VACUUM PUMP COOLING KIT INSTALLATION INSTRUCTIONS
for
KIT NO. RA20A (Fits Airborne Model 200 thru 212CW and CC Dry Air Pumps)
KIT NO. RA30E (Fits EDO-AIRE Model 1U128, 1U128A & B; SIGMA-TEK Model 1U128B Dry Air Pumps)

To install Vacuum Pump Cooling Kits No. RA20A or RA30E proceed according to the following instructions. Refer to the Drawing List to identify the appropriate flange installation drawing for your model aircraft. For a view of an installed cooling shroud, ducting, and flange, refer to Drawing 1 for Kit No. RA20A and Drawing 2 for Kit No. RA30E. The STC and Eligibility Listing is found on page 2.

COOLING SHROUD INSTALLATION:

1. To mount the cooling shroud on the vacuum pump, the shroud must be held open slightly while installing. The shroud is made so the cooling exit is not centered with the cooling inlet. Turn over and/or rotate the shroud on the vacuum pump to best compromise the cooling inlet and outlet with other objects that may interfere with them near and around the vacuum pump.
2. On the Airborne installation (Kit No. RA20A), the shroud may not be able to be slipped on the pump and rotated to the desired position because of interference with other parts. In this case, remove the rear fitting on the pump, slip the shroud on and rotate it, then reinstall the rear fitting. If lubrication of the fitting is needed, use only a spray silicone on the threads, shake off the excess and let it dry before installing the fitting. **DO NOT** use oil, grease or tape on the threads.
3. Optional Shroud Position on *Lycoming* Engines: Due to tachometer drive interference on some *Lycoming* engines, an optional position on the shroud may be 1/8" toward the undriven end of the pump, or the shroud can be filed to allow the shroud to center on the pump. **DO NOT** file through the shroud.

COOLING DUCT INSTALLATION:

Install the cooling duct on the shroud inlet using sealant and a nylon cable tie, as per instructions on Drawing 1 or 2, as applicable. Route the cooling duct to the aft side of the rear engine baffle, avoiding sharp bends, sharp objects and moving parts. **DO NOT** cut off excess duct at this time.

INSTALLATION OF FLANGE FITTING: (Refer to Flange Installation Drawings.)

1. Make a 1 1/8- inch hole in the baffle, maintaining a 1-inch edge distance minimum, or as per drawing.
2. Drill four (4) #40 holes and use washers under rivets on flange side. Install the flange through the baffle from the front. .Use sealant between flange and baffle. Install the flanged fitting using four (4) AN470AD-3 rivets or drill four (4) #28 holes and use four (4) AN526-632 screws and AN365-632 nuts and AN960-6 washers.
3. Cut the cooling duct to length--avoid making it too long or too short for best routing. Try to avoid making over 90 degree bends and sharp bends.
4. Install the cooling duct on the flanged fitting using sealant and a nylon cable tie (see Drawing 1 or 2). Support or tie the cooling duct every 12 inches.

SEALING REQUIREMENTS:

1. To compensate for the 7/8- inch hole in the rear engine baffle, seal holes in the engine baffling at forward and rear corners, the space between the rear baffle and the engine crankcase, where sheet metal corners have holes in them, and where hoses and wires pass through the baffling. Seal enough holes and gaps to exceed .601 square inch, or 1 /8" x 5", or 1/4" x 2.5".
2. Use 890 or RTV 106 red high temperature sealants per manufacturers' instructions. Alternate sealants are GE RTV 102, 103, 108, 158; Dow Corning 732 RTV sealants; or equivalents.

PAPERWORK:

1. Add the appropriate cooling kit number to the aircraft equipment list.
2. Weight of this kit is .24 lbs.
3. Complete FAA Form 337 and make proper logbook entry of kit installation.
4. These installation instructions will become part of the permanent aircraft records.

DRAWING LIST - KITS RA20A & RA30E
(FLANGE INSTALLATION LOCATION DRAWINGS & MEASUREMENTS)

AIRCRAFT MODEL	KIT NO.	DRAWING
CESSNA 152;A152	RA20A & RA30E	A
CESSNA 172K;172L;172M;172N;172P;172Q	"	B
CESSNA 182G;182H;182J;182K;182L;182M;182N;182P;182Q	"	C
CESSNA R182;T182;TR182	"	D
CESSNA P210N	RA20A	E

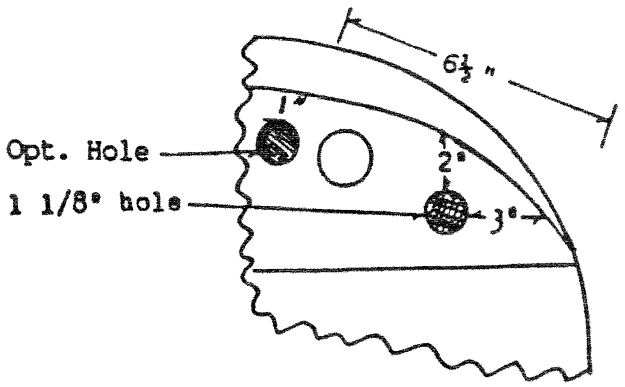
AIRCRAFT MODEL	KIT NO.	DRAWING
CESSNA 210R	RA20A	F
CESSNA P210R;T210R	"	G
CESSNA 206-series (all models thru 1973); CESSNA U206-series (1974 to present); CESSNA 210L;210M;210N (Left Hand Drive Pad)	"	H
CESSNA 310P;310Q	RA20A & RA30E	I-1
CESSNA 310R;T310P;T310Q	"	I-2
CESSNA T310R	"	I-3
CESSNA U206F;U206G; CESSNA 210N (Right Hand Drive Pad)	"	J
CESSNA T206F;T206G; CESSNA T210L;T210M;T210N (Left Hand Drive Pad)	RA20A	K
CESSNA T206F;T206G; CESSNA T210L;T210M;T210N (Right Hand Drive Pad)	RA20A & RA30E	L
PIPER PA-28-151;PA-28-161	"	M
PIPER PA-28-235;PA-28S-235;PA-32-260;PA-32-300;PA-32R-300; PA-32RT-300;PA-32S-300	"	N-1
PIPER PA-28-236;PA-32R-301;PA-32-301	"	N-2
PIPER PA-34-200T; PA-34-220T	"	O
PIPER PA-28-201T;PA-28R-201T;PA-28RT-201T	"	P
PIPER PA-28-140;PA-28-150;PA-28-160;PA-28S-160	"	Q
PIPER PA-28-180;PA-28S-180;PA-28R-180;PA-28R-200;PA-28-181; PA-28R-201;PA-28RT-201	"	R
BEECH A36TC;B36TC	"	S
BEECH F33A;S35;V35;V35A;V35B;36;A36	"	T
MOONEY M20E;M20F	"	U
MOONEY 201 (M20J)	"	V
MOONEY M20K	"	W
VIEWS OF COOLING SHROUD ON PUMP, INCLUDING DUCTING & FLANGE:		
All above aircraft models with AIRBORNE Pumps	RA20A	1
All above aircraft models with EDO-AIRE or SIGMA-TEK Pumps	RA30E	2

STC AND ELIGIBILITY LISTING

TC NUMBER	STC NUMBER	ELIGIBILITY
3A12	SA 702GL	CESSNA 172K;172L;172M;172N;172P;172Q
3A13	SA 777GL	CESSNA 182G;182H;182J;182K;182L;182M;182N; 182P;182Q;R182;TR182;T182
3A21	SA 785GL	CESSNA 210L;210M;210N;T210L;T210M;T210N; T210R;P210N;P210R;210R
A4CE	SA 791GL	CESSNA 206;P206;P206A;P206B;P206C; P206D;P206E;U206;U206A;U206B;U206C; U206D;U206E;U206F;U206G;TP206A; TP206B;TP206C;TP206D;TP206E;TU206A; TU206B;TU206C;TU206D;TU206E;TU206F; TU206G
3A19	SA 1003GL	CESSNA 152;A152
A7SO	SA 1015GL	PIPER PA-34-200T;PA-34-220T
3A15	SA 1034GL	BEECH F33A;S35;V35;V35A;V35B;36;A36;A36TC; B36TC
2A13	SA 1072GL	PIPER PA-28-140;-150;-151;-160;-161;-180;-181; -235;-236;-201T;PA-28S-160;-180;-235; PA-28R-180;-200;-201;-201T;PA-28RT-201; -201T
A3SO	SA 1073GL	PIPER PA-32-260;-300;-301;PA-32S-300; PA-32R-300;-301;PA-32RT-300
2A3	SA 1074GL	MOONEY M20E;M20F;M20J;M20K
3A10	SA 1374GL	CESSNA 310P;310Q;310R;T310P;T310Q;T310R

FLANGE INSTALLATION DRAWINGS

CESSNA 152 and A152, TC 3A19

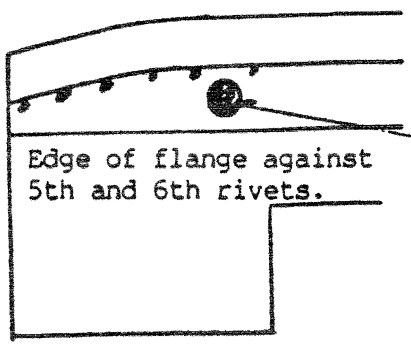


View: R H rear engine baffle, looking forward

DRAWING A

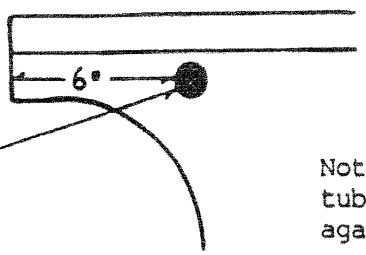
CESSNA 172N, TC 3A12

View: L H rear engine baffle, looking forward



CESSNA 172K, 172L, 172M, 172P, 172Q, TC 3A12

View: R H rear engine baffle, looking forward

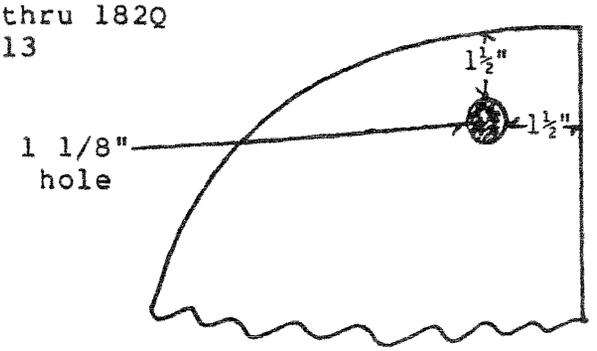


Note: Protect tubing from chafing against engine mount in back of baffle. (Suggest using sealant specified in instructions to coat tubing & engine mount, but do not glue together.)

DRAWING B

FLANGE INSTALLATION DRAWINGS

CESSNA 182G thru 182Q
TC 3A13



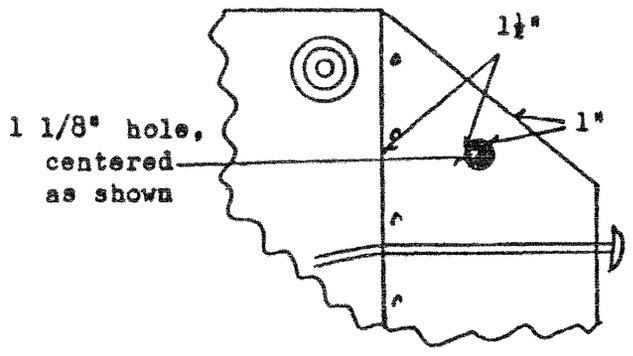
View: L H rear engine baffle, looking forward.

DRAWING C

CESSNA R182 TC 3A13
(R18201314 and up)
and
CESSNA T182 and TR182 TC3A13

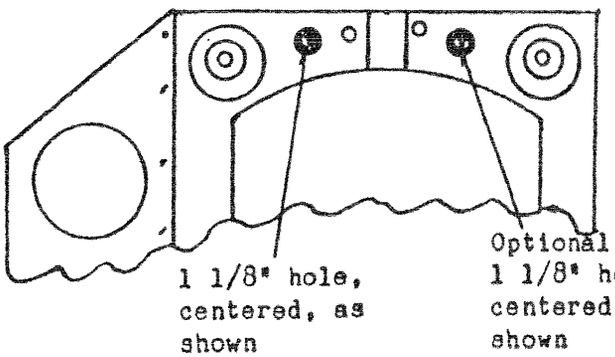
Note: To avoid sharp bend in ducting from flange inlet due to engine mount interference, remove 1/8" from top of flange and install as high as possible on baffle.

CESSNA R182 TC 3A13
(R18200001 thru R18201313)



View: R H rear engine baffle, looking forward

Note: Seal hoses under oil cooler.

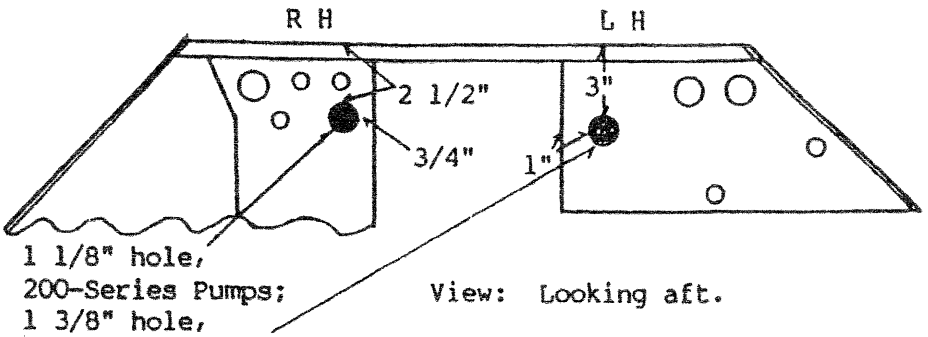


View: R H and center engine baffle, looking aft

DRAWING D

CESSNA P210N - TC 3A21

(AIRBORNE 200-212CW & CC and 400-Series PUMPS ONLY)



1 1/8" hole, 200-Series Pumps; 1 3/8" hole, 400-Series Pumps

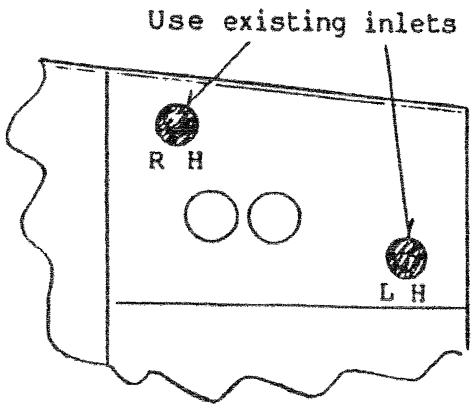
View: Looking aft.

DRAWING E

Note: If your aircraft has existing inlets, remove plugs and use.

SSNA 210R - TC 3A21

IRBORNE 200-212CW & CC and 400-Series UMPS ONLY)

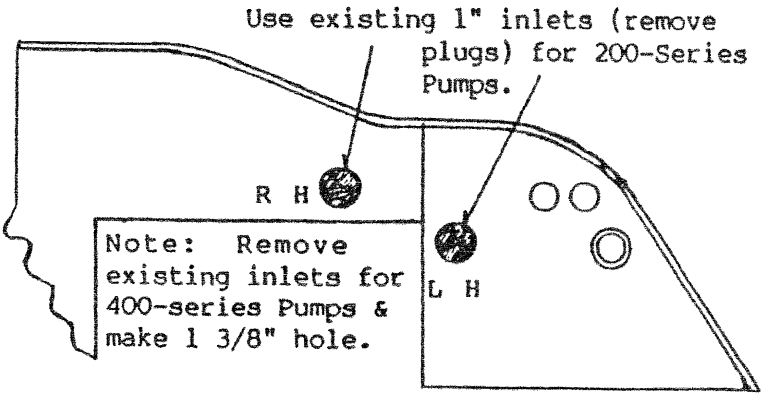


View: Looking aft L H side.

DRAWING F

CESSNA P210R, T210R - TC 3A21

(AIRBORNE 200-212CW & CC and 400-Series PUMPS ONLY)



View: Looking aft.

DRAWING G

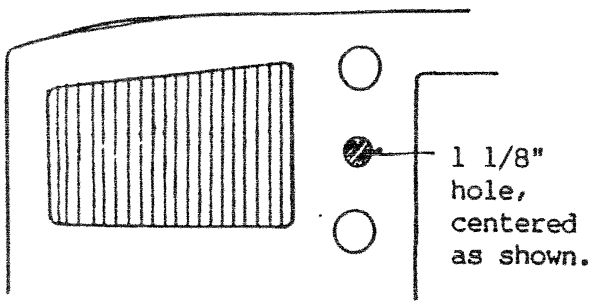
FLANGE INSTALLATION DRAWINGS

CESSNA 206-Series, all models, TC A4CE (thru model year 1973)

CESSNA U206-Series, TC A4CE (model year 1974 to present)

CESSNA 210L, 210M, 210N - TC 3A21

(AIRBORNE 200-212CW & CC PUMPS ONLY)
Left Hand Drive Pad

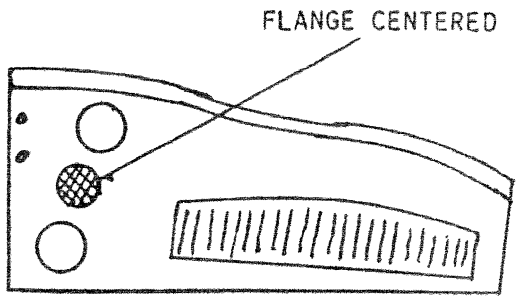


View: L H rear engine baffle, looking forward.

DRAWING H

CESSNA 310P AND 310Q, TC 3A10

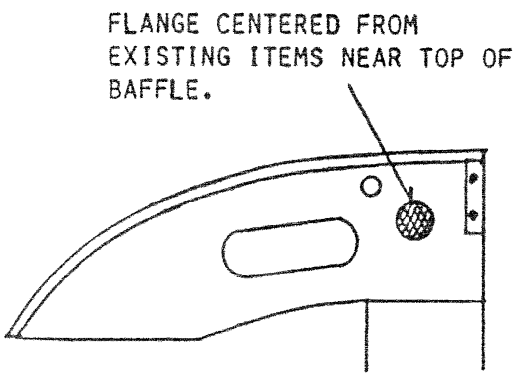
VIEW: L H REAR BAFFLE LOOKING AFT



DRAWING I-1

CESSNA 310R, T310P, T310Q, TC 3A10

VIEW: R H REAR BAFFLE LOOKING AFT

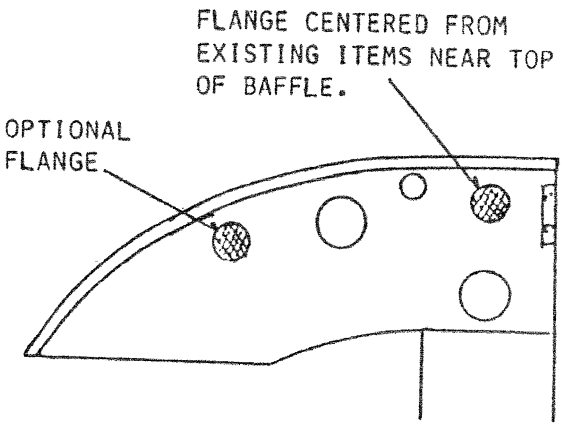


NOTE: BAFFLE CONFIGURATION MAY VARY BETWEEN S/N'S.

DRAWING I-2

CESSNA T310R, TC 3A10

VIEW: R H REAR BAFFLE LOOKING AFT



NOTE: BAFFLE CONFIGUARATION MAY VARY BETWEEN S/N'S.

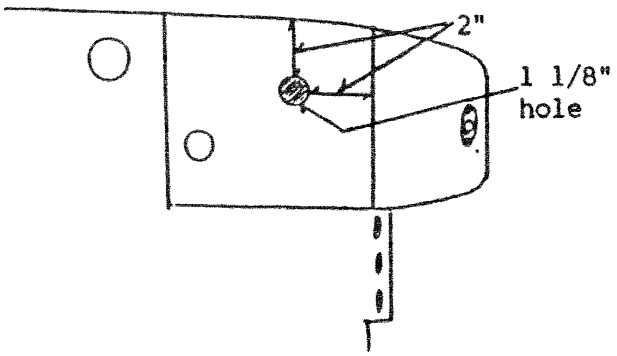
DRAWING I-3

FLANGE INSTALLATION DRAWINGS

CESSNA U206F, U206G - TC A4CE

CESSNA 210N - TC 3A21

Right Hand Drive Pad

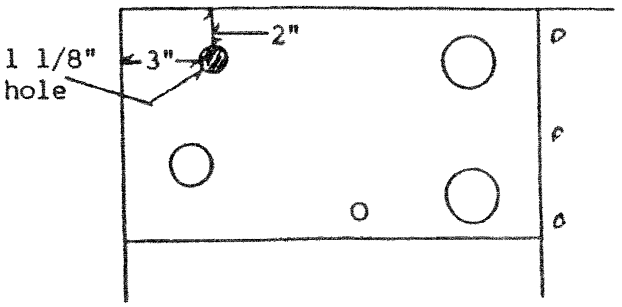


View: R H rear engine baffle, looking forward.

DRAWING J

CESSNA T210L, T210M, T210N,
P210N - TC 3A21
CESSNA T206F, T206G - TC A4CE

(AIRBORNE 200-212CW & CC PUMPS ONLY)
Left Hand Drive Pad

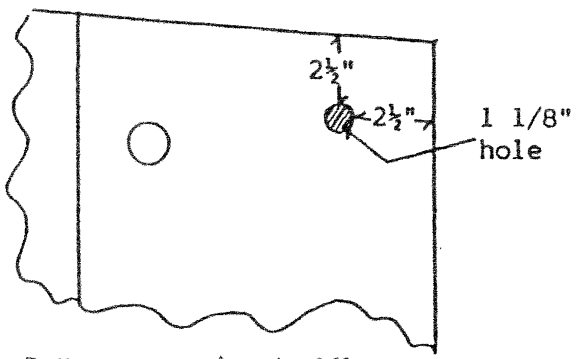


View: L H rear engine baffle, looking forward.

DRAWING K

CESSNA T210L, T210M, T210N,
P210N - TC 3A21
CESSNA T206F, T206G - TC A4CE

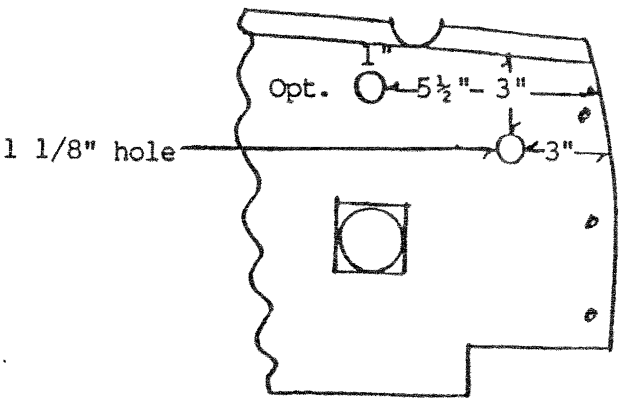
Right Hand Drive Pad



View: R H rear engine baffle, looking forward.

DRAWING L

PIPER PA-28-151; PA-28-161
TC 2A13

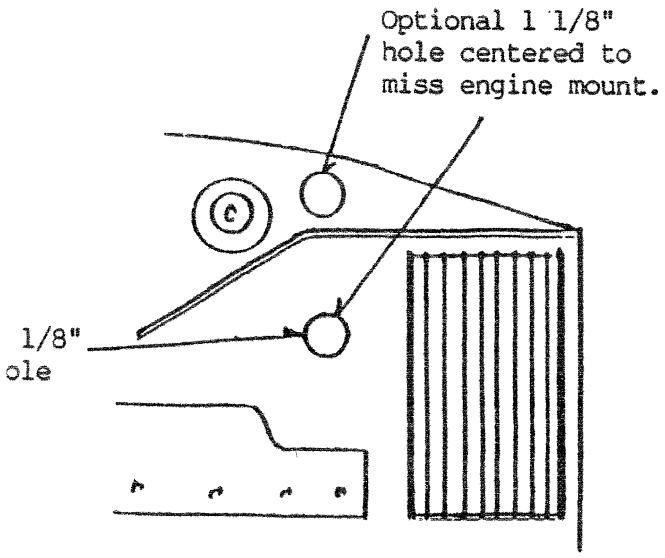


View: R H rear engine baffle, looking forward.

DRAWING M

[PER PA-32-260, PA-32-300, PA-32S-300, PA-32R-300, PA-32RT-300 TC A3SO

'IPER PA-28-235; PA-28S-235, TC 2A13

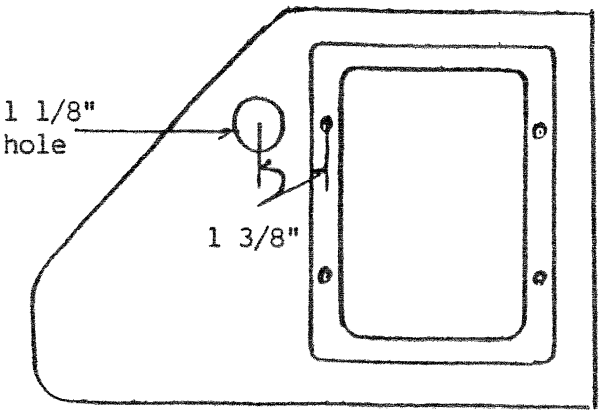


iew: R H rear engine baffle, looking forward.

DRAWING N-1

PIPER PA-28-236 TC 2A13

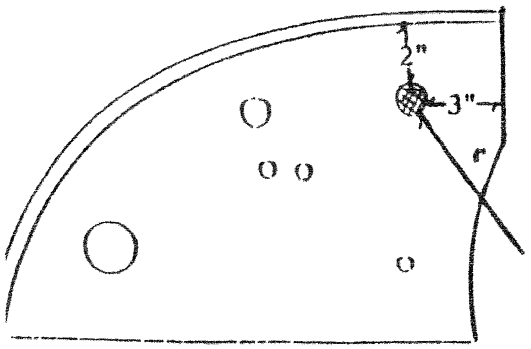
PIPER PA-32R-301; PA-32-301 TC A3SO



View: R H rear engine baffle, looking forward.

DRAWING N-2

'IPER PA-34-200T, PA-34-220T TC A7SO



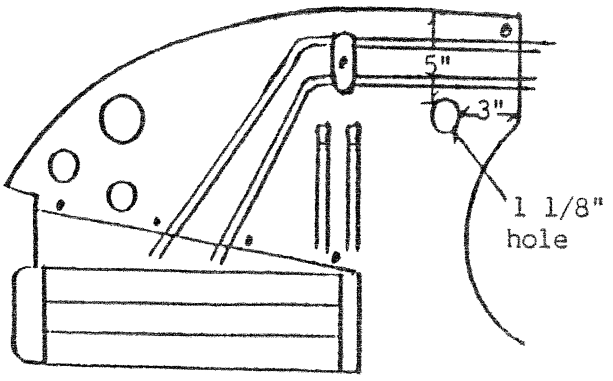
1 1/8" hole on 200-Series Pumps

1 3/8" hole on 400-Series Pumps

'iew: L H rear engine baffle, looking forward

DRAWING O

PIPER PA-28-201T; PA-28R-201T; PA-28RT-201T TC 2A13

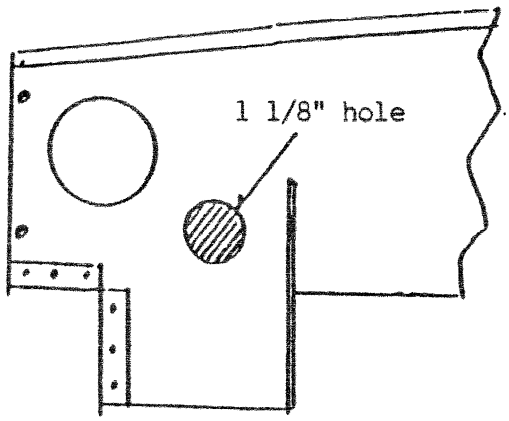


View: L H rear engine baffle, looking forward.

DRAWING P

FLANGE INSTALLATION DRAWINGS

PIPER PA-28-140; PA-28-150; PA-28-160; PA-28S-160; TC 2A13



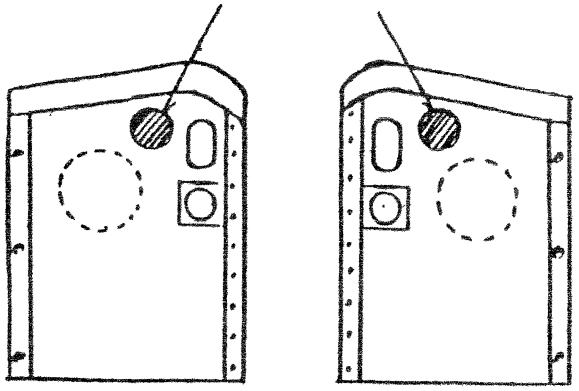
View: R H rear engine baffle, looking aft.

DRAWING Q

PIPER PA-28-180; PA-28S-180; PA-28R-180; PA-28R-200; PA-28-181; PA-28R-201; PA-28RT-201 TC 2A13

1 1/8" hole

Use location suiting your aircraft.

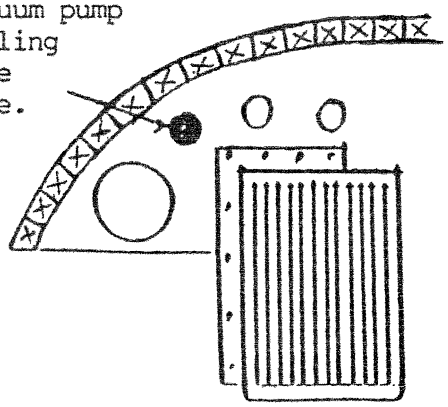


R H Looking Aft L H

DRAWING R

BEECH A36TC; B36TC TC 3A15

Use existing vacuum pump cooling tube hole.

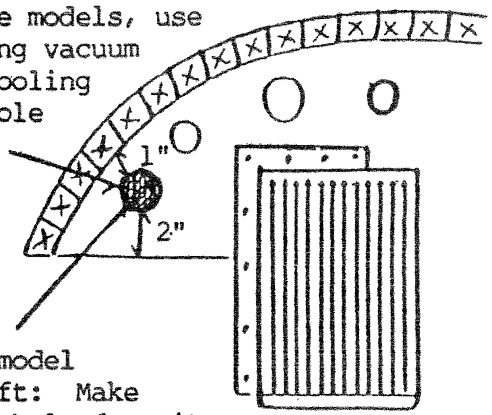


View: L H rear engine baffle, looking forward

DRAWING S

BEECH F33A; S35; V35; V35A; V35B; 36; A36; TC 3A15

On late models, use existing vacuum pump cooling tube hole



Early model aircraft: Make 1 1/8" hole for Kits No. RA20A and RA30E; 1 3/8" hole for Kit No. RA40A.

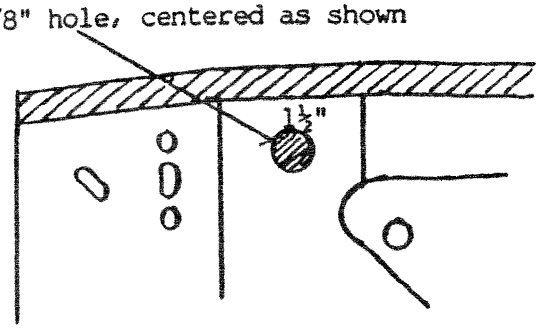
View: L H rear engine baffle, looking forward.

DRAWING T

FLANGE INSTALLATION DRAWINGS

MOONEY M20E; M20F TC 2A3

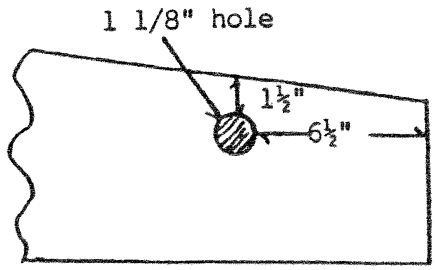
1 1/8" hole, centered as shown



View: R H rear engine baffle, looking aft

DRAWING U

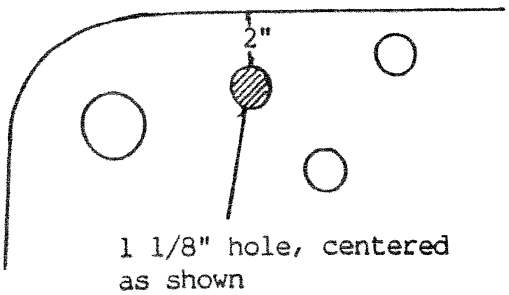
MOONEY 201 (M20J) TC 2A3



View: R H rear engine baffle, looking forward

DRAWING V

MOONEY M20K TC 2A3



1 1/8" hole, centered as shown

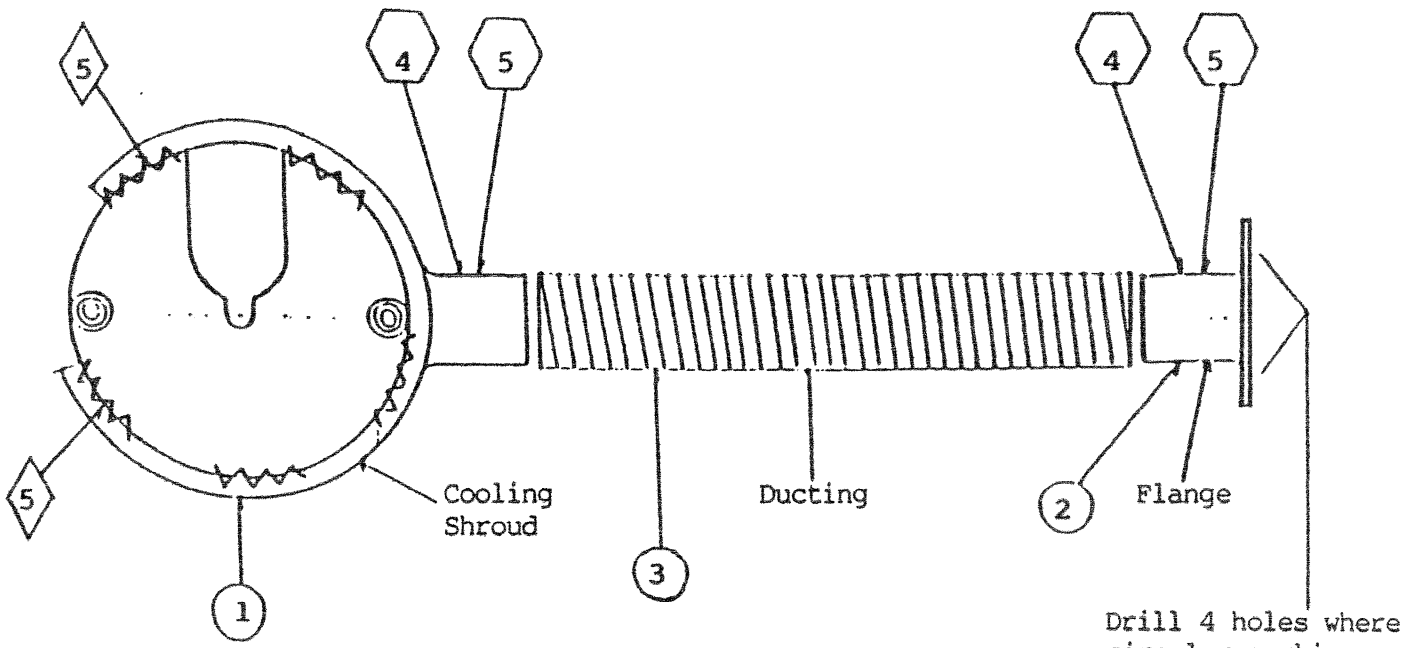
View: L H rear engine baffle, looking forward

DRAWING W

FLANGE INSTALLATION DRAWINGS

KIT NO. RA20A

View of Cooling Shroud on Airborne 200-212CW & CC Pumps, Ducting & Flange



Note: Shroud must be centered on the pump.

4 **Cable Ties** - Attach these around ducting at inlet of shroud and outlet of flange after ducting has been sealed into place on the inlet and outlet.

5 **Sealant** - Place sealant on outside of shroud inlet and flange outlet, then push ducting into place. For type of sealant to be used, refer to "Sealing Requirements" in Installation Instructions. Note: If cooling shroud appears to rotate easily after installation, it may be advisable to place a sealant fillet between shroud and pump as shown.

5 Optional: Apply sealant fillet between shroud and pump, at the rear of the pump, as shown, to prevent shifting of shroud on pump.

DRAWING 1

Item	Qty	Nomenclature	Part No.
5	A/R	Sealant	
4	2	Cable Ties	RA2CDH-3
3	A/R	Ducting	RA2CDH-2
2	1	Flange	RA2CDH-1
1	1	Shroud	RA2CDH

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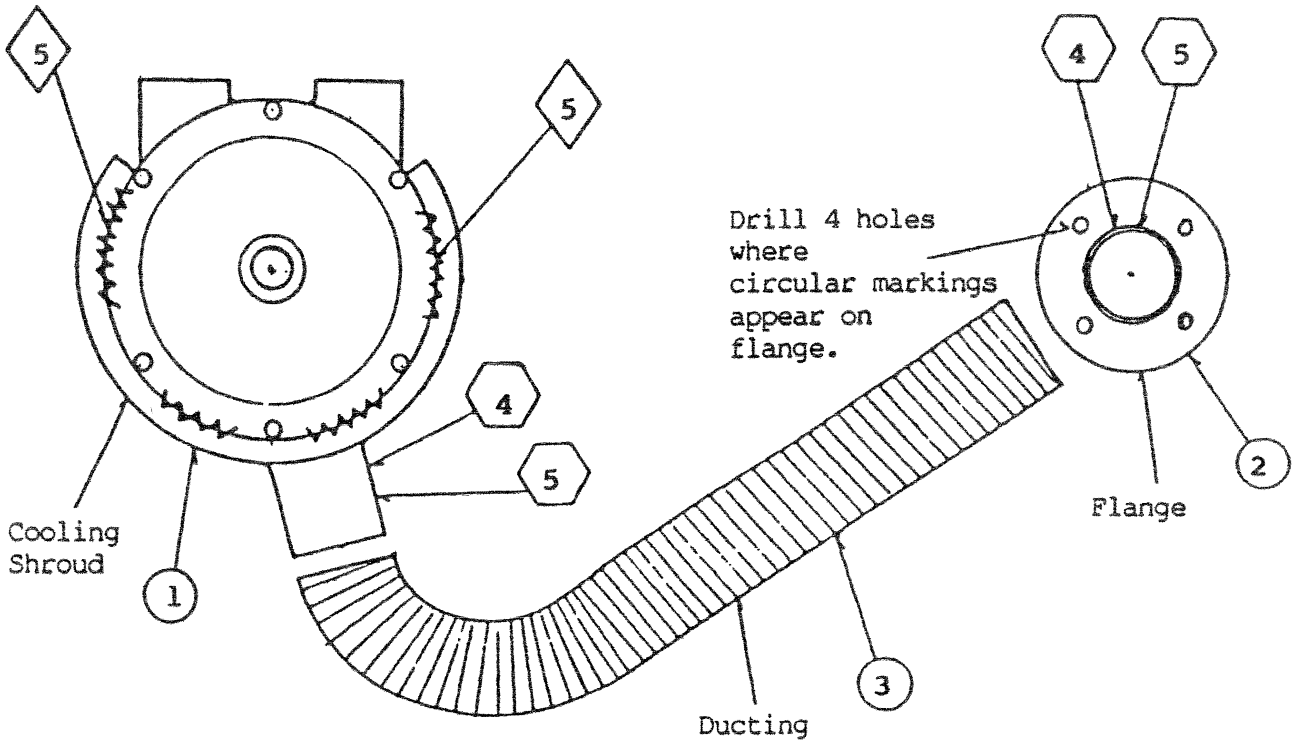
KIT NO. RA30E

View of Cooling Shroud on EDO-AIRE & SIGMA TEK Pumps, Ducting & Flange



Note: Shroud must be centered on the pump. On some installations the pump may have to be rotated on the mounting pad because of interference with other objects.

4 **Cable Ties** - Attach these around ducting at inlet of shroud and outlet of flange after ducting has been sealed into place on the inlet and outlet.

5 **Sealant** - Place sealant on outside of shroud inlet and flange outlet, then push ducting into place. For type of sealant to be used, refer to "Sealing Requirements" in Installation Instructions.

5 Apply sealant fillet between shroud and pump, at the rear of the pump, as shown, to prevent shifting of shroud on pump.

DRAWING 2

5	A/R	Sealant	
4	2	Cable Ties	RA2CDH-3
3	A/R	Ducting	RA2CDH-2
2	1	Flange	RA2CDH-1
1	1	Shroud	RA4ADH
Item	Qty	Nomenclature	Part No.

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