Signal Systems

NEC Articles 250, 300, 344
T310.16, 352, 410, 590, & 725

Standard Specifications

• 8-20.3(14)
• 8-20.3(14)a signal controllers
• 8-20.3(14)b signal heads
• 9-29.13 traffic signal controllers
• 9-29.15 flashing beacon control
• 9-29.16 vehicular signal heads
• 9-29.17 signal head mounting brackets…
• 9-29.19 pedestrian push buttons
• 9-29.20 pedestrian signals
Controller Cabinet (Back)
Controller (Front) and Police Door
Type “E” Service to the Left
Controller Cabinet and Transformer
Good House Keeping Helps
Seal Under Cabinet

J-6c
Note 3
Aerial Signal Hanger
The rubber washer needs to be inside the fixture between the wall of the fixture and the steel washer. A bead of silicone sealant shall be applied around the perimeter of all top end cap openings prior to installation of the end cap assembly. 9-29.16(2)B
Ped Head E Mount (clamshell) J-6f

Left Mount Opens Down

Right Mount Opens Down
Side of Pole Mounts

Side mounts with terminal compartments

Type B – Ped

Type K - Vehicle

J-6f
This sign is required with the 5 section signal head.

5 Section Head and Sign
ADA Requires Wheel Chair Access

Good

Bad
ADA Option
Ped Pole With “D” Mount

J-6f
Ped Pole With “C” Mount

J-6f
Three Heads Three Types of Mounts

M, L & LE

J-6g
LED Red Arrow Is Failing

Red, Yellow and Green LED

9-29.16(2)A
4 Section Head “M” Mount

8-20.3(14)B
4 and 5 section stacks
mount between second
and third display

9-29.16(2)D
Louvered aluminum
Back plates
GEOMETRICALLY PROGRAMMED LOUVER INSTALLATION INSTRUCTIONS

Please read these instructions carefully before proceeding with installation of the GPL.

I. COMPONENTS

The GPL GL-1001 is completely assembled and ready for installation. Do not disassemble.

It is constructed of a Housing (2 halves) surrounding and enclosing the Baffles. Two Neoprene O-Rings encircle the GPL and seal it against the signal visor. (Fig. 1)

Six #10 thread forming screws are included with each assembly. Only four are required for fastening the GPL to the visor. (2 spares)

II. INSTALLATION TOOLS

An Installation Kit is recommended for installing the GPL in the signal visor.

The basic GL-2001 Installation Kit includes all of the necessary tools to install the GPL in a signal visor. The Optional GL-2002 Installation Kit includes all of the items in the basic GL-2001 and in addition includes a Cordless Makita Screw Gun with battery, battery charger, magnetic socket and larger tool box. See enclosed Tool Kit Bulletin #2007 for details.

III. PREPARATION OF THE GPL

Each plastic shipping bag contains one GPL and a bag containing 6 each #10-16 x 3/4” Slotted Hex Head Screws.

Rt. Turn signal as viewed from through lane. Green arrow programmed out on right side.
Programmable Visors

GPL VIEW ANGLE ADJUSTMENTS

ITEM DESCRIPTION PART NO.
1 SET OF 8 GPL COMBS, Stainless Steel GL-1008
2 GPL COMB, 7° GL-0109
3 GPL COMB, 8° GL-0110
4 GPL COMB, 9° GL-0111
5 GPL COMB, 11° GL-0112
6 GPL COMB, 13° GL-0113
7 GPL COMB, 15° GL-0114
8 GPL COMB, 23½° GL-0115
9 GPL COMB, 42° GL-0116

DISTANCE (FEET)

VIEW ANGLE (DEGREES)

POSITIONS (1 THRU 11)

NOTE:
DENOTES FACTORY SET BAFFLE POSITION FOR 8°.

VIEW ANGLE BAFFLE LOCATIONS PART NO.
7° Move "G" Baffle to #11 position GL-1001
8° With all Baffles in factory set position (1,2,3,4,5,7,10) GL-1003
9° Move "G" Baffle to #9 position GL-1004
11° Move "G" Baffle to #8 position GL-1005
13° Omit "G" Baffle completely GL-1006
15° Omit "G" Baffle completely & move "F" Baffle to #6 position GL-1007
23½° Omit "F" & "G" Baffle completely GL-1013
42° Omit "E", "F", & "G" Baffle completely GL-1014

LIGHT SOURCE

320 S.W. 18th St. • Edmond, Oklahoma 73013 • (405) 340-3434 • FAX: (405) 340-3435 • E-mail: pelco@pelcoinc.com
Aiming of the GPL requires two people. One person located at the signal for making adjustments to the GPL, the other person on the ground to view the signal’s projection and to give instructions where to aim by adjusting the GPL within the visor.

FOR LANE CONTROL:

BAFFLES REMAIN VERTICAL

FOR LIMITING SIGHT DISTANCE:

ROTATE GPL 90°
BAFFLES HORIZONTAL

NOTE: Sight Distance application is limited to a maximum of 125’ from signal.
# Cone of Vision

<table>
<thead>
<tr>
<th>Distance from stop bar</th>
<th>Clearance above Rd.</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3 section head</td>
<td>4 section head</td>
<td>5 section head</td>
<td></td>
</tr>
<tr>
<td>40-feet</td>
<td>16.5 Ft.</td>
<td>17.3 FT.</td>
<td>16.5 Ft.</td>
<td>16.9 FT.</td>
</tr>
<tr>
<td>45-feet</td>
<td>16.5 Ft.</td>
<td>19.1 FT.</td>
<td>16.5 Ft.</td>
<td>17.9 FT.</td>
</tr>
<tr>
<td>50-feet</td>
<td>16.5 Ft.</td>
<td>20.9 FT.</td>
<td>16.5 Ft.</td>
<td>19.7 FT.</td>
</tr>
<tr>
<td>53-150-feet</td>
<td>16.5 Ft.</td>
<td>21.9 FT.</td>
<td>16.5 Ft.</td>
<td>20.7 FT.</td>
</tr>
</tbody>
</table>

5 Section cluster is the same height as 3 section head. All measurements are to bottom of signal head housing.

Link to Design Manual Pg. 571
Install a spare 12 terminal strip.

Multi conductors for signal displays shall be installed entirely through the mounting fitting to a point a minimum of 1” inside the housing.

8-20.3(8)
Maintain Ten Foot of Clearance from ALL Power Lines

Electrical Safety Manual
Chapter 22

WAC 296-24-960

NEC Table 225.61
Safety Manual

• Chapter 22 Electrical Safety
  – 22-2 High Voltage Lines
    • A) No work shall be performed around energized high voltage electrical conductors.
    • B) Equipment shall be operated proximate to, under, over, by, or near power lines only in accordance with the following:
      – 1) For lines rated at 50 KV or below, minimum clearance between the lines and any part of the equipment or load shall be 10 feet.
      – 2) For lines rated over 50 KV the minimum clearance between the lines and any part of the equipment or load shall be 10 feet plus .4-inch for each 1 KV over the 50 KV or twice the length of the line insulator but never less than 10 feet.
Approx. 4 ft  
8 ft min.  

Center Stripe  

One Through Lane  
With Permissive Left Turn
Two Through Lanes With Permissive Left Turn
Two Through Lanes and One Left Turn Storage Lane
With Permissive Left Turn
One Through Lane With Protected Left Turn Phasing
Two Through Lanes
With Split Phasing for Protected Left Turns
(Left turn and through movements terminate together.)
One Through Lane, a Dual Purpose (Left or Through) Lane and One Left Turn Storage Lane With Split Phasing for Protected Left Turns (Left turn and through movements terminate together.)
One Through Lane and One Left Turn Storage Lane
With Protected Left Turn Phasing

(Left turn and through movements terminate independently.)
Two Through Lanes and One Left Turn Storage Lane
With Protected Left Turn Phasing

(Left turn and through movements terminate independently.)
One Through Lane
With Protected / Permissive Left Turn Phasing
One Through Lane and One Left Turn Storage Lane With Protected / Permissive Left Turn Phasing
Two Through Lanes and One Left Turn Storage Lane
With Protected / Permissive Left Turn Phasing
One Through Lane and Two Left Turn Storage Lanes With Protected Left Turn Phasing

(Left Turn and Through Movements Terminate Independently.)
Two Through Lanes and Two Left Turn Storage Lanes With Protected Left Turn Phasing

(Left turn and through movements terminate independently.)
Signal Standards

NEC Articles 250, 300.19, 344, 352, 590, & 725

Standard Specifications

• 8-20.3(14)e

• 9-29.6 light and signal standards

• 9-29.6(1) steel light and signal standards

• 9-29.6(3) timber strain poles
Standard Plan J-7a
Make sure poles, mast arms and luminaire arms are in the correct locations.

• Each part will have a tag on it. Make sure each part matches.
Anchor Bolt Nuts Tightening

8-20.3(4) All anchor bolt nuts must be tightened by the turn of the nut method. Minimum $\frac{1}{4}$ Max $\frac{1}{3}$ turn past snug tight. Permanent marks shall be set on the base plate and the nuts.

6-03.3(32) Page 6-128 Assembling and Bolting
6-03.3(33) Page 6-130 Bolted Connections (1)(Turn of the Nut)
Use the Proper Tools
Nuts and bolts damaged with an improper tool will have to be replaced.
Turning Anchor Bolt Nuts

- The Bridge group in Olympia suggest that it may require a **hydraulic wrench** or a **multiplier wrench** to be able to turn the nuts tight enough to meet the requirements of the Turn of the Nut tightening requirements. They indicate that the threads will actually start to **stretch** when we reach the specified tightness.