

# MODEL "AX" SERIES



*Engineering Excellence!*

Single Channel  
Inductive Loop Vehicle Detectors

11 Pin Rear "Amphenol" Connector



## FEATURES & BENEFITS:

- Loop Diagnostics: Front panel "LOOP FAIL" LED indicates "real-time" Open Loop and Shorted Loop conditions. A third distinct flash rate indicates a loop failure has occurred.
- "POWER" LED provides visual check of low line voltage or no power at all.
- Automatic Reset Internal Fuse (24 VAC version), provides fuse & circuit protection when incorrect voltage is applied.

## FEATURES & BENEFITS (Cont.):

- Detect memory helps prevent detection drops during short power interruptions.
- Sensitivity-Boost, for gate operation where high profile vehicles might be encountered.
- 2-second CALL Delay.
- Single Programmable relay offers four selectable modes of operation:
  - True Presence (Infinite) - Factory Set
  - Limited Presence
  - Pulse on Entry
  - Pulse on Exit
- 4 loop frequencies selectable from front panel.
- 4 sensitivity levels selectable from front panel.
- Super bright LEDs provide separate Power, Detect, and Loop Fail indications.
- 11-pin Rear "Amphenol" connector.
- Fail-Safe and Fail-Secure versions available.
- Configurations available:
  - 24 VAC
  - 120 VAC
  - 240 VAC
  - 12 VDC
  - 24 VDC

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# Specifications:

*This is a basic Performance Specification and is not intended to be used as Operating Instructions.*

**Loop Frequency:** There are 4 frequencies (normally in the range of 20 to 100 kHz) that are DIP switch selectable from the front panel.

**Reset:** Changing the front panel RESET button or any DIP switch position (except frequency selection) resets the detector. After changing the frequency selection switches, the detector will require a RESET. Reset clears the loop fault memory.

**Sensitivity:** Vehicle detection results when a negative change in loop inductance ( $-\Delta L/L$ ) exceeds the sensitivity setting. The 4 detection sensitivity levels are front panel DIP switch selectable. (See Tables, "Sensitivity").

**Sensitivity-Boost:** An external DIP switch setting may be turned ON to increase sensitivity ONLY during the DETECT period. When a vehicle enters the loop, the detector sensitivity is boosted to a higher level than the vacant loop setting. The boosted sensitivity remains throughout the DETECT period. When the vehicle leaves the loop, the sensitivity returns to the vacant loop setting. This feature helps prevent dropouts during the passage of high bed vehicles and is particularly useful in sliding gate situations.

**Output Configurations:** An external DIP switch setting offers either a Presence or Pulse mode of operation. When set to the Presence position, an internal DIP switch setting offers either the output to be TruePresence™ (infinite) or Limited Presence. When set to the Pulse position, an internal DIP switch setting offers either Pulse on Entry or Pulse on Exit (see Tables, "Factory Default Settings").

TruePresence™ will hold the Call for as long as the vehicle is present and power is not removed or reset applied. Limited Presence will typically hold the Call output for about one to three hours. The TruePresence™ time applies only for normal size automobiles and trucks and for normal size loops (approximately 12 sq ft to 120 sq ft).

When in the pulse mode, the 250 millisecond pulse can be selected as either pulse-on-entry (when a vehicle enters the loop) or pulse-on-exit (when a vehicle exits the loop).

**Call Delay:** A 2 second delay can be activated by an internal DIP switch. Output delay is the time the detector output is delayed after a vehicle first enters the loop detection area and is indicated by the front panel "DETECT" LED flashing at 4 Hz with a 50% duty cycle. If the 2 second output delay feature is activated, the output relay will only be turned on after 2 seconds has passed with a vehicle continuously present in the loop detection area. If a vehicle leaves the loop detection area during the 2 second delay interval, detection is aborted and the next vehicle entering the loop detection area will initiate a new full 2 second delay interval.

**Output "CALL" Memory:** When power is removed for 2 seconds or less, the detector automatically "remembers" if a vehicle was present over the loop. When power is restored, the detector will continue to output a Call until the vehicle leaves the loop. (Power loss or dips of 2 seconds or less will not drop the Call).

**Power Status Indicator:** A green super high intensity light emitting diode (LED) indicates power status during normal detector operation. When the green (POWER) LED is ON the power to the detector is normal. When power drops approx. 20% from nominal, the green LED turns OFF and the detector remains operational. When power drops approx. 25% from nominal, the green LED is OFF and the "line" voltage is not sufficient to operate the detector.

**Detect Status Indicator:** The red "DETECT" LED is steady ON while a vehicle is being detected. The "DETECT" LED will flash at a 4 Hz rate with a 50% duty cycle while timing out the 2 Second Call Delay.

**Loop Fail Monitor Indicator:** If the total inductance of the detector input network goes out of the range specified for the detector or suddenly changes more

than  $\pm 25\%$  the detector will enter fail mode. The red "LOOP FAIL" LED will begin flashing with a 50% duty cycle once per second for a shorted loop condition or will be ON continuously for an open loop condition. These indicator conditions will continue until the inductance returns to its previous value at which time the detector output will automatically resume normal operation and the red "LOOP FAIL" LED will flash at a distinctive rate (a burst of three flashes once per second) to indicate an intermittent loop fault has occurred and corrected. The flash rate will continue until another loop fault occurs, the detector is RESET, or the detector loses power. [The detector input network, consists of the loop or loops plus the feeder cable (lead-in or home run) up to the connector on the detector].

**Fail-Safe Operation:** When the loop fails or power is removed, continuity exists between Common & N.O.

**Fail-Secure Operation:** When the loop fails or power is removed, continuity exists between Common & N.C.

**Self Tuning:** Automatically tunes to loop within 2 seconds after application of power or reset. 30 seconds of operation is required before full sensitivity and presence time is reached following application of power or a reset.

**Environmental Tracking:** Fully self-compensating for environmental changes and loop drift over the full temperature range and the entire loop inductance range.

**Loop Inductance Range:** 20 to 1000 microhenries with Q factor of 5 or greater.

**Loop Feeder Length:** Up to 2500 feet (762 m) maximum with proper feeder cable and appropriate loops.

**Loop Input:** Transformer isolated. The minimum capacitance added by the detector is 0.068 microfarads.

**Grounded Loop Operation:** The loop isolation transformer allows operation with poor quality loops (which may include a single point short, or leakage, to ground).

**Lightning Protection:** The detector can tolerate, without damage, a 10 microfarad capacitor charged to 1,000 volts being discharged directly into the loop input terminals, or a 10 microfarad capacitor charged to 2,000 volts being charged between either loop terminal and earth ground.

**Internal Circuitry Isolation:** All internal electronic circuitry is isolated from all external circuitry. AC Power is isolated by means of the power transformer. The loop is isolated by means of the loop isolation transformer. The outputs are isolated by means of the output relays.

**Automatic Reset Internal Fuse:** When 120 VAC is applied to 24 VAC models, the automatic internal fuse will open. The fuse will automatically reset when power is removed for 3 seconds. Source voltage should be verified before reinstalling.

**Relay Rating(s):** The relay contacts are rated for 6 Amps max, 150 VDC max, 300 VAC max and 180 Watts max switched power.

**Ruggedized Construction:** The enclosure is high temperature rated lexan plastic. Printed circuit boards are 0.062 in FR4 material with 2 oz copper each side.

**Operating Temperature:** -40°F to + 180°F. (-40°C to +82°C)

**Power(s):**  
 18 to 32 VAC, 50/60 Hz., 4.0 Watts max.  
 89 to 135 VAC, 50/60 Hz. 4.0 Watts max.  
 176 to 288 VAC., 50/60 Hz., 4.0 Watts max.  
 10 to 16 VDC, 80 milliamps max.  
 20 to 34 VDC, 50 milliamps max.

**Fuse(s):**  
 24 VAC power: 120 milliamp, Polymeric.  
 120 VAC power: 3/8 amp., Slo-Blo.  
 240 VAC power: 3/8 amp., Slo-Blo.  
 12 VDC power: Current limited.  
 24 VDC power: Current limited.

**Size:** 1.55 in (3.90 cm) Wide x 2.50 in (6.35 cm) High x 4.20 in (10.65 cm) Deep, including rear connector.

**Weight:** Approximately 7.6 oz (215.46 gm).

**Connector:** Rear mount 11 Pin male "Amphenol" connector (86CP11).

## Tables:

### Sensitivity:

| Sens   | $-\Delta L/L$ |
|--------|---------------|
| Lo     | 0.32%         |
| Med Lo | 0.16%         |
| Med Hi | 0.08%         |
| Hi     | 0.02%         |

### Pin Assignments:

| Pin | Function                             |
|-----|--------------------------------------|
| 1   | Power, Hot or (+)                    |
| 2   | Power, Neutral or (-)                |
| 3   | No Connection                        |
| 4   | No Connection                        |
| 5   | Relay Output, Common                 |
| 6   | Relay Output, Normally Open (N.O.)   |
| 7   | Loop                                 |
| 8   | Loop                                 |
| 9   | No Connection                        |
| 10  | Relay Output, Normally Closed (N.C.) |
| 11  | No Connection                        |

**Note:** Relay contacts are shown with power applied, loop(s) connected, and no vehicles present.

### Models & Configurations:

| Model   | Connector         | Voltage | Operation   |
|---------|-------------------|---------|-------------|
| AX-3    | 11 Pin "Amphenol" | 120VAC  | Fail-Safe   |
| AX-3-S  | 11 Pin "Amphenol" | 120VAC  | Fail-Secure |
| AX-7    | 11 Pin "Amphenol" | 24VAC   | Fail-Safe   |
| AX-7-S  | 11 Pin "Amphenol" | 24VAC   | Fail-Secure |
| AX-8    | 11 Pin "Amphenol" | 240VAC  | Fail-Safe   |
| AX-8-S  | 11 Pin "Amphenol" | 240VAC  | Fail-Secure |
| AX-23   | 11 Pin "Amphenol" | 12VDC   | Fail-Safe   |
| AX-23-S | 11 Pin "Amphenol" | 12VDC   | Fail-Secure |
| AX-24   | 11 Pin "Amphenol" | 24VDC   | Fail-Safe   |
| AX-24-S | 11 Pin "Amphenol" | 24VDC   | Fail-Secure |

### Factory Default Settings (External DIP Switch):

Sensitivity Level: Med Lo (1)  
 Frequency Level: Normal (2)  
 Output Configurations: TruePresence™ (Infinite)  
 Sensitivity Boost: OFF

### Factory Default Settings (Internal DIP Switch):

Output Configurations: TruePresence™ (Infinite)  
 when front panel DIP switch is selected for the Presence Mode.  
Pulse on Entry when front panel DIP switch is selected for the Pulse Mode.  
 2-Second Call Delay: OFF



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