

# AX2DL SERIES



## TWO CHANNEL DETECTOR WITH DIRECTIONAL LOGIC



Single 11-Pin Connector

Dual 11-Pin Connector

3.00" High x 1.75" Wide x 4.30" Deep

### Ordering Information:

Model AX2DL-X-XX-X-(XX)



(NC) or (NO): (NC) = Normally Closed Relay Contacts, (NO) = Normally Open Relay Contacts \*

Blank = Fail-Safe, S = Fail-Secure

1C or 2C: 1C = Single Connector, 2C = Dual Connectors

3, 4, or 8: 3 = 120 VAC Input Power

4 = 12 VDC, 24 VDC, or 24 VAC Input Power

8 = 240 VAC Input Power

\* 2C (Two Connector) models do not have the (NO) Normally Open or (NC) Normally Closed contact designation.

- Directional Logic.
- Models available that operate on 12 VDC / 24 VDC / 24 VAC, 120 VAC, or 240 VAC input power.
- Fail-Safe or Fail-Secure versions available.
- Single Relay output per channel:
  - True Presence™.
  - Pulse-on-Entry.
- Four levels of sensitivity.
- Sensitivity Boost for applications where high-bed vehicles might be encountered.
- Power Down Memory feature enables the detector to automatically track the status of the loop during power interruptions of any duration.
- Fail LED indicates current loop failures or loop failures that have occurred.
- Four loop frequencies.
- Single 11-pin connector or Dual 11-pin connector models available.

### Overview:

The Model AX2DL is a full featured, dual channel, dual output (one per channel) vehicle detector with Directional Logic. Directional Logic, also known as AB Logic or BA Logic, uses the Channel 1 (A) & Channel 2 (B) loops to determine the direction the vehicle is traveling. The AX2DL incorporates the reliable vehicle detection technology found in all of Reno A & E's vehicle detectors. All detector functions and settings are easy to configure by using two sets of six external DIP switches.

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# AX2DL SERIES SPECIFICATION

This is a Performance Specification. It is not intended to be used as Operating Instructions.

**Loop Frequency:** Four (4) operating frequencies (normally in the range of 20 to 100 kilohertz) are selectable for each channel by means of four front panel mounted DIP switches (two per channel).

**Sensitivity:** Four (4) detection sensitivity levels are selectable for each channel by means of four front panel mounted DIP switches (two per channel). Vehicle detection results from a sufficient negative change in loop inductance (-ΔL/L). (See **SENSITIVITY -ΔL/L** table.)

**Sensitivity Boost:** Each channel has a front panel mounted DIP switch that may be turned on to increase sensitivity during the Detect State. When a vehicle enters the loop detection zone, the detector channel sensitivity is automatically boosted to a higher level than the vacant loop setting. The boosted sensitivity level is maintained throughout the Detect State. When the vehicle leaves the loop detection zone, the channel sensitivity immediately returns to the vacant loop setting. This feature is particularly useful in preventing dropouts during the passage of high bed vehicles.

**Directional Logic:** The detector's directional logic feature uses the Channel 1 and Channel 2 loops to determine the direction a vehicle is traveling. The loops must be spaced such that the vehicle can span both loops. The expected installation is two loops, one after the other in the same lane, spaced anywhere from overlapping to 6 feet apart. When a vehicle enters the first (leading) channel's loop detection zone, that channel will go into a pending state. As soon as the vehicle enters the second (trailing) channel's loop detection zone, that channel will generate a directional output. If the vehicle moves out of the first (leading) channel's loop detection zone before entering the second (trailing) channel's loop detection zone, directional logic detection is aborted and a directional output will not be generated.

**Presence / Pulse Output Modes:** Each detector channel's output has two modes of operation that are selectable by means of two front panel mounted DIP switches (one per channel): True Presence™ and Pulse-on-Entry. True Presence™ will hold the channel's directional output in the Detect state or maintain a pending state as long as the vehicle is present in the loop detection zone and power is not removed or reset applied. True Presence™ time applies only for normal size automobiles and trucks and for normal size loops (approximately 12 to 120 sq. ft.). When set to operate in Pulse-on-Entry mode, a 250 millisecond pulse directional output will occur when the vehicle enters the trailing loop detection zone.

**Fail-Safe / Fail-Secure Operation:** The detector is factory configured for Fail-Safe or Fail-Secure operation. When the detector is configured to operate in Fail-Safe mode, both channel outputs will assume a Detect output state (relay Normally Open contacts closed, relay Normally Closed contacts open) during a power loss or loop fault condition. When the detector is configured to operate in Fail-Secure mode, both channel outputs will not respond to power losses or loop failures (relay Normally Open contacts open, relay Normally Closed contacts closed).

**Power Indicator:** The green Power LED is Off when the detector has no power supplied or when the power level is below 75% of its nominal value. The Power LED is On when the detector is being supplied with a suitable level of power.

**Detect / Fail Indicator:** Each channel has a red Detect / Fail LED that is used to convey information about the channel's output state and/or loop failure conditions. The Detect / Fail LED is Off when the channel's loop detection zone is vacant and no current or prior loop failure conditions exist.

**Detect indications:** The Detect / Fail LED is On when a vehicle is in a trailing channel loop detection zone and that channel is set to operate in Presence mode. The Detect / Fail LED will turn On for 250 milliseconds when a vehicle enters a trailing channel loop detection zone and that channel is set to operate in Pulse mode. A flash rate of 750 milliseconds On and 250 milliseconds Off is an indication of a leading channel pending state. A flash at a rate of 250 ms On and 750 ms Off is an indication of a vehicle's presence in a trailing channel loop detection zone following a pulse output.

**Fail indications:** The Detect / Fail LED flashing at a one Hz rate with a 50% duty cycle indicates that a Shorted Loop fail condition exists. The Detect / Fail LED flashing at a 10 Hz rate with a 50% duty cycle indicates that an Open Loop fail condition exists. The Detect / Fail LED flashing at a rate of three flashes per second indicates that a loop failure condition has occurred and has been corrected. This flash rate will continue until another loop fault occurs, the detector is reset, or the detector loses power. Note: If a vehicle is detected, the Detect / Fail LED will turn ON even if a prior loop failure condition exists.

**Directional Logic Outputs and Indications:** When a vehicle enters the leading channel's loop detection zone, that channel will enter a pending state and its Detect / Fail LED will flash at a rate of 750 milliseconds On and 250 milliseconds Off to indicate the presence of the vehicle. This flash rate will continue until the vehicle is clear of the leading channel's loop detection zone. If the trailing channel's output is set to Presence mode, its relay will activate and its Detect / Fail LED will turn On as soon the vehicle enters the trailing channel's loop detection zone. The relay will remain activated and the Detect / Fail LED will remain On until the vehicle is clear of the trailing channel's loop detection zone. If the trailing channel's output is set to Pulse mode, its relay will momentarily activate (i.e. generate a 250 millisecond pulse) and its Detect / Fail LED will turn On for 250 milliseconds. The Detect / Fail LED will then begin to flash at a rate of 250 ms On and 750 ms Off to indicate the vehicle's presence over the trailing channel's loop detection zone. This flash rate will continue until the vehicle is clear of the trailing channel's loop detection zone. If the vehicle moves out of the leading channel's loop detection zone before entering the trailing channel's loop detection zone, directional logic detection is aborted and the trailing channel's relay and Detect / Fail LED will not activate.

**Detector Reset:** Changing the position of either channel's DIP Switches (except the Frequency DIP switches) will reset that detector channel. The detector can be reset by pressing the front panel mounted pushbutton labeled **RESET**. After changing either channel's Frequency selection switches (DIP switches 1 & 2), the detector channel must be reset.

**Detect Memory:** When power is removed, the detector automatically remembers the status of each channel's loop. During the loss of power, vehicles may enter or leave the loop detection zones. When power is restored, the detector will correctly determine the current loop status and output a Call if a vehicle is in the loop detection zone. If the loop detection zone is vacant, a Call will not be output. (A power loss power dip of any duration will not bring a gate arm down onto cars as they wait at the gate). **IMPORTANT:** After installing and applying power to the Model AX2DL detector, momentarily push the RESET button to clear the Power Down Memory. This initializes the detector to the loops that are connected and clears the memory of any previous loop information.

**Self Tuning:** The detector automatically tunes and is operational within two seconds after application of power or after being reset. Full sensitivity and hold time requires 30 seconds of operation.

**Environmental & Tracking:** The detector is 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 2000 microhenries with a 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 microfarad.

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

**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.

**Electrical Isolation:** The loop is isolated by means of the loop isolation transformer. The outputs are isolated by means of the output relays.

**Relay Outputs:** Rated for maximum continuous current of 6.0 amps, 300 VAC maximum, 150 VDC maximum, and 180 Watts maximum switched power.

**Power:** 120 VAC version (AX2DL-3): 89 to 135 VAC, 4 Watts maximum.

240 VAC version (AX2DL-8): 180 to 270 VAC, 4 Watts maximum.

12 VDC / 24 VDC / 24 VAC version (AX2DL-4): 10 to 16 VDC, 80 milliamps maximum / 20 to 34 VDC, 50 milliamps maximum / 18 to 32 VAC, 4 Watts maximum.

**Ruggedized Construction:** The detector enclosure is made from a high temperature rated plastic. Printed circuit boards are 0.062 inch thick FR4 material with 2 oz. copper on both sides and plated through holes. Circuit board and components are conformal coated with polyurethane.

**Operating Temperature:** -30° F to +180° F (-34° C to +82° C).

**Connector(s):** One or two rear mounted 11 Pin Amphenol connector(s) (See **PIN ASSIGNMENTS** tables.)

**Size:** 3.00 inches (7.62 cm) high x 1.75 inches (4.45 cm) wide x 4.30 inches (10.92 cm) deep (excluding connector).

**Weight:** 8.8 oz (249.5 gm).

## TABLES

### SENSITIVITY, -ΔL/L (Both Channels):

Sensitivity Setting	0	1 *	2	3
-ΔL/L	0.32%	0.16% *	0.08%	0.02%

\* Denotes factory default.

Note: Changing a sensitivity switch will reset the detector channel.

### PIN ASSIGNMENTS (Single Connector Models):

Pin	Function (NO Models)	Function (NC Models)
1	AC Line / DC +	AC Line / DC +
2	AC Neutral / DC Common	AC Neutral / DC Common
3	Channel 2 Relay, Normally Open (N.O.)	Channel 2 Relay, Normally Closed (N.C.)
4	No Connection	No Connection
5	Channel 1 Relay, Common	Channel 1 Relay, Common
6	Channel 1 Relay, Normally Open (N.O.)	Channel 1 Relay, Normally Closed (N.C.)
7	Channel 1 Loop	Channel 1 Loop
8	Channel 1 Loop	Channel 1 Loop
9	Channel 2 Relay, Common	Channel 2 Relay, Common
10	Channel 2 Loop	Channel 2 Loop
11	Channel 2 Loop	Channel 2 Loop

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

### PIN ASSIGNMENTS (Dual Connector Models):

Pin	Function (Connector 1)	Function (Connector 2)
1	AC Line / DC +	No Connection
2	AC Neutral / DC Common	No Connection
3	No Connection	No Connection
4	No Connection	No Connection
5	Channel 1 Relay, Common	Channel 2 Relay, Common
6	Channel 1 Relay, Normally Open (N.O.)	Channel 2 Relay, Normally Open (N.O.)
7	Channel 1 Loop	Channel 2 Loop
8	Channel 1 Loop	Channel 2 Loop
9	No Connection	No Connection
10	Channel 1 Relay, Normally Closed (N.C.)	Channel 2 Relay, Normally Closed (N.C.)
11	No Connection	No Connection

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

### FACTORY DEFAULT SETTINGS (Both Channels):

Switch	ON	OFF	Factory Default
1	Four (4) Frequency Selections		OFF
2			OFF
3	Output True Presence™	Output Pulse-on-Entry	OFF
4	Sensitivity Boost	No Boost	OFF
5	Four (4) Sensitivity Selections		ON
6			OFF