PIGEON FORGE
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DEPARTMENT OF PUBLIC WORKS

MARK MILLER
DIRECTOR

# NOTICE OF BID

The City of Pigeon Forge is receiving equipment bids for signalized intersection modernization.

Specifications may be obtained from the Public Works Department in City Hall between the hours of 8:00 and 4:30 p.m., Monday thru Friday.

All bids must be in sealed envelope with bidder's name and address on outside and marked "Bid on Signalized Intersection Modernization."

Bids will be received until 2:30 p.m., August 27, 2019, at which time they will be opened and read aloud. Equipment must be delivered within 45 days of receipt of purchase order.

The City reserves the right to reject any or all bids or to accept the bid most favorable to the City.

This 8th day of August, 2019.

Department of Public Works
Pigeon Forge, Tennessee

P.O. Box 1350 • Pigeon Forge, TN 37868-1350 • 865-429-7312 • fax 865-429-7322 • email: mmiller@cityofpigeonforge.com

**McCarter Hollow/Dollywood Entrance:**

| | |
|---|---|
| Type 130 signal w/LEDs | Qty. of 6 |
| Type 150 signal w/LEDs | Qty. of 1 |
| Type 140A1 signal w/LEDs | Qty. of 1 |
| Type 130A3 signal w/LEDs | Qty. of 1 |

All signals to have 12 circuit Quick Disconnects with Balance Adjuster and Span Wire Clamp and Tether.

All signals will have Black Louvered Metal Reflective Edge Backplates.

Type 150 signals to have Black upper and lower two-way arm assembly.

All Signals and disconnects are BLACK.

**Veteran's Blvd and Goldrush Road:**

| | |
|---|---|
| Type 130 signal w/LEDs | Qty. of 10 |

Above signal heads to have 12 circuit Quick Disconnects with Balance Adjuster and Span Wire Clamp and Tether.

All signals will have Black Louvered Metal Reflective Edge Backplates.

All Signals and disconnects are BLACK.

**Parkway and Christmas Tree Lane:**

Type 130 signal w/LEDs Qty. of 8
Type 150 signal w/LEDs Qty. of 2

All signals to have 12 circuit Quick Disconnects with Balance Adjuster and Span Wire Clamp and Tether.

All signals will have Black Louvered Metal Reflective Edge Backplates.

Type 150 signals to have Black upper and lower two-way arm assembly.

All Signals and disconnects are BLACK.

Countdown Pedestrian Signals Qty. of 2
Pedestrian signal heads above are single-section, with (right) clamshell mounting.

Countdown Pedestrian Signals: Qty. of 3
Pedesrian signal heads above are single-section with (left) clamshell mounting.

Countdown Pedestrian Signal: Qty. of 1
Pedestrian Signal head above is single-section, with post top mounting.

Pedestrian Poles 10' with base (black) Qty. of 2

Pedestrian Pole with slip fitter for single PED Qty. of 1

Pedestrian Pole cap Qty. of 1

Pedestrian signals will include ADA Pushbutton and Sign. Pedestrian Heads and Pushbuttons will be Black.

All Pedestrian Countdown to have inserts.

## Spare Heads and Equipment

| | |
|---|---|
| 130 signal with LED's | Qty. of 4 |
| 150 A2H signal with LED's | Qty. of 3 |
| 16" PED housing right clamshell with countdown | Qty. of 2 |
| 16" PED housing left clamshell with countdown | Qty. of 1 |
| 16" PED housing slip fitter with countdown | Qty. of 1 |
| 4" Pole tri-stud slip fitter | Qty. of 1 |
| 4" Pole cap | Qty. of 1 |
| 10' PED Pole tube | Qty. of 1 |
| PED Pole anchor bolts | Qty. of 1 set |
| PED Pole base | Qty. of 1 |
| PED Buttons (Pellco Passport only) | Qty. of 2 |
| PED usage signs R10-3E Right | Qty. of 2 |
| PED usage signs R10-3E Left | Qty. of 2 |
| 3 section Astro bracket hardware kit only w/82: cable | Qty. of 2 |
| 5 section Astro bracket hardware kit only w/82" cable | Qty. of 2 |

**NOTE: ALL SIGNAL HOUSING AND EQUIMENT TO BE BLACK, SIGNAL HEADS TO INCUDE REFLECTIVE BACKPLATE, 12 POSITION QUICK DISCONNECT WITH SPAN HANGER (Prefer PELLCO Brand) and 12' TETHER BRACKET.**

**EQUIPMENT MUST BE DELIVERED WITHIN 45 DAYS OF RECEIPT OF PURCHASE ORDER.**

# SIGNAL HEAD DESCRIPTION

Type 130 Signal Head is a 3-section signal with 12" red, yellow and green balls LED lens.

Type 130A3 Signal Head is a 3-section signal with 12" red ball, yellow arrow and green arrow LED lens.

Type 150A2H Signal Head is a 5-section signal with 12" red, yellow and green balls LED lends and also has 12" yellow arrow and green arrow LED lens.

Ped signal is single section signal with "Hand & Man" display with countdown timer display. These PED heads also include ADA (American Disabilities Act) compliant push buttons.

All signal heads are to be Black Aluminum.

All signal heads are to include Quick Disconnect hangers with appropriate span wire hangers.

## Aluminum

The lightweight aluminum housings, visors, and doors are equipped with stainless steel hardware. Door and lens gaskets make the signal weatherproof and dust-tight, while the integral visor rims prevent light leakage.

## Aluminum Specifications

| Characteristic | Description |
|---|---|
| Material | Die-cast aluminum alloy housing and door. Stainless steel hardware. |
| Finish | Electrostatically applied powder coat with five stage iron phosphate treatment. |
| Wire opening between sections | Accommodates three ¾" diameter cables. |
| Signal alignment | Integral 72-tooth serrated locking ring. Adjustable in 5° steps. |
| Overall dimensions | 12"(300mm)Section<br>13.25"W x 13.44"H x 6.44"D<br>(337mm x 341mm x 164mm)<br><br>Lane Control Section<br>13.50"W x 13.50"H x 9.75"D<br>(343mm x 33mm x 248mm) |
| Weight | 12 (300mm)Section<br>12.75 lbs. (5.7kg)<br><br>Lane Control Section<br>19.25 lbs. (8.7kg) |

## XL Series LED Traffic Signals

Operating Voltage Range: 80VAC to 135VAC (120VAC nominal)
Operating Temperature Range: -40°c to +74°C
Turn-on/Turn-off time < 75 msec
Power Factor >0.9
Total Harmonic Distortion <20%

Meets FCC Title 47, Subpart B, Section 15 regulations for electrical noise
Failed State Impedance >250K ohm within 300ms
Conforms to MIL-STD-810F for blowing rain
Conforms to MIL-STD-883, Test Method 2007, for mechanical vibration
Conforms to MIL-STD-883, Test Method 1010, temperature cycling requirements
Provided with quick connect terminals and spade adapters
Written manufacturer's warranty available on request
All products traceable by serial number
Luminance uniformity and color uniformity exceed ITE VTCSH-LED Circular Signal supplement requirements
Transient suppression exceeds ITE VTCSH-LED Circular Supplement requirements and meets the following standards:

- NEMA TS-2 Sec.2.1.6 and Sec. 2.1.8
- IEC 1000-4-5, 3KV, 2 ohm source impedance
- ANS/IEEE C62, 41-2002; IEC 61000-4-12, 6KV, 200A, 100KHz ring wave

Power supply is conformally coated for robust operation

## 12" (300MM) 120VAC Signal Modules

| Part Number | Color | Lens Type | Dominant Wavelength (nm) | Typical Wattage at 25°C | Peak Minimum Maintained Luminous Intensity (cd) | Meets ITE VTCSH LED Circular Signal Supplement |
|---|---|---|---|---|---|---|
| 433-1210-003XL | Red | Tinted | 625 | 6 | 365 | x |
| 433-3230-001XL | Yellow | Tinted | 590 | 19 | 910 | x |
| 433-2220-001XL | Green | Tinted | 500 | 9 | 475 | x |

# Uniform Appearance LED Arrows

Operating Voltage Range: 80VAC to 135VAC (120VAC nominal)
Operating Temperature Range: -40°c to +74°C
Turn-on/Turn-off time < 75 msec
Power Factor >0.9
Total Harmonic Distortion <20%
Meets FCC Title 47, Subpart B, Section 15 regulations for electrical noise
Failed State Impedance >250K ohm within 300ms
Conforms to MIL-STD-810F for blowing rain
Conforms to MIL-STD-883, Test Method 2007, for mechanical vibration
Conforms to MIL-STD-883, Test Method 1010, temperature cycling requirements
Provided with quick connect terminals and spade adapters
Written manufacturer's warranty available on request
All products traceable by serial number
Luminance uniformity and color uniformity exceed ITE VTCSH-3 LED Arrow specification requirements
Transient suppression exceeds ITE VTCSH-3 LED Arrow specification requirements and meets the following standards:

- NEMA TS-2 Sec.2.1.6 and Sec. 2.1.8
- IEC 1000-4-5, 3KV, 2 ohm source impedance
- ANS/IEEE C62, 41-2002; IEC 61000-4-12, 6KV, 200A, 100KHz ring wave

Power supply is conformally coated for robust operation

| Part Number | Color | Lens Type | Typical Wattage at 25°C | Dominant Wavelength (nm) | Peak Minimum Maintained Luminous Intensity (cd) |
|---|---|---|---|---|---|
| 432-1314-001X | Red | Tinted | 7 | 625 | 59 |
| 431-3334-001X | Yellow | Tinted | 9 | 590 | 146 |
| 432-2324-001X | Green | Tinted | 7 | 500 | 76 |

## Free Swinging Signal MTGS
## Disconnect Hanger Assemblies

W/2" Non-Threaded Top, Tri-Stud Hub & 4' Harness.....SE-5031
12 Cir. Term. W/7" Leads.....SE-0620
Disconnect Hub Assy., Tri-Stud..... SE-5033
Male Harness: 12 Circuit, 84".....SE-0626

## Specifications
## Cast Aluminum Span Wire Clamp

Material: Span Wire Clamp shall be cast from aluminum alloy 713 or equivalent, free of voids, pits, dents, molding, sand and excessive foundry grinding marks. All design radii shall be smooth and intact. Exterior surface finish shall be smooth and cosmetically acceptable, free of molding fins, cracks and other exterior blemishes. Certification shall be available upon request.

Shall be fabricated from aluminum ingot with minimum requirements as follows:

| | |
|---|---|
| Aluminum Alloy.....713 | Brinell Hardness.....75 |
| Yield Strength, KSI.....25 | Elongation (% in 2").....3 |
| Tensile Strength, KSI.....35 | |

Design:

1. The span Wire Clamp shall be fabricated with dimensions and design characteristics as shown in Figure 1.
2. Shall accommodate cables ¼" – 5/8" diameter.
3. Weight shall not be less than 1-3/4 lbs. with hardware
4. Shall have a minimum overall length of 7"
5. Shall have a centerline dimension from cable to clevis pin of 2" (+1/2", -0)
6. Shall have a cast aluminum Cable Bar to protect calbe when tightening U-bolts or J-bolts.
7. Shall have a mounting opening of ¾" (+1/32").
8. Shall have ½"-13 UNC U-bolts with ½" lockwashers and nuts. If J-bolts are allowed a minimum of 3½" in overall length is required to allow for mounting on cable without removal of lockwashers and nuts.
9. Clevis pin shall be 5/8" diameter with a length of 2½" and secured with a hump back stainless steel cotter pin.

Finish: Clamp and Cable Bar shall have an alodine 1200 conversion coating to help resist oxidization. Clevis Pin and hardware shall be galvanized per ASTM-123 or stainless steel.

Delivery: Upon request, successful bidder shall deliver a completed assembly within 45 working days after bid opening date.

## Specification
## Cast Aluminum Tri-Stud Disconnect Balancer Assembly

Material: Tri-Stud Balancer shall be cast from aluminum alloy 713 or equivalent, free of voids, pits, dents, molding sand and excessive foundry grinding marks. All design radii shall be smooth and intact. Exterior surface finish shall be smooth and cosmetically acceptable, free of molding fins, cracks and other exterior blemishes. Certification shall be available upon request.

Shall be fabricated from aluminum ingot with minimum requirements as follows:

Aluminum Allow.....713
Brinell Hardness.....75
Yield Strength, KSI.....25
Elongation (%in 2").....3

Design:

1. Tri-Stud Balancer Assembly shall be fabricated with dimensions and design characteristics as shown in Figure 1. Balancer Assembly is designed to hang a non-threaded Disconnect Body & Traffic Signal array.

2. Balancer shall have top mounting support width of 11/16" thick (+ or = 1/16").

3. Weight shall not be less than 1.00 lb. with hardware.

4. Mounting support shall have at least four clevis openings for clevis pin adjustment to balance a Disconnect Body. Mounting support shall accommodate stainless steel bushing(s) if specified.

5. Disconnect end shall be serrated. Serrations shall have 72 tooth design to match Disconnect Body.

6. Three (3) stainless steel Studs shall be cast into Balancer. The Studs shall be 5/16"-18 and extend 1½" beyond the serrations (+ or – 1/16").

7. A Tri-Stud Hardware Kit shall consist of a slotted washer, slotted gasket, three (3) 5/16"-18 hex nuts and three (3) 5/16" split lock washers.

Finish: The Tri-Stud Balancer shall have an alodine conversion coating to provide base for paint adhesion. The assembly shall be painted federal yellow or other color as specified and baked in a drying oven after painting.

Delivery: Successful bidder shall deliver complete order in 45 days.

Pedestrian Signals and Pushbuttons
Lighting Uniformity

Operating Voltage Range: 80VAC to 135VAC (120VAC nominal)
Operating Temperature Range: -40°c to +74°C
Turn-on/Turn-off time < 75 msec
Power Factor >0.9
Total Harmonic Distortion <20%
Meets FCC Title 47, Subpart B, Section 15 regulations for electrical noise
Conforms to MIL-STD-810F for blowing rain
Conforms to MIL-STD-883, Test Method 2007, for mechanical vibration
Conforms to MIL-STD-883, Test Method 1010, temperature cycling requirements
Provided with quick connect terminals and spade adapters
Written manufacturer's warranty available on request
All products traceable by serial number
Luminance uniformity and color uniformity exceed ITE PTCSI-2 LED Pedestrian Signal specification requirements
Transient suppression exceeds ITE PTCSI-2 LED Pedestrian Signal Specification requirements and meets the following standards:

- NEMA TS-2 Sec.2.1.6 and Sec. 2.1.8
- IEC 1000-4-5, 3KV, 2 ohm source impedance
- ANS/IEEE C62, 41-2002; IEC 61000-4-12, 6KV, 200A, 100KHz ring wave

430-6479-001X meets City of Pigeon Forge DOT specifications

| Part Number | Housing Size Inches | Symbol Color | | | Typical Wattage @25°C | | | Min Luminance | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | countdown | hand | person | countdown | hand | person | ctdown | hand | peson |
| 430-6479-001X | 16x18 | Portland orange | Portland orange | Lunar white | 5 | 8 | 6 | 1,400 | 1,400 | 2,200 |
| 430-7773-001X | 12x12 | Portland | n/a | n/a | 5 | n/a | n/a | 1,400 | n/a | n/a |

# Aluminum Model 9098

The general construction shall include a single piece cast aluminum case housing, a solid state LED indication, message lens, a single piece cast aluminum swing down door frame, a blackout Z-Crate sun visor, and appropriate other hardware.

9098.....18 lbs (8.2 kg) max

The case shall be one piece corrosion resistant aluminum alloy die casting complete with integrally cast top, bottom, sides and back. Four integrally cast top, bottom, sides and back. Four integrally cast hinge lug pairs, two at the top and two at the bottom of each case, shall be provided for operation of a swing down door.

Door Flat Black
Housing Federal Black
Clamshell 2 Mounting (pole left of message)
Clamshell 2 Mounting (pole right of message)
Clamshell 3 Mounting (pole left of message)
Clamshell 3 Mounting (pole right of message)
"Vision" Z-Crate Visor/Door

# ADA Round Push Button Assembly W/2" Plunger

Material: Push, button housing shall be cast from aluminum alloy 319 or equivalent, free of voids, pits, dents, molding and sand and excessive foundry grinding marks. All design radii shall be smooth and intact. Exterior surface finish shall be smooth and cosmetically acceptable, free of molding fins, cracks and other exterior blemishes.

Design:

1. The Push Button Assembly shall be fabricated with design characteristics as shown in Figure 1.

2. The bottom of the push button housing shall be tapped for and provided with a ½" NPT threaded conduit plug.

3. The back of the push button housing shall be provided with a hole capable of being threaded for a ½" NPT threaded conduit plug and capped with a non-threaded ½" plastic plug.

4. The back portion of the housing shall be designed to accommodate pole diameters from 3" through 14".

5. The push button housing shall be tapped and provided with (2) ¼"-20 stainless steel flat socket head screws, as shown, to accommodate the push button cover.

6. A neoprene O-ring as shown shall be provided to provide a weather tight seal between the housing and cover.

7. The assembly shall conform to all minimum requirements set forth by the Americans with Disabilities Act.

Finish: Both housing and cover shall have an alodine conversion coating to prevent oxidation to provide a proper base for paint adhesion. The assembly shall be painted federal yellow or other color as specified and baked in a drying oven after painting.

Push Button:

1 The switch assembly shall be capable of disengaging from the mounting bracket assembly without removing the mounting bracket assembly.

2. Each switch shall be equipped with (2) 3" tinned wire leads soldered to the switch terminal with free ends stripped complete with (2) sire nuts.

3. The switch assembly shall be capable of operating in temperature ranges of –65 F through +180 F and have a mechanical life of up to 10,000,000 actuations.

1. **Round Push Button Assembly:** The cover shall attach to the body with two screws and not require an adapter. The body shall mount on round poles or flat poles with an adapter, and shall have a threaded ½" NPT conduit opening in the bottom. The back of the body shall have a capped hole that can be threaded to ½" NPT for conduit.
2. **Round Push Cover Assembly:** The cover assembly shall be built for visual and audio confirmation of pedestrian actuation. When actuated, the visual confirmation shall have an ultra- bright LED flash, with a minimum luminous intensity of 1200 mcd. The audio confirmation, when actuated, shall have two sounds. The higher tone will sound when the plunger is pushed, and a slightly lower tone when the plunger is released.
3. **Round Plunger:** Push Button Plunger diameter shall be 2-1/8" diameter and made of corrosion resistant stainless steel. The center of the Plunger is to have a recess for actuation by small, or gloved, hands, canes and umbrellas. The actuation force of the Plunger assembly shall be 3 pounds, or less, and not require any adjustments, including when manufactured. The back of the cover is to be sealed and have a terminal strip for connection of the two wires to the traffic controller cabinet.

**MATERIAL:**

The Push Button Body, Push Button Cover, and Stainless Steel Plunger shall be metal castings with the following properties:

| Casting: | **Body** | **Cover** | **Plunger** |
|---|---|---|---|
| Process: | Permanent Mold | Die Cast | Investment Cast |
| Material: | 319 Alum | 319M Alum | CF8 Stainless Steel |
| Yield Strength (min): | 14 KSI | 24 KSI | 30 KSI |
| Tensile Strength (min): | 27 KSI | 27 KSI | 70 KSI |
| Elongation (% in 2"): | 2 | 2.5 | 30 |

All castings are to be free of voids, pits, excessive grinding marks and with all design radii that are smooth and intact. Exterior surfaces shall be smooth and cosmetically acceptable, free of molding fins, cracks and exterior blemishes.

**FINISH:**

1. The steel hardware, if not stainless, shall be zinc plated per ASTM B633.
2. The aluminum alloy and die cast surfaces shall be properly cleaned to remove the oils, dirt, oxides, and smudges with an immersion wash process that leaves a thin oxide coating to enhance the casting's resistance to atmospheric corrosion. (Ref: Pelco Spec Section L Bulletin 3112).
3. If a paint color is required, the aluminum alloy and die cast components shall be powder coated with an exterior grade of Polyester TGIC resin that meets the corrosion requirements AAMA 2603-02 and ASTM B117. (Ref: Pelco Specification Section L Bulletin 3009).

## OPERATING SPECIFICATIONS:

Electrical:

Operating Voltage: 12-35 VDC or 12-25 VAC RMS
Typical "Off" Current: less than 10μA typ. For 12 to 24 VDC operation
Maximum "On" current: 160 mA typ. (over-current rating)
Maximum Source Impedance: 100 kΩ (less than 50lΩ recommended)

General:

Operating Force: less than 3 lbs
Operating Temperature: -30°F to 165°F
Beeper Volume: 70 dB @ 1m typ.
Switch Activation Time: 60 ms min to 4s max typ
Debounce Time: 20 ms typ.

Designed Compliance:

Activation Force: MUTCD 2009
Temperature and Humidity: NEMA TS 2
Transient Voltage Protection: NEMA TS 2
Mechanical Shock and Vibration: NEMA TS 2
Ingress of Water (submersion): NEMA 250-6P
Ingress of Water (rain and snow): NEMA 250-6P
Ingress of Foreign Objects: NEMA 250-6P

NOTES:

1. The button should only be connected to traffic equipment that has surge suppression to NEMA TS2 standards or equivalent.
2. Only applicable sections of referenced standards.
3. All specifications are subject to change with or without notice.

Delivery:

Successful bidder shall deliver complete order in 45 days.

1. All items will be installed by the City of Pigeon Forge Traffic Signal Maintenance Contractor.
2. All items shall be delivered to the City of Pigeon Forge Traffic Signal Maintenance Contractor and labeled Pigeon Forge Project:
   Progression Electric
   2823 Thorngrove Pike
   Knoxville, TN 37914
3. All billing will be submitted to:
   City of Pigeon Forge
   Public Works Department
   Mark Miller, Public Works Director
   P.O. Box 1350
   Pigeon Forge, TN 37868
4. Hand deliver bids to: Public Works, 3211 Rena Street, Pigeon Forge, TN 37863.
5. Mail bids to: Public Works, P.O. Box 1350, Pigeon Forge, TN 37868

BID SHEET

Bidder:_____

Address:_____

_____

Contact:_____ Phone:_____

Email:_____ FAX:_____

_____
Signature

_____
Date

McCarter Hollow/Dollywood Entrance $_____

Veteran's Blvd and Goldrush Road $_____

Parkway and Christmas Tree Lane $_____

Spare Heads and Equipment $_____