

**PARAVION TECHNOLOGY, INC.
2001 AIRWAY AVENUE
FT. COLLINS, COLORADO 80524**

PR-505AC-120M

Rev. D

June 11, 2019

Instructions for Continued Airworthiness

For

Bell Model 505 Series Helicopters

Air Conditioning System

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REVISION HISTORY

Revision	Date	Detail of Changes	By
A	07/26/2016	Original	JT
B	12/06/2016	Completely revised	LS
C	05/24/2017	Added torque check for pulley after installation.	MEH
D	06/11/2019	Added Right Hand Forward Evaporator	ZA

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LIST OF EFFECTIVE PAGES

PAGE NO.	REVISION	DATE	PAGE NO.	REVISION	DATE
Cover	D	06/11/2019			
I	D	06/11/2019			
II	D	06/11/2019			
III	D	06/11/2019			
IV	D	06/11/2019			
V	D	06/11/2019			
VI	D	06/11/2019			
1	D	06/11/2019			
2	D	06/11/2019			
3	D	06/11/2019			
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6	D	06/11/2019			
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AIRWORTHINESS LIMITATIONS

No airworthiness limitation associated with this type design change.

This system has no life-limited components.

REVISION	DATE	APPROVED
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1 SYSTEM DESCRIPTION

1.1 AIR CONDITIONING SYSTEM INSTALLATION GENERAL

The cabin air conditioning system operates on the vapor cycle principal and includes a compressor, condenser, receiver/drier bottle, and two evaporators with an optional third. A diagram of typical basic air conditioning systems components, plumbing routing and description of operation can be found in the 505AC-900M, Installation Instructions.

1.2 AIR CONDITIONING SYSTEM COMPONENTS AND LOCATIONS

- A. The compressor is located above the upper deck, forward of the aft firewall in the engine compartment. It is belt-driven by the tail rotor drive shaft.
- B. The condenser is located aft of the baggage compartment. Air is drawn through the belly fairing and the condenser coils, then exhausted back through the aircraft belly.
- C. The receiver/drier bottle is located on the left hand side of the bulkhead aft of the baggage compartment. The HI-LO switch, located on the receiver/drier bottle will disengage the compressor if system pressure is greater than 454 psi or less than 28 psi. This protects the system against over-pressure or refrigerant loss.
- D. Refrigerant lines are routed between the compressor and condenser, to the receiver/drier bottle, the evaporators, and back to the compressor. These lines are made from 1/4", 3/8" and 1/2" aluminum tubing according to the volume of refrigerant which flows in each.
- E. The aft evaporator is mounted on the left side, aft of the passenger cabin above the baggage compartment. The left-hand forward evaporator is mounted forward of the instrument panel. The optional right-hand forward evaporator is mounted behind the glareshield on the bulkhead.
- F. The electrical system powers the evaporator and condenser fans, as well as the compressor clutch. The air conditioning system controls are located in the center console panel.

1.3 AIR CONDITIONING ELECTRICAL SYSTEM

Electrical power for the air conditioning system is provided by the "AIR COND" push/pull breakers located in the main electrical breaker panel on the right hand, aft side of the aft baggage compartment bulkhead.

The air conditioning system draws 36.3 amps maximum @ 24VDC with optional 3rd evaporator installed, 28.9 amps maximum with base system. The system is controlled by switches located in the center console panel. The 3-position switch, BLO/OFF/AIR COND, is used to choose fan only or cooled air. The HIGH/LOW switches are used to choose high or low fan rpm for the evaporator blowers.

2 INSPECTION AND MAINTENANCE

The objective of this document is to ensure that component installations are secure and that the electrical system is airworthy. See Troubleshooting Procedures table in 505AC-900M, Installation Instructions, for most likely problems which may be encountered, and the appropriate corrective actions. Re-torque all loose and/or replaced fasteners per instructions below.

TABLE 1 – BETWEEN 10 AND 25 FLIGHT HOURS AFTER INSTALLATION

INSPECTION	COMMENTS	INITIALS
1. Between 10 and 25 flight hours after installation and anytime the driveshaft and/or pulley are removed and reinstalled, check torque of attaching hardware on air conditioner compressor pulley in accordance with drawing 505AC-330.		

TABLE 2 – 300-HOUR / 12 MONTH INSPECTION CHECKLIST

INSPECTION	COMMENTS	INITIALS
1. Check all electrical wires and connections for chafing and security.		
2. Check all electrical grounds for proper sealing and signs of corrosion.		
3. Check electrical operation of the entire system, referencing Installation Instructions procedures.		
4. Check all fittings, fasteners, and components for security. If necessary, torque per applicable installation drawing or table in the Installation Instructions.		
5. Check compressor drive belt for wear and tension. **		
6. Inspect and lubricate #1 tail rotor drive shaft splines of the compressor drive pulley assembly per aircraft manufacturer's instructions.		
7. Check system operating temperatures. It is generally not necessary to inspect for system leakage, or to adjust the refrigerant charge if the evaporators produce a temperature drop of 25°F or greater.*		
8. Verify placard installation for legibility and condition.		

*Refer to Troubleshooting Procedures in the install Installation Instructions, if any system malfunctions occur.

** The belt tension on a newly installed belt should be reset after the first two hours of operation. Replace the belt based on condition, reference component removal and replacement in this document.

NOTE: Servicing of HFC Systems should be performed by Licensed and Qualified Personnel only.

2.1 SAFETY PRECAUTIONS

Follow all precautions and safety practices outlined in the Installation Instructions. The refrigerant used in the air conditioning system is HFC-134a. Other refrigerants, such as R-12, must not be introduced into the system.

2.2 TROUBLESHOOTING THE SYSTEM AND COMPONENTS

Refer to the Troubleshooting Information section of the Installation Instructions to determine if system components are working properly.

2.3 COMPRESSOR OIL LEVEL MEASUREMENT (IN AIRCRAFT)

It is not necessary to check the oil level as routine maintenance. Referencing the System Servicing section of the Installation Instructions, oil level should be checked when a system component has been replaced, when an oil leak is suspected, or when it is specified as a diagnostic procedure as detailed in the Troubleshooting Section of the Installation Instructions.

- A. Run the compressor for 10 minutes with the engine at idle.
- B. With the engine off, recover all refrigerant from the system, record amounts of oil and refrigerant recovered.
- C. Remove the oil filler plug as detailed in the Installation Instructions. Using a socket wrench on the armature-retaining nut, turn the shaft clockwise until the counterweight is positioned as shown.

NOTE: This oil level is based on the assumption that the compressor is upright and is approximately level.

- D. Add or remove oil as necessary to achieve the recommended compressor oil level. Re-install oil filler plug and torque per instructions.
- E. Charge the system with refrigerant and replace oil removed during refrigerant recovery, if applicable, per system servicing procedures contained in the servicing unit manufacturer's instructions and the Installation Instructions. Factor in any changes made in compressor oil level at this time to achieve final system oil charge of 6.5 oz. \pm 0.5 oz. Record amount of oil and refrigerant added in aircraft records.

2.4 PULLEY AND BELT WEAR

See Figure 1 for correct V-belt positions in pulley. Replace belt if frayed, excessively worn or damaged, reference Figures 3, 4. A properly tensioned belt as detailed in this document and the Installation Instructions maximizes drive components life.

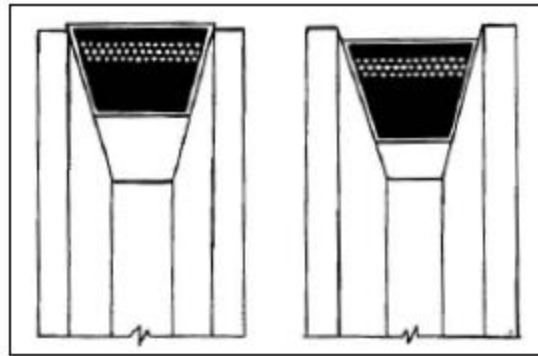


FIGURE 1: CORRECT BELT POSITIONS

Reference Figure 2, check drive and driven pulleys for uneven or excessive wear on the belt contact surface in the form of sharp edges, steps, or dished out sidewalls. Follow instructions in this document and remove drive belt. Using a straight edge and a wire gage, measure pulley wear at the most worn point. Replace pulley if wear is greater than 0.025" from nominal or if belt contacts pulley inner diameter.

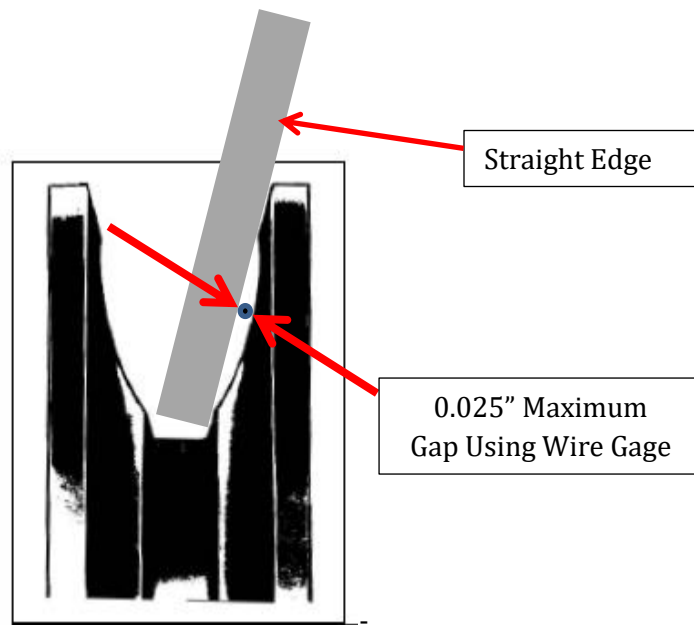


FIGURE 2: DISHED OUT PULLEY GROOVE EXAMPLE

Reference Figure 3, a slip burn is caused by improper belt tension (too loose), or belt overload from a damaged compressor or clutch bearing. Replace damaged components and properly tension belt as detailed in this document.



FIGURE 3: BELT SLIP BURN

Reference Figure 4, if belt tension is too high, this will cause excessive heat and will produce large cracks on the belt underside. Replace belt and properly tension as detailed in this document.



FIGURE 4: BELT UNDERSIDE CRACKED

3 COMPONENT REMOVAL AND REPLACEMENT

NOTE: Before removing any component which requires loosening the refrigerant line, the refrigerant must be removed and reclaimed. When reclaiming refrigerant, oil removed from the system should be measured and must be replaced in the system prior to recharging as detailed in the Installation Instructions.

Gain access to component locations. Refer to the appropriate Bell Helicopter maintenance manual, installation drawings, and PR-505AC-900M, Installation Instructions, for air conditioning component installation details. It is good practice to thoroughly inspect all fasteners, fittings, connections, plumbing, and electrical routing before proceeding to charge the system.

3.1 REFRIGERANT PLUMBING COMPONENTS REMOVAL

Remove any clamps and attaching hardware. Refer to Paravion Drawing 505AC-540, Plumbing Installation, to remove drier bottle, fittings, tubes or hose assemblies.

3.2 REFRIGERANT PLUMBING COMPONENTS INSTALLATION

Reinstall removed components, referencing the Installation Instructions and drawings 505AC-540 and 505AC-543 as applicable. Ensure correct torque values and installation of SECO seals.

3.3 COMPRESSOR REMOVAL

Refer to drawings 505AC-330, 505AC-540, and 505AC-601. Disconnect electrical harness; remove the hoses from their fittings at the drain pan and compressor. Cap all open lines and ports to prevent intrusion of foreign matter. Loosen the tensioner, remove the compressor mounting bolts and drive belt and lift the compressor from the bracket.

3.4 COMPRESSOR INSTALLATION

Reinstall compressor per Installation Instructions and drawings 505AC-330, 505AC-540, and 505AC-601.

3.5 DRIVE BELT REMOVAL

Refer to Section 3.4 for removal of the compressor. Refer to manufacturer's maintenance manual and remove the number 1 tail rotor drive shaft. Remove the drive belt from the drive pulley and compressor.

3.6 DRIVE BELT INSTALLATION

Refer to applicable maintenance manual for installation and spline lubrication of the number 1 tail rotor drive shaft. Install belt on drive pulley and complete drive shaft installation. Refer to Section 3.5 for compressor installation. With compressor belt tensioner bolt adjusted to maximum length, place drive belt over compressor pulley and temporarily install the compressor assembly in the mount bracket using hardware indicated. After adjusting belt tension per Section 3.8, complete the compressor installation per Section 3.5

3.7 ADJUSTING DRIVE BELT TENSION

Reference drawing 505AC-330 and Installation Instructions, check drive belt tension, if needed; tighten the drive belt by adjusting the belt tensioner to achieve 35 pounds belt tension. A "KRIKIT" belt tension gage (Gates P/N 91107) or equivalent tool is useful to accurately set belt tension. If belt cannot be adjusted to proper tension, replace belt.

WARNING: DO NOT OVER TIGHTEN THE BELT, THIS CAN LEAD TO PREMATURE WEAR OF COMPONENTS

3.8 CONDENSER REMOVAL

Reference manufacturer's maintenance manual and drawings 505AC-230, 505AC-540, and 505AC-601. Disconnect condenser electrical harness and remove belly panel from aircraft. With refrigerant discharged, loosen and detach the inlet and outlet tube assemblies from the condenser. Cap all open lines and ports to prevent intrusion of foreign matter.

Disassemble the fasteners attaching condenser assembly to the airframe. Remove the condenser by sliding forward, off mount tabs, and lowering out of airframe.

3.9 CONDENSER FAN REPLACEMENT

If troubleshooting reveals condenser fan failure, remove the condenser and follow instructions per PR-505-910M Component Servicing Instructions to replace fan.

3.10 CONDENSER INSTALLATION

Reinstall condenser per Installation Instructions and drawings 505AC-230, 505AC-540, and 505AC-601. Reinstall belly panel per manufacturer's maintenance manual.

3.11 RECEIVER/DRIER BOTTLE REMOVAL

Recover refrigerant and referencing drawings 505AC-540, 505AC-601, disconnect electrical harness and plumbing lines. Remove receiver/drier assembly from aircraft. Cap all open lines and ports to prevent intrusion of foreign material. The HI-LO switch is part of the receiver/drier assembly.

NOTE: The receiver/drier bottle contains a filter trap for particulate contamination and a desiccant to absorb moisture from the system. A new receiver/drier bottle should be replaced each time the system is discharged, components removed, or if any reason exists to believe that the desiccant is saturated. To preclude saturation of the desiccant, the receiver/drier fitting caps should not be removed and dryer bottle not connected until just prior to system evacuation and charging.

3.12 RECEIVER/DRIER BOTTLE INSTALLATION

Reinstall new receiver/drier bottle per Installation Instructions and drawings 505AC-540, 505AC-601.

3.13 EVAPORATOR REMOVAL

Reference drawings 505AC-513, 505AC-440, 505AC-540, 505AC-601, 505AC-443, 505AC-523, 505AC-543, and 505AC-603 as applicable. Recover refrigerant per Installation Instructions and disconnect electrical harness, inlet and outlet plumbing, drain lines, and ducting. Cap all open lines and ports to prevent intrusion of foreign matter. On instrument panel evaporator installation, reference manufacturer's instructions and first remove instrument panel shroud and associated ducting. Remove the four evaporator support bolts and remove evaporator assembly.

3.14 EVAPORATOR INSTALLATION

Reinstall evaporators per Installation Instructions and drawings 505AC-513, 505AC-440, 505AC-540, 505AC-603, 505AC-443, 505AC-523, 505AC-543AC, and 505AC-603 as applicable. Install instrument panel shroud per manufacturer's instructions if applicable.

3.15 ELECTRICAL CIRCUITS & WIRING

Refer to the Bell Helicopter "Electrical Standard Practices manual" (BHT-ELEC-SPM) for acceptable practices during electrical repair procedures. Reference troubleshooting information in the Installation Instructions to determine electrical system components correct operation and condition. Replace any damaged or failed electrical wiring or components with equivalent units obtained from or approved by Paravion Technology, Inc. Install electrical components per install Installation Instructions and drawings 505AC-601 505AC-603 as applicable.

4 SYSTEM SERVICING

NOTE: Only trained and qualified personnel should service an air conditioning system.

Refer to the Safety Precautions and System Servicing sections of the Installation Instructions before recovering or charging the air conditioning system. If a previously charged system is low on refrigerant, the system should be checked for leaks. Follow instructions in sections System Evacuation and Leak Check Procedures outlined in the Installation Instructions. Charge the air conditioning system according to outlined procedures.

NOTE: A new receiver/drier bottle should be replaced each time the system is discharged, components removed, or if any reason exists to believe that the desiccant is saturated.

4.1 ADDING REFRIGERANT TO A PARTIAL EXISTING CHARGE

NOTE: Only trained and qualified personnel should service an air conditioning system.

A partial system charge can be restored to "full charge" without discharging and evacuating the system. A partial charge indicates either a leak in the system, or incorrect servicing. See Installation Instructions for complete information.

- A. Reference the Installation Instructions for servicing information and refrigerant recovery.
- B. Check for and correct any leaks found in the system per Installation Instructions.
- C. Follow Installation Instructions and recovery/charging unit manufacturer's instructions and charge system.

5 REFERENCES

14 CFR, Part 27

Paravion Technology Inc. PR-505AC-900M Installation Instructions

Paravion Technology Inc. PR-505AC-910M Component Servicing Instructions

The following Paravion Technology Inc. Installation Drawings:

- A. 505AC-101 Installation Configuration
- B. 505AC-230 Condenser Installation
- C. 505AC-330 Compressor Installation
- D. 505AC-440 Evaporators Installation
- E. 505AC-513 Inlet Duct Installation
- F. 505AC-524 Outlet Duct Installation
- G. 505AC-540 Plumbing Installation
- H. 505AC-601 Electrical Installation

Additional forward evaporator drawings:

- I. 505AC-103 – Installation Configuration
- J. 505AC-443 – Evaporator Installation
- K. 505AC-523 – Evaporator Ducting Installation
- L. 505AC-543 – Plumbing Installation
- M. 505AC-603 – Electrical Installation

Bell Helicopter Textron Model 505 Maintenance Manuals

Bell Helicopter Textron BHT-SPM-ALL, Standard Practices Manual

Bell Helicopter Textron BHT-ELEC-SPM, Electrical Standard Practices Manual