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 can 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 insure 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 bags (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. 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 IN THE PROPER USE OF EMERGENCY WARNING DEVICES IS ESSENTIAL TO INSURE THE SAFETY OF EMERGENCY PERSONNEL AND THE PUBLIC.

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 period 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. For warranty information regarding this product, visit www.whelen.com/warranty.

- **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 that if connected 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, or become a projectile that could cause serious personal injury or death. Refer to your vehicle owner's manual for the air bag deployment area. The User/Installer assumes full responsibility to determine proper mounting location, based on providing ultimate safety to all passengers inside the vehicle.**
- **For this product to operate at optimum efficiency, a good electrical connection to chassis ground must be made. The recommended procedure requires the product ground wire to be connected directly to the NEGATIVE (-) battery post (this does not include products that use cigar power cords).**
- **If this product uses a remote device for activation or control, make sure that this device is located in an area that allows both the vehicle and the device to be operated safely in any driving condition.**
- **Do not attempt to activate or control this device in a hazardous driving situation.**
- **This product contains either strobe light(s), halogen light(s), high-intensity LEDs or a combination of these lights. Do not stare directly into these lights. Momentary blindness and/or eye damage could result.**
- **Use only soap and water to clean the outer lens. Use of other chemicals could result in premature lens cracking (crazing) and discoloration. Lenses in this condition have significantly reduced effectiveness and should be replaced immediately. Inspect and operate this product regularly to confirm its proper operation and mounting condition. Do not use a pressure washer to clean this product.**
- **It is recommended that these instructions be stored in a safe place and referred to when performing maintenance and/or reinstallation of this product.**
- **FAILURE TO FOLLOW THESE SAFETY PRECAUTIONS AND INSTRUCTIONS COULD RESULT IN DAMAGE TO THE PRODUCT OR VEHICLE AND/OR SERIOUS INJURY TO YOU AND YOUR PASSENGERS!**
**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 tighten all of the set screws from step 6 (2 or 4 per side) to 14-16 In. Lbs.
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. Tighten the tinnerman plate to secure the lightbar in place.
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 tighten all of the set screws (2 or 4 per side) to 14-16 In. Lbs. 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.

Adjustable Mounting Foot / Model MKAJ

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.

Standard Mounting Foot / Model MKEZ

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 in./lbs.
Wiring:
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 the roof and the headliner by lowering the headliner before drilling.

**WARNING!** There is 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. Refer to “Safety First” on Page 1 for important precautionary information.

2. Using a 1” hole saw, drill the cable access hole.
3. Use a round file to de-burr the edges of the cable access hole and insert a 1” grommet (customer supplied) into the hole.
4. Insert the cables through the cable access hole into the vehicle. Use RTV silicone to weatherproof the access hole after the cables are pulled completely into the vehicle.
5. Route the cables one at a time to your power source. 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 wires 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. Insert a grommet into the hole, to protect the cable.
3. Route the cable along the factory wiring harness towards the battery.
4. Install a 40 Amp fuse block (customer supplied) on the end of the RED wire in the power cable. Remove the fuse from the fuse block before connecting any wires to the battery.
5. Connect the fuse block to the POSITIVE (+) terminal on the battery. There can not be more than two (2) feet of wire between the fuse block and the battery. The wire between the fuse block and the battery is “unprotected”, do not allow this wire to come into contact with any other wires.
6. Connect the BLACK wire to the factory chassis ground adjacent to the battery.

Control Cable:

Extend the control cable to your switch panel and make the appropriate connections, using the information provided on page 3. *When you apply +12 VDC to a Control Cable wire, you activate its function.* The control cable connects to your control head or switch box and is fused there. Typical fusing is 5 Amps.

**Note:** The wire functions listed in this manual are the factory default settings for a fully loaded lightbar. To find the correct wire functions for the lightbar you ordered, refer to the switch operations sheet included with your lightbar.

**White-Violet / Scan-Lock™**

**TO CYCLE FORWARD THROUGH ALL PATTERNS:** Choose the Scan-Lock™ wire controlling the function you wish to change the flash pattern on and apply +12 volts to that wire for less than 1 second and release. This will change the pattern. Repeat to go to next pattern.

**TO CHOOSE A PATTERN:** While cycling through the patterns, when you find the pattern you want let it run for more than 5 seconds and it will lock in and become the default pattern.

**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.

**Available LED Scan-Lock™ Patterns:** SignalAlert™ 75 (Default pattern) / CometFlash® 75 / DoubleFlash 150 / DoubleFlash 75 / SingleFlash 375 / SingleFlash 150 / SingleFlash 75 / ActionFlash™ 75 / ModuFlash™ 75 / ActionScan™

**Front Inboards only:** Single 75, Driver Steady / 2 Lamps Steady

**Violet / Low Power**

The type of switch used is dependant on how the operator wishes the Hi/Low feature to function:

**Latching Mode:** By applying +12 VDC voltage to the Violet wire for less than 1 sec., the power supply is “latched” into low power operation. The unit must be turned off and then back on to restore normal, Hi power operation. (A Momentary Switch is Preferred)

**Level Mode:** Applying +12 VDC voltage to the Violet wire for more than 1 sec. holds the power supply in low power mode until voltage is removed. (A Toggle Switch is Preferred)
Wiring Designations: The control wire functions shown below are given for a general reference only and may not match the wire designations of your individual lightbar. For the wire functions of the specific lightbar you ordered, refer to the wiring sheet attached to the instruction manual shipped with the lightbar.

Freedom™ NFPA Lightbar

- **GREEN**: In the factory default configuration, this wire activates the Front Corner LEDs.
- **BLUE**: In factory default configuration, this wire activates the Rear Corner LEDs or Endcap.
- **GREEN-WHITE**: In factory default configuration, this activates the Front Outboard LEDs.
- **BLUE-BLACK**: In factory default configuration, this activates the Front or Rear Outboard LEDs.
- **GREEN-BLACK**: In factory default configuration, this activates the Front Inboard LEDs.
- **BLUE-BLACK**: In factory default configuration, this activates the Front or Rear Inboard LEDs.
- **VIOLET**: This will initiate low power operation of all LEDs (See: Low Power Violet).
- **YELLOW**: In factory default configuration, this activates the Passenger Alley Light.
- **WHITE**: In factory default configuration, this activates the Driver Alley Light.
- **WHITE-BLACK**: In factory default configuration, this activates the Take-Down Lights.
- **WHITE-ORANGE**: In factory default configuration, this activates the Cruise Lights.
- **NONE**: This is the RFI shield drain wire and is connected to ground.
- **WHITE-YELLOW**: Not Used.
- **WHITE-BROWN**: In factory default configuration, this activates the Front or Rear Inboard LEDs.
- **WHITE-GREEN**: Not Used.
- **WHITE-VIOLET**: Scan-Lock™.
- **WHITE-RED**: In factory default configuration, this activates the Front or Rear Inboard LEDs.

**Power Cable Fusing Chart**: After determining which function wires you will use, add up the amp rating of each function wire. You must then multiply this by 1.25 (see warning) and fuse the RED power wire at this rating.

**EXAMPLE**: If you are using the YELLOW, WHITE, & WHITE/ BROWN function wires, the total amp draw is 7.5 amps. Multiply this by 1.25 which comes out to 9.375 amps. You must fuse the RED power wire at 10 amps.

All options may not be present on all Lightbars.
The lightbar owner should be familiar with the following component replacement procedures to assure proper assembly and reassembly of this product.

**Installing the Endcap Gasket & Alley Light**
Place the endcap gasket into position on the endcap, locating all tabs and holes. Align the reflector assembly of the alley light with the 4 bosses in the endcap. Press the reflector in place until the 4 barbs are engaged around the reflector.

**Lighthead Mounting Bracket**
Ears on mounting bracket slide into the channels in the extrusion. Lighthead mounting holes snap into the raised bosses on mounting bracket. The edge of the lighthead snaps into the clips on the mounting bracket.

**Installing a Corner LED**
Snap lighthead into bracket here

**Removing the Endcap and Lenses**
Remove the four screws (A) that hold the endcap (B) on and pull the endcap and gasket (C) off. Slide the lenses (D) out of the lightbar, to gain access to the extrusion. When reinstalling the lenses and spacers, install the cord seal (see below). When reinstalling the endcap, place the endcap gasket into its position on the endcap and line up all the tabs and holes. Spacers (not shown) mount the same as lenses.

**Seal Cord Installation:**
1. Cut the seal cord approx. 1-1/2" longer than the extrusion on each side.
2. Rub silicone over the cord seal leaving 3 to 4 inches on one end dry.
3. Beginning with 1 corner lens, start the lens into the bottom lens track. Place the cord seal onto the groove in the top of the lens. Leave 1 to 2 inches free.
4. Hold onto the left end of the seal hanging out and slide the corner lens into position.
5. From the opposite end of the lightbar, pull the seal cord tight and install the remaining lenses and divider.
6. Inspect the seal cord for any areas that have wrinkled. Especially in the areas around the dividers.
7. Push the lenses together tight and trim excess seal cord at each end.