Safety

Pre-Operation Requirements

Operation

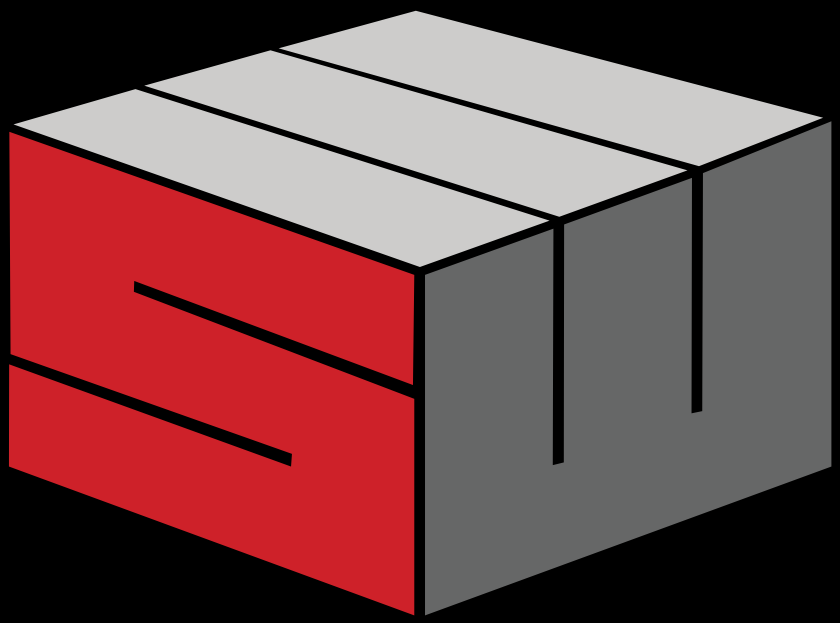
Technical Information

Troubleshooting

Tests

Maintenance

# DewPoint 6110
## Owner's Manual



STAHELIWEST

2010 DewPoint 6110
2011 DewPoint 6110
2012 DewPoint 6110
2013 DewPoint 6110
2014 DewPoint 6110

R9.1: 1.6.23

Safety

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# Quick Navigation Buttons

STAHELI WEST

RAISING INDIVIDUAL, FAMILY, AND COMMUNITY STANDARDS WHILE REVOLUTIONIZING THE AGRICULTURAL INDUSTRY.

FOR THE MOST UP-TO-DATE SERVICE INFORMATION DOWNLOAD THE STAHELI WEST APP:

iOS

**Download the App**

When you see a QR code in this handbook, scan the code with your smart phone or tablet to see the associated video or content.

CONTACT YOUR DEALER FOR SERVICE ASSISTANCE

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## Maintenance

# DewPoint Machine Operator Training

**Scan to watch the "Operator Training" video in order to learn the following topics:**

| | | |
|---|---|---|
| Preparation | Open the "Owner's Manual". | ✓ |
| | Read the "Owner's Manual" before operating the DewPoint machine. | |
| | Train on where resources are found (Customer Portal, Support Tab, Owner's Manual). | |
| | Train on local boiler requirements. | |
| Safety | Show where emergency shut-offs are located. | |
| | Never remove any boiler component while under pressure. | |
| | Always make sure hydraulic brakes are hooked up and functioning properly. | |
| | Always lock the steering axles on the steamer and baler when traveling on roadways, operating on hillsides, or backing up. | |
| Operation | Use only soft water or reverse-osmosis-treated water in the DewPoint machine. | |
| | Fill the supply tanks and add Boiler Guard (water treatment chemical). | |
| | Set up your tractor steering stops. | |
| | Set up your moisture sensor. | |
| | Teach the differences between microwave and contact moisture sensors with steam. | |
| | Teach the basics of the touch screen. | |
| | Turn on the steamer. | |
| | Shut off the steamer . | |
| | The importance of the PPM setting and how to set it based on your water test. | |
| | Different start options (basic overview). | |
| | Start All. | |
| | Start Fill. | |
| | Keep Hot. | |
| | Wet Layup. | |
| | Tune the burner (low and high fire). | |
| | Field work screen (overview). | |
| | Setting the steam valve proportions (4 individual sliders). | |
| | Ideal conditions (all sliders 100%). | |
| | Changing dew conditions. | |
| | Adverse conditions (hot and windy). | |
| | Turn steam off when turning around. | |
| | Blowdown (what it is and what to do about it). | |
| | Teach what to do when there is a fault. | |

| | | |
|---|---|---|
| Operation | Teach that ideal baling moisture, with steam, is 12-14%. | |
| | Steamed bales should be tightly packed with good leaf pattern. Sides of bales should be smooth but not smeared. | |
| | Never exceed 135° F (57° C) internal bale temperature. | |
| | Never stack hay if internal bale temperature exceeds 115° F (45° C). | |
| | High-temperature stacking method. | |
| | Train on what to do if dark spots or wet flakes appear. | |
| | General baling with steam guidelines. | |
| | Baling speed. | |
| | Ideal steaming conditions. | |
| | Baling in hot/dry conditions. | |
| | Baling in moderate humidity conditions. | |
| | Avoid baling with stem moisture. | |
| | Baling in high-humidity conditions with stem moisture. | |
| | You are responsible for how your bales turn out. | |
| Service & Cleaning | Train how to perform daily maintenance. | |
| | Show where to find the maintenance schedule. | |
| | Train how to confirm blowdown is working. | |
| | Train how to confirm water purge is working. | |
| | Explain crackling noise in rear supply tank. | |
| | Train how to perform the yearly boiler safety test. | |
| | Safety devices (what they do and where they are located). | |
| | Call dealer if more service is required. | |

I _____ have received instructions on how to properly operate,
(customer / operator)

test, service, and clean the boiler. I understand that operating, testing, and servicing may only be performed by a qualified individual that has received the instructions contained in this manual.

Print:_____

Signature: _____ Date: _____

Trainer Name:_____

Trainer Signature:_____ Date: _____

# Warranty Information

All DewPoint machines come with a 1-Year Limited Warranty. This voluntary manufacturer's warranty covers everything on the machine against manufacturing defects. Normal wear-and-tear items and problems caused by operator negligence or operator error are not covered.

The warranty period for the DewPoint machine starts from the date of first use.

Staheli West Parts offers a 1-year warranty on all parts from the date of purchase. Staheli West Parts does not cover labor costs of replacing a warrantied part.

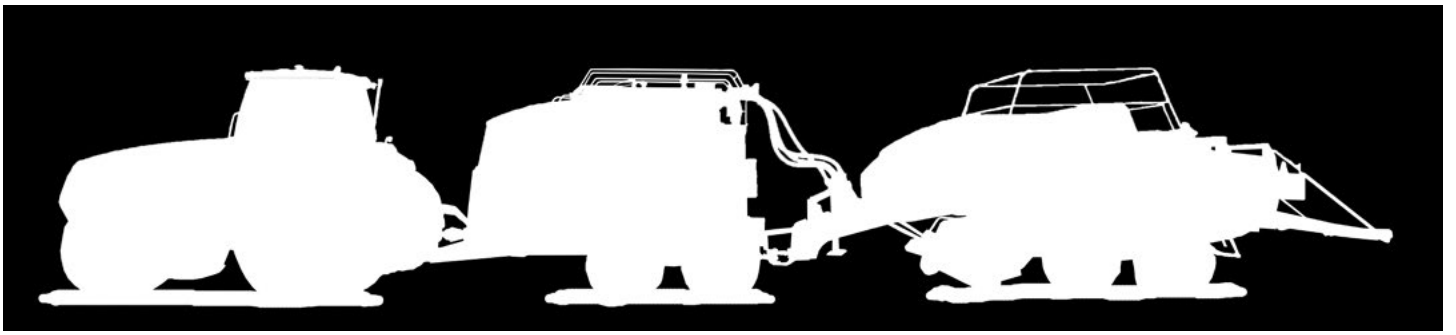
DewPoint Machine

| Warranty Period | | Coverage | |
|---|---|---|---|
| **Months** | **Hours** | **Parts** | **Labor** |
| 0-12 | Unlimited | 100% | 100% |

Warranty will not be honored if routine maintenance has not been performed.
To ensure warranty coverage, use only OEM parts.

## Safety





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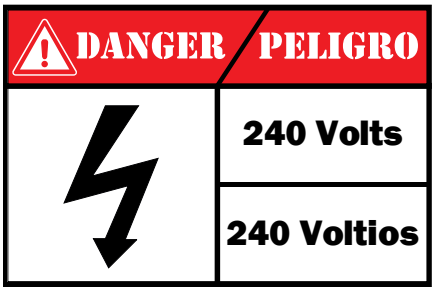
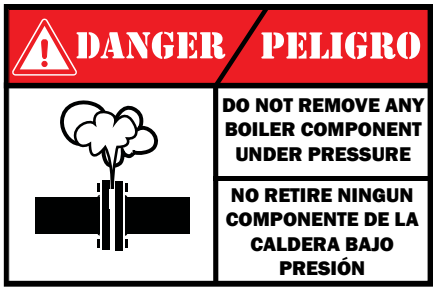
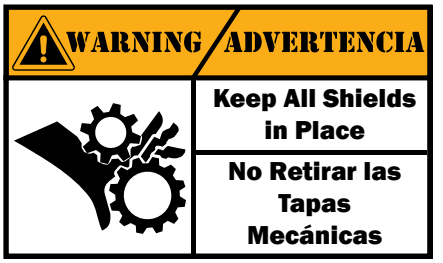
# Safety Decals

The DewPoint machine has many safety decals to help ensure operator safety. Pay attention to the decals and their warnings to avoid serious injury. They range from red DANGER (most dangerous) to the yellow CAUTION (less dangerous... but still dangerous)

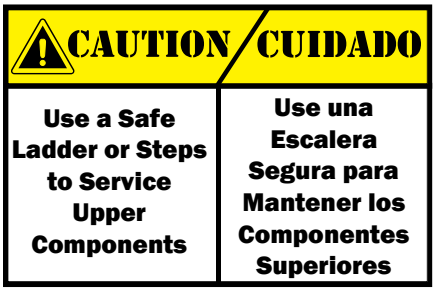


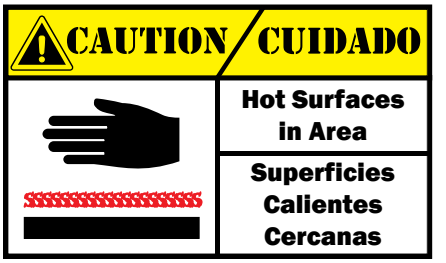



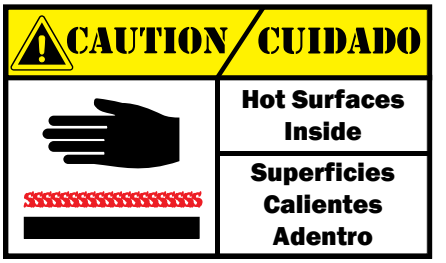


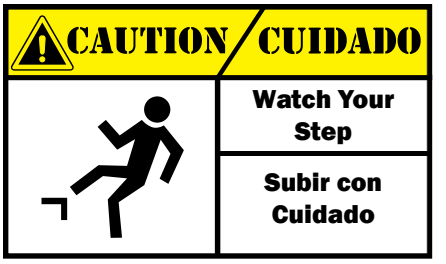


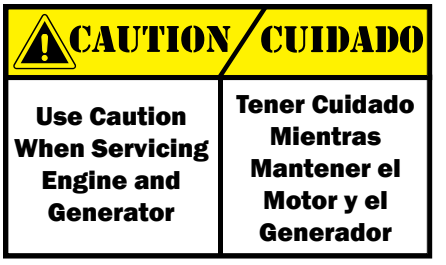


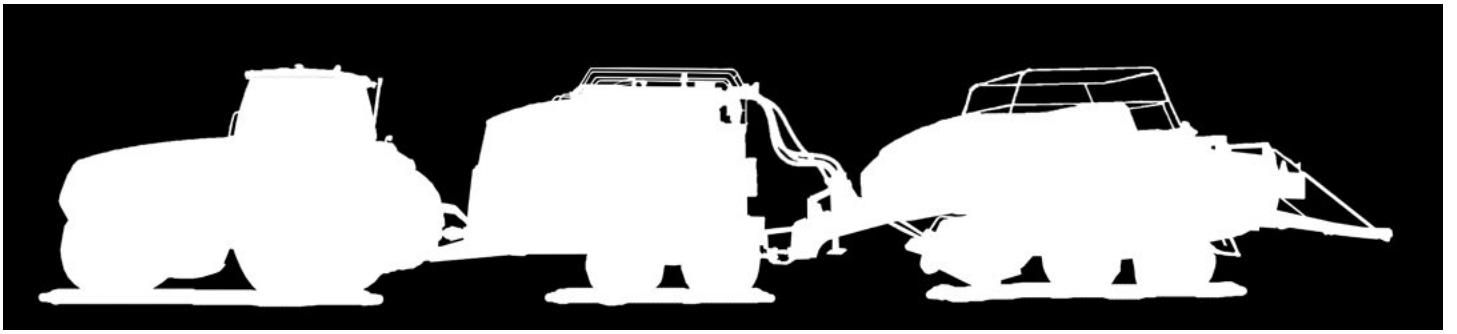


# Safety Decals

There are also many lengthy warnings and words of advice. Read all of them and know what they refer to.

**WARNING / ADVERTENCIA**

**To Prevent Serious Injury or death:**
**1. Read the Instruction Manual before operating the machine**
**2. Keep all shields in place**
**3. No Riders**
**4. Make certain everyone is clear of machine before starting engine or operation**
**5. Stop engine and operation before adjusting, lubricating, or cleaning**
**6. Use the flashing warning lights and slow moving vehicle emblem when transporting on highways.**

**Para evitar lesiones graves o la muerte:**
**1. Lea el "Instruction Manual" antes de hacer funcionar la máquina**
**2. Mantenga todos las tapas mecánicas en su lugar**
**3. No Pasajeros**
**4. Asegúrese de que todos estén lejos de la máquina antes de arrancar el motor o la operación**
**5. Apague el motor y la operación antes de ajustar, lubricar, o limpiar la máquina**
**6. Use las luces intermitentes de advertencia y de vehículo lento durante el transporte en las carreteras**

**WARNING / ADVERTENCIA**

**Personal injury or property damage may result from loss of control**
**• Maximum recommended towing speed is 25 mph**
**• Use Flashing amber warning lights and SMV emblem when on pumblic roads, except where prohibited by law**
**• Refer to tractor and implement Operator's Manuals for weights and further information.**

**Lesiones personales o daños materiales debido a la pérdida de control**
**• La velocidad máxima de remolque recomendada es de 40 kmh**
**• Use las luces intermitentes de advertencia y de vehículo lento durante el transporte en las carreteras, excepto donde esté prohibido por la ley**
**• Consulte el Manual del operador del tractor para los pesos y más información**

**WARNING / ADVERTENCIA**

**Personal injury or property damage may result from loss of control**
**• Always use a large enough tractor with sufficient braking capacity, and a fully functional hydraulic brake valve**
**• Trailer brake hose must be connected to tractor brake valve**

**Lesiones personales o daños materiales debido a la pérdida de control**
**• Siempre use un tractor lo suficientemente grande con capacidad de frenado suficiente , y una válvula de freno hidráulico completamente funcional**
**• Hay que connectar la manguera del freno de remolque a la válvula de freno de tractor**

**WARNING / ADVERTENCIA**

**This product may contain one or more substances or chemicals known to the state of California to cause cancer, birth defects, or other reproductive harm**
**www.P65Warnings.ca.gov**

**Este producto puede contener una o más sustancias o productos químicos conocidos por el estado de California como causantes de cáncer, defectos de nacimiento u otros daños reproductivos**
**www.P65Warnings.ca.gov**

**IMPORTANT / IMPORTANTE**

**To avoid excessive driveline wear, please refer to your baler Operator's Manuals regarding proper hitch and PTO shaft operating angle adjustments.**
***See PTO section of the Instruction Manual for further detail.**

**Para evitar el desgaste excesivo de toma de fuerza, consulte los manuales del operador de su empacadora en relación con el enganche adecuado y ajustes del ángulo de funcionamiento de la toma de fuerza .**
*** Véase la sección de toma de fuerza en el "Instruction Manual" para más detalles**

**IMPORTANT / IMPORTANTE**

**When connecting PTO drivelines between this machine and the baler, be sure the front connecting yoke of the driveline on each machine holds the same rotation angle.**
***See PTO section of the Instruction Manual for further detail.**

**Al conectar la toma de fuerza entre esta máquina y la empacadora , asegúrese de que la conexión frontal yugo de la línea de conducción en cada máquina tiene el mismo ángulo de rotación.**
*** Véase la sección de toma de fuerza en el "Instruction Manual" para más detalles.**

**IMPORTANT / IMPORTANTE**

**To avoid excessive driveline wear, adjust hitch height so that the machine runs level.**

***See PTO section of the Instruction Manual for further detail.**

**Para evitar el desgaste excesivo de toma de fuerza, adjuste la altura del enganche de modo que la máquina funciona nivel.**

*** Véase la sección de toma de fuerza en el "Instruction Manual" para más detalles**

# Tractor Requirements

In order to pull the DewPoint machine ≈ 30,000 lbs (when fully loaded) and a big baler ≈ 20,000 lbs, you will need a tractor with the following horsepower.

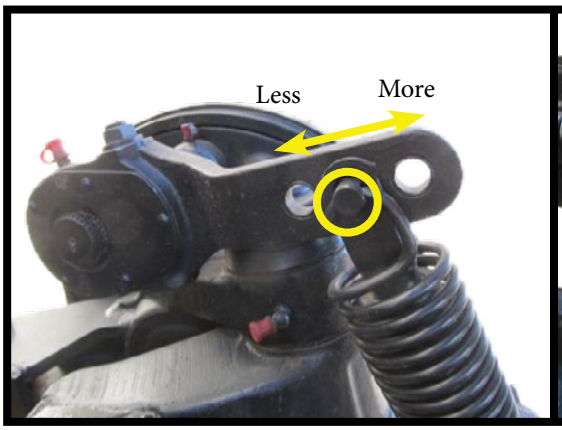
| | Minimum Engine Horsepower | Recommended Engine Horsepower |
|---|---|---|
| **0-2% Slopes** | 200 | 225 |
| **0-5% Slopes** | 240 | 265 |
| **0-10% Slopes** | 275 | 300 |

In order to safely stop the DewPoint machine and a big baler you will need a tractor equipped with a hydraulic trailer brake valve.

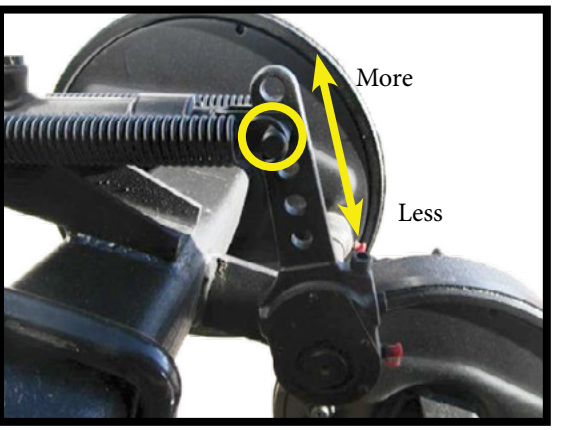
Hydraulic Trailer Brake Valve Required

Adjust the amount the hydraulic trailer brakes engage by moving these pins to meet your needs.

Rear




Front




DO NOT OPERATE THE DEWPOINT MACHINE WITH A TRACTOR THAT LACKS THE NECESSARY HORSEPOWER OR HYDRAULIC BRAKING SYSTEM. SERIOUS DEATH OR INJURY MAY OCCUR.

## Operating on Hillsides

- Operating on side slopes can cause water to get into your steam.
- The DewPoint is a heavy machine, and significant side slopes could cause the machine to slide or tip.
- Ensure that brakes are functioning properly before taking the DewPoint up or down steep slopes.

## Safety Lighting

The DewPoint has all proper safety, hazard, and signal lighting installed. Check that all lights are functioning properly before each use.

## Electricity Overhead

Ensure that the DewPoint will not interfere with overhead power lines. Hitting power lines with the DewPoint can cause serious damage to you, your equipment, and/or others.

## Personal Protective Equipment

When operating or servicing the DewPoint, ensure that you use all proper Personal Protective Equipment (PPE). PPE includes, but is not limited to, proper footwear, gloves, eye protection, and ear protection.

## Persons on DewPoint

- NEVER operate the DewPoint while others are on or under the machine.
- Ensure that stepping and standing only happens in designated safe areas.
- DO NOT step or climb areas specifically marked prohibited. Doing so can cause serious injury or death.
- Use caution when standing on the deck of the machine - especially if deck is wet.
- DO NOT operate with children near the machine. Ensure that all children are kept at a safe distance.

## Shields, Guards, and Door

- All shields and guards are in place for a reason. Never operate the machine with shields or guards displaced or removed.
- Never attempt to operate the machine with the boiler door removed.

## Exhaust and Fumes

Never operate the DewPoint in confined spaces. The generator and burner generate toxic gases. Operation and maintenance should only happen in well-ventilated areas.

## Handrails

Some service and maintenance procedures on the DewPoint require climbing around the top of the machine. Step ladders and handrails have been specifically put in place and designed with your safety in mind. Use caution and common sense when climbing on top of the DewPoint machine.

## Chemicals

Use chemicals according to instructions attached to their containers. Using them improperly can be very dangerous. If no longer needed, ensure that excess chemicals are disposed of properly.

## Traveling on Public Roads

When traveling on public roads, obey all local traffic laws. Before traveling on any public road (or any road when you will be traveling at higher rates of speed) make sure that steering is locked and trailer brakes are working properly.

# Safety Warnings

## Safety Chains

Ensure that safety chains are connected and free from defect before operating the DewPoint.

## Faulty/Broken/Worn Out Components

- Replace all filters according to maintenance schedule.
- Repair/Replace any faulty components as soon as they fail to function properly. Using defective components (especially sensors) can be a hazard to you and those around you.
- Periodically check bolts to ensure that they are properly tightened.
- Do not operate the DewPoint if any components are leaking or will not hold pressure.

## Fire Safety

- Check the fire extinguisher according to the maintenance schedule attached to the extinguisher.
- If fire does occur, use the fire extinguisher as directed.
- Always stand upwind of flames.

## Burner Safety System

- NEVER bypass burner safeties.
- Keep hands away from the louver. Hands and/or fingers can be pinched and lacerated by the fan.
- Keep debris away from the louver to avoid pulling debris into the burner.

## Opening Valves/Drains Under Pressure

- Use extreme caution when opening/flushing any valve that is under pressure. Hot steam and/or water can cause harm to you and others.
- Do not operate the blowdown valve or baler steam valves without all hardware properly installed.
- Stand clear when draining hot water from the boiler.

## Electrical/Battery Safety

Use caution when working:

1) near the ignition transformer.
2) in the electrical panel.
3) around any loose electrical wires.
4) near pump & generator plugs.
5) near the battery.

## Sight Glass

Remember that the sight glass is actually GLASS, not plastic or rubber. It can break and can cut you.

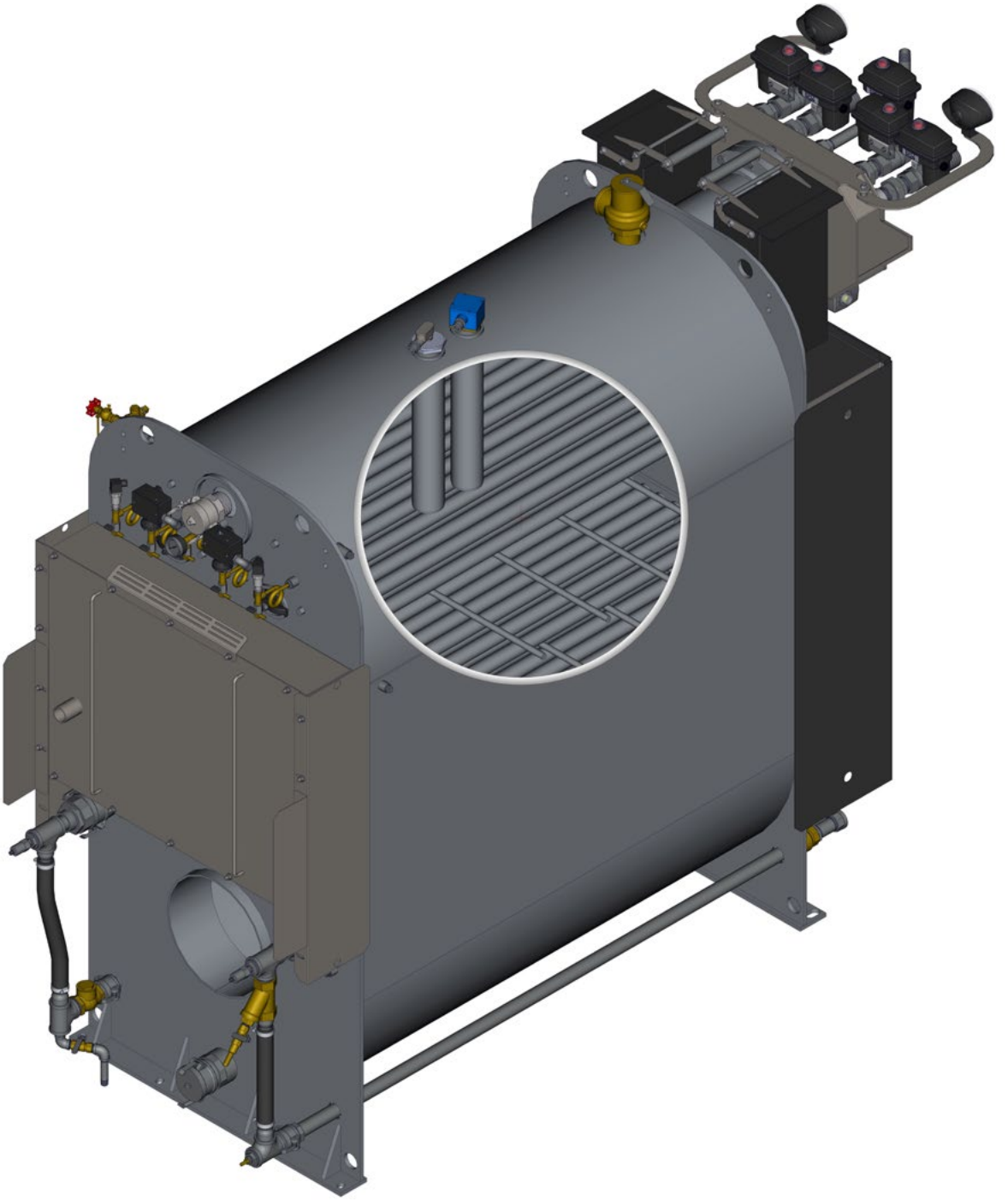
## Propane

- Close valve on propane tanks when the DewPoint is not in use.
- If propane smell is detected, shut down and find the leak.
- Check hoses to ensure they are not cracked and/or leaking.
- Check propane tanks for damage. Replace if damaged.
- Keep the dust covers over the filling valves when the machine is in use.

# Boiler Jurisdiction

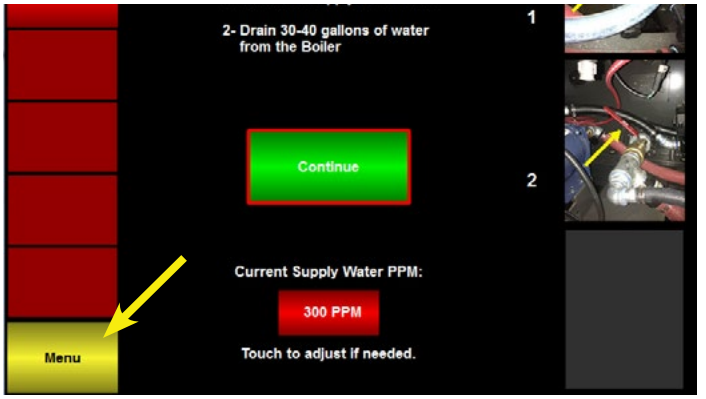
**It is your responsibility to make sure your boiler is up to code and meets the legal requirements in your area.**

For boiler jurisdiction information in your area, navigate to:
https://www.nationalboard.org/PrintAllSynopsis.aspx?Jurisdiction=Select



# Boiler Safety Test

1

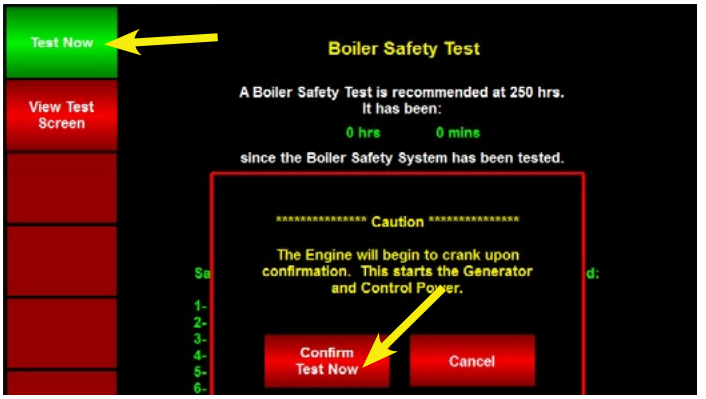



Press Menu.
*The DewPoint machine needs to be full of fuel and water before the boiler safety test can occur.

2

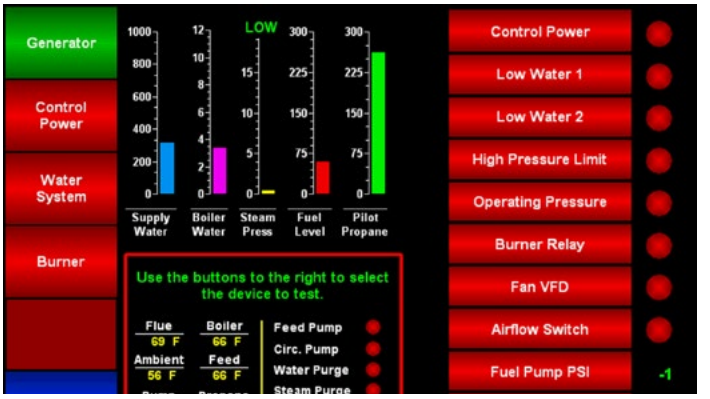

Press Maintenance.
Press Boiler Safety Test.

3



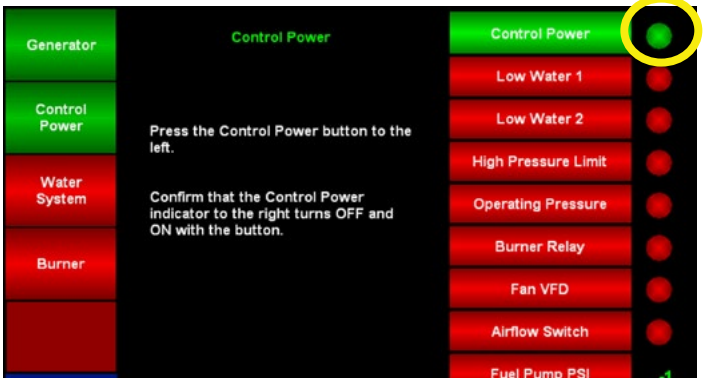

Press Test Now.
Press Confirm Test Now.
*Generator will start after this step.

4



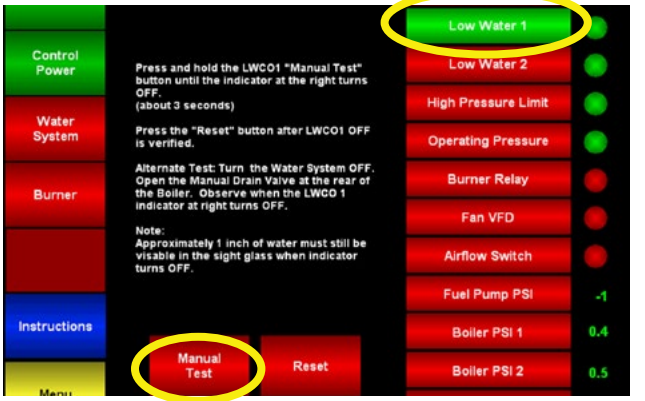

Press Control Power button on the right.

5




Following the instructions on the screen, press Control Power on the left of the screen off (RED) and on (GREEN). When the indicator on the right turns green it means that the system is functioning properly.

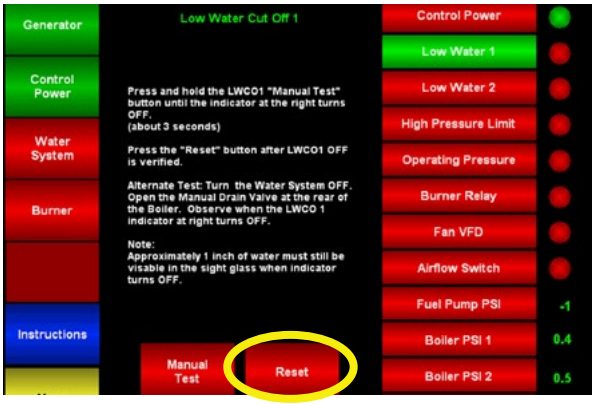
6




Press Low Water 1.
Press and hold Manual Test.

# Boiler Safety Test

7

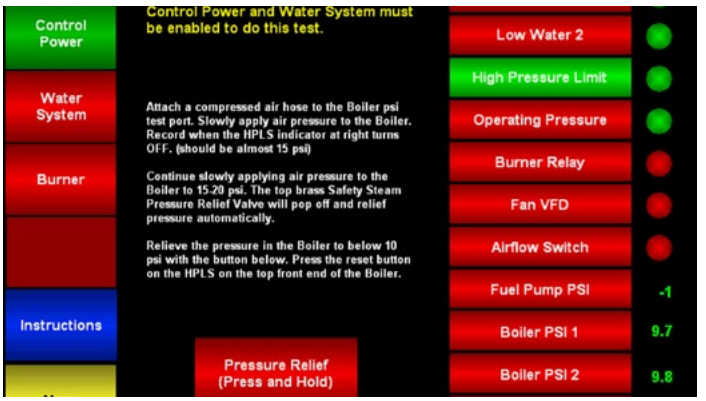



Press Reset.

8


The indicator turning green indicates proper function of Low Water 1.
Repeat these steps for Low Water 2.

9

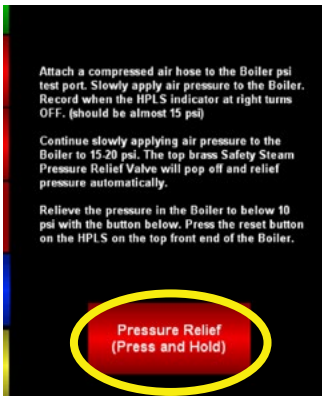



Press High Pressure Limit.

10

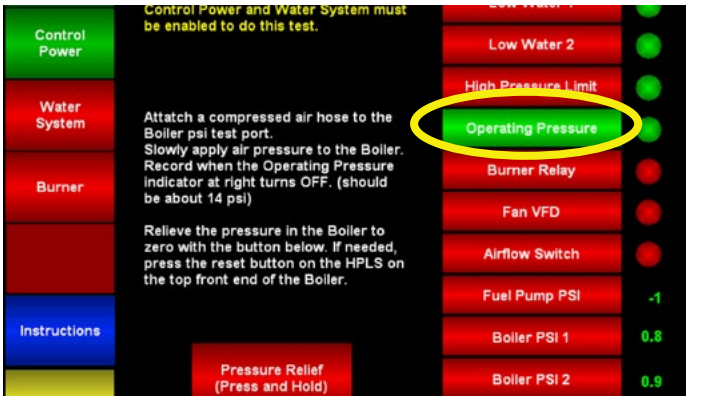
Attach air compressor fitting to the pressure test hose. Begin filling with air slowly until the High Pressure Limit Switch trips (Trips around 15 psi).

11




Press and hold the Pressure Relief button to relieve pressure (Opens steam purge valve).
Reset the HPLS by pressing down on the Reset button.

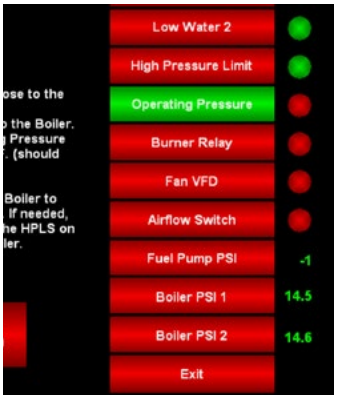
12

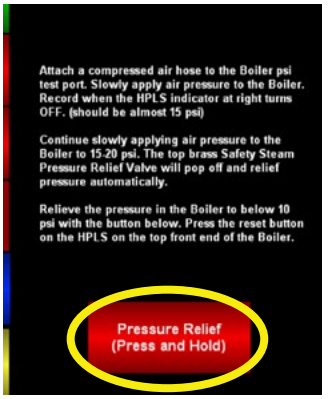



Press the Operating Pressure button. Fill the boiler again with compressed air until the Operating Pressure Limit Switch trips (Trips around 14.5 psi).

# Boiler Safety Test

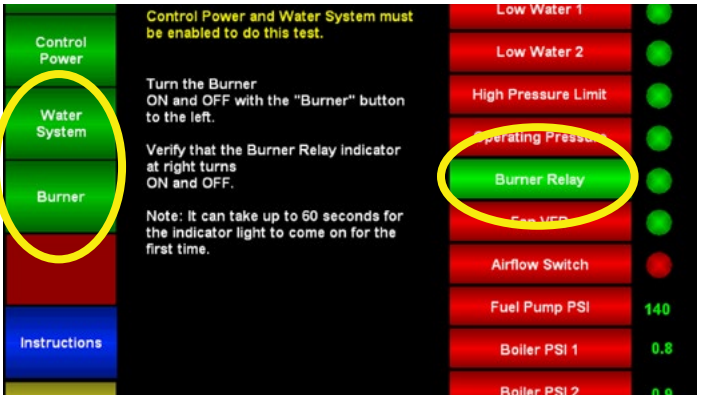
## 13



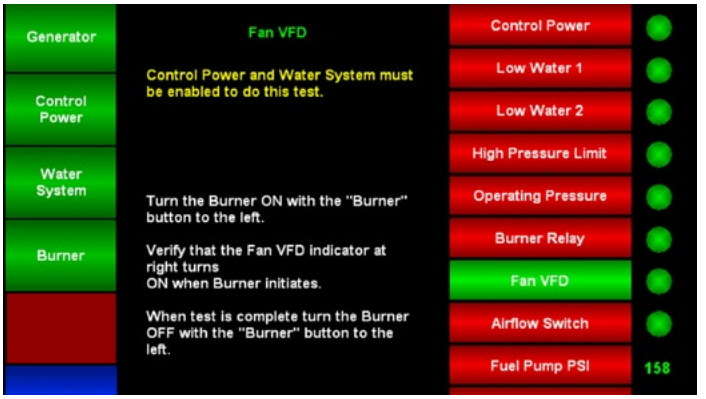

After the OPLS trips, relieve pressure by holding the Pressure Relief button until the OPLS resets.

## 14



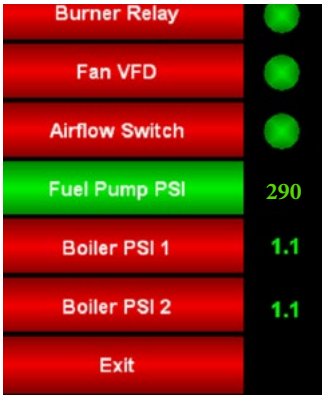

Press Burner Relay then start the Water System and Burner.

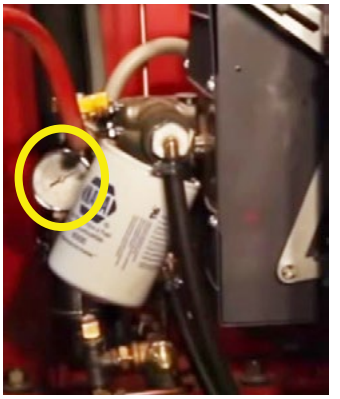
## 15




If the indicators turn green for Burner Relay, Fan VFD, and Airflow Switch, and turn red when the burner is turned off, they are functioning properly.

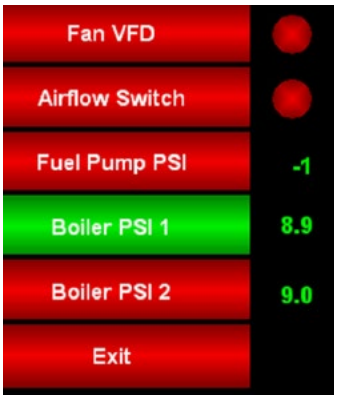
## 16

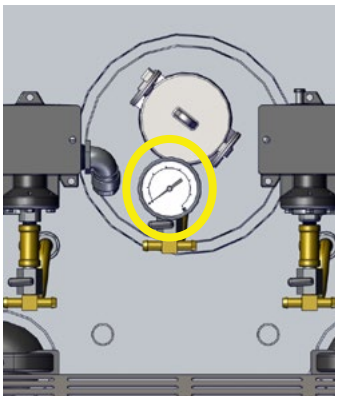


Ensure that the fuel pump pressure on the screen matches the manual gauge.

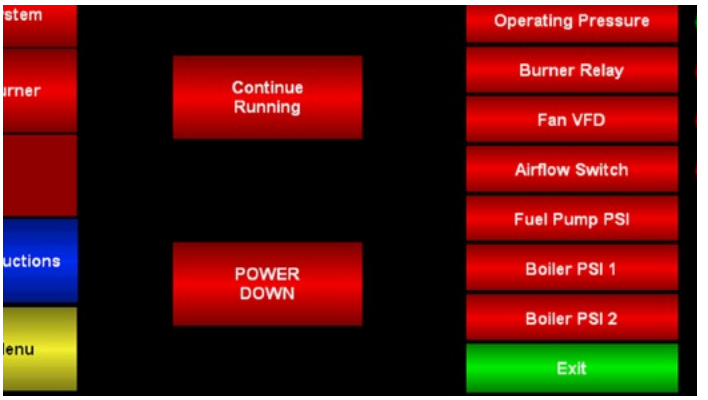
## 17



Ensure that boiler psi 1 & 2 match the manual gauge.

## 18




You have successfully completed the Boiler Safety Test. You can now Power Down or Continue Running.

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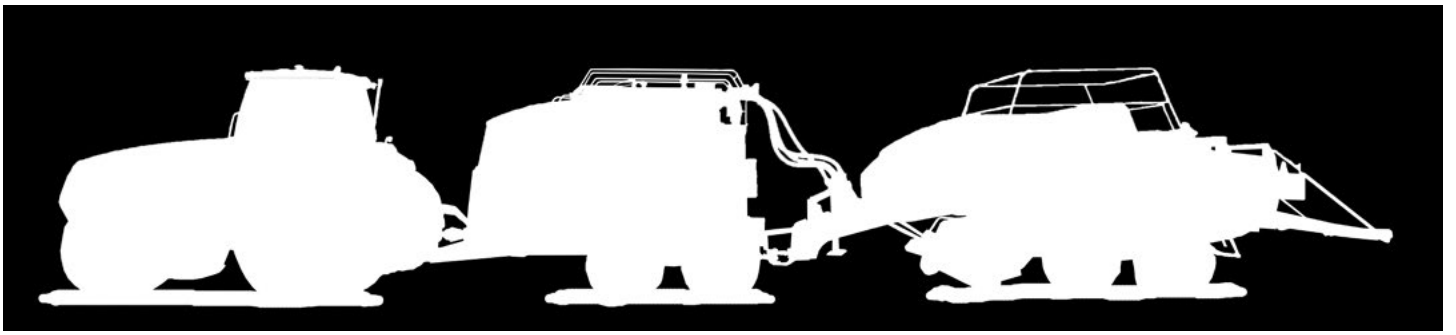
## Pre-Operation Requirements





**Water Quality is one of the most important considerations to achieve successful implementation of DewPoint technology in your operation.**

The following information will assist you in setting up the necessary water treatment equipment and boiler chemical treatment to maintain efficient operation of the DewPoint machine.

**Water Source Selection and Water Sampling**

- An appropriate water analysis is required.
  - □ SELECT the best water sources possible in your area and, where possible, avoid poor water sources that cause iron stains, heavy scale deposits, or strong odors.
    - Most sources of water will require a water softening system to be installed. This will require:
      - A continuous pressurized supply of water available – 40 psi minimum.
      - A 120 V electrical outlet to operate the softener control system.
      - An enclosed, insulated area which is protected from freezing.
      - An area or drain where bypass water consumed in the softener re-charge process can be discharged.
    - Some areas with lower water quality may require a Reverse Osmosis (RO) System to remove impurities from the water. This type of system will require:
      - A continuous pressurized supply of water available – 40 psi minimum.
      - 240 V electrical service to operate the RO control and pumping system.
      - An enclosed, insulated area which is protected from freezing.
      - An area or drain where bypass water consumed in the RO Flush process can be discharged.
  - □ COLLECT the water sample(s) from your selected location(s) in sample bottles supplied by your Staheli West Dealer and SHIP the sample(s) to the test lab on the label.

**Water Analysis and Treatment Equipment Specification**

- The test lab will analyze your water sample(s) and send a report to Staheli West.
- Staheli West will send their recommended water treatment method to your dealer. Your dealer will help you select the appropriate water softener, RO unit, or other necessary equipment available through Staheli West Parts.

**Water System Equipment Setup**

- Bulk Water Storage Tank.
  - □ The water tank should be capable of a 2500-3000 gallon capacity for EACH DewPoint machine that you plan to service.
  - □ Select a black plastic (or other light restricting) tank(s) which will eliminate light infiltration to prevent algae growth. Black plastic will also help absorb heat from the sun into the stored water.
  - □ Add necessary fittings and valves to Bulk Water Storage Tank.
    - Install valve and hose fittings to the bottom outlet fitting on the tank necessary to feed your water transfer pump.
    - Install a float valve near the top of the tank with the necessary fittings to attach the discharge hose from your softener or RO unit.
- Water Transfer Pump.
  - □ A 2-inch engine driven transfer pump is normally used to transfer water from the bulk water storage tank into the DewPoint machine or a water transport vehicle.
  - □ Install 2-inch camlock fittings to inlet and discharge ports of the pump.
  - □ Attach chemical inductor tee to the inlet port of the pump. This is used to induct boiler water treatment chemical into the water as it is pumped from the bulk water storage tank into the DewPoint machine or a water transport vehicle.
  - □ Connect 2-inch suction hose between the bulk water storage tank and the pump inlet/chemical inductor TEE.
  - □ Connect 2-inch discharge hose to pump discharge fitting.
- Water Softener or RO Unit.
  - □ Set up in an enclosed, insulated area which is protected from freezing.
  - □ Connect to water supply.
  - □ Connect bypass/flush hose to drain or other suitable drainage system.
  - □ Connect treated water discharge hose to float valve inlet fitting on the bulk water storage tank.
  - □ Connect to electrical service (See requirements in water softener/RO Manual).
    - A softener requires a 120 V electrical outlet to operate the control system.
    - An RO unit requires a 240 V electrical service to operate the control and pumping system.
  - □ Follow all instructions in softener or RO unit owner/operator manual to start and calibrate the system.
- Fill Bulk Water Storage Tank(s).
  - □ Turn water supply ON to the softener or RO unit.
    - LEAVE THIS WATER SUPPLY ON ALWAYS to supply the water pressure necessary to flush/regenerate the softener or RO unit.
  - □ Be sure that the treated water from your softener or RO unit is flowing through the treated water discharge hose to the float valve mounted in the bulk water storage tank.
  - □ Test the operation of the float valve to be sure it will stop the water flow when the bulk water storage tank is full.
- You should leave your water system active during the season to keep the bulk water storage tank(s) full and ready for harvest operations.

**Water Transportation**

- Consider your water logistics well ahead of the harvest season.
  - □ DECIDE whether you will need to employ a water truck or trailer to transport water to the fields where the DewPoint machine(s) is(are) working.
    - Remember that a DewPoint machine will operate for 3-6 hours on one load (1000 gallons) of water.
    - Consider the distance to the field from the water source.
    - Remember that you can typically bale about 60 tons/hour with a large rectangular baler and that road transport time to fill with water will affect your overall baler productivity.
- Use a tank made of either a black plastic, steel or other light-blocking material which will eliminate light infiltration and prevent algae growth.
- Set Up Water Transfer Pump.
  - □ A 2-inch engine driven transfer pump is normally used to transfer water from the water transport vehicle into the DewPoint machine.
- Tailor your water/service transport vehicle to your own needs.

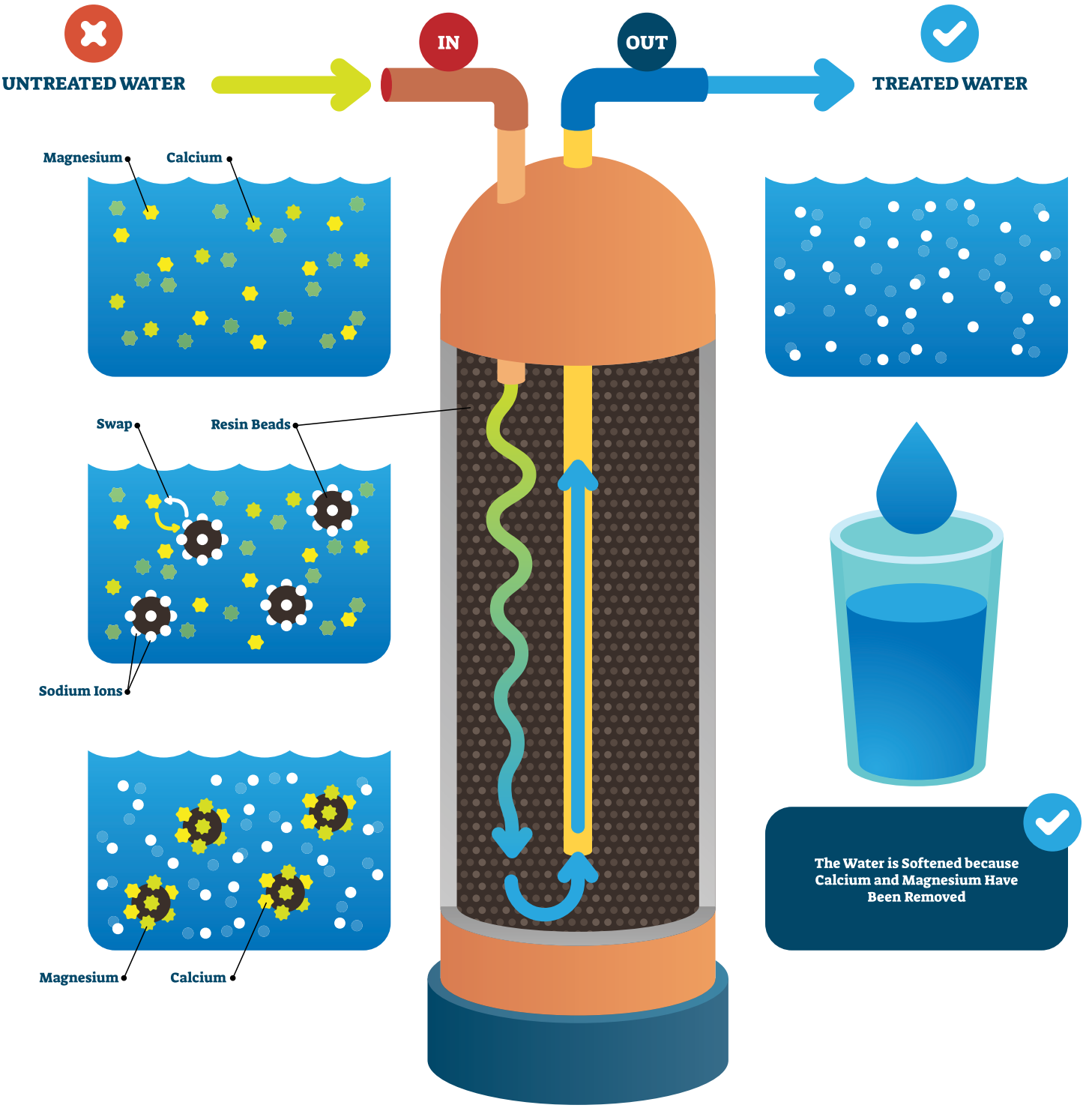
**Water Softener Unit**

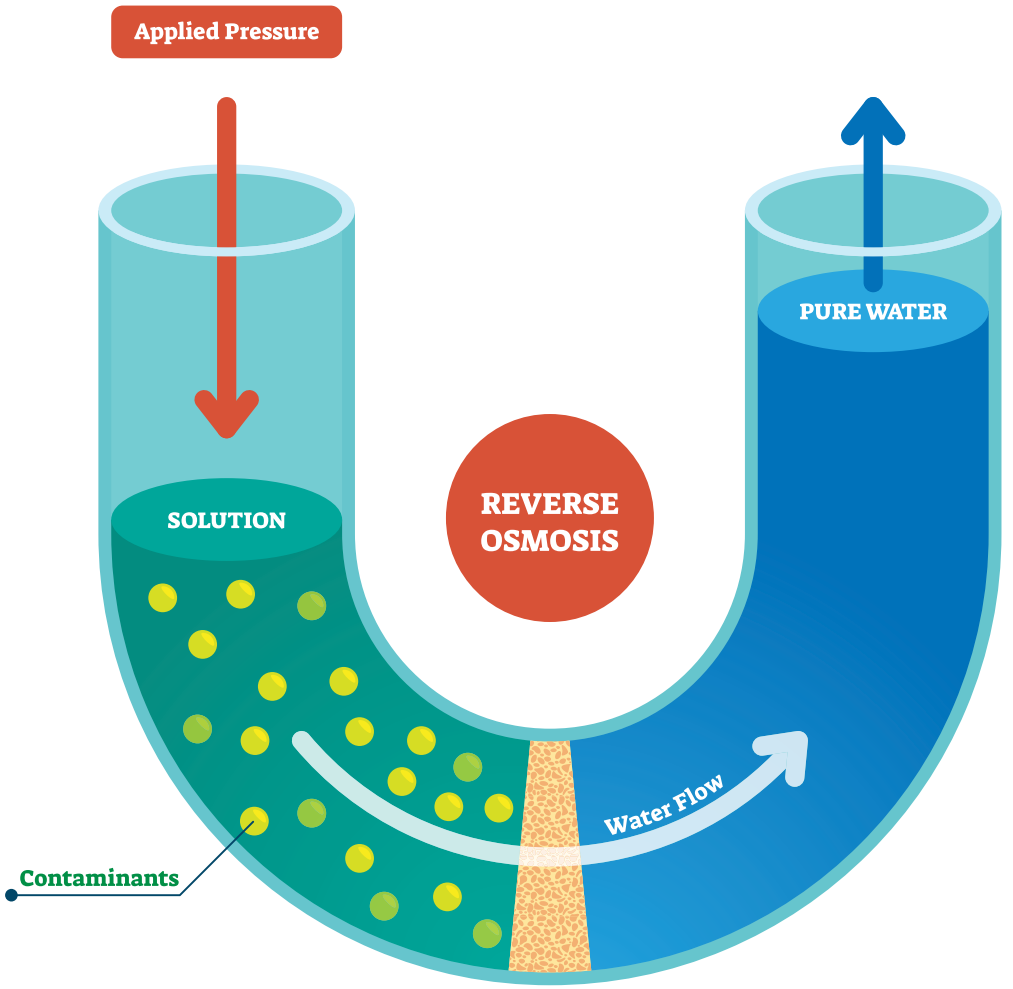
**Reverse Osmosis (RO) Unit**

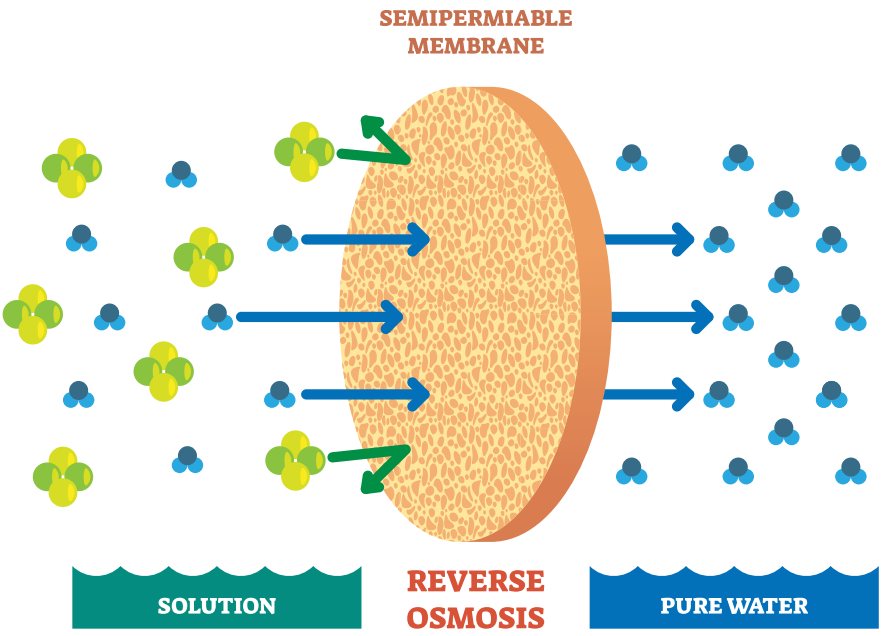
**Bulk Water Storage Tank**

**Water Transfer Pump**

# Water Softener





# Water Setup

Water Softener Unit

or

Reverse Osmosis (RO) Unit

Water Treatment Chemical 55 Gallon

1 Gallon Container

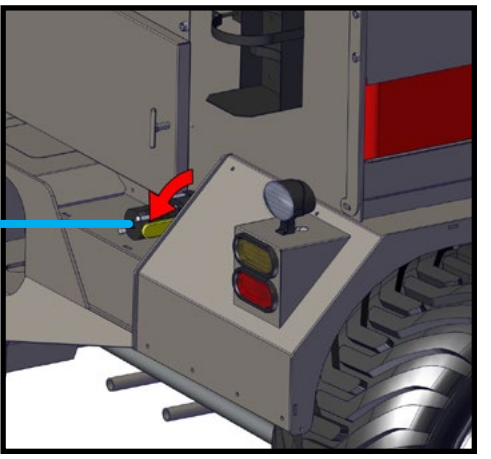
Bulk Water Storage Tank

Light restricting to prevent algae growth

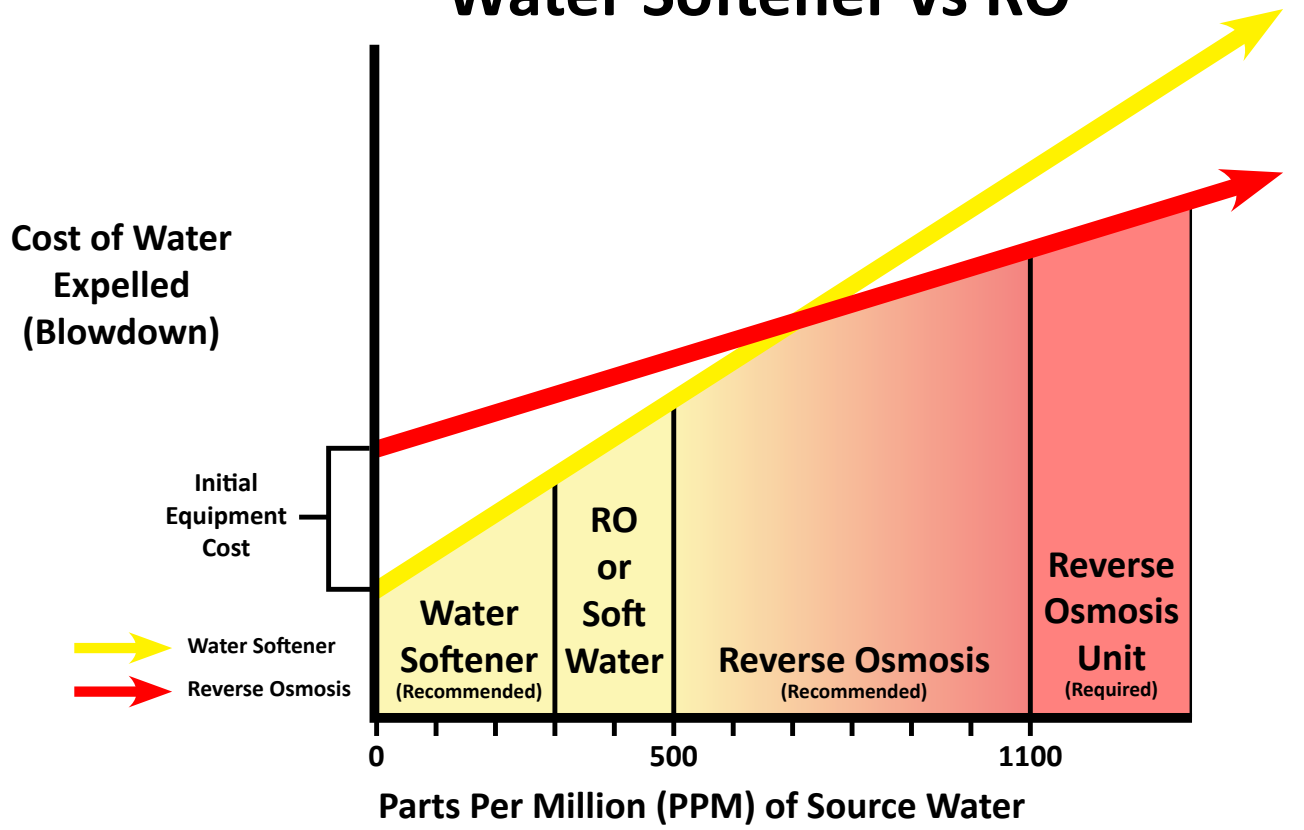
1 Gallon Chemical

Ratio 1:1000 Chemical:Water

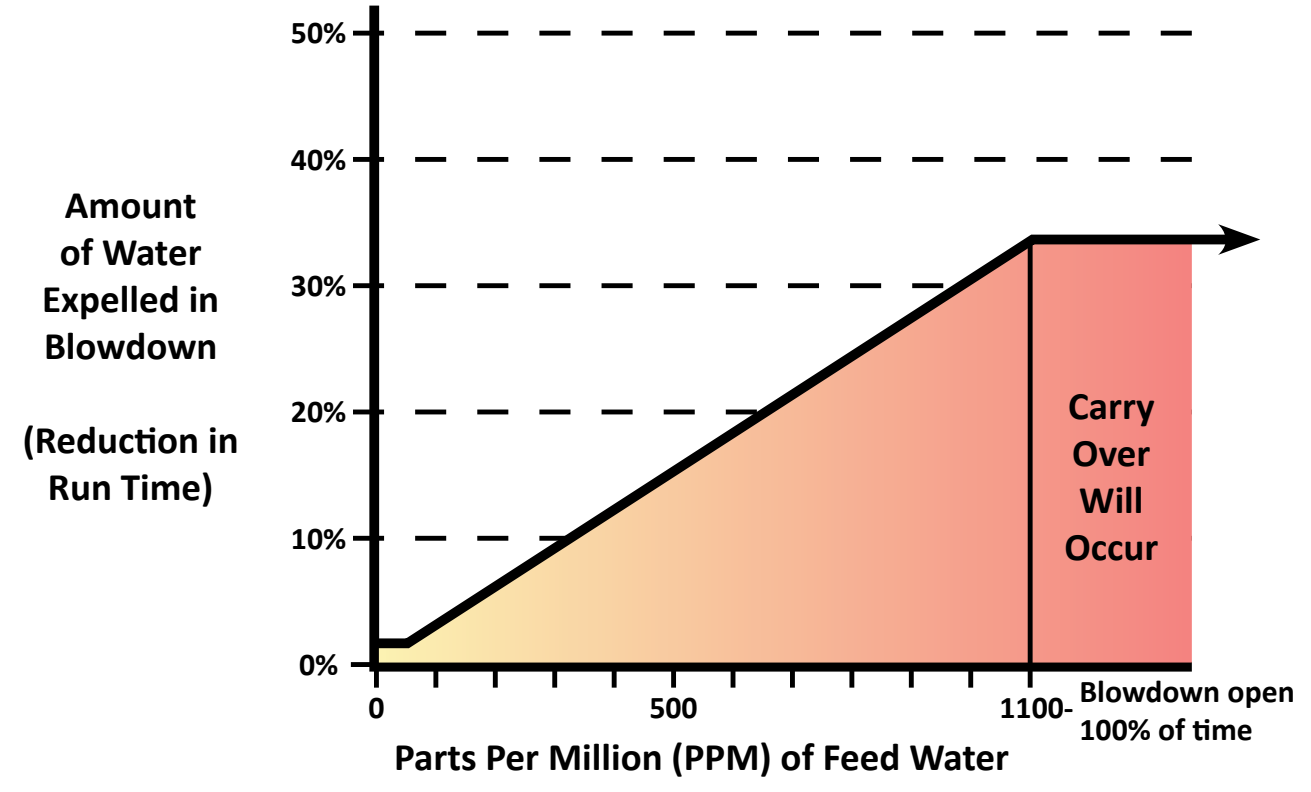
Water Transfer Pump



## Water Softener vs RO




## Run Time Loss



# Water Equipment Selection

## Water Softener Unit

600 PPM
Hard Water

600 PPM
Soft Water

-Uses Salt
-Requires 120v

### Water Softener Pros:
- Cheaper cost compared to RO
- Prevents scale build up
- Low operating costs

### Water Softener Cons:
- Does not lower ppm
- High ppm can cause time loss
- Cannot work with water higher than 1100 total ppm
- Not recommended for water over 500 ppm of hard minerals

## Reverse Osmosis (RO) Unit

600 PPM
Hard Water

<50 PPM
RO Water

-Requires 240v

### Reverse Osmosis Pros:
- Reduces total ppm
- Prevents scale build up
- Longer DewPoint run time
- Can use for house, shop, and spraying operations

### Reverse Osmosis Cons:
- Higher initial cost
- Higher operating cost
- Non-Toxic waste water created
  - Irrigation
  - Dust abatement
- Needs 240v power

BOILER GUARD

Staheli West, Inc. • 600 N Airport Rd • Cedar City, UT 84721
(435) 586-8002 • www.staheliwest.com

| | Reverse Osmosis Water | Soft Water | Untreated Water |
|---|---|---|---|
|  55 Gallon | Part #10945 | Part #10033 | Part #11636 |
|  15 Gallon | Part #10944 | Part #11082 | Part #11637 |
|  Organic 55 Gallon | Part #11634 | Part #10034 | N/A |
|  Organic 15 Gallon | Part #11635 | Part #10790 | N/A |

## Boiler Guard™ has 3 purposes:

1. Scale Prevention
2. Rust Prevention
3. Foam Prevention

## Mix with supply water at a 1:1000 ratio.

**Water Quality Settings on the DewPoint Machine**

It is critical that water quality settings in the DewPoint control system are set up correctly. Failure to do so may result in poor water quality conditions in the boiler. Poor boiler water quality can cause water carryover into hay during the baling process, which will damage the hay and may create a risk of stack fires.

- Obtain water test and recommendations report for your operation.
  - □ Your water samples should have been processed and the report should be available from your dealer.
- ENTER water quality settings based on water test and recommendations report.
  - □ SWITCH DewPoint touch screen "ON" with lighted rocker switch on the lower right side of the touch-screen enclosure.
  - □ When the computer has initialized, follow on-screen instructions and PRESS "Continue" button.
  - □ Select "Menu" → "Settings" → "Water Quality".
  - □ Enter location name and water PPM for each tested water source.
- SELECT the water source you will be using for the next operation.
  - □ Whenever a different water supply source is used, select that water source from the "Water Quality" screen.

**Water Quality/Blowdown Principles**

- Boiler Blowdown.
  - □ Boiler water quality maintenance is critical in maintaining the health and longevity of your boiler system. Proper blowdown settings and procedures are a critical element in maintaining boiler water quality.
  - □ Blowdown frequency and duration.
    - Duration of blowdown is dependent upon your water quality test.
    - Water tests prior to the use of the DewPoint machine provide the information you need to enter in the water quality screen for an appropriate blowdown schedule.
    - If you notice water carryover or "foaming" during field operation you should check your supply water source to be sure your water treatment is working properly. You may also need to change the settings in the water quality screen.
    - "Foaming" or water "carryover" occurs because of high surface tension on the surface of the boiler water. It is the same reaction that occurs when a pan of spaghetti noodles cooking on the stove boils over. Surface tension is increased because of high concentrations of contaminants left behind in the boiler water as steam is produced and discharged.
    - The blowdown process removes some of the contaminated water in a controlled manner and allows new clean supply water to replace the old.

- Automatic Field Operation "Surface Blowdown" Settings
  - Boiler surface blowdowns are done automatically during field operation based on the water quality settings entered by the operator. An electronic blowdown valve and surface skimmer tube in the boiler are controlled by the DewPoint control system.
  - The DewPoint control system will monitor water use, and when the proper water quality settings have been entered into the system a blowdown request will pop up on the screen approximately every 250 gallons of water use.
    - Confirm the blowdown request and continue baling while the blowdown procedure is executed.
    - The waste water from the automatic surface blowdown is discharged through the small red blowdown hose behind the baler pickup.
- Manual "Bottom Blowdown" at the beginning of the day.
  - Drain 30–50 gallons of water from the boiler in a safe location using the 2-inch boiler drain valve at the rear bottom end of the boiler. An on-screen reminder will appear at each start-up of the DewPoint machine.
    - Be careful to avoid burns from hot boiler water.
    - Choose a location where the water will not run back on the operator's feet from the boiler drain hose.
    - Be sure that the hot boiler water will not damage persons or property in the vicinity.
    - Observe all local regulations regarding the discharge of boiler water.

ALWAYS USE A WATER SOFTENER OR A REVERSE OSMOSIS SYSTEM

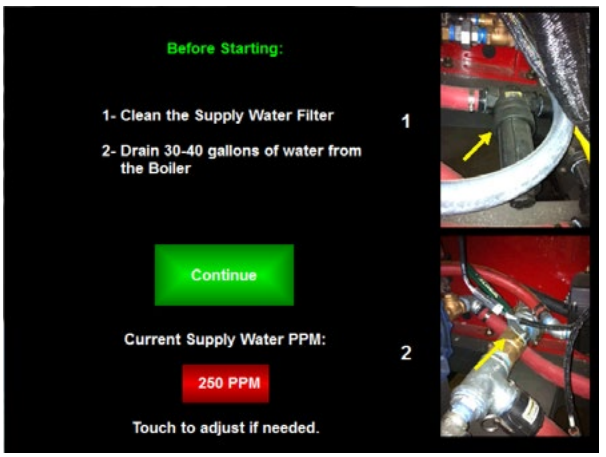
ALWAYS USE WATER TREATMENT CHEMICAL

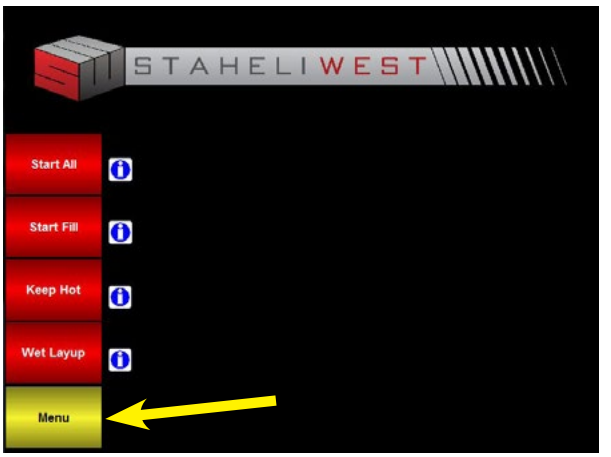
BOILER DAMAGE WILL OCCUR IF THESE STEPS ARE NOT TAKEN

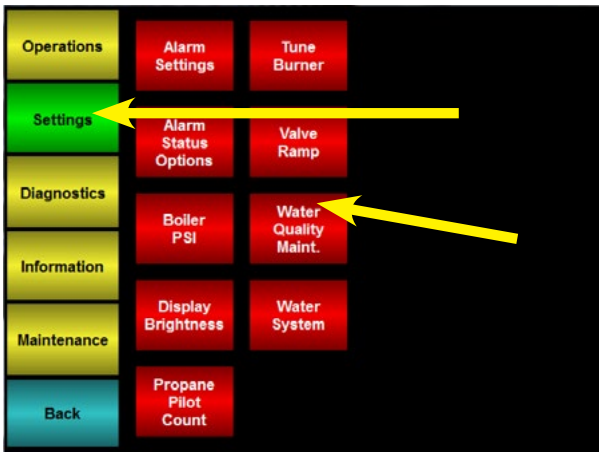
# Water Quality Settings

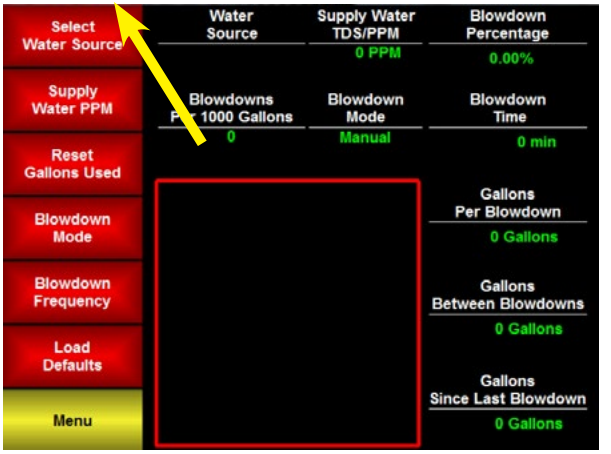
1. Turn on the screen and navigate to the “Water Quality Maint.”.
2. Select a water source (name the source, if desired).
3. Enter the PPM (Parts per Million) for that particular source.

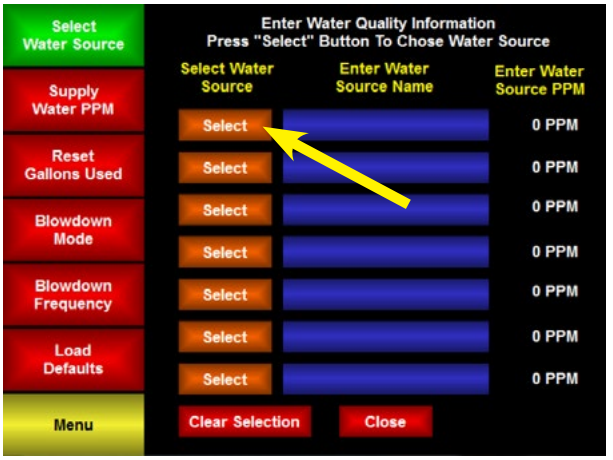
Failure to enter an accurate PPM will result in blowdown cycles being too short, or too long. To ensure maximum efficiency, enter the appropriate PPM whenever changing water sources.

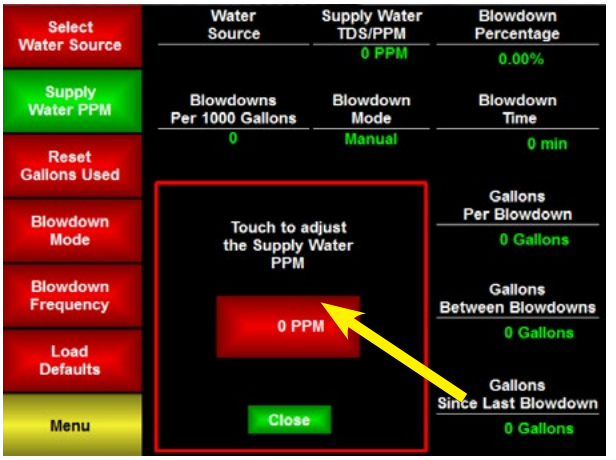


**Install Baler Hardware**

- Follow instructions to install baler steam hardware.
    - □ Some balers may require installation of an auxiliary tongue jack included in the hardware package.
    - □ After installation, CHECK for interference between baler components and baler steam hardware by cycling the baler through all functions by hand and observing the movement of baler components in relation to the baler steam hardware. Make corrections as needed.

**Install Cameras on Baler**

- □ CHOOSE mounting locations for each camera.
    - Mount one camera to provide a good view of the knotter area or knotter flags.
    - Mount one camera to provide a good view of the bale chute or bale accumulator.
- □ INSTALL camera extension cables in the baler so they can connect to the two camera cables that are mounted in the rear panel of the DewPoint machine and extend to each of the baler mounted cameras.
- □ ROUTE and SECURE the camera cables with cable zip ties to prevent damage from mechanical components on the baler.
- □ CONNECT the end of each camera cable to each camera extension cable.

- Test camera installation to be sure it is suited to machine operation.

**Install Bale Moisture Monitor on Baler**

We highly recommend the GAZEEKA moisture gauge which is a non-contact, microwave-moisture-measuring instrument.

- □ INSTALL GAZEEKA moisture gauge as instructed in the Gazeeka instruction manual.
    - CALIBRATE prior to putting hay in the baler the first time. Follow all directions with the GAZEEKA instrument to calibrate and establish proper settings for safe and reliable operation.

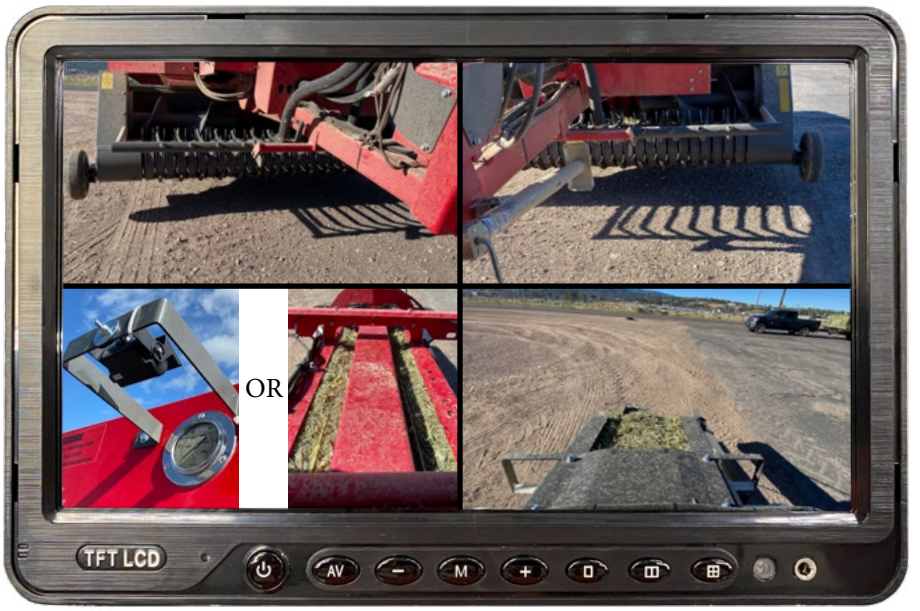
**Install Optional/Custom Equipment**

- Install custom wire harnesses.
  - □ Gazeeka, accumulator, preservative applicator, etc.
- Install custom hydraulic lines.
- Install any other custom equipment.

**Install Cameras on DewPoint Machine**

- With rear door opened:
  - □ ATTACH two magnetic base cameras just below the hole to the inside of each tail/work light assembly on each side of the DewPoint machine.
  - □ CONNECT camera cable to each camera. Route and secure each cable through the grommets mounted in each fender and the inner fender walls as needed.
  - □ FOLLOW the routing of the wire harnesses that run to the tail/work light assemblies, so the end of each cable is inside the pump enclosure area inside the rear door of the machine.
  - □ CONNECT the end of each camera cable to the camera extension cables which are just inside and below the rear door.
  - □ Use cable zip ties to secure all camera cables to the wire harnesses that run to the tail/work light assemblies.

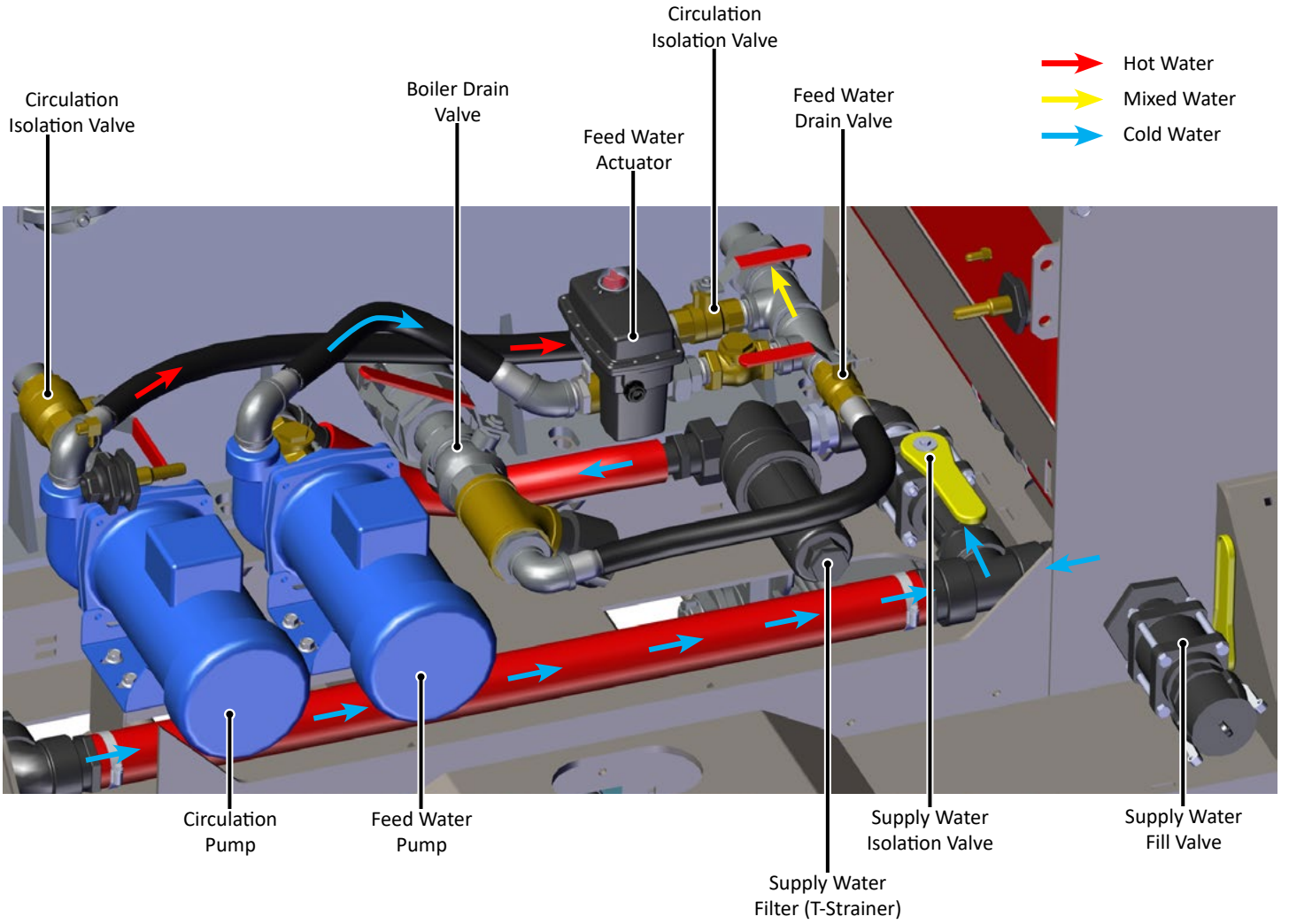
Pickup Pickup

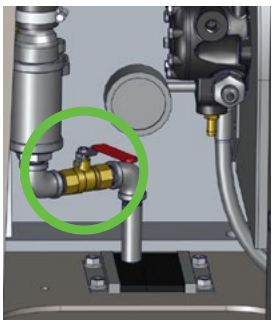


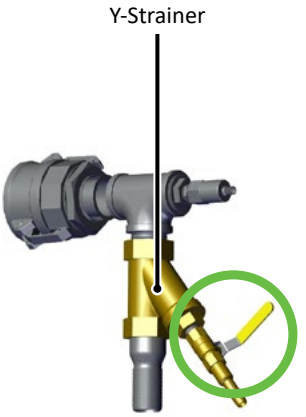

PSI Gauge / Knotters Bale Chute

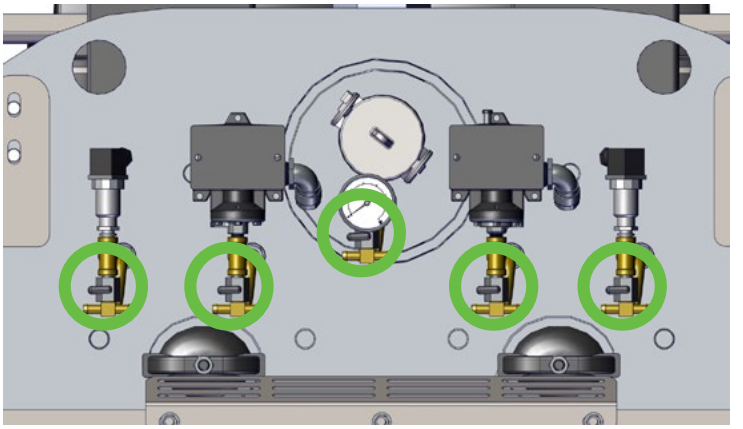
# Valve Inspection

Ensure all valves are in the positions shown below for normal operation positions.





# Generator Inspection

1

Remove tie downs from flue caps before starting the generator.

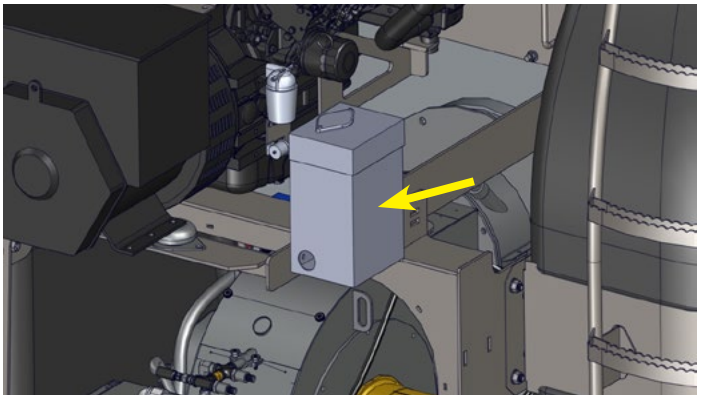
2

Check engine radiator coolant.

3

Check engine oil (use SAE 15W-40 rated for heavy duty diesel engine use).

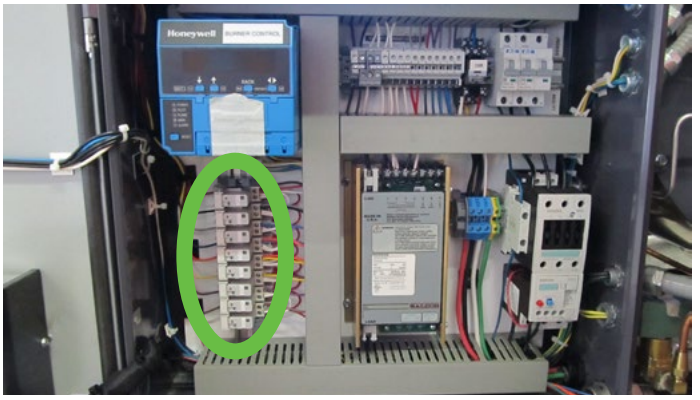
4



Ensure main circuit breaker is turned on.

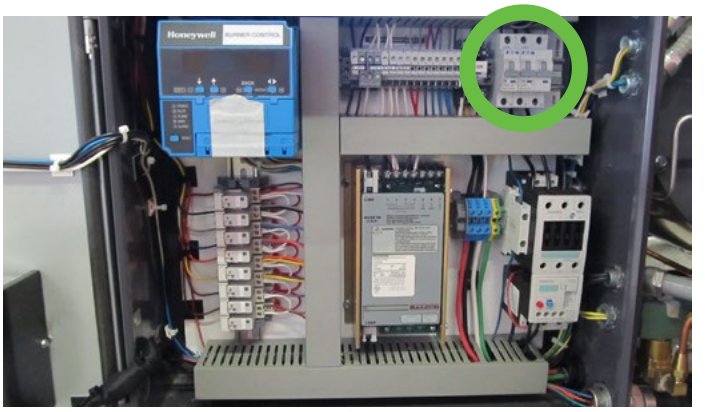
# Electrical Panel Inspection

1



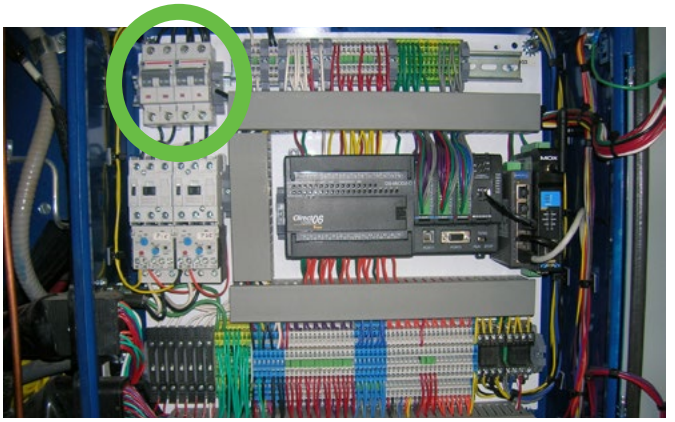
Ensure that all relays are securely plugged in and latch is closed.

2



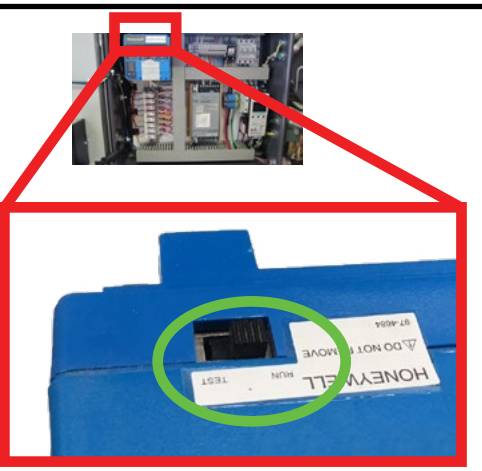
Make sure all circuit breakers are turned “ON”.

3



Make sure all circuit breakers are turned “ON”.

4



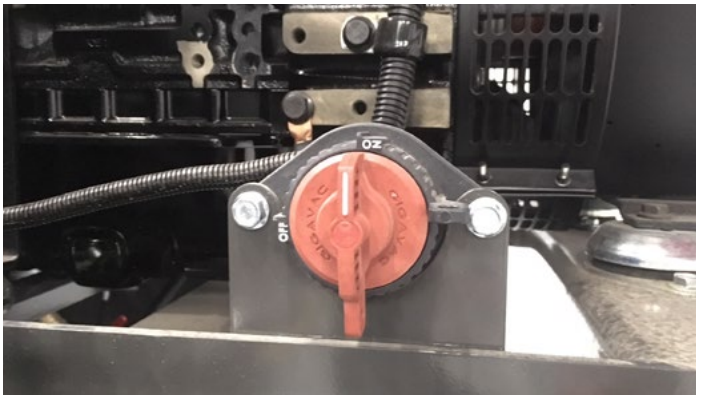

Make sure the “Run/Test” switch on the Honeywell Burner Controller is in the “Run” position.

5


Make sure the toggle switch on the bottom of the PLC is set to “RUN”.

# Actuator Inspection

1



Turn on the battery cutoff switch.
(Update Kit Part #11062)

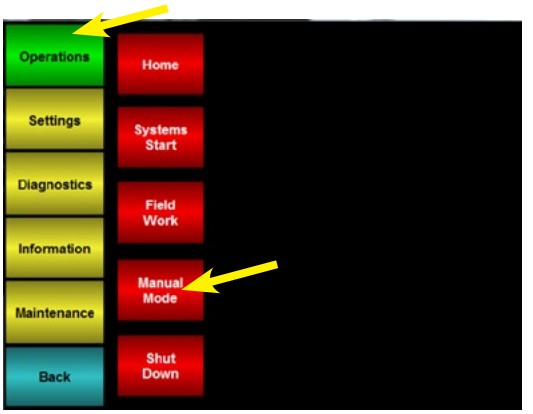
2


Plug in the touch screen to the DewPoint machine.

3


Turn on the machine by flipping the red rocker switch.

4



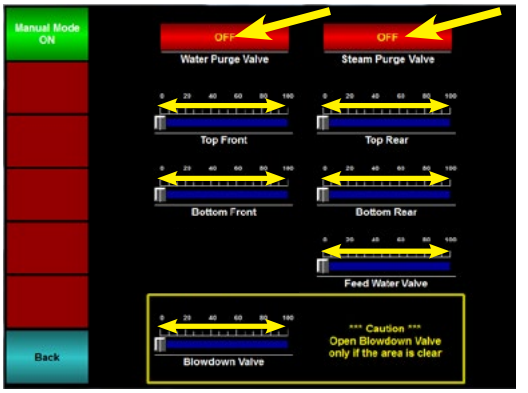

From the Menu Screen:
Go to “Operations”.
Go to “Manual Mode”.

5


Activate “Manual Mode”.

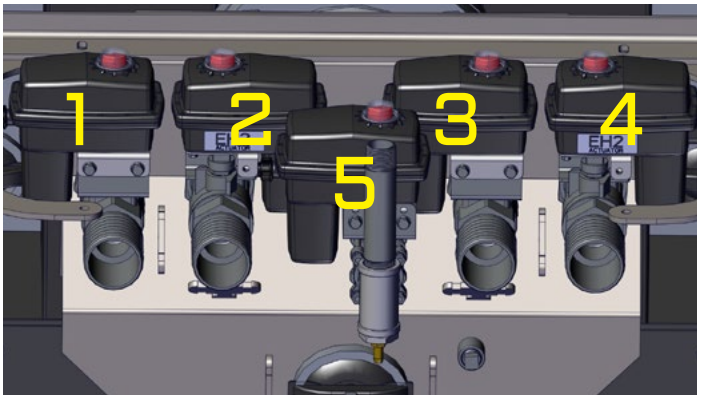
Generator does not need to be running.

6



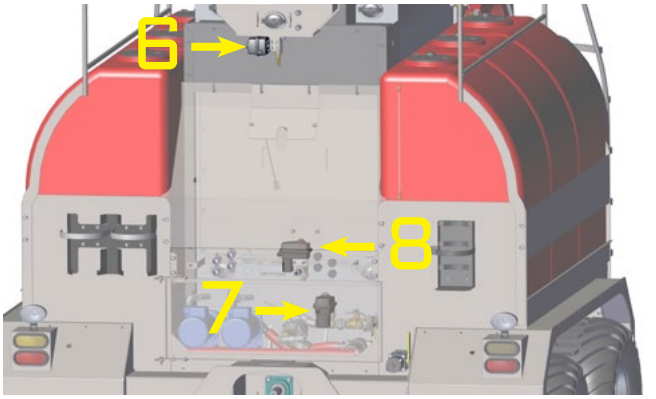

Open and close all 8 valves one at a time. Listen to be sure you hear each one.

7




Visually inspect valves and actuators for damage.
1-4: Steam Valves.
5: Steam Purge Valve.

8




6: Water Purge Valve.
7: Feed Water Valve.
8: Blowdown Valve.

# Wheel Inspection

1

Make sure all lug nuts are tightened to 260 ft-lbs.

2

Inflate tires to proper pressure.

| | |
|---|---|
| **Tires:** | **BKT 628 16-Ply Flotations** |
| **Size:** | **550/45 R22.5** |
| **Wheels:** | **Custom Built Silver** |
| **Tire pressure:** | **52 psi** |

# DewPoint Hookup to Tractor

1


Insert and secure hitch pin.
*Tip: Make sure DewPoint machine is full of water so it is at operating level before adjusting hitch height.

2

Place jack in horizontal position.

3

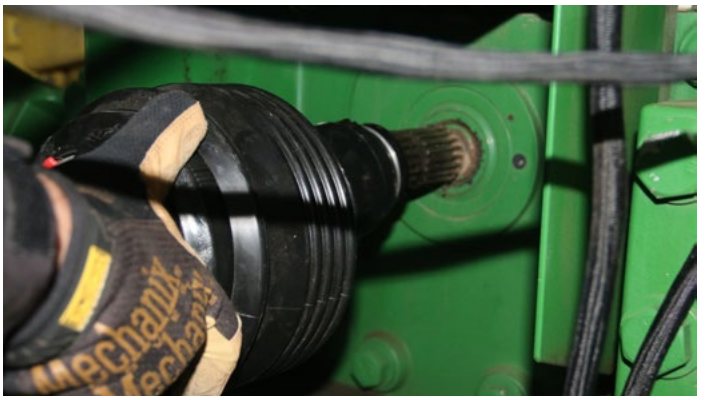
Connect chains in crossing pattern shown above. This prevents the chains from dragging in the windrow while still allowing you to turn.

4


Connect hydraulic trailer brakes and light harness.

Connect hydraulic steering.

5



Connect PTO.

6


Secure anti-rotating shield clip as shown.

# DewPoint Hookup to Baler

7

Back the DewPoint machine up to the baler.

8

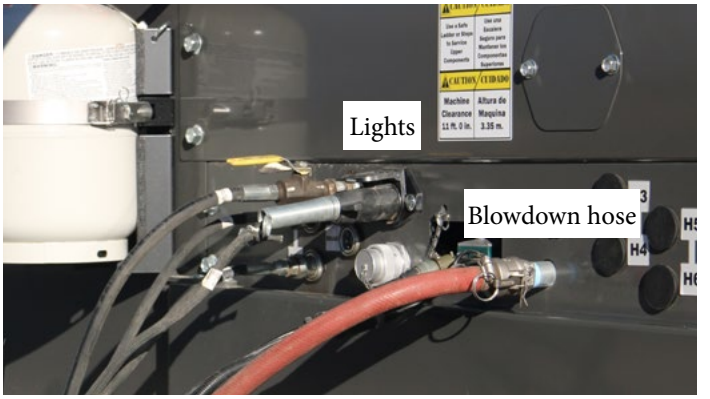
Insert and secure hitch pin.

Secure chain so it won't drag through the windrow.

9

Connect PTO.

10



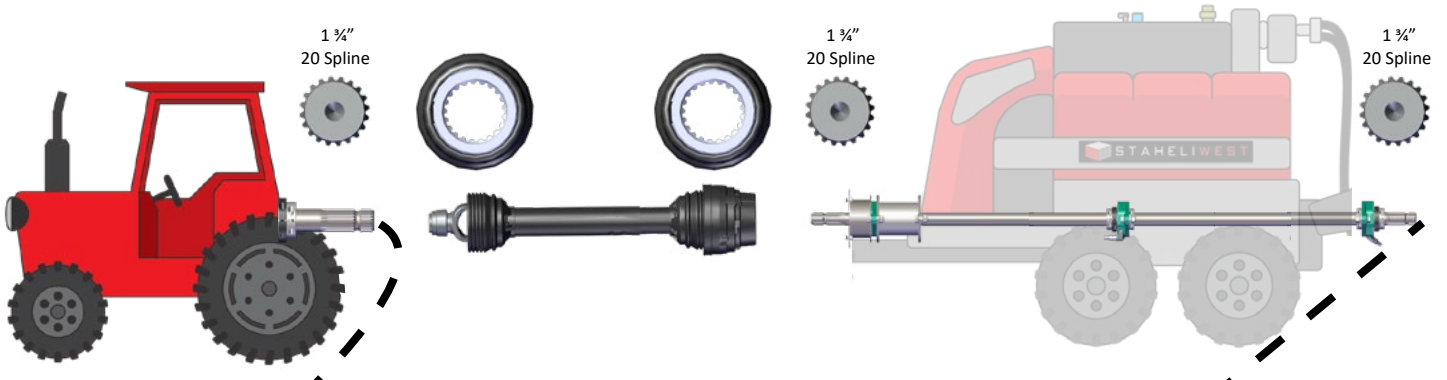

Attach blowdown hose, light harness, camera harness, hydraulic lines, and other equipment as needed.

11

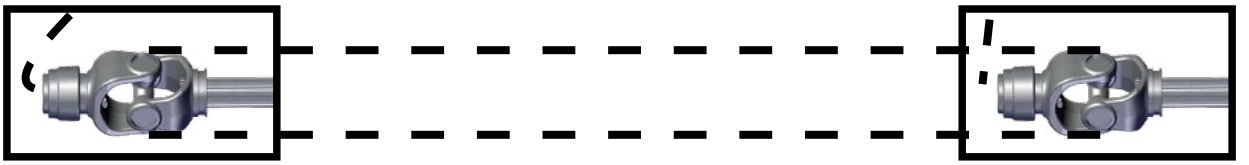
Be sure to adjust hitch height for optimal PTO angles. Never operate with harsh PTO angles.

12

# PTO Specs




Make sure the PTO knuckles are lined up on both the DewPoint machine and the baler. Failure to do so will result in heavy vibrations and excessive wear.



CV Joints do not require joint alignment.

(CV Joints are common on older John Deere and Krone Equipment.)

**DO NOT** use PTO adapter to connect tractor or baler to DewPoint machine. Doing so will risk damaging PTO shaft.

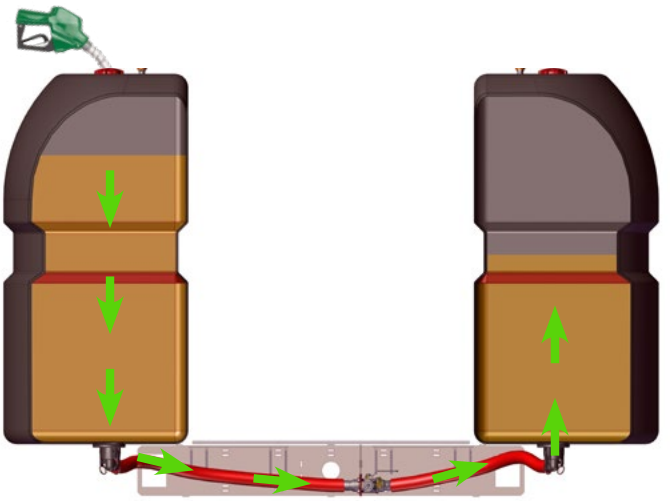
**(All warranties related to PTO shaft will be voided if adapter is used)**

# DewPoint Hookup

**Check for Interference with DewPoint Machine and Baler Attached**

- MOVE steering hydraulic control lever or switch in tractor cab in the "float" position. Some tractor hydraulic systems require that you cycle this lever or switch a few times to initiate proper operation
- DRIVE the tractor through several turning maneuvers to check for interferences and turn angle limits between the tractor, the DewPoint machine, and the baler including:
  - □ Rear Tractor Tires/Duals and the DewPoint machine frame
  - □ PTO
  - □ 3-Pont Hitch
  - □ Hydraulic Hoses
  - □ Brake and Steering Hoses
  - □ All Wire Harnesses
- LEARN your turning radius and clearance limits with all machinery attached (including accumulators if used)
  - TURNING ANGLE NOTES:
    - In a turn, the angle between the baler and DewPoint machine will be sharper than the angle between the Tractor and the DewPoint machine
    - When coming out of a sharp turn quickly, the angle between the DewPoint machine and the baler can decrease dramatically. It is best to come out of sharp turns gently.
    - Turning too sharp will cause major damage to the DewPoint machine and/or the baler.
    - LEARN THE BEHAVIOR OF YOUR ENTIRE MACHINE DURING VARIOUS TURNING CONDITIONS
    - LEARN YOUR LIMITS!

# Fill Fuel Tanks



Fill the fuel tanks with #2 Diesel. The tanks are connected so you only need to fill from one side. You need to give the fuel a little time to equalize after filling one tank and then add more. Leave 4" of space in the top of the tanks.

# Fill Water Tanks

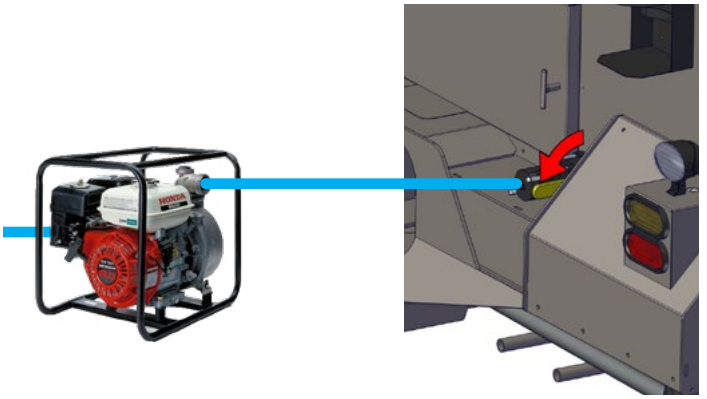
1

Ensure you have the proper water treatment equipment for your water. Contact your dealer if you have questions (See water section).

2


Your water setup should be similar to the above picture.

3



Connect hose to the supply water fill valve.

Open the supply water fill valve.

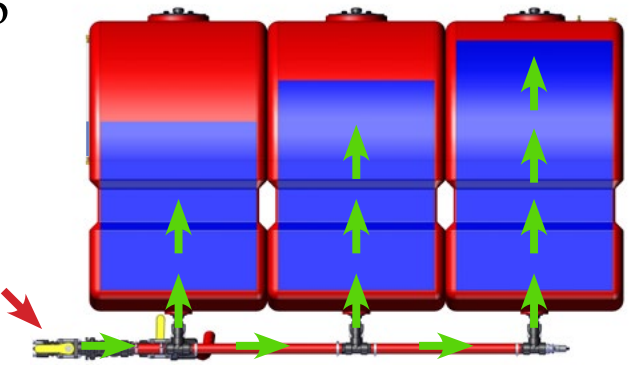
4


Start your water transfer pump to begin filling the DewPoint supply tanks with water.

5


Slowly open the induction valve and suction 1 gallon of water treatment chemical into the supply tanks. Always add 1 gallon of chemical for every 1000 gallons of water.

6



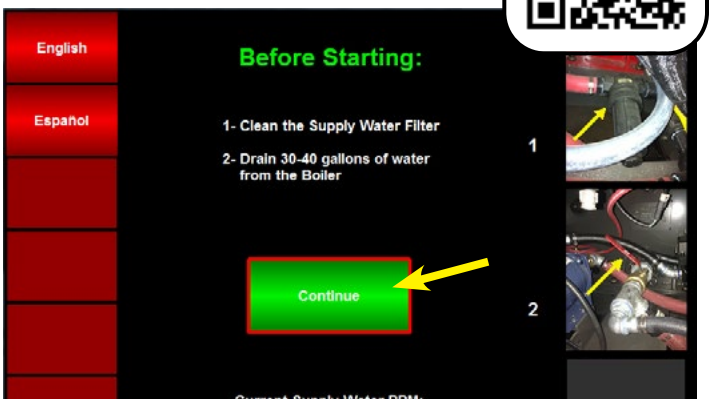
When the tank is about 3/4 full, reduce the flow rate by closing the fill valve half way. Give the tanks some time to equalize and finish filling.
*Tip: Fill the boiler with water and then top off the supply tanks for longer operating time.

# Start DewPoint

1

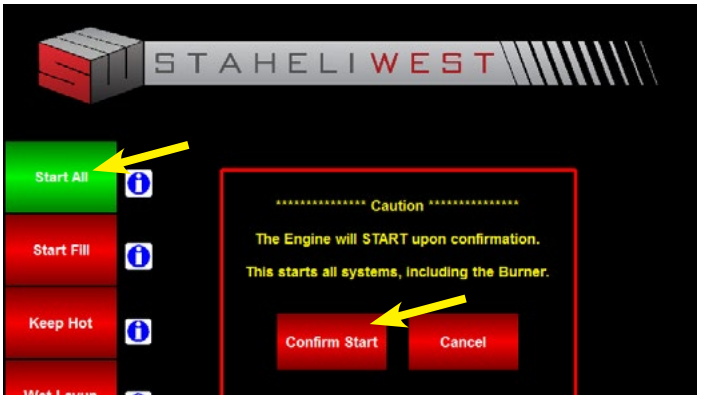
Turn on the machine by flipping the red rocker switch.

2



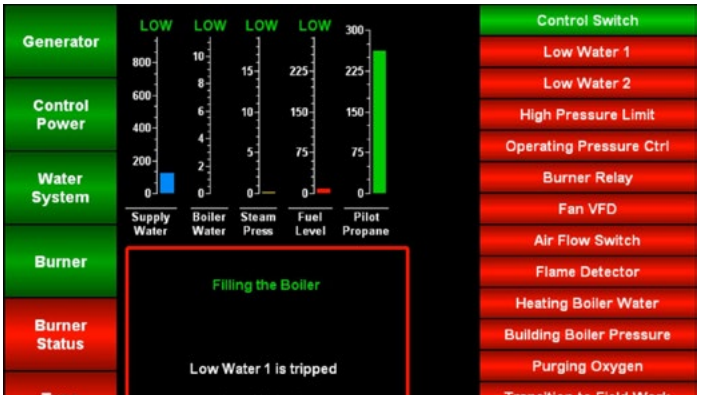

Follow the on screen instructions and then press Continue.

3



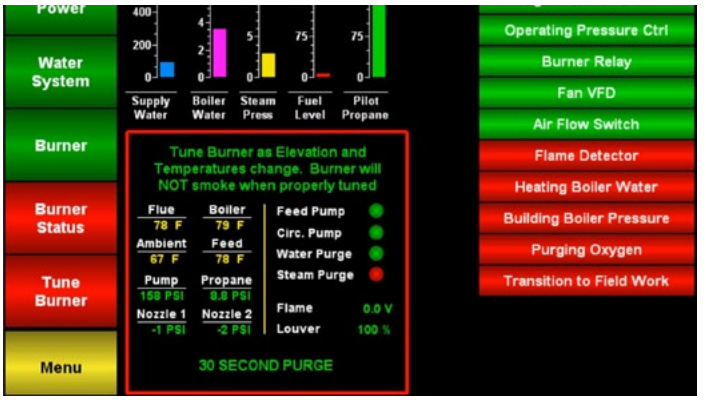

Press Start All.
Press Confirm Start.

4



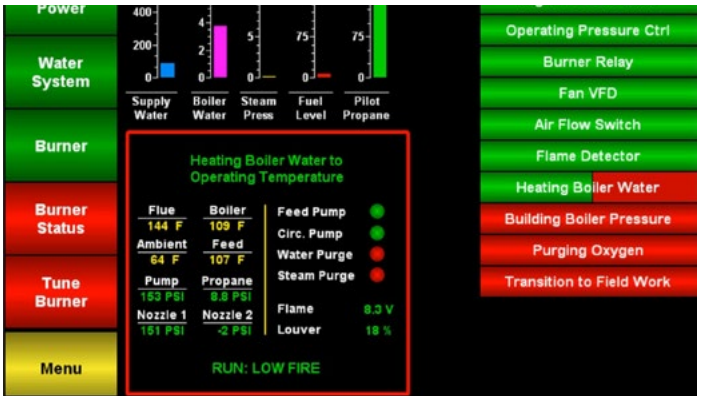

The generator will start.
The boiler will begin to fill with water. (8-10 min)
*Tip: Top off the supply water tanks after filling boiler.

5




The DewPoint ensures safeties are in place and starts the burner fan.
A 30 second purge occurs before the burner ignites.

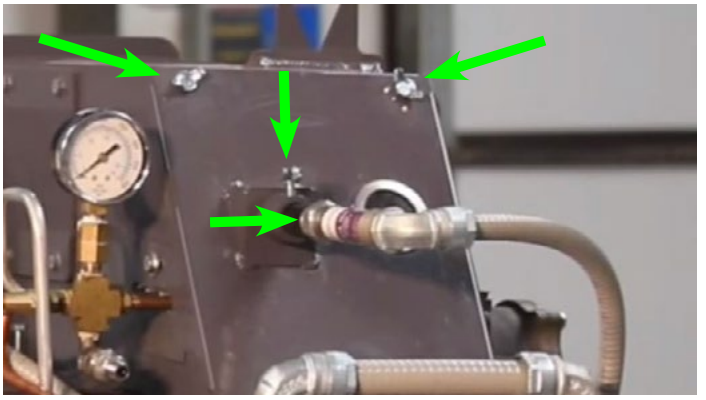
6




The burner ignites and begins heating boiler water (10-20 min). Proceed to Burner Tune (Should be tuned once a year or anytime it blows black smoke).

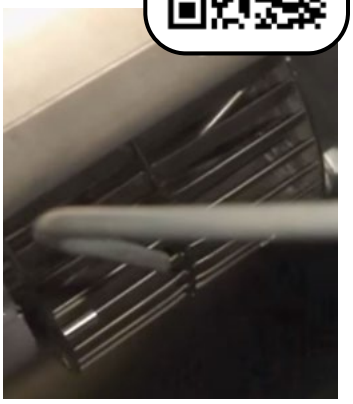
# Burner Tune

1



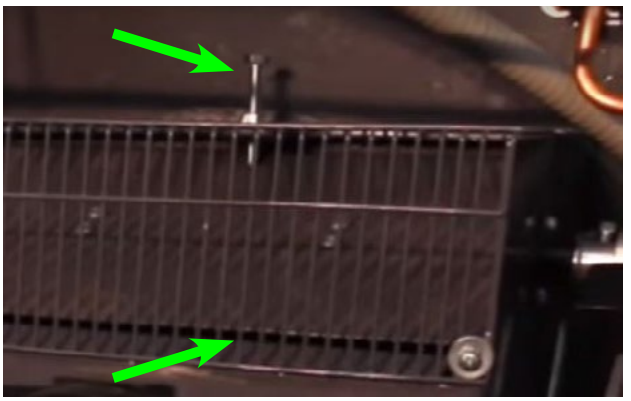
With the machine turned off, remove flame detector and burner cover.

2



Clean the fan with compressed air and reinstall the burner cover and flame detector.

3

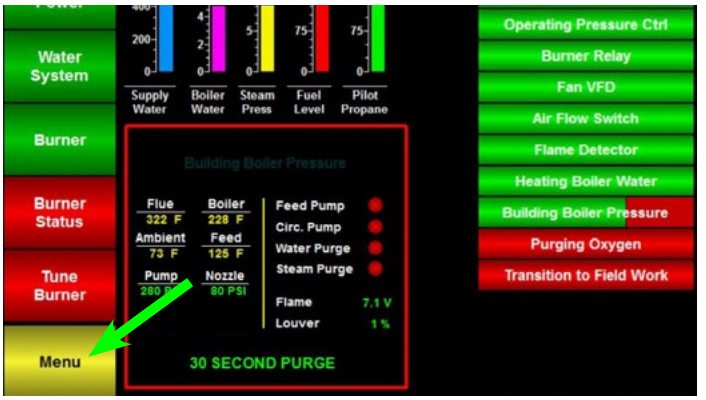


Check louver position (Should be about 1/4 inch open; adjust the top bolt as needed).

4

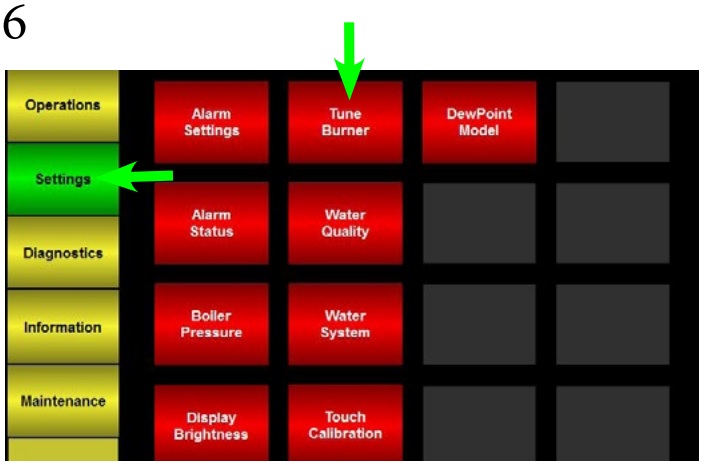

Turn on the touch screen press “Start All” and “Confirm Start”.

5




Press “Menu”.

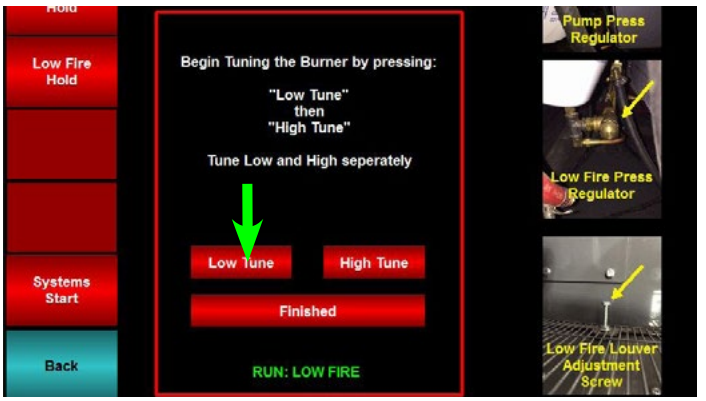
6




Press “Tune Burner”.

# Burner Tune

7

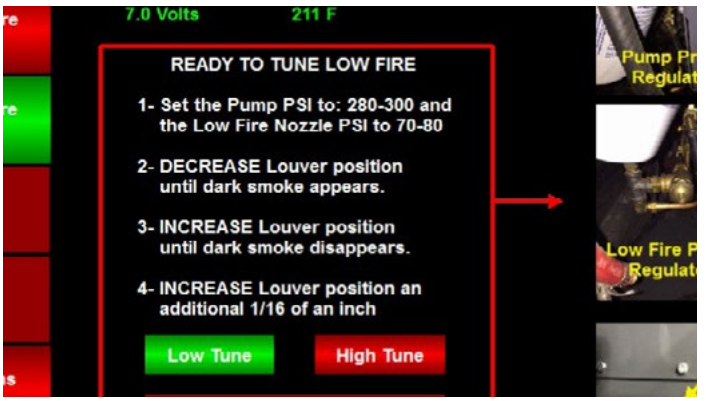



Press “Low Tune”.

8

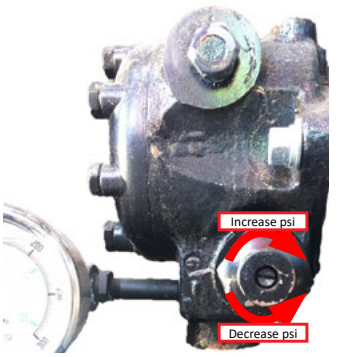

Wait for the burner to reach “Low Fire”.

9



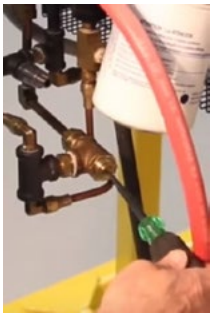

Once the burner advances to Low Fire, follow steps 10-14. Instructions are also found on screen.

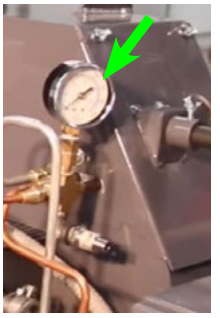
10




Set the fuel pump psi to 280-300 psi using a flat head screwdriver (Use the physical gauge next to the pump and the digital gauge on the touch screen).

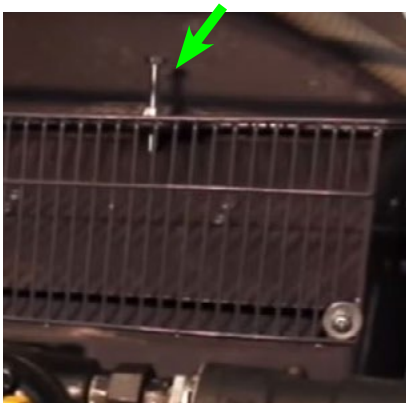
11

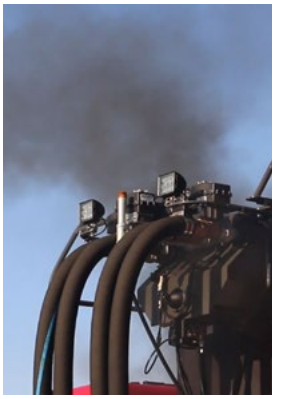




Remove the low fire fuel regulator cap and gasket then loosen the lock-nut, then adjust the nozzle psi to 80-90 psi using a flat head screwdriver. Reinstall when done. Use the physical gauge and the digital gauge on the touch screen.

12

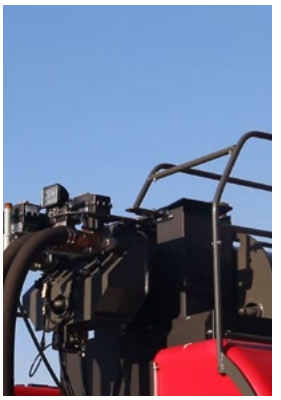




Decrease the louver position by loosening the top bolt until dark smoke appears.

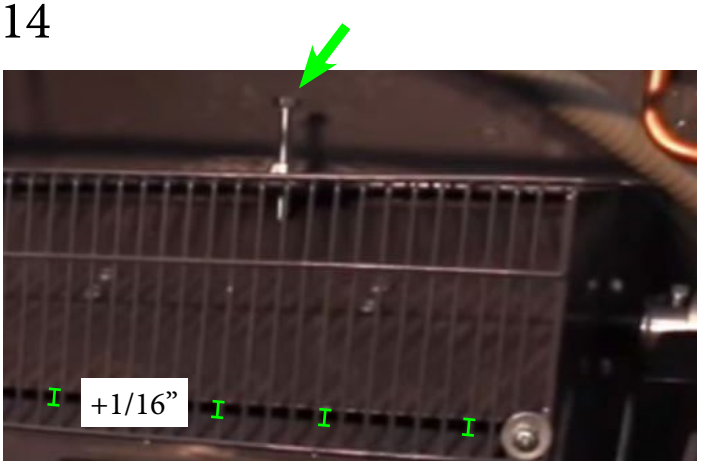
# Burner Tune

13



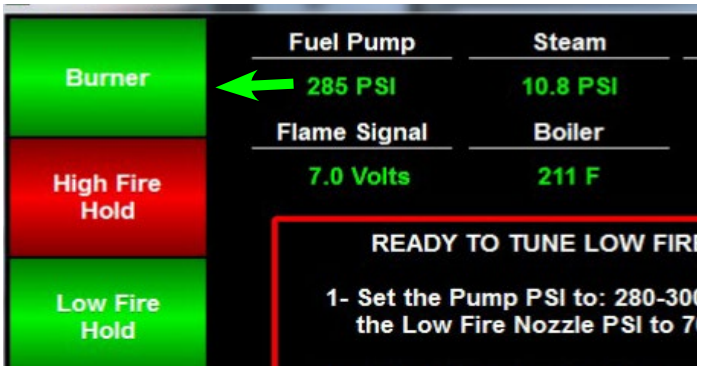
Open the louver position by tightening the top bolt until dark smoke disappears.

14




Open the louver position an additional 1/16 of an inch.

15

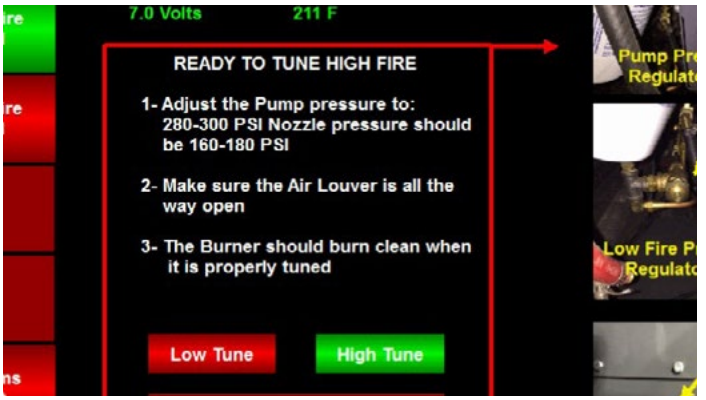



Re-fire the burner to confirm everything is working properly (Pump pressure = 280-300 psi, Low Fire Nozzle pressure = 80-90 psi, System does not blow black/white smoke).

16

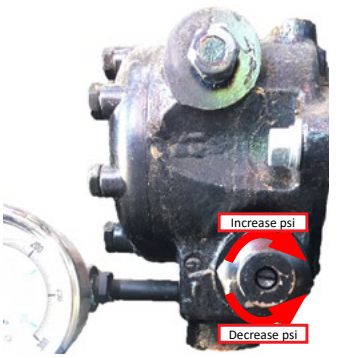

Press “High Tune” and wait. Boiler needs to reach 180° F before entering high fire.

17




Once the boiler reaches 180° F, make sure the fuel pump pressure is still between 280-300 psi.

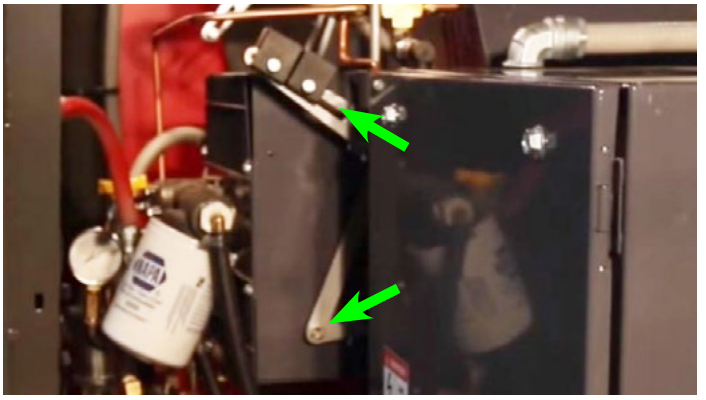
18




Make sure the fuel pump pressure is still between 280-300 psi.

# Burner Tune

19



Make sure the air louver is 100% open.

20

The burner should burn clean when properly tuned. (No white/black smoke)

21


Press “Finished”.
*Note: Nozzle pressure should automatically scale to 160-190 psi during high fire.

# Gazeeka Calibration

1

With the tractor running:
Make sure the instrument has been on for at least 2 minutes.
Make sure the air path between the antennae is clear (i.e., no bale or anything else). The end of the bale should be inside the rear end of the baler doors by at least a foot.

2


Select the Setup Mode – If in Analyze Mode, press (F1) to select the Setup mode.

3


Press (Item) to select the "ENT for Air Cal" item.
Press (ENT) to select an air path reading to be carried out.

4



Clear the air path and press (F1). Press (ENT) to calibrate – it will take a few seconds.

5


If no error message displayed, the air path standardization has been completed OK.
Press (ENT) to go back to the Setup Menu.

6


Power the Gazeeka off then on again.
The instrument is now ready to start measuring bales.

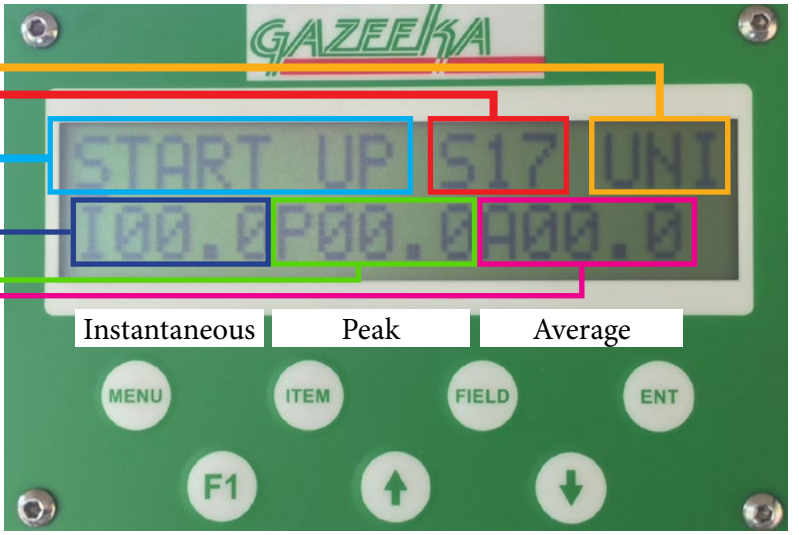
# Gazeeka Screen

**Current Status** - The first 8 characters on the top line display the current status of the instrument.

**Moisture Set Point** - The Sxx (shown below set to S17) is the moisture value set point at which the terminal gives out an audible "beep" and the bale is marked by the spray cans.

**Calibration Setting** - The last three characters on the top line display the equation being used to convert the microwave readings to moisture readings. There is a universal calibration equation which may be used at any time, but using the appropriate calibration equation for the type of hay you are baling will give the best results.
The current calibrations are:

| | |
|---|---|
| UNI | (Universal 1) |
| FES | (Grass Hay) |
| OAT | (Cereal Hay) |
| LEG | (Legume Hay) Alfalfa is a legume |
| OMX | (Oat Mix) |




**Instantaneous Moisture output** - This gives you the average moisture reading over a preset analysis time (typically every 5 seconds).

**Peak Moisture output** - This gives you the maximum moisture reading over a preset number of instantaneous readings. This is typically 12 readings (12 x 5 = 60 seconds of analysis time).

**Average Moisture output** - This gives an average of the moisture from a number of Instantaneous readings. For example, if the analysis time is set to 5 seconds and the average time constant is set to 120 seconds, then this output will give the average of the last 24 readings (120 / 5 = 24). Note that this time is the time spent analyzing, not the real time on a clock. If the Gazeeka 870 is on the ISObus reading the star wheel and knotter signals, then the peak and average will not be time based, but bale by bale.

# Brake Adjustments

- Attach DewPoint 6110 and your baler to the tractor.
- Attach brake hose to tractor hydraulic trailer brake valve.
- Before moving, depress brake pedal to test brake actuation.
- Drive tractor about 10 MPH in an open area on a level dirt or gravel surface and depress the brake pedal to test braking power.
- You should feel the DewPoint trailer brakes engage slightly before you feel the tractor brakes.
- The hydraulic pressure applied to the tractor hydraulic trailer brake valve should vary according to the pressure you apply to the tractor brake pedal.
- Be sure the braking action is sufficient but not too aggressive.
- Adjust if necessary.

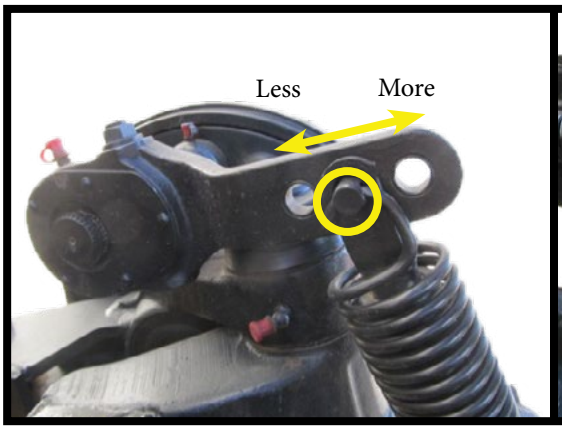
**Disconnect Cylinder Return Springs, then:**

Move pin OUT on brake lever for MORE braking power.

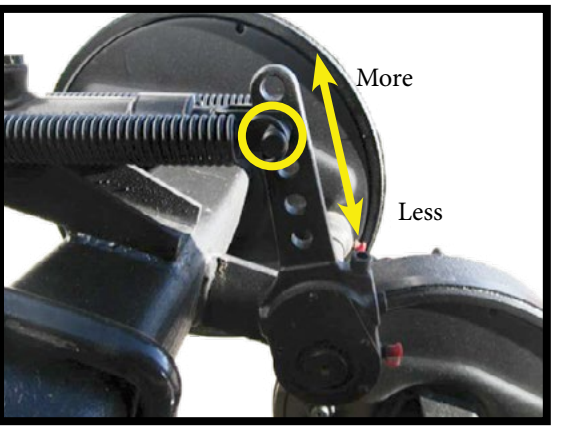
Move pin IN on brake lever for LESS braking power.

Check brake action after adjustment.

Rear



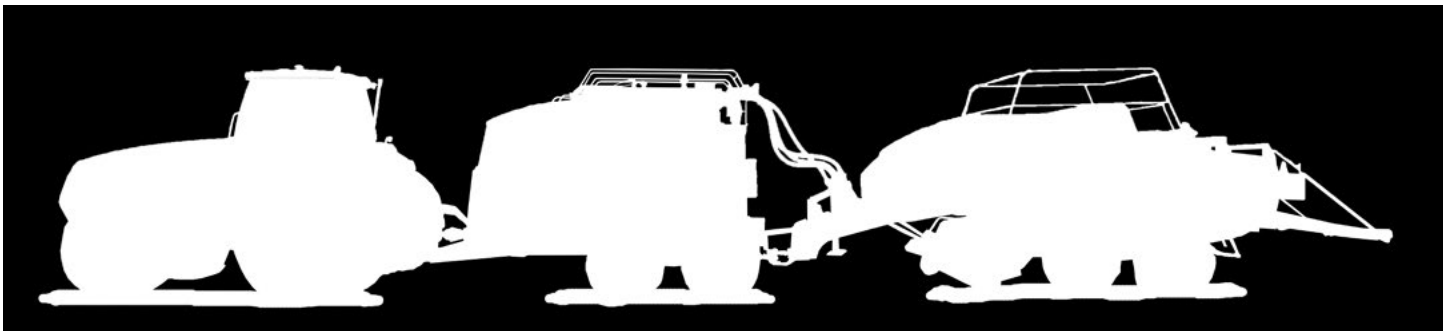

Front




DO NOT OPERATE DEWPOINT MACHINE WITH A TRACTOR THAT LACKS THE NECESSARY HORSEPOWER OR HYDRAULIC BRAKING SYSTEM. SERIOUS INJURY OR DEATH MAY OCCUR.

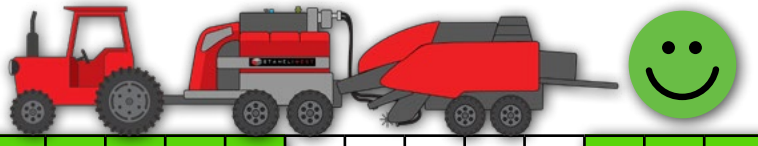
## Operation



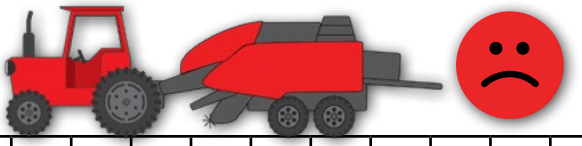


## Dry Climates

In dry climates, DewPoint operators normally start baling in the late evening and bale through the night adjusting steam for the changing dew conditions. If necessary the operator can bale for 24 hours straight as long as conditions don't get too wet at night or too hot causing internal bale temperatures to exceed 135° F.



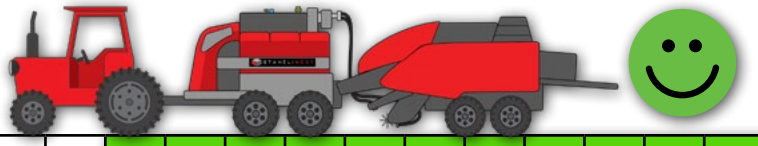
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AM | | | | | | | | | | | | | | | | | PM | | | | | | |
| | | | | | | | | | | | | Often too hot | | | | | | | | | | | |



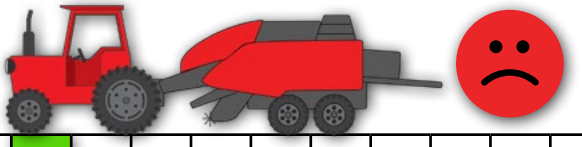
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | AM | | | | | | | | | | | PM | | | | | | | | | | | |
| | | | | | | | | Not enough dew / moisture / often too hot | | | | | | | | | | | | | | | |

## Wetter Climates

In wet climates, DewPoint operators normally start baling in the morning as soon as the dew burns off and the hay is dry enough to start baling. Operators often bale through the rest of the day as long as internal bale temperatures don't exceed 135° F. They often bale into the evening until the windrows become too saturated with dew.



| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AM | | | | | | | | | | | | PM | | | | | | | | | | | |
| Often too wet | | | | | | | | | | | | | | | | | | | | | | | |



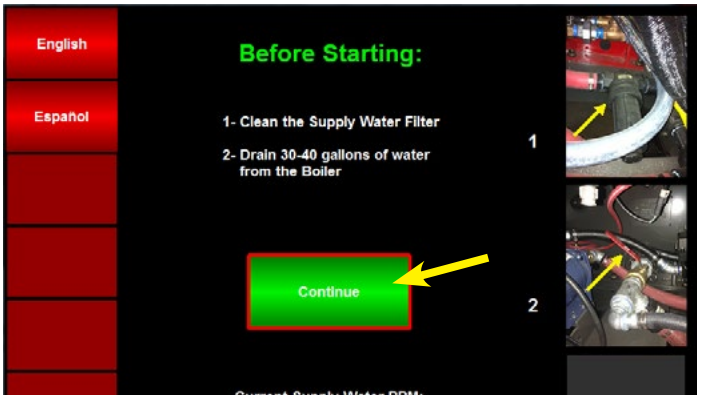
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AM | | | | | | | | | | | | PM | | | | | | | | | | | |
| Often too wet | | | | | | | | | | Not enough dew / moisture | | | | | | | | | | | | | |

# How to Start Steaming

1

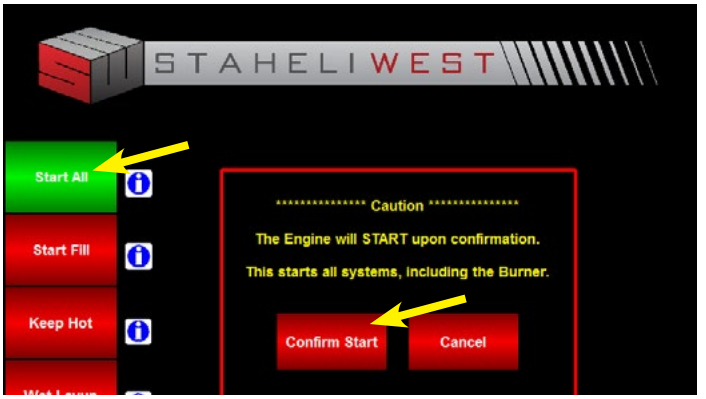
Turn on the machine by flipping the red rocker switch.

2



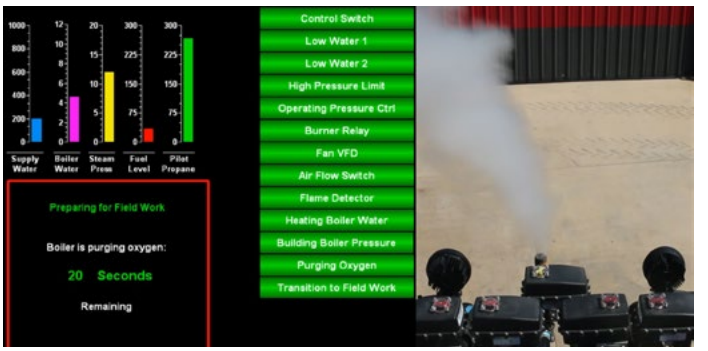

Follow on screen instructions and then press Continue.

3



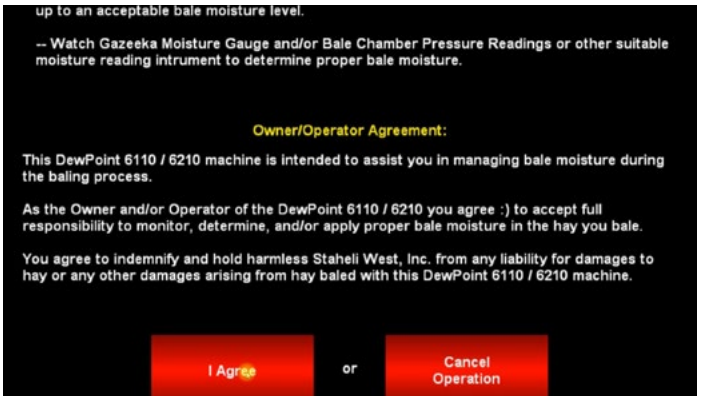

Press Start All.
Press Confirm Start (The machine needs to have water and fuel before you can start steaming).

4




The machine will prepare for field work.
This will take 5-30 min depending on if the boiler is full of water and the current temperature of the water.
The steam purge valve will open.

5



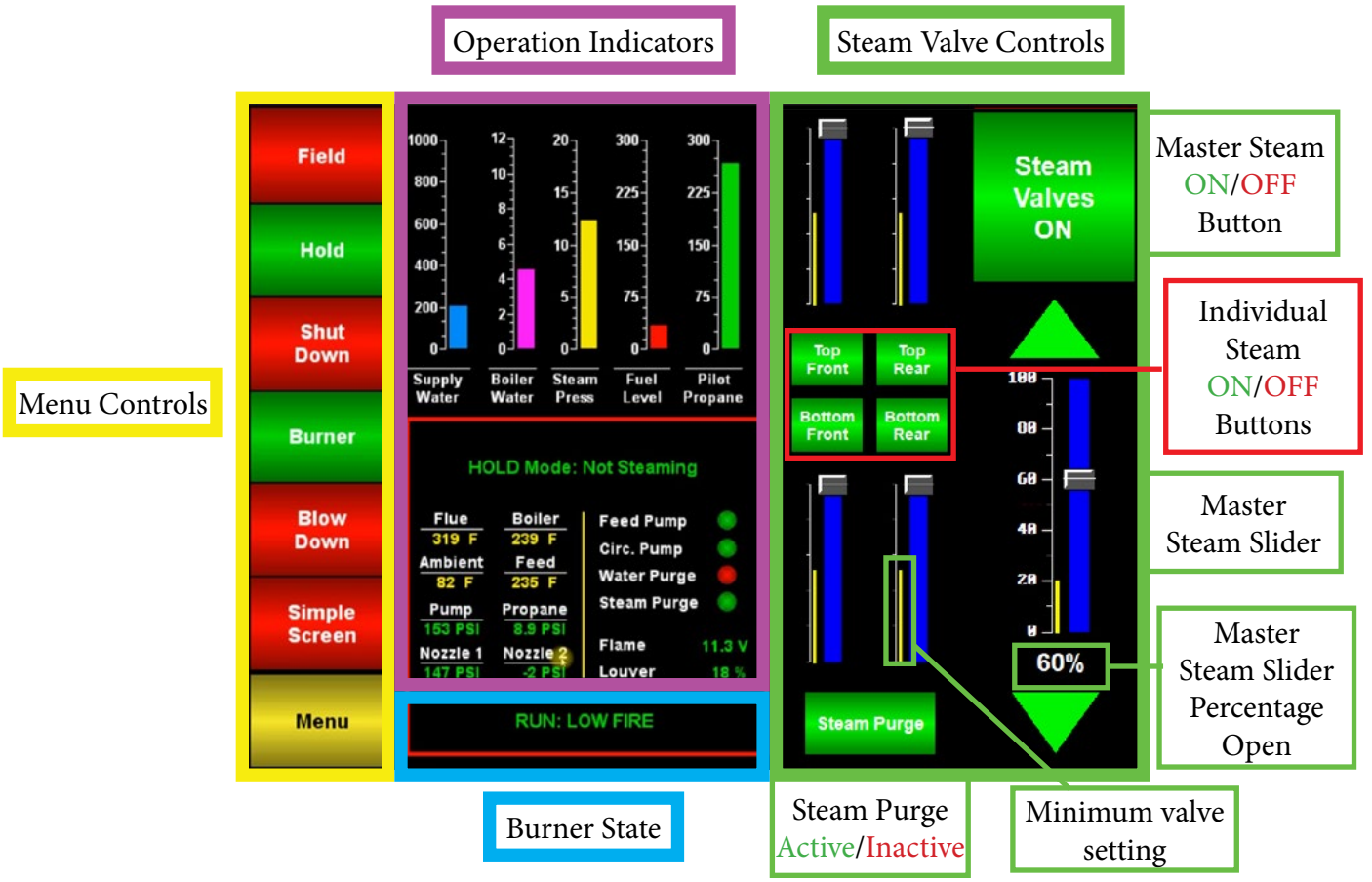

The operator then has to agree with the Owner/ Operator Agreement before he can move on to the Field Work screen.

6


You have arrived at the Field Work screen!

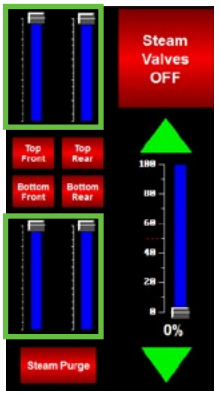
# How to Start Steaming

7



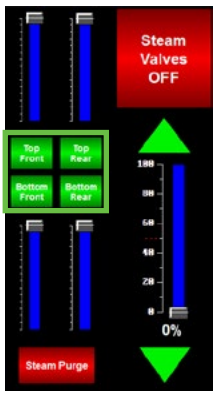

Individual valve adjustments should be used to adjust the steam output of the manifolds in relation to each other. At least one valve should always be set to 100% where the most steam is wanted. Adjust other valves in proportion to the valve you want the most output from. The MASTER steam slider should be used to adjust the overall steam output. The MASTER steam slider also adjusts all valves in the proportion you have set. The yellow bar beside each steam valve control indicates the minimum valve setting. If the slider is below the top of the yellow bar no steam will come out of that valve. (Minimum will vary for each valve depending on the MASTER steam slider setting.)

8



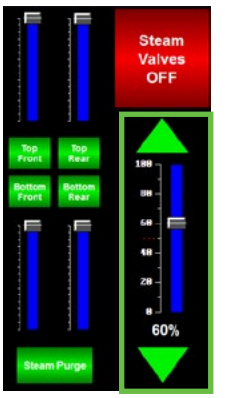

Adjust the individual steam sliders to where you want them.

9



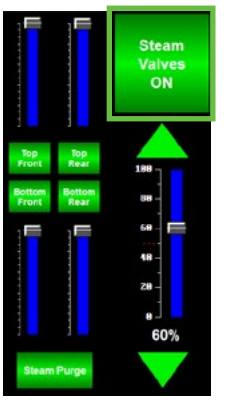

Turn on the individual valves by pressing them.

10




Adjust the master steam slider to a good starting point. (We suggest 60%)

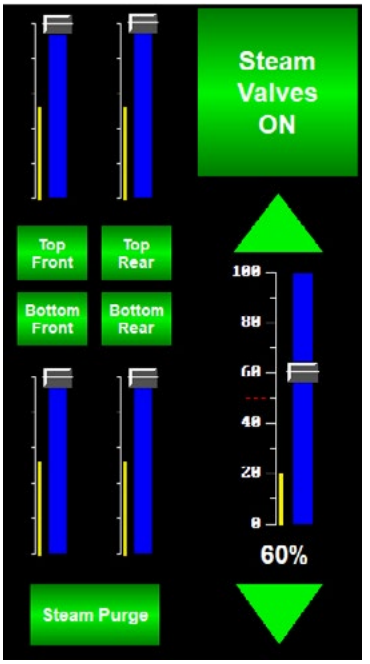
11




Turn on the master steam button and steam will start coming out.

# Common Valve Settings

## Windrow Evenly Cured Top to Bottom



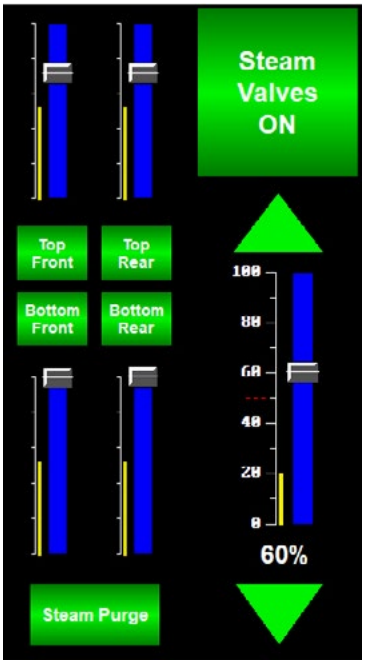


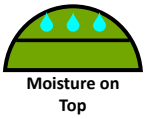
Start Master Slider at 60%

When a windrow is evenly cured, start with all steam valves open to 100% and the Master Steam Valve at 60%. Adjust Master as needed.

## Windrow with More Moisture on Top than Bottom

Top Steam Valves at 70%

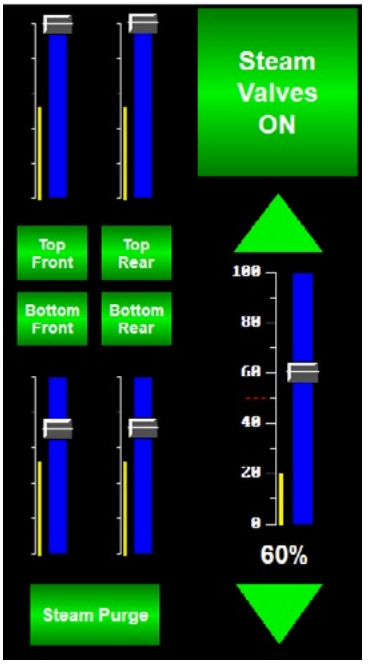



Start Master Slider at 60%

When a windrow has more moisture on top than on bottom, start with the top steam valves around 70% and the bottom steam valves at 100%.

## Windrow with More Moisture on Bottom than Top



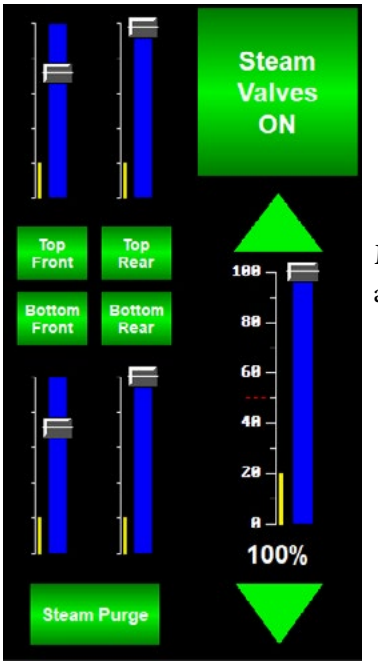


Start Master Slider at 60%

Bottom Steam Valves at 70%

When a windrow has more moisture on bottom than on top, start with the bottom steam valves around 70% and the top steam valves at 100%.

## Hot and Dry Conditions

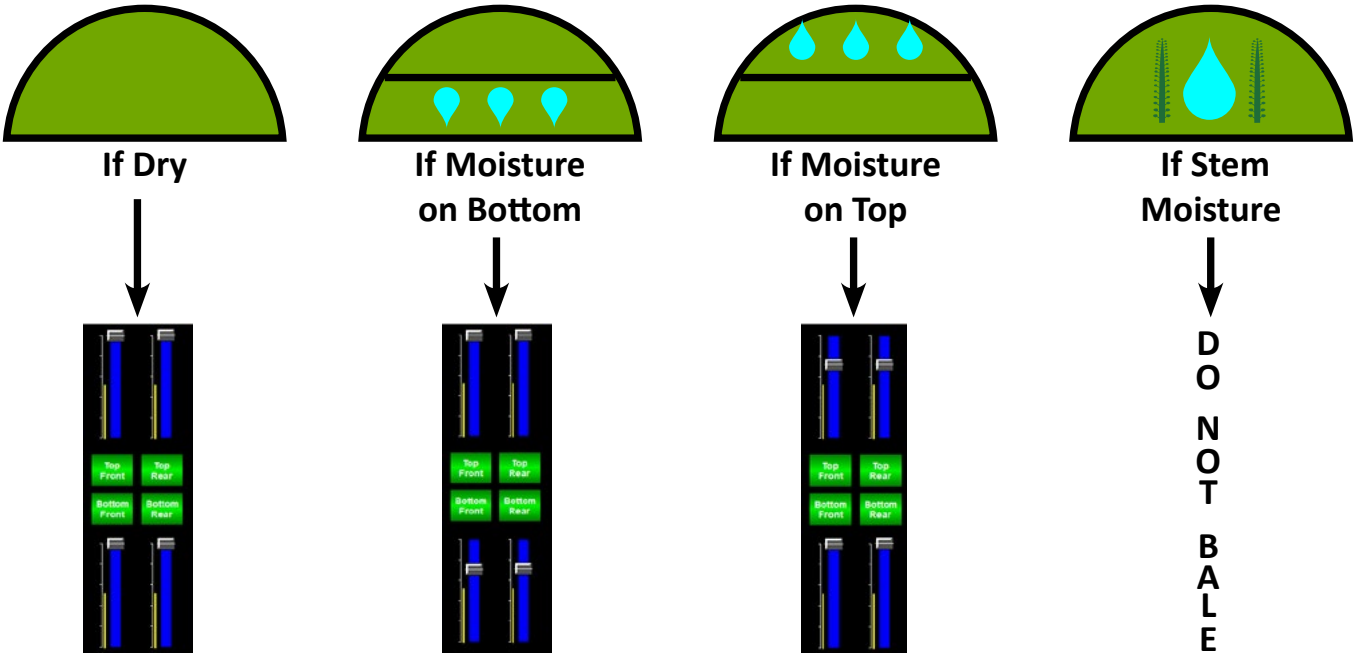




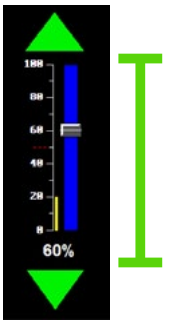
Master Slider at 100%

When baling in hot and dry conditions, adjust the front steam valves to around 70% and the rear steam valves to 100%.

## #1 - Check Current Windrow Condition
## #2 - Set Steam Ratio

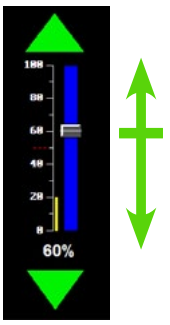



## #3 - Set Steam Rate




60% is a good starting rate

## #4 - Bale 2-4 Bales with Steam
## #5 - Adjust Steam Rate 5-10% If Necessary
## #6 - Repeat Steps 4-5 Until Optimum Bale Moisture is Reached

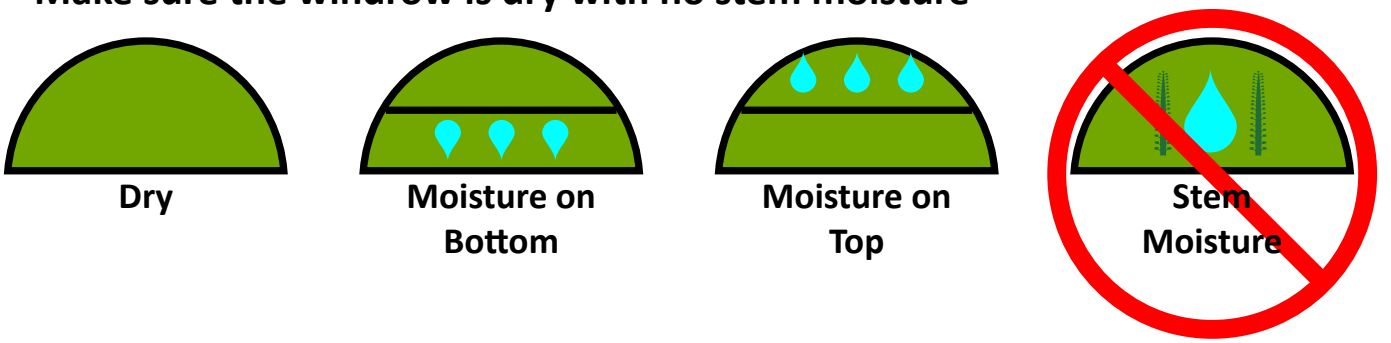



Make steam rate changes based on the average (Avg) reading


***The steam ratio should not be changed unless the windrow condition changes**

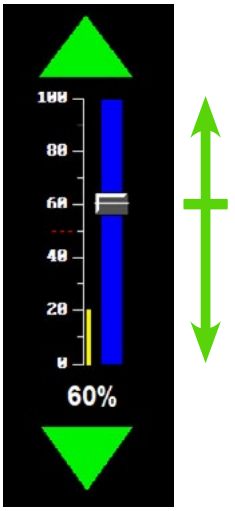
# Steam Rate Adjustment With a Gazeeka

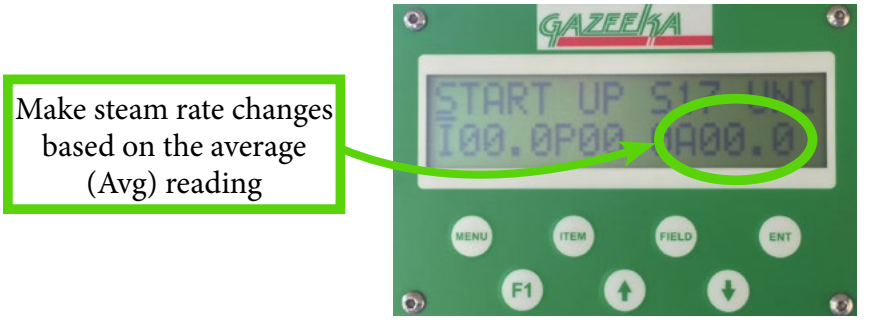
## #1 - Make sure the windrow is dry with no stem moisture



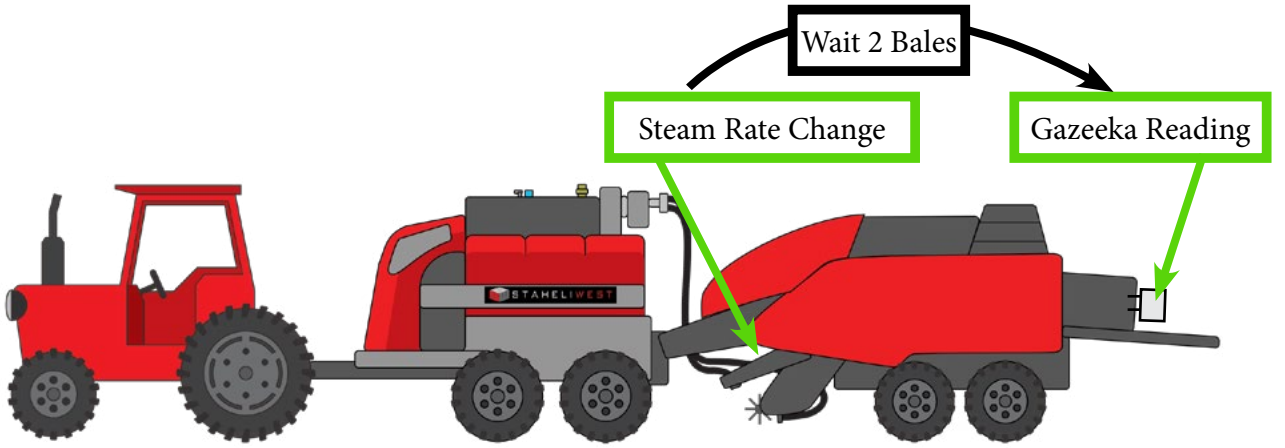

## #2 - Pick a target moisture level [12-14%]

## #3 - Adjust steam rate based on the Gazeeka Avg reading



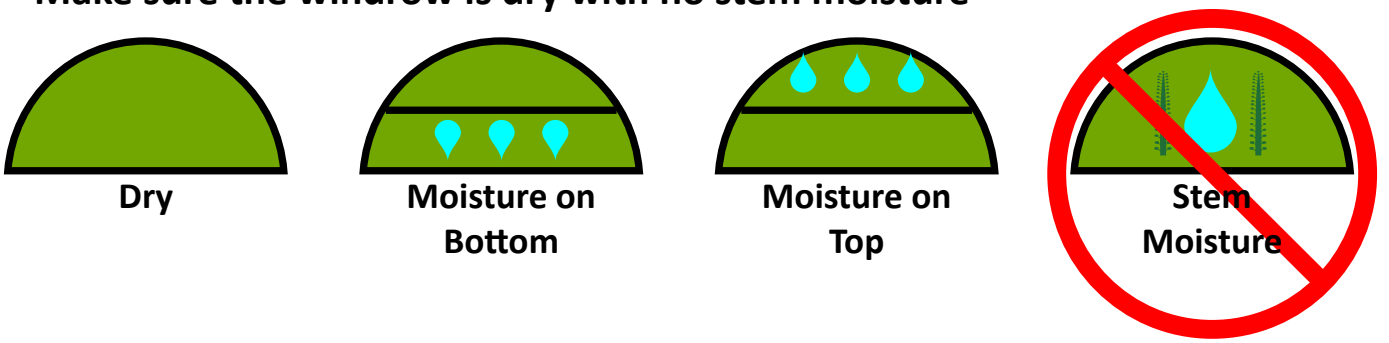

## #4 - Wait for at least two bales before making more steam rate changes



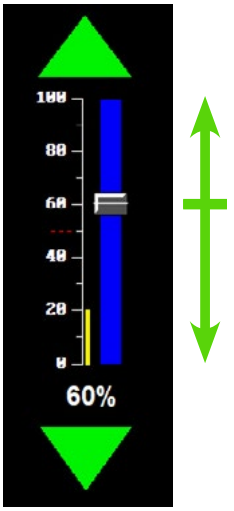

**REMEMBER TO WAIT AT LEAST TWO BALES BETWEEN MAKING ADJUSTMENTS**

# Steam Rate Adjustment Without a Gazeeka

## #1 - Make sure the windrow is dry with no stem moisture

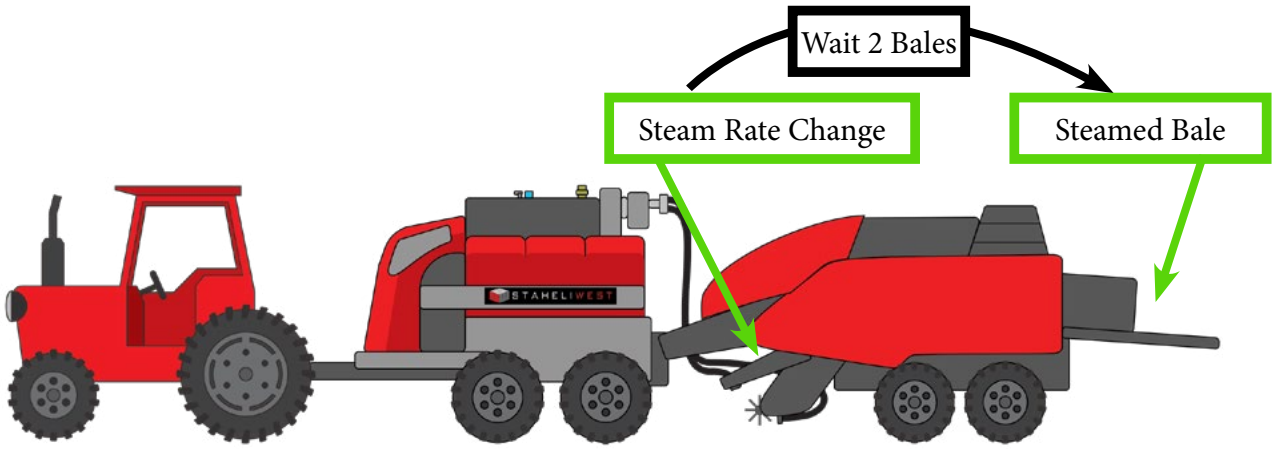



## #2 - Increase steam rate until bales look good



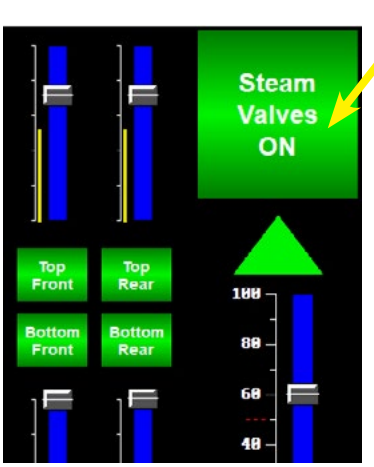

**Handheld moisture probes are inaccurate when reading recently steamed bales.**
**Wait for 1 hour to get a more accurate reading.**
**Wait 24-72 hours to obtain a precise reading.**

## #3 - Wait for at least two bales before making more steam rate changes




**REMEMBER TO WAIT AT LEAST TWO BALES BETWEEN MAKING ADJUSTMENTS**

**Turn steam off when:**




**Turning around at the end of windrows**

**Slowing down**

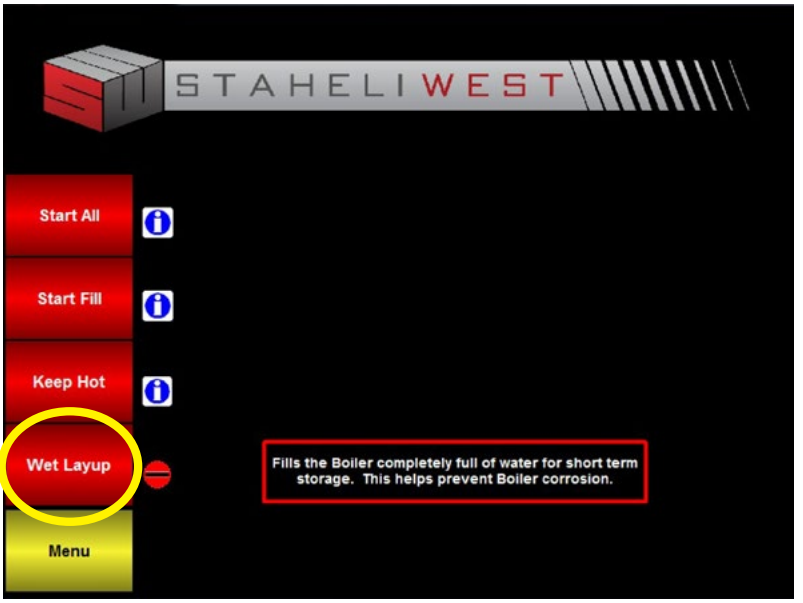
**Light/Absent windrow spots**

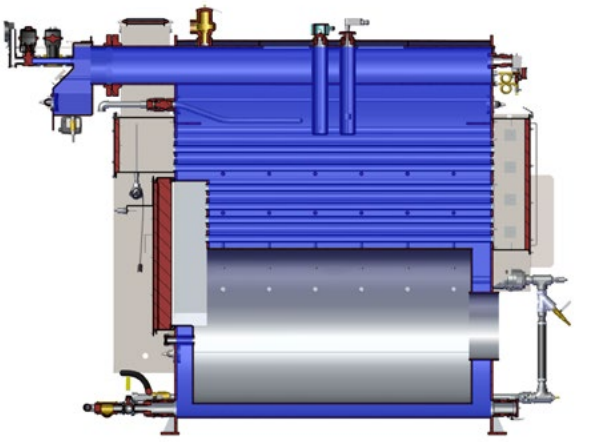
# Short Term Storage (Wet Layup)

Short term storage (wet layup) should be used anytime the machine is going to sit 3-30 days without being used. If it will sit for less than 3 days the machine can be left with water at the normal operating level. If it will sit for more than 30 days, it should be winterized (see winterization in the maintenance section).

Filling up the boiler completely with water is the preferred method for short term storage. To do this, press Wet Layup > Confirm Wet Layup. The generator will start and the boiler will begin to fill until water comes out of the pressure relief valve. As soon as water comes out, shut down the machine. The machine is now ready for short term storage.

Having the boiler completely full of water prevents rust and corrosion inside the boiler.



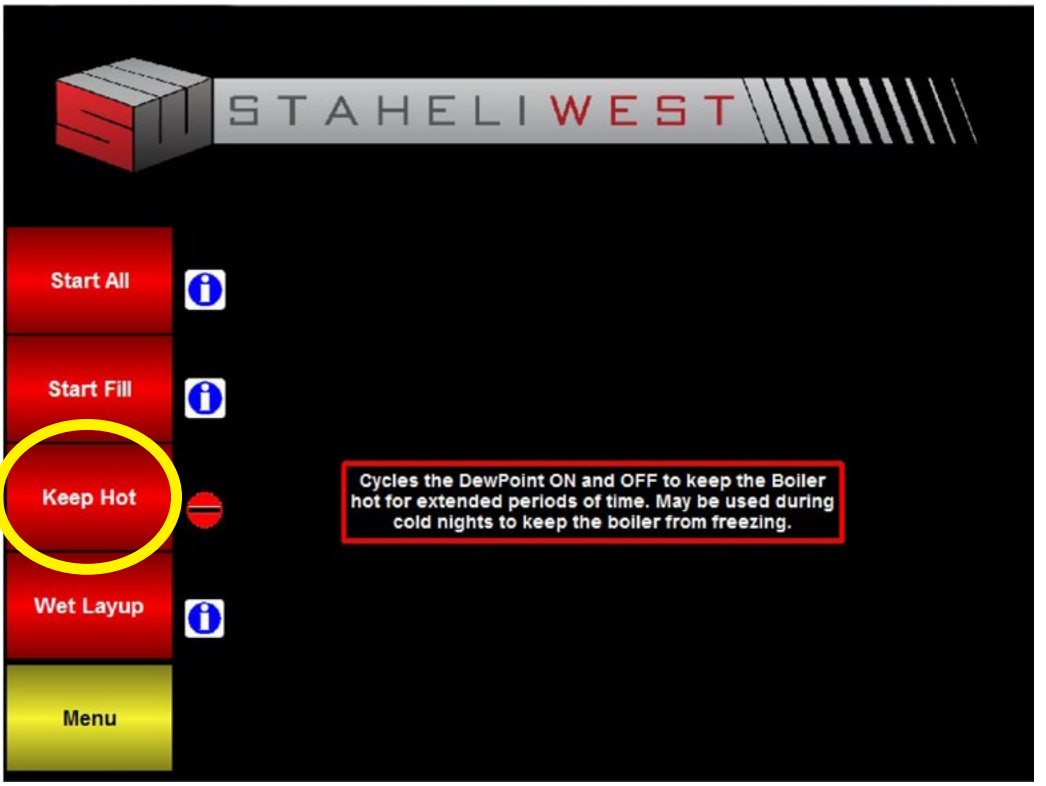
| Days of Storage | Storage Recommendations |
|---|---|
| 0-3 | None |
| 3-30 | Short Term Storage (Wet Layup) |
| >30 | Winterize |

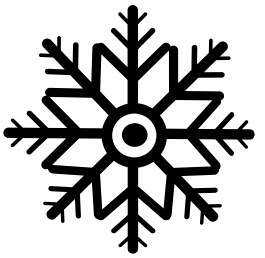
# Keep Hot

Keep hot should be used whenever the machine is subjected to less than 32° F (0° C) temperatures.

To initiate keep hot, turn on the touch screen, press Keep Hot > Confirm Keep Hot. The generator will start and the machine will start and build pressure like a normal start all. The generator will shut off after 30 minutes and stay off for 60 minutes. It will cycle like this until the machine is turned off. Leave the steamer in keep hot mode the entire time the machine will be subjected to below freezing temperatures.

Using keep hot will prevent sensors, plumbing, and other components on the steamer from freezing.



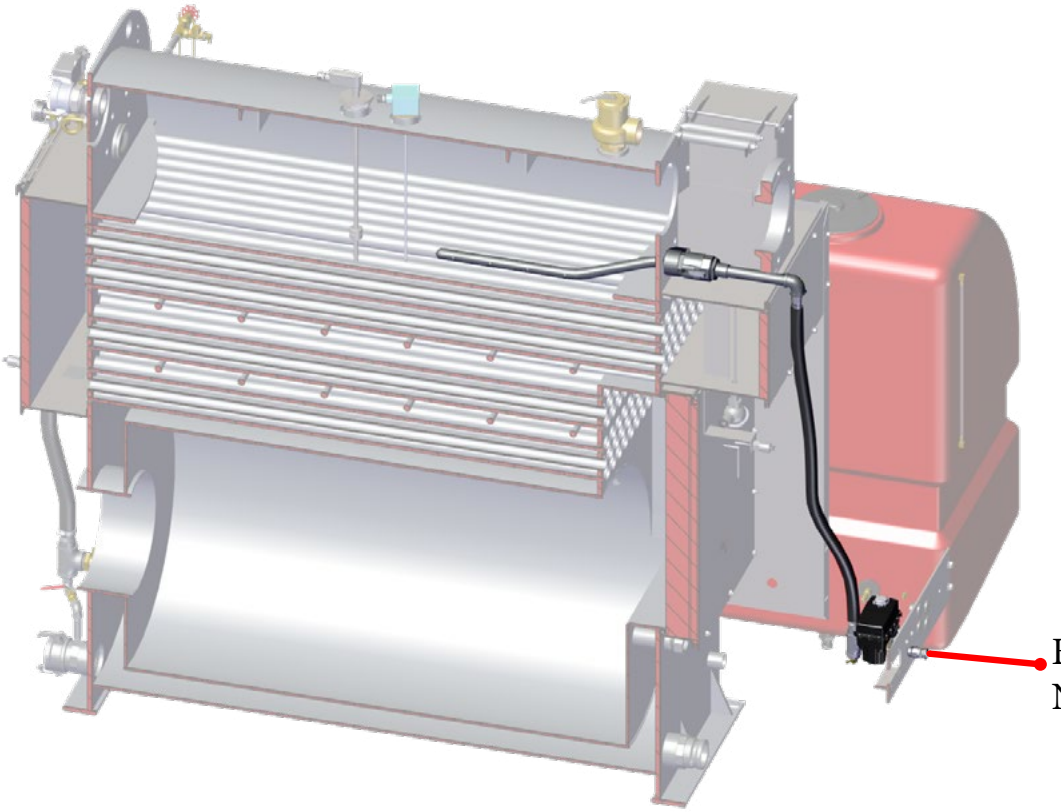



# Blowdown System

The Blowdown System will prompt the operator to start a blowdown once every 250 gallons of water. Once a blowdown has commenced, the blowdown actuator will open, allowing the skimmer tube to remove some of the foamy contaminated water. The blowdown should expel 1.9 gallons per minute. The contaminated water then travels through the blowdown hose to where it is routed behind the baler pickup. There the contaminated water should be safely discarded on the ground. If the supply water level sensor is faulty, the blowdown system may not function properly and foaming and water carryover may result. A blowdown can last several minutes. It is important to let the blowdown finish its cycle whenever possible. The length a blowdown lasts is dependent on the PPM setting. The higher the PPM, the longer the blowdown. It is recommended to route the rear blowdown hose behind the baler pickup and where it will not spray on the baler tires. Hot blowdown water has been known to cause premature wear on baler tires.

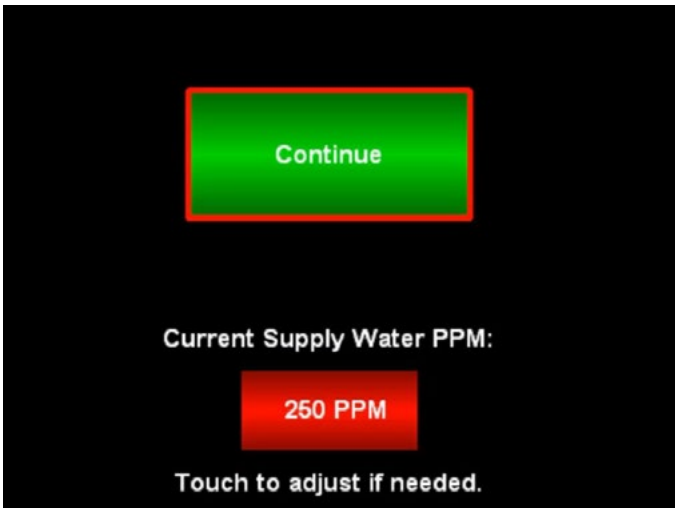
The purpose of the blowdown system is to prevent water from carrying over into the steam hoses and into the hay. The blowdown actuator opens and purges contaminated water out of the boiler.

A manual blowdown is performed each day as part of the pre-operation maintenance. The operator should drain 30-40 gallons out of the bottom of the boiler by opening the boiler drain valve. When the DewPoint machine has not been running for a while, the contaminants in the water will settle to the bottom of the boiler. This manual blowdown is a method of getting rid of the contaminants. While operating the machine while the water is boiling, the highly concentrated water will rise to the top. The surface blowdown that the operator performs while running the machine removes highly concentrated water from the surface of the boiling water.



# Blowdown System

1




Always make sure you have the proper PPM (parts per million) setting before operating the DewPoint machine.
Contact your dealer if you do not know your PPM number

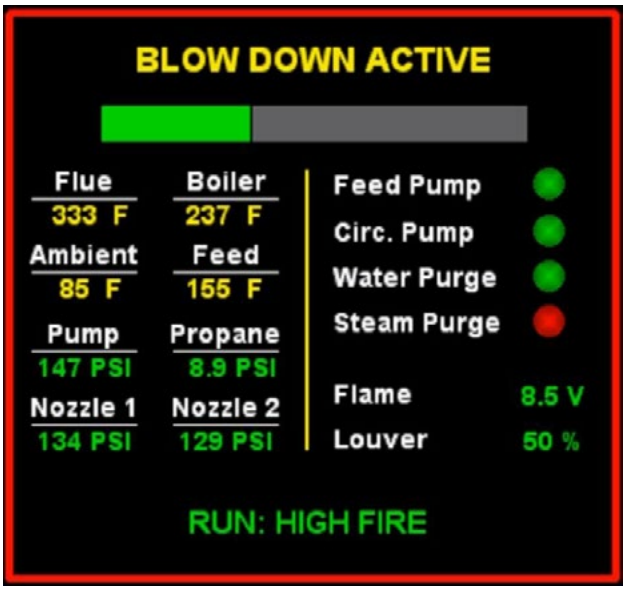
2


When you are prompted to begin the blowdown, ensure the area by the blowdown hose (behind baler pickup) is clear of people.
If area is clear, press blowdown.

3

The blowdown will begin and hot water will purge out of the blowdown hose. Ensure the blowdown hose is not kinked. A kinked blowdown hose will cause foaming and water to enter the bales.

4




The blowdown can last several minutes. Always allow the blowdown to finish its cycle to maintain water quality.

# Water Purge System

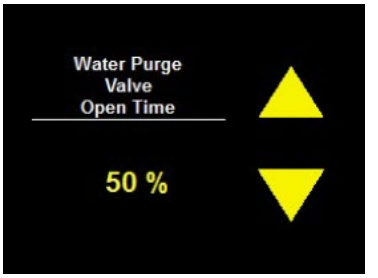
The water purge system starts functioning as soon as the operator presses "Confirm Start" on the touch screen. The default setting for the "Water Purge Valve Open Time" is 50%. This means that for every minute, the water purge actuator is open 50% of the time. The actuator opens for 30 seconds, and then closes for 30 seconds. If the operator changes the "Water Purge Valve Open Time" to 75%, the valve would open for 45 seconds and then close for 15 seconds each minute. This water purge system continues to operate until the machine is shut down.

The purpose of the water purge system is to prevent water from carrying over into the steam hoses and into the hay. The water purge actuator opens which purges excess water in the steam manifold back into the rear supply tanks.

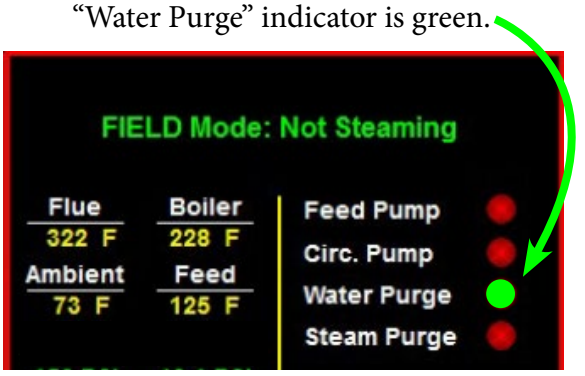
It is common for the water purge system to become clogged/blocked. It is part of the 50 hour maintenance to clean the water purge system. An easy way to verify that the water purge system is functioning properly is to listen for a crackling sound in the rear supply tanks while the machine is under pressure and the water purge valve is open.

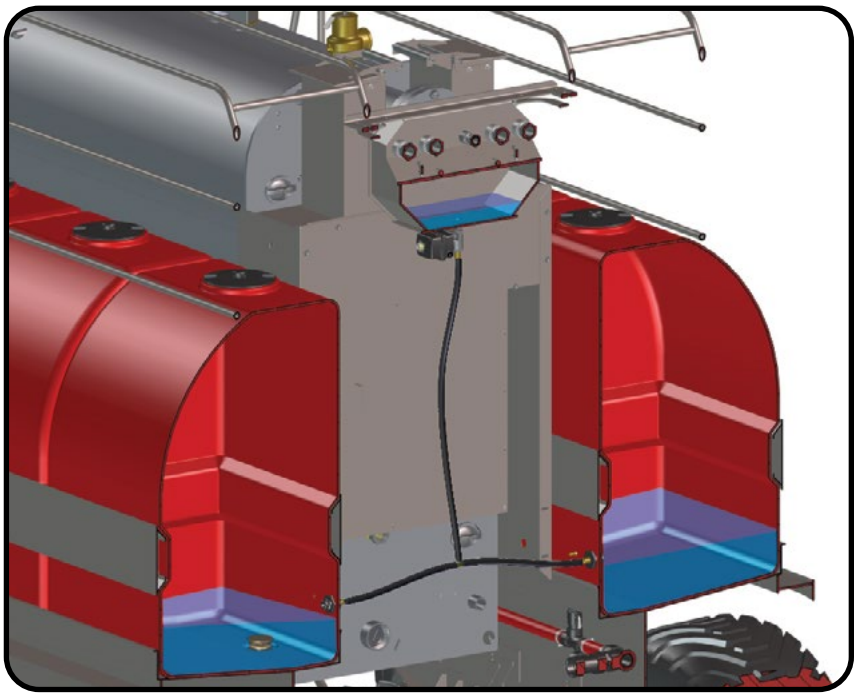
To change the setting for the "Water Purge Valve Open Time", go to Menu > Settings > Water System.

The "Water Purge Valve Open Time" setting loses its value each time the touch screen is turned off.




The water purge valve is open when the "Water Purge" indicator is green.



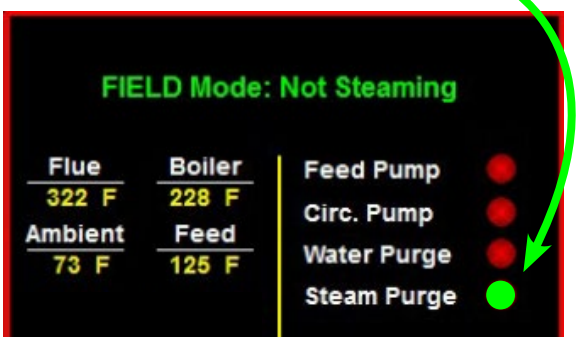
# Steam Purge System

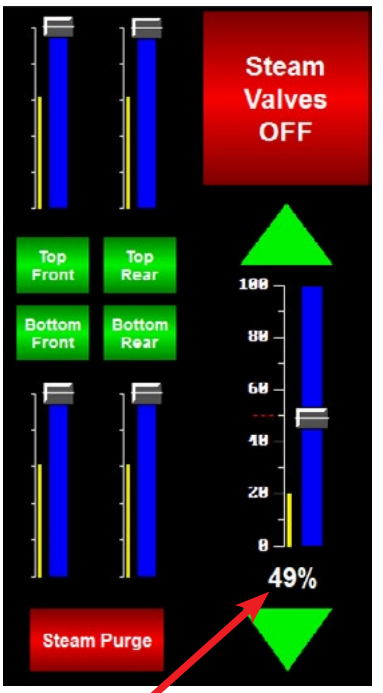
The steam purge is a system that helps prevent the burner from shutting off. The burner will shut of when the boiler pressure reaches 1 psi higher than the target (Default target =12 psi | Default shutdown =13 psi). The steam purge valve opens to relieve pressure in the boiler at the target steam rate (12 psi default).

The steam purge is active at 50% and above on the master steam rate, and it is deactivated when the master steam rate is below 50%. It is deactivated on lower rates to preserve efficiency and it is often not needed.

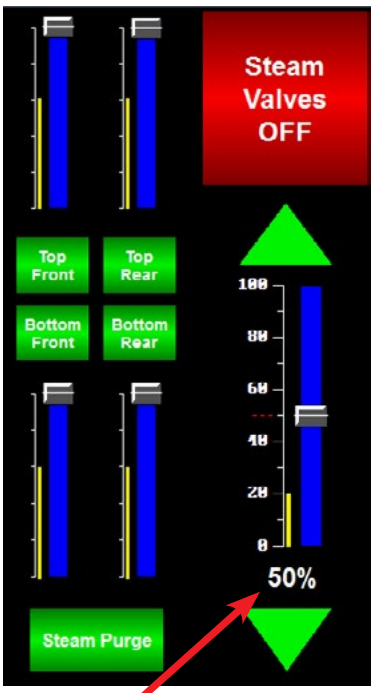
The steam purge valve most commonly opens during initial startup to purge oxygen, and when turning at the end of a windrow when steam is turned off.

The steam purge valve is open when the "Steam Purge" indicator is green.




OFF




ON

The steam purge system turns on automatically at 50% and above. It turns off automatically at 49% and below.

The steam purge system can be manually activated and deactivated. When active, it will open the steam purge valve when the boiler reaches 12 psi.

General Considerations

When using the DewPoint steam technology to bale your hay you should update your crop management practices to increase efficiency in your overall operation. Baling is no longer the limiting factor in your operation since you are generally able to open the baling window up to 12-24 hours per day if needed. You can bale anytime the hay is dry with the exception of very hot afternoon hours in some climates.

Irrigation

- COMMON PRACTICE: Irrigation Timing.
    - In arid climates many hay producers using conventional balers leave their irrigation water on very close to the time they cut their hay in order to draw some ground moisture into windrows of hay for baling after it is cured.
    - This practice causes excessive machine tracking and crop damage when cutting, raking, baling and hauling hay. It also slows the hay curing process, causes inconsistencies in dry-down, and increases bleaching and the possibility of wet slugs in windrows of hay.
- CONSIDER THIS CHANGE: Irrigation Timing.
    - When using DewPoint technology you are able to re-hydrate very dry hay for baling with no problem.
    - We recommend shutting off your irrigation water several days ahead of your hay harvest to allow the ground to dry more thoroughly before cutting.
    - This will reduce hay curing time, reduce tracking during harvest operations, improve dry-down consistency and decrease bleaching.
- CONSIDER THIS CHANGE: Pivot Rotation.
    - You should also consider the rotation of Pivot Irrigation systems leading up to your hay harvest.
    - Since Natural Dew tends to form more heavily in low areas of a field it is a good practice to water the low side of the field first and the high side last during the final rotation before your hay harvest. This will make your dry-down more consistent across the entire field.

Cutting

- COMMON PRACTICE: How Many Acres to Cut.
    - Hay producers often limit the acres of hay they cut each day because they are not sure how much baling they can actually get done each day with unpredictable natural dew conditions.
- CONSIDER THIS CHANGE: How Many Acres to Cut.
    - Since DewPoint technology allows operators to bale 12-24 hours per day, (almost anytime the hay is dry) hay producers can "schedule" their harvest.
    - Simply decide how many acres you want to bale each day and go ahead and cut that many acres each day.
    - Each DewPoint/Baler combo can typically bale 200-250 acres in 8-10 hours, depending on yield.

Raking

Proper raking is one of the most critical elements in maintaining the value of your harvested hay crop. Poor raking practices can cause substantial crop loss.

Timing

- □ Hay should be double raked when it has enough moisture to hold the leaves during the raking process but not so much moisture that the double windrow is too dense to allow airflow through the windrow.
  - In dry climates or conditions when rapid dry-down conditions exist and natural dew is scarce or non-existent you should consider raking your hay while there is still a little green stem moisture. The evaporative effect of a windrow with some stem moisture will cool the air and raise the humidity level in the windrow, and will create a natural dew effect within the windrow for raking, even when the ambient air in the field is too dry to form natural dew.
  - In humid climates or conditions you should avoid double raking hay too early, perhaps even waiting until the morning you bale. Double raking a day or two ahead of baling in high humidity conditions when there are heavy dews at night causes the dew moisture to sink to the bottom of the windrow after sunrise. This moisture is very slow to migrate out of the windrow and sometimes makes it necessary to "flip" the double windrow to get sufficient dry-down for baling.
- □ Double raking hay that is too dry will result in excessive leaf loss on the ground during the raking process resulting in crop loss.

- □ Double raking hay that is too green will cause serious increases in dry-down time and inconsistent dry-down characteristics in the windrow.

Soil Moisture

- □ Some hay producers cut their hay too soon after the irrigation water is turned off.
- □ Double raking on ground with excessive soil moisture will cause an increase in dry-down time and inconsistent dry-down characteristics in the windrow.
  - Moisture from the soil will percolate up into the bottom of a double windrow particularly when yields are heavy.
  - In this case it may be necessary to "flip" the double windrow to get sufficient dry-down for baling.

Rake Adjustments and Maintenance

- □ Your hay rake should be set to sweep the crop from the ground without the rake teeth touching the soil. This requires careful daily attention to rake adjustment.
  - If rake teeth are set too low, dirt and/or dust will be raked into the hay. This increases the "ash" content in your hay which decreases the feed value numbers on your hay tests. This also decreases the monetary value of your crop. Just a $10/ton decrease in value due to high "ash" content over 10,000 tons in a year is a $100,000 decrease in your income.
  - If rake teeth are set too high you will leave valuable crop tonnage on the ground in the field.
- □ Maintaining rake teeth and the rake in general, and careful daily adjustment are worth the effort.

# DewPoint Machines

| | DewPoint 6110/6210 | DewPoint 331 |
|---|---|---|
| Water Storage Needed | 2500-3000 Gallons (9500-11300 Liters) | 1500-2000 Gallons (5700-7500 Liters) |
| Supply Water Capacity  | 1000 Gallons (3800 Liters) | 500 Gallons (1900 Liters) |
| Amount of Boiler Chemical to Add Each Fill 1:1000  | 1 Gallon (3.8 Liters) | 0.5 Gallons (1.9 Liters) |
| Boiler Water Capacity  | 350 Gallons (1300 Liters) | 250 Gallons (950 Liters) |
| Fuel Capacity  | 300 Gallons (1100 Liters) | 120 Gallons (450 Liters) |
| Tractor Requirements | | |
| Horse Power | 200-275 (Depending On Slopes) | 100-175 (Depending On Slopes) |
| Min Hydraulic GPM | N/A | 15 |
| Recommended Hydraulic GPM | N/A | 25 |
| Hydraulics | • Hydraulic Trailer Brake Valve | • 1 Set SCV<br>• 3/8” Direct Return to Hydraulic Tank |
| Electrical | N/A | • 12 Volt Auxillary Port<br>• SW Harness 11546<br>• SW Harness 11547<br>• Trailer Brake Controller |

# Baling With Steam

| | Large Square Bales | Small Square Bales |
|---|---|---|
| Max Bale Temperature | 135° F (57°C) | 145° F (60°C) |
| Max Bale Stacking Temperature | 115° F (45°C) | 115° F (45°C) |
| Max Moisture Increase With Steam | 4-5% | 6-8% |
| Suggested Moisture Range (Alfalfa) | 12-14% | 14-22% |
| Accumulators | Horizontal = OK | Horizontal = OK<br>Bale Band-it & Bale Baron only if bales are ≤ 115° F (45°C) |
| Suggested Moisture Sensor | Gazeeka 870 | Gazeeka 180s (Colt) |
| Contact Moisture Sensors (Hand Probe, Star Wheel + Other baler mounted sensors) | Contact moisture sensors read 3-5% high when testing recently steamed bales. Wait 24 hours for the steam to dissipate and then the hand probe moisture sensor will read accurately. | |
| Condition of Alfalfa Before Steaming | Fully Cured (6-10%) | |
| Condition of Cereal Grain Before Steaming | Fully Cured (6-10%)<br>Don’t be tricked by green nodes on plants that appear dry | |
| Condition of Mixed Grass/Alfalfa Before Steaming | Fully Cured (6-10%) | |

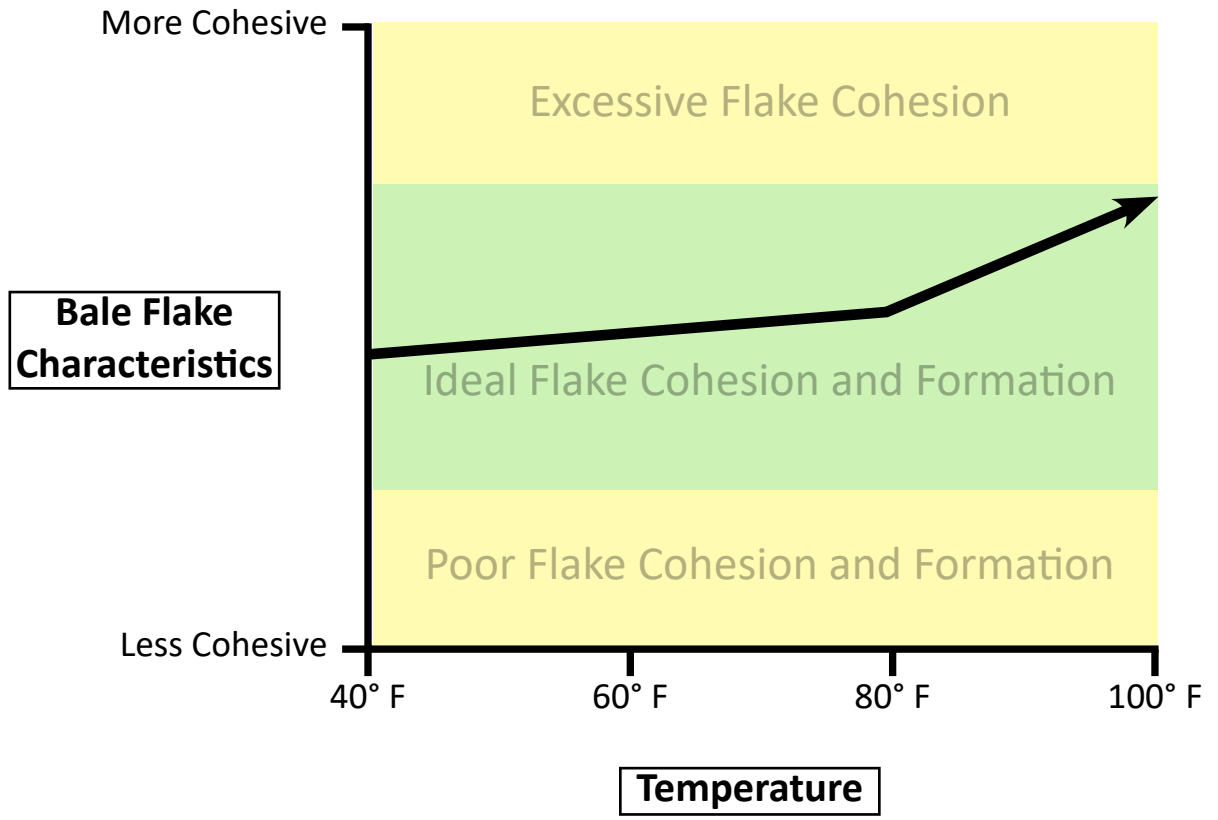
# Suggested Moisture With Steam

| | | Large Square Bales | Small Square Bales |
|---|---|---|---|
| Legumes | Alfalfa | 12-14% | 14-22% |
| Grasses | Alfalfa/Grass | 12% | 14% |
| | Forage Grasses | | |
| | Timothy | | |
| Cereal Grains | Oat | 12% | 14% |
| | Wheat | | |
| | Triticale | | |
| | Beardless Barley | | |
| | Straw | | |

# Steaming Different Crops

| | | Baled with Steam |
|---|---|---|
| **Legumes** | **Alfalfa** | More leaves, higher density, more weight, less dust, consistent bales, better effects with TMR (Total Mixed Ration) and hay press machinery. |
| **Grasses** | **Alfalfa/Grass** | Higher density, more weight, less dust, consistent bales, reduces “springy” characteristics of bales, better effects with hay press machinery. |
| | **Forage Grasses** | |
| | **Timothy** | |
| **Cereal Grains** | **Oat** | Higher density, more weight, less dust, consistent bales, reduces “springy” characteristics of bales, better effects with hay press machinery. |
| | **Wheat** | |
| | **Triticale** | |
| | **Beardless Barley** | |
| | **Straw** | |

# Steam Effects in Different Temperatures




Steam will always help flake formation while baling. As the temperature rises and the operator uses more steam, the flakes will become more and more cohesive. The higher the temperature and the steam rate, the more cohesive the flakes will be. This is one reason why operators may choose to bale during cooler temperatures.

**Managing and Judging Bale Moisture is Your Responsibility**

LEARN YOUR OWN LIMITS AND THE DEMANDS OF YOUR HAY MARKET

There is an acceptable range of bale moisture where bale density, flake wafering, and other characteristics can be manipulated and controlled according to the demands of your hay market. We recommend that you and your hay buyers and consumers become familiar with the characteristics of hay baled with steam at different moisture levels to determine what best suits the needs of all concerned parties.

The beauty of DewPoint Technology is that you can choose the way you want to bale your hay and the bale formation characteristics you and your market want in the finished product.

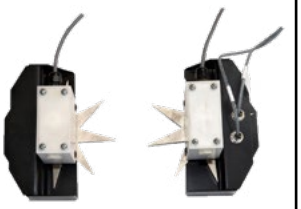
- REMEMBER: Steam applied to hay using the DewPoint machine will simulate a higher moisture effect than the actual moisture percentage that is applied.
    - FOR EXAMPLE: Hay that is 8% moisture in the windrow can be baled at around 12% using steam from the DewPoint Machine but will look like it was baled at 16-18% with natural dew.
    - This moisture effect allows a producer to bale hay that has superior leaf retention characteristics and high bale density with a relatively low bale moisture level.

The next few pages contain information regarding different ways to judge bale moisture.
We highly recommend the GAZEEKA moisture gauge as your primary moisture measuring instrument while baling hay using the DewPoint system.
We also recommend that you watch bale chamber pressure readings and visually observe the bales you are making as you pass by them on the next windrow. These redundant observations will help assure that you are making the best hay possible.

# Moisture Sensors

**There are a variety of moisture sensors or gauges on the market. Be sure that your moisture measurement method is installed correctly, properly calibrated, well understood and working properly before baling hay.**

**All methods of moisture measurement should be confirmed by measuring with a hand held moisture probe a few days after the hay has been baled.**

| | | Preferred Method | Alternative 1 | Alternative 2 | Alternative 3 |
|---|---|---|---|---|---|
| **Type** | | Microwave | Bale Chamber Pressure | Hand Held | Contact |
| | |  |  |  |  |
| **Initial Reading with steam** | | Accurate | Accurate in cooler conditions; similar readings to natural dew (for experienced balers only) | Reads high 3-5% | Reads high 3-5% |
| **Initial Reading without steam** | | Accurate | Accurate in cooler conditions; similar readings to natural dew (for experienced balers only) | Accurate ONLY with even moisture dispersion | Accurate ONLY with even moisture dispersion |
| **3 day Reading** | | | | Accurate | |
| **With Stem Moisture** | **Initial Reading with steam** | Accurate | Accuracy varies | Reads low 3-5% | Reads low 3-5% |
| | **3 day Reading** | | | Accurate | |

**It is NEVER recommended to bale with stem moisture**

# Judging Bale Moisture with the Gazeeka Moisture Gauge

| Preferred Method |
| --- |
| Microwave |


**Judging Bale Moisture with the GAZEEKA Moisture Gauge**

- PREFERRED METHOD: We highly recommend the GAZEEKA Microwave Moisture Gauge which is a non-contact, microwave moisture measuring instrument.
- Use a baler mounted GAZEEKA Moisture Gauge.
    - Effectiveness and accuracy of the GAZEEKA Moisture Gauge in DewPoint steam baled hay.
        - The speed of microwaves through air is very close to the speed of light, and the speed of microwaves through dry hay is a little slower than through air.
        - The speed of microwaves through water is considerably slower than in dry hay. The difference in this speed is attributed to a value known as the dielectric constant (sometimes called relative permittivity). The dielectric constant for air is close to 1, for dry fibrous material it is closer to 2 while for pure water it is approximately 80. Similarly, the amount of microwave energy absorbed in air is less than dry hay and in dry hay is much less than in water. Thus, if measured correctly, these measurements can be a very sensitive method of measuring moisture in a bale of hay.
        - Whether the moisture detected in hay is from steam, natural dew or stem moisture, the GAZEEKA Moisture Gauge provides an accurate moisture reading when properly calibrated.
        - Calibration should be done prior to putting hay in the baler the first time. Follow all directions with the GAZEEKA instrument to calibrate and establish proper settings for safe and reliable operation.
- MONITOR bale moisture using the GAZEEKA Moisture Gauge and adjust steam rate to meet your bale moisture target.
    - It is your responsibility determine acceptable bale moisture parameters.
    - As a general rule you will add from 1%-5% moisture to the hay you are baling, depending on the ambient conditions and the steam rates used to meet the existing conditions.
        - In climates with low humidity fully cured hay that has no natural dew will normally range from 8-10% moisture in the windrow.
            - In these climates you will normally be able to make bales with very good leaf retention and density by applying enough steam to bring the bale moisture up to 12-14%.

# Judging Bale Moisture with the Gazeeka Moisture Gauge

- REMEMBER: Steam applied to hay using the DewPoint Machine will simulate a higher moisture effect than the actual moisture percentage that is applied.
  - FOR EXAMPLE: Hay that is 8% moisture in the windrow can be baled at around 11-13% using steam from the DewPoint Machine, but will look like it was baled at 16-18% with natural dew.

- In climates with moderate humidity fully cured hay that has no natural dew will normally range from 10-12% moisture depending on ambient humidity.
  - In these climates you will normally be able to make bales with very good leaf retention and density by applying enough steam to bring the bale moisture up to 13-15%.
  - REMEMBER: Steam applied to hay using the DewPoint Machine will simulate a higher moisture effect than the actual moisture percentage that is applied.
    - FOR EXAMPLE: Hay that is 10-12% moisture in the windrow can be baled at around 13-15% using steam from the DewPoint Machine but will look like it was baled at 16-18% with natural dew.
- In climates or seasons of high humidity where hay cannot be fully cured (no stem moisture), you may choose to use hay preservative along with steam application. The steam application will reduce leaf loss and the preservative will prevent hay spoilage.
  - We do not recommend baling with “Stem Moisture” whether using steam or not, unless:
    - You are using a proven preservative product.
    - You have tested the preservative product along with the use of steam, and you know your limits!
    - Some producers have successfully baled with some stem moisture in the daytime while adding a proven preservative and a moderate amount of steam to hold leaves. This practice is more common in more humid climates and during monsoon conditions.
    - REMEMBER: Steam applied to hay using the DewPoint Machine will simulate a higher moisture effect than the actual moisture percentage that is applied.
      - Adding just 1-3% more moisture with steam will reduce leaf loss and improve bale quality while keeping the bale moisture within an acceptable range where a proven hay preservative will prevent spoilage.

□ IN ALL OPERATING CONDITIONS YOU MUST FIND YOU OWN LIMITS.

- WATCH the moisture reading on the GAZEEKA monitor.
- ADJUST the steam injection rate over the first 5 to 10 bales.
- MONITOR and make adjustments throughout the operating time to keep the bale moisture at the desired level.

# Judging Bale Moisture by Bale Chamber Pressure

| Alternative 1 |
| --- |
| Bale Chamber Pressure |
|  |

**Judging Bale Moisture by Bale Chamber Pressure**

- Use bale chamber pressure readings with steam in a similar fashion as you would use them to judge natural dew conditions. This is a good redundant method of bale moisture measurement.
  - □ Effectiveness and accuracy in DewPoint steam baled hay.
    - During the cooler hours of the day and at night, bale chamber pressure is fairly accurate in DewPoint steam baled hay. During these hours an operator who is accustomed to judging bale moisture by the bale chamber pressure reading should be able to keep within reasonable bale moisture tolerances using similar readings to baling fully cured hay with natural dew.
    - If baling with stem moisture, the bale chamber pressure method of judging moisture is not accurate and is risky.
    - When baling with steam in the hot part of the day, bale chamber pressure will nearly double to maintain the friction necessary to reach plunger load target settings even though the bale moisture is sufficient.
    - An operator using this method of moisture judging would do well to become very familiar with the characteristics of this method before becoming dependent upon this method.
  - □ If you use the bale chamber pressure reading to monitor bale moisture during operation:
    - You must DETERMINE the acceptable bale moisture parameters you are comfortable with.
    - As a general rule you will add from 1%-5% moisture to the hay you are baling, depending on the ambient conditions and the steam rates used to meet the existing conditions.
    - WATCH Bale Chamber pressure readings on baler monitor.
    - ADJUST the steam injection rate over the first 5 to 10 bales.
    - INCREASE steam injection rate to lower bale chamber pressure readings.
    - DECREASE steam injection rate to raise bale chamber pressure readings.

**Judging Bale Moisture Visually**
You should always observe the bales within a field while you are baling

- Bales with proper moisture levels will exhibit the following characteristics:
  - □ Leaf Pattern.
    - Leaves should be attached to stem and/or somewhat "wafered" into the flakes in the bale.
    - The front (plunger end) of the bale will normally not look as good as the rear end of the bale simply because of the action of the plunger against the front face of the bale on each plunger/stuffer stroke. When observing the front of the bale you should expect a little surface damage from the plunger, however if you brush away the surface you should see a good leaf pattern.
    - The rear end of the bale will normally show less mechanical damage since the plunger does not come in direct contact with it. When observing the rear end of a bale with the correct moisture level you should expect an excellent leaf pattern.
  - □ Bale Conformation.
    - The sides of bales with a good moisture level should be compressed, smooth, and may be slick but of good color.
    - Bale shape should be consistent, with firm corners and ends.
  - □ Bale Color.
    - The sides of bales with a good moisture level should be compressed, smooth, and may be slick but of good color.

- Bales that are too dry will exhibit one or more of the following characteristics:
  - □ Appear ragged and shattered along the sides.
  - □ Leaves will be detached from stems.
  - □ Corners and ends will be soft.
  - □ Bale weights will be low.

- Bales that are too high in moisture will exhibit one or more of the following characteristics:
  - □ Sides of bale may be dark or slightly discolored, and slick or smeared.
  - □ Leaf retention will be good but the flakes in the bale may be caked too tightly.

NOTE: There is an acceptable range of moisture where bale density, flake wafering and other characteristics can be manipulated and controlled according to the demands of your hay market. You should become familiar with these characteristics.

# Judging Bale Moisture with a Hand Held Moisture Probe

| Alternative 2 |
| --- |
| Hand Held |
|  |

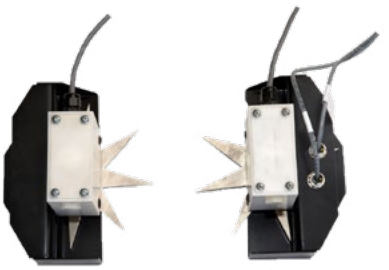
**Judging Bale Moisture with a Hand-Held Moisture Probe**

- If you use a hand-held moisture probe to monitor bale moisture during operation:
  - □ You must DETERMINE acceptable bale moisture parameters.
  - □ BE AWARE that the accuracy of this type of moisture sensor in steamed hay is not suitable for a true real time reading of bale moisture during the baling process. The surface moisture on the steamed hay causes the moisture to read several points higher than the actual moisture.
    - Fully Cured Hay: If an operator becomes very familiar with the typical offset of the moisture reading of this instrument compared to the actual moisture in the bale he can learn to use a hand held contact type moisture sensor with reasonable effectiveness when baling fully cured hay using steam. Various conditions at the time of baling can affect the performance of this type of sensor. The offset reading will vary depending on ambient conditions in the windrow.
      - ▫ If the windrow of hay has some degree of natural dew and a small amount of steam is added to the hay to bring it up to an optimum moisture level, there will be only a small offset in the moisture reading compared to the actual moisture in the bale.
      - ▫ If the windrow is very dry, requiring a higher rate of steam to bring the bale moisture to an optimum level there will be a much larger offset in the moisture reading compared to the actual moisture in the bale.

# Judging Bale Moisture with a Hand Held Moisture Probe

- Hay with Stem Moisture: When baling hay with stem moisture, a hand held contact type moisture sensor is not accurate when baling and will normally read lower than the actual moisture content of the hay.
    - A stem of hay that is not fully cured may be relatively dry on the outside but green on the inside. Therefore, while the inside of the stem may be very conductive, the conductivity between stems is typically much lower which insulates the signal between the measuring points on the sensor resulting in a lower overall reading at the time of baling. Moisture readings with a hand-held probe a few days after baling will be higher when the moisture from the stems migrates more fully throughout the bale profile.
- This type of moisture probe is effective several hours after the hay has been baled as the applied moisture diffuses throughout the plant tissue more completely.

# Judging Bale Moisture with a Baler Mounted Contact Moisture Sensor

| Alternative 3 |
| --- |
| Contact |
|  |

**Judging Bale Moisture Using a Baler Mounted Contact Type Moisture Sensor**

- If you use a conventional baler mounted moisture sensor such as a star wheel sensor or other contact type sensor mounted in the bale chamber to monitor bale moisture during operation:

  - □ You must DETERMINE acceptable bale moisture parameters.
    - BE AWARE that the accuracy of this type of moisture sensor in steamed hay is not suitable for a true real time reading of bale moisture during the baling process. The surface moisture on the steamed hay causes the moisture to read several points higher than the actual moisture because the sensor depends on electrical conductivity between two points. This conductivity always looks for the path of least resistance and any type of surface moisture will carry conductivity more readily than the entire profile of the crop being baled.
      - ▫ If an operator becomes very familiar with the typical offset of the moisture reading of this instrument compared to the actual moisture in the bale he can learn to use a baler mounted contact type moisture sensor with reasonable effectiveness when baling fully cured hay using steam. Various conditions at the time of baling can affect the performance of this type of sensor.
      - ▫ When baling hay with stem moisture, whether using steam, natural dew or no added moisture at all, a baler mounted contact type moisture sensor is not accurate when baling and will normally read lower than the actual moisture content of the hay.
    - The same principles noted in the Hand-Held moisture probe section apply to these baler mounted contact type sensors.
    - As a general rule you will add from 1%-5% actual moisture to the hay you are baling, depending on the ambient conditions and the steam rates used to meet the existing conditions.
    - WATCH moisture sensor readings.
    - ADJUST the steam injection rate over the first 5 to 10 bales to achieve the desired moisture level in your bale.

**Judging Bale Moisture After Baling**

- Regardless of the method you use to judge moisture during the baling operation you should always CHECK bales with a hand-held moisture probe a day or two after they are baled to be sure the moisture reading has settled.
    - □ If hay was dried completely before baling with steam (no stem moisture) the moisture level reading on a hand-held moisture probe will normally begin to drop after baling. Learn your limits and bale moisture characteristics for your own operation.
    - □ If you bale with stem moisture (whether you use steam or not) the moisture reading will generally increase significantly over the first 24-48 hours as the stem moisture migrates from the stems into the overall bale profile.
        - If you notice rising bale moisture readings over several days after baling you should monitor the bale moisture and temperature readings daily until these readings peak and begin to fall.
        - If bale temperature and moisture readings continue to rise to dangerous levels you should consult your local hay association and/or Fire Department to avoid a stack fire. In this case you should find a reliable source of information to guide your actions.

**Judging Bale Moisture is Your Responsibility**
**LEARN YOUR OWN LIMITS AND THE DEMANDS AND DESIRES OF YOUR HAY MARKET**

There is an acceptable range of bale moisture where bale density, flake wafering, and other characteristics can be manipulated and controlled according to the demands of your hay market. We recommend that you and your hay buyers and consumers become familiar with the characteristics of hay baled with steam at different moisture levels to determine what best suits the needs of all concerned parties.

The beauty of DewPoint technology is that you can choose the way you want to bale your hay and the bale formation characteristics you and your market want in the finished product.

# Judging Bale Temperature

- Bale Temperature.
  - When using steam, heat is added to the hay.
  - Bale temperatures can become excessive during high ambient temperatures when a high rate of steam is used to bale hay.
  - Excessive bale temperatures will deteriorate bale color in the center of large square bales.
  - Do not raise bale temperatures above the maximum bale temperature listed on the “Baling with Steam” page.
  - When bale temperatures approach the maximum, either reduce steam injection rates or wait until a cooler time of day to bale.
- How to Judge Bale Temperature.
  - Use a combination handheld bale moisture/temperature probe.
  - Use a bale temperature probe (Part #11345).
  - Insert thermometer into bale and allow to equalize for a few minutes to get a stable bale temperature reading.
- When baling with high rates of steam in high ambient temperatures, take regular bale temperature readings to be sure you are baling within a safe temperature range.

**Judging Bale Temperature is Your Responsibility**
**LEARN YOUR OWN LIMITS**

Some types of hay may be more sensitive to heat than others. We recommend that you define temperature levels that are acceptable for your operation.

**Temperature Probe**
**(Large Square Bales)**


**Part # 11345**

# Hauling, Stacking, and Storage of Steam Treated Hay

**Hauling and Stacking Steamed Hay during Normal Harvest Operations**

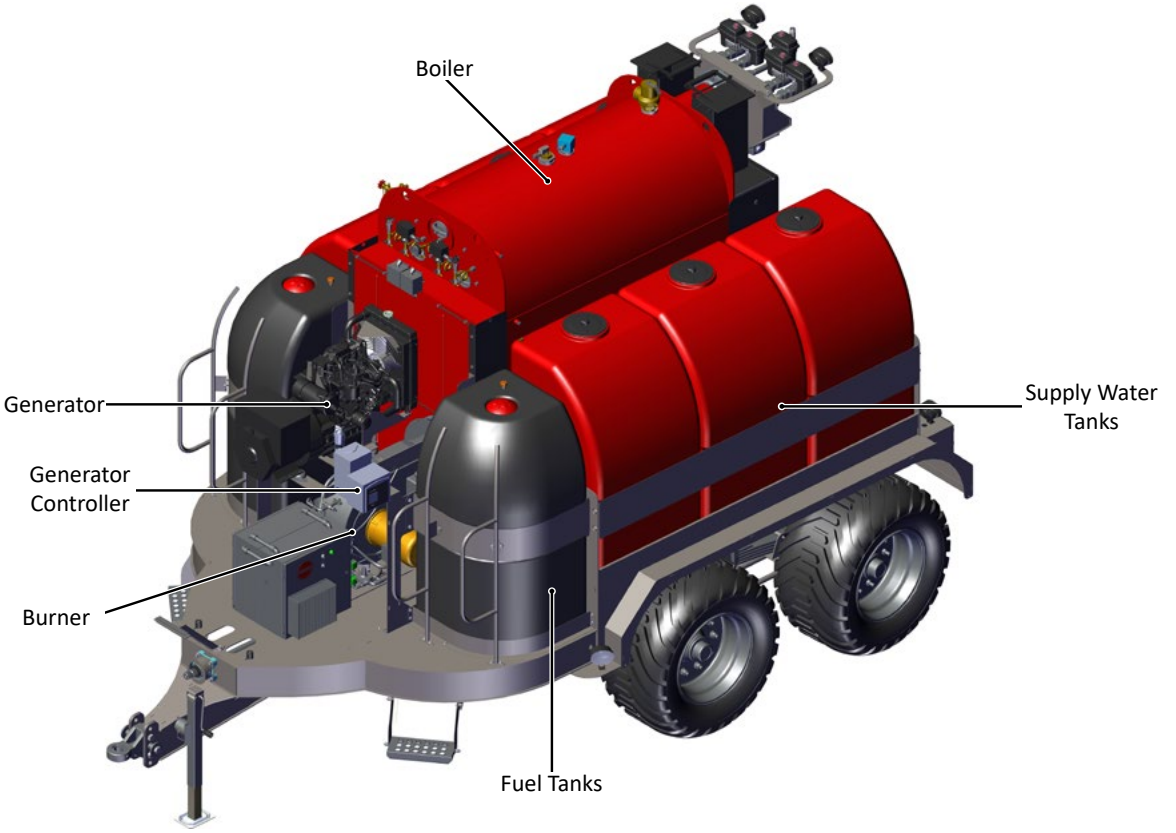
- To avoid discoloration of the hay in the stack you should not stack hay that is above 115° F.
  - As a general rule please observe the following:
    - Hay baled in the evening or at night can be hauled and stacked the next morning.
    - Hay baled in the early morning to mid-morning before high steam rates are used can be hauled and stacked the same day.
    - Hay baled from mid-morning through the early evening at high steam rates should not be hauled and stacked until the next morning.

**Stacking High Temperature Steamed Hay when Weather is a threat**

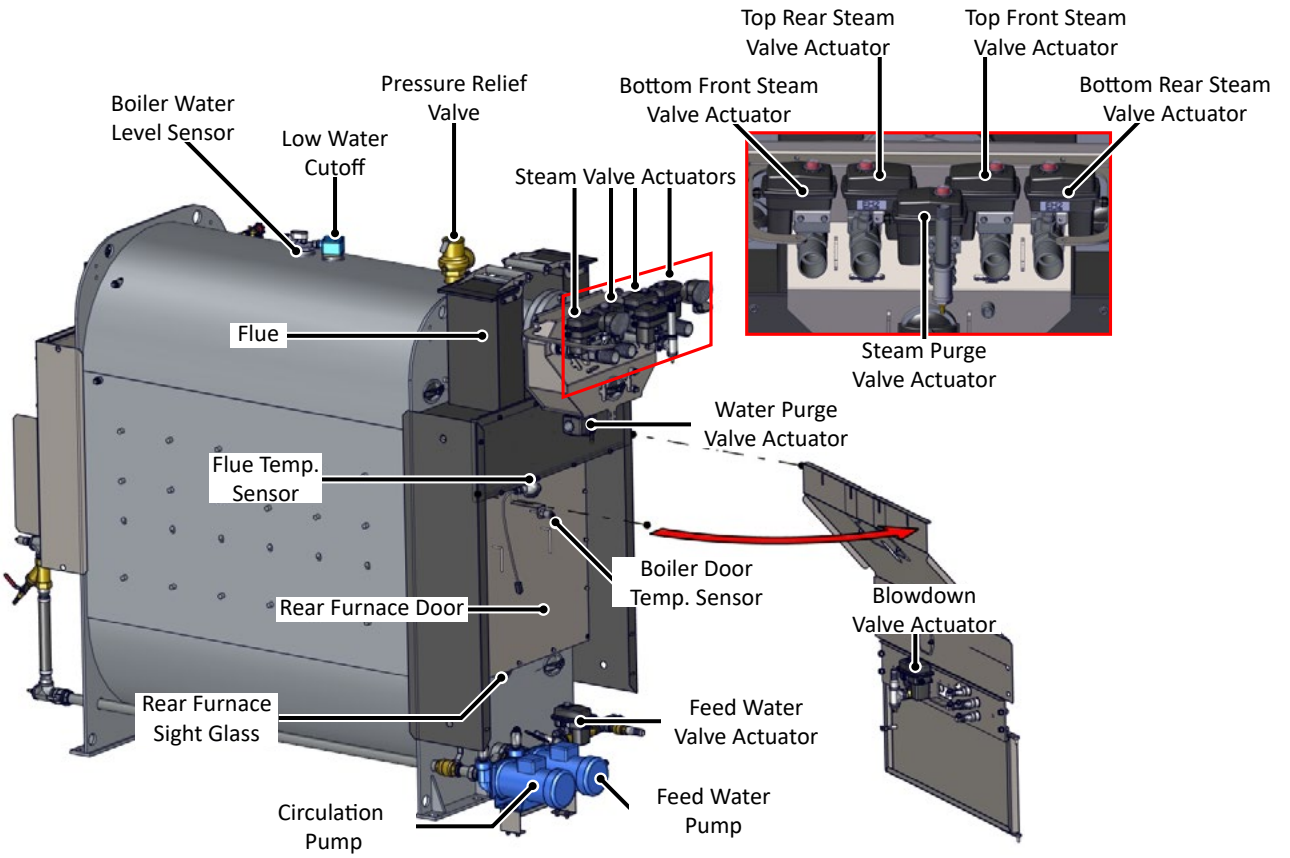
- If bales must be moved off the field immediately after baling to avoid weather damage, but they are too hot to stack conventionally, consider the following procedure:
  - Pick up and haul the bales from the field using you normal method.
  - DO NOT leave bales on a truck, bale mover etc. for more than the time it takes you to drive a short distance from the field to the stack yard or field side. Long distance hauling or stopping for more than a few minutes will cause bale discoloration.
  - Dump hay in stack location and immediately re-stack the hay in a configuration that allows heat dissipation from all four sides of the bales.
    - Use a tele-handler or other suitable machine to stack hay in a pyramid fashion with 18-24" of space between each bale on each layer.
      - Start the first layer with 18-24" between the sides of each bale.
      - Add each layer with each bale straddling the spaces between the bales in the layer below.
      - This allows heat dissipation through all four sides of each bale.
      - Allow the stack to remain in this configuration for a few days to cool.
      - Re-stack the hay in a tight stack when bales have cooled enough to stack conventionally (below 115° F).

## Technical Information

# Diagram 1




# Diagram 2



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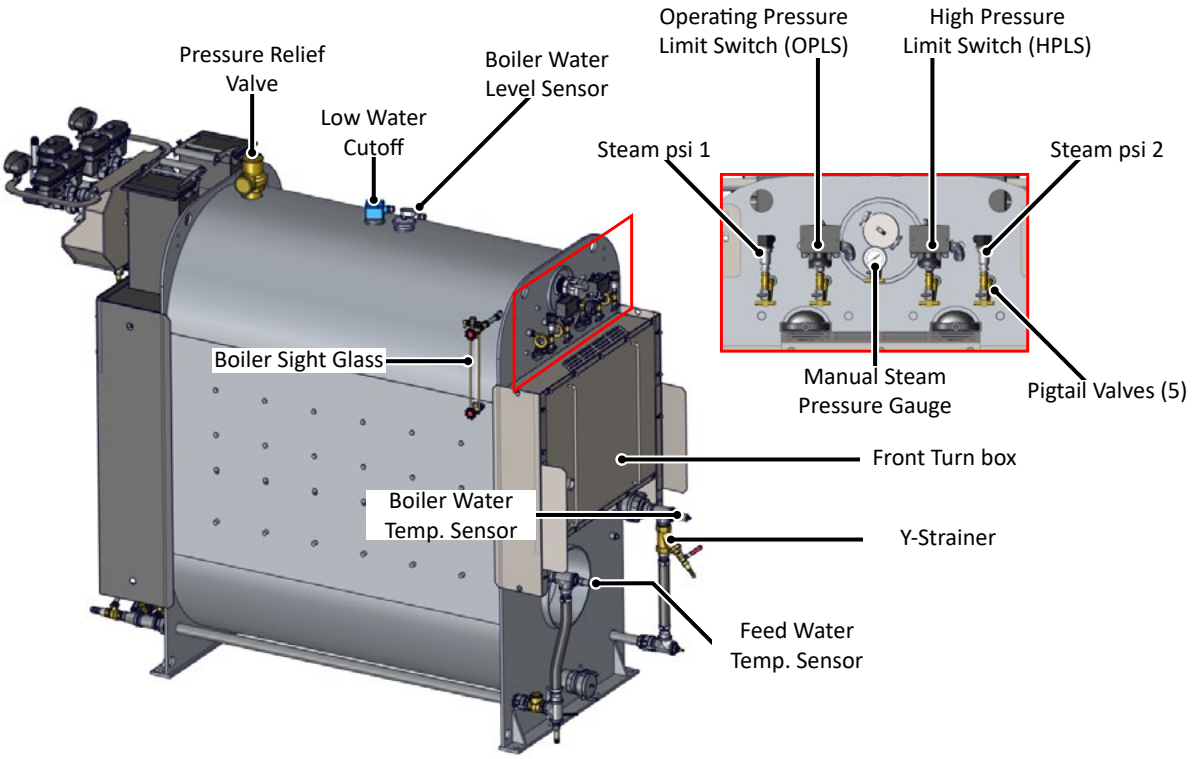


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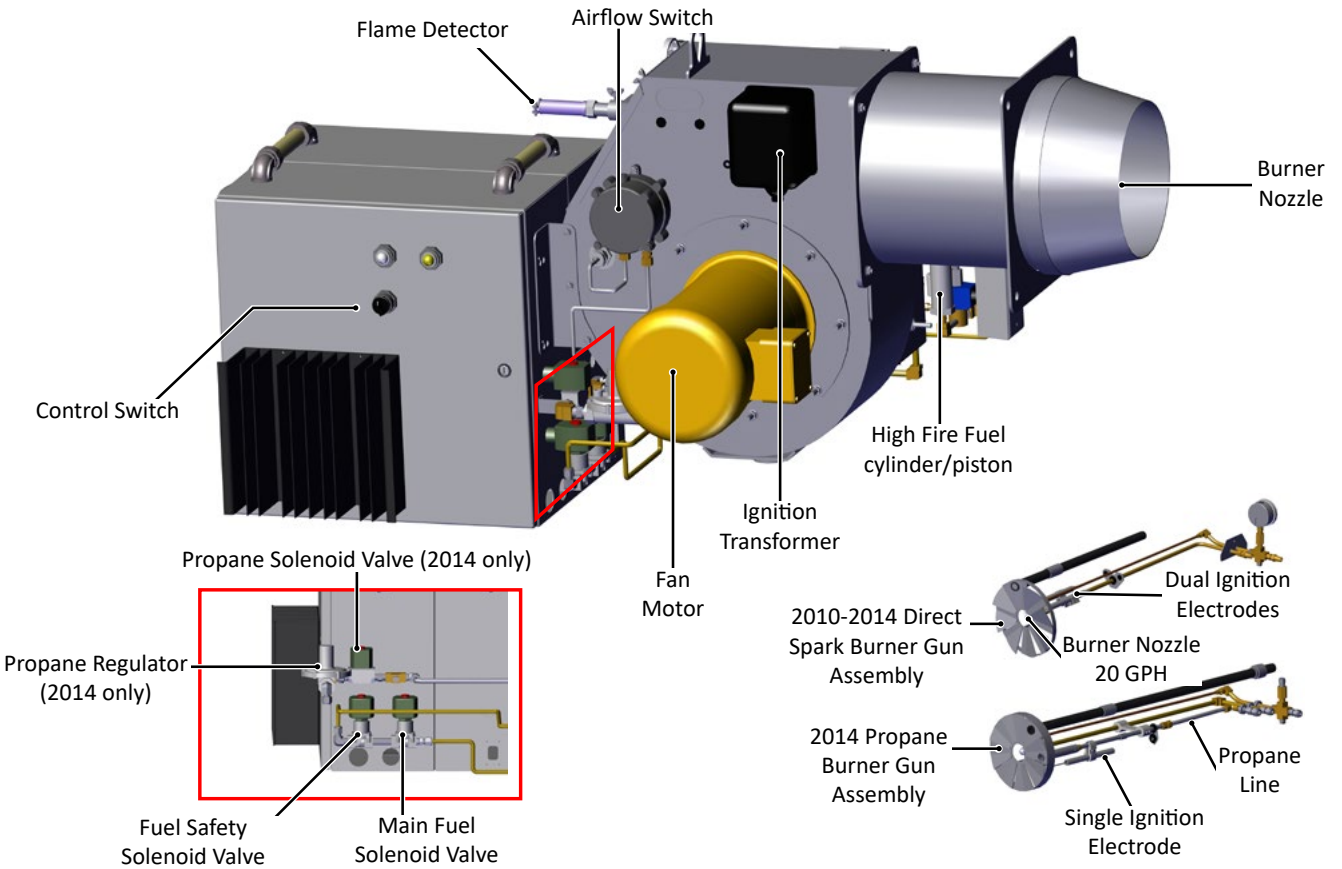

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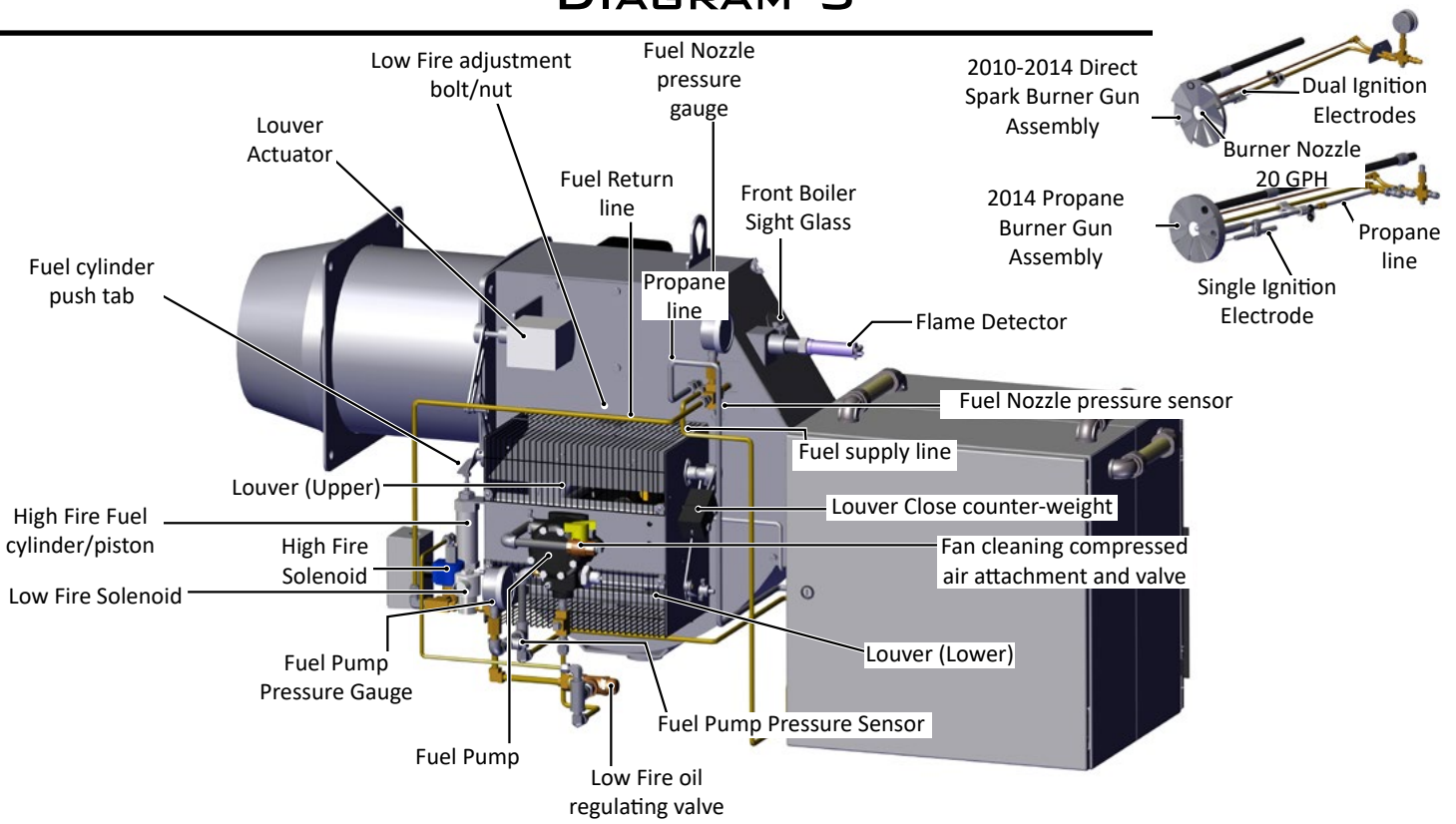
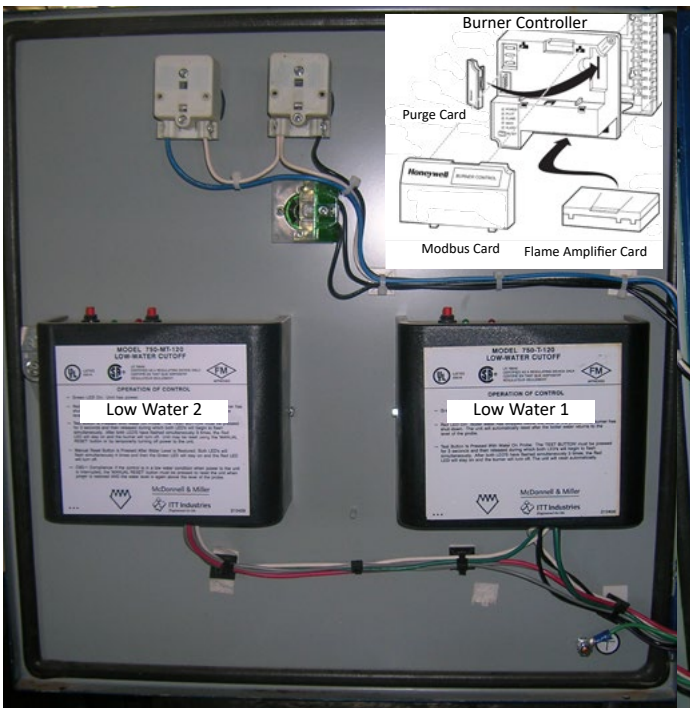
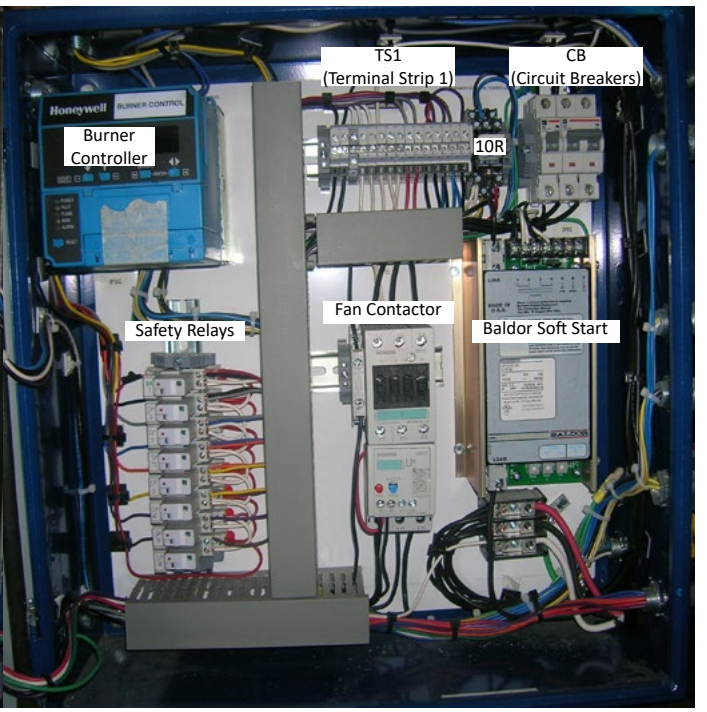



# Diagram 6a (2010)

## Panel 1 door



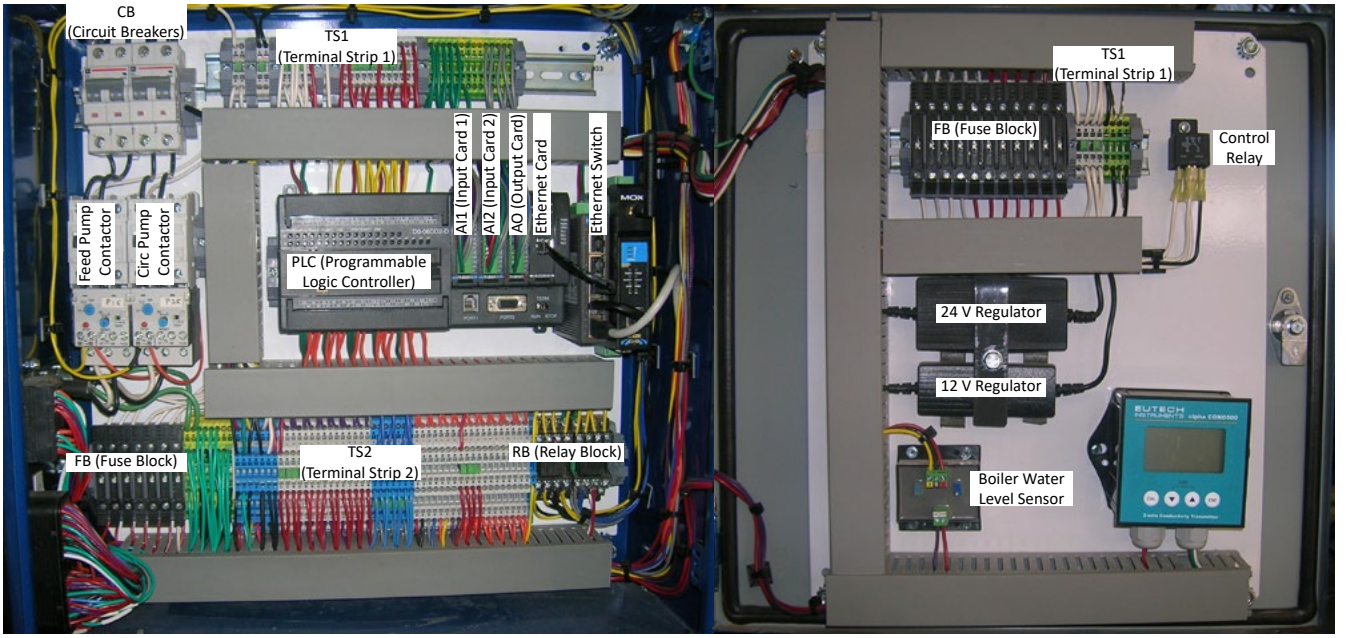

## Panel 1



# Diagram 7a (2010)

## Panel 2

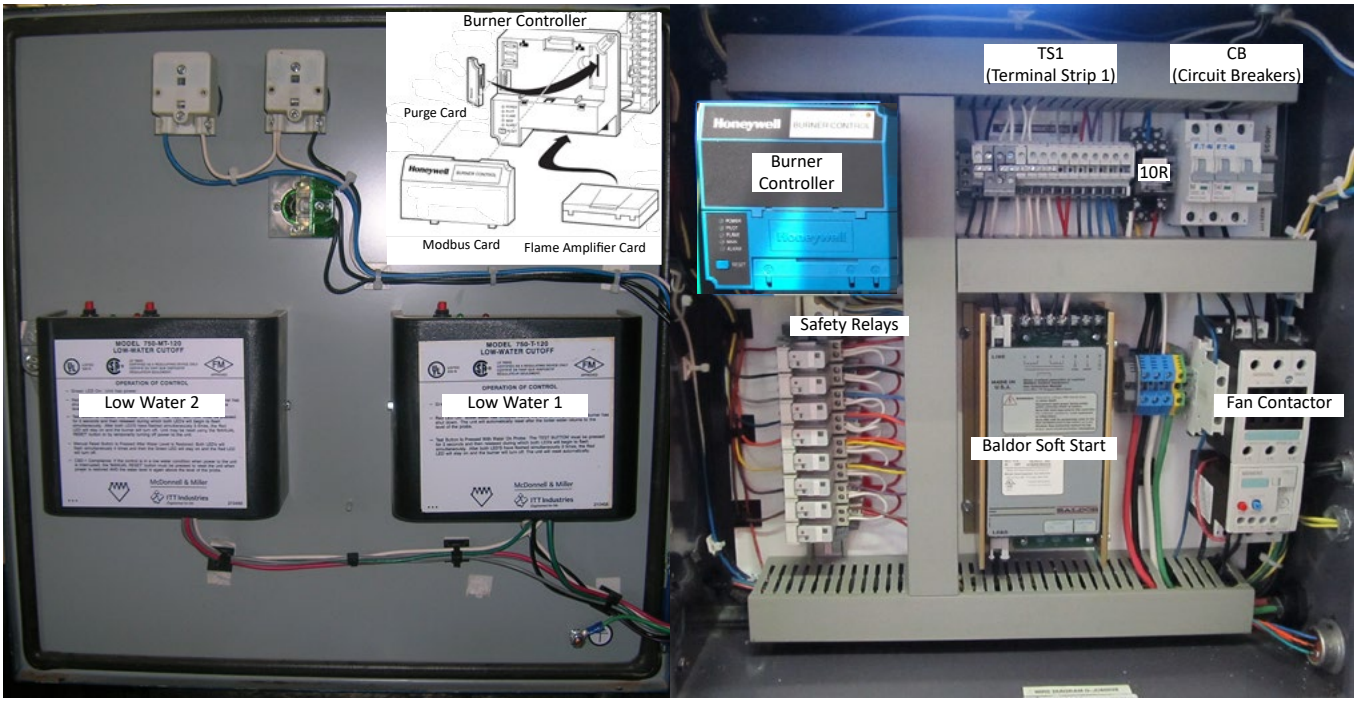
## Panel 3




# Diagram 6b (2011-2013)

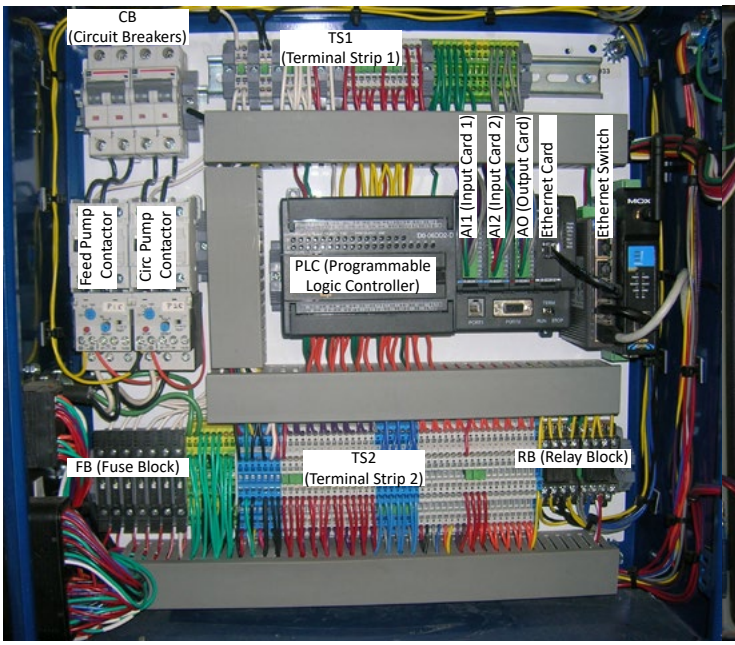
## Panel 1 door

## Panel 1

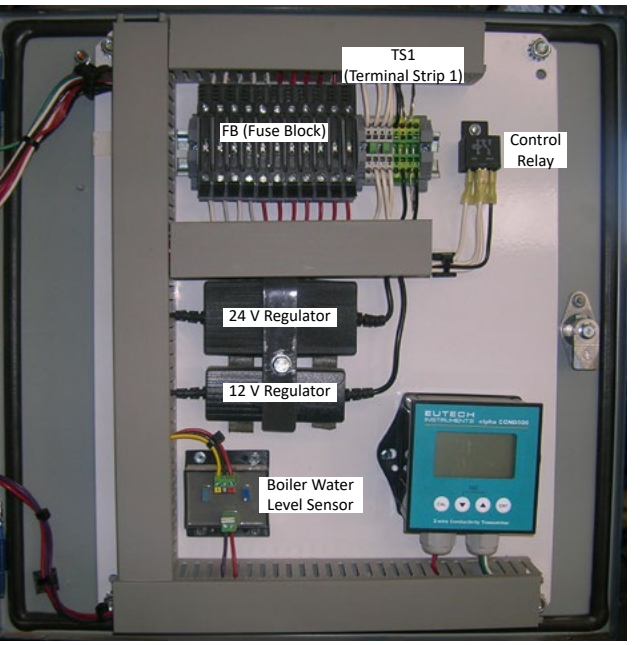


# Diagram 7b (2011-2013)

## Panel 2

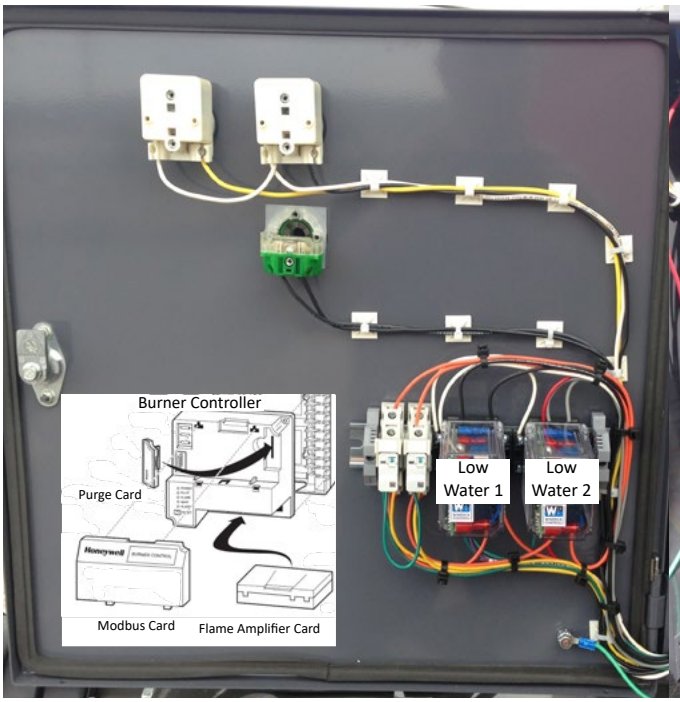



## Panel 3

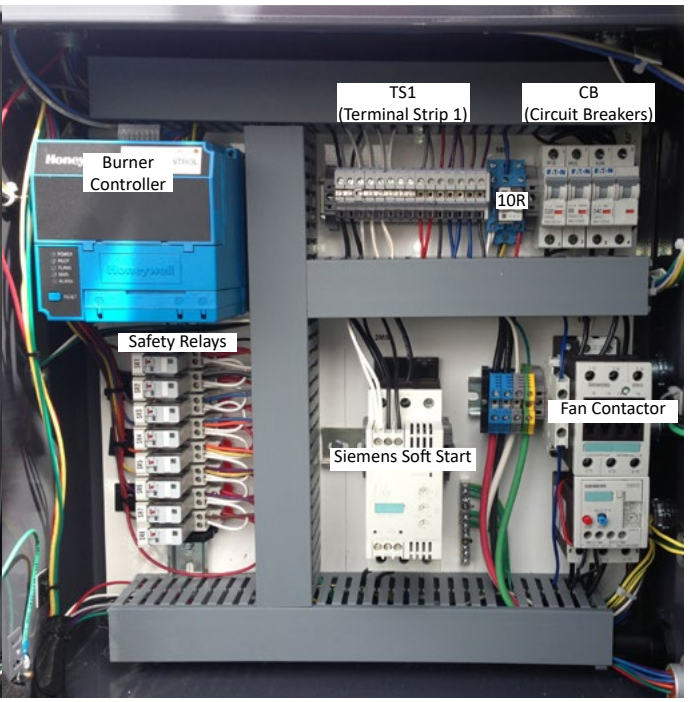



# Diagram 6c (2014-Soft Start)

## Panel 1 door

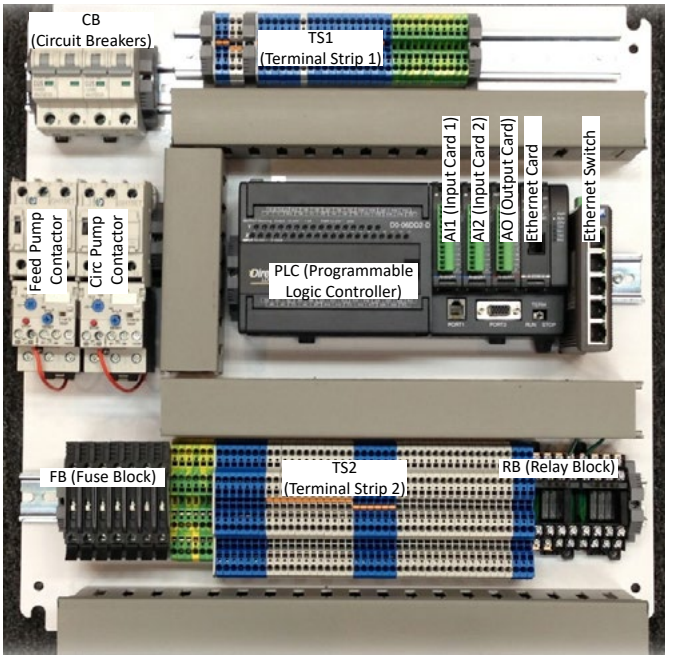



## Panel 1

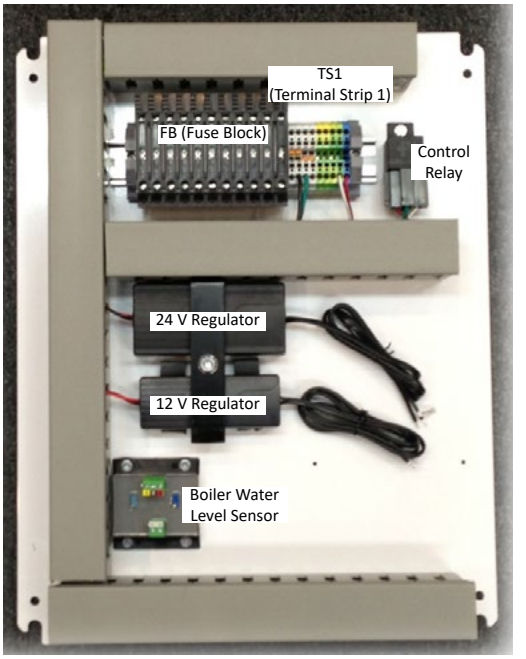


# Diagram 7c (2014-Soft Start)

## Panel 2

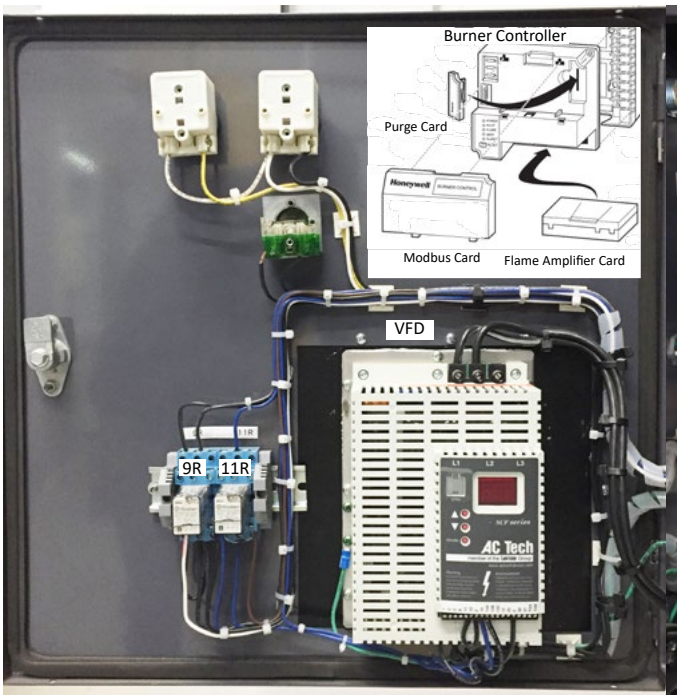



## Panel 3

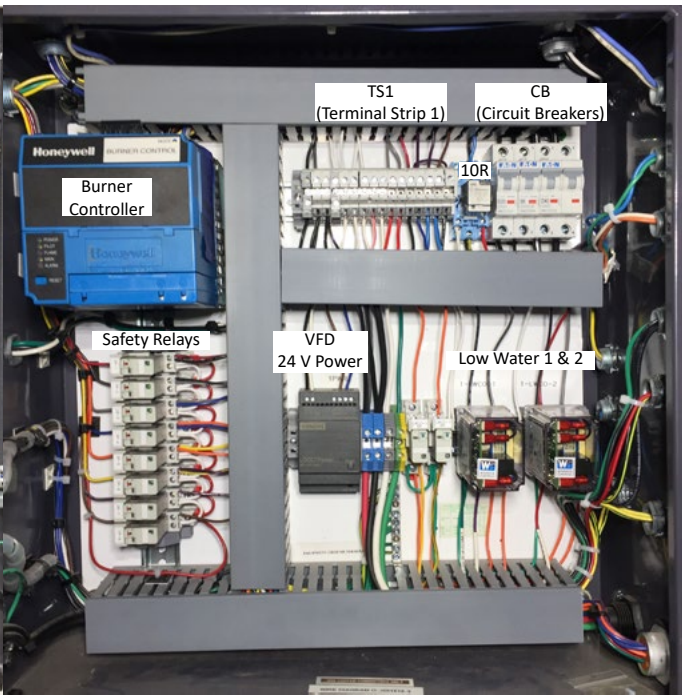



# Diagram 6d (2014-VFD)

## Panel 1 door

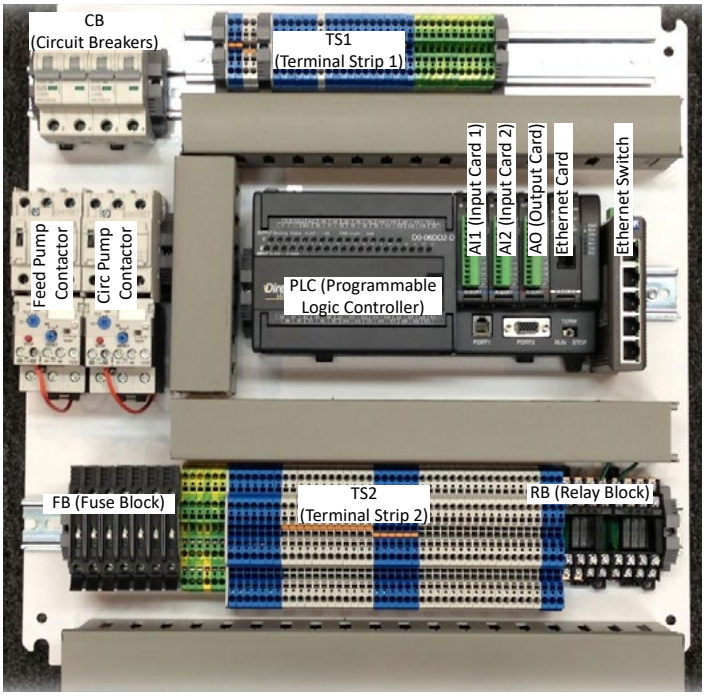



## Panel 1

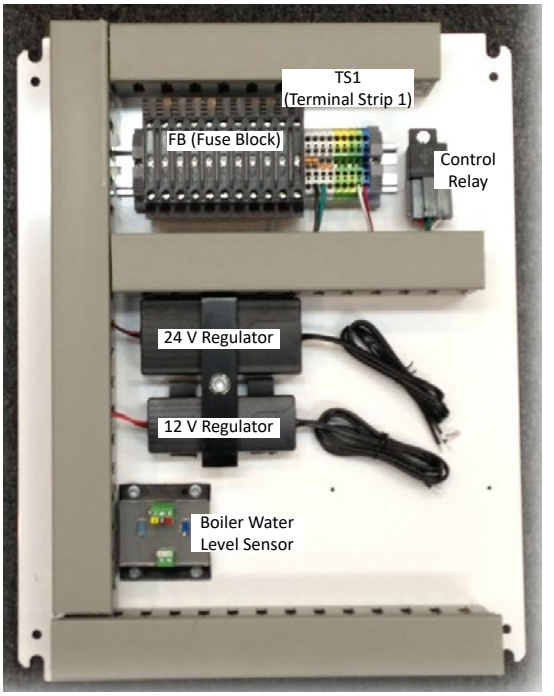


# Diagram 7d (2014-VFD)

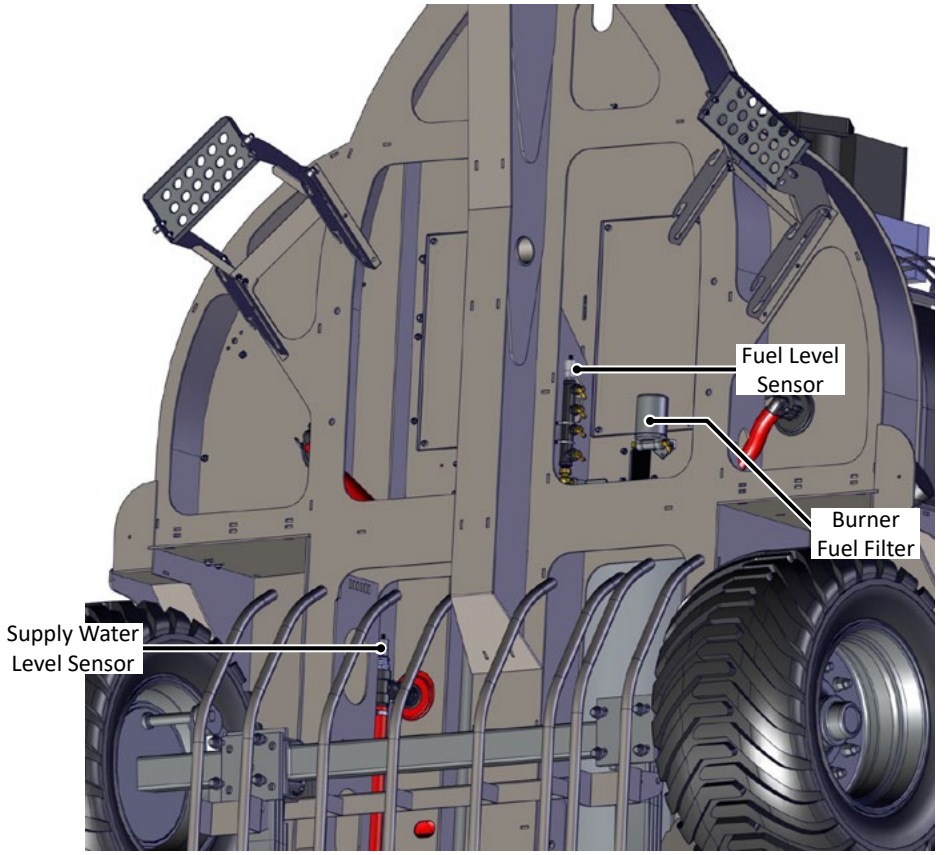
## Panel 2

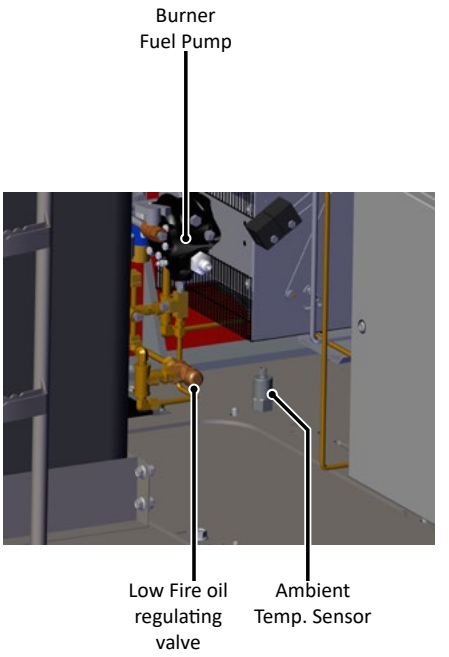



## Panel 3

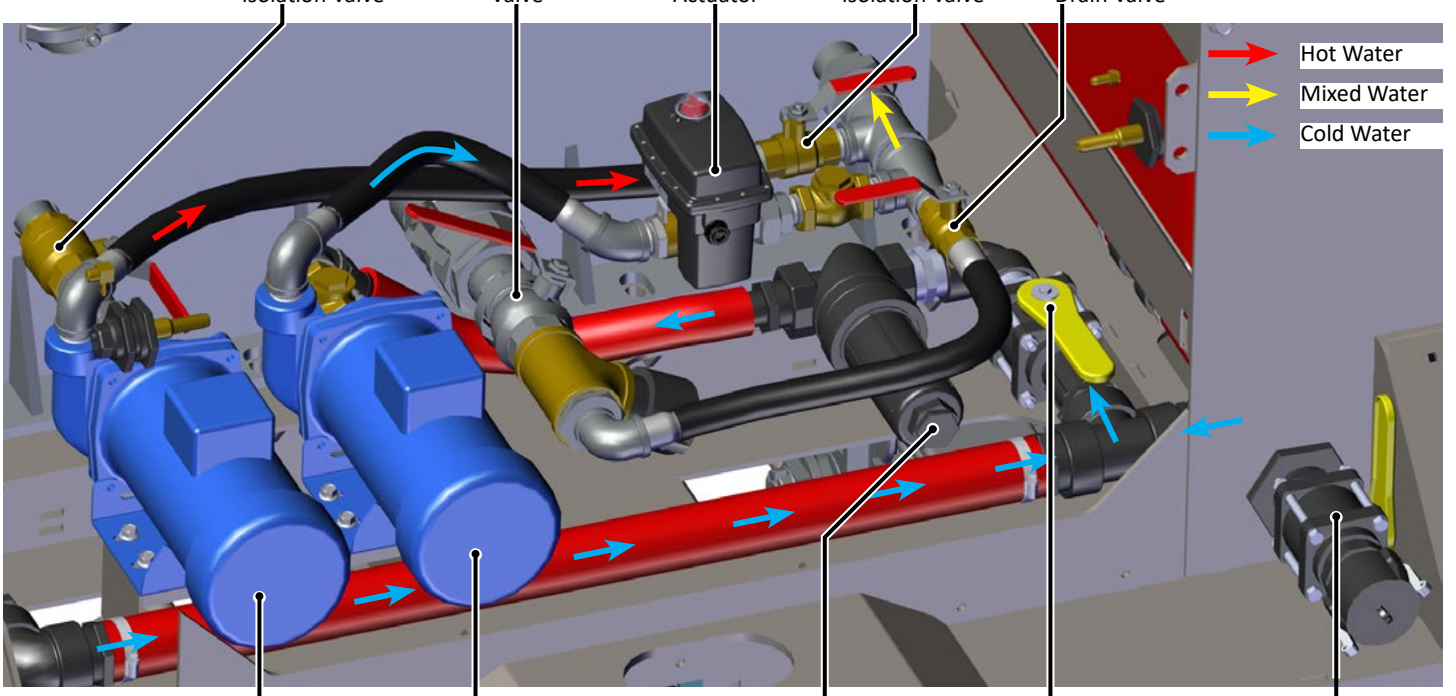



# Diagram 8



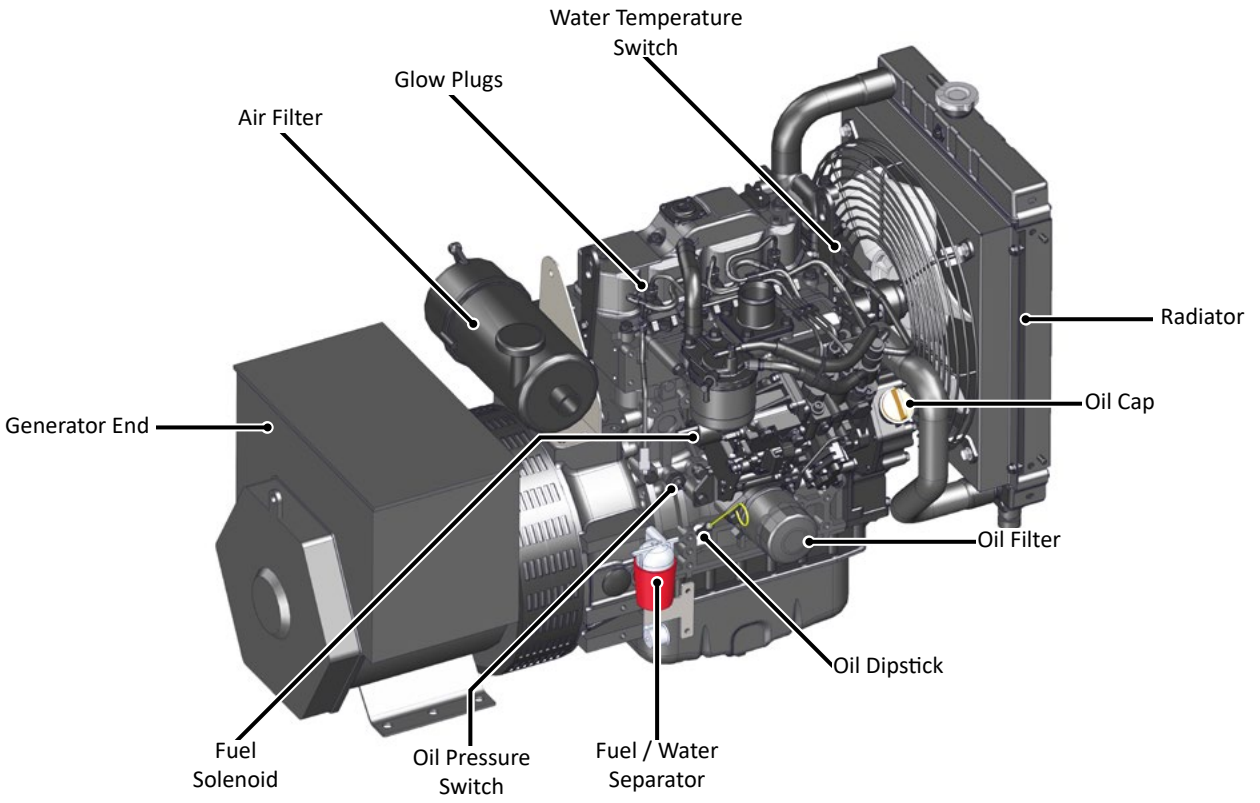



# Diagram 9



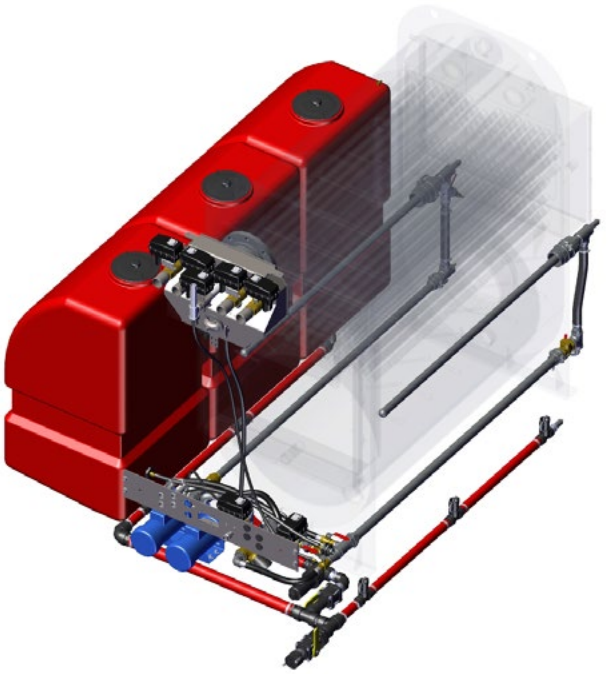

*All valves are shown in normal operating positions

# Diagram 10



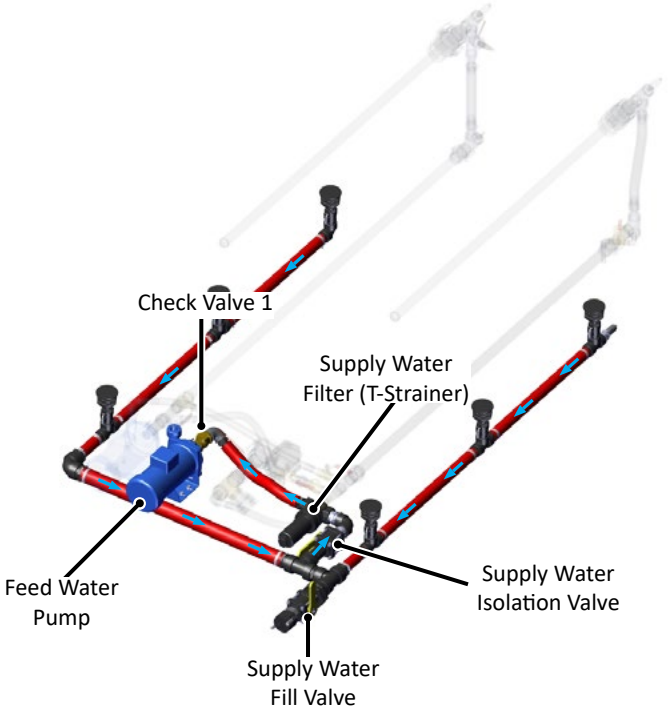
## Diagram 11

Water System



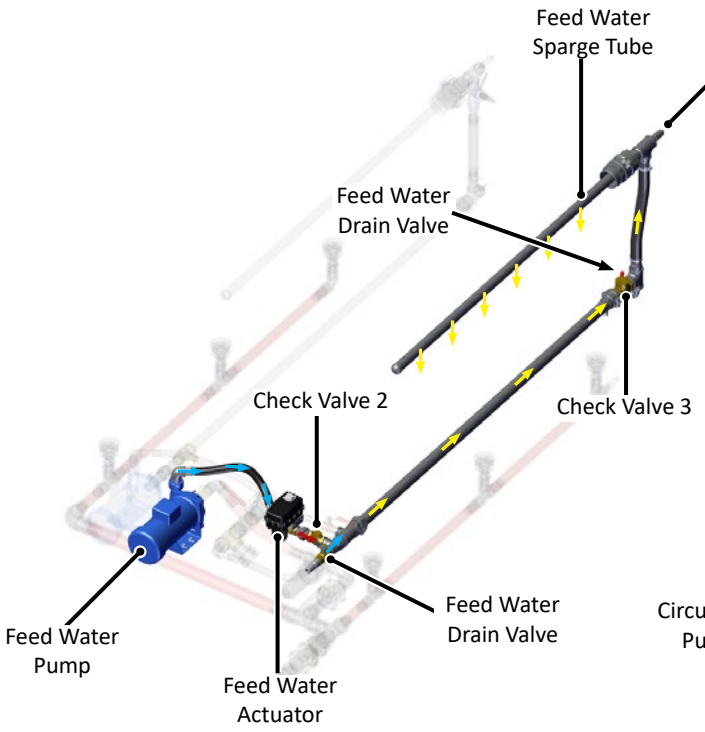
## Diagram 12

Supply Water



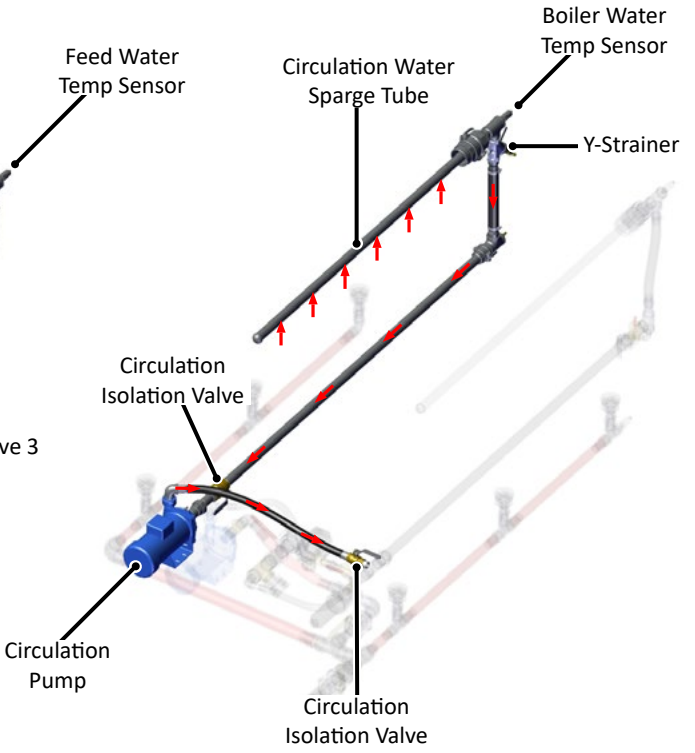

## Diagram 13

Feed Water

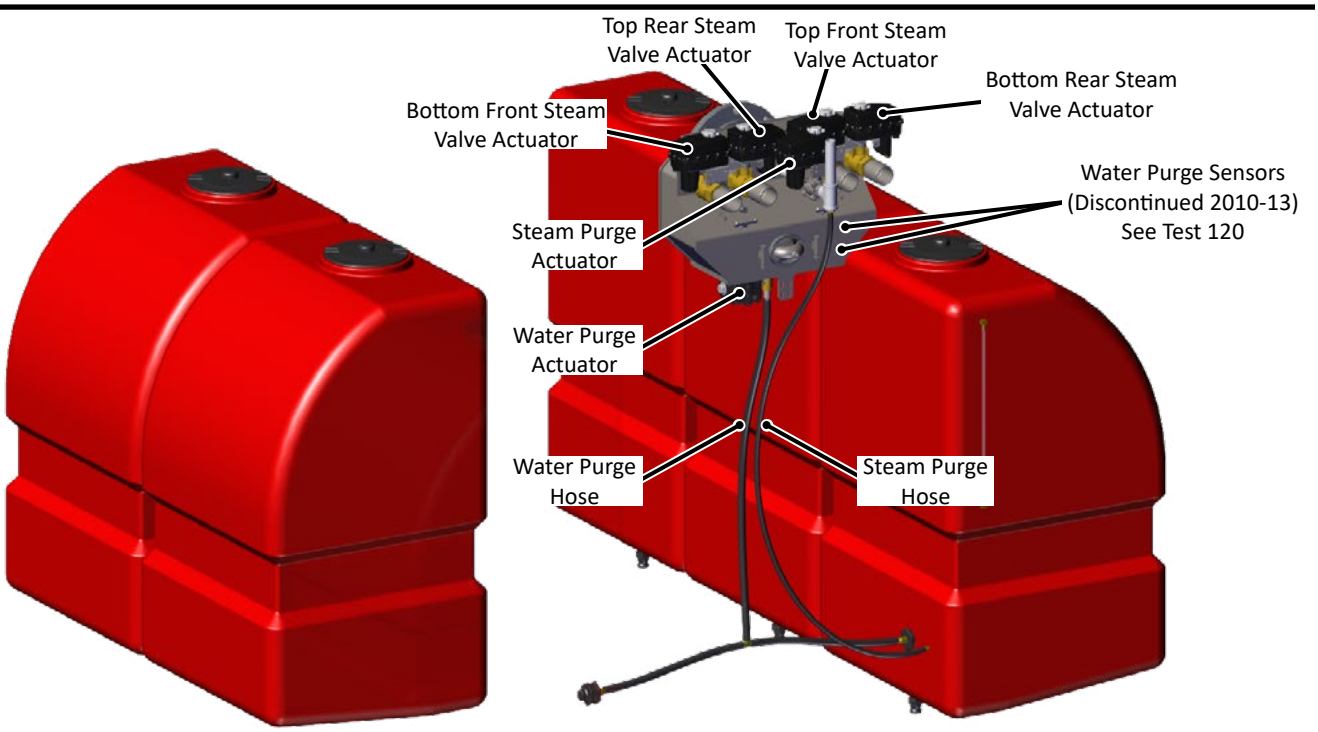



## Diagram 14

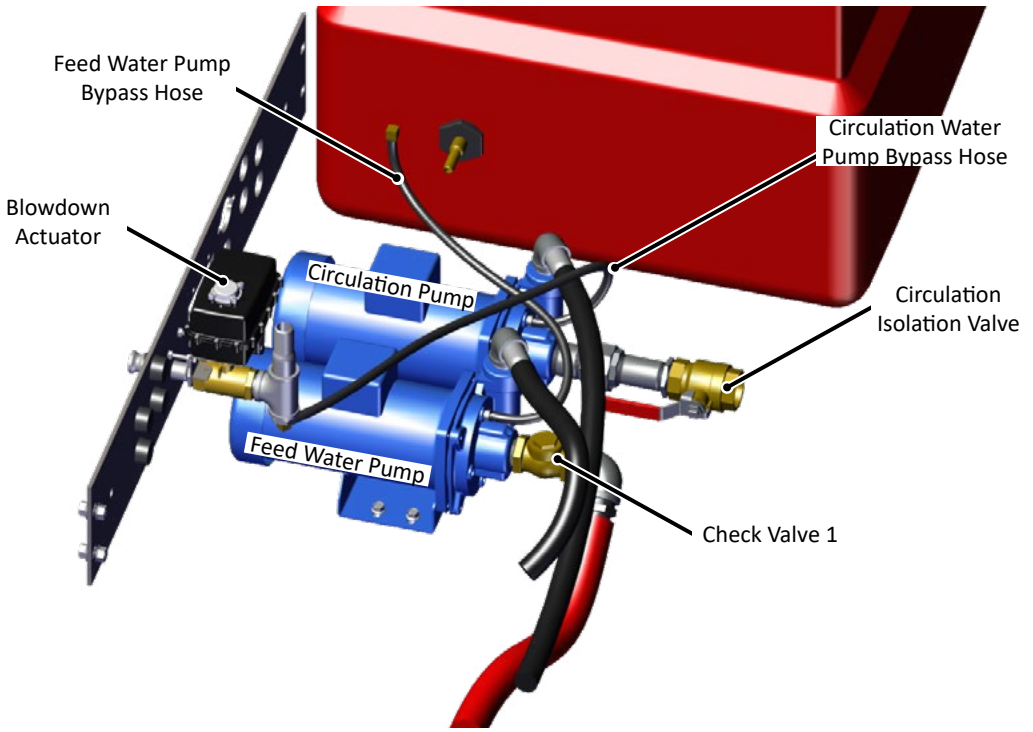
Circulation Water



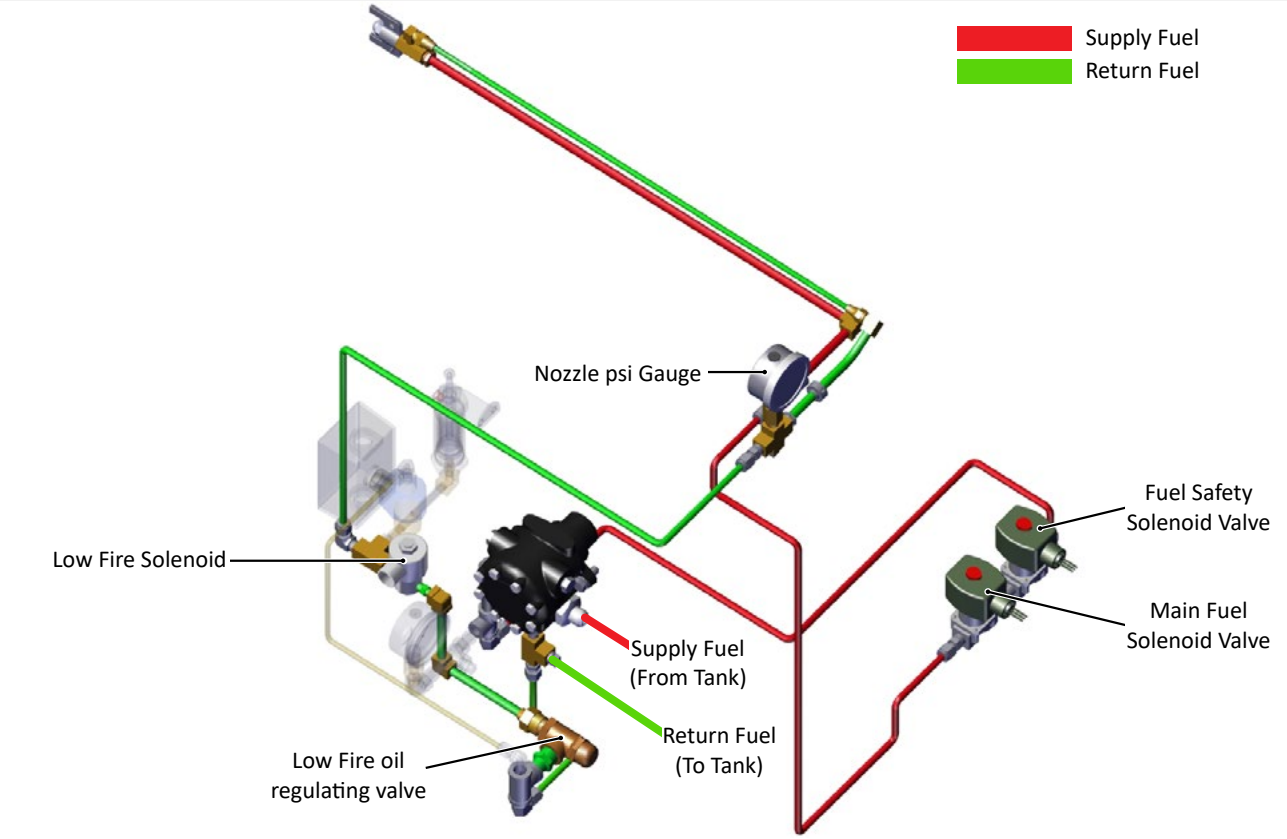
# Diagram 15



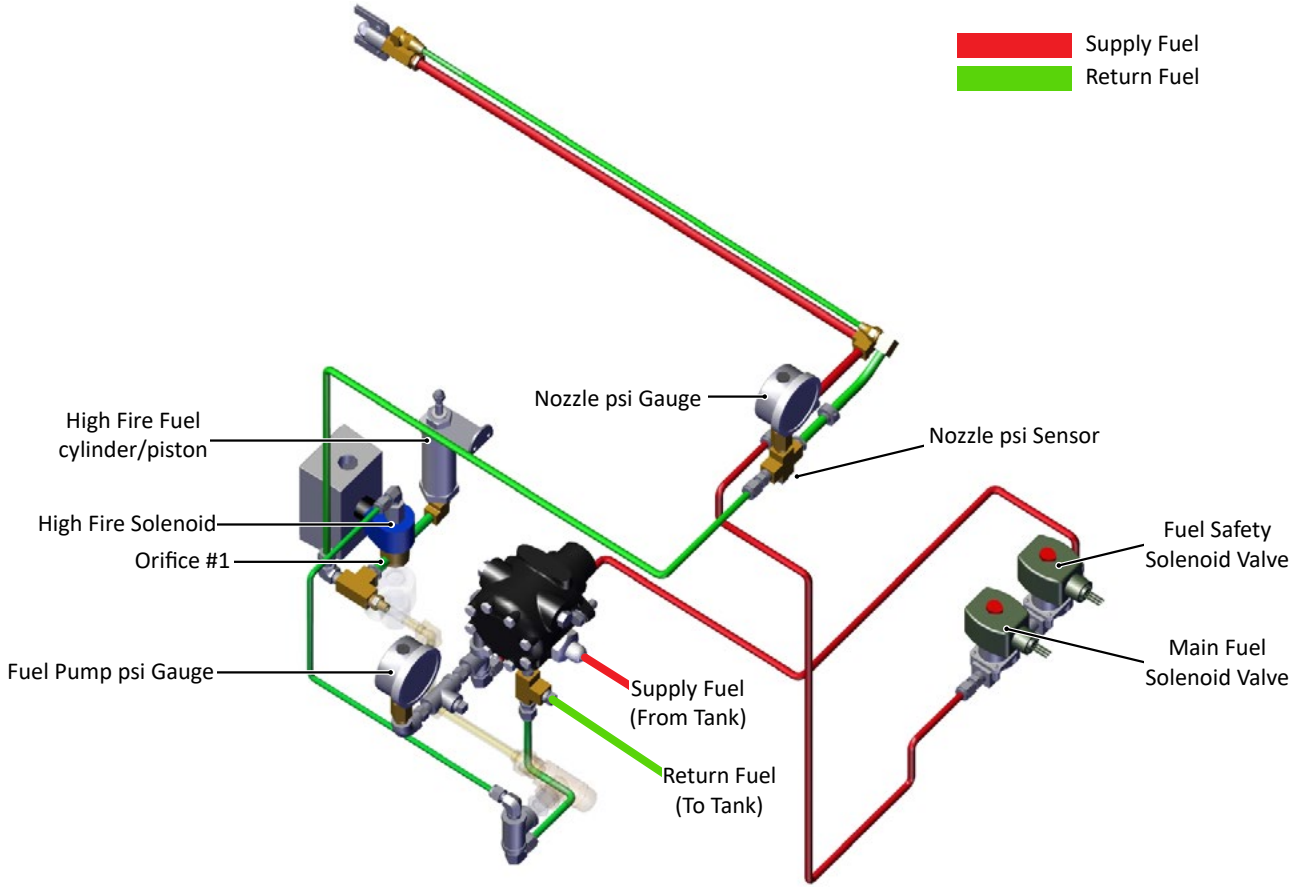

# Diagram 16



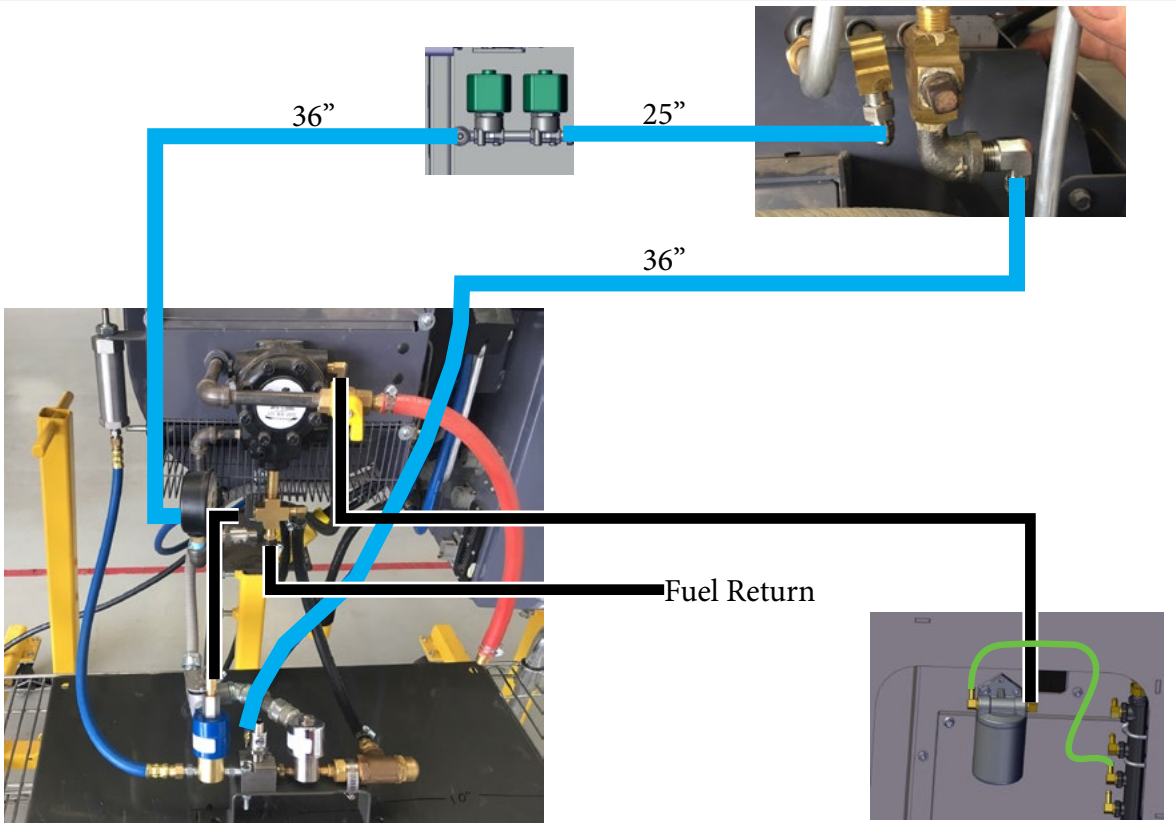
# Diagram 17 Low Fire Fuel Path



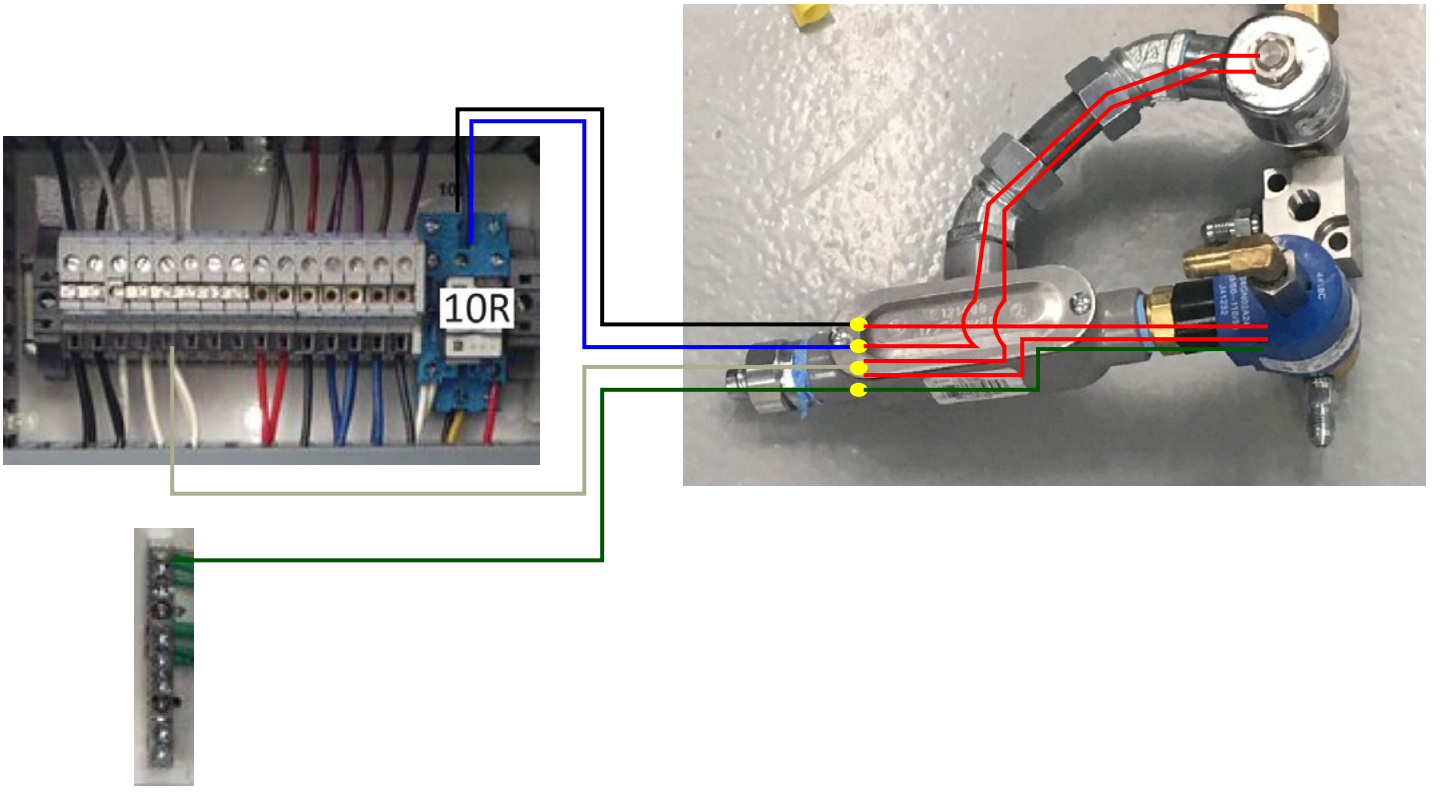

# Diagram 18 High Fire Fuel Path



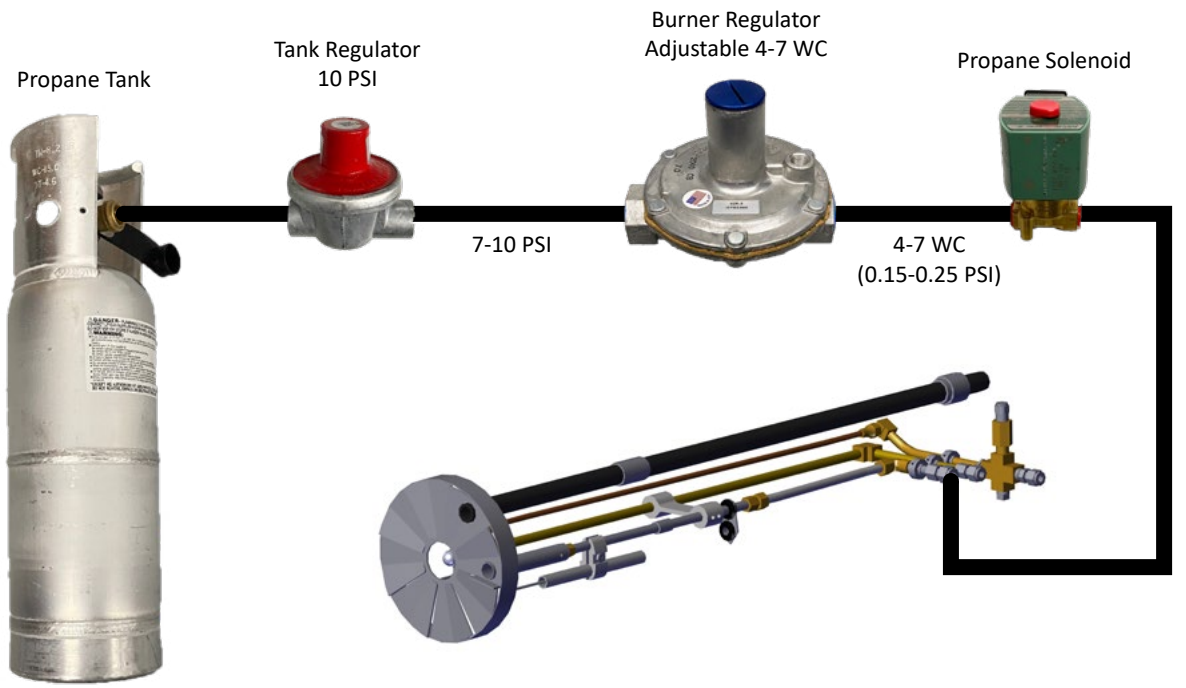
## Diagram 19 Soft Line Fuel Path (Update)



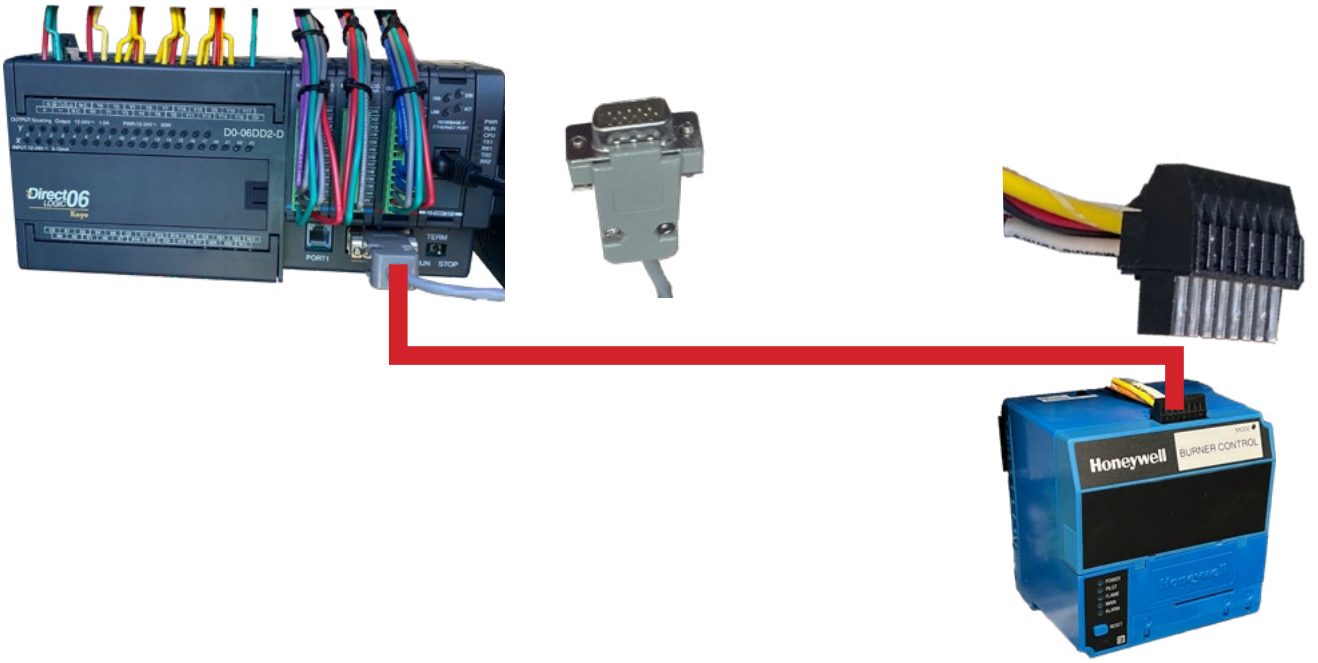

## Diagram 20 Soft Line Fuel Wiring (Update)



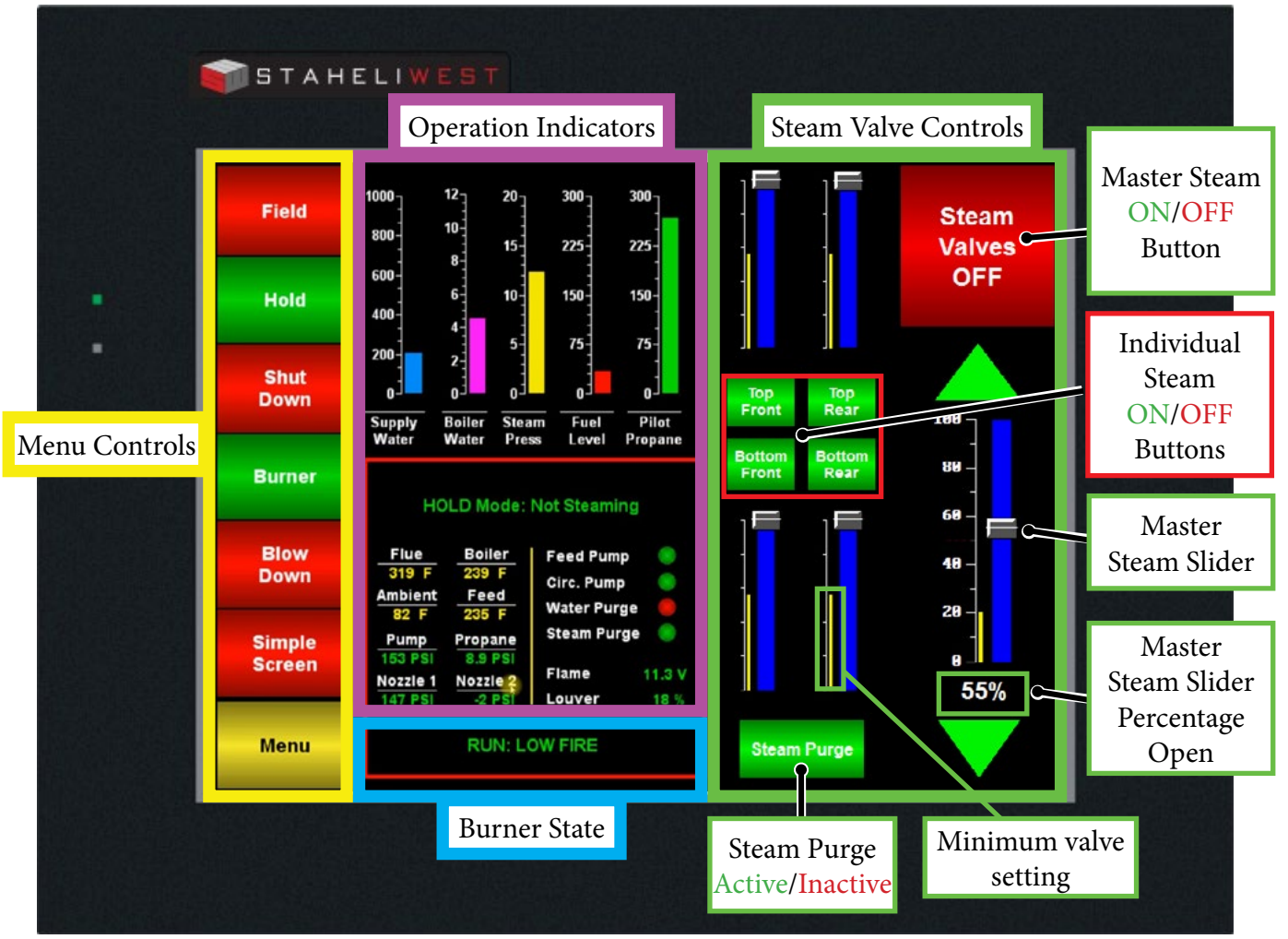
# Diagram 21 Propane System (2014 Only)



# Diagram 22 Modbus path

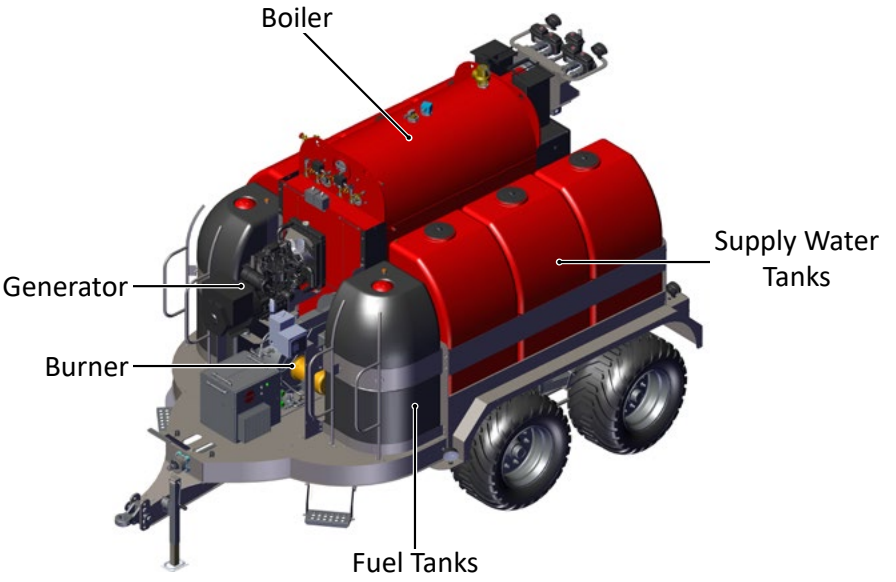


# Field Work Screen



# How The DewPoint 6110 Works

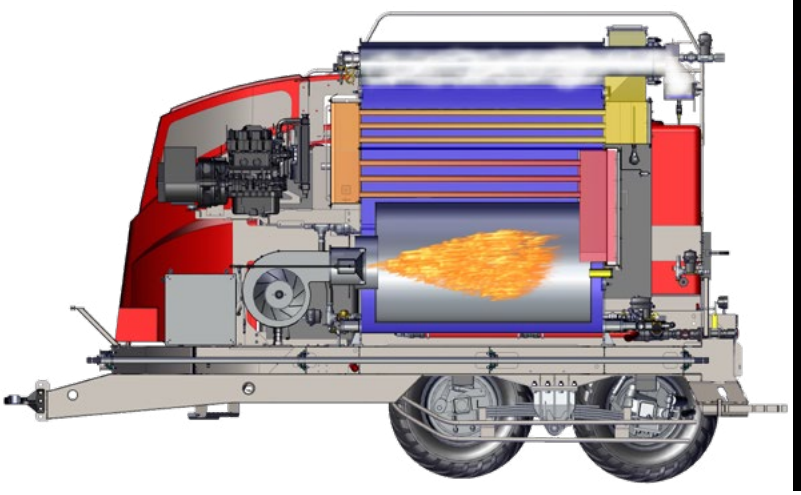
The DewPoint 6110 is powered by a 240 V generator. A diesel burner heats water inside the boiler until boiling. Steam is transferred through hoses into custom manifolds mounted on the baler. The operator controls which manifolds are active and the rate at which steam is applied.

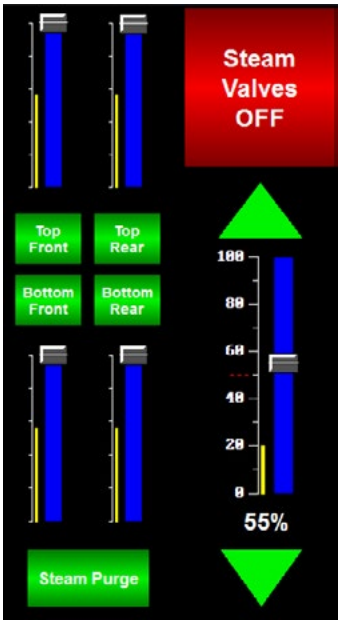


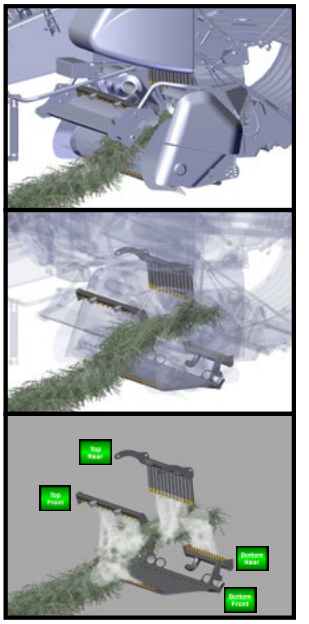

The DewPoint 6110 generates steam which is injected into hay windrows. The ability to inject steam gives farmers the following benefits:

- *Added Bale Weight*
- *Added Value*
- *Risk Mitigation*
- *Increased Annual Yield*
- *Dew More With Less*
- *Better Lifestyle*

Steam rate and distribution is controlled by the machine operator from the touch screen located in the tractor cab.

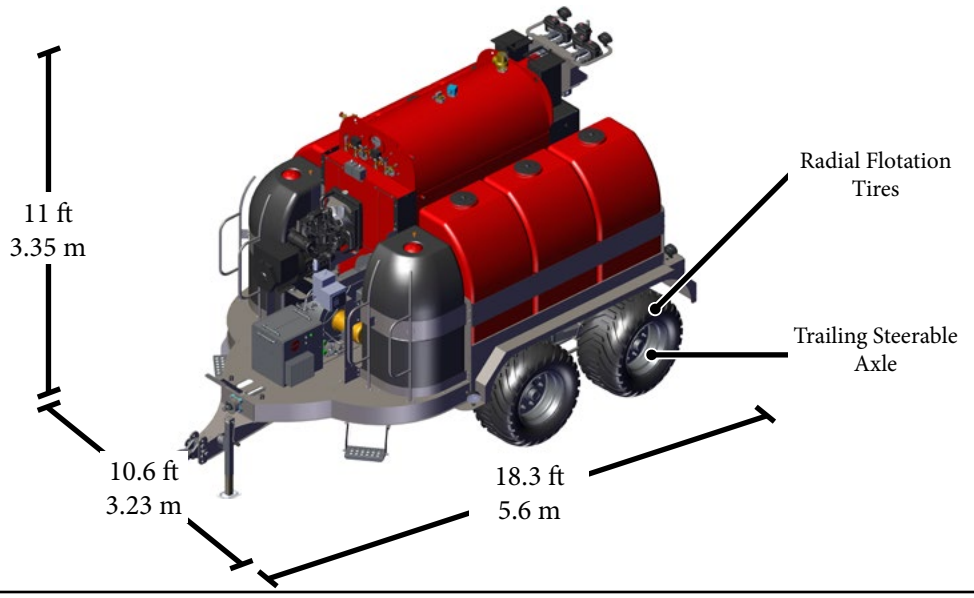




# Machine Specifications

**Machine Specifications**




Dry Weight

16,500 lbs
7,500 kg

Fully Loaded

29,000 lbs
13,200 kg

| | Capacity | Run Time | Output |
|---|---|---|---|
| Supply Water | 1,000 Gal.<br>3,800 L | 3-6 Hours | 120-200 Tons / Load<br>110-180 Metric Tons / Load |
| Boiler Water | 350 Gal.<br>1,300 L | | |
| Fuel / Diesel | 300 Gal.<br>1,100 L | 9-18 Hours | 360-600 Tons / Load<br>330-540 Metric Tons / Load |

# Tractor Requirements

| | Minimum Engine Horsepower | Recommended Engine Horsepower |
|---|---|---|
| **0-2% Slopes** | 200 | 225 |
| **0-5% Slopes** | 240 | 265 |
| **0-10% Slopes** | 275 | 300 |

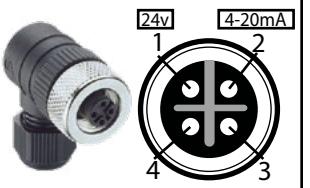
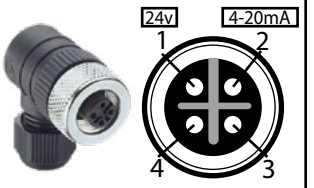
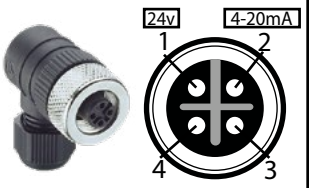
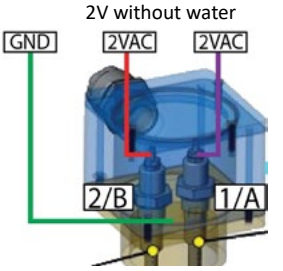
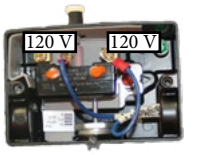
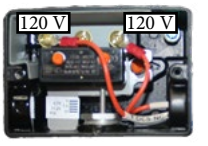
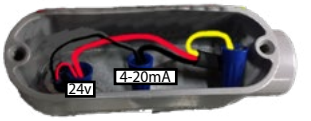
Hydraulic Trailer
Brake Valve Required

# Machine Specifications

| DIMENSIONS | | INCHES | METERS |
|---|---|---|---|
| Overall Width | | 128 | 3.23 |
| Overall Length | | 220 | 5.62 |
| Overall Height | | 132 | 3.35 |
| Shipping Height | | 132 | 3.35 |
| **APPROXIMATE WEIGHT** | | **POUNDS** | **KILOGRAMS** |
| Empty Shipping Weight with Baler Hardware | | 17,000 | 7,700 |
| Fully Loaded with Fuel & Water | | 29,000 | 13,200 |
| **FLUID CAPACITIES** | **RUN TIME** | **GALLONS** | **LITERS** |
| Diesel Fuel | 9-18 Hours | 300 | 1,135 |
| Boiler Supply Water | 3-6 Hours | 1,000 | 3,800 |
| **BOILER** | | | |
| Boiler Normal Operating Pressure | | 12 psi | |
| Boiler Pressure Max | | 15 psi | |
| Maximum Operating Slope | | 20% Grade Intermittent | |
| **BURNER** | | | |
| Fuel Type | | #2 Diesel | |
| Ignition | | Propane Pilot | |
| **GENERATOR** | | | |
| Engine | | 3 Cyl. Diesel | 21 Horsepower |
| Alternator | | 240 VAC | 12,000 Watts |
| **TIRES** | | | |
| Bias Ply Floatation Tires (Standard) | | Four (4): 550/45-22.5 | 52 psi Field Pressure |
| Radial Floatation Tires (Optional) | | Four (4): 620/40-R22.5 | 36 psi Field Pressure |
| **AXLES** | | | |
| Type | | Bogie Tandem | Rated 30,000 lbs |
| Suspension | | Spring | Rated 30,000 lbs |
| Front Axle | | Leading Rigid | Hydraulic Brakes |
| Rear Axle | | Trailing Steerable | Hydraulic Brakes |
| **TRACTOR REQUIREMENTS** (when operated with large square baler) | | | |
| Horsepower | 0-2% Slopes | | 200 Recommended |
| Horsepower | 0-5% Slopes | | 240 Recommended |
| Horsepower | 0-10% Slopes | | 275 Recommended |
| Horsepower | > 10% Slopes | Contact Staheli West for detailed tractor assessment | |
| | > 20% Slopes | Not recommended for field operation of the DewPoint | |
| PTO | | 1 3/4 Inch | 1,000 RPM |
| Hydraulics | | Steering Axle Lock Cylinders | 1 SCV |
| | | Baler Pickup | 1 SCV |
| | | Other Baler Hydraulic Requirements | As Needed |
| Trailer Brake Capability Required | | Hydraulic Trailer Brake Valve | See Your Dealer |
| Lighting System | | Standard 7-Pin Trailer Light Receptacle | See Your Dealer |
| Other Tractor Recommendations | | Rear Duals | Recommended |
| | | MFWD | Recommended |
| | | Extended Rear-View Side Mirrors | Recommended |

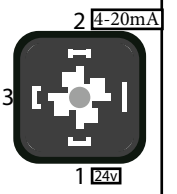
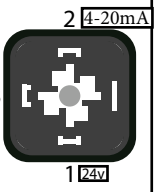
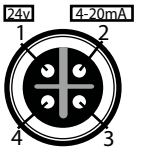
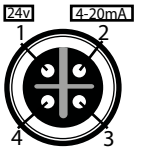
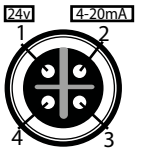
# Sensors

*Same fill color = interchangeable

| Sensor | Function/ Range | Normal Range | Trip/ Alarm | Options | Pin Out |
|---|---|---|---|---|---|
| Supply Water Level  | 0-1000 gallons | | Below 200 gallons | Disable in Settings > Alarm Status Screen |   |
| Fuel Supply Level  | 0-300 gallons | | Below 30 gallons | Disable in Settings > Alarm Status Screen |   |
| Ambient Temperature  | 32°-212° F | | Above 110° F | Disable in Settings > Alarm Status Screen Adjust in Settings > Alarm Settings |   |
| Low Water 1  | Annunciate upon contact with water | On/Off | Below 1 inch in sight glass | |   |
| Low Water 2  | Annunciate upon contact with water | On/Off | Below 1 inch in sight glass | | |
| Manual Steam Pressure Gauge | 0-30 psi | 0-12 psi | | |  |
| High Pressure Limit Switch  | Set at 15 psi | | Trips at ≥15 psi | Manual reset required |   |
| Operating Pressure Limit Switch  | Set at 14.5 psi | | Trips at ≥14.5 psi | Automatically resets once pressure drops |   |
| Boiler Water Level  | 0-12-inches | 4-8 inches | Below 4 inches Above 10 inches | Level adjustable in Settings > Water System |   |

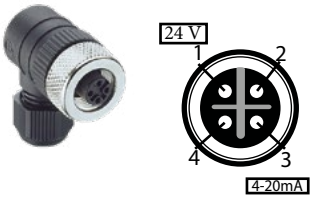
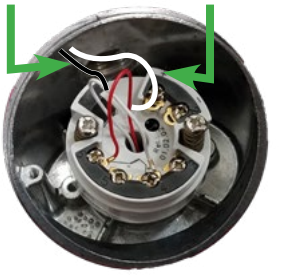
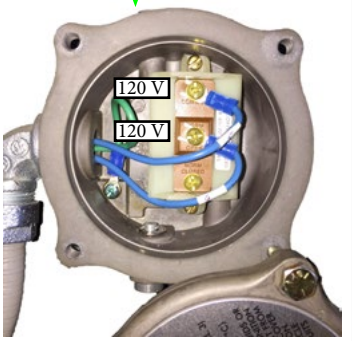
# Sensors

*Same fill color = interchangeable

| Sensor | Function/ Range | Nor-mal Range | Trip/ Alarm | Options | Pin Out |
|---|---|---|---|---|---|
| Steam psi 1  | -14.7 to 30 psi | 6-13 psi | More than 2 psi differential | Selectable and differential limit adjustable in Settings > Boiler Pressure Screen |    |
| Steam psi 2  | -14.7 to 30 psi | 6-13 psi | More than 2 psi differential | Selectable and differential limit adjustable in Settings > Boiler Pressure Screen |    |
| Feed Water Temperature  | 0-300° F | 100-240° F | Above 150° F differential | Disable in Settings > Alarm Status Screen Adjust in Settings > Alarm Settings |    |
| Boiler Water Temperature  | 0-300° F | 230-240° F | Above 150° F differential | Disable in Settings > Alarm Status Screen Adjust in Settings > Alarm Settings |    |
| Boiler Door Temperature  | 0-300° F | 100-150° F | Above 250° F (Changed to 170° F in version 2.7 & 3.4 | Disable in Settings > Alarm Status Screen Adjust in Settings > Alarm Settings |    |
| Fuel Pump psi  | 0-500 psi | 280-300 psi | 250 psi during purge Fault 250 | |    |
| Fuel Pump psi Gauge | 0-300 psi | 145-155 psi | | |  |

# Sensors

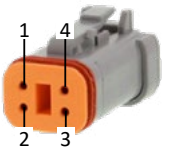
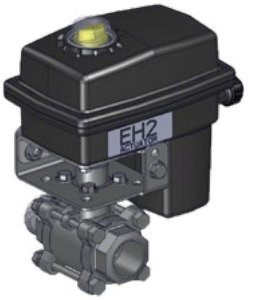
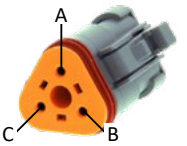
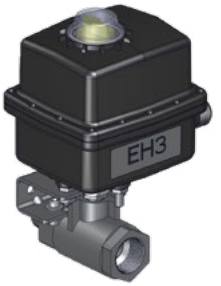
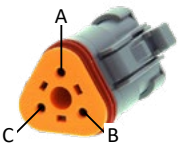
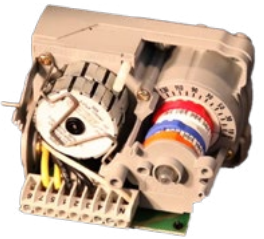
*Same fill color = interchangeable

| Sensor | Function/ Range | Normal Range | Trip/Alarm | Options | Pin Out |
|---|---|---|---|---|---|
| Nozzle 1 psi  | 0-500 psi | Low Fire 80-90 High Fire 160-190 | | Disable in Settings > Alarm Status Screen |   |
| Flue Temperature  | 0-1000° F | 300-450° F | Above 600° F | Disable in Settings > Alarm Status Screen Adjust in Settings > Alarm Settings | Black Wire = 24 V White Wire = 4-20mA  |
| Airflow Switch | Detects airflow = ON Does not detect airflow = OFF | | | Turning the sensor adjustment screw counter-clockwise will increase sensitivity. Clockwise adjustment will decrease sensitivity | Adjustment screw   |
| Flame Detector | 0-15 V (Screen Reading) | 3-15 V | | |  |

**(New)**Flame Detector **P/N: 12097** used with Amplifier Card **P/N: 12098**
Flame Detector *Manufacturer P/N:C7027A1049*

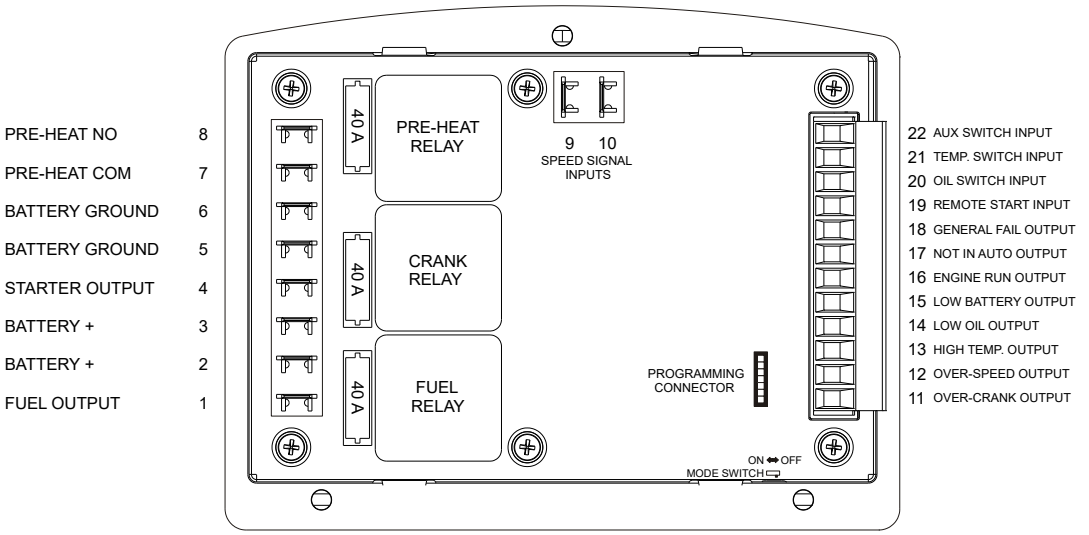
**(Obsolete)** Flame Detector **P/N: 10047** used with Amplifier Card **P/N: 10798**
Flame Detector *Manufacturer P/N:C7927A1016*

# Actuators

| | | | | |
|---|---|---|---|---|
| Top Front Steam Valve Actuator<br>Top Rear Steam Valve Actuator<br>Bottom Front Steam Valve Actuator<br>Bottom Rear Steam Valve Actuator<br>Feed Water Valve Actuator<br>Blowdown Valve Actuator |  |  | 1. GND<br>2. 4-20mA<br>3. GND<br>4. 12 V | Actuators are interchangeable<br><br>Connections are interchangeable |
| Steam Purge Valve Actuator |  |  | A. GND<br>B. 24 V<br>C. 12 V | Actuators are not interchangeable<br><br>Connections are interchangeable |
| Water Purge Valve Actuator |  |  | A. GND<br>B. 24 V<br>C. 12 V | |
| Louver Actuator |  | | | See Test 115 for details |


DewPoint 6110 machines need to be factory programmed to work with the oil pressure sending units (on the motor), or the sending units need to be replaced with oil pressure switches.

Reset faults by holding red “OFF” button for 3 seconds




On power up the controller defaults to the mode it was in when power was last removed (AUTO or OFF). OFF mode can be entered by pressing the OFF button on the front panel. When the GSC300 is in the OFF mode the “Not In Auto” LED will be lit on the front panel (NOT IN AUTO below).

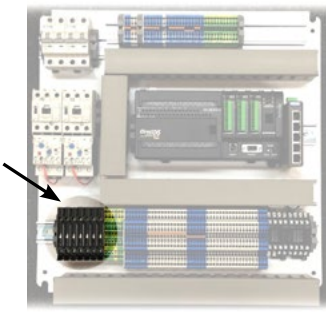
When the GSC300 is in the OFF mode, starting – either from the remote start contacts or from the front panel run button – is disabled. To start the genset the GSC300 needs to be placed in the AUTO mode by pressing the AUTO button on the front panel.

Once in AUTO mode the genset can be started by pressing the RUN button.

Once crank success is achieved (i.e. engine has started), the GSC300 enters the RUN mode and the front panel ENGINE RUNNING LED will be lit. Removing power while the controller is in the RUN mode may corrupt the EEPROM. If this occurs, the GSC300 will have to be reprogrammed.

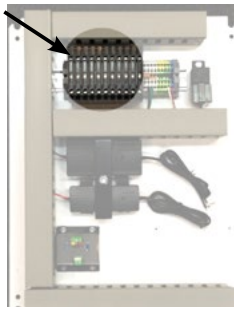
# Fuses

## Panel 2



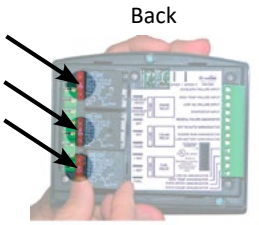
| Panel 2 | AMP | Component |
|---|---|---|
| F1 | 5 | Top Front Steam Valve |
| F2 | 5 | Top Rear Steam Valve |
| F3 | 5 | Bottom Front Steam Valve |
| F4 | 5 | Bottom Rear Steam Valve |
| F5 | 5 | Steam/Water Purge |
| F6 | 5 | Feed Water Valve |
| F7 | 5 | Blowdown Valve |

## Panel 3



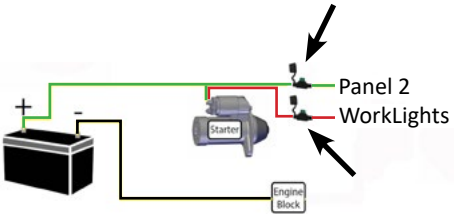
| Panel 3 | AMP | Component |
|---|---|---|
| F1 | 15 | 12 V to Actuators, Work Lights |
| F2 | 15 | 12 V to Power Regulator |
| F3 | 2 | 12 V to Generator Start/Stop |
| F4 | 15 | 12 V to 24 V Power Regulator |
| F5 | 5 | 24 V to F6 |
| F6 | 1.5 | 24 V to PLC |
| F7 | 2 | 24 V to Analog Sensors |
| F8 | 2 | 24 V to PLC in/output Cards |
| F9 | 2 | 24 V to Ethernet Switch |
| F10 | 1.5 | 24 V to Touch Screen |
| F11 | 1.5 | 12 V to Red Rocker Switch |

## Generator Controller



| Engine | AMP | Component |
|---|---|---|
| F1 | 40 | Glow Plugs |
| F2 | 40 | Crank |
| F3 | 40 | Fuel |

## Battery

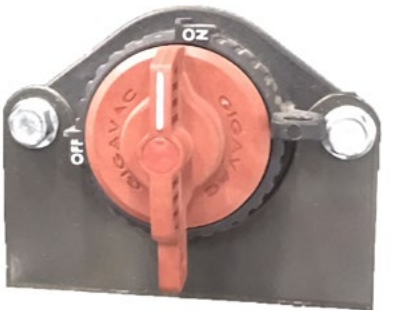



| Battery | AMP | Component |
|---|---|---|
| F1 | 30 | Power to Panel 2 |
| F2 | 30 | Work Lights |

## Battery Cut-Off Switch Update

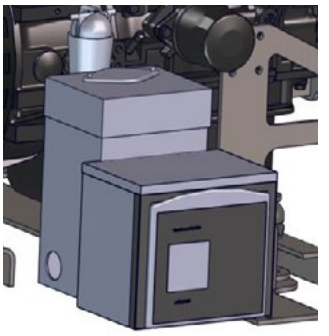
The battery cut-off switch is located on the passenger side of the generator near the battery. The switch needs to be turned ON to be able to operate the machine. Between cuttings and for winter storage we suggest turning the switch OFF to save the battery life.

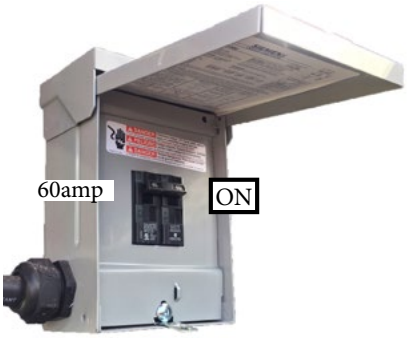
Update Kit Part #11062



## Main Circuit Breaker

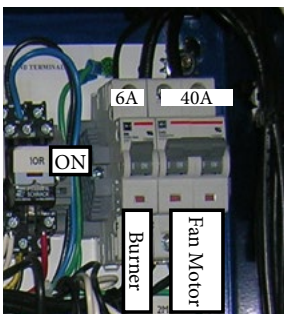
The main circuit breaker is located on the passenger side of the generator. The breaker needs to be turned ON to be able to operate the machine.



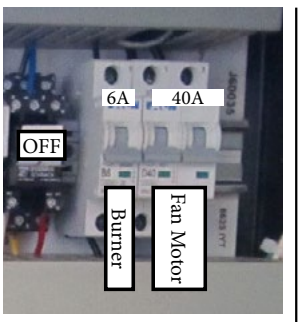



## Panel 1 Circuit Breakers

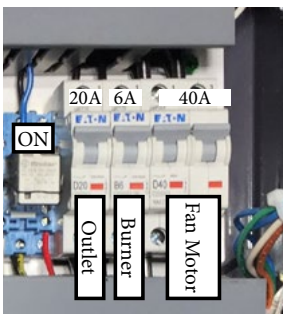
2010




2011-2013

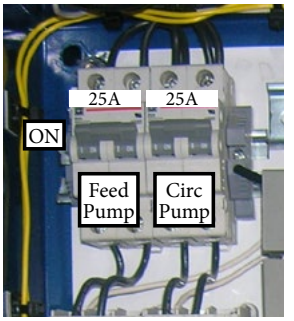



2014

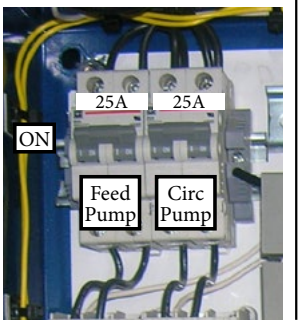



## Panel 2 Circuit Breakers

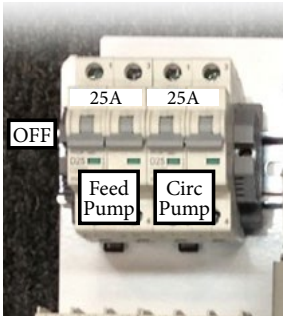
2010




2011-2013



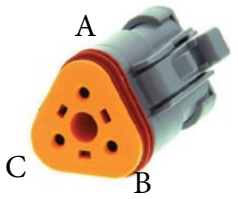

2014



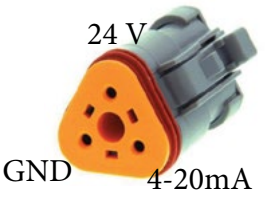
**DT06-2S**


Work Lights


**DT06-3S**



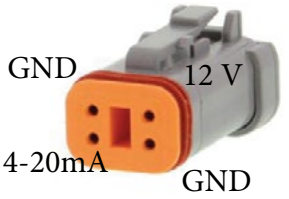

Flue Temp




Water/Steam Purge


**DT06-4S**

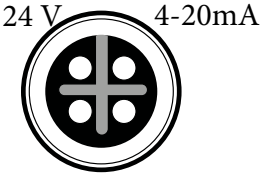

Valve Actuators



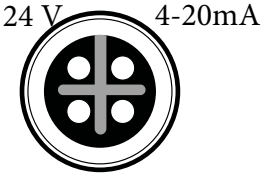

Tail Light Assembly


**M12**

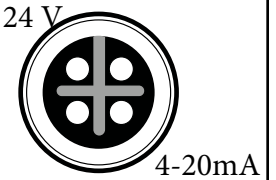

Temp Sensors



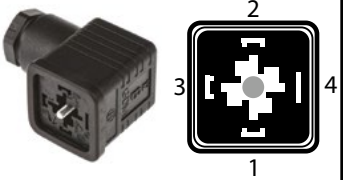

Fuel/Water Level Sensors




Pres Sensors

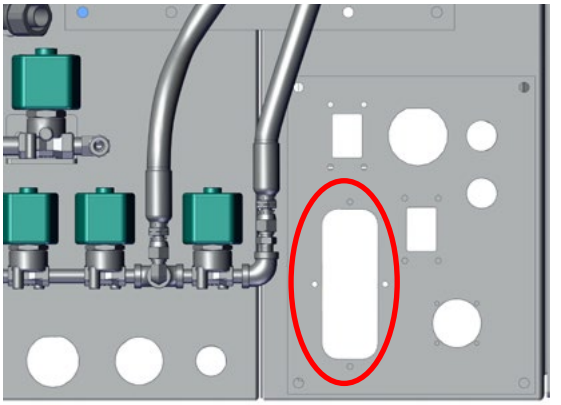


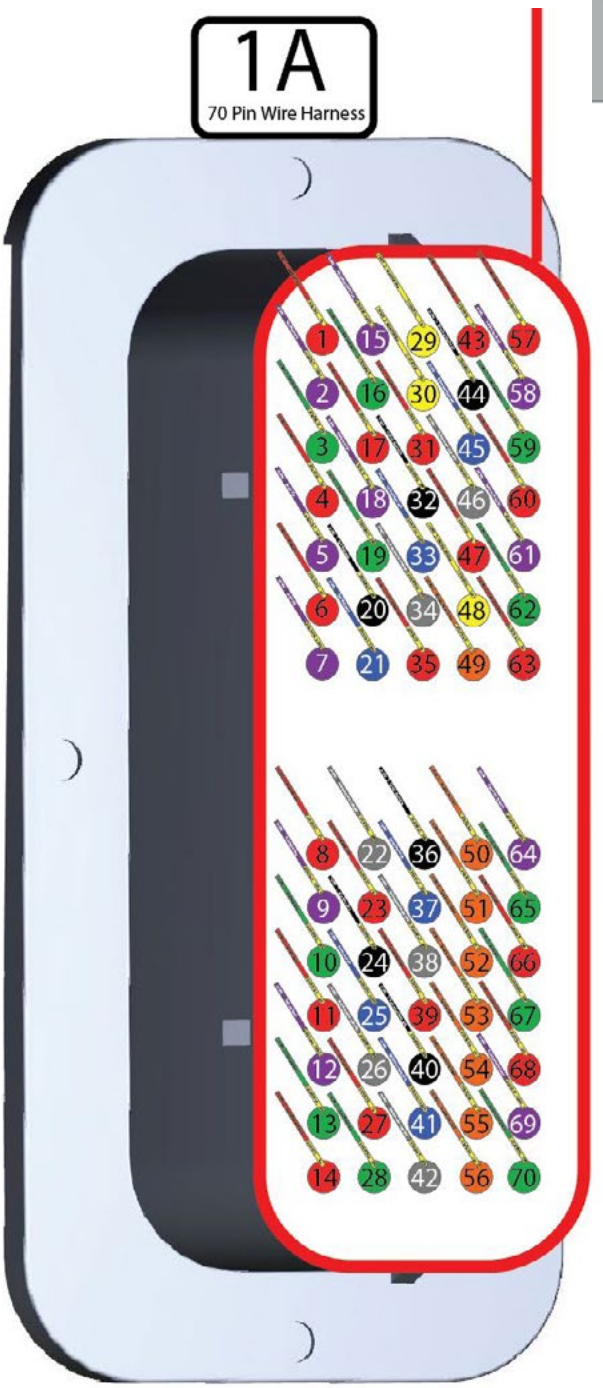

**DIN 4 Pin**




Steam psi Sensors

Note: 2014 machines only

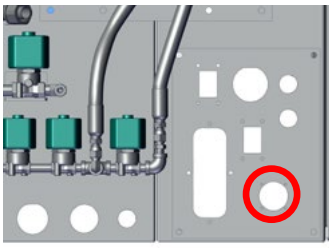




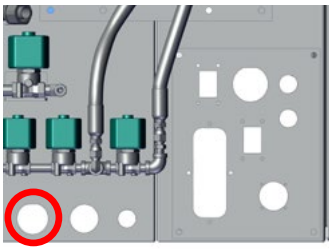

| | | | | | |
|---|---|---|---|---|---|
| 1 | Feed Water Temp | 24v | 36 | Steam Valve 2 | Gnd |
| 2 | Feed Water Temp | 4-20mA | 37 | Steam Valve 2 | 4-20mA |
| 3 | Feed Water Temp | Gnd | 38 | Steam Valve 2 | Gnd-Com |
| 4 | Nozzle 1 PSI | 24v | 39 | Steam Valve 2 | 12v |
| 5 | Nozzle 1 PSI | 4-20mA | 40 | Steam Valve 3 | Gnd |
| 6 | Nozzle 2 PSI | 24v | 41 | Steam Valve 3 | 4-20mA |
| 7 | Nozzle 2 PSI | 4-20mA | 42 | Steam Valve 3 | Gnd-Com |
| 8 | Boiler Water Temp | 24v | 43 | Steam Valve 3 | 12v |
| 9 | Boiler Water Temp | 4-20mA | 44 | Steam Valve 4 | Gnd |
| 10 | Boiler Water Temp | Gnd | 45 | Steam Valve 4 | 4-20mA |
| 11 | Fuel Level | 24v | 46 | Steam Valve 4 | Gnd-Com |
| 12 | Fuel Level | 4-20mA | 47 | Steam Valve 4 | 12v |
| 13 | Fuel Level | Gnd | 48 | Generator Start/Stop | 12v |
| 14 | Supply Water Level | 24v | 49 | Generator General Failure | 12v |
| 15 | Supply Water Level | 4-20mA | 50 | Generator Not in Auto | 12v |
| 16 | Supply Water Level | Gnd | 51 | Generator Running | 12v |
| 17 | Flue Temp | 24v | 52 | Generator Low Battery | 12v |
| 18 | Flue Temp | 4-20mA | 53 | Generator Low Oil PSI | 12v |
| 19 | Flue Temp | Gnd | 54 | Generator High Temp | 12v |
| 20 | Feed Water Valve | Gnd | 55 | Generator Over Speed | 12v |
| 21 | Feed Water Valve | 4-20mA | 56 | Generator Over Crank | 12v |
| 22 | Feed Water Valve | Gnd-Com | 57 | Ambient Temp | 24v |
| 23 | Feed Water Valve | 12v | 58 | Ambient Temp | 4-20mA |
| 24 | Blow Down Valve | Gnd | 59 | Ambient Temp | Gnd |
| 25 | Blow Down Valve | 4-20mA | 60 | Fuel Pump PSI | 24v |
| 26 | Blow Down Valve | Gnd-Com | 61 | Fuel Pump PSI | 4-20mA |
| 27 | Blow Down Valve | 12v | 62 | Fuel Pump PSI | Gnd |
| 28 | Steam/Water Purge | Gnd | 63 | Propane Pilot PSI | 24v |
| 29 | Steam Purge Valve | 24v | 64 | Propane Pilot PSI | 4-20mA |
| 30 | Water Purge Valve | 24v | 65 | Propane Pilot PSI | Gnd |
| 31 | Steam/Water Purge | 12v | 66 | Work Lights | 12v |
| 32 | Steam Valve 1 | Gnd | 67 | Work Lights | Gnd |
| 33 | Steam Valve 1 | 4-20mA | 68 | Boiler Door | 24v |
| 34 | Steam Valve 1 | Gnd-Com | 69 | Boiler Door | 4-20mA |
| 35 | Steam Valve 1 | 12v | 70 | Boiler Door | Gnd |

# Connections

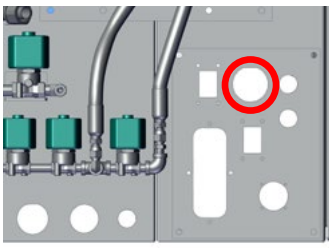

| | | |
|---|---|---|
| 1 | RJ45 PIN 1 (WHITE/ORANGE) | |
| 2 | RJ45 PIN 2 (ORANGE) | |
| 3 | RJ45 PIN 3 (WHITE/GREEN) | |
| 4 | RJ45 PIN 6 (GREEN) | |
| 5 | RED ROCKER SWITCH T1 | 12v IN |
| 6 | RED ROCKER SWITCH T2 | 12v OUT |
| 7 | 24v TO TOUCH SCREEN | 24v |
| 8 | GND TO TOUCH SCREEN | GND |

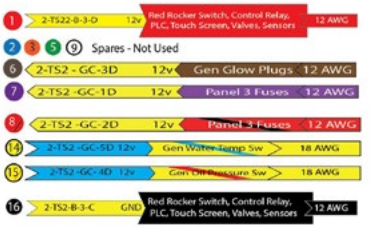


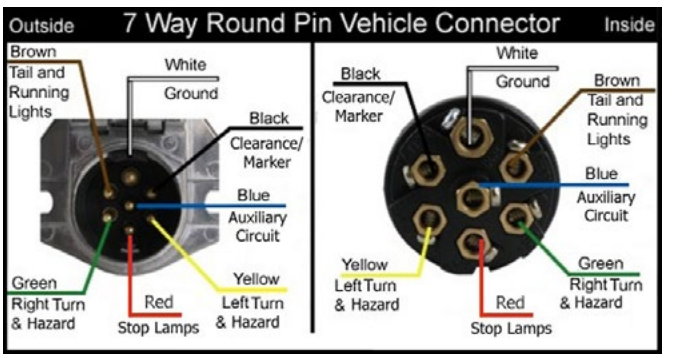

| | | |
|---|---|---|
| A | STEAM PSI 1 | 24v |
| B | STEAM PSI 1 | 4-20mA |
| C | STEAM PSI 1 DRAIN WIRE | Gnd |
| D | STEAM PSI 2 | 24v |
| E | STEAM PSI 2 | 4-20mA |
| F | STEAM PSI 2 DRAIN WIRE | GND |
| G | BOILER WATER LEVEL SENSOR | 24v |
| H | SPARE | |
| J | BOILER WATER LEVEL SENSOR | 4-20mA |



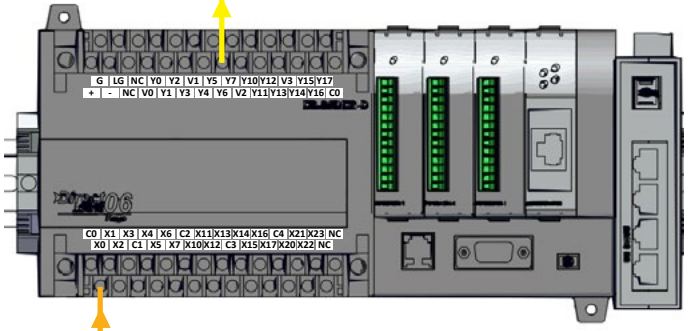

| | | |
|---|---|---|
| A | OPERATING PRESSURE SWITCH | 120v |
| B | OPERATING PRESSURE SWITCH | 120v |
| C | HIGH PRESSURE SWITCH | 120v |
| D | HIGH PRESSURE SWITCH | 120v |
| E | LOW WATER 1 | 2VAC |
| F | LOW WATER 2 | 2VAC |
| G | LOW WATER GROUND | GND |



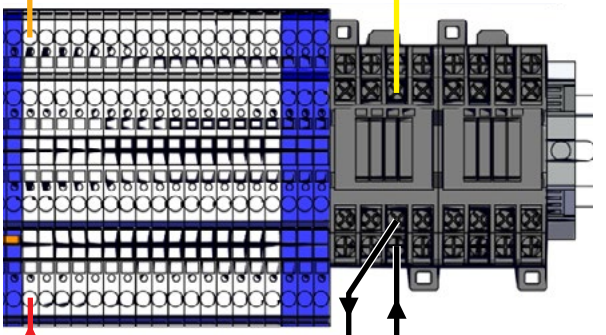



# Panel 2



24 V signal to turn on Control Power

24 V signal from SR1 telling the PLC that Control Power is ON



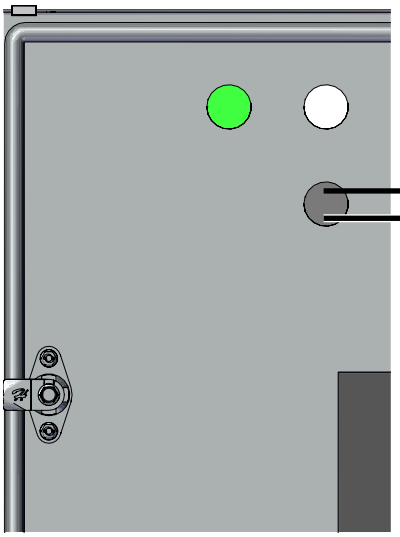
24 V

120 V

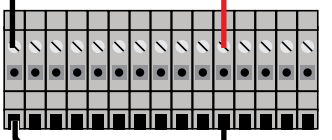
120 V

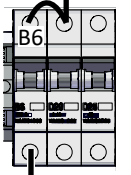
120 V

# Panel 1 Door



# Panel 1

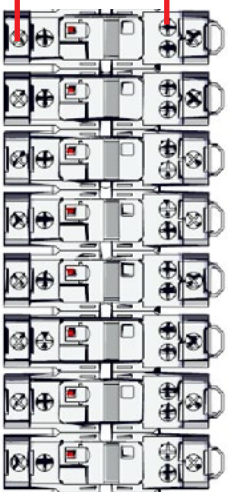


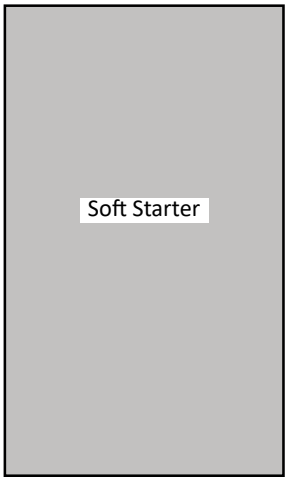


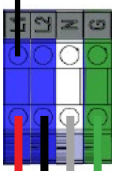

120 V

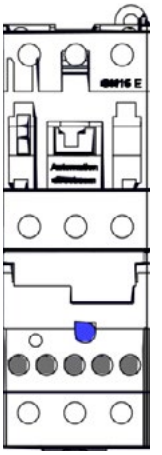
120 V

120 V



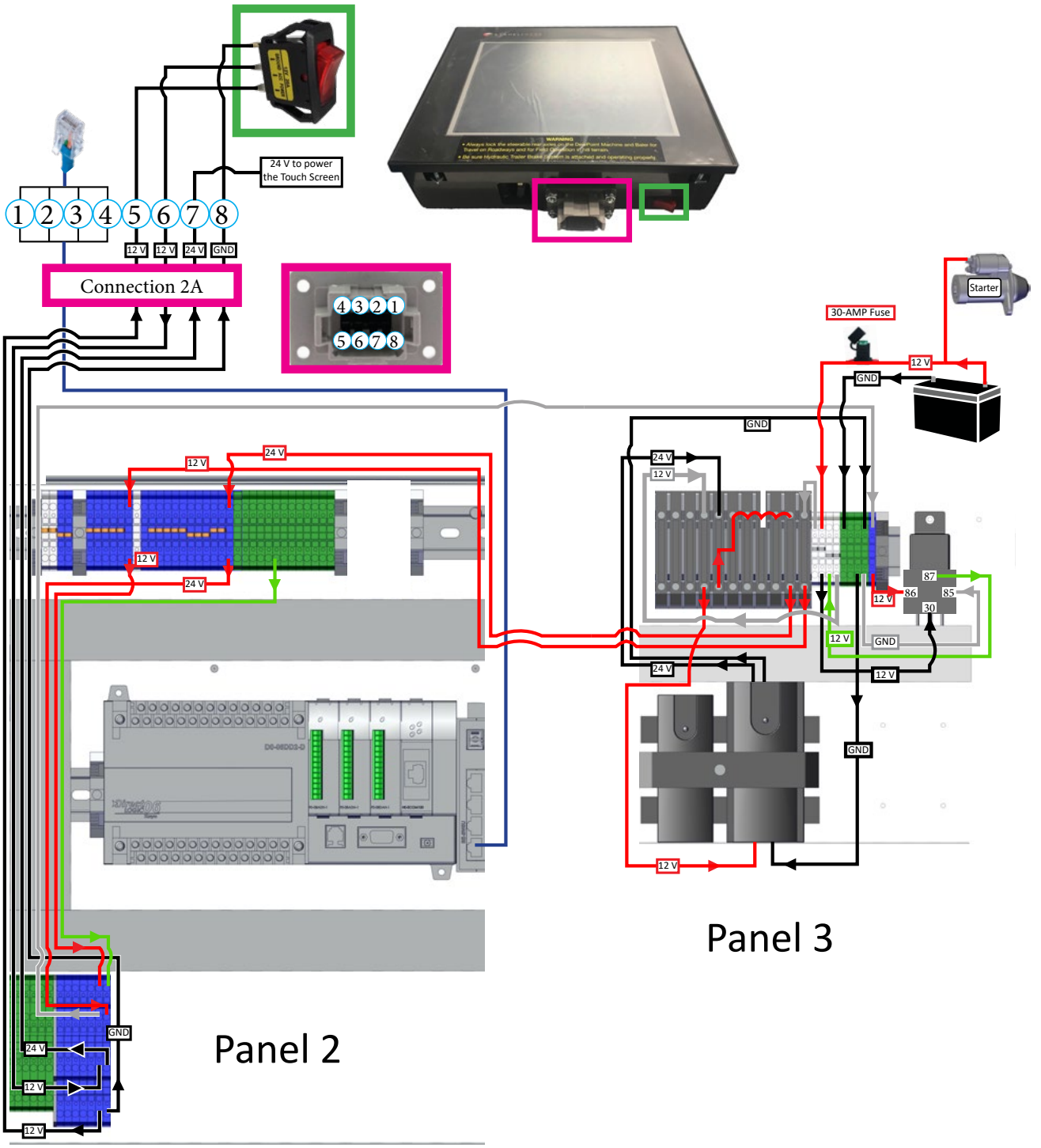


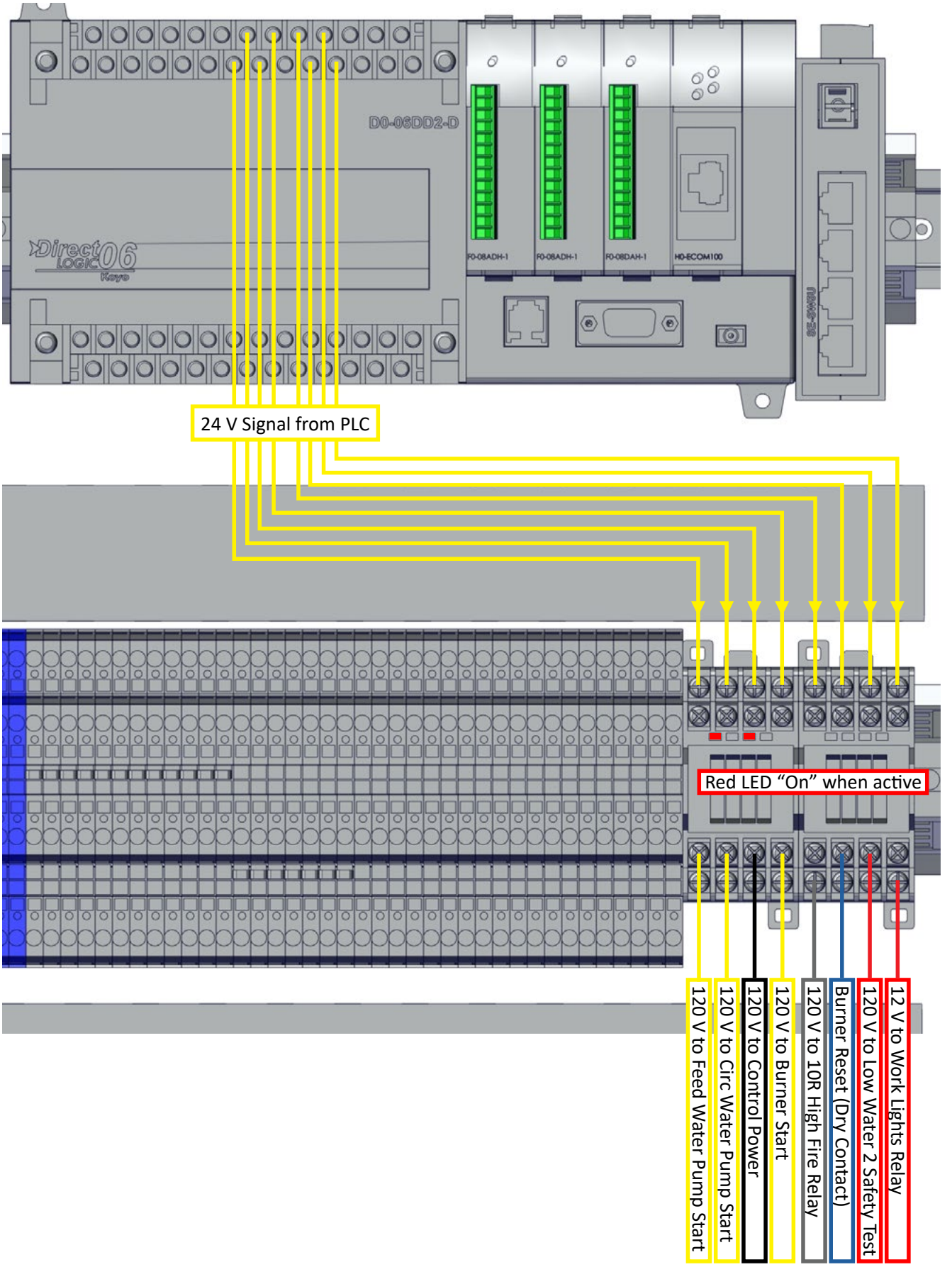


Generator Plug

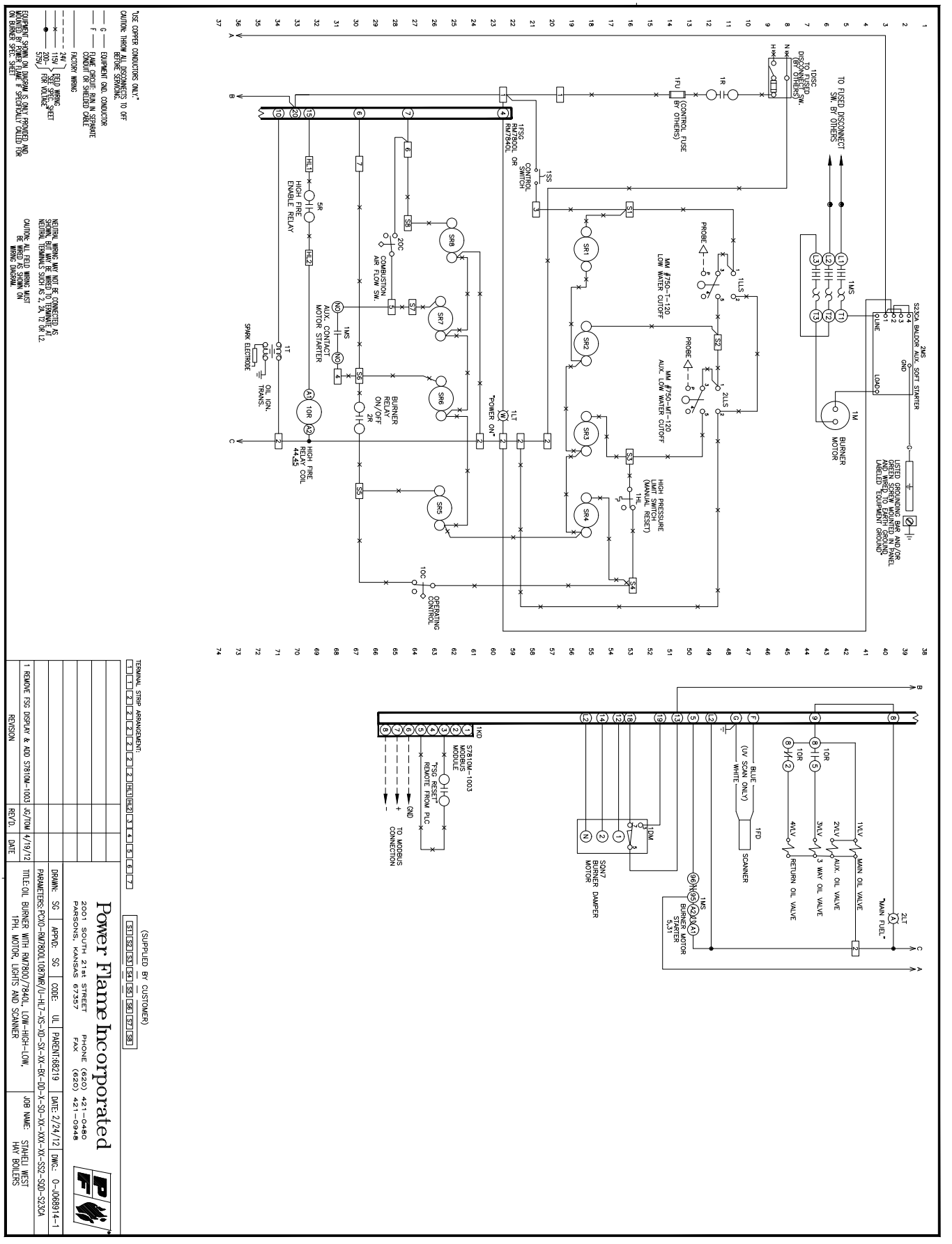
# Touch Screen Wiring



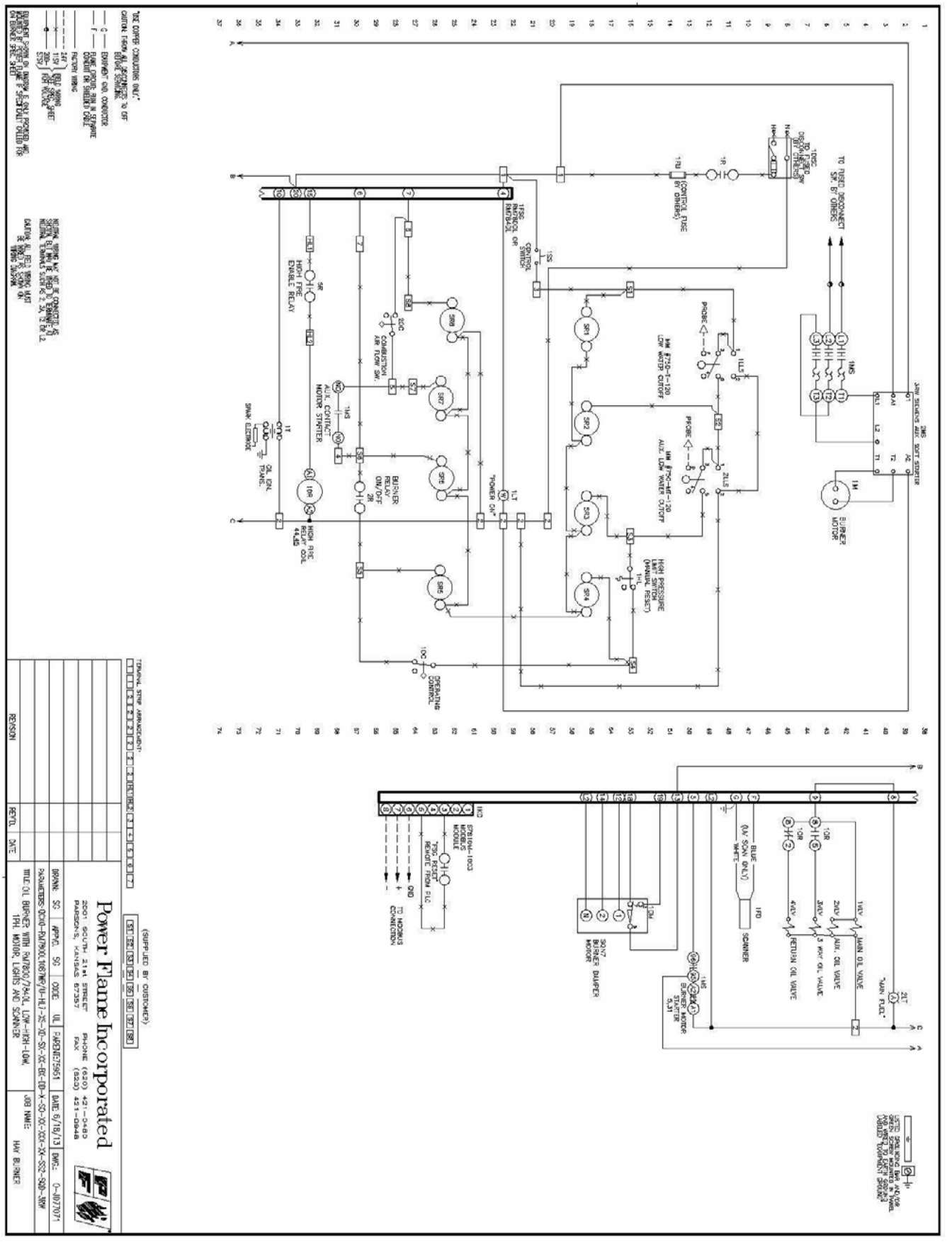
# Panel 2 Relay Block Wiring



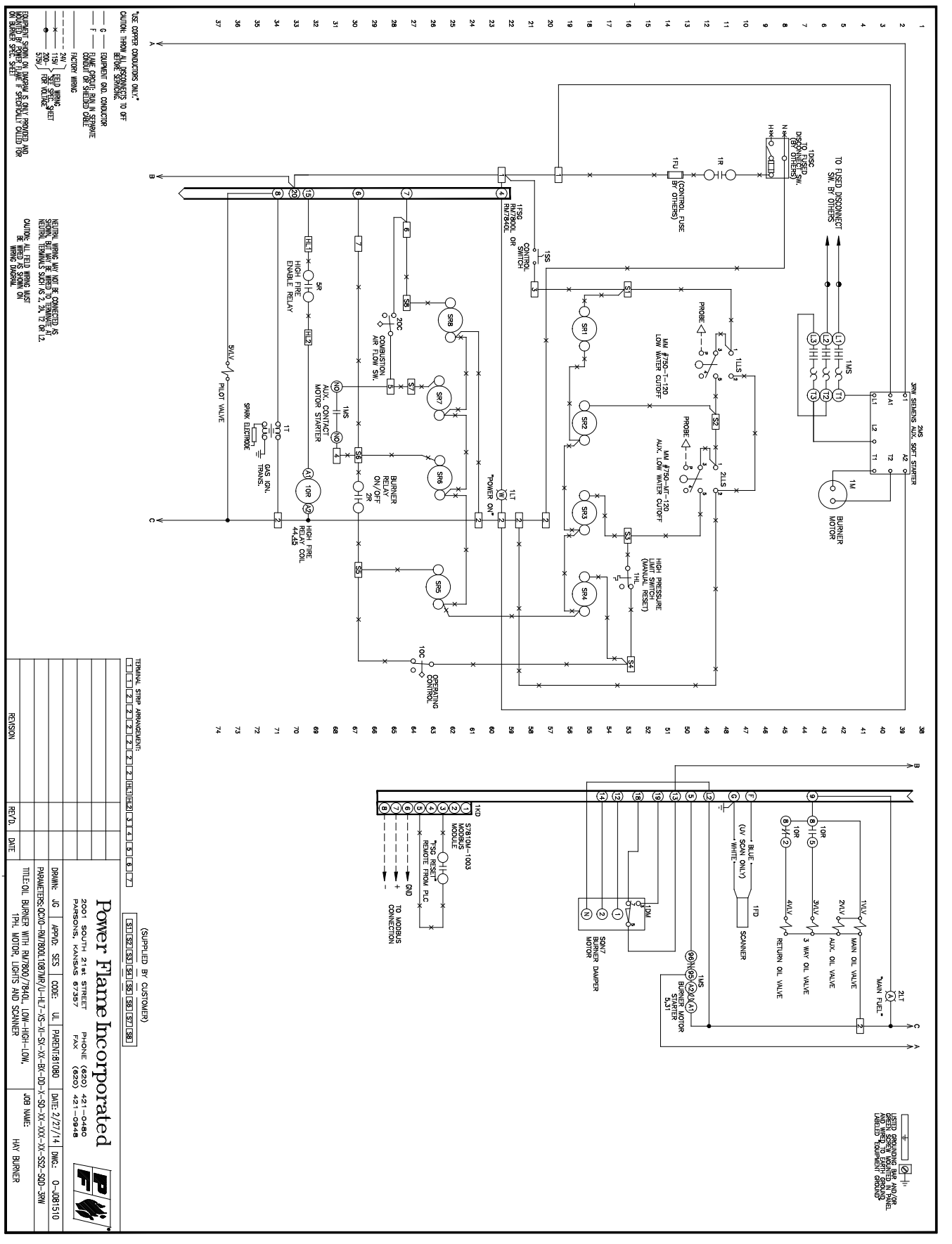
# Burner Wiring 2010-2013



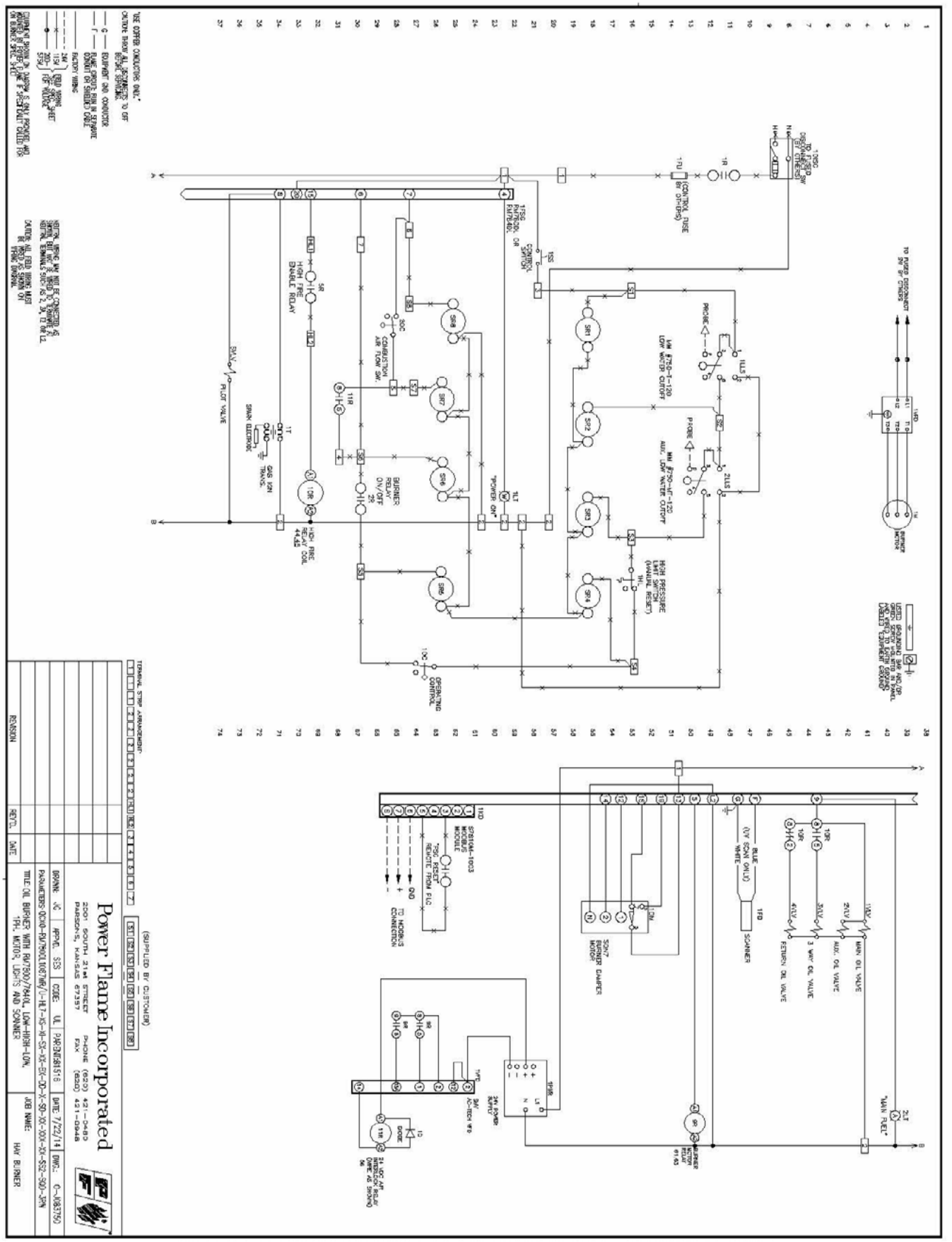
# Burner Wiring 2014 (SS Direct Spark)



# Burner Wiring 2014 (SS Propane)



# Burner Wiring 2014 (VFD Propane)

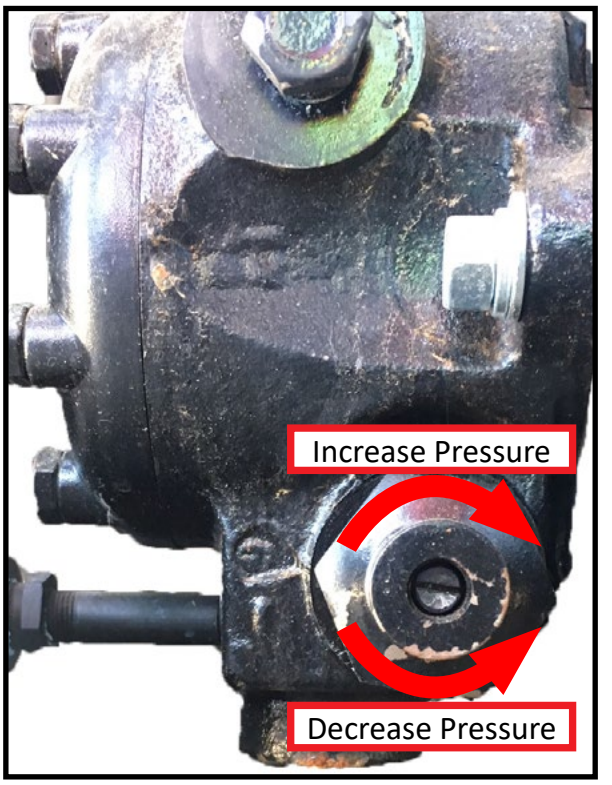


# Fuel Pump

The fuel pump pressure should be set between 280-300 psi. This should result in 80-90 psi at the nozzle in low fire and 160-190 psi at the nozzle in high fire.

To adjust the fuel pump pressure, insert a flat head screwdriver into the adjustment port. Turn clockwise to increase pressure and counterclockwise to decrease pressure. Make sure the manual gauge and the touch screen readings match up when adjusting pressure.

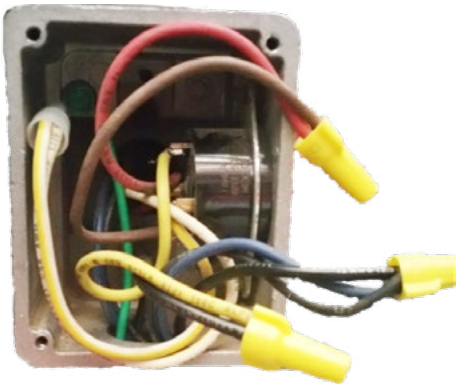
| Fuel Pump Pressure |
| --- |
| 280-300 psi |

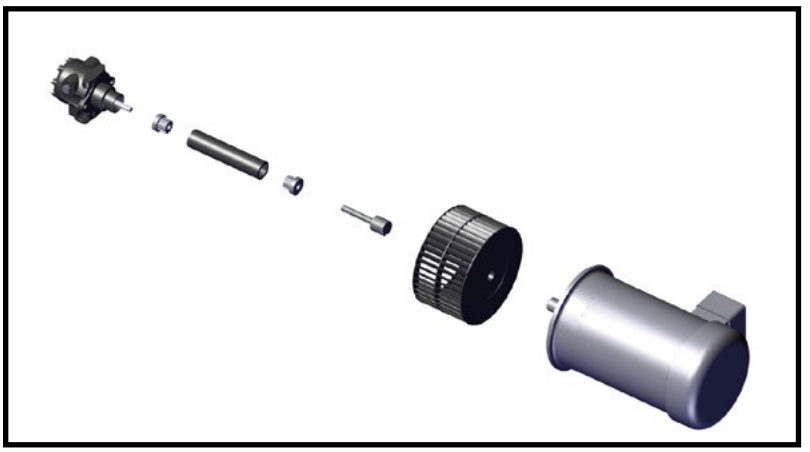



| | | |
| --- | --- | --- |
| **Nozzle Pressure** | **(Low Fire)** | 80-90 psi |
| **Nozzle Pressure** | **(High Fire)** | 160-190 psi |

# Fan Motor

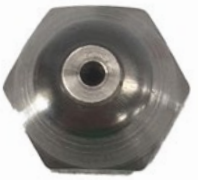
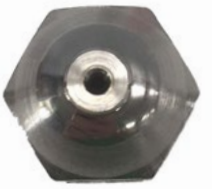
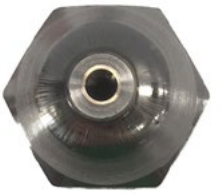
| | 2010-2013 | 2014 |
|---|---|---|
| **Motor Type** | 1 Phase | 1 Phase / 3 Phase |
| **Soft Start/VFD** | Baldor Soft Start  | Siemens Soft Start / VFD   |
| **Soft Start Settings** | Load = 25-50%<br>Time = 5-10 sec | Load = 25-50%<br>Time = 5-10 sec |

| | | |
|---|---|---|
| **Wiring** |  1 Phase Wiring |  3 Phase Wiring |

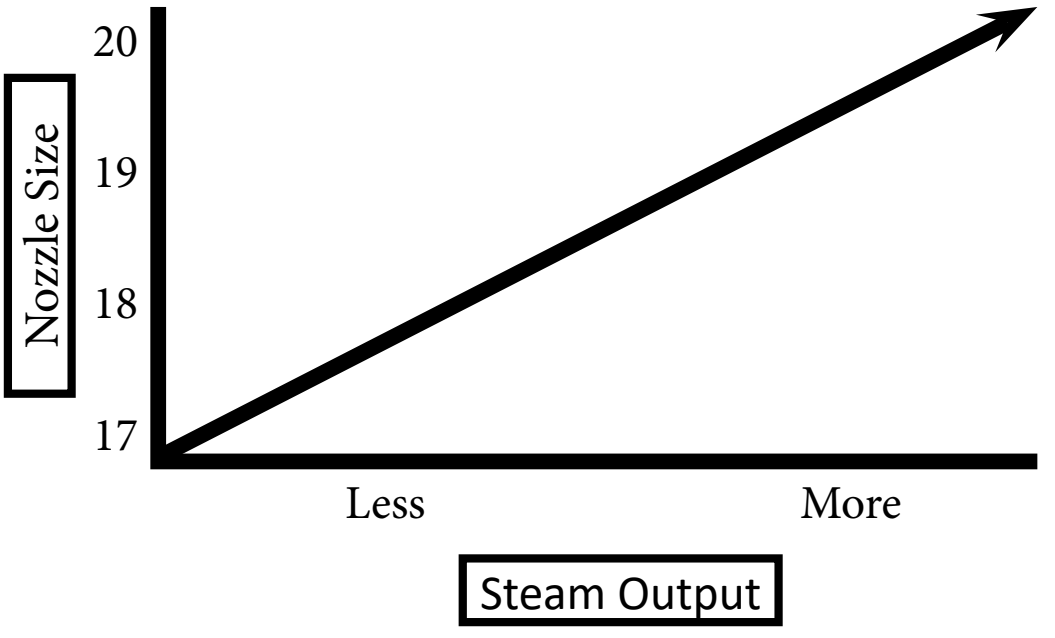


| | Typical Amp Draw |
|---|---|
| **Low Fire** | ~12 amps |
| **High Fire** | ~15 amps |
| **Purge** | ~19 amps |


## Suggested Elevation

| 17 | 18 | 19 | 20 |
|---|---|---|---|
| Part #10994 | Part #10609 | Part #10610 | Part #10048 |
|  |  |  |  |
|  |  |  |  |
| Case by Case | Over 7,000 ft | 4,000 - 7,000 ft | 0 - 4,000 ft |

Choosing the right size burner nozzle can significantly improve a machine's performance. The higher the elevation, the smaller the nozzle size should be. The number relates to how many gallons per hour the nozzle sprays.



## Troubleshooting



## Faults

## Fault Conditions (Not Detectable)

# Faults

## Fault 1: No Purge Card

The Honeywell burner controller is not detecting a purge card (Panel 1).

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • No purge card installed. | • Check for purge card. | • Install purge card. |
| • Bad purge card. | • Replace with new purge card. **P/N:10712** | |
| • Bad burner controller. | • Replace burner controller. **P/N: 37253** | |

## Fault 14: High Fire Switch / Purge Hold T19 High Fire Switch

Indicates that the louver is not opening during the purge cycle or that the signal from the high fire switch is not reaching the Honeywell burner controller.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Misadjusted louver actuator. | • See Test 115 to adjust/configure the louver Actuator. | |
| • Faulty louver actuator. | • See if the louver actuator opens the burner louvers during the 30 second purge. The louver actuator should hold the louvers open for the full 30 second purge. | • Replace louver actuator (check other causes before buying a new component). **P/N: 10038**<br>• Temporary fix: assist the louver actuator by opening the louvers manually during the 30 second purge cycle. |
| • Obstructed path of the louver actuator/louvers. | • Manually move the louvers to feel if there is any resistance or obstructions. | • Remove obstructions.<br>• Lubricate the bushings. |
| • Faulty wiring. | • Inspect wiring for continuity, voltage, and ground. | • Repair/Replace faulty wiring. |
| • Faulty burner controller. | • Check for 120 V on T19. | • Replace burner controller. **P/N: 37253** |

## Fault 15: Flame Detected (Standby)

Indicates that a flame has been detected when there should not be a flame.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Flame in boiler. | • Check for burning/smoldering debris inside the boiler. | • Put out the flame.<br>• Remove flame source.<br>• Wait for flame to burn out. |
| • Faulty flame detector. | • Perform Test 101. | • Replace flame detector. **P/N: 12097** |
| • Faulty/Loose amplifier card. | • Check the amplifier card is seated properly. (See Diagram 6) | • Replace/Re-seat amplifier card (Re-seat and secure in place with tape or a tie wrap). **P/N: 12098** |
| • Faulty wiring. | • Inspect the wiring for continuity, ground, and proper voltage. | • Repair/Replace wiring. |

# Faults

## Fault 17: Main Flame Fail

Indicates that the flame detector cannot detect flame during run mode (low fire/high fire).

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty flame detector. | • Perform Test 101. | • Replace flame detector (check other causes before buying a new component). **P/N: 12097** |
| • Moisture/Dust on the flame detector lens. | • Check the lens for moisture/ dust. | • Remove and dry/clean flame detector lens (weatherproof if needed). |
| • Faulty/Loose amplifier card. | • Verify the amplifier card is seated properly. | • Replace/Reseat amplifier card (Reseat and secure in place with tape or a tie wrap) See Diagram 6. **P/N: 12098** |
| • Loose flame detector. | • Check to see if the flame detector has “slop/play”. The flame detector needs to be looking straight down the sight tube. | • Hand tighten flame detector. |
| • Overtightened flame detector. | • Check for smashed o-ring from over-tightening the flame detector (o-ring is between the flame detector and the sight tube). | • Loosen the flame detector. |
| • Misaligned flame detector.<br>• Missing o-ring.<br>• Damaged o-ring. | • Remove the flame detector and check for the o-ring that prevents play/slop from the flame detector and aligns the flame detector with the sight tube; it also prevents malfunctions from metal on metal contact. | • Replace flame detector o-ring **P/N: 10644** |
| • Restricted fuel flow through the main and safety fuel solenoid valves. | • Inspect fuel paths, check for overtightened fittings. | • Remove restrictions. |
| • No fuel flow through the main and safety fuel solenoid valves. | • Perform Test 102. | • Replace faulty fuel solenoid valve. **P/N: 10730** |
| • Pilot flame lost just before main ignition. | • This will also cause a Fault 28. Check your propane valve and pressure. | • Turn propane valve on.<br>• Refill/Replace propane tank. |
| • Loose/Leaking/Faulty fuel nozzle.<br>• Clogged nozzle screen. | • Remove burner gun and inspect nozzle. (See Fuel Nozzles page) | • Tighten/Replace nozzle. **P/N: 10609/10610** |
| • Flame in boiler. | • Check for burning/smoldering debris inside the boiler. | • Put out the flame.<br>• Remove flame source.<br>• Wait for flame to burn out. |

# Faults

## Fault 18: Flame Detected (Pre-Purge)

Indicates that a flame has been detected when there should not be a flame.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Flame in boiler. | • Check for burning/smoldering debris inside the boiler. | • Put out the flame.<br>• Remove flame source.<br>• Wait for flame to burn out. |
| • Faulty flame detector or amplifier card. | • Perform Test 101. | • Replace flame detector or amplifier card.<br>**Flame detector P/N: 12097**<br>**Amplifier card P/N: 12098** |
| • Faulty wiring. | • Inspect the wiring for continuity, ground, and proper voltage. | • Repair/Replace wiring. |

## Fault 19: Main Flame Ign (Page 1 of 2)

Indicates flame was lost during the first 10 seconds of the RUN state.

| | Causes | Troubleshooting | Fixes |
|---|---|---|---|
| Flame Detector | • Faulty flame detector. | • Perform Test 101. | • Replace flame detector (check other causes before buying a new component). **P/N: 12097** |
| | • Moisture/Dust on the flame detector lens. | • Check the lens for moisture/ dust. | • Remove and dry/clean flame detector lens (weatherproof if needed). |
| | • Faulty/Loose amplifier card. | • Verify the amplifier card is seated properly. | • Replace/Reseat amplifier card (Reseat and secure in place with tape or a tie wrap). **P/N: 12098** |
| | • Loose flame detector. | • See if the flame detector is has slop/play. The flame detector needs to be looking straight down the sight tube. | • Hand tighten flame detector. |
| | • Overtightened flame detector. | • Check for smashed o-ring from over-tightening the flame detec-tor. o-ring is between the flame detector and the sight tube. | • Loosen the flame detector. |
| | • Misaligned flame detector.<br>• Missing o-ring. | • Remove the flame detector and check for the o-ring that prevents play/slop from the flame detector and aligns the flame detector with the sight tube; it also prevents malfunctions from metal on metal contact. | • Replace flame detector o-ring. **P/N: 10644** |

# Faults

## Fault 19: Main Flame Ign (Page 2 of 2)

Indicates flame was lost during the first 10 seconds of the RUN state.

| | Causes | Troubleshooting | Fixes |
|---|---|---|---|
| Fuel | • Burner fuel filter clogged. | • Replace burner fuel filter (Napa 4006). **P/N: 10054** | |
| | • Clogged fuel manifold/line. | • Inspect and clean fuel manifold and fuel lines. | |
| | • Low fire nozzle pressure is low/high.<br>• Fuel pump pressure is low. | • Set nozzle pressure to 80-90 psi (See Test 101).<br>• Set the pump pressure to 280-300 psi (See Test 101). | |
| | • No fuel flow through the main and safety fuel solenoid valves. | • Perform Test 102. | • Replace faulty fuel solenoid valve. **P/N: 10730** |
| | • Restricted fuel flow through the main and safety fuel solenoid valves. | • Inspect fuel paths, check for overtightened fittings. | • Remove restrictions. |
| | • Nozzle fuel feed/return lines are crossed. | • Check nozzle fuel feed/return lines are connected properly. | • Connect nozzle fuel feed/return lines properly (See Diagram 5). |
| | • No fuel pump pressure. | • Check for fuel at the pump.<br>• Check that the fan/pump shaft coupler is in place. | • Bleed the fuel pump.<br>• Replace the fuel pump. **P/N: 10045**<br>• Repair/Replace the fan/pump shaft coupler. **P/N: 12060** |
| | • Faulty wiring. | • Inspect the wiring for continuity, ground, and proper voltage. | • Repair/Replace wiring. |
| | • Intermittent pilot flame (2014 propane machines only). | • If the pilot flame goes out right before main ignition, a fault 19 will appear. An inconsistent pilot will cause both faults 28 & 19.<br>• See test 106. | • See fault 28 propane section. |

## Fault 20: Low Fire SW Off / Purge Hold T18 Low Fire Switch

Indicates that the louver is not closing during the purge cycle or that the signal from the low fire switch is not reaching the Honeywell burner controller.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Misadjusted louver actuator. | • See Test 115 to adjust/configure the louver actuator. | |
| • Faulty louver actuator. | • See if the louver actuator returns to the closed position after the 30 second purge. | • Replace louver actuator (check other causes before buying a new component). **P/N: 10038** |
| • Faulty wiring. | • Inspect wiring for continuity, voltage, and ground. | • Repair/Replace faulty wiring. |

# FAULTS

## Fault 28: Pilot Flame Fail (Page 1 of 2)

Indicates a failure in either the ignition system or the safety system that detects the pilot flame.
**IMPORTANT: Perform Test 101 first to determine whether or not a pilot flame is present.**

| | | | |
|---|---|---|---|
| Flame Detector | • Faulty flame detector. | • Perform Test 101. | • Replace flame detector (check other causes before buying a new component). **P/N: 12097** |
| | • Moisture/Dust on the flame detector lens. | • Check the lens for moisture/ dust. | • Remove and dry/clean flame detector lens (weatherproof if needed). |
| | • Faulty/Loose amplifier card. | • Verify the amplifier card is seated properly. | • Replace/Reseat amplifier card (Reseat and secure in place with tape or a tie wrap). **P/N: 12098** |
| | • Loose flame detector. | • Check to see if the flame detector has “slop/play”. The flame detector needs to be looking straight down the sight tube. | • Hand tighten flame detector. |
| | • Overtightened flame detector. | • Check for smashed o-ring from over-tightening the flame detec- tor. o-ring is between the flame detector and the sight tube. | • Loosen the flame detector. |
| | • Misaligned flame detector.<br>• Missing o-ring. | • Remove the flame detector and check for the o-ring that prevents play/slop from the flame detector and aligns the flame detector with the sight tube; it also prevents malfunctions from metal on metal contact. | • Replace flame detector o-ring. **P/N: 10644** |
| No Spark | • Dirty electrode assembly. | • Check for spark. | • Clean electrode assembly. |
| | • Improper electrode gap/ orientation.<br>• Spark grounding to burner. | • Check for spark. | • Set electrode gap and orientation (Test 105). |
| | • Ignition cable disconnected. | • Check ignition cable(s) *2014’s one cable. | • Connect ignition cable(s) *2014’s one cable. |
| | • Faulty ignition transformer. | • Perform Test 104. | • Replace ignition transformer. **P/N: 10043 (Direct Spark)** **P/N: 10698 (Propane)** |
| *Propane: 2014’s | • Propane tank valve closed. | • Check propane tank. | • Open propane tank valve. |
| | • Propane tank empty. | • Check propane tank. | • Refill propane tank. |
| | • Clogged burner regulator. | • Test that propane is passing through the burner regulator.<br>• Perform Test 127. | • Replace burner regulator. **P/N: 10693**<br>• To prevent future clogs, clean propane hoses using compressed air. |

# Faults

## Fault 28: Pilot Flame Fail (Page 2 of 2)

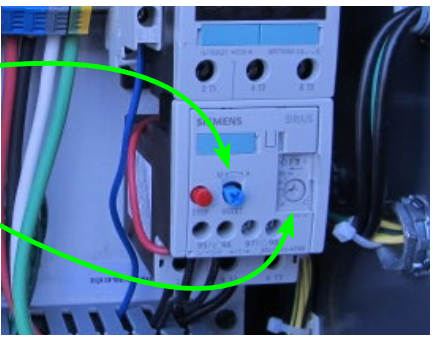
Indicates a failure in either the ignition system or the safety system that detects the pilot flame.
**IMPORTANT: Perform Test 101 first to determine whether or not a pilot flame is present.**

| | | | |
|---|---|---|---|
| *Propane: 2014's | • Improper burner regulator adjustment. | • Perform Test 106. | • Adjust regulator psi output (Clockwise increases pressure). |
| | • Faulty propane solenoid. | • Perform Test 103. | • Replace/Clean propane solenoid. **P/N: 10733** |
| | • Clogged propane hose/ nozzle. | • Disconnect propane regulator; during pilot ignition, spray compressed air through the propane solenoid valve to clear the hose and nozzle of debris. | |
| | • Faulty propane tank regulator; too much propane pressure.<br>• Faulty propane tank regulator damaged the burner regulator. | • Test for 10 psi after the propane tank regulator (the burner regulator inlet supports 10 psi max). | • First replace the propane tank regulator. **P/N: 10740**<br>• Then replace the burner regulator. **P/N: 10693** |
| | • Overfilled propane tank. | • Inspect propane tank pressure relief valve. | • Replace propane tank. |
| | • Overtightened propane solenoid fittings. | • Check for overtightened fittings. | • Repair/Replace overtightened fittings. |
| Fuel | • Low fire nozzle pressure is low/high.<br>• Fuel pump pressure is low. | • Set nozzle pressure to 80-90 psi (See Test 116).<br>• Set the pump pressure to 280-300 psi (See Test 116). | |
| | • No fuel flow through the main and safety fuel solenoid valves. | • Perform Test 102. | • Replace faulty fuel solenoid valve. |
| | • Restricted fuel flow through the main and safety fuel solenoid valves. | • Inspect fuel paths, check for overtightened fittings. | • Remove restrictions. |
| | • Nozzle fuel feed/return lines are crossed. | • Check nozzle fuel feed/return lines are connected properly. | • Connect nozzle fuel feed/return lines properly (See Diagram 5). |
| | • No fuel pump pressure. | • Check for fuel at the pump.<br>• Check that the fan/pump shaft coupler is in place. | • Bleed the fuel pump.<br>• Replace the fuel pump. **P/N: 10045**<br>• Repair/Replace the fan/pump shaft coupler. |
| Air | • Louver not closing enough for ignition. | • Observe the louver during ignition to see if it closes as shown in Test 116 step 3. | • Perform Test 115.<br>• Perform Test 116. |
| • Faulty wiring. | | • Inspect the wiring for continuity, ground, and proper voltage. | • Repair/Replace wiring. |

# Faults

## Fault 29: Lockout ILK (Airflow Switch / VFD) (Page 1 of 2)

Indicates that the VFD/fan motor did not turn on or the airflow switch did not detect the fan air moving.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Clogged airflow switch or aluminum tubes. | • Check the airflow switch and hoses for obstructions. | • Clean out aluminum tubes.<br>• Remove obstructions.<br>• Remove and clean sensor air inlet port. |
| • Airflow switch out of adjustment. | • Fan is spinning but airflow switch is not tripped. | • Adjust airflow switch to most sensitive setting.<br>  <br>• Counterclockwise = More sensitive.<br>• Clockwise = Less sensitive. |
| • Over-greased fan motor. | • Has the fan motor been over greased? (1 pump per year) | • Repair/Replace fan motor. |
| • Fan contactor overload tripped. | • Reset by pressing blue button.<br>• Turn up load setting by turning the knob clockwise (this could indicate the fan motor is going bad). |  |
| • Faulty fan contactor overload. | • Replace fan contactor overload. **P/N: 10040** | |
| • Failed fan motor. | • Check for 3 phase power reaching fan motor if it is a 2014 DewPoint with a VFD.<br>• Check for single phase 240 V voltage reaching the fan motor.<br>• Fan should spin freely. | • Repair/Replace fan motor. **P/N: 10687** |
| • Faulty 11r relay (Panel 1 Door). | • Applicable to 2014 machines with a VFD. | • Check/Replace 11r relay (Panel 1 Door). **P/N: 10624** |
| • Faulty/Non-programmed VFD (some 2014's). | • Watch VFD LCD screen as the fan motor starts; It should ramp from 0-60 over 15 seconds. | • Program the VFD (See Test 114).<br>• Replace VFD. **P/N: 10714** |
| • Low supply voltage to VFD (some 2014's). | • Check for 120 V on L1 and L2 of VFD. | • Repair faulty wiring or cause of low voltage. |

# Faults

## Fault 29: Lockout ILK (Airflow Switch / VFD) (Page 2 of 2)

Indicates that the VFD/fan motor did not turn on or the airflow switch did not detect the fan air moving.

| | | |
|---|---|---|
| • Faulty/Misadjusted Siemens soft start (2014). | • Check that the load is set between 25% - 50%.<br>• Check that the time is set between 5s - 10s. | • Adjust the load to between 25% - 50%.<br>• Adjust the time to between 5s - 10s.<br>• Replace the soft start. |
| • Faulty/Misadjusted Baldor soft start (2010-2013). | • Check that the load is set between 25% - 50%.<br>• Check that the time is set between 5s - 10s. | • Adjust the load to between 25% - 50%.<br>• Adjust the time to between 5s - 10s.<br>•Replace the soft start. |
| • Fan not speeding up fast enough to trip airflow switch. | • Use Test 114 to give instructions on switching ramp time to 10 seconds instead of 15. | • Change VFD ramp time to 10 seconds instead of 15. |
| • Faulty wiring. | • Inspect the wiring for continuity, ground, and proper voltage. | • Repair/Replace wiring. |

## Fault 30-44

- Check wiring behind the burner controller.
- Replace the burner controller if fault persists.

## Fault 45: Low Fire Switch Off

Indicates low fire switch was not on during main oil ignition (low fire switch turning on is required during main oil ignition).

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Misadjusted louver actuator. | • See Test 115 to adjust/configure the louver actuator. | |
| • Faulty louver actuator. | • See if the louver actuator opens the burner louvers during the 30 second purge. The louver actuator should hold the louvers open for the full 30 second purge. | • Replace louver actuator (check other causes before buying a new component). **P/N: 10038**<br>• Temporary fix: Assist the louver actuator by opening the louvers manually during the 30 second purge cycle. |
| • Obstructed path of the louver actuator/louvers. | • Manually move the louvers to feel if there is any resistance or obstructions. | • Remove obstructions.<br>• Lubricate the bearings. |
| • Faulty wiring. | • Inspect wiring for continuity, voltage, and ground. | • Repair/Replace faulty wiring. |

# Faults

## Fault 46-127: Call Service

- Check wiring behind the burner controller.
- Replace the burner controller if fault persists. **P/N: 11677**

## Fault 101: Call Service

| | |
|---|---|
| • New burner controller on old base. | •Needs stud installed on burner controller base. |

## Fault 200: High Pressure Limit Switch (HPLS) Is Tripped

The high pressure limit switch shuts off the burner anytime it is tripped; it trips anytime boiler pressure is over 15 psi.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Wet layup (causes more than 15 psi in the boiler). | • Have you performed a wet layup recently (wet layup fills the boiler completely full of water). | • Manually reset switch.  |
| • 1 or more pigtail valves are open. | • Steam can be seen coming out of the front supply water tanks. | • Close the open pigtail valves (don't forget the one behind the manual psi gauge). |
| • High pressure limit switch faulty or out of calibration. | • Perform Test 108. | • Adjust the calibration nut to 15 psi.<br>• Replace high pressure limit switch. **P/N: 10380** |
| • Operating pressure control switch faulty or out of calibration. | • Perform Test 109. | • Adjust the calibration nut to 14.5 psi.<br>• Replace operating pressure control switch. **P/N: 10379** |
| • Faulty SR-4 relay (Panel 1) Fault 243. | • Swap SR-4 with spare 120 V relay (Panel 1). | |
| • Faulty wiring. | • Inspect the wiring for continuity, ground, and proper voltage. | • Repair/Replace wiring. |

# Faults

## Fault 201: Turn Burner Switch ON

Indicates that the burner is not getting 120 V power (See 120 V Control Power page).

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Burner door switch is “OFF”. |  • Turn the switch to “ON”. | |
| • Circuit breaker B6 is tripped (Panel 1). | • Reset the circuit breaker. | |
| • Main generator circuit breaker is tripped/faulty. | • Reset/Replace the circuit breaker. **P/N: 10207** | |
| • Faulty burner door switch. | • Test 120 V on both wires. | • Replace burner door switch. **P/N: 11409** |
| • Generator plug disconnected. | • Connect generator plug to burner. | |
| • Loose wires or jumpers. | • Check Terminal Strip 2 (TS2) in Panel 1 for loose wires or jumpers. | • Tighten any loose wires. Ensure jumpers are seated properly. |

## Fault 202: Operating Pressure Control Switch (OPLS) Is Tripped

The operating pressure control switch shuts off the burner anytime it is tripped; it trips anytime boiler pressure is over 14.5 psi. Switch auto-resets at 12.5 psi.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • 1 or more pigtail valves are open. | • Steam can be seen coming out of the front supply water tanks. | • Close the open pigtail valves (don’t forget the one behind the manual pressure gauge). |
| • Faulty steam pressure sensor (Fault 207). | • Menu > Settings > Boiler Pressure > Pressure Sensor Selection \| If Steam psi 1 & 2 are reading more than 2 psi different, then compare their readings to the manual pressure gauge on the top front of the boiler and select the sensor that matches the pressure reading to temporarily run on one steam pressure sensor. | •Replace steam pressure sensor. **P/N: 10350** |
| • Operating pressure control switch faulty or out of calibration. | • Perform Test 109. | • Adjust the calibration nut to 14.5.<br>• Replace operating pressure control switch. **P/N: 10379** |
| • Faulty SR-5 relay (Panel 1) Fault 244. | • Swap SR-5 with spare 120 V relay (Panel 1). | |
| • Faulty wiring. | • Inspect the wiring for continuity, ground, and proper voltage. | • Repair/Replace wiring. |

# Faults

## Fault 203: Boiler Water Level Is High

- See Fault 403: Boiler water level higher than set point / boiler overflowing.

## Fault 204: Pilot Propane Level Is Low

Indicates that the propane level count is down to 5 remaining lights (this can often be inaccurate).

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Propane level is low. | • Check propane level. | • Refill propane tank. |
| • Propane lighting count is not accurate. | • Refill propane tank & reset propane light count (Menu > Settings > Pilot Propane > Reset Pilot Propane Gauge). | |

## Fault 206: Supply Water Is Empty

Indicates that the supply water is empty.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Supply water is empty. | • Fill the supply water tanks with treated water. | |
| • Sensor is disconnected. | • Check to see if sensor is disconnected. | • Connect sensor. |
| • Faulty sensor. | • Replace sensor. **P/N: 10371** | |
| • Damaged wire harness. | • Inspect 70 pin wire harness for water damage. | • Repair/Replace damaged components. |
| • Faulty wiring. | • Inspect the wiring for continuity, ground, and proper voltage. | • Repair/Replace wiring. |

## Fault 207: Pressure Differential Alarm

Indicates that the two steam pressure sensors are reading more than 2 psi (default setting) apart from each other.

*Bad steam pressure sensors can damage input cards and PLC's, they can also cause max readings for all inputs on card 1 on the PLC.

** If the PLC or input card are replaced before a possible faulty steam pressure sensor is replaced, the steam pressure sensor can damage the newly replaced components ***(Replace components in order shown below).***

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty/disconnected steam pressure sensor. | • Compare steam pressure sensors against manual pressure gauge to determine which sensor is reading incorrectly.  | • Replace sensor (RELEASE BOILER PRESSURE BEFORE REPLACING).<br>• Reconnect sensor.<br>• Temporary fix: Menu > Settings > Boiler Pressure > Pressure Sensor Selection > Select the sensor that matches the manual pressure gauge (NOT A PERMANENT FIX). **P/N: 10350** |
| • 1 or more pigtail valves are open. | • Steam can be seen coming out of the front supply water tanks. | • Close the open pigtail valves (don't forget the one behind the manual pressure gauge). |
| • Faulty input card 1 in the PLC. | • Perform Test 113. | • Replace faulty input card (see Test 113). **P/N: 10375** |
| • Faulty PLC. | • If after replacing the sensor and the input card 1 there is still an abnormal reading this indicates a faulty PLC. | • Replace PLC. **P/N: 10374** |

# Faults

## Fault 208: Flue Temp Is High

Indicates flue temperature is above 600° F.

*Bad flue temperature sensors can damage input cards and PLC's, they can also cause max readings for all inputs on card 1 on the PLC.

** If the PLC or input card are replaced before a possible faulty flue temp sensor is replaced, the faulty flue temp sensor can damage the newly replaced components ***(Replace components in order shown below).***

***** Alarm can be disabled in Menu > Settings > Alarm Status > Flue Temp Alarm.***

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Soot has built up on tubes causing high flue temperatures. | • If you don't trust the flue temperature reading on the touch screen, confirm temperature with infrared gun or 0-1000° probe. | • Clean the tubes :) |
| • Faulty flue temp sensor. | • Confirm with an infrared gun or 0-1000° probe that the actual temperature is not what is shown as the flue temp reading on the touch screen.<br>• Sudden spikes in flue temp readings also indicate a faulty flue temp sensor. | • Replace flue temp sensor. **P/N: 10366** |
| • Faulty boiler rear door rope gasket. | • Inspect the boiler rear door for signs of heat damage where the gasket may have failed. Too much heat on the flue temp sensor head can cause max readings. | • Repair/Replace boiler rear door rope gasket. **P/N: 11160** |
| • Faulty wiring. | • Inspect the wiring for continuity, ground, and proper voltage. | • Repair/Replace wiring. |
| • Faulty input card 1 in the PLC. | • Perform Test 113. | • Replace faulty input card (See Test 113). **P/N: 10375** |
| • Faulty PLC. | • If after replacing the sensor and the input card 1 there is still an abnormal reading this indicates a faulty PLC. | • Replace PLC. **P/N: 10374** |
| • Scale has built up in the boiler. | • Remove a hand-hole cover and inspect boiler tubes for scale. | • Use REDEW boiler de-scaler. **P/N: 11194**<br>• Use Boiler Guard (preventative). |

# Faults

## Fault 209: Feed Water and Boiler Water Temp. Differential Limit Has Exceeded

Indicates that the difference in temperature between the feed water temperature sensor and the boiler water temperature sensor is more than 150° F.

| Causes | | Troubleshooting | Fixes |
|---|---|---|---|
| • Clogged/Dirty Y-strainer. | | • Flush Y-strainer by opening for 3 seconds under steam pressure.<br>• Clean/replace Y-strainer filter.  | |
| • Circulation pump isolation valves are closed. | | • Check valve positions (both circulation pump inlet and outlet valves). | • Open valves (both circulation pump inlet and outlet valves). |
| • Faulty temperature sensor. | | • Compare reading with actual temperature (faulty sensors normally read very high or very low). | • Replace faulty sensor. **P/N: 10372** |
| Circulation Pump not running | • Pump contactor overload is tripped. | • Inspect circulation pump contactor; if yellow stripe is present in test window, reset is required. | • Reset pump contactor overload (Panel 2). |
| | • Circuit breaker is tripped. | • Check circuit breaker (Panel 2). | • Reset circulation pump circuit breaker (Panel 1). |
| | • Yellow weatherproof 240 V plug loose/disconnected. | • Inspect yellow weatherproof plug to see if it is loose or has a bad connection. | • Reconnect yellow weatherproof plug behind the burner that gives 240 V to the pump. |
| | • Loose wires inside pump motor housing. | • Inspect wire nuts and ensure that 240 V is reaching the pump. | • Secure wire nuts inside pump motor housing. |
| | • Faulty/Seized pump. | • Manually attempt to spin pump motor (should spin freely). | • Replace pump. **P/N: 10585** |
| | • Water system not enabled on touch screen. | • Circulation pump should be running anytime water system is enabled and low water 1 & 2 are satisfied. | • Enable water system (Menu > Operations > System Start). |
| | • Faulty relay between PLC and motor contactor. | • Check relay to see if light is on (Panel 2 Relay Block 2nd relay). | • Replace relay. **P/N: 10299** |
| | • PLC output not sending signal. | • Check for 24 V on PLC output “Y5” (Menu > Diagnostics > Inputs/Outputs > Discrete Outputs > Y5). | • Replace PLC. **P/N: 10374** |
| • Faulty wiring. | | • Inspect the wiring for continuity, ground, and proper voltage. | • Repair/Replace wiring. |

# Faults

## Fault 210: Ambient Temperature Is High

Indicates that the ambient temperature is above the alarm set-point (default 100° F).

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Ambient temperature is high. | • Compare reading to actual ambient temperature. | • Reconsider using the DewPoint at these temperatures.<br>• Stop baling if internal bale temperatures reach more than 135° F. |
| • Heat from tractor is causing the sensor to read higher than normal. | • Compare reading to actual ambient temperature. | • Adjust the tractor heat offset by touching the ambient temperature icon on the touch screen (default is 10° F). |
| • Faulty sensor. | • Compare reading to actual ambient temperature. | • Replace sensor. **P/N: 10374** |
| • Faulty wiring. | • Inspect the wiring for continuity, ground, and proper voltage. | • Repair/Replace wiring. |

# Faults

## Fault 211: Furnace Door Temp Is High

Indicates that the rear furnace door is above 250° F (2014-6110's are the only 6110's to have this sensor).

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Temperature is above 250° F. | • Use infrared thermometer to check rear furnace door.<br>• Check the rear furnace door for paint bubbling and discoloration from excessive heat. | • Replace rear furnace door insulation and rope gaskets. **P/N: 11160** |
| • Temperature is above 170° F (Version 2.7).<br>• Temperature is above 250° F (Earlier versions). | • Use infrared thermometer to check rear furnace door.<br>• Check the rear furnace door for paint bubbling and discoloration from excessive heat. | • Replace rear furnace door insulation and rope gaskets. **P/N: 11160** |
| • Faulty sensor. | • Use infrared thermometer to check rear furnace door area for normal temperatures (below 250° F). | • Replace sensor. **P/N: 10366** |

## Fault 212: Low Water 2 Tripped

• See "Fault 400: Low Water 1 or 2 Tripped".

## Fault 213: Boiler Taking Longer Than Expected to Fill

• See "Fault 400: Low Water 1 or 2 Tripped".

## Fault 214: Data Logging Failed: Replace USB Drive

Indicates that the screen can no longer detect the USB flash drive that should be installed at the bottom of the touch screen. This fault will not prevent operation of the machine, but sensor trending will not record. Press "Confirm" to continue operation.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • No USB drive in touch screen. | • Look in bottom of screen to see if USB drive is plugged in. | • Plug in new USB drive (recommended 8 GB). |
| • Faulty USB drive. | • Replace with new USB drive (recommended 8 GB). | |

# Faults

## Fault 215: Manual Valve Operation Is ON

Indicates that manual valve operation is on Menu > Operations > Manual Mode.

## Fault 224: Trouble with One or More Sensors

Indicates that one or more 4-20mA sensors are not communicating or are sending a max signal to the PLC. At least 4mA is needed on each sensor for communication to be established (4mA=min 20mA=max).

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Sensor is unplugged. | • Check sensor connections. | • Plug in sensor. |
| • Sensor is accurately reading an abnormally high value. | • Investigate why sensor is reading high.<br>• A faulty propane regulator can cause abnormally high reading for the propane pressure sensor.<br>• Supply water level sensor isolation valve closed can cause a minimum or a maximum reading. | • Find and fix the source of high reading. |
| • Sensor is damaged. | • Test with interchangeable sensor (many sensors are interchangeable)(See sensor page). | • Replace damaged sensor. |
| • One or more sensors maxed out:<br>-Faulty sensor.<br>-Faulty input card (Fault 402) (Test 113).<br>-Faulty wire harness.<br>-Faulty PLC. | • See Test 123. | • Replace damaged sensor.<br>• Repair/Replace damaged wire harness.<br>• Replace faulty input card. **P/N: 10375**<br>• Replace faulty PLC. **P/N: 10374** |
| • Multiple sensors offline:<br>-Blown fuse (Panel 3).<br>-Faulty sensor.<br>-Faulty 24 V regulator.<br>-Faulty wire harness. | • See Test 124.<br>• 2010-2013 machines See Test 120. | • Replace blown fuse (Panel 3).<br>• Replace damaged sensor.<br>• Replace 24 V regulator.<br>• Repair/Replace damaged wire harness. |
| • Faulty wiring. | • Inspect wiring for continuity, voltage, and ground. | • Repair/Replace faulty wiring. |

# Faults

## Fault 225: Burner Modbus Signal Failure

The modbus connection is the way that the Honeywell Burner Controller communicates with the PLC. If the connection is lost, the burner will not function properly.

The machine can still operate with Fault 225 active. However, the following features will not display properly: Flame Detector indicators, Burner State, Burner Faults, Burner Reset (Burner Reset can only be done in Menu > Diagnostics > Burner Status > "Burner Reset" or by lifting the hood of the steamer, opening Panel 1 and pressing the "Reset" button on the Honeywell Burner Controller.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Modbus cable faulty/ unplugged. | • Inspect modbus cable on PLC port 2 (Panel 2) and top of burner controller (Panel 1). | • Plug in/Replace modbus cable **P/N: 10327**<br>• Tighten wire terminals on cable connecting to modbus card. |
| • Modbus address not set to 78. | • Visually inspect modbus module.<br>• See Test 126. | • Reset module by turning both pots to 99, then turn the pots to 78. |
| • Machine not updated to v2.5 or higher. | • Update machine PLC and touch screen to v2.5 or higher. | |
| • Faulty modbus module. | • Replace modbus module. **P/N: 10713** | |
| • PLC modbus connection shorting. | • Disassemble DB-15 (PLC port 2) connector and check for shorted and/or grounded pins. | Repair/Replace modbus wire harness. **P/N: 10327** |

## Fault 228: Steam Pressure Is Low

• See "Fault 409: Loss of Steam Pressure During Operation".

## Fault 229: Boiler Water Temp. Is Low and Steam Pressure Is Normal

• See "Fault 411: Circulation Pump Not Running".

## Fault 230: Turn Water System On

Indicates that field mode is active and the water system is off.

| Causes | Fixes |
|---|---|
| • Field mode is active and the water system is off. | • Turn water system on. |

## Fault 231: Boiler Water Level Is Too High for Operation

• See "Fault 403: Boiler Water Level Higher Than Set Point / Boiler Overflowing".

# FAULTS

## Fault 232: Generator Status (Page 1 of 3)

Indicates generator has failed and shut off for safety (Hold "OFF" for 3 seconds to reset).

| | Causes | Indicates | Fixes |
|---|---|---|---|
| Overspeed (flashing light) = Underspeed | • Main fuel shutoff valve closed. | • Open main fuel shutoff valve located beneath the front left fuel tank. | |
| | • Water separator fuel valve closed. | • Open water separator fuel valve. | |
| | • Loose fuel hose clamp / air in fuel line. | • Check all 10 fuel hose clamps for tightness on the generator fuel path. | • Tighten loose fuel hose clamps. |
| | • Clogged in-line fuel filter. | • Remove filter and see if you can blow air through it (replace every 250 hours). | • Replace in-line fuel filter. **P/N: 10090** |
| | • Clogged engine fuel filter. | • Replace every 250 hours. | • Replace engine fuel filter. **P/N: 10083** |
| | • Faulty lift pump. | • Remove hose from output side of the lift pump and see if fuel comes out during engine pre ignition (use generator controller to turn engine off before it starts to crank). | • Replace fuel lift pump. **P/N: 10064** |
| | • Water in fuel or bad fuel. | • Check for water in fuel tanks, drain water from bottom of tank. (There is an isolation valve on the fuel manifold. | • Replace bad fuel, drain water separator. **P/N: 10078** |
| • Overspeed (steady light). | | • The generator is running faster than normal. | • Contact dealer. |
| • Low Battery Voltage. | | • Battery voltage is below normal. | • Charge/Replace battery.<br>• Use the battery cutoff switch when the steamer is not in use to preserve battery. |
| • Over Frequency. | | • The generator is running faster than normal. | • Check and adjust engine throttle and lock nut.<br>• The frequency should be set to 60hz. |
| • Under Frequency. | | • The generator is running slower than normal. | • Check and adjust engine throttle and lock nut.<br>• The frequency should be set to 60hz |
| • AC Over Voltage. | | • There is more voltage than normal. | • Check and adjust the generator automatic voltage regulator (See Test 121).<br>• Voltage between L1 and L2 should be 240 V. |

## Fault 232: Generator Status (Page 2 of 3)

Indicates generator has failed and shut off for safety (Hold “OFF” for 3 seconds to reset).

| | Causes | Indicates | Fixes |
|---|---|---|---|
| | • AC Under Voltage. | • There is less voltage than normal. | • Check and adjust the generator automatic voltage regulator (See Test 121).<br>• Voltage between L1 and L2 should be 240 V. |
| | • Low Oil Pressure. | • There is low oil pressure in the engine.<br>• Oil pressure should be between 42-64 psi. | • Check engine for proper oil level.<br>• Check/Replace the engine oil filter. **P/N: 10082**<br>• Replace oil pressure sending unit. **P/N: 10646** |
| | • High Engine Temperature. | • Engine temperature is above normal. | • Check engine coolant level.<br>• Check belt, fan, and radiator. |
| | • Engine Failed to Stop. | • The engine failed to stop. | • Turn off fuel valve. |
| Overcrank | • Fuel not reaching injector pump. | • Remove supply hose from injector pump to see if fuel is reaching the engine.<br>• Follow the fuel line from tank to engine until blockage is found (most common is the in-line fuel filter). | • Replace in-line fuel filter. **P/N: 10090**<br>• Replace engine fuel filter. **P/N: 10083**<br>• Replace lift pump. **P/N: 10064**<br>• Remove any fuel blockages.<br>• Open the water separator shutoff valve.<br>• Open the main fuel shutoff valve.<br>• Replace water separator. **P/N: 10078** |
| Overcrank | • Air in fuel supply line. | • Remove supply hose from injector pump to see if fuel is reaching the engine.<br>• Inspect all hoses and hose clamps for air leaks. | • Tighten loose hose clamps.<br>• Repair/Replace hoses. |
| Overcrank | • Faulty fuel relay or blown fuse. | • Check fuse.<br>• Test output with multimeter while starting the engine. | • Replace fuse.<br>• Replace relay. |
| Overcrank | • Faulty crank relay or blown fuse. | • Check fuse .<br>• Test output with multimeter while starting the engine. | • Replace fuse.<br>• Replace relay. |

# FAULTS

## Fault 232: Generator Status (Page 3 of 3)

| | Causes | Indicates | Fixes |
|---|---|---|---|
| Overcrank | • Faulty fuel shutoff solenoid. | • Remove solenoid from engine and test with 12 V to see if it functions.<br>Black-GND White-Pull Red -Hold<br>*DO NOT START ENGINE WITH SOLENOID REMOVED. RUNAWAY ENGINE WILL OCCUR. | • Replace fuel shutoff solenoid. |
| | • Faulty temp switch/sending unit. | • If throwing this fault while engine is cool, then a faulty temp switch/sending unit is likely. | •Replace temp switch/sending unit.<br>**Switch P/N: 11139**<br>**Sending Unit P/N: 10646** |
| | • Faulty glow plugs or cold weather. | • Inspect glow plugs.<br>• Check pre-heat relay.<br>• Check pre-heat relay fuse. | • Replace glow plugs.<br>• Replace pre-heat relay.<br>• Replace pre-heat relay fuse. |
| | • Faulty generator controller. | • Replace generator controller. **P/N: 11078** | |
| | • Faulty 12 V relay. | • Replace 12 V relay in generator end box or located in wire harness somewhere. | |
| • Faulty 12 V regulator. | | • Check if there is a green light on the 12 V regulator (Panel 3 diagram 7). | • Replace 12 V regulator.<br>**P/N: 10301** |

## Fault 239: Initiate Hold: AC Frequency / Noise

Indicates that the burner controller has restarted.

The burner has shut off and will automatically re-fire. This fault displays if this condition happens twice in one hour. If this problem persists, the burner controller may need to be replaced.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty burner controller. | • Replace burner controller if problem persists. **P/N: 10654**<br>The amplifier card, modbus card, and purge card do not need to be replaced. Swap them from the old burner controller to the new one. | |
| • Faulty louver actuator wiring. | • Replace louver actuator. **P/N: 10038** | |

# Faults

## Fault 240: Control Switch Relay SR-1 Did Not Annunciate

Indicates that control switch relay SR-1 did not annunciate. Burner will not operate.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Generator shutting off unexpectedly. | • The generator shutting off unexpectedly can cause this fault. | • See fault 236 (2017+ machines).<br>• See fault 232 (2015-2016 machines). |
| • Faulty SR-1 relay. | • Swap relay with SR-5-8 in panel 1 for a temporary fix. | • Replace SR-1 relay in panel 1. **P/N: 10269** |
| • Faulty PLC input. | • If the relay is lit up green and voltage is making it to the PLC, this indicates a faulty PLC input. | • Replace PLC. **P/N: 10374** |

## Fault 241: Low Water 1 Relay SR-2 Did Not Annunciate

Indicates that low water 1 relay SR-2 did not annunciate. Burner will not operate.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Generator shutting off unexpectedly. | • The generator shutting off unexpectedly can cause this fault. | • See fault 236 (2017+ machines).<br>• See fault 232 (2015-2016 machines). |
| • Faulty SR-2 relay. | • Swap relay with SR-5-8 in panel 1 for a temporary fix. | • Replace SR-2 relay in panel 1. **P/N: 10269** |
| • Faulty PLC input. | • If the relay is lit up green and voltage is making it to the PLC, this indicates a faulty PLC input. | • Replace PLC. **P/N: 10374** |

## Fault 242: Low Water 2 Relay SR-3 Did Not Annunciate

Indicates that low water 2 relay SR-3 did not annunciate. Burner will not operate.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Generator shutting off unexpectedly. | • The generator shutting off unexpectedly can cause this fault. | • See fault 236 (2017+ machines).<br>• See fault 232 (2015-2016 machines). |
| • Faulty SR-3 relay. | • Swap relay with SR-5-8 in panel 1 for a temporary fix. | • Replace SR-3 relay in panel 1.<br>• Replace PLC. **P/N: 10269** |
| • Faulty PLC input. | • If the relay is lit up green and voltage is making it to the PLC, this indicates a faulty PLC input. | • Replace PLC. **P/N: 10374** |

# Faults

## Fault 243: High Pressure Limit Switch Relay SR-4 Did Not Annunciate

Indicates that High Pressure Limit Switch Relay SR-4 did not annunciate. Burner will not operate.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Generator shutting off unexpectedly. | • The generator shutting off unexpectedly can cause this fault. | • See fault 236 (2017+ machines).<br>• See fault 232 (2015-2016 machines). |
| • Faulty SR-4 relay. | • Swap relay with SR-5-8 in panel 1 for a temporary fix. | • Replace SR-4 relay in panel 1.<br>• Replace PLC. **P/N: 10269** |
| • Faulty PLC input. | • If the relay is lit up green and voltage is making it to the PLC, this indicates a faulty PLC input. | • Replace PLC. **P/N: 10374** |

## Fault 244: Operating Pressure Control Relay SR-5 Did Not Annunciate

Indicates that the Operating Pressure Control Relay SR-5 did not annunciate. Burner will not operate.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Generator shutting off unexpectedly. | • The generator shutting off unexpectedly can cause this fault. | • See fault 236 (2017+ machines).<br>• See fault 232 (2015-2016 machines). |
| • Faulty SR-5 relay. | • Swap relay with SR-5-8 in panel 1 for a temporary fix. | • Replace SR-5 relay in panel 1.<br>• Replace PLC. **P/N: 10269** |
| • Faulty PLC input. | • If the relay is lit up green and voltage is making it to the PLC, this indicates a faulty PLC input. | • Replace PLC. **P/N: 10374** |

## Fault 245: Burner Relay SR-6 Did Not Annunciate

Indicates that Burner Relay SR-6 did not annunciate. Burner will still operate.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Generator shutting off unexpectedly. | • The generator shutting off unexpectedly can cause this fault. | • See fault 236 (2017+ machines).<br>• See fault 232 (2015-2016 machines). |
| • Faulty SR-6 relay. | • Swap relay with SR-5-8 in panel 1 for a temporary fix. | • Replace SR-6 relay in panel 1. **P/N: 10269** |
| • Faulty PLC input. | • If the relay is lit up green and voltage is making it to the PLC, this indicates a faulty PLC input. | • Replace PLC. **P/N: 10374** |

# Faults

## Fault 246: Fan VFD SR-7 Did Not Annunciate

Indicates that Fan VFD SR-7 did not annunciate. Burner will still operate.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Generator shutting off unexpectedly. | • The generator shutting off unexpectedly can cause this fault. | • See fault 236 (2017+ machines).<br>• See fault 232 (2015-2016 machines). |
| • Faulty SR-7 relay. | • Swap relay with SR-5-8 in panel 1 for a temporary fix. | • Replace SR-7 relay in panel 1. **P/N: 10269** |
| • Faulty PLC input. | • If the relay is lit up green and voltage is making it to the PLC, this indicates a faulty PLC input. | • Replace PLC. **P/N: 10374** |

## Fault 247: Airflow Switch SR-8 Did Not Annunciate

Indicates that Airflow Switch SR-8 did not annunciate. Burner will still operate.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Generator shutting off unexpectedly. | • The generator shutting off unexpectedly can cause this fault. | • See fault 236 (2017+ machines).<br>• See fault 232 (2015-2016 machines). |
| • Faulty SR-8 relay. | • Swap relay with SR-5-8 in panel 1 for a temporary fix. | • Replace SR-8 relay in panel 1. **P/N: 10269** |
| • Faulty PLC input. | • If the relay is lit up green and voltage is making it to the PLC, this indicates a faulty PLC input. | • Replace PLC. **P/N: 10374** |

## Fault 248: Touch Screen Version Is Incompatible With This DewPoint

Indicates that the programming version on the touch screen and the PLC are incompatible.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • An older/newer steamer touch screen has been connected to a newer/older steamer. | • Check the version in Menu > Information > Version (the first digit in the PLC and touch screen version should match).<br>• 2016 and older should be version 2.x.<br>• 2017 and newer should be version 3.x. | • Locate and use appropriate screen for appropriate steamer.<br>• Update to the latest version of touch screen and PLC. |
| • PLC lost the version #. | • Ignore the fault. | • Update to the latest version of touch screen and PLC. |

# FAULTS

## Fault 249: Check Network Cable or Fault 214: Missing USB Drive (PLC-015: DEV001 No Device Found)

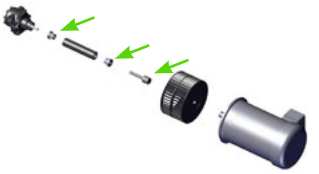
Indicates that the network connection between the PLC and the touch screen has been lost.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Loose network cable. | • Check the network cable at the bottom of the touch screen and also in the PLC.<br>• Check the 6” network cable between the PLC and the ethernet switch. | • Plug the network cable securely into the bottom of the touch screen and PLC.<br>• Plug the 6” network cable securely into both PLC and Ethernet switch.<br>• Re seat connection 2A. |
| • Faulty network cable. | • Run an external network cable from the touch screen to the ethernet switch: If this fixes your problem, you have a faulty network cable. | • Replace RJ45 network connectors on existing network cable (any IT store will be able to do this).<br>  <br>RJ45<br>• Repair/Replace the internal touch screen wire harness.<br>• Repair/Replace the internal electrical panel wire harness.<br>• Repair/Replace the main touch screen wire harness. |
| • Faulty USB flash drive. | • Temporary fix: remove USB flash drive. Fault 214 will appear but operation should still be possible.<br>• Replace USB flash drive. | |
| • Improperly seated PLC network card. | • Ensure the PLC network card is seated properly in the PLC. | |
| • Faulty PLC ethernet switch. | • Replace ethernet switch. **P/N: 10378** | |
| • Faulty PLC network card. | • Replace network card. **P/N: 10379** | |
| • Faulty PLC. | • Check “Run” light on PLC. If “Run” light is off, reprogram or replace PLC. | • Reprogram PLC.<br>• Replace PLC: **P/N: 10374** |
| • Faulty touch screen. | • Replace touch screen. **P/N: 10370** | |
| • Fault 214. | • See Fault 214. | |

# FAULTS

## Fault 250: Fuel Pump Pressure LOW

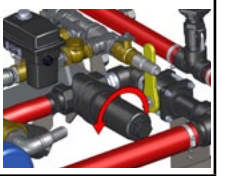
Indicates that the fuel pump pressure is below 250 psi during purge.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Fuel pump pressure misadjusted. | • Check the fuel pump pressure to see if it is below 250 psi (Should be between 280-300 psi). | • Adjust fuel pump to 280-300 psi (See fuel pump page). |
| • Loose set screw(s) on shaft coupler. | • Inspect the fuel pump coupler set screws for tightness.  | • Tighten set screw(s). |
| • Burner fuel filter clogged. | • Inspect burner fuel filter. | • Replace burner fuel filter (Napa 4006)**. P/N: 10083** |
| • Fuel manifold clogged. | • Inspect fuel manifold. | • Clean out fuel manifold. |
| • Fuel lines clogged. | • Inspect fuel lines. | • Clean out fuel lines. |
| • Faulty fuel pump. | • Causes fluctuating fuel psi. | • Replace fuel pump. **P/N: 10045** |

# FAULTS

## Fault 400: Low Water 1 or 2 tripped (Page 1 of 2)

Indicates boiler water level is too low for safe operation.
Verify that the boiler water sight glass matches the boiler water level on the touch screen.

| | | |
|---|---|---|
| • Supply water valve is closed. | • Check supply water valve in rear door area. | • Open supply water valve. |
| • Supply water filter (T-strainer) is plugged. | • Remove and clean the supply water filter (T-strainer).<br>• Replace supply water filter (T-strainer).  | |
| • LWCO relay tripped on Panel 1 door. | • Reset the LWCO relay on panel 1 door (affects 2010-2013 machines). | |
| • Air lock (feed water pump). | • Loosen the supply water filter and open the supply water valve to purge possible air lock. | |
| • No supply water; faulty supply water level sensor. | • Check to see if there is water in the supply tanks. | • Replace supply water level sensor. . **P/N: 10371** |
| • Faulty feed water actuator. | • Test for functionality in Manual Mode: Menu > Operations > Manual Mode (Test at 40%, 60%, and 100% open).<br>• Swap connection with blowdown actuator to confirm faulty actuator. | • Temporary fix: Menu > Settings > Water System and set Feed Water Induction Valve Min Open to 100% (actuator will still need to be replaced).<br>• Update to v2.8 or newer.<br>• Replace feed water actuator. **P/N: 10363** |
| • Blown fuse | • A seized valve can cause blown fuses; remove actuator and check for seized valve | • Replace fuse F1 in panel 3.<br>• Replace fuse F6 in panel 2.<br>• Remove actuator and manually open and close seized valve. |
| • PLC not in “Run” mode. | • Bottom right of the PLC ensure that the toggle switch is set to “Run”. | |
| • Faulty PLC analog output card. | • If no actuators are working, this could be your problem. | • Replace PLC analog output card. .**P/N: 10376** |
| • Low battery voltage. | • Start the generator. | • Charge/Replace battery. |
| • Faulty wiring. | • Inspect the wiring for continuity, ground, and proper voltage. | Repair/Replace wiring. |
| • Faulty boiler water level sensor. | • Perform Test 110. | • Clean/Replace boiler water level sensor. **P/N: 11040** |
| • Faulty/Dirty low water cut off probe. | • Swap purple and red wires in blue low water housing to see if the fault changes, indicating a faulty/dirty probe. | • Clean/Replace probe. **P/N: 10354** |
| • Faulty check valve. | • Check the 3 check valves in the feed water system. A faulty check valve may cause the circ pump to spin backwards during the fill stage. | • Replace the faulty check valve. |

# Faults

## Fault 400: Low Water 1 or 2 tripped (Page 2 of 2)

Indicates boiler water level is too low for safe operation.
Verify that the boiler water sight glass matches the boiler water level on the touch screen.

| Causes | | Troubleshooting | Fixes |
|---|---|---|---|
| • Bad water (water level drops and trips LWCO 1 while turning). | | • Test boiler water ppm >3500ppm = foaming. | • Drain boiler and refill with fresh water. |
| Feed Pump not running (Fault 410) | • Pump contactor overload is tripped. | • Inspect feed pump contactor; if yellow stripe is present in test window, reset is required. | • Reset feed pump contactor overload (panel 2). **P/N: 10298** |
| | • Circuit breaker is tripped. | • Check circuit breaker (panel 2). | • Reset feed pump circuit breaker (panel 2). |
| | • Yellow weatherproof 240 V plug loose/disconnected. | • Inspect yellow weatherproof plug to see if it is loose or has a bad connection. | • Reconnect yellow weatherproof plug behind the burner that gives 240 V to the pump. |
| | • Loose wires inside pump housing. | • Inspect wire nuts and confirm that 240 V is reaching the pump. | • Secure wire nuts inside pump housing. |
| | • Faulty/Seized pump. | • Manually attempt to spin pump motor (should spin freely). | • Replace pump. **P/N: 10585** |
| | • Water system not enabled on touch screen. | • Feed pump should be running anytime water system is enabled. | • Enable water system (Menu > Operations > System Start). |
| | • Faulty relay between PLC and motor contactor. | • Check relay to see if light is on (Panel 2 Relay Block 2nd relay). | • Replace relay. **P/N: 10299** |
| | • PLC output not sending signal. | • Check for 24 V on PLC output "Y4" (Menu > Diagnostics > Inputs/Outputs > Discrete Outputs > Y4). | • Replace PLC. **P/N: 10374** |
| • Faulty low water cut off relay. | | • Swap suspected faulty low water cut off relay with the other low water cut off relay to see if the fault changes, indicating a faulty relay. | • Replace low water cut off relay. **P/N: 10352** |
| • Loose low water cut off relay base screw terminals. | | • Tighten screw terminals behind the low water cut off relay. | |
| • Moisture in blue low water cut off housing and/or 6B connection. | | • Check for moisture damage in the blue low water cut off housing on top of the boiler (water can travel down the conduit line and interfere with the low water cut off signal). | • Remove moisture from conduit and connections.<br>• Tighten sensor stems and crush washer.<br>• Replace damaged connectors. |
| • Faulty 24 V regulator. | | • Regulator giving less than 24 V (Check for 24 V on Fuse 4-9 of panel 3). | • Replace 24 V regulator. **P/N: 12138** |
| • Faulty wiring. | | • Inspect the wiring for ground, continuity, and proper voltage. | Repair/Replace wiring. |
| • Plugged/Blocked sparge tubes. | | • Inspect sparge tube holes. | • Re-drill holes in sparge tubes. |
| • Blockage in feedwater system. | | • Inspect feedwater system (See diagrams 12 and 13). | • Remove blockage. |

# FAULTS

## Fault 401: Boiler Not Filling / Slowly Filling with Water (See Fault 400)

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • No water in the supply tanks. | • See Fault 206. | |
| • Supply water filter (T-strainer) is plugged. | • Remove and inspect the screen for debris. | • Clean the supply water filter. |
| • Supply water valve is closed. | • Inspect valve to see if it is closed. | • Open valve by putting the handle in line with the pipe. |
| • Feed water valve is not opening. | • Inspect valve to see if it is closed. The red indicator on top will be perpendicular to the pipe if it is closed (valve should not be closed).<br>• Inspect the actuator to ensure it is still attached properly to the valve.<br>• Inspect the coupler between the valve and the actuator.<br>• Check the ball valve for free movement. | • See “Fault 408”. |
| • Pump not functioning. | • Check that the feed water pump is running. | • See “Fault 410 Feed Water Pump Not Running”. |
| • Boiler water level sensor malfunction. | • Intermittent readings.<br>• Level on the touch screen does not match sight glass level . | • Replace boiler water level sensor (See Test 110). **P/N: 11040** |
| • 70 Pin connector pins are damaged. | • Disconnect 70 pin connector from panel 2 and inspect pins. | • Repair/Replace bad pins in 70 pin connector. |
| • Faulty check valve. | • Check the 3 check valves in the feed water system. A faulty check valve may cause the circ pump to spin backwards during the fill stage. | • Replace the faulty check valve. **P/N: 10488** |
| • Plugged/Blocked sparge tubes. | • Inspect sparge tube holes. | • Clean/Re-drill holes in sparge tubes. |

# Faults

## Fault 402: Faulty PLC Input Card (See Test 113)

Always turn the power off before replacing any sensor or any card.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Bad flue temp sensor.<br>• Steam pressure sensor.<br>• All other analog input sensors. | • A faulty input card will normally give you abnormal readings on one or more inputs.<br>• Determine which sensor caused the card to fail by unplugging each sensor linked to the input card one at a time until other input readings return to normal.<br>• After replacing the faulty sensor, a faulty input card will still give you abnormal readings on one or more inputs. | • **ALWAYS REPLACE THE FAULTY SENSOR AND INSPECT WIRING BEFORE REPLACING THE INPUT CARD.**<br>• Replace input card. Turn power off and be gentle (input cards are delicate). **P/N: 10375** |

# Faults

## Fault 403: Boiler Water Level Higher Than Set Point / Boiler Overflowing

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Wet layup. | • Have you performed a wet layup recently (wet layup fills the boiler completely full of water)? | • Drain water from boiler to desired level. |
| • Faulty boiler water level sensor. | • Compare touch screen reading to water level in sight glass (if they do not match, perform "Test 110" to determine if the boiler water level sensor is working). | • Clean the boiler water level probe.<br>• Ensure the wire nuts are secure and connected in the top conduit housing above the water level sensor.<br>• Replace boiler water level sensor. **P/N: 11040** |
| • Faulty feed water valve actuator (stuck open/improperly connected). | • Test in "Manual Mode" to see if feed water valve actuator moves Menu > Operations > Manual Mode.<br>• Verify that the valve is coupled to the actuator correctly and that the valve is actually opening and closing. | • Replace feed water valve actuator. **P/N: 10363**<br>• Temporary fix: swap feed water actuator with a steam actuator.<br>• See Fault 408. |
| • Boiler water level target set too high. | • Check target in Menu > Settings > Water System > Boiler Water Level Fieldwork. | • Press "Load Defaults" in Menu > Settings > Water System > Boiler Water Level Fieldwork<br>• Lower Boiler Water Level Fieldwork in Menu > Settings > Water System > Boiler Water Level Fieldwork. |
| • Faulty wiring. | • Inspect the wiring for continuity, ground, and proper voltage. | • Repair/Replace wiring. |
| • 70 Pin connector pins are damaged. | • Disconnect 70 pin connector from panel 2 and inspect pins. | • Repair/Replace bad pins in 70 pin connector. |

## Fault 404.A: Bottom Rear Work Lights Will Not Turn On (All Work Lights Not Working 2010-2012 Machines)

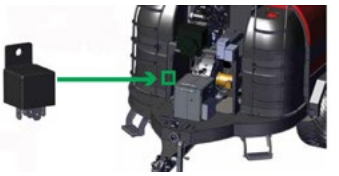
Tractor controls the bottom rear work lights.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Trailer light harness disconnected. | • Check light harness. | • Plug in the harness. |
| • Tractor not sending 12 volt supply.<br>• Tractor light circuit not rated for 30 amps. | • Check tractor fuses and supply voltage. | • Purchase lighting boost adapter. **P/N: 11351** |
| • Trailer light harness faulty. | • Inspect the wiring for continuity, ground, and proper voltage.<br>• Check each light harness pigtail. | • Repair/Replace harness. |

# Faults

## Fault 404.B: Side and Top Rear Work Lights Will Not Turn On

DewPoint controls the side and top rear work lights.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Button is not pressed on touch screen. | • Green button = ON.  <br>• Red button = OFF.  | • Press light icon on touch screen. |
| • Faulty light harness relay. | • Test with spare 12 V relay (2014's have a spare relay in Panel 3). | • Replace the in-line light harness relay. **P/N: 10340**<br>  |
| • Blown fuse. | • Check Fuse (F1) in panel 3. | • Replace fuse (F1) panel 3. **P/N: 10293** |
| • Faulty panel 2 relay. | • Check for an LED indicator light on panel 2 relay block #8. | • Replace panel 2 relay block #8. **P/N: 10623** |
| • Blown in-line battery fuse. | • Check in-line 30A fuse from battery.<br>• Check for break in the wire harness where the in-line fuse is spliced in. | • Replace in-line 30A battery fuse.<br>• Repair in-line wire splice (See Fuses page). |

# FAULTS

## Fault 405: Touch Screen Controller Will Not Turn On

See “Touch Screen Wiring” page.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Low battery voltage. | • Start the generator. | • Charge/replace battery. |
| • Blown fuse F4, F5, F10, F11 (panel 3). | • Fuse should light up with a red LED if blown. | • Replace fuse F4, F5, F10, or F11 (panel 3).<br>**F4 - P/N: 10293**<br>**F5 - P/N: 10292**<br>**F10,11 - P/N: 10290** |
| • Blown in-line battery/starter fuse. | • Check in-line 30A fuse from battery.<br>• Check for break in the wire harness where the in-line fuse is spliced in. | • Replace in-line 30A battery/ starter fuse.<br>• Repair in-line fuse wire splice (See Fuses page). |
| • Faulty control relay (panel 3). | • If the red rocker switch on the touch screen is lit up, this indicates the 12 V system is functioning. | • Replace with spare 12 V relay in panel 3 if red rocker switch lights up but screen does not turn on. |
| • Faulty 24 V regulator (panel 3). | • No green light may indicate a failure, especially if the red rocker switch on the touch screen is lit up, indicating the 12 V system is functioning. | • Replace 24 V regulator.<br>**P/N: 10302** |
| • Faulty 12 V regulator (panel 3). | • Check for 12 V output. | • Replace 12 V regulator.<br>**P/N: 10301** |
| • Faulty enclosure wiring. | • Inspect wiring inside of touch screen enclosure. | • Repair/Replace wiring. |
| • Faulty wiring. | • Inspect the wiring for continuity, ground, and proper voltage. | • Repair/Replace wiring. |

# Faults

## Fault 406: Steam Coming Out of Water Supply Tanks

| Causes | | Troubleshooting | Fixes |
|---|---|---|---|
| Front Tanks | • One or more pigtail valves open (top front of boiler). | • Check pigtail valves. | • Close all pigtail valves (don't forget the valve behind the manual pressure gauge). |
| Front Tanks | • Faulty boiler sight glass check valve. | • Inspect check valve for leaks. | • Replace boiler sight glass check valve. **P/N: 10486** |
| Rear Tanks | • Normal opening and closing of the water purge valve. | • The water purge valve opens for 30 seconds, purging water and steam into the rear supply tanks. Then it closes for 30 seconds. | • Does not need a fix / normal operation. |
| Rear Tanks | • Faulty water purge valve actuator. | • Test in manual mode: Menu > Operations > Manual mode: Open and close the water purge actuator making sure it rotates a full 90°. | • Replace actuator. **P/N: 103695** |
| • Faulty wiring. | | • Inspect the wiring for continuity, ground, and proper voltage. | • Repair/Replace wiring. |

# Faults

## Fault 407: Burner Smoking / Pulsing (Page 1 of 2)

Indicates burner air to fuel ratio is not working properly. A puff of smoke every 10 seconds is normal for the 6110.
(Black smoke = not enough air / too much fuel) (White smoke = too much air / not enough fuel).

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Dirty burner fan. | • Check the burner fan for dirt build up. | • Clean the burner fan. |
| • Nozzle fuel feed/return lines are crossed. | • Check nozzle fuel feed/return lines are connected properly. | • Connect nozzle fuel feed/return lines properly (See Diagram 5). |
| • Low fire/High fire tuned incorrectly. | • Tune the burner (See Test 116). | |
| • Incorrect fuel pump pressure. | • Set fuel pressure to 280-300 psi (See Test 116). | |
| • Incorrect fuel nozzle pressure. | • Set low fire fuel nozzle pressure to 80-90 psi (See Test 116).<br>• High fire fuel nozzle pressure should be around 160-180 psi. | |
| • Dirty fuel filter. | • Causes fluctuating fuel psi. | • Replace fuel filter. **P/N: 10054** |
| • Faulty fuel pump. | • Causes fluctuating fuel psi. | • Replace fuel pump. **P/N: 10045** |
| • Dirty flue tubes. | • Inspect flue tubes from rear exhaust/flue area. | • Clean the flue tubes (Test 119). |
| • Air turbulators in top flue tubes. | • Remove the air turbulators in the top flue tubes. | |
| • Faulty/Loose fuel nozzle. | • Remove gun assembly and inspect nozzle for tightness (remember to inspect internal parts of nozzle).<br>• Can cause white smoke in post purge. | • Repair/Replace/Tighten fuel nozzle.<br>**20 GPH P/N: 10048**<br>**19 GPH P/N: 10610**<br>**18 GPH P/N: 10609** |
| • Leaky gun assembly. | • Remove gun assembly and inspect for leaks. | • Repair/Replace gun assembly. |
| • Fuel piston cylinder malfunction. | • Inspect the fuel piston cylinder and linkage behind the louver intake assembly.<br>• The fuel piston cylinder engages the louver linkage to drive louvers open during high fire. | • Replace the fuel piston cylinder.<br>• Repair the fuel piston cylinder linkage to the louvers.<br>**P/N: 10816** |
| • Loose fuel piston push tab. | • Inspect push tab. | • Tighten push tab into place. |
| • Air louver linkage not working. | • Check that the “butterfly” air louver system is working properly. Top and bottom louvers open together. | • Repair “butterfly” louver system. |

# Faults

## Fault 407: Burner Smoking / Pulsing (Page 2 of 2)

Indicates burner air to fuel ratio is not working properly. A puff of smoke every 10 seconds is normal for the 6110.
(Black smoke = not enough air / too much fuel) (White smoke = too much air / not enough fuel).

| | | |
|---|---|---|
| • Louver not closing during transition from high to low fire. | • Check that louver closing weight is in place and louvers can open and close freely.<br>• Check fuel cylinder to see if it is closing. | • Lubricate louver bearings.<br>• Install second louver closing weight.<br>• Replace fuel cylinder. |
| • Clogged nozzle screen. | • Remove and inspect nozzle screen. | • Clean/Replace nozzle screen. |
| • Clogged fuel path. | • Inspect fuel path from tanks to fuel manifold to fuel filter for restrictions. This will cause white smoke. | • Remove clogs. |
| • Slow fan speed. | • Check generator frequency on generator controller. | • 2010-2014: Adjust generator to 63Hz (DO NOT EXCEED 63Hz).<br>• 2014 with VFD: Adjust VFD to 63Hz (DO NOT EXCEED 63Hz). |
| • Faulty 1/2” low fire oil regulating valve (Part #10727). | • Smoking on low fire. | • Replace the 1/2” low fire oil regulating valve. **P/N: 10727** |
| • Fuel puddled in bottom of furnace. | • Check for fuel puddled at the bottom of the furnace. | •Remove puddle of fuel in the bottom of the furnace. |

# Faults

## Fault 408: Actuators/Valves Not Opening/Closing

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Low battery voltage. | • Start the generator. | • Charge/Replace battery. |
| • Stuck valve causing blown fuse(s). | • Remove actuator and manually open/close valve.<br>• Check all fuses in Panels 2 & 3.<br>• Fuse should light up with a red LED if blown. | • Repair/Replace valve.<br>• Replace blown fuse(s). |
| • Faulty actuator. | • Test in “Manual Mode” to see if actuator moves Menu > Operations > Manual Mode.<br>• Swap with similar actuator. | • Replace actuator. |
| • Actuator thermal protection. | • Disconnect and reconnect the actuator wire harness to see if it starts working again.<br>• Stiff valve may be causing the actuator to overwork. | • Exercise/Repair/Replace the valve (See Test 111). |
| • Faulty PLC analog output card 1. | • Feed water, all 4 steam valves, blowdown, and louver actuator run off this card. If all or most of these are not working, the output card has likely failed. | • Replace PLC analog output card 1. **P/N: 10376** |
| • PLC not in “Run” mode. | • Bottom right of the PLC ensure that the toggle switch is set to “Run”. | |
| • Faulty 12 V regulator. | • Check for 12 V output. | • Replace 12 V regulator. **P/N: 10301** |
| • Faulty wiring. | • Inspect the wiring for continuity, ground, and proper voltage. | • Repair/Replace wiring. |

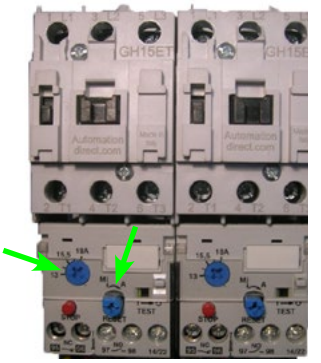
# Faults

## Fault 409: Loss of Steam Pressure During Operation

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Master steam rate above 90%. | • With all valves set to 100% and the master steam rate above 90%, the boiler will struggle to keep up with steam demand. The result will be loss of steam pressure. This is normal. When large amounts of steam are needed it is suggested to set the valves to the "Hot and Dry" settings shown on the Common Valve Settings page (front manifolds set near 70%). | |
| • Steam purge system off or steam purge valve is not opening to maintain target steam pressure (Fault 408). | • Test in "Manual Mode" to see if steam purge actuator moves when turned "ON" Menu > Operations > Manual Mode. | • Replace steam purge actuator **P/N: 10364**<br>• Turn on steam purge system<br>• See "Fault 408" for more fixes. |
| • Faulty burner controller (Fault 239). | • Replace burner controller if problem persists. **P/N: 37253** | |
| • Low water 1 or 2 tripped (Fault 400). | • See "Fault 400" for more fixes. | |
| • Low fuel pump pressure. | • Sometimes operators will turn down the fuel pump pressure to avoid smoking.<br>• See fuel pump page.<br>• If fuel pump pressure is set correctly, check for fuel leaks in the burner.<br>• Fuel pump ~280-300 psi.<br>• Nozzle on low fire ~80-90 psi.<br>• Nozzle on high fire ~160-190 psi. | • See Test 116.<br>• Adjust fuel pump pressure to ~280-300 psi. |
| • Low nozzle pressure. | | • See Test 116.<br>• Adjust fuel pump pressure to ~280-300 psi.<br>• Repair fuel leaks. |
| • Plugged/dirty fuel nozzles. | • Check for correct nozzles size (see fuel nozzles page). | • Remove and clean fuel nozzles. |
| • Dirty flue tubes. | • High flue temps indicate dirty flue tubes. | • Clean flue tubes (Test 119). |
| • Scale has built up in the boiler. | • Remove a hand-hole cover and inspect boiler tubes for scale. | • Use REDEW boiler de-scaler. **P/N: 11194**<br>• Use Boiler Guard (preventative). |
| • Steam leaks. | • Check hoses from DewPoint machine for leaks.<br>• Check baler hardware for steam leaks. | • Repair steam leaks. |
| • Circulation pump not running (Fault 411). | • See "Fault 411" for more fixes. | |
| • Poor water quality / Untreated water. | • Poor water quality can cause foam to carryover into the steam hoses causing wet bales and loss of steam pressure. | • Drain boiler and supply tanks and refill with treated water. |
| • Faulty high fire relay 10r. | • Burner won't go into high fire. | • See Fault 425. |
| • Faulty boiler water circulation system. | • See "Fault 209". | |

# Faults

## Fault 410: Feed Water Pump Not Running

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Supply tanks empty. | • See Fault 206. | |
| • Pump contactor overload is tripped. | • Inspect feed pump contactor; if yellow stripe is present in test window, reset is required. | • Reset pump contactor overload (Panel 2).<br>• Adjust the amperage to 14.5.<br>  |
| • Faulty pump contactor overload. | • Test for proper amperage draw (Less than 6 amps on each leg). | • Replace overload (Panel 2). **P/N: 10299** |
| • Circuit breaker is tripped. | • Check circuit breaker (Panel 2). | • Reset circulation pump circuit breaker (Panel 1). |
| • Yellow weatherproof 240 V plug loose/disconnected. | • Inspect yellow weatherproof plug to see if it is loose or has a bad connection. | • Reconnect yellow weatherproof plug behind the burner that gives 240 V to the pump. |
| • Loose wires inside pump housing. | • Inspect wire nuts and ensure that 240 V is reaching the pump. | • Secure wire nuts inside pump housing. |
| • Faulty/Seized pump. | • Manually attempt to spin pump motor (should spin freely). | • Replace pump. **P/N: 10585** |
| • Water system not enabled on touch screen. | • Feed pump should be running anytime water system is enabled. | • Enable water system (Menu > Operations > System Start). |
| • Faulty relay between PLC and motor contactor. | • Check Relay to see if light is on (Panel 2 Relay Block 2nd relay). | • Replace relay. **P/N: 10623** |
| • PLC output not sending signal. | • Check for 24 V on PLC output “Y4” (Menu > Diagnostics > Inputs/Outputs > Discrete Outputs > Y4). | • Replace PLC. **P/N: 10374** |
| • Loose wires or jumpers. | • Check Terminal Strip 2 (TS2) in Panel 1 for loose wires or jumpers. | • Tighten any loose wires. Ensure jumpers are seated properly. |
| • Faulty wiring. | • Inspect entire wiring path checking for continuity, ground, and proper voltage. | • Repair/Replace faulty wiring section. |

# Faults

## Fault 411: Circulation Pump Not Running

It is OK to temporarily operate with the circulation pump disconnected and isolated (Valves closed).

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Water level is not high enough. | • Water level must be above Low Water 1 & 2 for the circulation pump to run. | • Low boiler water level (See Fault 400). |
| • Pump contactor overload is tripped. | • Inspect circulation pump contactor; if yellow stripe in test window, reset is required. | • Reset pump contactor overload (Panel 2).<br>• Adjust the amperage to 14.5.<br>  |
| • Faulty pump contactor overload. | • Test for proper amperage draw (less than 6 amps on each leg). | • Replace overload (Panel 2). **P/N: 10299** |
| • Circuit breaker is tripped. | • Check circuit breaker (Panel 2). | • Reset circulation pump circuit breaker (Panel 2). |
| • Yellow weatherproof 240 V plug loose/disconnected. | • Inspect yellow weatherproof plug to see if it is loose or has a bad connection. | • Reconnect yellow weatherproof plug behind the burner that gives 240 V to the pump. |
| • Loose wires inside pump housing. | • Inspect wire nuts and ensure that 240 V is reaching the pump. | • Secure wire nuts inside pump housing. |
| • Faulty/Seized pump. | • Manually attempt to spin pump motor (should spin freely). | • Replace pump. **P/N: 10585** |
| • Water system not enabled on touch screen. | • Circulation pump should be running anytime water system is enabled and low water 1 & 2 are satisfied. | • Enable water system (Menu > Operations > System Start). |
| • Faulty relay between PLC and motor contactor. | • Check Relay to see if light is on (Panel 2 Relay Block 2nd relay). | • Replace relay. **P/N: 10623** |
| • PLC output not sending signal. | • Check for 24 V on PLC output “Y5” (Menu > Diagnostics > Inputs/Outputs > Discrete Outputs > Y5). | • Replace PLC. **P/N: 10374** |
| • Loose wires or jumpers. | • Check Terminal Strip 2 (TS2) in Panel 1 for loose wires or jumpers. | • Tighten any loose wires. Ensure jumpers are seated properly. |

| Faults | | |
|---|---|---|
| • Faulty wiring. | • Inspect entire wiring path checking for continuity, ground, and proper voltage. | • Repair/Replace faulty wiring section. |
| | | |

# Faults

## Fault 412: Water In Steam / Bales Have Water Splotches / Sudden Loss of Steam Pressure and Water Level

Indicates poor water quality.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Supply water PPM not set correctly on the touch screen. | • Check PPM setting on boot up screen. | • Enter correct PPM setting on boot up screen or Menu > Settings > Water Quality. |
| • Water in boiler is too concentrated. | • Drain 150 gallons out of the boiler and refill with fresh water. | |
| • Water treatment equipment malfunction. | • Check water treatment equipment. | • Work with the dealer water specialist. |
| • Water holding and transportation tanks are contaminated. | • Visually inspect the insides of the tanks for algae and other contaminants. | • Clean the tanks and remove all contaminants. |
| • Water purge valve not working correctly. | • Test the valve in manual mode (can be swapped with steam purge valve for testing). | • Replace water purge valve (See Fault 408). **P/N: 10571** |
| • Water purge valve opening/ hose is clogged. | • Listen for crackling noise in rear supply water tanks when the water purge valve opens. | • If crackling noise not present, remove obstructions in water purge valve path (manifold > supply tanks). |
| • Blowdown valve not working correctly. | • Test the valve in manual mode and verify water is coming out of baler blowdown hose. (See 50 hour maintenance). Check blowdown hose for kinks. | • Replace blowdown valve (See Fault 408). **P/N: 10570** |
| • Dissolved solids have not been drained out of the bottom of the boiler. | • Drain 30-40 gallons of water out of the bottom of the boiler using the main boiler drain valve. | |
| • Scale has built up in the boiler. | • Remove a hand-hole cover and inspect boiler tubes for scale. | • Use REDEW boiler de-scaler. **P/N: 11194**<br>• Use Boiler Guard (preventative). |
| • Boiler water level set point too high. | • Set boiler water level field work to 4” Menu > Settings > Water System. | |
| • Bad boiler water level sensor. | • Remove boiler water level sensor (See Test 110). | • Clean/Replace boiler water level sensor. |
| • Faulty supply water level sensor. | • Verify that the level of water in the supply tanks matches the touch screen reading. Boiler blowdown is based on the amount of water used. If the supply water level sensor is not working, the machine will not prompt for blowdowns. | • Replace supply water level sensor. **P/N: 10371** |

# Faults

## Fault 413: Pilot Propane Pressure Low

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Propane tank valve closed. | • Check valve position. | • Open propane tank valve. |
| • Propane tank empty. | • Check propane level. | • Refill propane tank. |
| • Clogged propane tank regulator. | • Inspect regulator. | • Clean/replace propane tank regulator. **P/N: 10740** |

## Fault 414: Fuel Nozzle Pressure Is Low in Low Fire

Fuel nozzle pressure is below 80-90 psi in low fire.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Low fire fuel regulator is out of adjustment. | • Low fire fuel pressure should be 80-90 psi. | • Adjust the low fire regulator (See Test 116). |
| • Fuel pump is out of adjustment. | • Fuel pump pressure should be 280-300 psi. | • Adjust the fuel pump pressure (See Test 116). |
| • Restricted fuel flow through the fuel solenoid valves. | • Inspect fuel path, check for overtightened fittings. | • Remove restrictions. |
| • Loose/Leaking fuel nozzle. | • Remove burner gun and inspect nozzle. | • Tighten/Replace nozzle.<br>**20 GPH P/N: 10048**<br>**19 GPH P/N: 10610**<br>**18 GPH P/N: 10609** |
| • Faulty sensor (fuel pump or nozzle). | • Swap sensors to identify faulty sensor. | • Replace faulty sensor.<br>**P/N: 10349** |

## Fault 415: Fuel Nozzle Pressure Is High in Low Fire

Fuel nozzle pressure is above 80-90 psi in low fire.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Low fire fuel regulator is out of adjustment. | • Low fire fuel pressure should be 80-90 psi. | • Adjust the low fire regulator (See Test 116). |
| • Fuel pump is out of adjustment. | • Fuel pump pressure should be 280-300 psi. | • Adjust the fuel pump pressure (See Test 116). |
| • Nozzle fuel feed/return lines are crossed. | • Check nozzle fuel feed/return lines are connected properly | • Connect nozzle fuel feed/return lines properly (See Diagram 5) |
| • Restricted fuel flow through the fuel solenoid valves. | • Inspect fuel path, check for overtightened fittings. | • Remove restrictions. |
| • Faulty fuel nozzle. | • Remove burner gun and inspect nozzle. | • Repair/Replace nozzle.<br>**20 GPH P/N: 10048**<br>**19 GPH P/N: 10610**<br>**18 GPH P/N: 10609** |
| • Faulty sensor (fuel pump or nozzle). | • Swap sensors to identify faulty sensor. | • Replace faulty sensor.<br>**P/N: 10349** |

# Faults

## Fault 416: Fuel Nozzle Pressure Is Low in High Fire

Fuel nozzle pressure is below 160-190 psi in high fire.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Low fire fuel regulator is out of adjustment. | • Low fire fuel pressure should be 80-90 psi. | • Adjust the low fire regulator (See Test 116). |
| • Fuel pump is out of adjustment. | • Fuel pump pressure should be 280-300 psi. | • Adjust fuel pump pressure (See Test 116). |
| • Restricted fuel flow through the fuel solenoid valves. | • Inspect fuel path, check for overtightened fittings. | • Remove restrictions. |
| • Loose/Leaking fuel nozzle. | • Remove burner gun and inspect nozzle. | • Tighten/Replace nozzle. |
| • Faulty sensor (fuel pump or nozzle). | • Swap sensors to identify faulty sensor. | • Replace faulty sensor. **P/N: 10349** |

## Fault 417: Fuel Nozzle Pressure Is High in High Fire

Fuel nozzle pressure is over 160-190 psi in high fire.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Low fire fuel regulator is out of adjustment. | • Low fire fuel pressure should be 80-90 psi. | • Adjust the low fire regulator (See Test 116). |
| • Fuel pump is out of adjustment. | • Fuel pump pressure should be 280-300 psi. | • Adjust the fuel pump pressure (See Test 116). |
| • Restricted fuel flow through the fuel solenoid valves. | • Inspect fuel path, check for overtightened fittings. | • Remove restrictions. |
| • Nozzle fuel feed/return lines are crossed. | • Check nozzle fuel feed/return lines are connected properly. | • Connect nozzle fuel feed/return lines properly (See Diagram 5). |
| • Faulty fuel nozzle. | • Remove burner gun and inspect nozzle. | • Repair/Replace nozzle. **20 GPH P/N: 10048** **19 GPH P/N: 10610** **18 GPH P/N: 10609** |
| • Faulty sensor (fuel pump or nozzle 2). | • Swap sensors to identify faulty sensor. | • Replace faulty sensor. **P/N: 10349** |

## Fault 418: Purge Delay: T19 High Fire Jumpered

Indicates that the burner louver actuator is in the open position before the 30 second purge starts (Can cause an extra long purge).

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Misadjusted louver actuator. | • See Test 115 to adjust/configure the louver actuator. | |
| • Faulty louver actuator. | • See if the louver actuator returns to the closed position after the 30 second purge. | • Replace louver actuator (check other causes before buying a new component). **P/N: 10038** |
| • Faulty wiring. | • Inspect wiring for continuity, voltage, and ground. | • Repair/Replace faulty wiring. |

# FAULTS

## Fault 419: Purge Hold: T19 High Fire Switch (Waiting for Louver to Open)

Indicates that the burner louver actuator did not open the louver for purge (Fault 14 indicates the same failure. Fault 14 can take up to 5 minutes to occur).

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Misadjusted louver actuator. | • See Test 115 to adjust/configure the louver actuator. | |
| • Faulty louver actuator. | • See if the louver actuator opens the burner louvers during the 30 second purge. The louver actuator should hold the louvers open for the full 30 second purge. | • Replace louver actuator (check other causes before buying a new component). **P/N: 10038**<br>• Temporary fix: Assist the louver actuator by opening the louvers manually during the 30 second purge cycle. |
| • Obstructed path of the louver actuator/louvers. | • Manually move the louvers to feel if there is any resistance or obstructions. | • Remove obstructions.<br>• Lubricate the bearings. |
| • Faulty wiring. | • Inspect wiring for continuity, voltage, and ground.<br>• Trace the 120 V wires. When the louver is open T19 on the burner controller should have 120 V. | • Repair/Replace faulty wiring. |
| • Faulty burner controller. | • Check for 120 V on T19. | • Replace burner controller. |

## Fault 420: Purge Hold: T18 Low Fire Switch (Waiting for Louver to Close)

Indicates that the burner louver did not close for pilot ignition (Fault 20 indicates the same failure. Fault 20 can take up to 5 minutes to occur).

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Misadjusted louver actuator. | • See Test 115 to adjust/configure the louver actuator. | |
| • Faulty louver actuator. | • See if the louver actuator returns to the closed position after the 30 second purge. | • Replace louver actuator (check other causes before buying a new component). **P/N: 10038** |
| • Faulty wiring. | • Inspect wiring for continuity, voltage, and ground.<br>• Trace the 120 V wires. When the louver is closed T18 on the burner controller should have 120 V. | • Repair/Replace faulty wiring. |

# FAULTS

## Fault 421: Generator Will Not Start From Touch Screen

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Slightly drained battery causes PLC to drop start signal to generator controller during engine crank. | • Start/Stop the generator manually from the generator controller by pressing “Auto” then “Manual Start”. | • Temporary fix: Start/Stop the generator manually from the generator controller by pressing “Auto” then “Manual Start”<br>• Charge the battery<br>• Install the battery update kit with larger battery and cutoff switch. **P/N: 11062** |
| • Faulty 12 V regulator. | • Check if there is a green light on the 12 V regulator (Panel 3 diagram 7). | • Replace 12 V regulator. **P/N: 10301** |
| • Faulty 24 V regulator. | • Replace 24 V regulator. | |
| • Faulty wiring. | • Test wiring between PLC Y0 to generator control terminal 19.<br>• Inspect wiring for continuity, voltage, and ground. | • Repair/Replace faulty wiring. |

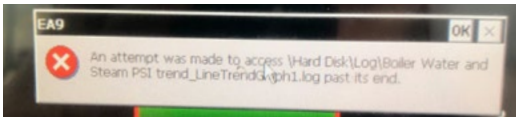
## Fault 422: Generator Will Not Shut Off From Touch Screen

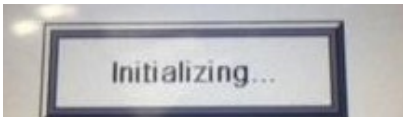
Indicates that the generator was started manually from the generator controller.
- The generator needs to be shutoff from the generator controller.
- Consider getting the battery update kit with larger battery and cutoff switch. **P/N: 11062**

# Faults

## Fault 423: Touch Screen Problems: Frozen, Won't Respond To Touch...

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty USB flash drive. | • Is the screen locking up / displaying one of the messages below? | • Replace USB flash drive (Recommended 8 GB). |




Error message: EA9 An attempt was made to access \Hard Disk\Log\.....

| | | |
|---|---|---|
| • Application Error; Application EA-RUN.exe encountered 1- . | • Reset panel to factory default by entering programming mode on the touch screen. Press and hold top left corner of touch screen for up to 5 seconds. Press "Memory" then press "Reset to factory default". Reload firmware and project after touch screen has been reset. | |
| • Faulty Software. | • Reprogram touch screen with appropriate software. | |
| • Faulty Touch Screen. | • Order new touch screen. | |
| • Faulty PLC. | • Pressing confirm start doesn't do anything. It stays on the same screen. No control over valves in Manual Mode. | • Reprogram the PLC.<br>• Replace PLC. **P/N: 10374** |
| • No system found. | • Factory reset screen then program screen (new screen).<br>• Send to Staheli West to be reprogrammed (old touch screen).<br>• Upgrade to new touch screen (old touch screen). | |

## Fault 424: Generator Controller Not Working; "????????" Displayed On Screen

Indicates that there is a failure in the generator controller.

- Disconnect the battery for 1 minute and reconnect.
- Controller needs to be reprogrammed. Contact dealer.
- Replace the generator controller. **P/N: 11078**

# Faults

## Fault 425: Burner Not Going Into High Fire / Stuck in Low Fire

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Boiler water temperature reading is below 180° F. | • Burner will not go into high fire until boiler water temperature is above 180° F.<br>• If the circulation pump is not running, the feed water pump can pump cool water through the circulation system and cause the boiler temperature to read low. | • Let the water warm up to more than 180° F.<br>• Replace / repair circulation pump. **P/N: 10585**<br>• Temporary fix: close the valves around the circulation pump isolating the circulation system. |
| • Steam pressure reading is at or above 12 psi. | • Check the steam pressure readings in Menu > Settings > Boiler Pressure > Select<br>Verify that the readings match the manual steam pressure gauge or select the correct sensor. | • Purge steam until pressure is below 12 psi.<br>• Replace faulty steam pressure sensor(s). **P/N: 10350** |
| • Fuel pump pressure adjusted below 280 psi causing a nozzle pressure of less than 105 psi (nozzle pressure of less than 105 psi displays low fire on the screen even if the burner is in high fire). | • Check the fuel pump pressure. | • Tune the burner correctly (See Test 116) Cleaning the flue tubes may be necessary to tune the burner correctly (See Test 119). |
| • Faulty 10r relay | • Replace 10r relay | |
| • Faulty high fire solenoid. | • If the water is above 180° F and steam pressure is below 12 psi, the burner should ignite directly to high fire. Listen and feel for a “click” on the high fire solenoid to ensure proper function. | • Replace high fire fuel solenoid. **P/N: 10730** |
| • Faulty relay (Panel 2 relay block). | • Check relay to see if light is on (Panel 2 Relay Block 5th relay). | • Replace relay. **P/N: 10623** |
| • PLC output not sending signal. | • Check for 24 V on PLC output “Y10” (Menu > Diagnostics > Inputs/Outputs > Discrete Outputs > Y10). | • Replace PLC. **P/N: 10374** |
| • Faulty wiring. | • Inspect wiring for continuity, voltage, and ground. | • Repair/Replace faulty wiring. |

# Faults

## Fault 426: Failed PTO Bearing(s)

Indicates poor drive-line quality.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Not greasing bearings every 50 hours. | • If there is play/movement in the PTO shaft, this indicates that your bearings have failed.<br>• If there is rattling or knocking sounds, this indicates that your bearings have failed. | • Replace PTO bearings.<br>• Align front and rear knuckles. |
| • Bad PTO shaft angles. | | |
| • Turning too sharp. | | |
| • Stopping too abruptly. | | |
| • PTO front and rear knuckles aren't aligned causing vibration. | | |

## Fault 427: PTO Shaft Slipping

Indicates PTO shaft is slipping.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty lock collar. | • Check tightness of lock collars. | • Tighten / Replace lock collars. |
| • Faulty bearing. | • Check tightness of bearings. | • Tighten / Replace PTO bearings. |

## Fault 428: Water Coming Out of Steam Purge Valve (See Fault 403)

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Water purge valve clogged. | • Listen for crackling noise in rear supply water tanks when the water purge valve opens. If the valve opens and there is no crackling noise, this may indicate the water purge valve is clogged. | • Unclog the water purge valve (MAKE SURE THE BOILER IS NOT UNDER PRESSURE BEFORE CLEANING).<br>• See Faults 403 & 412.<br>  |
| • Faulty water purge actuator. | • Test the water purge valve in manual mode for function. | • Replace water purge actuator.<br>**P/N: 10365** |

# Faults

## Fault 429: PLC NAK Error

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty/corrupted PLC Programming. | • Reload PLC program. | |
| • Faulty PLC. | • Check “Run” light on PLC. If “Run” light is off, reprogram or replace PLC. | • Reprogram PLC.<br>• Replace PLC: **P/N: 10374** |

## Fault 430: Water in Furnace / Steam Coming Out of Flue Exhaust / Leaky Flue Tube(s)

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Leaky flue tube. | • Water will be leaking where the burner mounts to the boiler, or on the rear boiler door, or at the front turn box. | • Plug flue tube on both ends. Contact Staheli West for repair options. (A boiler repair shop will need to be used). |

## Fault 431: Camera Problems

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty monitor. | • Swap with known working monitor. | • Replace monitor. |
| • Faulty camera. | • Swap with working camera. | • Replace camera. |
| • Faulty wire harness. | • Swap with working wire harness. | • Repair/Replace wire harness. |
| • Under voltage / over voltage. | • Test voltage to ensure 12 V. | • Fix voltage problems. |

## Fault 432: Boiler Building Pressure During Fill Stage

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty steam purge actuator. | • Test in “Manual Mode” to see if the steam purge actuator opens Menu > Operations > Manual Mode. | • Replace steam purge actuator. **P/N: 10364** |
| • Faulty boiler water level sensor. | • See Test 110. | • Replace boiler water level sensor. **P/N: 11040** |
| • Filling in “Keep Hot” mode. | • Keep hot mode keeps the actuators on the boiler from opening to relieve pressure. | • Fill the boiler with “Start Fill”. |

# FAULTS

## Fault 433: Burner Switching From High to Low Fire Frequently

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Normal operation (steaming at a lower steam rate). | • This is normal. The burner will switch frequently from low fire to high fire if you are steaming at a lower rate.<br>• Low fire hold option:<br>The machine can be held in low fire. Menu > Settings > Tune Burner > Low Fire Hold. | • Replace steam purge actuator. **P/N: 10364** |
| • Plugged steam hardware nozzles. | • Plugged nozzles can make the steam output lower than what is shown on the touch screen causing the machine to switch quickly between low and high fire. | • Clean/Replace steam nozzles. |

## Fault 434: Main Wire Harness Damage / 70 Pin Connector Damaged

2013 and older harnesses have been discontinued and must be repaired or replaced. If one part of the main trunk harness is damaged on a 2013 and older machine, all associated wire harnesses will need to be replaced along with the damaged harness.

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Corrosion/Damage in 70 pin connector. | • Unplug the 70 pin connector and check the condition of the pins and sockets. | • Repair the 70 pin connector.<br>• Replace the 70 pin connector.<br>• Replace the wire harnesses and use the cross over document to land the new wires correctly.<br>• Replace with a pre-populated 70 pin connector (move pin by pin and add labels). |

## Fault 435: Melted Igniter Wires

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Fire in the burner blast tube / fuel leaking in burner blast tube / air leaks in burner blast tube. | • Inspect for fuel leaks inside the burner blast tube area.<br>• Inspect for air leaks in the burner blast tube area. | • Repair leaks.<br>• Replace fuel lines. |
| • Broken burner sight glass. | • Replace sight glass. **P/N: 11031** | |

# Faults

## Fault 436: Blown Valve Actuator Fuses Panel 2: F1-F7 (5 Amp)

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty actuator. | • Verify faulty actuator by swapping connection with other actuator.<br>• Test for ground short. | • Replace actuator. |
| • Seized valve. | • Remove actuator and test valve for tightness. Normal valves should be stiff but movable. | • Repair/Replace valve. |
| • Faulty wiring. | • Inspect entire wiring path checking for continuity, ground, and proper voltage. | • Repair/Replace faulty wiring section. |

## Fault 437: Blown Fuse Panel 3: F1 (15 Amp)

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty actuator. | • See faults 321-322. | • Replace faulty actuator. |
| • Faulty wiring. | • Inspect entire wiring path checking for continuity, ground, and proper voltage. | • Repair/Replace faulty wiring section. |

## Fault 438: Blown Fuse Panel 3: F2 (15 Amp)

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty 12 V regulator. | • Test for ground short. | • Replace faulty 12 V regulator. **P/N: 10301** |
| • Faulty wiring. | • Inspect entire wiring path checking for continuity, ground, and proper voltage. | • Repair/Replace faulty wiring section. |

## Fault 439: Blown Fuse Panel 3: F3 (2 Amp)

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty PLC. | • Test for ground short. | • Replace PLC. **P/N: 10374** |
| • Faulty wiring. | • Inspect entire wiring path checking for continuity, ground, and proper voltage. | • Repair/Replace faulty wiring section. |

## Fault 440: Blown Fuse Panel 3: F4 (15 Amp)

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty 24 V regulator. | • Test for ground short. | • Replace faulty 24 V regulator. **P/N: 10302** |
| • Faulty wiring. | • Inspect entire wiring path checking for continuity, ground, and proper voltage. | • Repair/Replace faulty wiring section. |

# Faults

## Fault 441: Blown Fuse Panel 3: F5 (5 Amp)

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty PLC. | • Test for ground short. | • Replace PLC. **P/N: 10374** |
| • Faulty analog sensor. | • Test for ground short. | • Replace analog sensor. |
| • Faulty PLC In/Output card. | • Test for ground short. | • Replace PLC In/Output card. **Input - P/N: 10375** **Output - P/N: 10376** |
| • Faulty PLC ethernet switch. | • Test for ground short. | • Replace PLC ethernet switch. **P/N: 10378** |
| • Faulty touch screen. | • Test for ground short. | • Replace touch screen. **P/N: 11027** |
| • Faulty louver actuator. | • Test for ground short. | • Replace louver actuator. **P/N: 10038** |
| • Faulty wiring. | • Inspect entire wiring path checking for continuity, ground, and proper voltage. | • Repair/Replace faulty wiring section. |

## Fault 442: Blown Fuse Panel 3: F6 (1.5 Amp)

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty PLC. | • Test for ground short. | • Replace PLC. **P/N: 10374** |
| • Faulty wiring. | • Inspect entire wiring path checking for continuity, ground, and proper voltage. | • Repair/Replace faulty wiring section. |

## Fault 443: Blown Fuse Panel 3: F7 (2 Amp)

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty analog sensor. | • See Test 19. | • Replace analog sensor. |
| • Faulty wiring. | • Inspect entire wiring path checking for continuity, ground, and proper voltage. | • Repair/Replace faulty wiring section. |

## Fault 444: Blown Fuse Panel 3: F8 (2 Amp)

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty PLC In/Output card. | • Test for ground short. | • Replace PLC In/Output card. **Input - P/N: 10375** **Output - P/N: 10376** |
| • Faulty wiring. | • Inspect entire wiring path checking for continuity, ground, and proper voltage. | • Repair/Replace faulty wiring section. |

# Faults

## Fault 445: Blown Fuse Panel 3: F9 (2 Amp)

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty PLC ethernet switch. | • Test for ground short. | • Replace PLC ethernet switch. **P/N: 10378** |
| • Faulty wiring. | • Inspect entire wiring path checking for continuity, ground, and proper voltage. | • Repair/Replace faulty wiring section. |

## Fault 446: Blown Fuse Panel 3: F10 (1.5 Amp)

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty touch screen. | • Test for ground short. | • Replace touch screen. **P/N: 11027** |
| • Faulty wiring. | • Inspect entire wiring path checking for continuity, ground, and proper voltage. | • Repair/Replace faulty wiring section. |

## Fault 447: Blown Fuse Panel 3: F11 (0.5 Amp)

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty louver actuator. | • Test for ground short. | • Replace louver actuator. **P/N: 10038** |
| • Faulty ABD-1 or 2 relay. | • Test for ground short. | • Replace relay. **P/N: 10268** |
| • Faulty wiring. | • Inspect entire wiring path checking for continuity, ground, and proper voltage. | • Repair/Replace faulty wiring section. |

## Fault 448: Blown Fuse Panel 3: F12 (1.5 Amp)

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty control relay. | • Test for ground short. | • Replace control relay. **P/N: 10340** |
| • Faulty wiring. | • Inspect entire wiring path checking for continuity, ground, and proper voltage. | • Repair/Replace faulty wiring section. |

# Faults

## Fault 449: Algae in Supply Tanks

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Missing lid on supply tanks letting sunlight enter tanks for algae to grow. | • Check for missing lids. | • Replace lids. **P/N: 10101** |
| • Water left in supply tanks over winter. | • The supply tanks can grow algae if left for long periods of time. | • Drain water from supply tanks each time the machine is winterized. |
| • Algae in main holding tank. | • Check for algae in main holding tank. Main holding tank should be UV resistant to prevent algae growth. | • Paint holding tank to make UV resistant. |

• If algae is found in supply tanks or in the main holding tank, do the following:

1- Drain the supply tanks completely.

2- Pressure wash as much of the algae as possible off of the tanks.

3- Fill the supply tanks completely full and add 1/3 gallon of bleach while filling (Let stand for 30 min). **DO NOT MIX BLEACH WITH BOILER GUARD! DOING SO WILL CREATE TOXIC GAS THAT MIGHT KILL YOU DEADER THAN HECK!**

4- Drain the tanks completely of the bleach solution before steaming hay.

## Fault 450: Burner Stuck in Purge

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Burner controller on “test” mode. | • Switch to “Run” mode.   | |

## Fault 451: Trouble Reinstalling Sparge Tube

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Scale buildup on tip of sparge tube. | • Grind/Polish the last 6 inches of the sparge tube to fit into the support sleeve.  | |

# Faults

## Fault 452: Touch Screen Rebooting When Generator Starting

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Low battery. | • Charge/Replace battery. | |
| • Loose connection on 12 V inline fuse. | • Inspect/Tighten connection. | |
| • Loose ground connection. | • Check battery ground to engine frame. | • Tighten ground. |
| • Faulty 24 V regulator. | • Replace 24 V regulator. **P/N: 10302** | |

## Fault 453: Boiler Taking Longer Than Normal to Heat Up

| Causes | Troubleshooting | Fixes |
|---|---|---|
| A properly tuned 6110 will take 12-16 minutes to heat from 100° F to 180° F depending on nozzles. | | |
| • Sooted up flue tubes. | • See test 119 to clean the flue tubes. Fault 208 will normally appear with dirty flue tubes during high fire. | • Clean flue tubes. |
| • Faulty/Clogged low fire nozzle. | • Remove, inspect, and clean the low fire nozzle. (See nozzle page.) | • Clean/Replace low fire nozzle. **P/N: 10609** |
| • Restriction in fuel path. | • Inspect fuel path. | • Remove restriction(s) in fuel path. |
| • Severe scale on water side of boiler tubes. | • Inspect boiler tubes. | • Use REDEW boiler de-scaler. **P/N: 11194**<br>• Use Boiler Guard (preventative). |

## Fault 454: Low Water Tripping While Turning Around When Steam Turned Off

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Ultra concentrated water causing foaming. | • When steam is turned off water level drops below LWCO probes. This commonly happens when turning at the end of a windrow. Water in the boiler will foam when it is above 3500 ppm. | • See fault 312 for all causes and fixes. |
| • Water holding and transportation tanks are contaminated. | • Visually inspect the insides of the tanks for algae and other contaminants. (See Fault 345) | • Clean the tanks and remove all contaminants. |
| • Normal if steaming at a high rate. | | |
| Quick Fix: Turn up boiler water level | | |

## Fault 455: Grounding Issues

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Bad ground on din rail or between panels. | • Intermittent screen (can also be caused by a faulty 24v regulator).<br>• Intermittent Voltage. | • Ground panel 2 & 3 together.<br>• Bend out ears on ground block to ensure good connection.<br>(See test 128) |

# Faults

## Fault 456: Hours, PPM, Louver Tuning Resetting to Default

| Causes | Troubleshooting | Fixes |
|---|---|---|
| This is a known issue and will likely always be an issue; The PLC "supercapacitor" will typically only last for a few years. In 2017 we started pulling machine hours from the generator controller to the touch screen. For years 2016 and earlier we recommend using the generator controller to determine machine hours. | | |

## Fault 457: Nothing Happens after Pressing "Confirm Start" on Touch Screen

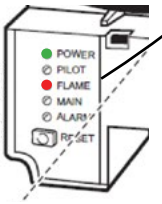
| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Unplug ethernet and confirm fault 249. Plug back in and confirm fault goes away.<br>• Test in manual mode. | | • Reprogram/replace PLC.<br>**P/N: 10374** |

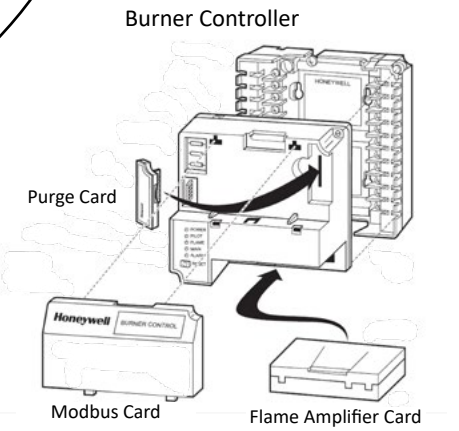
## Test 101: Flame Detector Testing Procedures

1. Ensure Control Power is on (Green “POWER” LED).
   -Generator must be running.
   -Control Power must be enabled on the touch screen.
2. Remove flame detector.
3. Point the flame detector at a light source and confirm the red “FLAME” LED lights up on the burner controller.
4. Cover the flame detector and confirm that the red “FLAME” LED on the burner controller turns off.

This test confirms that the flame detector is functioning properly.

See Fault: 15, 17, 18, 19, 28




## Test 102: Fuel Solenoid Test

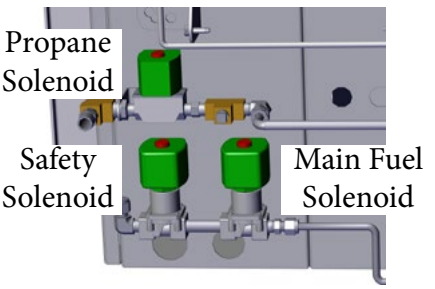
1. Start the burner.
2. In the main flame ignition stage, put your hand on the fuel safety / main fuel solenoid valve and confirm that it opens. You should hear and feel an audible click as it opens. If it hums or buzzes, this indicates a faulty solenoid valve that needs cleaning or replacement.
3. On the touch screen, you should be able to watch the nozzle pressure go from 0 psi to about 80 psi.

See Fault: 17, 19, 28

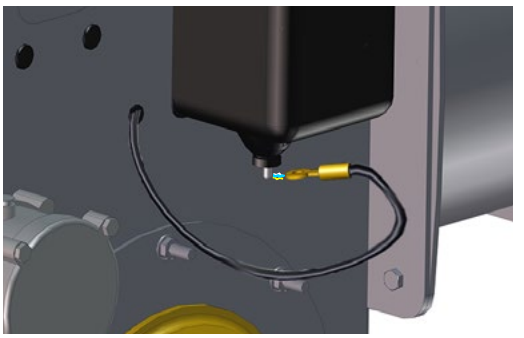
## Test 103: Propane Solenoid Test

1. Start the burner.
2. In the pilot ignition stage, put your hand on the propane solenoid valve and confirm that it opens. You should hear and feel an audible click as it opens. If it hums or buzzes, this indicates a faulty solenoid valve that needs cleaning or replacement.

See Fault: 28



## Test 104: Ignition Transformer Test



Note: 2013 and older machines; watch for the spark through the sight-glass. If you can't see the spark through the sight glass, remove the transformer from the burner.

1. Disconnect the ignition cable from the transformer.
2. Hold the ignition cable eyelet 3/8” - 1/2” away from the ignition transformer post.
3. Start the burner.
4. During pilot ignition stage, the spark should jump the gap between the eyelet and the post.

See Fault: 28

## Test 105.A: Igniter Electrode Orientation & Gap (Direct Spark)

Remove the burner gun assembly (See Test 117).

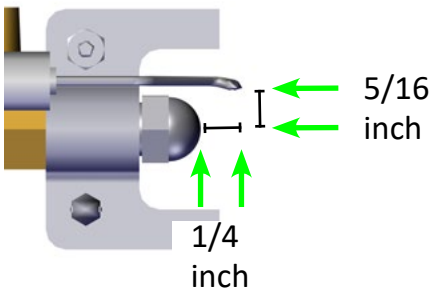
1. The gap between the nozzle and the tip of the electrodes should be 1/4” and the gap between the center of the nozzle and the tip of the electrode should be 5/16”.
2. The gap between the two electrode tips should be 1/16”.
3. The gap between the nozzle and the diffuser cone should be 5/16”.

Note 1: Adjust the electrode depth with Allen wrench.

Note 2: Adjust the electrode gap with pliers.

See Fault: 28

1

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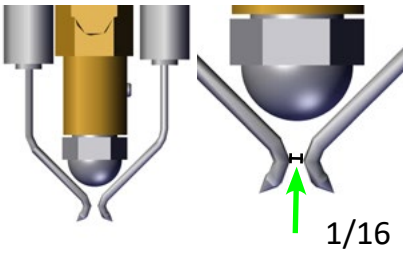


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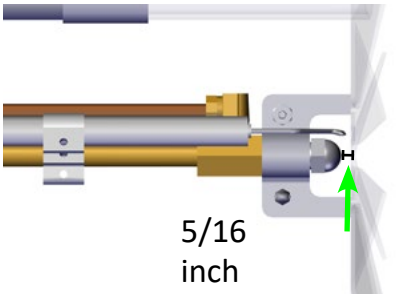
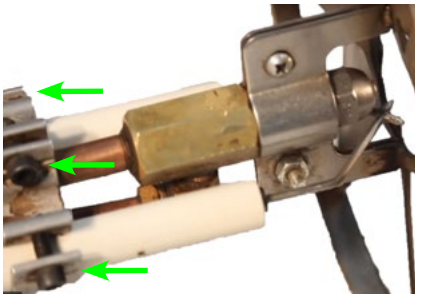
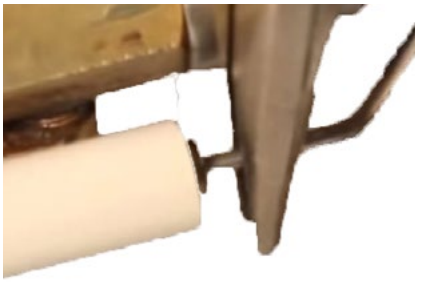



Note 1



Note 2



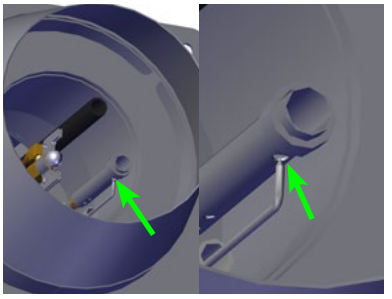
## Test 105.B: Igniter Electrode Orientation & Gap (Propane: 2014)

Remove the burner gun assembly (See Test 117).

1. Locate the electrode spark centering hole (end of the burner gun assembly).
2. Position the electrode where the tip is flush with the outside of the propane tube.
3. Adjust the electrode depth and lateral movement if needed using a Phillips screwdriver.

See Fault: 28

1



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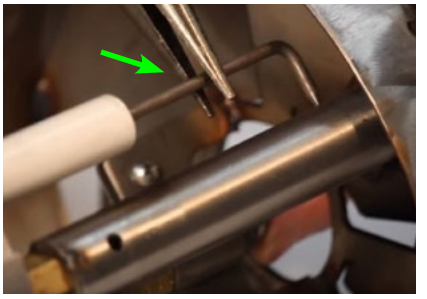

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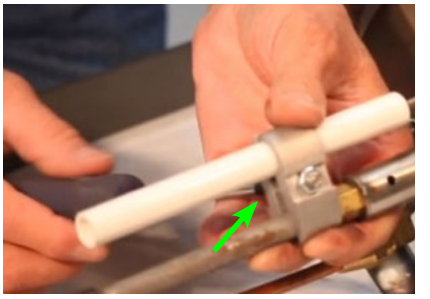
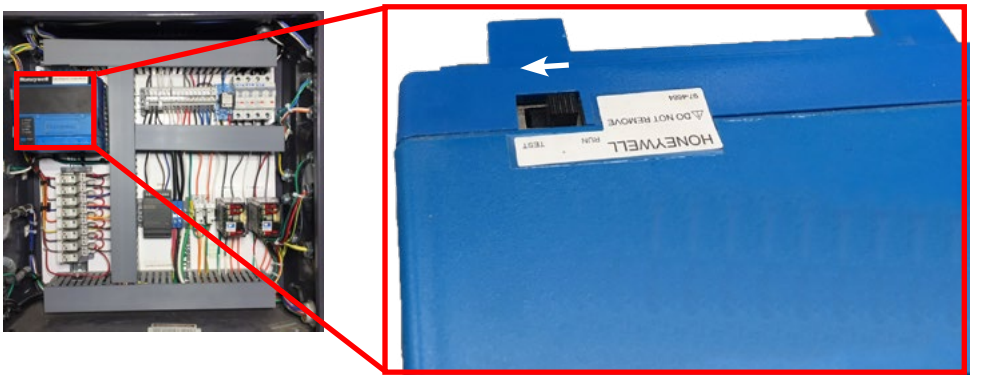


## Test 106: Intermittent Pilot Flame Test (2014 machines only)

1. Start the burner.
2. When the burner goes into pilot ignition, move the switch to the “Test” position (this will hold the burner in pilot mode until the switch is placed in the “Run” position).
3. Remove top cap on the propane regulator with a flat head screwdriver.
4. While observing the pilot flame through the sight glass, adjust the regulator to stabilize the flame.

See Fault: 28



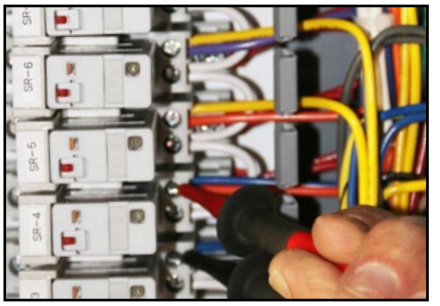

*Propane Pressure at pilot:
4-7 in WC (inches Water Column)
0.14 - 0.25 psi

## Test 108: HPLS Calibration [15 psi]

1. With the boiler full of water, hook up an air hose to the boiler to simulate pressure.
2. With the multimeter set to measure ohms, connect your pins to the terminals on SR-3 and SR-4 as shown in #2.
3. The multimeter will read continuity until the HPLS trips.
4. Slowly pressurize the boiler while monitoring the steam pressure on the touch screen; take note at what pressure the HPLS trips and whether adjustment is necessary. Menu > Diagnostics > Inputs Outputs > Analog Inputs (the HPLS should be set to trip at 15 psi).
5. After the HPLS trips, release pressure to adjust HPLS by opening one of the pigtail valves and reset the sensor (releasing only a few psi is necessary).
6. Loosen the set screw (5/64” Allen), and then increase HPLS psi by rotating the bolt clockwise in the bottom of the housing.

1

2



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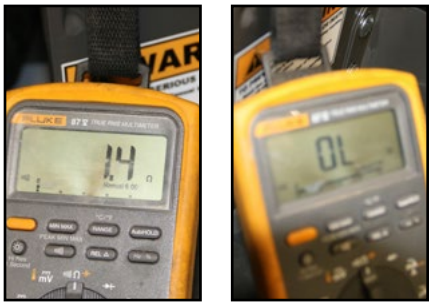


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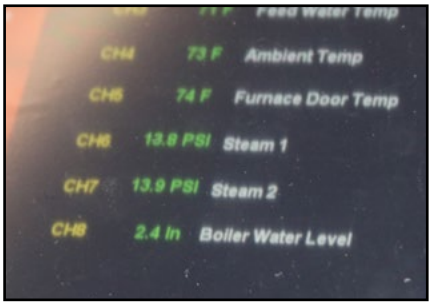


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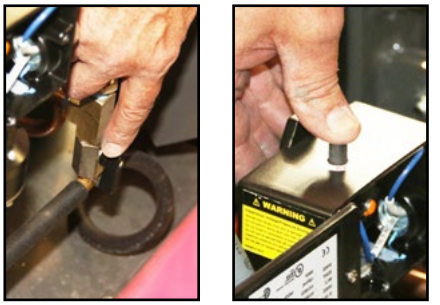

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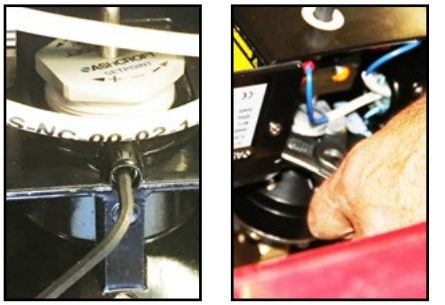
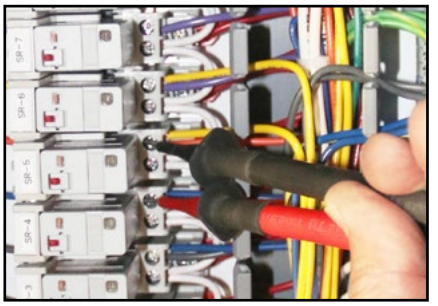


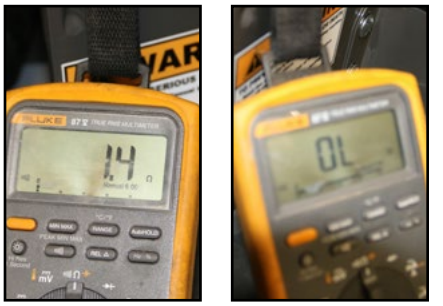
See Fault: 200

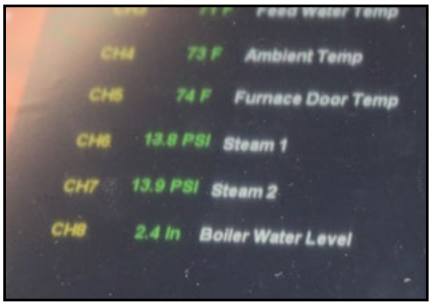
## Test 109: OPLS Calibration [14.5 psi]

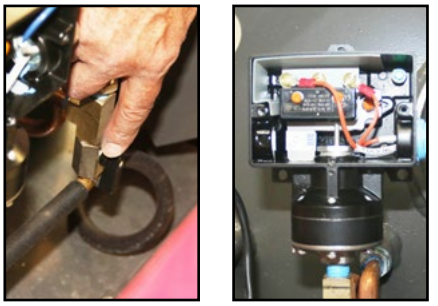
1. With the boiler full of water, hook up an air hose to the boiler to simulate pressure.
2. With the multimeter set to measure ohms, connect your pins to the terminals on SR-4 and SR-5 as shown in #2.
3. The multimeter will read continuity until the OPLS trips.
4. Slowly pressurize the boiler while monitoring the steam pressure on the touch screen; take note at what pressure the OPLS trips and whether adjustment is necessary. Menu > Diagnostics > Inputs Outputs > Analog Inputs (the OPLS should be set to trip at 14.5 psi).
5. After the OPLS trips, release pressure by opening one of the pigtail valves (releasing only a few psi is necessary; this will also reset the sensor automatically).
6. Loosen the set screw (5/64” Allen), and then increase OPLS psi by rotating the bolt in the bottom of the housing clockwise.

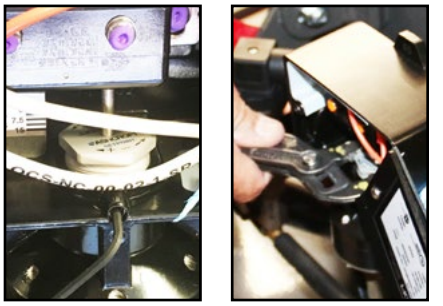
1 

2 

3 


4 


5 

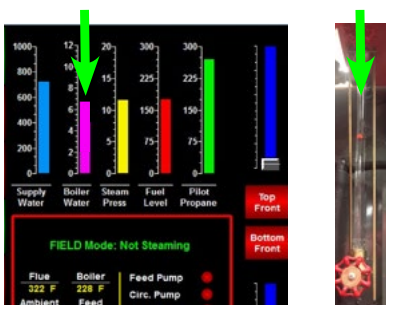
6 

See Fault: 200, 202

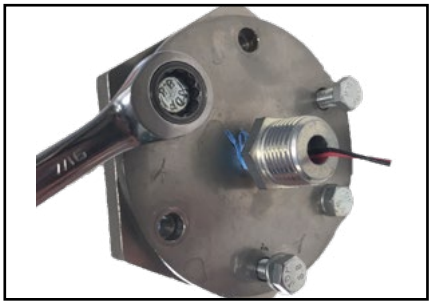
## Test 110.A: Boiler Water Level Sensor Testing

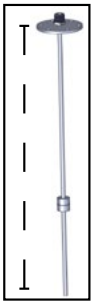
*Check stem float clearance in the well.

1. Compare the touch screen boiler water level reading with the water in the boiler sight glass. If the readings match, there is likely no problem with the sensor. If it does not match or is giving erratic readings, continue to steps 2 & 3.
2. Remove boiler water level sensor (6 bolts 7/16”).
3. Move the float in increments of 1” and verify that the touch screen reading reflects accurately.

1 




2 

3 

## Test 110.B: Boiler Water Level Sensor Testing

*Check stem clearance in the well.

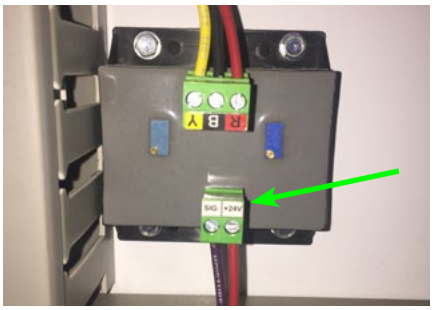
1. Disconnect power to the signal conditioner by removing the two-cavity green terminal strip from the conditioner (Panel 3).
2. Check to see if the sensor is working.
3. Shut off touch screen.
4. Remove the top conduit cap and disconnect the three wires by removing the wire nuts.
5. Remove boiler water level sensor.
6. Clean the stem.
7. Reconnect the three wires using the wire nuts.
8. Move the float in increments of 1” on the stem and verify that the touch screen reading reflects accurately.

Boiler Water Level Sensor Ohms Test:

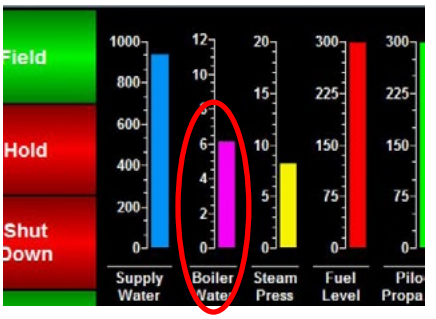
9. Shut off touch screen.
10. Remove the top conduit cap and disconnect the three wires by removing the wire nuts.
11. Remove boiler water level sensor.
12. Use an ohm meter and connect between the red and black wires.
13. With the float at the top of the stem, the resistance should be between 500-750 ohms.*
14. Move the float toward the bottom and the resistance should decrease.
15. Connect between the black and yellow wires.
16. Move the float to the top of the stem, the resistance should be less than 100 ohms.
17. Move the float toward the bottom and the resistance should increase.*
18. Connect between the red and yellow wires.
19. The resistance should be between 600-750 ohms, moving the float should not effect the resistance.


*The resistance must never go above 900 ohms.
**Replace the sensor if any of the tests fail.

1



2



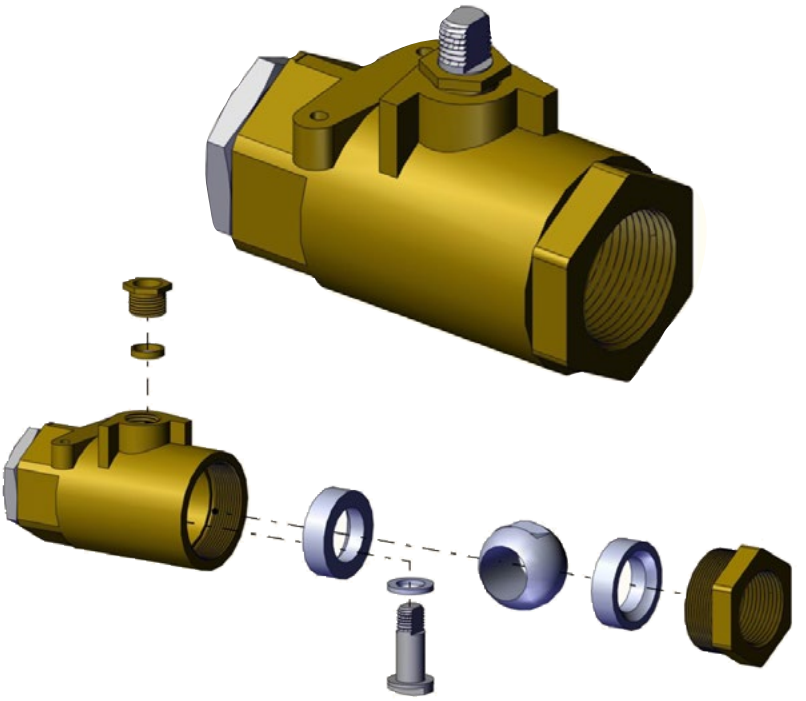
## Test 111: Valve Repair

Before you begin, turn the valve to the fully closed position (the ball must be in the closed position before it can be removed).

Be careful not to damage the surfaces on the valve where the seats will need to seal.

1. Remove the retainer nut from the end of the valve and remove the outer seat and the ball.
2. Remove the retainer nut on the stud at the top of the valve.
3. Remove the stud and the inner seal by pressing the stud down into the valve and out the end.
4. Remove the outer seal.
5. Remove the inner seat.

*To reassemble, repeat these steps in reverse with the new parts.



## Test 112: Pump Service

NOTICE: The highly polished and lapped faces of this seal are easily damaged. Read instructions and handle the seal with care. Some models are equipped with an impeller screw, which has a left hand thread. Remove the impeller screw before unscrewing the impeller.

Remove the impeller:

Use multiple screwdrivers or other tools to wedge the cooling fins on the back of the pump motor to hold the impeller still while it is unscrewed. Wedge in multiple spots so as to not break the cooling fins.

**REMOVAL OF OLD SEAL**

1. After unscrewing impeller, carefully remove rotating part of seal by prying up on sealing washer, using two screwdrivers (see Figure 5A). Use care not to scratch motor shaft.
2. Remove seal plate from motor and place on flat surface, face down. Use a screwdriver to push ceramic seat out from seal cavity (see Figure 5B).

**INSTALLATION OF FLOATING SEAT (Figure 5C)**

1. Clean polished surface of floating seat with clean cloth.
2. Turn seal plate over so seal cavity is up, clean cavity thoroughly.
3. Lubricate outside rubber surface of ceramic seat with soapy water and press firmly into seal cavity with finger pressure. If seat will not locate properly in this manner, place cardboard washer over polished face of seat and press into seal cavity using a 3/4” socket or 3/4” piece of standard pipe.
4. DISPOSE OF CARDBOARD WASHER. Be sure polished surface of seat is free of dirt and has not been damaged by insertion. Remove excess soapy water.

**INSTALLATION OF ROTATING PART OF SEAL UNIT (Figure 5D)**

1. Reinstall seal plate using extreme caution not to hit ceramic portion of seal on motor shaft.
2. Inspect shaft to make sure that it is clean.
3. Clean face of sealing washer with clean cloth.
4. Lubricate inside diameter and outer face of rubber drive ring with soapy water and slide assembly on motor shaft (sealing face first) until rubber drive ring hits shaft shoulder.
5. Screw impeller on shaft until impeller hub hits shaft shoulder. This will automatically locate seal in place and move the sealing washer face up against seat facing. Reinstall impeller screw (if used).

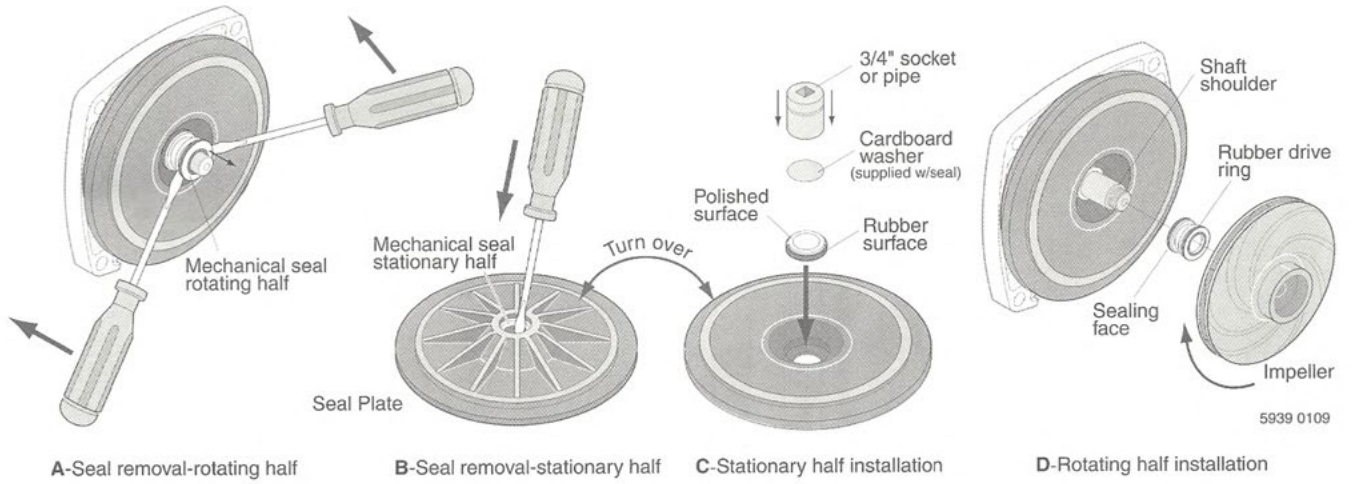
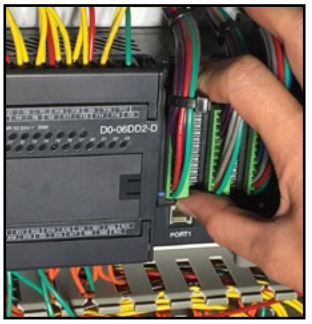


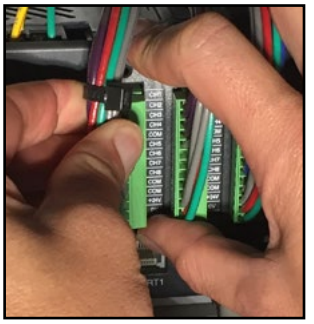

FIGURE 5

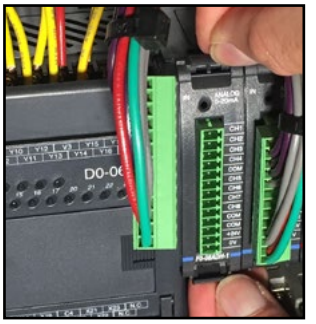
## Test 113: Input Card Testing (See Fault 402)

- Go to Menu > Diagnostics > Inputs Outputs > Analog Inputs and inspect channels 1-8 on cards 1 & 2 for normal readings. A faulty input card will often max out the readings on one or more channels.
  - If all channels on one card are maxed out, this indicates a faulty sensor or faulty wiring. Locate the faulty sensor/wiring before replacing/swapping PLC input cards.
  - If one channel is reading higher than normal, then the card can be swapped with the other input card to see if the problem follows that particular input card. WARNING: ensure you have replaced the suspected faulty sensor. A faulty sensor can fry a new input card.

1. Use caution when swapping input cards. Always support the input card housing while removing green wiring blocks.
2. While supporting the input card housing, remove the green wiring block.
3. Lift up the top and bottom tabs on the input card and gently remove from slot.
4. Make sure the multimeter is set to measure ohms Ω.
5. Connect one lead of the multimeter to the “0V” terminal and the other lead to channels 1-8 (one at a time) as shown below.
6. A functioning channel reads about 100 Ω.
7. A non functioning channel will read some other amount (see below 33.68 Ω).
8. A functioning COM port will read about 0 Ω.

1 

2 

3 

4 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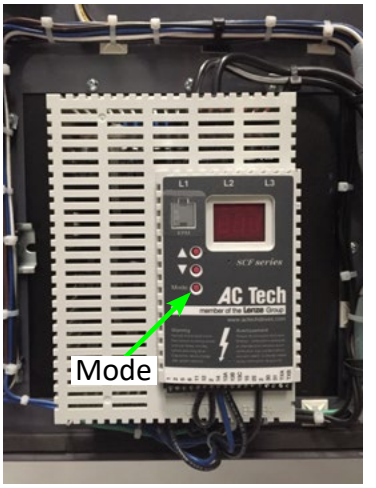
8 

## Test 114.A: Program the VFD (See Fault 29) (Some 2014 machines)

- Programming the VFD requires entering the password and adjusting 5 parameters:
  (P05 = 2, P06 = 3, P19 = 15, P20 = 30, P31 = 60)

1. With the generator running: Press “Mode” on the VFD.
2. Use the up arrow and input the password (225), then press “Mode”.
3. Use the up arrow and advance to (P05), then press “Mode”.
4. Use the up arrow and advance to (02), then press “Mode”.
5. Use the up arrow and advance to (P06), then press “Mode”.
6. Use the up arrow and advance to (03), then press “Mode”.
7. Use the up arrow and advance to (P19), then press “Mode”.
8. Use the up arrow and advance to (15), then press “Mode”.
9. Use the up arrow and advance to (P20), then press “Mode”.
10. Use the up arrow and advance to (30), then press “Mode”.
11. Use the up arrow and advance to (P31), then press “Mode”.
12. Use the up arrow and advance to (60), then press “Mode”.



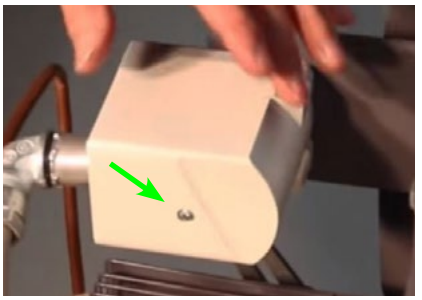

## Test 114.B: Program the VFD (New)

- Programming the VFD requires entering the password and adjusting 5 parameters:
  (P100 = 1, P101 = 3, P104 = 15, P121 = 11, P122 = 3, P131 = 60, P132 = 60)

1. With the generator running and “Stop” displayed, press “M”.
2. With P100 displayed, press “M”.
3. Use up arrow to advance to 1 and press “M”.
4. With “Stop” displayed, Press “M”.
5. Use up arrow to advance to P101 and press “M”.
6. Use up arrow to advance to 3 and press “M”.
7. With “Stop” displayed, press “M”.
8. Use up arrow to advance to P104 and press “M”.
9. Use down arrow to decrease setting to 15 and press “M”.
10. With “Stop” displayed, press “M”.
11. Use up arrow to advance to P121 and press “M”.
12. Use up arrow to advance to 11 and press “M”.
13. With “Stop” displayed, press “M”.
14. Use up arrow to advance to P122 and press “M”.
15. Use up arrow to advance to 3 and press “M”.
16. With “Stop” displayed, press “M”.
17. Use up arrow to advance to P131 and press “M”.
18. Use up arrow to advance to 60 and press “M”.
19. With “Stop” displayed, press “M”.
20. Use up arrow to advance to P132 and press “M”.
21. Use up arrow to advance to 60 and press “M”.
22. “Stop” should be displayed.


## Test 115: Louver Actuator adjusting (See Fault 14)

1. Remove the louver actuator cover by removing the cover screw.
2. Press in and lock the “louver locking pin” to free the louver.
3. Remove the spanning wrench tool. (For new machines all cams are adjusted using a small flathead screwdriver.)
4. Using the spanning wrench tool adjust the blue home position cam to “zero”. Jam the spanning wrench against the louver actuator housing and use the freed louver linkage arm to adjust the cam (use this method for the red cam also).
5. Adjust the red cam to 40 degrees (determines how far the actuator opens).
6. Lock the “home” position to “zero” by adjusting the white ring indicator to “zero” and releasing the louver locking pin (pressed in step 2).
7. Adjust the orange cam to 10 degrees using a small flat-head screwdriver (determines the open/closed switch position).
8. In the resting position, make sure that the louver actuator roller linkage and the louver linkage arm are not touching. They should be spaced by 0.25" - 1.0” apart.
9. Ensure the louvers move freely and that the bushings are lubricated with a greaseless lubricant. The counterweight(s) should not be so heavy to where the louver actuator cannot lift the louvers, but they should be heavy enough that the louvers return to closed position when the burner is off.

1


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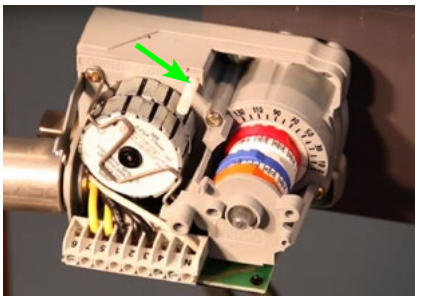

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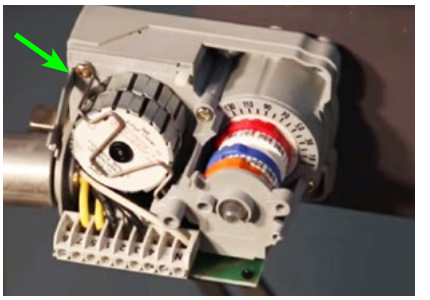

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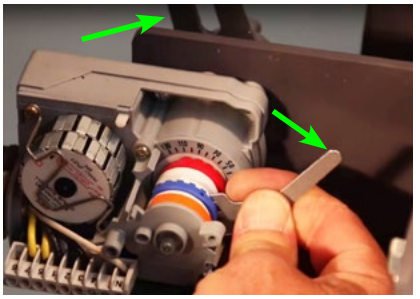

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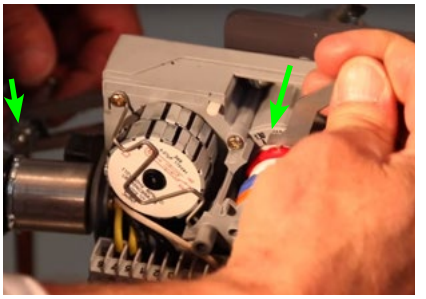

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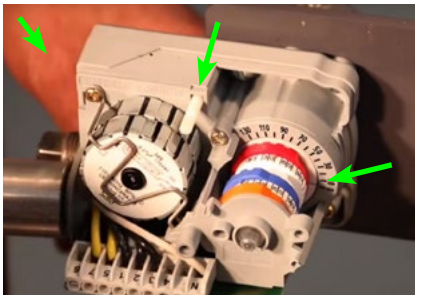

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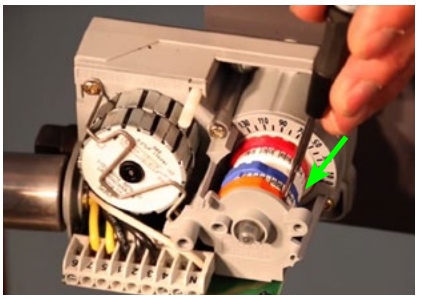

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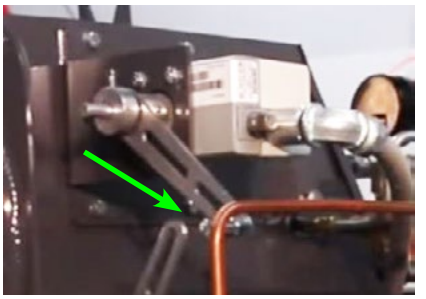

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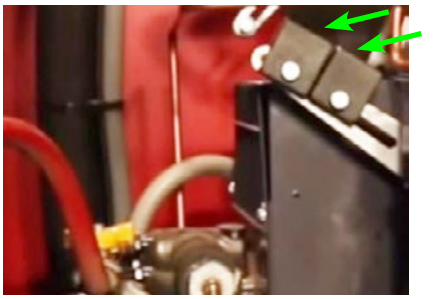
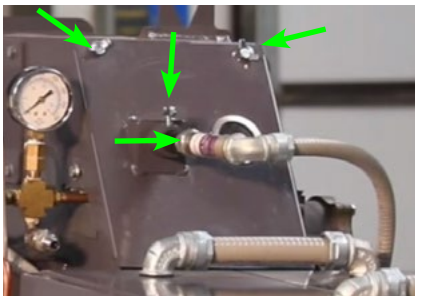


## Test 116: Tune the burner (Page 1 of 3)

1. Remove flame detector and burner cover.
2. Clean the fan with compressed air and reinstall the burner cover and flame detector.
3. Check louver position (Should be about 1/4” open; adjust the top bolt as needed).
4. Turn on the touch screen press “Start All” and “Confirm Start”.
5. Press “Menu”.
6. Press “Tune Burner”.
7. Press “Low Tune”.
8. Wait for the burner to reach “Low Fire”.

1


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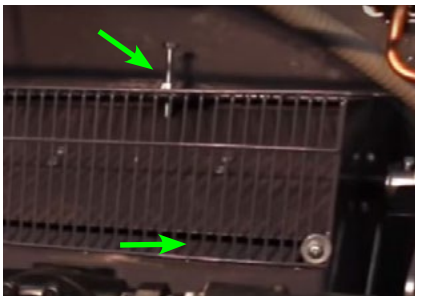

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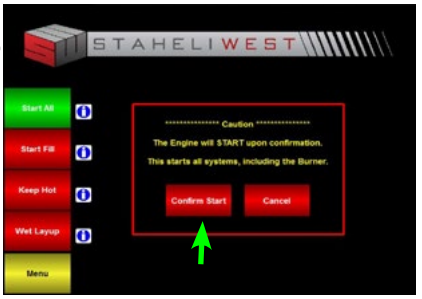


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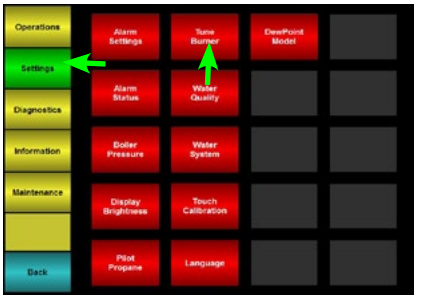


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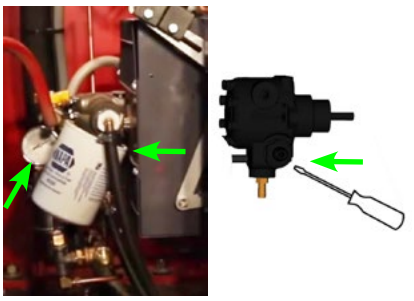
8


## Test 116: Tune the burner (Page 2 of 3)

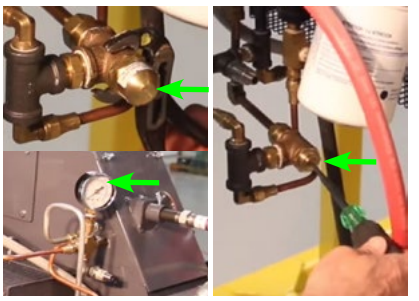
9. Once the burner advances to low fire, follow the steps below.
   a. Set the fuel pump pressure to 280-300 psi using a flat head screwdriver (Use the physical gauge next to the pump and the digital gauge on the touch screen).
      i. Remove the low fire fuel regulator cap and gasket then loosen the lock-nut, then adjust the nozzle pressure to 80-90 psi using a flat head screwdriver. Reinstall when done. (Use the physical gauge and the digital gauge on the touch screen).
   b. Decrease the louver position until dark smoke appears.
   c. Increase the louver position until dark smoke disappears.
   d. Increase the louver position an additional 1/16".
10. Turn off burner and relight to confirm everything is working properly (Pump pressure = 280-300 psi, low fire nozzle pressure = 80-90 psi, system does not blow black/white smoke).

9


a



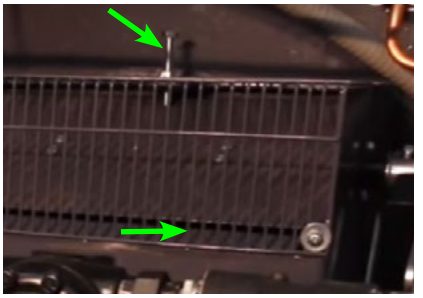
i



b

c

d



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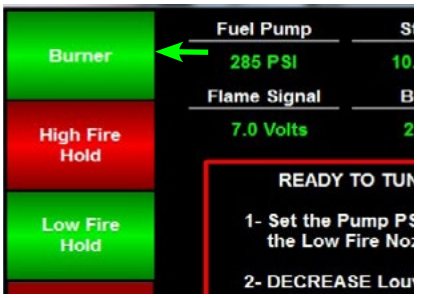


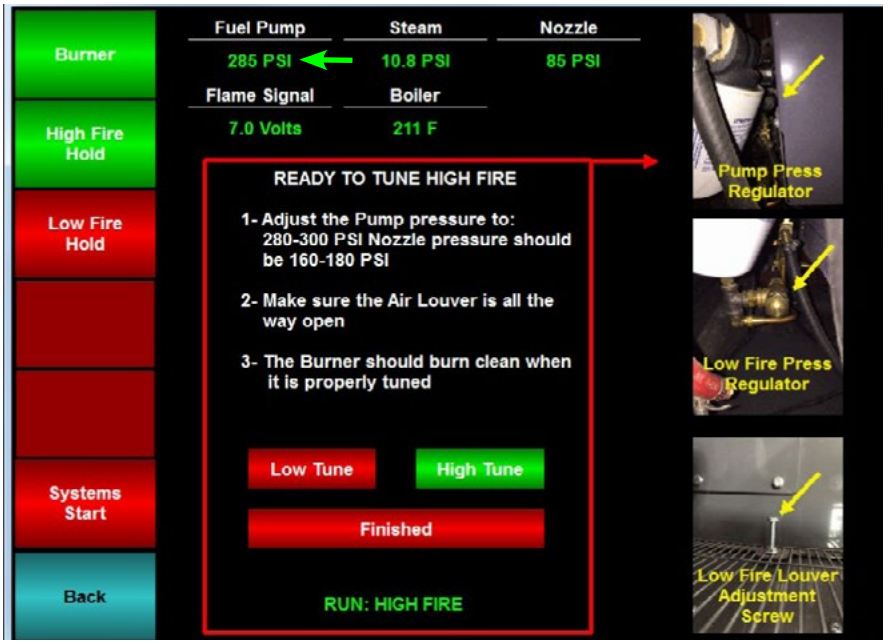
## Test 116: Tune the burner (Page 3 of 3)

11. Press “High Tune” and wait (Boiler water needs to reach 180° F before entering high fire).
12. Once the boiler water reaches 180° F:
    a. Adjust the fuel pump pressure to 280-300 psi.
    b. Make sure the air louver is 100% open.
    c. The burner should burn clean when properly tuned (no white/black smoke).
13. Press “Finished”.

Note: Nozzle pressure should automatically scale to 160-190 psi during high fire.

11


12

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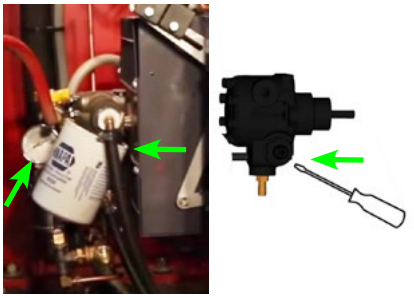

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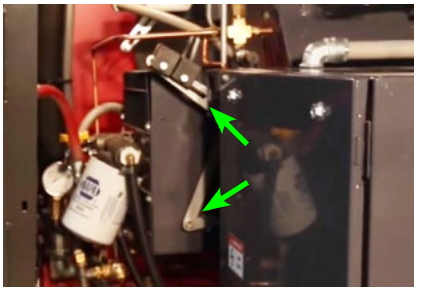
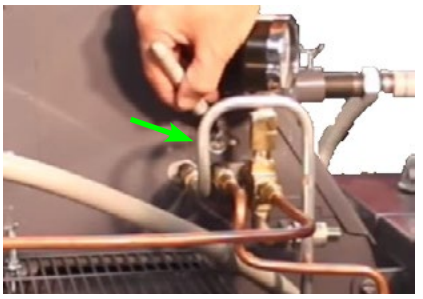


c

## Test 117: Remove the burner gun assembly

1. Mark the burner gun assembly depth.
2. Loosen sight tube locking bolt; remove the flame detector, cover bolts, nozzle pressure sensor M12 plug, fuel lines and propane line (2014 only).
3. Lift up then out to remove the cover.
4. Remove the fuel line pass-through plate and bolt.
5. Disconnect the ignition electrode wire (two wires and electrodes on 2010-2013 machines).
6. Plug the fuel lines and remove the gun assembly.
7. Drain the excess fuel into a bucket.

1



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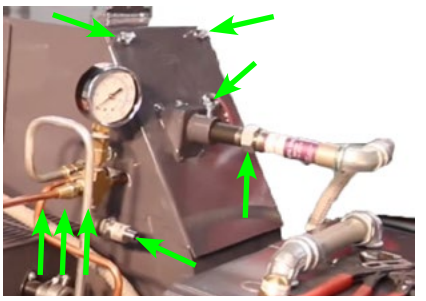

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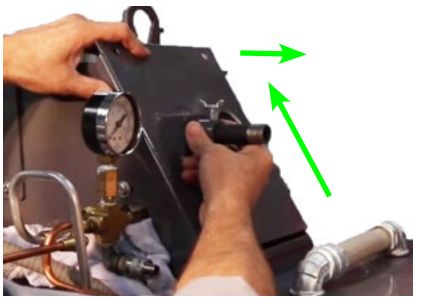

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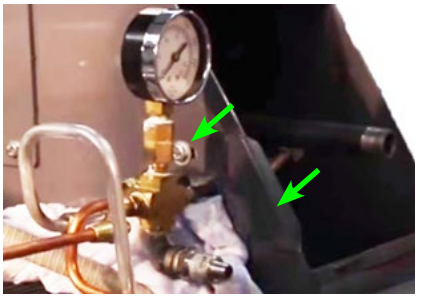

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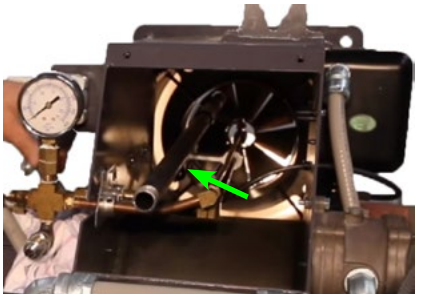

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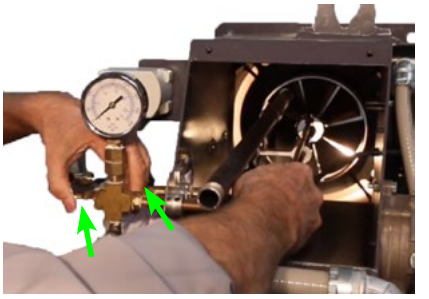
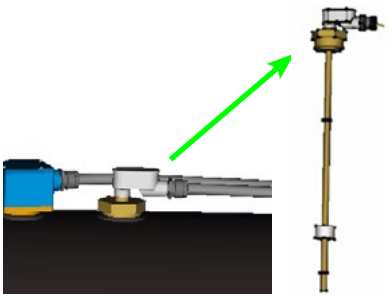


7

## Test 118: Update to new boiler water level sensor (Page 1 of 2) Part # 10344

1. Remove the old boiler water level sensor.
2. Install the new boiler water level sensor using the adapter flange, gasket and bolts.
3. Connect the Red wire to the Red wire and the Black wire to the Black wire. Put a wire nut cap on the Yellow wire.
4. How to release wires from spring type terminal strips (use in steps 6, 7, 9, 10).
5. In Panel 2, locate the first blue terminal strip section on TS1.
6. (2010-2013 DewPoint machines) release the Red and Black wires shown.
7. (2014 DewPoint machines) release the Red and Black wires shown.
8. In Panel 2, locate the first white terminal strip section on TS1.

1



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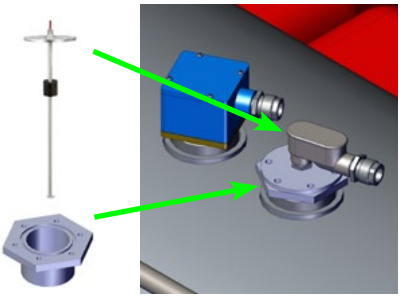

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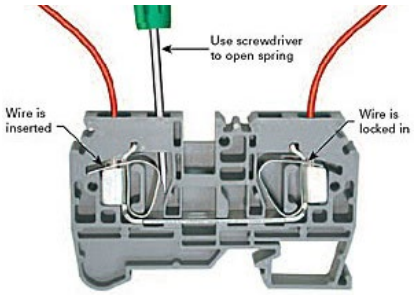


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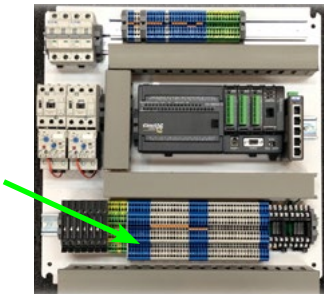

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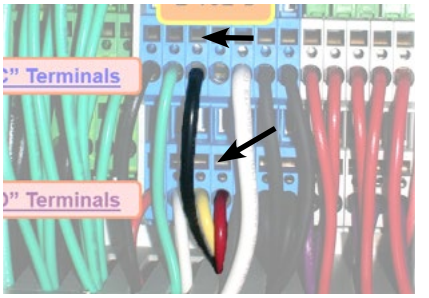


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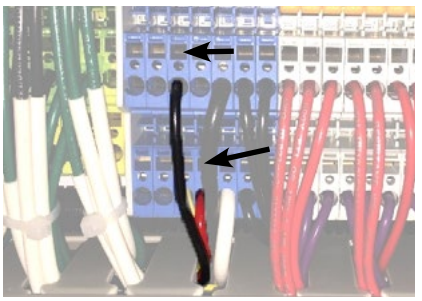

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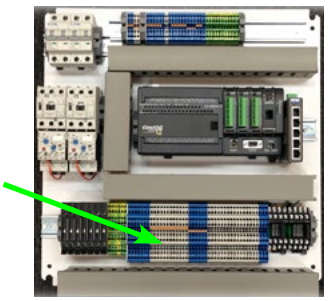
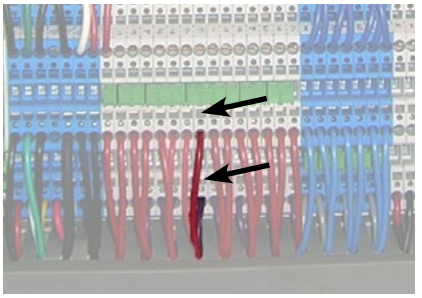


## Test 118: Update to new boiler water level sensor (Page 2 of 2) Part # 10344

9. (2010-2013 DewPoint machines) Release the 8th Purple and Red wires and tuck them into the panduit cable hider (they will no longer be used).
10. (2014 DewPoint machines) Release the 8th Purple and Red wires and tuck them into the panduit cable hider (they will no longer be used).
11. (2010-2013 DewPoint machines) Put the Red wire from step 6 into the top open hole created in step 9; Also, put the Black wire from step 6 into the lower open hole created in step 9.
12. (2014 DewPoint machines) Put the Red wire from step 7 into the top open hole created in step 10; Also, put the Black wire from step 6 into the lower open hole created in step 9.
13. Remove the boiler water level sensor signal conditioner on panel 3.

9



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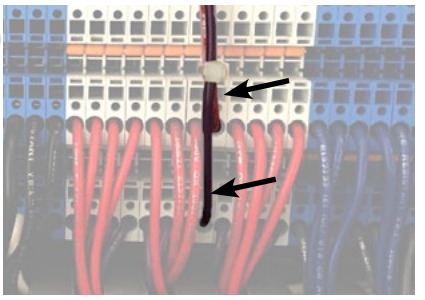

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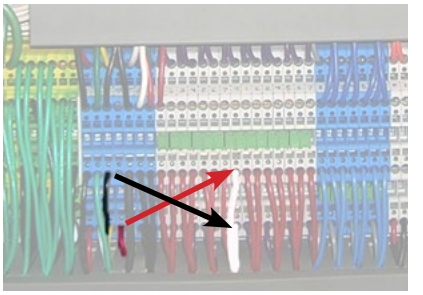

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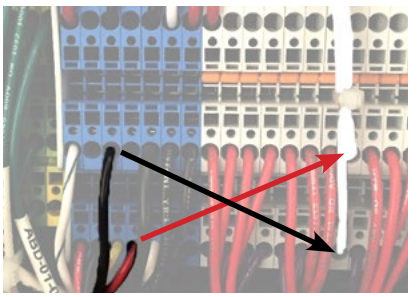

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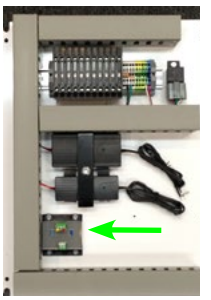
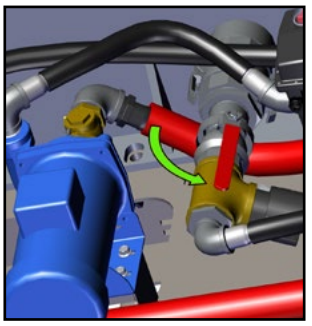


## Test 119: Fire Tube Cleaning (Page 1)

Tools recommended: Safety goggles, dust mask, shop vac, paint suit, 1.5” flue tube brush (Part # 10178) attached to a 7’ rod, socket set...

1. Drain the boiler: open the main boiler drain valve.
2. Open blowdown valve and the water purge valve to drain additional water (Menu > Operations > Manual Mode)(Turn off screen when done).
3. Close propane valve, disconnect propane hose, remove regulator from the hose and pull the hose through the rear shield.
4. Remove the rear shield.
5. Remove the blowdown hose and the water purge hose.
6. Remove the left and right heat shields.
7. Remove the rear flue box cover to expose the upper tubes.
8. Disconnect the rear door temperature sensor wire harness.

1


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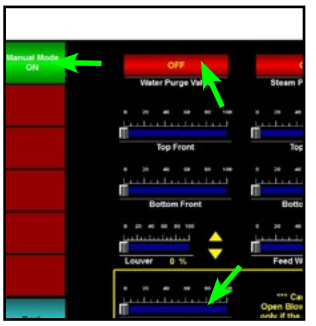


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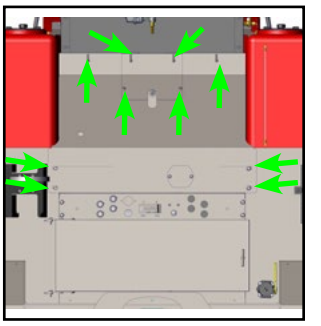

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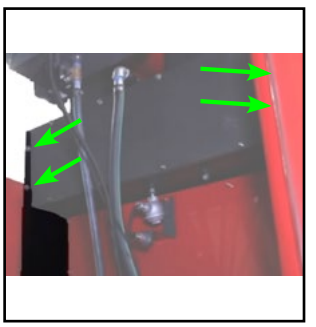

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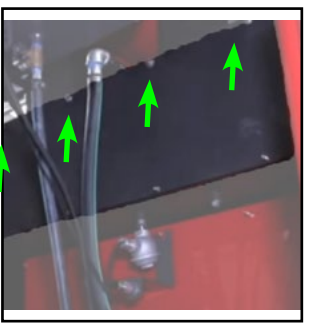

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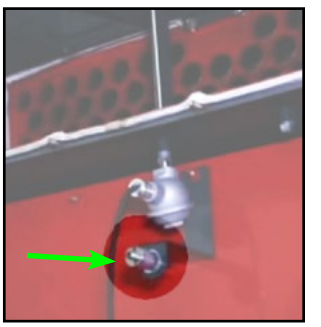
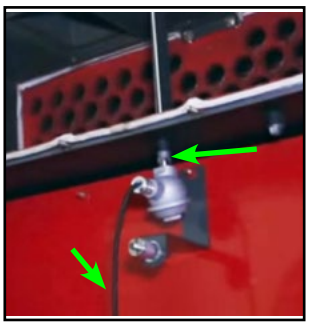


## Test 119: Fire Tube Cleaning (Page 2)

9. Disconnect the flue temp sensor wire harness and remove the flue temp sensor (use the nut, not the head).
10. Remove the rear door cover nuts (and door temp sensor and bracket) .
11. Remove the rear door (two person lift).
12. Remove the insulation;
    a. Make shim tools.
    b. Insert in bottom and pull out.
    c. Remove the insulation by pulling the bottom down and out, the top is held in place internally (inspect rope gaskets and insulation; replace as needed).
13. Remove all top heat diffusing rods from the top flue tubes.

9


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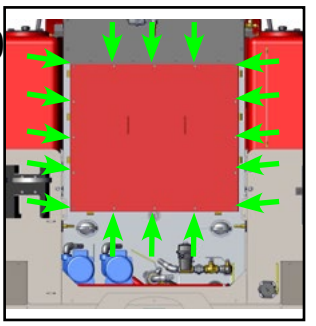

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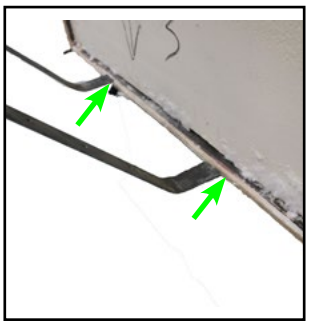
a


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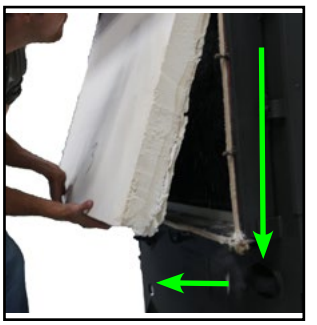

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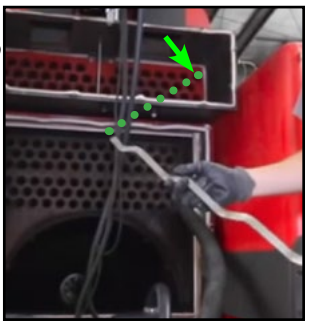
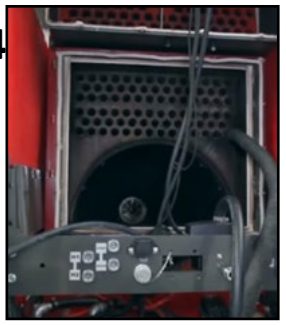


## Test 119: Fire Tube Cleaning (Page 3)

14. Prepare to brush the flue tubes by attaching the flue tube cleaning brush (Part # 10178) to a 7’ rod.
15. When brushing, be careful not to damage the front turn box insulation with the brush as it pushes through the end of the tube.
16. Brush top to bottom, brush and vacuum each flue tube one at a time (clean vacuum filter as needed).
17. Inspect tightness of the “L” bracket nuts that hold the insulation frame to the boiler (23 ft-lbs). A 9/16” crow’s foot makes this job easier.
18. Finished: Reverse steps: Reinstall the insulation, rear door, rear door temp sensor, flue temp sensor, flue box cover, heat shields, water purge hose blowdown hose, rear shield and rear access shield. Note: Reinstalling the insulation board; orient properly (flat edge) and put top in first then the bottom.
19. Re-Tune the burner (See Burner Tune).

14


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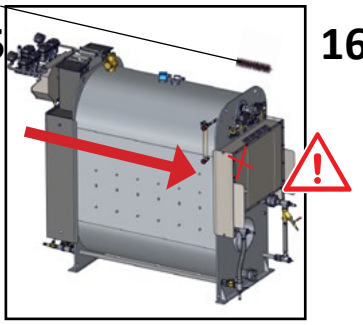

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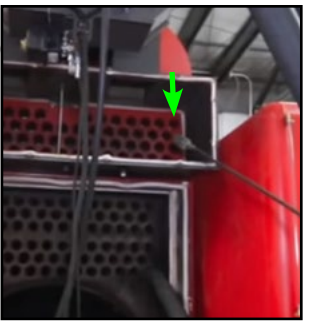

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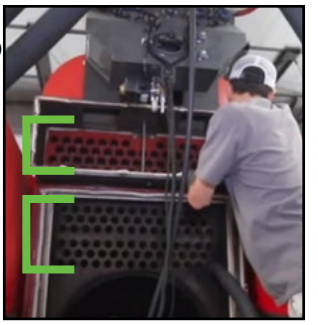

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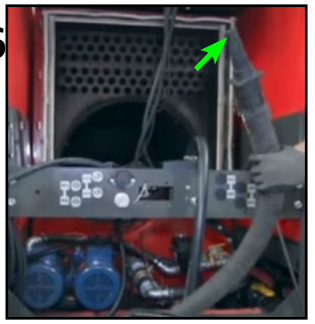

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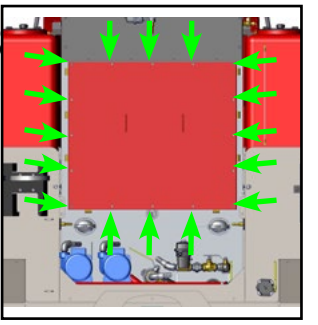
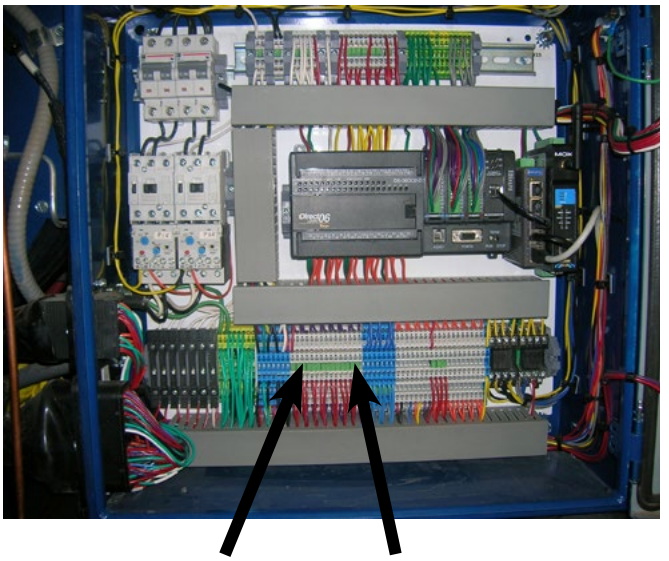


19


## Test 120: Remove panel 2 TS2 jumpers (2010-2013 machines only)

1. Locate the TS2 white terminal strips in Panel 2.
2. Count how many white terminal strips.
   a. If there are 15 white terminal strips, remove the last three green/orange jumpers.
3. Remove the two sensors in the rear steam manifold and plug the holes.
4. Remove the three green jumpers shown.

1



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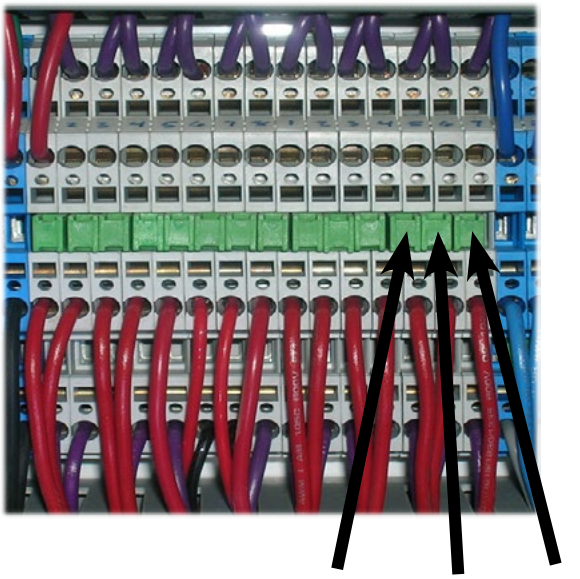

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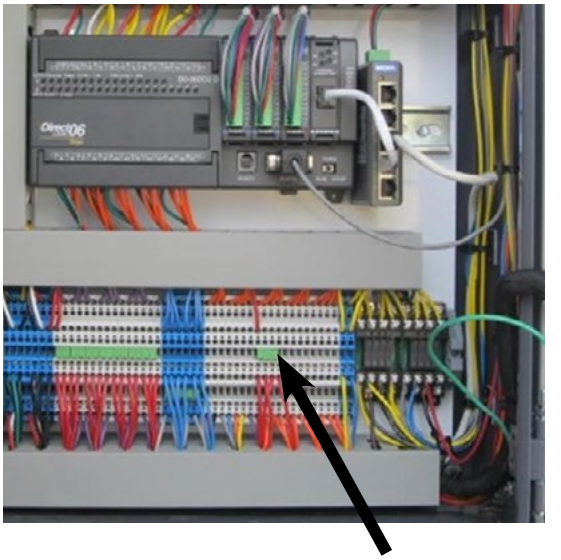

Note: This update should be done to all 2010-2013 DewPoint 6110 machines. These extra jumpers are sending 24 V power to disconnected sensors and can cause fuses to blow.

## Test 121: Generator End Troubleshooting (Page 1 of 3)

| Causes | Troubleshooting | Fixes |
|---|---|---|
| • Faulty exciter wires. | • See Test A. | • Replace generator end. |
| • Faulty motor stator. | • See Test B. | • Replace generator end. |
| • Faulty voltage regulator. | • See Test C. | • Replace voltage regulator. |
| • Faulty surge suppressor. | • See Test D. | • Replace surge suppressor or replace generator. |
| • Faulty diodes. | • See Test E. | • Replace all diodes or replace generator. |

## A: Exciter Wire Test

1. Remove the 4 screws from the top of the generator cover with an 8mm wrench.
2. Note the position of each of the 4 wires connected to the voltage regulator then disconnect.
3. Wire positions shown on voltage regulator.
4. Connect an ohm meter to wires F2(-) and F1(+). If the resistance is NOT between 15-25Ω ohms, replace the generator end.
5. If the resistance is in range, leave one lead connected and connect the other to 1 of the 4 grounding bolts. The meter should show an open. If the resistance is low (less than 10kΩ) then the exciter is shorted and the generator end will need to be replaced.

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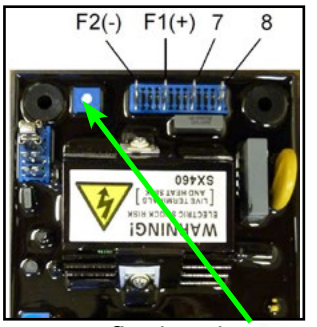
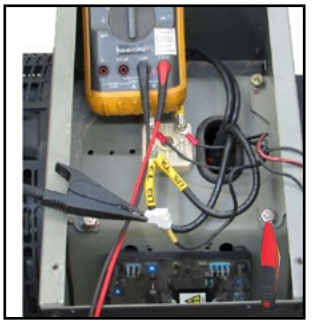



Use a flat head screwdriver to adjust voltage

4

5

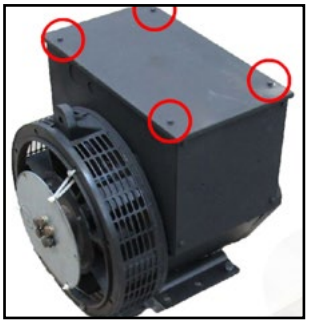


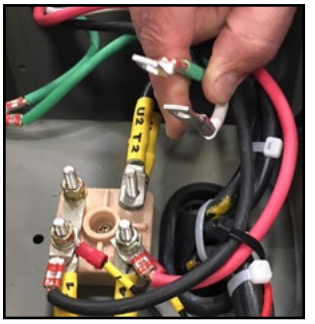
# Test 121: Generator End Troubleshooting (Page 2 of 3)

## B: Main Stator Test

1. Turn off the main circuit breaker.
2. Remove the 4 screws from the top of the generator cover with an 8mm wrench.
3. Remove the white and green wires from T2.
4. Connect one lead to a grounding bolt and the other to one of the output terminals. Check resistance for all output terminals. The meter should show an open or extremely high resistance (more than 100kΩ or OL). This means the main stator winding is good. If there appears to be a short between any one of the output terminals and the generator housing, the main stator has shorted and the generator end needs to be replaced.

1 

2 

3 


4 

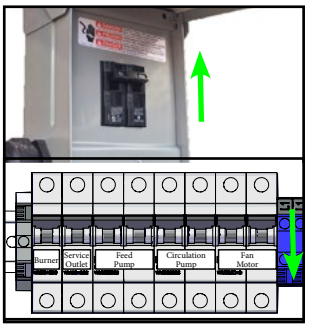
## C: Voltage Regulator Test

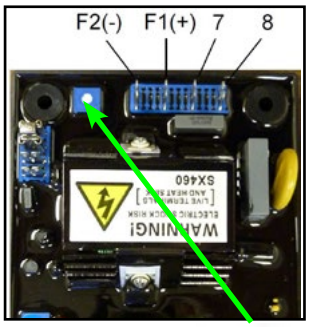
1. Disconnect the F(+) wire and the F(-) wire from the voltage regulator and connect them to a separate 12 V or 24 V battery.
2. Connect an AC volt meter to output terminal T1/L1 and T4/L2.
3. Leave the main circuit breaker on but turn off the rest of the breakers in panel 1.
4. Turn on the engine, verify RPM is ±4% of 1800. Check the output voltage. If output voltage is ≥215 V, the generator end is good and the voltage regulator should be replaced.

*Voltage regulator can be model 440 or 460

1 

2 


3 

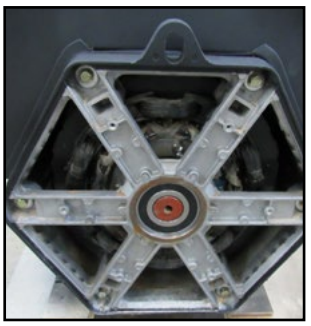

4 


Use a flat head screwdriver to adjust voltage

# Test 121: Generator End Troubleshooting (Page 3 of 3)

## D: Surge Suppressor Test

1. Use an 8mm wrench/socket to remove the 6 bolts and the back cover of the generator.
2. Inspect the surge suppressor. If burnt, cracked, or otherwise damaged replace it and all 6 diodes.
3. If surge suppressor is in good condition, use an 8mm socket to remove the bolt from one side only. Gently pry suppressor until it is no longer contacting the metal surface from the non-fastened side.
4. Use a multimeter to check the resistance across the suppressor. It should either be open OL or show a very high resistance (1MΩ or more). If resistance is low or there appears to be a short, the suppressor and all diodes should be replaced. If any of the diodes test bad (Test E) then the suppressor should be replaced as well.

1 
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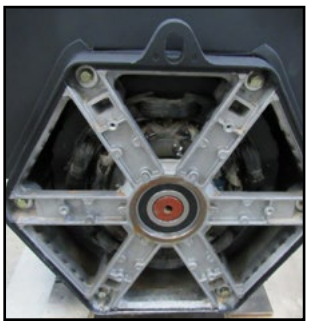
## E: Diodes Test

1. Use an 8mm wrench/socket to remove the 6 bolts to remove the back cover of the generator.
2. Locate the diodes. There are a total of six. There are three with cathode tips sharing a halfmoon metal bracket on one side and three with anode tips sharing a metal bracket on the other side.
3. Pick a side and remove the screws, nuts, and washers from each diode then gently pull away the wires from the diodes.
4. Use a multimeter with a diode function to test each diode. Place one meter lead on the shared metal bracket, then place the other lead on the tip of one diode. You should either see an open OL or a small voltage of about 0.5VDC. Repeat for all three diodes – the result should be same for all three. Now reverse the leads so the one on the metal bracket is used to test the diode tips and the other is now on the bracket. Retest each diode. The result should be the opposite of the previous test – if all diodes showed an open previously, then all diodes should show about 0.5VDC now. Repeat for the other side.

* If any diode has a short or has an open in both directions, then all the diodes and the surge suppressor should be replaced.

1 
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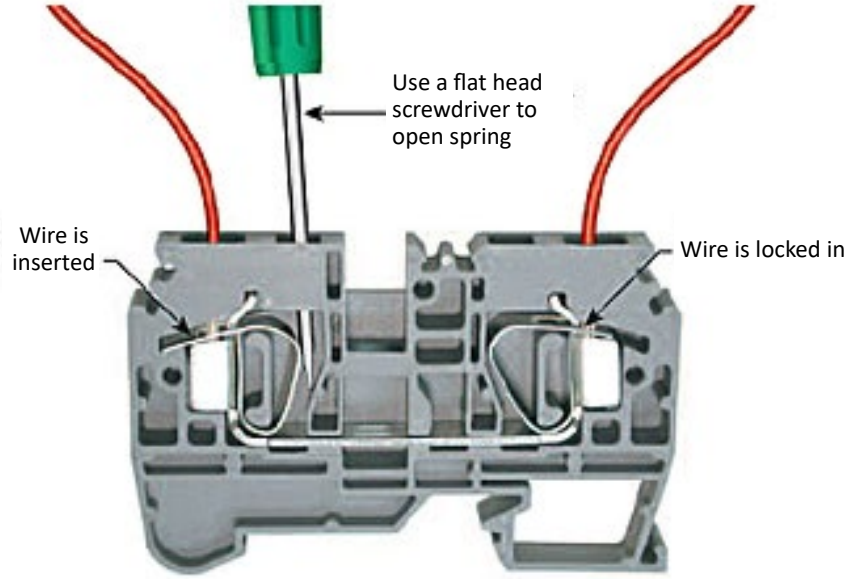
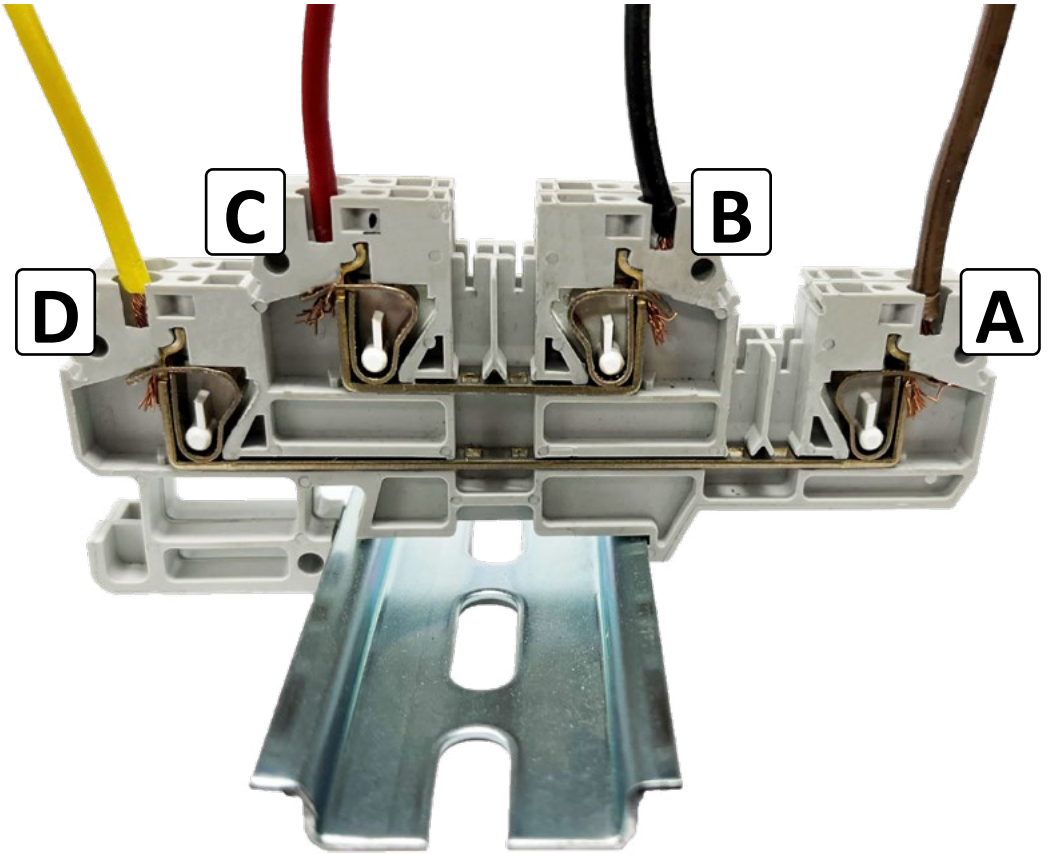
## Test 122: Release Wires From Terminal Block



## Test 123: Maxed Out Sensor Readings

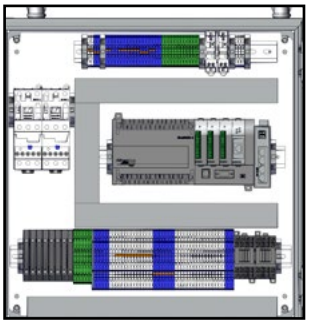
## Test 123.A: Faulty Sensor / Faulty Wire Harness Test

1. Open Panel 2 (Touch screen should be off).
2. Find the analog input terminal strip shown in the picture below.
3. Make sure the multimeter is set to measure Ω ohms/continuity.
4. Place one lead on the 24 V wire and the other lead on each of the 4-20mA wires one at a time; there should not be continuity (you should see an "OL" Open Loop or very high ohms).
5. If there is a 4-20mA wire that has continuity with the 24 V wire, unplug the respective sensor.
6. Test the wire again with the sensor unplugged. If there is no continuity, this indicates a faulty sensor; If there is still continuity, this indicates a faulty wire harness.

*If replacing the faulty sensor does not fix the problem, go to Test 113.

**If replacing the faulty sensor does not fix the problem and you have a good input card (Test 113), replace the PLC.

1



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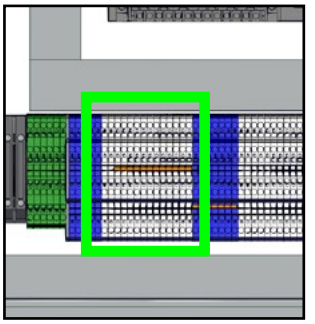

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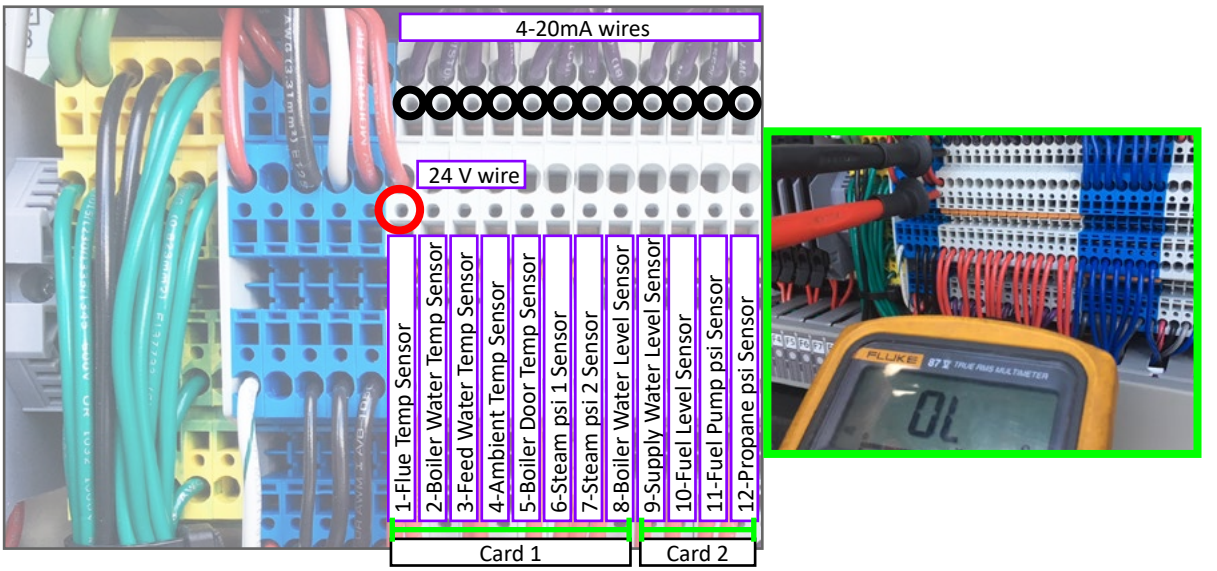


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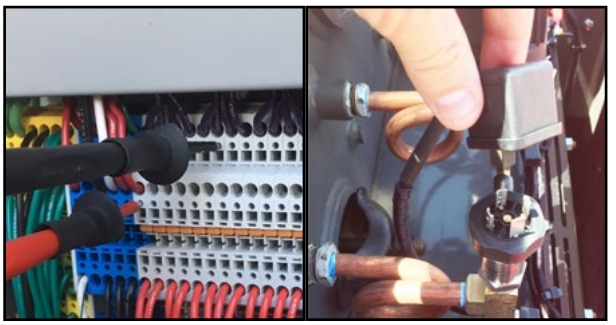

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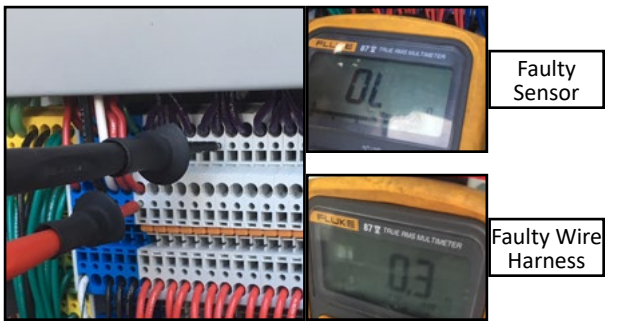


## Test 123.B: Faulty Sensor Test (No Multimeter Required)

1. Go to Menu > Diagnostics > Inputs Outputs > Analog Inputs.
2. Watch touch screen as you unplug the affected sensors one by one to see if there is a change (A change in the sensor reading may take up to 30 seconds).
3. Find out which sensor causes the other sensors to max out.
4. Replace the faulty sensor before it ruins the input card or PLC .

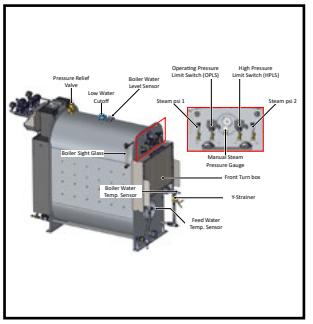
*If you cannot find a faulty sensor, go to Test 123: A.

**If replacing the faulty sensor does not fix the problem, go to Test 113.

***If replacing the faulty sensor does not fix the problem and you have a good input card (Test 113), replace the PLC.

1


2

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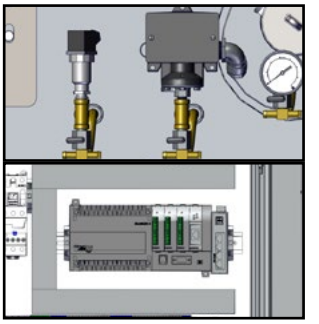

## Test 124: All Sensors Offline / Fuse Keeps Blowing

## Test 124.A: Faulty Wire Harness Test (Multimeter Required)

1. Open Panel 2 (Touch screen should be off).
2. Find the Analog Input terminal strip shown in the picture below.
3. Make sure the multimeter is set to measure Ω ohms/continuity.
4. Place one lead in a ground (GND) block and the other lead on each of the 24 V wires one at a time. Use a small flat head screwdriver to remove each wire (Test 122) one at a time. There should not be continuity (you should see an "OL" Open Loop).
5. If there is a 24 V wire that has continuity with a ground (GND) wire, unplug the respective sensor.
6. Test the wire again with the sensor unplugged. If there is no continuity, this indicates a faulty sensor. If there is still continuity, this indicates a faulty wire harness.

*If no faulty sensors or faulty wiring is found, replace the 24 V regulator (Part# 10302).

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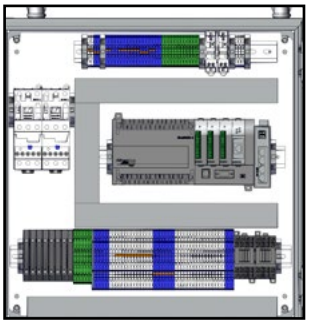
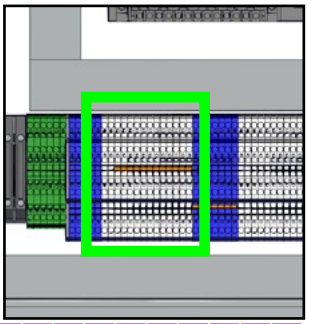
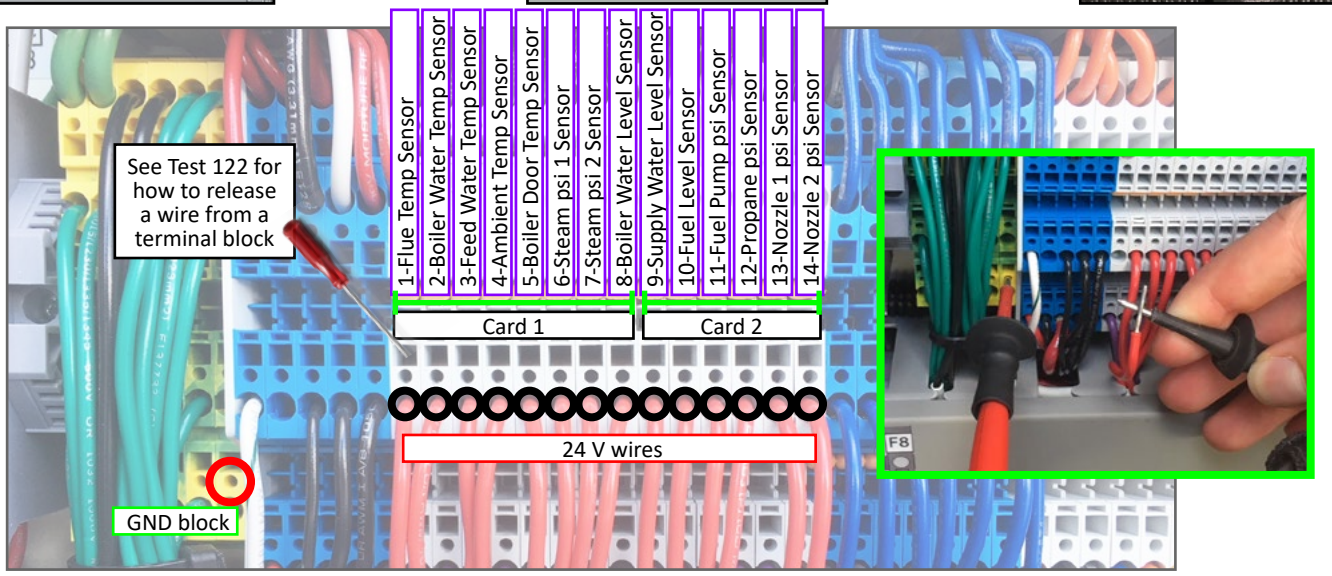


2



3


4

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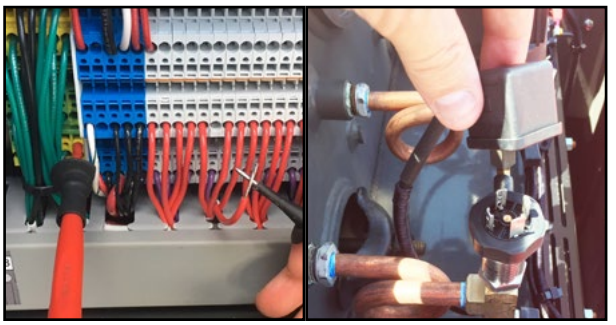

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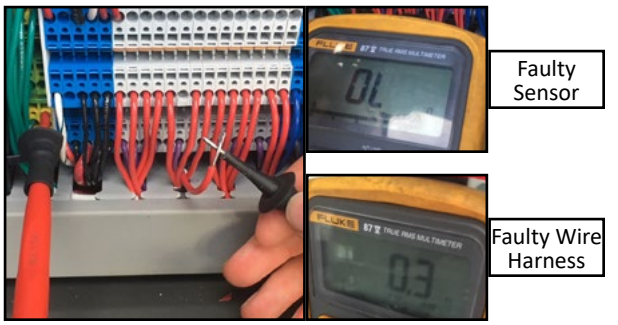
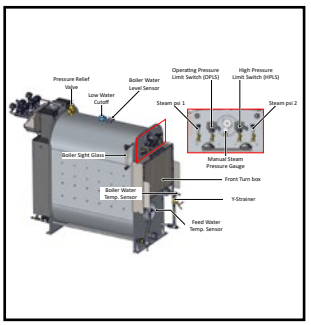


## Test 124.B: Faulty Sensor Test (No Multimeter Required)

1. Unplug all sensors.
2. Replace the blown fuse (Panel 3) (if the fuse blows immediately when you turn on the touch screen, go to Test 19.A).
3. Watch touch screen as you plug the sensors in one by one: Menu > Diagnostics > Inputs Outputs > Analog Inputs.
4. Find out which sensor causes a blown fuse.
5. Replace the faulty sensor.

*If you cannot find a faulty sensor, go to Test 19.A.

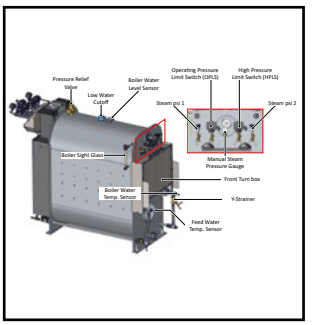
1




2

3

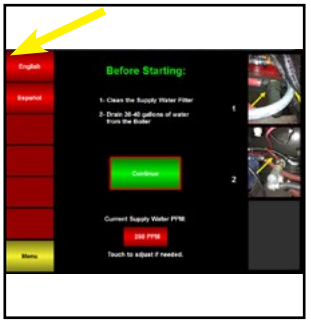

4



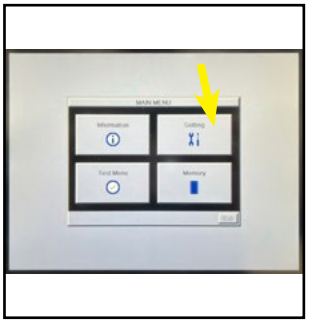
## Test 125: Touch Screen Calibration (Updated Touch Screens)

1. With the touch screen on, press and hold the top left corner of the screen for 5 seconds.
2. Press OK
3. Press Settings
4. Press Adjust Touch Panel
5. Press Start Calibration
6. Complete the calibration
7. Press Menu
8. Press Exit

*Calibration can be done on any page.

1



2


3


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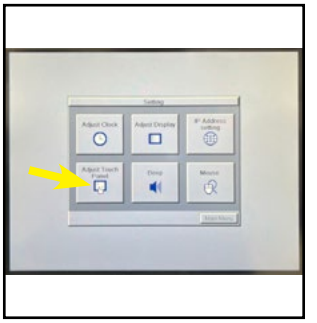
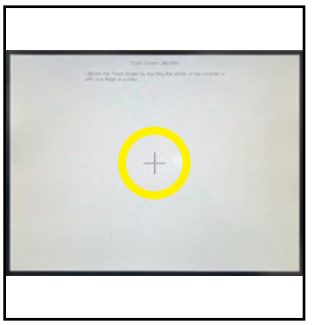
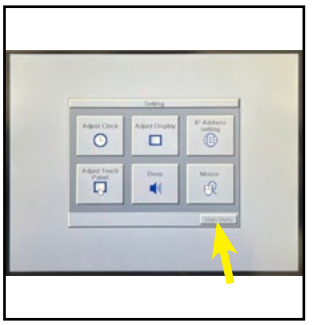


5


6


7


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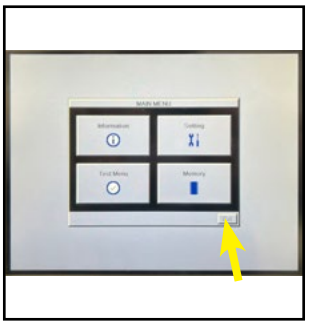
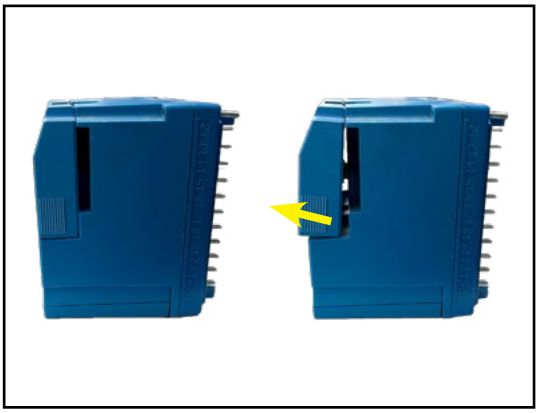


## Test 126: Setting Modbus Address

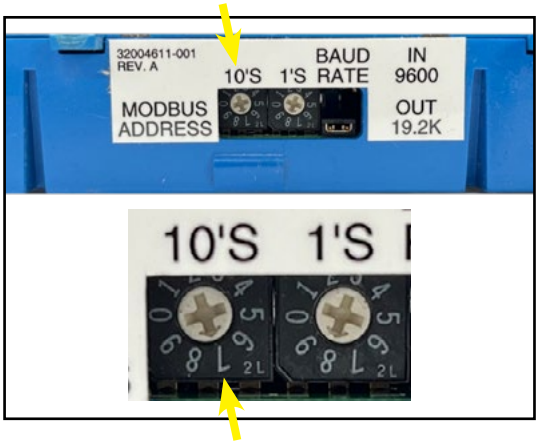
1. Unplug the modbus cable and remove any tape holding the modbus card in place.
2. Remove the modbus card pulling out from the bottom.
3. On the bottom of the modbus card set the 10's pot to 7.
4. Set the 1's pot to 8.

1


2



3




4

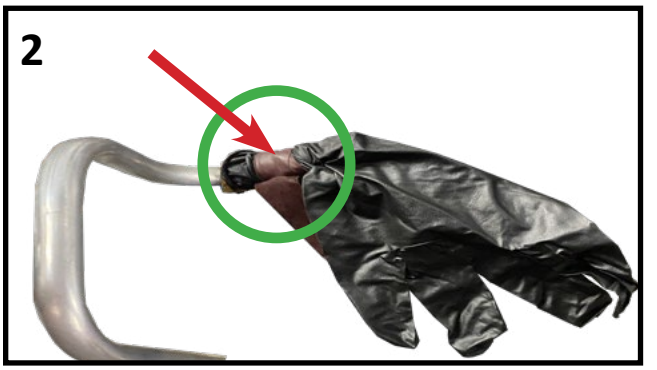
## Test 127: Propane Flow Test (The Daryl Test)

1. Remove propane hose from ignition assembly.
2. Tape a vinyl glove or something similar to the end of the hose.
3. Start the Machine and wait for pilot ignition cycle.
4. If glove inflates propane flow is not the cause of the fault.

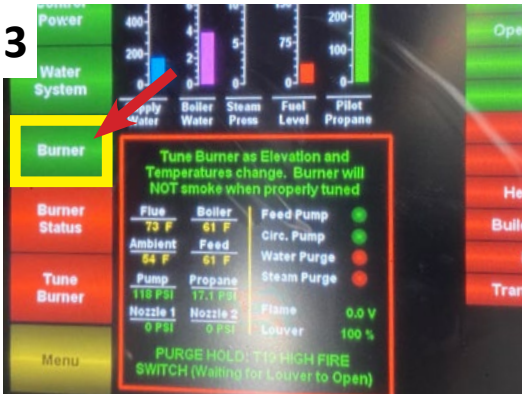
If glove does not inflate the propane flow is being restricted. (See Diagram 21)

1

2



3



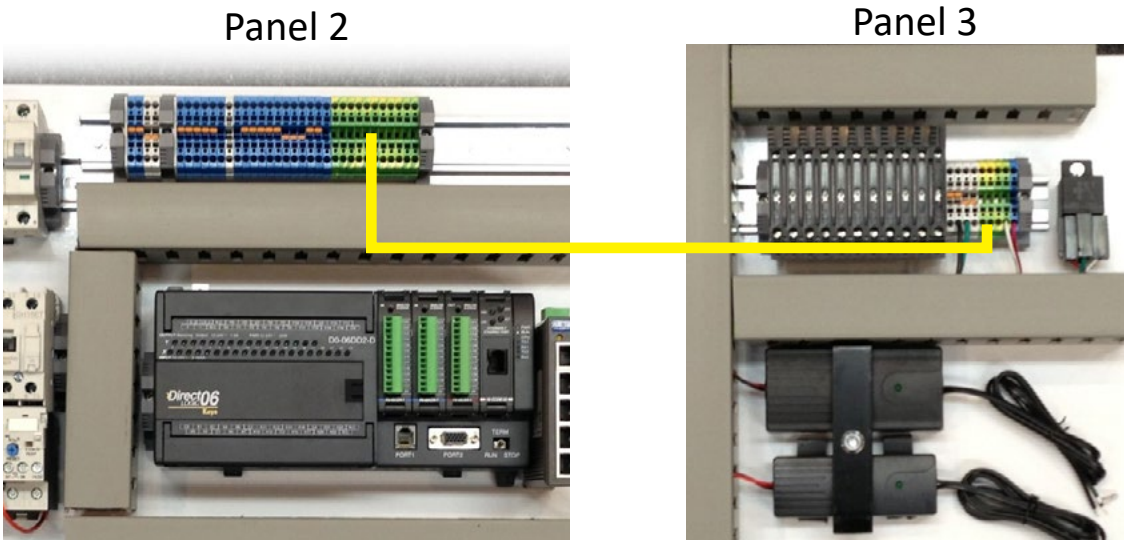

4

# Test 128: Grounding Issues Procedures

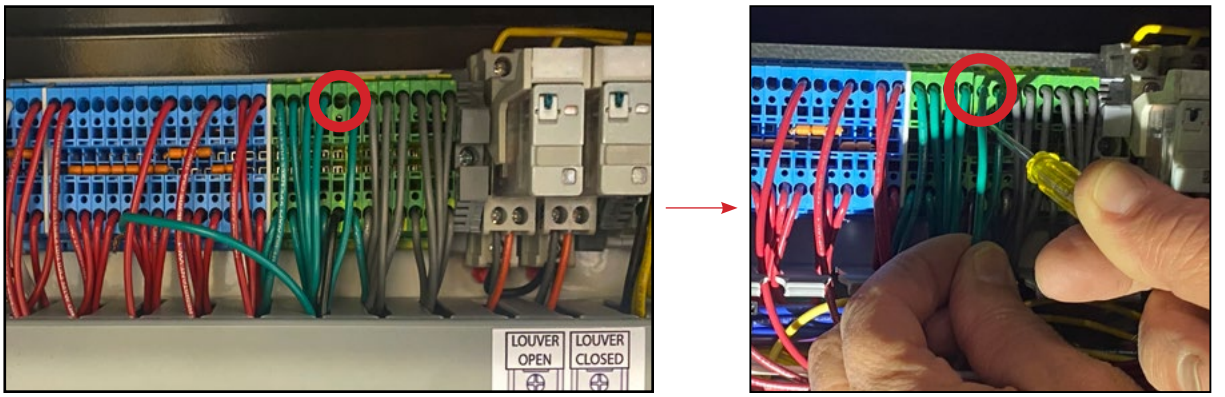
## Test 128.A: Grounding Panel 2 and 3 Together

1. Cut a 16-18 AWG wire long enough to run from Panel 2 grounding block to Panel 3 grounding block.
2. Insert wire into vacant slot on Panel 2 grounding block.
3. Insert other end of wire into vacant slot on Panel 3 grounding block.

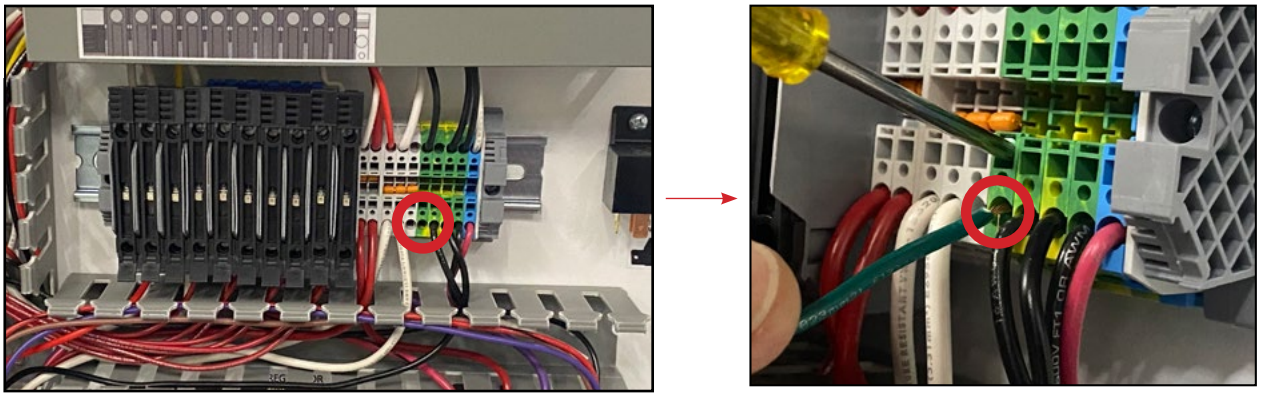
1




2

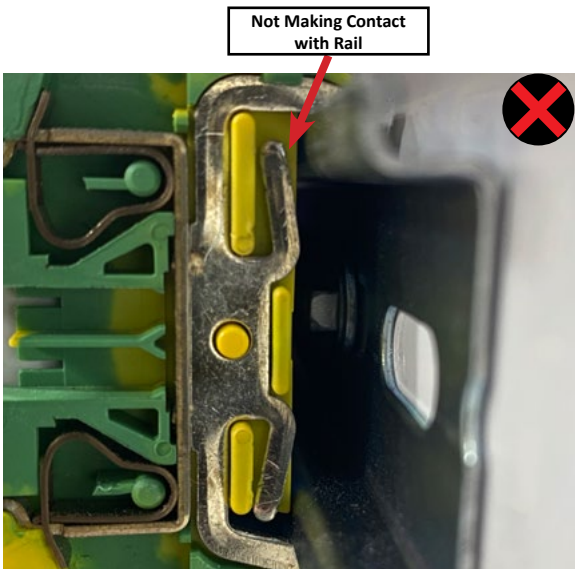


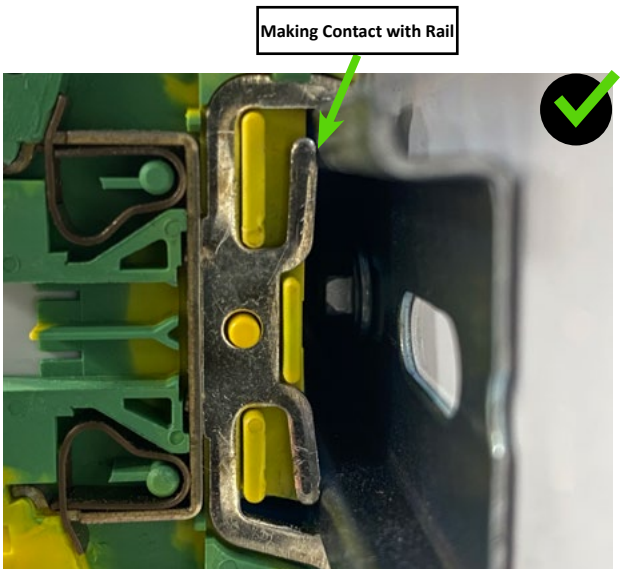

3



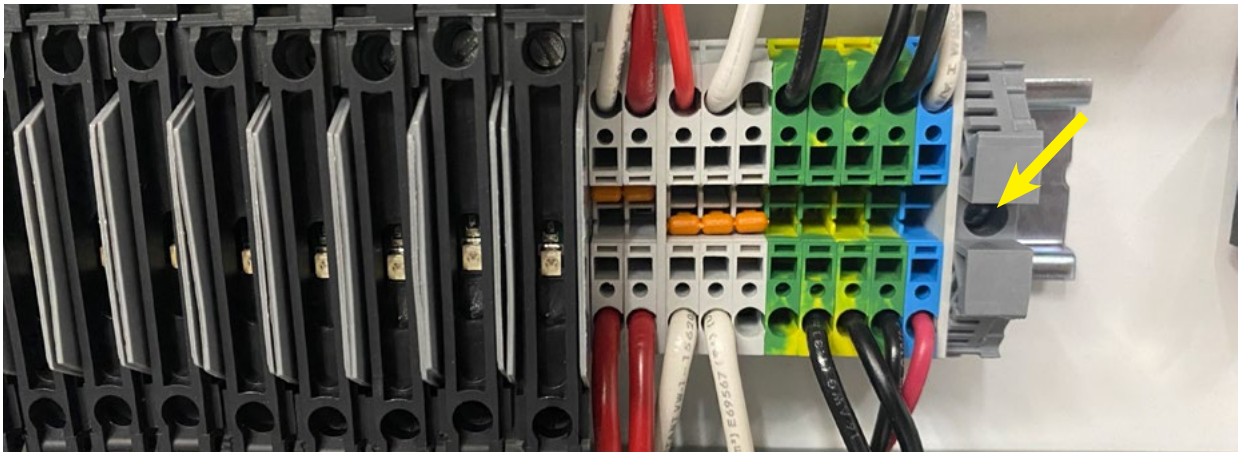
## Test 128.B: Flaring Grounding Terminal Block Ears

1. Remove rail guard and disconnect wires and slide desired terminal off of rail. ( Grounding terminal blocks are green and yellow.)
2. Using a flathead screwdriver flare rail ears up slightly to increase continuity.

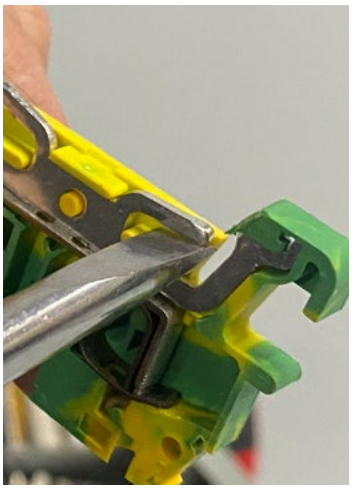


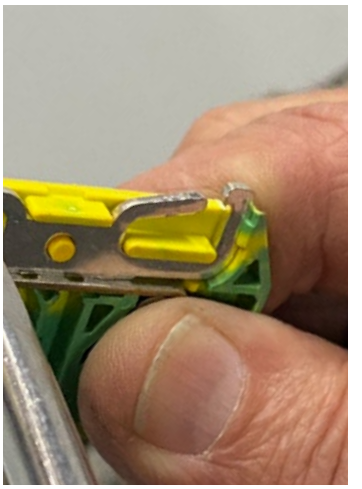




1



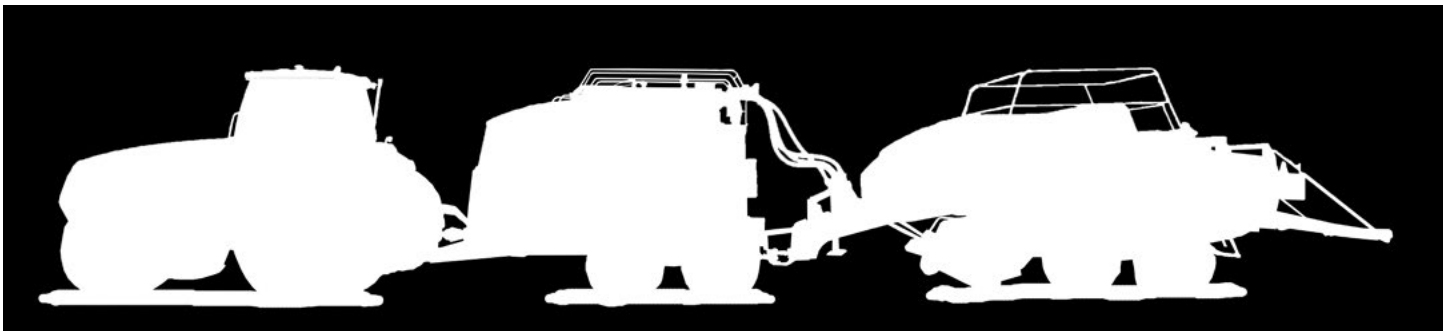
2





## Maintenance





# WINTERIZE



It is very important that you follow these winterization procedures to prevent freeze damage and corrosion to your DewPoint machine.

SAFETY PRECAUTIONS

- Do not climb on machine to perform winterization procedures.
- Always use a ladder or other appropriate means to reach upper components which require attention for winterization.
- Allow boiler to cool to 120° F before draining or removing plugs.

| Days of Storage | Storage Recommendations |
|---|---|
| 0-3 | None |
| 3-30 | Short Term Storage (Wet Layup) |
| >30 | Winterize |

Tools Needed:

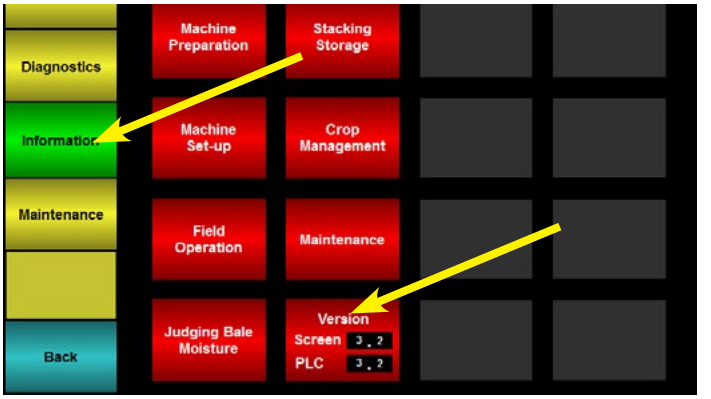
- Phillips Screwdriver
- Crescent Wrench
- Shop Vac / 2 large pipe wrenches (depending on method)
- 9/16” End Wrench
- Air Compressor
- Hammer

Failure to winterize will hurt your wallet

1

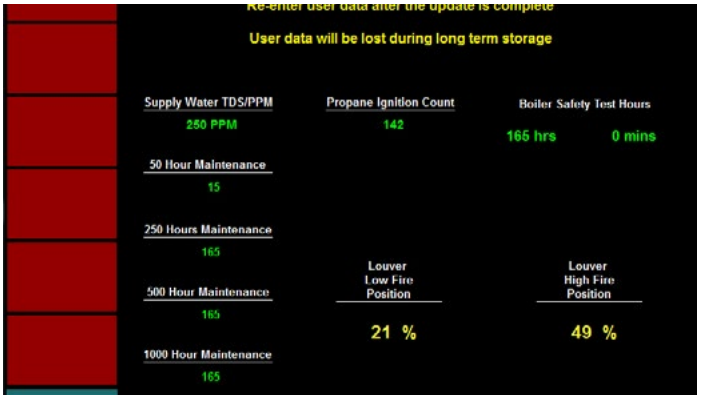

Go to Menu.

2



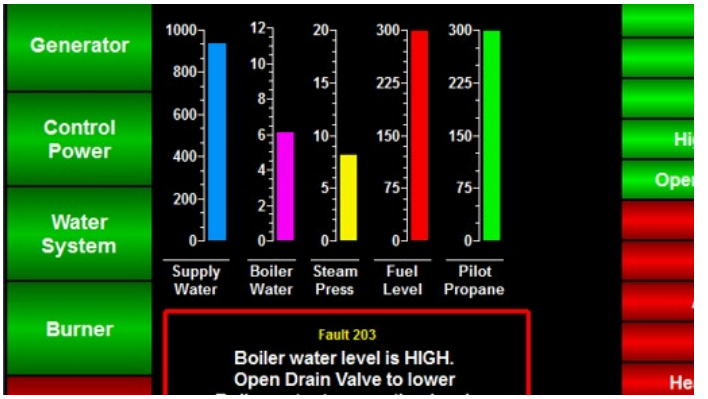

From the Menu: Go to Information > Version.

3



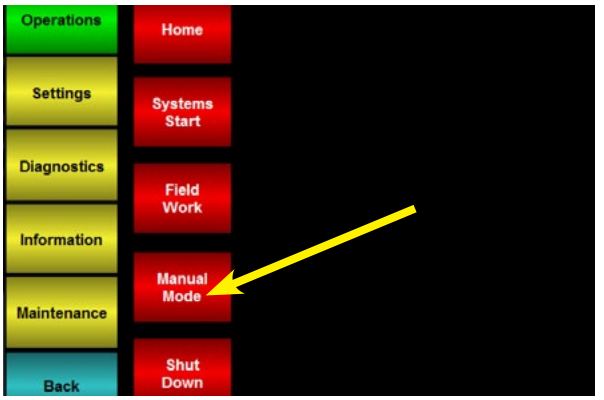

Write down all user settings as this data may be lost during long term storage. Re-input the numbers during de-winterization.

4



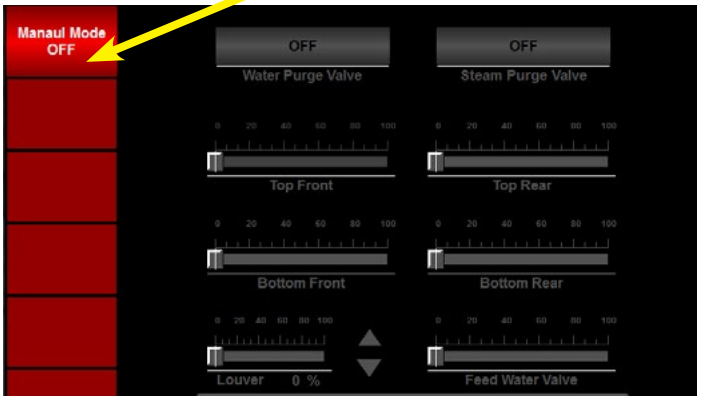

To speed up the drying process, start the boiler and heat up the water to around 120° F.

5



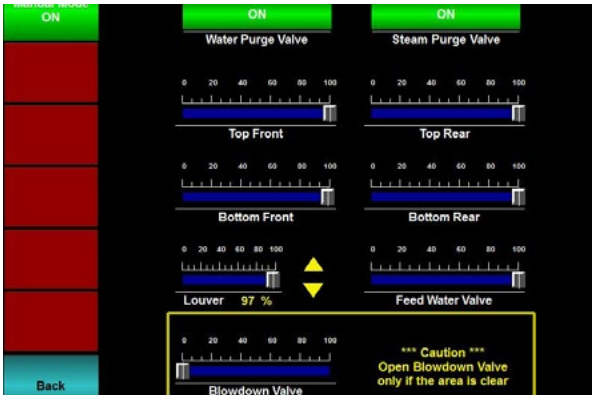

From the Menu: Go to Operations > Manual Mode.

6




Activate “Manual Mode”.

7

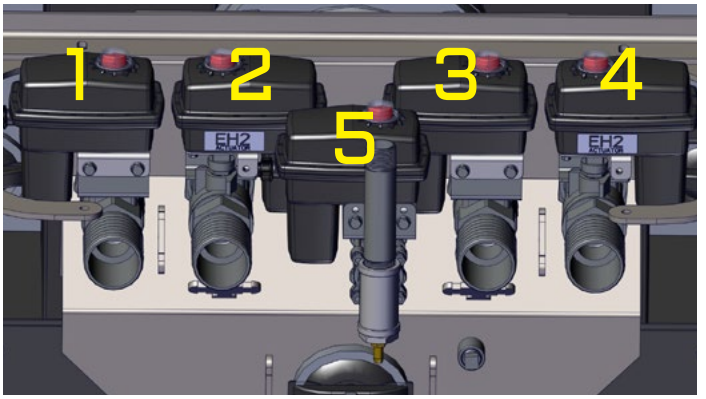



Open all valves by sliding the grey slide bar all the way to the right and by turning them on (if needed).

8

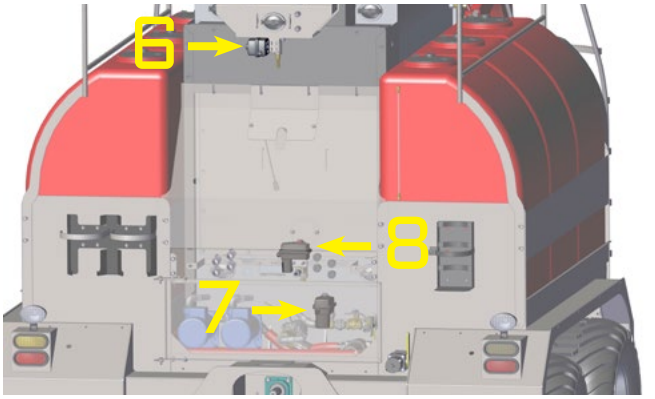

When boiler is completely depressurized, visually check that all valves are open.

9




1-4: Steam Valves.
5: Steam Purge Valve.

10




6: Water Purge Valve.
7: Feed Water Valve.
8: Blowdown Valve.

11


While still in the “Manual Mode” screen, turn off the screen with the red rocker switch.

12


Disconnect touch screen and store in safe dry place that is between 0-140° F.

13


Open the supply water fill valve to drain supply tanks *To prevent burns make sure water is below 120° F.

14

Open feed water pump inlet valve (should already be open).

15

Open main boiler drain valve and be careful to not let hot water drain on your feet.

16

After boiler has drained, disconnect boiler drain camlock and remove boiler drain assembly to allow complete drainage of the boiler.

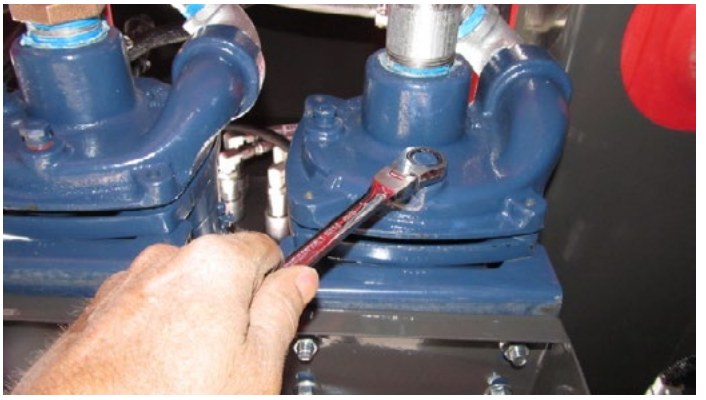
17


Unscrew and remove supply water filter housing and filter.

18

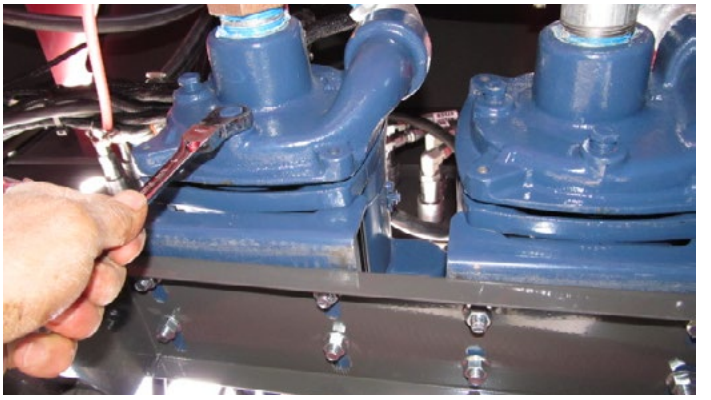
Supply water filter shown removed.

19



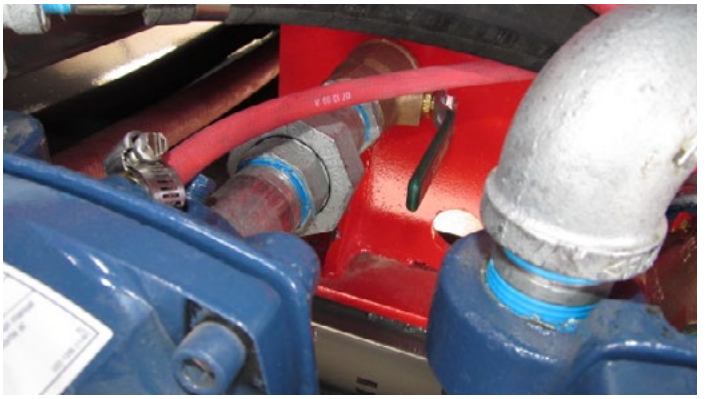
Remove circulation pump bottom drain plug and store it in the control panel box for winter.

20



Remove feed water pump bottom drain plug and store it in the control panel box for winter.

21

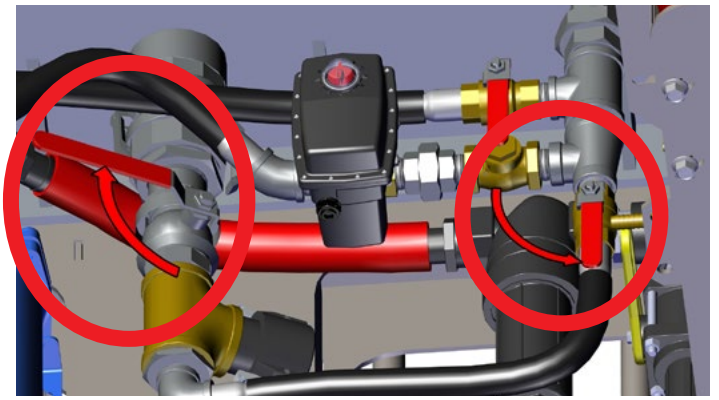


Open circulation pump inlet valve (should already be open).

22

Open circulation pump outlet valve (should already be open).

23a Shop Vac Method (a)

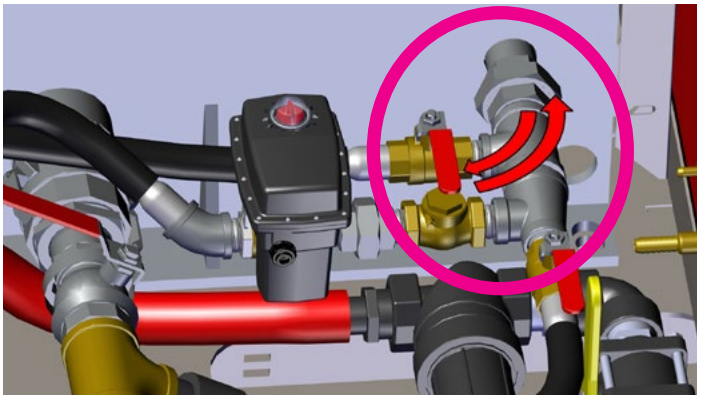


Close boiler drain valve and open feed water drain valve.

24a Shop Vac Method (a)

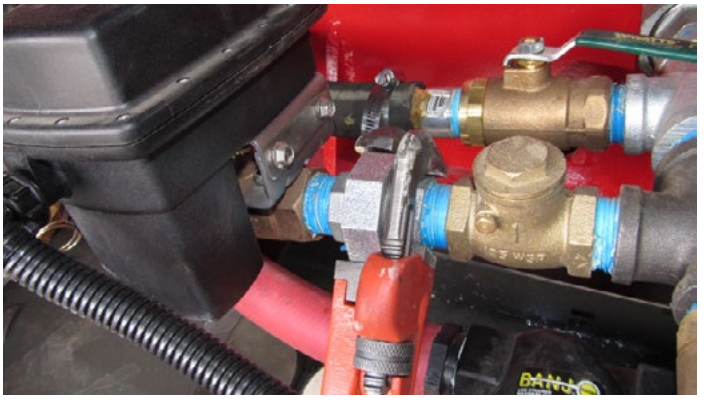
Remove the boiler drain hose and attach vacuum hose. Turn on the vacuum and allow air to be pulled in through the pump plugs, through the feed water system, and into the vacuum.

## 25a Shop Vac Method (a)



After the feed water system has dried, open and close the circulation isolation valve while vacuuming to dry out the circulation system.

## 23b Pipe Wrench Method (b)



After opening all valves, disconnect feed water induction valve pipe union.

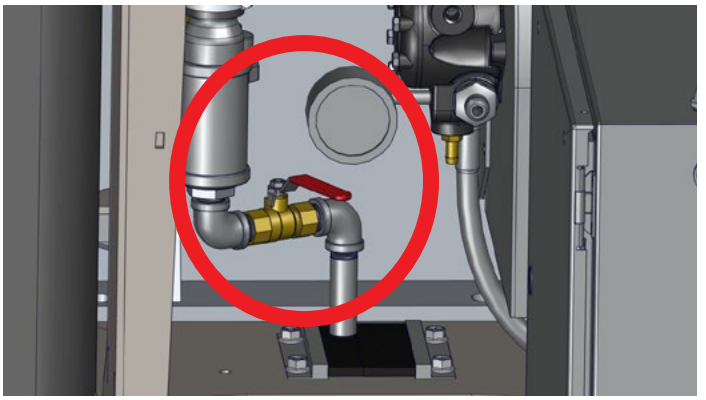
## 24b Pipe Wrench Method (b)

Position valve so water can drain completely.

## 25b Pipe Wrench Method (b)

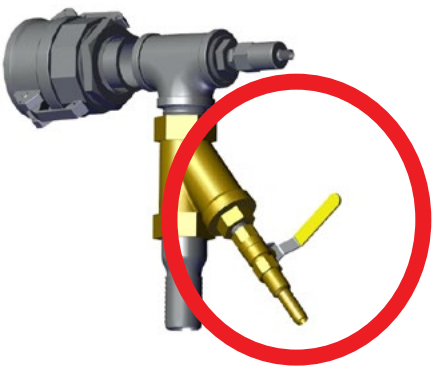
Push check valve open to drain water from back side of valve.

## 26



Open feed water system drain valve (boiler right front).

## 27

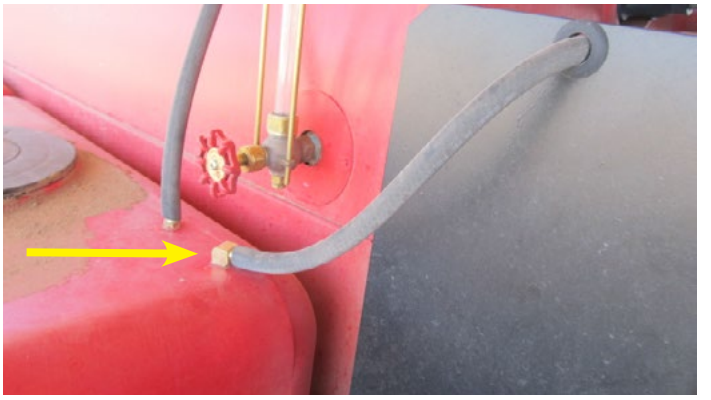


Open feed water system “Y” strainer flush valve (boiler left front).

28

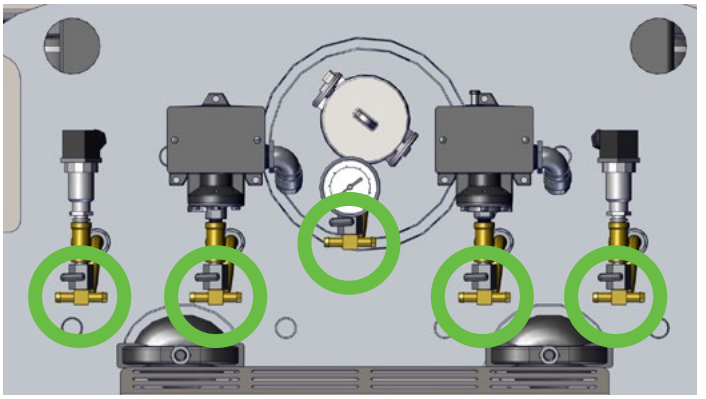
Verify that top and bottom sight glass valves are open (should already be open).

29



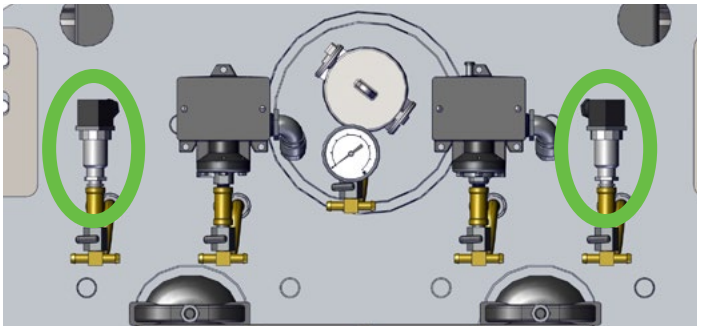
Disconnect pressure control flush hose from water tank fitting. Connect a compressed air nozzle to this hose for Step 30.

30



Open each of the 5 pigtail flush valves one at a time blowing compressed air through the hose in Step 29 each time to remove all water (valves shown closed).

31



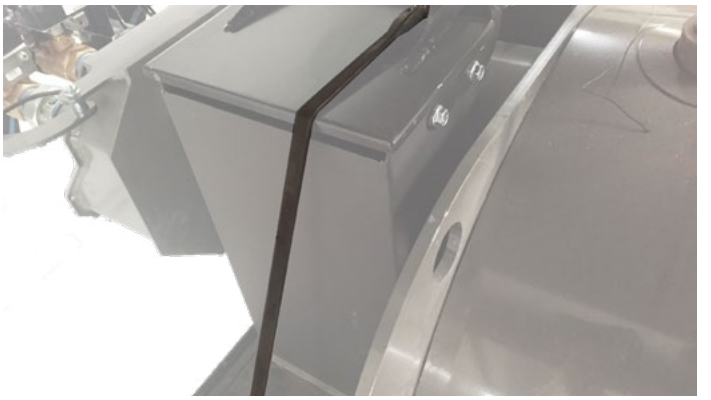
Loosen the screw on top of the pressure transducers and carefully lift off the plug from each one.
Put a piece of tape around the plug to prevent losing the gasket. Next remove the pressure transducers and store them where they won't freeze.

32

Unscrew plug lock ring and unplug the supply water level sensor (under the right front water tank).
Unscrew and remove supply water level sensor.
Store the sensor where it won't freeze.

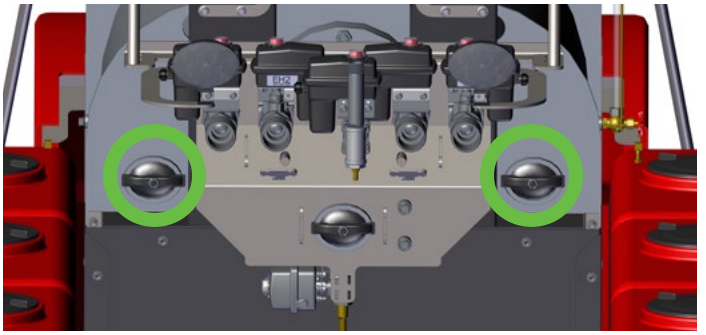
*Dry out the pressure transducers and the water level sensor with a rag or compressed air.

33



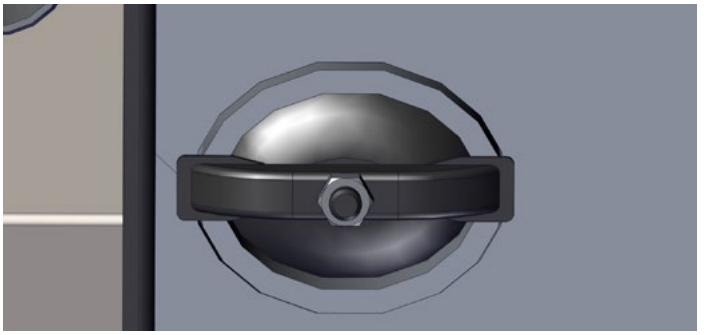
Place tie-down straps on flue exhaust caps to prevent water, birds or rodents from entering the flue.

34



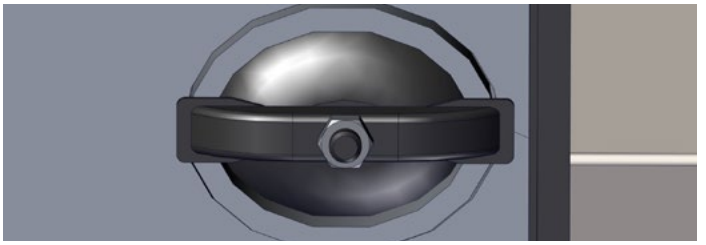
Remove the two rear hand-hole plugs to allow ventilation and drying of the boiler.
Replace hand-hole plugs after dry down to prevent rodent infestation.

35



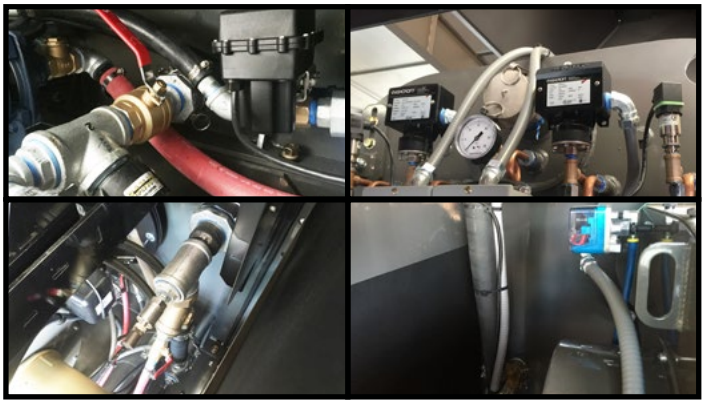
Loosen the nut but do not remove it completely. While holding the loosened clamp firmly in your hand, tap the end of the stud down with a hammer to break the plug loose.
DO NOT drop the plug into the boiler.

36



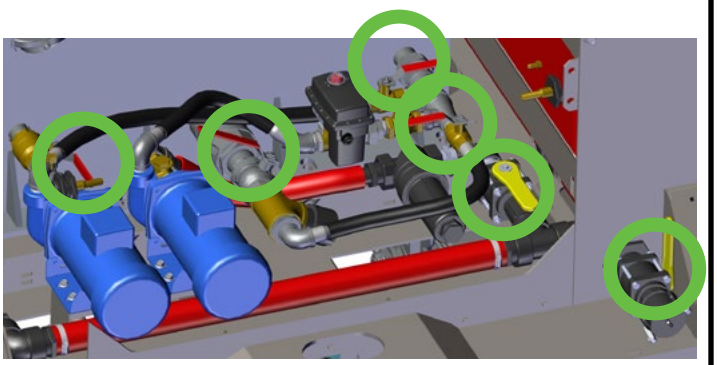
If you do not want to remove the plug completely, just slip the plug downward until the stud rests on the bottom of the hole and hand tighten the nut to keep the plug from falling into the hole.
To completely remove the plug, peel the gasket from the plug and remove the gasket. Then turn the plug and remove it.

37



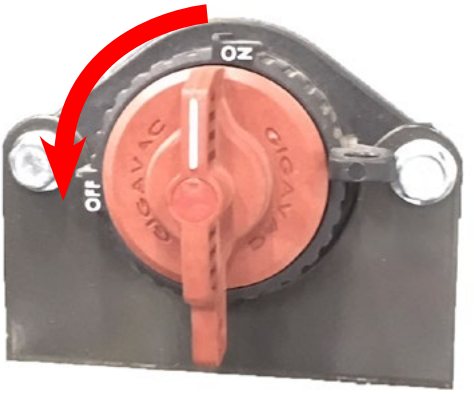
Check all camlocks and fittings for corrosion and/or other damage.

38



Check and manually actuate all hand valves.

39




Turn the battery disconnect switch to “OFF” (Update Kit Part #11062).

40

Raise the front of the machine up 4 inches or more above level with the tongue jack to assure that all water drains from the boiler and other systems.

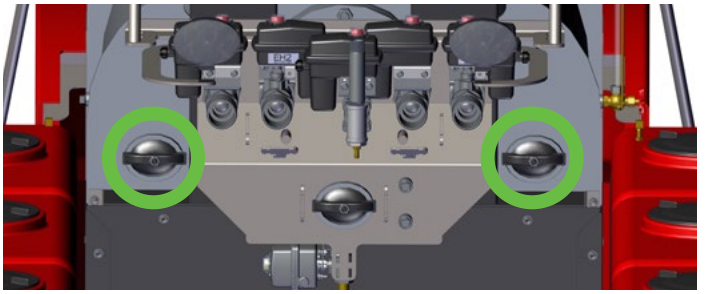
41


Remove a hand hole and take a picture of the inside of your boiler to compare with upcoming years.

42


If your fire tubes are in bad condition, consider purchasing ReDew boiler de-scaler to increase the efficiency and life of your DewPoint machine.

43



After the boiler has dried for several weeks, verify it is completely dry. When it is dry, replace the hand-hole plugs and close the drain valves to keep rodents, birds and weather out.
Store your DewPoint under a shed, hay barn or in a shop all winter if possible.

# De-Winterize


It is very important that you follow these de-winterization procedures to ensure proper operation of your DewPoint machine.

SAFETY PRECAUTIONS

- Do Not climb on machine to perform de-winterization procedures
- Always use a ladder or other appropriate means, to reach upper components which require attention for de-winterization

When should you de-winterize your DewPoint machine?

- Anytime you plan on operating your machine after it has been winterized

Tools Needed:

- Phillips Screwdriver
- Crescent Wrench
- 9/16” End Wrench

# De-Winterize

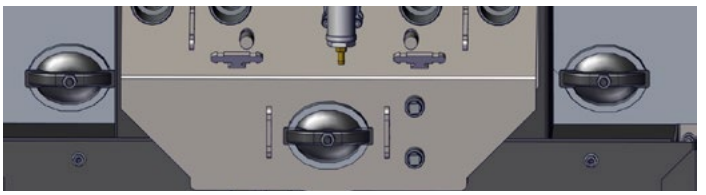
1

Remove any bird or rodent nests from inside the boiler.

2

Disconnect the boiler drain valve and remove all scale and debris.

3

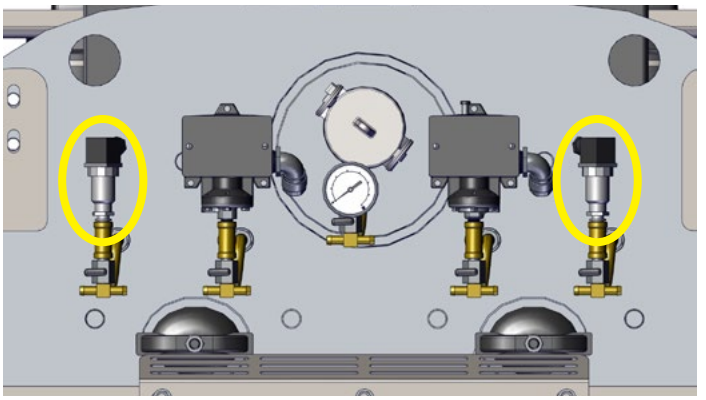


Ensure all hand hole plugs are tightened and secure.

4

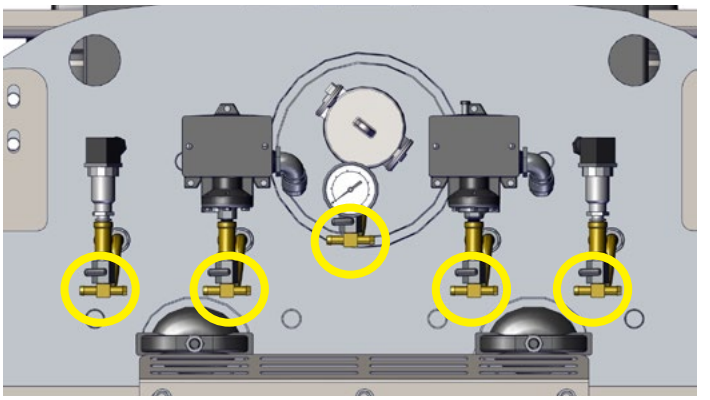
Install the supply water level sensor (under the right front water tank).

5



Install the steam pressure sensors on the front of the boiler.

6



Close all 5 pigtail valves.

# De-Winterize

7

Ensure the pressure control flush hose is connected to the water tank fitting as shown.

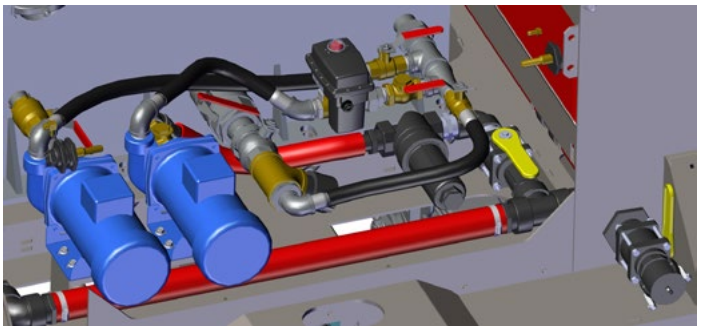
8

Replace feed and circulation pump drain plugs.

9

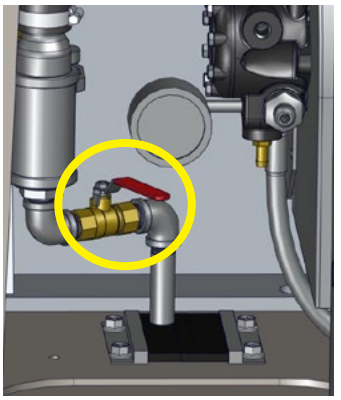

Reinstall supply water filter (T-strainer) as shown.

10



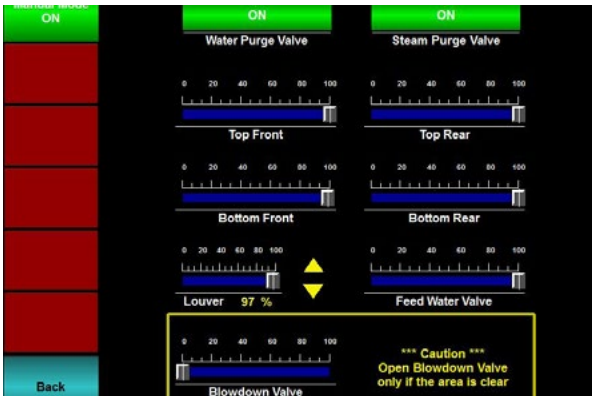
All valves should be positioned as shown above for operation.

11



Close the feed water system drain valve (boiler front right) and the Y-Strainer (boiler front left).

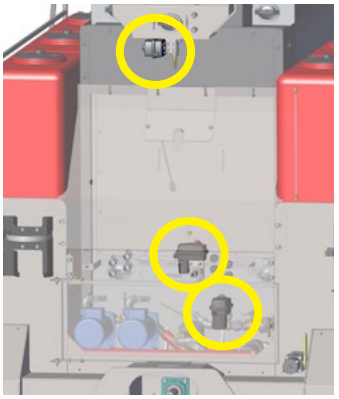
12

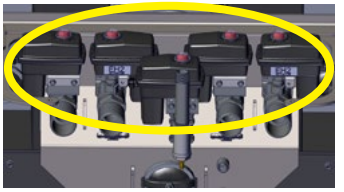



Connect the touch screen and go to Menu > Operations > Manual mode and test all valves for functionality.

# De-Winterize

13





Inspect all 8 valves for frost damage.

14

Test the pressure relief valve by lifting up the lever fully several times.

15

Check flue caps for free operation.

16


Tune the burner before operating. (See Burner Tune).

| | PRE-OPERATION | STEP(S) |
|---|---|---|
| | Grease PTO anti-rotating shields | 1 |
| | Check engine coolant and oil levels | 2-3 |
| | Check water separator | 4 |
| | Clean supply water filter (T-strainer) | 5-8 |
| | Drain 30-40 gallons of water from boiler | 9 |
| | Inspect gauges, sensors and sight glasses | 10 |
| | Purge steam through all baler hardware nozzles | 11 |

| | POST-OPERATION | STEP(S) |
|---|---|---|
| | Clean generator and engine with compressed air | 1 |
| | Purge hot water through the “Y” strainer for 2-3 seconds | 2 |
| | Remove crop debris from enclosed areas | 3 |
| | Purge steam through baler hardware nozzles to clear debris | 4 |
| | Clean the fan with compressed air | 5 |

| 1st OPERATION |
|---|
| Wheel nut torque check (see 500 hour maintenance step 9) |
| Steering hinge gap check/adjustments (see 1500 hour maintenance step 2) |
| Check/Adjust engine speed so that frequency is 61-62.5hz (see 250 hour maintenance steps 5-7) |

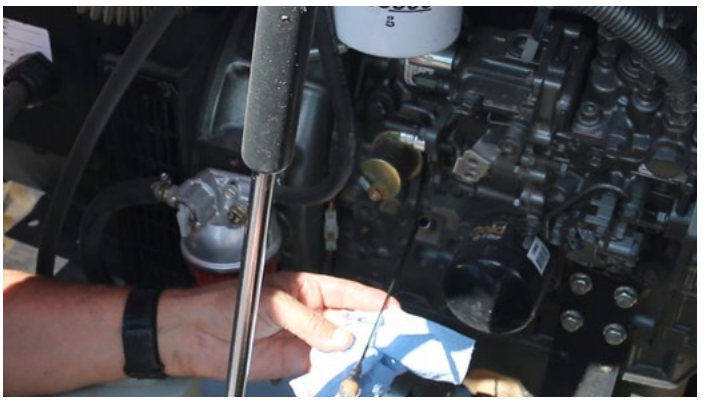
1

Grease PTO anti-rotating shield.

2

Check engine coolant level.

3

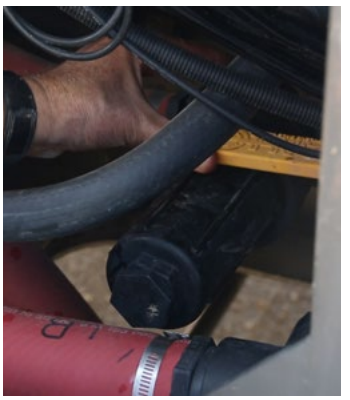


Check engine oil level.

4

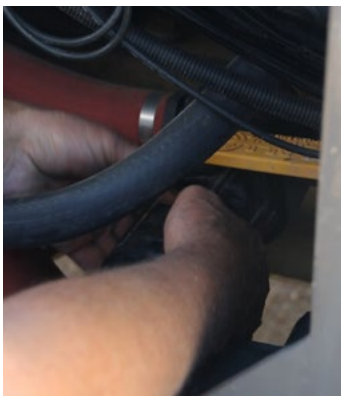
Check water separator.

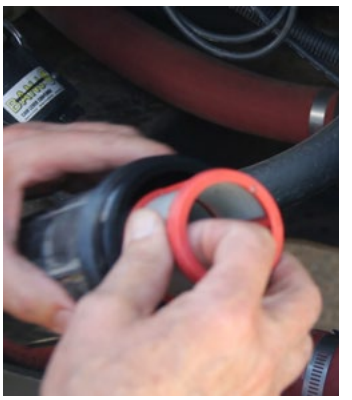
5



Close the supply water isolation valve.

6

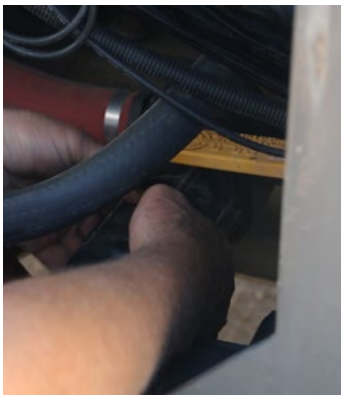




Unscrew the supply water filter.

Remove the internal mesh filter.

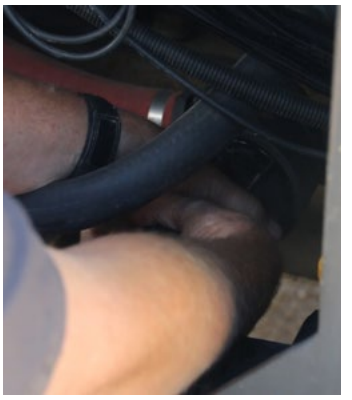
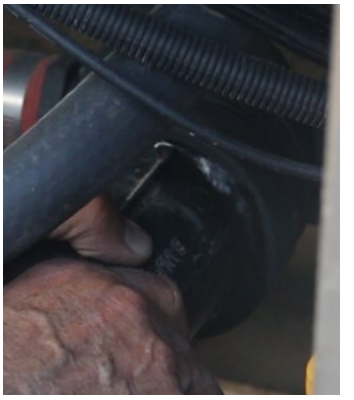
7

Clean out the filter.

Reinstall the filter.

8

Open the supply water isolation valve. Unscrew the supply water filter to purge any excess air that may be trapped in the lines. Then re-tighten the filter.

9


Open the boiler drain valve and drain 30-40 gallons of water. This helps prevent boil-over by reducing the amount of dissolved solids in the boiler.

10

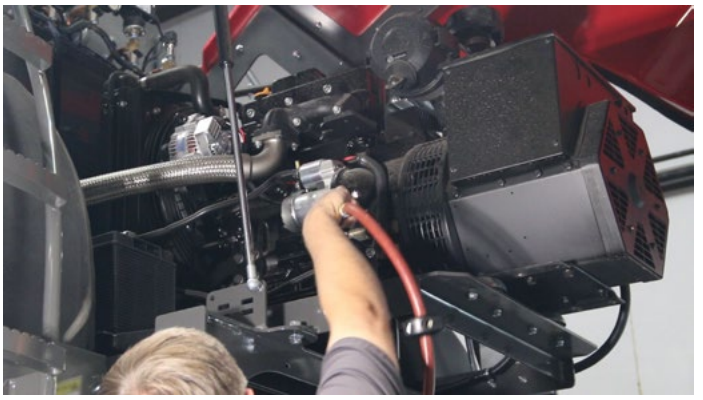

Inspect gauges, sensors, and front/rear sight glasses for damage.

11


Purge steam through all baler hardware nozzles to clear condensed water and debris. Ensure nozzles are not plugged.

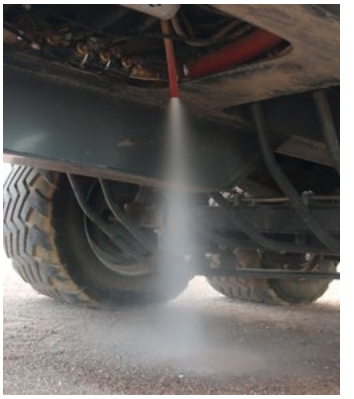
# Daily Maintenance (Post-Operation)

1



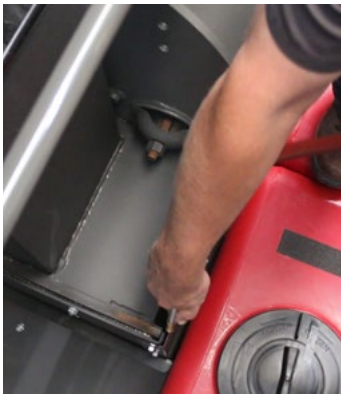
Clean generator and engine with compressed air.

2



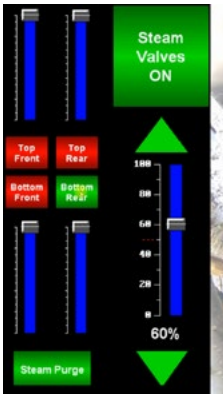
Purge the "Y" strainer for 2-3 seconds. Make sure your feet don't get burned.

3



Remove crop debris from enclosed areas.

4




Purge steam through all baler hardware nozzles to clear debris.

5

Hook up and blow compressed air in **short quick bursts** until the fan blades are free of debris.
*Blowing a constant stream of compressed air will spin the fan but will not clean it properly.

| | EVERY 50 HOURS | STEP(S) |
|---|---|---|
| | Grease and lubricate PTO bearings and hitch. | 1-4 |
| | Check battery and recharge. | 5 |
| | Drain water separator. | 6-9 |
| | Clean radiator fins. | 10 |
| | Clean/Replace generator inner and outer air filters. | 11-13 |
| | Clean igniter assembly. | 14-16 |
| | Clean inside the burner blast tube area. | 17 |
| | Clean flame detector lens. | 18 |
| | Purge steam through top front pigtail valves to clear the steam pressure sensor paths. | 19 |
| | Check water purge system for blockages. | 20-23 |
| | Check blowdown system for blockages. | 24 |
| | Inspect front and rear of boiler. Look for any potential hot spots on the boiler doors. | 25 |
| | Inspect baler hardware | 31-32 |

| 1st 50 HOUR MAINTENANCE |
|---|
| Check/Adjust generator cooling fan v-belt (see 250 hour maintenance steps 8-9). |
| Change oil and oil filter (see 250 hour maintenance steps 10-13). |

# 50 Hour Maintenance

1

Grease every 50 hours.

2


Grease every 50 hours.
For machines without the update, the grease zerks are directly on the middle bearings.

3

Grease every 50 hours.

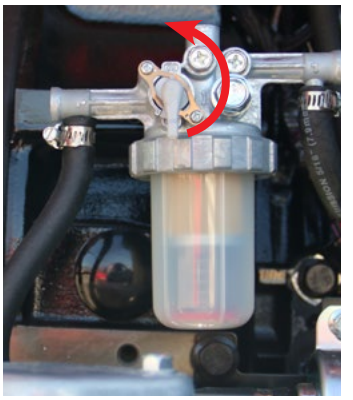
4

Grease every 50 hours.

5

Check the battery and recharge if necessary.

6



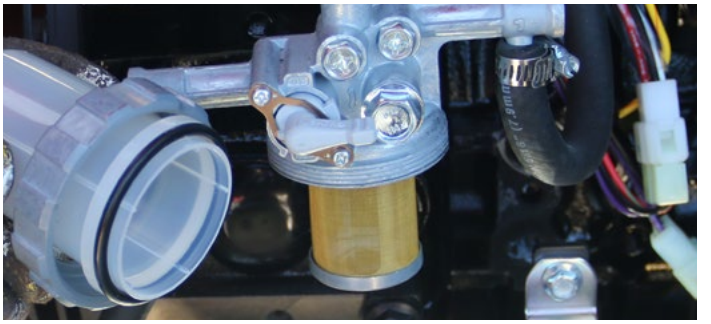
Close the fuel valve.

Unscrew the retaining ring.

7

Carefully remove the cup. Remove the retaining spring and float from the cup. Pour the fuel into an approved container and dispose of waste properly. Hold the bottom of the cup with a shop towel to prevent the fuel from dripping.

8



Inspect the mesh filter. Clean if necessary. Inspect o-ring. Replace if necessary. Put the float and the retaining spring back inside the cup. Reinstall the cup. Hand tighten only.

9


Prime the generator:
Press “OFF”.
Press “Run” / “Manual Start” (Lift pump will turn on).
After 5 seconds press “OFF”.
Repeat this process until water separator is filled.
Press “Auto” to return controller to auto state.

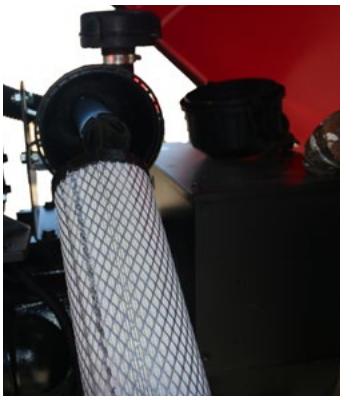
10

Clean the radiator fins with 28 psi or less of compressed air. Do not damage the fins with compressed air. Use detergent and rinse with tap water if needed.

11

Pop these two tabs to clean the inner and outer air filters.

12



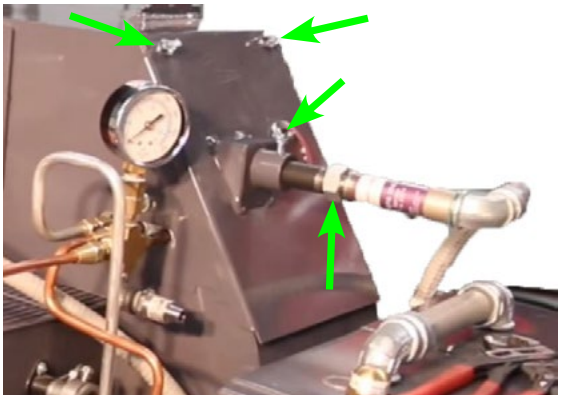
Remove end cap.

Remove the outer air filter.

13

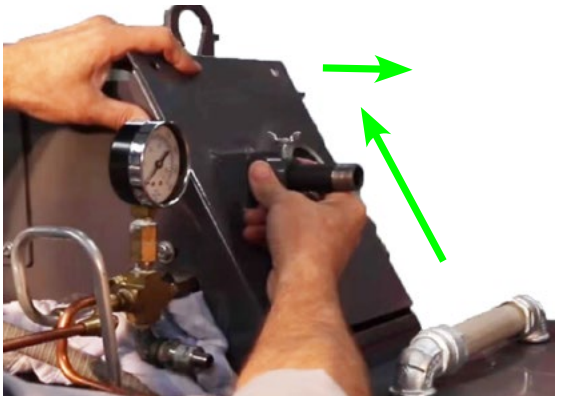
Remove the inner air filter. Clean both using compressed air. Then reinstall the air filters and end cap.

14



Loosen sight tube locking bolt; remove the flame detector and remove the cover bolts.

15

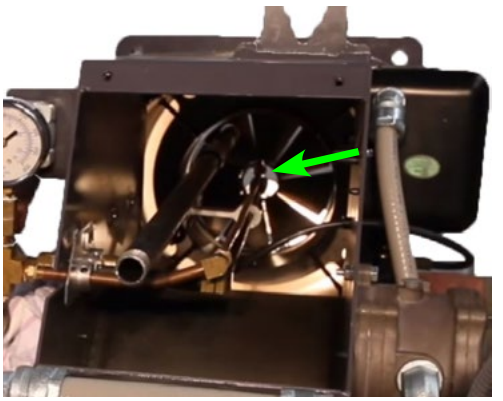


Lift up then out to remove the cover.

16

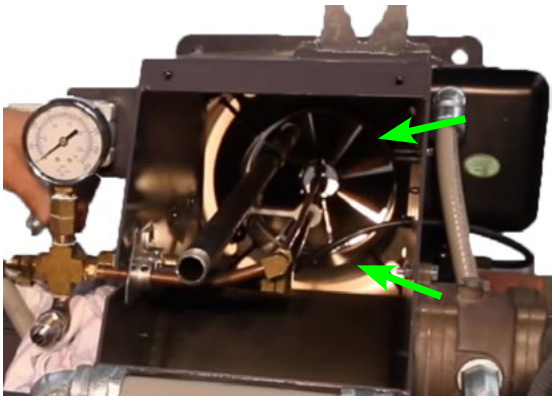
Direct Spark

Propane



With the cover removed, blow off the nozzle and electrode(s) with compressed air. Use an extension wand with a 90° bend if necessary.

17

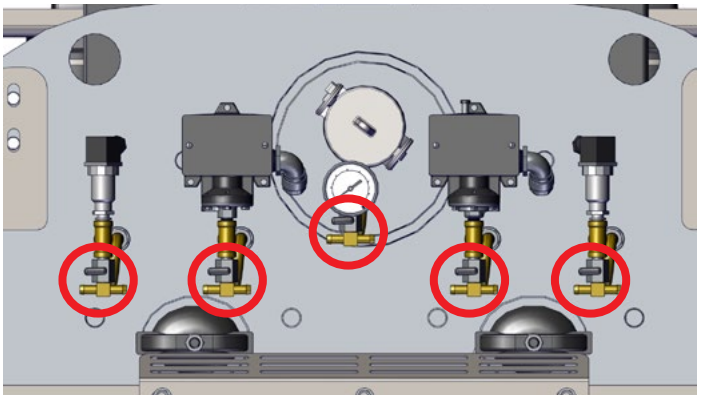


Clean the rest of the burner blast tube area with compressed air.

18

Clean the flame detector lens and inspect the o-ring to make sure it is not damaged.
When reinstalling, hand tighten only.

19



While the boiler is under pressure, open each of these pigtail valves one at a time to clear the steam pressure sensor paths.

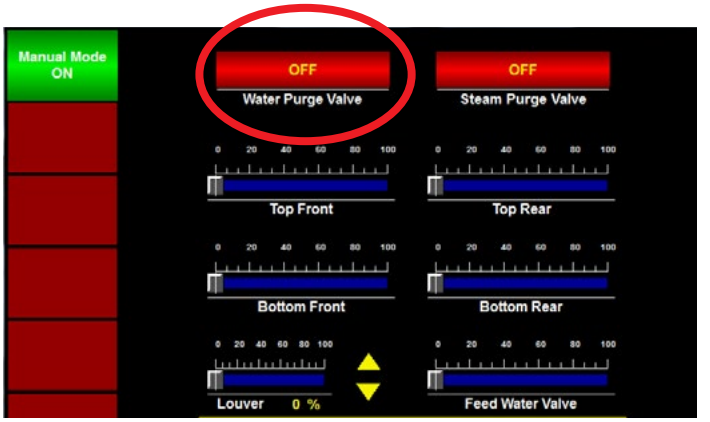
20

**Depressurize the boiler**. Loosen the nut on the hand hole on the steam manifold to check the water purge system for blockages.

21

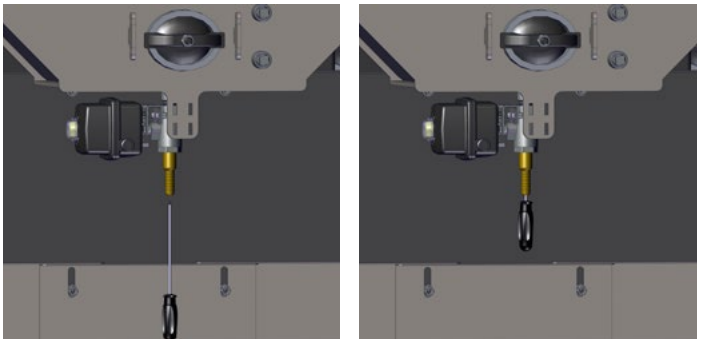
After removing the hand hole, check the water purge drain for blockages. Remove any blockages with a shop vac or by hand.

22




In manual mode, turn the water purge valve ON.

23

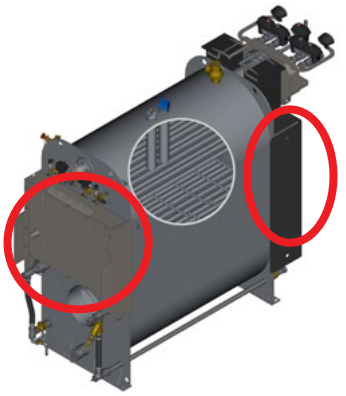


Remove the hose from the bottom of the water purge valve. Stick a long screwdriver or rod up through the water purge valve to ensure there are no blockages.

24


Verify that water is coming out of the blowdown hose when the DewPoint performs a blowdown. Caution! Hot water has been known to scald!

25



Inspect front and rear of boiler. Look for any potential hotspots on OR NEAR the boiler doors AND HEAT SHIELDS.

31

Inspect all nozzles and ensure they are clean and functioning properly.

32

Inspect steam hoses and ensure there are no kinks or holes.

| | EVERY 250 HOURS | STEP(S) |
|---|---|---|
| | Perform 50 hour maintenance (Not included in 5 hour time estimate above). | See 50 hour |
| | Grease fan motor (1 pump) (DO NOT OVER GREASE). | 1 |
| | Grease axles. | 2-4 |
| | Check/Adjust engine speed so that frequency is 61-62.5hz. | 5-7 |
| | Check/Adjust generator cooling fan v-belt. | 8-9 |
| | Change oil and oil filter. | 10-13 |
| | Replace in-line fuel filter. | 14 |
| | Replace burner fuel filter (Napa 4006). | 15 |
| | Remove and clean burner gun nozzle. | 16-21 |
| | Remove and clean “Y” strainer filter. | 23-24 |
| | Remove and clean airflow switch sensor and air lines. | 25-28 |
| | Clean low water 1 & 2 probes and boiler water level sensor. | 29-35 |
| | Rotate tires (front to rear). | 36 |
| | Inspect boiler tubes for scale. | 37 |
| | Boiler Safety Test. | 38 |

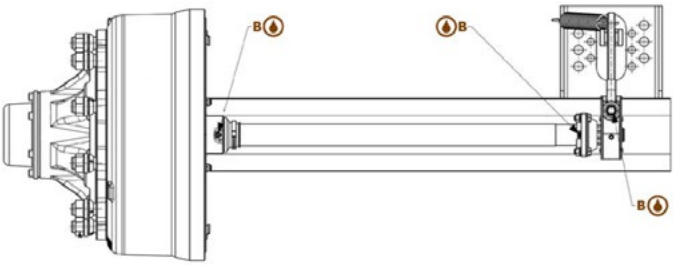
| 1st 250 HOUR MAINTENANCE |
|---|
| Check/Adjust wheel bearing gap (see 1500 hour maintenance step 3). |

# 250 Hour Maintenance / Yearly

1

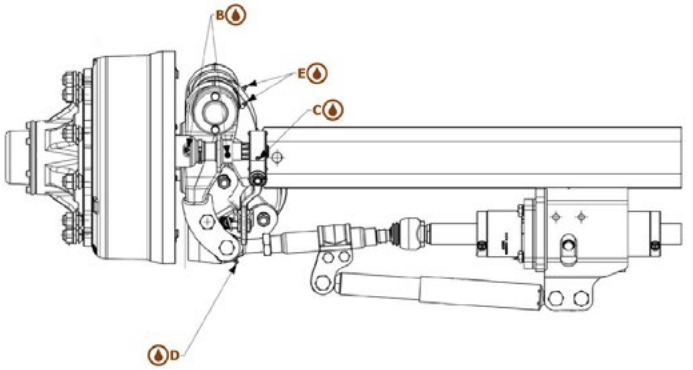
Grease the fan motor with 1 pump.
DO NOT OVER GREASE! OVER GREASING WILL CAUSE PREMATURE MOTOR FAILURE!

2



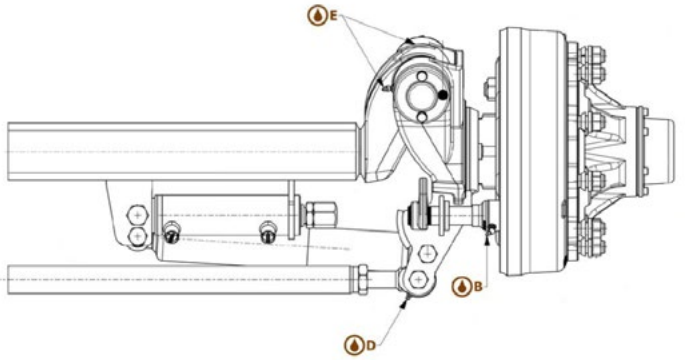

Grease all zerks shown above.

3




Grease all zerks shown above.

4




Grease all zerks shown above.

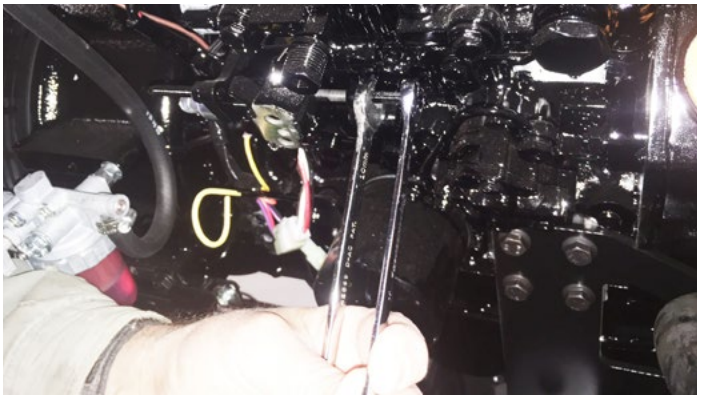
5


Start the generator.

6

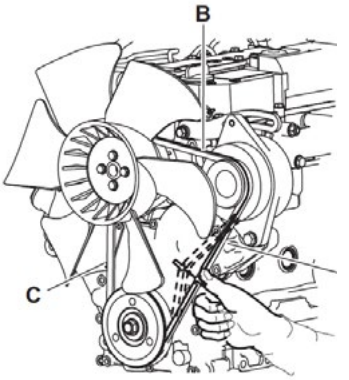

After the generator starts, the generator controller will cycle through screens. Ensure that the AC frequency is between 61-62.5 Hz.

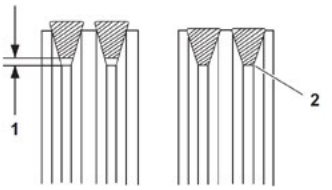
7



You can adjust the AC frequency by adjusting the idle. Two 10mm wrenches are necessary.

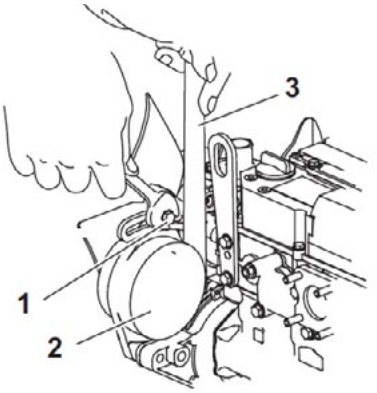
8



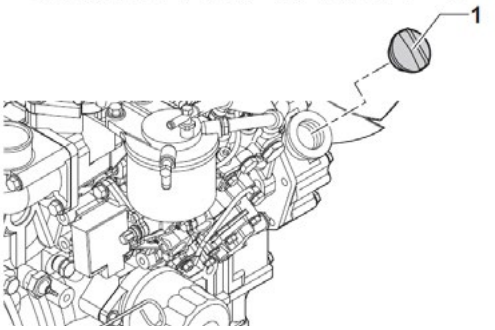

Check for proper V-belt tension.
Check for clearance (1) between the V-belt and the pulley. If there is no clearance (2), replace V-belt.

9



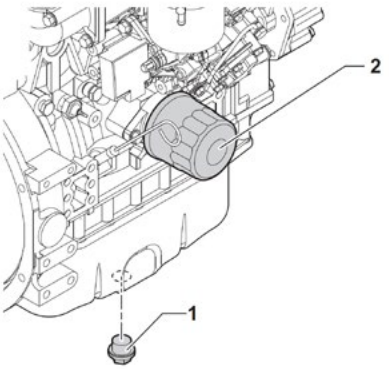

Inspect the V-belt for cracks, oil or wear. If any of these conditions exist, replace the V-belt.
Tighten the V-belt if necessary.

10



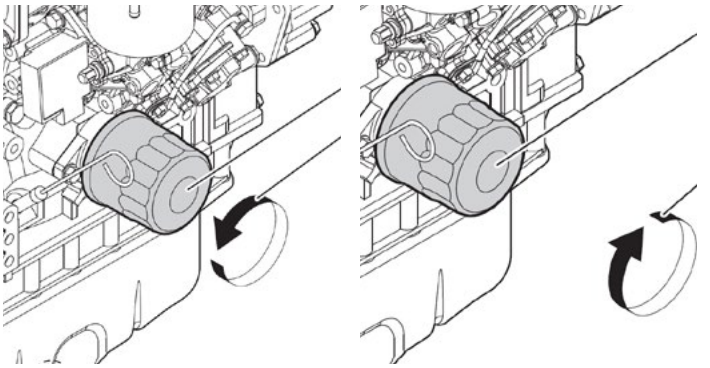

With the engine level, start the engine and bring up to operating temperature. Stop the engine. Remove the filler cap (1). Position a container under the engine to collect waste oil.

11



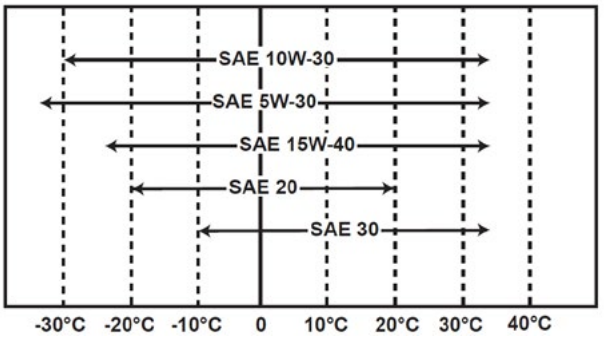

Remove oil drain plug (1). After all oil has been drained from the engine, reinstall the oil drain plug and tighten to 40-47 ft-lb. Dispose of oil properly.

12



Remove oil filter with oil filter wrench. Clean the engine oil filter mounting face. Lightly coat the gasket on the new oil filter with engine oil. Install the new oil filter and tighten to 14-17 ft-lb.

13




Add the proper engine oil using the chart above. Oil Capacity: 4.1 to 7.1 qt (lower/upper dipstick) Always keep the oil level between the upper and lower lines on the oil dipstick. Warm up the engine for 5 minutes. Shut it off for 10 minutes and recheck the oil level. Add more oil as needed. Reinstall the oil cap.

14

Replace the in-line fuel filter using a flat head screwdriver to remove the hose clamps.

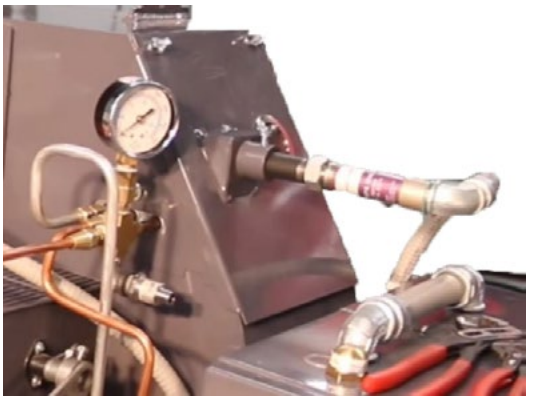
15

Replace burner fuel filter (Napa 4006).

16

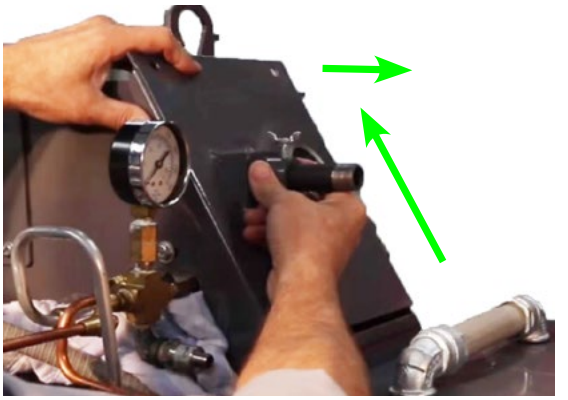
Mark the burner gun assembly depth.

17



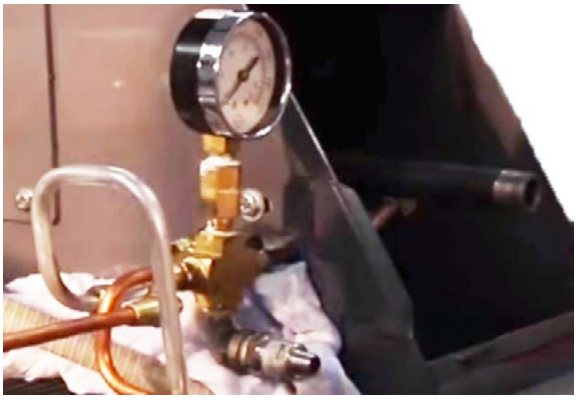
Loosen sight tube locking bolt; remove the flame detector, cover bolts, nozzle pressure sensor M12 plug, fuel lines and propane line (2014 only).

18



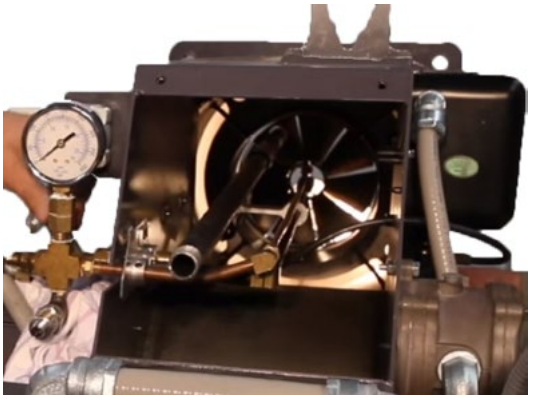
Lift up then out to remove the cover.

19



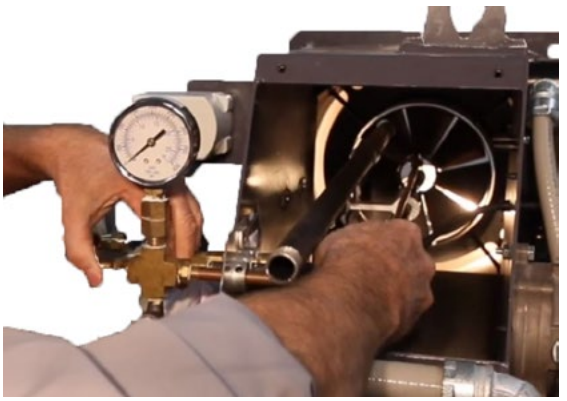
Remove the fuel line pass-through plate and bolt.

20



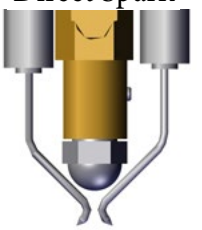
Disconnect the ignition electrode wire (two wires and electrodes on 2010-2013 machines).

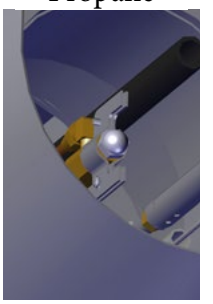
21



Plug the fuel lines and remove the gun assembly.

22




Drain the excess fuel into a bucket. Then clean the nozzle with denatured alcohol.

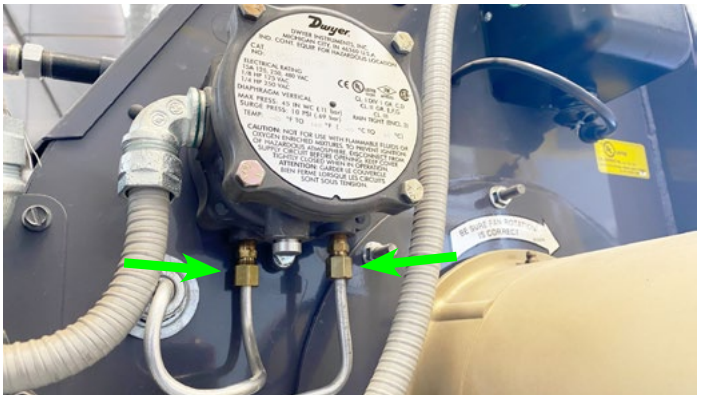
23

Unscrew the bottom portion of the Y-Strainer. Ensure the boiler is empty and not under pressure.

24

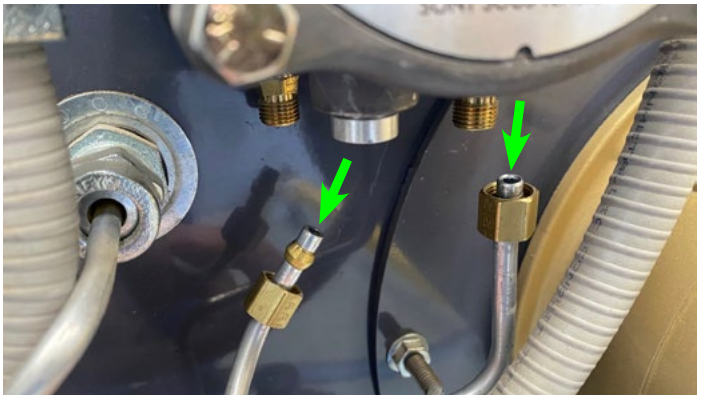
Remove the Y-Strainer filter and clean. Reinstall the filter and reassemble the Y-Strainer.

25



Airflow switch cleaning: remove the air lines from the bottom of the airflow switch.

26

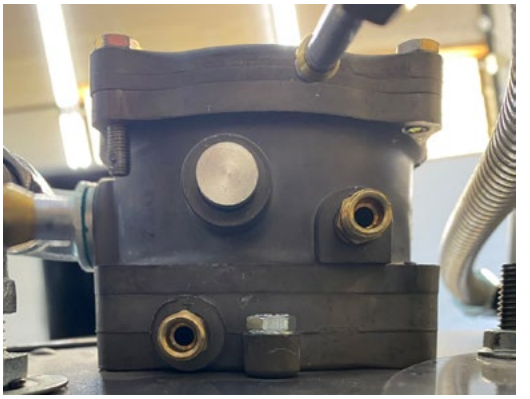


Blow compressed air through the air lines.
DO NOT BLOW COMPRESSED AIR INTO THE AIRFLOW SWITCH ITSELF!

27

Inspect the airflow ports for debris.

28



If there is debris in the airflow ports, use a small screwdriver to delicately remove the debris.

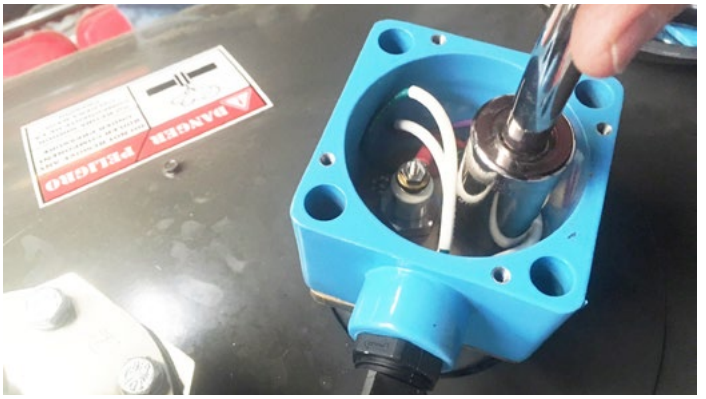
29

Remove the cap of the low water cutoff by removing the 4 screws on top with a Phillips screwdriver.

30

Remove the wires by loosening the top nuts with a 3/16” socket.

31



Remove the probes with a 13/16” deep socket.

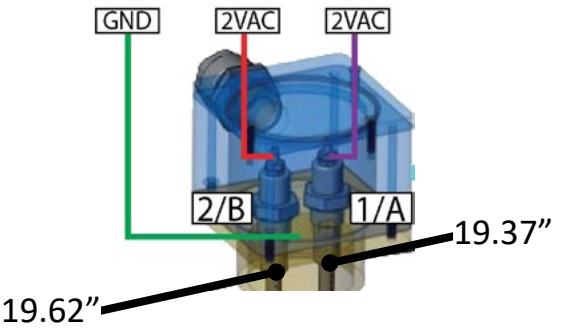
32

Clean the tip of the probe.

33

Only the tip of the probe is used for sensing.

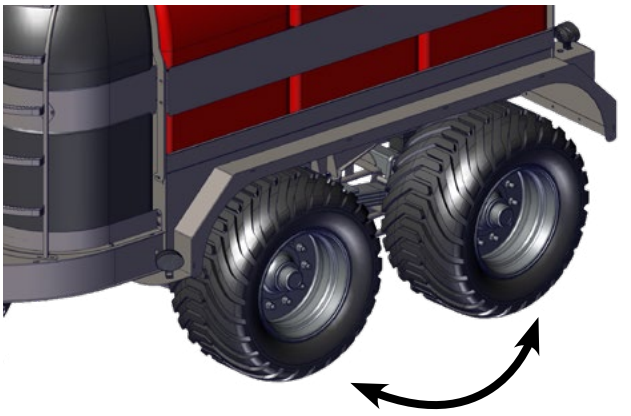
34




35

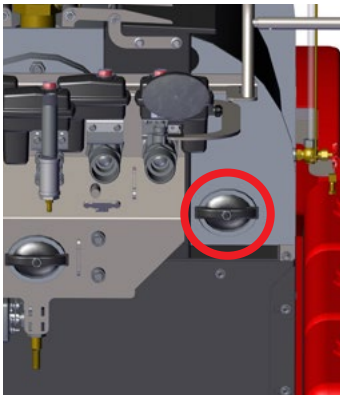
Remove the 6 bolts on the boiler water level sensor and disconnect the wires.
Remove the sensor and clean the probe.

36



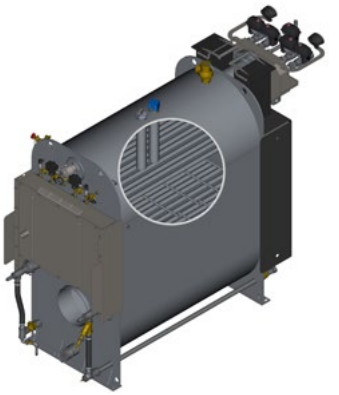
Rotate tires (front to rear).

37



Remove one of the rear hand holes and inspect your fire tubes for scale. If a lot of scale is present, contact your dealer (Tubes in picture are in good condition).

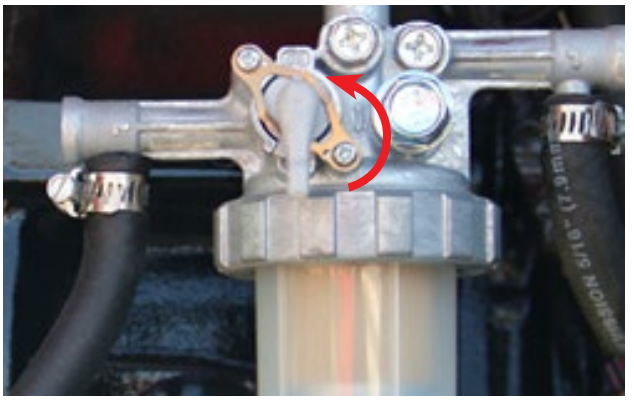
38



Perform a boiler safety test. Instructions are located in the front of this manual in the “Safety” section.

| | EVERY 500 HOURS | STEP(S) |
|---|---|---|
| | Perform 50 hour maintenance (Not included in 6 hour time estimate above). | See 50 hour |
| | Perform 250 hour maintenance (Not included in 6 hour time estimate above). | See 250 hour |
| | Clean water separator. | 1-4 |
| | Replace fuel filter on generator. | 5 |
| | Clean boiler flue tubes (top and bottom as needed) (Not included in 6 hour time estimate above). | 6 |
| | Inspect boiler rear door insulation. | 7 |
| | Inspect boiler rear door “L” brackets for tightness. | 8 |
| | Inspect boiler front smoke turn box insulation. | 9 |
| | Check torque on wheel nuts. | 10 |
| | Check brake gasket. | 11 |
| | Check/Adjust brake lever stroke. | 12 |
| | Grease central joints. | 13 |
| | Grease brake cam supports and levers. | 14 |
| | Grease steering rod joints. | 15 |
| | Grease steering hinges. | 16 |

1



Close the fuel valve on the water separator.

2

Unscrew the retaining ring on the water separator.

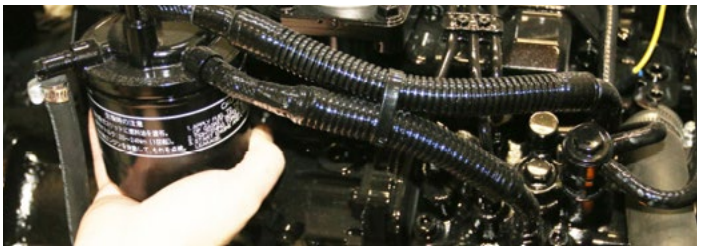
3

Carefully remove the cup. Remove the retaining spring and float from the cup. Pour the fuel into an approved container and dispose of waste properly. Hold the bottom of the cup with a shop towel to prevent the fuel from dripping.

4

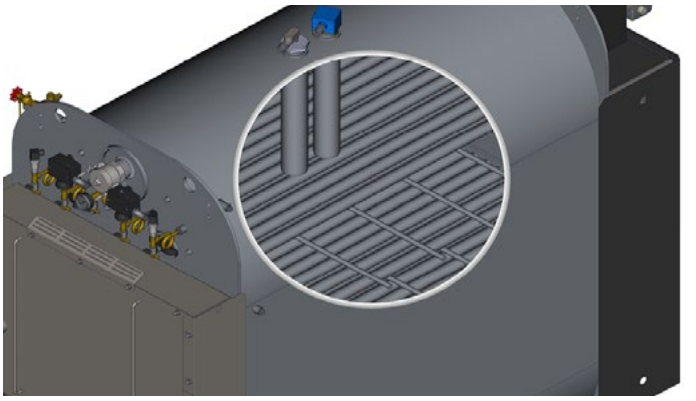
Inspect the mesh filter. Clean if necessary. Inspect O-ring. Replace if necessary. Put the float and the retaining spring back inside the cup. Reinstall the cup. Hand tighten only.

5



With the valve on the water separator still closed, remove the fuel filter using a filter wrench. Clean the filter mounting surface and put a small amount of diesel on the gasket of the new filter. Tighten the new filter with a filter wrench to 14-17 ft-lb. Be sure to prime the diesel fuel system afterwards. (50 hour maintenance step 9)

6



Clean the boiler flue tubes. See Test 119.

7

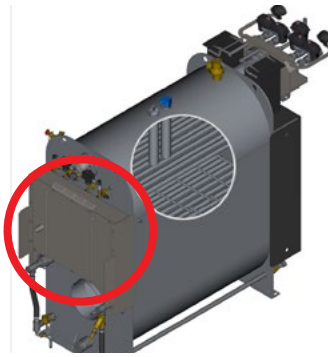
Inspect boiler rear door insulation. See Test 15.

8

9/16" Crow's Foot

Inspect boiler rear door "L" brackets for tightness. Tighten boiler rear door "L" brackets to 23 ft-lbs. See Test 15.

9

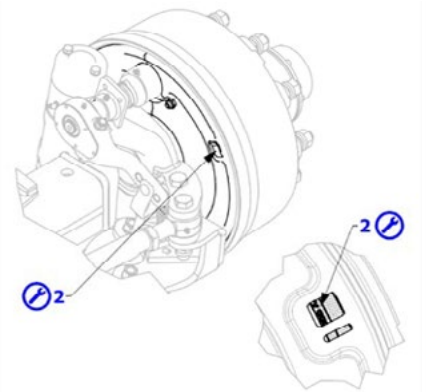


Inspect boiler front smoke turn box insulation. Inspect for paint peeling. If needed, use an infrared thermometer while the machine is running to see if any spots are abnormally hot.

10

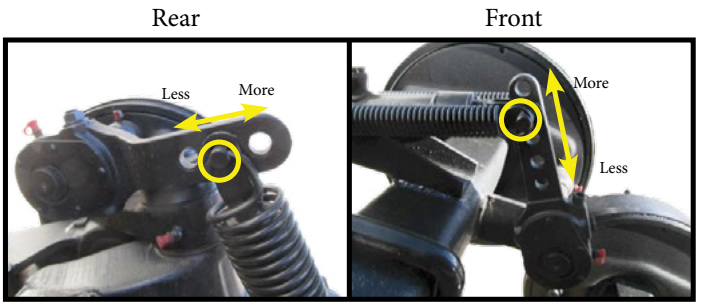
Check the torque on wheel nuts to ensure they are all still tight (260 ft-lb).

11



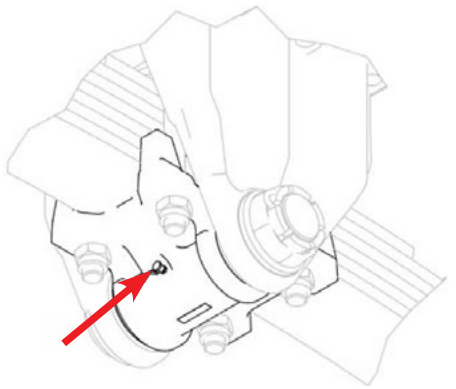
Check the wear on the brake gasket. Open both inspection windows and check friction material thickness outside the reference line. Replace when material thickness is less than 2mm outside the line.

12



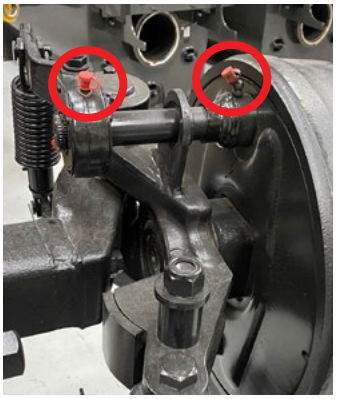

Adjust the brake lever stroke. After 500 hours it is likely that more braking power will be needed.

13



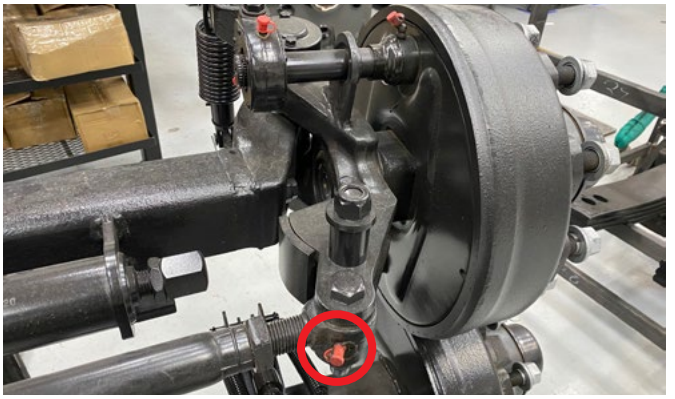
Grease the central joints below both sets of leaf springs (2 zerks total).

14



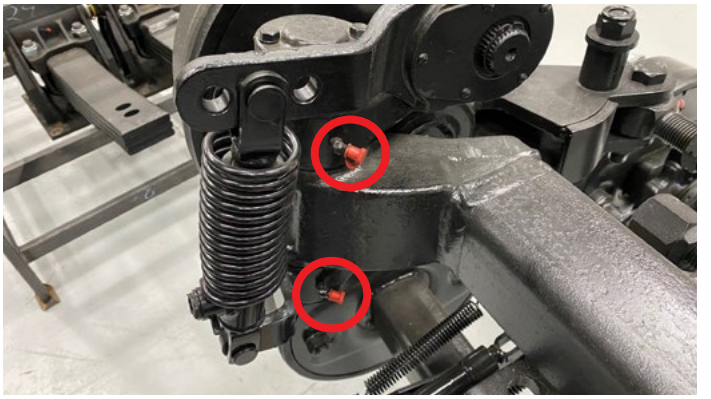
Grease the brake cam supports and the brake levers on both axles (8 zerks total).

15



Grease steering rod joints (2 zerks total).

16



Grease steering hinges (4 zerks total).

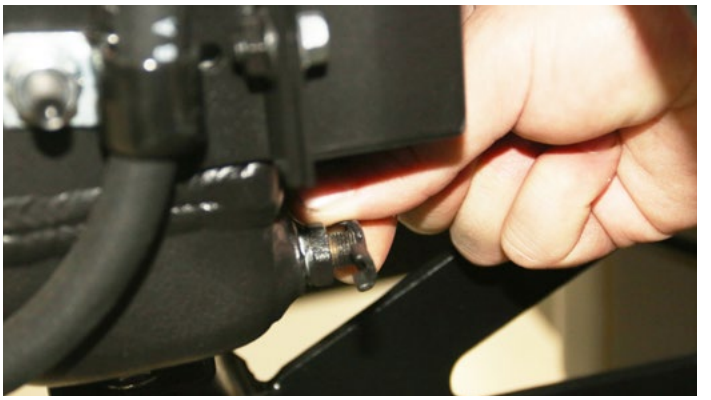
| | EVERY 1000 HOURS | STEP(S) |
|---|---|---|
| | Perform 50 hour maintenance (Not included in 6 hour time estimate above). | See 50 hour |
| | Perform 250 hour maintenance (Not included in 6 hour time estimate above). | See 250 hour |
| | Perform 500 hour maintenance (Not included in 6 hour time estimate above). | See 500 hour |
| | Flush and replace coolant. | 1-4 |
| | Adjust intake / exhaust valve clearance. | 5 |
| | Clean out water side of the boiler. | 6 |

# 1000 Hour Maintenance

1

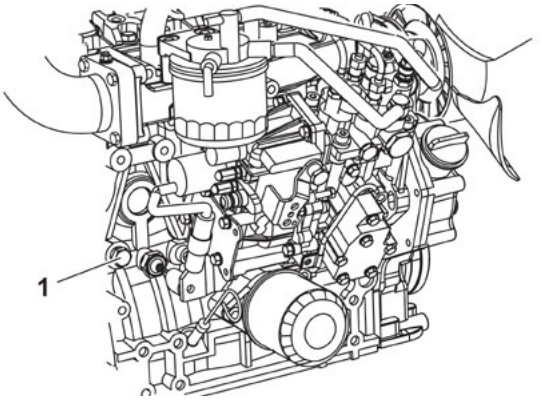
While the machine is cool, remove the radiator cap to drain and flush the radiator.

2



Remove the drain plug and drain coolant into an appropriate container.

3




Drain the coolant from the engine block by removing the coolant drain plug (1) shown above.

4

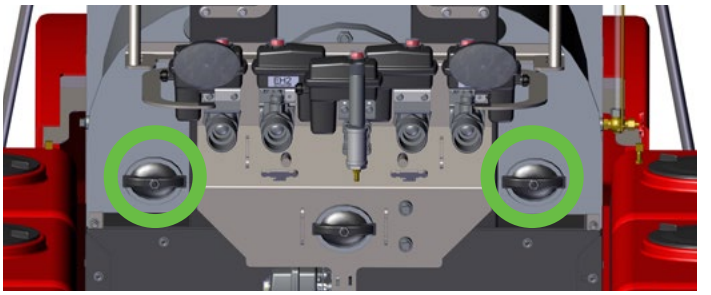
Flush the radiator and engine block. Reinstall the drain plugs. Fill radiator and engine with coolant.

5

Improper intake/exhaust valve clearance will cause the engine to run noisily, resulting in poor engine performance and engine damage. Proper adjustment is necessary to maintain the correct timing for opening and closing the valves.

Standard valve clearance: 0.15 ~ 0.25 mm.

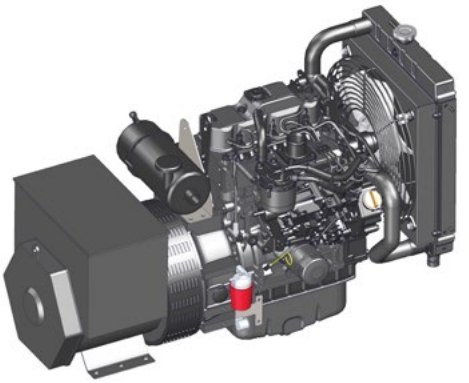
6



Clean out the water side of the boiler.
Remove all hand holes and camlocks.
Pressure wash as much of the internals of the boiler as possible.
Use a shop vac to vacuum everything out of the bottom of the boiler.

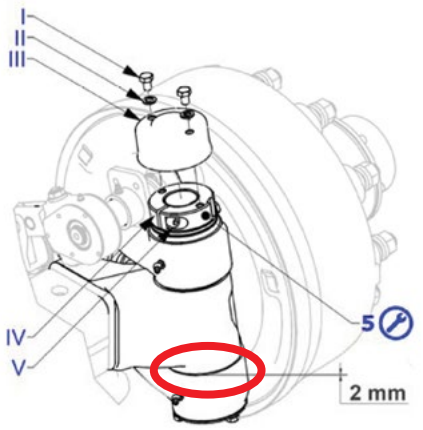
| | EVERY 1500 HOURS | STEP(S) |
|---|---|---|
| | Perform 50 hour maintenance (Not included in 2 hour time estimate above). | See 50 hour |
| | Perform 250 hour maintenance (Not included in 2 hour time estimate above). | See 250 hour |
| | Perform 500 hour maintenance (Not included in 2 hour time estimate above). | See 500 hour |
| | Inspect, clean and test fuel injection nozzle, if necessary. | 1 |
| | Inspect crankcase breather system. | 1 |
| | Check/Adjust steering hinge gap. | 2 |
| | Check/Adjust wheel bearing gap. | 3 |
| | Check torque on steering rod end screw. | 4 |

1



See an Isuzu Distributor to:
1) Inspect, clean and test fuel injection nozzle.
2) Inspect crankcase breather system.

2

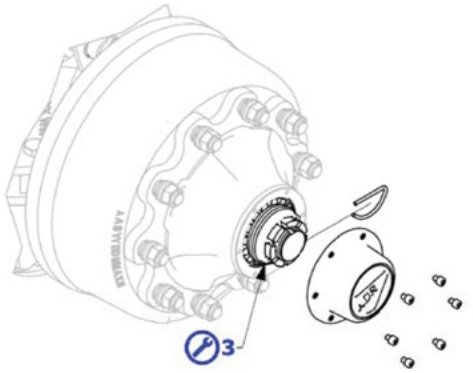



Check the steering hinge gap. If the gap is smaller than 2mm, follow the instructions in step 3 to adjust the hinge pin.

To adjust the hinge gap, do the following:

1) Remove the cover III.
2) Loosen the screw V to free regulation nut rotation IV.
3) Rotate the nut clockwise to restore the required gap.
4) Block the nut with the screw V.
5) Reassemble the cover III and secure it with the screws I and elastic washers II.
6) If the O-ring in the cover III is damaged, replace it with an original ADR - Colaert spare part.

3

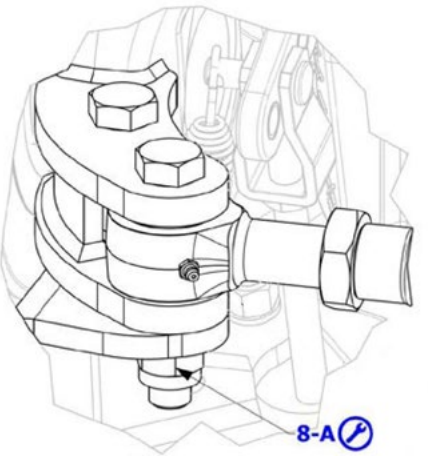



Make sure the wheel bearings do not rock. This check is performed by lifting the axle with a jack until the wheel is off the ground and rotates freely. Insert a lever between the ground and tire and force the wheel up to find any gaps.

To adjust the bearing gap, do the following:

1) Remove the flanged hub cap removing the 6 screws.
2) Remove the elastic stop pin on the castle nut.
3) Tighten the rack nut while simultaneously rotating the wheel until the hub is slightly braked.
4) Rotate the rack nut until a slot with the hole on the spindle is found and insert the elastic pin. Make sure the hub rotates manually with modest resistance.
5) Grease the bearing and reassemble the hub cap without damaging the seal gasket. If damaged, replace the gasket with an ADR original spare part.
6) Reassemble the hub cap and tighten the 6 screws.

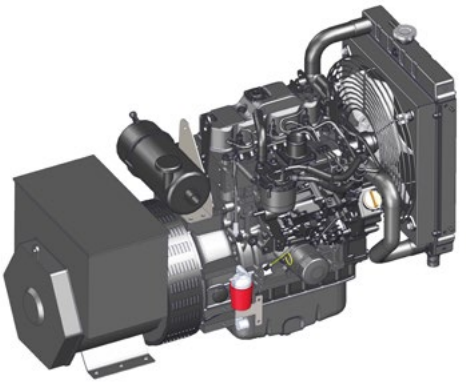
4




Check screw torque indicated in the illustration with a torque wrench. Torque should be between 290 - 325 ft-lb.

| | EVERY 2000 HOURS | STEP(S) |
|---|---|---|
| | Perform 50 hour maintenance (Not included in 2 hour time estimate above). | See 50 hour |
| | Perform 250 hour maintenance (Not included in 2 hour time estimate above). | See 250 hour |
| | Perform 500 hour maintenance (Not included in 2 hour time estimate above). | See 500 hour |
| | Perform 1000 hour maintenance (Not included in 2 hour time estimate above). | See 1000 hour |
| | Replace fuel hoses and coolant hoses (Not included in 2 hour time estimate above). | 1 |

1



Replace all fuel hoses and coolant hoses on the generator.

# Maintenance Schedule

| System | Check Item | Daily | 50 | 250 | 500 | 1000 | 1500 | 2000 |
|---|---|---|---|---|---|---|---|---|
| Boiler/Burner | Clean burner fan | x | | | | | | |
| | Clean supply water filter (T-strainer) | x | | | | | | |
| | Drain water from boiler for 10 seconds | x | | | | | | |
| | Purge hot water through the Y-strainer for 2-3 seconds | x | | | | | | |
| | Remove crop debris from enclosed areas | x | | | | | | |
| | Purge steam through baler hardware nozzles to clear debris (pre and post operation) | x | | | | | | |
| | Inspect gauges, sensors, and sight glasses | x | | | | | | |
| | Clean igniter assembly with compressed air | | x | | | | | |
| | Clean flame detector lens | | x | | | | | |
| | Clean inside the burner blast tube area | | x | | | | | |
| | Purge steam through top front pigtail valves | | x | | | | | |
| | Check water purge system for blockages | | x | | | | | |
| | Check blowdown system for blockages | | x | | | | | |
| | Inspect front and rear of boiler by looking for any potential hotspots on the boiler doors | | x | | | | | |
| | Replace burner fuel filter (Napa 4006) | | | x | | | | |
| | Check set screw tightness of the fan cleaning tube assembly | | | x | | | | |
| | Remove and clean burner gun nozzle | | | x | | | | |
| | Remove and clean the Y-strainer filter | | | x | | | | |
| | Remove and clean airflow switch and air lines | | | x | | | | |
| | Clean low water 1 & 2 probes and boiler water level sensor | | | x | | | | |
| | Perform boiler safety test | | | x | | | | |
| | Inspect boiler tubes for scale build up | | | x | | | | |
| | Clean boiler flue tubes (top and bottom as needed) | | | | x | | | |
| | Inspect boiler rear door insulation | | | | x | | | |
| | Inspect boiler rear door “L” brackets for tightness (23 ft-lbs) | | | | x | | | |
| | Inspect boiler front smoke turn box insulation | | | | x | | | |
| | Clean out water side of the boiler | | | | | x | | |
| | | | | | | | | |
| Grease/Lube | Grease PTO anti-rotating shields | x | | | | | | |
| | Grease and lubricate axles and PTO bearings | | x | | | | | |
| | Grease fan motor (1 pump) (DO NOT OVER GREASE) | | | x | | | | |
| | Grease central joints | | | | x | | | |
| | Grease brake cam supports and levers | | | | x | | | |
| | Grease steering rod joints | | | | x | | | |
| | Grease steering hinges | | | | x | | | |

# Maintenance Schedule

| System | Check Item | Daily | 50 | 250 | 500 | 1000 | 1500 | 2000 |
|---|---|---|---|---|---|---|---|---|
| Generator | Check engine coolant and oil levels | x | | | | | | |
| | Check indicators | x | | | | | | |
| | Check and adjust governor lever and engine speed control | (1st) | | x | | | | |
| | Check water separator | x | | | | | | |
| | Clean generator and engine with compressed air | x | | | | | | |
| | Check/Adjust cooling fan v-belt | | (1st) | x | | | | |
| | Check battery and recharge | | x | | | | | |
| | Change oil and oil filter (15w 40) | | (1st) | x | | | | |
| | Drain water separator | | x | | | | | |
| | Clean radiator fins | | x | | | | | |
| | Clean/Replace inner and outer air filters | | x | | | | | |
| | Drain fuel tank | | | x | | | | |
| | Replace in-line fuel filter | | | x | | | | |
| | Clean water separator | | | | x | | | |
| | Replace fuel filter | | | | x | | | |
| | Flush and replace coolant | | | | | x | | |
| | Adjust intake / exhaust valve clearance | | | | | x | | |
| | Inspect, clean and test fuel injection nozzle, if necessary | | | | | | x | |
| | Inspect crankcase breather system | | | | | | x | |
| | Replace fuel hoses and coolant hoses | | | | | | | x |
| | | | | | | | | |
| Frame/Axles | Check torque on wheel nuts (325-370 lb-ft) | (1st) | | | x | | | |
| | Check/Adjust steering hinge gap | (1st) | | | | | x | |
| | Rotate tires (front to rear) | | | x | | | | |
| | Check/Adjust wheel bearing gap | | | (1st) | | | x | |
| | Check brake gasket | | | | x | | | |
| | Check/Adjust brake lever stroke | | | | x | | | |
| | Check torque on steering rod end screw (290-325 lb-ft) | | | | | | x | |
| | | | | | | | | |
| Other | Inspect baler hardware | | x | | | | | |

# Notes

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STAHELIWEST

# Keys to Success

## Preparation

- Read the "Owner's Manual"
- Always make sure hydraulic brakes are hooked up and functioning properly.
- Always lock the steering axles on the steamer and baler when traveling on roadways, operating on hillsides, or backing up.
- The Owner's Manual, Troubleshooting Guides, Training Videos and more can be found on the "Customer Portal". Go to www.staheliwest.com/customer

## Operation

- Ideal baling moisture, with steam, is 11% - 15%
- Never exceed 135° F (57° C) internal bale temperature.
- Never stack hay if internal bale temperature exceeds 115° F (45° C)
- Do not bale with stem moisture
- Steamed bales should be tightly packed with good leaf pattern. Sides of bales should be smooth but not smeared.

## Water

- Always use boiler water treatment chemical in boiler water.
- Always use appropriate water treatment equipment (Softener, RO) to treat boiler water.
- Make sure PPM setting in controller matches the results of your water test.
- If dark spots or wet flakes appear in bales, check the PPM setting in the controller, drain the water out of the boiler, and refill with fresh water. High concentrations of minerals in boiler water will cause foaming which will cause water to carry over into the steam.