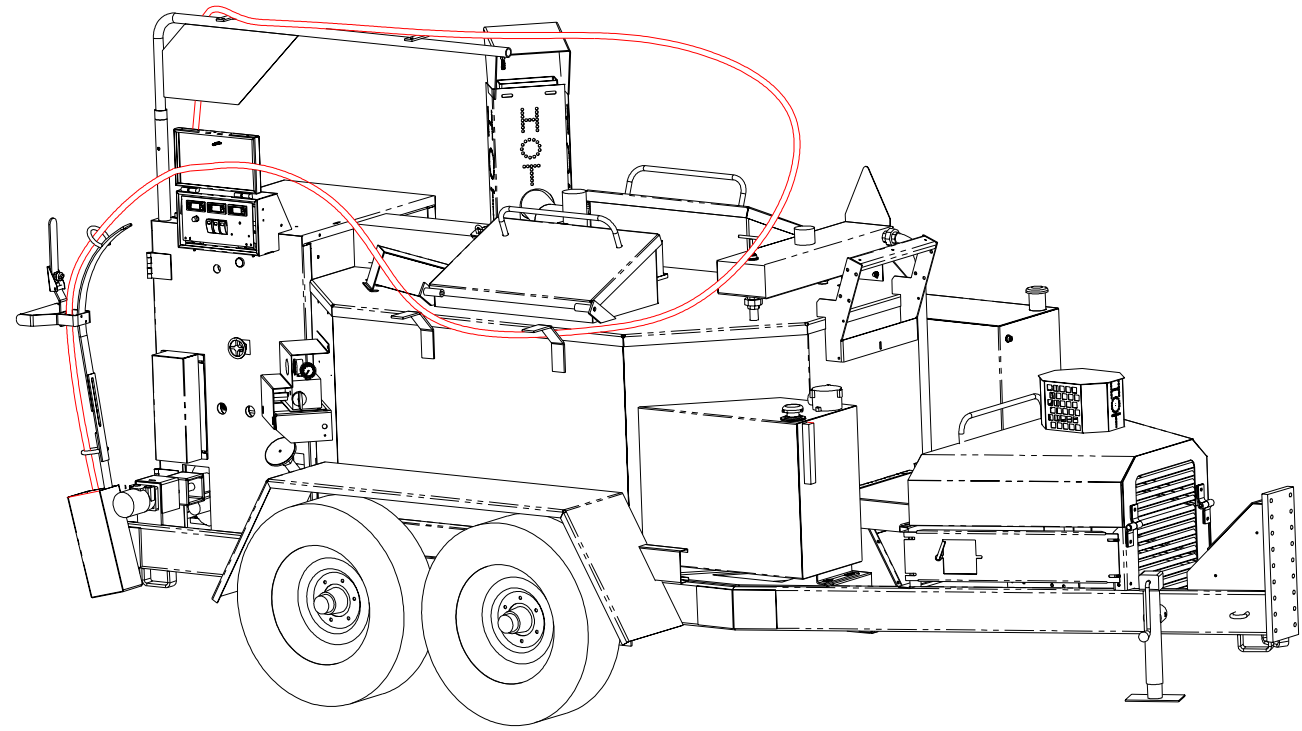
CIMLINE

Melter Applicator

MAGMA
CIMLINE

Model 110/230/410 Melter Applicator
Owner / Operator Manual



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Shipping Papers and Information

A packet containing IMPORTANT INFORMATION has been enclosed with your Melter. This packet contains:

1) Operation Instructions

2) Parts List

3) Warranty Information

4) Manufacturer's Documents
   a) Engine
   b) Material Pump
   c) Burner (Diesel only)

IMPORTANT: This manual contains the basic information required to operate, maintain and repair the CIMLINE Melter you have purchased. The use of this manual insures accurate adjustments, operation and proper lubrication of your equipment. Please keep it handy.

Any parts orders or service problems relating to CIMLINE equipment should be directed to the CIMLINE Parts Department at either (763) 557-1982 or (800) 328-3874. When ordering parts, please have the following information available.

Serial Number: _____

Model Number: _____

Engine Model (H.P.): _____

Engine Manufacturer: _____

Pump Number: _____

Replacement Part Number(s):

PLEASE READ AND UNDERSTAND ENTIRE OPERATORS MANUAL BEFORE PROCEEDING

WARNING: Protective clothing must be worn. Refer to ANSI Regulations:

1) Wear gloves with wristlets.

2) Wear long sleeve shirt with sleeves rolled down and cuffs buttoned.

3) Wear a face shield.

4) Load Melter from ground level.

5) Keep material door closed at all times except when adding material.

6) Never stand on any part of the machine.

7) Do not pull, twist, stretch or kink the material hose.

8) Do not operate without safety cover on hose.

9) Do not touch exhaust stacks or mufflers.

10) Wear heavy leather boots or shoes.

11) Wear long pants with no cuffs.

WARNING: Do not over fill the melting tank. For best results, add only as much material as required for the job or a maximum of 75% of tank capacity. (Model 110 - 78 gallons, Model 230 - 168 gallons & Model 410 - 308 gallons).

WARNING: On a new Melter applicator or a unit that has been idle for some time, slowly raise the oil temperature to 250º F and hold there for approximately 20 to 30 minutes. This will help get rid of any condensation that may be in the oil chamber.

WARNING: Never leave machine unattended while it is running.

Operating Sequence

Diesel Units

NOTE: This step by step procedure is only an outline. Refer to the page(s) indicated for complete instructions.

	PROCEDURE:	**PAGE**
1)	Refer to fuel system air bleeding before starting.	12
2)	Start engine per engine operating instructions.	14
3)	Set temperature controller(s).	16
4)	Make sure tank outlet, sealing hose, and air cleanout valves are closed.	10-11
5)	Open Thermal Regulating Gate if cabinet heating is required.	18
6)	Ignite burner.	16
7)	Allow oil temperature to reach approximately 250º F.	
8)	Regulate cabinet temperature.	18
9)	Start agitation.	20
10)	Add material, typically 2-3 biscuits if tank is empty.	20
11)	Allow for sufficient melting.	21
12)	Start material pump.	21
13)	Close Thermal Regulating Gate.	18
14)	Attach sealing wand extension and adjust flow.	21-22
15)	Begin sealing procedure.	21-22
16)	10-15 minutes before the end of the work day, return temperature control knobs to zero.	25
17)	Clean out Melter.	25-27

NOTE: When leaving reheatable material in tank, allow the agitator to run until the oil and material temperatures are the same.

PROCEDURE: **PAGE**

18) Turn the temperature control box off and shut off engine. 14,16

19) Coil sealing hose and place in cabinet along with wand (Non-heated hose models only).

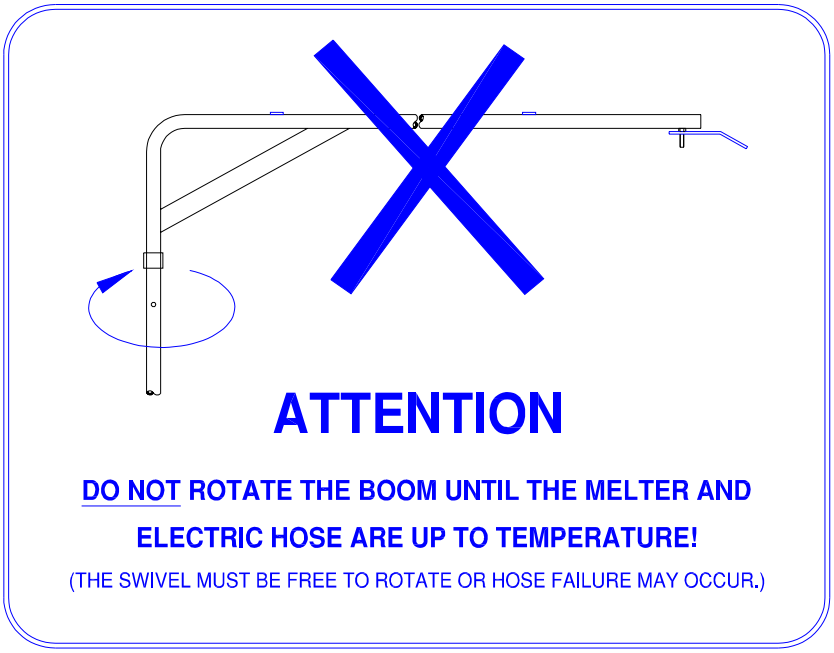
20) Lock hose boom in tow position.

21) Always secure sealing wand, sealing hose and hose boom before towing the Melter.

Attention!

Do not turn on heated hose controller until material has pumped through the hose !! (this pertains to first start up of new hose)

On electric hose option only.



Operating Sequence

Propane Units

N**OTE: This step by step procedure is only an outline. Refer to the page(s) indicated for complete instructions.**

	PROCEDURE:	**PAGE**
1)	Hook up LP bottle(s).	13
2)	Turn on gas and adjust regulator.	13
3)	Set temperature controller(s).	16
4)	Make sure tank outlet, sealing hose, and air cleanout valves are closed.	10-11
5)	Open Thermal Regulating Gate and close stack diverter if cabinet heating is required.	18
6)	Ignite burner.	16
7)	Allow oil temperature to reach approximately 250º F.	
8)	Start engine per engine operating instructions.	15
9)	Regulate cabinet temperature.	19
10)	Start agitation.	20
11)	Add material, typically 2-3 biscuits if tank is empty.	20
12)	Allow for sufficient melting.	21
13)	Start material pump.	21
14)	Close Thermal Regulating Gate and open stack diverter.	19
15)	Attach sealing wand extension and adjust flow.	21-22
16)	Begin sealing procedure.	21-22
17)	10-15 minutes before the end of the work day, return temperature control knobs to zero	25

PROCEDURE:		PAGE
18)	Clean out Melter.	25-27

N**OTE: When leaving reheatable material in tank, allow the agitator to run until the oil and material temperatures are the same.**

19)	Turn the temperature control box off and shut off engine.	15
20)	Turn LP bottle(s) off.	13
21)	Coil sealing hose and place in cabinets along with wand (Non-heated hose models only).	
22)	Lock hose boom in tow position.	
23)	Always secure sealing wand, sealing hose and hose boom before towing the Melter.	

Controls and Their Functions

NOTE: This general outline will only familiarize you with the machine. Read through the entire manual before putting this machine into operation. (Refer to Diagram 1 on page 11)

1) Tank Outlet Valve: Allows melted material from the tank to flow into the pumping system.

2) Access Port: The sealing wand is placed in here when not in use. This allows operator to continue circulating material through the hose to prevent material from cooling and freezing up.

3) Loading Door (2 on Model 230 & 410): Place the material on safety door to load the melting tank.

4) Oil Temperature Gauge: Monitors the heat transfer oil temperature.

5) Material Temperature Gauge (optional): This gauge shows the temperature of material inside the melting tank. This gauge is for reference before pumping starts. Once pumping begins, gauge (6) will be an exact reading of material passing through the system. (Not shown)

6) Material Temperature Gauge: Reads material temperature as it pumps through plumbing system.

7) Pressure Valve: This valve controls the flow rate of the material being pumped to the hose and sealing wand by changing the pressure setting. (Turning the valve clockwise will increase the pressure which in turn will increase the flow). During sealing operations, this valve alone can be used to regulate flow.

8) Sealing Hose Valve: Opening this valve will allow the material being pumped to flow through the hose and sealing wand. The valve should be in the full "on" position during operation to prevent flow restriction.

9) Agitation Drive Control Knob: Rotate knob counterclockwise to start agitation. Rotate knob clockwise to reverse agitation, which is useful for dislodging material. Center position is neutral.

10) Pressure Gauge: This gauge measures the pressure required to turn the agitator. By observing this gauge, the operator can tell if the agitator is rotating.

11) Pump Drive Control Knob: Rotate knob counterclockwise to start material pump for sealing operation. Rotate the knob clockwise to reverse the material flow. Reverse flow is used for system cleanout. Center position is neutral.

12) **Air Cleanout Valve (optional):** Connect air line or solvent line to this connector to flush out system. This valve should remain closed at all times other than cleanout.

13) **Temperature Control Box:** This control allows the operator to set the desired oil and material temperatures. The setting will be maintained automatically.

14) **Wand Holder:** On models with the electrically heated hose, the wand is placed into this holder.

15) **Cabinet Temperature Gauge:** Indicates the temperature inside the cabinet. Do not exceed 320º F. If conditions permit exceeding this temperature, open cabinet door.

16) **Thermal Regulating Gate:** Lift lever to open gate which will direct hot air to cabinet to heat pump and plumbing.

17) **PSI Gauge:** This gauge will tell you the amount of pressure in the hydraulic system.

18) **Ignition Access Door:** On Diesel models, lift this door for access to ignition key.

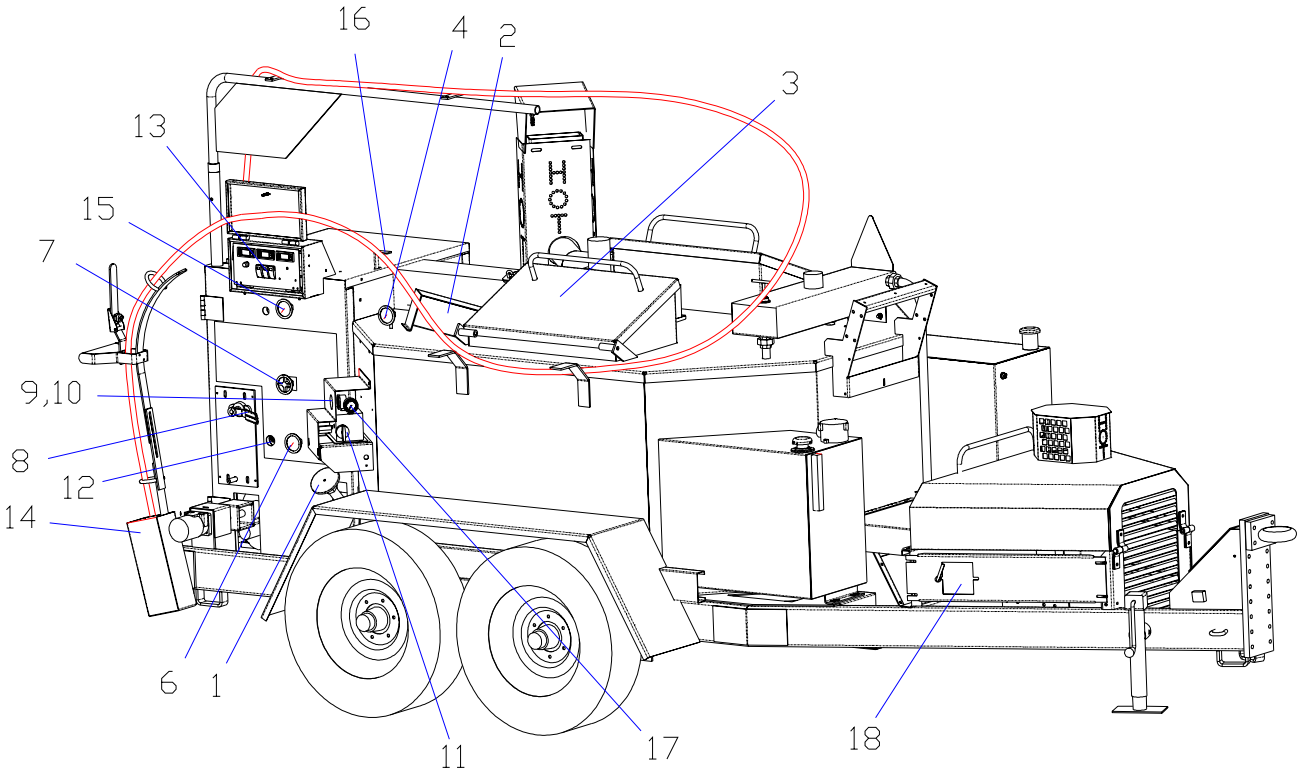


Diagram 1

Fuel System Air Bleeding

This section only pertains to Diesel engines. The engine and burner are pretested and bled during factory run in. If the fuel tank is permitted to run dry or when changing filters, bleeding may be necessary to restart the burner.

Your fuel tank is equipped with a visual fuel level gauge (diagram 3). Avoid letting the fuel level drop below the lowest visible level. There is some reserve below this level, but your burner may draw air due to splashing of fuel while transporting the unit. Once air gets into the fuel supply line, the burner will run erratically or not at all.

To bleed the diesel burner (Diagram 2):

1) Attach a 1/4" ID hose to the bleeder screw. Run the other end of the hose into a clean collection can or bottle.

2) Start the engine.

3) Turn the temperature control system on so that the burner will try to ignite.

4) Loosen the bleeder screw and allow the fuel to flow through the hose into the collection can. Once there are no more bubbles in the fuel stream, tighten the screw immediately.

5) Turn off the temperature control system. When you restart the temperature control, the burner should ignite.

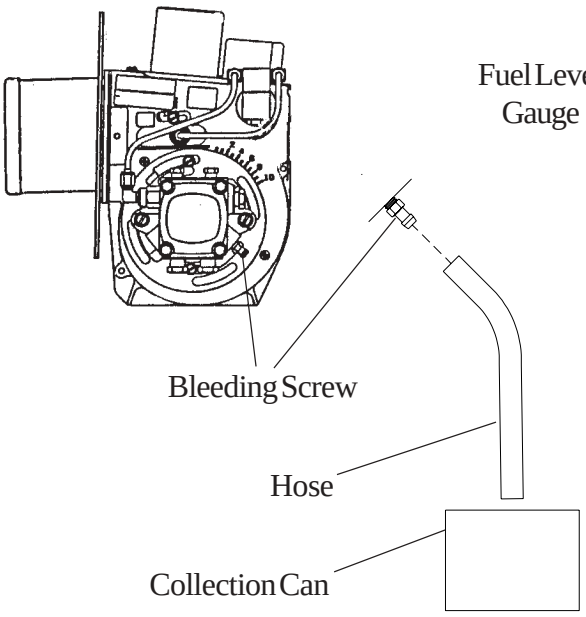


Diagram 2

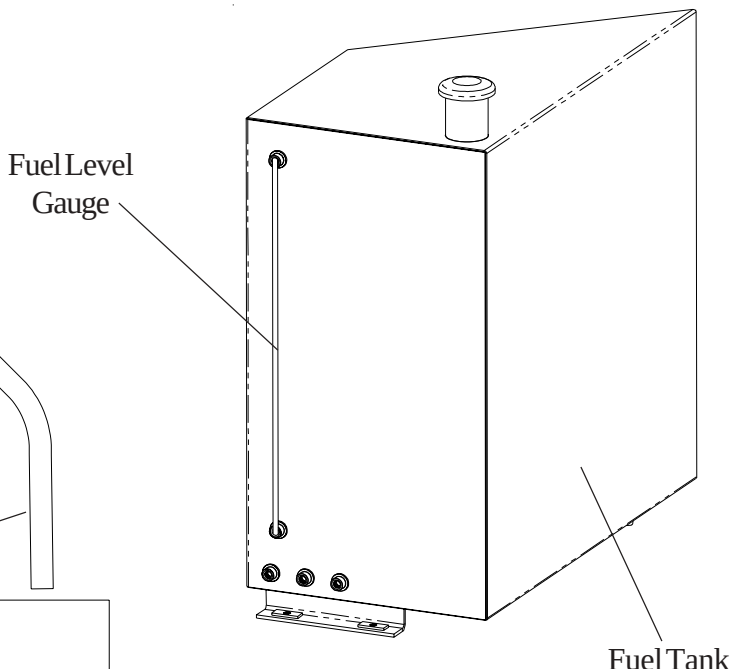


Diagram 3

NOTE: Liquid withdrawal requires optional hose adapters and engine vaporizer (Diagram 4).

1) Place 100 lb. propane bottle(s) in rack and secure in place with chain binder(s).

2) Connect hoses (A) to bottle(s).

NOTE: POL fittings are left hand thread. All connections must be air tight.

3) Close hand torch supply valve (B). (optional)

4) On models with optional two bottles, open the valve (C) from one bottle or the other.

5) Open valve on LP bottle and set regulator (D) at 13 to 14 PSI.

WARNING: DO NOT exceed 14 PSI.

6) Set the oil controller (E) to 550º F (Diagram 5). **DO NOT** exceed 550º F. Set the material controller (F) to the recommended material working temperature (typically listed on can or box). (optional)

7) Turn the rocker switch (G) on. The light in the switch will indicate that the control system is on.

NOTE: If the burner does not ignite within 8-10 seconds, the unit will require resetting. Turn switch "off", allow time for the unburned fuel to exit the chamber and repeat procedure.

8) If ignition does not occur, check the fuse and gas supply.

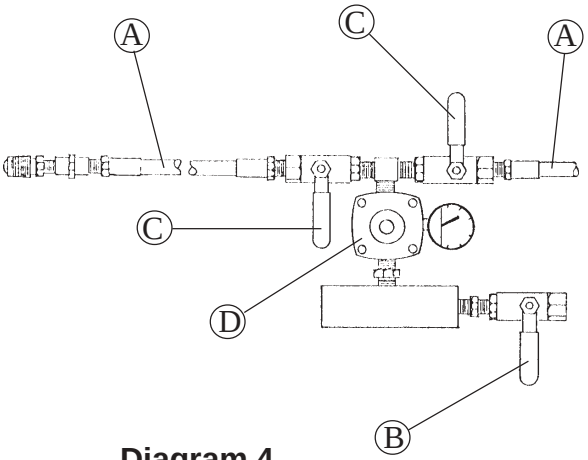


Diagram 4

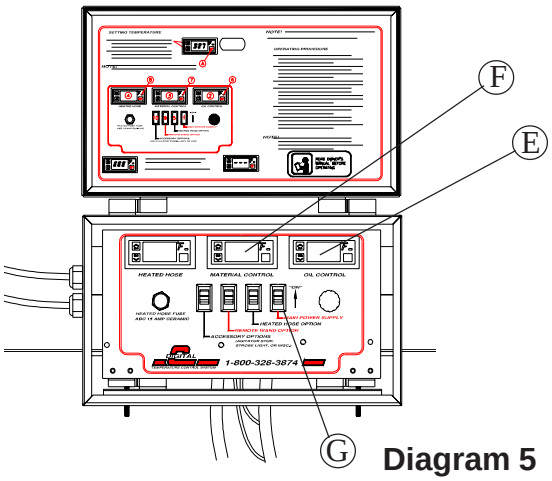


Diagram 5

Starting the Engine

NOTE: Read the engine instruction manual before starting.
Engine RPM is factory set and fixed at 2200 RPM.

Diesel Engine:

Your Isuzu Diesel Powered Melter is equipped with an electronic shutdown system (see page 38). If the system detects excessive water temperature, low alternator output, or low oil pressure, the engine will automatically shut down. The indicator light that remains on indicates the malfunction. An integral digital hourmeter records engine run time,

The engine must be running before igniting the burner. The burner will only operate if the ignition key is turned on. **DO NOT** turn on burner without engine running. To start engine:

1) Place the pump drive (A) and agitation control knobs (B) in the neutral (center detent) position (Diagram 6).

2) Open the ignition access door (Diagram 7(C)).

3) Rotate the key to position #1 (Diagram 8).

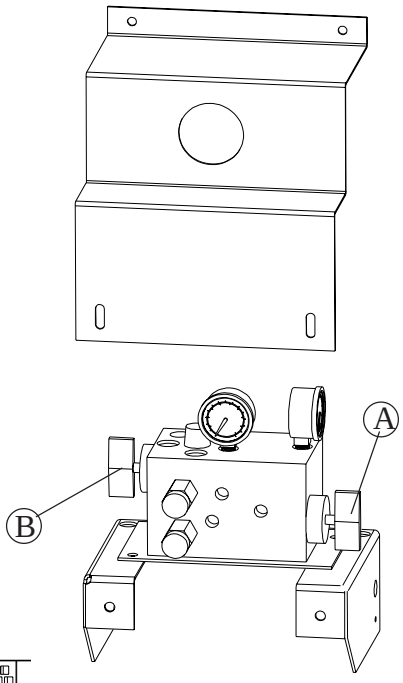
4) Wait for system "on" light to finish flashing (about 10 seconds). This is the glow plug heating cycle.*** (Diagram 8)

5) Rotate the Key to the #2 position until the engine starts (Diagram 8).

6) If the engine does not start within 6-7 seconds, repeat glow plug cycle.

***Glow plug cycle use not required on warm engines.

Diagram 6



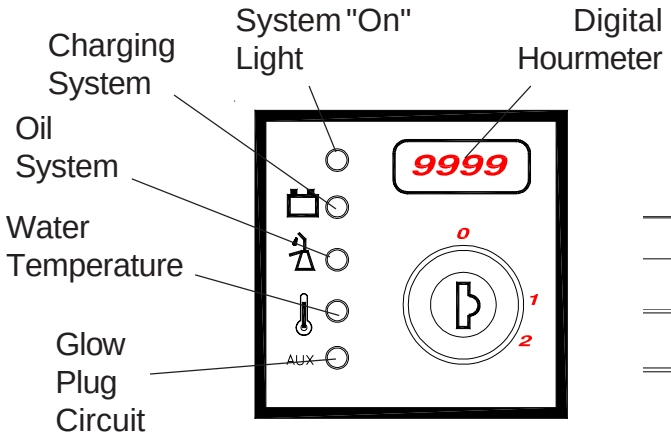


Diagram 8

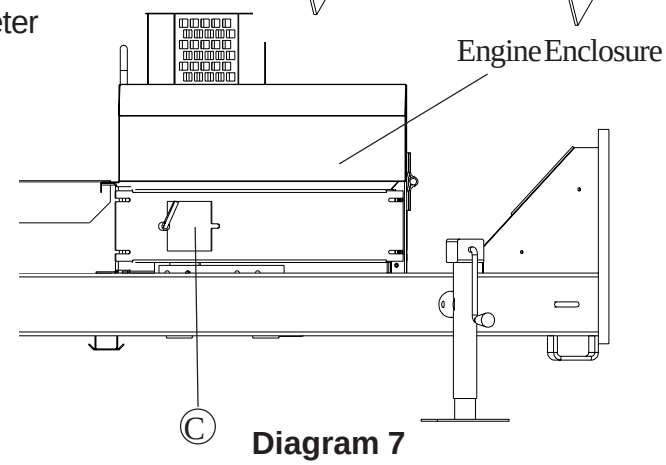


Diagram 7

NOTE: Read the Kohler engine instruction manual before starting. The Engine RPM is factory set and fixed.

Propane Engine:

NOTE: Allow oil thermometer (mounted on tank) to reach 250º F. before starting this procedure.

1) Place the pump drive (A) and agitation control (B) levers in the neutral (center detent) position (Diagram 9).

2) Start the engine (Refer to Kohler Engine Manual for start up procedure, maintenance and trouble shooting).

3) The prime button on the L.P. regulator will allow fuel to enter the carburetor while depressed. This may be required for cold start up.

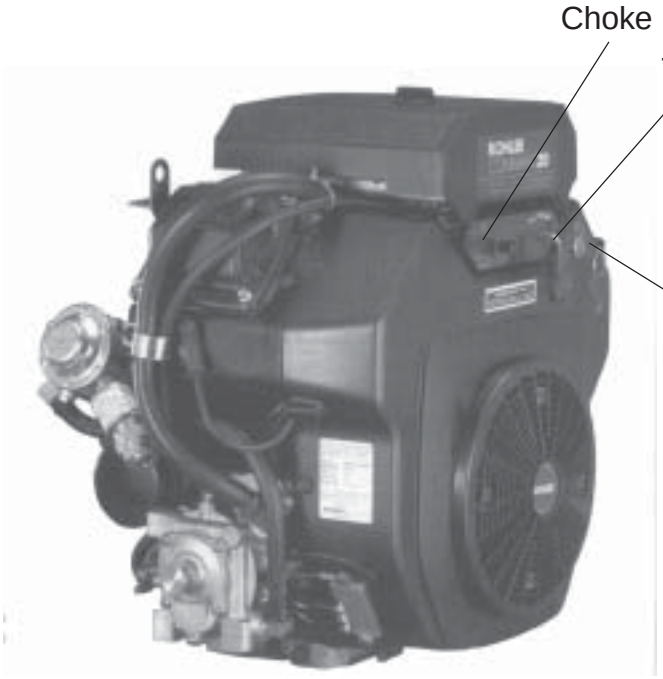


Diagram 10

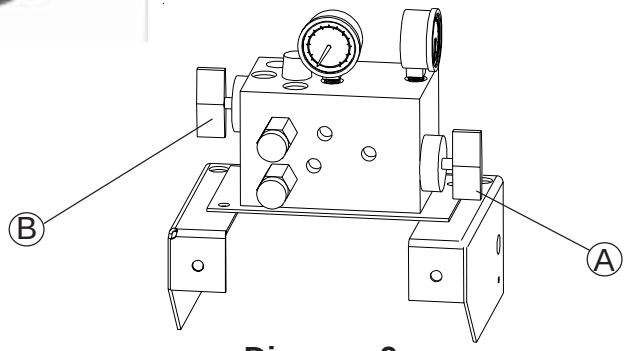


Diagram 9

Automatic Temperature Control Setting

NOTE: On diesel units, the engine must be running before activating temperature control. The automatic temperature control system monitors the heat transfer oil temperature and material temperature (Refer to diagram 11).

1) Set the oil controller (A) to 550º F (See Setting Temperature Controllers, pg. 17)

2) Set the material controller (B) to the recommended material working temperature which is typically listed on the material container.

3) On units with heated hose, set the hose controller (C) to the pour temperature.

4) Turn rocker switch (D) on. The switch will light up to indicate that the control system is activated. The oil control indicator (F) will light also. The material control light (G) will be on only when burner is running. Lights (D,F and G) should light during a cold start up.

5) Turn switch (H) on to activate the heated hose (if equipped). The switch will light up to indicate power is on.

6) Hose indicator light (J) will light only when hose is being heated.

7) Switch (E) is used to activate remote control sealing wand valve (if equipped).

8) Switch (I) is used to activate any optional accessories.

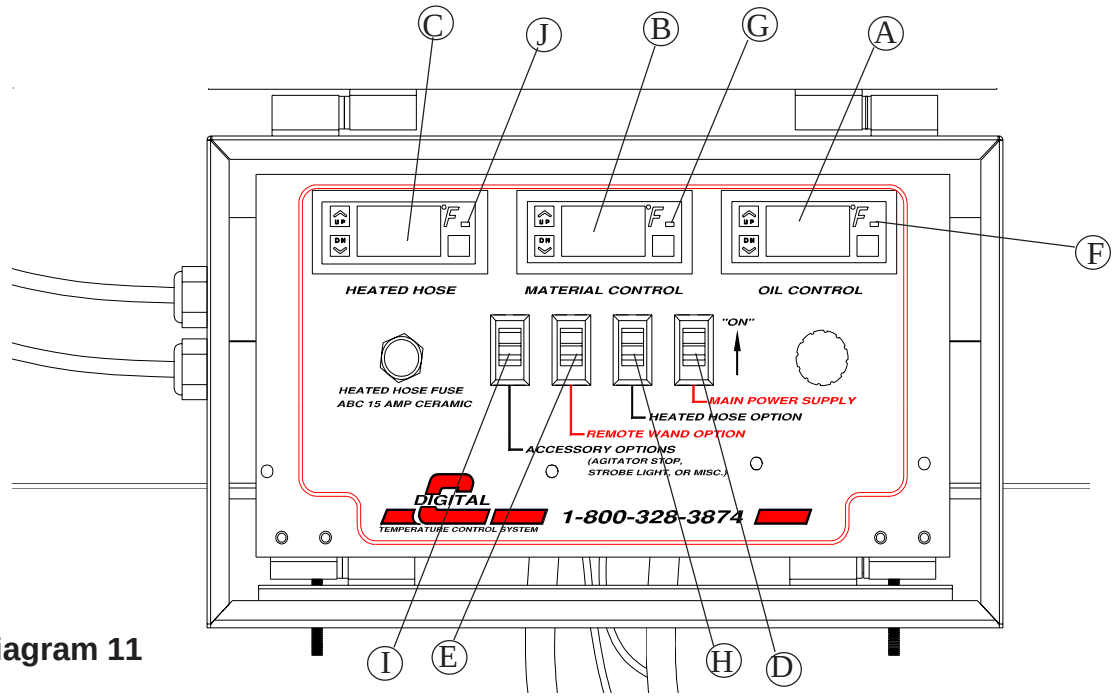


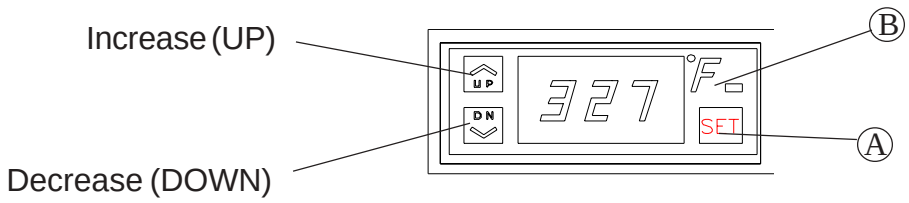
Diagram 11

1) Press set button (A). Light (B) will flash while in the setting mode.

2) Press "UP" or "DOWN" button until desired temp is shown.

3) After a few seconds, light (B) will quit flashing and the readout will display actual temperature.

4) Indicator light (B) will remain on anytime the burner is running.



NOTE: Press set button (A) at anytime to display the setpoint temperature.

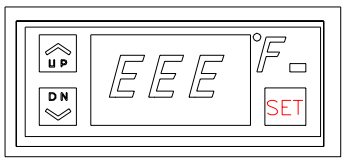
For safety, the high limit settings are locked in at the factory to prevent overheating. The settings are:

Oil Controller- 575 Degrees Fahrenheit
Material Controller- 450 Degrees Fahrenheit
Heated Hose Controller- 425 Degrees Fahrenheit

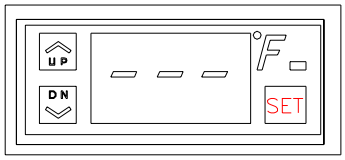
These settings can be field adjusted for specific applications.
Consult the factory for instructions.

Setting your controllers higher than the high limit will cause an error code as shown below.

Troubleshooting Codes



"EEE" indicates thermocouple break, no sensor, or overrange of system.



"---" indicates shorted thermocouple.

Cabinet Pre-Heating

WARNING: Always wear gloves when adjusting the damper.

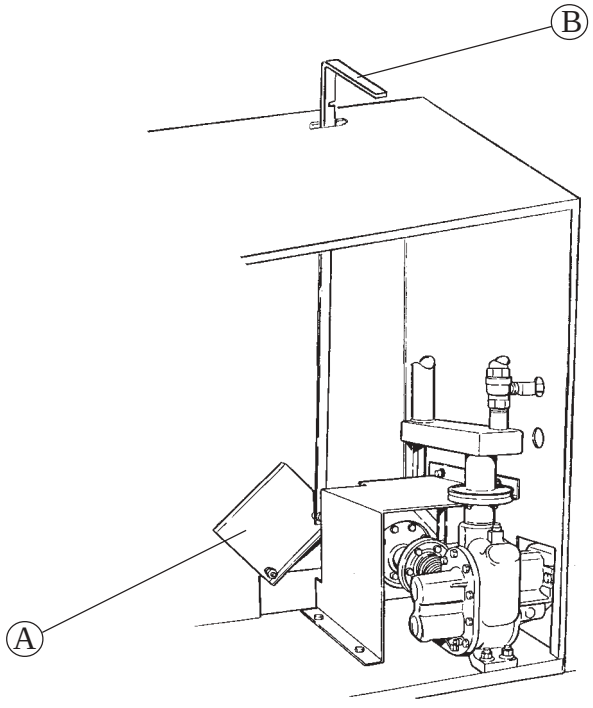
The burner exhaust is equipped with an adjustable Thermal Regulating Gate (A) to help regulate the amount of heat diverted to the cabinet for hose, wand and plumbing preheating. At the end of each day after cleaning out the system, the hose should be coiled and placed in the cabinet. The wand may remain attached as it will fit in the cabinet.

NOTE: On units equipped with a heated hose, the hose and wand must remain outside the cabinet.

COLD START-UP

1) Open the gate, using the gate lever (B), to the full position. This will force hot air into the cabinet. The temperature gauge installed in the side of the cabinet will measure actual temperature. **Never** allow cabinet temperature to exceed 320º F. Open the door partially if necessary. Adjust gate or close completely to keep temperature below 320º F.

2) Once the material in tank has started melting and is circulating through the plumbing system, close the gate. This will prevent excessive cabinet temperatures and will divert the heat around the oil for more efficient heating.



WARNING: Always wear gloves when adjusting the damper.

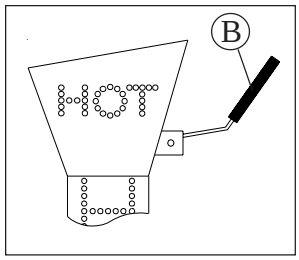
The burner exhaust is equipped with an adjustable Thermal Regulating Gate (A) and a damper (B) to help regulate the amount of heat diverted to the cabinet for hose, wand and plumbing preheating. At the end of each day after cleaning out the system, the hose should be coiled and placed in the cabinet. The wand may remain attached as it will fit in the cabinet.

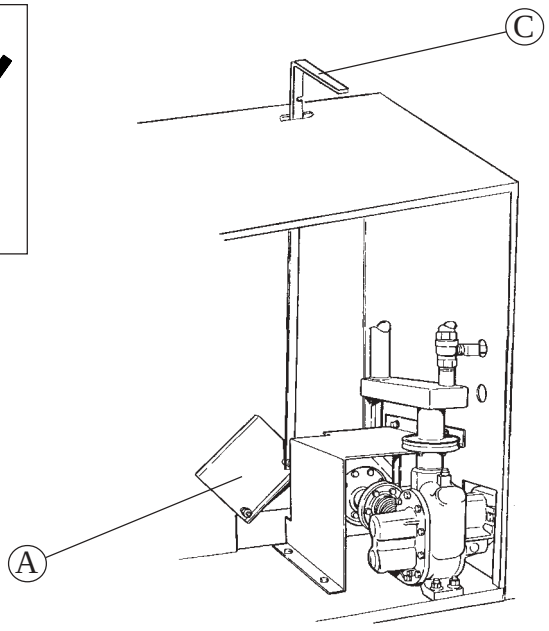
NOTE: On units equipped with a heated hose, the hose and wand must remain outside the cabinet.

COLD START-UP

1) Close the damper until it covers the exhaust stack. Open the gate by lifting lever (C) to the full open position. This will force hot air into the cabinet. The temperature gauge installed in the side of the cabinet will measure actual temperature. **Never** allow cabinet temperature to exceed 320º F. Open the door partially if necessary. Adjust gate or close completely to keep the temperature below 320º F.

2) Once the material in the tank has started melting and is circulating through the plumbing system, open the damper and close the gate. This will prevent excessive cabinet temperatures and will divert the heat around the oil for more efficient heating.





Agitation Start-up

Loading Empty Tank

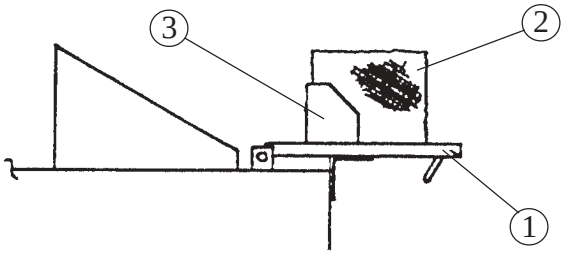
1) Start agitation by rotating knob (A) counterclockwise.

2) Tank outlet valve must be in the "off" position.

3) All material must be clean. Keep all foreign matter out of melting tank.

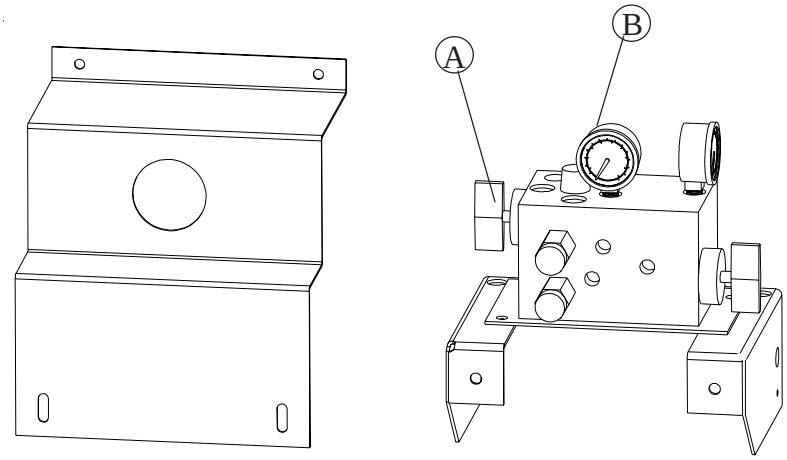
4) Open the material door (1) and place slab or biscuit (2) on the open door against the holder (3).

5) Push door to the closed position. **DO NOT DROP MATERIAL INTO THE MELTER WITH DOOR OPEN.**



Material Left in Tank

1) When oil reaches 250º F., rotate knob (A) counterclockwise and observe pressure gauge (B). If the gauge jumps to 1000-1200 psi and remains there with no fluctuation, the agitator is not turning. The oil is going over the relief valve setting. Place knob into neutral position and wait until sufficient melting occurs. (On Model 230 and 410, gauge will vary between 750 - 850 PSI).



Refer to Diagram 12 on page 22

When sufficient material has melted (approximately 4-6 inches liquid on tank bottom) or gone through the heating cycle required for liquid type sealants, begin circulation procedure.

1) *Close air cleanout valve (if equipped) and sealing hose valve (A).

2) Turn pressure valve (B) counterclockwise to the full "decrease" position.

3) Rotate the material pump drive knob (C) counterclockwise to the normal flow position. If the pump will not rotate, return knob to neutral and continue heating until pump will rotate.

4) Open tank outlet valve (D).

5) When the material is flowing evenly through the bypass and is at the recommended pouring temperature, stop the material pump drive by returning knob to the neutral position.

6) Close thermal regulating gate if still open, and on propane units open stack diverter.

7) *Remove sealing tip, open wand valve (F). Place the wand into the access port.

8) Restart the material pump and allow the material to circulate. Turn pressure valve clockwise, "increase" until the engine begins to lug.

9) *Open sealing hose valve to the full "open" position.

10) When the material is flowing freely through the sealing hose and wand, place material pump drive knob to the neutral position to stop pump.

11) Turn wand valve "off".

12) Remove the wand from the access port and quickly install the appropriate sealing tip. Immediately return the wand to the access port.

13) *Open wand valve and start material pump drive by rotating knob counterclockwise.

Sealing Procedure

During the circulation and sealing operations, it is important to monitor the material temperature gauge as the material circulates through the plumbing system. The material should not exceed the manufacturer's recommended pouring temperature.

Sealing Procedure

1) *Turn wand valve (A) "off" and remove the wand from the access port until you can see the sealing tip.

2) Open wand valve to the full "on" position and observe the material as it flows into the tank through the access port.

3) Adjust the pressure valve (B) until the flow rate appears to be correct for the size crack or joint to be filled.

4) Turn the wand valve "off" and proceed to the crack or joint to be filled.

5) Place the sealing tip into the joint, open the wand valve to the full "on" position and begin sealing by dragging tip through the joint.

6) If the flow rate is incorrect, repeat steps 1 through 3 until the desired flow is achieved.

7) As you approach the end of the joint, turn the wand valve "off" to avoid excess spillage.

8) To avoid material freezing in the hose, always return the wand to the access port and open the wand valve to allow material to circulate through the hose.

NOTE: On units equipped with the electrically heated hose option, the wand can be placed in the wand holder instead of the access port.

*Does not apply to remote wand model.

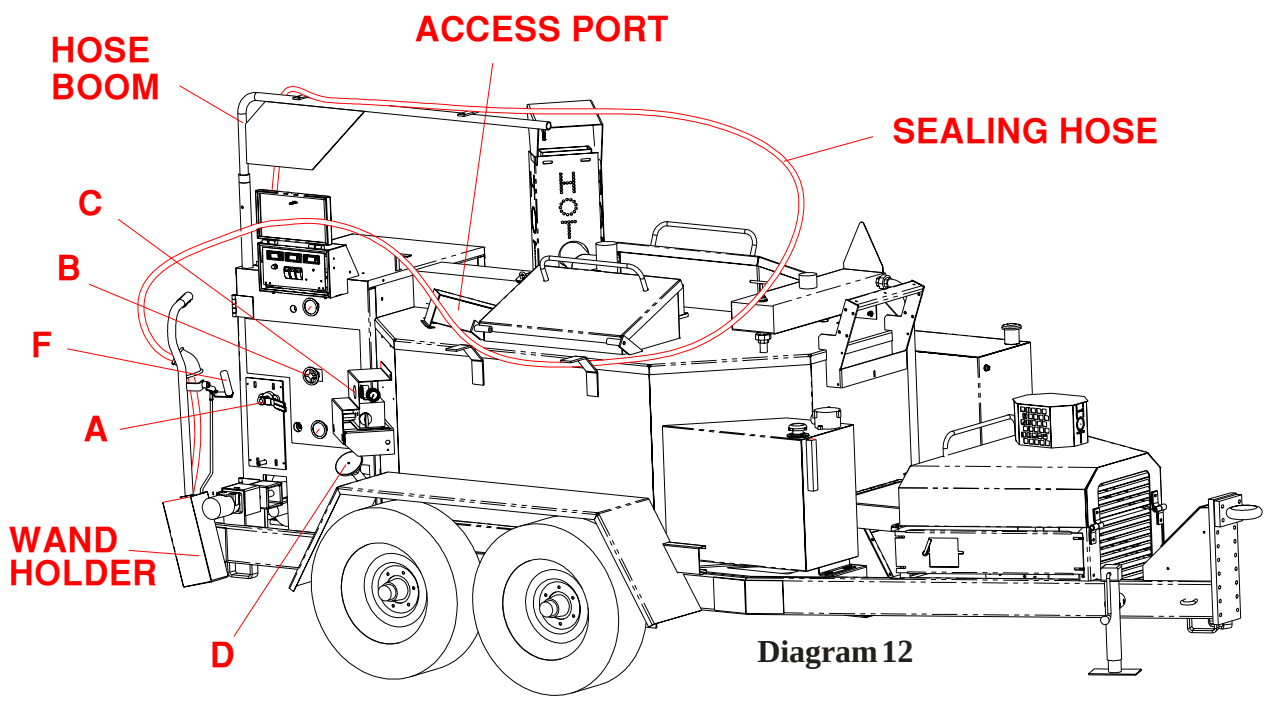
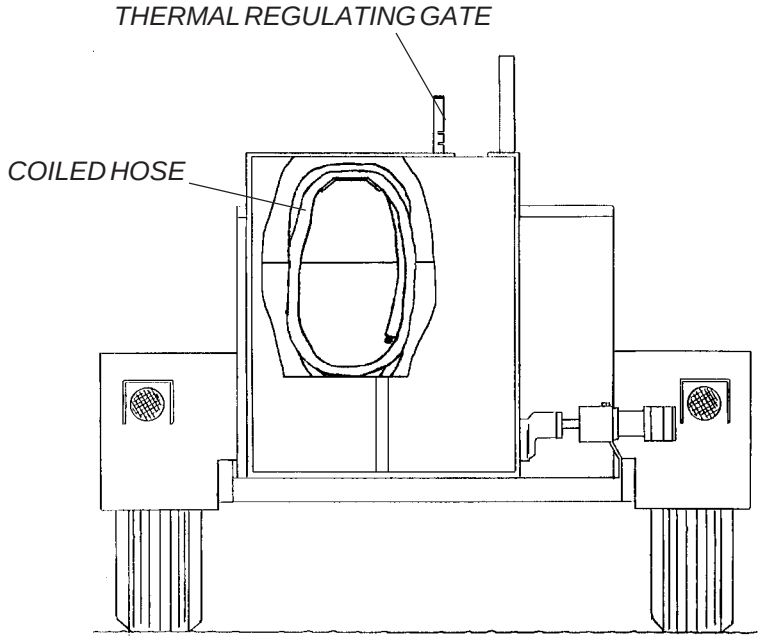


Diagram 12

Unplugging a Clogged Hose (Non-Heated Hose Models)

Regardless of how you store your hose, the residue tends to settle at the bottom of the coils overnight. Each day when the unit is started, the hose must be coiled up and placed in the cabinet during the preheating process, as shown in the picture below. Unless the hose was cleaned with compressed air, you will probably have enough material remaining in the hose to require this procedure.

NOTE: Once the Melter is up to operating temperature, the burner typically does not cycle often enough to get the cabinet to the required temperature to unplug the hose.



On cold and windy days, it is very important to maintain material flow through the hose at all times. This requires keeping the material up to temperature and returning the wand to the access port anytime the wand will be shut off for more than 30 seconds to a minute. If the hose plugs during sealing operations, one of the following procedures should be followed:

1) **Immediately** remove the sealing tip (if you are using one) and insert the wand into the access port. With the sealing hose valve and the wand valve both wide open, turn the pressure valve clockwise to increase the pressure supplied to the hose. Do this until the engine almost stalls. If this does not work, proceed to another method.

NOTE: Immediately coil the hose inside the cabinet.

Unplugging a Clogged Hose

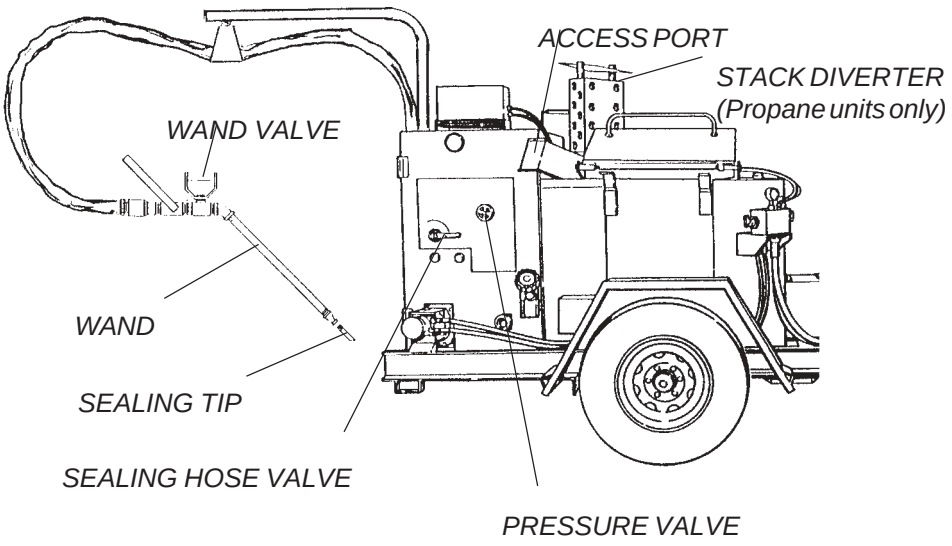
2) If the unit is not full of material, add material to lower the tank temperature enough so the control box will fire the burner. Keep adding material until the cabinet temperature is high enough to unplug the hose.

NOTE: Be sure to open the thermal regulating gate to the full open position. On propane units, be sure the stack diverter is closed.

3) If the unit is full, it may be necessary to open up the loading door and allow the material to cool down. Turn the temperature control setting to 250º F. Allow the material to cool down enough so that the burner will have to run for a period of time long enough to heat the hose sufficiently. The actual time required will vary depending on how much material and what type of material is left in the hose. Thermal regulating gate must be wide open. On propane units, the stack diverter must be closed.

4) If the unit is clogged and the above two procedures are not possible, it may be necessary to use a back up hose. The clogged hose can then be connected and unplugged the next time you start up with a cold material tank.

The above situations illustrate the importance of properly cleaning the hose after use. It also shows the importance of returning the hose to the access port during times between use to keep the material flowing freely through the hose.



Approximately 10-15 minutes before the end of the work period, turn the temperature control knob(s) "off". There are three methods of cleaning that can be used; reverse flow, air and solvent flushing.

NOTE: The material loading doors and wand access port must be closed at all times.

REVERSE FLOW CLEANOUT METHOD (Diagram 13)

1) To clean out the machine at the end of the day, return the wand to the wand return and open the wand valve (F). Turn the pressure valve (B) clockwise until closed and reverse the material pump by turning the material pump drive knob (C) clockwise. Run the pump in reverse for 2 - 3 minutes.

2) With the hose still in the hose holder, elevate the hose over your head and physically walk the length of the hose, shaking it to drain any residual sealant out of the hose.

3) Close the sealing hose valve (A) by turning clockwise, and continue with pump in reverse for 2 - 3 minutes.

4) Close the tank outlet valve (D) by turning clockwise.

5) Turn the pump off and open the pressure valve by turning counterclockwise.

6) Coil the hose back into the heating cabinet and shut the machine down (Non-heated hose models only).

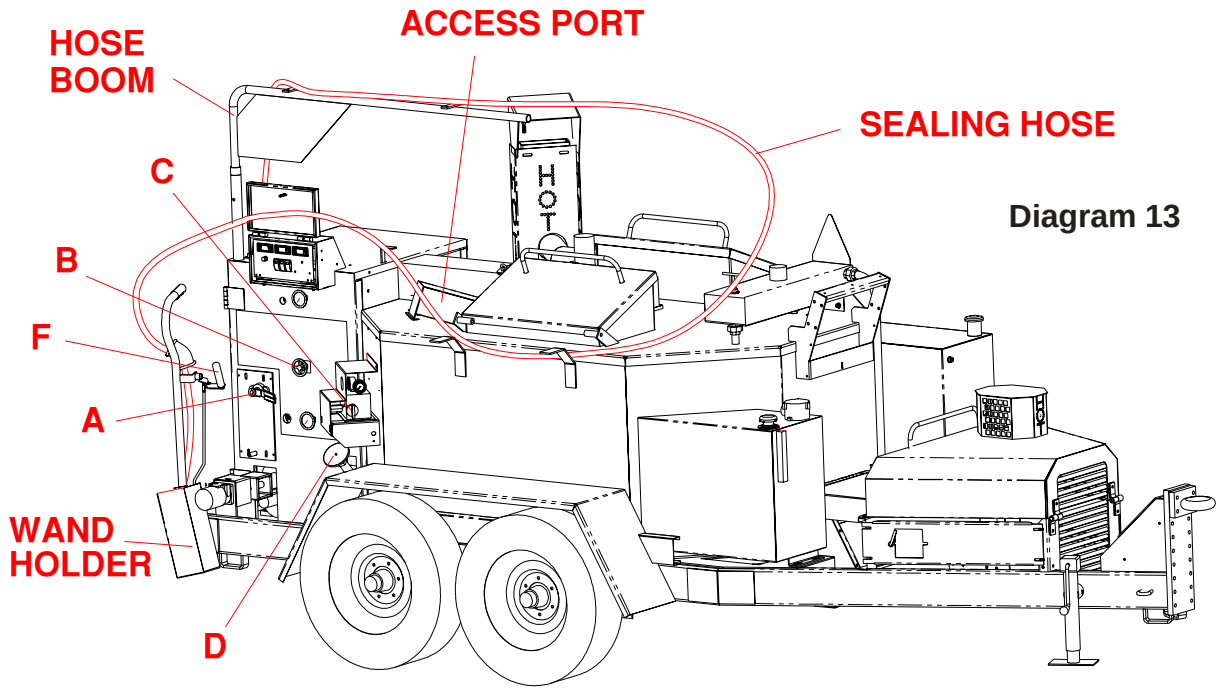


Diagram 13

AIR CLEANOUT METHOD (OPTIONAL)

Refer to Diagram 13 on pg 25

1) Place material pump in neutral.

2) Remove sealing tip and return wand to access port..

3) Open wand valve (F) and sealing hose valve (A).

4) Close tank outlet valve (D).

5) Increase (close) pressure valve (B) to maximum**.**

6) Connect air hose and open air cleanout valve.

7) Allow air to blow freely through sealing hose. (Turn wand valve (F), open and closed several times during this phase, to aid in cleaning valve. Leave valve open).

8) Open tank outlet valve (D) momentarily, then close.

9) Decrease (open) pressure valve (B) and leave open.

10) Close sealing hose valve (A).

11) Shut air hose off at compressor, close air cleanout valve and disconnect hose.

12) Proceed with normal machine shut down.

FLUSHING NON-REHEATABLE MATERIALS

1) Pump the material tank as low as possible.

2) Add 5 to 10 gallons of recommended flushing solvent to tank.

3) Place the wand into access port and open wand valve.

4) Circulate the solvent approximately 5 to 10 minutes.

5) Pump the solvent through the wand into a container and dispose of it according to EPA guidelines.

6) Add another 5 to 10 gallons of material and circulate for 5 minutes.

7) Pump this 5 to 10 gallons into empty containers and reuse it for the first purge next time the unit is used.

FLUSHING REHEATABLE MATERIALS (Solvent Tank Option)

To save material, proceed through the five steps of the Reverse Flow Cleanout Method and then:

1) Remove wand from access port and place end into waste container.

2) Open sealing hose valve and wand valve.

3) Connect solvent tank hose to air cleanout connection and open solvent tank flow valve.

4) Open air cleanout valve and allow 4-5 gallons of solvent to flow into the plumbing system.

5) As the solvent is filling the system, turn the material pump to the normal flow position by rotating knob counterclockwise.

6) The solvent will flush the system and empty into the waste container.

7) Turn "off" the solvent tank flow valve and the air cleanout valve. Return the material pump knob to the neutral position.

8) Remove the sealing hose from the hose holder and drain as much solvent from the hose as possible (Non-heated hose models only).

9) Close sealing hose valve, wand valve and open pressure valve.

10) Reuse the solvent if possible or dispose of it according to EPA guidelines.

Material Pump Adjustment

Operate the pump under normal conditions for a short run-in period. Examine the packing for leakage. If leakage is excessive, tighten the locknuts evenly until there is only slight leakage from the packing rings. This slight leakage is a necessary and normal condition for packing and allows for expansion and proper seating.

REPLACING THE PACKING

1) Remove the locknuts, packing gland clips, spring clip, square head bolts, packing gland and packing rings.

2) Clean the shaft and adjacent parts.

3) Examine the shaft and replace if excessively worn or scored.

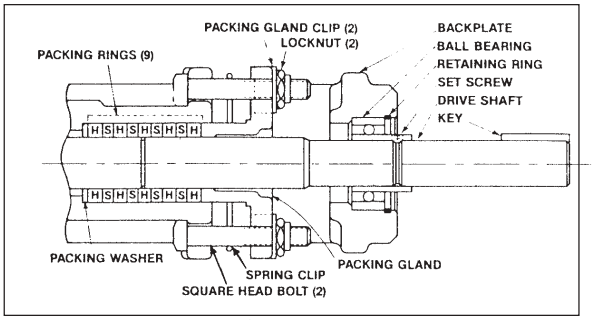
4) Reassemble the components.

5) Draw up evenly on the packing gland to assure proper seating of the packing and then loosen locknuts about 1/2 turn.

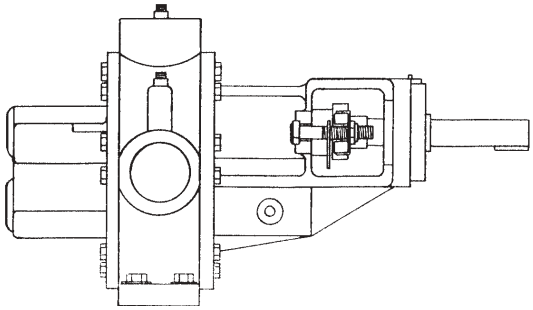
NOTE: Do not cock the packing gland. This may cause binding or excessive heating of the shaft.

6) Run-in the pump as explained above.

NOTE: It is normal for the packing to leak.



Top view

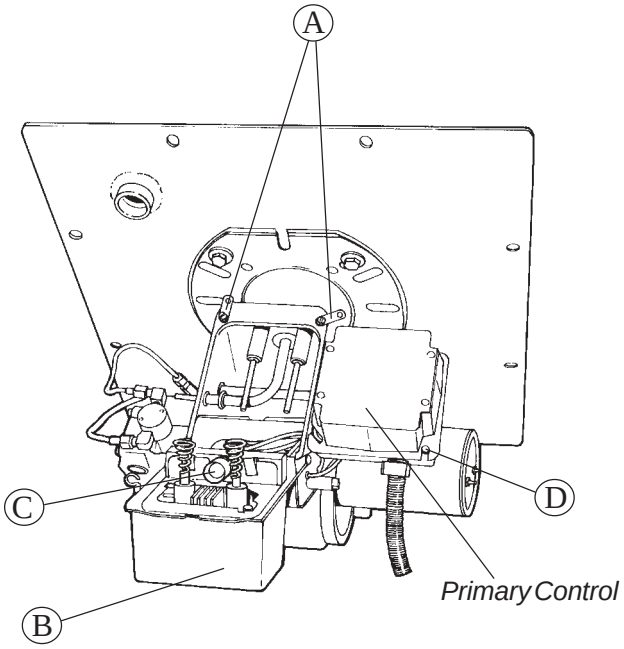


Diesel Burner - Electric Eye and Fuse Inspection

Diesel Burner - Electric Eye Inspection

The diesel burner is equipped with an electronic eye which detects the presence of a flame. If the eye does not detect a flame after ignition, it will shut down the burner.

Periodically this eye will get covered with soot or dirt from the burner. If your burner lights and then shuts down immediately, you can normally expect the problem to be a dirty electric eye. To clean the eye, simply loosen the two retaining clip screws (A) and rotate the clips which hold the hinged spark box (B) to the burner. Gently wipe the eye (C) with a soft cloth and reattach the spark box.



After cleaning the eye, if the burner will not stay ignited after initial firing, check fuse located inside the primary control box. You can open the box by loosening the two screws (D) and removing the box.

Burner Motor Brush Inspection

Due to the high current draw of the burner motor, it is advised to inspect the brushes for excessive wear every 100 hours of operation. If the brushes are worn out completely it will stop the motor and typically damage or destroy the ignition transformer assembly.

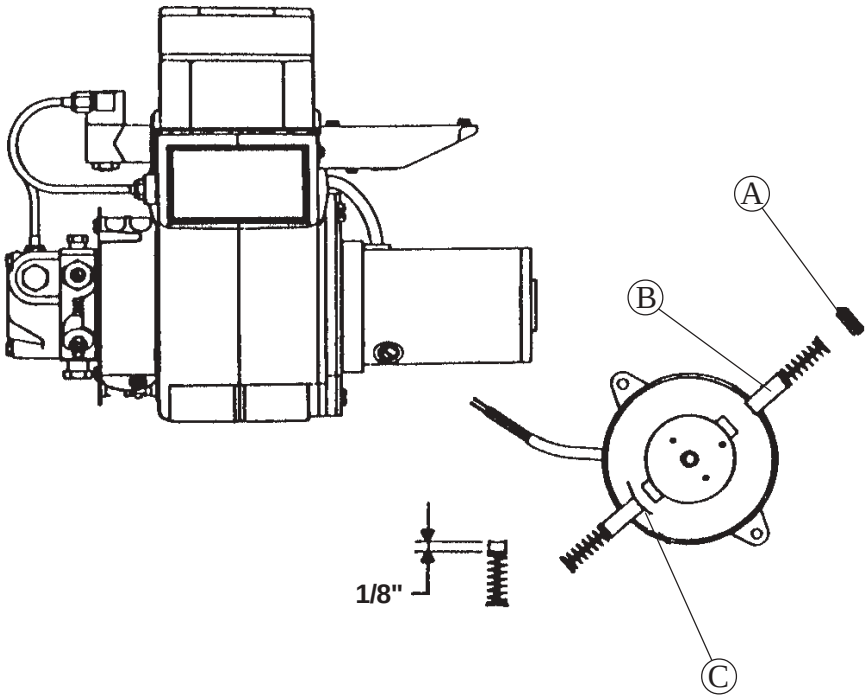
The brushes can be inspected and installed in a matter of minutes as follows:

1) Remove the brush caps (A) with a standard straight slot screw driver.

2) Remove the brushes (B) and inspect. If there is less than 1/8" of brush remaining, replace it immediately. If not, reinstall existing brush.

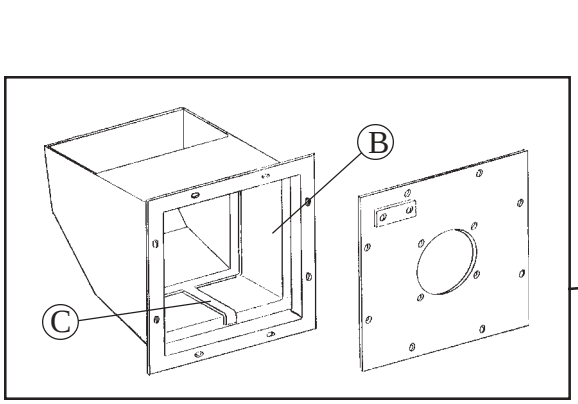
3) Be sure the radius (C) of the brush follows the curvature of the motor as shown below.

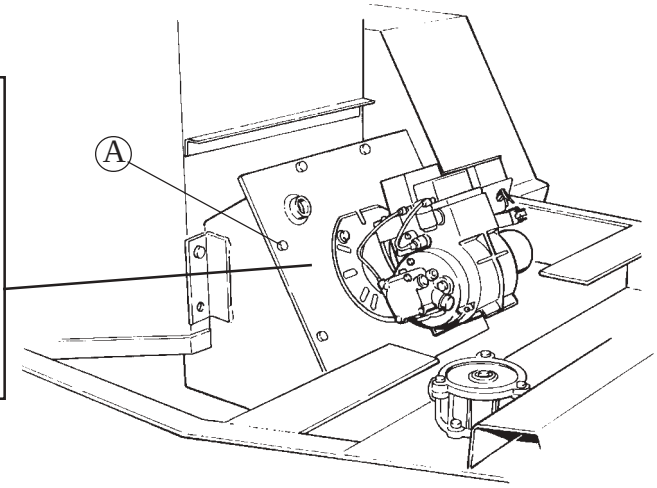
4) When the brushes are worn close to 1/8", check frequently to avoid failure.



Chamber Lining Inspection

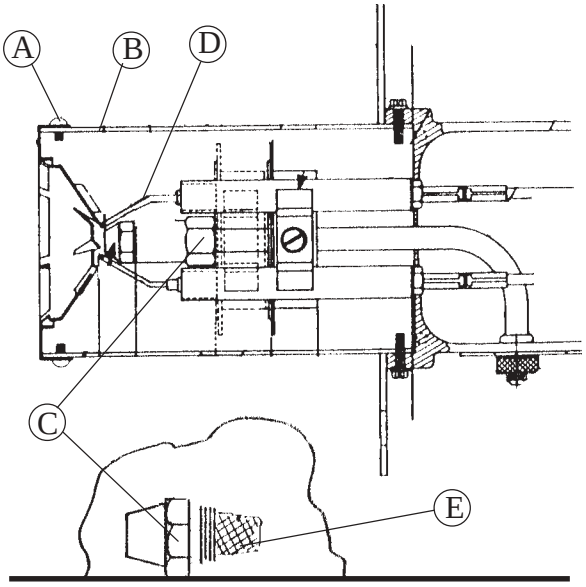
After each 200 hours of operation, the chamber lining should be inspected. Remove (8) burner mount securing bolts (A) and pull out burner and mount. Inspect lining (B) for excessive cracking. Also check the condition of retainer (C). Lining cracks are acceptable as long as they are not large enough to allow flame to contact the combustion chamber walls.





Burner Nozzle Replacement

During operation, oil is forced through the burner nozzle at 140 PSI to permit the fuel to be atomized for easy ignition. The nozzle orifice has normal wear due to this high pressure. Due to the high wear, it is recommended that the nozzle be replaced at least once per operating season. To replace the nozzle, remove the burner from chamber. Remove the two screws which secure the burner head (A) to the air tube (B). Carefully insert a 5/8" deep well socket over the nozzle (C) and turn it counterclockwise to remove. Be very careful not to bend the electrodes (D) while performing this task. When installing the new nozzle, **do not** touch the filter portion (E) of the nozzle. The filter is so fine that oil from your skin can clog the filter.



Adjusting Replacement Burner

The excess air adjustments on the Beckett ADC burner are essential to prevent the potential damage to the burner and the burner combustion chamber. Excess air is required to insure that the carbon and hydrogen are supplied with enough oxygen to burn completely.

If there is not enough excess air, the unit will smoke inside the combustion chamber and eventually lead to unburned fuel residue left in the chamber. The function of the combustion chamber is to reflect and retain heat to insure that all the atomized oil is burned.

Even a slight amount of soot can decrease the effectiveness of the chamber. It is estimated that 1/8" of soot is equivalent to approximately a 1" thick fiberglass sheet.

With too little excess air, eventually the unburned fuel accumulates into the lining material. Eventually it will burn even when the burner is turned off. The heat generated by this flame will vent out through the burner and can cause internal damage to the burner. Typically it will damage the plastic coupling which operates the fuel pump and it can also damage the primary control unit. Other common problems include blackening and even distorting the optic eye.

The burner is factory set with the air band (B) at the wide open position and the air shutter (D) adjusted typically between the 8 and 10 setting. Decreasing the excess air settings can lead to the chamber fires as outlined above.

Note that as the nozzle wears, the flame characteristics will change. It is important to check the nozzle periodically and replace it each year as outlined in the owners manual.

To adjust excess air flow into the burner: (Diagram 14)

1) Loosen screw (A) and rotate air band (B) to the wide open position, then tighten screws.

2) Loosen 2 screws (C) and rotate the air shutter (D) until the pointer arrow (E) points to the number 8 setting.

3) Start the burner and allow it to run for about 10 minutes.

4) Loosen the viewport retaining bolt (F) and swing cover (G) out of the way as shown.

5) While observing the flame through the view port , decrease the air shutter (D) by rotating it until the flame tip appears slightly smoky, then increase the air until the flame clears up. The arrow (E) should be in the vicinity of 7 - 10. Tighten two screws (C).

6) Close and secure viewport.

Adjusting Fuel Pump Pressure

The fuel pressure is factory set @ 140 PSI. As the pump wears, it may require adjustment as follows:

1) If your unit is not already equipped with a fuel pressure gauge, remove plug (H) and insert a 0-200 psi gauge.

2) With the pump running, loosen jamnut (J) and turn screw (K) clockwise to increase the pressure, CCW to decrease pressure.

3) Hold the screw (K) with a screwdriver while tightening jam nut (J).

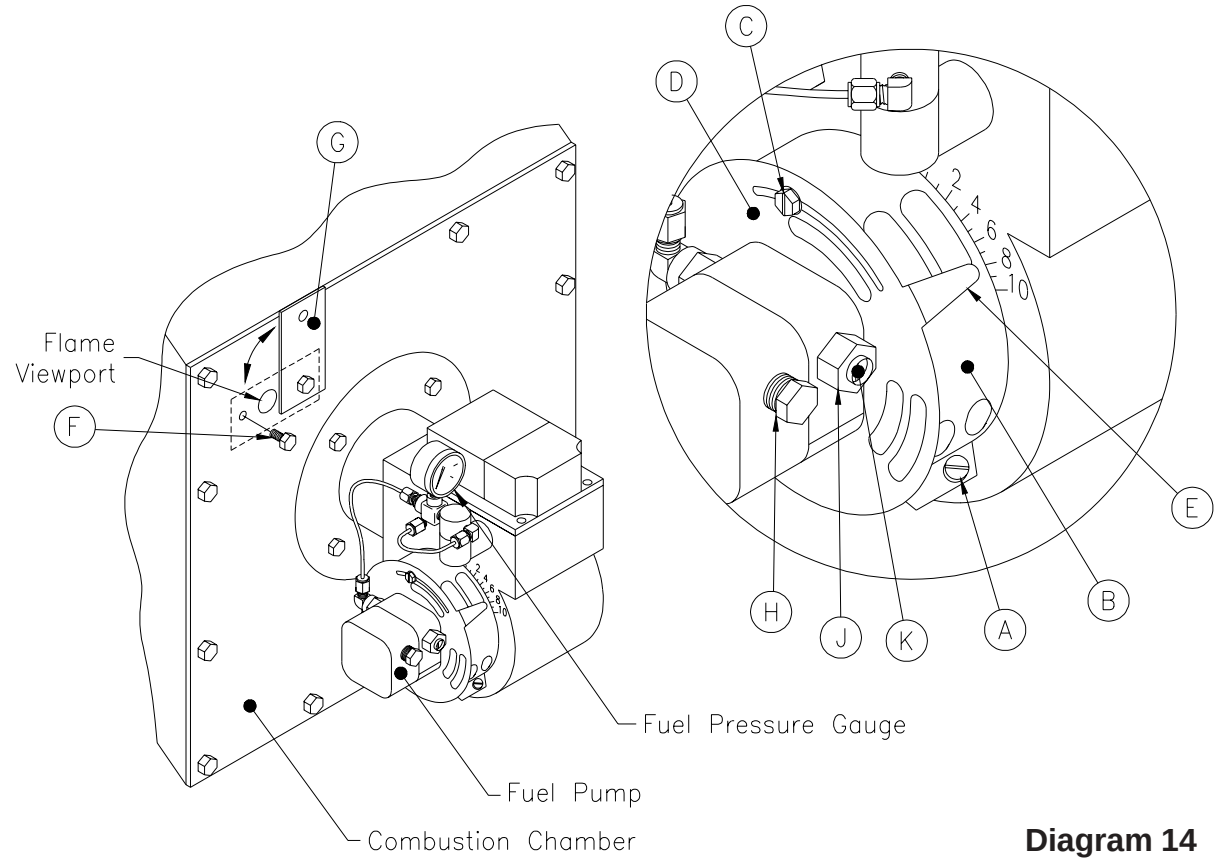


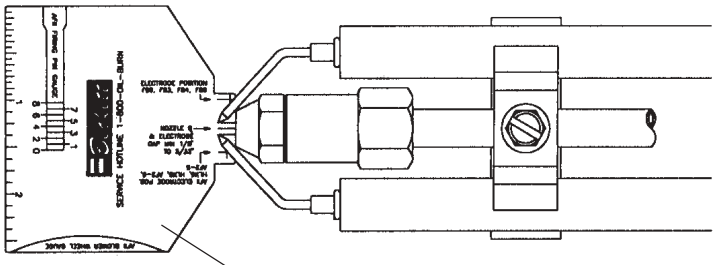
Diagram 14

Adjusting Burner Nozzle, Electrode and Head Position

Your CIMLINE 110, 230 or 410 Melter is equipped with a model ADC burner. Each unit comes with a nozzle, electrode and head position gauge. For optimum performance, the steps below should be performed periodically. The burner must be removed from the combustion chamber.

Step 1: Setting the Electrode Gap

Check electrodes to see if the gap is aligned with the lines on the gauge. The gap should be from 1/8" to 5/32" as shown below. Bend the electrodes slightly if required. If the electrodes are way out of line, you may have to remove the head and realign as described in Step 3.

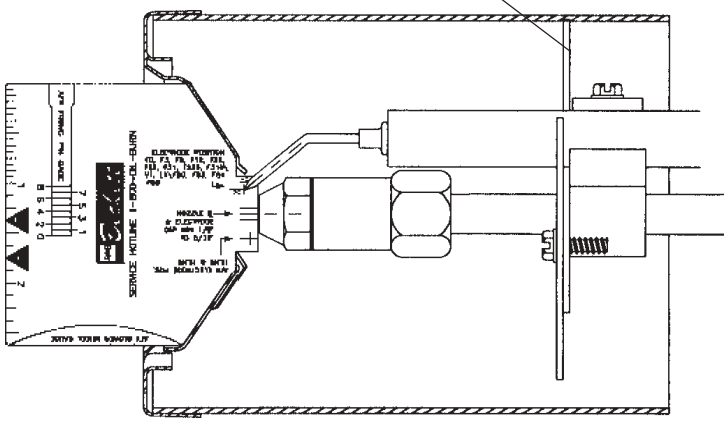


P/N 152668

Step 2: Inspecting Nozzle Concentricity

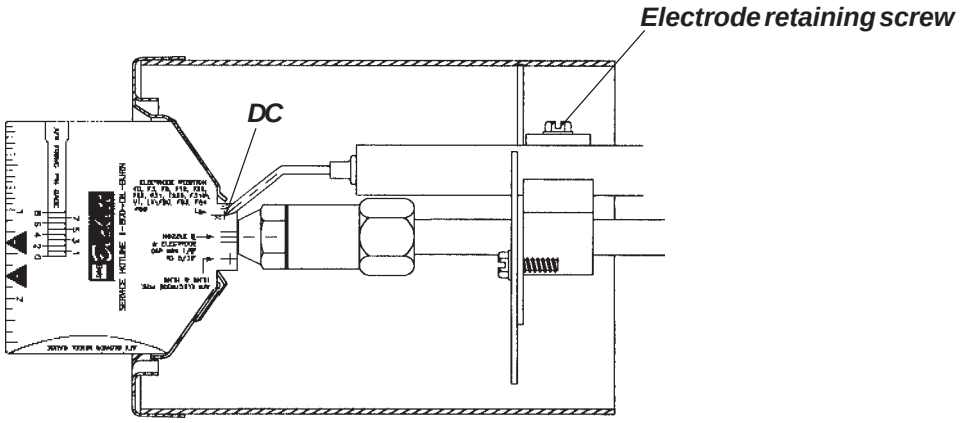
The nozzle should be approximately centered within the head. Insert the gauge as shown. The center of the nozzle should be aligned with the center line. Rotate the gauge and check alignment from several locations. BE CAREFUL NOT TO SCRATCH THE SURFACE. If it is not concentric, you may have to replace or straighten center bracket.

Centering bracket



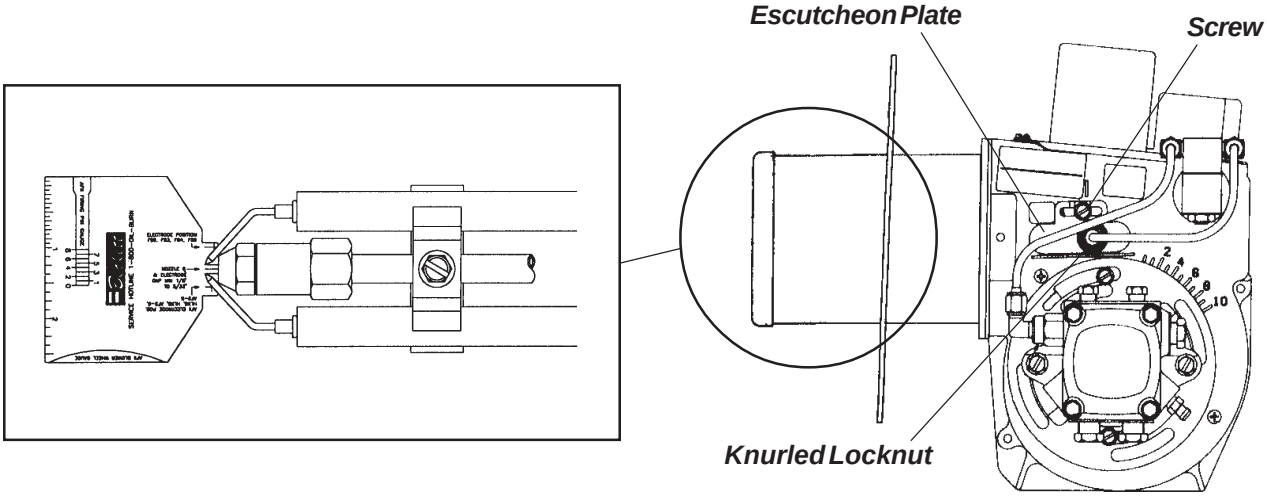
Step 3: Setting Electrode Position

Insert gauge as shown below. The electrode tip should be in line with the intersection of the cross hairs labeled "DC". If not, you must remove the head, then loosen the electrode retaining screw just enough to allow you to slide the electrodes into the proper location. Tighten the screws and replace the head.



Step 4: Setting Nozzle Position

Insert the gauge against the head. The end of the gauge should now touch the nozzle. If not, slightly loosen the knurled nut and the screw on the escutcheon plate until the entire nozzle assembly can be moved forward or backward. Adjust accordingly and tighten the knurled nut and screw.



Remote Wand Option

How it Works: The remote wand operates on a 12-volt DC circuit. When the engine is started, hydraulic pressure from the manifold (A) is sent to the valve-actuating cylinder (B) through lower hose (C). The cylinder will extend fully and *CLOSES* the sealing hose valve to stop material flow to the hose.

When the trigger switch handle (D) is depressed, 12-volts is sent to the manifold cartridge (E). The cartridge opens and sends oil to hose (F) and at the same time, allows oil in the other line to return to tank. This retracts the cylinder and *OPENS* the sealing hose valve so material can flow to the hose. As soon as the switch is released, the 12-volt current is removed and the cylinder extends and closes the sealing hose valve.

12-volt power runs from the remote sealing wand switch (G) to the switch located under handle (D). The wire then runs back to the manifold cartridge (E). When the switch is activated, the two wires connect and send 12-volts to the cartridge.
There is a 10-amp fuse inside the control box to protect this circuit.

Troubleshooting: If the hydraulic cylinder does not respond when the trigger is activated, one of the following items may be the cause.

1) Bad trigger switch
2) Unresponsive solenoid at the hydraulic manifold
3) Clogged hydraulic line
4) Broken or disconnected wire in the electric hose or at the switch
5) Blown fuse or a bad switch in the control box
6) Defective cylinder –bad seals or bent rod
7) Binding or frozen sealing hose valve or linkage
8) Bad ground connection on the cartridge

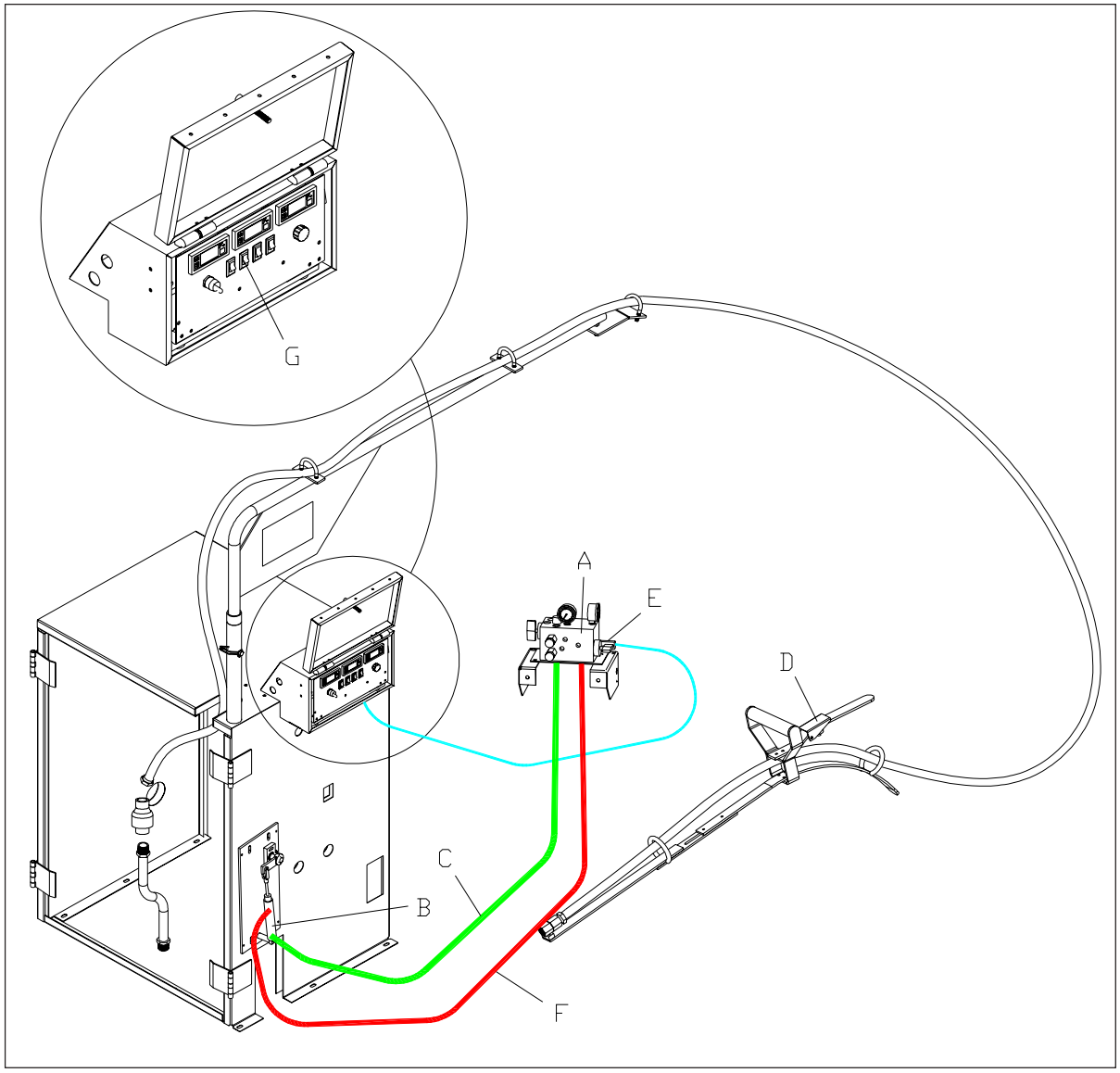
The best place to start looking for the problem is the power source. Check the 10-amp fuse (orange wire, see decal inside temp control). If it is good, use a power tester to see if you have voltage to and from switch (G). If you do, check to see if you have voltage at one of the terminals at the trigger switch. If you don't, there is a broken or loose wire between the control panel switch and the trigger switch on the wand.

If you have 12-volts to the trigger switch, depress the trigger and you should send 12-volts to the cartridge (E) at the hydraulic manifold, which in turn will activate the cylinder (B). An easy way to check to see if the solenoid is getting current is to put your hand on the solenoid and see if you can feel it click each time you depress the trigger switch. If it does not click and you are sure you have power, it may be defective. You may also "hot wire" the cartridge by running a jumper wire from any 12-volt source directly to the wire coming from the cartridge to see if it is working properly.

If you have power at the solenoid, turn off engine and disconnect upper hose (F). Hold the end in a container and start the engine. No oil should be flowing from the hose. Depress the trigger switch momentarily. Oil should flow out of the hose each time you press the trigger.

If you determine you have a broken wire inside the hose, the easiest repair is to run new wires on the outside of the hose and secure them in place with plastic ties. You may also run new line under the yellow sleeve. These wires have no impact on the performance of the heated hose. The hose does not have to be replaced.

If you perform the above tests and cannot correct the problem, consult customer service.

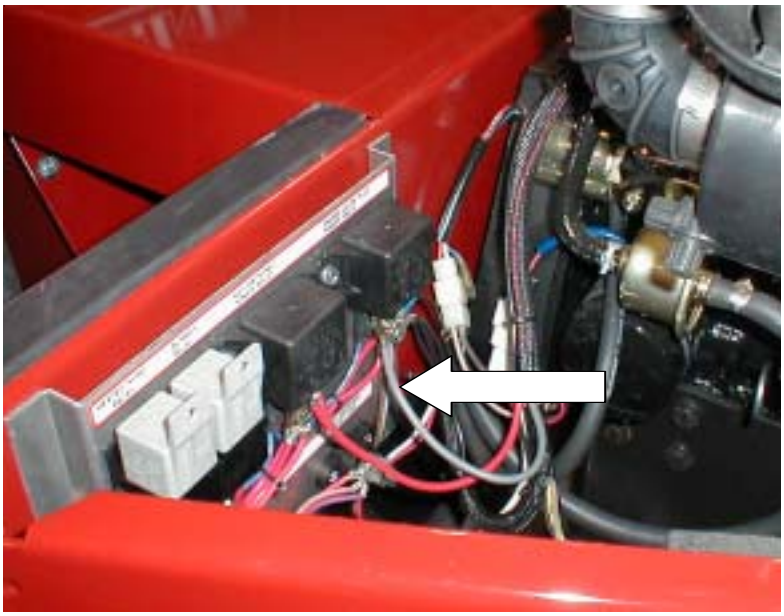


Lofa Shutdown System

The Lofa Shut Down System activates the glow plugs for approximately 30 seconds each time the switch is turned to the on position. The glow plugs are rated to handle the current from 45 to 60 seconds. If you cycle the switch repeatedly (for demonstration, testing, or repairing) the plugs may overheat.

If you need to turn the key on and off repeatedly, disconnect the glow plug (heavy grey wire) lead as shown in the diagram. Make sure it does not contact any steel as it will still send current each time the switch is turned on.

When you complete your repair, reconnect the wire.



Engine: The operation and life of the engine depends on you and your operator. Do not start engine until the engine precheck is complete. The engine precheck consists of checking the oil, the fuel level, the hydraulic oil level and the air filter. The 110/230/410 M/A has the option of (2) different engines. The Kohler Command 16 H.P. OHC (propane units) and the Isuzu 25.4 H.P. (diesel units). Basic engine maintenance is shown in Table 1 on page 40. For more detailed information please refer to the Engine Operator Maintenance Manual and Warranty provided with your Melter applicator.

NOTE: When breaking in a new Melter, we recommend running the engine for one hour with no load prior to actual use on the job.

Air cleaner: Due to the dusty conditions that can be created by road work, it is essential to check the engine air cleaner element daily. Remove element and shake out the accumulated dust and dirt. Wipe out dirt from inside cover and from housing. Check engine manual for washing instructions. We recommend stocking replacement filters.

Lubrication: The Melter should be greased according to table 1 on page 40 of this manual.

Diesel Units: Use of high quality detergent oil of API (American Petroleum Institute) service class CC or CD grade. Select the viscosity based on the air temperature at the time of operation. Check your engine manual for other recommendations.

Propane Units: Use of high quality detergent oil of API (American Petroleum Institute) service class SG or SH grade. Select the viscosity based on the air temperature at the time of operation. Check your engine manual for other recommendations.

Burner: There are several items that need to be inspected periodically on the burners. These items include the burner motor brushes, the nozzle, electrode and head position, chamber lining and the 4 electric eye. Inspect according to table 1 on page 40. There is a section on how to perform each of these operations in this manual, check the index on pages 2 & 3 to locate the appropriate section.

Maintenance Operation	Daily	25 Hrs	100 Hrs	200 Hrs	Yearly
Check fuel level (add if low)	◆				
Check engine and heat transfer oil (add if low)	◆				
Check hydraulic oil (add if low)	◆				
Check engine air cleaner	◆				
Inspect pre-cleaner (clean if dirty)	◆				
Cleanout material system	◆				
Inspect sealing hose and cover	◆				
Inspect sealing hose connections	◆				
Inspect and clean cooling system (Diesel units only)		◆			
Inspect material pump packing (adjust if leaking is excessive)		◆			
Change engine oil and oil filter			Propane	Diesel	
Service air cleaner element			◆		
Inspect spark plugs and breaker pts. (Propane units only)			◆		
Inspect burner motor brushes (replace if worn out)			◆		
Inspect burner nozzle, electrode & head pos. (adjust if nec.)			◆		
Grease agitator bearing block (load adapter)				◆	
Inspect fuel filter (replace if dirty)				◆	
Inspect Diesel burner electric eye (clean if dirty)				◆	
Grease wheel bearings				◆	
Inspect chamber lining (replace if excessive cracking)					◆
Inspect starting motor					◆
Replace hydraulic oil					◆
Replace hydraulic return filter					◆
Replace hydraulic suction strainer					◆
Replace burner nozzle					◆
Change heat transfer oil					◆
Change Diesel fuel filter					◆
Flush radiator and replace fluid (Diesel units only)					◆

Table 1

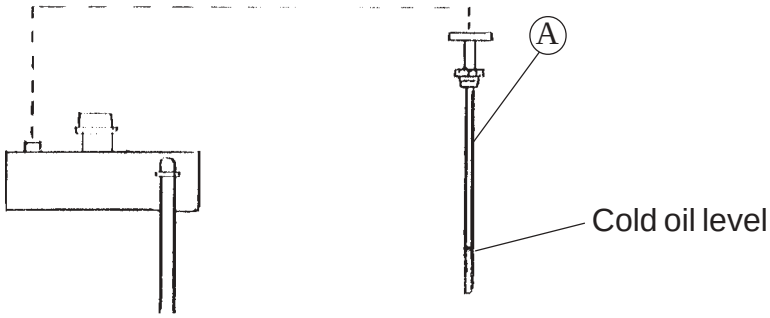
Fluid and Components Specifications

	Model 110	Model 230	Model 410
Hydraulic Reserve Capacity	25 Gallons		
Hydraulic Oil Type*	Conoco MV32 or equiv		
Diesel Fuel Capacity	30 Gallons		
Propane Fuel Capacity	(1) 100 lbs. LP bottle (2) bottles optional	100 lbs. LP bottle (2) bottles optional	N/A
Diesel Fuel Type	ASTM D975 No.2D		
Heat Transfer Oil Capacity	18 Gallons	33 Gallons	41 Gallons
Heat Transfer Oil Type	See Specifications on next page		
Agitation Drive Relief Setting	1100 PSI	800 PSI	800 PSI
Material Pump Drive Relief Setting	1500 PSI		
Material Pump Displacement	.11 Gal/Rev.		
Material Pump Maximum Output Pressure	125 PSI		

WARNING: Only the oil specified or equal may be used in this system. (Always check your local and state regulations before disposal).

NOTE: A dipstick (A) is provided for checking oil level when cold.

*This is a petroleum based product, it can be mixed with other petroleum based hydraulic oils such as Dextron III or common straight weight oils. We recommend that you do not mix oil brands. Mixing any oils (engine oil, transmission fluid, etc.) adversely affects each manufacturers formula.



Heat Transfer Oil Specifications

ISO Grade 68 Heat transfer Oil Specification

There are many different types of Heat Transfer Oils on the international marketplace. It is critical that you use the proper oil to prevent poor performance, oil flashing, or auto-ignition. To conform to most government bids and to supply a readily available product, Cimline typically uses brands manufactured by Conoco or Phillips 66 that meet the ISO Grade 68 Heat Transfer Oil specifications listed. To insure maximum safety and performance, we recommend you purchase your oil through Cimline.

ISO VG#	68
Pour Point - F	0 Degrees Fahrenheit
Flash Point - F	482 Degrees Fahrenheit
Fire Point - F	527 Degrees Fahrenheit
Auto Ignition - F	700 Degrees Fahrenheit
Lbs/Gallon	7.27
Viscosity CsT @ 40C	63

IMPORTANT NOTICE!!

The ISO Grade is just a viscosity index (ability to flow/thickness). An ISO Grade 68 oil can be an engine oil, hydraulic oil, etc. The manufacturer uses different additives to make the oil conform to different applications. **YOU MUST CLARIFY** with the supplier that the oil is to be used in a heat transfer system to avoid any potential problems. Oil is also available from Cimline in 5 and 30 Gallon containers for ship-out.

NOTE: Cimline Melter/Applicators include and expansion tank that cools the oil that is exposed to the outside air. When the oil heats up and expands, it flows into the expansion tank. The tank is cooler since it is not oil jacketed and is surrounded by outside airflow. The only exposure the hot oil has to the atmosphere is through a 3/4" vent/overflow pipe. This is done so the oil in the tank can run higher than the flash point. Only the lower temperature oil fumes are exposed to the atmosphere.

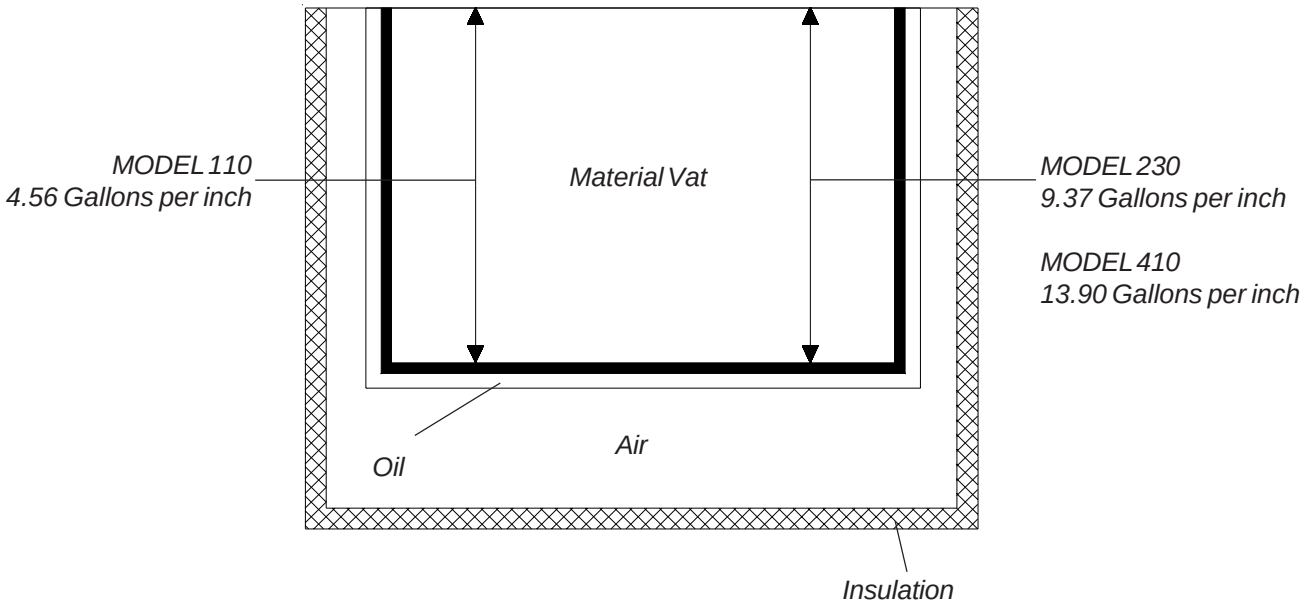
FLASH POINT - Test in which an open container of oil can heated until an open flame will flash when passed over the fumes.

FIRE POINT - Same test as the flash point except the oil is heated until the gasses will start a fire.

AUTO IGNITION POINT - The point at which fumes will burst into flame when exposed to air.

MATERIAL CAPACITY

(Tank cutaway)



Material Depth	Model 110 1052 Cubic Inches*	Model 230 2165 Cubic Inches*	Model 410 3210 Cubic Inches*
2"	9.11	18.74	27.79
4"	18.23	37.48	55.58
6"	27.34	56.22	83.38
8"	36.46	74.96	111.17
10"	45.58	93.70	138.96
12"	54.70	112.44	166.75
14"	63.81	131.18	194.55
16"	72.93	149.92	222.34
18"	82.04	168.66	250.13
20"	91.16	187.40	277.92
22"	100.28	204.14	305.71
24"	109.39	224.88	333.50
26"	---	---	361.30
28"	---	---	389.09

Gallons of material is found by first dividing the tank volume by 231 (# of cubic inches per gallon of liquid), and then multiplying that number by the number of inches of material in the tank. For example, 1052 divided by 231 = 4.55. 4.55 x 2" of material = 9.11.

***** Volume of tank in cubic inches for each inch of material.

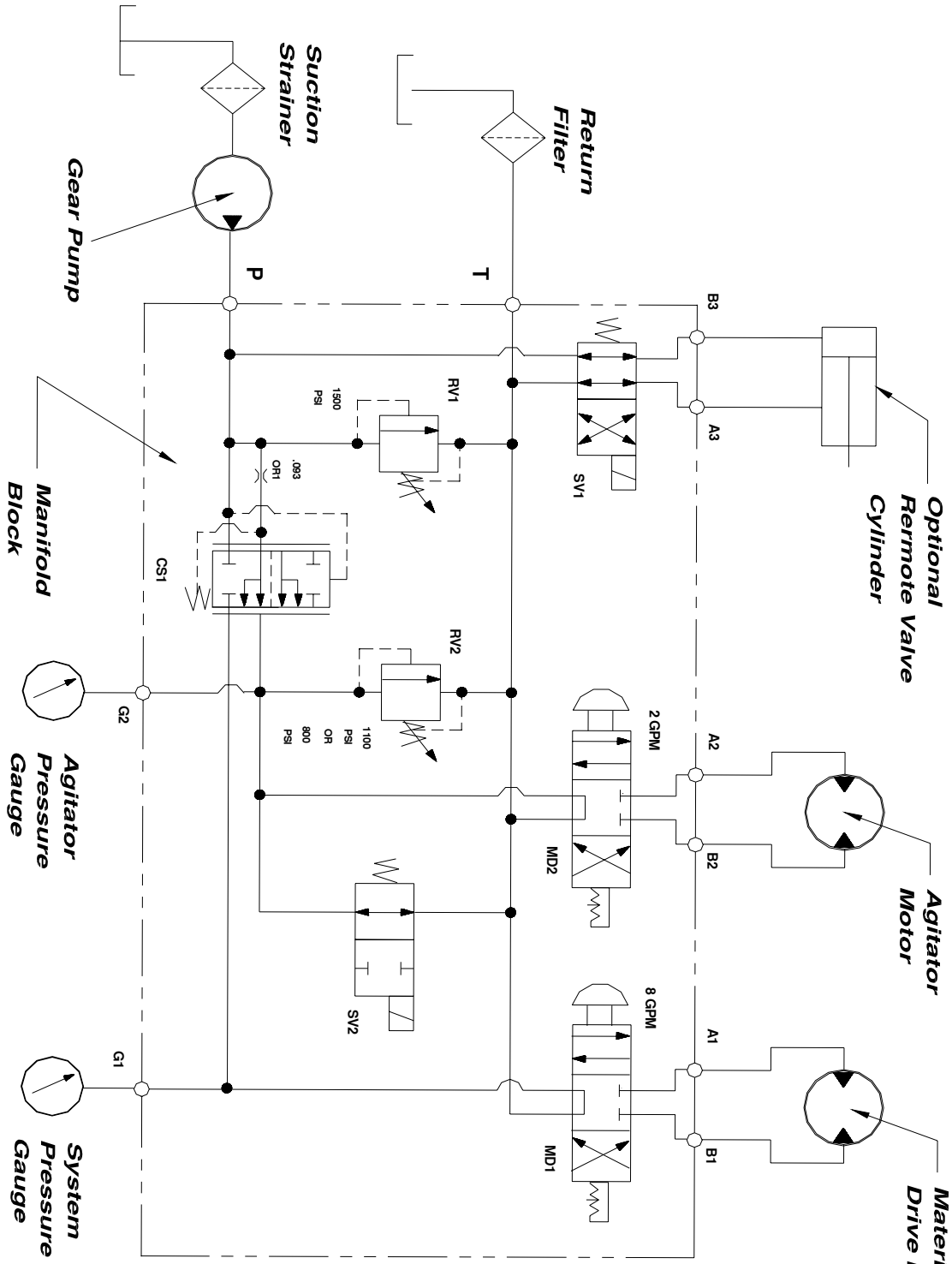
Trouble Shooting Guide

PROBLEM	CAUSE	SOLUTION
Burner will not ignite.	Fuse burned out.	Check fuse.
	Burner relay inoperative.	Check for 12 VDC at relay.
	Orifice is clogged.[1]	Clean orifice.
	Primary control fuse.[2]	Check fuse.
	Air in fuel line.[2]	Bleed burner.
	Thermocouple(s) inoperative.	Replace thermocouple(s).
Agitator will not rotate.	Sealant material not hot enough.	Allow material to heat longer.
	Too many biscuits added at one time.	Continue heat up and reverse agitation to break biscuits free.
	Low hydraulic oil level.	Check oil level.
	Worn agitator motor.	Replace motor.
Material pump will not rotate.	Sealant material not hot enough.	Allow material to heat longer.
	Too much material left in lines.	Heat plumbing and valves to melt material.
	Low hydraulic level.	Check oil level.
	Foreign object lodged in line.	Remove foreign object.
	Pump damaged.	Repair or replace pump.
Material pump rotates but does not pump material.	Pump worn or damaged.	Repair or replace pump.
	Pump rotating in wrong direction.	Check rotation.
	Pump inlet line plugged.	Check material filter and lines.
	Too much material left in lines from previous use.	Heat plumbing and valves.

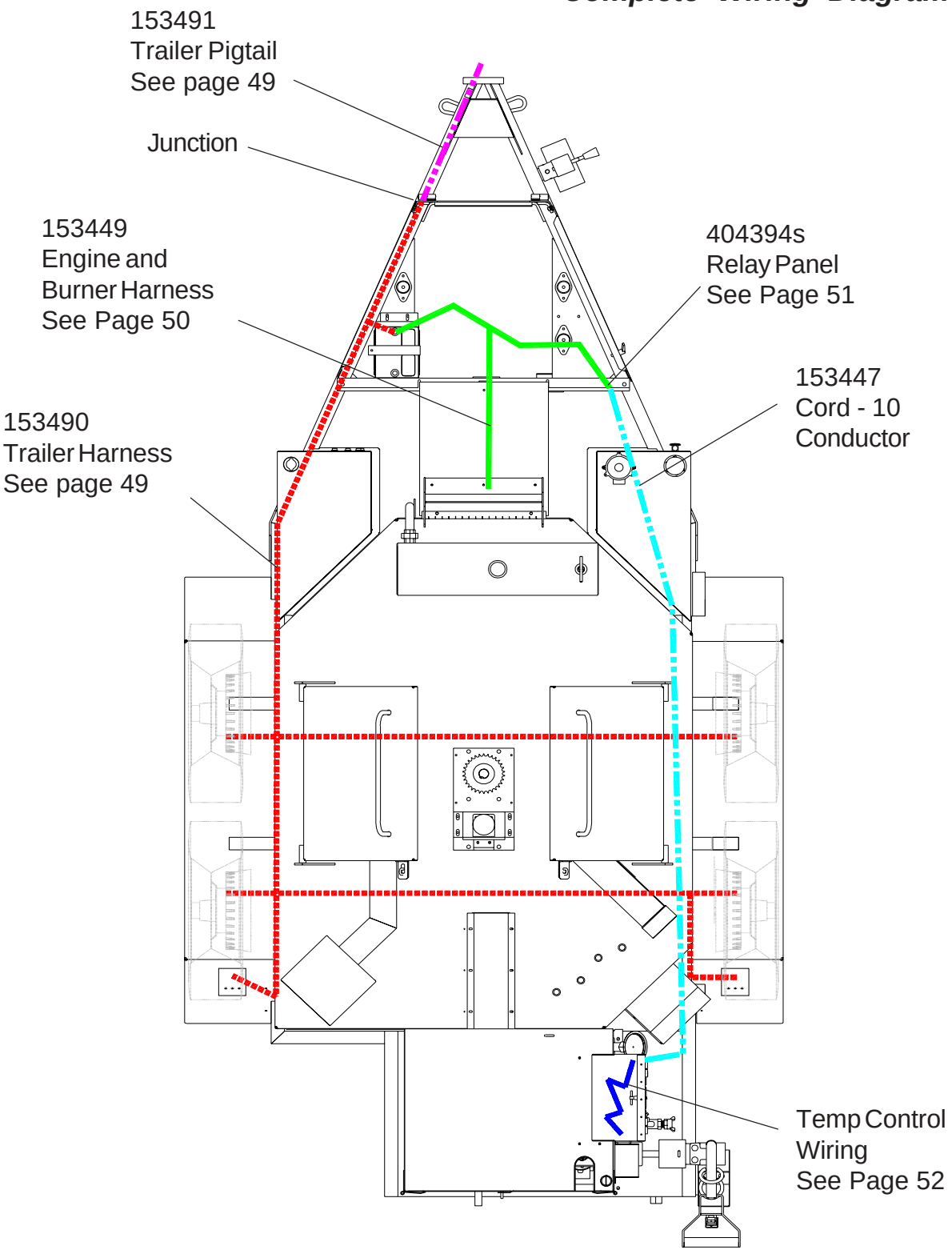
PROBLEM	CAUSE	SOLUTION
Material recirculates but will notflow through sealing wand.	Sealing hose froze up.	Remove wand and place hose incabinet to melt material.
	Sealing wand froze up.	Heat wand and melt material.
	Sealing hose valve not completely open.	Open valve to the full "on" position.
Material heat up time slow.	Burner orifice clogged.	Remove orifice and clean.
	Hot oil pump worn.	Replace or rebuild pump.
	Heat transfer oil is worn out.	Check oil level. Replace if necessary.
During sealing operation, material stops flowing.	Wand valve left in "off" position too long before returning to access port for recirculation.	Place hose in cabinet to melt material. Refer to heating a plugged hose on page.
	Too many biscuits added at one time causing coldmaterial to enter pump.	Heat hose and plumbing system.Reverse pump momentarily toforce cold material into tank.
	Material temperature too low.	Check control box settings.

[1] LP units only.
[2] Diesel units only.

Hydraulic Schematic

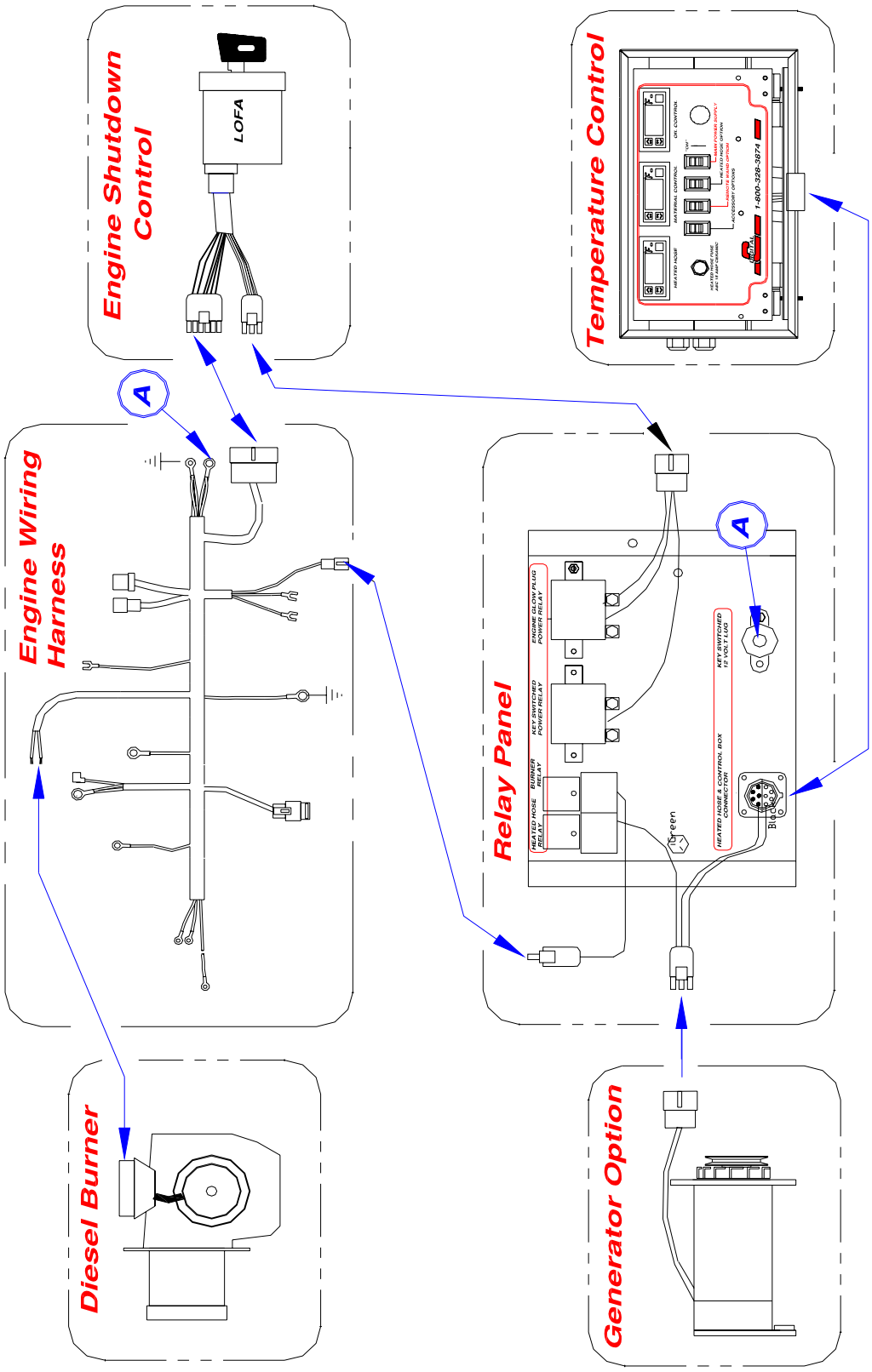


Complete Wiring Diagram

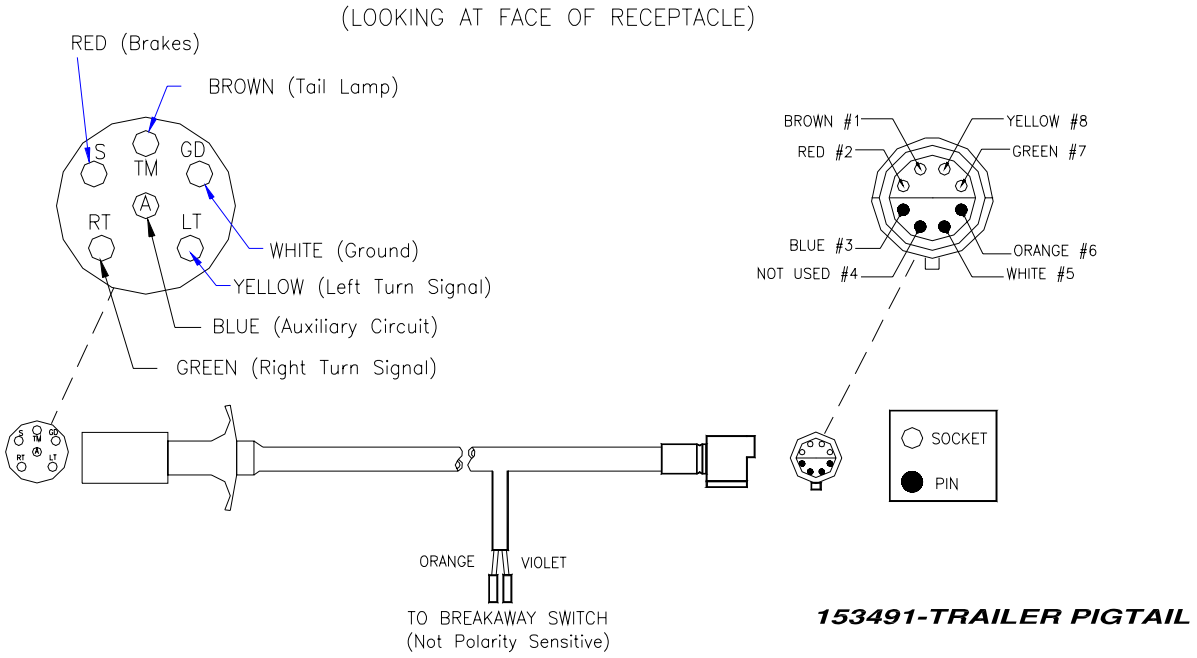


Wiring Diagrams

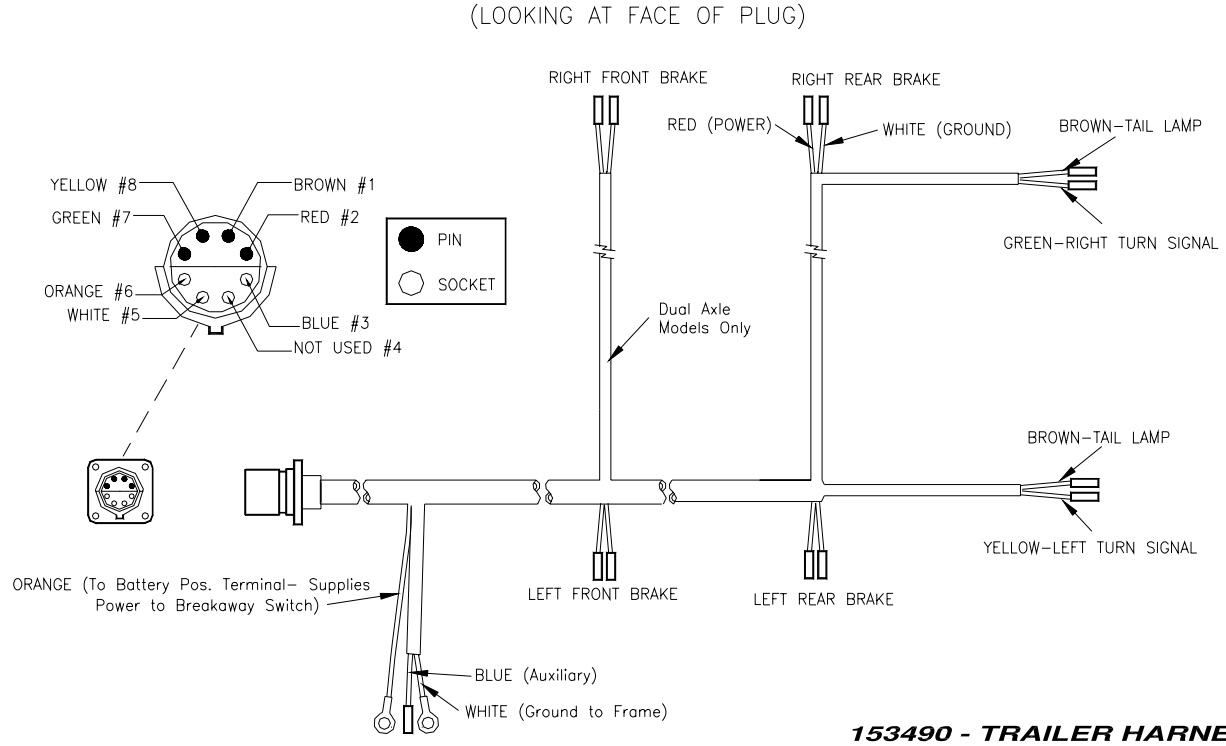
(Refer to Individual Wiring Diagrams for Details)



Trailer Wiring Diagram



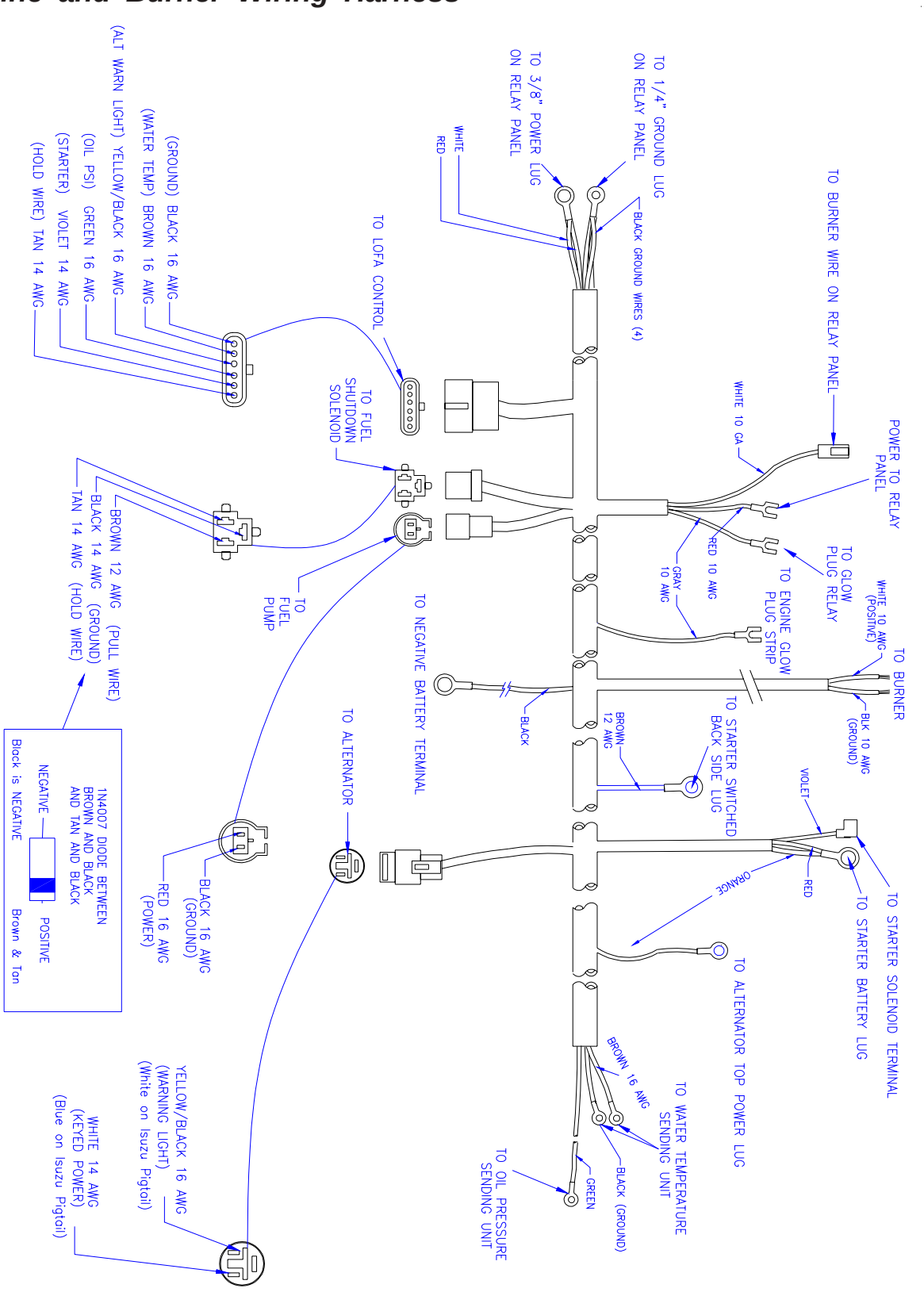
153491-TRAILER PIGTAIL



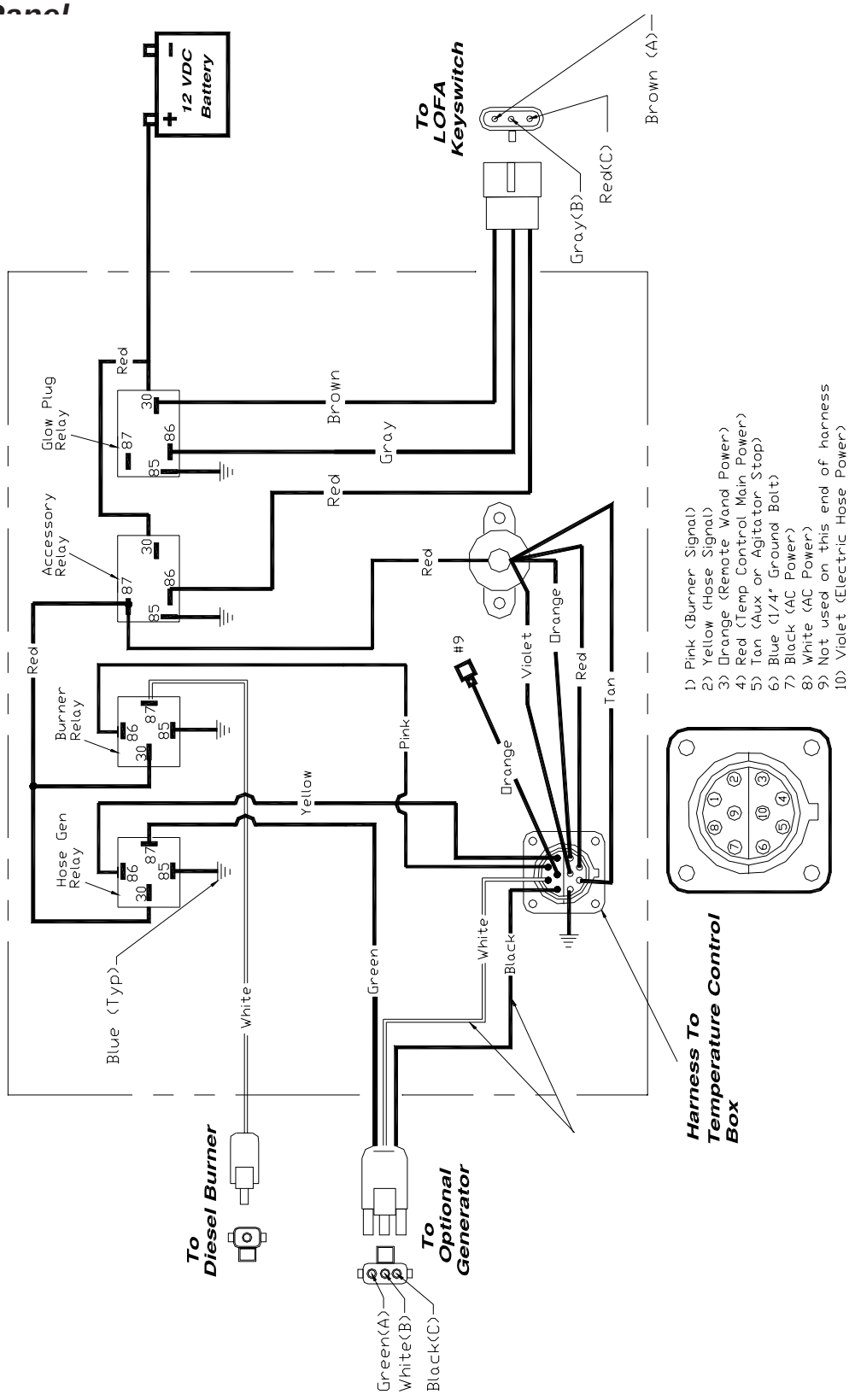
153490 - TRAILER HARNESS

Wiring Diagrams

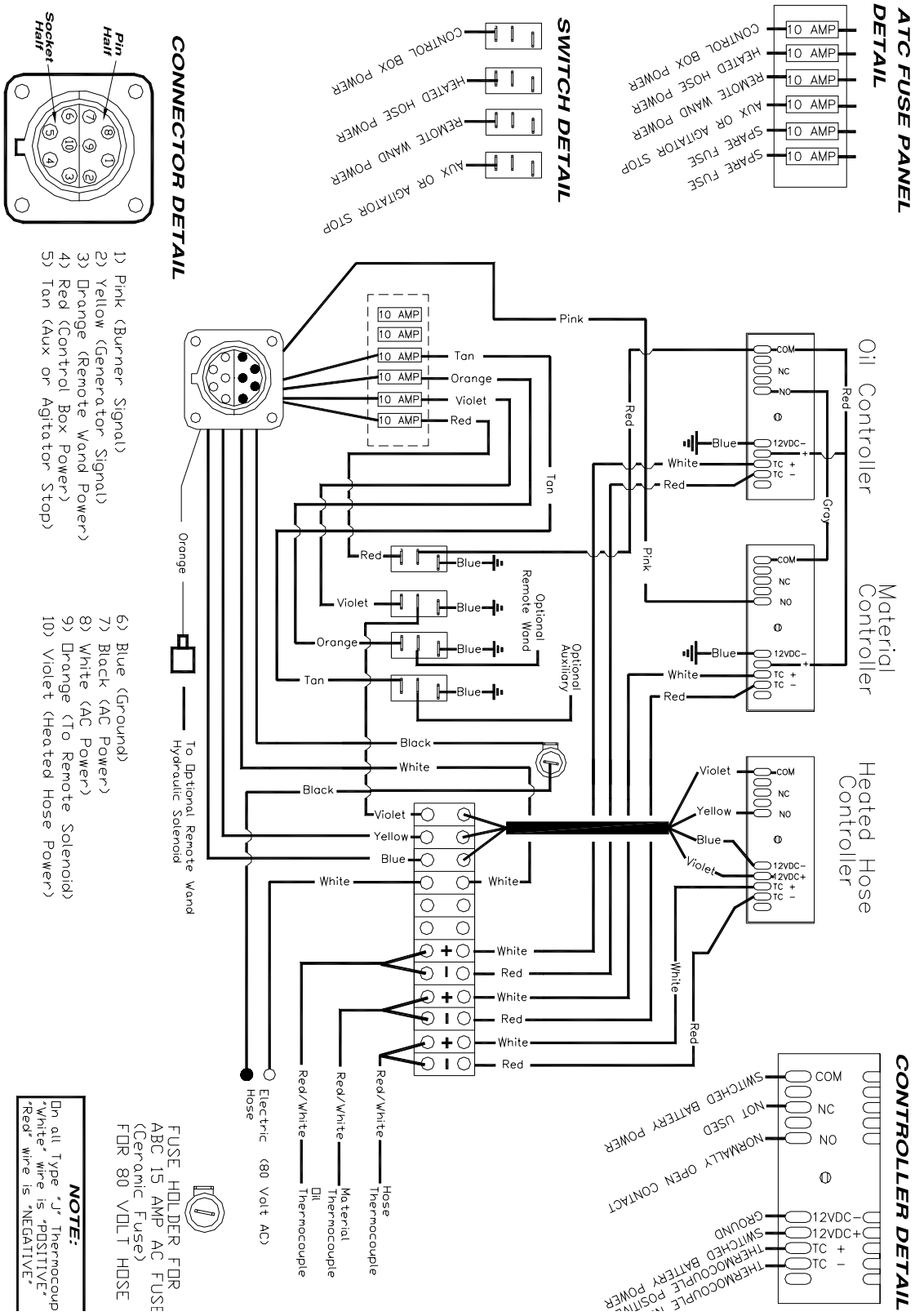
Engine and Burner Wiring Harness



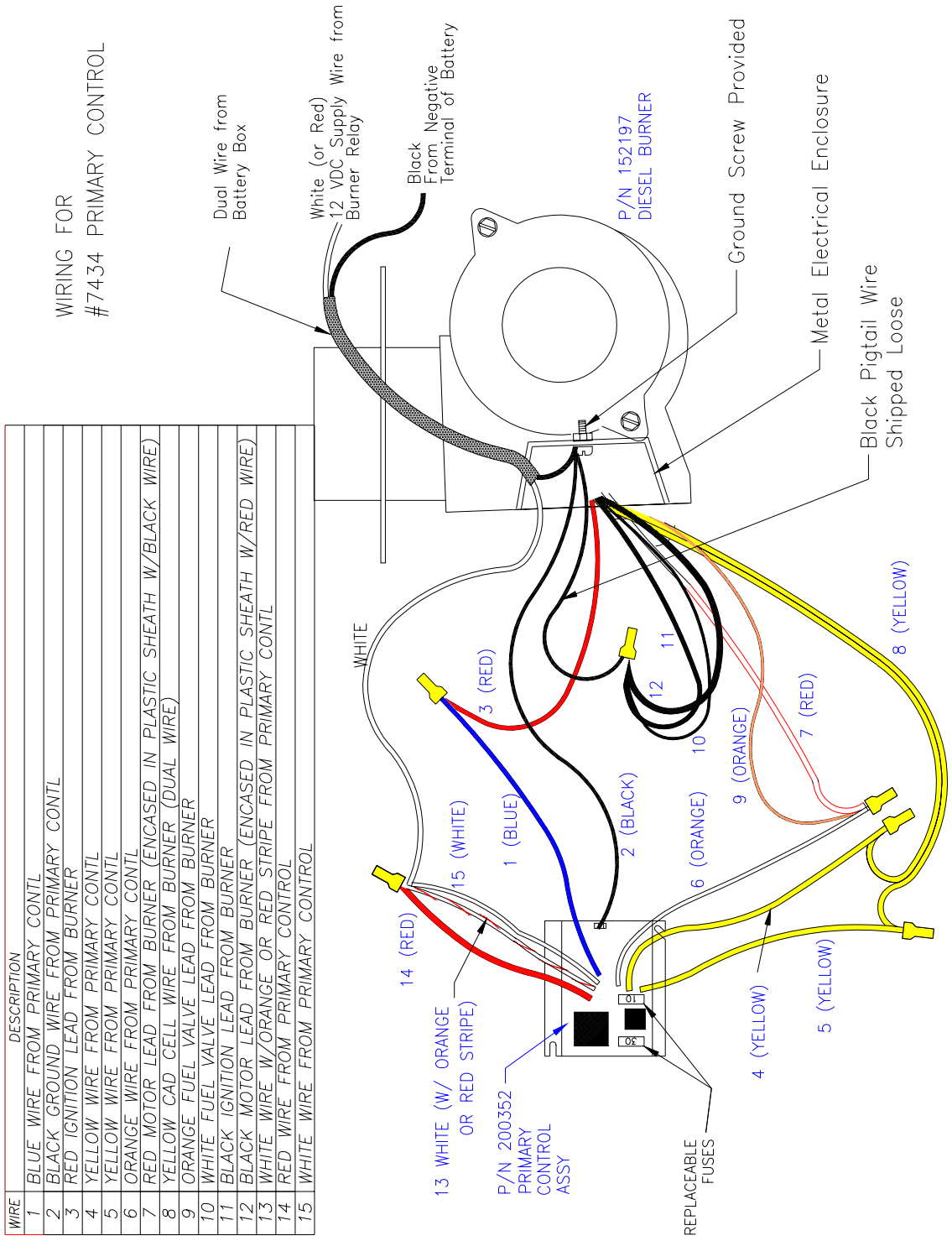
Relay Panel


12 VDC Battery
To LOFA Keyswitch
Brown (A)
Red(C)
Gray(B)
Glow Plug Relay
Accessory Relay
Burner Relay
Hose Gen Relay
30
85
86
87
Red
Brown
Gray
Red
Red
Red
Red
#9
Violet
Orange
Red
Tan
Orange
Pink
Yellow
Blue (Typ)
White
Green
White
Black
1) Pink (Burner Signal)
2) Yellow (Hose Signal)
3) Orange (Remote Wand Power)
4) Red (Temp Control Main Power)
5) Tan (Aux or Agitator Stop)
6) Blue (1/4" Ground Bolt)
7) Black (AC Power)
8) White (AC Power)
9) Not used on this end of harness
10) Violet (Electric Hose Power)
Harness To Temperature Control Box
To Diesel Burner
To Optional Generator
Green(A)
White(B)
Black(C)

Te

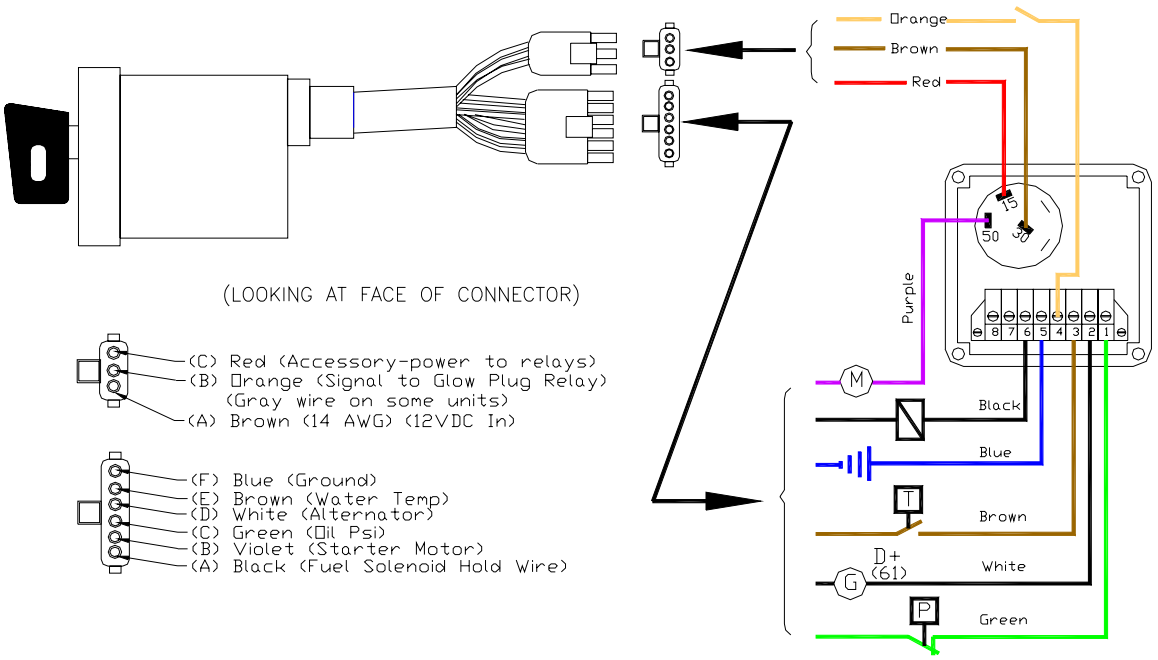

ATC FUSE PANEL DETAIL
10 AMP
CONTROL BOX POWER
HEATED HOSE POWER
REMOTE WAND POWER
AUX OR AGITATOR STOP
SPARE FUSE
SWITCH DETAIL
CONNECTOR DETAIL
Socket Half
Pin Half
1) Pink (Burner Signal)
2) Yellow (Generator Signal)
3) Orange (Remote Wand Power)
4) Red (Control Box Power)
5) Tan (Aux or Agitator Stop)
6) Blue (Ground)
7) Black (AC Power)
8) White (AC Power)
9) Orange (To Remote Solenoid)
10) Violet (Heated Hose Power)
Oil Controller
Material Controller
Heated Hose Controller
COM
NC
NO
12VDC-
12VDC+
TC +
TC -
Pink
Red
Tan
Gray
Blue
White
Violet
Yellow
Orange
Black
Optional Remote Wand
Optional Auxiliary
To Optional Remote Wand Hydraulic Solenoid
FUSE HOLDER FOR ABC 15 AMP AC FUSE (Ceramic Fuse) FOR 80 VOLT HOSE
Electric (80 Volt AC) Hose
Red/White
Hose Thermocouple
Material Thermocouple
Oil Thermocouple
CONTROLLER DETAIL
SWITCHED BATTERY POWER
NOT USED
NORMALLY OPEN CONTACT
GROUND
SWITCHED BATTERY POWER
NOTE:
On all Type "J" Thermocoup
"White" wire is "POSITIVE"
"Red" wire is "NEGATIVE"

Primary Control

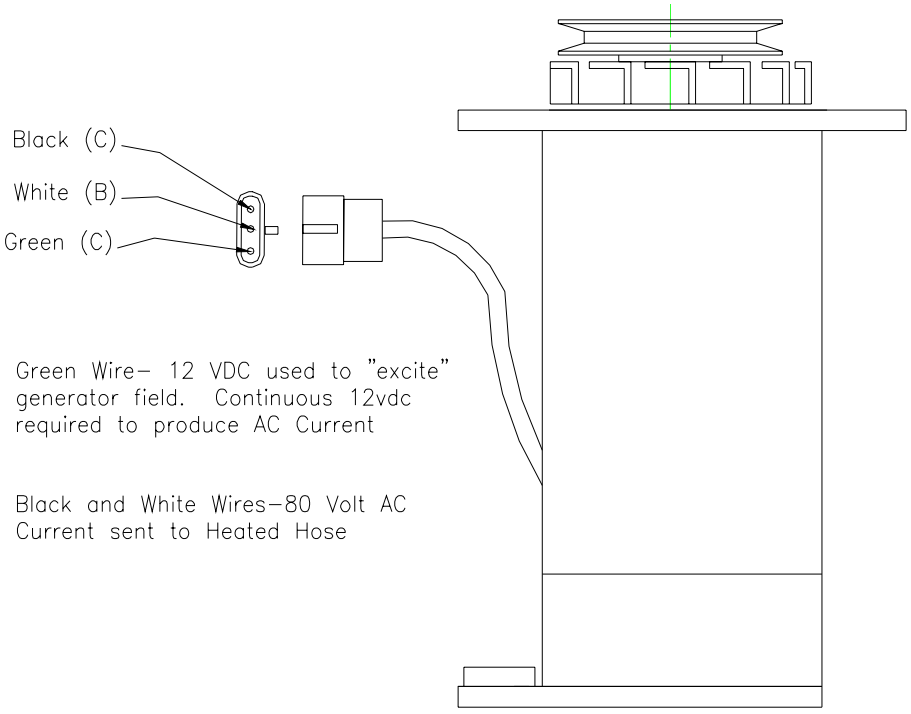


WIRE	DESCRIPTION
1	BLUE WIRE FROM PRIMARY CONTL
2	BLACK GROUND WIRE FROM PRIMARY CONTL
3	RED IGNITION LEAD FROM BURNER
4	YELLOW WIRE FROM PRIMARY CONTL
5	YELLOW WIRE FROM PRIMARY CONTL
6	ORANGE WIRE FROM PRIMARY CONTL
7	RED MOTOR LEAD FROM BURNER (ENCASED IN PLASTIC SHEATH W/BLACK WIRE)
8	YELLOW CAD CELL WIRE FROM BURNER (DUAL WIRE)
9	ORANGE FUEL VALVE LEAD FROM BURNER
10	WHITE FUEL VALVE LEAD FROM BURNER
11	BLACK IGNITION LEAD FROM BURNER
12	BLACK MOTOR LEAD FROM BURNER (ENCASED IN PLASTIC SHEATH W/RED WIRE)
13	WHITE WIRE W/ORANGE OR RED STRIPE FROM PRIMARY CONTL
14	RED WIRE FROM PRIMARY CONTROL
15	WHITE WIRE FROM PRIMARY CONTROL

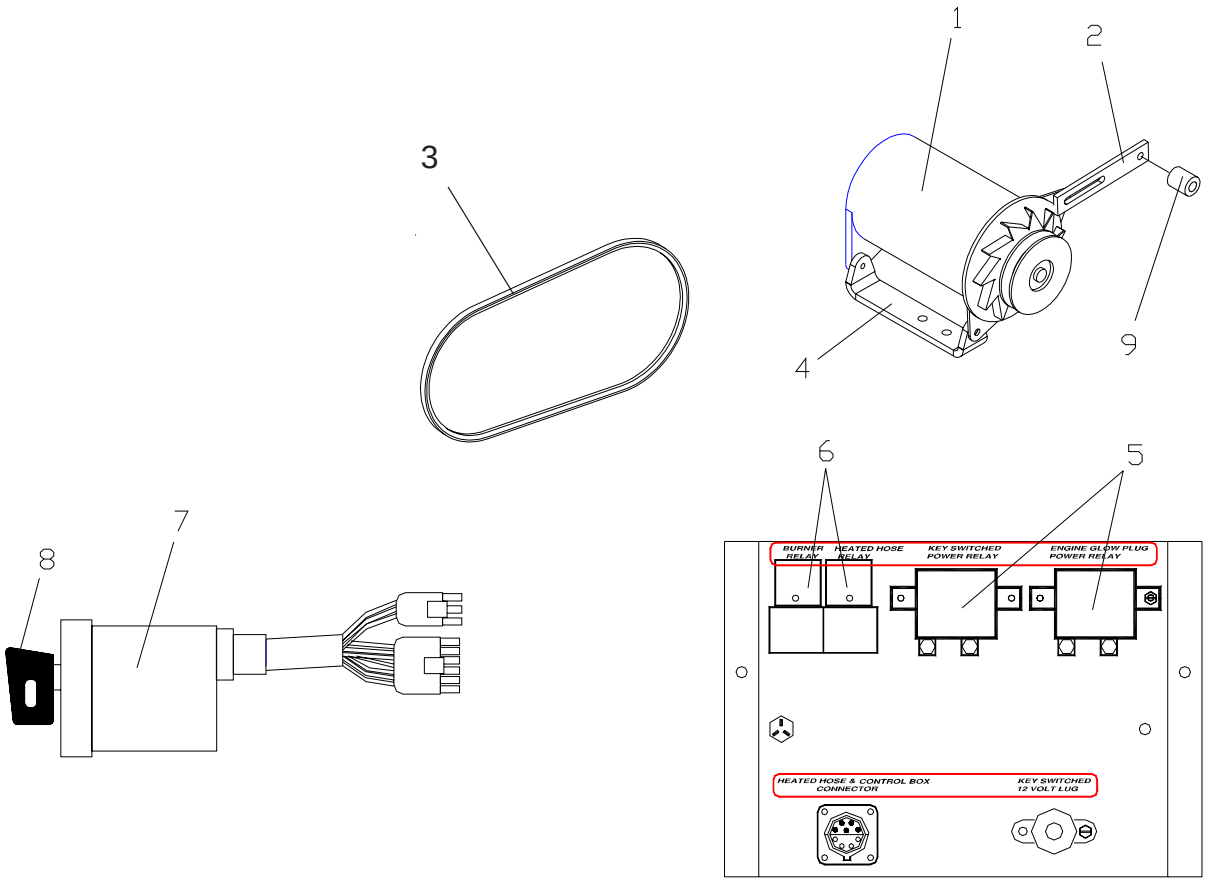
LOFA Engine Shutdown



Heated Hose Generator



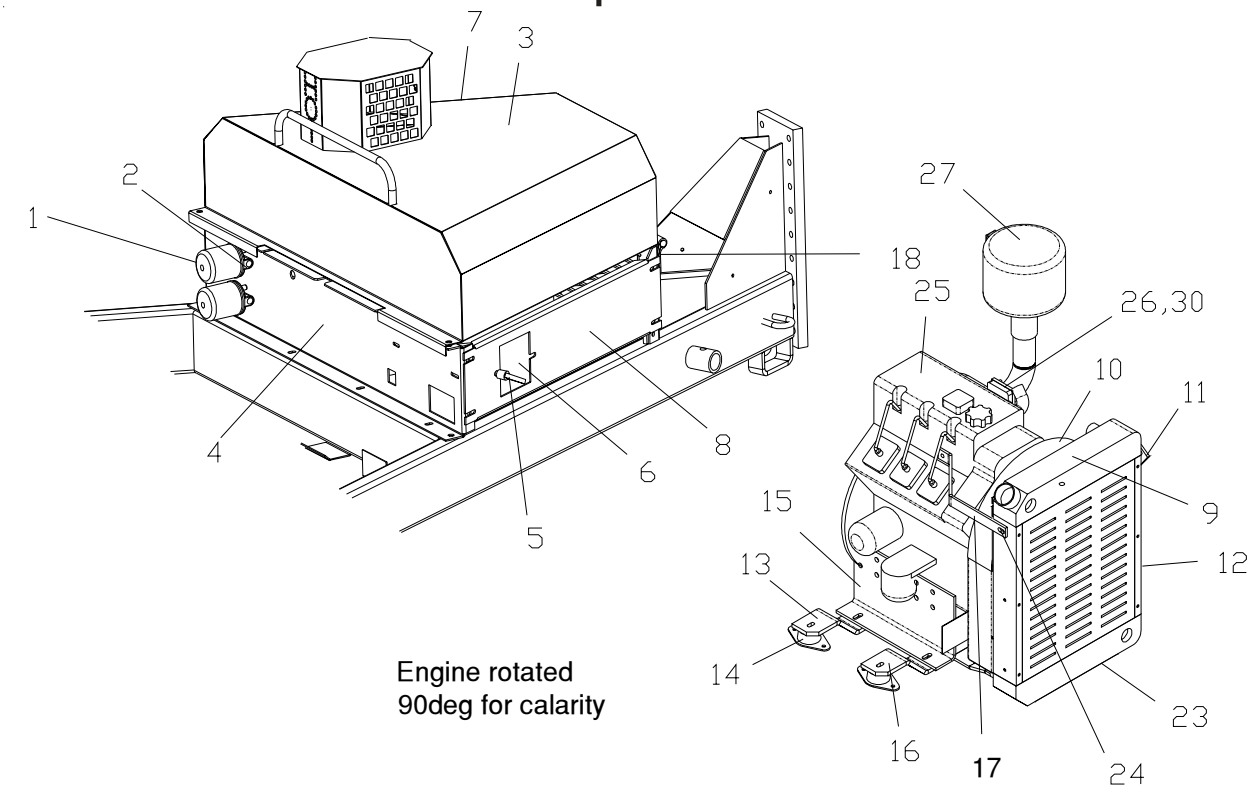
Item	Part #	Description
1	130220	Generator with pulley
2	420658	Generator Adj. Brkt. (2002 and newer)
	153441	Pulley - Generator
3	110405	Belt A-28
	111124	Belt A-27
4	420304	Generator U-Brkt
5	130222	Relay with Diode (2 req'd)
6	130113	Relay (2 req'd)
7	111108	Micro Panel
8	111117	Key
9	420806	Spacer 1" long



Isuzu 3LB1 Diesel Engine and Pump Parts List

Item	Part #	Description
1	170169	Fuel Filter Element
2	170208	Fuel Filter Housing
3	404343	Hood
4	420180	Back Plate
5	153471	Handle Nut
6	404391	Door
7	*420299	LH Side Plate
8	404390	RH Side Plate
9	153513	Radiator
10	404342	Radiator Shroud
11	420295	Radiator Strap LH
12	420212	Motor Mount LH
13	420213	Rear Cross Strap
14	152047	Rubber Isolator
15	420211	Motor Mount RH
16	404345	Radiator Mount
17	420294	Radiator Strap RH

Item	Part #	Description
18	404344	Lower Grill
19	110942	Oil Filter
20	110962	Fan Belt
21	170477	Hydraulic Spline Pump
	*100553	Allen Head Screw (for pump)
22	111111	Air Filter Element
23	152606	Bottom Shock Mount
24	153433	Top Shock Mount
25	110936	Engine 3LB1
	*111092	Glow Plug for 3LB1
26	153731	Flange Fasket
27	153619	Muffler
28	*111157	Air Cleaner
29	111158	Air Cleaner Mount
30	404386	Muffler Mount
	*	(Not Shown)



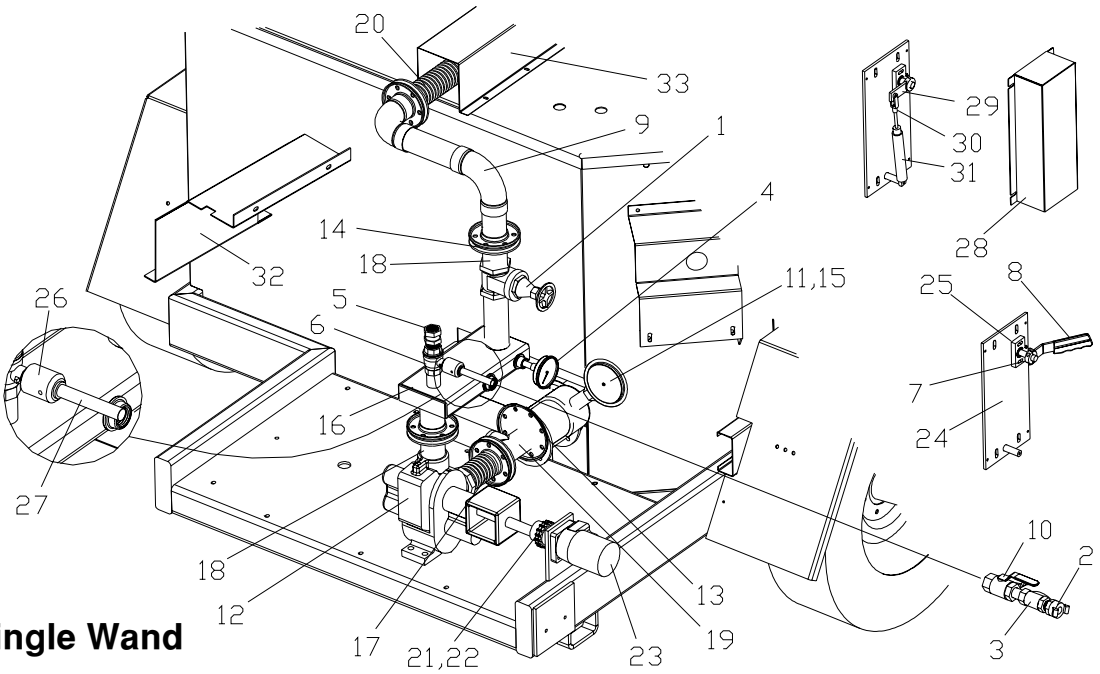
Item	Part #	Description
1		Mufler
2	110987	Engine -
3	170477	Pump - Splined Shaft
4		Oil Filter
5		Air Filter Element
6		Precleaner, Foam

Plumbing System Parts List

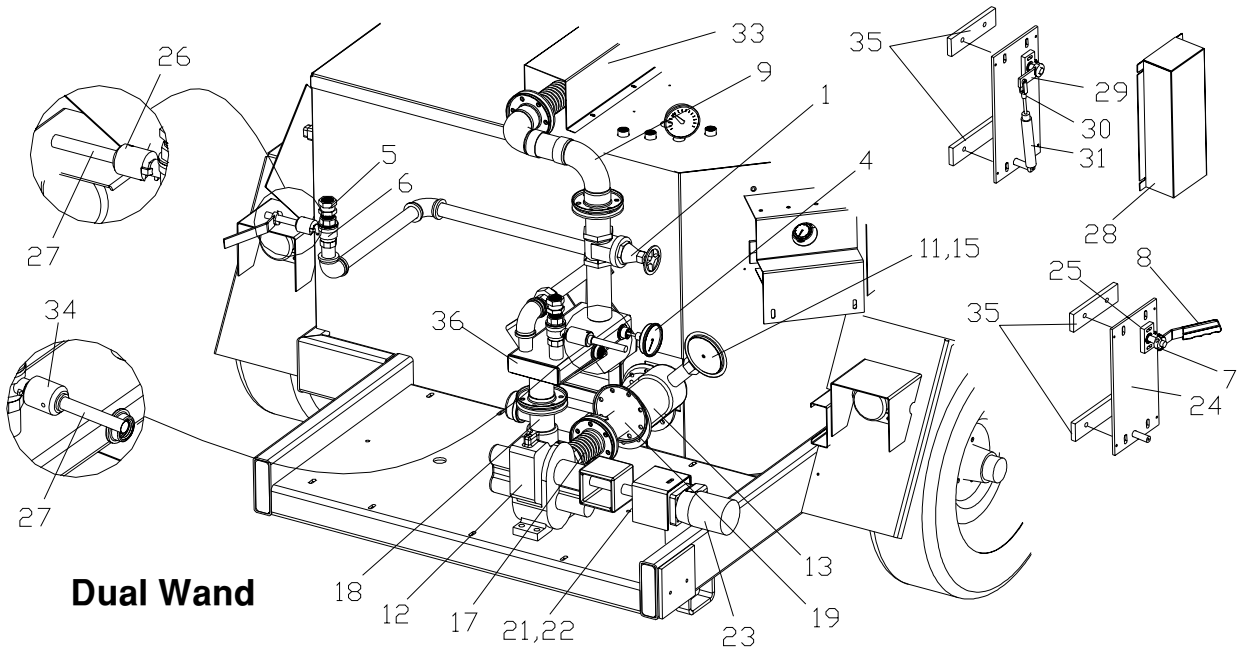
Item	Part #	Description
1	120497	Gate Valve - 2"
*2	120437	Air Hose Connection
*3	120475	Check Valve - 3/4"
4	130009	Thermometer 3"
5	152279	Swivel - 1"
6	152042	Ball Valve FP 1"
7	404324	Handle
8	152038	Grip
9	404352	Return Elbow (410)
9	402896	Return Elbow (110 & 230)
*10	120448	Ball Valve 3/4"
11	120498	Gate Valve 3"
12	120546	Roper Pump - HBZ-2
13	152127	Gasket 10233B 3"
14	152126	Gasket 10233A 2"
15	152292	Valve Handle 3"
16	404290	Plumbing Manifold (110&230)
	404580	Plumbing Manifold (410)
17	402900	Flex Hose w/Flange - 6""

Item	Part #	Description
18	403045	Flange Adapter - 3"
19	402895	Outlet Tee
20	403046	Flex Hose w/Flange - 10"
21	110159	Coupling Chain
22	110927	Coupling Sprockets (2 req'd)
23	170469	Hydraulic Motor
24	404329	Bearing Plate
25	404426	Bearing Block Assy
26	420086	Valve Adapter
27	420088	Valve Adapter Rod
*28	420108	Cover
*29	404294	Ear Weldment
*30	130155	Clevis
*31	171144	Cylinder
32	416716	Plumbing Shield
33	402897	Cover 110
	403592	Cover 230 & 410
34	420850	Valve Adapter Rod (Dual Hose)
35	420851	Spacer Plate (Dual Hose)
36	404580	Plumbing Manifold (Dual Hose)

*Optional



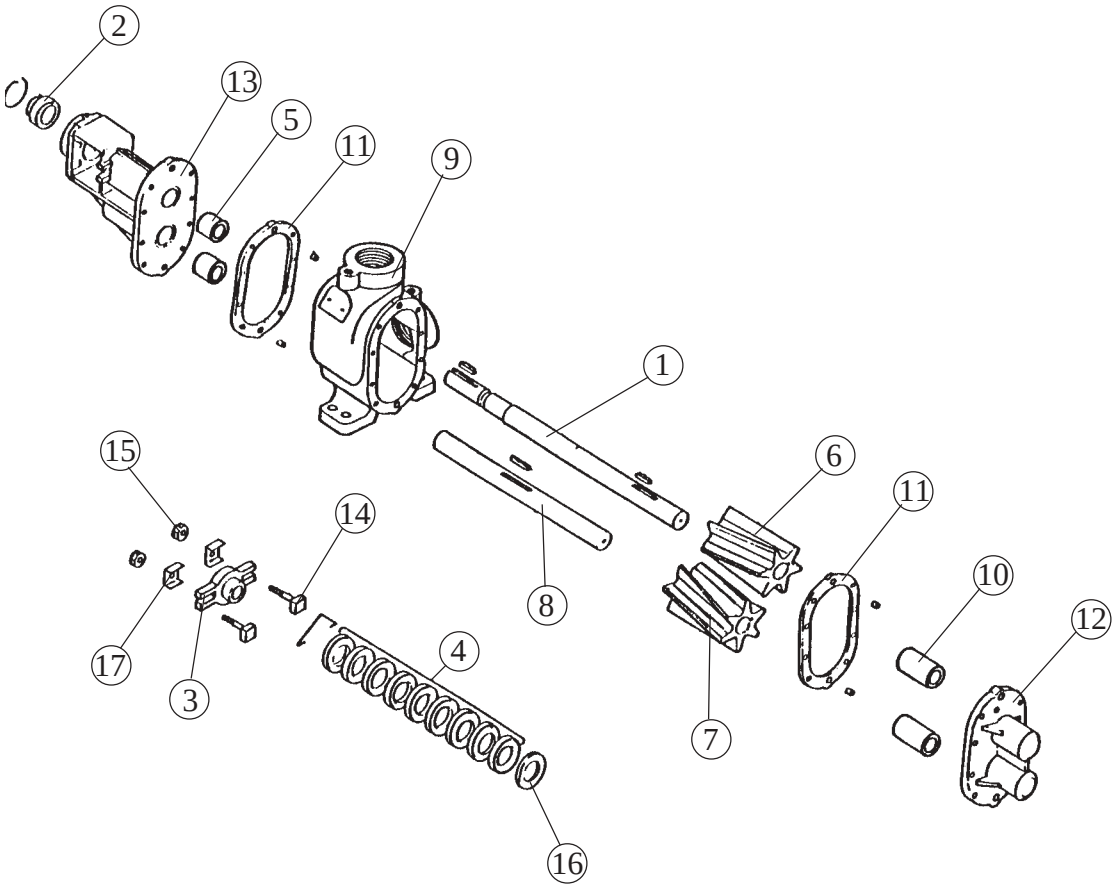
Single Wand



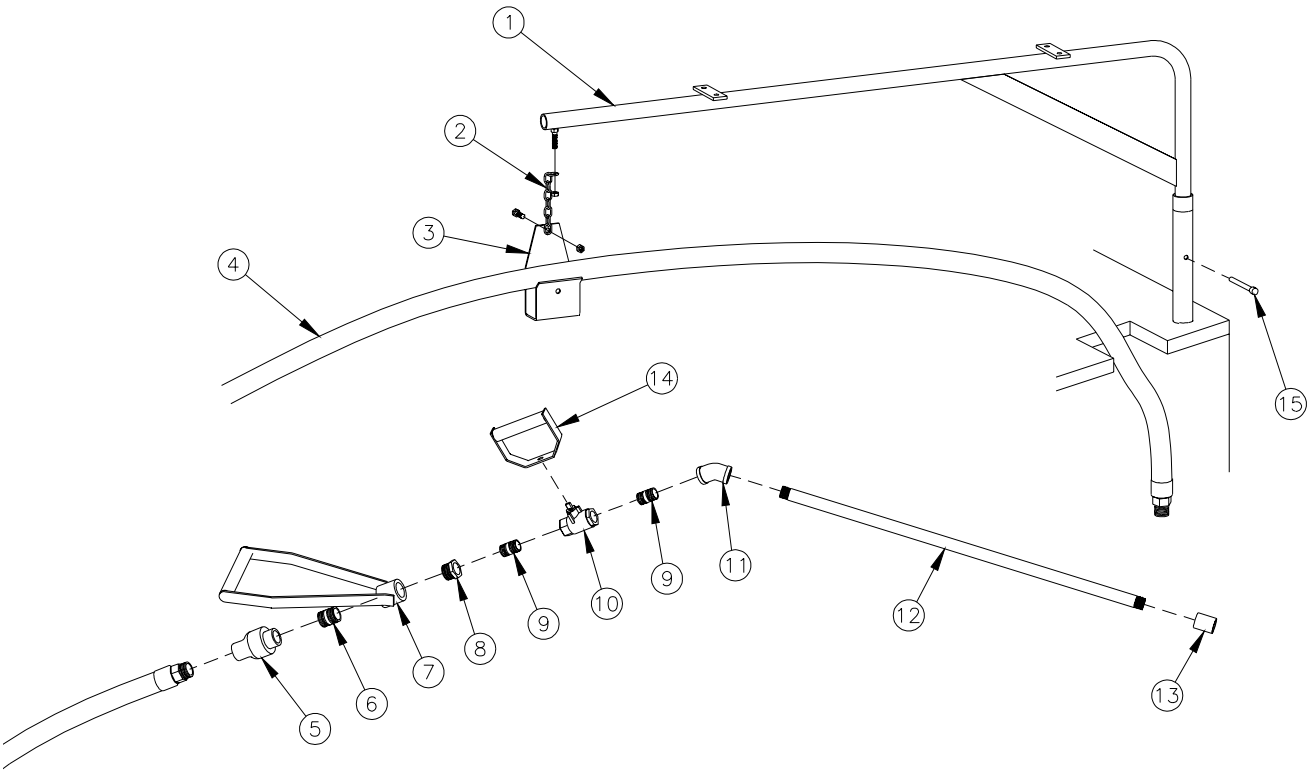
Dual Wand

Gear Pump Parts List

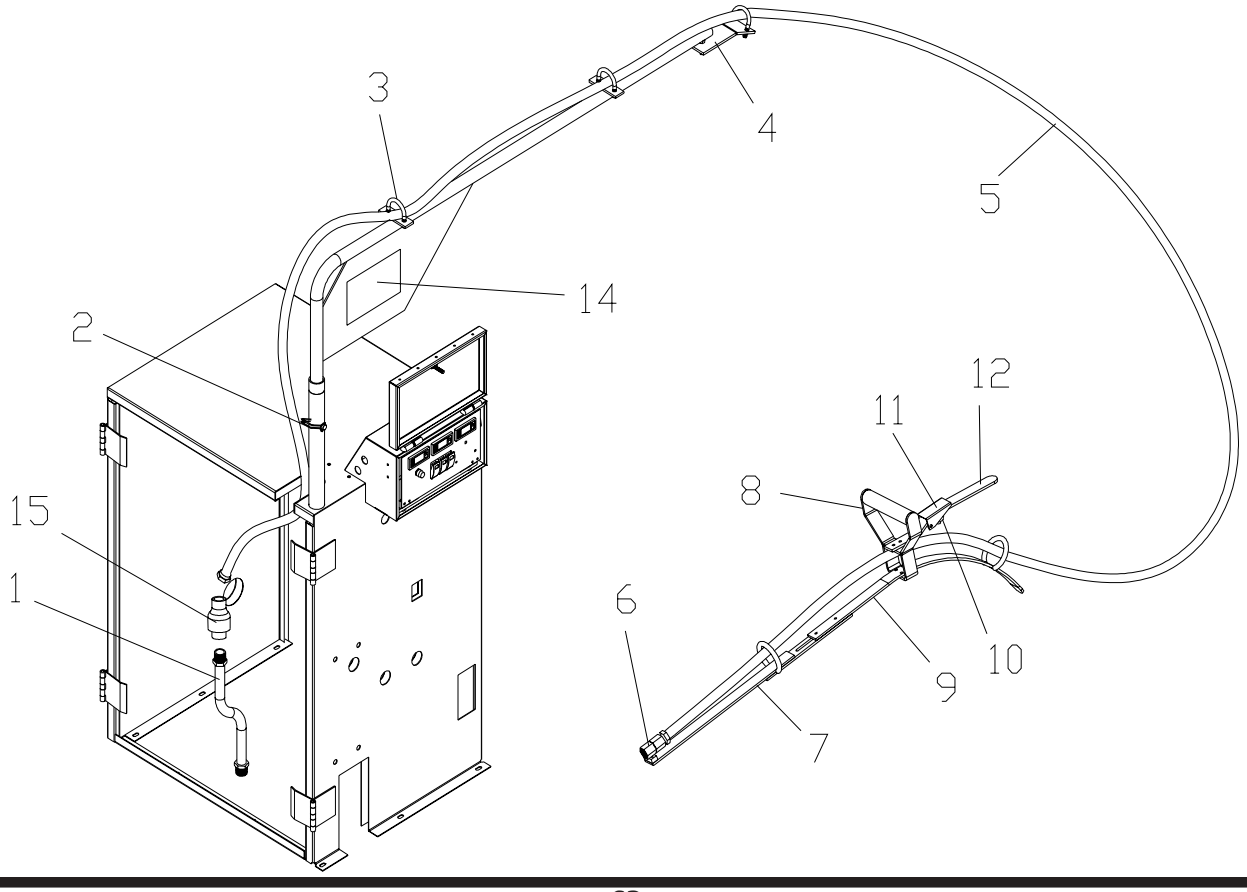
Item	Part #	Description
1	120483	Drive Shaft
2	110734	Outboard Bearing
3	120525	Packing Gland
4	120541	Pump Packing
5	120468	Bushing 1 1/4" Long
6	120482	Drive Gear
7	120511	Idler Gear
8	120512	Idler Shaft
9	120474	Center Case
10	120471	Bushing 2 1/2" Long
11	120444	Aluminum Gasket
12	120486	Face Plate
13	120445	Back Plate
14	120554	Square Head Bolt
15	100495	Lock Nut
16	120527	Packing Washer
17	120526	Packing Gland Clip



Item	Part #	Description
1	403090	Hose Boom
2	200294	Chain 4/0 x 8
3	416518	Hose Holder
4	152188	Metal Hose w/Cover, 20 ft.
4	152146	Rubber Hose w/Cover, 20 ft.
5	152280	Swivel Joint H.D.
6	120407	Nipple, 1"
7	402841	Wand Handle
8	120269	Hex Bushing, 1.0 x .75
9	120412	Nipple, 3/4"
10	120560	Wand Valve, 3/4"
11	120406	Elbow, 3/4" x 45 Deg.
12	120523	Nipple, 3/4" x 32
13	120048	Coupling, 3/4"
14	403201	Valve Handle
15	150124	Lock Pin
16	403205	Wand Assembly *(includes items 6-14)*

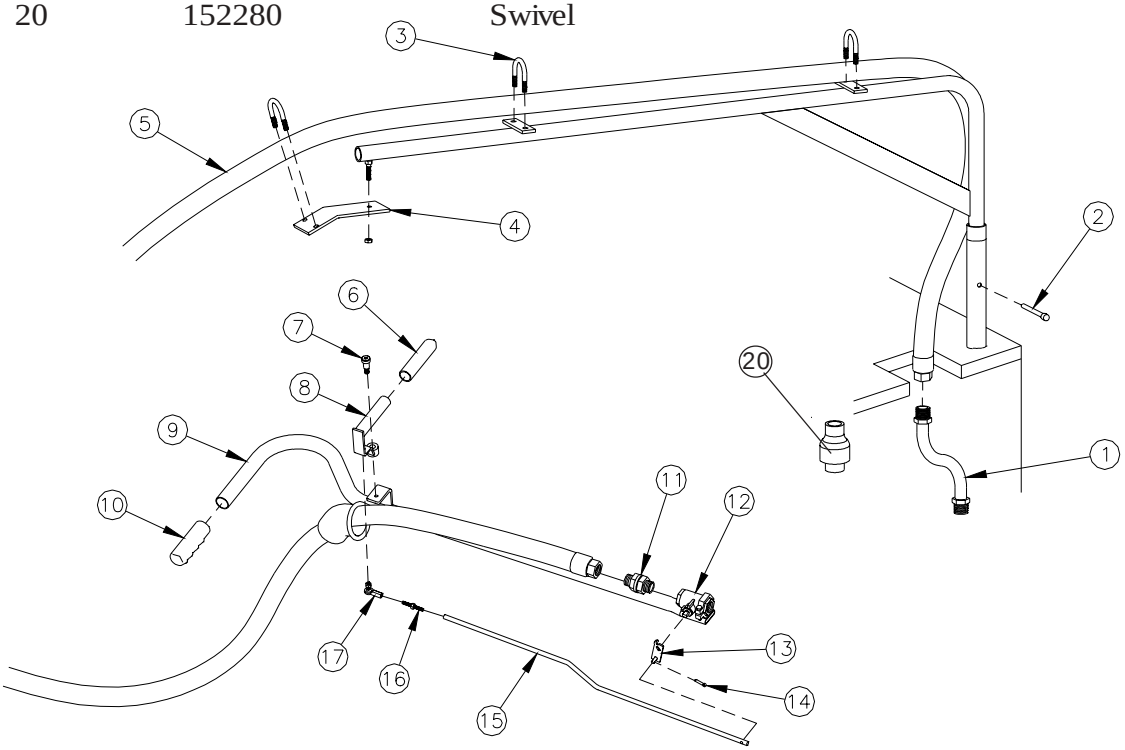


Item	Part #	Description
1	404389	Adapter Pipe
2	150124	Lock Pin
3	100507	U-Bolt, .38 x 2 x 2.62
4	418906	Hose Holder
5	403911	Hose, Electrically Heated w/Cover, 20 ft.
6	404300	Swivel Weldment
7	404303	Wand, Back Weldment
8	404301	Handle Weldment
9	404304	Wand, Front Weldment
10	130204	Switch
11	420105	Trigger
12	404302	Trigger Weldment
13	404293	Wand Assembly *(includes items 6-12)*
14	160884	Decal (Do not Rotate)
15	152280	Swivel

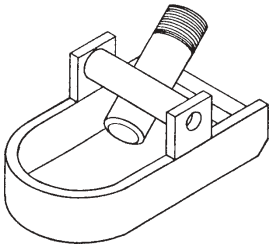
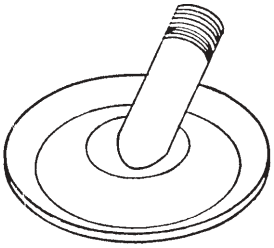
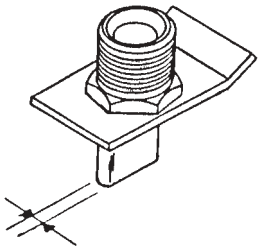
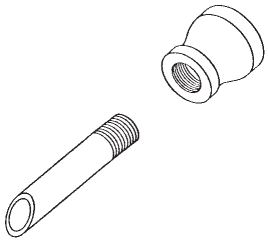


Sealing Hose and Accessories

Item	Part #	Description
1	404389	Adapter Pipe
2	150124	Lock Pin
3	100507	U-Bolt, .38 x 2 x 2.62
4	418906	Hose Holder
5	403911	Hose, Electrically Heated w/Cover, 20 ft.
6	152839	Foam Grip, 1.0
7	100520	Shoulder Bolt, .5 x .75
8	403899	Valve Handle
9	403898	Wand, Weldment
10	152838	Foam Grip, 1.25
11	170635	Swivel, .75
12	120560	Wand Valve, .75
13	403905	Valve Lever
14	100275	Cotter Pin
15	418930	Valve Linkage
16	416863	Control Rod
17	110764	Rod End
18	403890	Wand Assembly *(includes items 6-17)*
19	160884	Decal (Do not Rotate)
20	152280	Swivel

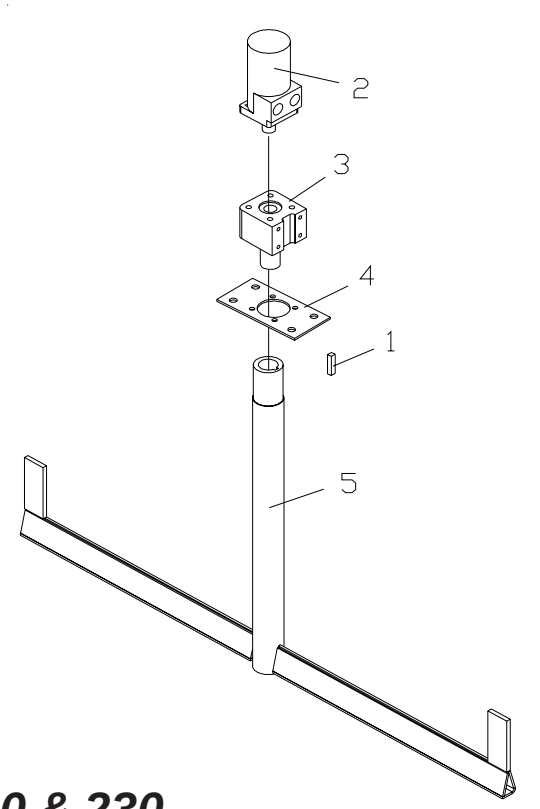


Sealing Attachments

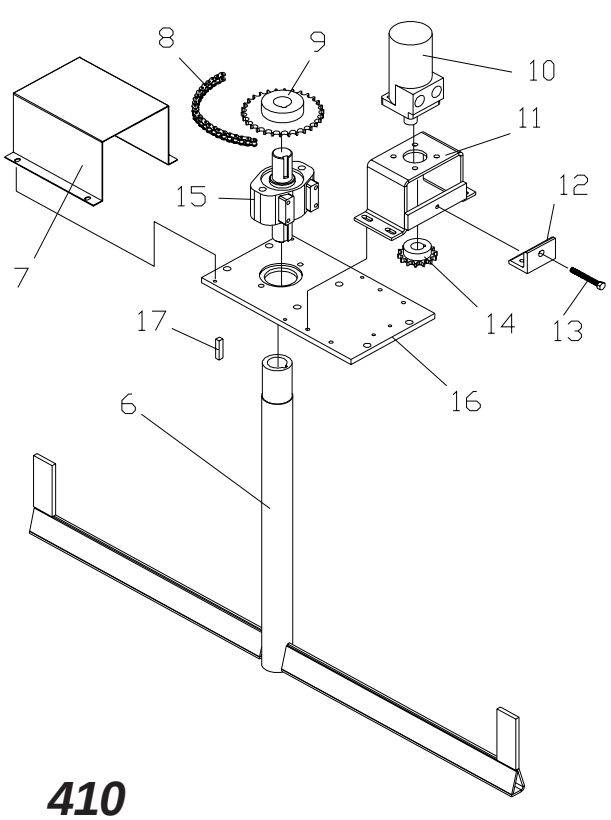
ITEM / PART #	FEATURES
 PIVOTING SHOE / 403137	* 2 1/2" wide band * 3/4" NPT inlet * Open shoe design for clear visibility of material * Pivoting inlet tube maintains contact with the road
 SEALING DISC / 403162	* 3/4" NPT inlet * 3/8" OD orifice * Uniform band provided by disc shape
SEALING DISC / 404528	*3" Wide Band *4 1/2" OD plate *2 3/8" Wide Band *3" OD Plate
 1/8" SEALING TIP / 403164 1/4" SEALING TIP / 403163	* Available in 1/8" and 1/4" * 3/4" NPT inlet * Skid plate to reduce operator fatigue * Tip may be shortened or angled in field for specific applications
 3/8 SEALING TUBE / 416968 3/4 x 3/8 REDUCER / 120567	* 3/8 NPT x 3 1/2" long tube * Angled tip * May be flattened in field for different applications * 3/4" NPT bushing inlet

Item	P/N	Description
1	110294	Key 3/8 x 2
2	170467	Motor, Agitation - 110
2	170602	Motor, Agitation - 230
	171081	Seal Kit 170602
3	170449	Load Adapter M
4	416670	Agitator Motor Mount - 110 & 230
5	402901	Agitator - 110
5	403557	Agitator - 230
6	404325	Agitator - 410
7	420170	Cover
8	110488	Chain

Item	P/N	Description
9	111087	Sprocket - 50BS30 x 1.50
10	170602	Motor, Agitation - 410
	171081	Seal Kit For 170602
11	404327	Agitator Motor Mount - 410
12	420171	Adjustment Angle
13	100295	3/8 x 3 Full Thread Bolt
14	111088	Sprocket - 50BS14 x 1
15	171173	Load Adapter
16	420169	Motor Mount Plate
17	110294	3/8 x 2 Key



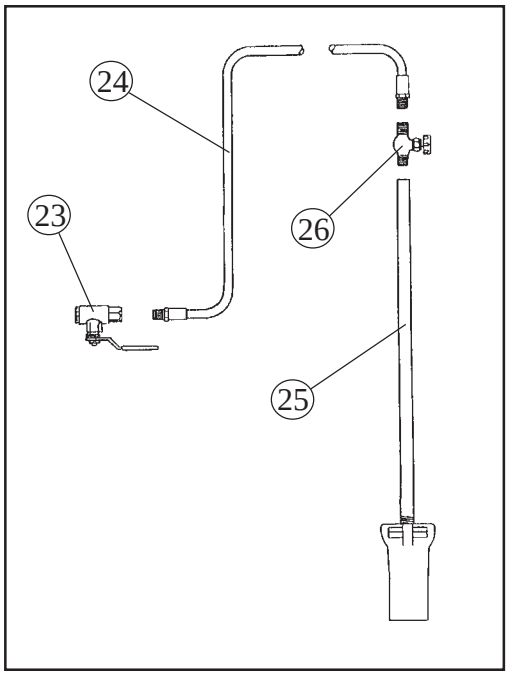
110 & 230



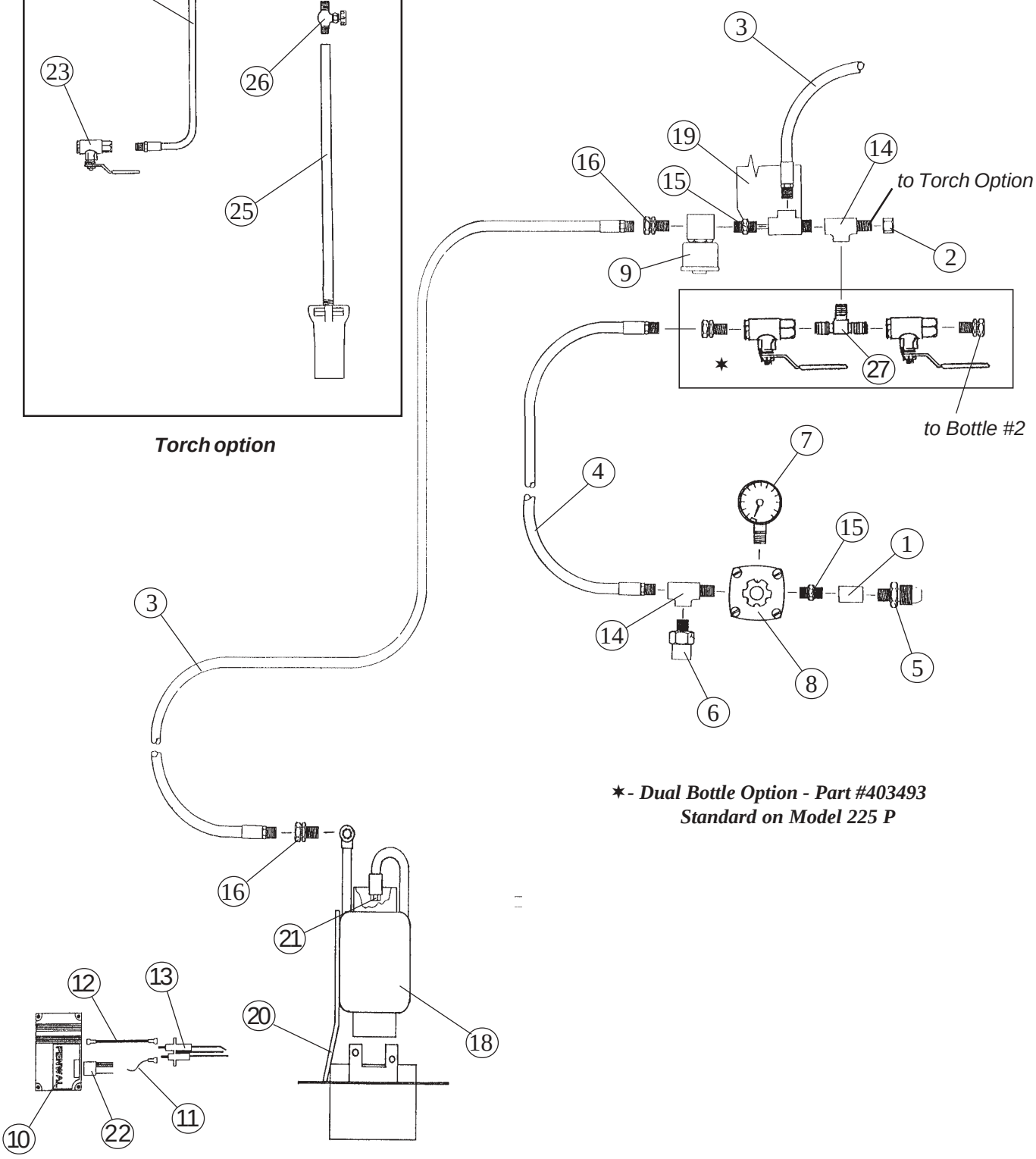
410

LP Components

Item	Part #	Description
1	120098	Coupling, Brass 1/4"
2	120306	Cap, Hex 1/4"
3	120515	LP Hose x 18
4	120519	LP Hose x 92
5	120535	POL w/Check valve
6	120536	Pop-Off Valve
7	130001	Gauge 0-60 PSI
8	130006	Regulator Standard
9	130148	Solenoid
10	130119	Spark Module - 92
11	152114	Flame Sensor Wire
12	152174	Ignitor Wire 36 w/Ends
13	152175	Ignitor / Sensor Unit
14	170090	Hydraulic Adapt., St. Tee
15	170092	Hydraulic Adapt., Male
16	170508	Swivel
17	170509	Swivel 1/4 F x 90
18	402999	Burner 600K
19	403451	Manifold Bracket Weldment
20	403449	Mount Weldment (LP Burner)
21	152203	Orifice 600K
22	152081	Cable Assembly
23	120085	Ball Valve 1/4
24	120126	LP Hose
25	120501	Hand Torch
26	120502	Hand Torch Valve
27	170458	Tee, Pipe 1/4"



Torch option

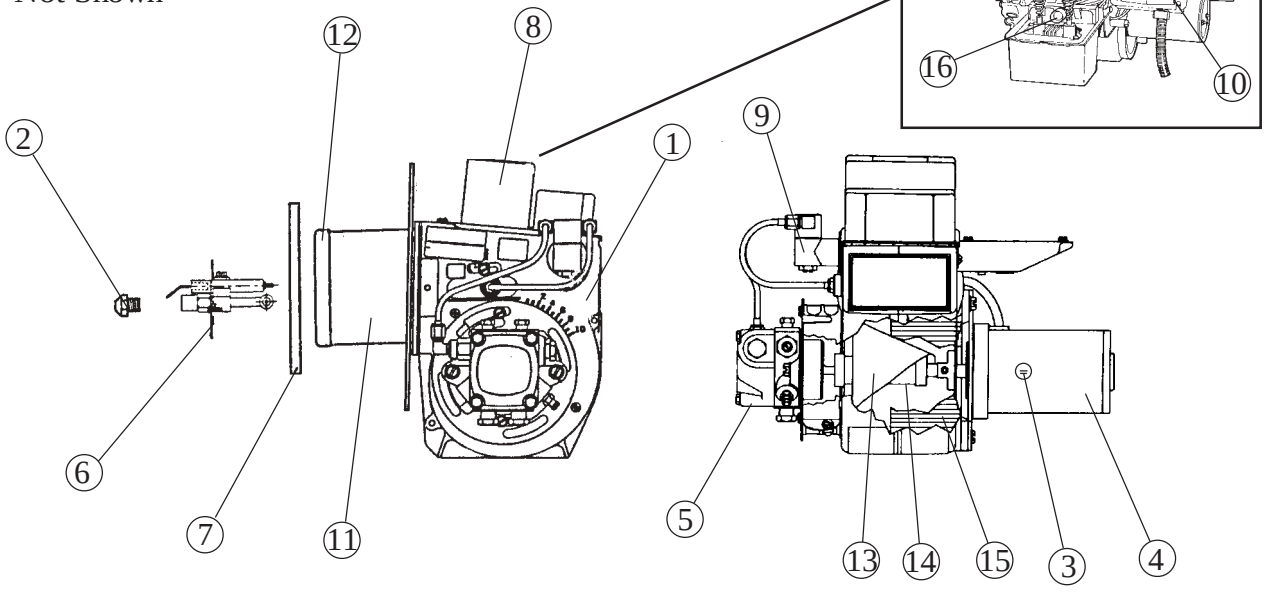


✶- Dual Bottle Option - Part #403493
Standard on Model 225 P

Oil Burner Parts List

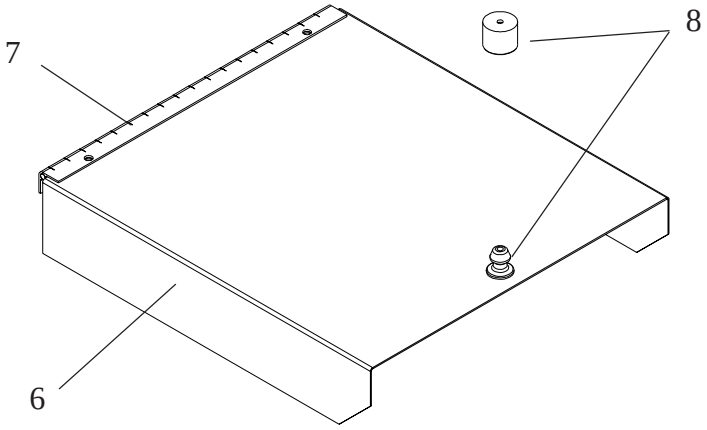
Item	Part #	Description
1	152197	110 Burner - Oil (complete assembly)
	404428	230 Burner - Oil (complete assembly)
	404388	410 Burner - Oil (complete assembly)
2	152305	Orirfice, 1.75 x 90B - 110
2	152204	Orifice, 2.0 x 90B - 230
2	153445	Orifice, 2.25 x 90B - 410
3	152190	Motor Brush Set
4	152191	Motor - Oil Burner
5	152228	Pump - Fuel Oil
6	152106	Electrode Rod/Ins Assy
7	152128	Gasket
8	152173	Ignition Transformer Assy
9	152200	Oil Valve
10	200352	Primary Control Assy
11	120443	Air Tube
12	120466	Burner Head - 110 & 230
12	153446	Burner Head - 410
13	152398	Air Inlet Guide
14	152399	Coupling
15	152466	Blower Wheel
16	152105	Electric Eye Assy.
*17	130166	Fuel Pressure Gauge

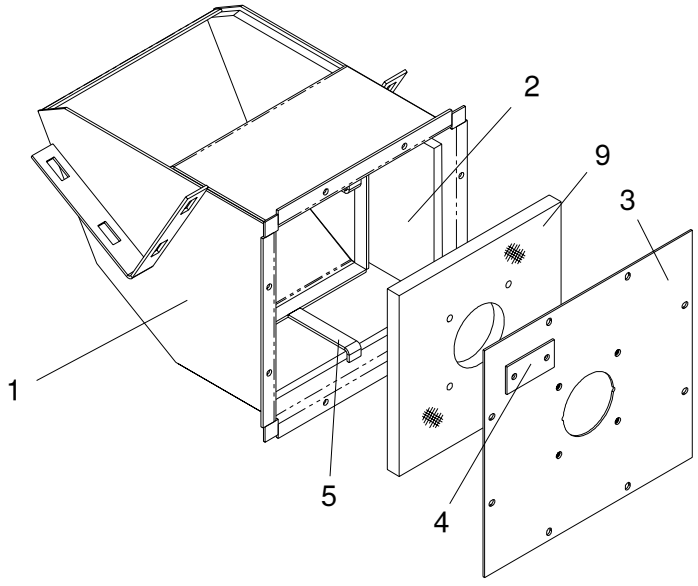
* Not Shown



Combustion Chamber Parts List

Item	Part #	Description
1	402893	Combustion Chamber
2	403400	Chamber Lining Kit
3	402898	Burner Mount
4	417041	Inspection Cover
5	402923	Lining Retainer
6	420210	Burner Cover
7	420296	Burner Hinge
8	153502	Door Holder
9	152487	Insulation
	152485	Bottom Insulation (Rear) 110
	152486	Bottom Insulation (Front) 110
	152525	Bottom Insulation (Rear) 230
	152526	Bottom Insulation (Front) 230
	153417	Bottom Insultaion Kit 410

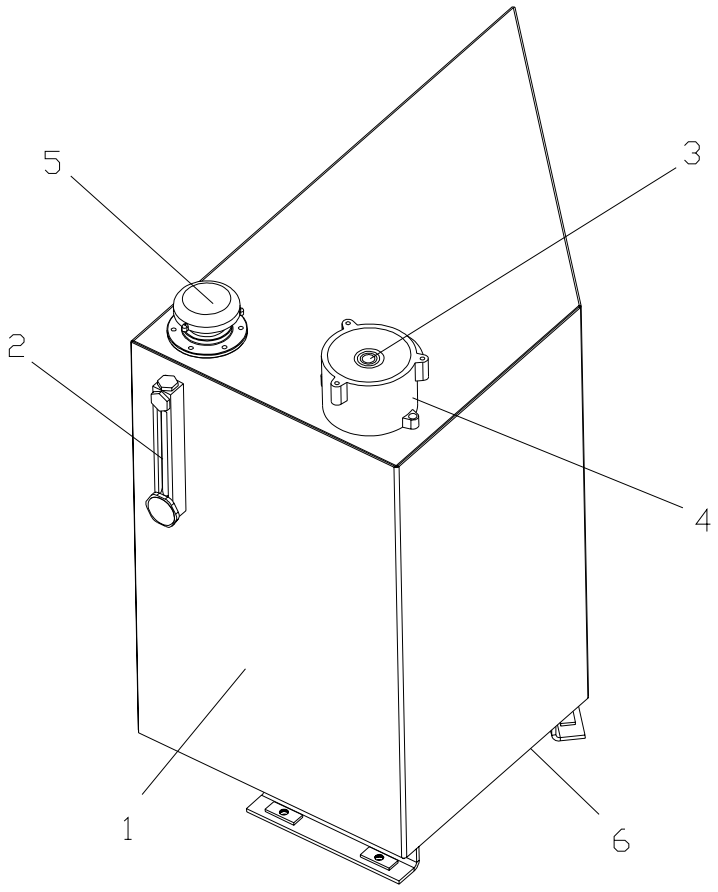




Hydraulic Reservoir Components

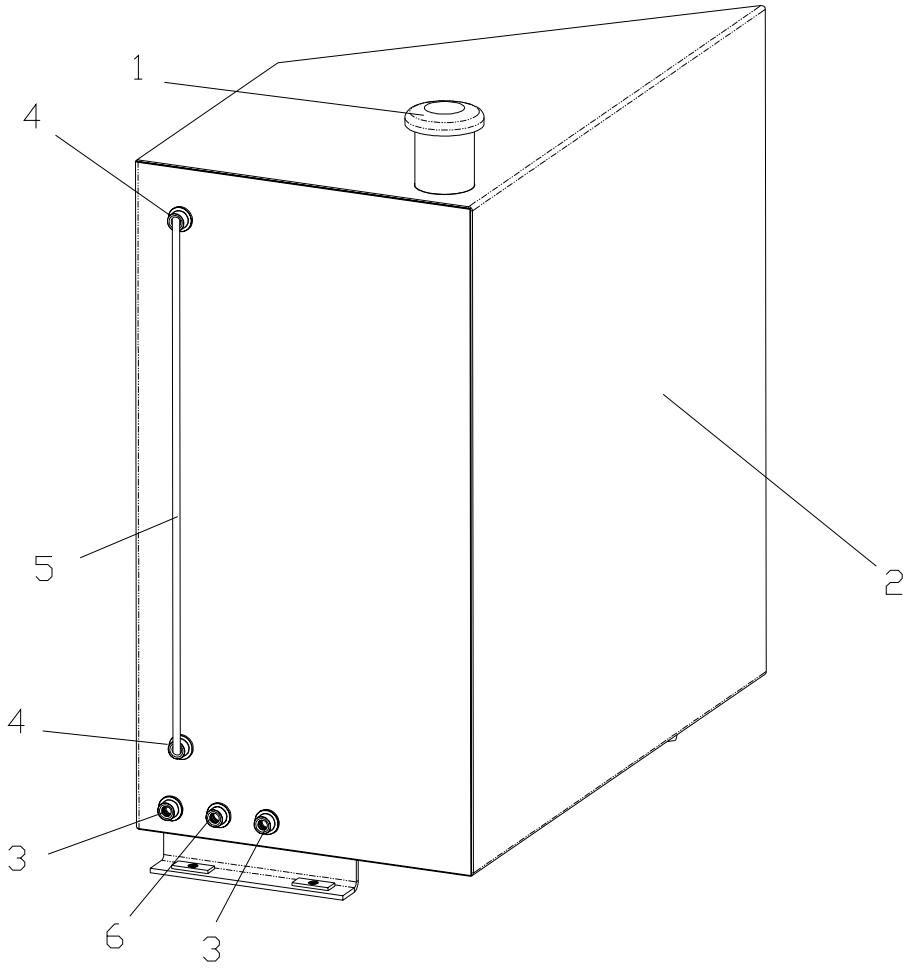
Item	Part #	Description
1	404432	Hydraulic Reservoir 110
1	404338	Hydraulic Reservoir 230 and 410
2	171000	Sight Guage
3	170487	Return Filter
	*153136	Oil Filter Gasket
	*170625	Seal Kit for Return Filter
4	170407	Element - Return Filter
5	152044	Filler Cap
6	*170507	Suction Strainer

* Not Shown



Fuel Tank Components (Diesel Engine)

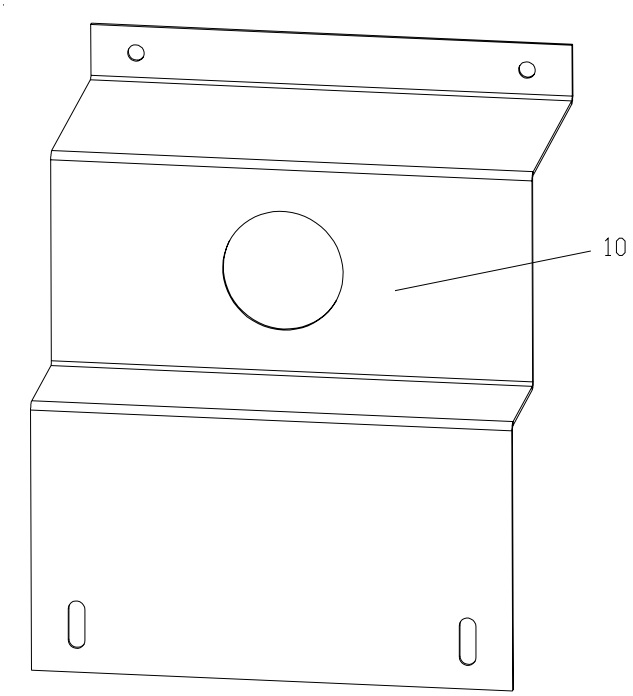
Item	Part #	Description
1	152124	Fuel Tank Cap
	153403	Locking Gas Cap
2	404431	Fuel Tank 110
2	404340	Fuel Tank 230 and 410
3	120434	3/8" Brass Fitting
4	120452	90 Deg. Brass Fitting (2)
	152163	Hose Clamp
5	152804	Fuel Level Sight Indicator (20" Required)
6	120666	1/4" Brass Fitting

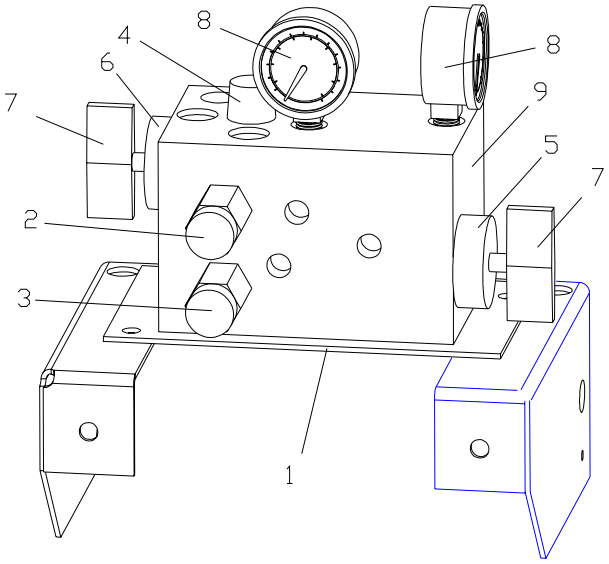


Hydraulic Manifold Parts List

Item	Part #	Description
1	420195	Mount Plate
2	170483	Relief Valve - 1100 PSI
3	170484	Relief Valve - 1500 PSI
4	170393	Compensator Spool
5	170521	Rotary Valve - Pump Drive
6	170520	Rotary Valve - Agitation
7	170522	Handle Knob with Detent Kit
7	170665	Knob Only
8	171133	Gauge 0-1500
9	171068	Hyd. Manifold
10	420346	Manifold Cover
*11	170490	Seal kit for Comp spool and Rotary valve - agitation
*12	170492	Seal kit for Relief valves
*13	170604	Seal kit for Rotary valve - pump drive
*14	170523	Seal kit for the entire assembly
*15	153529	Rubber Flap
*16	171121	Solenoid for Trigger Flow Control

* Not Shown

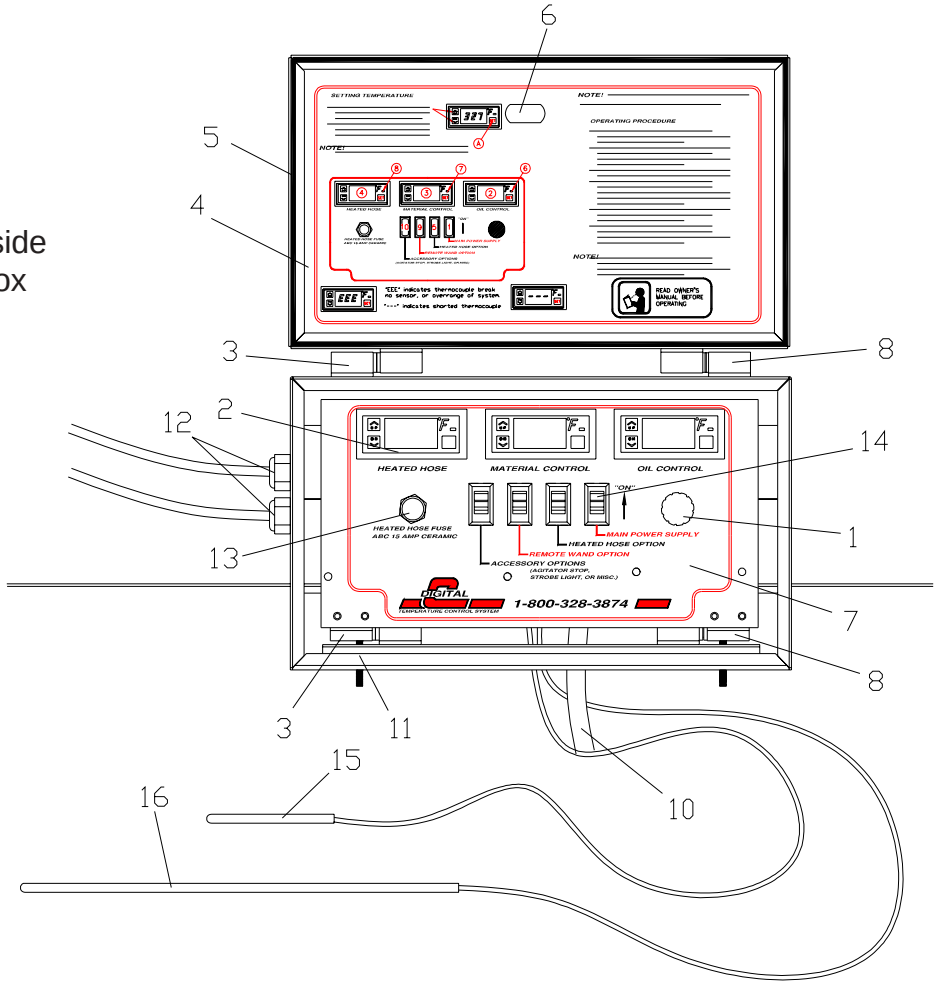




Item	P/N	Description
1	153470	Knob
2	130212	Controller
3	152813	Hinge, Left Side
4	420279	Control Box Cover
5	152840	Gasket
6	152814	Control Box Latch/Lock
7	160922	Control Box Decals
8	152817	Hinge, Right Side
*9	153537	Fuse ATC 10 Amp
10	153447	Cord

Item	P/N	Description
11	152053	Rubber Shock Mount
12	152754	Strain Relief - Large
13	152119	Fuse Holder
	153644	Fuse Ceramic ABC 15
14	130221	Lighted Rocker Switch
15	153621	Material Thermocouple
16	130097	Oil Thermocouple
17	404377s	Temp Control Assy (Includes Items 1,2,11,13,14 Mounted On Panel)

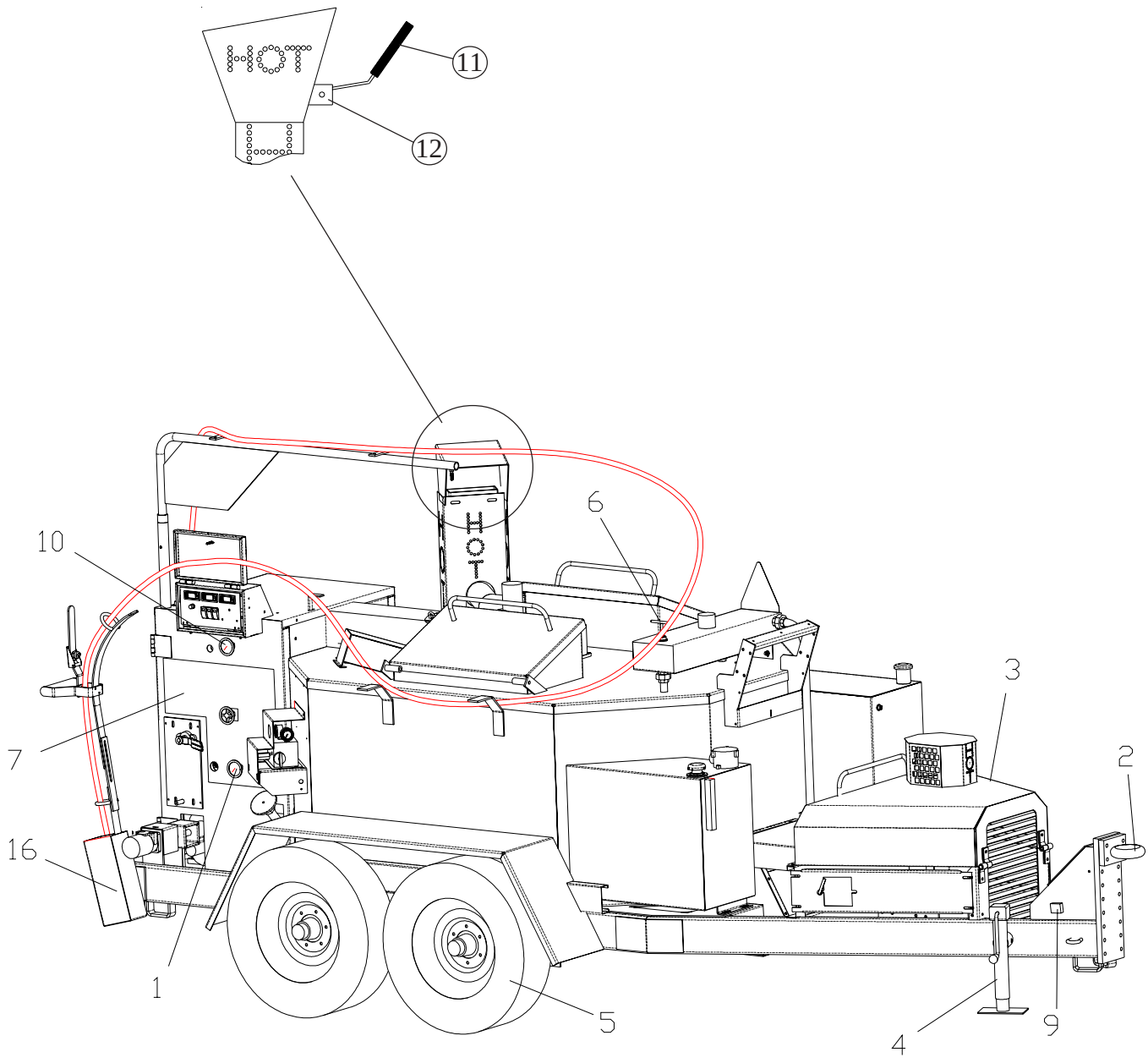
*Located Inside of Control Box



Miscellaneous Parts

Item	Part #	Description
1	130241	Thermometer 4"
2	140333	Pintle Hitch, 2 1/2"
2	403135	Pintle Hitch, 3"
2	403271	Ball Hitch, 2" (110 only)
2	402954	Ball Hitch, 2 5/16"
3	150212	Battery, 12 V-M
4	140330	Jack - 5000 lb.
5	140381	Radial Tire R15 (110 and 410)
5	140282	Tire / Wheel Assy. (230 only)
	140468	Stud (230 only)
6	402890	Dipstick
7	160913	Tank Outlet Label
*8	403404	Plumbing Cover
9	130050	Breakaway Switch
	153638	Cable For Breakaway Switch
10	130020	Thermometer 2"
11	403450	Damper (Propane Units Only)
12	417354	Damper Mount
*13	153491	Wire Harness, Trailer
*14	403910	Heat Transfer Oil - 5 Gallon Pail
*15	152842	Heat Transfer Oil - 30 Gallon Drum
16	403907	Wand Holder

* Not Shown


HOT
11
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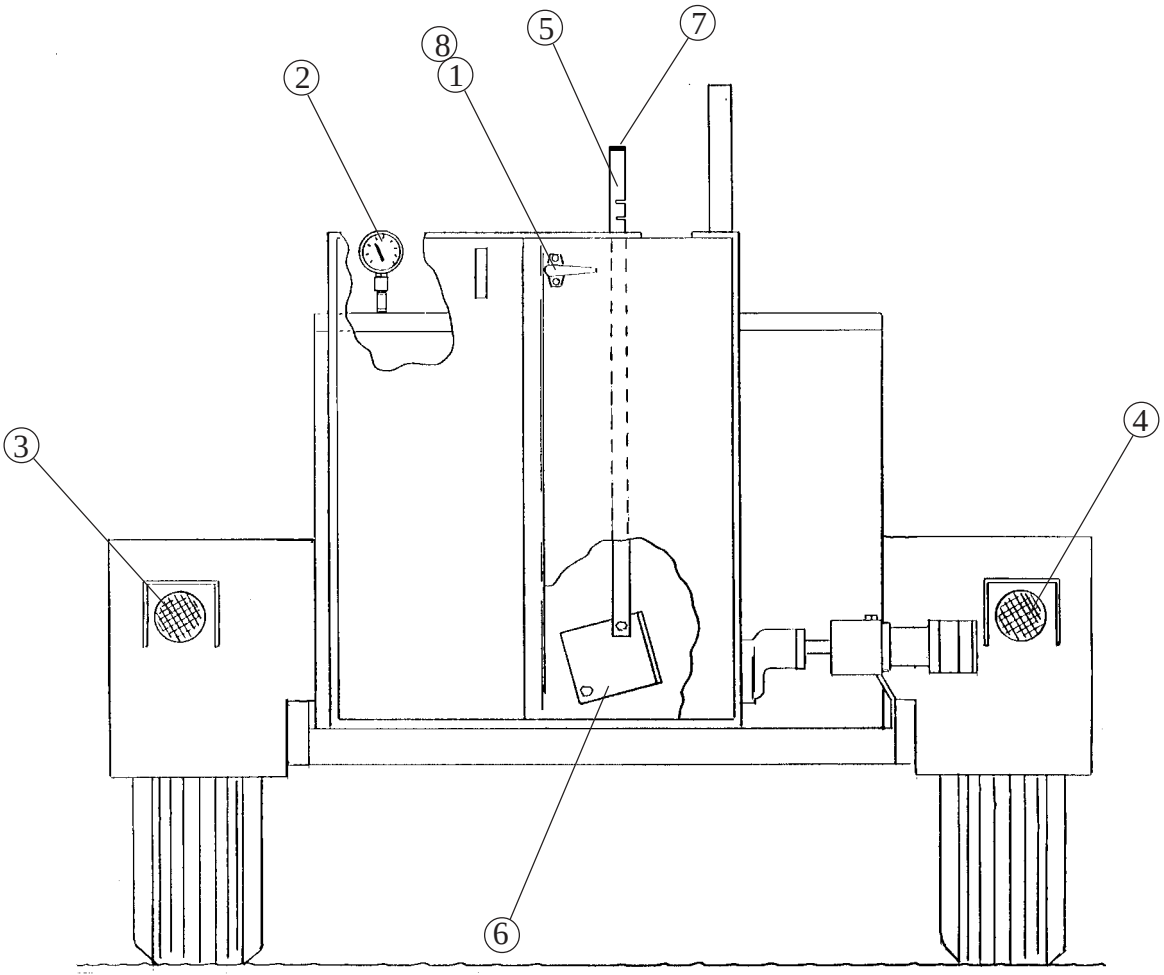
Miscellaneous Parts

Item	Part #	Description
1	152045	Handle, # 277
2	130130	Thermometer, 24"
3	150656	Stop and Tail Light
4	150445	Tail Light
5	420109	Gate Lever
6	416714	Gate
7	152038	Handle Grip
8	152046	Latch (inside door)
9	160931	Instruction Video



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