



SPOTLIGHT & BRACKET INSTALLATION INSTRUCTIONS

B460: 420-A

Orig. Date: 08/01/87

Rev. C

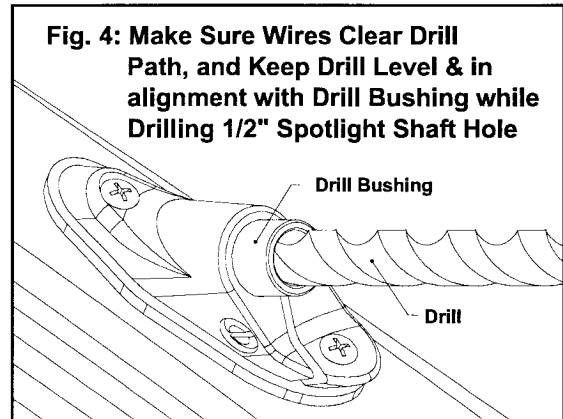
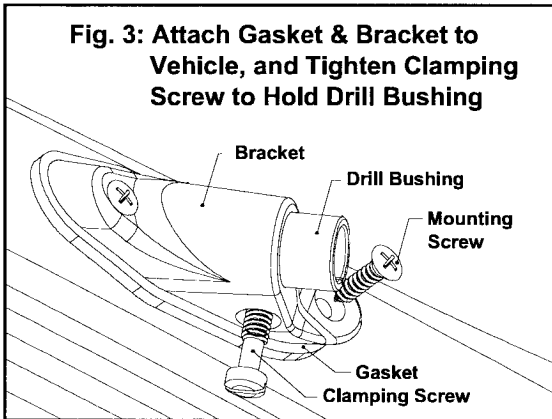
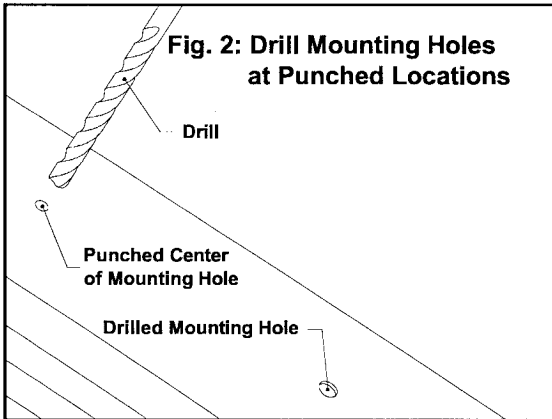
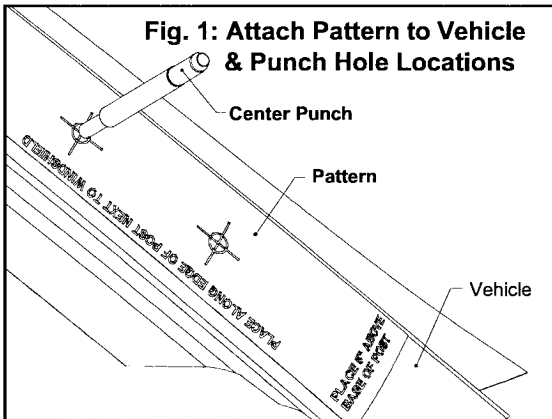
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Unity spotlights are designed to give years of reliable performance. Our products are manufactured in our own factory to the most exacting standards and only the finest materials are used. Please level your vehicle, disconnect battery, and familiarize yourself with all instructions before proceeding step by step. **Protect your eyes with safety glasses.** Proper care during installation and an occasional coat of automotive wax on exposed parts of spotlight will ensure years of beauty and service.

TOOLS REQUIRED

SCISSORS	PLIERS	1/8" DRILL BIT	1/2" DRILL BIT	CENTER PUNCH	SCREWDRIVERS	3/8" BOX WRENCH
MASKING TAPE	DRILL	5/16" DRILL BIT	FLASH LIGHT	HAMMER	ALLEN WRENCHES	TORQUE WRENCH

INSTALLATION OF BRACKET



1. Follow instructions on template sheet. Double check for the correct bracket kit and shaft length.
2. Select a proper Pattern and cut it out from template sheet.
3. Find the bracket mounting location by taping Pattern to your vehicle (Fig. 1) through usage of the pattern locating points, lines, and/or curves, or by following the instructions on Pattern if it is marked as an illustration.
4. Lay Bracket over Pattern or the determined mounting location to check fit. For post installation, also remove garnish trim to make sure that all hidden objects such as wires and side airbags clear the drill path of the 1/2" shaft hole, and then reinstall garnish trim. If Bracket does not fit, or any hidden objects cannot be pushed aside to clear the drill path, do not proceed. Contact Unity and/or its distributor for further instructions.
5. Punch centers of holes for self-tapping mounting screws (Fig. 1), and remove Pattern.
6. Drill 1/8" holes for mounting screws (Fig. 2).
7. Mount Bracket and Gasket securely with Mounting Screws (Fig. 3).
8. Insert Drill Bushing into Bracket (Fig. 3) and tighten Clamping Screw (or Set Screw as shown in Fig. 8) to hold Drill Bushing firmly. *Note: there are two types of Drill Bushings: 1" long with split (shown in Fig. 3-4), and 1/2" long with a flat (not shown).*
9. Drill a 1/2" hole through outer skin of vehicle (Fig. 4). Using a flashlight, check and make sure that all wires or cables clear the drill path.
10. Then, continue drilling through body. Keep the drill level and in proper alignment with Drill Bushing (Fig. 4). Make sure that Mounting Screws remain tight during drilling.
11. Loosen Bracket Clamping Screw (or Set Screw as shown in Fig. 8) and remove Drill Bushing with pliers as Drill Bushing may be hot.



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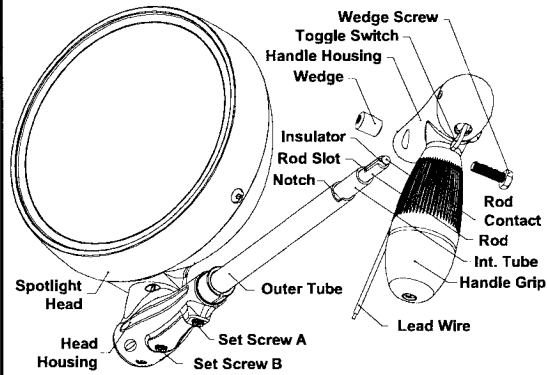
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Fig. 5: Remove Handle Assembly



INSTALLATION OF SPOTLIGHT

12. Remove Handle Assembly by removing Wedge Screw and Wedge (Fig. 5). Check the distance between ends of Outer Tube and Intermediate Tube and *make sure it is at least 1"* (Fig. 14) to ensure electrical continuity between Rod Contact (Fig. 5 or 12) and Switch Contact (Fig. 9). If it is less than 1", loosen Set Screw **A** and seat Outer Tube into head housing completely. Under any circumstances, if Nylon Bushing is pulled out of Head Housing (Fig. 6), *align the key on Nylon Bushing with the keyway inside Head Housing* to seat Nylon Bushing back into Head Housing. Otherwise, Outer tube cannot be seated properly.

13. Insert shaft gently through Bracket (Fig. 7) without disturbing Rod Contact and Insulator at the end of Rod (Fig. 5).

14. Set up Notch orientation of Outer Tube

- A. If Bushing has a Flat, Dimple or Groove (Fig. 8), set up Notch Orientation of Outer Tube simply by seating Bushing into Bracket with Flat in alignment with Bracket Flat, Dimple lining up with Set Screw, or Groove mating with Clamping Screw (**Note: it has no undercut**), and by tightening Set Screw or Clamping Screw to a torque of 50 ± 5 in-lbs.
- B. If Bushing has no Flat, Dimple or Groove, follow below Steps C-H to setup Notch Orientation of Outer Tube.
- C. Orient the slot on Bushing to align with the slot on Bracket or to be perpendicular to Set Screw for maximum clamping force, and seat Bushing into Bracket completely. Rest Spotlight Head on your vehicle (Fig. 7).
- D. Loosen Set Screw **A** (Fig. 7) to release clamping force so Outer Tube can be rotated freely inside Head Housing.
- E. Tighten Bracket Clamping Screw or Set Screw slightly to create adequate friction force to keep Outer Tube in position without over-tightening. Over-tightening will make it difficult to set up Notch Orientation of Outer Tube in the following steps.
- F. Gently slide Handle Assembly (Fig. 9) onto Spotlight Shaft, at the same time turn Handle Grip to engage Gear Key with Rod Slot, and rotate the whole handle assembly to engage Handle Housing Key with Outer Tube Notch as shown Fig. 10.
- G. Now, ready for setting up Notch Orientation. Rotate Outer Tube by using Handle Housing Key to push against the side(s) of Outer Tube Notch until the following three conditions are met:
 - a). Handle Grip approximately points to 9 o'clock position for LH (Fig. 10) and 3 o'clock position for RH (Fig. 11) with Handle Housing Key contacting one side of Notch;
 - b). Handle Housing can be rotated counterclockwise for LH and clockwise for RH with its key moving away from the contacted notch side without Outer Tube being rotated;
 - c). There is sufficient space (about 1") between Handle Grip and your vehicle for you to turn Handle Grip.

Once these conditions are met, Notch Orientation and Parking Position of Outer Tube are setup.

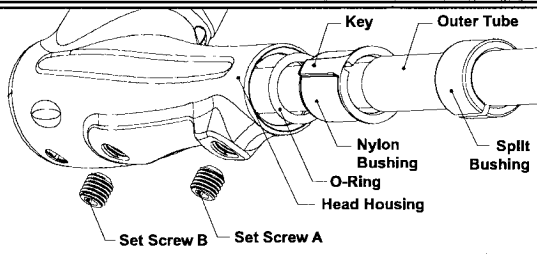


Fig. 6: Exploded View of Head Housing Assembly. Align the Key on Nylon Bushing with the Key Way inside Head Housing when Seating Nylon Bushing back into Head Housing.

Fig. 7: Insert Spotlight Shaft, Seat Split Bushing Inside Bracket and Tighten Clamping Screw

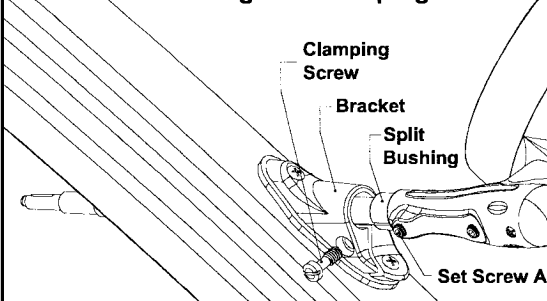


Fig. 8: Align Dimple with Set Screw, Flat with Flat, or Groove with Clamping Screw to Set Notch Orientation

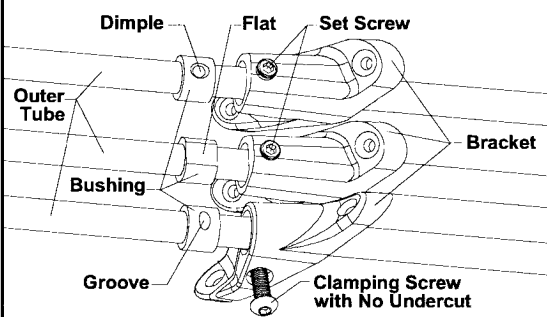
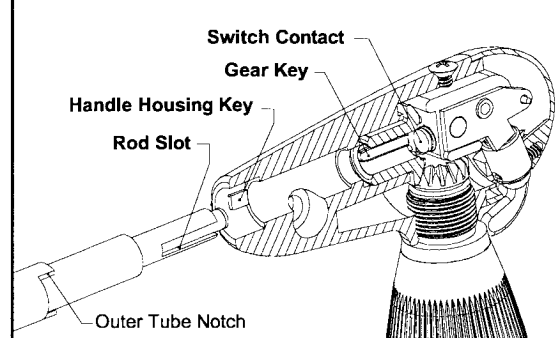


Fig. 9: Use Handle Housing Key to Set Notch Orientation





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Fig. 10: LH Handle Grip Approximately Points to 9 O'clock Position at Parking Position

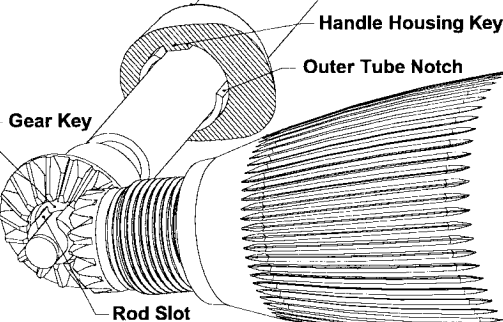
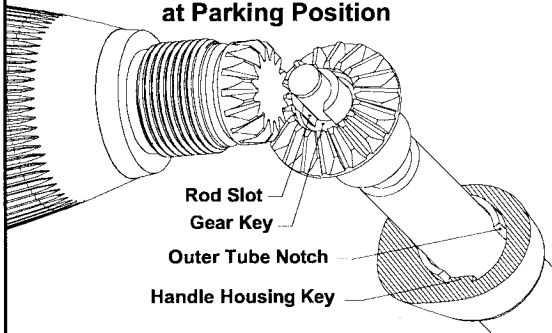


Fig. 11: RH Handle Grip Approximately Points to 3 O'clock at Parking Position

Fig. 12: Align Wedge Flat with Int. Tube Flat to Set Parking Position of Spotlight Head

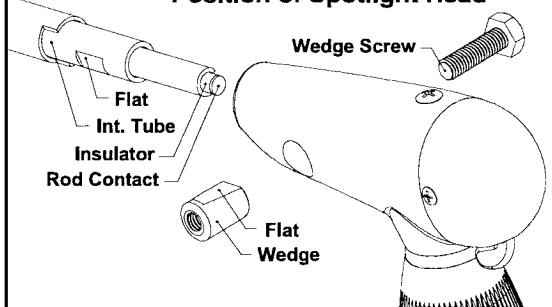


Fig. 13: Keep 1" Min. Gap between Head and Vehicle at Parking Position

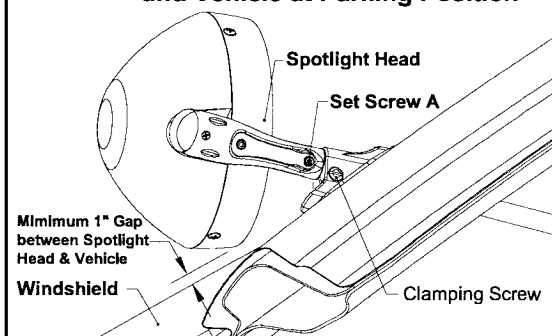
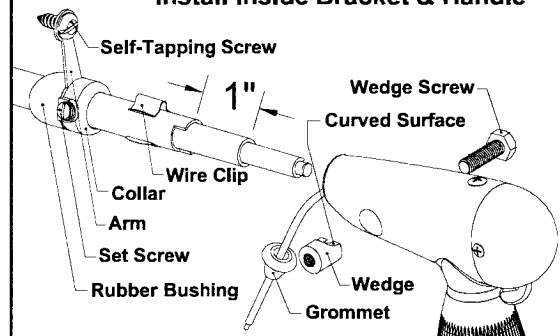


Fig. 14: Check the 1" Dimension and Install inside Bracket & Handle



- H. Remove Handle Assembly. Tighten Bracket Clamping Screw or Set Screw to a torque of 60-70 in.-lbs to keep Outer Tube at Parking Position.
- Set up Parking Position of Spotlight Head:**
 - If Int. Tube has a Flat (Fig. 12), set up Parking Position of Spotlight Head simply by aligning Flat on Wedge with Flat on Int. Tube during the installation of Handle Assembly in Step 18.
 - If Int. Tube has no flat, set up Parking Position of Spotlight Head by rotating it towards windshield (Fig. 13) and by leaving a minimum 1" clearance between your vehicle and the outermost edge of Spotlight Head. Tighten Set Screw **A** to keep Spotlight Head in this parking position until Step 18 is completed.
 - Recheck the 1" dimension* (Fig. 14) to be sure that Outer Tube is not moved out of Head Housing during the installation process.
 - Slip Rubber Bushing, Arm (if furnished), and Collar on shaft, and push them against your vehicle and tighten Set Screw inside Collar (Fig. 14). When Arm is used, bend it to fit your vehicle, and attach with Self-Tapping Screw.
 - Install Handle Assembly (Step 14.F). Bring Handle Grip to Parking Position (approximately at 9 o'clock position for LH (Fig. 10) and at 3 o'clock position for RH (Fig.11)) with Handle Housing Key contacting one side of Notch (Step 14.G). At Parking Position, *Apply pressure against Handle Assembly to assure continuity between Switch Contact and Rod Contact* while inserting Wedge and Wedge Screw into Handle Housing, and tightening Wedge Screw to a torque of 60-70 in-lbs for Wedge without flat, or 25-35 in-lbs for Wedge with flat.
 - Make proper adjustments (Fig. 15) to Set Screw **A** which controls the tension for up-down swing of Spotlight Head, and to Set Screw **B** which controls the tension for 360° rotation of Spotlight Head, so that they create just enough tension to hold the position of Spotlight Head in wind. Over-tightening may cause difficulties to aim spotlight as well as premature wear-and-tear of spotlight components.
 - Make sure that Spotlight Head always has proper clearance from windshield and door (in its open position), and that Handle Grip always has proper clearance from dashboard and side-window. If there is any interference between Spotlight Head and your vehicle, readjust Parking Position of Spotlight Head. If there is any interference between Handle Grip and your vehicle, readjust Notch Orientation of Outer Tube.
 - Secure Lead Wire with Wire Clip on Outer Tube, and connect Lead Wire to a fused power supply such as Fuse Panel or Ignition Switch as desired. You may need to drill a 5/16" hole in a desired location for Grommet on Lead Wire.
 - Finally, connect battery and test spotlight. Turn spotlight on-off through using Toggle Switch (Fig. 5), and swing it up and down by turning the handle assembly about the shaft axis, and rotate it 360° around in both directions by turning the handle grip about its own axis.



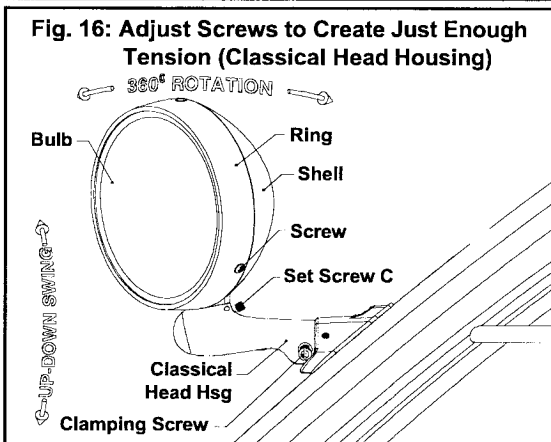
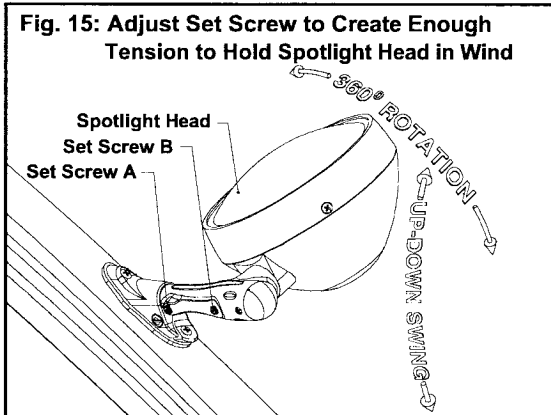
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TROUBLE-SHOOTING TIPS

23. **Electrical Trouble-Shooting:** if a spotlight does not light, first read steps 12-22 and *step 25* to understand the spotlight installation process, and then follow the below procedures.

- Assure continuity between Switch Contact and Rod Contact by loosening Wedge Screw, pushing Handle Assembly forward, and re-tightening Wedge Screw.
- If light does not work, check fuse. If fuse failed, replace fuse. If the fuse is good or if light still does not work, go to the next step.
- Disconnect Lead Wire from power source first, and then remove Handle Assembly. *Always keep Lead Wire disconnected from Power during the removal and installation process of Handle Assembly.* Test light by applying 12 VDC power to Rod Contact.

If light works,

- Check the 1" dimension of exposed Intermediate Tube (Fig. 14). If at least 1", replace the handle assembly with new one, and then install the new handle assembly. If less than 1", go to the next step.
- Reposition Outer Tube. Loosen Clamping Screw or Set Screw on Bracket and Set Screw A on Head Housing. Remove Spotlight Assembly and Outer Tube. Seat Outer Tube into Head Housing (Step 12). Then, reinstall and test spotlight. If light does not work, replace the handle assembly with new one.

If light does not work,

- Check Bulb. Open Spotlight Head (Fig. 16), disconnect bulb wires, and use a 12 VDC power source to check out Bulb. If it lights, replace the spotlight shaft assembly with new one. If it does not, go to the next step.

- Replace bulb and test light by applying 12 VDC power to Rod Contact. If light still does not work, replace the spotlight shaft assembly with new one. If light works, check the 1" dimension of exposed Intermediate Tube. If less than 1", go to Step b) above. If at least 1", reinstall the handle assembly and test light. If light still does not work, replace the handle assembly with new one.

24. Mechanical Trouble-Shooting

- If it is hard to turn Handle Grip to rotate Spotlight Head 360° in each direction smoothly:
 - Adjust Set Screw B (Fig. 15) and make sure it is not over-tightened. After proper adjustment, if it is still hard to turn, go to Step b) below.
 - Disconnect Lead Wire from power source. Remove Handle Assembly and rotate Handle Grip 360° in each direction. If the rotation is not smooth, replace the handle assembly with new one. If it is, replace the spotlight shaft assembly with new one.
- If it is hard to move Handle Assembly to swing Spotlight Head up and down about the shaft axis smoothly:
 - Make proper adjustment to Set Screw A (Fig. 15). If rotation is still not smooth, go to Step b) below.
 - Disconnect Lead Wire from power source. Remove Handle Assembly, loosen Set Screw A, pull out the spotlight (do not remove Outer Tube, and also refer to Step 12), clean dirt from Intermediate Tube by using Penetrating Oil, apply White Lithium Grease evenly on Intermediate Tube, and then install the spotlight.
- If spotlight has interference with vehicle, disconnect Lead Wire from power, remove Handle Assembly, and check if Handle Housing Key (Fig. 9) is sheared. If it is, replace the handle assembly with new one. If it is not, re-set Notch Orientation of Outer Tube (Step 14) and Parking Position of Spotlight Head (Step 15), and reinstall Handle Assembly (Step 18).

CLASSICAL HEAD HOUSING

25. If your spotlight has the classical head housing (Fig. 16), Clamping Screw and Set Screw C (Fig. 16) have the same functions as Set Screw A and Set Screw B (Fig. 15), and they can be used to adjust tensions for up-down swing and 360° rotation, respectively.