Automotive: Lightbars

Warnings to Installers
Whelen’s emergency vehicle warning devices must be properly mounted and wired in order to be effective and safe. Read and follow all of Whelen’s written instructions when installing or using this device. Emergency vehicles are often operated under high speed stressful conditions which must be accounted for when installing all emergency warning devices. Controls should be placed within convenient reach of the operator so that they can operate the system without taking their eyes off the roadway. Emergency warning devices may require high electrical voltages and/or currents. Properly protect and use caution around live electrical connections. Grounding or shorting of electrical connections can cause high current arcing, which can cause personal injury and/or vehicle damage, including fire. Many electronic devices used in emergency vehicles can create or be affected by electromagnetic interference. Therefore, after installation of any electronic device it is necessary to test all electronic equipment simultaneously to ensure that they operate free of interference from other components within the vehicle. Never power emergency warning equipment from the same circuit or share the same grounding circuit with radio communication equipment. All devices should be mounted in accordance with the manufacturer’s instructions and securely fastened to vehicle elements of sufficient strength to withstand the forces applied to the device. Driver and/or passenger air bag(s) (SRS) will affect the way equipment should be mounted. This device should be mounted by permanent installation and within the zones specified by the vehicle manufacturer, if any. Any device mounted in the deployment area of an air bag will damage or reduce the effectiveness of the air bag and may damage or dislodge the device. Installer must be sure that this device, its mounting hardware and electrical supply wiring does not interfere with the air bag or the SRS wiring or sensors. Mounting the unit inside the vehicle by a method other than permanent installation is not recommended as unit may become dislodged during swerving; sudden braking or collision.

Warnings to Users
Whelen’s emergency vehicle warning devices are intended to alert other operators and pedestrians to the presence and operation of emergency vehicles and personnel. However, the use of this or any other Whelen emergency warning device does not guarantee that you will have the right-of-way or that other drivers and pedestrians will properly heed an emergency warning signal. Never assume you have the right-of-way. It is your responsibility to proceed safely before entering an intersection, driving against traffic, responding at a high rate of speed, or walking on or around traffic lanes. Emergency vehicle warning devices should be tested on a daily basis to ensure that they operate properly. When in actual use, the operator must ensure that both visual and audible warnings are not blocked by vehicle components (i.e.: open trunks or compartment doors), people, vehicles, or other obstructions. It is the user’s responsibility to understand and obey all laws regarding emergency warning devices. The user should be familiar with all applicable laws and regulations prior to the use of any emergency vehicle warning device. Whelen’s audible warning devices are designed to project sound in a forward direction away from the vehicle occupants. However, because sustained periodic exposure to loud sounds can cause hearing loss, all audible warning devices should be installed and operated in accordance with the standards established by the National Fire Protection Association.

Safety First
This document provides all the necessary information to allow your Whelen product to be properly and safely installed. Before beginning the installation and/or operation of your new product, the installation technician and operator must read this manual completely. Important information is contained herein that could prevent serious injury or damage.

WARNING: This product can expose you to chemicals including Methylene Chloride which is known to the State of California to cause cancer, and Bisphenol A, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

- Proper installation of this product requires the installer to have a good understanding of automotive electronics, systems and procedures.
- Whelen Engineering requires the use of waterproof butt splices and/or connectors if that connector could be exposed to moisture.
- Any holes, either created or utilized by this product, should be made both air- and watertight using a sealant recommended by your vehicle manufacturer.
- Failure to use specified installation parts and/or hardware will void the product warranty.
- If mounting this product requires drilling holes, the installer MUST be sure that no vehicle components or other vital parts could be damaged by the drilling process. Check both sides of the mounting surface before drilling begins. Also de-burr the holes and remove any metal shards or remnants. Install grommets into all wire passage holes.
- If this manual states that this product may be mounted with suction cups, magnets, tape or Velcro®, clean the mounting surface with a 50/50 mix of isopropyl alcohol and water and dry thoroughly.
- Do not install this product or route any wires in the deployment area of your air bag. Equipment mounted or located in the air bag deployment area will damage or reduce the effectiveness of the air bag and may damage or dislodge the device. Installer must be sure that this device, its mounting hardware and electrical supply wiring does not interfere with the air bag or the SRS wiring or sensors. Mounting the unit inside the vehicle by a method other than permanent installation is not recommended as unit may become dislodged during swerving; sudden braking or collision. Failure to follow instructions can result in personal injury. Whelen assumes no liability for any loss resulting from the use of this warning device. PROPER INSTALLATION COMBINED WITH OPERATOR TRAINING IS THE PROPER USE OF EMERGENCY WARNING DEVICES IS ESSENTIAL TO INSURE THE SAFETY OF EMERGENCY PERSONNEL AND THE PUBLIC.

For warranty information regarding this product, visit www.whelen.com/warranty
**IMPORTANT! The lightbar should be located a minimum of 16" from any radio antennas!**

**Permanent Mounting:**
1. Locate the mounting foot and mounting plate included with your lightbar. If not already present, install the mounting plate onto the mounting foot. When properly positioned, this plate is centered from side to side on the mounting foot.
2. Flip the lightbar upside-down to expose the bottom of the extrusion and place the mounting foot onto the extrusion.
3. Rotate the mounting foot 90° in a counter-clockwise direction. Make sure that the edges of the mounting foot swing into position under the extrusion mounting lip.
4. Repeat this procedure for the remaining mounting foot and return the lightbar to its right side-up position.
5. Position the lightbar onto the vehicle roof in the desired mounting location. One often selected location is directly above the B-pillars. This area is the strongest part of the roof. Refer to your lightbar manual for cable exit location, to be sure that the lightbar is facing the proper direction.
6. Adjust the two mounting feet outwards so that they are as close to the edge of the roof as possible. Make sure that both mounting feet are in full contact with the roof. Be sure that there is no less than 1/2" clearance between the roof and the lightbar at their closest point. When the mounting feet are in their proper position, lightly tighten the mounting foot allen head set screws.
7. Turn the lightbar upside down and firmly tighten all of the set screws from step 6 (2 or 4 per side).
8. Note that on the adjustable foot, use the hole in the pad as a guide to drill the two holes into the mounting foot at the locations shown.

**Strap Mounting:**
1. Locate the mounting foot, mounting plate and tinnerman plate included with your lightbar. If not already present, install the mounting plate onto the mounting foot. When properly positioned, this plate is centered from side to side on the mounting foot.
2. Flip the lightbar upside-down to expose the bottom of the extrusion and place the mounting foot onto the extrusion.
3. Rotate the mounting foot 90° in a counter-clockwise direction. Make sure that the edges of the mounting foot swing into position under the extrusion mounting lip. Install a tinnerman plate onto the extrusion in the same manner.
4. Repeat this procedure for the remaining mounting foot and tinnerman plate and return the lightbar to its right side-up position.
5. Position the lightbar onto the vehicle roof in the desired mounting location. One often selected location is directly above the B-pillars. This area is the strongest part of the roof. Refer to your lightbar manual for cable exit location, to be sure that the lightbar is facing the proper direction.
6. Adjust the two mounting feet outwards so that they are as close to the edge of the roof as possible. Both mounting feet must be in full contact with the roof. Be sure that there is no less than 1/2" clearance between the roof and the lightbar at their closest point. When the mounting feet are in their proper position, lightly tighten the mounting foot allen head set screws.
7. Return the lightbar to an upside down position. Slide each tinnerman plate outwards until it is fully engaged with its corresponding mounting foot. With the mounting feet and tinnerman plates in their proper positions firmly tighten all of the set screws (2 or 4 per side). Flip the lightbar right side-up and return it to its mounting position.
8. Open both drivers side doors. In the area directly below the mounting foot, carefully pull the drivers side weatherstrip away from the vehicle. Remove enough so that the area where the mounting strap will be secured to the vehicle is exposed. Repeat procedure for passenger side.
9. Insert the mounting strap through the mounting foot. Be sure that the strap fits flush against the area where it will be secured onto the vehicle. Insert the tension bolt through the mounting strap and into the tinnerman nut on the tinnerman plate. Tighten slightly with a long shafted, Phillips screwdriver. Repeat procedure for passenger side.
10. If your mounting strap has mounting holes in the end of the strap, use these holes as a template to drill appropriately sized pilot holes through the strap and into the vehicle. Repeat for passenger side of the vehicle.
11. Firmly tighten the tension bolts to secure the lightbar to the vehicle.

**NOTE:** Model MKAJ is an adjustable mounting foot. On this model you may loosen the screws on the rear of the foot and adjust the angle of the lightbar. This feature can be used if the angle of the roof is not level with the road.

**IMPORTANT:** To adjust the leveling screws you must use a torque wrench set at 35 to 40 ft. lbs.

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**Standard Mounting Foot / Model MKEZ**

**Adjustable Mounting Foot / Model MKAJ**

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**5" Mounting Foot**

**NOTE:** The mounting straps are made to fit the contours of individual vehicles. The strap shown here is for example only. The strap for your vehicle may look different.

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**NOTE:** Unless otherwise specified, the lightbar mounting feet must be sitting as close to the edge of the roof as possible. They must also be in full contact with the roof and not be hanging off the edge.
Routing the Cable(s)

1. To protect the headliner from damage caused by drilling the cable access hole through the vehicle roof, allow a 5” to 7” distance between roof and headliner by lowering the headliner before drilling.
2. Using a 1” hole saw, drill the cable access hole.

**NOTE:** There may be a roof support member that spans the distance between the driver’s and passenger’s side. **DO NOT DRILL THROUGH THIS MEMBER!** Adjust the location until the hole can be drilled without contacting this support member.

3. Use a round file to smooth and de-burr the edges of the hole.
4. Insert a 1” grommet (user supplied) into the cable access hole.
5. Insert the cable(s) through the cable access hole into the vehicle. Use RTV silicone to weatherproof the access hole after the cable(s) are pulled completely into the vehicle.
6. Route the cables one at a time to their respective destinations (Power Cable to vehicle battery; Control Cable to customer switch panel). It is left to the installation technician’s discretion where to run the cables, as vehicles will vary.

Connecting the Cables

**WARNING!** All customer supplied wires that connect to the positive terminal of the battery must be sized to supply at least 125% of the maximum operating current and FUSED at the battery to carry that load. **DO NOT USE CIRCUIT BREAKERS WITH THIS PRODUCT!**

**Power Cable:**
1. Route the power cable towards the firewall. Again, the wire path is left to the installation technician’s discretion.
2. Follow the factory wiring harness through the firewall. It may be necessary to drill a hole in the firewall. If so, be absolutely sure that there are no components that could be damaged by drilling. After the hole has been drilled, insert a grommet to protect the cable.
3. Connect the Power cable as shown on the following page.

**Control Cable:**
1. Route the cable to a customer installed switch panel.
2. Connect the control wires to this switch panel using the information provided on the following page.

Understanding TA Operation & Scan-Lock™

To change TA sequences, momentarily apply +12VDC to the Scan-Lock™ wire for the TA in question (front or rear) while that TA is flashing Left, Right or Split. For example, with the Front TA in ‘sequence to left’ mode (+12VDC applied to the BLUE/WHITE wire), apply +12VDC to the front Scan-Lock™ wire (WHITE/VIOLET) for less than 1 second. The next sequence will now be displayed. Repeat to advance to the next sequence. Applying +12VDC for more than 1 second will cycle to the previous sequence. Allow the sequence to run uninterrupted for at least 5 seconds to set it as the default sequence.

**TA Sequences:**
1. 1-lamp sequence to Triple Flash™.
2. 2-lamp sequence to Triple Flash™.
3. 3-lamp sequence to Triple Flash™.
4. Sequence to Solid
5. Sequence to Solid - Sequence Off

Changing TA Patterns while in Flash mode uses the appropriate Scan-Lock™ wire in the same manner as outlined above. Refer to the **TA Patterns (for Flash mode Only)** table below for pattern order.

For example, with the Rear TA in Flash Mode (+12VDC applied to the WHITE/BROWN wire), momentarily apply +12VDC to the rear Scan-Lock™ wire (WHITE/GREEN). If previously set to pattern 1 (see below), the front TA will now display pattern 2. Repeat to advance to the next pattern.

**TA Patterns (for Flash Mode Only):**
1. SignalAlert™75
2. CometFlash®75
3. DoubleFlash 120
4. DoubleFlash 75
5. RapidRate™375
6. RapidRate™150
7. RapidRate™75
8. ComAlert™75
9. ActionFlash™
10. ActionScan™

**TO RESET TO THE FACTORY DEFAULT PATTERN:** Turn off the option you want to reset, apply +12 volts to the Scan-Lock™ function wire of that option then turn the option back on.

Troubleshooting:

Your lightbar should now be fully operational. If your lightbar is not functioning properly, check the following:

- The positive wire (RED) is properly connected to the battery, by way of the user supplied fuse block.
- A working fuse of the correct amperage (30 amp) is installed in the fuse block.
- The ground wire (BLACK) is properly connected to the factory ground.

If all of these connections are good, contact your Whelen representative for further assistance.
<table>
<thead>
<tr>
<th>Color Combination</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>GREEN</td>
<td>Activates <em>Front Corner Strobes</em></td>
</tr>
<tr>
<td>BLUE</td>
<td>Activates <em>Rear Corner Strobes</em></td>
</tr>
<tr>
<td>WHITE/BLUE</td>
<td><em>Scan-Lock™ for Strobes</em></td>
</tr>
<tr>
<td>GREEN/WHITE</td>
<td>Activates <em>Front TA (Sequence to Right)</em></td>
</tr>
<tr>
<td>BLUE/WHITE</td>
<td>Activates <em>Front TA (Sequence to Left)</em></td>
</tr>
<tr>
<td>WHITE/RED</td>
<td>Activates <em>Front TA (Flash Mode)</em></td>
</tr>
<tr>
<td>WHITE/VIOLET</td>
<td><em>Scan-Lock™ for Front TA</em></td>
</tr>
<tr>
<td>GREEN/BLACK</td>
<td>Activates <em>Rear TA (Sequence to Right)</em></td>
</tr>
<tr>
<td>BLUE/BLACK</td>
<td>Activates <em>Rear TA (Sequence to Left)</em></td>
</tr>
<tr>
<td>WHITE/BROWN</td>
<td>Activates <em>Rear TA (Flash Mode)</em></td>
</tr>
<tr>
<td>WHITE/GREEN</td>
<td><em>Scan-Lock™ for Rear TA</em></td>
</tr>
<tr>
<td>YELLOW</td>
<td>Activates the <em>Passenger Alley Light</em></td>
</tr>
<tr>
<td>WHITE</td>
<td>Activates the <em>Driver Alley Light</em></td>
</tr>
<tr>
<td>VIOLET</td>
<td>Initiate low power operation <em>(see: Low Power Violet)</em></td>
</tr>
<tr>
<td>WHITE/ORANGE</td>
<td>Not Used</td>
</tr>
<tr>
<td>WHITE/BLACK</td>
<td>Not Used</td>
</tr>
<tr>
<td>WHITE/YELLOW</td>
<td>Not Used</td>
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</tbody>
</table>