



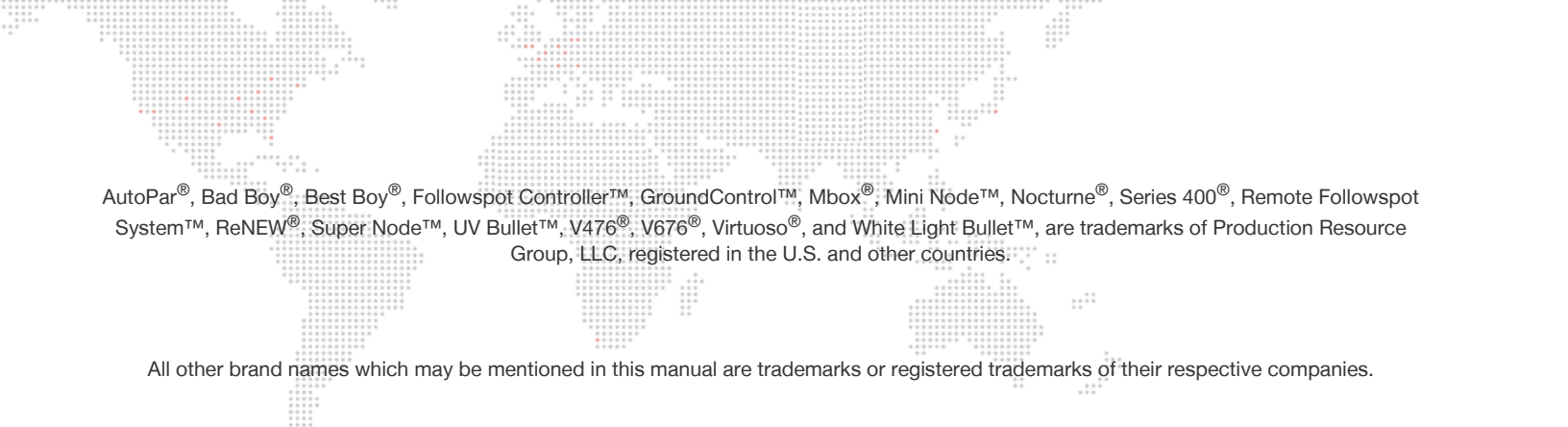
SOFTWARE VERSION v1.03

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GROUNDCONTROL™ LONGTHROW SPOT LUMINAIRE (GCLT)

SERVICE MANUAL

REV A0



AutoPar[®], Bad Boy[®], Best Boy[®], Followspot Controller[™], GroundControl[™], Mbox[®], Mini Node[™], Nocturne[®], Series 400[®], Remote Followspot System[™], ReNEW[®], Super Node[™], UV Bullet[™], V476[®], V676[®], Virtuoso[®], and White Light Bullet[™], are trademarks of Production Resource Group, LLC, registered in the U.S. and other countries.

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GroundControl[™] Longthrow Spot Luminaire Service Manual

Version as of: January 10, 2020

Written by J. Hutchison

PRG part number

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GroundControl[™] Longthrow Spot Luminaire Service Manual
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FOREWORD

Compliance Notice

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

- 1) This device may not cause harmful interference, and
- 2) This device must accept any interference received, including interference that may cause undesired operation.

Conforms to:

UL STD 1573

Certified to:

CAN/CSA STD E598-1




CAN/CSA STD E598-2-17



Safety Notice

It is extremely important to read ALL safety information and instructions provided in this manual and any accompanying documentation before installing and operating the products described herein. Heed all cautions and warnings during installation and use of this product.

Safety symbols used throughout this manual are as follows:

	ATTENTION This advises you that important or helpful information follows.
	CAUTION This advises you of a precaution to take. Not taking that precaution can cause damage to the product, injury to yourself and others, or both.
	WARNING! This advises you of a warning to heed. Not following the warning <u>could cause death</u> or <u>serious injury</u> .
	DANGER! This warns you of a danger to avoid. Not avoiding the danger <u>will cause death</u> or <u>serious injury</u> .

GENERAL INFORMATION PERTAINING TO PROTECTION AGAINST ELECTRICAL SHOCK, FIRE, EXPOSURE TO EXCESSIVE UV RADIATION, AND INJURY TO PERSONS CAN BE FOUND ON THE FOLLOWING PAGE.



WARNING! INSTRUCTIONS FOR CONTINUED PROTECTION AGAINST FIRE

- 1) PRG luminaires have been designed for use only with specific lamps. Note lamp type before replacing. Installing another type of lamp may be hazardous.
- 2) PRG luminaires may be mounted on any type of surface as long as mounting instructions are followed. See instructions detailed in this manual.
- 3) Replace fuses with same type and rating only.
- 4) Minimum distance from head to any flammable object is 2m.

WARNING! INSTRUCTIONS FOR CONTINUED PROTECTION AGAINST ELECTRICAL SHOCK

- 5) PRG luminaires are designed for dry locations only. Exposure to rain or moisture may damage luminaire.
- 6) Disconnect power before servicing any PRG equipment.
- 7) Servicing to be performed by qualified personnel only.

WARNING! INSTRUCTIONS FOR CONTINUED PROTECTION AGAINST EXPOSURE TO EXCESSIVE ULTRAVIOLET RADIATION

- 8) PRG luminaires may use an HID type lamp which produces UV radiation. DO NOT look directly at lamp.
- 9) It is hazardous to operate luminaires without complete lamp enclosure in place or when lens is damaged. Lenses or UV shields shall be changed if they have become visibly damaged to such an extent that their effectiveness is impaired.

WARNING! INSTRUCTIONS FOR PROTECTION AGAINST INJURY TO PERSONS

- 10) Exterior surfaces of the luminaire will be hot during operation. Use appropriate safety equipment (gloves, eye protection, etc.) when handling and adjusting hot equipment and components. Service and maintenance should be performed only by qualified personnel as determined by the high pressure lighting fixture manufacturer.
- 11) Arc lamps generate intense heat. Disconnect power and allow lamp to cool for 5 minutes before relamping.
- 12) Arc lamps emit ultraviolet radiation which can cause serious skin burn and eye inflammation. Additionally, arc lamps operate under high pressure at very high temperatures. Should the lamp break, there can exist a danger of personal injury and/or fire from broken lamp particles being discharged.
- 13) The lamp shall be changed if it has become damaged or thermally deformed.
- 14) If lamp is touched with bare hands, clean lamp with denatured alcohol and wipe with lint-free cloth before installing or powering up the luminaire.
- 15) Serious injury may result from the generation of ozone by this lamp system. A proper means of venting must be provided.
- 16) GroundControl Longthrow weighs approximately **200 pounds** (90.71 kg), and care must be taken to ensure proper lifting techniques at all times when handling the luminaire. Please note that three persons are required for installing the luminaire in the "yoked out" orientation. More information on proper lifting postures and smart lifting practices can be found at www.osha.gov/SLTC/etools/electricalcontractors/materials/heavy.html.

Notes de sécurité

Avant de procéder à l'installation des produits décrits dans ce guide et de les mettre en marche, il est extrêmement important de lire TOUS les renseignements et TOUTES les directives de sécurité contenues dans ce guide ainsi que toute documentation jointe. Tenir compte de tous les avertissements et suivre toutes les précautions pendant l'installation et l'utilisation de cet appareil.

Les symboles de sécurité utilisés dans ce guide sont les suivants :



ATTENTION Ce symbole annonce que l'appareil risque d'être endommagé.



AVERTISSEMENT! Ce symbole annonce qu'il y a risque d'accident grave ou même fatal.

CETTE SECTION CONTIENT DES INFORMATIONS GÉNÉRALES POUR SE PROTÉGER CONTRE LES DÉCHARGES ÉLECTRIQUES, LES INCENDIES, L'EXPOSITION EXCESSIVE AUX RAYONS UV ET TOUT AUTRE ACCIDENT POUVANT ENTRAÎNER DES BLESSURES.

AVERTISSEMENT: Risque d'explosion.

- 1) Le service et le maintenance ne devront être assurés que par des personnes qualifiées comme précisé par le fabricant des lampes à haute pression.
- 2) Des vêtements de protection et les procédures précisées dans le manuel du fabricant doit être fournies.

AVERTISSEMENT: Réglage des lampes

- 3) Chaleur intense. Débrancher le matériel et laisser refroidir pendant 5 minutes avant de rallumer.
- 4) Risque l'incendie. N'utilise que des Osram SHARXS HTI 1500W/D7/60 Lamp.

AVERTISSEMENT: DIRECTIVES POUR SE PROTÉGER CONTRE UNE EXPOSITION EXCESSIVE AUX RAYONS UV

- 5) Risque d'explosion en cas de radiation ultraviolet imprantes.
- 6) Ne pas intervenir en l'absence de confinement de la lampe en place ou quand la lentille est abîmée.

AVERTISSEMENT: DIRECTIVES POUR SE PROTÉGER CONTRE LES ACCIDENTS POUVANT ENTRAÎNER DES BLESSURES

- 7) Chaleur intense. Eviter tout contact avec des personnes ou des tissus. Attention, de graves blessures peuvent résulter de production d'ozone par cette lampe. Un système de ventilation adapté doit être fournies
- 8) La température de surface = 300.c
La temperature de l'ambiance = 50.c
- 9) Ne convient pas pour un usage résidentiel.
- 10) Utilisable seulement dans les locaux secs.



Revision History

This manual has been revised as follows:

Version	Release Date	Notes
REV A0	1-8-2020	Release of SERVICE Manual Combined Field Service and Shop Service into SERVICE Updated Part Numbers Updated Framing Mechanism retention upgrade Created clickable Illustrated Parts Bulletin Added Appendix B: Lamp Adjustment for GCLT

INTRODUCTION

About This Manual

This manual provides testing, troubleshooting, maintenance procedures, and illustrated parts breakdowns for the following equipment:

- + GroundControl™ Longthrow Spot Luminaire

This manual is intended for use in both Field-level and Shop-level operations.



WARNING! It is important to read ALL accompanying safety instructions to avoid damage to the product and potential injury to yourself or others.

Additional Documentation

For installation and operation instructions, refer to the following PRG manual:

- + GroundControl™ Longthrow Spot Luminaire User Manual (02.9834.0001)

Technical updates regarding this equipment are issued by the PRG Dallas office. These updates are in the form of Technical Bulletins, which contain procedures for equipment upgrades, retrofits, and repairs not found in the existing manual(s).

For more information about DMX512 and sACN protocols, refer to the following documents available from the American National Standards Institute (ANSI) at www.ansi.org:

- + ANSI E1.11 - 2008 (R2013)
Entertainment Technology - USITT DMX512-A, Asynchronous Serial Digital Data Transmission Standard for Controlling Lighting Equipment and Accessories
- + ANSI E1.31 - 2009
Entertainment Technology – Lightweight streaming protocol for transport of DMX512 using ACN
- + ANSI E1.20 - 2010
Entertainment Technology-RDM-Remote Device Management over USITT DMX512 Networks

The above documents are also available for free in electronic format at <http://tsp.esta.org/tsp/about/index.html>

For more information about Art-Net, refer to the following document available from Artistic License Engineering at www.artisticlicence.com:

- + Specification for the Art-Net Ethernet Protocol

Safe Lifting Practices

For information on proper lifting techniques when handling the GroundControl Longthrow Spot Luminaire, please visit the **Materials Handling** section of the Occupational Safety and Health Administration website:

<https://www.osha.gov/SLTC/etools/electricalcontractors/materials/heavy.html>



Customer Service

For technical assistance, contact the PRG International Service Center or contact your nearest PRG office. Contact information for all PRG office locations can be found on our website at: www.prg.com

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For GroundControl Longthrow support, please contact: GroundControlService@prg.com

For additional resources and documentation, please visit our website at: www.prg.com

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1.

DESCRIPTION

This chapter contains an overview of luminaire components.

+ COMPONENTS

COMPONENTS

Exterior Components

The following illustration shows the exterior GroundControl™ Longthrow components and controls.

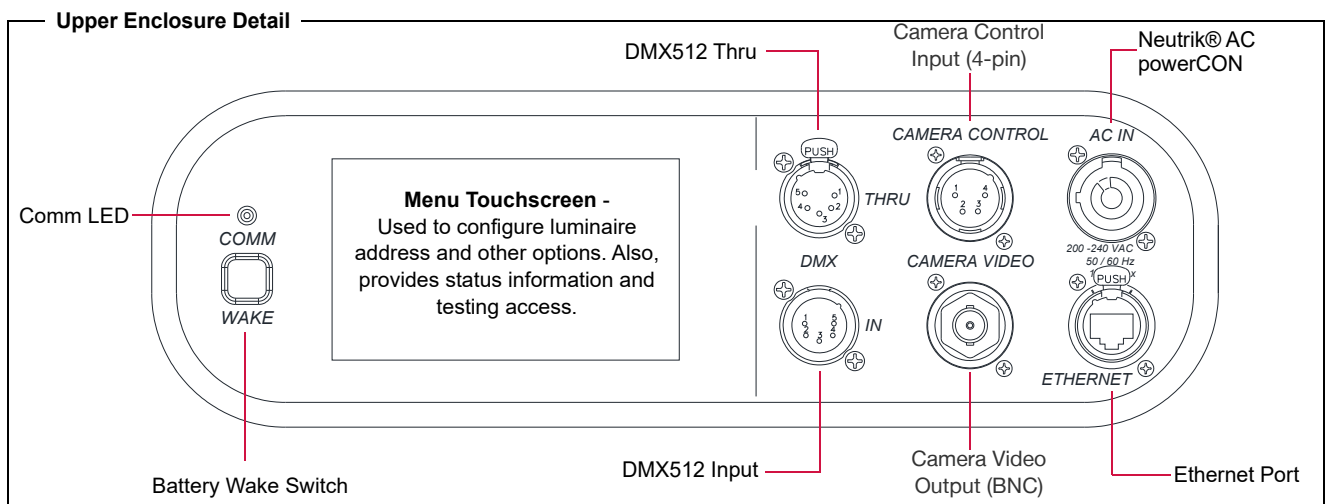
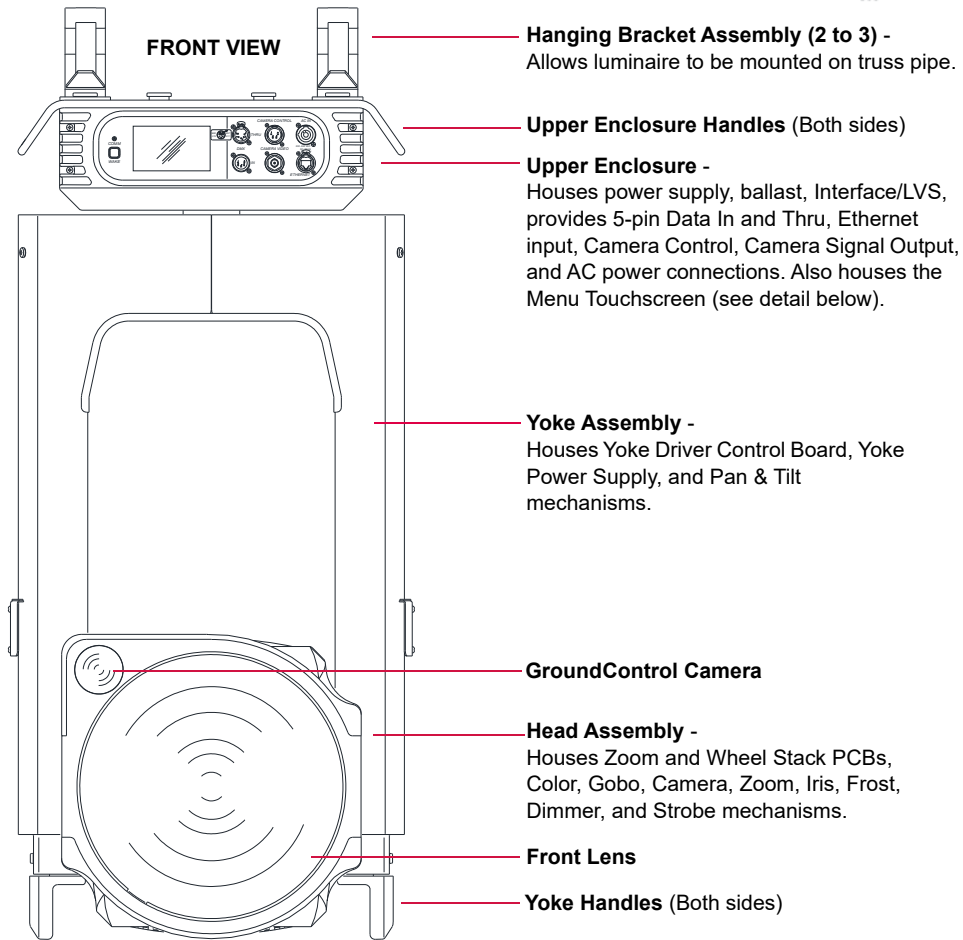


Figure 1-1: Exterior Components

Head and Enclosure Components

The illustration below shows major sub-assemblies located in the GroundControl Longthrow Head and Enclosure.

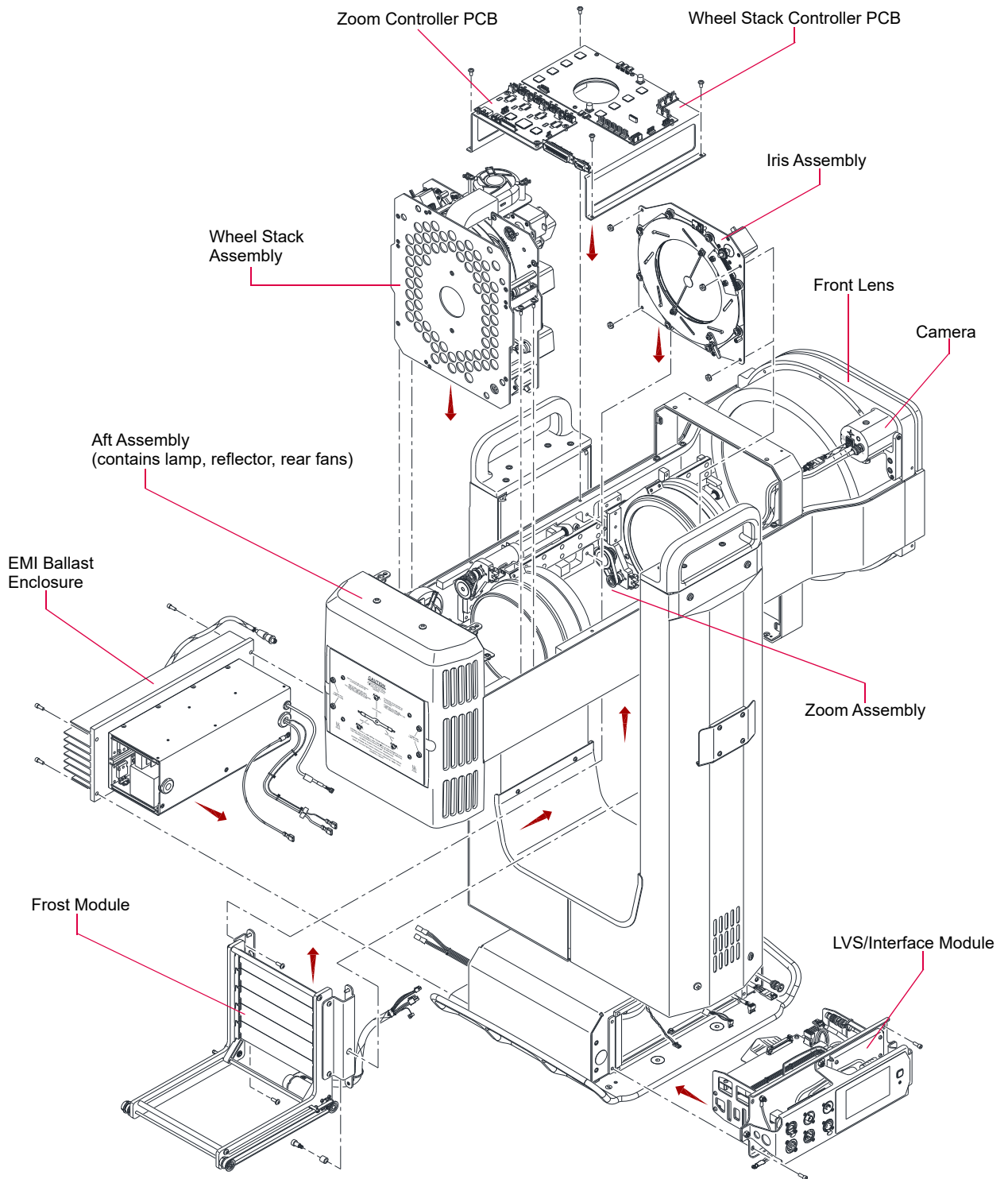


Figure 1-2: Head and Enclosure Components

Yoke Components

Tilt-Side Yoke

The following illustration shows major sub-assemblies located in the GroundControl Longthrow Tilt-Side Yoke Leg.

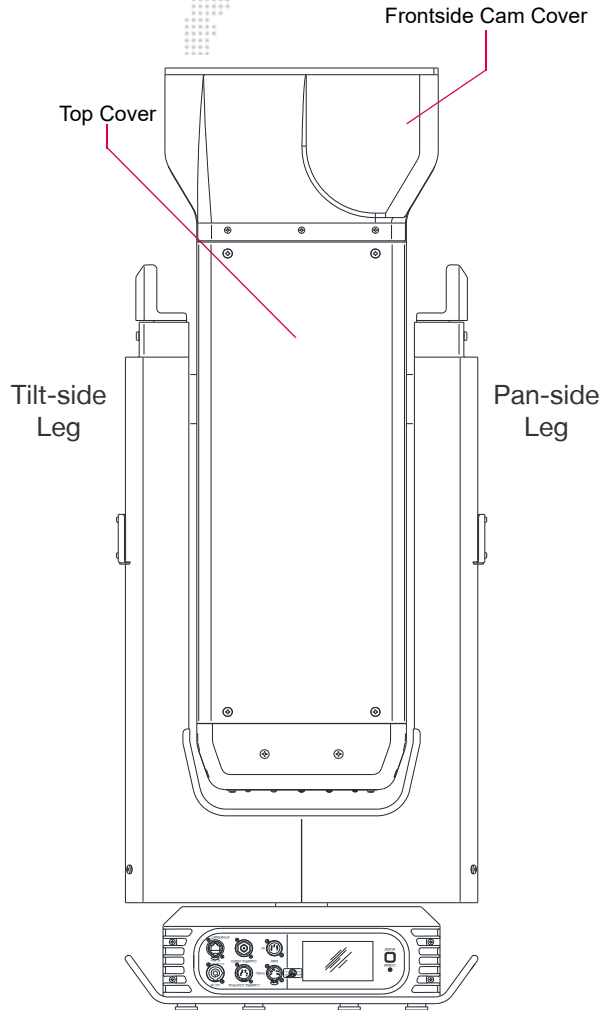


Figure 1-3: Yoke Leg Identification

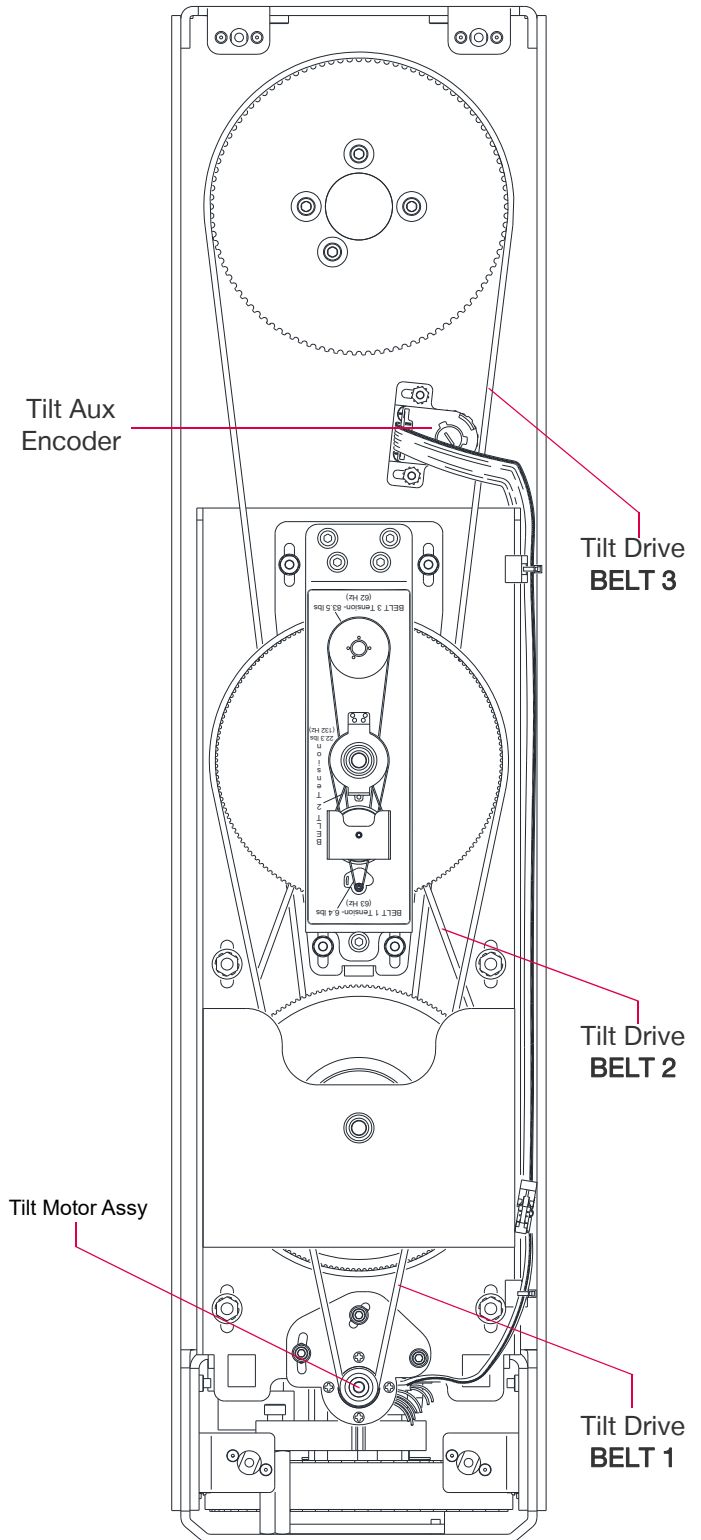


Figure 1-4: Tilt-Side Yoke Leg

Pan-Side Yoke Leg

The following illustration shows major sub-assemblies located in the GroundControl Longthrow Pan-Side Yoke Leg.

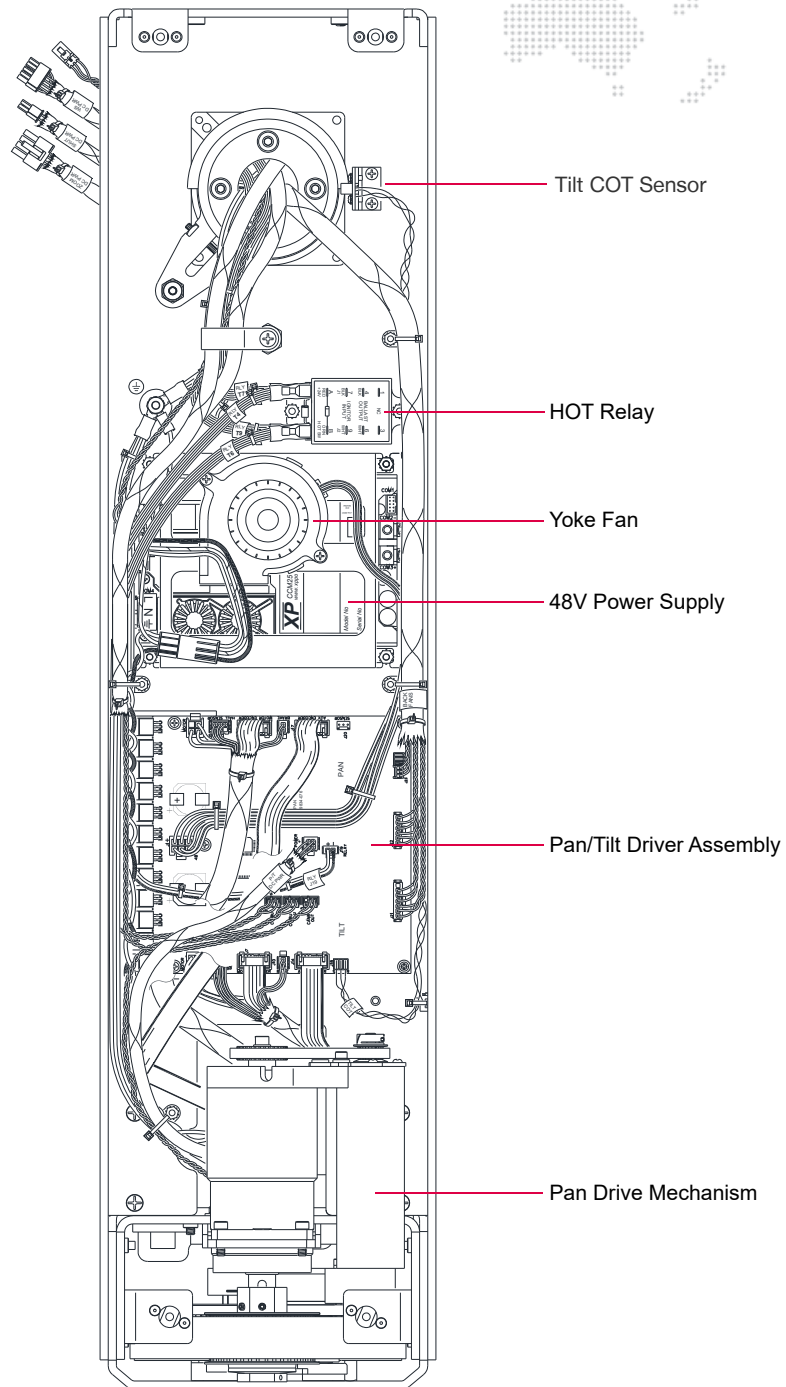


Figure 1-5: Pan-Side Yoke Leg

Color Correction Wheel Standard Configuration

The following drawing shows the standard Color Correction Wheel configuration:

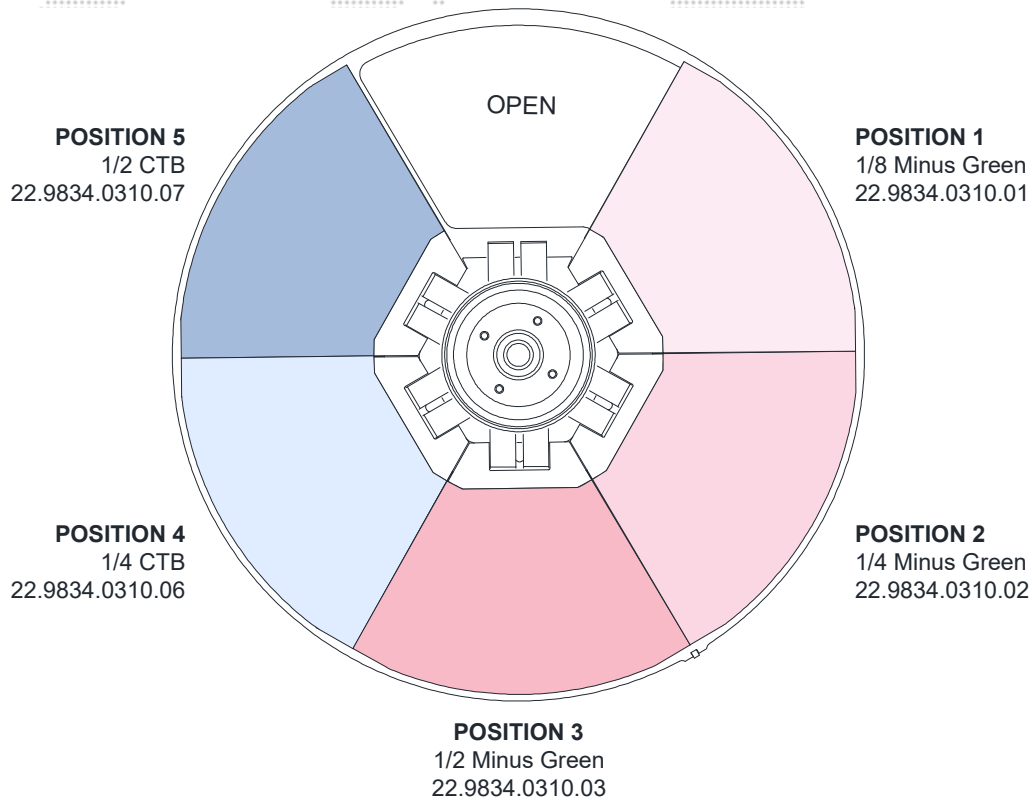


Figure 1-6: Color Correction Wheel, Standard Configuration

Color Correction Part Numbers

To order replacement color correction flags for GroundControl Longthrow, please use the following part numbers:

PRG Part #	TEAM Ecode	Color/Component	Reference
22.9834.0311	----	Color Correction Wheel, Full Assembly	ASSY, MINUS GREEN WHEEL, GCLT
22.9834.0310.01	374CF-C1	Panel, 1/8 Minus Green	ASSY, 1/8 MINUS GREEN PANEL
22.9834.0310.02	374CF-C2	Panel, 1/4 Minus Green	ASSY, 1/4 MINUS GREEN PANEL
22.9834.0310.03	374CF-C3	Panel, 1/2 Minus Green	ASSY, 1/2 MINUS GREEN PANEL
22.9834.0310.06	374CF-C6	Panel, 1/4 CTB	ASSY, 1/4 CTB PANEL
22.9834.0310.07	374CF-C7	Panel, 1/2 CTB	ASSY, 1/2 CTB PANEL

Gobo Wheel Standard Configuration

The following drawing shows the standard Gobo Wheel configuration for GroundControl Longthrow.

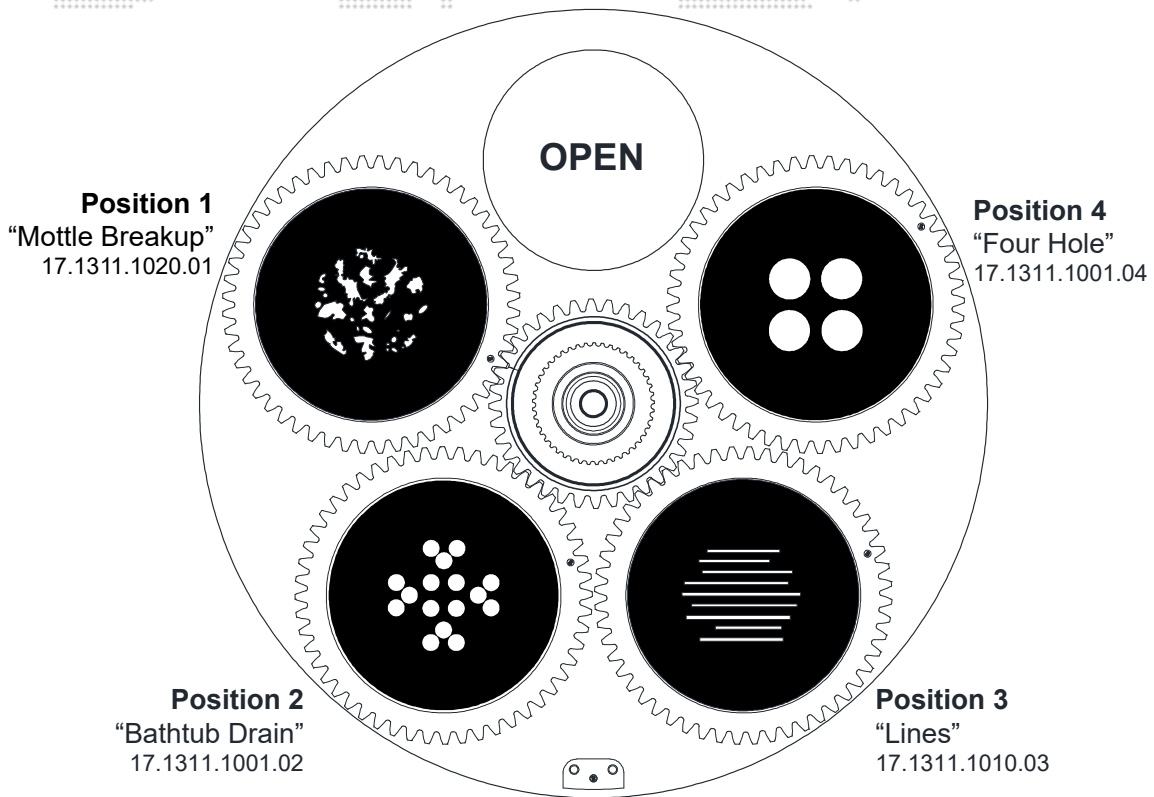


Figure 1-7: Gobo Wheel Standard Configurations

Gobo Wheel Part Numbers

To order replacement gobos/wheel assembly for GroundControl Longthrow, please use the following part numbers:

PRG Part #	TEAM Ecode	Gobo/Component	Reference
22.9815.0210	----	Gobo wheel assembly, no gobos	ASSY, GOBO WHEEL
17.1311.1020.01	374CG-G1	Gobo: "Mottle Breakup"	ASSY, GOBO, MOTTLE BREAKUP, GCLT
17.1311.1001.02	374CG-G2	Gobo: "Bathtub Drain"	ASSY, GOBO, BATHTUB DRAIN, GCLT
17.1311.1010.03	374CG-G3	Gobo: "Lines"	ASSY, GOBO, LINES, GCLT
17.1311.1001.04	374CG-G4	Gobo: "Four Hole"	ASSY, GOBO, FOUR HOLE, GCLT



2.

TESTING & TROUBLESHOOTING

This chapter provides testing and troubleshooting procedures for the luminaire.

- + TESTING
- + TROUBLESHOOTING

TESTING

About This Section

The following section provides instructions for using the test and recalibration features of the Bad Boy menu system. For complete menu operating instructions, refer to the GroundControl™ Longthrow Spot Luminaire User Manual (02.9816.0001).

Test Screen

The Test menu provides options for using the luminaire's self-test features.

- + **Recalibrate** - press to bring up Recalibration Screen. (During recalibration, intensity goes out until all mechanism calibrations are complete and back in position, then fades in.)
- + **Recal All** - press to bring up Recalibrate All Yes/No options.
- + **Disable** - press to bring up Disable Screen, which allows specific mechanisms to be disabled during testing.
- + **Mech Test** - press to bring up Mechanical Tests Screen. (See "Mechanical Tests" on page 21 for more explanation.)
- + **Clean Lenses** - press to bring up Cleaning Lenses screen. This feature will position lenses so that all surfaces may be cleaned with a cloth. (Note that pressing the buttons does not actually clean the lenses.)
- + **Group Test** - press to bring up Group Tests screen, which allows multiple luminaires to be run through a configurable test sequence when chained together via DMX512 or Ethernet. (See "Group Tests" on page 22 for more explanation.)

Recalibrate	Recal All	Test X
Mech Test	Group Test	
Disable	Clean Lenses	

Test Sub-Menu Screens

ALL	Pan & Tilt	Recalibrate X
Zoom	Colors	
Gobo	Dim/Str/Iris/Fro	
Framing Blades & Rotate		

Recalibrate Screens - Specifies a specific mechanism for recalibration.

ALL	Pan & Tilt	Disable X
Zoom & Effects	Colors	
Gobos	Dim/Strobe/Iris	
Framing Blades & Rotate		

Disable Screen - Specifies mechanisms to be disabled from fixture operation.

Pan	Tilt	Dimmer	Strobe	Iris	Mech Test X
Cyan	Yellow	Magnta	Des	CTW	
Fr Rot	Gobo	Index	Zoom	Frost	
Framing Blades		Open			

Mechanical Tests Screen - Specifies mechanisms to be tested.

Cleaning Lenses	
Begin	End

Cleaning Lenses Screen - Positions lenses so that they may be easily cleaned with a cloth.

START	Pan & Tilt Status Step	Intensity Iris & Effects Status Step	Colors Status Step	Group Tests X
All On	off OK	off OK	off OK	
Sequential/ Concurrent	Gobos Status Step	Zoom Status Step	Framing Status Step	
Manual Control	off OK	off OK	off OK	

Group Tests Screen - Allows multiple luminaires to be tested when daisy-chained together.

Mech	Board	Fuse	Mech	Board	Fuse	Fuse Map X
PAN	Yoke	F1	G01	Stack	F17	
TLT	Yoke	F2	IN1	Head	F7	
DIM	Yoke	F3	G02	Stack	F18	
STR	Yoke	F4	IN2	Head	F8	
IRS	Head	F9	FRT	Head	F13	
CYA	Head	F10	FRM	Stack	F21	
MAG	Head	F11	LN1	Head	F14	
YEL	Head	F12	LN2	Head	F15	
CTW	Stack	F19	LN3	Head	F16	
DES	Stack	F20	EFF	Head	F5	
			EIN	Head	F6	

Fuse Map - Provides the circuit board location for all mechanism fuses.

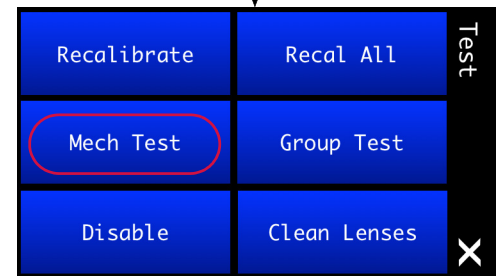
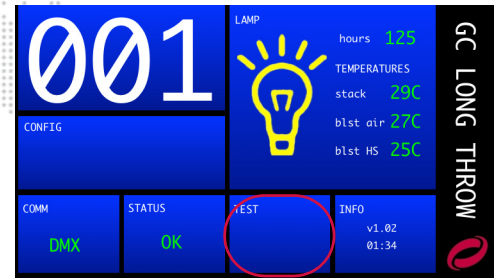
Mechanical Tests

The Mechanical Tests menu provides a method for exercising all luminaire mechanisms individually. Each mechanism has a similar Test screen. Cyan is shown in the example to the right.

The following test functions are available:

- + **Test Chase** - The mechanism will move back and forth between two positions. The START/STOP button starts and stops the motion, and the SPEED button sets the rate of the motion. For mechanisms with sensors, one of the positions will be on the sensor and the other position will be off.
- + **Manual Control** - The knob at the bottom right of the screen moves the mechanism through its range of travel, manually.
- + **Manual Position Entry** - Press POSITION to enter a value for the mechanism's position.
- + **Feedback** - The current status of the mechanisms encoder (POSITION) and sensor (SENSOR) are shown (if available for that mechanism). STATUS indicates whether the mechanism is in an error state or normal operating state.
- + **Utility Functions** - Press **Recalibrate** to recalibrate the mechanism or **Disable** to turn off the motor control to allow the mechanism to move freely.
- + **Configuration Information** - HOME OFFSET indicates whether the home position* has been adjusted to fine tune sensor positions (applies to gobo wheel only).

* Due to small variations in sensor and sensor board positions, the open position on a gobo wheel might not be precisely aligned with the optical axis, creating a slight blockage on one side of the open beam. Adjust the wheel position via DMX to get the proper alignment and send the HOME OFFSET command to store the current position as the new "home" position. This position is stored in persistent memory and will be used going forward as the home position.



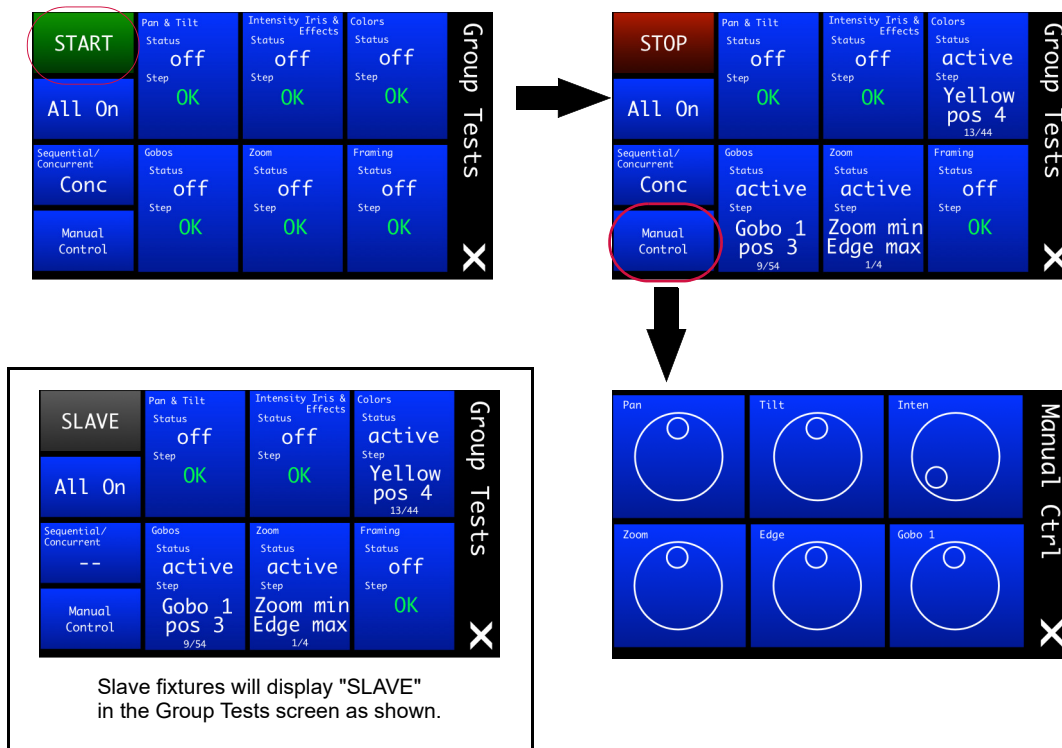
Group Tests

The Group Test menu allows multiple GroundControl Longthrow Spot Luminaires to be run through a configurable test sequence when chained together via DMX512 or Ethernet.

To perform a group test:

- Step 1. At Group Test screen, select options to run: Pan/Tilt, Intensity, Colors, Gobos, Zoom, and/or Framing.
- Step 2. Select test option: Concurrently (all selected tests are run at once) or Sequentially (tests are run one at a time as each one finishes).
- Step 3. Press START to begin testing. All luminaires connected to the main fixture (now referred to as the "Master") will become "Slaves" and follow the test routine set on the Master in an endless loop.
- Step 4. To stop the test sequence, press STOP on the Master.

While in group test, a Master can manually change certain values by using the Manual Control screen. From here, you can adjust the levels of parameters not active in the test sequence. For example, if a test were running on gobos and colors, you can adjust the pan and tilt to point the Master and all Slaves to a position where it will be easier see the output of the fixtures.



TROUBLESHOOTING

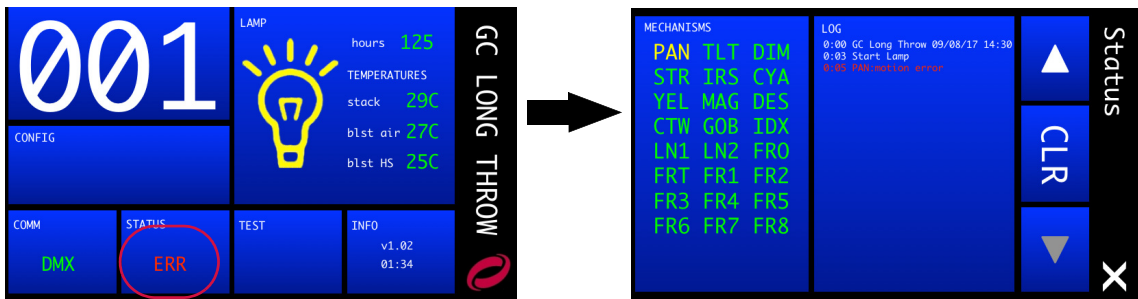
Errors

Status Indications

The STATUS panel at the Home screen will report overall luminaire conditions as follows:

- + **CALIBRATION** (yellow)
- + **OK** (green)
- + **ERROR** (red)
- + **LOCKED** (white)

Pressing the STATUS panel will bring up a detailed Status screen as shown below:



The Status screen will indicate which specific mechanisms, if any, have errors. It also provides a log of systems activity. The Status screen operates as follows:

- + **Mechanisms** - displays mechanism status. Mechanism names will be shown in yellow during calibration, green if okay, and red if an error exists. If an error exists, press the Mechanisms panel to bring up the Recalibration screen. Try recalibrating the mechanism(s) that is reporting the error.
- + **Log** - displays system log. Use touchscreen arrows to scroll up or down. Press CLR to bring up Clear Log Yes/No options.

Comm LED

In the case of a mechanism error, the Comm LED on the input panel will flash either red or green (depending on the comm state).

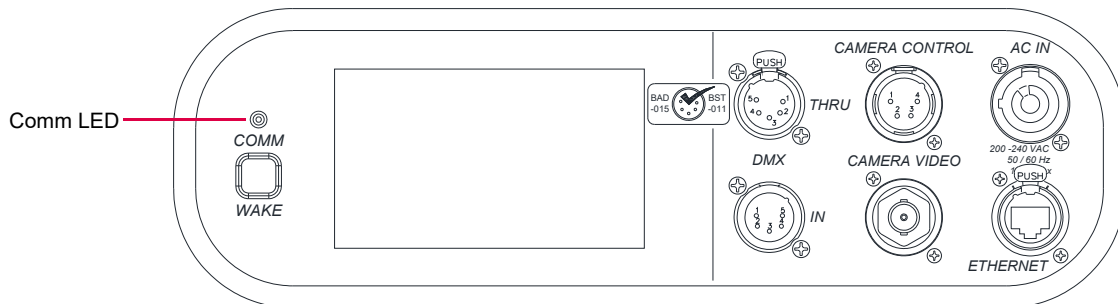


Figure 2-1: Comm LED

Mechanism Errors

Errors will be shown after the mechanism code, for example: PAN:Comm Error.

Error Code	Explanation	Solution
Cal Error	Error resetting position values in motion processor at beginning of calibration	Check CAN cables/connections, motor control board
Cal Timeout	An action during calibration took longer than expected	Check CAN cables/connections, motor control board
Comm Error	Error communicating with motion processor	Check CAN cables/connections, motor control board
Get Position Error	Error when retrieving current position from motion processor	Check CAN cables/connections, motor control board
Init Error	Error during initialization of motion processor	Check CAN cables/connections, motor control board
Motion Error	Mechanism's actual position is too far from its commanded position	Check mechanism motion
No Sensor	During calibration, no sensor was found in the range of travel	Check for mechanism motion, sensor operation
No Stop	Mechanism which calibrates to a physical stop did not find that stop	Check mechanism
Sensor Stuck	During calibration, could not find either edge of the sensor or the sensor did not turn off as expected	Check for mechanism motion, sensor operation
Spin Error	Error while sending spin command to motion processor	Check CAN cables/connections, motor control board
Stop Spin Error	Error while sending stop spin command to motion processor	Check CAN cables/connections, motor control board

Other Errors

Error Code	Explanation	Solution
Ballast Errors: Parity, Overrun, Bad Header, Msg Too Long	Various ballast errors	Check ballast comm cable/connections
Ballast Heat Sink Over Temp	Ballast too hot	Check fans
Ballast Lamp EOL H/L Voltage Limit	Lamp life limit exceeded	Check lamp
Ballast Line Voltage Low	Wrong voltage to strike	Check power connection
Ballast Short Detected	Short circuit on ballast output	Check wiring
Ballast Timeout: Lamp Strike	Lamp failed to strike	Check igniter, lamp
CAN Comm Error	Stopped receiving CAN messages from motion processor	Check CAN cables/connections, motor control board
Crossload Timeout	Crossload execution took too long due to error	Remove any incoming DMX, retry
Data not crossload format	Data in memory is not proper format for crossload	Load software via computer
DMX busy: cancel crossload	Cannot execute crossload with traffic on DMX line	Remove incoming DMX control for cross load

Error Code	Explanation	Solution
DMX: UART transmit error	Transmit buffer busy when trying to send	Remove any incoming DMX, retry
Fuse Blown	One or more fuses are blown	Check fuse on specified board
Gobo out of zero range	When zeroing gobo wheels, the wheel is too far away from zero to set the position	Move wheel closer to home position before zero command
Head Fan Error	Fan not running properly	Check fan
In Free Mode: Can't Lock	Free mode is enabled	Use pan/tilt menu to change from "free" to "lock"
Lamp Off	Fan Error: Cannot strike lamp while any fan is in error state	Check fan, fan cabling
Lamp Off: Over Temperature	Head temperature too high	Check fans
Lamp over threshold	Lamp hours above recommended maximum	Change lamp
Must Unlock via Free Option	Lock is enabled	Use pan/tilt menu to change from "lock" to "norm"
Plenum Fan Error	Fan not running properly	Check fan
PMD Motion Error	Mechanism's actual position is too far from its commanded position	Check mechanism motion
Framing Motor Disabled	Framing not running properly	Recalibrate, check mechanism motion
Stack Fan Error	One or more stack fans not running properly	Check fan, fan cabling
Temp over threshold	Temperature too high	Check fans/filters
Tip Fan Error	Fan not running properly	Check fan
UPE Fans Error	Upper Enclosure fans not running properly	Check fan, fan cabling
Yoke Fan Error	Fan not running properly	Check fan

Basic Troubleshooting

The following table provides a list of common start-up problems and possible solutions. Refer to the GroundControl™ Longthrow Spot Luminaire User Manual for more information about installation and operation.

Symptom	Solution(s)
No power to luminaire.	Ensure power cable is properly connected to Neutrik input connector.
	Ensure power is switched on at source (mains, disconnect box, etc.)
No console control.	Ensure DMX512 or Ethernet data cable is properly connected.
	Ensure DMX512 address setting is correct.
DMX512 control not working correctly throughout daisy-chain.	Ensure data cables are correctly configured.
	Ensure termination connector is installed at last luminaire in data link.
Lamp does not strike at power-up.	Configure lamp to start at power-up.
Comm LED is red indicating that no valid DMX or Ethernet signal is detected.	Ensure DMX512 or Ethernet data cable is properly connected. Check console.
No Ethernet control.	Ensure that luminaire is not also receiving a DMX signal. If both valid DMX and Ethernet control are being received, DMX control will take precedence.
Beam obstructed by gobo in open position.	Set new gobo zero position.
Luminaire won't take software update.	Remove active control (DMX512, Art-Net, or sACN).
Comm LED flashing red or green.	Indicates an internal error on the fixture. Check Status screen to isolate.
No output from camera, or camera signal is not clean	Check BNC connection on umbilical from Truss Box to luminaire, and from fiber connection to GroundControl remote.
No control of GCLT camera on GroundControl remote	Check 4-pin control connection on umbilical from Truss Box to luminaire, and from fiber connection to GroundControl remote.



3.

MAINTENANCE

This chapter provides maintenance procedures for the luminaire.

- + EQUIPMENT HANDLING
- + ROUTINE MAINTENANCE
- + REMOVE AND REPLACE PROCEDURES

EQUIPMENT HANDLING

Proper Lamp Servicing and Operation

Servicing

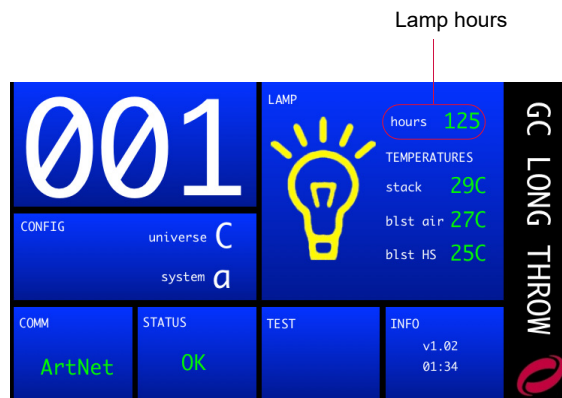
- + When handling a lamp, hold it by the ceramic base while wearing cotton gloves or finger cots. Do not touch the glass envelope (bulb). If you touch the glass with bare fingers, wipe off any fingerprints with alcohol.

Heat

- + When lamps are lit, the interior of the luminaires becomes very hot. To aid in the airflow circulation within the luminaires, after dousing the lamps, wait at least 5 minutes before removing power to the luminaires. This will provide enough time for the equipment fan to cool off the unit.

Lamp Life

- + When operating arc lamps, allow luminaires to operate for at least 3 minutes. It takes about 3 minutes for the fill components (mercury and halogen-metal compounds) in the lamp tubes to vaporize completely. If the lamps are switched off earlier than 3 minutes, the fill components are partially vaporized. The inadequately vaporized fill components and the electrode material (tungsten) are deposited in the areas of the lamp tubes that have remained cool. As a result, the lamp tubes blacken prematurely and reduce the service lives of the lamps.
- + If system will be unattended for more than 3-4 hours, luminaire lamps should be doused.
- + The lamp indicator (available on the menu Home screen) displays total lamp hours. Lamp hours are shown in green if under threshold, yellow at 650 hours, and red at 750 hours. *It is mandatory that the lamp be changed before 750 hours.*



CAUTION: It is **mandatory** that the lamp be changed before 750 hours.

Wheel Stack Road Case Instructions

Parts:

20.9816.1229

2.3749A-P05

CASE, WHEEL STACK, WS BB WASH (MODIFIED FOAM)

TEAM Ecode for above

A special road case is provided for shipping the GroundControl Longthrow Wheel Stack Assembly. The case is necessary to protect the fragile components of the Wheel Stack Assembly during storage, transport and shipping.

Pre-printed labels (addressed to the PRG Dallas office) are provided for ease of shipping. The labels can be found in a plastic bag taped to the inside of all wheel stack road cases.

The illustrations in **Figure 3-1** show how the Wheel Stack Assembly should be packed and unpacked inside the case.

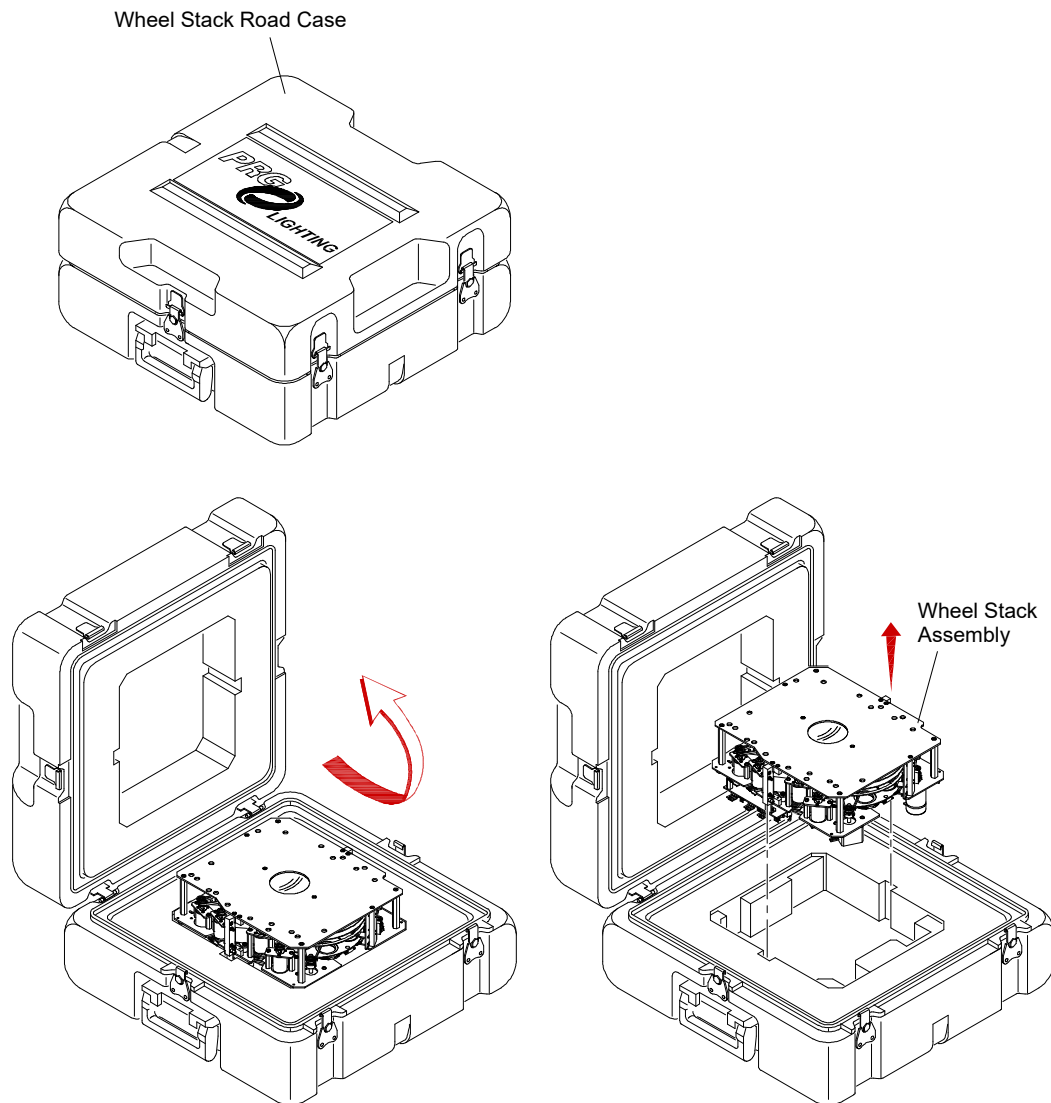


Figure 3-1: Wheel Stack Road Case

ROUTINE MAINTENANCE

Removing Head Covers - Top and Bottom Head

To access interior head components, one or both of the Head Covers may need to be removed. Two (2) Front Covers, bottom and camera side, are also secured above the Front Lens/Camera area. You will find information on removal of these Front Covers on the proceeding pages (Refer to "[Removing Head Covers - Camera-Side Front and Bottom-Side Front](#)" on page 33)

The Bottom Head Cover on GCLT contains filters mounted forward; its placement is the non-camera side of the head.

Parts:

22.9834.1630	ASSY, HEAD COVER, GCLT
22.9834.1631	ASSY, BOTTOM HEAD COVER, GCLT

Tools:

#2 Philips screwdriver

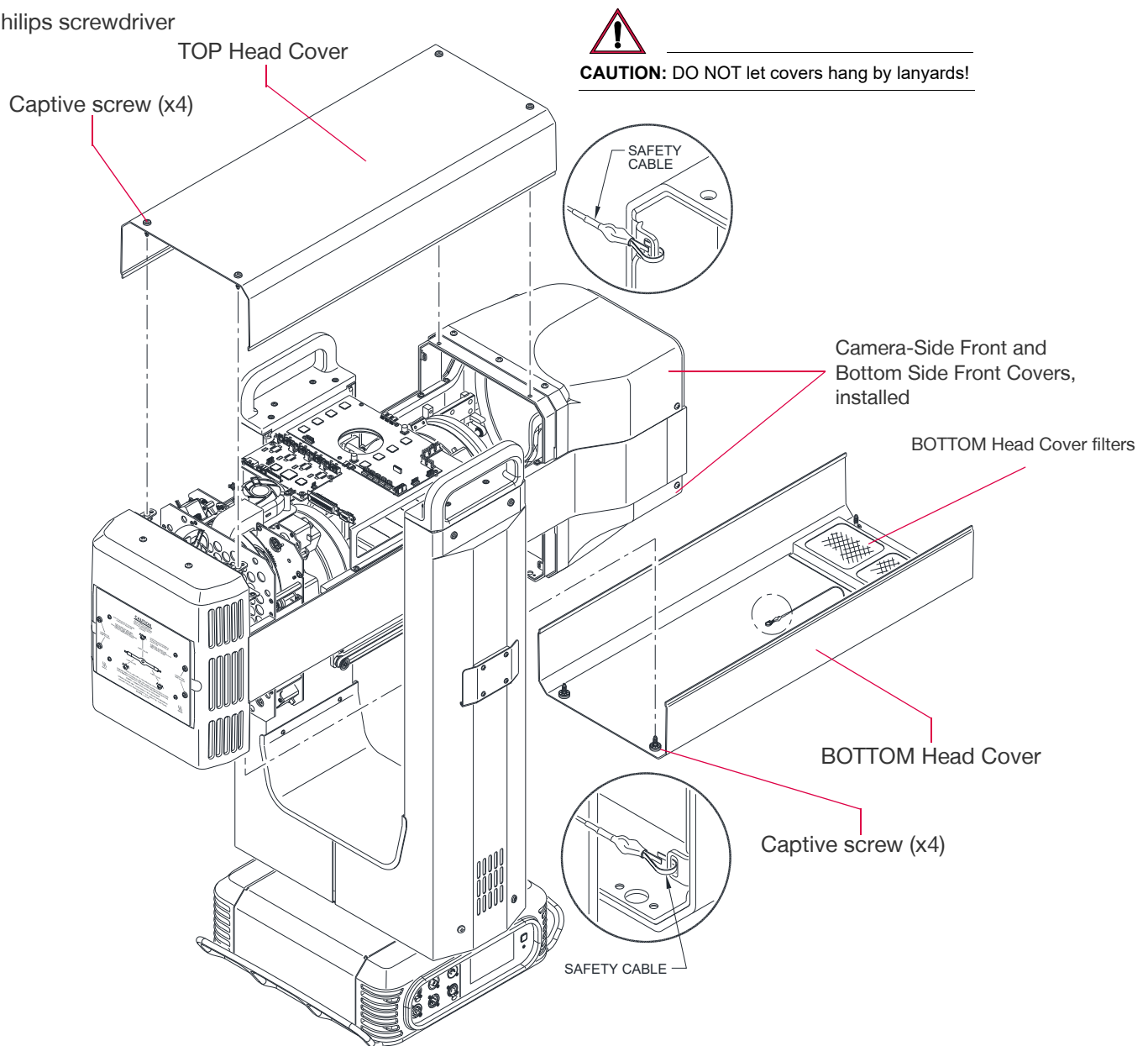


Figure 3-2: Removing Top and Bottom Head Covers



To remove Top and Bottom Head Covers (Illustration on previous page):

- Step 1. At Top Head Cover, loosen four captive screws (**Figure 3-2**).
(Cover will still be secured by a safety lanyard.)
- Step 2. Unclip lanyard to completely remove cover.
- Step 3. At Bottom Head Cover, loosen four captive screws (**Figure 3-2**).
(Cover will still be secured by a safety lanyard.)
- Step 4. Unclip lanyard to completely remove cover.
- Step 5. Replace Top Head Covers as follows:
 - a. Attach lanyard clip for Top Head Cover.
 - b. Fit Top head Cover in place.
 - c. Tighten four captive screws.
- Step 6. Replace Bottom Head Cover as follows:
 - a. Attach lanyard clip for Bottom Head Cover.
 - b. Fit Bottom Head Cover in place.
 - c. Tighten four captive screws.

Note: The Bottom Head Cover contains **air vents with filter pads** -- take a moment to clean or replace the foam Air Filter pads. Refer to "**Cleaning or Replacing the Bottom Head Cover Air Filters**" on page 40.

Removing Head Covers - Camera-Side Front and Bottom-Side Front

At the very front of the GroundControl Longthrow head are two covers protecting the camera and front glass assemblies -- the Camera-Side Front Cover and Bottom-Side Front Cover. The Camera-Side Front Cover has an extrusion above the camera assembly and can be identified with this feature, but the Front Covers only mount in one configuration.

Parts:

- | | |
|--------------|--------------------------------|
| 10.9834.0632 | COVER FRONT, CAMERA SIDE, GCLT |
| 10.9834.0633 | COVER FRONT, BOTTOM SIDE, GCLT |

Tools:

- #2 Phillips screwdriver

To remove Camera-Side Front and Bottom-Side Front Head Covers (Illustration on next page):

- Step 1. At Camera-Side Front Cover, loosen five (5) 8-32 x 3/8" screws (**Figure 3-3**).
- Step 2. Set screws and Camera-Side Front Cover aside.
- Step 3. At Bottom-Side Front Cover, loosen five (5) 8-32 x 3/8" screws (**Figure 3-3**).
- Step 4. Set screws and Bottom-Side Front Cover aside.
- Step 5. Replace Camera-Side Front Cover as follows:
 - a. Fit Camera-Side Front Cover in place.
 - b. Replace and tighten the five (5) 8-32 x 3/8" screws.
- Step 6. Replace Bottom Head Cover as follows:
 - a. Fit Bottom Head Cover in place.
 - b. Replace and tighten the five (5) 8-32 x 3/8" screws.

Note: The Camera-Side and Bottom-Side Front Covers only fit in one configuration, and the Camera-Side Front Cover has an extrusion for the camera's corner mount.

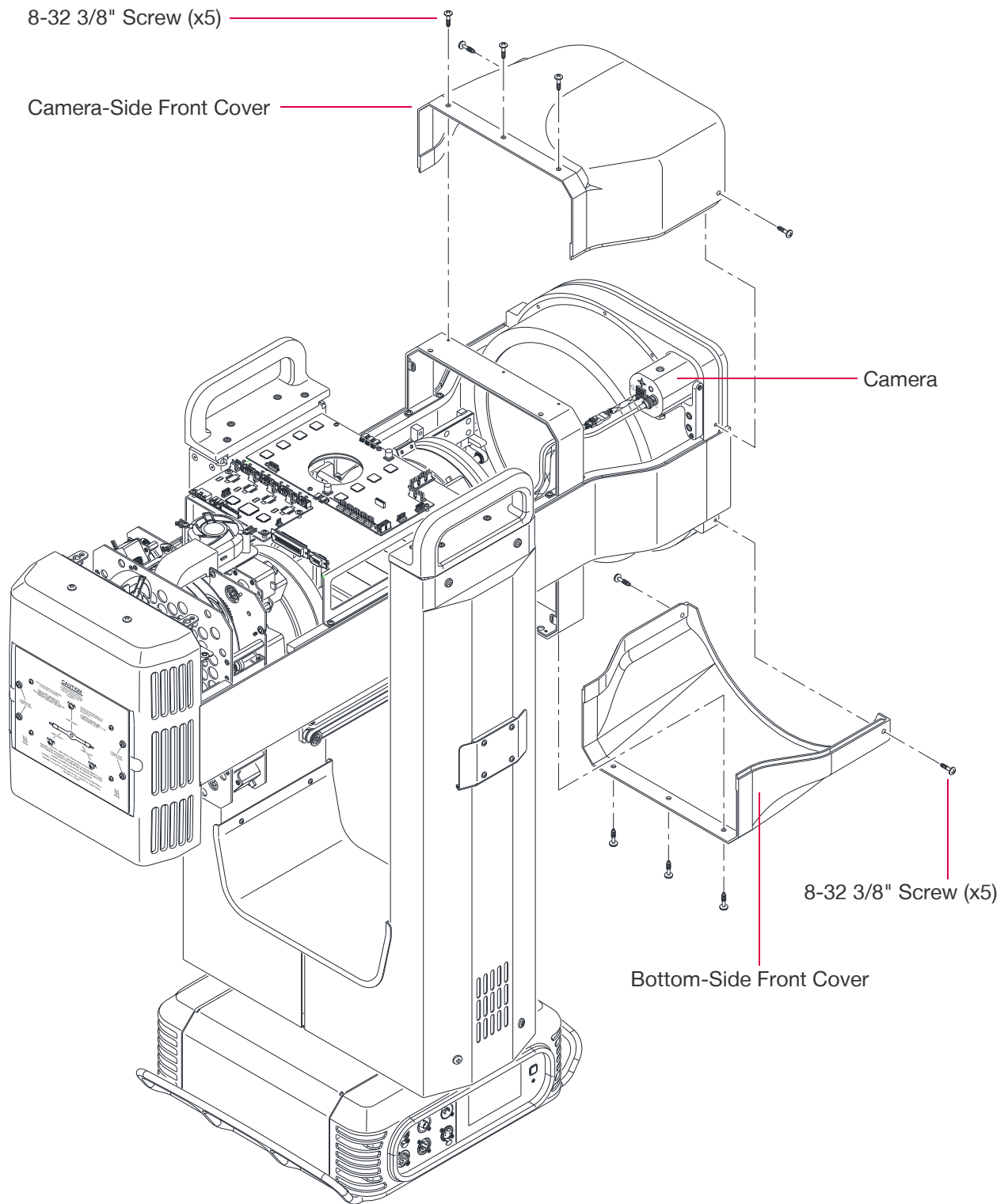


Figure 3-3: Removing Camera-Side and Bottom-Side Front Covers

Removing Aft Cover and XYZ Assembly

To access some interior components, the Aft Cover may need to be removed.

Tools:

- #2 Phillips screwdriver
- 5/32" hex key or T-handle



WARNING! Remove power from luminaire before performing any maintenance procedures.

To remove Aft Cover and XYZ Assembly:

- Step 1. Remove Top Head Cover and Wheel Stack. (Refer to "Removing the Wheel Stack" on page 52.)
- Step 2. Open lamp access door and remove lamp. (Refer to "Replacing Lamp" on page 48.)
- Step 3. Remove four 6-32 x 5/16" PPSS screws which secure XYZ Assembly in place (**Figure 3-4**).
- Step 4. Disconnect Ignitor Output to Lamp Socket Cable from two locations by loosening screws. (Refer to detail in **Figure 3-4** below.)
- Step 5. Completely remove XYZ Assembly and set aside.

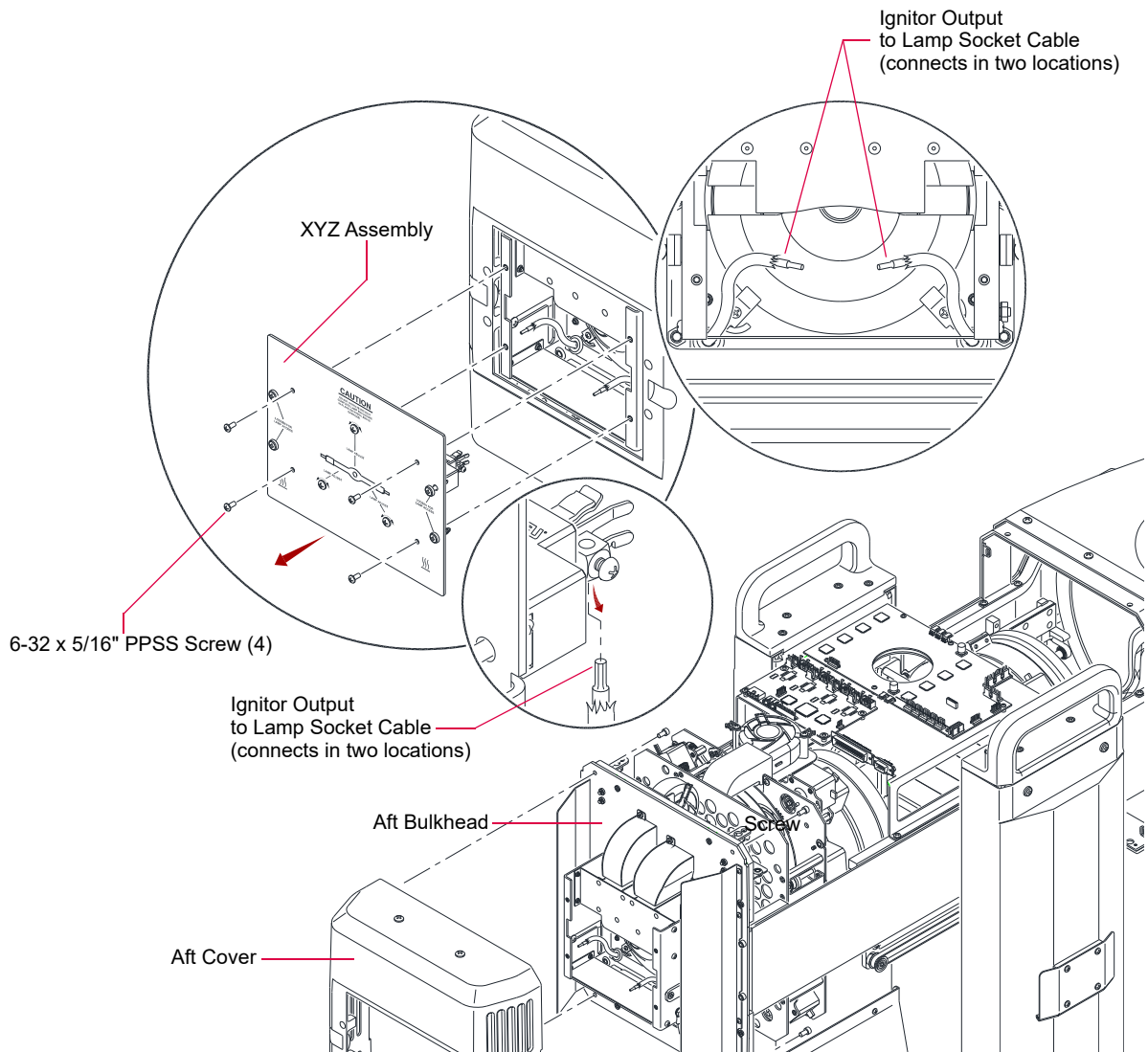


Figure 3-4: Removing XYZ Assembly

Step 6. Remove Aft Cover by removing four 10-32 x 1/2" socket head screws from the Aft Bulkhead.

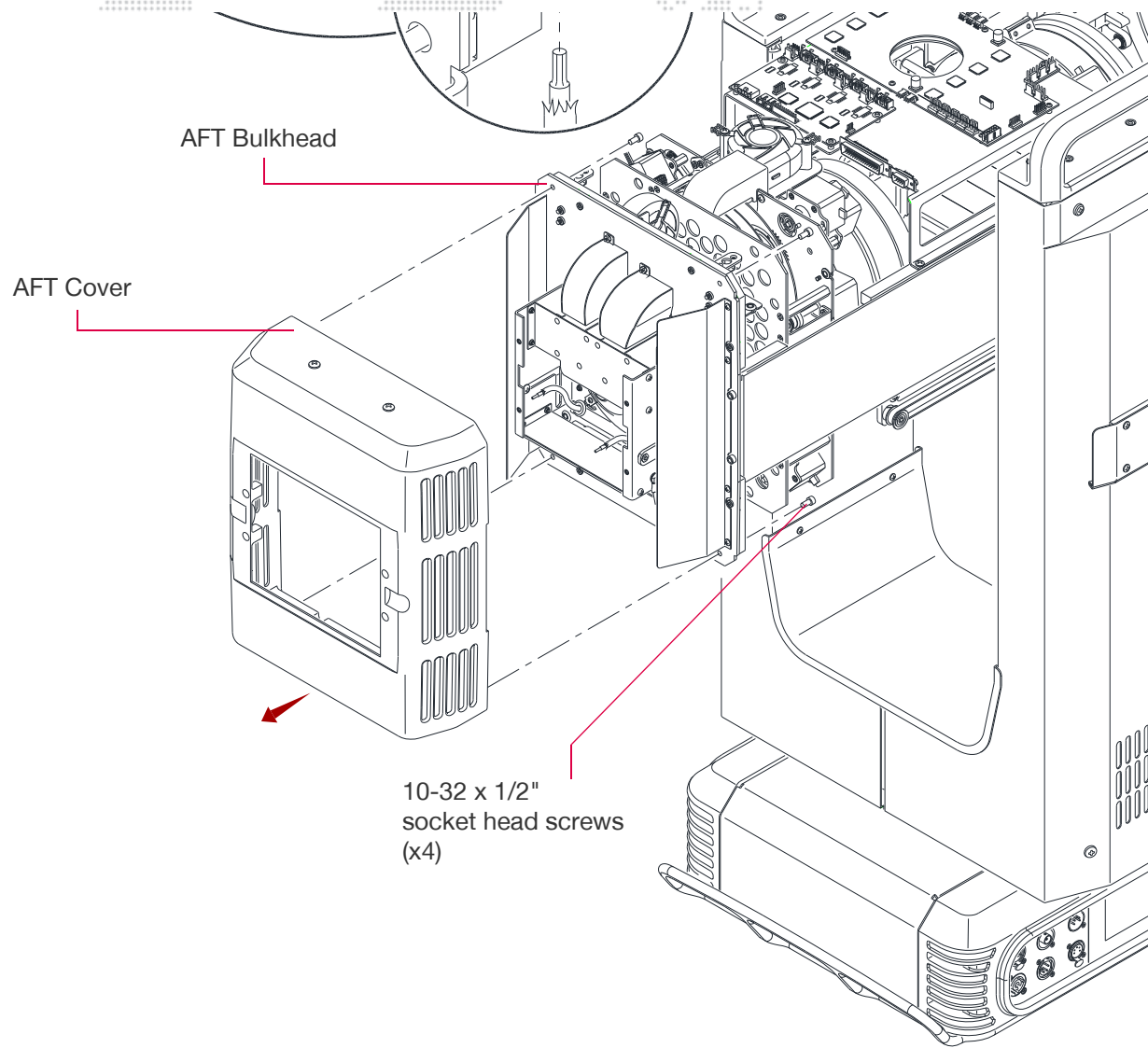


Figure 3-5: Removing Aft Cover

Removing Yoke Leg Covers

To access some interior components, one or more of the Yoke Leg Covers may need to be removed.

Tools:

#2 Philips screwdriver



WARNING! Remove power from luminaire before performing any maintenance procedures.

To remove yoke leg covers:

- Step 1. At yoke leg cover, loosen four captive screws (**Figure 3-6**).
- Step 2. Remove cover by pulling away from yoke leg.
- Step 3. Repeat Steps 1 and 2 for other yoke leg cover.

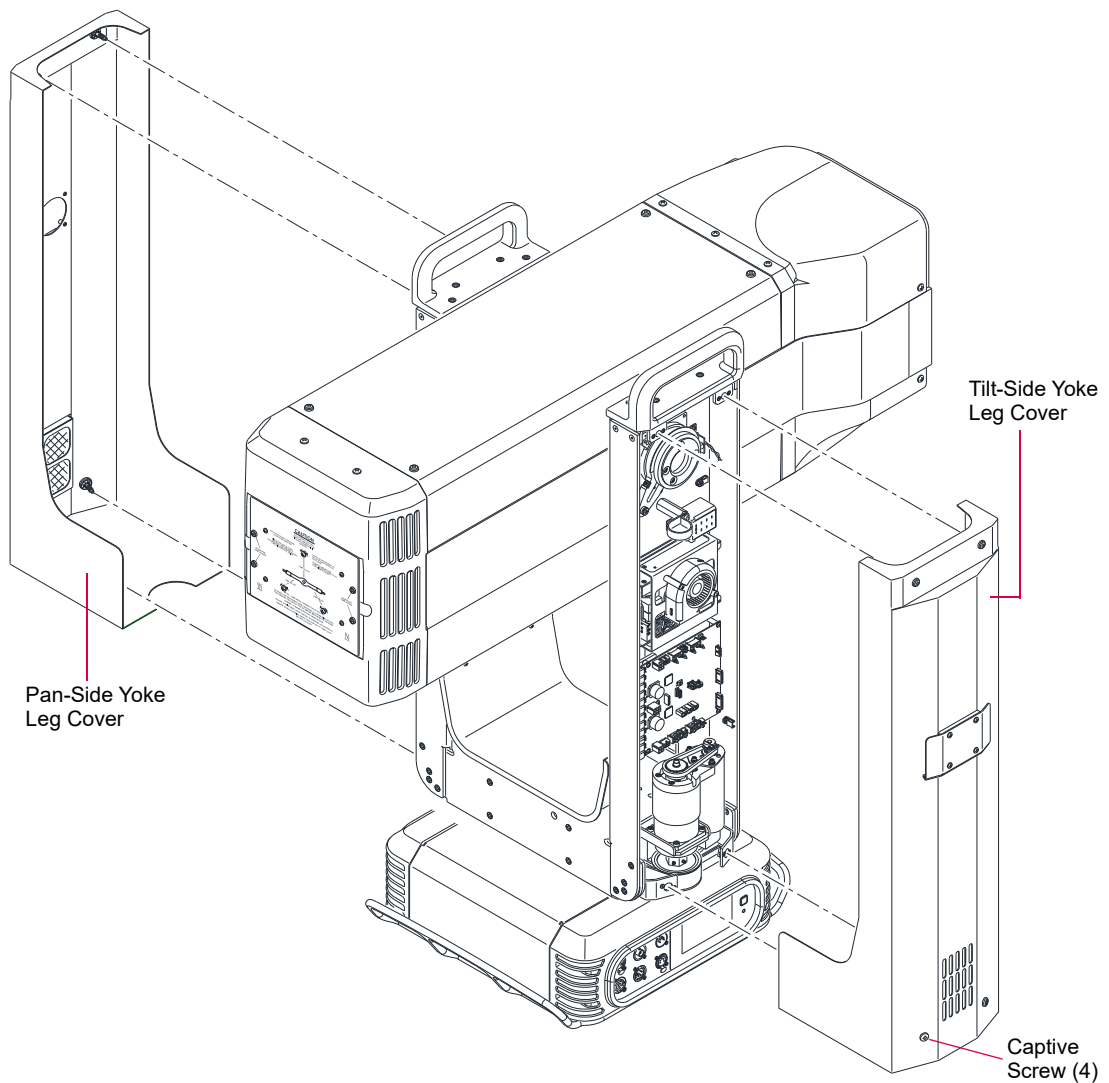


Figure 3-6: Removing Yoke Leg Covers



Cleaning or Replacing Yoke Cover Filters

When the Yoke Covers are removed, take a moment to remove debris from the Intake and Exhaust filters on the Yoke Covers, or replace them if they are damaged or saturated.

Tools:

- #2 Phillips screwdriver
- Lint-free cloth
- Vacuum cleaner with brush nozzle or compressed air
- Window Cleaner

Parts:

- 10.9834.0789 FILTER, YOKE INTAKE GCLT
- 10.9834.0769 FILTER, YOKE EXHAUST GCLT



WARNING! Remove power from the luminaire before performing this procedure.

To clean or replace the Intake and Exhaust filters on the GCLT Yoke Covers:

- Step 1. Remove power from the luminaire.
- Step 2. Remove the pan-side and tilt-side Yoke Covers from the luminaire.
(Refer to "[Removing Yoke Leg Covers](#)" on page 37)
- Step 3. Remove the Yoke Intake Blower cover plate by removing the four (4) 6-32 x 1/2" PPSS screws from the plate. Remove the plate, filter, and rubber plate gasket and set aside. Do this for both Yoke Leg covers, one at a time. (**Figure 3-7**)
- Step 4. Using a vacuum with a brush attachment, carefully remove debris from the filter pad of each Yoke Leg Intake Blower filter. Replace the filter pad if it is damaged, saturated with atmospheric, or otherwise not cleanable. Do this for both Yoke Leg covers.
- Step 5. Reinstall the Yoke Intake Blower filter, gasket, and plate by performing steps 4 and 3 in reverse, for both Yoke Leg Intake filter assemblies.
- Step 6. Inside of each Yoke Leg Cover, remove the Exhaust filter from its filter cage and clean or replace for both Yoke Leg covers. (**Figure 3-7**)
- Step 7. Reinstall both of these filters in their filter cages. Do this for both Yoke leg covers.
- Step 8. Take a moment to wipe the inside of both Yoke Leg covers with a lint-free cloth lightly saturated with window cleaner. This prevents accumulated dirt and atmospheric from working its way into the luminaire. Allow both covers to completely dry before re-installation.



WARNING! MAKE SURE that both Yoke Leg covers are COMPLETELY DRY of cleaner before re-installation!

See Yoke Cover Filters illustration on next page:

Figure 3-7

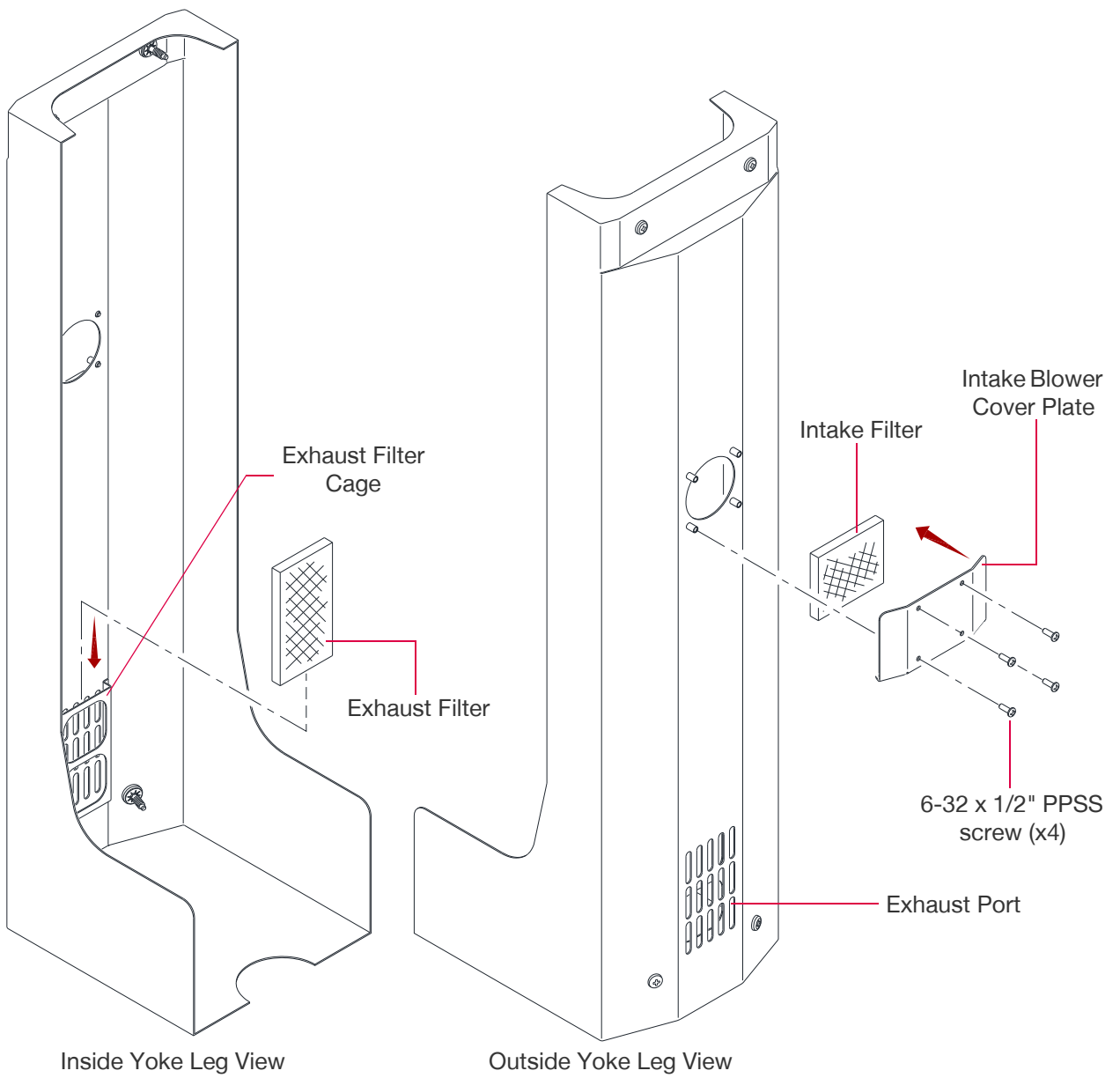


Figure 3-7: Removing Yoke Cover Intake and Exhaust Filters

Cleaning or Replacing the Bottom Head Cover Air Filters

While you have the Head Covers removed, take a moment to clean or replace the **Bottom Head Cover** Air Filter pads that are located on the forward section of the Bottom Head Cover.

Tools:

- #2 Phillips screwdriver
- Lint-free cloth
- Vacuum cleaner with brush nozzle or compressed air
- Window Cleaner

Parts:

- 10.9834.0661 FOAM, HEAD AIR FILTER (2 pcs)

To clean or replace the foam filter on the GCLT Bottom Head Cover:

- Step 1. Remove the Bottom Head Cover. (Refer to "**Removing Head Covers - Top and Bottom Head**" on page 32)
- Step 2. Slide the two foam Bottom head Cover filters out of the filter cage on the cover via the opening on the side.
- Step 3. Using a vacuum with a brush attachment, carefully remove debris from both filter pads on the Bottom head Cover. Replace both of these filter pads if they are damaged, saturated with atmospheric, or otherwise not cleanable. Do this for both of these two filters.
- Step 4. Re-install both filter pads into the filter cage on the Bottom Head Cover.
- Step 5. Take a moment to wipe down the inside of the Bottom Head Cover of any accumulated dirt or debris using a lint-free cloth lightly saturated with window cleaner. This prevents any accumulated dirt from entering the luminaire. Allow the Bottom Head Cover to **COMPLETELY DRY** before re-installing.



WARNING! MAKE SURE that both Head covers are COMPLETELY DRY of cleaner before re-installation!

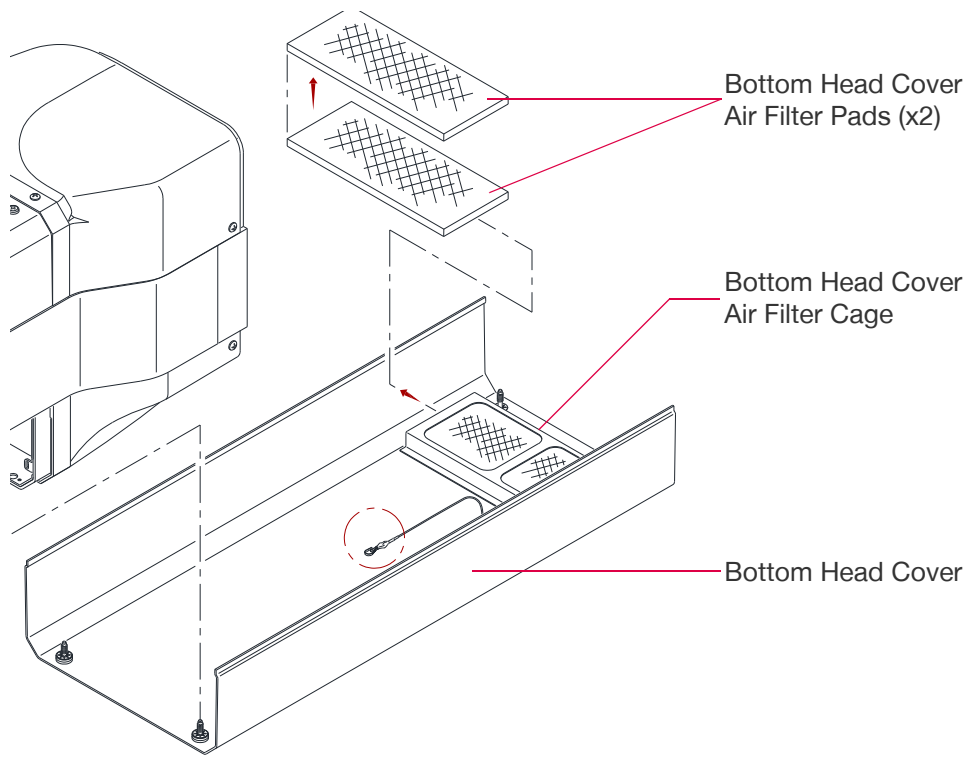


Figure 3-8: Removing Bottom Head Cover Filters

Removing Upper Enclosure Covers

To access some interior components, one or both of the Upper Enclosure Covers may need to be removed.

Tools:

#2 Philips screwdriver



WARNING! Remove power from luminaire before performing any maintenance procedures.

To remove upper enclosure covers:

- Step 1. At cover, loosen four captive screws (**Figure 3-9**).
- Step 2. Remove cover by pulling away from enclosure.

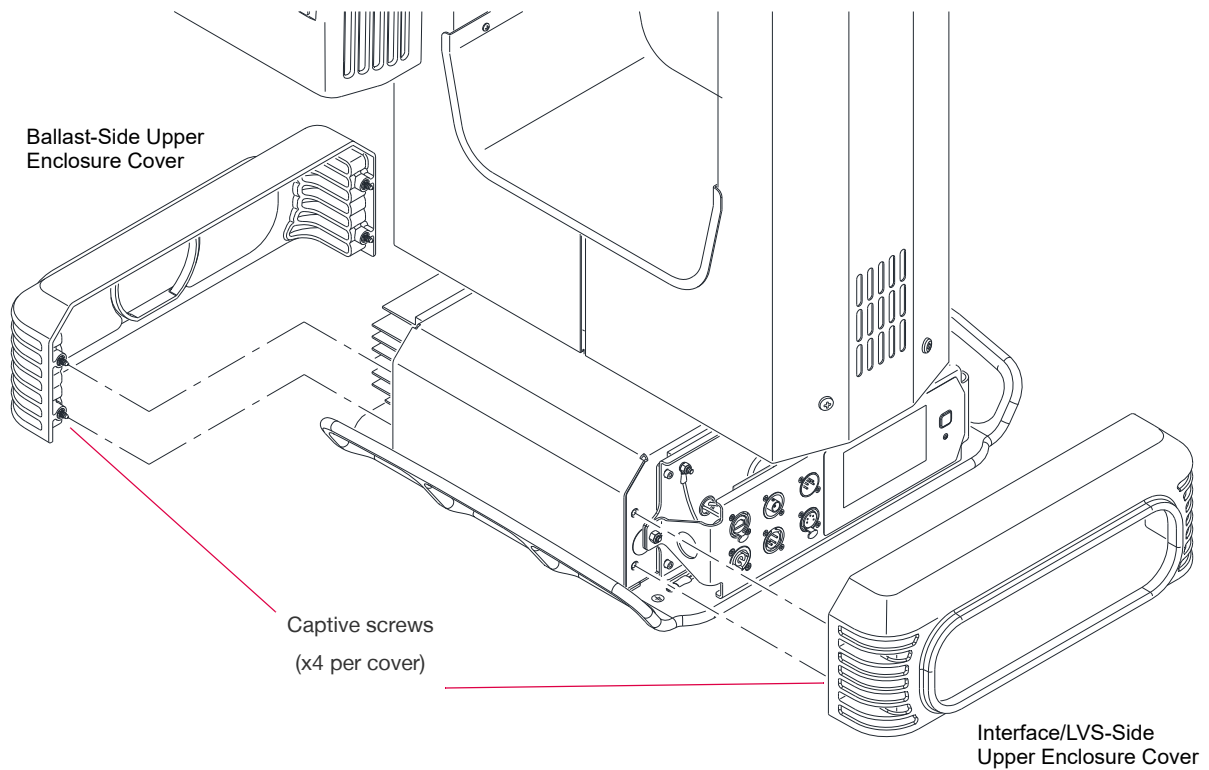


Figure 3-9: Removing Upper Enclosure Covers

Cleaning Luminaire Exterior

Tools:

- Lint-free cloth
- Window cleaner
- Vacuum cleaner with brush nozzle or compressed air
- #2 Phillips screwdriver

To clean luminaire exterior:



WARNING! Remove power from luminaire before this procedure.



CAUTION: Use ONLY the PRG approved mixture to clean optical components, including lenses, gobos, color chips, front and camera glass. **DO NOT EVER use Window Cleaner on lens or camera glass!**

- Step 1. Remove power from luminaire.
- Step 2. Using vacuum cleaner with brush nozzle or compressed air, clean dust from external components. *If using compressed air to clean out luminaire, DO NOT allow fans or blower to spin at high speeds, as this will damage their bearings.*
- Step 3. Use a clean, lint-free cloth to wipe outside surface of luminaire.
DO NOT use window cleaner on lens OR camera glass!

PRG Fixture Glass Cleaning Solution

We recommend using a solution of distilled water, 95% isopropyl alcohol, and Dawn[®] liquid dish washing soap.

Previously in PRG manuals, we have recommended OptiMax Solution for cleaning any glass on or in the fixture, which includes the lenses, front glass, camera glass, gobos, color chips, and reflector. If you are currently using the OptiMax product [OptiMax™ Ultra Pure Cleaning Solution (06.6084.0001.0)], please use up your OptiMax product supply and move to the following solution below. The solution is based on 4oz spray bottle containers.

To make PRG-approved Fixture Glass Cleaning Solution in a 4oz bottle:

- Step 1. Add an equal (50/50) mixture of 95% isopropyl alcohol and distilled water to a 4 oz spray bottle. You are ostensibly adding 2 oz of 95% alcohol and 2 oz of distilled water to the bottle.
- Step 2. Add two (2) small drops of Dawn[®] liquid dish washing soap to spray bottle.
- Step 3. Cap container of spray bottle and gently agitate to combine.

This mixture can be scaled up to make a larger batch for filling individual containers:

To make 4 oz of PRG Fixture Glass Cleaner:	2 oz of 95% alcohol	2 oz of distilled water	2 drops of Dawn [®]
To make 16 oz of PRG Fixture Glass Cleaner:	8 oz of 95% alcohol	8 oz of distilled water	8 drops of Dawn [®]
To make 32 oz of PRG Fixture Glass Cleaner:	16 oz of 95% alcohol	16 oz of distilled water	16 drops of Dawn [®]
To make 48 oz of PRG Fixture Glass Cleaner:	24 oz of 95% alcohol	24 oz of distilled water	24 drops of Dawn [®]
To make 64 oz of PRG Fixture Glass Cleaner:	32 oz of 95% alcohol	32 oz of distilled water	32 drops of Dawn [®]

Cleaning Lenses

Tools:

- (2) Micro Fiber cloths (06.6085.0001.0)
- PRG Fixture Glass Cleaning Solution (See "PRG Fixture Glass Cleaning Solution" on page 42.)
- Cotton gloves or finger cots
- #2 Phillips screwdriver
- 3/16" flat screwdriver

To clean lenses:



CAUTION: Use caution when handling lenses. Avoid scratching optical surfaces.



CAUTION: Use ONLY the PRG-approved Fixture Glass Cleaning Solution to clean optical components. DO NOT use Window Cleaner on lenses! Wear cotton gloves or finger cots when handling lenses/glass.

- Step 1. Apply power to luminaire and set intensity to 20%. (A beam will be necessary to see dirt and dust on the lenses.)
- Step 2. Remove Bottom Head Cover to access Zoom Lens Assembly. (Refer to "Removing Head Covers - Top and Bottom Head" on page 32.)

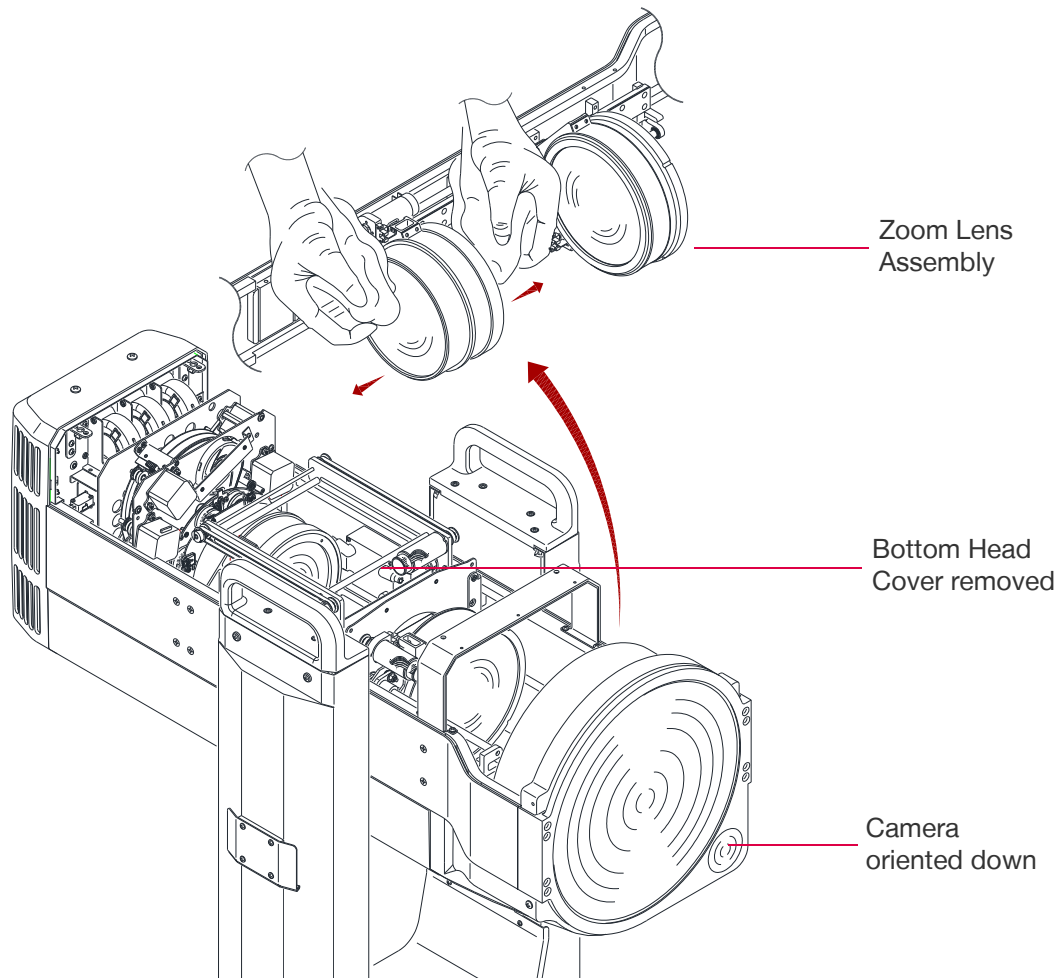


Figure 3-10: Accessing the Zoom Lens Assembly

Zoom Lens Assembly Detail

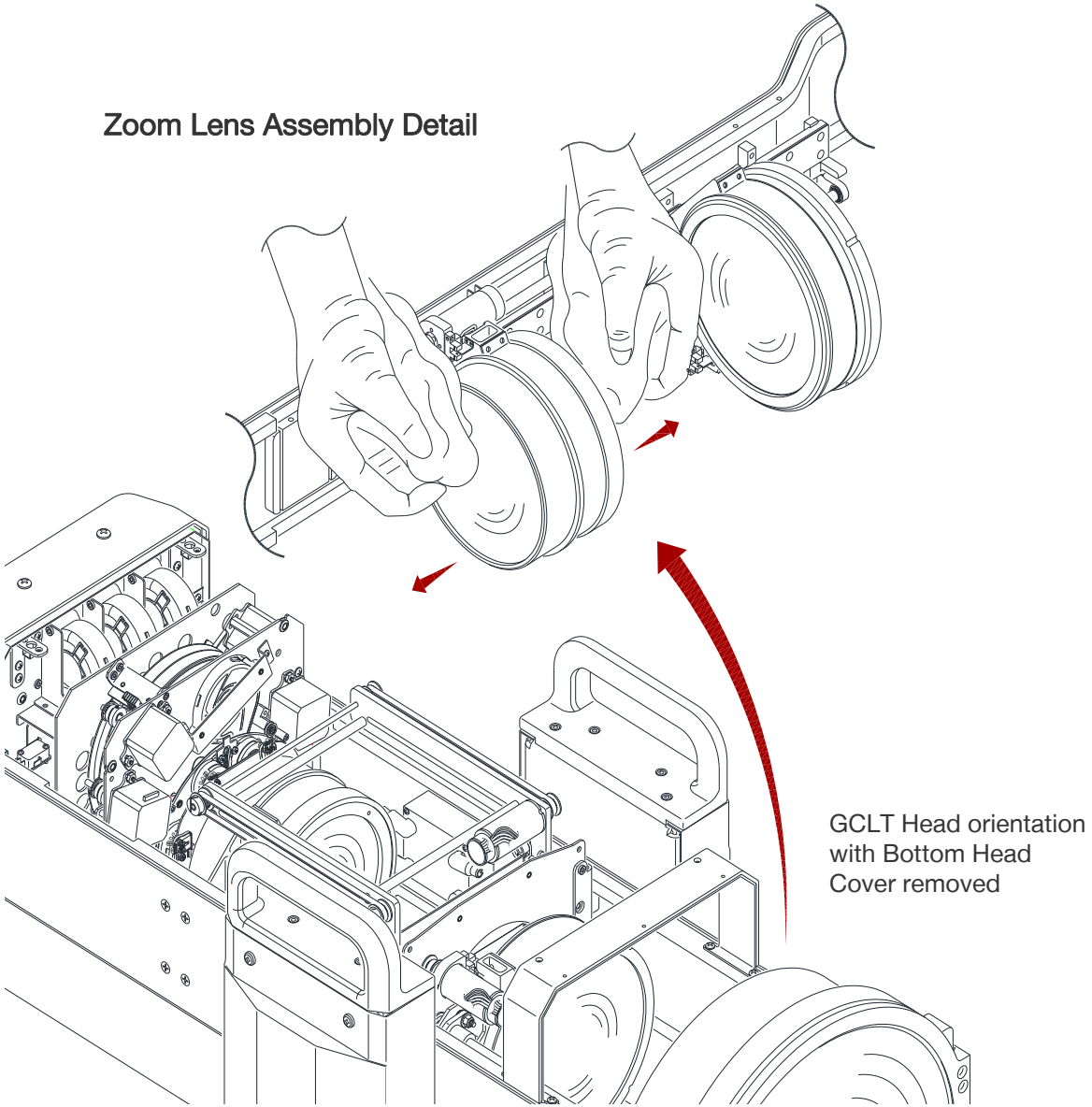
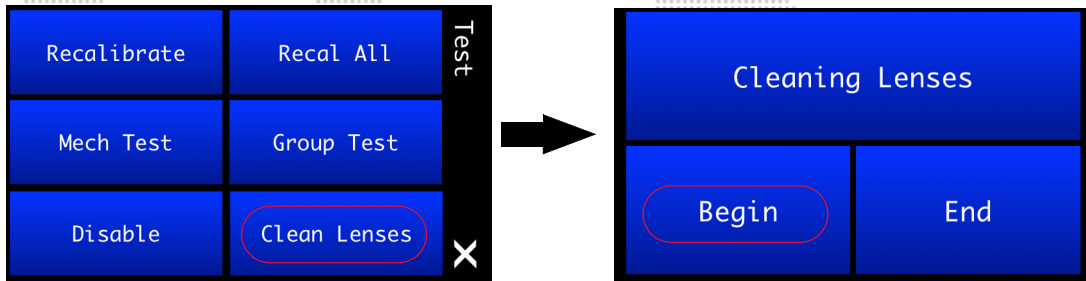


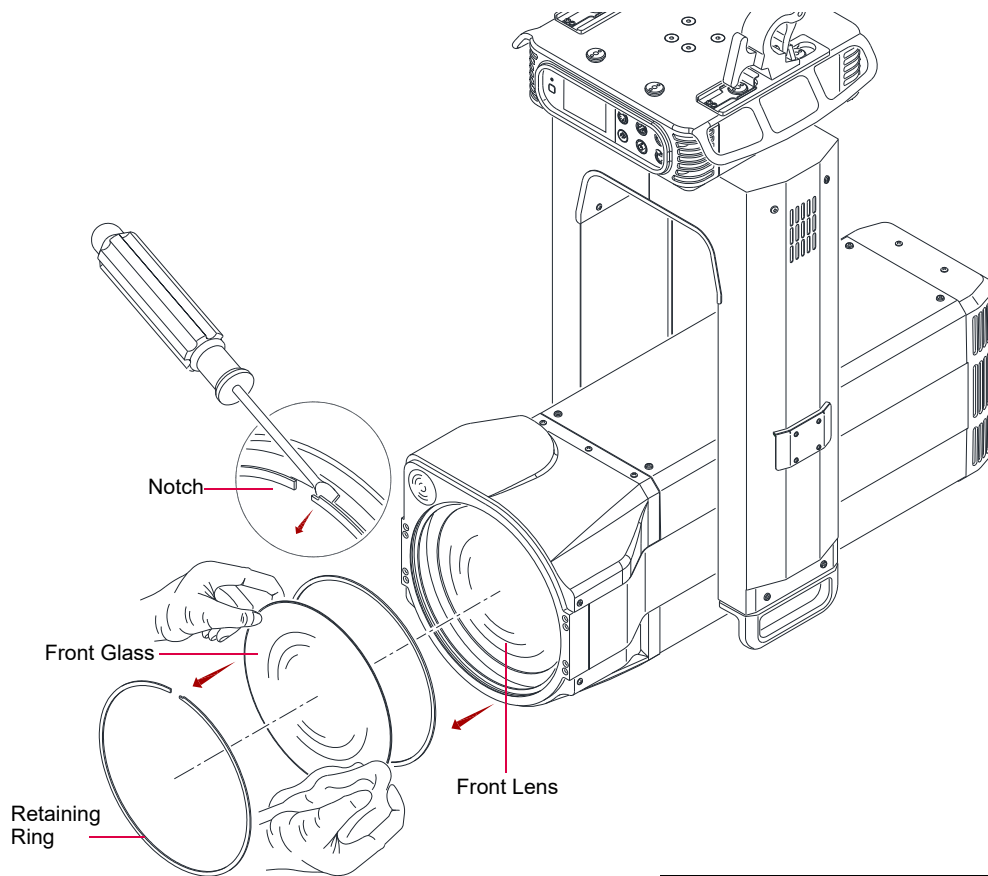
Figure 3-11: Zoom Lens Assembly Detail

- Step 3. At menu TEST screen, press "Clean Lenses." The Cleaning Lenses screen will open.
- Step 4. Press "**Begin**" to position lenses in cleaning configuration, which will also move the Frost module. Wait until lenses and Frost module finish moving to proceed.



CAUTION: When cleaning, do not allow the cleaning cloth to come into contact with the lens carrier rail. The rail has lubrication that will contaminate the cleaning cloth. Wear cotton gloves or finger cots.

- Step 5. If lenses are only dusty, use Micro Fiber cloth to carefully wipe lens surfaces. If further cleaning is required, use PRG Cleaning Solution and a Micro Fiber cloth to clean. **DO NOT use window cleaner!**
- Step 6. As in Step 5 above, clean remaining lens surfaces and front of luminaire Front Glass (**Figure 3-12**).



Note: Ensure gasket under Front Glass is not damaged or missing before reinstalling.

Figure 3-12: Removing Front Glass



CAUTION: Be extremely careful when removing Retaining Ring and Front Glass in next step. The glass can be easily chipped or cracked. Refer to **Figure 3-12** on the previous page for visuals.

- Step 7. To clean backside of Front Glass and front of Lens Group, remove Front Glass as follows:
- a. Position the GCLT luminaire head so that Front Glass is facing upward.
(This prevents it from falling onto the floor when the Retaining Ring is removed in the next step.)
 - b. Insert flat screwdriver under notch in Front Lens Retaining Ring. Carefully remove Retaining Ring.
 - c. Remove Front Glass and place face-down on a Micro Fiber cloth.
 - d. Using PRG Fixture Cleaning Solution and a Micro Fiber cloth, clean both sides of Front Glass and front of Lens Group. **DO NOT use window cleaner!**
 - e. Ensure gasket under Front Glass is not damaged or missing.
 - f. Re-install Front Glass.



CAUTION: "End" MUST BE PRESSED at the menu to complete the procedure. If the lens motors are left in the cleaning configuration for too long, they may be damaged due to overheating.

- Step 8. At menu, press "End" -- This will free the motors and recalibrate the lenses.
- Step 9. Replace Bottom Head Cover.

Cleaning Gobo and Color Correction Wheels

Tools:

- Micro Fiber cloth (06.6085.0001.0)
- PRG Fixture Glass Cleaning Solution (See "PRG Fixture Glass Cleaning Solution" on page 42.)
- Cotton gloves or finger cots
- #2 Phillips screwdriver

To clean gobo, color and effect wheels:



CAUTION: Use ONLY the PRG-approved Fixture Glass Cleaning Solution to clean optical components. DO NOT use Window Cleaner on gobo, color, or dimmer wheels! Wear cotton gloves or finger cots when handling optical components.



CAUTION: The optical components are very fragile, use extreme caution when cleaning! Color gobos have thin layers applied to one side that can be damaged if cleaned too roughly. Use caution.



WARNING! Remove power from luminaire before this procedure.

- Step 1. Remove power from luminaire.
- Step 2. Remove Head Covers. (Refer to "Removing Head Covers - Top and Bottom Head" on page 32.)
- Step 3. To clean Gobos:
 - a. Remove all gobos. (Refer to "Removing the Wheel Stack" on page 52.)
 - b. Using PRG Fixture Glass Cleaner and a Micro Fiber cloth, carefully clean gobos.
DO NOT use window cleaner!
- Step 4. To clean Color Correction Wheel [Minus Green Wheel]:
 - a. Remove each filter. (Refer to "Replacing a Color Correction Filter (Minus Green Wheel)" on page 55.)
 - b. Using PRG Fixture Glass Cleaner and a Micro Fiber cloth, carefully clean filters.
DO NOT use window cleaner!
- Step 5. To clean Color Wheels/Color Temperature Wheel:
 - a. Using PRG Fixture Glass Cleaner and a Micro Fiber cloth, carefully clean color wheels.
DO NOT use window cleaner!
 - b. Rotate wheels to access all surfaces.
- Step 6. Replace Head Covers.

REMOVE AND REPLACE PROCEDURES

Replacing Lamp

Parts:

71.2550.1500.0 / 2.3749D-11 1 EA LAMP, 1500W/D7/60 DOUBLE ENDED OSRAM

Tools:

Cotton gloves or finger cots
Alcohol wipe (supplied with new lamp)



WARNING! Remove power from luminaire before performing any maintenance procedures.



CAUTION: Refer to "**Proper Lamp Servicing and Operation**" on page 30 before handling the lamp.



CAUTION: Wear cotton gloves or finger cots while servicing lamp. Touching the lamp glass with bare fingers will leave oil and cause the lamp to explode or burn out early. Clean with alcohol wipe after installing, but avoid ALL CONTACT with alcohol and reflector.

To replace lamp:

- Step 1. If luminaire is powered-up, douse lamp and allow fans to run for at least 5 minutes.
- Step 2. Remove power from luminaire.
- Step 3. At lamp access door, loosen four captive screws (two on each side). Refer to **Figure 3-13** on next page.
- Step 4. Pull lamp box out of head assembly and rotate 90 degrees to access lamp.
- Step 5. Grasp lamp at metal ends and carefully remove from lamp box.
- Step 6. While holding new lamp at metal ends, install lamp so that nipple faces rear of luminaire (towards reflector).
- Step 7. Ensure lamp base is fully seated so that it touches contacts on both ends of socket.
- Step 8. Using supplied alcohol wipe, carefully - but thoroughly - clean glass bulb.
- Step 9. Re-insert lamp box into head and tighten four captive screws.
- Step 10. Reset Lamp Hours. (Refer to GC Longthrow User Manual.)
- Step 11. Optimize lamp. (Refer to "**Adjusting Lamp**" on page 50.)



CAUTION: Allow lamp to cool before servicing, **at least** five minutes after dousing.

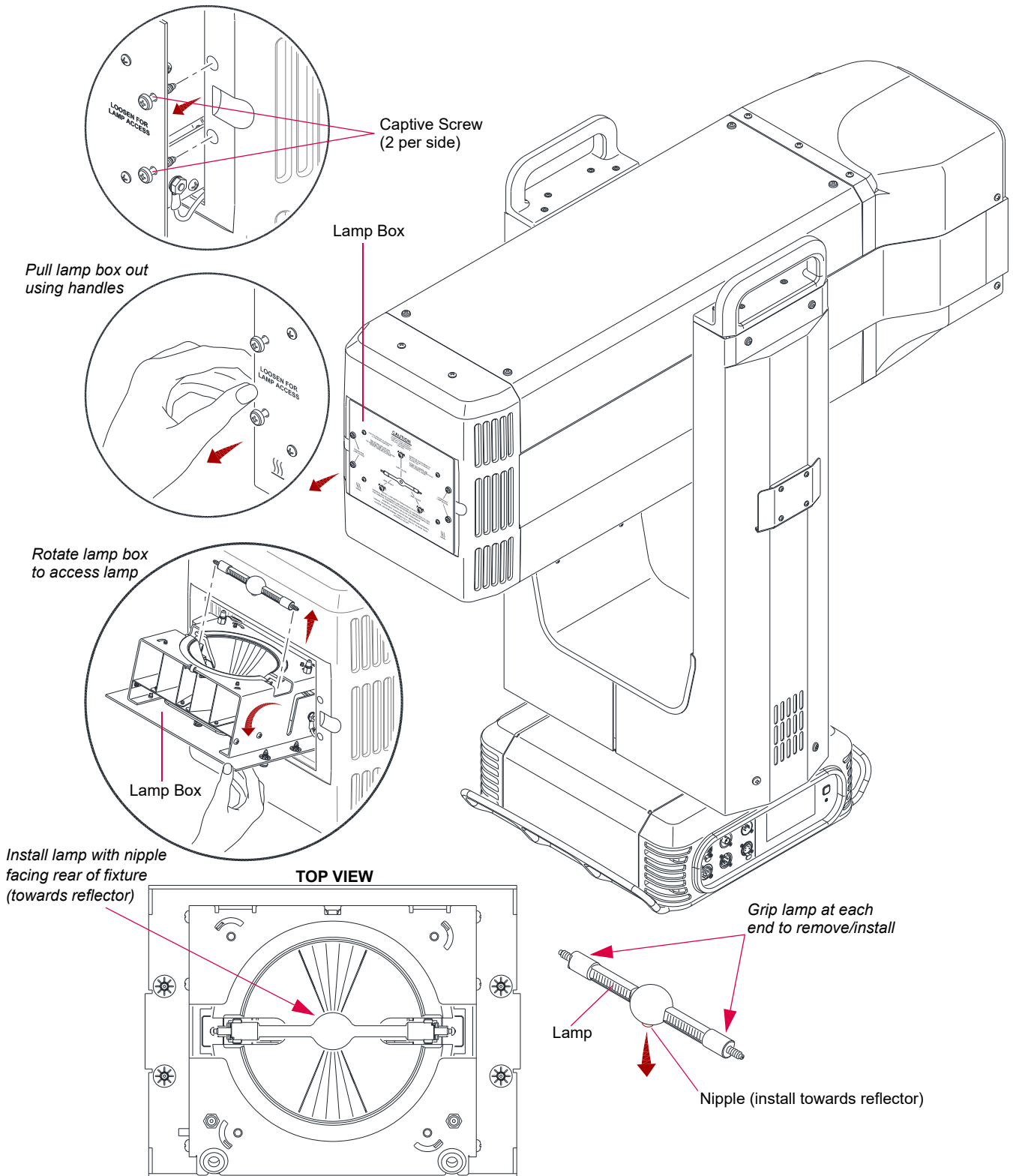


Figure 3-13: Replacing the Lamp



Adjusting Lamp

After a new lamp is installed, the lamp must be aligned to optimize the beam.

Please turn to Appendix B, "[Lamp Bench Focusing for GCLT](#)" on page 143.

Do not overlook this procedure when performing maintenance on fixtures or preparing them for productions; Lamp Alignment, or "Bench Focusing," is one of the most important preparation procedures.

When you send out a fixture that hasn't been bench focused, you are sending imperfect equipment on a job.

To Bench Focus the GCLT Lamp:
[See "Lamp Bench Focusing for GCLT" on page 143.](#)



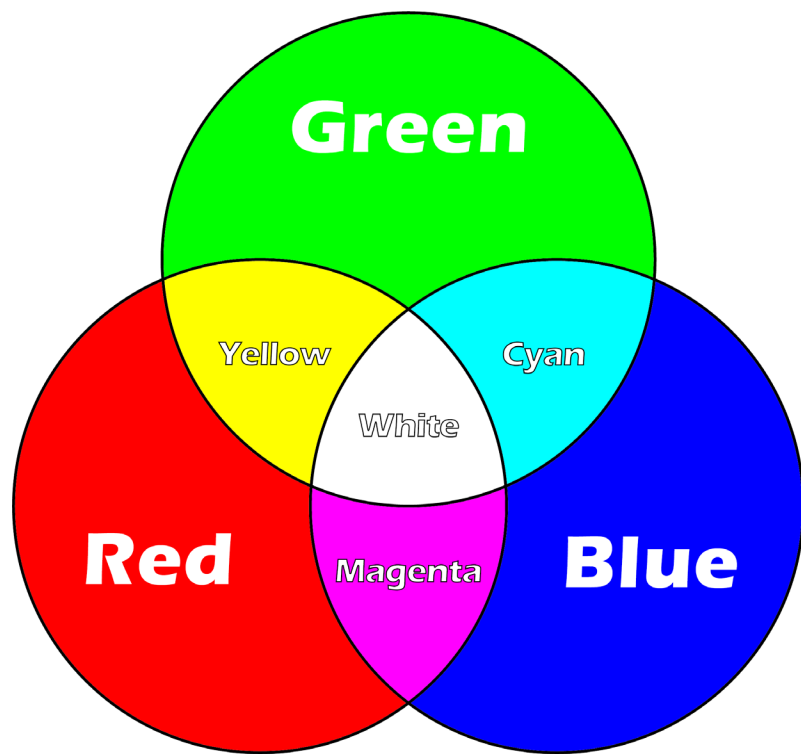
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So that you can learn about the Primary Colors of Light!

Primary Colors of Light are **Red**, **Green**, and **Blue**;
Secondary Colors of Light are **Cyan**, **Magenta**, and **Yellow**.

All colors together make White light.

Red + **Green** = **Yellow**
Green + **Blue** = **Cyan**
Blue + **Red** = **Magenta**



Removing the Wheel Stack

Due to the complex gear alignment, it is best to remove ALL gobos from the wheel even when replacing or swapping only one gobo. This way all gobos can be re-installed at one time with the proper alignment. Recalibrating a single gobo can be a difficult process.

Parts:

Standard or Custom Gobo(s), as required. (Refer to "Gobo Wheel Standard Configuration" on page 17.)

Tools:

- #2 Phillips screwdriver
- Long-shaft 3/32" flat-head screwdriver or right-angle driver with 3/32" flat-head bit
- Hook and Pick Tool
- Cotton gloves or finger cots



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace a gobo:

- Step 1. If the lamp was struck, douse the lamp and give the fixture at least five minutes to cool.
- Step 2. Remove power from luminaire.
- Step 3. Rotate the Head assembly so that the Back Plate text is readable.
- Step 4. Remove Top Head Cover. (Refer to "Removing Head Covers - Top and Bottom Head" on page 32.)



CAUTION: Do not touch gobos with bare fingers. Wear cotton gloves or finger cots when handling.

- Step 5. Remove the Wheel Stack as follows:
 - a. Disconnect the Power and Data cables for the from the Wheel Stack from the Driver PCB mount by loosening the slotted screws in each mount, and then gently rocking each side-to-side until disconnected. (**Figure 3-14**)
 - b. Gently position the Zoom Power and Can Bus cables out of the way so they do not catch on the Wheel Stack as it is removed. (**Figure 3-14**)

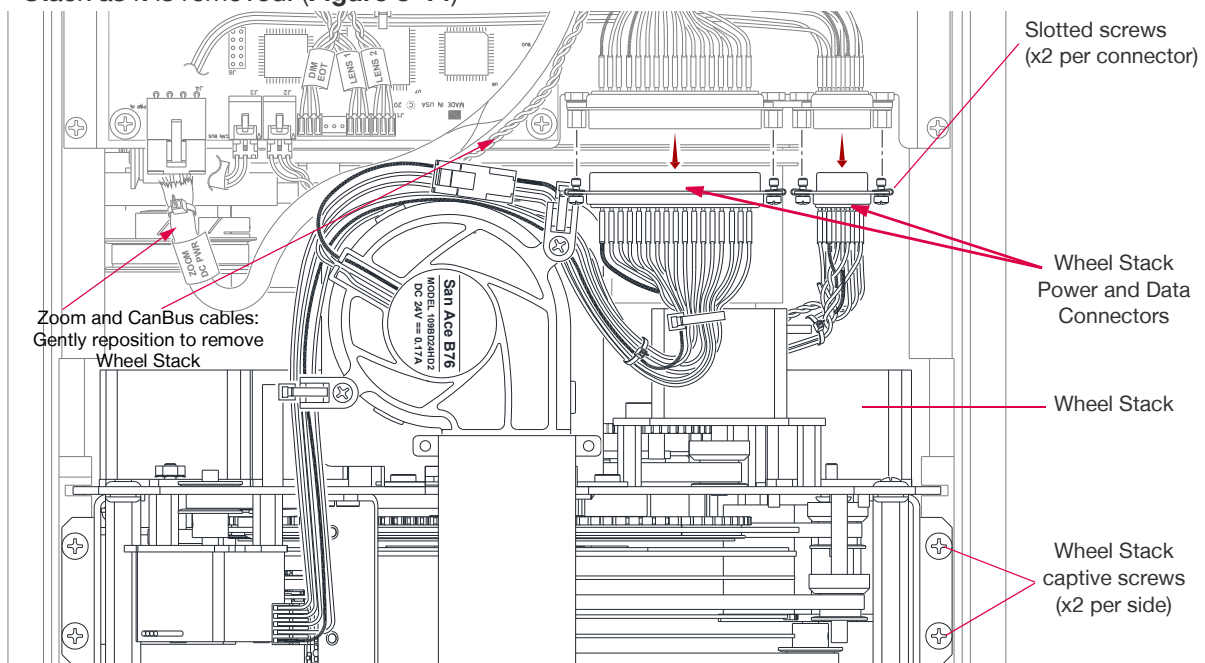


Figure 3-14: Wheel Stack Power and Data Cable Detail

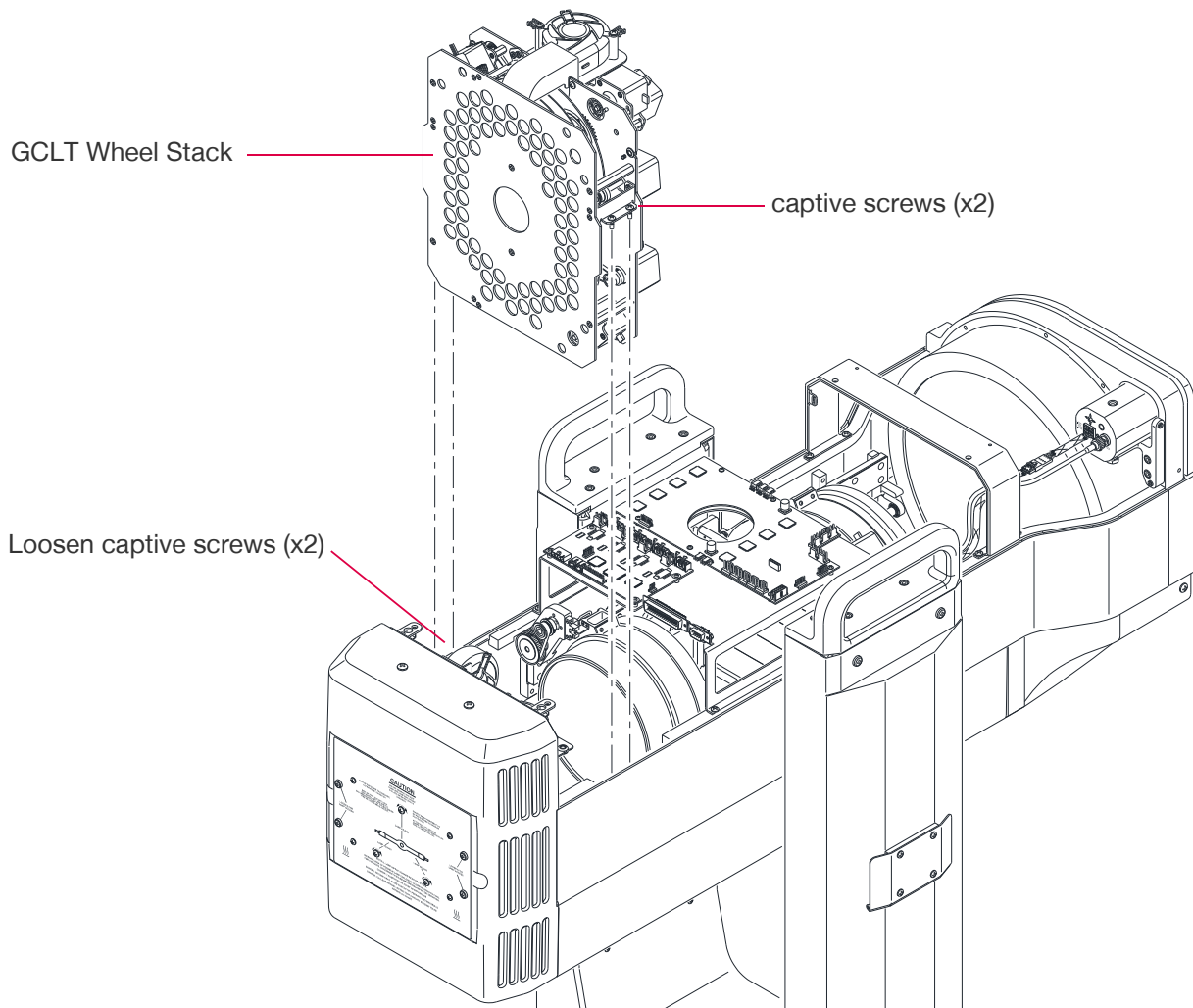


Figure 3-15: Removing the GCLT Wheel Stack

- Step 6. Loosen captive screws at Wheel Stack, two per side. **(Figure 3-15)**
- Step 7. Gently push the lenses out of the way of the Wheel Stack.
- Step 8. Grasp the Wheel Stack on both sides, and lift straight up out of the Head while minding the Zoom and CanBus cables you repositioned so they don't catch on the Wheel Stack. **(Figure 3-14)**
- Step 9. Once the Wheel Stack is removed, rotate the Gobo Wheel so that the desired gobo is accessible.
- Step 10. Rotate the gobo to align the magnet with the alignment mark on the sun gear. **(Figure 3-16)**
- Step 11. Using the Hook and Pick tool, carefully pull out the retaining ring and remove gobo.
When removing the retaining ring, don't hook the ring -- it can be damaged by the tool.
- Step 12. Install the new gobo by aligning its magnet with the alignment mark on the sun gear and then inserting it into place (as shown on the next page, **Figure 3-16**).
- Step 13. Replace the retaining ring.
- Step 14. When finished, rotate the gobo wheel as a visual test -- when properly installed, the gobo magnet for each installed gobo should be positioned in approximately the same position as the gobo wheel is spun around. Adjust as necessary.
- Step 15. Re-install the Wheel Stack by performing Steps 5-8 in reverse order.
- Step 16. Replace Top Head Cover.

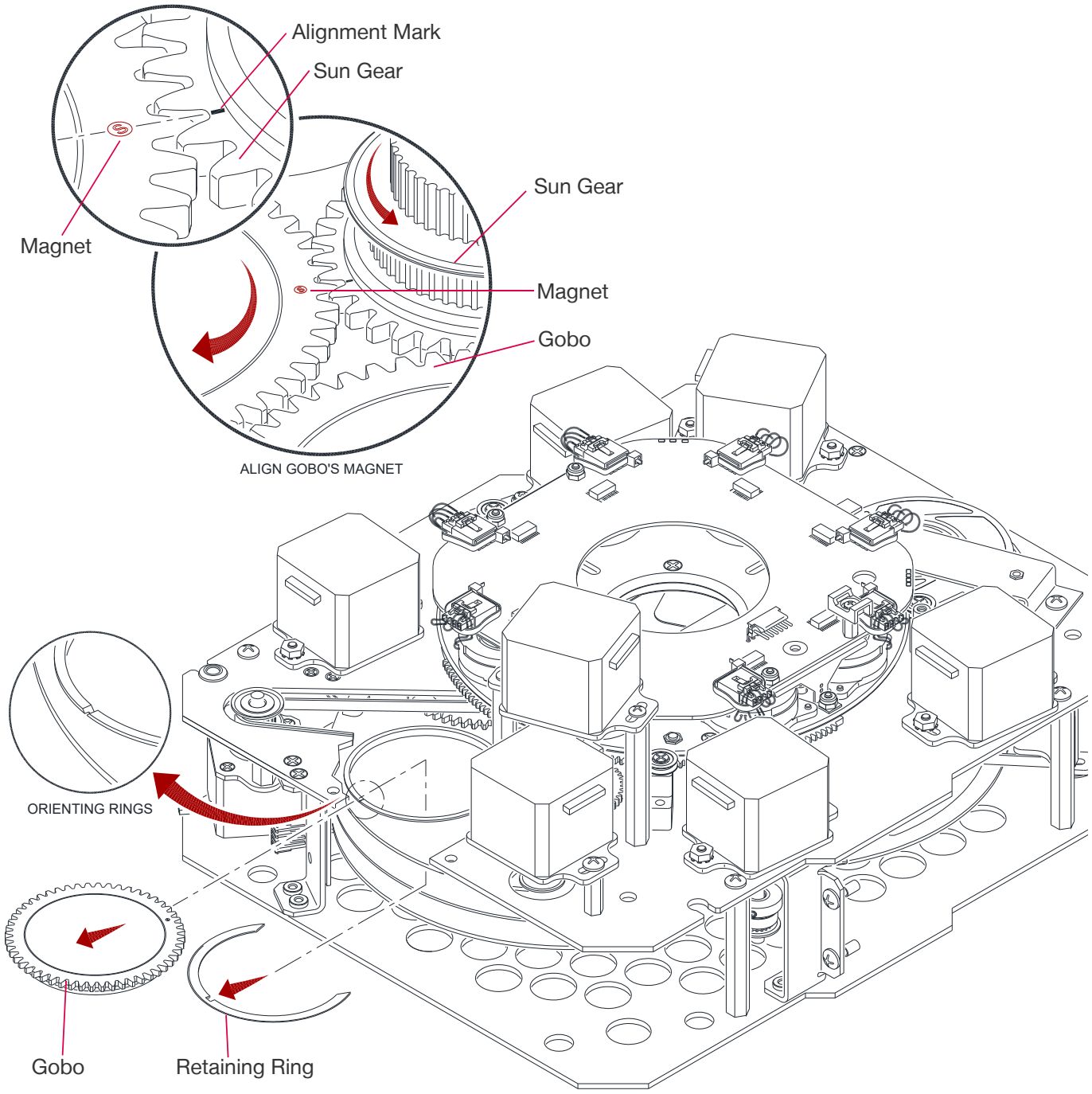


Figure 3-16: Removing a GCLT Gobo

Replacing a Color Correction Filter (Minus Green Wheel)

Parts:

Color Correction Filter(s), as required. (Refer to "Color Correction Wheel Standard Configuration" on page 16.)

Tools:

#2 Phillips screwdriver or Right-angle driver with #2 Phillips bit
Hook and Pick tool
Cotton gloves or finger cots



WARNING! Remove power from luminaire before performing any maintenance procedures.

To remove a filter in the Minus Green wheel:

- Step 1. Remove power from luminaire.
- Step 2. Rotate the Head until the Back Plate text is upside-down.
- Step 3. Remove Bottom Head Cover. (Refer to "Removing Head Covers - Top and Bottom Head" on page 32.)



CAUTION: Do not touch color filters with bare fingers. Wear cotton gloves or finger cots when handling.

- Step 4. Remove Wheel Stack. Refer to "Removing the Wheel Stack" on page 52.



CAUTION: Use extreme care not to contact the filter panels or color mixing wheels with the hook tool to avoid scratching or damaging the coatings or glass.

- Step 5. At this point, you have two options for removing the Color Panels out of the Correction Wheel:
 - a. Carefully use the hook tool in the alignment notch in the metal mount on the glass panel. The metal mount is inserted in the Spring Retainer at the center of the wheel; gently hook the notch and pull straight out to remove the panel from the wheel.
 - b. Remove the Iris Fan (refer to "Replacing Iris Fan on Wheel Stack" on page 62), which gives a better view of the Minus Green wheel. Follow step 5a exactly as written, you will simply have a better view of the panels on the wheel.

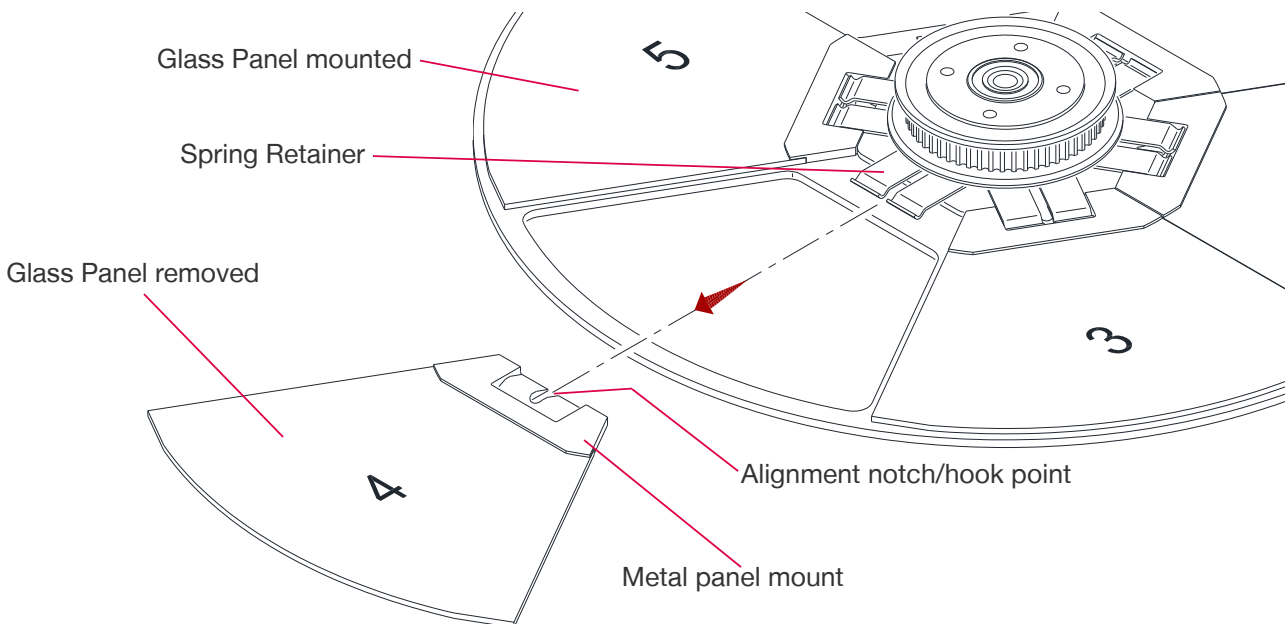


Figure 3-17: Removing a panel from the Color Correction Wheel

To reinstall a color filter panel back into the wheel:

- Step 1. Carefully position the glass panel as close to the spring mount as possible.
- Step 2. Align the notch with the mating point in the Spring Retainer for the panel slot you're working on.
- Step 3. Using light pressure, press straight in on the glass panel into the Spring Retainer until you hear or feel the panel "click" into position. Visually inspect the panel; it should be flat against the wheel and not protruding from the outside of the metal of the wheel itself.
- Step 4. (Optional) Once you have replaced all removed filter panels, reinstall the Iris Fan if you have removed it for this procedure. Make sure to replug the fan and secure its cable with a cable tie.

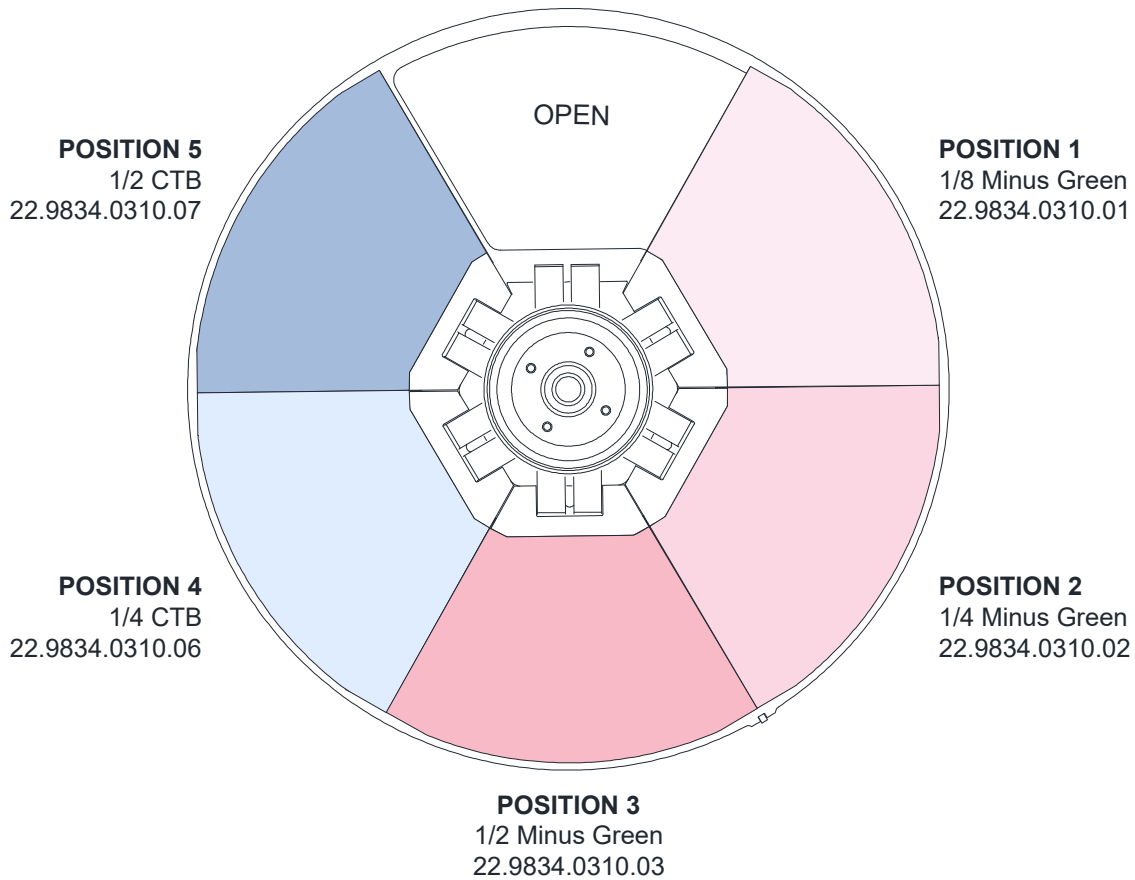


Figure 3-18: Standard Color Correction Wheel Positions and Part Numbers

Replacing Front Glass

Parts:

41.9834.0628 GLASS, FRONT GCLT

Tools:

Flat screwdriver
Cotton gloves or finger cots



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace front glass:

Step 1. Remove power from luminaire and allow components to cool for at least 5 minutes.



CAUTION: Be extremely careful when removing Retaining Ring and Front Glass in next step. The glass can be easily chipped or cracked. Wear cotton gloves or finger cots when handling the glass.

- Step 2. Position luminaire head so that Front Glass is facing upward. (To prevent it from falling onto the floor when the Retaining Ring is removed in the next step.)
- Step 3. Insert flat screwdriver under notch in Front Lens Retaining Ring. Carefully remove Retaining Ring.
- Step 4. Remove Front Glass.
- Step 5. Replace Front Glass by doing steps in reverse. Ensure gasket under Front Glass is not damaged or missing.

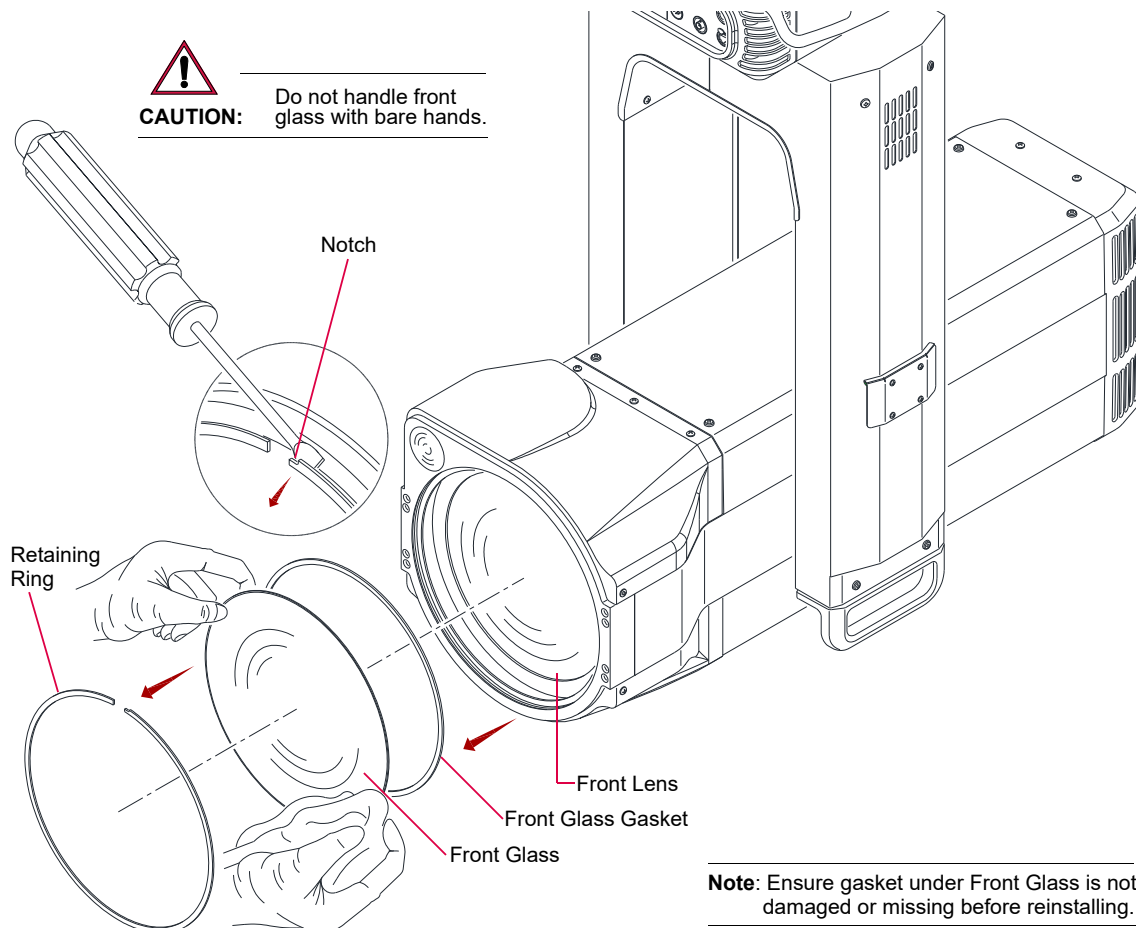


Figure 3-19: Removing Front Glass

Replacing Camera and/or Camera Glass

The procedure for removing and replacing the camera on the luminaire is necessary to remove/replace the camera glass, so these two procedures have been merged in this section.

Parts:

41.9834.0669	GLASS, CAMERA GCLT
06.6083.0090.0	RTV, 3145 CLEAR 90mL TUBE MIL-A-46146
72.2145.0350.10	CAMERA, 1080 HD-SDI 10X AUTOFOCUS LENS DAY/NIGHT
25.9833.0039.04	[Optional, if orig. is damaged] CABLE ASSY, PART D CAMERA CONTROL & POWER, GCLT

Tools:

- #2 Phillips screwdriver
- 3/8" open end/box end wrench
- 5/32" and 5/64" hey keys or t-handles
- Hook and pick tool
- Loctite #242 (06.6008.0001)



CAUTION: Do not touch camera glass with bare fingers. Wear cotton gloves or finger cots when handling.



WARNING! Remove power from luminaire before performing any maintenance procedures.

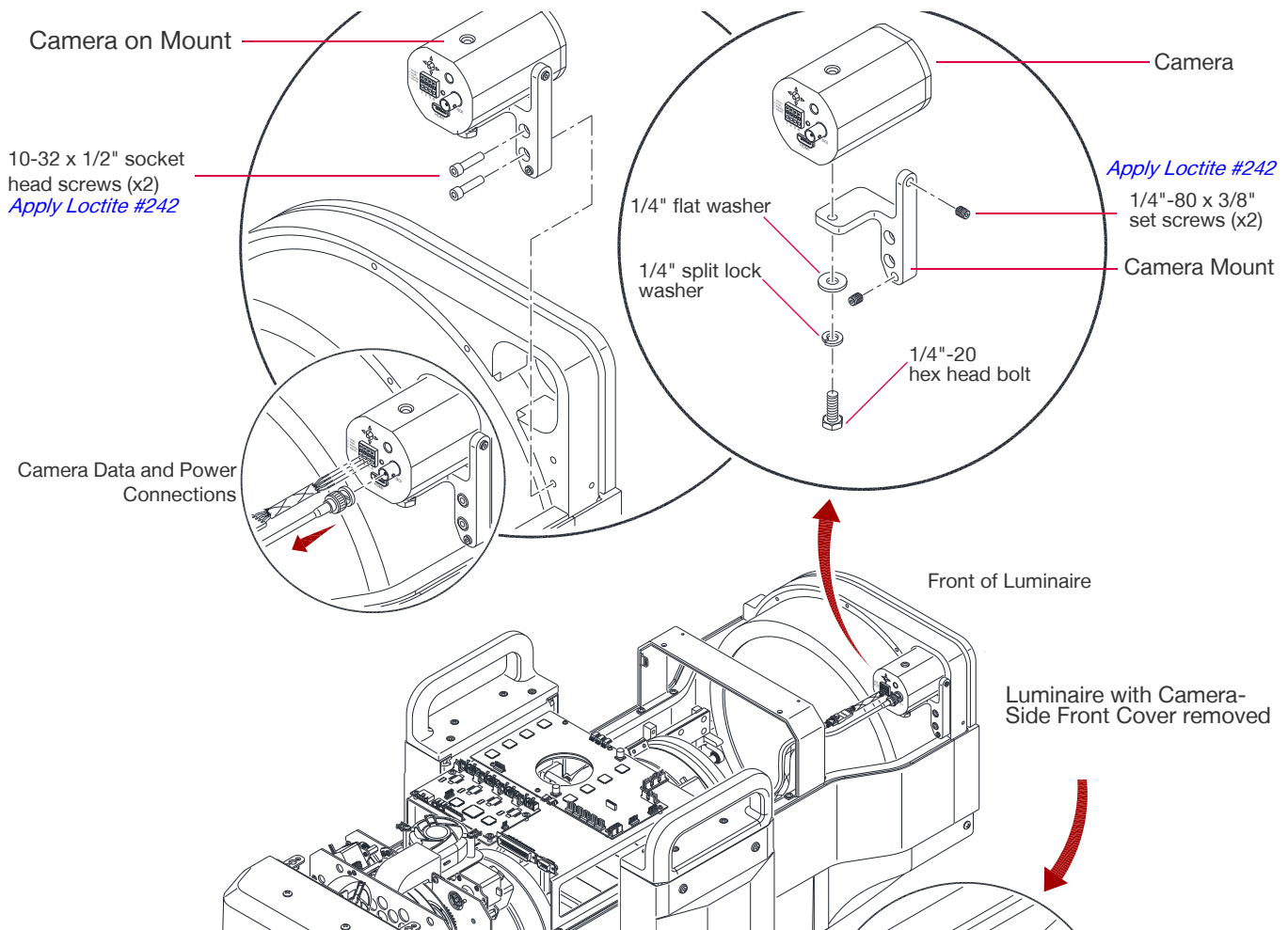


Figure 3-20: Removing the GCLT Camera and Mount

To remove the camera:

- Step 1. Remove power from luminaire.
- Step 2. Remove Camera-side Front Cover.
(Refer to "[Removing Head Covers - Camera-Side Front and Bottom-Side Front](#)" on page 33.)
- Step 3. Remove BNC video connection from the HD/SDI port on the camera by turning connector counter-clockwise, and disconnect the camera power cable connection from the jumper -- do not remove the leads directly from the back of the camera yet.
(**Figure 3-20**)
- Step 4. Using a 3/8" open end/box end wrench, remove the 1/4"-20 x 5/8" hex head bolt from the bottom of the camera. Retain the 1/4" flat washer and 1/4" split lock washer for re-installation.
- Step 5. Pull straight back on the camera to remove from the front of the luminaire.
- Step 6. [Optional] If you need to remove the camera mount from the luminaire:
 - a. Using a 5/32" hex key or t-handle, remove the two 10-32 x 1/2" socket head screws from the mount.
 - b. Once the mount is free, use a 5/64" hex key or t-handle to back out both of the 1/4"-80 x 3/8" set screws just inside the flat edges of the camera mount. You don't have to remove them from the mount completely unless you're replacing the mount.
- Step 7. If you need to replace the camera, you will need to remove and re-install the Camera Cable lead into the new camera (**Figure 3-21**):

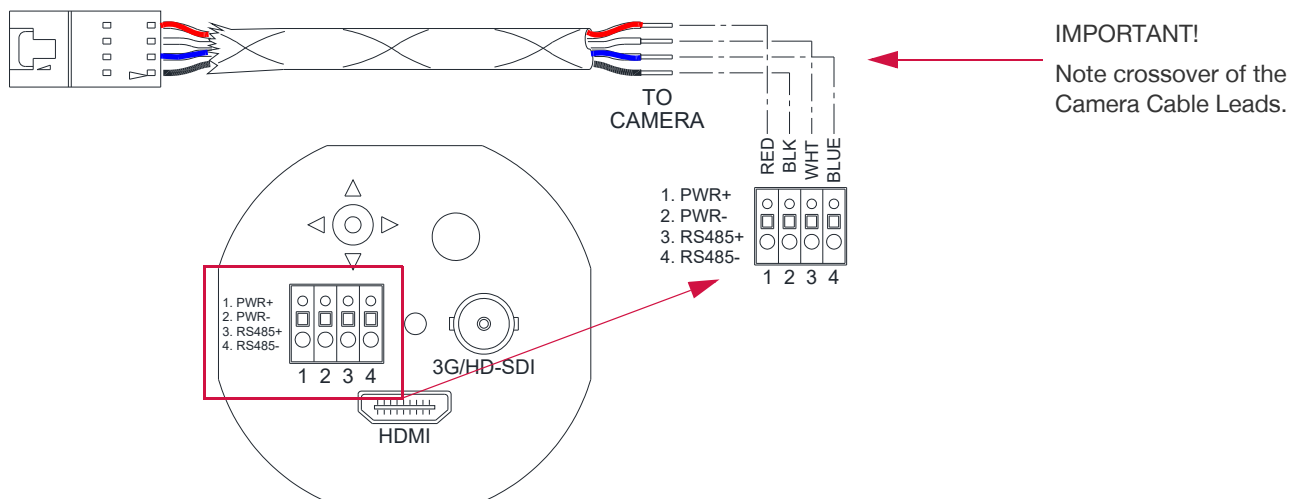


Figure 3-21: Removing/Installing GCLT Camera Cable

If you need to remove/replace the camera glass, the only way to access it is while the camera is removed from the front of the luminaire.

To remove the Camera Glass from the GCLT:

- Step 1. With the camera removed, use the handle of your #2 Phillips screwdriver to remove the glass from the luminaire front by pushing the handle through the Camera hole and gently applying pressure to the glass.
- Step 2. Once the glass is removed, you will need to remove any excess RTV 3145 sealant from the Camera Glass mount on the front of the luminaire. Use the hook and pick tool to pull the remnant RTV from the Glass mount.
- Step 3. Apply a small bead of RTV 3145 to the inside of the camera glass mount towards the outside edges of the mount; don't apply a large amount of sealant.
- Step 4. Remove both protective filters from the new Camera Glass; note which side is "Front." This side will face out from the front of the luminaire.

- Step 5. Using gloves or finger cots, install the new Camera Glass into the front of the luminaire and press down on the glass to seat it in the mount. Allow ten minutes for the RTV sealant to dry.
- Step 6. Reinstall the camera mount to the camera, then reinstall the camera. **(Figure 3-20)**.
- Step 7. Re-plug the Camera Cable into the Camera Jumper cable, and replug the BNC connector to the BNC port on the camera.

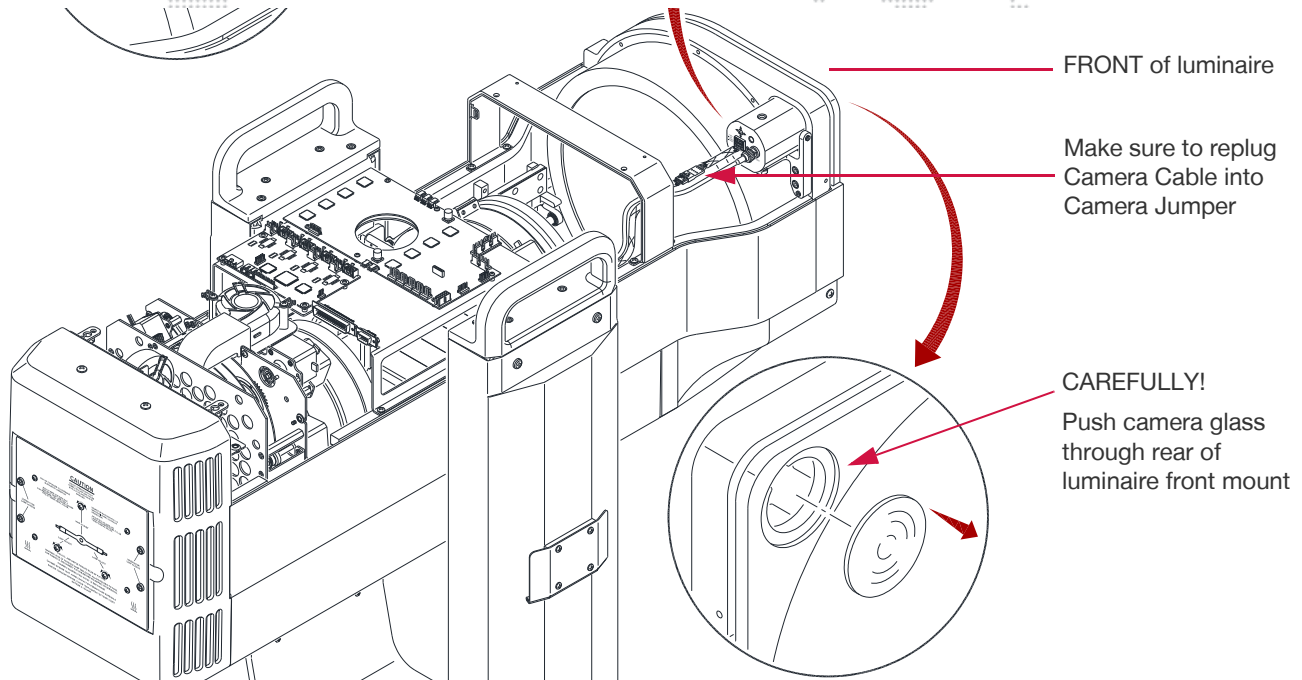


Figure 3-22: Removing Camera Glass

Replacing Head Fan on Wheel Stack

Parts:

22.9834.0606 ASSY, FAN HEAD ON WHEEL STACK, GCLT
06.6008.0242.0 LOCTITE, #242, 250ml BLUE

Tools:

#2 Phillips Screwdriver
Wire Cutters
Cable ties (2)
[Loctite #242](#) (06.6008.0001)



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace the Head Fan on the Wheel Stack:

- Step 1. Remove power from the luminaire.
- Step 2. Remove the Top Head Cover. (Refer to "[Removing Head Covers - Top and Bottom Head](#)" on page 32)
- Step 3. Remove the Wheel Stack. (Refer to "[Removing the Wheel Stack](#)" on page 52)
- Step 4. Cut cable ties on Head Fan. Note wire bundle placement for re-installation.
- Step 5. Unplug the Wheel Stack Head Fan (labeled "FAN WS").
- Step 6. Remove the two 8-32 x 1-3/8" PPSS screws holding fan in place. Retain cable anchors for re-installation.
- Step 7. Remove the Wheel Stack Head Fan.
- Step 8. Position new Wheel Stack Head Fan; perform steps 4-6 in reverse.
- Step 9. Secure wire bundle onto wire mounts and trim wire ties.

Remember!

Re-install these two cable ties and include the Head Fan cable in the bundle.

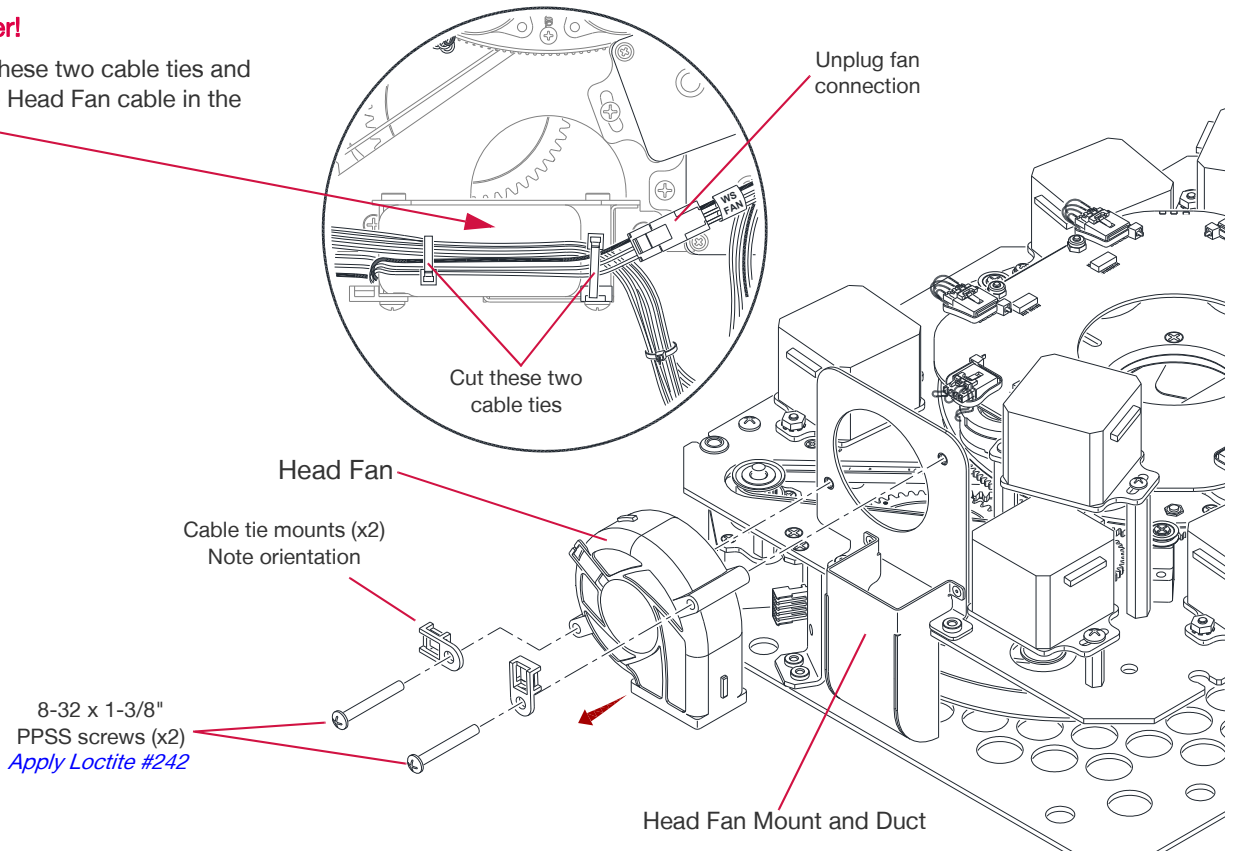


Figure 3-23: Removing Wheel Stack Head Fan

Replacing Iris Fan on Wheel Stack

Parts:

25.9834.0995 CABLE ASSY, IRIS FAN 12V

Tools:

#2 Phillips screwdriver
Loctite #242 (06.6008.0001)
Wire cutters
Cable ties



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace the Iris Fan on the Wheel Stack (Figure 3-24):

- Step 1. Remove power from luminaire.
- Step 2. Remove Top Head Cover. (Refer to "Removing Head Covers - Top and Bottom Head" on page 32.)
- Step 3. Remove Wheel Stack. (Refer to "Removing the Wheel Stack" on page 52.)
- Step 4. Cut cable tie at single cable tie mount; retain cable tie mount for re-installation.
- Step 5. Unplug Iris Fan connector -- labeled "IRIS FAN"
- Step 6. Remove Blower Mount by removing two (2) 6-32 x 5/16" PTZ screws from the Blower Mount. At this point, the Iris Fan assembly will detach from the Wheel Stack.
- Step 7. Remove the two (2) 4-40 x 3/4" PPZ screws securing Iris Fan to Blower Mount.
- Step 8. Using new Iris Fan, perform steps 4-7 in reverse to reinstall Iris Fan into Wheel Stack.

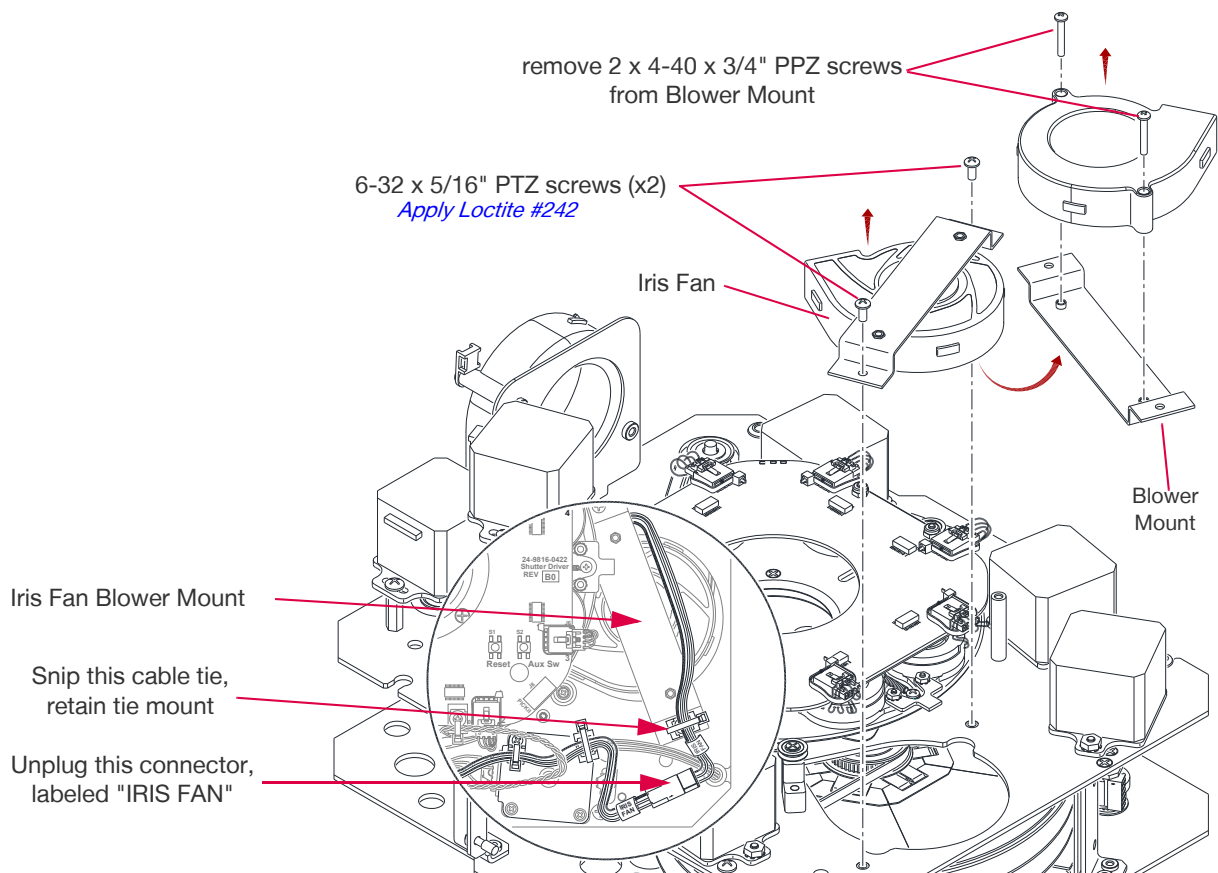


Figure 3-24: Removing Iris Fan from Wheel Stack

Replacing Wheel Stack Driver

Parts:

24.9815.0224 PCB ASSY, WHEEL STACK INTERFACE

Tools:

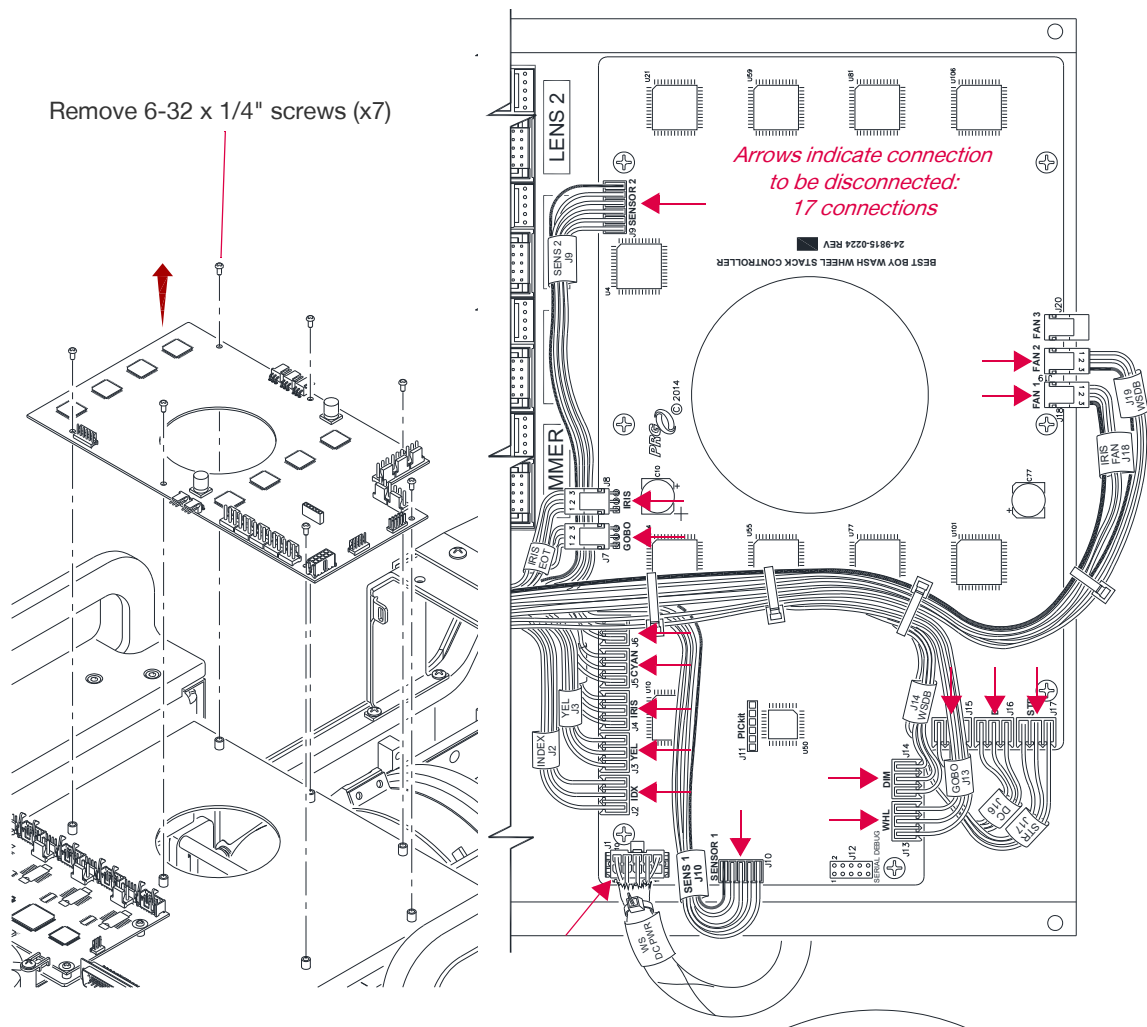
#2 Phillips screwdriver



WARNING! Remove power from luminaire before performing any maintenance procedures.

To remove the Wheel Stack driver card (Wheel Stack Interface PCB):

- Step 1. Remove power from luminaire.
- Step 2. Remove Top Head Cover. (Refer to "Removing Top and Bottom Head Covers" on page 32)
- Step 3. Carefully disconnect all connections to Wheel Stack card. Connections are labeled, as is the Wheel Stack PCB card for easy re-attachment.
- Step 4. Remove the seven (7) 6-32 x 1/4" PP screws from the Wheel Stack driver card and remove the card.
- Step 5. Position the new Wheel Stack driver card and re-attach all seven (7) 6-32 x 1/4" screws.
- Step 6. Re-connect all cable connections on the Wheel Stack driver card.



Replacing the Zoom Controller Card

Parts:

24.9812.0511.0 PCB ASSY, ZOOM CONTROLLER

Tools:

#2 Phillips Screwdriver



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace the Zoom Controller Card (Figure 3-26):

- Step 1. Remove power from luminaire.
- Step 2. Remove Top Head Cover. (Refer to "Removing Top and Bottom Head Covers" on page 32)
- Step 3. Carefully disconnect all connections on the Zoom Controller card. Connections are labeled, as is the Zoom Controller card for easy reconnection.
- Step 4. Remove the four (4) 6-32 x 1/4" PP screws from the Zoom Controller card and remove the card.
- Step 5. Position the new Zoom Controller card and re-attach all four (4) 6-32 x 1/4" PP screws.
- Step 6. Reconnect all cable connections on the Zoom Controller card.

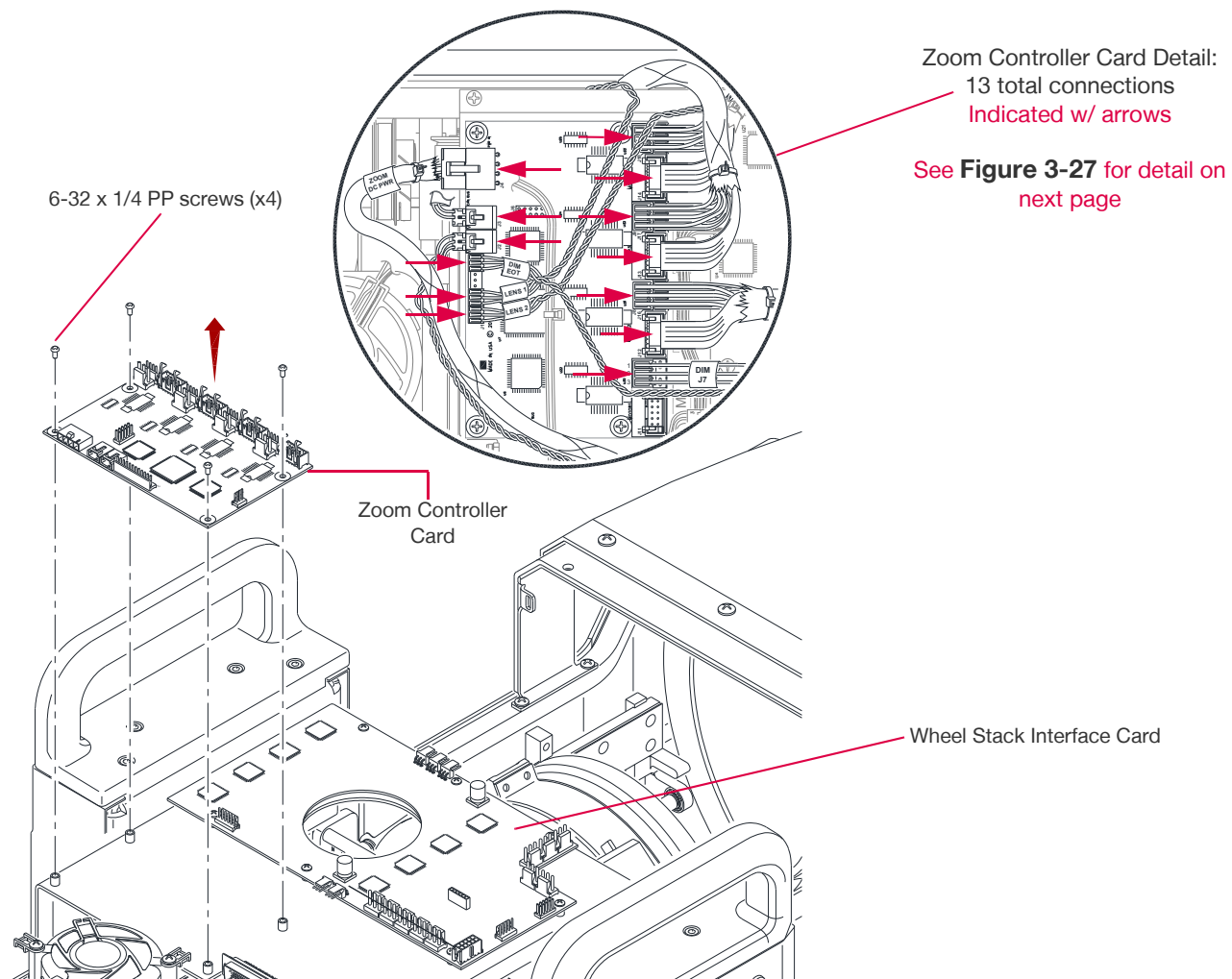
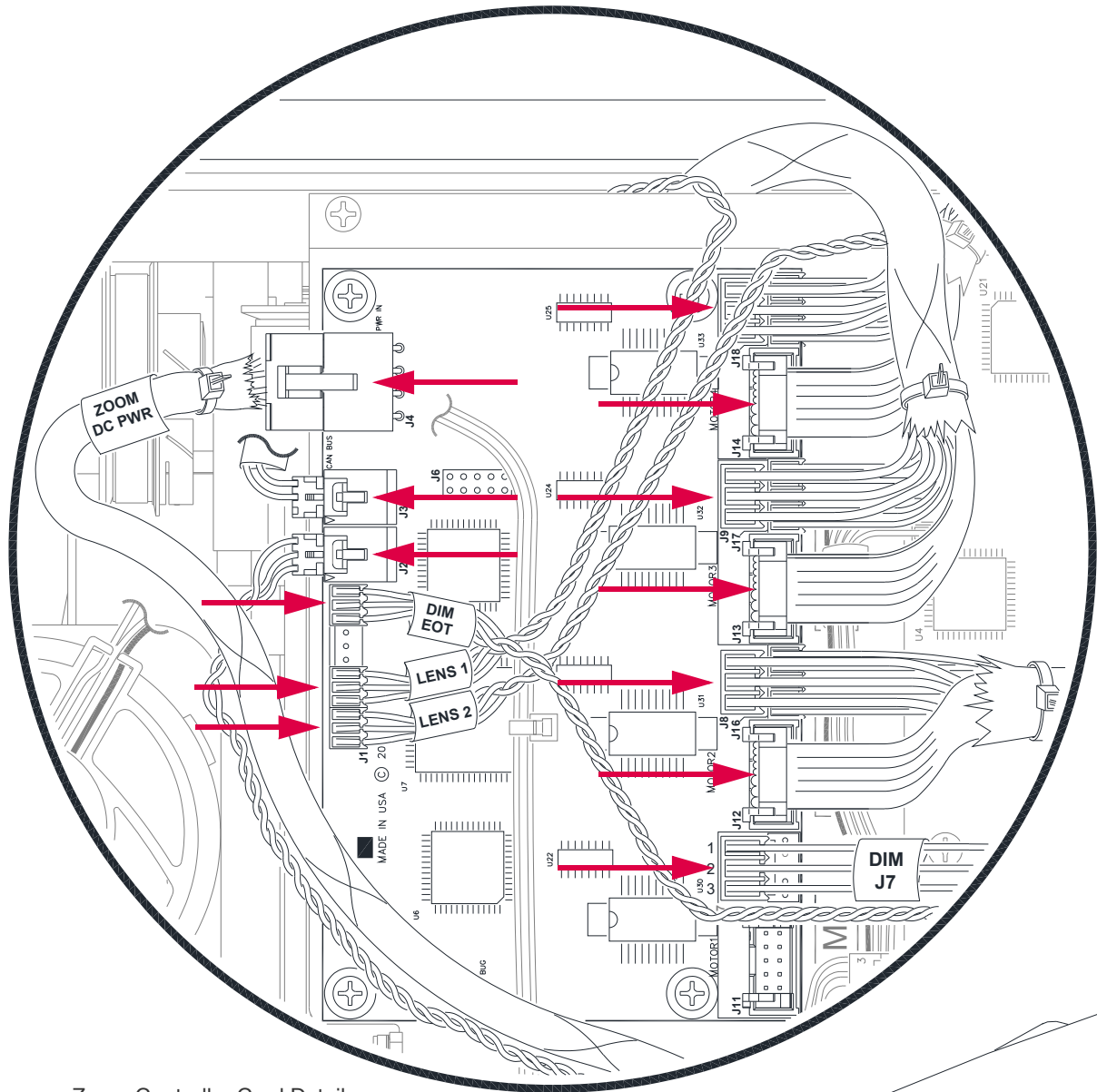


Figure 3-26: Removing the Zoom Controller Card



Zoom Controller Card Detail:
13 total connections
 Indicated w/ arrows

BE SURE to DISCONNECT for removal
 and RECONNECT for re-installation

Figure 3-27: Zoom Controller PCB Detail

Replacing the Dimmer Assembly

Parts:

22.9834.0690 ASSY, DIMMER GCLT

Tools:

11/32" socket wrench, box-end wrench, or nut driver

Loctite #242 (06.6008.0001)

#2 Phillips screwdriver



WARNING! Remove power from luminaire before performing any maintenance procedures.

To remove the GCLT Dimmer Assembly:

- Step 1. Remove power from the luminaire.
- Step 2. Remove Top and Bottom Head Cover.
(Refer to "Removing Head Covers - Top and Bottom Head" on page 32)
- Step 3. Disconnect Dimmer Motor cable (labeled **DIM**) and Dimmer EOT cable (labeled **DIM EOT**) (**Figure 3-28**)
- Step 4. Remove four 8-32 x 1/4" PPSS screws from the Zoom and Wheel Stack Driver Mount and gently slide that assembly towards the lamp end of GCLT just enough to clear the mount from the Dimmer Assembly motor. (**Figure 3-28**). You do not need to disconnect all of the cabling, just the motor cable in **Step 3**.
- Step 5. Remove four 8-32 KEPS nuts from the Dimmer Assembly and remove the assembly by clearing it from the Frost Module and lifting straight up out of the head.

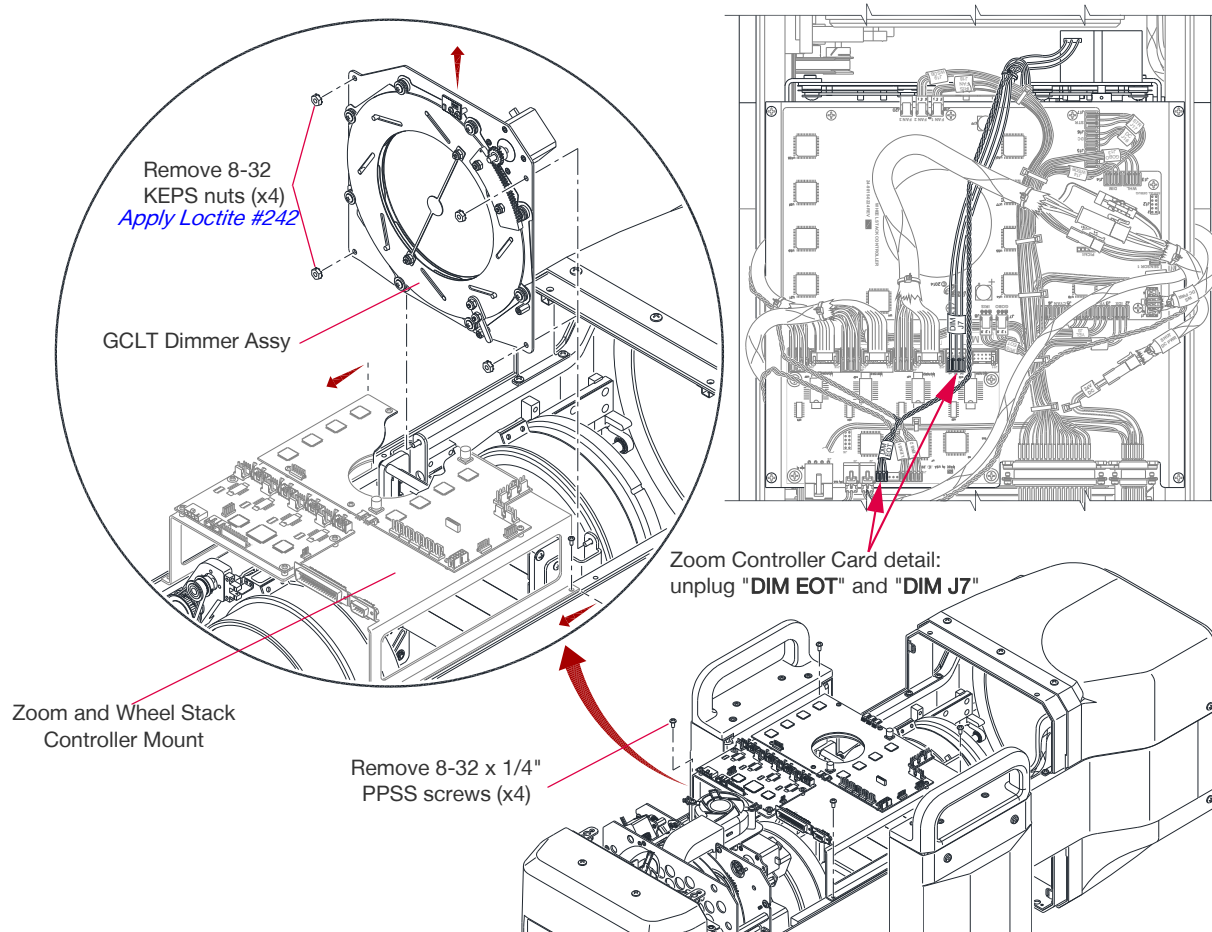


Figure 3-28: Removing the GCLT Dimmer Assembly Detail

Replacing the Dimmer EOT Sensor

The Dimmer EOT (End of Travel) Sensor is located on the Dimmer assembly; it is best to remove the Dimmer assembly in order to perform this procedure but is not required. The Zoom and Wheel Stack Controller Mount needs to be moved out of the way of the Dimmer assembly to access this sensor.

Parts:

25.9834.0690 CABLE ASSY, DIMMER EOT SENSOR

Tools:

#1 and #2 Phillips Screwdriver
Loctite #222 (06.6019.1222.0)
Wire cutters
Cable ties



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace the Dimmer EOT Sensor:

- Step 1. Remove power from the GCLT luminaire.
- Step 2. Remove Top and Bottom Head Covers.
(Refer to "[Removing Head Covers - Top and Bottom Head](#)" on page 32)
- Step 3. Remove the Dimmer assembly. (Refer to "[Replacing the Dimmer Assembly](#)" on page 66)
- Step 4. Disconnect the Dimmer EOT sensor cable assembly from the Zoom Controller Card. (Figure X)
- Step 5. Clip cable ties securing the Dimmer Motor and Dimmer EOT Sensor leads; note position for re-install.
- Step 6. Remove the two 4-40 x 1/4" PPZ screws from the Dimmer EOT Sensor; remove the sensor/cable assembly.
- Step 7. Re-install the new Dimmer EOT Sensor by performing these steps in reverse.

Note: Make sure to remember to re-install cable tie securing Dimmer EOT cable and Dimmer Motor cable together.

See Dimmer EOT Sensor illustration on next page:

Figure 3-29

Unplug the Dimmer EOT cable assy (labeled "DIM EOT")

Dimmer EOT Sensor

Dimmer Assy

Dimmer EOT Sensor Detail

4-40 x 1/4" PPZ screws (x2)
Apply Loctite #222

Zoom Controller PCB

Slide Zoom/WS Controller Mount back enough to clear Dimmer Motor

Refer to "Removing the GCLT Dimmer Assembly Detail" on page 66

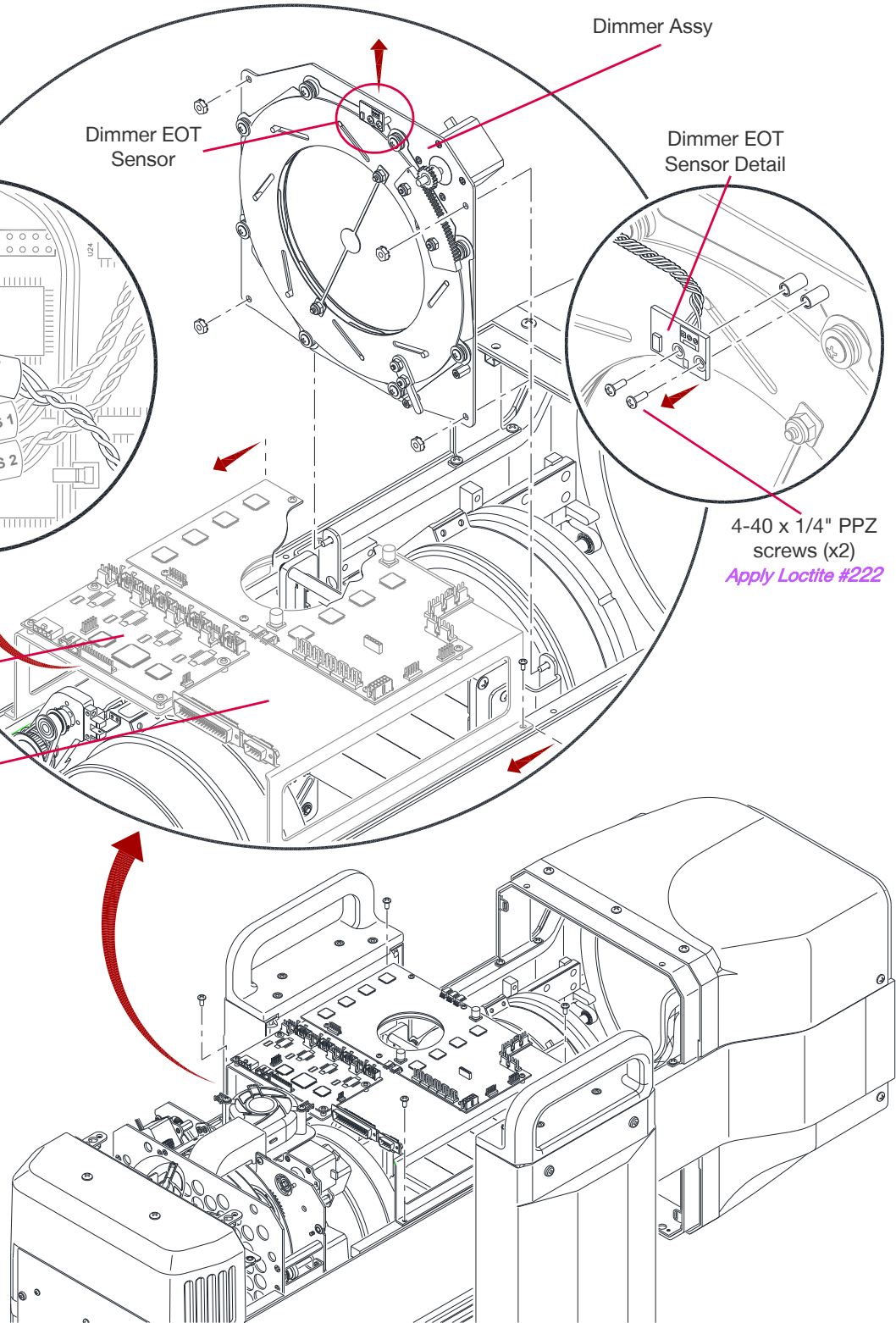


Figure 3-29: Replacing the Dimmer EOT Sensor

Replacing the Zoom Lens Group 1 EOT Sensor

Zoom Lens Group 1 and 2 each have an independent EOT (End of Travel) Sensors mounted to their Motor Assemblies. This procedure is to replace **Zoom Lens Group 1's** EOT Sensor:

Note: Zoom Lens 1 is located closest to the lamp; Zoom Lens 2 is furthest from the lamp, closest to the camera.

Parts:

25.9834.0986 CABLE ASSY, LENS 1 EOT SENSOR

Tools:

#1 and #2 Phillips Screwdriver
[Loctite #242](#) (06.6008.0001)



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace the Zoom Lens Group 1 EOT Sensor:

- Step 1. Remove power from the GCLT luminaire.
- Step 2. Remove Top and Bottom Head Covers.
(Refer to "[Removing Head Covers - Top and Bottom Head](#)" on page 32)
- Step 3. Flip the Head around so that the XYZ Assembly text is upside down. Camera will be on the bottom.
- Step 4. Unplug the connector "LENS 1" from the Zoom Controller PCB. Free the leads to the EOT sensor so they hang free; make note of the path of the leads for re-installation.
- Step 5. Roll the motor pulley for the Zoom Lens 1 assembly to move the lens into a workable position.
- Step 6. Remove the two 4-40 x 3/8" PPZ screws from the Zoom Lens 1 EOT sensor; remove the sensor/cable assembly.
- Step 7. Re-install the new Zoom Lens 1 EOT Sensor by performing these steps in reverse.

See Zoom Lens Group 1 EOT Sensor illustration
on next page:

Figure 3-30

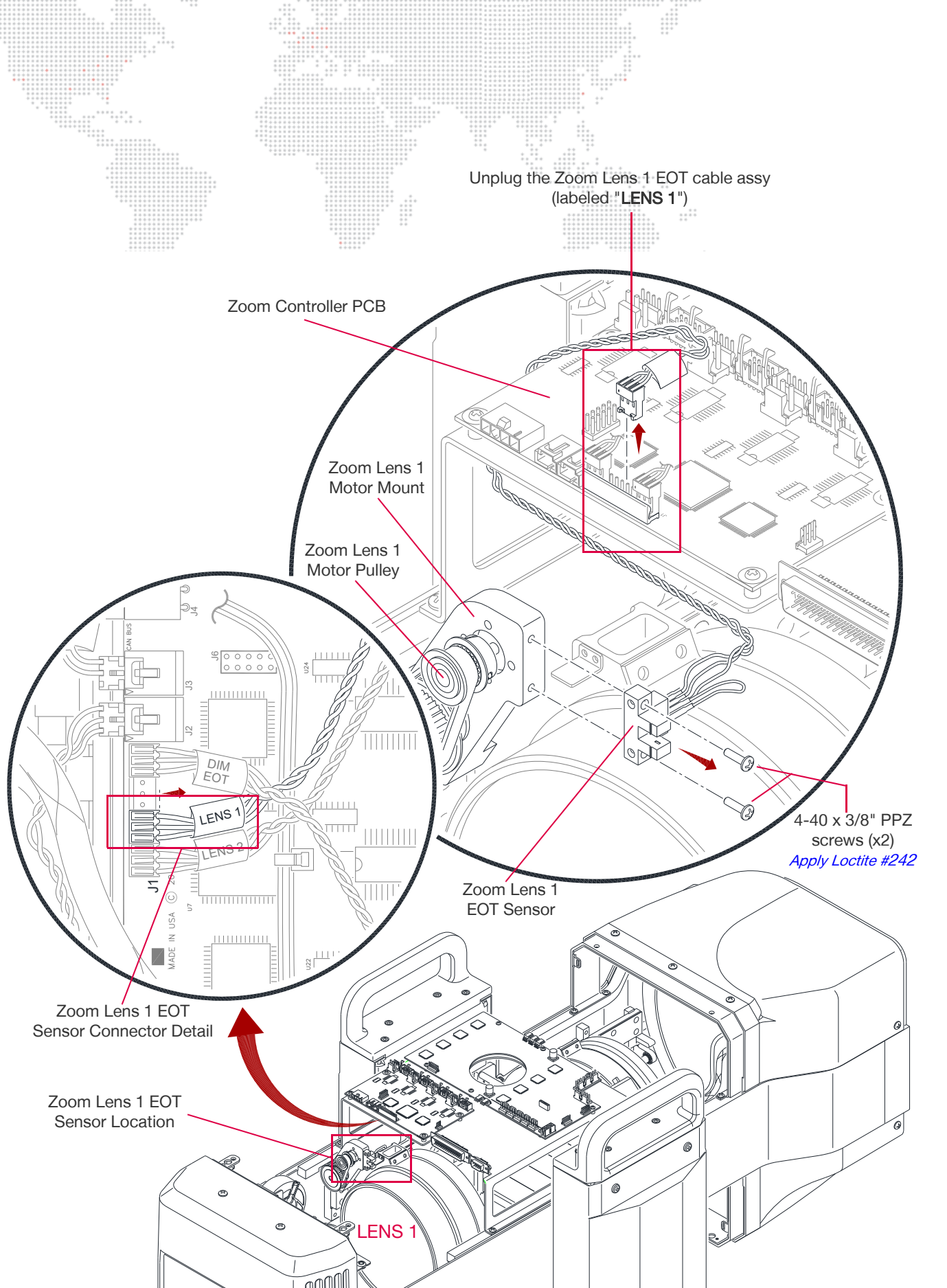


Figure 3-30: Replacing Zoom Lens Group 1 EOT Sensor

Replacing the Zoom Lens Group 2 EOT Sensor

Zoom Lens Group 1 and 2 each have an independent EOT (End of Travel) Sensors mounted to their Motor Assemblies. This procedure is to replace **Zoom Lens Group 2's** EOT Sensor:

Note: Zoom Lens 1 is located closest to the lamp; Zoom Lens 2 is furthest from the lamp, closest to the camera.

Parts:

25.9834.0987 CABLE ASSY, LENS 2 EOT SENSOR

Tools:

#1 and #2 Phillips Screwdriver
Loctite #242 (06.6008.0001)



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace the Zoom Lens Group 2 EOT Sensor:

- Step 1. Remove power from the GCLT luminaire.
- Step 2. Remove Top and Bottom Head Covers.
(Refer to "**Removing Head Covers - Top and Bottom Head**" on page 32)
- Step 3. Flip the Head around so that the XYZ Assembly text is upside down. Camera will be on the bottom.
- Step 4. Unplug the connector "LENS 2" from the Zoom Controller PCB. Free the leads to the EOT sensor so they hang free; make note of the path of the leads for re-installation.
- Step 5. Roll the Zoom Lens 2 motor pulley assembly to move Lens Group 2 into a workable position.
- Step 6. Remove the two 4-40 x 3/8" PPZ screws from the Zoom Lens 2 EOT sensor; remove the sensor/cable assembly.
- Step 7. Re-install the new Zoom Lens 2 EOT Sensor by performing these steps in reverse.

See Zoom Lens Group 2 EOT Sensor illustration
on next page:

Figure 3-31

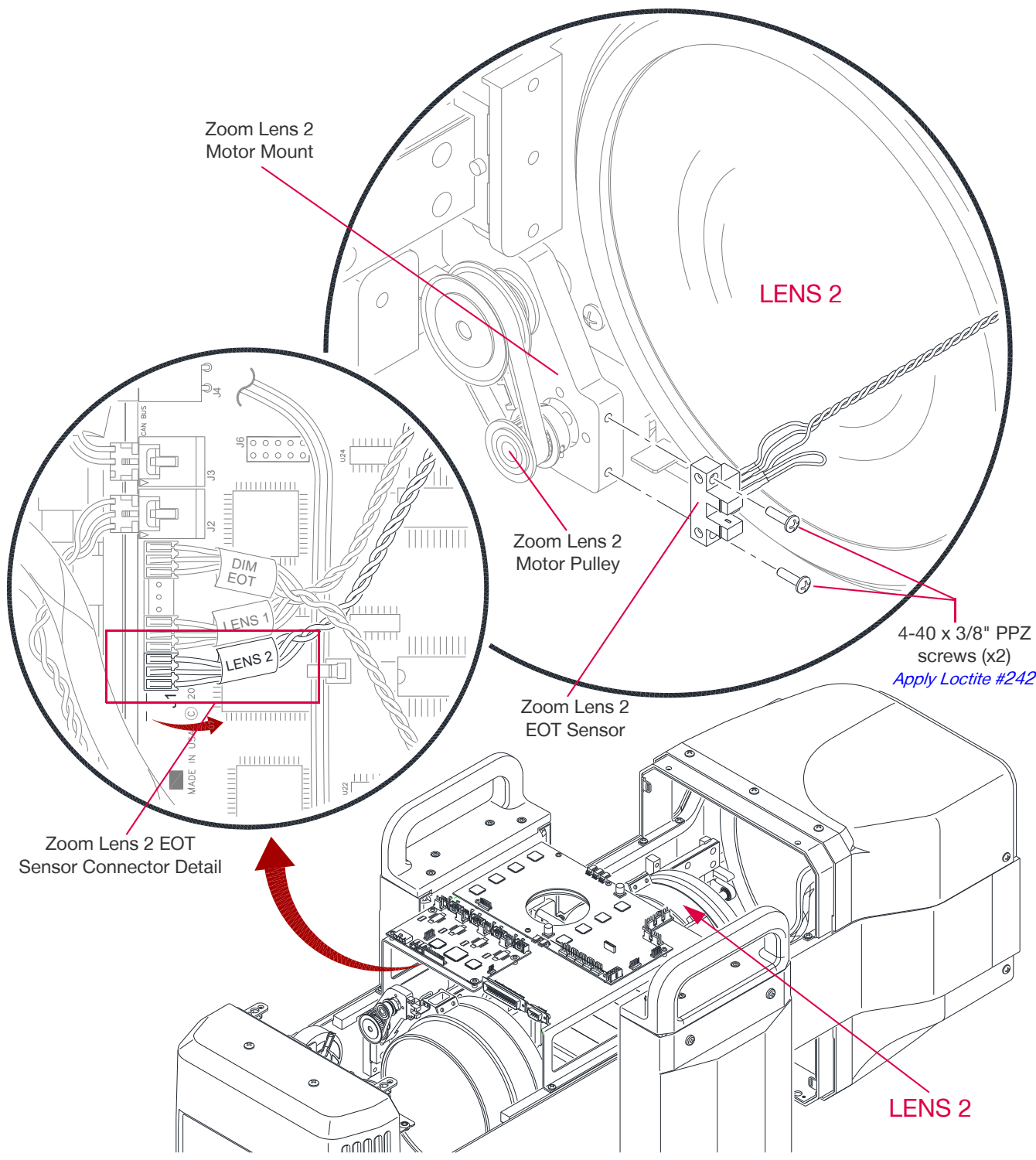


Figure 3-31: Replacing Zoom Lens Group 2 EOT Sensor



Replacing the Zoom Lens Group 1 Motor

Parts:

25.9834.0519.01 ASSY, ZOOM LENS 1 MOTOR, GCLT

Tools:

#1 and #2 Phillips Screwdriver

Loctite #242 (06.6008.0001)

2.5mm Hex Key or T-Handle

Torque Gauge



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace the Zoom Lens Group 1 Motor:

- Step 1. Remove power from the GCLT luminaire.
- Step 2. Remove Top and Bottom Head Covers.
(Refer to "[Removing Head Covers - Top and Bottom Head](#)" on page 32)
- Step 3. Remove the Wheel Stack. (Refer to "[Removing the Wheel Stack](#)" on page 52)
- Step 4. Invert the head; XYZ Assembly text should be upside down.
- Step 5. Disconnect the Motor 1 cable from the Zoom Controller Card. Note cable path for re-installation.
- Step 6. Turn pulley assembly to maneuver Zoom Lens Group 1 so you have access to the Motor.
- Step 7. Loosen the set screw on the Belleville spring disc and carefully slide both pulleys off of their shafts with the belt. Make sure to note orientation of spring disc in relation to locking ring. (**Figure 3-32**)
- Step 8. Remove four M3 x 10mm SC screws from the Zoom 1 Motor; remove the motor/cable assembly.
- Step 9. Install new motor assembly; slide pulleys and belt onto their respective shafts.
IMPORTANT! When re-installing the pulleys, particularly when tightening the drive pulley, compress the Belleville and spring against the bearing to eliminate any axial play while tightening the pulley clamp set screw. Torque to 4 in-lbs.
- Step 10. Re-run the Motor cable for Zoom Lens Group 1 and plug back into the Zoom Controller Card.
- Step 11. Re-install the Wheel Stack.

Note: MAKE SURE to note Drive Pulley spring disc orientation when re-installing! See **Figure 3-32**.

See Zoom Lens Group 1 Motor illustration
on next page:

Figure 3-32

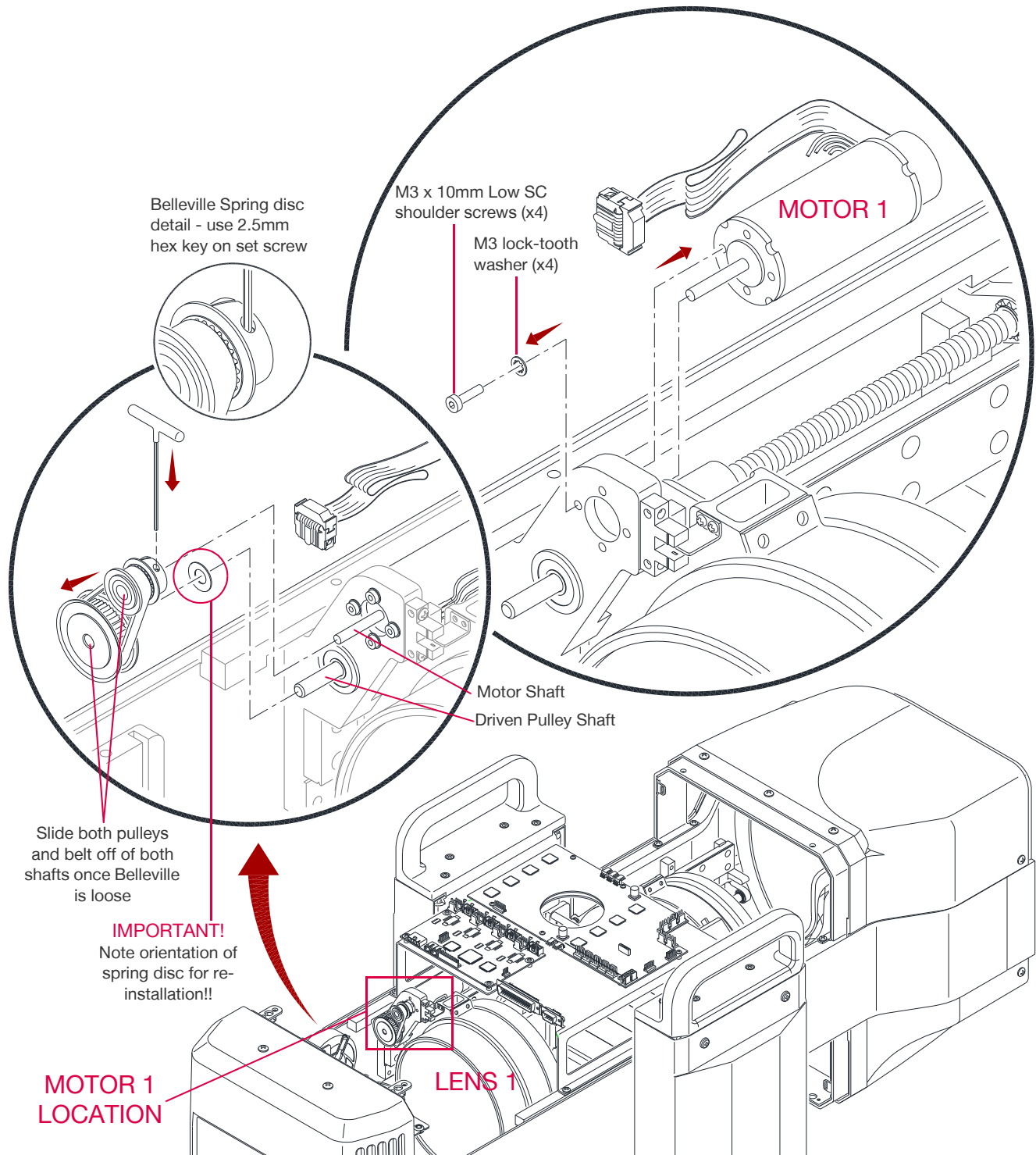


Figure 3-32: Replacing Zoom Lens Group 1 Motor



Replacing the Zoom Lens Group 2 Motor

Parts:

25.9834.0519.02 ASSY, ZOOM LENS 2 MOTOR, GCLT

Tools:

#1 and #2 Phillips Screwdriver

Loctite #242 (06.6008.0001)

2.5mm Hex Key or T-Handle

Torque Gauge



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace the Zoom Lens Group 2 Motor:

- Step 1. Remove power from the GCLT luminaire.
- Step 2. Remove Top and Bottom Head Covers.
(Refer to "**Removing Head Covers - Top and Bottom Head**" on page 32)
- Step 3. Invert the head; XYZ Assembly text should be upside down.
- Step 4. Disconnect the Motor 2 cable from the Zoom Controller Card. Note cable path for re-installation.
- Step 5. Turn pulley assembly to maneuver Zoom Lens Group 2 so you have access to the Motor.
- Step 6. Loosen the set screw on the Belleville spring disc and carefully slide both pulleys off of their shafts with the belt. Make sure to note orientation of spring disc in relation to locking ring. **(Figure 3-33)**
- Step 7. Remove four M3 x 10mm SC screws from the Zoom 2 Motor; remove the motor/cable assembly.
- Step 8. Install new motor assembly; slide pulleys and belt onto their respective shafts.
IMPORTANT! When re-installing the pulleys, particularly when tightening the drive pulley, compress the Belleville and spring against the bearing to eliminate any axial play while tightening the pulley clamp set screw. Torque to 4 in-lbs.
- Step 9. Re-run the Motor cable for Zoom Lens Group 2 and plug back into the Zoom Controller Card.

Note: MAKE SURE to note Drive Pulley spring disc orientation when re-installing! See **Figure 3-33**.

See Zoom Lens Group 2 Motor illustration
on next page:

Figure 3-33



IMPORTANT!
Note orientation of
spring disc for re-
installation!!

Driven Pulley Shaft

Motor Shaft

MOTOR 2

Slide both pulleys
and belt off of both
shafts once Belleville
is loose

Belleville Spring disc
detail - use 2.5mm
hex key on set screw

M3 lock-tooth
washer (x4)

M3 x 10mm Low SC
shoulder screws (x4)

**LENS 2 &
MOTOR 2
LOCATION**

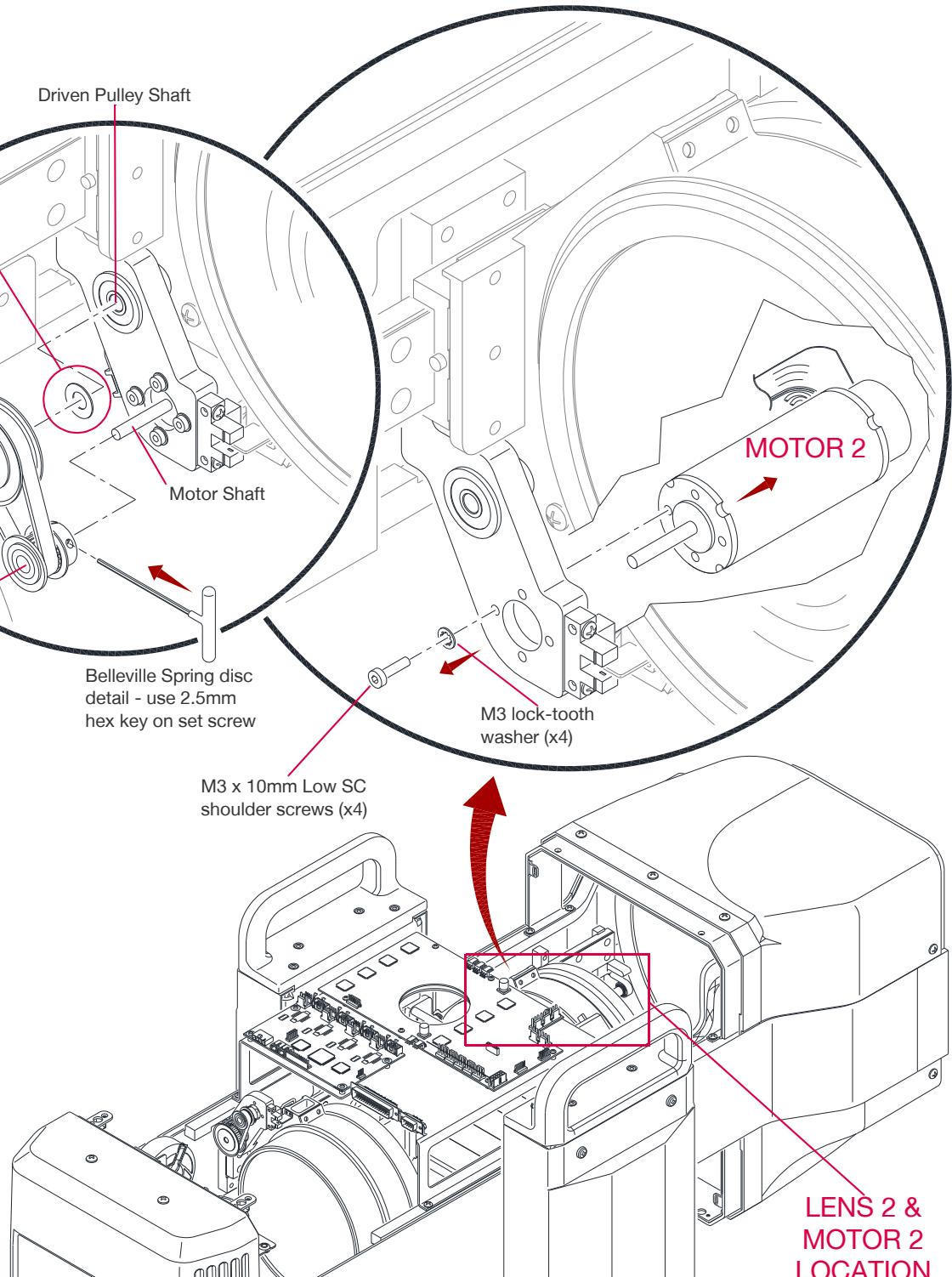


Figure 3-33: Replacing Zoom Lens Group 2 Motor

Removing the GCLT Frost Module

The procedure to remove the Frost Module is best performed with the Head positioned inverted, XYZ assembly text upside down. It is not necessary to remove the dimmer module from the Diffuser Mounting Bracket for the procedure.

Parts:

21.9834.0580 ASSY, FROST GC LONGTHROW

Tools:

#2 Phillips screwdriver
5/32" hex key or t-handle
[Loctite #242](#) (06.6008.0001)



WARNING! Remove power from luminaire before performing any maintenance procedures.



CAUTION: Exercise care working with tools and the Frost Module; the frost panes are glass and can break.

To remove the Frost Module from the GCLT:

- Step 1. Remove power from the luminaire.
- Step 2. Remove the Top and Bottom Head Covers. (Refer to "[Removing Top and Bottom Head Covers](#)" on page 32)
- Step 3. Trace the wiring from the Frost Module motor to the Wheel Stack Controller card; disconnect the three (3) connectors from the jumper. (**Figure 3-34**)
- Step 4. Invert the GCLT Head Assembly so that the XYZ plate text is upside down.
- Step 5. Carefully, manually open the dimmer module, and gently roll the frost pane assembly so it is parallel with the length of the head. This will allow you more maneuvering room.
- Step 6. Remove the one 10-32 x 0.3125" SEMS shoulder screw (and blue 3/8" poly tubing) from the right diffuser mounting bracket (**Figure 3-34**)
- Step 7. While holding onto the diffuser module, remove two 10-32 x 3/8" SEMS screws from the left diffuser mounting bracket; the assembly is free at this point, carefully remove from the head.
- Step 8. Reassemble in reverse order, steps 4-7.

See GCLT Frost Module illustration
on next page:

Figure 3-34

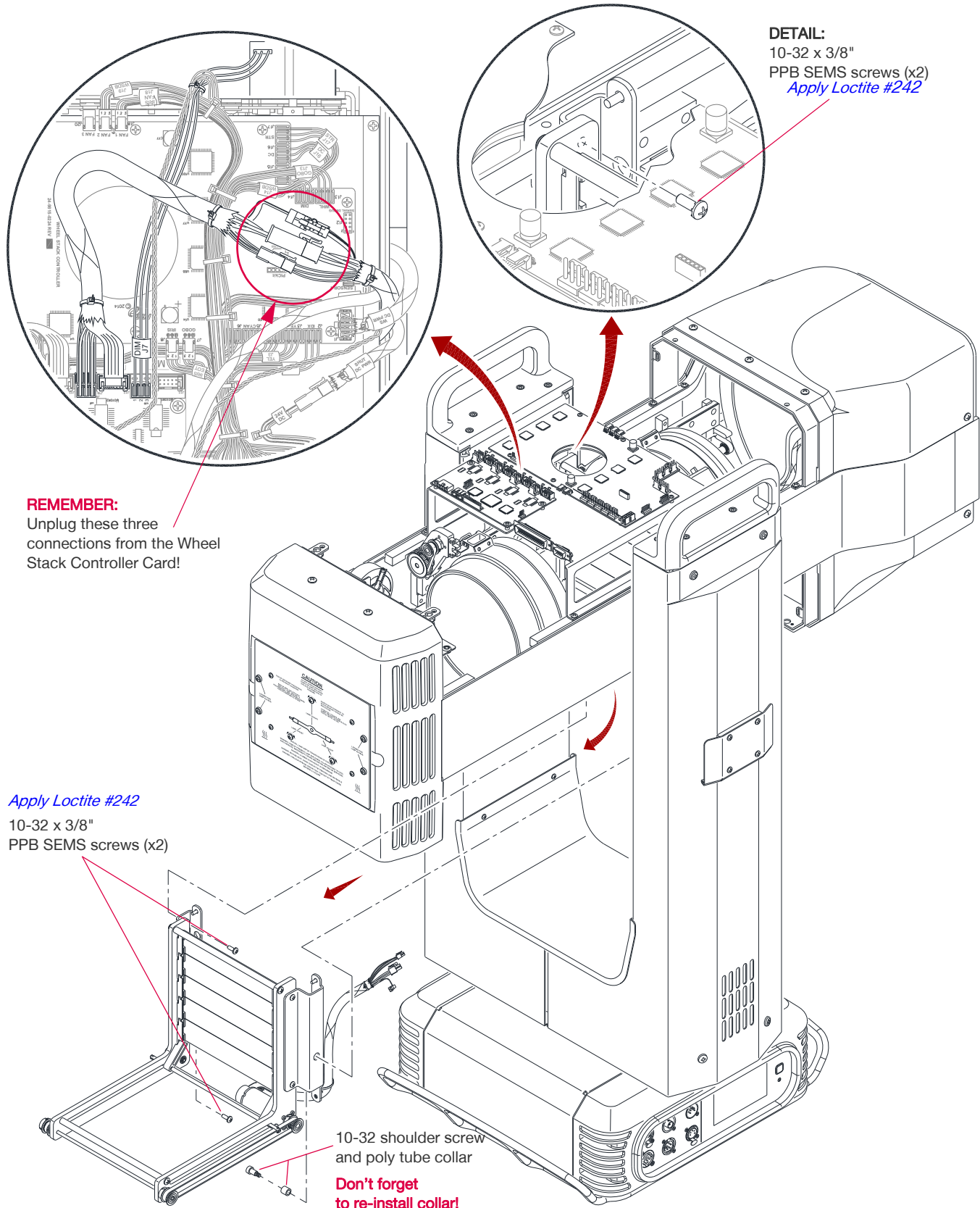


Figure 3-34: Removing GCLT Frost Module

Replacing AFT Bulkhead Fans

The GCLT luminaire has five (5) fans for cooling in the AFT bulkhead, Fans 1-5. **Fan 1** and **Fan 2** are mounted above the UV/IR box; **Fan 3**, **Fan 4**, and **Fan 5** are mounted below it.

Note: The part number below is for each of the five fans; regardless of which you need, use that part number.

Parts:

25.9815.0994 CABLE ASSY, HEAD FAN (SAN ACE)

Tools:

#2 Phillips screw driver
Wire cutters
Cable ties

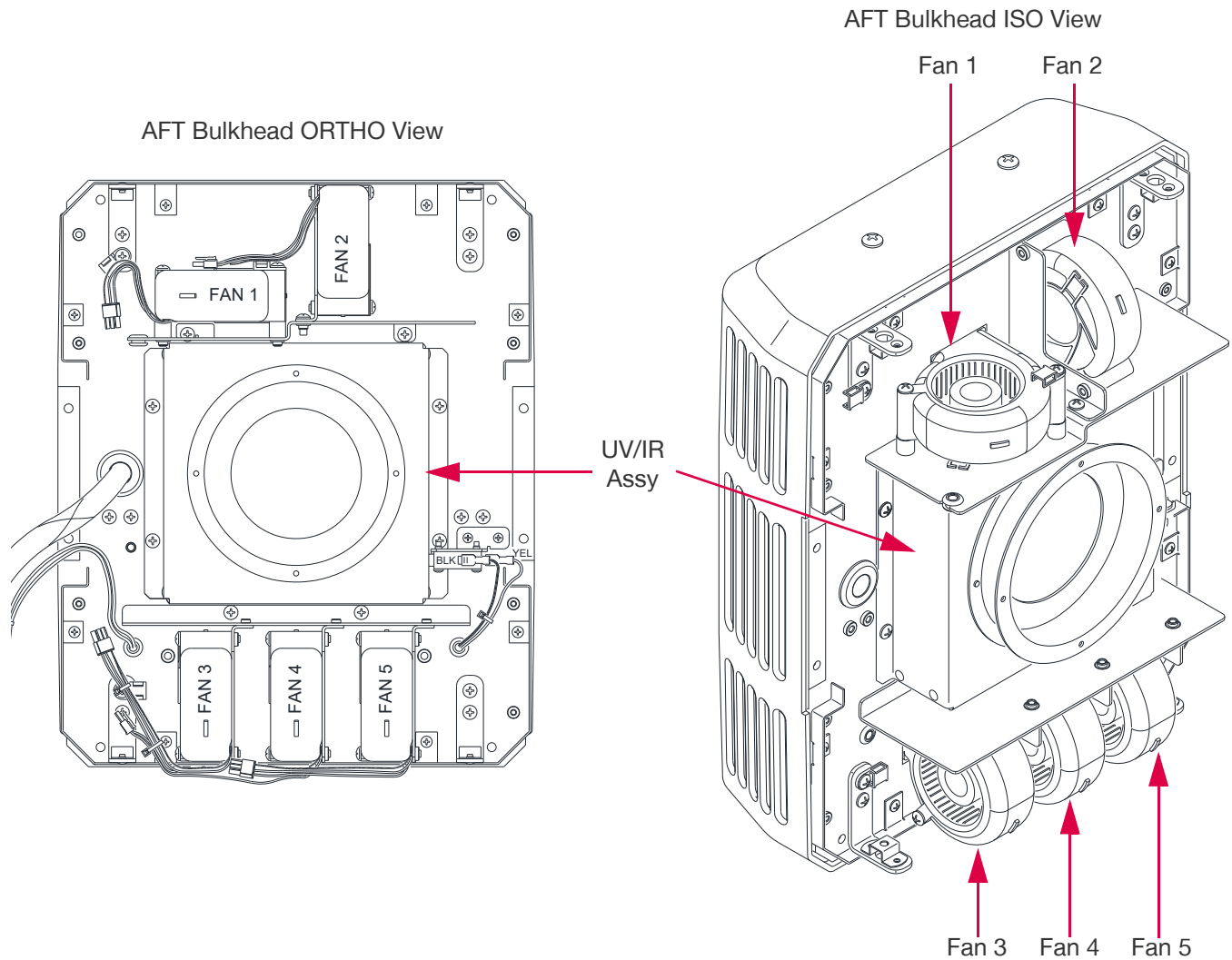


Figure 3-35: GCLT AFT Fan Number Identification



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace AFT Bulkhead Fan #1:

- Step 1. If luminaire is running, douse lamp and allow at least five minutes for the AFT assembly to cool. It may be very warm to the touch, and will need time to cool before performing the procedure.
- Step 2. Remove power from the luminaire after the lamp and AFT assembly have had proper cooling time.
- Step 3. Remove the Top Head Cover. (Refer to "**Removing Top and Bottom Head Covers**" on page 32)
- Step 4. Cut cable tie securing power leads from Aft Fan #1 (**Figure 3-36**); unplug the #1 fan
- Step 5. Remove two (2) 8-32 x 1-3/8" PPSS screws securing the #1 Fan. Retain the two #8 standoffs and one cable anchor for re-installation. Note position of standoffs and cable anchor. (**Figure 3-36**)
- Step 6. Re-install Fan #1 by performing steps 4-5 in reverse; make sure to install standoffs and cable anchor!

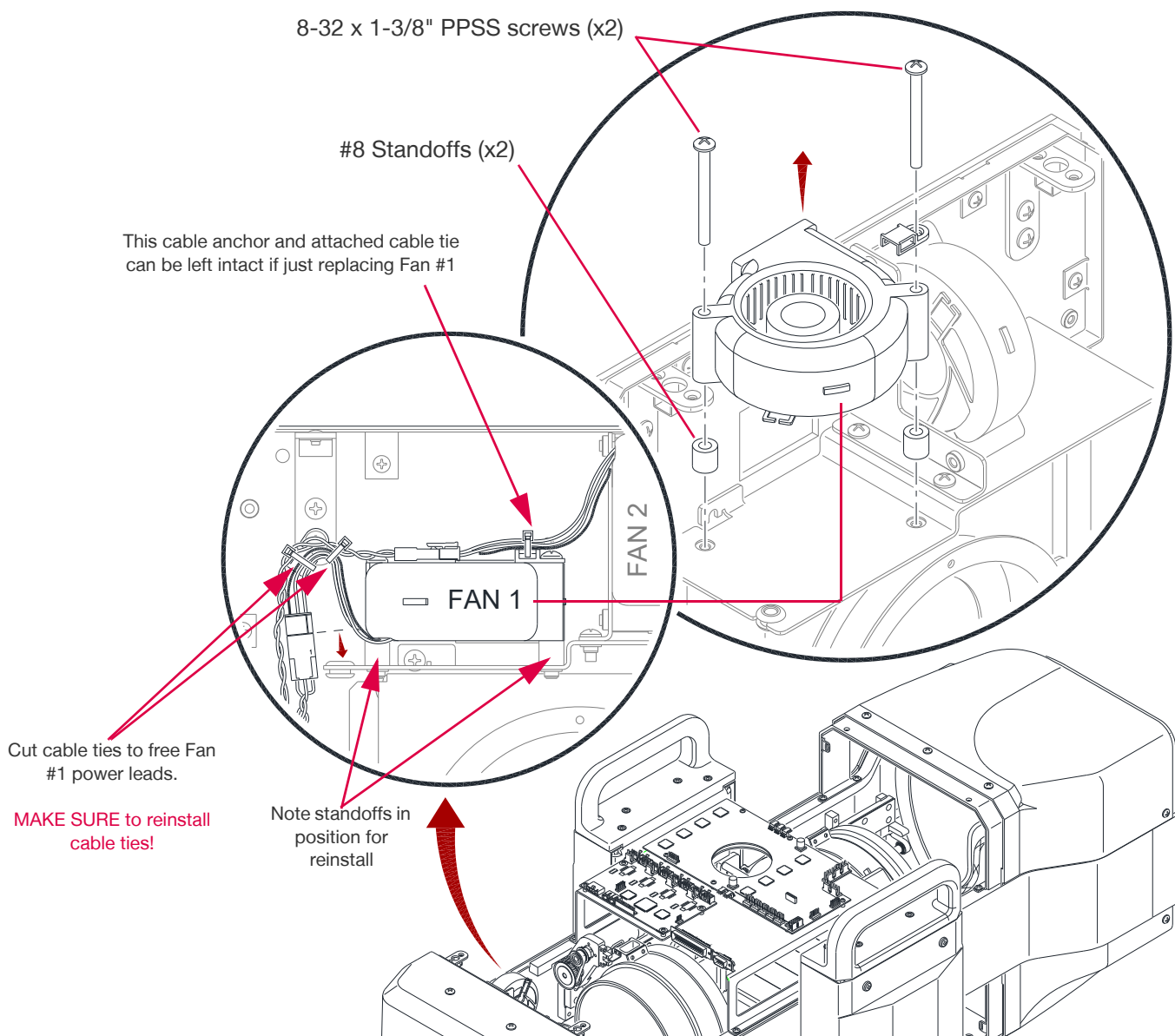


Figure 3-36: Replacing AFT Bulkhead Fan #1



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace AFT Bulkhead Fan #2:

- Step 1. If luminaire is running, douse lamp and allow at least five minutes for the AFT assembly to cool. It may be very warm to the touch, and will need time to cool before performing the procedure.
- Step 2. Remove power from the luminaire after the lamp and AFT assembly have had proper cooling time.
- Step 3. Remove the Top Head Cover. (Refer to **"Removing Top and Bottom Head Covers"** on page 32)
- Step 4. Cut cable tie securing power leads for Fan #2, which is attached to the PPSS screw on Fan #1; unplug connection for Fan #2. (**Figure 3-37**)
- Step 5. Remove two (2) 8-32 x 1-3/8" PPSS screws securing the #2 Fan.
- Step 6. Re-install Fan #2 in reverse order.
- Step 7. Plug in Fan #2, and make sure to re-install the cable tie on the Fan #1 mount. (**Figure 3-37**)

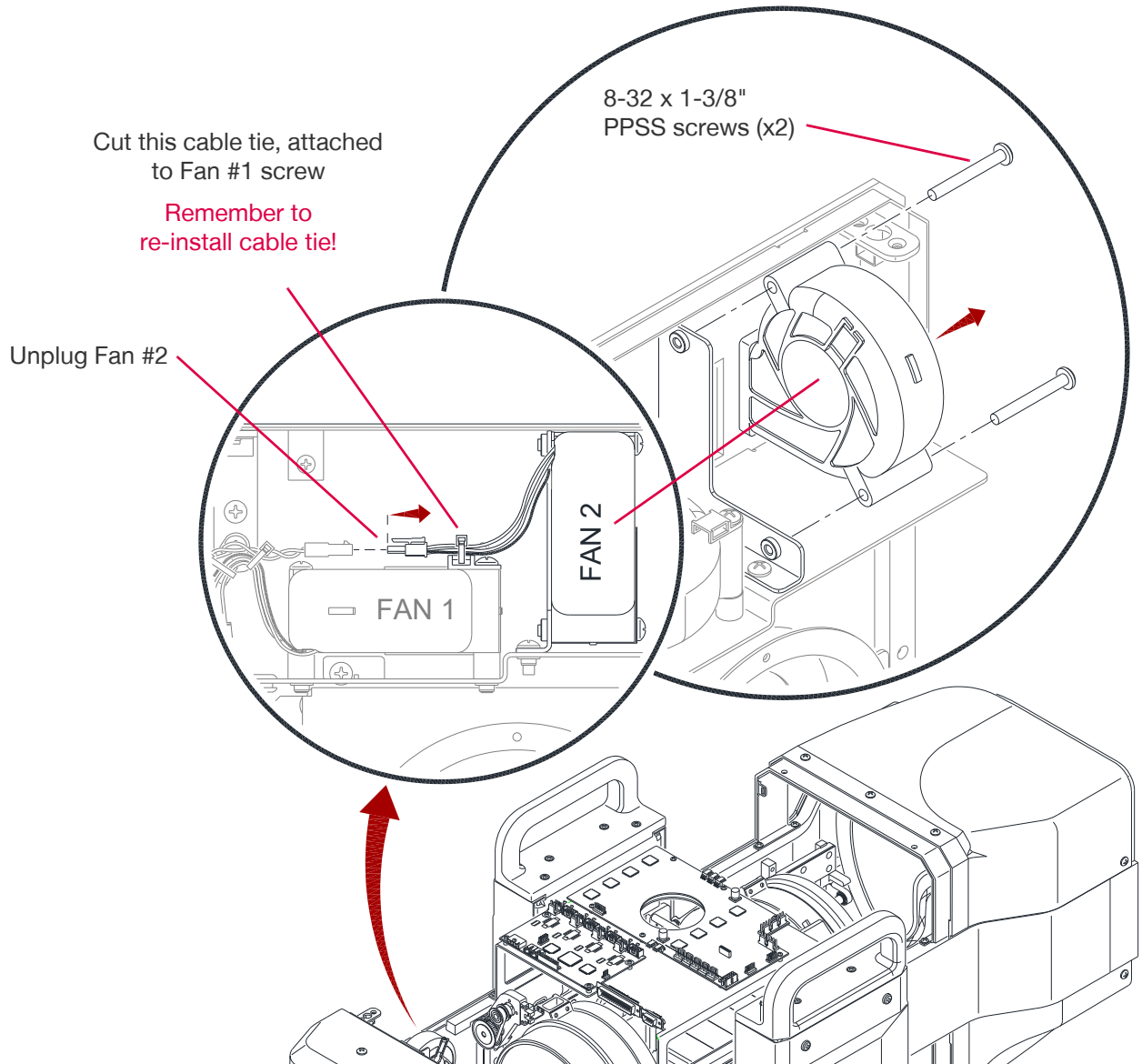


Figure 3-37: Replacing AFT Bulkhead Fan #2



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace AFT Bulkhead Fans #3, #4, and #5:

- Step 1. If luminaire is running, douse lamp and allow at least five minutes for the AFT assembly to cool. It may be very warm to the touch, and will need time to cool before performing the procedure.
- Step 2. Remove power from the luminaire after the lamp and AFT assembly have had proper cooling time.
- Step 3. Remove the Bottom Head Cover. (Refer to "**Removing Top and Bottom Head Covers**" on page 32)
- Step 4. [Optional] Tilt the Head around so that the XYZ Assembly text is upside down; this procedure can be performed in either configuration, but if you have the luminaire in a repair area, this configuration offers the best access.
- Step 5. Clip the cable ties that hold the Fan Connectors in place on the Aft Assembly and unplug the fan you want to replace -- make note of arrangement and cable tie placement.
- Step 6. Fans #3, #4, and #5 (Lamp Pinch Fans) are secured to the Aft Assembly via individual L-shaped brackets. Choose the fan you need to replace and remove the two 8-32 x 3/8" PPZ screws holding the fan and bracket to the Aft Assembly.
- Step 7. To remove the fan from the bracket, remove the two 8-32 x 1-3/8" PPSS screws from the Fan Bracket.
- Step 8. Re-install the selected fan to the selected Fan Bracket.
- Step 9. Re-install the selected Fan Bracket assembly to the Aft Assembly by performing Steps 6-9 in reverse.
- Step 10. Re-plug the selected fan (and any other fans you unplugged in this process) to their selected power connection and re-install cable ties to secure the cable bundle to the Aft Bulkhead.
- Step 11. Re-install the Bottom Head Cover.

See Aft Bulkhead Fans #3, #4, #5 illustration on next page:

Figure 3-38

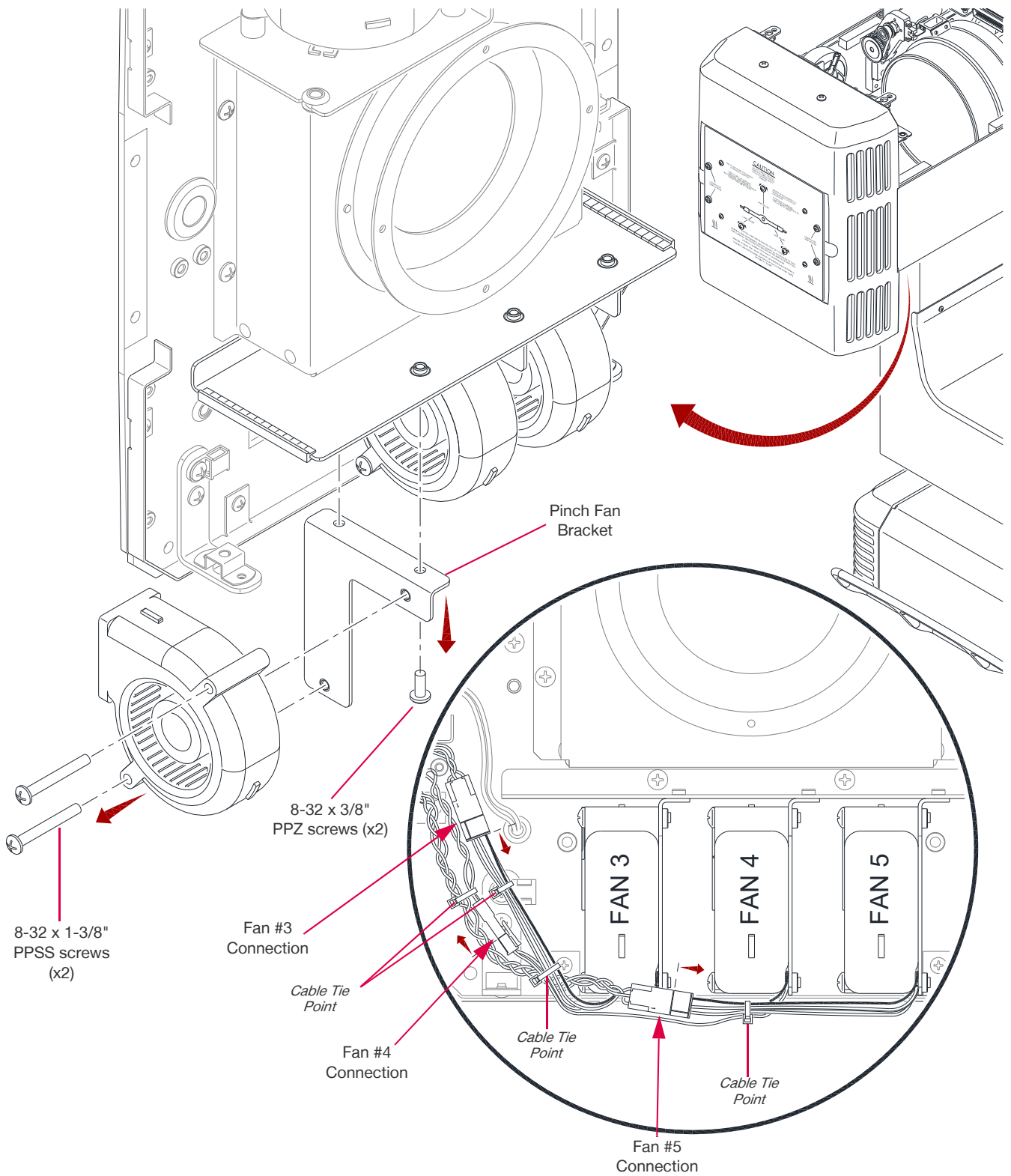


Figure 3-38: Replacing AFT Bulkhead Fans #3, #4, and #5

Replacing Door Closure Safety Switch

Parts:

74.2003.0001.0 SWITCH SAFETY, HIGH TEMP

Tools:

#1 and #2 Phillips Screwdrivers



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace the GCLT Door Closure Safety Switch:

- Step 1. If luminaire is running, douse lamp and allow at least five minutes for the AFT assembly to cool. It may be very warm to the touch, and will need time to cool before performing the procedure.
- Step 2. Remove power from the luminaire after the lamp and AFT assembly have had proper cooling time.
- Step 3. Remove the Bottom Head Cover. (Refer to "**Removing Top and Bottom Head Covers**" on page 32)
- Step 4. Rotate the Head so that the XYZ Plate text is upside down -- Fans #3 - #5 will be at the top of the head.
- Step 5. At the Aft Bulkhead assembly, locate the Safety Switch and remove the two wires.
- Step 6. Remove the two 4-40 x 5/8" PPZ screws from the Switch to release it from the Mounting Plate.
- Step 7. Re-install Safety Switch by performing Steps 5 and 6 in reverse.

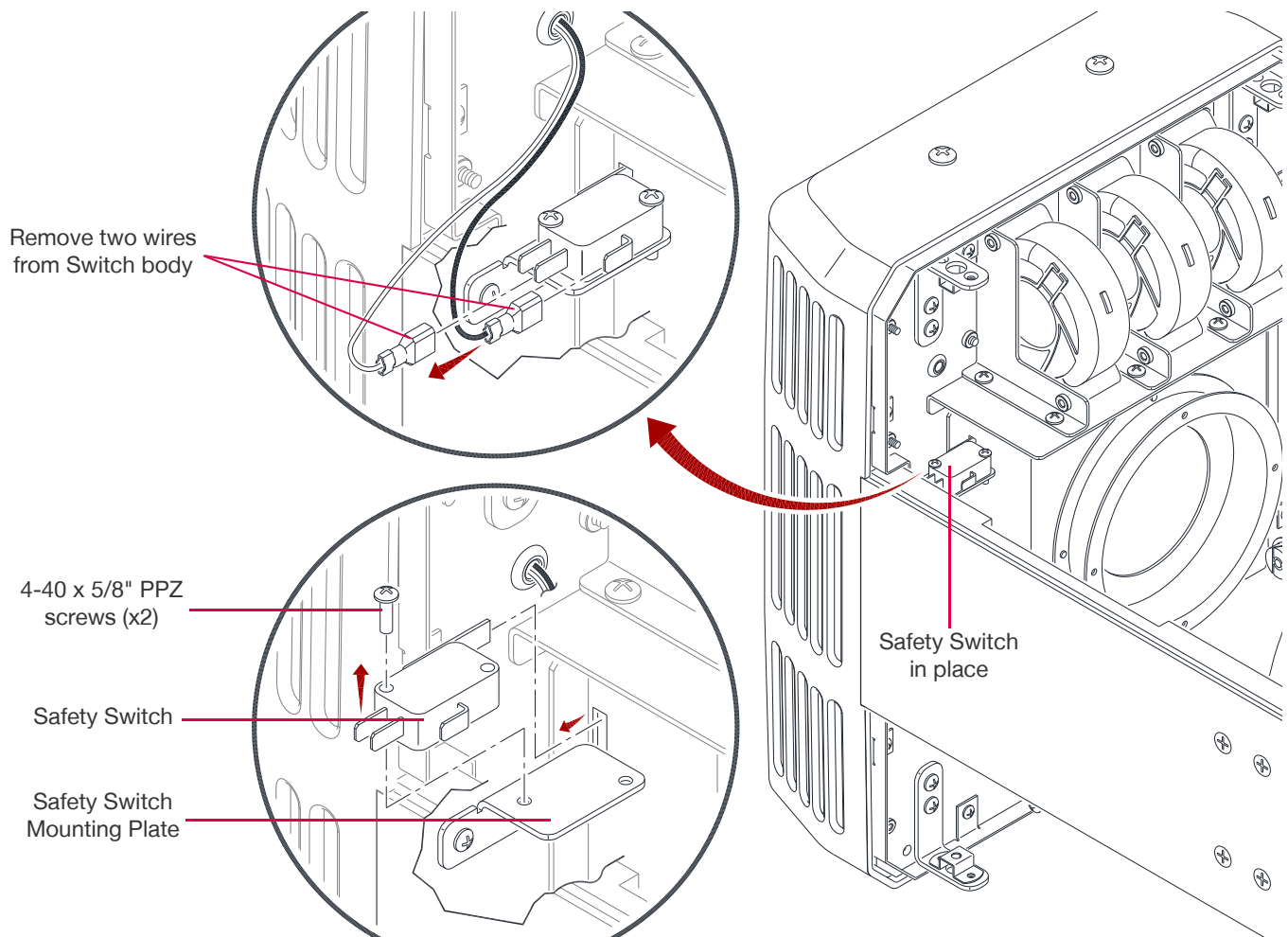


Figure 3-39: Replacing Door Closure Safety Switch

Replacing Lamp Thermal Switch

Parts:

74.1034.0001 SWITCH, THERMAL 15AMP 315 DEGREE F OPEN

Tools:

#2 Phillips Screwdriver
3/16" Nut Driver



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace the Lamp Thermal Switch:

- Step 1. If luminaire is running, douse lamp and allow at least five minutes for the AFT assembly to cool. It may be very warm to the touch, and will need time to cool before performing the procedure.
- Step 2. Remove power from the luminaire after the lamp and AFT assembly have had proper cooling time.
- Step 3. Remove the Top and Bottom Head Cover. (Refer to "[Removing Top and Bottom Head Covers](#)" on page 32)
- Step 4. Remove the AFT Assembly cover. (Refer to "[Removing Aft Cover](#)" on page 36)
- Step 5. If needed, rotate the Head as that the XYZ Plate text is upside down. Fans #3 - #5 will be on the top.
- Step 6. At the Thermal Switch, remove the two FastOn connectors. (**Figure 3-40**)
- Step 7. Remove the two 4-40 hex nuts from the Thermal Switch to remove it. (**Figure 3-40**)
- Step 8. Re-install a new switch by following these steps in reverse.

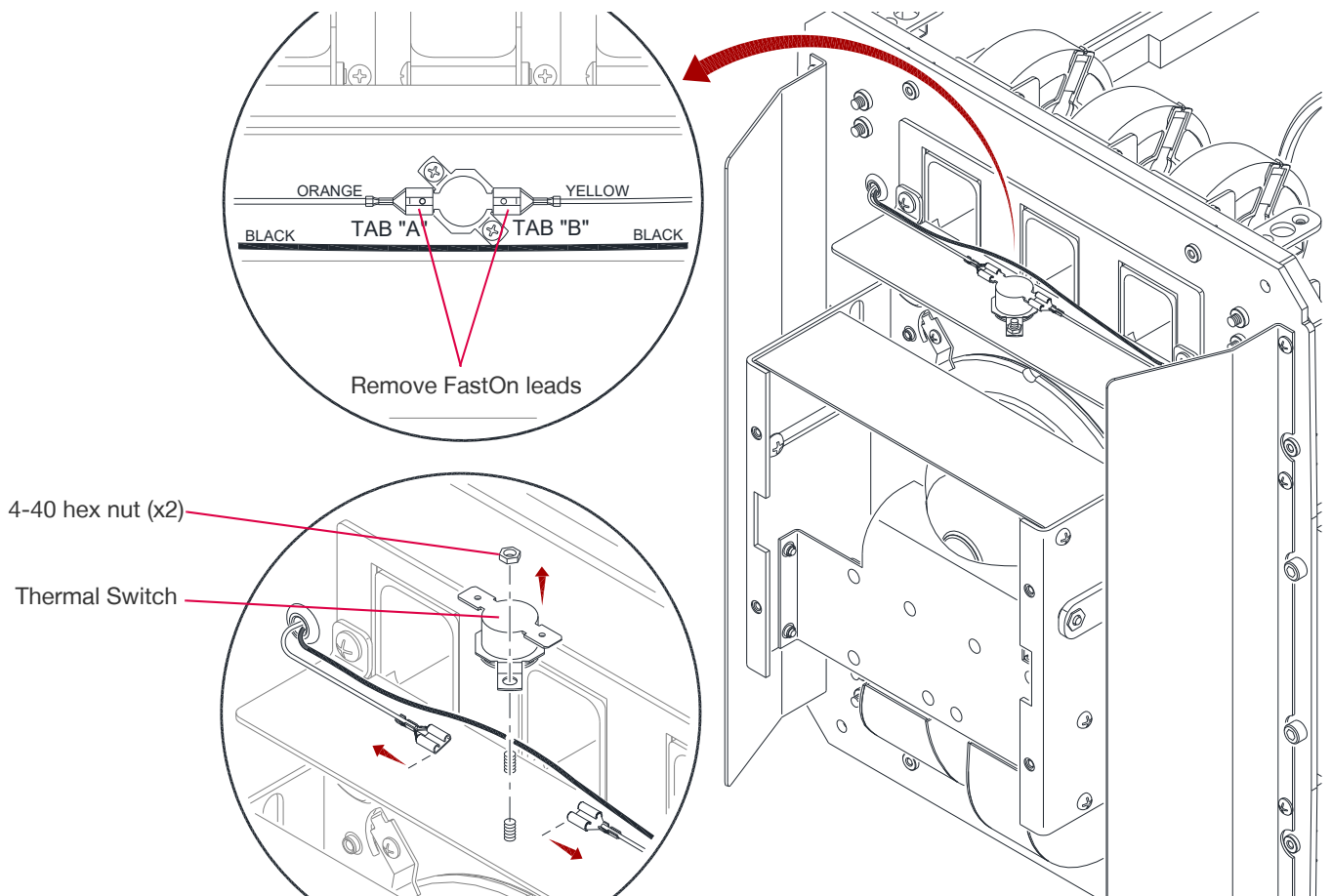


Figure 3-40: Replacing Lamp Thermal Switch



Removing the UVIR Box and Retro-Reflector

Parts:

21.9834.0616 ASSY, UVIR WASH W/UVIR GLASS, GCLT
42.9815.0161 RETRO-REFLECTOR, WASH

Tools:

#1 and #2 Screwdrivers
Cotton gloves or finger cots
[Loctite #246](#)



WARNING! Remove power from luminaire before performing any maintenance procedures.



WARNING! Hot fixture? Wait at least five (5) minutes with the lamp doused and the fans on to cool the unit.



CAUTION: Use gloves or finger cots to handle the glass reflector to prevent fingerprints. Reflector is fragile.



CAUTION: Use caution not to over-tighten fasteners during this process, or you could crack the reflector.

To remove the UVIR Box:

- Step 1. If fixture was previously energized with the lamp struck, douse the lamp and allow the fixture to run with fans on for at least five minutes.
- Step 2. Remove power to the luminaire.
- Step 3. Remove the Top and Bottom Head Cover. Refer to "[Removing Head Covers - Top and Bottom Head](#)" on page 32.
- Step 4. Remove the Wheel Stack. Refer to "[Removing the Wheel Stack](#)" on page 52.
- Step 5. Rotate the Head either perpendicular to the Yoke Arms, or tilt the front of the luminaire UP so the XYZ assembly is lower towards the Upper Enclosure for optimum work clearance, depending on your access to the unit.
- Step 6. Roll the mechanism for Zoom Lens Group 1 away from the Lamp Box to increase working space.
- Step 7. Remove the four 8-32 x 3/8" PPZ screws from the UVIR Box, then remove the UVIR Box.

Once the UVIR Box is removed -- To Remove the Retro-Reflector:

- Step 1. LOOSEN but do not remove the four 4-40 KEPS nuts holding the Retro-Reflector mounting clips in place. Keep a hand on the Retro-Reflector to prevent it from falling out during this process. Rotate each mounting clip out of the way of the Retro-Reflector until it is free, then remove it. **(Figure 3-41)**
- Step 2. To re-install, perform the previous step in reverse, then re-install the UVIR Box by performing Steps 3 to 7 in reverse order. The Retro-Reflector must be installed before the UVIR Box.

See UVIR Box and Retro-Reflector illustration on next page:

Figure 3-41

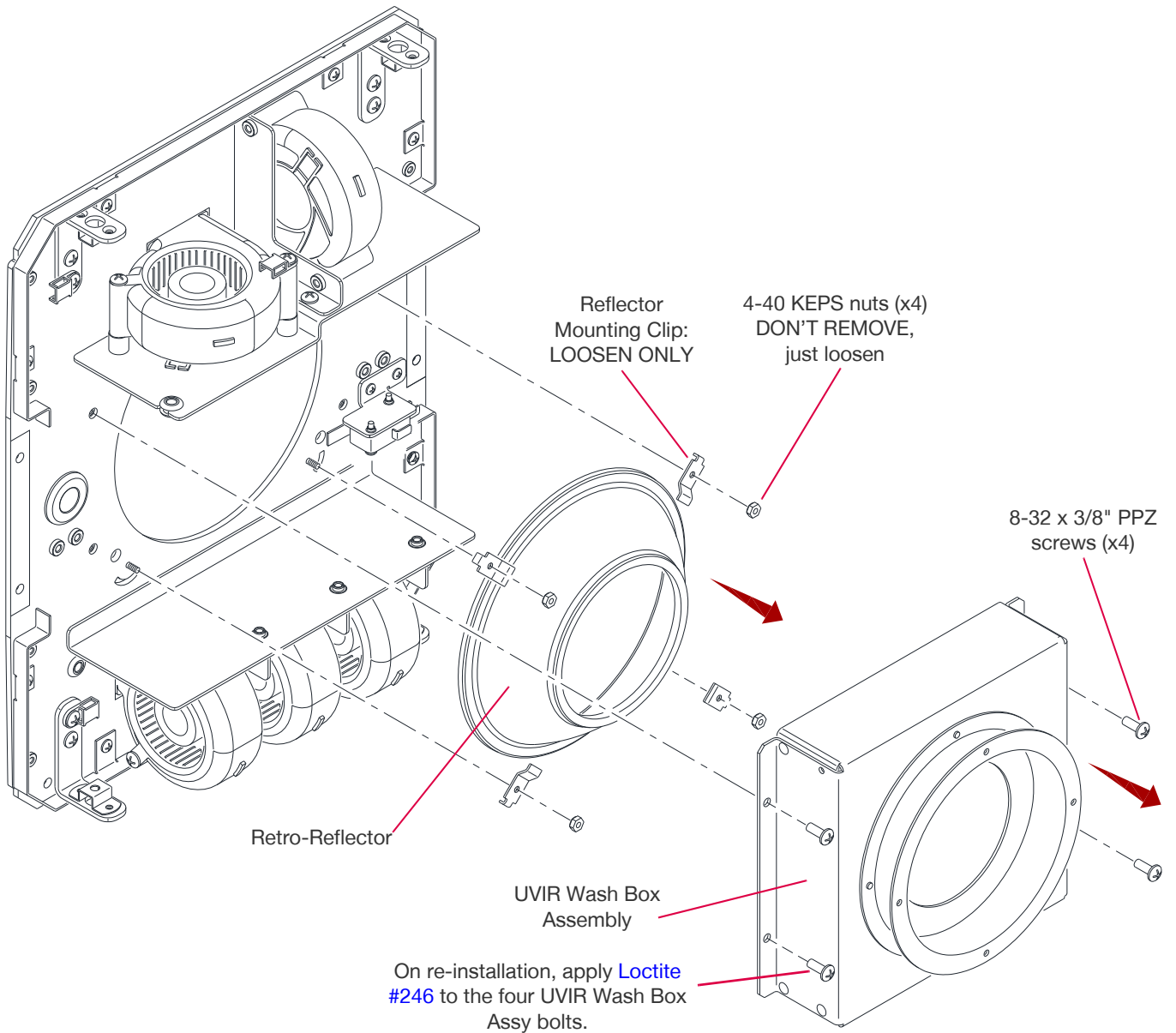


Figure 3-41: Removing the UVIR Box and Retro-Reflector



Removing the Lamp Box and Reflector

Parts:

42.9816.0170 REFLECTOR, STEPPED 10 LUNES COATED

Tools:

#1 and #2 Screwdrivers
Cotton gloves or finger cots



WARNING! Remove power from luminaire before performing any maintenance procedures.



WARNING! Hot fixture? Wait at least five (5) minutes with the lamp doused and the fans on to cool the unit.



CAUTION: Use gloves or finger cots to handle the glass reflector to prevent fingerprints. Reflector is fragile.



CAUTION: Use caution not to over-tighten fasteners during this process, or you could crack the reflector.

To remove the Lamp Box and Reflector:

- Step 1. If fixture was previously energized with the lamp struck, douse the lamp and allow the fixture to run with fans on for at least five minutes.
- Step 2. Remove power to the luminaire.
- Step 3. Rotate the Head either perpendicular to the Yoke Arms, or tilt the front of the luminaire down so the XYZ assembly is elevated for optimum work clearance, depending on your access to the unit.
- Step 4. Remove XYZ Assembly from Lamp Box. Refer to "[Removing Aft Cover and XYZ Assembly](#)" on page 35.
- Step 5. Pull Lamp Box out from Aft Assembly as far as it will traverse from the Aft Assembly.
- Step 6. Remove the Flipper Duct Assembly (**Figure 3-42**) by removing the four 6-32 x 1/4" PPSS screws from the sides of the Lamp Box and remove the assembly.
- Step 7. LOOSEN but do not remove the four 4-40 x 1/4" PPSS screws securing the mounting clips on the reflector; maintain a hand on the reflector during this process. As you loosen each screw, flip the mounting clip around and out of the way of the reflector.
- Step 8. Once the mounting clips are free, remove the reflector.
- Step 9. When re-installing the reflector, make note of the notch on the top of the reflector and align this with the notch on the top of the Lamp Box.
- Step 10. Re-install by following these steps in reverse.

See Lamp Box and Reflector illustration on next page:

Figure 3-42

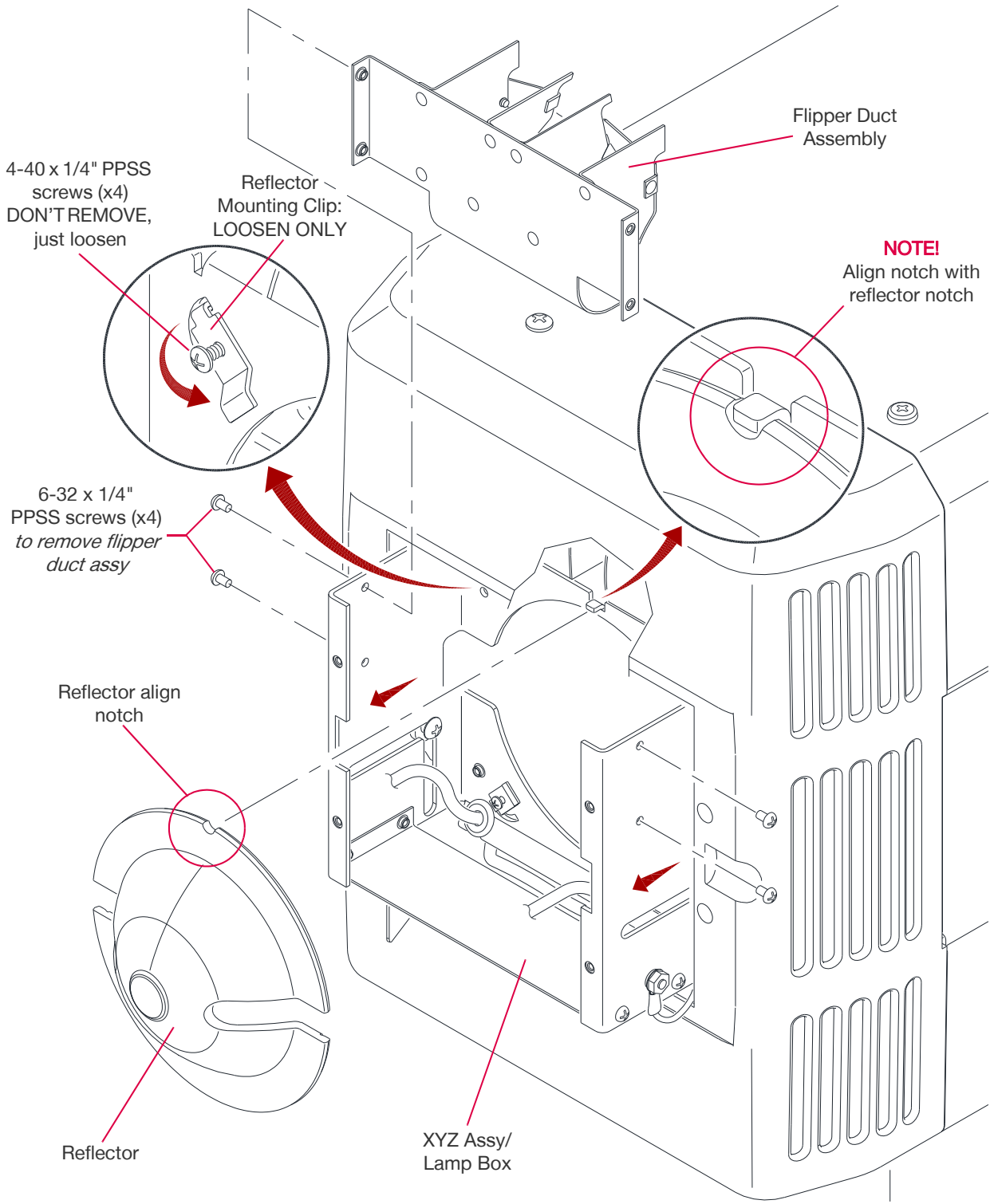


Figure 3-42: Removing the Lamp Box and Reflector

Replacing the Ignitor

The Lamp Ignitor is located inside the Head, on the Camera-side head rail, past the Tilt tube towards the AFT Assy. This is a high voltage component: It is CRITICAL to follow all warnings and procedures!

Parts:

12.9815.0787 IGNITOR, MODIFIED

Tools:

#2 Phillips Screwdriver



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace the Ignitor:

- Step 1. If luminaire is running, douse lamp and allow at least five minutes for the Head Assembly to cool. It may be very warm to the touch, and will need time to cool before performing the procedure.
- Step 2. Remove power from the luminaire after the lamp and AFT assembly have had proper cooling time.
- Step 3. Remove the Top Head Cover. (Refer to "[Removing Top and Bottom Head Covers](#)" on page 32)
- Step 4. Disconnect the four wires connected to the Ignitor. (**Figure 3-43**)
- Step 5. Remove the four 4-40 x 1-3/8" PPZ screws securing the Ignitor to the Camera-side Head Rail to remove or replace the Ignitor. **MAKE SURE to confirm Ignitor Orientation!!!** (**Figure 3-43**)
- Step 6. Follow these steps in reverse to re-install the Ignitor.

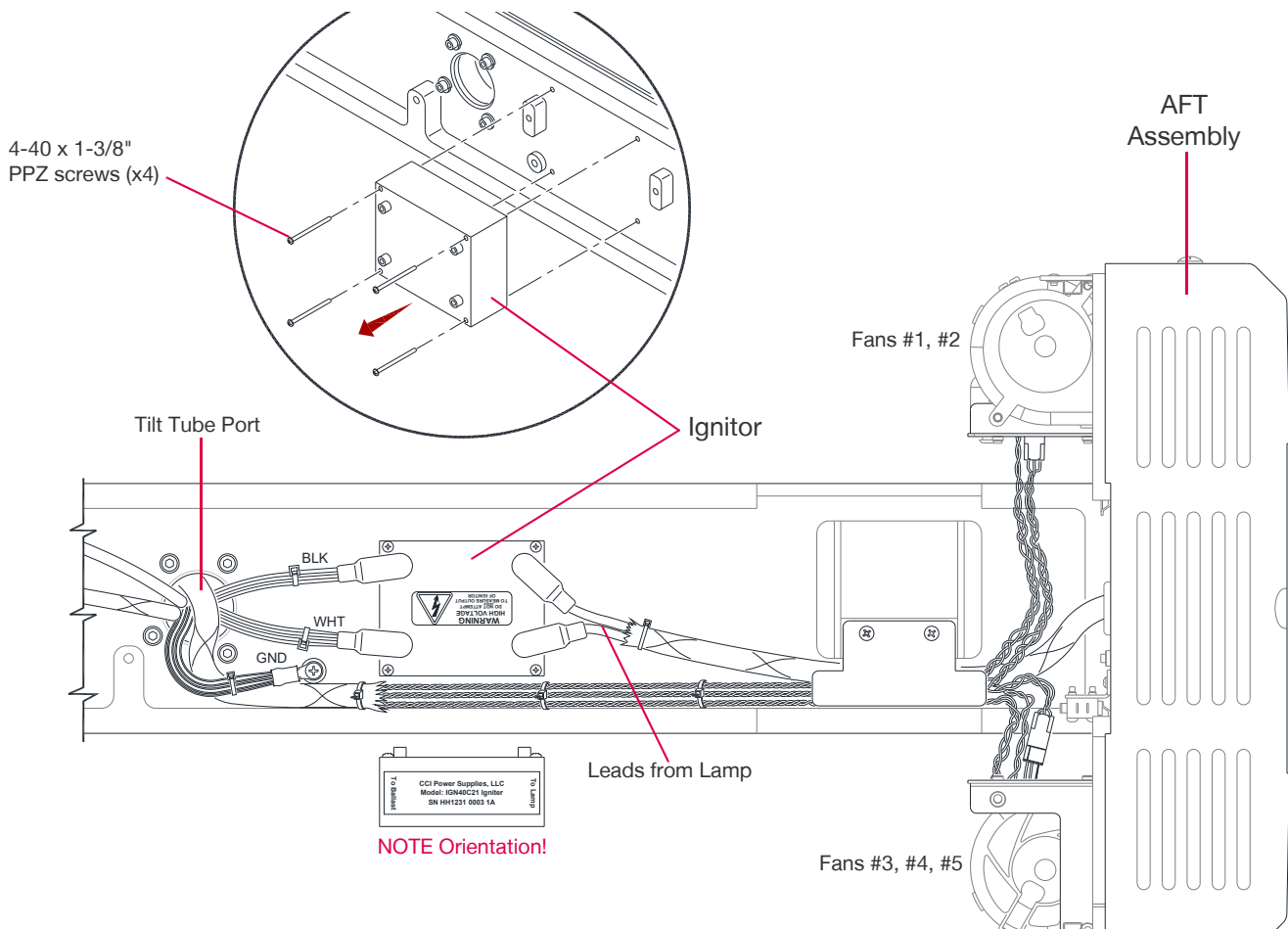


Figure 3-43: Replacing the Lamp Ignitor



Replacing the Yoke Fan

The Yoke Fan is located in the Pan Side Leg, which is on the same side as the GCLT Camera, or by referencing the images in **Figure 1-3** and **Figure 1-5**.

Parts:

25.9834.0996 CABLE ASSY, YOKE FAN, SAN ACE B76 24V GCLT

Tools:

#2 Phillips Screwdriver
Cable Tie
Wire Cutters



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace the Yoke Fan:

- Step 1. Remove power from luminaire.
- Step 2. Remove Pan Side Yoke Leg cover. (Refer to "**Removing Yoke Leg Covers**" on page 37)
- Step 3. Cut cable tie holding Yoke Fan Cable Assembly and unplug the fan from the Pan/Tilt Driver PCB. (See **Figure 3-44**) Note cable tie placement for re-installation.
- Step 4. Remove the two 8-32 x 1-3/8" PPSS screws holding the Yoke Fan onto the Yoke Arm Blower Bracket. (**Figure 3-44**)
- Step 5. Re-install Yoke Fan by performing steps in reverse order.

See Yoke Fan illustration on next page:

Figure 3-44

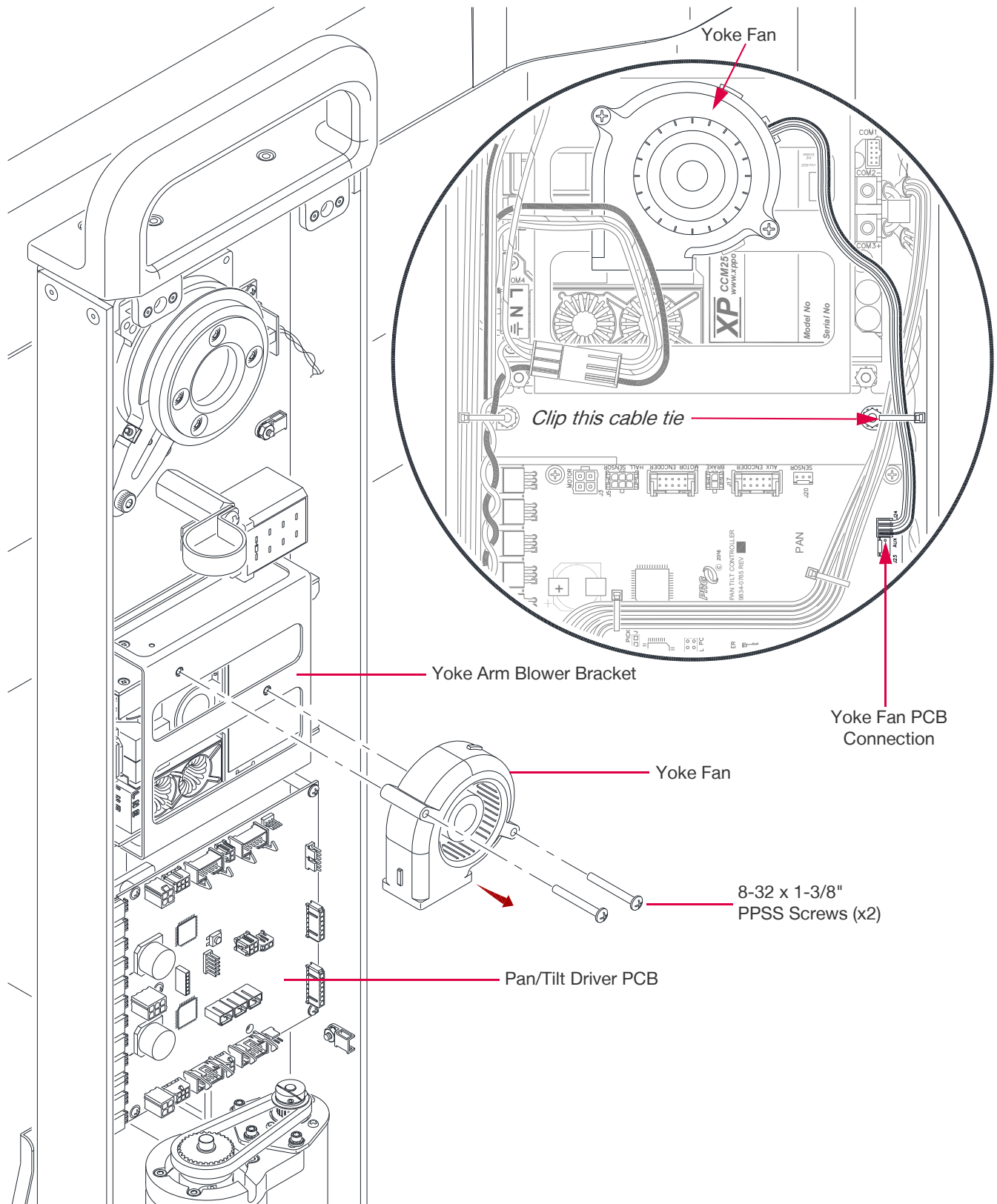


Figure 3-44: Replacing the Yoke Fan

Replacing Yoke HOT Relay

The Yoke HOT Relay is located in the Pan Side Leg, which is on the same side as the GCLT Camera, or by referencing the images in **Figure 1-3** and **Figure 1-5**.

Parts:

23.9812.3327 ASSY, HOT RELAY

Tools:

#2 Phillips Screwdriver



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace the Yoke HOT Relay:

- Step 1. Remove power from the luminaire.
- Step 2. Remove Pan Side Yoke Leg cover. (Refer to "**Removing Yoke Leg Covers**" on page 37)
- Step 3. Disconnect wires from the Relay (See **Figure 3-45**)
- Step 4. Remove the two 6-32 x 5/16" PPZ SEMS screws and #6 washers securing the Yoke HOT Relay in place.
- Step 5. Re-install by following these steps in reverse.



CAUTION: MAKE SURE that you are connecting the leads onto the correct terminals on the HOT Relay!

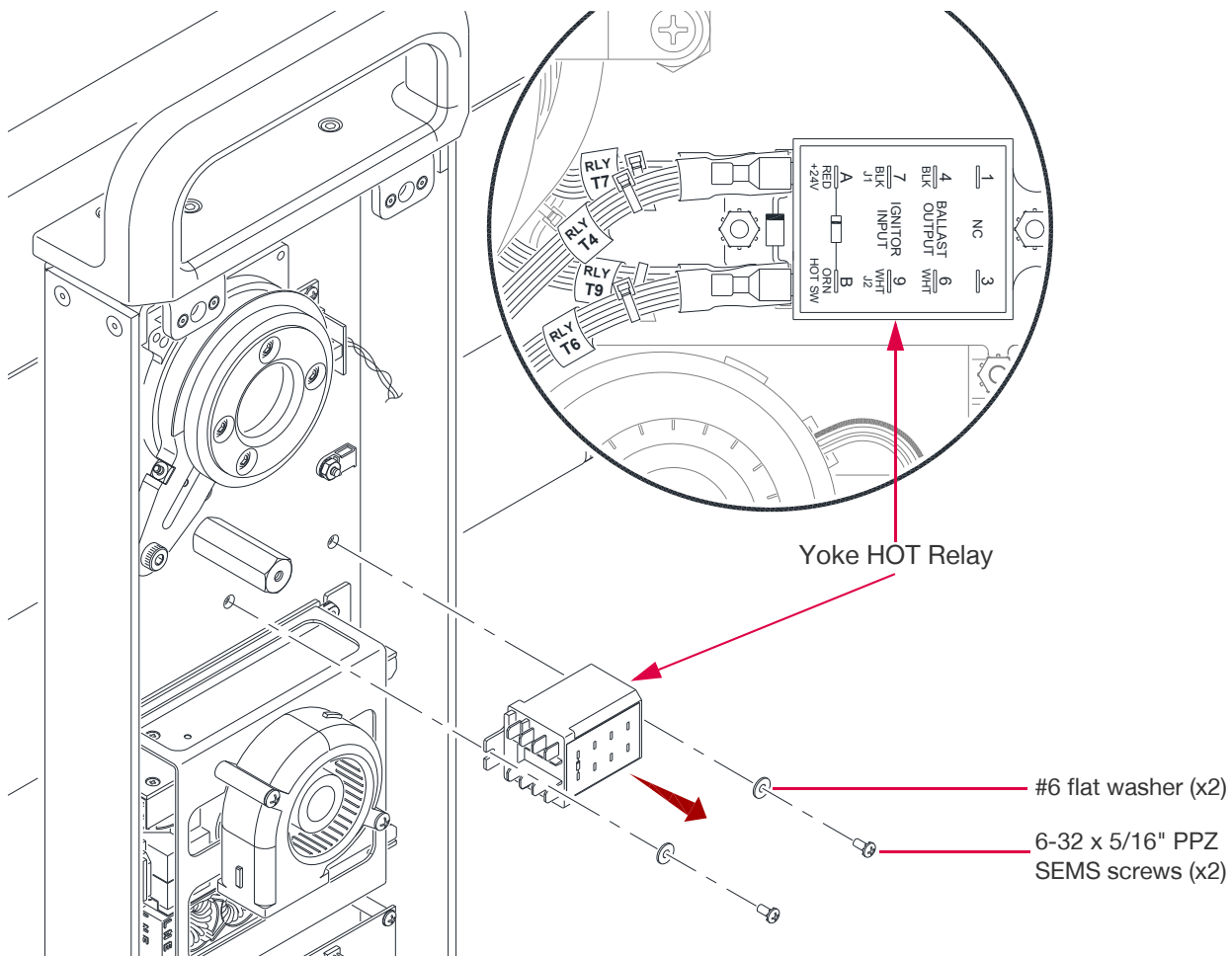


Figure 3-45: Replacing the Yoke HOT Relay

Replacing the Yoke Power Supply

The Yoke Power Supply is located in the Pan Side Leg, which is on the same side as the GCLT Camera, or by referencing the images in **Figure 1-3** and **Figure 1-5**. GCLT's Pan and Tilt system uses 48V and requires an additional low voltage supply to provide this power source.

Parts:

23.9834.0770.01 ASSY, XP 48V DC POWER SUPPLY, GCLT

Tools:

#2 Phillips Screwdriver
5/16" Nut Driver
Wire cutters (Optional)
Cable Tie (Optional)



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace the Yoke Power Supply:

- Step 1. Remove power from the luminaire.
- Step 2. Remove Pan Side Yoke Leg cover. (Refer to "**Removing Yoke Leg Covers**" on page 37)
- Step 3. Remove the four 6-32 KEPS nuts from the Yoke Arm Blower Bracket -- it is not necessary to remove the Yoke Arm Fan from the Bracket for this procedure, the Bracket/Blower assembly can hang loose while you change the Power Supply. (See **Figure 3-47** on the next page)
- Step 4. Remove wire connections from the Yoke Power Supply. (See **Figure 3-46** below)
- Step 5. Remove Yoke Power Supply from the Yoke Arm.
- Step 6. Re-install by performing these steps in reverse.

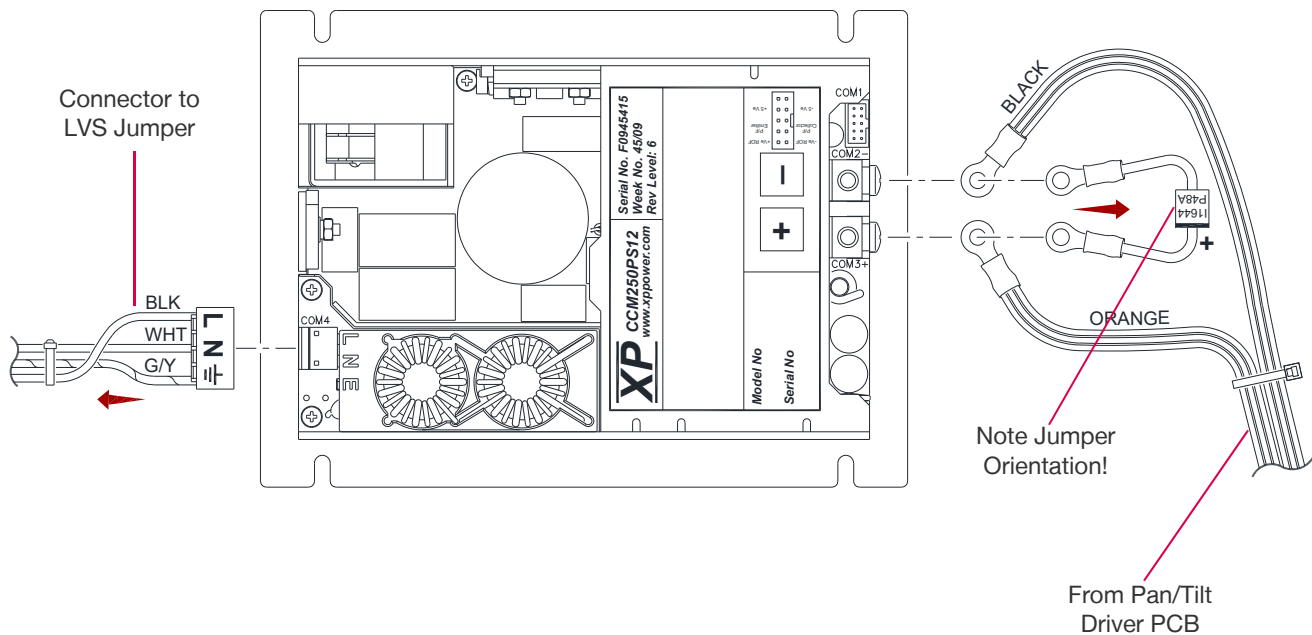


Figure 3-46: Removing the Yoke Power Supply Cabling

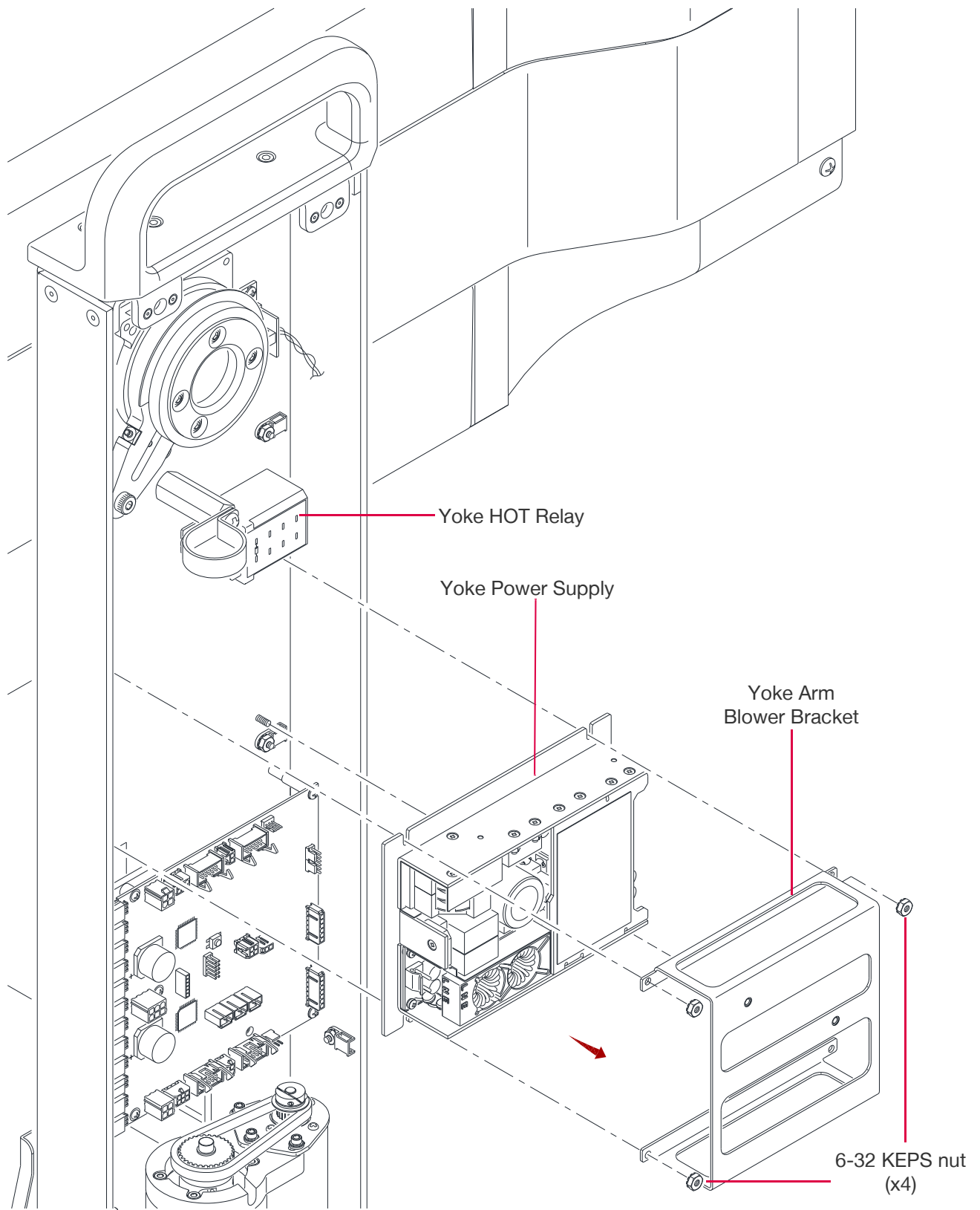


Figure 3-47: Replacing the Yoke Power Supply

- Step 4. Position the head so it is perpendicular to the yoke arms. This allows access to the driver card's mounting screws and spacers.
- Step 5. Looking at the card, remove the two 6-32 x 1" PPBZ screws and their two spacers. You will want to loosen but not pull out these screws so as not to drop the spacers into the Upper Enclosure.
- Step 6. In the drawing below, remove the two indicated 10-32 x 1/2" PFB screws from the Head-side of the yoke. These two screws are each attached to a 3/8" hex standoff in the heat sink on the rear of the card.
- Step 7. Re-install the Pan/Tilt Driver PCB card by following these steps in reverse.

Note: Check **Figure 3-49** below to determine which two screws to remove on the yoke side; you will only need to remove two of eight screws from the yoke side to free the card.

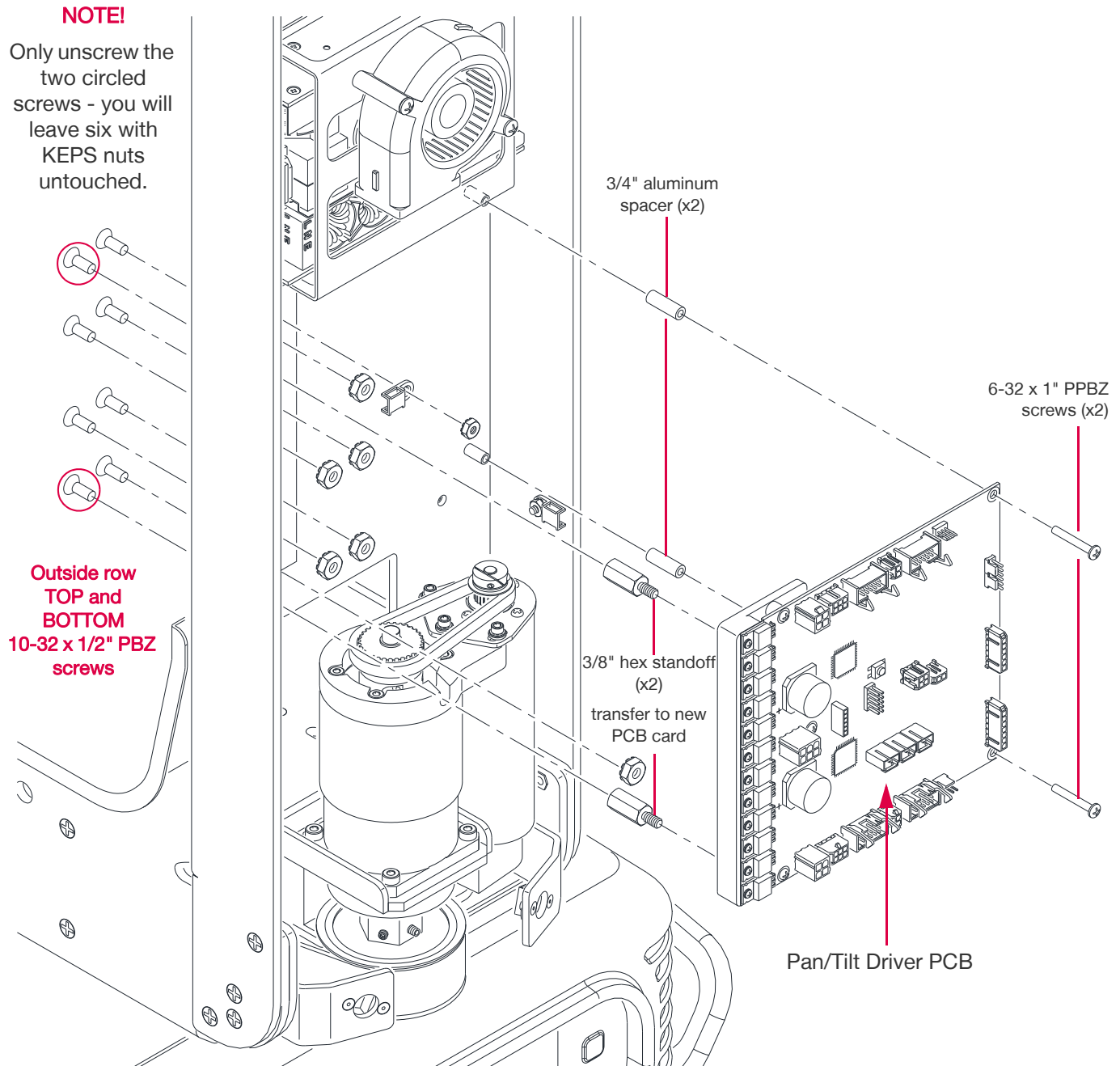


Figure 3-49: Removing the Pan/Tilt Driver PCB

Replacing the PAN Mechanism

The PAN mechanism is located in the Pan Side Leg, which is on the same side as the GCLT Camera, or by referencing the images in **Figure 1-3** and **Figure 1-5**.

Parts:

21.9834.0718 ASSY, PAN DRIVE MECHANISM

Tools:

#2 Phillips Screwdriver
7/16" nut driver, socket wrench, or combination wrench
Wire cutters
Cable ties



WARNING! Remove power from luminaire before performing any maintenance procedures.



CAUTION: Pinch Risk -- handle the Pan mechanism with care as to not pinch fingers when removing.

To remove the Pan Mechanism:

- Step 1. Remove power to the luminaire.
- Step 2. Remove Pan Side Yoke Leg cover. (Refer to "**Removing Yoke Leg Covers**" on page 37)
- Step 3. Rotate the Head perpendicular with the Yoke arms. Remove the Pan Shield by removing the four 6-32 x 5/16" PTB screws from it and lifting up, as indicated in the image below, **Figure 3-50**.

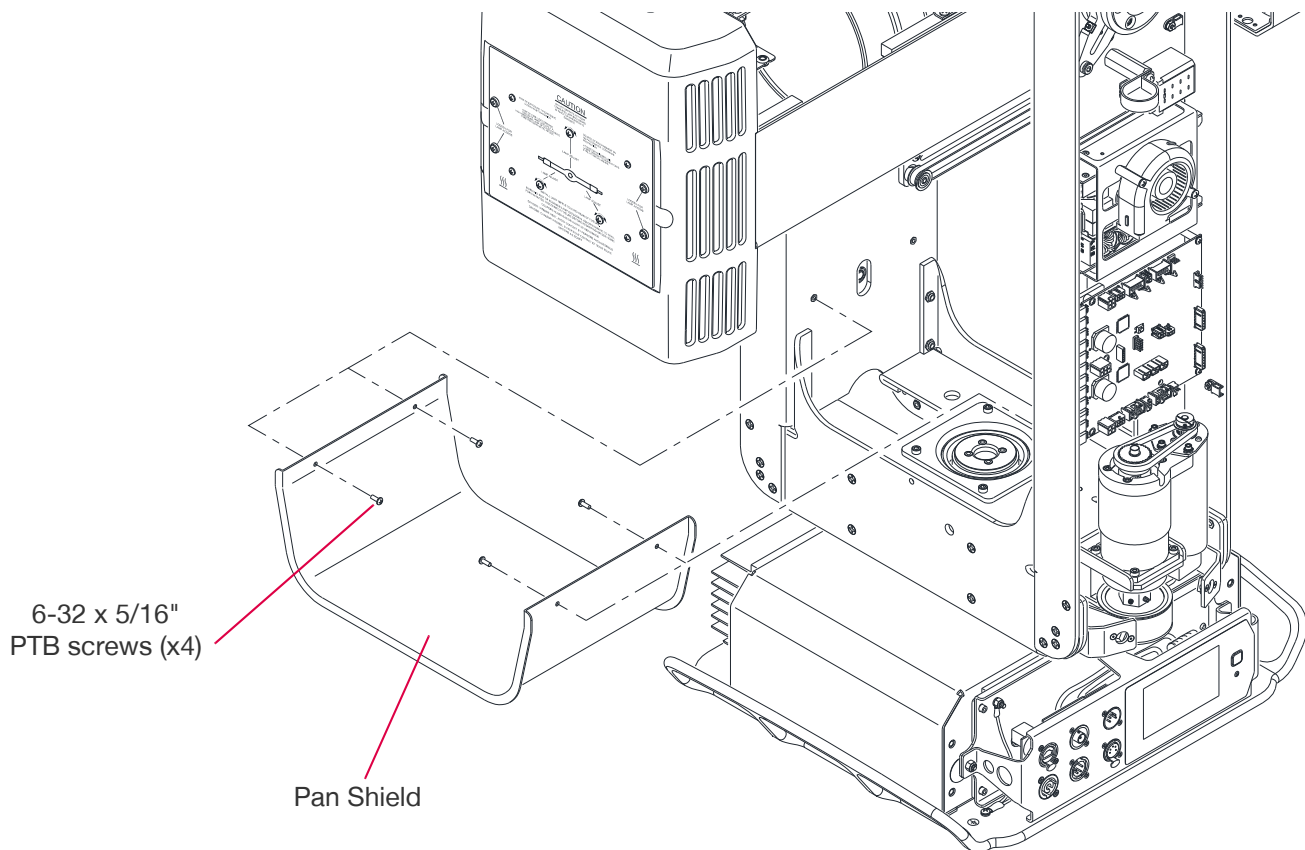


Figure 3-50: Removing the PAN Shield

- Step 4. At the Pan/Tilt Driver PCB in the Pan Side Leg, disconnect the Pan Mechanism cable bundle.

- Step 5. Loosen Pan Mechanism tension bolts (four 1/4-20 x 1/2" Hex bolts) and slip Timing Belt off of Pan Clutch.
- Step 6. Remove the four 1/4-20 x 1/2" Hex bolts and washers and remove Pan Mechanism.
- Step 7. Re-install Pan Mechanism by performing these steps in reverse.
- Step 8. Set proper Belt Tension. (Refer to "[Setting Pan/Tilt Belt Tension](#)" on page 106)

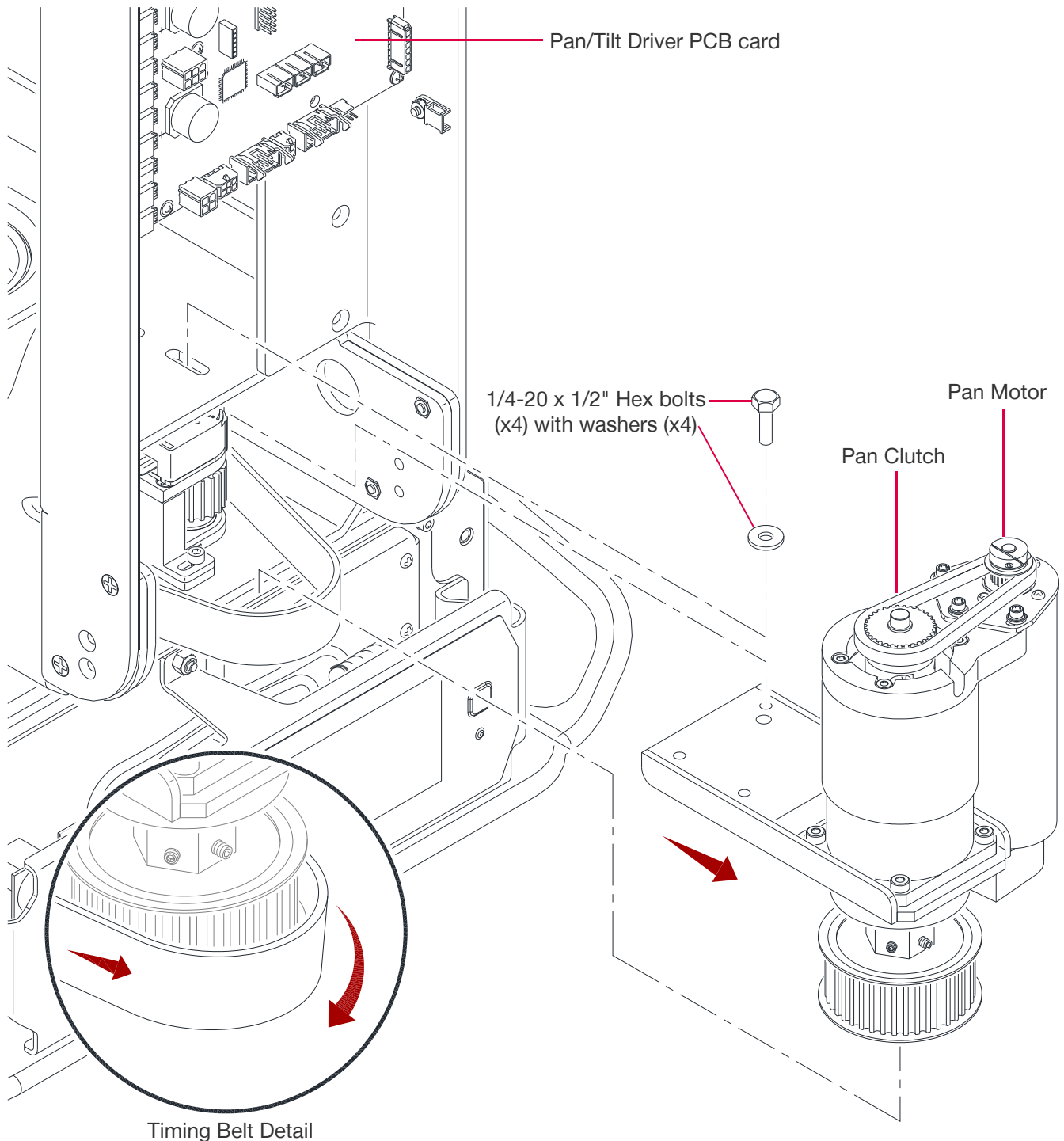


Figure 3-51: Removing the PAN Mechanism



Replacing the Tilt COT Sensor

The Tilt Center-of-Travel (COT) sensor is located in the Pan Side Leg, which is on the same side as the GCLT Camera, or by referencing the images in **Figure 1-3** and **Figure 1-5**.

Parts:

25.9834.0981 CABLE ASSY, TILT COT SENSOR
06.6019.1222.0 **Loctite #222**

Tools:

#1 and #2 Phillips Screwdrivers
Wire cutters
Cable ties
Loctite #222



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace the Tilt COT Sensor:

- Step 1. Remove power to the luminaire.
- Step 2. Remove Pan Side Yoke Leg cover. (Refer to "**Removing Yoke Leg Covers**" on page 37)
- Step 3. Disconnect the Tilt COT Sensor from the Pan/Tilt Driver PCB card.
- Step 4. Cut wire ties holding the Tilt COT Sensor leads. Note placement for re-installation.
- Step 5. Remove the two 6-32 x 5/16" PPZ SEMS screws from the Tilt Sensor Bracket.
- Step 6. Once the bracket is removed, remove the two 4-40 x 1/4" PPSS screws from the Tilt COT sensor and remove the sensor.
- Step 7. Replace the Tilt COT Sensor onto the Tilt Sensor Bracket, and re-install Tilt Sensor Bracket.
- Step 8. Re-plug the Tilt COT Sensor into the Pan/Tilt Driver PCB card and re-install cable ties.
- Step 9. Set proper belt tension. Refer to "**Setting Pan/Tilt Belt Tension**" on page 106.

See Tilt COT illustration on next page:

Figure 3-52

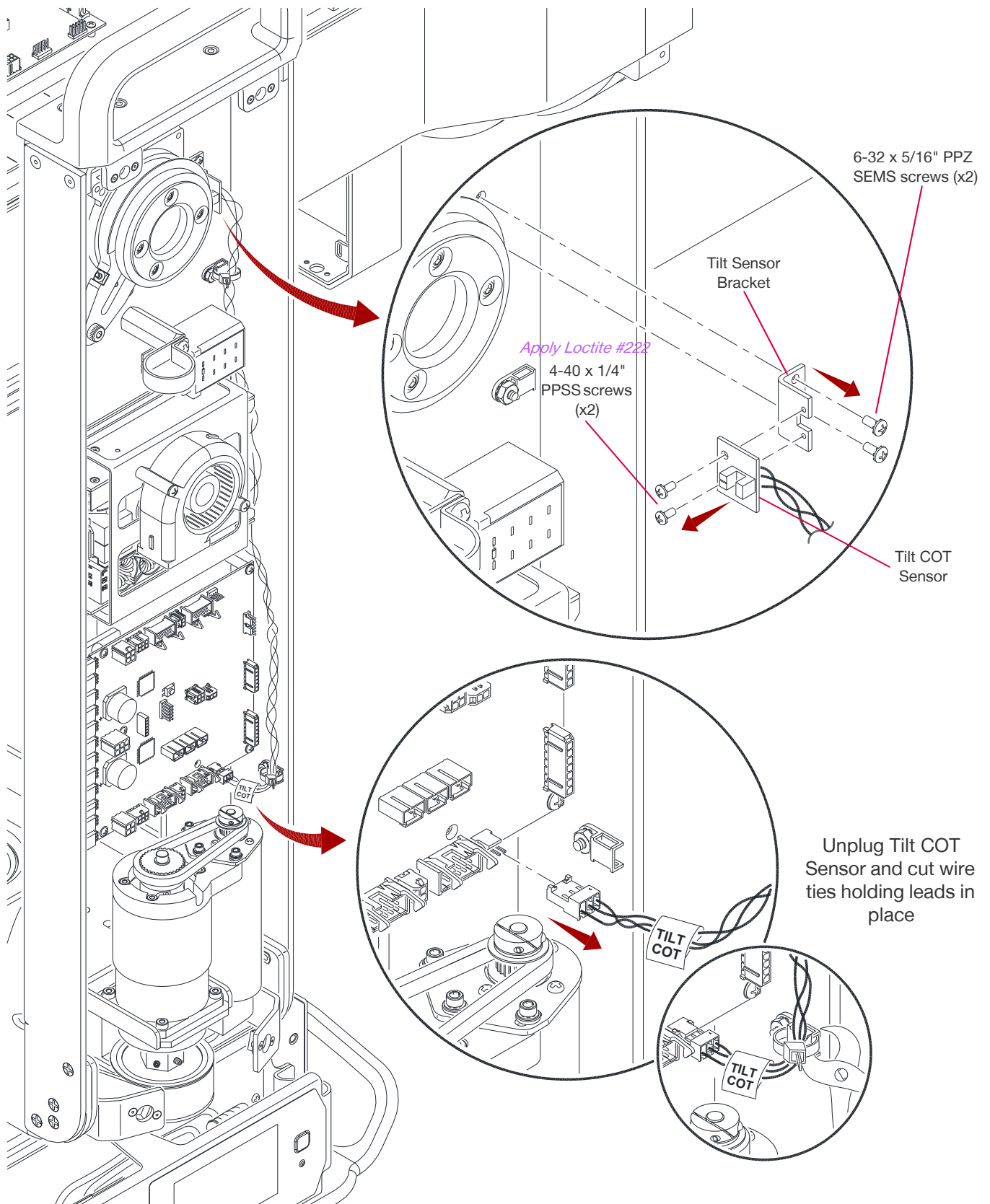


Figure 3-52: Replacing Tilt COT Sensor



Replacing the Tilt Aux Encoder

The Tilt Aux Encoder is located in the Tilt Side Leg, which is on the opposite side as the GCLT Camera, or by referencing the images in **Figure 1-3** and **Figure 1-5**.

Parts:

23.9834.0750 ASSY, PAN/TILT AUX ENCODER, GCLT

Tools:

#1 and #2 Phillips Screwdrivers
11/32" Nut Driver
Wire cutters
Cable ties



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace the Tilt Aux Encoder:

- Step 1. Remove power from the luminaire.
- Step 2. Remove Tilt Side Yoke Leg cover. (Refer to "**Removing Yoke Leg Covers**" on page 37)
- Step 3. Disconnect the Tilt Aux Encoder from its jumper; cut the cable ties holding the cable in place. Note cable tie placement for re-installation. See **Figure 3-53**
- Step 4. Remove the two 8-32 KEPS nuts holding the Tilt Aux Encoder in place, then remove the Tilt Aux Encoder.
- Step 5. Re-install the Tilt Aux Encoder by performing these steps in reverse.

See Tilt Aux Encoder illustration on next page:

Figure 3-53

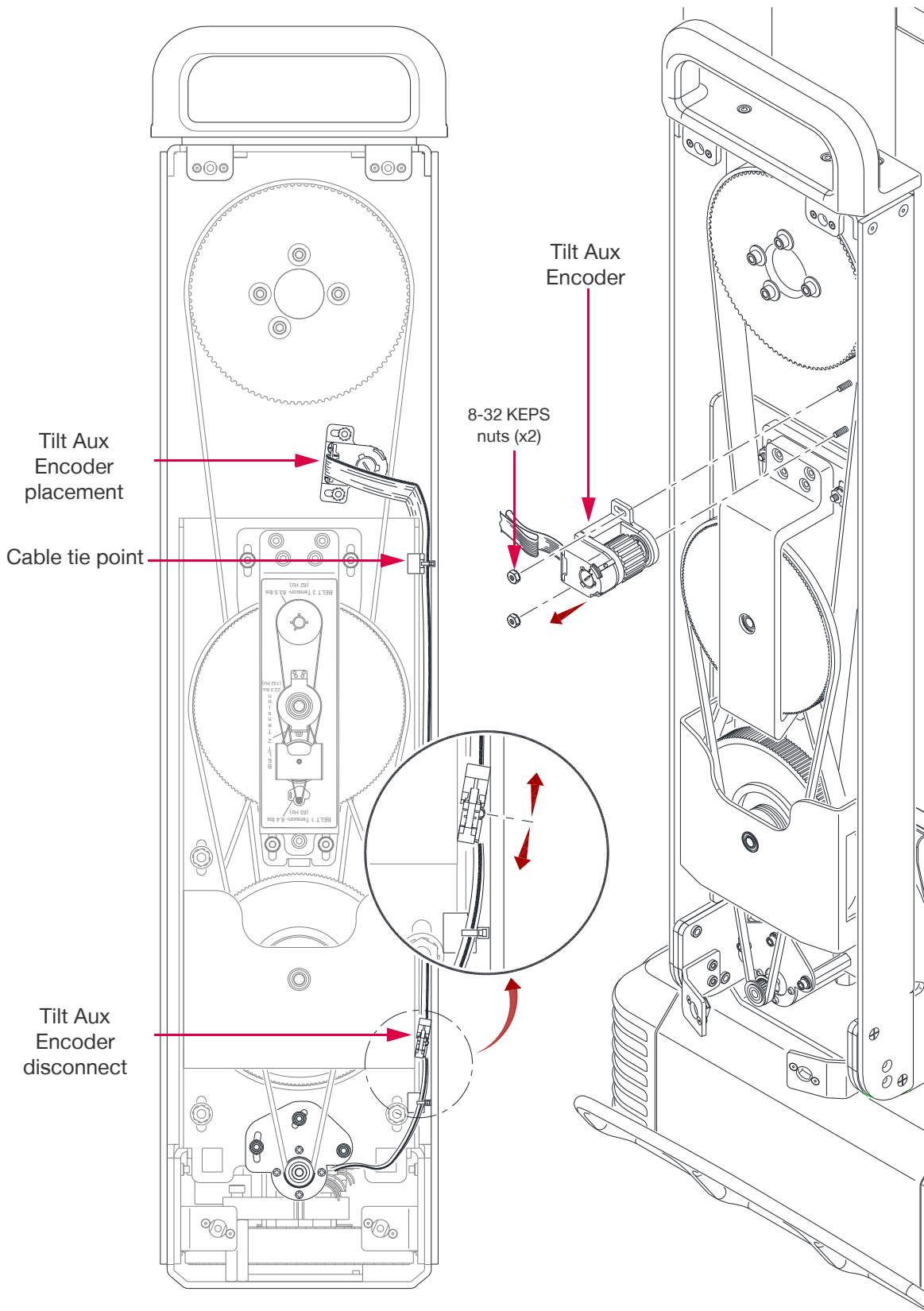


Figure 3-53: Replacing the Tilt AUX Encoder

Replacing the Tilt Mechanism

The Tilt Mechanism is located in the Tilt Side Leg, but plugs into the Pan Side Leg Pan/Tilt Driver PCB card. Reference the images in **Figure 1-3** and **Figure 1-5**.

Parts:

23.9834.0719 ASSY, TILT DRIVE MECHANISM

Tools:

#1 and #2 Phillips Screwdrivers
7/16" Nut Driver, socket wrench, or combination wrench
Wire cutters
Cable ties



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace the Tilt Mechanism:

- Step 1. Remove power from the luminaire.
- Step 2. Remove Tilt Side and Pan Side Yoke Leg covers. (Refer to "**Removing Yoke Leg Covers**" on page 37)
- Step 3. Remove the Pan Shield. (Refer to **Figure 3-51**, "**Replacing the PAN Mechanism**" on page 98.)
- Step 4. Disconnect the Tilt COT Encoder from the Tilt Mechanism. Refer to **Figure 3-52**, "**Replacing the Tilt COT Sensor**" on page 100).
- Step 5. Disconnect the Tilt Mechanism motor from the Pan/Tilt Driver PCB on the Pan-Side Yoke Arm and feed the cables through to the Tilt-Side Yoke Arm. See **Figure 3-49**, "**Replacing the Pan/Tilt Driver PCB**" on page 96.
- Step 6. Loosen the four 1/4-20 KEPS nuts on the Tilt Mechanism; slide the large belt, Belt 3, off of the Tilt Pulley. See **Figure 3-54**
- Step 7. Remove the four 1/4-20 KEPS nuts and 1/4" flat washers from the Tilt Mechanism.
- Step 8. Remove the Tilt Mechanism from the Tilt-Side Yoke Arm.
- Step 9. Re-install the Tilt Mechanism by following these steps in reverse.
- Step 10. Set proper belt tension. (Refer to "**Setting Pan/Tilt Belt Tension**" on page 106.)

See Tilt Mechanism illustration on next page:

Figure 3-54

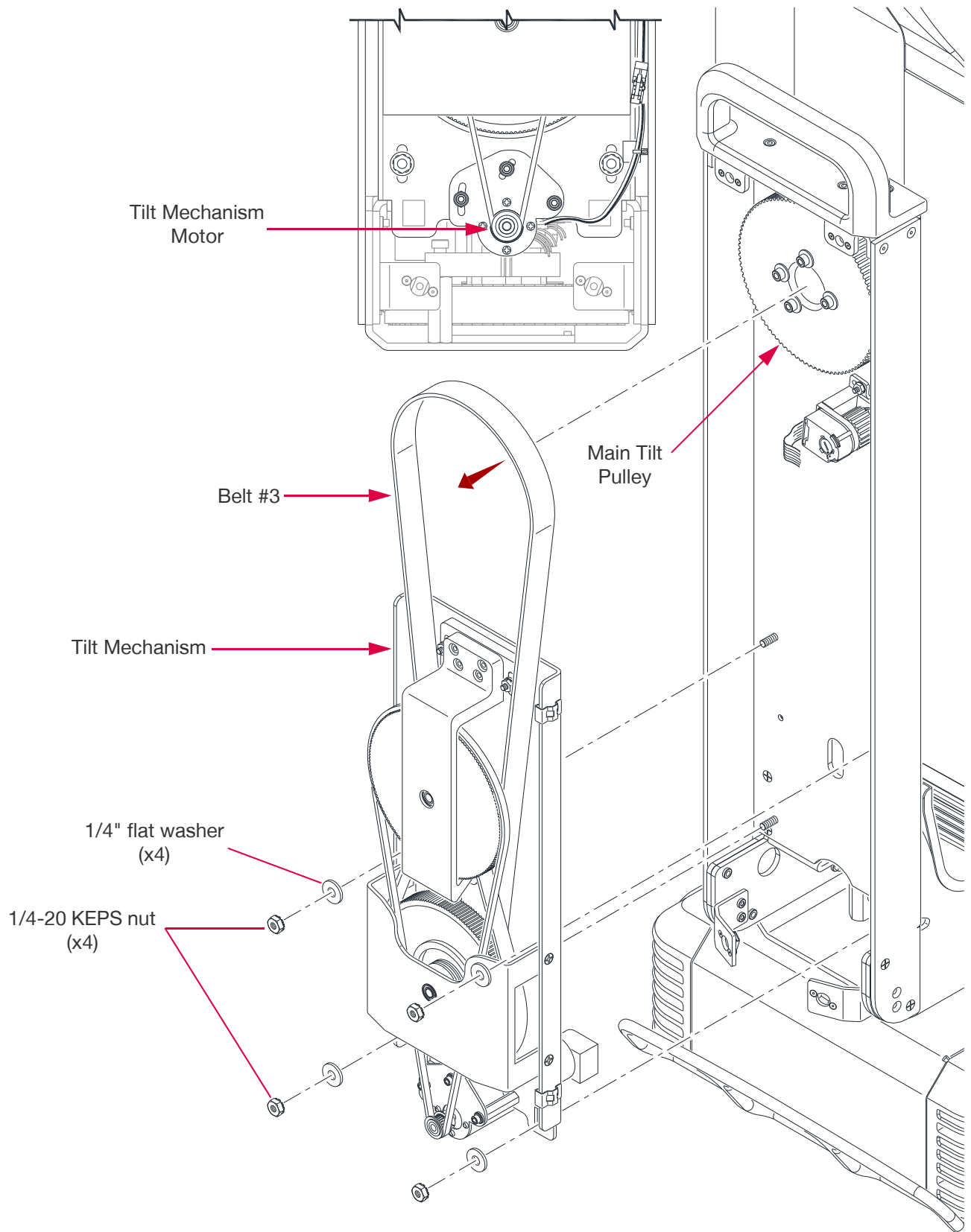


Figure 3-54: Replacing the Tilt Mechanism

Setting Pan/Tilt Belt Tension

Loose pan/tilt drive belts can create calibration problems and increase wear on the system. When the luminaire reaches the end of travel, excess belt slack can produce a vibration that causes the encoder to continue producing a movement output signal to the processor (even though the luminaire is at its stop).

When properly set, the belt should not show bilateral deflection. Bilateral deflection on drive belts can be defined as one side being tight, one side having slack; this may be observed by loosening the tension adjustment bolt(s) and rotating the head assembly. As the head is rotated back and forth, tension is created on one side and deflections are created on the other.

There are three ways to set proper belt tension:

- 1) Using a **Sonic Tension Meter** (recommended).
- 2) Using the **Easy Tension** App from Hutchinson Belt Drive Systems (Apple App Store and Google Play Store)
- 3) By manually tightening until no bilateral deflection is present.

When using the Sonic Tension Meter, it will be necessary to program separate presets for the Pan and Tilt Drive belts as follows -- the Easy Tension app utilizes frequency in Hertz, measurements listed below:

Preset	Belt	Mass	Width (mm)	Span (mm)	Tension (lbs.)	Frequency (Hz)
14	PAN Belt 1	2.8	6	64	2.3 lbs	197 Hz
15	PAN Belt 2	4.1	25	188	52.5 lbs	126 Hz
16	TILT Belt 1	2.8	6	326	6.4 lbs	63 Hz
17	TILT Belt 2	2.8	15	184	22.3 lbs	132 Hz
18	TILT Belt 3	4.1	25	468	83.5 lbs	62 Hz

Tools:

7/16" open-ended wrench, *or*

Sonic Tension Meter, Model 507C (07.3082.1052.0), *or*

Easy Tension App from Hutchinson Belt Drive Systems (Apple store/Google Play store)



CAUTION: Do not over-tighten belts! Pulleys will break and/or bearings will fail.

To set belt tension using the Sonic Tension meter:

- Step 1. Set Pan and Tilt presets on the Tension Meter for the specific belt being tensioned as given above.
- Step 2. Orient head as shown in **Figure 3-55** on next page.
- Step 3. Slowly tighten belt adjustment bolt(s).
Use Sonic Tension Meter to verify correct tension.



CAUTION: Do not overtighten belt! Pulley will break and/or bearings will fail.

To set belt tension manually:

- Step 1. Orient head as shown in **Figure 3-55**.
- Step 2. Manually move the luminaire head back and forth (tilt) or around (pan), noting the tension created on one side of belt and deflections on the other.
- Step 3. Using wrench, tighten belt adjustment bolt(s) until no bilateral deflection occurs.

PAN MECHANISM

Preset	Belt	Mass	Width (mm)	Span (mm)	Tension (lbs.)	Frequency (Hz)
14	PAN Belt 1	2.8	6	64	2.3 lbs	197 Hz
15	PAN Belt 2	4.1	25	188	52.5 lbs	126 Hz

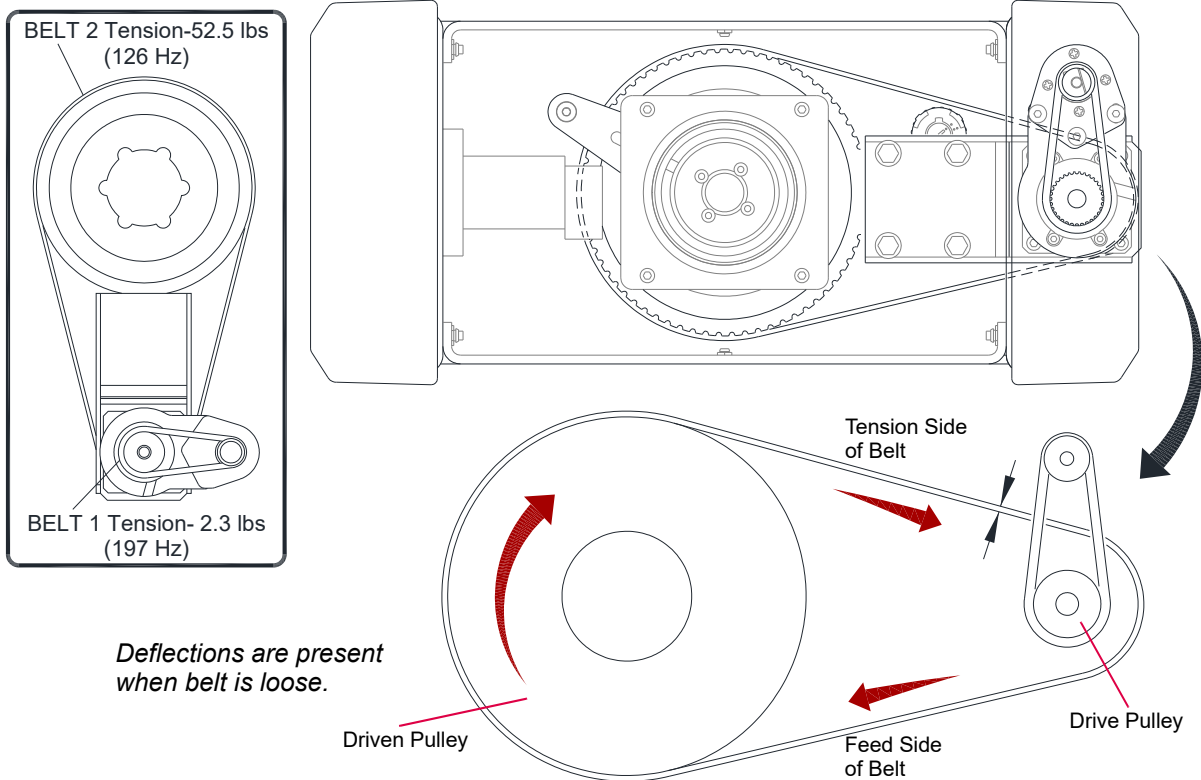
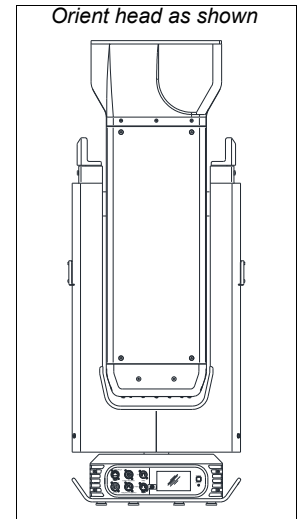


Figure 3-55: Belt Tension: PAN Details

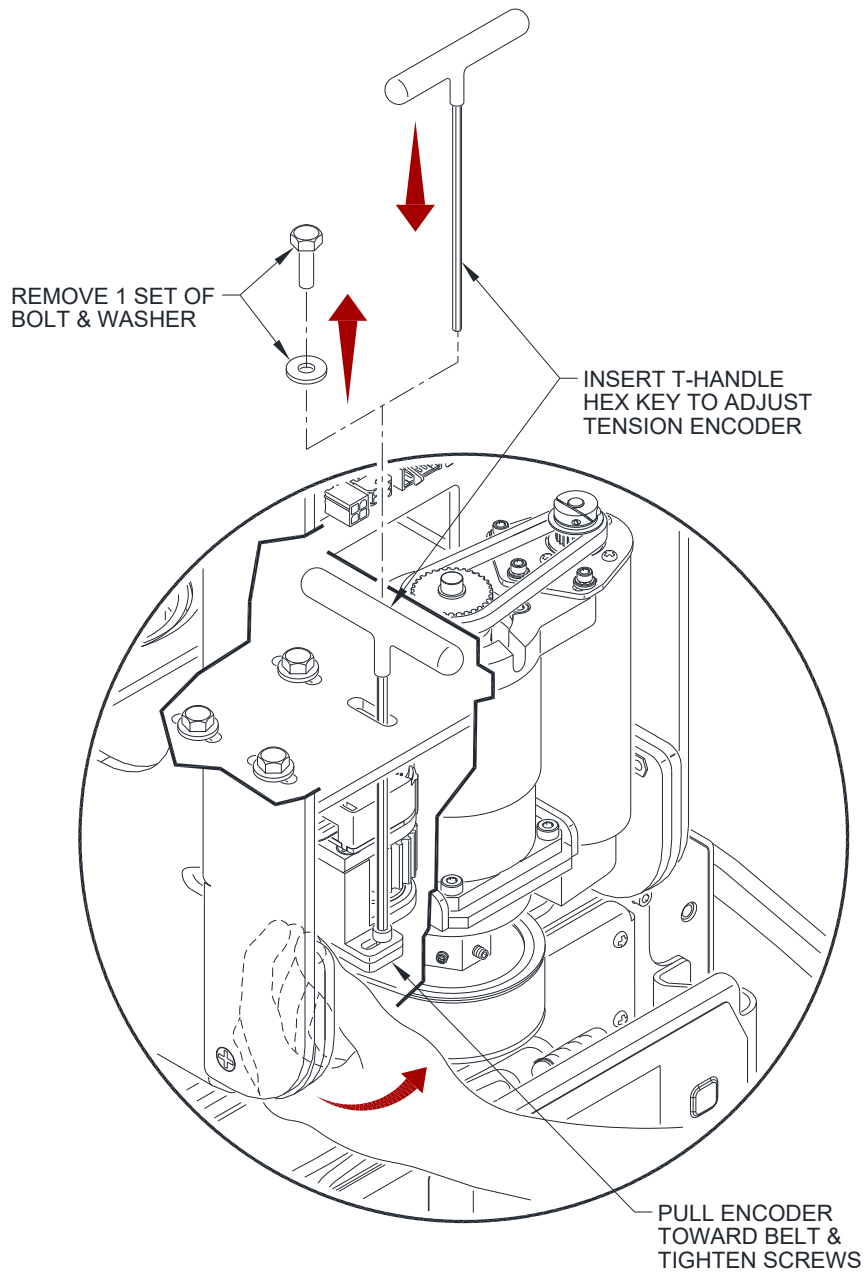


Figure 3-56: PAN Tension Encoder Detail

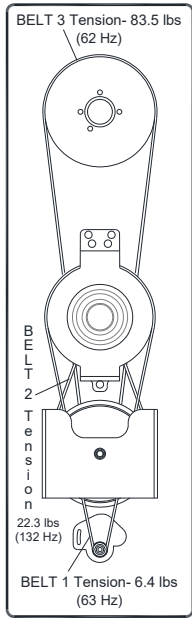
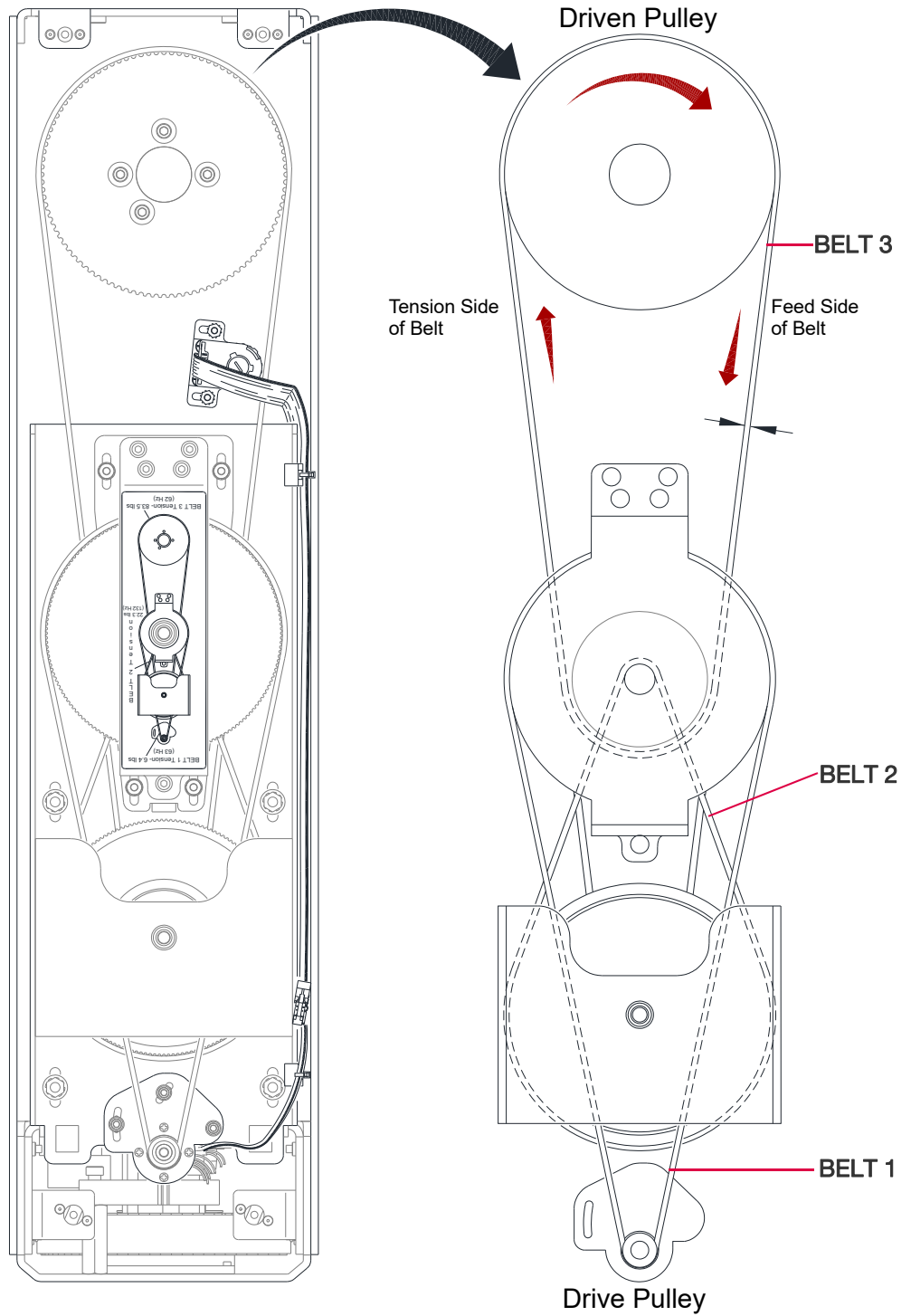


Figure 3-57: Belt Tension Adjustment - TILT Details

Preset	Belt	Mass	Width	Span	Tension	Frequency
16	TILT Belt 1	2.8mm	6mm	326mm	6.4 lbs	63 Hz
17	TILT Belt 2	2.8mm	15mm	184mm	22.3 lbs	132 Hz
18	TILT Belt 3	4.1mm	25mm	468mm	83.5 lbs	62 Hz

To set tension using the Easy Tension App:

- Step 1. Open the Easy Tension app on your Apple or Android device
- Step 2. Choose the "Frequency Meter" option on the app.
- Step 3. Hold the microphone end of your device as close to the belt to be measured as possible for best reading. The screen will turn from white with a gold "wave" to blue with a gold wave.
- Step 4. Tap the "Measurement" button on the screen, and use your index finger to "pluck" the belt you want to measure. Strikes of the belt must be frank and repeated until you receive a validated measurement. The validation will occur in Hertz, and the screen will turn white, with a green checkmark next to the measurement.
- Step 5. Perform at least three measurements to accurately determine belt tension.

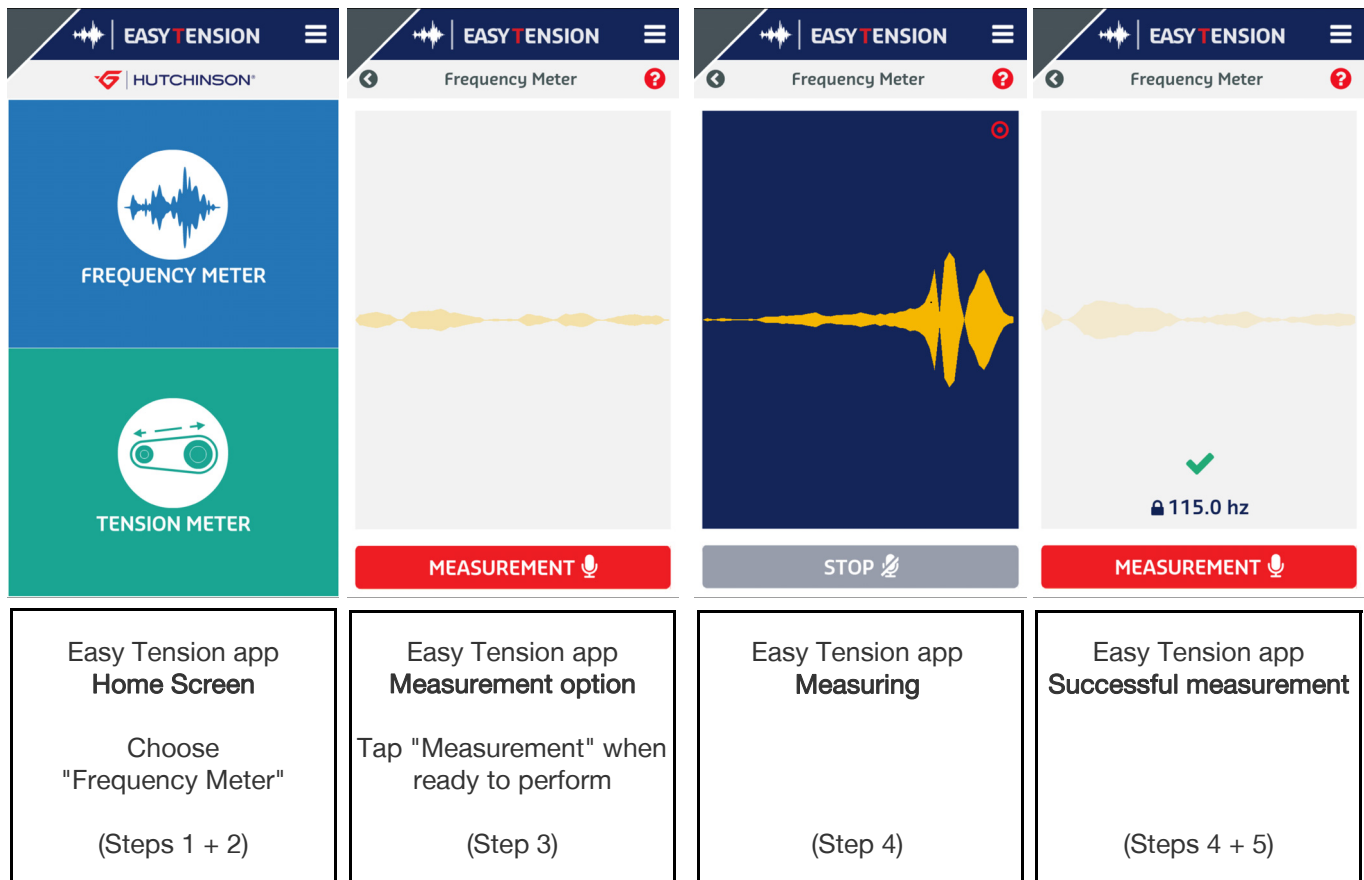


Figure 3-58: Testing Belt Tension with the Easy Tension App

Removing the GCLT Interface/LVS

Parts:

21.9834.0811 ASSY, INTERFACE/LVS, GCLT

Tools:

#2 Phillips Screwdriver
5/32" Hex key or T-Handle



WARNING! Remove power from luminaire before performing any maintenance procedures.



CAUTION: Use anti-static precautions when working on the Interface/LVS or any PCBs in the luminaire.

To remove the GCLT Interface/LVS:

- Step 1. Remove power from the luminaire.
- Step 2. Remove the Interface Cover. (Refer to "[Removing Upper Enclosure Covers](#)" on page 41)
- Step 3. Remove the one 10-32 x 1/4" PPB SEMS screw securing the Chassis Ground to the Upper Enclosure. ([Figure 3-59](#))
- Step 4. Remove the four 10-32 x 3/4" socket head cap screws securing the Interface to the Upper Enclosure. ([Figure 3-59](#))
- Step 5. Gently pull the Interface/LVS out a few inches so that you can access the PCB and ballast connections that now must be disconnected. Disconnect connections from the Ballast and from the Yoke. ([Figure 3-60](#))
- Step 6. Gently remove the Interface/LVS by pulling directly out of the Upper Enclosure while checking cable clearances and pinch points.
- Step 7. Re-install by following these steps in reverse; assure accuracy of all connections during re-installation.

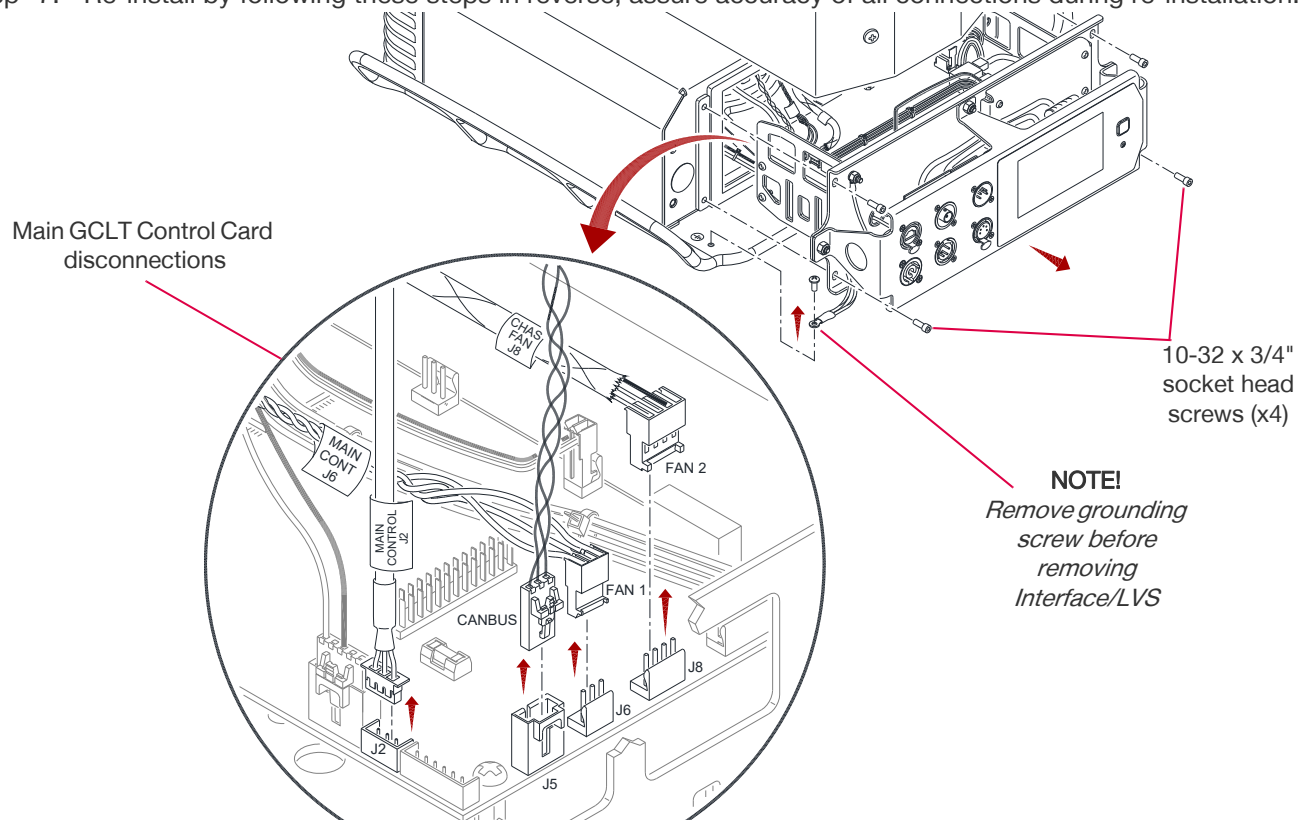


Figure 3-59: Removing the Interface/LVS, Part 1

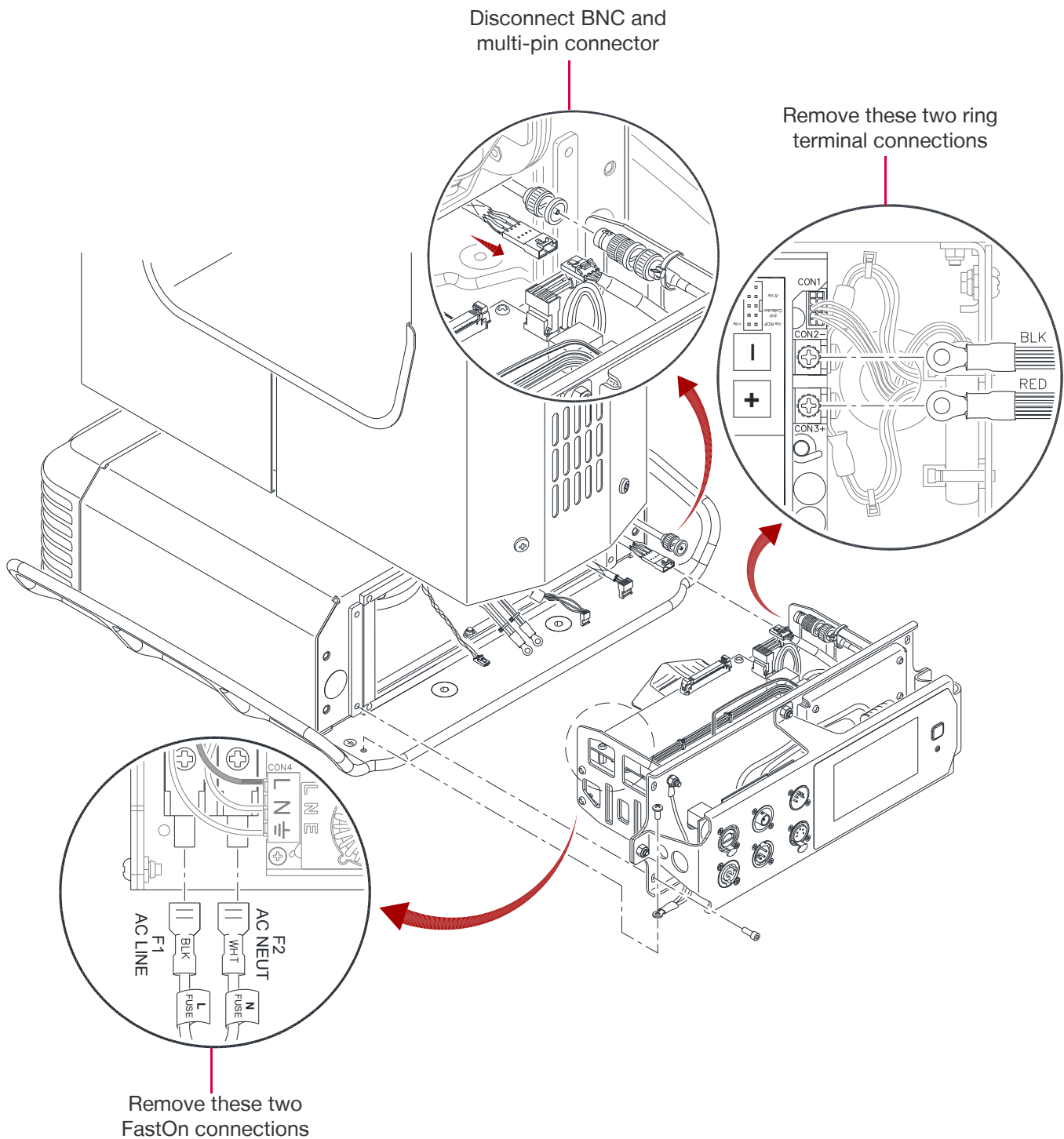


Figure 3-60: Removing the Interface/LVS, Part 2

Removing the Interface/LVS Front Panel

GCLT's low voltage supply in the Interface/Front Panel provides low voltage power to everything in the fixture except the Pan and Tilt system, which has its own 48V supply.

Tools:

- 5/16" Nut Driver
- #2 Phillips Screwdriver



WARNING! Remove power from luminaire before performing any maintenance procedures.



CAUTION: Use anti-static precautions when working on the Interface/LVS or any PCBs in the luminaire.

To remove the Front Panel on the GCLT Interface/LVS:

- Step 1. Remove power from the luminaire.
- Step 2. Remove the Interface Cover. (Refer to "Removing Upper Enclosure Covers" on page 41)
- Step 3. Remove the Interface/LVS from Upper Enclosure. (Refer to "Removing the GCLT Interface/LVS" on page 111)
- Step 4. Remove one 8-32 x 0.375" screw from the bottom of the Interface Front Panel. (Figure 3-61)
- Step 5. Remove the three 8-32 nylon insert nuts securing the Front panel to the LVS. (Figure 3-61)
- Step 6. Re-attach by following these steps in reverse.

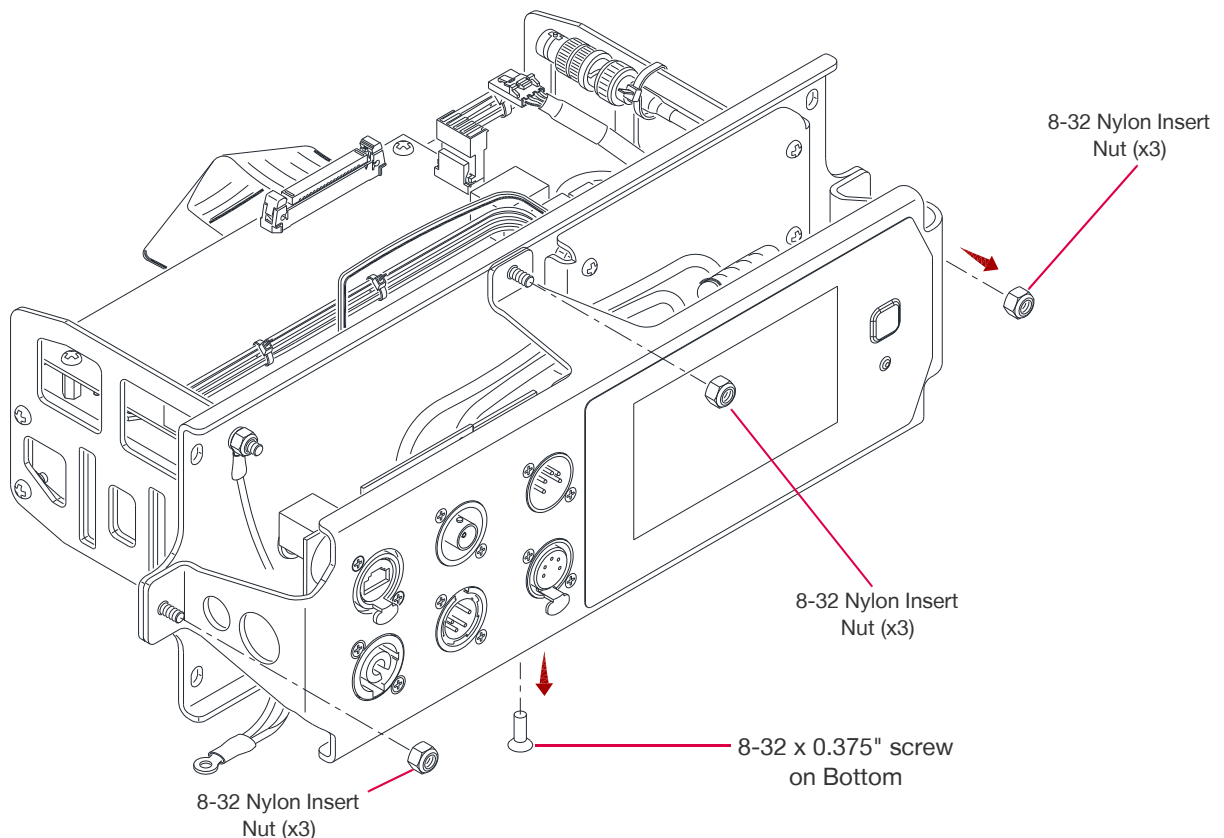


Figure 3-61: Removing the Interface/LVS Front Panel

Removing Interface/LVS Main Controller PCB

Parts:

24.9816.0840.06 PCB ASSY, MAIN CTL - GCLT

Tools:

#2 Phillips Screwdriver
1/4" Nut Driver



WARNING! Remove power from luminaire before performing any maintenance procedures.



CAUTION: Use anti-static precautions when working on the Interface/LVS or any PCBs in the luminaire.

To remove the GCLT Interface/LVS Main Controller PCB:

- Step 1. Remove power from luminaire.
- Step 2. Remove the Interface Cover. (Refer to "Removing Upper Enclosure Covers" on page 41)
- Step 3. Remove the Interface/LVS from Upper Enclosure. (Refer to "Removing the GCLT Interface/LVS" on page 111)
- Step 4. Disconnect all connections from the Main Interface PCB.
- Step 5. Remove the four 6-32 x 1/4" PPSS screws from the Main Controller PCB; these screws are mounted into 6-32 x 1/4" hex standoffs under the card, so if these come loose while removing the card, they will need to be re-mounted into the Interface. **(Figure 3-62)**
- Step 6. Re-install by performing these steps in reverse.

Apply Loctite #242

6-32 x 1/4" Hex
Standoffs (x4)

Mount into Interface,
Card mounts to standoffs

Apply Loctite #242

6-32 x 1/4" PPSS screws (x4)

Card mounts to standoffs

Interface/LVS body

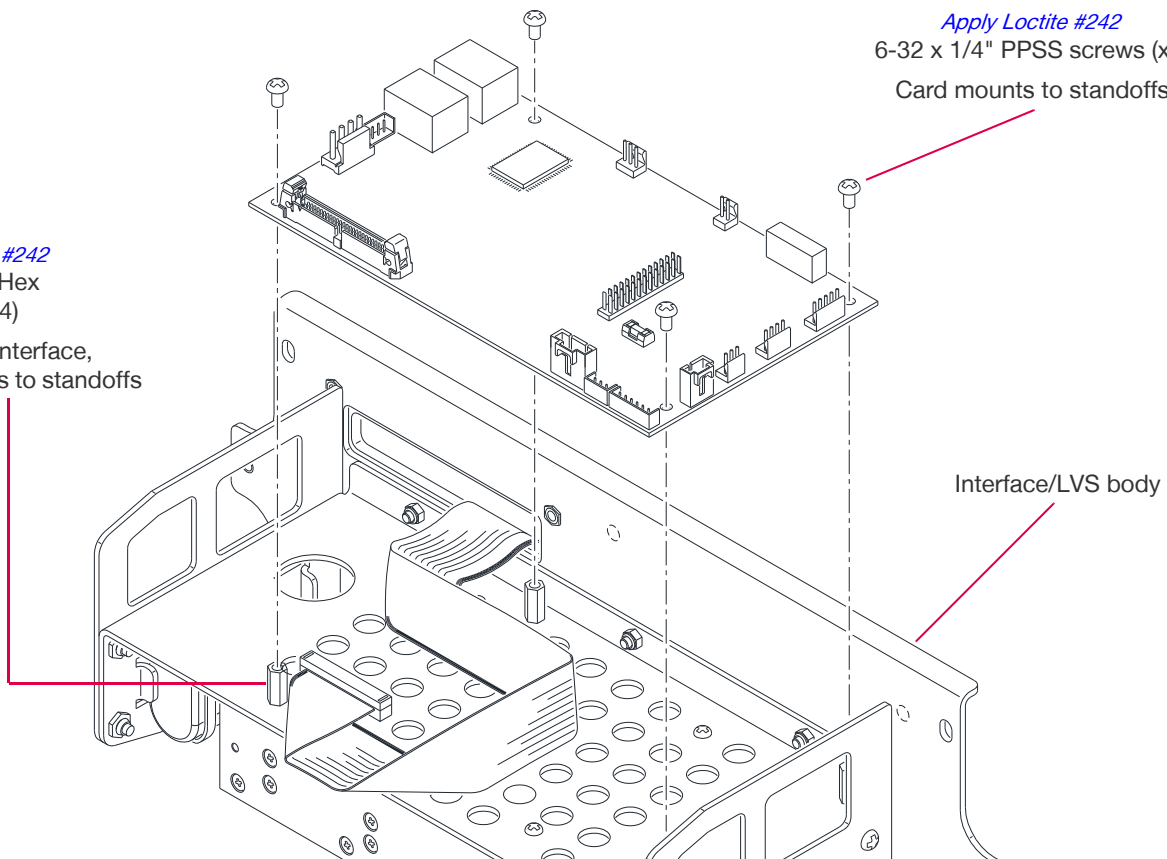


Figure 3-62: Removing the Interface/LVS Main Controller PCB

Removing the Interface/LVS Power Supply

Parts:

69.3132.0002.0 POWER SUPPLY, 250W +24V/10.4A OUT +5V/0.5A AUX CCM250PS24

Tools:

#1 and #2 Screwdrivers
1/4" Nut Driver



WARNING! Remove power from luminaire before performing any maintenance procedures.



CAUTION: Use anti-static precautions when working on the Interface/LVS or any PCBs in the luminaire.

To remove the GCLT Interface/LVS Power Supply:

- Step 1. Remove power from luminaire.
- Step 2. Remove the Interface Cover. (Refer to "Removing Upper Enclosure Covers" on page 41)
- Step 3. Remove the Interface/LVS from Upper Enclosure. (Refer to "Removing the GCLT Interface/LVS" on page 111)
- Step 4. Remove Interface/LVS Main Controller PCB. (Refer to "Removing Interface/LVS Main Controller PCB" on page 114)
- Step 5. Flip the Interface over, as the power supply is mounted under the Interface; unplug and unscrew all wire connections to power supply, then flip the Interface right side up. (Figure 3-63)
- Step 6. Remove the four M3 x 5 screws that hold the Power Supply to the Interface body. (Figure 3-64)
- Step 7. Re-install by performing these steps in reverse.

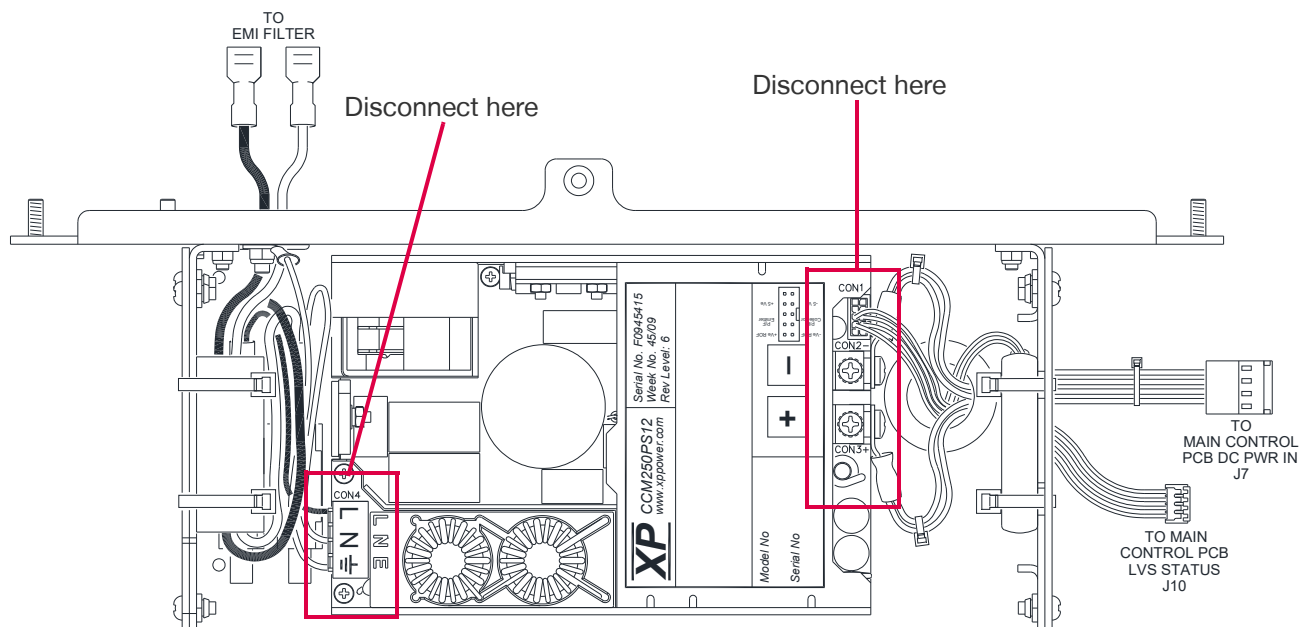


Figure 3-63: Interface Power Supply Connections

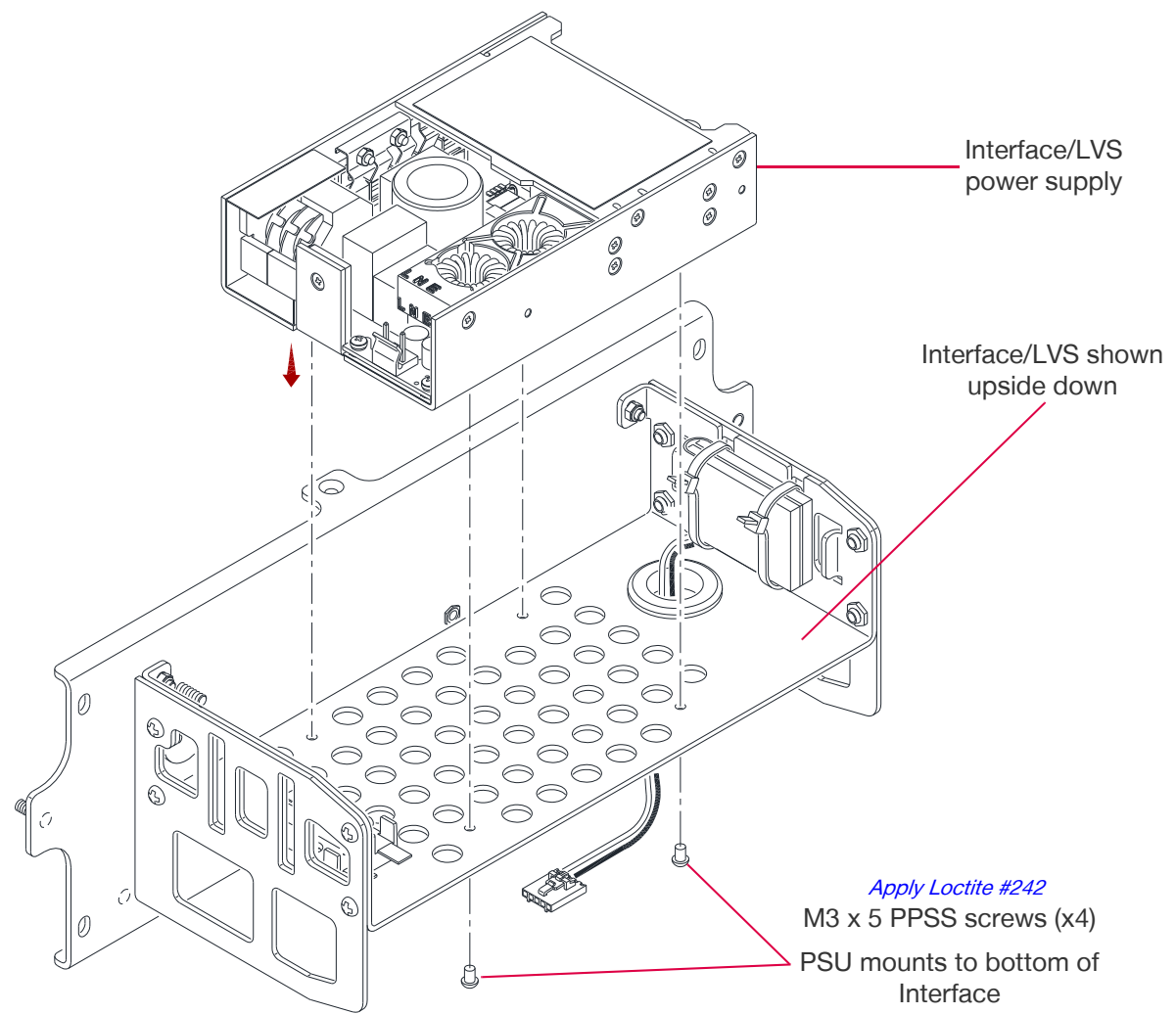
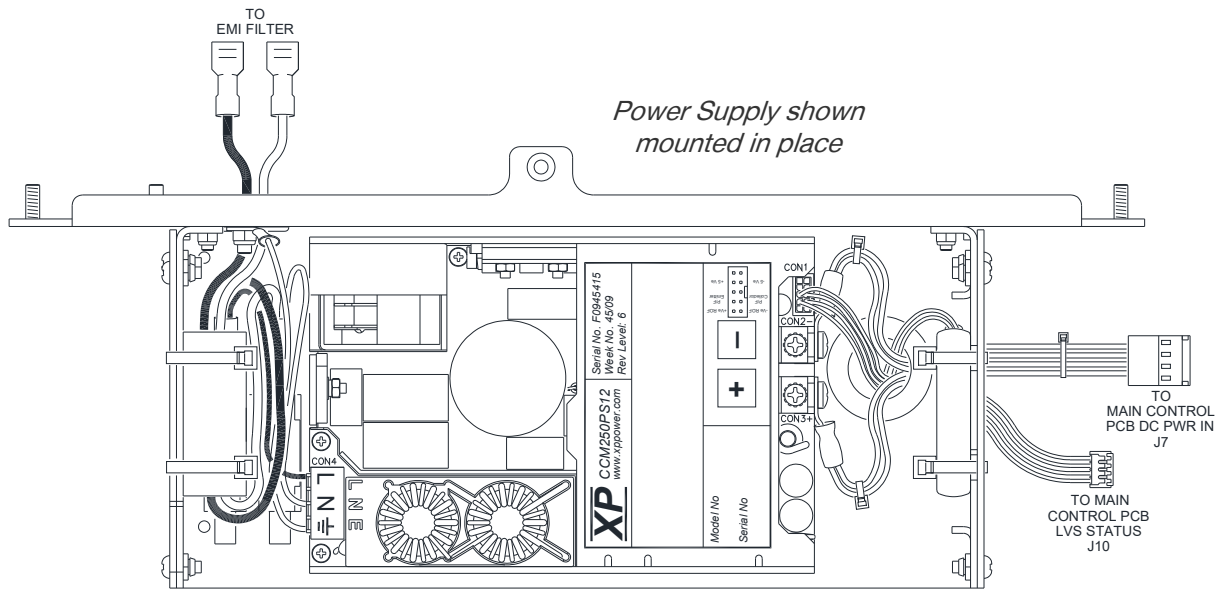


Figure 3-64: Removing the Interface/LVS Power Supply



Removing the GCLT Ballast

Parts:

21.9834.0810 ASSY, BALLAST, GCLT

Tools:

#2 Phillips Screwdriver
5/32" Hex key or T-handle



WARNING! Remove power from luminaire before performing any maintenance procedures.



CAUTION: Use anti-static precautions when working on the Interface/LVS or any PCBs in the luminaire.



CAUTION: Use caution when removing the Ballast from the Upper Enclosure.

To remove the GCLT Ballast:

- Step 1. Remove power from luminaire.
- Step 2. Remove both Upper Enclosure covers. (Refer to "[Removing Upper Enclosure Covers](#)" on page 41)
- Step 3. To disconnect Ballast wiring, partially remove the Interface/LVS Assembly: (See **Figure 3-59**)
 - a. Remove the four 10-32 x 3/4" socket head screws from the front of the Interface/LVS assembly.
 - b. Remove the one 10-32 x 3/8" PPB screw securing the ground wire lug.
 - c. Pull the Interface/LVS assembly out enough to access wiring.
 - d. Disconnect the AC wires and Main Control wire from the Interface/LVS.
- Step 4. At the Ballast, remove the four 10-32 x 3/4" socket head screws and carefully pull the Ballast out of the enclosure. You will only be able to remove the Ballast an inch or so, use care.
- Step 5. Disconnect the Relay wires and Ground Cable from the rear of the Ballast assembly.
- Step 6. Twist the Fan Cable connector to disconnect it from the Upper Enclosure.
- Step 7. Remove the Ballast from the Upper Enclosure.
- Step 8. Install new ballast by performing these steps in reverse.

See GCLT Ballast illustration on next page:

Figure 3-65

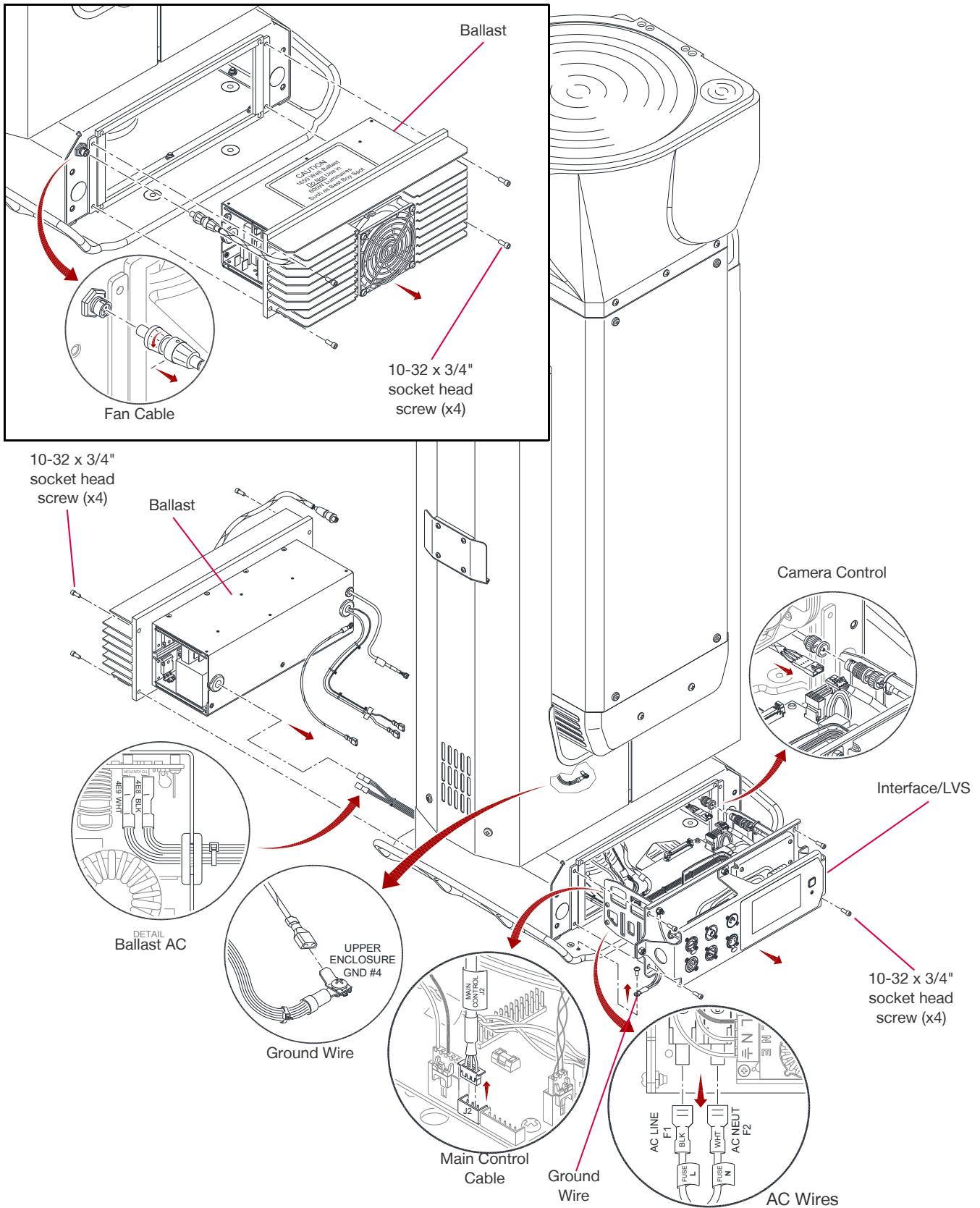


Figure 3-65: Removing the GCLT Ballast

Replacing Ballast Fan

Parts:

25.9816.0991 CABLE ASSY, BALLAST HEATSINK FAN BEST BOY

Tools:

#2 Phillips Screwdriver
Loctite #242 (06.6008.0001)



WARNING! Remove power from luminaire before performing any maintenance procedures.

To replace the GCLT Ballast Fan:

- Step 1. Remove power from the luminaire.
- Step 2. Remove the Ballast-Side Enclosure Cover. (Refer to "Removing Upper Enclosure Covers" on page 41)
- Step 3. Disconnect Fan Cable by twisting connector. (**Figure 3-66**)
- Step 4. At the Ballast Fan, remove the four 8-32 x 1-1/2" PPZ screws. ("Replacing Ballast Fan" on page 119)
- Step 5. Remove Mesh Screen and Ballast Fan.
- Step 6. Install new Ballast Fan by performing steps in reverse. Apply Loctite #242 to Ballast Fan screws.

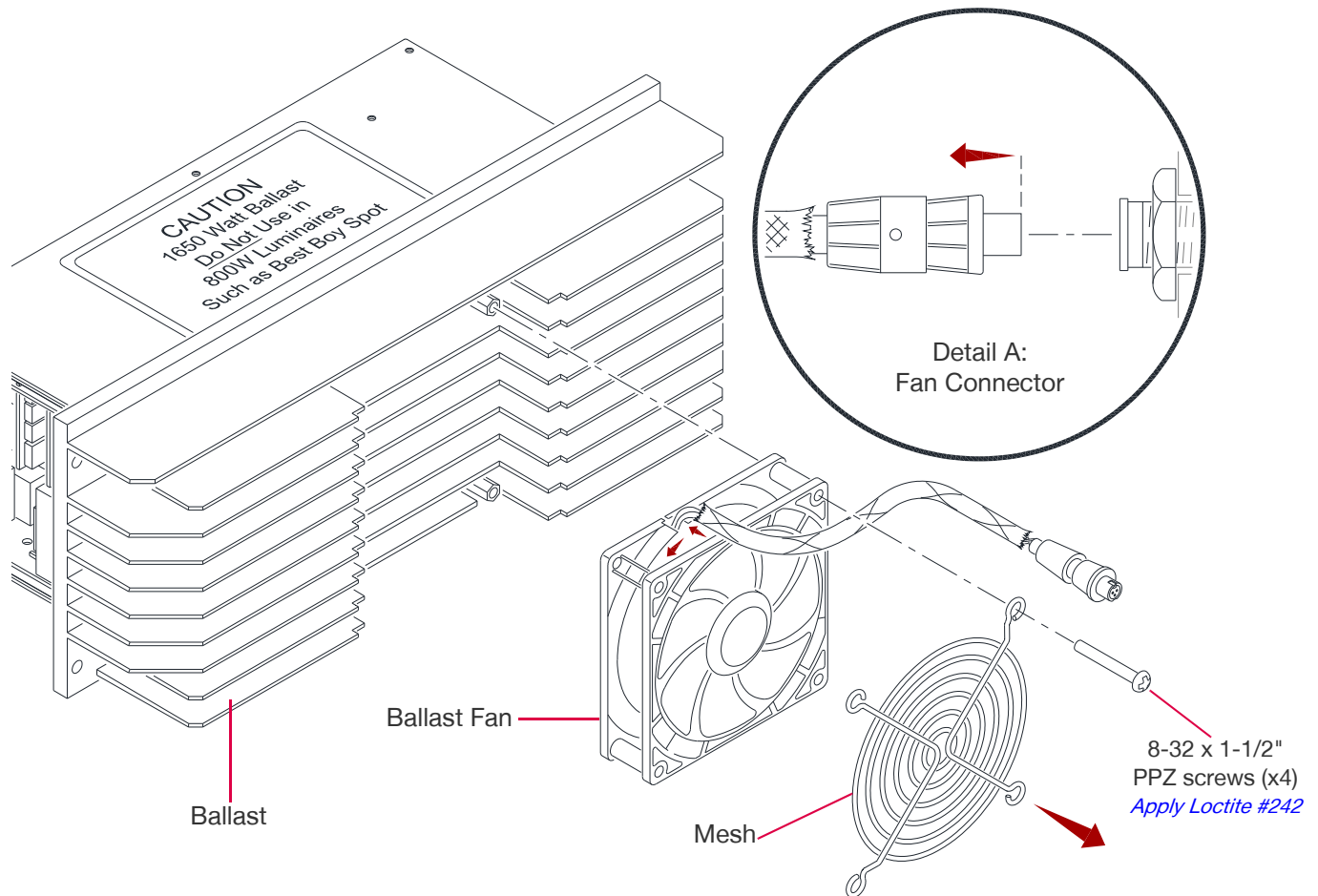


Figure 3-66: Replacing the Ballast Fan



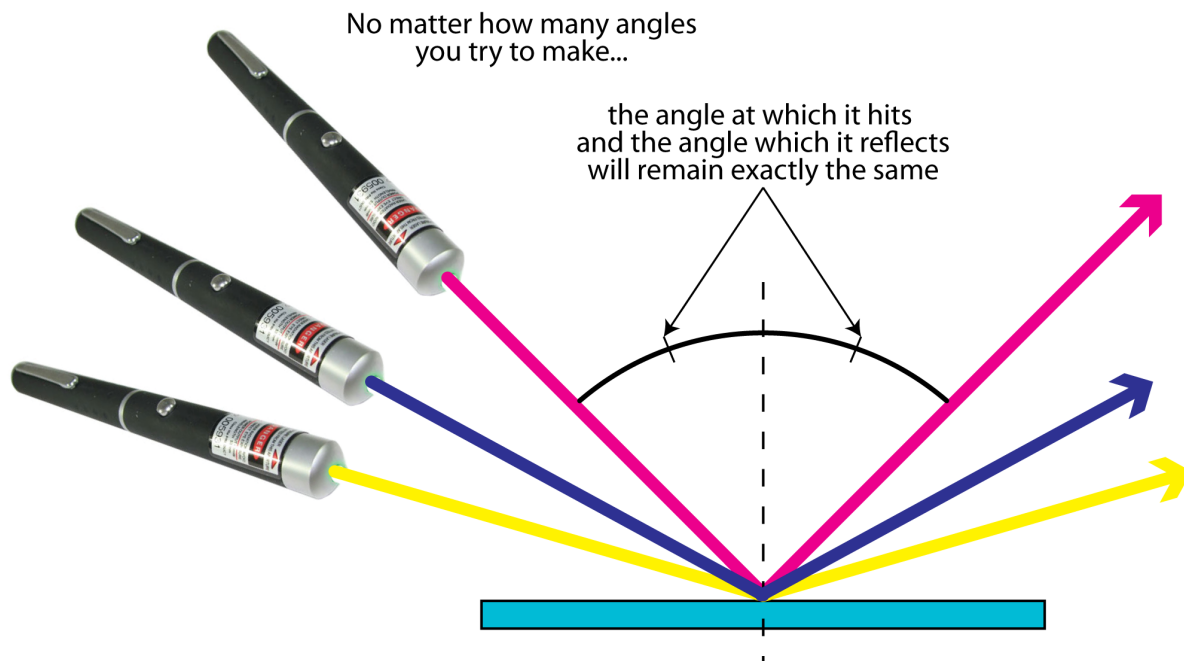
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But since you're here...

Do you know about the [Law of Reflection](#)?
It says "the **angle of incidence** is equal to the **angle of reflection**."

That means when you shine a flashlight or laser pen into a mirror (the incident light), it reflects off of the mirror at exactly the same angle it struck the mirror (the reflected light).

It's Physics!





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Did you know?

After 750 hours of use, GCLT lamps should be replaced and not used beyond 750 hours.
Don't forget to reset the Lamp Timer!



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Did you know?

The United States consumes 4 petawatts of electricity per year, on average.

That's 4.0×10^{15} watts: 4,000,000,000,000,000 W

That's about 5,333,333,333,333 incandescent ellipsoidals at 750W,
4,000,000,000,000 (that's four **trillion**) PAR64 lamps (1000W each),
2,453,987,730,061 Bad Boys, Best Boys, or GCLTs,
and 1,666,666,666,666 border lights running 2400W per circuit.

That's also:

2,857,142,857,142 coffee makers,
3,636,363,636,363 clothing irons,
5,128,205,128,205 really nice refrigerators,
44,943,820,224,719 PlayStation 4 units,
55,555,555,555,555 XBox One units,
and 800,000,000,000,000 (quadrillion) charging iPhones.



4.

ILLUSTRATED PARTS BREAKDOWN

This chapter provides illustrated parts breakdowns for all Longthrow luminaire spares components.

- + OVERVIEW
- + PARTS BREAKDOWN

OVERVIEW

About this IPB

The Illustrated Parts Breakdown is intended for use with Field Service of the luminaire. The items identified here match the spares assemblies which are supplied with the GroundControl Longthrow Spares Kit, along with basic components such as Covers and Mounting Brackets. This IPB is not a complete shop-level breakdown.

The GroundControl Longthrow luminaire includes the following assemblies, for reference:

21.9834.0020 LUMINAIRE W/O COVERS, GROUNDCONTROL LT

Note, this is not the Spares Kit list, this is sub-assembly part number list. Refer to [Itemized Parts List](#), page 126.

PRG P/N	TEAM Ecode	Qty	Description
21.9834.0200	374BP-109	1	ASSY, WHEEL STACK GCLT
21.9834.0600	-----	1	ASSY, HEAD GCLT
21.9834.0701	-----	1	ASSY, YOKE LEG TILT, GCLT
21.9834.0702	-----	1	ASSY, YOKE LEG PAN
21.9834.0718	374BP-116	1	ASSY, PAN DRIVE MECHANISM
21.9834.0719	374BP-119	1	ASSY, TILT DRIVE MECHANISM
21.9834.0800	-----	1	ASSY, UPPER ENCLOSURE GCLT
21.9834.0500	-----	1	ASSY, ZOOM GCLT
21.9834.0580	374BP-113	1	ASSY, FROST GC LONG THROW
21.9834.0616	-----	1	ASSY, UVIR WASH W/GLASS
21.9834.0670	-----	1	ASSY, XYZ, GCLT
21.9834.0810	374BP-122	1	ASSY, BALLAST, GCLT
21.9834.0811	374BP-125	1	ASSY, INTERFACE/LVS, GCLT
22.9834.0260	-----	1	ASSY, FRAME SHUTTER, GCLT
22.9834.0608	-----	1	ASSEMBLY, AFT BULKHEAD
22.9834.0690	374BP-131	1	ASSY, DIMMER GCLT
22.9834.0768	-----	1	ASSY, YOKE COVER MOUNTING BRACKET GCLT
23.9834.0660	-----	1	ASSY, ZOOM & WS DRIVER PCB MOUNT

Torque Chart

Unless otherwise specified, torque all fasteners as called out below:

TORQUE CHART	
SCREW SIZE	TORQUE IN-LBS
2-56	2.20
4-40	4.70
6-32	8.70
8-32	17.80
10-32	29.70
1/4-20	65.00

PARTS BREAKDOWN

GroundControl Longthrow Top Assembly

20.9834.0001 GROUNDCONTROL, LONGTHROW LUMINAIRE

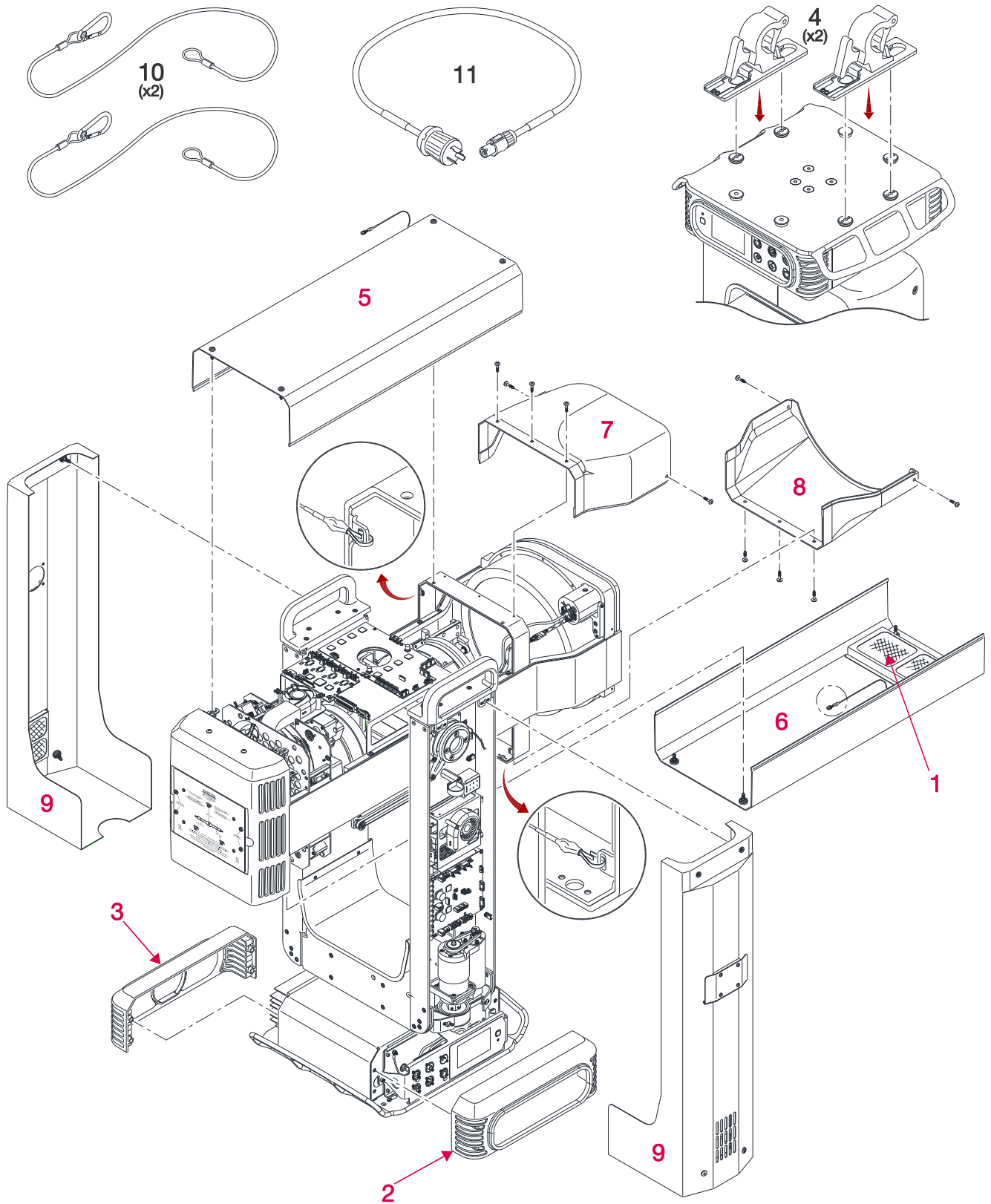
Note, this is not the Spares Kit list, this is sub-assembly part number list. Refer to [Itemized Parts List](#), page 126.

No.	PRG P/N	TEAM Ecode	Qty	UM	Description	Procedure
1	21.9834.0020	-----	1	EA	LUMINAIRE W/O COVERS, GROUNDCONTROL LT	---
2	21.9816.0820	-----	1	EA	ASSY, UE INTERFACE COVER	page 41
3	21.9816.0830	-----	1	EA	ASSY, UE BALLAST COVER	page 41
4	21.9816.0863	3749A-68	2	EA	ASSY, HOOK BRACKET	---
5	22.9834.1630	-----	1	EA	ASSY, HEAD COVER, GCLT	page 32
6	22.9834.1631	-----	1	EA	ASSY, BOTTOM HEAD COVER, GCLT	page 32
7	10.9834.0632	-----	1	EA	COVER FRONT, CAMERA SIDE, GCLT	page 33
8	10.9834.0633	-----	1	EA	COVER FRONT, BOTTOM SIDE, GCLT	page 33
9	22.9834.1716	-----	2	EA	ASSY, YOKE ARM SHEETMETAL COVER	page 37
10	22.9834.0033	27814-	2	EA	ASSY, SAFETY CABLE HEAVY DUTY	---
11	25.9812.0902.5	-----	1	EA	CABLE ASSY, AC LINE CORD 2.5' 14/3 L6-20P TO POWERCON	---
12	53.6619.0375.0	-----	10	EA	SCREW, 8-32 X 3/8" L PHILLIPS TRUSS HD SS BLACK ZINC <i>(for Front Covers)</i>	page 32

Refer to Top Assembly illustration on next page.

GroundControl Longthrow Top Assembly (continued)

Refer to [Top Assembly Parts List](#). Click on a [red call-out number](#) in the illustration to jump to repair procedure.



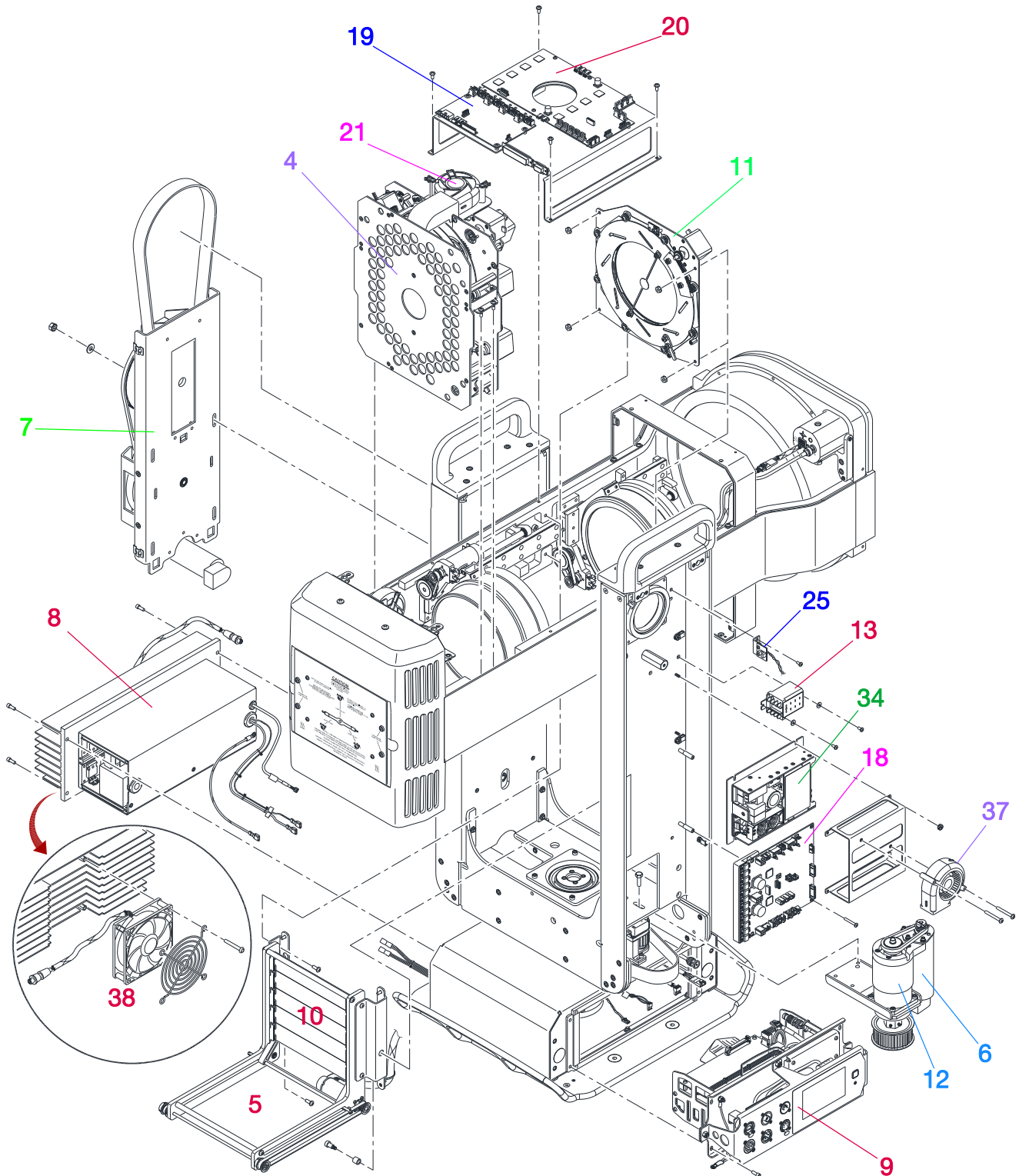
GroundControl Longthrow Spares Kit, Itemized List

No.	PRG P/N	TEAM Ecode	Qty	UM	Description	Procedure
1	10.9834.0661	374BP-101	4	EA	FOAM, HEAD AIR FILTER	page 40
2	12.9815.0787	3749H-P35	1	EA	IGNITOR, MODIFIED	page 90
3	20.9815.1229	374BP-106	1	EA	ASSY, ROAD CASE, WS BB WASH (MODIFIED FOAM)	page 31
4	21.9834.0200	374BP-109	1	EA	ASSY, WHEEL STACK GCLT	page 52
5	21.9834.0580	374BP-113	1	EA	ASSY, FROST GC LONG THROW	page 77
6	21.9834.0718	374BP-116	1	EA	ASSY, PAN DRIVE MECHANISM	page 98
7	21.9834.0719	374BP-119	1	EA	ASSY, TILT DRIVE MECHANISM	page 104
8	21.9834.0810	374BP-122	1	EA	ASSY, BALLAST, GCLT	page 117
9	21.9834.0811	374BP-125	1	EA	ASSY, INTERFACE/LVS, GCLT	page 111
10	22.9834.0584	374BP-128	1	EA	ASSY, PANELS, EXTRA-FINE, DIFFUSER, GCLT	page 77
11	22.9834.0690	374BP-131	1	EA	ASSY, DIMMER GCLT	page 66
12	22.9834.0783	374BP-134	1	EA	ASSY, CLUTCH, PAN GCLT	page 98
13	23.9812.3327	3749H-P12	1	EA	ASSY, HOT RELAY	page 93
14	23.9834.0519.01	374BP-140	1	EA	MOTOR ASSY, ZOOM LENS 1, GCLT	page 73
15	23.9834.0519.02	374BP-143	1	EA	MOTOR ASSY, ZOOM LENS 2, GCLT	page 75
16	23.9834.0519.03	374BP-146	1	EA	MOTOR ASSY, FROST, GCLT	page 77
17	23.9834.0750	374BP-149	1	EA	ASSY, PAN/TILT AUX ENCODER, GCLT	page 102
18	23.9834.0765	374BP-152	1	EA	ASSY, PAN TILT DRIVER GCLT	page 96
19	24.9812.0511.0	374BP-155	1	EA	PCB ASSY, ZOOM CONTROLLER	page 64
20	24.9815.0224	374BP-158	1	EA	PCB ASSY, WHEEL STACK INTERFACE	page 63
21	25.9815.0994	3749H-P31	1	EA	CABLE ASSY, HEAD FAN (SAN ACE)	page 61
22	25.9817.0992	3749D-P52	1	EA	CABLE ASSY, UE CHASSIS FAN 24V, BB HP SPOT	---
23	25.9834.0690	374BP-167	1	EA	CABLE ASSY, DIMMER EOT SENSOR	page 67
24	25.9834.0977	374BP-170	1	EA	CABLE ASSY, BACK FANS	page 79
25	25.9834.0981	374BP-173	1	EA	CABLE ASSY, TILT COT SENSOR	page 100
26	25.9834.0986	374BP-176	1	EA	CABLE ASSY, LENS 1 EOT SENSOR	page 69
27	25.9834.0987	374BP-179	1	EA	CABLE ASSY, LENS 2 EOT SENSOR	page 71
28	28.9812.1302	37493-T70	1	EA	KIT, BAD BOY OPTICS CLEANING	page 43
29	28.9834.1301	374BP-185	1	EA	HARDWARE, FIELD SERVICE, GCLT	---
30	42.9815.0161	3749H-P91	1	EA	RETRO-REFLECTOR, WASH	page 86
31	42.9816.0170	3749D-P09	1	EA	REFLECTOR, STEPPED 10 LUNES COATED	page 88
32	71.2521.0003.0	3749H-P82	1	EA	SOCKET, LAMP OSRAM - CUSTOM BRACKET SFc10-4BB 12/CS	page 35
33	74.2003.0001.0	3749H-P38	1	EA	SWITCH SAFETY, HIGH TEMP	page 85
34	23.9834.0770.01	-----	1	EA	ASSY, XP 48V DC POWER SUPPLY, GCLT	page 115
35	10.9834.0769	-----	4	EA	FILTER, YOKE EXHAUST GCLT	page 38
36	10.9834.0789	-----	4	EA	FILTER, YOKE INTAKE GCLT	page 38
37	25.9834.0996	-----	1	EA	CABLE ASSY, YOKE FAN, SAN ACE B76 24V GCLT	page 91
38	25.9816.0991	3749A-R10	1	EA	CABLE ASSY, BALLAST HEATSINK FAN BEST BOY	page 119
39	74.1034.0001	-----	1	EA	SWITCH, THERMAL 15AMP 315 DEGREE F OPEN	page 84
40	21.9834.0616	-----	1	EA	ASSY, UVIR WASH W/ UVIR GLASS, GCLT	page 86

GroundControl Longthrow Spares Kit, Exploded

Refer to [Itemized Parts List](#).

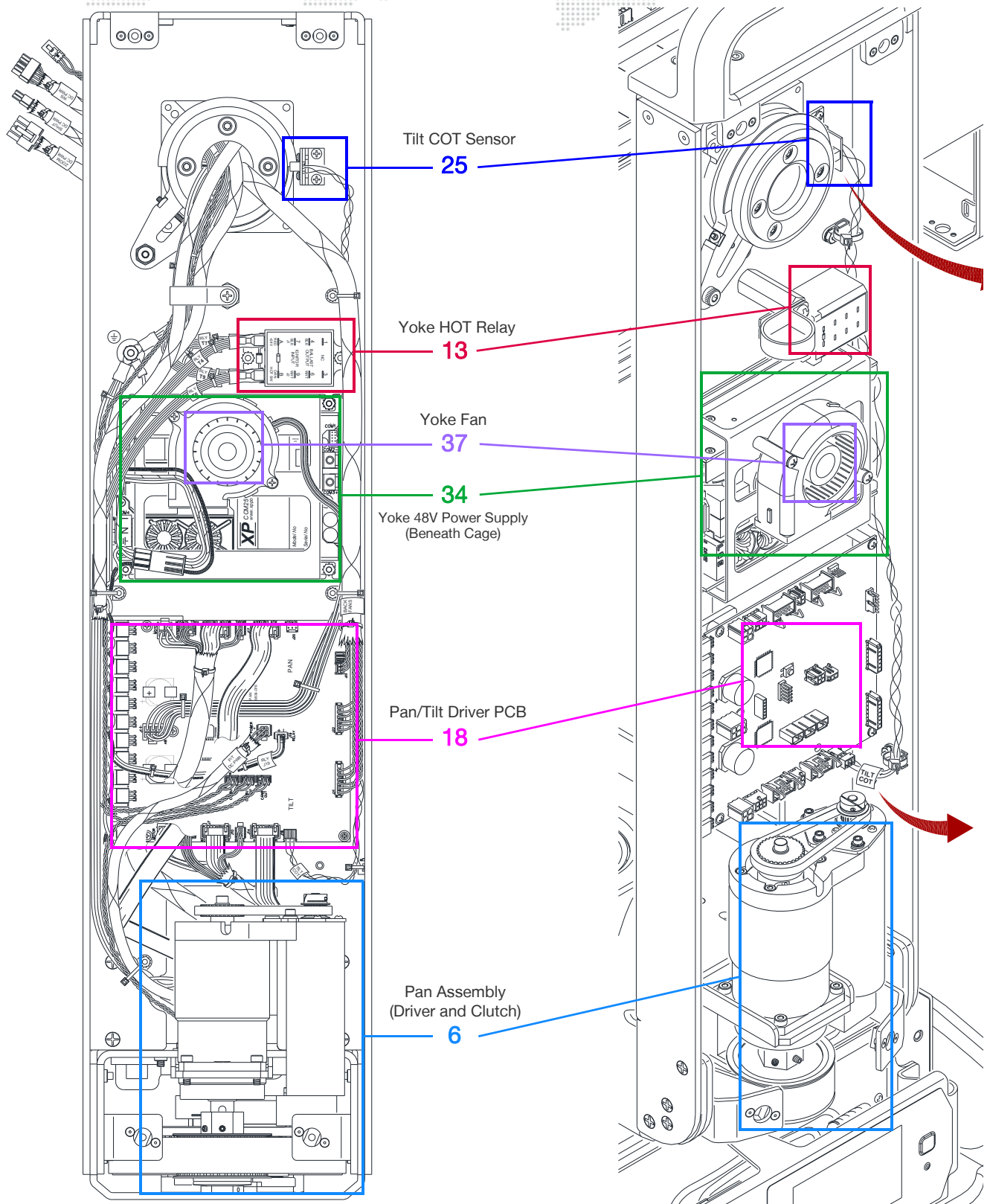
Click on a [colored call-out number](#) or directly on the component in the illustration to jump to that repair procedure.



GroundControl Longthrow Spares Kit, Pan-Side Yoke Leg

Refer to [Itemized Parts List](#).

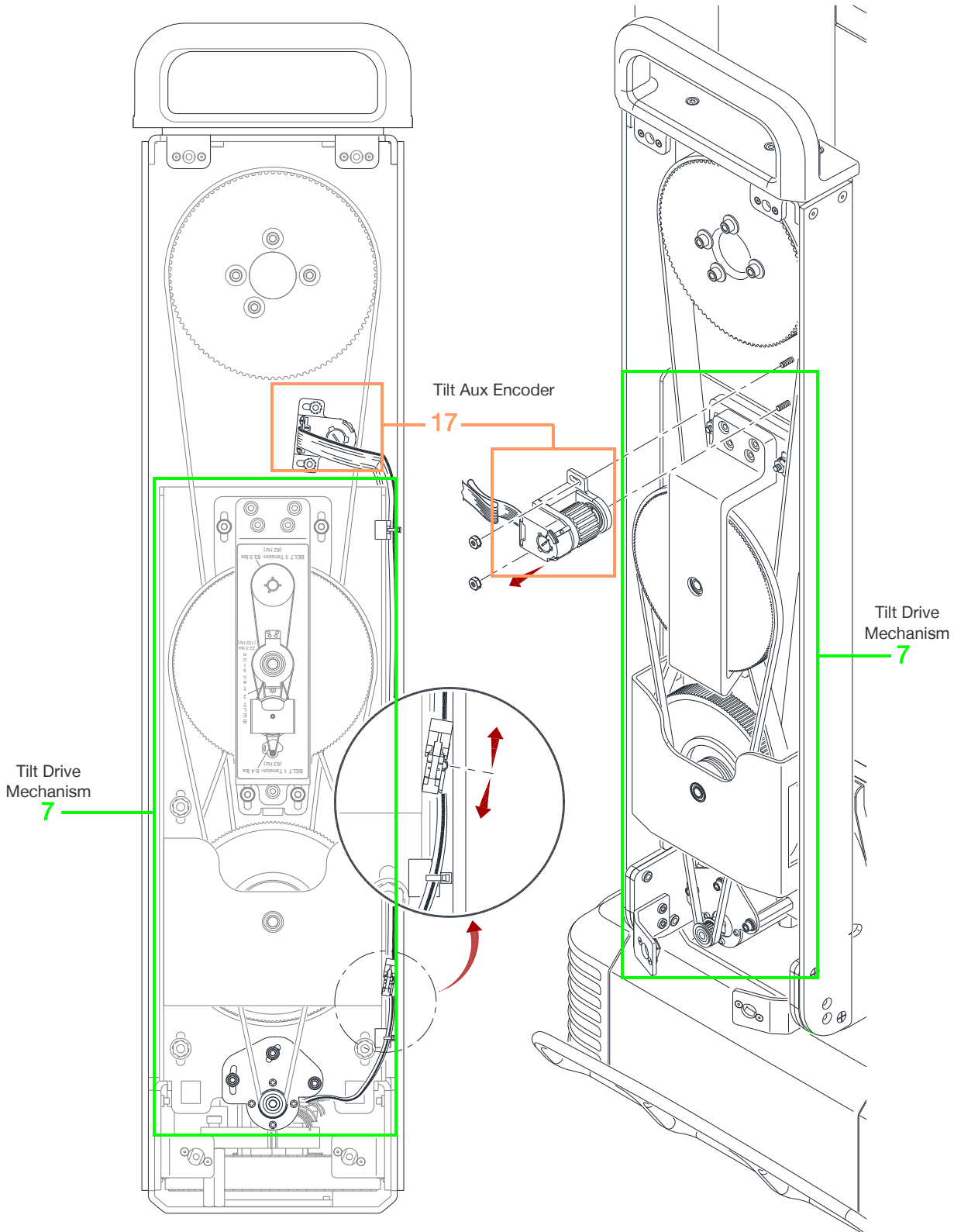
Click on a [colored call-out number](#) or directly on the component in the illustration to jump to that repair procedure.



GroundControl Longthrow Spares Kit, Tilt-Side Yoke Leg

Refer to [Itemized Parts List](#).

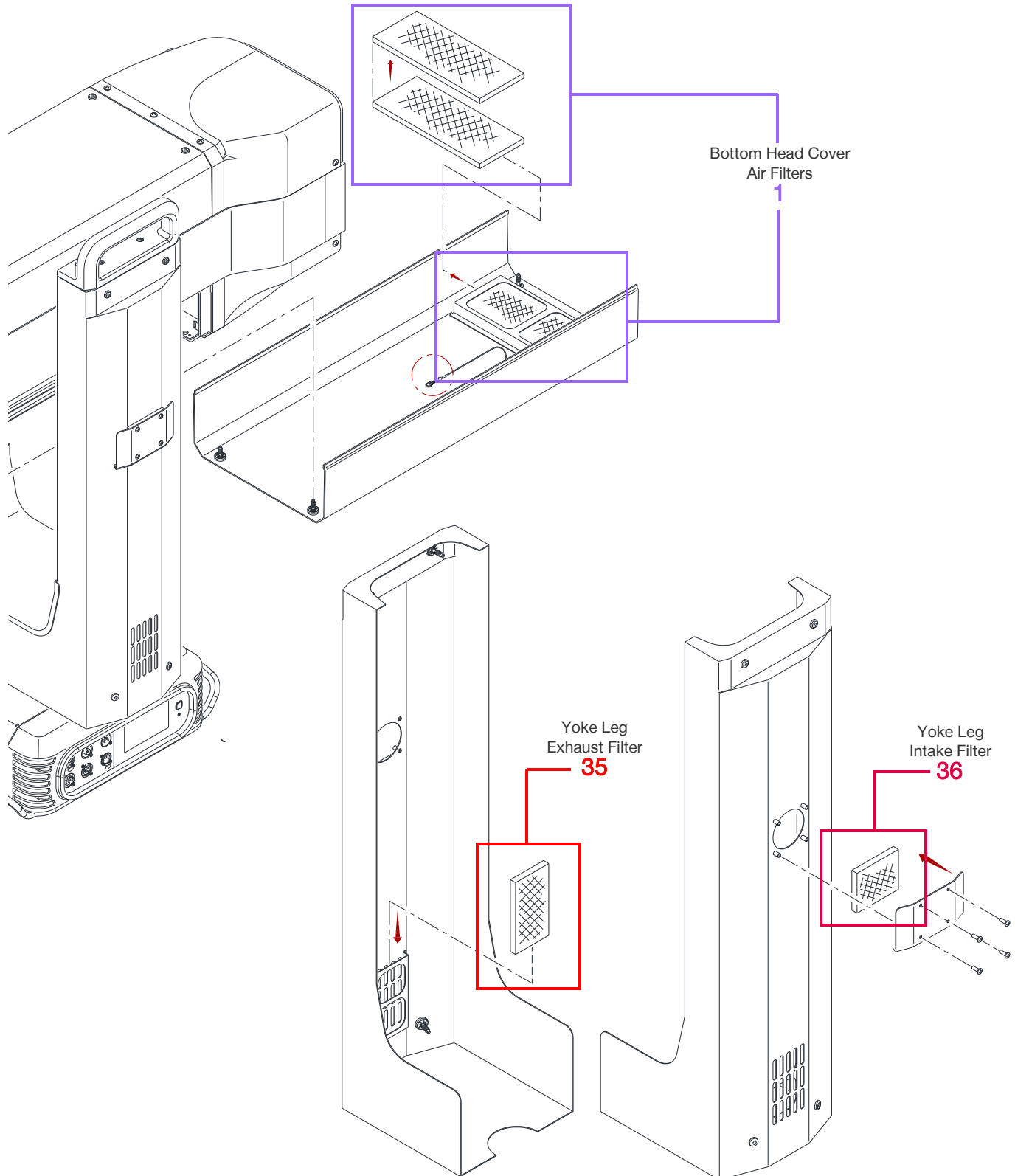
Click on a [red call-out number](#) or directly on the component in the illustration to jump to that repair procedure.



GroundControl Longthrow Spares Kit, Air Filters

Refer to [Itemized Parts List](#).

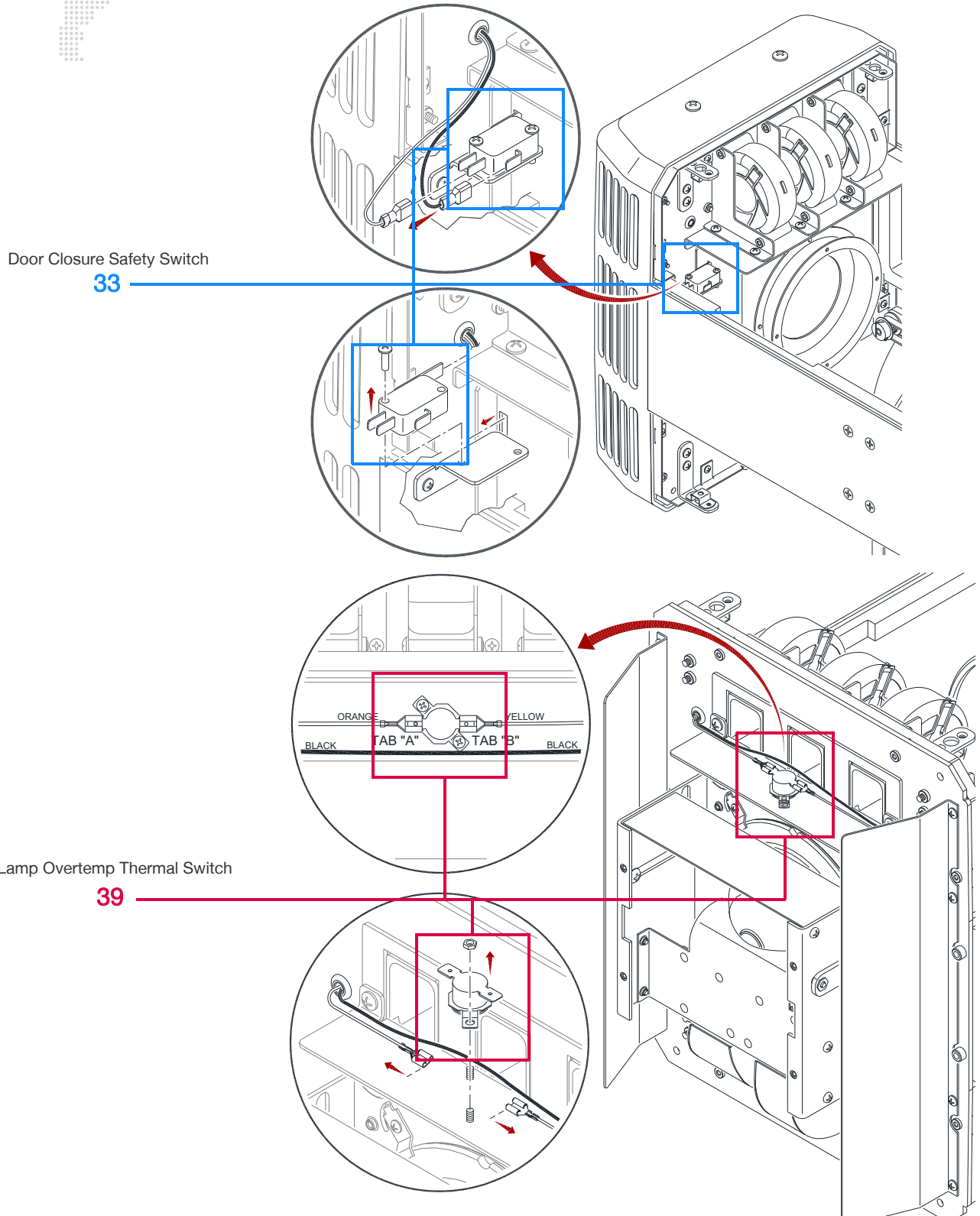
Click on a [red call-out number](#) or directly on the component in the illustration to jump to that repair procedure.



GroundControl Longthrow Spares Kit, Aft Assembly Detail, Continued

Refer to [Itemized Parts List](#).

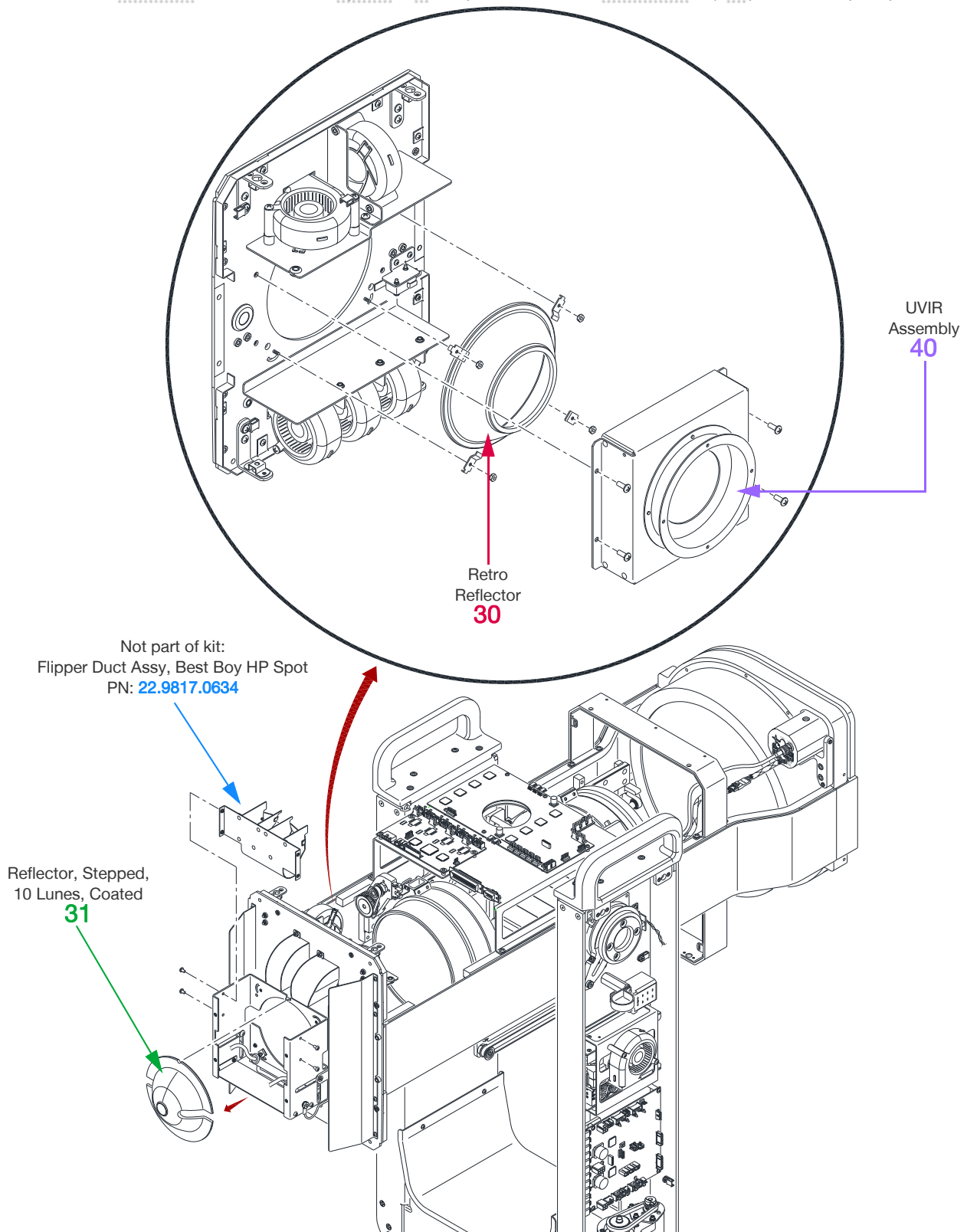
Click on a [colored call-out number](#) or directly on the component in the illustration to jump to that repair procedure.



GroundControl Longthrow Spares Kit, Lamp Box and Reflector Detail

Refer to [Itemized Parts List](#).

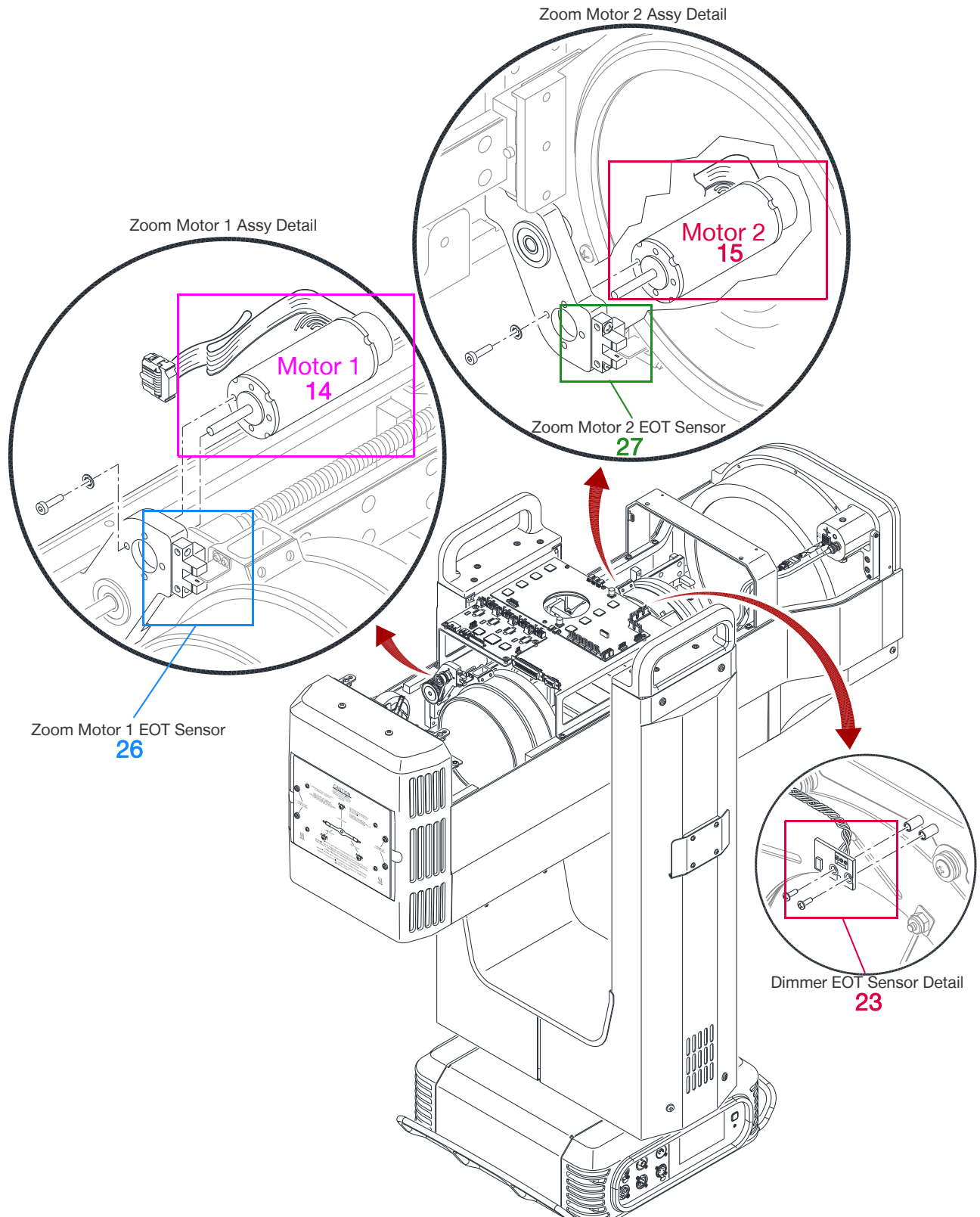
Click on a [colored call-out number](#) or directly on the component in the illustration to jump to that repair procedure.



GroundControl Longthrow Spares Kit, Zoom Mechanism Detail

Refer to [Itemized Parts List](#).

Click on a [colored call-out number](#) or directly on the component in the illustration to jump to that repair procedure.



GroundControl Longthrow Cable Assembly Reference

The following **Cable Assemblies** comprise the GroundControl Longthrow luminaire, for reference.

Note, this is not the Spares Kit list, this is Cable Assembly part number list. Refer to **Itemized Parts List**, page 122.

PRG P/N	Description
25.9834.0231	CABLE ASSY, GOBO INDEX
25.9834.0941	CABLE ASSY, 50 POS D-SUB TO WS GCLT
25.9834.0942	CABLE ASSY, 50 D-SUB TO WS DRIVER PCB GCLT
25.9834.0943	CABLE ASSY, 15 POS D-SUB TO WS GCLT
25.9834.0944	CABLE ASSY, SHUTTER DRIVE TO 15 POS D-SUB GCLT
25.9834.0955	CABLE ASSY, EMI FILTER TO FUSES & 24V LVS
25.9834.0952	CABLE, ASSY, POWERCON TO CHASSIS GND
25.9834.0953	CABLE ASSY, 48V LVS DC OUTPUT TO PAN/TILT PCB
25.9834.0954	CABLE ASSY, POWERCON TO EMI FILTER
25.9834.0957	CABLE ASSY, CHASSIS TO YOKE GND, GCLT
25.9834.0958	CABLE ASSY, YOKE TO HEAD GND
25.9834.0961	CABLE ASSY, 48V LVS AC INPUT
25.9834.0961.01	CABLE ASSY, XP 48V LVS AC INPUT, GCLT
25.9834.0961.02	CABLE ASSY, BEL 48V LVS AC INPUT, GCLT
25.9834.0962	CABLE ASSY, BAL OUTPUT TO RELAY INPUT
25.9834.0963	CABLE ASSY, RELAY OUTPUT TO IGNITOR INPUT
25.9834.0964	CABLE ASSY, IGNITOR OUTPUT TO LAMP SOCKET
25.9834.0969	CABLE ASSY, 24V LVS DC OUT TO YOKE & HEAD
25.9834.0972	CABLE ASSY, TILT AUX ENCODER EXT GCLT
25.9834.0975	CABLE ASSY, DIMMER MOTOR GCLT
25.9834.0976	CABLE ASSY, FROST MOTOR EXT GCLT
25.9834.0977	CABLE ASSY, BACK FANS
25.9834.0978	CABLE ASSY, INTERLOCK & HEAD OVER TEMP-SWITCH
25.9834.0979	CABLE ASSY, HOT RELAY COIL
25.9834.0980.01	CABLE ASSY, CAN BUS, MAIN CONTROL PCB TO P/T PCB
25.9834.0981	CABLE ASSY, TILT COT SENSOR
25.9834.0982	CABLE ASSY, IRIS EOT SENSOR
25.9834.0986	CABLE ASSY, LENS 1 EOT SENSOR
25.9834.0987	CABLE ASSY, LENS 2 EOT SENSOR
25.9834.0988	CABLE ASSY, GOBO EOT SENSOR
25.9834.0996	CABLE ASSY, YOKE FAN, SAN ACE B76 24V GCLT
25.9834.0995	CABLE ASSY, IRIS FAN 12V

GroundControl Longthrow Figure Reference

This is a reference of all illustrations in this Field Service Manual for quick reference. Click on a Figure Number to transport to that illustration and section of the Manual.

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Figure 1-2	Head and Enclosure Components	Figure 3-43	Replacing the Lamp Ignitor
Figure 1-3	Yoke Leg Identification	Figure 3-44	Replacing the Yoke Fan
Figure 1-4	Tilt-Side Yoke Leg	Figure 3-45	Replacing the Yoke HOT Relay
Figure 1-5	Pan-Side Yoke Leg	Figure 3-46	Removing the Yoke Power Supply Cabling
Figure 1-6	Color Correction Wheel, Standard Configuration	Figure 3-47	Replacing the Yoke Power Supply
Figure 1-7	Gobo Wheel, Standard Configurations	Figure 3-48	Pan/Tilt Driver PCB Wiring Diagram
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A.

TECHNICAL SPECIFICATIONS

- + GROUNDCONTROL LONGTHROW SPOT LUMINAIRE
- + GROUNDCONTROL LONGTHROW ROAD CASE



GroundControl Longthrow Spot Luminaire

SOURCE:	Osram SHARXS HTI 1500W/D7/60 lamp Can be set to 1200W, 1400W, or 1630W
OUTPUT:	200fc @ 350 feet
INPUT CURRENT:	12.5A at 208V, 10.75A at 240V. Auto-sensing voltage input range is 170V-270V, 50/60HZ. Power factor > 0.95
REFLECTOR:	Precision glass reflector with dichroic cold mirror coating.
ZOOM RANGE:	3:1 from a narrow spot of 2° to a wide flood of 6°
BEAM SIZE CONTROL:	A 16-blade mechanical iris provides continuous beam size control for both rapid changes and smooth timed beam angle changes.
FRAMING:	Four-blade framing system featuring four independent blades mounted in two planes. Each blade can be tilted +/- 30° and the entire frame system can be rotated +/- 60° for a total travel of 120°.
DIMMING:	Mechanical dimmer for full-field dimming from 0% to 100% with accurate slow-speed control and fast bumps.
STROBE:	Lightning fast strobe system.
EFFECTS:	One (1) multiplying four-facet prism, two (2) glass effects, and variable frost.
COLOR:	CMY color system featuring three (3) crossfading color wheels of Cyan, Magenta, and Yellow.
COLOR CORRECTION:	Variable color temperature wheel, range from 5600K down to 3200K. Also includes one (1) minus green wheel with five (5) discrete user-changeable minus green color filters.
ONBOARD CAMERA:	1080i HD-SDI Autofocus Camera with Day and Night Visibility, 2.5 Megapixel w/ Zoom. Full integration with PRG's GroundControl™ Followspot System.
ROTATING GOBOS:	One (1) indexable, rotating gobo wheels with four (4) gobos. Gobos are individually calibrated so the unit will automatically index the orientation of each gobo regardless of initial placement.
OPERATING TEMP:	32°F to 120°F (0°C to 49°C)
CONTROL:	Compatible with all PRG consoles and a wide variety of DMX512, Art-Net, and sACN consoles, as well as the GroundControl™ Followspot System.
DMX CHANNELS:	41 channels.
ON-BOARD CONTROL:	Built-in LCD touchscreen display allows for on-board fixture control and feedback. On-board battery power allows for the fixture address and configurations to be set without having to apply AC power to the luminaire.
PAN & TILT:	Three-phase, high-speed servomotors. Brakes are applied when off.
RANGE:	Pan - 615°, Tilt - 260°
POSITIONING:	Can be mounted in any orientation.
SPACING:	Hangs on 46 inch (1168 mm) centers.
WEIGHT:	200 lbs (91 kg) without hooks. 2-point hang hardware adds 7.55 lbs (3.42 kg), 3-point adds 11.3 lbs (5.12 kg).

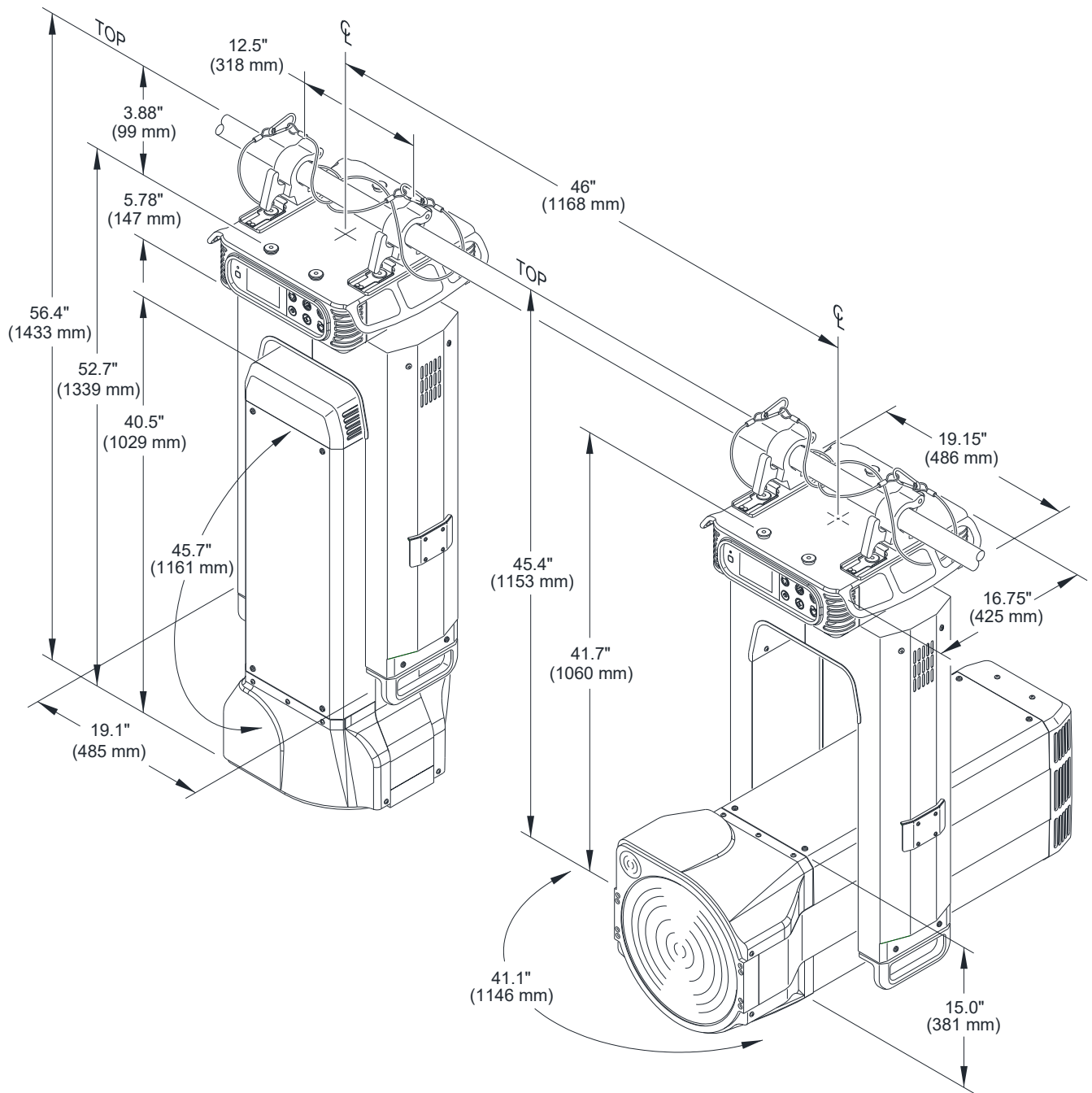


Figure A-1: GCLT Isometric with Dimensions

GroundControl Longthrow Road Case

EMPTY WEIGHT: 171 lbs (77.56 kg)

LOADED WEIGHT: 384 lbs (174.17 kg)

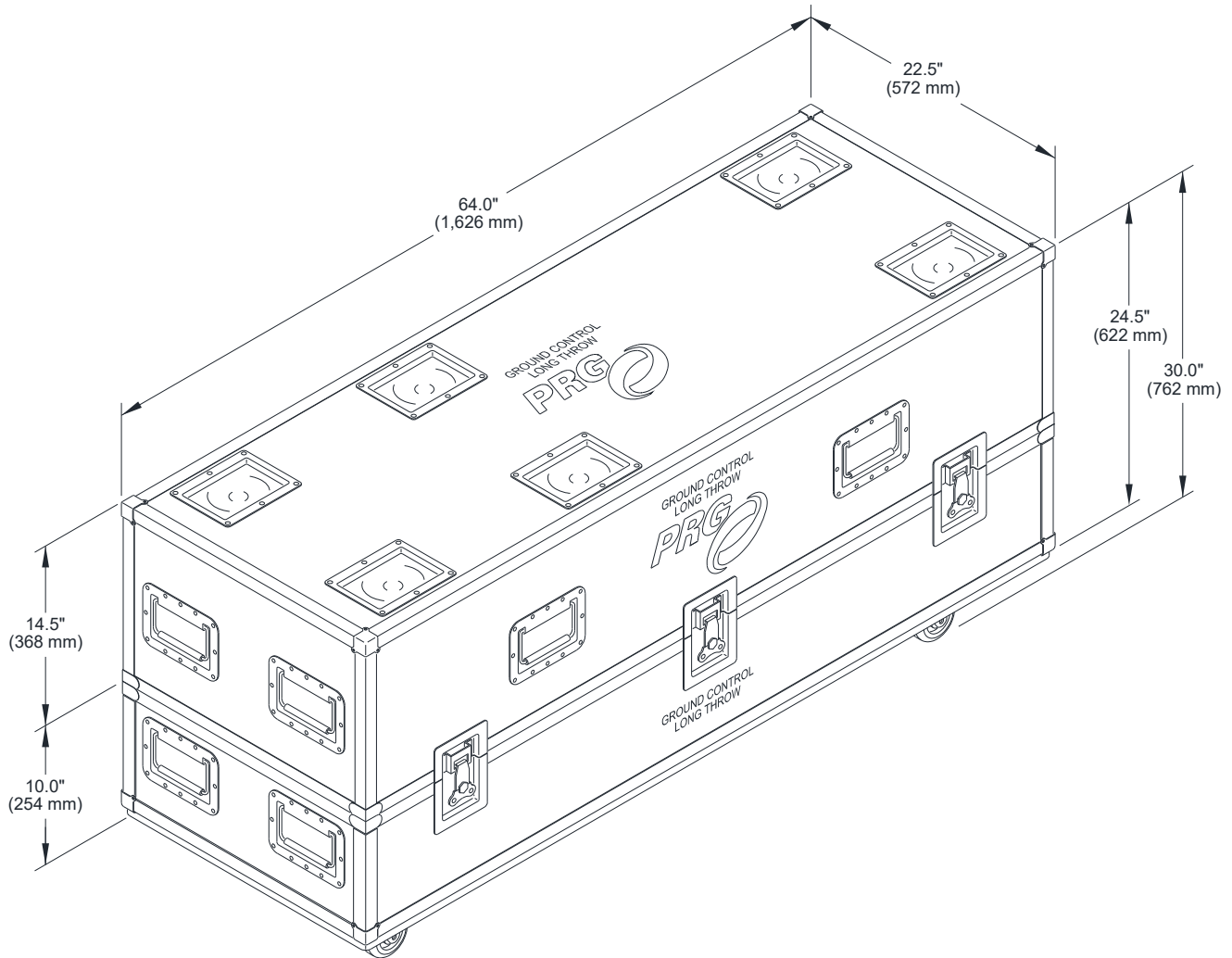


Figure A-2: GCLT Road Case Isometric with Dimensions



B.

LAMP BENCH FOCUSING FOR GCLT

- + BENCH FOCUSING: AN ESSENTIAL COMPONENT OF PREP
- + BENCH FOCUSING PREPARATION
- + PRE-SETTING GROUNDCONTROL LONGTHROW (GCLT)'S LAMP PLATE
- + BENCH FOCUSING GROUNDCONTROL LONGTHROW (GCLT)

Bench Focusing: An Essential Component of Prep

Bench Focusing PRG fixtures allows us to flatten the field for the most effective lamp focus and field coverage. Bench focusing is not difficult, but it requires some knowledge -- first and foremost, what we're doing when we bench focus is we're moving the lamp around inside the reflector to get the perfect spot. In the diagram below, you'll see what a flat field looks like, a field with the lamp inside the reflector too far, and a field with the lamp not far enough inside the reflector. **Important to remember:** When we say "focus to a flat field," we're talking about the image on the left:

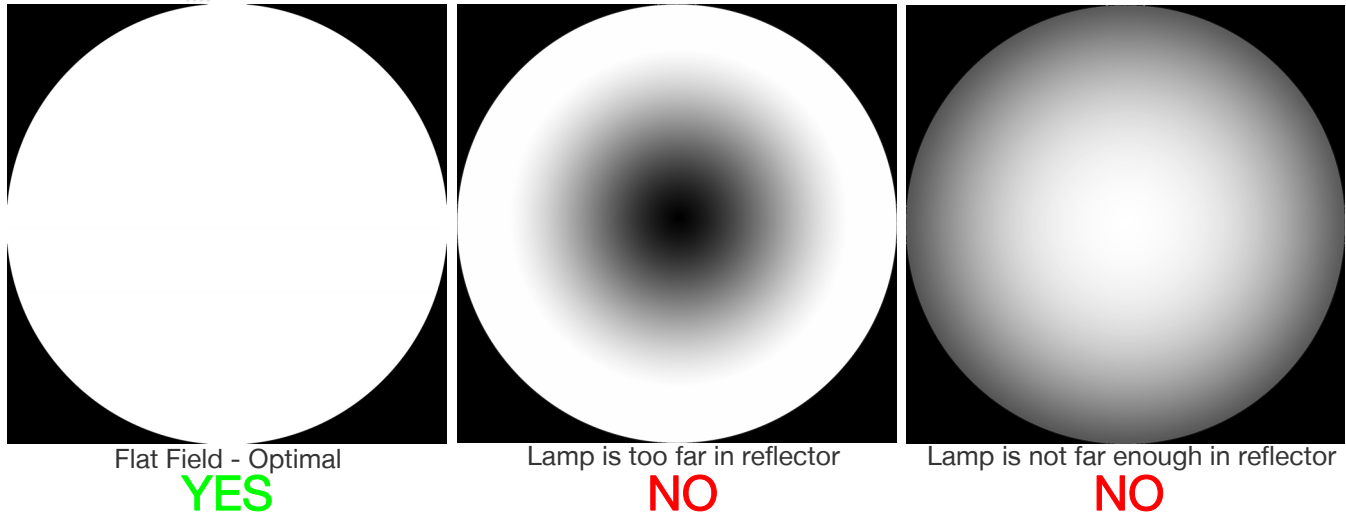


Figure B-1: Examples of Fields and Root Causes

Why Do We Have to Bench Focus?

Tuning the field of each fixture is paramount to consistency of light quality, look, and appearance of the field on camera. In order to properly prepare our fixtures for production, bench focusing is a critical step. You'll perform the first part of the bench focusing process, which is to set the XYZ Assembly to the proper distance. That procedure gives us the intended starting point of the lamp inside the reflector. After the pre-setting process, you will analyze the field of light and optimize it for best focus.

When you send out a fixture that hasn't been bench focused, you are sending imperfect equipment on a job.

Bench Focusing Preparation

Each fixture has different distances that must be set for the XYZ Assembly, and each fixture also has different distances in which we need to set to get an accurate bench focus. To the trained eye, bench focusing can be done quickly and easily; in today's environment of televised events and film production, it is imperative we use a digital analysis as well as our eyes to set our beam.

Pre-Setting GroundControl Longthrow (GCLT)'s Lamp Plate

This Appendix assumes you are familiar with PRG practices and equipment used for Lamp Bench Focusing, and references certain equipment and procedures listed in [PRG Technical Bulletin LAMP-001](#).

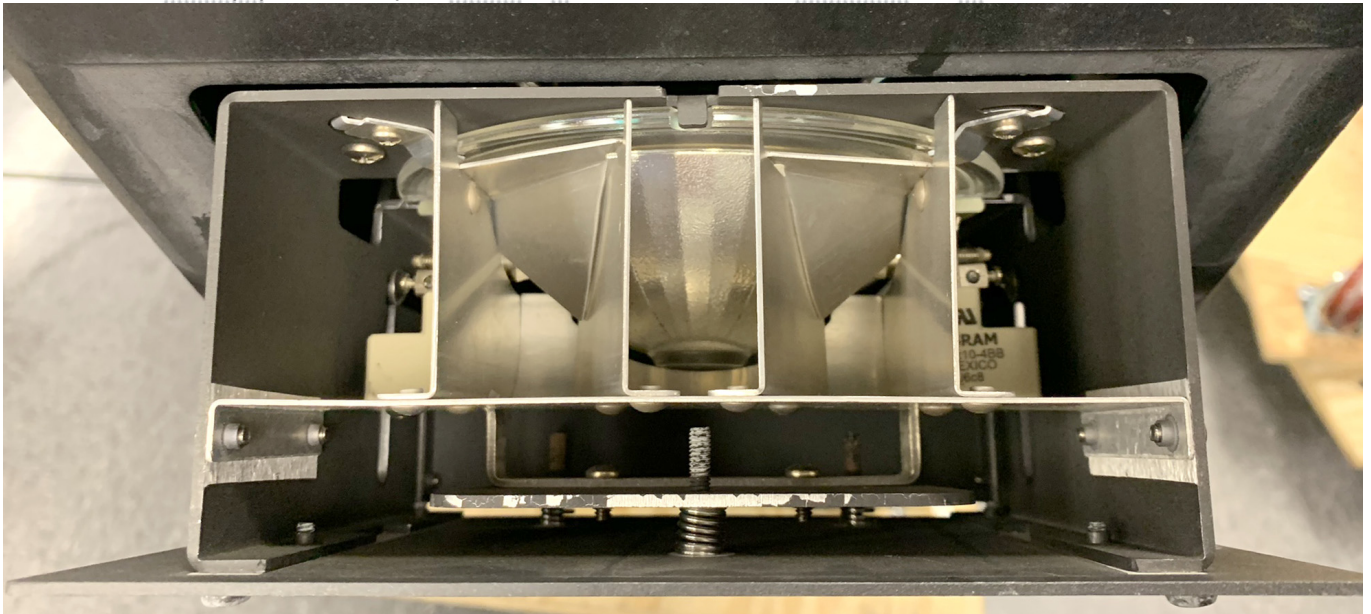


Figure B-2: GCLT XYZ Assembly with Wobble Plate Detail

ATTENTION: Due to the sensitive nature of the optics on GCLT, it is imperative that you are accurate when setting the XYZ Assembly on the luminaire.

Tools:

- PPE: safety glasses, latex gloves or finger cots, heat-resistant work gloves
- #1 Phillips Screwdriver
- #2 Phillips Screwdriver
- Dial or Digital Calipers
- Telescoping Gauge, 2.375" handle -- [Starrett 579A Telescoping Gauge](#) [Also see PRG P/N 07.4040.0579.0]
- Telescoping Gauge, 8" handle -- [Starrett 579A-8 Telescoping Gauge](#)
- Alcohol wipes
- Optional: GCLT Lamp Adjustment Tool, PRG P/N 07.9834.0670 -- TOOL, GCLT LAMP ADJUST

WARNING! The Back Cap will be HOT during operation -- wait at least ten minutes for the luminaire to cool.

To set the proper Lamp Plate distances for GCLT:

- Step 1. If the lamp was struck, douse the lamp and wait at least ten minutes with fans running to cool the lamp box.
- Step 2. Completely remove power from the luminaire once it is cool to the touch.
- Step 3. Open the Lamp Access Door, flip it down and out as if you were changing a lamp - now you have access to the entire XYZ Assembly and Wobble Plate.
- Step 4. You will need to use Calipers and a Telescoping Hole Gauge to complete this procedure. If you're not familiar with using these tools, please see "Setting Up Your Calipers for Lamp Plate Adjustment" in Tech Bulletin LAMP-001 page 4, and "Setting a Telescoping Gauge Using Calipers" on page 6 of the same for Telescoping Gauge setup.
- Step 5. There is only one measurement to set for all three screws on GCLT, **0.465"**.

- Step 6. With your calipers and gauge set and locked at 0.465", focus on the XYZ Assembly, illustrated on the next page. Go to each of the three screws in the Wobble Plate and slide the gauge under the plate, perpendicular to the plate and parallel to the axis screws.
- Keep your calipers handy, and verify your telescoping gauge is correct periodically throughout the process, and definitely after each screw and before the next one.
 - If you approach the Wobble Plate with the gauge, and the gauge will not fit under the plate, the plate needs to be raised.
Clockwise turns on that axis screw, a quarter turn at a time, will lower the plate;
Counter-clockwise turns, a quarter turn at a time, will raise the plate.
 - It is best to have the plate a tiny bit higher than the gauge as you fine-tune the measurement.
 - Don't screw the plate down so hard that it deforms your gauge and ruins your measurement -- as you are tuning the screw, keep your gauge next to the screw and move it back and forth until you feel the gauge come into contact under the plate. You want to be able to pull the gauge out, and once you do, verify your measurement again.
- Step 7. Measure all three screws and set them appropriately -- check all sides of all three screws for 0.465".
- Step 8. Once you've verified screws are at a distance of 0.465", perform **Step 3** in reverse to reassemble the XYZ Assembly, taking extra care that you're not tugging on the lamp wires during installation.
- Step 9. Replace the lamp with extra care not to touch the lamp or reflector with your skin. If you do have an accidental contact, make sure to use an alcohol wipe to clean the lamp and reflector of contaminants.
- Step 10. Close and secure the Lamp Access Door.



Figure B-3: Setting GCLT XYZ Assy Screws with Gauge

Once you have confirmed the required measurement of 0.465", the fixture is ready for bench focusing. Proceed to "**Bench Focusing GroundControl Longthrow (GCLT)**" on page 149 to bench focus GCLT.

Setting GCLT Lamp Plate Distance with the GCLT Lamp Adjustment Tool

It's imperative that you master the Caliper and Gauge method of Lamp Plate Adjustment, because you obviously won't have all of your shop tools on a show site. In the event that you ever need to perform any of these procedures on site, you're more likely to have a caliper and gauge.

The Dallas Office has created a tool for quick focusing of the GCLT Wobble Plate simply due to how important it is to get an accurate, equal measurement for optimal lamp position on this luminaire.

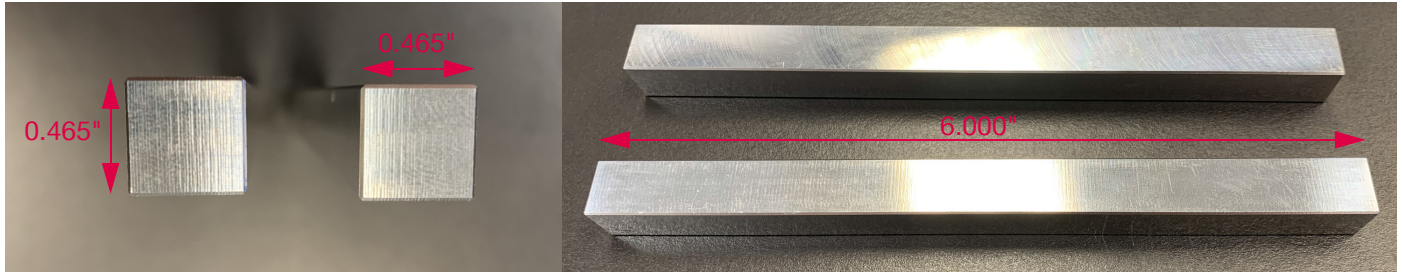


Figure B-4: GCLT Lamp Adjust Tool

The GCLT Lamp Adjust Tool works exactly like a set of calipers and a gauge, except for that it is milled at 0.465" and never has to be set. The additional benefit of this special tool is that you can set all three screws together, ostensibly, paying very careful attention to spacing for each screw.

WARNING! The Back Cap will be HOT during operation -- wait at least ten minutes for the luminaire to cool.

To set the proper Lamp Plate distances for GCLT:

- Step 1. If the lamp was struck, douse the lamp and wait at least ten minutes with fans running to cool the lamp box.
- Step 2. Completely remove power from the luminaire once it is cool to the touch.
- Step 3. Open the Lamp Access Door, flip it down and out as if you were changing a lamp - now you have access to the entire XYZ Assembly and Wobble Plate.

Step 4. Slide the tool up to the first screw:

- a. If you approach the Wobble Plate with the tool, and the tool will not fit under the plate, the plate needs to be raised.

Clockwise turns on that axis screw, a quarter turn at a time, will lower the plate;

Counter-clockwise turns, a quarter turn at a time, will raise the plate.

- b. It is best to have the plate a tiny bit higher than the tool as you fine-tune the measurement.
- c. Don't screw the plate down so hard that you can't move the tool -- as you are turning the screw, keep your tool next to the screw and move it back and forth until you feel the gauge come into contact under the plate. You want to be able to pull the tool out, and once you do, verify your measurement again with the tool.

Step 5. Measure all three screws and set them appropriately -- check all sides of all three screws for 0.465"

Step 6. As you get one screw set, slide your tools back towards the rear screws and continue the adjustments.

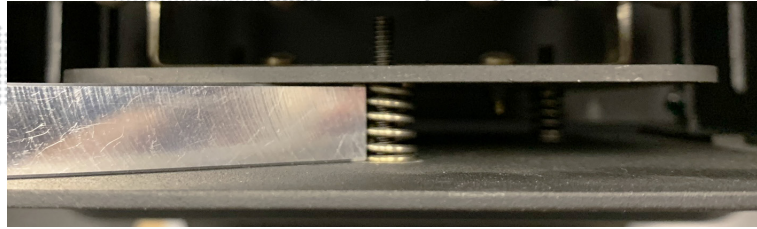


Figure B-5: Using the GCLT Lamp Adjust Tool

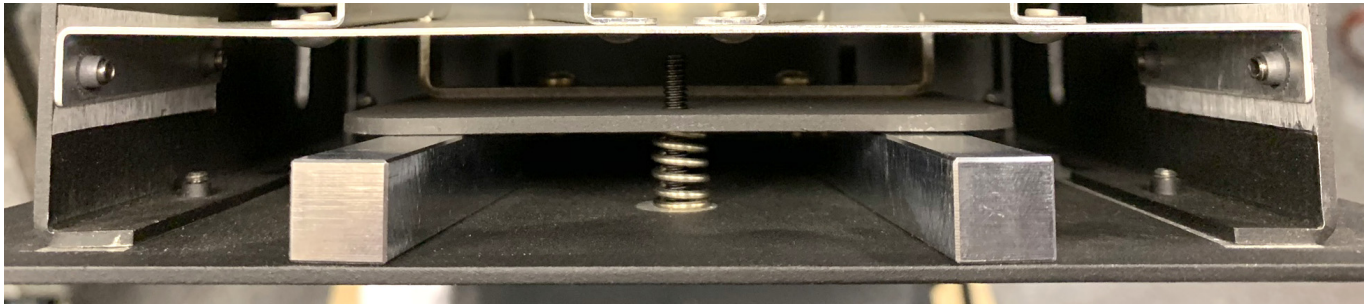


Figure B-6: Tuning the Rear Screws with the GCLT Lamp Adjust Tool

- Step 7. There are several permutations of how you can use this tool to set the Wobble Plate, but use your imagination for what works for you -- the most important thing here is that all three of the XYZ Assembly screws have a distance of 0.465".

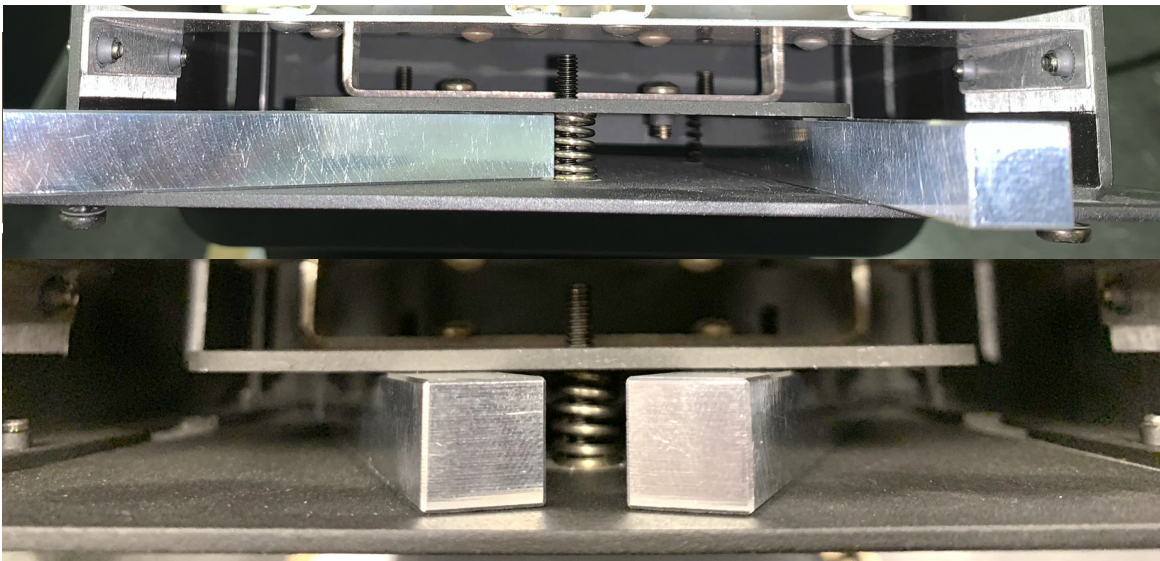


Figure B-7: More GCLT Lamp Adjust Tool Positioning

- Step 8. Once you've verified screws are at a distance of 0.465", perform Step 3 in reverse to reassemble the XYZ Assembly, taking extra care that you're not tugging on the lamp wires during installation.
- Step 9. Replace the lamp with extra care not to touch the lamp or reflector with your skin. If you do have an accidental contact, make sure to use an alcohol wipe to clean the lamp and reflector of contaminants.
- Step 10. Close and secure the Lamp Access Door.

Once you have optimized the GCLT Lamp Plate to 0.465", your luminaire is ready for bench focusing. Please proceed to "[Bench Focusing GroundControl Longthrow \(GCLT\)](#)" on page 149.

Bench Focusing GroundControl Longthrow (GCLT)

WARNING! Luminaire will be HOT during this operation. Wear work gloves when adjusting knobs.

To Bench Focus the GCLT:

- Step 1. Power up luminaire, set intensity to 100%. Allow fixture to run open for at least ten minutes.
- Step 2. Position beam on your Bench Focus surface, between 25 and 100 feet distance from fixture. 25 to 50 feet is a good distance for using just ScopeBox, 100 feet is a good eyes-only distance. Use both methods on this fixture, its optics are critical to focus correctly.
- Step 3. Put the fixture in Open White, open the Beam Size Iris, set the zoom for mid-range, and adjust for a hard edge. Focus your edge on the iris Mounting Aperture, not the actual iris. You want to make approximately a ten foot beam on your surface.
- Step 4. Set your ScopeBox configuration for lamp optimization.
See "Setting Up ScopeBox" on page 17 of TB LAMP-001.
- Step 5. At backcap, use the three screws of the XYZ Assembly to center the hot spot of the beam in center.
- Step 6. Once you have found the hot spot at center, use the XYZ Assembly screws to flatten the field. Refer to "Examples of Fields and Root Causes" on page 22 of TB LAMP-001 for examples of properly and improperly focused beams.
- Step 7. Does your GCLT field look like the image on the left below?
If so, it is properly focused. If not, keep going!

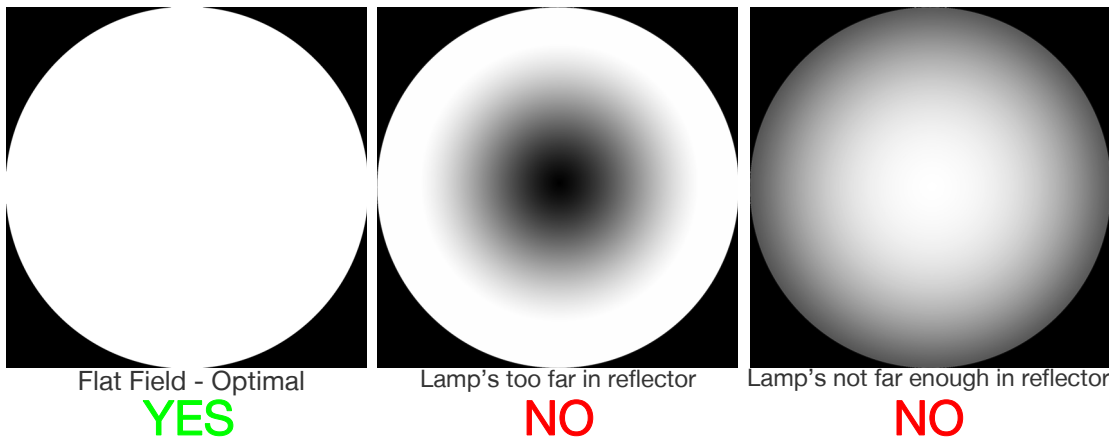


Figure B-8: GCLT Fields and Quality



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