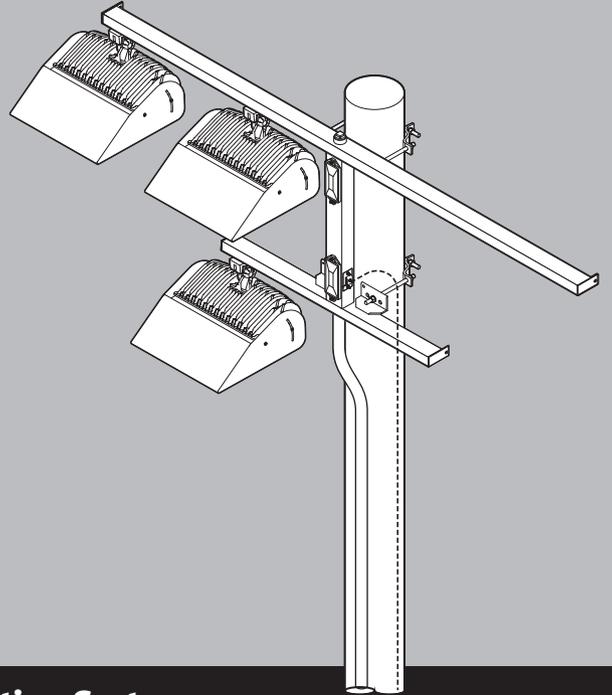
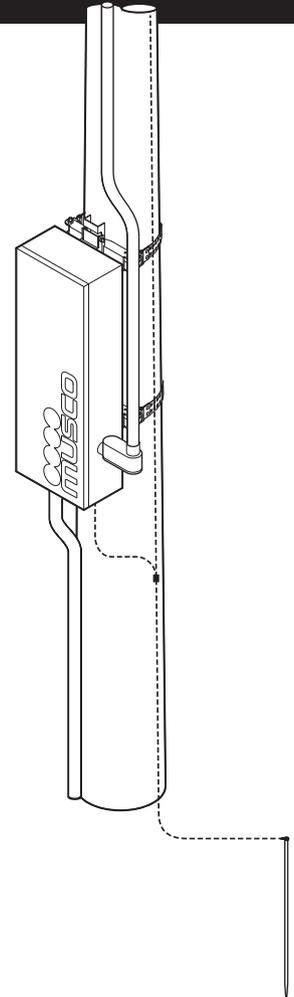


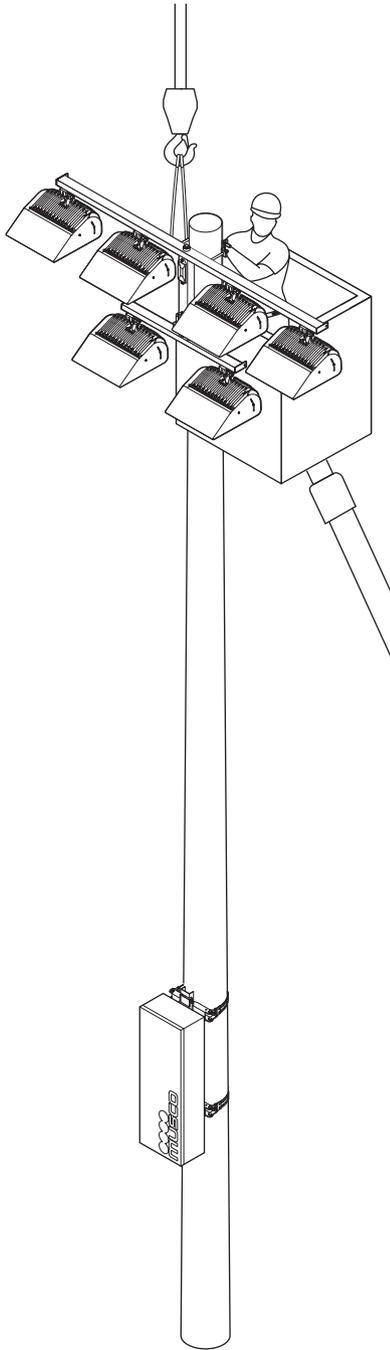
Diode Light Source—LED



Installation Instructions: **SportsCluster Green™** Lighting System



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Before You Begin

Safety Information

Electrical Safety Guidelines

Use extreme caution near overhead power lines or underground utilities. Observe all safety precautions for high-voltage equipment. Only qualified personnel may perform wiring. Follow all applicable building and electrical codes.

General Safety Guidelines

Follow proper safety procedures during installation. Installers must wear the appropriate personal protective equipment including:

- Hard hat
- Steel-toed shoes
- Fall protection
- Leather work gloves
- Eye protection

Locate all underground utilities prior to digging.

All tools and equipment supplied by Musco are designed for specific use as described in these instructions. Do not use them in any other manner. Do not alter structural members in any way, such as bend, weld, or drill, without prior authorization from Musco.

About These Instructions

These instructions outline basic assembly procedures for the SportsCluster Green lighting system. They are not a comprehensive guide to all possible situations. Direct any questions to +1-800-825-6020 or call your local Musco representative.

Throughout this manual note these important symbols:

- | | | | |
|--|---|---|---|
|  | The safety alert symbol alerts you of situations that require care and caution to avoid serious personal injury. |  | The go-to arrow indicates a branch in a procedure for special situations. In case of optional equipment, the instructions may be in another document. |
|  | The stop and check symbol signals you to stop and verify conditions before proceeding. |  | The tip symbol points out advice that makes installation easier. |
|  | The contact Musco symbol appears in special situations where you may need to contact Musco for further information. |  | The recycle symbol identifies recyclable materials. |

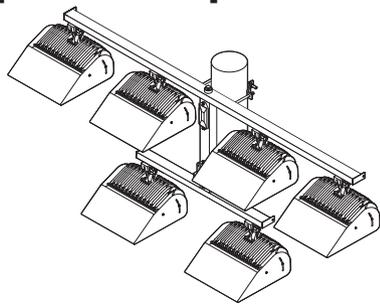
Installation Instructions: SportsCluster Green™ Lighting System

Before You Begin

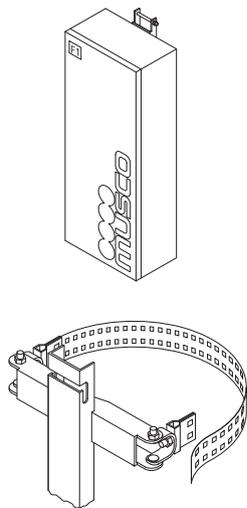
Standard Tools/Supplies

Contractor/installer supplies	Function	Page
Hammer, pry-bar, banding cutters	Unloading equipment	5
Measuring tape, 25 ft (7.5 m)	Identifying brackets and straps, locating components at proper height on pole	7, 8, 9, 15
Torque wrench	Torquing pole clamping hardware	10
Sockets: 1/2, 5/16 in standard and deepwell	Torquing pole clamping hardware	10
Screwdrivers, standard and Phillips	Landing power, tightening enclosure hub screws	11, 26, 28
Marker	Marking hanger bracket mounting locations on pole	9
Paint, chalk, flags	Marking aiming points on field	20
Measuring tape, 300 ft (90 m)	Locating aiming points on field	20
1 5/16 in open-end torque wrench or torque wrench with 1 5/16 in crows-foot	Torquing pole clamping hardware, torque nuts	21, 23
1 5/16 in open-end wrench	Tightening pole clamping hardware	16–19, 21, 23
Stepped drill, hole saw, or die set	Cutting conduit entryways	26
Conduit, fittings, clamps, etc.	Conduit and supplies as needed for wiring routing	26
Electrical fish tape	Pulling conductors	27, 28
Main power disconnect and distribution panels	Power to lighting system	28
Electricians pliers		28
Grounding electrode and driving sleeve*	Pole lightning ground	30, 30
Grounding conductor, AL to CU splice (if required), saddle clamp, bonding jumper, exothermic weld kit*	Pole lightning ground	29, 30
Shovel	Excavating grounding electrode	29, 30
Musco supplies	Function	Page
Snips	Cutting steel strapping	10
1/2, 5/16 in offset combination wrench	Tightening strap hardware	10, 11, 29
7/16 in ratcheting combination wrench	Tightening luminaire captive bolts	14, 28
5 mm hex key	Landing primary feed wires on 125 A disconnect switch	28
3/16 in hex key	Ground bar	26, 28, 29, 30
5/16 in hex key	Grounding lug	27, 29, 30
Wago brand LEVER-NUTS® wire connector	Connecting pole harness	27
Equipment needed	Function	Page
Load-rated crane and rigging	Unloading, lifting crossarm assembly	5, 21, 22
Aerial work platform	Attaching crossarm assembly to pole and other aerial work	21, 22
10 ft (3 m) stepladder or small line truck	Attaching crossarm assembly to pole and other aerial work	9, 24–30

Components of SportsCluster Green Lighting System



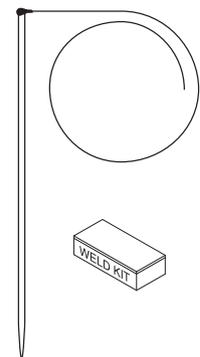
Poletop luminaire assembly and mounting hardware



Electrical components enclosure and mounting hardware



Wire harness (contractor supplied)*



Lightning ground equipment (contractor supplied)*

* May be supplied by Musco.

Installation Instructions: SportsCluster Green™ Lighting System

Before You Begin

Unloading Instructions

A typical shipment includes electrical components enclosures, crossarm assemblies, luminaire cartons, attachment hardware, and may include wire harnesses. Unload and uncrate equipment. Stage for assembly placing all matched components and hardware at the proper pole location as noted on *Field Aiming Diagram*.

Tools/Materials Needed

- Crane or forklift
- Hammer
- Pry bar
- Banding cutters

As you unload, do the following:

- Check bill of lading to verify you have all materials.
- Inspect all materials for shipping damage.
- Store electrical components enclosures in a dry location or cover with tarp until ready to install.



If you need additional information, contact your local Musco representative.



Please recycle.

Luminaires, hardware, and other components are shipped in recyclable cardboard packaging.

Electrical System Requirements

While portions of the SportsCluster Green™ lighting system can be assembled by non-professionals, a qualified electrician must handle the electrical supply installation and hook-up in accordance with national, state, and local codes. Your electrician should review this information before installation begins.

The electrician is generally required to provide these items:

- Service entrance
- Main power disconnect and distribution panel(s)
- Supply wiring and equipment grounding conductors
- Lightning grounding conductor and electrode, one per pole

Ensure supply wiring is rated for 90° C. Review the label inside the electrical components enclosure door and *Control System Summary* for voltage and phase requirements. All entrance hubs must be rated NEMA 3R (IP44) or better.

Other features that may affect the wiring supply requirements for this project include:

- Lighting contactor cabinets — refer to the supplemental installation instructions and the *Musco Control System Summary*.
- Control-Link® control system — refer to the supplemental installation instructions and *Musco Control System Summary*.

Always dispose of electronic waste in accordance with all applicable laws and regulations.

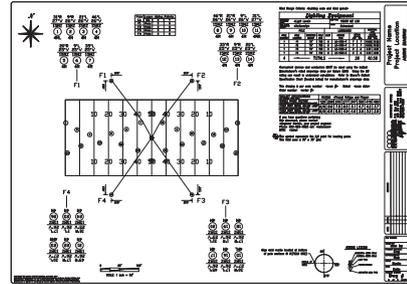
Before You Begin

Documents We Provide

Field Aiming Diagram

The *Field Aiming Diagram* is your map for locating all poles on your project. It gives this information:

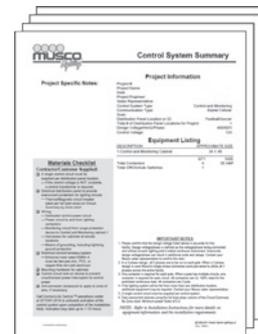
- Pole IDs, locations, and heights
- Luminaire IDs
- Field origin for coordinate measuring
- Aiming points for each pole
- Poletop luminaire assembly mounting height
- Full load current for each luminaire



Control System Summary

Projects with a control system include a *Control System Summary*. It gives this information:

- Control system diagram and details
- Contactors and cabinets
- Lighting circuits
- Voltage, phase, and frequency
- Full load current for each circuit



Installation Instructions: SportsCluster Green™ Lighting System

Electrical Components Enclosure

Hardware Sorting

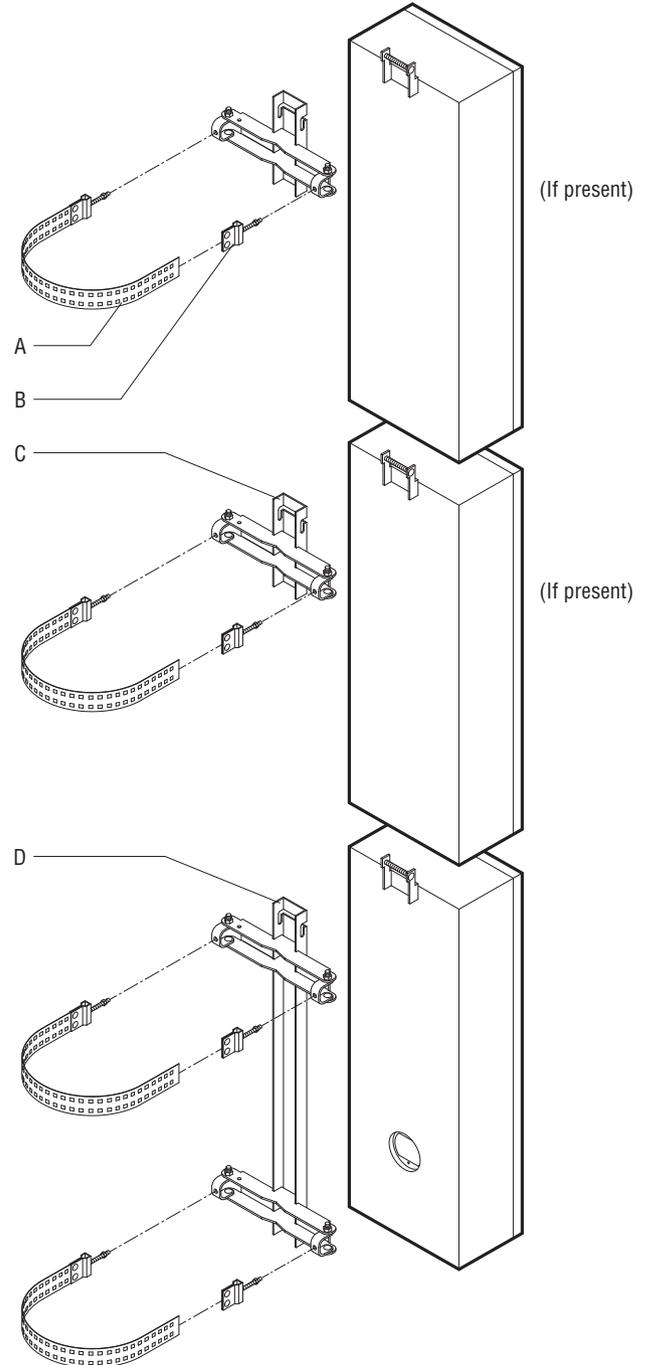
Electrical components enclosure hardware will require sorting before assembly.

Round Poles

Item	Description	Quantity (per stack)	Note
A	Strap assembly	2–4	See strap selection table.
B	Strap bracket	2–4	
C	Hanger bracket (short)	0–2	
D	Hanger bracket (tall)	1	Select hanger bracket approximately 3 in (76 mm) shorter than enclosure height. Hanger bracket arm width is 14 in (356 mm).

Strap Selection

Diameter	Strap Length
0–19 in (0–483 mm)	45 in (1143 mm)
19.1–24 in (483–610 mm)	60 in (1524 mm)
24.1–30 in (610–762 mm)	78 in (1981 mm)
30.1–36 in (762–914 mm)	96 in (2438 mm)
36.1–42 in (914–1067 mm)	114 in (2896 mm)
42.1–48 in (1067–1219 mm)	132 in (3353 mm)



Installation Instructions: SportsCluster Green™ Lighting System

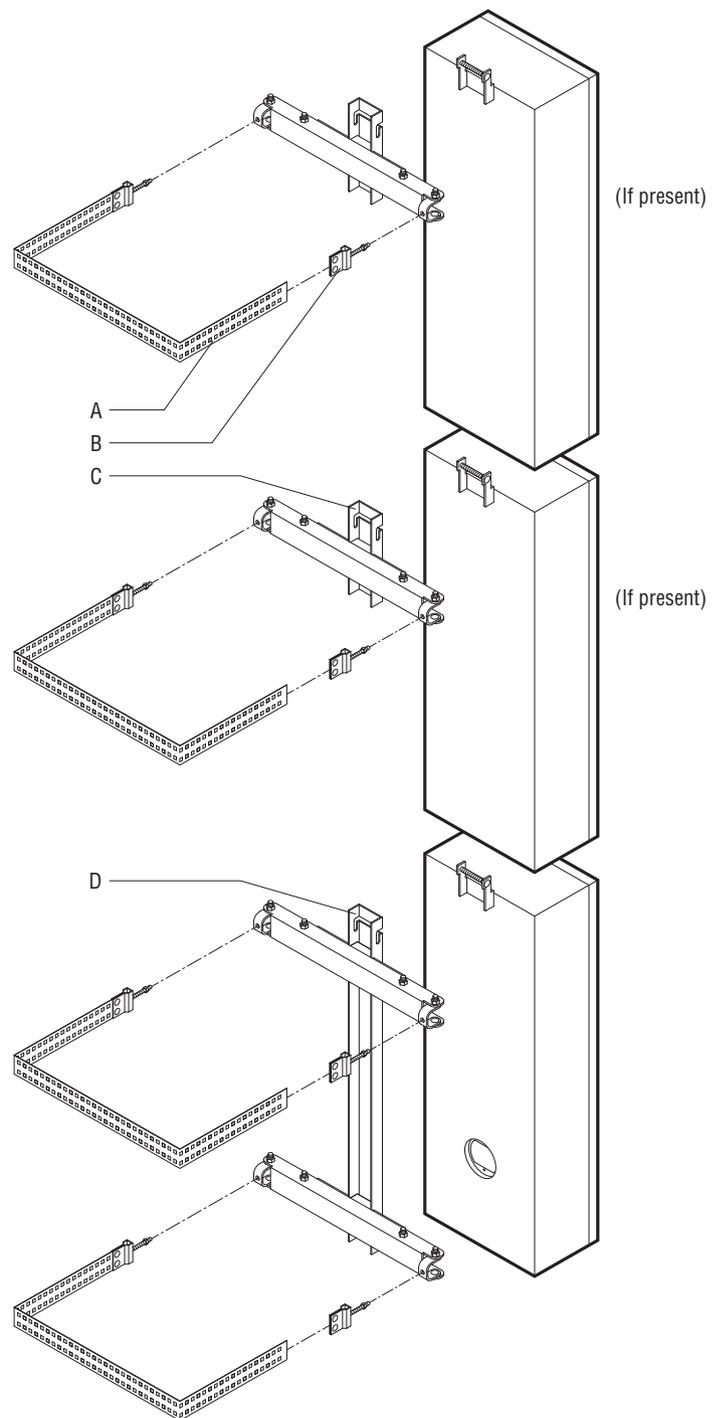
Electrical Components Enclosure

Square Poles

Item	Description	Quantity (per stack)	Note
A	Strap assembly	2-4	See strap and bracket selection table.
B	Strap bracket	2-4	
C	Hanger Bracket (short)	0-2	See strap and bracket selection table.
D	Hanger bracket (tall)	1	Select hanger bracket approximately 3 in (76 mm) shorter than the enclosure height. See strap and bracket selection table.

Strap and Bracket Selection

Pole Width	Strap Length	Bracket Arm Width
0 – 11 in (0 – 280 mm)	45 in (1143 mm)	14 in (356 mm)
11.1 – 16 in (280 – 406 mm)	45 in (1143 mm)	18.5 in (470 mm)
16.1 – 20 in (406 – 508 mm)	60 in (1524 mm)	22.5 in (572 mm)
20.1 – 24 in (508 – 610 mm)	78 in (1981 mm)	26.5 in (673 mm)
24.1 – 28 in (610 – 711 mm)	96 in (2438 mm)	14 in (356 mm)
28.1 – 32 in (711 – 813 mm)	114 in (2896 mm)	14 in (356 mm)
32.1 – 36 in (813 – 914 mm)	132 in (3353 mm)	14 in (356 mm)



Installation Instructions: SportsCluster Green™ Lighting System

Electrical Components Enclosure

Overview

The electrical components enclosure is factory-wired and tested. It contains lamp ballasts, capacitors, fusing, and other essential components of the lighting system in an accessible location. It is ideally mounted on the pole about 10 ft (3 m) above grade to discourage tampering. You may mount it in another accessible location, however limitations on conductor length and size apply.

Tools/Materials Needed

Musco Supplied

- ½ and ⅝ in offset combination wrenches
- Snips
- Field Aiming Diagram*

Contractor Supplied

- Torque wrench with ½ and ⅝ in sockets
- Large Phillips-head screwdriver
- Measuring tape
- Marker
- 10 ft (3 m) stepladder or small line truck

Installation Procedure



Verify pole ID on electrical components enclosure matches pole location on *Field Aiming Diagram*. If assembling pole on ground, determine final grade level on pole for proper measurement.

1

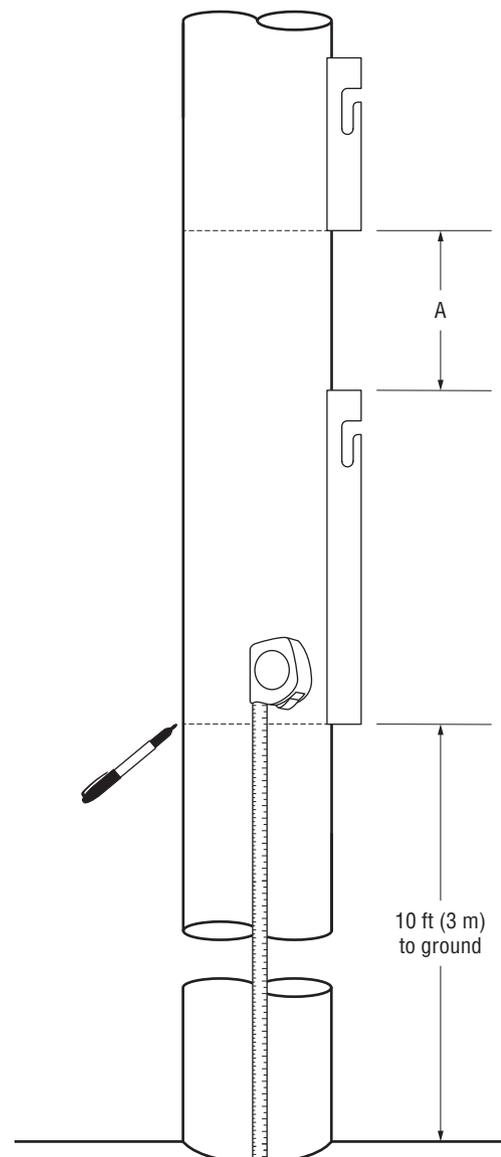
Measure and mark hanger bracket locations on pole.

Bracket Positioning

Stacker (Upper) Box Height	Dimension A
28½ in (724 mm)	19⅞ in (494 mm)
40½ in (1029 mm)	31⅞ in (799 mm)



Dimension A in chart allows for approximately 0.75 in (20 mm) gap between upper and lower enclosures.



Electrical Components Enclosure

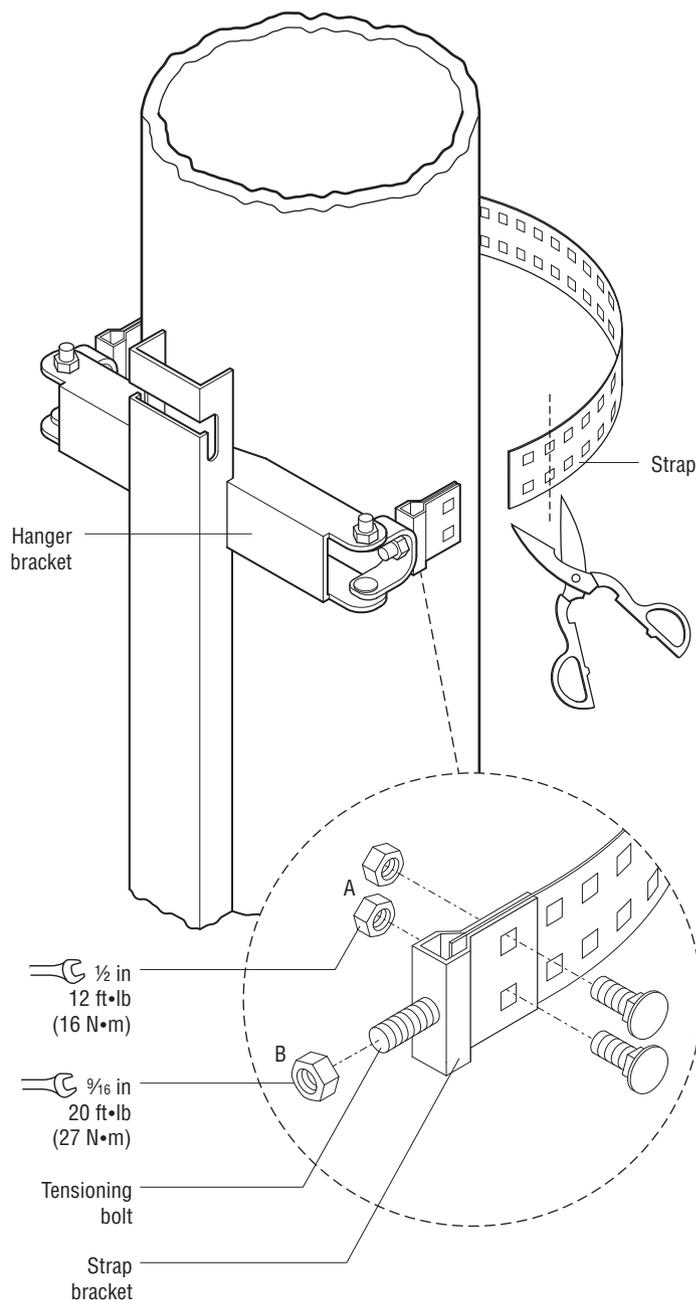
2 Cut straps to required length. Pull tight around pole and trim excess within 1 in (25 mm) of strap bracket. Cut across square holes, not between them.

3 Attach hanger brackets to pole. Torque $\frac{5}{16}$ in strap bracket hardware A to 12 ft•lb (16 N•m) using $\frac{1}{2}$ in socket and torque wrench. Torque all $\frac{3}{8}$ in tensioning nuts B to 20 ft•lb (27 N•m) using $\frac{9}{16}$ in socket and torque wrench.

 **Caution**
Falling equipment hazard.

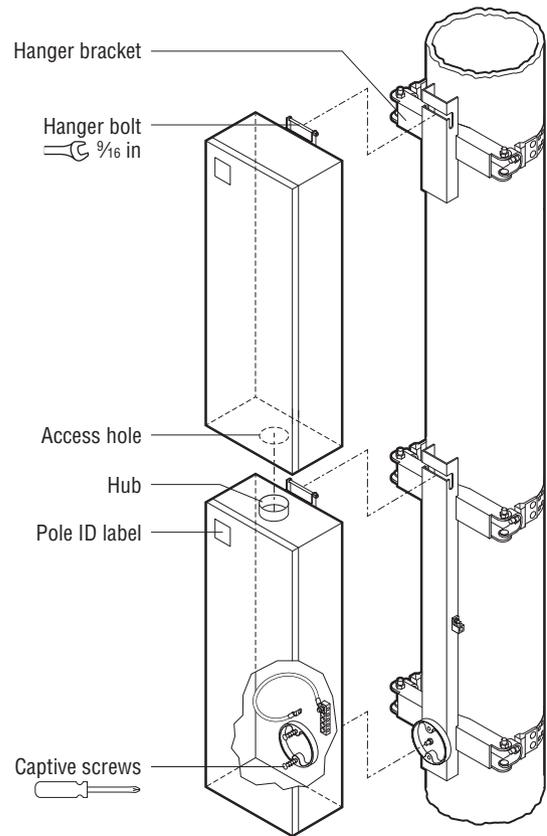
Ensure you meet torque values specified on all tensioning hardware.

 If tensioning bolt is fully seated and strap is not yet tight, trim strap at next set of holes and repeat step 3.

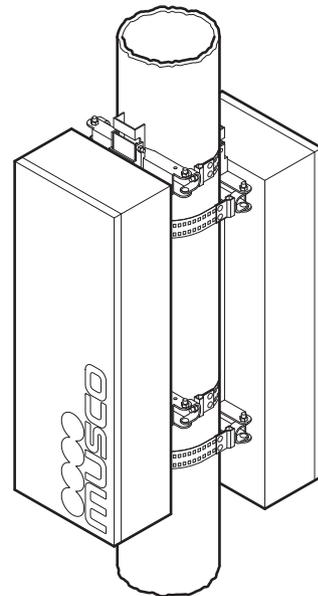


Electrical Components Enclosure

- 4 Mount bottom enclosure on hanger bracket. Tighten captive screws on hub. Tighten hanger bolt using provided $\frac{3}{16}$ in wrench.
- 5 Mount middle and/or top enclosures (if present) on hanger brackets. Align hub and drop enclosure onto hanger bracket. Tighten hanger bolt(s) using provided $\frac{3}{16}$ in wrench.



- 6 Repeat steps 1 – 5 for back-to-back or multiple stacks. Offset mounting straps vertically by 3 – 5 in (75 – 125 mm).



Poletop Luminaire Assembly

Overview

The luminaire assembly conveniently allows mounting of luminaires on the pole as a unit. Luminaires are factory built and shipped in individual cartons. Luminaires are factory aimed and ready for installation to poletop luminaire assembly. Do not disassemble.

Tools/Materials Needed

Musco Supplied

- 7/16 in ratcheting combination wrench

Assembly Procedure



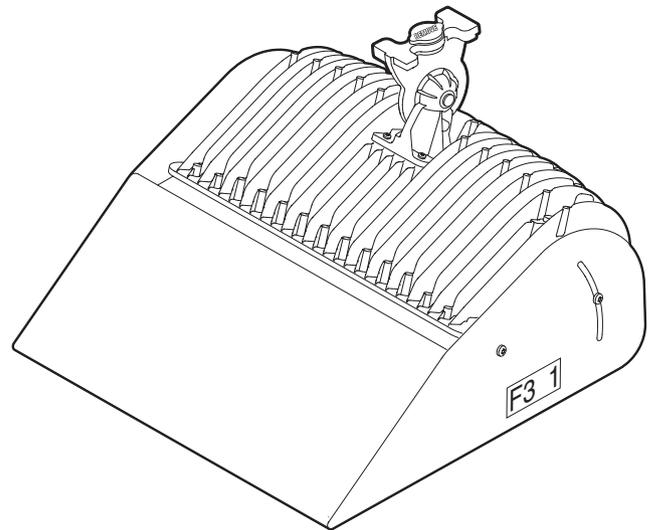
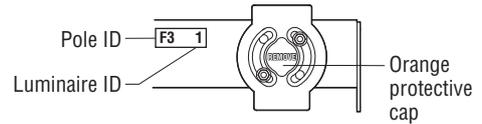
Verify pole ID on luminaire cartons matches pole and location on *Field Aiming Diagram*.

1

Remove orange protective caps from luminaire knuckle and mounting plate; discard.

Note: Do not remove temporary protective cover (if present) from luminaire until ready to set pole.

Note: The luminaire style may vary from what is shown.



Installation Instructions: SportsCluster Green™ Lighting System

Poletop Luminaire Assembly

- Match luminaire ID to crossarm and install luminaire onto mounting plate. Insert knuckle into mounting plate and pivot into position.

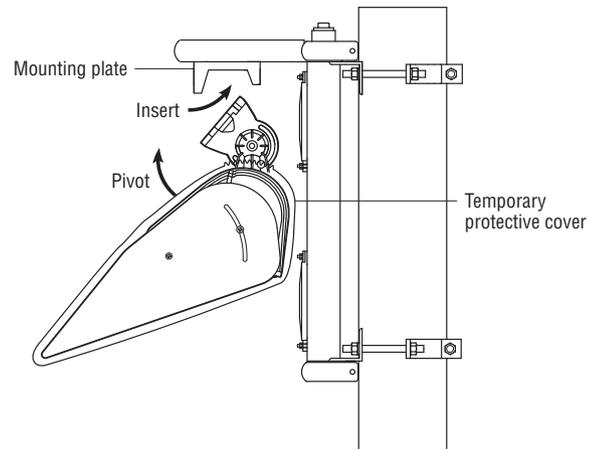
Note: The luminaire style may vary from what is shown.

Luminaire	Weight
96 LED	35 lbs (16 kg)
228/216 LED	45 lbs (20 kg)
228NB LED	95 lbs (43 kg)

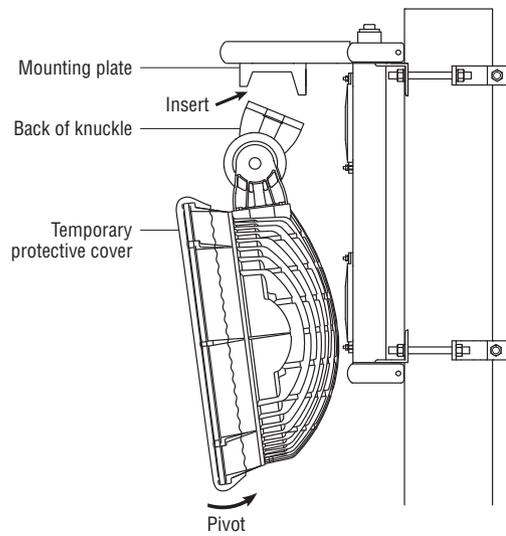


Caution

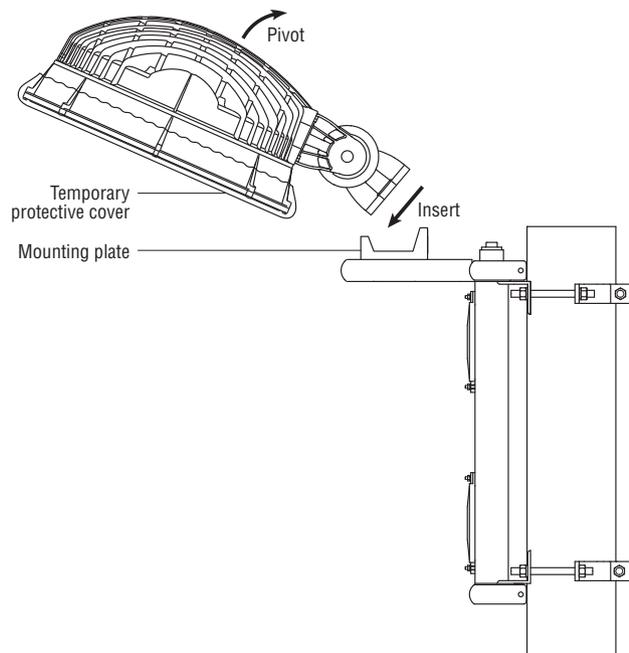
Luminaire may be heavy. Lift carefully with two people to avoid injury.



Or

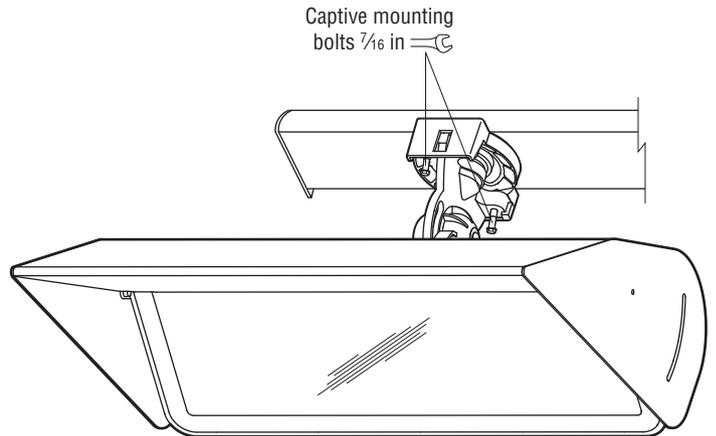


Or



Poletop Luminaire Assembly

- 3** Tighten captive mounting bolts. Torque must not exceed 20 ft•lb (27 N•m). To avoid overtightening, use provided $\frac{7}{16}$ in combination wrench.

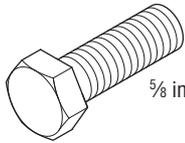


Installation Instructions: SportsCluster Green™ Lighting System

Setting Poletop Luminaire Assembly

Hardware Sorting and Preassembly

Determine necessary pole clamping hardware using illustrations provided. Partially preassemble pole clamping hardware for faster, easier aerial work. Match description and item letter below to bulk-shipped parts.



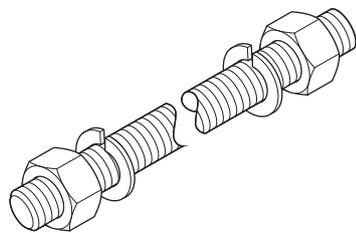
Item A
5/8 in x 1 1/4 in (44 mm) hex bolt
Part Number: PC-139-1



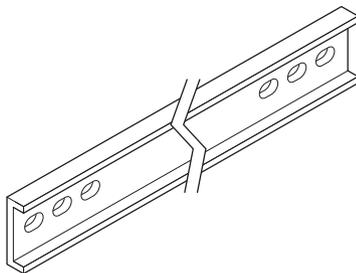
Item B
5/8 in lock washer
Part Number: PC-140-1



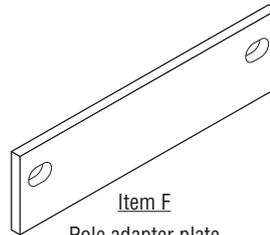
Item C
5/8 in hex nut (standard)
Part Number: PC-141-1



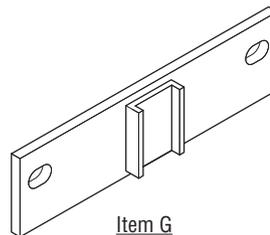
5/8 in threaded rod with nuts and washers		
Item	Length	Part Number
D1	9 1/2 in (241 mm)	996-PC1001
D2	12 in (305 mm)	SCR-1571-2
D3	14 in (356 mm)	996-PC1002
D4	23 1/2 in (597 mm)	SCR-1571-1
D5	29 1/2 in (749 mm)	SCR-1573-1
D6	35 1/2 in (902 mm)	SCR-1575-1
D7	41 1/2 in (1054 mm)	SCR-1577-1



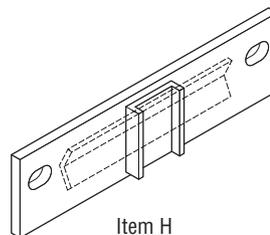
3 in channel		
Item	Length	Part Number
E1	15 1/2 in (394 mm)	SCR-1501-1
E2	23 1/2 in (597 mm)	SCR-1500-1
E3	28 1/2 in (724 mm)	SCR-1502-1
E4	34 1/2 in (876 mm)	SCR-1504-1
E5	41 in (1041 mm)	SCR-1506-1



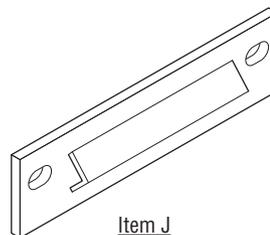
Item F
Pole adapter plate
5/8 in x 3 in (76 mm) x 11 1/4 in (286 mm)
Part Number: SCR-1119-1



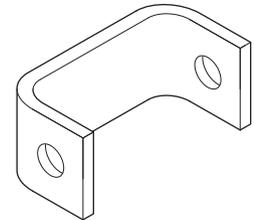
Item G
Pole adapter plate with channel
5/8 in x 3 in (76 mm) x 11 1/4 in (286 mm)
Part Number: PC-143



Item H
Pole adapter plate with channel and brace
5/8 in x 3 in (76 mm) x 11 1/4 in (286 mm)
Part Number: PC-142



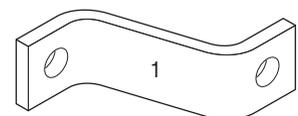
Item J
Pole adapter plate with brace
5/8 in x 3 in (76 mm) x 11 1/4 in (286 mm)
Part Number: SCR-1121-1



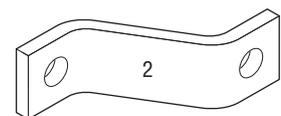
Item K
C-shaped bracket
1 3/4 in (44 mm) wide
Part Number: SCR-1120-1



Item W
W-shaped bracket
1 3/4 in (44 mm) wide
Part Number: PC-135



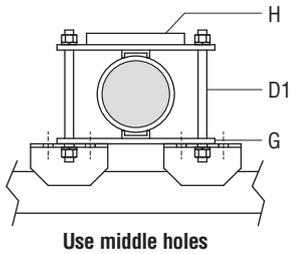
Item Z1
Z-shaped bracket, type 1
steep angle 1 3/4 in (44 mm) wide
Part Number: PC-210



Item Z2
Z-shaped bracket, type 2
shallow angle 1 3/4 in (44 mm) wide
Part Number: SCR-1118-1

Setting Poletop Luminaire Assembly

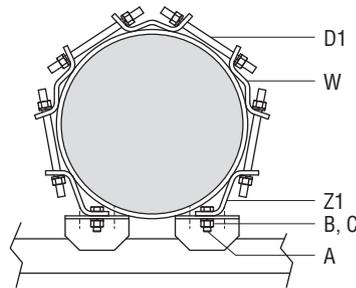
Round poles – front side only



Use middle holes

Up to 5.50 in (140 mm) diameter

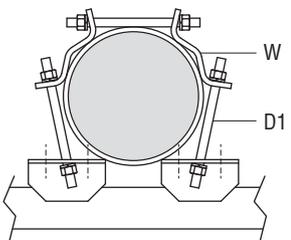
Item	Qty	Description
D1	(2)	5/8 in x 9 1/2 in (241 mm) threaded rod with nuts and washers
G	(1)	Pole adapter plate with channel
H	(1)	Pole adapter plate with channel and brace



Use middle holes

15.01 – 16.50 in (381 – 419 mm) diameter

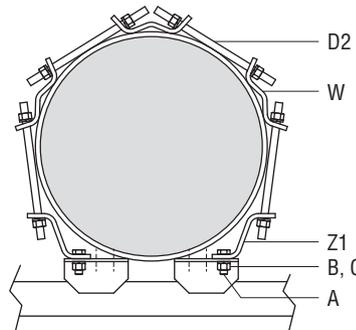
Item	Qty	Description
A	(2)	5/8 in x 1 1/4 in (44 mm) bolt
B	(2)	5/8 in lock washer
C	(2)	5/8 in hex nut
D1	(4)	5/8 in x 9 1/2 in (241 mm) threaded rod with nuts and washers
W	(3)	W-shaped bracket
Z1	(2)	Z-shaped bracket, type 1



Use middle holes

5.51 – 10.00 in (140 – 254 mm) diameter

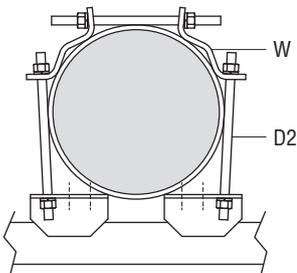
Item	Qty	Description
D1	(3)	5/8 in x 9 1/2 in (241 mm) threaded rod with nuts and washers
W	(2)	W-shaped bracket



Use outer holes

16.51 – 20.00 in (419 – 508 mm) diameter

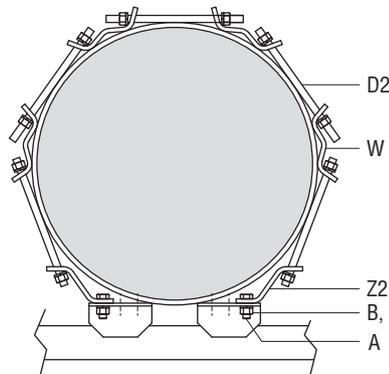
Item	Qty	Description
A	(2)	5/8 in x 1 1/4 in (44 mm) bolt
B	(2)	5/8 in lock washer
C	(2)	5/8 in hex nut
D2	(4)	5/8 in x 12 in (305 mm) threaded rod with nuts and washers
W	(3)	W-shaped bracket
Z1	(2)	Z-shaped bracket, type 1



Use outer holes

10.01 – 12.50 in (254 – 318 mm) diameter

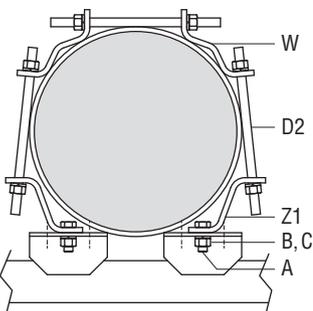
Item	Qty	Description
D2	(3)	5/8 in x 12 in (305 mm) threaded rod with nuts and washers
W	(2)	W-shaped bracket



Use outer holes

20.01 – 25.00 in (508 – 635 mm) diameter

Item	Qty	Description
A	(2)	5/8 in x 1 1/4 in (44 mm) bolt
B	(2)	5/8 in lock washer
C	(2)	5/8 in hex nut
D2	(5)	5/8 in x 12 in (305 mm) threaded rod with nuts and washers
W	(4)	W-shaped bracket
Z2	(2)	Z-shaped bracket, type 2



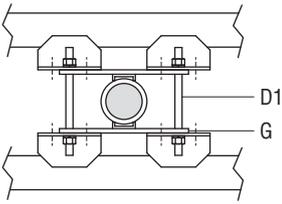
Use middle holes

12.51 – 15.00 in (318 – 381 mm) diameter

Item	Qty	Description
A	(2)	5/8 in x 1 1/4 in (44 mm) bolt
B	(2)	5/8 in lock washer
C	(2)	5/8 in hex nut
D2	(3)	5/8 in x 12 in (305 mm) threaded rod with nuts and washers
W	(2)	W-shaped bracket
Z1	(2)	Z-shaped bracket, type 1

Setting Poletop Luminaire Assembly

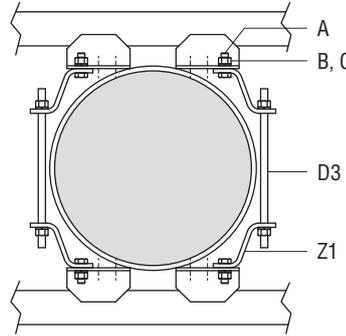
Round poles – front and back sides



Use middle holes

**Up to 4.00 in
(102 mm) diameter**

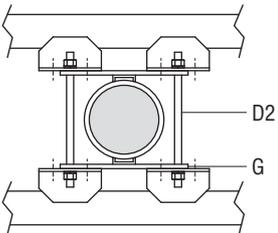
Item	Qty	Description
D1	(2)	5/8 in x 9 1/2 in (241 mm) threaded rod with nuts and washers
G	(2)	Pole adapter plate with channel



Use outer holes

**15.01 – 18.00 in
(381 – 457 mm) diameter**

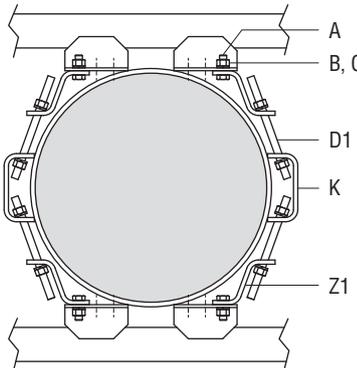
Item	Qty	Description
A	(4)	5/8 in x 1 1/4 in (44 mm) bolt
B	(4)	5/8 in lock washer
C	(4)	5/8 in hex nut
D3	(2)	5/8 in x 14 in (356 mm) threaded rod with nuts and washers
Z1	(4)	Z-shaped bracket, type 1



Use middle holes

**4.01 – 7.00 in
(102 – 178 mm) diameter**

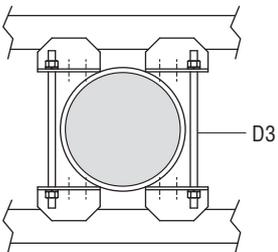
Item	Qty	Description
D2	(2)	5/8 in x 12 in (305 mm) threaded rod with nuts and washers
G	(2)	Pole adapter plate with channel



Use outer holes

**18.01 – 21.00 in
(457 – 534 mm) diameter**

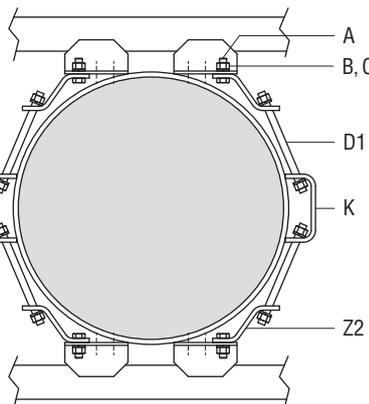
Item	Qty	Description
A	(4)	5/8 in x 1 1/4 in (44 mm) bolt
B	(4)	5/8 in lock washer
C	(4)	5/8 in hex nut
D1	(4)	5/8 in x 9 1/2 in (241 mm) threaded rod with nuts and washers
K	(2)	C-shaped bracket
Z1	(4)	Z-shaped bracket, type 1



Use outer holes

**7.01 – 11.00 in
(178 – 280 mm) diameter**

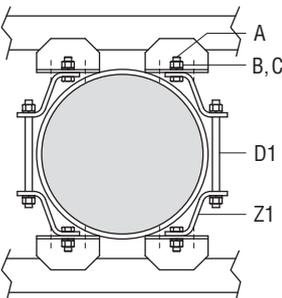
Item	Qty	Description
D3	(2)	5/8 in x 14 in (356 mm) threaded rod with nuts and washers



Use outer holes

**21.01 – 24.00 in
(534 – 610 mm) diameter**

Item	Qty	Description
A	(4)	5/8 in x 1 1/4 in (44 mm) bolt
B	(4)	5/8 in lock washer
C	(4)	5/8 in hex nut
D1	(4)	5/8 in x 9 1/2 in (241 mm) threaded rod with nuts and washers
K	(2)	C-shaped bracket
Z2	(4)	Z-shaped bracket, type 2



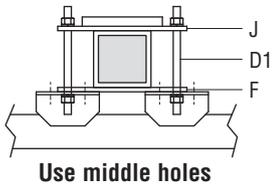
Use middle holes

**11.01 – 15.00 in
(280 – 381 mm) diameter**

Item	Qty	Description
A	(4)	5/8 in x 1 1/4 in (44 mm) bolt
B	(4)	5/8 in lock washer
C	(4)	5/8 in hex nut
D1	(2)	5/8 in x 9 1/2 in (241 mm) threaded rod with nuts and washers
Z1	(4)	Z-shaped bracket, type 1

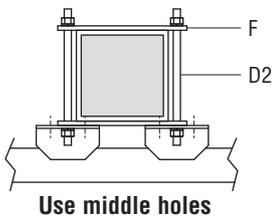
Setting Poletop Luminaire Assembly

Square poles – front side only



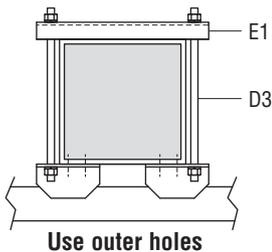
**Up to 5.00 in
(127 mm)**

Item	Qty	Description
D1	(2)	5/8 in x 9 1/2 in (241 mm) threaded rod with nuts and washers
F	(1)	Pole adapter plate
J	(1)	Pole adapter plate with brace



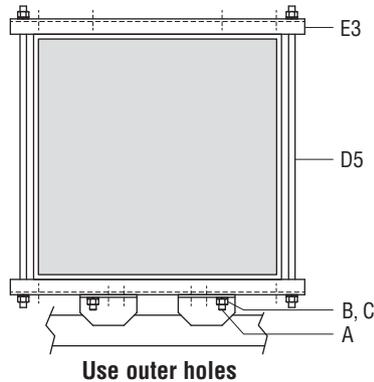
**5.01 – 8.00 in
(127 – 203 mm)**

Item	Qty	Description
D2	(2)	5/8 in x 12 in (305 mm) threaded rod with nuts and washers
F	(2)	Pole adapter plate



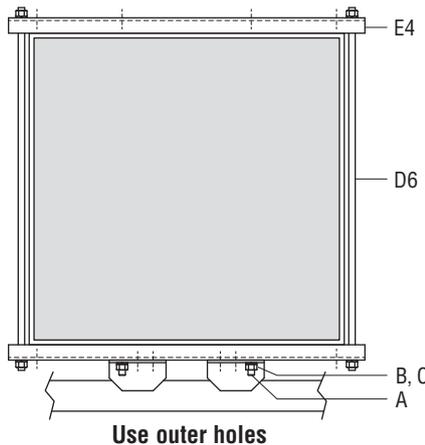
**8.01 – 11.00 in
(203 – 279 mm)**

Item	Qty	Description
D3	(2)	5/8 in x 14 in (356 mm) threaded rod with nuts and washers
E1	(1)	3 in channel x 15 1/2 in (394 mm)



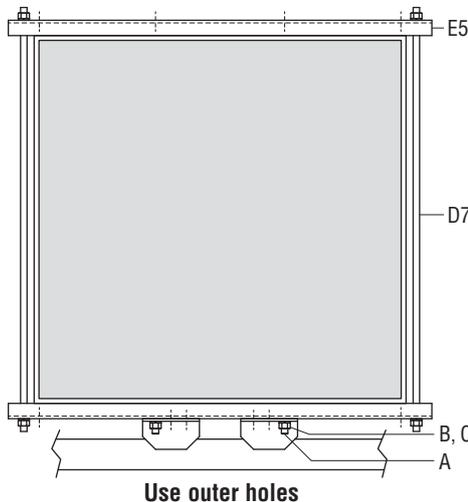
**18.51 – 24.00 in
(470 – 610 mm)**

Item	Qty	Description
A	(2)	5/8 in x 1 3/4 in (44 mm) bolt
B	(2)	5/8 in lock washer
C	(2)	5/8 in hex nut
D5	(2)	5/8 in x 29 1/2 in (749 mm) threaded rod with nuts and washers
E3	(2)	3 in channel x 28 1/2 in (724 mm)



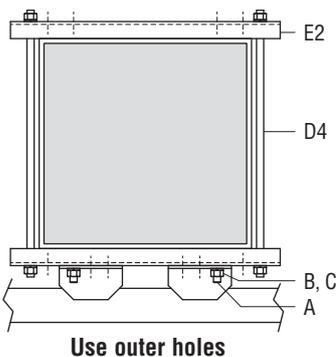
**24.01 – 30.50 in
(610 – 775 mm)**

Item	Qty	Description
A	(2)	5/8 in x 1 3/4 in (44 mm) bolt
B	(2)	5/8 in lock washer
C	(2)	5/8 in hex nut
D6	(2)	5/8 in x 35 1/2 in (902 mm) threaded rod with nuts and washers
E4	(2)	3 in channel x 34 1/2 in (876 mm)



**30.51 – 36.50 in
(775 – 927 mm)**

Item	Qty	Description
A	(2)	5/8 in x 1 3/4 in (44 mm) bolt
B	(2)	5/8 in lock washer
C	(2)	5/8 in hex nut
D7	(2)	5/8 in x 41 1/2 in (1054 mm) threaded rod with nuts and washers
E5	(2)	3 in channel x 41 in (1041 mm)

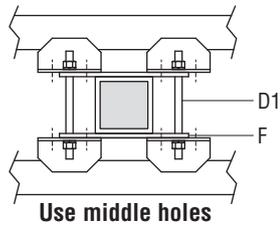


**11.01 – 18.50 in
(280 – 470 mm)**

Item	Qty	Description
A	(2)	5/8 in x 1 3/4 in (44 mm) bolt
B	(2)	5/8 in lock washer
C	(2)	5/8 in hex nut
D4	(2)	5/8 in x 23 1/2 in (597 mm) threaded rod with nuts and washers
E2	(2)	3 in channel x 23 1/2 in (597 mm)

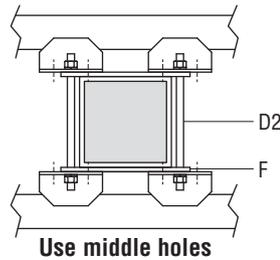
Setting Poletop Luminaire Assembly

Square poles – front and back side



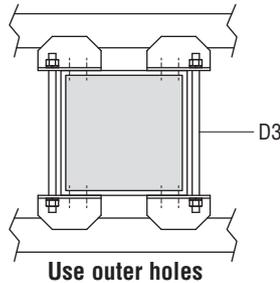
**Up to 5.00 in
(127 mm)**

Item	Qty	Description
D1	(2)	5/8 in x 9 1/2 in (241 mm) threaded rod with nuts and washers
F	(2)	Pole adapter plate



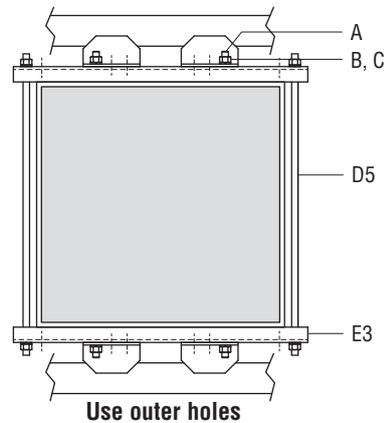
**5.01 – 8.00 in
(127 – 203 mm)**

Item	Qty	Description
D2	(2)	5/8 in x 12 in (305 mm) threaded rod with nuts and washers
F	(2)	Pole adapter plate



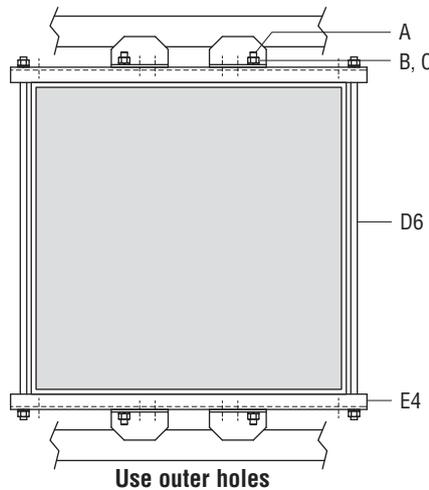
**8.01 – 11.00 in
(204 – 280 mm)**

Item	Qty	Description
D3	(2)	5/8 in x 14 in (356 mm) threaded rod with nuts and washers



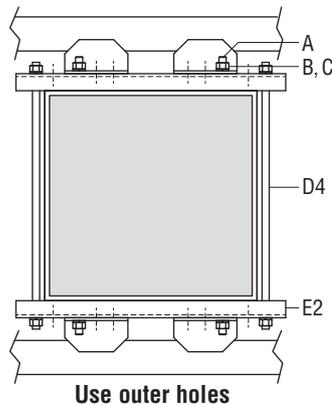
**18.51 – 24.00 in
(470 – 610 mm)**

Item	Qty	Description
A	(4)	5/8 in x 1 3/4 in (44 mm) bolt
B	(4)	5/8 in lock washer
C	(4)	5/8 in hex nut
D5	(2)	5/8 in x 29 1/2 in (749 mm) threaded rod with nuts and washers
E3	(2)	3 in channel x 2 8 1/2 in (724 mm)



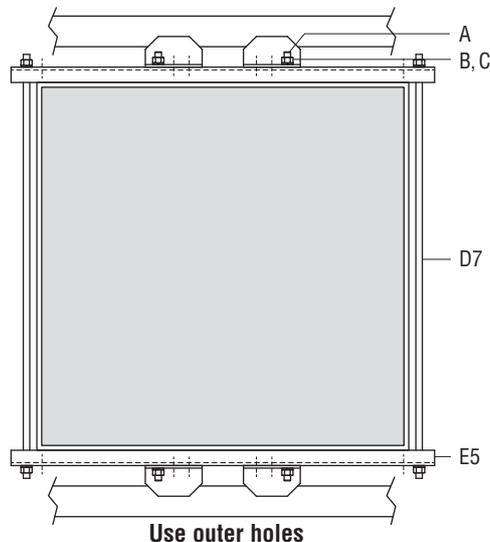
**24.01 – 30.50 in
(610 – 775 mm)**

Item	Qty	Description
A	(4)	5/8 in x 1 3/4 in (44 mm) bolt
B	(4)	5/8 in lock washer
C	(4)	5/8 in hex nut
D6	(2)	5/8 in x 35 1/2 in (902 mm) threaded rod with nuts and washers
E4	(2)	3 in channel x 3 4 1/2 in (876 mm)



**11.01 – 18.50 in
(280 – 470 mm)**

Item	Qty	Description
A	(4)	5/8 in x 1 3/4 in (44 mm) bolt
B	(4)	5/8 in lock washer
C	(4)	5/8 in hex nut
D4	(2)	5/8 in x 23 1/2 in (597 mm) threaded rod with nuts and washers
E2	(2)	3 in channel x 2 3 1/2 in (597 mm)



**30.51 – 36.50 in
(775 – 927 mm)**

Item	Qty	Description
A	(4)	5/8 in x 1 3/4 in (44 mm) bolt
B	(4)	5/8 in lock washer
C	(4)	5/8 in hex nut
D7	(2)	5/8 in x 41 1/2 in (1054 mm) threaded rod with nuts and washers
E5	(2)	3 in channel x 41 in (1041 mm)

Setting Poletop Luminaire Assembly

Overview

All luminaires are factory aimed to their exact position on the field. To ensure proper poletop luminaire assembly alignment, a simple-to-use alignment beam completes the precision field aiming. The alignment beam is attached in the factory to one luminaire on each poletop luminaire assembly.

Tools/Materials Needed

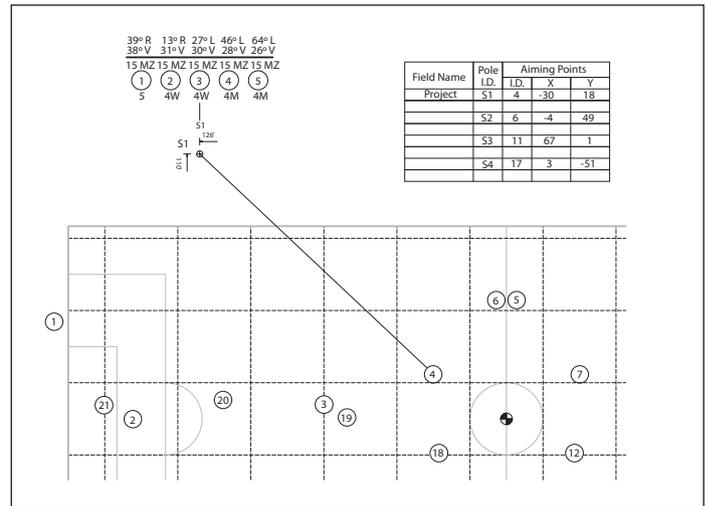
Contractor Supplied

- $\frac{15}{16}$ in open-end torque wrench or torque wrench with $\frac{15}{16}$ in crows-foot
- $\frac{15}{16}$ in open-end wrench
- Chalk or flags to mark aiming points on field
- Measuring tape

Installation Procedure

1

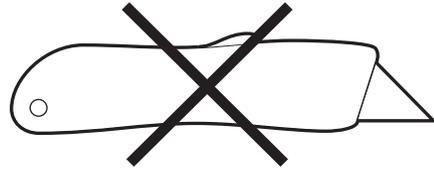
Plot and mark aiming points on field. Refer to *Field Aiming Diagram*. Plot one aiming point per poletop luminaire assembly.



Setting Poletop Luminaire Assembly

2

Remove plastic wrap from luminaires. Do not use knife.



Warning
Hazard of falling personnel and materials.

Use separate lifting equipment for assemblers and materials. Sling luminaire assembly properly and do not release from suspension until all pole clamping hardware is installed and torqued.

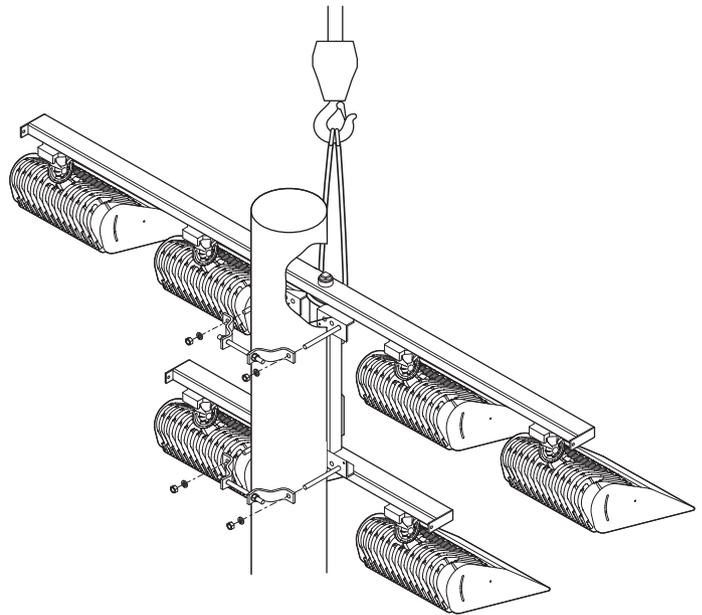
3

Attach luminaire assembly to pole using pole clamping hardware.

If pole is already standing, sling and lift luminaire assembly to poletop location.

If assembling pole on ground, ensure:

- Crossarms are parallel
- All pole clamping hardware is torqued to 80 ft•lb (108 N•m) using $\frac{15}{16}$ in open-end torque wrench before lifting pole (see step 5). Instead of turning luminaire assembly, turn pole to align with aiming point.



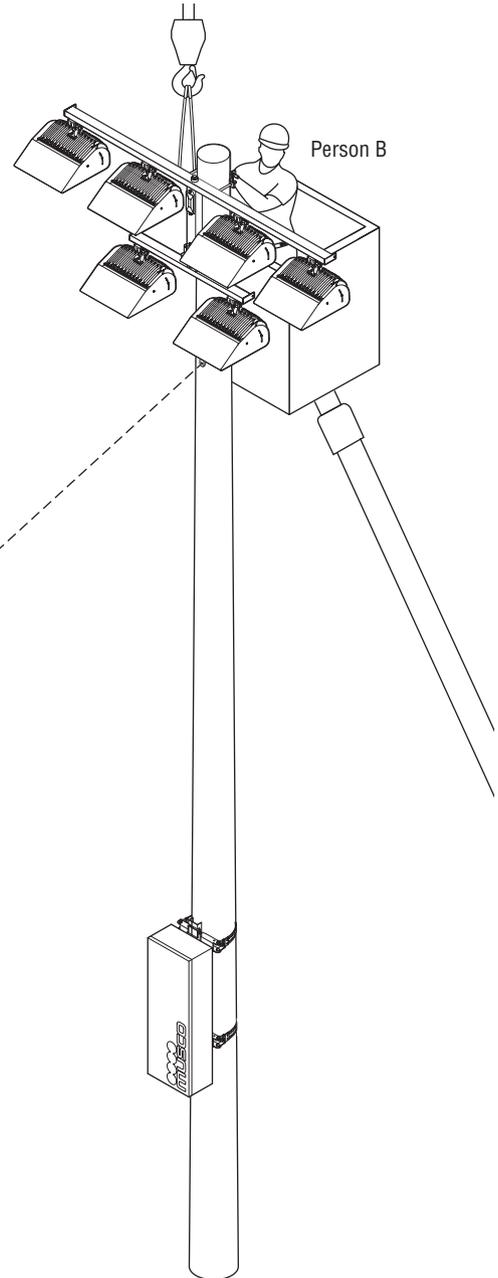
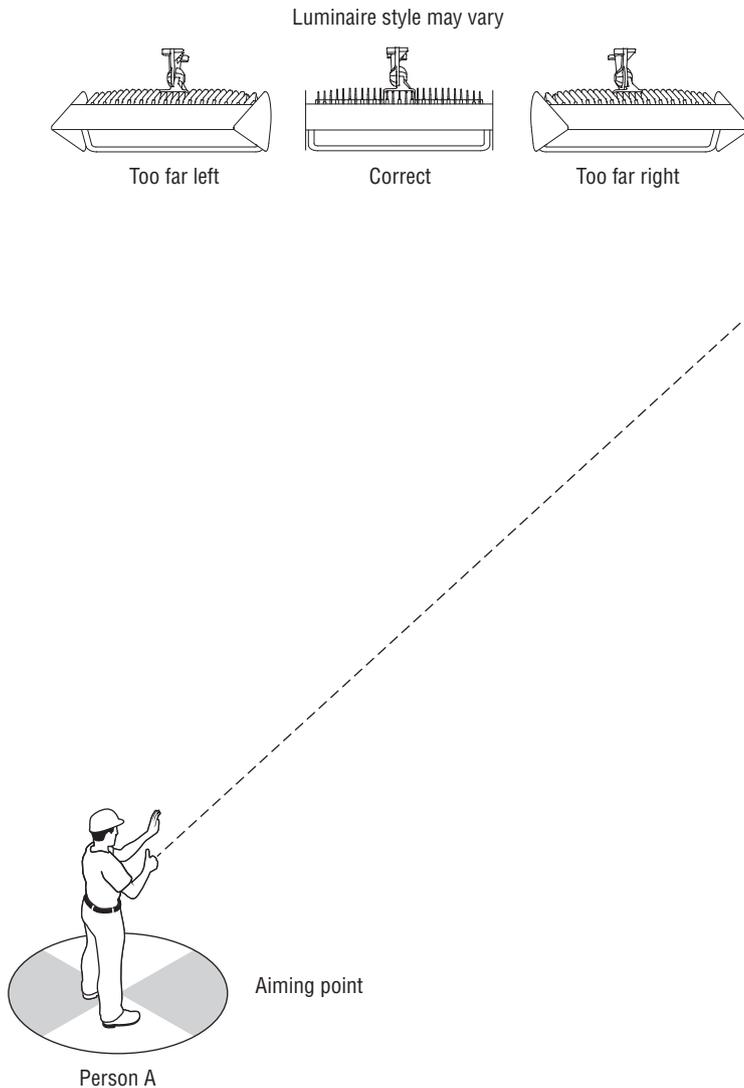
Setting Poletop Luminaire Assembly

4

Aim luminaire assembly. This step requires two people.

Person A: Stand on field aiming point and using binoculars, look at luminaire corresponding to the aiming point. Signal person B to rotate luminaire assembly left or right until luminaire aligns with aiming point.

Person B: Following direction from person A, rotate luminaire assembly left or right until it is aligned.



Warning
Falling material hazard.

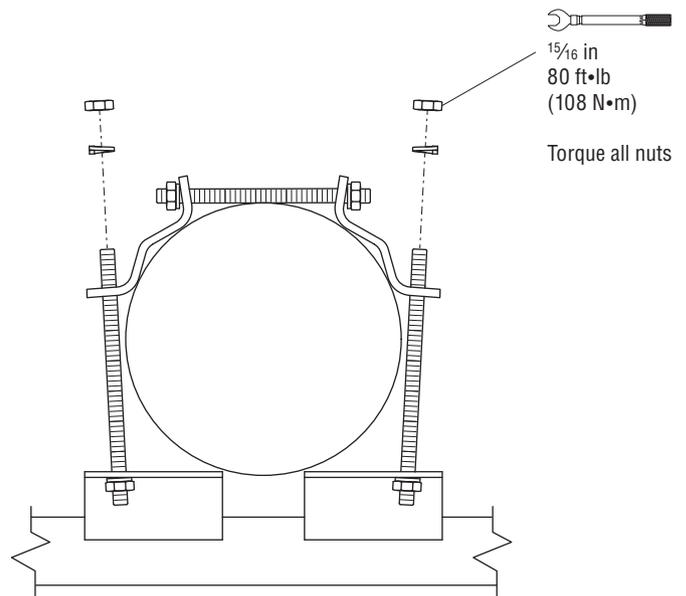
If erecting pole with luminaire assembly attached, do not attach rigging to luminaire assembly. Follow pole supplier instructions for lifting

Setting Poletop Luminaire Assembly

5 Tighten pole clamping hardware. Torque all nuts to 80 ft•lb (108 N•m) using $1\frac{5}{16}$ in open-end torque wrench.

 Ensure back-to-back crossarms remain parallel while tightening.

6 After all hardware is torqued and poletop luminaire assembly is secure, release rigging.

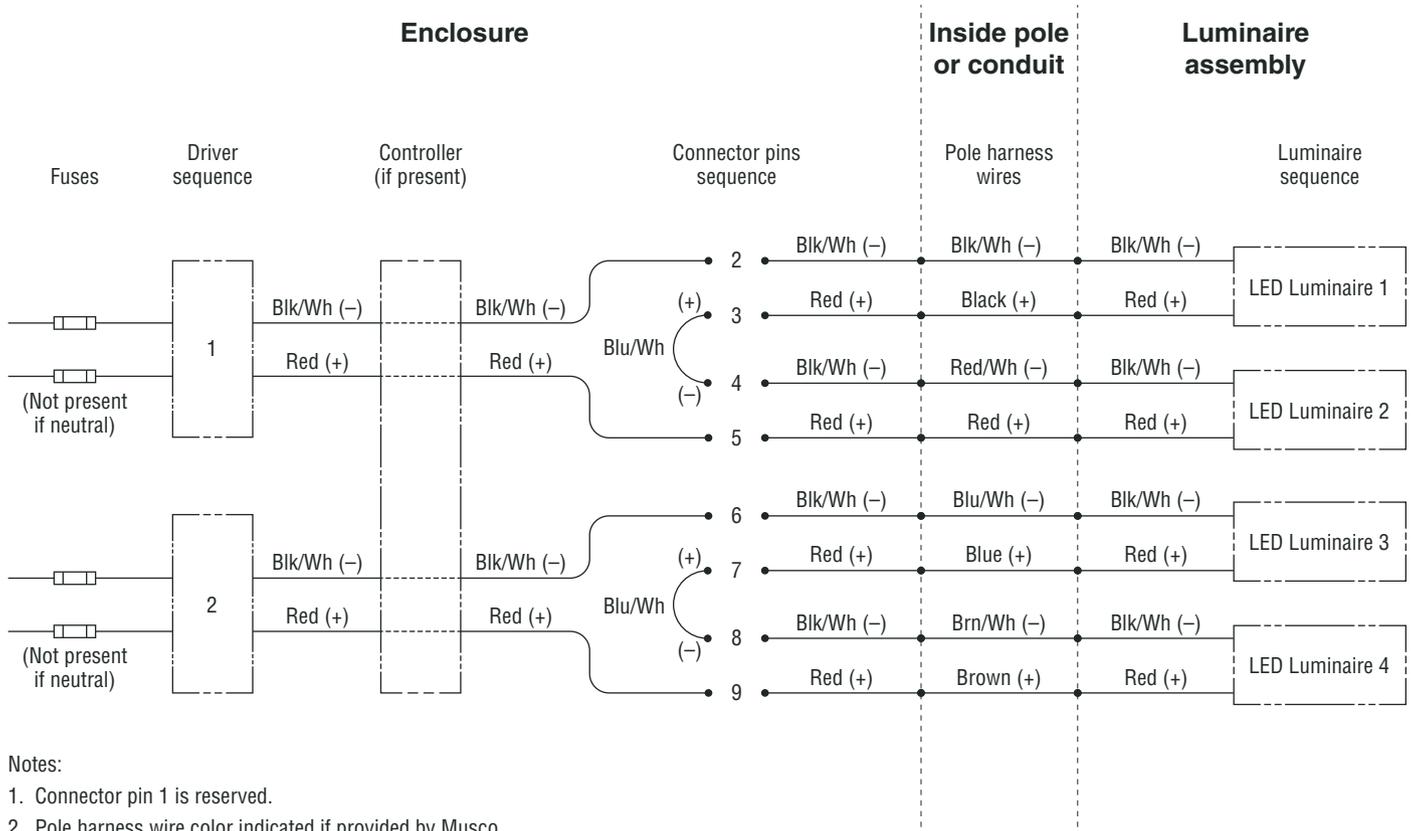


Note: Pole clamping hardware configuration varies with pole diameter and shape. See pages 15 – 19 for proper pole clamping hardware configuration. Poletop luminaire assemblies mounted to tapered poles may have different configurations for upper and lower clamps.

Wiring

Overview and System Diagram

A qualified electrician must install supply wiring for each lighting circuit and install harness between electrical components enclosure and crossarm assemblies. Depending on configuration, Musco may supply factory-built pole harness(es), and/or disconnect switch(es) in the electrical components enclosure. Each electrical components enclosure may contain up to four drivers. Each driver may power up to two luminaires.



Notes:

1. Connector pin 1 is reserved.
2. Pole harness wire color indicated if provided by Musco.
3. Diagram shows driver powering two luminaires wired in series. If single luminaire is powered from driver, only one pair of wires per driver is required in pole harness.

Installation Instructions: SportsCluster Green™ Lighting System

Wiring

Tools/Materials Needed

Musco Supplied

- Field Aiming Diagram*
- Control System Summary*
- 7/16 in ratcheting combination wrench
- 3/16 in hex key (ground bar)
- 5 mm hex key (125 A disconnect terminals if present)
- Wire harness ID labels

Contractor Supplied

- Conduit and hubs rated NEMA 3R (IP44) or better
- Supply and equipment grounding conductor sized per code.
- Standard screwdriver
- Hole punch or stepped drill/hole saw
- Electrical fish tape
- 10 ft (3 m) stepladder or small line truck

Installation Procedure



Only qualified personnel may perform wiring. Route wires as shown in step 1, but leave the final connections for your electrician.

1

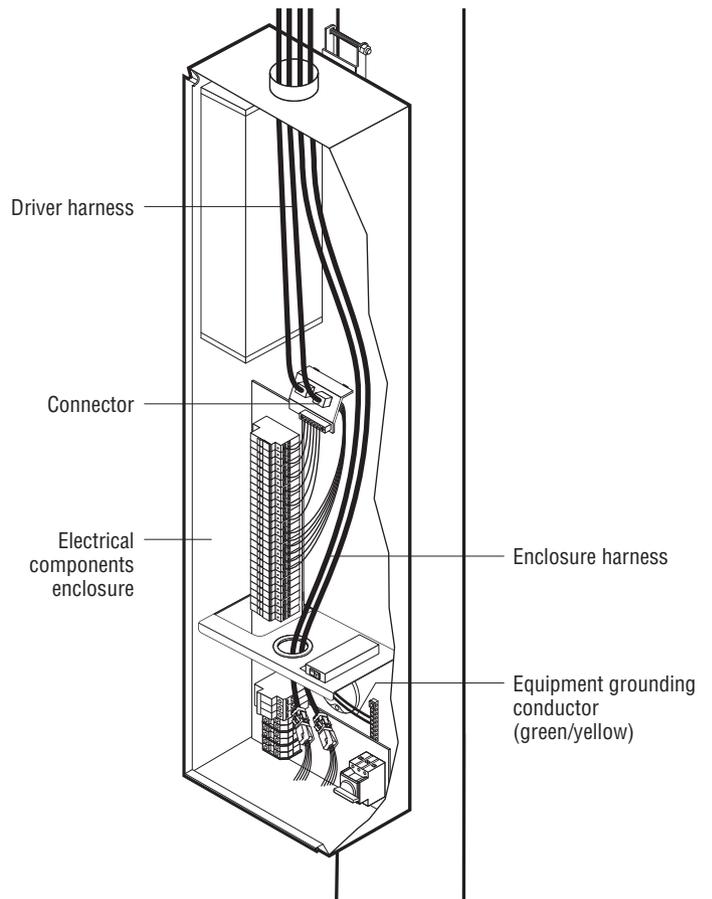
Route driver harnesses from top and middle enclosures to bottom enclosure and plug into primary wire harnesses mounted in bracket.

2

Route equipment grounding conductor and enclosure harnesses from top and middle enclosures to bottom enclosure.

3

Repeat steps 1 – 2 for each stack.



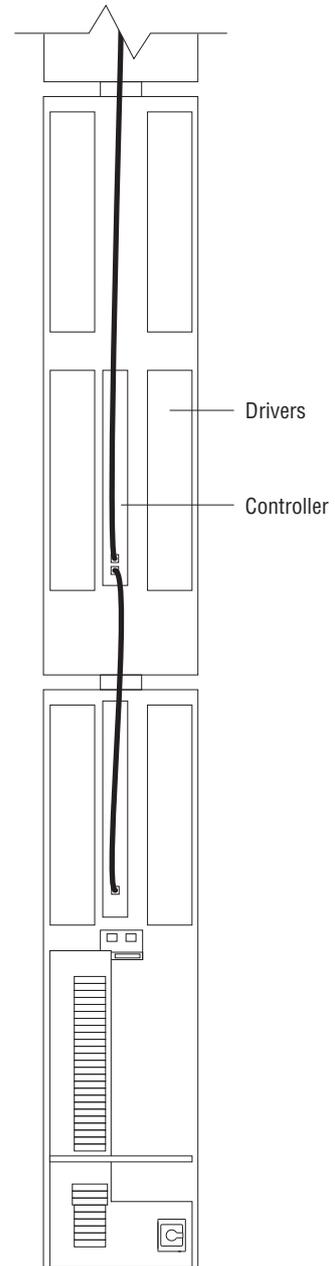
Wiring



If controller is not present, skip to step 5.

4

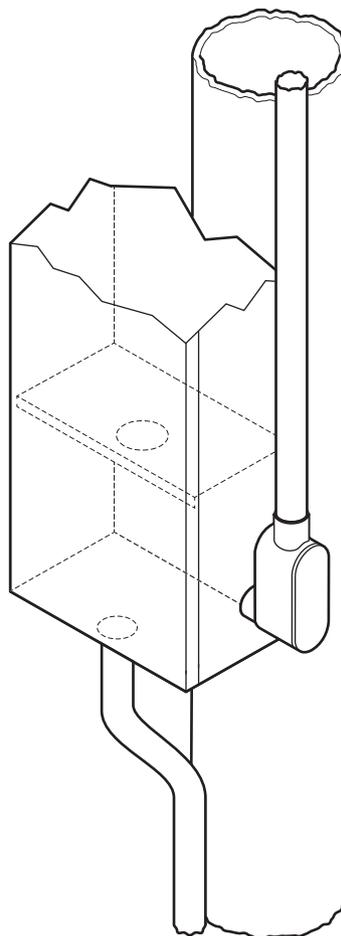
Route and connect communication cable in each electrical components enclosure to termination point in next sequential electrical components enclosure per illustration.



Wiring

- 5 Install conduit as needed for supply and/or luminaire wiring. Cut all entryways below electrical components enclosure partition.

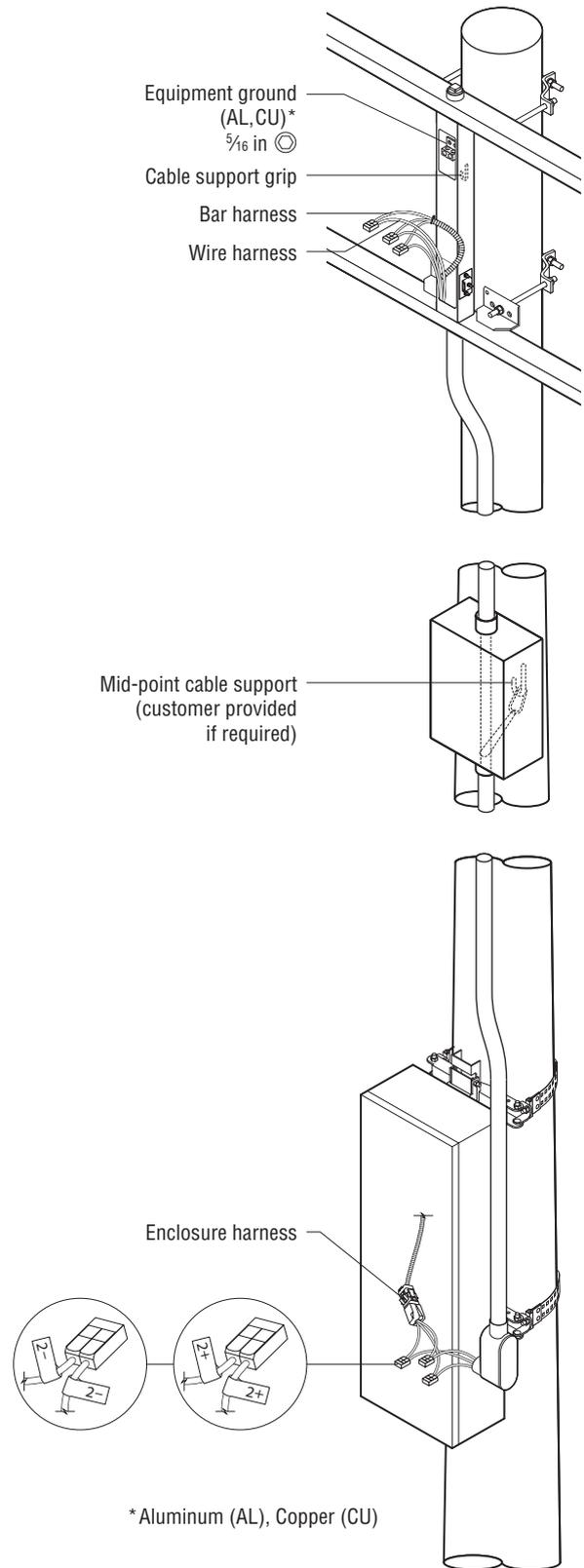
Note: Connect the electrical components enclosure stacks that share a circuit, with conduit below partition in order to route primary wires to distribution lugs.



Installation Instructions: SportsCluster Green™ Lighting System

Wiring

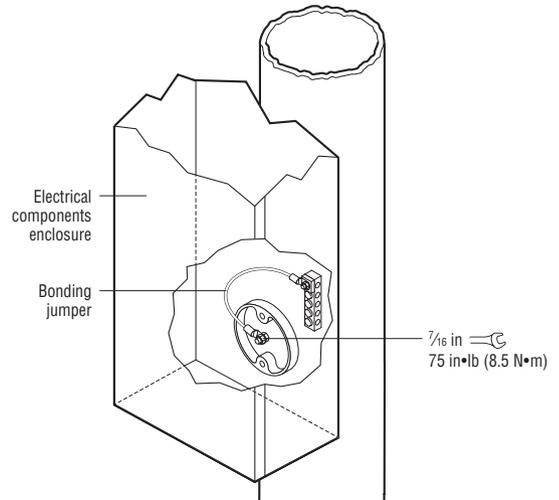
- ✓ Verify pole ID on wire harness matches pole location on *Field Aiming Diagram*.
- 6 Fish all pole wire harnesses between poletop and appropriate electrical components enclosure(s).
- 7 Attach support grips at poletop and midpole (if required due to pole height).
- 8 Trim wire harness to length (if required). If luminaire polarity wire ID labels are trimmed off, apply new ID labels (supplied by Musco).
- 9 Connect pole harness at poletop and inside electrical components enclosure(s). Match luminaire ID and wire polarity per each wire label. Use the Musco-provided LEVER-NUTS® wire connectors



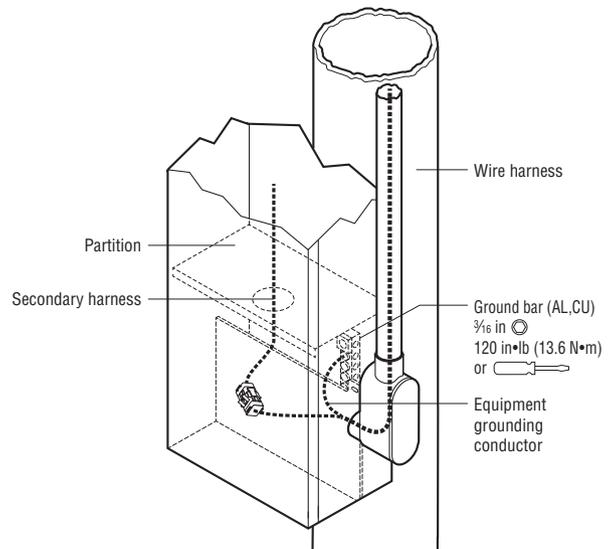
Installation Instructions: SportsCluster Green™ Lighting System

Wiring

- 10** Using $\frac{7}{16}$ in wrench connect bonding jumper from equipment ground bar in electrical components enclosure to mounting plate.



- 11** Connect equipment ground wire to ground bar inside electrical components enclosure.



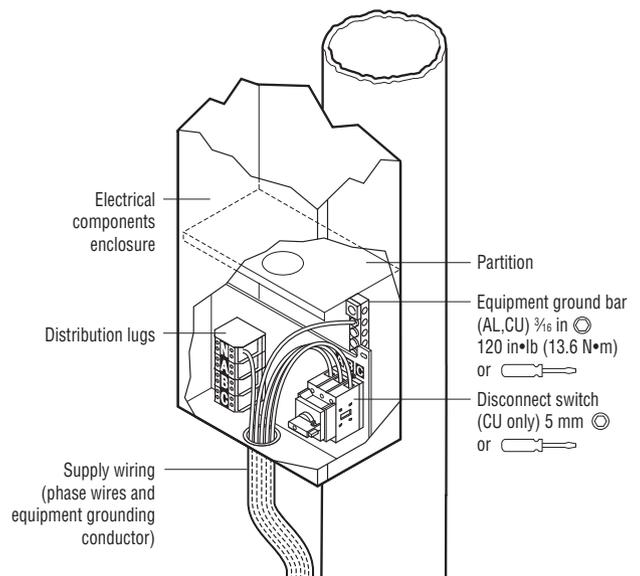
-  Musco *Control System Summary* or *Field Aiming Diagram* provides electrical loading information needed to size wire and switchgear. Musco provides instructions for installing Control-Link™ control system or lighting contactor cabinet when these items are part of your project.

- 12** Pull supply wiring into enclosure below partition. Poles with multiple circuits have multiple disconnect switches, generally in separate enclosures.

- 13** Land equipment grounding conductor from supply on ground bar.

- 14** Connect equipment grounding conductors (green/yellow) from each upper enclosure to equipment ground bar in bottom enclosure. If pole has multiple stacks, connect bonding jumper from stack with circuit disconnect. Tighten lugs using $\frac{3}{16}$ in hex key.

- 15** Land supply wires on disconnect switch, and land neutral wire on distribution lugs.



-  Disconnect is rated for copper wire only. Contact Musco for adaptor or use UL-listed adaptor for aluminum wire.

Lightning Ground

Overview

Proper pole grounding is important to protect people and property from the hazards of lightning. This installation instruction is based on the recommendations found in NFPA 780 for lightning protection. Check local and other applicable codes for any additional requirements.

Tools/Materials Needed

Musco Supplied

- 5/16 in hex key
- 1/2 in wrench
- 3/16 in hex key

Contractor Supplied

- Shovel
- 5/8 in (16 mm) copper clad steel grounding electrode 8 ft (2.5 m) long, one per pole
- Grounding electrode conductor, see table
- Saddle clamp (rated for wire)
- Copper-to-aluminum connector (if required)
- Exothermic fusion-welding kit
- Bonding jumper

Installation Procedure

1 Excavate location near pole to depth of at least 2 ft (0.6 m). Drive grounding electrode into ground. In case of shallow bedrock or obstruction, you may drive electrode at 45° or shallower angle.

 Use driving sleeve to prevent deforming end of electrode. Trim any deformed portion for proper exothermic fusion-welding.

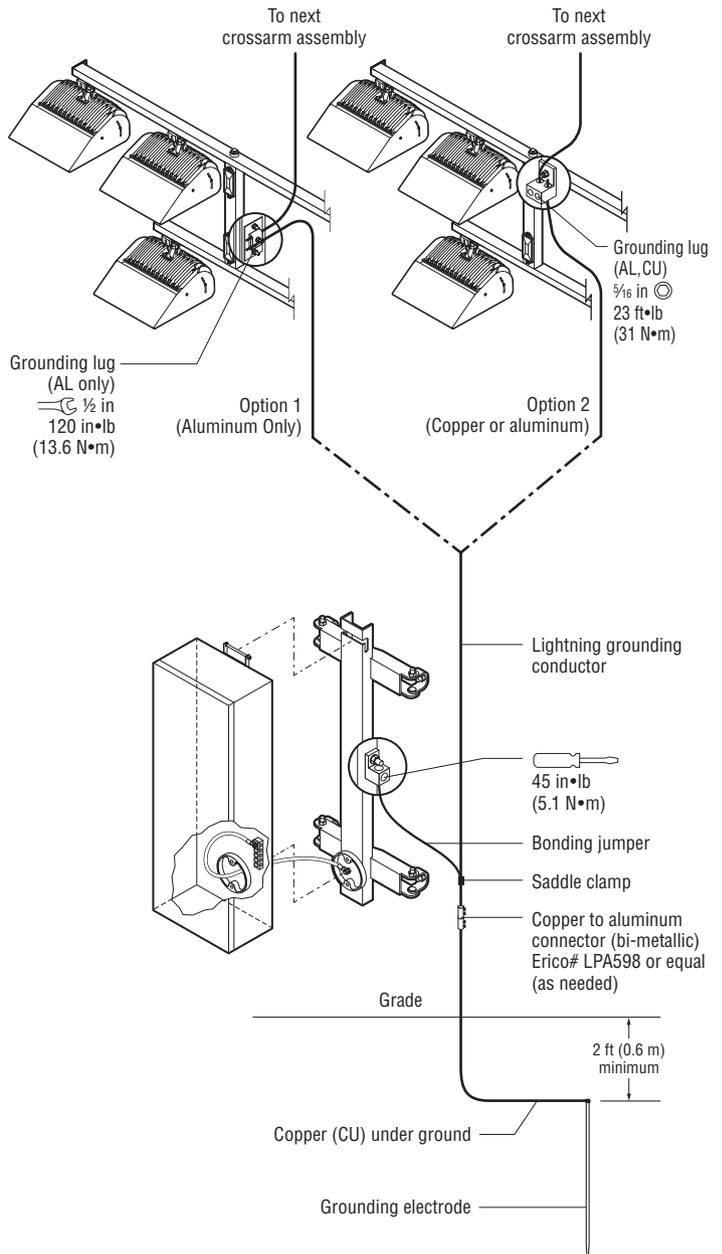
2 Install lightning grounding conductor from poletop to grounding electrode. Support per code. Attach to grounding lug on each crossarm assembly. When routing below grade, do not allow conductor to dip below top of grounding electrode.

Lightning Grounding Conductor

Attach to external lightning grounding lug (rated for aluminum only) or to internal lightning grounding lug (dual-rated).

Mounting Height	Bare Stranded Aluminum*	Bare Stranded Copper
Up to 75 ft (23 m)	1/0 AWG (cross-sectional area of 53.5 mm ²)	2 AWG (cross-sectional area of 33.6 mm ²)
Over 75 ft (23 m)	4/0 AWG (cross-sectional area of 107.2 mm ²)	2/0 AWG (cross-sectional area of 67.4 mm ²)

* Copper grounding conductor required for underground connection to grounding electrode. Use properly rated AL to CU connector.



Lightning Ground

- 3** Bond conductor to electrode using exothermic fusion-welding kit with ignitor and brush. Follow instructions inside kit.
- 4** Route bonding jumper from hanger bracket grounding lug to lightning grounding conductor. Attach with saddle clamp.
- 5** Backfill excavated area around grounding electrode.

Note: Regularly inspect and maintain lightning ground in accordance with applicable laws and regulations.



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Musco SportsCluster Green™ product referenced or shown may be protected by one or more of the following patents. United States Patent(s): D682459, D695949, D695952, D734525, D734532, 6969034, 7500764, 7918586, 7956551, 7956556, 8104925, 8508152, 8575866, 8789967, 9066401. Canada Patent(s): 158610, 158611. China Patent for Design: ZL201230474541.X, ZL201330222107.7, ZL201330222318.0, ZL201430207133.7, ZL201430388788.9, ZL201430388828.X. Germany Patent(s): 402014002112. Republic of Korea Patent(s): 30-0740472-00-02, 30-0748680, 30-0776415, 30-0819161. United Kingdom Patent(s): 4036147. U.S. and foreign patents pending. [Pat_059B]