INSTALLATION & OPERATION MANUAL



for SOLEX™ LIGHT BARS



SOLEX TM

LIGHT BAR WITH SIRIS™ TECHNOLOGY

Patents Pending

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For future reference record your light bar's serial no. here _____

Introduction

The SOLEX™ (Patent-Pending) Light bar Features the truly unique, SIRIS™ (Patent-Pending) Technology which constitutes a quantum leap forward in signal brightness far exceeding the intensity and quality of any system. The low profile and aerodynamic lines reduce air drag, which results in fuel savings and stability at high speeds. The SOLEX light bar also has an extruded internal frame that is 2X stronger, shock-resistant polycarbonate lenses with an intermolded solar barrier, and warning signals that exceed SAE standards.

Unpacking & Pre-Installation

Carefully remove the light bar and place it on a flat surface, taking care not to scratch the lenses or damage the cable coming out of the bottom. Examine the unit for transit damage, broken lamps, etc. Report any damage to the carrier and keep the shipping carton.

The use of this or any warning device does not ensure that all drivers can or will observe or react to an emergency warning signal. Never take the right-of-way for granted. It is your responsibility to be sure you can proceed safely before entering an intersection, driving against traffic, responding at a high rate of speed, or walking on or around traffic lanes.

The effectiveness of this warning device is highly dependent upon correct mounting and wiring. Read and follow the manufacturer's instructions before installing or using this device. The vehicle operator should insure daily that all features of the device operate correctly. In use, the vehicle operator should insure the projection of the warning signal is not blocked by vehicle components (i.e.: open trunks or compartment doors), people, vehicles, or other obstructions.



This equipment is intended for use by authorized personnel only. It is the user's responsibility to understand and obey all laws regarding emergency warning devices. The user should check all applicable city, state and federal laws and regulations.

WARNING!

Code 3, Inc., assumes no liability for any loss resulting from the use of this warning device.

Proper installation is vital to the performance of this warning device and the safe operation of the emergency vehicle. It is important to recognize that the operator of the emergency vehicle is under psychological and physiological stress caused by the emergency situation. The warning device should be installed in such a manner as to: A) Not reduce the output performance of the system, B) Place the controls within convenient reach of the operator so that he can operate the system without losing eye contact with the roadway. Emergency warning devices often 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 severe vehicle damage, including fire. 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.

Installation & Mounting

Standard light bars are built to operate on 12 volt D.C. negative ground (earth) vehicles. If you have an electrical system other than 12 volt D.C. negative ground (earth), and have not ordered a specially wired light bar, contact the factory for instructions.

Test the unit before installation. To test, touch the black wire to the ground (earth) and the other wires to +12 volts D.C., in accordance with the instructions attached to the cable (an automotive battery is preferable for this test). A battery charger may be used, but note that some electronic options (flashers, etc.) may not operate normally when powered by a battery charger. If problems occur at this point, contact the factory.



Utilizing non-factory supplied screws and/or mounting brackets and/or the improper number of screws or modifying the supplied parts may result in loss of warranty coverage on the equipment.

MOUNTING HARDWARE - Mounting hardware is usually packed in a small box inside the main carton although some mounting kits may be shipped separately. Refer to the Installation Manual included in the mounting kit for mounting instructions. Note: Hook-on mounting for "gutterless" type vehicles will require a special hook for mounting. Several special application hooks are available. Contact the factory for details.

Wiring Instructions, Options, and Specifications

Before attempting to connect wiring, refer to wire tag attached to the light bar's main cable. Each wire in the cable controls a separate function of the Central Controller as described in the wire tag.



Larger wires and tight connections will provide longer service life for components. For high current wires it is highly recommended that terminal blocks or soldered connections be used with shrink tubing to protect the connections. Do not use insulation displacement connectors (e.g. 3M® Scotchlock type connectors). Route wiring using grommets and sealant when passing through compartment walls. Minimize the number of splices to reduce voltage drop. High ambient temperatures (e.g. under hood) will significantly reduce the current carrying capacity of wires, fuses, and circuit breakers. Use "SXL" type wire in engine compartment. All wiring should conform to the minimum wire size and other recommendations of the manufacturer and be protected from moving parts and hot surfaces. Looms, grommets, cable ties, and similar installation hardware should be used to anchor and protect all wiring. Fuses or circuit breakers should be located as close to the power takeoff points as possible and properly sized to protect the wiring and devices. Particular attention should be paid to the location and method of making electrical connections and splices to protect these points from corrosion and loss of conductivity. Ground terminations should only be made to substantial chassis components, preferably directly to the vehicle battery. The user should install a fuse sized to approximately 125% of the maximum Amp capacity in the supply line to protect against short circuits. For example, a 30 Amp fuse should carry a maximum of 24 Amps. DO NOT USE 1/4" DIAMETER GLASS FUSES AS THEY ARE NOT SUITABLE FOR CONTINUOUS DUTY IN SIZES ABOVE 15 AMPS. Circuit breakers are very sensitive to high temperatures and will "false trip" when mounted in hot environments or operated close to their capacity.

Fusing Considerations

The SOLEX™ Light bar should be installed with an external fuse or circuit breaker in the RED lead of the two conductor 10 AWG power cable. The recommended external fuse size for the light bar is 30A. The internal circuitry of the Central Controller is reverse polarity protected. Each output on the Central Controller board is protected against over current and over heating with automatically resetting output devices.

Dim Operation

The SOLEX features a low power "Dimming" mode. Dimming will be controlled by applying +12V by way of the appropriate wire (Blue) in the wire harness/wire list. Dimming can also be controlled by an optional photo cell. When DIM is engaged, the SIRIS™ light heads will operate in a reduced power mode.



The Dim setting reduces the light output of emergency warning lights reducing the effectiveness of them especially in brightly lit areas. Failure to use adequate light for the circumstances can cause motorists to fail to see the emergency vehicle and lead to serious personal injury or death. Never use the DIM setting in a brightly lit area. Use of the DIM setting may cause emergency lights to not comply with applicable emergency warning light standards. Use caution when using the DIM setting to assure that motorists can clearly see the emergency vehicle.



Selecting Flash Patterns

Use the following instructions for lightbars without programmable light head pairs.

Note: For lightbars equipped with programmable light head pairs refer to the following: If the lightbar has all single color light heads, please see supplement T16406 (800Series Software).

If the lightbar has any multi-color light heads, please see supplement T54006 (950Series Software).

STEP 1

Select the desired 3-Level mode to program by applying +power to the appropriate wire in the 16 conductor cable.

There are seven possible 3-Level modes (see Table 1). The factory default is different for each of the 3 -Level modes. The standard progressive switch will use the Level-1, Level-2 and Level-3 modes. The defaults for Level-1, Level-2 (L1 + L2) and Level-3 (L1 + L2 + L3) are identified in Table 1A. When using individual switches, make sure to select patterns for all switch combinations.

3-LEVEL MODES OF OPERATION				
MODE NUMBER	WIRES ACTIVATED			
L1	GRN/BLK (LEVEL-1)			
L2	WHT/BLK			
L1 + L2	GRN/BLK & WHT/BLK (LEVEL-2)			
L3	RED/BLK			
L1 + L3	GRN/BLK & RED/BLK			
L2 + L3	WHT/BLK & RED/BLK			
L1 + L2 + L3	GRN/BLK, WHT/BLK, & RED/BLK (LEVEL-3)			

Table 1

STEP 2

Observe the flashing pattern operation and determine which pattern is in operation. Refer to Table 1A. This table shows the available flash patterns. Note: the Factory Default is different and identified in the table for each of the flash mode Levels (L1, L2, L3). Once the flash pattern has been determined, proceed to Step 3

STEP 3

Scroll to the next flash pattern by momentarily holding the Pattern Select wire (BLK/RED) to +power for ~1 sec. The light bar will stop flashing when the wire is connected to +power. Release the wire and the next pattern as listed in Table 1A will begin to flash. The new pattern is automatically stored each time. Repeat this procedure for each of the seven possible 3-level modes.

NOTE: To restore the Factory Default Emergency Warning Flash Patterns (see Table 1A), hold the pattern select wire to +power for ~four (4) seconds.

SEE FLASH PATTERN SELECTION NOTES ON FOLLOWING PAGES

<u>Make sure +12v is only applied to the function you are trying to program - otherwise program function will not operate.</u>

Factory Default	Lighting Level			Flash Pattern Description		
	L1	L2	L3			
Factory Default Level 2	15	1	5	Fast Alternating Quad Flash		
	16	2	6	Alternating Two Flash		
	17	3	7	Alternating Single Flash		
	18	4	8	Fast Picket Fence Quad Flash		
	19	5	9	Slow Picket Fence Quad Flash		
	20	6	10	Alternating Quad Flash		
	21	7	11	Slow Alternating Six Flash		
	22	8	12	Alternating Six Flash		
	23	9	13	Variable Rate Even/Odd Flash		
	24	10	14	Alternating Quad Flash 75 FPM (NFPA)		
Factory Default Level 1	1	11	15	Fast Alternating Quad Flash (Rear Only)		
	2	12	16	Fast Even/Odd Quad Flash (Rear Only)		
	3	13	17	Alternating Quad Flash (Rear Only)		
	4	14	18	Alternating Six Flash (Rear Only)		
	5	15	19	Variable Rate Even/Odd Head Flash (Rear Only)		
	6	16	20	Fast Alternating Quad Flash (Front Only)		
	7	17	21	Fast Even/Odd Quad Flash (Front Only)		
	8	18	22	Alternating Quad Flash (Front Only)		
	9	19	23	Alternating Six Flash (Front Only)		
	10	20	24	Variable Rate Even/Odd Head Flash (Front Only)		
Factory Default Level 3	11	21	1	Cycle Flash (cycles through multiple flash patterns)		
	12	22	2	Simultaneous Quad Flash (all LEDs) 75 FPM (NFPA)		
	13	23	3	Null Flash (no flashing LEDs - only Steady Burns if equipped		
	14	24	4	Rapid Quad Flash Picket Fence		

Table 1A

Control Input Function Definitions (Note: All control inputs are +power enabled				
Wire Color	<u>Function</u>	<u>Description</u>		
GRN/BLK	Level 1	Level 1 Emergency Mode		
WHT/BLK	Level 2	Level 2 Emergency Mode		
RED/BLK	Level 3	Level 3 Emergency Mode		
ORG/BLK	Take Down lights	Take Down Lights Steady Burn (overrides Take Down Flash)		
BLU/BLK	Rear Cut-Off	Blacks-Out Rear Facing LEDs		
GRN/WHT	Front Cut-Off	Blacks-Out Front Facing LEDs		
RED/WHT	Right Alley Light	Right Alley Steady Burn (overrides Alley Light Flash)		
BLK/WHT	Left Alley Light	Left Alley Steady Burn (overrides Alley Light Flash)		
WHT	ArrowStik® Flash	ArrowStik Flash (overrides L1, L2 & L3 for rear of light bar)		
BLK/RED**	Pattern Select	Pattern Select for ArrowStik, L1, L2 & L3, enables test mode)		
BLK	Take Down Flash	Enables Take Down Lights Wig/Wag Flash		
RED*	ArrowStik Left	Left ArrowStik (overrides L1, L2 & L3 for rear of light bar)		
GRN	Cruise Lights	End LEDs only (overridden by all other functions except for Dim)		
ORG*	ArrowStik Right	Right ArrowStik (overrides L1, L2 & L3 for rear of light bar)		
BLU	Light bar DIM	Sets LED to Dim mode		
BLU/WHT	Alley Light Flash	Enables Alley Light Wig/Wag Flash		

Table 1B

The Pattern Select wire is the BLK/RED wire as noted above in the sixteen conductor light bar control cable and is activated by momentarily touching the wire to +power.

FLASH PATTERN SELECTION NOTES:

- * (See Table 1B) When the ArrowStik® Left and ArrowStik Right wires are both connected to +power, the Center-Out ArrowStik function is activated.
- ** (See Table 1B) When the Pattern Select wire is connected to +power and all other inputs are off, test mode is enabled to exercise all outputs in sequence until +power is removed from the wire.

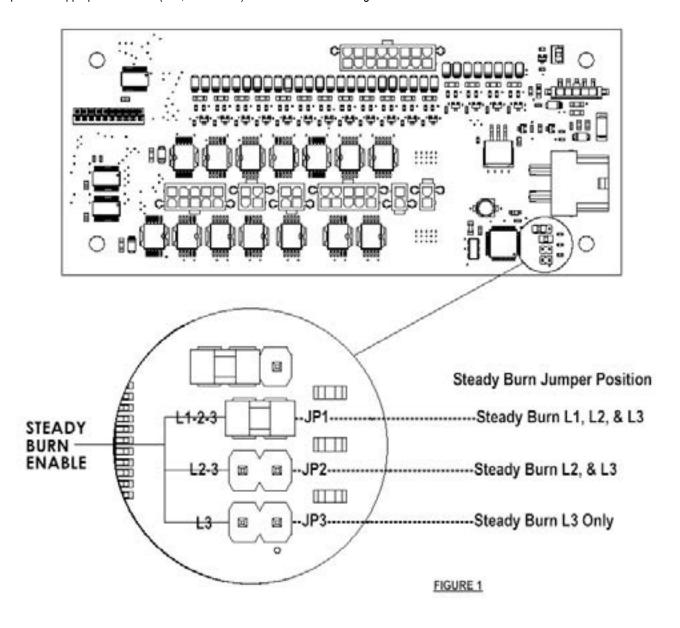
The Steady Burn function for both the Take Down and Alley lights will always override the Wig/Wag Flash function.

The Cruise Light function is mutually exclusive with all other functions. If any other input has +power applied, the Cruise Lights will be turned off. Light bars with software T116XXV6 or greater, T117XXV6 or greater or T118XXV2 or greater or T514XXV0 or greater can operate the Cruise Light Function and the Dim Function together. The Dim Function has no affect on the Cruise Lights.

Steady Burn Setting

The SOLEX's M Steady Burn feature allows up to two (2) of the light bar's SIRIS I light heads to be designated to operate in Steady Burn mode. The Steady Burn SIRIS light heads are always connected to connectors P9 & P10.

The Steady Burn outputs are enabled by the 3-Level control inputs. The SOLEX may be configured so that Steady Burn SIRIS light heads are on when either L1, L2 or L3 are active (JP1 position); when L2 or L3 are active (JP2 position) or just when L3 is active (JP3 position). Simply move the jumper to the appropriate location (JP1, JP2 or JP3). Refer to the detail in Figure 1.



ArrowStik® Modules

Selecting the ArrowStik Pattern

The Central Controller is designed to offer user selectable traffic directing and traffic warning flash patterns. Each of the ArrowStik functions (LEFT, CENTER-OUT, RIGHT or FLASH) can be programmed individually for unique patterns and flash rates. This allows the greatest flexibility when controlling the various light bar configurations available. The light bar can be ordered with a 5, 6, 7 or 8 lighthead configuration. The light bar will come from the factory with the Building Fast pattern as the default for LEFT, CENTER-OUT and RIGHT. The default pattern for FLASH is the Standard Flash. If it is desired to change the pattern for any of the functions, follow the programming procedure below.

STEP 1:

Power-up the light bar. Select the ArrowStik function that you wish to program (LEFT, CENTER-OUT, RIGHT or FLASH).

Make sure +12v is only applied to the function you are trying to program - otherwise program function will not operate.

STEP 2:

Continue applying power to the wire from Step 1. Refer to Table 2 for the available flash patterns.

Scroll to the next flash pattern by momentarily holding the Pattern Select wire (BLK/RED) to +power for ~1 sec. The light bar will stop flashing when the wire is connected to +power. Release the wire and the next pattern as listed in Table 2 will begin to flash. The new pattern is automatically stored each time.

Notice that for the LEFT, CENTER-OUT and RIGHT functions there are four pattern choices (Building, Building with 3 Flash for the end lightheads, Traveling Ball with 3 Flash for the end lightheads, and Build/Collapse) and three speeds (Fast, Medium and Slow). There are a total of twelve possible selections for each function and then you return to the top selection.

For the FLASH function there are nine traffic warning patterns available. Flash patterns marked with an asterisk "*" can be selected in Fast, Medium or Slow flash rate.

NOTE: To restore the Factory Default ArrowStik Flash Patterns, hold the BLK/RED wire to +power for ~four seconds.

STEP 3:

Repeat steps 1 through 2 for the other ArrowStik functions as desired.

	TRAFFIC DIRECTING / TRAFFIC WARNING FLASH PATTERNS					
Mode	LEFT	CENTER-OUT	RIGHT	FLASH		
1	Building	Building	Building	Standard Flash*		
2	Building, 3 Flash	Building, 3 Flash	Building, 3 Flash	Quad Flash Standard		
3	Traveling Ball, 3 Flash	Traveling Ball, 3 Flash	Traveling Ball, 3 Flash	Simultaneous Flash*		
4	Build/Collapse	Build/Collapse	Build/Collapse	Quad Flash Simultaneous		
5				Even/Odd Flash*		
6				Quad Flash Even/Odd		
7				Left/Right Flash*		
8				Quad Flash Left/Right		
9				Traveling Ball Flash*		
	All Patterns have a fast, medium, or slow speed.	All Patterns have a fast, medium, or slow speed.	All Patterns have a fast, medium, or slow speed.	Patterns with the * have a fast, medium, or slow speed.		

Table 2

Take Down and Alley Flash

Selecting Flash Patterns:

The Take Down and Alley Lights can be programmed to flash at different rates.

STEP 1:

Power-up the light bar. Select the Take Down Flash Mode (BLK) or the Alley Flash Mode (BLU/WHT) by applying +power to the appropriate wire. . **NOTE: Make sure +12v is only applied to the function you are trying to program - otherwise program function will not operate.**

STEP 2:

Observe the flash pattern and determine which pattern is in operation (see Table 3). This table shows the available flash patterns. Once the flash pattern has been determined, proceed to Step 3. **NOTE: The default flash pattern for Take Down and Alley Lights is Medium Single 115FPM.**

STEP 3:

Scroll to the next pattern by momentarily holding the BLK/RED wire to +power for ~one (1) second. The light bar will stop flashing when the wire is connected to +power. Release the wire and the next pattern as listed in Table 3 will begin to flash. The new pattern is automatically stored each time. NOTE: To restore the Factory Default Take Down and Alley Flash Patterns, hold the BLK/RED wire to +power for ~four (4) seconds.

TAKE DOWN AND ALLEY FLASH PATTERNS				
PATTERN NUMBER	PATTERN DESCRIP- TION			
1	FAST QUAD 80FPM			
2	SLOW QUAD 60FPM			
3	FAST SINGLE 375FPM			
4	MEDIUM SINGLE 115FPM			
5	SLOW SINGLE 60FPM			
6	FAST DOUBLE 115FPM			
7	SLOW DOUBLE 60FPM			
8	FAST SIX 80FPM			
9	SLOW SIX 60FPM			
10	VARIABLE RATE SINGLE			
11	NFPA QUAD 75FPM			
12	CYCLE FLASH			

Table 3

Maintenance

Lens Cleaning

Use plain water and a soft cloth, or Code 3® lens polish and a very soft paper towel or facial tissue. Plastic scratches easily, as a result, cleaning is recommended only when necessary (about every six months). Do not subject the lenses to car washes that use brushes, as these will scratch the lenses.

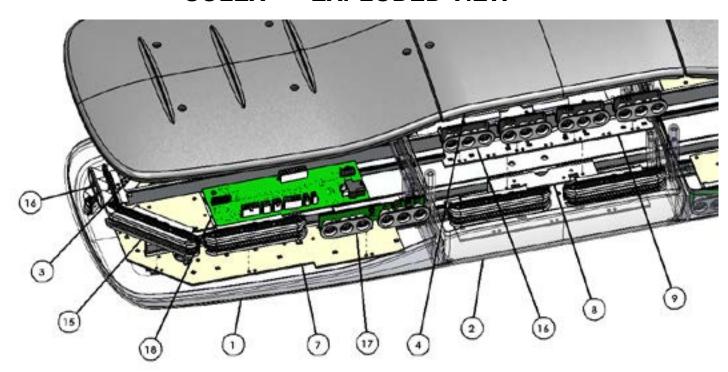
Lens Removal

With a Phillips screwdriver, remove the cap attachment screws (with neoprene washers). Insert a small screwdriver blade (or coin) into the small slot a the corner of the lens cap and twist the screwdriver to lift the cap. Then gently lift the cap off. When finished carefully replace the cap making sure the lens gasket is not misplaced, then replace the cap mounting screws making sure the neoprene washers are in place.

Light Head Removal

Unplug the SIRIS™ light head's power wire/wires from the light bar's wiring harness. Then with a 1/4" Hex Bit Driver, remove the #8 X .270" 6 Lobe Hex Washer Head Screws that attach the light head mounting bracket to the light bar. The takedowns and alleys require decoupling mated quick-slide terminals (be sure to pull on the terminals and not the wires).

SOLEX™ - EXPLODED VIEW



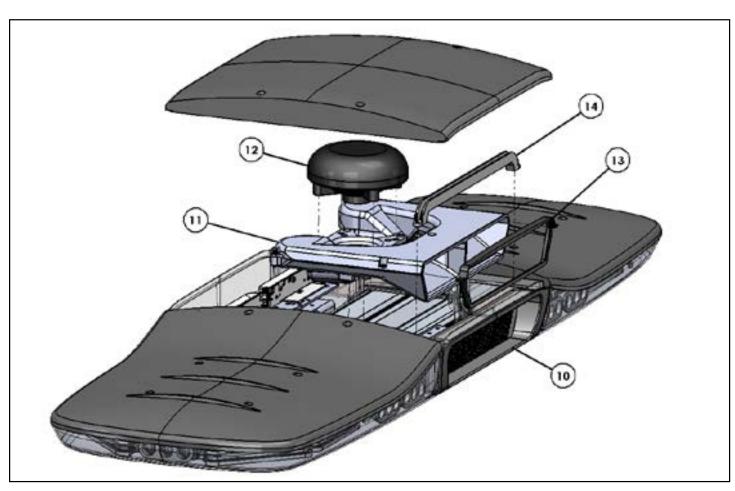


FIGURE 2

Ref No.	Descri	ption	Part No.	
1 Outboard Lo	ower Lens	Green Clear Red Blue Amber	T51440 T51441 T51442 T51443 T51444	
2 Center Lowe All-Light (No		Green Clear Red Blue Amber	T51450 T51451 T51452 T51453 T51454	
3 Outboard U	pper Cap	Clear Red Blue Amber Black	T51501 T51502 T51503 T51504 T51505	
4 Center Uppo	er Cap	Clear Red Blue Amber Black	T51511 T51512 T51513 T51514 T51515	
		oprene Washer - 0.625" Long oprene Washer - 1.500" Long	T51179 T51439	
7 Outboard Lo 8 Center Lowe 9 Center Uppe	er Mtg Plate	with Support	T51550 T51553 T51558	
10 Center Lov 11 Speaker H 12 Speaker D 13 Speaker H 14 Speaker G	orn Assemb river orn-Grill Ga	sket	T51481 T56030 T11260 T56038	>
		, Blue, Amber, White, Green I Color: Red/Blue, Red/Amber, Blue/Amber, Red/White, Blue/White, Amber/White		CTORY
16 3-UP Take	Down or All	ley Light Head	i	CALLFAC
17 6-UP Take	Down Head	3		ΆLΙ
	ArrowStik®	control control for dual color sister control for dual color	T11564 T55490 T55491	J

Troubleshooting

All SOLEXTM Light bars are thoroughly tested prior to shipment. However, should you encounter a problem during installation or during the life of the product, follow the guide below for information on repair and troubleshooting. Additional information may be obtained from the factory technical help line at 314-996-2800.

SIRIS™ LIGHT HEAD TROUBLESHOOTING

Note: LED light heads must be replaced as a module. There are no user serviceable parts. Warranty is void if module is disassembled

PROBLEM	QUESTIONS	POSSIBLE CAUSE	SOLUTION
SIRIS Front Module not operating	Are all heads out in front or in back, and not just a single module out?		
	Yes	a. Front and/or Rear Cut Function powered	a. Remove power (turn off) Front and/or Rear Cut
	No	a. Defective module b. Cable/Connector unplugged	a. Replace module b. Check cable & connector
SIRIS Corner Module has one head out.	NA	a. Defective module b. Cable/Connector unplugged	a. Replace module b. Check cable & connector
Cruise Lights do not operate	NA	a. No power on Cruise wire b. Another Central Controller Function is on	a. Connect Cruise wire to switch b. Turn off other functions

Notes:

WARRANTY

This product was tested and found to be operational at the time of manufacture. Provided this product is installed and operated in accordance with the manufacturer's recommendations, Code 3®, Inc. warrants all parts and components (with the exception of all incandescent and halogen bulbs) of the product to be free of defects in material and workmanship for a period of one (1) year and SIRIS™ led light heads for a period of five (5) years from the date of purchase. This Warranty excludes normal wear & tear. Units demonstrated to be defective within the warranty period will be repaired or replaced at the factory service center at no cost. Code 3, Inc. will return the repaired product with transportation cost prepaid. Code 3, Inc. assumes no liability for expenses incurred in the packaging, handling, and shipping of the product to the Factory Technical Service Department for repair. For in-warranty product return authorization, questions regarding product warranty coverage or questions regarding out-of-warranty repair quotes, contact the Factory Technical Service Department.

This Warranty is void if, in the judgment of Code 3, Inc. (1) an attempt has been made to repair the light head, and/or (2) the product has been used with inappropriate or inadequate wiring or circuit protection, and/or (3) the product has failed as a result of abuse or unusual use and/or accidents.

CODE 3, INC. SHALL IN NO WAY BE LIABLE FOR ANY OTHER DAMAGES RE-LATING TO THE PRODUCT INCLUDING BUT NOT LIMITED TO CONSEQUENTIAL, INCIDENTAL, INDIRECT OR SPECIAL DAMAGES OR LOST PROFITS OR REVENUE; NOR ANY EXPENSES INCURRED IN THE REMOVAL AND/OR RE-INSTALLATION OF PRODUCTS REQUIRING SERVICE AND/OR REPAIR.

EXCEPT AS SET FORTH ABOVE, CODE 3, INC. MAKES NO OTHER EXPRESS OR IMPLIED WARRANTIES WHATSOEVER, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY, WITH RESPECT TO THIS PRODUCT.

PRODUCT RETURNS

If a product must be returned for repair or replacement*, please contact our factory to obtain a Return Goods Authorization Number (RGA number) before you ship the product to Code 3®, Inc. Write the RGA number clearly on the package near the mailing label. Be sure you use sufficient packing materials to avoid damage to the product being returned while in transit.

*Code 3®, Inc. reserves the right to repair or replace at its discretion. Code 3®, Inc. assumes no responsibility or liability for expenses incurred for the removal and /or reinstallation of products requiring service and/or repair.; nor for the packaging, handling, and shipping: nor for the handling of products returned to sender after the service has been rendered.

For Technical Support / Service, please call 314-996-2800.

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