



LM222

INDUCTIVE LOOP MONITOR™

- DUAL CHANNEL – RACK MOUNT
- CALTRANS QPL APPROVED

For over 25 years Eberle Design, Inc. (EDI), has provided technicians and engineers with reliable, high quality mission critical component products that improve the performance and lifecycle of traffic control systems.

EDI's wide range of traffic control vehicle detection products help technicians save valuable time and bank budgeted dollars by quickly installing, accurately troubleshooting, and reliably maintaining traffic control systems with easy to use hi-tech vehicle detectors.

The Model LM222 has been specifically designed to deal with all traffic applications and meets or exceeds all requirements of:

- Caltrans QPL, TSCES January 1989 with July 1991 Addendum
- Caltrans TEES August 2002, Chapter 1
- NEMA Standard TS 1-1989 part 15

ENHANCED FEATURES

- Rugged Handle Assembly:** The LM222 handle assembly is made of GE Lexan™, Type 121, which is a super durable polycarbonate resin. The design of this assembly strengthens and protects the whole PCB assembly much better than conventional metal face plates. The temperature stability of critical components is improved with the larger more encompassing enclosure. Most importantly, detailed operating instructions are attached directly on the side of the unit, eliminating the need for instruction cards.
- Separate Detect / Fault LEDs:** The Fault (FLT) indicator displays the type of fault: Short, Open or 25% change of inductance. Each type of fault is indicated by a unique sequence of flashes allowing the user to diagnose loop failures at a glance. Individual indicators eliminate the confusion encountered with other detectors that use only one LED to display both faults and detection.
- Loop Fault Memory:** Records previous loop fault information. If a problem self-heals, the LM222 will resume normal operation. The contents of the memory will be displayed on the Fault (FLT) indicator. This feature can be used to isolate the source of intermittent loop failures.

STANDARD FEATURES

- Automatic Tuning / Loop Configuration:** No manual tuning is required and works effectively on all inductive loops from 20 to 2000 uH.
- Eight Levels of Sensitivity:** Allows users to fine tune the LM222 to their application.
- Four Loop Frequencies and Sequential Scanning:** Together these features greatly reduce the incidence of crosstalk.
- Three Selectable Modes:**
- Short Presence:** For normal detection.
 - Long Presence:** For sites where loops may be occupied for extended periods of time.
 - Pulse:** For counting and volume.
- Environmental Tracking:** Ensures reliable operation by continuously adjusting for changes in ambient conditions.

Loop Monitor is a trademark of Eberle Design Inc.
Patent Pending
LEXAN Resin is a trademark of General Electric

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MODEL LM 222 DUAL CHANNEL INDUCTIVE LOOP VEHICLE DETECTOR

SPECIFICATION

Power Supply: 10.8 to 28.8 VDC, 50mA nominal both channels operating.

Loop Input: The loop inputs incorporate lightning and transient protection devices and the loop oscillator circuitry is transformer isolated. The lightning protection will withstand the discharge of a 10uF capacitor charged to 2,000V across the loop inputs or between any loop input and earth ground. The transformer isolation allows operation with loops which are grounded at a single point.

Tuning: Each channel of the LM222 series will automatically tune to any loop and lead-in combination within the tuning range upon application of power or when a valid reset signal is received. A channel may be retuned by adjusting mode, sensitivity or frequency and resetting to the desired value.

Tuning Range: 20 to 2000 microhenry with a Q factor greater than 5.

Lead-in Length: The unit will operate with lead-in (feeder) lengths over 1,000 feet with appropriate loops and proper lead-in cable.

Environmental Tracking: The LM222 series automatically and continuously compensates for component drift and environmental effects throughout the tuning range and across the entire temperature range.

Grounded Loop Operation: The LM222 series will operate when connected to poor quality loops including those that have a short to ground at a single point.

Sequential Scanning: Only one channel is energized at any given time, thus reducing the possibility of crosstalk between adjacent loops connected to the same unit.

Fault Monitoring: The Loop Monitor™ continuously checks the integrity of the loop. The system is able to detect shorted or open circuit loops, or sudden changes in inductance exceeding 25% of the nominal value. If a fault is detected on a channel, the DET and FLT indicators will flash and the channel output will remain in either the detect (call) or no-call state depending on the fault output option selected. If the fault condition is removed, the DET indicator and the output will return to normal operation. The FLT indicator will continue to flash indicating that a fault had occurred.

High Intensity LED Indicators: Each channel is fitted with a high intensity Red DET indicator and a Yellow FLT indicator.

Front Panel Controls: Front panel mounted DIP switches allow the user to set up sensitivity, operational mode, frequency and channel OFF/ON independently on each channel.

Sensitivity: One of eight settings may be selected to optimize detection on varying loop and lead-in configurations. Sensitivity is stated in terms of $\Delta L/L$ i.e. the minimum percentage change in the total inductance (loop plus lead-in) to which the unit will respond at the given level setting.

Level 7 = 0.01%	Level 3 = 0.16%
Level 6 = 0.02%	Level 2 = 0.32%
Level 5 = 0.04%	Level 1 = 0.64%
Level 4 = 0.08%	Level 0 = 1.28%

Channel ON/OFF: Selecting Channel OFF will disable the channel. In this condition, the loop oscillator is de-energized, and the output will remain in the no-call state.

Operational Modes:

Pulse:..... 125ms +/- 25ms momentary output

Presence (SH): 30 minutes

Presence (LG): 120 minutes

Note: When operating in pulse mode, a vehicle remaining over a loop will inhibit further pulse outputs from being issued for a period of 2 seconds after which time vehicles passing over the uncovered portion of the loop will be detected.

Frequency: One of four settings may be selected to alleviate interference which may occur when loops connected to different detectors are located adjacent to one another.

Reset Input: The LM222 series may be reset by applying a ground true logic level to the reset input Pin C.

Response Times: The following are typical response times at different sensitivity levels. Note the times indicated are valid when both channels are set to the same sensitivity.

Level 7 = 40 +/- 15ms	Level 3 = 2.8 +/- 1ms
Level 6 = 19 +/- 7ms	Level 2 = 2.5 +/- 1ms
Level 5 = 9 +/- 3ms	Level 1 = 2.5 +/- 1ms
Level 4 = 5 +/- 1.5ms	Level 0 = 2.5 +/- 1ms

Output Ratings: The output circuit is rated for a maximum collector voltage of 50 VDC. Maximum collector current is 50mA. In the saturated condition the collector voltage will be less than 1.5 VDC with a collector current of 50mA. Maximum off state leakage current is 1 microampere. The output circuit is protected against transient voltages by a high TVS wattage diode. Isolation exceeds 2500 Vrms.

Mechanical:

Dimensions: 1.2" W x 4.5" H x 7.0" L.

Environmental:

Temperature Range:

Operating: -37°C to +74°C (-35°F to 165°F)

Storage: -45°C + 85°C (-50°F to 185°F)

Humidity: 0 to 95% relative

Connections:

Edge Connector mates with connector type Cinch 50-44A-30.

PIN FUNCTION

A	Logic Ground
B	+24 V d.c.
C	Reset
D & 4	Loop Input CH 1
E & 5	Loop Input CH 1
F	CH 1 O/P Collector
H	CH 1 O/P Emitter
J & 8	Loop Input CH 2
K & 9	Loop Input CH 2
L	Chassis Ground
W	CH 2 O/P Collector
X	CH 2 O/P Emitter

Note: Pins M & 11, N & 12, P & 13, R & 14, S & 15, T & 16, U & 17, V & 18, Y & 21, Z & 22 have no connection.