



## Instruction Manual: 8170A Demodulator

### Introduction

The Opcon 8170A Demodulator supplies all signals required to operate Opcon 70 Series pulsed LED sources and decodes 70 Series detector signals. It uses a synchronous demodulation technique to prevent any interference from ambient light. The patented input circuitry allows long cable runs as well as direct connection of multiple source and detector heads.

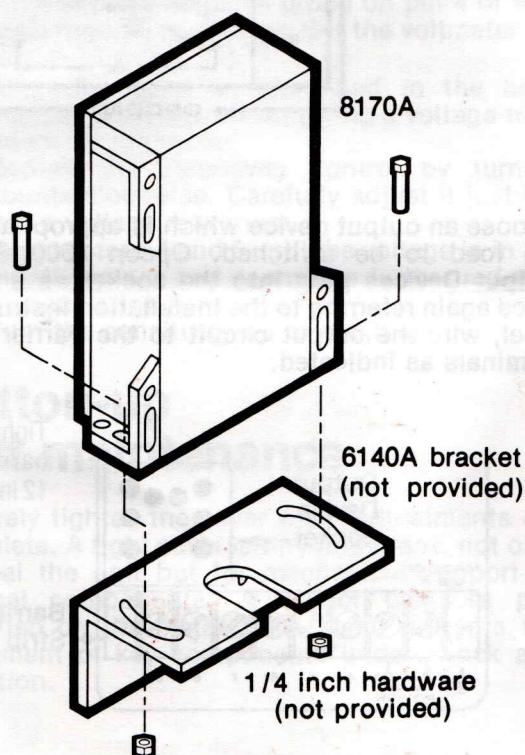
Head alignment is facilitated by the rear panel LED indicator.

The 8170A can handle a wide variety of specific application problems with the addition of one logic module. The board fits entirely within the standard housing.

### Mounting

Use at least two of the five mounting flanges that are both drilled and slotted for quarter-inch hardware. In areas of severe vibration the unit should be mounted by the front panel flanges rather than the base flanges.

Accessibility to the back panel should be considered before the unit is mounted.



### Wiring

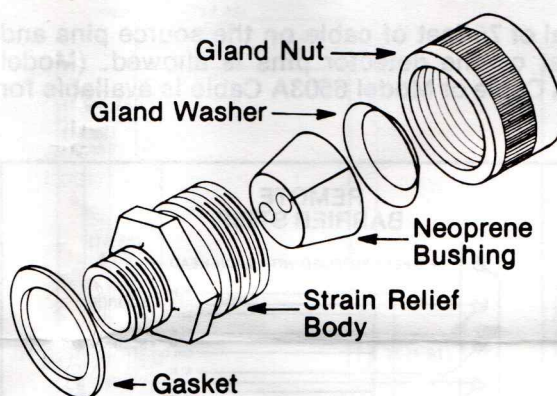
Each 70 Series head cable has one or two twisted pairs plus a shield wire for each pair. Cables provided with sources are color-coded red and black. Cables provided with detectors are color-coded either red and black or green and white. Two-element heads, such as the 1370A or 1470A, have all four leads in one cable. The label on all head cables identifies a head as a source (1170 Series), detector (1270 Series) or a two-element proximity (1370 Series) or reflex (1470 Series) head.

Head connector pins and the barrier strip terminals for power and output wiring are all clearly labelled.

*Note: Do not connect 70 Series heads to external power; the head leads should only be connected to Opcon 70 Series electronics units.*

Proceed to wire the heads after consulting the manual supplied with the heads.

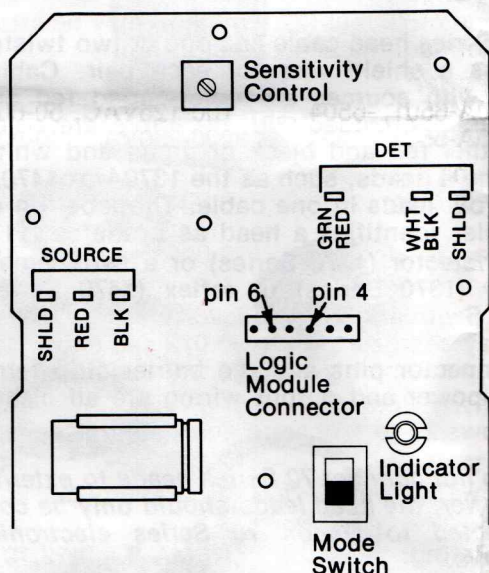
1. Securely tighten the strain relief into the side panel port using the gasket provided.
2. Thread the gland nut and washer over the head cable(s).



3. Thread the cable(s) through the split neoprene bushing. Then, thread the cable(s) through the strain relief body in the side panel port of the 8170A.
4. Screw the gland nut onto the strain relief body (finger tight).



5. Connect the source wires to the set of three pins designated SOURCE, the red lead to the RED terminal, the black lead to the BLK terminal, and the shield to the SHLD. Connect the detector wires to the set of three pins designated DET, the green or red lead to the GRN/RED terminal, white or black lead to the WHT/BLK terminal and the shield to SHLD. Do not tie the shields together.



6. Dress the wires as desired and securely tighten the gland nut for a water tight seal.

One Model 8170A will drive up to four 70 Series sources and four 70 Series detectors at one time. Sources should be wired in series, detector in parallel as shown.

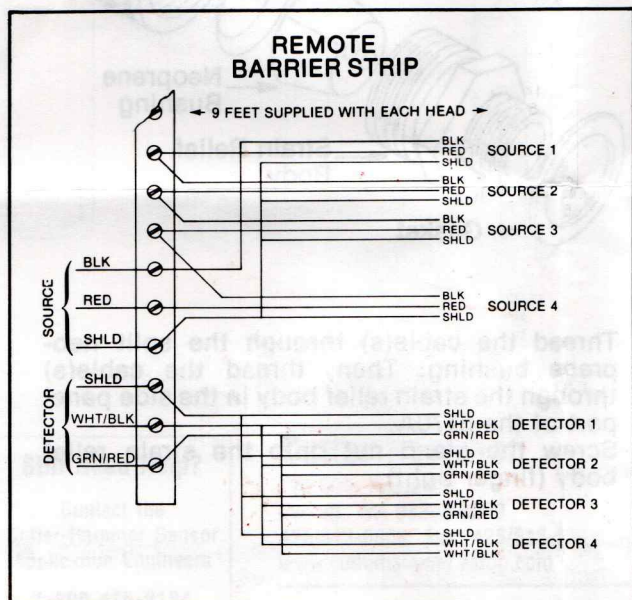
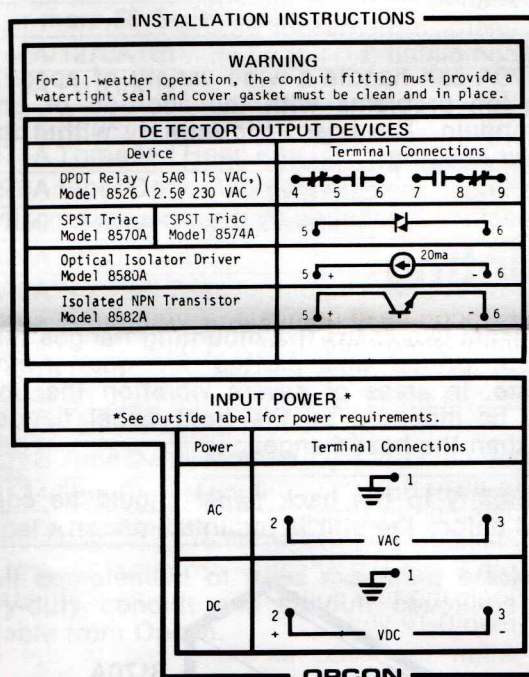
A total of 75 feet of cable on the source pins and 75 feet on the detector pins is allowed. (Model 6506A Cable or Model 6503A Cable is available for

extension wiring.) 70 Series heads are supplied from the factory with 9 feet of cable attached.

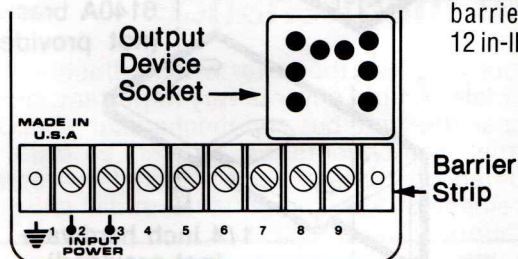
Extensions should be spliced on using a barrier strip located inside a junction box. Source and detector signal wires should be separated by source and detector shield wires. Strip leads back only as far as is necessary. Do not connect source and detector shields together.

The bottom panel 3/4-14 NPT port is for power wiring and output wiring. It should be mated with a water tight fitting.

Prior to making power connections check the nameplate located on the side of the unit for proper voltage rating. Refer to the installation instruction sticker on the inside back cover. Proceed to wire power leads to the labeled barrier strip.



Choose an output device which is appropriate for the load to be switched. Opcon 8500 Series Output Devices plug into the socket as shown. Once again referring to the installation instruction label, wire the output circuit to the barrier strip terminals as indicated.



Tighten screws on barrier strip to 12 in-lbs. maximum



## Alignment

The 8170A Demodulator is designed to operate with any Opcon 70 Series head (identified by Model numbers ending in "70-79"), either separate source and detector elements or enclosed two-element reflex and proximity heads.

"Alignment" sections of the instruction manuals supplied with the heads detail the preferred alignment procedure. An index containing order numbers for 70 Series head manuals appears on page 2.

A few notes of importance to 8170A users follow.

1. Alignment is easier if the optional plug-in logic module is removed from the 8170A.
2. A rear panel LED indicator is provided to aid in alignment.
3. A slide switch is included that can be set to energize the output device when the beam is completed (LIT) or when it is broken (DARK).

The Opcon 8170A is normally operated with the sensitivity control at maximum (fully clockwise) to increase the length of time between lens cleanings. The sensitivity should be reduced only if specifically required by the detection problem at hand.

Step-by-step alignment procedures can be found in all Opcon head manuals. *If optimum alignment accuracy is required*, users of the 8170A may want to proceed as follows:

1. If system is to operate in through-beam or reflex, remove the object to be detected from the beam path.
2. In proximity systems, place the object to be detected in the detection zone.
3. Place the positive probe of an DC voltmeter on pin 6 and the negative probe on pin 4 of the logic module connector. Set the voltmeter to read 0-12 volts.
4. Align the head as described in the head manual. Find a position giving a voltage minimum on the meter.
5. Reduce the sensitivity control by turning counterclockwise. Carefully adjust it just below a voltage maximum.
6. Repeat steps 4 and 5 until the voltage is in the 0-5 VDC range and cannot be further reduced by head alignment.
7. Turn the sensitivity up to maximum.

## Button-up and maintenance

Securely tighten the cover when adjustments are complete. A tight cover is very important, not only to seal the unit but for mechanical support to internal components. A rubber pressure pad mounted on the inside back panel prevents the movement of key components under shock and vibration.

## Specifications

**SR** Approved

### Multiple Heads:

Up to four 70 Series sources in series, up to four 70 Series detectors in parallel, may be connected

### Cable Length:

A total of 75 feet (22.9 meters) may be attached to both source and detector inputs.

### Input Power:

8170A-6501, -6504	5VA max.
	100-125VAC, 50-60Hz
8170A-6502, -6505	
	200-250VAC, 50-60Hz

### Switching Times to Output Device Driver:

Object breaking beam	0.003 sec. typ., 0.005 sec. max.
Object leaving beam	0.0005 sec. typ., 0.0015 sec. max.

### Relay Switching Times (8526A):

Relay energize	0.012 sec max
Relay de-energize	0.010 sec max

### Sensitivity Control:

Allows 20 to 1 change and detector sensitivity

### Mode Switch:

Allows Output Device to be energized light or dark

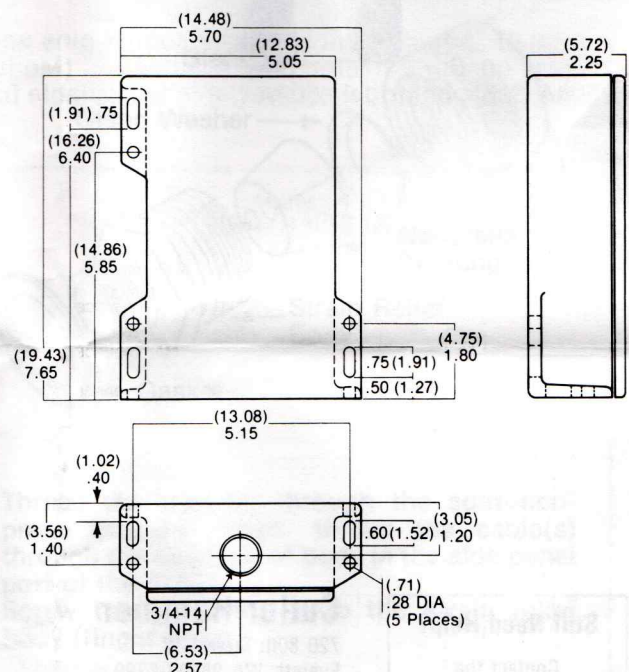
### Case Rating:

NEMA 3,4,5,12,13  
Coupling provided to seal side port; 3/4-14 NPT port must be sealed by user; (unit available without case)

**Ambient Temperature:** +32° to +158°F  
(0° to +70°C)

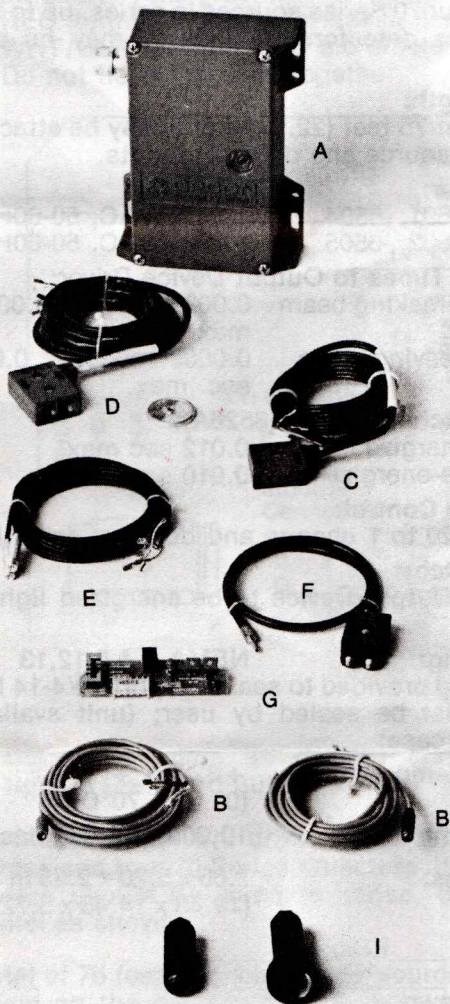
**Sunlight Immunity:** 10,000 foot candles

**Dimensions:** 7.65 x 5.70 x 2.25 in  
(19.43 x 14.48 x 5.72 cms)



Parenthesized dimensions are in centimeters, all other dimensions are in inches.





Opcon's Model 8170A is a 70 Series demodulator, modulator and power supply all in one rugged NEMA 3,4,5,12,13 cast aluminum case. Operating on 115VAC or 230VAC, the 8170A works with the smallest heads made by Opcon as well as the rugged compact two-element heads specially designed to operate in proximity and reflex modes.

Plugging into a socket on the circuit board and fitting completely within the case, the output devices provided will switch a wide variety of AC and DC loads. A slot is provided for an optional logic module which is also housed within the casting.

An operating system is comprised of:

#### One 8170A Demodulator (A)

115VAC	(various models)
230VAC	(various models)

#### One or more 70 Series head

1170A/1270A (B)	(various models)
1370A Proximity (C)	101984
1470A Reflex (D)	101986
1571A Threaded Head Pair (E)	102371
6276A Fiber Optic Cable (F)	102370

#### One 8500 Series Output Device

8526A DPDT Relay	100867
8570A Isolated Triac	100736
8580A Optical Isolator Driver	100742
8582A Isolated NPN Transistor	100849

#### Optional

##### One 8200 Series Logic Module

8212B Time Delay Module (G)	101612
8213A One-Shot Module	(various models)

##### Optical Attachments for 1170/1270 (I)

A full complement of head mounting brackets, heavy-duty conduit and conduit couplings are available from Opcon.

#### Still Need Help?

Contact the  
Cutler-Hammer Sensor  
Application Engineers

1-800-426-9184  
Fax: 425-513-5356

#### Cutler-Hammer

720 80th Street SW  
Everett, WA 98203-6299  
425/513-5300 Fax: 425/513-5302  
www.cutlerhammer.eaton.com

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