Marvel

Manufacturing Company

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Main Rotor Hub & Blade Assembly Balance
Bell Helicopter Models 204, 205, 212 Typical

Balance Equipment

Balance Indicator

1	7BAL052	Kit - Balance Indicator
1	3350	Stand & Hoist
	Alternate	
1	7BAL051	Kit - Balance Indicator

Rotor Mount

1	7HEL061	Kit - Main Rotor Balance Adapter
1	2337	Fixture
1	2467	Sleeve

Accessory

2	3434	Jack - Position

Note: The jacks provide a mechanical means to position and retain rotor grips/blades outward to seat tension straps and anchors during blade bolt station adjustment and balance operations. Use can be deleted if another procedure will insure this radially outward condition.

Preparation

1. **Select a draft free area of adequate size. If required, provide shop equipment for work support and hoist.**
2. **Assemble 3350 Stand & Hoist and install 7BAL052 Kit under the table section when used.**
3. **Prepare 2293 Balance Indicator Arbor for use. Stand upright and remove rubber seals (2) for damping oil at indicator collar and clean indicator surfaces. Reposition indicator collar to provide minimum free clearance, approximately .005", with end of arbor and secure. Maintain arbor in upright position after removal of seals. Reinstall after use if arbor is to be stored horizontally.**

4. **Preparation of the rotor assembly prior to installation for balance must include attachment of pitch position locks, setting the blade bolt station and installation of blades including their alignment. Oil level in grips and reservoirs must be normal. Refer to applicable helicopter maintenance manual. Tightening of blade bolts and drag brace locks to be snug but not to final torques.**
5. **Clean bore and cone seat of rotor trunnion, check for and remove raised portion of nicks, insert 2588 Adapter from lower end to verify clearance and remove.**

Balance Procedure

1. **Place 2337 Fixture central on table of work stand and install 2467 Sleeve over top extension.**
2. **Install 2588 Adapter, large end downward, over top extension and seat on sleeve.**
3. **Carefully install rotor, engaging trunnion bore with pilot diameter of adapter and seat cone surfaces.**
4. **Install 2589 Yoke, legs downward, on 2293 Arbor and position to align its top surface at the arbor scale Sensitivity Setting indicated by the installation illustration. Secure with clamp screw of lock collar.**
5. **Insert arbor, with yoke, downward thru trunnion and fixture. Align legs with blade span axis and seat on top surface of rotor hub.**
6. **Select and install spacer on exposed lower end of arbor as required to extend beyond arbor not to exceed 1 1/4". Insert 2215 handwheel and tighten to seat yoke firmly on surface of hub.**
7. **Adjust blade pitch locks to position root of blades at zero pitch using top surface of yoke lock collar as reference. Place end of bevel (bubble) protractor base firmly on top surface of yoke lock collar and align at 90° to rotor span axis. Adjust quadrant of protractor to centralize bubble and secure. Transfer protractor, maintaining same transverse position, to flat upper surface of grip fork adjacent to outboard side of blade bolt and again align at 90° to span axis. Adjust pitch with pitch lock to centralize bubble. Transfer protractor, maintaining same transverse position, to opposite grip fork and repeat pitch adjustment procedure.**
8. **Install 3434 Jacks to bear against vertical end surfaces of trunnion pillow blocks and locate swivel pad to contact recess of oil reservoir plate adjacent to attachment bolt head. Lift blades at tip to horizontal, limiting droop, and adjust swivel pads to maintain 1/2 turn outboard pressure loading. Lower blades and readjust pads to load 1 /2 turn from minimum pressure condition.**

9. **Attach 2264 cable with 2266 Quick Disconnect to arbor and engage ball with lift plate of stand hoist or alternate 2994 Quick Disconnect Cable to shop hoist.**
10. **Hoist assembly approximately 1/4" above stand table, stabilize movements and observe balance condition as indicated by exposure of black disc in top surface of arbor shaft. Check to insure indications are not affected by interferences, air drafts or movement of nearby personnel.**
11. **The initial balance indication will determine which blade must be swept for chordwise balance correction. Final blade bolt torque and drag strut lock operations for the blade not requiring change can be accomplished at this time. Upon completion, recheck pitch position of both blades and reset, if necessary, in accordance with step 7 and maintain jack preload before proceeding with final balance.**
12. **Refer to applicable helicopter maintenance manual for balance tolerance, method of correction or other assembly requirements.**

Balancer Installation - Main Rotor Bell Models 204 - 205 - 212 Typical