

May 1, 2011

Cessna 177
NEW Skybolt 2003-42A Platemount Conversion Kit

CLoc® SK40S5 Series Fasteners



Forward – Skybolt allows 9-1/2 to 10 Hours labor for this Installation...we have the right tools and experience. Some aircraft of the same model are easy conversions (6-7 hours); some are not (10 hours). Allow time for required paperwork (Form 337 submitted with STC and proper logbook entry).

Procedurally, do not remove your cowling, and then start reading instructions as all of the following steps are out of sequence and the project will take longer than required. Our experience suggests the following sequence:

- 1) Use the SK203-TEM1 alignment procedure to establish a baseline to refer back to with the cowling removed.
- 2) Remove only the Top Cowling and follow the Steps 1 thru 8. This establishes early on some options to consider when the Lower Cowling is removed and SK2003-42 Platemounts are installed. Not following this sequence could require removing new platemounts in order to modify (SK2003-AW5 Camwashers) to fix alignment problems. This sequence also is designed to minimize how many times you must position the Lower Cowling (difficult and time consuming) attempting to align fastener holes, paint stripes, or nose to spinner alignment. Working with the Upper Cowling first gives an established baseline to work from.

The Cessna 177 Cowling is the simple to convert. It presents the least problems of all cowlings. Fastener alignment, however, can be improved. This conversion kit is not only designed to provide better fasteners, it is designed to correct any fastener alignment problems.

Before you begin the project, become familiar with the following recommendations or warnings –

- 1) Before you remove the cowling – Read section on SK203-TEM1 Alignment Template, Page 4
- 2) For Firewall Only Installations - It is particularly easy to mistakenly drill the rear hole on either side of the Upper Cowl thinking that it is associated with a firewall Platemount. Mark this rear hole or place a piece of tape over each rear hole on the upper cowl horizontal split.
- 3) Camloc or CLoc® Studs - Forcing or over-torquing studs will allow the stud pin to loosen and fail. Forcing means that the stud is too short for the application or the insert is incorrectly adjusted. No returns accepted on over torqued studs (Studs with loose or missing pins). This is plainly indicated by galled heads on the stud as a result of attempting to force the stud to lock.

Cessna issued Service Bulletin SB98-53-02 for newer 172 R & S airplanes on December 31, 1998 to address the root of the problem with shock-mounted cowlings. (Applies to all shock-mounted cowlings). This 29 page service bulletin describes an exhaustive procedure to align cowl mounts and assumes approximately 18 hours to accomplish. Skybolt has developed an alternate procedure that is simple and consumes very little time to properly align mounts with the corresponding fastener hole in the cowling. Step 1 in this manual will describe how to check for mount alignment. The fix to alignment problems is explained throughout the instructions.

*******For Firewall Only Conversion Kits*******

MARK REAR SIDE HOLES OF UPPER COWLING TO PRECLUDE INADVERTENTLY DRILLING THESE HOLES FOR THE SK-O GROMMET. MARK OR TAPE OVER THIS HOLE.

INSTALLATION

Converting Southco Fasteners to CLoc® SK40S5 Series Fasteners

SKYBOLT SK2003-42A Mounts and SK245-4 Receptacle

PLEASE NOTE: The most important points you must adhere to in converting your aircraft are:

- (1) Reading these instructions will save installation time and costly mistakes.
- (2) Never drill any holes referenced with a standard drill bit. You must use a step drill or risk damage to the airframe or cowling.
- (3) The biggest problem we encounter is a lack of understanding on how a CLoc® stud works. These are not Dzus® studs where the bigger the screwdriver the better. CLoc® studs require very little torque to lock. Over torquing simply ruins the stud by loosening the pin. Readjust inserts to allow stud to lock with minimum effort.

There are three segments of the cowling we refer to in these instructions:

- (A) The firewall support brackets
- (B) The lower cowling containing the firewall studs and the side receptacle mounts.
- (C) The upper cowling containing both firewall and side studs.

ADVANTAGES TO CLoc® SK40S5 Series studs:

- (1) The strongest, most durable panel fastener.

SKYBOLT SK203 Series Kits are designed to convert the entire cowling to CLoc® SK40S5 Series fasteners.

Tools Required: 3/8 Drill Motor (Extra Drill Motors preferred)

Small Open End wrench (11/32)

UNIBIT-1 and UNIBIT-3 or -4 Step drill

100 Degree Countersink Bit

Rivet Gun or Rivet Squeezer

SK-4P3 Pliers

SK-T26 Grommet Retainer Installation Tool

Template-245A

Optional Drill Jig – 1-1/4” Hole Saw and 3/4” Hole Saw

Before you begin –

Take a close look at your cowling before removal.

Note its positioning relative to the prop spinner. If the cowling appears to not align with the spinner bulkhead or is not centered, repositioning of shims and mounts can correct this problem.

Also note clearances between the aft cowling skin and the fuselage skin. The allowable gap is 0.03 inch to 0.25 inch, with 0.12 inch preferred, except within 5.0 inches above and below the static port where the allowable gap is 0.06 inch to 0.13 inch. With this installation, it is simple to correct a side fastener alignment problem by a shim adjustment when you install the new SK2003 mounts, and positioning adjustment (alignment) of the mount to correspond with fastener hole in the cowling and or centering of the nose of the cowl.

Note paint stripes and paint lines.

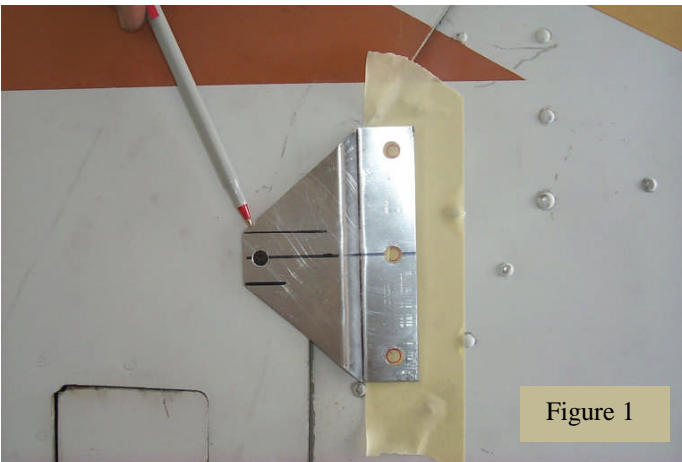
Note any difficulty of fasteners aligning with respective holes.

To do this conversion correctly, we will address all of these issues.

Many cowlings are difficult to install because of unaligned side holes and fasteners, especially the rear most fasteners. A shim adjustment (firewall platemounts) can cure this problem easily. If your cowling has no problems with skin clearance or side fasteners, thus shim adjustments are not necessary, the next step is to note any adjustments required to center the nose of the cowling relative to the spinner. If shim adjustments are required, mount alignment will become more of a two-step process involving both the upper and lower cowling. By moving the mounts forward or rearward, the nose cowling can be adjusted. The second step will be to adjust firewall mounts in order to center the fastener hole with the corresponding mount. With the SK2003-AW5 washers, this adjustment is very easy.

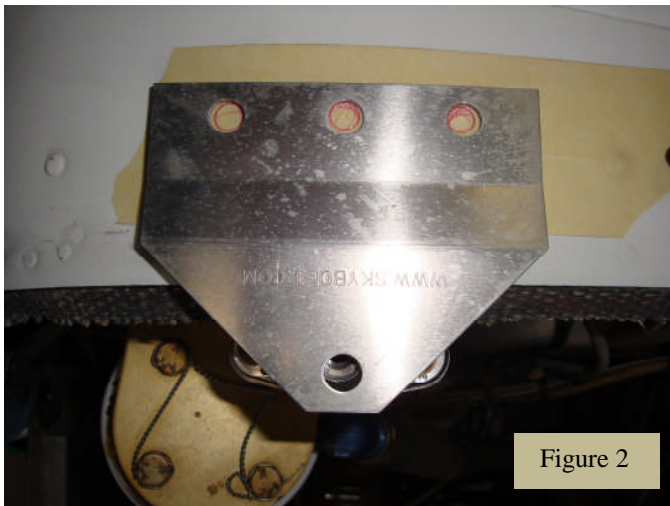
Step 1 – (1/2 Hour)

Place 8” strips of 1” masking tape behind the rivet line on the boot cowl adjacent to each stud as noted in picture. Sight template over each stud and mark holes onto tape. This important step will greatly enhance the alignment of each SK2003 mount at each location.



Close-up of template placed over stud and holes marked for alignment after cowling removed

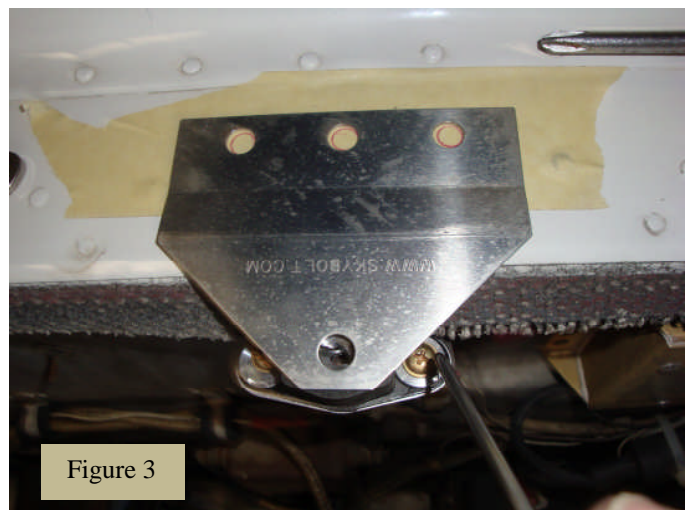
Now, when you remove the cowling, it is easy to determine the mount position relative to the cowling hole for each location. If the template determines that a mount is over 1/4” from the center, the use of SK2003-AW5 Cam Washers are an easy fix to re-locate the new mounts.



This is all top common on many Cessna cowling mounts. Without the SK203-TEM1, it would be difficult to tell just how much each mount is off from its respective cowling hole. To move a mount far enough to center (as in this case), this mount will need to be modified for SK2003-AW5 Camwashers.

With camwashers installed, simply dial the washer to move the mount until centered with the template. It is that simple!

We will discuss the camwashers later on page 7.



Step 2 - Remove Upper Cowling (Leave Lower Cowling on Aircraft). If you are *not* converting the side fasteners, place a piece of tape over the rear hole of the side cowling to prevent drilling in Step 5.

Step 3 – (1/2 Hour) Remove Old Upper Firewall Platemarks

Note the number of shims at each location and mark this on the firewall bracket. Plan to add or subtract shims to achieve clearances stated in Step 1. Now, remove all old mounts.

Step 4 – (1/2 Hours) Install New SK2003-42 Platemarks

Install new SK2003-42 Mounts at all upper firewall locations with hardware supplied in kit. With the SK203-TEM1 template, check that each mount is centered as described above. If mounts are not centered within 1/4 of an inch, the SK2003-AW5 Camwashers must be considered.

Step 5 - (1/4 Hour) Upper Cowl Firewall Holes Only (For Firewall *Only* Kits, do not drill rear hole along cowling Side) - With Unibit-1, drill firewall mount fastener holes to 15/32 (the next to last step on the Unibit-1 drill).

Step 6 – (1/4 Hour) Install Grommets

Install the grommets and retainers with the SK-T26 tool. Push the R4G retainer onto the tapered shank close to the end, then use the hand tool to insert the ring onto the grommet. Check that the retainer is properly seated.



Figure 4

Step 7 – Install CLoc® Studs in firewall holes in Upper Cowling with SK-4P3 Pliers.

Step 8 – (1/4 Hour) Position Upper Cowling. Lock firewall studs and note any changes to the alignment of the side fasteners. (With new mounts, most likely you will see alignment issues). This step will determine the decision to use SK2003-AW5 CamWashers for the Lower Cowling Mounts. You now have a good baseline to work with the Lower Cowling..

Step 9 - Remove Upper Cowling

Step 10 – (1/2 Hour) Remove Southco Receptacles from Lower Cowling sides –

Drill out Southco receptacles with #40 drill.

Step 11 – Remove Lower Cowling

Step 12 – (1/2 Hour) Lower Firewall - Remove Old Firewall Platemarks as noted in Step 3.

Step 13 – (1/2 Hour) Install New SK2003-42A Platemarks

Install new SK2003-42 Mounts at all lower firewall locations with hardware supplied in kit. With the SK203-TEM1 template, check that each mount is centered as described above. If mounts are not centered within 1/4 of an inch, the SK2003-AW5 Camwashers must be considered.

Step 14 – (1/4 Hour) With Unibit-1, drill Lower Cowl firewall mount fastener holes to 15/32 (the next to last step on the Unibit-1 drill).

Step 15– (1/4 Hour) Install Grommets in Lower Cowling firewall as described in Step 6.

Step 16 – Install 2ea CLoc® Studs in upper firewall holes in Lower Cowling with SK-4P3 Pliers. (Leave the other studs out for the initial phase).

Note – We are purposely not installing any side receptacles until Step 22.

Step 17 – (1/2 Hour) Position Lower Cowling and fasten two upper fasteners to hold cowling in place. Be certain that rear cowling firewall doubler (doubler inside of Lower Cowling) is properly positioned on mounts.

Note 3 things: (1) Do the cowling paint stripes line up. (2) Is the cowling in line with the spinner? (3) Look through each grommet hole to determine if mounts are aligned with holes. Placing the Upper Cowling into position will also determine how close the horizontal split is a proper fit. It is more of the norm that 2-3 mounts do not align with the grommet holes; that the paint stripe is not aligned; and the horizontal split is 1/4 inch or more from an ideal fit. You can force anything up to a point, but the beauty of this installation is that we can fix all of these problems with shims and/or the SK2003-AW5 Camwashers.

Note: If by chance your cowling holes all align; the paint stripes align; and the horizontal split holes all align, skip to step 20. This is a rare occurrence.

If the lower cowling must be shifted up (typically), consider removing shims at the bottom. If shim elimination is not an option, plan on using SK2003-AW5 Camwashers at multiple locations on either side of the lower cowling. By “dialing” the Camwashers full up for multiple mounts, the cowling can be shifted up considerably without the cowling skin touching the aircraft skin. Approximately .030 clearance can be considered a minimum. You may find that only one side needs a shift.

-----If Required-----

Step 18 – (1 Hour) To modify SK2003-42 Mounts - If Required

Typically, three or four mounts may require movement greater than 1/4 of an inch. Modify as many SK2003 mounts as required by drilling mounting holes to 7/16 inch with a Unibit-1 bit. Deburr holes and check that the SK2003-AW5 washers insert properly.



Drill mount holes to 7/16” with Unibit-1 drill

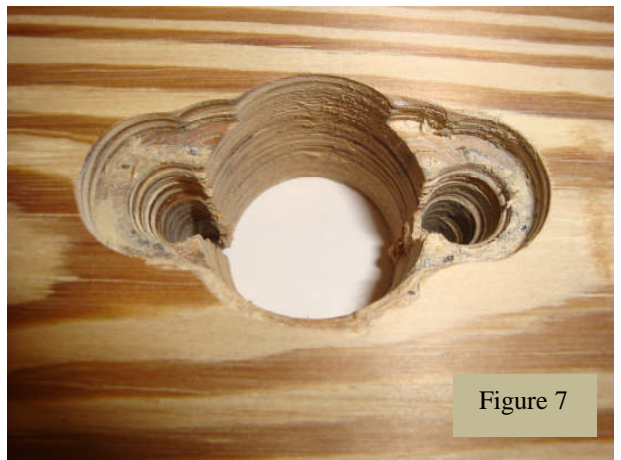


Modified SK2003 Platamount installed with SK2003-AW5 Cam Washers.

Simple Drill Jig -

Use a small 2x4 as a drill fixture. Trace a platamount onto the wood surface. Mark the mount center and the center for each mounting hole. Drill the center all the way through the board with a 1-1/4” hole saw. For the “ears”, only plan to drill the mounting holes 1/4” deep. Any deeper and a typical drill press with a Unibit-1 will use up its full stroke prior to the 7/16 step. Use a 3/4” hole saw for the ears. Carefully notch the wall between the large and small holes so that the mount fits nicely into the drill jig.

Place the mount into the drill jig and drill each mounting hole. To prevent a huge burr on the back side, only start the 7/16” step less than 1/2 way through the metal and stop. Flip the mount and finish the 7/16” step from the back side.



The SK2003-AW5 Cam Washers are slotted so as the mounts can be fastened in a centered position. (Previous versions had no center positioning). By moving the mount within the slot, centering may be possible. For additional movement, simply rotate the washers to a desired center or shift. Once the desired center or shift is located, tighten screws and you are done. Unlike the Cessna Service Bulletin SB98-53-02, this modification is easy, accurate, and involves no drilling of the airframe brackets or relocation of brackets.

Note – Camwashers “dialed” full up to shift this Lower Cowl up to the paint line and to align side fasteners. The 3 lower mounts on the right side have all been modified for the SK2003-AW5 Camwashers, full up bias. The left side of this cowling did not need this shift for alignment



Step 19 – (1 Hour) Re-install modified SK2003-42A Mounts. “Dial” the Camwashers to the desired offset to achieve alignment goals.



Step 20 – (1/2 Hour) Position Lower Cowling as described in Step 17. Position the Upper Cowling. Install SK40S5S fasteners in all firewall holes and lock. (**Note: If studs appear to be tight or not lock, do not force to lock. A longer stud is required**).

Now note 3 things: Are the same alignment items as described above resolved? Hopefully, considerable progress has been made. The horizontal split holes should be close to center, hopefully, at center. If alignment is still a problem, additional Camwashers may be the only answer.

With Lower Cowl fastened, and Upper Cowl in position, stripes are in line, side edge is properly positioned with paint line, and side holes are in line.

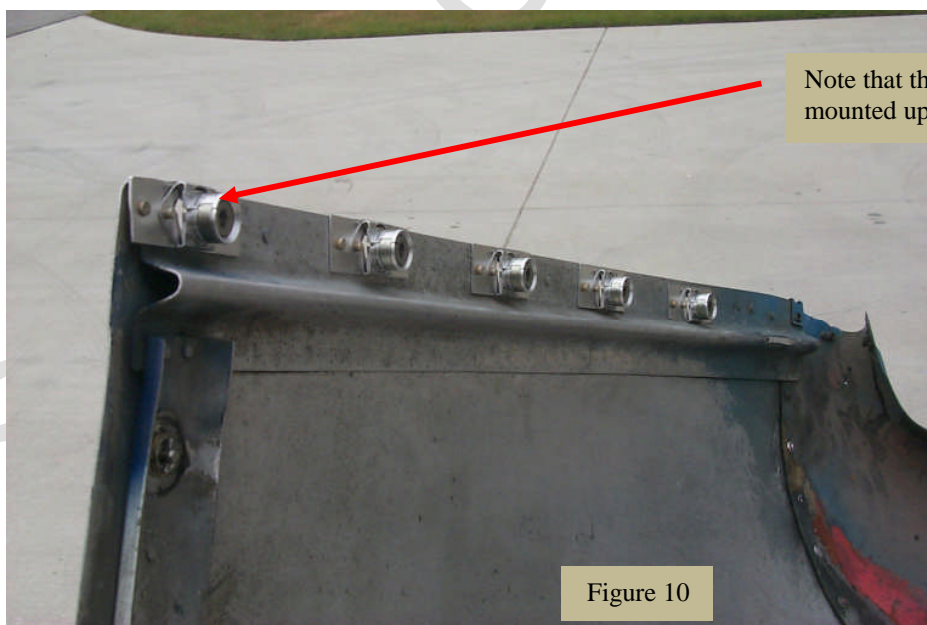
At this point, all firewall mounts are properly positioned and all firewall studs are properly locked. All horizontal holes are aligned. If any alignment issue remains, the quality of this conversion assumes that these conditions are addressed and resolved. On some cowlings, this can be time consuming and outside of the estimate of time required to fix.

Step 21 – (1/4 Hours) Establishing desired center for all Side Receptacle Adapters. With both cowlings properly positioned and firewall fasteners properly locked, the desired positioning of each side receptacle can be easily established by marking or scribing each side hole through the grommet. Remove the Upper Cowling. Check that the scribe lines are within reasonable location to the original center holes. If a hole is too high, the receptacle adapter edge will be above the cowling edge and must be trimmed. The best cure to this situation is to “shift” the Lower Cowling SK2003 Platemarks using the SK2003-AW5 Camwashers on one or both sides. If the hole is too low, the receptacle adapter will interfere with the inner doubler. The best cure to this would be to add shims to the Lower Cowling SK2003 Platemarks.

Step 22 – (1 Hour) With Lower Cowling on aircraft, determine that the SK245-4A Adapter Assemblies will fit within the limits of the inner doubler and the cowling edge. Clamp the template, centered to the scribe marks. **Note that the template holes are biased to one edge** to allow the proximity of the inner doubler and the center of the receptacle hole. With Unibit-3 or -4 Stepdrill, expand the center pilot holes to 5/8”. Drill outer rivet holes with #30 drill. Repeat this procedure for all side holes. Note that the rear holes may require that the SK245-4A Adapter Assembly to be trimmed flush with rear edge. In some cases, the rear rivet on the adapter may be removed so that this hole becomes a combined fastening attach point for the assembly.

Countersink all rivet holes and deburr all holes.

Step 25 – (1/2 Hour) Mount all SK245-4A side receptacle assemblies as shown.



Note that the locking clip engagement tab is mounted upwards (accessible). See Figure 12.

Figure 10

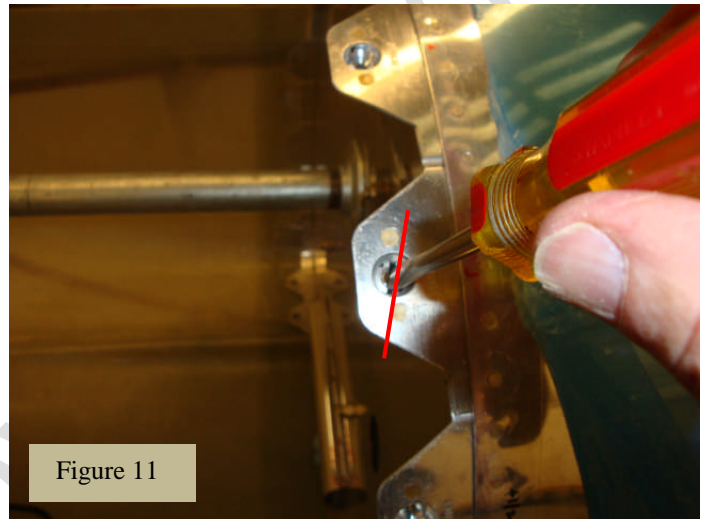
Inspect engine compartment for tools. Reconnect landing light wires if applicable.

Step 26 – (1/2 Hour) Position Top Cowling. Lock all firewall fasteners. Install SK40S5 studs along sides and lock. Adjust any stud (receptacles) as required.

Step 27 – (1/2 Hour) Install Lower and Upper Cowl.

Lock all studs around firewall. Begin engaging studs along the sides and continue to turn until adjusted so that the stud head is flush with the grommet face. With a sharp push-turn motion, attempt to unlock studs without disturbing the receptacle insert. Remove Upper Cowl. Pull anti-lock pins.

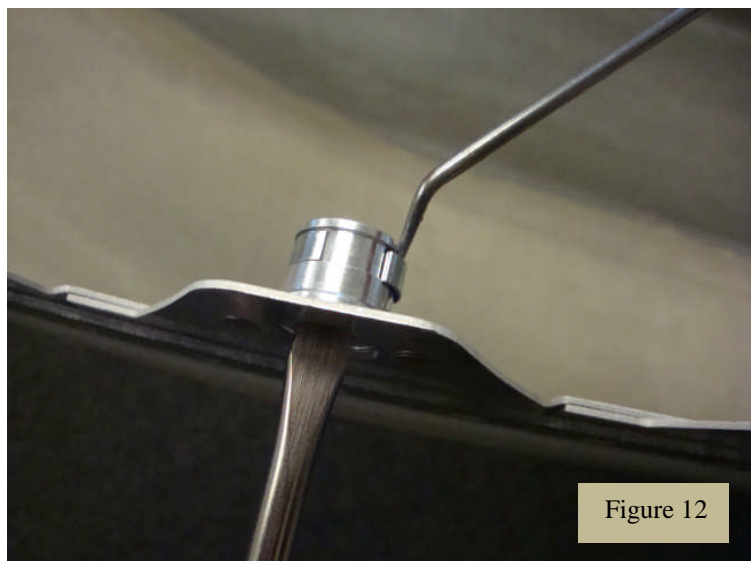
With a flat blade screwdriver, turn inserts so that the slot is just past being aligned with the mounting rivets



Re-Adjusting the SK245-4 Adjustable Receptacle (after initial adjustment and pin removal)

The easiest method of re-adjustment is with a curved pick tool (part of any pick tool set). It allows access in tight spaces and is much easier to use than a straight pick tool.

Locate the locking clip tab (the reason we orientated the receptacle in Step 25). Insert the pick and lift the tab, unlocking the insert, adjust with flat blade screwdriver. One half turn adjusts the fastener .015; one full turn adjusts the fastener .030; the equivalent of a stud dash number.



Platemount Configured Aircraft

Aircraft	Note	Year	Models	Serial Numbers	Screw Cowlings	Platemount Cowlings
C150	A	59-66	150A-F	17001-17999, 5901-64532	6,527	
C150	1	67 On	150G-M	64533 thru 79405		14,872
A150	1	70-77	150K-M	A150001 thru A150734		734
C172	A	56-66	172, A-G	28000-54892 plus Reims SN	27,279	
C172	1	67-81	172H-P	54893 thru 75034		21,186
C172	2	82-83	172P	75035 thru 76079		200
C172	2	83	172Q	75869 thru 76079		200
C172	3	84-86	172PII & Q	76080 thru 76673		593
C172	4	77-81	172XP,XPII	2000 thru 3454		1,454
C172	5	96-On	172 R&S			300
C175	A	58-62	175, Skylark	55001 thru 57119	2,119	
C177	1	71-78	177 A-B Classic	0001 thru 1366		2,752
C177RG	1	71-78	177RG,RGII	0001 thru 1366		1,366
C180	A	53-60	180, A-C	30002-33000, 50105-50911	3,804	
C182	A	56-60	182, Skylane	33000 thru 53007	4,105	
C182	5	73-86	182P-RB	61426 thru 68542		7,116
					43,834	50,773

Note Configuration

A	Screw Cowling
(1)	Lord-Southco
(2)	Lord-Southco FW & Sides, Camloc 4002 Nose
(3)	Lord-Camloc 27S3 FW & Sides, Camloc 4002 Nose
(4)	Lord-Southco FW, Camloc 4002 Top Center, Nose & Sides
(5)	Lord-Camloc 27S3 FW, Camloc 4002 Sides

Weight & Balance Considerations for Conversion

Aircraft	Original Fasteners	Skybolt Fasteners
C150	.160g/.35lb	.385g/.85lb
C172	.210g/.46lb	.525g/1.15lb
C177	.215g/.48lb	.520g/1.15lb
C182	.170g/.37lb	.385g/.85lb

United States of America
Department of Transportation — Federal Aviation Administration
Supplemental Type Certificate

This Copy *Not* Approved
for Installation or Log
Book Entry

This certificate, issued to

Skybolt Aeromotive Corporation
9000 Airport Boulevard
Leesburg Municipal Airport
Leesburg, Florida 34708

SA327630

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified herein meets the airworthiness requirements of Part 21 of the Federal Aviation Regulations.

Original Product — Type Certificate Number: A13CE, A20CE
Make: Cessna
Model: 177 series, 177RG

Description of Type Design Change: Installation of engine cowling and firewall fasteners in accordance with Skybolt Aeromotive Corporation Master Drawing List - C177, SKMDL177.WQ9, no revision, dated March 1, 1992, or SKMDL177.XLS, Revision 002, dated April 25, 2001, or later FAA approved revisions.

Limitations and Conditions: This approval should not be extended to other aircraft of this model on which other previously approved modifications are incorporated unless it is determined by the installer that the interrelationship between this change and any of those other previously approved modifications will produce no adverse effect upon the airworthiness of that airplane. If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: April 23, 1992

Date issued:

Date of issuance: July 15, 1992

Date amended: August 29, 2001



By direction of the Administrator
Paul C. Sconyer
Paul C. Sconyer (Signature)
Associate Manager, ACE-117A
Atlanta Aircraft Certification Office
(Title)

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.

This certificate may be transferred in accordance with FAR 21.47.