ATTENTION!!

DO NOT PLACE OBJECTS
DIRECTLY ON BOTTOM
HEATING PANEL.
THIS WILL SHORT OUT
THE HEATING PANEL AND
VOID WARRANTY

PLACE THE **STAINLESS** HEARTH PLATE (THAT WAS PROVIDED WITH THE FURNACE) IN THE FURNACE CHAMBER ON THE HEARTH SUPPORT BRICKS. SHOULD WARPING OCCUR, THE STAINLESS HEARTH PLATE CAN BE STRAIGHTENED. **DO NOT USE A STEEL HEARTH PLATE AS IT WILL FLAKE AND SHORT OUT THE PANELS.**

MIFCO
McEnglevan Industrial Furnace Company, Inc.

Dear MIFCO Customer:

We would like to thank and congratulate you on the purchase of the McEnglevan machine and accessories, and to share with you our confidence in the quality and reliability of our equipment.

The enclosed Operating Manual is important.

1. Proper instruction on the maintenance of your machine is very important. Please read your instruction manual completely for best results and maximum machine tool life.

Should you ever need service, it is available through the distributors, or directly from the factory. It is the obligation of our franchised distributor who sells you this equipment to conduct field service where possible. Please contact your local distributor first and they will assist you in resolving any problems you may encounter.

We take pride along with you in your purchase of this equipment. We will be happy to assist you in any way possible to receive optimum results in its operation and use.

DO NOT REMOVE THIS PAGE

For all MIFCO heat treat furnaces (gas or electric):

In accordance with the National Electric Code, A.G.A., Canadian Standard Association and O.S.H.A. recommendations, this specification sheet must remain a part of this manual. Most of the components are U.L. and A.G.A. listed. The control panel wiring is designed to conform to the specifications of the National Electric Code.

This manual contains the electrical wiring schematic applicable to this particular piece of equipment. If there are any questions, please contact your distributor or the factory. Only licensed electricians or qualified factory representatives should troubleshoot the electrical system of this equipment.

All furnace electric power must be connected to electrical disconnects.

All fuel lines must have manual shut off valves.

Purchased from _____ Date _____

City _____ State _____

Model Number _____ Serial Number _____

Electrical Service Specifications

_____ volts _____ Phase _____ Hertz

Note: Schematic drawings showing different voltages, phase and hertz may be included in this manual.

Furnace Installation and Setup-DU AND HT MODEL FURNACES

1. Cut all banding, remove shrinkwrap and remove furnace from skid. Be sure to locate hearth plate in packing materials and set aside.

2. Set furnace in place, allowing at least a 24 inch clearance around the unit on all sides.

3. Install electrical power according to local code and regulations. See electrical drawing included in this booklet.

4. Check rotation of chamber recirculating fan.

5. Read and follow New Furnace Break-In Procedure which follows.

6. Read and follow Electric Heat Treat Furnace Start-Up Procedure which follows.

Maintenance

Grease bearings every 200 hours

Grease door every 6 months

Check belts every week

New Furnace BREAK-IN Procedure

• These instructions apply to the following MIFCO models: HTE46, HTE-88, HTE-1212, HTE-1414, HTE-2020, HTE-2424

- These instructions apply to the upper chambers of the following MIFCO models: DU-614, DU-1020, DU-1224, DU-2020

It is important for your new furnace to be slowly heated and dried before using. The high temperature cast insulation that helps make your MIFCO furnace energy efficient and fast heating contains moisture trapped during the casting process. Setting at room temperature will not remove it. This moisture will be present as both liquid water and steam, therefore the heating process must follow the steps listed below or the warranty may be voided. Follow these steps closely. It will help insure that you get the maximum performance from your new equipment.

Step 1. After all electrical connections have been made, turn the furnace on and set the temperature controller at 200 degrees F. The furnace should be allowed to run at this setting for approximately 24 hours for complete drying. If this is impractical or impossible, allow the furnace to run at this temperature for as long as possible. Note: liquid water and steam will be visible for most, if not all, of the drying process. The temperature, as shown on the temperature controller display, may fluctuate above and below the 200 degree setpoint. This is acceptable because good control is not always easy at this low temperature when moisture is present, especially in the high temperature chambers.

Step 2. After drying, the temperature should be raised to 1200 degrees F and allowed to "soak" at this setting for approximately 1-2 hours.

Step 3. Set the furnace temperature to 1300 degrees and hold for one hour.

Step 4. Set the furnace temperature to 1400 degrees and hold for one hour.

Step 5. Set the furnace temperature to 1500 degrees and hold for one hour.

Step 6. Set the furnace temperature to 1600 degrees and hold for one hour.

Step 7. Set the furnace temperature to 1700 degrees and hold for one hour.

After Step 7 has been completed, the furnace may be cooled down or can be used at a higher temperature for heat treating. These 7 steps need to be completed only once. The furnace may now be used as needed.

ALL KEARNY NUTS / COPPER LUGS THAT CONNECT WIRES TO HEATING ELEMENTS NEED TO BE CHECKED AND RE-TIGHTENED ABOUT ONCE A MONTH UNTIL THEY STOP NEEDING TO BE TIGHTENED.

AT LEAST ONCE A MONTH, REMOVE THE HEARTH PLATE AND VACUUM ANY SLAG OFF OF THE BOTTOM HEATING ELEMENT. THIS WILL HELP SUSTAIN LIFE OF THE ELEMENT.

Electric Heat Treat Furnace Start-Up Procedure **06/2016**

MIFCO heat treat furnaces are very easy to operate. The furnace has been thoroughly tested and calibrated at the factory. The following steps will get the furnace running and if you refer to the easy, one page start-up guides for your particular instrument, the setpoints and programs can be entered. Included with this manual are the instrument manual CDs from the manufacturer.

Start-Up

1. Press the start button or flip the toggle switch to on. The instrument will go through a brief self diagnostic and then display the current temperature.

2. Enter a setpoint into the controlling instrument, per instructions for that instrument on the following pages.

3. If there is a high limit instrument, there must also be a setpoint entered into it that is 25 to 30 degrees higher than the controlling instrument setpoint. This can also be left at its maximum temperature setting (default setting from the factory). The primary purpose of the high limit instrument is to protect the heating panels (in high temperature models designated HT) from overheating in the event of a problem with the main temperature controller. The default is set to the chamber maximum setpoint at the factory. The secondary purpose of the high limit is to protect parts from going over a maximum setpoint, as a backup to the main temperature controller.

4. The chamber should proceed to the setpoint and hold at temperature with no further adjustments.

Shut-Down

5. Turn the setpoint on the controlling instrument down to 100 degrees or less and open the chamber door. Allow the furnace to run until the chamber falls below 200 degrees F. This will protect the bearings on the fan shaft, if equipped. In the low temperature furnaces (LT models,and lower chamber of DU models) that contain stainless work chambers, the fan will continue to run automatically with the door open. **Failure to follow this procedure will reduce the life of the bearings on the fan shaft and they will not be replaced under the machine warranty.**

This is intended as a quick reference guide and should not be substituted for reading the product manual!! The purpose of this sheet is to get the furnace up and running quickly and simplify operation in the beginning.

Your new furnace was tested at the factory prior to shipping and the instrument(s) were tuned for optimum performance. There should be no need for further adjustment in the field. It is also locked out on several levels to prevent unauthorized changes. If you have problems, CALL MIFCO!

Note: This lockout is installed for your protection. If you feel the need to change the factory parameters, call MIFCO first! We will discuss your needs and help you through the process.

Operation of the Watlow F4 Control Instrument

To start the furnace, press the start button or flip the toggle switch to on. The instrument will power up automatically and display the process temperature in the upper display and the setpoint in the lower display. To change the setpoint, press the UP or DOWN buttons and hold until the desired setpoint is reached. (The longer the button is held, the faster the numbers will change.) The furnace will operate automatically from that point on.

Operation of the Watlow EZ-Zone High Limit Instrument

The high limit instrument is relatively simple to operate. It comes prefigured with maximum high limit setpoints in place and these operate automatically when the furnace is run.

The purpose of the high limit system is to protect the furnace in the event the main control fails and the furnace attempts to "run away". In high temperature furnaces and the upper chamber of the dual chamber units, this value is pre-set by MIFCO at 2250 deg F; in the low temperature ovens and the lower chamber of the dual units, this value is pre-set at 1225 deg F. The only reason to adjust the setpoint would be to protect a particular process from overheating (at some temperature below the maximum temperature of the furnace or oven). If adjustments are required, set the high limit setpoint at a value of approximately 30 degrees greater than the main controller's setpoint. Please call the factory for details on this procedure.

Operation of the Watlow Programmable Instrument

(if ordered with your unit)

Entering a Ramp/Soak Profile

There are questions that have to be answered for each step when a profile is being created that tell it to perform certain functions, or to observe certain parameters. It is also strongly suggested that you refer to the chapter on Profile Programming, on the Watlow CD supplied with this operating manual for further details pertaining to creating profiles.

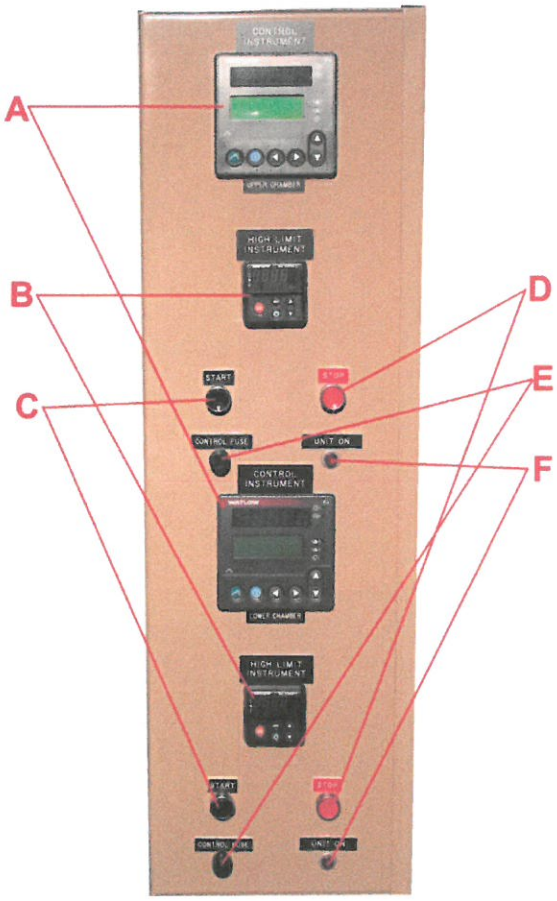
To run the profile, press the profile button in the lower left corner of the instrument. It will ask which profile you with to run. Select the profile, right arrow out of the group, and the profile will start. You can confirm this by referring to the lower display. Line 3 reads out the current step, line 4 tells the time remaining for that step, and line 5 tells the actual time in 24 clock readout. To stop a profile, press the profile button again and tell the instrument to terminate the profile. Right arrow out of the group and the profile terminates. The Setpoint 1 reading will say OFF. Arrow down to the Setpoint 1 and right arrow into it, enter a setpoint again and right arrow out of the group and a new setpoint will be entered.

Watlow EZ-Zone Temperature Controllers

The HTE46, E4-0 and the EM-810 furnaces are equipped with the Watlow EZ-Zone temperature controller. These are pre-tuned at the factory for optimum performance and the furnace is tested at two temperature setpoints. When you receive your unit, all you need to do is apply power, turn the toggle switch to the on position and the unit will begin heating to one of the last setpoints from the factory. The instrument has an upper and a lower display. The upper display is the process temperature, and the lower display is the current setpoint. All that is needed to change the setpoint is to depress the upper or lower arrows on the right hand side of the instrument and the setpoint in the lower display will begin to change up or down. The speed of change will increase the longer the button is depressed.

There is no need for further tuning of the instrument, but if you wish to, please consult the supplied operating manual (on CD) from Watlow before attempting to do so.

DU Outside Cabinet Parts Listing 6/16/2016



A	004206 Watlow control instrument F4PH-CAAA-01RG or 004190 Watlow control instrument F4SH-CAAAA-01RG if optional programmable control
B	004515 Watlow high limit instrument PM6L1EJ-AAAAAAA
C	003662 Black start switch
D	003663 Red stop switch
E	003624 5 amp fuse
F	003906 Red indicator light

- Alarm bell or light will have toggle switch 003666 to the right of letter B

06/2016

DU1020 Cabinet Parts Listing-refer to picture on following page

230v, 3ph:

A	003932 C25BNB220A contactor
B	003939 XTOB004CC1 relay
C	003930 XTCE025C10A contactor
D	003604 LR25030-3CR fuseholder
E	003917 B100BTZ13JK transformer
F	004318 Hammond filter fan kit
G	004209 CVC6HC00001250C Watlow instrument
H	004319 Hammond exhaust filter kit
I	003606 LR25060-3CR fuseholder
J	003584 DC20-24C0-0000 SCR
K	003910 LFT30060-2CR fuse holder
L	003936 C25DNF340A 3 pole contactor

Not shown in picture:

For alarm bell option:

004550 SSR-240-10A-DC1 solid state relay (located in top of cabinet)

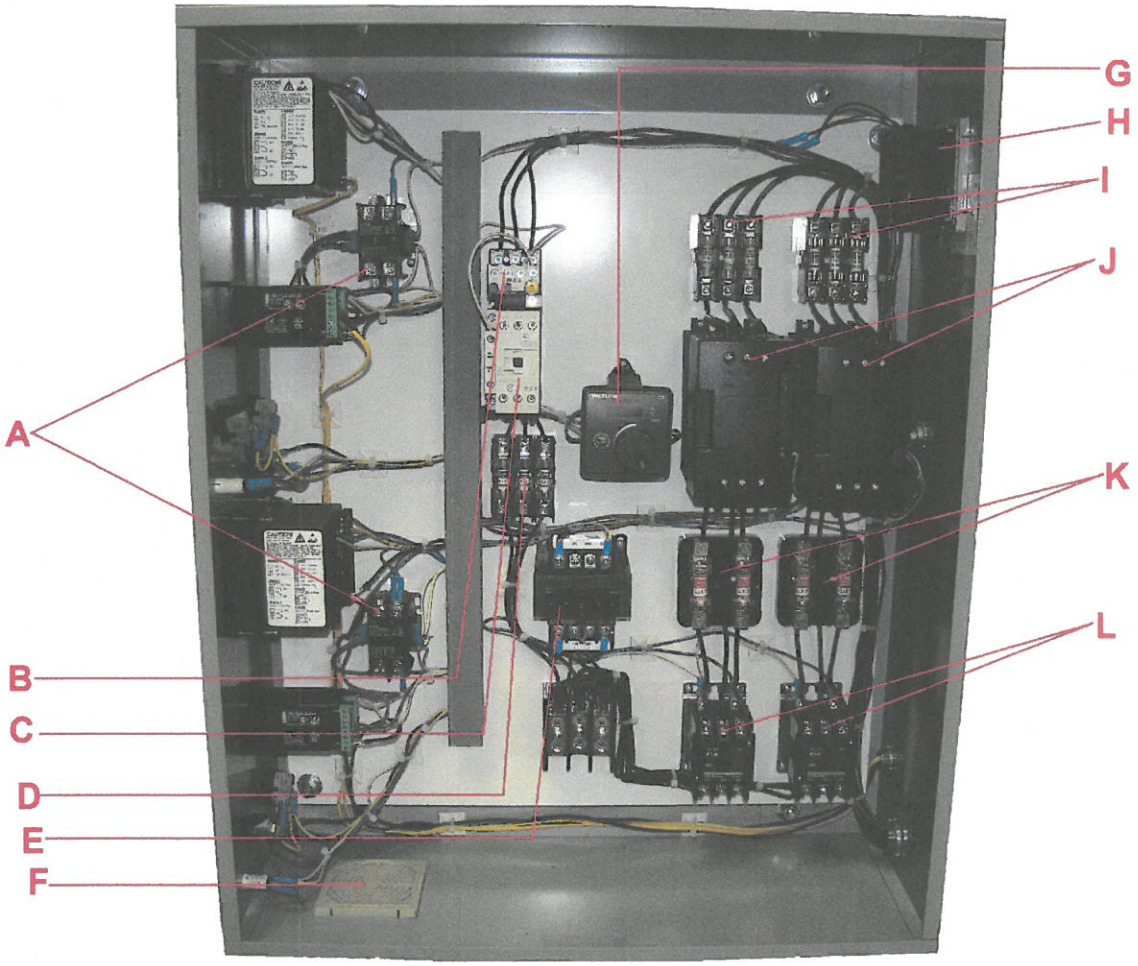
11/13/14

DU1020 Cabinet Parts Listing-refer to picture on following page

460v, 3ph:

A	003932 C25BNB220A contactor
B	003971 XTOB2P4CC1 relay
C	003930 XTCE025C10A contactor
D	003612 L60030M-3C fuseholder
E	003917 B100BTZ13JK transformer
F	004318 Hammond filter fan kit
G	004209 CVC6HC00001250C Watlow instrument
H	004319 Hammond exhaust filter kit
I	003612 L60030M-3C fuseholder
J	003585 DC20-60C0-0000 SCR
K	004184 LFT60030-2C fuse holder
L	003936 C25DNF340A 3 pole contactor

DU1020 Standard Control Cabinet

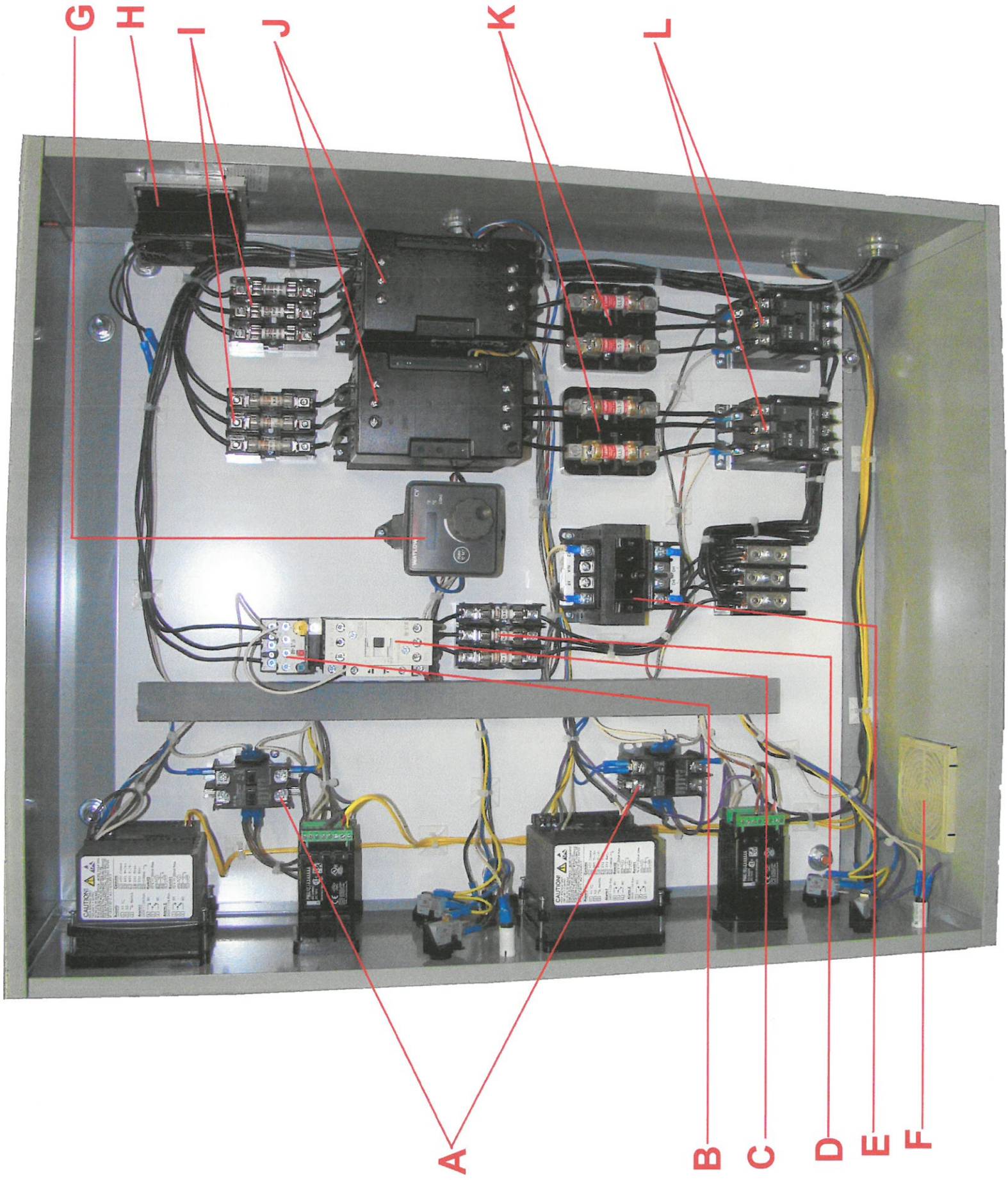


11/17/14

DU1224 Cabinet Parts Listing-refer to picture on following page

460v, 3ph:

A	003932 C25BNB220A contactor
B	003971 XTOB2P4CC1 relay
C	003930 XTCE025C10A contactor
D	003612 L60030M-3C fuseholder
E	003917 B100BTZ13JK transformer
F	004318 Hammond filter fan kit
G	004209 CVC6HC00001250C Watlow instrument
H	004319 Hammond exhaust filter kit
I	003612 L60030M-3C fuseholder
J	003585 DC20-60C0-0000 SCR
K	004184 LFT600303C fuse holder
L	003936 C25DNF340A 3 pole contactor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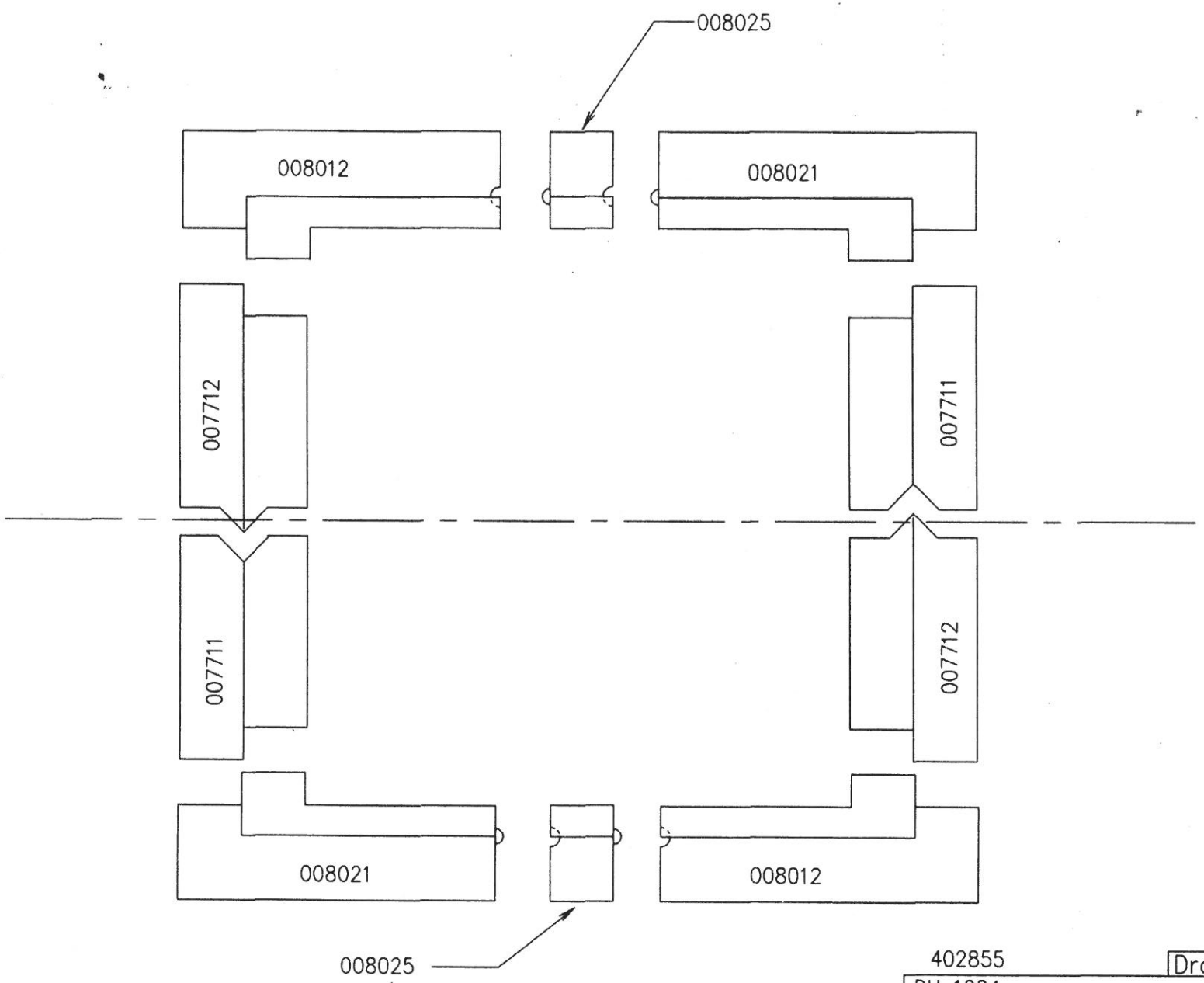


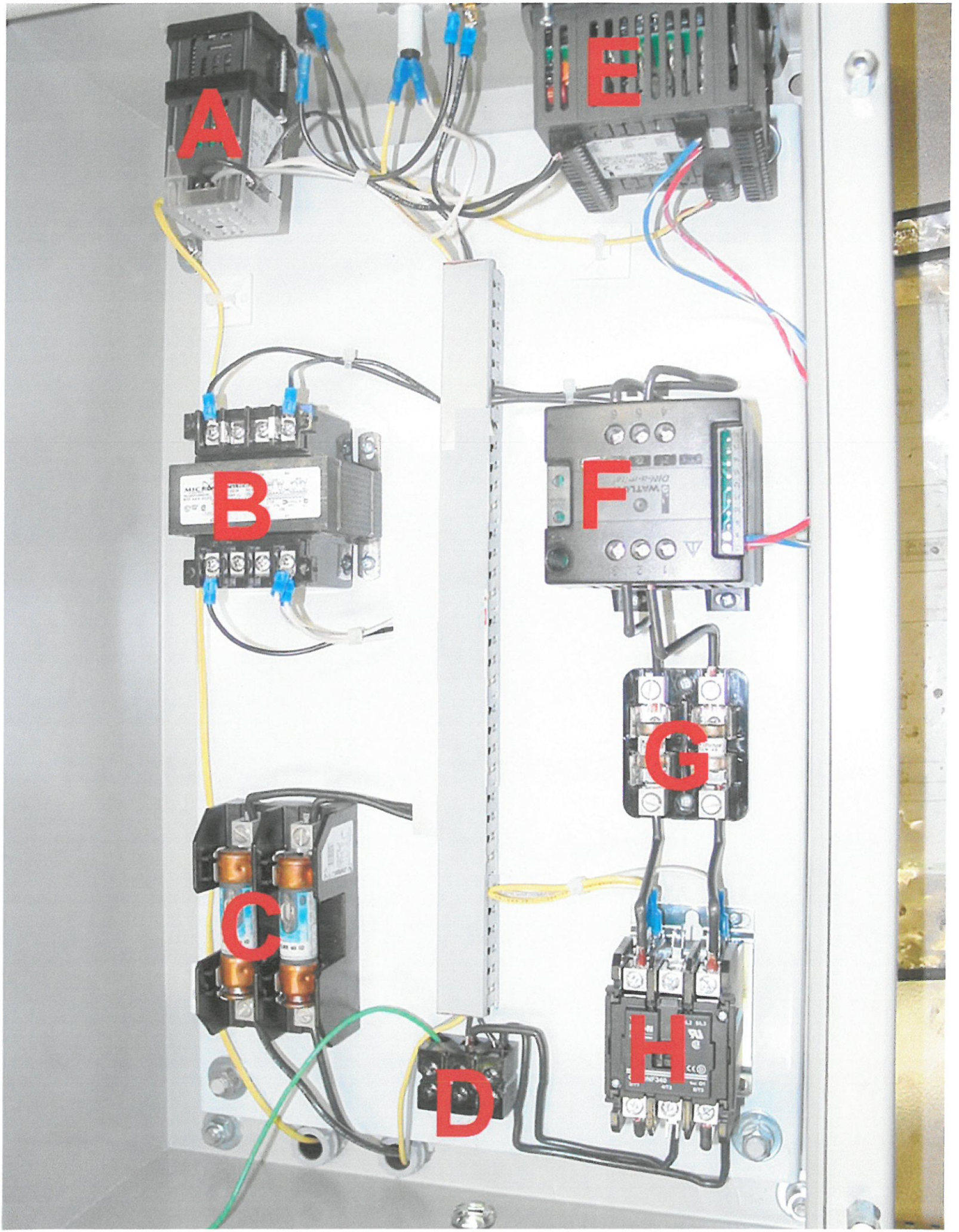
402855	Drawn By Bill Walter
DU 1224	
Door frame brick assembly	1 Per Unit
Mat.	
M I F C O	10/12/2009

7/30/2015

HTE88 Cabinet Parts Listing- refer to picture on following page

220v 1 ph

	Part#	Description
A	004515	EZ Zone High Limit Watlow Instrument
B	003917	Transformer B100BTZ13JK
C	003636	FLNR040ID fuse (uses 003608 LFR25060-2ID fuse holder)
D	003877	Power block 985GP03
E	004190	F4SH-CAAO-O1RG programmable Watlow Instrument
or	004206	F4PH-CAAA-01RG std Watlow Instrument
F	003587	DB10-24C0-0000 Watlow SCR
G	003574	JLLN045 45A fuse 300v (uses 003910 LFT30060-2CR fuse holder)
H	003936	Contactor 3 pole 40 amp C25DNF340A


A
E
B
F
G
C
H
D

09/01/2015

HTE1414-I Cabinet Parts Listing-refer to picture on following page

240v, 1ph :

A	004206 F4PH-CAAA-01RG standard Watlow instrument
B	003591 DC11-24F0-0000 SCR
C	003874 JLLN80 fuses
D	003907 C52FNF375A contactor
E	004515 PM6L1EJ-AAAAAAA hi limit Watlow instrument
F	003917 B100BTZ13JK transformer
G	003595 FLNR80 fuses
H	003877 Terminal block 985GP03


A
B
C
D
E
F
G
H
CAUTION!
HTE-1414I, 240/1
F4PH-CAAA-01RG
PM6L1EJ-AAAAAAA
9/1/15

460v, 3ph programmable:

A	004190 F4SH-CAAO-O1RG Watlow instrument
B	004508 DC20-60F0-0000 SCR
C	003573 JLLS030 fuse or Mersen A6T30
D	003936 C25DNF340A contactor
E	004515 PM6L1EJ-AAAAAAA hi limit Watlow instrument
F	003917 B100BTZ13JK transformer
G	003653 KLKR30 600v fuse
H	003877 Terminal block 985GP03