

**SUPPLEMENT START-UP INSTRUCTIONS
 SYSTEM 1
 MAXON "PL" SERIES PREMIX
 "L" NO_x SYSTEMS**

FACILITY
COMPANY/ADDRESS: _____

BOILER MODEL NO.: _____

FUEL: _____ **SALES ORDER NO.:** _____

SERIAL NO.: _____

PHONE: _____

DATE: _____

CONTACT: _____

INSTALLING CONTRACTOR: _____

These supplemental start up instructions must be used in conjunction with the normal Installation and Start Up Check Off Sheets for Parker Hot Water, Steam or Thermal Fluid Heaters. (Bulletins ISCS 101-5, ISCS201, ISCS207 or ISCS210)

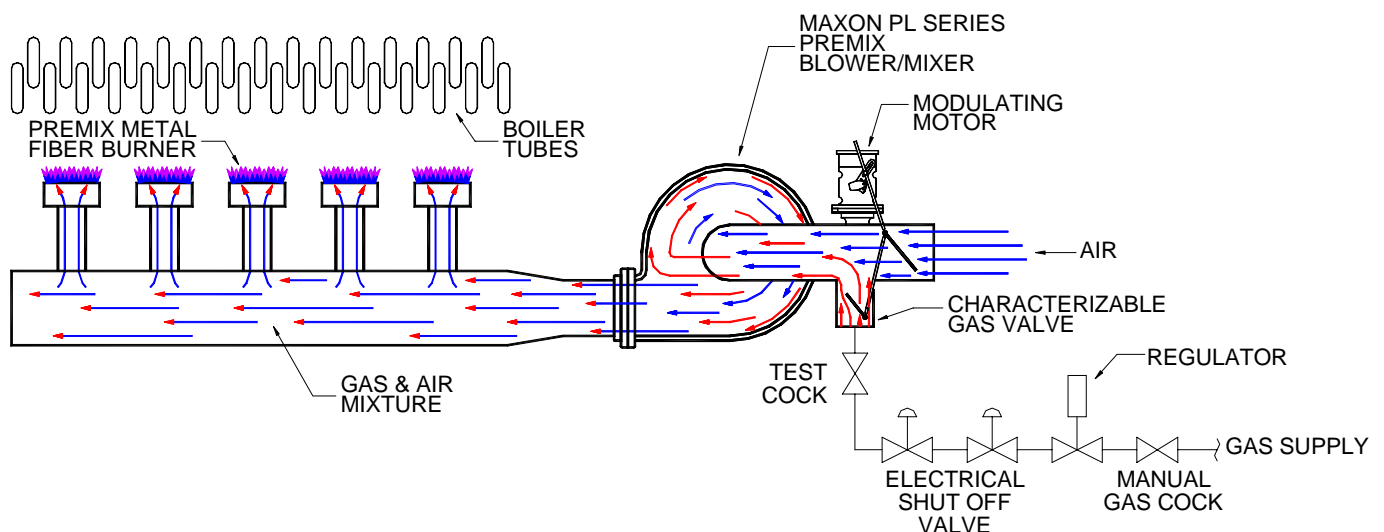
These instructions are to be followed after the Installation and Check Off Sheet has been completed to the Start Up Section. The start up portion of ISCS101-5, ISCS201, ISCS207 or ISCS210 should also be followed in addition to these instructions (some items may be redundant).

Read complete instructions before proceeding, and familiarize yourself with all the system's components. Verify that your equipment has been installed in accordance with the Manufacturer's current instructions.

CAUTION: Initial adjustment and light-off should be undertaken only by trained and experienced personnel familiar with combustion systems, with control/safety circuitry, and with thorough knowledge of the overall installation.

Start up technician should be familiar with the installation so proper air fuel ratios can be set. Check the permit conditions so NO_x and CO values can be set to satisfy the job requirement. Combustion Analyzer with NO_x, CO and O₂ measurement is required.

**SUPPLEMENTAL START-UP INSTRUCTIONS
 SYSTEM 1
 MAXON "PL" SERIES PREMIX**



MAXON PL SERIES PREMIX BURNER SYSTEM

	For "L" Systems Initial Premix Metal Fiber Burner System Start-up:	Y	N
1.	Check all electric circuitry. Verify that all control devices and interlocks are operable and functioning within their respective settings/ranges. Be sure all air and gas manifolds are tight and that test ports are plugged if not being used. Tighten all terminals conduit and linkages. Refer to normal start-up sheets		
2.	All boiler gas valves turned off.		
3.	Notify Boiler Inspection Jurisdiction if required.		
4.	If Modulation or Two Stage boiler disconnect the modulating motor's linkage rod from the blower mixer's screw quadrant carrier by disconnecting the control rod swivel nut on the quadrant. Do not disconnect at motor side as exact repositioning is difficult. This linkage is normally factory adjusted. Initial start-up adjustment should only be accomplished during a "manual" burner control mode.		
5.	Remove cabinet door on pilot side.		
6.	Insure that all burners are straight and level. Insure that no shipping damage has occurred.		
7.	Look for dirt or metal flakes on burner surface. If present blow off with air, or vacuum burners with soft brush.		
8.	Insure carryover tube, ignitor & flame rod or scanner are in proper position.		
9.	Check Blower Mixer impeller for solid mounting, motor firmly bolted to base, shaft in proper position, shaft allen set screws tight on impeller, check all bolts for tightness.		
10.	Insure that stack or roof jointing compound or sealant is not present inside stack so if heat is applied to stack no sealant will drip onto burners.		
11.	Rotate Blower Mixer slowly by hand to insure free rotation.		
12.	Gas line blown out, thoroughly cleaned, tested for leaks. Install gas pressure gauges of proper ranges upstream and at blower mixer gas inlet test tap.		
13.	System installer, plumber, owner and/or Gas Co. technician shall if safe turn on gas at meter and bleed air from gas line to proper safety standards if required to allow safe gas flow to boiler.		
14.	Gas line size proper.		
15.	Shut-off valve with handle and union installed ahead of boiler.		
16.	Gas pressure at test opening on boiler inlet to Manufacturer's specifications.		
17.	On Steam Boilers open water supply and boiler feedwater valves. Never operate the boiler feed pump with any valve in the suction or discharge piping closed as this will damage the pump. Check for water and proper float valve level in return tank. (see ISCS 101-5)		
18.	For Hot Water Boilers or Thermal Fluid Heaters insure proper circulation. (see ISCS 201 or 207)		
19.	Check electrical wiring per wiring diagram. With Boiler Control Switch off, turn on electrical to boiler if safe, hot lead (black wire) should read 115 VAC to ground, neutral white wire should read 0 VAC to ground. (Not applicable if 3 Phase power is provided.) Check for proper voltage and disconnet.		
20.	Turn Boiler Controls Switch, on. Main Burner Switch, off. On Steam Boilers pump will be energized. Check boiler feed pump for proper start, stop and rotation. Fill and flush boiler (see ISCS 101-5).		
21.	Check low water cutoff control or controls for proper installation and operation. Test for proper manual reset function.		
22.	Open upstream main gas cock. Downstream gas valve and pilot gas valve closed. Reset gas pressure switches if required.		
23.	For an instant, turn on Main Burner Switch. (This will start Blower Motor.) Check for proper motor rotation and impeller direction, no grinding. Verify that all control interlocks are working. Insure all is safe.		
24.	With pilot and downstream gas valves shut, again turn on Main Burner Switch this will put system in purge cycle. Switch the run/check switch on the flame safeguard to check position this will hold boiler in purge cycle. Manually advance blower mixer's screw carrier to "high fire" position so that air only flows through burner and combustion chamber. Check for smooth movement. Turn off Main Burner Switch, blower should stop, post purge may be present on some units. CAUTION: Do not by-pass control panel timers typically controlling sequential operations.		

	<p>For "L" Systems Initial Premix Metal Fiber Burner System Start-up: (Continued)</p>	<p>Y N</p>
<p>25.</p>	<p>Check minimum low fire position by checking position of minimum stop screw located on the side of the screw carrier quadrant of blower mixer ratio valve (see sketch 1 below). Minimum position will be 4-6 for PL8500-PL1440 mixers and 3 for smaller blower mixers. Confirm screw setting and low fire. This stop is factory set.</p> <p>This minimum stop screw creates a mechanical block which prohibits the screw carrier quadrant and its direct-connected air butterfly valve from closing completely. Thus a "minimum" volume of air is allowed in through the ratio valve to be delivered down the distribution manifold(s) to the burner(s). This is low fire position.</p> <p>Screwing in (clockwise) on minimum stop screw will open up the air butterfly and increase the low fire setting (minimum differential pressure).</p>	
<p>26. Adjusting the ratio valve of your Premix Blower Mixer: The heart of each Premix Blower Mixer is its ratio valve. The ratio valve is normally factory pre-adjusted but minor field adjustments may be required. The following explains the proper procedures if tuning is required. Refer to general theory bulletin. The description and accompanying sketches summarize its operation.</p>		
<p>A quadrant (shown in Sketch 2) is rotated either manually or by a mod motor to change firing rate as indicated by a position indicator strip (1) and position pointer (2). A minimum stop screw (3) limits rotation and establishes a minimum air flow.</p> <p>Removing a cover piece (4) reveals a numbered series of adjusting screws (5) which bear on a cam strip (6) beneath the quadrant.</p>	<p style="text-align: center;">SKETCH 2</p>	
<p>Turning in the adjusting screws (clockwise) increases gas flow at that particular set point and gives a contour to flexible steel cam (see Sketch 3) this opens the gas butterfly. This cam strip bears on a plunger and cap assembly (7) that determines the amount of opening of the gas butterfly valve. The cam strip serves to provide a continuous gradient.</p> <p>As shown in Sketch 3, the plunger and cap assembly (7) acts upon a roller/crank (8) to rotate a valve shaft (9) to which the gas butterfly is attached.</p>	<p style="text-align: center;">SKETCH 3</p>	
<p>Do not attempt to force screws when adjusting.</p> <p>Directly connected to the quadrant by a shaft (10) extending through its point of rotation is the air control butterfly (11), also shown in Sketch 3. Note that at the low fire position of quadrant, the air butterfly may be partially "closed" but deliberately undersized to provide a required minimum air flow. Air butterfly is fully open with quadrant at highest numbered position. (Number varies with mixer size).</p>		

	For Initial Premix Metal Fiber Burner System Start-up: (Continued)	Y	N
27.	Return blower mixer quadrant to "low fire" position. Turn off all switches, switch flame safeguard to run position. Open cabinet doors on boiler. As flame rollout may occur on initial boiler firing insure no personel are near boiler door area. Insure safety of all present.		
28.	With pilot and downstream gas valves closed attempt to fire boiler. (I.E. Turn Boiler Controls and Main Burner Switch on.) Boiler should purge, ignitor should spark but no pilot will be established. Check for flame failure lockout.		
29.	With upstream and pilot gas cocks open and downstream gas valve closed, attempt to light pilot burner. Repeat procedure as necessary until pilot ignites as air might have to be bled out of fuel supply lines before reliable pilot flame is established.		
30.	After pilot ignition before main flame period turn flame safeguard to check position, adjust pilot flame for good stable flame shape. Adjust pilot to give the strongest and most stable flame signal through flame safety circuit. Normally 6" W.C. gas pressure is required at pilot. The signal strength (or range) will be determined by the specific type of flame safeguard you have with your boiler. Check positioning of stringer pilot tubes to insure good carryover from tube to tube.		
31.	Re-light and refine pilot gas adjustment and light off's as necessary to get reliable pilot ignition. With pilot established the flame safeguard should now power your main fuel shut-off valve(s) if (run, check) switch were turned to run position. CAUTION: After completing the steps above, re-check all interlocking safety components and circuitry to prove that they are properly installed, correctly set, and fully operational. If in doubt, shut the system down, close gas valves and contact responsible individual before proceeding further.		
32.	Light main burners at minimum setting as follows: First turn off all switches and turn flame safegaurd to run position, make sure ratio valve is at its minimum setting (which may be at position 3 thru 6). With gas pilot established and flame supervision system in operation, open the downstream fuel shut-off valve which will allow fuel flow to the blower mixer's ratio valve. There is a 10 second trial period for main flame establishment after pilot is established. If boiler does not ignite on first attempt slightly increase upstream gas pressure regulator setting. Repeat this procedure insure downstream valve is closed on each attempt. Verify that after fuel valves open a 3½" to 7" gas pressure is observed at Premix Blower gas inlet pressure tap. NOTE: At this point, it is more important to get any kind of a flame as soon a possible. The flame geometry can be adjusted and refined as needed later. If after increasing gas pressure regulator setting ignition does not occur, it may be necessary to increase allen screw setting at light off position. If after light off, flame becomes noticeably rich (usually orange), then slowly back the screw out until the flame becomes bright blue.		
33.	Once your flame is established and refined at this position, and without advancing the screw carrier quadrant higher, insure all screws are at least the same level as your first adjusted screws or lower. This is normally set at the factory. NOTE: A preliminary setting can be established with all the remaining adjusting screws. Generally, each succeeding screw needs to be screwed in approximately one additional full turn from the preceding screw. A smooth "stair step" gradient pre-set at this point from low to high will simplify the remaining adjustment steps.		
34.	Cycle boiler at low fire position for assured good light off of all burners.		
35.	With boiler running in low fire slowly advance the ratio valve quadrant to the next higher position. Adjust flame appearance at this new position if required. See general theory. Progressively work your way up through each adjusting screw position. With boiler doors closed check combustion with a NOx, CO, O2 analyzer, developing a smooth progression slope from your first screw to the "maximum" position. As each is adjusted, you must turn the remaining unadjusted screws in at least that far to prevent possible damage to flexible cam strips inside the ratio valve. NOTE: To adjust the flame at any position, you must move the ratio valve to the number you desire to adjust. This aligns the adjusting screw directly on top of the fuel valve plunger. A resulting adjustment of the screw is directly applied to the fuel valve plunger and its interconnected valve body linkage. Adjust the screw corresponding to the position at which the ratio valve has been set, and adjacent ones may be moved slightly. CAUTION: If flame is extinguished, immediately return ratio valve to minimum position and shut off fuel (if flame safeguard has not already done so). Turn in slightly on adjusting screw at point where flame was lost, then return ratio valve to minimum position, re-establish pilot, open fuel valve and verify ignition.		

	For Initial Premix Metal Fiber Burner System Start-up: (Continued)	Y	N
36.	Refine main gas regulator adjustment (if necessary) to give the required pressure. If a major adjustment is made, you may then need to re-adjust the set screws.		
37.	After adjusting through the full range , allow boiler to reach operating temperature and refine adjustment as needed for hot conditions.		
38.	Check all of the adjusting screws for tightness. If screws are loose, the gas air ratio may be affected. After a period of time, flame failures may result. Insure all screws are tight by applying teflon tape or by slightly adjusting threads.		
39.	Cycle burner from minimum to maximum and refine adjustment, if necessary.		
40.	<p>When burner performance is satisfactory and stable throughout the firing range, with all switches off re-connect linkage to quadrant.</p> <p>It must be assured that control linkage travel be such that burner quadrant is moved throughout its complete travel, or turndown will not be achieved. CAUTION: Internal drive mechanism within the control motor may be damaged if linkage is adjusted so as to cause bottoming out or binding with burner in high or low fire position.</p> <p>If less than full-rated burner capacity is required, linkage can be adjusted to limit maximum output. Record all data as shown in sample setting and on Combustion Analysis Report form.</p>		
41.	Plug all test connections not in use to avoid fuel leakage. Replace equipment cover caps and tighten linkage screws.		
42.	Check out overall system operation by cycling through light-off at low fire and allowing control system to cycle burner from minimum to maximum and return adjust modulating or hi-low controls. (Note: Manual/auto rate control operation should be verified at this time.)		
43.	<p>Re-check all safety system interlocks for proper setting and operation.</p> <p>WARNING: Test every UV installation for dangerous spark excitation from ignitors and other possible sources of direct or reflected UV radiation. Use only gas-tight scanner connections.</p>		
44.	Before system is placed into full service , instruct operating personnel on proper start-up, operation, and shut down of system. Establish written instructions for their future reference.		
45.	Completely go through installation and start up check off sheet and include this document as well as combustion report forms with start up sheet for file copy and owner.		

VII. List any items that are not approved as satisfactory or that may be questionable:

1. _____
2. _____
3. _____
4. _____
5. _____