INSTALLATION & OPERATION MANUAL

FM 9000 FLUSH-MOUNT LIGHTBAR

CODE 3® INC.
A PUBLIC SAFETY EQUIPMENT COMPANY

FM 9000™
FLUSH-MOUNT LIGHTBAR

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IMPORTANT: ***Read all instructions and warnings before installing and using.***
INSTALLER: ***This manual must be delivered to the end user of this equipment.***

Introduction

The FM 9000 is a forward or rear facing LED lightbar that has an extruded polycarbonate lens mounted to a strong aluminum extrusion. Angled lights project light to the intersections while forward facing lights provide a strong signal straight ahead. Clear endcaps allow for an end signal or alley lights. PriZm™ LED lightheads provide a high intensity warning signal while drawing very little current. The FM 9000 is only 3" high and 4" deep. Load lights and forward clear lights round out the options for the FM 9000. Properly configured, the FM 9000 meets all SAE, California Title 13, KKK and NFPA specifications.

WARNING!

The use of this or any warning device does not insure 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.
Public Safety Equipment, 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.

Unpacking & Pre-Installation

Carefully remove the lightbar and place it on a flat surface, taking care not to scratch the lenses. Examine the unit for transit damage. Report any damage to the carrier and keep the shipping box.

Standard lightbars are built to operate on +12VDC negative ground vehicles. If you have an electrical system other than this and have not ordered a specially wired lightbar, contact the factory for instructions.

Test the unit before installation. To test, touch the black wire to ground and the other wires to +12VDC (an automotive battery is preferable for this test). A battery charger may be used, but please note that some electronic options may not operate normally when powered by a battery charger. If problems occur, at this point, contact the factory.

Installation & Mounting

Select the desired mounting location for the lightbar. This product is attached with 1/4" carriage bolts whose centerlines are 1.3" below the top of the lightbar (Figure 1).

Locate the bolts along the back of the lightbar. The number of mounting bolts varies with the length of the lightbar. Place a mounting bolt near each end of the frame. Space additional bolts evenly across the remaining length. Locate 5/16" diameter clearance holes on the vehicle to work with the bolt locations. Locate for easy access from the inside of the vehicle. Locate and drill a minimum 1/2" diameter hole for the control cable exiting as shown in Figure 2 below. Insure the cable jacket cannot be cut by sharp edges.

Route the cable and the bolts into their respective holes. Attach the washers and nuts to the bolts from the inside of the vehicle. Apply caulk to all bolts and wires at the point of entry.

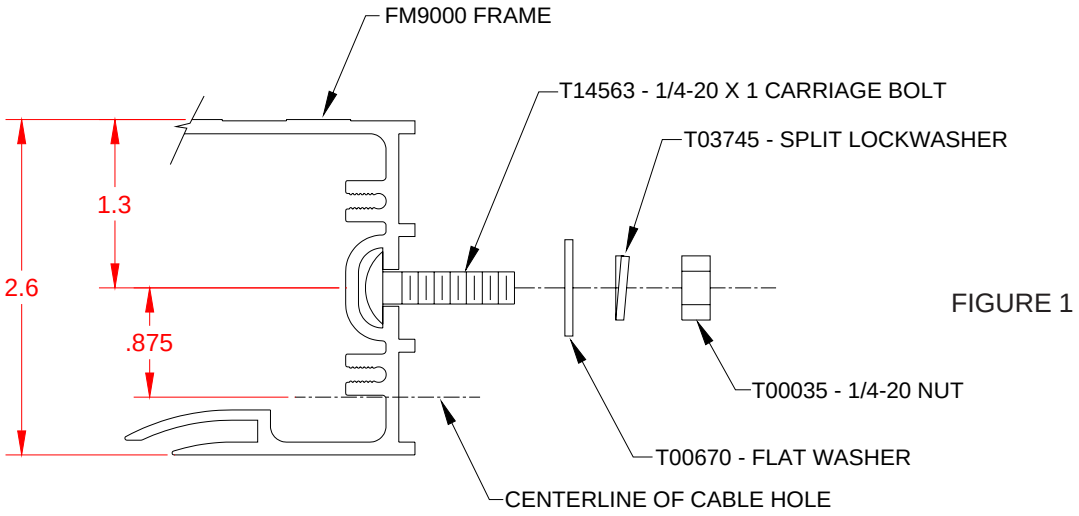


FIGURE 1

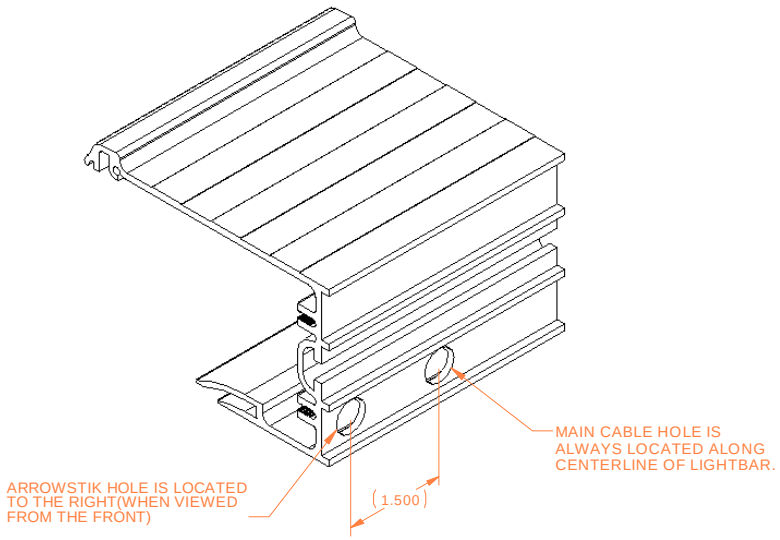


FIGURE 2

Wiring Instructions

WARNING!

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. underhood) 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.

Always refer to the wire tag attached to the lightbar cable to match lightbar functions with colored wire. Several items may be controlled by the same wire. Extend all control wires to switching device and make appropriate connections. The black ground wire must be securely attached to the vehicle chassis to provide reliable grounding.

LED Warning Devices

WARNING!

This Product contains high intensity LED devices. To prevent eye damage, DO NOT stare into light beam at close range.

LED Fusing Considerations

Although the average current draw per module is very low, due to the type of circuit used to power each module, the instantaneous peak current to a module can be significantly higher during low voltage conditions. To avoid prematurely blowing ATO style fuses or tripping breakers, it is recommended the following rule-of-thumb be used to size fuses or breakers. This is especially important in lightbars with many LED modules running off a single fused source.

Minimum fuse size calculation:

1.5 x (number of 6/8/12-up modules being fused) + .5 x (number of 3-up modules being fused)

Example:
FM 9000 lightbar with 7 forward facing 6-up modules and 16 angled and end facing 3-up modules

Minimum fuse requirement for single fuse: (1.5 x 7) + (.5 x 16) = 18.5A minimum

Note:
Each 35 Watt halogen lamp requires 3A fusing. Each 55 Watt halogen lamp requires 5A fusing.

LED MODULES

The LED modules are available as “flashing” and “steady burning” versions. The steady burning versions can be flashed by connecting the module(s) to any flasher that does not require ground through the load (example: Code 3® 925 or 700 series relay flasher). The flashing modules will have "Cycle flash" as the standard pattern. Flash patterns can be changed by shorting the 2-pin header, J1 as shown in Figure 3, momentarily then releasing. **PLEASE NOTE THAT THE LIGHTHEAD MODULE MUST BE REMOVED FROM THE FRAME TO EXPOSE THE J1 HEADER**. Table 1 shows the available patterns and the order when stepping through patterns. The module can be reset to "Cycle flash" by shorting the header for greater than 5 seconds and releasing.

Directional Module Flash Pattern - Table 1

Flash Pattern	Description
Cycle Flash	Cycles through various patterns @ 70 fpm
Steady-Burn	Steady-Burn
Five Flash	Five Pulses per flash @ 70 fpm
Quad Flash	Four Pulses per flash @ 70 fpm
Triple Flash	Three Pulses per flash @ 70 fpm
Double Flash	Two Pulses per flash @ 70 fpm
Fast Double Flash	Two Pulses per flash @ 85 fpm
NFPA	Four Pulses, 70% Duty Cycle @ 75 fpm
Quad Pop Flash	Four Pulses per flash (3 equal, 1 extended) @ 70 fpm
Triple Pop Flash	Three Pulses per flash (2 equal, 1 extended) @ 70 fpm

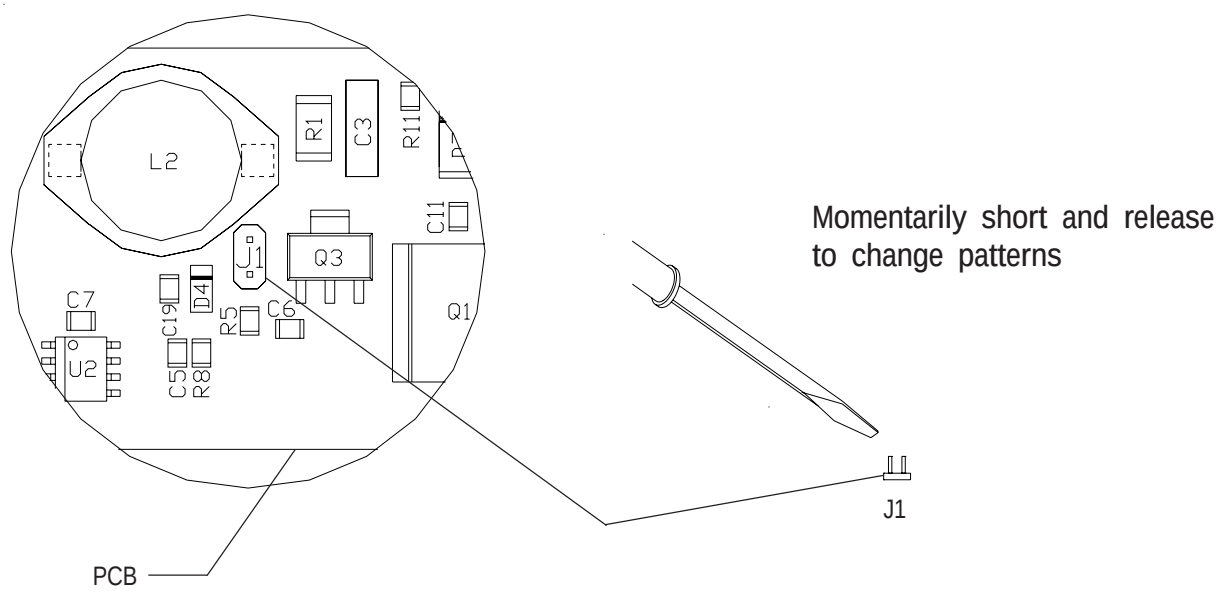


FIGURE 3

Maintenance

Make sure power is disconnected to the lightbar before servicing. Refer to Figure 4a. To remove the lens, remove the 4 screws on each endcap as shown. Remove all clips (Figure 4b) on the front face of the lens and frame with a flat blade screwdriver.

Please note that the lens comes off the front! It does not slide out. Pull down on the top of the lens as shown in Figure 5a. Once the top part of the lens is out, rotate the lens down and out as shown in Figure 5b.

If an LED assembly is not working, refer to the troubleshooting section. If it needs to be removed, disconnect power to the module by pulling apart the red quick connect terminal and unscrewing the black ground lead. Remove the sheet metal screws holding the assembly. Halogen assemblies are removed in the same manner.

Before reassembling the lens, make sure the gasket is properly seated.

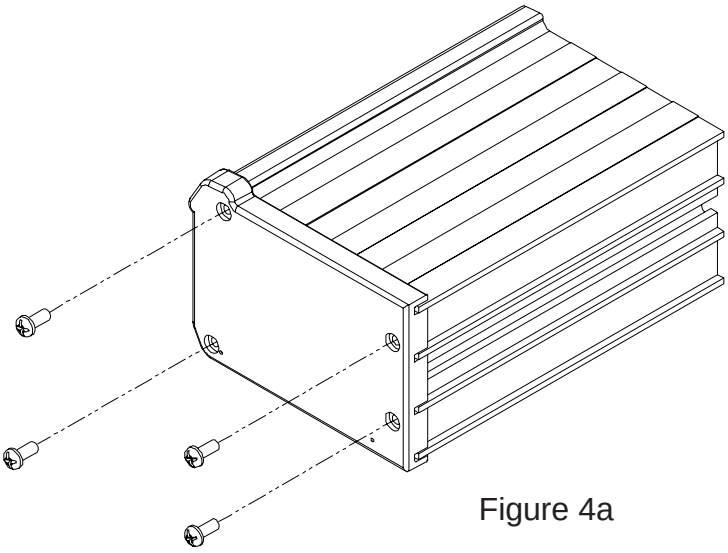


Figure 4a

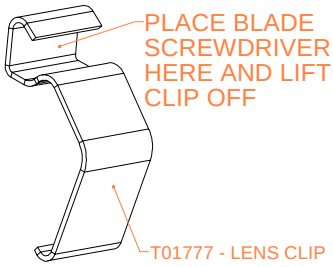


Figure 4b

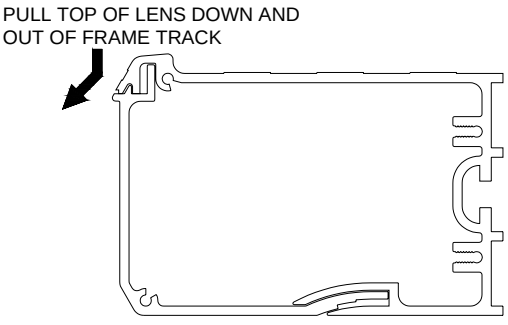


Figure 5a

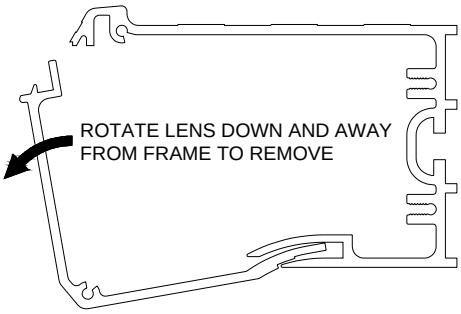


Figure 5b

Troubleshooting

All FM 9000 lightbars 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.

LED MODULE
TROUBLESHOOTING GUIDE

Note: LED modules must be replaced as a module. There are no user serviceable parts.

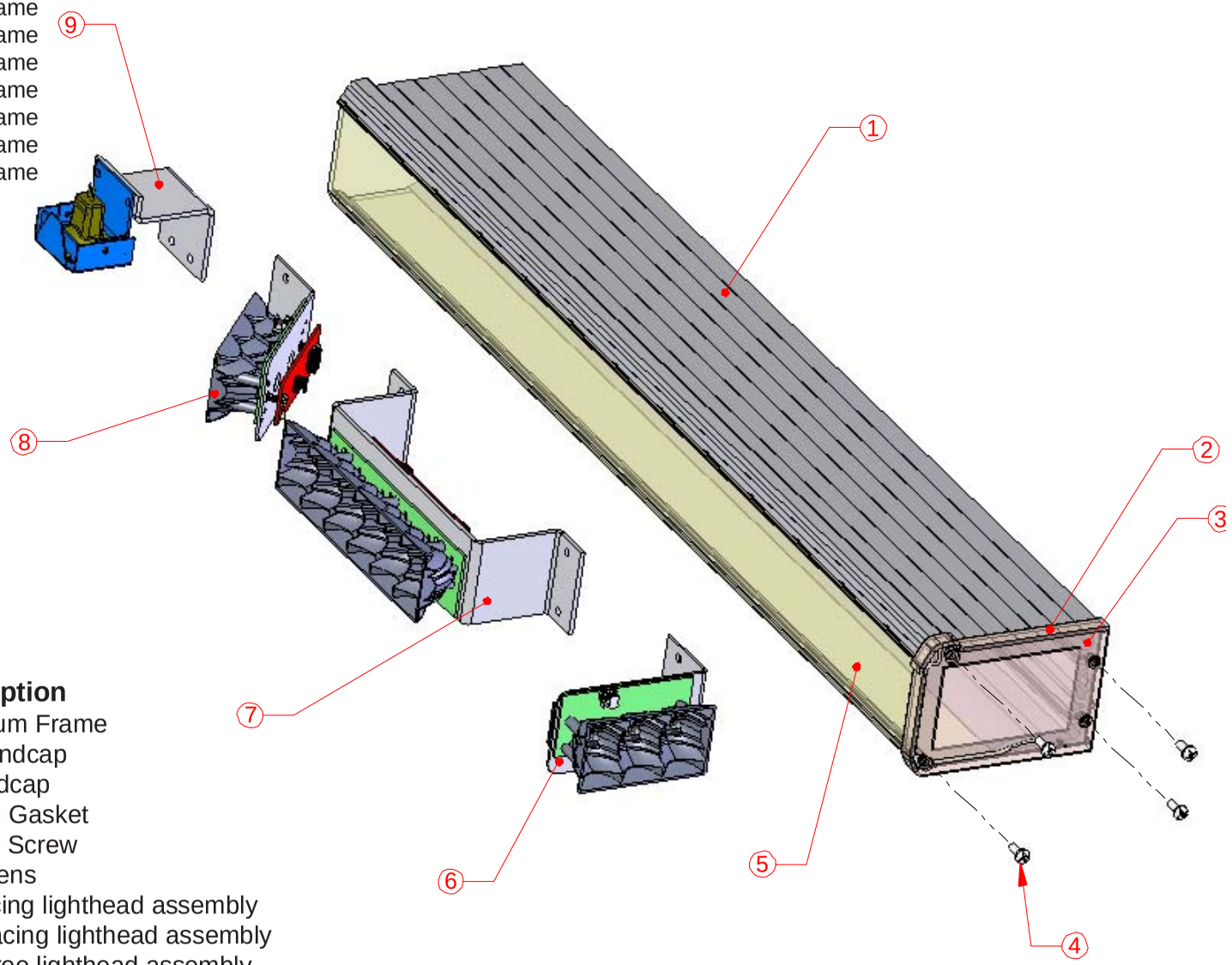
PROBLEM	QUESTIONS	POSSIBLE CAUSE	SOLUTION
LED directional module not operating when powered.	N/A	a. Bad power/ground connection.	a. Fix connection.
		b. Defective module.	b. Replace module.
Lamp or LED module does not come on when it should (based on controller function)	Are the controller panel LED indicators functioning properly?		
	Yes	a. Bad lamp or defective LED module	a. Replace lamp or LED module
		b. Defective wiring connection	b. Repair connection
	No	a. Control box is damaged	a. Return to Code 3

Table 2

T16311	13” Mounting Frame
T16312	23” Mounting Frame
T16313	36” Mounting Frame
T16314	49” Mounting Frame
T16315	62” Mounting Frame
T16316	75” Mounting Frame
T16317	88” Mounting Frame

Table 3

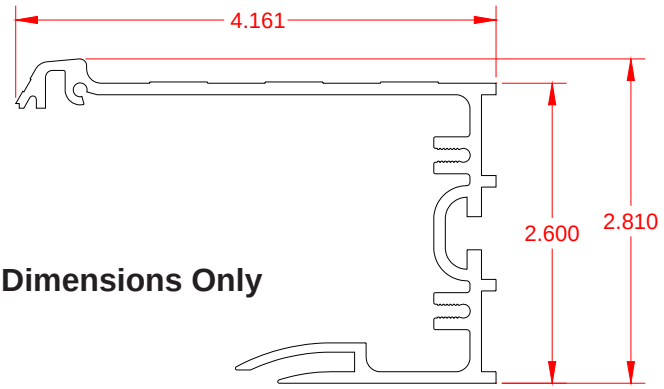
T16331	13” Front Lens
T16332	23” Front Lens
T16333	36” Front Lens
T16334	49” Front Lens
T16335	62” Front Lens
T16336	75” Front Lens
T16337	88” Front Lens



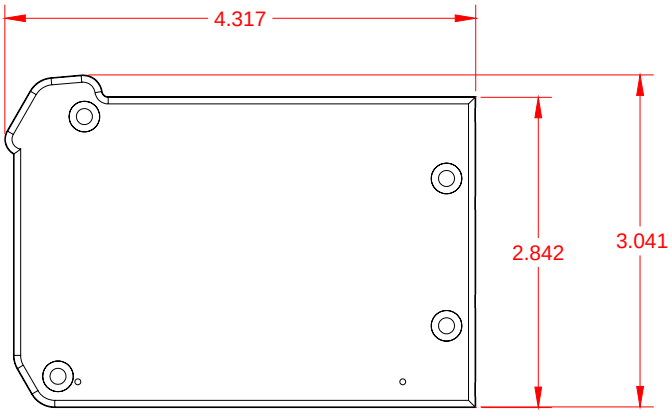
Ref.	Part No.	Description
1	See Table 2	Aluminum Frame
2	T08871	Right Endcap
	T08872	Left Endcap
3	T16322	Endcap Gasket
4	T15759	Endcap Screw
5	See Table 3	Front Lens
6	Call Factory	End facing lighthead assembly
7	Call Factory	Front facing lighthead assembly
8	Call Factory	45 degree lighthead assembly
9	S27166	35 Watt Load light assembly

FM 9000 OVERALL DIMENSIONS

DESCRIPTION	LENGTH	DEPTH	HEIGHT
FM9013	12.875	4.320	3.040
FM9023	22.875	4.320	3.040
FM9036	35.875	4.320	3.040
FM9049	48.875	4.320	3.040
FM9062	61.875	4.320	3.040
FM9075	74.875	4.320	3.040
FM9088	87.875	4.320	3.040



Frame Dimensions Only



Endcap Dimensions Only

NOTES:

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. guarantees all parts and components, except the halogen lamps, for a period of 1 year, LED lighthead modules to a period of 5 years (unless otherwise expressed) from the date of purchase or delivery, whichever is later. Units demonstrated to be defective within the warranty period will be repaired or replaced at the factory service center at no cost.

Use of a lamp or other electrical load of a wattage higher than installed or recommended by the factory, or use of inappropriate or inadequate wiring or circuit protection causes this warranty to become void. Failure or destruction of the product resulting from abuse or unusual use and/or accidents is not covered by this warranty. Use of non-Code 3 components and assemblies may cause damage to the system and/or personal injury, and voids all warranties on Code 3 systems and components.

Code 3 shall in no way be liable for other damages including consequential, indirect or special damages whether loss is due to negligence or breach of warranty.

CODE 3 MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY INCLUDING, WITHOUT LIMITATION, WARRANTIES OF FITNESS OR MERCHANTABILITY, WITH RESPECT TO THIS PRODUCT.

PRODUCT RETURNS

In order to provide you with faster service, if you are going to return a product 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. 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 reserves the right to repair or replace product at its discretion. Code 3 assumes no responsibility or liability for expenses incurred for the removal and/or reinstallation of products requiring service and/or repair.

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