Federal Mogul Engine Bearing
Shop Spec Manual

115, 1989

		Available Undersize	STD Part Number	Size STD Shaft	Wall	Length
P 6	Sec 13	Allis C. 10-20-30-40	[2441 AP]	2.9990 / 3.0000	.095	1.2562 (Short)

(Part 284 of Main Bearing Set: 4086M)

					Wall	Length
P.20 (8)	Sec 1	Buick 265 301 10-20-30-40	[2339CP]	2.999° / 3.000°	.093⁸	1.590

(Part 5 of Main Bearing Set: 5092M)

					Wall	Length
P.22 (7)	Sec 10	Buick 400 1-10-20-30	[2438 AP]	2.999° / 3.000°	.093⁷	1.600

(Part 5 of Main Bearing Set: 4084 M)

					Wall	Length
P.29 (6)	Sec 7	Case 251 267 284 301 377 401 451 10-20-30	[2431CPA]	2.998° / 2.999°	.095²	2.161

(Set 7040M Has 4 of these Bearings in it - + 3 unusable ones)

					Wall	Length
P.37 (5)	Sec 7	Caterpillar 312 350 525 10-20-30-50	[2040 AP]	2.999° / 3.008	.162⁷	1.495

(These are Rod Bearings - Available 4 or 6 to a Set)

					Wall	Length
P.41 (4)	Sec 24	Caterpillar 350 425 525 638 10-20-30-50	[2530 AP]	2.999° / 3.000°	.1236	1.505

(Rod Bearings, Sets of 4 or 6)

					Wall	Length
P.68	Sec 27	Continental 513 572 602 10-20-30	[1410 CP]	2.999° / 3.000°	.100°	1.781

(Rod Bearings, Sets of 6)

					Wall	Length
P.71	Sec 38	Continental 478 10-20	[3355 CPA]	2.996° / 2.997°	.125⁴	1.453

(Rod Bearings, Sets of 6)

					Wall	Length
~~P.114~~ (2)	~~Sec 46~~	~~GMC Truck 350 1-10-20-30~~	~~[2564 AP]~~	~~2.999° / 3.000°~~	~~.093⁴~~	~~1.634~~

~~(Main Brng, Position #5, Set# 4294M.)~~

					Wall	Length
P. 116	Sec 3	Hercules 478 10-20-30	[3355 CP]	2.997° / 2.998°	.125⁴	1.453

(Rod Bearing Set, 6 to the Set)

					Wall	Length
P. 131	Sec. 11	Int Harvester 335 350 10-20-30	[1350 CP]	2.996⁵ / 2.997⁵	.099⁷	1.979

(Rod Bearing Set, 4 To the Set)

					Wall	Length
P. 134 (3)	Sec. 36	Int Harvester 429 573 800 10-20-30	[3210 C.P]	2.997⁷ / 2.999°	.099⁶	1.351

(Rod Bearing Set, ~~8~~ or 6 in Sets)

Continued over Sheet 2

P. 156 Sec24 — John Deere 201, 227, 257, 270, 302, 340, 381, 404 — 2-10-20-30 [3125 CP] — 2.998° / 2.999° — Wall .095⁵ — Length 1.390

①

(Rod Bearings, 4 or 6 to a set)

(this may be Nearest Allaround Set, Size, etc)
(is very Close if the +.002 is used to Form the Std size)

P. 161 Sec 1 — Mack Truck 672, 707 — 10-20-30-40 [1755CPA] [1755CPB] — 2.997° / 2.998° — Wall .090² — Length 1.600

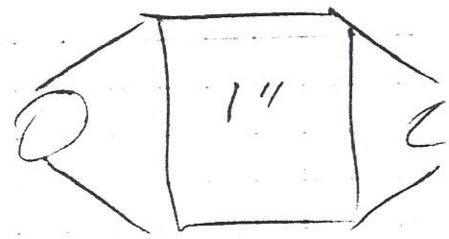
Standard Size Reference

Std. Shaft Size	Wall	Length
Franklin sizes: 2.999 - 3.000	.084⁶ - .085¹	1.375

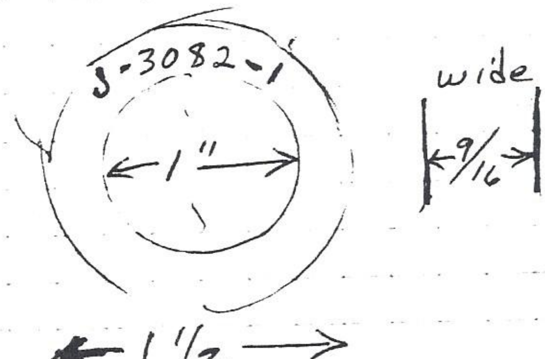
Lord Mounts 6-J-2245-2

Biscuit
Outside dia: 2 1/4"
Thickness : 7/8"
O:D of Metal outside Face = 2"

① Slug, metal : 1 3/4 / ② Slug = : 1 7/8"



Rubber Hose Cutoff



Lord, Erie. PA
1-814-868-0924-0 For inital contact

Aero Space Division
Customer Service ask for
Aviall - Dist. -2245-1
814-456-8511 - ext 2624

J-2861-1 Kit
2
J-2860-5 Kit

Call Aviall and Ask For -2245-1 Kits which is the Par
Number of the individual Biscuits.

New Lord Mounts Biscuits 352043 (Continental Motors)
New Hoses From Firewall to Engine
New FAN Belt NAPA # 2509480 (8.21 in 1987)

PaintRemover: Ace 11196

WiringHarness: 45 Feet Total

Magneto	1 : 40"	2: 57"
	3 : 33"	4: 50"
	5 : 26"	6: 43"

Distributor	1: 69"	2: 46"
	3: 62"	4: 39"
	5: 55"	6: 32"

Coil wire: 24"

Cabin ∠: in Flight = +4°
" " : on ground = +8°

CYLINDER DEGLAZING

The importance of cylinder wall deglazing cannot be overemphasized. The proper cylinder finish will provide the quickest possible break-in and greatly reduce the possibilities of ring or piston scuffing during break-in.

The glazed cylinder wall causes rings to "skate" on the highly polished finish and discourages the minute amount of wear which is necessary to mate piston rings with the bore.

The interrupted "deglazed" finish contains minute hills and valleys which carry a film of oil which will retard scuffing during break-in as well as produce the type of cylinder finish piston rings can mate to very rapidly.

The finish produced by a 220-300 grit stone is most desirable. The cross hatch pattern should intersect at approximately a 45° angle. Too flat an angle leads to ring spinning which prevents seating the rings.

(1) You must Do this

Probably the most critical part of the deglazing operation is the proper cleaning after deglazing. The residue of honing, if left in the engine, will rapidly destroy all moving parts. It is recommended that engines be cleaned thoroughly with soap and water. Clean with soap and water until the bore can be wiped with a clean white cloth without soiling the cloth. After clean up, oil the area to prevent rust formation. Waterless hand soap also serves as an excellent cleaning agent.

And, Dont Neglect to Clean out ALL carbon From Compression Ring Grooves before Inserting Pistons In Cyl's – Seizing or Breaking of Liners, Can be the Result of ignoring this Basic Step – (If it isn't showing 100% Aluminum, it isn't Ready For use)

(2) And this: Check Rings For Circumferental Clearance in piston Lands – They must be capable of Having Some clearance between inner face of Rings & Piston Lands, when Compressed under the 5" outer Ring Diameter –

(3) **And This:** Bearings & Bearing Saddles:
Always make sure Mating Surfaces are dry & oil Free at assembly – (you do put oil on the

Cutting Piston Skirts
For Balancing Sets

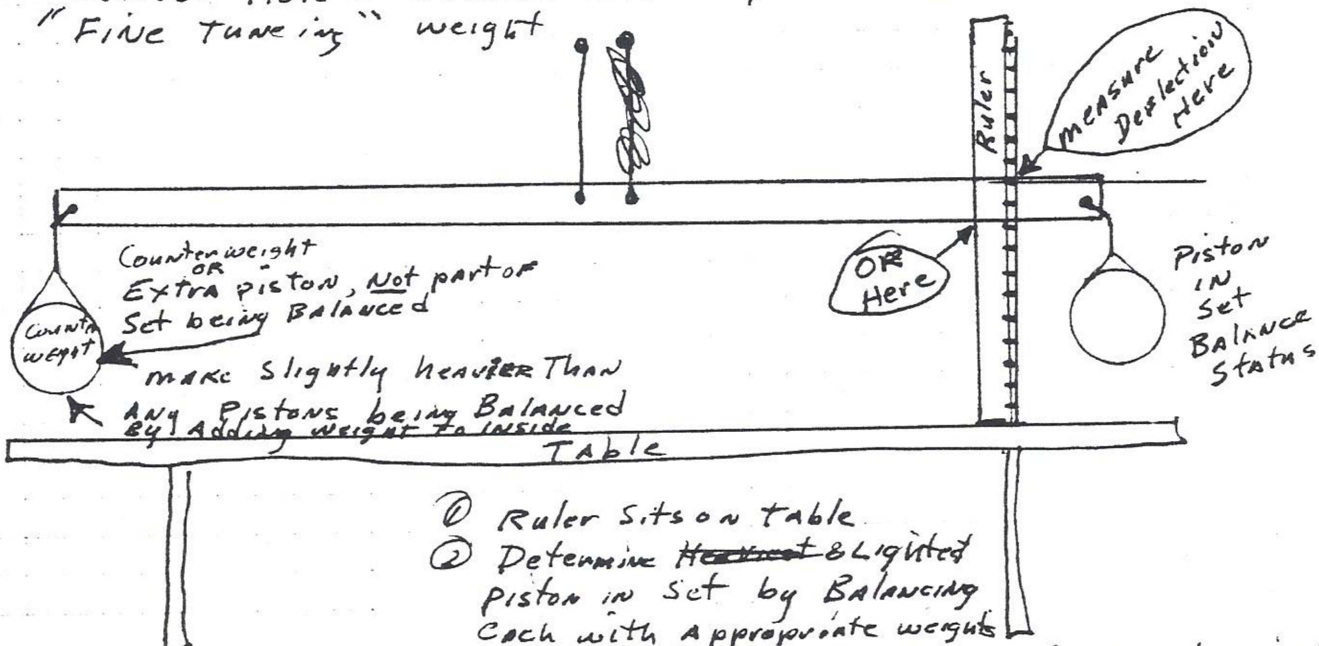
Cutting to Level with The Piston Pin Boss (About .440" deep)

Each .001" Cut from inside The piston Skirt = Approximately .6 of This (washer) Aluminum Washer That I used For Counter weights —

(Washer is 1/2" O.D., 1/4" I.D., and .062" Thick
(Washers weigh Approx 1/2 Gram.)

I use The Aluminum Washers For Counterweights in Following Mann

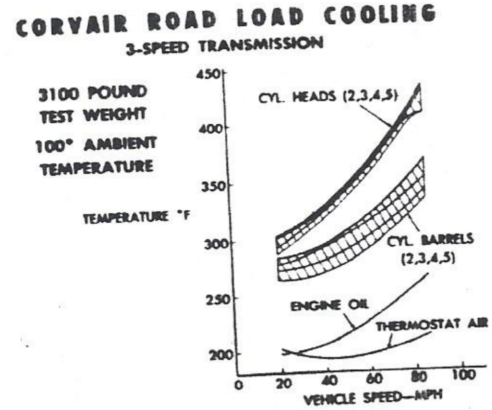
① Set up 4 Foot Long Alum. Bar with Strings on each end To hold Pistons Suspended - Suspend Bar on String thru Center Hole - Balance with Tape or other Permanent "Fine Tuneing" weight



① Ruler Sits on table
② Determine ~~Heaviest~~ & Lighted piston in Set by Balancing each with Appropriate weights Such As washers, Pennies, dimes, Gram Scale weights
③ Make each Piston Equal to Lightest one by Trimming inside of Skirt on Lathe (At Approx ~~.1/2 Gram~~ .3 grams per .001" Cut From piston Skirt to depth Just above Piston Pin Boss)
④ IF Deflection is identical, weight will be identical. (1 gram = about 3/32 ⅛ deflection with this Setup

Note: ① when using This Dont Forget To Keep The Loads on The Scales, So As to Eliminate The "Stretch" of The Suspension Strings.
② Check each Piston Against The Low weight Piston Right After Last Cut on Piston being Lightened. Errors will Show up Then.

An air-cooled engine is operated over a considerable temperature range under normal operation. From 20 miles an hour at road-load conditions to maximum speed, the cylinder-head temperature increases from about 300 to 435 degrees. This represents the worst road-load cooling condition: the same temperature also prevails at lower speeds during full-throttle operation. The temperature characteristic curve of this engine follows quite closely after the indicated mean effective pressure curve. The peak for our engine, occurring at about 2,600 RPM represents the worst cooling conditions we can obtain -- about 30 degrees hotter than at maximum speed." The foregoing statements related to the 80 HP engine as originally introduced and failed to mention that oil temperature simultaneously soared to 280° F, which is higher than can be considered safe. According to Mackerle, oil temperatures should be maintained above 176° F to keep down friction loss and dilution by gasoline, and should not exceed 230° F for continuous operation. Up to 230° may be considered permissable for short bursts.

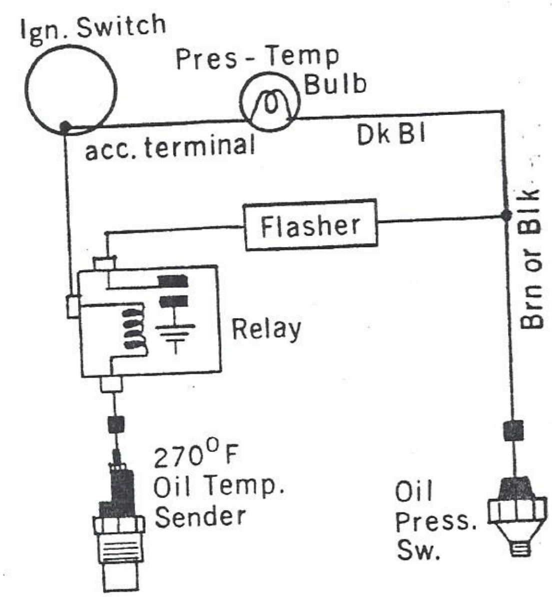


MEASURING CYLINDER HEAD TEMPERATURES

All Spyders and the 1965-66 Corsa models have cylinder head temperature gauges operating from one cylinder head. Like many low-production parts, these devices are quite high priced should you choose to build your own from the available stock parts. You can install the gauge, but it requires a separate housing, and the marked lens must be mounted in the housing which you fabricate. The harder part relates to removal of your standard cylinder heads and machining an opening for the sender -- which must match the one used in the Spyder head, so you'll need one of those for a sample. Perhaps a simpler, though probably less-accurate gauge to use is the one made by STEWART-WARNER for the Corvair.

A Chevy dealer bulletin advised Spyder cylinder-head temperatures as: 200° to 300° at idle; 350° to 475° at 30 to 60 MPH cruise; and 460° to 575° from 3,000 to 5,000 RPM at full-throttle.

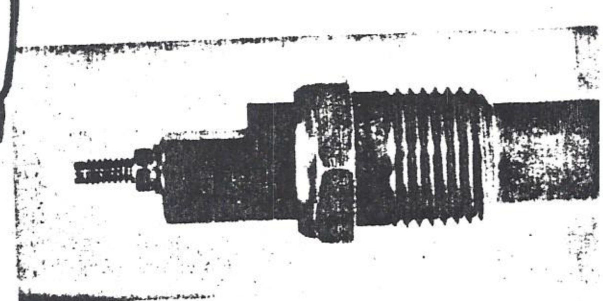
Overheat-warning switches are used on all Corvair engines, and these have changed as the factory has upped the horsepower produced by the engine. The unit used on the Spyder and 140HP engines operates at 575° F, but uses a 3/8-24 thread instead of the 3/8-16 thread used on the other switches. 60-64 engines (if not originally supplied with air conditioning, can have a switch which operates somewhere close to this 575° temperature by installing Part No. 1993574 (identified by grooves on the hex nut).



OIL TEMPERATURE MEASUREMENT

Oil temperature can be measured with a sending unit coupled to a gauge. Although all special oil pans include a boss for the addition of such a sender, the bottom of the oil sump gives a false too-cool reading which cannot be relied on for accuracy. The best place to measure oil temperature in the Corvair -- as the oil leaves the cooler -- is not easy to get to because the rear accessory cover delivers the cooled oil directly to the main oil passages. A second-best choice for early engines is to insert the temperature sender in the right side of the block where the pressure sender was originally located. If this spot is used, an aluminum heat shield must be constructed for the sender. Later blocks have a boss near the cooler. This boss can be drilled and tapped for sender installation.

If you merely want to be warned when oil temperature reaches the danger point, $10 will buy the system Ford uses with their 427's. The schematic diagram shows how to wire the parts to work with your TEMP-PRESS warning light. When oil temperature rises above 270°±8° F, the instrument-panel warning light flashes on and off until temperature drops below that point. The low-pressure warning (2 to 6 psi) operates as it was intended to. Ford Parts required are: oil-temp. relay C1TF10B840-A, oil-temp.flasher C3AZ9E296-A, and oil-temp. sending unit C3AZ10B921-A. The sender will require some special mounting techniques. *Parts No Longer Available*



Ford oil-temperature switch closes at 280° F, flashing panel light in warning when wired as shown.

PRESSURE SWITCH

When your Corvair engine's oil pressure drops to 2 to 6 psi, the oil-pressure warning light tells you that you have insufficient oil pressure. This inadequate warning system is the primary reason for installing an oil-pressure gauge. 1960-62 pressure switches failed frequently due to design and location in an area of extreme heat in the air-exhaust duct. The switch was improved and relocated. Modify your 60-61 model to relocate the new switch into the top of the oil-filter adapter. Use a six-point 1-1/16 socket, not pliers or a 12-point socket or you will distort the switch, causing quick failure.

PANS: STOCK OR SPECIAL?

ned sump covers should only be discussed after understanding the gineering facts of the matter. Fortunately, several authorities on engine nstruction have written a considerable amount of material which we can tudy to improve our knowledge.

P. E. Irving, in his excellent book "MOTORCYCLE ENGINEERING" has this to say. (p 239)

> "While oil is good at collecting heat, it is very bad at getting rid of it again, because the layer directly in contact with a cool surface increases its viscosity and stays there, acting as an insulator and effectively preventing heat being dissipated from the hotter oil in the interior. Ribbing a sump which contains a quantity of oil is not very effective unless there are internal ribs also to transfer as much heat as possible from the body of the oil, but ribs placed on areas against which hot oil is violently thrown by centrifugal action can be made to radiate a lot of heat. In this connection, the polishing of crankcases, though pleasing to the eye, may cost as much as the whole of the machining and cuts down the heat-radiating ability to a fraction of what it would be if the metal were left "as cast!"

In another part of the same book (p 183) Mr. Irving says,

> "A polished surface emits less heat by radiation than a black one. Rate of heat emission from a polished surface is approximately one-tenth that from the same surface covered with a thin film of lamp black, and the emissivity of a cast-aluminum surface is increased about 10% by a thin coating of black paint."

Note that a black surface is ten times as efficient as a polished one. The ALCOA Engineering Handbook indicates that Irving's comment may be quite conservative. ALCOA compares an as-cast surface with one which has been black-anodized to a depth of 1.7 thousandths. The black surface is more than ten times better in heat-radiating ability than a plain cast surface. Remember these facts when you are tempted to start polishing and chroming various engine parts which could conceivably contribute to cooling efficiency.

See P. 62 Also

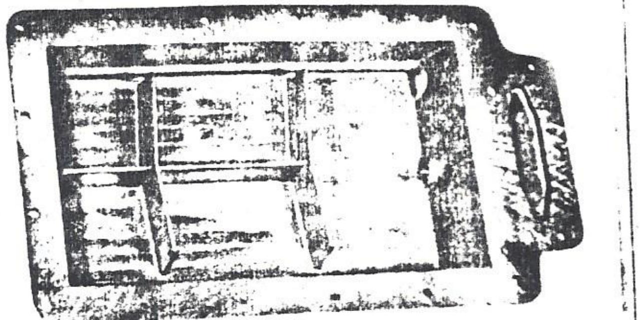
Another noted mechanical engineer, Mr. Julius Mackerle in his book "AIR-COOLED MOTOR ENGINES" states that it is an error to assume that using a greater quantity of oil will reduce oil temperature. He further remarks that "A finned sump does not aid cooling to any great extent as the oil does not flow down the cooled sump walls. Cooling is more intense on the crankcase walls, over which the oil flows in a thin film . . . Best oil cooling is obtained by a tube-type radiator. . . ."

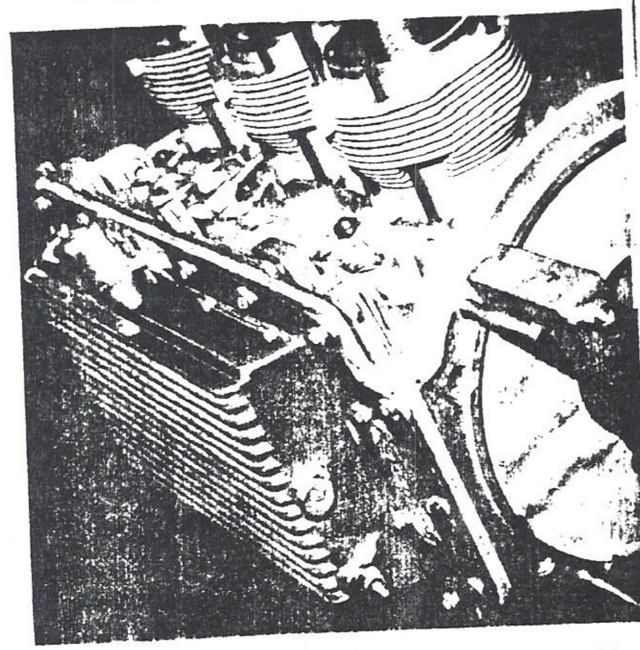
The reader should take note of the words "thin film" as these are the key to understanding the removal of heat from oil.

If you choose to use the stock Corvair oil pan, do not chrome plate it! Additional heat-removal capability can be added by welding or brazing sheet-metal fingers and/or baffles to extend into the hot oil to transmit the heat to the radiating surface. The pan is black as received from the factory. If you have to refinish it, use a thin coat of flat-black paint. The stock pan has approximately 178 square inches of radiating surface.

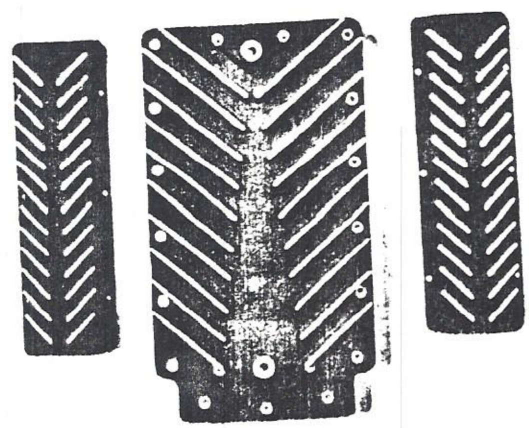
Should you decide on one of the more exotic special pans made of cast aluminum you will find that there are several from which you can choose. Most of them offer similar features including the following ones.

1. Baffles which slow oil in sloshing away from the pump pick up in corners or on hard acceleration and deceleration. These baffles serve an important function in conducting heat to the radiating surface of the pan, providing the pan is not polished. Some pans have no baffles, or very short baffles which should be lengthened to at least provide one central baffle equivalent to that provided by the stock pan. In some instances it

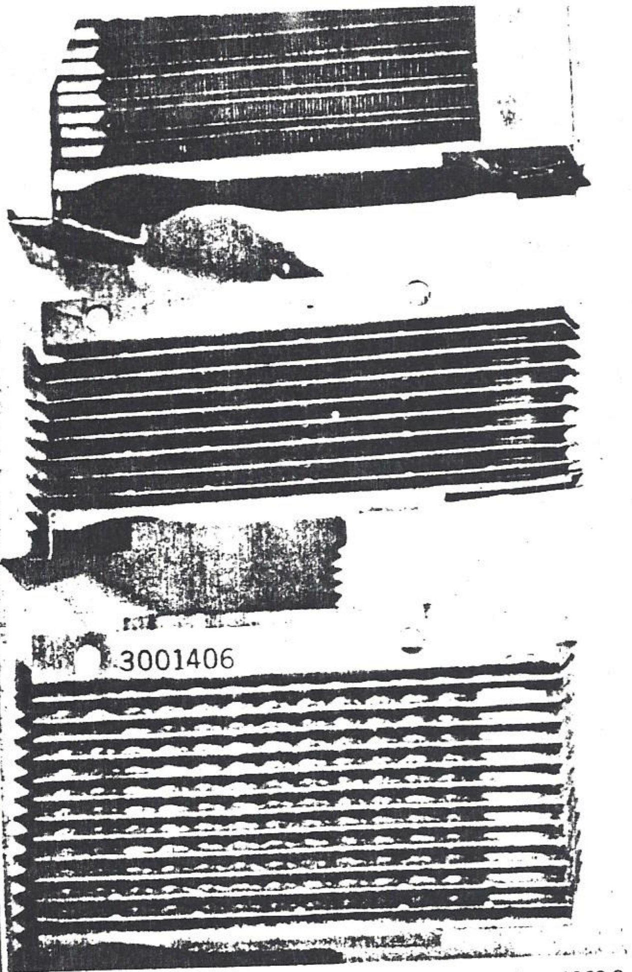




CRAGAR oil pans provide additional oil capacity; may give ground-clearance problems. Baffles must be cut away to relocate the oil pick up on the bottom. Polished surface should be eliminated and pan black anodized for maximum cooling effect.

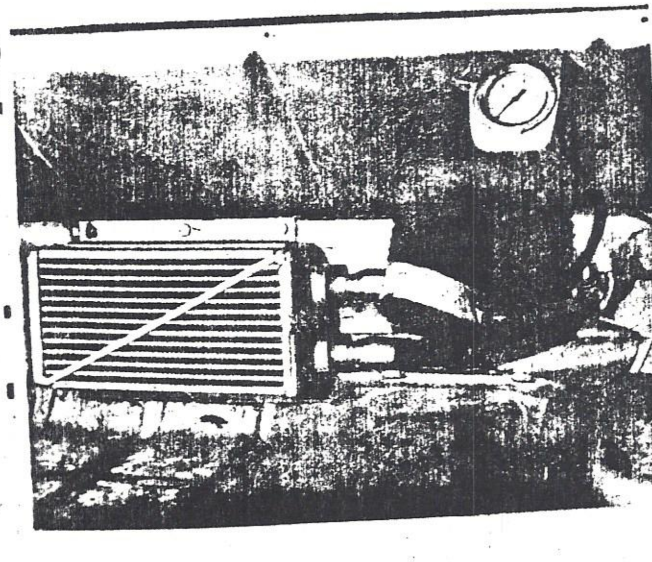


OTTO PARTS finned oil pan and rocker covers are black anodized to improve cooling efficiency. Pan has 314 square inches of cooling surface area; covers add another 316 square inches.



Three of the four oil coolers supplied for Corvairs from 1960-2 (top), 1963 Spyder and 64 standard and high-performance (center), and at the bottom is the 12-plate cooler for 64 Spyders, 65 140-180-HP engines. 8-plate also on 95 and 110-HP 65's.

Doug Roe's Spyder-engined "Desert Rat" never exceeds 260° F oil temperature in a one-hour race in 90° ambient temperature using Harrison "big car" oil cooler insalled as you see it here. Body is cut away behind cooler for air flow. Hose is cool-air inlet for carburetor.



OIL COOLERS

Like the cooling fans, the oil coolers have also been subject to considerable change since the introduction of the Corvair engine in its original form. At least four coolers have been supplied in the 1960-67 period. The original folded-fin aluminum oil cooler as used on 1960-62 models is the best one you can get. It dissipated about 160 BTU's per minute, keeping lubricating-oil temperature at 280° F with the engine under full-throttle operation in an ambient temperature of 100° F. In 1963, the production-economy types introduced a new-design 3-plate cooler on standard and 102 HP engines, and an 8-plate job on the Spyders. Experience showed that more cooling was needed for the 164-inch engines introduced in 64, so those used the 8-plate design on standard and 110 HP engines, and a 12-plate on the Spyders. The 65 Spyder and 140 HP engines all use the 12-plate models, lower-HP models get the 8-plate. The 12-plate type is not as efficient as the original folded-fin cooler, according to all of the information which I have been able to glean from various sources. The original type is no longer sold by Chevrolet.

If you are going to race your Corvair in hill climbs or road races, then improved cooling must be supplied by installing a large, remote-mounted cooler which is connected through 1/2-inch inside diameter or larger hoses. The hoses can be connected to the stock oil-cooler adapter manifold after it has been modified by heliarcing female pipe fittings (aluminum)to it and opening up the holes. The reason for the large lines is that oil is quite viscous when cold and large lines ensure that the bearings will be adequately supplied under warm-up conditions. The pressure-relief valve in the filter adapter must be removed and plugged. Otherwise, the restriction caused by the cooler and filter combination will cause the relief valve to open and the oil will by-pass the cooler. Before modifying the oiling system in any way, study page 6A-6 of the 61 Corvair Shop Manual where lubrication-system functioning and routing is thoroughly explained and diagrammed.

The best externally mounted oil cooler is the stock-car racer's model which HARRISON Division of GM manufactures. Your Chevy dealer can get it for you for about $125. The Part No. is 3157804. The mounting shown in Doug Roe's car is generally accepted as the best position as cool air can be ducted to the cooler, and it is close to the engine so that the lines can be kept short.

OIL FILTERS

The stock Corvair oil filter is adequate for most road use, but when the engine is being modified for competition, use a larger filter. It will give added oil capacity as well as improved filtering. A non-stock filter will also be easier to mount remotely on Porsche/VW installations where the stock filter has to be cut off to get the engine into the chassis. Perhaps the easiest full-flow filters to adapt are those made by Ford. Oil-filter adapter Part No. C3AZ-6881A used on the 427 engines has threaded holes for the oil-pressure and oil-temperature-warning switches. Its large openings are easily adapted to a plate-type adapter into which you can mount your hose fittings. Gasket is COAE-6A636A: Filter is C1AZ-6731A. Hoses to and from the oil filter must be 1/2-inch diameter minimum. This inside diameter is absolutely essential to avoid oil starvation when the oil is cold and viscous. Attaching the hoses at the engine end is another problem, especially with the die-cast oil-filter adapters used after 1961. Adding threaded holes to attach 1/2-inch I. D. hoses will probably require heliarcing onto one of the 1960-61 permanent-molded adapters as these have more "meat" and are more easily modified. Do not hesitate to reroute the passages in the adapter to permit getting the hoses in the correct position. You may want to bring the new hoses in under the generator, or into the top of the adapter, depending on the rest of the installation problems. Avoid interference with the fan belt and generator. Arrange the hoses so that they do not have to be removed to install a new fan belt.

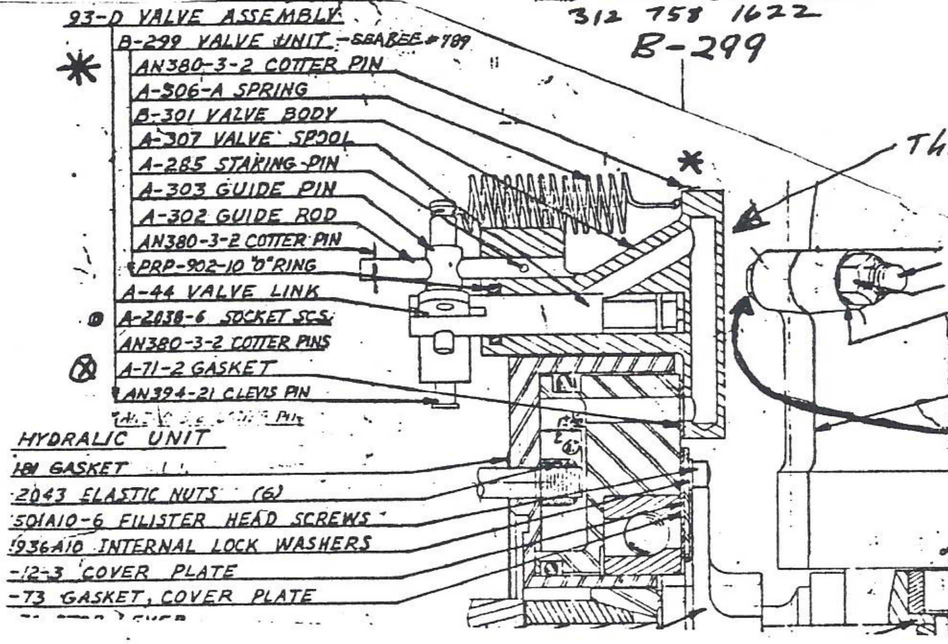
AIRWORTHINESS DIRECTIVES APPLYING TO REPUBLIC SEABEE RC-3 SERIAL #797

47-21-11	Firewall Stud Bushings	D.N. Apply -
47-21-12	No Smoking Placard	D.N.A.
47-21-13	Elevator Push-Pull tube Rivets	D.N.A.
47-21-14	Elevator Control Cable Guide	D.N.A.
47-21-15	Radio Filters	D.N.A.
47-21-16	Fuel Strainer Drain	D.N.A
47-21-17	Backfire Screen	D.N.A.
47-21-18	Mixture Control Support Bracket	D.N.A
47-21-19	Control Clamps or Brass Ferrules	D.N.A
47-21-20	Oil Pressure Gauge Line Restrictor	D.N.A.
47-21-21	Tip Float Struts	Applies
47-21-22	Engine Mounting Bolt Lock Washers	C/W 10-28-58 by installation tab washers
47-21-23	Engine Cooling Fan	C/W 7-12-70 by torquing and .041 S.S. wire
47-47-10	Float Strut Rework	Previously C/W
47-47-11	Propeller Reverse Contool Spring	Previously C/W by installation spring
47-47-12	Carburetor Anti-Swerl Vanes	Previously C/W by installation 68014-20 vanes
47-47-13	Hartzell Hub Counterweight	Previously C/W by installation 1/8" slug
47-47-14	Oil Screen Inspection	C/W 10-21-66 by installation sinko float
47-51-8	Tailwheel Horns	Previously C/W by installation horns
48-1-3	Elevator Trim Tab Bushing	Previously C/W
48-11-4	Hydraulic Pump Handle	Previously C/W by installation proper bolts
48-3-1	Fuel Pump Diaphrams	C/W 7-12-70 by replacement of pumps
49-31-2	Fuel Tank Placard	Previously C/W by installation placard
53-6-2	Hartzel Propeller Hub	Does not apply
53-23-2	Strut Fitting Inspection	C/W by inspection each 25 hrs. or each 6 months
56-17-3	Propeller Valve	Previously C/W (New valve is B 299 model.)
59-1-3	Propeller Split Rings	Previously C/W Hub stamped "N"
59-13-7	Float Assembly	C/W 6-22-70 by overhaul WO 4869
59-26-1	Hartzell Hub Spider	Does not apply
60-26-2	Magneto Lubrication	Does not apply
62-4-2	Carburetor Float Valve and Bracket Screws	C/W 6-22-70 see 64-27-2
63-22-3	One-Piece Primary and Main Venturi	C/W 7-12-70 by installation 46A-226.
64-27-2	Float Assembly, Valve & Bracket Screws	C/W 6-22-70 see 66-5-4
66-5-4	Carburetor Supersedes 64-27-2	C/W 6-22-70 by overhaul WO 4869
72-6-5	Throttle Arm wire Safety	- Complied with
76-7-12	Bendix Ignition test	For Positive "OFF" to Left Position Limits

Seabee Propeller Control Valves

GEORGE POMEROY
1860 Reichert Ave.
Sauk Village, IL 60411
312 758 1622

B-299



This Represents the Acceptable B-299 Valve unit For Seabee

Note That there is No "Staple Tube" ON This Valve

Danger here too: Prop Shop Have been Changing to Crown Head Bolts here. Crown Ne[illegible] To be Ground OFF To Clear B 299 Valve when prop is in Full Reverse OR Valve will b[e] Ripped open. G. Pomeroy

* Note: Spring, As shown above, Represents A danger to Seabee Fliers in that it will put the Valve-Spool into Reverse if The Pilot's Overhead Control wire Should Come Loose at the Valve-Link Arm. The Cure For This Condition is to hook that Spring To Something Forward of The Valve Body, instead of to the AN ~~380~~-3-2 Cotter pin.

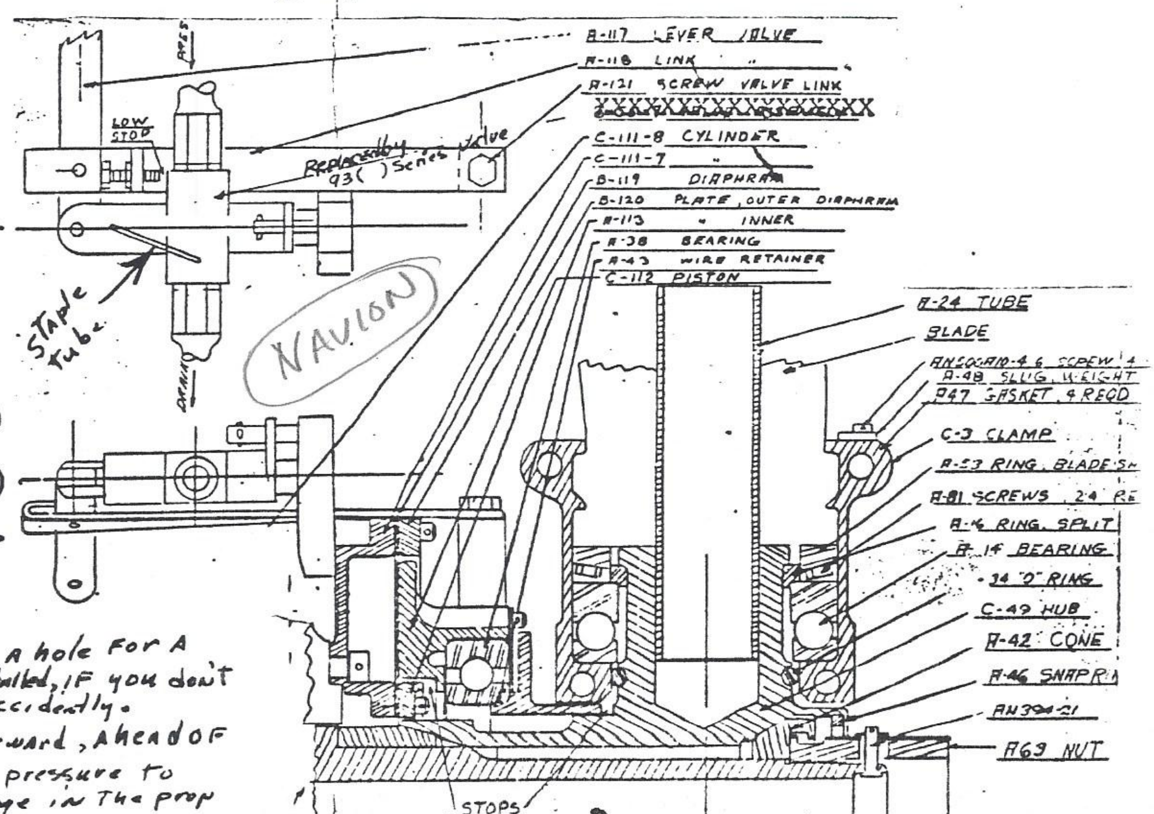
⊗ A-71-2 Gasket Represents Another Trouble Spot. If A tight metal Sleeve or "O" Ring Recess could be placed there, Gasket Blow-out Damage would be Less.

B-99

This is typical of The B-99 "Suicide Valve" (Top View)

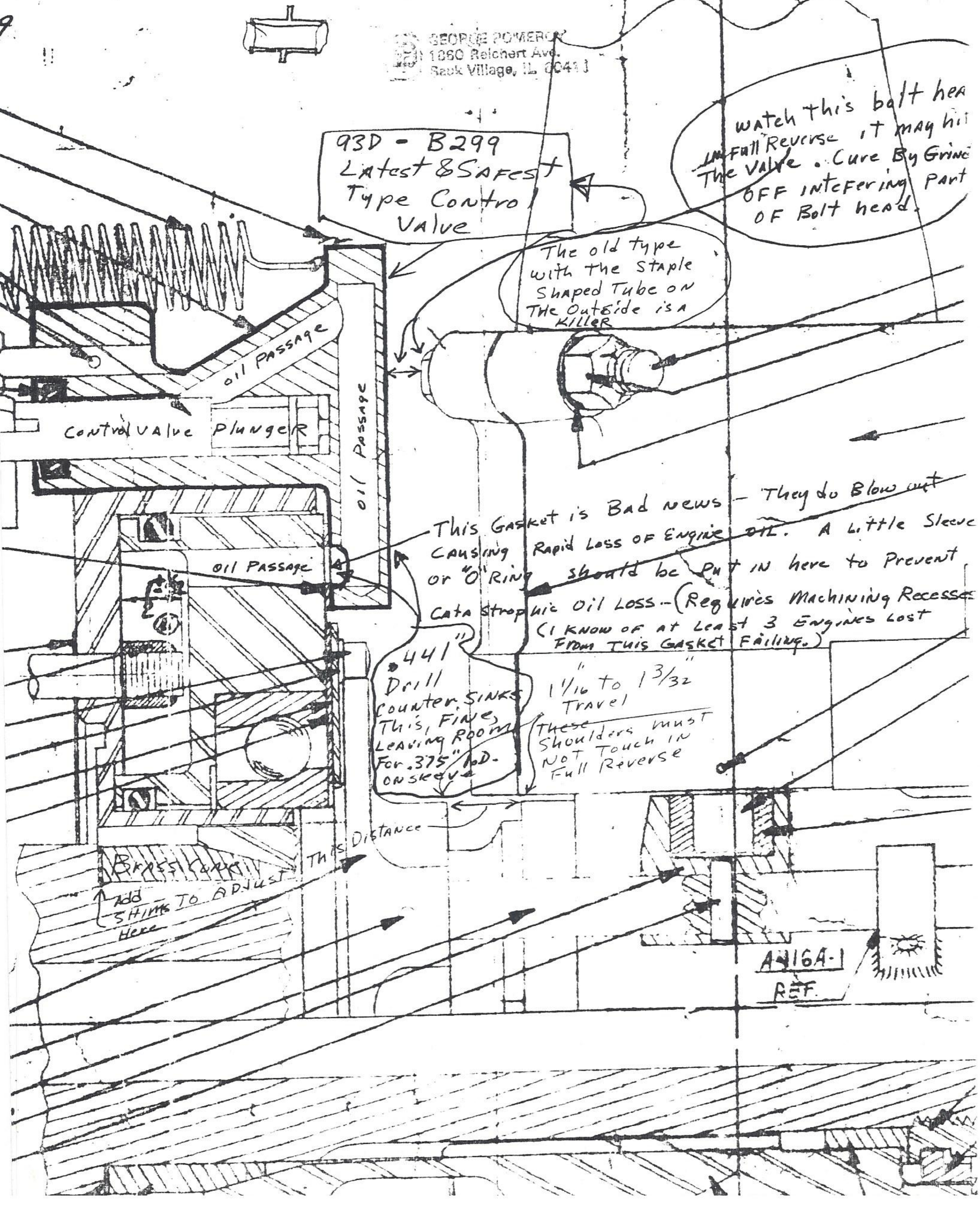
(Note That This Differs slightly From Seabee Installation, in that this is Showing Navion installation which is Tractor — Not Pusher.)

(Side view)



Another Caution! B-299 Valve
On The A 302 Guide Rod is A hole For A Cotter pin, which MUST be installed, IF you don't want to Go into Reverse Accidently. Moving overhead Control Forward, ahead of the Cotter pin hole, allows oil pressure to slip Through the wrong Passage in The prop Valve Body and puts the Prop into Reverse. Keep A Cotter Pin in that Hole!

Seabee
Propellor Valve & Pitch Control Mechanism



Important: Before setting these Lever Ends you must First

① Make Certain your tachometer is Accurate.

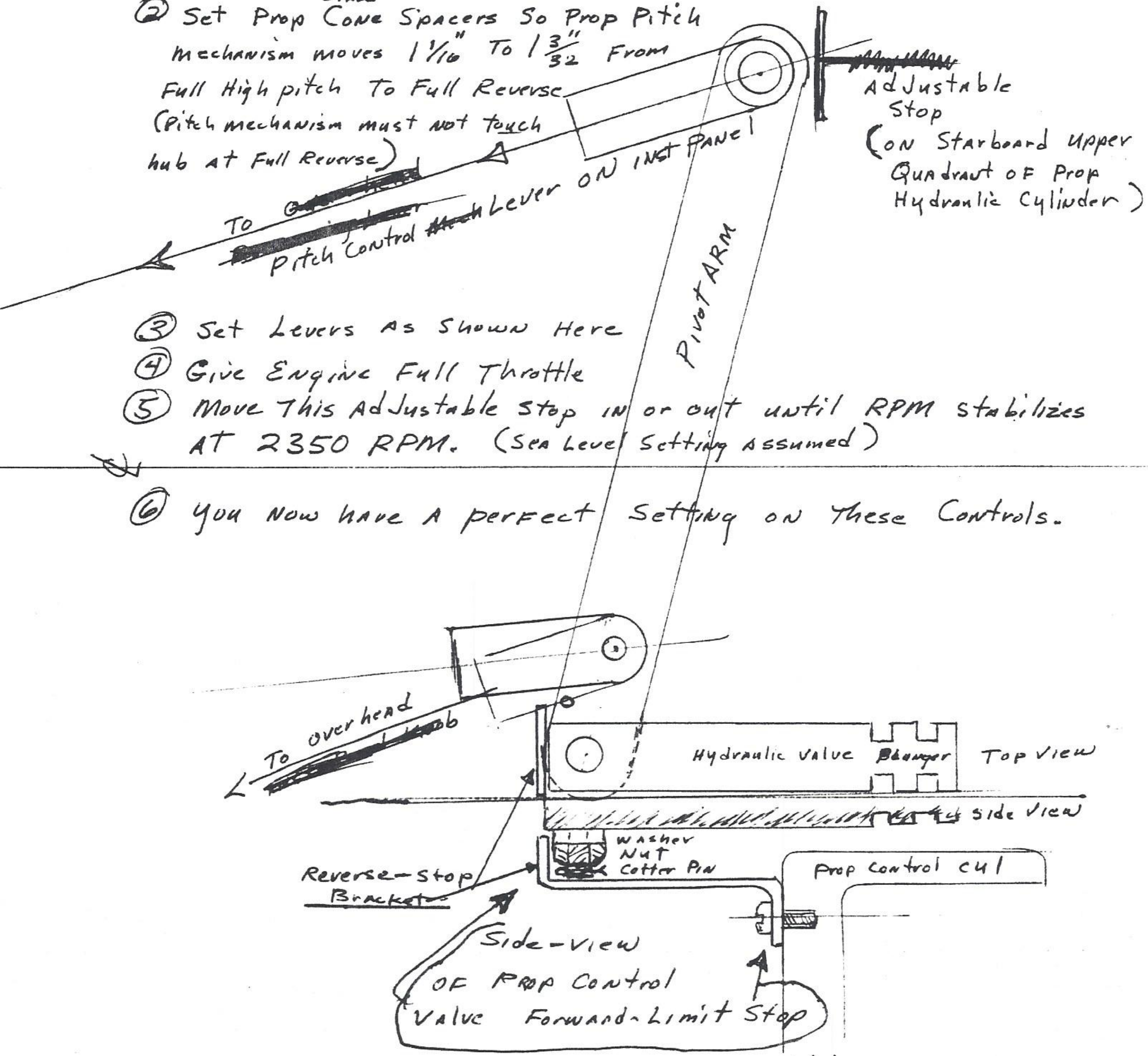
② Set Prop Brass Cone Spacers So Prop Pitch mechanism moves 1 1/16" To 1 3/32" From Full High pitch To Full Reverse (Pitch mechanism must not touch hub at Full Reverse)

③ Set Levers As Shown Here

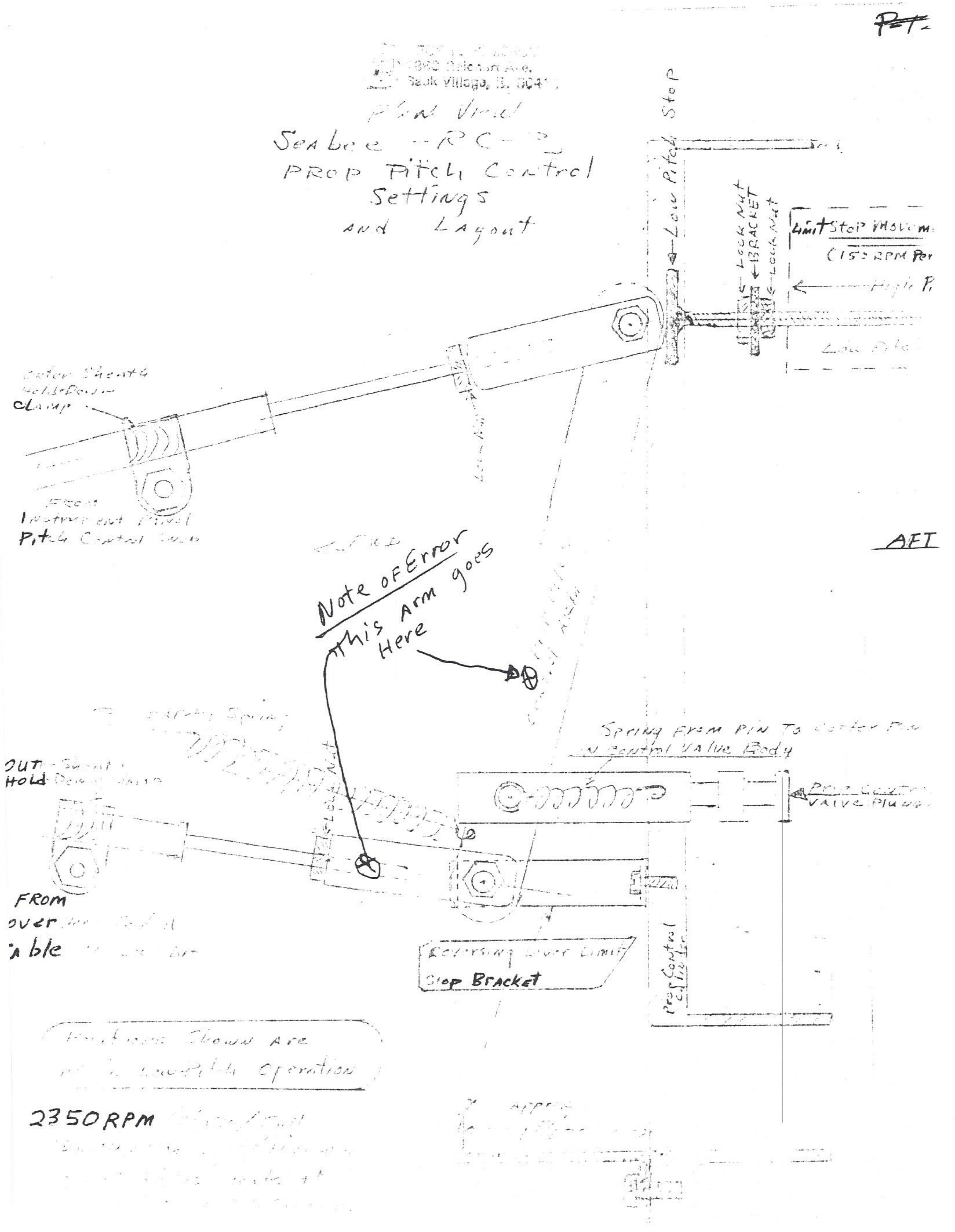
④ Give Engine Full Throttle

⑤ Move This Adjustable stop in or out until RPM stabilizes AT 2350 RPM. (Sea Level Setting Assumed)

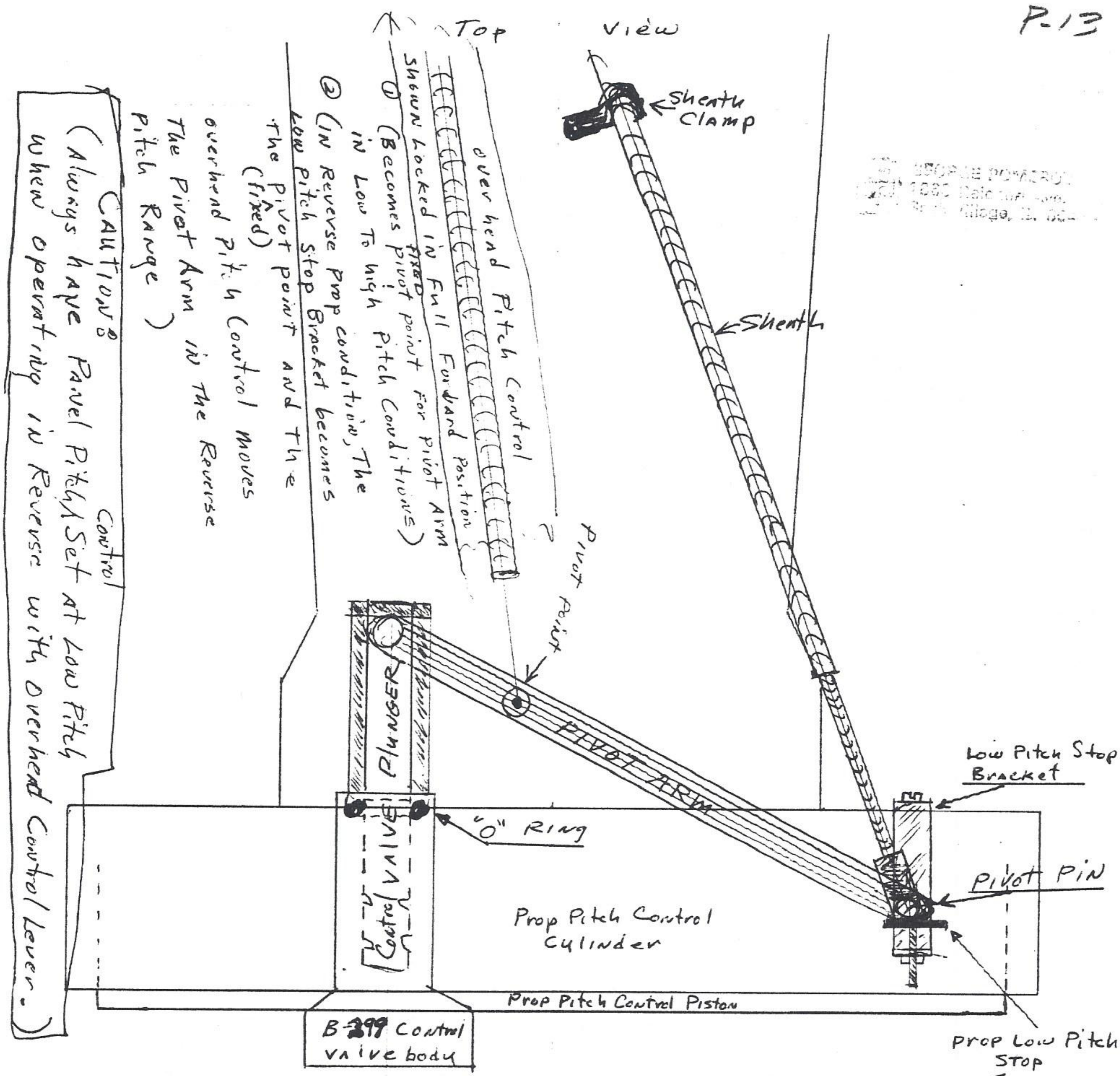
⑥ You Now have A perfect Setting on These Controls.



Located on Prop Hyd. Cylinder Port upper Quadrant - Toward Bow side of Cyl.



Seabee - RC-3
PROP Pitch Control
Settings
and Layout
Low Pitch Stop
Lock Nut
BRACKET
Lock Nut
Limit Stop Movement
High P
Outer Sheath
Hold Down
CLAMP
Front
Instrument Panel
Pitch Control Knob
AFT
Note of Error
This Arm goes
Here
Spring From Pin To Cotter Pin
On Control Valve Body
OUT - Sheath
Hold Down
Lock Nut
Prop Control
Valve Plunger
FROM
over
Cable
Reversing Lever Limit
Stop BRACKET
Prop Control Cylinder
Positions Shown Are
Low Pitch Operation
2350RPM



Top View of Prop Pitch Mechanical Layout ~ Seabee (Late type Control Valve)

Set Low pitch Stop with Prop Pitch knob Full IN tow. Inst. Panel - Engine should show 2350 RPM at Full Pow. while Plane is tied Down if pitch is Properly set - The Further aft the Pitch Stop is set The Higher the RPM sho. get. (Each turn of the Stop equals about 150 RPM.) Drawing Shows Correct TAKE-OFF Position For 2350 RF

AL = .04043"
Cyl
@5" = .040"

Liner Expansion 5" Bore

Expansion Factors
Coefficient tables, 0°F
AL = .0001244"/Deg F
Steel = .00000633 /Deg F.

Steel-Iron
Liner at 650°F = .020"

This Suggests about .020" Clearance at 650
-.015" interference
.005" Actual Clearance

Liner Insertion:

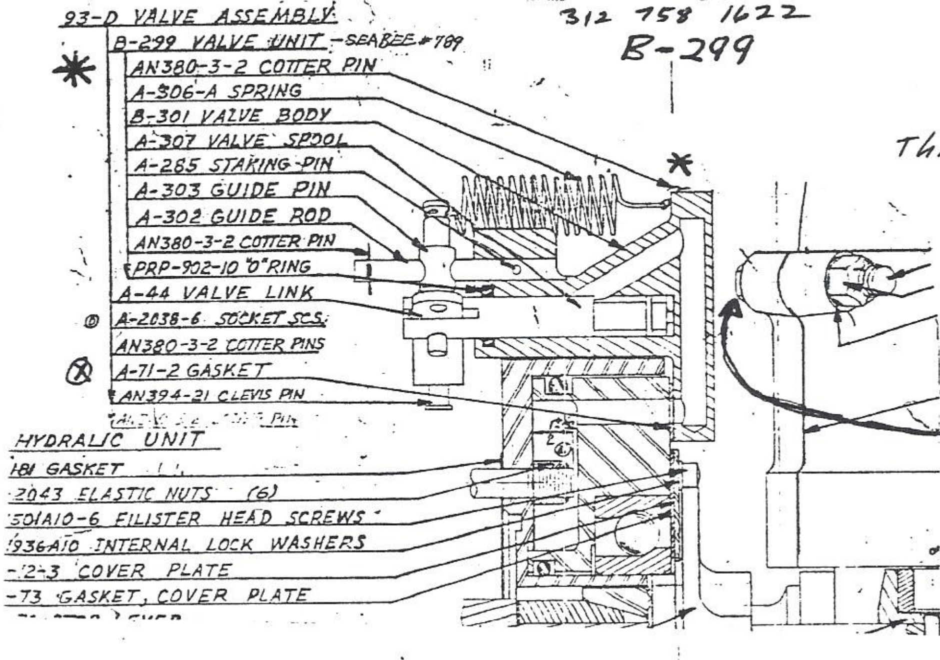
① Clean Bore of Cyl, then heat to 650° or more (on Burner or Elect oven)

② Clean Liner O.D. - Put insertion Stop Collar on Outer End of Liner

GEORGE POMEROY
1860 Reichert Ave.
Sauk Village, IL 60411
312 758 1622

Seabee Propeller Control Valves (Identification & Comments)

B-299



This Represents the Acceptable B-299 Valve unit For Seabee

Note That there is No "Staple Tube" on This Valve

Danger here too: Prop Shop Have been changing to Crown Head Bolts here - Crown Nee[ds] To be Ground off To Clear B 299 Valve when prop is in Full Reverse or Valve will be Ripped open. G. Pomeroy —

* Note: Spring, as shown above, Represents a danger to Seabee Fliers in that it will put the Valve-Spool into Reverse if the Pilot's overhead Control wire Should Come Loose at the Valve-Link Arm. The Cure for this Condition is to hook that Spring to Something Forward of the Valve Body, instead of to the AN380-3-2 Cotter pin.

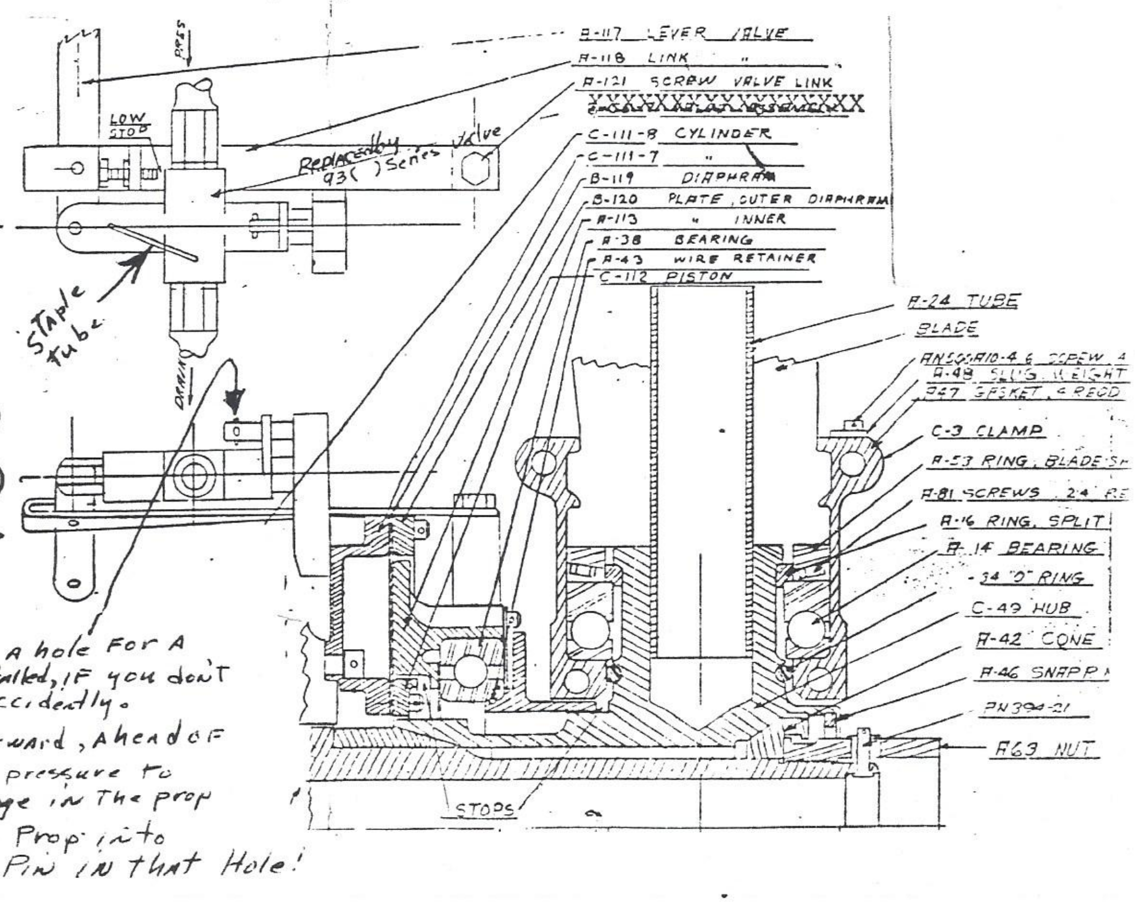
⊗ A-71-2 Gasket Represents another Trouble Spot. If a Tight metal Sleeve or "O" Ring Recess could be placed there, Gasket Blow-out Damage would be Less.

B-99

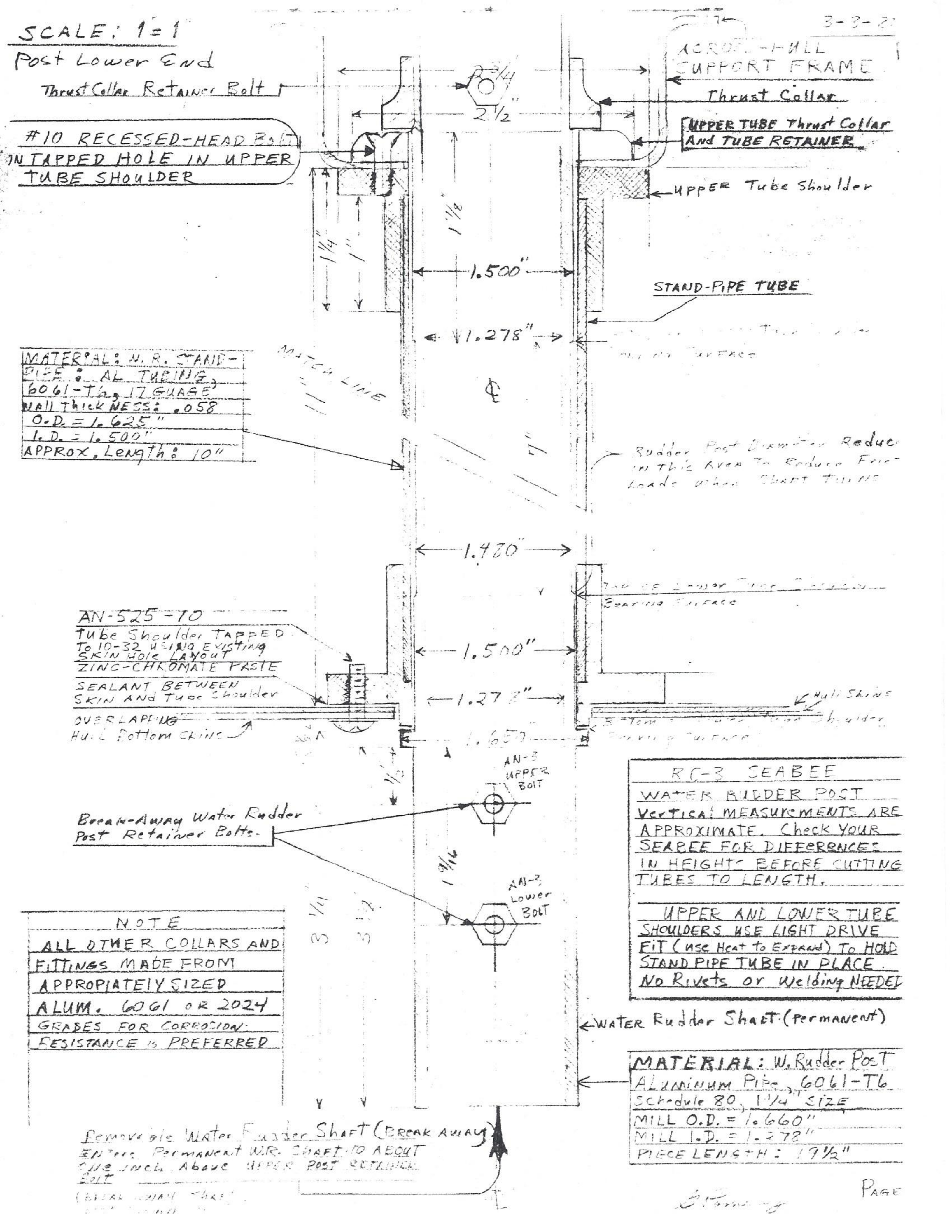
This is typical of the B-99 "Suicide Valve" (Top View)

(Note That this Differs slightly From Seabee Installation in that this is Showing Navion installation which is Tractor — Not Pusher.)

(Side view)



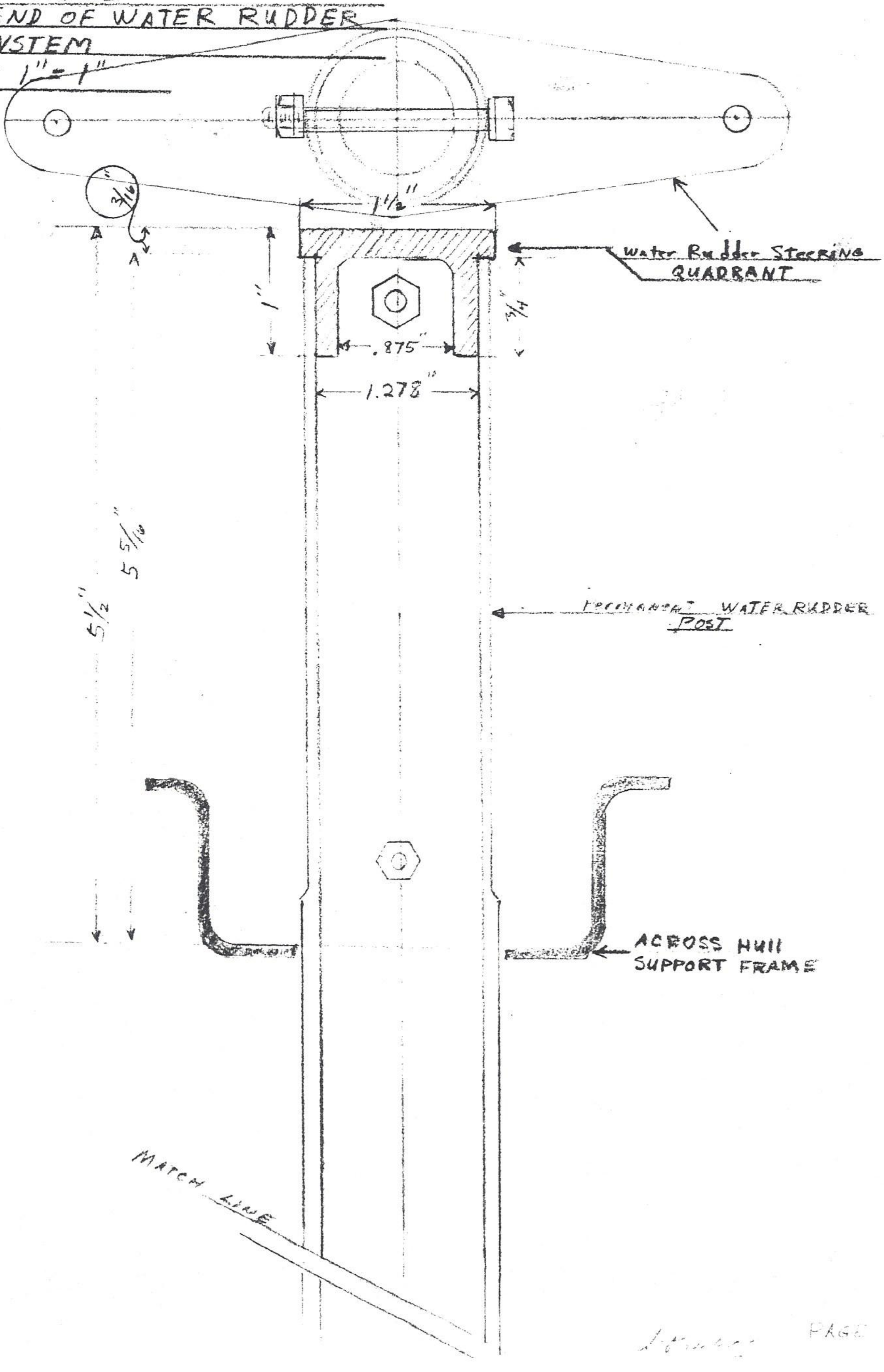
Another Caution! B-299 Valve
On the A 302 Guide Rod is a hole for a Cotter pin, which MUST be installed, if you don't want to Go into Reverse Accidently. Moving overhead Control Forward, ahead of the Cotter pin hole, Allows oil pressure to slip through the wrong Passage in the Prop Valve Body and puts the Prop into Reverse. Keep a Cotter Pin in that Hole!



SCALE: 1=1"
Post Lower End
3-3-2
ACROSS-HULL SUPPORT FRAME
Thrust Collar Retainer Bolt
Thrust Collar
2 3/4
2 1/2
#10 RECESSED-HEAD BOLT IN TAPPED HOLE IN UPPER TUBE SHOULDER
UPPER TUBE Thrust Collar And TUBE RETAINER
Upper Tube Shoulder
1 1/4"
1"
1 1/8
1.500"
STAND-PIPE TUBE
1.278"
MATERIAL: W. R. STAND-PIPE: AL TUBING, 6061-T6, 17 GUAGE
WALL THICKNESS: .058
O.D. = 1.625"
I.D. = 1.500"
APPROX. Length: 10"
MATCH LINE
℄
Rudder Post Diameter Reduced In This Area To Reduce Friction Loads When Shaft Turns
1.480"
Bearing Surface
AN-525-10
Tube Shoulder TAPPED To 10-32 USING EXISTING SKIN HOLE LAYOUT
ZINC-CHROMATE PASTE SEALANT BETWEEN SKIN AND Tube Shoulder
OVERLAPPING HULL BOTTOM SKINS
1.500"
1.278"
Hull Skins
1.660
1/2
AN-3 UPPER BOLT
Break-Away Water Rudder Post Retainer Bolts.
RC-3 SEABEE
WATER RUDDER POST
Vertical MEASUREMENTS ARE APPROXIMATE. Check YOUR SEABEE FOR DIFFERENCES IN HEIGHTS BEFORE CUTTING TUBES TO LENGTH.
UPPER AND LOWER TUBE SHOULDERS USE LIGHT DRIVE FIT (use Heat to Expand) To HOLD STAND PIPE TUBE IN PLACE. No Rivets or Welding NEEDED
1 9/16
AN-3 Lower BOLT
3 1/4
3 1/2
NOTE
ALL OTHER COLLARS AND FITTINGS MADE FROM APPROPIATELY SIZED ALUM. 6061 OR 2024 GRADES FOR CORROSION RESISTANCE IS PREFERRED
WATER Rudder Shaft (Permanent)
MATERIAL: W. Rudder Post
Aluminum Pipe, 6061-T6
Schedule 80, 1 1/4" SIZE
MILL O.D. = 1.660"
MILL I.D. = 1.278"
PIECE LENGTH: 19 1/2"
Removable Water Rudder Shaft (BREAK AWAY)
Enters Permanent W.R. SHAFT TO ABOUT ONE INCH Above UPPER POST RETAINER Bolt
PAGE

3-3-84 P-

RC-3 SEABEE
UPPER END OF WATER RUDDER
POST SYSTEM
SCALE: 1" = 1"



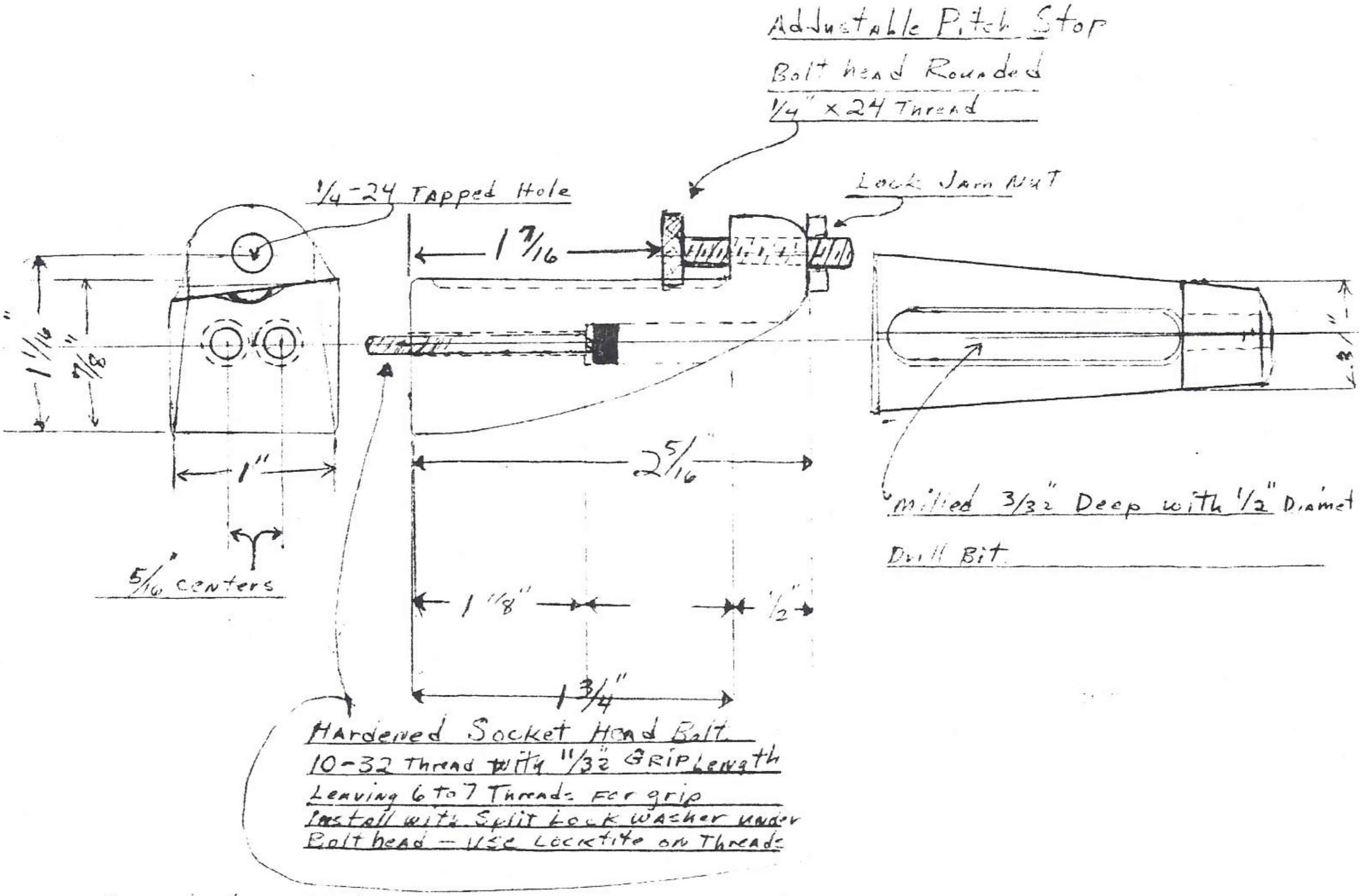
Aircraft Model	Engine	HP	RPM	Propeller	Blade	Blade Angle & Tolerances (°) Low	High	Feather	Wt.	Gov.	Spinner	Torque	Aircraft Spec. No./STC No./Approval Status
Pacific Airmotive (See American Turbine)													
Pacific Propeller (See Piper PA-28-140)													
Page Industries Rockwell S-2R Grumma G164A	LTP-101-600A	600	1950	HC-B3TN-3D	T10282	18±0.1	(Rev.) -5±0.5	90±0.5	(Cwt. angle) 1-4		C-3065	100-125	Conversion
Partenavia P-68, P68B	Lyc. IO-360-A1B,-A1B6	200	2700	HC-C2YK-2C(U)F (No reduction permitted)	FC7666A-4	14.2±.2	18.5-21.5	80-82	60	F-6-3A B210655	836-29	60-70	A.S. A31EU
Partenavia P68CTC	Lyc. TO-360-C1A6D	210	2575	HC-C2YK-2CUF	FC7666A	16±.1	20-23	81±1				60-70	Experimental Hartzell 8110-3 Vibration Approval, 2/5/80
Partenavia P68T	Allison 250-B17B			HC-B3TF-7A	T10173-11R								Hartzell 8110-3 Vibration Approval, 8/15/78, Rev. 1/16/81
Pay's Air Service	Lyc. TIO-720	400	2625	HC-C3YR-1RF	F8475R	13.0±.1	29-31		78	F-4-1D	835-36	90-100	Production
Percival	Lyc. GO-480	280	3400	HC-82X20-1B	9333C-3	17			72		835-15	450	HC-A2X20 is replacement prop per Hartzell T.C.D.S. P-908.
				HC-A2X20-1A	9333C-3	17			72		835-15	450	
Pegaso F.20 (See General Aviation and Italair)													
Piaggio P.136-L (Royal Gull)	Lyc. GO-435-C2B	260	3400	HC-83X20-2CL	L8433	15		82-84	92		835-11S	450	HC-A3(X,V)20 are replacement props per Hartzell T.C.D.S. P-913 & P6EA.
				HC-A3X20-2L	L8433	15		82-84	85		835-11S	450	
				HC-A3V20-2L (No reduction permitted)	VL8433	15		82-84	85		835-11S	450	Hartzell 1600 Vibration Approval, 4/27/61
Piaggio P.136-L1 (Royal Gull)	Lyc. GO-480-B, -B1B, -B1D	270	3400	HC-83X20-2CL (No reduction permitted)	L8433H	15		82-84	92		835-11S	450	A.S. A-813.HC-A3(X,V)20 are replacement props per Hartzell T.C.D.S. P-913 & P6EA.
				HC-A3X20-2L	L8433H	15		82-84	85		835-11S	450	
				HC-A3V20-2L	VL8433H	15		82-84	85		835-11S	450	
Piaggio P.136-L2 (Royal Gull)	Lyc. GSO-480-A1A6	340	3400	HC-83X20-2CL	L9333C-5 to -6	18		82-84			835-11S	450	A.S. A-813.HC-A3(X,V)20 are replacement props per Hartzell T.C.D.S. P-913 & P6EA.
				HC-A3X20-2L	L9333C-5 to -6	18		82-84			835-11S	450	
				HC-A3V20-2L	VL9333C -5 to -6	18		82-84			835-11S	450	
Piaggio P-149-D (Hoffmann)	Lyc. GO-480-B1A6	270	3400	HC-A3V20-1D	V8433N	16±0.1	33-34			B-4	A837-17	450	
Piaggio P.166 (Royal Gull)	Lyc. GSO-480-B1C6	340	3400	HC-83X20-2CL	L9333CH to -1	15		83	100		835-11S	450	A.S. 7A4.HC-A3(X,V)20 are replacement props per Hartzell T.C.D.S. P-913 & P6EA.
				HC-A3X20-2L	L9333CH to -1	15		83	103		835-11S	450	
				HC-A3V20-2L	VL9333CH to -1	15		83			835-11S	450	
Piaggio P.166 (Royal Gull)	Lyc. GSO-480	340	3400	HC-A3VF-5AL	VL9333CH -5	18.0±.1	(Rev. -18 to -19)	82-84				80-90	
Piaggio P.166	Lyc. IGSO-540-A1H			HC-B3Z30-2BL (Minimum Diameter 90.5")	L10151-8								Hartzell 8110-3 Vibration Approval, 3/5/76
Piaggio P.166	Lyc. LTP-101	600	2000	HC-B3TN-3DL	LT10282 -9.5 (Pusher)	20±.1	(Rev. -11±.5)	85-86			D-4033L	100-125	A.S. 7A4
Piaggio P.166B., P.166C	Lyc. IGSO-540-A1C	380	3400	HC-B3Z30-2BL	L10151 -8 to -9	17		82	118		836-32SPRL	600	A.S. 7A4
Pilatus PC-6, -6-H1, -6-H2	Lyc. GSO-480-B1A6	340	3400	HC-83X20-1B	9333C to -5	15	36		99	B-3	836-15	450	A.S. 7A15.HC-A3(X,V)20 are replacement props per Hartzell T.C.D.S. P-913 & P6EA.
				HC-A3X20-1D	9333C to -5	15	36		99	B-3	836-15R	450	
				HC-83X20-2C1	9333C to -2	15		84-86	100			450	
				HC-A3X20-2	9333C to -2	15		84-86	103			450	
				HC-A3V20-2	V9333C to -2	15		84-86	115			450	
Pilatus PC-6/ 350,-H1, -H2	Lyc. IGO-540-A1A	350	3400	HC-B3Z30-2B (No reduction permitted)	9349	15.0		87			836-32SPR	600	A.S. 7A15. Props interchangeable per Hartzell T.C.D.S. P2EA.
				HC-B3W30-2B (No reduction permitted)	W9349	15.0		87			836-32SPR	600	
Pilatus Turbo-Porter PC-6/B1-H2	UAC PT6A-20	550	2200	HC-B3TN-3C	T10173CH to -2	15.0±.1	(Rev. -11.5 ±.5)	85.5	121		C-3065P	100-125	A.S. 7A15
Pilatus PC-6/ B1-H2				HC-B3TN-3D	T10178C(H)						C-3065P	100-125	STC SA545EA., Fairchild Industries, Inc., 20301 Century Blvd., Germantown, MD 20767
Pilatus PC-6/B-H2	UAC PT6A-6A	550	2200	HC-B3TN-3C	T10173 CH to -2		(Rev. -11.5)	85.5	121		C-3065P	100-125	A.S. 7A15
Pilatus PC-6/ B2-H2	UAC PT6A-27	550	2200	HC-B3TN-3D (Minimum Diameter 99")	T10178CH		(Rev. -10)	85.5			C-3065P	100-125	A.S. 7A15
Pilatus PC-6/C-H2	AiResearch TPE-331-25D	575	2000	HC-B3TN-5C	T10178C or CH to -2	①	(Rev. -9.5)	87	132		C-3043-1P	100-125	A.S. 7A15

① (Start 2) (Minimum in flight 5)

For Hartzell Reversing Prop-

May 30/81

Propeller Control Valve Limit Stop



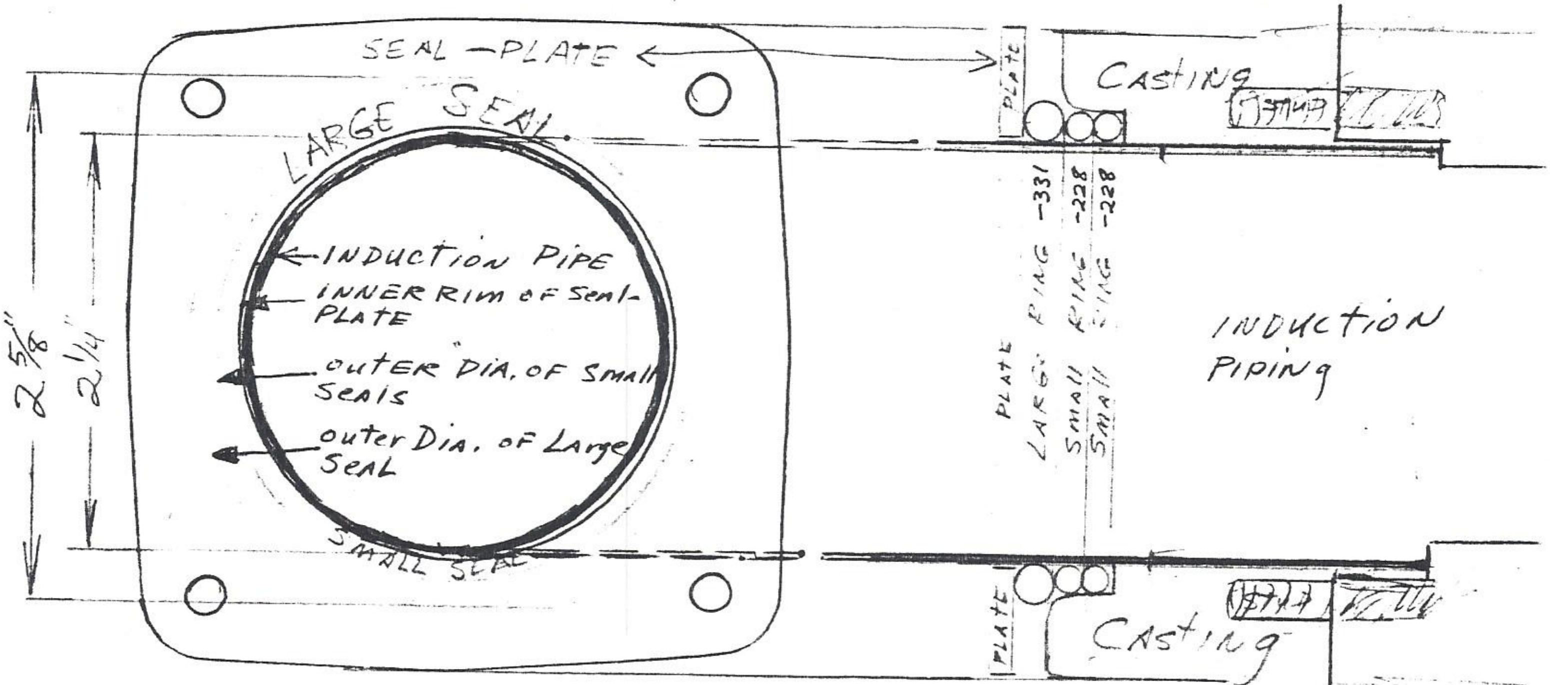
Main body Milled out of 6061-T3 Aluminum

P-
APR 29 '86

ALTERNATE
INDUCTION SYSTEM SEALS
B9F — B8F

These Seals ARE IN PLACE OF THE ORIGINAL FLAT TYPES USED BY FRANKLIN on the Induction System.

IF THESE ARE INSTALLED in the order Shown, And Coated with Dow-Corning Silicon Sealant of the type used on Bath tubs, windows, Auto Seals, etc, you will HAVE AN Air-Leak-Proof Joint, Double Sealed by Mechanical Pressure on THE "O" RINGS And The Sealant.



CROSS-SEC. SIDE - VIEW

SMALL "O" RINGS - 228 SIZE

1/8" Section Diameter

2 1/4" Inside Diameter

2 1/2" Outside DIAMETER

LARGE "O" RINGS - 331 SIZE

3/16" Section DIAMETER

2 1/4" INSIDE DIAMETER

2 5/8" Outside DIAMETER