PERFORMANCEstol
BY AIRFRAMES ALASKA

Instructions for Continued Airworthiness

Manual No. PSTOL-010

Performance STOL Double Slotted Flaps for Piper PA-18 Series Aircraft

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Record of Revisions

Rev Level	Date	Page	By	Explanation of Revision
IR	9/6/2016	-	Doug Keller	Initial Release
A	1/31/2017	All	Doug Keller	Complete rewrite per Order 8110.54A
B	10/4/2017	All	Abe Harman	Changed all company references and logos to Airframes Alaska per STC acquisition. Removed statement on page 4 which said the aircraft could not be fitted with a shortened flap handle without also installing double slotted flaps.

Distribution of Changes

A current copy of this manual will be maintained on the Airframes Alaska, LLC. Website www.airframesalaska.com

Introduction:

The performance STOL PA-18 Double Slotted Flap system is a replacement flap system with enhanced performance over the OEM PA-18 flap system.

Description:

The Performance STOL PA-18 Double Slotted flap system is composed of three key components:

1. New flap hinges which replace the original OEM flap hinges. The installer simply drills out the OEM flap hinges and installs the Performance STOL flap hinges along with a flap hanger stiffener.
2. A Vane Element which is the first of the two flap elements. The vane element mounts directly to the newly installed flap hinges. A new pushrod is used to connect the vane element to the existing OEM flap bell crank inside the wing.
3. The Flap Element which is the second element of the two element flap system. The flap element mounts directly onto the vane element. Another pushrod is used to control the flap element which is attached to the new flap hinge.

The Performance STOL PA-18 Double Slotted flap kit has an optional provision to shorten the flap handle. A shortened flap handle allows for more control stick lateral movement, avoiding the typical pilot's thigh interference problem with the flap handle.

If the installer wishes to install the shortened flap handle separately, they are still limited by the Approved Flight Manual Supplement to a maximum airspeed with flaps extended of 70 MPH IAS, and the aircraft must be placarded as such in full view of the pilot.

Instructions for installation of this kit are detailed in Manual No.: PSTOL-013 "Installation Instructions" which can be found on our web site: www.airframesalaska.com.

Airworthiness Limitations

"The Airworthiness Limitations section is FAA approved and specifies maintenance required under 14 CRF, Sections 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved."

Limitations:

Currently there are no components of the PSTOL PA-18 Double Slotted Flap Kit that have a time limited mandatory replacement, inspection, service, or critical design configuration control limitations.

Instruction for Continued Airworthiness:

Inspection Criteria
100 Hour / Annual
(100 hour or Annual inspection interval, whichever comes first)

1. **Inspect –** The vane and flap for: skin damage, cracks, smoking rivets, missing rivets, excessive play in bearings, missing clevis pins, cotter pins, nuts, or bolts. If any damage if found, repair per 43.13, contact Airframes Alaska, LLC. If you have any questions. All the flap bearings are oil impregnated and do not require additional lubrication. All bearings are pressed into the flaps and are easily replaced when worn. If bearing play over 0.010" is found, replace worn bearings. Refer to the Manual No. PSTOL-013 "Installation Instructions" for bearing part numbers.
2. **Inspect** – The flap gap seals for: Proper fastening and ensure that all the mounting hardware is intact and secure. Replace any missing mounting hardware as required.
3. **Inspect –** Control pushrods for: jam nuts and ensure they are all tight. Ensure proper thread engagement in rod end bearings and clevis.
4. **Inspect –** Flap hangers for: proper fastening and ensure all the mounting hardware is intact and secure. Inspect for cracks or excessive play in the bearings. All of the bearings are oil impregnated and do not require additional lubrication. All bearings are pressed into the hangers and are easily replaced when worn. If bearing play over 0.010" is found, replace worn bearings. Refer to the Manual No. PSTOL-013 "Installation Instructions" for bearing part numbers.
5. **Inspect –** Flap actuation system for: proper actuation. Ensure the cable tension is tight, but not too tight so as to move the bell crank off its stop when the flaps are retracted. Ensure proper full deflection angle of the aft flap is 50.5° ± 2° degrees per PSTOL-0001 "Master Assembly PA-18 Double Slotted Flaps" drawing.
6. **Inspect –** Placard: proper placement. Ensure that the "DO NOT EXCEED **70 MPH IAS** WITH FULL FLAPS DEPLOYED" placard is placed on the instrument panel immediately adjacent to the airspeed indicator and in full view of the pilot. If the placard in not properly placed, the aircraft is not safe for flight. Please contact Airframes Alaska, LLC. If a replacement placard is required.
7. **Inspect –** Weight & Balance: inclusion of the flap kit. Ensure that the aircraft W&B has been updated to include the installation of the Double Slotted Flap kit. If the W&B does not reflect the installation of the flap kit, the aircraft is not safe for flight. Refer to the Manual No. PSTOL-013 "Installation Instructions" for W&B alteration.

Double Slotted Flap Removal Procedure if Repairs are Required

In the event the flaps need to be removed to preform repairs follow these removal instructions:

1. Remove the turnbuckle assemblies (PSTOL-0038) from the hanger extenders (PSTOL-0029) and aft flap elements (PSTOL-0027). Each end of each turnbuckle assembly is mounted with a MS20392-2C21 clevis pin, one AN960-10L washer under the cotter pin, and a MS24665-132 cotter pin. To do this remove the cotter pins, washers, and clevis pins on both the inboard and outboard hangers on both wings.
2. Remove the second flap elements (PSTOL-0027) from the vane elements (PSTOL-0015) on both wings. Each aft flap hinge is installed with an MS20392-3C53 clevis pin, two AN960-416 washers (one on each side of the hinge), and a MS24665-132 cotter pin. To do this remove the cotter pins, washers, and clevis pins on both the inboard and outboard aft flaps on both wings.
3. Remove the pushrods (PSTOL-0042) from the vanes (PSTOL-0015) and the wing flap bell crank. Note: The pushrods have LH threads on one side and RH threads on the other.
4. Remove the vanes (PSTOL-0015) from both wings. Each vane hinge is installed with an MS20392-3C53 clevis pin, two AN960-416 washers (one on each side of the hinge), and a MS24665-132 cotter pin. To do this remove the cotter pins, washers, and clevis pins on both the inboard and outboard flap hanger extenders (PSTOL-0029) on both wings.
5. If the flap gap seals need repair, remove them as well by unscrewing the sheet metal screws.

Double Slotted Flap Installation Procedure after Repairs

In the event that the flaps need to be reinstalled after repairs, follow these installation instructions:

1. Refer to Manual No.: PSTOL-013 “Installation Instructions” for proper flap install and rigging. This manual is available on our web site: www.airframesalaska.com.
2. Mount the first elements, the vanes (PSTOL-0015), to the wings. Note that there are left and right flap elements. The end with the shorter distance from the flap hinge to the end of the flap element is the inboard end. Each vane is mounted with an MS20392-3C53 clevis pin, two AN960-416 washers (one on each side of the hinge) and an MS24665-132 cotter pin.
3. Attach the pushrods (PSTOL-0042) to the vane elements and to the bell cranks rod ends in the wings. The vanes already have a rod ends installed on the inboard hangers. Note: The pushrods have LH threads on one side and RH threads on the other. Ensure that there is equal and adequate thread engagement at both ends. Adjust the length of the push rods by rotating the pushrod. One direction will increase the length, the other direction will decrease the length.
4. Using a long straight edge, adjust both vane elements so that the bottom of the vanes are parallel to the bottom of their respective wings.
5. With the vane elements (PSTOL-0015) mounted and adjusted, mount the second elements, aft flaps (PSTOL-0027), to the vane elements. Ensure that the left flap is mounted to the left wing, and the right to the right wing. Each flap hinge is installed with an MS20392-3C53 clevis pin, two AN960-416 washers (one on each side of the hinge), and a MS24665-132 cotter pin.
6. Mount the turnbuckle assemblies (PSTOL-0038) to the hanger extenders (PSTOL-0029) and aft flap elements (PSTOL-0027). Each end of each turnbuckle assembly is mounted with a MS20392-2C21 clevis pin, one AN960-10L washer under the cotter pin, and a MS24665-132 cotter pin. Using a long straight edge, adjust the turn buckle assemblies so the flap element bottom is parallel to the bottom of the vane element. Repeat for the second wing.
7. Operate the flap handle to ensure proper motion of the flap system and that there is no binding.
8. If the flap return springs are old or worn, the flaps may sag with the flap handle in the fully retracted position. In such case, replace the springs. The Piper part number for the flap return spring is 10940-00. (It is recommended to use a “heavy-duty” replacement if available)
9. Pull the flap handle to the fully deployed position and verify that the vane and flap deployment angles are equal or less than the maximum angles specified on PSTOL-0001 “Master Assembly PA-18 Double Slotted Flaps” drawing. This drawing is located in Manual No.: PSTOL-013 “Installation Instructions” which is located on our web site: www.airframesalaska.com. Note that these are nominal static maximum deployment angles for a stock 3 position flap ratchet. Flap ratchet tolerances, cable slack and cable tension could vary per individual aircraft, and most installations will be less than the maximum angles specified. Exceeding maximum deployment angles could result in structural damage to the wing.
10. After the flaps are installed and properly adjusted, check to see that all the cotter pins are properly installed and all push rod jam nuts are tightened.
11. If the flap gap seals were removed, re-install them with the existing sheet metal screws.

Trouble Shooting

Problem: The flap elements and/or gap seals rub and cause wear marks.

Correction: Bend the vane and/or flap elements and/or gap seal trailing edges up where wear is occurring. Bend up until the wear/rubbing is eliminated. Make sure not to crease any components.

Problem: The flaps do not deploy to the specified angle.

Correction: Tighten the flap cable turn buckles to eliminate any slop in the cable. Make sure that the cables are not tightened so much as to move the flap bell cranks off their stops when the flaps are not deployed. It is possible that the flap pawl and or ratchet are worn and are in need of replacement.

Problem: The flaps do not retract flush with the bottom of the wing when fully retracted.

Correction: The flap springs are worn and in need of replacement. As the flap springs age, they lose stiffness. Dropping flaps in static non-deployed position is not a hazard to flight, but may be problematic when parked outside in strong winds.

Problem: The aircraft turns to the left or right and/or the inclinator ball is not centered in cruise flight.

Correction: The flaps are not adjusted properly in the non-deployed position. Adjust the pushrods so that the vane and flap elements are parallel to the bottom of the wing. The addition of the Performance STOL flaps should not alter the aircraft rigging as long as the bottom of each element is parallel to the bottom of their respective wing. Ensure that the aircraft is properly rigged according to the aircraft's TCDS.

Problem: The bottom of the flaps are lower or higher than the bottom of the wing.

Correction: All aircraft have build tolerances and they vary drastically from one aircraft to another. There is no correction for this problem and it is acceptable. It is important that the bottom of the flap elements are parallel to the bottom of the wing.

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