

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

Contents

BTM-1	1.1 Chin Strap	BTM-4	1.2.3.1 Preparation
BTM-1	1.1.1 Chin Strap Removal	BTM-4	1.2.3.2 Disassembly
BTM-1	1.1.2 Chin Strap Replacement	BTM-5	1.2.3.3 Reassembly and Filling
BTM-2	1.2 Sealed Pull Pins	BTM-9	1.2.4 Pull Pin Sleeve
BTM-2	1.2.1 Removal of Sealed Pull Pins	BTM-10	1.3 Swing Catch
BTM-3	1.2.2 Replacement of Sealed Pull Pins	BTM-10	1.3.1 Disassembly of the Swing Catch
BTM-3	1.2.3 Sealed Pull Pin Overhaul	BTM-10	1.3.2 Reassembly of the Swing Catch

1.1 Chin Strap

1.1.1 Chin Strap Removal

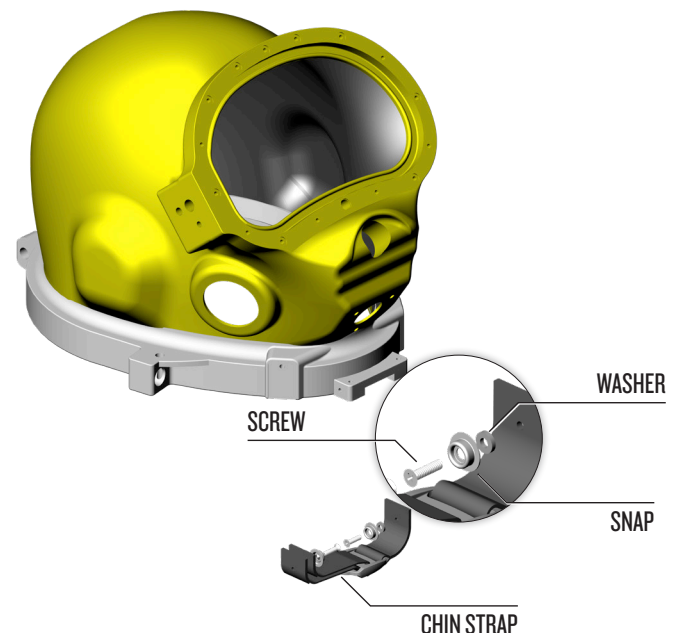
Tools required:

- Phillips Screwdriver
- Plastic Syringe for Easy Application of RTV Sealant.

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



NOTE

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

1) Using a syringe, 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

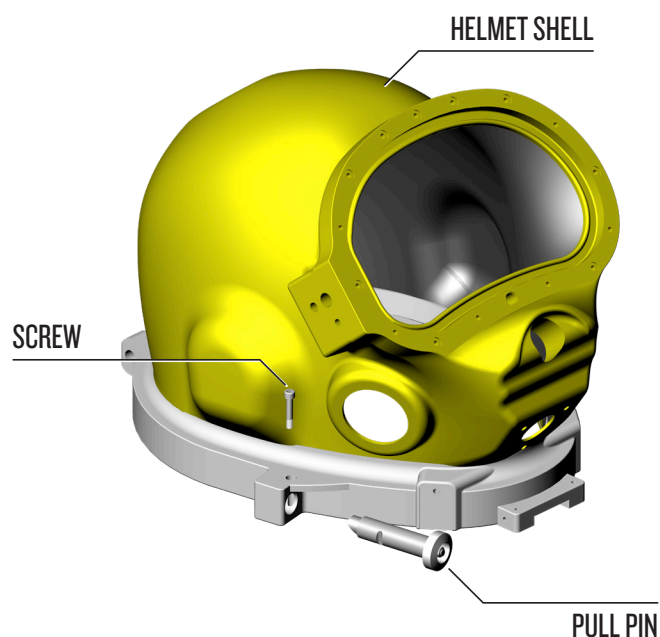
may re-use the same snaps and washers if in good condition.

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.

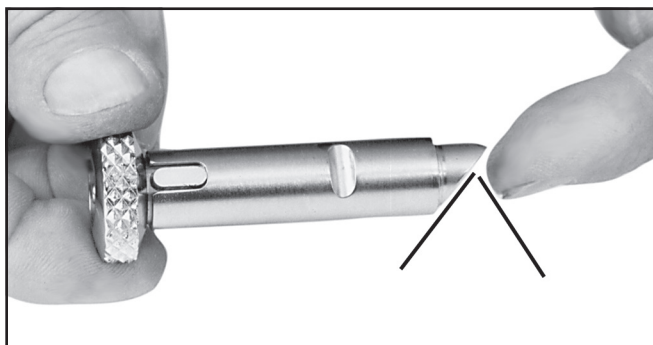
The sealed pull pins lock the helmet onto the divers head, and should be inspected carefully in accordance with Dive Lab checklists A2.1, A2.2 and A2.23. Sealed pull pins should be regularly checked for signs of corrosion and silicone fluid leakage. If the sealed pull pins stick, do not provide adequate tension, do not pass inspection, or are in any way questionable, it is essential that they be serviced by certified personnel, factory trained specifically to perform rebuilds on the sealed pull pins. Read more on this topic; [see Maintenance & Repair Bulletin #2 of 2013](#) on the KMDSI website 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. Align angle towards bottom of the helmet neck ring.

1.2.1 Removal of Sealed Pull Pins

Tools required:

- 1/4 Hex Key on Torque Screwdriver

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.

3) Have the sealed pull pins inspected by, and if

necessary, serviced by factory trained personnel, certified to rebuild the pins. Or, the pins may be replaced.

1.2.2 Replacement of Sealed Pull Pins

Loctite® 248 may be required.

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.

1.2.3 Sealed Pull Pin Overhaul

Tools required:

- P/N 525-211 Sealed Pull Pin Overhaul Kit
- $\frac{3}{4}$ " Allen Wrench
- Loctite® 248
- Nylon Tube Brush

- Block of Wood Approximately 2" × 4" × 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

⚠ 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.



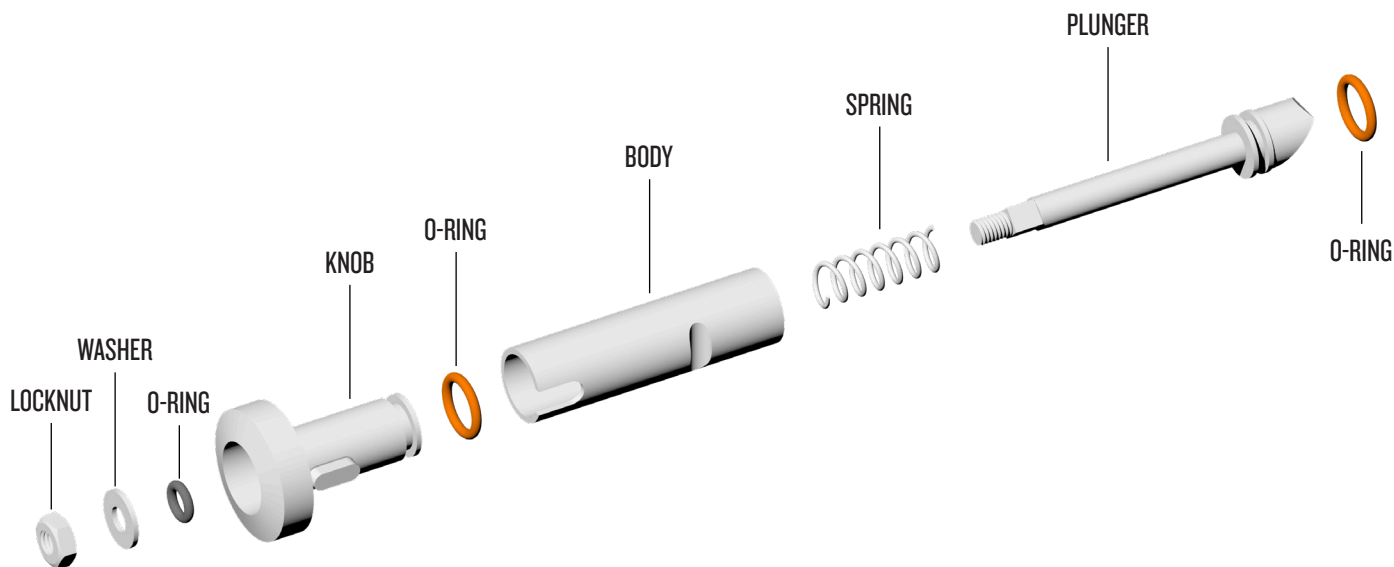
VIDEO



How To: Kirby Morgan Sealed Pull Pin Overhaul Kit

https://www.youtube.com/watch?v=PyUgwwN_I9Y

The sealed pull pins used on KMDSI helmets work extremely well and have shown to be very



Exploded view of the sealed pull pin

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.

1.2.3.1 Preparation

1) Drill a $\frac{1}{2}$ " diameter hole by $\frac{1}{2}$ " deep in the center of a 2" \times 4" piece of wood approximately eight inches long and set aside. The 2" \times 4" makes a good working base and helps keep the pull pin from moving during assembly.



2) Drill a $\frac{1}{4}$ " diameter hole approximately $\frac{1}{2}$ " 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" \times 4" when filling the pull pin casing with oil.

1.2.3.2 Disassembly



NOTE

Sealed pull pins made prior to 2003 used a $\frac{1}{4}$ " locknut. There is no reason other than putting an older helmet back into service where one would encounter a $\frac{1}{4}$ " 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 $\frac{5}{64}$ " 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 $\frac{3}{8}$ " 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 piston is damaged the piston should be replaced.

1.2.3.3 Reassembly and Filling

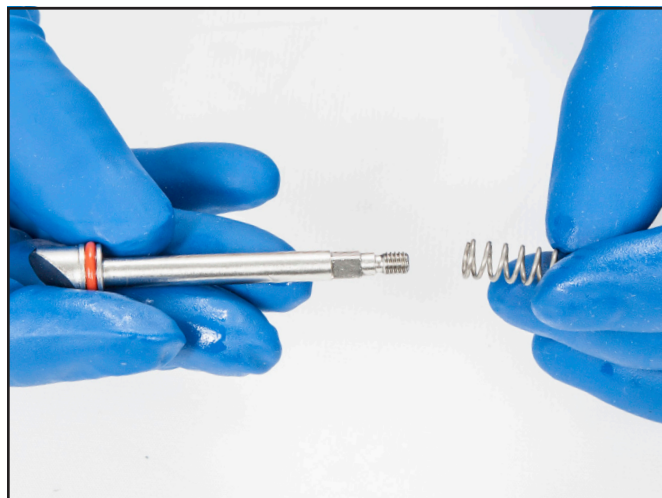
**NOTE**

New silicone sealing O-rings must be used on the piston 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.

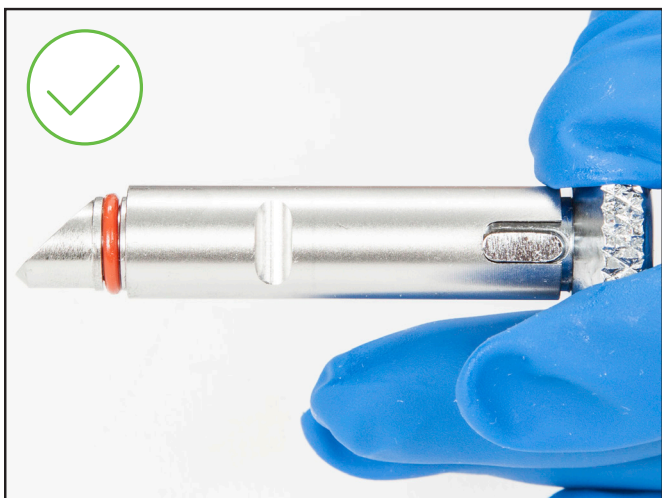
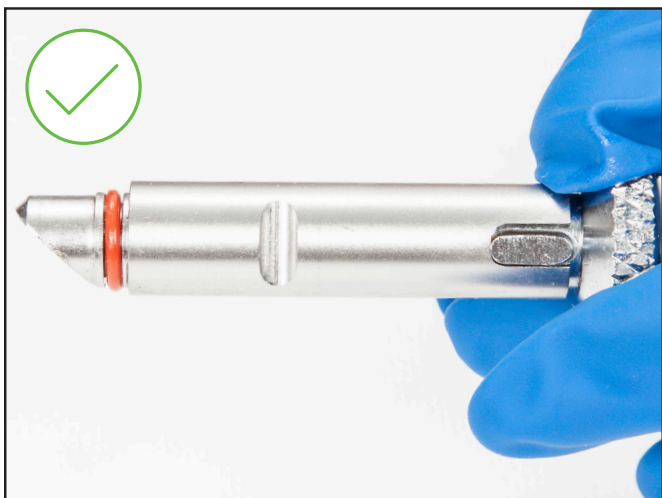


3) Carefully install the knob into the body, making sure not to pinch the O-ring. Ensure the index tab on the knob aligns with the recess on the body.



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.



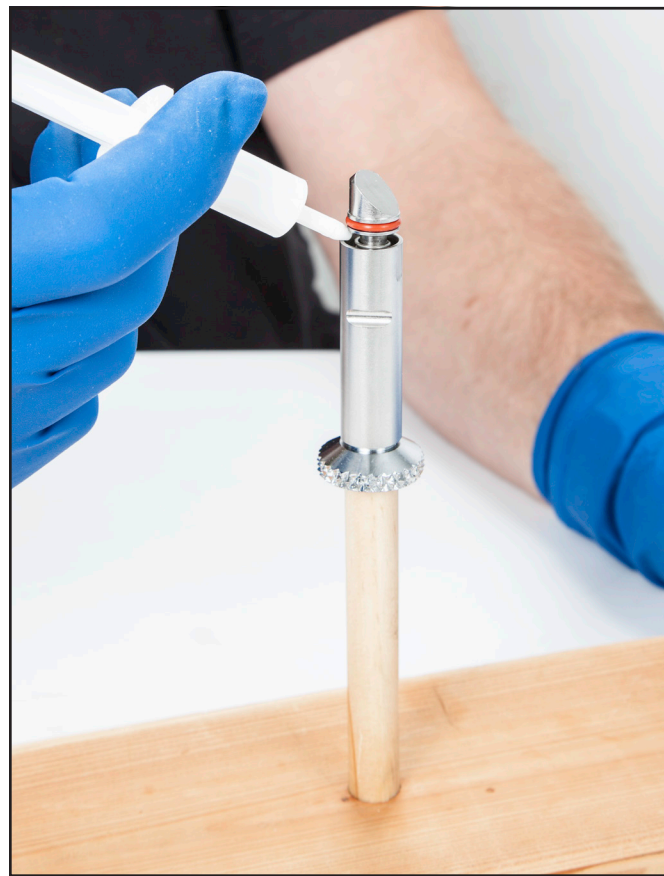
5) Place the black O-ring over the threaded plunger and using the dowel with the hole, press the O-ring into the knob recess around the threaded plunger. Ensure the black O-ring is in the recess formed by the threaded plunger and the groove in the pull knob. The threaded plunger protrudes just enough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

**NOTE**

Thread the nut only about one turn so that the knob end is sealed for filling with oil. This will leave a small opening between the body and plunger for filling on the opposite end using the syringe. 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) Place the knob end of assembly onto wooden dowel. With your hands on the body slightly push down to create a small gap at the plunger end of pull pin.



8) Fill pull pin with oil from the plunger end, use half the amount of oil contained in one of the syringes and do not fill to the top of the pull pin body. The remaining oil and syringe may be either stored or used in a 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.



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



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.



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 re-used apply a small amount of Loctite® 248 onto the ends of the screws.

NOTE: If any part of the red O-ring at the bev-

eled 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).

1.2.4 Pull Pin Sleeve

Tools required:

- P/N 525-112 Pull Pin Sleeve Kit
- $\frac{3}{4}$ " Hex Wrench
- $\frac{3}{4}$ " Torque Wrench with Hex Attachment
- Loctite® 248



Pull pins should be in the closed position when installing.

1) Using a $\frac{3}{4}$ " hex 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

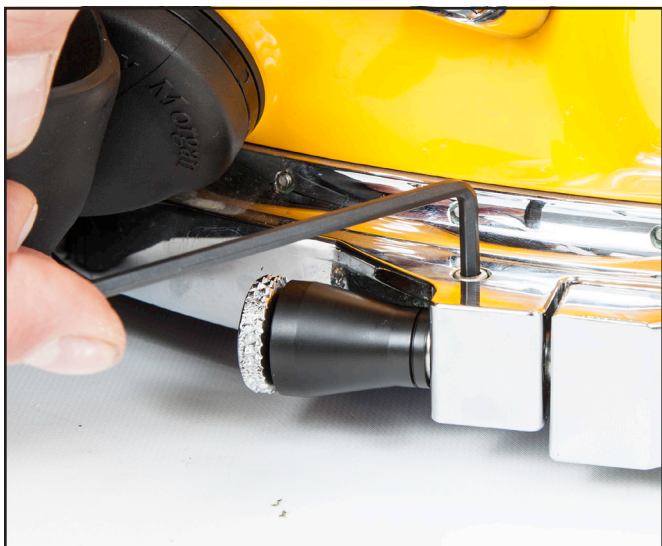
base of the helmet. The cam angle must be correct for the pins to function.



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 to provide alignment for the front of the neck ring assembly, as well as making it easy to remove the helmet. The swing catch should rarely need attention or service, unless damaged accidentally.

1.3.1 Disassembly of the Swing Catch

Tools required:

- Screwdriver

1) Remove the screw on the starboard side of the swing catch.

2) Remove the spring spacer. Take care not to lose the Teflon® washer that is attached to the inside of the swing catch. If it comes loose it can be glued back into place. (A “quick dry” rubber cement works well). Silicone grease can also be used to hold the washer in place.

3) Remove the screw from the port side of the swing catch.

4) Remove the washer and the spacer. The swing catch should now disengage from the spring.

5) If the spring needs to be replaced, this requires removal of the regulator and whisker. See "1.3.1 SuperFlow® 350 Demand

Regulator Removal from Helmet or Mask" on page SF350-8 or "1.3 455 Balanced Regulator Removal from Helmet or BandMask" on page 455BAL-4 for instructions on how to remove the regulator and whisker.

1.3.2 Reassembly of the Swing Catch



Loctite® 222 should be applied on all screws used in the assembly of the swing catch.

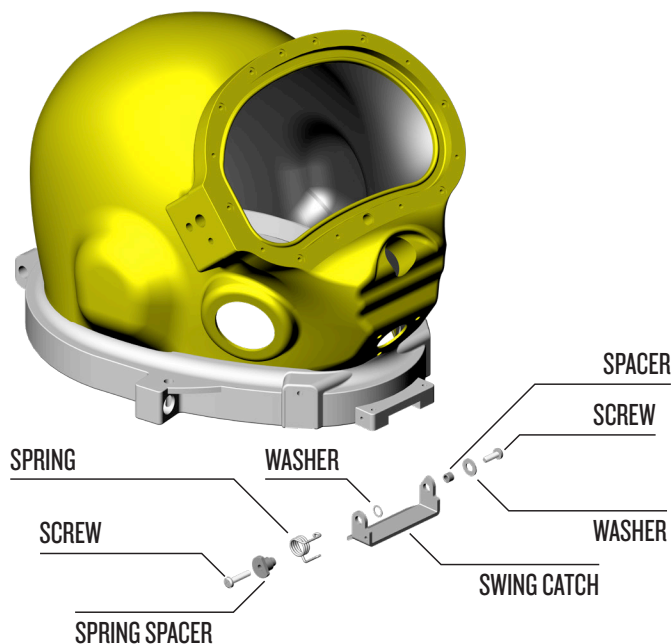
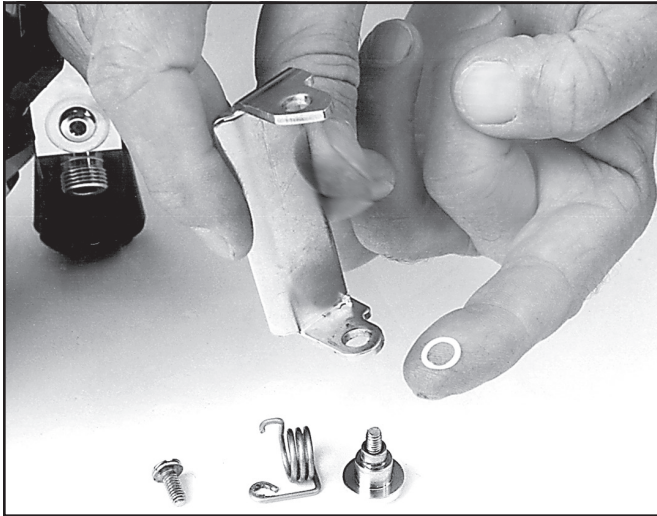


Diagram of the swing catch.

1) Make sure the Teflon® washer is on the right side and in the proper place, inside of the swing catch.



Make sure you have not dislodged the Teflon® washer.

2) Insert the hooked end of the spring into the small hole in the swing catch. Slip the swing catch over the tongue catch of the bottom ring on the base of the helmet. The spring end goes on the right side. Make sure you have not dislodged the Teflon® washer.

3) Insert the screw and spring spacer into the spring, then thread the screw into the screw hole on the bottom ring. Run the screw in until it is just snug.

4) Place the washer and spacer on the screw and insert the screw through the hole on the left end of the swing catch.

5) Tighten the screw while ensuring that the spacer fits through the hole in the swing catch, along with the washer, and no binding occurs.

6) Torque all three screws in accordance with the torque specification. See "Torque Specs" module.

7) Test the function of the swing catch. Also, test prior to diving with the system to ensure proper operation.