

STEADICAM®

M-1

Operator's Manual



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M-1 Operator's Manual
Rev. A
p/n LIT-815000

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The Tiffen Company

A word from Garrett Brown



Congratulations on your new M-1!

Dear Friends,

There have been three generations of Steadicam® operators since we began it all in 1976. Thousands of us have graced tens of thousands of movies and shows with the unique visual music of Steadicam—played worldwide on *seven generations* of Steadicam equipment.

Many of our innovations—think extendable monitor and battery, no-tools clamps and integral super post—became industry must-haves, but our exclusive tilt-head and motorized stage remain essential to the very highest standard of Steadicam precision.

And now my inventing colleagues at Tiffen have raised the bar once again and I'm proud to report that nearly all aspects of modern operating—mechanical, electronic, artistic, ergonomic and political—are augmented and advanced.

M-1 is for Modular—*user-configurable, upgradable, swappable*—with a host of superbly engineered new features:

- Ultra-rigid post, stage and base
- Vernier-drive tilt-head
- Super-precise removable gimbal
- Indexed center post with custom hi-amp bayonet connectors
- Quick-release camera plate system with patented safety latch
- Monitor mounts instantly to any post
- Super-adjustable monitor and battery pivots
- 3x true HD video lines and 10 hi-amp power ports
- Industry-best level-keeping, hi-def and voltage options

In short, the M-1 is brilliant—rigid, precise, tool-free, super-adjustable and *fast*. Above all, it is infinitely configurable and as close to future-proof as a rig can be.

Good luck with your new Steadicam M-1 and good shooting!
I think it's the best Steadicam ever... *Where was this baby when I needed it?*

Garrett Brown, Philadelphia 2015
www.garrettbrown.com

The M-1 System Components

The Stage

Quick release dovetail
Tilt-able to maintain dynamic balance
Camera power and video connections

The Gimbal

Removable handle for future upgrades

The Post

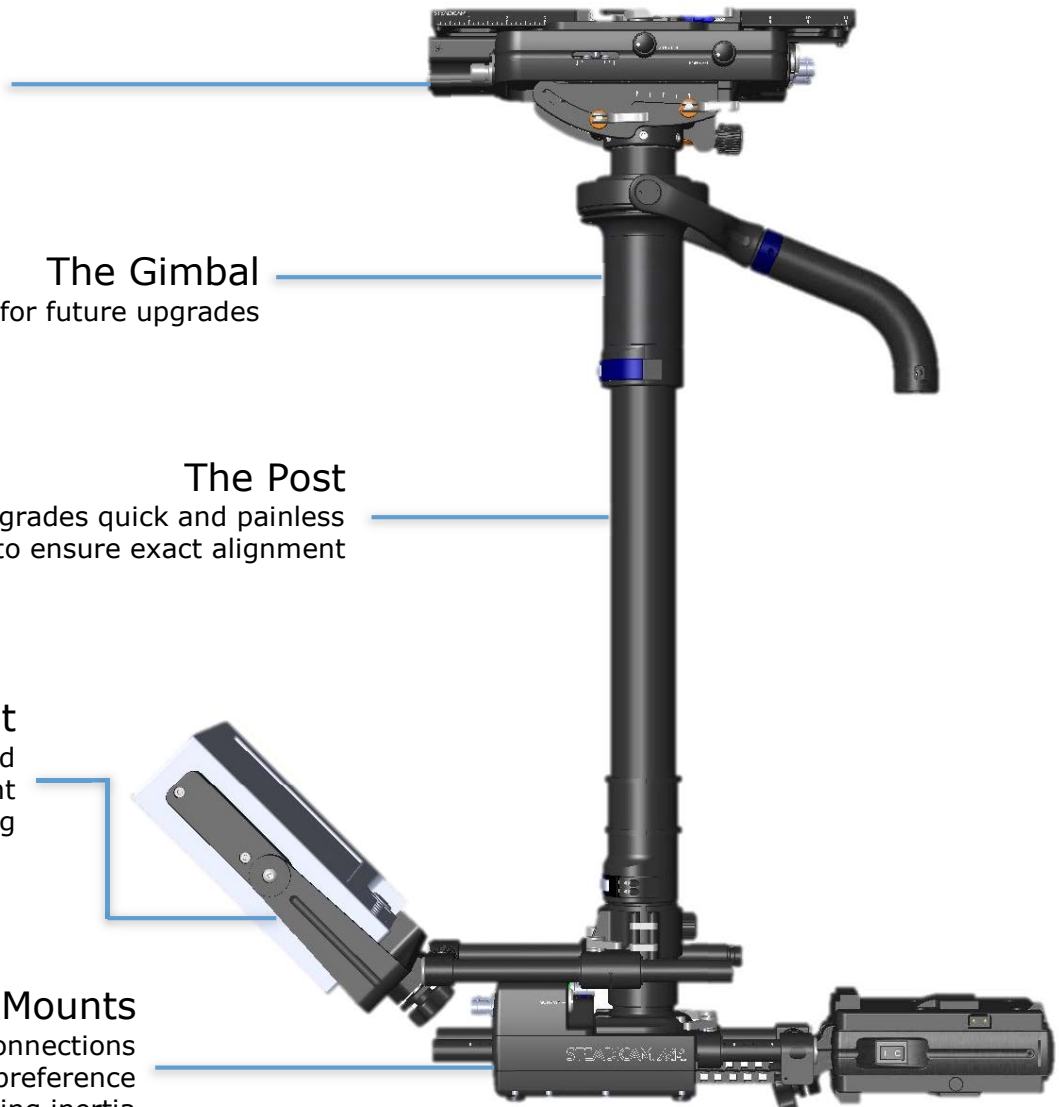
Modular ends make system maintenance and upgrades quick and painless
Carbon fiber posts are indexed to ensure exact alignment

The Monitor Mount

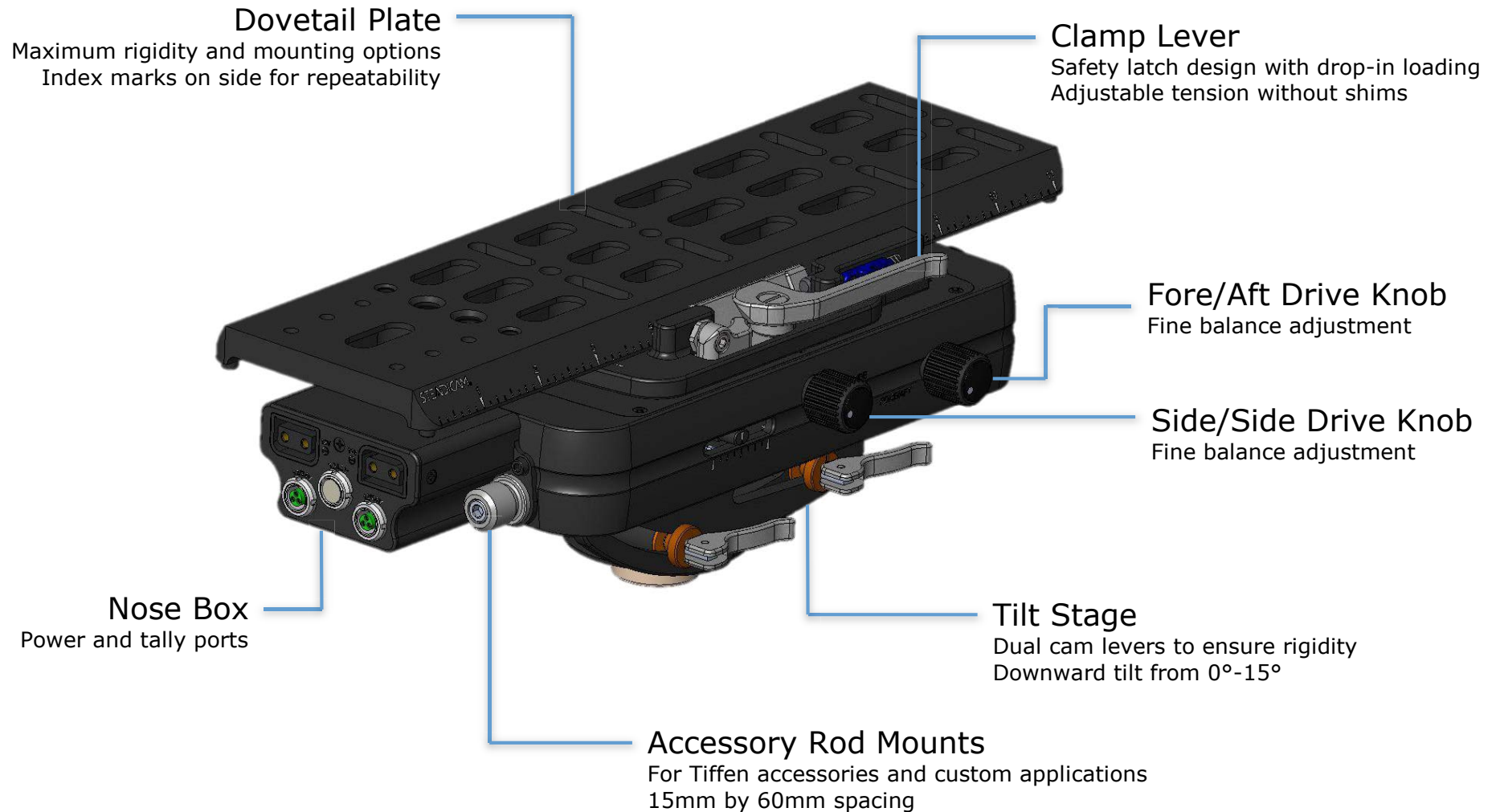
Allows monitor to be mounted to either post and inverted
Monitor tilts at the center of gravity for angle adjustment
Modular rods extend for optimal viewing

The Base and Battery Mounts

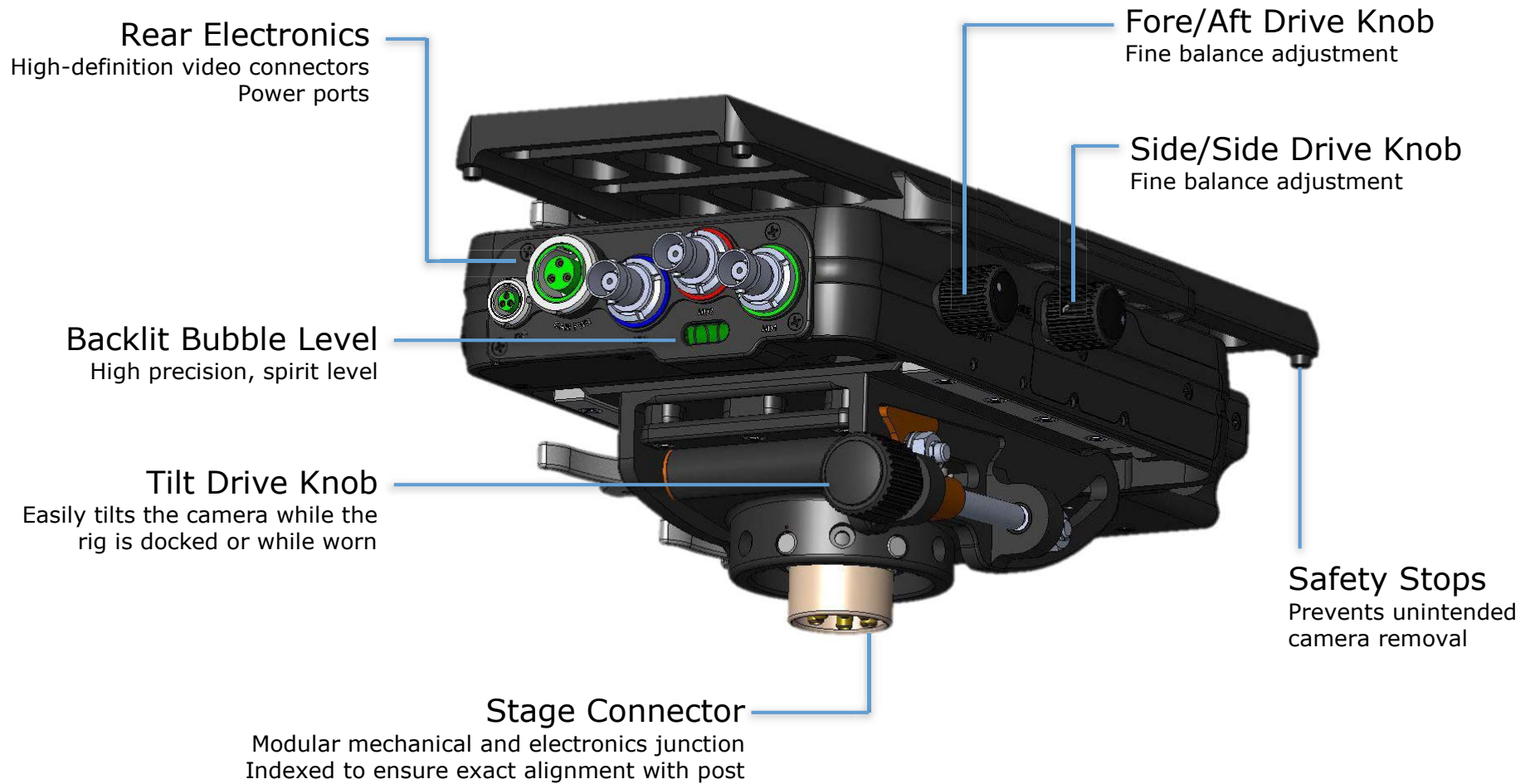
Monitor power, accessory power and video connections
Battery mount rotates 180° to suit user preference
Modular rods extend to increase panning inertia



The Stage



Components



The Stage

Nose Box Electronics

Dual P-Tap Ports
12 Volts supplied at all times

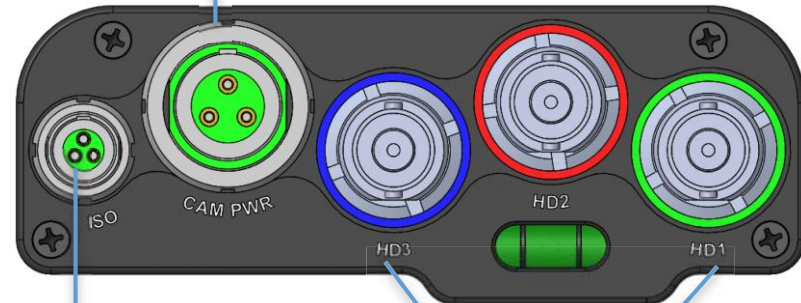


Tally Input Port
Use with available tally sensor

Dual 12/24 Volt LEMO 0B Ports
12 Volts supplied at all times
12 and 24 Volts simultaneously when in 24V mode

Rear Electronics

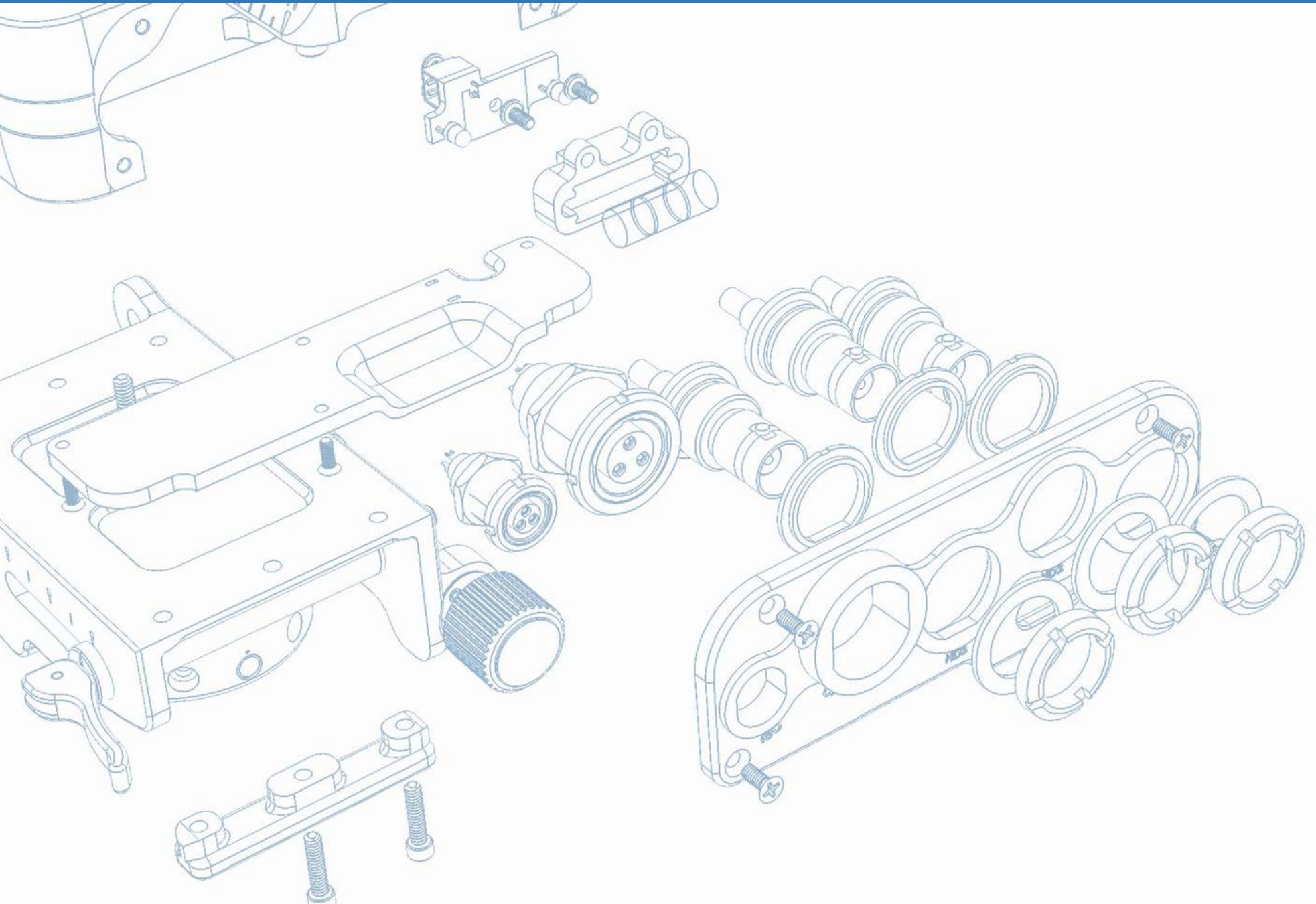
Camera Power Port, LEMO® 2B
12 Volts supplied at all times
12 and 24 Volts simultaneously when in 24V mode



ISO Port, LEMO 0B
Provides an isolated port for
dedicated accessories

High-Definition Video Ports
Three direct, 3G compatible connections to the M-1 base
Color-coded at each end

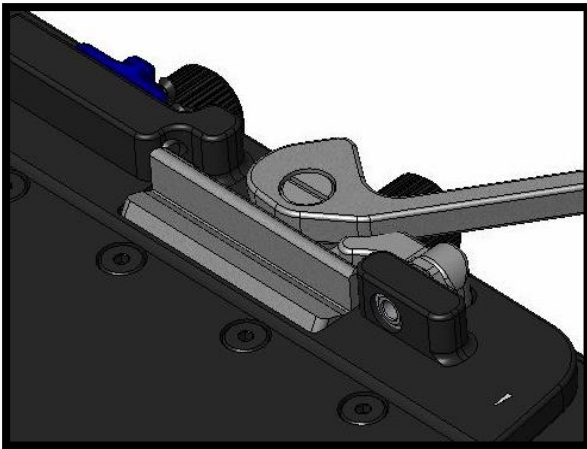
Components



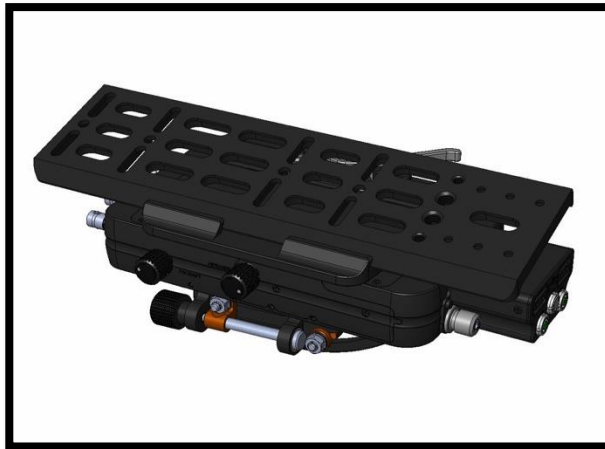
The Stage

Camera Installation:

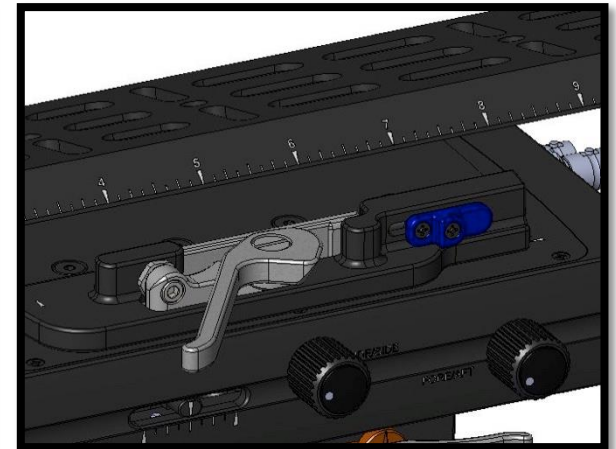
The dovetail lock system was designed to ensure reliable camera safety. Mounting the camera to the M-1 encourages you to keep at least one hand on the camera at all times until it is securely fastened. With your camera mounted to the dovetail plate, follow these steps:



The stage is ready for the camera plate. Note that the dovetail lock and clamp lever are both open.

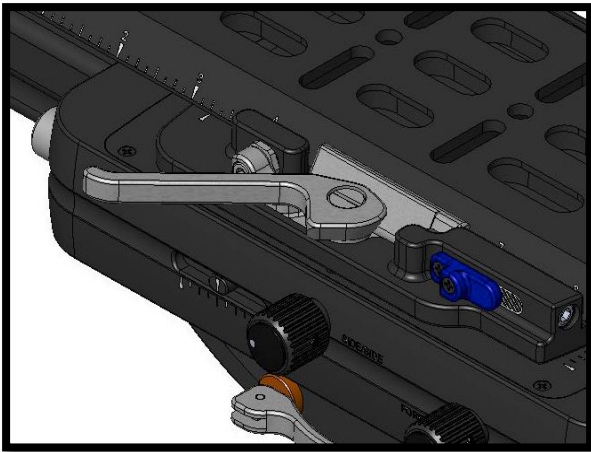


Place the dovetail plate against the passive side of the clamp.

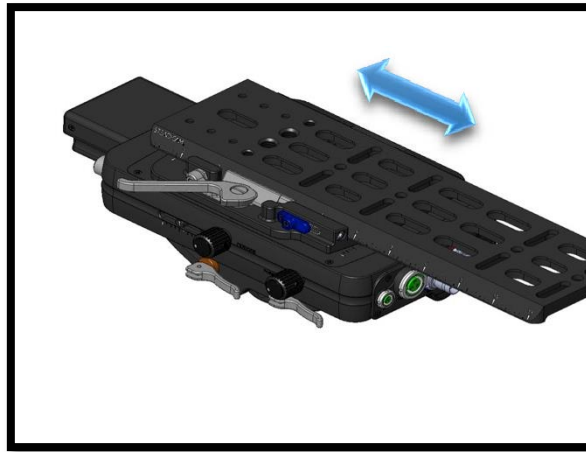


With two hands still on the camera, tilt the plate into the dovetail lock.

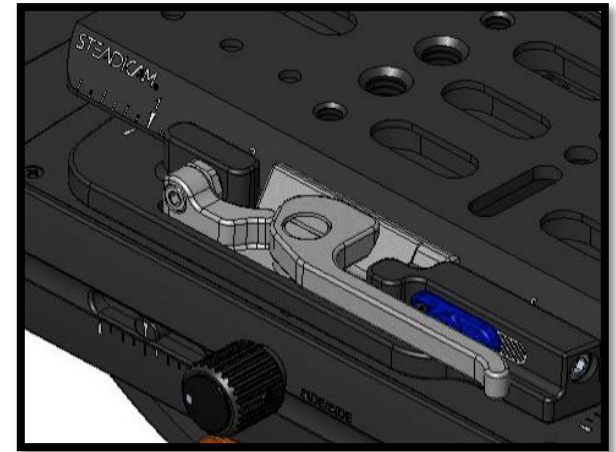
Camera Installation



The weight of the camera will press the dovetail lock down and release the safety latch. You'll hear a satisfying **click**.



The camera and plate can be moved fore and aft for coarse balancing, but the safety stops prevent any unintended release of the camera.



Close the clamp lever to firmly secure the camera onto the M-1.

Note:

If the dovetail lock has been pressed down while the dovetail plate was out, you will have to slide the safety latch to the right to reopen the lock. This can be a fun test for your new camera assistant.

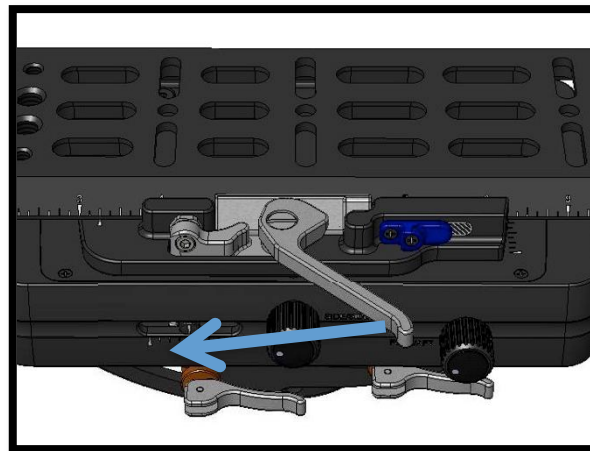
The Stage

Camera Removal:

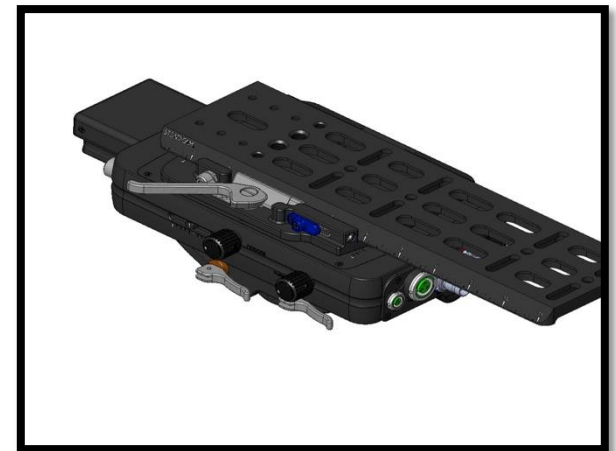
As with installing the camera, separating the camera from the M-1 is designed to encourage users to keep at least one hand on the camera at all times. Unlocking the clamp and removing the camera is a quick and easy process that will become second nature in no time.



With your left hand, secure the camera throughout this process.

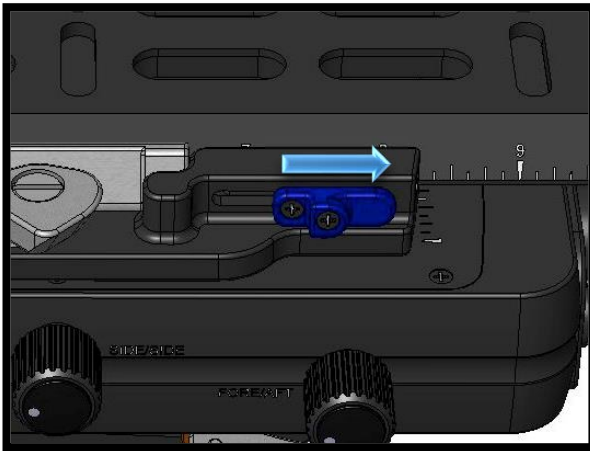


Open the clamp lever.

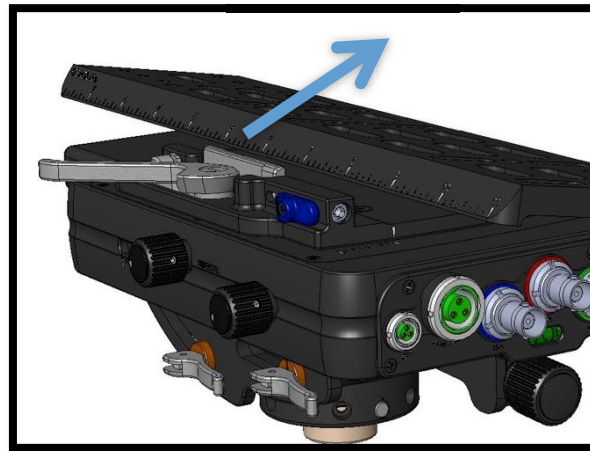


The camera is still retained by the safety latch.

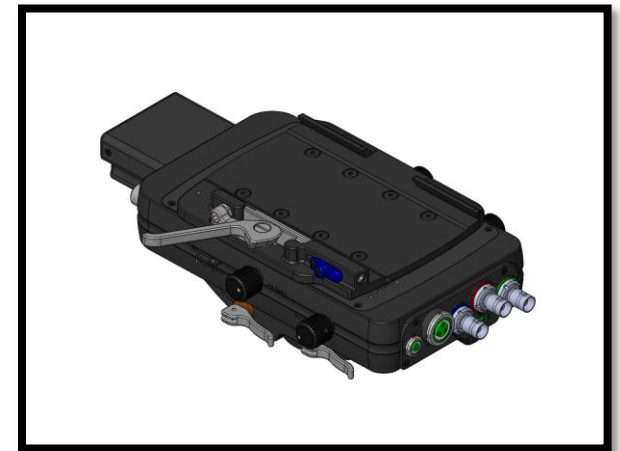
Camera Removal



Push and hold the safety latch to the right.



Keeping the safety latch held to the side, tilt the dovetail plate out of the dovetail lock.



Lift the camera off the rig.

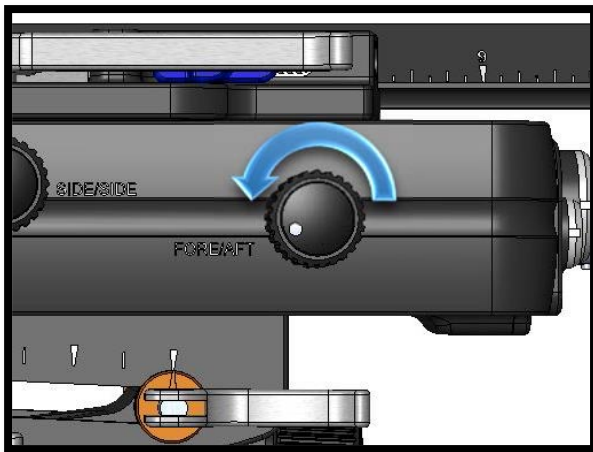
Caution:

Do not remove safety screws from the dovetail plate or it could slide out if you forget to lock the clamp lever.

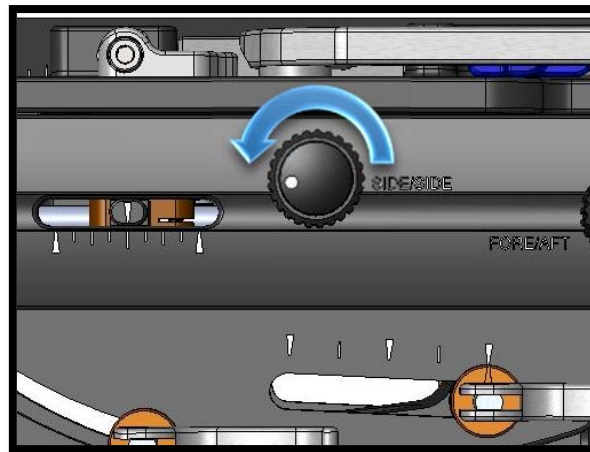
The Stage

Balance Drives:

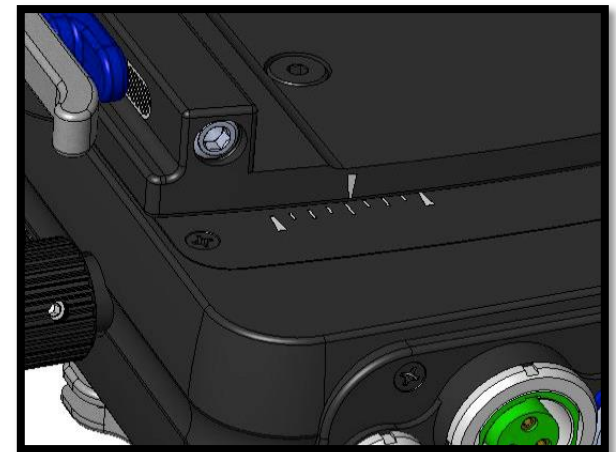
Each knob has a twin on either side of the stage so you can adjust the balance from either side of the rig. With the coarse balancing done and the camera locked in place, fine balancing can be finished with the drives:



Fore/aft adjustment knob: turning towards the front of the rig will move the camera weight forward.



Side-to-side adjustment knob: turning towards the front of the rig will move the camera weight to the left.



Each drive has a scale indicating the location and range. Starting with the scales centered leaves the most room for adjustment.

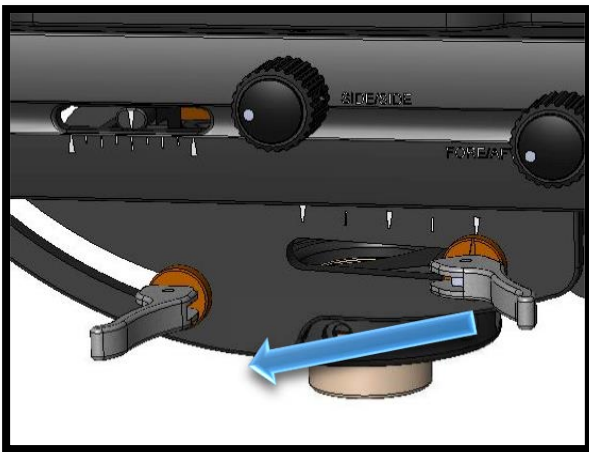
Note:

Think about the drive knobs as turning towards the front or rear of the stage. The knobs turn clockwise on one side and counterclockwise on the other side for the **same** stage movement.

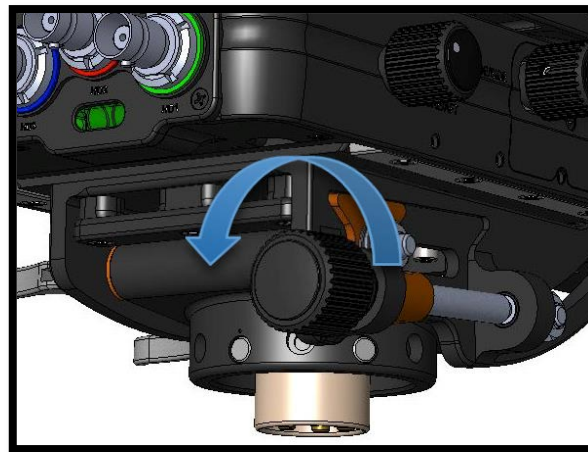
Drive Mechanisms

Tilt Drive:

The tilt drive enables you to easily tilt the camera relative to the post, which allows you to maintain dynamic balance while panning and helps control headroom. It's also very useful in low mode. The tilt stage offers 15° of downward tilt, but if you need to tilt the lens upward, read about the 180° post reversal in the next section.



Unlock cam levers.



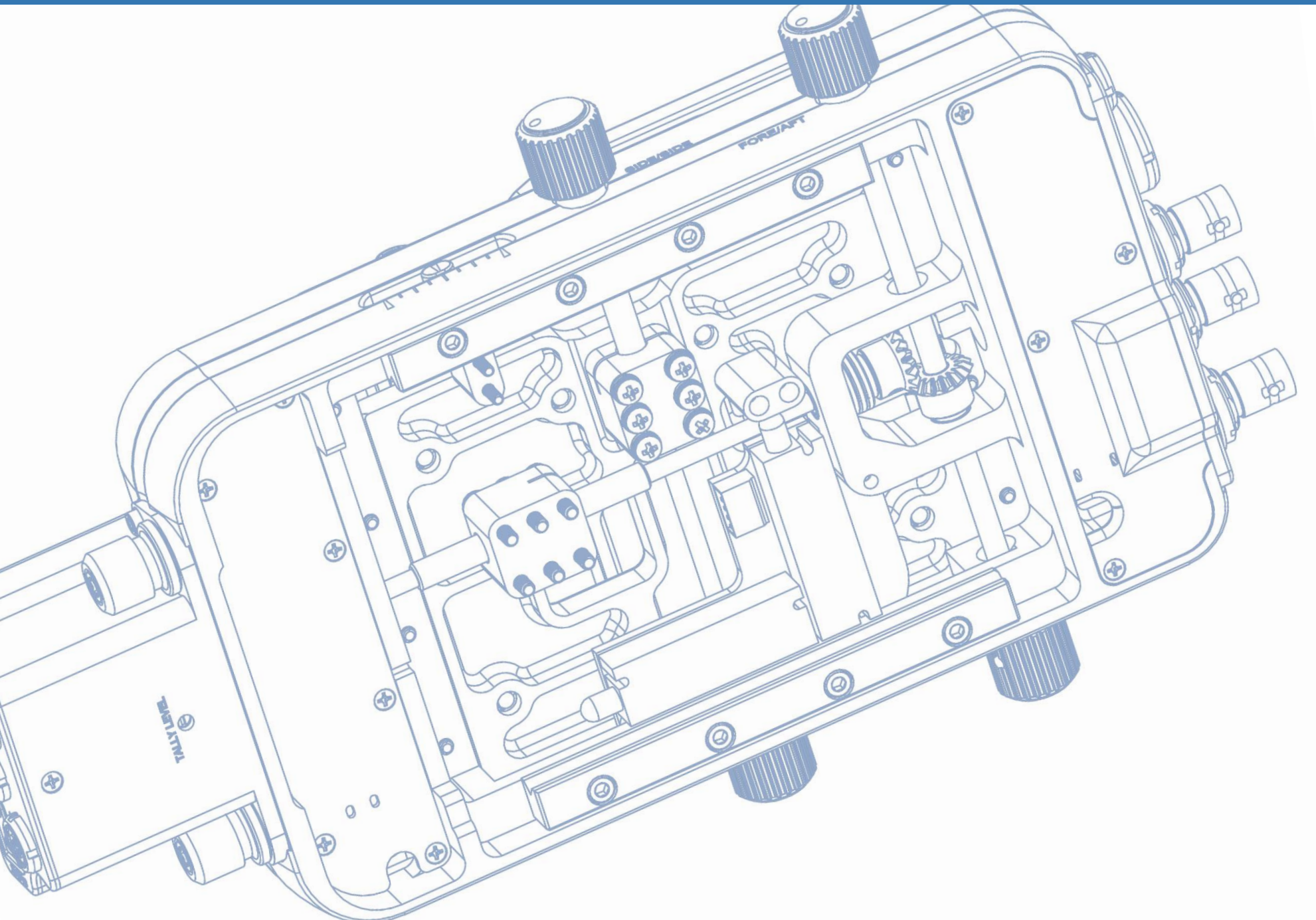
Turn tilt drive to achieve desired camera angle. Counterclockwise turning tilts the camera down.



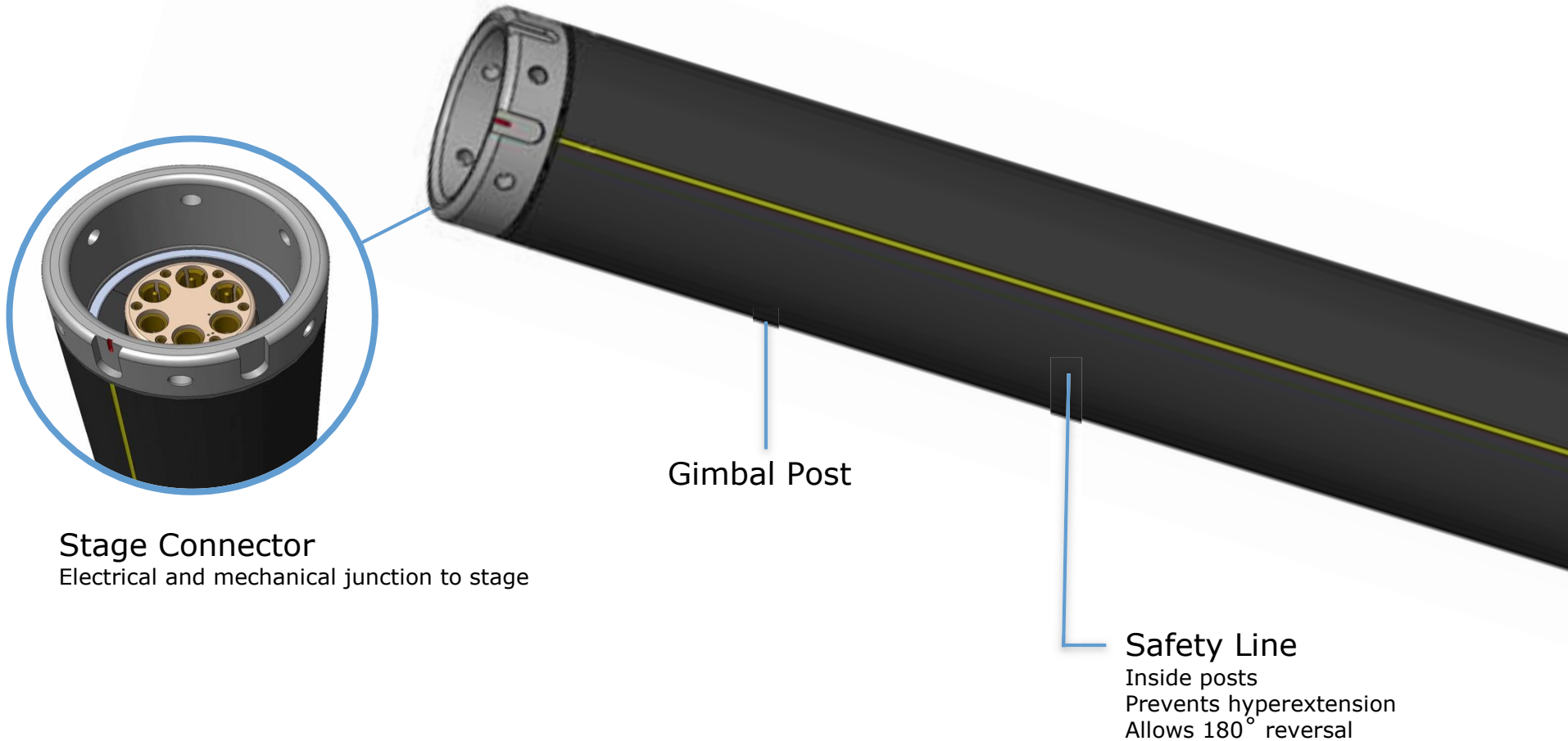
Always re-lock cam levers.

Tip:

The scale on the cam lever side of the tilt stage is handy for repeating setups. For example, if you have a tilt you prefer the scale allows you to dial it in quickly without any guesswork, saving time.



The Post



Stage Connector

Electrical and mechanical junction to stage

Gimbal Post

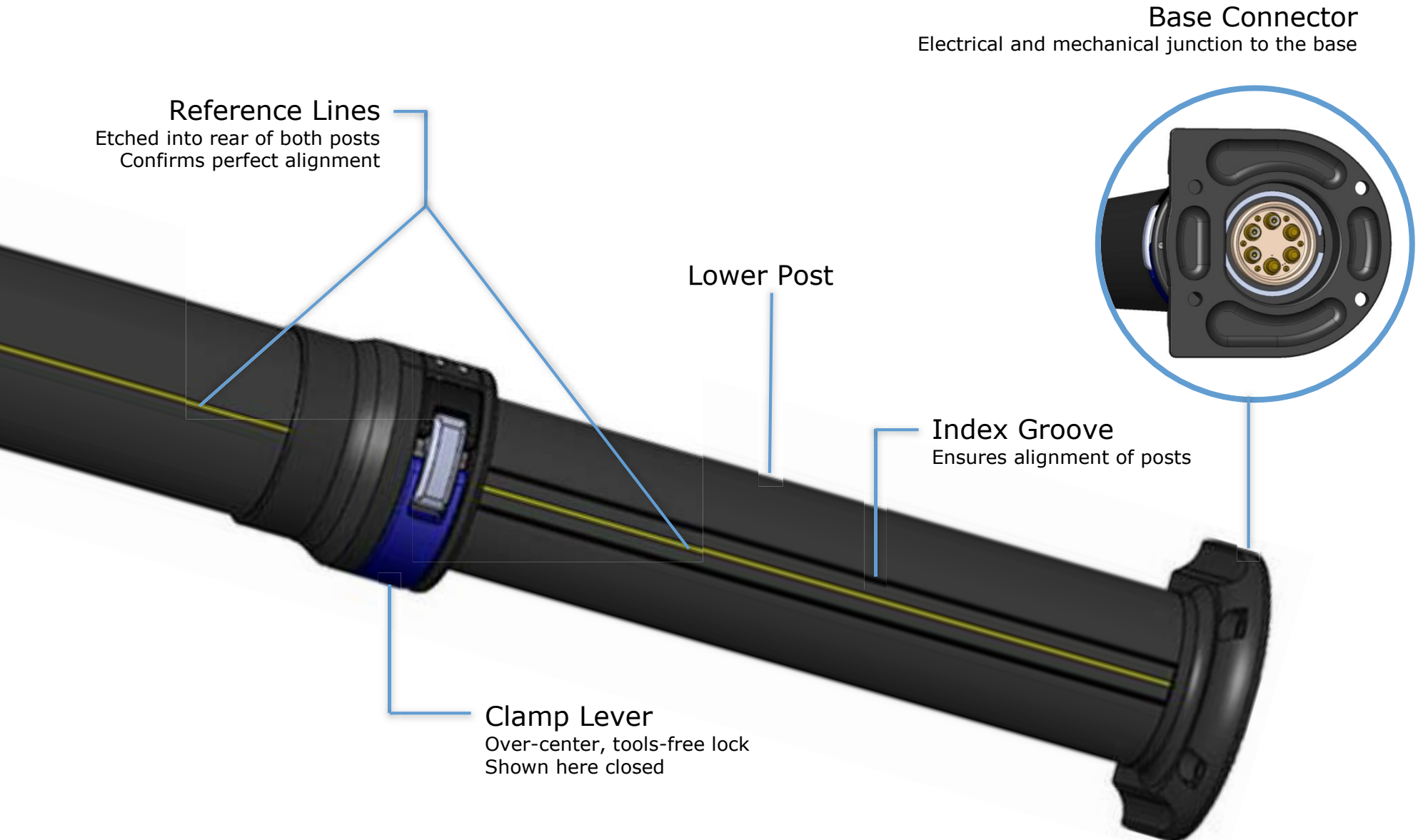
Safety Line

Inside posts
Prevents hyperextension
Allows 180° reversal

The M-1 Post

The new modular post for the M-1 system offers maximum rigidity whether it's built short or at full extension. It also allows users quick access to the stage, gimbal and base components for future upgrades, mods and maintenance. The stage and base are both indexed to the post and the post segments are indexed within each other, making alignment of the various components practically automatic.

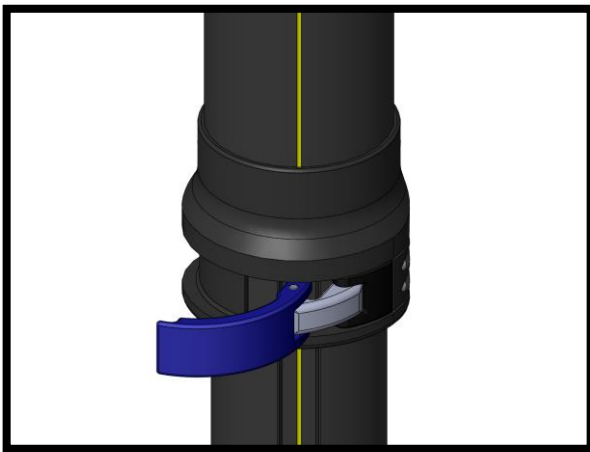
Components



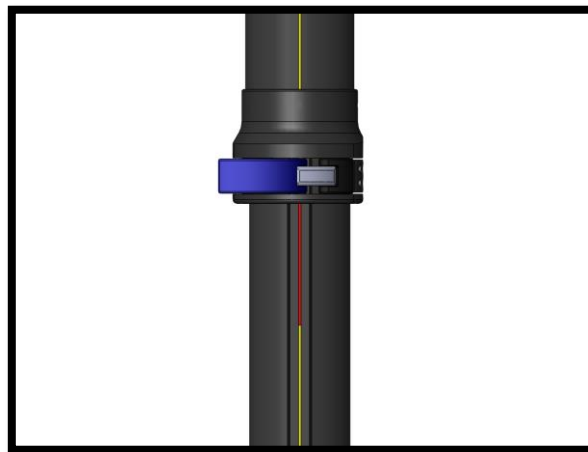
The Post

180° Post Reversal

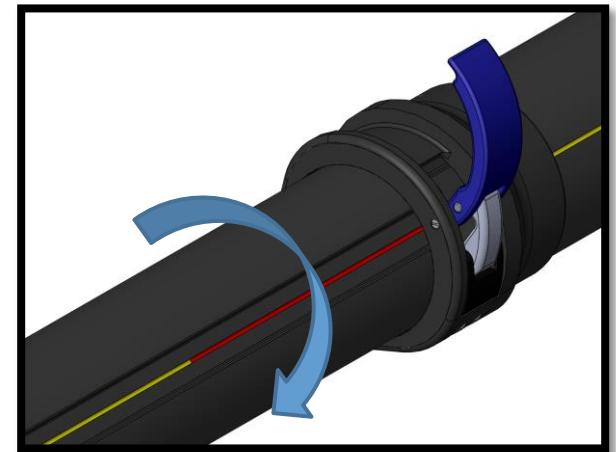
In some situations you may benefit from having the stage turned to face the other direction; for example, with large camera setups (like 3D) that need additional room directly in front of the stage, or to enable the tilt-head to tilt the lens upward.



Without a camera or batteries on board, unlock the clamp lever and extend the lower post.



Slide the lower post until the yellow reference line changes to red. Continue until you feel the post index disengage, allowing both sections to rotate.

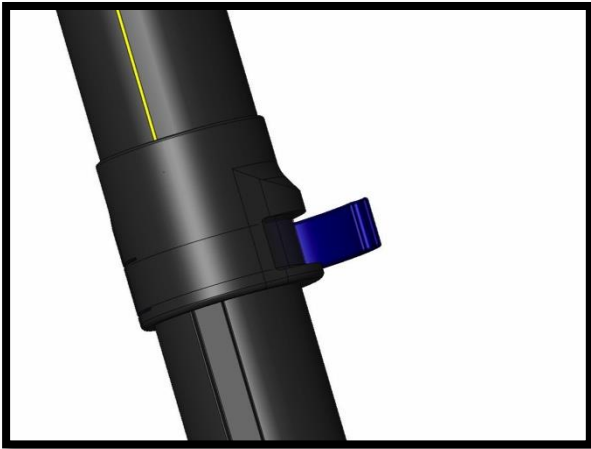


Carefully rotate the lower post 180° until the indexing system allows the posts to rejoin. Insert the lower post back into the gimbal post.

Caution:

To prevent damage to the cables inside the post, be careful not to twist the safety line past 360° by taking note of the direction you turn the post in this process. For example, we suggest turning the lower post to the right for the reversal and then returning it back to the left.

180° Post Reversal

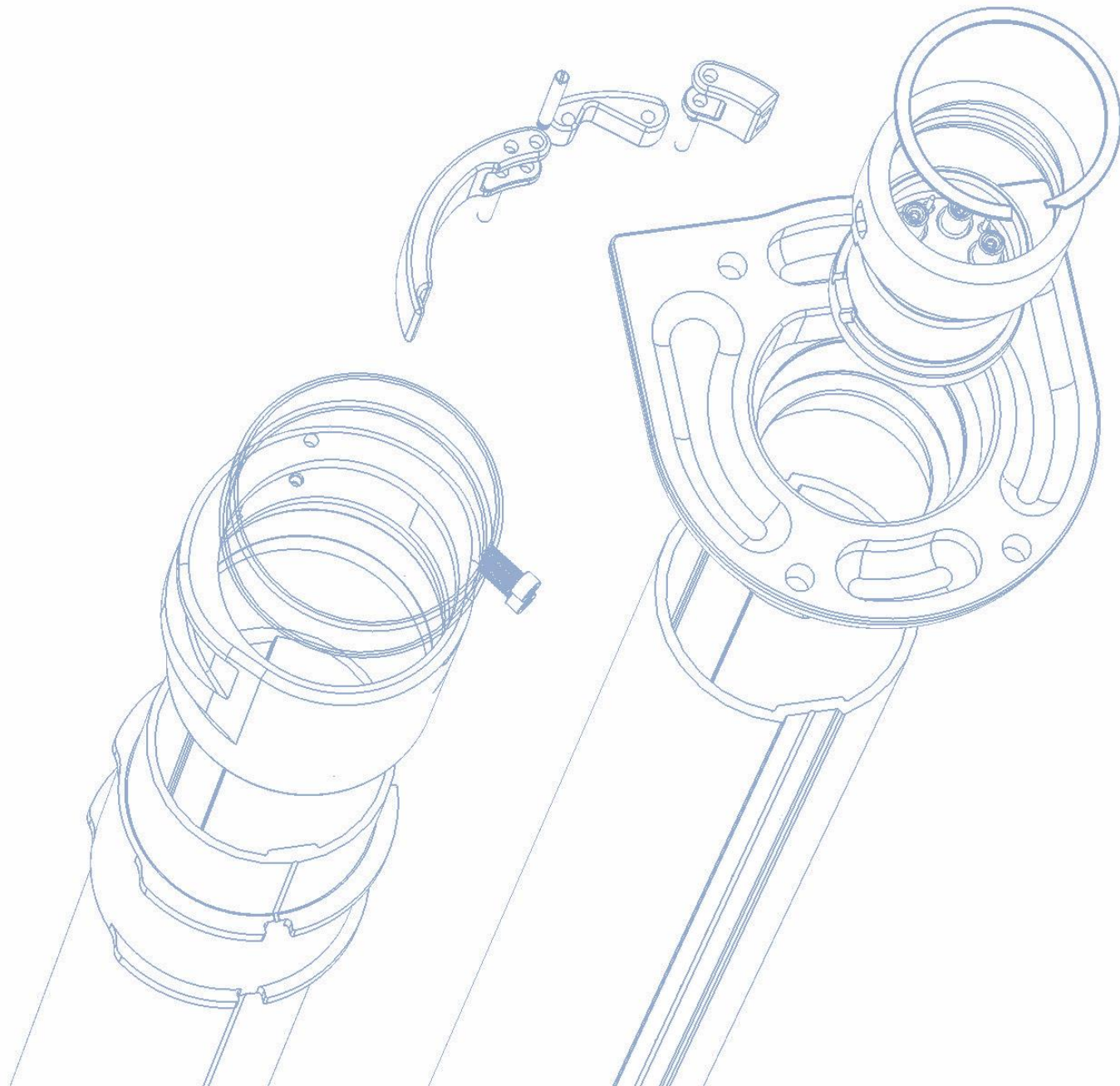


The stage is now turned 180° relative to the base. The gimbal post reference line faces forward.

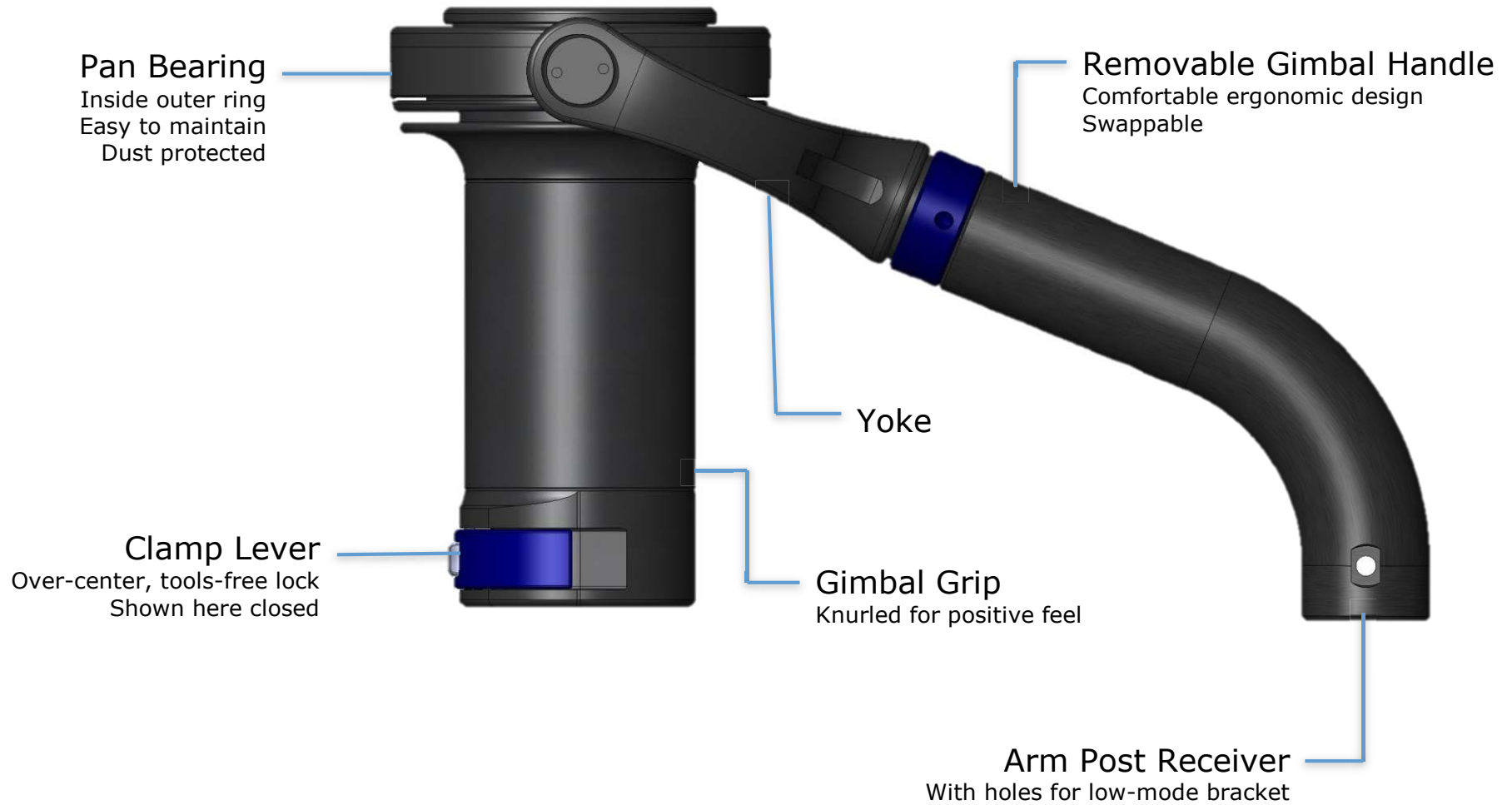


Note:

Do not operate the M-1 with the red reference line showing!

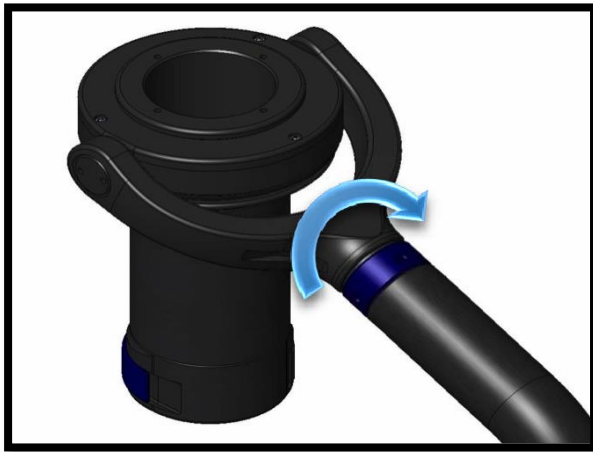


The Gimbal

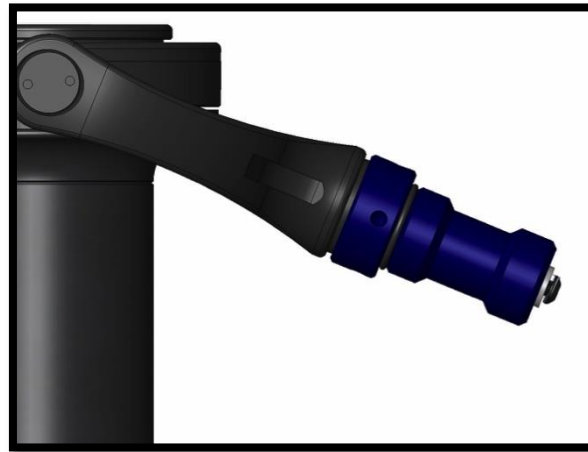


Gimbal Handle Hints:

The M-1 gimbal handle is removable. You might want to remove it for shipping, to replace with an accessory, or to adjust the roll bearings. You can also add a low-mode bracket to quickly lower the lens.



To remove the gimbal handle, turn the knurled blue knob to the right.



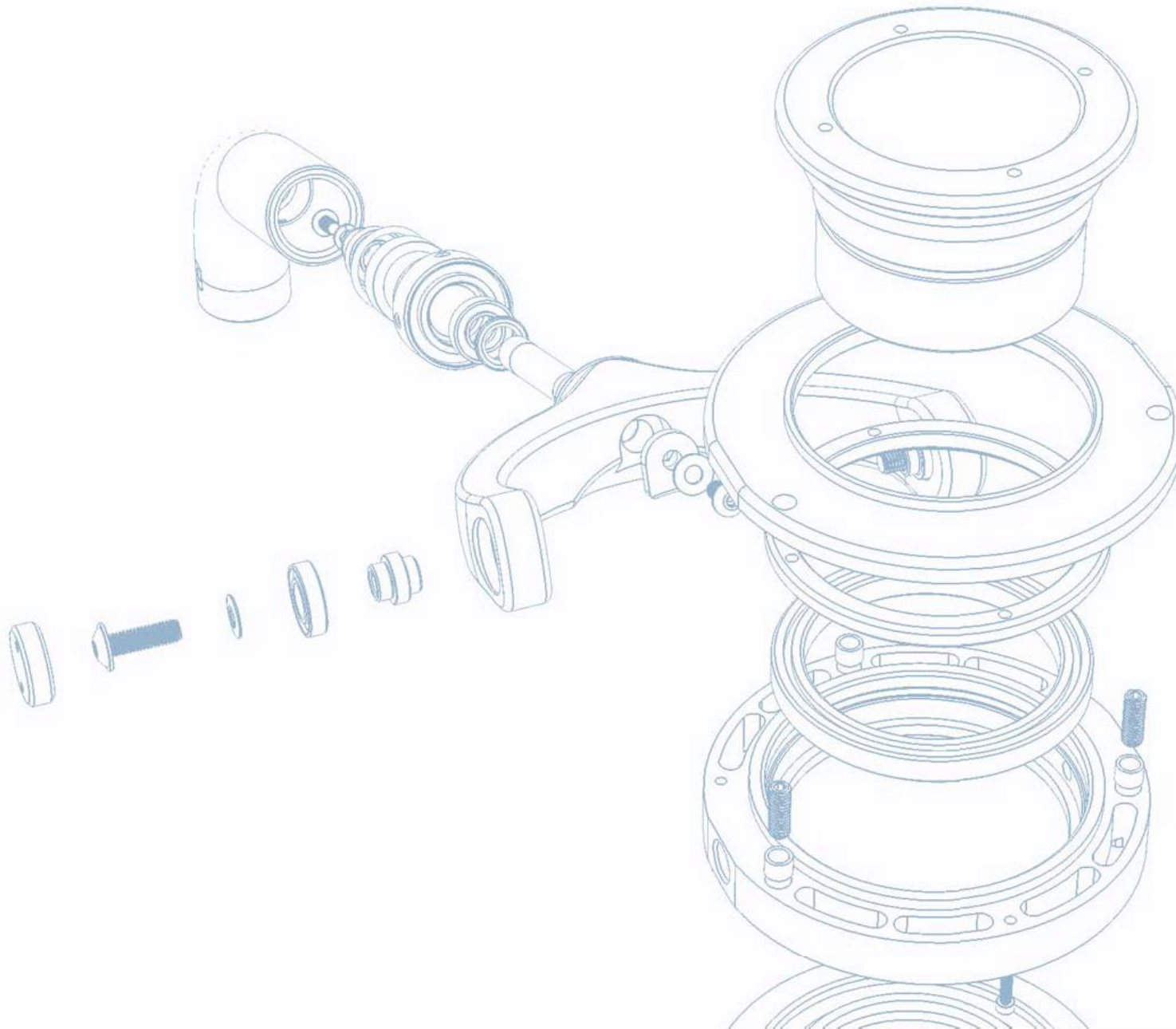
Shown above with the gimbal handle removed.



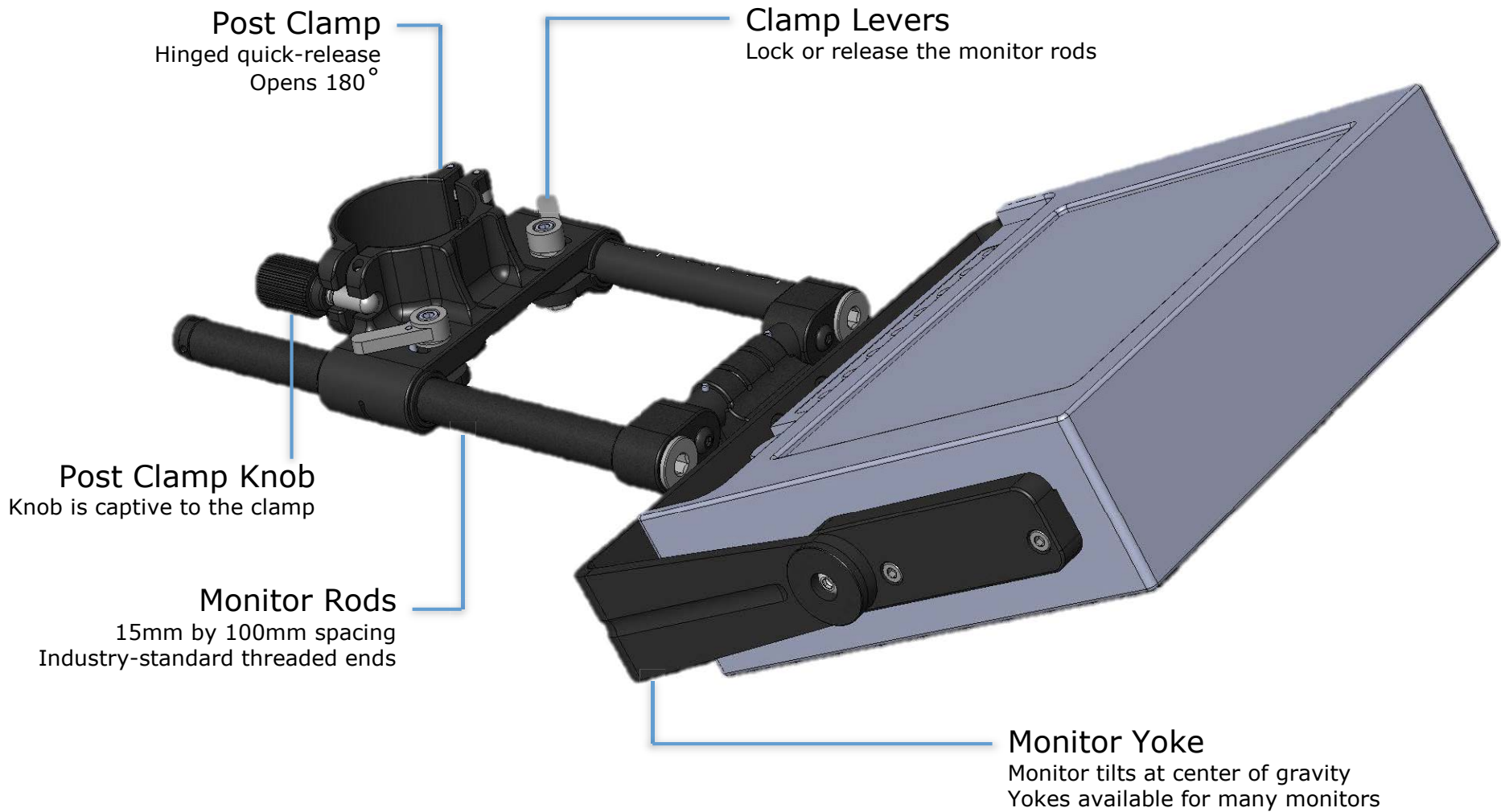
If installing the low-mode bracket, always use the included stainless aircraft pin when attaching.

Tip:

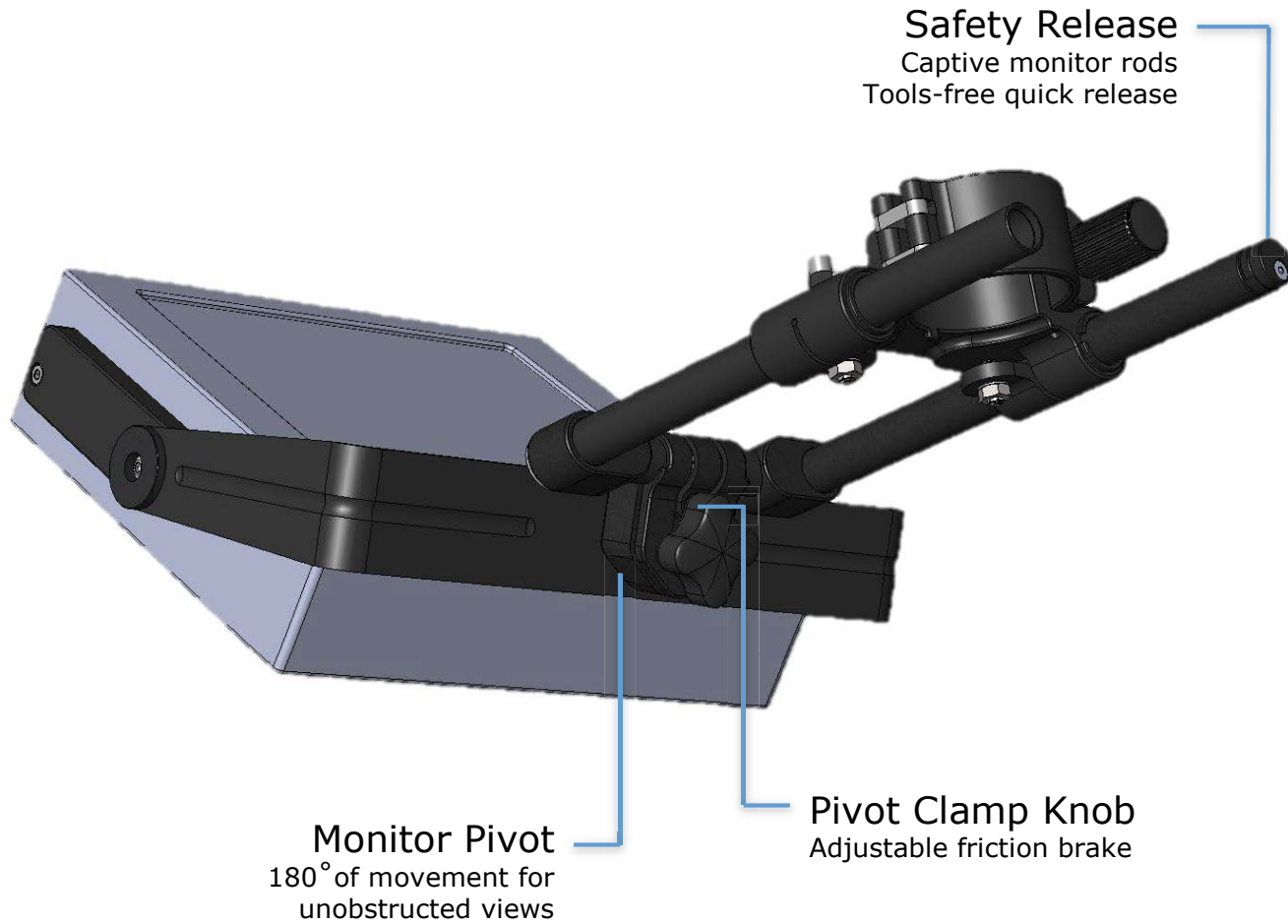
If you plan to spend an extended period of time in low-mode, you might consider removing the stage and flipping the gimbal over so you can operate on the gimbal grip. This also allows the camera to go even lower.



The Monitor Mount



Components



Upper Post Brake
Mount monitor bracket on gimbal post

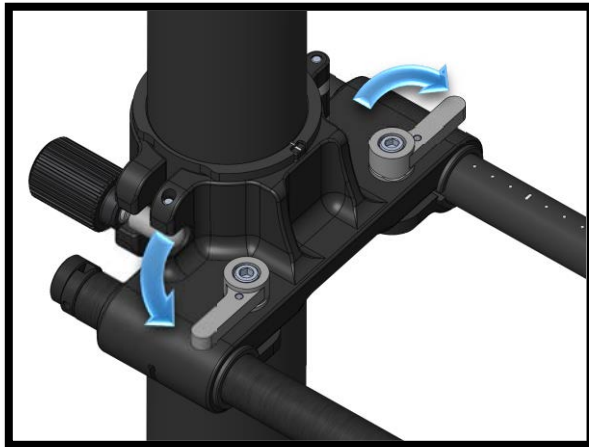


Lower Post Brake
Mount monitor bracket on lower post

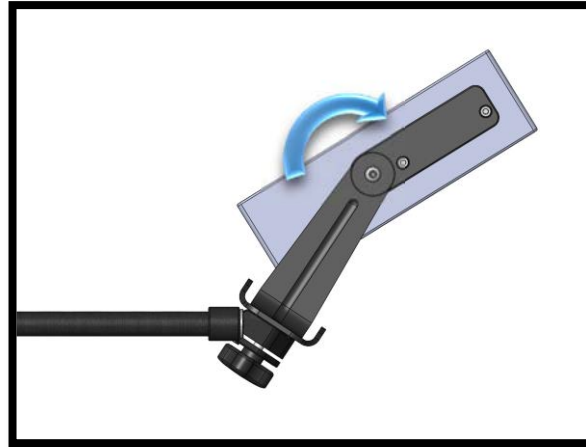
The Monitor Mount

Monitor Positioning:

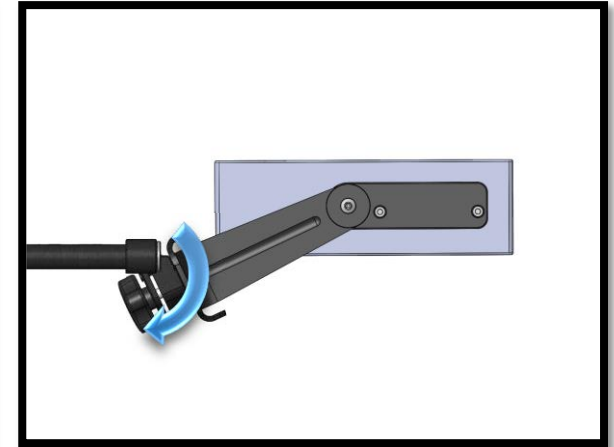
The M-1 monitor mount is intended to allow practically limitless mounting positions. The monitor can be positioned close to the post or far away. The mount can attach to either post. The monitor can be tilted to any angle and arced from upright to inverted. Many of the possibilities take mere seconds to achieve and none take more than a minute. Get creative and put that monitor where it helps you most:



To move the monitor fore and aft on the rods, loosen the clamp levers and slide. Re-lock clamp levers to secure the monitor rods.

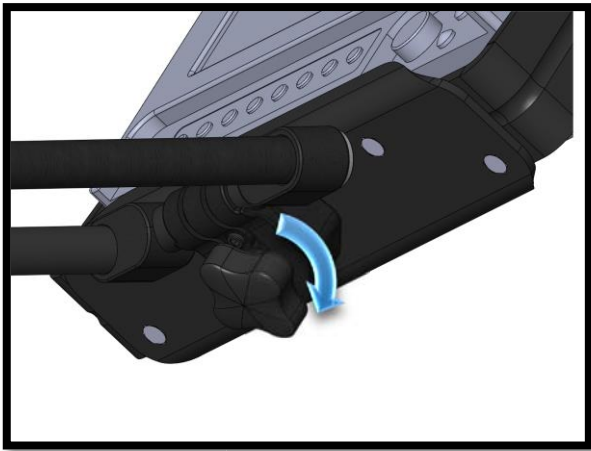


For fine angle adjustment, perhaps to reduce glare, just tilt the monitor by hand. No fasteners required.



To move the monitor in an arc, loosen the pivot clamp knob and rotate the yoke around the monitor pivot.

Monitor Positioning



Tighten the pivot clamp knob to secure the yoke.



Note:

Tilting the monitor within the monitor yoke does not affect the balance of the M-1 because it spins at the monitor's center of gravity. Tilting the yoke at the monitor pivot will require rebalancing the rig.

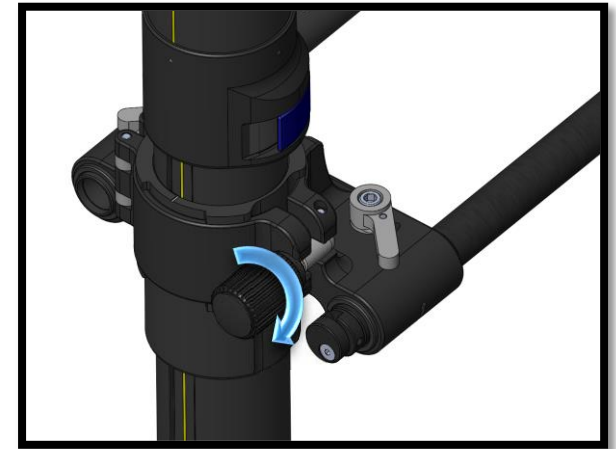
The Monitor Mount



To slide the monitor bracket up or down the post, start by supporting the monitor and loosening the post clamp knob.



Reposition the entire assembly. When on the lower post, the index groove will maintain monitor alignment.



Tighten the post clamp knob to lock the monitor mount at the new position.

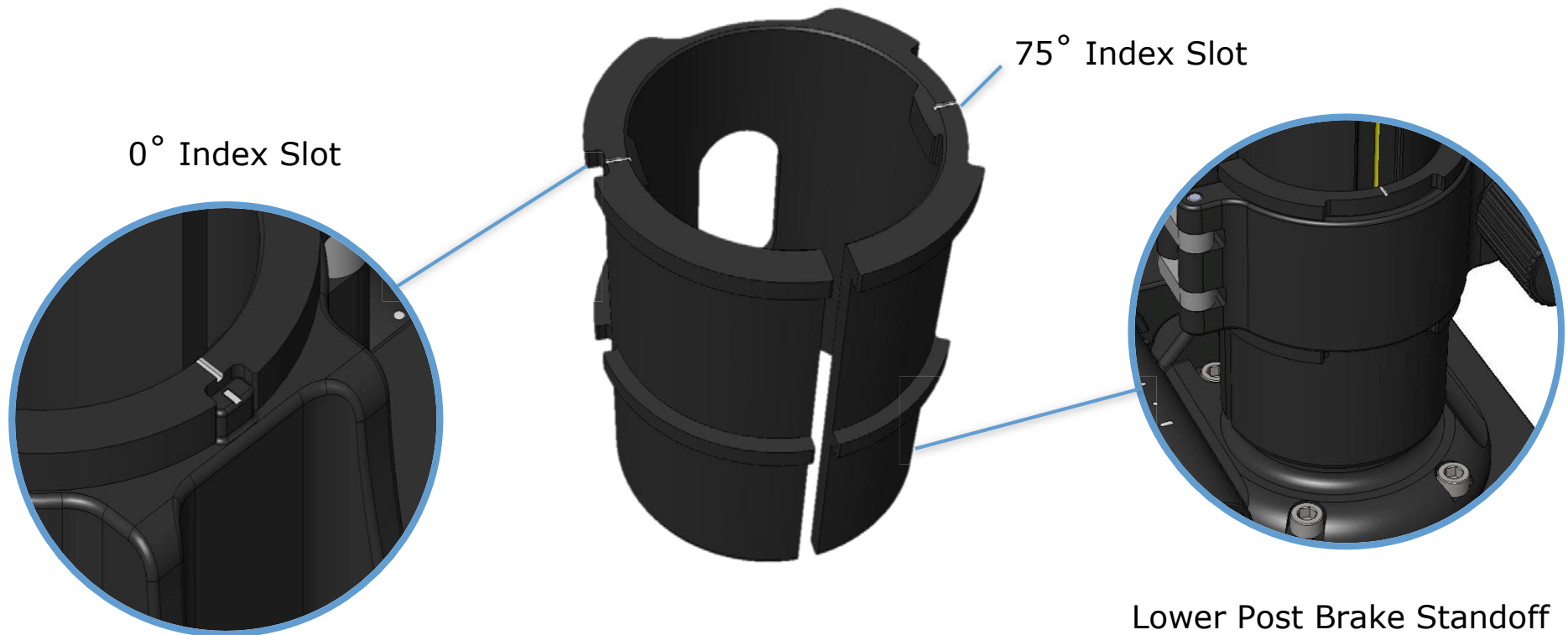
Tip:

Support the monitor when sliding up or down the post to relieve the pressure on the mount so it will slide easily.

Monitor Positioning

The Brakes:

Each post on the M-1 has a specific collar, called a brake, for the monitor mount. They are intended to stay on each post to allow for quick repositioning of the monitor from one post to the other. The lower post brake has tabs that align it with the post to ensure the stage, monitor and base stay parallel. The gimbal post brake must be aligned by eye using the reference lines.



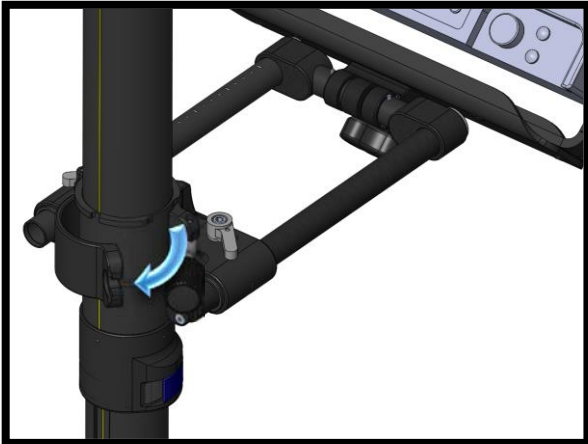
Note:

If you prefer NOT to have the monitor indexed on the lower post, simply rotate the brake 180° on the post and you will have 75° available for rotation.

The Monitor Mount

Switching Posts:

You can easily move the monitor mount from the lower post to the gimbal post. While the mount is off the brake, you can also flip it over so the monitor will be upright in low-mode. Always support the monitor with one hand while disengaging and engaging the clamp.



Loosen the post clamp knob until it can clear the swing arm.

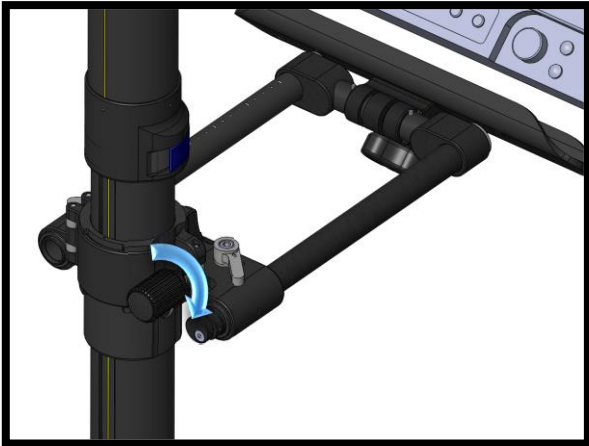


Pull the monitor away from the post. The post clamp will swing clear, leaving the brake on the post.



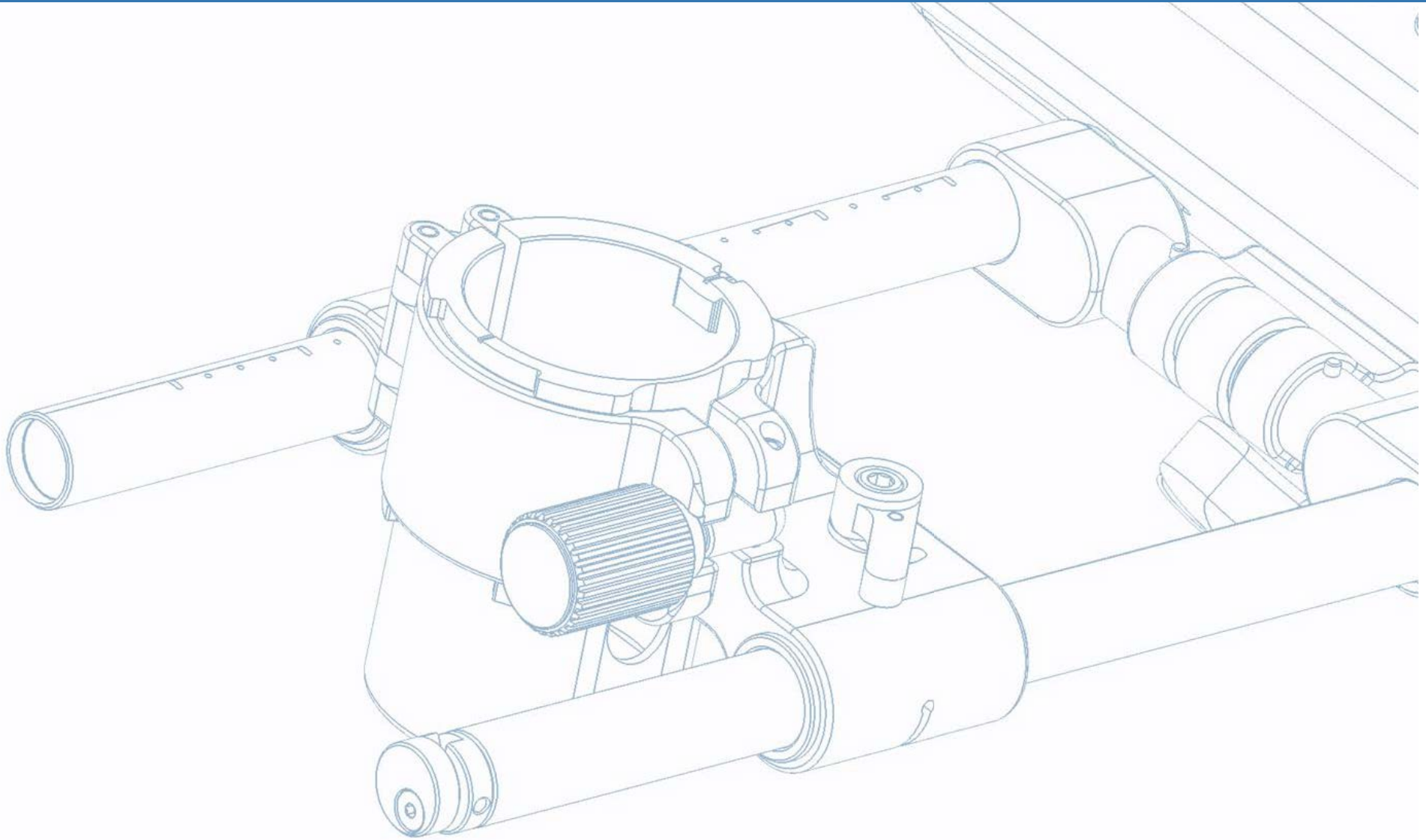
Reposition the monitor mount on the other post brake, or flip it over for low-mode. Ensure the front index tabs are aligned.

Monitor Positioning

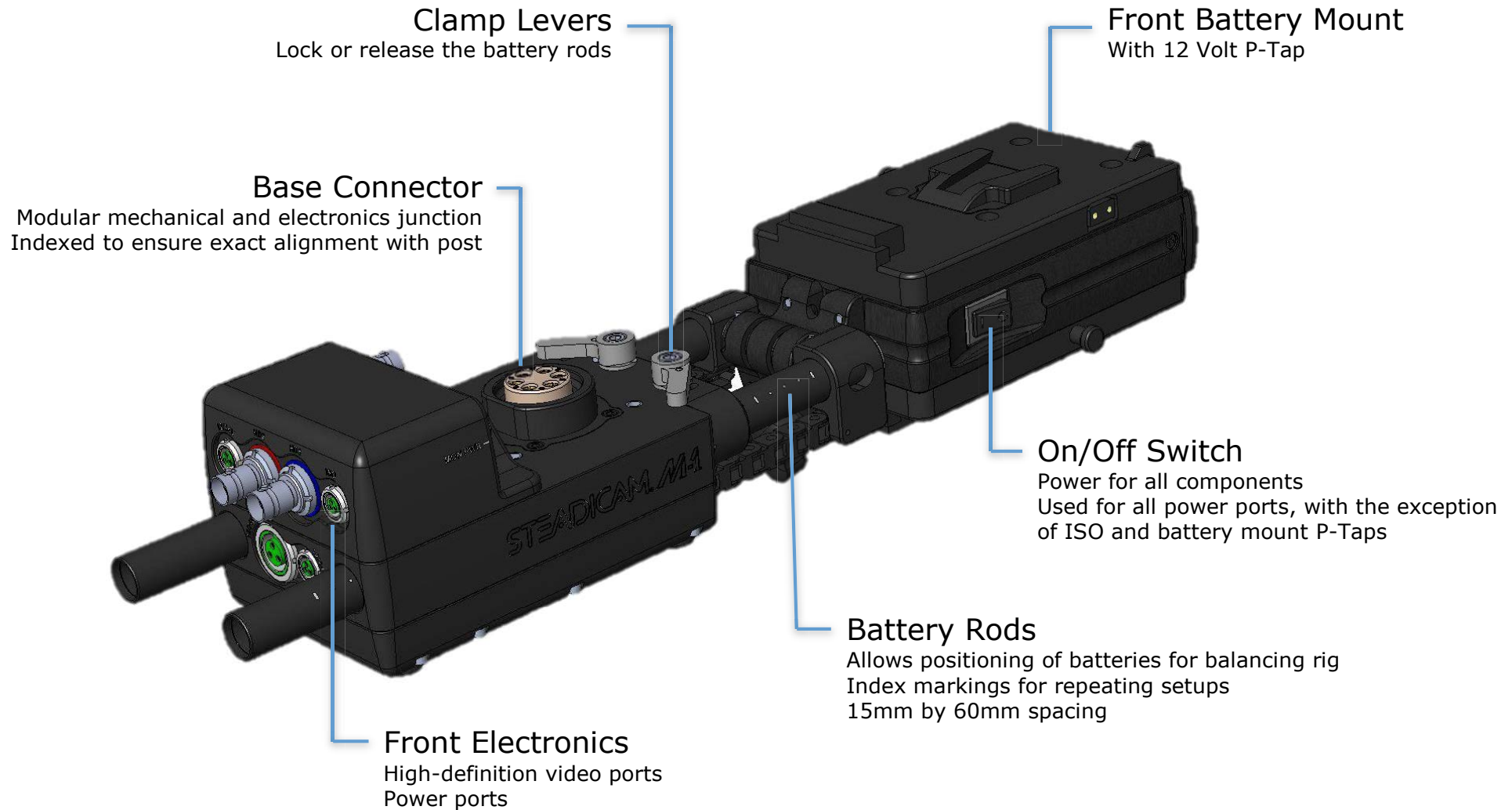


Close the post clamp swing arm around the brake and lock the monitor mount in place with the post clamp knob.

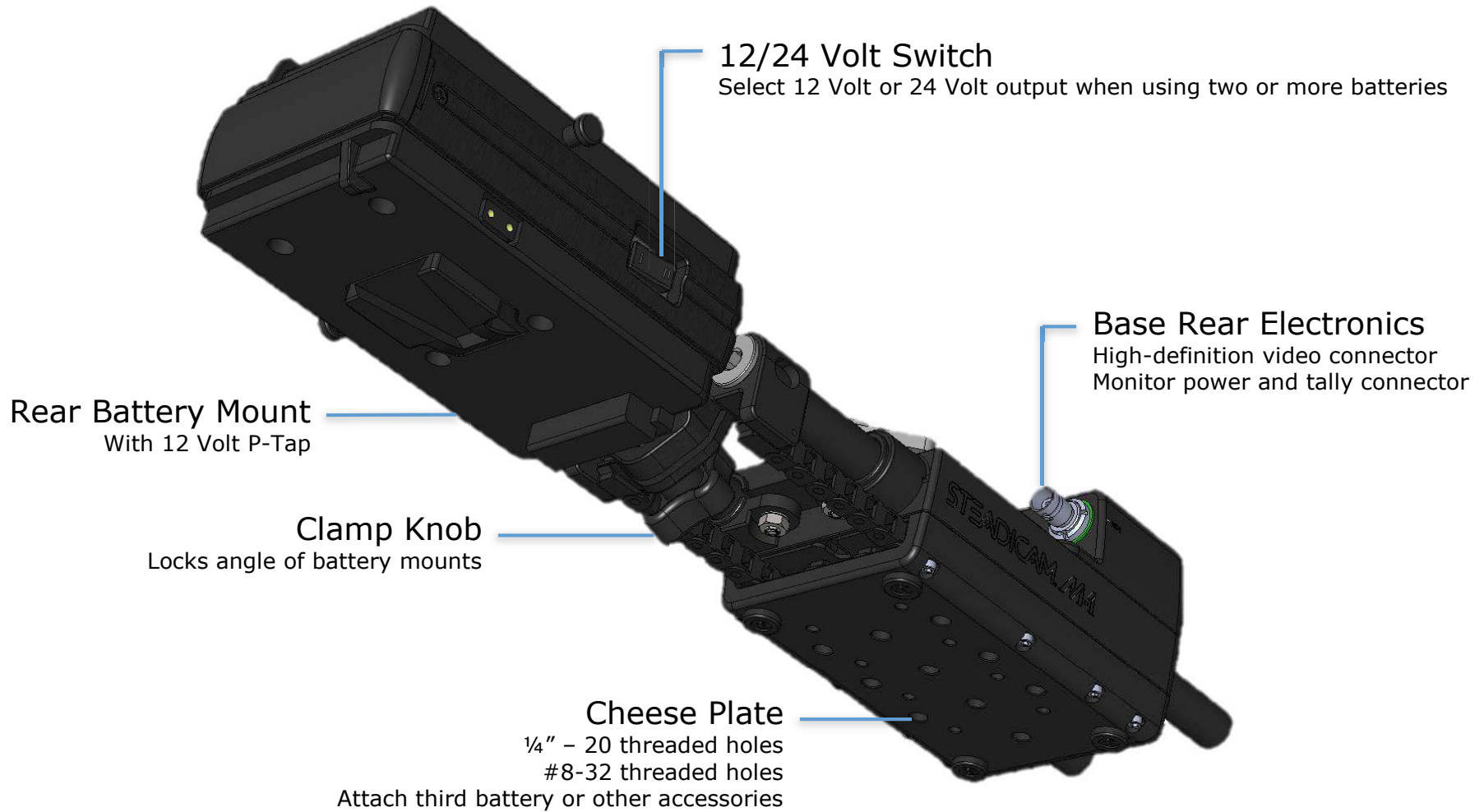




The Base and Battery Mount



Components

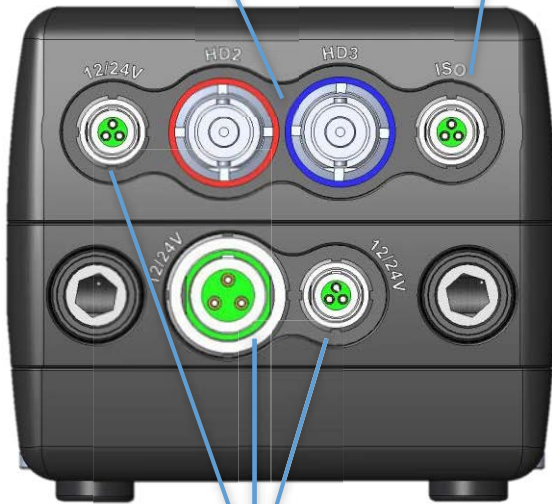


The Base and Battery Mount

Front Electronics

ISO Port, LEMO 0B
Provides an isolated port for dedicated accessories

High-Definition Video Ports
Direct, 3G compatible connections to the M-1 stage
Color-coded at each end



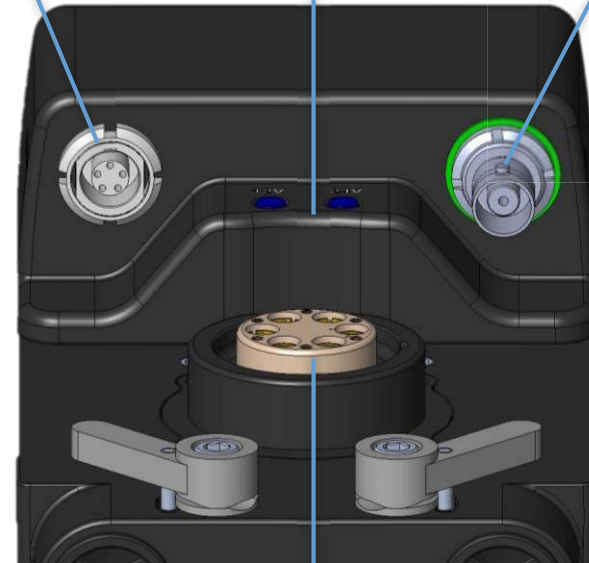
Three 12/24 Volt LEMO Ports
12 Volts supplied at all times
12 and 24 Volts simultaneously when in 24V mode
One 2B and two 0B sized ports

Rear Electronics

Monitor Port
Power and tally signal

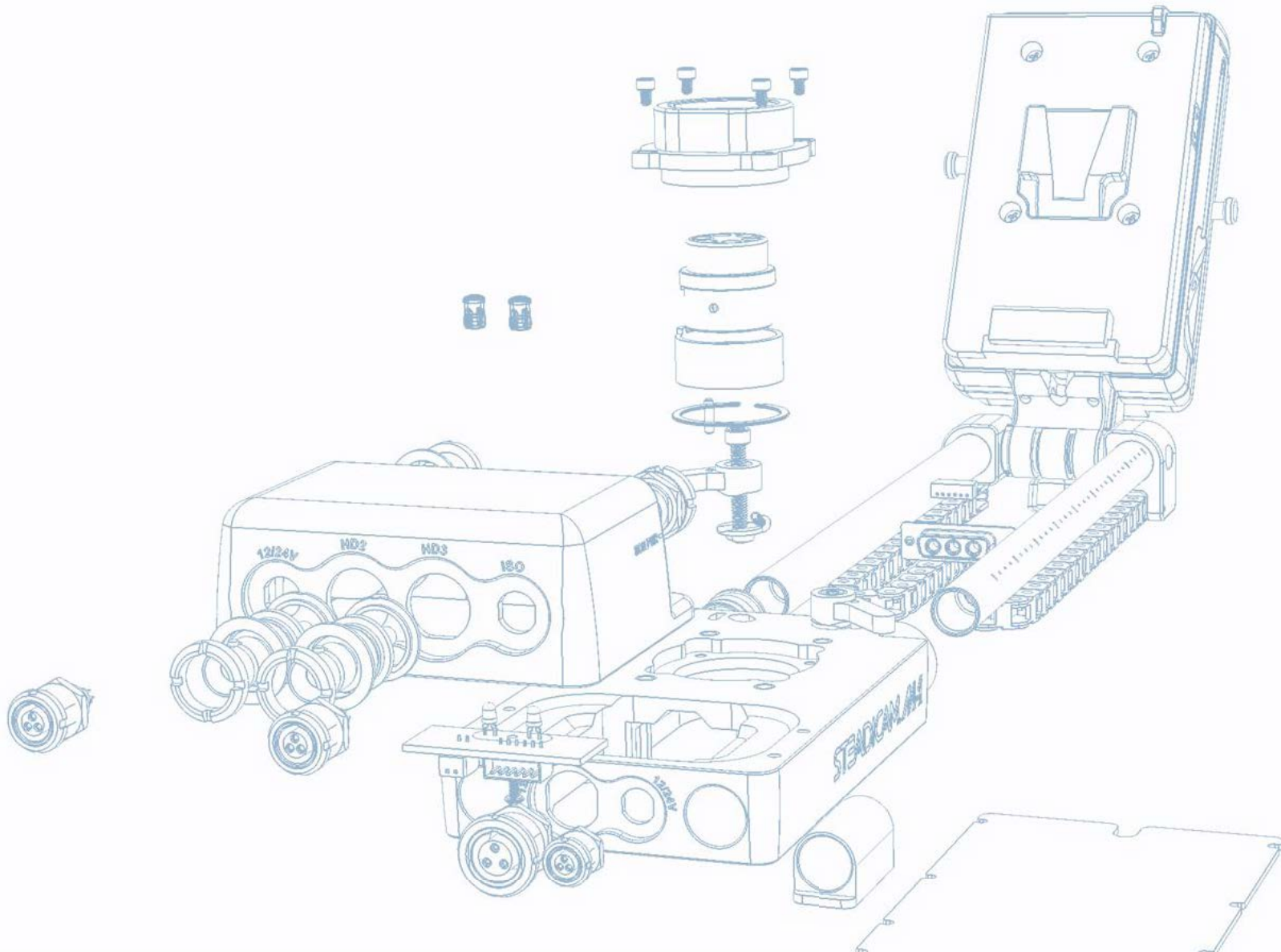
High-Definition Video Port
Direct, 3G compatible connection to the M-1 stage
Color-coded at each end

12/24 Volt LEDs
Indicates selected voltage



Base Connector
Modular mechanical and electronics junction
Indexed to ensure exact alignment with post

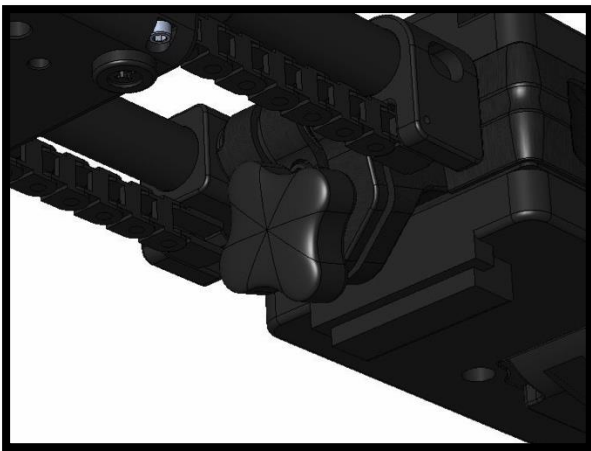
Components



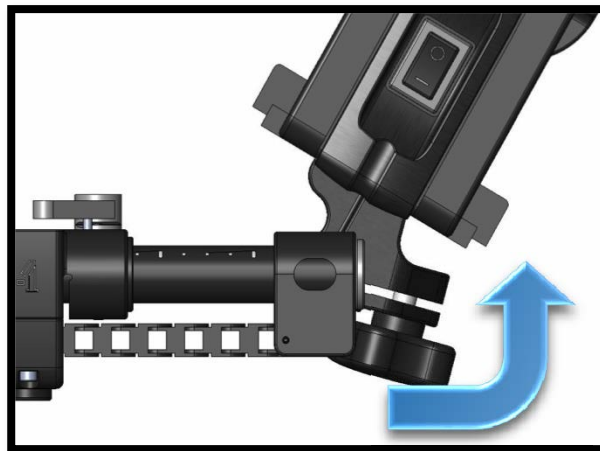
The Base and Battery Mount

Battery Positioning:

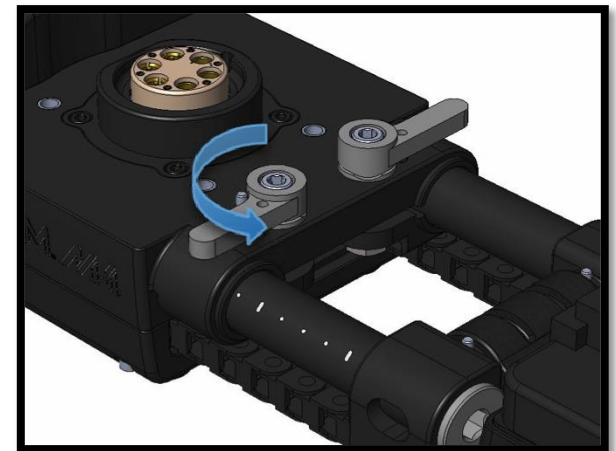
As with the monitor mount, the battery mount gives operators the freedom to set up the rig to their liking. The batteries can be brought in tight to the base for a whippy feel and plenty of leg clearance for switches. The battery mount can also be elongated to increase pan inertia and to balance a monitor placed way out front. Adjusting for position and rotation takes seconds:



Support the batteries with one hand and loosen the battery clamp knob with the other.



Rotate the batteries to the angle you desire and re-tighten the battery clamp knob.

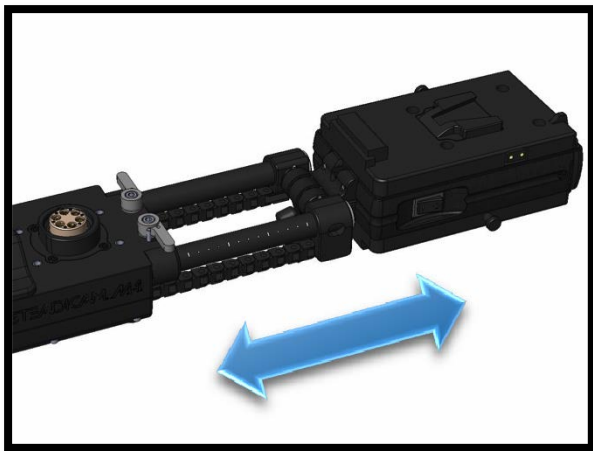


Unlock the battery rods by rotating both clamp levers perpendicular to the battery rods.

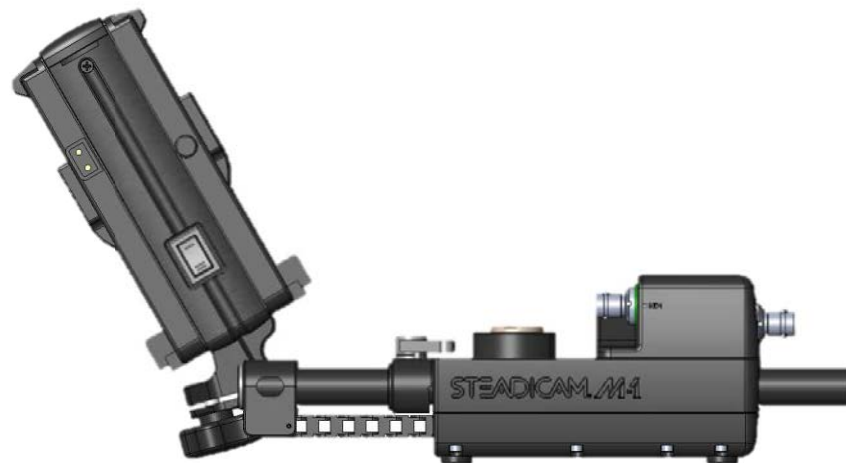
Note:

The batteries have approximately 8 inches of fore-aft adjustability on the battery rods. The cable chain limits the extension.

Battery Positioning



Slide the batteries to either balance the rig or move to your preferred position. Then re-lock the clamp levers before checking drop time.





NEW

Power Management and Electronics

Using Two Batteries on the M-1 Base:

With the 12/24V switch in the 12 Volt position, the front and rear batteries are wired together in **parallel**. When the switch is in the 24 Volt position, the two batteries are wired together in **series**. It is best not to mix charged and discharged batteries. Note that the 12V output voltage is battery dependent and may vary approximately from 11 to 17 Volts with typical lithium-ion batteries. The 24V output voltage is battery dependent and will vary between approximately 22 and 34 Volts.

P-Tap Ports:

The P-Taps integrated into the M-1 are limited to 5 Amps per connector, which are protected by self-resetting fuses (check the specifications of accessories before powering via the P-Tap ports). The P-Taps on the stage deliver voltage of approximately 12 Volts and are operated via the power switch on the base; the P-Taps on the base deliver the same 5 Amps but are not controlled by the power switch. The P-Taps on the base are current-limited by fuses in the battery mounts which are typically 5 Amps for IDX VL and 10 Amps for Anton Bauer.

ISO Ports:

The ISO connectors on the stage and the base are isolated from the rest of the power system. There is no power provided from the M-1 batteries and they are not operated via the power switch. The ISO lines are open and available to accommodate the future expansion of your M-1 and custom applications.

Current Rating:

Maximum recommended current rating as rated by manufacturer (* **see Power Management and Electronics connector matrices**)

Circuit Protection:

Circuit protection provided via internal battery protection circuitry. Current availability limited by battery protection.

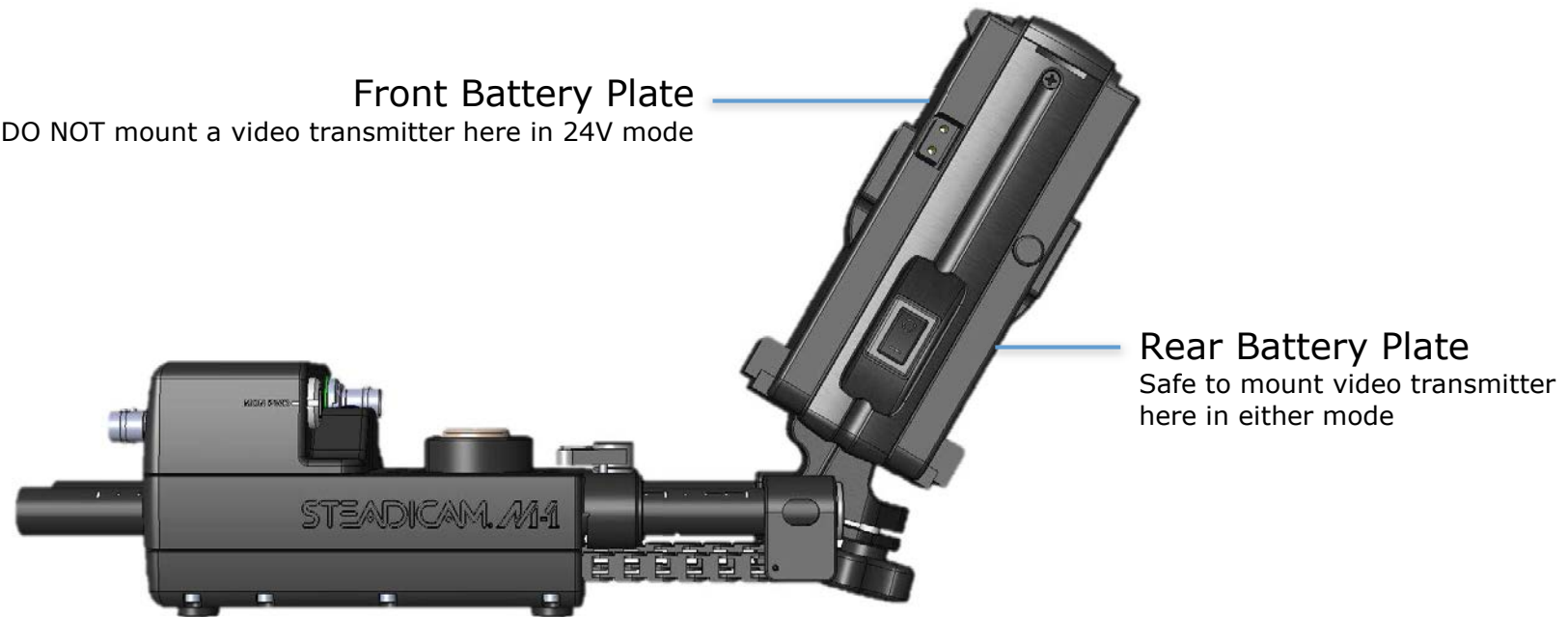
Name Brand Batteries:

Using name brand Anton Bauer® or IDX® batteries is recommended.

Special Notes

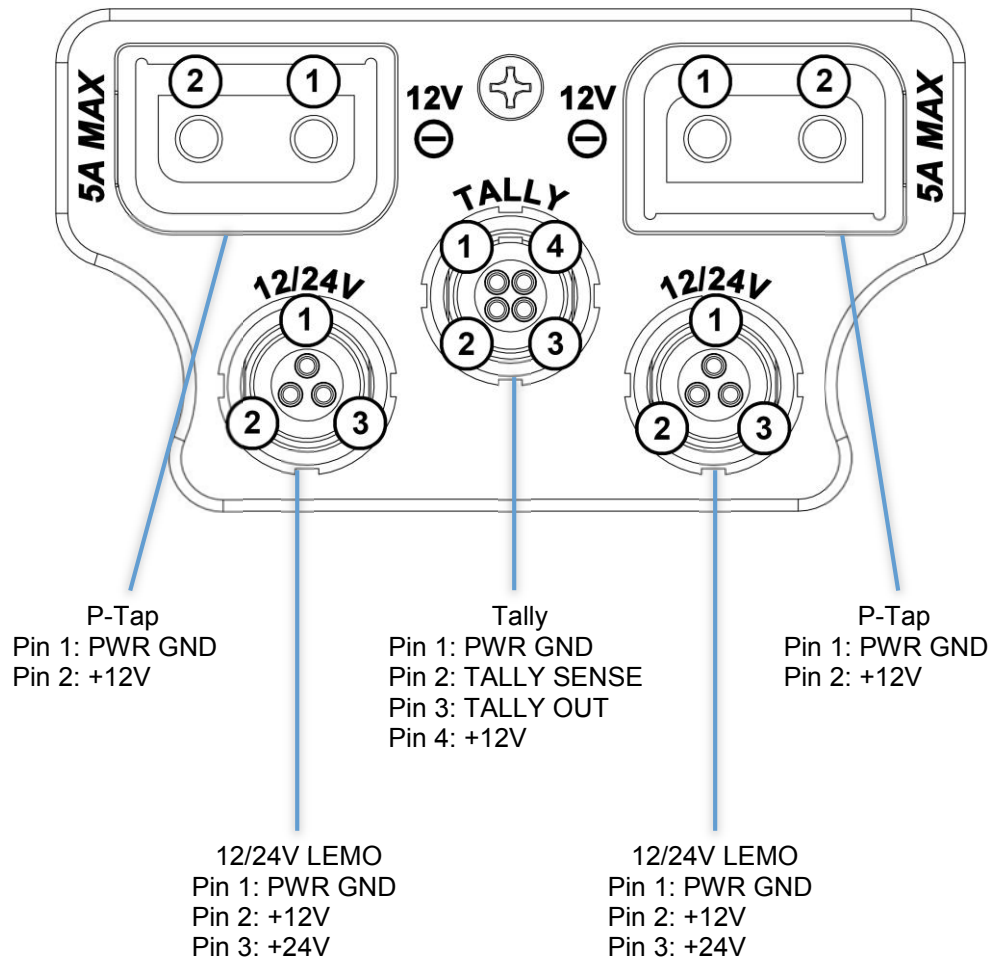
Caution about Battery-Mount Video Transmitters:




When utilizing 24V mode, do not attach a sandwiched video transmitter to the front battery plate of the M-1. This will cause a live ground situation, damaging the transmitter or other components. Sandwiched transmitters are safe on the rear battery plate in 12V or 24V mode.



Power Management and Electronics

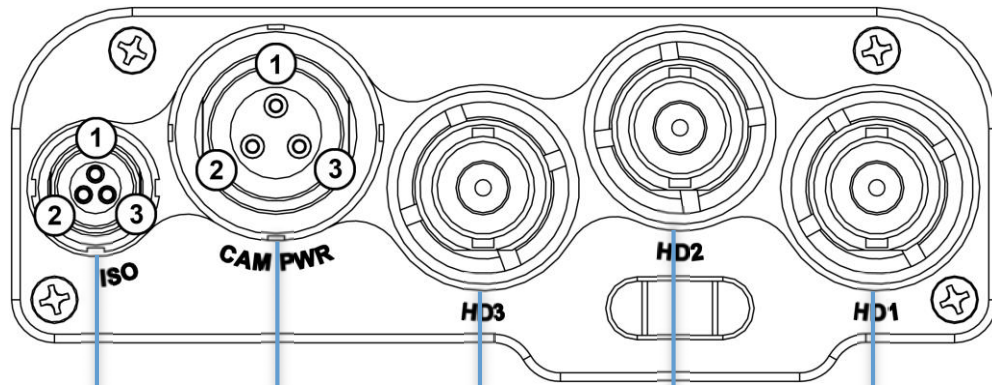
Nose Box Electronics






| Nose Box Connector Matrix | | | |
|--|---------------------|------------------------------------|---------------------------------------|
| Connector Type | Manufacturer & P/N | Recommended Mating Connector | MAX Amperage (*) |
|  P-TAP | TIFFEN | STANDARD P-TAP OR D-TAP CONNECTORS | 5A (SELF RESETTING FUSE PROTECTED) |
|  12/24V LEMO | LEMO ECG.0B.303.CLL | LEMO FGG.0B.303.CLAD42Z | 8A |
|  TALLY | LEMO ECG.0B.304.CLL | LEMO FGG.0B.304.CLAD31Z | 8A |

Connector/Pin Diagrams

Stage, Rear Electronics



| Stage, Rear Connector Matrix | | | |
|--|---------------------|------------------------------|------------------|
| Connector Type | Manufacturer & P/N | Recommended Mating Connector | MAX Amperage (*) |
| ISO  | LEMO ECG.0B.303.CLL | LEMO FGG.0B.303.CLAD42Z | 8A |
| CAM PWR  | LEMO ECG.2B.303.CLL | LEMO FHG.2B.303.CYCD72 | 17A |
| HD1, HD2, HD3  | AMPHENOL® 112253 | STANDARD 75ohm BNC | N/A |

ISO
Pin 1: Pin 1 Base
Pin 2: Pin 2 Base
Pin 3: Pin 3 Base
Direct connect to ISO on Base

CAM PWR
Pin 1: PWR GND
Pin 2: +12V
Pin 3: +24V

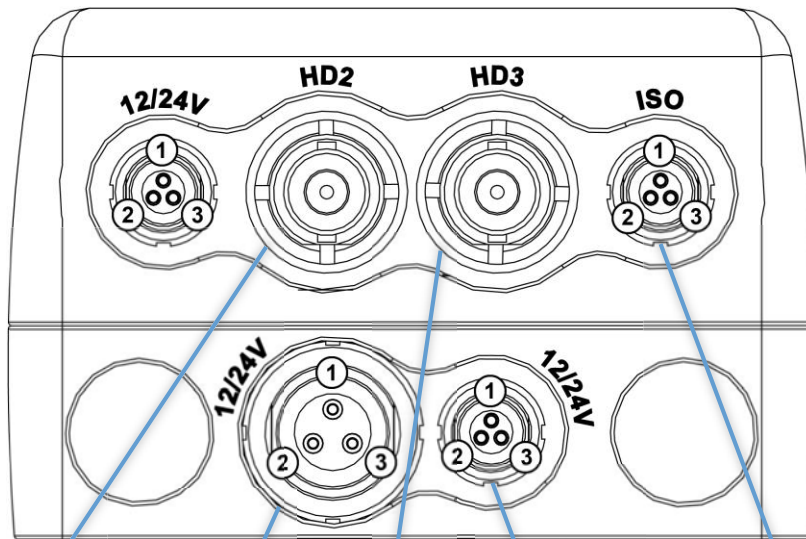
HD3
BNC male, direct connect to HD3 on Base

HD2
BNC male, direct connect to HD2 on Base

HD1
BNC male, direct connect to HD1 on Base

Power Management and Electronics

Base, Front Electronics







HD2
BNC male, direct
connect to HD2 on Stage

HD3
BNC male, direct
connect to HD3 on Stage

ISO
Pin 1: Pin 1 Stage
Pin 2: Pin 2 Stage
Pin 3: Pin 3 Stage
Direct connect to
ISO on Stage

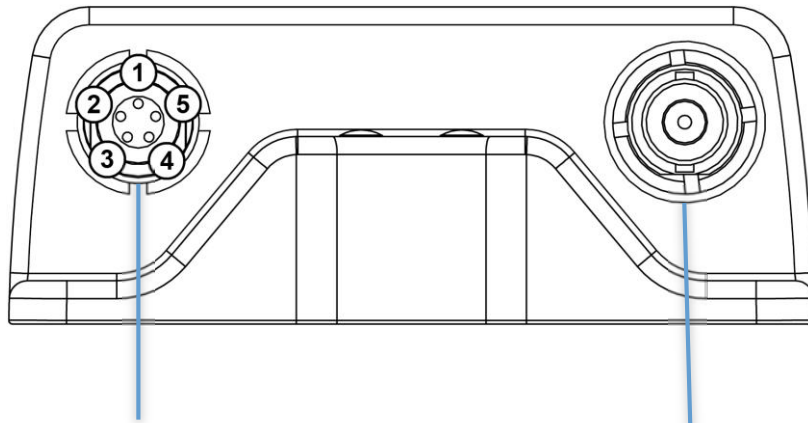
12/24V 2B LEMO
Pin 1: PWR GND
Pin 2: +12V
Pin 3: +24V

12/24V (2X) 0B LEMO
Pin 1: PWR GND
Pin 2: +12V
Pin 3: +24V

| Base, Front Connector Matrix | | | |
|---|---------------------|------------------------------|------------------|
| Connector Type | Manufacturer & P/N | Recommended Mating Connector | MAX Amperage (*) |
|  HD2, HD3 | AMPHENOL 112253 | STANDARD 75ohm BNC | N/A |
|  12/24V 2B LEMO | LEMO ECG.2B.303.CLL | LEMO FHG.2B.303.CYCD72 | 17A |
|  12/24V 0B LEMO | LEMO ECG.0B.303.CLL | LEMO FGG.0B.303.CLAD42Z | 8A |
|  ISO | LEMO ECG.0B.303.CLL | LEMO FGG.0B.303.CLAD42Z | N/A |

Connector/Pin Diagrams



Base, Rear Electronics



MON PWR
Pin 1: PWR GND
Pin 2: +12V
Pin 3: TALLY
Pin 4: RX
Pin 5: TX

HD1
BNC male, direct connect
to HD1 on Stage

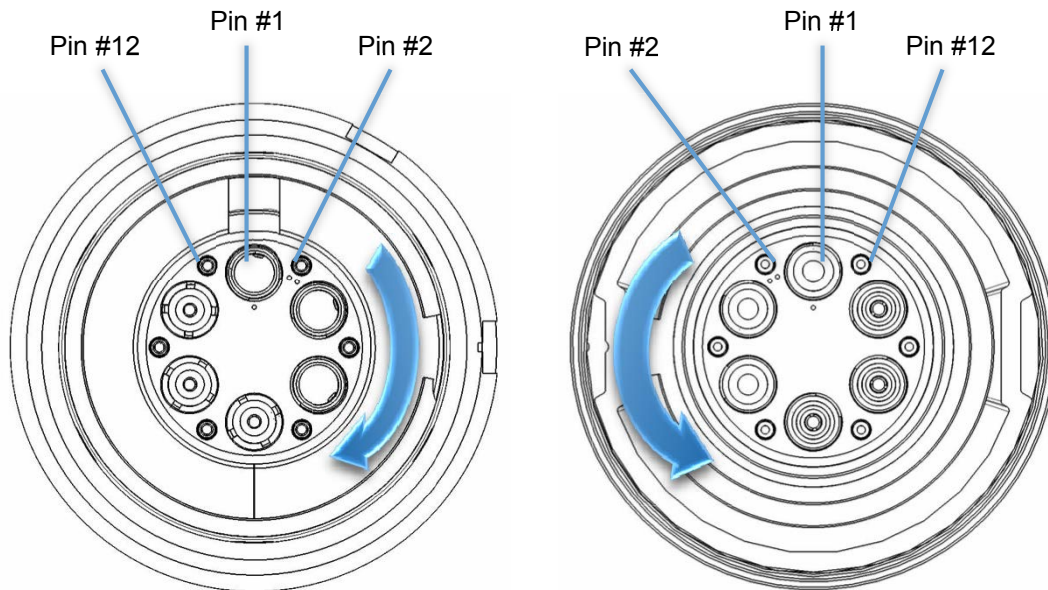
Base, Rear Connector Matrix

| Connector Type | Manufacturer & P/N | Recommended Mating Connector | MAX Amperage (*) |
|--|---------------------|------------------------------|------------------|
| HD1  | AMPHENOL 112253 | STANDARD 75ohm BNC | N/A |
| MON PWR  | LEMO ECG.1B.305.CLL | LEMO FGG.1B.305.CYCD72Z | 9A |

Power Management and Electronics

M-1 Stage, Base and Post Connectors:

These proprietary connectors carry power and video signals through the post but still allow the components to be disassembled easily. Because these connectors mate together, they are mirrors of each other, so be careful when determining pins. The 12 pins are counted in a circle starting at pin #1 with one dot, followed by #2 with two dots and continuing from there.



| Stage, Base and Post Connector Matrix | | | |
|--|--------------|-------------|------------|
| Connector Type | Pin Location | Description | Tiffen P/N |
| Male Connector, Stage, Post Bottom | #1 | PWR GND | PIN-250254 |
| | #2 | ISO GND | PIN-250267 |
| | #3 | +12V | PIN-250254 |
| | #4 | ISO +12V | PIN-250267 |
| | #5 | +24V | PIN-250254 |
| | #6 | ISO +24V | PIN-250267 |
| | #7 | HD3 | PIN-250253 |
| | #8 | TALLY | PIN-250266 |
| | #9 | HD2 | PIN-250253 |
| | #10 | RX | PIN-250266 |
| | #11 | HD1 | PIN-250253 |
| | #12 | TX | PIN-250266 |
| Female Connector, Base, Post Top | #1 | PWR GND | SCT-138714 |
| | #2 | ISO GND | SCT-138717 |
| | #3 | +12V | SCT-138714 |
| | #4 | ISO +12V | SCT-138717 |
| | #5 | +24V | SCT-138714 |
| | #6 | ISO +24V | SCT-138717 |
| | #7 | HD3 | SCT-138713 |
| | #8 | TALLY | SCT-138716 |
| | #9 | HD2 | SCT-138713 |
| | #10 | RX | SCT-138716 |
| | #11 | HD1 | SCT-138713 |
| | #12 | TX | SCT-138716 |



NEW

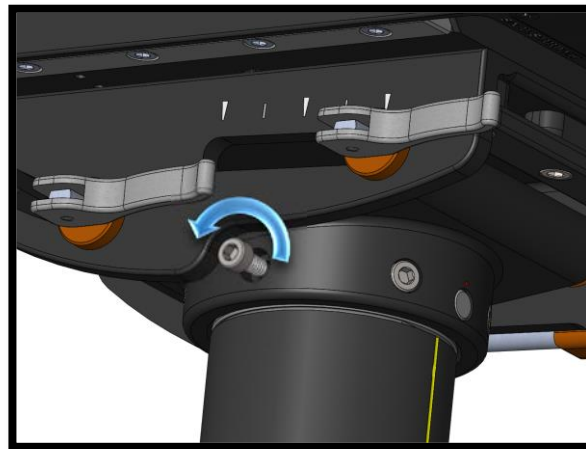
Adjustments and Maintenance

Separating the Major Modular Components:

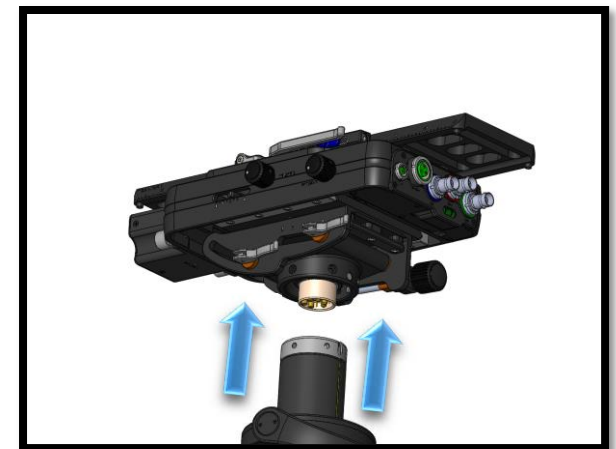
The three major components—the stage, post and base—all connect through the post connectors. You can easily gain access to your gimbal by removing the stage. Here's how it works:



To remove the stage from the post, start with the tilt set square, which allows access to all screws.



Use a 7/64" Allen® wrench to remove the six screws from the post connector.

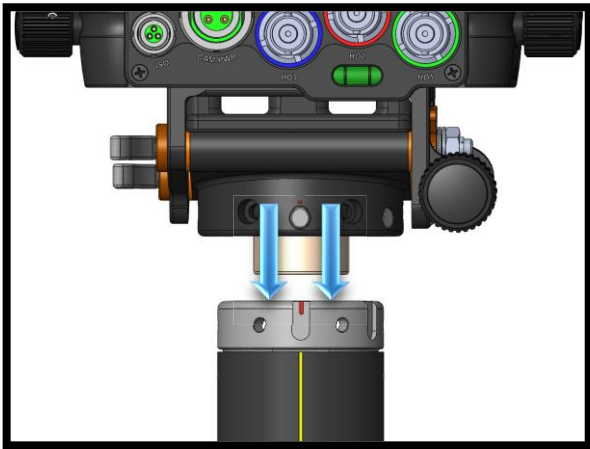


Pull the stage STRAIGHT up off the post. It may take a firm pull, but do not force anything.

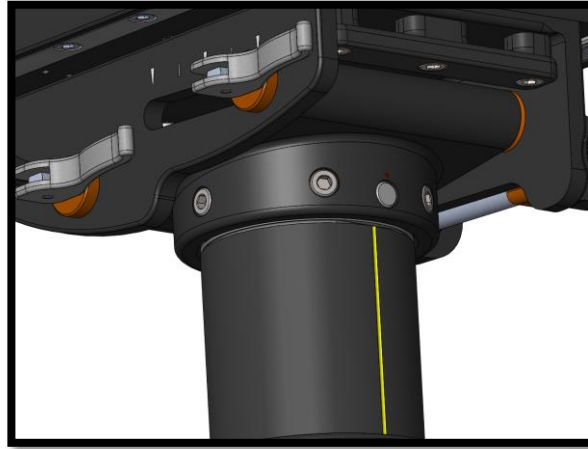
Note:

While the stage is removed, the gimbal can be slid off the post for inspection and maintenance.

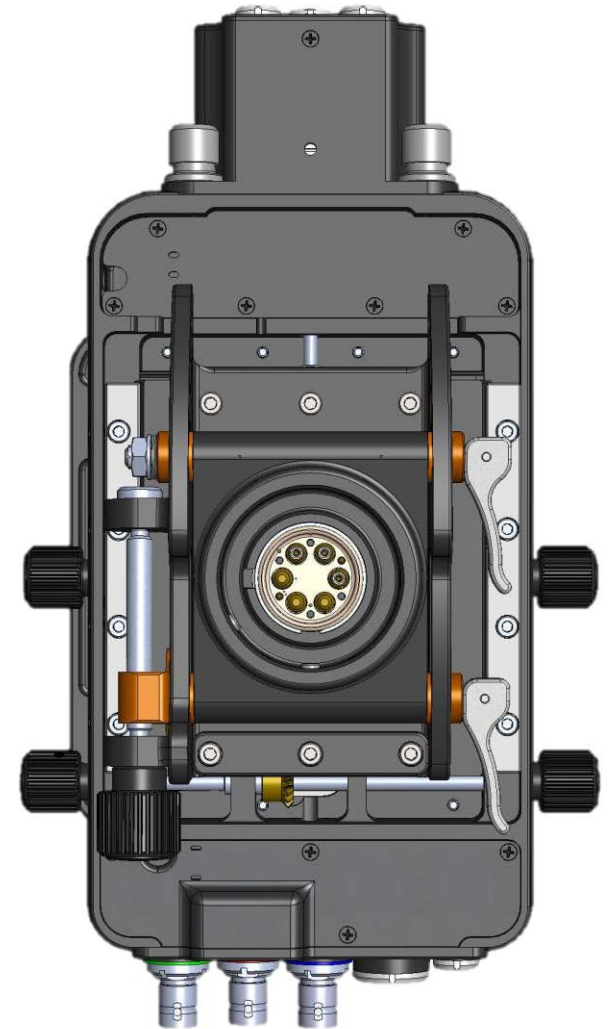
Separating Modular Components



To reinstall the stage, align the red dot with the red line on the post connectors. Insert firmly until the stainless ring is flush.



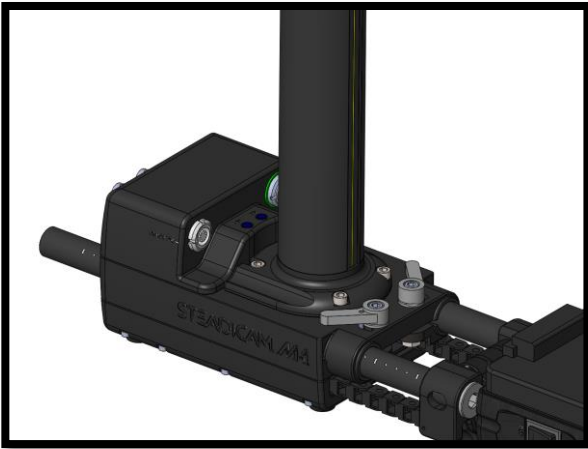
Install the six screws with a 7/64" Allen wrench. Tighten with ample torque to secure the stage.



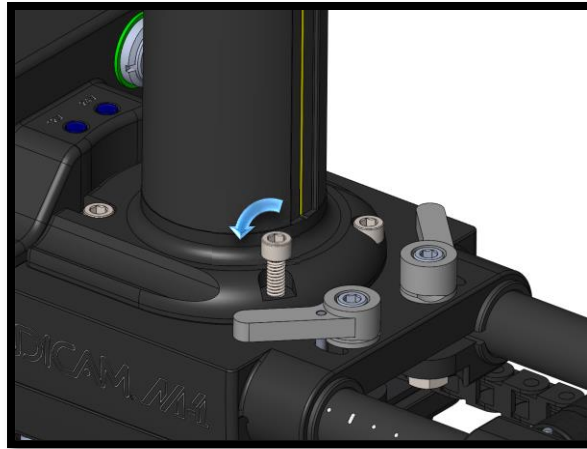
Caution:

Only use the provided high-strength screws for the stage connector. Spares are available.

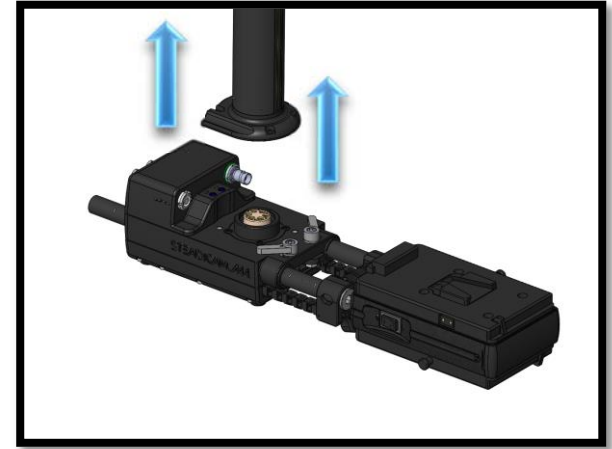
Adjustments and Maintenance



To remove the base, start by removing the monitor mount to make it easier to access the screws.

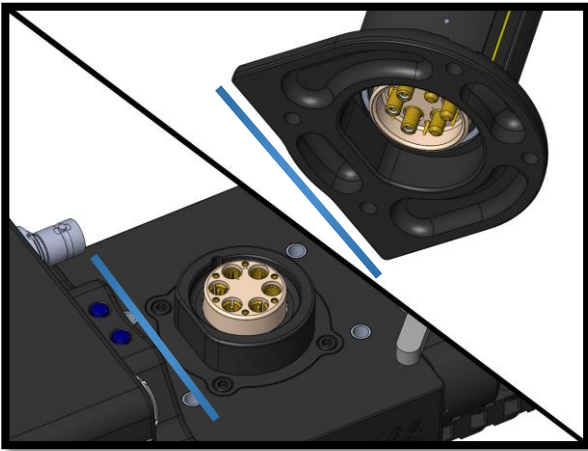


Use a 9/64" Allen wrench to remove the four screws from the post connector.

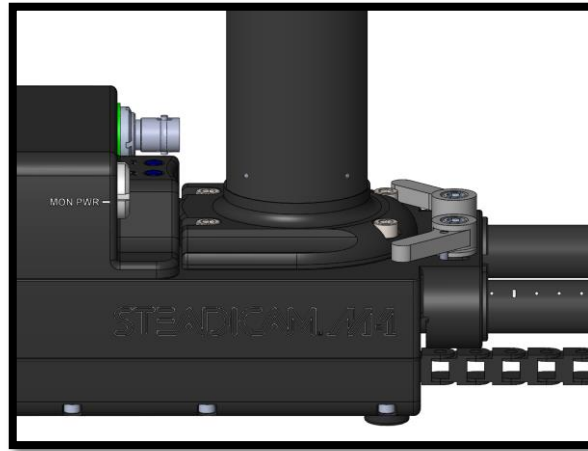


Pull the post STRAIGHT up off the base. It may take a firm pull, but do not force anything.

Separating Modular Components



To reinstall the post on the base, align the flat spot on the post connectors. The straight edge of the post foot should align behind the 12/24V LED's (as indicated by the blue lines in the image above).



Insert firmly until the post connector sits flush on the base and install the four screws with a 9/64" Allen wrench. Tighten with ample torque to secure the post.

Note:

Only use the provided high strength screws for the base connector. Spares are available.

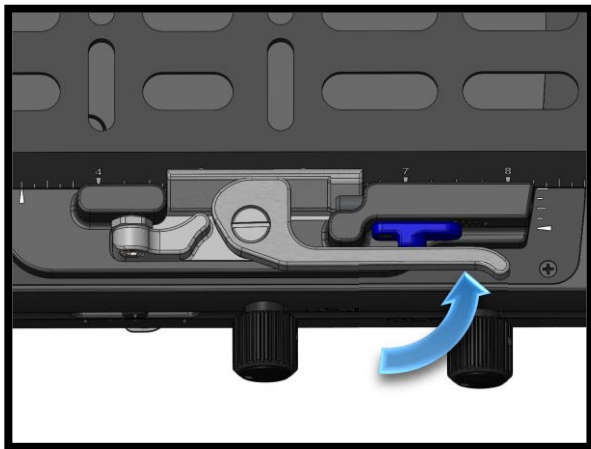




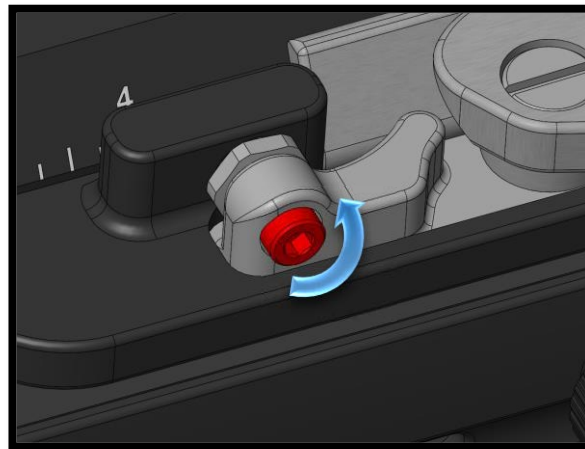
Adjustments and Maintenance

Adjusting Clamps:

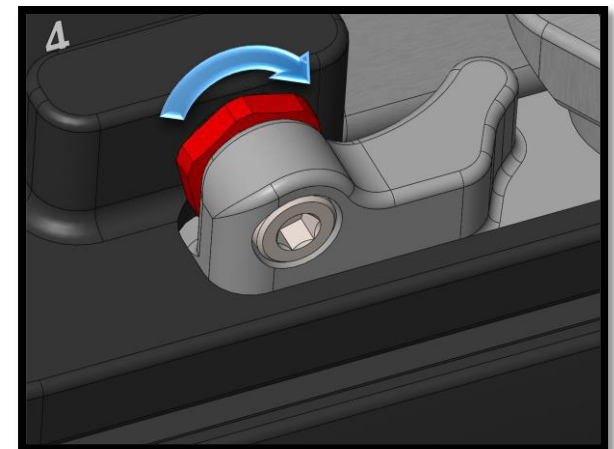
The M-1 utilizes a variety of clamps for tools-free adjustments. This section will show you how to ensure each type is adjusted for optimum clamping force and ease of use. When the rig is new, get accustomed to the feel of each mechanism so that you can determine if one needs attention later. Let's start at the top:



Adjusting the dovetail clamp begins with the dovetail plate installed and the clamp lever closed.

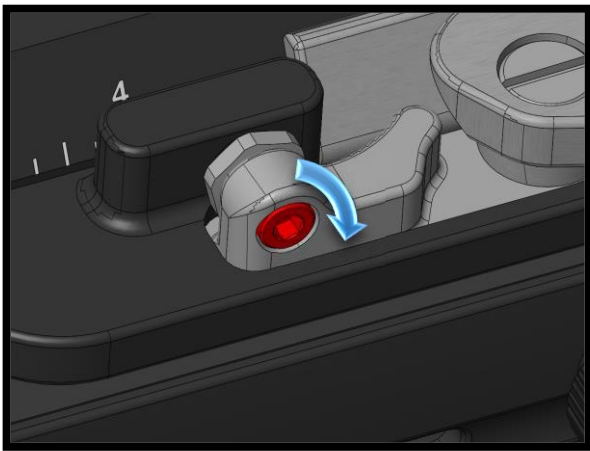


Use a 7/64" Allen wrench to loosen the lock screw approximately one-half turn.

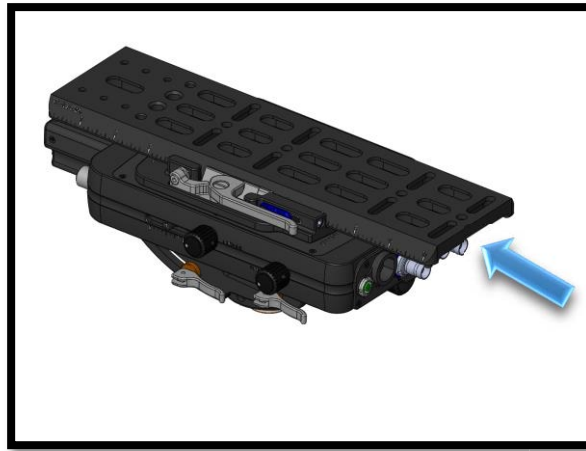


Turn the adjustment nut to dial in the tension. Turn clockwise to tighten, counterclockwise to loosen. Make small adjustments.

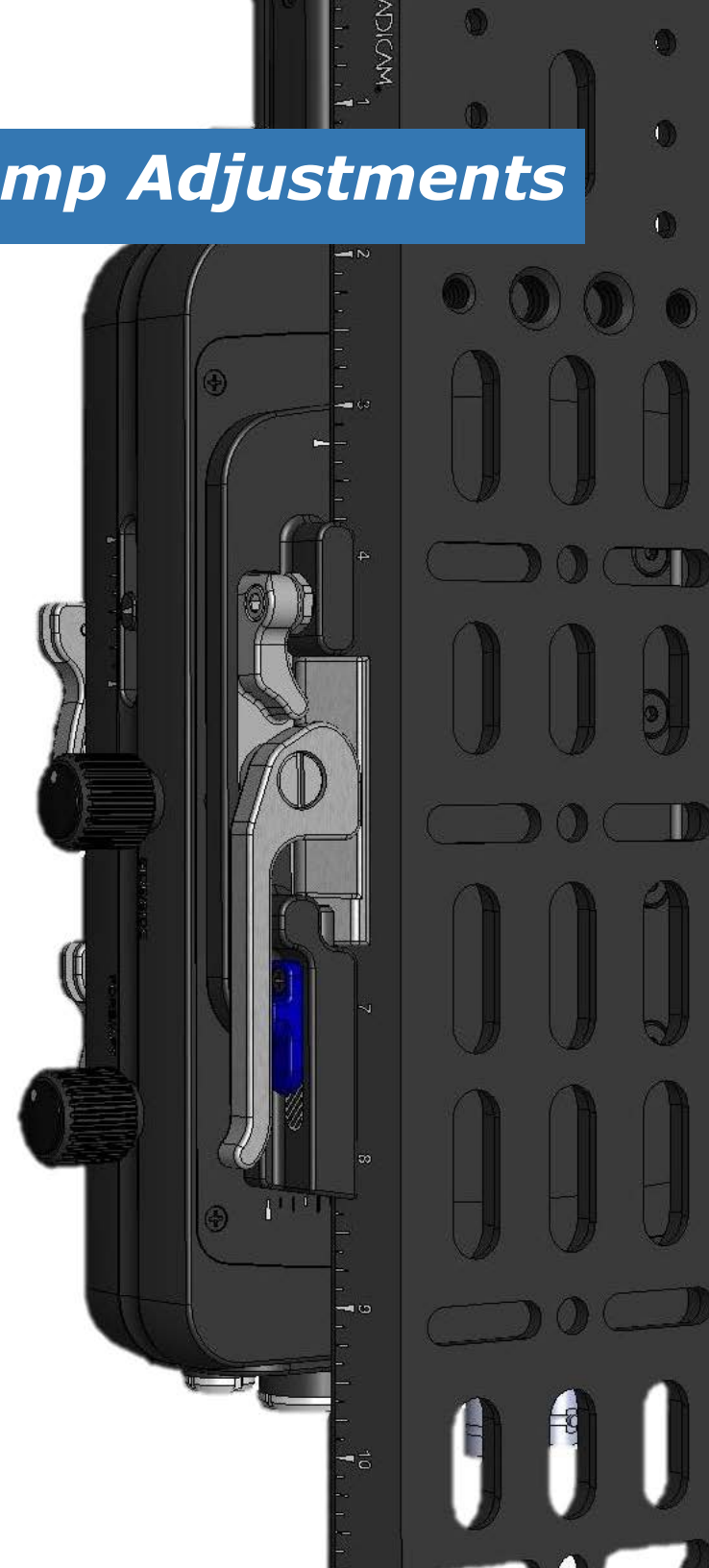
Clamp Adjustments



Tighten the lock screw.



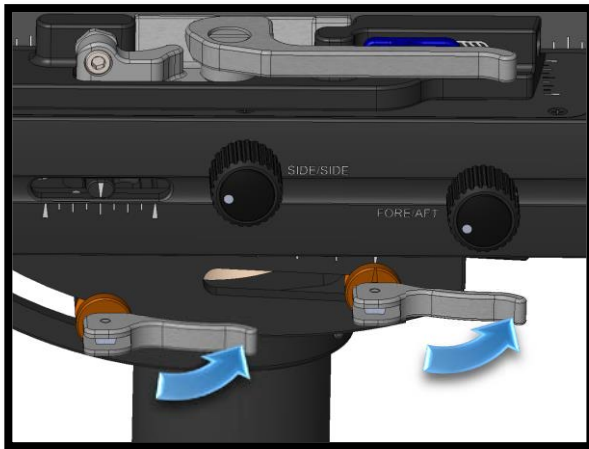
Test to see if the dovetail clamp holds firmly by trying to move the dovetail plate with your hands. Test the clamp lever movement. Repeat adjustment if necessary.



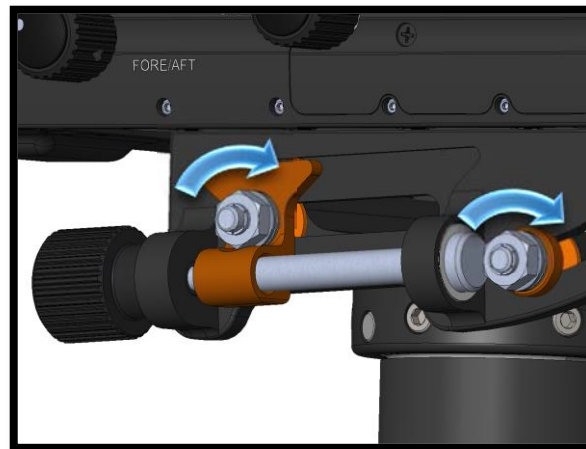
Adjustments and Maintenance

Tilt Locks:

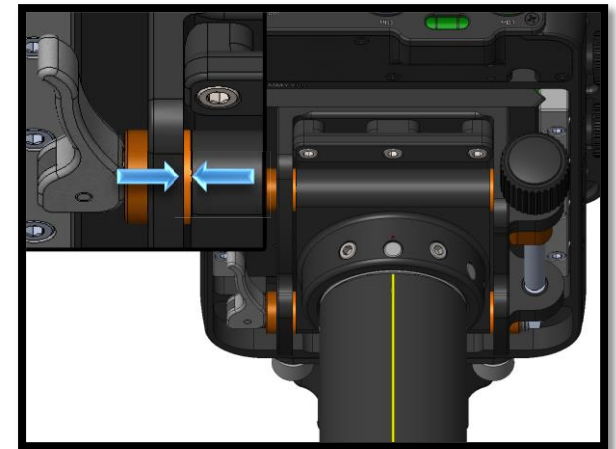
If the brass washers between the tilt stage components have any play when the cam levers are in their closed position, you're not getting the most rigidity from the system. Here's how to adjust them properly:



Adjust the cam levers while they're in the closed position.



Use an 11/32" open-end wrench to tighten each nut a small but equal amount. Start with one-eighth of a turn each.

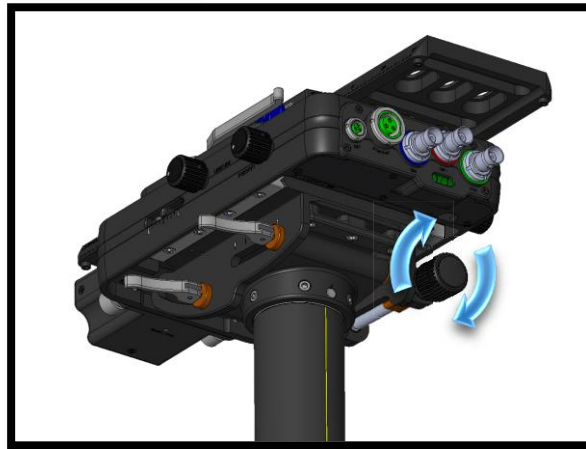


Check to ensure that the brass washers do not move. If they do, add another small turn to each nut.

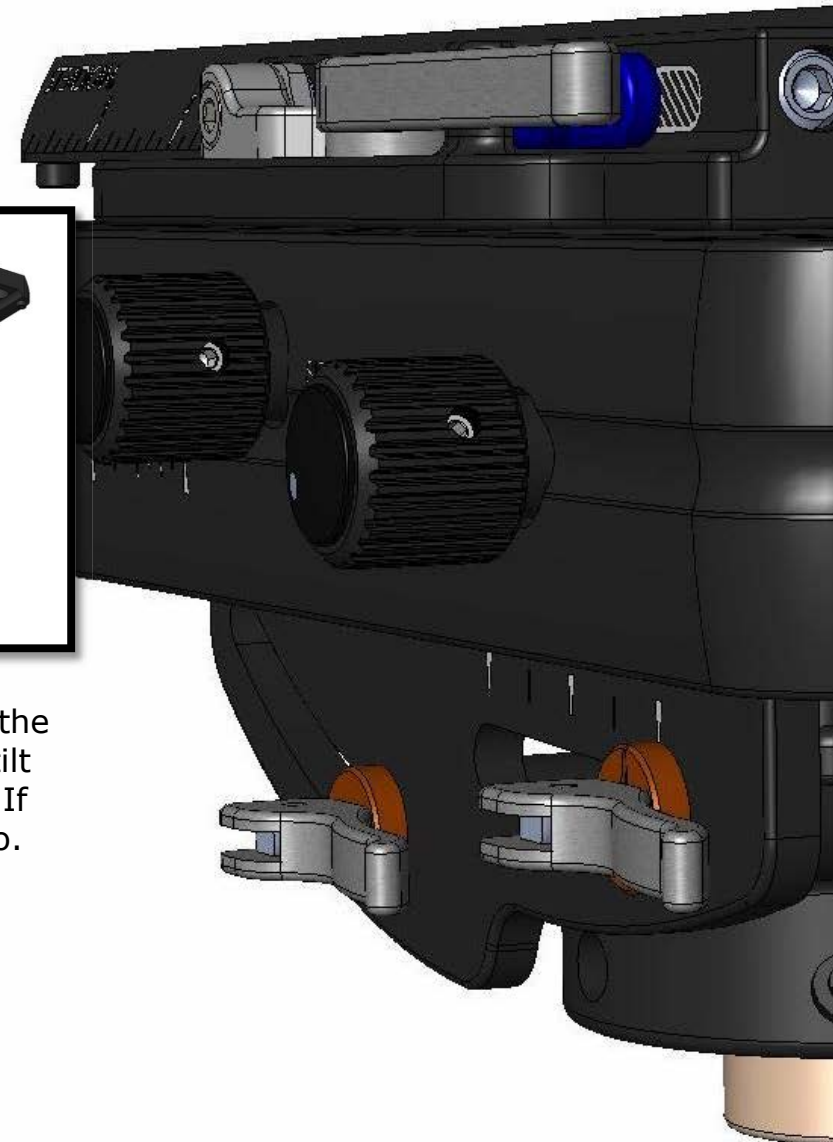
Clamp Adjustments



Check to ensure the cam levers move freely. If they won't open, you've over-tightened the nuts.



With the levers unlocked, turn the tilt drive knob to test that the tilt drive system moves smoothly. If it feels right, you're ready to go.



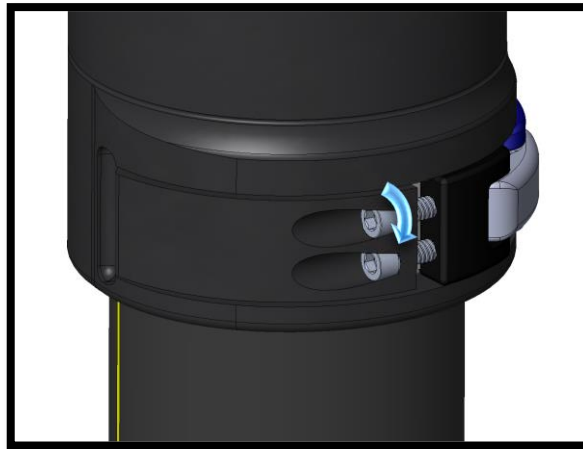
Adjustments and Maintenance

Post Locks:

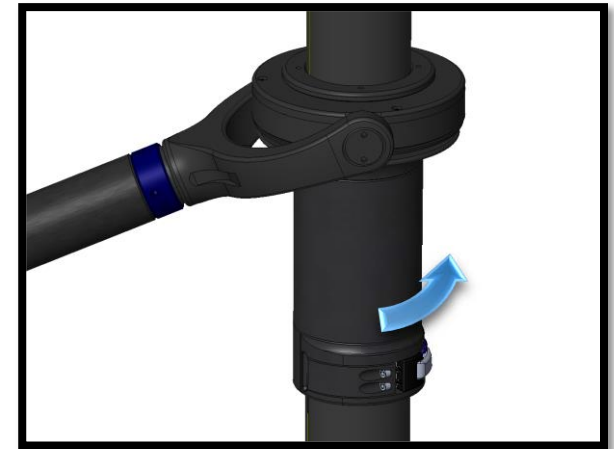
The low-profile post clamps are easy to use and offer a positive lock. You should occasionally test to ensure the gimbal and post are being clamped fully by trying to move the components with the clamps closed. If the components slide with a camera on board, it will affect your drop time.



The over-center locks on the post clamps are adjusted while the post clamp is closed.



Use a 3/32" Allen wrench to turn each screw an equal, tiny amount. You don't want to over-tighten these, take your time.



Test the action of the clamp lever and the holding power of the clamp. Repeat if necessary.

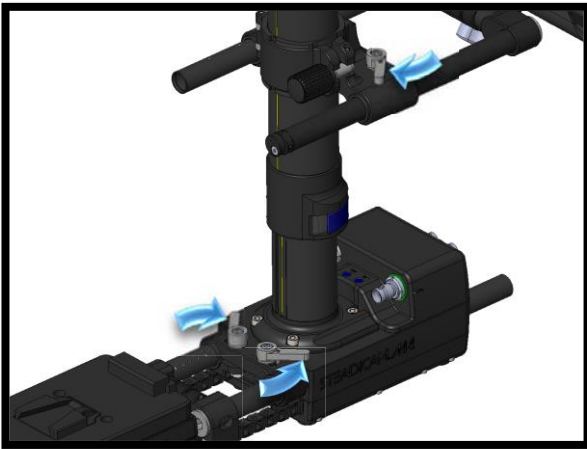
Caution:

Do not over-tighten the post clamps! They are strong enough to distort the carbon fiber post sections but do not need to be that tight to hold. Use minimum clamping force while still holding securely.

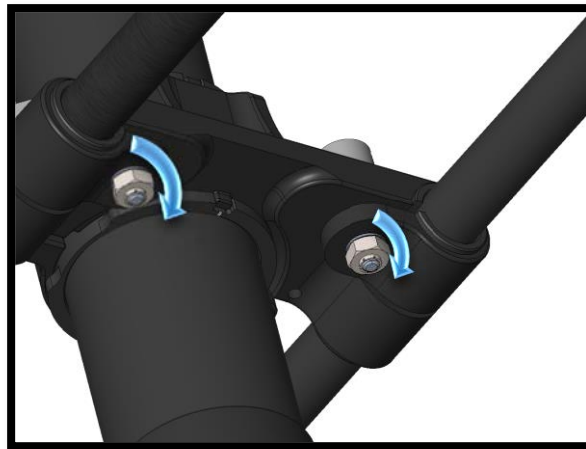
Clamp Adjustments

Rod Clamps:

The monitor and battery rod clamp locks are identical. Though the levers only have a short 45° throw, they clamp securely when properly adjusted. If they slide with a camera on board it will affect your static balance.



Adjust the clamp locks with the clamp levers closed.



Turn the nut a small amount with an 11/32" wrench. Test that the clamp lever opens and closes smoothly.

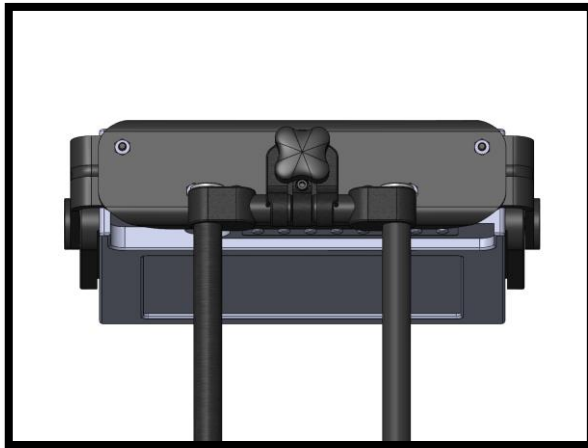


Test the holding power of the rod clamps to ensure the monitor or batteries will not slide when locked.

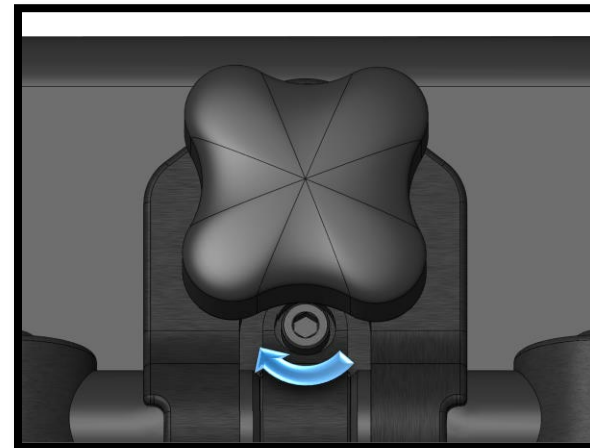
Adjustments and Maintenance

Hinge Brakes:

The monitor and battery pivots have built in friction brakes to support the weight of your monitor and batteries while the clamp knobs are open. If you prefer more or less friction, adjust the friction brakes to your preference. Have your rig completely built and keep one hand on the monitor or batteries while making this adjustment:



Adjust the friction hinge with the clamp knob loose. This allows you to feel the effects of your changes.



Use a 7/64" Allen wrench to either tighten or loosen the brake screw to achieve the desired amount of friction to support your setup.

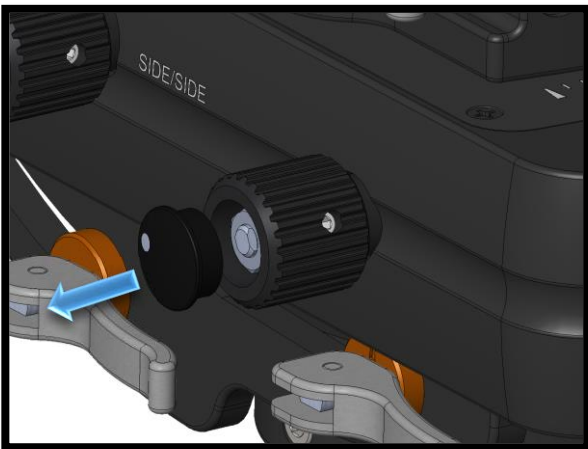
Clamp Adjustments



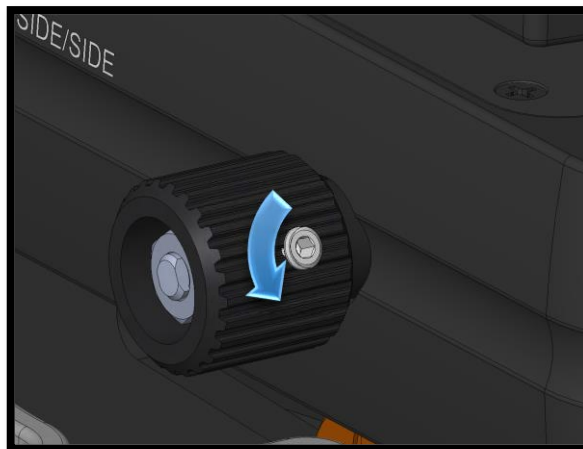
Adjustments and Maintenance

Drive Knob Adjustment:

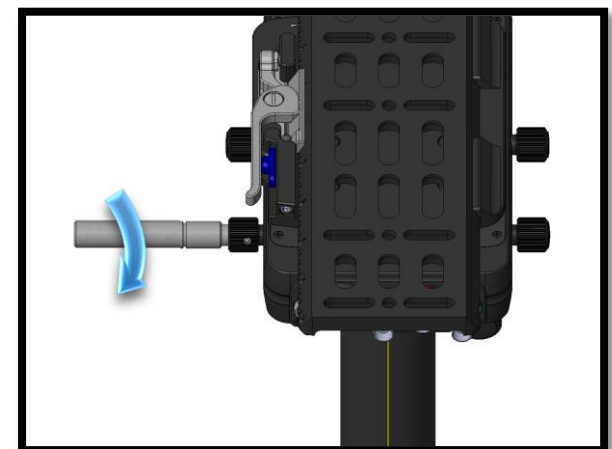
If the fore/aft, side-to-side or tilt drive knobs exhibit free play, your balancing accuracy may be compromised. However, over-tightening can be worse than being loose, so approach these adjustments with care. Follow the steps to tighten the knobs and ensure the proper amount of tension on the drives:



Remove the covers on one pair of stage drive knobs. A penknife or fine blade screwdriver work nicely.

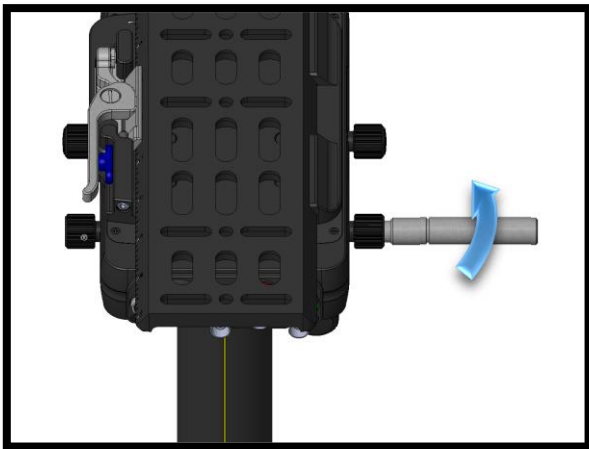


Loosen the locking set screws one-half turn with a 1/16" Allen wrench. You do not need to remove the set screw.

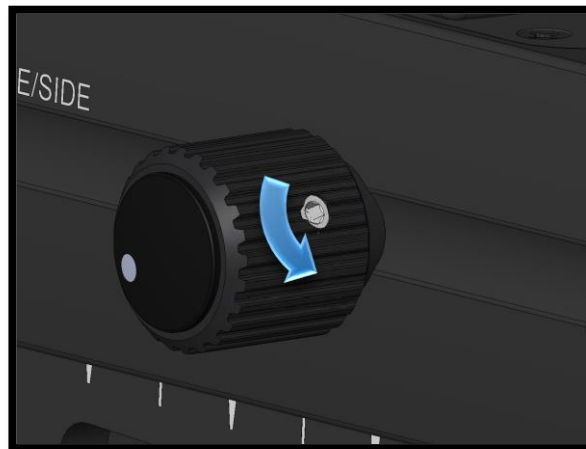


Use the supplied tool (815-7971) to hand-tighten the nut a small amount.

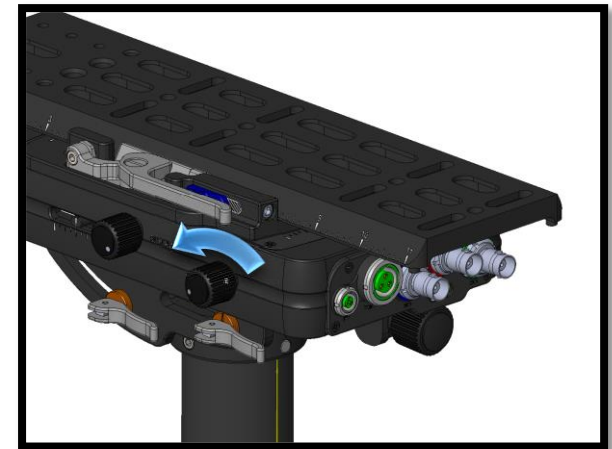
Drive Knob Adjustment



Tighten the knob on the opposite side a small amount as well. Adjust the tension a little at a time and sneak up on the perfect setup.



Tighten the locking set screws before testing the drive knobs.



The knob should not be overly tight, but should not have any slack. When you're satisfied with the feel of the drive, replace the nut covers.

Note:

Tighten the stage drive knobs in pairs; BOTH fore/aft or BOTH side/side knobs. Each pair of knobs share an axle and should be tensioned evenly.

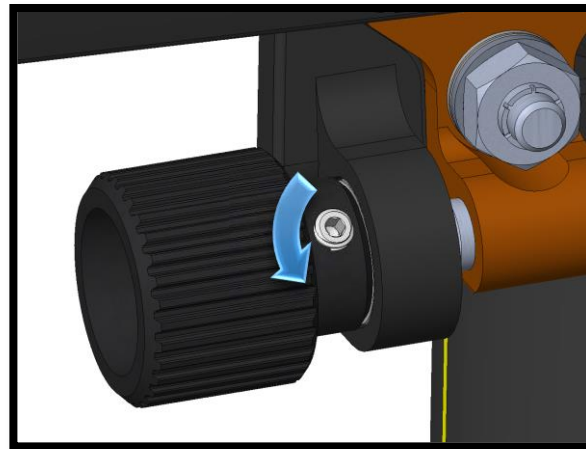
Adjustments and Maintenance

Tilt Drive Adjustment:

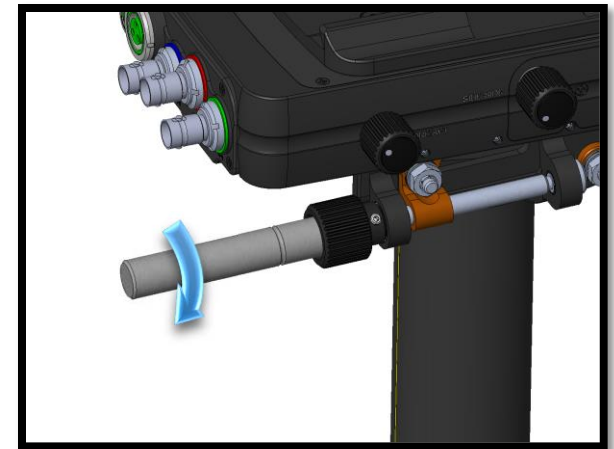
As with the stage drive knobs, the tilt drive knob has an adjustment nut inside. Adjusting it is a similar process:



With no camera on the rig, open the cam levers and remove the cover from the tilt drive knob with a penknife or thin screwdriver.

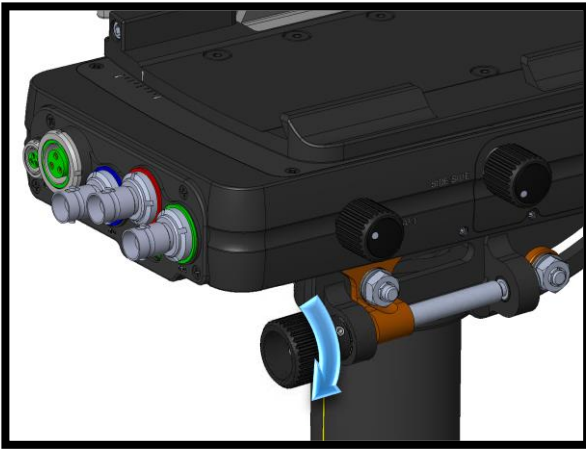


Use a 1/16" Allen wrench to loosen the locking set screw one-half turn.



Use the supplied tool (815-7971) to hand-tighten the nut a small amount. Re-tighten the set screw and test the drive by turning the tilt drive knob.

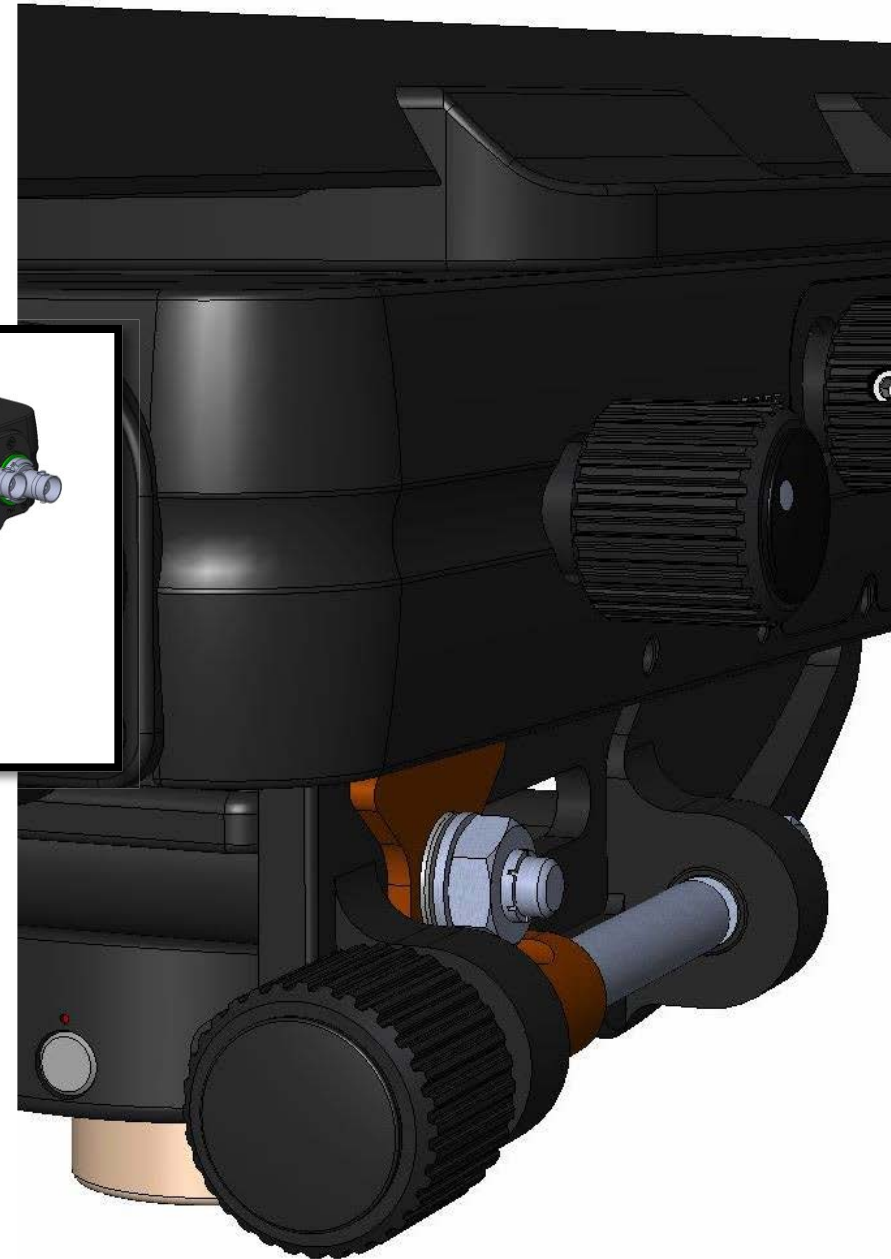
Drive Knob Adjustment



The drive should have minimal play before engaging, but operate very smoothly. Repeat the previous steps until you're satisfied with the feel.



Put the cover back on the tilt drive knob and don't forget to close the cam levers.

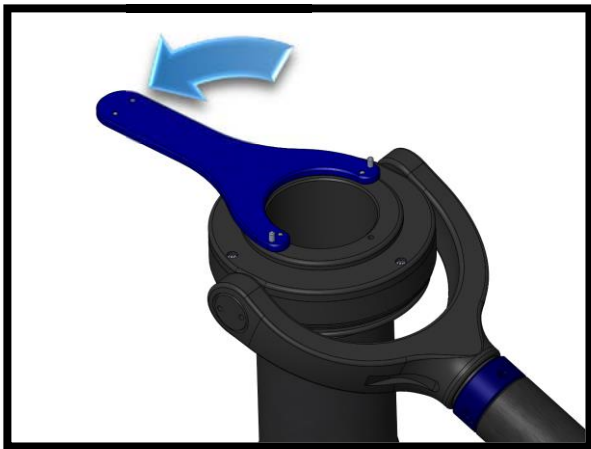




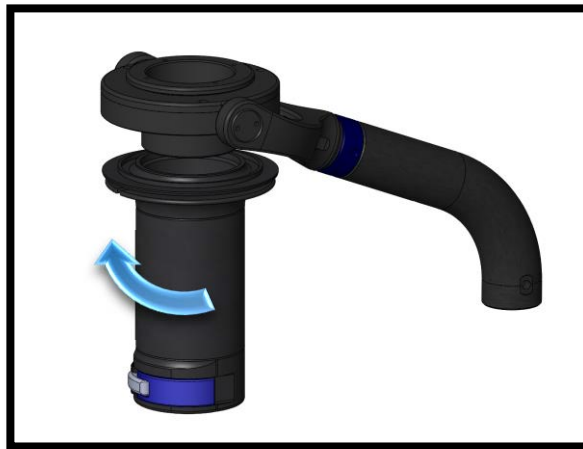
Adjustments and Maintenance

Gimbal Disassembly:

The modular nature of the M-1 encourages operators to take good care of their rigs. Cleaning the pan bearing from time to time will keep your M-1 performing at its best. First, remove the gimbal from the post and grab the included blue spanner tool (815-7910).



Use the “inside” pins of the spanner tool to loosen the inner ring.

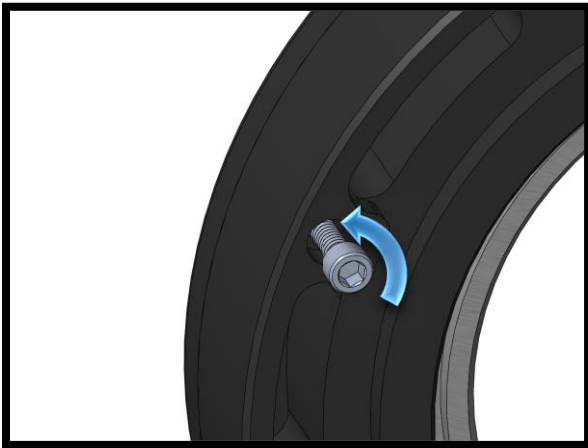


Unscrew the gimbal grip and set it aside.



Invert the gimbal and carefully press the inner ring out of the bearing and set it aside.

Gimbal Disassembly and Cleaning



Use a 1/16" Allen wrench to remove the three hex screws and set aside the top cover.



Use the "outer" spanner pins to unscrew and remove the pan bearing lock.

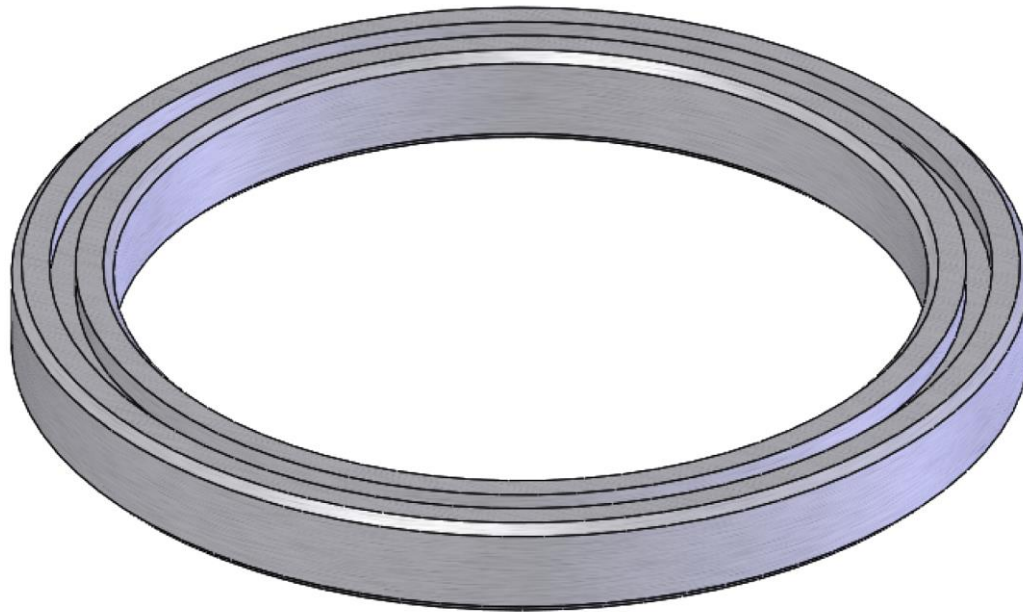


Applying even pressure to both sides, ease the pan bearing out. Never use tools to pry on a bearing.

Adjustments and Maintenance

Pan Bearing and Gimbal Housing Cleaning:

With the pan bearing removed, spend an adequate amount of time to carefully clean out any contaminants within the pan bearing. Warning: our recommended solvent is 100% acetone; take the necessary precautions to keep it off of sensitive items (such as plastics and your skin) and always follow the manufacturer's safety recommendations.



Note:

Please dispose of acetone in an environmentally conscious manner, or reuse it to clean non-sensitive items.

Pan Bearing Cleaning

Cleaning Steps:

- In a glass container, put enough 100% acetone to completely cover the bearing and submerge it.
- Let soak for 10 minutes. Gently agitate the acetone by moving the container or using a paintbrush.
- Drain and refill the container with fresh acetone and repeat until no more contaminants can be seen in the fluid.
- While the pan bearing is soaking, clean the other gimbal parts with a lint free rag and more acetone.
- When the bearing is completely clean, let it air dry for a few minutes. Use compressed air to blow off excess acetone.
- Use **ONE** drop of the lightest oil available on the bearing balls and slowly turn the bearing to distribute; using an oil that complies with MIL-PRF-7808 is preferred. The pan bearing is now ready to reinstall.

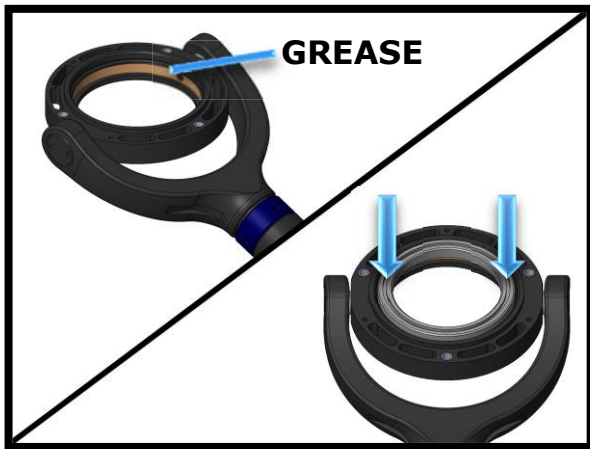
Caution:

Never spin a dry bearing! Doing so without any lubricant can score the internals and lead to increased friction. Be patient and wait until you have applied oil before turning the pan bearing.

Adjustments and Maintenance

Gimbal Reassembly:

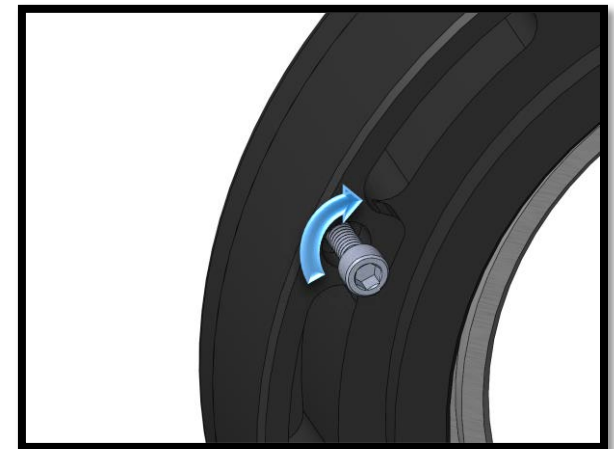
With everything now inspected and cleaned, it's time to put it all back together. Don't remember where everything goes? No problem, just follow along:



Lightly grease the inside of the outer ring and carefully press in the pan bearing. If you apply too much grease it will migrate into the bearing, causing excessive friction, so be careful.



Install the pan bearing lock. Hand turn first to ensure proper threading, then finish with the "outer" pins of the spanner.

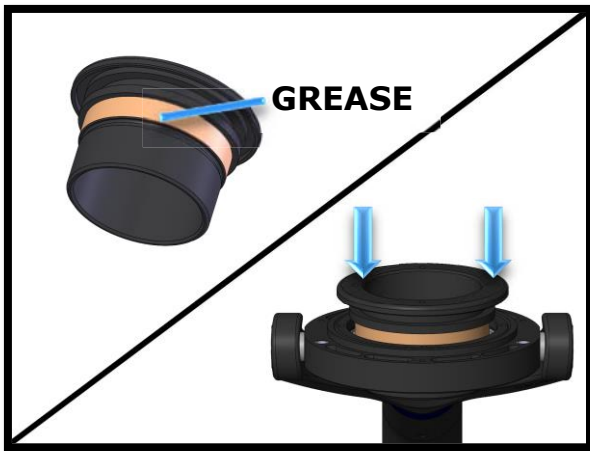


Install the top cover with the three hex screws. Do not over-tighten; this is just a cover.

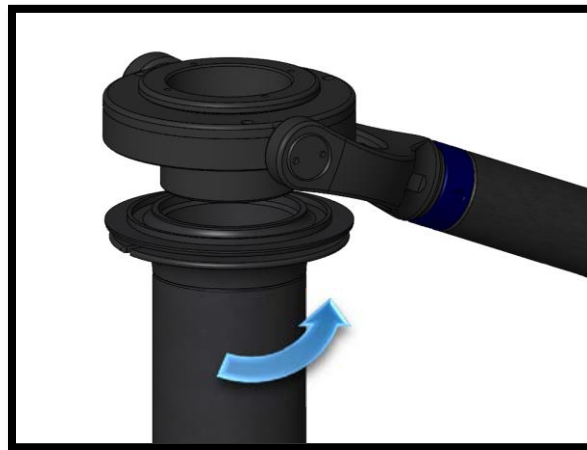
Note:

When reinstalling the pan bearing we recommend using a grease such as Magnalube-G®.

Gimbal Assembly



If necessary, lightly grease the inner ring and install with even pressure. Use as little grease as possible to install. Attach the top cover.



Hold on to the inner ring and screw on the gimbal grip until it's seated. Use the "inner" pins of the spanner to tighten fully. And you're done!



Adjustments and Maintenance

Lubricating the M-1:

There are a few locations on the rig that can use occasional lubrication. Use a heavy Teflon® grease sparingly to keep from attracting debris; we recommend Magnalube-G.

Areas to Apply Grease:

- A little grease on the drive gears of the stage will help keep things operating smoothly.
- The threads of the tilt drive might like some grease from time to time. Don't use too much.
- The threads of the clamp knobs also benefit from a little grease. Greasing the threads of the clamp knobs allows for maximum clamping force with minimal effort.

Lubrication and Exterior Cleaning

Cleaning the M-1:

If you're careful, the 100% acetone used to clean the gimbal is a suitable solvent for cleaning much of the M-1's carbon fiber, aluminum and stainless steel components. But, if you wish, window cleaner misted onto a lint-free cloth will take care of most grime.

Cleaning Notes:

- The carbon fiber post sections are extremely durable but will slide better when kept clean.
- All of the aluminum and steel components can be cleaned to maintain a like-new appearance.
- Carefully clean your monitor screen with Pancro or a similar lens cleaning solution.

Caution:

If you use acetone to clean the post sections, be extremely careful not to remove the painted reference lines!

Accessories for the M-1

Accessories:

There are many accessories to accommodate the wide variety of operators working with the M-1. From return monitor mounts for the broadcast world to follow focus receiver/amp mounts for cinema ops. Make sure to check out the latest innovations at www.steadicam.com.

| PART NO. | DESCRIPTION |
|-------------|---|
| 805-7200-02 | G-70x Arm with Socket Block & 3/4" Arm Post |
| 811-7200-10 | G-50x Arm with Socket Block & 3/4" Arm Post |
| 815-7800-01 | Exovest with Large Socket Block |
| 078-1121 | 1/4"-20 Camera Mounting Screw |
| 078-1122 | 3/8"-16 Camera Mounting Screw |
| 078-2038-01 | Video Low Mode Cage |
| 078-4122-01 | Video Cable, 2', BNC to BNC |
| 078-7410-01 | Vehicle Mount with Large Socket Block |
| 250-0045 | Accessory Cable, 12V, 22", Right Angle 2B.303 to Right Angle Female XLR-4 |
| 250-0046 | Accessory Cable, 24V, 22", Right Angle 2B.303 to Open-End |
| 250-0093 | Power Cable, 24V, 22", Right Angle 2B.303 to 2-Pin Fischer® for ARRI® Alexa |
| 250-7915 | 15mm Motor Rod Set with Mounting Bracket |
| 250-7977 | Post Adapter, 6" x 5/8" Arm to 3/4" |
| 252-0021 | Accessory Cable, 24V, 8", 1B.304 to 0B.303 for Preston |
| 252-0054 | Power Cable, 24V, 15", Right Angle 2B.303 to 1S.302 for Panavision® Millennium® XL |
| 252-7906 | Low Mode Bracket |
| 252-7926 | Cable, 12V, 24", XLR-4 to Open-End |
| 257-0045 | Accessory Cable, 12V, 22", 2B.303 to Right Angle XLR-4 |
| 257-0046 | Accessory Cable, 12V, 22", 2B.303 to Open-End |
| 800-0106 | Power Cable, 12V, 15", Right Angle 2B.303 to 2B.306 for Red One® |
| 800-0107 | Power Cable, 12V, 15", Right Angle 2B.303 to 3B.308 for Genesis® |
| 800-0111 | Monitor Cable, 12V, 32", 1B.308 to Right Angle XLR-4/BNC/2.5mm for 7" Marshall HD LCD |
| 800-0116 | Power Cable, 12V, 15", Right Angle 2B.303 to 1B.306 for Red Camera® Epic®, Scarlet® & Dragon® |
| 800-7350-01 | Large Dovetail VL Battery Mount (3rd Battery Mount) |
| 800-7350-02 | Large Dovetail AB Battery Mount (3rd Battery Mount) |
| 800-7900 | Mitchell Base Vehicle Mount with Large Socket Block |

| PART NO. | DESCRIPTION |
|--------------|---|
| 800-7970 | 1 lb. Weight |
| 815-7905 | Docking Collar |
| FFR-000005 | Dual Sequential V-Mount Battery Charger |
| FFR-000008 | Quad Simultaneous V-Mount Battery Charger |
| FFR-000012 | IDX Adapter Bracket |
| FFR-000040 | Dual Charger & (2) IDX E-HL9S Batteries |
| FFR-000041 | Dual Charger & (4) IDX E-HL9S Batteries |
| FFR-000042 | Quad Charger & (4) IDX E-HL9S Batteries |
| FFR-000043 | Quad Charger & (8) IDX E-HL9S Batteries |
| FFR-000052 | IDX E-HL9S Battery |
| FGS-900207 | Docking Bracket |
| Coming Soon! | Return Monitor & Bracket |
| Coming Soon! | Slim Third Battery Mount |
| Coming Soon! | MDR Bracket |
| Coming Soon! | Short Dovetail Plate (6") |
| Coming Soon! | Accessory Weight & Bracket |

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