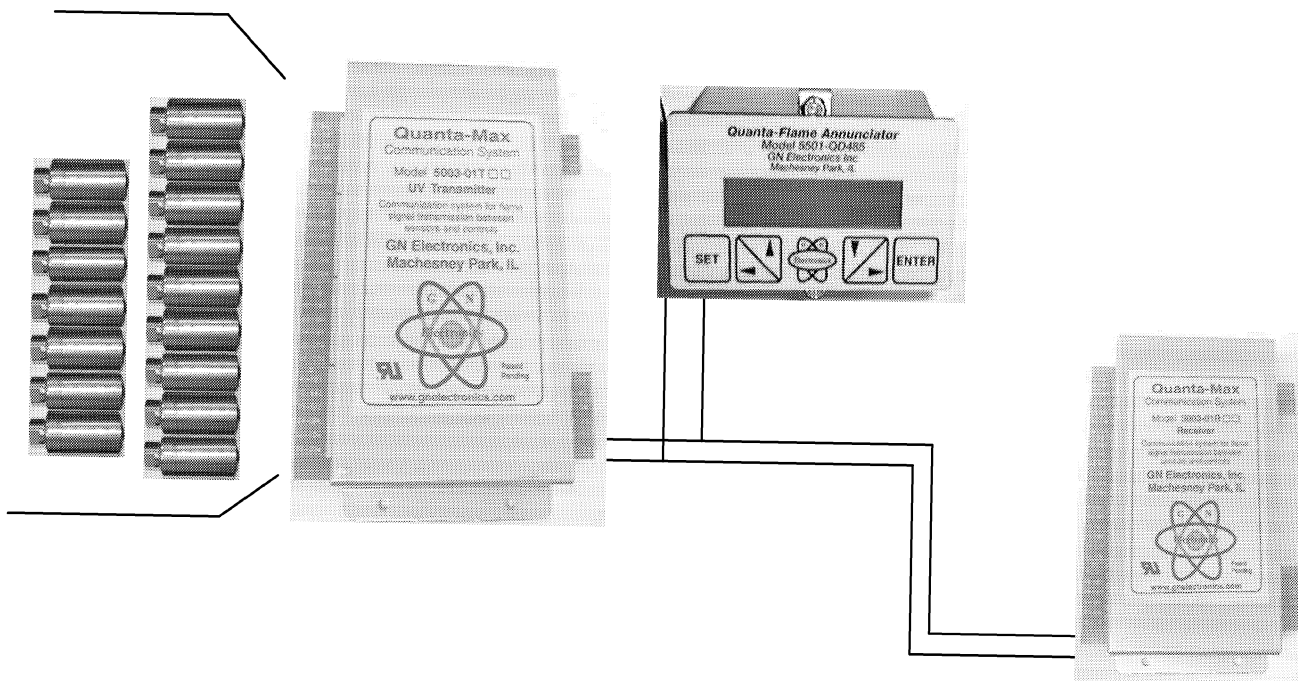


GN Electronics Inc.

5003 Quanta-Max System



USER MANUAL

UL Recognized: File Number MH28316

Patent Pending



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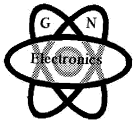
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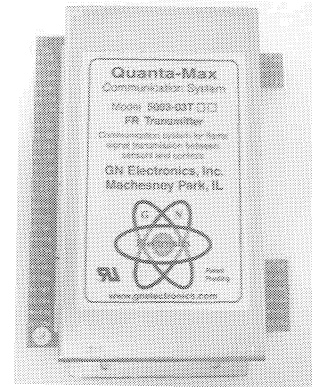
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DESCRIPTION

Quanta-Max

This is a microcomputer-controlled communication system. It has provisions for up to 8 or 16 flame sensor inputs*, which it monitors and converts to a contact closure, single or multiple zone sensor outputs. The Quanta-Max also has RS485 communication to a receiver module, PLC or Computer.



*in some applications

Quanta-Max Features

- RS 485 Communication Interface
- Optional signal display for each sensor flame level (using the DISPLAY)- Recommended
- Isolated 5 Amp relay alarm contact
- Easy mounting in control panels
- Optional History Logging of previous shutdowns
- Built-in 120 VAC 50/60 Hz supply

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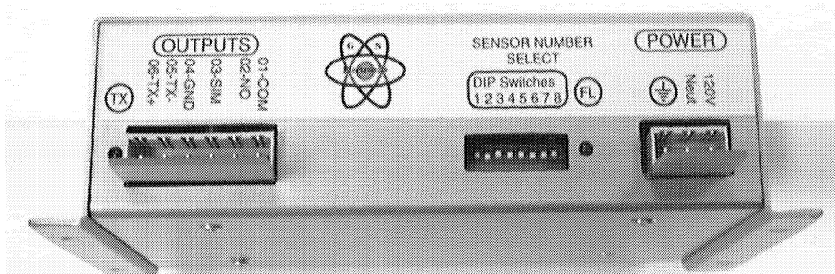
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Quanta-Max

Function Description

Quanta-Max



LED indicators

The Quanta-Max has two Red LED indicators located on either side of the DIP Switches

TX LED

Illuminates when RS 485 communication is taking place.

FL LED

If a flame is detected by any one of the connected scanners when power is applied to the Quanta-Max transmitter unit, the FL LED will illuminate and flash at the rate of four times per second until the signal is removed. This rapid flashing also indicates that no output would be permitted from the unit. If a signal is not detected at power up then the FL LED will remain off until a signal is detected. When some signals are detected the FL LED will flash at the rate of once per second. When all signals are detected an internal 20-second timer will start and the FL LED will illuminate and remain on without flashing. If a flame signal is lost before the 20-second time is complete, the FL LED will flash at the rate of once per second. If the flame signal is re-established within the twenty-second period, the FL LED will be on steady again and the timer will reset. If a flame signal is lost any time after the twenty second timer has timed out then the FL LED will flash at the rate of once per second for up to five seconds if the signal does not return. After this five-second period the FL LED will flash four times per second and the output signal will not be allowed to reestablish until all of the flame signals are off for one second.

Note: The Output signal from the Transmitter will always shutoff with 2 seconds if any of the flame signals are lost.



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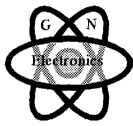
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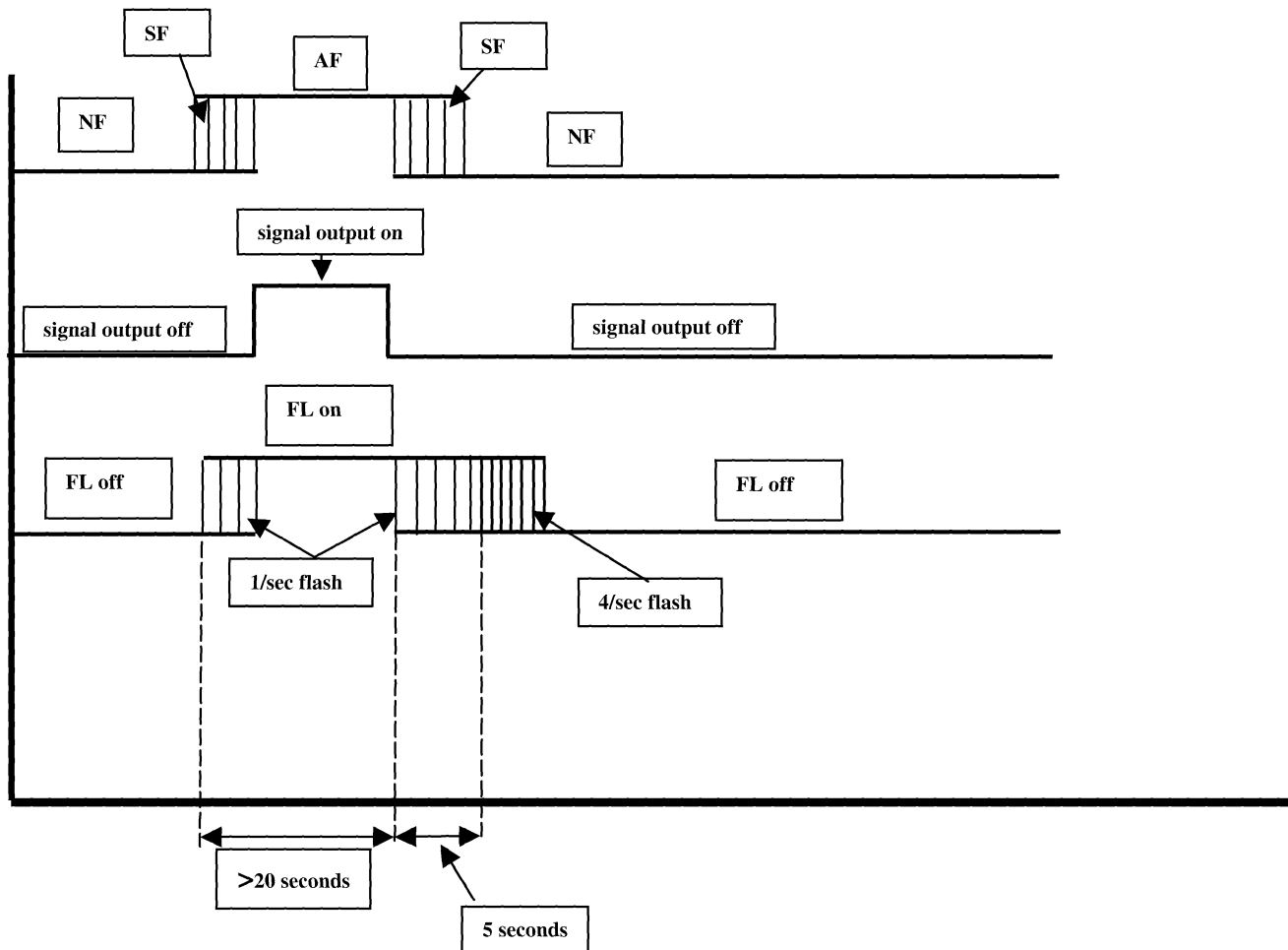
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Timing and Operational Chart



NF: No Flame Signals Detected at any Input
SF: Some Flame Signals Detected at the Inputs
AF: All Flame Signals Detected at the Input

FL: The FL LED on the Quanta-Max Transmitter

FL on: LED is on solid without flashing

FL off: LED is off

1/sec Flash : LED flashes at the rate of one flash per second

4/sec Flash : LED flashes at the rate of four flashes per second

Signal output: Flame signal output from Quanta-Max (P5)

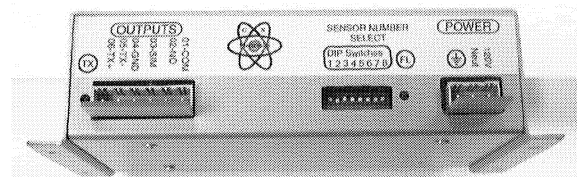




Configuration:

Setup Dipswitch: There is one set of 8 Dip switches on the Quanta-Max module.

Note: Any switch changes must be done with power removed from the module



DIP switches 1 through 4 correspond to the number of attached flame sensors
DIP switch 5 not used

DIP switches 6 & 7 set the flame signal trip level

DIP switch 8 must be in the Down position (off) if the Quanta-Max is used in a Flame Safeguard System. It must be in the Up (on) position if the Quanta-Max is used a flame monitor only.

Note: For system setup switch 8 should be in the up position.

Flame Signal Trip Level	DIP Switch Number 6	DIP Switch Number 7
2 Volts	Down (off)	Down (off)
3 Volts	Down (off)	Up (on)
4 Volts	Up (on)	Down (off)
5 Volts	Up (on)	Up (on)

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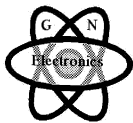
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Flame Sensor Setup Table

Number of flame sensors connected*	Dip Switch Number 1	Dip Switch Number 2	Dip Switch Number 3	Dip Switch Number 4
2	on	off	off	off
3	off	on	off	off
4	on	on	off	off
5	off	off	on	off
6	on	off	on	off
7	off	on	on	off
8	on	on	on	off
9	off	off	off	on
10	on	off	off	on
11	off	on	off	on
12	on	on	off	on
13	off	off	on	on
14	on	off	on	on
15	off	on	on	on
16	on	on	on	on

*Set for two or more

Maximum setting is 8 flame sensors for 5003-01T8 & 5003-03T8 models (see page 11)



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Display Messages Examples

The display will display the signal level of each sensor and the status of all the sensors as a group.

**Sensor- IN#01=0V
All Sensors = OFF**

**Sensor-IN#16=10V
Some Sensors = ON**

**Sensor- IN#07=06V
All Sensors = ON**

First Out annunciation will indicate which sensor was the first to lose the flame signal.

**Sensor- IN#01=0V
Sensor#16 F-Down**



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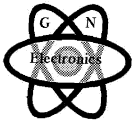
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Alarm History Option

History Recall: This feature will recall the previous 16 Alarm Occurrences

Press “SET” to enter History Records

HISTORY RECORDS
UP=NXT; DWN =LST

Press the UP or DOWN keys to display the records

RECORD # 1

If no records are available

NO RECORDS
AVAILABLE

Press “SET” again and then the UP key to Erase Records

ERASE RECORDS?
UP = YES; DWN = NO



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Display Specifications

MECHANICAL:

Enclosure: 1¾" H by 3½" L by 3" D (1/8th DIN)

ELECTRICAL:

Supply: 120VAC 50/60 Hz

220VAC 50/60 Hz (Model Available)

Power consumption: 2VA

Output: Configurable Relay contact (5 Amps), RS485

Environmental:

Class: NEMA type 4 Membrane Front

Temperature rating: -20°C to +60°C (0°F to 140°F).

Quanta-Max Specifications

MECHANICAL:

Enclosure: 5 7/8" H by 4 3/8" W by 1 5/8" D

ELECTRICAL:

Transmitter Unit

Voltage: 120 VAC 50/60Hz (Standard), Power consumption: 2VA
220VAC 50/60 Hz (Model Available)

Inputs (Depending on Model Selected)

UV Sensor Input (2-wires)- PCI, Eclipse, Honeywell, Fireye
Flame Rod (1 wire each)- common ground
Relay- Dry contact

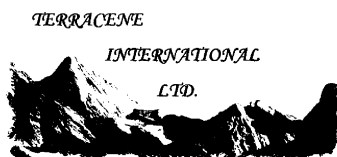
Receiver Unit

Voltage: 120 VAC 50/60Hz
220VAC 50/60 Hz (Model Available)

Outputs (Depending on Model Selected)

Flame Rod output /UV output.

Supervised dry contact (5 amp)



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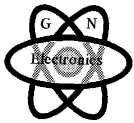
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Quanta-Max Model Numbers

5003-QD485- Quanta-Max RS 485 Operator Interface Display (1/8 DIN panel mount)

5003-01T8-X Receives up to 8 UV sensor signals* and converts to one UV/FR sensor signal. Note: The X denotes the brand on UV scanner (H for Honeywell, P for PCI, E for Eclipse, G for GN Electronics). Not all scanner models may work. Call for confirmation before ordering.

5003-01T16-X Receives up to 16 UV sensor signals* and converts to one UV/FR sensor signal. Note: The X denotes the brand on UV scanner (H for Honeywell, P for PCI, E for Eclipse, G for GN Electronics). Not all scanner models may work. Call for confirmation before ordering.

5003-03T8 FR- Receives up to 8 FR sensor signals* and converts to one UV/FR sensor signal.

5003-03T16 FR- Receives up to 16 FR sensor signals* and converts to one UV/FR sensor signal.

5003-01R- Receives RS 485 from sender and converts to up to 16* UV/FR sensor signals for interface to controls and one combined UV/FR signal for one control.

5003-01RT-(X)- Receives RS 485 from sender and converts to triac outputs for interface to PLC Systems. The X denotes the number of outputs needed (1 to 16).

*in some applications



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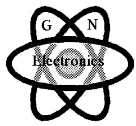
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Installation Notes (Read before beginning installation)

- All installation, wiring, or service activities must only be performed by knowledgeable and qualified technicians.
- All system wiring should be run in accordance with the National Electrical Code and all local code requirements.
- Neutral must be grounded
- The Quanta-Max is designed to work in a variety of applications and conditions, however some applications may not be applicable due to the presence of high electrical noise, lack of adequate ground connections, floating neutrals or other known or unknown conditions. It is therefore important to ensure proper system environment before installing these devices.
- Scanner sensitivity varies with the number of scanners connected to the Quanta-Max module. The more sensors connected the less sensitive each sensor will be to incoming flame signals. In some cases a Quanta-max module may need to be used with less sensors in order to achieve adequate flame signals from a flame. In these cases 2 Quanta-max controls can be “daisy chained” together into one control. (See page 27 for example wiring)
- The signal levels and functionality of a particular brand of sensor will not be identical to the signal levels and functionality of a sensor when used with other burner control brands. Due to variable manufacturing tolerances it is possible but unlikely for an individual sensor to not function in a Quanta-max system but still operate with its own branded control or vice versa. In these cases the scanner may need to be replaced with a new scanner.
- Route Sensor wiring a sufficient distance away from any type of ignition or other wiring to avoid electrical noise interference. Each sensor wiring must be run separate from all other wires including other sensors. In some cases shielded cable or coax may be required for long distances or high electrical interference environments. Each pair of sensor leads should be in their own shielded or coaxial pair and terminated at the Quanta-Max module.
- Always remove all power to the system before wiring.



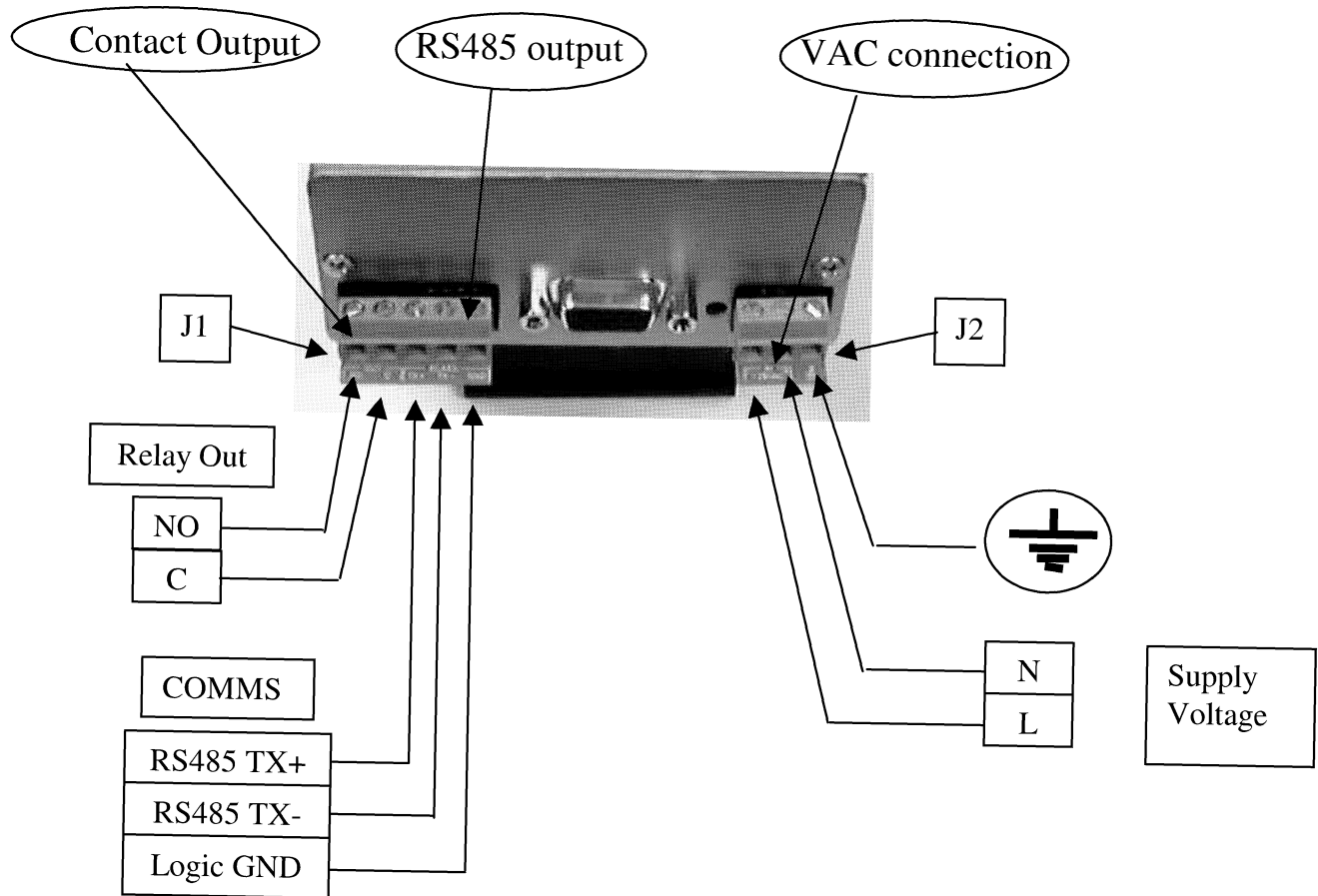
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WIRING and CONNECTIONS

Display



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Wiring Diagram (Display)

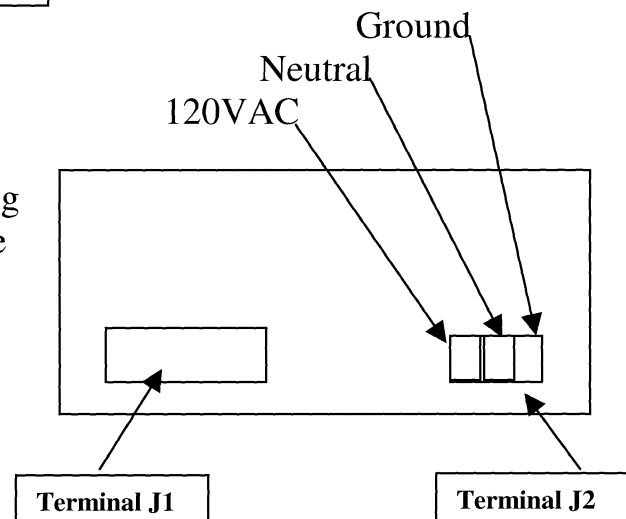
Terminal J1

Alarm Contact Output	1-OUT-NO
Alarm Contact Output	2-OUT-C
RS 485 +	3-RS485-TX+
RS 485 -	4-RS485-TX-
Logic Ground	5-GND

Terminal J2

120VAC	01-120VAC-IN-L
Neutral	02-120VAC-IN-N
Ground	03-Ground

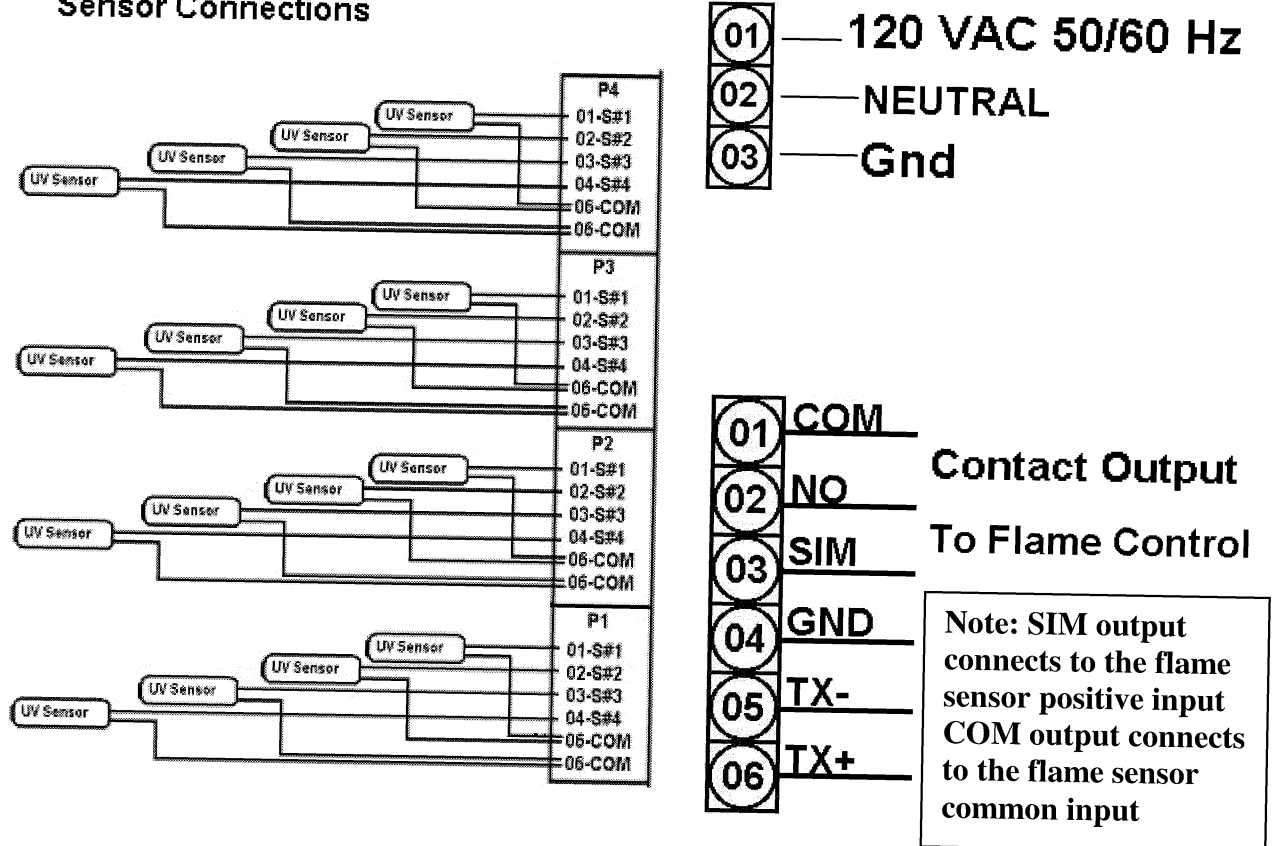
Note: The polarity of the plug connecting Power to the display is the reverse of the Polarity for the transmitter and receiver modules. Check designations on the module connectors before wiring.





Wiring Diagram (Quanta-Max Transmitter)

Sensor Connections



Note: Scanner signal lead connects to the “COM” terminals and the scanner return lead connects to the numbered inputs (01 to 04)

For PCI scanners, the purple wire connects to 06-COM and the yellow wire connects to one of the input terminals (01-S#1 thru 04-S#4)

For Eclipse scanners, the blue wire (S1) connects to 06-COM and the yellow wire (S2) connects to one of the input terminals (01-S#1 thru 04-S#4)

Note: the polarity of the power connections are opposite from the Display connections. Connection the power leads incorrectly will cause damage to the unit. Please check connection designations on the units before applying power





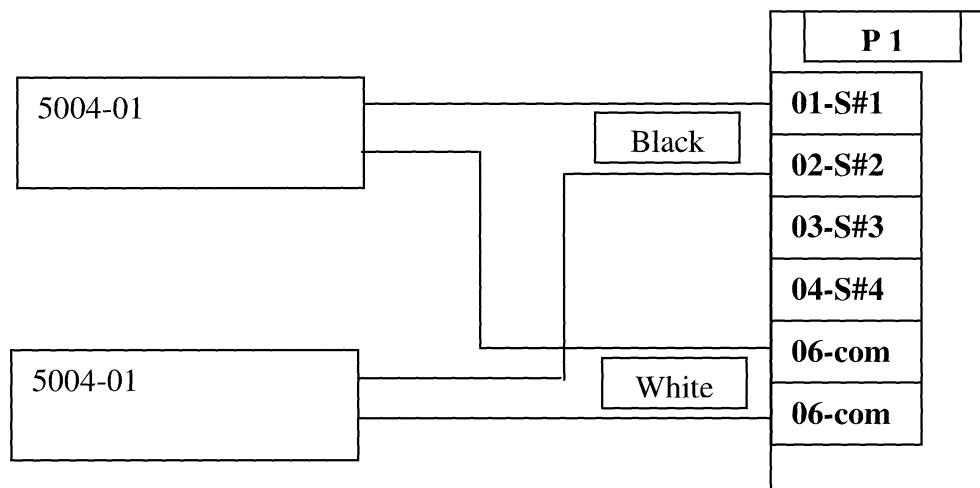
GN Electronics Scanner Connections

- Route Sensor wiring a sufficient distance away from any type of ignition or other wiring to avoid electrical noise interference. Each sensor wiring must be run separate from all other wires including other sensors. In some cases shielded cable or coax may be required for long distances or high electrical interference environments. Each pair of sensor leads should be in their own shielded or coaxial pair and terminated at the Quanta-Max module.

GN Electronics Scanners (5004-01) connect with the Black lead connects to the input pins one to four and the White lead connects to the COM terminal on each of the four terminal blocks (P1 to P4).

For applications using less than 16 scanners the scanner connections must start on terminals 1, 2, 3, 4 on P1 terminal block. Additional scanners are connected on terminal blocks P2 through P4 in a sequential order.

Example: When using only two scanners, the Black lead of scanner number 1 is connected to 01-S#1 on P1. The White of scanner number 1 connects to 06-com on P1. The Black lead of scanner number 2 is connected to 02-S#2 on P1. The White lead of scanner number 2 connects to 06-com on P1.



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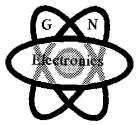
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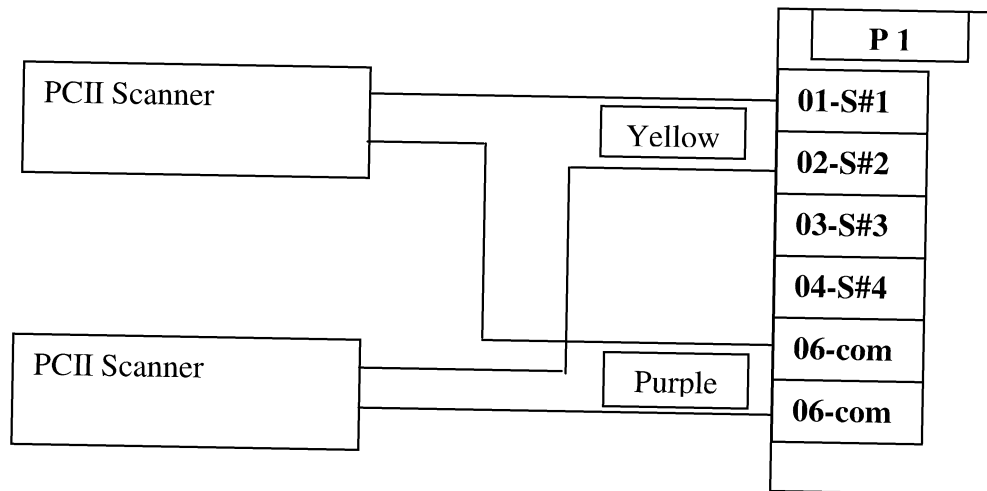
Protection Controls (PCI) Scanner Connections

- Route Sensor wiring a sufficient distance away from any type of ignition or other wiring to avoid electrical noise interference. Each sensor wiring must be run separate from all other wires including other sensors. In some cases shielded cable or coax may be required for long distances or high electrical interference environments. Each pair of sensor leads should be in their own shielded or coaxial pair and terminated at the Quanta-Max module.

Protection Controls Scanners (PCII) connect with the Yellow lead connects to the input pins one to four and the Purple lead connects to the COM terminal on each of the four terminal blocks (P1 to P4).

For applications using less than 16 scanners the scanner connections must start on terminals 1, 2, 3, 4 on P1 terminal block. Additional scanners are connected on terminal blocks P2 through P4 in a sequential order.

Example: When using only two scanners, the Yellow lead of scanner number 1 is connected to 01-S#1 on P1. The Purple of scanner number 1 connects to 06-com on P1. The Yellow lead of scanner number 2 is connected to 02-S#2 on P1. The Purple lead of scanner number 2 connects to 06-com on P1.



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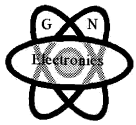
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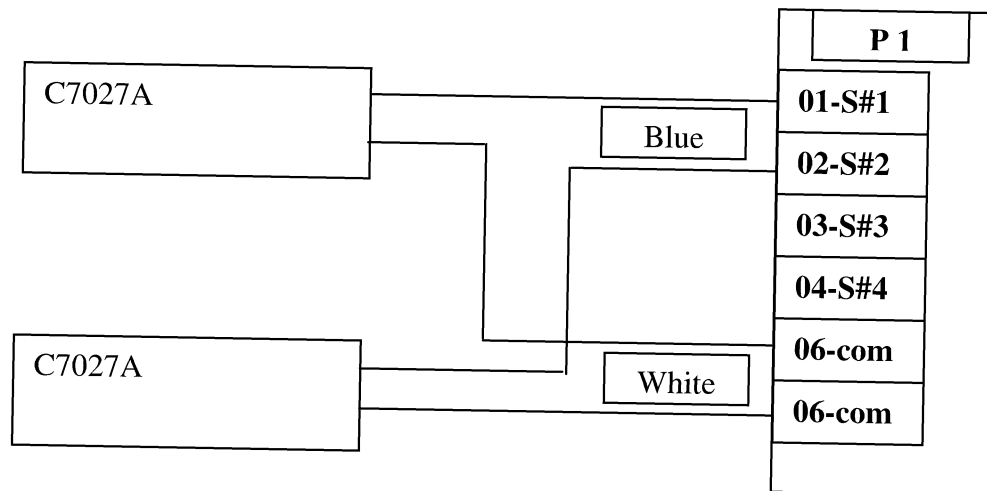
Honeywell Scanner Connections

- Route Sensor wiring a sufficient distance away from any type of ignition or other wiring to avoid electrical noise interference. Each sensor wiring must be run separate from all other wires including other sensors. In some cases shielded cable or coax may be required for long distances or high electrical interference environments. Each pair of sensor leads should be in their own shielded or coaxial pair and terminated at the Quanta-Max module.

Honeywell Scanners (C7027A) connect with the Blue lead connects to the input pins one to four and the White lead connects to the COM terminal on each of the four terminal blocks (P1 to P4).

For applications using less than 16 scanners the scanner connections must start on terminals 1, 2, 3, 4 on P1 terminal block. Additional scanners are connected on terminal blocks P2 through P4 in a sequential order.

Example: When using only two scanners, the Blue lead of scanner number 1 is connected to 01-S#1 on P1. The White of scanner number 1 connects to 06-com on P1. The Blue lead of scanner number 2 is connected to 02-S#2 on P1. The White lead of scanner number 2 connects to 06-com on P1.



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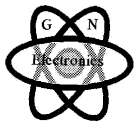
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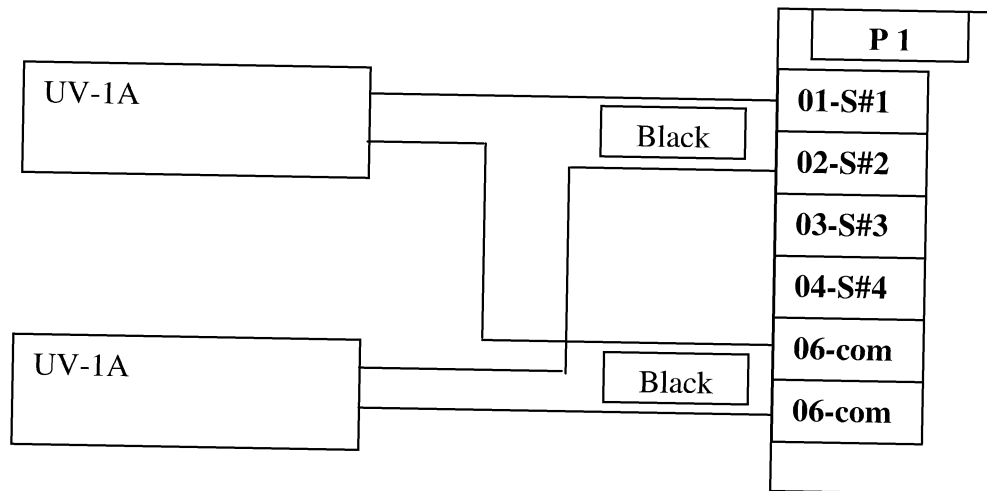
Fireye Scanner Connections

- Route Sensor wiring a sufficient distance away from any type of ignition or other wiring to avoid electrical noise interference. Each sensor wiring must be run separate from all other wires including other sensors. In some cases shielded cable or coax may be required for long distances or high electrical interference environments. Each pair of sensor leads should be in their own shielded or coaxial pair and terminated at the Quanta-Max module.

Fireye Scanners (UV-1A) connect with one Black lead connecting to the input pins one to four and the other Black lead connecting to the COM terminal on each of the four terminal blocks (P1 to P4).

For applications using less than 16 scanners the scanner connections must start on terminals 1, 2, 3, 4 on P1 terminal block. Additional scanners are connected on terminal blocks P2 through P4 in a sequential order.

Example: When using only two scanners, a Black lead of scanner number 1 is connected to 01-S#1 on P1. The other Black lead of scanner number 1 connects to 06-com on P1. A Black lead of scanner number 2 is connected to 02-S#2 on P1. The other Black lead of scanner number 2 connects to 06-com on P1.



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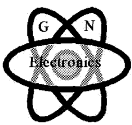
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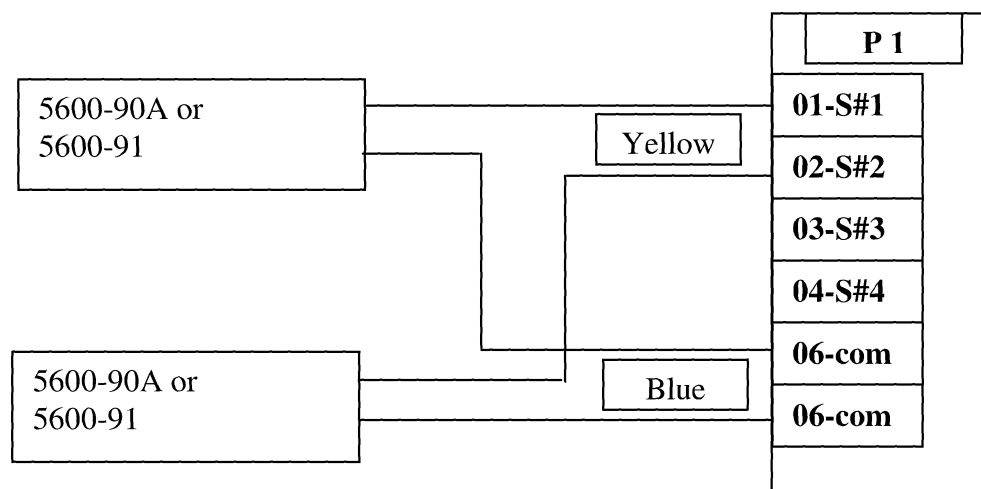
Eclipse Scanner Connections

- Route Sensor wiring a sufficient distance away from any type of ignition or other wiring to avoid electrical noise interference. Each sensor wiring must be run separate from all other wires including other sensors. In some cases shielded cable or coax may be required for long distances or high electrical interference environments. Each pair of sensor leads should be in their own shielded or coaxial pair and terminated at the Quanta-Max module.

Eclipse Scanners connect with the yellow lead (normally going to S2 on a Veriflame) connects to the input pins one to four and the blue lead normally going to S1 on a Veriflame) connects to the COM terminal on each of the four terminal blocks (P1 to P4).

For applications using less than 16 scanners the scanner connections must start on terminals 1, 2, 3, 4 on P1 terminal block. Additional scanners are connected on terminal blocks P2 through P4 in a sequential order.

Example: When using only two scanners, the yellow lead of scanner number 1 is connected to 01-S#1 on P1. The blue lead of scanner number 1 connects to 06-com on P1. The yellow lead of scanner number 2 is connected to 02-S#2 on P1. The blue lead of scanner number 1 connects to 06-com on P1.



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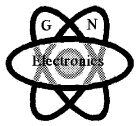
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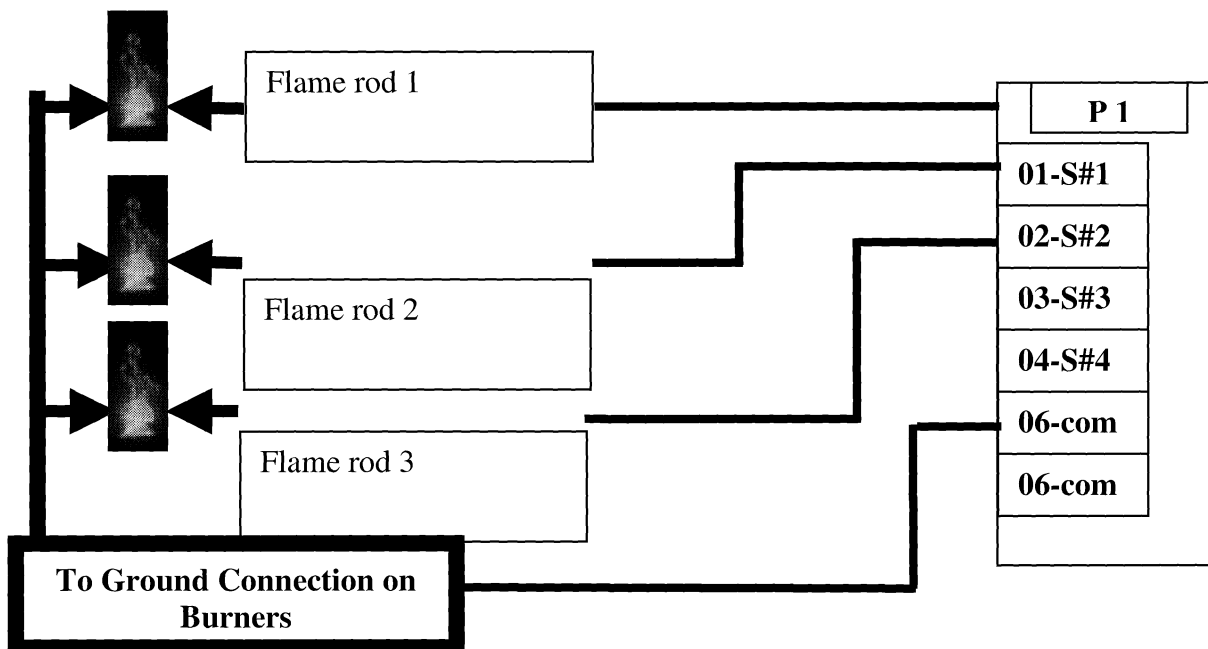
Wiring For Flame Rod Version

- Route Sensor wiring a sufficient distance away from any type of ignition or other wiring to avoid electrical noise interference. Each sensor wiring must be run separate from all other wires including other sensors. In some cases shielded cable or coax may be required for long distances or high electrical interference environments. Each pair of sensor leads should be in their own shielded or coaxial pair and terminated at the Quanta-Max module.

Flame Rods connect to the input pins one to four and a wire from the burner ground connects to the COM terminal (06-com) on each of the four terminal blocks (P1 to P4).

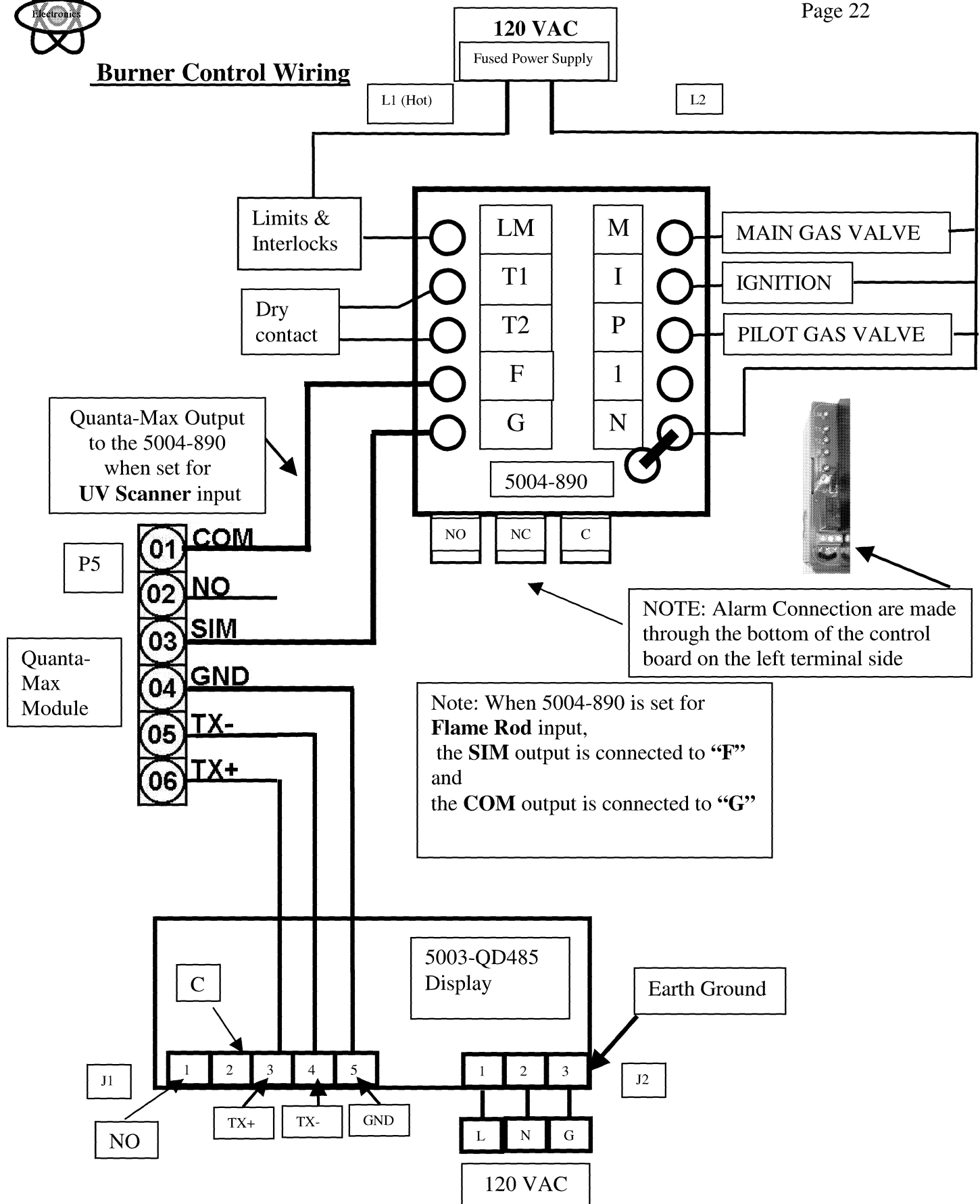
For applications using less than 16 flame rods the flame rod connections must start on terminals 1, 2, 3, 4 on P1 terminal block. Additional flame rods are connected on terminal blocks P2 through P4 in a sequential order.

Example: Flame rod number 1 is connected to 01-S#1 on P1. The Ground connection on burner 1 connects to 06-com on P1. Flame rod number 2 is connected to 02-S#2 on P1. The Ground connection on burner 2 connects to 06-com on P1. Flame rod number 3 is connected to 03-S#3 on P1. The Ground connection on burner 3 connects to 06-com on P1.





Burner Control Wiring



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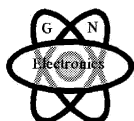
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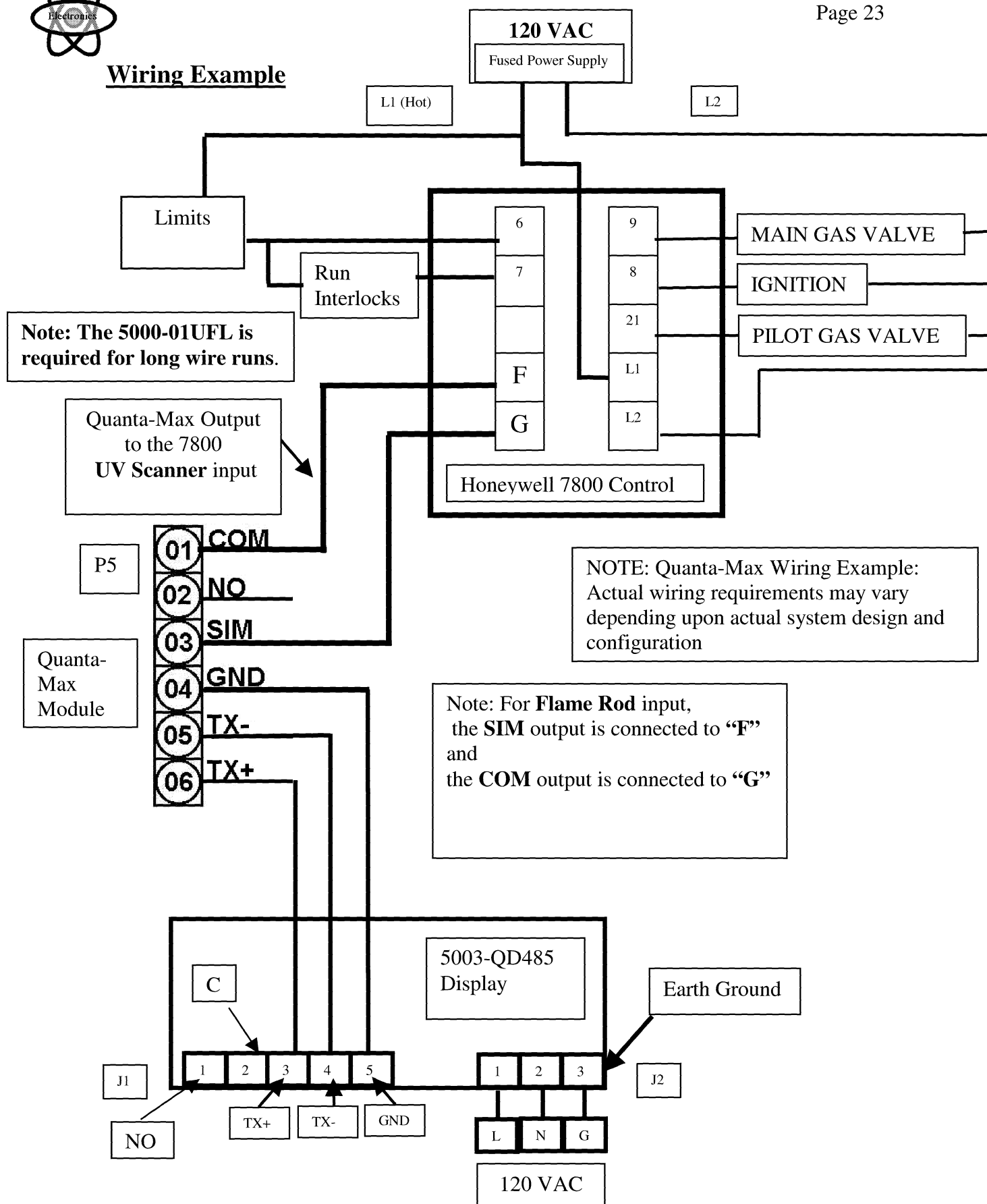
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Wiring Example



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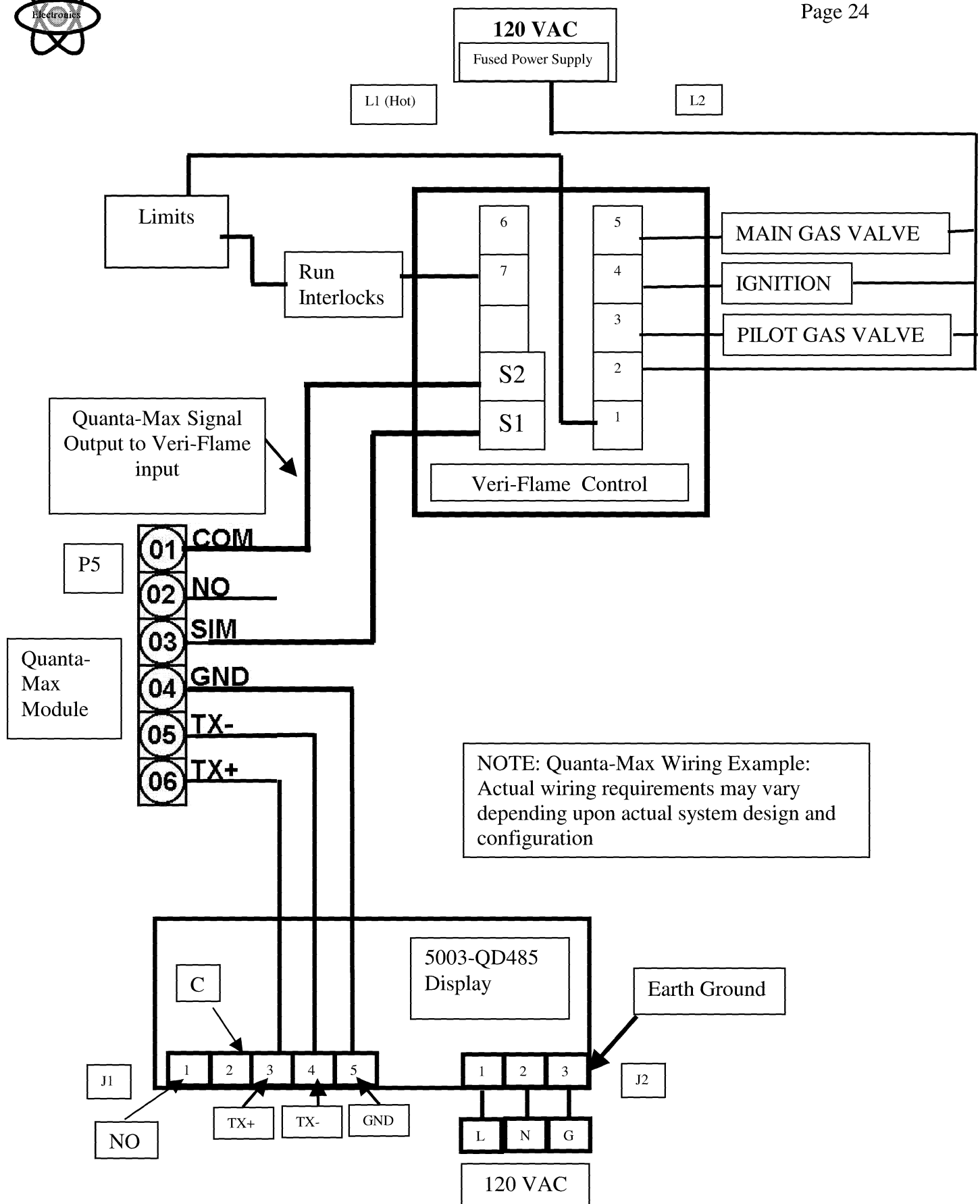
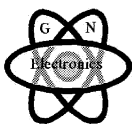
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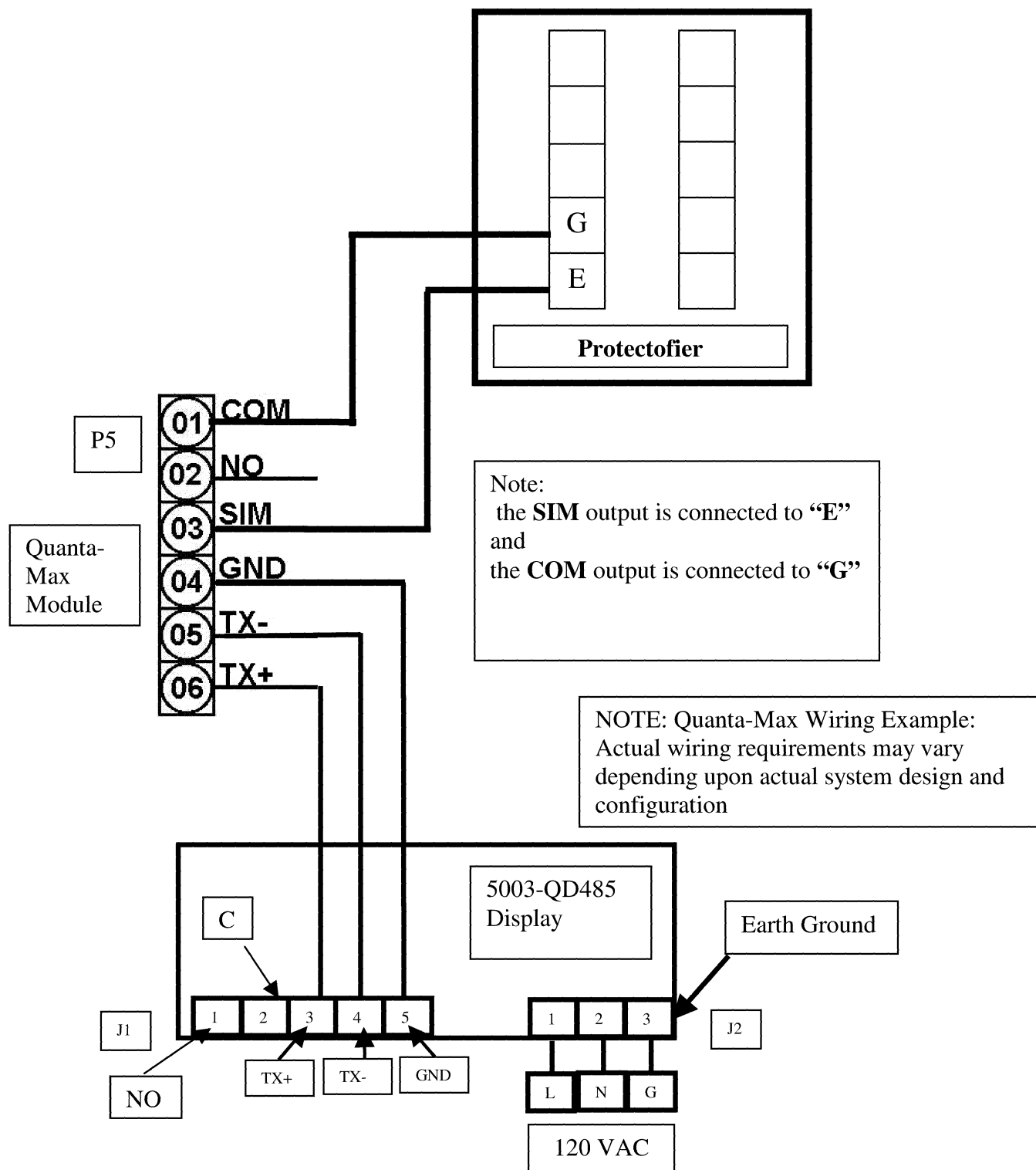
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PCI Wiring Example



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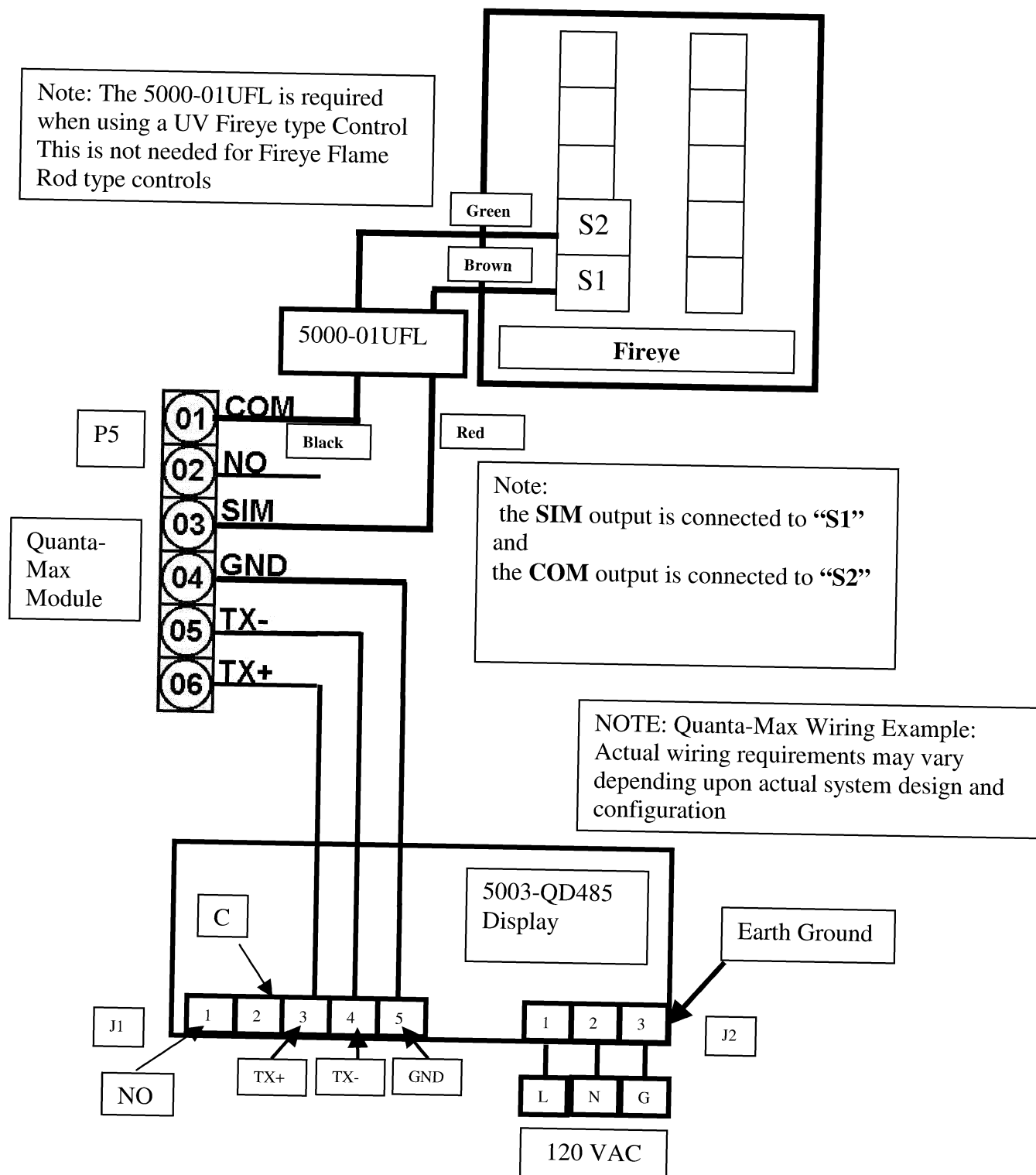
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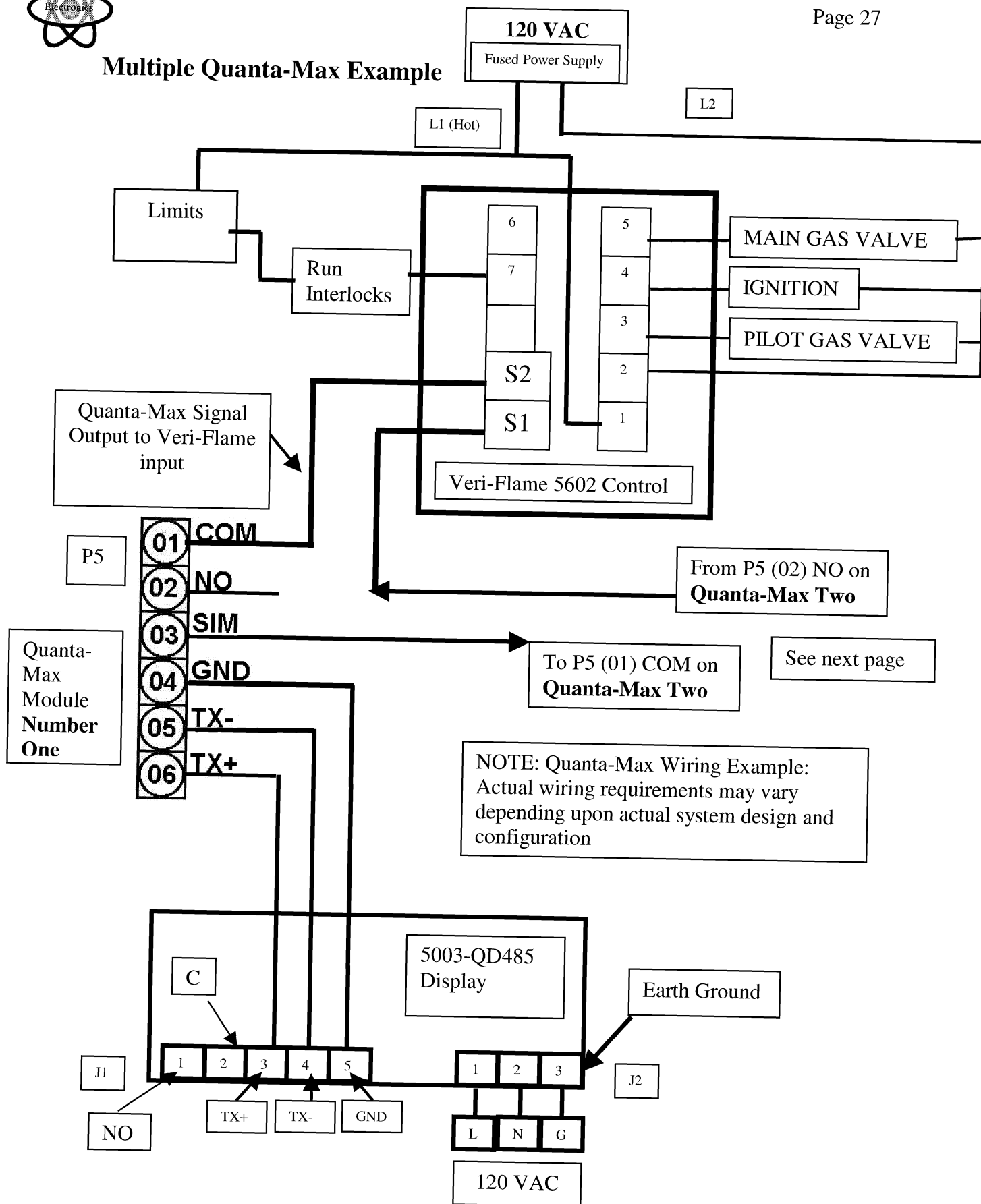
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Fireeye Wiring Example





Multiple Quanta-Max Example



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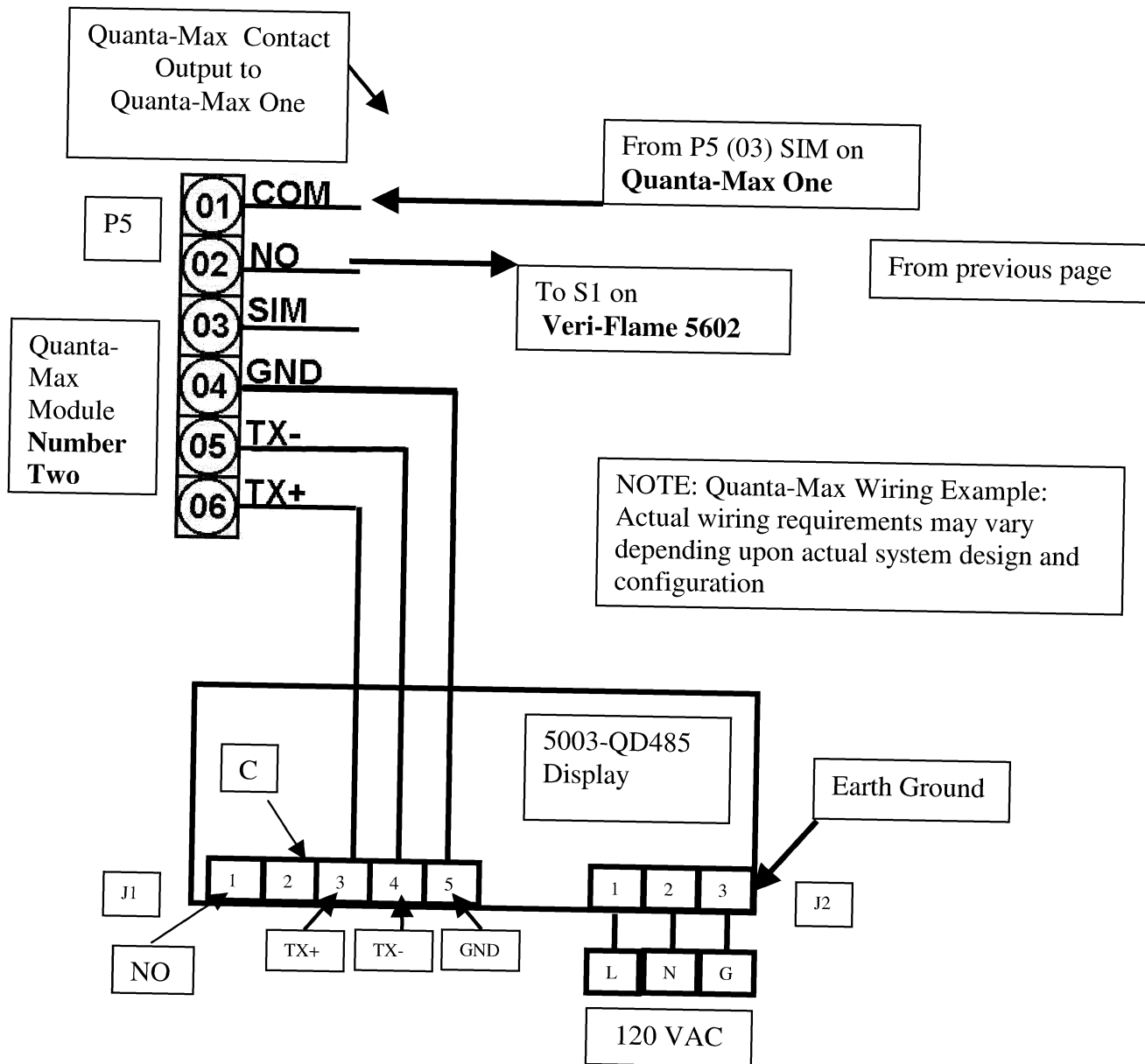
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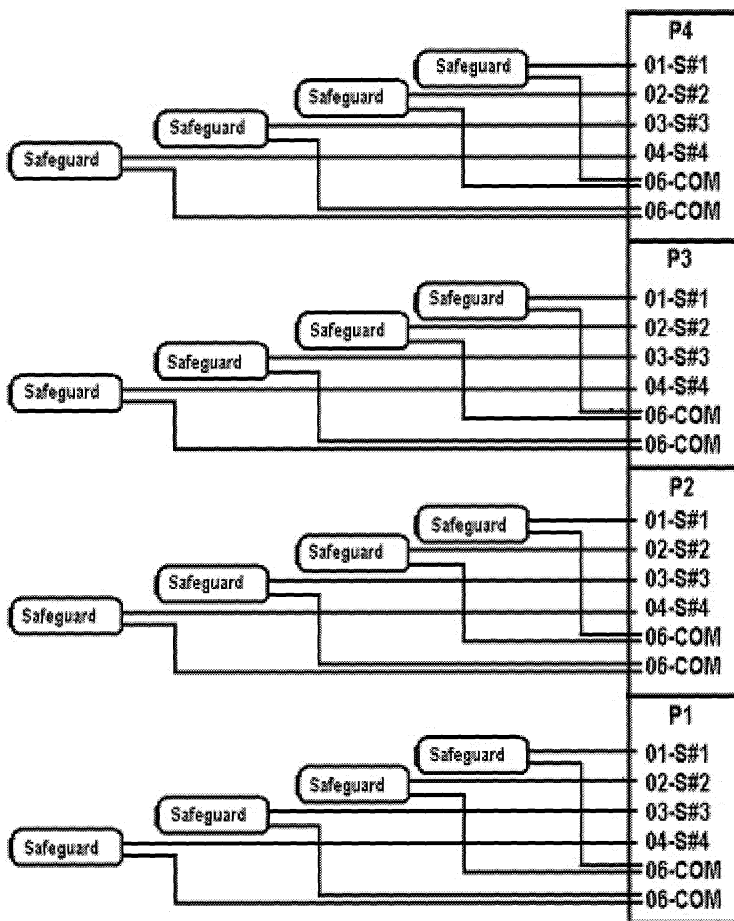
Multiple Quanta-Max Example (Cont.)





Wiring Diagram (Quanta-Max Receiver)

Note: the polarity of the power connections are opposite from the Display connections. Connection the power leads incorrectly will cause damage to the unit. Please check connection designations on the units before applying power



120 VAC 50/60 Hz

NEUTRAL

Gnd



COM

NO

SIM

GND

TX-

TX+

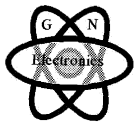
Contact Output
To Flame Control

Gnd

RS 485 Comm
From Quanta-Max
Transmitter

Note: SIM output
connects to the flame
sensor positive input,
COM output connects
to the flame sensor
common input



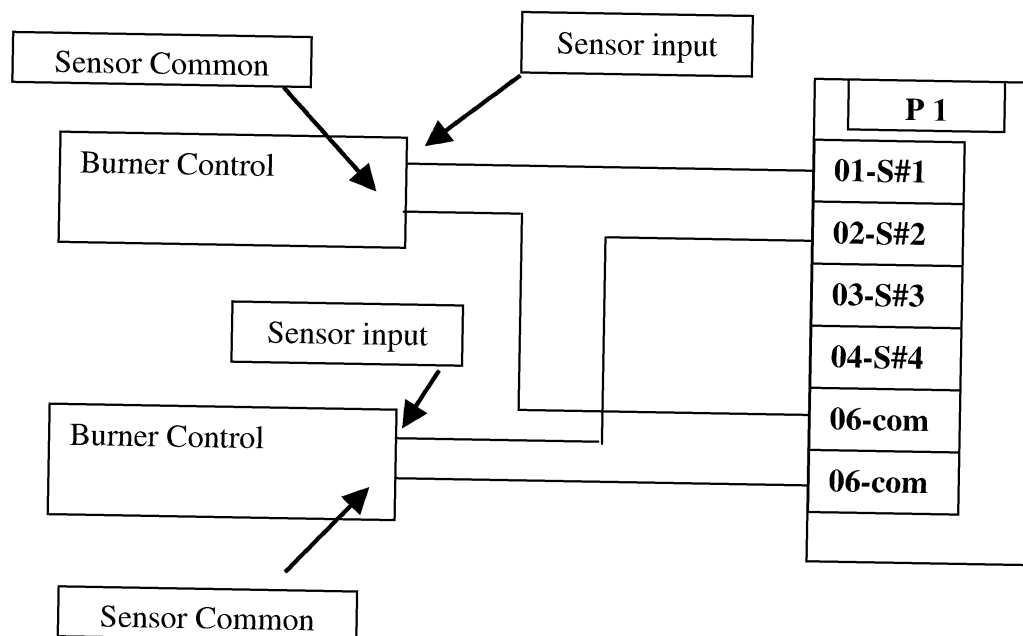


MODEL 5003-01R Receiver Wiring

The flame signal input of the burner control connects to the output pins one to four and the flame signal common connects to the COM terminal on each of the four terminal blocks (P1 to P4).

For applications using less than 16 burner controls, connections must start on terminals 1, 2, 3, 4 on P1 terminal block. Additional control sensor inputs are connected on terminal blocks P2 through P4 in a sequential order.

Example: When using only two burner controls, the first control sensor input is connected to 01-S#1 on P1. The first burner control sensor common connects to 06-com on P1. The second control sensor input connects to 02-S#2 on P1. The second burner control sensor common connects to 06-com on P1.





Wiring Considerations

Depending on the output option used the wiring requirements will vary somewhat.

Output type	Suggested wire	Wiring run considerations
Contact	14 to 16 AWG	THHN or equivalent Nothing special- can be run with other wires in conduit
0 to 12VDC Flame Sensors Other Signals RS 485	14 to 16 AWG	THHN if wire is run in separate conduit Flame Sensor wires must be individually run in their own separate conduit
		Shielded cable if multiple wires are in one conduit
		Coax cable if long distance runs are required or if high level of electrical noise is present

Note

All wiring runs to the field on, or near, hot surfaces should be rated for 90°C (195°F) or at least 25°C (50°F) higher than the surface temperature.



System Setup and Testing the Installation

This section describes the test procedures that must be performed after installation to insure that the 5003 Module and the connected sensors are operating properly.

Manually shut off the fuel supply to the burner and the pilot

With the system powered down, Set the DIP Switches as follows:

DIP switches 1 through 4: Set the number of attached flame sensors (See table page 7)

DIP switch 5: Put in the down position

DIP switches 6 & 7: Put both Switches in the Down position

DIP switch 8 must be in the Up position

If Quanta-Max is used as part of a Flame Safeguard System then Dipswitch 8 must be placed back into the down position after set is finished (See Page 34)

Connect 5003-QD485 Display (If Available) to Quanta-Max Module as indicated on page 22

Note: A Display is strongly recommended for setup and testing. It is also recommended for indication and annunciation during normal system operation

Restore power to the Quanta-Max system.

The LED labeled “TX” should be blinking and the LED labeled “FL” should not be illuminated. If the “FL” LED is illuminated and blinking then one of the scanners is indicating a flame signal when no flame is present. To determine which one disconnect each scanner until the blinking stops. If there is a display connected it will indicate which scanner has a flame signal as it scrolls through the scanner status list.

Remove one of the scanners from its sight tube on a burner.

Place a flame in front of the scanner and the “FL” LED should begin blinking. Then remove the flame and the “FL” LED should go out. If the LED does not blink then the scanner is not sensing a flame. If the “FL” LED does not go out when flame is removed then scanner may be in a “runaway” condition. If this occurs check the wiring. If wiring appears okay then replace the scanner.

Repeat this process until all scanners have been checked.

After all individual scanners have been checked, replaced them into their respective burner sight tubes. Then start the system normally.

When all burners are lit every sensor should be indicating a flame signal on the display unit and the “FL” LED should be illuminated and on steady (not blinking).

Manually remove one of the scanners from its burner and cover it. The “FL” LED should start blinking and the display will indicate which scanner lost its signal.

Replace that scanner and repeat this process until all scanners have been tested.



Flame Safeguard Systems

Refer to the Flame Safeguard and Burner manuals for proper system setup and testing procedures

If the Quanta-Max is used as part of a flame Safeguard System

The following must occur:

Shut down the system and remove power to the Quanta-max module.

With power removed place DIP switch 8 in the Down position.

Reestablish power and start the system normally

With Dipswitch 8 in the Down position the Quanta-max flame sensing sequence must follow the timing chart on page 5.

Note: Periodically check all interlock and limit switches by manually tripping them during burner operation to make sure they cause the system to shut down.

Warning: Never operate a system that is improperly adjusted or has faulty interlocks or limit switches. Always replace faulty equipment with new equipment before resuming operation. Operating a system with defective safety equipment can cause explosions, injuries, and property damage.

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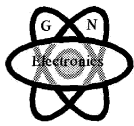
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Units should be returned to G N Electronics. Controls should be well packed in a suitable container encased in appropriate stuffing.

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Machesney Park, IL 61115**

**Tel: (815)637-8624
Fax: (815)637-8626**

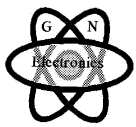
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