

## **SECTION 665 PEDESTRIAN DETECTION SYSTEM**

### **665-1 Description.**

Install a pedestrian detection system. Use pedestrian detection systems and components listed on the Department's Approved Product List (APL). Pedestrian detection systems are classified into three categories: Standard Pedestrian Pushbutton Detectors, Accessible (Audible/Tactile) Pedestrian Pushbutton Detectors, and Thermal Passive Detectors. The components of the pedestrian detection system include pushbuttons, pedestrian actuation signs, electronics, wiring, and mounting hardware.

### **665-2 Materials.**

**665-2.1 Standard Pedestrian Pushbutton Detector:** Pushbuttons must be raised from or flush with their housings and be a minimum of 2 inches in the smallest dimension. The pushbutton must require no more than 5 pounds of force to activate. The detector must be weather-tight and tamper resistant.

**665-2.1.1 Housing:** The housing must be a two piece unit consisting of a base housing and a removable cover. The housing must be cast aluminum meeting the physical characteristics and chemical content established in ASTM B26 for alloys S5A and CS72A.

The housing or adapter (saddle) must conform to the shape of a pole and provide a flush, secure fit. Saddles must be of the same material and construction as the housing. Pushbuttons for wood pole mounting must have threaded holes for 1/2 inch conduit provided in the housing top or bottom. A 3/4 inch hole with an insulated bushing shall be provided through the back of the housing. Unused openings shall be closed with a weatherproof closure and painted to match the housing.

The housing must have a powder-coat finish and painted in accordance with Military Standard MIL-PRF-24712A. The housing must be permanently marked with manufacturer name or trademark, part number, date of manufacture, and serial number.

**665-2.1.2 Pushbutton:** The pushbutton must include a normally open, mechanical phenolic enclosed, positive-acting, spring-loaded, audible (i.e., click) snap-action switch with single pole, single throw contacts, or a Piezo driven solid state switch rated for a minimum of 50 V. The Piezo driven solid state switch, when activated, must give an audible (i.e., two-tone chirp) and visual indication of actuation. The visual indication must remain illuminated until the pedestrian's WALKING PERSON (symbolizing WALK) signal indication is displayed. Switch connections inside the housing must allow wiring and installation without binding. The switch must have a design life of one million operations (minimum) at rated load.

**665-2.1.3 Electrical Requirements:** The wiring must be No. 18 AWG stranded (minimum) with 600 V outdoor insulation rating.

**665-2.2 Accessible (Audible/Tactile) Pedestrian Pushbutton Detector:** The accessible pedestrian pushbutton detector must consist of all electronic control equipment, wiring, mounting hardware, pushbuttons, and pedestrian actuation signs designed to provide both a pushbutton with a raised, vibrating tactile arrow on the button as well as a variety of audible indications for differing pedestrian signal functions.

**665-2.2.1 Electronic Control Equipment:** The accessible pedestrian pushbutton detector must include electronic control equipment that is programmable and adjustable using a

laptop computer or vendor supplied programmer. Electronic control equipment must be able to be installed within a traffic controller cabinet or within a pedestrian signal housing. Electronic control equipment installed within a traffic controller cabinet must allow the use of up to 16 pushbuttons (4 maximum per channel) with a single traffic controller cabinet. The accessible pedestrian pushbutton detector must receive timing from Walk and Don't Walk signals.

**665-2.2.1.1 Audible Messages:** Audible messages must be programmable. All audible messages and tones must emanate from the accessible pedestrian pushbutton housing. The accessible pedestrian pushbutton detector must utilize digital audio technology. The system shall have, at a minimum, three programmable locator tones. The accessible pedestrian pushbutton detector must have independent minimum and maximum volume limits for the Locator Tone, Walk, and Audible Beaconing features. The Wait message must only annunciate once per actuation.

**665-2.2.1.2 Pushbutton locator tone:** The accessible pedestrian pushbutton detector must provide independent ambient sound adjustment for the locator tone feature. The accessible pedestrian pushbutton detector must allow the locator tone to be deactivated.

**665-2.2.1.3 Vibrating Pushbutton (VPB):** The accessible pedestrian pushbutton detector must include a Vibrating Pushbutton (VPB). The VPB must be a single assembly containing an ADA compliant, vibro-tactile, directional arrow button, weatherproof audible speaker and pedestrian actuation sign with optional placard Braille messages. The VPB tactile arrow must be 2 inches in length, be field adjustable to two directions, and require no more than 5 pounds of applied force to activate.

**665-2.2.1.4 Conflict Monitoring:** The accessible pedestrian pushbutton detector must monitor the Walk condition for conflict operation. The accessible pedestrian detector system must disable the Walk functionality if a conflict is detected.

**665-2.2.1.5 Cabinet Control Unit (CCU):** The accessible pedestrian pushbutton detector may include a CCU for interfacing and connecting the system. The CCU shall have labeled LED indicators for each channel operation. The CCU must reset upon loss of internal communication.

**665-2.2.2 Inputs and Outputs:** All inputs and outputs must use Mil-Spec Multi-pin connectors.

**665-2.2.2.1 Inputs:** Walk and Don't Walk inputs must be optically isolated 80-150 volts AC/DC, 5mA max. General purpose inputs must be optically isolated 10-36 volts AC/DC, 10mA max.

**665-2.2.2.2 Outputs:** Outputs must be optically isolated 36 volts AC/DC peak, 300mA solid state fused contact closures. CCUs must include a normally open relay contact fault output.

**665-2.2.3 Communication:** The CCU must include an Ethernet interface. The CCU must have an integral web server that provides information on audible/tactile pedestrian-pushbutton detector status, access to event logs, and provides for remote Configuration of accessible pedestrian pushbutton detector system options. VPBs must include an Ethernet, serial, or USB programming interface.

**665-2.3 Thermal Passive Detectors (TPD):** The TPD must consist of all electronic control equipment, wiring, and mounting hardware.

**665-2.3.1 General:** A TPD system uses one or more sensors and analytics hardware and software to detect pedestrian movement presence, and provides a detection output.

**665-2.3.2 Configuration and Management:** Ensure that the TPD is provided with software that allows local and remote configuration and monitoring. Ensure that the system can display detection zones and detection activations overlaid on live thermal inputs. Ensure that the TPD allows a user to edit previously defined configuration parameters, including size, placement, and sensitivity of detection zones.

Ensure that the TPD retains its programming in nonvolatile memory. Ensure that the detection system configuration data can be saved to a computer and restored from a saved file. Ensure that all communication addresses are user programmable.

**665-2.3.3: Solid State Detection Outputs:** Ensure outputs meet the requirements of NEMA TS2-2003, 6.5.2.26.

**665-2.3.4: Electrical Requirements:** Ensure the system operates using a nominal input voltage of 120V of alternating current ( $V_{AC}$ ). Ensure that the system will operate with an input voltage ranging from 89 to 135  $V_{AC}$ . If a system device requires operating voltages other than 120  $V_{AC}$ , supply a voltage converter.

**665-2.4 Electrical:** All wiring must meet applicable NEC requirements. The accessible pedestrian pushbutton detector must operate using a nominal input voltage of 120 ~~V~~Volts alternating current (~~V~~AC~~AC~~). If any device requires nominal input voltage of less than 120 ~~V~~AC~~AC~~, furnish the appropriate voltage converter.

Accessible pedestrian pushbutton detector control electronics that are mounted in a pedestrian signal head must be able to receive power from the Walk and Don't Walk circuits of the signal head. Control electronics shall not require more than four wires for each pushbutton connection, and no more than two wires for each controller pedestrian input. Voltage at the pushbutton shall not exceed 24 ~~V~~AC~~AC~~.

**665-2.5 Mechanical:** Equipment must be permanently marked with manufacturer name or trademark, part number, date of manufacture, and serial number. Do not use self-tapping screws on the exterior of the assembly.

Ensure that all parts are made of corrosion-resistant materials, such as plastic, stainless steel, anodized aluminum, brass, or gold-plated metal. Ensure that all assembly hardware, including nuts, bolts, external screws and locking washers less than 5/8 inch in diameter, are Type 304 or 316 passivated stainless steel. Stainless steel bolts, screws and studs must meet ASTM F593. Nuts must meet ASTM F594. All assembly hardware greater than or equal to 5/8 inch in diameter must be galvanized. Bolts, studs, and threaded rod must meet ASTM A307. Structural bolts must meet ASTM F3125, Grade A325.

Enclosures must have a NEMA-~~4~~X rating. Pushbutton housings for intersections must be black.

**665-2.6 Environmental:** Ensure equipment performs all required functions during and after being subjected to the environmental testing procedures described in NEMA-~~TS2~~, Sections 2.2.7, 2.2.8, and 2.2.9.

### **665-3 Warranty.**

Ensure that pedestrian detection systems have a manufacturer's warranty covering defects for a minimum of 5 years from the date of final acceptance by the Engineer in accordance with 5-11 and Section 608. Ensure the warranty includes providing replacements, within 10 calendar

days of notification, for defective parts and equipment during the warranty period at no cost to the Department or the maintaining agency.

#### **665-4 Installation.**

Install pedestrian detectors at the locations and in a manner as shown in the Plans and Design Standard Plans, Index-~~No. 17784~~665-001. Ensure all detectors are the same manufacturer and model.

Pushbuttons mounted on wood poles must be serviced by a conduit riser. Pushbuttons mounted on steel or aluminum (poles, pedestals, or posts) must be serviced by wiring inside the pole. Pushbuttons mounted on existing concrete poles may be serviced by a conduit riser. Pushbuttons mounted on new concrete poles or pedestals must be serviced by wiring on the inside.

A pedestrian actuation sign must be included with each pushbutton assembly. Provide the sign type, size and legend as specified on the plans or as directed. Tactile arrows of accessible pedestrian pushbuttons must align parallel with the direction of the crossing.

The Engineer will direct any variation from the locations shown. When mounting, place the detector housing or saddle in complete contact with the pole or controller cabinet. When a post is required in the installation of the pedestrian detector, restore the area around the post to its original condition or as required by the Plans.

#### **665-5 Method of Measurement.**

The Contract unit price for pedestrian detectors, will be paid per each, and will include the pedestrian actuation sign, all mounting hardware, wiring, materials and equipment, and all labor and miscellaneous materials necessary for a complete and accepted installation.

Payment for poles, pedestals, and posts will be made under their respective pay item numbers.

#### **665-6 Basis of Payment.**

Price and payment will be full compensation for all work specified in this Section.

Payment will be made under:

Item No. 665- 1-      Pedestrian Detector - each.