

Installation/Wiring Instructions
CERBERUS PYROTRONICS™
Models AD-3XRI and AD-3XRILP
Air Duct Detectors

INTRODUCTION

CERBERUS PYROTRONICS™ Model AD-3XRI and AD-3XRILP Detectors are System IXL (ICON-1), System XL3, and MXL Control Panel compatible air duct detectors with an auxiliary relay. They are designed for use in heating, ventilating, and air conditioning duct systems. Model AD-3XRI uses ionization smoke detectors, and Model AD-3XRILP uses photoelectric smoke detectors to detect the presence of combustion products in a duct system. (Refer to **TECHNICAL DATA** below for information on compatible detectors.)

When smoke or combustion products are detected, shutdown of the duct system and/or operation of supplementary equipment is provided by the related system control panel.

TECHNICAL DATA
Smoke Detector Compatibility

TABLE 1 AD-3XRI COMPATIBILITY	
System/Module	Compatible Detectors
System XL3	DI-BX3, DI-BX3H, ID-60IB, ID-60IBH, ILI-1B, ILI-1BH
MXL Control Panel	ID-60IB, ID-60IBH, ILI-1B, ILI-1BH
System IXL (ICON-1)	ILI-1B, ILI-1BH
TABLE 2 AD-3XRILP COMPATIBILITY	
System/Module	Compatible Detectors
System XL3	ILP-1
MXL Control Panel	ILP-1

**TABLE 3
DETECTOR DATA**

System	Sensitivity	How Set	Alarm Indicator	Max No. Detectors/Zone
System XL3	See Detector Label	Selected at Control Panel	Red LED flashes every 3 seconds; OFF in supv	AD-3XRI: 30 AD-3XRILP: 30
MXL Control Panel		Selected at Control Panel	Red LED flashes approx. every 3 seconds; OFF in supv	MXL: AD-3XRI: 60 AD-XRILP: 60
System IXL (ICON-1)		Selected at Control Panel	Red LED flashes; goes off in norm supv	See SYSTEM IXL INSTALLATION AND SERVICE MANUAL , P/N 315-092371

DO NOT USE air duct detectors with Alarm Verification.

**TABLE 4
AIR DUCT CONDITIONS**

Temperature Range: 32°F (0°C) - 100°F (38°C) per UL 268/268A

Altitude Range:

Model	Detectors	Range
AD-3XRI	DI-BX3, ID-60IB, ILI-1B	0-4000 feet
	DI-BX3H, ID-60IBH, ILI-1BH	3000-8000 feet
AD-3XRILP	No altitude limitations	

Relative Humidity Range: 0-93% (non-condensating) per UL 268-268A

Air Duct Velocity Range: 500-4000 ft/min – AD-3XRI
300-4000 ft/min – AD-3XRILP

Sampling Tube Pressure Range of Differences:
.01-1.0 inches of water column

CAUTION: These air duct detectors are designed for detection and control of products of combustion in a duct system. **They are not to be used for open area protection.**

OPERATION

When the AD-3XRI/3XRILP (AD-3XRI or AD-3XRILP) is operating, a sample of air is drawn from the duct and passed through the sampling chamber at low velocity by means of the inlet sampling tube. The air sample passes through the smoke detector mounted in the duct housing and is exhausted back into the duct through the outlet sampling tube.

Alarm Indication

The XL3, IXL, and MXL Control Panels have LEDs for alarm indication that are used with the AD-3XRI/3XRILP. Refer to Table 3 above.

The LED on the detector in alarm can also be turned on or off by system command.

Alarm Condition

When used with the XL3, IXL, or MXL Control Panel, the Model AD-3XRI/3XRILP operates directly from the control panel. An alarm condition on either of these systems is indicated by visual and audible system devices. On XL3 Systems the alarm is also indicated on the DAX module and any optional printers used. On MXL Control Panels the alarm is indicated on the MKB-1/-2 and on any optional printers used.

After a fire is extinguished, and all products of combustion are cleared from the duct system, each system can be reset at its respective control panel, and the XL3 also can be reset at its optional printer, if available.

Trouble Condition

A trouble condition from an AD-3XRI/3XRILP is indicated by visual and audible system devices connected to the control panel in an XL3, IXL, or MXL Control Panel, depending on the type of system in which it occurs. It can also be indicated by an optional printer. Call your Authorized Siemens Building Technologies, Inc. Service Representative when a trouble occurs.

For further information, refer to the appropriate Operation Instructions:

System XL3 **OPERATION INSTRUCTIONS**, P/N 315-082989

MXL/MXLV Control Panel **OPERATION INSTRUCTIONS**, P/N 315-092117

System IXL **OPERATING INSTRUCTIONS**, P/N 315-079651

MOUNTING THE AIR DUCT HOUSING

Location on Duct System

Locate the air duct detector in the main supply duct, downstream from the filters and positioned so as to operate reliably in case of smoke in any part of the air stream. In instances where filters are capable of removing smoke, install detectors both upstream and downstream from the filters.

The air duct detectors use sampling tubes which monitor the full width of an air duct to overcome the limitations of spot-type smoke and heat detectors in the duct. However, since stratification can occur in the air stream after a long duct run, locate the detector after bends or inlets which create turbulence, and hence, a more homogeneous mixture of air. The detector should, when possible, be located a minimum of six duct-widths downstream from the source of the turbulence (See Figure 1). A 12 inch by 12 inch access hole should be cut in the duct adjacent to the detector to permit checking and cleaning of the sampling tubes, if necessary. Locate the air duct detector in the air handling system, as shown in Figure 2 and in conformance with NFPA Pamphlet No. 90A, **Air Conditioning**

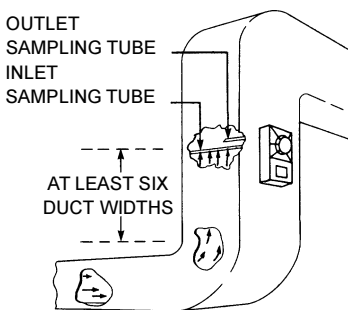


Figure 1
Typical Mounting of Duct

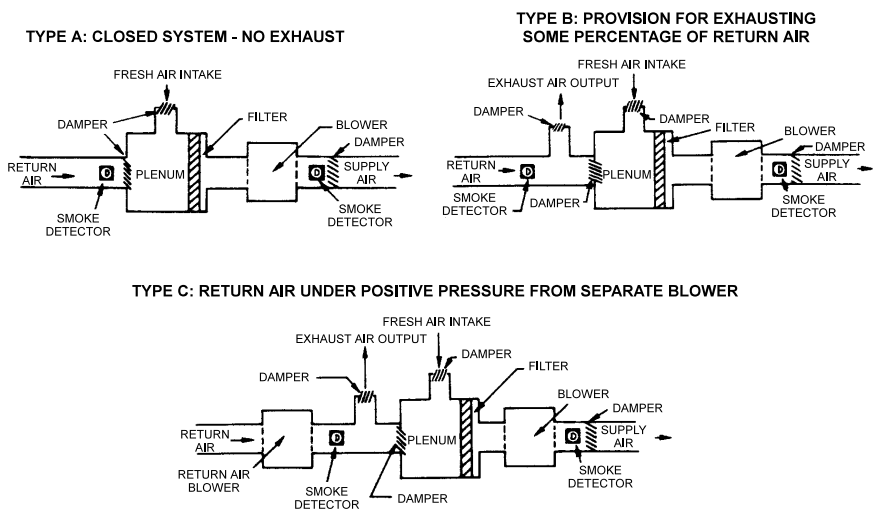


Figure 2
Recommended Locations in Duct Systems

and Ventilating System and with NFPA 72 National Fire Alarm Code. (Both publications are available from the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts.) The detector on the return air side of the blower should be located at a point prior to exhausting air from the building or diluting return air with outside air. The detector on the supply air side of the blower should be downstream of the blower.

Wire or program the detectors into the system so that they automatically shut down the blowers and operate dampers as required.

Mounting of the Air Duct Housing (See Figure 3)

- a. Affix the adhesive backed gaskets (Item 1) to the back of the detector housing (2) so that the larger hole on the gasket lines up with the sampling tube hole on the sampling chamber and the smaller hole lines up with the housing mounting hole.
- b. Affix the adhesive backed template (5) to the side of the ductwork.
- c. Drill the four 0.110 diameter holes with a No. 35 drill bit and cut or punch out two 7/8-inch diameter holes as indicated on the template.
- d. Attach the appropriate model housing to the air duct using two No. 10 1½ inch screws (6) and also using two No. 10 1-inch screws (7) with lockwashers (8).
- e. Cut a 12 inch by 12 inch access hole in the duct adjacent to the housing to permit checking and cleaning of the sampling tubes. The access hole must be covered and sealed when not in use.

Sampling Tube Selection

To ensure accurate air sampling, there are four standard lengths of inlet sampling tubes to choose from. To select the appropriate length, determine the outside width of the duct. Select the sampling tube nearest to, but greater than, the duct width (Table 5). The outlet sampling tube for all ducts is a fixed length of 4 inches (10.1 cm). Trim the inlet sampling tube at the job site as described below.

TABLE 5 SAMPLING TUBE SELECTION CHART		
Outside Duct Width	Sampling Tube Model No.	Standard Tube Length
1 ft 9¾ in or less	STA-2	2 ft
1 ft 9¾ in - 3 ft 3¾ in	STA-3	3 ft 6 in
3 ft 3¾ in - 6 ft 3¾ in or less	STA-6	6 ft 6 in
6 ft 3¾ in - 9 ft 9¾ in or less	STA-10	10 ft
Greater than 9 ft 9¾ in	Consult factory	

Note: Each model is manufactured with a different number and size of sampling hole. Only the specific tube must be used for the specified duct width.

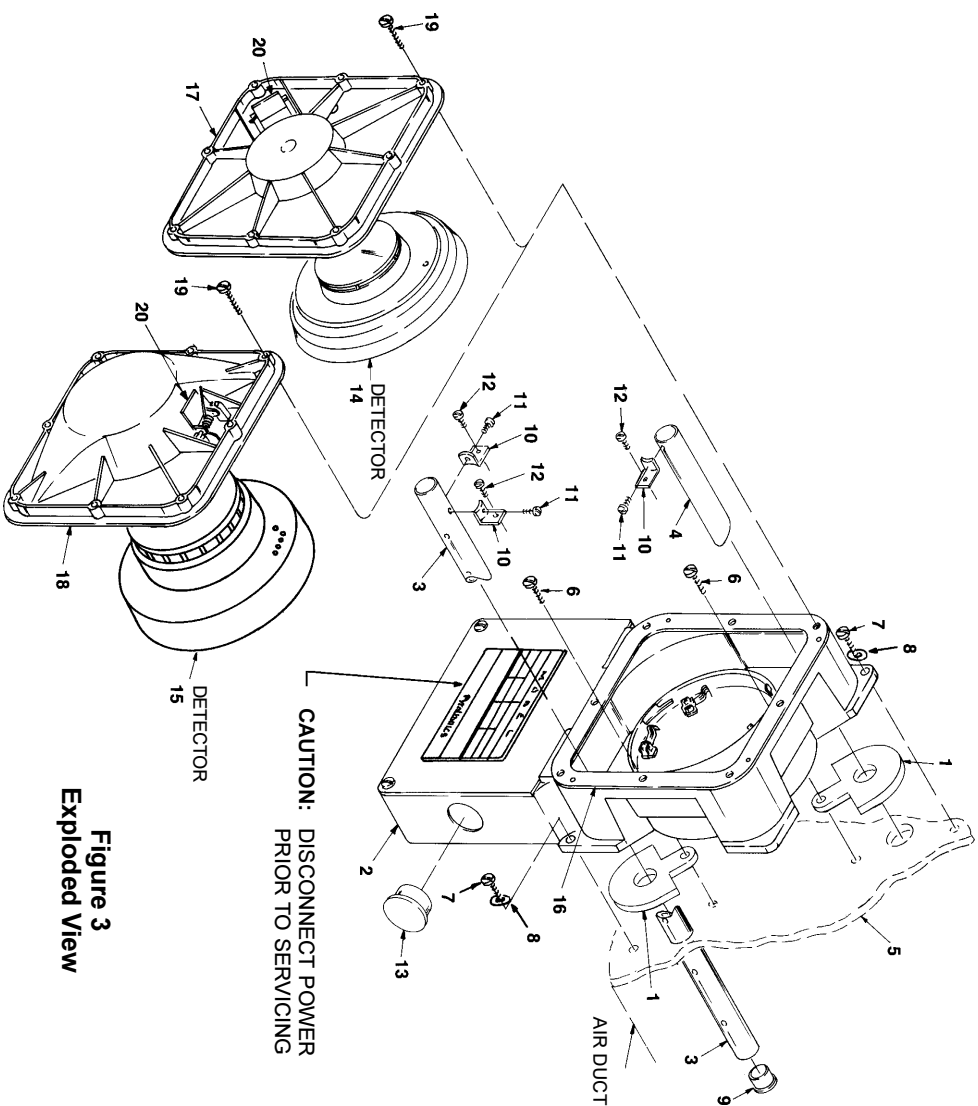


Figure 3
Exploded View

Trimming the Inlet Sampling Tube (See Figure 4)

- Measure the outside width of the duct.
- Add 2.25 inches to obtain proper length of tube.

Example: Outside width of duct 2 ft 6 in
Add 2.25 inches + 2.25 in
Length of sampling tube 2 ft 8.25 in

The length (2 ft 8.25 in) determines (Table 5 on page 5) the model number of the appropriate sampling tube (STA-3).

- Measure the sampling tube, starting from the end with the four mounting holes.
- Trim tube to the correct length, remove all burrs, and insert a rubber stopper (Figure 3, Item 9) in the tube.

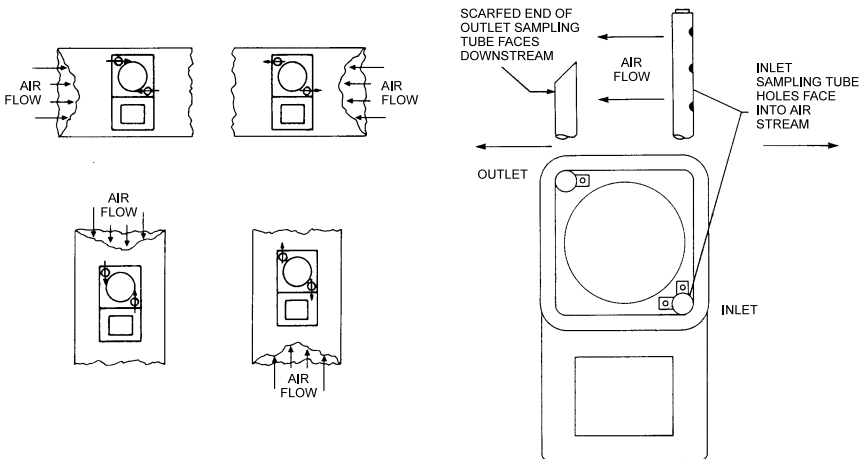


Figure 4
Sampling Tube Orientation

Installation of the Sampling Tubes

- Before installing the tubes, cut a $\frac{7}{8}$ -inch hole in the duct wall that is directly opposite the inlet sampling chamber hole in the detector housing. This will allow the inlet tube to protrude through the duct.
- Attach brackets (10) to the inlet and outlet air sampling tubes with $\frac{3}{16}$ screws (11).

NOTE: When attaching brackets, be sure to align tubes properly (See Figure 4).

- c. Install the inlet tube (3) by inserting it through the air sampling chamber as shown in Figure 3. Face sampling tube holes into the air stream (Figure 4), and secure to the housing with $\frac{8}{32}$ screws (12).
- d. Install the outlet tube (4) by inserting it into the upper socket of the air sampling chamber with the scarfed end facing downstream (See Figure 4). Secure the bracket to the housing with an $\frac{8}{32}$ screw.
- e. Make sure no sampling holes extend beyond the ductway, that the stopper (9) remains firmly in position, and that the duct hole is sealed around the protruding sampling tube.

Air Duct Sampling Tube Pressure Measurement

The **CERBERUS PYROTRONICS™** Model PDM-3 Pressure Differential Measuring device should be used to ensure that the sampling tube pressure differential is within the specified limits (See **TECHNICAL DATA**). Qualified personnel should take measurements in accordance with the **PDM-3 Instructions**, P/N 315-085535.

ELECTRICAL WIRING

System XL3 - See Figure 6. Use two wire circuits of 18 AWG, limited energy, shielded cable without conduit, if permitted by the local building codes.

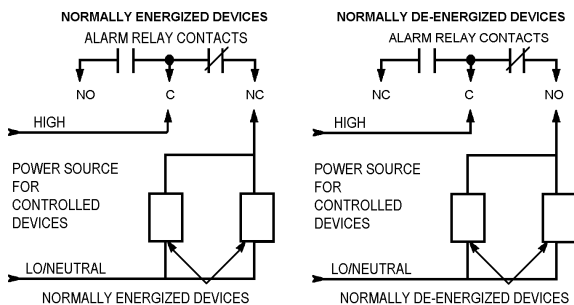
MXL Control Panel - See Figure 7. Use two wire circuits of 18 AWG, limited energy, shielded cable without conduit, if permitted by the local building codes.

IXL System (ICON-1) - See Figure 7. Use two wire circuits of 18 AWG, limited energy, shielded cable, without conduit if it is permitted by the local building codes.

Control of Normally Energized and De-Energized Devices

The Model AD-3XRI/3XRILP can be wired for direct relay control of normally energized and de-energized devices as follows (Refer to Figure 5).

- a. Wire normally energized devices (fans, blowers, etc.) to the NC contacts between terminals 9 and 10 in order to shut down these devices on alarm.



NOTES:

1. All relay contacts shown represent the condition they are in just after a reset pulse - the normal supervisory, no alarm condition.
2. If the alarm relay contacts on the relay board are being used to control 120 VAC operated equipment, ensure that earth ground is properly connected to the internal ground strap, using the proper conduit lock nuts.
Failure to provide proper grounding may result in fatal electrical shock and causes non-conformance with national and local codes.

Figure 5

Connections for Control of Normally Energized and De-Energized Devices

- b. Wire normally de-energized devices (extinguishing smoke removal fan, etc.) to the NO contacts between terminals 10 and 11 in order to activate these devices on alarm.

NOTE: Relay contacts may not be in supervisory condition when shipped.

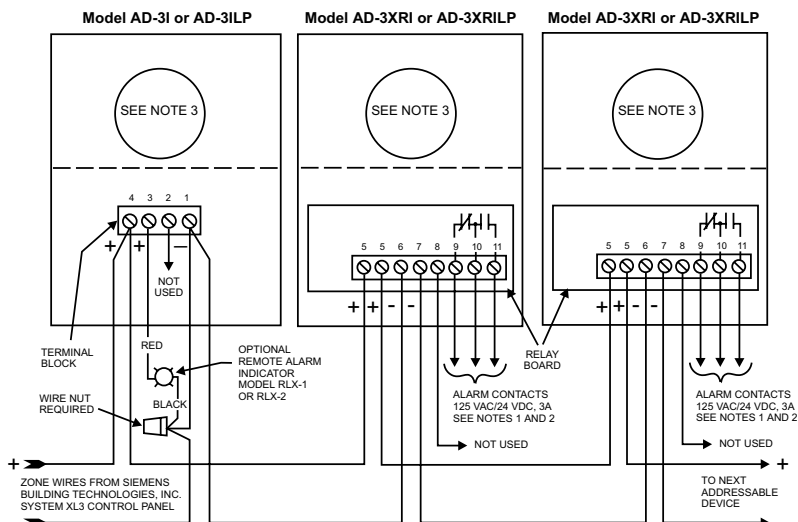


Figure 6

Typical Connections for Models AD-3XRI and AD-3XRILP when used with XL3

NOTES:

1. The relay contacts are shown just after a reset pulse, which represents the non-alarm condition.
2. If the relay contacts are being used to control 120 VAC operated equipment, ensure that the conduit is properly attached to the internal

- ground strap, using the proper conduit locking nuts. **Failure to provide proper grounding may result in fatal electrical shock and causes non-conformance with national and local codes.**
3. Use DI-BX3, DI-BX3H, ID-60IB, ID-60IBH, ILI-1B, ILI-1BH, and ILP-1 detectors only.

INSTALLATION OF SMOKE DETECTORS

CAUTION: Air Duct Detector Models AD-3XRI/3XRILP are designed only for those detectors shown in the Smoke Detector Compatibility section (See Tables 1 and 2). Do not use any other detector (See Figure 3, items 14, 15 and 21).

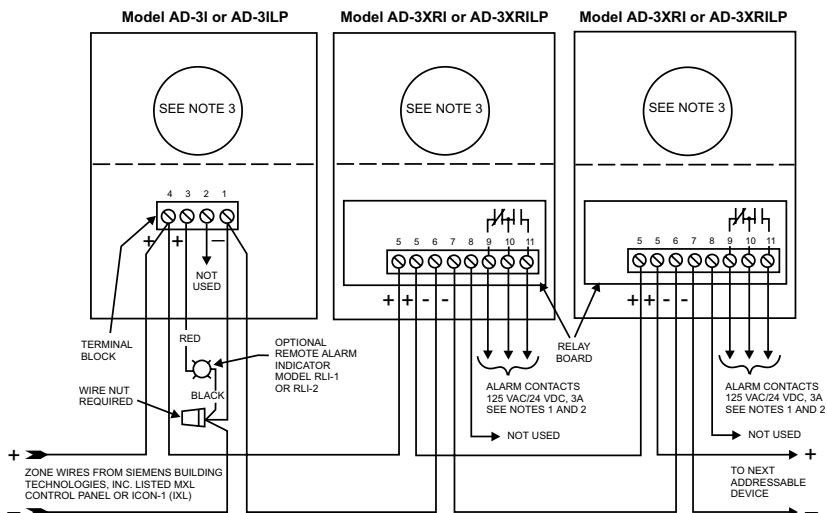
Programming

DI-BX, DI-BX3H Detectors

Model AD-3XRI, using X Series smoke detectors, can be programmed to respond at a specific and unique address (See Figure 8). Program each detector by referring to the table and notes in Figure 8. Record each device number and zone in the space provided on the detector cover.

ID-60IB, ID-60IBH, ILI-1B, ILI-1BH, ILP-1 Detectors

Model AD-3XRI/3XRILP, using ID-60IB, ID-60IBH, ILI-1B, ILI-1BH, or ILP-1 detectors, can be programmed to respond at a specific and unique system



NOTES:

1. The relay contacts are shown just after a reset pulse, which represents the non-alarm condition.
2. If the relay contacts are being used to control 120 VAC operated equipment, ensure that the conduit is properly attached to the internal

metal ground strap, using the proper conduit locking nuts. **Failure to provide proper grounding may result in fatal electrical shock and caused non-conformance with national and local codes.**

3. Use ID-60IB, ID-60IBH, ILI-1BH, and ILP-1 detectors only.

Figure 7
Typical Connections for Models AD-3XRI and AD-3XRILP
when used with MXL or ICON-1 (IXL)

address. Program each detector using the Model FPI-32 Programmer/Tester. See the FPI-32 Manual, P/N 315-090077.

Installation

Align the detector alarm LED with the LED imprint located within the detector compartment on the housing. Rotate the detector counterclockwise while pushing on the detector until it drops in place. Next, push and rotate clockwise to engage the electrical connections. The detector automatically stops and locks in place.

Removal

To remove the detector, push on the detector and rotate it counterclockwise until the stop is reached. Then pull the detector out of the base to disengage.

Sensing Compartment Cover Installation

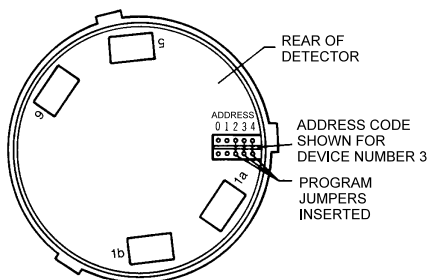
1. Install the cover gasket (Figure 3, 16) on the housing, if not already installed. Be certain the alignment holes in the cover gasket are aligned with the guides on the housing.
2. Install the sensing compartment ionization cover (17) when using DI-BX3, DI-BX3H, ID-60IB, ID-60IBH, ILI-1B, or ILI-1BH detectors and the photoelectric cover (18) when using an ILP-1 detector.

Detector Device Address Codes

DEVICE NUMBER	ADDRESS 01234	DEVICE NUMBER	ADDRESS 01234
1	0XXXX	16	XXXX0
2	X0XXX	17	0XXX0
3	00XXX	18	X0XX0
4	XX0XX	19	00XX0
5	0X0XX	20	XX0X0
6	X00XX	21	0X0X0
7	000XX	22	X00X0
8	XX0X0	23	000X0
9	0XX0X	24	XXX00
10	X0X0X	25	0XX00
11	00X0X	26	X0X00
12	XX00X	27	00X00
13	0X00X	28	XX000
14	X000X	29	0X000
15	0000X	30	X0000

0 = NO JUMPER X = JUMPER

**Figure 8
Detector Programming**



NOTES:

1. The device number of the detector is set by inserting program jumpers into the appropriate combinations of address holes located on the rear of the detector.
2. The Detector Device Number Table lists the device number, address, and jumpers required.
3. A space is provided on the detector label to record the zone and device number for the detector.

- c. Fasten the cover, using the No. 6 screws (19) provided. Tighten snugly, but not so tightly as to warp the cover and cause air leakage around the edges of the cover.

Sensitivity Testing

1. The sensitivity of System XL3 smoke detectors can be selected at the system control panel. Refer to **SYSTEM XL3 OPERATION, INSTALLATION, AND MAINTENANCE MANUAL**, P/N 315-083206.
2. The sensitivity of MXL Control Panel smoke detectors can be selected at the system control panel. Refer to the **MXL OPERATION, INSTALLATION, AND MAINTENANCE MANUAL**, P/N 315-092036.
3. The sensitivity of System IXL (ICON-1) smoke detectors can be selected at the system control panel. Refer to the **IXL OPERATION, INSTALLATION, AND MAINTENANCE MANUAL**, P/N 315-092371.
4. To ensure that the sensitivities are within factory-specified limits, sensitivity testing of the smoke detectors should be done by qualified service personnel only.

Maintenance

The performance of the air duct detector unit may be adversely affected by dirt or foreign matter on the sampling tubes or detector. If the air holes in the inlet sampling tube become restricted, the unit cannot receive a proper air sample, and performance is impaired. It is recommended that the sampling tubes be checked and cleaned periodically. The detector maintenance program should consist of periodic cleaning of dust from the detector head by using a vacuum cleaner. For cleaning Model ILP-1, refer to the related Installation Instructions.

The cleaning and test program is recommended for 6 month intervals, or more frequently, if needed, depending on the individual detector environment.

CAUTION: Under no circumstances is the ionization or potoelectric detector portion of the unit to be disassembled by anyone other than an authorized Siemens Building Technologies, Inc. Systems Technician. For service, contact your nearest authorized Siemens Building Technologies, Inc. Service Representative.

Periodic Testing

The unit should be tested periodically to ensure optimum performance. This can be done by removing the sealing plug from the inlet sampling tube on the opposite side of the duct and blowing smoke directly into the inlet tube. Check that the fire alarm system is activated.

CAUTION: If the fire alarm system is connected to a central station or fire department, or has external devices such as fans, extinguishers, etc., connected, notify appropriate personnel and disconnect the external devices until all tests are completed. After testing, reset the system, reconnect the devices, and notify the personnel that the system is operating again.

COMPATIBLE CONTROL EQUIPMENT	
Equipment Compatibility Identifier	Installation/Wiring Instructions
MXL XL3 IXL (ICON-1)	P/N 575-295370-2 P/N 315-183000-17 P/N 315-092371-5

The detector model number is the compatibility identifier.