

# 3M

## Canoga™ Vehicle Detection System

### Non-invasive Microloop Model 702

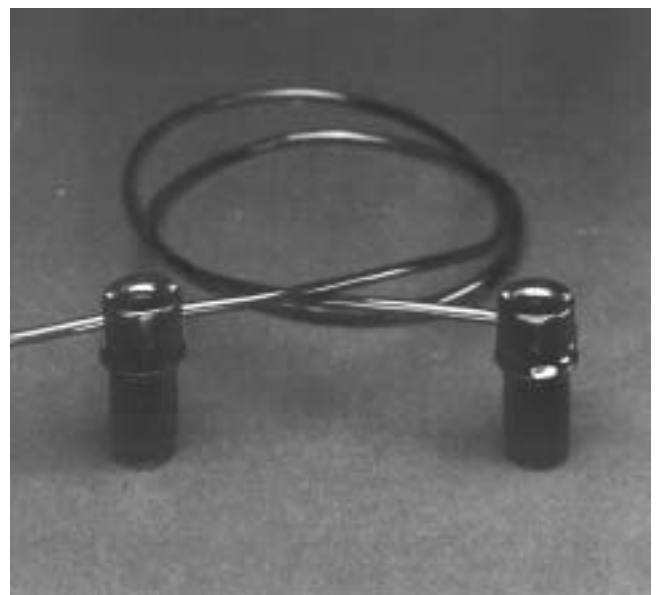
A Canoga™ System Matched Component Product

#### Description

The 3M™ Canoga™ Non-invasive Microloop Vehicle Detection System consists of the following matched components: Model 702 non-invasive microloop probes and carriers, installation kit, Canoga vehicle detectors, and home-run cables required to install the non-invasive microloop.

The non-invasive microloop probe is a transducer that converts changes in the vertical component of the earth's magnetic field to changes in inductance. Vehicles containing vertical components of ferromagnetic material “focus” the earth's field, increasing the magnetic field at the sensor when the vehicle moves over the sensor. Changes in inductance can be sensed by a Canoga vehicle detector suitably configured for the non-invasive microloop.

The non-invasive microloop probe's small size permits its easy insertion into a three inch plastic conduit installed 18-24 inches below the road surface. Installing the sensors in a conduit leaves the road surface intact, bypasses the effects of poor pavement conditions, and virtually eliminates the maintenance and service requirements of conventional loops.



— Model 702

## Features

The non-invasive microloop vehicle detection technology offers superior value compared to other loop-based systems. Replaces 6x6 loops in freeway monitoring and advance detection applications. Provides speed measurements, counting, occupancy and length classification when connected to a Canoga vehicle detector.

A single probe centered under a lane will detect most vehicles. Two or more probes with a three to four foot spacing are recommended to detect small motorcycles and bicycles.

### ■ Superior Value

- Lower life cycle costs.
- Lower loop maintenance costs. Maintenance and repair are virtually eliminated. The buried probes and cables are not affected by environmental factors, pavement deterioration or other mechanical stresses.
- Lower pavement repair and maintenance costs; the road surface is not damaged.
- Better installation efficiency; traffic lanes are not closed for long periods of time.
- Better repair efficiency; resurfacing and surface repairs can occur without affecting detection performance.

### ■ Flexibility

- Connect up to four (4) probes to the same lead. Easily reposition or readjust probe placement to improve vehicle sensing accuracy or to reflect changing traffic characteristics in permanent installations or work zones.

### ■ Easy to Use

- Permits conventional, horizontal directional drilling techniques or open trenching for installation.

### ■ Small Size

- Probes fit into specially designed carriers. Carriers can be inserted in less than an hour into a three-inch Schedule 80 conduit installed 18-24 inches below the road surface.

### ■ Accurate

- Can resolve closely spaced vehicles and reject adjacent lane vehicles; the unique magneto-inductive operating characteristics improve count accuracy.

## Operating Parameters

- Earth's Vertical Magnetic Field ... 0.2 to 0.8 Oersted.
- Inductance (Red to Green wires) ... 50-63 microHenries per probe plus a nominal 16.5 microHenries per 100 feet of lead-in cable.
- DC Resistance (Red to Green wires) ... 1.2 ohms - 1.8 ohms per probe plus a nominal 3.04 ohms per 100 feet of lead-in cable.
- Transducer Gain (Sensitivity) ... Typically 5.0 nanoHenries per millioersted per probe at 0.4 Oersted ambient vertical field intensity.
- Non-invasive Microloop Assemblies ... Available in single, double, triple or quadruple probe assemblies with specified probe separations and connected in series to a lead-in cable which may be up to 1000 feet in length.
- Home-run Cable ... Model 30003 is used to connect the lead-in cable to the cabinet. The combined length of the home-run cable and the lead-in cable may be as long as 2500 feet.
- Maximum Number of Probes per Channel ... up to four probes are recommended per channel.
- Microloop Peak-to-Peak Drive Current with Canoga vehicle detector ... The detector must provide between 14 and 80 milliAmp<sub>p-p</sub>.

## Installation

The non-invasive microloop assemblies are designed to be inserted into a three-inch non-ferrous Schedule 80 conduit.

Conduit is installed  $21 \pm 3$  inches below the road surface using horizontal directional drilling or open trenching techniques.

*(see Installation Instructions for further information)*

## Wiring

Multiple non-invasive microloop probe sets can be wired in series to accommodate different applications. Two independent probe sets can be connected to a single Model 30003 home-run cable. For reliable operation, all splices must be soldered, insulated and waterproofed. See Model 702 Installation Instructions for detailed wiring instructions.

## Environmental

- Temperature Range ... -30° F to +165° F (-34° C to +74° C).
- Humidity ... To 100% relative humidity including submersion in chemical solutions typical of roadway runoff.

## Physical Characteristics

- Probe ... Cylindrical shape 2 1/4 inches high, fitting a 13/16 inch hole in the carrier.
- Lead-in Cable ... Polyurethane-jacketed cable with two PVC insulated AWG #22 conductors and an overall diameter 0.19 inches.
- Color ... Black probe and black, jacketed lead-in cable with red and green insulated wires.

## Related Products

### Model 702 Carrier

Model 702 carriers hold the non-invasive microloop probes in a fixed, vertical position as they are inserted into the previously installed, three-inch conduit. The interlocking mechanism of the carriers maintains the alignment of the probes within  $\pm 20$  degrees from vertical.

- Physical Dimensions of the Carrier ... 12 inch long PVC probe carrier with an outer diameter of 2.6 inches.



Model 702 Carrier



Model 702 Installation Kit

### Model 702 Installation Kit

One installation kit is required for each conduit. The kit contains all the parts necessary to insert and remove the probes, to label probe cables and to close off the conduit ends.

- Physical Dimensions of End Cap Carrier ... The end cap carrier is PVC tubing 13 inches long and 2.6 inches in diameter. The end cap carrier is the first piece to be inserted into the conduit. It has a rope attached to it that permits removal of the installed non-invasive microloop assembly.

Consult the Installation Instructions to install the conduit and the Model 702 non-invasive microloop probes using the Model 702 carriers.

### 3M Scotchcast™ 3832 Buried Service Wire Splice Installation Kit

Scotchcast 3832 is recommended for splicing the lead-in cable with the home-run cable. This wire splice installation kit assures a reliable connection in the environments encountered by the non-invasive microloop.

### Canoga™ C800 Series Vehicle Detector

Canoga C800 vehicle detectors are recommended. Consult Canoga system product literature for detailed specifications.

### Model 30003 Home-run Cable

Home-run cable is recommended for all home runs, especially those exceeding 500 feet.

### **Important Notice to the Purchaser**

THE FOLLOWING IS MADE IN LIEU OF ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE:

3M will, at its option, either repair or replace any 3M™ Canoga™ Vehicle Detection System component or components found to be defective in materials or manufacture within five (5) years from date of purchase provided the component has been installed, maintained, and used as instructed. This warranty does not apply to components that have been subjected to misuse, neglect or accident or that have been damaged by extreme atmospheric or weather-related conditions, including chemical corrosion, hail, windstorm, lightning or flooding.

In no event shall 3M be liable for any injury, loss, or damage, whether direct, indirect, incidental or consequential, arising out of the use or inability to use the Canoga system or any component thereof. THE REMEDIES SET FORTH HEREIN ARE EXCLUSIVE.



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