

G N Electronics Inc

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www.gnelectronics.com

Infra Red self-checking Scanner

Model #5000-11

USER MANUAL

5000-11 -E-090

TERRACENE

INTERNATIONAL

LTD.



Terracene International Ltd.

Instrumentation Sales, Design, and Service.

#100, 18016 - 105 Ave.

Edmonton, Alberta

T5S 2P1

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Phone: 1-780-443-2299

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A. Description

The Infra Red scanner is based on a NPN Silicon Phototransistor sensor. The presence of flame is detected by sensing the variations of the intensity of the flame. This technique assists in discriminating between the actual flame and background radiation. The ac signal from the photodiode is amplified before it is fed into a bandwidth filter. The sensitivity of the amplifier is selected by a DIP switch that has 16 ranges of amplifications: full..1/2.1/4.1/8.1/16.

A solid state shutter that periodically saturates the phototransistor continuously supervises the signal processor. The signal from the amplifier is fed into a bandwidth filter that is centered on 60 Hz. A pair of DIP switches selects the center of the bandwidth filter.

The signal from the filter is fed into a peak follower that converts the ac signal into a variable dc signal. This variable dc signal is fed into a voltage-controlled oscillator that generates a square wave signal that is proportional to the sensed signal.

Auto check is performed when the electronic shutter interrupts the signal generated from the optosensor. Any component failure will be detected during the self-check period by the controller (5501-11 or 5501-11-1)



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B. Specifications

MECHANICAL:

Length Overall	7" (178mm)
Diameter	3.25" (82.5mm)
Housing	Machined 6061 Alum. Alloy
Finish	Clear Anodized
Sight Tube Entrance	1" Pipe Thread
Air Entrance	3/8" Pipe Thread

ELECTRICAL:

Processor Supply	12V to 18VDC 20mA max
Solid State Shutter	20V to 28VDC 6mA max
Output	Pulses, normalized as to length and amplitude
Output Load	2000 Ohms 0.1 microfarad max (this represents approx cable length of 500 ft. or 152 m)

ENVIRONMENT:

Class	NEMA type 4
Temperature	-20°C to 60°C
Lens	Fused Silica spec #7940
Spectral Sensitivity	400 nanometer to 1050 nanometer wavelength

ELECTRICAL CONNECTOR:

Type	M53102A (MIL-C-5015)
Description	5 pin box mounting receptacle
Operating Voltage	700 VDC
Test Voltage	2000V RMS 60Hz for 1 minute



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C. Installation

1. Choose a sighting location providing an unobstructed view of the flame under all firing conditions. **UNDER NO CONDITIONS SHOULD THE SCANNER SEE IGNITOR SPARK.**

A scanner monitoring a pilot flame should be positioned so that no flame will be detected if the pilot flame is too small to reliably and safely light the main flame.

In multiple burner furnaces, choose a sighting angle with the best possible view of the flame of interest and the poorest possible view of other flames in the furnace.

The sighting pipe should be inclined slightly downward toward the furnace floor so that unburned particles will not fall, or moisture will not drain, into the scanner cavities.

2. The actual attachment of the scanner to the burner can be varied to suit individual applications. The scanner when applied to multi burner applications should always be attached to a 5000-73/74 swivel mount to assist in burner discrimination. The swivel mount has a 2" NPT male connection and connects to a 2" NPT coupling welded to the burner front plate. The use of the swivel mount is recommended on single burner applications. A 1" NPT nipple connects the scanner to the swivel ball joint.

When mounting scanners the temperature ratings must not be exceeded. If temperatures are excessive, cooling air must be applied to the scanner by means of the 3/8" NPT air port or by injecting cooling air downstream of the scanner. Pressurizing the scanner site pipe also protects the lens from debris.

3. When the scanner has been installed on the burner the cable #5000-02 is attached to the 5-pin connector at the rear of the scanner. Finger tight is sufficient. The bare ends of the cable are taken back to the control (5501-11 or 5501-11-1) either directly to the control's sub-base or via a junction box. See sections on cable assembly and cable connections.



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Set-up Procedure

Remove the scanner from its housing and mount the optic carrier assembly. Aim the scanner so that the light spot falls on the photo detector.

With the burner to be scanned OFF, eliminate unwanted signal by switching ON DIP switch S1 which is located alongside the photo detector. The switch settings are as noted below.

S1	1	2	3	4		
	OFF	OFF	OFF	OFF	Full sensitivity	
	OFF	OFF	OFF	ON	15/16	FS
	OFF	OFF	ON	OFF	7/8	FS
	OFF	OFF	ON	ON	13/16	FS
	OFF	ON	OFF	OFF	3/4	FS
	OFF	ON	OFF	ON	11/16	FS
	OFF	ON	ON	OFF	5/8	FS
	OFF	ON	ON	ON	9/16	FS
	ON	OFF	OFF	OFF	1/2	FS
	ON	OFF	OFF	ON	7/16	FS
	ON	OFF	ON	OFF	3/8	FS
	ON	OFF	ON	ON	5/16	FS
	ON	ON	OFF	OFF	1/4	FS
	ON	ON	OFF	ON	3/16	FS
	ON	ON	ON	OFF	1/8	FS
	ON	ON	ON	ON	0	

The bandwidth adjustment is done by DIP switches S2 and S3 which MUST have the same settings. These switches are located on the circular circuit board at the rear of the optic carrier.

When S2 and S3 switches are all OFF, the bandwidth is at the lowest point of 15 Hz. The Center Frequency is shifted toward maximum frequency of 150 Hz by setting the switches in steps of 1/16 as described above



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D. Maintenance

Lens Cleaning

This is the only routine maintenance required. It is suggested a good lens cleaning fluid and lint free tissue be used for this operation. Remove the scanner as follows:

1. Disengage the scanner cable from the scanner.
2. Turn off the purge air supply
3. Close any shut off valve in downstream of the scanner.
4. Keeping the scanner housing front solidly attached to the sight pipe, unscrew the cylinder rear portion of the scanner. The lens is now accessible for cleaning.

When the lens has been cleaned the scanner should be put back into service by reversing the above removal instructions.

Repair of Scanners

Defective scanners should be returned to G N Electronics for repair.
Controls should be well packed in a suitable container encased in appropriate stuffing.

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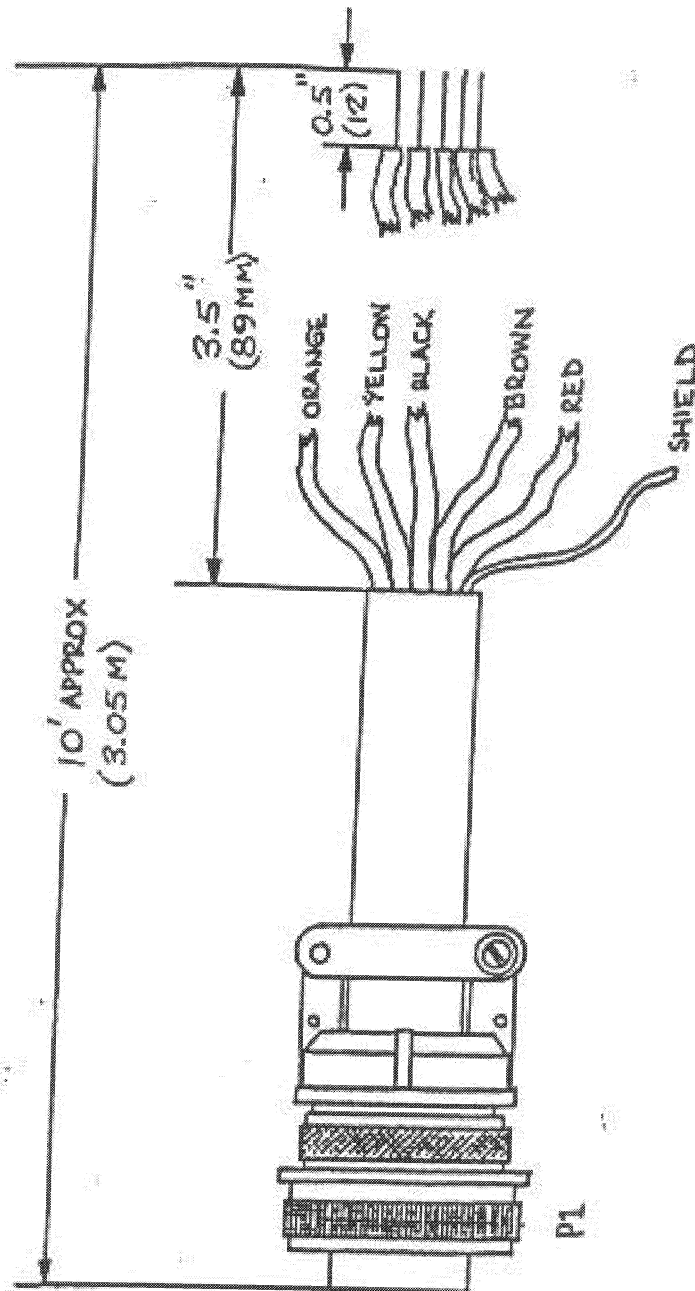


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CABLE ASSEMBLY



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CABLE CONNECTIONS

<u>CONNECTOR PIN</u>	<u>WIRE END</u>
A (Chopper Drive)	ORANGE
B (+30V max, +12V min)	YELLOW
C (GND)	BLACK
D (Signal)	BROWN
E (520V)	RED
SHIELD	BARE



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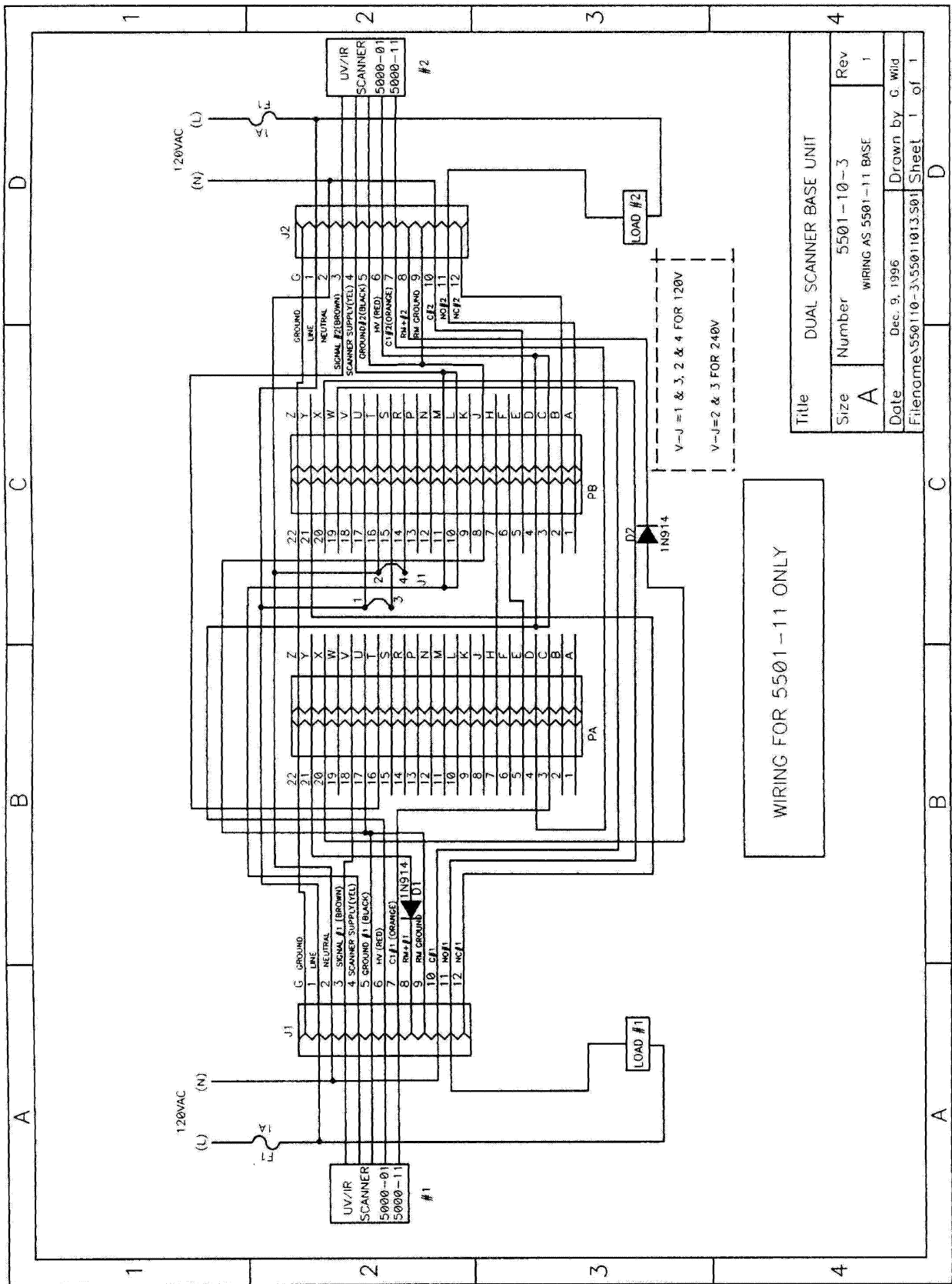
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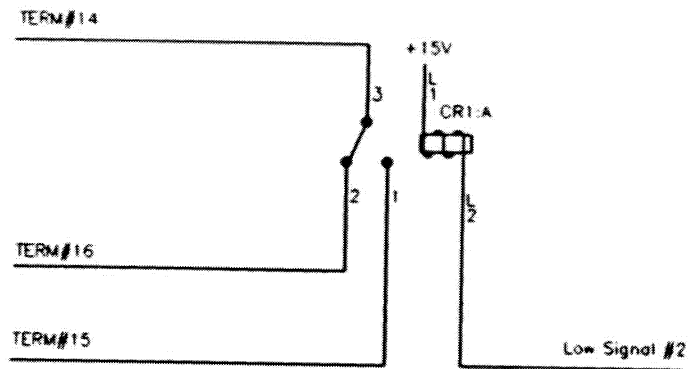
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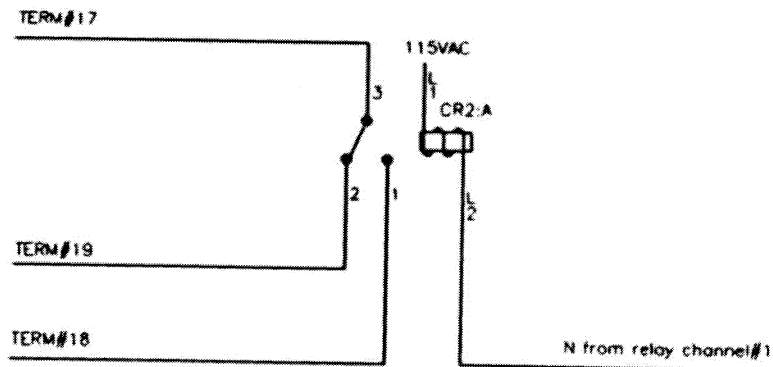
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5501-01/03 RELAY LOGIC



Relay CR1 is activated when a flame is NOT detected on CH#1



Relay CR2 is activated when flame is detected on CH#1 OR CH#2



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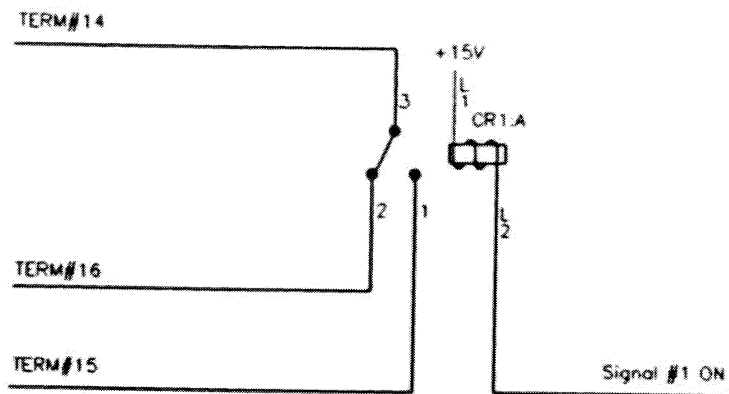
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Toll Free: 1-888-433-2299

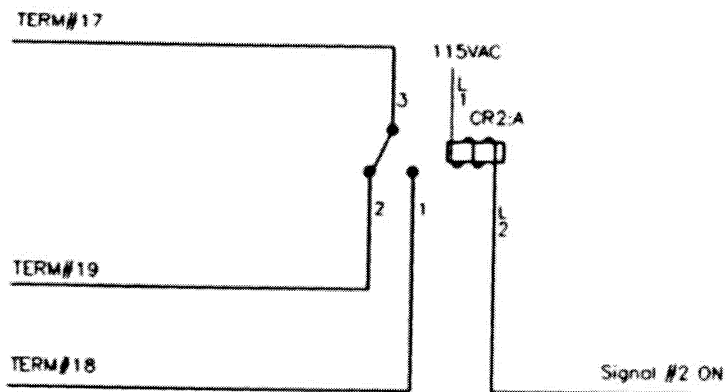
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5501-11 RELAY LOGIC



Relay CR1 is activated when a flame is detected on CH₁



Relay CR2 is activated when flame is detected on CH#2

