HARTZELL PROPELLER INC.
STC SA377CH

PILATUS PORTER MODEL PC-6/B1-H2, B2-H2 & B2-H4
4 BLADE HARTZELL PROPELLER CONVERSION

INSTALLATION INSTRUCTIONS
PC6-4BLD-II Revision D

FAA Approved _____ Date 9/28/15
PAGES 1 THROUGH 16

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PC6-4BLD-II Rev D
LOG OF REVISIONS

Note: Revisions are denoted by a vertical line in the left margin.

Revision No.	Pages Affected	Description	Date
A	2, 10	Blade angle tolerances, active page and revision log added	7-31 1995
B	1	Incorporated Woodward 210577U governor on B1-H2 aircraft (item 4).	7-7 2000
B	1	Incorporated PWC SB 1582 on B2-H2 and B2-H4 aircraft (items 5 & 6).	7-7 2000
B	1	Added requirement to install Pilatus guide pins on B1-H2 aircraft (item 7).	7-7 2000
B	3	Section 5.1.2. Added clarification "With PCL at idle detent " and "set as close as spline pitch allows" (2 pl).	7-7 2000
B	4	Section 5.1.2. Changed cable travel measurement and tolerance.	7-7 2000
B	7	Section 8.5. Changed reverse power check from torque values to RPM values.	7-7 2000
C	All	Created cover page, moved revision page to Page 2 and re-paginated entire document. Added reference to dynamic balancing procedure on page 11.	9-18 2015
D	1,2,4	Added reference to Hartzell Owner's Manual 149 on page 4.	9-24 2015

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PILATUS PORTER MODEL PC-6/B1-H2, B2-H2 & B2-H4
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INSTALLATION INSTRUCTIONS
PC6-4BLD-II Rev C

INTRODUCTION

The replacement of the original three blade propeller by a Hartzell, HC-D4N-3P/D9511F(K)/D-630, four blade propeller assembly is performed as described in the following installation instructions.

The installations instructions describe the basic procedures and the specific adjustments and settings for the individual aircraft models and engine installations.

AIRCRAFT PREPARATION

1. Remove the original three-blade propeller installation from the aircraft.

2. Incorporate Pratt & Whitney PT6A Engine Service Bulletin 1509 to modify the PT6A-20 or -27 engine to the standard required for the new propeller installation.

3. B2-H2 and B2-H4 aircraft only: Remove the Q-STOL installation if equipped per Pilatus Service Bulletin 121.

4. B1-H2 aircraft (PT6A-20 engine): Remove existing governor and replace with Woodward governor P/N 210577U.

5. B2-H2 aircraft (PT6A-27 engine): Incorporate Pratt & Whitney Canada Service Bulletin 1582 for installation of Woodward governor P/N 8210-412.

6. OPTIONAL: B2-H4 aircraft (PT6A-27 engine): Incorporate Pratt & Whitney Canada Service Bulletin 1582 for installation of Woodward governor P/N 8210-412.

7. B1-H2 aircraft only (PT6A-20 engine): Remove existing reversing lever guide pins from forward gearbox. Install new guide pins, Pilatus part number 190.00.06.086A and 190.00.06.087A, as shown in figure AA.

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PROPELLER AND SPINNER INSTALLATION

1. Install the new four blade propeller in accordance with the installation procedures in Hartzell Owner's Manual 149.

   Propeller blade angles for the propeller are as follows:
   Pitch settings at 30" station:

   Fine Pitch 20.5° +0.10°
   Reverse -11.0° +1.5°,-0.0°
   Feathering 86.1° +0.5°

2. Install the D-630P spinner assembly in the reverse order of the removal instructions as presented in the Aircraft Maintenance Manual. Hartzell Owners Manual 149 may also be consulted.

3. Modification of the engine by P&WC SB 1509 replaced the propeller control cam. New P&WC part number is 3119347-01.

   Connect the beta cable as follows:

   PC-6/B1-H2 & B2-H4: Second hole from top
   PC-6/B2-H2: Top hole

4. Modify the existing propeller tachometer as required to:

   1. Incorporate a "RED ARC" between the following limits:
      PC-6/B1-H2 20% to 48%
      PC-6/B2-H2, -H4 440 to 1056 rpm.
      (20% to 48% for Fairchild built a/c)

   2. "RED RADIAL" limit at the following value:
      PC-6/B1-H2 100%
      PC-6/B2-H2 2200 rpm
      (100% for Fairchild built a/c)
      PC-6/B2-H4 2025 rpm

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5. Powerplant Rigging and Adjustment

The current aircraft maintenance/service manual, AMM, procedures are modified by the following procedures.

For B1-H2	AMM, Chapter 76-10-00 Sections 5.6 & 5.7
For B2-H2 & H4	AMM No. 01975, Chapters 76-10-00 & 71-00-00

5.1 Beta Control Rigging

5.1.1 Front end rigging - No change

5.1.2 Rear End Rigging

Move the propeller control cam to the maximum position. Disconnect the PCL cable from the input lever on the engine. Adjust the maximum forward and reverse screws on the cockpit quadrant (not in all aircraft) to give the greatest travel. Adjust the PCL cable if necessary (spherical bearing or clamp) so that full PCL travel can be achieved.

B1-H2 (-20 engine):
Adjust the "Z" gap at the beta valve to 2.11mm as shown in Figure A.

B2-H2, B2-H4 (-27 Engine):
While the Beta valve is flush, Figure B, adjust beta cable terminal stop (100) to contact low pitch adjuster (280A) as shown in Figure C.

Move the input lever at the cam box to the maximum position. Connect the beta cable to the propeller control cam as follows:

PC-6/B1-H2 & B2-H4	Second hole from top
PC-6/B2-H2	Top hole

Adjust the rear end rod to install the bolt.

With the PCL at the idle detent, retard the input lever to the knee (pickup) at the idle detent in the propeller control cam slot, Figure D. Adjust the input lever to an angle, forward of the vertical, Figure E, as follows:

B1-H2 & B2-H2:	10° (set as close as spline pitch allows)
B2-H4:	5° (set as close as spline pitch allows)

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Connect the power control cable to the bottom hole on the input lever. At this position (knee, Figure D, at the propeller control cam) the PCL should be forward of the idle detent as follows:

B1-H2, B2-H2 & B2-H4: 24mm to 25 mm (cable travel)

Push the PCL to the maximum power position and measure the position of the beta cable, forward or rear end. Mark the cable with a piece of masking tape. Retard the PCL to the idle detent. The beta cable should be retarded by:

B1-H2 : 4.0 to 4.5mm
B2-H2 : 5.6 to 6.1mm
B2-H4 : 4.5 to 5.0mm

Note: This dimension defines the minimum pitch in flight.

Adjust the power control cable length, with the clevis/spherical bearing/clamp, or input lever position accordingly. If the input lever position is changed, repeat all steps of Section 5.1.2.

Set the PCL to the idle detent. Disconnect the FCU control rod. Adjust the FCU pick-up point as described in the AMM:

(a) Rotate the FCU arm (17) fully counter clockwise, Figure F.

(b) Slowly rotate the FCU arm clockwise until resistance is felt. This is the FCU pick up point.

(c) Check that the FCU arm is approximately parallel to the engine axis. Adjust the position of the arm by the serrated spacer (21) on the shaft if necessary.

(d) Turn the arm counter-clockwise by approximately 2°.

(e) Adjust the FCU control rod (19) to align the attachment holes and install the bolt, nut and washer.

Adjust the idle deadband adjustment bolt to give the following gap between the idle deadband adjustment bolt and the cam follower with the PCL in the idle detent, see Figure G.

B1-H2 & B2-H2: 3.0mm
B2-H4: 5.5mm

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Adjust the maximum forward and reverse PCL position as described in the AMM and Figure H.

(a) Disconnect the Beta cable.

(b) Move the PCL to maximum reverse and then to maximum power.

Check that the Ng maximum stop (16) is contacted in both positions. Adjust the position of the FCU arm (19) on the shaft if necessary.

(c) Move the PCL to maximum reverse and check that the FCU control rod (17) does not touch the FCU arm extension (18).

(d) Reconnect the Beta cable.

Starter Control Rigging - B2 models only.

Rigging is as described in the AMM except that the gap on the starting control rod between the two parts of the rod, with the condition lever at low idle is (Figure I):

B2-H2: 10mm
B2-H4: 32mm
(Note: PCL is at idle setting)

6. Install cockpit placards. Placards part numbers as listed below or equivalent with wording as defined in the Aircraft Flight Manual supplement for the specific aircraft model.

B1-H2: Pilatus Aircraft P/N 110.71.06.289 (Np in %)
B2-H2, B2-H4: Pilatus Aircraft P/N 110.71.06.288 (Np in rpm)

7. Update aircraft weight and balance records to reflect removed and installed equipment or reweigh the aircraft if necessary.
The following weight and moment data apply to the 4 blade propeller:

4-Blade propeller, No de-ice.	Weight 129.6 lbs Balance arm -13.2"
De-ice (if installed):	Weight 3.3 lbs Balance arm -13.2"

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Spinner (D-630): Weight 10.3 lbs
Balance arm -18.9"

Note: Balance arm datum is 118.11" fwd. of wing leading edge.

8. Conduct engine ground run in accordance with standard AMM procedures except as modified by the following instructions.

8.1 Low Speed Idle

Adjust the low speed idle to:
B1-H2 & B2-H2: 51.5 to 53.5% Ng
B2-H4 : 52.5 to 54.5% Ng

This setting should give a propeller speed of approximately 1100 rpm ±40 rpm with the PCL at the idle detent. If not check the beta cable travel from PCL at idle detent to maximum power. Minimum propeller speed is 1056 rpm / 48%.

8.2 Propeller Speed

Adjust the maximum stop on the CSU and the maximum stop detent in the cockpit to give the following propeller speeds:

B1-H2: 99.5% to 100% max./ 87% to 88% min.
B2-H2: 2189 to 2200 rpm max./1914 to 1936 rpm min.
For Fairchild built a/c
99.5% to 100% max./ 87% to 88% min.
B2-H4: 1980 to 2000 rpm max./1800 to 1820 rpm min.

Note: It may not be possible to obtain 100% rpm with the aircraft stationary. 100% rpm should be obtained during takeoff run.

8.3 High Speed Idle

The high speed idle is adjusted by this check. The minimum pitch in flight is set by the beta control cable travel with the PCL at the idle detent.

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Set the PCL to the idle detent and select high idle with the condition lever. Set the propeller control to maximum. Do not disconnect anything on the engine. Adjust the high idle to give:

B1-H2 : 74 to 75% (high idle stop on FCU)
B2-H2 : 72 to 73% (the starting control rod length)
B2-H4 : 68 to 69% (the starting control rod length)

8.4 Powerplant Control Rigging

This is a new procedure to check the idle deadband and reverse pick-up adjustment. Set the condition lever to low idle. Set the propeller control to maximum. Move the PCL slowly forward. There should be a dead band of approximately 1mm before Ng begins to pick-up. If this is not correct readjust the idle pick-up on the FCU control rod.

Retard the PCL slowly into reverse. The propeller speed should reach a peak just before the Ng begins to pick up again. If this is not correct adjust the deadband adjusting bolt. If the Ng pickup is too far after the Np peak, maximum reverse may not be achieved.

8.5 Reverse Power Setting

The reverse power ground run check shall be performed per the AMM without recording of the reverse torque. The only applicable target value shall be the propeller RPM tolerance band as follows:

PC-6/B1-H2: 93% to 95%
PC-6/B2-H2: 2046 to 2090 RPM, or, 93% to 95%
PC-6/B2-H4: 1880 to 1925 RPM

9. Complete FAA form 337 showing installation of the subject STC to return the aircraft to service. File a copy of this FAA 337 form and the STC in the aircraft's records. Include Aircraft Flight Manual Supplement with current aircraft Flight Manual. AFM Supplement to contain those pages as applicable to the aircraft model. AFM pages related to other approved aircraft installations may be stored with the aircraft records.

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INSTALLATION FLIGHT CHECK

The following flight check of the installation shall be performed to confirm the normal and proper operation of the four blade propeller installation.

1. Rate of Descent

Determine the rate of descent for the following power and airspeed conditions and compare with the values as listed in the following table:

(a) Altitude: below 10,000 ft
(b) Power Control Lever at idle detent.
(c) Condition lever set for high idle
(d) Propeller control at maximum
(e) Full flaps down, 38°

Aircraft Model	Weight lbs.	Airspeed kts	Rate of Descent ft/min ± 50fpm target	test
B1-H2 & B2-H2	<3960	60 70	1400 1900	
	>4400	59($1.3V_{so}$) 70	1300 1850	
B2-H4	<3960	60 70	1300 1800	
	>5720	60 68($1.3V_{so}$)	1200 1450	

If the rate of descent is too high then the minimum in flight pitch is too low. Reduce the travel of the beta control cable with the PCL at idle detent, See Installation Instruction section 5.1.2. Do not adjust the fine pitch stops on the propeller.

2. "Beta" Descent

Below 10,000 ft the engine should enter "beta" range (Np coming off speed) below 120 KIAS, approximately, with the propeller control set to maximum.

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A "beta" descent (at minimum in flight pitch) should be possible below 10,000 ft up to an aircraft speed of 135 KIAS with the propeller control set to maximum, and up to 115 KIAS with the propeller control set to minimum. In this condition the Ng governor is reducing engine power to keep the propeller at underspeed.

NOTE: With the B1-H2 there is no "beta" descent possible with reduced propeller speed. Above 85 KIAS the propeller goes into constant speed range. With reduced propeller speed the PCL must not be retarded over the idle detent.

3. Dynamic Balancing

Dynamic is recommended but not required. If dynamic balancing is performed, it should be done in accordance with Hartzell Propeller Owner's Manual 149.

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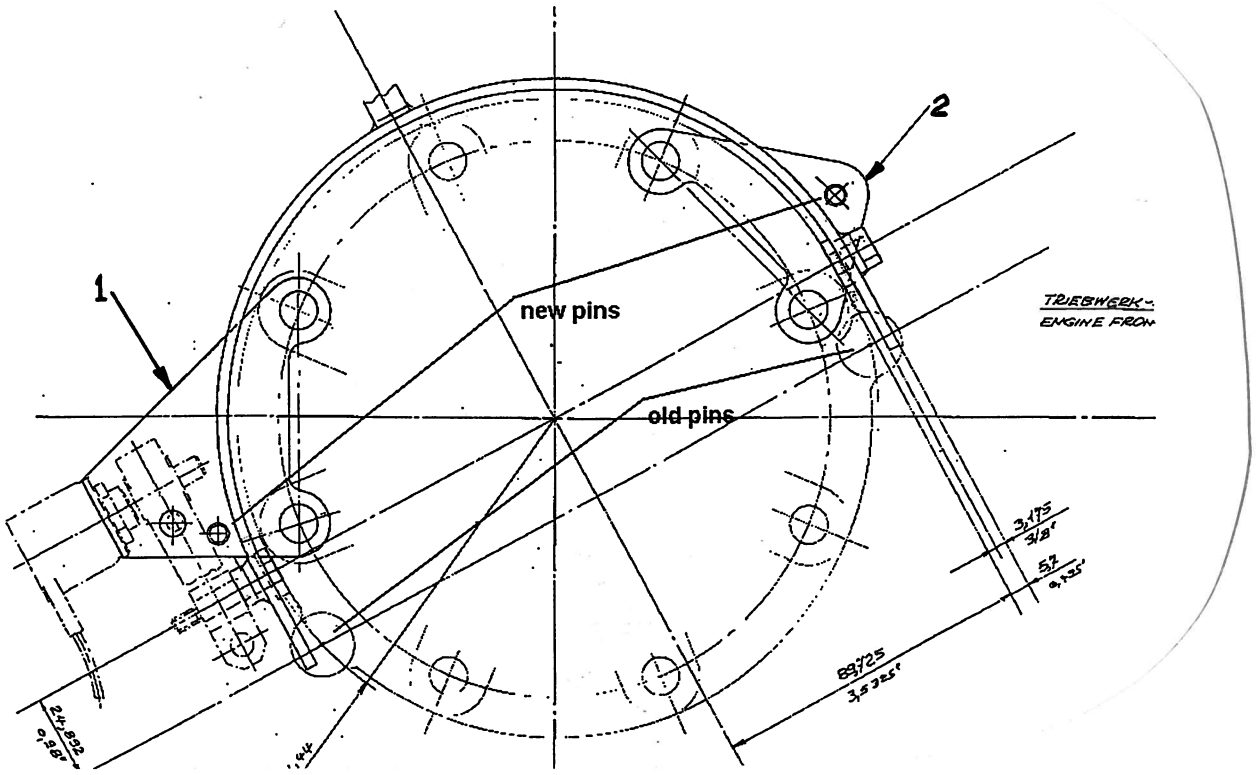
190.00.06.086A, Item 1

190.00.06.087A, Item 2



New Guide Pin Locations for PC-6/B1-H2 Aircraft Only (PT6A-20 Engine)

Forward looking aft – propeller flange not shown

FIGURE AA

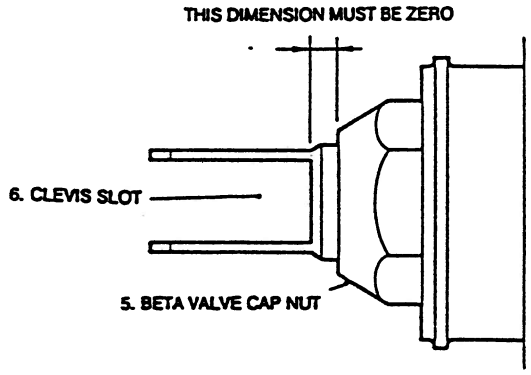


FIGURE B

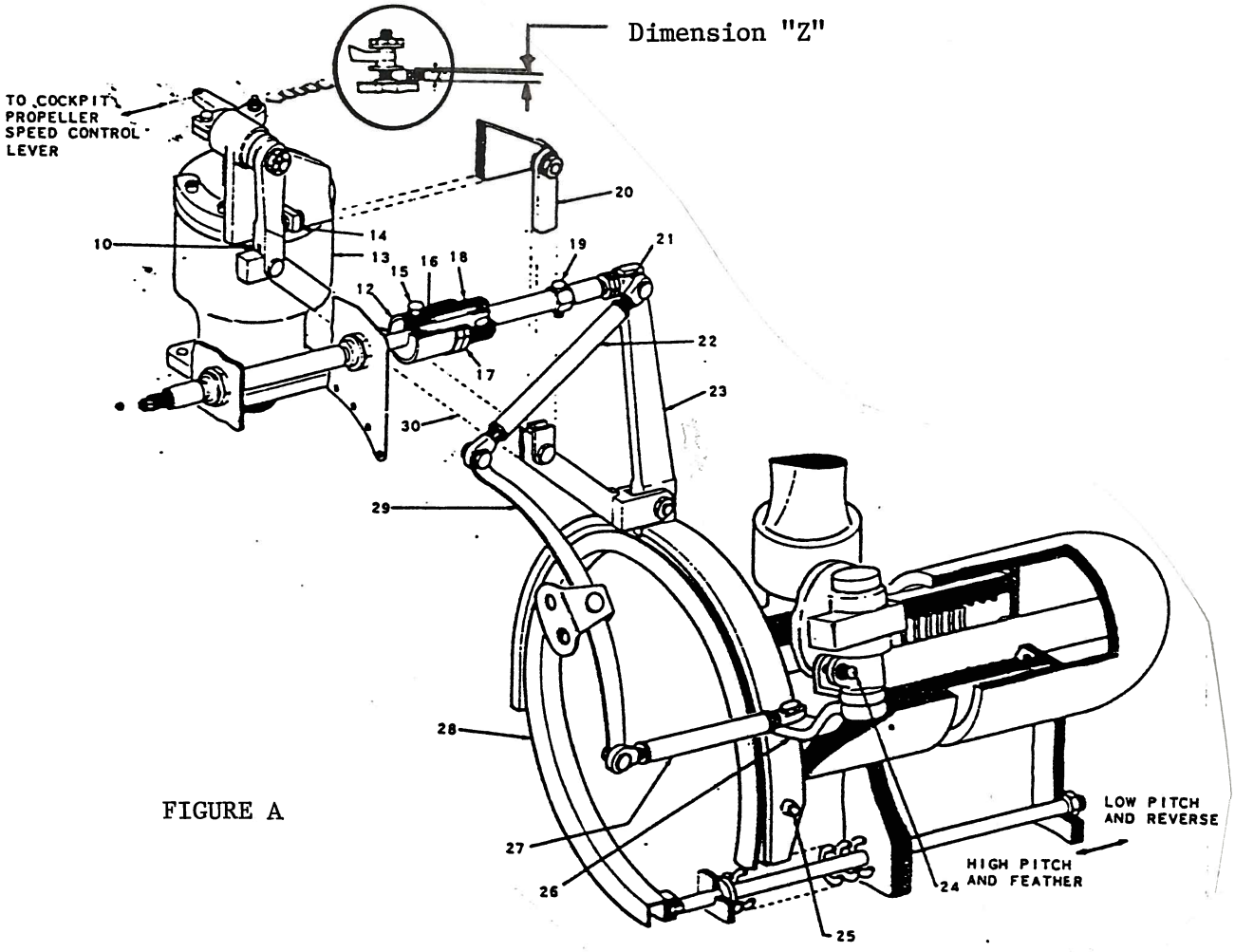
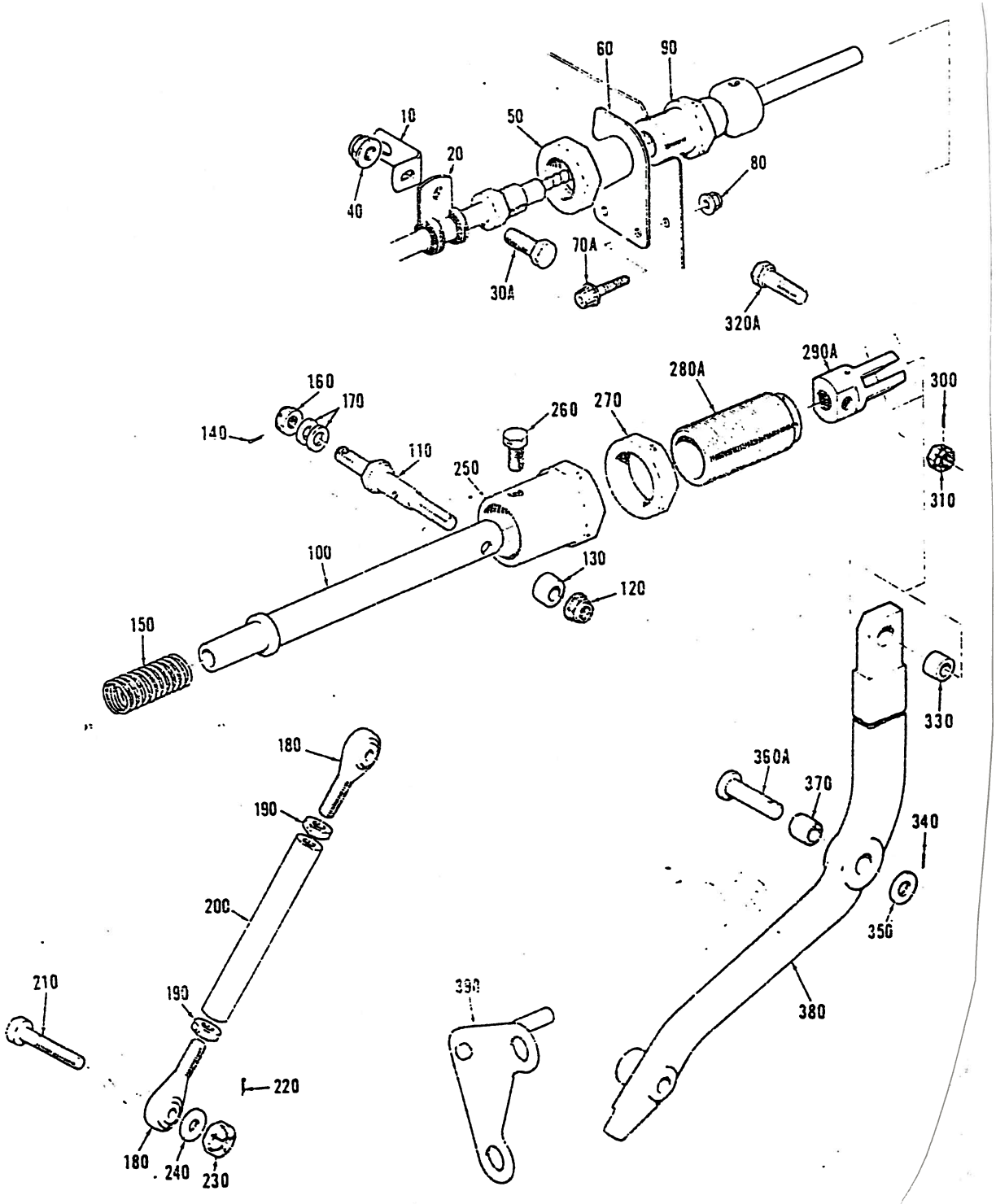


FIGURE A



Propeller Reversing Interconnect Linkage Group (Front)

FIGURE C

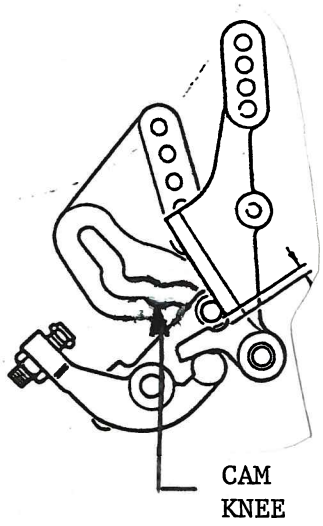


FIGURE D

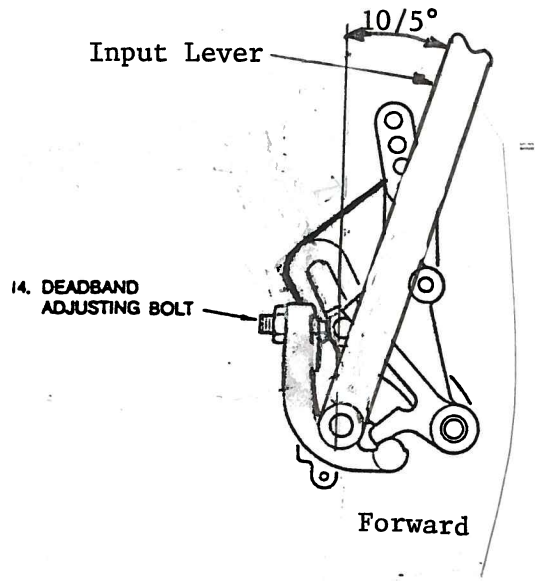


FIGURE E

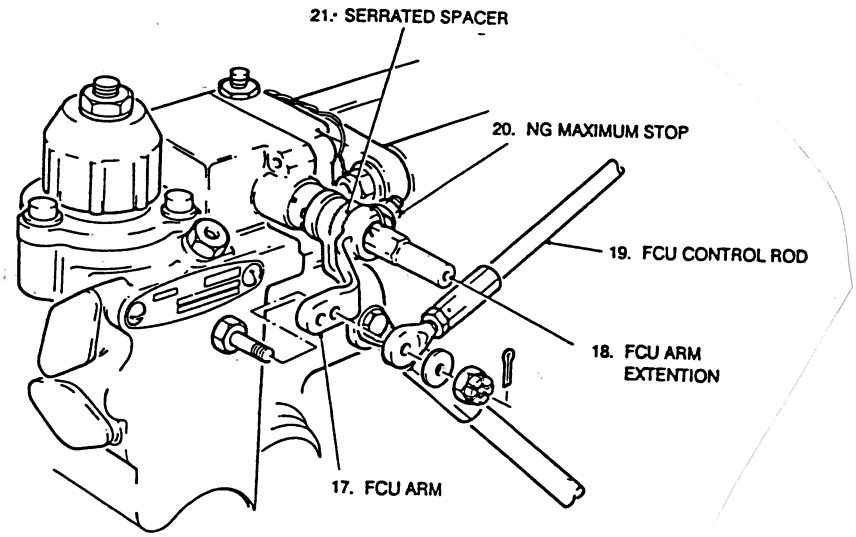
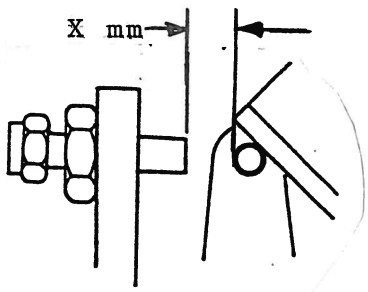


FIGURE F



DEADBAND ADJUSTMENT

FIGURE G

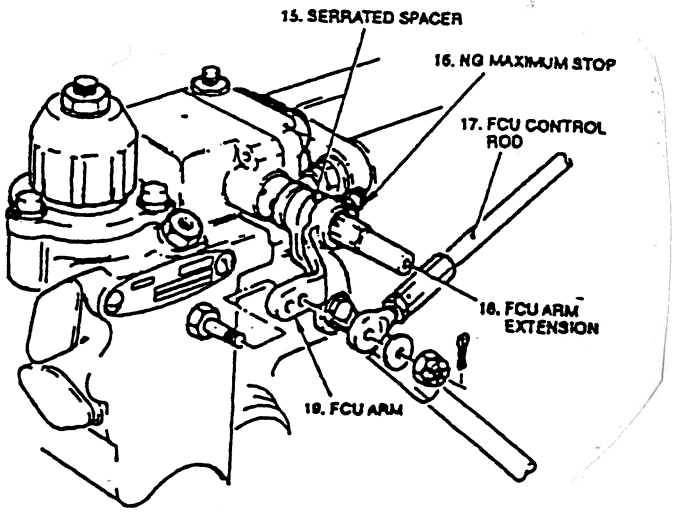
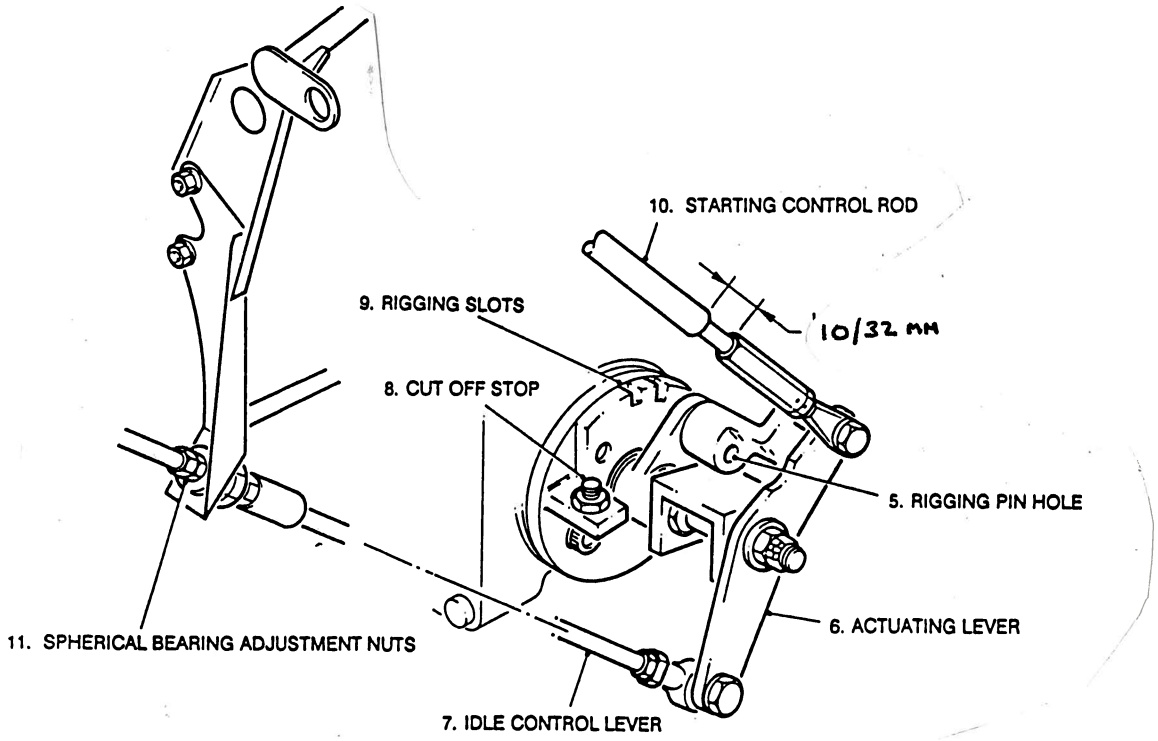


FIGURE H



Idle Control System Rigging

FIGURE I