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WARRANTY - SKYBOLT will replace any part that is defective in material or workmanship upon return and inspection. This warranty does not cover damage to any other components, labor, personal injury or any other damage or injury. This warranty is expressly in lieu of any other expressed or implied warranties and of any other obligation on the part of SKYBOLT.

WARNING - Buyer takes full responsibility for the proper use and installation of the parts in this kit by a qualified A&P mechanic and that proper log book entries are made.

Before you begin – Skybolt developed cowling fastener replacements kits in the 1980s tailored to the model and serial numbers of just about all certificated aircraft built. We began by investing in a complete library of aircraft IPCs. As our experience with these kits grew by our own installations on hundreds of aircraft at our facility; add hundreds of customer feedback references; it was obvious, the IPCs are very lacking in detail when it comes to the cowling fasteners.

We discourage referencing the aircraft IPC as this is the quickest way to total confusion.

It is common for a customer to order parts from his IPC thinking this will save money (thus justifying the expense for the IPC) by eliminating the spares in a typical kit. We are more than happy to sell line item parts but we also know we will have the added expense for returns and replacements. Meanwhile, the customer has an airplane AOG. No one wins under this scenario.

After sales and installations of thousands of these replacement kits, we constantly update and revise them. It is important to understand, few aircraft cowlings are alike. When you take into account that a Southco fastener common to Cessna has a grip tolerance of +/- .010; an Airloc fastener common to Beech has a grip tolerance of +/- .005; and a Camloc fastener common to most aircraft has a tolerance of +/- .015; you can better understand the limitations to an IPC parts claim. Typically, cowling fasteners are fitted for every cowling that left the manufacturer. A good exception might be the Beech airframes where the IPC for Barons and Bonanzas are close to accurate; exception is the King Air. Mooney IPCs are bad and Cessna is worse…to the point, even the counts can vary. The most difficult airplanes to build a kit for are Cessna 182s and Mooneys. For the 182, the challenge is that the cowling is big, they are stiff (doublers), and no two are alike, especially the platemount cowlings (73-86). Mooneys have issues with the fiberglass/composite cowlings that are inconsistent and they use the Camloc 2700 series along the sides. Note: After all the GA manufacturers discovered the advantages of the 4000 series Camloc and scrapped all the light duty and cheap parts, most of the issues with cowlings settled down considerably.

Our goal is to complete the project the first time 95% of the time by including extra parts while assuming the customer has access to some spares. The aircraft owner with no spares, tools, or experience with these fasteners will be challenged. Even A&P mechanics are challenged if they do not have the right tools, experience, or spares.

Also keep in mind, we are working on airplanes that are 40, 50 and 60 years old. More often than not, we find cowlings with all sorts of substituted parts. A for instance, the IPC might call out flush grommets like 4002-G or -H and you find all 4002-O parts in your cowling. Actual stud lengths can and do vary. A cowling that has been tweaked ever so slightly can easily exceed the very tight tolerances in the grip of a stud. Simply altering the locking sequence can and does alter certain studs, making some tight to very tight or loose.

The Dzus cowlings can be frustrating because you will need a staking tool set for every size and type stud. The grommets can and do cost more than the studs. A Baron, for instance has two sizes and two head styles. That is sometimes four tool sets required to do a Baron. A Bonanza only requires one A5 tool, but it also requires the Airloc tool for the Gill Panels.

The 95% success rate we target with our kits begins with the customer that reads the instructions before they remove parts from their aircraft. They understand that each fastener length can vary throughout the cowling, thus they mark hole before removing a part. We find that a diagram quickly becomes confusing when the cowling is removed right-side-up, then turn over onto a workbench. A mark on the cowling itself really makes a difference in reconstructing the cowling.

The 5% either has an airplane that has had modifications (doublers for cracks, replaced cowlings, bend cowlings, even parts substituted) or the customer pulls everything apart with no clue as to what went where. I also blame much of the 5% as an airframe built on Friday afternoon or early on Monday morning. Work on enough C172s and you will understand what I mean.

At one time, we had specific instructions for every airplane model. We found this only complicated matters, so we changed to a generalized format that this is written for. There are customers with models and serial numbers exactly in sequence only to find a variation of parts between the airplanes (flight schools).

Here are the best preliminary instructions for installing a Skybolt Cowling Replacement Kit –

1) Read these instructions before you begin.
2) Document the size and length of the fastener in every hole and compare with the kit. A Sharpie is one of the best tools of all. Mark each hole.
3) Understand how a Camloc, Dzus, Southco, and Airloc part is installed (retained)
4) Do you have the necessary tools.
5) Do you have a large area workbench to work on the cowling. Attempting to remove and install parts on the hangar floor can be disastrous.
6) **www.skybolt.com has additional information on tools and installation. See Instructions at the bottom of our Home Page.**
7) Camloc/CLoc 2000 Series studs use a retainer that will add to the thickness. You may fit these studs (Mooney) then install the retainers only to find the stud will not lock. Anticipate the extra .020 material thickness when fitting these studs. (See also Instructions – Mooney Cowling Kit Instructions)

Stud Removal and Installation:

Camloc: Do not attempt to remove stud pin. Studs are removed by depressing with fingers (2600 or 2700 series) or SK-4P3 Pliers. 4002 series studs cannot be depressed with fingers and the SK-4P3 plier is required. Once the stud has been depressed against the spring, the stud will slide through the hole or grommet. Note: Some studs may also be retained by a retainer. 4002 Camloc Grommets are retained by a R4T (high shear) or R4G retaining ring. A curved picking tool will help remove these retainers. In the case of the R4T retainer, a carefully altered Snap Ring tool is required to expand the retainer enough to work it free with a picking tool. As there is no tool designed for this purpose, we have had excellent success with a good Snap Ring tool ground on each side so that the jaws are thin enough to engage in the snap ring. Try to taper the grind rearward so as the tool can better grip the ring when expanded. Grind the nose of the tool so the jaws will insert fully into the grommet groove and get the best grip on the ring itself. The R4T is a very difficult ring to remove, and in the case of Twin Cessnas which uses many of them, you will find that with a carefully prepared tool and some technique these retainers can be removed quickly and efficiently. In the case of 4002 series Camlocs, replace grommets and install snap rings. Note: It is very difficult to differentiate between the Flush and Plus Flush grommets. Also note the depth difference between `O' and `N' or `G' and `H' grommets. If your project involves replacement of more than a few grommets, we highly recommend the SK-T26 snap ring tool. **For more information on the SK-26 snap ring tool, see www.skybolt.com,**

Dzus: Almost all Dzus installations utilize a grommet which acts as a retainer. This permanent grommet can be removed by working the grommet from the backside up from the panel and bending inward enough to slide through the panel thus removing the stud with it. Re-installation requires Dzus tooling, a separate tool set for each size and head style. To lift the aluminum grommet material from the backside of the panel, we suggest using a nail cutting type tool or large end cutting pliers. Note: Old bent and rusted spring receptacles will hinder proper fit and engagement of new Dzus studs, especially stainless studs because they tend to be a bit softer than the steel studs you are replacing.

Airloc: Airloc studs are removed by pressing out the stud pin. As you can see, the Airloc pin serves a dual function as a locking mechanism and a retainer. Panels which use grommets may or may not require replacing the grommet, depending on wear. Airloc tooling is required if these grommets must be changed. Refer to the SKYBOLT catalog under Airloc Grommets for required tooling. Old studs can be removed by snipping or grinding the pins enough to allow the stud to be removed. No decent tooling is avialable at any reasonable price to remove or insert pins. We recommend altering a pair of vise grip pliers by grinding (with a die grinder) a thin slot in one of the jaws to allow relief for a pin pressed half way. For pin insertion, set the locking adjustment for the pliers such that when locked, the pin is exactly inserted the proper distance.

Southco (Lions): These studs are retained by a retainer. Simply remove the retainer. Install the new retainer with an appropriate sized deep socket.

8) If you did not mark each hole before removing parts, for the Camloc/CLoc parts, begin by placing the cowling into position. Install the longer studs and lock. Proceed around the cowling with the remaining studs. If the stud is too long, it will lock but the head will protrude beyond the grommet or cup. For every .030 protrusion, this requires one stud length shorted per .030. Swap studs as necessary to finish the installation with all studs locking properly. A stud that is notably tight is not a good thing.

   For the 2000 Series Camloc/CLoc, select studs for each hole that are slightly long as the retainers will add approximately .020 to your grip range (thickness). To install the retainers, you must remove the cowling so be certain to mark each hole for the different stud lengths.