

# Chin Strap, Sealed Pull Pins and Swing Catch for Fiberglass Helmets

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## 1.1 Chin Strap

ALL KMDSI helmets must be equipped with an internal helmet chin strap. The chin strap should be regularly inspected to ensure it is in good condition. It must be replaced if worn, frayed, or not in good working order.

The importance of a properly functioning chin strap cannot be overstressed. If the chin strap is missing or disengaged, the diver's face might not be properly positioned in the oral nasal mask. This can lead to a build-up of carbon dioxide inside the helmet.

The chin strap will also help to retain the helmet on the diver's head in the rare event that the neck clamp/yoke assembly becomes disengaged from the bottom of the helmet shell. If this happens, however, the helmet can still flood if the diver does not maintain an upright position in the water.

### **⚠ WARNING**

**The chin strap will help to retain the helmet to the diver's head in the rare event the locking collar and neck ring assembly separates from the bottom of the helmet. However, even if the helmet stays on the diver's head, it may flood, which can lead to drowning, unconsciousness, serious personal injury, or death.**



**NOTE**

Neck ring mounted chin straps found on older fiberglass models may be retained, but the P/N 505-111 internal chin strap must be installed. Stainless Steel helmets use P/N 505-748 Chin Strap Assembly

### 1.1.1 Chin Strap Removal

#### Tools required:

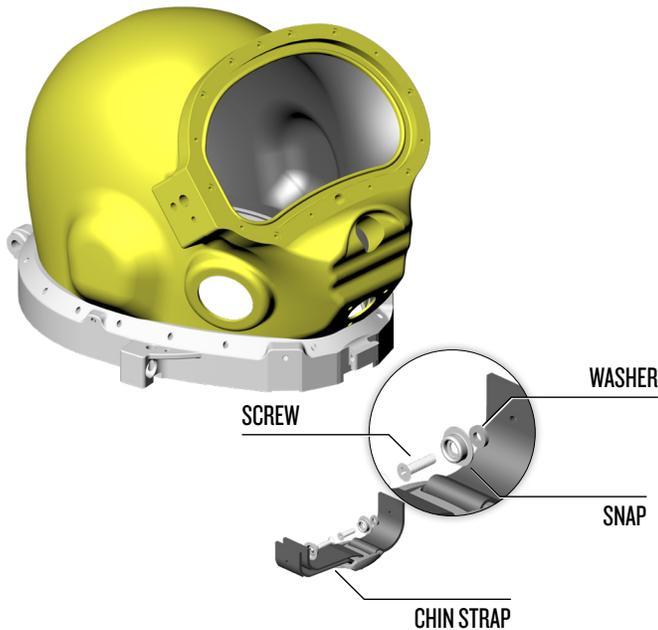
- #2 Phillips Screwdriver

The chin strap must be replaced as a complete unit.

1. Remove the two screws that secure the chin

strap to the helmet shell. Clean any sealant or debris from the holes.

2. Remove the worn chin strap and discard.



*The chin strap mounts inside the helmet.*

### 1.1.2 Chin Strap Replacement



The adjustment strap should pull toward the right side of the helmet when it is on your head.

#### Tools required:

- Torque Screwdriver with #2 Phillips Attachment
- DOWSIL™ 732 Silicone Sealant or Equivalent

1. Inject silicone sealant into the holes that secure the chin strap.

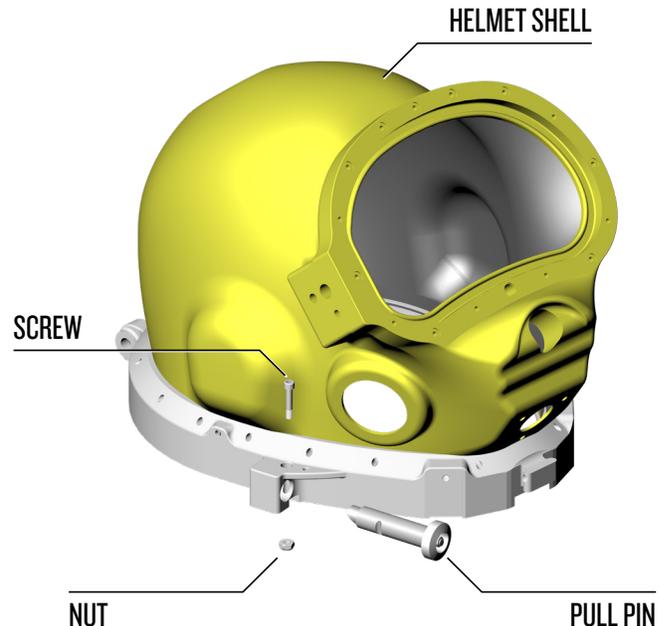
2. Install the two screws supplied with the chin strap kit to hold the chin strap in position. You may re-use the same snaps and washers if in good condition.

3. Torque the screws in accordance with the torque specification. See "Torque Specs" module.

## 1.2 Sealed Pull Pins

KMDSI recommends that the pull pins be serviced annually.

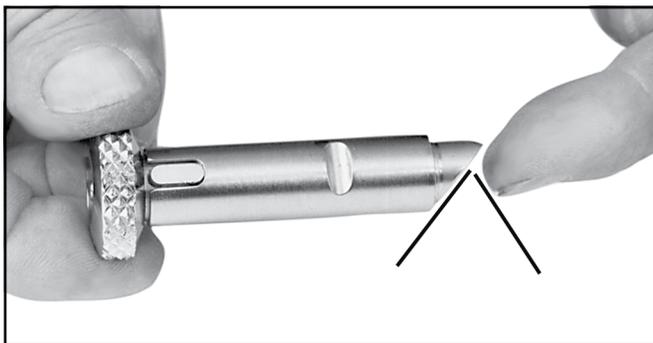
The sealed pull pins lock the helmet onto the diver's head and should be inspected carefully in accordance with Dive Lab checklists A2.1, A2.2, and A2.3. Sealed pull pins should be regularly checked for signs of corrosion and silicone fluid leakage. If the sealed pull pins stick, do not provide adequate tension, do not pass inspection, or are in any way questionable, they must be serviced. Read more on this topic; [see Maintenance & Repair Bulletin #2 of 2013](#) on the KMDSI website [www.kirbymorgan.com](http://www.kirbymorgan.com), under "Support," go to Bulletins.



*The sealed pull pins must be carefully inspected regularly and serviced annually.*

### **⚠ WARNING**

**The sealed pull pins must operate properly. If they do not lock properly the helmet could come off the diver underwater and drowning could result. If they do not release when needed, they could make it impossible to remove the helmet in an emergency situation. Do not use the helmet unless the pins are operating correctly.**



*The cam angle must be correct for the pins to work properly. The tip of the plunger is at the highest point, and the shortest part of the slant is at the lowest point of the bottom ring.*

### 1.2.1 Removal of Sealed Pull Pins

#### Tools required:

- $\frac{3}{64}$ " Allen Wrench (a small 90-degree ratchet with a  $\frac{3}{64}$ " bit or a long-shaft ball-end Allen is best)

1. Unscrew the hex head screws from the bottom ring on the base of the helmet.



*Unscrew the hex head screws*

2. Remove the sealed pull pins by pulling them out of the bottom ring.

### 1.2.2 Removal Of Sealed Pull Pins On A Stainless Steel Bottom Ring

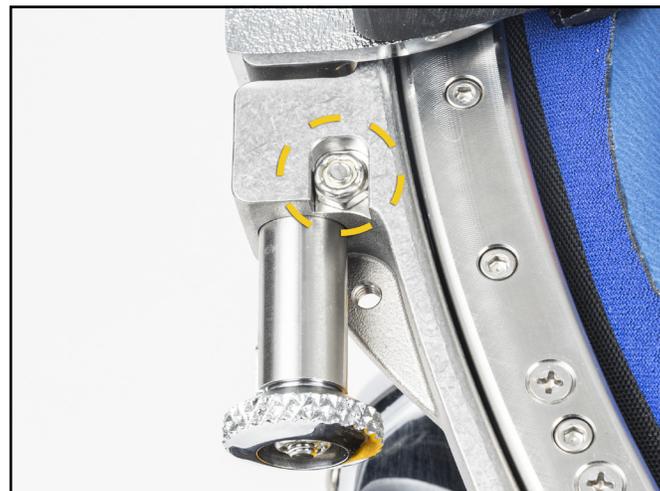
#### Tools required:

- $\frac{3}{64}$ " Allen Wrench (a small 90-degree ratchet with a  $\frac{3}{64}$ " bit or a long-shaft ball-end Allen is best)



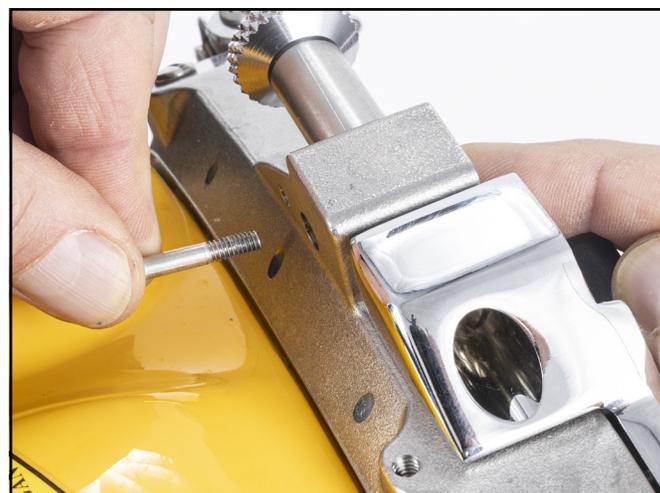
#### NOTE

Screws are held in place with lock nuts and are not threaded into the bottom ring. The lock nut may fall out once the screw is unscrewed past it.



1. Turn the helmet on its side.

2. With one finger over the lock nut, unscrew the hex head screw from the bottom ring. Remove the screw, and be mindful that the lock nut is free of the bottom ring.

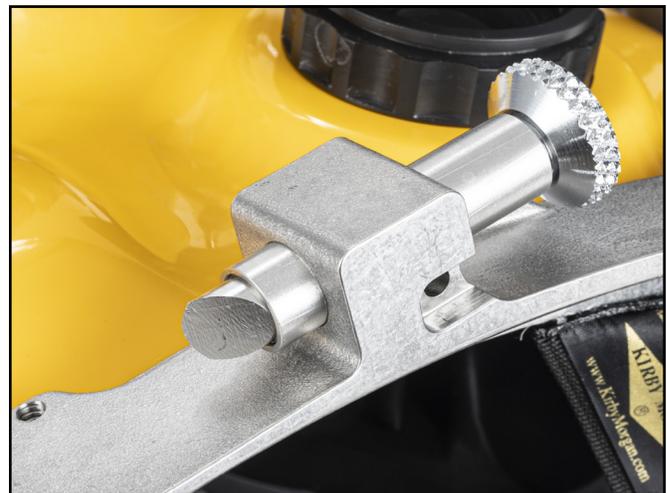


3. Remove the sealed pull pins from the bottom ring.

**NOTE**

The bottom ring assembly uses a lock nut to secure the pins in place, and no thread locker compound is required.

1. Turn the helmet on its side.
2. Insert the pin(s) into the bottom ring. Ensure the cam angle is correct. The tip of the plunger is at the highest point, and the shortest part of the slant is at the lowest point of the bottom ring.



3. Fit the lock nut into the receiving hole on the bottom of the ring.

**REMINDER**

Sealed pull pins should be overhauled once a year, or earlier if the daily and/or monthly inspection indicates service. Use P/N 525-211 Sealed Pull Pin Overhaul Kit.

### 1.2.3 Replacement of Sealed Pull Pins on Brass/Chromed Brass Bottom Rings

#### Tools required:

- $\frac{3}{64}$ " Allen Wrench (a small 90-degree ratchet with a  $\frac{3}{64}$ " bit or a long-shaft ball-end Allen is best)
- Loctite® 248 or an equivalent medium strength thread locker

1. Insert the pin(s) into the bottom ring on the base of the helmet. The cam angle must be correct for the pins to function.
2. If the original screws are being re-used and there is little or no thread locker remaining on the threads, apply a small amount of Loctite® 248 onto the ends of the screws. If new screws are used, applying Loctite® or other thread locker is not necessary because the screws come with a locking compound already applied.

3. Insert the screws into the bottom ring and tighten until it is just flush and has bottomed in the counter bore.

### 1.2.4 Installation Of Sealed Pull Pins On A Stainless Steel Bottom Ring

#### Tools required:

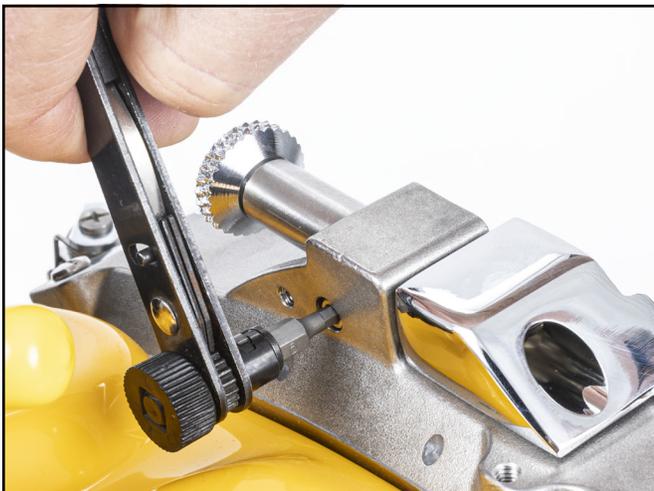
- $\frac{3}{64}$ " Allen Wrench (a small 90-degree ratchet with a  $\frac{3}{64}$ " bit or a long-shaft ball-end Allen is best)



4. Insert screw(s) into the top portion of the bottom ring, ensuring the sealed pull pin is in the correct position.



5. Tighten until the screw is snug. The sealed pull pin will have a slight movement when secured. This is standard.



### 1.2.5 Sealed Pull Pin Overhaul

#### Tools required:

- P/N 525-211 Sealed Pull Pin Overhaul Kit
- $\frac{9}{64}$ " Allen Wrench
- Loctite® 248 or an equivalent medium strength thread locker (if servicing a brass/chromed brass bottom ring)
- Nylon Tube Brush
- Block of Wood Approximately 2" x 4" x 8" with a Half Inch Diameter Hole in the Center  $\frac{3}{8}$ " to  $\frac{1}{2}$ " Deep
- $\frac{1}{2}$ " Wooden Dowel
- Access To Clean Fresh Water Clean Rags/ Paper Towels
- Mild Hand Washing Dish Soap Or Simple Green®
- Latex or Rubber Gloves
- $\frac{3}{8}$ " Nut Driver

**⚠ CAUTION**

**Overhauling the Sealed Pull Pins requires the use of the proper tools and components. Only use the type of silicone oil contained in this kit. Do not substitute O-rings. The red silicone O-rings swell after contact with the silicone oil. The use of the silicone O-rings allows for better sealing than rubber compounds because the silicone rubber swells after being in contact with the silicone oil.**



VIDEO



**How To: Kirby  
Morgan Sealed Pull  
Pin Overhaul Kit**

[https://www.youtube.com/watch?v=PyUgwwN\\_I9Y](https://www.youtube.com/watch?v=PyUgwwN_I9Y)

The sealed pull pins used on KMDSI helmets work extremely well and have shown to be very reliable with only minimal maintenance. The reliability stems from the pull pins being filled with silicone oil and sealed with O-rings. The silicone oil allows smooth hydraulic operation while preventing sand and debris from entering the sleeve. Under mild conditions the Pull Pins will operate for one to two years before the sliding surfaces start to wear the O-rings, allowing oil leakage to occur and eventually resulting in stiff operation. Diving in salt water with minimal rinsing, as well as welding, burning and especially jetting, will cause accelerated wear of the O-rings and possible corrosion of the pull pin components. Once the surface chrome on the pull knob has worn away due to corrosion /electrolysis, the pull pins will require disassembly and overhaul more frequently, usually every year to 18 months. If the pull pins have had water intrusion resulting in excessive corrosion of components, the effected components will need to be replaced. Until recently, overhaul of pull pins was only accomplished by KMDSI. This overhaul procedure was written to better serve the end user and guide KMDSI technicians in the overhaul of the pull pins. Technical questions regarding this procedure should be addressed to KMDSI or Dive Lab.

***Pre and post dive inspections are recommended and will help with the detection of excessive wear or corrosion.***

### 1.2.5.1 Preparation

1. Drill a ½" diameter hole by ½" deep in the center of a 2" x 4" piece of wood approximately

eight inches long and set aside. The 2" x 4" makes a good working base and helps keep the pull pin from moving during assembly.



2. Drill a ¼" diameter hole approximately ½" deep in one end of the wooden dowel. Make sure to drill this hole as close to the center of the dowel as possible. If the hole is drilled off center by too much, it may not align properly when it is needed to do so. It is also useful when inserted in the hole in the 2" x 4" when filling the pull pin casing with oil.

### 1.2.5.2 Disassembly



NOTE

Sealed pull pins made prior to 2003 used a ¼" locknut. There is no reason other than putting an older helmet back into service where one would encounter a ¼" locknut.

Fiberglass helmet retaining screws are located on the top of the helmet ring.

**Preparation:** Disassembling the pull pin should be done over a large paper cup or suitable container to capture oil and associated parts of the pull pin.

1. Using the ⅝" Allen wrench remove pull pin retaining screw and remove the pull pin from the helmet ring.



2. Hold the knob end of the pull pin while using the 3/8" nut driver to loosen and remove the lock nut.
3. Pull the knob free, then slide the plunger free from the body.
4. Remove and separate all associated parts. Dispose of all three O-rings and locknut.



5. Clean all parts with a nylon brush using a solution of mild soap and water then thoroughly rinse with clean fresh water and dry. Clean inside of body with nylon brush to remove debris and corrosion.
6. Inspect the pull pin body, slide surfaces, knob, spring and plunger for corrosion damage.



**NOTE**

Corroded parts can be soaked in a solution of 5% percent white vinegar and water for up to one hour. Any parts showing damage from excessive corrosion that could weaken the component or not allow the O-rings to seal must be replaced. Additionally, if the threaded area on the plunger is damaged the plunger should be replaced.

### 1.2.5.3 Reassembly and Filling

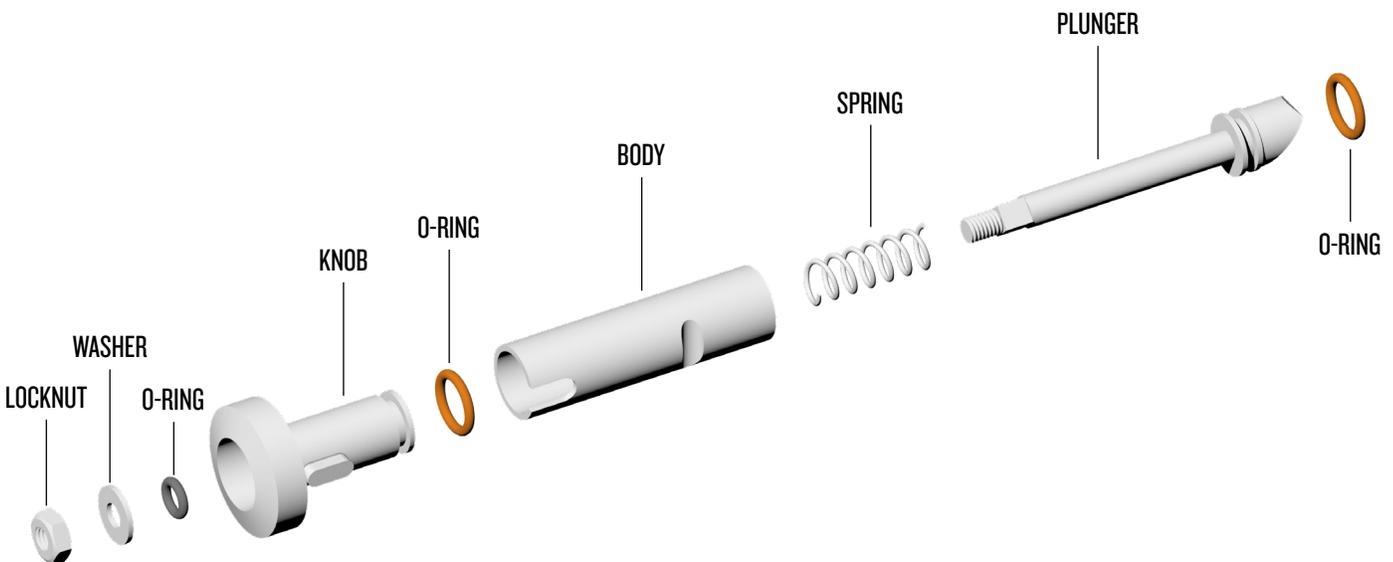
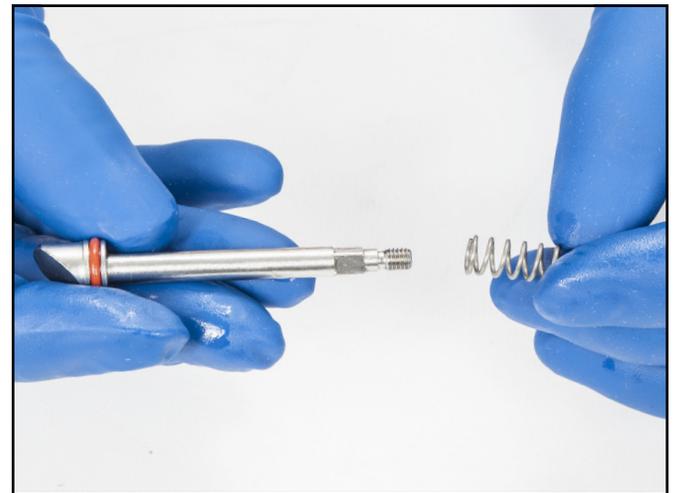


**NOTE**

New silicone sealing O-rings must be used on the plunger and knob. O-rings that have been in contact with silicone oil become very soft and will usually tear or chip during assembly, if attempting to re-use them. Always replace these O-rings when rebuilding this assembly

#### **DO NOT PRE-LUBRICATE THE O-RINGS**

1. Install the two new red O-rings, one on the plunger, one on the knob and set aside.
2. Slide spring onto plunger and set aside.



*Exploded view of the sealed pull pin*

3. Carefully install the knob into the body, making sure not to pinch the O-ring. Ensure the index tab on the knob aligns with the recess on the body.



4. Orient the pull pin body so the index is facing you. With one finger on the knob and the spring on the plunger, place the plunger assembly into the body so that you can see the beveled end of the plunger. It will be in line with the index recess.





5. Place the black O-ring over the threaded plunger and using the dowel with the hole, press the O-ring into the knob recess around the threaded plunger. Ensure the black O-ring is in the recess formed by the threaded plunger and the groove in the pull knob. The threaded plunger protrudes just enough to get the nut on the threaded shaft approximately one turn.



Thread the nut about one turn so the knob end is sealed for filling with oil. This creates a small gap between the body and plunger on the opposite end, allowing for filling with the oil package. The washer will not be used at this time.

6. Insert the wooden dowel (hole end up) into the hole found on the 2" x 4".

7. Orient the pull pin body so the index is facing you. With one finger on the knob and the spring on the plunger, place the plunger assembly into the body so that you can see the beveled end of the plunger. It will be in line with the index recess.



8. Fill the Pull Pin with oil from the plunger end, using one package of oil and stopping before the top of the Pull Pin body. The other package of oil will be used for the second Pull Pin

**NOTE**

If the body gets completely filled, you will need to dump out approximately 5-8 drops.

9. Slightly push down on the beveled end of the plunger as you lift the assembly away from the wooden dowel. Keep the pull pin in a vertical orientation.



10. Using the  $\frac{3}{8}$ " nut driver, slowly tighten the nut and draw the O-ring at the beveled end into the body. The red O-ring will no longer be visible.



11. Keep one finger on the plunger end while turning the pull pin 180 degrees so the knob is now at the top and the plunger at the bottom positions.



12. Remove lock nut using  $\frac{3}{8}$ " nut driver and install washer.



13. Place lock nut back onto threaded end of

plunger and use the  $\frac{3}{8}$ " nut driver to tighten until nut bottoms out.

14. Wipe any excess oil from the pull pin and test the pull pin to ensure the pin moves smoothly and does not bind. If the pull pin does not pull out smoothly and does not snap back when released, disassemble, inspect all parts and try again until proper operation is achieved.

15. Reinstall pull pin into the helmet. Tighten the Allen screw into the bottom ring and tighten until it is just flush and has bottomed in the counter bore. If the original screws are being reused, apply a small amount of Loctite® 248 to the ends of the screws when inserting into a chromed brass bottom ring or a stainless steel helmet model.



**NOTE**

If any part of the red O-ring at the beveled end is visible, this is an indication that too much oil is in the body. If this is the case, carefully redo steps 2-14. If the red O-ring is still visible, the knob key may be worn, and the knob must be replaced.

### 1.2.6 Pull Pin Sleeve

#### Tools required:

- P/N 525-112 Pull Pin Sleeve Kit
- $\frac{5}{64}$ " Allen Wrench
- Loctite® 248 or an equivalent medium strength thread locker if installing onto a chromed brass bottom ring or a stainless steel helmet model.



**IMPORTANT**

Pull pins should be in the closed position when installing.

1. Using a  $\frac{5}{64}$ " Allen wrench remove the pull pins.



2. Slide pull pin sleeve onto pull pin(s).



*Untrimmed pull pin sleeve shown*

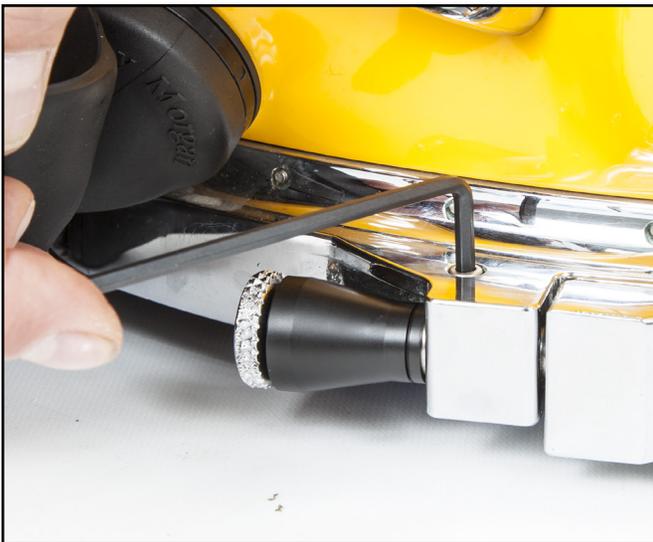
3. Insert the pin(s) into the bottom ring on the base of the helmet. The cam angle must be correct for the pins to function.



4. If the original screws are being re-used ensure threads are clean and apply a small amount of Loctite® 248 onto the ends of the screws. If new screws are used, applying Loctite® or other thread locker is not necessary because the screws come with a locking compound already applied.



5. Insert the screws into the bottom ring and tighten until it is just flush and has bottomed in the counter bore.



6. Check to make sure the sealed pull pins are functioning correctly.

## 1.3 Swing Catch

The swing catch assembly helps align the front of the neck ring assembly. The swing catch should rarely need attention or service unless it is accidentally damaged.

### 1.3.1 Disassembly of the Swing Catch



**HELPFUL  
HINT**

For best results, it is recommended to remove the regulator and exhaust system.

Turning the helmet on its side can be advantageous.

#### Tools required:

- #2 Phillips Screwdriver
- Flat Blade Screwdriver

1. Remove both screws on the sides of the swing catch, along with the associated washer, spacer, and spring spacer.

2. The swing catch should now disengage from the spring.

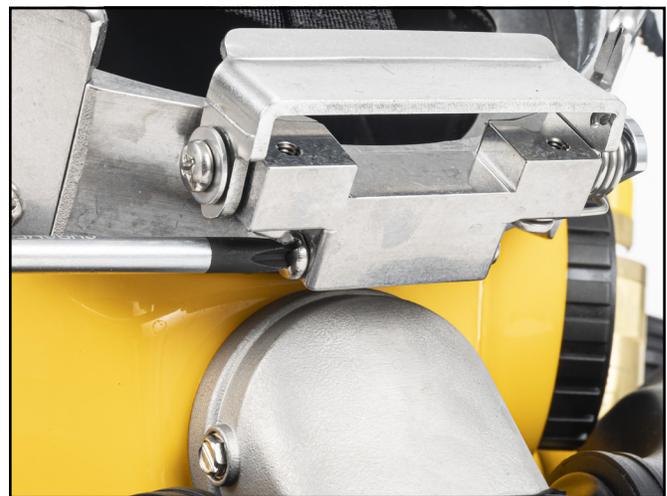
3. Remove both screws from the top tongue of the bottom ring.

### 1.3.2 Removal of the Swing Catch Assembly on Stainless Steel Bottom Rings

#### Tools required:

- #2 Phillips Screwdriver

1. Unscrew both screws on the sides of the tongue of the bottom ring.



2. Remove the swing catch assembly away from the bottom ring as a complete assembly.



### 1.3.3 Reassembly of the Swing Catch

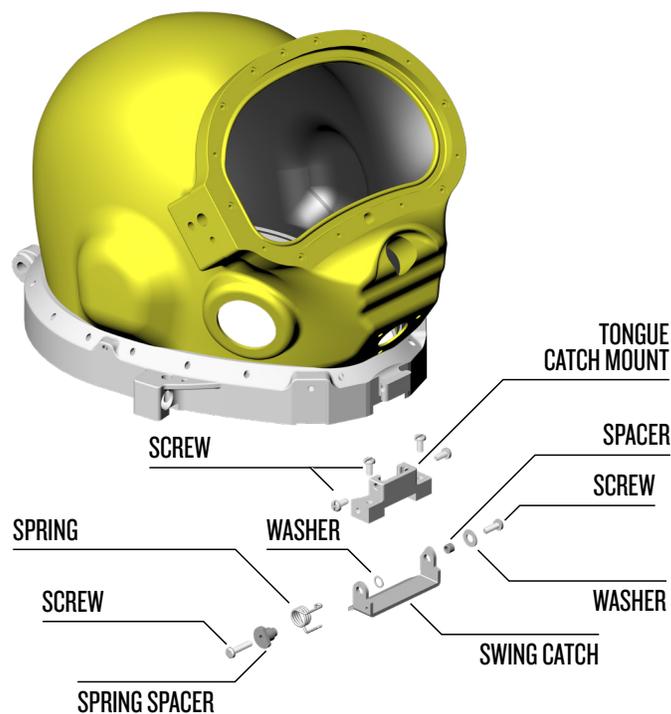
Loctite® 248 or an equivalent medium-strength thread locker should be applied to ALL OF THE SCREWS. Apply the thread locker to the side screws after the screws are inserted through the spacers and washers. Applying the thread locker after the screw passes through the washer and spacer will prevent the thread locker from fouling the spacers and washers.



**NOTE**

#### Tools required:

- Torque Screwdriver and #2 Phillips & ¼" Flat Blade Attachment
- Loctite® 248 or an equivalent medium strength thread locker
- Molykote® 111 Lubricate or equivalent



*Diagram of the swing catch.*



**HELPFUL HINT**

For best results, it is recommended to remove the regulator and exhaust system, if installed.

1. Position the helmet on its side, with the side block facing up.



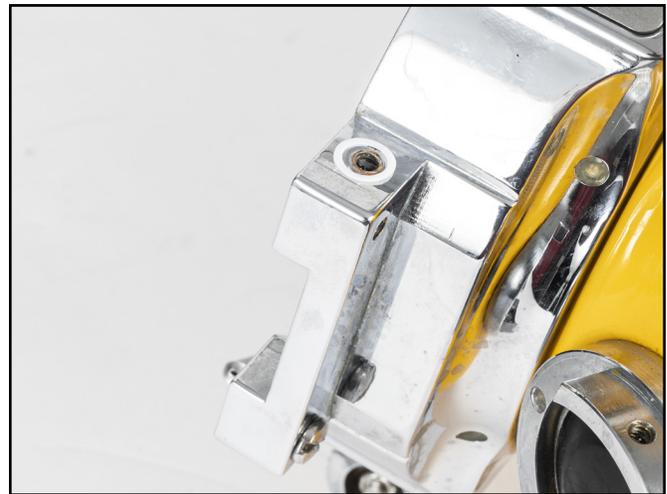
2. With thread locker applied, install the top-left screw.



3. For the two side screws, insert them through the spring spacer, washer, and spacer, then apply a small amount of Loctite® 248 or an equivalent medium-strength thread locker to the screw threads. Set aside.



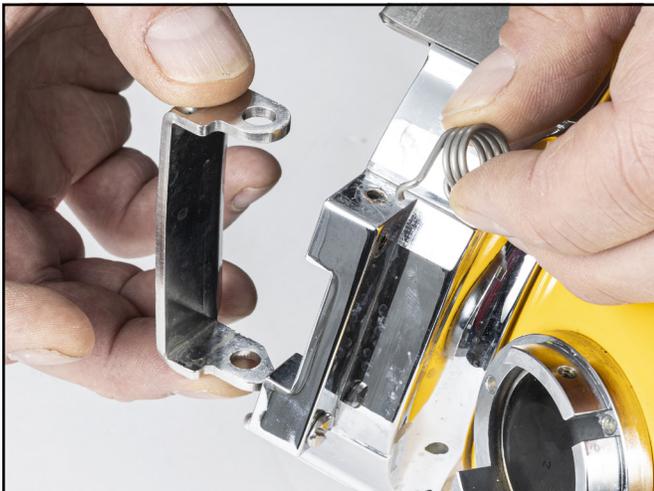
4. Use a small amount of food-grade silicone, such as Molykote® 111 or equivalent, to secure the Teflon® washer on the up side (starboard side) of the tongue. The position should allow the screw to pass through both the swing catch and the Teflon® washer.



The angled edge of the Swing Catch faces the diver.

**NOTE**

5. Place the swing catch in the correct position over the tongue.



through the hole on the downside end of the swing catch. Tighten 3 to 4 full turns.



6. If not already done, insert the screw through the washer and spacer, then apply a small amount of Loctite® 248 or an equivalent medium-strength thread locker to the screw threads.



8. Make sure you have not dislodged the Teflon® washer and that it is properly centered on the hole on the upside of the swing catch.

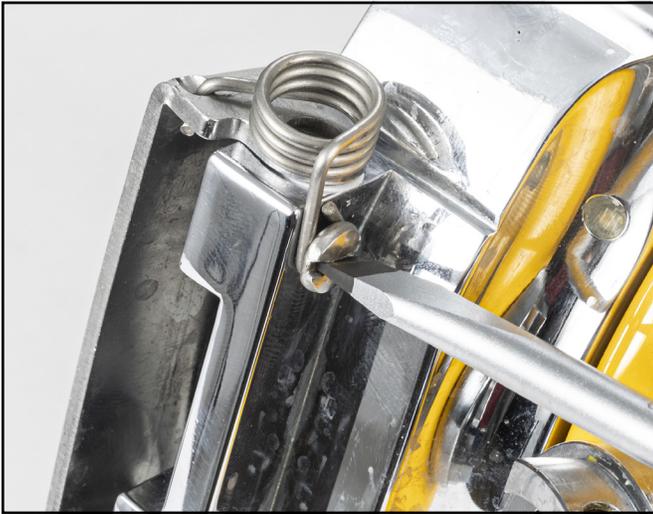


7. Insert the screw with the spacer and washer

9. Insert the spring's hooked end into the small hole in the swing catch.

10. With the looped end of the spring on top of the tongue, insert the mount screw (medium-

strength thread locker applied) through the loop and tighten it 3 to 4 full turns.



The Teflon® washer should not be visible through the remaining swing catch hole.

11. With thread locker applied, insert the screw and spring spacer into the spring, then thread the screw until it is just snug, ensuring no binding and that the flat edge of the spring spacer faces forward at a 45-degree angle.



While tightening the screw, use a finger to maintain a 45-degree forward-facing angle on the Spring Spacer.

12. Tighten all four screws to the specified torque. See "Torque Specs" module. Ensure that the spacer fits through the hole in the swing catch and that no binding occurs.



The washer on the left side of the swing catch will move when the correct torque is applied.

13. Test the function of the swing catch. Test it before each dive to ensure proper operation.

### 1.3.4 Installation of the Swing Catch Assembly on Stainless Steel Bottom Rings

#### Tools required:

- Loctite® 248 or Equivalent Medium Strength Thread Locker
- Molykote® 111 lubricate or equivalent
- Torque screwdriver and #2 Phillips attachment

1. Apply a light coat of Molykote® 111 lubricant or equivalent to the sides of the P/N 550-290 tongue catch mount.

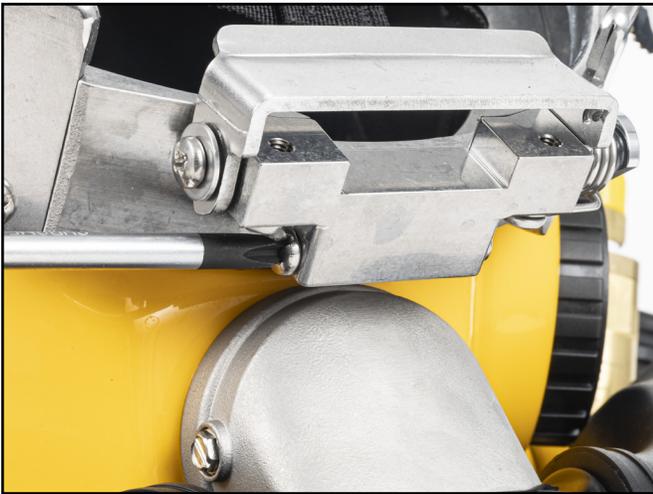


2. Position the swing catch assembly into the correct position on the tongue of the bottom ring. Ensure the tongue catch mount is fully seated, with the screw hole aligned.

3. Apply a small amount of Loctite® 248 or an equivalent medium-strength thread locker to the ends of the screw threads.



4. Secure screws to the port and starboard sides of the tongue catch mount.



5. Torque screws. See "Torque Specs" module.



**NOTE**

For complete service of the swing catch reference section "1.3.2 Removal of the Swing Catch Assembly on Stainless Steel Bottom Rings" on page BTM-12.