

## SECTION 16719

## PEDESTRIAN AND COUNTDOWN SIGNAL MODULE

## PART 1 GENERAL

Furnish LED pedestrian countdown signal modules or pedestrian signal mounting attachments that conform to the following:

- A. Manual on Uniform Traffic Control Devices (MUTCD)
- B. Applicable provisions of the current specifications of the Institute of Transportation Engineers (ITE) standards titled Vehicle Traffic Control Signal Heads (VTCSH) and Pedestrian Traffic Control Signal Indications (PTCSI).
- C. Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 on the Emission of Electronic Noise.

## 1.01 MATERIALS

The items furnished and installed under this contract shall be new, unused of the latest product in production to commercial trade, and shall be of the highest quality as to materials used and workmanship. Manufacturer(s) furnishing these items shall be experienced in design and construction of such items and shall furnish evidence of having supplied similar items which have been in successful operation. The bidder shall be an established supplier of the items bid.

## 1.02 UNIT PRICES

- A. Measurement  
This item will be measured as by each countdown pedestrian signal module complete in place.
- B. Payment  
The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid at the unit price bid for "Countdown Pedestrian Signal Module". This price shall be full compensation for furnishing, assembling, and installing the countdown signal, and for all mounting attachments, labor, tools, equipment, and incidentals necessary to complete the work.

## PART 2 PRODUCTS

Upon request, one schematic wiring diagram and installation manual shall be provided with each LED module.

## 2.01 MATERIALS

## A. Countdown Pedestrian Signal Module

1. The message-bearing surface of the module shall be supplied with a fully populated "HAND" and "MAN" symbol, overlapping, that comply with PTCSI Standard for these symbols for a message-bearing surface of the size specified.
2. The LED module shall display a solid Portland orange hand and lunar white man and two Portland orange countdown numbers.
3. The numbers 00 to 99 on the numerical display shall have 2 rows of LEDs, that are side by side, not offset, and a minimum height of 9 inches.
4. The LED pedestrian and countdown signal module shall be a single, self-contained device.
5. Portland Orange (amber hand and countdown numbers) LEDs shall be "AlInGaP" (Aluminum Indium Gallium Phosphorus) technology or equal, and rated for 100,000 hours or more of continuous usage at 25°C and 20 mA. White LEDs shall be InGaN (Indium Gallium Nitride) technology.
6. The assembly and manufacturing process for all internal LED and electronic components shall be adequately supported to withstand mechanical shock and vibration from high winds and other sources.
7. The signal module shall be made of UL94VO flame-retardant materials. The lens is excluded from this requirement.
8. The lens of the LED pedestrian and countdown signal modules shall be polycarbonate UV stabilized.
9. The exterior of the lens of the LED pedestrian and countdown signal module shall be uniform and frosted to reduce sun phantom effect.

10. Each individual LED traffic module shall be identified for warranty purposes with the manufacturer's trade name, serial number and operating characteristics, i.e., rated voltage, power consumption, and volt-ampere.
11. LED pedestrian and countdown signal modules shall fit into traffic housings built to the VTCSH Standard without any modification to the housing, as well as housings described in Technical Specification Section 16716.
12. Lens must diffuse the LED array over the entire surface of the lens.

#### B. ENVIRONMENTAL REQUIREMENTS

1. The LED pedestrian and countdown signal modules shall be rated for use in the ambient operating temperature range of  $-40^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$  to  $+140^{\circ}\text{F}$ ).
2. The LED pedestrian and countdown signal modules, when properly installed with gasket, shall be protected against dust and moisture intrusion per requirements of NEMA Standard 250-1991, sections 4.7.2.1 and 4.7.3.2, for type 4 enclosures to protect all internal LED, electronic, and electrical components.

#### C. ELECTRICAL REQUIREMENTS

1. The secured, color coded, 914 mm (36 in) long, 600V, 20 AWG minimum, jacketed wires, conforming to the National Electrical Code, rated for service at  $+105^{\circ}\text{C}$ , are to be provided for electrical connection.
2. The LED pedestrian and countdown signal module shall operate from a  $60 \pm 3$  Hz AC line over a voltage range of 80 to 135 volts rms. Variations in the voltage range shall have a minimal impact, less than 10%, on the luminous output of the module. Rated voltage for all measurements shall be  $120 \pm 3$  volts rms.
3. The LED circuitry shall prevent perceptible flicker over the voltage range specified above.
4. Transient Voltage Immunity: The modules shall be tested for transient immunity, at minimum amplitude of 2000 volts, using the procedure described in Section 2.1.8, NEMA Standard TS 2-2003.

5. Catastrophic failure of one LED light source in Man & Hand Symbol shall not result in the loss of more than the light from the one display segment.
6. The LED pedestrian and countdown module shall be operationally compatible with the currently used controller assemblies. The LED pedestrian and countdown module shall be operationally compatible with conflict monitors.
7. The LED pedestrian and countdown module including its circuitry must meet Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 regulations concerning the emission of electronic noise.
8. The LED pedestrian and countdown module shall provide a power factor of .90 or greater when operated at the nominal operating voltages, and 25 degrees C (77 degrees F).
9. Total harmonic distortion (current and voltage) induced into an AC power line by an LED pedestrian and countdown module operated at the nominal operating voltages, and 25 degrees C (77 degrees F), shall not exceed 20 percent.

D. INPUT PROTECTION (optional)

At the point of entry to the module for each input provide two 0.5-Ohm, 10-watt wire-wound power resistors with 0.2 micro Henries inductance (one on the AC+ Line & on the AC- Line). Provide one 20 Joule surge arrestor between AC+ to AC-. A 0.68 microfarad capacitor must be placed between AC+ & AC - (between the resistor & arrestor).

E. PHOTOMETRIC REQUIREMENTS

1. Luminance

For a minimum period of 60 months, the maintained minimum luminance values for the modules under the operating conditions defined in Sections 3.3.1 and 5.2.1, when measured normal to the plane of the icon surface, shall not be less than:

Walking person: 2,200 cd/m<sup>2</sup>  
Hand: 1,400 cd/m<sup>2</sup>

The luminance of the emitting surface, measured at angles from the normal of the surface, may decrease linearly to a value of 50% of the values listed above at an angle of 15 degrees.

The light output requirements in this specification apply to pedestrian signal heads without any visors, hooded or louvered (egg-crate). Addition of such visors may affect the light output of the signal head, and the purchasing agency may wish to consult the issue with the manufacturer.

2. Uniformity and Distribution

The uniformity of the walking person and hand icons' luminance shall meet a ratio of not more than 1 to 5 between the minimum and maximum luminance values, as measured in 12mm (0.5 in) diameter spots.

When operating within the temperature range specified in Section B1, the average luminance of the module shall not exceed three times the maintained minimum luminance of the modules, as defined in Section D1.

3. Chromaticity

The standard colors for the LED Pedestrian Signal Module shall be White for the walking person and Portland Orange for the hand icon. The colors for these icons shall conform to the following color regions, based on the 1931 CIE chromaticity diagram:

Walking Person—

White: Blue boundary:  $x = 0.280$ .

1st Green boundary:  $0.280 \leq x < 0.400$   
 $y = 0.7917 \cdot x + 0.0983$ .

2nd Green boundary:  $0.400 \leq x < 0.450$   
 $y = 0.4600 \cdot x + 0.2310$ .

Yellow boundary:  $x = 0.450$

1st Purple boundary:  $0.450 \leq x < 0.400$   
 $y = 0.4600 \cdot x + 0.1810$ .

2nd Purple boundary:  $0.400 \leq x < 0.280$   
 $y = 0.7917 \cdot x + 0.0483$ .

White Point	x	y
1	0.280	0.320
2	0.400	0.415
3	0.450	0.438
4	0.450	0.388
5	0.400	0.365
6	0.280	0.270

Hand—Portland Orange:  
 Yellow boundary:  $y = 0.390$   
 White boundary:  $0.600 \leq x \leq 0.659$   $y = 0.990 - x$  Red boundary:  
 $y = 0.331$ .

Portland Orange		
Point	x	y
1	0.6095	0.390
2	0.600	0.390
3	0.659	0.331
4	0.669	0.331

4. Color Uniformity

The uniformity of the emitted colors shall be such that any color measurement within a 12mm (0.5 in) spot on the emitting surface shall fall within the following regions around the average measured color of the entire emitting surface:

- Walking Person—White:

where  $\Delta x$  and  $\Delta y$  are the differences in the chromaticity coordinates of the measured colors to the coordinates of the average color, using the CIE 1931 Chromaticity Diagram and a 2 degree Standard Observer.

- Hand—Portland Orange:

The dominant wavelength for all individual color measurements shall be within  $\pm 3$  nm of the dominant wavelength for the average of all the individual color measurements.

F. FUNCTIONAL REQUIREMENTS

1. Basic Operation

The control and regulation module shall allow for the countdown displays to be automatically adjusted with the programmed intervals of the traffic controller.

2. Operating Modes

The module shall operate in one mode:

- Clearance Cycle Countdown Mode – The module will start counting when the flashing clearance signal turns on and will countdown to “0” and turn off when the steady “Don’t Walk” signal turns on.

3. Power Failures

The equipment must maintain a consistent countdown during short power failures (<1 second). A longer failure or an absence of signal superior to one (1) second must turn off display and trigger a restart system remembering the last sequence, as it is done for the NEMA traffic controller.

G. CLAMSHELL MOUNTING HARDWARE

1. Mounting hardware for pedestrian signal heads shall be a two-piece cast aluminum "clamshell" hinged mounting bracket or approved equal, designed for left or right hand mounting. Left hand mounting is interpreted as an installation with the supporting pole to the left of the signal legend. A 12-position terminal block shall be mounted within the clamshell assembly.
2. A rain shield shall be provided in upper third of clamshell housing to shield terminal block from water.
3. The "clamshell" mounting attachment shall be painted federal highway yellow.

END OF SECTION