STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

SHAILEN P. BHATT
SECRETARY

MEMORANDUM

To: All Users of Delaware Manual on Uniform Traffic Control Devices

From: Mark Luszcz, P.E., PTOE ML
Chief Traffic Engineer

Date: November 5, 2013

Subject: Overhead Street Signs Mounted on Traffic Signals

The DelDOT design criteria for overhead mounted street names differs from the recommended minimum lettering heights provided in **Paragraph 07** of **Section 2D.43** of the ***Delaware Manual on Uniform Control Devices for Streets and Highways*** (DE MUTCD). As a result, sign heights per the design criteria also differ from that recommended in **Table 2D-2** of the **DE MUTCD**. Our experience has indicated that an 8-inch letter height is typically of sufficient size, when mounted on traffic signal span wires or mast arms, to properly convey street name information to the driving public. Although this does not meet the recommended MUTCD criteria on higher speed roadways for letter height and legibility distance, taken in context with advanced street name signing, the conspicuous mounting location (overhead), and the presence of a significant traffic control "landmark" (the traffic signal), signs with 8-inch capital/6-inch lower case letters are sufficient. Furthermore, we have experienced significant problems with bracket mounting hardware, and many failures that have resulted in overhead signs falling to the ground when we attempted to utilize signs with larger letter heights. Finally, we could consider using a larger letter height on the same sized sign (18-inches sign height); however, the reduction of the margins on the sign would violate a standard in the MUTCD (Section 2A.11, Paragraph 2).

This memorandum is therefore issued to document the DelDOT design criteria for overhead mounted street name signs and provide details/illustrations of the overhead street name signs and mounting hardware.

DESIGN CRITERIA

1. All new traffic control signals, and traffic control signals that are undergoing significant retrofits, should include overhead street name signs (SNS) unless otherwise noted in this document, or other valid engineering or community involvement reasons are documented (i.e., DelDOT and a municipality agree that overhead SNSs are not needed in a specific low speed, downtown area due to aesthetic concerns).

2. All SNSs on span wires and on mast arms should have the following characteristics:

    a. Be dual sided (except for one-way streets)
    b. Be hung below the span wire or mast arm
    c. Have a maximum width of 120 inches (10 feet)
    d. Have an initial upper case height of eight inches (8"), and lower case height of six inches (6"), Highway Gothic D Lettering
    e. Have seventeen feet (17 feet) minimum clearance from roadway surface to bottom of sign
    f. Be installed **only** when the angle of the mast arm or span wire perpendicular to the direction of travel is less than 30 degrees. Regulatory signs can be hung with a pivot bracket.

3. Overhead SNSs conforming to the design criteria outlined above may incorporate a route shield when the roadway meets the conditions set out in the **DE MUTCD Section 2D.43 Paragraph 02**. State Route and US Route markers can be added to the left portion of the SNS; but shall not extend the length beyond 120" or increase the height of the sign. The symbol should be proportioned on the sign, so as not to distort the State Route or US Route symbol. If the length of the road name is so long that the 120 inches maximum width will be exceeded, the state or US route shield with the GREEN border measuring 18" X 18" overall, may be used without the street name (see page 5)

4. The designer should avoid overhead street name signs with two lines of lettering if at all possible. Typically, if a cross street has different names on either side of the intersection; two separate one-line signs should be used. In circumstances where a two line sign cannot be avoided, the designer should bring the issue up for discussion at the Project Process Meeting for an agreement regarding whether the sign should be used or not. If the use of the two-line street name sign is agreed, the designer should then contact Lori Hutson (302.760.2581; lori.hutson@state.de.us) for sizing based on the new design criteria.

5. Single line SNSs should not be tethered. Two line SNSs with a back plate application may be tethered, at the Engineers direction.

6. Note that regulatory signs mounted on mast arms should be rigid mounted to the mast arm (not hanging). Proposed new hardware should be used to mount regulatory signs mounted on span wires. Such span-mount signs will not be tethered unless special circumstances, such as size, dictate so.

7. The combination of possible geometric intersection designs (i.e., number of approaches, skew angles, etc.) and signal designs (e.g., box span, four mast arm, double mast arm, various unconventional options, etc.) make it impractical to develop a specific policy that will show exactly where every overhead sign should be located. The following principles should be followed:

    a. Avoid placing the SNS between traffic signal heads. Generally place overhead SNSs to the right of the far right traffic signal head, e.g., over the paved shoulder.
    b. For an undivided roadway with good visibility in both directions (e.g., not a skewed intersection), generally only one SNS is needed which can serve both directions of travel. So for the intersection of two undivided roadways that do not change names at the intersection, intersecting at a 90-degree angle without other sight obstructions, typically only two SNS are needed – one for each roadway. Sometimes even if the intersection is skewed, one sign may be visible from both directions if properly placed.
    c. When the cross street has different names on either side of the intersection, or if one SNS does not result in good visibility in both directions, two signs for the roadway in question will be needed. If possible, the first option is to place the SNSs on the far side right and near side left. The next option is near side right and/or far side left. The road to the right is shown on both sides (forward and reverse) on the right side SNS (whether far or near side), and the road to the left is shown on the left side SNS. Arrows should be included to indicate the direction in which the road name is valid.
    d. Divided highways should typically have one SNS for each direction of travel, generally following the placement guidelines noted in (c) above. Arrows should not be used if the cross street name is the same on either side.
    e. For installations where the vertical support is on the right, AND is in close proximity to the edge of roadway, AND the SNS would conflict with signal heads on the mast arm or span wire, the SNS may be mounted on the vertical support. If any portion of the SNS will extend over the roadway, the seventeen (17) feet minimum clearance will apply.
    f. If overhead SNSs properly convey all street names at an intersection, then ground mount SNSs should be omitted or if existing, removed. If one or more streets cannot feasibly be signed with overhead SNSs, then all streets should be designated with ground mount SNSs (even if one street has redundant overhead and ground mount SNSs).

8. Before the Project Process Meeting, the designer should contact the County 911 Centers to obtain official street names for all SNS:

    a. New Castle county – Bill Streets @ wfstreets@nccde.org or (302) 395-8213

    b. Kent County – Sabrina Fite @ (302) 744-2420

    c. Sussex County – Lindsey Stubbs @ (302) 855-1176

    d. Statewide Administrator @ (302) 744-2682

9. Additionally, when in doubt about sizing, the designer should contact Lori Hutson (302.760.2581; lori.hutson@state.de.us) for accurate sizing of overhead SNS before the Project Process Meeting.

CONSTRUCTION CRITERIA

1. Construction Manager will be notified on the Handoff Form of overhead signs. The order for overhead signs should be placed with DelDOT Sign Shop as early as possible to account for sign fabrication lead time.
2. Signs are to be mounted using the mounting hardware and details on the following pages.
3. If overhead SNSs cannot be installed per plan for any reason, the Construction Inspector should consult with the Designer on the proposed modifications.

OVERHEAD SIGN SIZING AND MOUNTING HARDWARE DETAILS /ILLUSTRATIONS

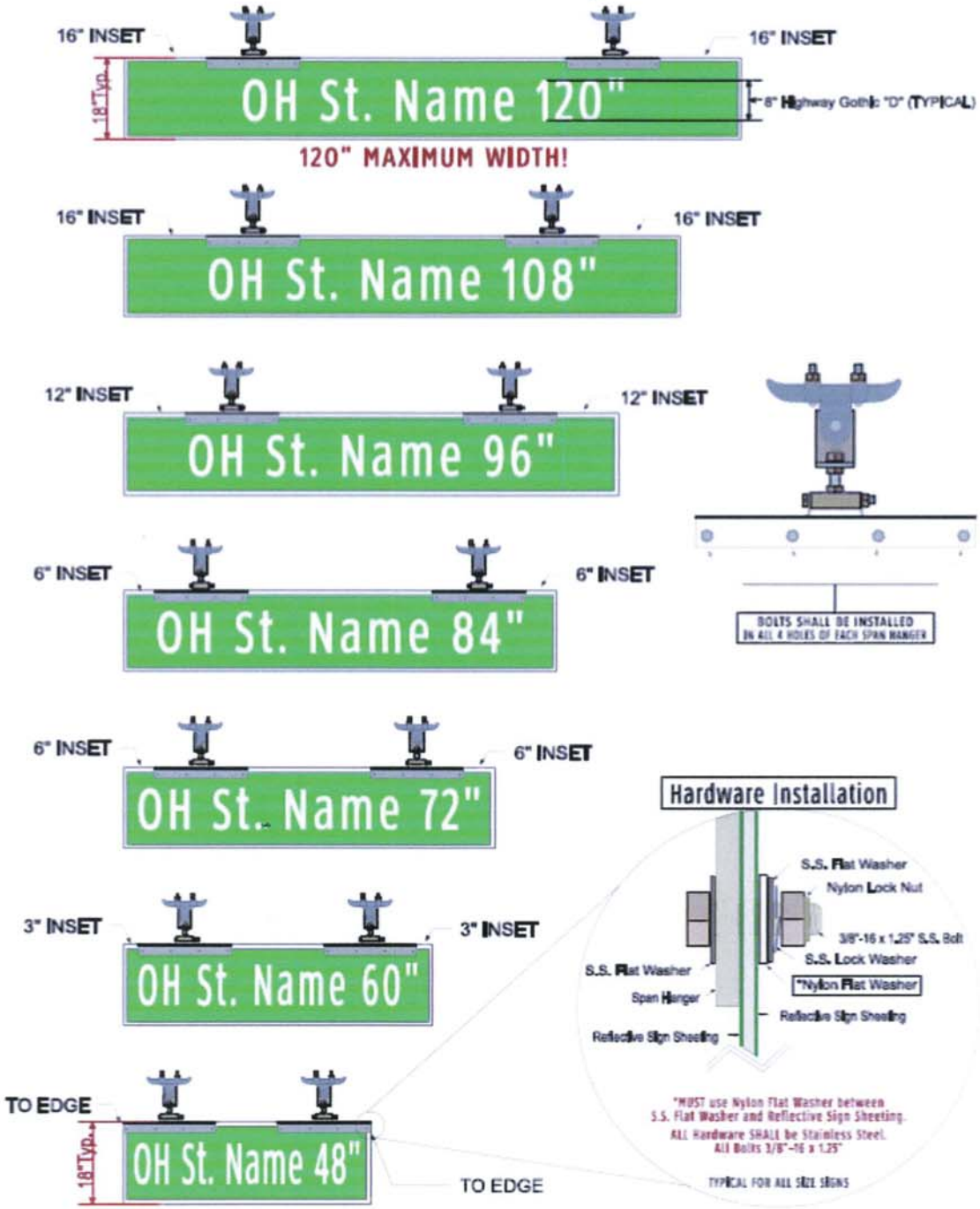
The following are details/illustrations for the design and mounting hardware for overhead mounted signs on span wires and on mast arms. These details/illustrations are not intended to restrict usage to specific manufacturers/suppliers. Alternate manufacturers/suppliers meeting the same specifications may be utilized.

State Route Overhead Street Name Sign: <u>Number Only</u>

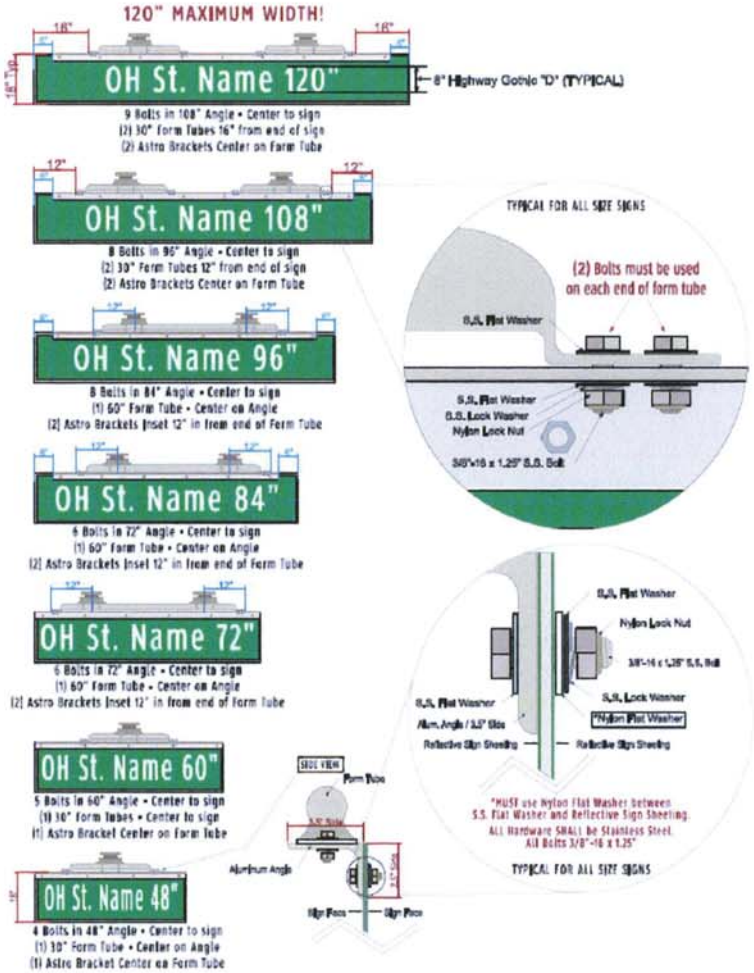
State Route Overhead Street Name Sign: <u>Route Shield & Road Name</u>

8" Capital Letters

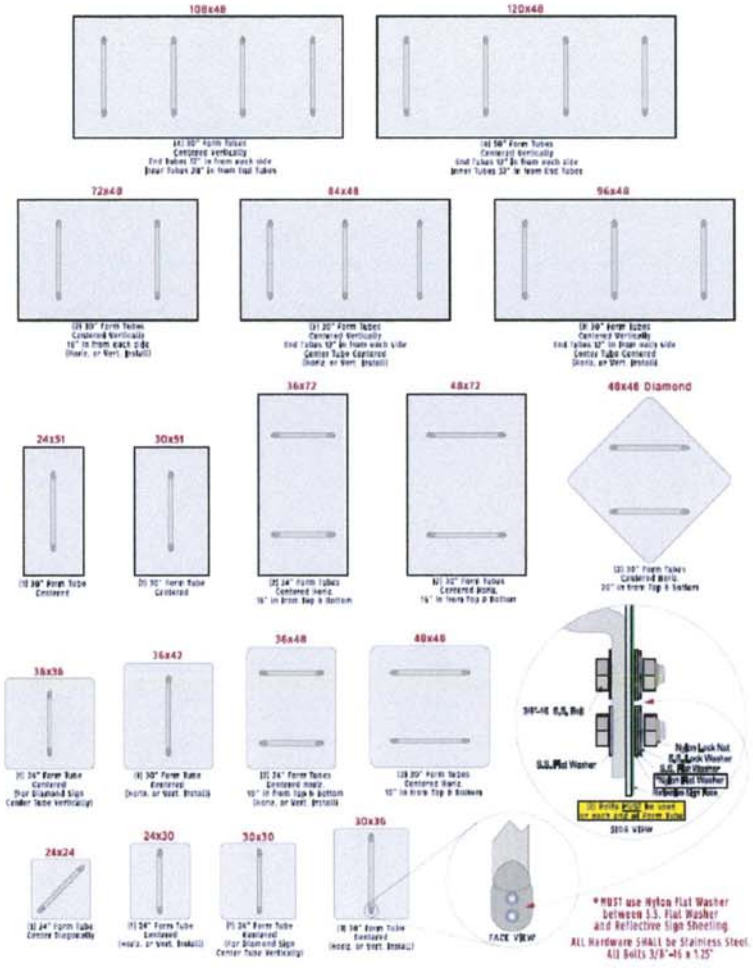
Dual Face Span Wire - Street Name Sign Hardware Installation Specifications

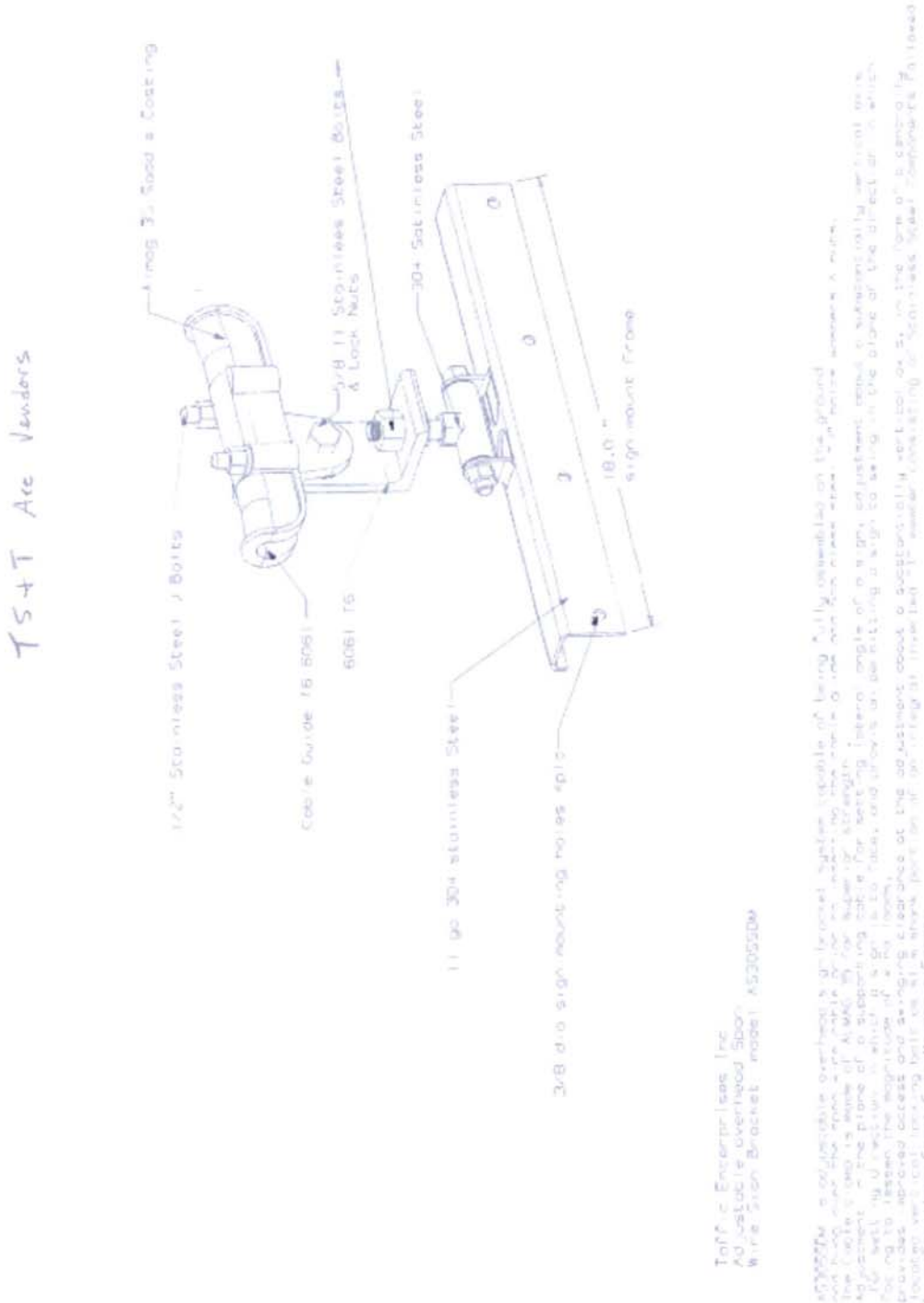


Dual Face Mast Arm / Street Name Sign Hardware Installation Specifications



Single Face Mast Arm / Pole Mount Sheet Sign Hardware Installation Specifications




TS+T Arc Vendors
1/2" Stainless Steel J Bolts
Cable Guide 16 6061
6061 T6
3/8 11 Stainless Steel Bolts & Lock Nuts
304 Stainless Steel
11 ga 304 stainless Steel
3/8 dia sign mounting holes 4pls
18.0"
sign mount frame
Traffic Enterprises Inc
Adjustable Overhead Sign
Wire Sign Bracket model AS300SDW

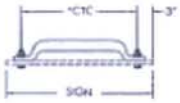
Astro Sign-Brac Formed Tubes Stellar Series

Pelco manufactures a variety of sign brackets in rigid and free-swinging mounts for both flat and internally illuminated signs.

Astro Sign-Brac, Stellar Band Mount, Formed Tube

AS-0105 - [ ] - [ ] - [ ]

CTC	Band Length	Coating
*See Chart	29=29" Band 36=36" Band 42=42" Band 48=48" Band 56=56" Band	PNC=Process No Color P__=Paint

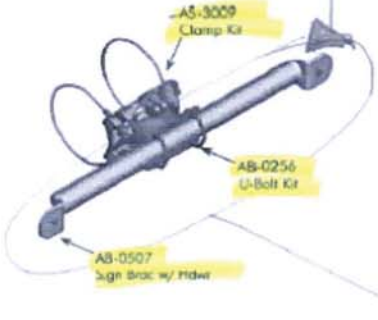


Sign Mount	
TUBE *CTC	SIGN
9"	15"
12"	18"
15"	21"
18"	24"
24"	30"
30"	36"
36"	42"
42"	48"
48"	54"
60"	66"
66"	72"
72"	78"

Note:
Specify stainless upgrade by including -SS in the part number, i.e., AS-0105-09-29-SS-PNC.

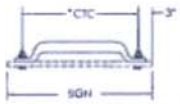
This is how most arm assemblies look installed AB 3009

Astro Sign-Brac, Stellar Cable Mount, Formed Tube



AS-0142 - [ ] - [ ] - [ ]

CTC	Cable Length	Coating
*See Chart	62=62" Cable 84=84" Cable 96=96" Cable	PNC=Process No Color P__=Paint



Sign Mount	
TUBE *CTC	SIGN
9"	15"
12"	18"
15"	21"
18"	24"
24"	30"
30"	36"
36"	42"
42"	48"
48"	54"
60"	66"
66"	72"
72"	78"

Note:
Specify stainless upgrade by including -SS in the part number, i.e., AS-0142-09-62-SS-PNC.

Note: 1. All assemblies are supplied standard with stainless fasteners. Stainless upgrade to include stainless steel clamp screws or cable where applicable.
2. Suggested maximum sign face of 16 sq. ft. per bracket.
3. See Reference Section for available paint colors.

SIGN MOUNTINGS

Astro-Brac

pelco

Cable Mount Clamp Kits

These high tensile aluminum alloy clamp kits provide strength with maximum adjustability and complete clamping versatility. They feature high strength galvanized aircraft cable and stainless steel swaged fittings. Supplied complete with all necessary attaching hardware.

Astro-Brac, Stellar Series Clamp Kit, Cable Mount

AS-3009 - [ ] - [ ]

Cable Length: 62=62" Cable; 84=84" Cable; 96=96" Cable; 110"=110" Cable; 120"=120" Cable; 132=132" Cable; 144=144" Cable

Coating: PNC=Process No Color; P__=Paint

Note:
Stainless steel upgrade available: includes stainless cable.
Specify by including -SS in the part number, i.e., AS-3009-62-SS-PNC.

Astro-Brac Clamp Kit, Cable Mount

AB-3009 - [ ] - [ ]

Cable Length: 62=62" Cable; 84=84" Cable; 96=96" Cable; 110"=110" Cable; 120"=120" Cable; 132=132" Cable; 144=144" Cable

Coating: PNC=Process No Color; P__=Paint

Note:
Stainless steel upgrade available: includes stainless cable.
Specify by including -SS in the part number, i.e., AB-3009-62-SS-PNC.

Astro-Brac Clamp Kit, Free-Swinging, Cable Mount

AB-3014 - [ ] - [ ]

Cable Length: 62=62" Cable; 84=84" Cable; 96=96" Cable; 110"=110" Cable; 120"=120" Cable

Coating: PNC=Process No Color; P__=Paint

Note:
Stainless steel upgrade available: includes stainless cable.
Specify by including -SS in the part number, i.e., AB-3014-62-SS-PNC.

Note: 1. All assemblies are supplied standard with stainless steel fasteners.
2. See Reference Section for clamp kit pole diameters.
3. See Reference Section for available paint colors.

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ASTRO-BRAC

NEW Astro-Brac Atlas
Pelco's Large Capacity Traffic Mounting System

Pelco's Astro-Brac Atlas Large Capacity Mounting System is made to the same quality and attention to detail as the traditional Astro-Brac Mounting System.

The Astro-Brac Atlas features an extended lower cover that allows for larger bend radius as well as a new UV-resistant snap-in large capacity insert and tube closure cover cap for easier installation.

The Original Astro-Brac

Introduced in 1968, the Astro-Brac family of signal, sign, and camera mounts has proven to be the most versatile mounting system ever designed. Available in band or cable, the Astro-Brac can mount to any size and shape of mast arm or pole.

The Astro-Brac, in it's various configurations, provides a universal system for mounting signs, cameras, and any size or combination of signals to any size and shape of mast arm or pole. Complete adjustability is only possible with the Astro-Brac mounting system. You will undoubtedly find that the Astro-Brac can solve many, if not all of your mounting problems!

Features
- Completely Adjustable
- 3 Axis of Rotation
- Band, Cable or Tenon Mount
- Quick Easy Installation
- Secure Mounting Method

Mounting Applications
- Any combination of signal heads
- Optically Programmed Signals
- Pedestrian Signals
- Internally Illuminated Signs
- Flat Sheet Signs
- Sensor & Camera Mounts

Stellar Series Astro-Brac
Pelco's newest addition to the Astro-Brac line, the Astro-Stellar 2-piece clamp features a stronger clamping method with quicker and easier installation. Available with band or cable mount.

Astro Mini-Brac
This smaller version of the Astro-Brac was designed to fit small diameter (2-3/8" OD) tubes as well as large diameter mast arms. Ideally suited for Emergency Traffic Signal Sensors or Confirmation Lights.

Mast Arm Mounted Camera Bracket
Designed to mount traffic monitoring cameras, this bracket represents just one of the many possibilities for camera and sensor mounting applications in today's complex and increasingly crowded streets and intersections.

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Astro-Brac Atlas Brochure (PDF)

Astro-Brac Brochure (PDF)

Installation Instructions

Astro-Brac Cable Clamp Kit Installation Instructions (PDF)
Astro-Brac Band Mount Installation Instructions (PDF)
Astro-Brac Mini-Brac Installation Instructions (PDF)
Stellar Cable Clamp Installation Instructions (PDF)
Stellar Band Mount Installation Instructions (PDF)
Stellar Tenon Mount Installation Instructions (PDF)
Triton Cable Clamp Installation Instructions (PDF)
Triton Band Mount Installation Instructions (PDF)
Triton Cable Clamp Installation Instructions (PDF)
Ty Bolt/Restraining Clamp for Cable Mount Installation Instructions (PDF)

Specifications

Mast Arm Mount Signal Bracket 1-Way Stainless Steel Band Mount (PDF)
Mast Arm Mount Signal Bracket 1-Way Stainless Steel Cable Mount (PDF)

Pelco Products, Inc. has the most extensive line of traffic products anywhere. For more information, call (408) 848-3434. You can also email us at sales@pelcoinc.com

INSTALLATION INSTRUCTIONS

ASTRO-BRAC CLAMP ASSY
3/16" Cable

Tools Required: 1/2" & 11/16" Sockets & Ratchets or Box End Wrenches (approx. 7" length)
3/8" Open End Wrench or Equivalent (approx. 7" length)
Torque Wrench or equivalent
Hack Saw

Attaching Clamp Kit to Mast Arm

1. Place Female Clamp Half on mast arm as shown in Figure 1. Leave two to three (2-3) threads exposed above the nut on the Cable Screw Assembly as shown.

2. Place Cable Screw Assembly in casting pawl of the Female Clamp as shown in Figure 2. Loosen four (4) 5/16" Bolts on Cable Plate. Pull cable loop to tighten cable on the mast arm. To secure cable with cable plate, tighten four (4) 5/16" bolts to 15-18 ft. lbs. of torque. ***DO NOT OVERTIGHTEN.***

3. Repeat Step 2 for second Cable Plate.

4. Back off nut on both Cable Screw Assemblies to loosen cable. Rotate Clamp Kit on mast arm to desired signal position (Figure 3). Snug nut on both Cable Screw Assemblies just enough to hold Clamp Kit in position. When tightening Cable Screw Assembly, hold hex portion with 3/8" Open End Wrench or equivalent. ***DO NOT ALLOW CABLE TO TWIST OR TURN WHEN TIGHTENING. DO NOT TIGHTEN TO FINAL TORQUE UNTIL STEPS 5-7 BELOW ARE COMPLETED.***

Attaching Signal and Tube Assembly to Clamp Kit

5. Position tube into Male Half of Clamp Kit (Figure 4). Insert V-Bolts as shown and attach with lockwashers and nuts.

6. With signal properly positioned to the desired height and direction, tighten nuts on two (2) V-bolts to 12-15 ft. lbs. of torque. ***DO NOT OVERTIGHTEN.***

7. Plumb or level signal and tighten two (2) 5/16" hex bolts on Female Half of Clamp Kit to 20-22 ft.lbs. of torque. ***DO NOT OVERTIGHTEN.***

8. Use 3/8" Open End Wrench to hold Cable Screw and tighten both Cable Screw Assembly Nuts to 20-22 ft.lbs. of torque, using a 11/16" Box End Wrench or Ratchet (Figure 4). Note: Tightening the Cable Screw Assembly Nuts firmly with a 7" Wrench will produce approximately 20 ft. lbs. of torque. ***DO NOT OVERTIGHTEN.***

9. Install cable Ty-Back/Restraining Clamp (AB-0506) per separate instruction Bulletin No. 2037. Clamp will provide neater cable appearance and a positive cable restraint.

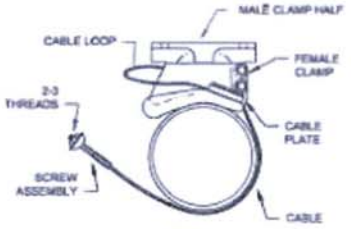


Figure 1

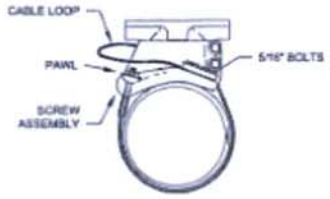


Figure 2

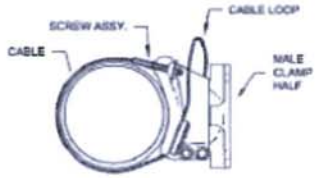


Figure 3

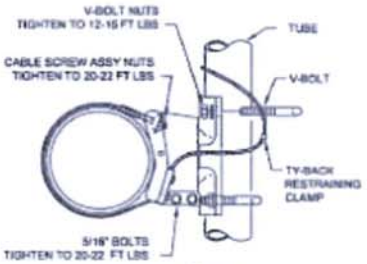


Figure 4

INSTALLATION INSTRUCTIONS

ASTRO-BRAC CLAMP ASSY
3/16" Cable

For All Arm and Tube Kits:

Gusseted  **and Solid** 

1. Mount lower arm to bottom of signal. Position arm so that tube boss will be centered in back of signal. (Figure 1). Using the hardware kit without rubber gasket, secure arm to signal.
2. Screw tube into lower arm, being sure to stop at a point where the channel (if using a gusseted tube) is at the back, facing directly away from the signal. Slide upper arm down over top of tube and secure to signal, using hardware kit with rubber gasket. Hardware kit should be installed against the inside top of signal. (Figure 2).
3. After upper and lower arms are secure, and tube channel (if gusseted tube) is centered at back of tube, tighten setscrews in upper and lower arms. This will prevent rotation of tube after installation. (Figure 3).
4. Using hack saw, cut off any excess tube which may protrude above the upper arm. (Figure 4).
5. Finished assembly is now ready for installation on Clamp Kit. (Figure 5).

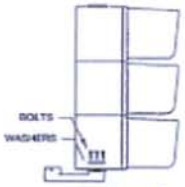


Figure 1

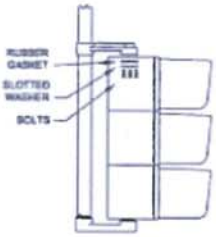


Figure 2

Figure 3

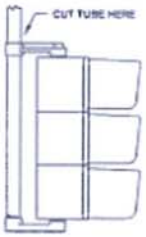


Figure 4

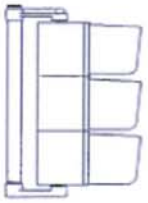
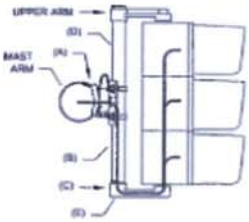


Figure 5

COVERED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 3586280, 3764099, 3854685, 4650046. OTHERS PENDING.

How To Wire When Using The Astro-Brac

1. Wiring from inside the MastArm should be fed through field drilled hole in the arm and brought through Clamp Kit (A) to extruded Aluminum Support Tube (B) to Lower Arm (C) and to signal connections.
2. After running wire, cut Vinyl Insert to size and insert in Support Tube (D).
3. Slide in Bottom Cover (E) and snap into place.



No Other Adjustable Bracket Gives You...
COMPLETELY CONCEALED WIRING!

The Astro-Brac provides the most versatile mounting system available!

Bulletin No. 2005 - Yellow

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