FMA®

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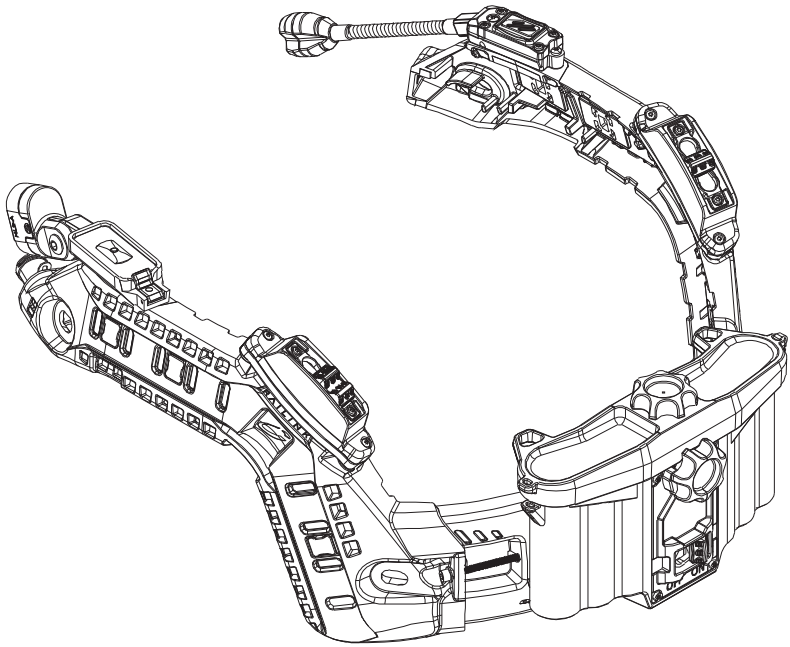


LINK-RAIL

OPERATOR'S MANUAL

中文版说明书

01-12页

ENGLISH VERSION MANUAL

PAGES 13-24

FMA® | 装箱单

尊敬的FMA用户：
Dear FMA users:

感谢您在众多带电导轨中选择FMA系列产品，现将您所购买产品的相关配件及资料条例如下，请注意清点验收!

Thank you for choosing the FMA series of electrified rails from among many options. The relevant accessories and specifications for your purchased product are listed below. Please check and accept the contents.

名称 (Name)	数量 (quantity)	备注 (Remark)
LINK-RAIL 导轨 (LINK-RAIL Rail)	1	
LINK-RAIL 电池盒 (Battery Pack)	1	
照明灯 (Flashlight)	1	
软管灯 (Flexlight)	1	
频闪灯 (Strobes)	2	
LINK-RAIL连接线 (Connecting cable)	1	
说明书 (OPERATOR'S MANUAL)	1	

注意：

1.安装电池盒时请务必托住电池盒体，将安装点与热靴推到位并确认卡紧否则会导致不通电。

1. When installing the battery box, be sure to support the battery box body, push the mounting point into place with the hot shoe and make sure it is firmly locked, otherwise it will result in no power.

2.LINK-RAIL 导轨仅适配专用连接线，无法与其他线兼容。

2. LINK-RAIL rails are only compatible with dedicated cables and are not compatible with other cables.

FMA® | 产品介绍

LINK-RAIL 是一种集成式供电解决方案，旨在作为快速扩展、可持续升级的头戴式生态系统的结构与功能核心。通过将供电整合至统一的滑轨接口中，LINK-RAIL 为现代头戴平台带来了更高层级的系统集成能力与模块化扩展性。

借助LINK-RAIL，用户可直接通过滑轨为兼容配件供电，无需额外电池、外接线缆或复杂的布线管理。这种高度简化的系统架构有效降低了整体重量，提高了系统可靠性，并使用户能够根据不同任务或应用需求更高效地配置装备。

LINK-RAIL平台在研发过程中经历了大量设计迭代、验证与测试，充分吸收了来自经验丰富的终端用户及行业专业人士在多种实际应用与训练环境中的反馈。在设计重点上，LINK-RAIL着重关注了结构耐久性、接口稳定性、操作便捷性以及对未来配件的长期兼容能力。

作为一个开放且可扩展的平台，LINK-RAIL支持不断扩展的新一代配件生态，使头戴系统无需进行根本性硬件改动即可持续提升功能。LINK-RAIL是一款面向未来的解决方案，旨在为专业用户提供更高的性能、更强的适应性以及更完善的系统整合能力。

关于 LINK-RAIL

LINK-RAIL系统将安装、供电整合于可扩展的头戴式平台。该系统通过集中式电池组，无缝集成兼容的、无电池配件，无需进行线缆管理。

LINK-RAIL 导轨

LINK-RAIL 电池盒

照明灯

软管灯

频闪灯

4针LEMO / ANIVS
母头接口（专有规格）

❶ 移除现有导轨和后魔术贴

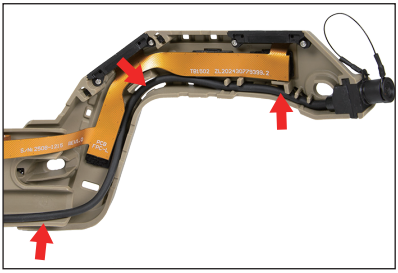
使用一把宽刃扁头螺丝刀，旋下并移除所有四颗螺钉和T型螺母，以拆卸现有的ARC轨道及垫片(如有)。此举还将松开下巴带固定扣和后部贴合带标签。请从头盔外壳上取下后部外层魔术贴(建议如此操作)。

请确保内部组件的正确布线

在将LINK-RAIL组件安装到头盔上之前，请轻轻地将扁平线缆压成"S"形。请勿在排线上形成尖锐折痕。此外，还需确保圆形线缆被妥善引导至轨道内部的内侧通道中。

扁平线缆

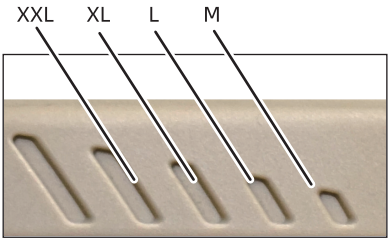
圆形线缆



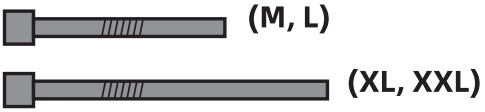
❷ 调整LINK-RAIL尺寸

请使用3/32英寸球头六角扳手，通过调节尺寸调整螺钉，将LINK-RAIL组件的宽度略微扩大至略大于您头盔尺寸的程度，并以刻度标记作为参考。(对于XL和XXL头盔尺寸，请使用随附的较长尺寸调整螺钉)。同一头盔尺寸的宽度调节可能因FAST头盔型号的不同而有所差异。在将LINK-RAIL组件装配到头盔上时，可能需要进行进一步的调整。

定位刻度标记:

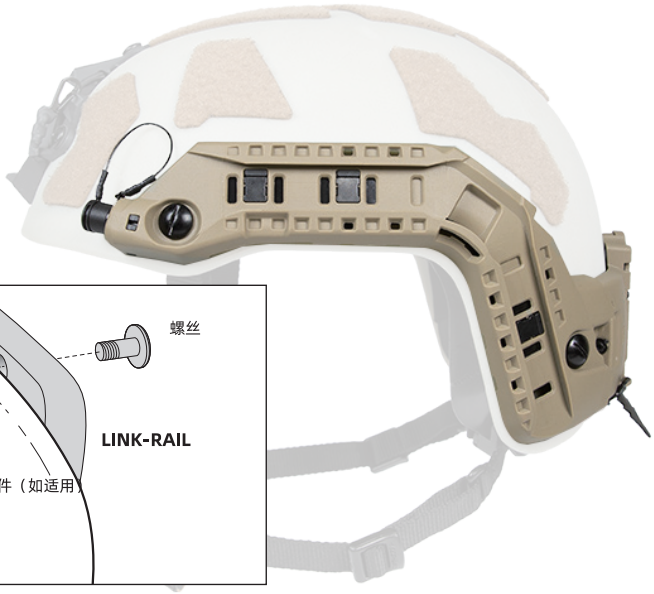


(尺寸仅供参考，仅作参考)

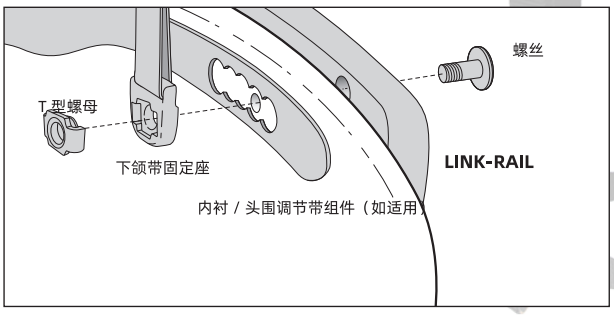


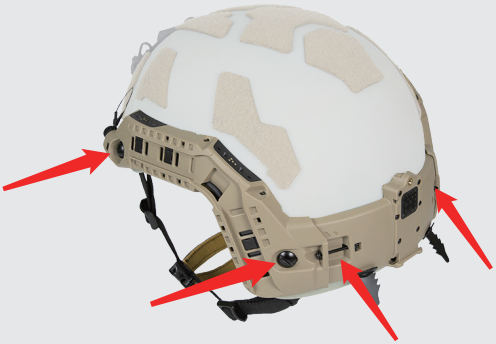
❸ 将LINK-RAIL安装至头盔上

将LINK-RAIL与头盔外表面上的现有系带孔对齐，然后按拆卸前的原状，**松散组装**螺钉、系带锚点、T型螺母以及任何衬垫/紧带组件（若适用）。确保螺钉能够穿过系带上的开口，以适配相应尺寸的头盔。同时确保柔性带状线缆和圆形线缆不会受到LINK-RAIL组件任何部分的挤压。



注意:视情况可能需要选用
不同长度的螺钉



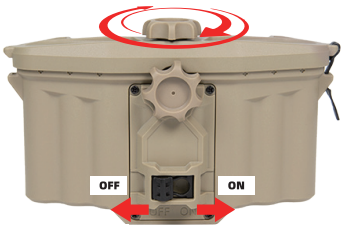


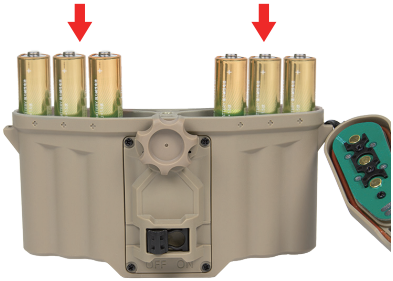
拧紧前部和后部的螺钉，然后交替拧紧LINK-RAIL尺寸调整螺钉，确保热靴始终保持在头盔的正中央位置(请参照定位刻度标记)。

❹ 安装电池(适用于5号AA电池组)

松开顶部螺钉并向上提起电池盒顶部盖板，即可卸下盖板。采用6节5号AA电池供电，电盒设计多种电池组提供电力，应急可使用2节或4节电池，确保所有电池正极(+)端子朝上。将顶盖**松散安装**回电池盒上。

注意:完全拧紧顶部盖板将导致电池盒无法正确与热靴连接。其他电池盒可能具有不同的电池安装要求。请参考适用于当前所用电池的特定说明以完成此步骤。

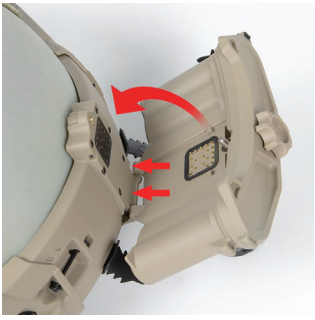




❺ 将电池盒连接到LINK-RAIL热靴接口

将下部的电池组安装点与热靴相连接，将电池盒倾斜就位，然后旋紧后部螺钉，将电池盒固定在热靴上。最后旋紧顶部盖板的螺钉，使二级固持机构锁定。

注意:未按此顺序操作可能导致密封不良、电池盒/热靴无法运行或损坏。



❻ 将附件连接至LINK-RAIL

要将外部电源线连接到LINK-RAIL 接口上，请取下LINK-RAIL 接口的保护盖。使用适用于您相应的外部电源线，旋转4针LEMO接口，使线缆标记点与LINK-RAIL 接口上的标记点对齐。推动插头使其触点就位并锁定接口位置。

注意:推入接口时，用力过度可能会导致LINK-RAIL 接口/外部电源线受损。请确保接口方向正确，以防止LINK-RAIL 接口/外部电源线永久损坏。

要将前部/后部配件连接到前部/后部配件节点，请使用定位锥对齐配件与LINK-RAIL对应的节点，然后拧紧。

软管灯定位锥

照明灯定位锥

频闪灯定位锥

FMA® | 导轨照明灯安装流程

用手指将固定螺丝
顶出表面

用工具将螺丝锁定

撬开电池盖

安装时需对准螺丝
位置

用工具将螺丝锁定

把电池盒合上

最后关闭锁定开关
并用螺丝拧紧

安装效果如图所示

设备	参数
	工作温度:-20℃~40℃ 电池盒接口输入电压:3.3V 设备接口输出电压:3.3V 防护等级:IPX7 支持NVG设备: 需另接外部电源线 重量:215g（不含设备） 适配尺寸:M/L/XL/XXL FAST头盔系统 可选颜色:黑色、沙色 材料:尼龙

导轨内部采用柔性FPC软排线，全履铜屏蔽保护电路。电盒通过触点接口与导轨连接，导轨系统电路通过排线传送到导轨上各设备接口，为设备提供电力通讯。

	工作温度:-20℃~40℃ 电压:3.3V LED闪烁:低亮3mA、高亮30mA IR 闪烁:低亮3mA、高亮30mA 防护等级:IPX7 重量:12g(单个) 可选颜色:透明黑 材料:ABS

1、功率模式 滑动开关: 0-1-2(关机-低亮-高亮)。	2、照明模式 滑动开关:IR-VIS（红外闪烁- 白光闪烁）。

	工作温度:-20℃~40℃ 电压:3.3V LED电流:低亮60mA、高亮300mA LED照明:低亮10LM、高亮60LM IR功率:低亮10mW 、高亮40mW IR电流:低亮60mA、高亮300mA 防护等级:IPX7 重量:29.5g 可选颜色:黑色、沙色 材料:外壳尼龙+灯头AL6061

IR模式 1.(<3秒）短按低亮~高亮~关机。 2.(≧3秒）任何状态短按关机。 3.任何状态长按切换LED低亮。	LED照明模式 A 长按低亮~(<3秒)短按高亮~短按关机。 B 高亮~长按低亮~(<3秒)短按高亮。 C（≥3秒）任何状态短按关机。

设备	参数
	工作温度:-20℃~40℃ 电压:3.3V 红光电流:低亮10mA、高亮50mA 红光照明: :低亮1LM、高亮3.5LM IR电流;低亮10mA、高亮50mA IR功率:低亮5mW、高亮20mW 防护等级:IPX7 重量: 18g 可选颜色:黑色、沙色 材料:尼龙
IR模式 1、(<3秒）短按低亮~高亮~关机。 2、(≥3秒）任何状态短按关机。 3、任何状态长按切换红灯低亮。	红光模式 A 长按低亮~(<3秒)短按高亮~短按关机。 B 高亮~长按低亮~(<3秒)短按高亮。 C（≥3秒）任何状态短按关机。
	工作温度:-20℃~40℃ 输出电压:3.3V 功率:9W 电池:1.5V AA/ 6节 全高功率续航：8h 重量:165g(不含电池) 防护等级:IPX7 可选颜色:黑色、沙色 材料:尼龙
推动开关: OFF关-ON开 *更换电池，需重新开机。	
接口：4针FISCHER公头 适配：夜视仪支架电力连接 颜色：黑色 	接口：4针LEMO/ANIVS公头 适配：夜视仪支架电力连接 颜色：黑色 
4针FISCHER**公头**，夜视仪等外部设备电力使用。	4针LEMO/ANIVS**公头**，夜视仪等外部设备电力使用。

LINK-RAIL is an integrated power solution that forms the backbone of a rapidly developing, scalable headborne ecosystem. By integrating power distribution into a unified rail interface, LINK-RAIL delivers a higher level of system integration and modularity for modern headborne platforms.

With LINK-RAIL, users can seamlessly connect and power compatible accessories directly through the rail system, eliminating the need for additional batteries, external wiring, or complicated cable management. This streamlined architecture reduces overall system weight, improves reliability, and allows users to configure their equipment more efficiently based on mission or application requirements.

The LINK-RAIL platform was developed through extensive design iteration, validation, and testing, incorporating feedback from experienced end users and industry professionals across a wide range of operational and training environments. Emphasis was placed on durability, interface stability, ease of use, and long-term compatibility with future accessories.

As an open and scalable platform, LINK-RAIL is built to support an expanding ecosystem of next-generation accessories, enabling continuous capability growth of the headborne system without requiring fundamental hardware changes. LINK-RAIL represents a future-ready solution that enhances performance, adaptability, and system integration for professional users.

ABOUT LINK-RAIL

LINK-RAIL is a system that integrates mounting and power into a scalable headborne platform. It seamlessly integrates compatible, battery-free accessories through a centralized battery pack without the need for cable management.

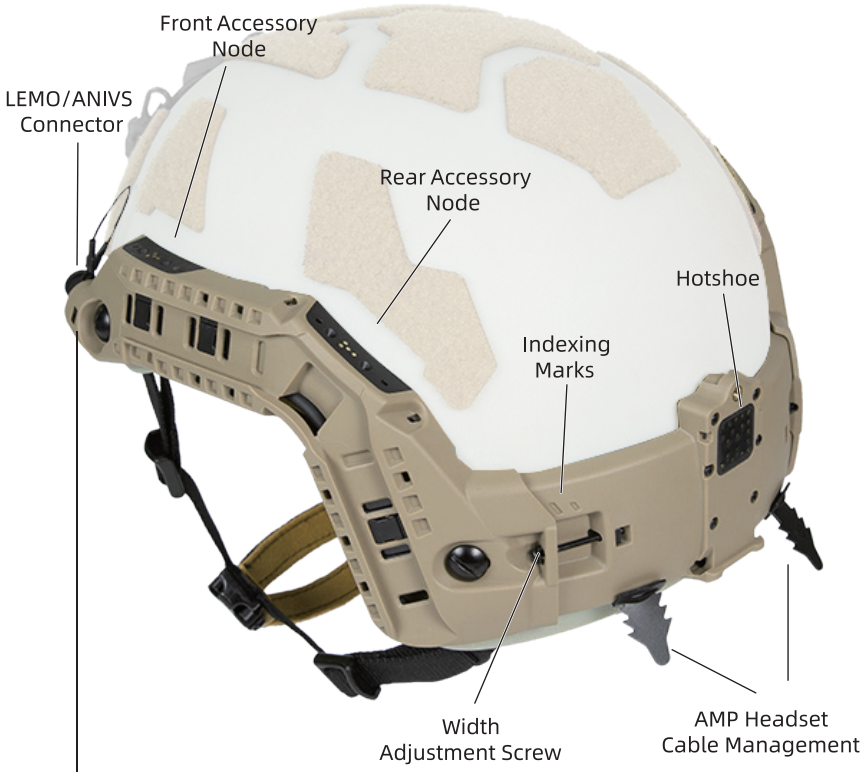
LINK-RAIL Rail

LINK-RAIL Battery Pack

Flashlight

Flexlight

Strobes



4-Pin LEMO / ANVIS Female Connector (Unique pinout)

1 REMOVE EXISTING RAILS AND REAR VELCRO

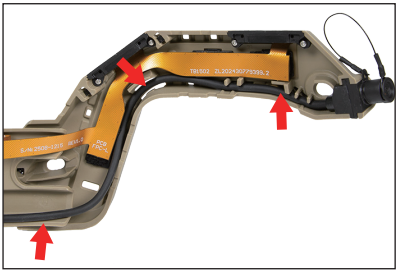
Using a wide blade flat head screwdriver, unscrew and remove all four screws and t-nuts to remove the existing ARC Railsand shims (if present).This will also release the chinstrap anchors and rear fitband tabs. Remove the rear exterior loop from the helmet shell (recommended).

ENSURE PROPER INTERNAL COMPONENT ROUTING

Before assembling LINK-RAIL onto the helmet, gently compress the flat ribbon cable into a "S" shape. DO NOT put a sharp crease into the ribbon.Also,ensure the round cable is routed inside the interior channel of the rail.

RIBBON CABLE

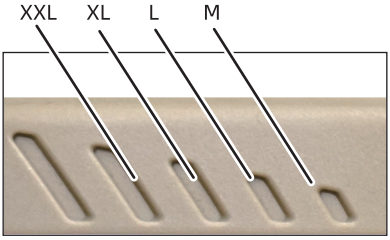
ROUND CABLE



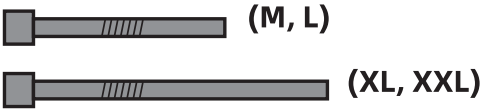
❷ ADJUST LINK-RAIL SIZING

Using a 3/32" ball end hex screwdriver, tighten or loosen the adjustment screws to slightly oversize the width of the LINK-RAIL assembly to the size of your helmet using the indexing marks as a reference.(For XL and XXL helmet sizes, usethe included longer adjustment screws).The width adjustment may vary for the same helmet size depending on modelof FAST helmet. Further adjustment may be needed when assembling LINK-RAIL onto the helmet.

INDEXING MARKS:

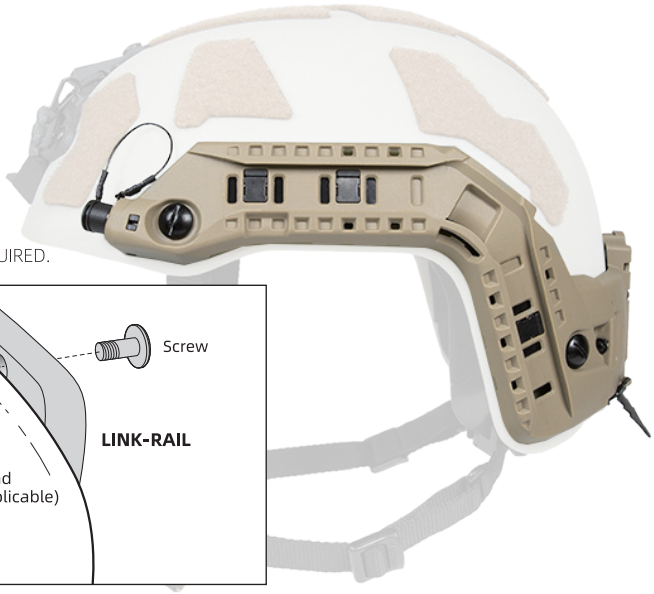


(approximates sizing, for reference only)

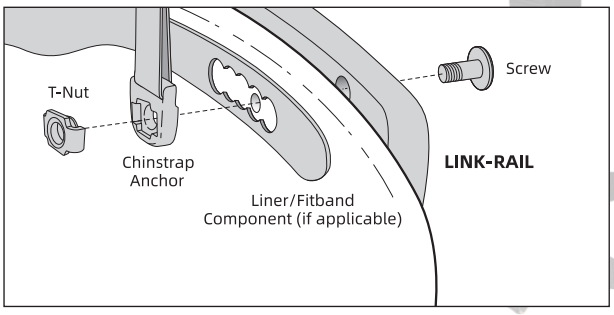


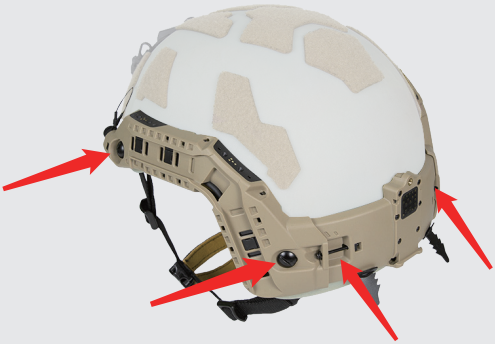
❸ Install the LINK-RAIL onto the helmet

Align LINK-RAIL with the existing chinstrap holes on the exterior of your helmet and **loosely assemble** the screws, chinstrap anchors, t-nuts and any liner/fitband components (if applicable) as they were before disassembling. Ensure screw passes through the opening for the appropriate size helmet on thefitband. Ensure flexible ribbon cable and round cable are not pinched by any part of the LINK-RAIL assembly.



NOTE:IN SOME INSTANCES,
ALTERNATE SCREW LENGTHS MAYBE REQUIRED.



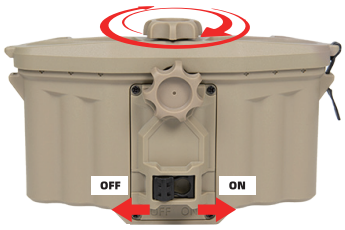


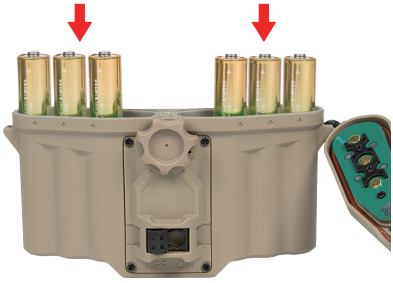
Tighten the front and rear screws, then alternately tighten the LINK-RAIL size adjustment screws, ensuring the hot shoe remains centered on the helmet at all times (refer to the index mark for alignment).

4 INSTALL BATTERIES (FOR AA BATTERY PACK)

Loosen the top screw and lift the top cover of the battery compartment to remove the cover. It is powered by six AA batteries. The battery compartment is designed to provide power using multiple battery packs; in an emergency, two or four batteries can be used. Ensure all batteries have their positive (+) terminals facing upwards. Loosely reinstall the top cover onto the battery compartment.

NOTE: TIGHTENING THE TOP COVER COMPLETELY WILL PREVENT THE BATTERY PACK FROM ATTACHING PROPERLY TO THE HOTSHOE. OTHER BATTERY PACKS MAY HAVE DIFFERENT BATTERY INSTALLATION REQUIREMENTS. REFER TO THOSE INSTRUCTIONS SPECIFIC TO THE BATTERY IN USE FOR THIS STEP.

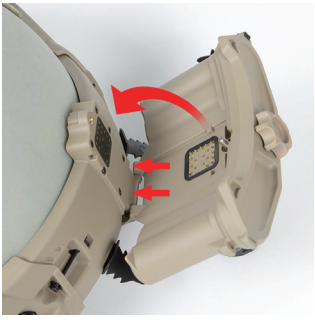




5 ATTACH BATTERY PACK TO LINK-RAIL HOTSHOE

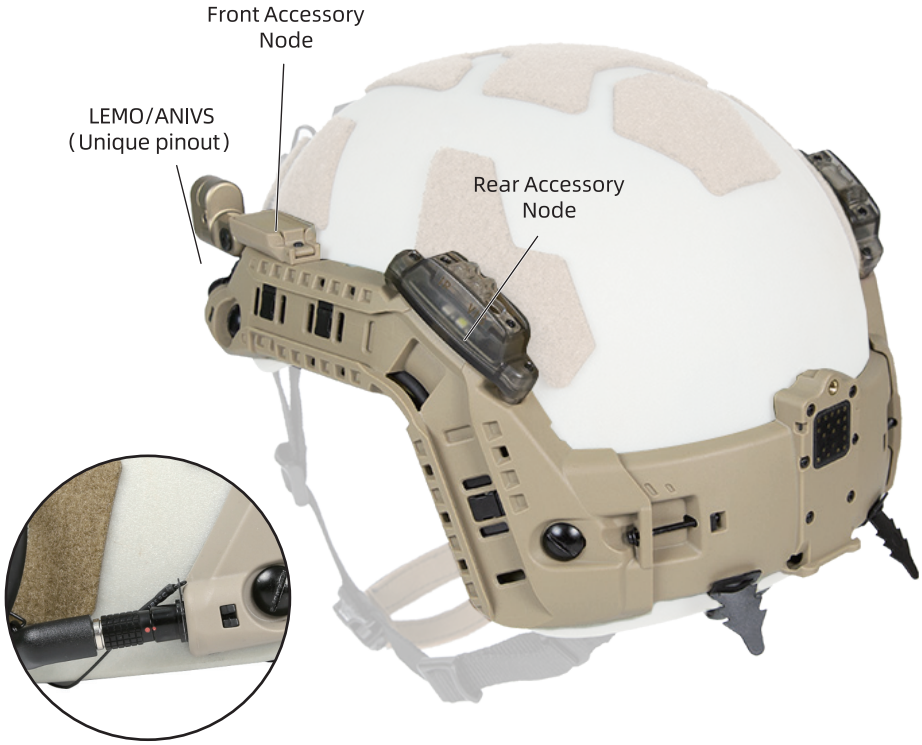
Engage the lower battery pack mounting points into the hotshoe, tilt the battery pack into place and tighten the rear screw to affix the battery pack to the hotshoe. Then tighten the top cover screw to engage the secondary retention mechanism.

NOTE:FAILURE TO FOLLOW THIS SEQUENCE MAY RESULT IN AN IMPROPER SEAL, NONOPERATION OF THE BATTERY PACK OR DAMAGE TO THE BATTERY PACK AND/ OR HOTSHOE.



6 ATTACHING ACCESSORIES TO LINK-RAIL

To connect the power cable to the LINK-RAIL interface, first remove the protective cap from the LINK-RAIL connector. Using the appropriate power cable for your system, align the index mark on the 4-pin LEMO connector with the corresponding index mark on the LINK-RAIL interface. Push the plug in until the contacts are fully seated, then rotate to lock the connector in position.



NOTE: PUSHING ON THE CONNECTOR WITH EXCESSIVE FORCE MAY RESULT IN DAMAGE TO THE LINK-RAIL CONNECTOR AND/OR THE POWER CABLE. ENSURE PROPER ORIENTATION OF THE CONNECTORS TO PREVENT PERMANENT DAMAGE TO THE LINK-RAIL CONNECTOR AND/OR POWER CABLE.

TO ATTACH FRONT OR REAR ACCESSORIES TO THE FRONT OR REAR ACCESSORY NODES, ALIGN THE ACCESSORY WITH THE CORRESPONDING NODE ON THE LINK-RAIL USING THE ALIGNMENT CONE, THEN TIGHTEN SECURELY.

Flexlight alignment cone

Flashlight alignment cone

Strobe alignment cone

FMA® | Flashlight installation process

Use your fingers to push the fixing screw out of the surface

Tighten the screws with a tool

Pry open the battery cover

During installation, ensure the screws are aligned correctly

Tighten the screws with a tool

Close the battery compartment

Finally, turn off the locking switch and tighten the screws

The installation result is shown in the picture

Device	Parameter
	Operating Temperature: -20℃~40℃ Electrical Box Input Voltage: 3.3V Device Interface Output Voltage: 3.3V Ingress Protection: IPX7 Support for NVG: Requires separate power cable Weight: 215g（Excluding devices） Size: M/L/XL/XXL FAST Helmet System Colors: BK、TAN Material: Nylon

The interior of the guide rail uses a flexible FPC ribbon cable with fully copper-clad shielding to protect the circuit. The electrical box connects to the guide rail via a contact interface, and the guide rail system's circuits are transmitted through the ribbon cable to various device interfaces on the rail, providing power and communication to the devices.

	Operating Temperature: -20℃~40℃ Voltage: 3.3V LED Strobe: 3mA (Low), 30mA (High) IR Strobe: 3mA (Low), 30mA (High) Ingress Protection: IPX7 Weight: 12g(Single unit) Colors: Transparent Black Material: ABS

1、Power Mode
Slide Switch: 0-1-2 (Off - Low - High)

2、Lighting Mode
Slide Switch: IR-VIS (IR Strobe - White Light Strobe)

	Operating Temperature: -20℃~40℃ Voltage: 3.3V LED Current: Low 60mA / High 300mA LED Illumination: Low 10 LM / High 60 LM IR Power: Low 10mW / High 40mW IR Current: Low 60mA / High 300mA Ingress Protection: IPX7 Weight: 29.5g Colors: BK、TAN Material: Housing Nylon / Lens Head AL6061

IR Mode
1.（<3s）Quick Press Low → High → Off
2.（≧3s）Turns the device off from any state
3. Switches to LED Low mode from any state

LED Lighting Mode
A Hold for Low → (<3s) Quick Press to High → Quick Press to Off
B From High → Hold to Low → (<3s) Quick Press to High
C(≥3s)：Turns the device off from any state

Device	Parameter
	Operating Temperature: -20℃~40℃ Voltage: 3.3V Red Light Current: Low 10mA / High 50mA Red Light Illumination: Low 1 LM / High 3.5 LM IR Current: Low 10mA / High 50mA IR Power: Low 5mW / High 20mW Ingress Protection: IPX7 Weight: 18g Colors: BK、TAN Material: Nylon

IR Mode
1.(<3s) Quick Press Cycles through: Low → High → Off
2.(≥3s) Instantly turns off from any state
3.Switches to Red Light (Low) mode from any state

2、Red Light Mode
A Hold for Low → (<3s) Quick Press to High → Quick Press to Off
B From High → Hold to Low → (<3s) Quick Press to High
C(≥3s): Turns the device off from any state

Operating Temperature: -20℃~40℃
Output Voltage: 3.3V
Power: 9W
Battery: 1.5V AA/ 6pcs
Runtime at Full Power: 8h
Weight: 165g(excluding batteries)
Ingress Protection: IPX7
Colors: BK、TAN
Material: Nylon

Switch Operation: Slide Switch: Push to OFF (Power Off) - Push to ON (Power On)
*Note: After replacing the battery, the
switch needs to be slid back to the "ON" position to power on.

Compatibility: For power connection to NVG

Interface: 4-pin FISCHER male connector

Color: Black

4-pin FISCHER male connector, power usage for night vision devices and other external equipment

Compatibility: For power connection to NVG mount

Interface: 4-pin LEMO male connector

Color: Black

4-pin LEMO/ANIVS male connector, power usage for night vision devices and other external equipment

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