

BROASTER® E-SERIES 24

SERVICE MANUAL BROASTER® E-SERIES 24 PRESSURE FRYER

Be sure ALL installers read, understand, and have access to this manual at all times.



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Broaster Company
2855 Cranston Road, Beloit, WI 53511-3991
608/365-0193 broaster.com

FOR YOUR SAFETY

Do not use or store gasoline or other flammable vapors or liquids in the vicinity of this or any other appliance.

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

For the sake of safety and clarity, the following words used in this manual are defined as follows:

⚠ DANGER Indicates an imminently hazardous situation which, if not avoided, could result in serious injury or death.

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

⚠ CAUTION Indicates a potentially hazardous situation which, if not avoided, could result in minor injury, property damage or both.

All adjustments and repairs shall be made by an authorized Broaster Company representative.

⚠ WARNING Failure to read and understand this manual completely could result in serious injury or death. Be sure ALL operators read, understand and have access to this manual at all times.

⚠ WARNING Rags or paper containing cooking oil can catch fire if exposed to heat. Laundering will not remove the oil. Dispose of all oil-soiled papers and rags in a trash container that is in a ventilated area away from all cooking equipment or other heat sources such as direct sunlight.

⚠ WARNING If at any time the POWER ON light does not turn off when the power switch is moved to the OFF position, disconnect the power to the fryer and contact your local Broaster Company representative for service immediately.

⚠ WARNING DO NOT operate unit without filter pan and filter pan cover in its proper position. Filter pan cover must be wiped clean after each filtering cycle. Make sure Pressure Relief Valve and Pressure Gauge ports on bottom of cover are clear of any oil or grease buildup.

⚠ WARNING Make sure Pressure Relief Valve and Pressure Gauge ports on bottom of cover are clear of any oil or grease buildup.

⚠ WARNING Make sure a restraining device is used that complies with the Standard for *Commercial Gas Ranges*, ANSI Z83.11/ CSA 1.8 to guard against transmission of strain to the gas connectors.

Failure to restrain the fryer could allow it to move, causing hot shortening to spill out, or a possible break in the gas line causing an explosive condition.

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SERVICE NOTES

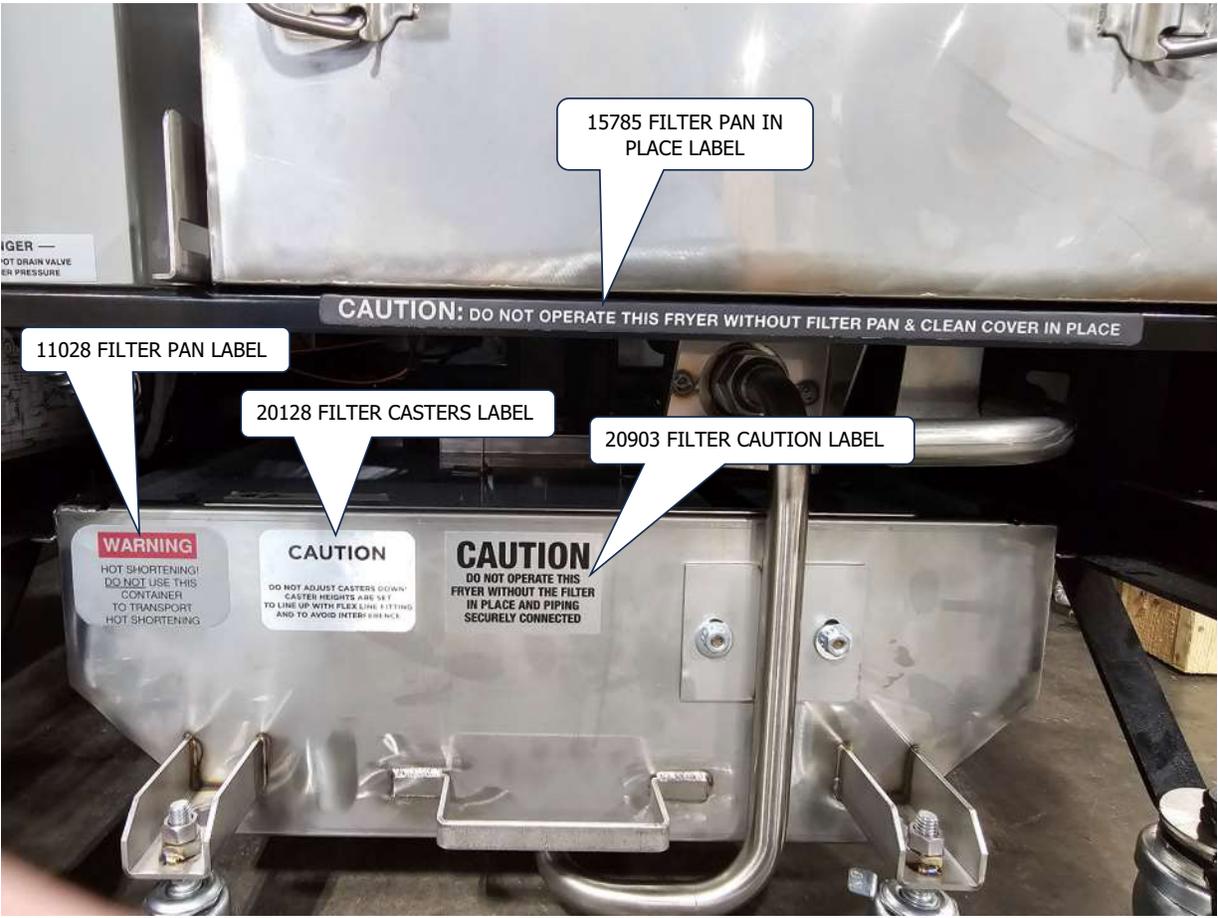
1 - WARNING SIGNS

When servicing a Broaster® pressure fryer, be sure all safety devices and warning signs are in place and legible. If not, the Broaster Company should be notified in writing of the lack of warning signs and the existence of an unsafe condition.

If you need replacement warning signs or manuals, contact an authorized Broaster Company representative or the Broaster Company Service Department at:

(608) 365-0193





2 - ELECTRIC POWER SUPPLY

⚠ WARNING The ES24E is designed to operate on 3-phase input **ONLY. DO NOT** connect to 1-phase power.

⚠ DANGER Many sections in this manual pertain to checking and repairing electrical components. **High voltage will be encountered in several instances. Only persons trained and equipped for checking high voltage shall undertake such repairs.**

If no component operates, check main power supply. Be sure main circuit breaker is ON and main fuses are good.

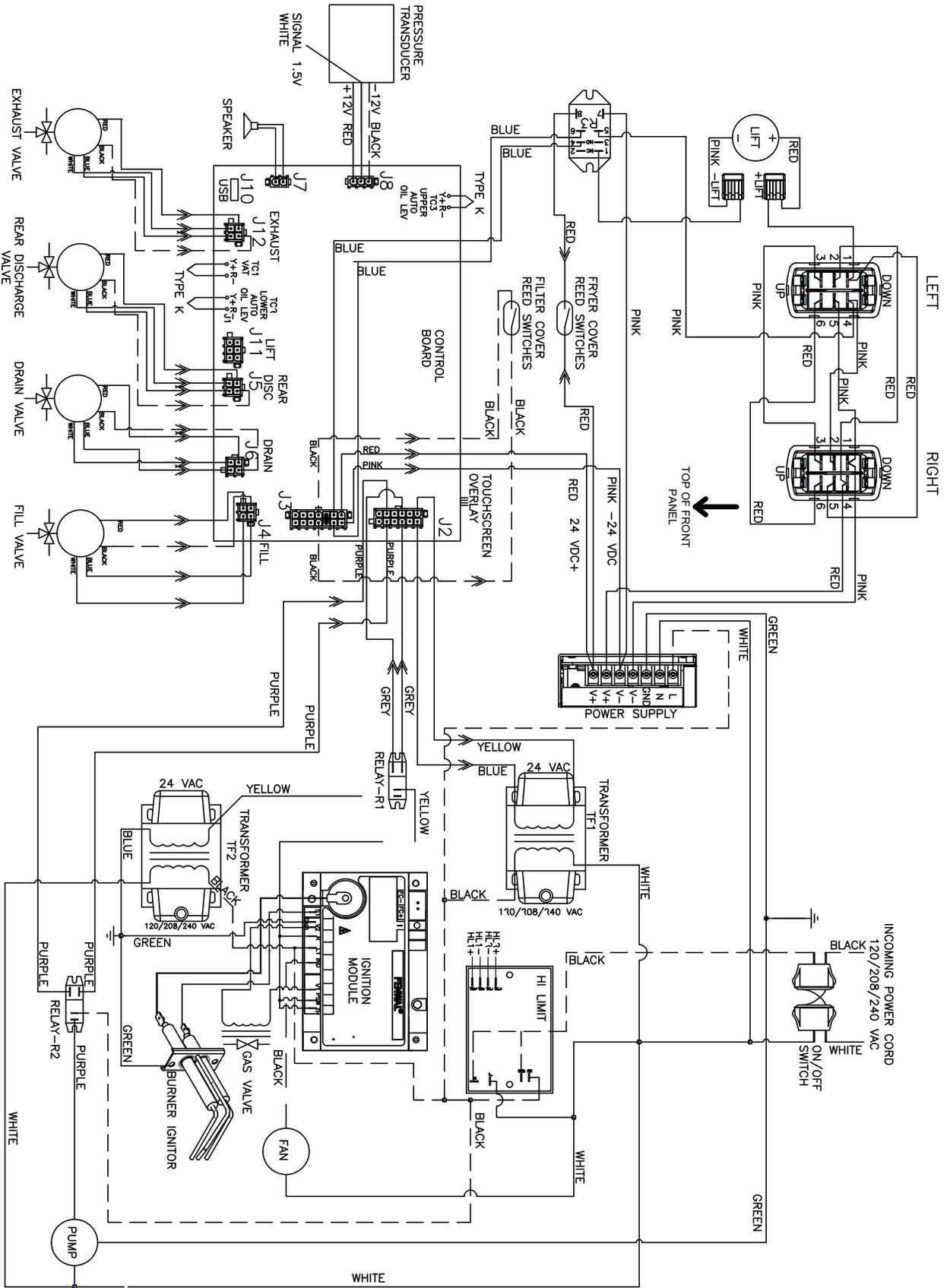
Input Voltage Specifications:

ES24G	120 VAC, 1PH
ES24E	208 or 230 VAC, 3PH

Perform the following if unit will not turn on:

1. Disconnect main power supply.
2. Be sure all connections are tight. If power supply is proper, see TROUBLESHOOTING section.

ES24G Wiring Diagram:



WIRE DIAG ES24G #219333

ES24E Wiring Diagram:

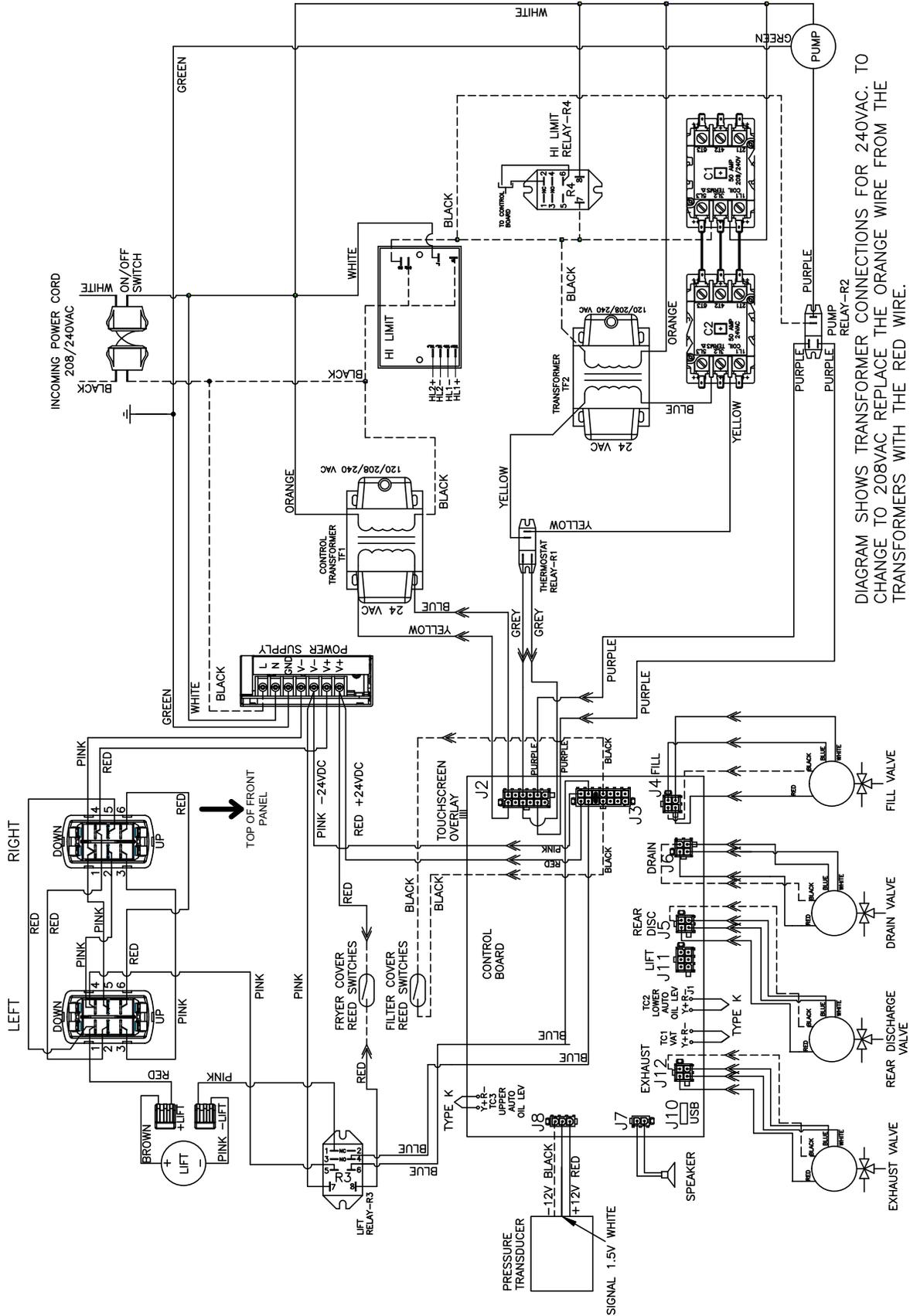


DIAGRAM SHOWS TRANSFORMER CONNECTIONS FOR 240VAC. TO CHANGE TO 208VAC REPLACE THE ORANGE WIRE FROM THE TRANSFORMERS WITH THE RED WIRE.

22202 WIRE DIAGRAM ES24E

3 - SOLID STATE CONTROL PANEL



SMART TOUCH FAMILIARIZATION

1. Power Switch: This switch has two positions: ON (UP) or OFF (DOWN).

2. Touch Control Screen: Touching this screen controls the many options of the fryer.

3. Dual Cover Lift Switches: These switches control the cooking well cover. Both for down, one for up.

INITIAL SETUP:

On initial power up you may be asked to enter the current date and time, and verify the Serial Number. If the date and time entry screen appears press the box after “Month” and a keypad will appear. Enter the number of the month and press the enter key. Repeat this action for the Day, Year, Hours, Minutes, AM and PM boxes. When finished press the green OK button in the bottom right corner of the screen. The next display will ask you if this date should be used to establish the warranty start date. Press the green OK button.

You will then see a display asking you to verify the serial number of your fryer. Enter the serial number using the keyboard and press enter.

NOTICE

The date/time display and the serial number display will not appear again when the power switch is turned off and back on.

A CAUTION screen will appear to remind you to check the oil level before the heating elements or burner are activated. If the oil is at the proper level, press the green OK button in the bottom right corner of the screen.



COOK TAB

Along the top of the screen are four tabs (Cook, Manage Oil, Setup and Help) to help you setup and use your fryer.



This tab is the main working screen. From this screen you can set the Cook Cycle Time, Cook Temperature, or select a Product Preset.

CookTime Display:



The cook time is indicated in the box next to the clock face. To change the time press the time display twice and a keypad will appear.

Enter the cook time for the product you are cooking, as you enter the time it will appear above the keypad. To save this time press the enter key and the new time will be entered and the keypad will disappear. If no entry is made or the enter key is not pressed within 25 seconds, no change is made to the time.

When a cooking cycle is started the box below the cook time turns yellow and shows the amount of time remaining in the cycle. The right box displays “CUSTOM”. The word “CUSTOM” also replaces the tabs across the top of the display. “CUSTOM” indicates you are in manual cooking mode.

At the end of the cycle the left box alternates between red and white, the alert sounds and continues until the exhaust valve opens automatically.

Auto Comp

In the upper right corner of the cook time display is the Auto Comp indicator. It will be black if Auto Comp is off and green if Auto Comp is on.

To turn Auto Comp on or off press the cook time display twice. When the keypad appears the Auto Comp toggle switch is in the upper right corner of the keypad. If the button is red Auto Comp is off, if it is green Auto Comp is on. Press the Auto Comp button to change it then press the enter key.

The Broaster Company recommends Auto Comp should be on when cooking a load of product.

The temperature is indicated next to the thermometer.



When the fryer is turned on in the morning this box will be yellow and “Heat On” will be displayed. The temperature will alternate between “LOW” and the set temperature until the oil temperature reaches the set temperature.

There are other times when this will occur;

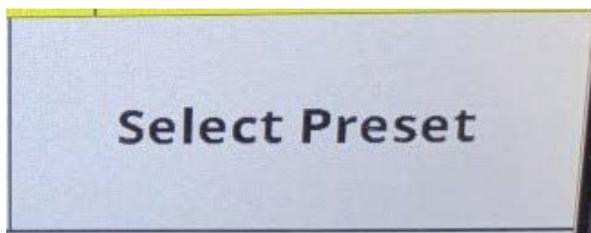
1. Anytime the temperature is changed.
2. After a filtering cycle.
3. When a preset is selected and the oil temperature is not at the preset temperature.

In any of these cases when the oil temperature reaches the set temperature the box turns green indicating the oil is up to the set temperature.

The temperature shown in this box can be either the “Set” temperature or the “Actual” temperature as indicated above the thermometer. To change from one to the other press and hold anywhere in the temperature box for 3 seconds. An alert will sound when you press the box and a second alert will sound when the change is made.

To set the temperature, press the temperature box twice and a keypad will appear. Enter the temperature for the product you want to cook, as you enter the temperature, it will appear above the keypad. To save this temperature press the enter key.

Select Preset Display:



There are 2 “Select Preset” boxes.

All of Broaster Company’s products are pre-loaded into the memory of the control and can be selected when you want to cook that product. The cook time and cook temperature for that product will be automatically entered in the Time and Temperature displays.

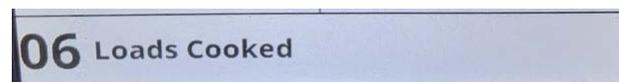
To select a product, press the preset box and a menu of the products will be displayed. Tap the product you wish to select. If the wrong product comes up, don’t worry! Tap the preset box again and the menu will reappear.

When the item has been selected a picture of the item will appear in the left box and a description of the item will appear in the right box. When a cook cycle is started the left box turns yellow and the time remaining in the cycle is displayed. The picture moves to the right box.

If the menu item to be cooked uses a different temperature the temperature box will either remain green meaning it is all right to start a cook cycle or it will turn yellow meaning the temperature is too low to start a load. Wait until the temperature display turns green before starting a cook cycle.

When the temperature box is green. Load the product into the well and close the cover for auto start of pressure cook or touch start for open fry. This will start the cycle timer counting down. When the load is done an alert will signal that the cooking cycle is complete.

Loads Cooked:

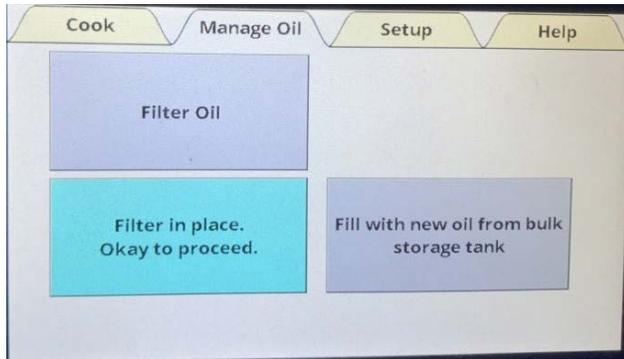


This indicates how many cook cycles have been completed since the last time the counter was reset, or the oil was filtered if the Auto Filter feature is turned off. The maximum cook cycles between filter cycles is 10.

After filtering, this number can be reset to 0 by tapping the box twice.

MANAGE OIL TAB

This tab has three rectangular areas with the following designations; **Filter Oil**, **Filter in place. Okay to proceed**, and **Fill with new oil from bulk storage tank**.

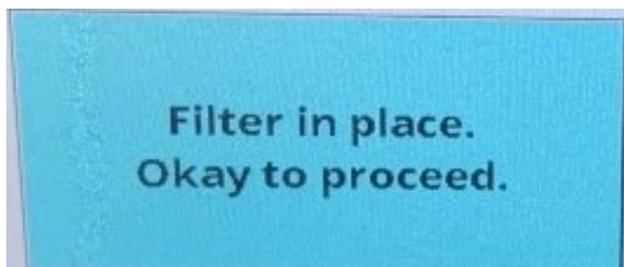


NOTICE

When the Manage Oil tab is selected and the filter pan is not in place, the only screen you can see is the manual filter screen with the Oil Pan Not in Place warning flashing red and yellow.



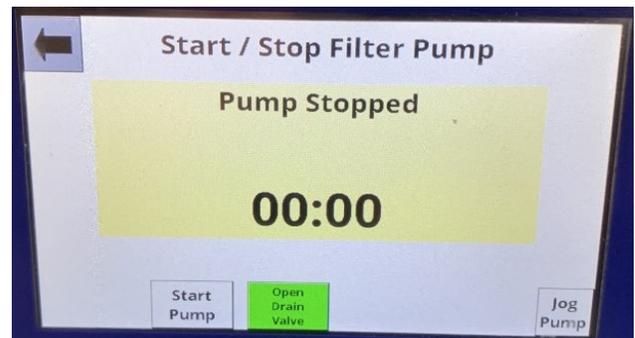
If the filter pan is in place, the Filter in Place, Okay to proceed field will be highlighted.



SEE SECTION 8 - COOKING OIL CARE AND FILTERING before starting the pump motor.

Filter Oil

When this area is pressed the Start/Stop Filter Pump screen appears.

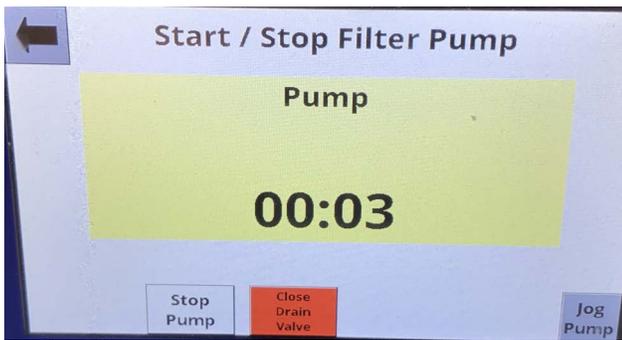


NOTICE

A CAUTION message will appear whenever the filter pan is not in place. For safety purposes, the drain valve can only be opened by pressing and holding the Open Drain Valve button for 3 seconds.

Press and hold the green **Open Drain Valve** button to drain the cooking oil into the filter pan. When the cooking oil is completely drained from the cooking well, press the **Start Pump** button.

When the **Start Pump** button is pressed the filter running display appears as shown. The **Start Pump** button changes to **Stop Pump** and the **Open Drain Valve** button will change from green to red and will say **Close Drain Valve**.



The timer in the middle of the screen starts counting up. When the timer reaches 5:00 minutes an alert sounds and a reminder flashes. To silence the alert, press the button with the speaker on it.

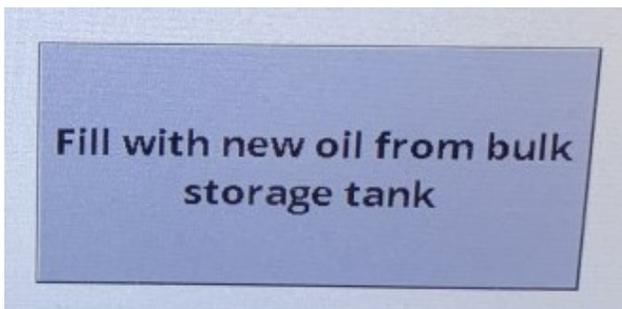
Press the **Close Drain Valve** button to return the filtered oil to the cooking well.

Allow the filter pump to run until it is pumping bubbles into the cooking well for 20-30 seconds. Press the **Stop Pump** button to stop the pump.

To return to the Cook Tab, press the back arrow button in the upper left corner. The Caution Display will appear advising the oil level be checked. If the oil level is OK press the green OK button.

Fill with new oil from bulk storage tank

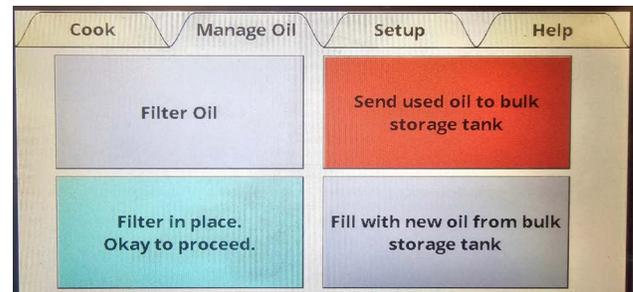
1. Select "Fill with new oil from bulk storage tank"



2. Screen will display "Initializing Fill Valve" you will hear the Fill Valve moving.

3. Press and hold Start Pump, release when a the desired oil level.

Send Used Oil to Bulk Storage Tank.



When the red field is touched, the drain and rear disposal valves will open and the pump start screen will appear.

Press Start to begin pumping oil to the bulk disposal system.

The pump will start and a timer will count up to a maximum of 5:00. Press Stop when all the oil has been removed from the cooking well. Check when complete to make sure filter pan is completely empty of oil.

Press the button indicated by the X in the upper left corner to exit to the Manage Oil tab. The valves will close and the Manage Oil tab screen will appear.

SETUP TAB

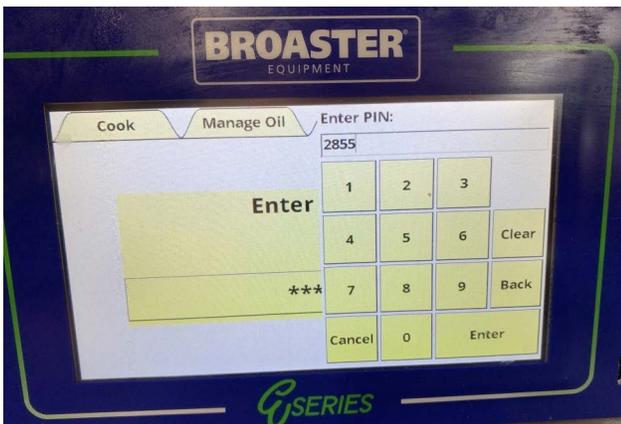
This tab may or may not be secured. If it is unsecured the Pin Disabled display will appear as shown below. Press the OK button to continue.



If this tab is secured the Enter Pin display will appear as shown below.



If the Pin number is known, press the box and a keypad will appear. Enter the PIN number and press Enter.



Setup Display:



Time & Date Adjustment:

Pressing this option opens the Set Date & Time display.

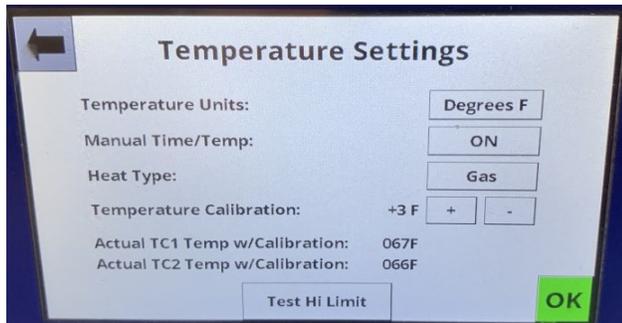


To set the date and time, press the box after "Month" and a keypad will appear. Enter the number of the month and press the enter key. Repeat this action for the Day, Year, Hours, Minutes, AM and PM boxes. When finished press the green OK button or the changes will not be saved.

To leave this display without making a change press the arrow in the upper left corner or the green OK.

Temperature:

Pressing this option opens the Temperature Settings Display.



The temperature scale can be set in this display to either Degrees F (Fahrenheit) or Degrees C (Celsius).

Pressing the Degrees box switches the units.

When Manual Time / Temp is set to ON, it allows changing the time, temperature, and pressure state of the recipe to a custom recipe.

When Manual Time / Temp is set to OFF, the time, temperature, and pressure state cannot be changed and only the preset menu item recipes are available.

Energy Save Setting:

Pressing this option opens the Energy Saving Settings display.

You have two options on this display:

OPTION 1: Energy Saving Option.

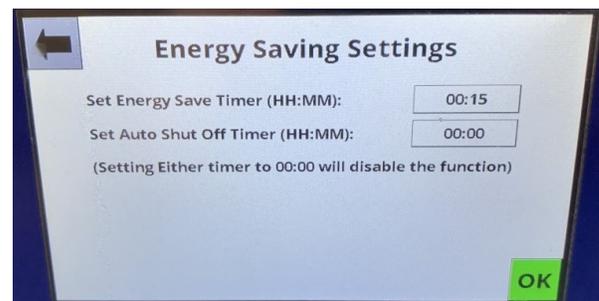
The fryer will go into this mode when the specified idle time has passed. When the fryer goes into the energy saving mode the oil temperature will drop to 270° F (132° C) and remain there until the fryer is prompted by pressing the green OK button, to resume the normal cooking temperature. When the fryer enters the energy saving mode the display shown below appears.



When the OK button is pressed the display returns to the normal Cook Tab display and the temperature will be yellow and Low and the set temp will be alternating. **DO NOT** start cooking until the temp display is green.

OPTION 2: Auto Shut Off Timer.

When this option is set, the control will shut off all heaters after the specified time, and the display shown below will appear.



Follow the instructions on the screen to resume use of the fryer.

For either of these options set the desired time by pressing the time button. A keypad will appear. Enter the desired time. As you enter the hours and minutes they will appear above the keypad. When the time is entered press the green OK button.

Pin Maintenance:

Pressing this option opens the PIN Maintenance display.

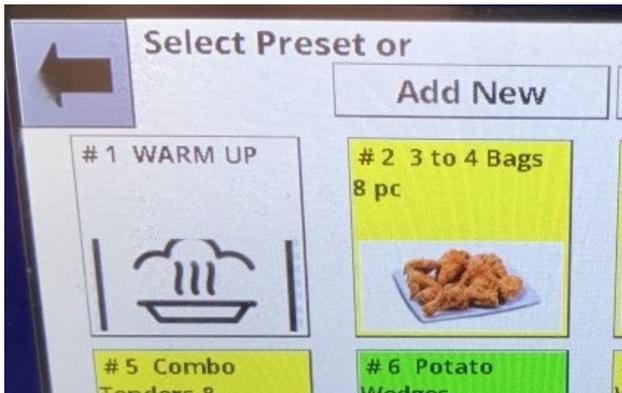


When the unit is installed there is no PIN set. To set a pin press the box next to PIN and the key pad screen will appear. Set the 4 digit pin you want and press enter. Press the box next to PIN on/off to turn the PIN on.

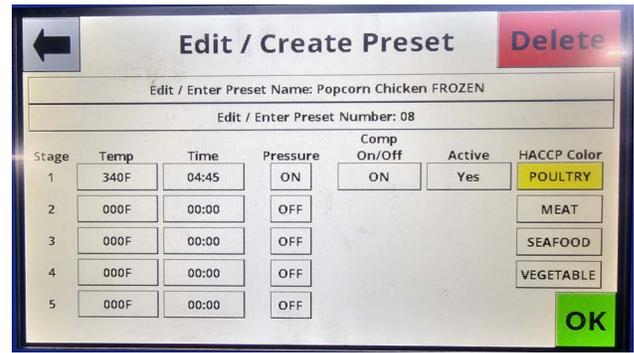
Presets:

Pressing this option opens a list of products with a picture of the product and the recipes pre-loaded.

Add new



Pressing this button opens a display to enter a new product to the menu list. This display is similar to the Edit display except all information must be added.



To enter the name press the Edit / Enter Preset Name bar and enter the name of the new product.

The Preset Number automatically defaults to the next number after the last item on the list. This can be changed by pressing the Edit / Enter Preset Number bar and entering the number where you want this item to appear.

Set the cook temperature, cook time, and pressurized / non-pressurized the same way as when editing a preset.

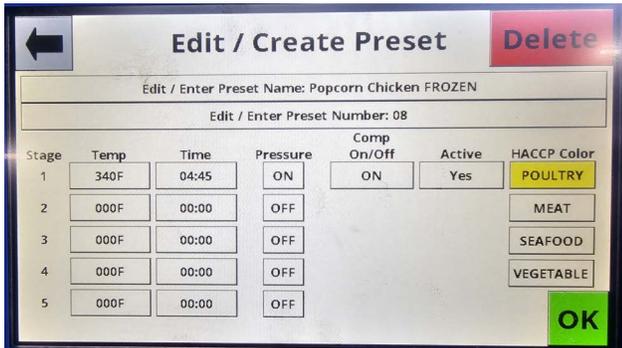
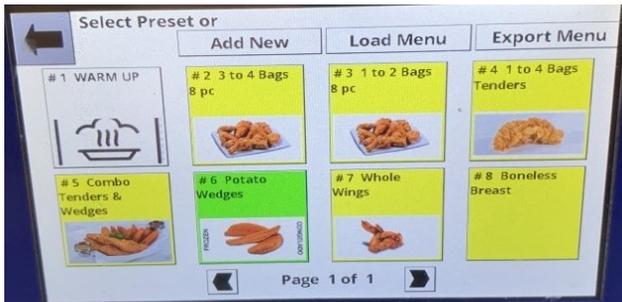
To enter up to five cooking stages, repeat steps above for each desired cooking stage.

Set Auto Comp and Activity accordingly. Press the green OK button to save the new product.

Set the HACCP color to the type of product being added.

Press the green OK button to save the product.

To edit any of the products, press the item once and the Edit/Create Preset display appears.



Here you can edit the name of the product, change its position on the list, set the cook time and temperature, set Auto Comp to be on or off during the cooking cycle, whether or not this item should be active as a preset on the Cook Tab, and whether its a pressure or non-pressure recipe.

Name Edit:

To edit the name of the current product press the Edit / Enter Preset Name bar and a typewriter keyboard will appear. The cursor will be at the end of the name. To change the name press the BACK button and the cursor will delete the name one letter each time the BACK button is pressed.

Delete the letters until you get to the place where you want to start making the change. To get the numbers and symbols to come up press the Symbol key.

When you have completed entering the changed name press the ENTER key.

Position Edit:

To change the position of this item on the menu list, press the Edit / Enter Preset Number bar and a number pad will appear. Enter the number of the position you want this item to appear at then press the ENTER key.

Time & Temperature Edit:

To edit this feature press the button and a number pad will appear. Enter the desired cooking temperature or time and press the ENTER button. If a number is entered and the ENTRY button is not pressed within 30 seconds the number pad will disappear and no changes will be saved.

Comp On / Off:

This button toggles Auto Comp on or off.

Active:

This button allows the item to be shown in the preset menu list of the Cook Tab. If the button says Yes the item appears on the list if No it does not.

You can quickly tell when a product is not active because the name and number of the item will be grayed out.

Menu Transfer:

The Smart Touch control allows a revised menu to be transported from one fryer to other fryers which also have a Smart Touch control. This is done from the Preset tab using the Load Menu and Export Menu buttons along the top of the display.

Load menu:

Menu changes that have been downloaded to a flash drive can be loaded onto fryer. Plug the flash drive into the USB port in the front panel above the control panel. Press the Load Menu button on the Preset menu display.

When the display appears there may be more than one menu. Press the bar for the menu you want loaded and a “Loading Menu...” box will appear with a progress bar.

When the menu is loaded a box will appear saying “Menu Loaded”. Press the OK button and the Preset display will appear.

Remove the flash drive from the USB port.

Export menu:

When you make changes to the menu on one fryer and want to put the same menu on other fryers with the Smart Touch Control you can export the revised menu from this fryer to the flash drive and load it onto the other fryers.

Plug the flash drive into the USB port in the front panel above the control panel. Press the Export Menu button on the Preset menu display.

Press the Export Menu button once and the control will ask you for a filename. Press the Enter Menu File Name bar and a keyboard will appear. Enter a name you will recognize then press the ENTER Button.

NOTICE

The file name can only be 8 characters long.

When the ENTER key is pressed a box will appear that says Exporting Menu... with a progress bar.

When the export is complete the box will say “Menu Exported”. Press the OK button and the Preset display will appear. Remove the flash drive from the USB port.

Oil management:

Pressing this option opens the Oil Management Display.



The recirculation time for the auto-filter feature can be adjusted here in 10 second intervals. The filter evacuation time at the end of auto-filtering can also be adjusted in 30 second intervals.

Pressing the “Oil Changed Today” bar enters today’s date and time as a reminder when the oil was last changed. This also resets the “Cycles Since Last Filtered” counter to 00 on the Cook Tab.

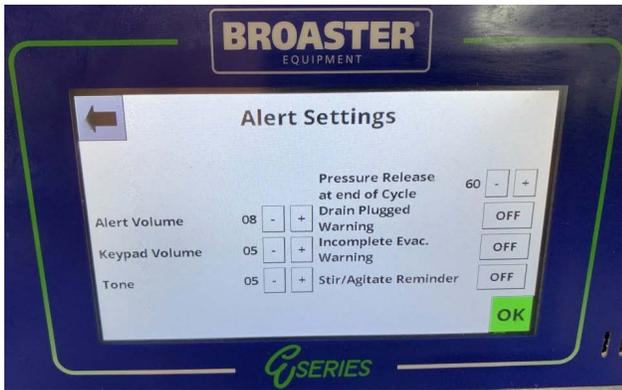
Language selection:

Pressing this option will allow you to change the language used in all displays.



Alert settings:

Pressing this option allows you to set conditions for several features.



The numbers left of the boxes indicate the current setting. They can be changed by pressing the “-” or “+” buttons.

Filter Reminder Cycles: This sets the number of cook cycles between each oil filter cycle. The Broaster Company recommends 5 cook cycles, however, you can set it as you desire. A setting of “0” will disable the filter reminder screen. This setting is only present if Auto Filter is disabled.

Alert Volume: This should be set loud enough to be able to hear it above any other noises in the kitchen.

Keypad Volume: It should be loud enough to hear while making changes in front of the fryer or when operating the fryer.

Tone: There are a range of tones from low to very high. Chose the one that suits your operation.

Pressure Release at End of Cycle: This setting allows the pressure to release before the cooking time reaches zero. This should be 30 seconds minimum.

Drain Plugged Warning: This controls whether the unit warns the operator that the drain may be clogged.

Incomplete Evacuation Warning: This

controls whether the unit warns the operator that the oil may not have fully returned to the cooking well after the auto-filter evacuation time has expired.

After making the adjustments on this display press the green OK button to save the entries.

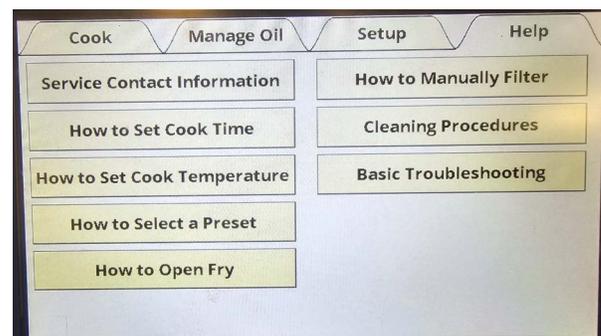
Stir/Agitate Reminder: This alert appears when 3 conditions occur.

1. When the fryer is first turned on in the morning, this reminder will appear after the oil comes up to the set temperature.
2. After a filter cycle has been completed this reminder will appear after the oil comes up to the set temperature.
3. If the fryer has been setting idle for 2 hours or longer this reminder will appear to alert you to stir the oil to get it to a uniform temperature.

After making the adjustments on this display press the green OK button to save the entries.

To go back to the Cook display either press the “Exit Setup” button or the Cook Tab.

HELP TAB



This display provides instructions for the items in the boxes. They are available at any time to help you set up the control to cook product.

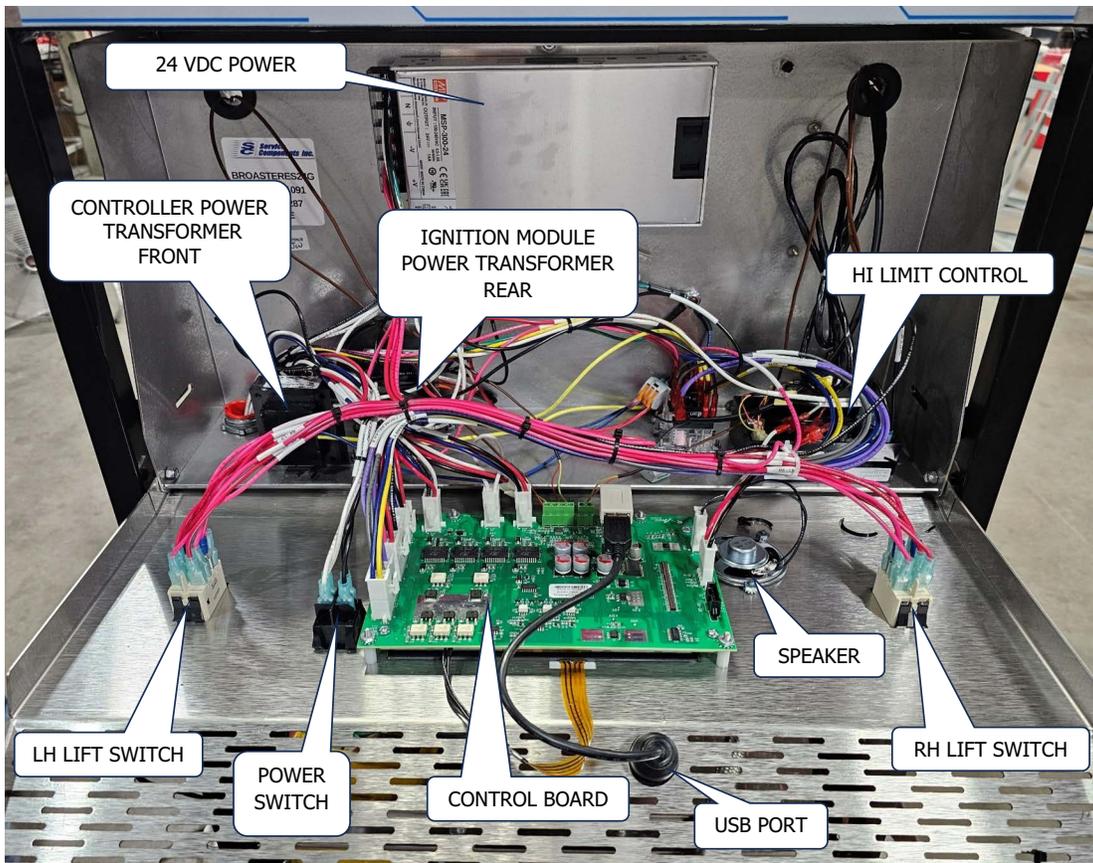
4 - POWER INPUT BOX

ACCESS FOR SERVICE

1. Disconnect main power supply.
2. Remove the retaining screws from the top of the control panel and use the tabs to pull the top of the panel out and swing down to the service position.

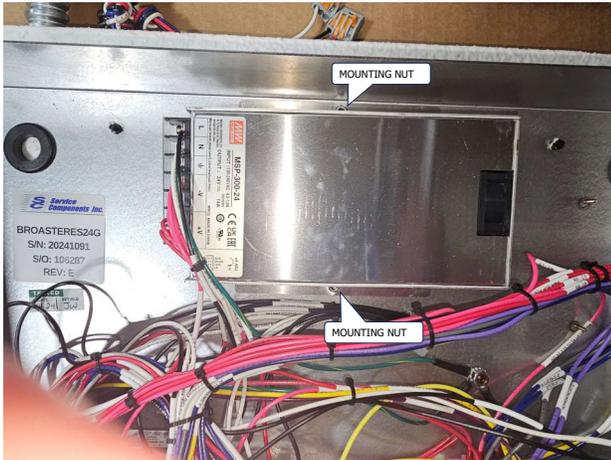


COMPONENTS



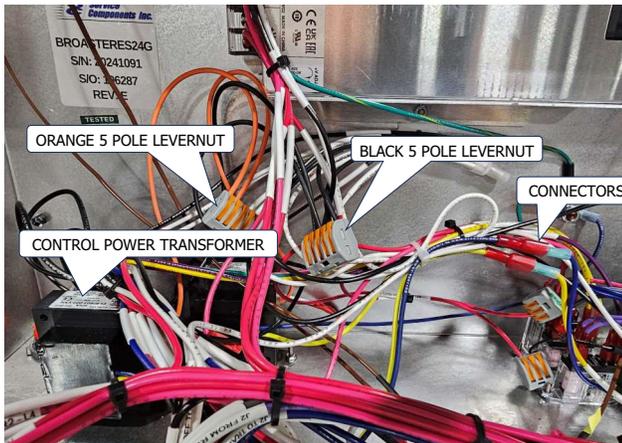
24 VDC POWER SUPPLY

1. See ACCESS FOR SERVICE (pg 4-1).
2. Disconnect wires from old power supply one by one and connect them to the new power supply.
3. Remove mounting nuts and remove old power supply.



4. Install new power supply, with wires connected, with mounting nuts.

CONTROL POWER TRANSFORMER



Provides power to the controller. It is located on the floor of the power input box on the left side toward the front.

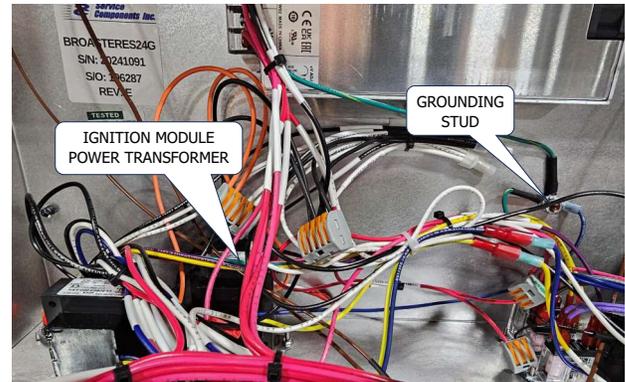
1. See ACCESS FOR SERVICE (pg 4-1)
2. Disconnect the black wire from the black 5 pole levernut.

3. Disconnect the orange wire from the orange 5 pole levernut.
4. Disconnect the blue and yellow wires at the connectors.
5. Remove mounting nuts and remove transformer.



6. Install new transformer in reverse order.

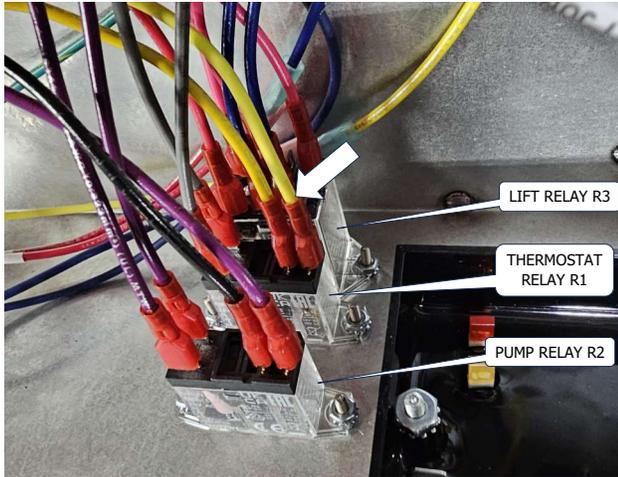
IGNITION MOD POWER TRANSFORMER



Provides power to the burner ignition module. It is located on the floor of the power input box on the left side toward the back.

1. See ACCESS FOR SERVICE (pg 4-1)
2. Disconnect the black wire from the black 5 pole levernut.
3. Disconnect the orange wire from the orange 5 pole levernut.
4. Disconnect the blue wire from the grounding stud.

- Disconnect the yellow wire from the thermostat relay R1.



NOTICE The front transformer may need to be dismantled to get to the mounting nuts of this transformer.

- Remove mounting nuts and remove transformer.



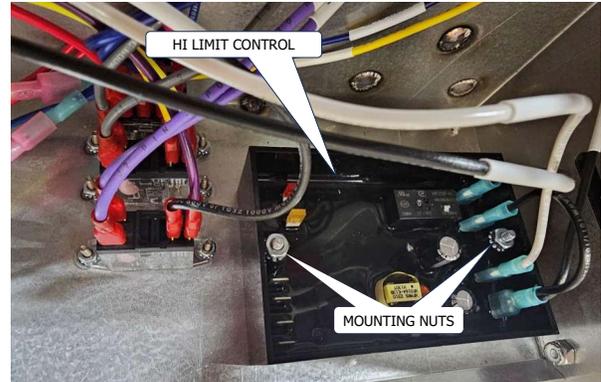
- Install new transformer in reverse order.

HI LIMIT CONTROL

This control disables all power to the controls if the temperature of the oil goes above the set point of the control.

- See ACCESS FOR SERVICE (pg 4-1)
- Disconnect all wires from control. Make a note of each wire connection.

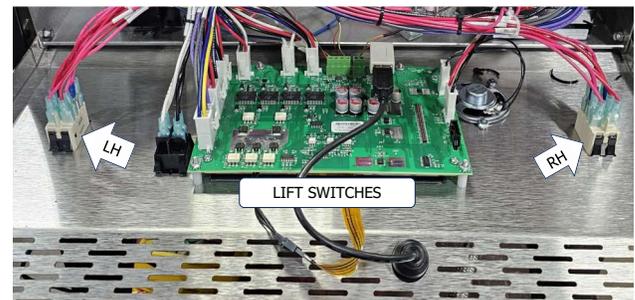
- Remove the mounting nuts from the control.



- Install new Hi Limit control in reverse order.

LIFT SWITCHES

These switches operate the cover lift system.



- See ACCESS FOR SERVICE (pg 4-1)
- Disconnect wires from switch being replaced. Make note of the connection of each wire.
- To remove switch depress the tabs on each end of the switch while putting pressure on the switch to push it out of the panel.

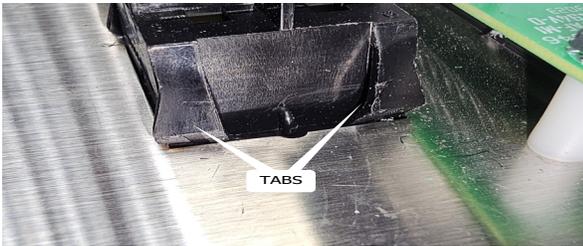


3. Install new switch in reverse order.
Reconnect wires to switch.

POWER SWITCH

This switch is the main power switch.

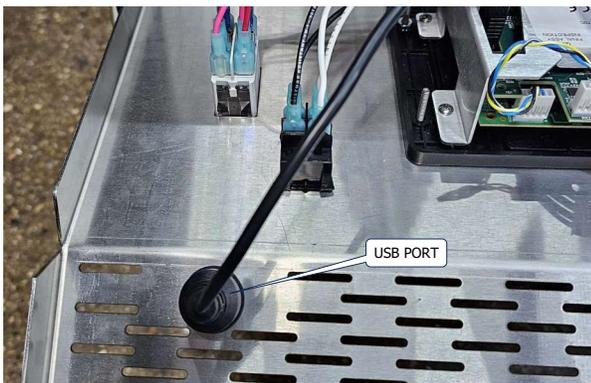
1. See ACCESS FOR SERVICE (pg 4-1)
2. Disconnect the black and white wires from the switch. Make note of the wire connections.
3. Push in on the tabs, top and bottom, while applying pressure on the switch to push switch out of panel.



4. Install new switch in reverse order.
5. Reconnect black and white wires to switch.

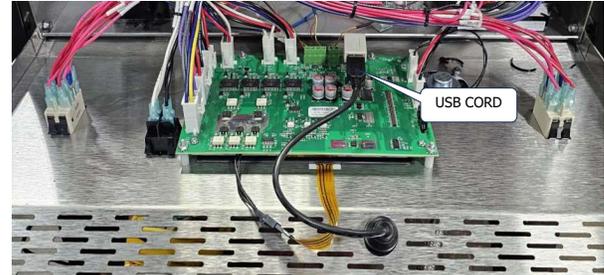
USB PORT

This port is used for uploading a program that has been changed or to install a new program into the control.



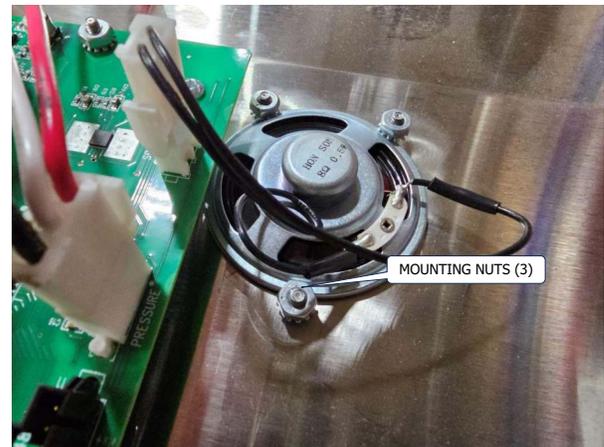
1. See ACCESS FOR SERVICE (pg 4-1)

2. From the front of the panel unscrew the protective cap, then remove the nut holding the port in place.
3. Disconnect the USB cord from the controller.



SPEAKER

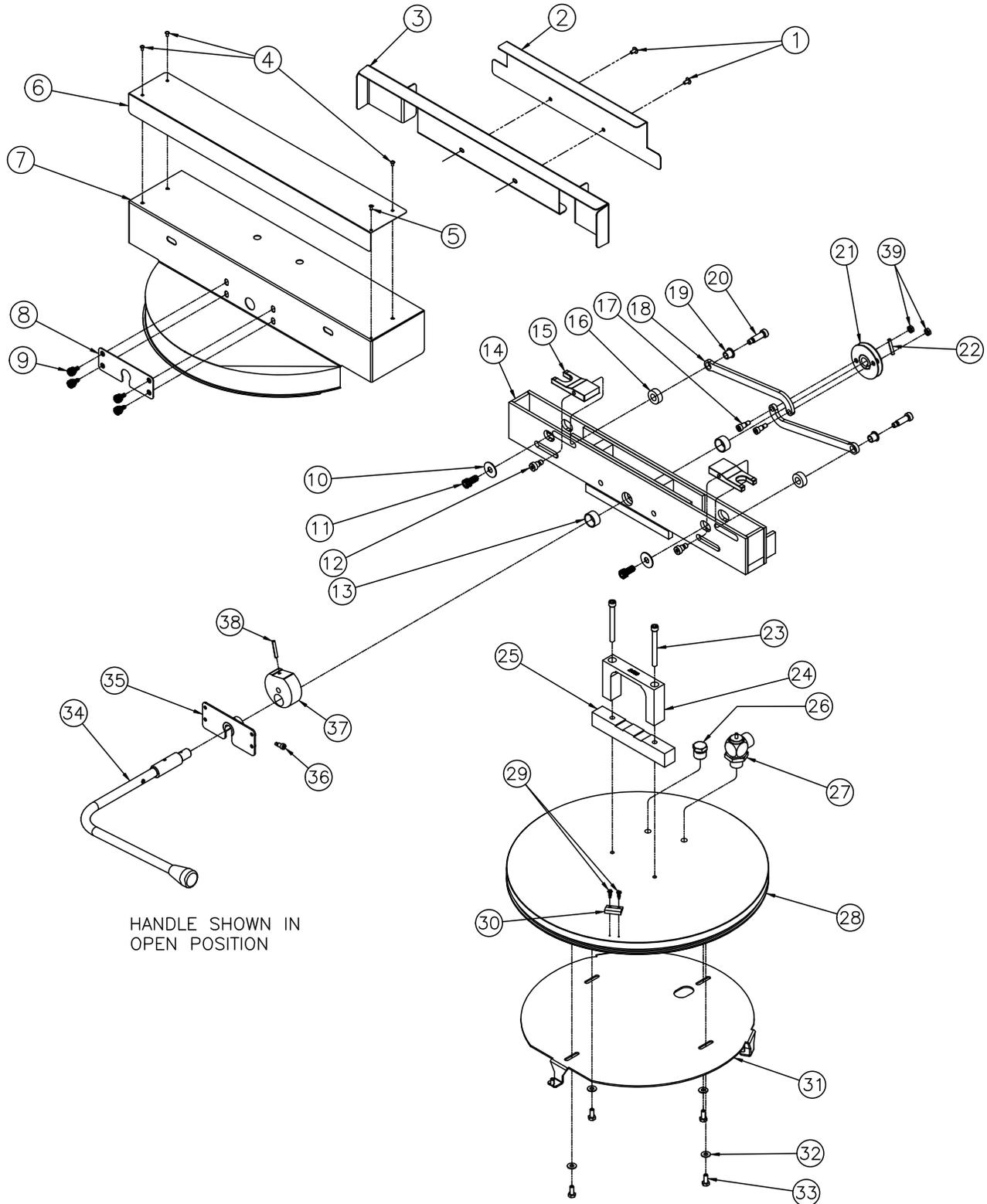
1. See ACCESS FOR SERVICE (pg 4-1)



2. Unplug speaker wire from control.
3. Remove the 3 mounting nuts.
4. Lift out speaker.
5. Install new speaker in reverse order.

5 - COVER AND YOKE

FAMILIARIZATION



HANDLE SHOWN IN
OPEN POSITION

COVER AND YOKE

ACCESS FOR SERVICE

1. Raise the cover 2 to 4 inches above the cooking well.
2. Place a support across the well to prevent the cover from dropping onto the cooking well.
3. Lower cover to within 1" of the support you placed across the well.
4. Remove the screws (1) from the back of the yoke bar and set aside.
5. Remove the Splash Shield Catch (2) and the Splash Shield Back Panel (3) and set them aside.
6. Unscrew the four screws (9) in the Washer Plate (8) and lift off of Handle (34).
7. Slide Splash Shield (7) toward the bend in handle (34).

Complete removal of cover and yoke assembly:

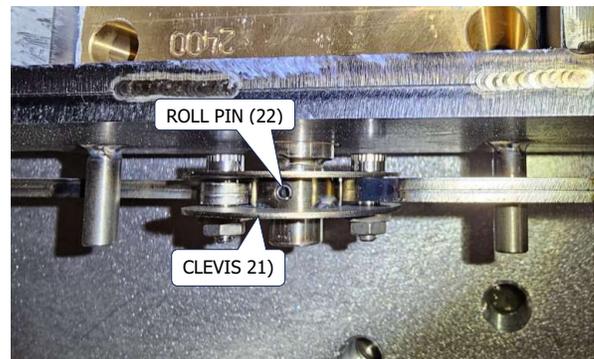
1. Remove four screws (33), four washers (32) and Basket Hanger Plate (31).
2. Remove two screws (11) and two washers (10).
3. Carefully slide cover assembly toward front of unit until it drops onto the support.

CAUTION Cover Assembly is very heavy. DO NOT allow cover assembly to fall off the support. Serious injury or damage to the unit may result.

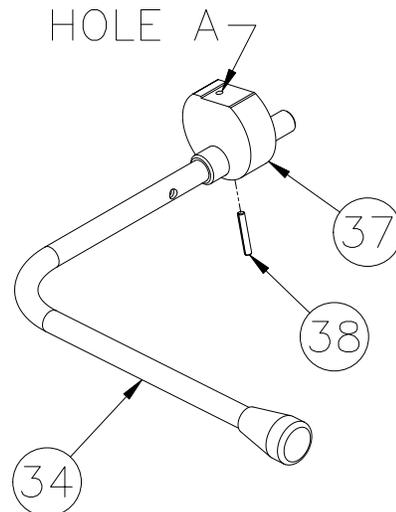
4. Perform maintenance.
5. Reassemble in reverse order.

COVER AND YOKE DISASSEMBLY

1. Remove two cover bolts (23).
2. Lift yoke bar up. The cover (28) and spacer block (25) will remain.
3. Remove lifter box (24).
4. Rotate cover handle to the OPEN position.
4. Using a 3/16" pin punch drive roll pin (22) out of clevis (21).



5. Locate hole A in the flat of cam (37).



NOTICE Be sure to note the position of the cam to the handle. Use a stiff wire to tie the handle and cam together after removal.

6. Insert a 1/8 inch pin punch into hole **A** and drive out the grooved pin. Remove handle from cam.
7. Clean lifter box, handle, cam and yoke bar where lifter box slides up and down.

COVER AND YOKE REASSEMBLY:

1. Install cam (37) into yoke bar making sure the step in the cam is down and toward the right end and the handle is in the “cover closed” position.
2. Install handle (34) through splash shield (7) and into yoke bar (14) then into the cam (37) and clevis (21).
3. Align holes in handle and cam then install a new grooved pin (38). Be sure the grooved pin is installed flush with the cam.
4. Reinstall roll pin (22) into clevis (21).
5. Lubricate inside of yoke bar where lifter box slides up and down.
6. Lubricate lifter box then install lifter box into the yoke bar.
7. Lower assembly over the cover (28) and spacer block (25).
8. Align holes in lifter box, spacer block and cover.
9. Install new cover bolts but do not tighten.

NOTICE Bolts will be tightened when centering cover at reassembly (see Centering Cover under ADJUSTMENTS).

10. Lift cover and yoke assembly and place on lift arms. Install washers (10) and bolts (11) into ends of lift arms.

CHECK CAM OPERATION

When handle is rotated, cam (37) moves cover (28) in or out of the cooking well. Cam and spacer block (25) lock the cover when pressure in cooking well pushes up on the cover.

CENTERING COVER:

This is important for prevention of steam leaks and keeping O-ring wear to a minimum.

NOTICE It is important warning sign (6) be placed back into its original position and screws replaced after making this adjustment. If this sign becomes worn or illegible, it must be replaced immediately.

1. Remove screws from both ends of warning sign (6) leaving rivet in place. Swing sign out toward the right.
2. Using a 1/4” allen wrench, loosen but do not remove two cover bolts (23) through holes in top of splash shield (7).
3. Move the cover handle to the closed position and place a lubricated O-ring gasket in the groove of the cover.
4. Depress the bottom half of the lift switches to move the cover to its lowest position. Switches must be depressed until the cover stops.
3. Open and close cover several times in cooking well to let cover seek its own center. With cover in CLOSED position, tighten each cover bolt a little at a time while alternating between the two until they are fairly tight.
4. Using a torque wrench, tighten each bolt to a maximum torque of 180 in/lbs or 15 ft/lbs.

SAFETY RELIEF VALVE

The safety relief valve opens in the event pressure in the cooking well meets relief pressure rating of the valve. DO NOT alter or attempt to repair this valve.

⚠ WARNING Keep away from safety relief valve opening without heat and steam protective apparel. Escaping steam could cause serious burns.

Replacement:

NOTICE Replacement valve must be rated 15 PSI MAX.

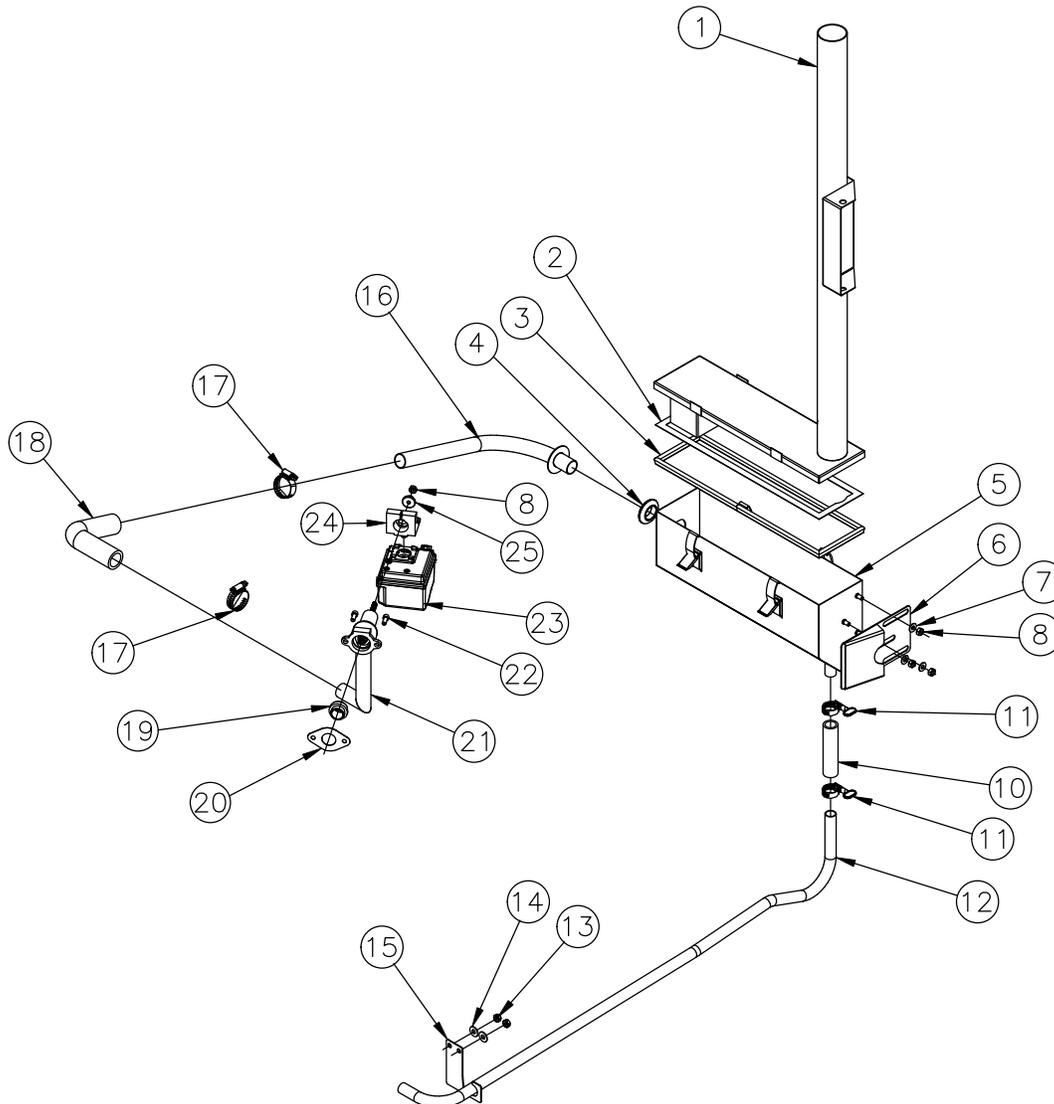
1. OPEN the cover.
2. Unscrew valve (27) from the cover.

⚠ WARNING DO NOT install valve discharge opening in the direction of foot traffic areas.

3. Apply teflon tape to threads. Screw new valve into the cover with valve discharge opening facing the rear, away from foot traffic as shown below.



6 - PRESSURE SYSTEM



⚠ DANGER DO NOT attempt to tighten, repair, or replace any fitting, line or component unless main electric power is disconnected, pressure regulating valve is OPEN and cooking oil has cooled. Hot oil could spray out under pressure causing serious burns.

The following operator habits may cause the pressure system to become faulty:

- Overfilling cooking well with oil: See operation manual for correct oil level.

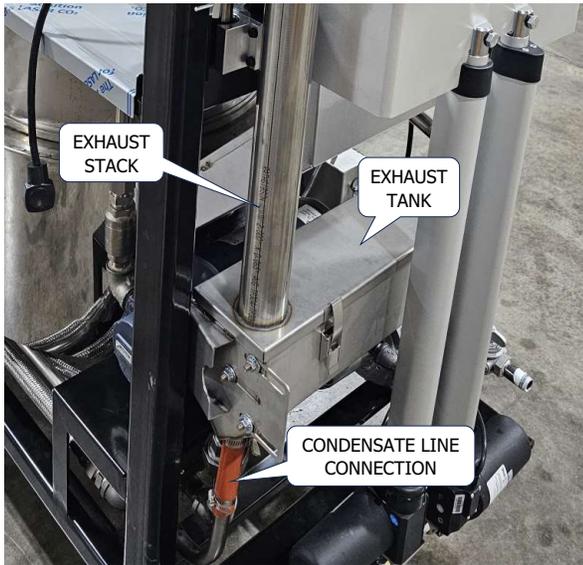
- Overloading basket with product: Oil level will raise too high.
- Breeding then dropping: Excess coating can collect in pressure regulating valve and exhaust tank. See operation manual for coating instructions.

EXHAUST DRAIN TUBE

Tube (12) drains condensation from exhaust tank into the condensate pan.

EXHAUST TANK

Steam and vapors are exhausted from the cooking well to the exhaust tank.



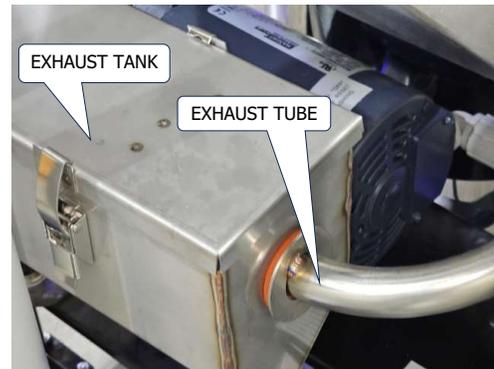
See previously mentioned operator habits. Muffler can become obstructed. The obstruction usually forms on the bottom of tank where condensate drain tube (12) is connected. Tank will then become filled with liquid. Liquid may be forced up the stack (1) when pressure is released at the end of a cooking cycle.

EXHAUST TANK REMOVAL:

1. Disconnect the Condensate Line from the exhaust tank by releasing one of the yellow butterfly clamps (11).
2. Release the exhaust tank from the mounting bracket on the frame by pulling the top release up and twisting to the right to hold it open. Do the same for the bottom release.



3. Pull the stack out of the mounting bracket. Then pull the exhaust tank off of the exhaust tube.



EXHAUST TANK CLEANING:

1. Loosen four latches holding cover and stack (1) to tank, then remove cover. Remove rubber grommet (4) from end of the muffler. Set the tank in a sink and clean thoroughly.

2. Inspect gasket (3). Replace if needed. If replacing gasket, apply small bead of silicone sealant in bottom of gasket groove before installing on to tank.
6. Clean all tubes.
7. Replace grommet (4) if necessary.
8. Assemble in reverse order

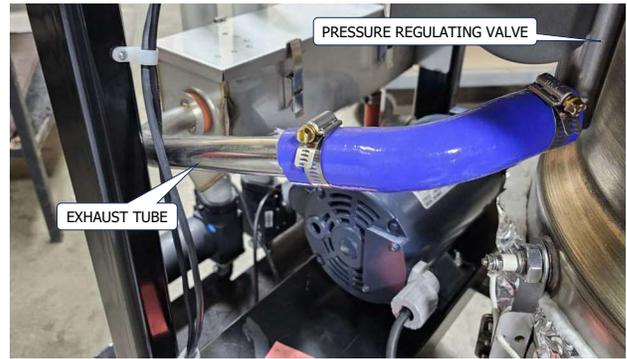
EXHAUST TUBE

Tube (16) directs steam and vapors from cooking well into the exhaust tank.

1. Loosen the nuts on the left end of the exhaust tank and slide the bracket all the way toward the rear.



2. On the right end of the exhaust tank. Loosen the hose clamps at each end of the connecting hose and pull the hose off the tubes.
3. Swing the Exhaust Tube down past the leg of the frame.
4. Pull the tube out of the end of the Exhaust Tank.

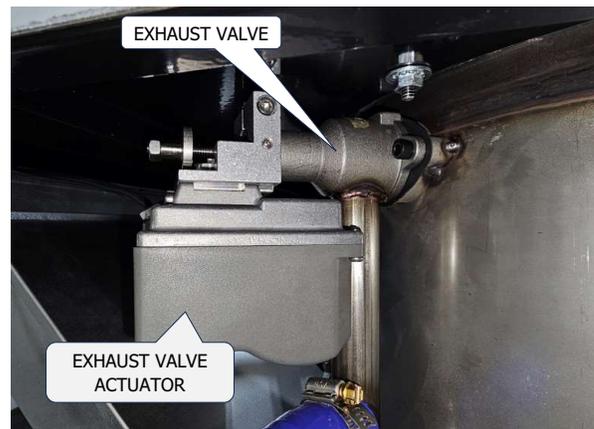


5. Rotate the exhaust tube down past the leg of the frame and pull out of the exhaust tank.
6. Reassemble in reverse order.

PRESSURE REGULATING VALVE

Valve (21) is preset to maintain a maximum pressure of 12-14 psi during a cooking cycle. Pressure may build slowly or remain low when cooking small loads. Add one or two quartered potatoes with product to help build and maintain maximum pressure.

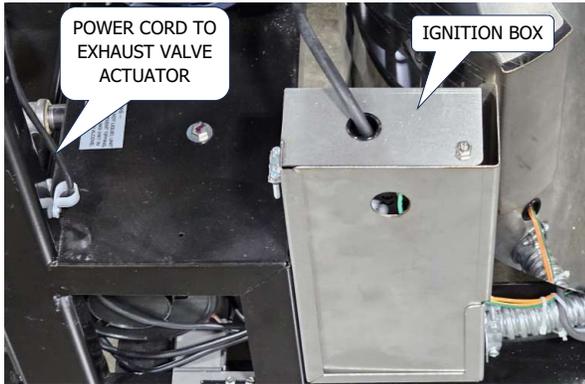
The valve is operated by an actuator which is controlled by the control panel.



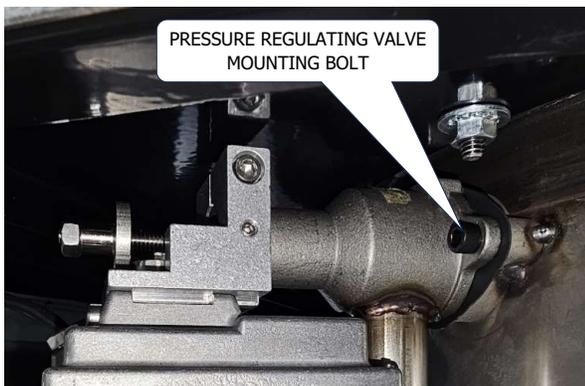
REMOVAL:

1. Move fryer to a place where access can be made to the left side of the fryer.
2. Remove the left side panel.

- Carefully remove the ignition box cover by sliding up. Be sure to observe how it fits so it can be put back in place.



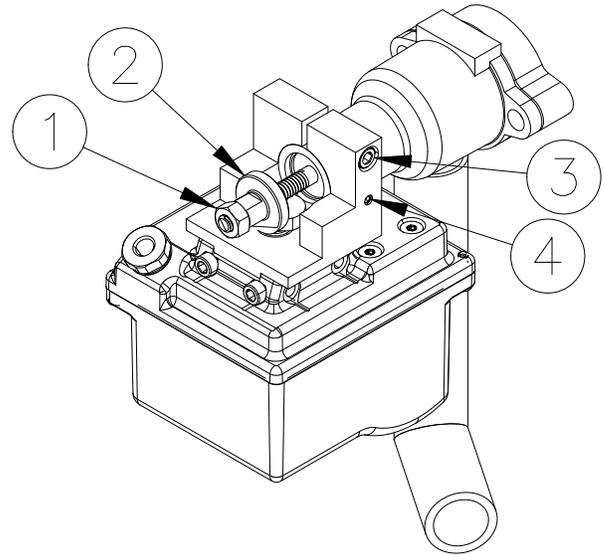
- Disconnect the exhaust valve actuator cord inside the ignition box.
- Carefully pull the cord out of the box and up through the white cable clamps.
- Remove the two PR valve mounting bolts being careful to prevent the valve from falling freely. Set the valve aside.



- Remove the gasket from the mounting boss on the cooking well. *It may have come out with the valve.*
- Remove the valve seat from the cooking well and set aside.

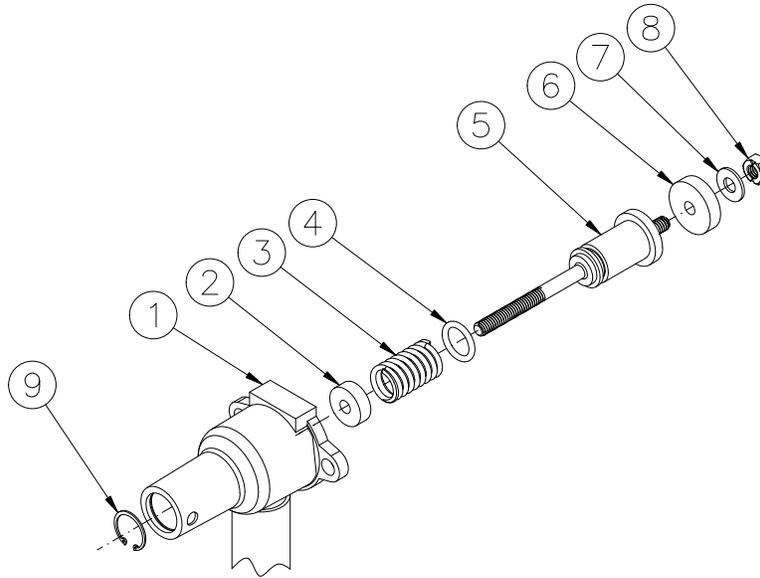
DISASSEMBLY:

After removing the exhaust valve from the fryer, follow the following steps to disassemble the valve for repair.



- Remove locknut (1) and cam follower (2).
- Remove two set screws (4)
- Loosen clamp screw (3) and slide actuator from the valve body.

REPAIR:

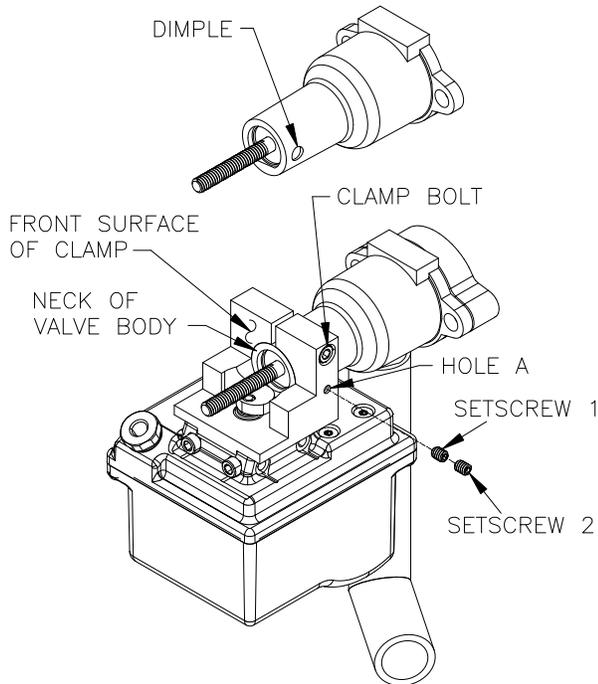


1. Reinstall locknut and push valve stem (5) out through valve body (1).
2. Remove all parts from valve stem (5).
3. Clean valve stem (5) and pressure disc (6).
4. Replace any damaged or worn parts.
5. Coat O-ring (4) with new cooking oil and install in O-ring groove on valve stem (5). Reassemble all other parts onto valve stem.

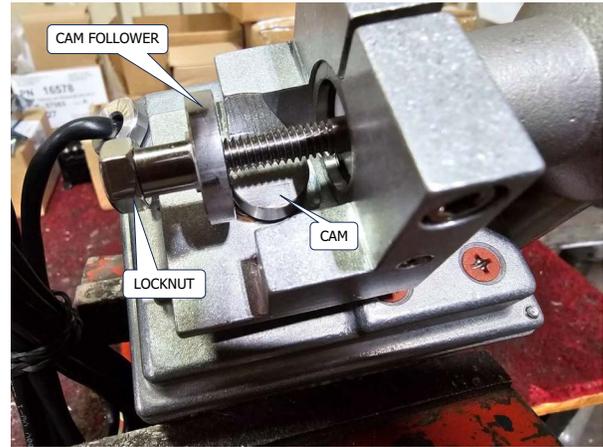
6. Reinstall retaining ring (9) into groove in the neck of the valve body (1).
7. Insert valve stem (5) into valve body (1) making sure the outer bearing (2) is against the retaining ring (9).

See Parts manual 21993 page 6-1 for a list of repair parts.

REASSEMBLY:



1. Insert the valve body into the clamp on the actuator so that the end of the valve neck is flush with the front surface of the clamp and tighten the clamp bolt slightly to hold the valve in place.
2. Rotate valve body to align hole A with dimple in the neck of the valve and insert one setscrew into hole A until it seats into the dimple on the neck of the valve.
3. Loosen the clamp bolt and tighten the setscrew finger tight. Insert the second setscrew into hole A and jam it against the first setscrew.
4. Tighten the clamp bolt until it is hand tight.

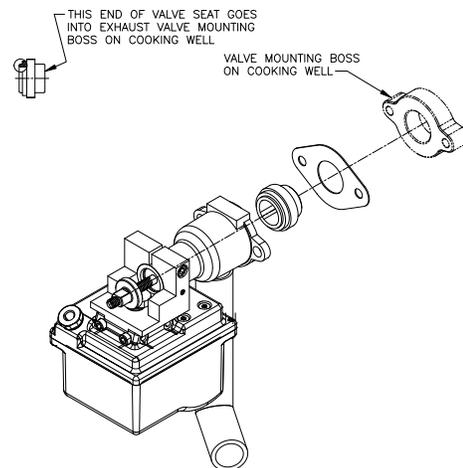


5. Reinstall the cam follower until it makes light contact with the cam. Hold the follower in place and install the locknut to lock the follower in place.

REINSTALLATION:

1. Place valve seat into the valve mounting boss on the cooling well.

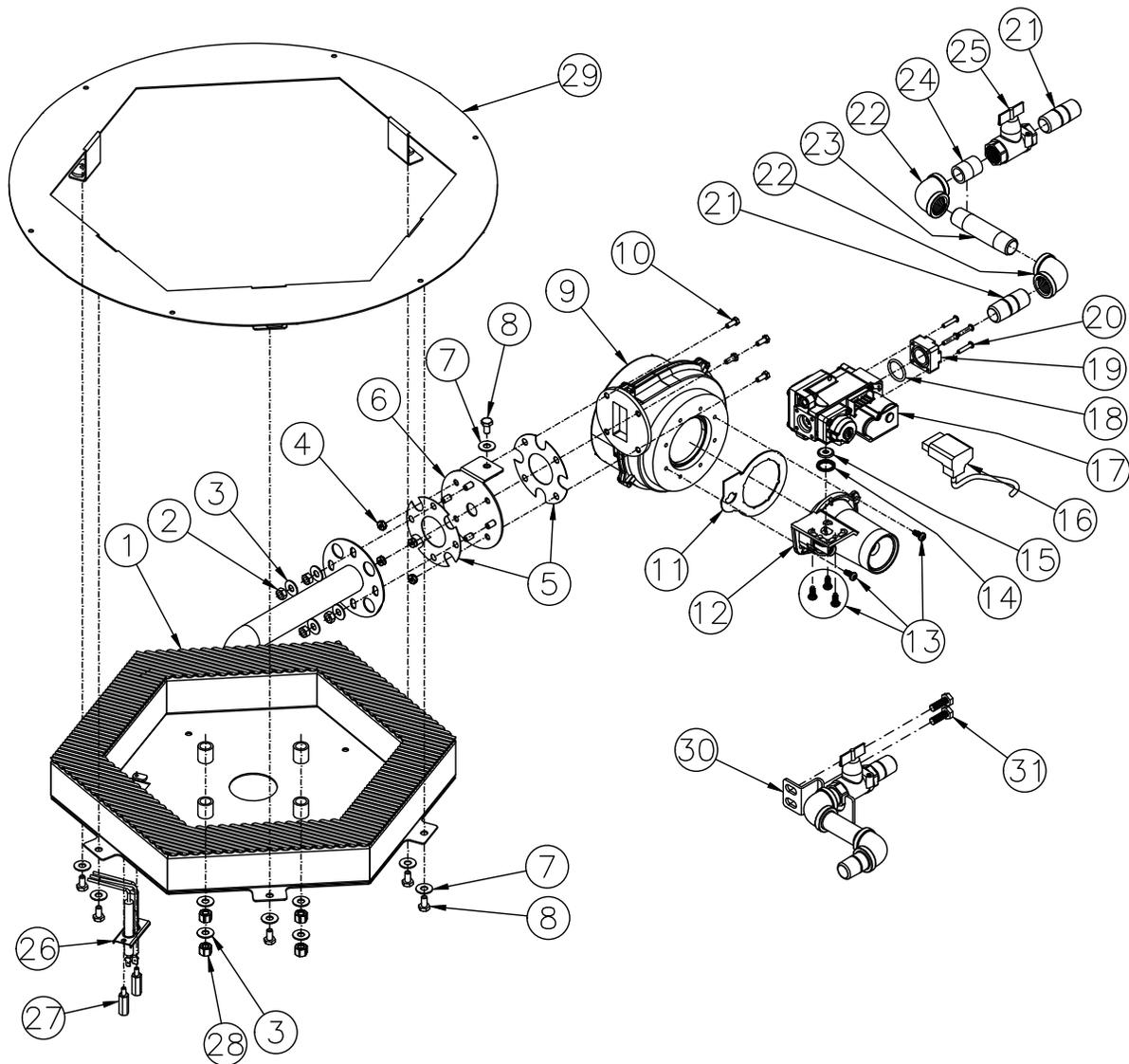
NOTICE Make sure the seat side of the valve seat faces out when inserting it into the well.



2. Insert the two valve mounting bolts removed earlier and place the valve gasket over the two bolts.
3. Hold the valve/actuator in place while screwing in the mounting bolts into the mounting boss and tighten.

4. Slide the wire from the actuator through the white wire clamps and into the ignitor box.
5. Reconnect the wires.
6. Reconnect the power to the fryer.

7 - ES24G MAIN BURNER SYSTEM



BURNER INFORMATION

Main Burner Orifice Sizes Up To 2000 Feet Above Sea Level:

Natural (G20) Gas: #14 (4.50mm)
Propane (G31) Gas: #32 (2.87mm)

Standard gas units operate up to 2000 feet above sea level. Installations above this require a special main burner orifice. Contact Broaster Company for orifice sizing.

VENTILATION:

- **Never modify exhaust flue!** Back pressures from added extensions can cause high ambient temperatures near the controls.
- Make sure unit is properly ventilated. Restrictions, drafts or other adverse conditions might affect proper operation of the burner and combustion assemblies.

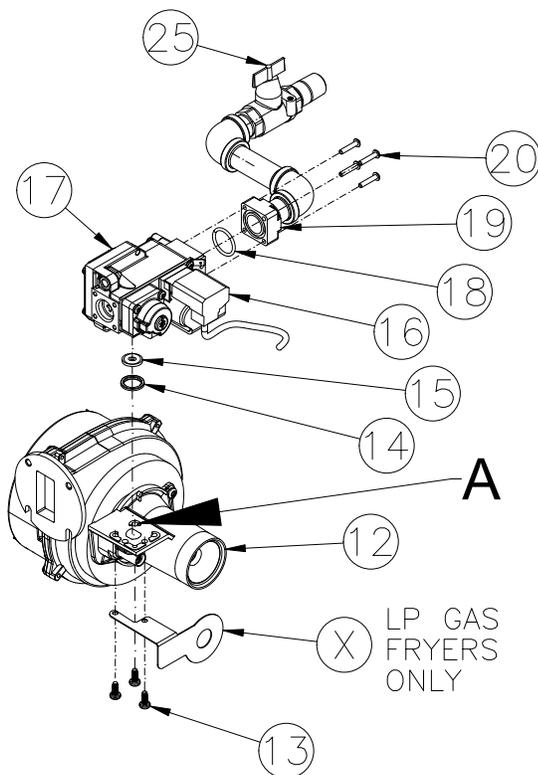
LIGHTING INSTRUCTIONS

When the power switch is turned on, this gas fryer automatically checks the oil level and adds oil as needed then lights the burner.

When the power switch is turned off, the burner goes out.

GAS CONVERSION:

Check the Gas Data Plate to verify the gas this fryer uses. To convert from one type of gas to another, the main orifice must be changed.

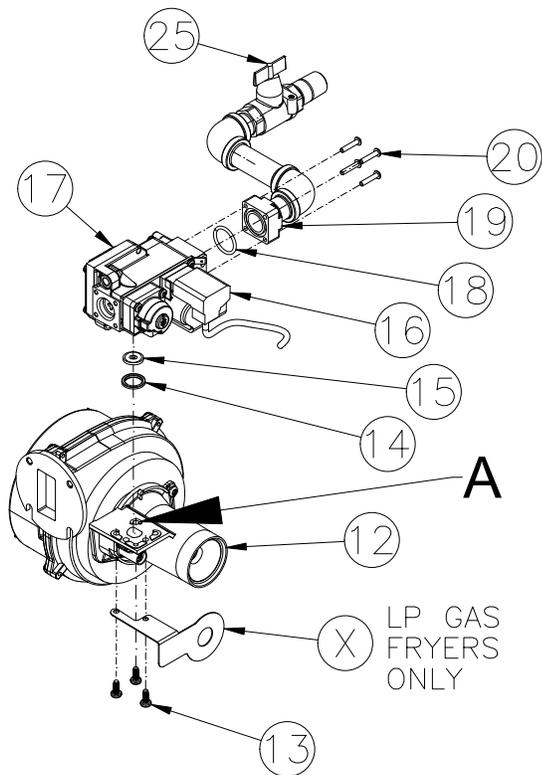


REPLACING THE MAIN ORIFICE:

1. Disconnect power
 - Gas Fryer - Unplug power cord, turn off main gas supply and disconnect from main gas supply line.
2. Move Fryer to clear area to be serviced and remove left side panel.
3. Turn manual gas valve (25) off.

4. From back of fryer, using a T20 TORX screwdriver, remove four screws (20) to disconnect gas pipe from gas valve. Retain O-ring (20) for reuse.
5. Unplug gas valve power supply cord (16) from gas valve (17).
6. From under fryer, using a T25 TORX screwdriver, remove three encircled screws (13).
7. Slide gas valve (17) out through back of frame.
8. Remove the main gas orifice (15) and O-ring (14) from the valve.
9. Insert the new main gas orifice into O-ring (14) and place into gas valve (17).
10. Slide gas valve (17) through back of frame and place on top of the venturi (12) insert a screw (13) through the inside hole (marked A).
11. Install the two remaining screws (13).
12. Reinstall O-ring (18) and reattach the gas pipe with the four screws (20) removed in step 4.
13. Plug gas valve power supply cord (16) into gas valve (17).
14. Open the manual gas valve (25).

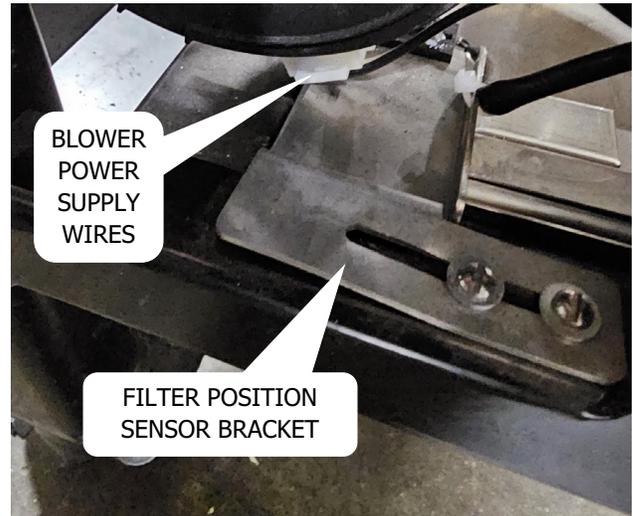
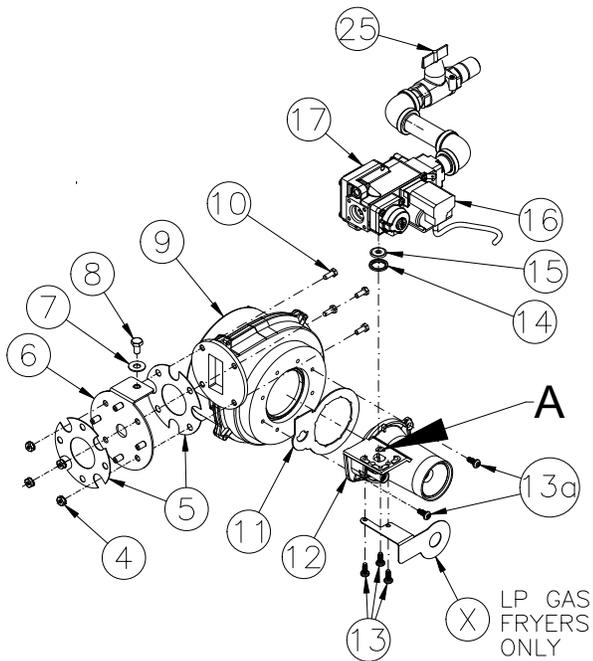
GAS VALVE REPLACEMENT:



1. Disconnect power
 - Gas Fryer - Unplug power cord, turn off main gas supply and disconnect from main gas supply line.
2. Move Fryer to clear area to be serviced and remove left side panel.
3. From back of fryer, using a T20 TORX screwdriver, remove four screws (20) to disconnect gas piping from gas valve (17). Retain O-ring (18) for reuse.
4. Unplug gas valve power supply cord (16) from gas valve (17).
5. From under fryer, using a T25 TORX screwdriver, remove three screws (13).
6. Lift gas valve (17) off of the venturi (12) and slide gas valve (17) out through back of frame.
7. Remove main gas orifice (15) and O-ring (14) from the valve.

8. Insert the main gas orifice (15) into O-ring (14) and place into new gas valve.
9. Slide gas valve through back of frame and set on top of the venturi (12). Insert one screw (13) through the inside hole (marked A).
10. Install the two remaining screws (13).
12. Reinstall O-ring (18) and reattach the gas supply piping with the four screws (20) removed in step 3.
13. Plug gas valve power supply cord (16) into gas valve (17).
14. Open the manual gas valve (25).

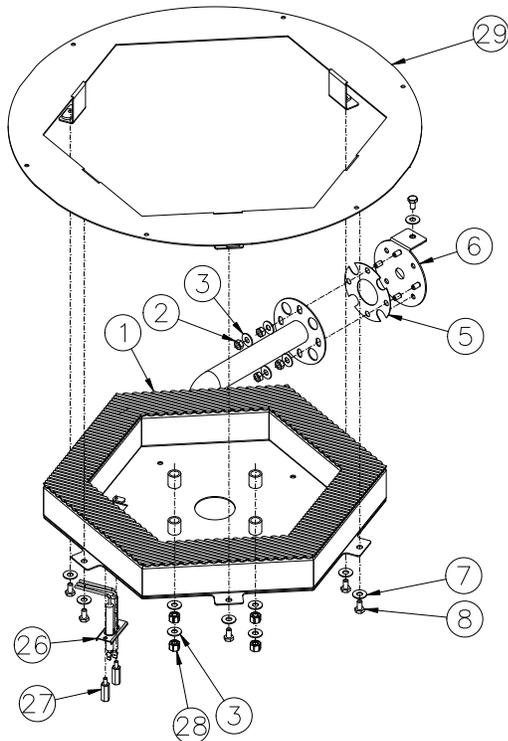
BLOWER REPLACEMENT:



1. Disconnect power
 - Gas Fryer - Unplug power cord, turn off main gas supply and disconnect from main gas supply line.
2. Move Fryer to clear area to be serviced and remove left side panel and remove filter pan.
3. From under fryer, using a T25 TORX screwdriver, remove three screws (13).
4. Unplug the gas valve power supply cord (16) from valve and lift gas valve (17) and gas supply piping off of venturi (12). Slide gas valve (17) and piping out through back of frame. Be sure orifice (15) and O-ring (14) stay with gas valve.
5. Remove the FILTER POSITION SENSOR and allow to drape over outside of frame retaining screws for reassembly.
6. Unplug blower power supply cord.
7. Carefully remove four bolts (10) and nuts (4) to disconnect blower from burner. See Illustration top left. **DO NOT** let blower drop out of fryer.
8. Using a T25 TORX screwdriver, remove two screws (13a) to separate venturi (12) from blower (9). **MAKE NOTE OF THE POSITION OF THE GASKET.**
9. Assemble venturi (12) to new blower using screws removed in step 6,
10. Install new blower using four bolts (10) and nuts (4). **MAKE SURE** gasket (5) is in place between blower (9) and plate (6).
11. Plug in blower power supply cord.
12. Reinstall FILTER POSITION SENSOR BRACKET.

13. Slide gas valve and gas supply piping through back of frame and set on top of the venturi (12). Be sure orifice (15) and O-ring (14) stay with gas valve.
14. Insert one screw (13) through the inside hole (marked A), then Install the remaining screws (13).
15. Open the manual gas valve (25).

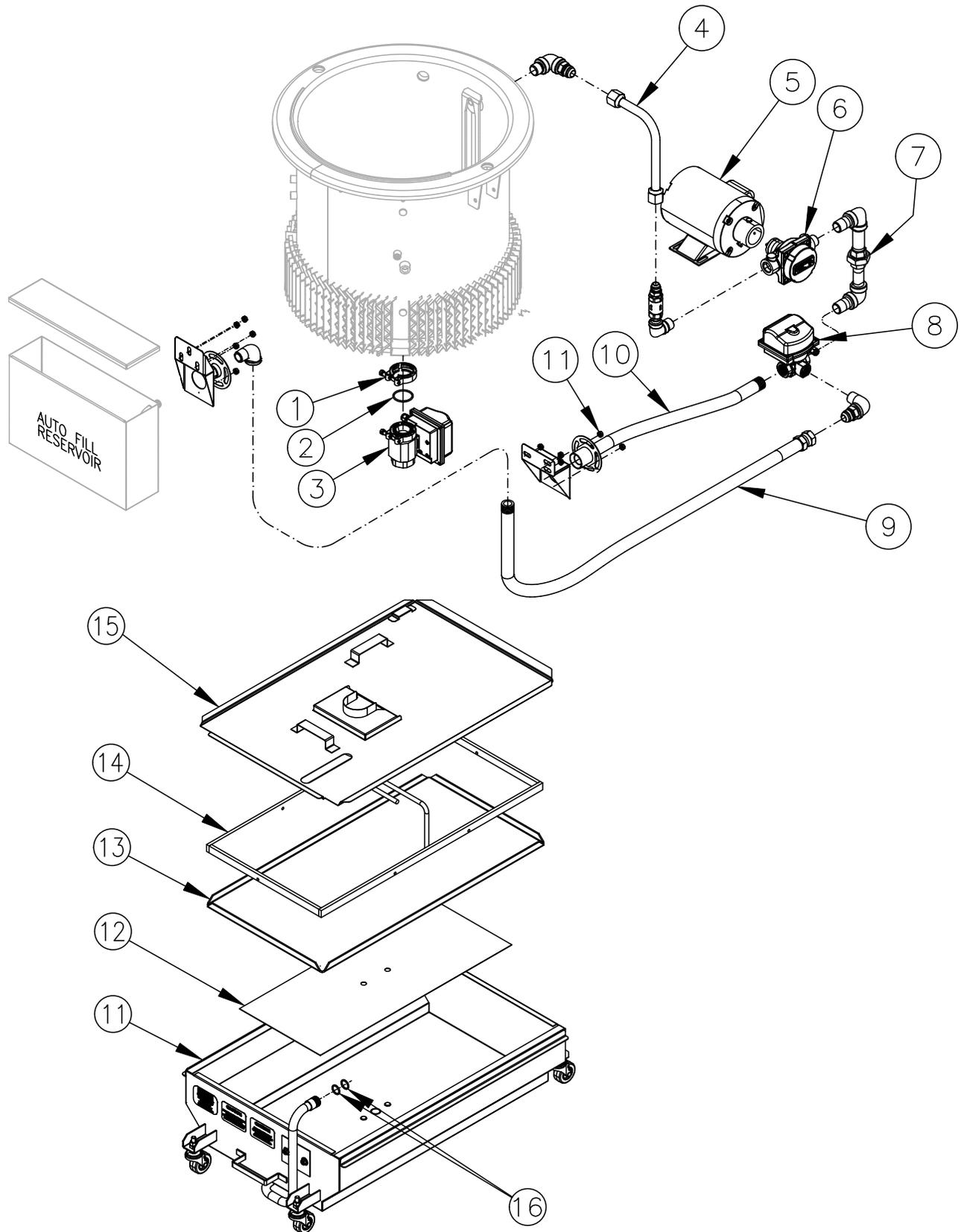
BURNER REPLACEMENT:



5. Remove two standoffs (27) and ignitor (26).
6. Remove four nuts (2) and washers (3) to disconnect burner (1) from bracket (6).
7. Remove five bolts (8) and washers (7).
8. Loosen four standoffs (28). While holding burner in place remove standoffs (28) and washers (3). Lower and remove burner from under fryer.
9. Slide new burner under fryer and install in reverse order.

1. Disconnect power
 - Gas Fryer - Unplug power cord, turn off main gas supply and disconnect from main gas supply line.
2. Move Fryer to clear area to be serviced.
3. Remove left side panel and filter pan.
4. From under fryer, disconnect ignition wire and flame sensor wire from burner ignitor (26).

8 - DRAIN VALVE AND FILTER SYSTEM

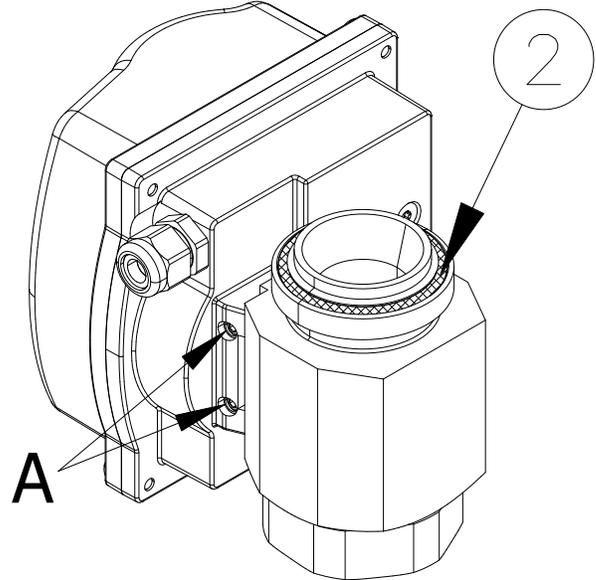


DRAIN VALVE & ACTUATOR

⚠ WARNING Never drain oil unless the controller display is on the **FILTER** tab and the pressure regulating valve is **OPEN**. Hot oil could spray out under pressure causing serious burns.

Replacement:

1. Disconnect fryer from power supply.
2. Open front panel, lift off and set aside. Remove filter pan from under the unit.
3. Drain cooking oil from cooking well into a container made for handling hot oil.
4. If necessary move fryer to a place where access can be made from the left side, back and right side.
5. Remove the left and right side panels.
6. Remove the wire box cover by sliding up.
7. Locate the wire going to the drain valve actuator, disconnect it and remove it so it is free.
8. While supporting drain valve and actuator, remove clamp (1) holding drain valve in place.
9. Remove drain valve and actuator (3) from under fryer.

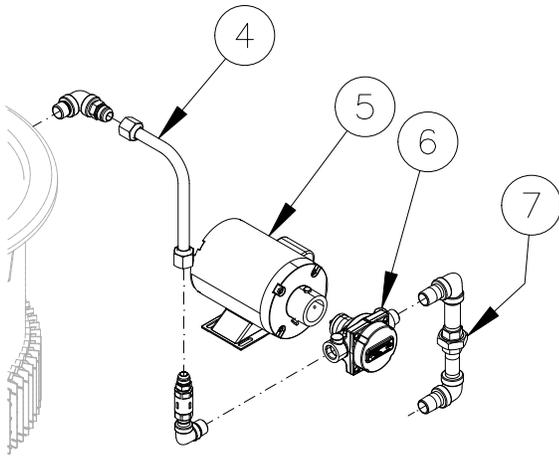


10. Remove O-ring (2)
11. To replace either the drain valve or the actuator, loosen screws **A** but do not remove.
12. Pull actuator away from valve.
12. Reassemble and reinstall in reverse order.

PUMP & MOTOR

Replacement:

1. Disconnect fryer from power supply.
2. Open front panel, lift off and set aside. Remove filter pan from under the unit.
3. Drain cooking oil from cooking well into a container made for handling hot oil.
4. If necessary move fryer to a place where access can be made from the left side, back and right side.
5. Remove the left and right side panels.
6. On the left side, slide the wiring box cover up and set aside.



7. Disconnect all motor power wires from box letting it hang free.
8. From right side of fryer, loosen compression nuts at both ends of return tube (4).
9. Completely remove compression nut on motor end of tube.
10. Disconnect union (7).
11. Remove motor mounting bolts and nuts and set aside.

12. From left side, lift motor and pump out of frame.
13. Remove piping from both sides of pump.
14. To separate the pump from the motor, back out the two or three setscrews in the neck of the pump.
15. When reassembling the new pump or motor make sure the tang on the pump shaft engages the slot in the motor shaft.

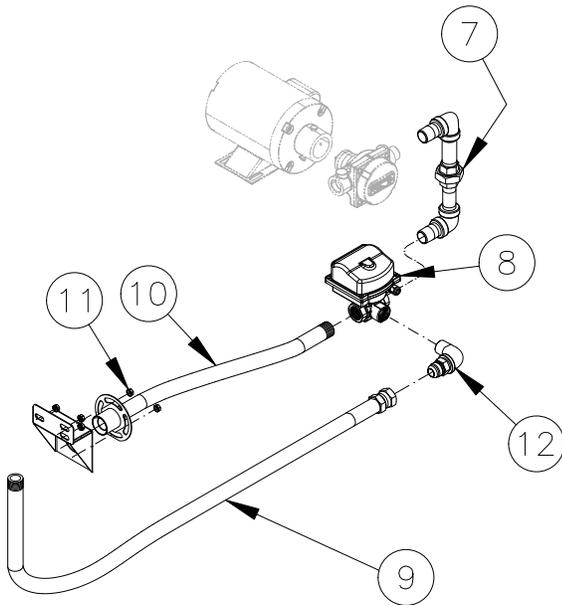
NOTICE

If the pump does not seat into the motor. Use the slot at the back of the motor to turn the motor shaft to align with the tang on the pump.

16. Reattach the piping to the pump. Make sure the check valve is on the left side as you look at the pump end.
17. Reassemble and reinstall in reverse order.

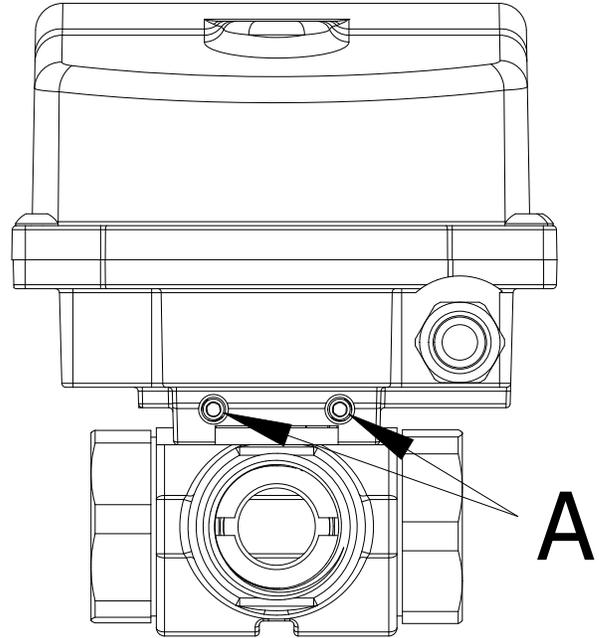
3-WAY VALVE & ACTUATOR

1. Disconnect fryer from power supply.
2. Open front panel, lift off and set aside. Remove filter pan from under the unit.
3. Drain cooking oil from cooking well into a container made for handling hot oil.
4. If necessary move fryer to a place where access can be made from the left side, back and right side.
5. Remove the left and right side panels.
6. Remove the wire box cover by sliding up.



7. Remove 2 kepsnuts (11) and set aside.
8. Remove Suction Hose (10) from 3-way valve (8).
9. Disconnect the Autofill Hose (9) from elbow (12)).
10. Loosen Union (7) and while supporting the 3-way valve and actuator completely disconnect union (7).

11. Remove the pipe assemblies from the 3-way valve.



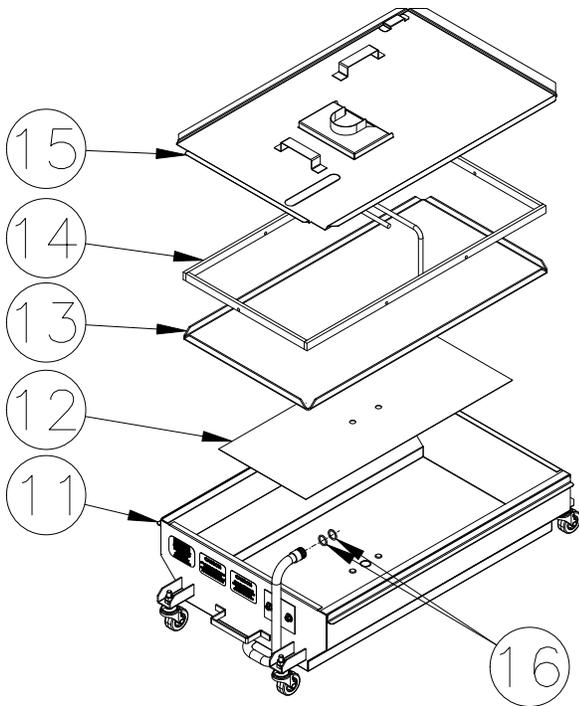
12. To separate the 3-way valve from the actuator, loosen screws **A** but do not remove.
13. Pull actuator away from valve.
14. Reassemble and reinstall in reverse order.

FILTER PAN

See Operation Manual for detailed filtering procedures.

Filter Pan Assembly:

⚠ WARNING DO NOT use the filter pan to transport hot oil. Hot oil could splash causing serious burns.



Be sure filter components are assembled correctly. Correct order is filter screen (12) on bottom of filter pan, filter paper (13), filter hold-down (14) and cover (15) on filter pan.

9 - TROUBLESHOOTING

SMART TOUCH CONTROLLER TIPS

		ES24G
COMPLAINT	CAUSE	REMEDY
Display reads OIL TEMP TOO HIGH	Controller detected an excess of 415°F (or 213° C)	<ul style="list-style-type: none"> • Go to Oil Management • Run manual filters to lower oil temperature. • After the manual filters, reset the system
Oil temp too high for selected product	Different preset selected	Go to Oil Management and run a manual filter to lower oil temperature.
Display reads HEATER FAULT	Oil temperature not rising properly	* Call for service
Display is blank	Unplugged Hi Limit Tripped	Plug in Cycle power, monitor, call Service if it repeats.
Display reads PROBE FAULT	<ul style="list-style-type: none"> * Probe circuit is open or shorted * Probe wires are connected in reverse * Temperature changes more than 100F in two seconds 	* Call for service
Display reads INTERNAL FAULT	Internal fault detected	* Call for service
Display reads Valve Initializing	Valve may be out of proper position.	* Call for service

ES24G GAS TIPS

COMPLAINT	CAUSE	REMEDY
Burner won't ignite	<ol style="list-style-type: none"> 1. Gas shut-off valve OFF 2. Gas line disconnected 	<ol style="list-style-type: none"> 1. See model ES24G lighting instructions 2. Turn ON 3. Call for service.

COVER AND YOKE TIPS

COMPLAINT	CAUSE	REMEDY
Cover hard to CLOSE	<ol style="list-style-type: none"> 1. O-ring dry or dirty 2. O-ring groove dirty 3. Hard O-ring 	<ol style="list-style-type: none"> 1. Clean and lubricate 2. Clean 3. Replace
Cover won't OPEN  WARNING Never use force to OPEN cover.	<ol style="list-style-type: none"> 1. O-ring dry or dirty 2. O-ring groove dirty 3. Hard O-ring 4. Pressure not released 	<ol style="list-style-type: none"> 1. Clean and lubricate 2. Clean 3. Replace 4. Contact service person
O-ring Break  CAUTION DO NOT rest rack on top flange of cooking well. Damage to area in contact with o-ring can cause leaking under pressure or O-ring failure.	<ol style="list-style-type: none"> 1. O-ring groove dirty 2. Nicks in cooking well or cover 	<ol style="list-style-type: none"> 1. Clean 2. Remove

PRESSURE SYSTEM TIPS



DO NOT attempt to tighten, repair or replace any fitting, line or component when there is pressure in the cooking well. Hot oil could spray out under pressure causing serious burns.

COMPLAINT	CAUSE	REMEDY
No pressure	<ol style="list-style-type: none">1. Pressure regulating valve dirty or blocked open2. Leaks around cover O-ring	<ol style="list-style-type: none">1. Contact service person2. Replace O-ring
Excess pressure		<ol style="list-style-type: none">1. Turn cook/filter switch OFF. Contact service person.

PRODUCT TIPS

Fresh Chicken:

COMPLAINT	CAUSE	REMEDY
Product too light	<ol style="list-style-type: none">1. Low oil temperature2. No coating3. Not done4. Incorrect rack tier used	<ol style="list-style-type: none">1. Check cook temperature2. Check procedures3. Increase cook time
Product too dark	<ol style="list-style-type: none">1. High oil temperature2. Wrong coating3. Breaded too long4. Old oil	<ol style="list-style-type: none">1. Check cook temperature2. Check procedures3. Discard4. Change oil
Product not done	<ol style="list-style-type: none">1. Low oil temperature2. Cook time too short	<ol style="list-style-type: none">1. Check cook temperature2. Increase cook time
No flavor	<ol style="list-style-type: none">1. Improper marination	<ol style="list-style-type: none">1. Check procedures
White spots	<ol style="list-style-type: none">1. Product stuck together2. Not following product loading process	
Dark spots	<ol style="list-style-type: none">1. Dirty oil	<ol style="list-style-type: none">1. Filter or replace

FILTERING TIPS

COMPLAINT	CAUSE	REMEDY
<p>Motor will not start</p> <p>⚠ WARNING Turn cook/filter switch to OFF position to avoid splashing of oil when motor protector reset button is pushed.</p>	<ol style="list-style-type: none"> 1. Overload tripped 	<ol style="list-style-type: none"> 1. Wait for overload to cool. Push red motor protector reset button located on rear of motor.
<p>Motor hums but will not start</p>	<ol style="list-style-type: none"> 1. Solidified shortening in pump 2. Crumbs in pump 	<ol style="list-style-type: none"> 1. Turn cook/filter switch OFF. Contact service person. 2. Turn cook/filter switch OFF. Contact service person.
<p>Motor starts but will not pump</p>	<ol style="list-style-type: none"> 1. Filter pan not completely installed 2. O-rings on riser line are not installed or cut. 3. Solidified shortening in piping or filter pan 	<ol style="list-style-type: none"> 1. Firmly push filter pan in 2. See FILTERING 3. Turn cook/filter switch OFF. Contact service person.
<p>Motor starts but will not pump or stops at any level</p>	<ol style="list-style-type: none"> 1. Filter paper or hold down improperly installed 2. Not using enough Broaster[®] filtering compound 	<ol style="list-style-type: none"> 1. See COOKING OIL CARE AND FILTERING 2. Next filtering cycle, make sure proper amount of Broaster[®] filtering compound is used
<p>Motor starts but stops pumping when oil is level with top of hold down, approximately 1 inch of oil in bottom</p>	<ol style="list-style-type: none"> 1. Filter paper improperly installed or crumbs under filter paper or hold down 	<ol style="list-style-type: none"> 1. See COOKING OIL CARE AND FILTERING

SERVICE NOTES

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Broaster Company
2855 Cranston Road, Beloit, WI 53511-3991
608/365-0193
broaster.com