Checklist for Flame Scanner Not Sensing Igniter Spark (FSNSIS)

Item	Make	Model	Rebuilt Y/N
Programmer			

*The scanner should not indicate a voltage-voltage indicates that scanner senses spark.

- Close manual valves in main fuel line and pilot gas line.
- Attempt to start boiler.
- Determine if the scanner output indicates a voltage.

Result	Y/N
Did the scanner work correctly?	

Comment:

Checklist for Igniter Timing (IT)

Item	Make	Model
Programmer		

* Maximum allowable duration is 10 sec.

- Close manual valves in main fuel line and pilot gas line.
- Start boiler.
- View igniter by means of furnace front or back view port and time the ignition spark. (You can hear the igniter click on and off so that it may not be necessary to view the spark if not easily visible).
- Observe the duration of the ignition spark with a stop watch.

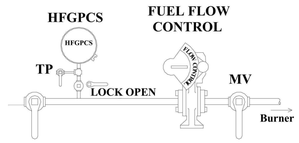
Result	Y/N	Time (seconds)
Did the scanner work correctly?		
Igniter timing?		

Comment:

Checklist for Main Flame Ignition Timing (MFIT)

Item	Make	Model
Programmer		

* Maximum timing should be 14 seconds.



- Close the lockable manual valve between the fuel line and the HFGPCS..
- Close manual valves in main fuel line.
- Attempt to start boiler.
- Time the AFGSOV from the time they begin to open until they close with a stopwatch.

Result	Y/N	Time (seconds)
Did the programmer work correctly?		
Time to AFGSOVs?		

Comment:

Checklist for Pre-Purge and Post-Purge Timing (PPT)

Item	Make	Model	Adjustable Timing Y/N
Purge Timer			

Boiler make	Fire Tube / Water tube	Boiler Fireside Volume (ft^3)

* Eight air changes are required for a water tube boiler and 4 air changes for a fire tube boiler.

- Begin firing boiler and record the pre-purge time in the table below.
- Repeat this step for post purge cycle.

Result	Time (sec)	Y/N
Low fire to high fire?		
Time in high fire?		
High fire to low fire?		
Time in post purge?		
Equivalent High Purge Time?		
Is purge adequate?		

*Equivalent purge is all time spent at high fire plus half of the time spent in getting to high fire and returning to low fire.

Comment:

Checklist for Low-Fire Proving Switch (LFPS)

Item	Make	Model
LFPS		

*Should not be made above a 5% point load increase above low fire.
*LFPS must be separate from the control system that modulates the firing rate.

- Measure the voltage across the switch during the purge cycle. (The switch should be closed at start up (no voltage) and should open with less than a 5% point increase in load).
- Disconnect one electrical lead from switch. Allow boiler to complete the purge cycle and return to low fire. Boiler should not start.

Result	Y/N	Switch Trip point
Did the switch work correctly?		
What was the switch trip point?		

Comment:

Checklist for Forced Draft Damper Wide-Open Pre-Purge Proving Switch (FDDWOPS)

Item	Make	Model
FDDWOPS		

* Must be open at positions lower than 90% of wide open (damper vanes).

- Measure the voltage across the switch during the purge cycle to determine if the switch is open or closed. Note load that switch closes.
- Disconnect one electrical lead from switch. Let boiler go through purge cycle. (Boiler should stay at high purge).

Result	Y/N	Load that switch closes.
Did the switch work correctly?		

Comment:

Checklist for Combustion Air Pressure Switch (CAPS)

Item	Make	Low Pressure Tap Location	High Pressure Tap Location	Switch Range (inwc)	Switch Setpoint (inwc)
CAPS					

*CAPS should open if pressure drops to 80% of minimum pressure difference.
* If the switch senses the correct pressure difference, the variation in pressure difference from low to high fire will vary only a few percent.

- Install appropriate flex tubing to a manometer from the test ports closest to CAPS to measure the pressure difference that the switch senses by opening the lockable test ports across the switch.
- Start the boiler and record the pressure difference read by manometer from the low fire to high fire position.
- Slowly allow the pressure to drop in the high pressure leg by using the test port closest to the fan outlet and observe the pressure at which the switch opens and shuts off boiler.
- It may be necessary to partially close the Lock Open valve to actuate the switch.
- Record value of pressure difference at which switch tripped.

Firing Rate	Pressure Difference (inwc)	Minimum Pressure Difference (inwc)	Switch Trip (Break) Point (inwc)
Low			
Med			
High			

*Switch trip point should be 80% of the minimum pressure difference.

Result	Y/N	Switch Trip (Break) point (inwc)
Did the switch work correctly?		

Comment:

Checklist for Purge Airflow Proving Switch (PAPS)

Item	Make	Low Pressure Tap Location	High Pressure Tap Location	Switch Range (inwc)	Switch Setpoint (inwc)
PAPS					

*Should make at 80% maximum pressure signal.
* If the switch senses the correct pressure difference, the variation in pressure difference at low fire will be small and at high fire will be large.

- Connect a manometer to measure the pressure difference that the switch senses by opening the test ports across the switch and installing appropriate flex tubing to the manometer from the test ports.
- Start the boiler and record the pressure difference indicated by manometer from low fire to high fire positions.
- With boiler offline disconnect one lead from the PAPS.
- Close lock open valve and slowly pressurize the high pressure leg with air. Determine switch trip point using a manometer and measuring electrical resistance across the switch.
- With lock open valve open and high pressure leg test port open attempt to restart boiler. Boiler should hold in purge.
- Open lock open valve and close test port. Boiler should light.

Firing Rate	Pressure Difference	Maximum Pressure Difference (inwc)	Switch Trip (Make) Point (inwc)
Low			
Med			
High			

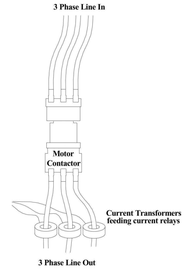
Result	Y/N	Switch Trip (Make) point (inwc)
Did the switch work correctly?		

Comment:

Checklist for Forced Draft Motor Interlock Switches (FDMIS)

Item	Make	Type of Switch: Aux. Contact Phase Monitor Current Relays
FDMIS		

*Current relays are the only acceptable FDMIS



- If current relays are not in place, abort test.
- With power to fan off, remove one electrical power lead to fan from terminal block and slip power lead out of the current transformer ring. Reconnect power lead to fan. (Note some "donut" rings are in form of a clamp and can be removed without disconnecting power lead).
- Attempt to start boiler. Boiler should shut down quickly.
- Repeat above process for each of three power leads to fan.

Result	Y/N
Did the switch work correctly?	

Comment:

Checklist for Outlet Stack Damper Interlock Switch (OSDI)

Item	Make
OSDI	

*Must be open if dampers are not at least 80% open.
*Not required if damper is welded in the wide open position and there are no other potential obstructions.

- Connect a multimeter across the switch and measure voltage.
- Start the boiler and monitor voltage across the switch. The switch should be open (no voltage) until the damper opens to wide open position.
- Stop boiler and turn off power to controls.
- Disconnect one lead from switch.
- Start boiler. The boiler should not complete purge sequence.

Result	Y/N
Did the switch work correctly?	

Comment:

100% DESIGN
APPROVED FOR CONSTRUCTION

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