DEFLECTOMETER™ SERIES
TWO CHANNEL NEMA TS-2 TYPE C LOOP MONITOR™

Built-in DEFLECTOMETER™ Technology Provides Users With:

- Call Strength Indicator for Optimum Sensitivity Programming
- Frequency Meter for immediate analysis of loop frequency, avoiding loop cross-talk problems
- Push Button Programming
- AccurateCount Precise Vehicle Count Outputs from Single & Multi-Loop Networks

Why guess when you can know your detector is optimally programmed and performing for all vehicle classes!

ENHANCED FEATURES

**DEFLECTOMETER Call Strength Indicator:** The Call Strength Indicator provides the technician with a simple one-step method for accurately setting the optimum level of sensitivity that ensures accurate vehicle detection of all vehicles, including motorcycles and high-bed trucks. NO MORE GUESSING!

When a medium size vehicle is over the roadway loop, a DEFLECTOMETER™ Call Strength value of “5” assures that the optimum sensitivity has been achieved. You can adjust the DEFLECTOMETER™ reading DYNAMICALLY without moving the vehicle by using the front panel UP or DOWN sensitivity buttons. IT DOES NOT GET ANY EASIER THAN THIS!

**Frequency Meter:** The built-in Frequency Meter reports the operating frequency of the loop network. Ensuring that adjacent loops are separated by at least 5 KHz will avoid crosstalk problems and future service calls.

**AccurateCount Single & Multi-Loop Counting Features:** ACCURATE COUNTS 24/7! AccurateCount produces precise vehicle counts from the secondary output in addition to the primary CALL output for each vehicle entering the loop zone. Loop configurations range from a single loop to four loops connected together in series. This feature eliminates the need for portable counting devices and individuals using hand held count boards, thus saving time and money!

**Output CALL Test Mode:** The Output Call Test Mode provides a straightforward way to test that the Controller Unit is receiving an active output from the detector. This eliminates the need for cabinet test switches and associated wiring. A huge time saving feature during system set-up and trouble-shooting.

**Rugged Handle Assembly:** The rugged handle assembly is made of GE LEXAN™, which is a super durable polycarbonate resin. The design of this assembly strengthens and protects the whole PCB assembly much better than conventional face plates. The temperature stability of critical components is improved with the more encompassing enclosure. Quick reference instructions are conveniently attached directly on the side of the unit, eliminating the need for cards.

**Advanced Loop Diagnostics:** The Fault (FLT) indicator displays the type of fault: Short, Open or 25% change of inductance. The Fault Monitor will report and store three types of loop faults; Open Loops, Shorted Loops, and 25% sudden changes in inductance. Each type of fault is indicated by a unique sequence of flashes allowing the user to diagnose loop failures at a glance.

STANDARD FEATURES


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For each channel, the Detector 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 inductance. If a fault is detected, the OUT and FLT indicators continuously emit a sequence of flashes during normal operation. The DETECTOR™ displays the letter “F” on the loop detection zone during the Extend time period causes the Extend timer to be reset and the output maintained. If the loop detection zone is completely removed from the detection zone (DET indicator Off), the first time a SENS button is pressed after the time delay period has expired, the DETECTOR™ will display the letter “E”. Any vehicle entering the loop detection zone during the Extend time period causes the Extend timer to reset and the output maintained. The Extend on Green mode is enabled by a factory installed diode located at OPT6 on the pcb. Consult the factory for details.

**Setting Sensitivity using the DEFLECTOMETER™ (recommended)**

The DEFLECTOMETER™ should be set to zero (0) with no vehicle over the roadway loop. If a typical mid-sized vehicle is completely in the detection zone (DET indicator On), the Call Strength value should be adjusted up or down until the DEFLECTOMETER™ displays the desired optimum value of 5 (or 4 or 6 as described above). If a typical vehicle located over the roadway loop causes the Call Strength “7” to be displayed on the DEFLECTOMETER™, the sensitivity should be decreased two levels. This can be done by pressing the front panel SENS button two times to achieve the Call Strength value of 5. If a typical vehicle located over the roadway loop causes the number “2” to be displayed on the DEFLECTOMETER™, the sensitivity should be increased three levels. This can be done by pressing the front panel SENS button three times to achieve the Call Strength value of 5.

NOTE: THE DEFLECTOMETER™ CALL STRENGTH DYNAMICALLY UPDATES AFTER EACH SENSITIVITY LEVEL CHANGE. ALLOWING YOU TO CHANGE SENSITIVITY SETTINGS WHILE A VEHICLE REMAINS IN THE LOOP DETECTION ZONE.

Adjusting sensitivity without using the DEFLECTOMETER™ (manually setting sensitivity):

The DETECTOR offers 9 levels of sensitivity (1 to 9). Level 9 is the highest sensitivity. Sensitivity Level can be manually set to any desired value by pressing the front panel SENS buttons ( or ) when a vehicle is over the roadway loop (DET indicator On). The first time a SENS button ( or ) is pressed, the current Sensitivity Level is displayed on the DEFLECTOMETER™ for 3 seconds. If either SENS button ( or ) is pressed again before the 3 second period ends, the Sensitivity Level changes (SENS 0 to decrease SENS 4). The new Sensitivity Level will be displayed on the DEFLECTOMETER™ display for 3 seconds. The factory default Sensitivity setting is level 6.

**Loop Frequency / Loop Frequency Display:** One of four frequency settings may be selected via the front panel FREQ push button to alleviate interference which may occur when loops connected to different detectors are located adjacent to one another. To help prevent or diagnose crosstalk problems, the loop frequency is displayed on the front panel DEFLECTOMETER™. The current loop frequency is displayed after pressing the FREQ button to display the current Frequency Level. The frequency is shown in KHz with a “∆” symbol displayed both before and after the numeric digits shown on the DEFLECTOMETER™.

For example, after pressing the FREQ button once the display sequence might show:

```
3 ∆ 8 -> 2 ∆ 9 -> 1 ∆ 8 -> 0 ∆ 9
```

This sequence would indicate Frequency Level “3” and a loop frequency reference of 27 KHz. Detectors on adjacent loops should all be separated by at least 5 KHz.

**Loop Fault Monitoring:** The Detector 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 inductance. If a fault is detected, the OUT and FLT indicators continuously emit a sequence of flashes during normal operation. The DEFLECTOMETER™ displays the letter “F” indicating a current loop fault. Each type of fault is identified by a unique flat/corner sequence:

**Flash Sequence Fault:**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Fault</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 flash</td>
<td>Open Circuit Loop.</td>
</tr>
<tr>
<td>2 flashes</td>
<td>Shorted Circuit Loop.</td>
</tr>
<tr>
<td>3 flashes</td>
<td>25% excessive change in inductance.</td>
</tr>
</tbody>
</table>

If the Open or Shorted fault condition self heals, the DET indicator and DEFLECTOMETER™ will return to normal operation. The FLT indicator will continue to flash with the sequence signifying the type of fault that was last detected. In the case of the excessive inductance change fault, the unit will return to the new inductance after a period of two seconds and continue operation. The fault condition will be indicated by the flash sequence of the FLT indicator.

**Operational Modes:**

**Presence Outputs:** For each channel, a Presence output mode may be selected from the front panel MODE push button. If presence mode is selected then a choice of short (S) or long (L) can be selected. Short Presence is defined as 30 minutes and Long Presence is defined as 120 minutes.

**Pulse:** For each channel, a Pulse output mode (P) may be selected from the front panel MODE push button. In Pulse mode, a 125 ms ± 25 ms width pulse will be output for each vehicle entering the loop.

**Call:** For each channel, a continuous CALL output (C) may be selected from the front panel MODE push button which will simulate the presence of a vehicle. This mode is used for testing the CALL output of a channel.

**Channel Off:** For each channel, the Channel Off (O) may be selected from the front panel MODE push button. This option turns OFF the channel and disables the oscillator. An additional option allows the Status Output to be turned ON while the channel is OFF.

**Selective Options:**

**Accurate Frequency (Precise Vehicle Counting) Mode:** For each channel the AccurateCount output feature can be selected from the PCB mounted DIP switches to produce a secondary output in addition to the primary CALL output for every vehicle entering the loop zone. Each vehicle entering the loop will cause an output pulse of 125ms ± 25ms from the secondary Count output on pin Y (Channel 1) and pin Y (Channel 2). Note: Multi-loop counting options along with single small, medium and long loop counting options are selectable from the PCB mounted DIP switches.

**Call Delay Timer for Presence & Pulse Modes:** For each channel, a delay of 1.0 to 63 seconds may be selected by setting the appropriate PCB mounted DIP switches to the ON position. Call Delay time starts counting down when a vehicle enters the loop detection area. During the Delay time the DET indicator will flash two times per second and the DEFLECTOMETER™ will display the letter “F”. Delay time can be overridden by a True (low) signal at the Timer Control input.

**Call Extend Time for Presence Mode:** For each channel, an extend time of 0.25 to 15.75 seconds can be set via the EXTEND DIP switches. The numeric sum of the switches in the ON position is equal to the Extendent time. Two modes are provided:

**Extend Always (default):** Call Extend time starts counting down when the last vehicle clears the loop detection zone. During the Extend time the DET indicator will flash four times per second and the DEFLECTOMETER™ will display the letter “E”. Any vehicle entering the loop detection zone during the Extend time period causes the Extend timer to reset and the output maintained. The Timer Control input has no effect on this mode.

**Extend on Green (EOG):** Call Extend time starts counting down when the last vehicle clears the loop detection zone if the Timer Control input is True (low). During the Extend time the DET indicator will flash four times per second and the DEFLECTOMETER™ will display the letter “E”. Any vehicle entering the loop detection zone during the Extend time period causes the Extend timer to reset and the output maintained.

**DC Supply Voltage:** Minimum 10.8 Vdc. Maximum 28.8 Vdc. DC Supply Current: Maximum 100 mA. DC Timer Control Inputs: True (low) Less than 6 Vdc False (high) Greater than 16 Vdc. Optically Isolated Outputs: True (low, 50 mA) Less than 1.5 Vdc Maximum Current 100 mA. Outputs are fail-safe such that a Detector with no power will provide the True (low) Call state.

**Relay Outputs:** AC Contact Rating: 5A @ 120 Vac. DC Contact Rating: 5A @ 30 Vdc. Environmental: Operating Temperature Range: -30°F to 165°F (-34°C to 74°C). Mechanical: International Card 4.500”H (114.30mm) x 6.975”D (174.83mm) x 1.14”W (28.69mm), excluding handle, with 4 pin double sided edge connector.

**Status Outputs:** Each channel includes a separate output which is used to transmit operational status information to a bus interface unit (BIU). Fault information is transmitted by means of pulse-width modulation. Pulse widths shown are +10ms.

**Status Output Condition**

<table>
<thead>
<tr>
<th>Normal operation / No fault</th>
<th>Continuous On (low)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relay time starts Power Supply fail</td>
<td>Continuous OFF (high)</td>
</tr>
<tr>
<td>Open circuit loop</td>
<td>50ms OFF, 50ms ON</td>
</tr>
<tr>
<td>Short circuit loop</td>
<td>100ms OFF, 50ms ON</td>
</tr>
</tbody>
</table>

% change in inductance.