



**Model 40**  
(Line and Low Voltage Models Appear Identical)  
Listed by Underwriters' Laboratories

Statitrol Model 40 detectors are designed to detect products of combustion from incipient fires for general area fire detection. Their application is principally for high value property protection and life safety.

**102-040**—Low voltage Model 40 is to be used with any listed power supply or control unit with 20-42 VDC filtered, or 15-30 VDC unfiltered output. A maximum of 25 detectors can be connected to each circuit, using minimum #16 gauge wire. A 1.5 amp power supply is adequate for two circuits or a total of 50 detectors.

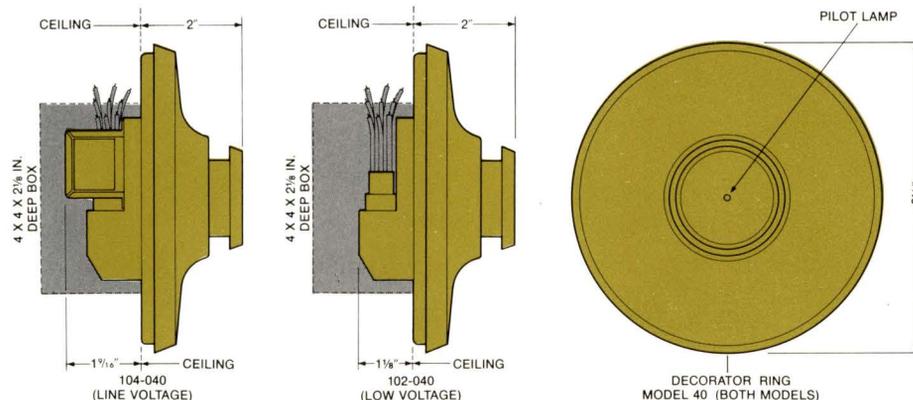
**104-040**—Line voltage Model 40 operates on 120 volts AC or 24 volts AC, 50-60 Hz. It is used principally for those spot detector applications such as fire door release, fan shutdown and applications where line power is readily available.

**Self-Monitoring**—The Model 40 detector introduces a major feature to the fire detection industry—that of a continuous visual indication of the condition of the detector, and its proximity to alarm or trouble. A pulsed diode pilot light can be seen from a distance of 50 to 60 feet with the naked eye. This important feature allows an entire system to be checked at each detector location without the need for ladders, the use of meters or special instruments; and at a great savings in time and expense.

#### GENERAL SPECIFICATIONS

- Pilot light
  - Standby—pulses at 60 times per minute
  - Alarm —Light on continuous
  - Trouble—Light either on or off
- Individual detector reset switch
- Fail safe—the Model 40 is self-supervising for component failure as well as line failure.

- Power consumption—
  - 102-040—Standby—25 milliamp
  - Alarm —65 milliamp
  - 104-040—Standby or Alarm—
  - 120 VAC, 50-60 Hz—50 milliamp
  - 24 VAC, 50-60 Hz—160 milliamp
- Electrical—
  - Alarm Relay—one set SPDT and one set normally open contacts.
  - Contact Rating—0.5 amp inductive at 120 VAC
  - Trouble Relay—one set normally open (closed in standby)
  - Contact Rating—0.1 amp, 120 volts inductive
- Velocity limits—300 feet per minute
- Temperature limits—0 to 150°F.
- Humidity limits—0 to 95% RH
- Sensitivity adjustable at each detector.

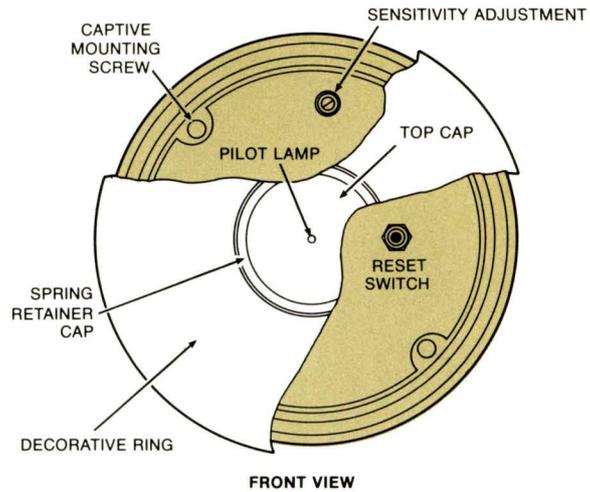


**APPLICATION RECOMMENDATIONS**

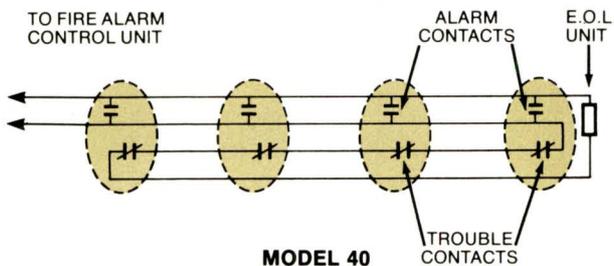
Detector spacing for ionization detectors should not exceed area coverage of 1,000 square feet or approximately 30 feet on center, for smooth ceilings in areas free of unusual air movement. For applications requiring higher sensitivity or areas of unusual air movement such as computer rooms, closer spacings are recommended.

Ionization detectors will always sense products of combustion. Some normal sources of products of combustion that should be avoided are as follows:

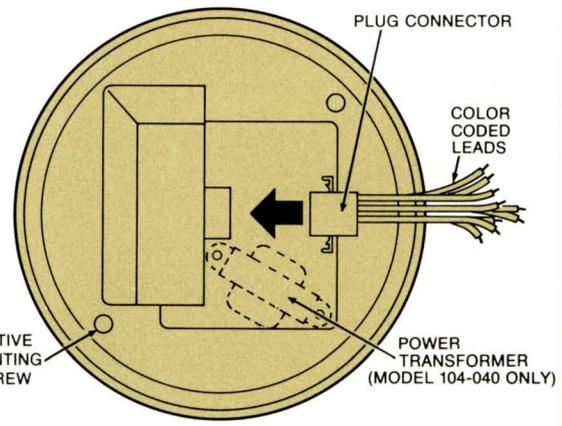
- Automobile exhaust
- Kitchen areas
- Motor generators, welders, or power tools
- Laboratories using bunsen burners, kilns or ovens for special purposes.



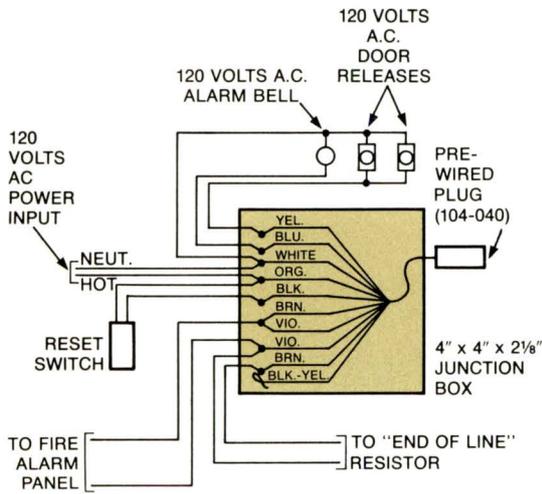
FRONT VIEW



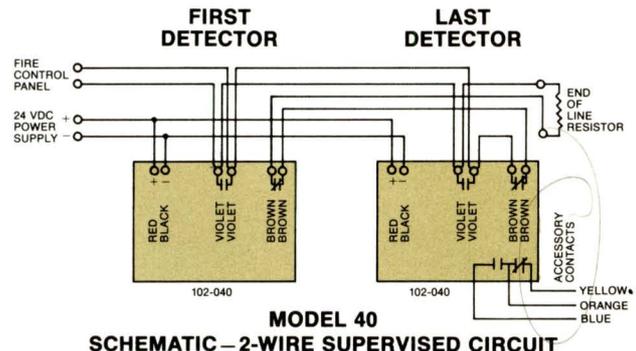
**MODEL 40**  
**SCHEMATIC - 2-WIRE SUPERVISED CIRCUIT**



REAR VIEW



**TYPICAL WIRING**  
**MODEL 104-040 FOR DOOR**  
**RELEASE AND SYSTEM CONNECTION**



**MODEL 40**  
**SCHEMATIC - 2-WIRE SUPERVISED CIRCUIT**

**\*NOTE:** Wiring for Model 104-040 identical to above except power connections are either 120 volts AC to black-white leads or 24 volts AC to black/yellow-white leads.

For complete startup and wiring, refer to installation instructions furnished with each detector.  
Shipping Weight - 1½ lbs. • Finish - Satin Aluminum



### ADAPTOR BOX

The Adaptor Box is for mounting to a 3" or 4" octagonal conduit box, or to a flat ceiling surface. The detector mounts to the adaptor box by using the (2) 8-32 screws normally supplied with detector.

Ordering information:

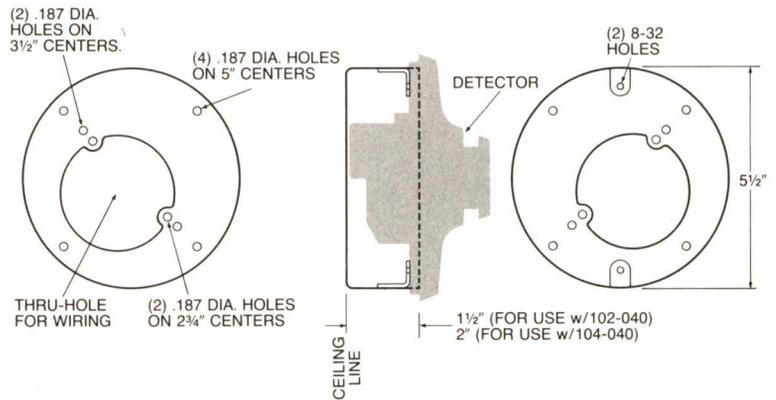
Finish—Silver Aluminum or off-white

Matl.—20 ga. steel

Weight— $\frac{1}{4}$  lb.

Part No. 102-0109-001 (For use w/104-040)

102-0109-002 (For use w/102-040)



### CEILING PLATE — FLUSH MOUNTING

The Ceiling Plate is for mounting detector to ceiling when it is desirable only to allow the ion chamber to extend into the room. In this case the detector and its 4 x 4 x 2 $\frac{1}{8}$ " conduit mounting box must be placed above the ceiling surface.

Ordering information:

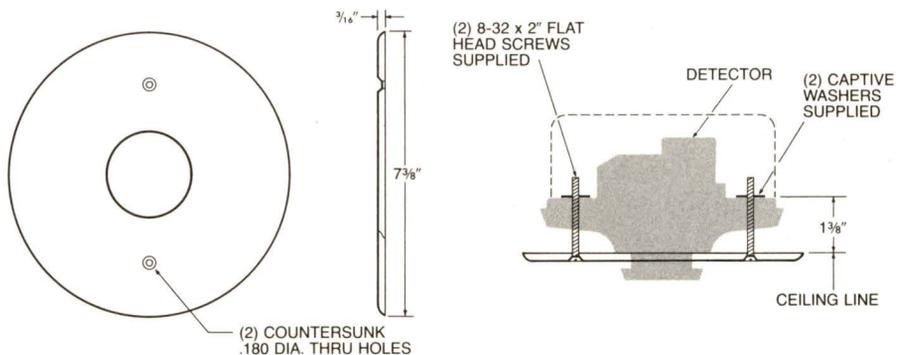
Finish—Silver Aluminum

Matl.—18 ga. steel

Weight incl. detector—1 $\frac{1}{2}$  lbs.

Detector for ceiling flush mount must be ordered by specifying "Model 102-040 (or 104-040) with 102-0103 ceiling plate."

(Note: Plates are not to be separately ordered. They must be supplied w/detectors as plates are *pre-assembled* to detector w/the flat head screws.



### ADAPTOR SKIRT

The Adaptor Skirt serves as a decorative ring around a surface mounted 4 x 4 x 2 $\frac{1}{8}$ " conduit box.

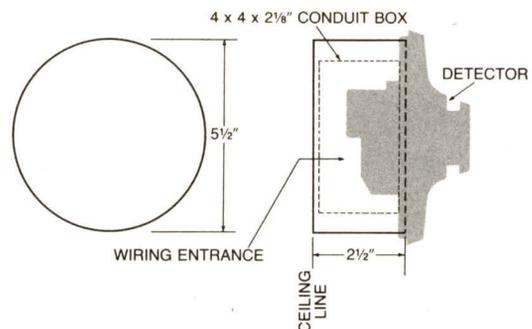
Ordering information:

Finish—Silver Aluminum

Matl.—20 ga. steel

Weight— $\frac{1}{4}$  lb.

Part No. 102-0116



## REMOTE ALARM LAMPS

The remote alarm lamps are designed for use with Model 102-040 & 104-040 detectors that are not exposed to view. When the concealed detector alarms the remote alarm lamp will turn on. The lamps are for use where 24VDC or 120VAC supervisory power is used.

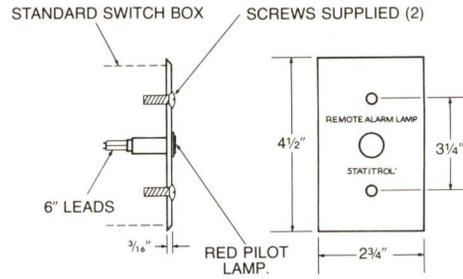
### Ordering information:

Finish—Chrome plate w/Black Lettering  
Matl.—18 ga. steel

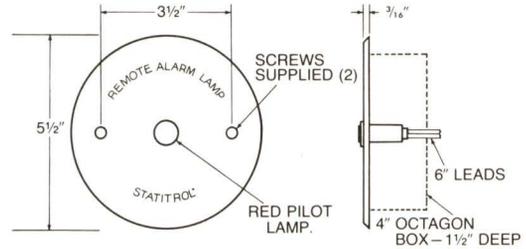
Weight—¼ lb.

Part No. 102-0111 Ceiling Mount 120VAC  
102-0112 Ceiling Mount 24VDC  
102-0114 Wall Mount 120VAC  
102-0115 Wall Mount 24VDC

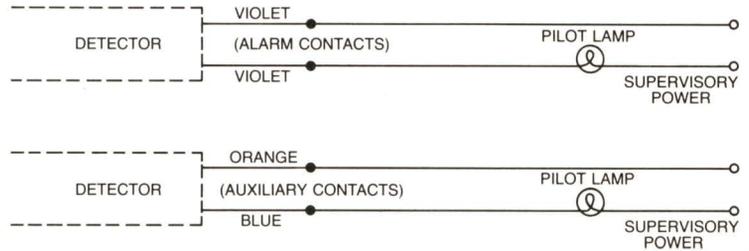
### WALL MOUNT



### CEILING MOUNT



### TYPICAL WIRING



## VELOCITY SHIELD

The velocity shield is designed for use with Model 102-040 & 104-040 detectors when applied to "under-the-floor" computer room applications where air velocities can be erratic and in the range of 200-2000 feet per minute.

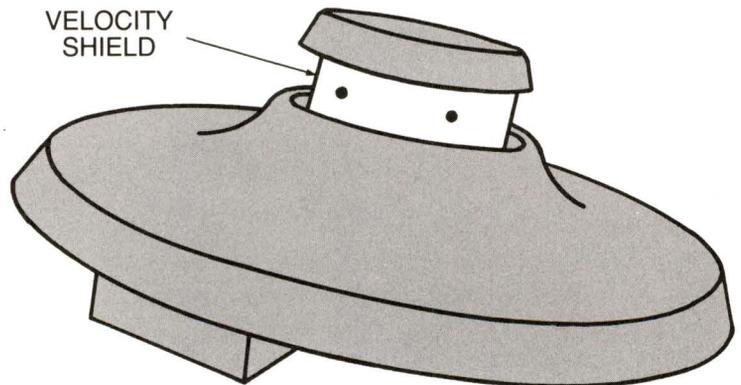
### Ordering information:

Finish—Silver Aluminum

Weight incl. detector—1½ lbs.

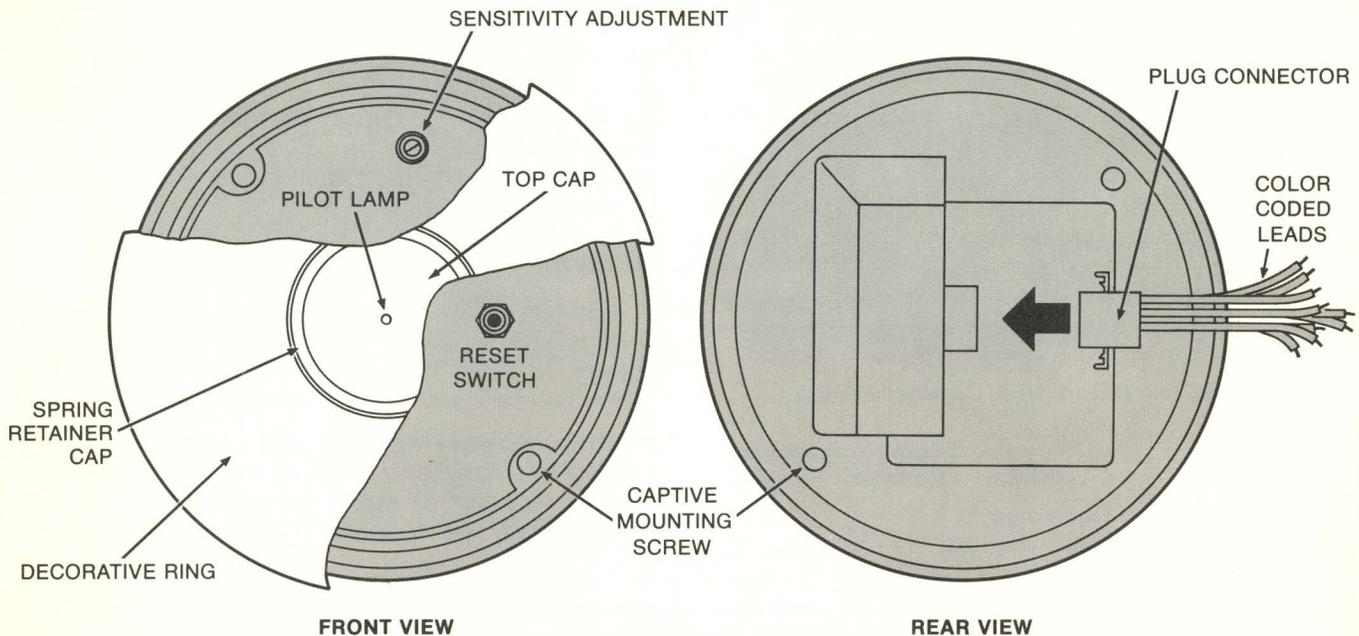
Detector requiring velocity shield must be ordered by specifying "Model 102-040 (or 104-040) with 103-0071 velocity shield."

(Note: Velocity shields not to be separately ordered as the shields are factory pre-assembled.)



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**FIG. 1**



**NOTE – PRIOR TO INSTALLATION**

1. The ceiling-mounted low voltage Model 40 detector mounts directly on a four-inch-square outlet box, 2 1/8 inches deep. The optimum coverage for a single unit is approximately 1,000 square feet. Care should be taken to avoid applications of the detector in areas where the ambient product of combustion level is high. Common machinery creating high levels of combustion are welders, motors, generators, automobile exhaust, etc.

The ionization fire detector should be as evenly spaced as possible throughout the protected area. The spacing distance is varied by rough, uneven or sloped ceilings. Ambient conditions such as air movement, ceiling lights, location of supply and return air grilles must be considered to assure optimum operating conditions. Air movement across the detector should not exceed 300 feet per minute.

2. The detector is intended to be used with a U.L. listed nominal 24 VDC power supply. Specifications for the supply are as follows:

- a) The output of the supply is to be between 15-30 VDC (unfiltered), or 20-42 VDC (filtered) with fluctuations in the primary

power of +10%, -15% and a load current as determined by number of detectors to be connected to supply (see Fig. 5).

- b) The power supply must also have an ON-OFF switch on the output if it is desirable to remotely reset the entire system of detectors when an alarm condition occurs. Individual detectors can be locally reset from alarm by use of the detector reset switch located under the cover.

- c) Power Consumption—Maximum/Detector

Operation Mode	24 Volts DC
Supervisory	25 ma
Alarm	65 ma

3. The use of #16 or #14 AWG wire is recommended for the DC supply line to the detectors. Wiring should always be in conduit, grounded at one central point in the system. When excessively long lines are required, increase wire sizes to keep total line resistance per circuit less than 10 ohms.

4. A watch with a second hand, preferably a stop watch, and a volt ohmmeter are necessary to complete the checkout procedure.

## MOUNTING

1. Connect the plug-in connector according to the job drawing (see Table 1).
2. Remove the decorator ring by turning to right or left until the three locking tabs (indicated by white dots) in the groove between the ring and center support are aligned with the ring slots. Ring will then release itself from chassis assembly. See Fig. 2.
3. Plug in the connector and mount the detector to the box, using both captive mounting screws supplied with the detector.
4. Replace the decorator ring by positioning the three slots in ring I.D. in between the three locking tabs (indicated by white dots) on spring retainer cap. Press the ring down and over the center casting until the three retainer tabs lock in place.

**TABLE I**  
Leadwire Coding & Contact Rating

Function	Leadwire	Supervisory Condition	Contact Ratings
Power Supply	Red—plus Black-negative		
Trouble Contacts	Brown Brown	Closed	0.1 Amp Inductive @ 120 Vac
Alarm Contacts	Violet Violet	Open	0.5 Amp Inductive @ 120 Vac
Accessory Alarm Contacts	Blue Orange Yellow	Open Common Closed	
Remote Test	Green	Connect to +24 VDC through remote mounted N.O. switch rated 50 VDC 50 ma min.	

## START-UP

Do not connect the detectors to the control panel wiring until the wiring has been completely checked out (see "Control Panel Hookup").

1. Disconnect the 24 V power leads supplying power to the detectors.
2. Apply AC power to the power supply and place a voltmeter across the 24 V output terminals. The output voltage should be no higher than 30 VDC (unfiltered), 42 VDC (filtered). Disconnect AC power.
3. After verifying the DC supply wiring to the detectors is correct, re-connect the DC power leads and apply AC power to the power supply.

When a detector is in a supervisory condition, the pilot light should flash on and off about 60 times a minute. When the detector is in alarm the pilot light should remain on. A de-energized pilot light indicates a trouble condition. Note that the detector "locks" into an alarm condition and remains in alarm until the unit is reset.

The detector sensitivity is factory set and normally should not be changed. Before attempting to read the flashing rate of the detectors, be sure they have been given proper warm-up time and the applied voltage is within the rated limits. (See "Detector Checkout.")

## DETECTOR CHECKOUT

1. After ½ hour of operation check the output voltage across the output terminals of the power supply. At least 15 VDC (unfiltered), 20 VDC (filtered) is necessary for proper detector operation.
2. If the voltage is less than required, check for an excess of detectors on one circuit, length of circuit, wire size or any factor causing excessive voltage drop on the output or low primary voltage.
3. If the detectors are pulsing normally, proceed to Step 4. If any pilot light is on, remove the decorator ring and reset the detector. If the pilot light remains on (does not flash) replace the detector. If the pilot light is out, remove the detector from its mounting and disconnect the socket between the detector and the connector. Measure the voltage between the red and black wire. The red wire should be the positive lead. If the polarity is reversed, correct the wiring. The detector will not be damaged by polarity reversal. If the lamp remains out and the voltage is normal, replace the detector.

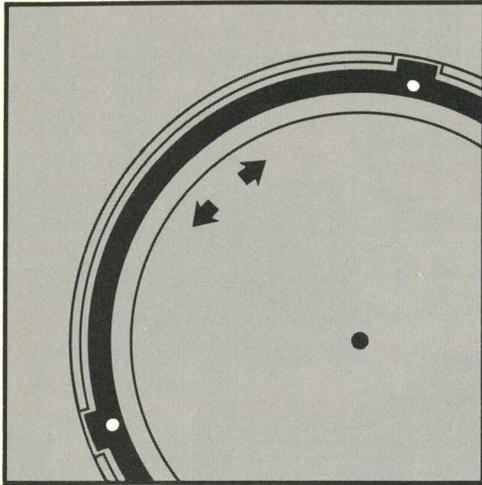
**NOTE: Do not smoke while performing Steps 4 and 5.**

4. Shield the detector from any air movement with a lightweight card or sheet of paper (this instruction sheet may be used) and check the detector for normal operation. Using a watch with a second hand, count the number of pulses the pilot light makes in 1 minute; record this number. If the number is between 60 and 90 the detector is operating normally. If the number of pulses is greater than 90 or less than 60, replace the detector.

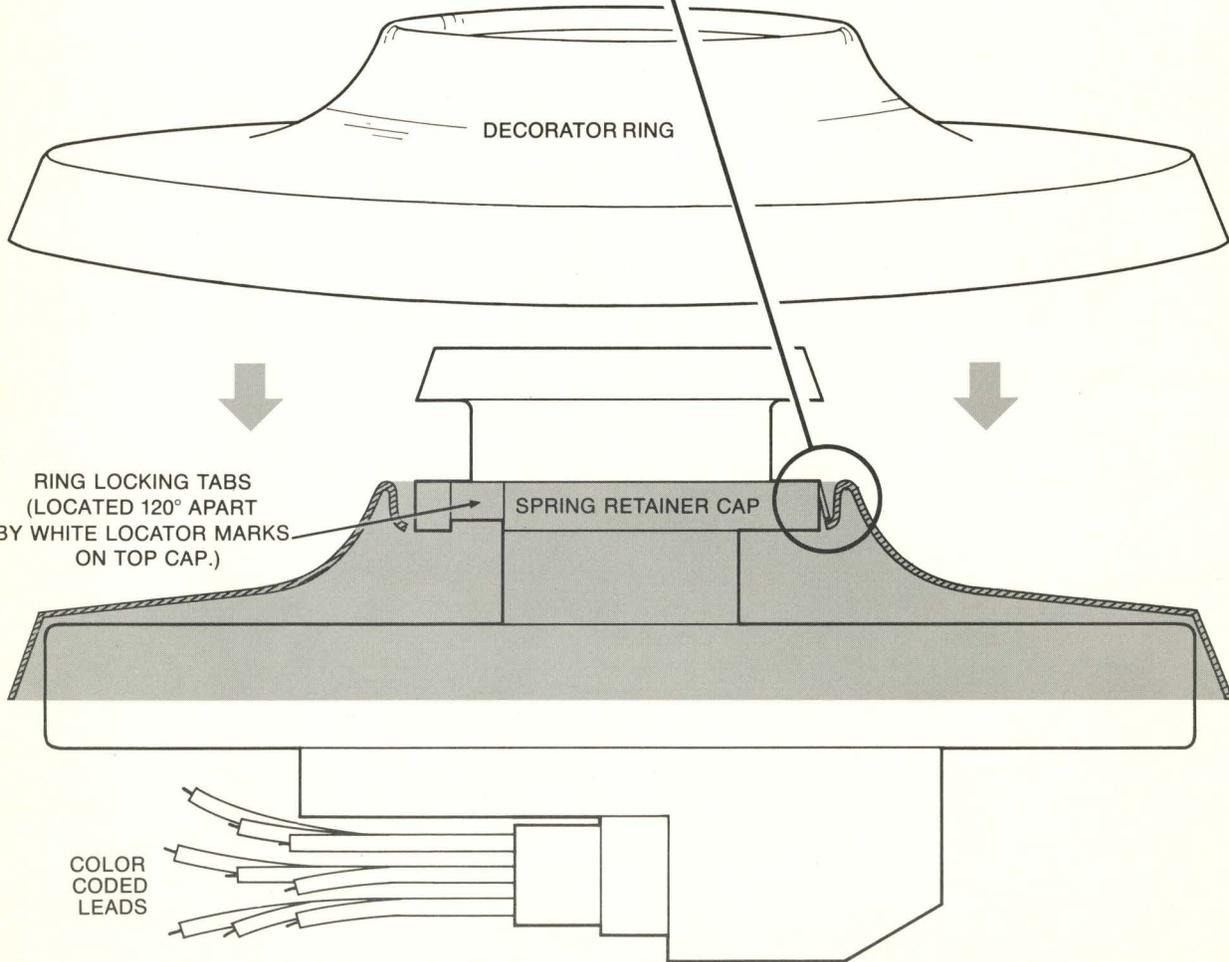
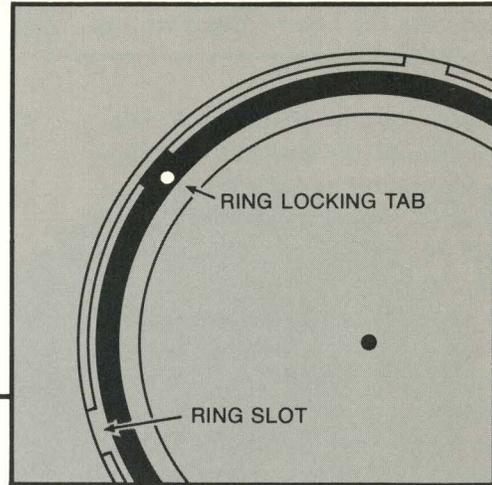
5. Remove the air shield and count the pulses for 1 minute. If this number is now less than 60 pulses the air velocity past the detector is too high. Either the detector must be moved or the source of air velocity must be removed.

FIG. 2

REMOVE RING



REPLACE RING



## CONTROL PANEL HOOKUP

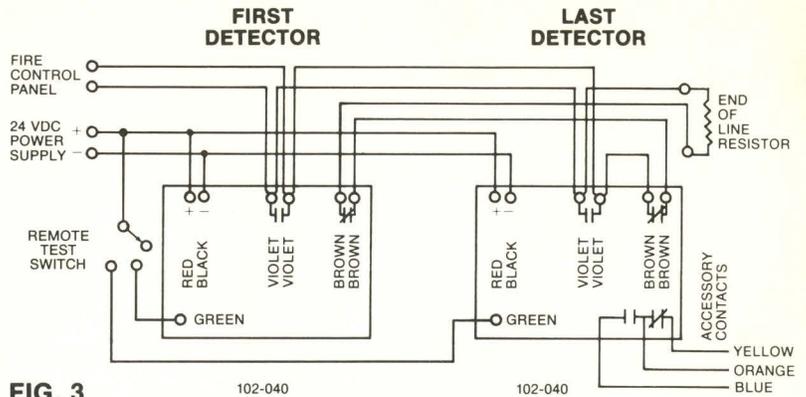
1. After all the detectors have been calibrated and are operating in a normal condition, the alarm circuit wiring should be checked.

2. Two-wire circuit (Fig. 3)—A two-wire circuit can be checked by placing the ohmmeter across the leads of the detection loop. Resistance should be equal to E.O.L. res. plus line resistance. An open circuit will indicate a loose connection, a broken wire, or a detector in a trouble condition. A resistance of less than E.O.L. will indicate a short or a detector in an alarm condition. After the wiring checks out, connect the leads to the alarm control unit.

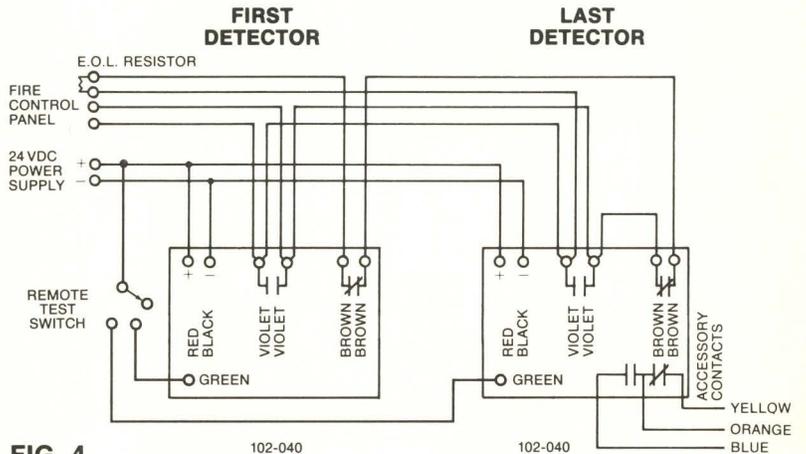
3. Four-wire circuit (Fig. 4)—a four-wire circuit will normally have the trouble contacts in only one loop of the circuit. An open circuit in this loop will indicate a trouble condition, a loose connection or a broken wire. Resistance reading should equal the loop line resistance and should not exceed the maximum rating for the control panel. Both loops should indicate an open circuit to ground.

## PERIODIC MAINTENANCE

At least every six months the detector pulses per minute should be read and recorded. In very dusty locations, it may be necessary to blow out the accumulated dust with an air hose connected to a portable tank.

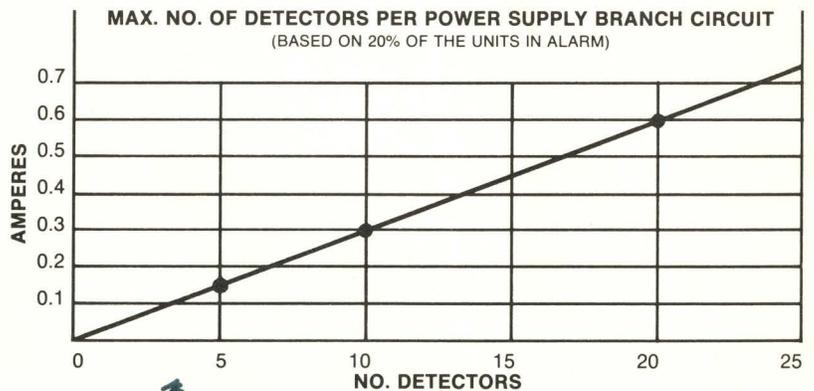


**FIG. 3**  
TYPICAL CONNECTION FOR A LOW VOLTAGE MODEL 40 DETECTOR WHEN USED IN A TWO-WIRE DETECTION LOOP.



**FIG. 4**  
TYPICAL CONNECTION FOR A LOW VOLTAGE MODEL 40 DETECTOR WHEN USED IN A FOUR-WIRE DETECTION CIRCUIT WITH RETURN WIRING IN THE SAME CIRCUIT.

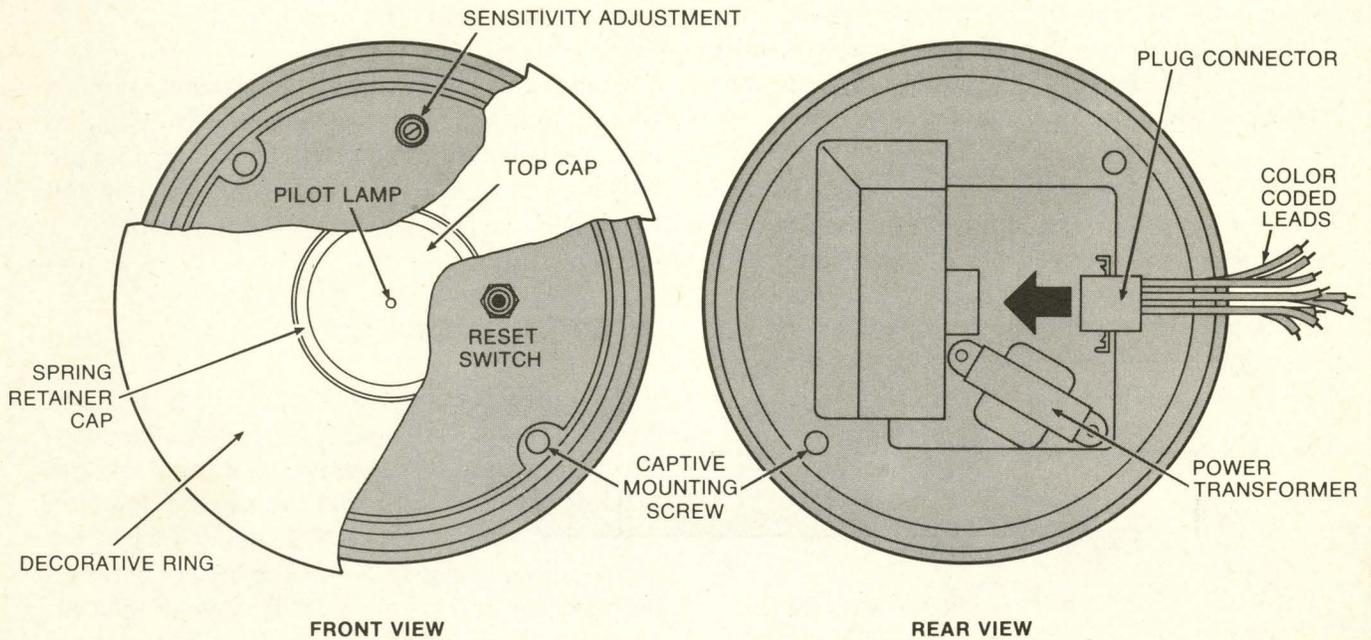
**FIG. 5**



*↑ 10 Ω max*

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FIG. 1



#### NOTE—PRIOR TO INSTALLATION

1. The ceiling mounted line voltage Model 40 detector mounts directly on a four inch square outlet box, 2 $\frac{1}{8}$  inches deep. The optimum coverage for a single unit is approximately 1,000 square feet. Care should be taken to avoid applications of the detector in areas where the ambient product of combustion level is high. Common machinery creating high levels of combustion are welders, motors, generators, automobile exhaust, etc.

The ionization fire detectors should be as evenly spaced as possible throughout the protected area. The spacing distance is varied by rough, uneven or sloped ceilings. Ambient conditions such as air movement, ceiling lights, location of supply and return air grilles must be considered to assure optimum operating conditions. Air movement across the detector should not exceed 300 feet per minute.

2. The detector is intended for operation on either 120 Volts AC or 24 Volts AC, 50 or 60 Hz. Tolerances allowed are -15% or +10% from rated voltages.

a) Power Consumption—Maximum/Detector

Operation Mode	120 Vac, 50/60 Hz	24 Vac, 50/60 Hz
Supervisory or Alarm	50 ma	160 ma

b) The AC supply line to the detectors must also have an ON-OFF switch if it is desirable to remotely reset the entire system of detectors when an alarm condition occurs. Individual detectors can be locally reset from alarm by use of the detector reset switch located under the cover.

3. A watch with a second hand, preferably a stop watch, and a volt ohmmeter are necessary to complete the checkout procedure.

## MOUNTING

1. Connect the plug-in connector according to the job drawing (see Table 1).
2. Remove the decorator ring by depressing the three retainer tabs in the groove between the ring and center support. A small screwdriver is necessary to depress the spring retainer tabs releasing the cover ring (see Fig. 2).
3. Plug in the connector and mount the detector to the box, using both captive mounting screws supplied with the detector.
4. Replace the decorator ring by pressing the ring over the center casting until the three retainer tabs lock in place.

**TABLE I**  
Leadwire Coding & Contact Rating

Function	Leadwire	Supervisory Condition	Contact Ratings
120 Vac	Black		
24 Vac	Black/yellow		
Common	White		
Trouble contacts	Brown Brown	Closed	0.1 Amp Inductive @ 120 Vac
Alarm contacts	Violet Violet	Open	} 0.5 Inductive @ 120 Vac
Accessory	Blue	Open	
Alarm	Orange	Common	
Contacts	Yellow	Closed	

## START-UP

After verifying the AC supply wiring to the detectors is correct, apply power to detectors. Do not connect the detectors to the control panel until the wiring has been completely checked out (see "Control Panel Hookup").

When a detector is in a supervisory condition, the pilot light should flash on and off about 60 times a minute. When the detector is in alarm the pilot light should remain on. A de-energized pilot light indicates a trouble condition. Note that the detector "locks" into an alarm condition and remains in alarm until the unit is reset.

The detector sensitivity is factory set and normally should not be changed. Before attempting to read the flashing rate of the detectors, be sure they have been given a ½ hour warm-up time and the applied voltage is within the rated limits.

## DETECTOR CHECKOUT

1. If the detectors are pulsing normally, proceed to Step 2. If any pilot light is on, remove the decorator ring and reset the detector. If the pilot light remains on (does not flash) replace the detector. If the pilot light is out, remove the detector from its mounting and disconnect the socket between the detector and the connector. Measure the AC applied voltage. If the lamp remains out and the voltage is normal, replace the detector.

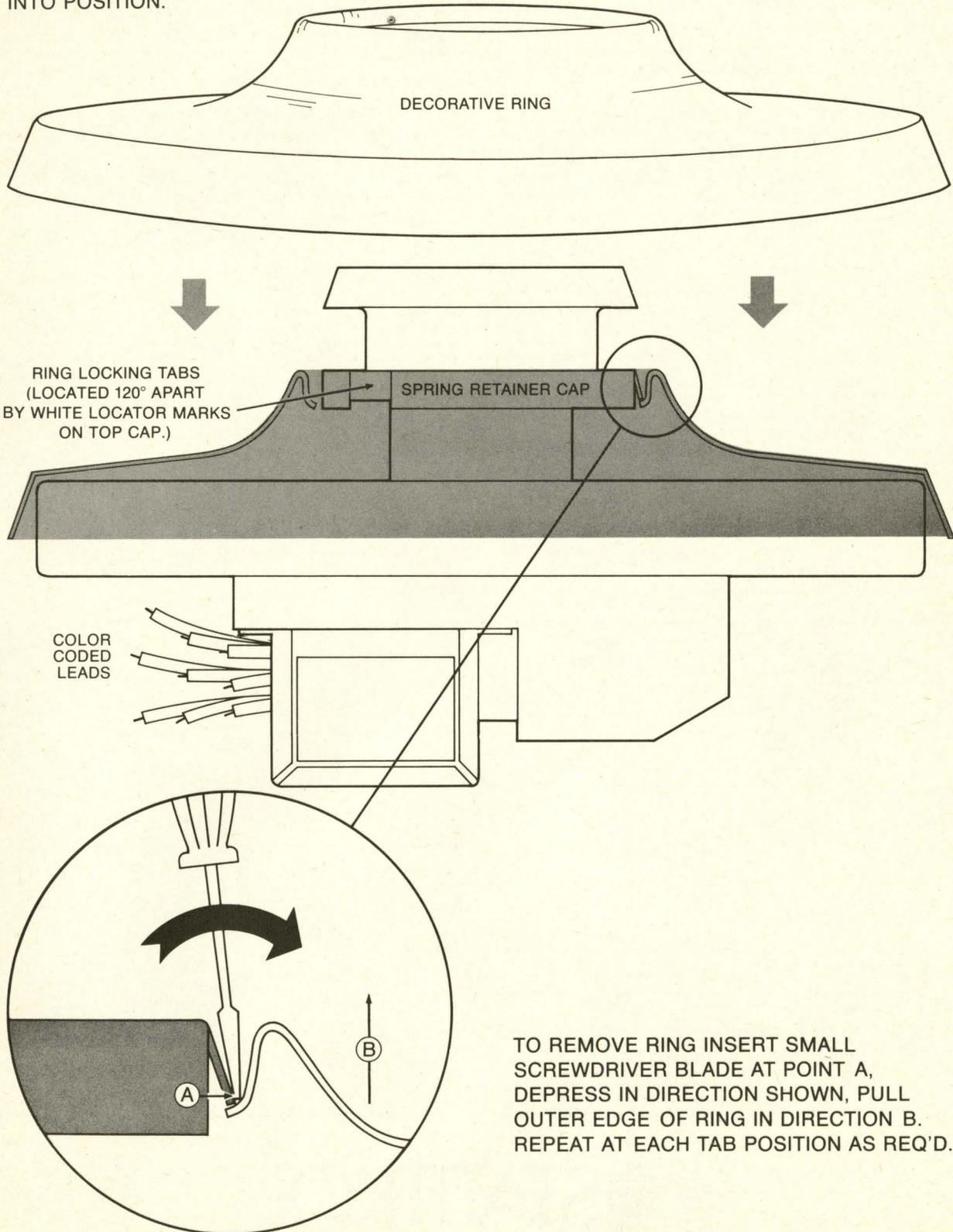
**NOTE: Do not smoke while performing Steps 2 and 3.**

2. Shield the detector from any air movement with a lightweight card or sheet of paper (this instruction sheet may be used) and check the detector for normal operation. Using a watch with a second hand, count the number of pulses the pilot light makes in 30 seconds; record this number. If the number is between 25 and 40 the detector is operating normally. If the number of pulses is greater than 40 or less than 25, replace the detector.

3. Remove the air shield and count the pulses for 30 seconds. If this number is now less than 25 pulses the air velocity past the detector is too high. Either the detector must be moved or the source of air velocity must be removed.

**FIG. 2**

TO ASSEMBLE RING, PLACE RING SQUARELY DOWN OVER SPRING RETAINER CAP, PUSH DOWN UNTIL TABS CAN BE HEARD SNAPPING INTO POSITION.



TO REMOVE RING INSERT SMALL SCREWDRIVER BLADE AT POINT A, DEPRESS IN DIRECTION SHOWN, PULL OUTER EDGE OF RING IN DIRECTION B. REPEAT AT EACH TAB POSITION AS REQ'D.

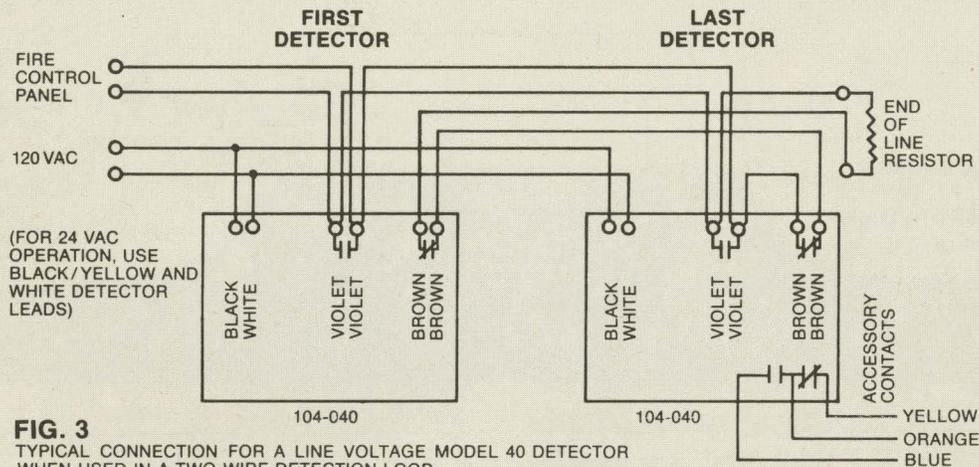
## CONTROL PANEL HOOKUP

1. After all the detectors have been calibrated and are operating in a normal condition, the alarm circuit wiring should be checked.
2. Two-wire circuit (Fig. 3)—A two-wire circuit can be checked by placing the ohmmeter across the leads of the detection loop. Resistance should be equal to E.O.L. res. plus line resistance. An open circuit will indicate a loose connection, a broken wire, or a detector in a trouble condition. A resistance of less than E.O.L. will indicate a short or a detector in an alarm condition. After the wiring checks out, connect the leads to the alarm control unit.

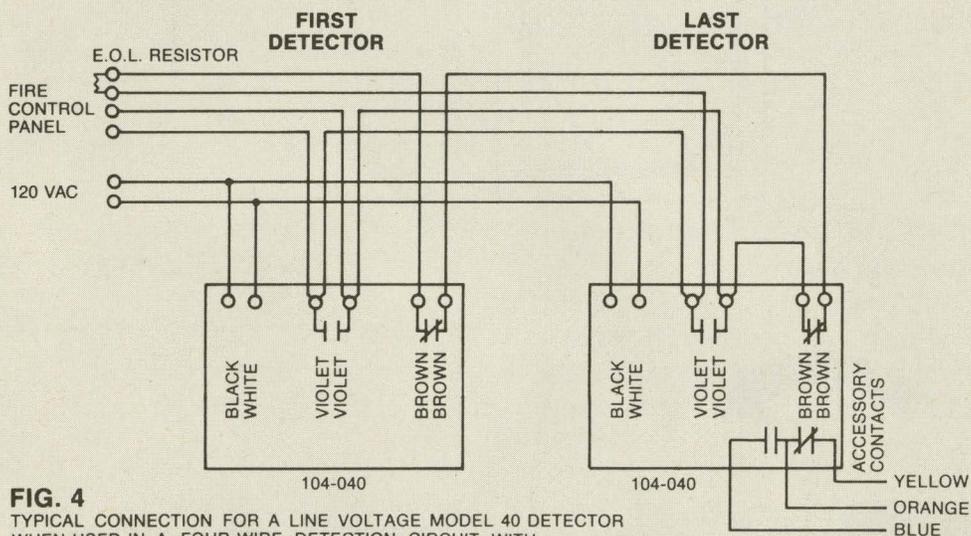
3. Four-wire circuit (Fig. 4)—A four-wire circuit will normally have the trouble contacts in only one loop of the circuit. An open circuit in this loop will indicate a trouble condition, a loose connection or a broken wire. Resistance should equal the loop line resistance and should not exceed the maximum rating for the control panel. Both loops should indicate an open circuit to ground.

## PERIODIC MAINTENANCE

At least every six months the detector pulses per minute should be read and recorded. Steps 4 and 5 above describe the procedure. In very dusty locations, it may be necessary to blow out the accumulated dust with an air hose connected to a portable tank.



**FIG. 3**  
TYPICAL CONNECTION FOR A LINE VOLTAGE MODEL 40 DETECTOR WHEN USED IN A TWO-WIRE DETECTION LOOP.



**FIG. 4**  
TYPICAL CONNECTION FOR A LINE VOLTAGE MODEL 40 DETECTOR WHEN USED IN A FOUR-WIRE DETECTION CIRCUIT WITH RETURN WIRING IN THE SAME CIRCUIT.

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