SIEMENS

INSTALLATION/WIRING INSTRUCTIONS
Models AD-3I and AD-3ILP
AIR DUCT DETECTORS

INTRODUCTION

Model AD-3I and AD-3ILP Detectors from Siemens Industry, Inc. are System 3, System PXL, System SXL-EX, System SXL, System XL3, System CP-2ER, MXL Control Panel and MXL-IQ Control Panel compatible air duct detectors. They are designed for use in heating, ventilating, and air conditioning duct systems. Model AD-3I uses ionization smoke detectors, and Model AD-3ILP 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-3I COMPATIBILITY

System/Module	Compatible Detectors
CP-2ER	DI-B3, DI-B3H
MXL/MXL-IQ Control Panel	ILI-1B, ILI-1BH
MXL/MXL-IQ Control Panel (CZM-1/1B6 or CZM-4)	DI-B3, DI-B3H (no accessories with CZM-1/1B6)
System 3	DI-B3, DI-B3H
System PXL	DI-B3, DI-B3H
System PXL (PZE-4B)	DI-B3, DI-B3H
System SXL	DI-B3, DI-B3H (no accessories)
System SXL (SZE-4R)	DI-B3, DI-B3H (no accessories)
System SXL (SZE-8A)	DI-B3, DI-B3H (no accessories)
System SXL-EX	DI-B3, DI-B3H
System SXL-EX (SZE-4X)	DI-B3, DI-B3H
System SXL-EX (SZE-8AX)	DI-B3, DI-B3H
System XL3 (INX-3)	ILI-1B, ILI-1BH
System XL3 (ZNX-3)	DI-B3, DI-B3H

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TABLE 2
AD-3ILP COMPATIBILITY

System/Module	Compatible Detectors
MXL/MXL-IQ Control Panel	ILP-1, ILP-2*
System XL3 (INX-3)	ILP-1

*The ILP-2 is only compatible with MXL/MXLV Rev. 8.0 or greater firmware and MXL-IQ Rev. 3.0 or greater firmware. When the CSG-M is configured, the DUCT application must be selected.

DO NOT USE air duct detectors with Alarm Verification.

TABLE 3
DETECTOR DATA

System	Sensitivity	How Set	Alarm Indicator	Max No. Detectors/Zone
CP-2ER MXL/MXL-IQ (CZM-4) System 3 System PXL System SXL System SXL-EX XL3 (ZNX-3)	See Detector Label	Factory Set	Red LED steady; OFF in supv	AD-3I: 30 (No accessories for SXL)
MXL/MXL-IQ (CZM-1/1B6)		Factory Set	Red LED steady; OFF in supv	AD-3I: 15 (No accessories)
System XL3 (INX-3)		Selected at Control Panel	Red LED flashes every 3 seconds; OFF in supv	AD-3I: 30 AD-3ILP: 30
MXL/MXL-IQ Control Panel		Selected at Control Panel	Red LED flashes every 3 seconds; OFF in supv	AD-3I: 60 AD-3ILP: 60

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-3I	DI-B3, ILI-1B	0-4000 feet
	DI-B3H, ILI-1BH	3000-8000 feet
AD-3ILP	No altitude limitations	

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

Air Duct Velocity Range: 500-4000 ft/min – AD-3I
300-4000 ft/min – AD-3ILP

Sampling Tube Pressure Range of Differences:
.017-1.07 inches of water column for AD-3I
.006-1.07 inches of water column for AD-3ILP

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-3I/3ILP (AD-3I *or* AD-3ILP) 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 System 3, System SXL-EX, System SXL, System XL3, MXL/MXL-IQ Control Panel, and System PXL all have LEDs for alarm indication that are used with the AD-3I/3ILP.

Alarm Condition

When used with the CP-2ER, MXL/MXL-IQ Control Panel, System PXL, System SXL-EX, System SXL, System 3, or System XL3, the Model AD-3I/3ILP operates directly from the control panel. An alarm condition on any 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 Systems the alarm is indicated on the Control Panel display and on the optional printer. See system manuals for further information.

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, or remote annunciator, if available.

Trouble Condition

A trouble condition from an AD-3I/3ILP is indicated by visual and audible devices on the control panel in the CP-2ER, System 3, System SXL-EX, System SXL, System XL3, MXL/MXL-IQ Control Panel, or System PXL, depending on the type of system in which it occurs. On System XL3 and MXL/MXL-IQ Control Panels it also may be indicated by an optional printer. Call your Authorized Siemens Industry, Inc. Service Representative when a trouble occurs.

For further information, refer to the appropriate Operating Instructions:

CP-2ER OPERATING INSTRUCTIONS, P/N 315-193524
MXL Control Panel OPERATING INSTRUCTIONS, P/N 315-092117
MXL-IQ Control Panel OPERATING INSTRUCTIONS, P/N 315-093626
System PXL OPERATING INSTRUCTIONS, P/N 315-094211
System SXL-EX OPERATING INSTRUCTIONS, P/N 315-094999
System SXL OPERATING INSTRUCTIONS, P/N 315-092419
System 3 OPERATING INSTRUCTIONS, P/N 315-084881
System XL3 OPERATING INSTRUCTIONS, P/N 315-082989

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.

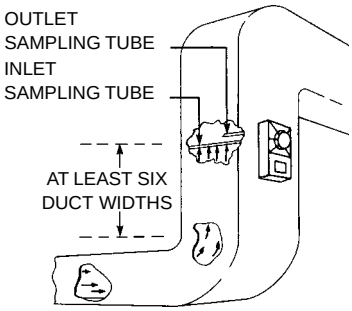


Figure 1
Typical Mounting of Duct

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 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 in the event of an alarm.

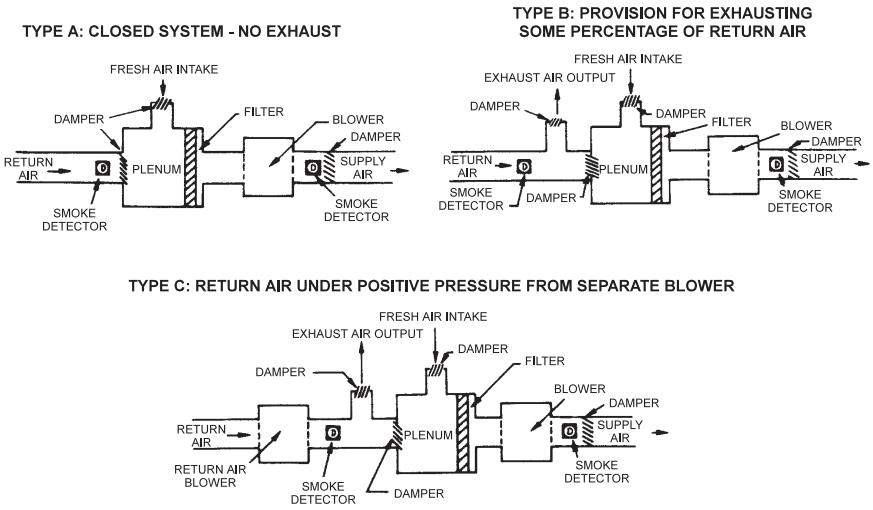


Figure 2
Recommended Locations in Duct Systems

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 $1^{1}/_{2}$ 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.

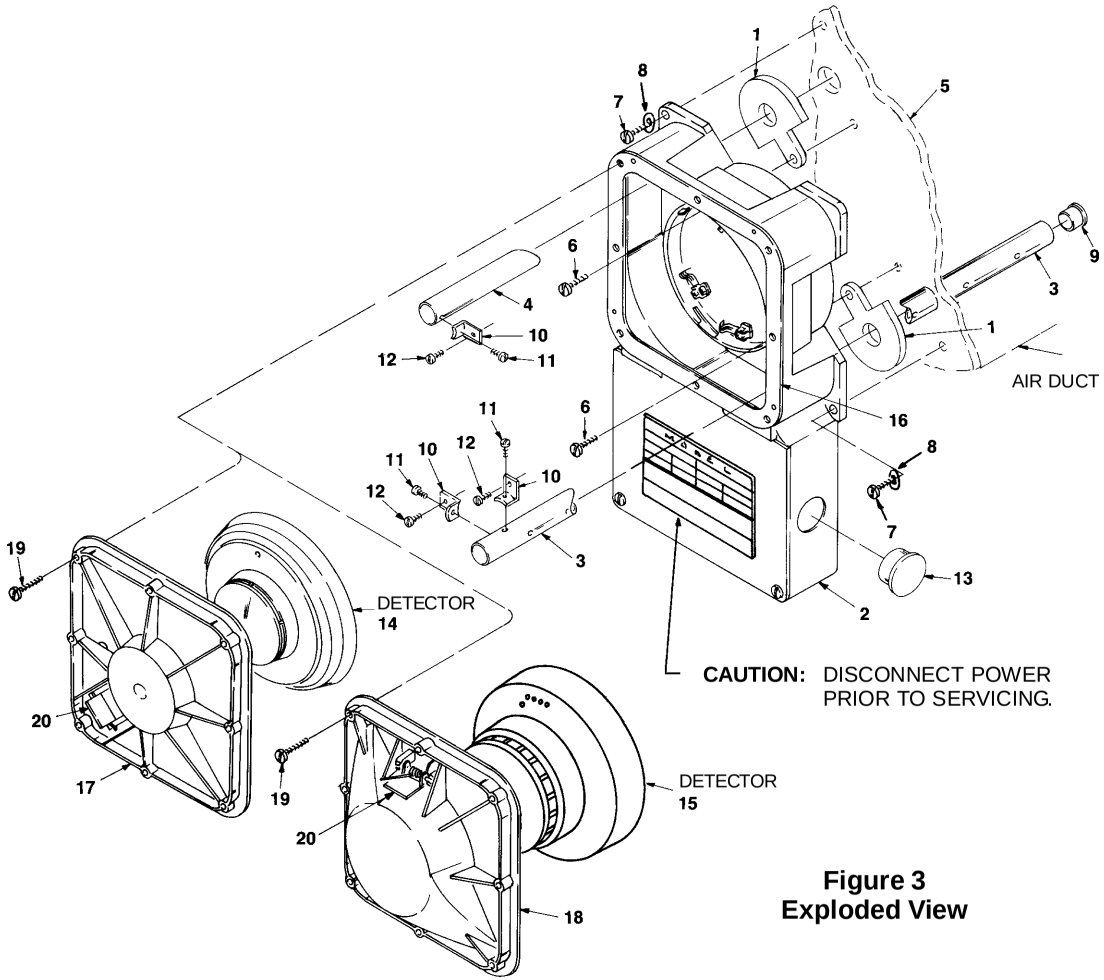


Figure 3
Exploded View

Item No.	Component
1	Sampling Tube Gasket
2	Housing
3	Inlet Sampling Tube
4	Outlet Sampling Tube
5	Template
6	Screw, No. 10 – 1 1/2
7	Screw, No. 10 – 1
8	Lockwasher
9	Rubber Stopper
10	Bracket
11	Screw, 3/16
12	Screw, 8/32
13	Plug
14	Detector DI-B3, DI-B3H, ILI-1B, or ILI-1BH
15	Detector ILP-1 or ILP-2
16	Cover Gasket
17	Ionization Detector Cover
18	Photoelectric Detector Cover (P/N 305-093076)
19	Screw, No. 6
20	Sensitivity Test Jack Lid

Sampling Tube Selection

There are four standard lengths of inlet sampling tubes. To ensure accurate air sampling, select the appropriate length and 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 9 3/4 in or less	STA-2	2 ft
1 ft 9 3/4 in - 3 ft 3 3/4 in	STA-3	3 ft 6 in
3 ft 3 3/4 in - 6 ft 3 3/4 in or less	STA-6	6 ft 6 in
6 ft 3 3/4 in - 9 ft 9 3/4 in or less	STA-10	10 ft
Greater than 9 ft 9 3/4 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.

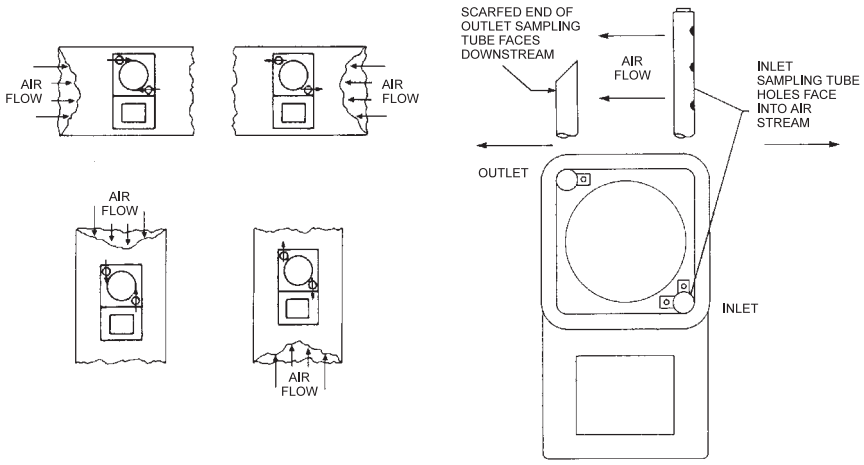


Figure 4
Sampling Tube Orientation

Trimming the Inlet Sampling Tube (See Figure 4)

a. Measure the outside width of the duct.

b. 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 7) the model number of the appropriate sampling tube (STA-3).

c. Measure the sampling tube, starting from the end with the four mounting holes.

d. Trim tube to the correct length, remove all burrs, and insert a rubber stopper (Figure 3, Item 9) in the tube.

Installation of the Sampling Tubes

a. Before installing the tubes, cut a $^{7}/_{8}$-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.

b. Attach brackets (10) to the inlet and outlet air sampling tubes with $^{3}/_{16}$ 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 $^{8}/_{32}$ 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 $^{8}/_{32}$ 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 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 3, System PXL, System SXL-EX, System SXL, MXL/MXL-IQ Control Panel (CZM-1/1B6 or CZM-4), or CP-2ER – See Figure 6. Use two wire circuits of 18 AWG, limited energy, shielded cable without conduit, if permitted by the local building codes.

System XL3 – See Figure 7. Use two wire circuits of 18 AWG, limited energy, shielded cable without conduit, if permitted by the local building codes.

MXL/MXL-IQ Control Panel – See Figure 8. Use two wire circuits of 18 AWG, limited energy, shielded cable without conduit, if permitted by the local building codes.

INSTALLATION OF SMOKE DETECTORS

CAUTION: Air Duct Detector Models AD-3I/3ILP 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 and 15).

Programming

ILI-1B, ILI-1BH, ILP-1, ILP-2 Detectors

Model AD-3I/3ILP ducts, using ILI-1B, ILI-1BH, ILP-1, or ILP-2 detectors, can be programmed to respond at a specific and unique system address. Program each detector using the Model FPI-32 Programmer/Tester. See the FPI-32 Manual, P/N 315-090077. The ILP-2 requires FPI-32 Rev. 1.3 software or greater.

Installation

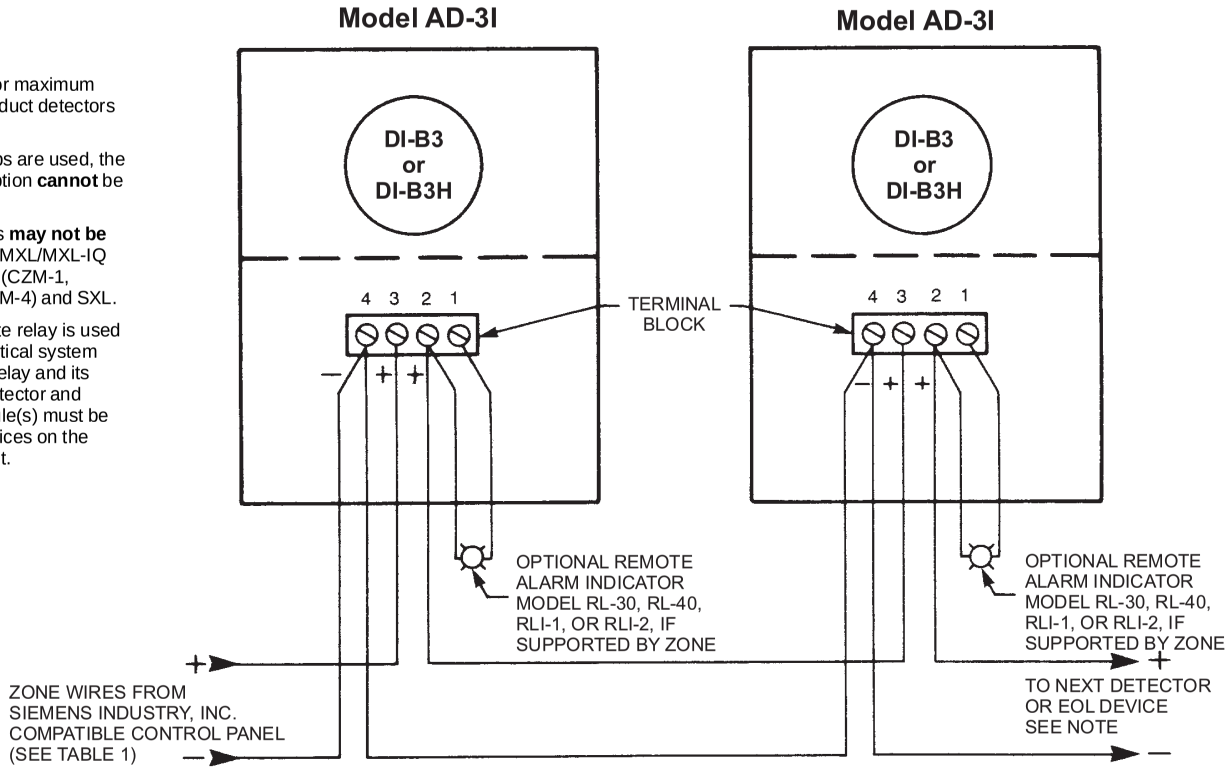
Align the detector alarm LED with the LED imprint located within the detector compartment on the housing. Rotate the detector counterclockwise while pushing on the detector until it drops in place. Next, push and rotate clockwise to engage the electrical connections. The detector automatically stops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

CAUTION:

1. See Table 3 for maximum number of air duct detectors per circuit.
2. If remote lamps are used, the relay board option **cannot** be used.
3. Remote lamps **may not be used** with the MXL/MXL-IQ Control Panel (CZM-1, CZM-1B6, CZM-4) and SXL.
4. When a remote relay is used to control a critical system function, the relay and its associated detector and optional module(s) must be the ONLY devices on the initiating circuit.



NOTE:
EOL device must be compatible with system initiating circuit.
Observe proper polarity where applicable.

Figure 6
Typical Connections for System 3, CP-2ER, System PXL, System SXL-EX
System SXL, MXL/MXL-IQ Control Panel (CZM-1, CZM-1B6, CZM-4)

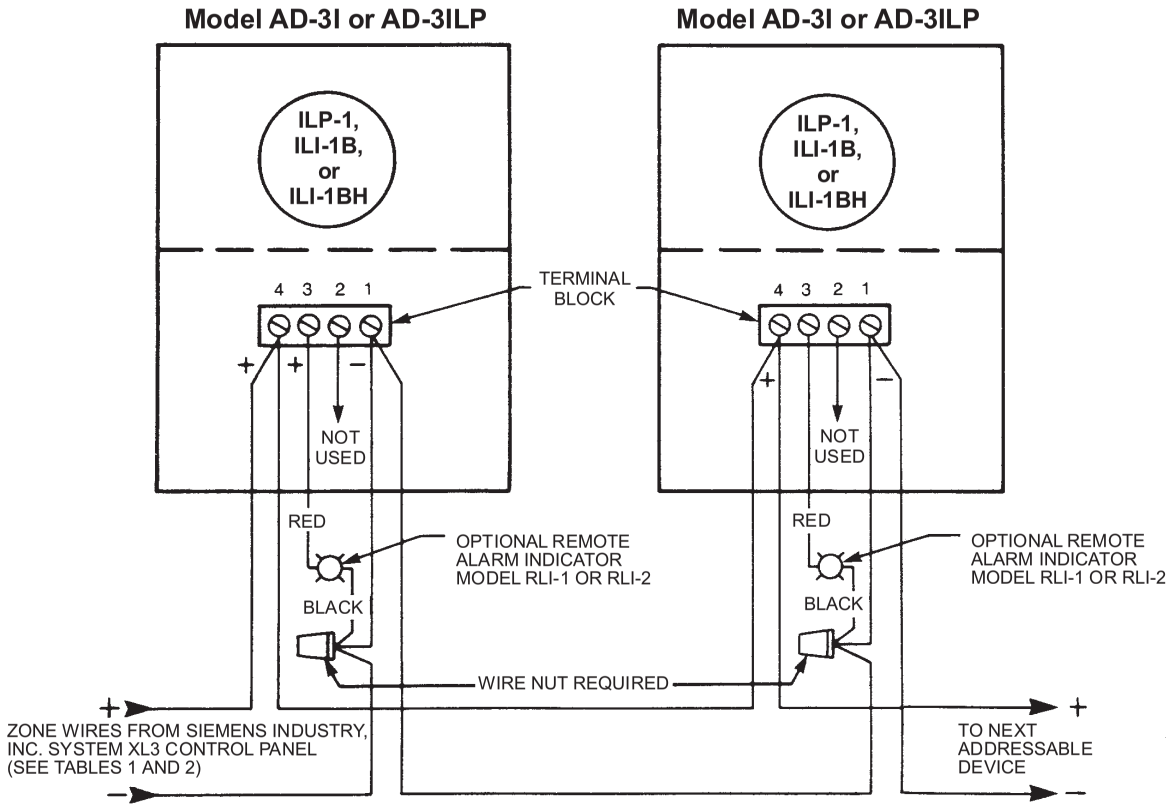


Figure 7
Typical Connections for System XL3 Use

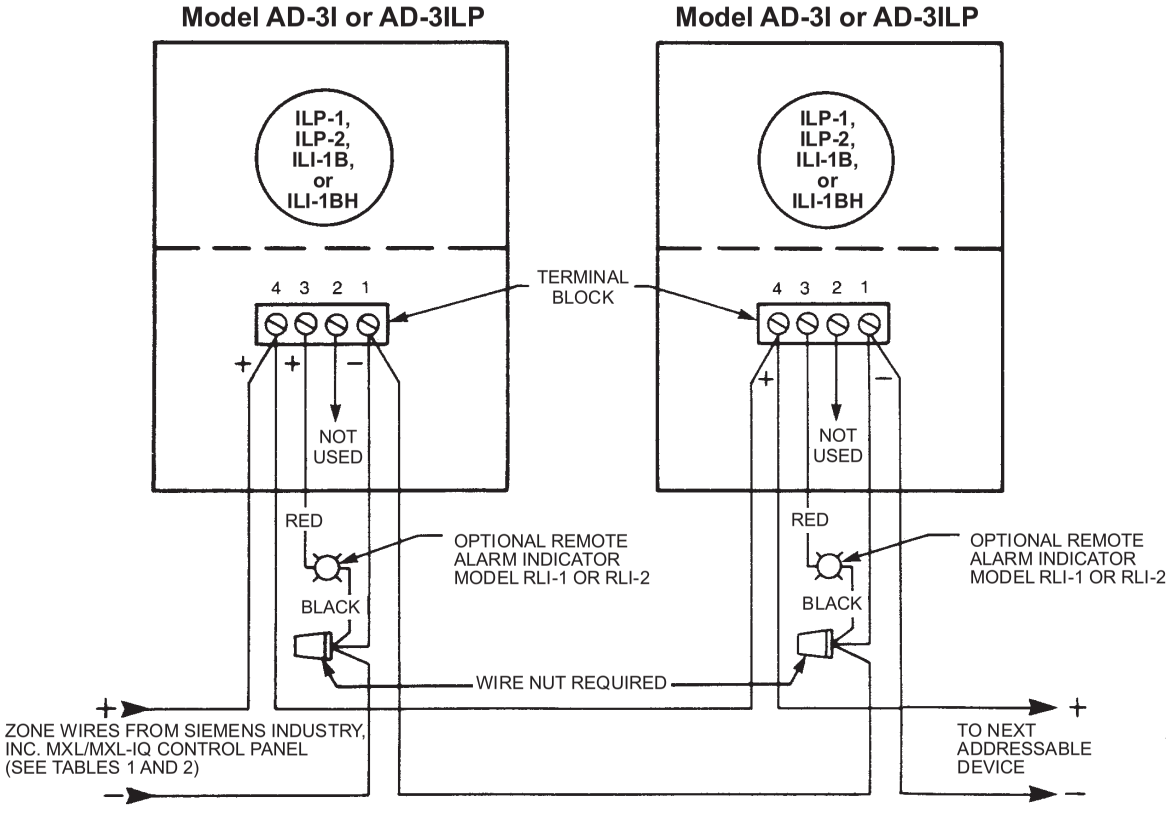


Figure 8
Typical Connections for MXL/MXL-IQ Control Panel Use

Sensing Compartment Cover Installation

a. 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.

b. Install the sensing compartment ionization cover (17) when using DI-B3, DI-B3H, ILI-1B, or ILI-1BH detectors and the photoelectric cover (18) when using an ILP-1 or ILP-2 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. System 3, System MXL/MXL-IQ (CZM-1, CZM-1B6, CZM-4), System PXL, System SXL-EX, System SXL, CP-2ER, and XL3 (ZNX-3) air duct smoke detector sensitivities are factory set and **not** field adjustable. The sensitivity range, as measured with the appropriate sensitivity meter, is listed on the nameplate label of the detector.

2. The sensitivity of addressable System XL3 smoke detectors can be measured at the system control panel. Refer to the *System XL3 Operation, Installation, and Maintenance Manual,* P/N 315-083206.

3. The sensitivity of addressable MXL/MXL-IQ Control Panel smoke detectors can be measured at the system control panel. Refer to the *MXL Operation, Installation, and Maintenance Manual,* P/N 315-092036, or the *MXL-IQ Operation, Installation, and Maintenance Manual,* P/N 315-093624, as applicable.

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 or ILP-2, refer to the detector's 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 photoelectric detector portion of the unit to be disassembled by anyone other than an authorized Siemens Industry, Inc. Systems Technician. For service, contact your nearest authorized Siemens Industry, Inc. Service Representative.

Periodic Testing

The unit should be tested per NFPA 70 recommendations 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
CP-2ER	P/N 315-093523-6
CP-35 (System 3)	P/N 315-084902-20
CZM-1 (MXL/MXL-IQ System)	P/N 315-090725-8
CZM-1B6 (MXL/MXL-IQ System)	P/N 315-095355-4
CZM-4 (MXL/MXL-IQ System)	P/N 315-090726-8
PXL	P/N 315-094131-4
PZC-4D (PXL)	P/N 315-094164-2
PZE-4B (PXL)	P/N 315-094065-4
SXL	P/N 315-092419-10
SXL-EX	P/N 315-095997-5
SZE-4R (SXL)	P/N 315-092430-4
SZE-4X (SXL-EX)	P/N 315-096018-4
SZE-8A (SXL)	P/N 315-092969-4
SZE-8AX (SXL-EX)	P/N 315-096022-4
ZNX-3 (XL3 System)	P/N 315-088562B
ZU-35 (System 3)	P/N 315-083222-14

The detector model number is the compatibility identifier.

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