

BURNERMATE TS MODEL BMTS-FSG

Flame Safeguard System

Application

The BurnerMate TS Model **BMTS-FSG** Flame Safeguard System provides automatic flame safety monitoring and control for new or existing steam or hot water boilers. The system is engineered to be in compliance with the latest Factory Mutual and NFPA 85 standards. The systems are manufactured, tested and labeled according to UL508A standards.

Key Features

- Microprocessor-based Controller – The Flame Safeguard System is microprocessor-based, with self-diagnostics and non-volatile memory.
- Flame Scanners – An infrared (IR) flame scanner is provided as a standard for water-wall furnaces. An ultraviolet (UV) self checking flame scanner is an available option for refractory lined furnaces. The Flame Safeguard System provides the proper burner sequencing, ignition and flame monitoring protection on single burner, automatically ignited oil or gas fired boilers.
- The system uses a fail-safe “de-energize” to trip design. Upon the loss of system power the fuel safety shutoff valves are automatically closed and ignition components are de-energized.
- Message Display – An externally-mounted LCD backlit display has two lines of sixteen characters each. The display provides burner status and historical information. Operation, troubleshooting and maintenance information is at the boiler front, where it is needed. On a safety shutdown, the message display will advise the operator that the control is in “Lockout” and will indicate the specific cause and the state in the operating sequence where the shutdown occurred.
- Combustion Control Sequence Interlocks – Combustion control system interfaces are provided to ensure safe automatic fuel and air sequencing for purge, light-off and shutdown.
- Drum level conductivity probe relays are incorporated for an auxiliary Low Water Cutout safety interlock, Low Water Alarm and High Water Alarm.

Specifications

Operator Control Panel

Touchscreen: OIT-10 or OIT-15
Display: 2 line x 16 character LCD display
Pushbutton: Membrane, tactile feedback

IR Flame Scanner: Infrared, ½" 90° angle mount, 96" cable

UV Flame Scanner: Ultraviolet 1" NPT mount, 72" lead

Ordering Information

Optional Features	Add Suffix to BurnerMate TS Catalog Number
Flame Safeguard	Add “-FSG” suffix

Consult Factory for suggested specifications and ordering information for Low Fire Fuel Change Over “LFCO,” Simultaneous Dual Fuel Firing, and Automatic Atomizer Post Purge functions.

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Suggested Specifications

1. Application

Integral to the control system shall be a Burner Management System (BMS) / Flame Safeguard System (FSG) with 10" (or 15") color touch screen. The system shall be designed to ensure the safe start-up, on-line operation and shutdown of fuel firing equipment. Burner management system components shall be located in the combustion control cabinet and shall be fully integrated for automatic sequencing of light-off and shutdown. Numbered terminal strips shall also be provided to permit termination of all field wiring.

2. Microprocessor

An industrial duty microprocessor-based FSG shall provide: safety interlocks, flame monitoring protection and timed sequences. Sequences shall include forced draft fan start and stop, furnace purge, burner light-off and shutdown and post-purge. The FSG shall be capable of firing two fuels, one fuel at a time. Fuel changeover shall require boiler shutdown. FSG components shall be located in the combustion control enclosure and shall be fully integrated for automatic sequencing of light-off and shutdown. The following color touch screen graphic pages shall be provided: Boiler Overview, Flame Safeguard Overview, Control Panel Faceplate with real time and historical trending, Set up and Commissioning screens, and Boiler Alarm. Graphic pages shall display flame signal strength, startup and shutdown sequence status, alarm, system diagnostic, first-out messages and burner historical information. Historical information shall include the last six lockout conditions, number of burner cycles and burner hours. The system shall include a "System Reset" pushbutton and "FD Fan "HAND-OFF-AUTO", "Burner Off - Fuel Select Gas - Oil" control switches and alarm horn. Drum level conductivity probe relays for low level cutout, low level and high level alarms shall be provided. Provision shall be made to allow for water column blowdown without tripping the boiler. Provide one (1) flame scanner for each burner.

3. Communications

The flame safeguard controller shall be equipped with an optically isolated RS485 modbus communications data highway connection to the color touch screen. The touch screen shall communicate with the plant BAS, EMS, or DCS by a Modbus over Ethernet communications data highway and shall allow reading of the following information: flame signal intensity, sequence of operation messages, diagnostic messages, "First Out" cause of lockout messages, last six lockout conditions, number of burner cycles and burner operating hours. Provide all equipment capabilities specified in this paragraph, even if a connecting SCADA system is not included in this project.

4. Quality Assurance

The system shall be factory manufactured and tested according to UL508A requirements. The system shall be designed to ensure the safe start-up, on-line operation and shutdown of fuel firing equipment. The system shall comply with NFPA 85. Per NFPA 85 "1.9.3.2.3 Requirement for Independence", the flame safeguard system shall be provided with independent logic and power supplies and shall be physically separated from the combustion control logic. The control system shall be a Preferred Instruments, Danbury, CT, **BurnerMate TS Model BMTS-FSG**.

Specifications

BurnerMate TS Control Panel

Touchscreen: OIT-10 or OIT-15
Input Power: 120 VAC (+/- 15%)

Inputs

Recycling High Steam Pressure	Dry Contact
Flame Scanner	Scanner Input
*High Drum Level	Water Probe
*Low Water Level	Dry Contact
Emergency Stop Pushbutton	Dry Contact
Low Draft Switch	Dry Contact
Low Water Cutout	Dry Contact
Auxiliary Low Water Cutout	Dry Contact
Blowdown Pushbutton	Dry Contact
Excessive High Steam Pressure	Dry Contact
Purge Air Flow Switch	Dry Contact
Minimum Air Flow Switch	Dry Contact
*Low Instrument Air Pressure	Dry Contact
Fan Motor Started	Dry Contact
*VSD Running and No Alarms	Dry Contact
Fuel Oil Temperature Low	Dry Contact
*Fuel Oil Temperature High	Dry Contact
Fuel Oil Pressure Low	Dry Contact
Low Atomizing Medium Flow	Dry Contact
Low Atomizing Medium Pressure	Dry Contact
Fuel Gas Pressure High	Dry Contact
Fuel Gas Pressure Low	Dry Contact
Low Fire Air Switch	Dry Contact
Air Damper Proof of Open	Dry Contact
*Draft Damper Proof of Open	Dry Contact
*FGR Damper Proof of Closure	Dry Contact
Fuel Gas SSOV Proof of Closure	Dry Contact
Fuel Oil SSOV Proof of Closure	Dry Contact
Fuel Gas Control Valve Low Fire	Dry Contact
Fuel Oil Control Valve Low Fire	Dry Contact

Outputs

Energize Igniter	120 VAC
Open/Close Igniter SSOV	120 VAC
Open/Close Gas SSOV	120 VAC
Open/Close Oil SSOV	120 VAC
Open/Close Atomizing Valve	120 VAC
Limits (to Lead/Lag)	120 VAC
Lockout (to Lead/Lag)	120 VAC

*These features are standard, but their use is selectable at time of start-up.