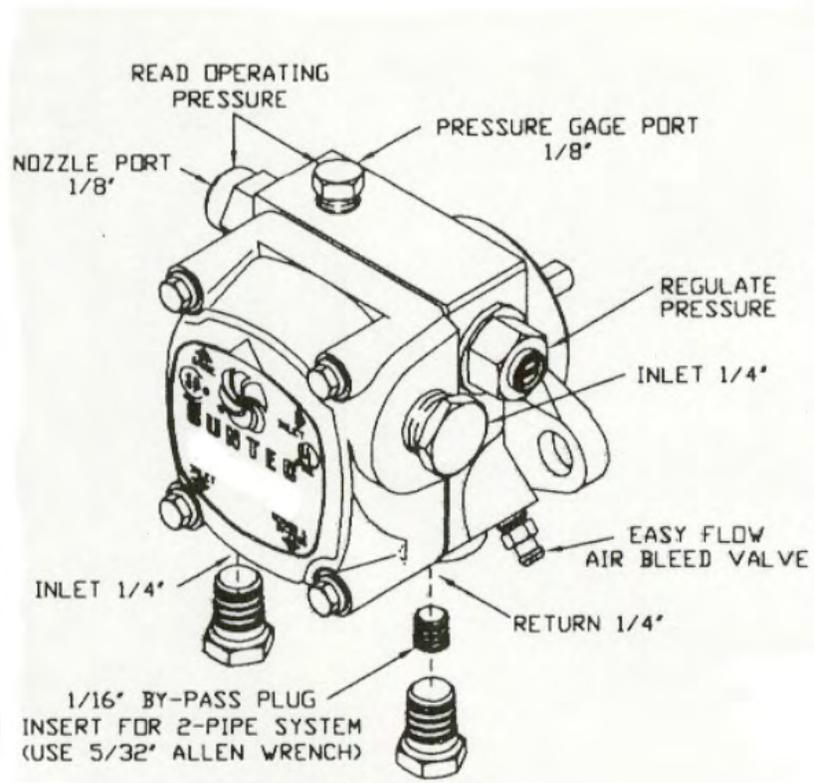
Figure 7 - Adjusting plate assy.



Legend (Figure 7)

- | | | | |
|----------|------------------|----------|---------------------------|
| c | Bottom acorn nut | e | Indicator adjusting plate |
| d | Fastener | f | Secondary adjusting plate |

“A” PUMP (#48139) IDH400QR & IDH400QRC



When replacing a fuel pump, ensure 1/16" by pass plug is installed in return port. Use a 5/32" hex key wrench.

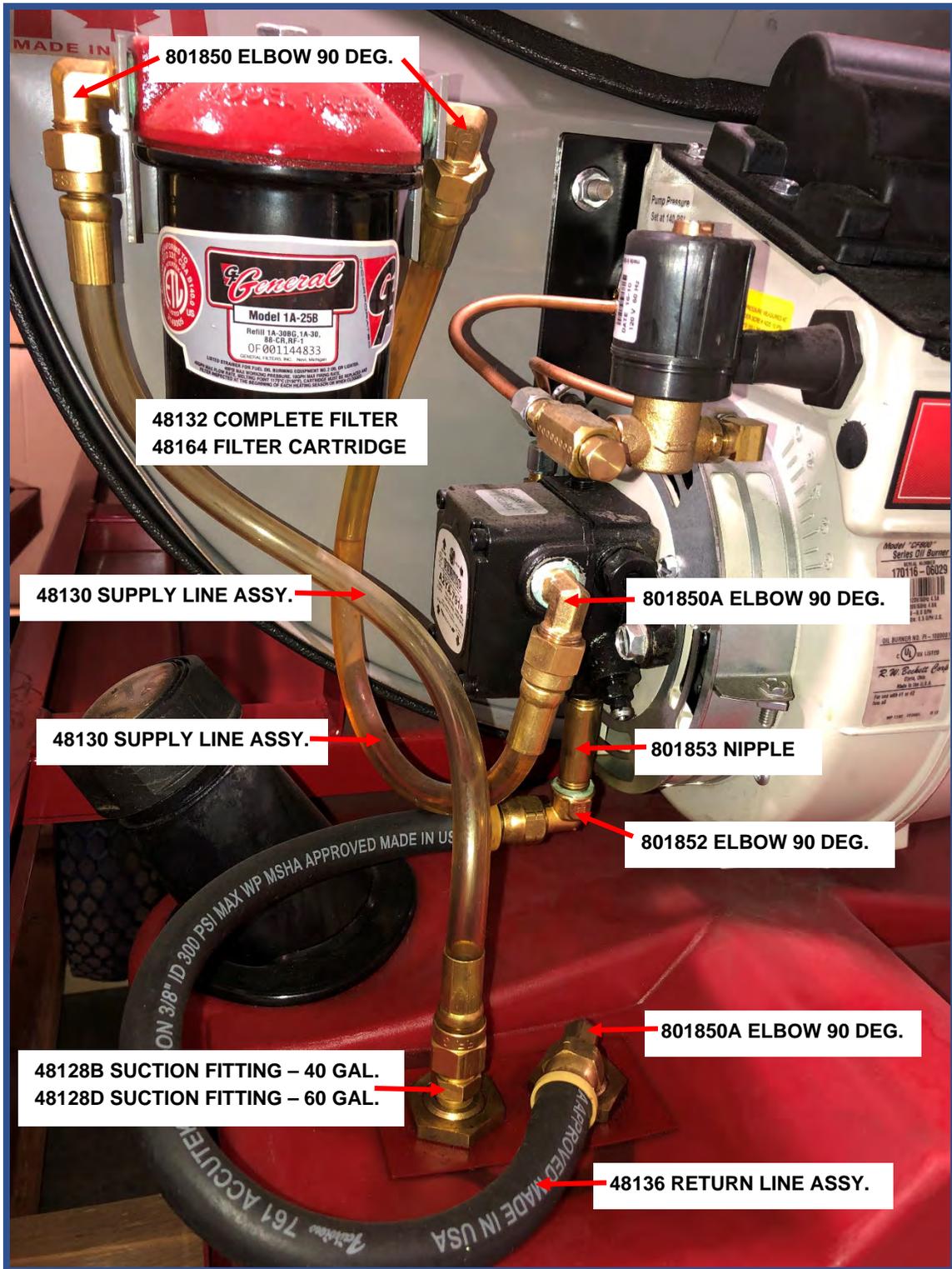
Pump fuel internal filter can be accessed if needed by removing 4 cover retaining bolts.

This filter would only need to be accessed if it is suspected that it may be restricted or clogged typically caused by the absence of proper primary filtering.

TYPICAL PRIMARY FUEL FILTER SUPPLIED ON ALL MODELS



FUEL LINES AND FITTINGS – IDF AND IDH HEATERS



FUEL LINE CONNECTIONS & PRECAUTIONS

CONNECTING THE OIL SUPPLY/ RETURN LINES

Install the oil tank lines in accordance with all applicable codes.

Use continuous lengths of reinforced fuel rated hose routed away from and protected from traffic, where possible.

Install a high quality shut-off valve in an accessible location on the oil supply line. Locate one valve close to the tank.

WARNING

Install the oil lines using the following guidelines. Failure to comply could lead to equipment damage and present a risk of severe personal injury, death or substantial property damage due to leakage of oil and potential fire hazard.

Use only flare fittings at joints and connections. Never use compression fittings.

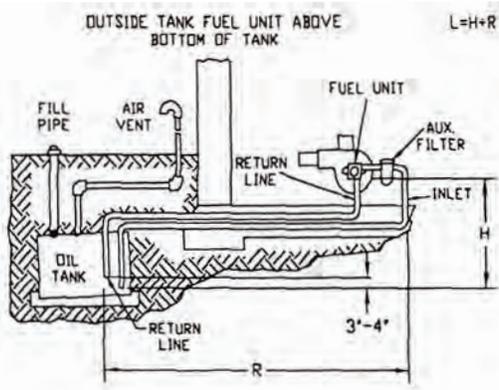
Install fittings only in accessible locations to assure any leak will be detected.

Where joint sealing is needed, use only pipes dope. Never use Teflon tape. Tape strands can break free and damage the fuel unit.

On two-pipe oil systems verify that the suction line vacuum does not exceed the fuel manufacturer's recommendation.

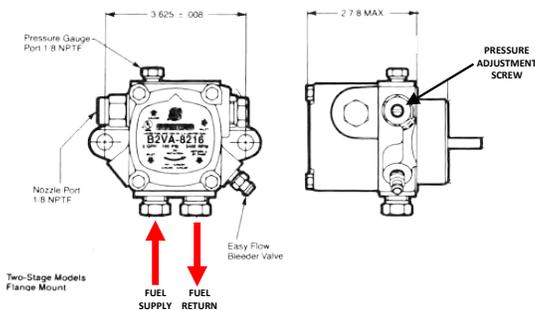
Do not operate the burner unless a return line or a by-pass loop is installed. Failure to follow this guideline and/or restricting or closing off the return line will cause damage to the fuel seals and consequent fuel leakage. This could result in severe personal injury, death or substantial property damage.

TWO-PIPE SYSTEM - (Bypass plug installed in pump)



TWO-STAGE TWO-PIPE MAXIMUM LINE LENGTH (H + R)

Lift "H"	3450 RPM Pump Speed
	3/8" OD Tubing @ 7 GPM
0'	80'
2'	73'
4'	66'
6'	59'
8'	52'
10'	45'
12'	38'
14'	31'
16'	80'



FUEL FLOW DIAGRAM

IDH SERIES TROUBLE SHOOTING GUIDE

ALWAYS DOUBLE CHECK FOR SUFFICIENT POWER , GAUGE OF CORD (SEE TOP OF PAGE #5) AND PROPER FUEL SUPPLY. POWER AND FUEL SUPPLY MUST BE SHUT OFF/DISCONNECTED BEFORE REMOVING OR REPLACING ANY COMPONENTS ON THE HEATER.

1. Unit is turned on, nothing happens after 5 second safe start.

- a. Ensure proper voltage coming in, 115V AC.
- b. Check for power on both sides of burner fuse. If no power, then check toggle switch. If power on one side, replace fuse. If power on both sides, go to **c**.
- c. Check black wire from primary control. If no power there, remove high limit cover & check for power on both sides of high limit. If power on one side only, replace high limit. If power on both sides, go to **d**.
- d. Ensure thermostat contacts on primary control (T and T) are jumpered out.
- e. Make sure light on primary control is not flashing. If so, push button to reset.
- f. Check manual reset button on motor and wiring connection to motor. If reset pushed and power going to motor, nothing is happening, replace burner motor.
- g. On neutral line (white wires) make sure all connections are tight and secure, and unit is properly grounded. With AC voltage tester, check white (neutral lines) for power (one on ground, one on neutral). If over 5 volts, check polarity. If polarity correct, check wires individually for power to determine leak source, then replace leak source.
- h. If power coming into black wire on primary control, but no power out to orange wire, replace primary control.
- i. If green light on primary control stays on, check to ensure transformer door is closed properly as cad cell is detecting light. Check cad cell is working. If light stays on and no obvious areas open, check OHM reading across two yellow wires. If you get a reading, replace cad cell. If you get no OHM reading from cad cell, replace primary control if light still on.

2. Burner motor starts but unit will not fire.

- a. Check for power on blue wire on primary control going to ignitor. If no power there, replace primary control if powered, go to **b**.
- b. Remove electrode assembly and check isolators for cracks or chips in the porcelain.
- c. Make sure electrode setting is proper. For electrode adjustments, see page 13. Clean assembly if there is any soot or oil..
- d. The nozzle should be checked and ensure it is not clogged or blocked. Make sure the nozzle is not loose and is the correct size & type.
- e. Ensure air shutters are properly set to factory specifications.
- f. Check for power on violet line on primary control. After pre-purge, if no power sent to violet line, replace primary control. If power on violet line, remove copper fuel line at electrode assembly to ensure fuel is coming out. If no fuel there, replace solenoid valve.
- g. At the bleeder screw, check for proper out pump pressure (see maintenance section). If low or no pump pressure, go to **g**
- h. Check oil filter, oil pick up tube and oil lines to ensure free flow and they are not clogged or dirty.
- i. Check electrical polarity and grounding

3. Burner fires then locks out.

- a. Check oil pressure to ensure solenoid valve is opening. Check oil flow system, filter, pick up tubes and lines.
- b. Cad cell (flame detector) could be defective. Disconnect yellow cad cell wires from primary control. Start unit and when it fires, connect jumper across connections on primary control. If unit continues to run, then check cad cell alignment with burner, clean face with a soft cloth and ensure no external light is affecting it. With an ohmmeter, check resistance across cad cell leads with machine running and primary control cad cell leads jumpered out. If resistance over 1200 OHMS, cad cell should be replaced. If unit locks out with jumper, replace primary control

IDH TROUBLE SHOOTING GUIDE

3. Burner fires then locks out continued:

- c. Wires between cad cell and primary control should be checked to see that they are not pinched or crimped.
- d. Prime fuel pump by loosening bleeder screw till steady stream of fuel comes out to ensure no air or bubbles in fuel line.
- e. **If unit locks out three times in succession, it will go into restricted lock out mode.**
- f. Check polarity, ground & voltage is between 108V - 130VAC.
- h. Ensure high limit is functioning properly.

To reset from restricted lockout, hold down reset button for 15 -20 seconds until "PUMP PRIME" LED flashes and release. The unit will then resume in normal operating mode. After verifying primary control is not in lockout & light continues to flash, primary control may be faulty.

4. Smoky fire

- a. Check nozzle, make sure is tight and not clogged.
- b. Check combustion chamber for cracks or burnt out.
- c. Check air band settings. (Air shutter and/or air band may be closed too much-restricting combustion air.
- d. Check pump pressure.
- e. Check slide plate to make sure it is in correct position. (See pages 13 & 14 for settings)
- f. Check recommended settings if using #2 fuel in cold ambient temperatures

5. Delayed ignition

- a. Check for proper electrode setting.
- b. Check the isolators for cracks or a conducting coat of soot or oil. Cracks sometimes occur under the electrode bracket, causing a short circuit.
- c. Check to see that the air shutter is not overly open-too much air will blow out flame.
- d. Check to ensure pump pressure is properly set..
- e. Change nozzle.
- f. Check fuel filter, replace if necessary.
- g. Ensure draft or wind is not blowing out flame-add 3' stack.

6. Main fan will not come on, unit shuts down on high limit.

- a. Check temperature feeler, make sure it is in properly.
- b. Jumper out fan switch to test motor. If you have voltage to motor and still does not start, replace motor. Check line voltage to ensure proper voltage. Also checks amp draw on motor. Motor may be running too hot and not run due to thermal overload being tripped.
- c. Replace fan switch if you have power on one side after unit heating up it does not make
- d. Replace high limit as it may be tripping too soon and not giving fan switch time to engage.
- e. Ensure fan switch temperature is correct for weather conditions (see pages 7 - 8 for settings)

7 Unit on, but cycles on high limit

- a. Check air flow, ensure both ducts are in place and clear of obstruction and straight.
- b. Check pump pressure, unit could be over firing.
- c. Check nozzle that proper size of nozzle is installed.
- d. Change high limit.
- e. See page 2 for maximum duct lengths. **Any longer will create back pressure in the unit and trip the high limit.**
- f. Fuel type- #2 will increase BTU output @cold ambient temperatures resulting in overheating.

8 Combustion chamber turns red.

- a. Nozzle may be firing side ways (replace or adjust)
- b. Clogged nozzle (replace)
- c. Temperature feeler not on properly or missing (Must be touching heat exchanger)
- d. High limit not functioning (replace)
- e. Excessive pump pressure. Check and reset if necessary
- f. Fuel type-see page 6 for recommended settings.

Sequence of Operation for Genisys Controller



Burner States

Standby:

The burner is idle, waiting for a call for heat.

Valve-On Delay:

The igniter and motor are on while the control delays turning on the oil solenoid valve for 45 seconds..

Trial For Ignition:

The oil solenoid valve is energized. A flame should be established within the factory set trial for ignition time ("lockout time").

Lockout:

The control has shut down for one of the following safety reasons:
a. The trial for ignition (lockout) time expired without flame being established.

b. The cad cell detected flame at the end of the Valve On Delay state. To reset the control from lockout click the button 1-second.

NOTE:

A recurrence of the above failure modes or a failed welded relay check could cause the control to enter a Hard Lockout state that must be reset only by a qualified service technician. To reset from Hard Lockout, hold the reset button for 15 seconds until the yellow light turns on.

Ignition Carryover:

Once flame is established, the igniter remains on to ensure flame stability.

Run:

The flame is sustained until the call for heat is satisfied. The burner is then sent to Motor-Off Delay, if applicable, or it is shut down and sent to Standby.

Recycle:

If the flame is lost while the burner is firing, the control shuts down the burner, enters a 60 second recycle delay, and repeats the ignition sequence. The control will continue to Recycle each time the flame is lost, until it reaches a pre-set time allotment. The control will then go into Hard Lockout instead of recycle. This feature prevents excessive accumulation of oil in the appliance firing chamber.

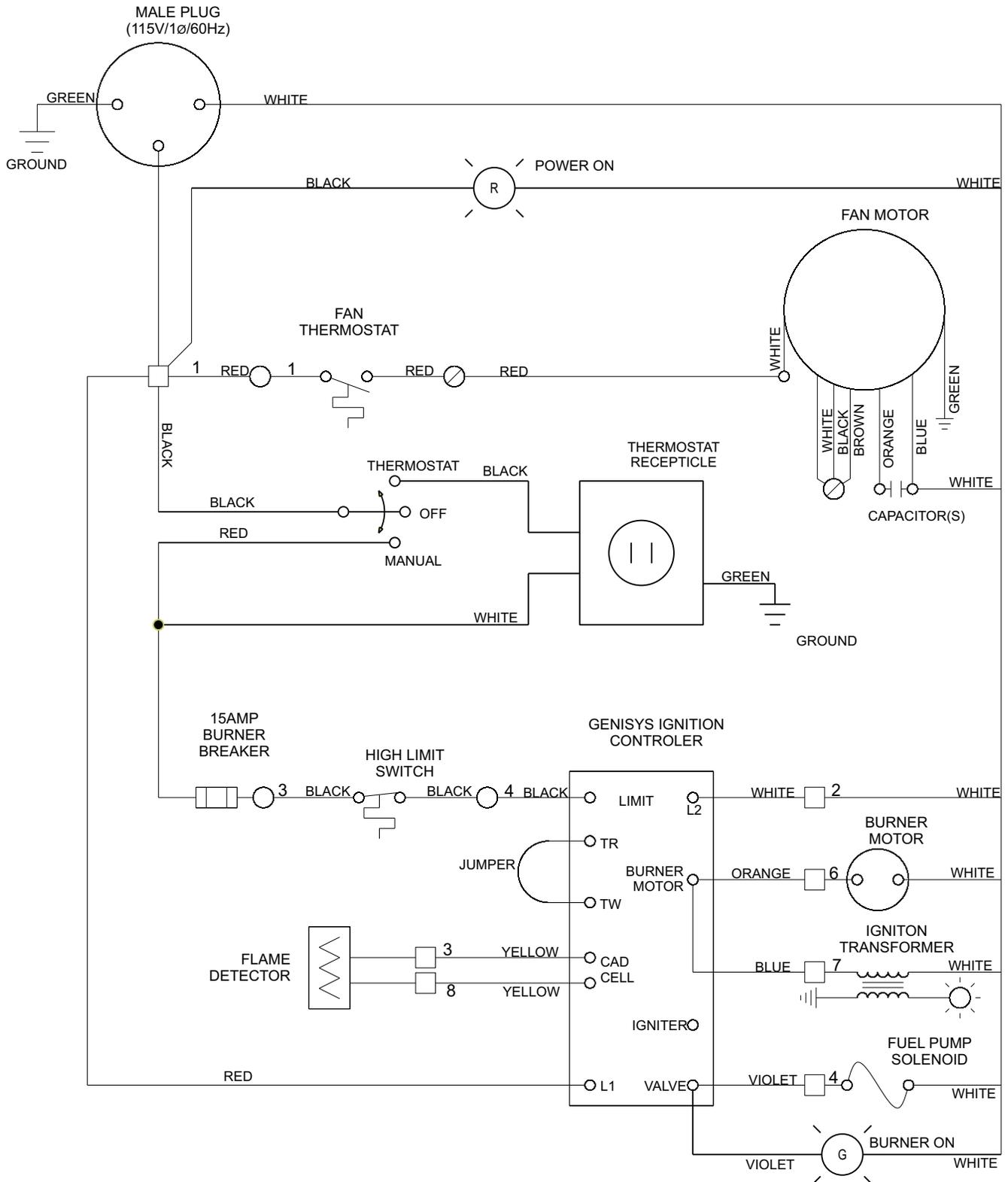
Motor-Off Delay:

If applicable, the oil solenoid valve is turned off and the control delays turning the motor off for the set motor-off delay time before the control returns to standby.

Pump Prime:

The igniter and motor are on with the oil solenoid valve energized for 4 minutes. During Pump Prime mode, the cad cell is disregarded, allowing the technician to prime the pump without having to jumper the cad cell.

IDH400QR & IDH400QRC WIRING DIAGRAM



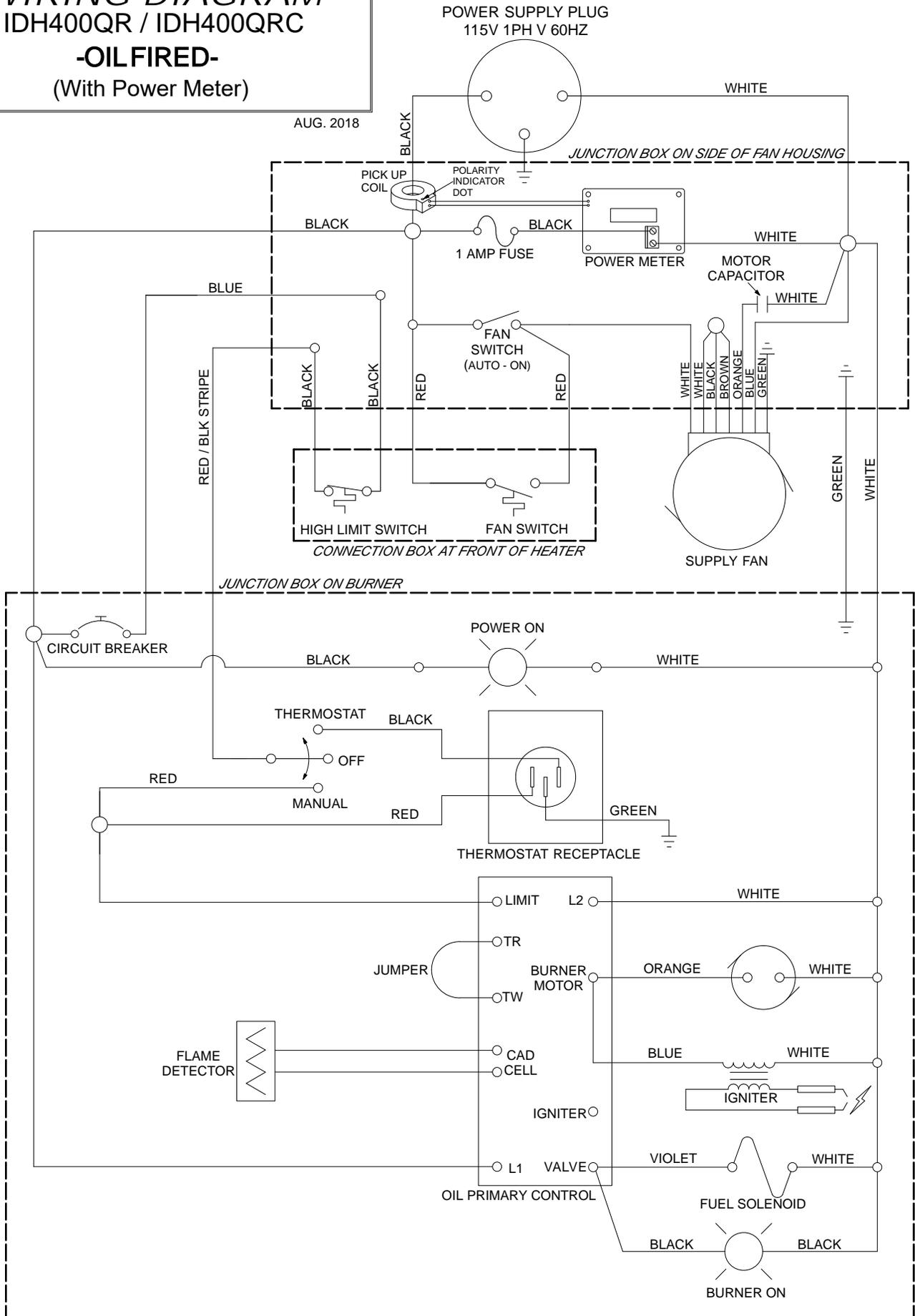
WIRING DIAGRAM

IDH400QR / IDH400QRC

-OIL FIRED-

(With Power Meter)

AUG. 2018



Frost Fighter IDH-QR Heaters after June 2018 may be equipped with optional power meter providing a real time display of critical information about the electrical power that is being supplied to the heater as well as heater's function and performance.

A bright 0.36"/9.2mm LED display is readable from up to 15 feet away which indicates the supply voltage, total amps, total watts or the line frequency by simply selecting which you wish to view. The display can also be set to continuously cycle through all four measurements.

Voltage measurement range is 85-264 VAC at 47-63HZ

Wattage is measured up to 9999 watts max.

Current is 0-32A with 0.01A resolution.

Display will accurately indicate real power and true rms current values of standard sine waves, triangle waves, square waves and other irregularly shaped waves with an accuracy of $\pm 1\%$ full scale.

DISPLAY SCREEN

INDICATES SUPPLY VOLTAGE, TOTAL AMPS, TOTAL WATTS OR LINE FEQUENCY



INDICATOR LIGHTS

ILLUMINATES TO SHOW WHAT IS BEING MEASURED & DISPLAYED

SELECTOR BUTTON

ALLOWS USER TO SELECT WHAT VALUE TO READ OR CAN BE SET TO SCROLL

Momentarily pressing "SEL" button each time will cycle the display to the next measurement.

Holding the "SEL" button for 3 seconds will set the meter to continuously cycle through each measurement and display them for 3 seconds.

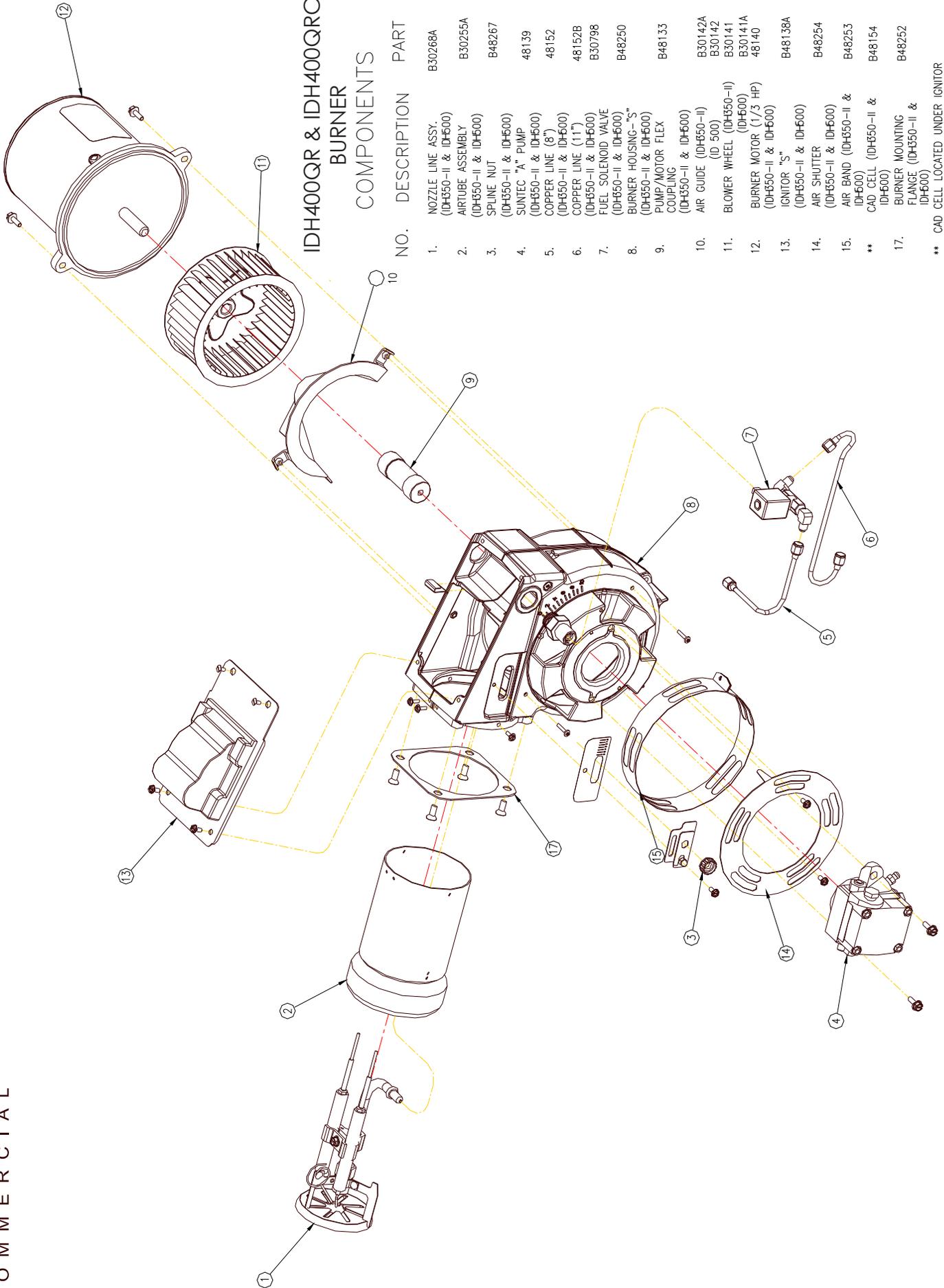
The meter can also be configured to always display the desired specific measurement such as amps or watts each time the heater is powered up. This is accomplished by setting the meter to the desired measurement reading and leaving it to display that reading without touching the "SEL" button for at least 60 seconds. Then each time the unit is powered up it will display that measurement.



POWER METER

FAN SELECTOR SWITCH

"AUTO" Norm. Temperature Controlled
 "ON" Continuous Operation



IDH400QR & IDH400QRC BURNER COMPONENTS

NO.	DESCRIPTION	PART
1.	NOZZLE LINE ASSY. (IDH550-II & IDH600)	B30268A
2.	AIR TUBE ASSEMBLY (IDH550-II & IDH600)	B30255A
3.	SPLINE NUT (IDH350-II & IDH600)	B48267
4.	SUNTEC "A" PUMP (IDH550-II & IDH600)	48139
5.	COPPER LINE (8") (IDH350-II & IDH600)	48152
6.	COPPER LINE (11") (IDH350-II & IDH600)	48152B
7.	FUEL SOLENOID VALVE (IDH550-II & IDH600)	B30798
8.	BURNER HOUSING-"S" (IDH350-II & IDH600)	B48250
9.	PUMP/MOTOR FLEX COUPLING (IDH350-II & IDH600)	B48133
10.	AIR GUIDE (IDH550-II)	B30142A
11.	BLOWER WHEEL (IDH550-II)	B30142
12.	BURNER MOTOR (1/3 HP) (IDH600)	B30141
13.	BURNER MOTOR (1/3 HP) (IDH550-II & IDH600)	B30141A 48140
14.	IGNITOR "S" (IDH350-II & IDH600)	B48138A
15.	AIR SHUTTER (IDH350-II & IDH600)	B48254
16.	AIR BAND (IDH350-II & IDH600)	B48253
**	CAD CELL (IDH350-II & IDH600)	B48154
17.	BURNER MOUNTING FLANGE (IDH350-II & IDH600)	B48252

** CAD CELL LOCATED UNDER IGNITOR

HEAT EXCHANGER FOR OIL UNITS

P/N 50200-ALL IDH SERIES

COMBUSTION CHAMBER
ASSEMBLY C/W INNER SHELL

FLUE COLLAR ASSEMBLY
P/N 50113-ALL UNITS

P/N 50207-IDH MODELS



OUTER SHELL
P/N 50206-ALL IDH MODELS



CAP RING
2 PER ASSEMBLY
P/N 50115 ALL IDH MODELS

RETAINER BOLT
W/WASHER
24 PER UNIT
P/N 48116 ALL UNITS



***COMBUSTION CHAMBER ASSEMBLY &
INNER SHELL ALL ONE PIECE**

IDH400QR AND IDH400QRC BACK VIEW



FRONT OF IDH400QR & IDH400QRC HEATERS

52014 ELECTRICAL BOX

52000-6 COVER

UNDER COVER 50 μ F CAPACITOR

UNDER COVER

48111B ADJUSTABLE FAN SWITCH

48110C HIGH LIMIT SWITCH - IDH400QR

48110D HIGH LIMIT SWITCH - IDH400QRC

