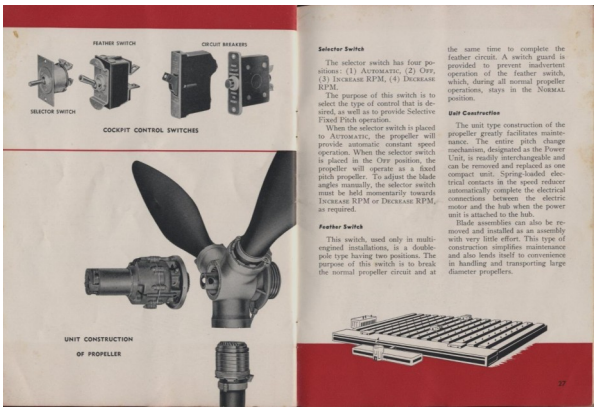
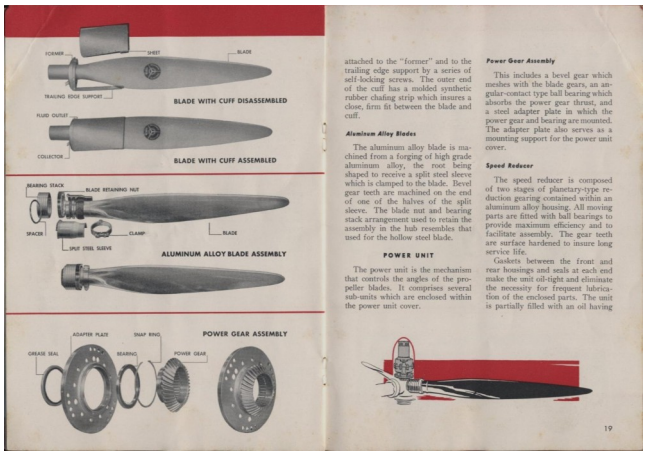
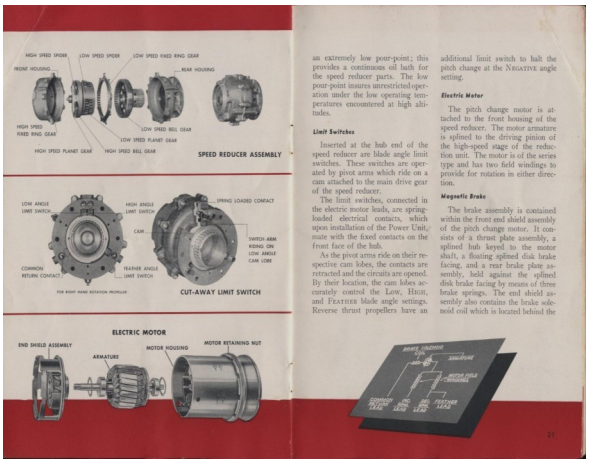
PPM pictures, sketches and notes

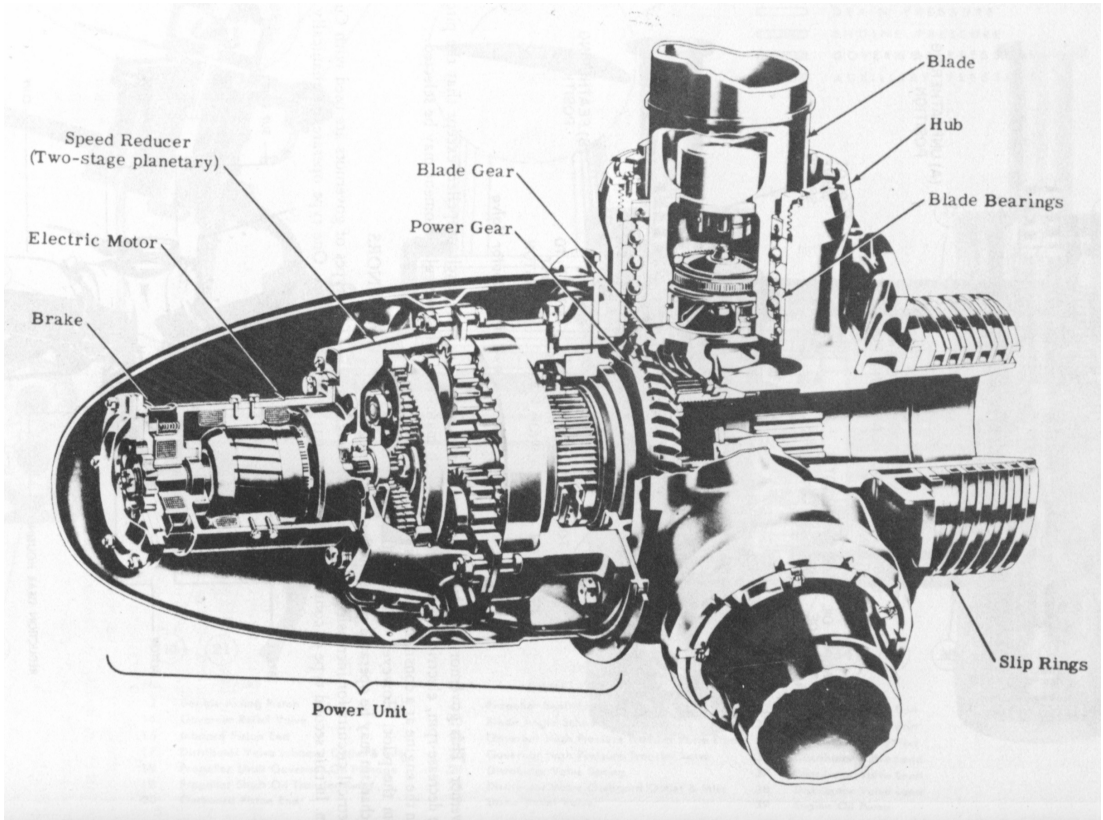
ZS6P/ ZS1J



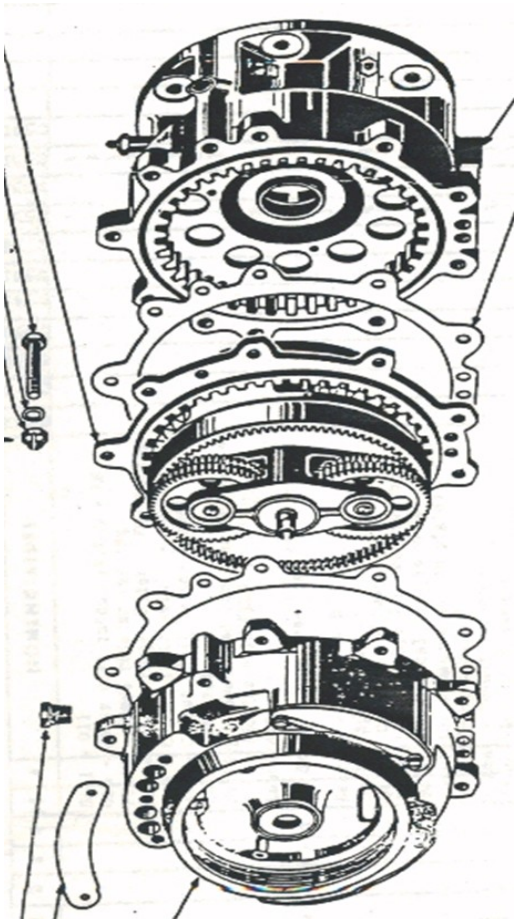




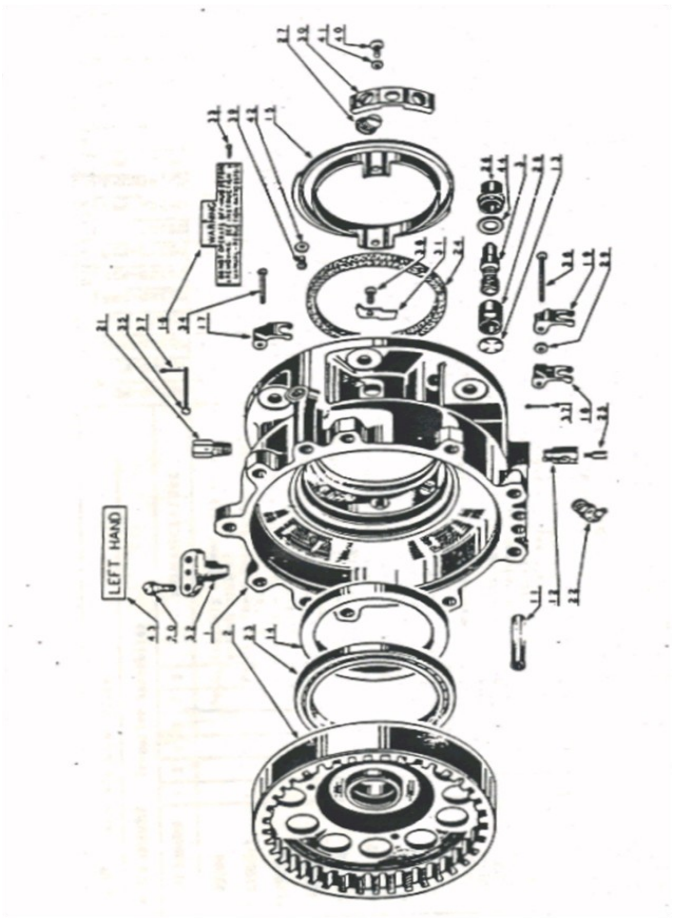
Illustrations from a 1943 Curtis flyer



Longitudal cross section of the assembly



High speed reducer assembly
This is an early model without jacks in the housing for power connections to the motor.



Rear housing assembly

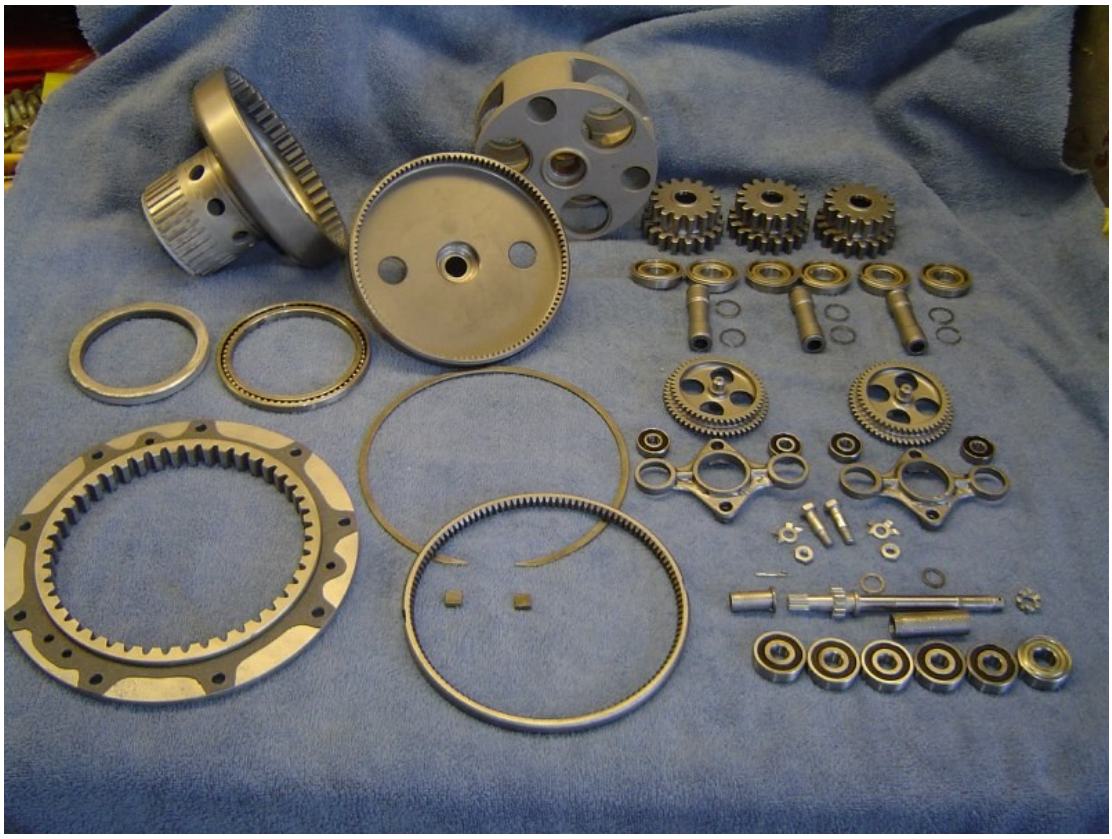
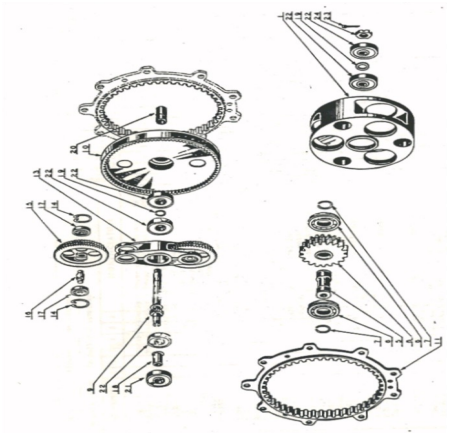


Photo taken from K6NV's website showing the gear train components.

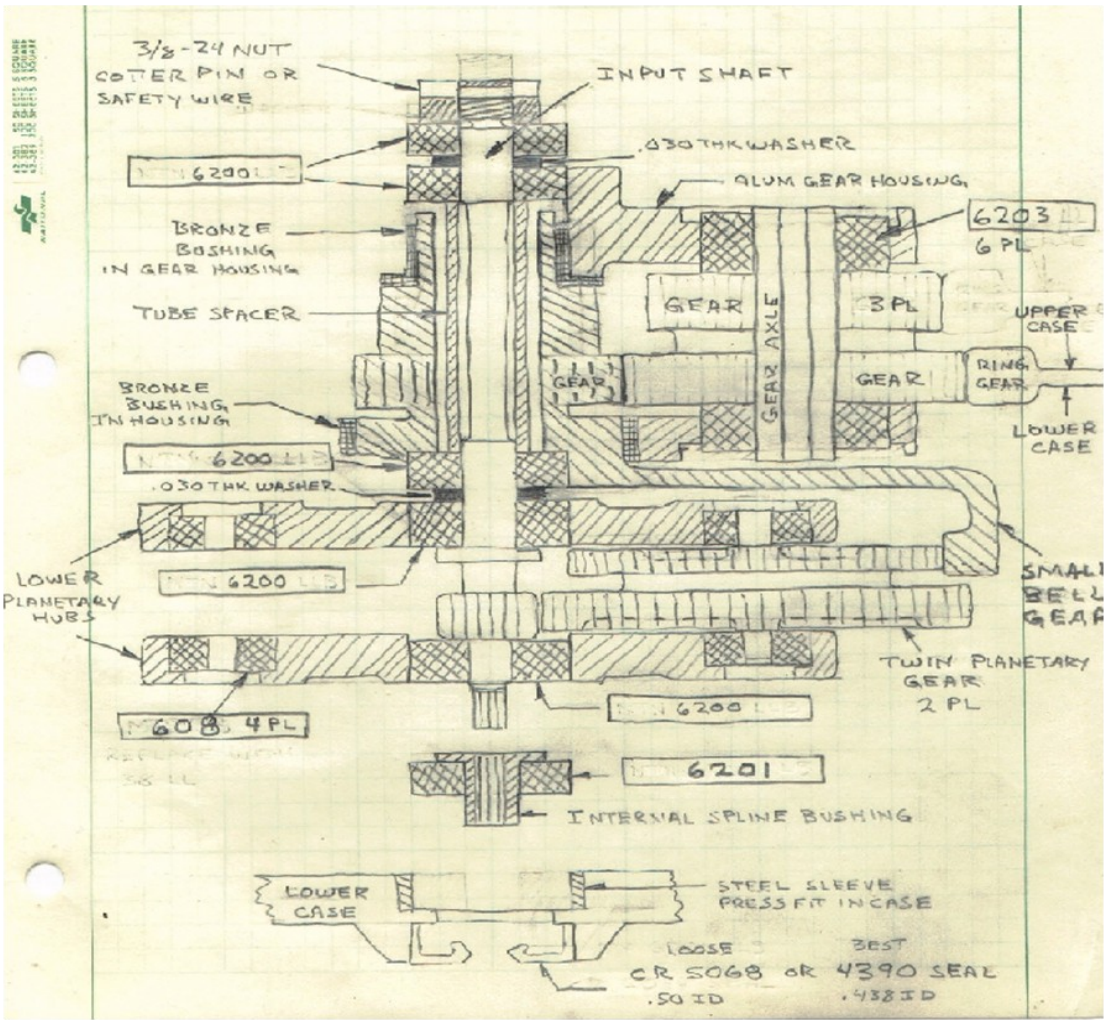


The Gear Train

The small, medium and large prop pitch units all use the same dual epicyclical (planetary) gear train configuration. Each of the two planetary systems, one high speed and one low speed, produce several gear reductions. This is a rather clever design producing a 9576:1 gear reduction in a very robust but small package for the torque it can produce when compared to the most common amateur antenna rotators.

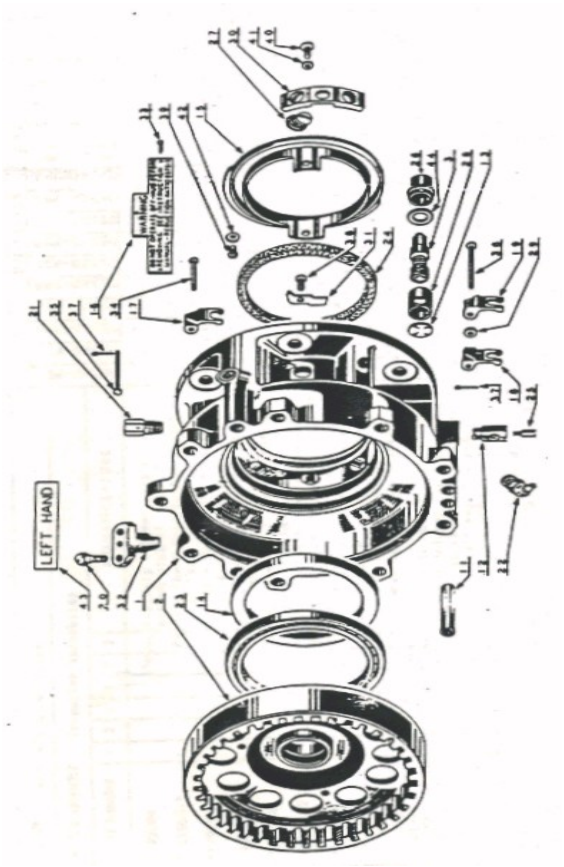
Early model gear train

The later ones have the same basic configuration. The early ones had a high speed planetary carrier that was one piece, machined out of aluminium. The later ones have a two piece carrier made out of forged steel. The drive shaft on the earlier ones had a slot at the motor connection end for the spade drive on the motor (like a flat blade screwdriver) .The later versions used a splined connection. The axles for the two high speed planetary gears on the early models were removable shafts, on the later ones the axles were integral with the gears. The tube spacer, #20, measures 45,3 x 14,3 x 10,3 mm.



Cross section of the gear train without the top bell gear with splined tube

Note: The reference to the 6203 bearings, #24, in the low speed planetary carrier does not mean that standard 6203 bearings will fit. The standard bearings are too thick and do not have a retaining ring groove. However the ID and OD of the special bearings that are in the carrier are the same.

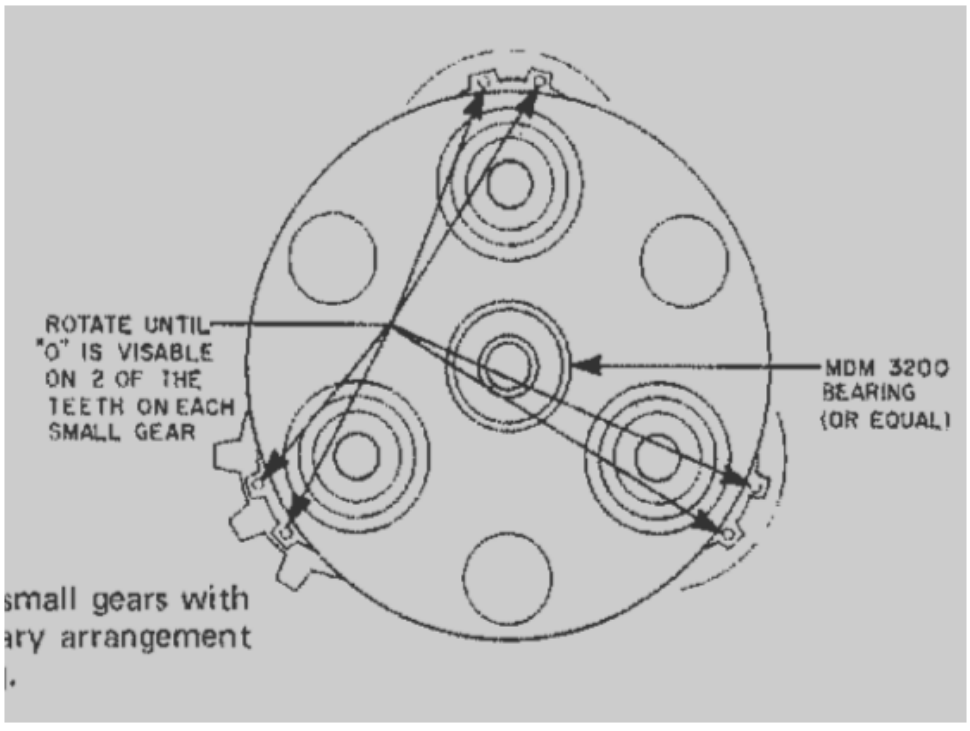


Before you can disassemble the gearbox:

1. Remove welded-on protrusions, such as shown above

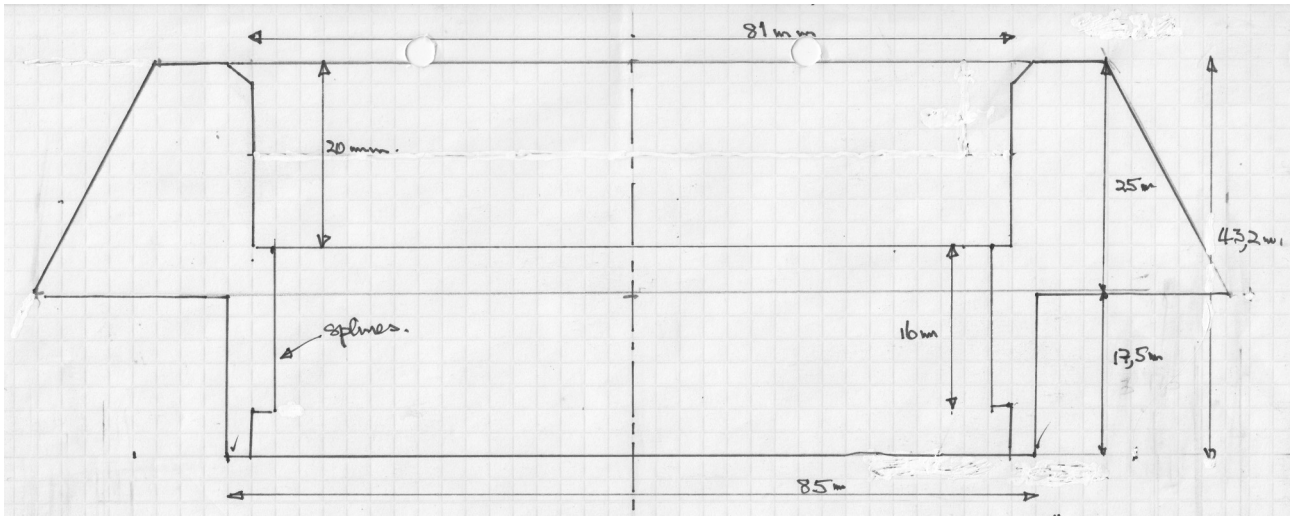
2. Remove the cam (rectangle with 3 holes) that is also shown at the top left. The 3 screws are accessible through an opening in the front housing. If rusted they will have to be drilled out.

When assembling the PPM, the illustration below, from an article in the August 1971 QST edition, is of utmost importance as there is no way that you will be able to assemble the unit unless you follow this critical instruction.



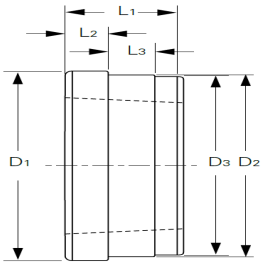
Low speed planetary assembly with the three gears properly aligned before sliding it onto the high speed planetary bell gear shaft.

Bevel gear modification for 6817-2RS bearing



Machine the lower part of the bevel gear to 81 mm OD with a 17,5 mm step.

Fenner WH-20 weld on hub (sri. no WH-20 picture available!)



D1 95 mm L1 32 mm

D2 90 mm L2 12 mm

D3 89,5 mm L3 12 mm

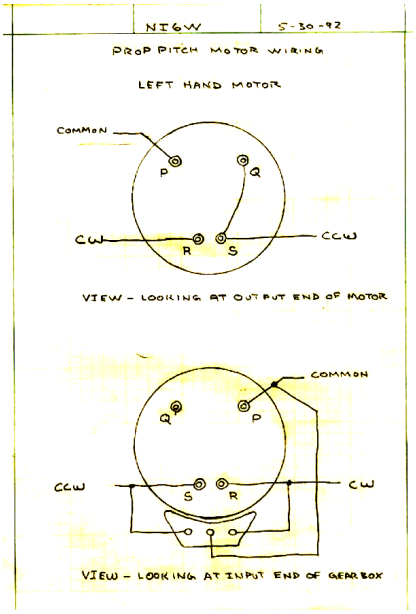
Machine the lower part of the hub so that D1 and D2 are about 81 mm, depending on whether you had machined the inside of the bevel gear, for a press fit.

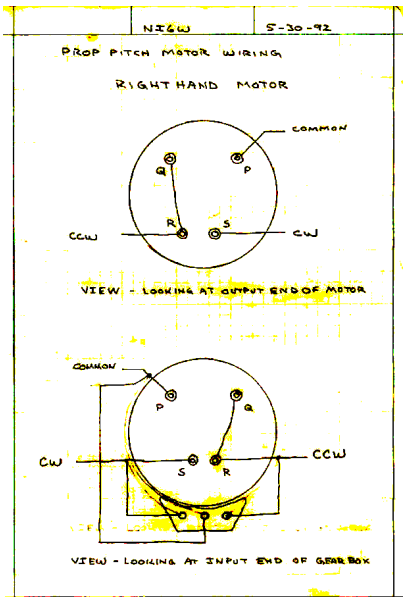
Small prop pitch motor wiring diagrams

The 24V DC motor has two sets of field windings to reverse direction. A single common terminal is used for the negative power lead.

The motors are not all the same. Some are Right handed, and others are Left handed. The pins on the motor that connect to the jacks in the input end of the gearbox are the same physical pattern, but different pins/jacks must be used for the common lead with each type of motor.

These sketches by NI6W show how the Right & Left hand small prop pitch motors need to be wired. The pins on the motor are marked P, Q, R, & S. The "P" terminal is always the common.





It is only necessary to measure the resistance between the 4 pins — Q and S will show no resistance on the LH motor and ditto for Q and R on a RH motor. The P terminal is always the common. CW and CCW identification is not important as you can always later swop the wires at the controller itself.