

FIREYE MODULAR M-SERIES II FLAME SAFEGUARD CONTROLS

M1R CONTROL WITH MC120 CHASSIS, MP100 PROGRAMMER, MART1 RECTIFICATION AMPLIFIER

Fireye M-Series II Flame Safeguard Controls (M1R) provide automatic ignition and flame safeguard control on certain size Parker Atmospheric Gas Fired Boilers. Flame monitoring is accomplished with a flame rod detector. M1R is a modular control package with three replaceable components; MC120 Chassis and dust cover, MP100 Programmer and MART1 Flame Rectification Amplifier with 2-4 second Flame Failure Response Time. Trial for ignition is 10 seconds. Using a pilot ignited burner, this control monitors the pilot or pilot and main flame, depending on the system and prevents the main fuel valves from being energized until the pilot flame is proven. LED status indicator lights are furnished on the programmer module. In the event of ignition failure, or following a safety shutdown, the lockout switch trips, activating an alarm circuit. Manual Reset is required. Test jacks are provided to permit flame signal measurement during operation.

M Series II Controls incorporate a safety checking circuit that is operative on each start. If flame (real or simulated) is detected prior to a start, the fuel valves will not be energized, and the unit will lockout. M Series Controls are UL Listed.

WARNING: All service work on Flame Safeguards should be performed by competent, trained Flame Safeguard Service Personnel.

CAUTION: While all controls in the M Series are mechanically interchangeable in that they mate with a common wiring base, you should select the correct replacement model for your boiler. Inappropriate application of a control could result in an unsafe condition hazardous to life and property. The M1R is the correct replacement for the TFM1F.

LED INDICATOR LIGHTS

The MP100 Programmer Module has 5 LED lights to indicate the following operating conditions of the control:

OPR CTRL (Operating Control): This LED is energized whenever the control switches, limit switches, operating controls and fuel interlocks are energized powering Fireye Terminal #7, indicating a call for heat.

AIR FLOW: This LED is energized whenever power is detected between Fireye Terminals #8 and #6. These terminals are jumpered on Parker Atmospheric Gas Boilers and this light will cycle with the OPR CTRL LED.

PTFI: This LED is energized only during the Pilot Trial for Ignition Period. If a separate "Pilot On" Indicator Light is furnished on the Boiler Panel, it indicates whenever the pilot valve is energized.

FLAME: This LED is energized whenever a flame signal is detected by the Flame Detector. If a separate "Burner On" Light is furnished on the Boiler Panel, it indicates whenever the Main Fuel Valves are energized.

ALARM: This LED is energized whenever a safety lockout occurs. (See APPLICATION and FUNCTION).

WARNING: Controls require safety limits utilizing isolated mechanical contacts. Solid state limit switches are not acceptable and should not be used due to their high leakage currents.

INSTALLING THE PROGRAMMER AND AMPLIFIER MODULES:

WARNING: Remove power from the control before proceeding.

Select the appropriate programmer and amplifier modules for your application. Remove the dust cover from the chassis. Insert the amplifier module into the slot in the center of the chassis and gently push the module into position. Insert the programmer module into the slot at the right side of the chassis and gently push the module into position.

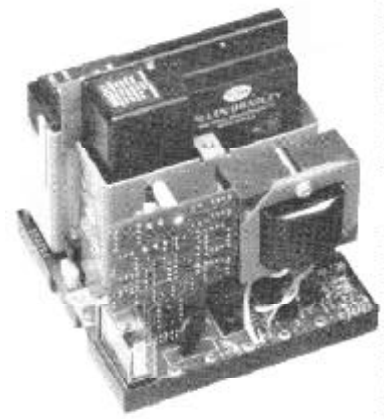
WARNING: Installing the Control: Turn off the power when installing or removing the control.

APPLICATION AND FUNCTION - MP100

The MP100 Programmer Module is designed as a replacement for the Fireye M1 Series Controls. It provides Ignition and Flame Safeguard for heating or process gas fired boilers.

PILOT IGNITED BURNERS: See BOILER WIRING.

1. Power is applied, and the limit-operating control circuit is closed (OPR CTRL LED lit). The air flow switch circuit is normally jumpered (AIR FLOW LED lit).
2. Following a short-time delay (2 to 5 sec.), a relay closes, energizing Fireye Terminal 3 which powers the pilot gas valve, and Fireye Terminal 4 which powers the spark ignition *. A 10 sec. trial for ignition is initiated (PTFI LED lit).
3. When pilot flame is detected (FLAME LED lit), another relay is powered, energizing Fireye Terminal 5 which powers the main fuel valve, and de-energizing Fireye Terminal 4 which shuts off the spark ignition.*
4. When the operating control opens its circuit, or if a power failure occurs, the control is de-energized. Power interruptions in the millisecond range do not affect the operation of the control. Power interruptions of longer duration will cause the control to recycle.
5. In the event the pilot flame is not detected by the end of the trial for ignition period, the pilot gas valve and spark ignition are de-energized. A safety lockout occurs which energizes the lockout alarm circuit (ALARM LED lit) approximately 30 seconds after the safety lockout occurs.



TYPICAL M1R CONTROL

PARKER BOILER CO.**FIREYE MODULAR M-SERIES II FLAME SAFEGUARD CONTROLS****M1R CONTROL WITH MC120 CHASSIS, MP100 PROGRAMMER, MART1 RECTIFICATION AMPLIFIER****PILOT IGNITED BURNERS:** See BOILER WIRING. - (Continued)

6. In the event of a flame failure during a firing period, the main fuel valves are de-energized and the spark ignition re-energized*. A 10 sec. relight trial for ignition is initiated (PTFI LED lit). If flame is detected (Flame LED lit) during the trial for ignition period, the main fuel valve is re-energized and the spark ignition de-energized. If flame is not detected during the trial for ignition period, the pilot gas valve and spark ignition are de-energized. A safety lockout occurs which energizes the lockout alarm circuit (Alarm LED lit) approximately 30 seconds after the safety lockout occurs.

7. Manual reset is required following any safety lockout.

NOTE: Wait 10 seconds after lockout before resetting the control. Power must be "On" to reset control.

The above sequence of operation is standard on Parker Atmospheric Gas Fired Boilers 2500 MBTU Input and smaller. It provides relight operation with an intermittent pilot and interrupted ignition.

* To provide for Non-recycle operation, which is required by UL above 2500 MBTU Input and by FM and IRI on all sizes: Parker atmospheric gas fired boilers may have: (1) the ignition wired to Fireye Terminal #3. Ignition cycles with pilot valve for intermittent pilot and ignition. (2) the ignition and pilot valve wired to a time delay relay which is wired to Fireye Terminal #3. This provides interrupted pilot and ignition. Spark ignition does not re-energize on these systems.

INSTALLATION TESTING**USE OF TEST METER (ALL CONTROLS)**

Testing the Fireye Modular M-Series II Controls requires the use of a test AC-DC multimeter, with a 1000 ohm/volt DC rating or greater, or a digital meter with 500K input impedance or greater.

With the test meter on the DC scale, and the test meter leads inserted into the test jacks on the amplifier module, a steady DC voltage reading of 14 to 18 volts for flame rectification amplifiers should be obtained when the controls are detecting flame, and zero volts when no flame is present.

With the test meter on the AC scale, line and load voltage may be measured at the identified test points on the chassis.

On the Modular M-Series II Controls utilizing a flame rectification amplifier, a micro-ammeter may be connected in series with the wire to Terminal S2. Normal flame will produce a meter reading between 4 and 10 micro-amperes.

FLAME SIGNAL TESTING (ALL CONTROLS)

1. Manually shut off the main fuel valve for a pilot ignited burner.
2. Set the test meter on the DC scale and insert the test leads into the test jacks on the amplifier module. Normally Upper Jack-Red = Plus, Lower Jack-Black = Negative. (If the meter reads backwards, reverse leads).
3. Initiate a normal startup.
4. When flame is established, the test reading should be normal: a steady DC voltage reading of 14 to 18 volts (for flame rectification amplifiers).
5. Inadequate flame signal may be improved by:
 - A. Assuring that the flame detector and wiring installations are correct.
 - B. Assuring that the flame detector is clean and within the ambient temperature limits.
 - C. Assuring that the flame is sufficiently large to detect.
 - D. Assuring that the flame quality (fuel to air ratio, combustion air velocity) is satisfactory.

WARNINGS: DO NOT TOUCH a flame rectification rod with power applied. A minimum pilot test must be accomplished by a trained and qualified burner technician.

FLAME FAILURE TEST

1. Follow lighting Instructions and initiate a normal startup.
2. Manually shut off pilot and downstream gas cocks. Observe loss of flame signal on the test meter.
3. Make certain that electric fuel valves close on loss of flame signal.
4. If flame signal does not reduce to zero within the flame failure response time of the control (2-4 Seconds) or lockout does not occur, replace control.

RECOMMENDATION

Periodic Safety Check: Test the complete flame safeguard system at least once a month. This test should verify flame failure safety shutdown and positive fuel cutoff when the fuel valves are de-energized.

REPLACEABLE FUSE

The programmer modules are designed with a field replaceable fuse. The fuse is located on the printed circuit board near the connectors. In the event the fuse becomes shorted, the Operating Control, Air Flow and PTFI LED's will light. However, control will not be energized and the control will lock, out. To replace the fuse, remove the fuse (using a small screwdriver) and install a Fireye replacement fuse (P/N 23-171).

MAINTENANCE: Clean flame rod with emery cloth if necessary.

ROTATION: It is recommended that units purchased as spares be rotated periodically, so that each unit will be placed in operation every 90 days.

STANDING PILOT BURNERS:

When using an MP100 with an MART1 amplifier to control a burner having a standing pilot, clip out the red wire loop close to the edge of the circuit board. This eliminates pilot proving when the main burner is off and requires pilot flame proving during the subsequent start-up.