PILOT PRO™

IGNITION SERIES

OPERATIONS MANUAL

The Combustex Pilot Pro™ 900

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
- LED Flame Status Indicator
- Fully Protected Ignition Lead with Optional High Temp. Sheath
- Low Fuel Gas Consumption
- Robust Aluminum / SS Construction
- 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	12 - 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	1/4" NPT
Mounting	1/2" NPT Close Nipple / Meyers Hub

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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™ 900. SAFETY FIRST.

CONTENTS

OPERATIONAL DESCRIPTION

The Pilot Pro™ 900 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™ 900 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 10 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.

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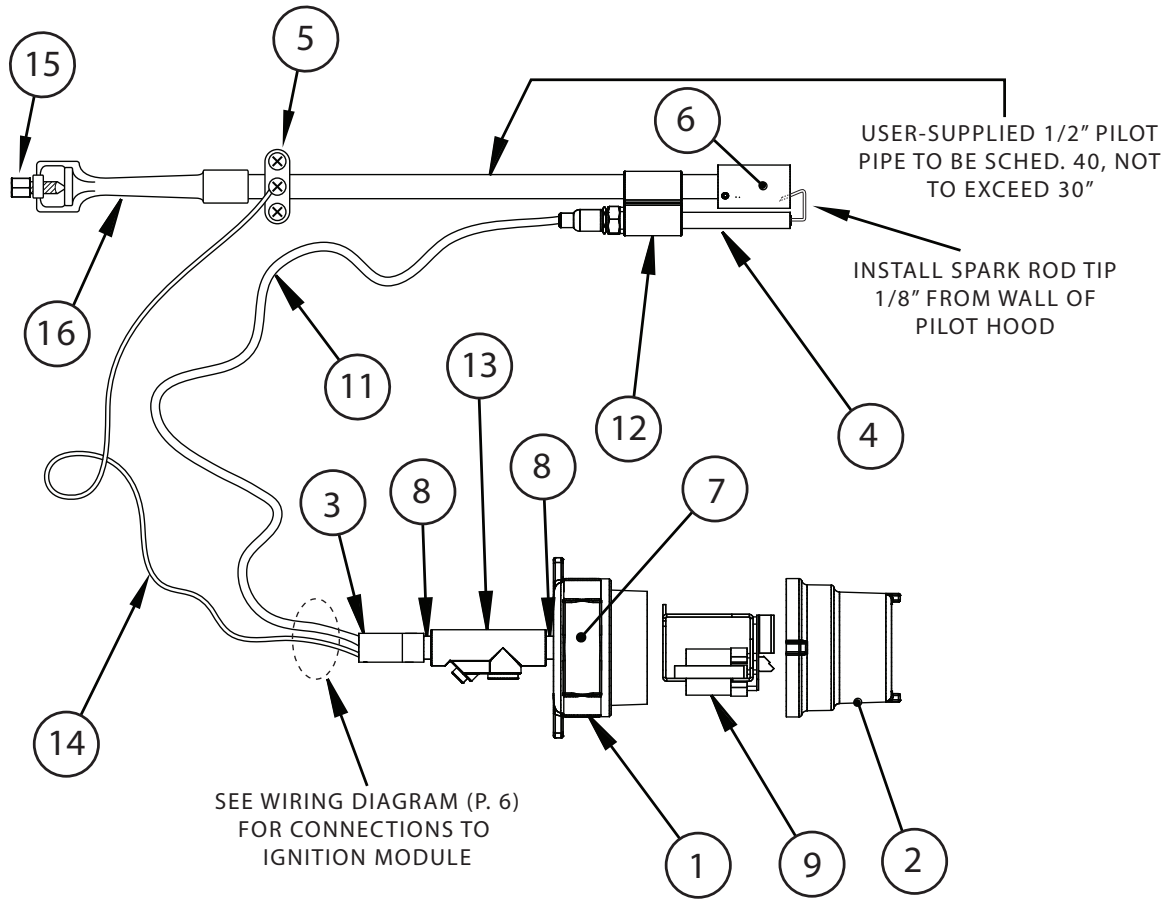


Item	Qty.	Description	Part No.
1	1	Cl. 1, Div. I & II Enclosure Base	1031
2	1	Killark HK2D Cap	1032
3	1	Hub 1/2" x 1/2" F/F	1383
4	1	Spark Rod	1384
5	1	1/2" Ground Clamp	1560
6	1	Burn Nozzle	1386
7	1	Serial Number Tag	1404
8	2	1/2" NPT Close Nipple	1015
9	1	Ignition Module (Flame Rod)	1590
10	1	#10-24 x 5/16 Screw (not shown)	1058
11	1	Ignition Wire (SA)	1416
12	1	Electrode Mounting Bracket	1418
13	1	1/2" Electrical Aluminum Seal	1014
14	1	Ground Wire	1399
15	1	Air / Fuel Mixer Orifice	1535
16	1	Air / Fuel Mixer Venturi Body	1534

INSTALLATION GUIDELINES

MOUNTING

Installation as per the Pilot Pro™ 900 Burner Installation Assembly drawing (see p. 4) is recommended.

The mounting location chosen on the vessel should be determined by

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

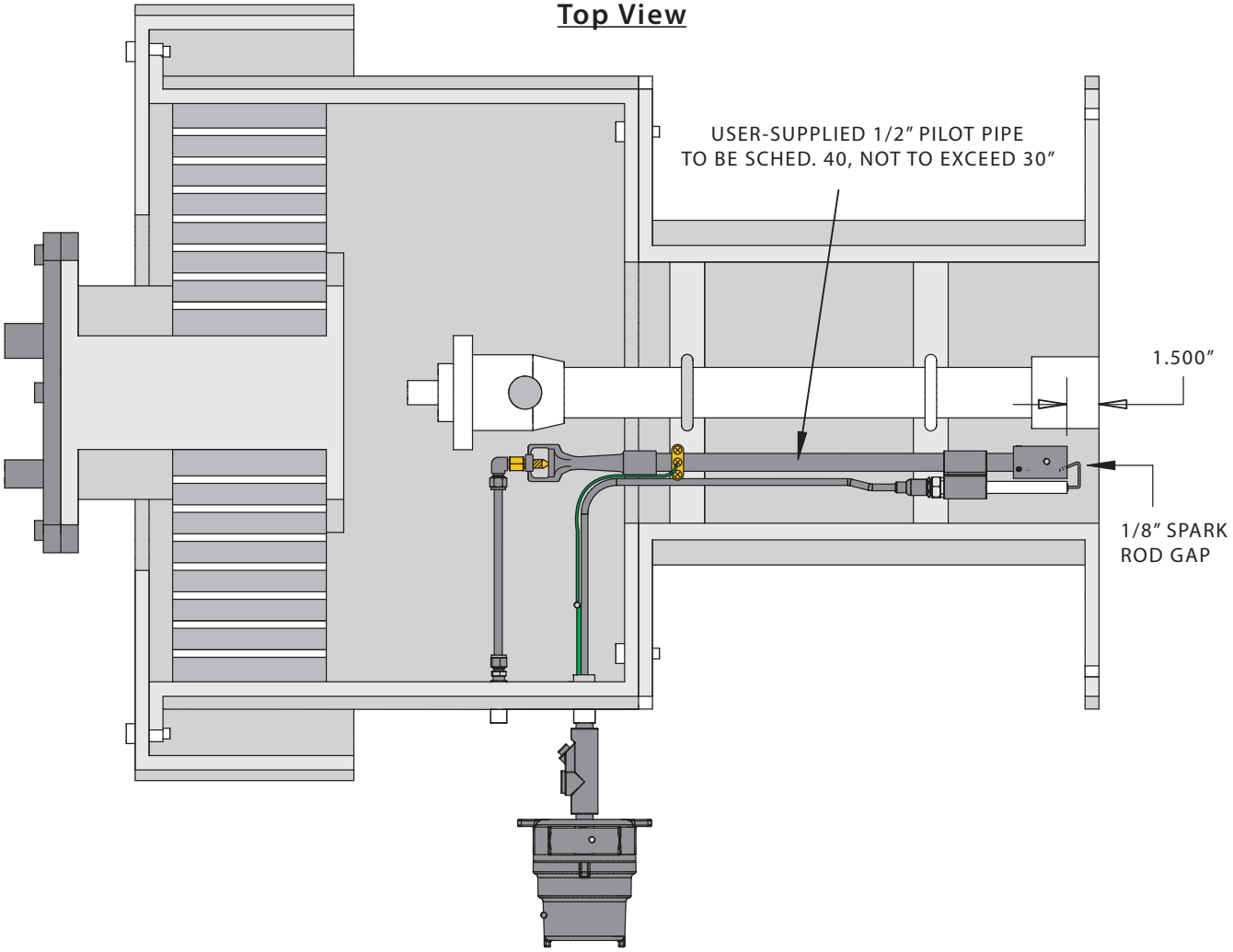
The recommended mounting location of the Pilot Pro™ 900 shall be located to enable a smooth and reliable ignition of the main flame over the entire firing range of the burner. Mount the pilot end approximately 1.5" behind the main burner and, where possible, at a slight angle so that the pilot flame protrudes into the main gas stream. Note that the pilot flame extends out approximately 5 - 6" from the end of the pilot. The igniter should be supported at about midpoint within the fire tube with either a 'J' bracket or cross support.

The 1/2" pilot pipe between the venturi and burn nozzle is not provided by Combustex. This pipe is user-supplied and fabricated according to the user's specific installation requirements. Combustex recommends the use of schedule 40 pipe not exceeding 30".

Note: *For proper operation, ensure that the overall installation configuration is such that the length of the ignition wire does not exceed 10 feet.*

Combustex Pilot Pro™ 900

Burner Installation Assembly



Notes

- Ensure ground wire connects Ignition Module ("GND") and 1/2" ground clamp.
- End of Pilot Pro™ 900 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.
- Mount pilot nozzle on a slight angle so the pilot flame protrudes into main gas stream.
- Ensure gap between spark rod tip and wall of pilot hood is approx. 1/8".
- Ensure ignition wire length does not exceed 10 feet.

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PIPING

The Pilot Pro™ 900 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™ 900 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.

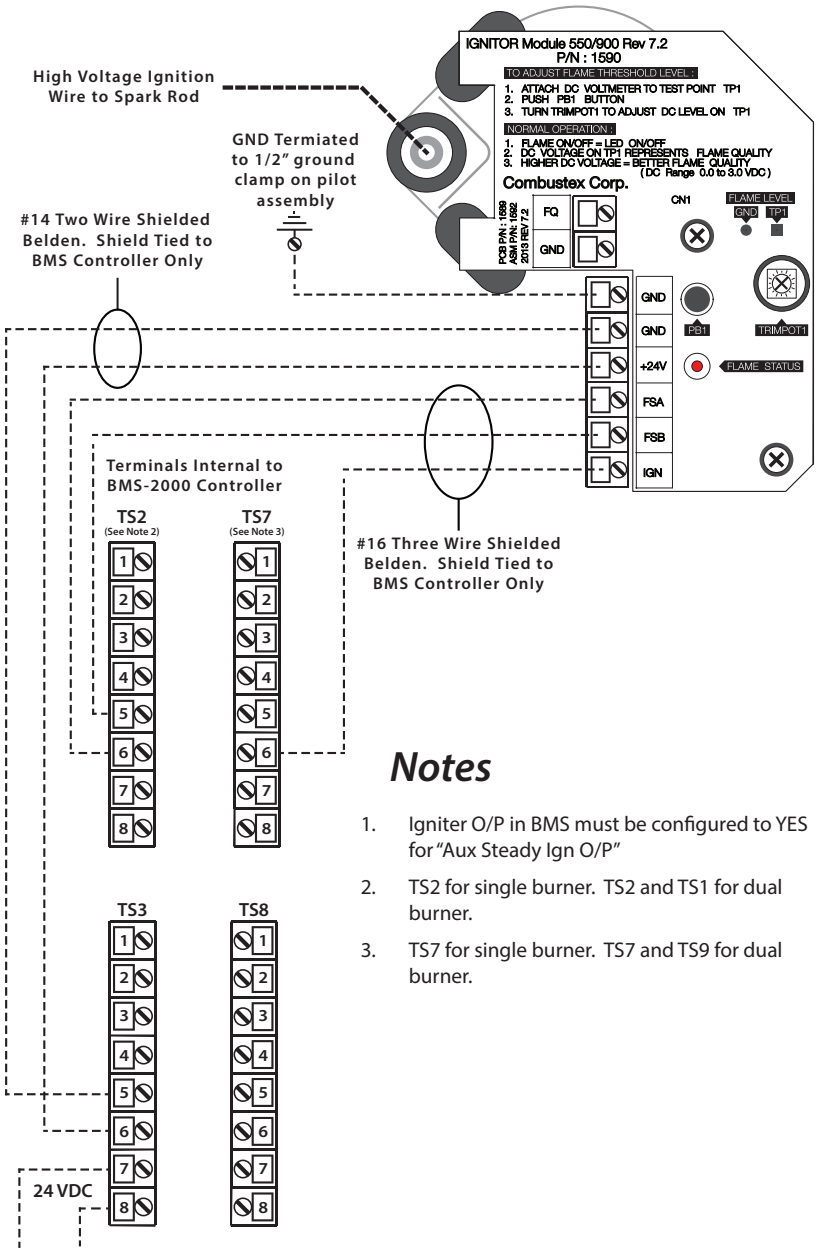
For installations where only wet fuel gas is available, it is recommended that a coalescing filter be installed on the pilot gas at a point before the gas leaves the heated building or, in cases where no building exists, directly after the filter regulator. Where concerns of freezing exist, keep the 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™ 900 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™ 900 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.*



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

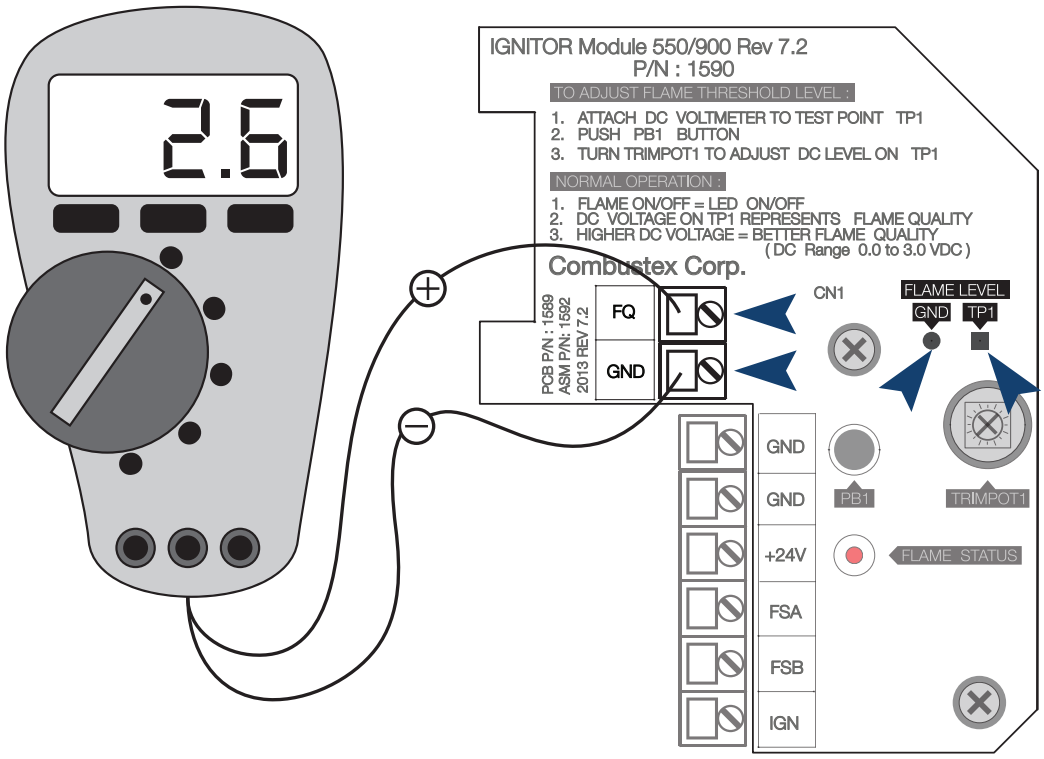
The Pilot Pro™ 900 utilizes Flame Ionization Detection for rapid flame response, and the ignition module is preset for typical conditions. Certain environmental and fuel gas variables, however, can result in less-than-ideal pilot flame strength and profile, thereby affecting flame voltage and system 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™ 900 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. Within four seconds of flame failure, the unit will try to relight for the preset number of times and then shut down, locking out the BMS. Retest the unit's FLAME ON and NO FLAME voltage readings using the procedures described on p. 7 of this manual. Once a year remove the assembly 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™ 900 complete with 1 year recommended spare parts. This package contains the following items:

- # 4 - Spark Rod (P/N 1384)
- # 9 - Ignition Module (P/N 1409)
- # 11 - Ignition Wire (P/N 1416)

NOTES

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