MASTER BPAS 1.386-2

FORM ACA-2817 (7-56) U.S. DEPARTMENT OF COMMERCE CIVIL AERONAUTICS ADMINISTRATION

Form App. o. Budget Bureau No 41-R1823

SEP 1 0 1959

SUPPLEMENTAL TYPE CERTIFICATE

INSTRUCTIONS - Submit in triplicate to local CAA Flight Operations and Airworthiness Inspector. Copy will be returned to applicant upon issuance.

1. NAME AND ADDRESS OF APPLICANT

Air Services Inc.
Box 2184 North Canton, Ohio

2. SUPPLEMENTAL TYPE CERTIFICATE APPLIED FOR:

[X] AIRCRAFT [ ] ENGINE [ ] PROPELLER

ORIGINAL MODEL DESIGNATION Piper PA-22

NEW MODEL DESIGNATION (If desired)

3. DESCRIPTION OF CHANGE

Installation of Heated Pitot Tube in accordance with Air Services Inc. Assembly Instructions for Adaption of Piper Kit #754-189 to PA-22 series aircraft dated July 28, 1959 and Drawing No. 1 dated Aug. 8, 1959.

4a. WILL DATA BE AVAILABLE FOR SALE OR RELEASE TO OTHER PERSONS? [X] YES [ ] NO

b. WILL PARTS BE MANUFACTURED FOR SALE (Ref. CAR 1.55)? [ ] YES [X] NO

5. SIGNATURE AND TITLE OF APPLICANT

Thomas R. Tilcatt
SIGNATURE

July 30, 1959
DATE OF APPLICATION

President, Air Services Inc.
TITLE

6. TO BE COMPLETED BY CAA

NATURE AND LOCATION OF DATA

Modification described under Item 3 accepted by NY-235B.

Conformity Inspection Report FA Form NY-313 signed by Inspector Perry A. Jamline indicates satisfactory inspection connected.

Approval Basis - CAR 3

Data located in Piper PA-22 FAA File, region 1, New York.

ORIGINAL TYPE CERTIFICATE NO.
1A6

SUPPLEMENTAL TYPE CERTIFICATE NO.
1.1-386

DATE OF APPROVAL
9/10/59

CAA APPROVAL

J. A. Maure
SIGNATURE

Chief, Aircraft Engineering Division
TITLE

AUG 1 1959

COMMERCE 32772

FORM ACA-2817 (7-56)

AIR SERVICES INC.

ASSEMBLY INSTRUCTIONS FOR ADAPTION OF PIPER KIT #754-189 (PA-24) to PA-22 SERIES AIRCRAFT DATED JULY 28, 1959

This adaption of Piper Kit #754-189 (PA-2-) to PA-22 series aircraft affords the advantage of a heated pitot installation being added to the Tri-Pacer with only a relatively minor mounting bracket substitution and no change in the aircraft's original static system.

Piper Kit #754-189 contains a heated pitot tube part #00-21301, a mounting base plate part #21299, a new section of pressure hose part #83161-14 and a bag of miscelaneous screws, all necessary wiring, an on-off switch and a 15 amp. circuit breaker. Also included are Piper Sketch "A" and Special Sketch "A" describing the wiring of a representative electrical circuit and an alternate circuit breaker wiring diagram respectively.

All other parts necessary to this modification are manufactured according to Air Services Drawing #1 dated July 28, 1959 or purchased from aircraft AN Parts suppliers in accordance with the material list as noted on the drawing. Manufacturing of parts and assembly of the sub-assemblies into a final product is as follows:

1. Remove the original non heated factory configured pitot tube and spar mounting bracket using the existing inspection hole and a new inspection hole cut under and behind the rear spar bracket mounting nuts for this purpose.

2. Make component parts according to Air Services Drawing #1. Assemble these parts into a complete sub-assembly as follows:
   a. Rivit the Heated Pitot Tube Main Support Bracket with 4-AN426 -3-2 Csk. rivits to the Support bracket Base Plate making sure that the angled fore and aft edges of the plate match the Piper part #21299 for fore and aft position, otherwise the plate will be 180 degrees off in matching location.
   b. Rivit the Right and Left Hand Stiffners to the Main Support Bracket and the Base Plate with 4-AN425-4-3 Csk. rivits and 4-AN456-4-2 Braizier Head rivits as noted on the drawing.
   c. File the eliptical holes in the assembly to match the hole in Piper Part #21299, also the stiffners to match the bracket.
   d. On trial assembly to the spar, file the completed sub-assembly to clear the spar flange as needed.

Continued on Sheet # 2.

AIR SERVICES INC.

ASSEMBLY INSTRUCTIONS PA-22 HEATED PITOT TUBE INSTALLATION- CONTINUATION SHEET

3. Prepare a spar template as follows: Measure the distance between the two factory drilled holes through which the old bracket was mounted to the spar. Lay two matching holes out on a 4 inch by 4 inch piece of aluminum. Fasten the Main Support Bracket sub-assembly securely to the template with two 6/32 screws and stop nuts using the two lower holes in the bracket. This spar template is made necessary by the obvious possibilities of distortion in the sub-assembly due to varying manufacturing skills and assembly workmanship.

Pick up the two top holes in the bracket through the spar template, fasten the bracket to the template through these holes, also check for any excessive distortion of the rivited assembly. If there is excessive distortion, then the sub-assembly must be corrected by remanufacture or other means that would be permanently effective as the completed spar mounted assembly must place the Heated Pitot Tube, Piper Part #00-21301 in perfect alignment with the relative air flow in level flight position.

Disassemble the spar template from the sub-assembly, trim it to fit the spar webing, fasten it to the rear side of the rear spar webing with two 6/32 screws and stop nuts. Drill the two top holes through the spar webing using the spar template as a guide with a right angle drill, remove the spar template. These holes are #18 holes, (Body Drill Index) to be reamed as necessary.

4. Assemble the Main Support Bracket sub-assembly to the rear spar according to Air Services Inc. Drawing #1 with 4-NAS 220-10 Aircraft Structural Screws, 4 AN 365-832 stop nuts and 8 AN 960-10L Washers. Note, Extra washers may be required due to length of Structural Screws.

5. Wiring Instructions and Electrical discussion.

To preclude the possibility of overloading the aircraft electrical system, a complete electrical load analysis must be run on each individual installation. This data must show, to be incompliance with CAR 3.681 and CAM 3.681.2, that the maximum probable load on the aircraft's electrical power system does not exceed 80% of the total generator rating. Since the PA-22 series aircraft can be equipped with different rated generators and a wide variety of electrical equipment, the electrical load analysis for each individual installation becomes mandatory.

For all practical purposes the heated pitot element draws 12 amps at 12 volts. Lycoming Service Bulletin #186C dated May 9, 1959 gives specific data as to generator installations currently available for use with the O-320 series engines. It is recommended that the local FAA Safety Agent be consulted and his cooperation solicited in solving the individual electrical problems that will arise in each individual case. The prototype of this installation is utilizing a 50 amp generator and regulator combination due to the electrical loads involved in conjunction with a dual omni and ADF radio installation along with the Heated Pitot Tube.

Continued on Sheet # 3.

AIR SERVICES INC.

ASSEMBLY INSTRUCTIONS PA-22 HEATED PITOT TUBE INSTALLATION - CONTINUATION SHEET

5. Wiring (Continued)

Wire the aircraft and pitot assembly Part #00-21301 as per sketch "A" furnished with Piper Kit #154-189. Place the circuit breakers as furnished with the Kit or as an alternate a Klixon PSM-15 circuit breaker which will match the other breakers installed by Piper in the circuit breaker panel. It may be necessary to rework the existing circuit breaker panel should all the holes be filled up by previously installed breakers. The circuit breaker should be plainly decaled as to function and connected to the master switch through the main buss. Place the on-off switch as furnished in the Piper Kit on the assecory control section of the lower instrument panel, preferably mounting through the structural mounting tab between the carburetor heat control and the left control wheel rod opening in the panel. The Off-On switch must be plainly and properly decaled as to function and direction of operation.

Route wire # F2A from the switch to the circuit breaker as per Piper Sketch "A". Route wire # F2B from the switch, through the left front post out to the inboard compression strut at the fuselage fitting. The quick disconnect is used at this point. Wire # F2D from the pitot heat tube to ground as shown in Piper Sketch "A". Route wire # F2C from the pitot tube as shown in Piper Sketch "A" through the wing to the quick disconnect point at the fuselage and the wing butt being carefull to route the wiring so as to suitably protect it from fuel, oil, water and other detrimental substances as well as mechanical damage and chaffing. Wires #F2A, F2B, F2C, F2D are included in the Piper Kit #754-189. Should wire F2C prove to be of inadequate length, make a substitue wire of matching material to the desired length. Thouroughly inspect the wiring installation for compliance of all applicable good installation practices as set forth in CAM 18.

6. Assemble the wired Part #00-21301 to Part #21299 with the screws and lock washers as provided in Piper Kit #754-189.

7. Assemble the Pitot Heat Sub-assembly to the spar mounted Bracket Sub-assembly with the neoprene gasket placed between the fabric and the pitot sub-assembly acting both as a chafe pad and insulation material. 4-526R-6-6 screws and 4-AN365-632 stop nuts are used for this purpose.

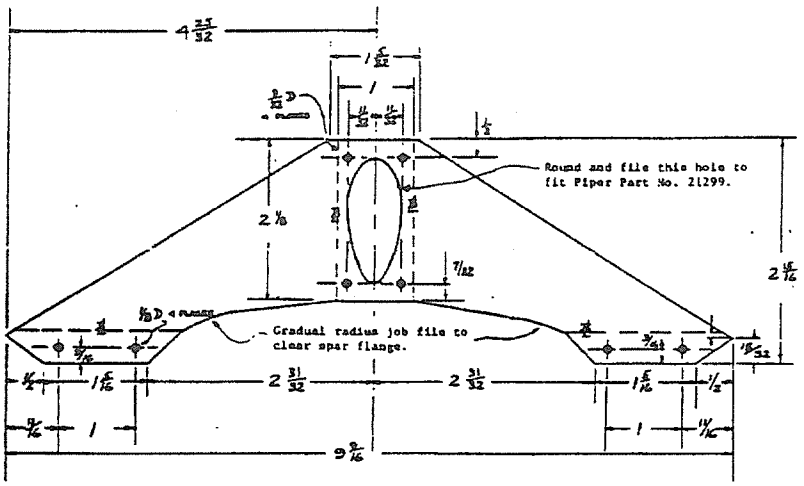
8. Drill 4 # 30 holes, one through each corner of part #21299, the neoprene gasket and the base plate. Secure the 4 corners with 1- #4 x ½ sheet metal screw in each hole.

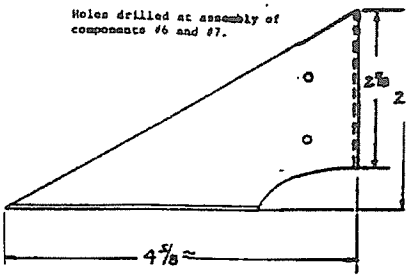
9. Hook up the pitot pressure line, the original rubber hose will do if not deteriorated. If deterioration has set in, use the hose as furnished with Piper Kit #754-189, part # 63161-14.

10. Rework the inspection hole cover plates as necessary to clear Piper part #21299.

NOTE: This installation has been worked out with Piper Kit #754-189 originally designed for use on PA-24 aircraft and has been adapted for use on the PA-22 series aircraft with expressed permission of the Piper Aircraft Corporation. These drawings and assembly instructions are not valid or approved for use in any other manner than for the purpose as stated in the title of this Assembly Instruction and Air Services Inc. Drawing #1. This set of instructions, Serial # _____ has been issued for installation to be accomplished on PA-22 Serial # _____ only.

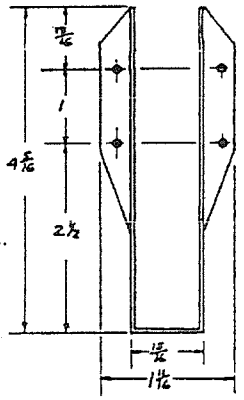
END OF ASSEMBLY INSTRUCTIONS



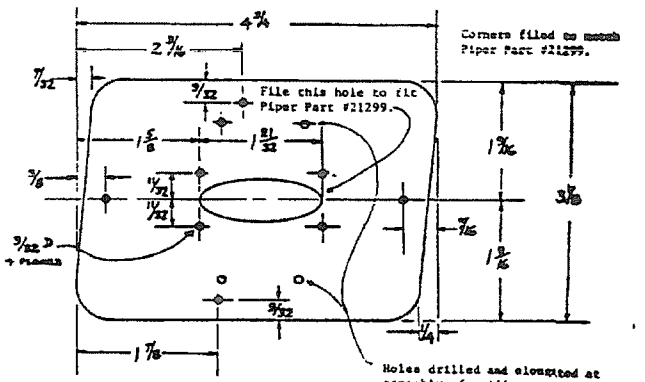


Component #3

Heated Pitot Tube Main Support Bracket.
Material; 0.032-2AS-T3 Aluminum.

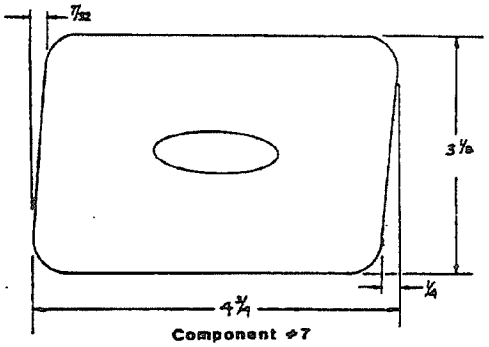


NOTE
Il bend radii to CAM-18 specs.
Ile round corners for stress
:lief.



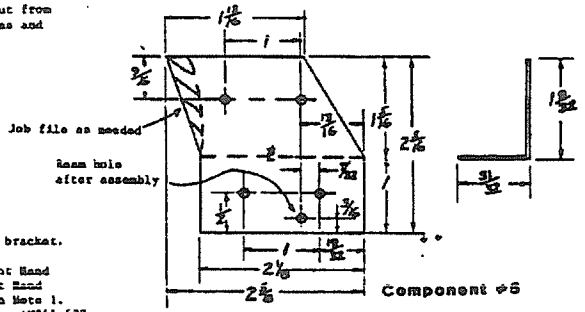
Component #4

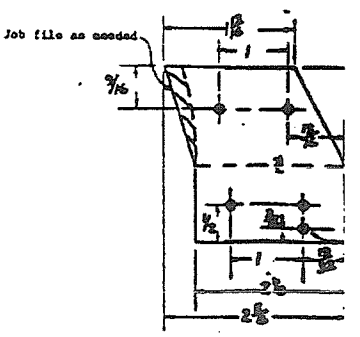
Pitot Support Bracket Base Plate.
Material; 0.032-2AS-T3 Aluminum



Component #7

NEOPRENE GASKET
Note 1: Material 1/32" neoprene cut from B. F. Goodrich A084 1/32" thick gas and oil resistant neoprene sheeting.



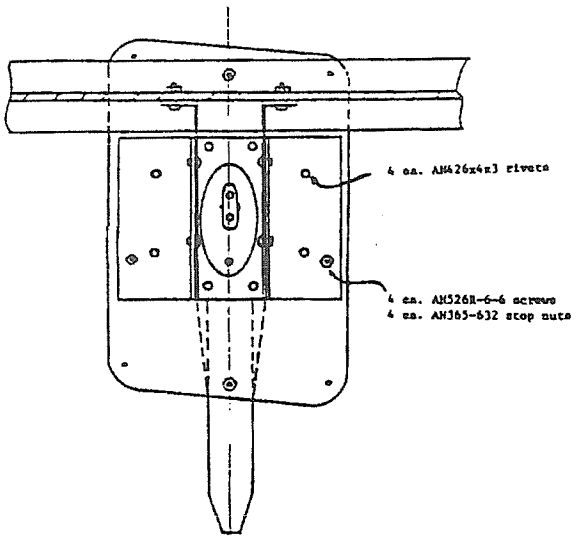


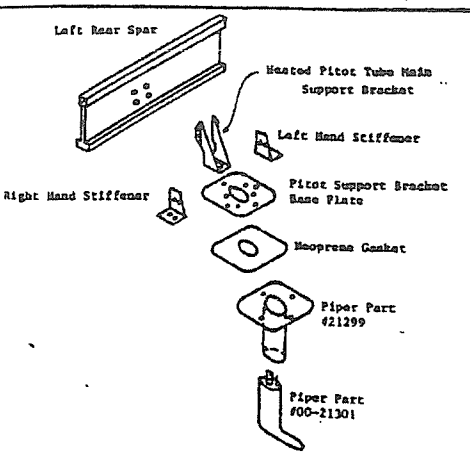
Component #5

Support Bracket Stiffener, Right Hand
Material; 0.032-2AS-T3 Aluminum.

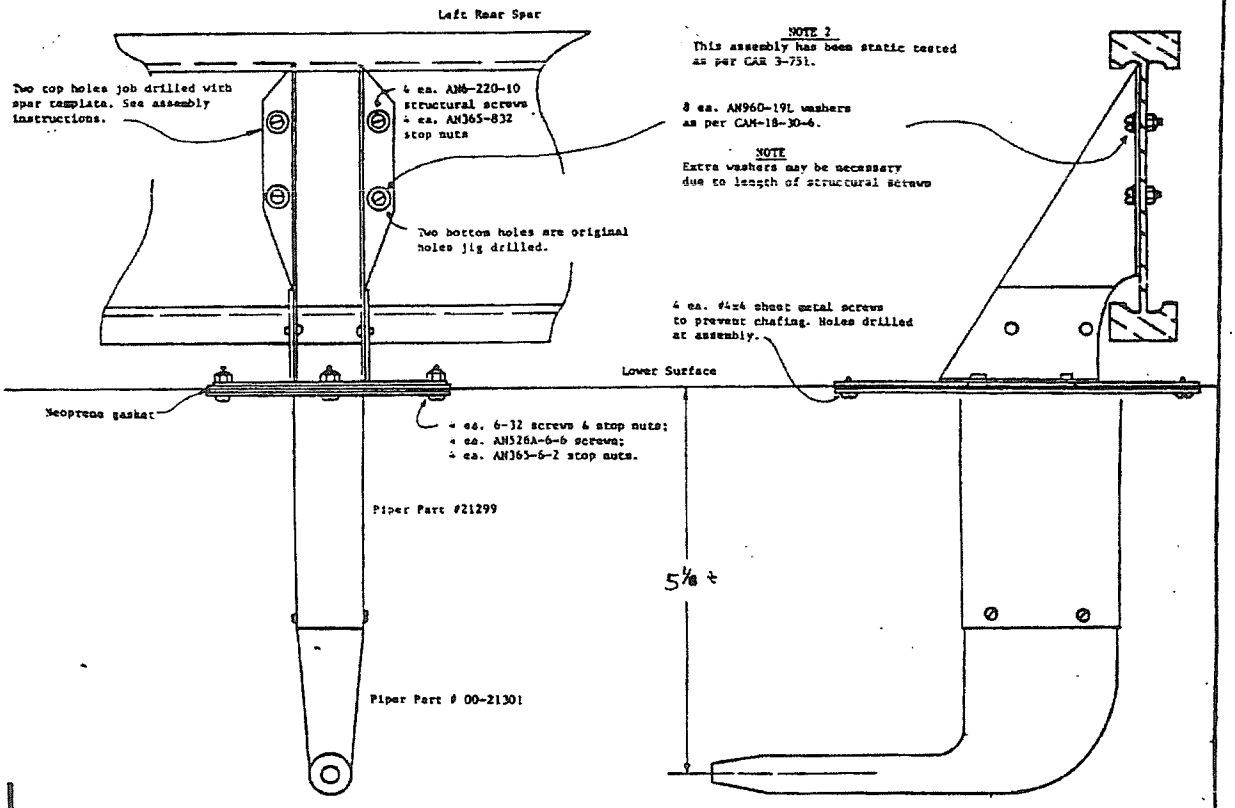
MATERIAL LISTING

1. Piper heated pitot kit #754-189 (PA-24)
2. Component #1. Piper part #21299 (PA-24)
3. Component #2. Piper part heated pitot tube AN5812 (12 volt) #00-21301 (PA-24)
4. Component #3. Heated pitot tube main support bracket.
5. Component #4. Support bracket base plate
6. Component #5. Support bracket stiffener, Right Hand
7. Component #6. Support bracket stiffener, Left Hand
8. Component #7. Neoprene gasket as specified in Note 1.
9. Miscellaneous - 4 ea. AN526R-6-6 screws; 4 ea. AN365-632 stop nuts; 4 ea. #4-4 brazier head sheet metal screws; 4 ea. AN426 AK-3n2 countersink rivets; 4 ea. AN426r4r3 countersink rivets; 4 ea. AN456r4z2 brazier head rivets; 4 ea. AN960-10l washers; 4 ea. NAS 320-10 structural screws; 4 ea. AN365-832 stop nuts.

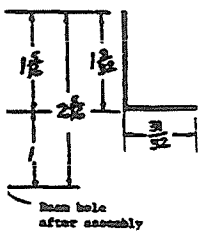




Exploded Assembly View



Assembly View



Note 3. This drawing must be used with Air Services Inc., installation instructions, Heated Pitot Tube Installation, PA-22 Aircraft, Supplemental Type Certificate applied for 7-30-59.

S.T.C. 71-386 issued 9-10-59.

Component # 8

Mount Bracket Stiffener, Left Hand
Material: 0.032-2AS-T3 Aluminum

Reproduced from the official FAA microfilm record.
Certified by:
A. Krull SA-210

Air Services, Inc. Box 2184, North Canton, Ohio Akron-Canton Airport	
T. H. Clemmitt A&P 1303382	
FAA Ltr 8-6-58	7-28-59

Heated Pitot Tube Installation
Piper PA-22 Series Aircraft
The Piper Kit #754-189 (PA24)

KIT 754 189 Rev: 3/13/79

HEATED PITOT TUBE INSTALLATION

PA-24-180
PA-24-250
PA-24-260
PA-24-400

(Factory Reference Only)
(Reference Drawings 21300 - Rev. D, 23382 - Rev. J, 26819 - Rev. A)

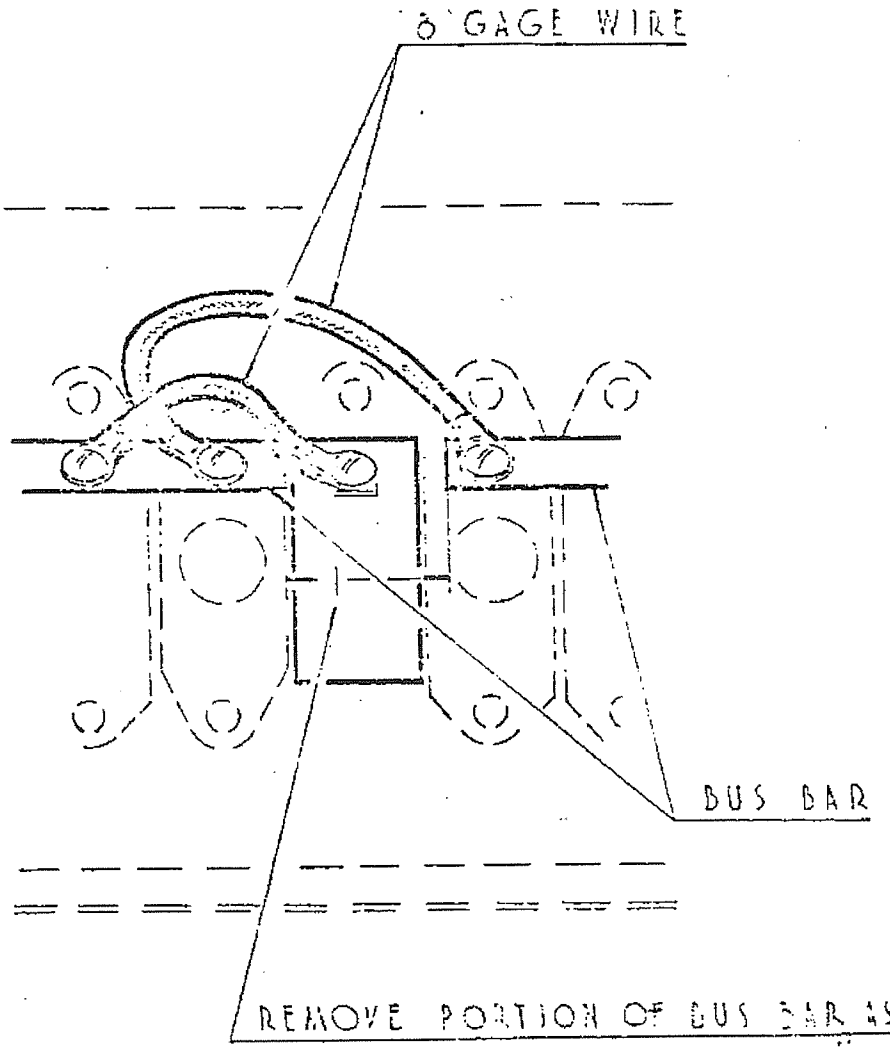
PART NO.	QUANTITY	NOMENCLATURE
754-1894	1	Kit List
754-1898	1	Sketch "A" (R790313) Ref. Dwgs. 23382 & 21300
754-1899	1	Sketch "B" (R790313) Ref. Dwg. 26819
754-1895	1	Special Sketch "A" (Wood Circuit Protector)
20847-15	1	Wire
20847-20	1	Wire
21299-00	1	Mast Assembly - Heated Pitot Tube
21301-00	1	Tube Assembly - Heated Pitot Tube
24159-25	1	Wire Assembly
31506-02	3	Bus Bar
32370-09	1	Switch (487 952)
83161-27	1	Hose
407 041	4	Washer - Lock MS35338-41
407 042	2	Washer - Lock MS35338-42
407 043	4	Washer - Lock MS35338-43
415 518	4	Machine Screw - MS35206-228
415 520	1	Machine Screw - MS35206-230

HEATED PITOT TUBE INSTALLATION

PART NO.	QUANTITY	NOMENCLATURE
415 533	2	Machine Screw - MS35206-243
454 658	1	Circuit Protector - #109-215-102
487 860	1	Switch - #2FA54-73
488 665	1	Tip - Vinyl #207-10 (701-1R), Red

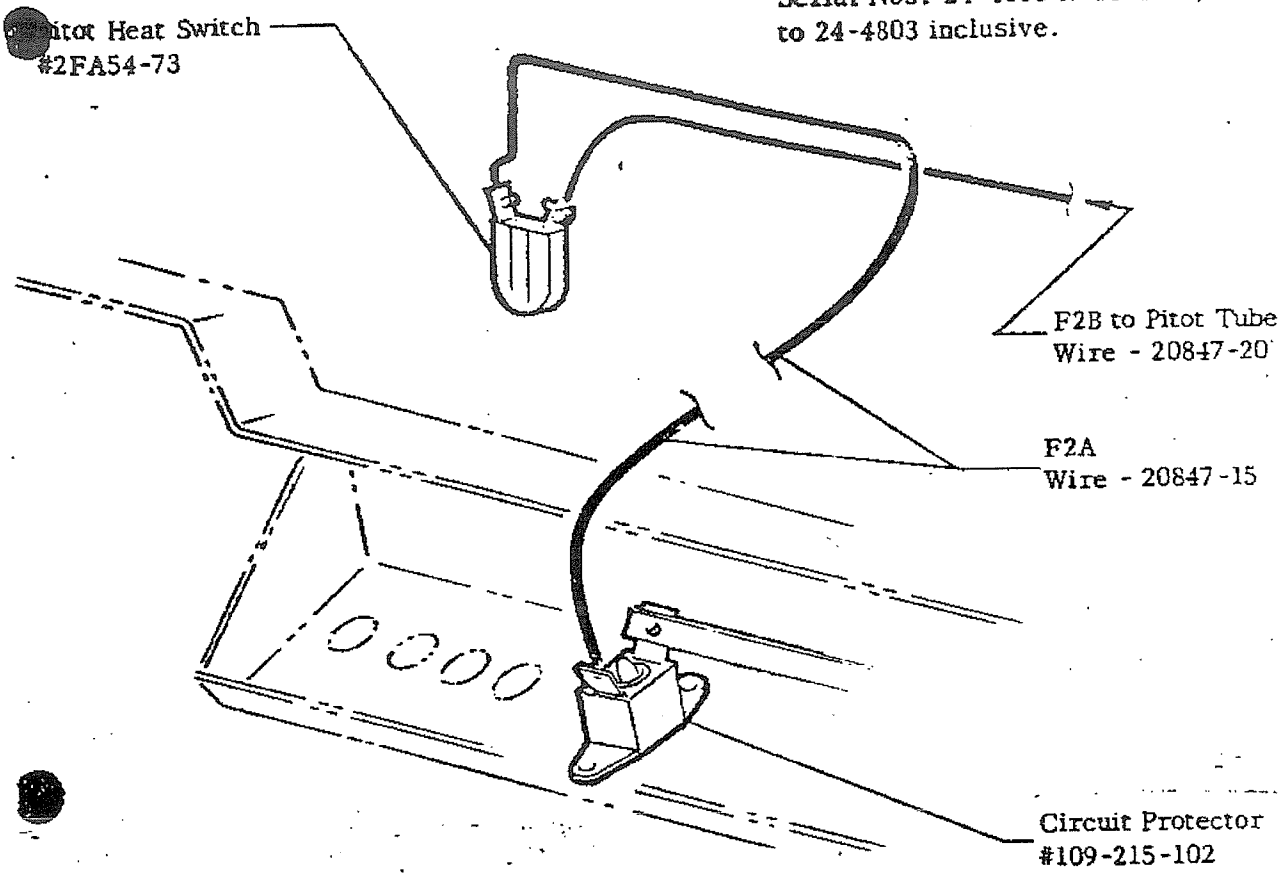
NOTE:

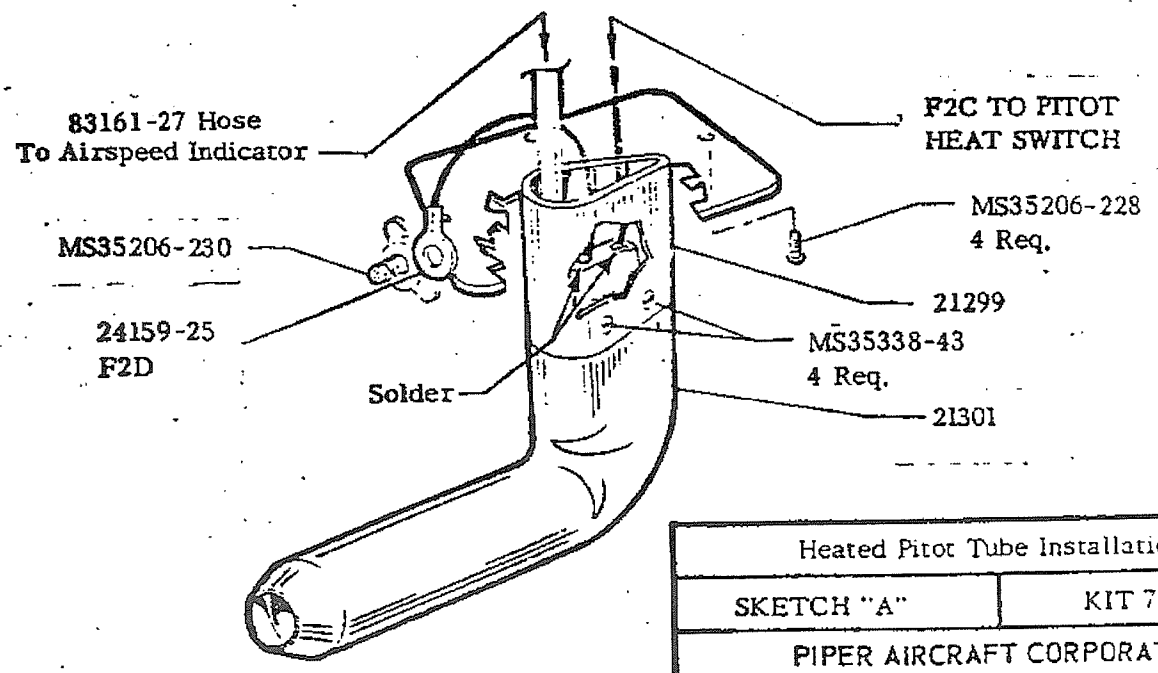
WHEN SPENCER CIRCUIT PROTECTORS ARE INSTALLED, INSTALL WOOD CIRCUIT PROTECTOR AS SHOWN.



WOOD CIRCUIT PROTECTOR	
PIPER AIRCRAFT CORPORATION	
LOCK HAVEN, PENNSYLVANIA	

This Switch & Circuit Protector Installation for PA-24-180-250-400 & PA-24-260 - Serial Nos. 24-4000 to 24-4782, 24-4784 to 24-4803 inclusive.

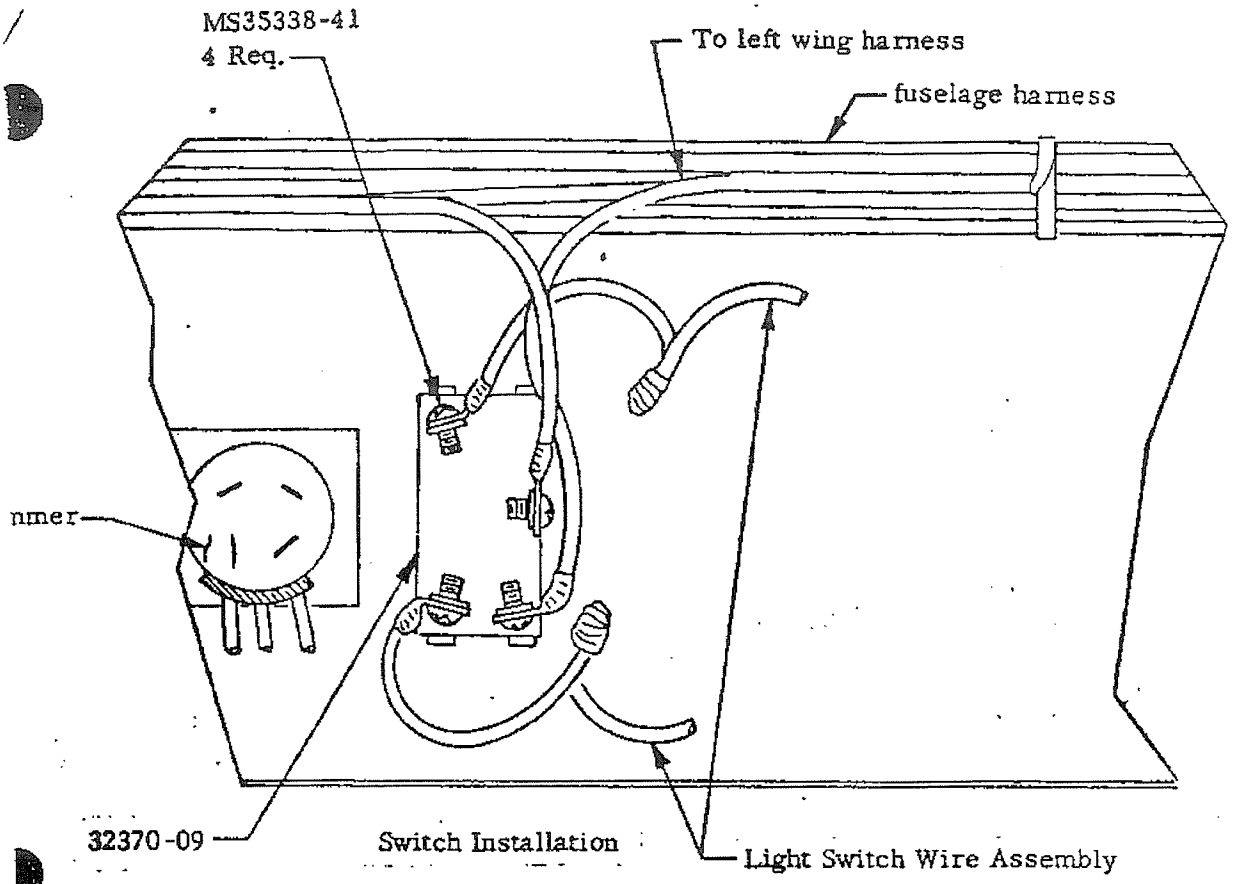


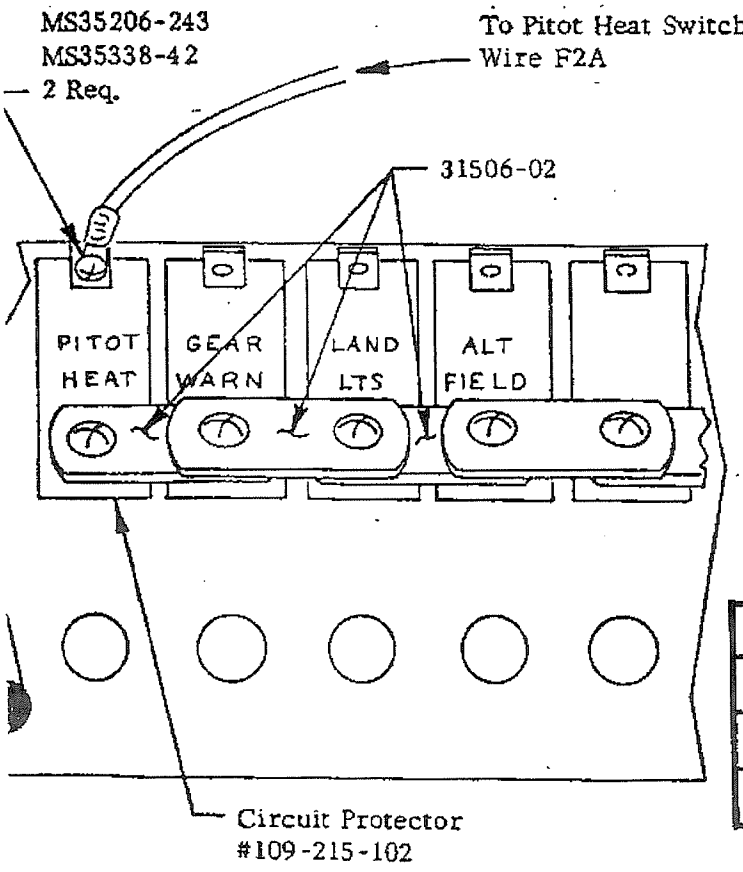


Heated Pitot Tube Installation	
SKETCH "A"	KIT 754 189
PIPER AIRCRAFT CORPORATION	
LOCK HAVEN, PENNSYLVANIA	

PA-24-180-250-260-400

(R790313)





Switch & Circuit Protector Installation
for PA-24-260
Serial Nos. 24-4783, 24-4804 and up

Circuit Protector Installation	
Sketch "B"	KIT #754 189
PIPER AIRCRAFT CORPORATION	
LOCK HAVEN, PENNSYLVANIA	

(R790313)