

A947 Analog Control

Owner's Manual

The A947 is a remotely-operated control designed to work with a variety of remote pulsed LED heads and give an output voltage which is directly proportional to the intensity of pulsed LED light falling on the phototransistor. Pulsed LED's are used for immunity to ambient light and high stability over long periods of time.

When used with retro-reflective or through-beam heads, the A947 can be used to monitor smoke density, for thickness detection of paper stock or for checking optical clarity of fluids.

When used with photoelectric proximity heads, the voltage output will vary approximately as $1/d^2$ where "d" is the distance to a matte surface. If the distance is held constant, the A947 can be used to check reflectivity at 900 nm.

The ELD31-W Scanner is a good companion to the A947. The ELD 31-W generates a fan-shaped

light beam which is directed at a strip of retro-reflectors. See Figure on Page 4. This package is used for edge control and loop detection in the textile, steel and rubber industries. As the area of exposed reflective surface changes, the output voltage varies.

A phase switch allows the user to select either a proportional or inversely-proportional voltage output. The LITE phase output voltage increases as the input signal increases. The maximum output voltage can be set to any value between 1 and 10VDC by adjusting the 20-turn LITE Scale Adjust. The maximum output voltage in the DARK phase decreases from a fixed 10VDC as the input signal increases.

A 5V reference voltage is provided to give a null balancing voltage with positive and negative voltage on either side.



SPECIFICATIONS

Light Beam Distance:
See page 4

Input:

120V \pm 10% 60Hz

Optional - available upon request:

- 12 VAC 50-60 Hz
- 24 VDC
- 12 VDC
- 230 VAC 50-60 Hz
- 24 VAC 50-60 Hz
- 120 VAC 50-60 Hz

Power Consumption:
5VA maximum

Output Voltage:

1 to 10VDC

+ 5VDC reference voltage provided

All voltages are referenced to chassis ground. If isolation of the 1-10V analog voltage is required, order the A947GB. Complete isolation of all voltages is available with the A960.

Output Current:

10 ma maximum (analog and reference)

Response Time:

21 ms to get to within 5% of final voltage

Ambient Light Tolerance:

10,000 foot-candles of sunlight

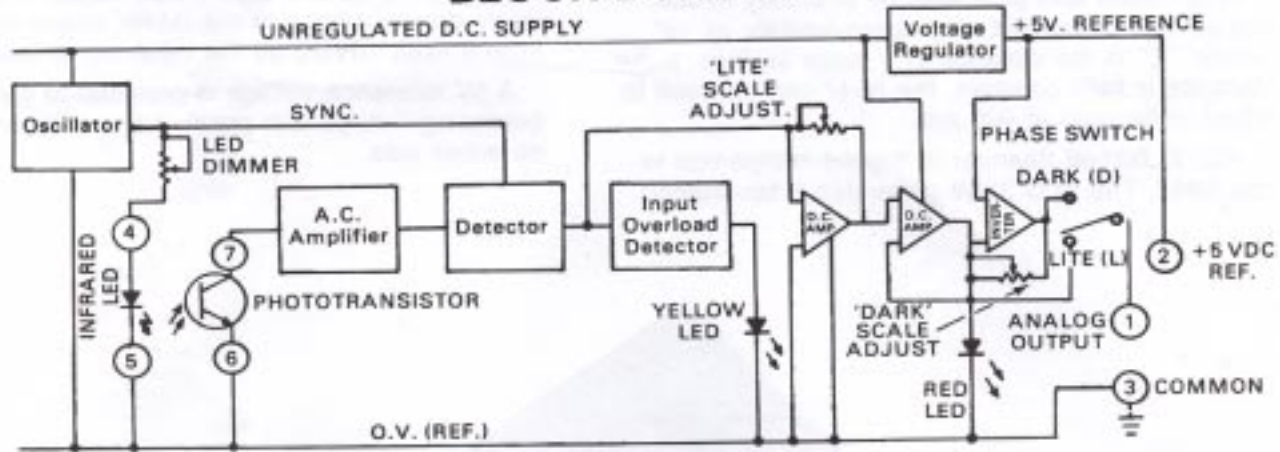
Ambient Operating Temperature:

Control & ELD31-W: -40° F to + 130° F (-40° C to + 55° C)
Other Heads: -40° F to + 176° F (-40° C to + 80° C)

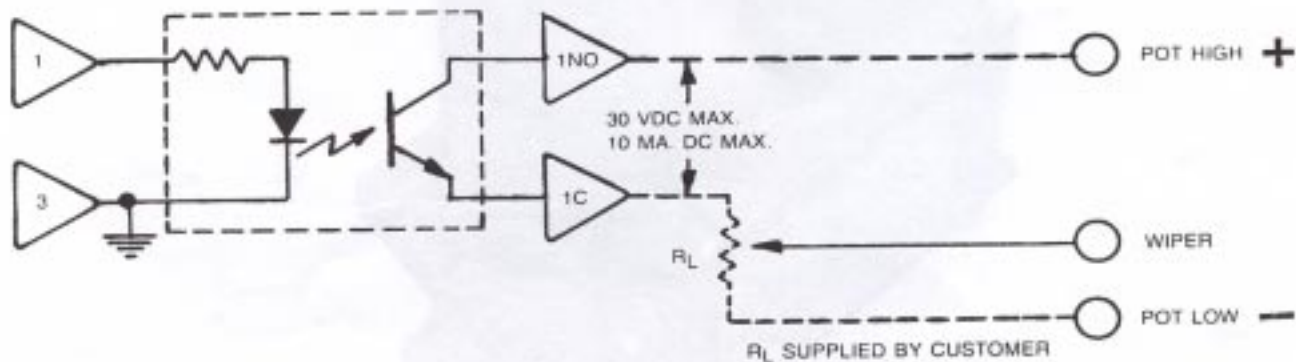
Shipping Weight:

2 lbs.

BLOCK DIAGRAM



**P1032 OUTPUT MODULE
ON A947 GB**



The oscillator generates current pulses for the infrared LED source. The LED dimmer is used to prevent the A.C. Amp from being overdriven into non-linearity. The yellow LED comes on when the overdrive condition exists. An adjustable gain - DC amplifier boosts the detector voltage and provides a

low impedance output. The red LED intensity increases as the input sees more light. A 5 volt voltage is provided for the convenience of the user. A phase switch is provided to allow selection of full voltage out at terminal (1) when input is seeing full LIGHT or full DARK.

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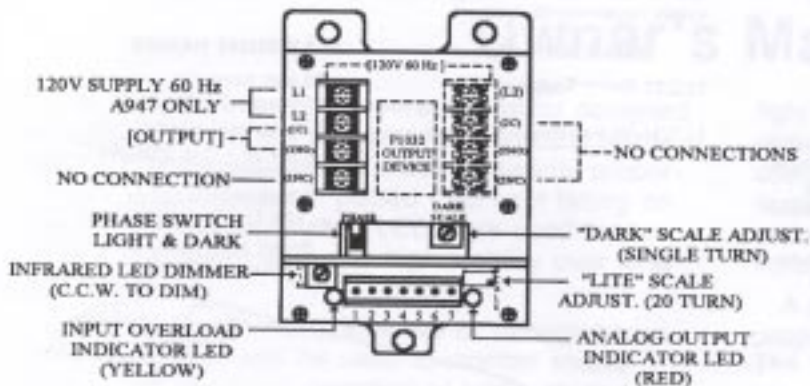
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HOOKUP DIAGRAM

[] INDICATES FEATURES SUPPLIED ON A947GB ONLY



Terminal No.	Connections
L1, L2	120VAC, 60 Hz Power
1	Analog Output (1-10VDC)
2	+5VDC Reference output
3	0V (chassis ground)
4	LED +
5	LED -
6	CELL -
7	CELL +

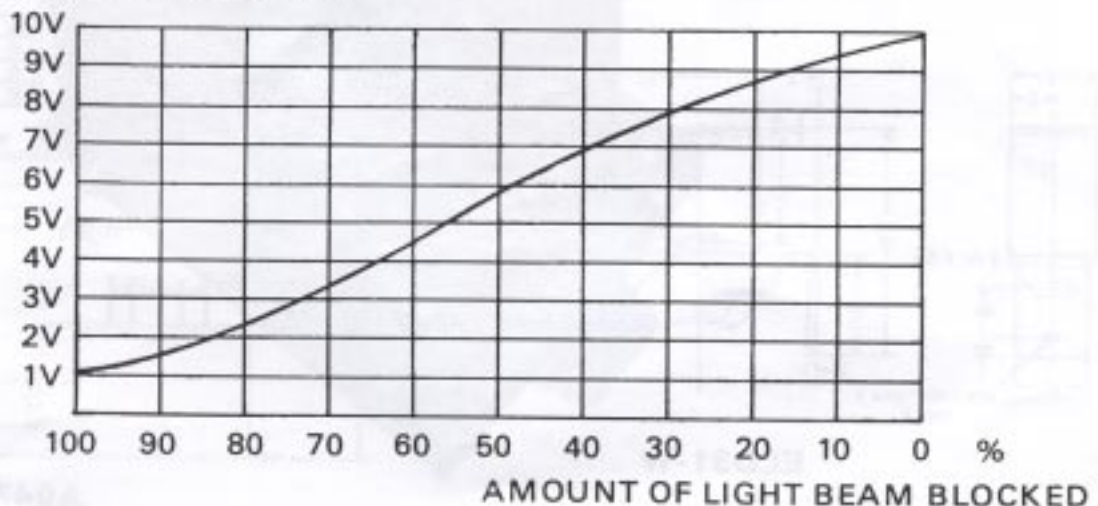
Remote Head Connections

SETUP PROCEDURE

1. Set phase switch to LITE (L) phase.
2. Connect the LOAD and remote heads to the appropriate terminals observing polarity. Apply power to the control.
3. Align the remote heads. Turn the single-turn LED dimmer fully clockwise. "Aim" the heads until the yellow LED lights. Decrease the LED dimmer (CCW) until the yellow LED just goes off. Further align the heads by rotating them side-to-side and up-and-down until the yellow LED turns on. Repeat until the LED is on at the lowest attainable dimmer setting. Decrease the LED dimmer again until the yellow LED goes off. Further improvement in the alignment can now be made by connecting a DC voltmeter to the output terminals and setting the LITE scale adjustment to read between 1 and 10 volts, say 5 volts. Align to achieve the highest voltage. Whenever the yellow LED lights, turn the dimmer CCW until it goes off.
4. Set the LITE Scale Adjustment for the maximum output voltage you desire. If the DARK phase is to be used set the maximum output voltage to 10VDC. The maximum output voltage will occur when the returned pulsed signal is the greatest in the LITE phase or when the returned pulsed signal is the smallest in the DARK phase.
5. If the DARK phase is desired, change the phase switch to DARK (D). Check that the maximum output voltage is 10VDC with no returned pulsed signal. Use the DARK Scale Adjust to set the maximum output voltage to exactly 10VDC. If the minimum output voltage is not less than one volt, turn the LITE Scale Adjust CW until the voltage drops to one volt or less.
6. The output voltage may be referenced to the +5VDC voltage at terminal 2 to allow a +5 to -4V swing.

TYPICAL OUTPUT VOLTAGE vs. BEAM BLOCKAGE

OUTPUT VOLTAGE — LIGHT PHASE



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REMOTE HEADS

The A947 can be used with any pulsed LED remote head described on Bulletin 378. The maximum operating ranges are repeated below for convenience. The ELD31-W Fan Beam

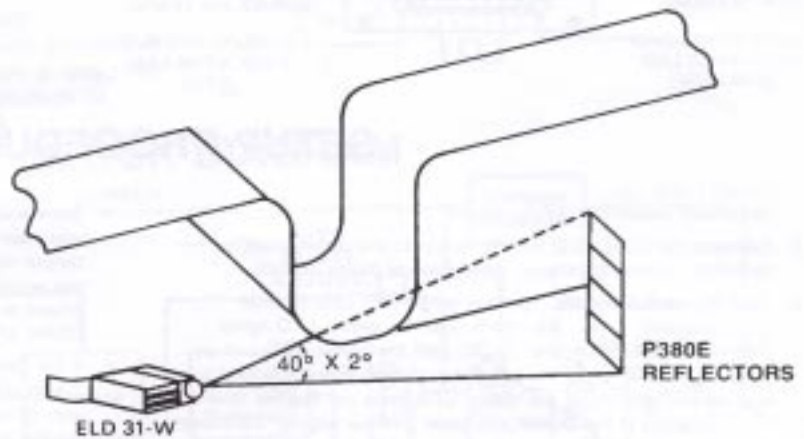
Scanner is described on this page. As a general rule, up to 100 feet of cable can be connected to the heads using the shielded cable recommended.

REMOTE HEAD	MAXIMUM RANGE
EAP30 Sensor and EL30 Source	4 feet
E8BP30 Sensor and E8B30 Source	50 feet
E8ZP30 Sensor and E8Z30 Source	50 feet
EBLP30 Prox Scanner	8 inches off diffuse white surface
ELDY30 Prox Scanner	15 inches off diffuse white surface
ELDX30 Prox Scanner	30 inches off diffuse white surface

REMOTE HEAD	MAXIMUM RANGE
ELD31 Retro Scanner	20 feet from 3 in diameter reflector
ELD31-W Fan Beam Scanner	10 feet from array of 1 1/4 in x 3 in (P380E) reflectors
	5 feet from array of 3870 retro tape
	8 feet from array of 2000X retro tape



**ELD31-W
Fan Beam
Scanner**



NOTE:

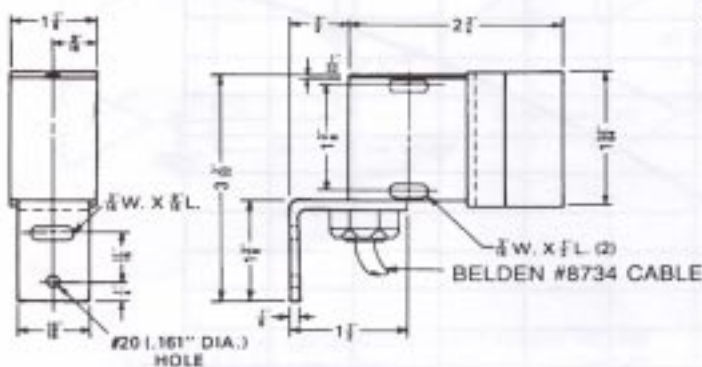
Mount scanner horizontally for vertical reflector array as shown.

Six (6) inches of reflector array length are needed for each foot of distance between the scanner and the array.

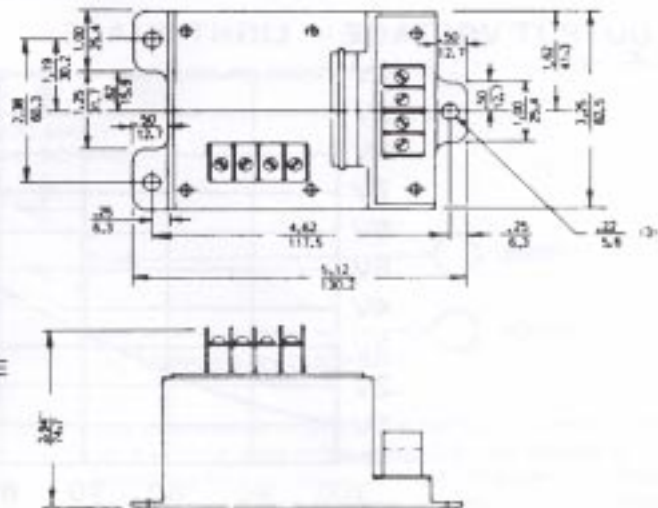
ELD31-W WIRE CODE

- LED + RED
- LED - BLACK
- CELL - SHIELD (BARE)
- CELL + WHITE

Range	Beam Size	Reflector Array
3 feet	2 x 30 inches	1 1/4 x 18 inches
6 feet	4 x 60 inches	1 1/4 x 36 inches
9 feet	7 x 100 inches	1 1/4 x 54 inches



ELD31-W



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