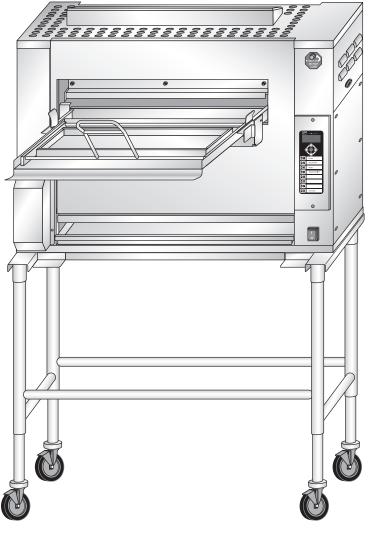


Your Solutions Partner

# Installation Instructions

REFURBISHMENT KITS 176838 - Natural Gas 176841 - Propane



**CAUTION:** Please read this manual completely before attempting to install, operate or service this equipment

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Translations of this document can be found at:

bk.dukemfg.com

P/N 529091 REV C 3/29/2018

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## IMPORTANT SAFETY INSTRUCTIONS

Throughout this manual, you will find the following safety words and symbols that signify important safety issues with regards to operating or maintaining the equipment.



Indicates a hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



**Indicates Important Information** 



Indicates electrical shock hazard which, if not avoided, could result in death or serious injury and/or equipment damage.



Indicates hot surface which, if not avoided, could result in minor or moderate injury.



Electrical shock hazard. Do not wash with water jet or hose.



# In addition to the warnings and cautions in this manual, use the following guidelines for safe operation of the unit.

- Read all instructions before using equipment.
- For your safety, the equipment is furnished with a properly grounded cord connector. Do not attempt to remove or disconnect the grounded connector.
- Install or locate the equipment only for its intended use as described in this manual.
- Do not use corrosive chemicals in this equipment.
- Do not use caustic cleaners, acids, ammonia products or abrasive cleaners or abrasive cloths. These can damage the stainless steel and plastic surfaces.
- Do not operate this equipment if it has a damaged cord or plug, if it is not working properly, or if it has been damaged or dropped.
- This equipment shall be serviced by qualified personnel only. Contact the nearest Duke authorized service facility for adjustment or repair.
- Do not block or cover any openings on the unit.
- Do not immerse cord or plug in water.
- Keep cord away from heated surfaces.
- Do not allow cord to hang over edge of table or counter.
- If the supply cord is damaged, it must be replaced by a special cord assembly available from Duke Manufacturing Co. or its service agent.

# Note: Refer to the specifications data plate when ordering or replacing a cord set. The following warnings and cautions appear throughout this manual and shall be carefully observed.

- Turn the unit off, disconnect the power source and allow unit to cool down before performing any service or maintenance on the unit.
- The procedures in this manual may include the use of chemical products. You must read the Material Safety Data Sheets before using any of these products.
- The unit shall be grounded according to local electrical codes to prevent the possibility
  of electrical shock. It requires a grounded receptacle with dedicated electrical lines,
  protected by fuses or circuit breaker of the proper rating, in accordance with all
  applicable regulations.
- Disposal of the unit must be in accordance with local environmental codes and/or any other applicable codes.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- CAUTION: Never use a high-pressure water wash for this cleaning procedure as water can damage electrical components

# **Tools Needed for Installation - Not Included**



**Nut Driver Set** 



Standard 6 PT Socket Set



Adjustable Wrenches



Screw Driver Set



Pipe Wrench



**Needle Nose** 



Gas Pipe Sealant

## **Hardware in Kit**





175682 - 3ea. TA-7 - 3ea. Coupling, nut Lock Washer



10-24X1-1/4 Screw



Orifice Holder Nut, Orifice Bottom Burner



281310 - 2ea. 176368 - 1ea. 175546 - 1ea. Holder



175547 - ea. Sleeve, 3/8 Compression



175548 - 1ea. Nut, 3/8" Compression



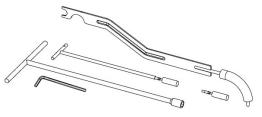
175587 - 4ea. 10-24X3/8" Hex Head Slotted



213042 - 2ea. 1/4-20 Serrated Flange Nut



213041 - 4ea. 10-24 Serrated Flange Nut



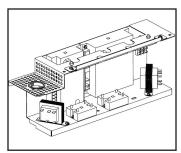
175700 Kit, Cleaning 1ea.



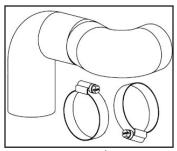
175540 - 2ea. 3/8X1/2" MNPT Fitting Straight Compression



## **Parts in Kit**



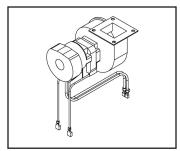
175391 Asm, Electrical Component Shelf -1ea.



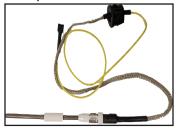
175549 Hose Clamp 2ea. 175189 Hose, Blower 1ea



175531 Valve, Gas 2ea. NG 175766 Valve, Gas 2ea. LP



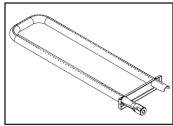
600249 Domestic Blower 1ea.



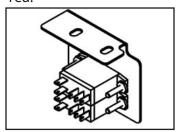
175534 Sensor - Lower (short) 1 ea.



175538 Cable 8" 1 ea. 175537 Cable 16" 2 ea.



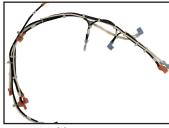
176370 Burner, Lower .375 Air shutter 1ea.



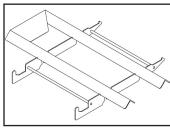
176188 Blower Relay 1ea. (wire harness not shown)



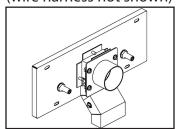
175535 Sensor - Upper IR (long) 2 ea.



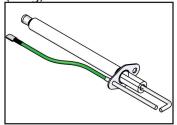
175608 Harness High Voltage 1ea.



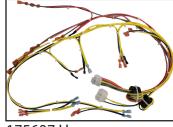
175200 Burner Shield 1ea.



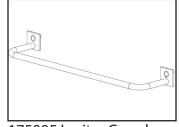
175108 Assy, Blower Box with Plungers 1ea.



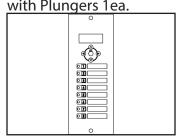
175536 Igniter, Spark 3 ea.



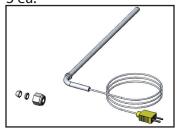
175607 Harness Low Voltage 1ea.



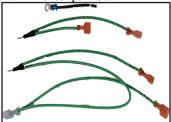
175095 Igniter Guard 1ea.



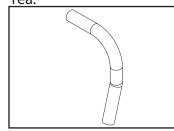
176039 Mylar, Control 1ea.



175977 Kit, Temperature Probe 1ea.



175610 Harness Ground 1ea.



175478 Lower Burner Tube 1ea.

## Items Not Shown

175727 Shim 16Ga 8ea. 175361 Shim 18Ga 5ea. 175360 Shim 20Ga 5ea. 175611 Wire Diagram 1ea.



## I. Getting Started

Step 1 Step 2

Disconnect all power to Broiler and allow to cool. Shut off main gas to Broiler and disconnect.



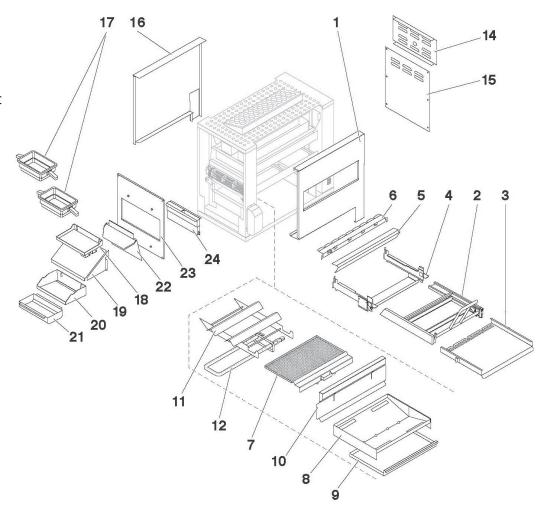
# If not completed, could result in death or serious injury.

## II. Tear Down

# Note: Some new fasteners have been supplied. Save all Fasteners for reuse. Step 1

Remove all removeable parts as indicated below.

- 1. Front Panel
- 2. Loader
- 3. Loader Tray
- 4. Loader Mounting Bracket
- 5. Door
- 6. Loader Ramp
- 7. Flame Arrester
- 8. "V" Grease Pan
- 9. Main Grease Pan
- 11. Burner Shield discard
- 12. Lower Burner discard
- 14. Electrical Panel Upper
- 15. Electrical Panel Lower
- 16. Rear Access Panel
- 17. Pan
- 18. Pan Shelf
- 19. Discharge Hood
- 20. Discharge Pan
- 21. Grease Pan
- 22. Discharge Chute
- 23. Access Panel Discharge
- 24. Pivot Ash Scraper





## II. Tear Down - continued

**Step 2**Disconnect all connections of the **High** and **Low Voltage** wire harnesses.



**Step 3**Remove the wire retainer bar.





**Step 4** Diconnect harness from Light (top front panel)



#### Step 5

Remove Control Panel and disconnect Molex connections and thermocouple.

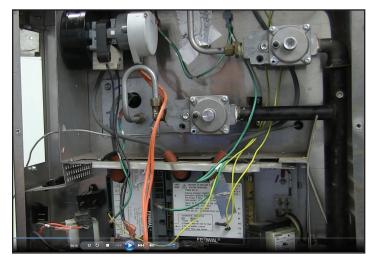
Note: Make sure you save all Heyco bushings to re-install later.

#### Step 6

Remove High and Low voltage wire harnesses and discard.

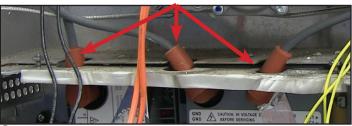
## Step 7

Disconnect all ground wires and discard.



Step 8

Disconnect the three Ignition wires from the ignition modules and the Igniters then remove. (discard)



Step 9

Pull out the top two sensors and then remove. (discard)

Note: The sensors have a three point spring clip.





**Your Solutions Partner** 

## II. Tear Down - continued

#### Step 10

Repeat for lower sensor. (discard)

Note: The lower sensor is located from the back of the unit.





Step 11

Remove the thermal sensor from the back of the broiler. (discard)

Note: The the nut should be only hand tight.
In some cases the wire will have to be cut to completely remove.

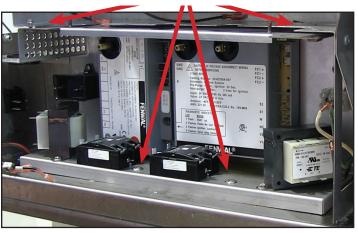


**Step 12**Disconnect power cord from terminal block.



#### Step 13

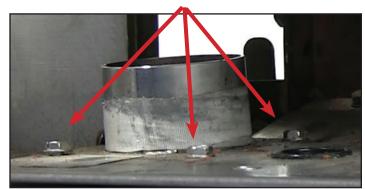
Remove the four screws holding the ignition assembly and remove complete assembly. (discard)



**Step 14**Loosen the two hose clamps and remove the hose.



**Step 15**Remove the three bolts and nuts holding the fan motor in place and remove the fan motor. (discard)

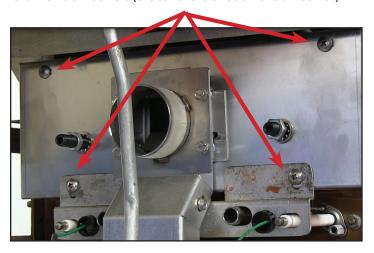




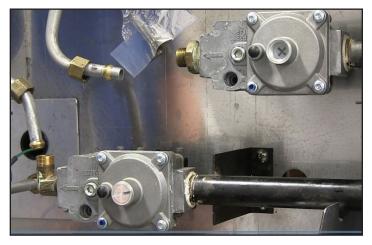
## **II. Tear Down - continued**

#### Step 16

Remove the screws holding the igniter bracket and blower box cover. (discard bracket and box cover)



**Step 17** Disconnect gas lines from gas valves.



**Step 18**Remove both gas vales. (discard)



## Step 19

Remove two nuts holding the Ignighter Guard and remove.



**Step 20**Remove four nuts holding the igniters plate in place.



**Step 21**Remove upper igniters from plate. (discard)



Note: Set aside the hex barrel nuts and washers.

**Step 22**Remove lower igniters from broiler. (discard) **Note: Save star washer and hex barrel nut.** 

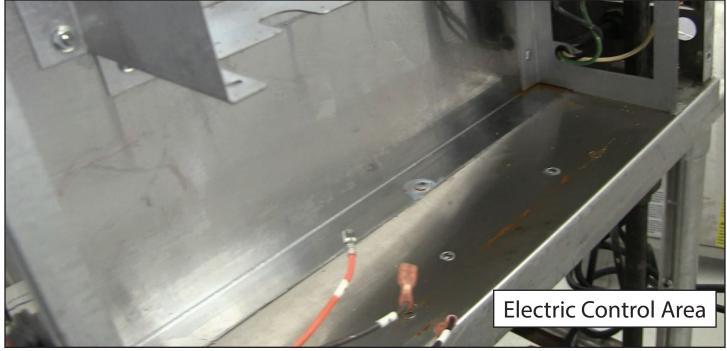




## **III. Clean Broiler**

Using only Burger King approved cleaners take this time to completly clean the Broiler including the control area.







## IV. Rebuilding Broiler

**CAUTION** Remove all tape from all parts.

Failure to remove tape could cause smoke or fire at start up.

Step 1 - Lower Igniter Install the lower Igniter.





**Step 2 - Upper Igniters** Install two igniters on the old igniter plate. Using star washers and hex barrel nuts.



**Step 3- Igniter assembly** Install the assembled igniter plate in Broiler with 4 flanged nuts.



213041v



Step 4 - Igniter Guard Install the igniter guard in the broiler using 2 1/4-20 Flannged Nuts 213042.





Step 5 - Lower Burner Install the new lower burner. 176370



**Step 6 - Lower Burner Guard** Install the new burner guard. 175200





Step 7 - Misc. Parts After cleaning all of the following parts can be re-installed on the end of the broiler.

22

18 19

20

- - 24. Pivot Ash Scraper
  - 23. Access Panel Discharge
  - 22. Discharge Chute
  - 21. Grease Pan
  - 20. Discharge Pan
  - 19. Discharge Hood
  - 18. Pan Shelf



## IV. Rebuilding Broiler - Continued

Step 8 - Gas Lines

Prep the two gas lines with gas pipe sealant.



**Step 9 - Gas Valves** Install the two gas valves.





Note: Make sure both gas valves have the solenoids in the back with terminals pointing up.

## Step 10 - Upper gas fitting

In upper gas valve install new brass compression fitting.



175540



**Step 11 - Upper Gas Line** Re-connect upper gas line.



**CAUTION** 

Over tightening nut could cause nut to split.



## Option 1 - Using old 90deg. Brass fitting.

## Option 1a - Models with U shaped gas line

Remove brass fitting from old gas valve. Apply new sealant and attach to new gas valve.

### Option 1b - 90deg. Brass Fitting

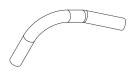
Reconnect lower gas line.



Option 2 - Straight brass fitting with new L shaped gas tube.



175540



175478

**Option 2a - Remove U Gas Line**If present remove the "U" shaped gas line.

Note: If newer L shaped gas line is already installed skip this step





## IV. Rebuilding Broiler - Continued

### **Option 2b - Lower Gas Fitting**

Using the nut and ferrule left from the upper burner install the L shaped gas line where the old gas line was removed.

#### **Option 2c**

Install the second brass fitting into the gas valve.





175540

#### Option 2d - Lower gas line

Using the Nut and Ferrule connect the L shaped gas line to the gas valve.



# **CAUTION**

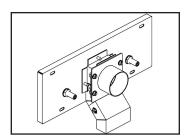
Over tightening nut could cause nut to split.

#### Note:

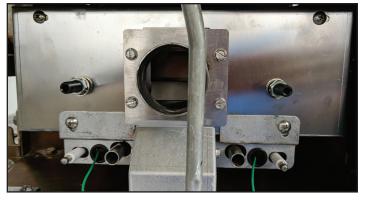
Extra parts for the orifice holder have been supplied if needed.

**Step 13 - Blower Box** Install new Blower Box with Plungers and lower bracket. (brkt.not in kit)

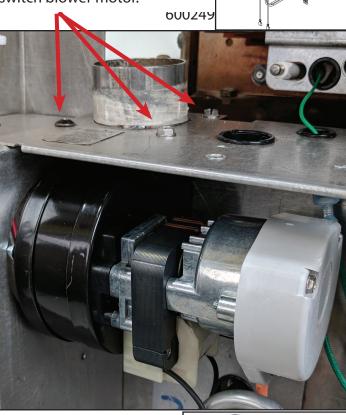
Note: Make sure the orientation of the bracket is correct.



175108

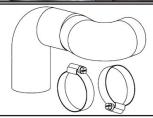


**Step 14 - Blower Motor** Install the new centrifugal switch blower motor.



**Step 15 - Hose**Using two hose clamps install the blower hose.

175549 Hose Clamp 2ea. 175189 Hose, Blower 1ea





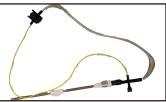


## IV. Rebuilding Broiler - Continued

18b

## Step 16 - Upper IR Sensor Install the two long upper IR sensors.

175535 Sensor - Upper IR (long) 2 ea.





Step 17 - Lower IR Sensor From the back side of the broiler install the lower short IR sensor

175534 Sensor - Lower (short) 1 ea.



18c Slide the Nut and fittings onto the probe.

Just behind the lower gas line feed the probe

through the back wall of the Gas Chamber.



**CAUTION** Make sure the fittings are orientated correctly.



**Step 18 - Thempurature Probe** 18a

From the front of the broiler, fish the Temperature probe through the hole in the Gas valve chamber.



175977 Kit, Temperature Probe 1ea.



## 18d Slide the Nut and fittings onto the probe. Make sure to reinstall Heyco bushings at both locations where the wire goes through metal.







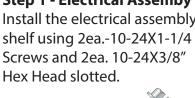
## V. Electrical

# **CAUTION**

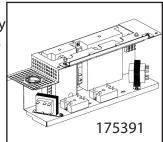
## Reference Wire Diagram 175611 for all electrical. Electrical Diagam included with Kit and available on last page of these instructions.

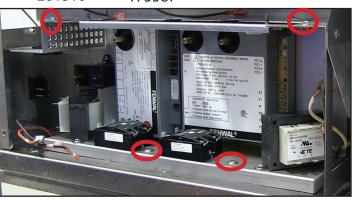
For LP Lower burner with Purge Blower, see page 24.

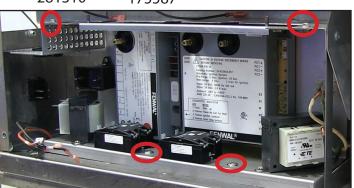
**Step 1 - Electrical Assemby** Install the electrical assembly shelf using 2ea.-10-24X1-1/4 Screws and 2ea. 10-24X3/8"



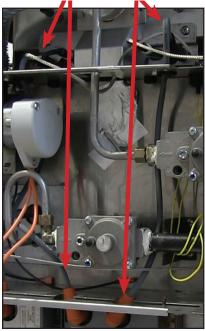








Step 4 - Upper igniter cables Install the upper Igniter cables. - 2ea.





Step 5 - Upper Igniter **Ground Wire** 

#### 5a

Connect the eyelet to the ground lug on the right side of the Electrical Shelf



## 5b-d

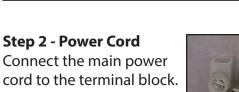
Connect the two male ends to the two upper igniters. Connect the Female end to the ground location of the dual ignition module.





Right Igniter

Dual Module





**Step 3 - Lower Igniter cable** Install the lower Igniter cable.





### **Step 6 - Lower Igniter Ground Wire**

#### **6a**

6b-c

Connect the eyelet to the ground lug on the left side of the Electrical Shelf

Connect the male end to the lower igniters.

Connect the Female end to the ground location of



Connect the Black 6 and Wht 3 male terminals to the black leads off of the blower motor.



## Connect the 3 and 4 female flag terminals to the high voltage side of the transformer.





the single ignition module.



9d Connect dual wht 3 and dual blk 4 to the high voltage side of the second

transformer.



**Step 7 - Upper IR Sensors** 

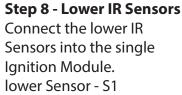
Connect the upper IR Sensors into the dual Ignition Module. Right Sensor - S1 Left Sensor - S2



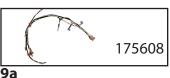
Connect the following to the power switch: #2 Blk Bottom Back #4 Blk Top Back #1 Wht bottom front #3 Wht top front





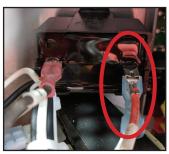


**Step 9 - High Voltage Wire Harness** 



Connect the hot and neutral to the terminal block





Connect #3 Wht dual female to the Orange wire from the bottom pan of the broiler with the spade terminal and connect to the capacitor.





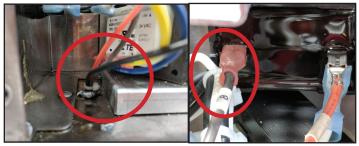
#### 9g

Connect the remaining #4 wires to L1 on the relays.



Step 10

Connect the Brown #8 wire to the capacitor.

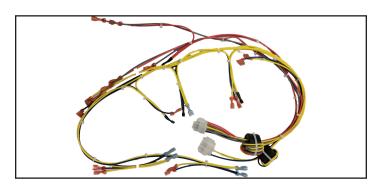


Step 11

Connect the Black #1 wire to T1 on the Conveyor relay.



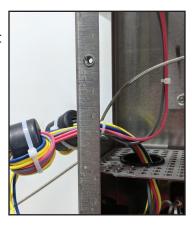
**Step 12 - Low Voltage Wire Harness** 



175607 Harness, LOW VOLTAGE 1ea.

#### 12a

From the front of the unit feed all the wires except Red #30 and Grey # 33 down through the large grommet in the electrical assembly.



#### 12b

Feed Red #30 and Grey #33 up through the heyco bushing and connect to the light.



#### 12c

In the lower electrical area connect Red #30 to the positive and Grey #32 to the negative of the IR Blower Relay (right)



#### 12d

In the lower electrical area connect the dual Red #30 to the positive and Grey #31 to the negative of the Conveyor relay (left)





Note: At this point the only wires to connect on the low voltage harness are Yellow and blue

#### 12e

Connect #11 Yellow and #12 Blue flag terminals to the Low voltage side of the controller transformer



12f

Connect the following to the Ignition Control Module Lower Burner:

Blue #19 to V2 GND
Yellow #18 to V1
Yellow #20 to TH
NOTE: For LP units
with Purge Blower
see page 23 for more
instructions.

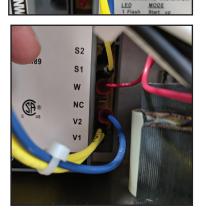


## 12g

BEFORE SEI

Connect the following to the Ignition Control Module IR Burner: (Dual Module)
Blue #14 - GND

Yellow #13 - R



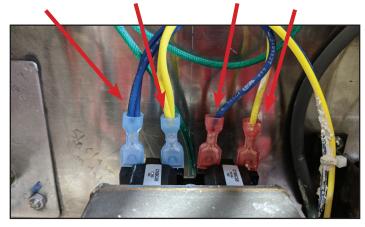
#### 12h

Connect the following to the Ignition Control Module IR Burner: (Dual Module)
Blue #16 - V2

Yellow #15 - V1

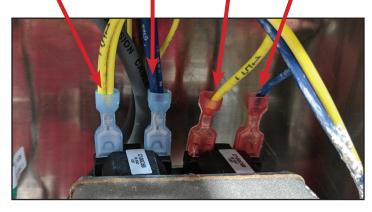
#### **12**j

Connect the following to the **Lower Gas Valve**: Blue #19 - Dual, Yel #18 - Dual, Blue #19, Yel #18



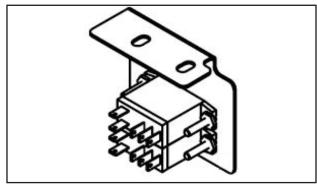
#### 12k

Connect the following to the **Upper Gas Valve:** Yel #15 Dual, Blue #16 Dual, Yel #15, Blue #16



**Step 13 - Blower Relay** 

Note: This should be installed on all units.



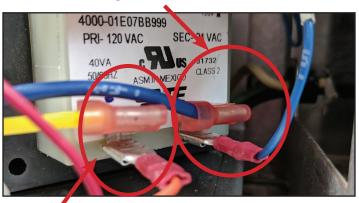
176188 Blower Relay 1ea. (wire harness not shown)

Note: Unit is shipped with harness attached.



#### 13a

Connect blue #5 wire to the Ignition Module Transformer. Then connect the Blue #14 flag terminal on the Low Voltage Wire harness to the #5 blue wire.



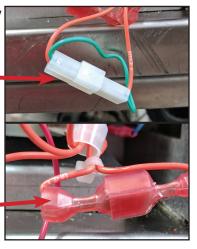
13b

Locate the Orange #5a wire with the spade piggy-back terminal and connect to the Ignition Modual transformer. Then connect the Yellow #13 with Flag terminal on the Low Voltage Wire harness to the spade with the Orange wire. (see Above)

#### 13c - For Domestic Only

 Locate the two Molex connections and plug together.

- Locate the male and female connections #5a and connect togather.





Connect #2 red to #21 of the low voltage harness.

#### 13e

Connect red #5 to position W on the Ignition Module for the IR burners.



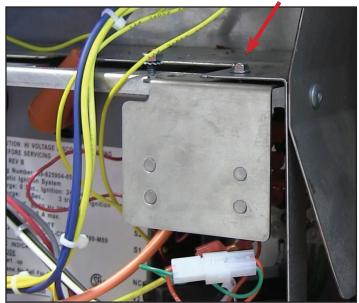
#### 13f

Connect the two Male connections Orange #3 and #5 to the orange wires from the blower motor.



#### **Step 14 - Blower Relay**

Mount the blower relay using the 8/32 bolt holding the electrical shelf in place. (See Picture below)





#### **Step 15 - Wire Retaining Bracket**

Using (2) 10/24 Bolts, install the wire retention bracket making sure none of the wires are pinched.



## Step 16 - Control Panel - Mylar

Follow the instructions enclosed with the new Mylar to replace the old control Mylar.



## **Step 17 - Control Panel**

Connect the thermocouple to the bottom of the control panel. Attach the two Molex connections and then mount the control panel to the Broiler.





## **VI. Safety Testing**



# **AWARNING** Failure to complete these tests could result in damage, injury or death.

## **Step 1 - Continuity Check**

Before connecting the broiler to power complete a continuity test at the terminal block by:

A. Checking Common line to Ground Should test positive.

B. Checking Line to Ground Should test negative.

Note: If either of these test fail refer back to the Wire Diagram to troubleshoot.

### **Step 2 - Reconnect to Power**

## Step 3 - Gas Leak Test

Reconnect the unit to the Gas Line. Check the unit for any gas leaks up to the Gas Valves.

Place the broiler into Diagnostic mode by:

- A. Press and hold the **BK Logo** for five Seconds. Displays "**CODE**"
- B. Enter **3424** then press the **BK Logo** Displays "**8888**"
- C. Press the *up arrow* 1 time. The lower burner will turn on.

## Check all fittings to the lower burner for any Gas Leaks

D. Press the *up arrow* 1 time and the lower burner will turn off and the upper burners will turn on.

## Check all fittings to the upper burners for any Gas Leaks

- E. Press the *up arrow* 1 time and the broiler will go into *standby*.
- F. Press the **down arrow** 1 time to start the conveyor.
- G. Press the **down arrow** 1 time and the conveyor turns off.

Note: Do not let the chain run for more than 10 seconds.

Press the **BK Logo** to exit **Diagnostic** mode.

## **Step 4 - Set Gas Pressure**

Turn unit on and let it heat to 400 degrees so both burners are on.

- For Natural Gas adjust each valve to 3.75 WC
- For LP gas, adjust each valve to 8.0 WC

## **Step 5 - Replace all Panels**

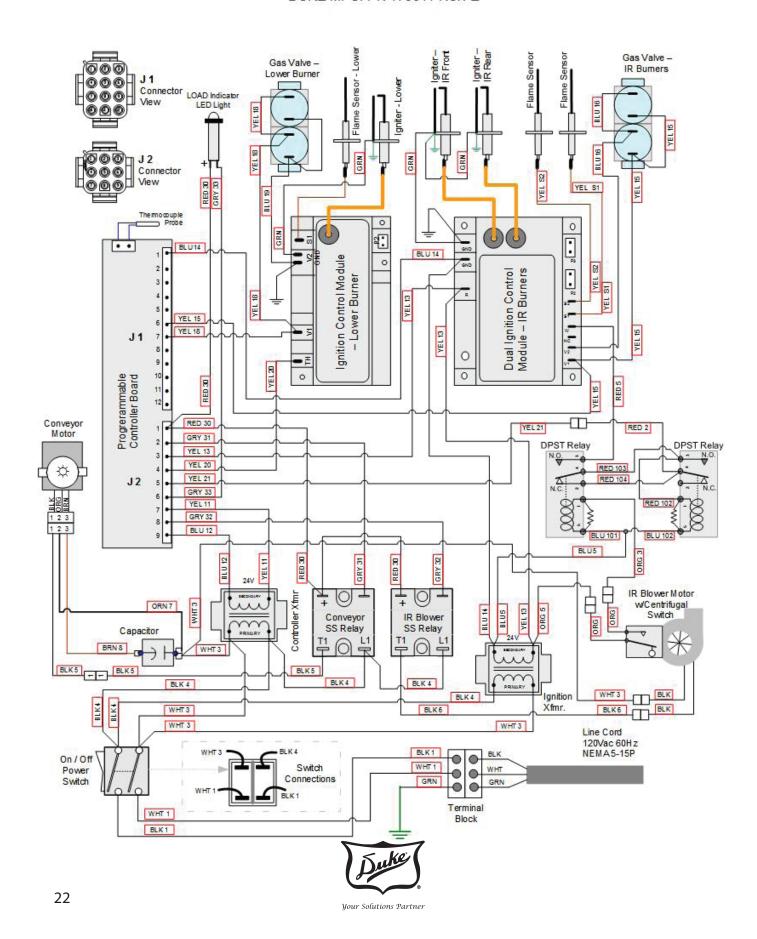
Install all remaining panels making sure wires are not pinched or exposed.





#### ELECTRICAL SCHEMATIC - FLEXIBLE BATCH BROILER

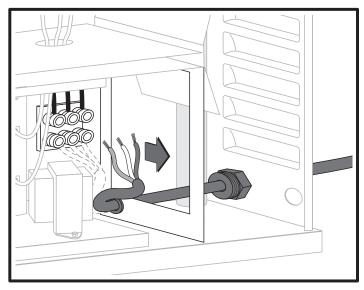
DUKE MFG. PN 175611 Rev. E.



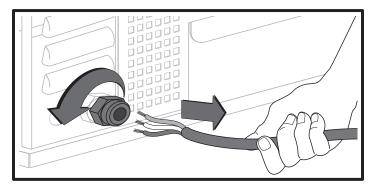
## **VII. LP With Purge Blower**

## **Unit Wiring:**

**Step 1** - Disconnect the main power cord from the terminal block.



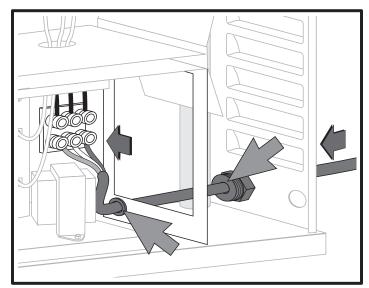
**STEP 2** - Loosen the strain relief nut and remove the power cord from the unit.



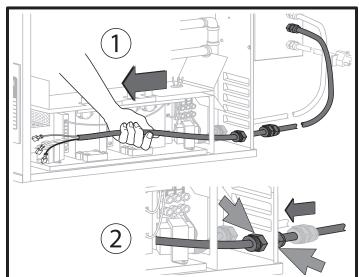
**STEP 3** - Route the harness power cord (preassembled in the blower assembly) through the strain relief and the bushing in the divider wall.

**STEP 4** - Connect the harness to the terminal block as shown and per the enclosed wire diagram.

**STEP 5** - Firmly tighten the nut on the strain relief to secure the cord.



**STEP 6** - Remove the bulkhead jam nut from the strain relief and route the harness through the strain relief hole drilled previously. Once the harness is routed through the hole, re-install the bulkhead jam nut and fasten the strain relief to the panel/bulkhead. Make sure the harness length is long enough to make the connections to the ignition module and firmly tighten the nut to secure the cord.

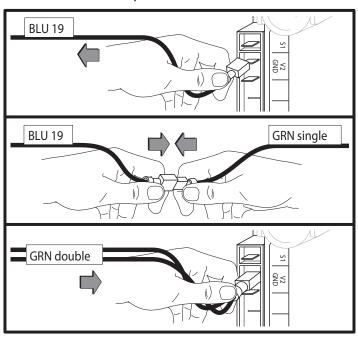




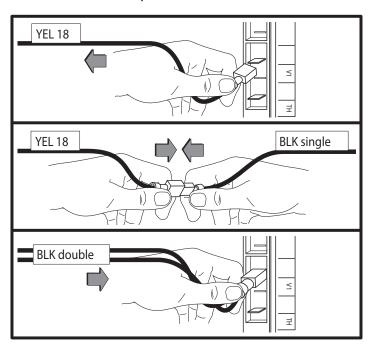
## VII. LP With Purge Blower - continued

**STEP 7** - Following the wire diagram, make the following connections on the ignition module:

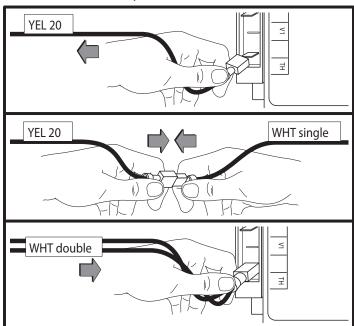
a. Disconnect BLU 19 from V2 and connect with the GRN wire (single wire). Connect the GRN double crimp to V2.

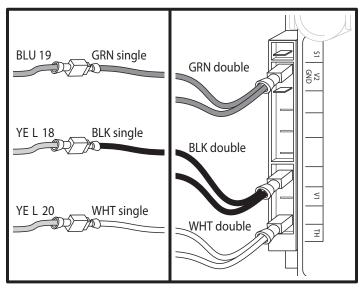


b. Disconnect YEL 18 from V1 and connect with the BLK wire (single wire). Connect the BLK double crimp to V1.



c. Disconnect YEL 20 from TH and connect with the WHT wire (single wire). Connect the WHT double crimp to TH.





**NOTE**: ENSURE THAT ALL CONNECTIONS ARE TIGHT.

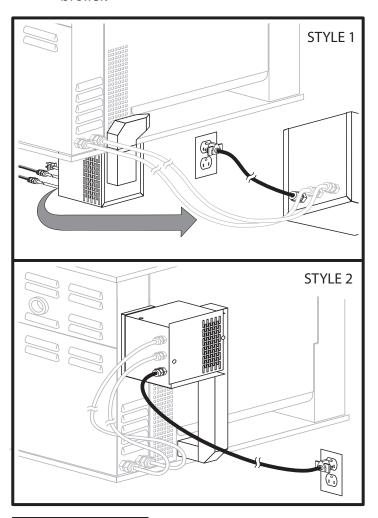


## VII. LP With Purge Blower - continued

#### **Blower Assembly Test:**

**STEP 1** - Connect the power cord on the blower box assembly to the facility electrical power.

**NOTE:** Only one outlet is required to power the broiler.



**STEP 3** - Verify the blower turns on after approximately 7 seconds. It will stay on for approximately 5 seconds until the re-attempt cycle.

- **a.** If you confirm the blower turns on: Turn off the broiler and proceed to the next step.
- **b. If the blower does not turn on: STOP** and call for Service.

# **CAUTION**

The following steps will conduct a functional test on the blower assembly. With the gas supply turned off, the blower assembly should run after the first failed burner ignition.

**STEP 2** - With the gas supply off, turn on the broiler.





# **NOTES**





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