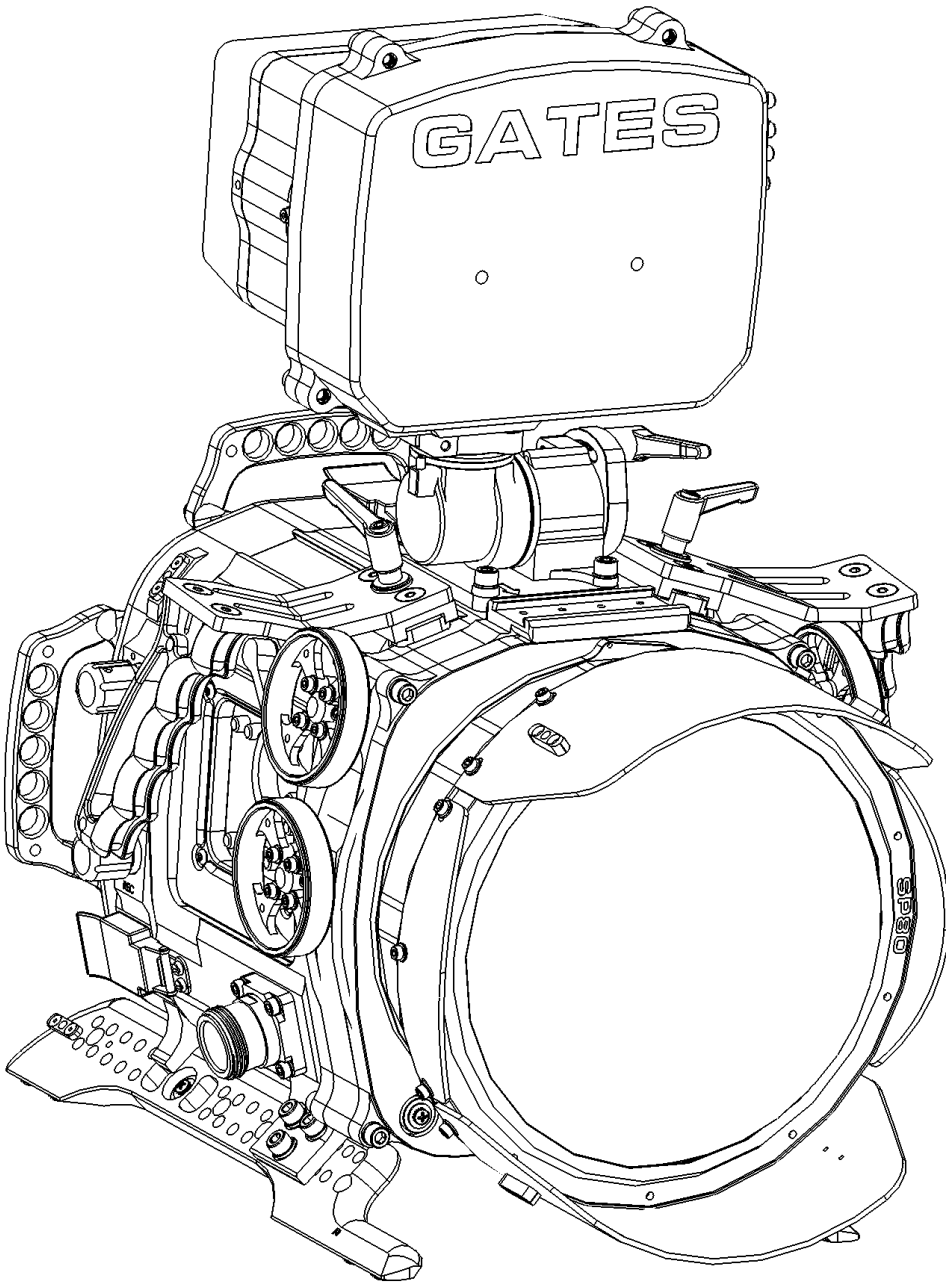

PRO RAPTOR Housing

Setup, Use, and Care Guide

This manual and current revision is available in 8.5 x 11 size and full color at

http://www.gateshousings.com/documentation.html

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TABLE OF CONTENTS

1. Introducing PRO RAPTOR

Congratulations on owning a new Gates product: the PRO RAPTOR (PR) housing. You've selected a product that will provide years of value and reliable service.

Please read through this entire guide to learn about PR so you can get the most out of this imaging tool. In this section, we'll introduce you to the features of PR so you can get started.

Features

PR has several key features:

- ✓ Full control access. PR allows access to the full camera menu.
- ✓ Lens flexibility. PR can accommodate a huge variety of DSLR, mirrorless, and cinema lenses.
- ✓ Gates COMMAND / CONTROL module. GCC allows convenient access to Iris, exposure functions and assignable buttons without having to page through camera menus.
- ✓ Cinema-grade design. Lens choice and control access are just two of the many features designed into PR. A/R coated glass optics, HD-SDI surface feed, comm. inputs and Seal Check are a few of the items any professional will appreciate.
- ✓ Modular. PR can be easily switched between compact 60 series ports for portability, 80 ports for diver operation or 110 ports for remote lens control.

Warranty Disclaimer

PR is a tool that, like any tool, requires knowledge and understanding to be effective.

Your responsibility is to learn the proper setup, use and care of PR. Because we can only provide you with the information necessary to do so, Gates does not warrant the contents of your housing (e.g. your camera and lenses) under any circumstance.

We warrant PR as an image acquisition tool for a period of 2 years. The Seal Check unit is warranted for 1 year. Optics (Dome and Flat ports) are warranted for a period of 1 year or 100 hours salt water contact, whichever comes first.

Gates does not warrant optical performance or image quality.

If you have any questions about the setup, use and care of PR, contact Gates directly.

Nomenclature

In this Setup, Use and Care Guide for PR, the following terms are used:

- ✓ **V-RAPTOR is the camera body style from RED DIGITAL CINEMA.**
- ✓ **At the time of writing there are 3 compatible V-RAPTOR versions available:**
  - *V-RAPTOR 8k VV*
  - *V-RAPTOR S35*
  - *V-RAPTOR [X].*
- ✓ **The setup and install process is the same for all compatible versions of V-RAPTOR.**
- ✓ **The "XL" versions of V-RAPTOR are currently not compatible with the PR housing.**

Required Equipment

The following camera items are required to operate the PR underwater system and are not included with the housing.

- ✓ ***Camera***
  - *RED DIGITAL CINEMA V-RAPTOR 8k VV, V-RAPTOR 8k S35, or V-RAPTOR-[X].*
- ✓ ***Compatible Media***
  - *Use Red approved media cards only.*
- ✓ ***Monitor***
  - ***DSMC3 Red Touch 7.0*** *(RMI interface) with RMI Adapter*
  - ***OR SDI Monitor***
    - SMALLHD Cine 7
    - SMALLHD Ultra 5
    - SMALLHD 503 Ultrabright (legacy)
    - Atomos Shinobi SDI (legacy)
- ✓ ***Battery***

  A wide variety of batteries are compatible with PR: Micro V-Lock, Mini V-Lock, and larger legacy type V-Lock. Some may require additional, optional items such as a V-Lock adapter and PR shell extension.

  The most current compatibility list can be found on the Gates PRO RAPTOR support page. This section is a purposely short list to aquaint you with the general differences in battery types, and how they are supported in PR.

Limitation: All battery types must delivery minimum 9 amps continuous current draw to power the PR system.

✓ **Batteries compatible with PR Base configuration (no shell extension) are Micro V-Lock type with a maximum depth of 3in / 76mm.**

- **RED**
  - *REDVOLT 98 WHr*
- **CORE SWX**
  - *Nano 98 WHr*
  - *Nano 150 WHr*
- **HAWK-WOODS**
  - *VL-M150D*
- **BEBOB**
  - *V98MICRO*
  - *V150micro*

- **Batteries compatible with PR Extended configuration (with shell extension). Micro V-Locks mounted directly to camera:**

- **BEBOB**
  - *V200Micro*
  - *V240Micro*

✓ Batteries compatible with PR Extended configuration (with shell extension) and **RED V-Lock Adapter**.

Note: the Red V-lock battery adapter is sold as a set by RED with the tactical top plate, which does not fit in the PR housing so the battery adapter must be used as a standalone item.

Limitation: Maximum size of V-lock batteries with the RED adapter and shell extension is limited to a depth of 3.75” / 95mm and a height of 5.75” / 146mm

- **CUE series**
  - *IDX CUE-D300*
  - *IDX CUE H180*
  - *IDX CUE-H135*
- **PAGLINK (2x stacked)**
  - *PL96e*
  - *PL96T*
  - *PL150e*
  - *PL150T*

✓ **Batteries compatible with PR Extended configuration (with shell extension) and Hawk-Woods Dual Mini V-lok Adapter VL-OCI allowing 2x Micro V-Locks to be used for extended run time.**

- *2x any compatible Micro V-lock except Bebob V200 and V240*

✓ ***Compatible Lenses***

- *DSLR* * *Mirrorless*
- *Cinema / PL Mount* * *Anamorphic*

- **Max Lens Envelope:**
  - *SPR60 Port Rings*
    - **Max lens overall OD: 5.6 in / 142mm**
    - **Max lens gear OD: 4.25 in / 108 mm / 136 Teeth**
    - **Min lens gear OD: 3.1 in / 79 mm / 100 Teeth**

  - *SPR80 or PR80 Port Rings*
    - **Max lens overall OD: 7.5 in / 190mm**

✓ ***Camera Control (Optional)***

RED CONTROL and RED CONTROL PRO apps may used for setup (via wifi) above water, and for underwater command / control via surface tether cable. Setup details for surface tether can be found on Gates PRO WEAPON-RAPTOR web page. For further information, contact Gates.

Unpacking PRO RAPTOR

After removing PR from its shipping container, carefully inspect it for missing parts or damage that may have occurred during shipment. If you discover any discrepancies, contact Gates or your dealer immediately for assistance.

- ✓ ***Included Items***
  - PR Housing w/Power Control Bracket
  - Seal Check Lite Rechargeable system.
  - Tool Kit / Spare Kit / Trim weights / O-Ring Kit
  - Port Cleaner
- ✓ ***Optional Items, Required for Operation***
  - Stackable Port Rings (SPR) for your lens(es) of choice.
  - Lens Gear Drives / Guide Bars / Drive shafts (80 Port Base only)
  - Drive Shafts / Lens Gear Set (60 Port Base only)
  - Port(s) of choice (Dome or Flat in either glass or acrylic material) and shade.
  - Power adapter cable and Top Dovetail Plate (for External SDI Monitors Only)
- ✓ ***Optional Items***
  - Trim Floats
  - Surface Command / Control Cables
  - Water alarm
  - Light Bar

2. Cautions

- ✓ **SEAL CHECK VACUUM**. In a later part of this manual, Seal Check will be introduced for verifying seal integrity before diving.

  The vacuum draw on PR should be about 100 millibars. This is enough to verify seal integrity.

- ✓ **V-RAPTOR FAN**. Set Fan Control to “Standard” in the V-RAPTOR menu. Do not use “Quiet Record”. This setting allows the V-RAPTOR camera to maintain a calibrated sensor temperature for optimal image quality. Refer to the V-RAPTOR Operations Guide.

  Do not block any ventilation openings or obstruct cooling fan airflow.

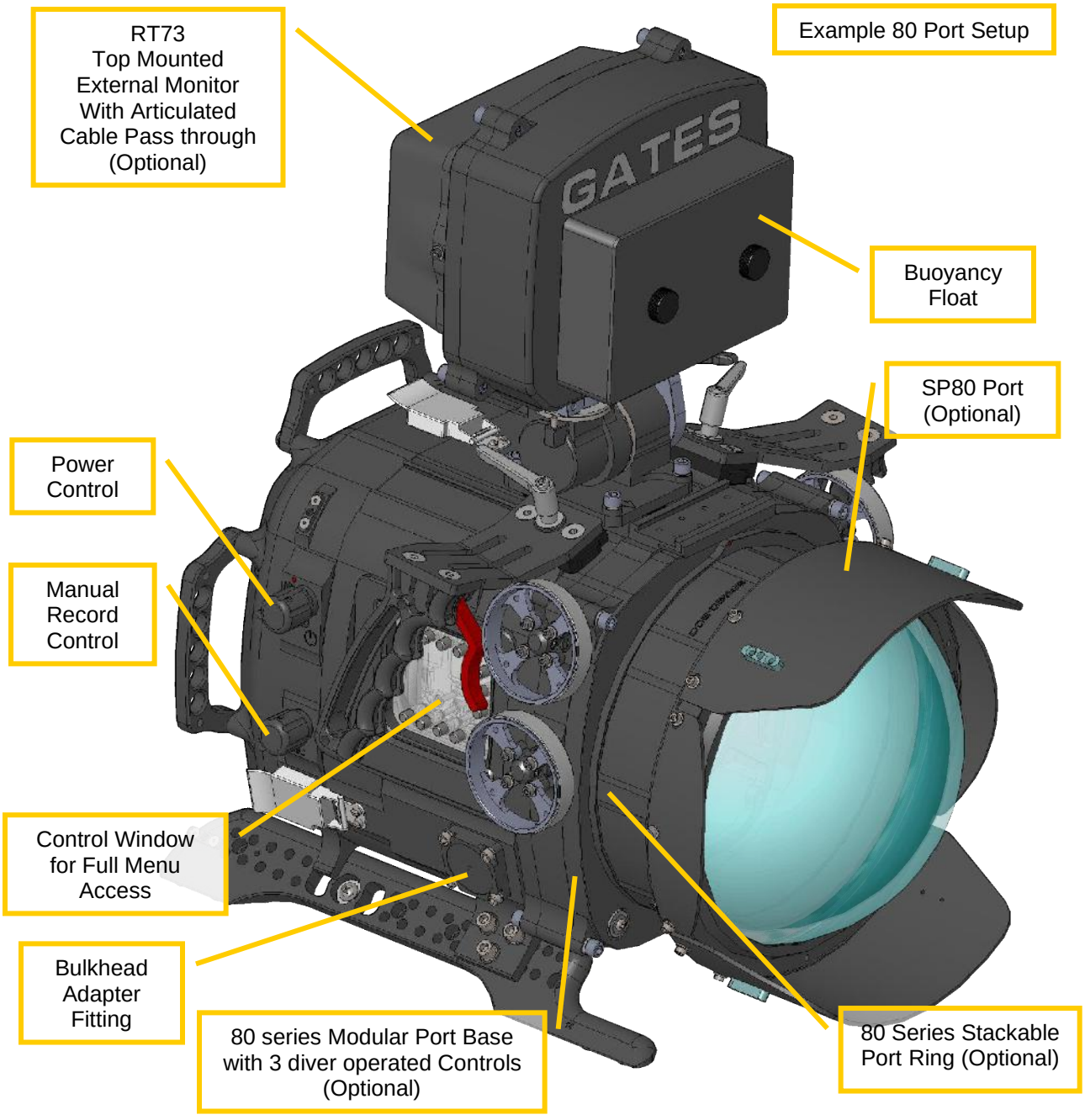
- ✓ **CAMERA TRANSPORT** Avoid transporting the housing with a Camera inside. Only transport a securely mounted camera inside PR IF the system is in your possession and without abusive handling. DO NOT ship or place in checked airline baggage with the camera inside as rough handling can cause damage. DO NOT transport PR with trim weights attached. Bundle all connectors together and protect. Install the caps that originally came with the housing,

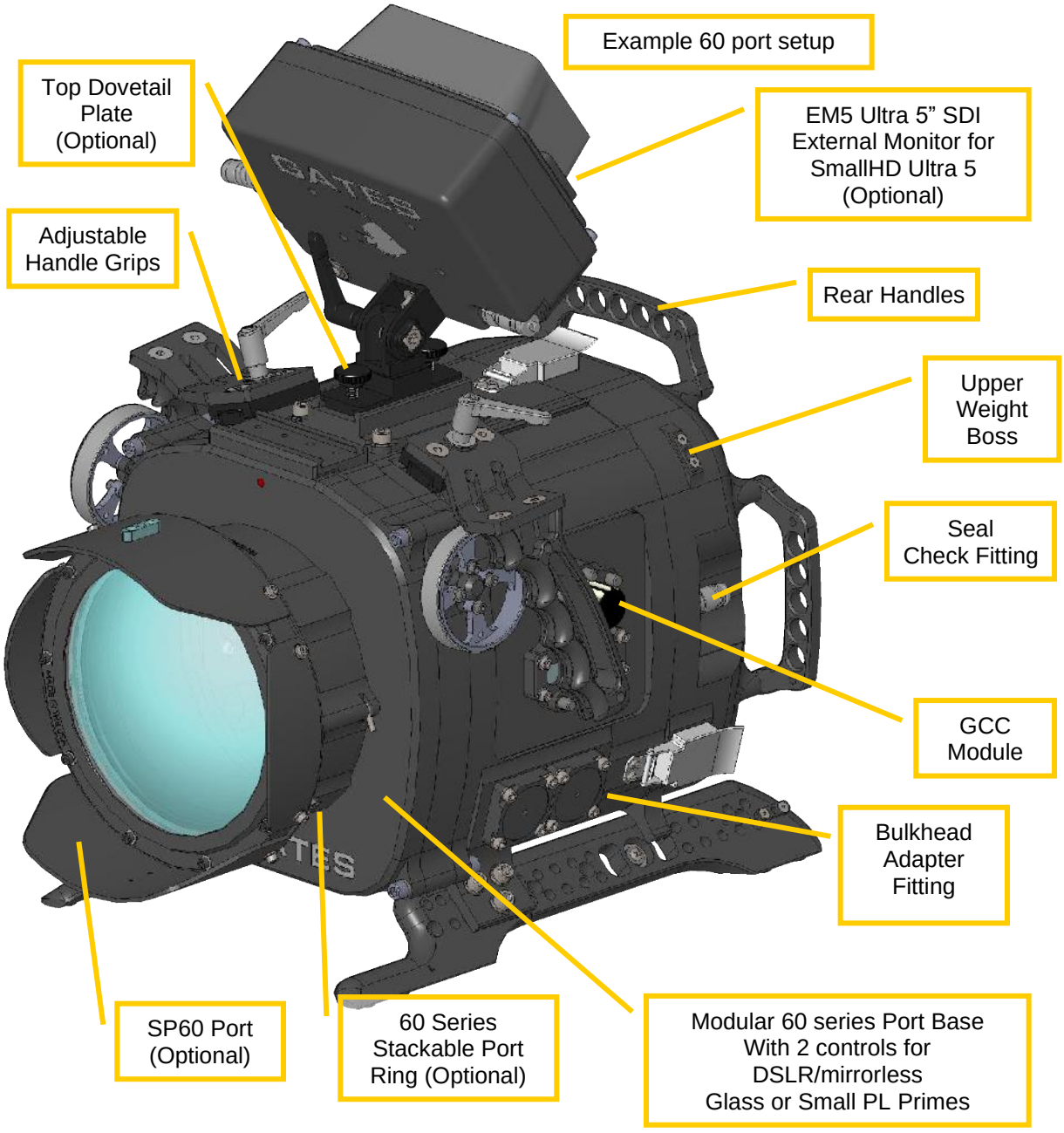
PACKING. Ensure the complete system is packed well in transport cases.

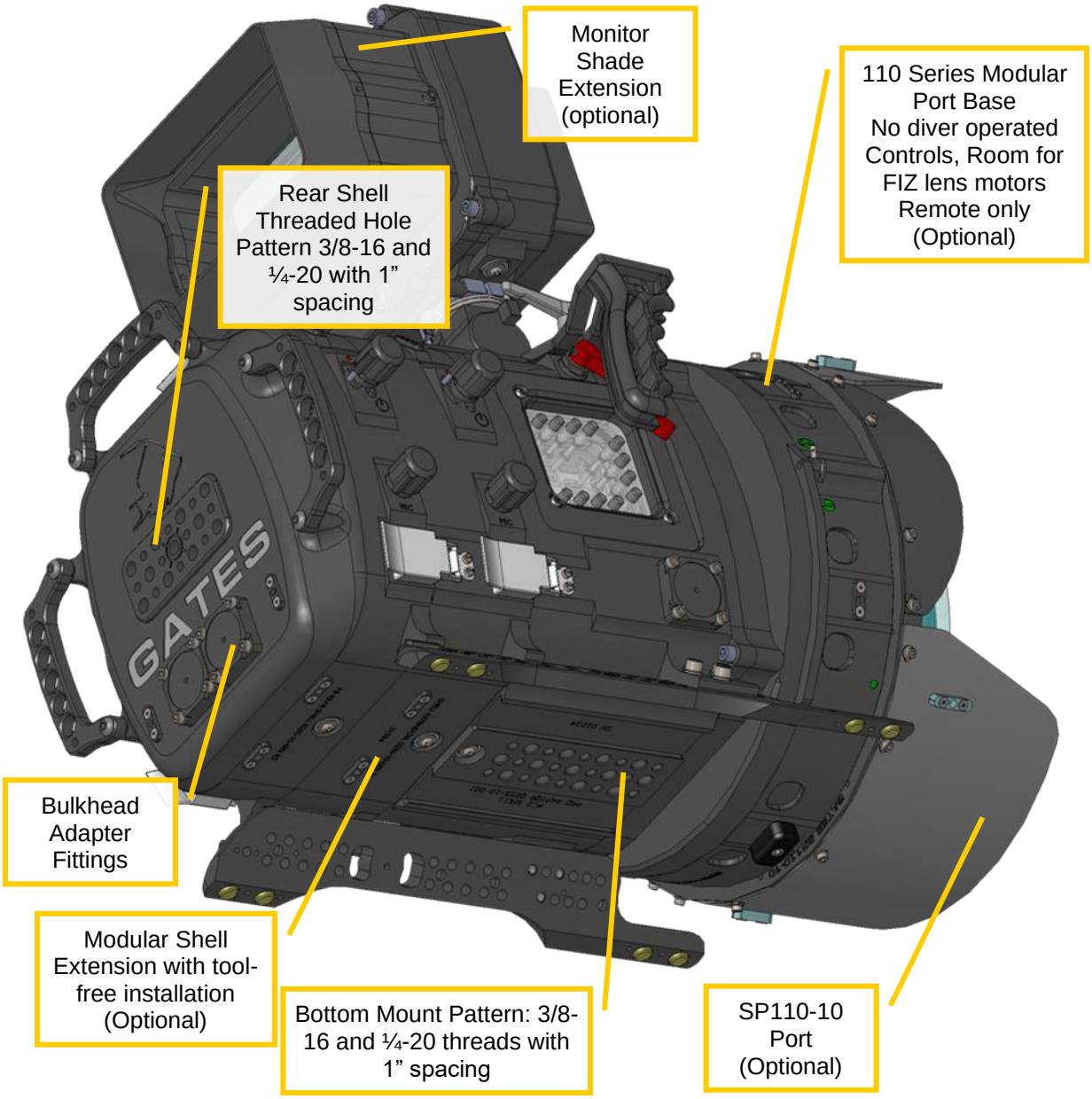
- ✓ **USER RESPONSIBILITY**. This Setup, Use and Care guide contains important detailed procedures for setup and use of PR. It is the user’s responsibility to read, understand and employ these procedures. Failure to do so can result in poor or non-operation of PR and may void your warranty. Contact Gates if you have questions about this manual or using PR.

3.PR Housing Overview

- PR has many features with which you will become familiar.




Example 60 port setup
Top Dovetail Plate (Optional)
EM5 Ultra 5” SDI External Monitor for SmallHD Ultra 5 (Optional)
Adjustable Handle Grips
Rear Handles
Upper Weight Boss
Seal Check Fitting
GCC Module
Bulkhead Adapter Fitting
SP60 Port (Optional)
60 Series Stackable Port Ring (Optional)
Modular 60 series Port Base With 2 controls for DSLR/mirrorless Glass or Small PL Primes


Monitor Shade Extension (optional)
110 Series Modular Port Base No diver operated Controls, Room for FIZ lens motors Remote only (Optional)
Rear Shell Threaded Hole Pattern 3/8-16 and ¼-20 with 1” spacing
GATES
Bulkhead Adapter Fittings
Modular Shell Extension with tool-free installation (Optional)
Bottom Mount Pattern: 3/8-16 and ¼-20 threads with 1” spacing
SP110-10 Port (Optional)

4. Preparing the V-RAPTOR Camera

Stripping the Camera Body

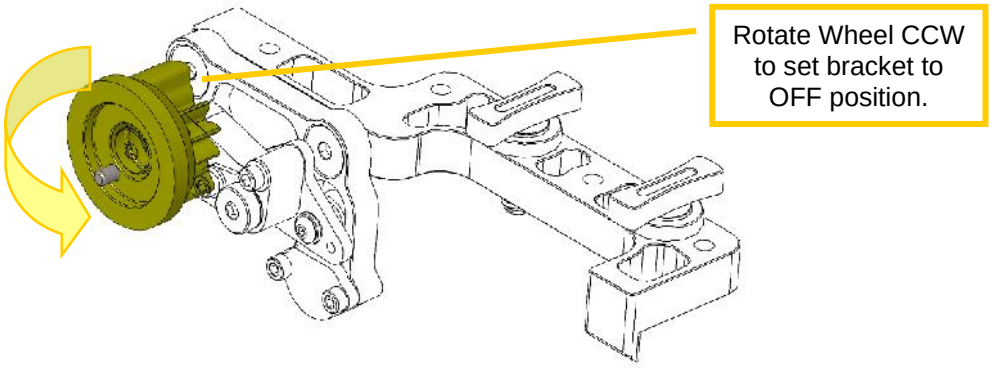
The V-RAPTOR camera must be stripped down to the bare body and powered off prior to use in the Gates PR Housing.

- ✓ **Remove any accessories from V-RAPTOR** such as handles, cages, top/bottom plates and monitors.
- ✓ **Unmount and set aside any lens that is mounted on V-RAPTOR.** This is necessary to avoid interferences when inserting V-RAPTOR into the PR housing.
- ✓ **Move the power slider** to the off position.
- ✓ **Insert compatible recording media.** (It is easier to insert the media when the camera body is removed from the housing)

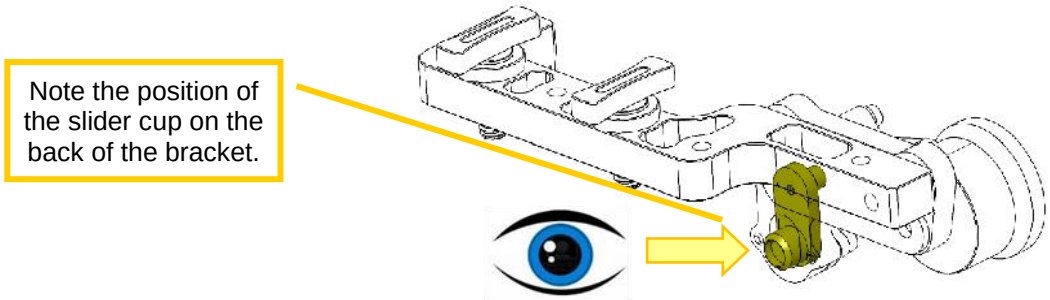
Mounting the Power Control Bracket

This bracket provides an interface for the knob on the rear shell (or shell extension) to move the on/off slider button on the V-RAPTOR camera.

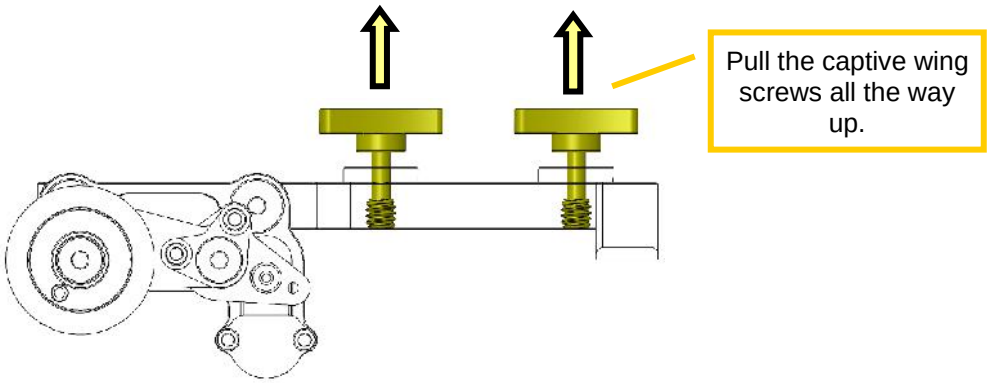
✓ Prepare the bracket and camera body for installation by moving both of them to the 'OFF' position. By hand, rotate the wheel on the power control counterclockwise until it stops.



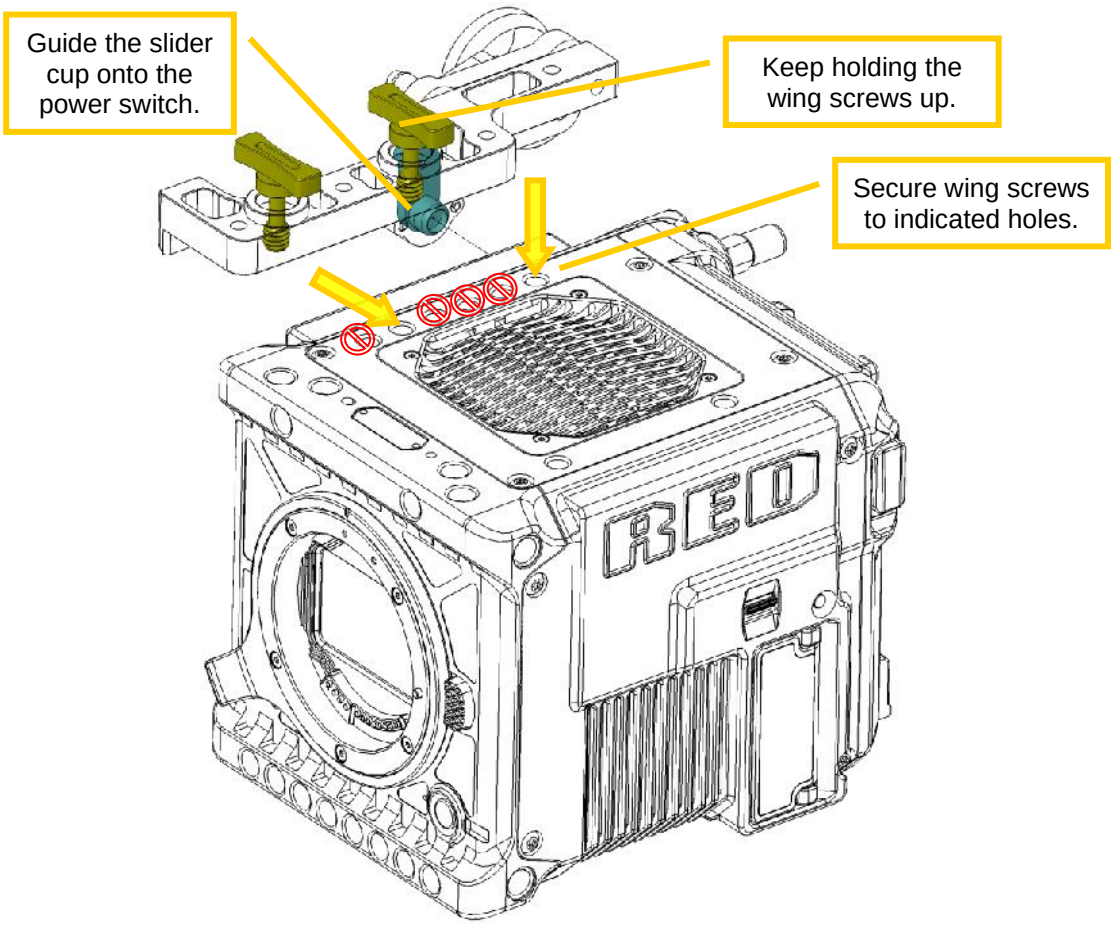
✓ Note the position of the cupped slider pin on the back of the bracket.



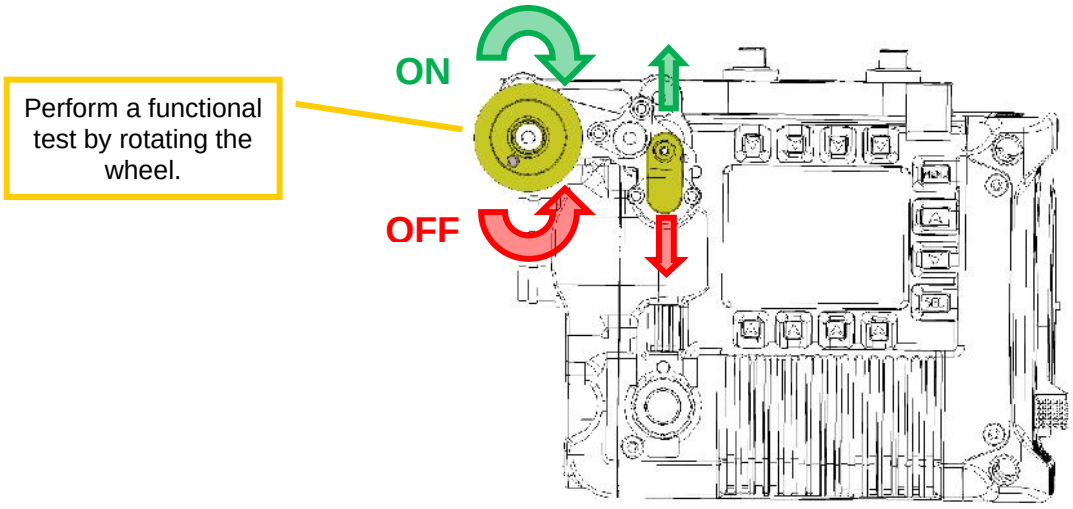
✓ Pull the wing screws from the bracket fully upwards and hold them up.



✓ Continue holding the wing screws upwards. Then slide the power control bracket onto the V-RAPTOR body, aligning the cup on the pin with the camera's slider button. After getting the bracket into position, tighten the wing screws, using the 2nd and last ¼-20 holes on the camera body.

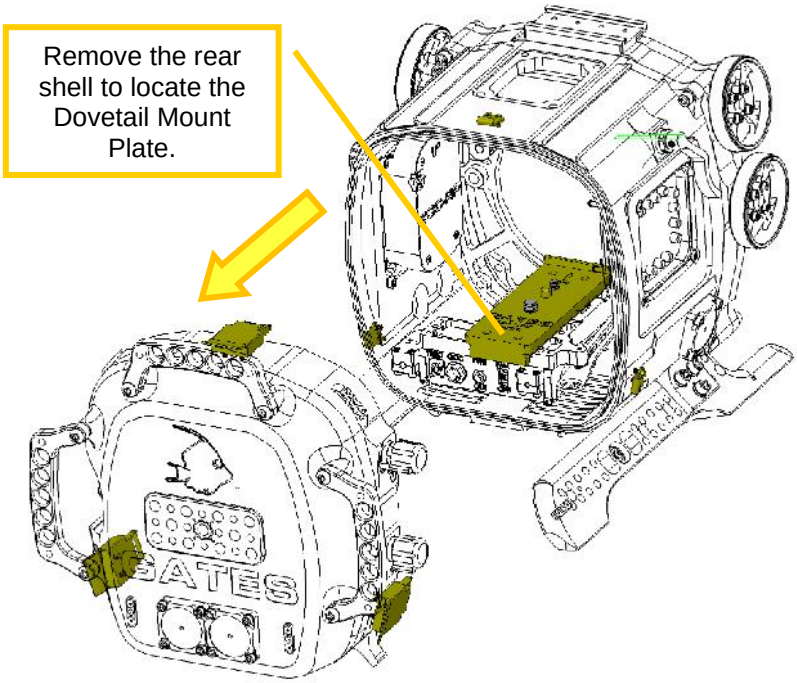


✓ Finish the bracket assembly by performing a function test, preferably with a charged battery. Moving the wheel clockwise will turn the camera on, and turning it counterclockwise turns it off.

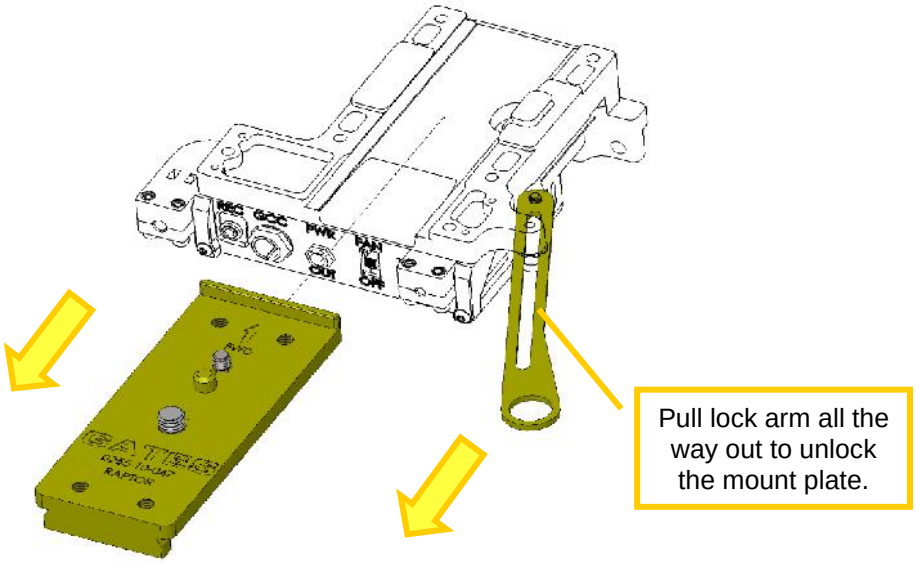


Installing the Dovetail Mount Plate

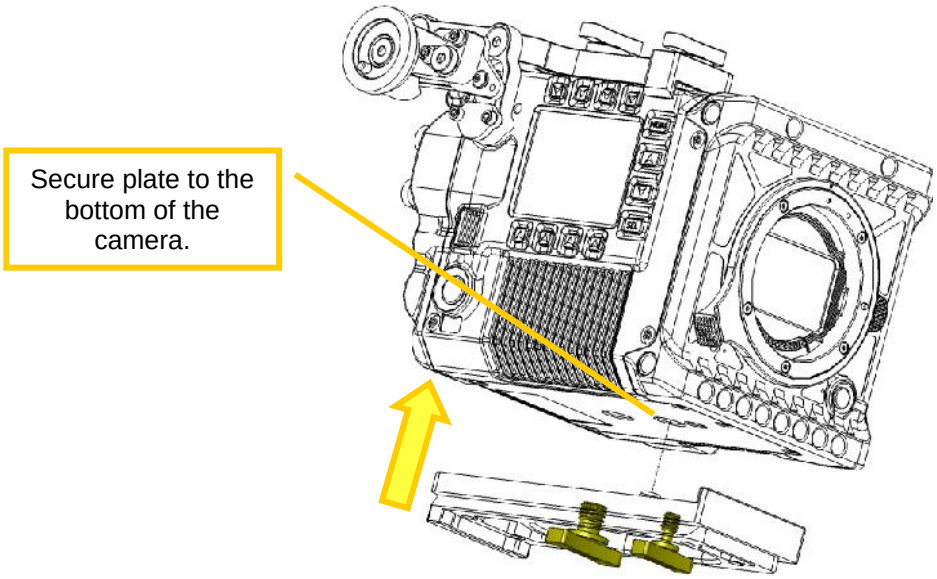
- ✓ To access the plate remove the rear shell by unlatching the 3 latches on the rear shell (or shell extension if installed).



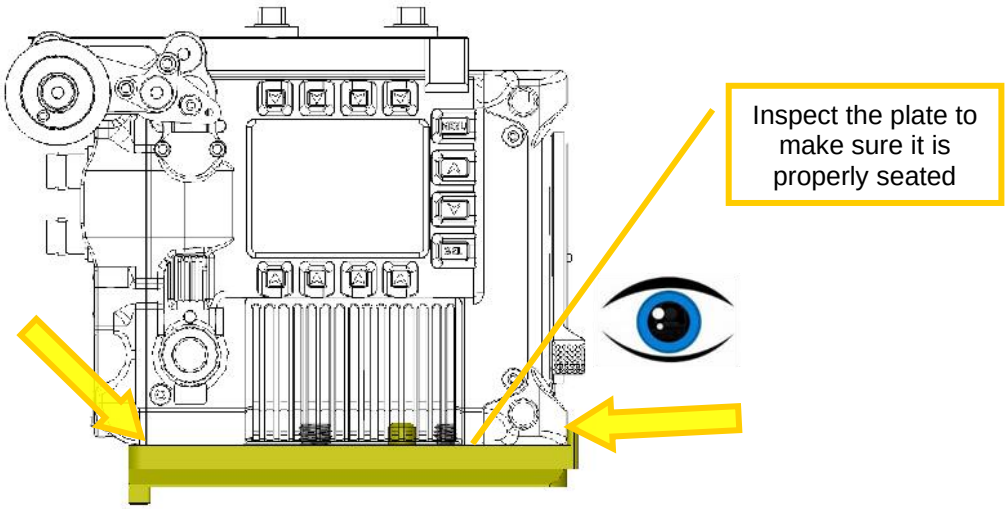
✓ Pull the lock arm on the dovetail mounting tray fully to the rear of the housing to unlock the mount plate. Then slide the mount plate out to the rear.



✓ Align the mount plate with the bottom of the V-RAPTOR camera body and secure it with the 3/8-16 and ¼-20 captive wing screws.



✓ Inspect mount plate and make sure the bottom is fully seated with the shelf up against the front of the camera body.



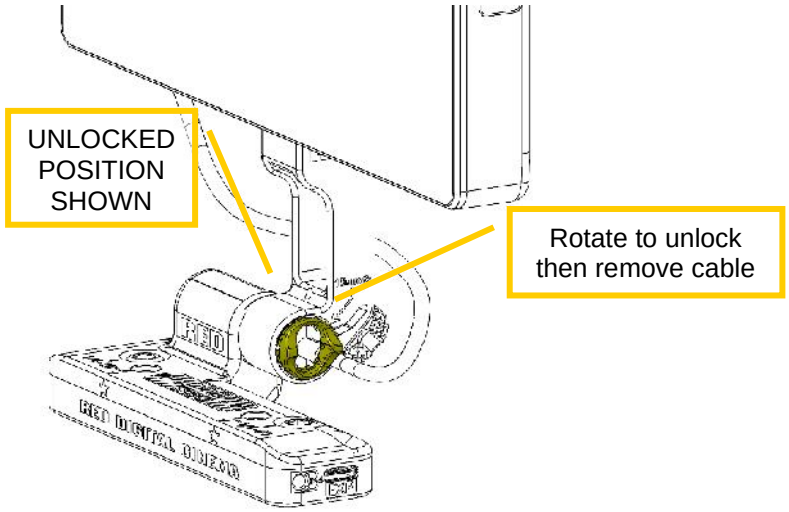
Installing the Red Monitor Interface (RMI) adapter

This section applies only if using the Red DSMC3 Red Touch 7 monitor.

Skip this section if using SDI monitors such as the SmallHD Cine7.

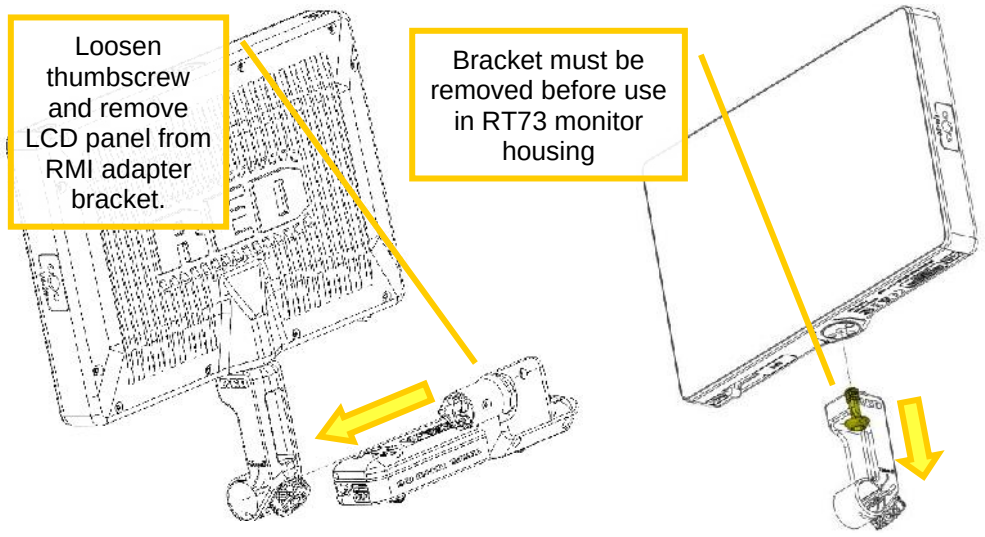
NOTE: Please read the *manufacturer's guide* before using this monitor with the Gates PR housing. The RMI cable can be easily damaged, and Gates does not cover damage to the cable due to mishandling.

✓ **Rotate the cable lock on the RMI adapter** arm to the open position to remove the short cable that comes with the monitor. Store the cable for later topside use or troubleshooting.

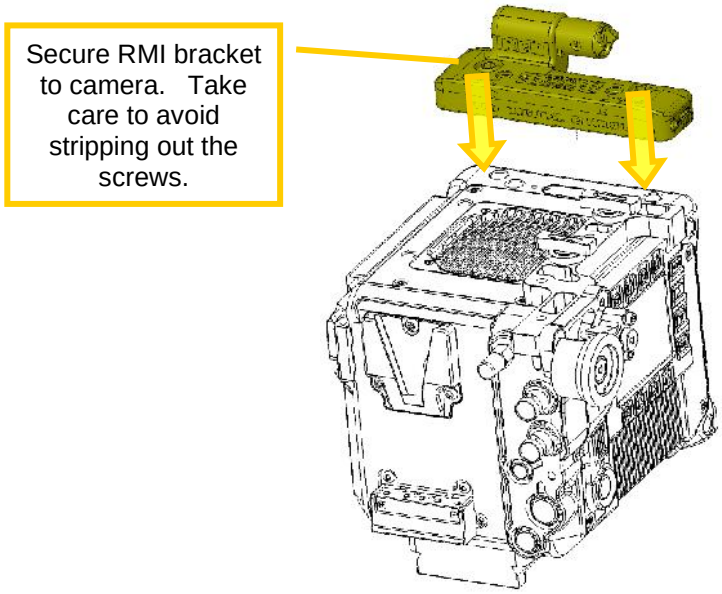


✓ **Loosen the thumbscrew** to remove the monitor and arm from mounting bracket.

The monitor arm must also be removed from the DSMC3 RED TOUCH 7.0 monitor in order to fit it inside the Gates External Monitor housing.



✓ **Secure the RMI adapter bracket onto the camera**. The sockets on the RMI adapter's screws are very shallow, so exercise care when securing. Use a 3/16 hex wrench and do not over tighten in order to avoid stripping screws.



Enabling Power Out in the V-RAPTOR Menu

The PR housing uses a relay powered by the V-RAPTOR camera's power output to turn on the Fan, GCC, and (optional) external SDI monitor with only one knob.

"Power Out" must be enabled by going to "Menu > System Settings > Power". The "Power Out" setting is found at the bottom of the menu list so you will have to use the down arrow to get to it.

Configuring Settings for the GCC Module

These settings are necessary for the Camera to Communicate with the GCC

- ✓ **BAUD RATE.** Menu → Communication → Serial → Baud Rate → **1000000**

- ✓ **IP ADDRESS.** MENU → Communication → Serial → IP Address → **169.254.1.1** (This is the camera default).

- ✓ Turn off Wi-fi if not actively using it with antenna extender.

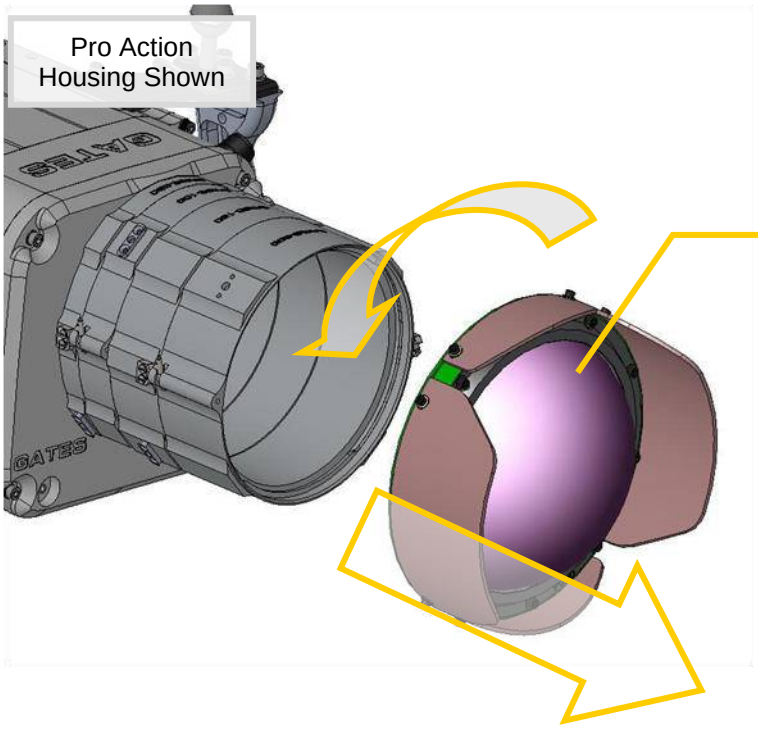
5. Preparing the Housing for the Camera

Removing Ports

Ports and/or Stackable Port Rings (SPR's) should be removed from the housing before the camera is mounted.

60 and 80 Series Port Removal

✓ Disengage the Port by rotating 90 degrees counter clockwise in the direction shown. Gently pull the Port away from the Port Ring(s)

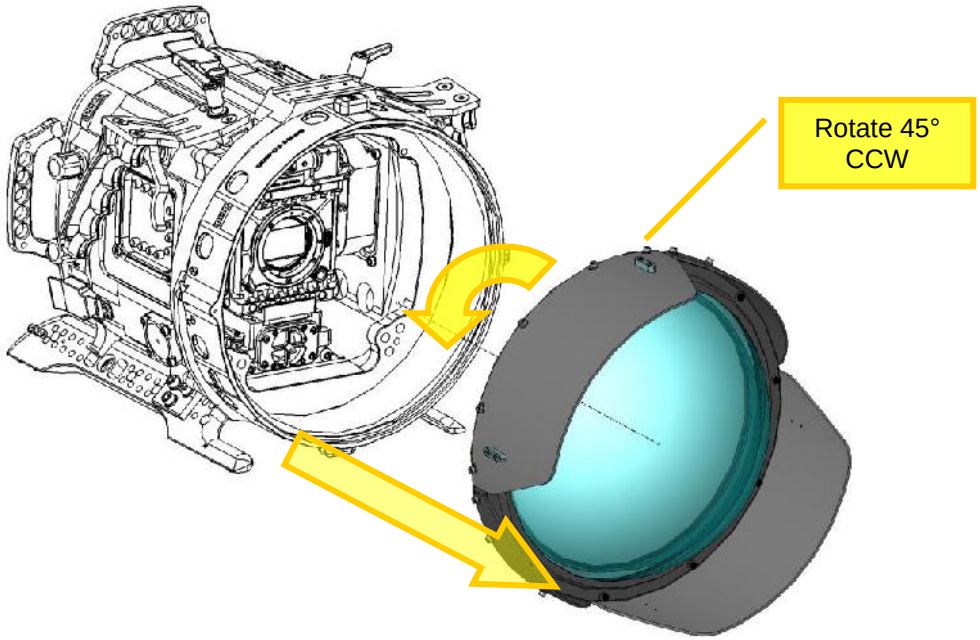


Rotate the port 90 degrees as shown, then gently pull forward to remove.

▶ TIP: Consistent lubrication of the Port and SPR o-rings allow easy rotation.

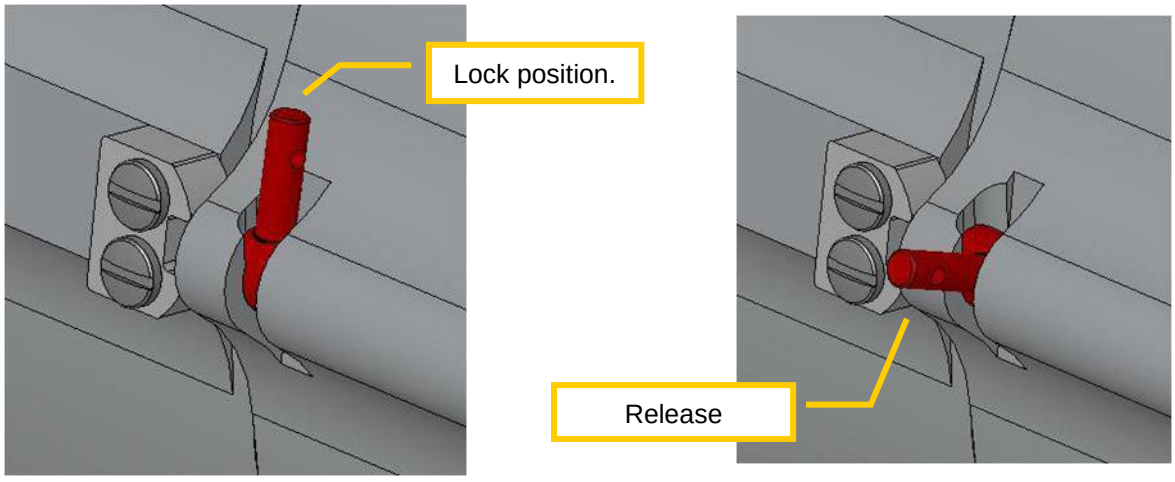
110 Series Port Removal

✓ Removal is the same as the 60 or 80 series except only 45 degrees rotation is required.

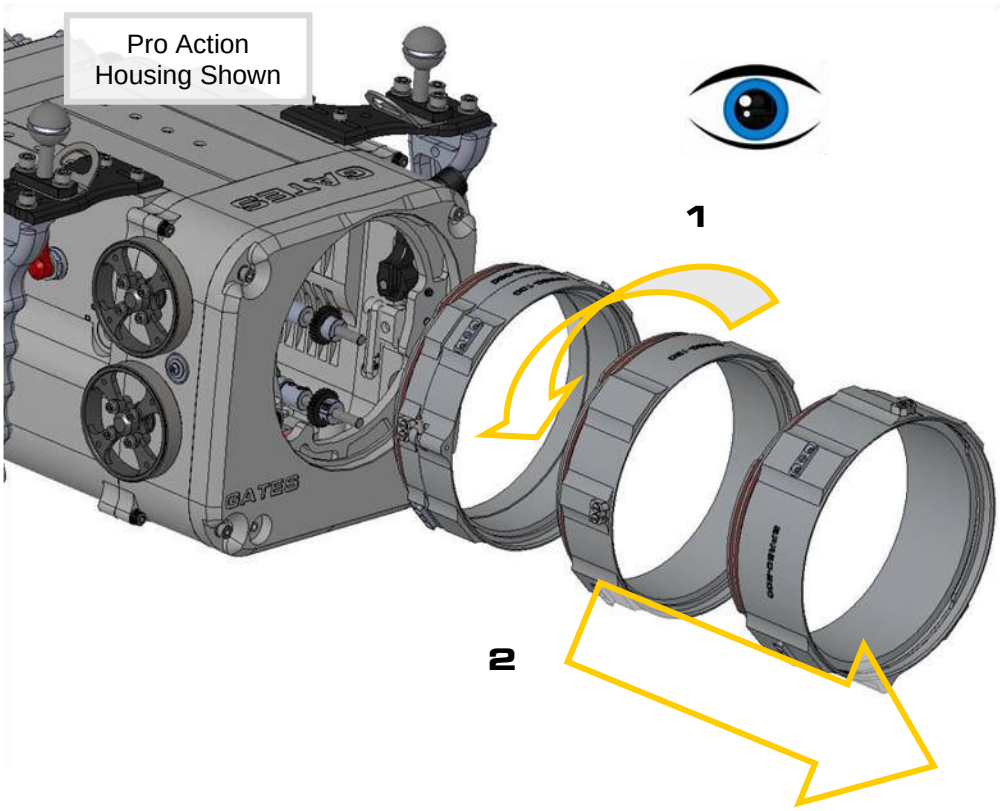


Stackable Port Ring (SPR).

✓ Remove the SPR's one at a time or as a group. The lock pin is shown below in the locked and release position.



Similarly to Port removal, SPR60 and 80 series ports need to be rotated 90 degrees while 110 series ports need to be rotated 45 degrees to release.

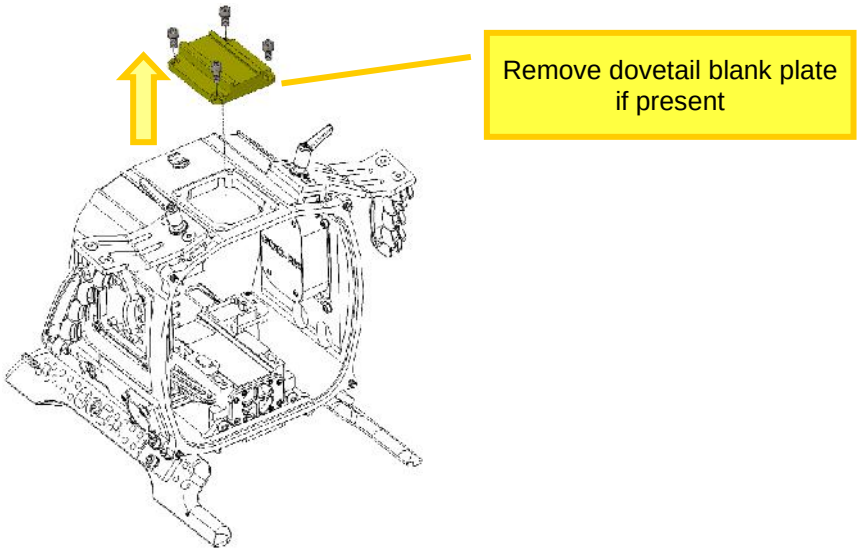


Attaching the RT73 (RMI) External Monitor

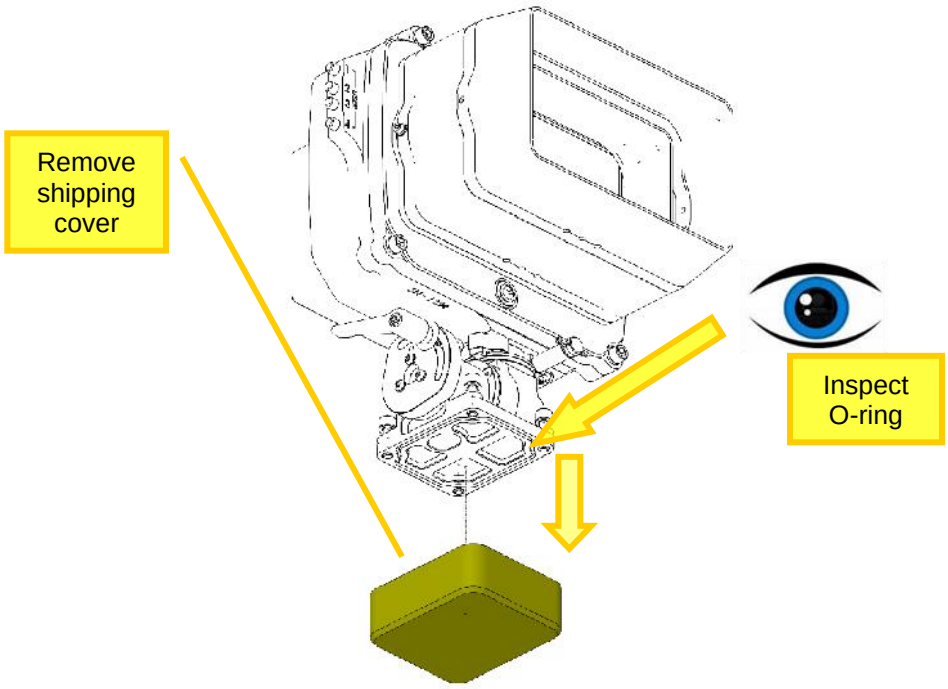
Skip this section if using an SDI External Monitor with the PR housing.

In order to properly connect the RED RMI cable, the RT73 External Monitor housing must be attached prior to inserting the camera into PR.

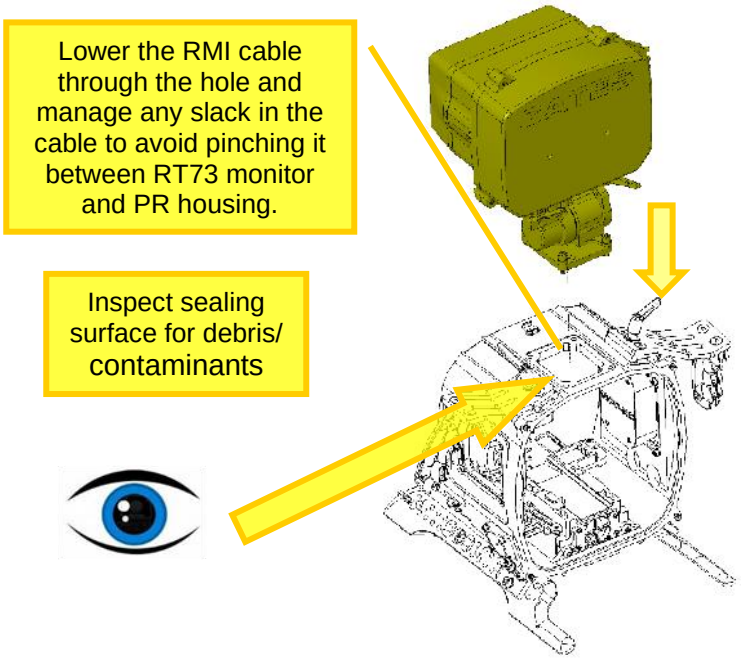
✓ Use a 3/16” Ball driver to remove dovetail blank plate if present.



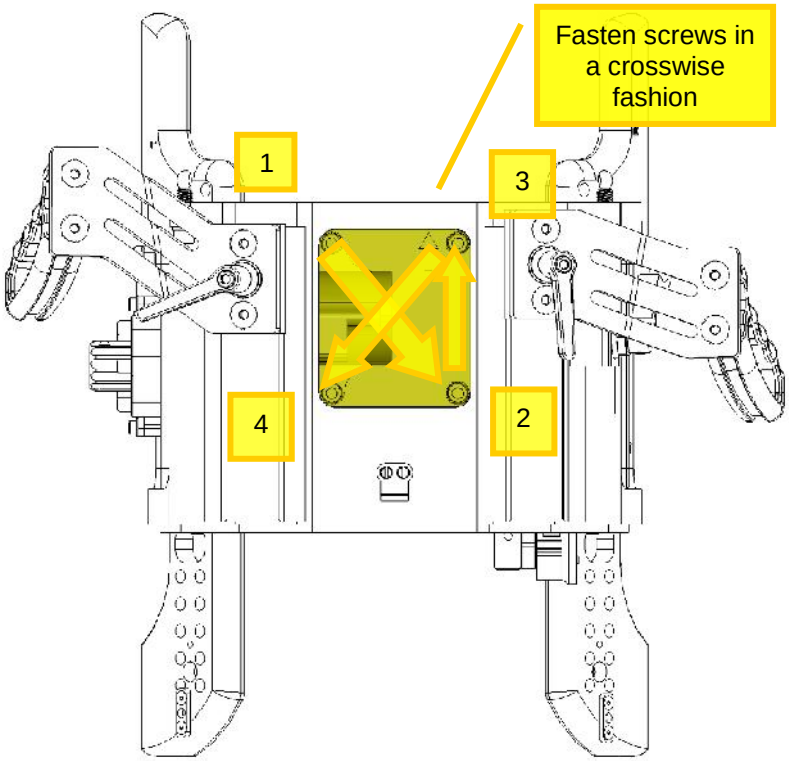
✓ **Remove the protective shipping cover** from the RT73 and inspect the o-ring for damage or foreign objects such as sand/dirt before installing.



✓ **Check sealing surface** for debris, then gently lower the attached RMI cable through the hole. Mount the RT73 to the top of the PR housing. Watch the cable to avoid pinching it between the housing and monitor.



✓ **Fasten the screws in a crosswise fashion**. The monitor may need to be swiveled up/down and/or rotated to access the socket head screws with the ball driver. Go back and tighten all screws again to make sure they are all securely fastened.

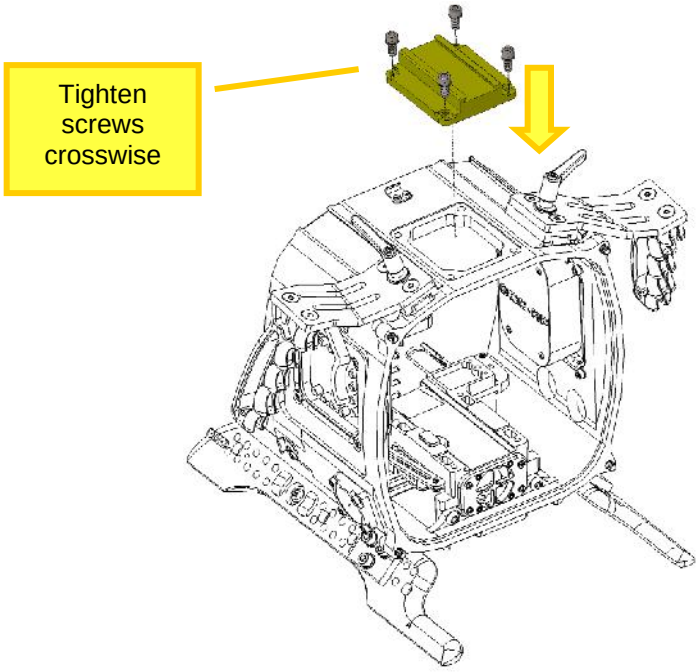


Attaching an SDI type External Monitor

Skip this section if using the RT73 RMI interface External Monitor.

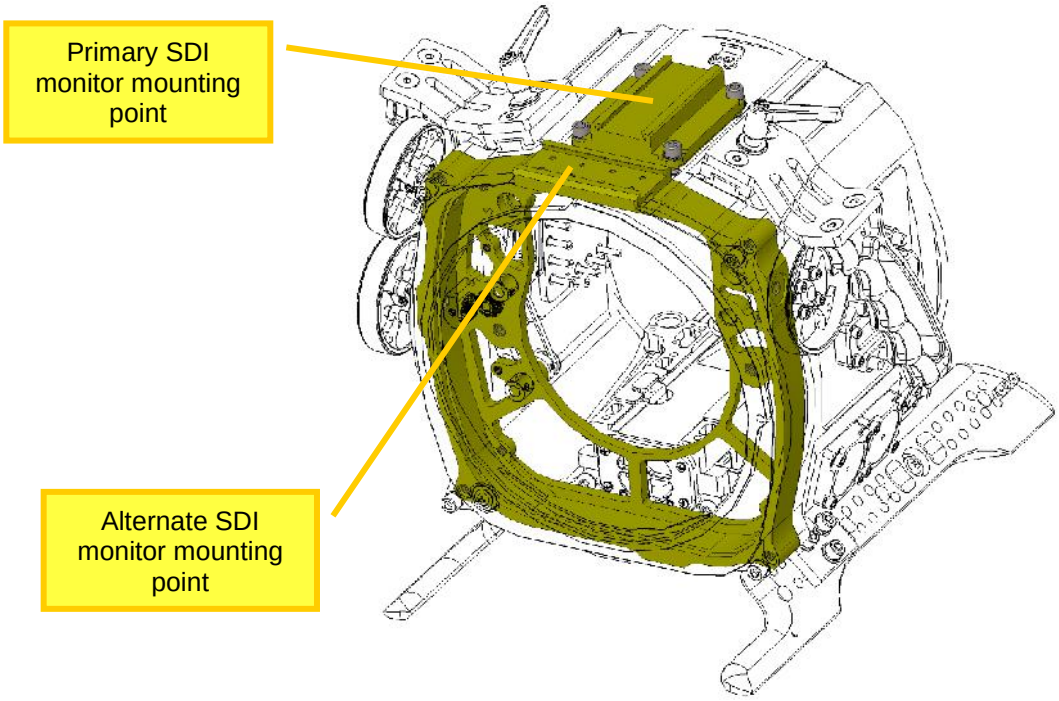
The SDI monitor should be installed now as it is much easier to route the cables before the camera is installed. Gates SDI type External Monitors will have a separate Setup, Use and Care Guide, refer to that document for additional details.

✓ If the Top Dovetail Blanking plate is not installed, **use the included ¼-20 screws and washers to install it now**. Fasten the screws in a crosswise pattern as in the previous page.

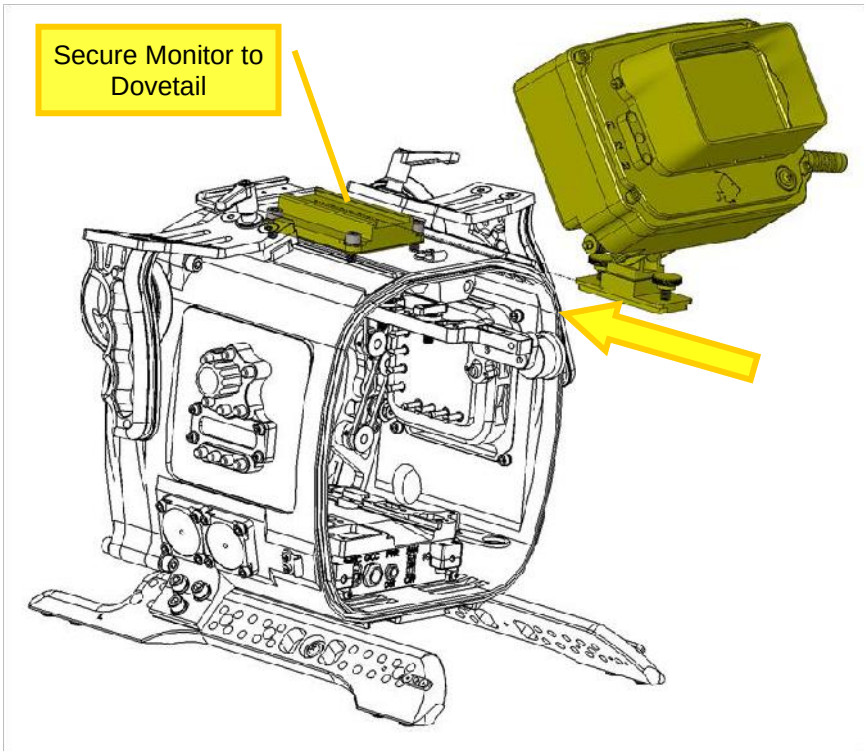


✓ **Adjust the monitor housing's dovetail as necessary** and secure it to the PR housing with thumbscrews.

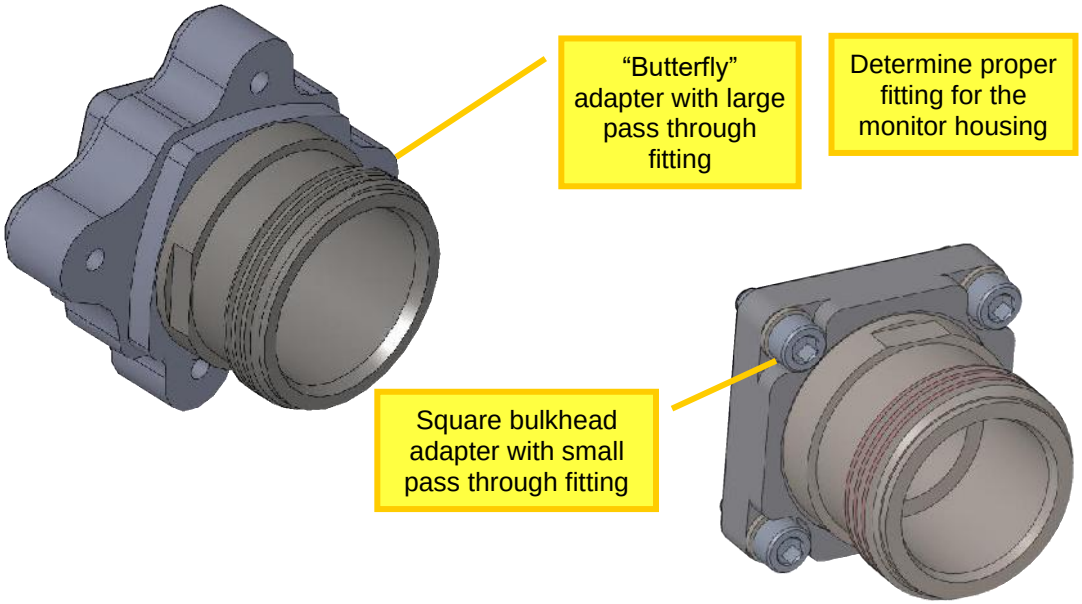
Monitor mounting points are on the top dovetail plate or on the Port Base.

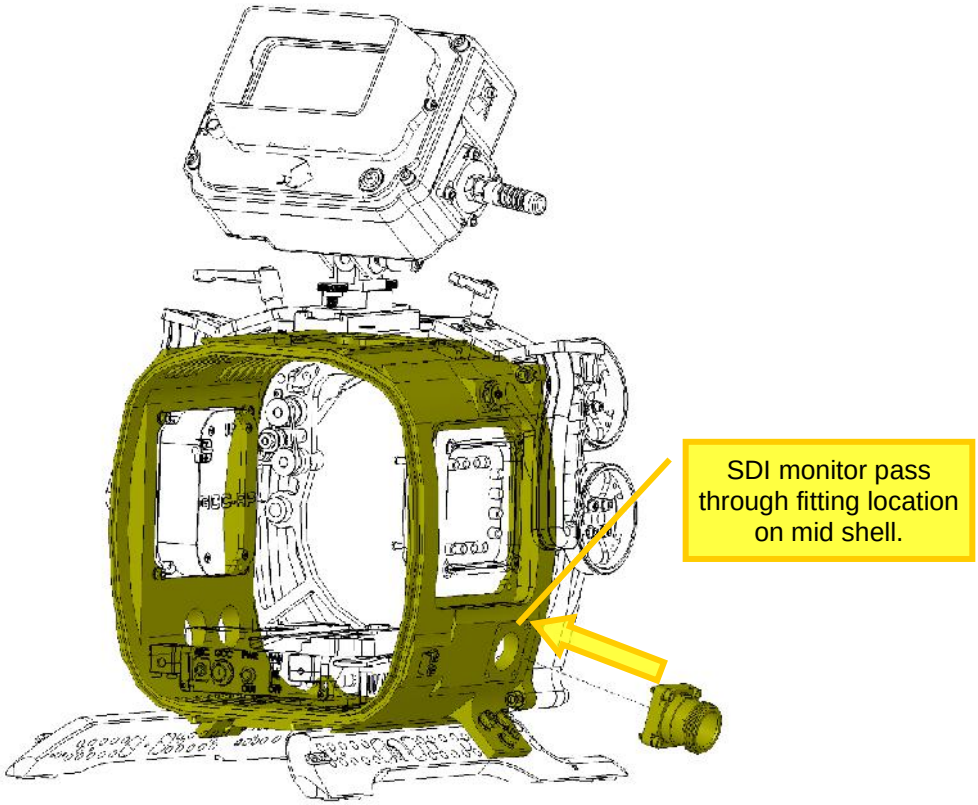


✓ **Slide the External Monitor housing into the dovetail** and secure with thumbscrews.

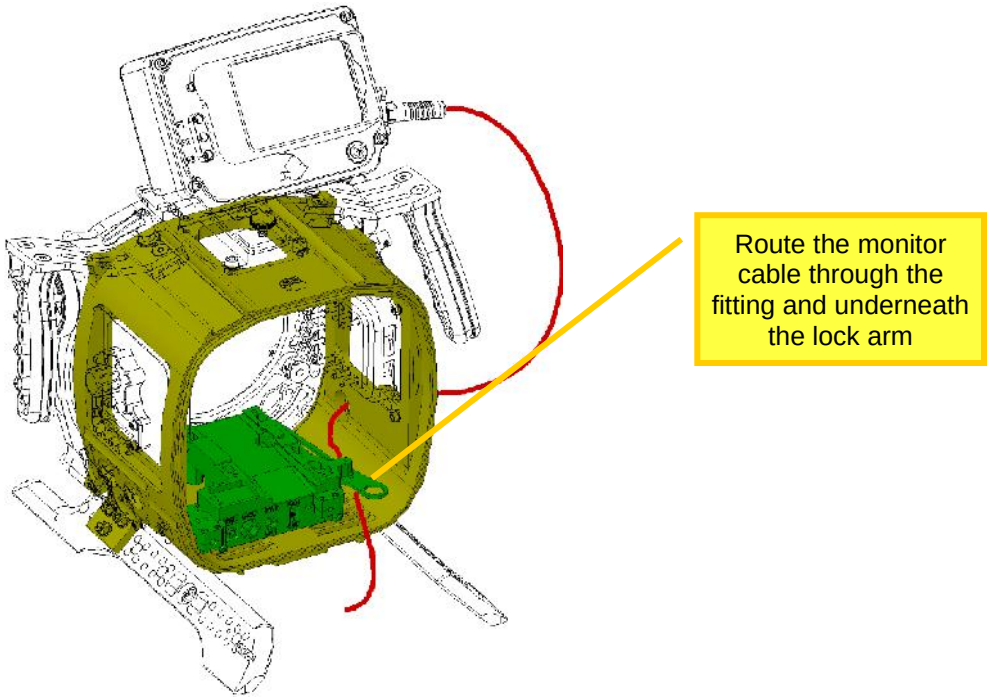


✓ If not already installed, **install the proper pass through fitting** in the PR housing's mid shell at the indicated location.





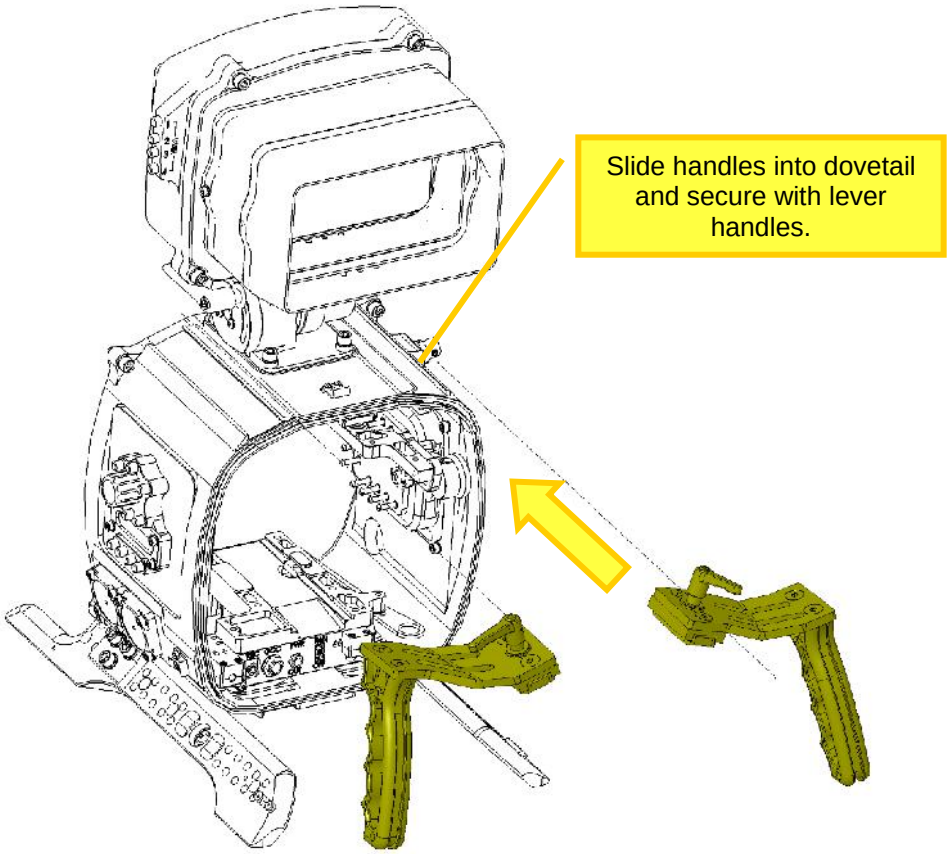
✓ **Pass the monitor cable through the fitting** and slide it underneath the camera tray lock arm.



✓ Finish monitor installation according to the specific External Monitor SU&C Guide.

Installing Handle Grips

Use the adjustable lever handle to secure the Handle Grips to PR. You can locate the Handle Grips in several different positions forward / aft on the housing.

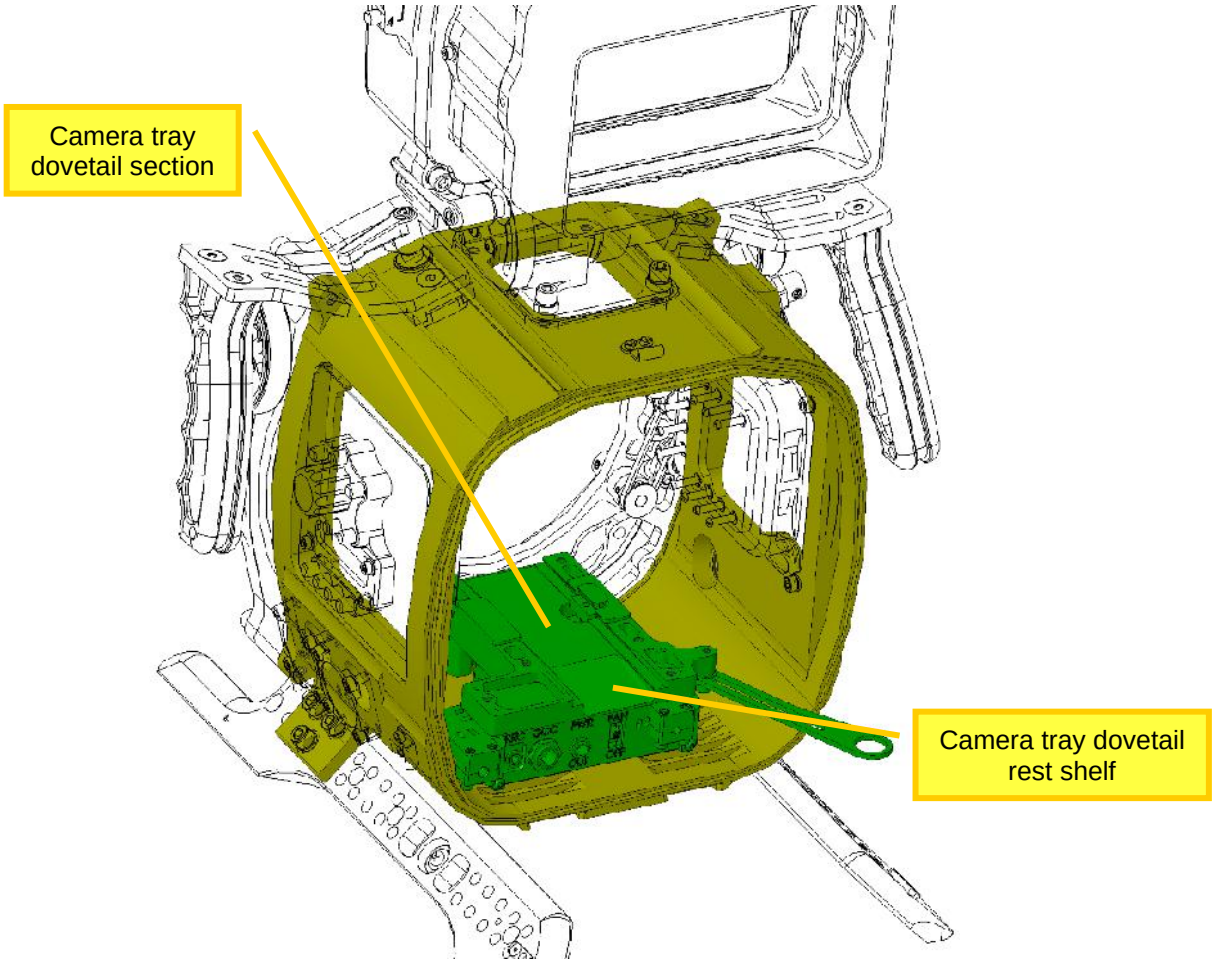

Slide handles into dovetail and secure with lever handles.

6. Installing the Camera

Connecting the RMI cable

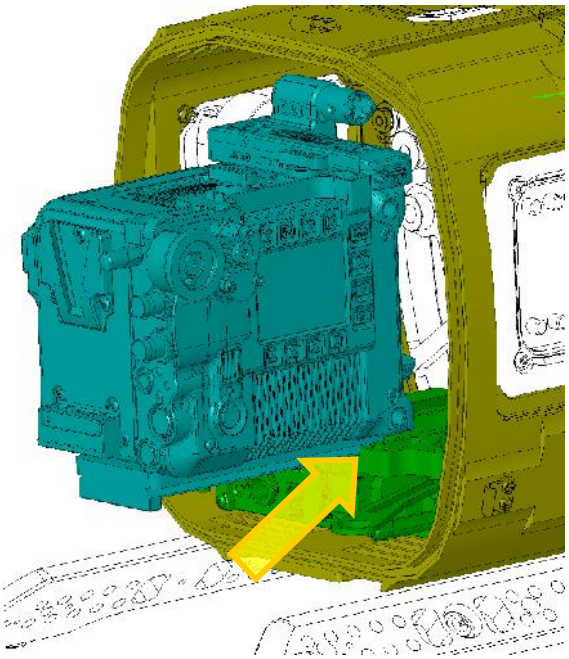
If using the RT73 RMI External Monitor, the cable must be connected before fully inserting the Camera.

- ✓ To begin, **locate the short section of camera tray** without a dovetail at the rear of the housing. This is the rest shelf.



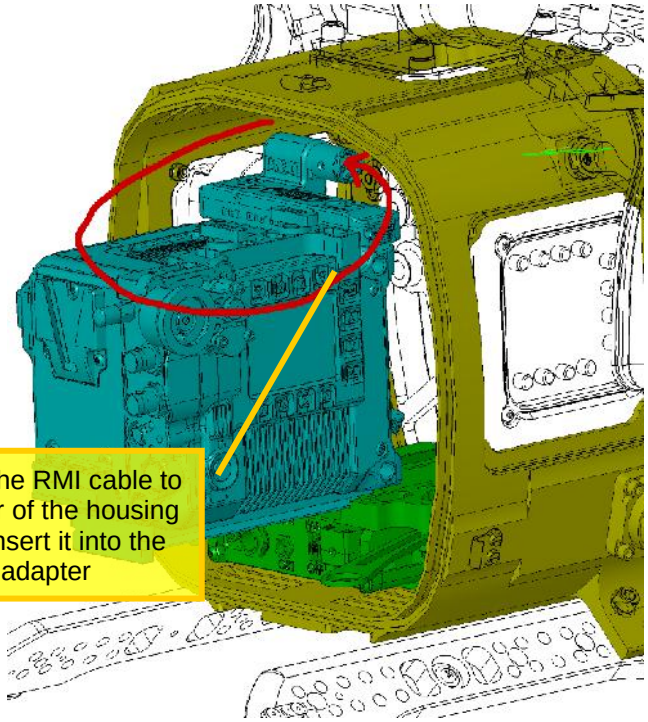
✓ **Rest the camera on the shelf and support** with one hand while connecting the RMI cable.

Rest the camera here while routing the RMI cable



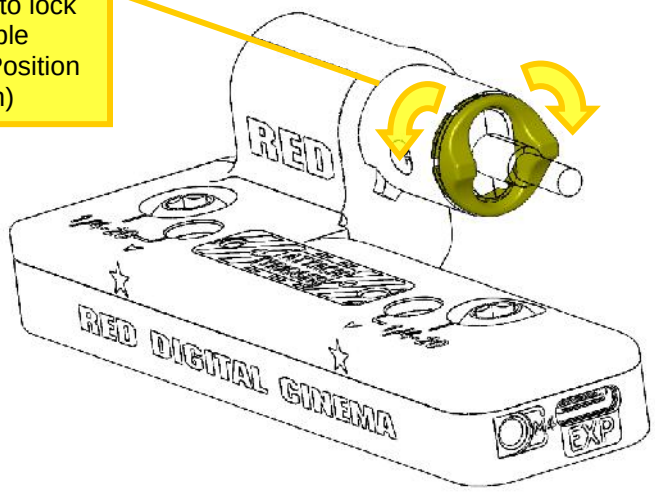
✓ **Route the RMI cable to the rear** of the PR housing and insert into the RMI adapter.

Route the RMI cable to the rear of the housing then insert it into the adapter

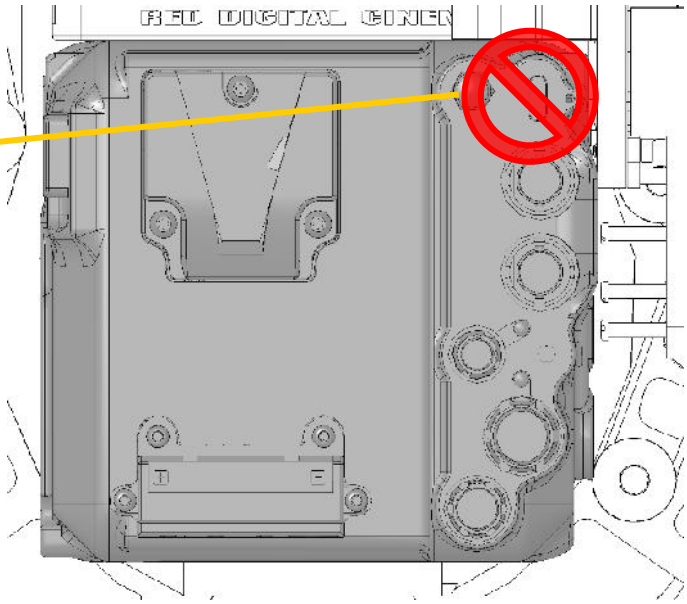


✓ **Rotate the lock ring on the RMI adapter** to fully lock the RMI cable into place.

Rotate ring to lock RMI cable (Unlocked Position Shown)

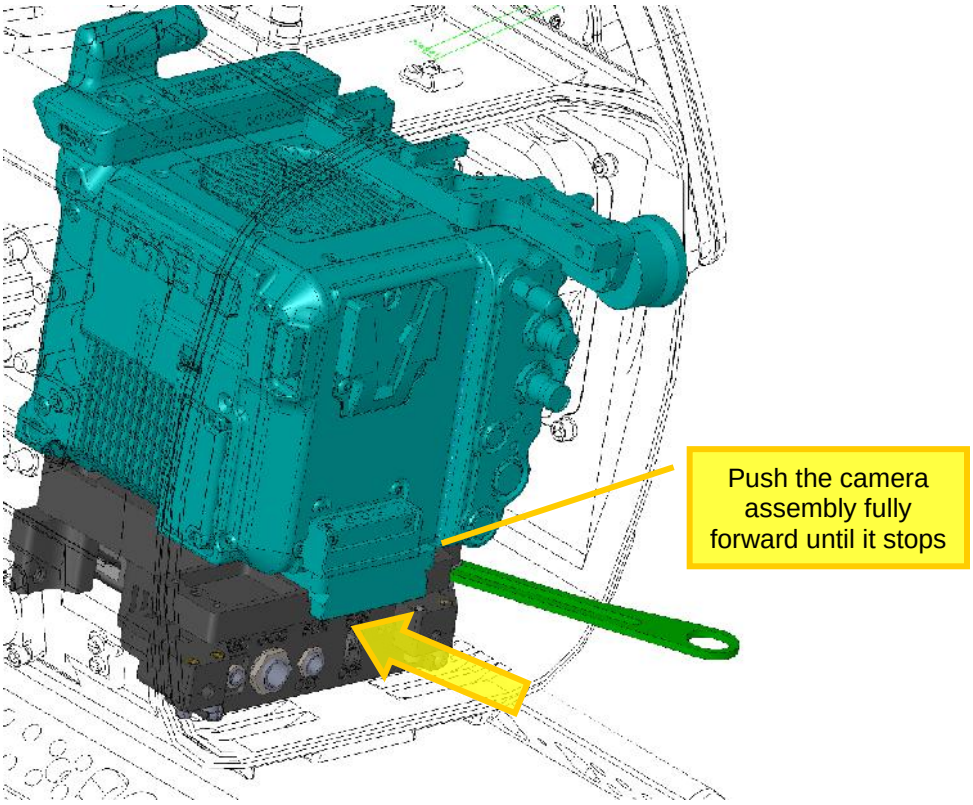


Plugging in the RMI cable to the back of the camera is a common mistake. IT WILL NOT WORK.
While the RMI cable uses a USB-C connector it is not a USB compatible cable, and will only work in the port on the RMI adapter.

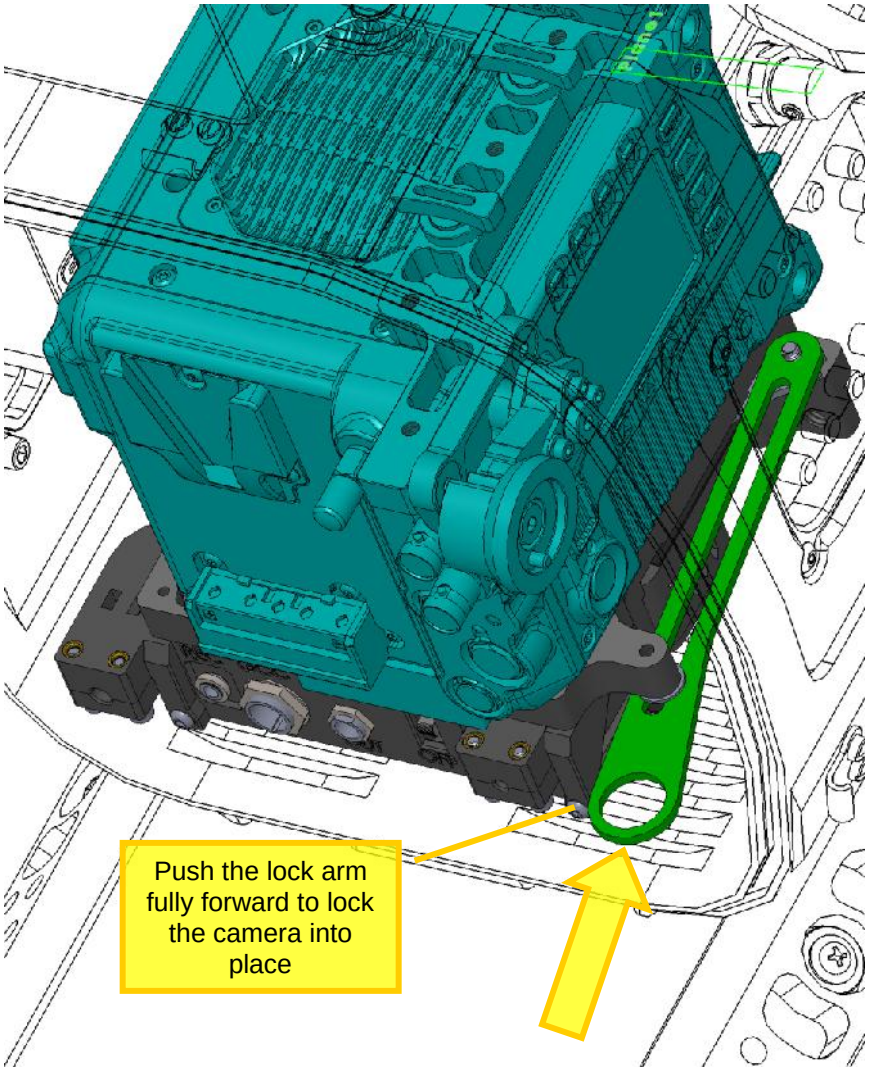


Seating and Locking the Camera Assembly

- ✓ **Push the assembled camera fully forward until it stops**. Examine the lip on the dovetail camera mount plate to make sure it contacts the end of the camera tray.

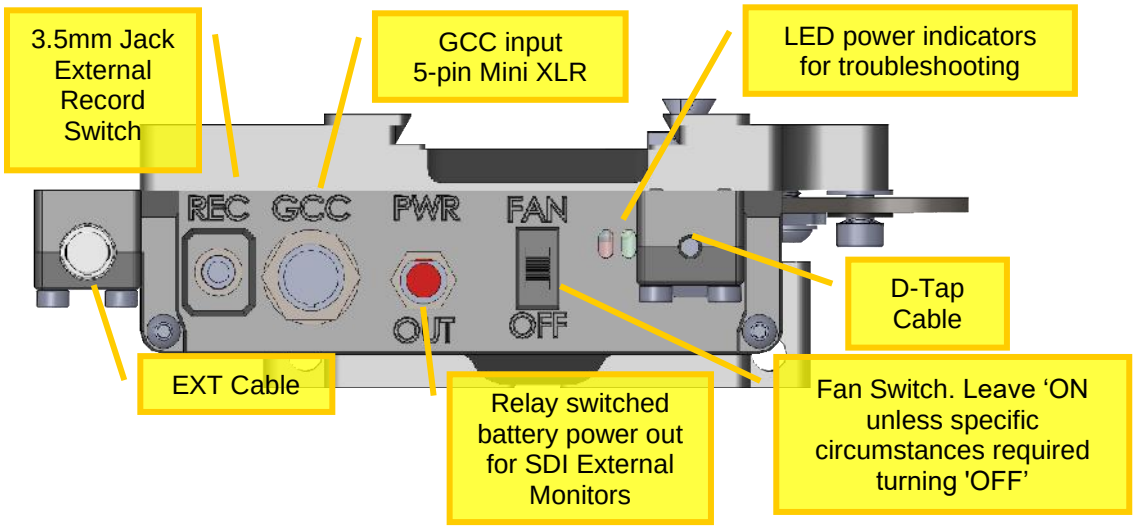


✓ **Push the lock arm all the way forward** to lock the camera assembly into place.



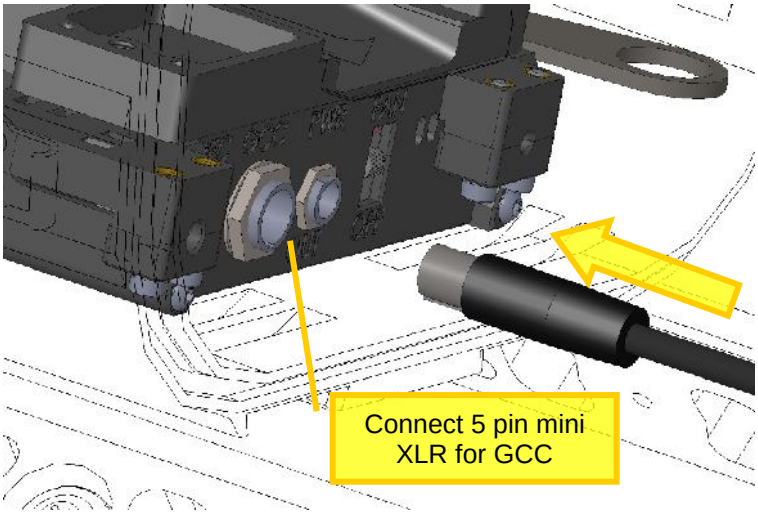
7.Connecting Cables

The Breakout Box Panel



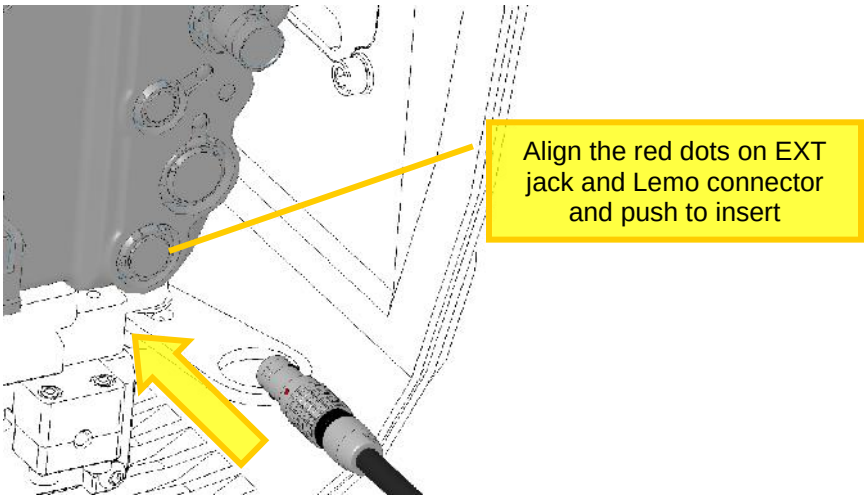
GCC Cable

The GCC is connected with a 5 pin mini XLR. Align the keyway on the connector and push it in to lock. Hold the button to remove. This connector can remain connected once complete. It is not necessary to unplug the cable to remove or mount V-RAPTOR into the housing.



EXT Cable

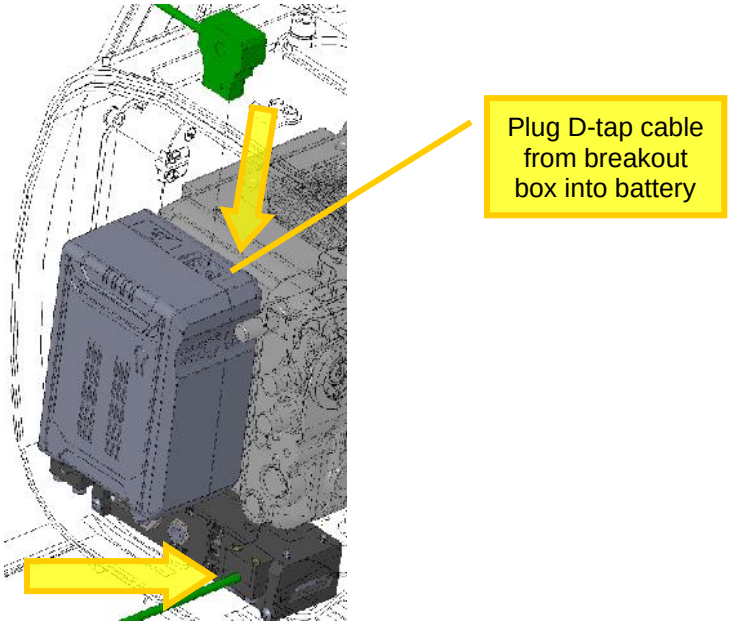
The 9 pin Lemo connector plugs into the EXT port on the V-RAPTOR Camera. Align the red dots on the port and connector to orient the cable before inserting. The Ext connector provides 5v power to switch the relay, record trigger and serial communication with the GCC.



D-tap Power Cable

The D-tap connector provides power for the GCC module, fan, and optional External SDI monitor.

Attach battery to the back of the camera. Next, connect the D-tap power cable. Route the cable where it won't get pinched when mating the rear shell. Use velcro cable wraps to hold it to other cables if necessary.

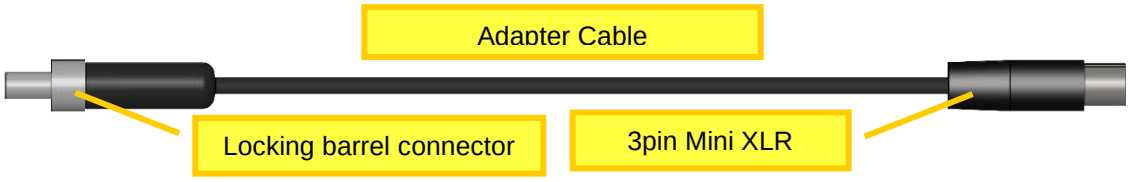


External SDI Monitor Cables

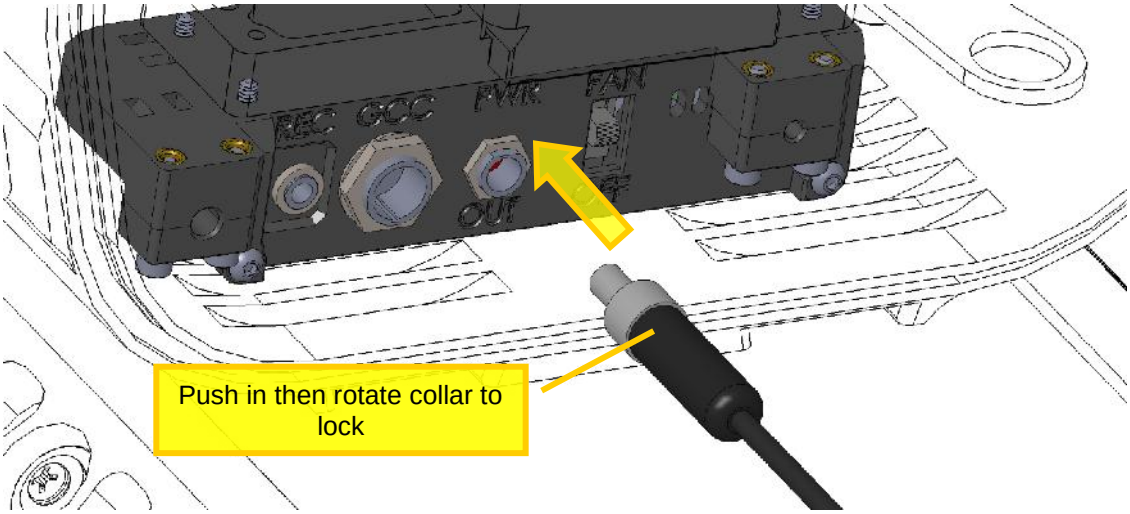
Read: All connections to SDI monitors should be done with the system power turned off. The 12g SDI boards on most new cameras can be damaged by hot swapping.

The connector on the breakout box provides switched power from the battery for Gates SDI External Monitor housings. Power from this connector will be supplied when the camera boots. When the auto boot feature on the monitor is enabled it allows the system to power on with only one knob.

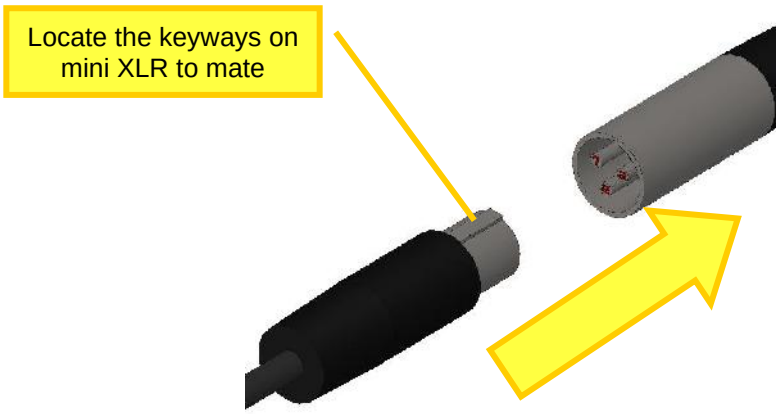
The breakout box uses a locking DC barrel connector. Some monitor housings use a 3pin mini XLR cable and will require an adapter cable to mate with the connector on the PR breakout box. The adapter cable is included with Gates SDI-type External Monitors.



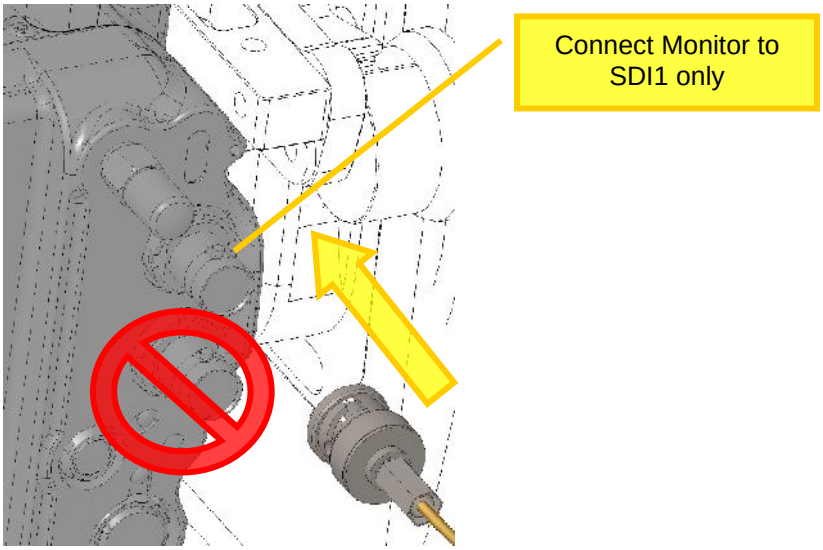
✓ **Connect the locking barrel cable** by pushing in then rotating the locking collar clockwise. Tighten by hand only… Do not over tighten the collar or it will be difficult to remove.



✓ Connect the 3 pin mini XLR on the adapter cable with the connector **on the monitor's wiring harness.**



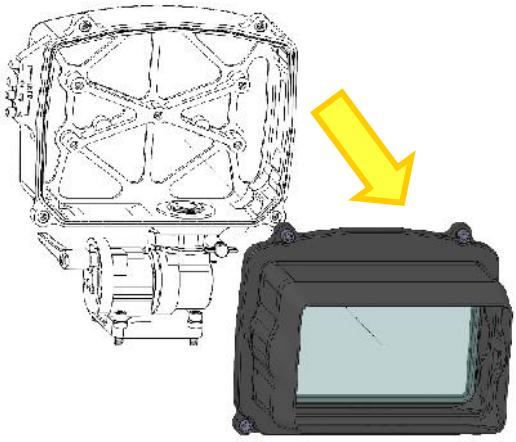
✓ **Mate the BNC connector from the monitor's wiring harness to SDI1 on V-RAPTOR Camera**. Connect to SDI1 only. This is important because the commands on the GCC module only work on monitors connected to SDI1. Reserve SDI2 for optional surface feed cables only.



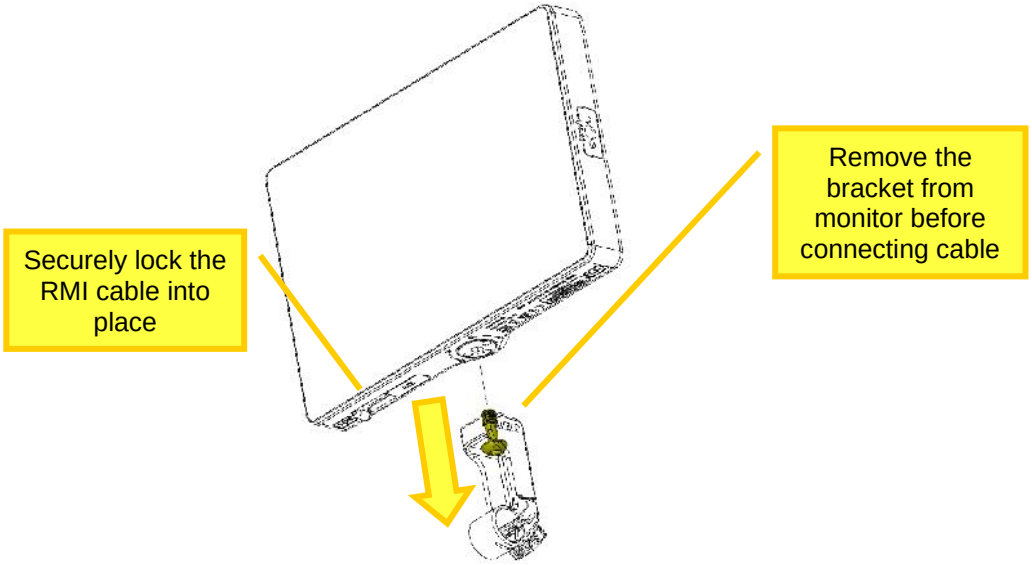
8. Monitor installation

DSMC3 Red Touch 7.0 RMI Monitor

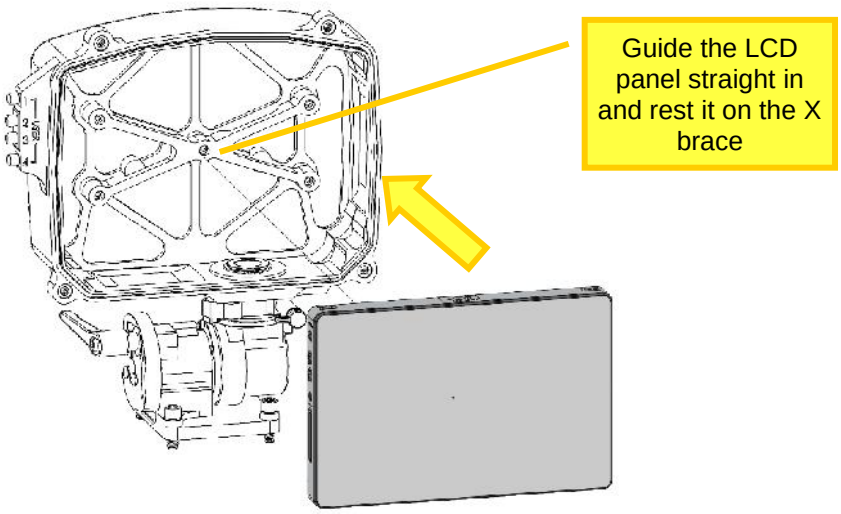
- ✓ **Use a 3/16" ball driver to loosen the four ¼-20 captive screws** on the front plate of the External Monitor. Remove the front plate.



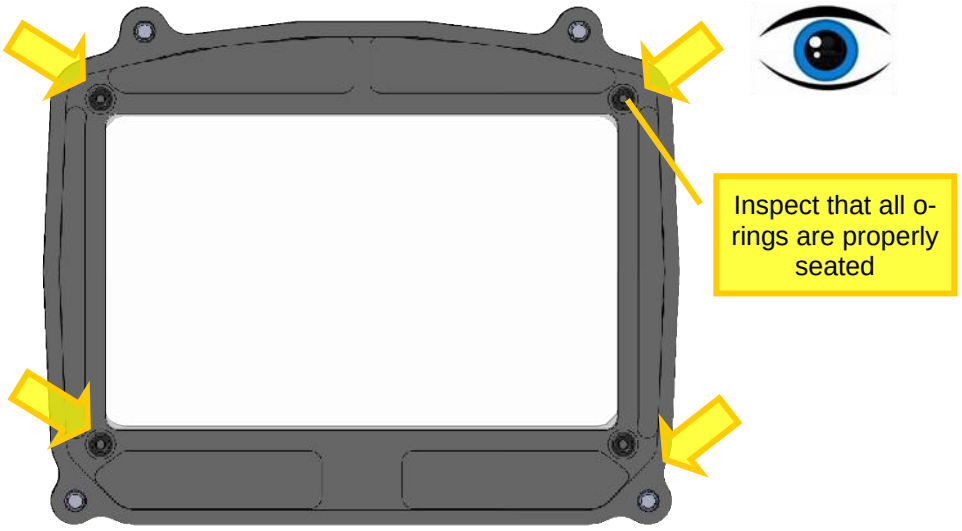
- ✓ **Check that the mounting bracket is removed** from the monitor then connect the RMI cable, making sure it is firmly locked.



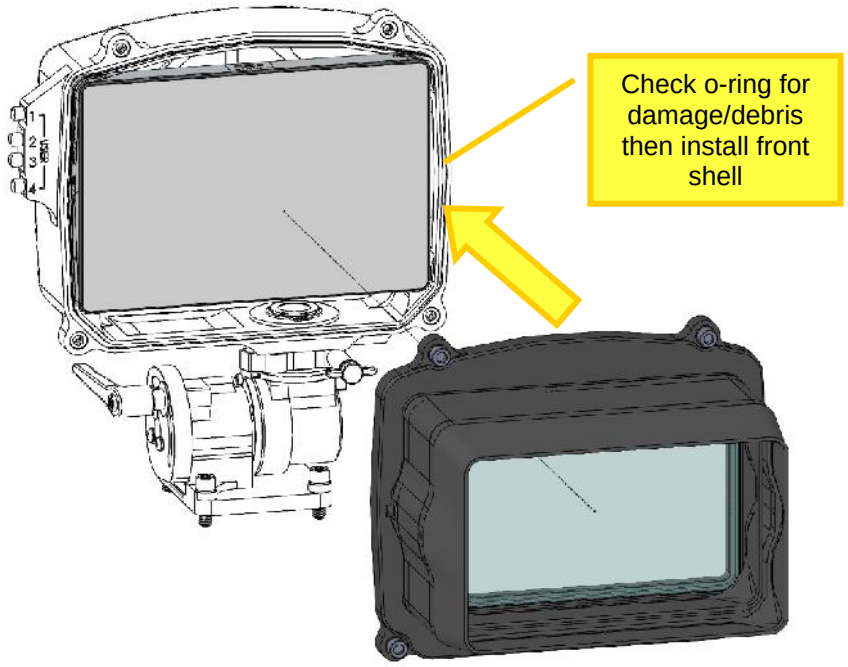
✓ **Keep the LCD panel straight and insert it into the shell**, guiding the cable to make sure it does not get pinched. The panel will rest on the X shaped brace.



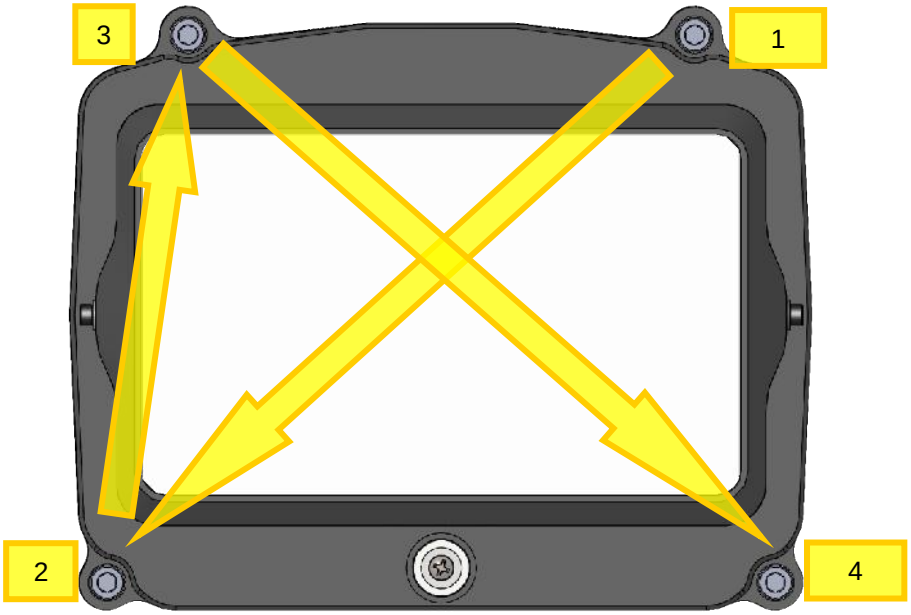
✓ **Inspect the o-rings on the back of the front plate** to make sure they are properly seated in their groove. They act as cushions for the LCD panel and if out of place can prevent the front plate from seating.



✓ **Replace the front plate on the monitor** after checking the o-ring for damage or debris.



Tighten the ¼-20 screws on the front plate crosswise once. Then go back and double check.



SDI Monitor

If using a Gates SDI-type External Monitor, it will have a separate SU&C Guide to consult for setup and operation. These can be found on Gates website.

9. Power on Functional Test

A power on functional test is recommended before sealing the housing and setting up the lens gear drives.

At this point, all previous set up steps should have been complete.

Mount a lens to the camera before beginning the test.

- ✓ Mount a lens to the camera. If youre lens requires Flex Gears, install those at this time.
- ✓ Rotate the wheel on the power control bracket clockwise to power on the system
- ✓ Wait 30 seconds for the camera to fully boot

Verify the following:

- ✓ The red record lever on the side of housing triggers camera's record function
- ✓ RMI monitor powers up
- ✓ External SDI monitor has power and displays image from Camera
- ✓ Fan Operates
- ✓ GCC module operates
- ✓ Iris control on DSLR/mirrorless lenses function and data displayed
- ✓ If using GCC with a SDI monitor, peaking, magnify and zebra functions work

If the housing successfully passes the functional test continue to set up Lens Gear Drives (LGD's).

Troubleshooting

- ✓ **Problem**: **The camera boots but there is no power for the GCC, External SDI monitor or Fan**

  Response: Check the LED trouble indicators in the breakout box. If power is supplied both a red and green light should be on.

  If no lights are on:
  - *Confirm that the 5v power out is enabled in the camera's menu.*
  - *Confirm that the EXT cable is properly seated and not damaged.*

  If only the red light is on:
  - *Confirm that the D-tap power cable is properly seated and not damaged.*
  - *Check that the battery is a compatible type and can handle enough peak current for the system.*
  - *Turn aux fan switch off to limit start up current and try again.*
  - *Cycle power to system and listen for the relay to click on. The green LED may also momentarily flash. If no clicking is heard or the clicking is intermittent/sporadic the relay may be faulty. Contact Gates*

- ✓ **Problem: GCC does not power on/ screen remains blank.**

  Response: Check the GCC window for the green LED.

  If the green LED is NOT on:
  - *Check the trouble lights on the breakout box to confirm power is being supplied.*
  - *Check the GCC cable for damage and make sure it is properly seated in the Mini XLR socket in the breakout box.*
  - *Remove Plastic GCC module cover and check that the 5 pin board connector is properly seated.*
  - *Remove Plastic Cover and check for water damage.*

  If the green LED is on but the screen won't come on:
  - *Remove Plastic Cover and reseat micro SD card.*
  - *Download Firmware and reformat SD card.*
  - *Possibly bad screen, replace unit.*

- ✓ **Problem: External Monitor does not come on with system**

  Response:

  RT73 External Monitor: Check RMI connectors are fully seated into LCD and RMI adapter.

  SDI External Monitor: Enable auto boot/ auto recovery in monitor menu. Power cycle monitor after applying changes and try again. Verify all cables are fully seated.

- ✓ **Problem: Camera not responding to GCC.**

  Response: Check settings in V-RAPTOR menu.
  - *Check IP address*

- *Check baud rate*
- *Remove Plastic Cover on GCC module and make sure 5pin board connector is properly seated*

✓ **Problem: RMI Monitor not turning on**

Response: Check cables and adapter.

- *Check that the RMI connectors are properly seated in the monitor/RMI adapter.*
- *Check cable for damage.*
- *Remove camera/monitor from housing and use a short cable to trouble shoot.*
- *Remove camera from housing…unscrew RMI adapter and reseat.*
- *Check the spring loaded Pogo contact pins on the RMI adapter for damage.*

✓ **Problem: Record Trigger on housing is not working**

Response: check cables and switch

- *Check that EXT cable is firmly seated in camera and not damaged*
- *Check record trigger cable running along inside of housing shell to make sure it hasn't been pulled out of the break out box. Make sure board connector firmly seated.*
- *Examine the switch. Use a flashlight and look inside the housing and check that the lever is firmly pressing the switch.*

✓ **Problem: GCC peaking/magnify/zebra controls not working on SDI monitor**

Response: GCC controls only work on outputs connected to SDI1.

- *Confirm that monitor is plugged into SDI 1*
- *Make sure that SDI 1 Tools are enabled in camera menu*

10. Port Bases and Lens Gears Drives

The Gates PR Housing has a modular front end that can accept several different port bases.

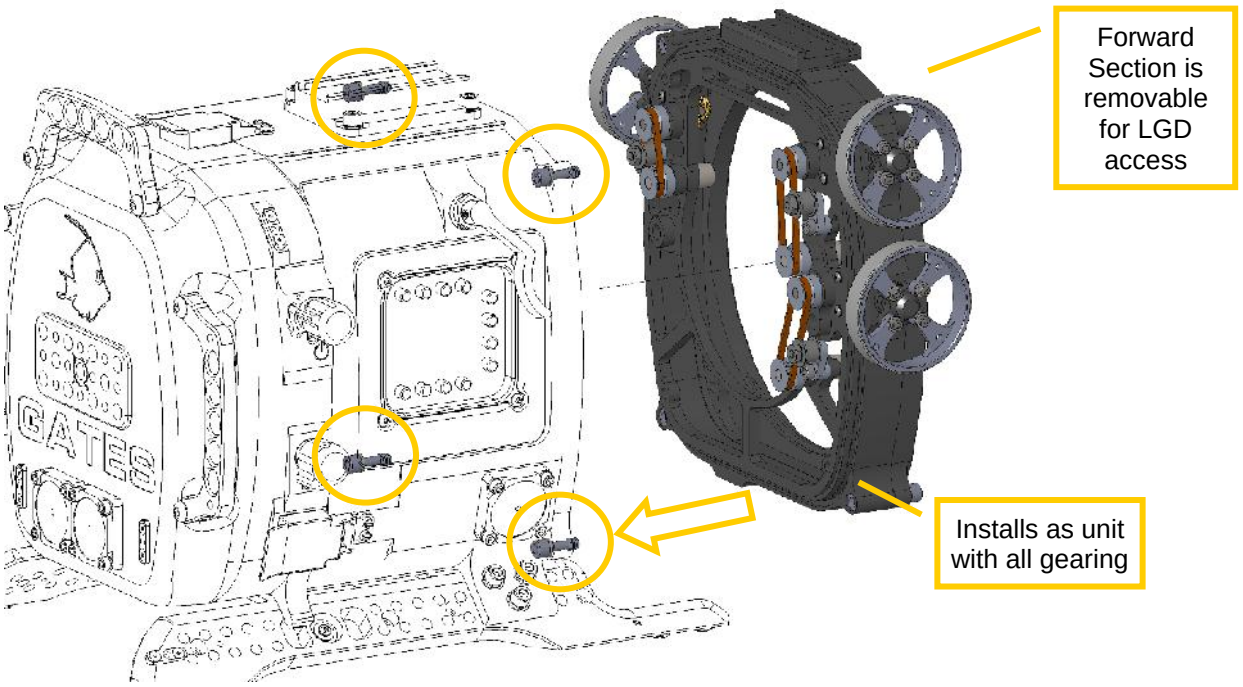
- ✓ **The 80 series is extremely flexible and has 3 diver operated controls** that work with a wide range of lenses.
- ✓ **The compact 60 series has 2 diver operated and electronic iris control.** This works best with DSLR and Mirrorless lenses with an electronic iris control.
- ✓ **The 110 series port base has no diver operable controls** but has extra room to allow mounting of motors for remote lens control systems.

The lens gear drives on the 80 and 60 ports are NOT the same and require a different setup. The 60 and 80 ports use a different rotation direction, due to different number of gears. Consult the proper section for each style of port base.

80 Series Port Base

The 80 port base assembly is secured to the front of the PR housing with 4 ¼-20 captive screws.

- ✓ **After inspecting the o-ring and gasket surfaces for damage and debris,** mount the port base to the housing.
- ✓ **Use a 3/16" ball driver to secure the port base** by tightening the screws in a cross-wise fashion.
- ✓ **Double check** the screws a second time after the initial tightening. Inspect the seal around the housing for gaps.



80 series Lens Gear Drives (LGD's)

The forward flange on the port base can be removed to get easier access to the set screws on the lens gear drive.

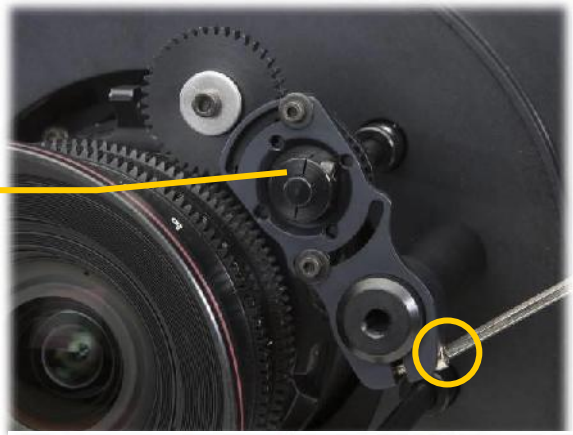
- **Lens Gear Drives (LGD's)**
- **General Notes.** This section addresses the installation of three LGD's – 2 x CCW (Counter Clock Wise) and 1 x CW (Clock Wise). These designators are applied because two LGD's point in a CW direction and the other in a CCW direction, The LGD's are marked CCW and CW. You will install guide bars and drive shafts that match the lens of your choice.
- **Secure Guide Bars.** Insert the guide bars by threading them into the front bulkhead. Tighten firmly by hand – no tools are required but wrench flats are provided on the guide bars should this be necessary.
- **Install Drive Shafts.** These are ¼" black delrin and have a flat spot milled into one end. This end inserts into the drive coupler at the face of the front bulkhead. **Secure gently**

with the set screw on the coupler. Do not overtighten.

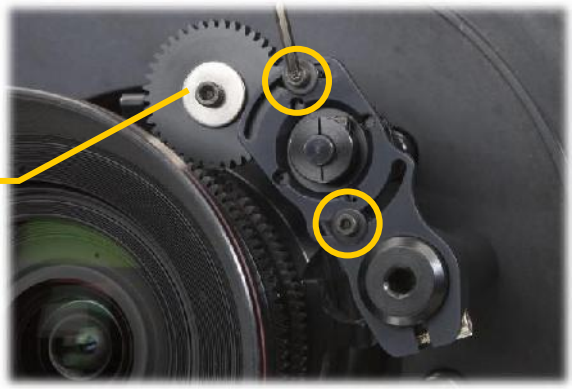
- **LGD's mounting. Install the LGD's in their proper orientation with pivot gear screws facing forward. Slide it onto the guide bar and drive shaft, then line up the LGD with the lens gear you wish it to access.**

  The sequence of tightening screws on the LGD's is important.

- **Step 1. Tighten the LGD mount screw securing it to the guide bar. Critical: the drive shaft/gear hub must be centered with the opening on the bracket.**



- **Step 2. Pivot the larger gear onto the lens gear such that it makes intimate contact. Carefully observe that the gear is still properly aligned and the drive shaft/gear hub is centered with the LGD bracket (see photo). Tighten the two pivot screws gently to secure it in position.**



- **Step 3. Firmly tighten the screw that couples the drive gear hub to the drive shaft.**

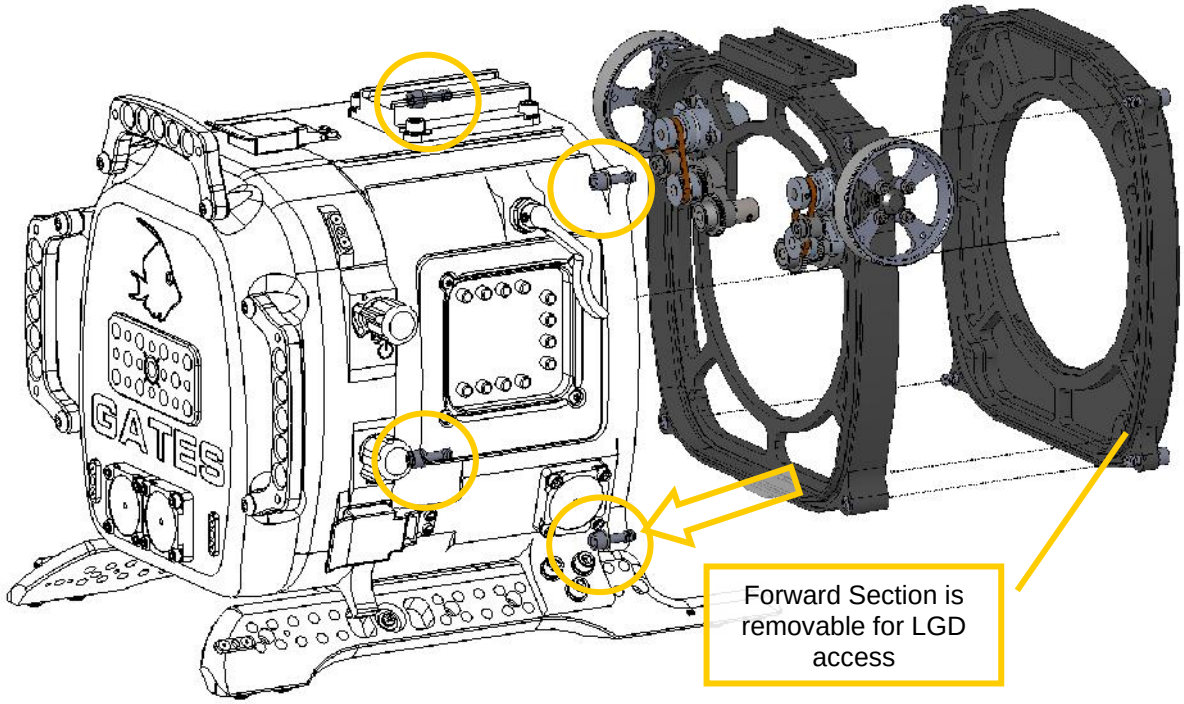
▶ TIP. The gear hub / drive shaft coupling acts like a clutch – the drive shaft will 'slip' when reaching the end of travel in either direction. Tightening the screw more will allow less slip. Adjust this amount of slip at your discretion.

- **Set the focus/iris indicators. The left and right side Gear Controls have silicone bands. The white silicone can be marked to indicate focus / iris position.**
- **Verify Operation.** Once positioned and secured, check operation. Focus / Iris / Zoom controls should rotate freely – but with slight resistance **– in both directions.**

60 Series Port Base

The 60 port base assembly is secured to the front of the PR housing with 4x 1/4-20 captive screws.

- ✓ **After inspecting the o-ring and gasket surfaces**
- ✓ **Use a 3/16” ball driver to secure the port base**
- ✓ **Double check the screws**



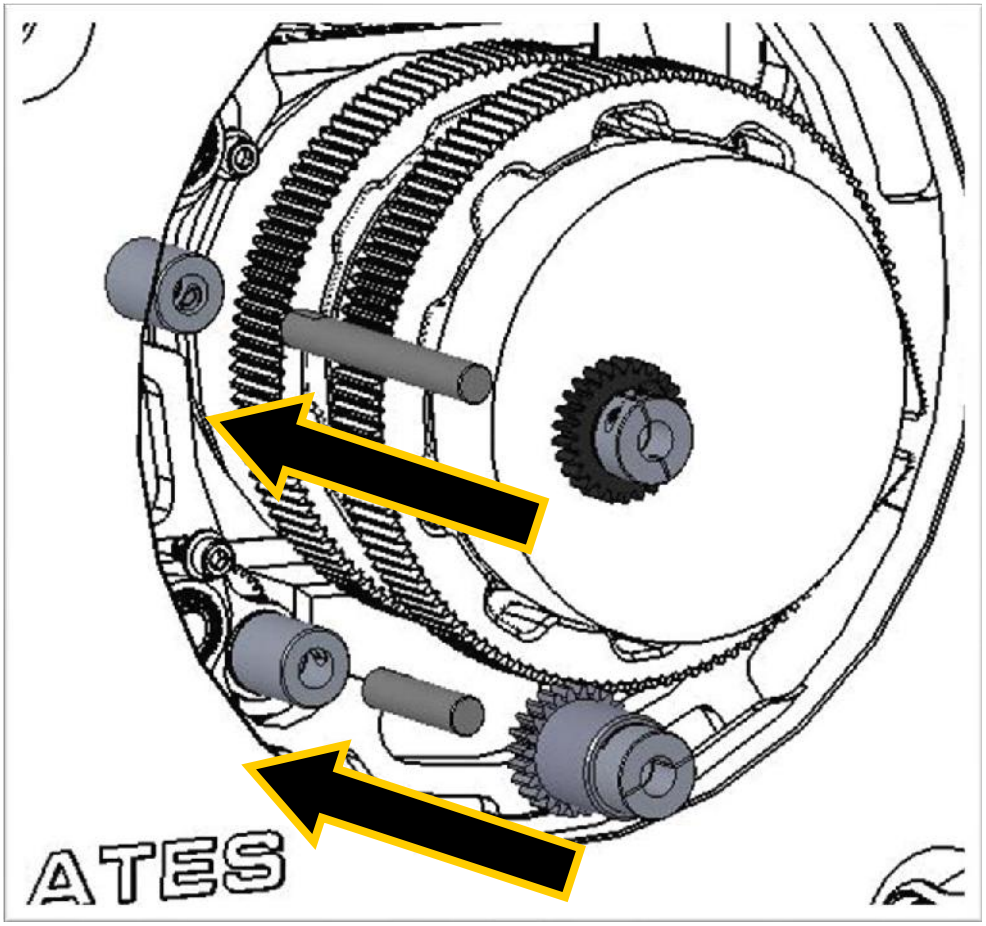
60 Series Lens Gear Drives (LGD's)

The forward flange on the port base can be removed to get easier access to the set screws on the lens gear drive.

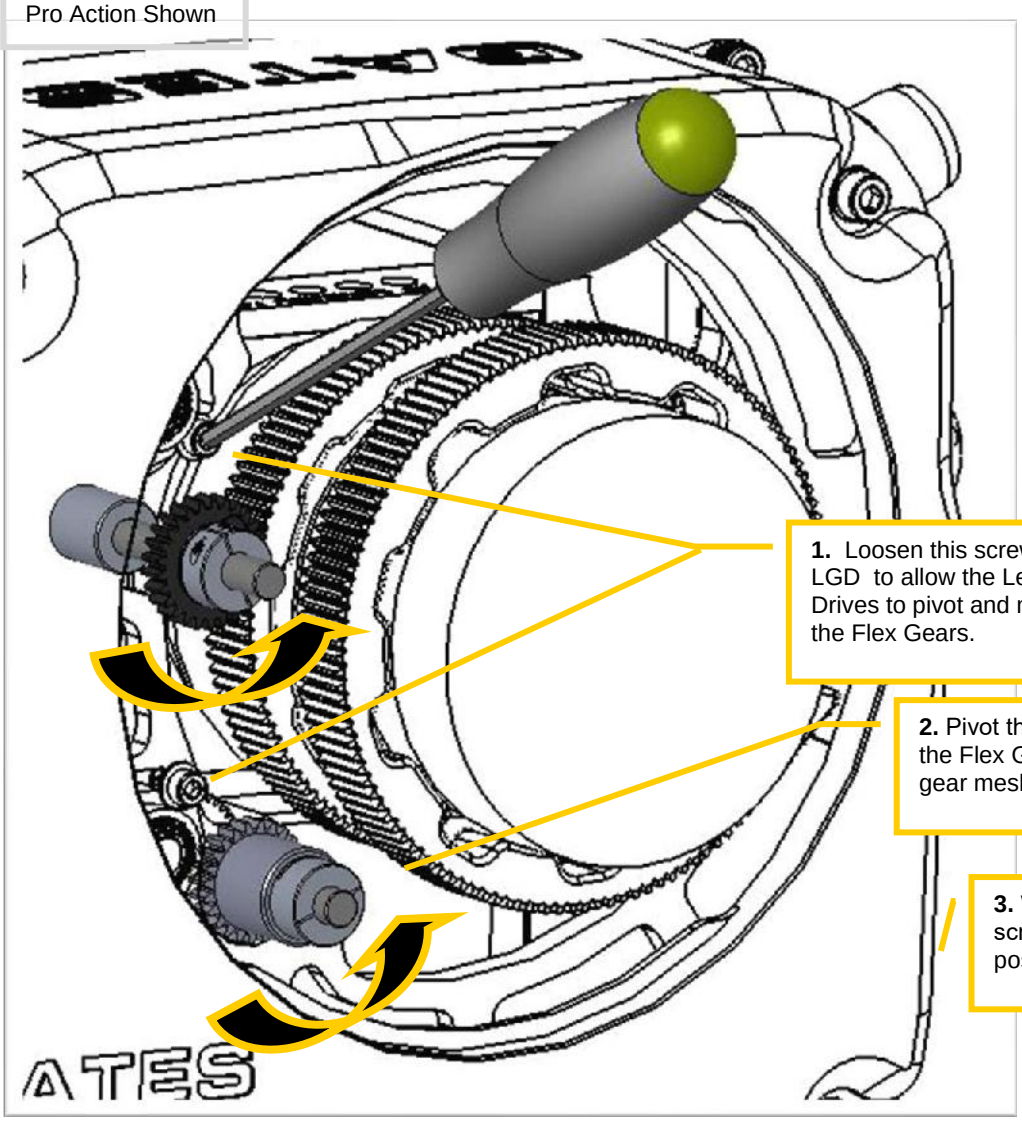
- ✓ General Notes. This section addresses the installation of two Lens Gear Drives (LGD's) in DK. This is relatively straightforward, using only two parts for each lens control: a drive shaft and drive gear.
- ✓ **Select drive shaft length**. Several lengths of drive shaft are included with the DK kit. Select the length to reach the lens gear but does not reach past it.

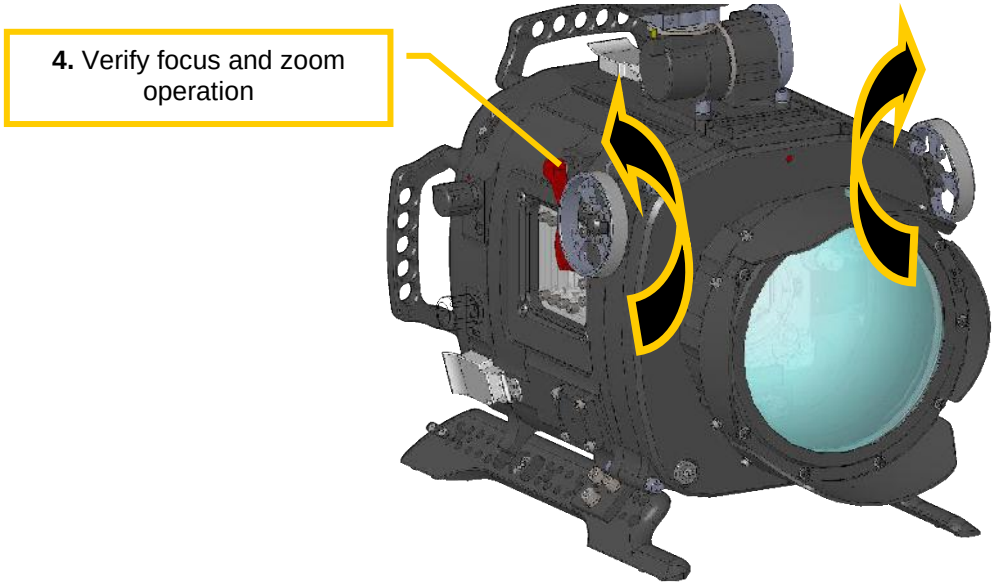
  Install this drive shaft into the coupler on the housing. Using the tool provided in the kit, tighten the shaft onto the coupler.
- ✓ **Select and install the Lens Gear Drive**. Note that your kit comes with six versions. Two are specifically designed for Flex Gears recessed into the housing, close to the camera. Refer to the images below.

  Once positioned, secure the Lens Gear Drive with the tool provided in your kit.
- ✓ **Pivot the LGD** into position to mesh smoothly with the Flex Gears.
- ✓ **Tighten the screw** as shown in the images to secure the LGD in position.
- ✓ **Verify smooth operation** of the Focus and Zoom controls.



Pro Action Shown



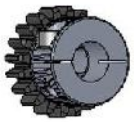


60 Series Port Lens Gear Drive (LGD) Size Reference

PR 60 series port base kit includes several size LGD's to accommodate different lens sizes. Below is a reference.

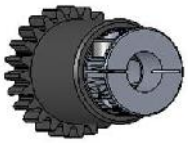
Focus Gears

P/N 3000-94-228

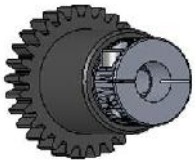


P/N 3000-94-

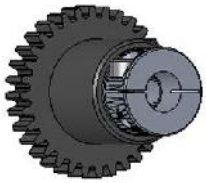
Iris and Zoom Gears



P/N 3000-94-229



P/N 3000-94-239



P/N 3000-94-233

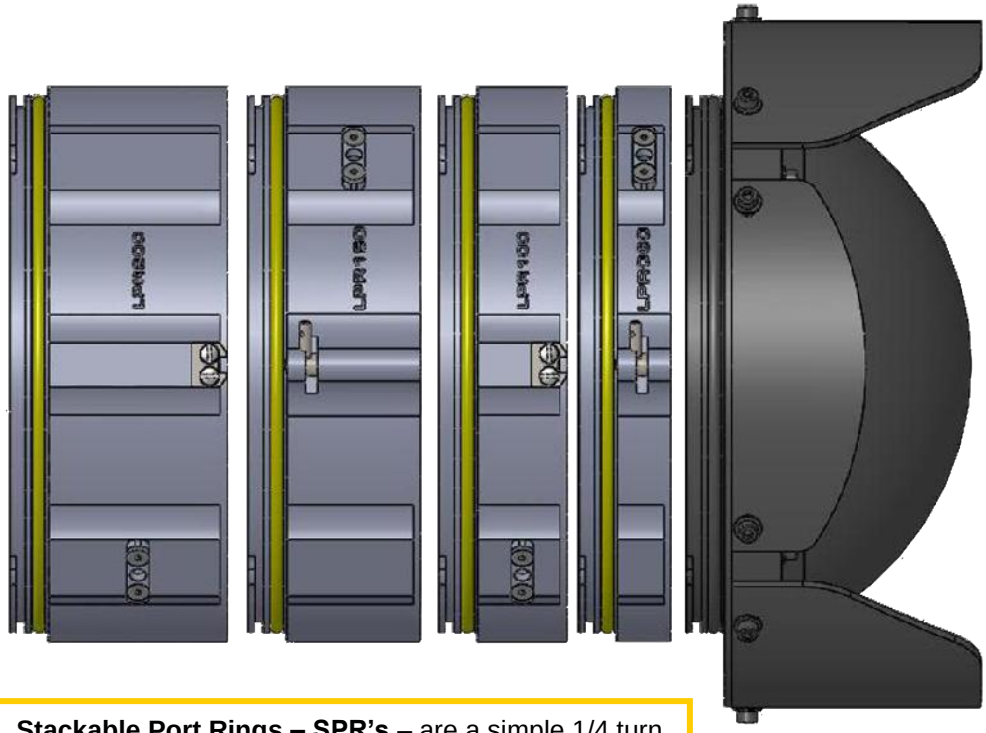
P/N 3000-94-246

LGD's designed for Zeiss CP.3 lenses and others as needed.

11. Ports and Stackable Port Rings (SPR's)

About Stackable Port Rings (SPR's)

Stackable Port Rings are a flexible and convenient way to support many different lenses. They can be stacked in many combinations to support virtually any lens.



Stackable Port Rings – SPR's – are a simple 1/4 turn bayonet mount system to support any lens. They lock in position for mounting or removing a port.

The SPR's stack for a lens can be determined in two ways:

- ✓ **Gates Lens Compatibility Matrix.** Gates has gathered extensive lens data for decades and can provide SPR configuration guidance for any given lens to use with DK. This lens data is summarized in a Compatibility Matrix. It can be found on Gates Website.

  The Compatibility Matrix is constructed to identify the proper Port Extender or Port Ring (used on other Gates cinema-grade housings), and a conversion to a combination of SPR's is available from Gates.

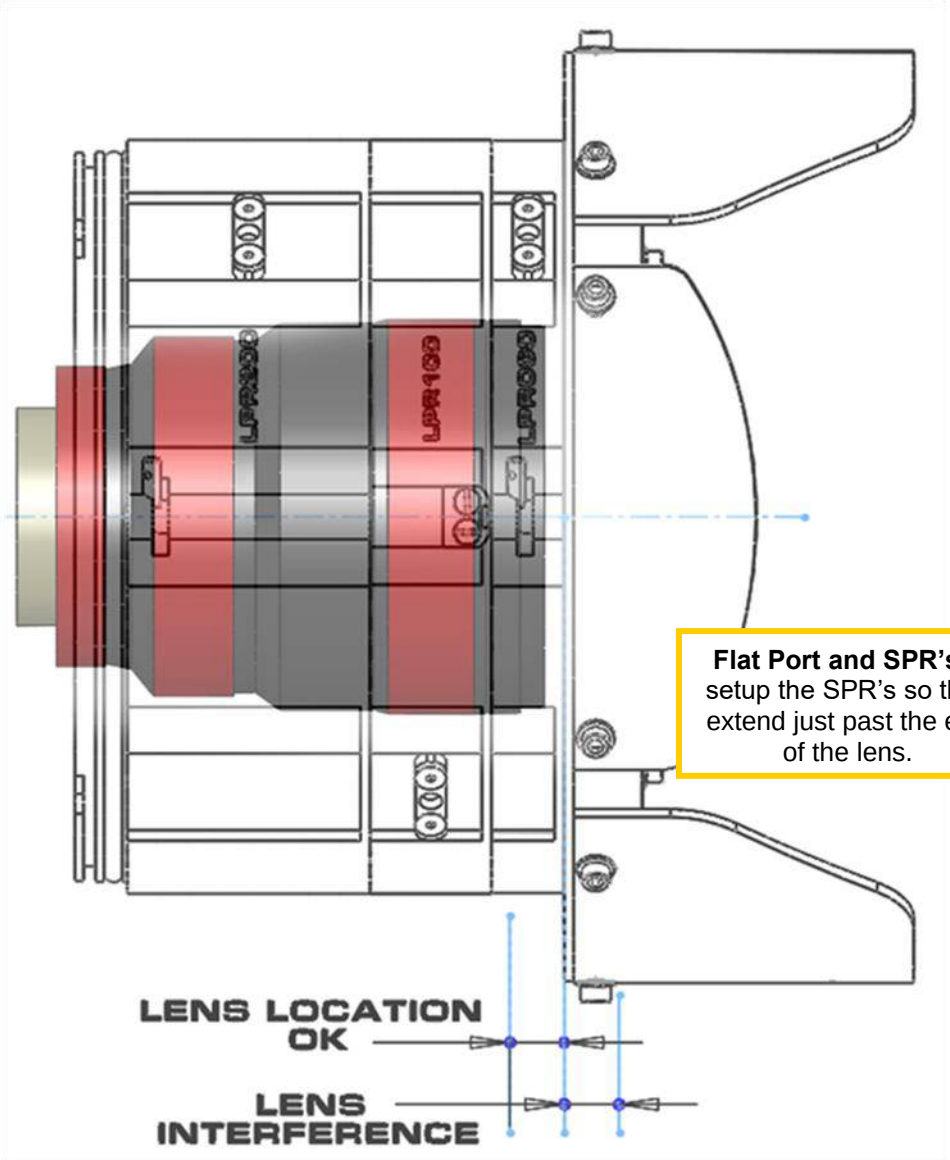
- ✓ **Visual Setup and Test. Use the following guide to setup the SPR's with a Dome Port or Flat Port, and then test in water for acceptable image quality.**

Using Flat Ports with SPR's

- ✓ A Flat Port is used commonly for macro lenses, and also for medium to long focal length lenses. The focal range that works best starts at approximately 20-35 mm. the SPR's to extend just past the end of the lens. Referring to the image, setup the SPR's to extend just past the end of the lens. Keep the entire SPR stack as short as possible while preventing interference with the port.

  Test for vignetting and image quality. If necessary, adjust the position of the lens with respect to the port by adding or removing SPR's. Re-test and re-adjust as necessary to achieve optimum results.

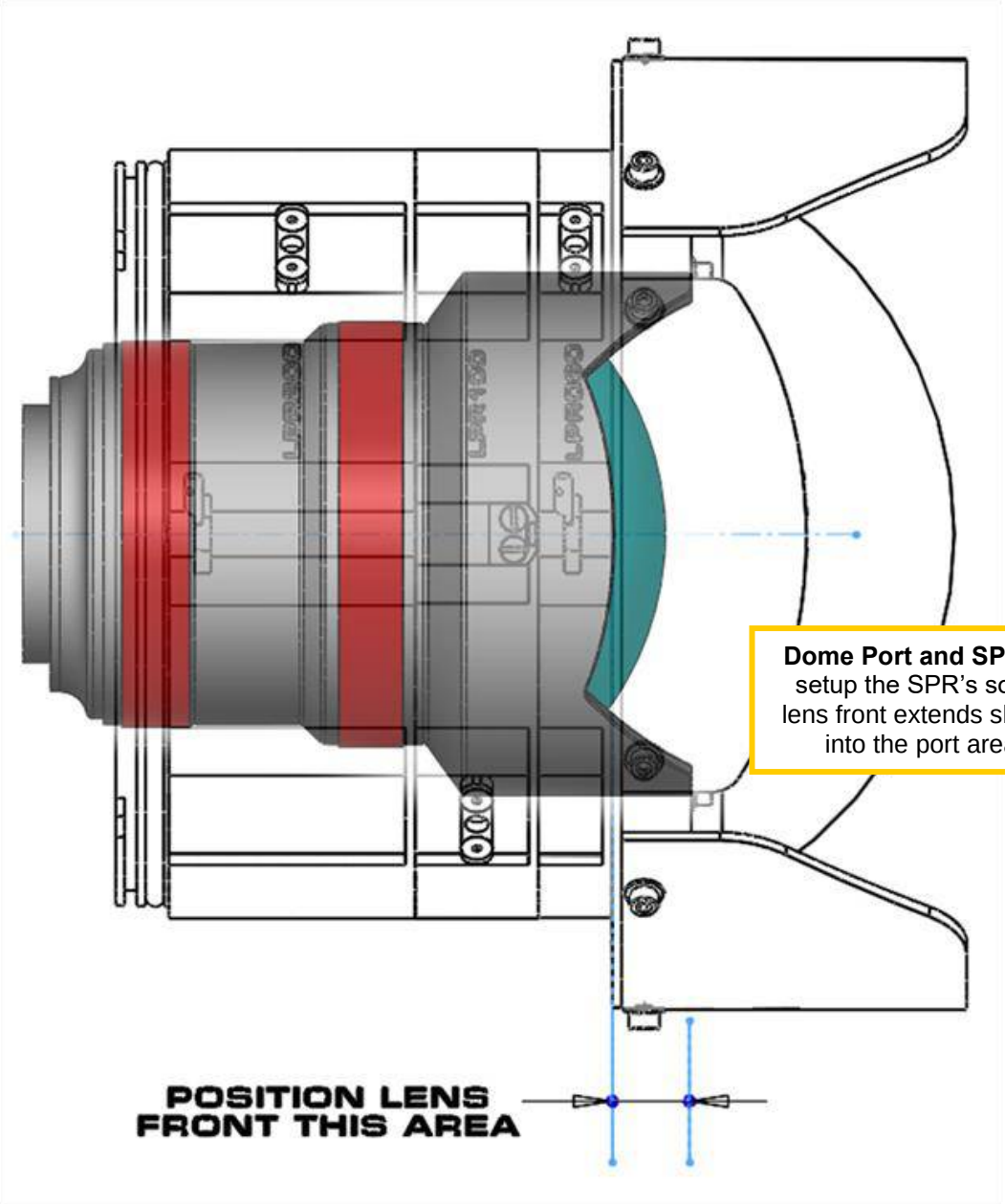
  .



Flat Port and SPR's – setup the SPR's so they extend just past the end of the lens.

Using Dome Ports with SPR's

- ✓ A Dome Port is used commonly with wide angle and fisheye lenses, typically 8mm at the shortest to about 20-35mm. Setup the SPR's so the end of the lens – either the lens body or glass element – extends slightly into the port. Test for vignetting and image quality. If necessary adjust the position of the lens with respect to the port and re-test to achieve optimum results.
- ✓ CAUTION! CAREFULLY INSTALL DOME PORT AND OBSERVE POSSIBLE INTEFERENCE WITH GLASS DOME.

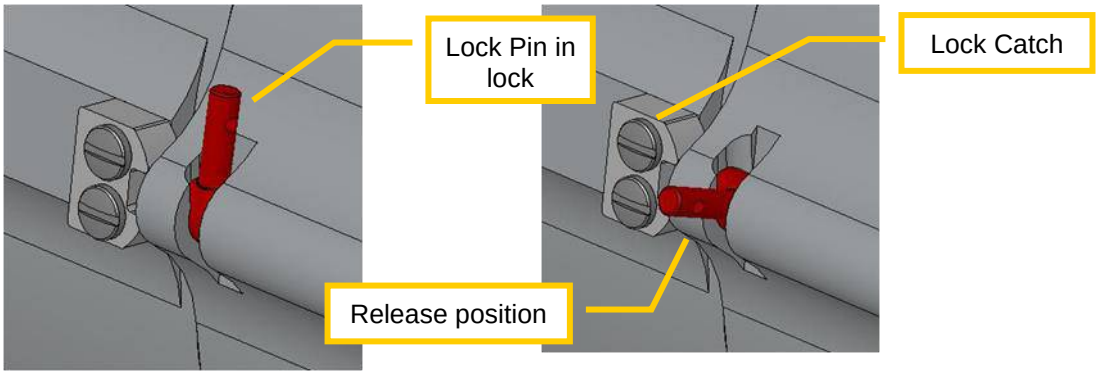


Dome Port and SPR's – setup the SPR's so the lens front extends slightly into the port area.

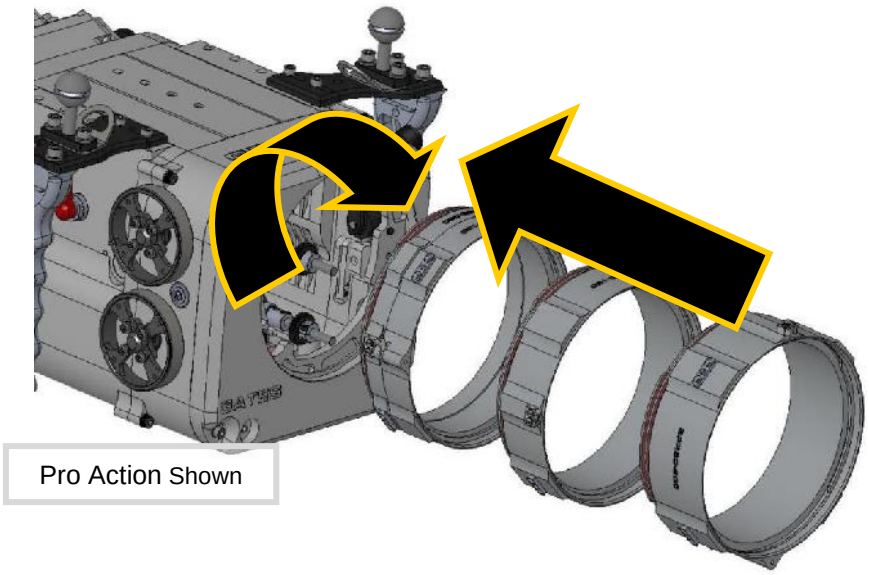
Mounting Stackable Port Rings (SPR's) and Port

- ✓ **SPR's are assembled in any order on the housing**. Place the lock pin on the first SPR in the 'lock' position.
- ✓ **Lubricate O-Rings as necessary for smooth, easy rotation**. Start by mating the first SPR to the Port Base with the locking pin at the top. Fully mate the SPR to the housing fully, and rotate 90 degrees until the lock pin 'snaps' into place.

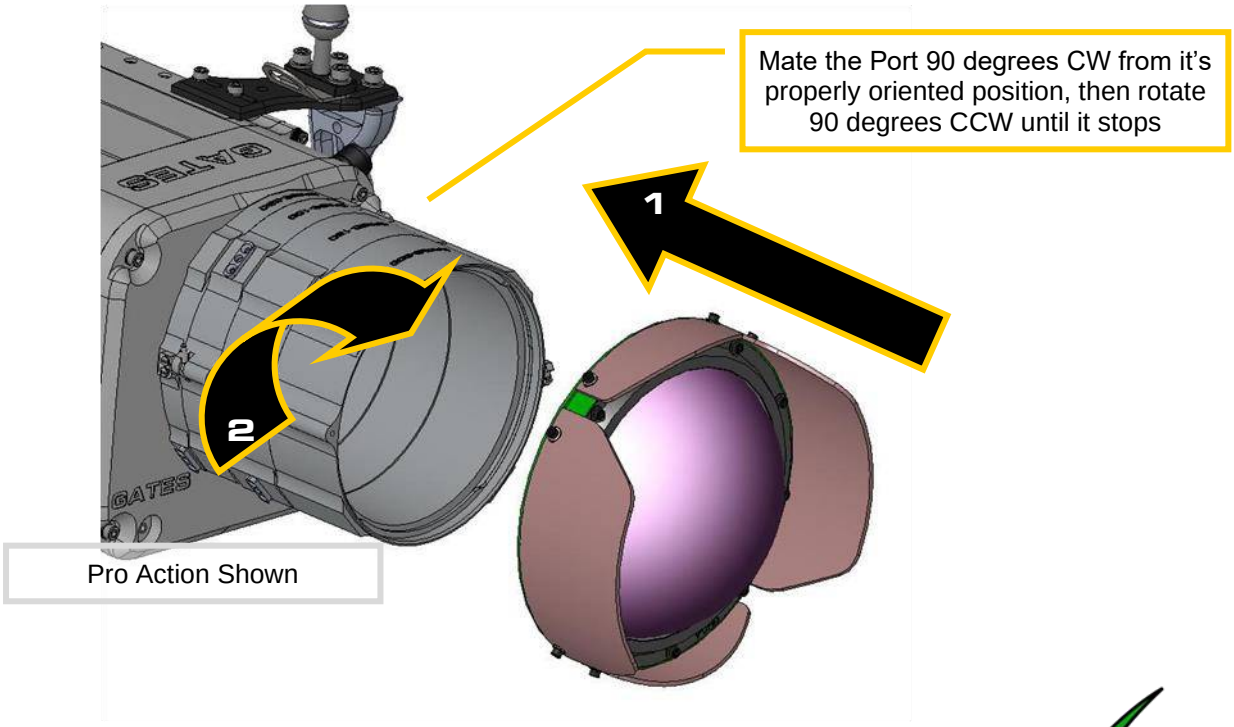
▶ **TIP**: Perform this procedure from the rear of the housing, pulling toward you to mate SPR's and Ports.



- ✓ Mate the next SPR with the lock catch at the top, and rotate 90 degrees until the lock pin 'snaps' into place.



✓ When finished mounting SPR's, mount a Port to the SPR's in the same manner, mating 90 degrees and rotating counter clockwise when viewing from the rear of the housing.



12. Sealing the Housing

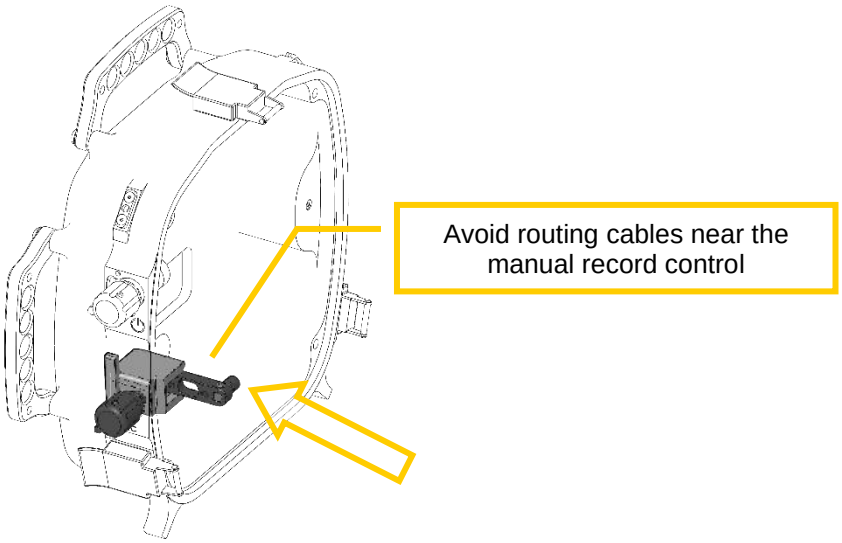
Pre-sealing Checklist

Before sealing the housing make sure the following is done:

- ✓ Power on/functional test of electronic and controls
- ✓ Media inserted
- ✓ Lens gear drives properly adjusted and tested
- ✓ Port installed
- ✓ Plugs installed on any unused surface feed fittings.

Cable Routing

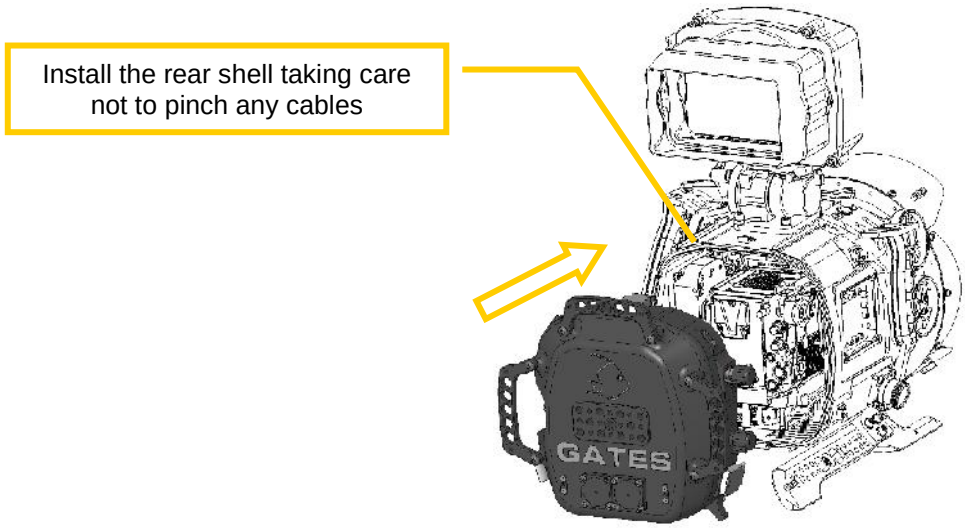
Double check your cable routing before putting on the rear shell. Avoid routing cables near the manual record control, as it can pull out cables when removing the shell.



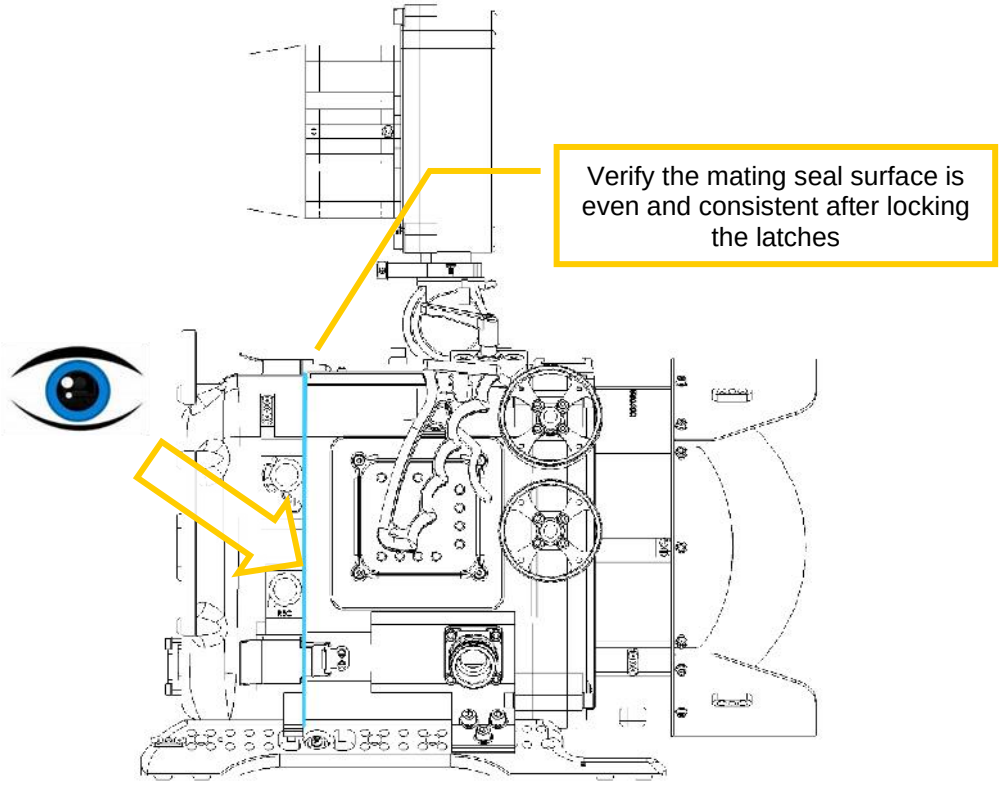
Mating the Rear Shell

- ✓ The **Rear Shell should freely mate** with the mid shell from the rear.

CAUTION: avoid obstructions. The Rear Shell should slide freely, without obstruction. If obstructions or resistance are encountered, stop. Remove the camera, find the cause of the obstruction, and try again.

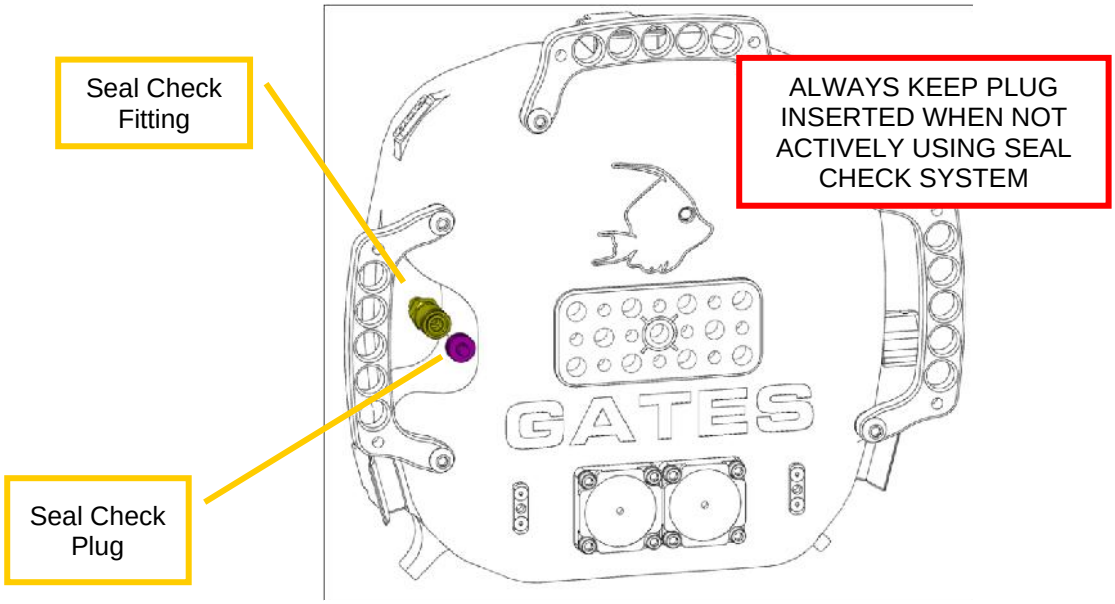


- ✓ **Latches**. Once properly mated, secure the 3 latches. Verify that the two shells are mated evenly and consistently around the sealing line of the housing.
- ✓ CAUTION. Faulty Latches can lead to a wet camera! Replacements for faulty latches are available at no charge from Gates.



The Seal Check Fitting

The seal check fitting is located on the rear shell. The plug is retained with a cable to prevent it from being lost. Always keep the plug inserted when not actively using the seal check system.



Using the Seal Check System

Seal Check Lite Rechargeable uses a separate hand pump and gauge to verify seal integrity.

Follow the procedures in the appropriate Seal Check manual to verify the integrity of the housing.

CAUTION. **Draw only about 100 millibars vacuum** (Seal Check Lite and Seal Check II kits) or 3 in Hg (Seal Check I) on PR. More vacuum can inhibit the transfer of heat away from the housing.

Note that Seal Check Lite Rechargeable – included with PR – requires about 80 cycles of the hand pump to reach 100 millibars vacuum.

Seal Check with External SDI monitors

If using an SDI External Monitor, It is necessary to Seal Check both the housing and External Monitor. The monitor will also have a seal check fitting.

- ✓ Use the pump to **draw a vacuum on the main housing**.
- ✓ **Insert gauge**, then note the gauge reading.
- ✓ **Remove the gauge** from the main housing.
- ✓ Then use the pump to **draw a vacuum on the monitor housing** as close as possible to the previous reading on the main housing.
- ✓ **Remove and plug the Seal Check fitting** on the External Monitor.
- ✓ **Move the Seal Check gauge back to the camera housing** and start the monitoring process.

Why do this?

The LCD cable is water blocked but not air-blocked. After drawing vacuum on the External Monitor air passes from there to the camera housing until the vacuum is equalized.

By drawing a vacuum on the External Monitor, very little air must pass between the housings so the 'settling' process and determination of housing integrity takes far less time.

CAUTION. ENSURE THE FITTING PLUG IS INSTALLED PRIOR TO SUBMERSION! FAILURE TO DO SO WILL RESULT IN A FLOOD.

Final Checks

- ✓ Visual Inspection.
  - *Look closely at all seal mates – Port, Port Ring, Port base and main housing seal – for uneven gaps.*
  - *Look over the housing one final time.*

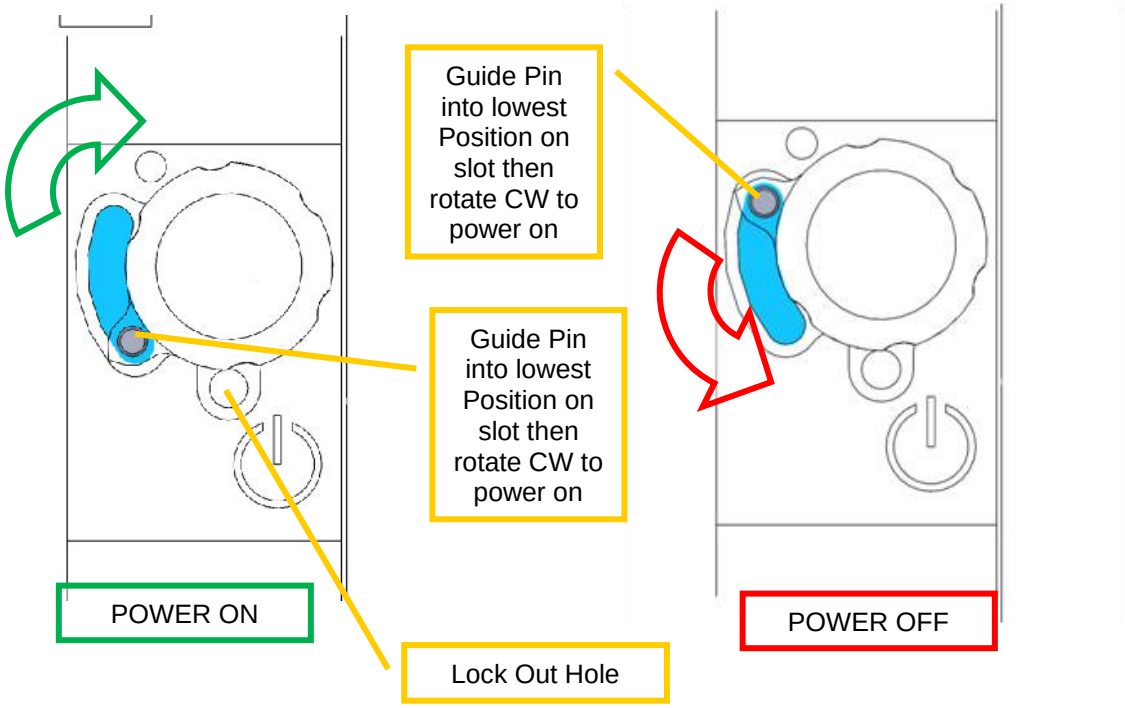
- ✓ Verify operation.
  - *As a final check, power on the camera and verify all controls are functioning normally.*

13. Control Operation

Power Control

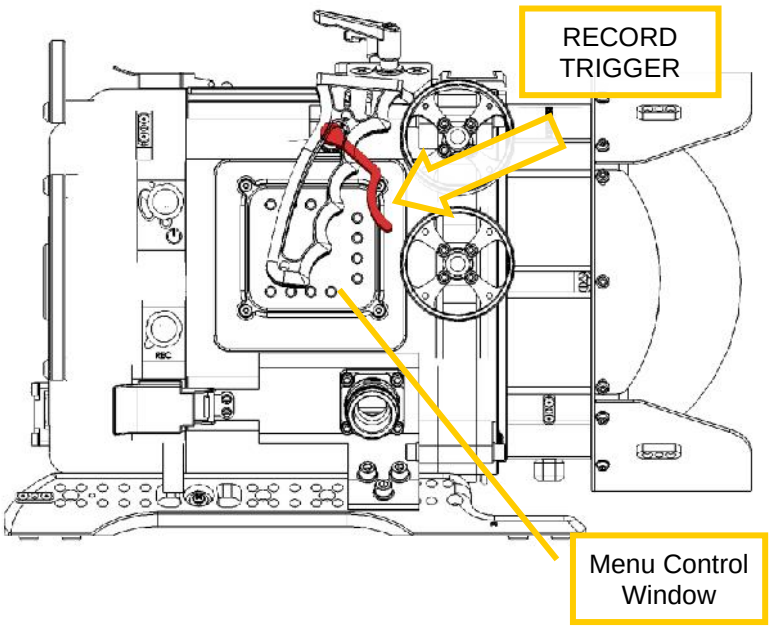
Located on the rear shell, the power control knob has a guide pin that allows the user to lock out the power control so it is not accidentally triggered.

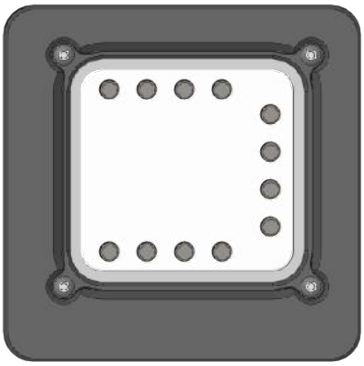
- ✓ To lock out the control, pull the knob out and place the pin into the lockout hole.
- ✓ To power the housing on, place the pin in the lowest position on the slot, push the knob in, and rotate clockwise.
- ✓ To power the housing off, place the pin in the highest position on the slot and rotate the knob counter clockwise.



Record Trigger

Located on the mid shell, the lever record trigger on the housing uses a switch to activate the GPI run/stop pin on the V-RAPTOR's EXT port. Record can also be initiated by the GCC and the Manual record push knob.



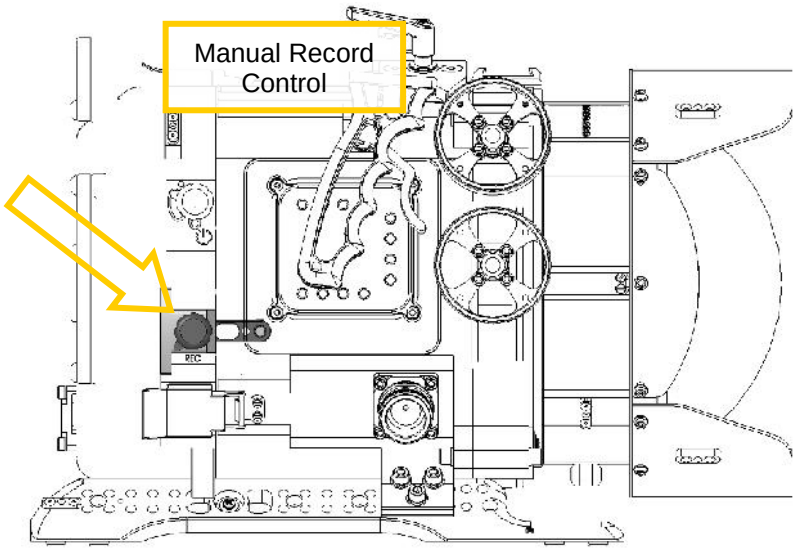


Menu Pushbuttons

Located on the right side of the control window, the menu pushbuttons allow full access to the menu on the V-RAPTOR. Look through the clear plastic window on the side of the housing to activate the corresponding button on the V-RAPTOR.

Manual Record Trigger

Located on the rear shell this knob touches the physical button on the V-RAPTOR camera body when pushed and acts as a secondary way to activate record.



14. Using the GCC Module

About the GCC

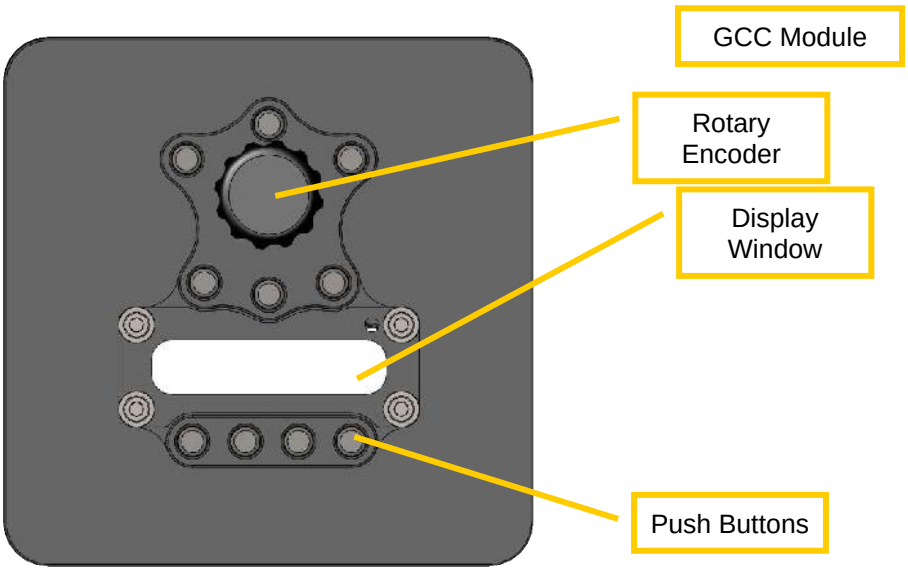
The GCC Module uses the Red RCP2 communication protocol to send commands to the V-RAPTOR.

It has 10 buttons and a rotary encoder that enables the user to quickly access camera functions without having to key through the camera's menu.

The display window has a small OLED screen that will show info on the GCC's status and echo commands.

There are 2 indicator LEDs that can be seen from the display window.

- *The green LED is a power indicator and should always be lit when the GCC has power.*
- *The red LED is used for basic notifications and will illuminate when the user presses a button and flashes while the unit is booting.*



Setting up the GCC

Before using the GCC, communication protocols must be setup in the Camera menu. See section on "Preparing the Camera" for more information.

Setting up User Assignable Buttons

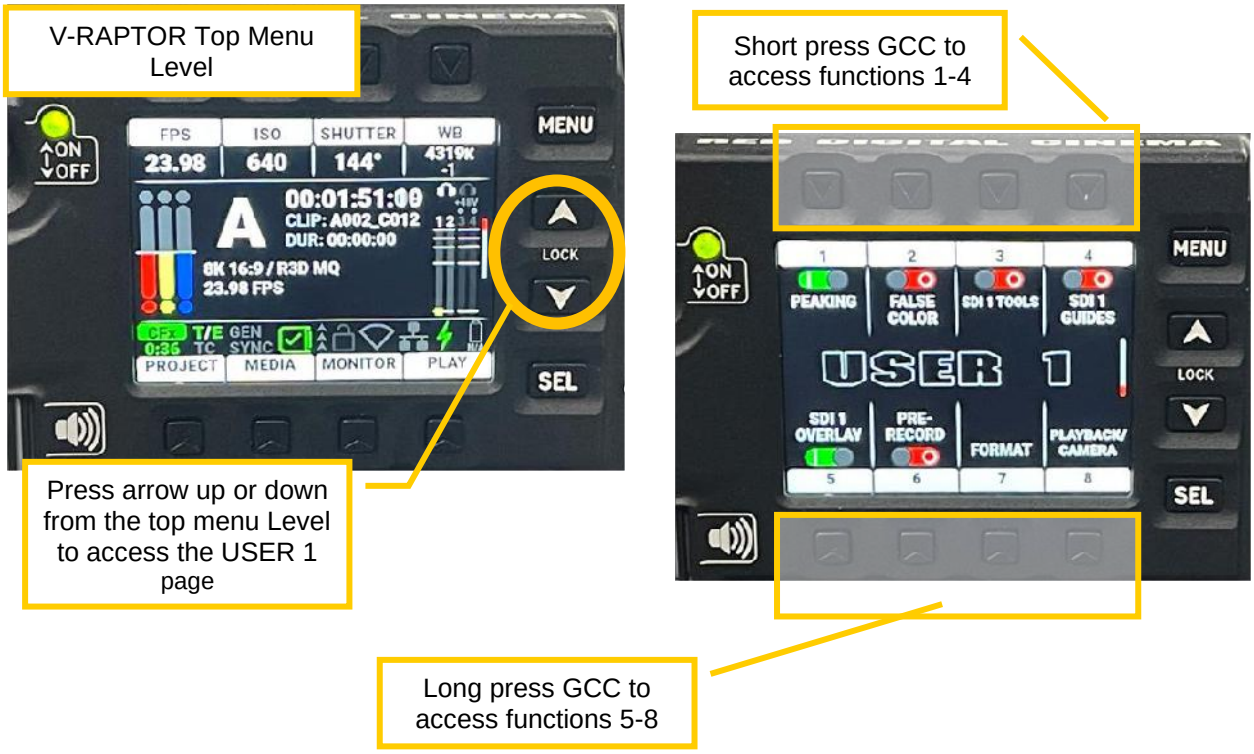
The bottom row of the GCC module activates the controls on the “USER 1” page of the V-RAPTOR menu.

A short press on the buttons triggers “USER 1” assignable functions 1-4.

A long press on the buttons triggers “USER 1” assignable functions 5-8.

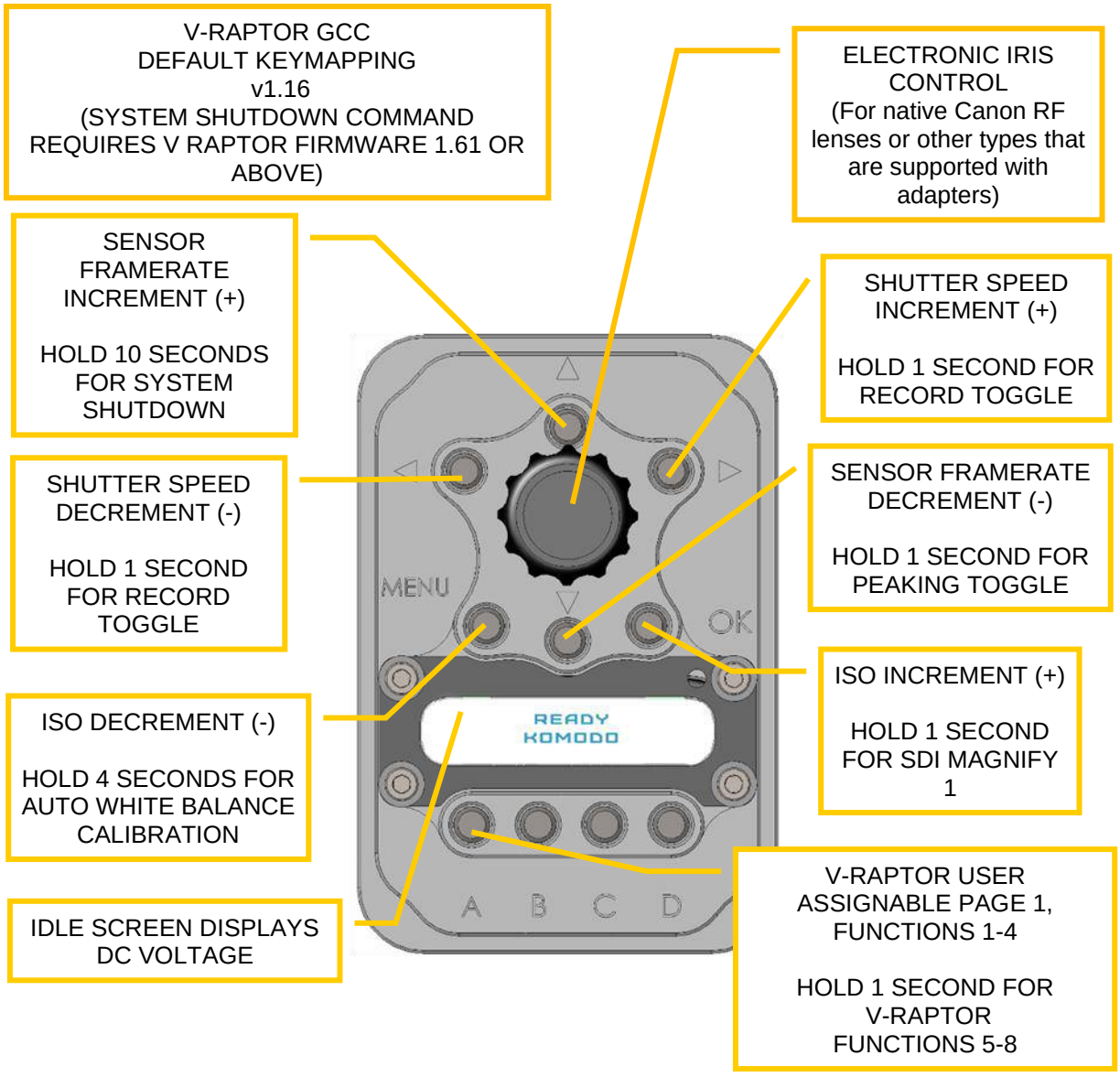
From the top menu level on the camera, press the up or down arrows to cycle through pages until reaching the “USER 1” page.

From this page, PRESS AND HOLD each SLOT button to access the list of functions available.



GCC Function Map

Below is the default key map as of the publication of this document. The default key map may change with firmware updates so check key maps when updating.



Updating Firmware

Firmware updates are done by removing the internal Micro SD card and flashing it on a PC/MAC. More information is available on the Gates website.

Advanced User Setup

All of the functions on the GCC can be customized by removing the Micro SD card and changing information in a text file. More information is available on the Gates website.

15. The RT73 RMI Monitor Housing

The RT73 is a unique option for the PR housing that allows the use of the DSMC3 Red Touch 7.0 LCD.

The articulated swivel allows the user to run an OEM red RMI cable through it and is user-replaceable.

Adding the RT73 also allows the operator access to 4 additional assignable buttons. Although the touch screen is not usable underwater, having access to it on the surface by simply removing the front plate can aid this setup.

Installation

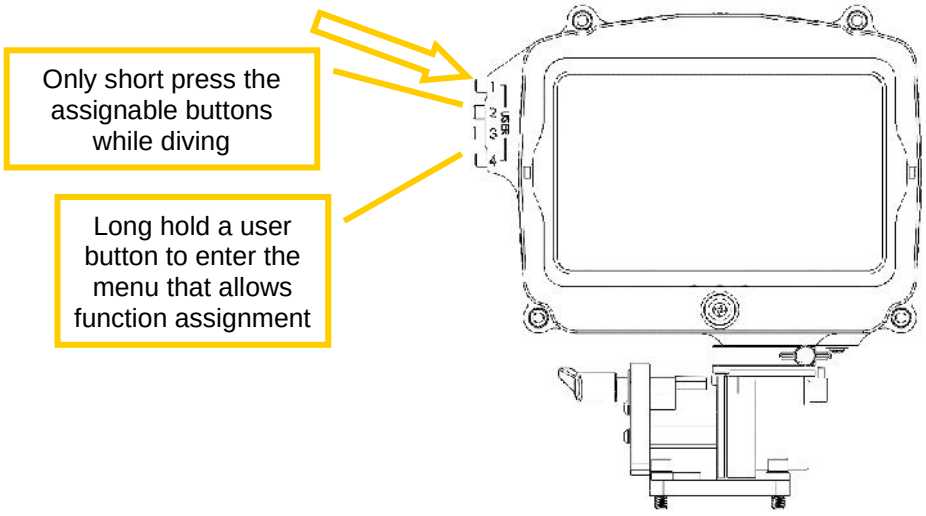
Installation is covered in the section titled “Preparing the housing for the Camera”.

Using the Controls

The RT73 has 4 user assignable buttons available:

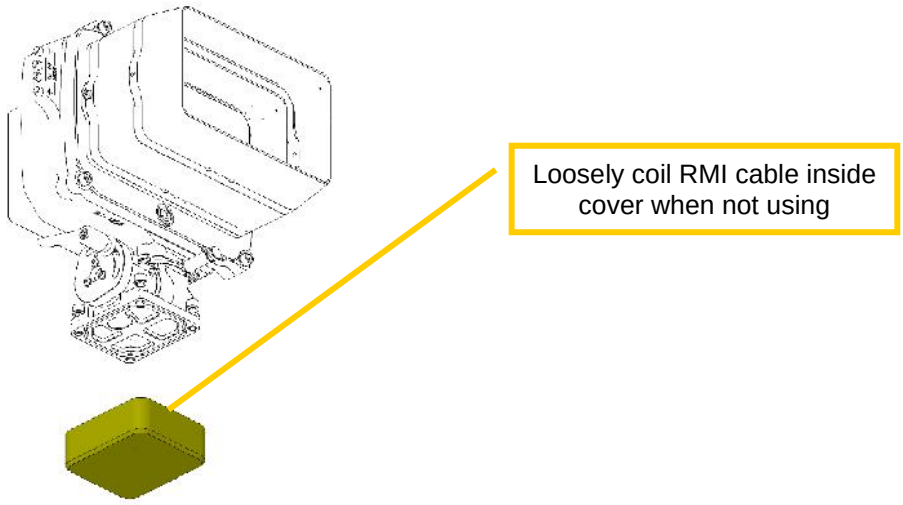
- ✓ Each assignable button **can be assigned from within the monitor UI only**.
- ✓ They can NOT be changed while diving.
- ✓ They are not accessible from the camera’s side menu.
- ✓ The menu that changes these controls is accessed by holding the buttons on the monitor.

DO NOT HOLD THE BUTTONS UNDERWATER. The menu cannot be cleared without the touch screen and the camera will require a power cycle.



Care and Replacement of the RMI Cable

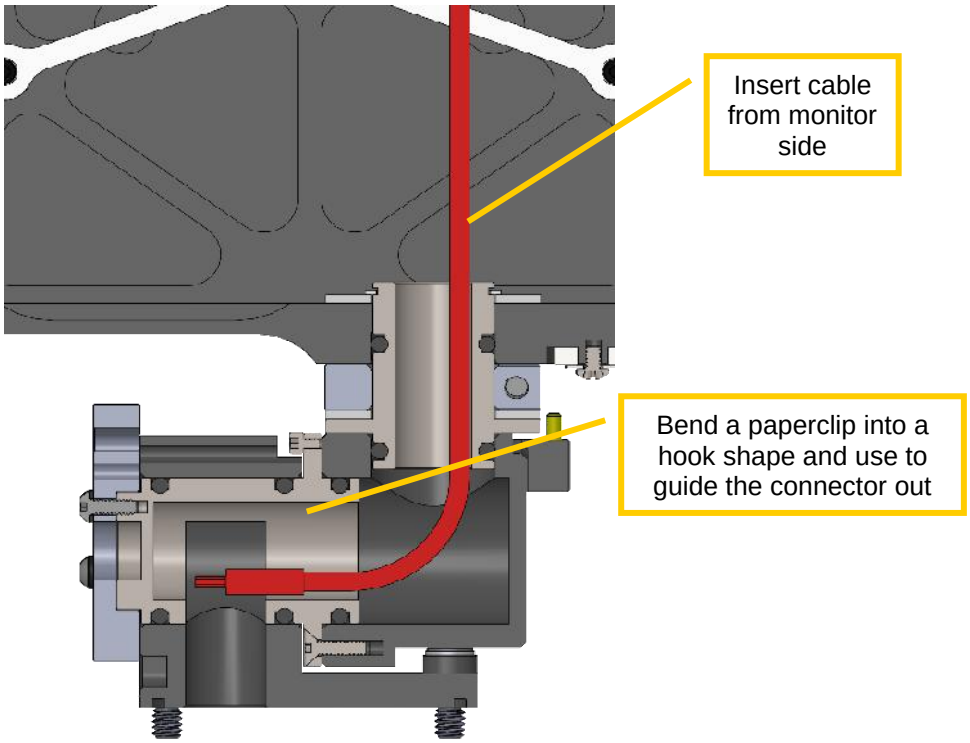
When transporting the monitor separately from the housing always loosely coil up the protruding cable end and place it within the protective cover.



The cable is user replaceable but may require some finesse to install.

- ✓ **Gently bend the cable and insert it from the monitor side** until you can see the connector from the hole in the bottom.
- ✓ **Rotate the monitor** if needed to allow easier access.
- ✓ **Bend a paperclip into a hook shape and use it to guide the connector** out of the housing side hole.
- ✓ **Always push the cable to give it some slack before pulling**.

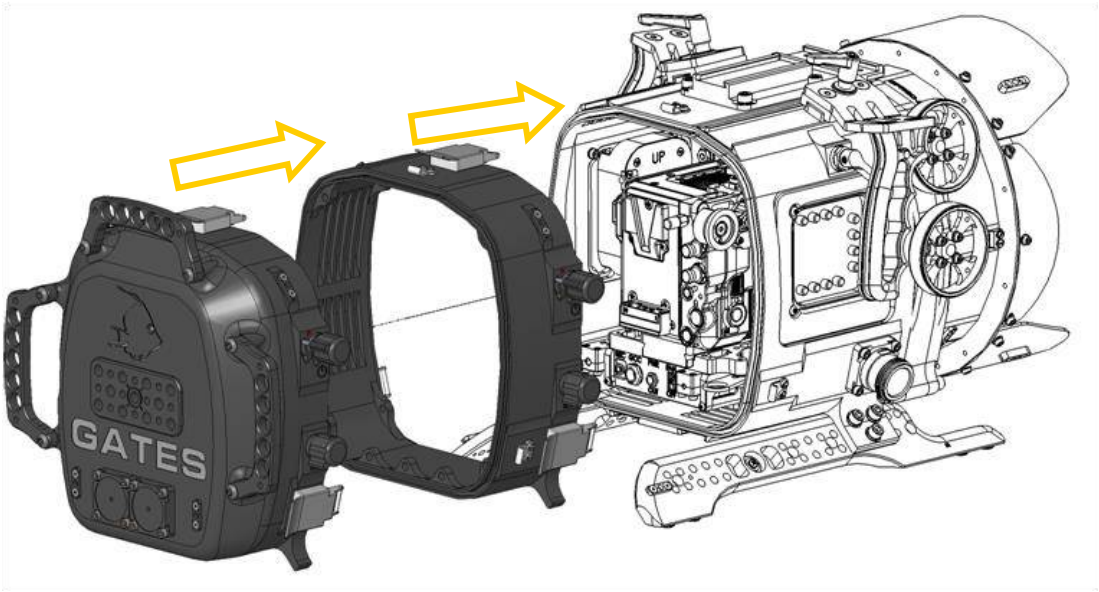
When properly installed, there should be enough slack to connect the RMI cable on the housing and monitor side without pulling on the connector. Excess loop on the monitor side can be rolled up under the X brace.


Insert cable from monitor side
Bend a paperclip into a hook shape and use to guide the connector out

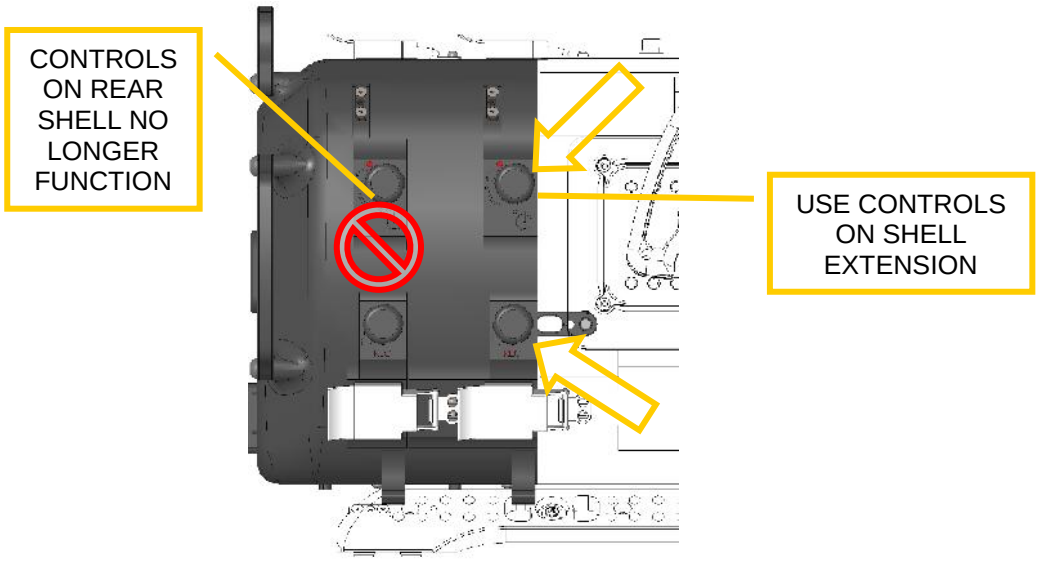
16. Optional Shell extension

The optional shell extension fits in between the Mid and Rear Shells, and allows the use of larger batteries or equipment.

It simply latches on and can be added or removed without tools.



When using the shell extension, the controls on the rear shell no longer function. The Power and Manual Record controls will now be activated on the Mid Shell.

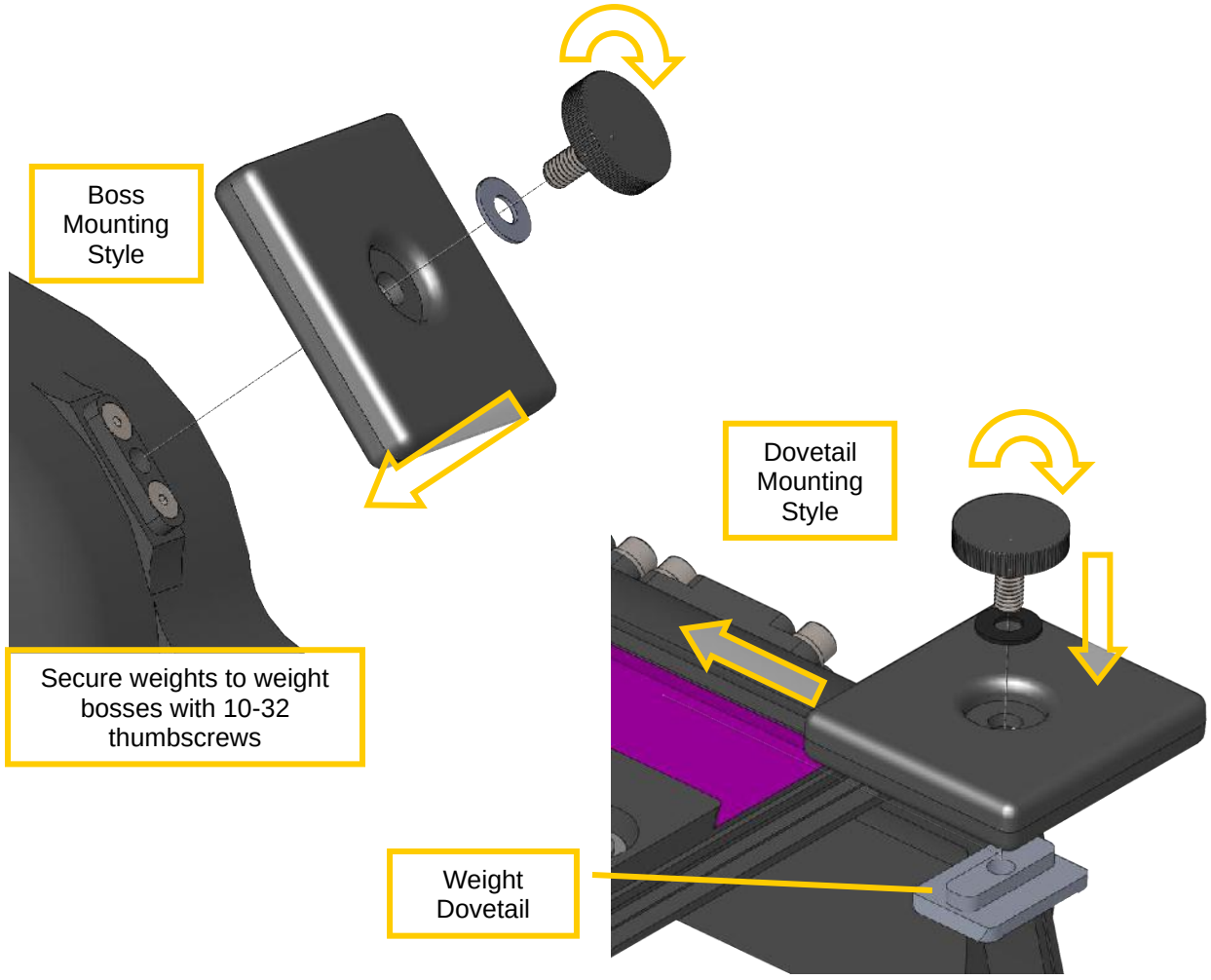


17. Buoyancy / Trim

PR is provisioned with several weight mounting points to allow the user to trim the housing.

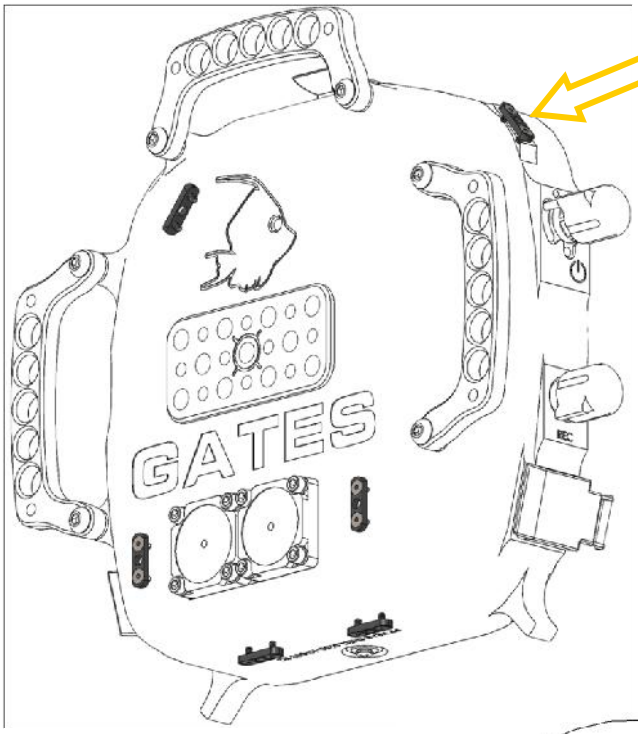
Trim Weights

Trim weights can either screw directly onto weight bosses or use a sliding dovetail.

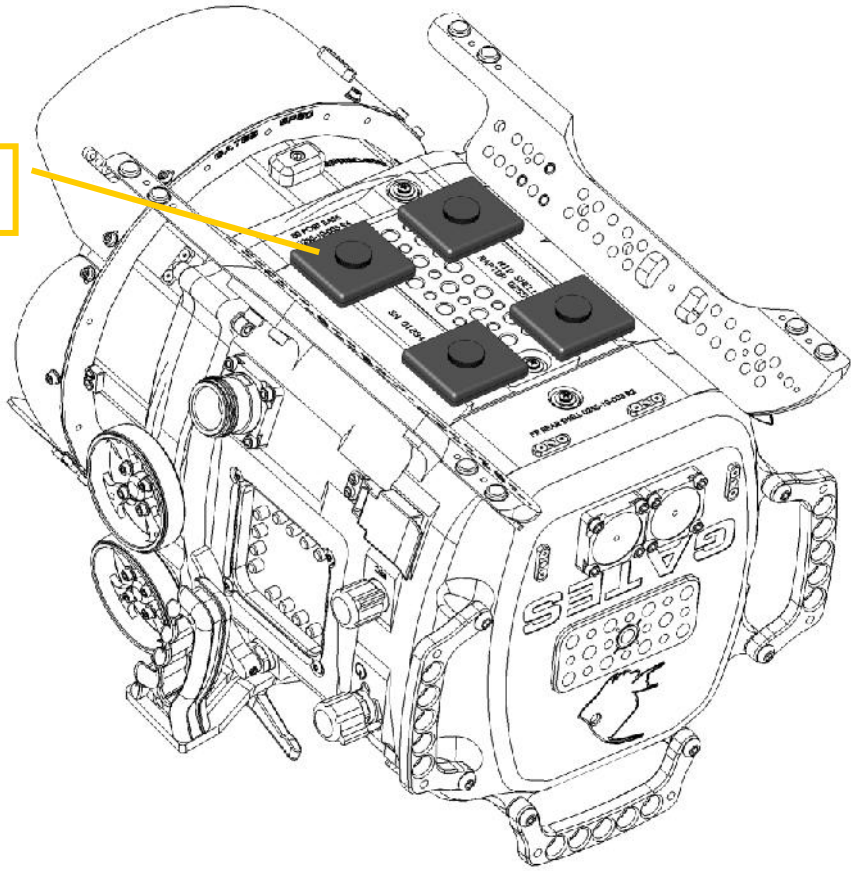


The rear shell has 6 weight mount bosses. Weight mount bosses can also be found on stackable port rings and the shades of ports.

The bottom dovetails on the Mid Shell are able to take weights also.



The Rear Shell has 6 weight bosses

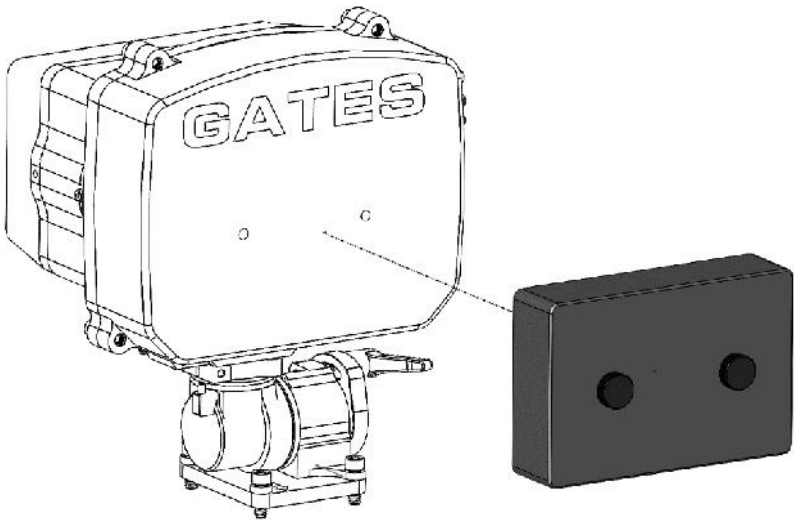


Weights can be secured to bottom dovetail

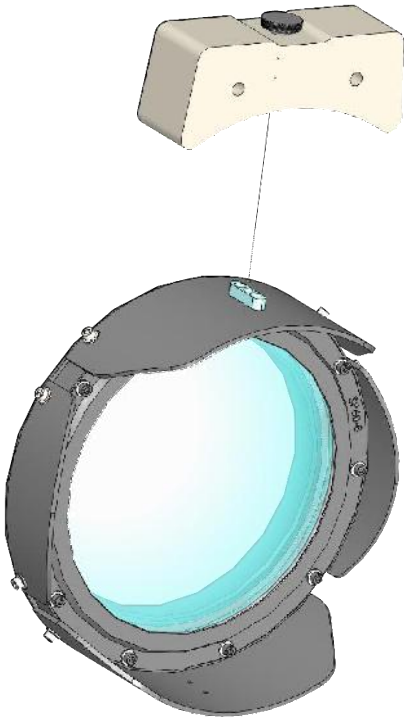
Trim Floats

Gates trim floats are made from high density foam to withstand pressure at depth.

The RT73 monitor housing and most Gates SDI monitors include a float which can be attached to it. The RT73's float can also be attached to the ¼-20 utility hole pattern on the Rear Shell on PR.



A specific float is also available for the SP60 port which is useful for ultra compact setups.

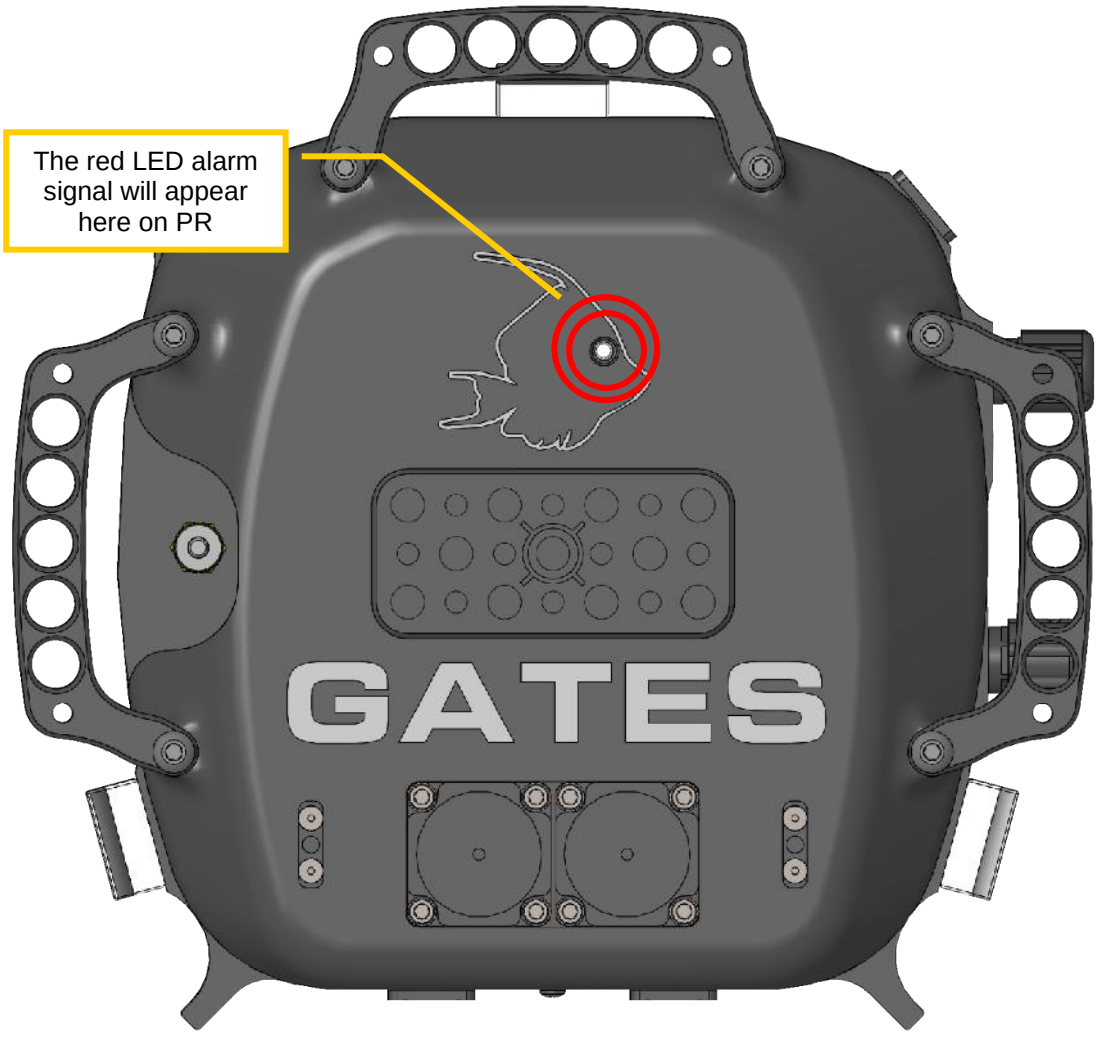


18. Optional Accessories

Water Alarm

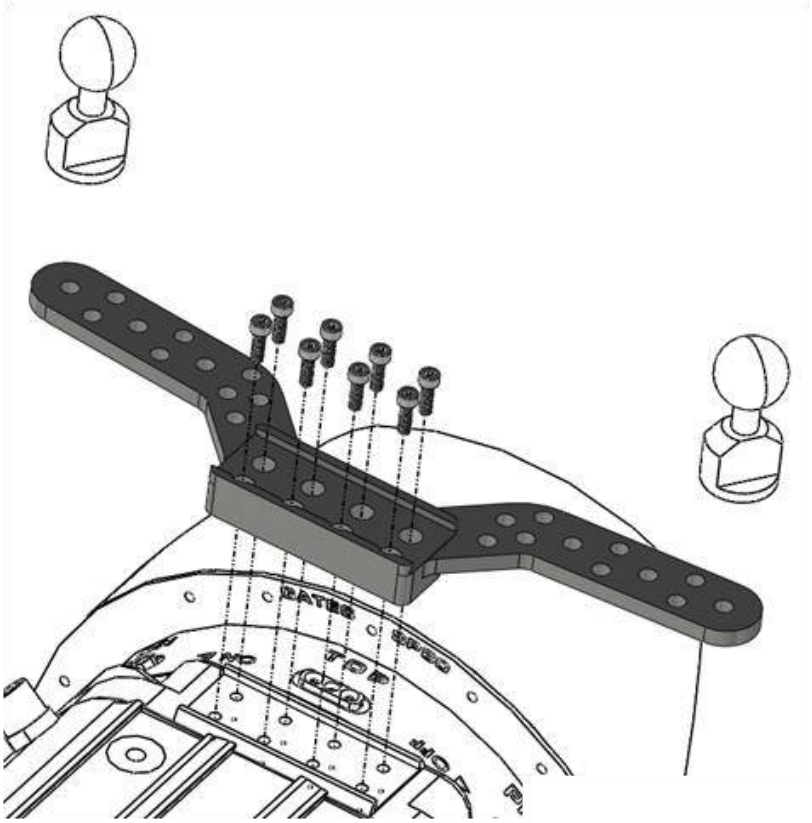
If you have the optional GWA-2000 Water Alarm installed, refer to the separate user manual for this item. It can be found on the Gates website GWA-2000 Water Alarm.

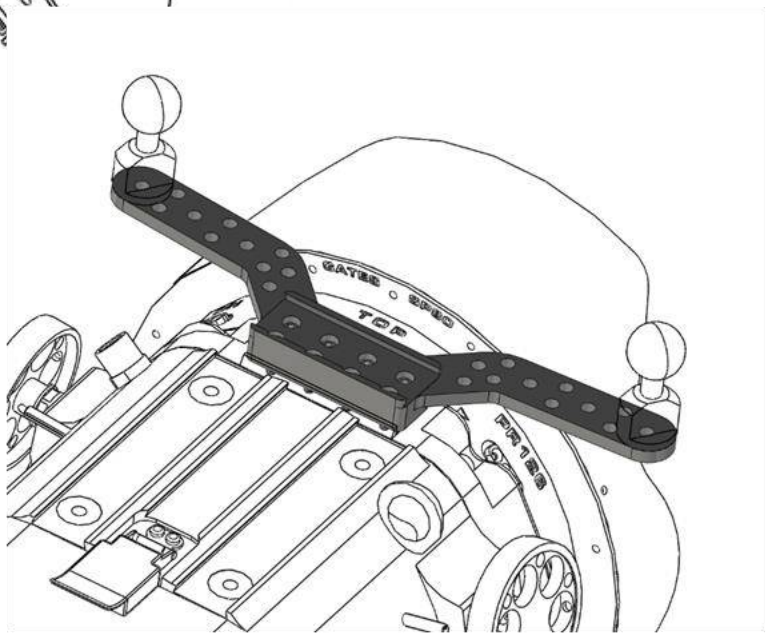
The LED indication for the water alarm is found on the Rear Shell in the eye of the fish logo.



Light Bar

The Light Bar is a convenient method to mount lights forward and to the outside edges of the housing. It accepts a wide variety of Ultralight Controls Systems ball mounts and bases. If your application requires a Light Bar, install it with the included screws as shown below.





19. Housing Maintenance

Housing Care and Maintenance

Proper care of your Gates housing is important to provide you reliable operation and long life. You'll find all the guidelines in the "Housing Care and Maintenance" document included with your Gates housing. You can also find it on Gates web site at www.GatesHousings.com.

Your Gates housing has 3 serviceable o-rings:

Housing Main Seal & LCD Cover Seal (ORANGE);

Port (YELLOW); and

Port Ring (YELLOW).

Servicing the o-rings is easy and covered in the "Housing Care and Maintenance" document in this package. It can also be found on the Gates website at www.gateshousings.com.

CAUTION: **Do not lubricate the ORANGE o-ring!** It is a special silicone o-ring and can be damaged by petroleum-based lubricants. Only the BLACK and YELLOW o-rings are safe to lubricate.

CAUTION: **Never use metal tools or objects for removing o-rings**!

Customer Support

Should you have any questions, please contact Gates.

Email: Customer.srvc@GatesHousings.com
Web: www.GatesHousings.com
Phone: +1-858.391.0052