11. A means of frequency separation or other methods of isolation shall be provided to minimize cross-talk between channels.

12. Detection shall be unaffected by inductance changes due to environmental conditions.

Functional Requirements (Delay Type Only)

In addition to the general functional requirements, the following shall also apply to delay type detectors.

1. A provision to delay the time between a vehicle detection and a call output signal to the controller shall be built into the detector amplifier.

2. The delay feature shall be inhibited by the presence of a 120V AC green signal input to the detector amplifier.

3. The delay interval shall be selectable from 0 to 15 seconds or more. Increments shall be 1 second or less.

4. Delay timing will begin with each detection against a red signal and shall continue until the selected delay time interval has expired, the signal turns green or the vehicle leaves the zone of detection.

Electrical Requirements

1. The unit shall operate from a 120-volt, 60 Hertz power source.

2. The detector shall include a regulated power supply and be independent of power line variations between the limits of 100 to 135 volts.

3. The detector shall operate properly at all temperatures between -20° F. and 165° F.

4. The detector shall provide continued operation in the event of a loop being shorted or "leaky" to ground.

5. Temperature compensation shall be provided.

6. The output of the detector shall provide fail-safe (call) operation in the event of a circuit failure, power supply failure, or an open circuit in the loop or lead-in. The output shall have a minimum current rating of 2 amperes at 28 V DC.

7. The detector shall be suitably fused. The fuse shall be readily replaceable without the use of tools.

8. Lightning protection shall be provided across loop terminals and from loop leads to ground to withstand repeated transients in excess of 1 KV @ 75 x 10^2 millijoules of either polarity.

9. Electrical connections of both the incoming and outgoing circuits shall be made by means of a ten terminal MS type plug. The detector unit shall be replaceable with a similar unit without the necessity of disconnecting and reconnecting individual wires leading therefrom. Type MS plugs shall be of protected male construction and the contact arrangement of MS3102A-18-1P. The pin connections shall be as follows:

A - 120 VAC Neutral	F - Relay NO Contact
B - Relay Common	G - Relay NC Contact
C - 120 VAC Line	H - Chassis Ground
D - Loop	I - Not Used
E - Loop	J - Not Used*

*Green Input (Delay Type Only)

Mating harnesses are to be furnished. Multichannel detector amplifiers are acceptable if an adapting harness is provided to accommodate the MS3102-18-1P type connector requirement per channel.

Mating MS plug (MS3106A-18-1S type) receptacles shall be attached to one end of connecting cables and shall be at least 48 inches long. The leads at the other end of the connecting cables shall be labeled and fitted with a spade type lug for easy attachment to terminal blocks.

Mechanical Requirements

1. The detector shall be housed in a durable finished fabricated sheet aluminum or steel case.

2. No special tools shall be required for removal of the cover. Removal of the cover shall provide access to the entire circuit and all components while the unit is connected and operating.

Acceptance

The Engineer may accept or reject any or all units. Rejected units will be shipped to the vendor C.O.D. Sample models may be required for inspection prior to acceptance.

Payment

Payment for Item 632, "Loop Detector Amplifier, As Per Plan" will be made at the contract unit bid price for each amplifier, adjusted and tuned.

843 GUARANTEE

The Contractor shall guarantee that the traffic control system installed as part of this contract shall operate satisfactorily for a period of 120 days following completion of the 10-day performance test. In the event of unsatisfactory operation, the Contractor shall correct faulty installations, make repairs, and replace defective parts with new parts of equal or better quality. Equipment, material, and labor costs incurred in correcting an unsatisfactory operation shall be borne by the Contractor.

The guarantee shall cover the following items of the traffic control system: controllers and associated equipment, detector amplifiers, interconnection items, and master control equipment.

Customary manufacturer's guarantees for the foregoing items shall be turned over to the state or the maintaining agency following acceptance of the equipment.

The cost of guaranteeing the traffic control system will be incidental to and included in the contract unit price of the various items making up the system.