



Instruction Manual

The ULT-DIN vehicle loop detector allows for detection of metallic objects entering the field around an induction loop. This vehicle detector may be used in center, reverse and exit loop positions. The ULTRAMETER™ display feature makes set-up easy by displaying the optimum sensitivity setting required to detect a vehicle positioned near the loop. Ten sensitivity settings allow for fine adjustment of the detection level. The ULT-DIN provides relay contact outputs indicating vehicle presence and a second set of relay contact outputs providing auxiliary functions. The second output can be used for loop fault, pulse on entry/exit, or the EMX exclusive feature Detect-on-Stop™ (DOS®). The ULT-DIN features automatic sensitivity boost (ASB), delay, fail-safe/fail-secure and infinite or normal (5 min.) presence. Four frequency settings provide flexibility in preventing crosstalk in multi-loop applications.

Cautions and Warnings



This product is an accessory or part of a system. Install the ULT-DIN according to instructions from the gate or door operator manufacturer. Comply with all applicable codes and safety regulations.

Specifications

Power	12-24 VDC/AC
Draw Current (Standby/Detect)	15 mA/45 mA
Loop Frequency	4 settings (low, med-low, med-hi, high)
Loop Inductance Range	20-2000 μ H (Q factor \geq 5)
Surge Protection	Loop circuitry protected by surge suppressors
Presence Relay	SPDT relay contact (form C)
Output B Relay	SPDT relay contact (form A)
Contact Rating	1 A @ 24-120 VDC/AC
Operating Temperature	-40° to 180°F (-40° to 82°C) 0 to 95% relative humidity
Connector	DIN rail screw terminal
Dimensions (L x W x H)	3.2" (80 mm) x 0.9" (23 mm) x 3.3" (84 mm)

Ordering Information

- ULT-DIN DIN rail mount vehicle loop detector (included)
- PR-XX Lite preformed loop (XX – specify size)
- TSTL Test loop, tool for troubleshooting

Wiring Connections



Terminal Pin	Description
1	Shield - Earth Ground
2	Loop Connection
3	Loop Connection
4	Power (12-24 VDC/AC)
5	Power (12-24 VDC/AC)
6	No Connection
7	Output B - NO (normally open contact)
8	Output B - COM (common contact)
9	No Connection
10	Output A - NC (normally closed contact)
11	Output A - COM (common contact)
12	Output A - NO (normally open contact)

Settings & Display

1. Sensitivity Setting

The 10-position rotary switch allows for adjustment of the detection level. The sensitivity threshold increases from position 0 (lowest setting) through 9 (highest setting). Typical applications require a setting of 3 or 4. The rotary adjustment must be set to a specific/whole number. There are no half settings.

2. Detect / Frequency Count (Red LED)

Presence Detected	on
No Presence	off
Frequency Count	flashing

3. Power / Loop Fault Indicator (Green LED)

Normal Operation	on
Shorted or Open Loop	fast flash
Previous Loop Fault	flashes fast twice intermittently

Upon power up, the detector initializes by automatically tuning to the loop. The green LED indicates that the detector is powered and operational.



4. ULTRAMETER™ Display

The display shows the sensitivity setting required to detect a vehicle near the loop. To use this feature, observe the display while a vehicle is moving into position near the loop, note the number displayed, then adjust the sensitivity setting to the displayed position. The display will adjust from 9 for a weak signal to 0 for a very strong signal. During normal operation, when a vehicle is not on or near the loop, the display is blank. The effects of cross-traffic interference can be observed on the display when the sensing area is vacant.

5. Frequency Count / Reset Button

Press the frequency count button and count the number of flashes on the red LED. Each flash represents 10 kHz. Following a frequency count cycle, the detector re-initializes.

6. DIP Switch

The DIP switch settings are explained on the next page.

Automatic Sensitivity Boost	DIP Switch 1
<i>ASB Enabled</i>	on
<i>ASB Disabled</i>	off

The **Automatic Sensitivity Boost** causes the sensitivity to increase following initial detection. This feature is useful to prevent dropout when detecting high-bed vehicles. The sensitivity returns to its normal setting after the vehicle exits the loop. The decimal point on the ULTRAMETER™ display indicates ASB is on.

Presence	DIP Switch 2
<i>Normal</i>	on
<i>Infinite</i>	off

Infinite presence mode causes the output to remain in detect as long as the vehicle remains on the loop. **Normal** presence mode causes the output to reset after 5 minutes. **Do not use Normal presence mode for reversing loop applications.**

Delay	DIP Switch 3
<i>Delay On</i>	on
<i>Delay Off</i>	off

The **Delay** mode provides a 2 second delay before activating Presence and Output B. Output B will not be activated if in Loop Fault mode. **Do not use Delay mode for reversing loop applications.**

Output B	DIP Switch	
Mode	4	5
<i>Pulse on Entry</i>	on	on
<i>Pulse on Exit</i>	on	off
<i>Detect-on-Stop™</i>	off	on
<i>Loop Fault</i>	off	off

The Output B relay is configurable for four possible modes. In **Pulse on Entry/Exit** mode, Output B will be activated for approximately 500ms when a vehicle is entering or exiting the detection zone. The **Detect-On-Stop™ (DOS®)** feature requires that a vehicle must come to a complete stop over the loop for a minimum of 1-2 seconds before Output B activates. **Do not use DOS® feature for reversing loop applications.** In **Loop Fault** mode, Output B will trigger if a loop fault occurs.

Fail Safe / Secure	DIP Switch 6
<i>Fail Safe</i>	on
<i>Fail Secure</i>	off

The **Fail Safe** setting causes the ULT-DIN to activate the presence output in the event of a loop failure. The **Fail Secure** setting will cause the ULT-DIN not to activate the presence output in the event of a loop failure. **Do not use Fail Secure for reversing loop applications.**

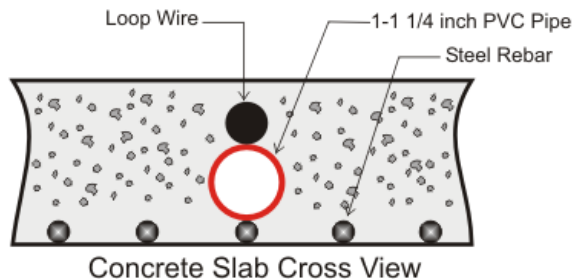
Frequency Settings	DIP Switch	
	7	8
<i>Low</i>	on	on
<i>Medium Low</i>	on	off
<i>Medium High</i>	off	on
<i>High</i>	off	off

DIP switches 7 and 8 are used to assign the loop operation frequency. The primary purpose of the **Frequency Setting** is to allow the installer the ability to set different operating frequencies for multi-loop installations and is recommended to prevent crosstalk/interference from adjacent loops.

Loop Installation

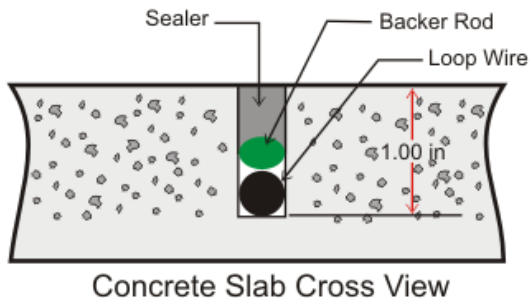
NEW SLAB POUR

Ty-wrap 1-1/4" PVC pipe to the top of the rebar in the size and configuration of the loop (ex. 4' x 8'). Then ty-wrap the loop to the top of the PVC frame. This stabilizes the loop during the pour and separates it from the rebar.



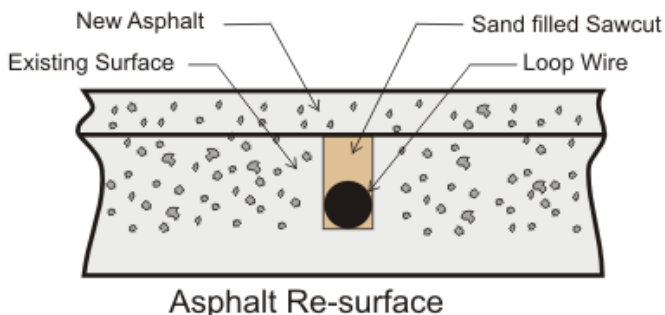
SAW CUT EXISTING SURFACE

Cut 1" deep into the existing surface, place a 45° cut at the corners to prevent sharp edges from damaging the loop wire. Notch out for the "T" connection where the lead wire connects to the loop. Remove all debris from the finished cut with compressed air. Place the loop into the saw cut. Place backer material into the saw cut over the loop wire and pack tightly. Place a high-quality sealer over the saw cut to seal the surface.



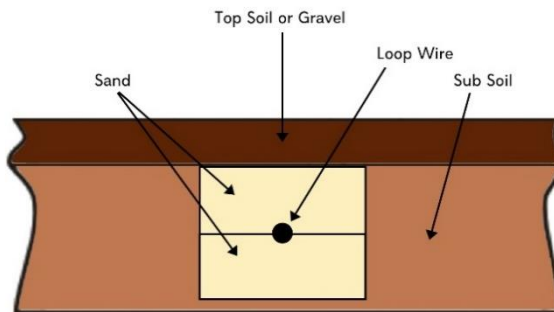
RESURFACE ASPHALT

Saw cut the existing surface 3/4" deep and place a 45° cut at the corners to prevent sharp edges from damaging the loop wire. Remove all debris from the finished cut with compressed air. Place sand over the loop wire to the surface and pack tightly. Lay new asphalt.



GRAVEL OR SOIL INSTALLATION

While this is not a recommended installation for most loops, it has been used successfully with proper preparation. Remove gravel or top soil until reaching a stable base. Dig ~ 6-8" deep by ~ 6-8" wide. Fill halfway with sand and pack tightly. Place the loop into the trench and finish filling to level with sand. Pack tightly and replace gravel or soil over top.



GENERAL INSTALLATION GUIDELINES

- Use EMX lite preformed loops for quick, reliable installations.
- It is not recommended to install a loop near power lines (overhead or underground) or low voltage lighting. If necessary near these power sources, place at a 45° angle. Make the loop shape a diamond, not a square.
- Never install a loop near inductive heaters.
- If using a non-preformed loop, lead-in wire (wire from loop to detector) must be twisted a minimum of 6 turns per foot to avoid the effects of noise or other interference.
- Detection height is approximately 70% of the shortest side of the loop.
For example: detection height for a 4' x 8' loop = 48" x .7 = 33.6"

Installation

1. Wire the ULT-DIN according to operator instructions. Refer to [Wiring Connections](#) for more information.
2. Configure the DIP switches according to preferences. Refer to [Settings & Display](#) for more information.
3. If using multiple loops or suspect crosstalk/interference from the environment, perform a frequency count on each detector to confirm that the operation frequencies are different.
 - Press the FREQUENCY COUNT / RESET button and count the number of flashes of the red LED. Each flash represents 10kHz. Counts from 3 to 13 confirm that the detector is tuned to a loop.
 - If adjacent loops and detectors are utilizing the same or very similar frequency, configure DIP switches 7 and 8 on one of the devices. For example: Move one ULT-DIN to the low frequency setting and the second ULT-DIN to the high frequency setting.
4. Press the FREQUENCY COUNT / RESET button to re-initialize the detector and program the DIP switch settings.
5. Adjust the sensitivity setting to desired level to assure detection of all vehicle traffic.

TIP:

 - To test the sensitivity, without moving the inductive loop, drive a vehicle near the loop. When the vehicle is first detected by the loop, "9" will be displayed on the ULTRAMETER™ display. Position the vehicle over the loop where detection point is desired, take note of the number displayed on the ULTRAMETER™ and change the sensitivity setting (10-position rotary switch) to match that number.
 - Move the test vehicle away from the loop to remove it from the detection zone (ULTRAMETER™ display should be blank).
 - Press the FREQUENCY COUNT / RESET button on the ULT-DIN.
 - Retest the product by moving the vehicle into and out of the detection zone to make sure the set-up and location are working as intended.
6. Press the FREQUENCY COUNT BUTTON / RESET button to calibrate the ULT-DIN to the loop.

Troubleshooting

Symptom	Possible Cause	Solution
Green LED not on	No power	Check the power supplied to the ULT-DIN. Voltage should read between 12-24 VDC.
Green LED fast flash	Loop wire shorted or open	<ol style="list-style-type: none"> 1. Check the loop resistance with a multimeter to confirm a reading between 0.5 ohms and 5 ohms. If the reading is outside of this range, replace the loop. The reading should be steady. 2. Check loop connections to terminals. 3. Press the FREQUENCY COUNT / RESET button.
Green LED flashes fast twice intermittently	Loop wire was previously shorted or open	<ol style="list-style-type: none"> 1. Check the loop resistance with a multimeter to confirm a reading between 0.5 ohms and 5 ohms. If reading is outside of this range, replace the loop. The reading should be steady. 2. Check loop connections to terminals. 3. Press the FREQUENCY COUNT / RESET button.
Red LED on constantly (stuck in detection mode)	<p>Faulty loop</p> <p>Poorly crimped connection or loose connection</p>	<p>Perform a megger test from loop lead to ground, it should be more than 100 megaohms.</p> <p>Check loop connections to terminals. Verify splices are properly soldered and sealed against moisture.</p> <p>Observe ULTRAMETER™ display. The level indicated on the display indicates residual frequency shift from vacant loop to vehicle presence. Press FREQUENCY COUNT / RESET button to re-initialize the detector.</p>
Detector detects intermittently when no vehicle is on the loop	<p>Faulty loop</p> <p>Poorly crimped connection or loose connection</p> <p>Cross-talk between multiple loop detectors</p> <p>Loop not securely installed to prevent movement of loop in pavement.</p>	<p>Perform a megger test from loop lead to ground, it should be more than 100 megaohms.</p> <p>Check loop connections to terminals. Verify splices are properly soldered and sealed against moisture.</p> <p>Set multiple loops to different frequencies.</p> <p>Verify that loop is securely installed in pavement and that site is in good condition preventing movement of loop wires.</p>
No detection	<p>Loop wire shorted or open</p> <p>Loop sensitivity set too low</p>	<ol style="list-style-type: none"> 1. Check loop resistance with a multimeter to confirm a reading between 0.5 ohms and 5 ohms. If the reading is outside of this range, replace the loop. The reading should be steady. 2. With vehicle on loop, observe ULTRAMETER™ display. Set sensitivity level to the level indicated on the display.

Warranty

EMX Industries, Inc. products have a warranty against defects in materials and workmanship for a period of two years from date of sale to our customer.