PILOT PRO™

IGNITION SERIES

OPERATIONS MANUAL

The Combustex Pilot Pro™ 550

Ignition System with Pilot Tip and Flame Sensor

COMBUSTEX
BURNER IGNITION & CONTROL SYSTEMS

VERSION 7.2

CANALTA CONTROLS GROUP

KEY FEATURES

- Strong, Reliable Ignition & Pilot Flame
- Rapid Flame Response
- Fully Protected Ignition Lead
- Low Fuel Gas Consumption
- Robust Aluminum / SS Construction
- External Mount for Easy Maintenance
- Rated for Class 1, Div. 2 Hazardous Locations
- B149.3 Compliance *

** When installed with a BMS-2000 Series Burner Management System.*

TECHNICAL SPECIFICATIONS

Electrical

Environment	CSA C22.2 Class 1 Div. 2 Groups B, C and D Hazardous Locations
Power Supply	24 VDC
Current Draw	75mA (normal operation)
Ignition	25 KV

Fuel Gas

Fuel Type	Natural Gas or Propane
Working Pressure	7 - 9 Psi
Maximum Test Pressure	15 Psi
Fuel Consumption	8 SCFH, 16,500 BTU/Hr. (nat. gas)

Physical

Operating Temperature	-40° to +40° C
Materials and Parts	Aluminum, SS
Supply Port	3/8" Tubing
Mounting	1" NPT Nipple
Insertion Length	12" through 72"

The Combustex Pilot Pro™ 550

Ignition System with Pilot Tip and Flame Sensor

OPERATIONS MANUAL

Combustex recommends that this manual be read thoroughly *before* attempting installation or operation of the Pilot Pro™ 550. SAFETY FIRST.

CONTENTS

OPERATIONAL DESCRIPTION

The Pilot Pro™ 550 Electronic Ignition Assembly provides the three primary functions required to establish and maintain pilot flames reliably and safely:

- Pilot flame ignition
- Flame rod flame sensing
- Contained and non-intrusive lighting

This unit is normally installed with a Combustex BMS-2000 Series Burner Management System or similar type of sequencing apparatus. The Pilot Pro™ Series igniters have been designed and built around the features of the BMS-2000. All Pilot Pro™ 550 units are function tested on a BMS-2000 sequencer prior to shipment from the factory.

A clean natural gas or propane supply is required on the supply port. When the pilot fuel gas valve is opened supplying the igniter with fuel gas, an ignition signal is sent to the electronic ignition assembly from a controller for an 8 second (max.) period. When the pilot gas ignites, a flame rod sensor provides a signal for flame detection. This signal should be used to establish a threshold to indicate flame or flame failure.

COMBUSTEX
BURNER IGNITION & CONTROL SYSTEMS
A Canalta Controls Company

For operational, technical or installation assistance, please contact us.

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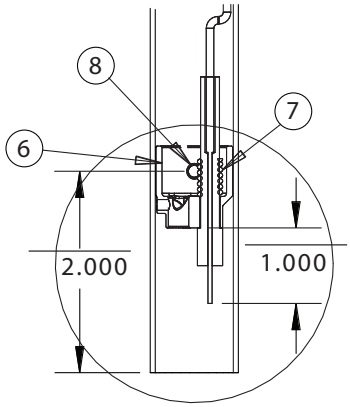
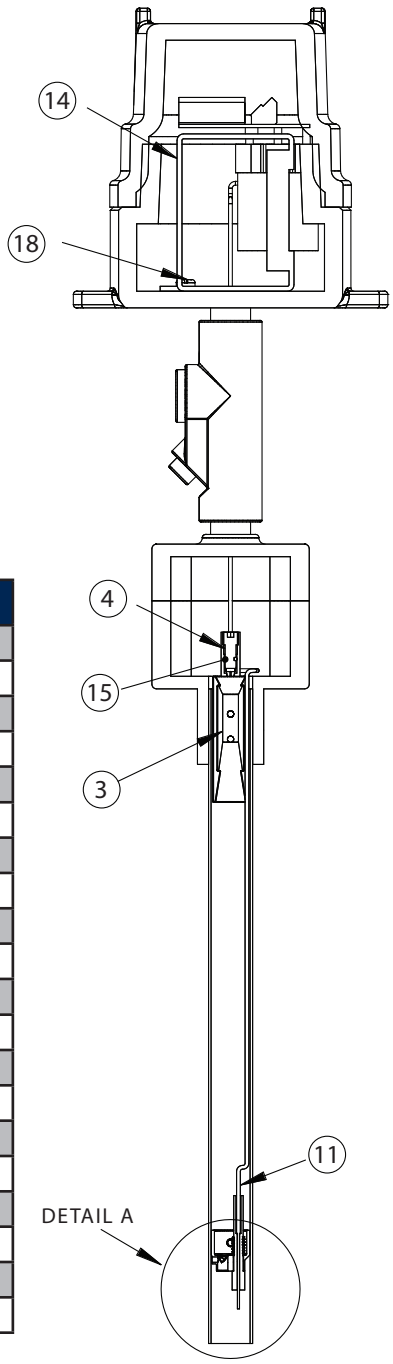


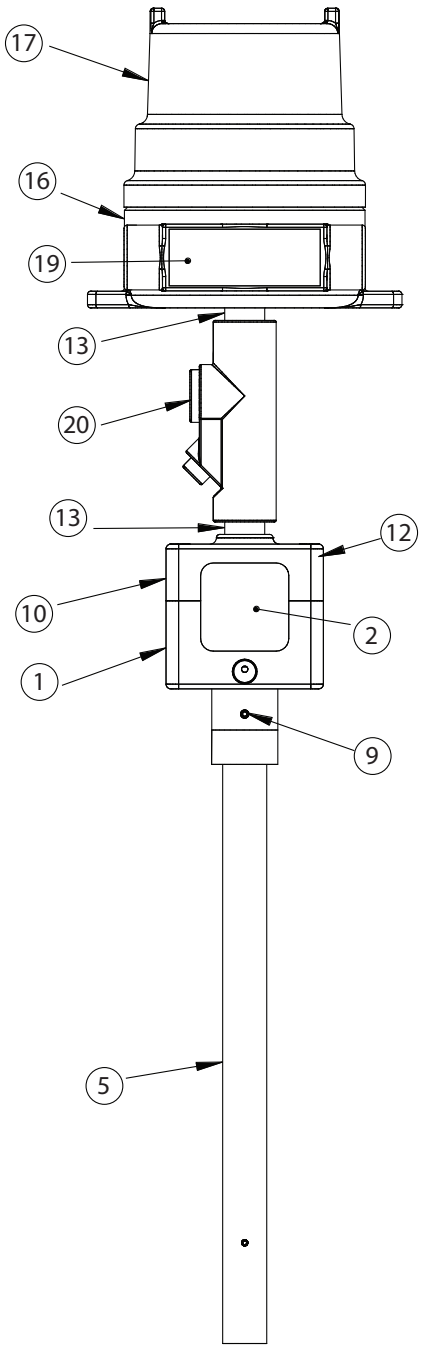
DETAIL A
SCALE 1 : 2

Item	Qty.	Description	Part No.
1	1	Bottom Body	1007
2	1	Flame Arrestor	1080
3	1	Venturi	1084
4	1	Pilot Jet	1006
5	1	7/8 x 0.049 SS Tubing	1083-(1 through 6) ★
6	1	Burn Tip	1089A
7	1	Ceramic Retainer Spring	1098A
8	2	Burn Tip Dowel Pin	1090
9	1	Venturi Set Screw	1101
10	1	Top Body	1005A
11	1	550 Ignition Lead Wire Assembly	2044-(1 through 6) ★
12	4	1/4-20 x 1-1/4 Socket Cap Screws	1082
13	2	1/2" Close Nipple	1015
14	1	Ignition Module	1590
15	1	Pilot Valve O-ring	1099
16	1	Cl. 1, Div I & II Enclosure Base	1031
17	1	Killark HK2D Cap	1032
18	2	10-24 x 5/16 Screw	1058
19	1	Serial Number Tag	1404
20	1	1/2" Aluminum Electrical Seal	1014

★ *Part number suffix indicates insertion length.*
E.g. 2004-2 = 2 ft. insertion length.



SECTION VIEW



BOTTOM VIEW

INSTALLATION GUIDELINES

MOUNTING

The mounting location chosen on the vessel should be determined by

- Operator accessibility and visibility
- Entry into the fire tube
- Ease of tubing installation

The recommended mounting configurations of the Pilot Pro™ 550 are

- Side Angle Mount - (see drawing p. 4).
- Parallel Mount - Front side of the fire tube directly below the main burner with the tip of the pilot vertically aligned with the tip of the main burner. (See drawing p. 5)

Side angle entry has the advantage of a shorter pilot assembly, making maintenance easier and tending toward a more stable flame in the fire tube. However, the welding procedure in this configuration is more difficult.

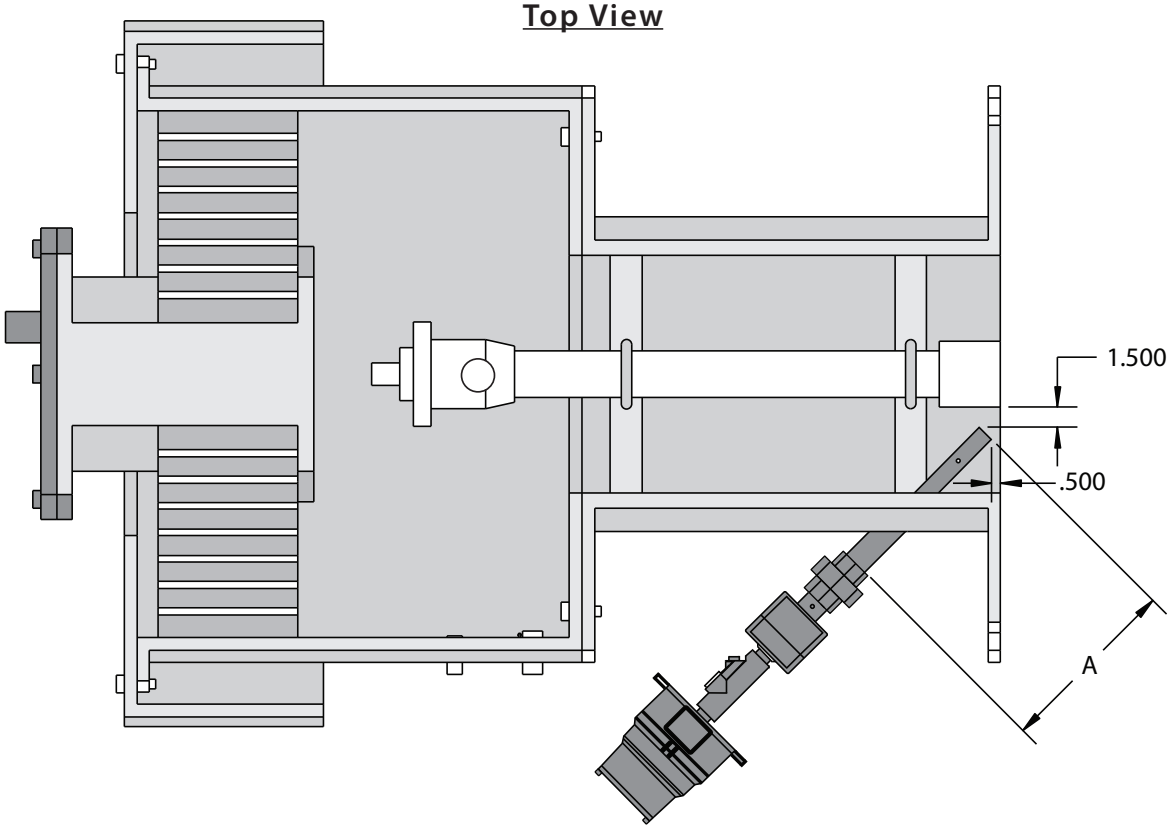
The Pilot Pro™ 550 is stocked and available in standard lengths of 12", 18", 24", 36", 48" 60" and 72". Custom lengths can be manufactured by special order. A 1" nipple welded squarely to the fire tube end plate or side is required for mounting with the length adjusted to match standard "A" dimensions (see drawings) wherever possible. Where the igniter length exceeds 48", it should be supported at about midpoint within the fire tube with either a 'J' bracket or cross support.

When threading the Pilot Pro™ 550 body onto the mounting nipple, ensure that an approved aluminum thread lubricant is used. Rotate the body until it sits snug against the supply port on the bottom.

Combustex Pilot Pro™ 550

Side Angle Mount Pilot Burner Installation

Top View



Dimensions given above are approximate.

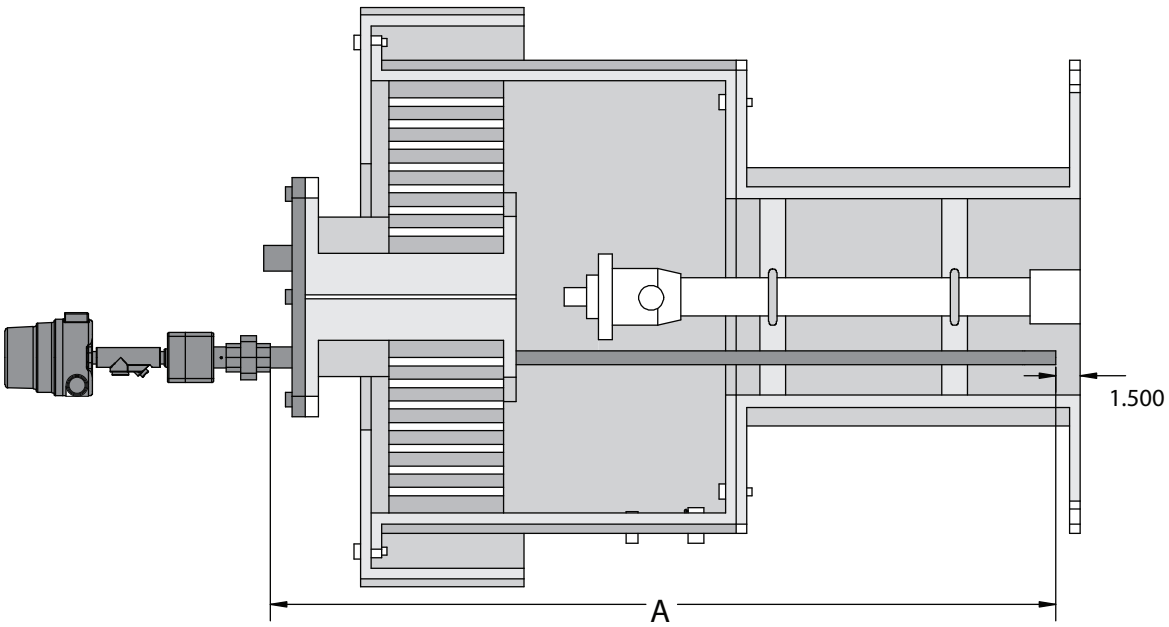
Notes

- "A" dimension (length from outside end of 2" or 3" nipple to tip of main fuel nozzle) required when ordering prefabricated units. Size to standard lengths where possible.
- End of Pilot Pro™ 550 igniter unit should be approximately 1.5" behind main burner. Pilot flame extends out approximately 5 inches. Igniter **SHOULD NOT** be installed with tip extending past the end of the main burner.
- Actual position of unit may vary depending on the angle of the mount.

Combustex Pilot Pro™ 550

Parallel Mount Pilot Burner Installation

Top View



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- "A" dimension (length from outside end of 2" or 3" nipple to tip of main fuel nozzle) required when ordering prefabricated units. Size to standard lengths where possible.
- End of Pilot Pro™ 550 igniter unit should be approximately 1.5" behind main burner. Pilot flame extends out approximately 5 inches. Igniter **SHOULD NOT** be installed with tip extending past the end of the main burner.

PIPING

The Pilot Pro™ 550 is normally installed with a Combustex BMS-2000 Series Burner Management System or other similar type of sequencing apparatus. P&ID drawings for the igniter unit are included in the BMS-2000 literature. Installation as per these Combustex-approved drawings is recommended. If the unit is to be installed with a controller other than the BMS-2000, consult the manufacturer's literature for proper piping arrangements.

A clean, steady gas supply is required for optimum reliable operation. It is recommended that a filtered instrument regulator be installed upstream of the unit directly at the point where the instrument gas is tapped off of the main fuel gas line.

The Pilot Pro™ 550 is rated for sour gas service, with higher maintenance requirements expected when operated on this type of gas. Where only sour or extreme wet gas is available for fuel, it may be advantageous to operate the pilot and instruments from an auxiliary propane source.

For installations where only wet fuel gas is available, it is recommended that a coalescing filter be installed on the pilot gas at a point before the gas leaves the heated building or, in cases where no building exists, directly after the filter regulator. Where concerns of freezing exist, keep the lines as short as possible and slope them back towards a drip pot located in a heated enclosure. Insulating the pilot supply and output lines, along with heat tracing where possible, will help in solving freeze-up problems. These problems can also be minimized on new installations by locating the supply line under the vessel insulation.

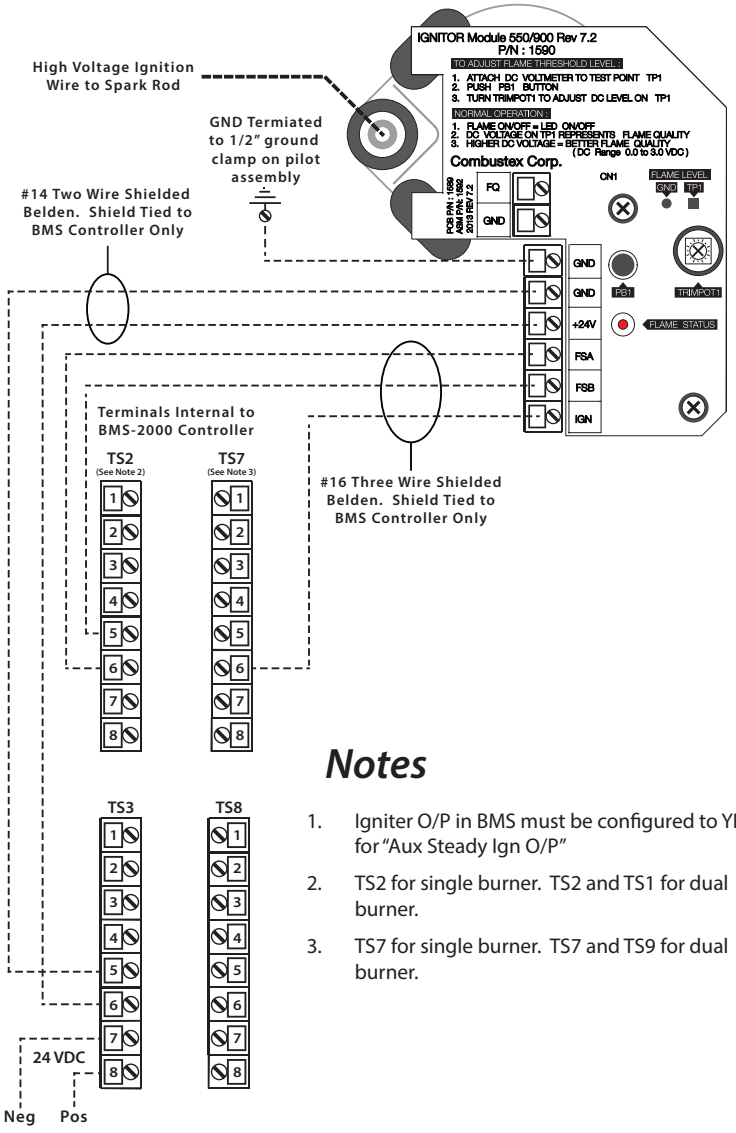
3/8" cadmium plated or stainless steel tubing, supported adequately, is recommended. Ensure that when installing the tubing, adequate flexibility is provided, allowing for removal and insertion of the unit during maintenance. Use an approved aluminum thread lubricant on the fittings inserted into the supply and output ports. Avoid stresses created by improperly installed tubing.

Wiring

The Pilot Pro™ 550 is normally installed with a Combustex BMS-2000 Series Burner Management System or similar type of sequencing apparatus. If the unit is to be installed with a controller other than the BMS-2000, consult the manufacturer's literature for proper wiring schematics.

The Pilot Pro™ 550 is CSA approved for Class 1, Div. 2 Group BC or D hazardous locations. Interconnecting wiring between the pilot / ignitor assembly and Combustex BMS-2000 must be #14 or #16 Belden or equivalent with shields tied to the BMS-2000 end only. At this gauge, ensure that the distance between the pilot / ignitor assembly and Combustex BMS unit does not exceed 50 feet. ***Note:*** *If more than 50 feet is required, increase the wire gauge such that line resistance no greater than 0.5Ω is achieved.*

The preferred location for flex entry is the bottom of the Pilot Pro™ 550 body between the pilot / ignitor assembly and the rigid conduit leading from the BMS-2000. **It is highly recommended that a length of seal tight flex long enough to extract the pilot assembly is used.** This will enable maintenance personnel to remove the assembly without having to disconnect the wiring.



Notes

1. Igniter O/P in BMS must be configured to YES for "Aux Steady Ign O/P"
2. TS2 for single burner. TS2 and TS1 for dual burner.
3. TS7 for single burner. TS7 and TS9 for dual burner.

Flame Voltage Levels

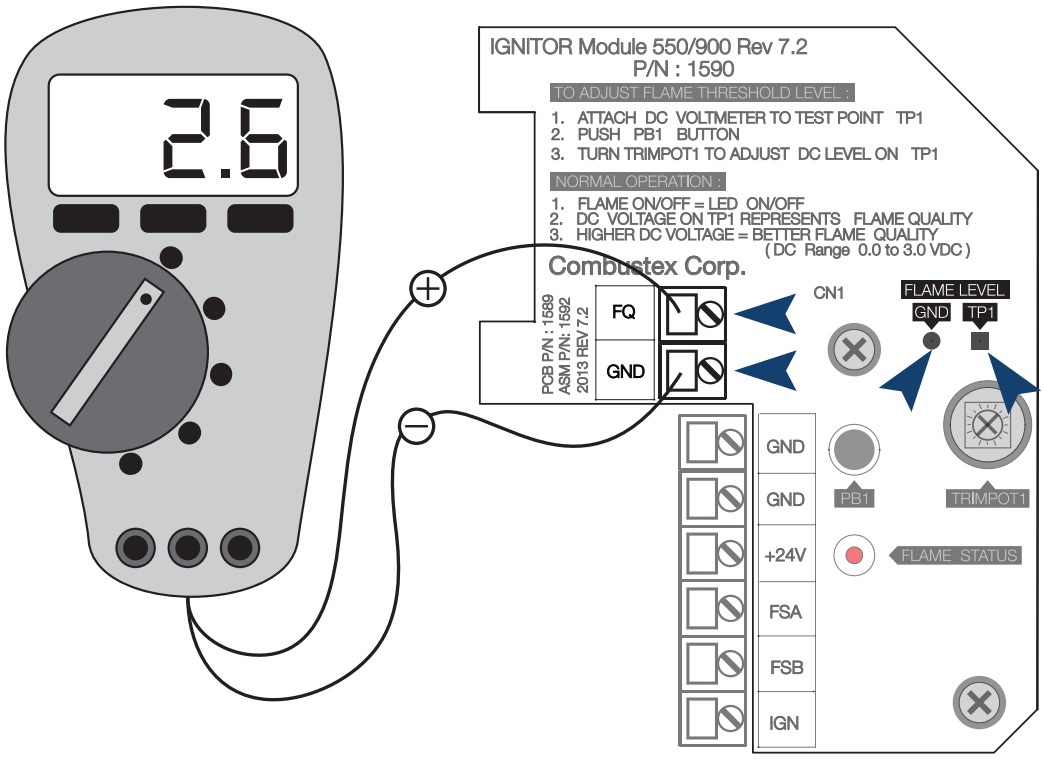
The Pilot Pro™ 550 utilizes Flame Ionization Detection for rapid flame response, and the ignition module is preset for typical conditions. Certain environmental and fuel gas variables, however, can result in less-than-ideal pilot flame strength and profile, thereby affecting flame voltage and system operation.

Once the unit has been installed and wired, remove the enclosure cap (item #2) to access the ignition module. Use a volt meter to read the DC voltage across the FQ (flame quality) terminal or TP1 node (+) and the GND terminal or node (-). See diagram below.

First, take a reading without a pilot flame. The NO FLAME (base) voltage will read 0.5 VDC.

Next, ignite the pilot. When the pilot flame is achieved, the red LED will light. Use the volt meter to read the pilot flame signal voltage. High quality pilot flames will generate FLAME ON voltage readings between 2.3 and 2.8 VDC.

Wind, poor fuel gas and other factors may degrade the pilot flame quality, indicated by lower voltage readings, and can, in turn, affect overall system operation. If FLAME ON voltage readings are below 2.3 VDC, contact Combustex directly for troubleshooting assistance.



OPERATING PROCEDURE

The Pilot Pro™ 550 is controlled by the Combustex BMS-2000 Series Burner Management System or similar type of sequencing apparatus. Operating instructions and safety information are included in the BMS-2000 literature. If the unit is to be installed with a controller other than the BMS-2000, consult the manufacturer's literature for operating information.

Note: It is the responsibility of the operator or controller to ensure that the fire tube has had enough time to be purged of combustible mixtures prior to attempting to relight the unit. Due to the possibility of a control valve leak, the main fuel gas valve should be closed for a period of time to ensure air purging of the fire tube. The main gas valve should not be re-opened until a pilot flame has been confirmed.

MAINTENANCE REQUIREMENTS

For trouble free operation, a maintenance and inspection schedule should be set up. Every 3 months, test the ignition and shutoff features by manually closing the fuel gas valves to simulate a flame failure condition. Ensure that the controller closes both the pilot and main gas valves. Retest the unit's FLAME ON and NO FLAME voltage readings using the procedures described on p. 8 of this manual. Once a year remove the assembly, replace the air intake arrestor and inspect the condition of the flame sensor and ignition wire for excessive corrosion and carbon buildup. Ensure that the orifices in the pilot tip are clear of any particulate as well. All seams and seals around the flame arrester and igniter body should be free of cracks or holes that might allow a flame to escape. If any of these conditions are found, the element should be cleaned or replaced prior to returning to service.

Inspect, clean and replace all components as required. Reassemble the unit and test after inspection and maintenance.

Combustex offers a service kit for the Pilot Pro™ 550 complete with 1 year recommended spare parts. This package contains the following items:

- # 2 - Flame Arrestor (P/N 1080)
- # 4 - Pilot Jet (P/N 1006)
- # 6 - Burn Tip (P/N 1089A)
- # 7 - Ceramic Retainer Spring (P/N 1098A)
- # 8 - Burn Tip Dowel Pin (P/N 1090)
- # 9 - Venturi Set Screw (P/N 1101)
- # 11 - 550 Ignition Lead Wire Assembly (P/N 2044-(1 through 6)
- # 14 = 550 Ignition Module (P/N 1409)

NOTES

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