ITEM 680.58010009 – MICROWAVE VEHICLE DETECTOR WITH 12 VOLT AC POWER SUPPLY–DETECTOR CARD

DESCRIPTION

The work shall consist of furnishing and installing an overhead microwave vehicle motion detector and a detector card with 12 Volt AC power supply at the locations indicated on the plans in accordance with these specifications, or where directed by the Engineer.

MATERIALS

All materials shall comply with the following specifications:

Detailed Specification - Microwave Vehicle Detector

Scope: This specification describes the requirements for an overhead microwave vehicle motion detector, capable of sensing vehicle movements in one direction only. The direction of detection desired shall be selectable by a switch.

1.0 General Technical Requirements:

1.1 The unit shall be capable of detecting directional motion (approach only or departing only), from overhead, for all directional motion of 2 miles per hour or more.

1.2 The unit shall be capable of detecting every type of vehicle that is licensed to date (including mopeds).

1.3 The range of the unit shall be from one three (3) feet to two hundred (200) feet for automobiles or smaller vehicles (including mopeds).

1.4 The pattern spread of the unit shall be determined by an antenna, acting as a wave guide, at a fixed cone of 16° (i.e. at two hundred (200) feet, the pattern will be fifty two (52) feet wide).

1.5 The unit shall have two switch adjustments. One being "range" (high-gain or low-gain) and the other being "directional selection" (approach or depart).
1.6 Operation and Maintenance Manuals shall be supplied with each unit. These manuals shall include the following information:

(a) General Description  
(b) General Characteristics  
(c) Installation Procedure  
(d) Adjustments  
(e) Theory of Operation  
(f) Schematic and Logic Diagram  
(g) Parts List (to include part type, part number manufacturer and ratings)

"A minimum of two Operation and Maintenance Manuals shall be supplied"

2.0 Functional Requirements:

2.1 The microwave detector must have a Federal Communication Commission (FCC) identifier number assigned to it with the number affixed to the unit. The unit shall also comply with FCC rules, Part 15, and be labeled stating complicity to these rules.

2.2 The unit shall operate in the microwave region of the electromagnetic spectrum.

2.3 The unit shall be self contained with the exception that power will be supplied to the detector unit from an external source. The maximum power consumption of the unit shall be 4.5 watts at 12 VAC.

2.4 The unit shall have an electro-mechanical relay (rated at 5 amperes at 24 VDC) to provide an output signal to devices that interface with the unit. The output signal shall be at ground level when the unit has detected a valid vehicle movement and an open circuit for a nondetected condition.

2.5 The unit must employ a monitoring circuit to supervise the Gunn and mixer diodes and fail safe the relay to the closed position (ground level) in the event of a transceiver or power failure.

2.6 The unit shall be self tuning with the exception of the high low range selection switch. A five minute warm up period shall be allowed for the unit to stabilize and operate properly.

2.7 The unit shall have, on the PC board, a LED indicator to demonstrate activation of the electro-mechanical relay.
3.0 Mechanical Construction Requirements:

3.1 Each unit shall be enclosed in a corrosion and water resistant case without the use of silicone gel or any other materials that could deteriorate with exposure to ultra violet rays.

3.2 Size of detector shall be:

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<thead>
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<tbody>
<tr>
<td>Height</td>
<td>4.3 inches (maximum)</td>
</tr>
<tr>
<td>Width</td>
<td>5 inches (maximum)</td>
</tr>
<tr>
<td>Depth</td>
<td>7.25 inches (maximum)</td>
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<tr>
<td>Weight</td>
<td>+/- 3 pounds</td>
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3.3 Each unit shall be supplied with a bracket designed for side-of-pole, overhead mast arm, or lag bolt mounting capabilities. All brackets and mounting hardware shall be corrosion resistant.

4.0 Environmental Operation Requirements:

4.1 The detector shall be capable of continuous operation over a temperature range of --35°F to 150°F.

5.0 Manufacturer Operations

5.1 The manufacturer shall test all units to FCC specifications (FCC rules, Part 15). Test reports to be furnished to NYSDOT upon request.

5.2 A minimum warranty of six months (6) shall start from date of receipt of equipment.

5.3 The manufacturer shall be required to supply a medical statement as to the safety of the unit to the general public, specifically to those persons who have medical implants, (i.e. pacemakers), when requested.

Detailed Specification - 12 VOLT AC Power Supply - Detector Card

Scope: This specification describes the requirements for a 12 Volt AC Power Supply -Detector Card Combination Unit. This card will be installed in a NYS Model 330 Traffic Control Cabinet Detector Rack.
1.0 General Technical Requirements

1.1 The components on this card shall be mounted on an edge connected printed circuit board that conforms to the specifications so that to work in the detector card rack of the model 330 system.

1.2 The module shall be provided with a hand pull to facilitate insertion and removal from the detector rack enclosure.

1.3 The module shall have a front panel mounted indicator to provide visual indication of each electrical contact closure. A test switch shall be provided to place an input to the controller unit. Both indicator and switch shall be on the input side of the optical coupler. The test switch shall be a single pole - double throw, three (3) position switch; momentary on, off and one maintained on position. The contacts shall be either silver or coin silver with gold over nickel plate rated for 5 amperes at 115 VAC.

1.4 The front panel of the module shall be labeled to indicate usage of all indicators and switches.

1.5 The unit shall be keyed (slotted) between pins B&C and M&N on the edge connector.

1.6 Operation and Maintenance Manuals shall be supplied with each unit. These manuals shall include the following information:

(a) General Description
(b) General Characteristics
(c) Installation Procedure
(d) Adjustments
(e) Theory of Operation
(f) Schematic and Logic Diagram
(g) Parts List (to include part type, part number manufacturer and ratings)

"A minimum of two Operation and Maintenance Manuals shall be supplied"

2.0 Electrical Requirements

2.1 The output channel of the detector circuitry shall be an opto-isolated NPN open collector capable of sinking 50 milliamperes at 30 volts. The output channel shall be compatible with New York State 170/179 controller inputs and shall present ground true logic to these inputs.
2.2 The detector circuitry shall be powered using the 24 VDC supplied in a New York State Model 330 traffic control cabinet detector rack. The detector circuitry shall not draw more than 100 milliamperes.

2.3 The module shall provide ground true logic to the controller when pins D & E of the edge connector are shorted and a logic high when pins D & E are opened.

2.4 The front panel shall be connected to chassis ground.

2.5 The input shall deliver no less than 15 or more than 20 milliamperes to a contract closure across pins D & E of the edge connector.

2.6 The unit shall be capable of supplying 12 VAC across pins F & H of the edge connector. This voltage shall be supplied by a transformer with a secondary rated at 12 volt amps. Power to the primary side of the transformer shall be provided by the Model 330 Cabinet through pins M & N of the edge connector. The primary shall be fused at 1/8 ampere with a time delay fuse.

2.7 Lightning protection shall be installed across all input pairs of the detector/input card. The protection shall be designed to enable the device to withstand a 10mF capacitor, charged to +/- 1000 VDC, being placed for a period of one (1) second, directly across the input pins or between either input pin and Chassis Ground of the detector/input card with no load present.

2.8 To avoid interference with the detector rack card guides, there shall be (3/32 inch) minimum clearance between the entire top and bottom of the PC board and any protruding hardware such as washers, screws, front panel mounting brackets or circuit components.

CONSTRUCTION DETAILS

The detector unit shall be mounted at the locations as shown on the plans. Mounting per the manufactures recommendations. The wiring hole in the pedestrian pole shall be deburred, insulation bushing installed and the hole ductsealed. When the Detector is mounted on a signal pole the wire shall be run from the poles weather head, to a riser assembly thru the riser to the Detector. Riser assembly paid for under that item. The 12 volt AC Power Supply Detector Card Combination Unit is to be installed in the NYS Model 330 Traffic Control Cabinet Detector Rack.
METHOD OF MEASUREMENT

The quantity to be paid for under this item shall be the number of detectors with 12 Volt AC Power Supply, installed in accordance with the manufacturer's recommendations or as ordered by the Engineer.

BASIS OF PAYMENT

The unit price bid per each shall include the cost of all labor, material and equipment necessary to complete the work. Wire and riser assembly shall be paid for under their respective items.