

Installation Instructions

General Instructions

Important: Do not discard packing material until all loose items are accounted for.

To prevent damage in transit, the control valves, pipe trains, spark ignitor, combustion sleeve, mounting gaskets and connecting linkage components may be packed separately and shipped loose with your new Maxon MEGAFIRE® Burner.

The burner itself is normally only a part of your complete combustion system. Additional pipe train accessories and control components will be required for a complete system installation.

IB MEGAFIRE® Burner provides its own combustion air supply ("EB" version requires a separate combustion air blower). Both nozzle mixing burners serve as their own fuel/air mixing device.

Burner should not be exposed to direct radiant heat or positioned where it might draw in inert gases. If problems exist, consider relocation and/or use of the "EB" version and external air supply.

Electrical service must match the voltage, phase and cycle of all electrical system components and be compatible with burner nameplate ratings. Insure that all normal control safeguards are satisfied. Combustion air blower should continue to run after shutdown to allow burner to cool.

Gas supply piping must be large enough to maintain the required fuel pressures cataloged for the particular burner size used with burner operating at full-rated capacity.

Anything more than minimal distance or piping turns may necessitate "oversizing" piping runs to keep pressure drops within acceptable ranges.

If multiple burners are fed from a single gas train, care should be taken to minimize pressure drop and give maximum uniformity.

Clean fuel lines are essential to prevent blockage of pipe train components or burner gas ports.

Main Shut-Off Cock should be upstream of both the main gas regulator and pilot line take-off. Use it to shut off fuel to both pilot and main burner during shutdown periods of more than a few hours.

The fuel throttling MICRO-RATIO® Valve with a Maxon MEGAFIRE® Burner is not intended for tight shut-off.

Main gas regulator is essential to maintain a uniform system supply pressure. If one pipe train supplies multiple burners, provide a separate regulator in the branch leading to each burner system.

Size the regulator for full system capacity at the required pressure, carefully considering pipe train losses. Follow the instructions attached to the regulator during installation and be sure to remove any shipping pin or block.

Pilot take-off should be upstream of the main gas regulator, but downstream of the main gas cock. It should normally include its own pilot gas regulator, a solenoid valve, and shut-off cock. A pilot adjustable orifice at the pilot inlet simplifies adjustment.

Pilot piping must be large enough to provide for the full flow and pressures shown in the catalog for your particular burner size.

Fuel Shut-Off Valves (when properly connected to a control system) shut the fuel supply off when a hazardous operating condition is sensed. Manual reset valves require operator attendance each time the system is started up (or restarted after a shutdown). Motorized shut-off valves permit automatic start-restart when used with an appropriate control system.

Test connections are essential for burner adjustment. They should be provided immediately downstream of the regulator and are included in the burner itself. **Test connections must be plugged except when readings are being taken.**

Blower location must deliver a reasonably clean and cool air supply. Where external blowers are used, care must be taken to keep pressure drops to a minimum and to independently support the weight of air piping.

Gas, oil, and air piping should be located reasonably close to the burner and sized for the pressure and volume requirements of the burner, with supply pressures high enough to permit subsequent regulation at each burner. Gas piping drops should not exceed 10% of initial supply pressure.

NOTE: To prevent dripping of oil at shut-down, oil piping should include a means to purge the oil gun of unburned oil after firing. This can be accomplished with a steam or air atomizing purge sequence. Oil shut-off should be located as close as possible to the burner oil inlet.

Installation Instructions

For proper operation, atomizing train should include a low pressure switch, interlocked with the oil shut-off valve, installed downstream of the regulator, with no valving between that tap and the burner itself.

Oil pipe train should be located below the burner inlet. The oil solenoid valve must be interlocked with the low pressure atomizing air switch.

Control systems should provide all normally recommended interlocks (including operation of fuel shut-off valves). **Sequencing Control Systems** are available from Maxon that include provision for post-purge pilots during all but emergency shut-downs. This sequencing is essential to minimize risk of smoke during oil-fired shutdown.

Always re-establish gas pilot before shutting off oil.

For gas-and-oil combination firing, valves for both fuels must operate simultaneously on light-off and on shut-down.

For gas or oil firing, interlock fuel valves electrically so only one or the other can be used, **not** both together.

Oil shut-off valves should be installed as close as possible to burner for dependable light off. If not, oil may not reach the burner nozzle before flame safeguard "times-out".

Low fire start and interrupted pilot are essential to obtain cataloged minimums.

Burner and pipe manifold support will be required to support weight of the burner and connected pipe train components. Air control motors, in particular, require additional support. Maxon connecting base and linkage assemblies are designed to position the control motors to work with the burner, not to support their weight.

Horizontal mounting is preferred, but burner may be mounted in any position suitable for automatic control motor and UV scanner.

MEGAFIRE® Burner will typically be installed through a refractory wall or insulated air duct. Cut opening at least 2" larger in diameter than combustion sleeve to allow for thermal expansion of sleeve.

The MEGAFIRE® Burner requires external auxiliary support provided by the user. Lifting lugs are provided on the burner to assist in lifting and the alignment mounting of the MEGAFIRE® Burner.

Burner mounting requires 16 studs and a flat mounting surface perfectly centered on the combustion sleeve.

After placing burner in position over studs, add lock washers and nuts, then draw up all 16 hand-tight only. Check that burner is seated evenly all around the flange, filling any gaps to prevent air leakage, then tighten all nuts firmly.

For proper performance of any burner, air inlet and motor should be surrounded by clean, fresh, cool air.

Additional burner support will be required in conjunction with a "stiffener plate" when mounting MEGAFIRE® Burner (weighing 650-1000 pounds) through typical thin wall of heater/oven panels.

Combustion sleeve must be flush with, or extend beyond, interior wall.

An external viewing port should be provided for flame observation, preferably in such a position that burner pilot and main flame can both be seen.

Flame sensing must be accomplished by UV scanner. UV scanner should be kept as close to burner as feasible. Heat block, if used, may affect signal strength with some brands of scanners.

Alternate fuels may require correction of supply pressures.

Maxon assumes no responsibility for the use or misuse of the layouts shown. Specific piping and wiring diagrams should always be submitted to the appropriate agencies for approval on each application.

Multi-burner installations require special considerations if supplied by a common pipe train and/or air supply. **Air Balancing Valves** and separate burner gas pressure regulators should be used for improved heating uniformity; **Gas Swing Check Valves** should be installed as close as possible to each burner inlet for dependable light-off (gas manifold may otherwise act as a reservoir, preventing light-off during trial-for-ignition period).

Control system's circuitry must not allow main Fuel Shut-Off Valve to be opened unless combustion air is on, and must de-energize valve upon loss of combustion air pressure, along with the other usual system interlocks. Motor starter is to be interlocked with valve, whether or not a combustion air pressure switch is used.



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Start-Up Instructions

Read complete instructions before proceeding, and familiarize yourself with all the system's equipment components. Verify that your equipment has been installed in accordance with the original 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 knowledge of the overall installation. Instructions provided by the company and/or individuals responsible for the manufacture and/or overall installation of complete system incorporating Maxon burners take precedence over these provided by Maxon. If Maxon instructions conflict with any codes or regulations, contact Maxon Corporation before attempting start-up.

For initial system start-up:

1. Close all burner fuel valves and/or cocks. Make preliminary adjustments to fuel regulators and oil back pressure relief valves. Check oil supply system to be free from air entrainment.
2. Check **all** electric circuitry. Verify that **all** safety devices and interlocks are operable and functioning within their respective settings/ranges. Be sure all manifolds are tight and that test ports are plugged if not being used.
3. Check that all duct and chamber dampers are properly positioned and locked into operating positions.
4. Start **all** system-related fans and blowers. Check for proper motor rotations and impeller direction. Verify safety interlocks are working. Allow air handling equipment to run for adequate purge of manifold and combustion chamber plenums.

CAUTION: Do not by-pass control panel timers typically controlling sequential operations.

5. Using 3/16" allen wrench, disconnect the automatic control motor(s) linkage from Maxon SYNCHRO Control Valve by loosening the control motor's connecting rod from the valve's toggle linkage. Initial start-up adjustment should only be accomplished during a manual control mode.

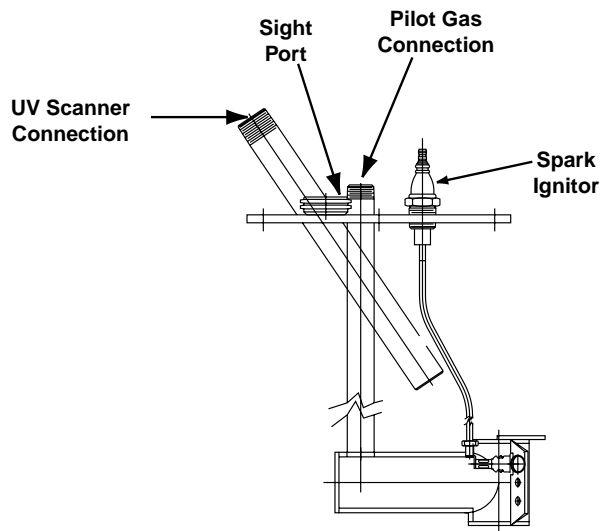
6. Prepare Maxon SYNCHRO Control Valve(s) for initial fuel firing adjustment. (See catalog pages 7000-S-1 through 4.) Remove screw carrier cover plate(s) from top of fuel control valve(s) exposing multiple adjusting screws. If multiple fuel arrangement, adjust linkage rods and toggle arrangements between SYNCHRO Fuel Valves, so that all fuel control valves travel together (from minimum to maximum positions). Leave SYNCHRO Fuel Valve(s) at minimum position, as shown by pointer on the position indicator strip.
7. Temporarily shut down MEGAFIRE® Burner blower and remove the access hatch cover entrance into your MEGAFIRE® Burner housing. This permits observing the internally mounted air shutter. Adjust length of the flexible operating cable by screwing the rod end bearings on either end of the cable to insure that when the fuel valve is at minimum position, the air control shutter is completely closed. At maximum setting position for the fuel valve(s), the air control shutter must have been pulled to its full open position.

Once the air control shutter positions are confirmed with regard to the fuel valves' minimum and maximum positions, the access hatch cover(s) must be replaced. Restart MEGAFIRE® Burner's combustion air blower.

8. Verify differential air pressure setting. With combustion air blower on and all volume air fans operating, connect a manometer between the 1/4" diameter air test connection on MEGAFIRE® Burner and your combustion chamber static pressure connection. This differential pressure reading (burner over combustion chamber) should be set per values on page 2604. Obtain this setting by either adjusting inlet air control valve (on EB MEGAFIRE® Burner) or combustion chamber shutters involved with IB MEGAFIRE® Burner applications.
9. With combustion air fan on, pilot gas regulator should initially be set at approximately midpoint of its adjustment range (range equals 0.5–5 inches wc). With pilot gas solenoid closed, open pilot gas cock. Energize spark ignitor and pilot gas solenoid. Observe pilot ignition through sight port of pilot assembly and/or by viewing micro-amp signal metered from flame safeguard relay circuit.

Start-Up Instructions (cont'd.)

MEGAFIRE® Raw Gas Pilot



Refine pilot setting for a hard blue flame (and/or strongest micro-amp signal) by adjusting gas flow through pilot regulator.

Shut off pilot gas cock to extinguish pilot fire. Reopen and confirm easy re-ignition several times. The flame safeguard relays should now power the main fuel Shut-Off Valves.

- 10.** To light and adjust MEGAFIRE® burner on **oil**: With gas pilot established and flame supervision system operational, the atomizing flow (either compressed air or steam) must be introduced to the burner's atomizing inlet. Verify that pressure and volume of atomizing media is being supplied to the burner inlet per catalog specifications.

Verify that oil supply pump is on. Verify **all** safety interlocks are operational before opening **any** main and/or individual burner oil valves.

With manual oil valve open, oil will flow to the Oil SYNCHRO Valve which is on minimum and the air control shutter is closed.

NOTE: The **oil** start-up procedure can advance to step #14.

- 11.** To light and adjust MEGAFIRE® Burner on **gas**: With gas pilot established and flame supervision system operational, opening the main fuel Shut-Off Valve(s) will allow fuel flow to the SYNCHRO Fuel Control Valve.

NOTE: At this point, refer to pages 2605-2607 for pressure settings versus valve position for each size MEGAFIRE®, oil and gas.

- 12.** To establish full range of burner's gas capacity: With gas flowing to burner, the first adjusting screw on your SYNCHRO gas valve is ready for adjusting.

- 13.** To adjust SYNCHRO Fuel Control Valve(s): Turn SYNCHRO Valve to minimum. Open upstream fuel cock. Using the allen wrench provided, turn that adjusting screw down (clock-wise) to permit fuel to flow to your MEGAFIRE® Burner. The **gas** will come out of the radial spokes inside your burner assembly. The **oil** flows out the nozzle in the center of the burner cone.

NOTE: At this point, it is more important to get any kind of a flame as soon as possible. The flame geometry can be adjusted and refined as needed later.

Once your flame is established and refined at this position, and without advancing the screw carrier quadrant higher, screw all remaining screws down to at least the same level as your first adjusted screw.

NOTE: A preliminary setting can be established with all the remaining adjusting screws. Generally, each succeeding screw needs to be screwed in approximately one full turn deeper than its preceding screw. A smooth "stair-step" gradient pre-set at this point from low to high will simplify the remaining adjustment steps.

CAUTION: Oil flames are highly radiant. Use eye protection and avoid prolonged viewing. Prepare to shut off oil quickly if there is a noticeable drop in oil pressure or if ignition does not occur.

- 14.** Without advancing the SYNCHRO Valve quadrant, screw down on #2 screw (one or two turns). Then slowly advance the SYNCHRO Valve quadrant to the #2 position. Adjust flame appearance at this new position #2.

NOTE: If firing chamber is of refractory construction, allow your MEGAFIRE® Burner system to operate at this low setting for the necessary dry/cure-out time period recommended by the chamber or refractory manufacturer. Then continue adjustments of SYNCHRO Valve.



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INDUSTRIAL COMBUSTION EQUIPMENT AND VALVES

Start-Up Instructions (cont'd.)

Again, without moving SYNCHRO Valve, bring #3 and all remaining adjusting screws down to the same level as #2 screw.

NOTE: If approximate pre-set gradient was made earlier, the remaining screws will already be at or below appropriate levels.

Progressively work your way up through each adjusting screw position, developing a smooth progression slope from your first screw to the "maximum" position.

NOTE: To adjust the flame at any position, you must move the SYNCHRO 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.

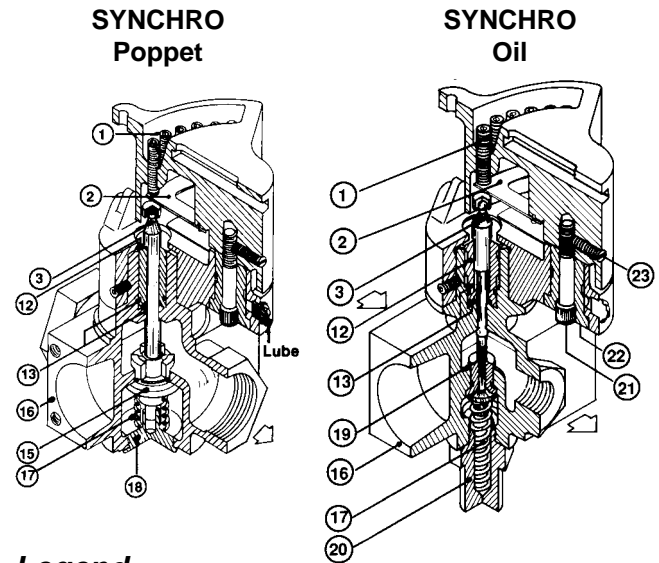
15. Cycle burner from minimum to maximum and refine adjustment, if necessary. Always set SYNCHRO Valve to the numbered position you wish to adjust.

For operation with interrupted pilot (as recommended), shut off pilot and cycle burner from minimum to maximum and back several times to verify the flame is maintained.

16. Reconnect linkage to control motor, plug all test connections, replace equipment cover caps and tighten linkage screws.
17. Check out overall system operation on all fuels by cycling through light-off at minimum, interrupting pilot, and allowing temperature control system to cycle burner from minimum to maximum and return. Recheck all safety system interlocks for proper setting and operation.

CAUTION: Test every UV installation for dangerous spark excitation from ignitors, and other burners, direct or reflected UV radiation.

18. Before system is placed into full service, instruct operator personnel on proper start-up operation with shutdown of system, establishing written instructions for their future reference.



Legend

Item	Description
1	Adjusting Screws
2	Cam Springs
3	Plunger/Cap Assembly
4	Plunger Bushing
5	Set Collar
6	Operating Crank
7	Upper Spring Retainer
8	Gas Valve Spring
9	Spring Return Shaft
10	Shaft Retainer
11	Lower Spring Retainer
12	Packing Collar
13	O-Rings
14	Operating Shaft
15	Valve Disc
16	Valve Body
17	Valve Disc Spring
18	Valve Disc Guide
19	Valve Stem
20	Spring Support Plug
21	Stud Bolt
22	Bushing
23	Locking Screw

CAUTION: If flame is extinguished, immediately return SYNCHRO 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 ignition was lost, then return SYNCHRO Valve to minimum position, re-establish pilots, open fuel valve and verify ignition.

Notes



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