

Larry Morgan
503-404-5508

VARI-PROP

BY

PITCH CONTROL SYSTEMS LLC

INSTALLATION HANDBOOK
for the
VARIABLE PITCH/CONSTANT
SPEED AIRCRAFT
PROPELLER SYSTEM

IMPORTANT

**CAREFULLY READ THIS ENTIRE
HANDBOOK BEFORE INSTALLING
YOUR AIRCRAFT PROPELLER
SYSTEM**

Pitch Control Systems LLC, an Oregon Limited Liability Company
12505 SW North Dakota Ave# 105, Tigard, OR 97223

lmorgan724@Yahoo.com

INSTALLATION HANDBOOK
for the
VARI-PPROP AIRCRAFT VARIABLE PITCH
PROPELLER SYSTEM

PATENT NUMBERS : 4,362,497; 6,478,542

PUBLICATION NUMBER VP 001

ISSUE No. 01

VARI-PROP PROPELLER SYSTEM, TIGARD, OREGON

VARI-PROP AIRCRAFT PROPELLER INSTALLATION HANDBOOK
PAGE TWO

1:0 REGISTRATION OF VARI-PROP AIRCRAFT PROPELLER SYSTEM

OWNER'S NAME Kelly T. Landrum
1244 N. Tenny's Bridge Road
Halifax, Va. 24558
TELEPHONE NUMBER 434 572 1889
EMAIL Kmradul@pure.net
VARI-PROP MODEL NUMBER VPI
PROPELLER SERIAL NUMBER
CONTROL UNIT SERIAL NUMBER PCS001 Rev B
ELECTRONIC CONTROL UNIT SERIAL NUMBER.....
ENGINE MAKE AND TYPE 2.5L EG25 Subaru
MAXIMUM RPM 5600
MAXIMUM RATED B.H.P.@ RPM 165 15600
INSTALLATION: TRACTOR ☒ PUSHER.....
ENGINE ROTATION RH
DATE OF RECEIPT 1-12-10
DATE OF INSTALLATION.....

RECOMMENDED LUBRICANTS

BEARINGS:

HYDRAULIC FLUID: MIL 5606

PLEASE RETURN THIS REGISTRATION FORM PROMPTLY TO: Pitch Control
systems ,LLC 12505 SW North Dakota Ave #105, Tigard, OR 97223 Phone: 503-804-5508

2:0 INTRODUCTION

The Vari-Prop Aircraft Propeller System is an operator controlled system that has been designed, developed, and manufactured for the experimental aircraft industry. It has been designed for installation, use, and operation on direct drive and geared aircraft engines in the 80 – 450 HP range.

The Vari-Prop Aircraft Propeller System is supplied in either a right hand or left hand turn engine configuration.

This handbook provides the installation guidance for builders and owners of experimental and light sport aircraft. In the event that a repair or replacement of any part or component becomes necessary, the owner should contact the Vari-Prop Propeller factory.

The descriptions and specifications contained herein are correct at the time of issue.

Pitch Control Systems LLC policy is to continuously improve the product. PCS LLC reserves the right, at any time without liability, to discontinue the Vari-Prop Aircraft Propeller Systems or to change the specifications or designs without notice.

3:0 SAFETY

Throughout this handbook, all instructional and cautionary notes should be observed during the installation, operating, servicing and maintenance of the Vari-Prop Aircraft Propeller system.

Make sure IGNITION switches are **off** and keys are removed before working on any part of the propeller or its associated equipment.

No attempt should be made to clean or make adjustments when the engine is running.

PROPELLERS ARE DANGEROUS. Keep clear when starting or running the engine and do not start the engine without first making certain that there are no loose objects, tools, hoses, etc., which can get caught in the propeller.

A clean working area is essential when servicing the unit, especially to avoid foreign matter from getting into the hydraulic system. This could cause the propeller unit to malfunction.

4:0 VARI-PROP NUMBERING SYSTEM

This paragraph explains the Vari-Prop Aircraft numerical model identification system.

It is possible to determine the important features of the Vari-Prop Aircraft Propeller system by studying the model number. This is how it works:

EXAMPLE: VP1 3 72 H R

The first three digits indicate that it is a Vari-Prop Aircraft Propeller system in the 80 – 140HP range

The first digit after the hyphen indicates the number of blades

The next two digits after the hyphen indicates the Length of the prop displayed in inches

The next letter indicates the drive type: H for hydraulic, GA for ground adjustable.

The next digit indicates left or right hand rotation as if sitting in the cockpit.

5:0 VARI-PPROP SERIAL NUMBERING SYSTEM

This paragraph explains the Vari-Prop Aircraft Propeller numerical serial numbering system.

It is possible by the serial number to determine the size of the propeller system, the date of shipping, the serial number, and the number shipped that day

EXAMPLE: VP2 00001 010106 2

The first three digits indicate the size of the propeller.

The second digits indicate the chronological number,

The next digits the date of shipping, and

The last digit(s) the sequential number of the propellers shipped that day.

6:0 DESCRIPTION AND FUNCTION OF SYSTEM

The Vari-Prop Aircraft Hydraulic Propeller System is comprised of four component groups:

1. The propeller hub assembly including the blades and the hydraulic operating mechanism.
2. The propeller controller and hydraulic reservoir with the electric drive motor, and computer board.
2. The cockpit control including the knob, indicator lights, and the operating encoder
3. The connecting hydraulic fluid lines and joining unions.

Together, these groups make up an infinitely-controllable pitch propeller system, which does not require any alteration to the engine or other aircraft systems.

The system functions by the displacement of hydraulic fluid. This displacement is controlled by the operator from an electronic controller located in the cockpit area. The “Master Cylinder” displaces fluid to the propeller hub which causes the propeller blades to change pitch as desired. It is COMPLETELY INDEPENDENT of all other aircraft systems.

The hydraulic piston within the control unit has a 3.75 to 1 hydraulic advantage over the hydraulic cylinder in the propeller hub. It also has the mechanical advantage of the lead screw and nut. The lead screw and motor gears take the thrust loads. This allows the motor to precisely adjust the propeller system with a comfortable turning pressure up to the propeller’s maximum rated RPM

The system will remain set in any automatically or manually chosen position without creeping.

6:0 DESCRIPTION AND FUNCTION OF SYSTEM (Con't)

A spring in the propeller hub and the over pitching moment of the blades while in motion maintain pressure on the hydraulic system. The propeller blade pitching moment (loads) adds to the spring force when the propeller is in rotation, tending to reduce the pitch. The propeller blades are controlled by balancing the blade pitching moments and hub spring compression force against the hydraulic pressure within the control system.

The blade aerodynamic loads are transmitted to the actuator through each blade shank pin to the spool. The spool turns with the hub. The hydraulic piston pushes on the spool when the transfer of hydraulic fluid takes place from the control to the hydraulic cylinder in the propeller hub. The blade aerodynamic loads are absorbed by a needle bearing between the spool hydraulic piston. The cylinder and piston do not rotate with the propeller hub during operation. The propeller shaft itself rotates through the "Slave Cylinder" on a bearing located at the rear of the hydraulic cylinder against the hub flange. hydraulic cylinder is kept from rotating by the slave cylinder anti-torque fitting captured by a bracket that is secured to the engine.

As the hydraulic system operates at moderate pressure, stainless steel braided hydraulic hose, tubing, and fittings must be used. This will protect the fluids from engine compartment heat. If proper installation procedures are followed, there should be no problem with heat or leakage associated with the hydraulic lines.