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**EASA STC No. 10036196**

# **INSTALLATION INSTRUCTIONS**

## **E-2042**

**MT-PROPELLER  
MODEL MTV-27-1-E-C-F-R(P)/CFR225-55f**

**ON**

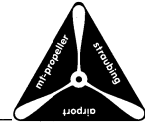
**HAWKER BEEHCRAFT CORPORATION  
200, 200C, 200CT, 200T, A200 (C-12A, C-12C),  
A200CT (C-12D, FWC-12D, RC-12D),  
A200CT (C-12F, RC-12G, RC-12H),  
B200, B200C, B200CT, B200T,  
B200GT, B200CGT**

**NOTE:**

This information supersedes and/or supplements information in the applicable HBC aircraft maintenance manual, MT-Propeller Operation and Installation Manual and Pratt & Whitney maintenance and service manuals. For all normal procedures not defined herein concerning rigging, installation and maintenance, consult the applicable manual.

The technical content of this document is approved under authority of DOA No. EASA.21J.020

Published By:  
MT-Propeller Entwicklung GmbH (DOA No. EASA.21J.020)  
94348 Atting, Germany

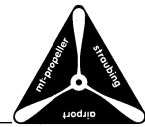


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Log of revisions

Rev. No.	Pages Revised	Description	Date
0	All	Initial Issue	21 June 2011
1	1, 2, 8;	Misc, Editorial Corrections	23 September 2011
2	1, 2, 5, 7,8, 9,	Misc, Editorial Corrections;	22 October 2012
3	1, 2, 6, 6-1, 8,14,15	Spare Parts List	23 November 2012

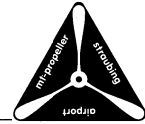
A black bar in the margin of a revised page shows the current change.



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## 1. INTRODUCTION / DESCRIPTION

This modification replaces the existing Hartzell or McCauley propellers and spinners with MT-Propeller Model MTV-27-1-E-C-F-R(P)/CFR225-55f and MT-Propeller spinners. The MTV-27-1-E-C-F-R(P)/CFR225-55f is a 5-blade hydraulically actuated, constant speed, counterweighted reversing propeller with 225 cm diameter. The propeller construction consists of natural composite blades mounted in a conventional aluminum hub. Metal erosion sheaths protect the propeller blade leading edges and electrically heated dual element deicing boots provide ice protection for the inboard leading edges. No change has been made to the propeller de-ice timer and its cycle times. The propeller is powered by the engine through the reduction gearbox. The propeller pitch and speed control is maintained by an engine driven single acting hydraulic governor (CSU), augmented by engine oil pressure. The counterweights, assisted by the feathering spring, move the propeller blades towards the high pitch (low rpm) and into the feathered position, while the governor boosted engine supplied oil pressure, move the propeller blades towards low pitch (high rpm) hydraulic stop, beta range and reverse position. The propeller has no high pitch stops; this allows the blades to feather after engine shutdown. No change has been made to the CSU, over-speed governor, and its settings.

### Note:

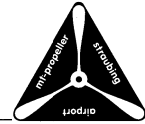
Every owner should stay in close contact with his MT-Propeller Dealer or Distributor and Authorized MT-Propeller Service Shop to obtain the latest information pertaining to his propeller and its installation. MT-Propeller takes a continuing interest in having the owner get the most efficient use of his propeller and keeping it in the best mechanical condition. Consequently, MT-Propeller from time to time issues Service Bulletins, Service Letters and Manuals relating to the propeller and its installation. Service Bulletins are of special importance and should be complied with promptly. These are sent to dealers, distributors and latest registered owners. Service Letters deal with products improvements and service hints pertaining to the propeller and its installation. These are sent to dealers, distributors and occasionally (at the factory's discretion) to latest registered owners. If an owner is not having his propeller serviced by an Authorized MT-Propeller Service Shop, he should periodically check the MT-Propeller's homepage to find out the latest information to keep his propeller up to date.

The list of valid Manuals, Service Bulletins, AD's and their latest revisions can be downloaded from the homepage of MT-Propeller ([www.mt-propeller.com](http://www.mt-propeller.com)).

Hardcopies can also be obtained from MT-Propeller Germany and MT-Propeller USA.

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1180 Airport Terminal Drive  
DeLand, FL 32724  
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Fax: 386-736-7696



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## 2. REMOVAL AND INSTALLATION INSTRUCTIONS

**BEFORE MODIFYING THE AIRCRAFT, IT MUST BE ASSURED BY THE EXECUTING COMPANY, THAT THE AIRWORTHINESS OF THE AIRCRAFT IS NOT AFFECTED BY ANY PREVIOUS MODIFICATION IN CONNECTION WITH THIS MODIFICATION.**

### A. APPLICABLE MANUALS / SERVICE BULLETINS / SERVICE LETTERS ETC.

Airplane Maintenance Manual, latest revision.

MT-Propeller Operation and Installation Manual Doc. No. ATA 61-06-10 (E-610), latest revision.

EASA approved Airplane Flight Manual Supplement Doc. No. E-2041, latest revision.

BF Goodrich Component Maintenance Manual No. ATA 30-61-01, latest revision.

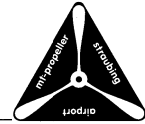
BF Goodrich Installation & Maintenance Manual No. ATA 30-60-02, latest revision.

BF Goodrich Report No. 68-04-714, latest revision.

BF Goodrich Report No. 68-04-712C, latest revision.

MT-Propeller Service Letter No. 4F or a later revision.

Additionally, see Note on previous page.



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**2. REMOVAL AND INSTALLATION INSTRUCTIONS CONTINUED**

Spare Parts List / Tool and Equipment per one MT-Propeller  
CHART 01

Qty	Item	Part Number
8	9/16 inches stop nuts (prop attachment nuts)	C-066
8	Washers	A-1181-1
1	O-ring	C-048-E
1	Spinner assembly	P-1228-( )
50	Spinner screws	C-306-8
50	Washers	C-344
1	Carbon block assembly (beta ring)	C-131
1	De-ice kit	P-1166-( )
1	Slip ring assembly	P-1129-A-( )
1	Beta Puller	T-375-( )

4 bladed Hot Prop 2 slip ring conversions to MTV-27-()

1	De-ice brush block bracket	A-1159-2-( )
1	Synchrophaser bracket	A-1685-4

3 bladed Hot Prop 2 slip ring conversions to MTV-27-()

2	Circuit Breaker L+R- Prop Man Delce	700-001-25 ( Beech AMM)
1	Circuit Breaker Prop Auto Ice	7270-5-25 ( Beech AMM)
1	De-ice brush block bracket	A-1159-12

3 bladed 3 slip ring conversions to MTV-27-()

1	De-ice brush block bracket	A-1159-14
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Torque Data for MT-Propeller Model MTV-27-1-E-C-F-R(P)/CFR225-55f  
CHART 02

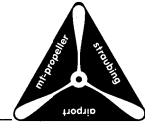
Component	Torque
9/16 inches propeller mounting stop nuts	92 - 98 NM (68 - 72 foot-pounds)
Beta Rod Cover Caps	8-11 NM (6-8 foot-pounds)
Spinner screws	4-5 NM (3-4 foot-pounds)

**Mounting Torques of 9/16 inches stop nuts with lubricated threads:**

Liberaly apply anti-seize thread compound, per MIL-T-83483 (e.g. Loctite® Moly 50™) only, to threads of studs & nuts; also to faces of nuts & washers.

Torque nuts **68 to 72 foot-pounds** equals **92 to 98 Nm**.

**LUBRICATED TORQUE ONLY**



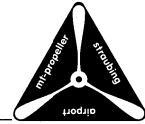
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Lubrication / Materials for MT-Propeller Model MTV-27-1-E-C-F-R(P)/CFR225-55f  
CHART 03

Approved Lubrication/Material	Location
Engine lubrication oil refer to Pratt & Whitney Service Bulletin No. 1001, and all revisions or supplement thereto	O-ring (C-048-E)
Anti-seize thread compound (MIL-T-83483)	9/16 inches stop nuts and washers

Blade angles at 84 cm (33 in) station for MT-Propeller Model MTV-27-1-E-C-F-R(P)/CFR225-55f  
CHART 04

Low Pitch (beta pick up)	16.5°+/-0.2°
Feathered	81.0°+/-1.0°
Full Reverse	-20.0°+/-1.0°



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**NOTE**

**Engine power lever and control rigging of the airplane must be in accordance with the rigging instructions of the Airplane Maintenance Manual before starting the propeller removal and installation work !**

**B. REMOVAL OF HARTZELL PROPELLER**

1. Remove Hartzell or McCauley propellers and existing de-ice brush block bracket and synchrophaser bracket per Airplane Maintenance Manual. The original modular brush assembly can be retained.

**C. INSTALLATION OF MT-PROPELLER**

**Note** The low idle N1 rigging must be performed in such a way that the rpm limitations of the original installations are kept.

1. Pilot's Sub Panel: Master Switch must be set to "OFF".  
Fuel Control Panel: Pull Ignitor Power CB and pull Start Control CB
2. Remove the upper engine cowling.
3. Remove reversing lever with carbon block. Discard the cotter pins. See Figure 01.
4. Remove spinner dome and spinner filler plates.
5. Install a sling on the propeller. Use a hoisting crane to take the weight of the propeller.
6. Clean propeller and engine flange. Do not lubricate propeller and/or engine flange.
7. Check for O-ring (C-048-E) in the propeller hub (Propeller is delivered with pre-installed O-ring).
8. Slightly lubricate O-ring (C-048-E) with new engine oil. See CHART 03.
9. Do not put another O-ring to the engine flange.
10. Align dowels on engine flange with holes on propeller flange.
11. Install propeller with mounted spinner front plate and spinner back plate, but without dome on engine shaft, engaging dowel pins.
12. Apply anti-seize thread compound (see CHART 03) to the eight washers (A-1181-1) and stop nuts (C-066) and install them hand tight.

**CAUTION**

PUT WASHERS P/N: A-1181-1 UNDER HEAD OF STOP NUTS P/N: C-066. DO NOT PUT THEM BETWEEN PROPELLER FLANGE AND ENGINE SHAFT FLANGE.

IT IS IMPORTANT THAT PROPELLER BE SEATED AGAINST ENGINE FLANGE WITH A STRAIGHT PUSH: ROTATION, COCKING OR WIGGLING IT ON WILL VERY PROBABLY DAMAGE THE O-RING GROOVE AND OIL LEAKAGE MAY RESULT.

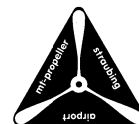
13. Remove Beta Rod Cover Caps on the propeller front plate.

**WARNING**

BETA ROD COVER CAPS ARE PRELOADED BY REVERSE RETURN SPRINGS

14. After removal of the Beta Rod Cover Caps, the springs and white plastic spring guide, install Beta-Puller (T-375) on the front plate and propeller guide rod and pull out the guide rod approx. 30 to 40 mm (1.2 to 1.6 inches) to get better access to the stops nuts (C-066). See Figure 02.
15. Pre-torque the eight stop nuts (C-066) to approx. 45 Nm (35 foot-pounds).
16. Torque the eight stop nuts as listed in CHART 02.
17. Move beta-ring back with the Beta-Puller, then remove Beta-Puller and reinstall Beta Rod Cover Caps. Make sure that all removed parts (spring, spring guide, caps) are reinstalled in the correct sequence. Torque caps as listed in CHART 02 and safety wire.





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### C. INSTALLATION OF MT-PROPELLER

#### CAUTION

**Any over-torque of the caps can damage the thread in the front plate.**

18. Install the carbon block assembly (C-131) and reversing lever. Use new cotter pins.
19. Make sure the side clearance between the beta-ring and carbon block is between 0.001 and 0.01 inches (0.03 and 0.25 mm). If necessary, remove material from, or replace, the carbon block to get the correct clearance.
20. Make sure that the brushes of the de-ice brush block assembly are centered correctly on the slip ring. Radial alignment of the modular brush assembly to the slip ring assembly is crucial to de-icing system operation. The brushes must contact the slip rings throughout 360 degrees of slip ring rotation. Angular fore and aft alignment prevents side loading and premature wear of the brushes and brush modules. See Figure 04a and 04b for correct alignment.
21. Install new de-ice brush block bracket (A-1159-A-()) and the original modular brush assy. See Figure 05 & 06. (4-blade to 5-blade propeller conversion). If the existing 3-blade propellers shall be replaced by 5-blade propellers, please contact MT-Propeller for additional instructions, if needed.
22. Install Synchrophaser Bracket 1 (A-1706-2-( )) onto de-ice brush block bracket and Synchrophaser Bracket 2 (A-1685-4) with Magnetic Screw (C-430) onto spinner back plate behind blade #1. Align synchrophaser pick-ups with Magnetic Screw correctly. The distance should be 2.5 mm +/-2 mm. See Figure 06. (4-blade to 5-blade propeller conversion). ). If the existing 3-blade propellers shall be replaced by 5-blade propellers, please contact MT-Propeller for additional instructions, if needed.
23. Make sure that the work area is clean and clear of tools and other items.
24. Install engine cowling.
25. After installation, check track. Up to 3 mm (0.12 inches) are max. allowed, measured 10 cm (3.9 inches) from blade-tip at the trailing edge.
26. Install spinner filler plates and fit spinner dome onto the propeller. Observe markings for alignment of the spinner (#1 blade to #1 in spinner). Torque spinner screws with washers. See CHART 02.
27. Check engine oil level.
28. Placards and Markings

#### PLACARDS

Placards concerning other propellers are obsolete and must be removed or permanently covered.

#### MARKINGS

Airplanes which have been converted from 3-blade Hartzell or 3-blade McCauley propellers to 5-blade MT propellers:

Propeller De-ice Ammeter: Green Arc (Normal Operating Range): **10 to 18** AMPS.

Prop De-Ice Circuit Breaker 20 Amps.

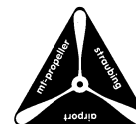
Airplanes which have been converted from 3-bladed Hot Prop (2 slip ring version) or 4-blade Hartzell propellers to 5-blade MT propellers:

Propeller De-ice Ammeter: Green Arc (Normal Operating Range): **18 to 24** AMPS.

Prop De-Ice Circuit Breaker 25 Amps.

A jumper wire is installed between the inboard and outboard connectors on the slip ring of the MTV-27 propeller to operate the inboard-outboard boots as hot prop boots when converted from the 3-bladed Hot Prop ( 2 slip ring version) or 4-blade Hartzell (2 slip ring version) prop to the 5-blade MT-Propeller.

Circuit Breakers for the correct AMPS requirement must be in accordance with the AMM.



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#### D. POWERPLANT ADJUSTMENT / TEST

##### D-1: Beta valve setting check.

1. Move the power control lever to the MAX forward position.
2. Ensure that the propeller is feathered, the governor reset arm is on the maximum stop, and the Beta valve plunger is hold with base of slot in clevis flush with the outer rim of the valve stop nut. (FACE "1" of the beta valve lines up with FACE "2" within +/- 0.010 inches (0.25 mm)). See Figure 03.
3. If necessary, adjust the beta control cable according to the Airplane Maintenance Manual.

##### D-2: Ground Idle Ng Speed and Flight Idle Ng Speed Check.

**Note** The low idle N1 rigging must be performed in such a way that the rpm limitations of the original installations are kept.

1. With power lever at the flight idle gate, the condition lever set at low idle and propeller lever set full forward verify N1 at **min. 52 % (PT6A-41 and -42 engines)**, and N1 at **min. 61% (PT6A-52 and - 61)**. Bleed Air Environmental Off, ECS Off.
2. With power lever at the flight idle gate, the condition lever set at high idle and propeller lever set full forward verify N1 at 70 % +/- 2 %. Bleed Air Environmental Off, ECS Off.

If necessary, GI and FI adjustments according to the Airplane Maintenance Manual and/or PWC Maintenance Manual.

##### D-3: Propeller Low Pitch Stop.

The new and/or overhauled or repaired 5-blade MT Propeller will be delivered with a correct low pitch stop setting. If low pitch stop has been adjusted in field or is unknown and a re-setting close to the correct approved low pitch stop setting will be required, use torque table. See Table 01 (Low Pitch Torque Setting Values).

- a. Large torque adjustments can be made by disconnecting the beta arm at the front end clevis, loosening the jam nut and turning the front end clevis counterclockwise to increase torque and vice versa. (See AMM for details). A half turn will change torque by approximately 70 foot-pounds.
- b. Fine adjustments can be made with the prop low pitch stops. Turn nuts clockwise to increase torque and vice versa. A quarter turn will change torque by approximately 80 - 100 foot-pounds and 50 - 100 RPM. Any low pitch stop adjustments of the propeller should be performed in accordance with the MT-Propeller's Operation and Installation Manual Doc. No. ATA 61-06-10 (E-610).

#### CAUTION

**Since the MT-Propellers may also pick up loose pieces of rock and debris from the ramp and runway, it is recommended to clean run-up area as far as possible before conducting rigging runs.  
Conduct the tests at calm winds and perpendicular to the wind as far as possible.**

##### D-4: Maximum Propeller Speed Check.

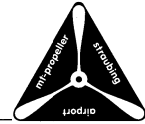
1. With condition lever set at flight idle and propeller lever set full forward (high rpm), advance power lever until maximum Np is reached, verify 2000 RPM +/- 20 RPM. If necessary, adjust governor maximum speed to 2000 RPM +/- 20 RPM.

##### D-5: Reverse Power Check.

1. Procedure according to the Airplane Maintenance Manual.
2. Reverse power should be minimum 220 SHP +/- 20. (SHP = TRQ [ft-lbs] x Np [rpm] x 0.00019).
3. If necessary, adjustment on the FCU according to the Airplane Maintenance Manual.

##### D-6: Autofeather Check.

Refer to AFM Supplement Doc. No. E-2041, latest revision.



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**E. CHANGE WEIGHT AND BALANCE RECORD AND EQUIPMENT LIST**

Replacement Propellers:  
MT-Propeller Model MTV-27-1-E-C-F-R(P)/CFR225-55f with spinners and de-ice:

<u>Total Weight (one propeller):</u>	<u>Arm</u>	<u>Total Moment</u>
65.5 kg (144.4 lbs)	1.739 m (68.46 in)	113.905 kgm (9885.624 in-lbs)

The equipment list must be amended to reflect addition of the new propeller.

**F. OPERATIONAL/FUNCTIONAL CHECKS/DYNAMIC BALANCING**

Perform engine ground run and verify engine linkage requirements per Airplane Maintenance Manual.  
Check for function and oil leakage make adjustments as required.  
Check the propeller de-ice system according to AFM Supplement Doc. No. E-2041, latest revision.

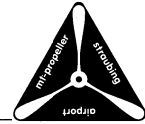
After adjustments are completed, final safety checks are made, safety wire installation as required.

Perform propeller dynamic balancing. MT-Propeller recommends Dynamic Solutions Systems Inc., MicroVib II™ Vibration Analyzer/Dynamic Balancer.

**NOTE**

**The MT-Propeller has twelve anchor nuts on the spinner back plate which must be used to install dynamic balance weights. The maximum allowable total balance weight per anchor nut is 60 grams (2.1 oz) at 2000 RPM propeller speed. The maximum unbalance should be less than 0.2 IPS after completion of the dynamic balancing.**

Perform flight test and make all required log book entries.



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**G. REMOVAL OF MT-PROPELLER**

1. Pilot's Sub Panel: Master Switch must be set to "OFF".  
Fuel Control Panel: Pull Ignitor Power CB and pull Start Control CB
2. Remove the upper engine cowling.
3. Remove reversing lever with carbon block. Discard the cotter pins. See Figure 01.
4. Remove spinner dome and spinner filler plates.
5. Remove Beta Rod Cover Caps on the propeller front plate.

**WARNING**

BETA ROD COVER CAPS ARE PRELOADED BY REVERSE RETURN SPRINGS

6. After removal of the Beta Rod Cover Caps, the springs and white plastic spring guides, move the beta-ring forward by hand to get better access to the stops nuts (C-066).
7. Install Beta-Puller (T-375) on the front plate and propeller guide rod and pull out the guide rod approx. 30 to 40 mm (1.2 to 1.6 inches) to get better access to the stops nuts (C-066).
8. Install a sling on the propeller. Use a hoisting crane to take the weight of the propeller.
9. Put a container or plastic bag below the propeller flange for the engine oil.
10. Remove the eight stop nuts (C-066) and washers (A-1181-1).
11. Carefully remove the propeller from the engine. Discard the propeller O-ring (C-048-E).
12. Do not store propeller on the beta-ring. Beta-ring can be damaged.
13. Release Beta-Puller (T-375) and disconnect it from the guide rod.
14. Reinstall Beta Rod Cover Caps with springs and white plastic spring guides.

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**H. FIGURES**

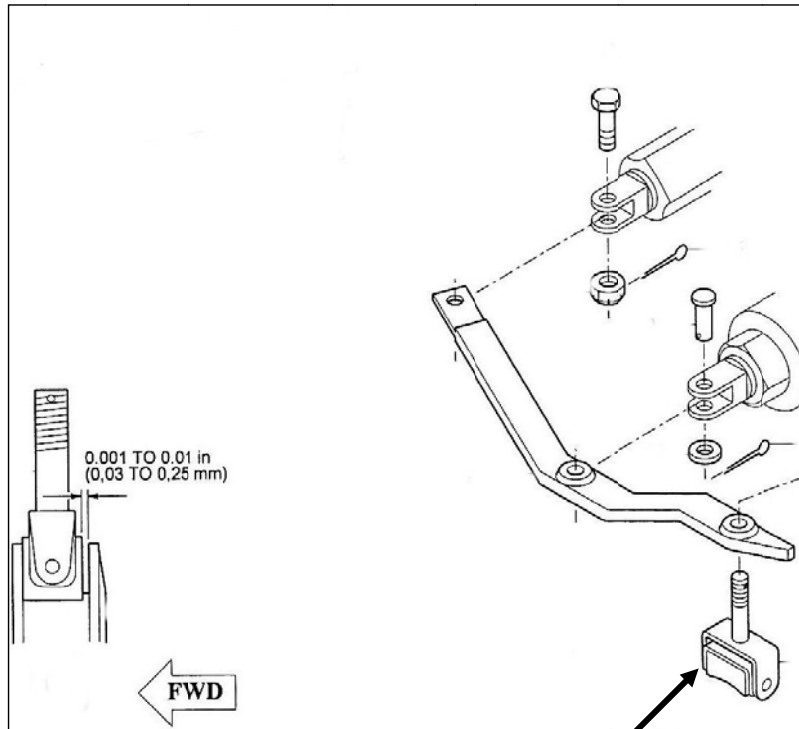


Figure 01

Carbon block assy C-131



Figure 02

Beta-Puller (T-375)

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**H. FIGURES**

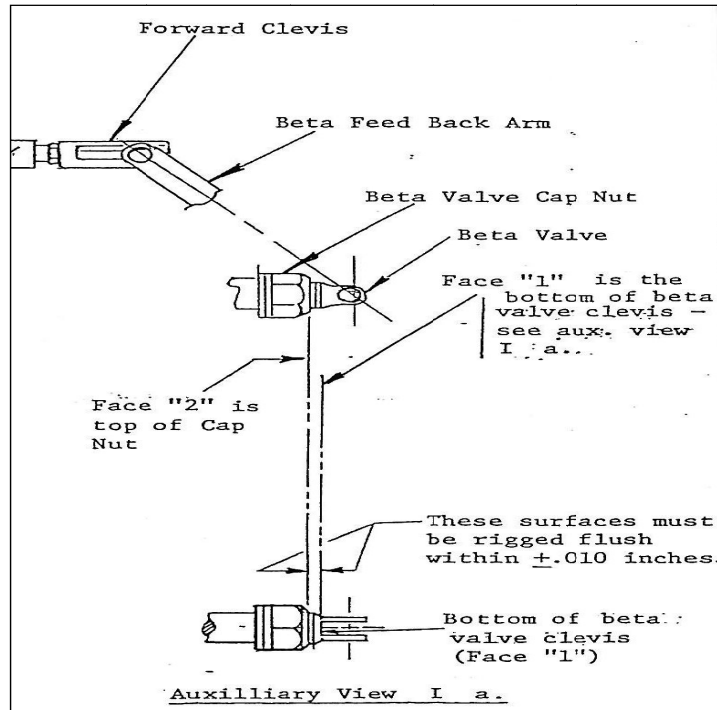


Figure 03

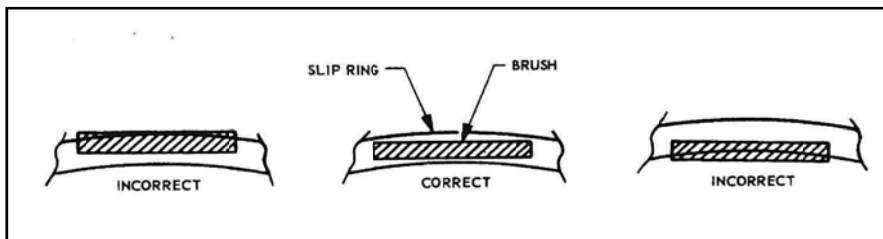


Figure 04a

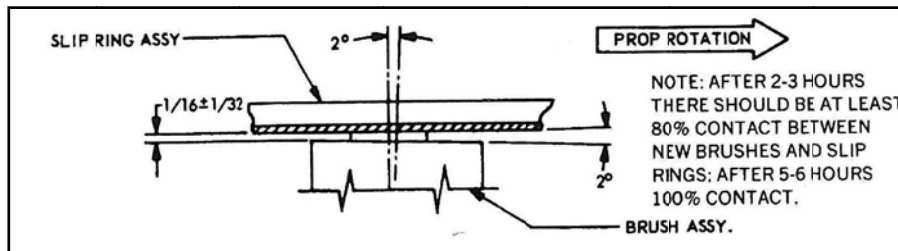


Figure 04b

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**H. FIGURES**     4 Bladed Conversion to MTV-27

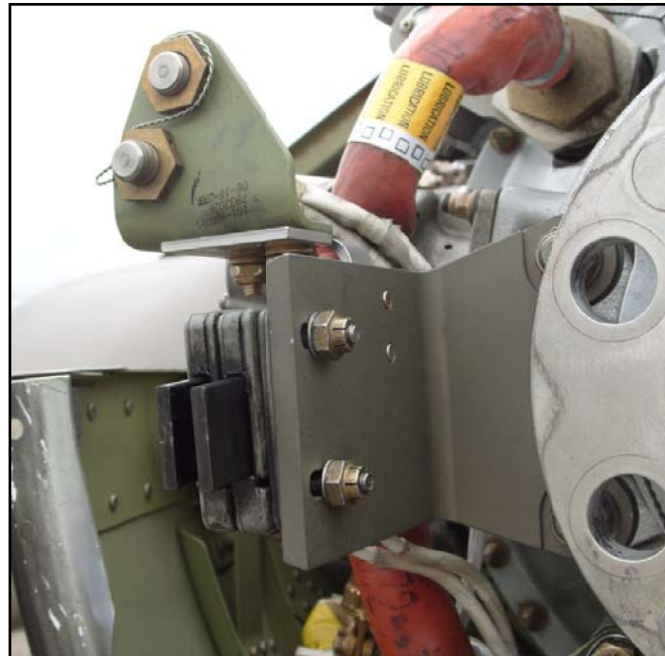


Figure 05  
De-ice brush block bracket (A-1159-2-( ))



Figure 06  
Synchrophaser Bracket 2 (A-1685-4), Magnetic Screw (C-430), preinstalled on the spinner back plate,  
Sync. Bracket 1 (A-1706-2-( )), preinstalled on the spinner back plate.

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**H. FIGURES    3 bladed conversion to MTV-27**

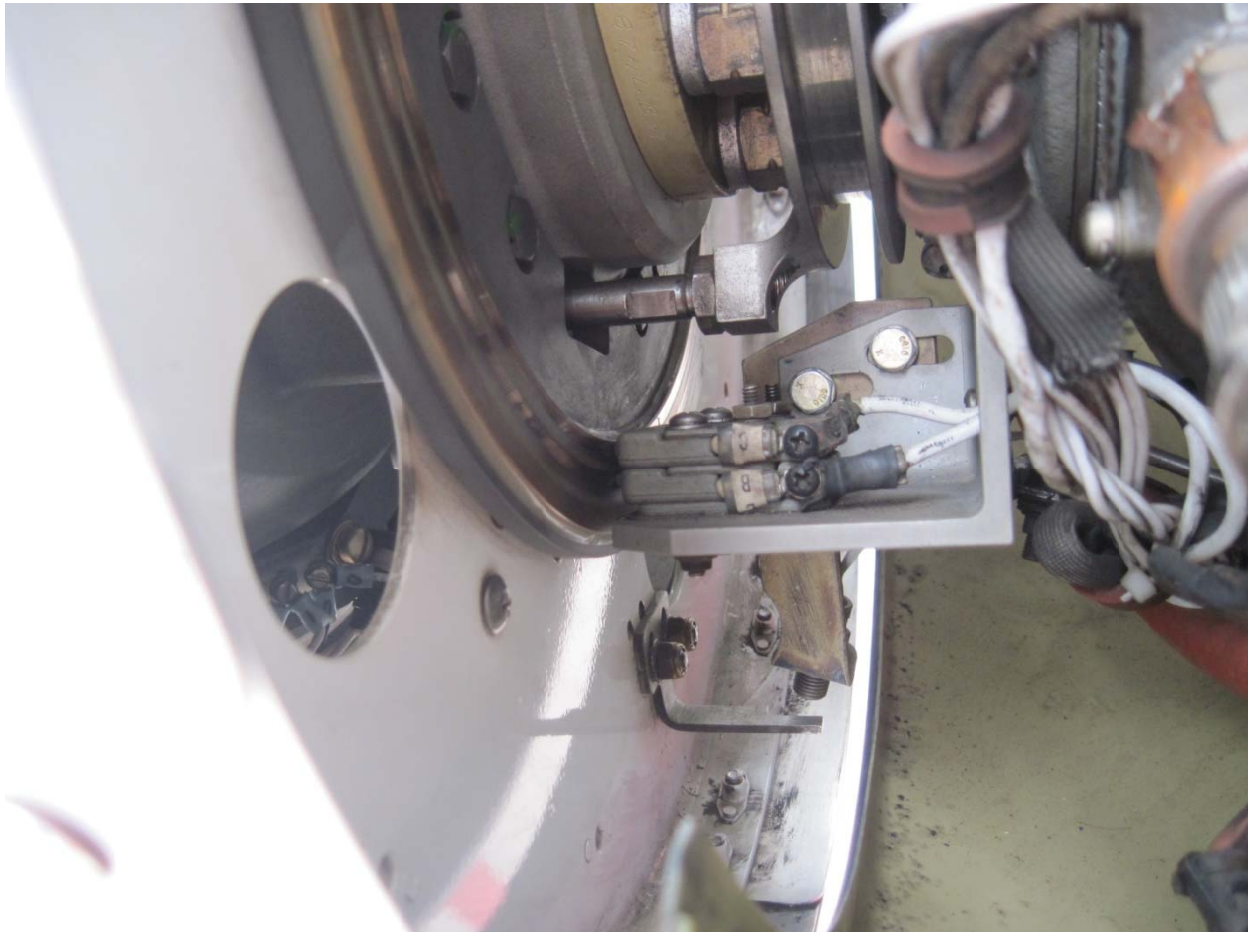


Fig. 07

De-Ice Bracket A-1159-12  
and Synchro Bracket on the spinner Backplate A-1685-5 ( pre-installed on the propeller)

With the 3 brush block-slip ring version connected ground/inboard/outboard the bracket A-1159-14 is installed allowing all 3 slip rings to be used.



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**H. FIGURES**

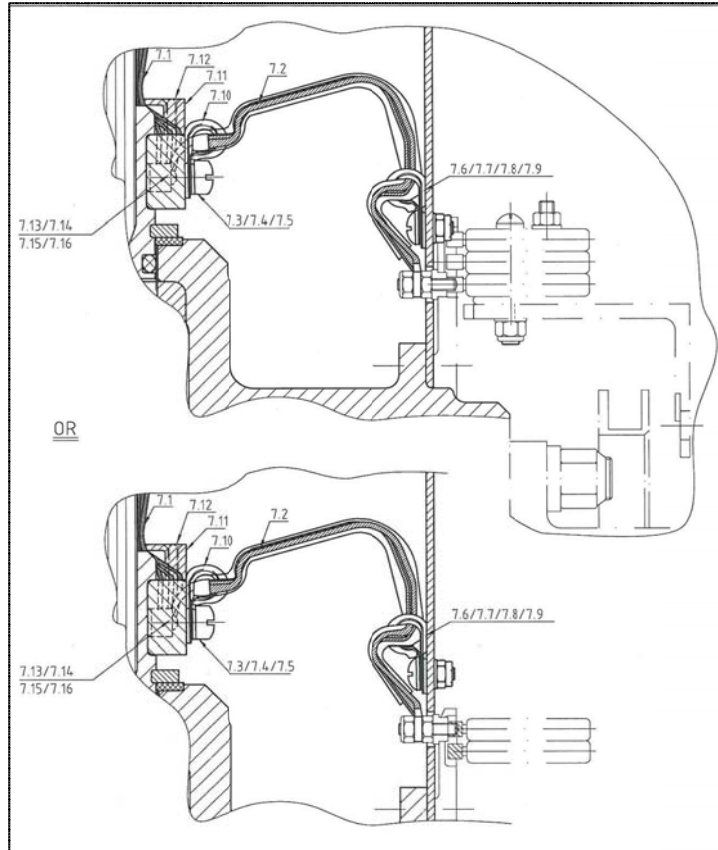


Figure 07  
De-Ice Kit (P-1166)

Quantity	Part No.	Description	Draw No.	Original Dimension
5	7.1.	Elt. Deice Boot	4E3029-1	24V 110W
5	7.2	Cable	RAC165013-0604	
5	7.3	Screw	C-364-8	
5	7.4	Teeth Wahser	C-352-40	
5	7.5	Washer	C-338-4	
5	7.6	Clamp Alu	C-151-2	
5	7.7	Screw	C-306-9	
5	7.8	Stop Nut	C-324-1032	
5	7.9	Washer	C-341-10	
5	7.10	Clamp Alu	C-151-3	
5	7.11	Terminal	A-1601-B-R	
10	7.12	Screw	C-422-30	
25	7.13	Teeth Washer	C-352-37	
5	7.14	Support	A-1189-1	
15	7.15	Screw	C-212-8	
10	7.16	Screw	C-314-27	

Figure 08  
De-Ice Kit Parts List (P-1166)

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**H. FIGURES**

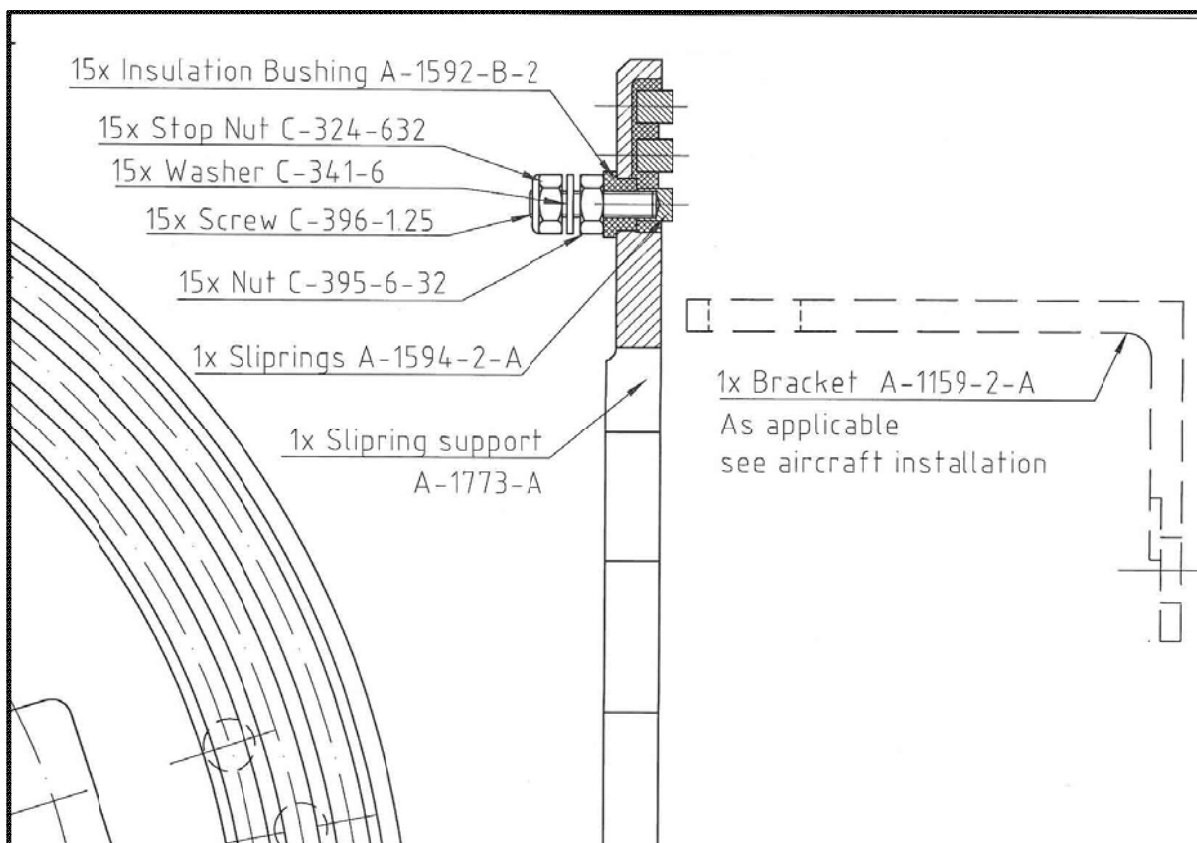


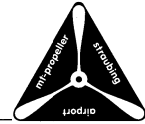
Figure 09  
Slip Ring (P-1129-A-( ))

**I. PROPELLER DE-ICING**

**1. TEST OF PROPELLER DE-ICE BOOTS RESISTANCE IF SYSTEM INDICATES A PROP DE-ICE MALFUNCTION**

**a. Resistance of an inner and an outer heating element of the 4E3029-1 dual element boots**

1. Remove propeller spinner dome.
2. Disconnect black de-ice boot cables from the terminal which mounted on a counterweight half.
3. Use an ohmmeter to read resistance between ground lead (G) and inner lead (I) to measure the inner heating element. Repeat it between ground lead (G) and outer lead (O) to measure the outer heating element. The resistance should be between **11.0 and 12.0 ohms**.



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**J. TABLE**

Configuration:

- Engine Oil Temp – GREEN RANGE
- Overspeed Governor & Feather Check - COMPLETED
- Bleed Air – ENVIRONMENTAL OFF
- Heating / ECS System – OFF
- Generators – ON
- Propeller Levers – FULL FORWARD (HIGH RPM)
- Advance Power Lever (PL) to match 1800 RPM
- Engine torque meter reading should be within +/-40 foot-pounds of the value obtained from Table 01.
- Maximum allowable difference between engines is 20 foot-pounds.

**LOW PITCH TORQUE SETTING VALUES**

OAT - °C	0	1000	2000	3000	4000	5000	6000	7000	8000	Pressure Altitude - ft
-30	883	851	821	791	762	735	707	681	656	
-20	848	818	788	760	732	706	680	654	630	
-10	816	787	758	731	705	679	654	629	606	
0	786	758	731	704	679	654	630	606	584	
10	758	731	705	679	655	631	608	585	563	
<b>15</b>	<b>745</b>	718	693	668	643	620	597	575	553	
20	732	706	681	656	632	609	587	565	544	
25	720	694	669	645	622	599	577	556	535	
30	708	683	658	635	612	589	567	546	526	
35	697	672	648	624	602	580	558	538	517	
40	685	661	637	614	592	570	549	529	509	

Table 01