



## Type AW Signal

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# ALSTOM

## Type AW Signal

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Operation and Maintenance Manual  
**Alstom Signaling Inc.**

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**PREFACE**

**NOTICE OF CONFIDENTIAL INFORMATION**

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OR  
WWW.ALSTOMSIGNALINGSOLUTIONS.COM**

**ALSTOM SIGNALING INC.  
1025 JOHN STREET  
WEST HENRIETTA, NY 14586**

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## **ABOUT THE MANUAL**

This manual is intended to provide the necessary information to maintain and ensure proper operation of the Type AW Signal.

The information in this manual is arranged into sections. The title and a brief description of each section follow:

**Section 1 – GENERAL DESCRIPTION:** This section gives general information on the components of the Type AW Signal.

**Section 2 – THEORY OF OPERATION:** This section gives general information on the operation of the Type AW Signal.

**Section 3 – INSTALLATION:** This section describes the field installation and setup of the Type AW Signal.

**Section 4 – PREVENTIVE MAINTENANCE:** This section describes the tools, preventive maintenance procedures, and functional tests used on the Type AW Signal. The frequency and interval, for the performance of the given information, are also included. Safety precautions are also provided in this section.

**Section 5 – TROUBLESHOOTING:** This section describes possible failures/symptoms along with the corrective action for the Type AW Signal.

**Section 6 – CORRECTIVE MAINTENANCE:** This section describes the adjustment and replacement procedures associated with corrective maintenance of the Type AW Signal. Safety precautions are also provided in this section.

**Section 7 – PARTS CATALOG:** This section identifies and lists the spare parts associated with operations of the Type AW Signal.

**Appendix A – DRAWINGS:** This section has representative circuit drawings along with an installation and space requirement drawing of the Type AW Signal.

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## **MANUAL SPECIAL NOTATIONS**

In the Alstom manuals, there are three methods used to convey special informational notations to the reader. These notations are warnings, cautions, and notes. Both warnings and cautions are readily noticeable by boldface type two lines beneath the caption.

### **Warning**

A warning is the most important notation to heed. A warning is used to tell the reader that special attention needs to be paid to the message because if the instructions or advice is not followed when working on the equipment then the result could be either serious harm or death. The sudden, unexpected operation of a switch machine, for example, or the technician contacting the third rail could lead to personal injury or death. An example of a typical warning notice follows:

#### **WARNING**

DISCONNECT MOTOR ENERGY WHENEVER WORKING ON SWITCHLAYOUT OR SWITCH MACHINE. UNEXPECTED OPERATION OF MACHINE COULD CAUSE INJURY FROM OPEN GEARS, ELECTRICAL SHOCK, OR MOVING SWITCH POINTS.

### **Caution**

A caution statement is used when an operating or maintenance procedure, practice, condition, or statement, which if not strictly adhered to, could result in damage to or destruction of equipment. A typical caution found in a manual is as follows:

#### **CAUTION**

Turn power off before attempting to remove or insert circuit boards into a module. Boards can be damaged if power is not turned off.

### **Note**

A note is normally used to provide minor additional information to the reader to explain the reason for a given step in a test procedure or to provide a background detail. An example of the use of a note follows:

#### **NOTE**

A capacitor may be mounted on the circuit board with a RTV adhesive. Use the same color RTV.

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# 1. SECTION 1 – INTRODUCTION

## 1.1. SCOPE OF MANUAL

This manual is intended to provide the necessary information to maintain and ensure proper operation of the Type AW Signal.

## 1.2. GENERAL

This section briefly describes the components and physical characteristics of a typical Alstom Type AW signal, available with three types of light fixtures:

- Alstom Aurora Type AW LED Unit P/N TXXXX-XXX-00
- LED Unit P/N 20179-0XX-00
- Incandescent Lamp P/N 48088-028-00

The components and configuration of signals can vary depending on the specific requirements of their locations. Type AW Signals can be stacked to produce a multi-aspect signal.

Each 3 aspect signal housing includes an LED or enameled number plate to identify the signal location, see Figure 1–1. Signals can be mounted to a wall, ceiling, or pole. Ladders can be provided where required. The Type AW signal conforms to requirements of the AREMA Signal Manual, Part 7.1.1.

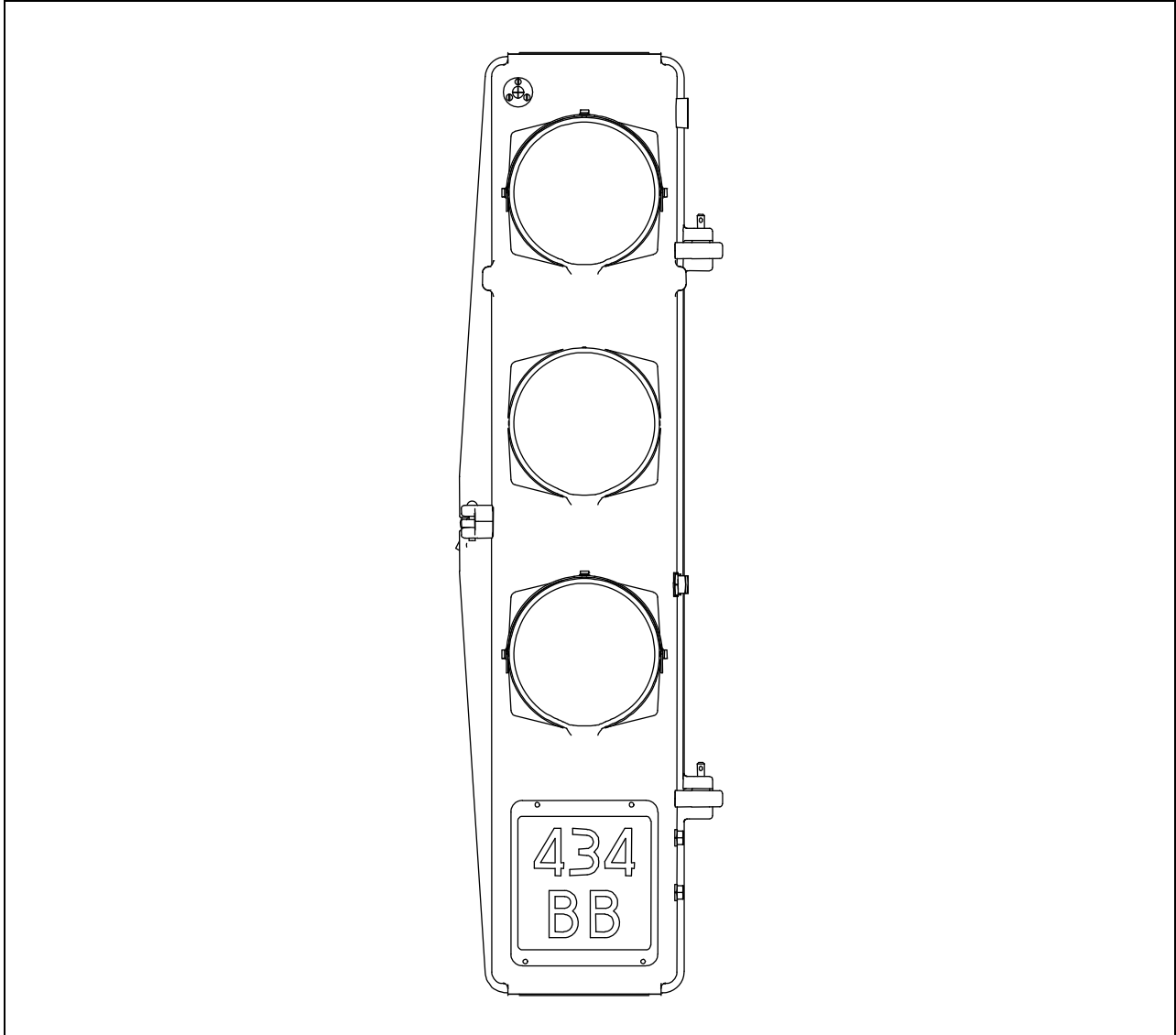


Figure 1–1. Typical Three Aspect Type AW Signal

### 1.3. PHYSICAL CHARACTERISTICS

The signal arrangement as well as the aspects and optional LED or enamel number plate, vary depending on the location requirements.

A basic AW three aspect signal is shown in Figure 1–2. It consists of a housing unit with a hinged door, three lamp units and lens assemblies, and internal electrical components to illuminate the aspects.

The AW single aspect signal is often used in a multi-aspect application. The single aspect signal consists of a housing unit with a hinged door, a lamp unit and lens assembly, and internal electrical components.

This signal is available with a number of options including:

- Type
  - Tunnel
  - Wayside
  - TrainOrder
  - Repeater
- Operating Voltage
  - High (120 VAC or VDC)
  - Low (10 VAC or VDC)
- Internal Components
  - Transformer with Taps
  - Transformer Without Taps
  - Resistor
  - None
- Options
  - SidePlate
  - BackLight
  - SideLight
  - Contactor
- Cable Entry
  - Top
  - Bottom
- Mounting
  - Ceiling
  - Wall Right Hand
  - Wall Left Hand
  - 3” (7.62 cm) Mast
  - 4” (10.16 cm) Mast
  - Hat
  - Pedestal
- Aspect Lamp
  - Alstom AW Aurora LED Unit
  - LED Unit P/N 20179-0XX-00
  - Incandescent
- Aspect Arrangements
  - Red
  - Yellow
  - Green
  - Lunar White
  - Blank (metal disk covers lamp compartment)

## 1.4. HOUSING

The signal housing is of cast-aluminum construction. Access to the internal parts of the signal is made through a hinged door at the rear of the housing.

The door of the three aspect signal is equipped with two ventilators to prevent moisture and heat build-up within the housing. The single aspect door has one ventilator. A latch is provided to padlock the door and prevent unauthorized access.

The AW 3 aspect signal is internally divided into four potentially active light compartments. Three compartments are used for aspect signals and one for the optional LED or enameled number plate (not used on all units).

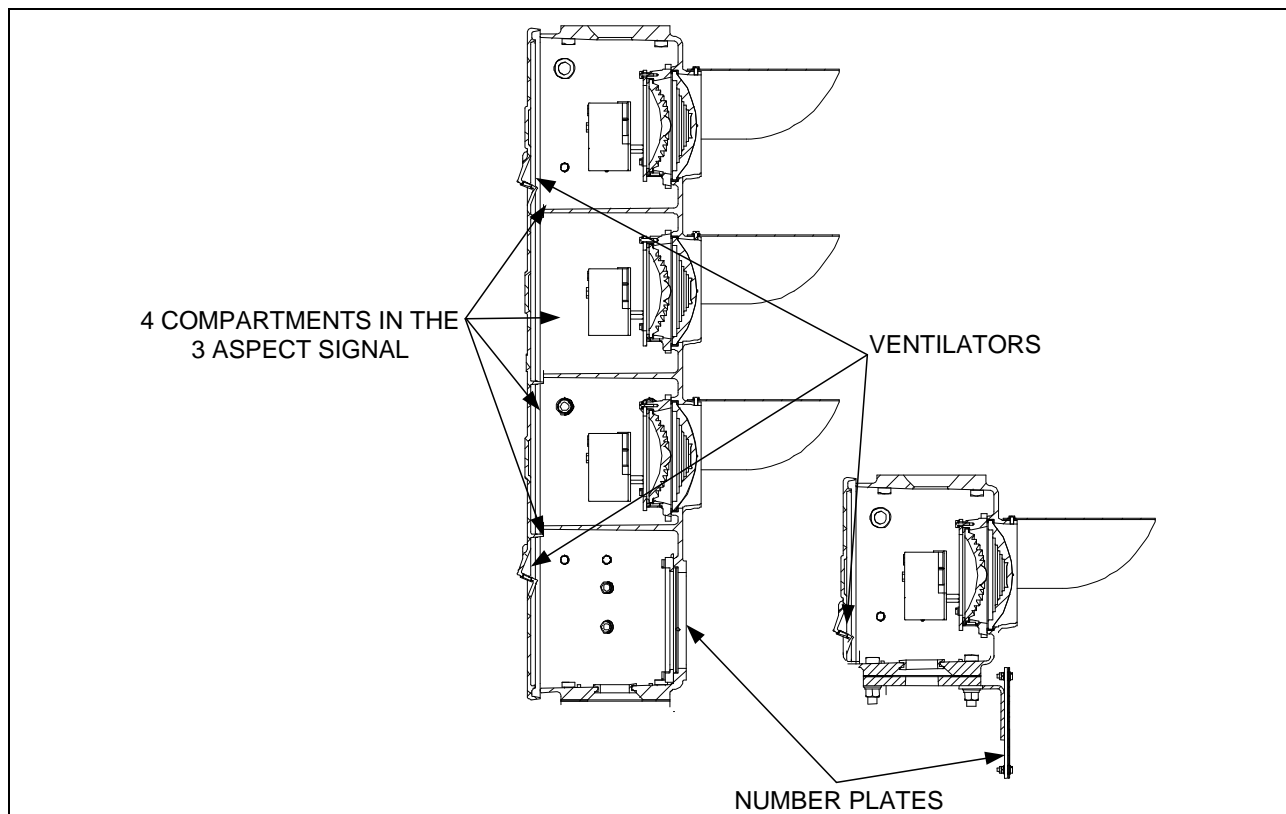


Figure 1–2. Basic 3 Aspect and Single Aspect Type AW Signals, Side View

The three aspect signal unit measures approximately 39.75" high by 11.31" wide (1 m by 28.73 cm). The single aspect signal unit measures approximately 9.75" high by 11.31" wide (24.76 cm by 28.73 cm). The outer lens measures 6.38" (16.20 cm) in diameter.

Table 1–1. Housing Dimensions

Dimension	3 Aspect	Single Aspect
Height	39.75" ( 1 m)	9.75" ( 24.76 cm)
Width	11.31" ( 28.73 cm)	11.31" ( 28.73 cm)
Depth	8.736" (22 cm)	8.736" ( 22 cm)
Outer Lens Diameter	6.3" ( 16.20 cm)	6.3" ( 16.20 cm)

## 1.5. LED LIGHT SOURCES

There are two available LED light sources:

- Alstom Aurora Type AW LED Unit (P/N TXXXX-XXX-00)
- LED Unit P/N 20179-0XX-XX

### 1.5.1. Alstom Aurora Type AW LED Unit

The Alstom Aurora LED light source (P/N TXXXX-XXX-00) measures 5.5" (13.97 cm) in diameter. It is a self contained unit; the lens and individual LEDs are not replaceable.

Two secured color coded 300V, 125°C, 16 AWG jacketed wires 14" (35.56 cm) long with terminal rings compatible with AAR terminal posts (.242" O.D. [.61 cm]) are provided for electrical connections.

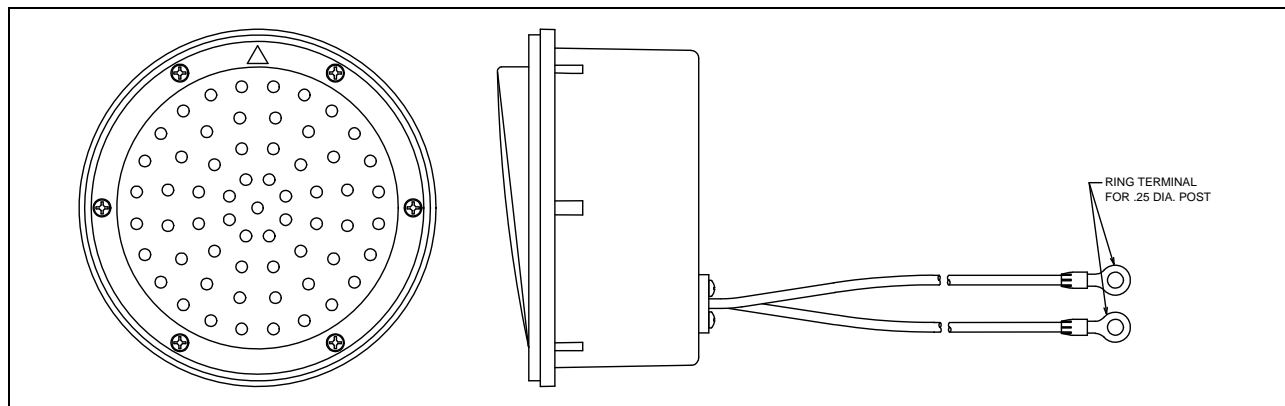


Figure 1–3. Alstom Aurora Type AW LED Unit

A variety of Alstom Aurora Type AW LED light source unit options are available:

- Color
  - Red
  - Yellow
  - Green
  - Lunar White
- Number of LEDs
  - 60
  - 90
  - 120
- Back Light
- No Back Light
- Lens
  - Wide, 30 degree
  - Narrow, 15 degree
  - Concentric, 8 degree
- Operating Voltage
  - High (120V AC/DC)
  - Low (10V AC/DC)
- Brightness
  - Adjustable
  - Not Adjustable

### 1.5.2. LED Unit P/N 20179-0XX-00

The LED light source unit P/N 20179-0XX-00 measures 2.2" (5.6 cm) in diameter. It is a self contained unit; the lens and individual LEDs are not replaceable.

Two secured color coded 300V, 125°C, 16 AWG jacketed wires 12" (30.5 cm) long with ring terminals compatible with the AAR terminal posts (.242" O.D. [.61 cm]) are provided. The AAR terminal posts are provided for field electrical connections.

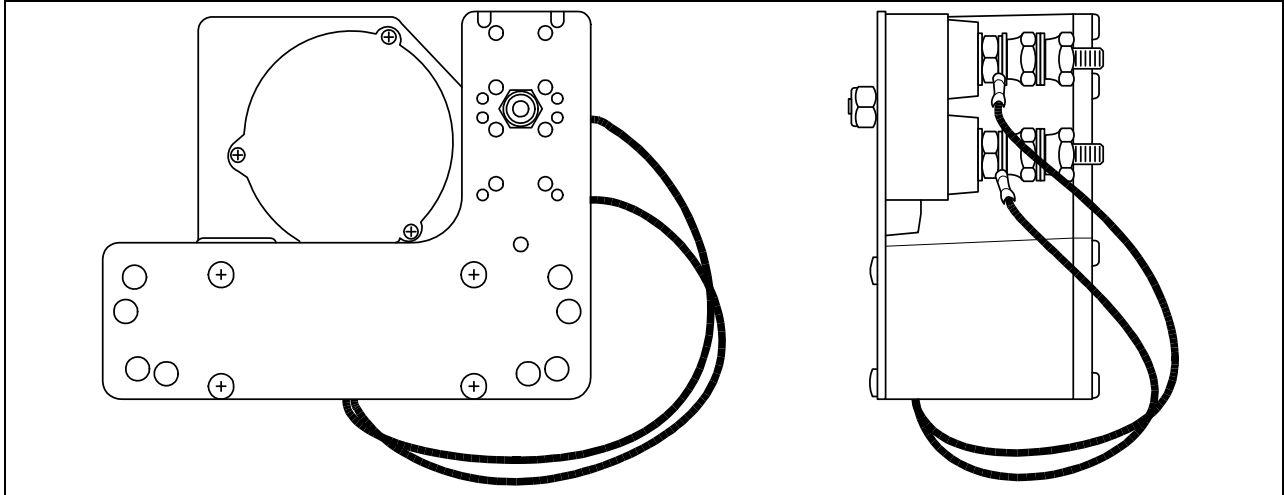


Figure 1-4. Type AW Signal LED Unit P/N 20179-0XX-00

LED Unit P/N 20179-0XX-00 has the following options:

- Color
  - Red
  - Green
  - Yellow
  - Lunar White
- BackLight
- Light Angle
  - 20 degree
- Operating Voltage
  - 110 VAC (60Hz)
- Brightness
  - Fixed, Not Adjustable

### 1.5.3. LED Lens Assembly Detail

Each AW LED signal aspect uses a clear outer lens. The LED lamp unit contains a clear lens. LED signal terminals are present for each aspect. Figure 1–5 shows the lens assembly components.

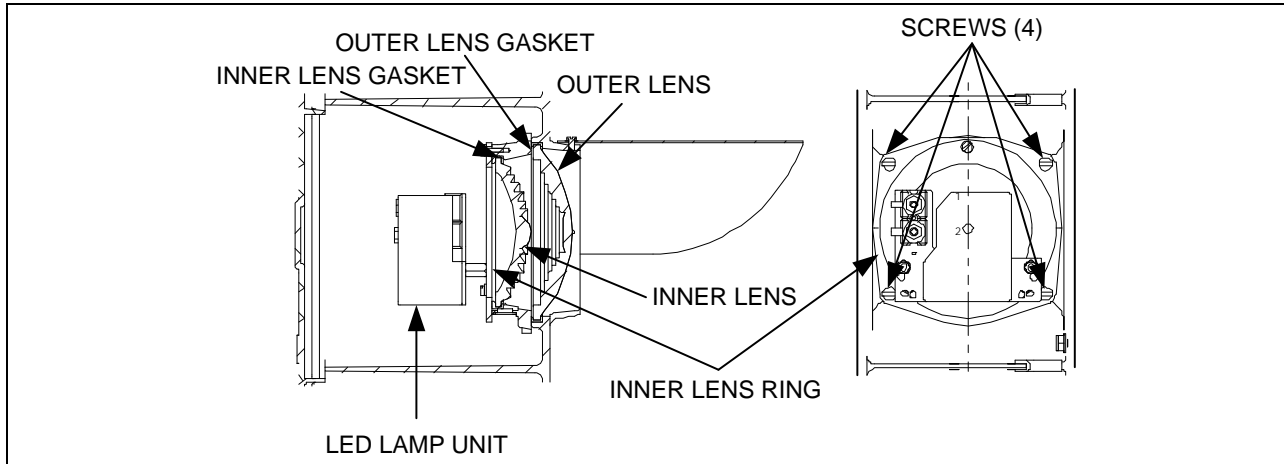


Figure 1–5. Example Type AW Signal LED Light Source Compartment

## 1.6. INCANDESCENT LIGHT SOURCE

Each active incandescent light source aspect uses a doublet-lens assembly. The outer lens is clear; the inner lens is either colored or clear. The optional, illuminated number plate light compartment contains a lighting transformer, terminals for power connection, and appropriate lamp receptacles.

Each compartment can include a resistor or a transformer, or neither, as appropriate. See Figure 1–6 for an example side view of the optional resistor, an example back view of the optional transformer, and an example of two lamps with no resistor or transformer.

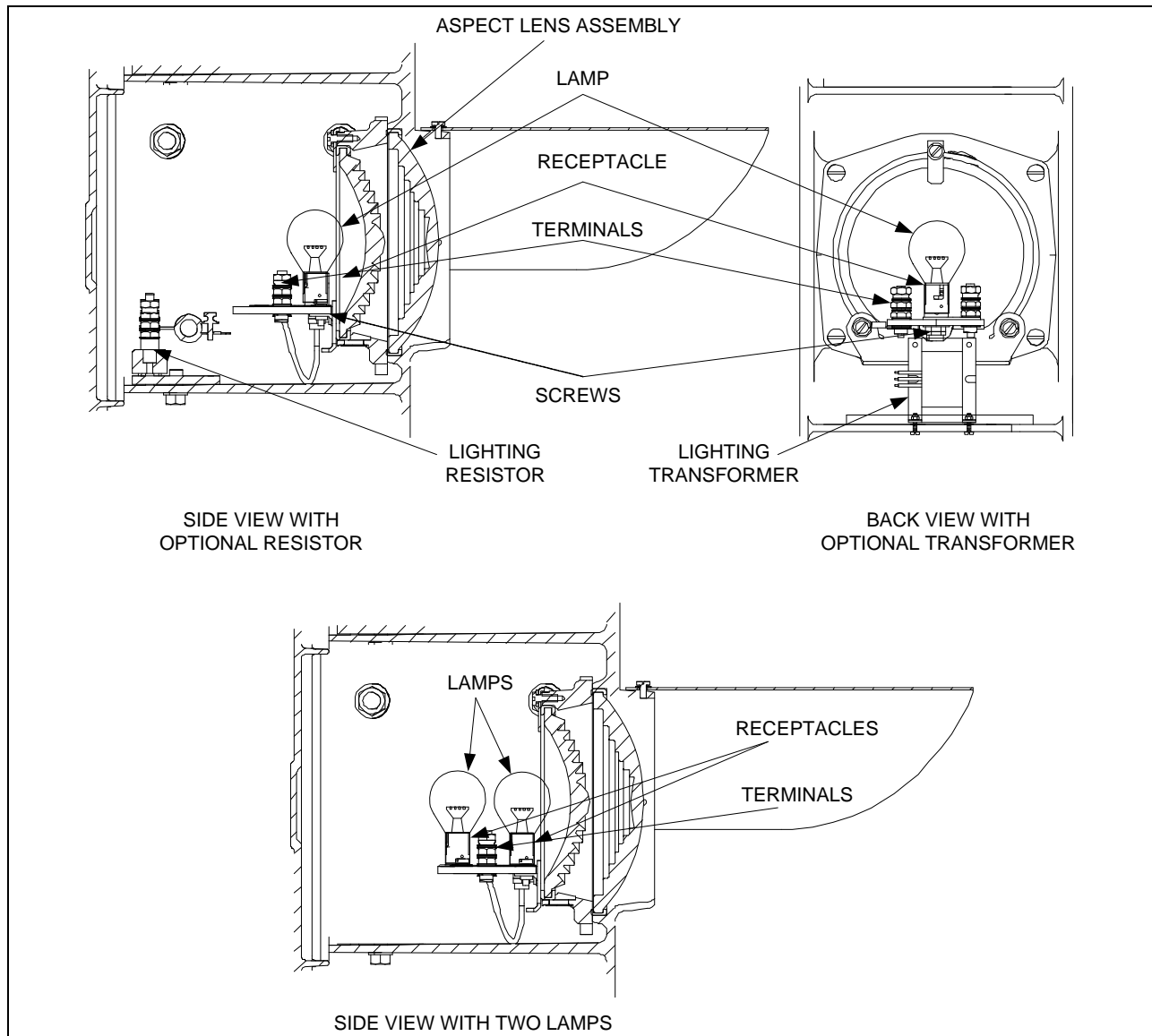


Figure 1–6. Example Type AW Incandescent Signal Light Compartment

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## **2. SECTION 2 – THEORY OF OPERATION**

### **2.1. GENERAL**

This section contains operating information on the Alstom Type AW Signal along with diagrams showing power distribution and wiring to the signal.

### **2.2. FUNCTIONAL DESCRIPTION**

Type AW Signals are controlled externally through relay logic circuits or vital processors. Depending on the distance of the signal from the relay room, power supplied to the signal may vary.

2.3. ALSTOM AURORA TYPE AW LED UNIT FUNCTIONAL DESCRIPTION

The Alstom Aurora Type AW LED Unit (P/N TXXXX-XXX-00, see Figure 7–4 for the various configuration options) is a single, self-contained device that doesn't require any field assembly. The lamp is wired via ring terminals to LED terminal posts within the signal unit.

Each unit contains an LED board and a power supply board. These boards are wired together with configurable plug-in terminal blocks and are contained in the module housing.

Operating (working) voltage for the low voltage LED module is 8 to 16 VAC (50/60 Hz) or 8 to 20 VDC. Operating (working) voltage for the high voltage LED module is 85.0 to 135.0 VAC (50/60 Hz). The LED module does not emit any light at a voltage under 4 VAC or VDC for the low voltage module or under 45 VAC for the high voltage module.

Nominal operating power of the various LED color and quantity combinations is summarized in Table 2–1.

Table 2–1. Nominal Operating Power

	<b>Nominal Operating Power</b>			
<b># of LEDs in Unit</b>	<b>Red LEDs</b>	<b>Yellow LEDs</b>	<b>Green LEDs</b>	<b>White LEDs</b>
60	5.6 amps	5.2 amps	5.6 amps	5.6 amps
90	7.1 amps	6.0 amps	6.5 amps	6.5 amps
120	8.0 amps	8.0 amps	8.0 amps	8.0 amps

For units with the adjustable brightness option an adjustment screw and locknut are located on the back of the LED lamp unit. The brightness adjustment allows the unit to be used in tunnel or other enclosed area where the full brightness is not desirable. See Table 2–2 for luminous intensity at operating voltage.

**NOTE**

The LED lamp units are shipped with the unit at full brightness.

Table 2–2. LED Lamp Luminous Intensity at Operating Voltage

LED Module Color	Wayside Or Tunnel	Initial Minimum Peak Intensity Cd	Beam Angle H°xV°	
			Narrow Beam Angle H°xV°	Wide Beam Angle° H°xV°
Red	Tunnel	125	30x30	
Yellow	Tunnel	100	30x30	
Green	Tunnel	175	30x30	
Lunar White	Tunnel	150	30x30	
			Narrow Beam Angle H°xV°	Wide Beam Angle° H°xV°
Red	Wayside	300	15x15	30x30
Yellow	Wayside	400	15x15	30x30
Green	Wayside	350	15x15	30x30
Lunar White	Wayside	300	15x15	30x30

2.3.1. Alstom Aurora Type AW LED Unit Signal Wiring

Figure 2–1 is a wiring diagram of a typical four aspect Alstom Aurora Type AW LED Unit signal (single aspect attached above a three aspect signal) configured red, yellow, yellow, red.

The signal wiring shown in dotted lines represents field wiring of eight conductor number 14 AWG cable. See Appendix A for additional example wiring diagrams.

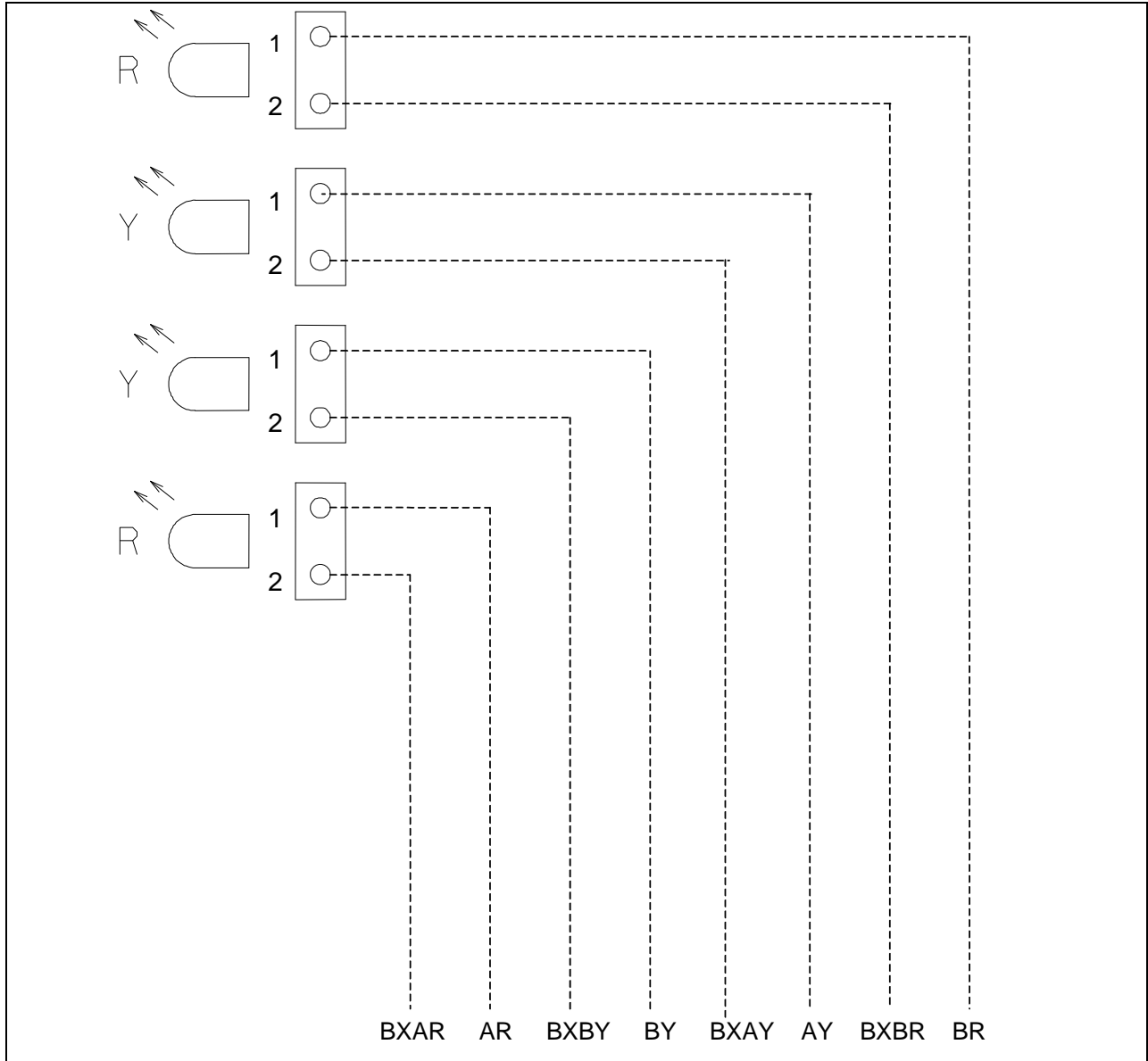


Figure 2–1. Typical Alstom Aurora Type AW LED Unit 4 Aspect Signal Wiring (Single Aspect Plus 3 Aspect)

#### 2.4. LED UNIT P/N 20179-0XX-00, FUNCTIONAL DESCRIPTION

The LED Unit P/N 20179-0XX-00 is available in 4 colors:

- Green LED 20179-008-00
- Red LED 20179-009-00
- Yellow LED 20179-010-00
- Lunar White LED 20179-011-00

This is a single, self-contained device that doesn't require any field assembly. The lamp is wired via ring terminals to AAR terminal posts within the signal unit.

Each unit contains an LED board and a power supply board contained in the signal housing. These housings are replaceable as a unit and are not serviceable.

The LED unit power boards operate from 90 to 130 VAC (60 Hz).

2.4.1. LED Unit P/N 20179-0XX-00 Signal Wiring

Figure 2–2 is a wiring diagram of a typical three aspect LED Unit P/N 20179-0XX-00 LED signal configured, green, yellow, and red.

The signal wiring shown in dotted lines represents field wiring of four-conductor number 14 AWG cable. Signal number is represented by xxx in this example. See Appendix A for additional example wiring diagrams.

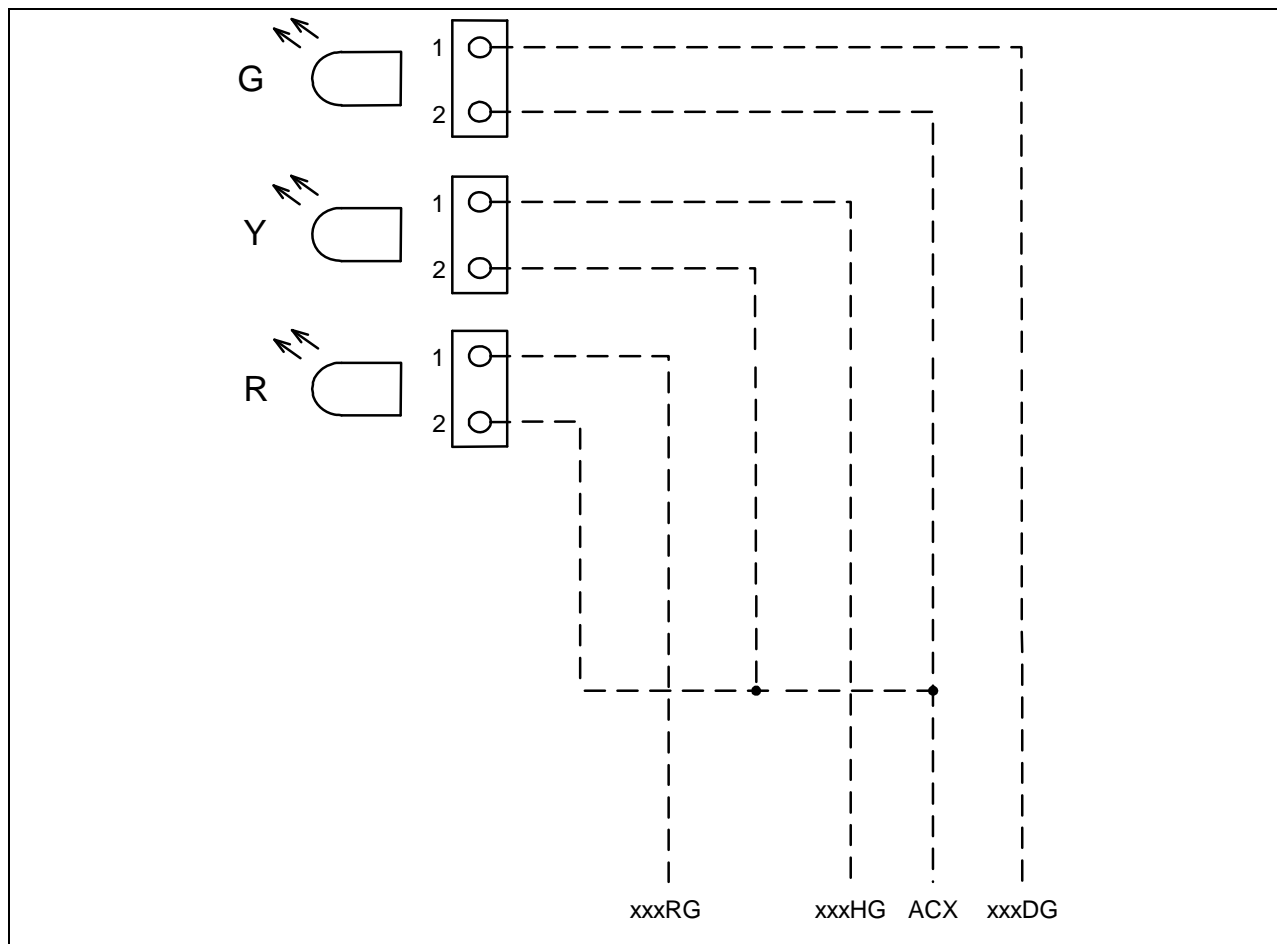


Figure 2-2. Typical 3 Aspect Type AW LED Unit P/N 20179-0XX-00 Signal Wiring

## 2.5. INCANDESCENT LAMP FUNCTIONAL DESCRIPTION

Incandescent Type AW signals operate on 110 VAC, 60 Hz (ungrounded) controlled externally through relay logic circuits in the relay room. Depending on the distance of the signal from the relay room, the nominal 110 VAC power supplied to the primary windings of the signal transformer may vary.

Figure 2–3 is a simplified circuit diagram of a 3 aspect signal using two single filament lamps and one non-tapping transformer per active light compartment. Points A, C, and E are connected to signal lighting relay logic circuits, which receives power through fused feeds. The aspect points A, C, and E, are fed from one fuse. The common 1 and 2 feeds (points B and F) are un-fused and connected to the same energy source but not through the relay logic control circuits. Although the signal lamp is rated for 13.0 VAC, it receives 10.0 VAC from the internal Type AW Signal transformer. Detailed diagrams on specific Type AW Signals are given in Appendix A.

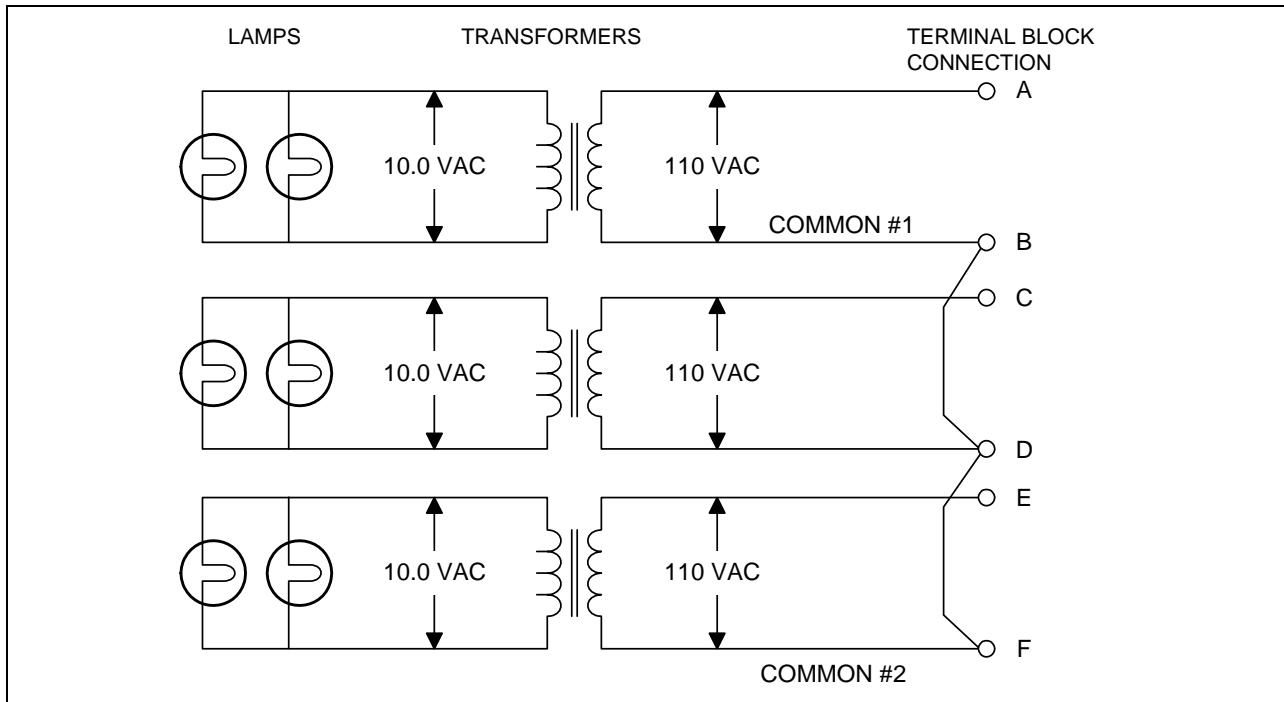


Figure 2–3. Example Type AW Incandescent Signal Circuit Diagram

2.5.1. Incandescent Type AW Signal Wiring

Figure 2–4 is a wiring diagram of a typical three aspect signal consisting of two 13.0 VAC rated incandescent lamps and one non-tapping transformer per active light compartment.

The signal wiring shown in dotted lines represents field wiring of multi-conductor number 14 AWG cable. The internal 14 AWG wiring of lamps and transformers are represented by solid lines. See Appendix A for additional example wiring diagrams.

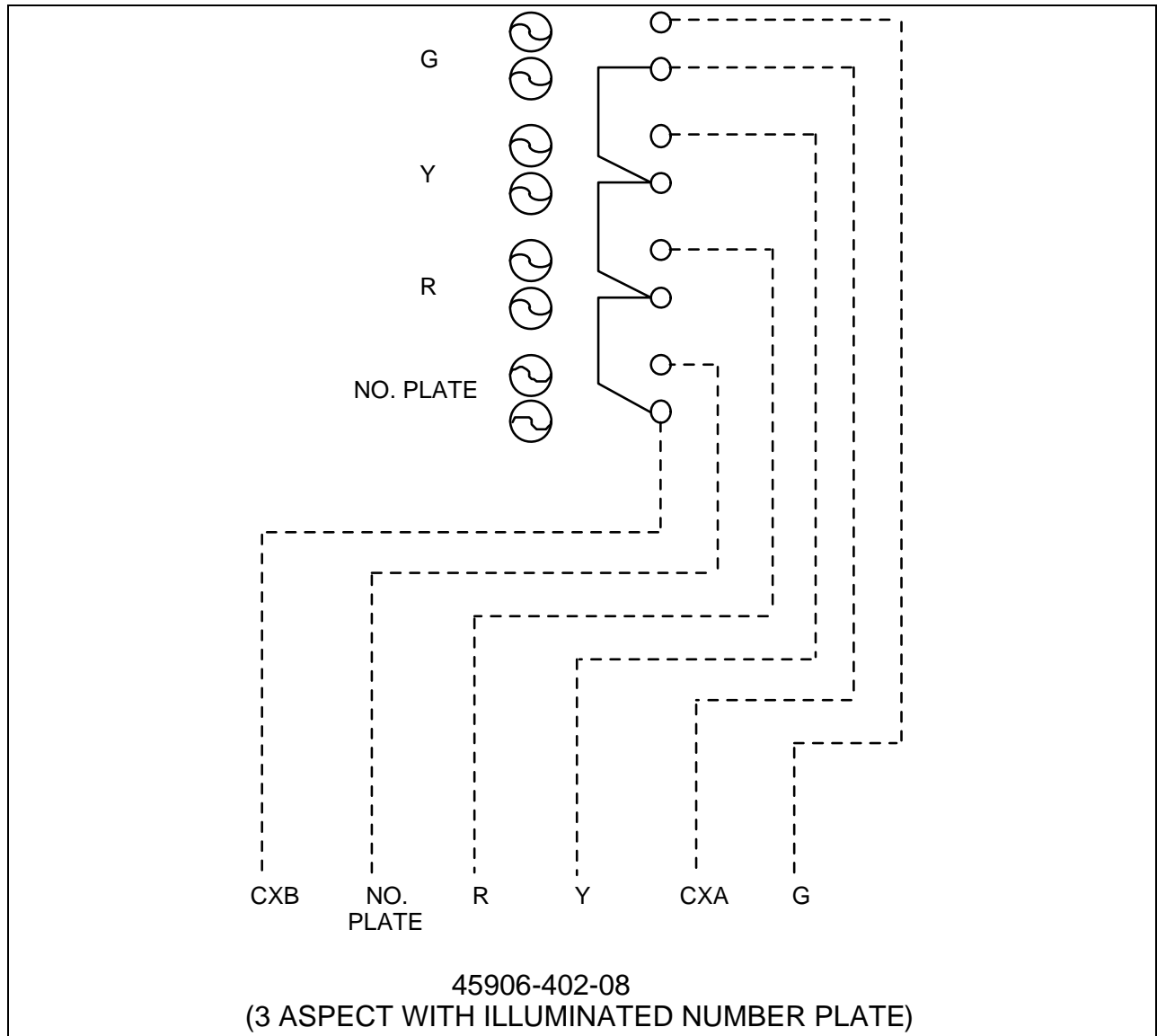


Figure 2–4. Typical 3 Aspect Type AW Incandescent Signal With Illuminated Number Plate Wiring

## **3. SECTION 3 – INSTALLATION**

### **3.1. GENERAL**

This section describes installation of the Alstom type AW LED Signal. If a fault is suspected upon installation, the maintainer should refer to Section 5 for the proper signal troubleshooting procedure.

### **3.2. SIGNAL MOUNTING**

The AW LED Signal can be mounted on a wall, pole, case (hat) or ceiling (horizontal). Example wall and pole mounting configurations are shown in Figures 3–1 through 3–3. The wall mounted signal is mounted using two brackets. The pole mounted signal is mounted on a 3" or 4" (7.62 cm or 10.16 cm) diameter pole. The pole is inserted in and fastened to a cast aluminum split base. The split base is bolted to a concrete foundation.

For any pole mounted signal that includes a 3 aspect case, see Table 3–1 for an initial siting procedure.

Refer to section 7 for sample parts lists and signal assembly drawings.

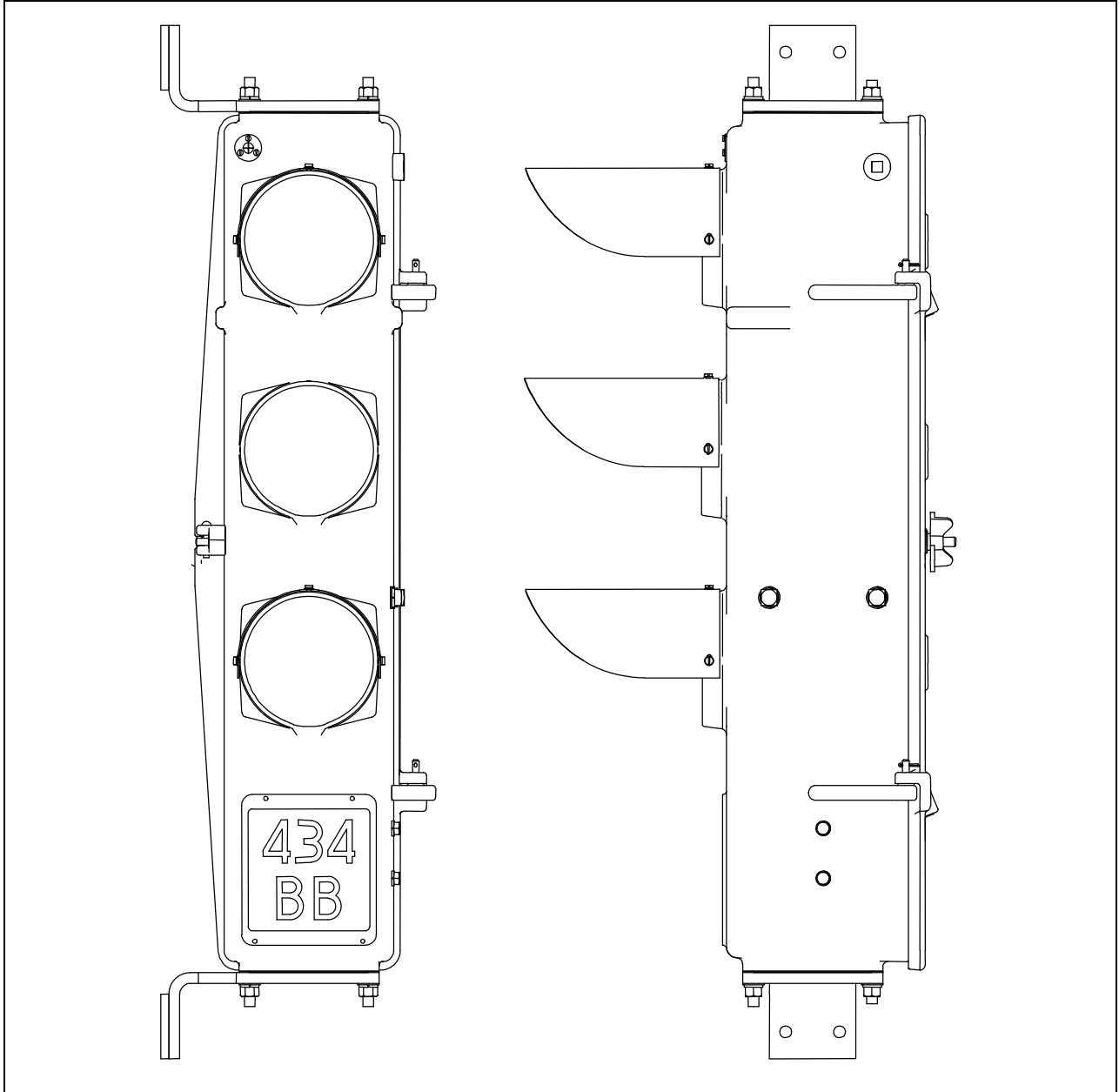


Figure 3-1. Example Wall Mounted Type AW Signal

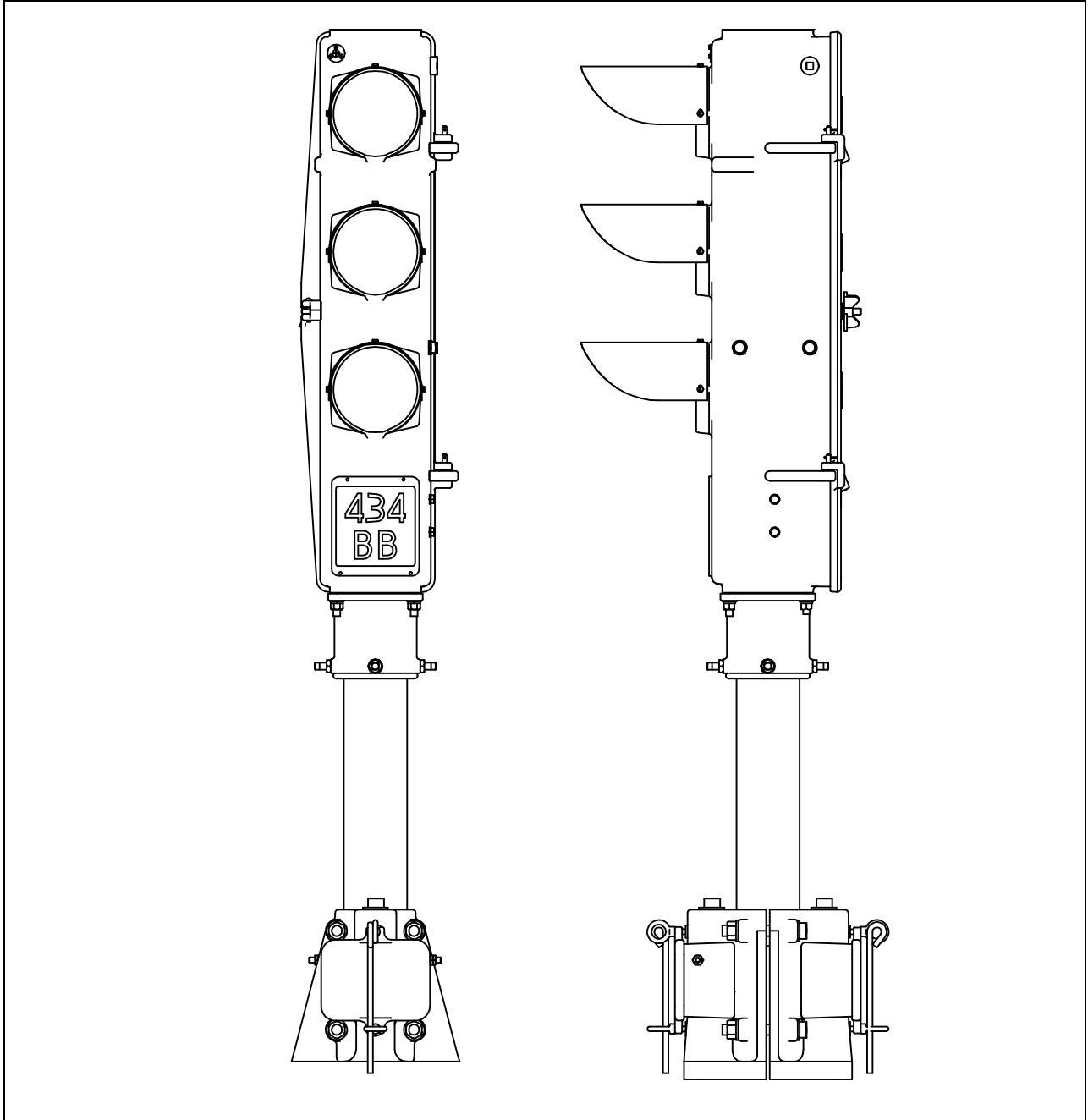


Figure 3–2. Example 3 Aspect Pole Mounted Type AW Signal

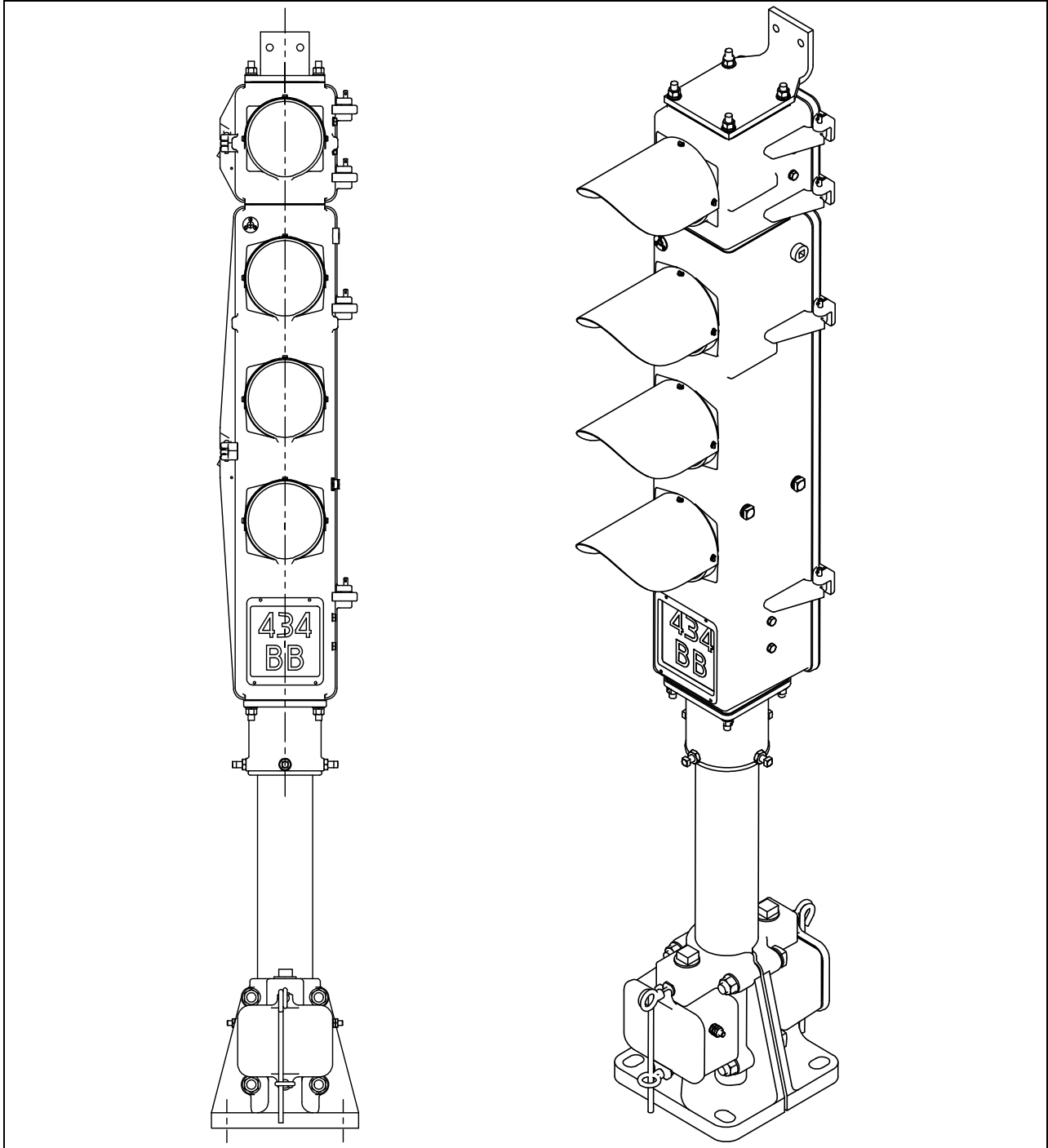
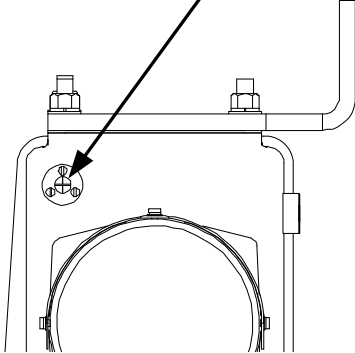
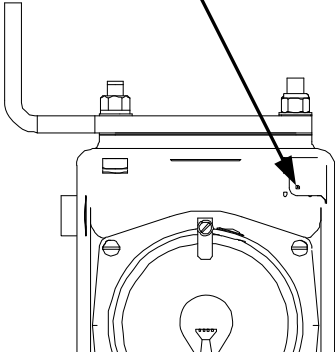


Figure 3-3. Example 4 Aspect (3 Aspect plus Single Aspect)  
Pole Mounted AW LED Signal

Table 3–1. Initial Siting Procedure For Pole Mounted AW Signals That Include A 3 Aspect Case

Step	Procedure
1	<p>To line up the 3 aspect signal case with a predetermined target use the peep hole and sight that are part of the case.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Crosshair</p>  </div> <div style="text-align: center;"> <p>Peep Hole</p>  </div> </div>
2	Loosen nuts and bolts below the signal that secure the pole socket to the pole.
3	Open the signal door.
4	Look through the peep hole located in the back of the case through to the cross hair located in the front of the case.
5	Rotate the signal to line up with the target.
6	Tighten the bolts and nuts on the pole socket holding the signal in horizontal position.
7	Continue installation.

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## **4. SECTION 4 – PREVENTIVE MAINTENANCE**

### **4.1. GENERAL**

This section describes preventive maintenance and testing for Alstom Type AW signals. If a fault is suspected as a result of this maintenance, the maintainer should refer to Section 5 for the signal troubleshooting procedure.

Preventive maintenance procedures include inspection, cleaning, and preventive maintenance (PM) checks. PM checks are performed to ensure proper equipment operation based on specific tolerances. These checks identify and isolate possible malfunctions.

Corrective maintenance at the field service level is intended to restore malfunctioning equipment to its normal operating condition as quickly as possible. Corrective maintenance procedures including component replacement, voltage adjustments and wayside siting are provided in Section 6.

### **4.2. PREVENTIVE MAINTENANCE**

Table 4–1 lists the typical preventive maintenance procedures for the Type AW signal. The Interval column gives the recommended frequency of procedures. The Maintenance Action column lists the preventive maintenance procedure to be performed at the prescribed interval. The Reference column lists the table number containing the procedure.

Table 4–1. Preventive Maintenance Index

<b>Interval</b>	<b>Maintenance Action</b>	<b>Reference</b>
Monthly	Periodic Inspection	Table 4–2
Monthly	External Lens Cleaning	Table 4–3
Quarterly	Door Hinge and Lock Lubrication	Table 4–4
As Needed	Signal Operational Test	Table 4–5

**WARNING**

ABIDE BY ALL OPERATIONAL AND SAFETY RULES WHEN ENTERING AND WORKING IN THE RIGHT OF WAY.

## 4.2.1. Inspection

The Inspection Procedure can be performed any time personnel are in close proximity to the signal. Follow the inspection procedures as outlined in Table 4–2, in the order given. If required, take the corrective actions described to properly service the signal.

Table 4–2. Inspection Procedures

<b>Step</b>	<b>Procedure</b>	<b>Action Taken</b>
1	Inspect cases for scratches, large dents, cracks, warped doors, or other obvious mechanical damage.	Paint scratches and replace excessively damaged parts.
2	Check for loose hardware or loose connections.	Tighten.
3	Inspect exterior of signal housing for excessive dirt, dust, or foreign objects.	Remove foreign objects. Clean case with damp lint-free cloth.
4	Inspect wiring and cables for broken or brittle wires or cracked insulation.	Replace wire/cable.
5	Verify each LED or Incandescent Lamp unit illuminates when controlled to be turned on and check for proper brightness.	Refer to troubleshooting Figures 5–1 and 5–3.
6	Inspect each lens for excessive dirt or dust and for cracked or broken lens.	Clean external lens, see Table 4–3. Replace lens, as required, see corrective maintenance Table 6–8.
7	Inspect vent screen in door for air blockage.	Clean screen with brush.
8	Inspect hinges and lock for proper lubrication.	Lubricate as required, see Table 4–4.
9	Inspect grounding of signal.	Clean and tighten connections.
10	Inspect condition of gasket in doors.	Replace damaged gasket.
11	Inspect for moisture between lenses.	Disassemble and clean lens.
12	Inspect telephone jack (if applicable).	Insert plug into jack and verify connection by establishing communication with another location.

#### 4.2.2. Lens Cleaning

Clean lenses any time an inspection reveals the need for cleaning. Materials required are:

- Cleaners such as Brillianize (The Brillianize Company), Novus Plastic Polish No. 1 (Novus Plastic Polish Ltd.) or equivalent plastic cleaner and polish approved for use on polycarbonate and Plexiglas® lenses

#### **NOTE**

If no other cleaner is available, use a solution of one part mild dishwashing liquid to 50 parts water. Rinse each lens with clean water and dry immediately with a damp chamois.

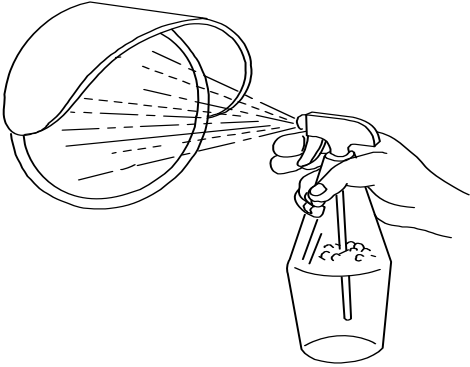

- Pump or spray dispenser
- Damp chamois

#### **CAUTION**

Never use an abrasive to clean a lens.

Do not use a dry chamois on a dry lens; this prevents accidental scratching of the lens. Do not use a cleaner with ammonia; this type of cleaner will attack the lens material.

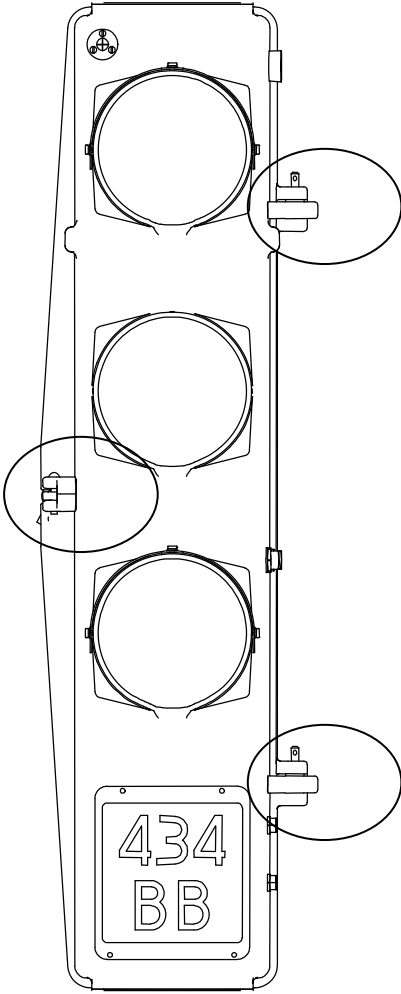
Table 4-3. External Lens Cleaning Procedure

Step	Procedure
1	<p data-bbox="786 333 943 365"><b><u>WARNING</u></b></p> <p data-bbox="394 401 1333 470">USE A SAFETY BELT WHEN THE CLEANING LENSES OF ANY POLE MOUNTED UNIT WHILE STANDING ON LADDER STEPS.</p> <p data-bbox="786 506 943 537"><b><u>WARNING</u></b></p> <p data-bbox="394 573 1284 642">DO NOT LOOK DIRECTLY INTO AN ILLUMINATED LAMP AT CLOSE RANGE.</p> <p data-bbox="300 684 456 716">Spray lens.</p>  A line drawing showing a hand holding a spray bottle and spraying a lens. The lens is depicted as a curved, bowl-like shape. Dashed lines radiate from the lens, indicating light or spray. The spray bottle is held at an angle, with a stream of liquid being directed towards the lens.
2	<p data-bbox="300 1121 448 1152">Wipe lens.</p>  A line drawing showing a hand wiping a lens with a cloth. The lens is depicted as a curved, bowl-like shape. The hand is holding a cloth and is shown in the process of wiping the lens.

4.2.2.1. Lubrication

Hinges on doors, locking eyebolt, and padlocks are lubricated with lightweight oil.

Table 4–4. Lubrication Procedure

Step	Action
1	<p>Sparingly oil door hinges, locking eyebolt, and any padlocks used.</p>  <p>The diagram shows a vertical signal head with four circular lenses. At the top is a locking eyebolt. At the bottom is a rectangular panel with the text '434' and 'BB' stacked vertically. Three specific points are circled with ovals: the top locking eyebolt, the hinge mechanism on the left side between the second and third lenses, and the hinge mechanism on the right side between the third and fourth lenses.</p>
2	Wipe off excess oil.

#### 4.2.2.2. Signal Operational Test

The Signal Operational Test verifies the visibility of the signal. If an indication is not met, proceed to Troubleshooting, Section 5. This operational test that should be performed when:

- a signal malfunction is suspected
- the signal or one of its components has been repaired
- the signal or one of its components has been replaced

Table 4–5. Signal Operational Test Procedure

<b>Step</b>	<b>Action</b>
1	Call each signal aspect and verify the correct LED unit is lit.
2	From a position 300 ft (91.44 m) in approach to the signal and 6 ft (1.83 m) over the top of the running rail, view signal at stop. Each aspect must be clearly visible.
3	If any viewed signal aspect is dim or not illuminated refer to Section 5 for Type AW Signal troubleshooting.

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## 5. SECTION 5 – TROUBLESHOOTING

### 5.1. GENERAL



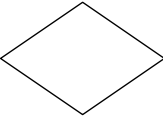
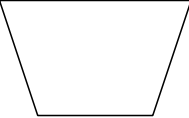

Troubleshooting information is given in the form of a fault isolation flowchart provided in Figures 5–1 through 5–3. Each chart begins with malfunction symptoms and, based on observations and tests by the maintainer, the chart branches out to isolate probable causes of the malfunction.

Troubleshooting flowchart symbols are explained in Table 5–1.

### 5.2. TROUBLESHOOTING GUIDE

The guide gives instructions on how to sequentially do a series of checks or tests, resulting in a practical repair solution. It is important to follow the instructions in the sequence given.

Table 5–1. Troubleshooting Symbols

Symbol	Explanation
	Malfunction statement as derived from operator's report.
	Basic instruction for preparation of a test, procedure, or observation. The action taken results in a diagnostic decision.
	Result from previous action, which is answered yes or no. If result is within tolerance, answer yes. If not, answer no. Do not consider any gray areas between yes and no.
	Final step of instructions involving corrective measures. Reference publication indicates suspected problem area.
	Special instruction for continuation of troubleshooting diagram at referenced location.

# Troubleshooting

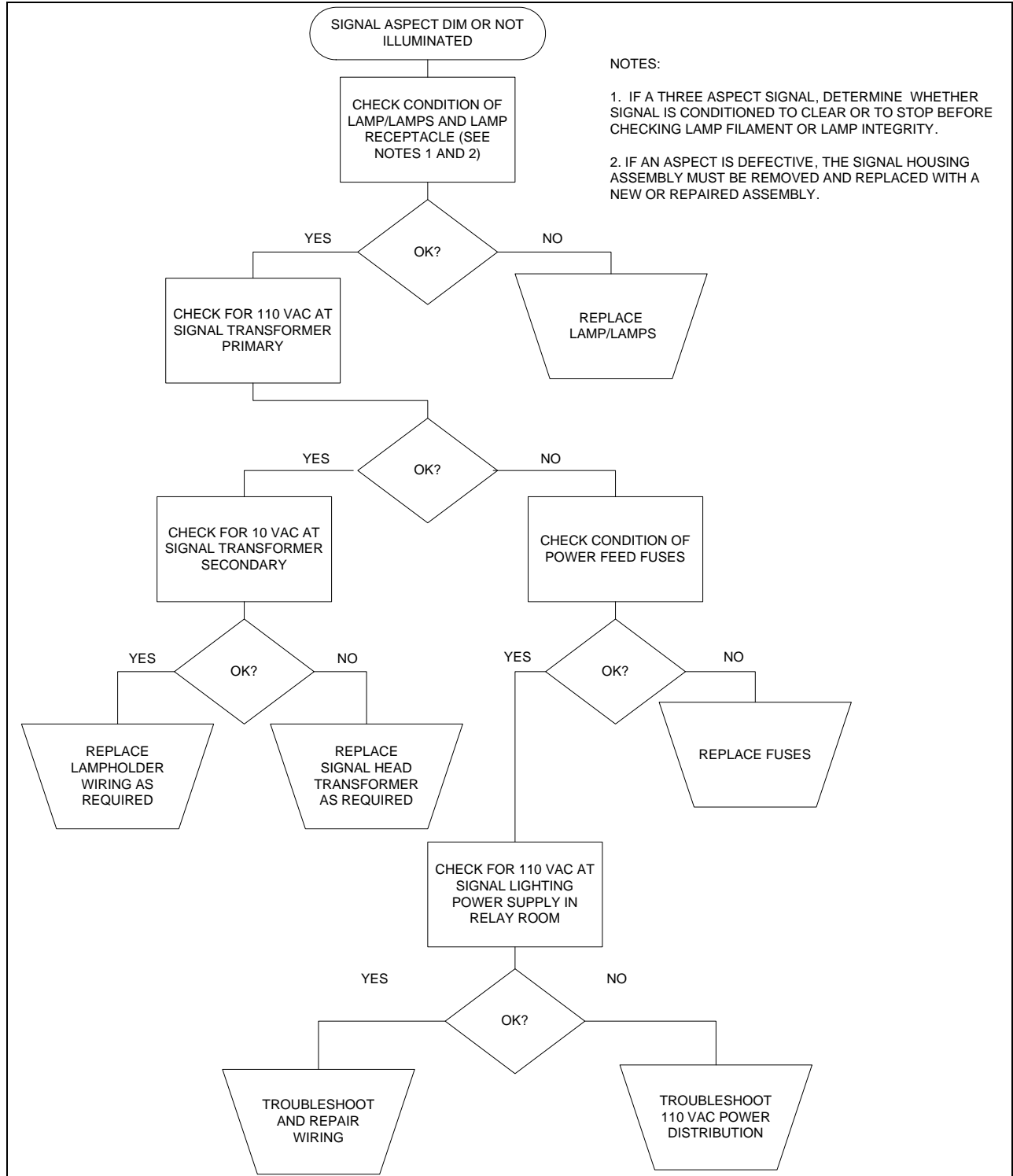


Figure 5–1. Incandescent Signal Aspect Dim or Not Illuminated

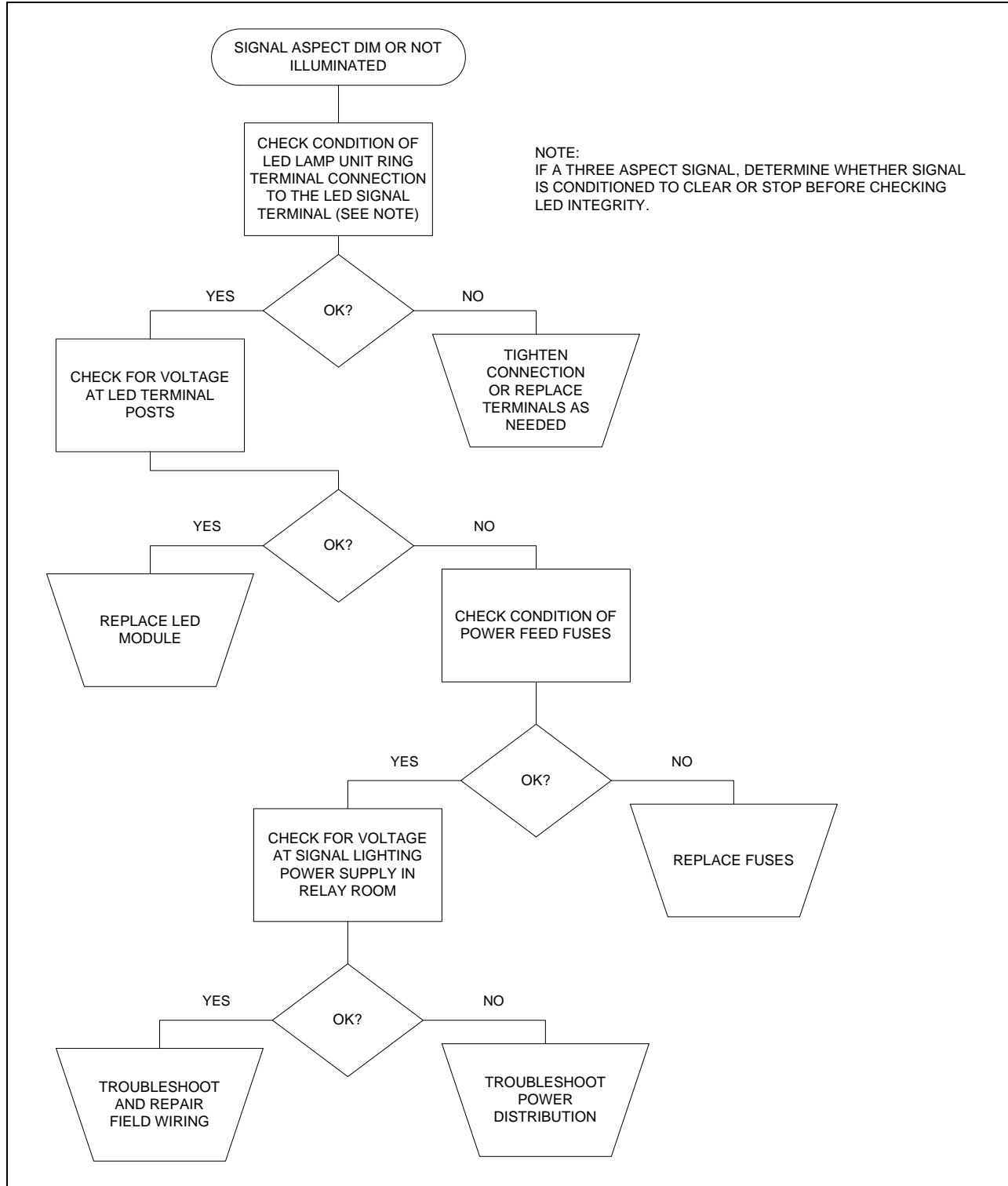


Figure 5–2. LED Signal Aspect Dim or Not Illuminated

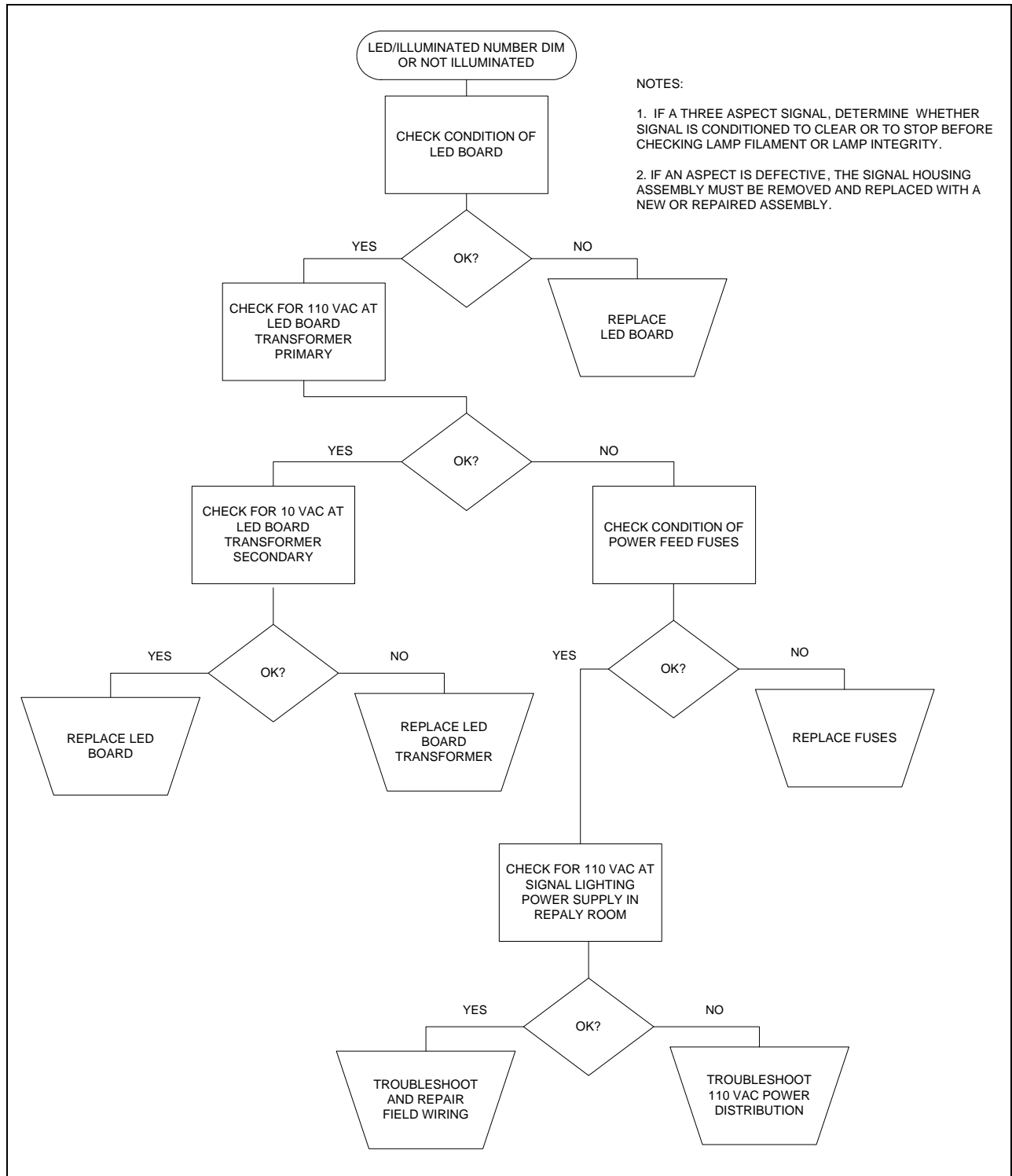


Figure 5–3. LED/Illuminated Number Dim or Not Illuminated

## 6. SECTION 6 – CORRECTIVE MAINTENANCE

### 6.1. GENERAL

Corrective maintenance, at the field level, is intended to restore proper operation to malfunctioning equipment by replacing components found to be faulty through the troubleshooting procedures described in Section 5 and the preventive maintenance procedures described in Section 4.

This section contains procedures for replacing the Type AW Signal lamps, transformers, receptacles, LED units and lenses used in the various light source versions of the signals as well as signal head replacement and wayside signal siting procedures, as listed in Table 6–1.

#### **WARNING**

VERIFY THAT POWER IS REMOVED FROM THE SIGNAL UNIT PRIOR TO PERFORMING ANY CORRECTIVE MAINTENANCE PROCEDURE.

#### **WARNING**

ABIDE BY ALL OPERATIONAL AND SAFETY RULES WHEN ENTERING AND WORKING IN THE RIGHT OF WAY.

#### **CAUTION**

Do not look directly into an illuminated light source at close range.

Table 6–1. Corrective Maintenance Procedures

Interval	Maintenance Action	Reference
As Needed or every 100,000 hours	Alstom Aurora Type AW LED Unit Replacement	Table 6–2
As Needed or every 43, 800 hours	LED P/N 20179-0XX-XX Module Replacement	Table 6–3
Periodically, as determined by local authorities	Incandescent Lamp Replacement	Table 6–4
As Needed	Transformer Replacement (if used)	Table 6–5
As Needed	Incandescent Lamp Receptacle Replacement	Table 6–6
As Needed	LED Board/Illuminated Number Plate Replacement	Table 6–7
As Needed	Outer Lens Replacement	Table 6–8
As Needed	Signal Head Replacement	Table 6–9
As Needed	Alstom Aurora Type AW LED Unit Brightness Adjustment (Only for Alstom LED Units with the adjustable brightness option)	Table 6–10
As Needed	Wayside Signal Siting	Table 6–11

## 6.2. AURORA TYPE AW LED UNIT REPLACEMENT

Aurora Type AW LED Unit (P/N TXXXX-XXX-00) units should be replaced before the end of their life expectancy. Replace LED units as determined by the local authorities. LED unit life is approximately 100,000 hours. Use the procedure provided in Table 6–2 to replace the LED unit.

Table 6–2. Aurora Type AW LED Unit Replacement Procedure

Step	Action
1	Remove power to the signal by removing its power feed fuses. (Refer to circuit drawings for location of power feed fuses.)
2	Remove padlock and open rear door.
3	<p>Disconnect the field ring terminals from the LED Unit Terminal Posts.</p>
4	Loosen the screws holding the three clips on the inner lens ring.
5	Turn the clips to allow removal of the LED lamp unit and lamp unit gasket.
6	Place the lamp unit gasket on the new LED lamp unit.
7	Place a new Aurora Type AW LED Unit with gasket in position; turn the clips to hold the unit in place.

Table 6–2. Aurora Type AW LED Unit Replacement Procedure (Cont.)

<b>Step</b>	<b>Action</b>
8	Tighten the screws holding the clips on the inner lens ring.
9	Connect LED lamp unit ring terminals to the LED Signal Terminal Posts.
10	Repeat steps 3 through 9 for any additional LED lamp units requiring replacement.
11	Reapply power to the signal.
12	Close rear door. Re-install and lock padlock.
13	Perform the Signal Operational Test provided in Table 4–5.

### 6.3. LED UNIT P/N 20179-0XX-XX REPLACEMENT

LED P/N 20179-0XX-XX units should be replaced before the end of their life expectancy. Replace LED units as determined by the local authorities. LED unit life is approximately 43,800 hours. Use the procedure provided in Table 6–3 to replace the LED unit.

Table 6–3. LED Unit P/N 20179-0XX-XX Replacement Procedure

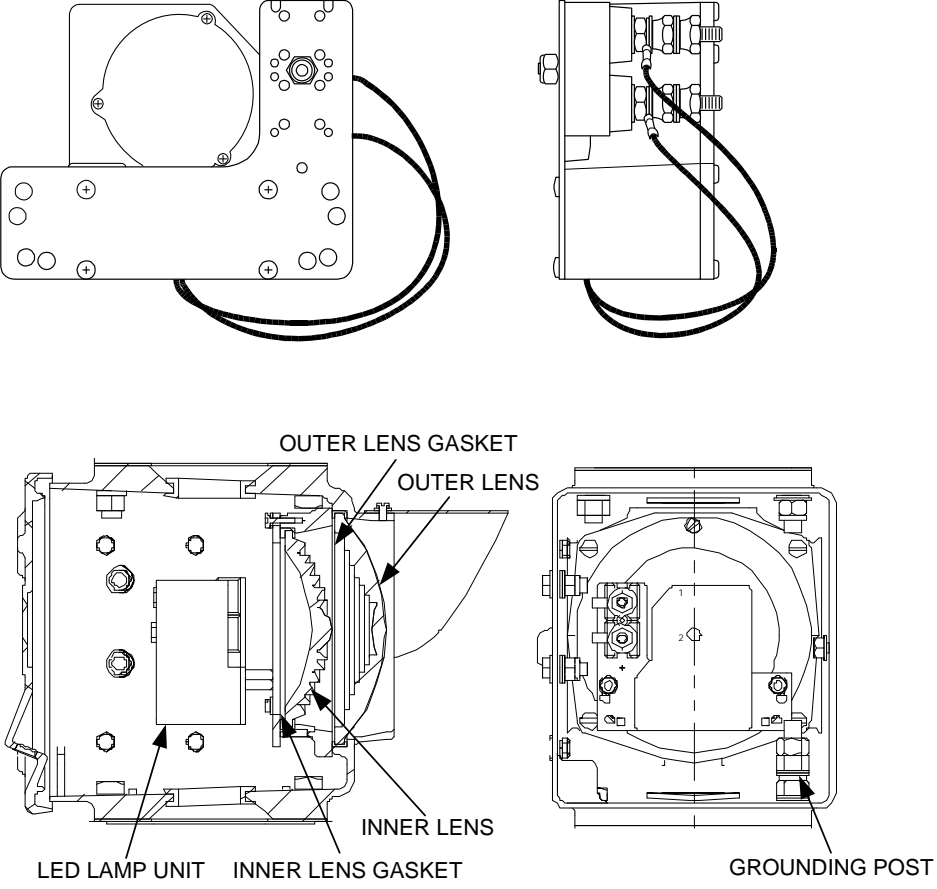
Step	Action
1	Remove power to the signal by removing its power feed fuses. (Refer to circuit drawings for location of power feed fuses.)
2	Remove padlock and open rear door.
3	Verify that field wires connected to the signal head are tagged or tag, as necessary.
4	<p>Disconnect the field ring terminals from the LED Unit Terminal Posts.</p> 

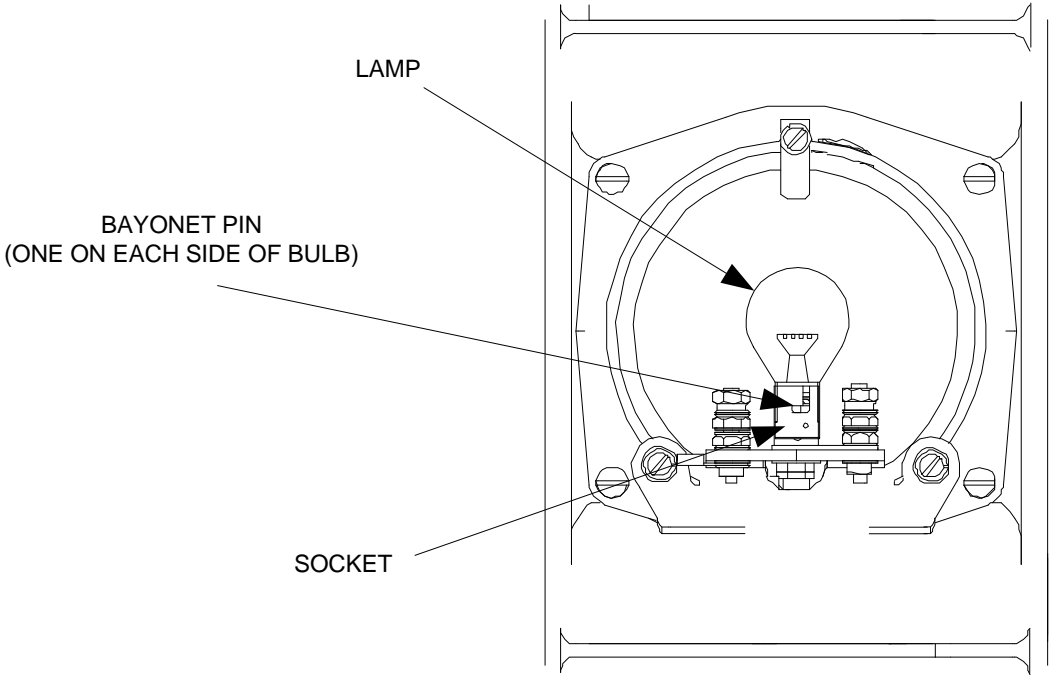
Table 6–3. LED Unit P/N 20179-0XX-XX Replacement Procedure (Cont.)

<b>Step</b>	<b>Action</b>
5	Remove the nuts and washers holding the LED lamp unit to the standoff spacers.
6	Remove the LED lamp unit.
7	Place the new LED lamp unit into position. <p style="text-align: center;"><b><u>NOTE</u></b></p> Use the same mounting holes in the new LED lamp unit mounting bracket as were used in the old unit to ensure the unit can be mounted and aligned properly.
8	Replace washers and tighten the nuts holding the LED lamp unit to the standoff spacers.
9	Reconnect the field wires to the LED lamp unit AAR terminal posts.
10	Repeat steps 3 through 9 for any additional LED lamp units requiring replacement.
11	Reapply power to the signal by reinstalling the power feed fuses.
12	Close rear door. Re-install and lock padlock.
13	Perform the Signal Operational Test provided in Table 4–5.

### 6.4. INCANDESCENT LAMP REPLACEMENT

Aspect lamps should not be allowed to burn themselves out. Replace aspect lamps periodically, as determined by the local authorities, using the procedure listed in Table 6–4.

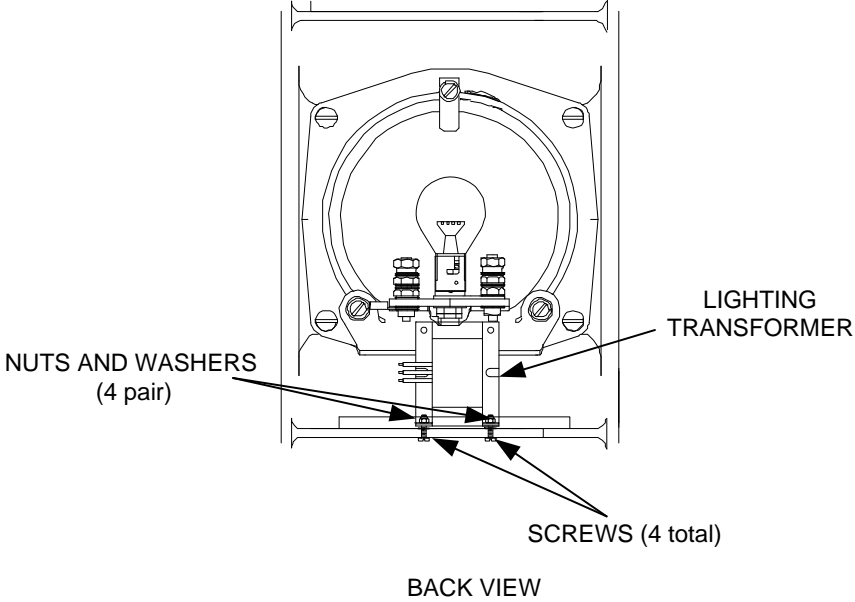
Table 6–4. Incandescent Lamp Replacement Procedure

Step	Action
1	Remove power to the signal by removing its power feed fuses. (Refer to circuit drawings for location of power feed fuses.)
2	Remove padlock and open rear door.
3	<p>Press lamp into socket and turn counter-clockwise. Remove lamp from socket and discard. Repeat for second lamp.</p>  <p style="text-align: center;">BACK VIEW</p>
4	Align bayonet pins on replacement lamp with slots in socket. Push lamp into socket. Turn lamp 1/4 turn clockwise. Release lamp. Repeat for second lamp.
5	Repeat steps 3 and 4 for additional light compartments.
6	Apply power to signal by replacing power feed fuses.
7	Perform the Signal Operational Test provided in Table 4–5.
8	Close rear door. Reinstall and lock padlock.

### 6.5. TRANSFORMER REPLACEMENT

Replace signal transformer using the procedure listed in Table 6–5 in the sequence given.

Table 6–5. Transformer Replacement Procedure

Step	Action
1	Remove power to the signal by removing its power feed fuses. (Refer to circuit drawings for location of power feed fuses.)
2	Remove padlock and open rear door.
3	Identify, tag, and disconnect wires from transformer.
4	Remove four screws and accompanying nuts and washers securing transformer to housing and remove transformer. <div style="text-align: center; margin-top: 20px;">  <p style="text-align: center;">BACK VIEW</p> </div>
5	Install new transformer and reconnect wires as tagged.
6	Apply power to signal by replacing power feed fuses.
7	Close rear door. Reinstall and lock padlock.
8	Perform the Signal Operational Test provided in Table 4–5.

### 6.6. INCANDESCENT LAMP RECEPTACLE REPLACEMENT

Replace the lamp receptacle unit using the procedure listed in Table 6–6 in the sequence given.

Should an aspect lamp receptacle be defective and warrant replacement, then the entire receptacle unit should be removed and replaced. Since the horizontal and vertical position of the lamp receptacle, as well as the distance of the lamp receptacle distance from the lens, controls the illuminating quality of an aspect, care should be taken to position the new receptacle unit in the same position as the replaced unit.

The illuminating quality of an aspect is changed through horizontal and vertical position adjustments made to the signal head lamp receptacle unit while viewing the aspect approach from a distance of up to 300 feet and about 6 feet above the running rail. A formal test specification (Alstom specification number ATS-10Q-28) exists for shop use. This specification may be used in field locations.

Table 6–6. Incandescent Lamp Receptacle Replacement Procedure

Step	Action
1	Remove power to the signal by removing its power feed fuses. (Refer to circuit drawings for location of power feed fuses.)
2	Remove padlock and open rear door.
3	Identify, tag, and disconnect wires from the lamp receptacle.
4	Remove lamps from receptacle and screws securing the receptacle unit to the signal housing. <div data-bbox="548 1234 1182 1608" style="text-align: center;"> </div>
5	Remove receptacle unit and install new receptacle unit.
6	Reconnect wires as tagged and install new lamps.
7	Apply power to signal by replacing power feed fuses.
8	Close rear door. Reinstall and lock padlock.
9	Perform the Signal Operational Test provided in Table 4–5.

## 6.7. LED BOARD/ILLUMINATED NUMBER PLATE REPLACEMENT

Replace the LED board/illuminated number plate unit using the procedure listed in Table 6–7 in the sequence given

Table 6–7. LED Board/Illuminated Number Plate Replacement Procedure

<b>Step</b>	<b>Action</b>
1	Remove power to the signal by removing its power feed fuses. (Refer to circuit drawings for location of power feed fuses.)
2	Remove padlock and open rear door.
3	Identify and disconnect LED board wires from terminal in signal head housing.
4	Remove the four screws securing the LED board/illuminated number plate and bezel ring to the signal housing.
5	Replace damaged components and install the LED board/illuminated number plate and bezel ring to the signal housing.
6	Reconnect LED board wires to terminal in signal head housing.
7	Apply power to signal by replacing power feed fuses.
8	Close rear door. Reinstall and lock padlock.
9	Perform the Signal Operational Test provided in Table 4–5.

### 6.8. OUTER LENS REPLACEMENT

Replace an outer lens using the procedure provided in Table 6–8. Be aware that the LED aspect inner lens is a part of the LED unit, and is not replaced separately. It is replaced with the unit.

There is no need to refocus the signal after a lens is replaced.

Table 6–8. Outer Lens Replacement Procedure

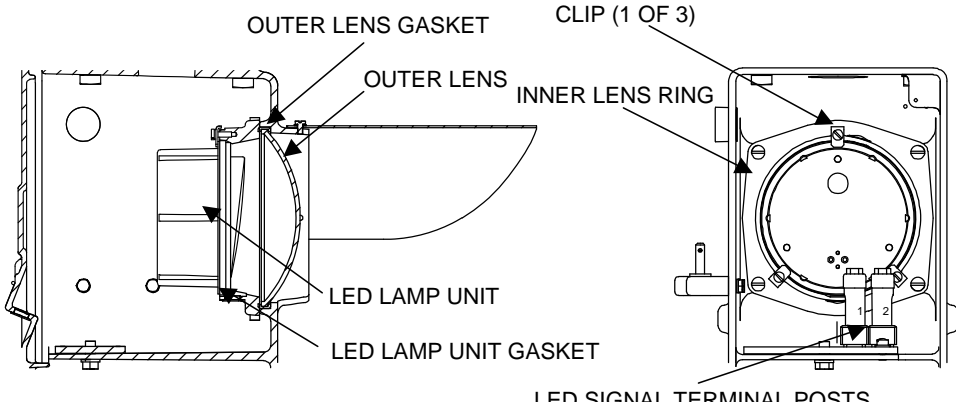
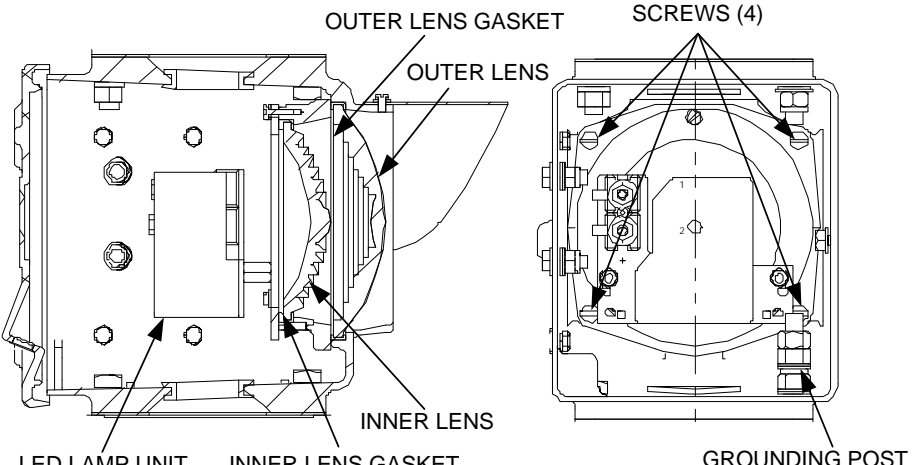
Step	Action
1	Remove power to the signal by removing its power feed fuses. (Refer to circuit drawings for location of power feed fuses.)
2	Remove padlock and open rear door.
3	<p>For the Aurora Type AW LED signal and the Incandescent signal, loosen the screws holding the three clips on the inner lens ring.</p>  <p>For the Alstom LED Signal, remove the four screws attaching the Inner Lens Ring to the housing.</p> 

Table 6–8. Outer Lens Replacement Procedure (Cont.)

Step	Action
4	Remove the LED lamp unit and lamp unit gasket. <p style="text-align: center;"><b><u>CAUTION</u></b></p> <p style="text-align: center;">BE AWARE OF THE LED LAMP RING TERMINALS ATTACHED TO THE LED SIGNAL TERMINAL POSTS. DISCONNECT THE RING TERMINALS, IF NECESSARY, TO AVOID DAMAGING THE WIRING OR CONNECTION.</p>
5	Remove the outer lens and replace outer lens gasket.
6	Replace outer lens, verifying that the outer lens gasket is uniformly in place against the signal case.
7	Reinstall the LED lamp unit and gasket, reconnecting the ring terminals to the LED signal terminal posts, if they were previously disconnected.
8	For the Aurora Type AW LED signal and the Incandescent signal, turn the clips to hold the assembly in place.  For the Alstom LED Signal, reinstall the four screws attaching the Inner Lens Ring to the housing.
9	Tighten the screws holding down the clips.
10	Apply power to the signal head by replacing its power feed fuses.
11	Close rear door. Re-install and lock padlock.
12	Perform the Signal Operational Test provided in Table 4–5.

## 6.9. SIGNAL HEAD REPLACEMENT

The signal head replacement procedure provided in Table 6–9 applies to the pole mounted and wall mounted signal examples provided in this manual. Your installation may vary.

### **CAUTION**

Signal heads are heavy. Stand clear of falling signal heads or obtain help to hold the signal head during removal so that it does not fall on you. The use of a rope and pulley or a come-along is recommended to raise and lower the signal.

Table 6–9. Signal Head Replacement Procedure

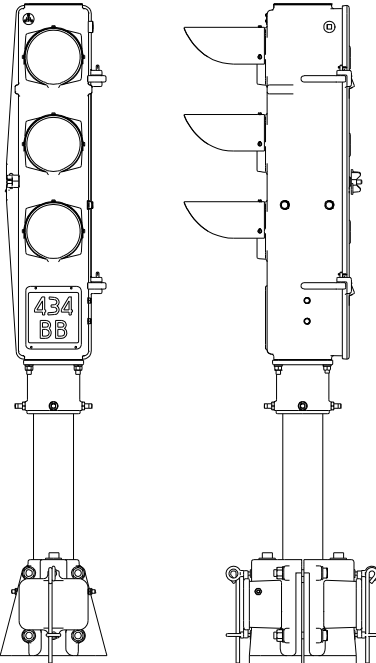
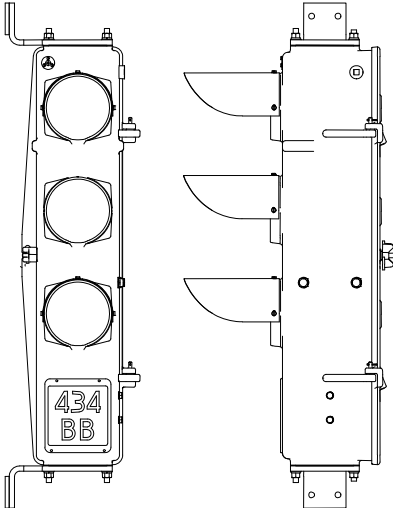
Step	Procedure
1	Remove the power to the signal head by removing the power feed fuses. (Refer to the circuit drawings for location and identity of the power feed fuses in the relay room.)
2	Remove the padlock and open the back door of the signal housing.
3A	<p><u>Pole mounted signal head removal:</u>                      Identify, tag, and disconnect the wires contained in the signal head that connect to wires in the pole. Loosen the bolts on the signal head mounting socket and lift the signal head off.</p> 

Table 6–9. Signal Head Replacement Procedure (Cont.)

Step	Procedure
3B	<p><u>Wall (or ceiling) mounted signal head removal:</u></p> <p>Disconnect the conduit; verify that wires connected to the signal head are tagged or tag, as necessary. Disconnect wires.</p> <p>Remove the bottom two bolts that secure the signal head to the wall; then remove the top two bolts, and lower the signal head to the ground, using caution to remain clear of the lowered equipment. Let the cable come out of the signal head.</p> 
4	<p>If signal is equipped with an enamel number plate, detach plate from the removed signal head and secure it to the replacement signal head. Replace number plate gaskets as needed.</p>
5	<p>Secure the replacement signal head to the mounting by reversing the procedure used to remove the replaced signal head, as follows:</p> <p><u>Pole mounted:</u> Feed the cable through the replacement signal head. Lower the signal head onto the pole and tighten the bolts on the signal head mounting socket. Reconnect the wires tagged in Step 3A.</p> <p><u>Wall (or ceiling) mounted:</u> Feed the cable through the signal head. Raise the signal head into position and secure to the wall using the four bolts removed in Step 3. Replace the conduit. Reconnect the wires tagged in Step 3B.</p> <p>For any pole mounted signal that includes a 3 aspect case, see Table 3–1 for an initial siting procedure performed before tightening the signal down to the mounting hardware.</p>
6	<p>Restore power to the signal head and perform the Signal Operational Test provided in Table 4–5.</p>
7	<p>Complete the Wayside Signal Siting Procedure provided in Table 6–11.</p>

### 6.10. AURORA TYPE AW LED BRIGHTNESS ADJUSTMENT

For Aurora Type AW LED Units with the adjustable brightness option, follow the procedure provided in Table 6–10 when the LED brightness needs adjusting. The brightness can be adjusted to allow the units to be used in tunnel or enclosed areas where full brightness is not desirable.

**WARNING**

DO NOT LOOK DIRECTLY INTO AN ILLUMINATED LIGHT SOURCE AT CLOSE RANGE.

Table 6–10. Aurora Type AW LED Unit Brightness Adjustment Procedure

Step	Action
1	<p>The Aurora Type AW LED Unit brightness should be adjusted for a viewing distance of 600 ft (183 m) in approach to the signal, where attainable, and six (6) feet over the top of the running rail (use the running rail located beneath the train operator). Where the track in approach to the signal is not tangent, sight the signal throughout a 150 ft (45.72 m) approach distance.</p> <p>Record the siting distance used on the data sheet for future reference.</p>
2	<p>Remove padlock and open rear door.</p>
3	<p>Loosen the locknut on the adjustment screw. Turn the screw clockwise (CW) to increase the brightness and counterclockwise (CCW) to dim the LED brightness.</p> <div data-bbox="321 1247 1393 1562" style="text-align: center;"> </div> <p><b><u>NOTE</u></b></p> <p>The LED lamp unit is shipped with the unit at full brightness.</p>
4	<p>Once the LED unit is adjusted to the desired brightness, retighten the locknut.</p>
5	<p>Repeat Steps 1 through 4 for each aspect LED requiring brightness adjustment.</p>
6	<p>Close rear door. Reinstall and lock padlock.</p>

### 6.11. WAYSIDE SIGNAL SITING

Whenever a signal head is replaced, it must be sited. The procedure Table 6–11 is performed to ensure that the oncoming train operator properly sees the signal.

For any pole mounted signal that includes a 3 aspect case, see Table 3–1 for an initial siting procedure. Then follow up by performing the procedure provided in Table 6–11.

Table 6–11. Wayside Signal Siting Procedure

<b>Step</b>	<b>Procedure</b>
1	<p>Sight the signal head starting from a position 600 ft (183 m) in approach to the signal and 6 ft (1.83 m) over the top of the running rail (use the running rail located beneath the train operator). Sight the signal at 30 ft (9.14 m) intervals moving towards the signal.</p> <p>Where the track in approach to the signal is not tangent, sight the signal throughout a 150 ft (45.72 m) approach distance.</p> <p>Record the siting distance used on the data sheet for future reference.</p>
2	<p>Verify that the signal is properly aligned for optimum visibility of the illuminated signal aspect throughout the approach distance.</p>
3	<p>Verify that the illuminated signal aspect is continuously readily readable (distinguishable from the non-illuminated signal heads without glare) throughout the approach distance.</p>
4	<p>Verify that there is an unobstructed (clear) view of the illuminated signal aspect throughout the approach distance.</p>
5	<p>Perform steps 1 through 4 for each signal aspect in the signal under test.</p>
6	<p>Repeat this procedure for each signal in the location under test.</p>

Should an aspect appear to dim when viewing the aspect on the approach from a distance of up to 600 ft (183 m) and about 6 ft (1.83 m) above the running rail, follow the troubleshooting procedure in Figures 5–1 through 5–3.

## 7. SECTION 7 – PARTS CATALOG

### 7.1. GENERAL

This section describes and shows the main component replacement parts for example Type AW Signals.

Replacement parts shown are the lowest level replaceable unit (LLRU) that can be ordered. The LLRU is a component part that can be easily removed and replaced without using special tools or equipment.

### 7.2. PARTS LIST

The basic signal cases include single aspect and three aspect versions. These two basic cases are combined in various configurations to also obtain up to 9 aspects in a single signal. The three aspect signal case is configured with or without an LED or enameled number plate.

To determine the part number to use when ordering a complete signal for your configuration or to obtain the parts list for your specific configuration, contact your Alstom Signaling Inc. representative.

- Figure 7–1 shows an example Single Aspect Aurora Type AW LED Signal Unit Complete, Wall Mount drawing
- Figure 7–2 shows an example 4 Aspect Aurora Type AW LED Signal Unit (Single Aspect Plus Three Aspect) Complete, Wall Mount drawing
- Figure 7–3 shows an example Single Aspect Aurora Type AW LED Signal Unit Complete, Pole Mount drawing
- Figure 7–4 shows the Aurora Type AW LED Unit drawing including a table of the available LED configurations
- Figure 7–5 shows an example 3 Aspect Type AW Signal Unit, With LED P/N 20179-0XX-00 Pole Mount drawing
- Figure 7–6 shows the LED Unit P/N 20179-0XX-00 drawing
- Figure 7–7 shows an example 3 Aspect AW Incandescent Signal Unit, Enameled No. Plate, Door Stop, Transformers W/Siting Device, Fuseblock and Fuse drawing

Each replacement part is listed with the Alstom 10-digit drawing number that should be used when ordering the replacement part. Replacement parts are listed, described, and identified along with the quantity required for each assembly in Tables accompanying the figures.

Screw, nut, and bolt dimensions are provided in diameter (inches) by threads per inch by length (inches). All other dimensions are provided in inches, unless indicated otherwise.

7.3. SINGLE ASPECT AURORA TYPE AW LED SIGNAL UNIT COMPLETE, WALL MOUNT

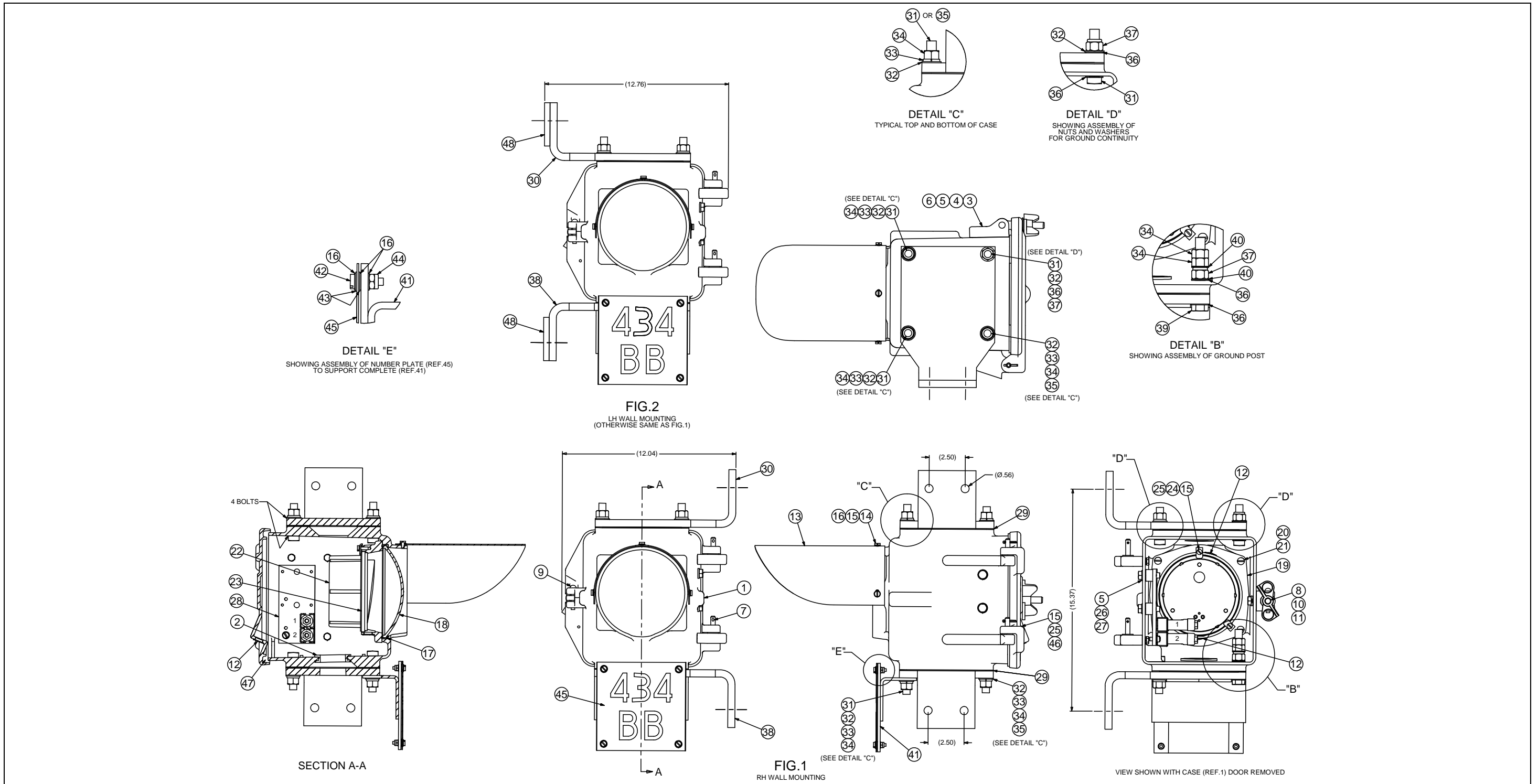


Figure 7-1. Example Single Aspect Aurora Type AW LED Signal Unit, Wall Mount

Table 7–1. Example Single Aspect Aurora Type AW LED Signal Unit,  
Wall Mount Part Numbers

<b>Ref.</b>	<b>Description</b>	<b>Qty.</b>	<b>Drawing No.</b>
1	Case Complete, 1 Aspect	1	AW003-001-01
2	Grommet, 1.75 ID, 2.50 OD, .25 Thk	1	55243-059-00
3	Lug, Hasp	1	51154-002-00
4	Gasket, Lock Lug	1	13014-709-00
5	Washer, .377 ID, .680 OD, .094 Thk Lock	3	01273-008-ON
6	Screw, .375-16 x .75 Lg Hex Hd	1	00395-012-ON
7	Pin, .125 x .75 Lg Cotter	2	00039-001-ON
8	Bolt, .438-14 x 2.14 Eye	1	39319-077-00
9	Rivet, .250 Dia x 1.500 Lg Solid	1	00544-011-ON
10	Bearing, Thrust, .500 ID, 1.000 OD	1	49536-136-00
11	Nut, .438-14 Thumb	1	10117-002-00
12	Ventilator	3	49915-001-00
13	Hood	1	49127-077-00
14	Screw, .190-32 x .38 Lg Pan Hd	3	03610-112-ON
15	Washer, .193 ID, .334 OD, .047 Thk Lock	7	01273-004-ON
16	Washer, .200 ID, .438 OD, .031 Thk Flat	15	01250-009-ON
17	Gasket, Outer Lens	1	13014-459-00
18	Lens, Outer	1	09238-002-00
19	Ring, Inner Lens	1	55653-005-00
20	Screw, .250-20 x .75 Lg Pan Hd	4	03615-024-ON
21	Washer, .252 ID, .487 OD, .062 Thk Lock	4	01273-006-ON
22	LED Lamp Unit, See Figure 7–4 for available units		See Figure 7–4
23	Gasket, LED Lamp Unit	1	13014-712-00
24	Clip	3	18547-110-00
25	Screw, .190-32 x .63 Lg Pan Hd	4	03610-120-ON
26	Collar	2	00420-026-00
27	Screw, .375-16 x 1.25 Lg Hex Hd	2	02472-045-00
28	Support, LED Signal Terminal	1	35655-100-02
29	Gasket	2	13014-678-00
30	Bracket	1	35656-021-00

Table 7-1. Example Single Aspect Aurora Type AW LED Signal Unit,  
Wall Mount Part Numbers (Cont.)

Ref.	Description	Qty.	Drawing No.
31	Bolt, .500-13 x 2.50 Lg Sq Hd	5	49527-029-00
32	Washer, .531 ID, 1.000 OD, .063 Thk Flat	7	01250-020-ON
33	Washer, .502 ID, .869 OD, .125 Thk Lock	6	01273-010-ON
34	Nut, .500-13 x .438 Thk Hex	8	01048-005-00
35	Bolt, .500-13 x 2.25 Lg Sq Hd	2	49527-005-00
36	Washer, .512 ID, .900 OD, .045 Thk Shk'prf	4	53029-078-00
37	Nut, .500-13 x .594 Thk Hex Elastic Stop	2	42333-050-00
38	Bracket	1	35656-020-00
39	Bolt, .500-13 x 3.50 Lg Hex Hd Tap	1	00520-005-ON
40	Washer, .516 ID, .875 OD, .063 Thk Flat	3	01250-019-ON
41	Support Complete, Name Plate	1	39751-018-02
42	Screw, .190-32 x .75 Lg Pan Hd	4	03610-124-ON
43	Washer, .205 ID, .500 OD, .031 Thk Flat Nylon	8	00493-354-00
44	Nut, .190-32 x .239 Thk Hex Elastic Stop	4	42333-047-00
46	Washer, .203 ID, .563 OD, .040 Thk Flat	1	01250-010-ON
47	Gasket, Neoprene, Rectangular	1	43460-051-00
48	Plate, Signal Spacer	2	54106-441-00
<b>THE FOLLOWING MATERIALS ARE ALSO REQUIRED FOR ASSEMBLY</b>			
--	Wiring Diagram	1 Print	43989KN
--	Soft Mastic Sealing Compound (Per 90B0010)	AS REQ'D	81361-050-06
--	Acrylic Paint, Black Fed Color #37038 (Per 92A0029)	AS REQ'D	81361-151-01
--	Mineral Base Oil (Per 91A0007)	AS REQ'D	81379-005-08
<b>THE FOLLOWING PARTS TO BE SPECIFIED ON SHIPPING ORDER AS REQUIRED</b>			
45	Plate, Number	1	45924-KN



Table 7–2. Example 4 Aspect Aurora Type AW LED Signal Unit (Single Aspect Plus Three Aspect) Complete, Wall Mount Part Numbers

Ref.	Description	Qty.	Drawing No.
1	Case Complete, 3 Aspect	1	AW002-001-01
2	Plug, Pipe 1.00 NPT	1	18524-031-00
3	Glass, Siting	1	00924-004-00
4	Ring, Bezel	1	43718-004-00
5	Washer, .141 ID, .250 OD, .031 Thk Lock	3	01273-002-ON
6	Screw, .138-32 x .25 Lg Pan Hd	3	03606-008-ON
7	Plug, Siting	1	51364-000-00
8	Bolt, .500-13 x 1.50 Lg Sq Hd	2	49527-031-00
9	Washer, .502 ID, .869 OD, .125 Thk Lock	11	01273-010-ON
10	Washer, .531 ID, 1.000 OD, .063 Thk Flat	14	01250-020-ON
11	Washer, .516 ID, .875 OD, .06 Thk Fibre	4	00493-260-00
12	Nut, .500-13 x .438 Thk Hex	13	01048-005-00
13	Lug, Hasp	2	51154-002-00
14	Gasket, Lock Lug	2	13014-709-00
15	Washer, .377 ID, .680 OD, .094 Thk Lock	7	01273-008-ON
16	Screw, .375-16 x .75 Lg Hex Hd	7	00395-012-ON
17	Pin, .125 x .75 Lg Cotter	4	00039-001-ON
18	Bolt, .438-14 x 2.14 Eye	2	39319-077-00
19	Rivet, .250 Dia x 1.500 Lg Solid	2	00544-011-ON
20	Bearing, Thrust, .500 ID, 1.000 OD	2	49536-136-00
21	Nut, .438-14 Thumb	2	10117-002-00
22	Ventilator	11	49915-001-00
23	Hood	4	49127-077-00
24	Screw, .190-32 x .38 Lg Pan Hd	12	03610-112-ON
25	Washer, .193 ID, .334 OD, .047 Thk Lock	26	01273-004-ON
26	Washer, .200 ID, .438 OD, .031 Thk Flat	12	01250-009-ON
27	Gasket, Outer Lens	4	13014-459-00
28	Lens, Outer	4	09238-002-00
29	Ring, Inner Lens	4	55653-005-00
30	Screw, .250-20 x .75 Lg Pan Hd	20	03615-024-ON

Table 7–2. Example 4 Aspect Aurora Type AW LED Signal Unit  
(Single Aspect Plus 3 Aspect) Complete, Wall Mount Part Numbers (Cont.)

Ref.	Description	Qty.	Drawing No.
31	Washer, .252 ID, .487 OD, .062 Thk Lock	20	01273-006-ON
32	LED Lamp Unit, See Figure 7–4 for available units	4	See Figure 7–4
33	Gasket, LED Lamp Unit	4	13014-712-00
34	Clip	12	18547-110-00
35	Screw, .190-32 x .63 Lg Pan Hd	14	03610-120-ON
36	LED Lamp Unit, See Figure 7–4 for available units	1	See Figure 7–4
37	Support, LED Signal Terminal	4	35655-100-02
38	Gasket, Square	1	13014-201-00
39	Gasket, Square	1	13014-685-00
40	Ring, Bezel	1	43983-143-00
41	Grommet, 1.75 ID, 2.50 OD, .25 Thk	2	55243-059-00
42	Gasket	3	13014-678-00
43	Bracket	1	35656-020-00
44	Bolt, .500-13 x 2.50 Lg Sq Hd	8	49527-029-00
45	Bolt, .500-13 x 2.25 Lg Sq Hd	3	49527-005-00
46	Bolt, .500-13 x 3.50 Lg Hex Hd Tap	1	00520-005-ON
47	Washer, .512 ID, .900 OD, .045 Thk Shk'prf	6	53029-078-00
48	Washer, .516 ID, .875 OD, .063 Thk Flat	3	01250-019-ON
49	Nut, .500-13 x .594 Thk Hex Elastic Stop	3	42333-050-00
50	Case Complete, 1 Aspect	1	AW003-001-01
51	Collar	2	00420-026-00
52	Screw, .375-16 x 1.25 Lg Hex Hd	2	02472-045-00
53	Bracket	1	35656-021-00
54	Plate, Number	1	45924-KN
55	Washer, .203 ID, .563 OD, .040 Thk Flat	2	01250-010-ON
56	Gasket, Neoprene, Rectangular	1	43460-051-00
57	Gasket, Neoprene, Rectangular	1	43460-041-00

Table 7-2. Example 4 Aspect Aurora Type AW LED Signal Unit  
(Single Aspect Plus 3 Aspect) Complete, Wall Mount Part Numbers (Cont.)

Ref.	Description	Qty.	Drawing No.
THE FOLLOWING MATERIALS ARE ALSO REQUIRED FOR ASSEMBLY			
--	Wiring Diagram	1 Print	43989KN
--	Soft Mastic Sealing Compound (Per 90B0010)	AS REQ'D	81361-050-06
--	Acrylic Paint, Black Fed Color #37038 (Per 92A0029)	AS REQ'D	81361-151-01
	Mineral Base Oil (Per 91A0007)	AS REQ'D	81379-005-08

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7.5. SINGLE ASPECT AURORA TYPE AW LED SIGNAL UNIT COMPLETE, POLE MOUNT

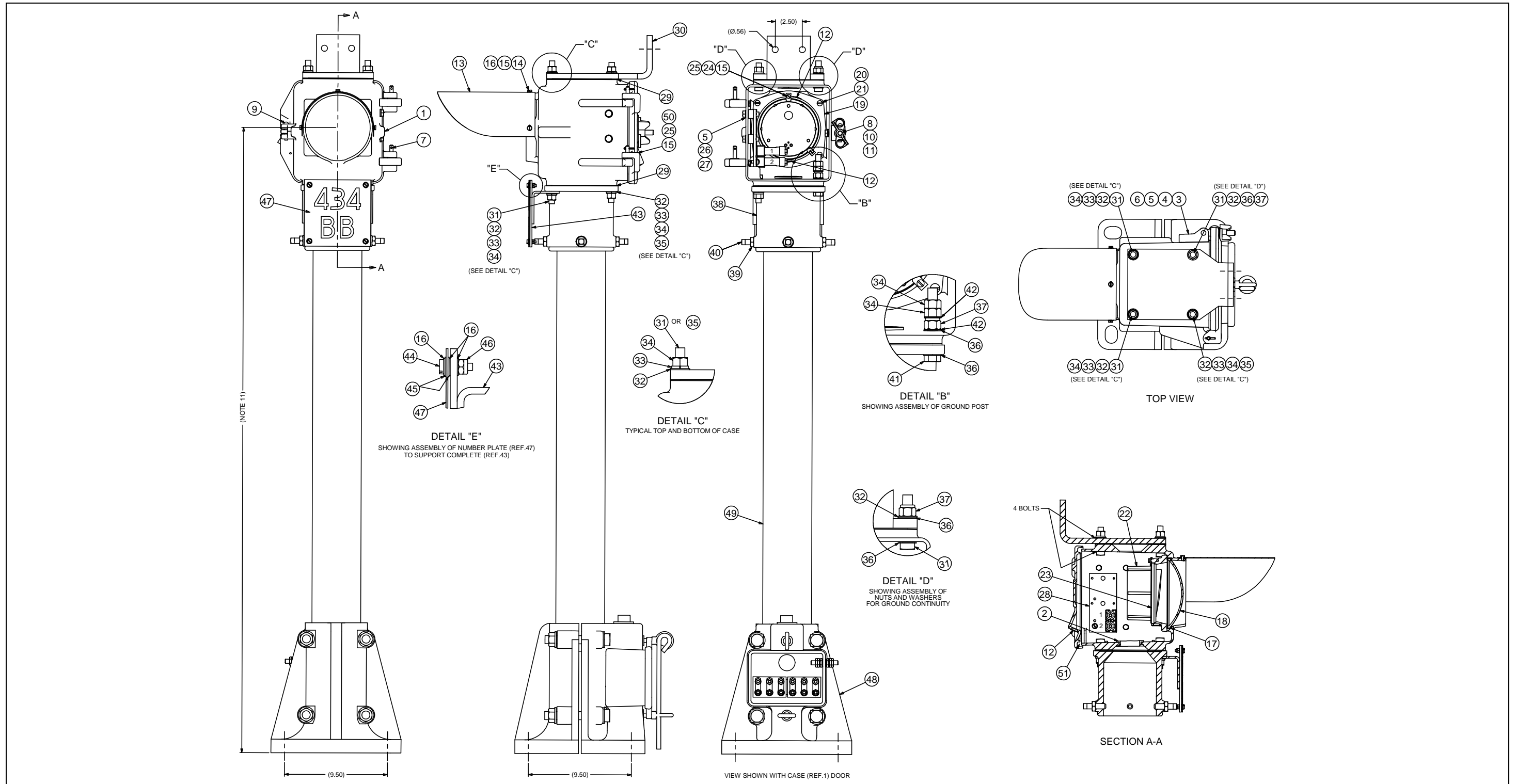


Figure 7-3. Example Single Aspect Aurora Type AW LED Signal Unit, Pole Mount

Table 7–3. Example Single Aspect Aurora Type AW LED Signal Unit Complete, Pole Mount Part Numbers

<b>Ref.</b>	<b>Description</b>	<b>Qty.</b>	<b>Drawing No.</b>
1	Case Complete, 1 Aspect	1	AW003-001-01
2	Grommet, 1.75 ID, 2.50 OD, .25 Thk	1	55243-059-00
3	Lug, Hasp	1	51154-002-00
4	Gasket, Lock Lug	1	13014-709-00
5	Washer, .377 ID, .680 OD, .094 Thk Lock	3	01273-008-ON
6	Screw, .375-16 x .75 Lg Hex Hd	1	00395-012-ON
7	Pin, .125 x .75 Lg Cotter	2	00039-001-ON
8	Bolt, .438-14 x 2.14 Eye	1	39319-077-00
9	Rivet, .250 Dia x 1.500 Lg Solid	1	00544-011-ON
10	Bearing, Thrust, .500 ID, 1.000 OD	1	49536-136-00
11	Nut, .438-14 Thumb	1	10117-002-00
12	Ventilator	3	49915-001-00
13	Hood	1	49127-077-00
14	Screw, .190-32 x .38 Lg Pan Hd	3	03610-112-ON
15	Washer, .193 ID, .334 OD, .047 Thk Lock	7	01273-004-ON
16	Washer, .200 ID, .438 OD, .031 Thk Flat	15	01250-009-ON
17	Gasket, Outer Lens	1	13014-459-00
18	Lens, Outer	1	09238-002-00
19	Ring, Inner Lens	1	55653-005-00
20	Screw, .250-20 x .75 Lg Pan Hd	4	03615-024-ON
21	Washer, .252 ID, .487 OD, .062 Thk Lock	4	01273-006-ON
22	LED Lamp Unit, See Figure 7–4 for available units		See Figure 7–4
23	Gasket, LED Lamp Unit	1	13014-712-00
24	Clip	3	18547-110-00
25	Screw, .190-32 x .63 Lg Pan Hd	4	03610-120-ON
26	Collar	2	00420-026-00
27	Screw, .375-16 x 1.25 Lg Hex Hd	2	02472-045-00
28	Support, LED Signal Terminal	1	35655-100-02
29	Gasket	2	13014-678-00
30	Bracket	1	35656-021-00

Table 7-3. Example Single Aspect Aurora Type AW LED Signal Unit Complete, Pole Mount Part Numbers (Cont.)

Ref.	Description	Qty.	Drawing No.
31	Bolt, .500-13 x 2.50 Lg Sq Hd	5	49527-029-00
32	Washer, .531 ID, 1.000 OD, .063 Thk Flat	7	01250-020-ON
33	Washer, .502 ID, .869 OD, .125 Thk Lock	6	01273-010-ON
34	Nut, .500-13 x .438 Thk Hex	8	01048-005-00
35	Bolt, .500-13 x 2.25 Lg Sq Hd	2	49527-005-00
36	Washer, .512 ID, .900 OD, .045 Thk Shk'prf	4	53029-078-00
37	Nut, .500-13 x .594 Thk Hex Elastic Stop	2	42333-050-00
38	Socket, 4.00 Pipe	1	28447-022-00
39	Nut, .500-13 x .297 Thk Hex	4	41895-001-00
40	Screw, .500-13 x 1.75 Lg Sq Hd Set	4	48576-004-00
41	Bolt, .500-13 x 3.50 Lg Hex Hd Tap	1	00520-005-ON
42	Washer, .516 ID, .875 OD, .063 Thk Flat	3	01250-019-ON
43	Support Complete, Name Plate	1	39751-018-02
44	Screw, .190-32 x .75 Lg Pan Hd	4	03610-124-ON
45	Washer, .205 ID, .500 OD, .031 Thk Flat Nylon	8	00493-354-00
46	Nut, .190-32 x .239 Thk Hex Elastic Stop	4	42333-047-00
50	Washer, .203 ID, .563 OD, .040 Thk Flat	1	01250-010-ON
51	Gasket, Neoprene, Rectangular	1	43460-051-00
<b>THE FOLLOWING MATERIALS ARE ALSO REQUIRED FOR ASSEMBLY</b>			
--	Wiring Diagram	1 Print	43989KN
--	Soft Mastic Sealing Compound (Per 90B0010)	AS REQ'D	81361-050-06
	Acrylic Paint, Black Fed Color #37038 (Per 92A0029)	AS REQ'D	81361-151-01
	Mineral Base Oil (Per 91A0007)	AS REQ'D	81379-005-08
<b>THE FOLLOWING PARTS TO BE SPECIFIED ON SHIPPING ORDER AS REQUIRED</b>			
47	Plate, Number	1	45924-KN
48	Base Complete	1	43951-027-05
49	Pole, 4.00 Pipe	AS REQ'D	



7.7. 7 ASPECT TYPE AW SIGNAL UNIT WITH LED P/N 20179-0XX-00, POLE MOUNT

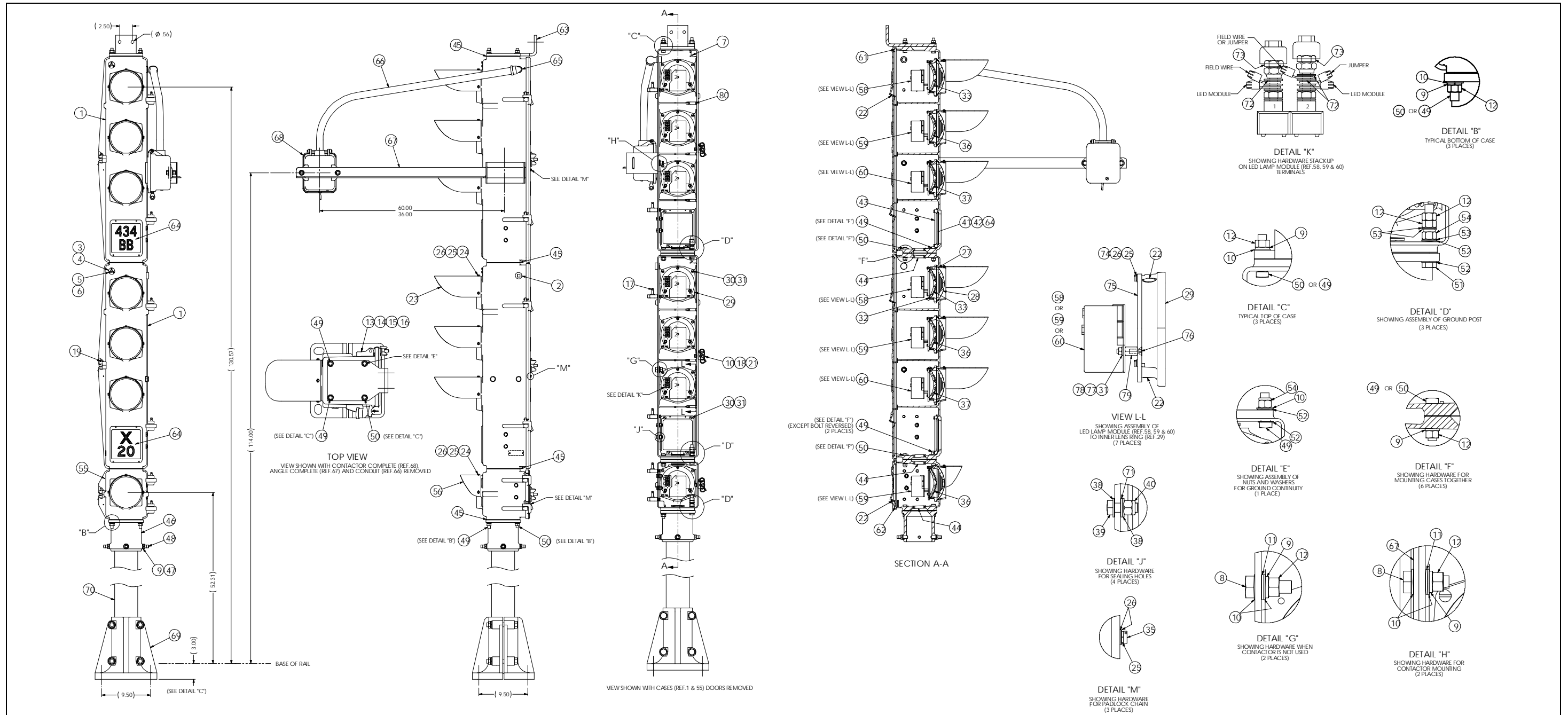


Figure 7-5. Example 7 Aspect Type AW Signal Unit With LED P/N 20179-0XX-00, Post Mount

Table 7-4. Example 7 Aspect Type AW Signal Unit With LED P/N 20179-0XX-00,  
Pole Mount Part Numbers

Ref.	Description	Qty.	Drawing No.
1	Case Complete, 3 Aspect	2	AW002-001-01
2	Plug, Pipe 1.00 NPT	1	18524-031-00
3	Glass, Sighting	2	00924-004-00
4	Ring, Bezel	2	43718-004-00
5	Washer, .141 ID, .250 OD, .031 Thk Lock	6	01273-020-ON
6	Screw, .138-32 x .25 Lg Pan Hd	6	03606-008-ON
7	Plug, Sighting	2	51364-000-00
8	Bolt, .500-13 x 1.50 Lg Hex Hd	4	00733-003-ON
9	Washer, .502 ID, .869 OD, .125 Thk Lock	20	01273-010-ON
10	Washer, .531 ID, 1.000 OD, .063 Thk Flat	15	01250-020-ON
11	Washer, 1.00 OD, .078 Thk Thred-Seal	4	01279-001-ON
12	Nut, .500-13 x .438 Thk Hex	22	01048-005-00
13	Lug, Hasp	3	51154-002-00
14	Gasket, Lock Lug	3	13014-709-00
15	Washer, .377 ID, .680 OD, .094 Thk Lock	3	01273-040-ON
16	Screw, .375-16 x .75 Lg Hex Hd	3	00395-012-ON
17	Pin, .125 x .75 Lg Cotter	6	00213-005-ON
18	Bolt, .438-14 Eye	3	39319-077-00
19	Rivet, .250 Dia x 1.500 Lg Solid	3	00544-011-ON
21	Nut, .438-14 Thumb	3	10117-002-00
22	Ventilator	19	49915-001-00
23	Hood, Long	6	49127-077-00
24	Screw, .190-32 x .38 Lg Pan Hd	21	03610-112-ON
25	Washer, .193 ID, .334 OD, .047 Thk Lock	45	01273-027-ON
26	Washer, .200 ID, .438 OD, .031 Thk Flat	48	01250-009-ON
27	Gasket, Outer Lens	7	13014-459-00
28	Lens, Outer Doublet, 6.38 Dia Glass, Clear	7	53119-073-00
29	Ring, Inner Lens	7	55653-005-00
30	Screw, .250-20 x .88 Lg Pan Hd	36	03615-028-ON

Table 7-4. Example 7 Aspect Type AW Signal Unit With LED P/N 20179-0XX-00,  
Pole Mount Part Numbers (Cont.)

Ref.	Description	Qty.	Drawing No.
31	Washer, .252 ID, .487 OD, .062 Thk Lock	50	01273-025-ON
32	Gasket, Inner Lens	7	13014-458-00
33	Lens, Inner Doublet, 5.50 Dia Glass, Green	2	43988-030-00
34	Washer, .453 ID, .750 OD, .125 Thk	3	01250-041-ON
35	Screw, .190-32 x .63 Lg Pan Hd	3	03610-120-ON
36	Lens, Inner Doublet, 5.50 Dia Glass, Yellow	3	43988-031-00
37	Lens, Inner Doublet, 5.50 Dia Glass, Red	2	43988-032-00
38	Washer, .406 ID, .750 OD, .063 Thk Flat	12	01250-016-ON
39	Screw, .375-16 x 1.00 Lg Hex Hd	6	06170-002-00
40	Nut, .375-16 x .453 Thk Hex Elastic Stop	6	42333-041-00
41	Gasket, Square	2	13014-201-00
42	Gasket, Square	2	13014-685-00
43	Ring, Bezel	2	43983-143-00
44	Grommet, 1.75 ID, 2.50 OD, .25 Thk	5	55243-059-00
45	Gasket	4	13014-678-00
46	Socket, 4.00 Pipe	1	28447-022-00
47	Nut, .500-13 x .297 Thk Hex	4	41895-001-00
48	Screw, .500-13 x 1.75 Lg Sq Hd Set	4	48576-004-00
49	Bolt, .500-13 x 2.50 Lg Sq Hd	9	49527-029-00
50	Bolt, .500-13 x 2.25 Lg Sq Hd	4	49527-005-00
51	Bolt, .500-13 x 3.50 Lg Hex Hd Tap	3	00520-005-ON
52	Washer, .512 ID, .900 OD, .045 Thk Shk'prf	8	53029-078-00
53	Washer, .516 ID, .875 OD, .063 Thk Flat	9	01250-019-ON
54	Nut, .500-13 x .594 Thk Hex Elastic Stop	4	42333-050-00
55	Case Complete, 1 Aspect	1	AW003-001-01
56	Hood, Short	1	49127-061-00
58	Lamp, LED Module, Green	2	20179-008-00
59	Lamp, LED Module, Yellow	3	20179-010-00
60	Lamp, LED Module, Red	2	20179-009-00
61	Gasket, Neoprene, Rectangular	2	43460-041-00
62	Gasket, Neoprene, Rectangular	1	43460-051-00

Table 7-4. Example 7 Aspect Type AW Signal Unit With LED P/N 20179-0XX-00, Pole Mount Part Numbers (Cont.)

Ref.	Description	Qty.	Drawing No.
63	Bracket	1	35656-021-00
71	Washer, .750 OD, .063 Thk Thred-Seal	6	01279-000-ON
72	Washer, .266 ID, .563 OD, .040 Thk Flat	21	01225-002-00
73	Nut, .242-24 x .188 Thk Hex	14	42839-005-00
74	Screw, #10-32 x 3/4 Lg Pan Hd	21	03610-124-ON
75	Ring, LED Module Mounting	7	55653-007-00
76	Screw, 1/4-20 x 3/4 Lg FlatSocket Hd Cap	14	17708-172-00
77	Nut, 1/4-20 x .193 Thk Hex	14	01272-008-ON
78	Washer, .281 ID, .625 OD, .065 Thk Flat	14	00626-272-00
79	Nut, 1/4-20 x 3/4 Lg M/F Hex Standoff	14	20673-205-00
80	Channel, Edge Guard (3.00 Long)	1.5	54991-030-00
--	Tag, Wire Marker, #6 AWG (GND)	4	48932-016-00
--	Tie, Cable (For GND Tags)	4	01232-013-ON
<b>THE FOLLOWING MATERIALS ARE ALSO REQUIRED FOR ASSEMBLY</b>			
	Tubing, .50 Dia, Spiral, Black (Per 82P0001)	3	81409-016-01
--	Terminal, .250 Ring (16-14)	14	59825-174-00
--	Terminal, .500 Ring (6)	4	59825-089-00
--	Wire, #14 Flex, 600V (Per 82E0005)	17	80551-051-01
--	Wire, #6, Solid Tinned (Per 82J0002)	6	80613-000-01
--	Soft Mastic Sealing Compound (Per 90B0010)	AS REQ'D	81361-050-06
--	Acrylic Paint, Black Fed Color #37038 (Per 92A0029)	AS REQ'D	81361-151-01
--	Mineral Base Oil (Per 91A0007)	AS REQ'D	81379-005-08
--	Tape, Vinyl (Per 99F0001)	AS REQ'D	
--	Retaining Compound (Per 90B0050)	AS REQ'D	81361-400-11
--	Wiring Diagram	1 Print	43989-775-00
<b>THE FOLLOWING PARTS ARE NOT INCLUDED IN ASSEMBLY AND MUST BE SPECIFIED ON SHIPPING ORDER AS REQUIRED</b>			
64	Plate, Number	2	45924-016-00
65	Elbow, 90° Street, 1.00 NPT	1	35132-015-00
66	Conduit (For 36.00 VPB)	AS REQ'D	51067-006-00

Table 7-4. Example 7 Aspect Type AW Signal Unit With LED P/N 20179-0XX-00,  
Pole Mount Part Numbers (Cont.)

<b>Ref.</b>	<b>Description</b>	<b>Qty.</b>	<b>Drawing No.</b>
66	Conduit (For 60.00 VPB)	AS REQ'D	51067-011-00
67	Angle Complete (For 36.00 VPB)	AS REQ'D	55696-013-01
67	Angle Complete (For 60.00 VPB)	AS REQ'D	55696-013-02
68	Contacto Complete	1	04987-004-03
69	Base Complete, Split, 4.00 Pipe	1	43951-035-01
70	Pole, 4.00 Pipe	1	11560-154-00
--	Shield Complete, Vandal	7	40186-003-01

LED Unit P/N 20179-0XX-00

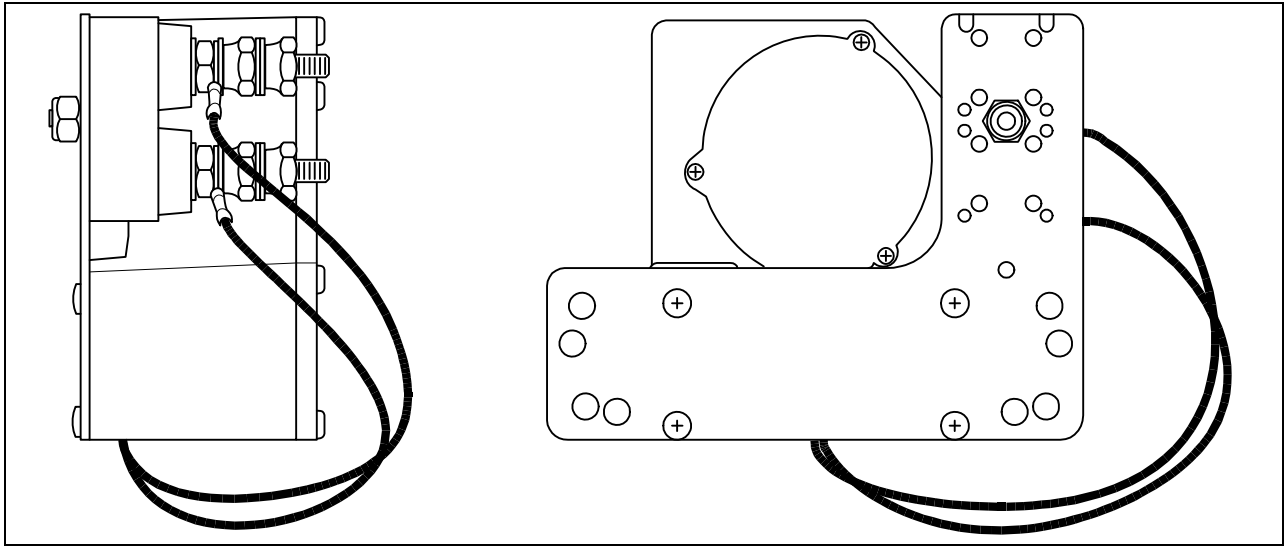


Figure 7-6. LED Unit P/N 20179-0XX-00

Table 7-5. LED Unit P/N 20179-0XX-00 Part Numbers

LED Color	Alstom Part Number
Red	20179-009-00
Green	20179-008-00
Yellow	20179-010-00
Lunar White	20179-011-00

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7.8. 3 ASPECT TYPE AW INCANDESCENT SIGNAL UNIT

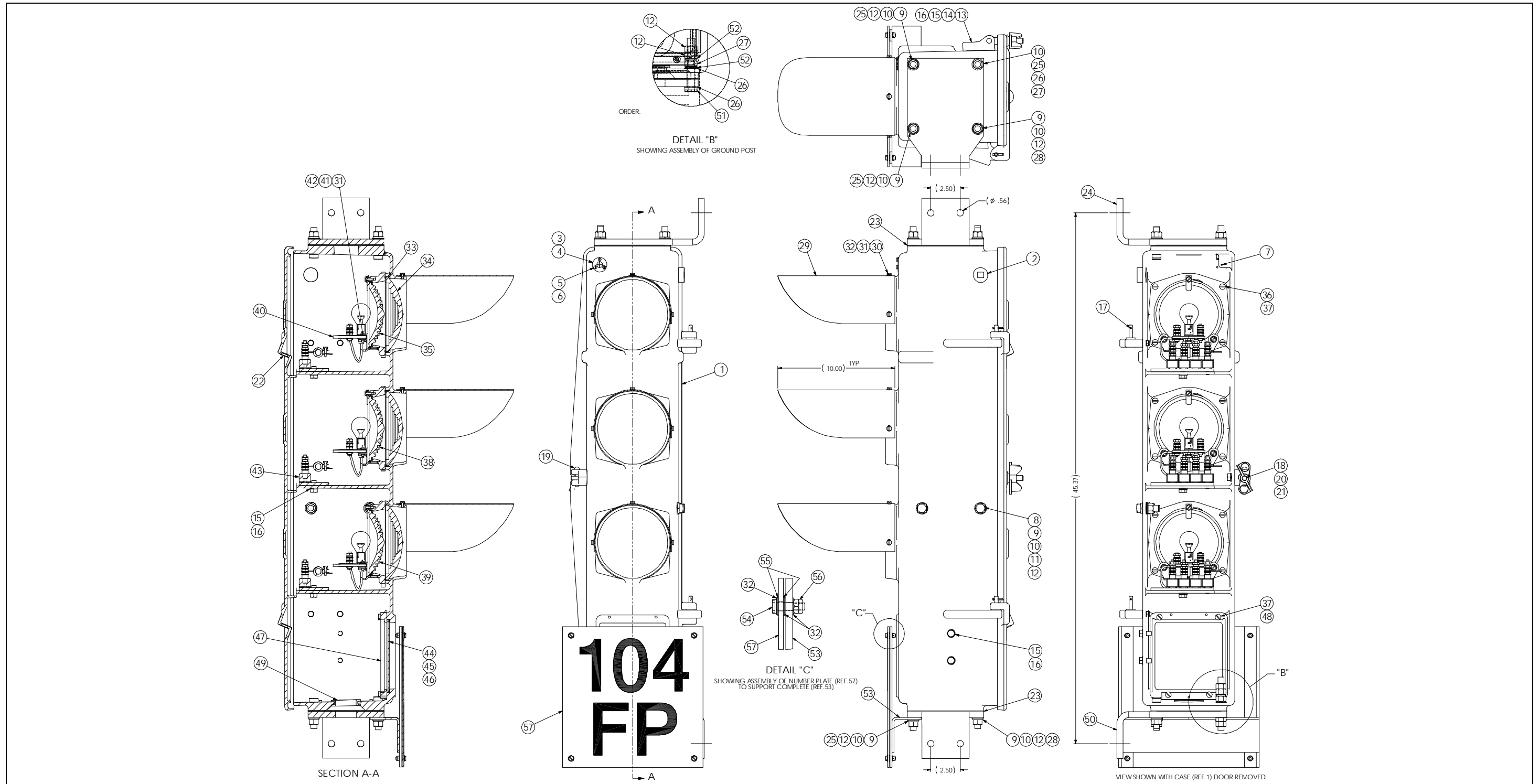


Figure 7-7. Example 3 Aspect Type AW Incandescent Signal Unit, Enameled No. Plate, Door Stop and Siting Device

Table 7–6. Example 3 Aspect Type AW Incandescent Signal Unit, Enameled No. Plate, Door Stop and Siting Device Part Numbers

Ref.	Description	Qty.	Drawing No.
1	Case Complete, 3 Aspect	1	AW002-001-01
2	Plug, Pipe 1.00 NPT	1	18524-031-00
3	Glass, Sighting	1	00924-004-00
4	Ring, Bezel	1	43718-004-00
5	Washer, .141 ID, .250 OD, .031 Thk Lock	3	01273-002-ON
6	Screw, .138-32 x .25 Lg Pan Hd	3	03606-008-ON
7	Plug, Sighting	1	51364-000-00
8	Bolt, .500-13 x 1.50 Lg Sq Hd	2	49527-031-00
9	Washer, .502 ID, .869 OD, .125 Thk Lock	8	01273-010-ON
10	Washer, .531 ID, 1.000 OD, .063 Thk Flat	13	01250-020-ON
11	Washer, .516 ID, .875 OD, .06 Thk Fibre	4	00493-260-00
12	Nut, .500-13 x .438 Thk Hex	10	01048-005-00
13	Lug, Hasp	1	51154-002-00
14	Gasket, Lock Lug	1	13014-709-00
15	Washer, .377 ID, .680 OD, .094 Thk Lock	6	01273-008-ON
16	Screw, .375-16 x .75 Lg Hex Hd	6	00395-012-ON
17	Pin, .125 x .75 Lg Cotter	2	00039-001-ON
18	Bolt, .438-14 Eye	1	39319-077-00
19	Rivet, .250 Dia x 1.500 Lg Solid	1	00544-011-ON
20	Bearing, Thrust, .500 ID, 1.000 OD	1	49536-136-00
21	Nut, .438-14 Thumb	1	10117-002-00
22	Ventilator	2	49915-001-00
23	Gasket	2	13014-678-00
24	Bracket	1	35656-021-00
25	Bolt, .500-13 x 2.50 Lg Sq Hd	5	49527-029-00
26	Washer, .512 ID, .900 OD, .045 Thk Shk'prf	4	53029-078-00
27	Nut, .500-13 x .594 Thk Hex Elastic Stop	2	42333-050-00
28	Bolt, .500-13 x 2.25 Lg Sq Hd	2	49527-005-00
29	Hood	3	49127-106-00
30	Screw, .190-32 x .38 Lg Pan Hd	9	03610-112-ON

Table 7-6. Example 3 Aspect Type AW Incandescent Signal Unit, Enameled No. Plate, Door Stop, Transformers, Siting Device, Fuseblock and Fuse Part Numbers (Cont.)

Ref.	Description	Qty.	Drawing No.
32	Washer, .200 ID, .438 OD, .031 Thk Flat	21	01250-009-ON
33	Gasket, Outer Lens	3	13014-459-00
34	Lens, Outer	3	53119-073-00
35	Lens Complete, Green	1	AW008-001-01
36	Screw, .250-20 x .50 Lg Pan Hd	12	03615-016-ON
37	Washer, .252 ID, .487 OD, .062 Thk Lock	16	01273-006-ON
38	Lens Complete, Yellow	1	AW008-001-02
39	Lens Complete, Red	1	AW008-001-03
40	Receptacle Complete, 1 Lamp	3	AW005-002-02
41	Screw, .190-32 x .63 Lg Pan Hd	6	03610-120-ON
42	Washer, .203 ID, .563 OD, .040 Thk Flat	6	01250-010-ON
43	Support, Signal Resistor	3	35655-101-02
44	Gasket, Square	1	13014-201-00
45	Plate, Blank	1	45924-075-00
46	Gasket, Square	1	13014-685-00
47	Ring, Bezel	1	43983-143-00
48	Screw, .250-20 x .88 Lg Pan Hd	4	03615-028-ON
49	Grommet, 1.75 ID, 2.50 OD, .25 Thk	1	55243-059-00
50	Bracket	1	35656-020-00
51	Bolt, .500-13 x 3.50 Lg Hex Hd Tap	1	00520-005-ON
52	Washer, .516 ID, .875 OD, .063 Thk Flat	3	01250-019-ON
53	Support Complete, Number Plate	1	39751-021-00
54	Screw, .190-32 x .75 Lg Pan Hd	4	03610-124-ON
55	Washer, .205 ID, .500 OD, .031 Thk Flat Nylon	8	00493-354-00
56	Nut, .190-32 x .239 Thk Hex Elastic Stop	4	42333-047-00
<b>THE FOLLOWING MATERIALS ARE ALSO REQUIRED FOR ASSEMBLY</b>			
--	Terminal, .250 Ring (16-14)	4	59825-174-00
--	Wire, #14 Flex, 600V (Per 82E0005)	3	80551-051-01
--	Wiring Diagram	1 Print	43989-750-00
--	Soft Mastic Sealing Compound (Per 90B0010)	AS REQ'D	81361-050-06

Table 7–6. Example 3 Aspect Type AW Incandescent Signal Unit, Enameled No. Plate, Door Stop, Transformers, Siting Device, Fuseblock and Fuse Part Numbers (Cont.)

<b>Ref.</b>	<b>Description</b>	<b>Qty.</b>	<b>Drawing No.</b>
--	Acrylic Paint, Black Fed Color #37038 (Per 92A0029)	AS REQ'D	81361-151-01
--	Mineral Base Oil (Per 91A0007)	AS REQ'D	
--	Tape, Vinyl (Per 99F0001)	AS REQ'D	
<b>THE FOLLOWING PARTS TO BE SPECIFIED ON SHIPPING ORDER AS REQUIRED</b>			
57	Plate, Number	1	45924-077-00
--	Shield Complete (For Assembly See 40186-003-00)	AS REQ'D	40186-003-01
<b>THE FOLLOWING PARTS MAY BE INCLUDED IN ASSEMBLY BUT MUST BE SPECIFIED ON SHIPPING ORDER AND SHIPPED SEPARATELY</b>			
--	Lamp, 10V, 18W, Single Filament	3	48088-032-00

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## **A. APPENDIX A – DRAWINGS**

### **A.1. GENERAL**

This Appendix contains sample wiring diagrams for basic Type AW Signals. Dashed lines indicate field installed wiring.

## A.2. ALSTOM AURORA TYPE AW SIGNAL WIRING DIAGRAMS

Figures A-1 and A-2 are example drawings of Alstom Aurora Type AW Signal Wiring. Dashed lines represent wires installed in the field.

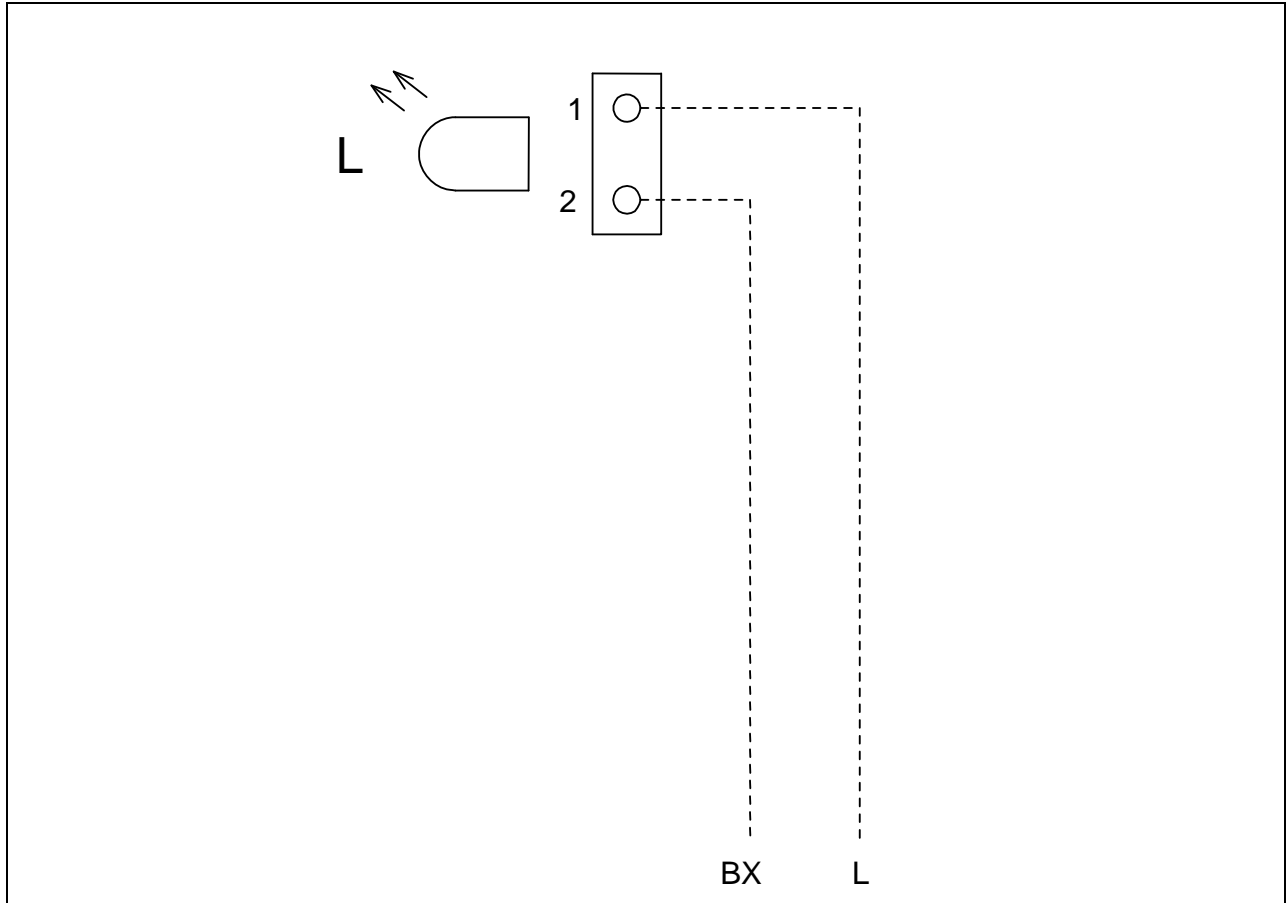


Figure A-1. Typical Single Aspect LED Signal Wiring

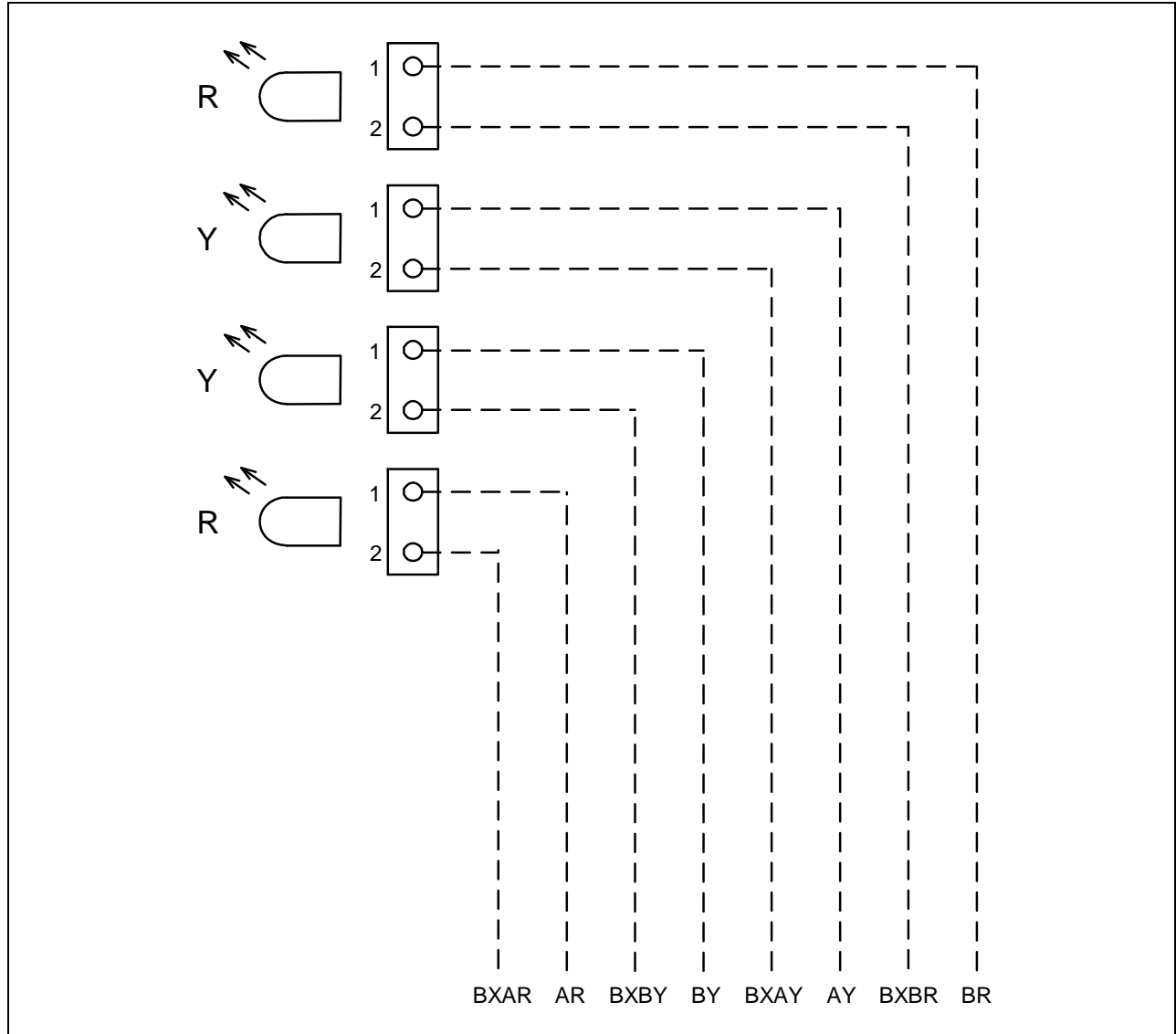


Figure A-2. Typical 4 Aspect LED Signal Wiring  
(Single Aspect Plus 3 Aspect)

A.3. LED UNIT P/N 20179-0XX-00 SIGNAL WIRING DIAGRAMS

Figures A-3 through A-5 are example drawings of Type AW LED Unit P/N 20179-0XX-00 Signal Wiring. Dashed lines represent wires installed in the field.

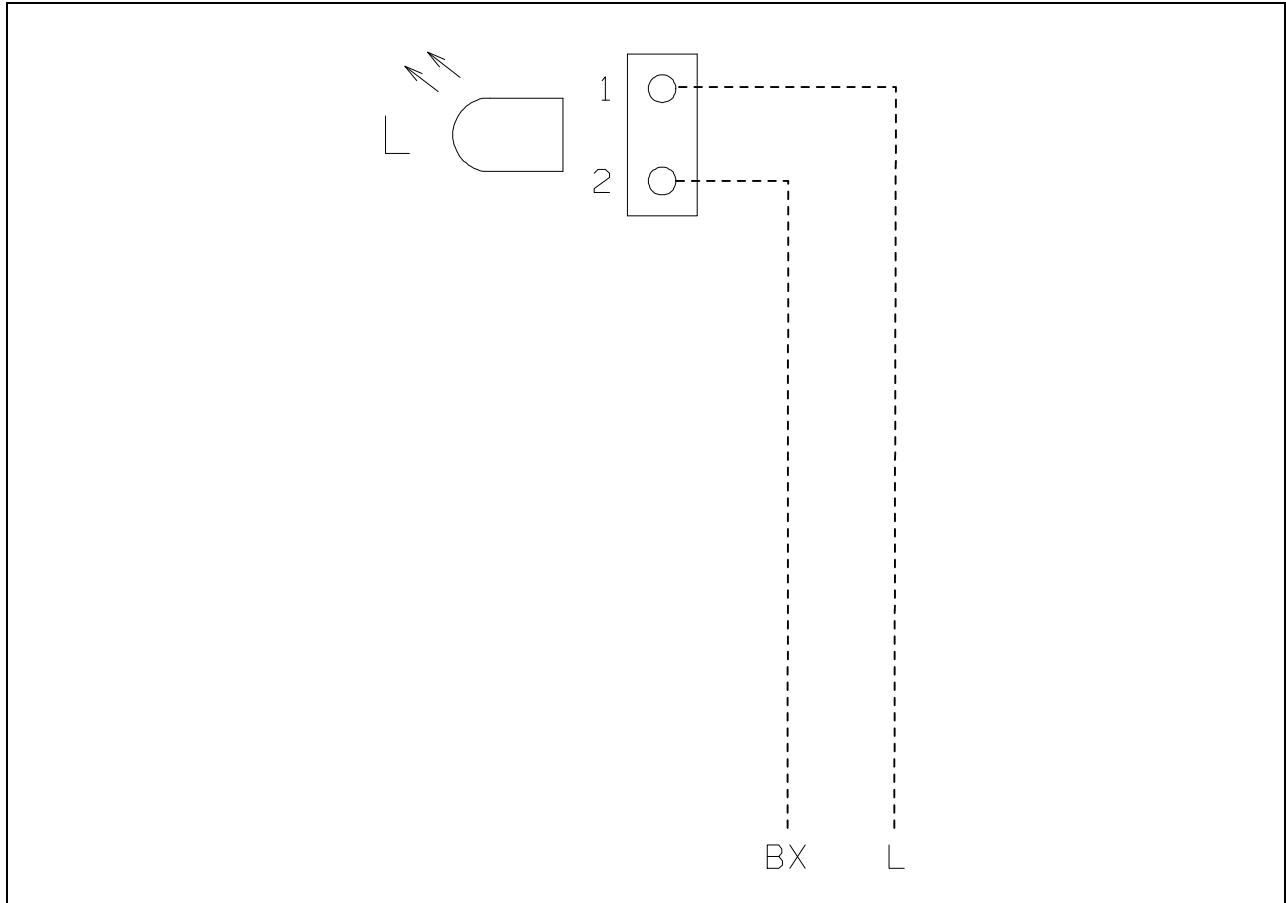


Figure A-3. Typical Single Aspect Type AW Signal With LED Unit P/N 20179-0XX-00 Wiring Diagram

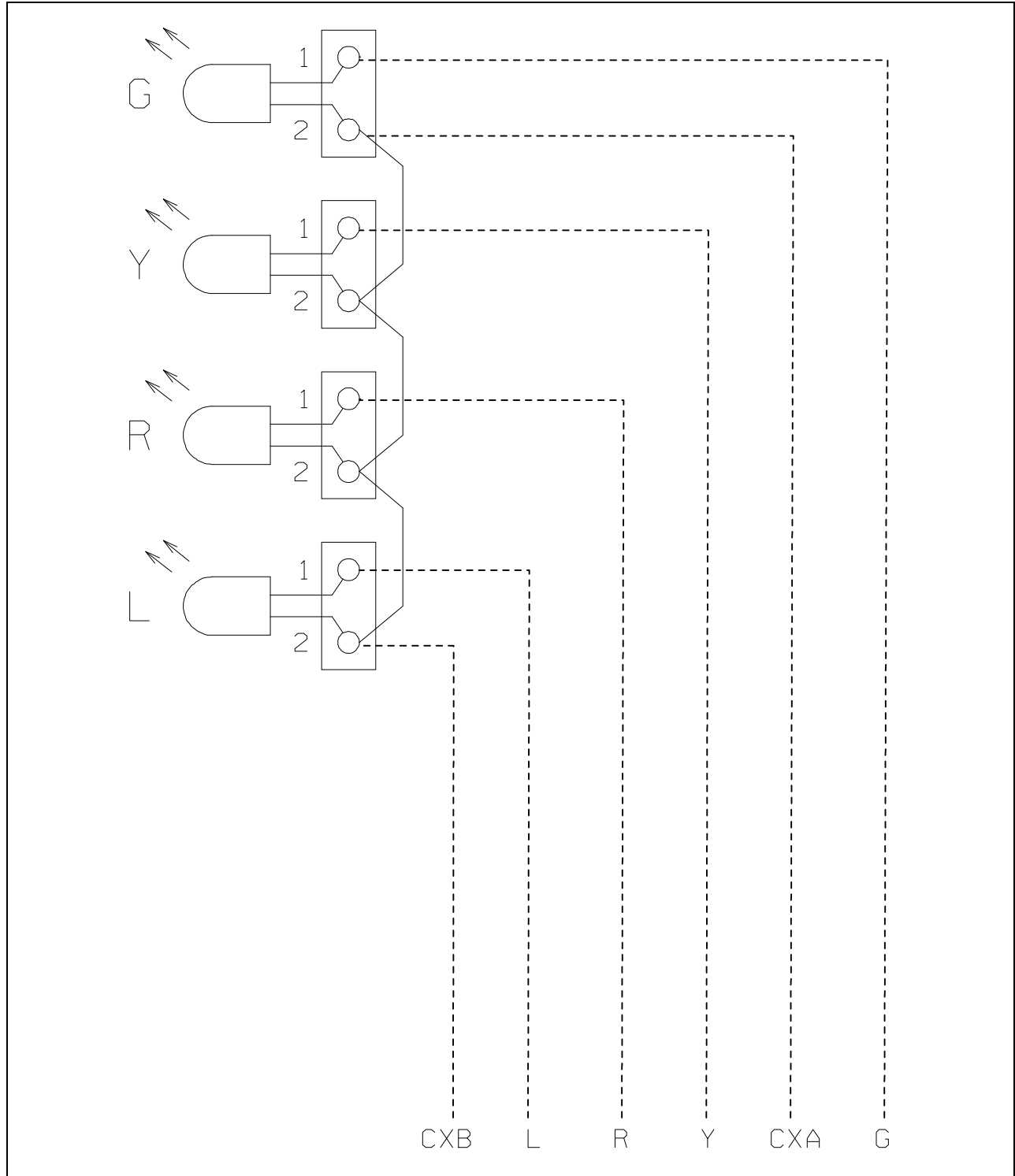


Figure A-4. Typical 4 Aspect Type AW Signal With LED Unit P/N 20179-0XX-00  
Wiring Diagram

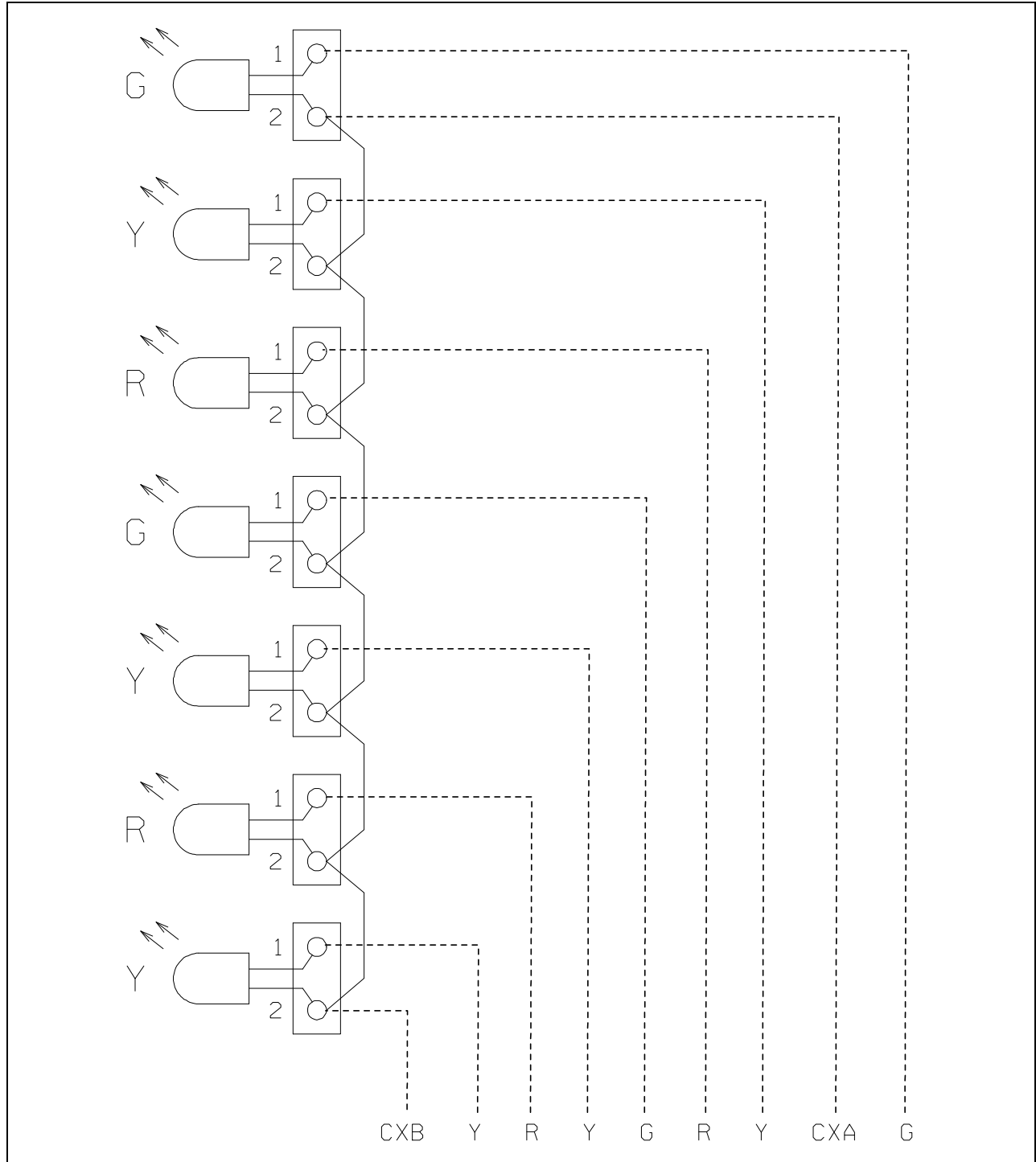


Figure A-5. Typical 7 Aspect Type AW Signal With LED Unit P/N 20179-0XX-00  
Illuminated Number Wiring Diagram

#### A.4. TYPE AW INCANDESCENT SIGNAL WIRING DIAGRAMS

Figures A-6 through A-10 are example drawings of Type AW Incandescent Signal Wiring. Dashed lines represent wires installed in the field.

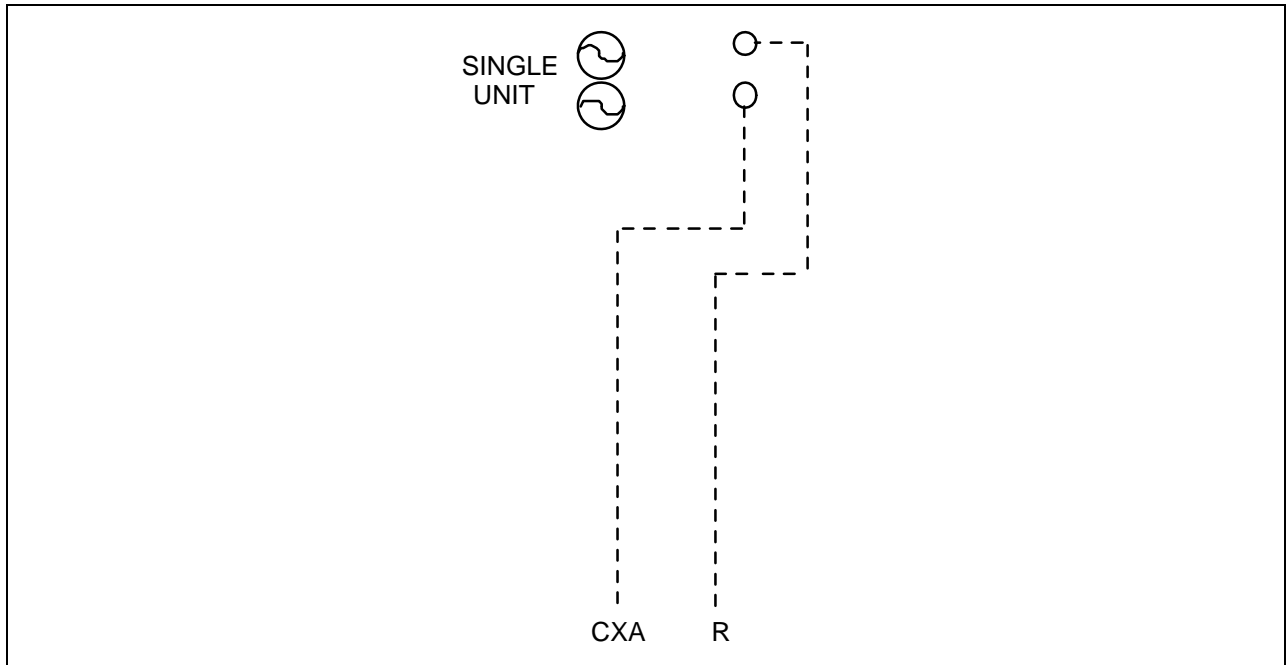


Figure A-6. Typical Single Aspect Type AW Incandescent Signal Wiring Diagram

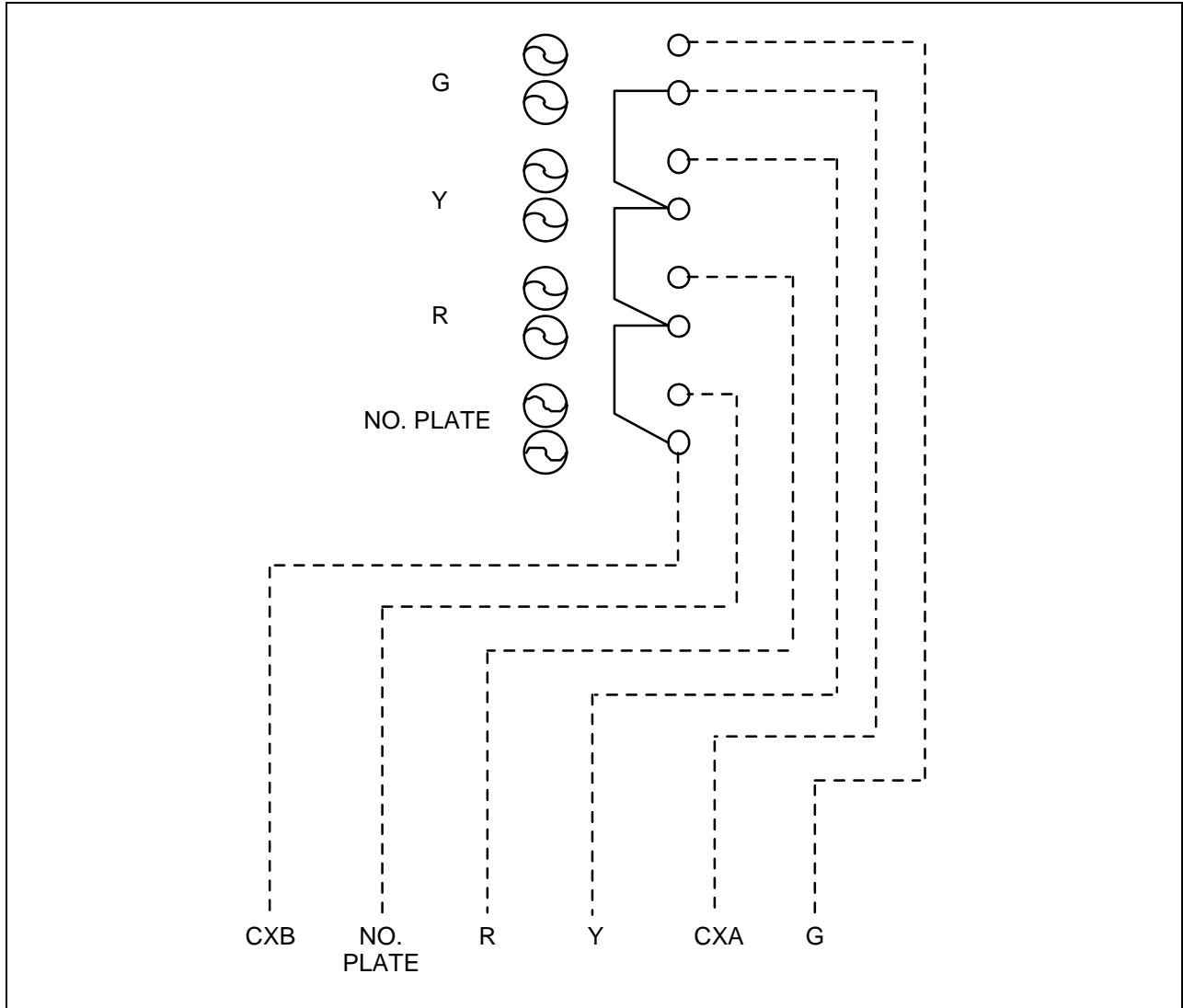


Figure A-7. Typical 3 Aspect Type AW Incandescent Signal With Illuminated Number Plate Wiring Diagram

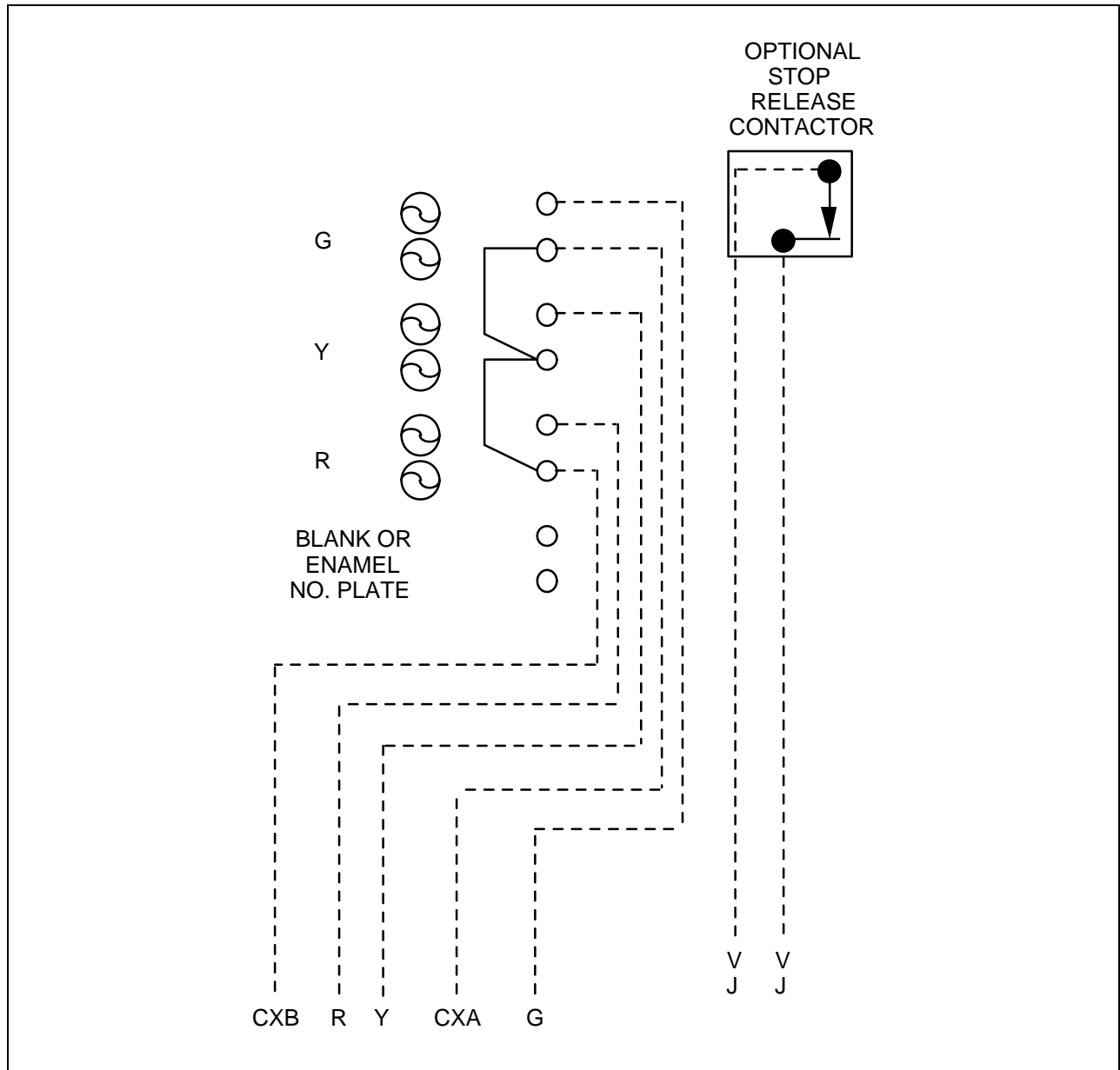


Figure A-8. Typical 3 Aspect Type AW Incandescent Signal With Enameled Number Plate and Optional Stop Release Contactor Wiring Diagram

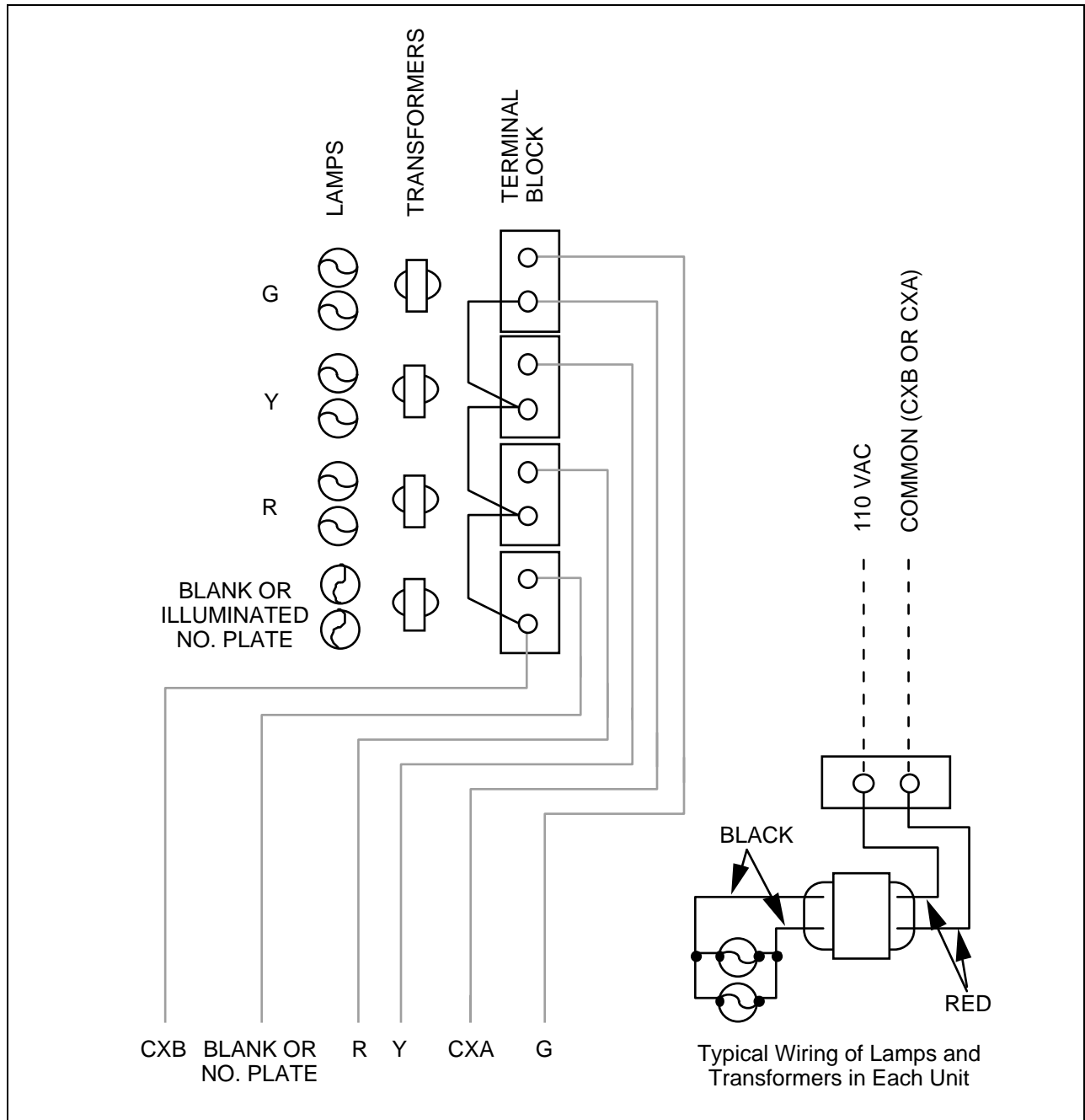


Figure A-9. Typical 3 Aspect Type AW Incandescent Signal With Transformers and With Or Without Illuminated Number Wiring Diagram

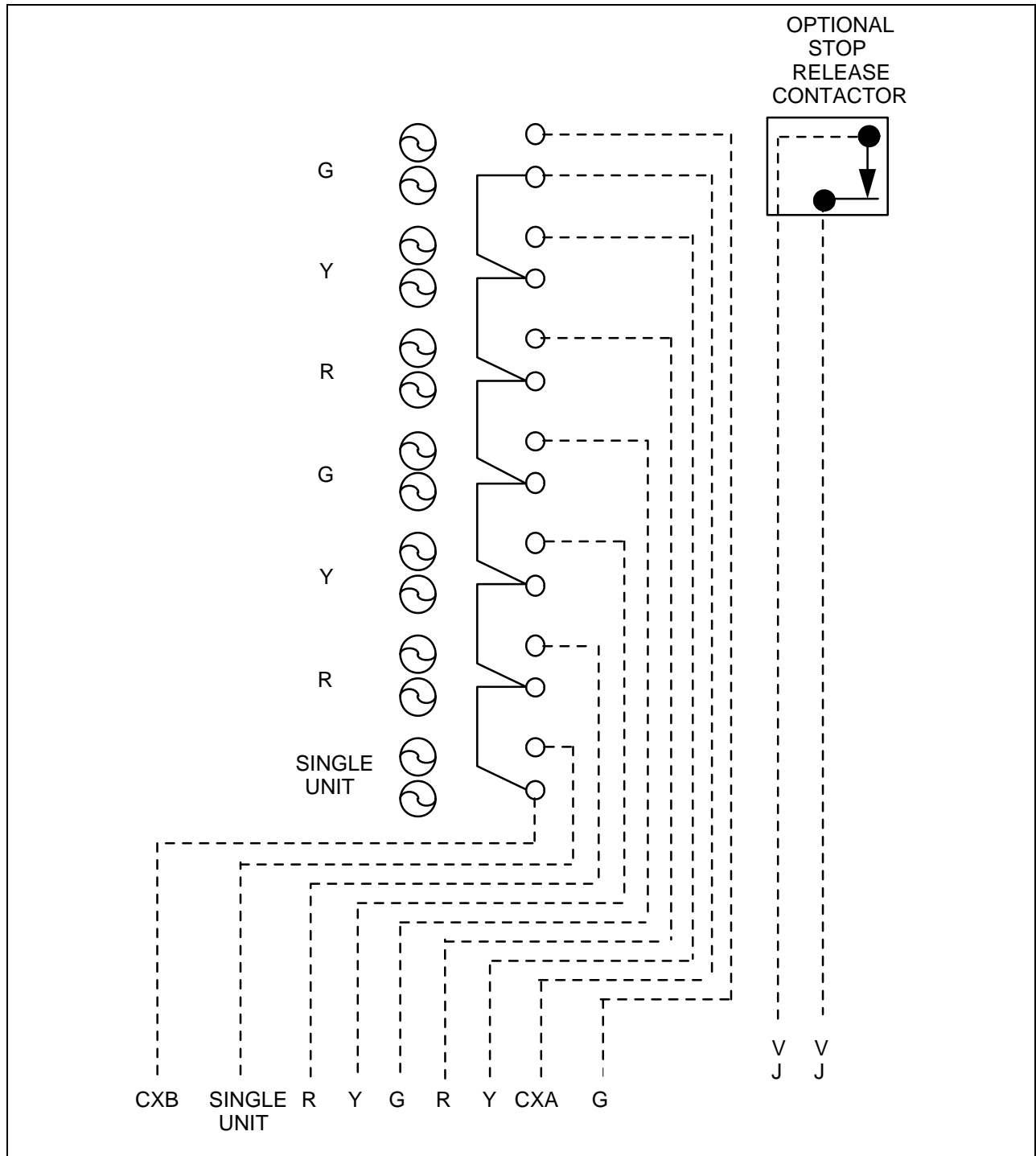


Figure A-10. Typical 7 Aspect Type AW Incandescent Signal With Enameled Number Plate Wiring Diagram

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1025 JOHN STREET  
WEST HENRIETTA, NY 14586**