HARTZELL PROPELLER INC.

SERVICE BULLETIN

Propellers

Propellers - Conversion of Aerobatic HC-( ) (2,3)YR-1( ) Propellers

February 15, 2012

This page transmits a revision to Service Bulletin HC-SB-61-240.

- Original Issue, dated Nov 12/99
- Revision 1, dated Feb 15/12

Propeller assemblies that have complied with a previous revision of this Service Bulleltin are not affected by this revision.

FAA approval has been obtained on technical data in this publication that affects type design.

Changes are shown by a change bar in the left margin of the revised pages.

This revision is issued to change the following in the Service Bulletin:

- Add additional hub part numbers for three bladed propellers
- Additional formatting changes

This Service Bulletin has been reissued in its entirety.

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SERVICE BULLETIN

Propellers

Propellers - Conversion of Aerobatic HC-( ) (2,3)YR-1( ) Propellers

1. Planning Information

   A. Effectivity

      (1) Hartzell Model HC-( ) (2,3)YR-1( ) propellers with 7690( ) composite blades installed on aerobatic aircraft.

      CAUTION: DO NOT USE OBSOLETE OR OUTDATED INFORMATION. PERFORM ALL INSPECTIONS OR WORK IN ACCORDANCE WITH THE MOST RECENT REVISION OF THIS SERVICE BULLETIN. INFORMATION CONTAINED IN THIS SERVICE BULLETIN MAY BE SIGNIFICANTLY CHANGED FROM EARLIER REVISIONS. FAILURE TO COMPLY WITH THIS SERVICE BULLETIN OR THE USE OF OBSOLETE INFORMATION MAY CREATE AN UNSAFE CONDITION THAT MAY RESULT IN DEATH, SERIOUS BODILY INJURY, AND/OR SUBSTANTIAL PROPERTY DAMAGE. REFER TO THE SERVICE BULLETIN INDEX FOR THE MOST RECENT REVISION LEVEL OF THIS SERVICE BULLETIN.

   B. Concurrent Requirements

      (1) Additional service documents may apply to the components/propellers affected by this Service Bulletin. Compliance with additional service documents may be necessary in conjunction with the completion of the Accomplishment Instructions in this Service Bulletin. Refer to the Hartzell Propeller website at www.hartzellprop.com for a cross-reference of service documents.

      (2) Accumulator modification in accordance with Hartzell Owner's Manual 145 (61-00-45)

      (3) Blade modification in accordance with Hartzell Service Bulletin HC-SB-61-329

   C. Reason

      (1) Affected propellers on aerobatic aircraft have experienced instances of engine overspeed (>10%) during certain aerobatic maneuvers that result in extended loss of engine oil pressure. In some cases, these overspeed instances have resulted in significant engine damage or engine failure.

      (2) Hartzell has determined that these overspeed conditions are caused by oil starvation to the propeller during aerobatic maneuvering, causing the propeller blades to move to a lower blade angle, resulting in an overspeed condition.

(3) Hartzell has determined that a propeller conversion, and the addition of blade counterweights to the propeller will protect against engine overspeed due to oil starvation.

NOTE: This Service Bulletin may be used to convert a Hartzell non-counterweighted propeller to a counterweighted propeller to protect against engine overspeed. If a counterweighted propeller is starved of oil during operation, the propeller blades move to a high blade angle, resulting in engine underspeed. Once engine oil supply has been restored, normal propeller governing will resume.

D. Description

(1) This Service Bulletin authorizes a propeller modification that permits the installation of counterweighted blades. This modification requires airframe changes and extensive rework of the propeller, resulting in a propeller model number change.

(2) Performing the propeller component modifications in accordance with the Accomplishment Instructions in this Service Bulletin will convert the HC-( )(2,3)YR-1( ) propeller to a HC-( )(2,3)YR-4( ) propeller.

(3) The Hartzell Service Center is the only facility authorized for modification of the propeller hub and installation of the counterweight on the blade.

E. Compliance

(1) Compliance with this Service Bulletin is optional, and may be accomplished at the discretion and convenience of the operator.

F. Approval

(1) FAA approval has been obtained on technical data in this publication that affects type design.

G. Manpower

(1) Accomplishment of this Service Bulletin will require approximately 7.2 man-hours per propeller.

H. Weight and Balance

(1) A two bladed propeller will increase in weight by approximately 6.69 lbs. (3.03 kg.).

(2) A three bladed propeller will increase in weight by approximately 10.04 lbs. (4.55 kg.).

NOTE 1: Due to the addition of balance weights and other assembly factors, it is advisable to weigh the propeller following final assembly to determine final weight of the propeller.

NOTE 2: Some aerobatic propeller systems employ a hydraulic accumulator that is located on the governor input line between the engine and the governor. If this accumulator is removed while performing this Service Bulletin, aircraft weight and balance must be recalculated. The effect of removing this accumulator has not been included in the above weights. The accumulator weight is approximately 4.3 lbs (1.95 kg.).

I. Electrical Load Data

(1) Not affected

CAUTION: DO NOT USE OBSOLETE OR OUTDATED INFORMATION. PERFORM ALL INSPECTIONS OR WORK IN ACCORDANCE WITH THE MOST RECENT REVISION OF A DOCUMENT.

J. References

(1) Hartzell Owner's Manual 145 (61-00-45)

(2) Hartzell Standard Practices Manual 202A (61-01-02)

(3) Hartzell Compact Non-Feathering (-1) and Aerobatic (-4) Propeller Overhaul and Maintenance Manual 113B (61-10-13)

(4) Hartzell Service Bulletin HC-SB-61-329

K. Publications Affected

(1) Hartzell Compact Non-Feathering (-1) and Aerobatic (-4) Propeller Overhaul and Maintenance Manual 113B (61-10-13)

(2) Hartzell Composite Blade Maintenance Manual 135F (61-13-35)

(3) Hartzell Standard Practices Manual 202A (61-01-02)

2. Material Information

A. Parts - Two-Bladed Propeller

New Part Number	Keyword	Old Part Number	Qty.
A-1305	Balance Weight	N/A	A/R
A-1381	Washer	N/A	6
A-1744	Hex Head Bolt	N/A	4
A-2043-1	Self-Locking Nut	N/A	14
A-2067	Stud	N/A	6
A-2069	Nut	N/A	6
A-2074-2	Seal Ring	N/A	2
A-2418-5	Piston Rod	A-2418-2	1
A-2420-( )	High Stop Spacer	N/A	A/R
A-4257	Pitch Adj. Screw	N/A	1
B-2428-2	“R” Cylinder	B-2428-1	1
B-3807	Nut, Self Locking	N/A	1
B-3822-36P	Socket Hd. Cap Screw	N/A	8
B-3828-6	Self-Locking Nut	N/A	8
B-3834-0632	Flat Washer	N/A	16
B-3838-3-5	Cotter Pin	N/A	1
B-3851-1032	Washer	N/A	1
B-3840-( )	Screw	N/A	A/R
B-3842-0750	SPS Spring Pin	N/A	6
B-6544	Lube Fitting Cap	N/A	4
C-3317-018	O-ring	N/A	1
C-3317-115-1	O-ring	N/A	1
C-3317-210-1	O-ring	N/A	1
C-3317-228	O-ring	N/A	1
C-3317-247	O-ring	N/A	1
C-3317-340	O-ring	N/A	2
C-3317-348-1	O-ring	N/A	1
C-7249	Slug	N/A	4
D-6105-2	Leading Edge	D-6105-3	2
D-2201-16	Hub	D-2201-17	1
D-7327	Spinner Assembly	C-3568	1
D-7248	Cwt. Clamp	N/A	2
C7690E	Blade	7690( )	2

B. Parts - Three-Bladed Propeller

New Part Number	Keyword	Old Part Number	Qty.
A-1305	Balance Weight	N/A	A/R
A-1381	Washer	N/A	6
A-1744	Hex Head Bolt	N/A	6
A-2043-1	Self-Locking Nut	N/A	21
A-2067	Stud	N/A	6
A-2069	Nut	N/A	6
A-2074-2	Seal Ring	N/A	3
A-2418-5	Piston Rod	A-2418-2	1
A-2420-( )	High Stop Spacer	N/A	A/R
A-4257	Pitch Adj. Screw	N/A	1
B-2281-1	“R” Cylinder	B-2281	1
B-3807	Nut, Self Locking	N/A	1
B-3822-36P	Socket Hd. Cap Screw	N/A	12
B-3828-6	Self-Locking Nut	N/A	12
B-3834-0632	Flat Washer	N/A	24
B-3838-3-5	Cotter Pin	N/A	1
B-3851-1032	Washer	N/A	1
B-3840-( )	Screw	N/A	A/R
B-3842-0750	SPS Spring Pin	N/A	6
B-6544	Lube Fitting Cap	N/A	6
B-7073-L1	Hex Head Bolt	N/A	3
C-3317-018	O-ring	N/A	1
C-3317-115-1	O-ring	N/A	1
C-3317-210-1	O-ring	N/A	1
C-3317-228	O-ring	N/A	1
C-3317-251	O-ring	N/A	1
C-3317-340	O-ring	N/A	3
C-3317-426-1	O-ring	N/A	1
C-7249	Slug	N/A	6
D-3251-2R	Hub	D-3251-1R	1
or			
E-7172-1R	Hub	E-7157-1R	1
or			
E-7172-11R	Hub	E-7157-11R	1
D-6105-2	Leading Edge	D-6105-3	3
D-7267P	Spinner Assembly	D-6936-P	1
D-7248	Cwt. Clamp	N/A	3
C7690E	Blade	7690( )	3

NOTE: The Hartzell D-6529-1, D-6529-21, D-6529-41, and the E-7157-41R hubs can not be modified for compliance with this Service Bulletin.

C. Governors

(1) Replacement of the governor is required when a HC-( )(2,3)YR-1( ) propeller is converted to a HC-( )(2,3)YR-4( ).

(2) Contact Hartzell Product Support for the part number of the new governor required.

D. Consumables

CM Reference Number	Keyword
CM19	Release Agent
CM20	Epoxy

NOTE: Additional consumable materials may be required by the disassembly and assembly procedures as published in the applicable overhaul manuals.

3. Accomplishment Instructions

A. Disassembly

(1) Disassemble the propeller in accordance with the Disassembly chapter of Hartzell Manual 113B.

(2) Upon disassembly, discard all consumable hardware (ie -O-rings, self-locking nuts, seals, etc.) The piston rod, spinner, and cylinder will be replaced with new components upon reassembly.

B. Hub Modification

(1) Hartzell will perform a factory-only modification to convert the two-blade D-2201-17 hub to a D-2201-16 hub,.

(2) Hartzell will perform a factory-only modification to convert the three-blade D-3251-1R hub to a D-3251-2R hub, or the E-7157-1R hub to a E-7172-1R hub, or the E-7157-11R hub to a E-7172-11R hub.

NOTE: Hub conversion involves boring out the piston rod bore of the hub and installing a bushing. A newly manufactured hub will not have this bushing installed. Although the converted hub will differ in appearance from a newly manufactured hub, the converted (bushed) hubs are to be considered functionally identical and interchangeable with the newly manufactured (unbushed) hubs.

(3) The modified hub must be restamped to indicate the new part number:

(a) Restamp the D-2201-17 hub as a D-2201-16 hub.

(b) Restamp the D-3251-1R hub as a D-3251-2R hub.

(c) Restamp the E-7157-1R hub as a E-7172-1R hub.

(d) Restamp the E-7157-11R hub as a E-7172-11R hub.

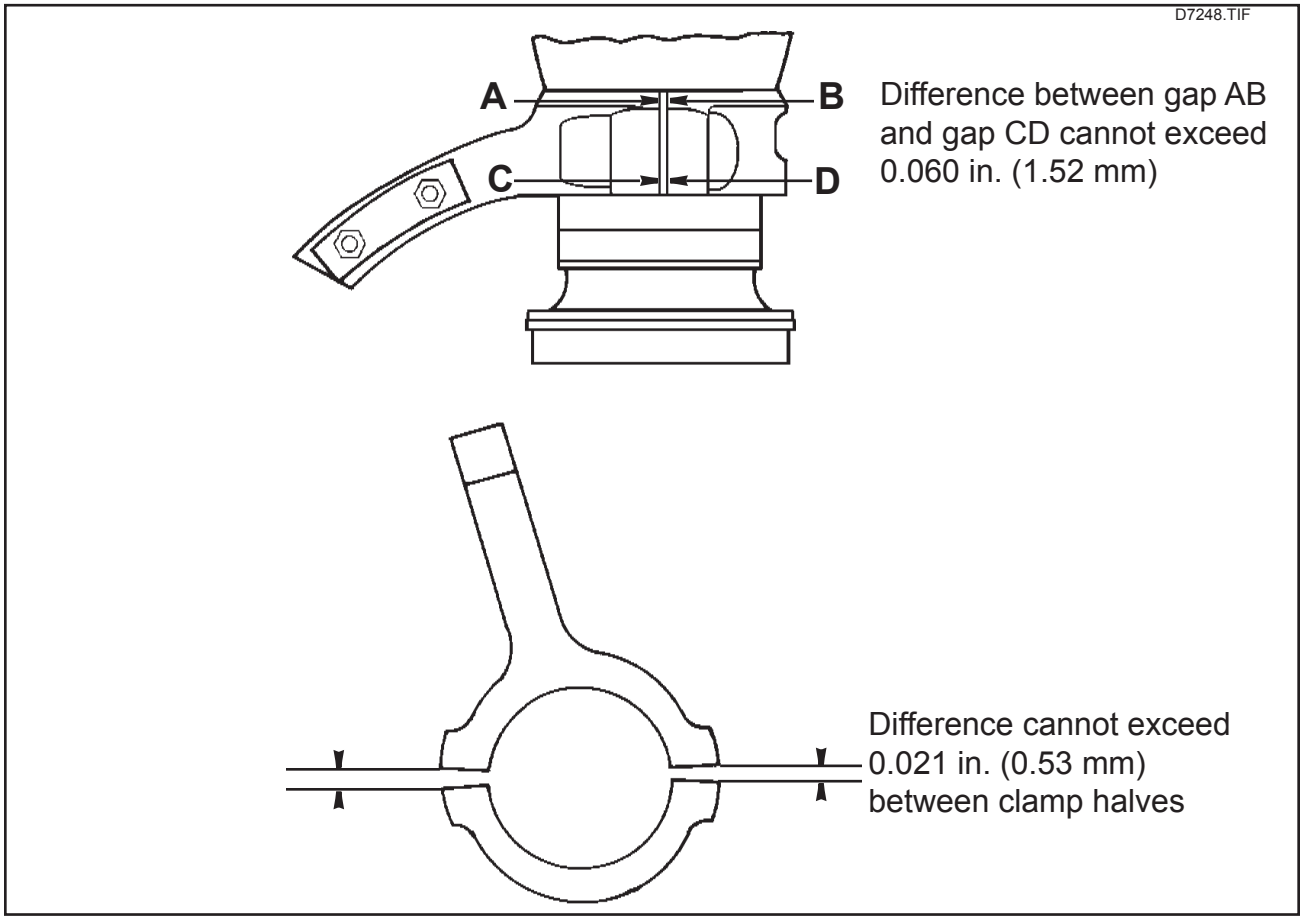

Figure 1 - Blade Clamp Installation

C. Blade Modification

(1) Return the 7690(A,C) blades to Hartzell Propeller. Hartzell will perform a factory-only modification per Hartzell Service Bulletin HC-SB-61-329 to convert the 7690(A,C) blades to 7690E blades.

D. Counterweight Installation

NOTE: Counterweight installation will be performed by Hartzell at the time of conversion. Should counterweight reinstallation be required in the future, install the counterweight in accordance with these instructions.

(1) Check the fit of the E-7248 counterweight clamp to the blade shank. If the counterweight clamp does not fit, check the blade for excess adhesive left on the surface from the erosion shield application procedure. Remove excess adhesive and fiberglass scrim. Excess material may be removed down to the blade surface. Use caution, do not remove any blade material. Recheck the fit of the counterweight.

NOTE: Any paint removed from the blade, during the fit check process must be replaced prior to continuing. See Refinishing After Repair in the Finish Procedures Chapter of Manual 135F (ATA 61-13-35).

(2) Apply release agent CM19 to the elliptical surfaces and the inboard and outboard edges of the clamp halves.

NOTE: Complete coverage with release agent is necessary to ensure ease of removal of counterweight clamp.

(3) Place one B-3834-0632 washer over each B-3822-36P cap-screw and set aside for later in assembly.

(4) Combine the appropriate quantity of epoxy CM20 needed for each counterweight clamp being assembled. Mix 100 parts of Part A with 22 parts of Part B thoroughly until the mixture is a uniform purple color.

(5) Apply an even layer of adhesive to the inside elliptical surfaces of the clamp halves. Do not apply any adhesive to surface of the counterbore.

CAUTION: TORQUING AND FINAL POSITIONING OF THE BOLTS MUST BE ACCOMPLISHED WITHIN THREE MINUTES OF THE APPLICATION OF THE RETAINING COMPOUND TO ENSURE THAT THE COMPOUND DOES NOT SET UP PRIOR TO FINAL POSITIONING.

(6) Position the counterweight clamp in place on the blade shank as shown in Figure 1.

(7) Install cap screw and washer through the small half of the E-7248 clamp first. Secure the large half of the clamp to the small half using one B-3834-0632 washer and one B-3828-6 nut.

(8) Repeat Step 7 for the remaining 3 bolts.

(9) Alternately tighten down the outboard B-3828-6 nuts at the leading and trailing edges of the blade, keeping the gap between clamp halves relatively equal until the clamp's outboard edge fits loosely against the blade between the leading and trailing edges. The clamp should be able to move freely on the blade.

NOTE: To maintain an equal gap, alternate tightening the nuts between the leading and trailing edges of the blade. Tighten each nut an equal amount.

(10) Repeat step 9 for the two inboard B-3828-6 nuts on the B-3822-36P cap-screws.

(11) Make sure that the clamp is seated properly against the secondary winding and the elliptical surface of the blade.

(12) Torque the outboard B-3828-6 nuts to 10 ft-lbs (13.6 N.m), keeping the gap between clamp halves approximately the same between the leading and trail edge.

NOTE: To maintain an equal gap, alternate tightening the nuts between the leading and trailing edges of the blade. Tighten each nut an equal amount.

(13) Repeat step 12 for torquing the two inboard B-3828-6 nuts to 10 ft-lbs (13.6 N.m).

(14) Torque the two outboard B-3828-6 nuts to 18-20 ft-lbs (24.4-27.1 N.m), keeping the gap between clamp halves approximately the same between the leading and trail edge.

NOTE: To maintain an equal gap, alternate tightening the nuts between the leading and trailing edges of the blade. Tighten each nut an equal amount.

(15) Torque the two inboard B-3828-6 nuts to 18-20 ft-lbs (24.4-27.1 N.m), keeping the gap between clamp halves approximately the same between the leading and trail edge.

NOTE: To maintain an equal gap, alternate tightening the nuts between the leading and trailing edges of the blade. Tighten each nut an equal amount.

(16) Check the gap distance between the clamp halves as shown in Figure 1.

(17) Remove excess adhesive with a dry rag. The rag may be moistened with acetone CM 11 if the adhesive is difficult to remove.

CAUTION 1: POTTING COMPOUND MUST BE CURED PRIOR TO PROPELLER USE.

CAUTION 2: CURE OF POTTING COMPOUND MAY NOT BE ACCELERATED BY HEAT.

(18) Cure at room temperature for a minimum of 24 hours before the propeller is used. **Heat accelerated cure is not permitted**. Propeller assembly may continue during the cure cycle.

E. Propeller Assembly

(1) Using the parts listed in the "new part number" column under Paragraph 2.A., assemble the propeller in accordance with the Assembly chapter of Hartzell Manual 113B.

NOTE: When reassembling the propeller, the assembly directions pertaining to Aerobatic (-4) Propellers should be followed.

(2) Re-identify the propeller model by restamping the hub to reflect the new propeller model, either HC-( )2YR-4( ) for a two blade propeller, or HC-( )3YR-4( ) for a three blade propeller as appropriate.

(3) Make a log book entry to reflect propeller overhaul, propeller model number change, and compliance with this Service Bulletin.

F. Aircraft Modification - Governor Removal, Aircraft Without an Accumulator System

WARNING: ALWAYS FOLLOW AIRFRAME MANUFACTURER'S MANUALS AND PROCEDURES. THEY MAY CONTAIN ISSUES VITAL TO AIRCRAFT SAFETY THAT ARE NOT CONTAINED IN THIS SERVICE BULLETIN.

CAUTION: USE ADEQUATE PRECAUTIONS TO PROTECT THE GOVERNOR ASSEMBLY FROM DAMAGE WHEN IT IS REMOVED FROM THE AIRCRAFT ENGINE AND WHEN IT IS STORED. DO NOT ALLOW PRESSURE AGAINST GOVERNOR BODY WITH A WRENCH WHEN REMOVING THE NUTS.

(1) Remove the aircraft linkage and any other rigging from the governor.

(2) Remove nuts and washers holding the governor to the engine pad per Airframe Manufacturer's instructions.

(3) Remove the governor.

(4) Remove and discard the mounting gasket .

G. Aircraft Modification - Governor and Accumulator System Removal (if applicable)

Some aerobatic propeller systems employ a hydraulic accumulator that is located on the governor input line between the engine and the governor. This accumulator is not required following the propeller conversion. The accumulator is to be removed as follows:

WARNING: DURING ACCUMULATOR REMOVAL, AIRFRAME MANUFACTURER'S MANUALS AND PROCEDURES MUST BE FOLLOWED AS THEY MAY CONTAIN ISSUES VITAL TO AIRCRAFT SAFETY THAT ARE NOT CONTAINED IN THIS MANUAL.

CAUTION: USE ADEQUATE PRECAUTIONS TO PROTECT THE GOVERNOR ASSEMBLY FROM DAMAGE WHEN IT IS REMOVED FROM THE AIRCRAFT ENGINE AND WHEN IT IS STORED. DO NOT ALLOW PRESSURE AGAINST GOVERNOR BODY WITH A WRENCH WHEN REMOVING THE NUTS.

(1) Remove the aircraft linkage and any other rigging from the governor.

(2) Disconnect the oil line between the valve assembly and the accumulator.

(3) Remove the accumulator and any associated mounting hardware.

NOTE: Refer to Hartzell HC-SL-61-200 for required rework of accumulator before storing the accumulator or returning the accumulator to service.

(4) Remove the governor and valve assembly.

(5) Remove the studs from the governor mounting pad.

(6) Install new 5/16-18 governor mounting studs in the engine:

(a) Install 5/16-18 x 1 3/4" mounting studs (Lycoming P/N 31C-14) to a driven height of 1.0 inch (2.5 cm) if a Hartzell governor is to be installed.

(b) Install 5/16-18 x 2.00" mounting studs (Lycoming P/N 31C-16) to a driven height of 1.31 inch (3.3 cm) if a Woodward governor is to be installed.

(7) Make a log book entry to reflect the removal of the accumulator, if appropriate.

H. Installation of the Governor Assembly to the Engine

WARNING: DURING GOVERNOR INSTALLATION, AIRFRAME MANUFACTURER'S MANUALS AND PROCEDURES MUST BE FOLLOWED AS THEY MAY CONTAIN ISSUES VITAL TO AIRCRAFT SAFETY THAT ARE NOT CONTAINED IN THIS SERVICE BULLETIN.

CAUTION: USE ADEQUATE PRECAUTIONS TO PROTECT THE GOVERNOR ASSEMBLY FROM DAMAGE WHEN IT IS INSTALLED ON THE AIRCRAFT ENGINE. DO NOT GOUGE OR PUT PRESSURE AGAINST THE GOVERNOR BODY WITH A WRENCH WHEN REMOVING NUTS. FOR E,U AND V SERIES GOVERNORS USE CAUTION WHEN USING AN OPEN END WRENCH TO TIGHTEN MOUNTING NUTS. THE WRENCH CAN GET CAUGHT BETWEEN THE MOUNTING NUT AND GOVERNOR BODY WALL CAUSING THE WALL OF BODY TO BE PUSHED INWARD.

(1) Ensure the governor mounting pad studs are installed in the aircraft engine, and are in suitable condition.

(2) Install the mounting gasket onto the engine pad.

(3) Install the appropriate governor (as defined in Paragraph C of this bulletin) and secure with mounting nuts and washers.

(4) Install aircraft linkage and any other rigging to the governor in accordance with the Airframe Manufacturer's instructions.

(5) Make a log book entry to reflect the governor change.

I. Propeller Installation and Operational Check

(1) Install the propeller in accordance with Hartzell Owner's Manual 145 (61-00-45).

(2) Perform an operational check of the propeller assembly in accordance with the Hartzell Pwner's Manual 145 (61-00-45).

J. Hartzell Propeller Inc. Contact Information

(1) Hartzell Propeller Inc.
Attn: Product Support
One Propeller Place
Piqua, Ohio 45356-2634 USA
Phone: (001) 937.778.4379
Fax: (001) 937.778.4391
E-mail: techsupport@hartzellprop.com

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