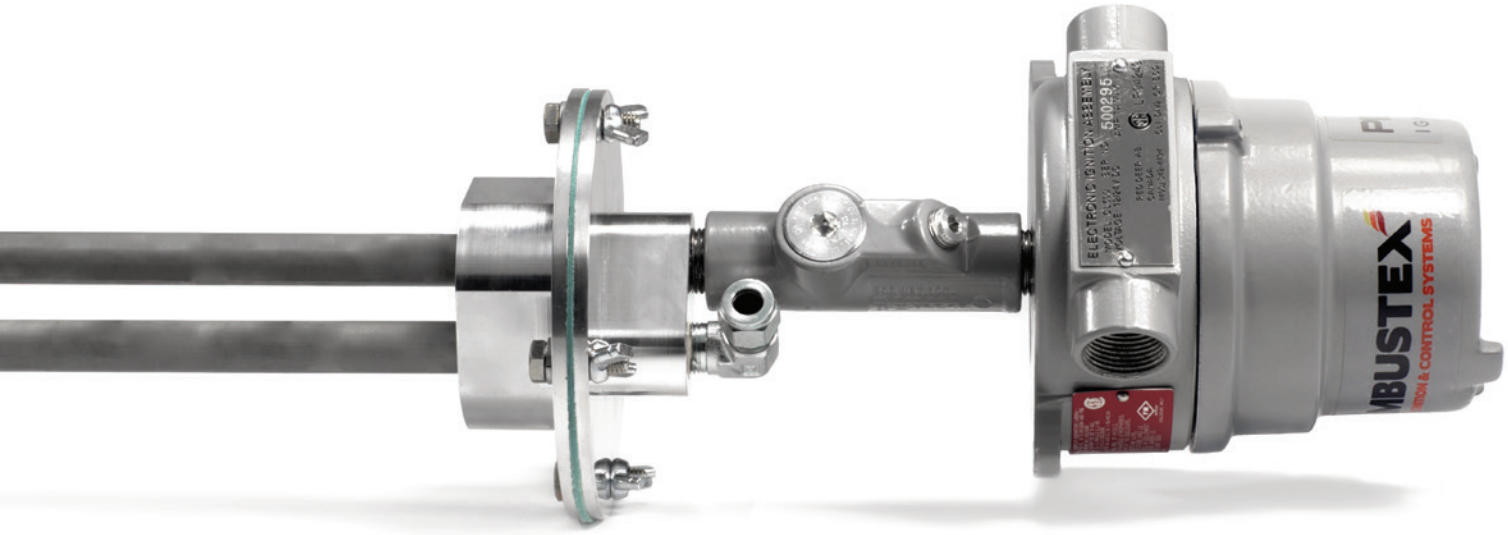
PILOT PRO™

IGNITION SERIES

OPERATIONS MANUAL



The Combustex Pilot Pro™ 500

Ignition System with Pilot Tip and Flame Sensor

*The **CSA approved** alternative ignition system delivering **safety**, **reliability** and **versatility**.*

COMBUSTEX
BURNER IGNITION & CONTROL SYSTEMS

CANALTA CONTROLS GROUP

KEY FEATURES

- Unique 316 SS Pilot Head Assembly.
- "Hot" Electronic Ignition.
- Retractable assembly easily installs through a standard 2" or 3" nipple. Easily removed for inspection.
- High temperature ignition lead is fully protected with 316 SS conduit.
- Local or remote spark ignition.
- Low fuel gas consumption.
- Easily incorporated system flame status reporting for burner management.

TECHNICAL SPECIFICATIONS

Electrical

Environment	CSA C22.2 Class 1 Div. 2 Groups B, C and D Hazardous Locations
Power Supply	12 - 30 VDC
Current Draw	40mA (ignition)
	0mA (normal operation)
Ignition	25 KV

Fuel Gas

Fuel Type	Natural Gas or Propane
Working Pressure	1 Psi (Natural Gas), 0.5 Psi (Propane)
Maximum Test Pressure	25 Psi
Fuel Consumption	8 SCFH, 22000 BTU/Hr.

Physical

Operating Temperature	-40° to +40° C
Materials and Parts	Aluminum, SS
Supply Port	3/8" Tubing
Mounting	2" or 3" NPT Nipple
Insertion Length	12" through 72"

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OPERATIONS MANUAL

Combustex recommends that this manual be read thoroughly *before* attempting installation or operation of the Pilot Pro™ 500. SAFETY FIRST.

CONTENTS

OPERATIONAL DESCRIPTION

The Pilot Pro™ 500 Electronic Ignition Assembly provides the three primary functions required to establish and maintain pilot flames reliably and safely:

- Pilot flame ignition
- Thermocouple 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™ 500 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 a 15 second (max.) period. When the pilot gas ignites, a thermocouple provides a signal for flame detection. This signal should be used to establish a threshold to indicate flame or flame failure.

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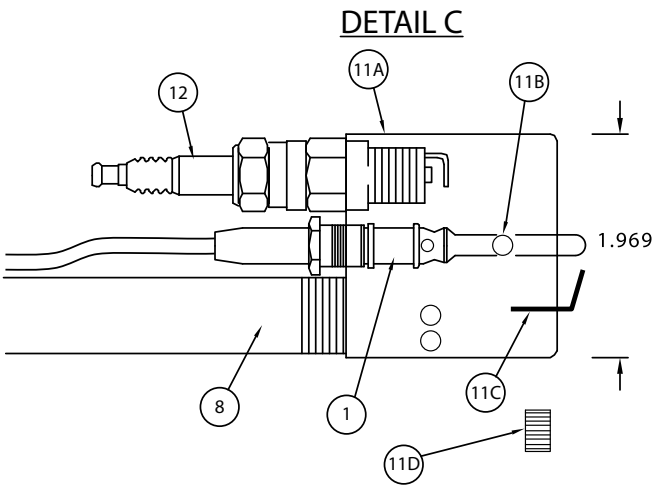
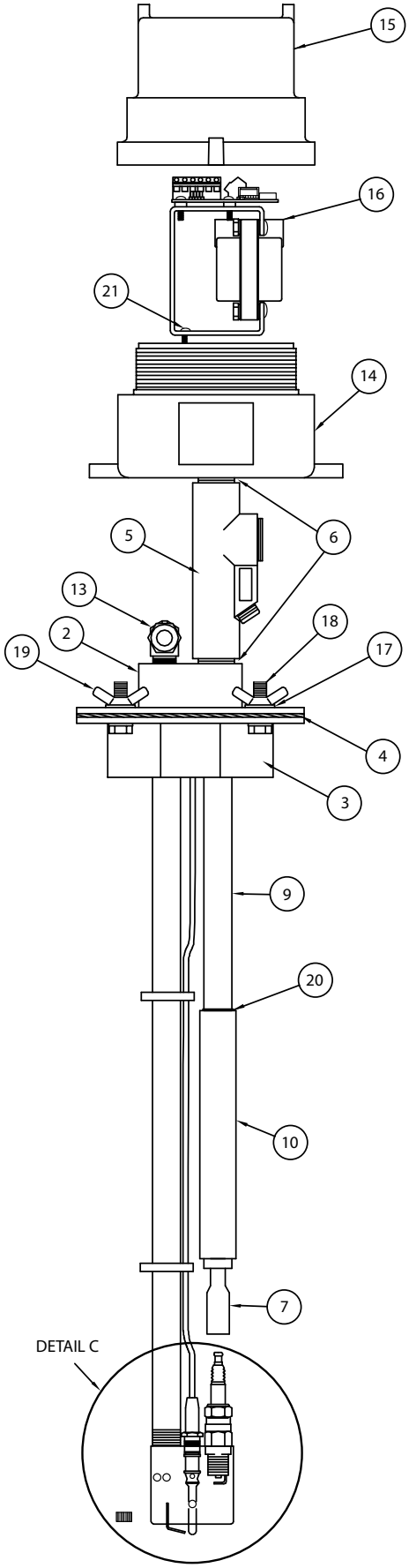




Item	Qty.	Description	Part No.
1	1	Type "K" Thermocouple	1008
2	1	Flange - Instrument Connection	1009
3	1	Flange - 2" NPT Female	1010
3	1	Flange - 3" NPT Female (optional)	1011
4	1	Flange Gasket	1013
5	1	1/2" Aluminum Seal	1014
6	2	1/2" x 2" Aluminum Nipple	1015
7	1	Ignition Lead Wire Assembly	2005
8	3	Gas Pipe - 3/8" (SS Pipe)	1023
9	1	Conduit - 3/8" (SS Pipe)	1023
10	1	Slide Protector	2002
11	1	Pilot Head Assembly (includes 11A through 11D)	2003
11A	1	Pilot Head 500	1026
11B	1	#8-32 x 1/4" Thermocouple Set Screw - SS	1299
11C	1	Deflector Plate	1027
11D	1	#10-24 x 3/8" Deflector Plate Set Screw - SS	1299
12	1	Spark Plug	1029
13	1	3/8" Elbow Tube Fitting	1030
14	1	Cl. 1, Div. I & II Enclosure Base	1031
15	1	Enclosure Cap	1032
16	1	Ignition Module	2007
17	4	5/16" Lock Washer - Zinc	1300
18	4	5/16"-18 x 1 Bolt - Zinc	1301
19	4	5/16"-18 Wing Nut - Zinc	1302
20	1	5/8" ID External Snap Ring	1025
21	2	10 - 24 x 5/16 Screw	1058

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™ 500 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.

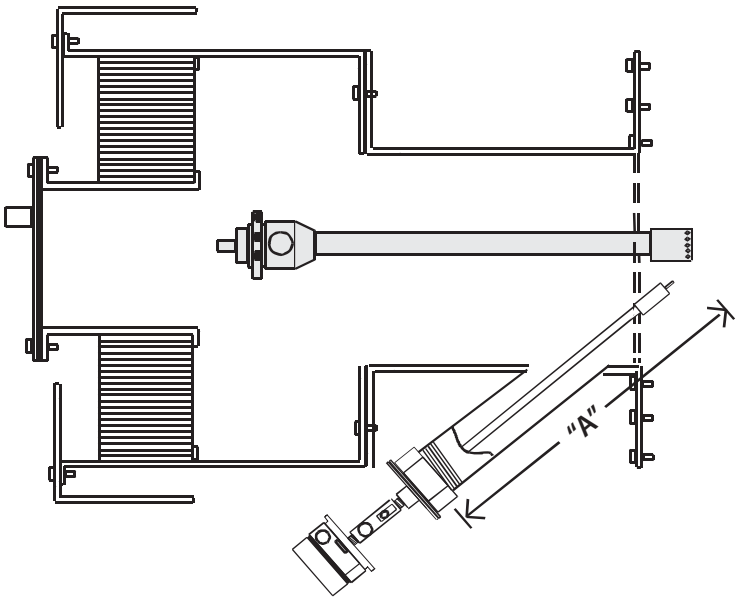
The Pilot Pro™ 500 is stocked and available in standard lengths of 12", 18", 24", 36", 48" 60" and 72". Custom lengths can be manufactured by special order. A 2" or 3" nipple welded squarely to the fire tube end plate or side is required for mounting with the length adjusted to match standard "A" dimensions (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™ 500 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.

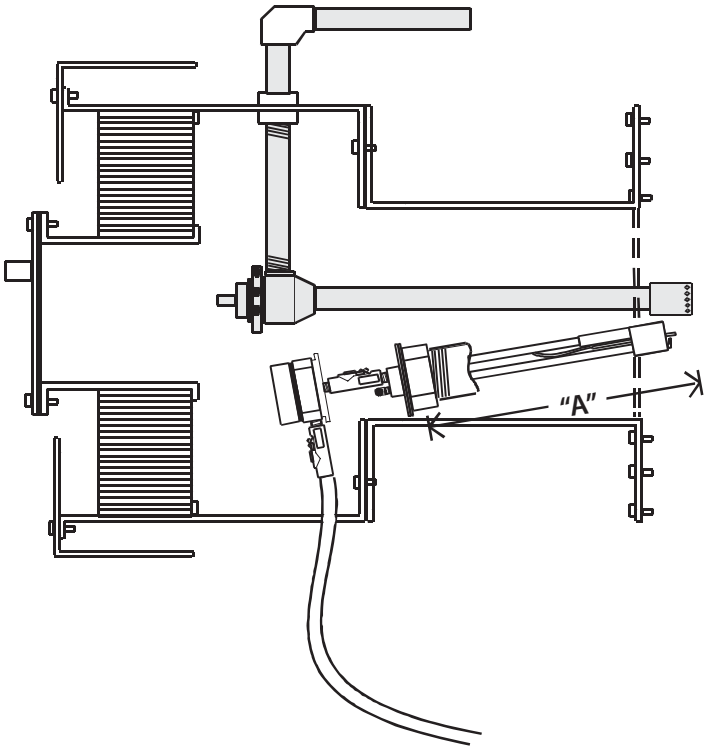
Combustex Pilot Pro™ 500

Side Angle Mount Pilot Burner Installation

Top View



Side View



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.
- Installed 2" nipples must be sch. 40.
- End of Pilot Pro™ 500 igniter unit should be approximately 1.5" behind main burner.

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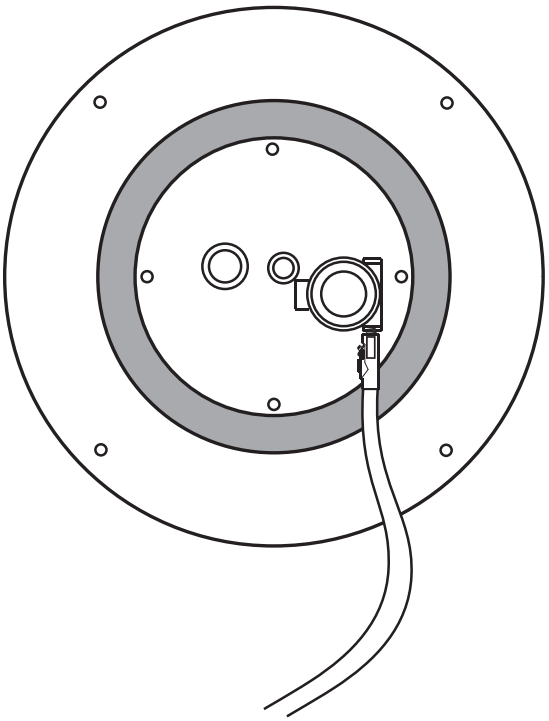
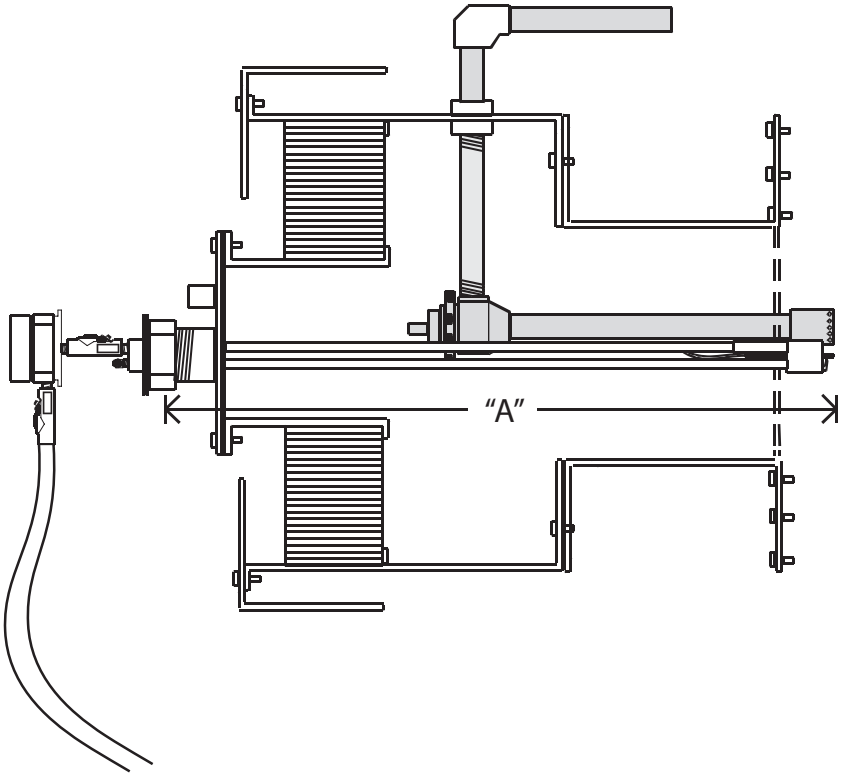
Combustex Pilot Pro™ 500

Parallel Mount Pilot Burner Installation

Back View



Side View



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- Installed 2" nipples must be sch. 40.
- End of Pilot Pro™ 500 igniter unit should be approximately 1.5" behind main burner.

PIPING

The Pilot Pro™ 500 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.

Where there may be a concern that the main fuel gas control valve could leak, it is recommended that the double block and bleed piping arrangement be installed.

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.

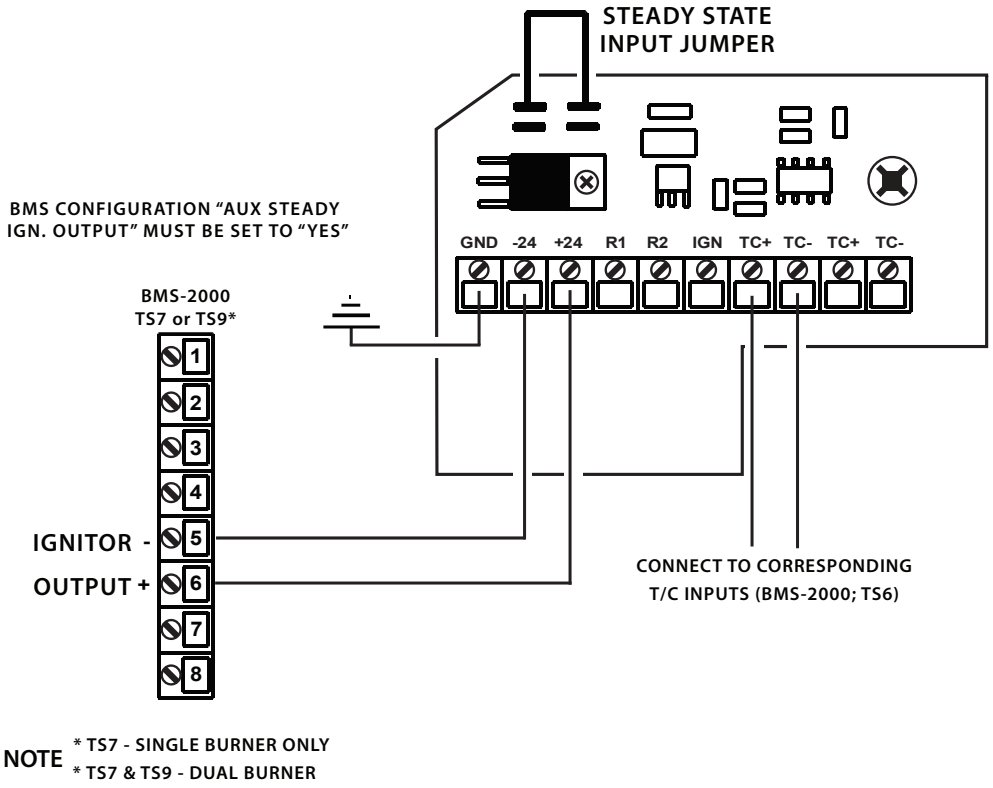
The Pilot Pro™ 500 is rated for sour gas service, with higher maintenance requirements expected when operated on this type of gas. Where only sour or extreme wet gas is available for fuel, it may be advantageous to operate the pilot and instruments from an auxiliary propane source.

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. On new installations, freeze-up problems can be minimized if the supply line can be located 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™ 500 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™ 500 is CSA approved for Class 1, Div. 2 Group ABC or D hazardous locations. Interconnecting wiring between the pilot / igniter assembly and Combustex BMS-2000 Series Burner Management System must be minimum (1) 2 conductor pair and (1) 3 conductor #18 shielded Belden with shields tied to ground at the BMS-2000 end only. An additional #14 XL Green conductor is used to ensure proper grounding between the BMS-2000 and igniter module, and is run with the Belden cables. The preferred location for flex entry is the bottom of the Pilot Pro™ 500, between the pilot / igniter 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.

OPERATING PROCEDURE

The Pilot Pro™ 500 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. The unit should lockout the pilot and main gas within two minutes. Once a year remove the assembly and inspect the condition of the thermocouple, ignition wire an spark plug 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™ 500 complete with 1 year recommended spare parts. This package contains the following items:

- # 1 - Type "K" Thermocouple (P/N 1008)
- # 7 - Ignition Lead Wire Assembly (P/N 2005)
- # 10 - Slide Protector (P/N 2002)
- # 11 - Pilot Head Assembly (P/N 2003)*
- # 12 - Spark Plug (P/N 1029)
- # 16 - Ignition Module (P/N 2007)

** Refer to assembly drawing p. 2*

NOTES

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