

High Intensity Xenon Searchlight Operation Manual



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Peak Beam Systems, Inc. is a leader in the design and manufacture of high-powered Xenon searchlights for military, law enforcement and security applications since 1987.

Peak Beam's **Maxa Beam Searchlights** are deployed in more than sixty-five countries. Users include the U.S. Border Patrol, FBI, Secret Service, U.S. Marshals and all branches of the U.S. Military.

Based outside of Philadelphia, Peak Beam Systems is a woman-owned small business. Maxa Beam Searchlights are proudly manufactured in the U.S.A.

BEAM Searchlight Operation Manual

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**For additional product support, please contact Peak Beam's
Technical Support Department and we will be happy to assist you:
1-610-353-8505 / techsupport@peakbeam.com.**

Overview

Characteristics

Maxa Beam Searchlights are high intensity illuminators that use an 85-watt Xenon short arc lamp and a precision electroformed reflector to provide the ultimate solution for long-range portable and remote-controllable illumination. All searchlights feature:

- 12,000,000 Peak Beam CandlePower Output
- Motorized Beam Width Adjustment from 1° Spot to 40° Flood*
- Strobe Function with Variable Rate and Duty Cycle
- Three Beam Intensity Levels
- Field-Programmable Beam Settings (start-up beam width, strobe rate, etc.)
- Visible and Infrared Illumination Capability
- Flexible Mounting Options
- Remote Control of Intensity, Beam Size, and Strobe Function
- Color Temperature Similar to Daylight (5600°K)

**MBS-430-W4-(RS)M Rail-Mounted Searchlight models feature 1° spot to 25° flood.*

Handheld Searchlight Systems include rechargeable Lithium Iron Phosphate (LiFePO₄) batteries that offer up to 2.5 hours of continuous operation from a single battery. The searchlight and battery weigh just 6.5 lbs.

Remote-Controlled Searchlights feature an optional RS-232 interface that allows computer-control of all searchlight functions. Remote-controlled searchlights are frequently integrated into camera and sensor systems for surveillance and escalation of force applications.

The complete Maxa Beam Searchlight Product Line consists of four series:

- MBS-410 Handheld Searchlights with Remote Control Capability
- MBS-430-W4 Rail-Mounted Remote-Controlled Searchlights
- MBS-430-Y Quick-Mount Remote-Controlled Searchlights
- MBPKG-E Computer-Controlled Searchlights in Environmental Enclosures

Applications

Military, law enforcement, and private end-users around the world have relied on the Maxa Beam Searchlight for over thirty-five years for:

- Force Protection
- Escalation of Force / Ocular Disruption
- Perimeter Security
- Shipboard Protection / Maritime Security
- Search and Rescue
- Night Vision Equipment Enhancement
- Border Protection
- Crew-Served Weapon Illumination
- Tactical Operations
- Infrared / Covert Surveillance

Theory of Operation

The Maxa Beam Searchlight generates light by passing an arc of electricity between two electrodes in a quartz tube filled with Xenon gas. A plasma ball is formed and precisely positioned within an electroformed reflector.

When the ignition button is pressed, a high voltage RF igniter produces up to 20,000 volts to ionize the Xenon gas within the lamp, allowing DC current to flow through the lamp. Once the arc is established, gas temperature and pressure start to climb, forcing the Xenon into a plasma state. The light will come on with a constant high beam for 3 seconds to assure reliable ignition of a cold lamp and will then go to the programmed start-up beam mode. After the lamp has ignited, the user has full control of the electronic focus, power level, and strobe mode.

The searchlight's electronics are factory calibrated and require no adjustment, even after a lamp change. Internal power regulation keeps both the intensity and color of the beam constant, regardless of input voltage variations.

Safety Warnings



ANSI Risk Group 3. Warning.

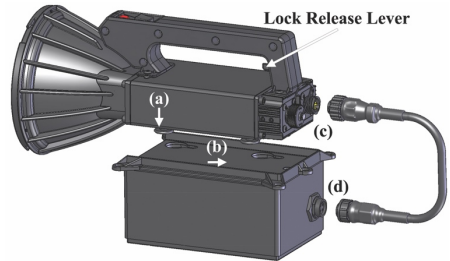
**Visible and infrared radiation emitted from this searchlight.
Permanent eye damage can result. Avoid direct exposure to the beam.**

- **Do not look directly into the searchlight beam.** Exposure of the eye to either the direct searchlight beam or a beam reflected from a flat mirror-like surface can cause permanent eye injury to the unprotected eye. Follow the same precaution even when an Infrared Filter is installed on the searchlight.
 - **Nominal Ocular Hazard Distance (NOHD), Visible Light:** 10 meters
 - **NOHD, Infrared Light:** 30 meters for exposures greater than 10 seconds
- **Do not operate searchlight if the front lens is damaged or removed.** Ultraviolet injury to skin and cornea can occur if the searchlight is operated with a damaged front lens or if the lens is removed.
- **Do not allow the concentrated beam of light to be focused on flammable materials at close distances for prolonged periods of time.**
- **Do not operate light in an explosive environment.**
- **Do not touch lamp connections during operation** as high voltage is present.
- **Do not touch the quartz envelope of the lamp.** If the lamp is accidentally touched, clean with alcohol and allow it to dry completely before operating the searchlight.
- **Always wear protective eyewear, long sleeves, and gloves if removing the front lens cover.** The lamp is under positive pressure and should be handled with care.
- **Always disconnect searchlight from power cord when not in use, when placed in storage or when being transported** to prevent accidental activation.

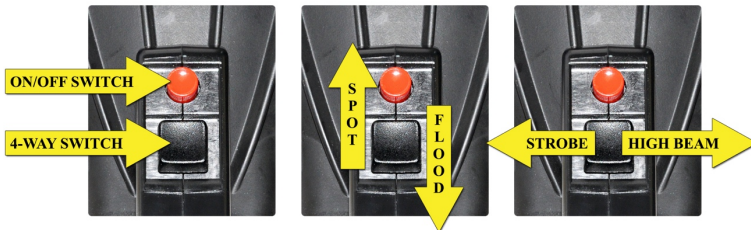
Searchlight Operation

1. Locate searchlight, battery and power cable.

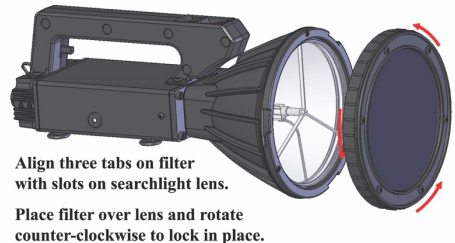
2. **Attach Searchlight to Battery** by lining up the four feet of the searchlight over holes in top of battery (a). Lower the searchlight into the holes, then slide the searchlight towards the connector end of the battery (b) until searchlight locks in place. To detach searchlight, lift the **Lock Release Lever** under the searchlight handle, then slide searchlight forward away from battery connector end.



3. Attach female end of power cable to 4-pin connector on searchlight (c). Attach male end of power cable to connector on battery (d). To lock, rotate only the locking ring clockwise. All connections are keyed; never force connections.
4. If desired, attach a battery shoulder strap to diagonally opposite tabs on battery.
5. **To Turn Searchlight On**, press red on/off switch. Searchlight starts on high power for 3 seconds, then transitions to normal power. To change the start-up beam mode, see the **Searchlight Programming** section of this manual.



6. **To Adjust Beam Width**, pull black 4-way switch back to increase beam width to flood. Push the 4-way switch forward to decrease beam width to spot. The default beam width on start-up is 9 degrees. To change the start-up beam width, see **Searchlight Programming**.
7. **To Activate Strobe**, rock and hold the 4-way switch to the left. The default setting is momentary strobe, which means that the searchlight will strobe when the 4-way switch is held to the left. To set continuous strobe, see **Searchlight Programming**.
8. **To Activate High Beam**, rock and hold the 4-way switch to the right. The default setting is momentary high beam, which means that the searchlight will stay on high beam when the 4-way switch is held to the right. To set continuous high beam mode, see **Searchlight Programming**.



9. **To Attach a Filter**, line up the three tabs on the filter with slots on the front of the searchlight. Place filter over front of searchlight and turn filter counter-clockwise until fully seated. Filter will lock in place.

Searchlight Programming

The Maxa Beam Searchlight's factory default settings can be modified by inputting a series of programming sequences. For example, the right and left 4-way switch functions can be programmed to be either momentary or continuous high or strobe. The searchlight can also be programmed to start on continuous high or in strobe at a custom beam width to tailor the searchlight to a specific application.

Note: The programming settings in this section apply only to searchlights with serial numbers ending "G3-34" or higher.

Programming Settings

	Factory Default	Programmable Options
Factory Settings		
Start-Up Beam Mode	Normal (after 3 sec. on High)	Normal, High, Strobe, or Low
Start-Up Beam Width	9°	1° to 40°
Strobe Rate (Frequency)	10 Hz	1 to 31 Hz
Strobe Duty Cycle (Duration)	38%	3 to 63%
4-Way Switch Functions		
Forward	Decrease Beam Width to Spot	-
Back	Increase Beam Width to Flood	-
Right	Momentary* High	Continuous** High
Left	Momentary* Strobe	Continuous** Strobe

****Momentary**: Selected beam mode will be maintained when 4-way switch is rocked and held in the indicated direction.*

*****Continuous**: Selected beam mode will be maintained after 4-way switch is rocked and released in the indicated direction.*

Explanation of Programming Symbols



With searchlight already turned on and 3+ second warm up completed, **hold down** the red on/off switch.



Rock black 4-way switch **one time** in the indicated direction, then release.



Release on/off switch. Searchlight will turn off and new setting is saved.

(A) Set the Start-Up Beam Mode to Normal, High, Strobe or Low



Enter start-up beam mode selector by holding down on/off switch, rocking LEFT, RIGHT. The current start-up beam mode will display. Continue to rock RIGHT to visually page through start-up mode options (in order: Normal, High, Strobe, Low, Normal, High, etc.). When desired start-up mode is displayed, release on/off switch.

Note: When start-up mode is set to normal or high, the searchlight warms up in high beam for 3 seconds before transitioning to programmed start-up beam mode. When start-up mode is set to strobe or low, the warmup time increases to 5 seconds.

When the start-up beam mode is modified, the default left and right 4-way switch functions also change:

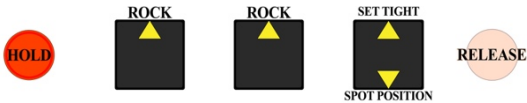
Start-Up Beam Mode	Left 4-Way Switch Function	Right 4-way Switch Function
High	Continuous Strobe/Normal	Continuous Normal/High
Strobe	Continuous Normal/Strobe	Continuous High/Normal
Normal	Momentary Strobe/Normal	Momentary High/Normal
Low	Momentary Strobe/Low	Momentary High/Low

(B) Set Start-Up Beam Width from 1° Spot to 40° Flood



Set searchlight to desired start-up beam width. Hold down on/off switch, rock FORWARD, and release on/off switch.

(C) Set the Smallest Spot from 1° to ~35°



Hold down on/off switch, rock FORWARD, FORWARD. Set searchlight to desired tightest spot position and release on/off switch.

Note: Spot and flood limits cannot be set closer than ~5° to one another.

If there is a delay between when 4-way switch is rocked and when lamp begins to move after setting spot or flood position, this indicates the spot or flood limit is set beyond the point at which the lamp is physically able to move. If this occurs, simply reset the spot or flood position at or within the physical limits of the lamp's travel.

(D) Set the Widest Flood from ~5° to 40°



Hold down on/off switch, rock BACK, BACK. Set searchlight to desired widest flood position and release on/off switch.

(E) Toggle Right Switch Function between Momentary and Continuous



Hold down on/off switch, rock RIGHT, and release the on/off switch.

Note: If start-up beam mode is set to high, the right switch function is locked to continuous and cannot be toggled to momentary.

(F) Toggle Left Switch Function between Momentary and Continuous

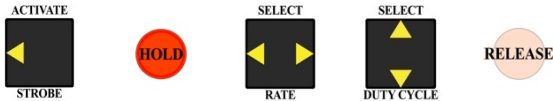


Hold down on/off switch, rock LEFT, and release the on/off switch.

Note: If start-up beam mode is set to strobe, the left switch function is locked to continuous and cannot be toggled to momentary.

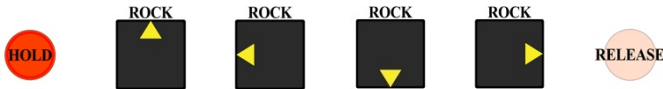
When the searchlight is actively in continuous strobe mode, all other programming sequences will not function with the exception of (G) Changing Strobe Rate or Duty Cycle. To perform all other programming sequences, first put searchlight in normal or high beam mode.

(G) Change the Strobe Rate or Duty Cycle



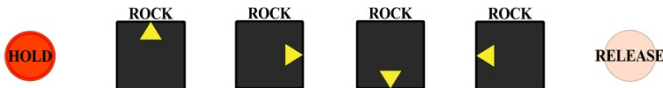
To follow this procedure the light must be in continuous strobe mode (see (F)). Activate continuous strobe by rocking LEFT and releasing. Hold down on/off switch. Rock and hold LEFT (decrease) or RIGHT (increase) to select desired strobe rate. Rock and hold FORWARD (increase) or BACK (decrease) to select desired duty cycle. Release on/off switch.

(H) Lock Out Programming Functions



Hold down on/off switch, rock FORWARD, LEFT, BACK, RIGHT. Release on/off switch. This will prevent modifications from being made to programming settings. To unlock, see (I), Restore Factory Settings.

(I) Restore Factory Settings



Hold down on/off switch. Rock FORWARD, RIGHT, BACK, LEFT. Searchlight will strobe to indicate proper sequence has been entered. Release on/off switch. This procedure restores all programmable functions to factory defaults. It is useful to set the searchlight back to a known state for troubleshooting purposes.

Rechargeable Battery Systems

Handheld Maxa Beam Searchlights are powered by rechargeable batteries that attach to the bottom of the searchlight. Maxa Beam Batteries are for use with Maxa Beam Searchlights only and should never be used with any other device.

This Operation Manual covers the use of Peak Beam's current Lithium Iron Phosphate (LiFePO₄) batteries. To view information regarding operation of older battery chemistries, visit <http://www.peakbeam.com/downloads/>.

MBP-1308 Series Lithium Iron Phosphate (LiFePO₄) Batteries

The MBP-1308 Series 7.5Ah LiFePO₄ Battery is the most powerful battery option for the Maxa Beam Searchlight, offering a longer run time, faster charge time, and more life cycles than previous Maxa Beam batteries.

MBP-1308 Series Batteries are available with an optional fuel gauge. For details on using the battery fuel gauge, see page 9.

MBP-1308 Series 7.5Ah Lithium Iron Phosphate Battery			
Run Time	75 minutes (<i>high</i>)	115 minutes (<i>default</i>)	150 minutes (<i>low</i>)
Charge Time	100 minutes (<i>MBP-3200 Series</i>)		110 minutes (<i>MBP-3205/3230</i>)
Life Cycles	2,500		
Capacity	7.5 Amp-hours / 96 Watt-hours		
Dimensions	5 x 7.25 x 3.5 inches		
Weight	3.0 lbs. (<i>MBP-1308</i>)		3.1 lbs. (<i>MBP-1308-FG</i>)
Compatible Chargers	MBP-3200 Series: Smart AC/DC LiFePO ₄ Charger MBP-3205: 100-240VAC Charger MBP-3230: 12VDC Charger		
Charging Adapters <i>(compatible with MBP-3200)</i>	MBP-5010: 100-240VAC 10A Supply MBP-5004: 100-240VAC 4A Supply MBP-5230: 12VDC Vehicle Adapter MBA-7110: 12VDC Searchlight Adapter MBA-7406: 28VDC NATO Slave Adapter		

The LiFePO₄ battery is compatible with all Maxa Beam Searchlights, however, the LiFePO₄ battery's connector differs from the connectors on older Maxa Beam batteries. Therefore, a LiFePO₄-specific power cord (signified with "L" suffix) must be used to connect this battery to a searchlight.

Battery Safety Warnings:



- Do not expose to fire or open flame.
- Do not puncture, deform, incinerate or heat above 85°C (185°F).
- Do not open or disassemble. Batteries are sealed in a waterproof case with no user-serviceable components. Do not attempt to use a battery that has a damaged case; please contact the factory about our re-casing service.
- Do not dispose in fire. Disposal must be conducted in accordance with applicable local, state, or national regulations. Batteries contain recyclable materials; recycling is encouraged over disposal.
- A Safety Data Sheet (SDS) for this battery is available upon request.

Battery Storage and Transport:

Always disconnect battery from the searchlight before storing or transporting. If storing battery for long periods of time, store battery at 75% charge level and recharge once every six months. Do not store batteries above 60°C (140°F) or below -20°C (-4°F). Store in a cool, dry location not subject to frequent temperature fluctuations. Elevated temperatures can result in reduced battery service life.

All Lithium ion batteries are classified as Class 9 Dangerous Goods for air, sea and surface transport and must be packaged and transported according to applicable regulations. However, small, “excepted” batteries such as the MBP-1308 LiFePO₄ Battery are not subject to certain provisions of the regulations (e.g. Class 9 labeling and UN specification packaging).

- Batteries shipped within the United States via ground transport methods must be packed, marked and labeled in accordance with the exceptions for small lithium batteries per 49 CFR 173.185(c).
- Batteries shipped via air transport methods without searchlights are classified as **UN3480 Lithium ion batteries** and must be packed, marked and labeled in accordance with Sec II or Sec IB of IATA/ICAO PI 965 – Cargo Aircraft Only.
- Batteries shipped via air transport methods with searchlights are classified as **UN3481 Lithium ion batteries packed with equipment** and must be packed, marked and labeled in accordance with Sec II of IATA/ICAO PI 966.

Fuel Gauge Operation:

MBP-1308-FG Batteries incorporate a five level LED fuel gauge which indicates the battery’s State of Charge (SoC) and State of Health (SoH).

- **To view the battery’s SoC**, press and release the white button at the top of the fuel gauge display. SoC will be displayed, steady, for 4 seconds. During recharge, the battery’s SoC will automatically flash while the battery is actively charging.
- **To view the battery’s SoH**, press and hold the white button until display begins to flash (~4 seconds). SoH percent displayed indicates the current capacity of the battery as a percentage of its rated capacity.

Battery Charging:

Warning: Never charge a COLD battery that is cooled below 32°F (0°C).
Allow battery to return to room temperature first before connecting it to charger.

Use only approved Peak Beam chargers. Improperly charging a battery may reduce service life and, in extreme cases, may cause the product to flame or leak.

Charging with MBP-3200 Series Smart AC/DC LiFePO₄ Chargers:

1. Locate the MBP-3200 Smart Charger and compatible charging adapter (*see adapters on page 8*). Connect adapter to appropriate input power source.
2. Plug the female end of the charging adapter into the charger’s input connector. Charger LED will turn steady **RED** when input power is connected.
3. Connect charger pigtail to battery. **Battery will automatically begin to charge.** Charger LED will turn **AMBER** during charge. LED will pulse **GREEN** at 99% of charge and turn steady **GREEN** when charge is complete. *Battery may be disconnected and used at any point during charge, but it is recommended that a full charge cycle be completed periodically to maintain optimum battery health.*

LED Status Indications for MBP-3200 Series Smart Charger	
Charger LED Behavior	Indication
Steady Red	Input power is connected
Steady Amber	Battery is charging normally
Pulsing Green	Battery is at 99% of charge
Steady Green	Charge is complete
Green / Amber Flash	Battery cells are being balanced
Flashing Amber	Low current charge mode for deeply discharged batteries
Red / Amber Flash	Charger and/or battery is too hot or too cold to charge
Flashing Red	Incorrect input voltage is connected to charger
Pulsing Red	Defective battery OR charger output is shorted
Erratic Charger Display	Bad/loose connection to battery OR defective charger

Charging with MBP-3205 or MBP-3230 Chargers:

1. **To charge battery from a 100-240VAC Power Source**, locate the MBP-3205 AC Charger. Connect charger’s power cord to a 100-240VAC power source. Connect charger to battery.
2. **To charge battery from a 12VDC Vehicle**, locate the MBP-3230 DC Charger. Connect charger’s 12V cigarette lighter plug to vehicle’s 12V receptacle. Connect charger to battery.
3. **Battery will automatically begin to charge.** Charger’s LED will turn **RED** during charging and will turn **GREEN** when charge is complete. The MBP-3205 AC Charger’s LED may pulse green during final charge stage.
4. **Do not leave battery connected to charger for longer than 24 hours.**

Searchlight Accessories

Optical Filters:

MBA-1500	Amber Smoke/Fog Filter
MBA-1715	Semi-Covert Infrared Filter (715nm sharp cut-on)
MBA-1850	Covert Infrared Filter (850nm sharp cut-on)
MBA-1900	Fully Covert Infrared Filter (920nm sharp cut-on)
MBA-3015	Collimating Lens

Power Options:

MBP-4000(-L/S)	100-240VAC Direct Drive Power Supply
MBA-7110	12VDC Vehicle Adapter for Searchlight, 10 Foot Straight Cord
MBA-8210(-L/-M)	10 Foot Power Cord (25 Ft. also available)

Remote Control Options:

MBA-8406	Wired Remote Handle with 6 Ft. Cord (25 Ft. also available)
MBA-8406-MP	Metal Remote Control Box with 6 Ft. Cord (25 Ft. also available)

Mounting Options:

MBA-3600	Flat Mounting Plate for Tripod
MBA-3605	Fixed Searchlight Mount
MBA-3661	Heavy-Duty Fluid Pan/Tilt Head

Computer-Controlled Searchlight Accessories:

MBA-8310-DB(-M)	10 Ft. DB9 Serial Cable (25 Ft. also available)
MBA-GUI	Maxa Beam Control Software

Other Accessories:

MBA-6100	Padded Filter Pouch
MBA-6200	Watertight Storage Case with Die-Cut Foam
MBA-6250-W	Wheeled Watertight Storage Case with Die-Cut Foam

Lamp and Lens Replacement:

Compatible with MBS-410, MBS-430-W4 and MBS-430-Y Series Searchlights:

MBA-2400	Lamp Replacement Kit
MBA-2400/20	Combination Lamp & Lens Replacement Kit
MBA-2400N	Combination Lamp, Lens, & Power Connector Kit
MBA-2420	Lens Replacement Kit

Compatible with MBPKG-E Series Searchlights:

MBA-2400-E	Lamp Replacement Kit for Watertight Enclosures
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Connector Kits:

MBA-2410	Searchlight Power Connector Replacement Kit, Plastic
MBA-2435(-M)	Mating Power Connector Kit, Plastic (Metal)
MBA-2445(-M)	Mating Control Connector Kit, Plastic (Metal)
MBA-2450-E	Mating Power/Control Connector for MPBKG-E Series
MBA-2450-E2	Mating Power & Control Connectors for MPBKG-E2 Series

For a complete listing of all Maxa Beam accessories, visit www.peakbeam.com.

Searchlight Maintenance

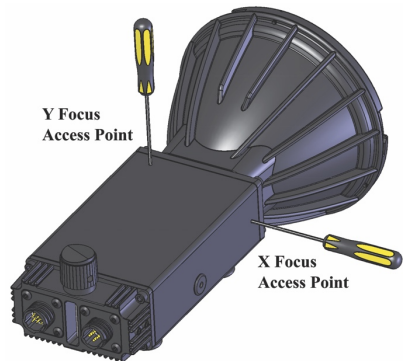
For best performance, clean the searchlight's front lens with window cleaner or rubbing alcohol. Periodically spray down the body of the searchlight with fresh water, especially in marine environments where the housing is exposed to salt.

Focusing the Lamp

If the searchlight is dropped or receives a heavy impact from transportation or shipping, it may be necessary to refocus the lamp to maximize output. Refocusing the lamp involves centering the lamp in the reflector.

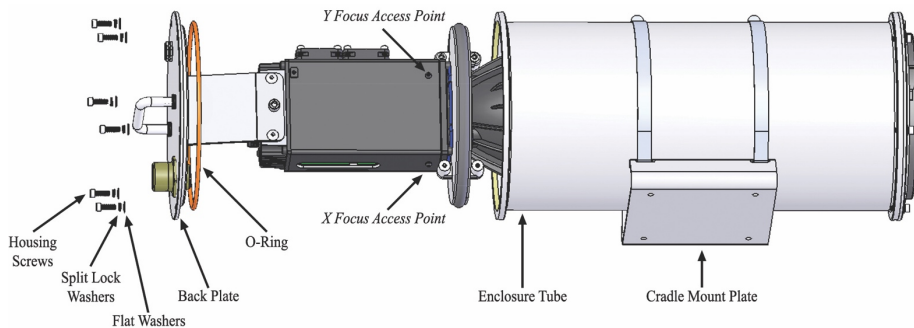
1. Use the 1/16" Hex Driver that is included with the Maxa Beam Searchlight to remove the two focus access screws and washers that cover the X and Y Focus Access Points.*
2. Turn the searchlight on and shine the beam onto a flat surface approximately 25 meters away.

(In general, ranges from 15 to 100 meters will suffice but at further distances it will become more difficult to see the precise adjustments taking place as the lamp is focused.)



3. Insert the hex driver into one of the focus access points. A slight rotation and/or side to side motion may be required until the hex driver becomes properly seated into the internal adjustment screw hole.
4. After the hex driver has been inserted into the adjustment screw, turn the driver slightly to rotate the screw. Notice how the hot spot of the beam moves on the target. Rotate the driver until the hot spot is centered in the beam on this axis.
5. Repeat steps 3 and 4 for the other internal adjustment screw in the other focus access point. Continue to switch between the X and Y focus access points until the hot spot is centered on both axes.
6. Adjust the searchlight's beam width out to flood and then back in to spot. If you notice that the light's focus has changed as you bring the beam back in to spot, adjust the focus of the light and then repeat the process of increasing the beam width to flood and decreasing it to spot until the focus remains consistent.
7. Replace the focus screws and washers when focusing is complete.

**The MBPKG-E Series Searchlight must first be removed from its enclosure in order to access the X and Y Focus Points. To do so, use a 9/64" Hex Driver to remove the housing screws and washers around the back plate of the searchlight. Grasp searchlight's handle and pull the searchlight straight out of enclosure tube. See diagram on page 13 or consult the Instruction Sheet included with that MBA-2400-E Lamp Replacement Kit for further details.*



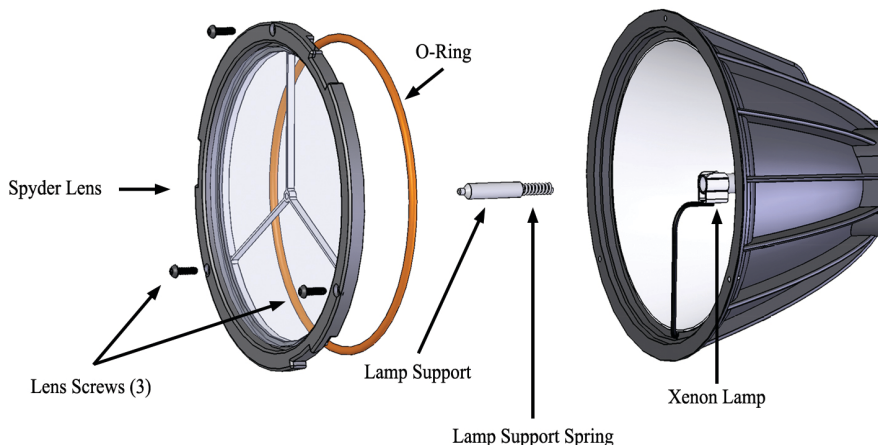
Lamp and Lens Replacement

All Maxa Beam Searchlights have a field-replaceable Xenon short arc lamp and lens. The replacement instructions listed below are included as a general reference. For complete, detailed instructions on how to replace a searchlight's lamp or lens, please see the Instruction Sheet that ships with each Replacement Kit.

Safety Precautions:

- ALWAYS wear included protective eyewear, a long-sleeved jacket, and gloves whenever the searchlight front lens is removed or the lamp is being handled.
- ALWAYS disconnect the searchlight from power when performing maintenance. Never perform maintenance on a searchlight connected to power.
- NEVER touch the quartz envelope of the lamp. If accidentally touched, clean the lamp with alcohol wipes and allow it to dry completely before installing.
- NEVER wipe the reflector surface as this may scratch the reflective surface.
- NEVER look directly into the searchlight when it is turned on. Due to the high intensity light that is emitted, serious eye injury may occur.

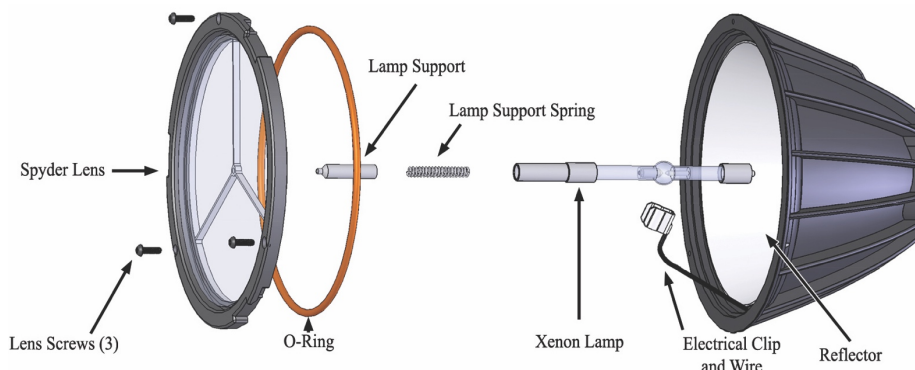
Lens Replacement Instructions:



1. Before beginning maintenance, put on protective eyewear, a long-sleeved jacket and gloves. Disconnect searchlight from power. If searchlight was recently turned on, allow the searchlight cavity to cool completely before proceeding.
2. Use the 1/16" Hex Driver that is included with the Maxa Beam Searchlight to remove the three screws holding the lens in place. Remove and discard the old front lens, O-ring, front lamp support, and spring.
3. If the reflector has visible dust on it, blow away all particles from inside of the reflector using a can of compressed air. Do not wipe or rub the reflector surface as this may scratch or abrade the reflective surface. If your reflector requires further cleaning, please contact the factory for instructions.
4. Insert the new Front Lamp Spring and Front Lamp Support into the open end of the lamp (see diagram). Locate the new O-ring and Spyder Lens Assembly. Place the O-ring over the step on the inside of the lens assembly.
5. Line up the three screw holes, then place and hold the lens and O-Ring on the front of the light. Ensure that the front lamp support seats into the center locator of the lens. Once the front lens, O-ring and lamp are positioned correctly, secure the assembly in place with three new Lens Screws. Do not over tighten screws. When properly installed, the O-ring should not be visible.
6. After replacing the front lens, the searchlight may need to be refocused. Follow the instructions on page 12 to Focus the Lamp.

Lamp Replacement Instructions:

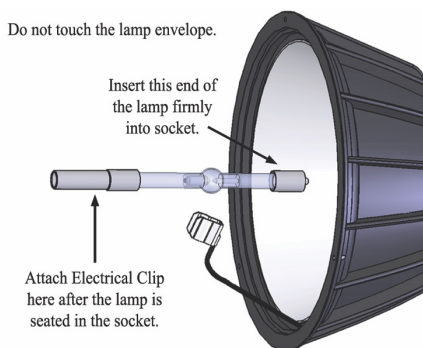
These instructions describe how to replace a lamp in an MBS-410, MBS-430-W4, or MBS-430-Y Series Searchlight. For information on how to replace a lamp in an MBPKG-E Series Searchlight or a Searchlight with upgraded metal lens, please see the Instruction Sheet that is included with the MBA-2400-E or MBA-2400-M Lamp Replacement Kits.



1. Before beginning maintenance, put on protective eyewear, a long-sleeved jacket and gloves. Disconnect searchlight from power. If searchlight was recently turned on, allow the searchlight cavity to cool completely before proceeding.
2. Use a 1/16" Hex Driver to remove the three screws holding the lens in place. Remove the front lens, O-ring, lamp support spring and front lamp support. Gently unclip the electrical wire from the front of the lamp and bend the wire aside. Set the lens, lamp support spring and front lamp support aside. Discard the O-ring.

3. To remove an intact lamp from the socket, grasp the metal end of the lamp and pull straight out. A slight side-to-side rocking motion may be necessary to gently unseat the lamp. To remove a lamp that is broken inside of the front cavity, tip the searchlight over a trashcan and gently shake to dislodge loose glass and metal fragments. Use needle-nose pliers to carefully remove the broken lamp from the socket and discard.
4. If the reflector has visible dust on it, blow away all particles from inside of the reflector using a can of compressed air. Do not wipe or rub the reflector surface with anything as this may scratch or abrade the reflective surface. If your reflector requires further cleaning, please contact the factory for instructions.

5. Remove the new Xenon lamp from the protective tube, taking care not to touch the quartz envelope of the lamp. Grasp the lamp by the metal tube and insert the short end of the lamp into the searchlight socket as shown in the diagram at right. Push the lamp firmly and squarely into its socket. Ensure that the lamp is pressed completely into the socket. Incorrect seating may cause the searchlight's motorized beam width adjustment to operate improperly.



6. Connect the electrical clip to the new lamp as shown in the diagram above.
7. Select the appropriate lamp support and spring depending on the type of Lens installed on your searchlight:

If your Searchlight has a *Spyder Lens* (the type of lens pictured on page 14), select the new Lamp Support Spring and Front Lamp Support that are included in the lamp replacement kit.

If your searchlight has an old-style Standard Lens (discontinued in 2013) and you plan to reinstall and continue using the old lens after lamp replacement, reuse the old Lamp Support Spring and Front Lamp Support..

8. Insert the appropriate Lamp Support Spring and Front Lamp Support into the hollow metal tube on the front of the lamp as shown in the diagram on page 14.
9. Locate the new O-ring and front lens. Place the O-ring over the step on the inside of the lens assembly.
10. Line up the three screw holes, then place and hold the front lens and O-Ring on the front of the light. Ensure that the front lamp support seats into the center locator of the lens. Secure the assembly in place with the three new Lens Screws in the kit. Do not over tighten screws. When properly installed, the O-ring should not be visible.
11. After lamp replacement, follow the instructions on page 12 to Focus the Lamp.

Technical Details

Remote Control Operation

Wired Remote Control:

All Maxa Beam Searchlights can be remotely controlled via a control connector on the searchlight housing. This remote control capability allows the operator to control the functions of the searchlight using a wired remote controller or to hard wire the searchlight directly into an auxiliary control panel. Wired controllers are available in standard 6 or 25 foot lengths; custom lengths are available upon request.

All contact closures (switches) used for remote operation must be momentary, normally open. During operation, the microprocessor constantly scans the status of all input lines from the remote control input connector. When the closure of one of the remote switches is detected, the microprocessor executes the appropriate command. Input lines for On/Off, High/Low, Focus Narrow/Wide and Strobe/Low are active high. These lines have internal pull down resistors.

Line 1 (“12VDC” pin) is an output line that provides power for the on/off and other remote functions. Caution: Power is applied to line 1 any time there is power supplied to the light, even when the light is off. This line is tied directly to the power input connector. When wiring the on/off switch and remote control switches, line 1 must be tied to one side of all switches in parallel. The “Ground” pin is chassis ground and should be wired to the cable shield for long cable runs. The “On/Off” pin is also scanned during operation. When the on/off switch is closed again after the light has been turned on, the microprocessor disables all normal operational modes and is then in the programming mode (see page 5). If one of the other remote switches is closed while the on/off switch is closed, one of the user functions will be reprogrammed.

Computer Control via RS-232 Interface:

Several Maxa Beam Searchlight models are available with an internal RS-232 computer interface. With this capability, the searchlight can be remotely controlled via computer either as a stand-alone illuminator or as part of an integrated computer-controlled surveillance or security system on a pan and tilt device.

An Interface Control Document (ICD) with ASCII command set and connector pin-outs is included with all RS-232-enabled searchlights and is available upon request. RS-232 Searchlights can be controlled using a terminal emulator such as HyperTerminal or Peak Beam’s Graphical User Interface (GUI).

The following searchlight models include an internal RS-232 interface:

- MBS-430 Series Searchlights with “RS” in model number
- All MBPKG-E Series Searchlights

Control Connector Pin-Outs

Standard 8-Pin Plastic Connector

MBS-410, MBS-430-Y, MBS-430-W4-P

Pin	Color	Function
1	Red	12VDC Out
2	Blue	Ground
3	Orange	On/Off
4	Brown	High/Normal Beam
5	Black	Focus Narrow
6	Yellow	Focus Wide
7	Green	Strobe/Low Beam Mode
8	-	blank - not normally used

RS-232 9-Pin Plastic Connector

MBS-430-RSY, MBS-430-W4-RSP

Pin	Color	Function
1	Red*	12VDC Out
2	Grey†	RS-232 Signal Ground (DB9 Pin-5 + Drain Wire)
3	Orange*	On/Off
4	Brown*	High/Normal Beam
5	Black*	Focus Narrow
6	Yellow*	Focus Wide
7	Green*	Strobe/Low Beam Mode
8	White†	RS-232 Receive Data (from searchlight to controller) (DB9 Pin-2)
9	Purple†	RS-232 Transmit Data (from controller to searchlight) (DB9 Pin-3)

10-Pin Metal Connector

MBS-430-(RS)M(Y/M), MBS-430-W4-(RS)(P)(M), MBPKG-E2 Series

Pin	Color	Function
A	Red*	12VDC Out
B	Black*	Focus Narrow
C	Green*	Strobe/Low Beam Mode
D	Orange*	On/Off
E	Grey†	RS-232 Signal Ground (DB9 Pin-5 + Drain Wire)
F	Blue*	Ground (not connected on MBPKG-E2 Series)
G	Brown*	High/Normal Beam
H	Yellow*	Focus Wide
J	White†	RS-232 Receive Data (from searchlight to controller) (DB9 Pin-2)
K	Purple†	RS-232 Transmit Data (from controller to searchlight) (DB9 Pin-3)

12-Pin Metal Power and Remote Connector

MBPKG-E Series

Pin	Color	Function
A	Green**	Strobe/Low Beam Mode
B	Black**	Focus Narrow
C	Black	Negative Supply Voltage
D	Orange**	On/Off
E	Grey†	RS-232 Signal Ground (DB9 Pin-5 + Drain Wire)
F	Brown**	High/Normal Beam
G	Red	Positive Supply Voltage
H	Yellow**	Focus Wide
J	White†	RS-232 Receive Data (from searchlight to controller) (DB9 Pin-2)
K	Purple†	RS-232 Transmit Data (from controller to searchlight) (DB9 Pin-3)
L	Red	Positive Supply Voltage
M	Black	Negative Supply Voltage

***Used for Hand Controller only; **not connected on model MBPKG-E-48

†Used for Serial Communication Only; only connected on RS-232 enabled searchlights

Input Power Requirements

Please contact Peak Beam Systems, Inc. for assistance sourcing an appropriate AC power supply for your searchlight: 1-610-353-8505 / techsupport@peakbeam.com.

10.0-13.5VDC Input Models

MBS-410 Series, MBS-430-W4/-Y Series, MBPKG-E, MBPKG-E2

Parameter	Value	Unit	Notes
Operating Voltage	10.0-13.5	Volts	Over Voltage/Reverse Polarity Protected to $\pm 36V$
Lamp Off, Standard Lights	<1	μAmp	25°C, 12VDC Input
Lamp Off, RS-232 Lights	0.077 ± 0.01	Amps	25°C, 12VDC Input
Low Beam Mode	3.35 ± 0.07	Amps	25°C, 12VDC Input
Normal Beam Mode	4.29 ± 0.08	Amps	25°C, 12VDC Input
High Beam Mode	8.29 ± 0.09	Amps	25°C, 12VDC Input
Peak Current at Lamp Start	20.5 ± 3.2	Amps	25°C, 12VDC Input
Peak Current Pulse Duration	8.1 ± 1.6	mS	Time spent above high beam mode current draw.

18-36VDC Input Models

MBPKG-E-24, MBPKG-E2-24

Parameter	Value	Unit	Notes
Operating Voltage	18.0-36.0	Volts	Reverse Polarity Protected to -50V
Lamp Off	0.320 ± 0.015	Amps	25°C, 24VDC Input
Low Beam Mode	2.04 ± 0.04	Amps	25°C, 24VDC Input
Normal Beam Mode	2.52 ± 0.04	Amps	25°C, 24VDC Input
High Beam Mode	4.75 ± 0.04	Amps	25°C, 24VDC Input
Peak Current at Lamp Start	12.6 ± 1.1	Amps	25°C, 24VDC Input
Peak Current Pulse Duration	8.3 ± 1.1	mS	Time spent above high beam mode current draw.

37-75VDC Input Models

MBPKG-E2-24, MBPKG-E-48

Parameter	Value	Unit	Notes
Operating Voltage	37.0-75.0	Volts	Reverse Polarity Protected to -60V
Lamp Off	0.179 ± 0.007	Amps	25°C, 48VDC Input
Low Beam Mode	1.04 ± 0.02	Amps	25°C, 48VDC Input
Normal Beam Mode	1.28 ± 0.02	Amps	25°C, 48VDC Input
High Beam Mode	2.38 ± 0.03	Amps	25°C, 48VDC Input
Peak Current at Lamp Start	4.6 ± 0.4	Amps	25°C, 48VDC Input
Peak Current Pulse Duration	7.8 ± 0.7	mS	Time spent above high beam mode current draw.

Power Connector Pin-Out

Pin <i>(Plastic Connector)</i>	Pin <i>(Metal Connector)</i>	Color	Function
1	A	Red	Positive Supply Voltage
2	B	Red	Positive Supply Voltage
3	C	Black	Negative Supply Voltage
4	D	Black	Negative Supply Voltage

Troubleshooting

Symptom	Probable Cause	Remedy
Searchlights, All		
Searchlight ignites but then flashes repeatedly or turns off after 1-2 seconds <i>(also described as "searchlight stuck in strobe mode")</i>	Low/dead battery OR Insufficient Input Voltage	Charge battery OR check power source
	If battery/power source are OK, bad lamp	Replace lamp
	For Gen. 2* Searchlights only, failed ignition circuit	Contact Peak Beam
Searchlight ignites but turns off when switched to high beam	Low battery OR low input voltage	Charge battery OR check power source
Nothing happens when power button is pressed	No power	Check power source and cable
Searchlight turns on but motorized focus will not work	Spot/flood limits not set correctly	Adjust spot/flood limits (p. 7) or restore factory settings (p. 8)
	If restore settings does not resolve issue, defective servo or switch/controller	Contact Peak Beam
Searchlight turns on but high/strobe and focus will not work	Defective switch/controller	Contact Peak Beam
Searchlight beam will not focus to the full flood position	Flood limit not set correctly OR lamp is not fully seated in socket	Reprogram flood limit (p. 7) OR reseal lamp (p. 14-15)
Searchlight turns on but will not change power level	Supply voltage is too high	Ensure supply voltage is within correct range (p. 18)
Searchlights, RS-232 Computer-Controlled		
Error during GUI Software Installation	Permissions not properly granted to installer file	Follow instructions in "ReadMe Before Install" document included on software CD
"Device Not Found" error upon software launch	Searchlight not connected OR COM Port not assigned	Check Searchlight connection and power OR consult "ReadMe Before Install" for instructions on how to configure COM Port
MBP-1308 Lithium Iron Phosphate (LiFePO₄) Battery Systems**		
Battery will not run Searchlight	Battery discharged OR short circuited	Connect battery to charger
Fuel Gauge does not respond when pressed	Battery is over-discharged	Connect battery to charger
All Fuel Gauge LEDs flash continuously during charge	Battery is too hot or cold to be safely charged	Allow battery temperature to stabilize before charging
Fuel Gauge LEDs scroll up and down 3X when pressed	Internal communication error	Contact Peak Beam for assistance; battery may still operate normally
Power cord will not connect to battery	Older style cable is being used	LiFePO ₄ -specific cable must be used; older cables are not compatible
Charger's LED does not light <i>(all charger models)</i>	No power OR defective charger	Check power source OR Contact Peak Beam
MBP-3200 Series Smart AC/DC LiFePO₄ Chargers		
Please see complete list of Charger LED Status Indications on page 10.		
MBA-7100(-L), MBA-7110(-L), and MBA-7210(-L) Vehicle Power Adapters		
Light will not turn on when powered from adapter	No power OR blown fuse in adapter	Check power source OR replace adapter's 15A fuse

*Gen. 2 searchlights were manufactured prior to 2005; indicated by "G2" in searchlight's serial number.

**This section covers troubleshooting for Peak Beam's current LiFePO₄ Battery systems. To view information regarding older battery chemistries, visit <http://www.peakbeam.com/downloads/>.

Warranty and Repairs

Warranty

Peak Beam Systems, Inc. warrants that for a period of 12 months from the date of purchase that its products (except as listed below) shall be free of defects in materials and workmanship under normal use and that Peak Beam Systems, Inc. shall, at its option, repair or replace any defective product upon the prepaid return of the product to its factory. In the case of any lamp, light bulb or other form of light source and the battery, the warranty period shall be 90 days.

The warranty only applies to defects in materials and workmanship and not to damage incurred in shipping or handling, damage due to abuse, misuse, alteration or improper application of the equipment. Damage incurred in return shipping and handling due to improper packaging is not covered.

In order to be eligible for coverage under the warranty, the equipment must have the original Peak Beam Systems, Inc. label with a legible serial number attached. Removal of any portion of the factory-affixed labels on any product will result in the voiding of any written or implied warranty.

The foregoing warranty is in lieu of any and all other warranties whether expressed or implied. This warranty contains the entire warranty. Peak Beam Systems, Inc. authorizes no other person or organization to modify this warranty or to assume for it any other warranty or liability concerning its products. The remedies of the buyer set forth hereon are exclusive and the liability of Peak Beam Systems, Inc. whether arising out of contract, negligence, strict tort, any warranty or otherwise shall not, except as expressly provided, exceed the price of the goods upon which such liability is based.

In no event shall Peak Beam Systems, Inc. be liable for direct, indirect or consequential damages, loss of anticipated profits, loss of time or any other losses incurred by the buyer in connection with the purchase, installation, operation or failure of operation of the product.

Returns to the Factory

All factory returns must have a Return Material Authorization (RMA) number. Peak Beam Systems is not responsible for items returned without an authorization number. All warranty returns without an RMA number will be returned at the customer's expense. RMA numbers can be obtained by calling 1-610-353-8505 or e-mailing techsupport@peakbeam.com. Please provide the following information:

- Serial number(s) of unit(s) to be returned
- For service returns, a description of the problem
- Date and location of purchase (if known)
- Method of payment for non-warranty service

Products returned by the customer to Peak Beam Systems must be sent freight prepaid.

Out-of-warranty repairs must be prepaid unless other arrangements have been made. Non-U.S. warranty repairs and out-of-warranty repairs will be returned to the customer by the customer's choice of freight carrier with the freight charges paid by the customer.

Domestic warranty repairs will be returned freight prepaid by Peak Beam Systems, Inc.'s choice of freight carrier with the freight charges paid by Peak Beam Systems. The customer will pay any additional freight costs for special handling or expedited freight.

Returns of non-defective goods will only be accepted from the original buyer within 90 days of sale and must be in "like new" condition. These returns are subject to a minimum restocking charge of 20% plus freight out and must be returned freight prepaid. Custom equipment is not returnable.

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