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Nevada Ryan

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DAILY OR PREFLIGHT CHECKS (cont'd)

4. Belly

- Verify all antennas and panels secure
- Verify aft crosstube cover properly installed
- Verify generator cooling air filter clean

5. Main Rotor

- Verify no damage to blades
- Verify paint covers bond line
- Verify no leaks at pitch change boots
- Verify all fasteners secure
- Verify no excessive looseness at scissors, rod ends

CAUTION

Do not pull down on blades to teeter rotor. To lower a blade, push up on opposite blade.

6. Fuselage Left Side and Engine Compartment

- Verify no visible damage
- Verify door hinge cotter rings installed
- Check landing gear strut fairings, skid, skid shoes
- Verify static port clear
- Verify fuel quantity and filler cap secure
- Verify engine air filter clean and secure
- Check engine, main gearbox, hydraulic oil levels
- Check gearbox oil filter impending bypass indicator
- Check engine and gearbox oil coolers
- Check engine governor control linkage
- Verify no fluid leaks
- Sample fuel, drain water and contaminants
- Verify all cowl doors latched

NOTE

If shut down for more than 15 minutes, engine oil level may read low. Motor engine with starter for 30 seconds and re-check before adding oil.

DAILY OR PREFLIGHT CHECKS (cont'd)

7. Nose

- Verify pitot tube clear
- Verify windshield clean and undamaged
- Check yaw string

8. Cabin Area

- Verify no loose items
- Verify all items clear of controls
- Verify left seat controls removed or properly installed
- Verify seatbelts for unoccupied seats buckled

CAUTION

Remove left seat controls if person in that seat is not a rated helicopter pilot.

CAUTION

Ensure compartments under occupied seats are not filled above maximum fill line.

CAUTION

Ensure all cabin doors are unlocked before flight to allow rescue or exit in an emergency. Aft door locks have a green stripe to indicate door unlocked.

CAUTION

Shorter pilots may require cushion to obtain full travel of all controls. Verify aft cyclic travel is not restricted.

PRACTICE AUTOROTATION - POWER RECOVERY

CAUTION

Verify a recent N_1 deceleration check was performed prior to conducting autorotations. Do not close throttle above 10,000 feet density altitude or with cabin heat ON (see Section 2).

1. Close throttle and lower collective to down stop.
2. Adjust collective to keep rotor RPM within limits. |
3. Keep airspeed 60 to 70 KIAS.
4. At about 40 feet AGL, begin cyclic flare to reduce rate of descent and forward speed, and smoothly roll throttle full on to recover engine power.
5. At about 8 feet AGL, apply forward cyclic to level aircraft, and raise collective to control descent.

CAUTION

Simulated engine failures require prompt lowering of collective to avoid dangerously low rotor RPM. Catastrophic rotor stall could occur if rotor RPM drops below 80% plus 1% per 1000 feet of altitude.

CAUTION

If entering autorotation with a rapid collective input, close throttle before lowering collective to avoid an N_2 overspeed. |

CAUTION

Engine may require several seconds to spool up to full power during power recoveries.

NOTE

For maximum glide distance and minimum rate of descent configurations, see Section 3.

PRACTICE AUTOROTATION - WITH GROUND CONTACT

If practice autorotations with ground contact are required for demonstration purposes, perform in same manner as power recovery autorotations except keep throttle closed throughout maneuver. Always contact ground with skids level and nose straight ahead.

NOTE

Have landing gear skid shoes inspected frequently when practicing autorotations with ground contact. Rapid wear of skid shoes may occur.

HYDRAULICS-OFF TRAINING

Hydraulic system failure may be simulated using cyclic-mounted hydraulic switch.

CAUTION

With hydraulics switched OFF, controlling helicopter in a hover may be difficult due to control system feedback forces.

CAUTION

Before switching hydraulics from OFF to ON, relax force on cyclic and collective to avoid overcontrolling.

DESCENT, APPROACH, AND LANDING

1. Reduce power with collective as desired. Observe airspeed limits. Maximum recommended airspeed is 110 KIAS except in smooth air.

CAUTION

Do not initiate a descent with forward cyclic. This can produce a low-G condition. Always initiate a descent by lowering collective.

2. Make final approach into wind at lowest practical rate of descent with initial airspeed of 60 knots.
3. Reduce airspeed and altitude smoothly to hover. (Be sure rate of descent is less than 300 feet per minute before airspeed is reduced below 30 KIAS.)
4. From hover, lower collective gradually until ground contact.
5. After initial ground contact, lower collective to full down position.

CAUTION

When landing on a slope, return cyclic control to neutral before closing throttle.

CAUTION

Never leave helicopter flight controls unattended while engine is running.

CAUTION

Hold throttle closed if passenger is entering or exiting left front seat with engine running and left seat collective installed.

SHUTDOWN PROCEDURE

- Collective down Friction ON
- Throttle closed N₁ deceleration check
- Cyclic and pedals neutral Friction ON
- Cool down Two minute idle
- Fuel cutoff Pull OFF, monitor MGT

CAUTION

Rapid MGT increase following shutdown indicates residual fire in combustor. Follow “Engine Fire During Start or Shutdown” procedure per Section 3.

- Sprag clutch check Verify N₂/R needles split
- Wait one minute Apply rotor brake
- Avionics, generator, battery, igniter switches OFF

CAUTION

Applying rotor brake less than one minute after fuel cutoff may cause heat damage to brake shoes and gearbox oil seal.

NOTE

After engine shutdown, pilot should uncover one ear and listen for unusual noise which may indicate impending failure of a bearing or other component.

CAUTION

Do not slow rotor by raising collective during shutdown. Blades may flap and strike tailcone.

NOTE

HYD switch should be left ON for start-up and shutdown to reduce possibility of unintentional hydraulics-off liftoff. Switch OFF only for pre-takeoff controls check or hydraulics-off training.

LOADING INSTRUCTIONS

The following table may be used when calculating loaded helicopter weight and CG position.

COMMON ITEM WEIGHT & CG

| Item | Weight (lb) | Longitudinal arm (in.) | Lateral arm (in.) (+ = right side) |
|---|-------------|------------------------|--|
| Pilot (right forward seat) | | 49.0* | 12.2 |
| Left forward passenger | | 49.0* | - 12.2 |
| Aft outboard passengers | | 80.0 | ± 16.0 |
| Aft center passenger | | 78.0 | 0.0 |
| Baggage under forward seats | | 42.0 | ± 12.2 |
| Baggage under aft seats | | 82.0 | ± 15.0 |
| Baggage in baggage compartment | | 107.0 | 0.0 |
| Fuel | | 102.5 | - 3.0 |
| Forward doors | 7.5 each | 49.5 | ± 26.8 |
| Aft doors | 7.0 each | 75.2 | ± 27.2 |
| Removable controls (cyclic, collective, pedals) | 2.0 | 31.0 | - 13.0 |
| Items on accessory mount bars | | 23.0 | ± 14.0 |

* If additional backrest cushion is used, subtract thickness of compressed cushion.

LOADING INSTRUCTIONS (cont'd)

The following sample calculation demonstrates how to determine loaded helicopter weight and center of gravity. A worksheet is provided on the page following the sample calculation for a weight and balance calculation for your helicopter. Calculated weight and balance must be compared with the CG limits given in Section 2 to determine safe loading. Both takeoff and empty fuel conditions must be within limits.

Lateral CG usually falls well within limits for conventional loadings. If an unusual lateral installation or loading occurs, lateral CG should be checked against the CG limits given in Section 2. The lateral reference datum is the aircraft centerline with items to the right positive and items to the left negative.

LOADING INSTRUCTIONS (cont'd)

SAMPLE LOADING CALCULATION

| Item | Weight (lb) | Location | | Moment | |
|---------------------------------------|----------------|-----------------------|--|-------------------|------------------|
| | | Long. Arm (in.) | Lat. Arm (in.) + = Right Side | Long. (in.-lb) | Lat. (in.-lb) |
| Basic empty weight | 1290 | | | 140610 | 431 |
| Remove forward right door | - 7.5 | 49.5 | 26.8 | - 371 | - 201 |
| Remove forward left door | | 49.5 | - 26.8 | | |
| Remove aft right door | | 75.2 | 27.2 | | |
| Remove aft left door | | 75.2 | - 27.2 | | |
| Remove left seat controls | | 31.0 | - 13.0 | | |
| Pilot (forward right seat) | 170 | 49.0 | 12.2 | 8330 | 2074 |
| Left forward passenger | 170 | 49.0 | - 12.2 | 8330 | - 2074 |
| Aft right passenger | 170 | 80.0 | 16.0 | 13600 | 2720 |
| Aft center passenger | 130 | 78.0 | 0.0 | 10140 | 0 |
| Aft left passenger | 170 | 80.0 | - 16.0 | 13600 | - 2720 |
| Baggage under forward right seat | 10 | 42.0 | 12.2 | 420 | 122 |
| Baggage under forward left seat | 10 | 42.0 | - 12.2 | 420 | - 122 |
| Baggage under aft right seat | 10 | 82.0 | 15.0 | 820 | 150 |
| Baggage under aft left seat | 10 | 82.0 | - 15.0 | 820 | - 150 |
| Baggage in main baggage comp. | 50 | 107.0 | 0.0 | 5350 | 0 |
| Items on accessory mount bars | 5 | 23.0 | 14.0 | 115 | 70 |
| Zero usable fuel weight and CG | 2187.5 | 92.4 | 0.1 | 202184 | 300 |
| Usable main fuel at 6.7 lb/gal. | 493.1 | 102.5 | - 3.0 | 50543 | - 1479 |
| Takeoff Gross Weight and CG | 2680.6 | 94.3 | - 0.4 | 252612 | - 1179 |

Note: CG location (arm) for loaded helicopter is determined by dividing total moment by total weight.

LOADING INSTRUCTIONS (cont'd)

LOADING CALCULATION WORKSHEET

| Item | Weight (lb) | Location | | Moment | |
|---------------------------------------|----------------|-----------------------|--|-------------------|------------------|
| | | Long. Arm (in.) | Lat. Arm (in.) + = Right Side | Long. (in.-lb) | Lat. (in.-lb) |
| Basic empty weight | | | | | |
| Remove forward right door | | 49.5 | 26.8 | | |
| Remove forward left door | | 49.5 | - 26.8 | | |
| Remove aft right door | | 75.2 | 27.2 | | |
| Remove aft left door | | 75.2 | - 27.2 | | |
| Remove left seat controls | | 31.0 | - 13.0 | | |
| Pilot (forward right seat) | | 49.0 | 12.2 | | |
| Left forward passenger | | 49.0 | - 12.2 | | |
| Aft right passenger | | 80.0 | 16.0 | | |
| Aft center passenger | | 78.0 | 0.0 | | |
| Aft left passenger | | 80.0 | - 16.0 | | |
| Baggage under forward right seat | | 42.0 | 12.2 | | |
| Baggage under forward left seat | | 42.0 | - 12.2 | | |
| Baggage under aft right seat | | 82.0 | 15.0 | | |
| Baggage under aft left seat | | 82.0 | - 15.0 | | |
| Baggage in main baggage comp. | | 107.0 | 0.0 | | |
| Items on accessory mount bars | | 23.0 | | | |
| Zero usable fuel weight and CG | | | | | |
| Usable fuel quantity at 6.7 lb/gal. | | 102.5 | - 3.0 | | |
| Takeoff Gross Weight and CG | | | | | |

Note: CG location (arm) for loaded helicopter is determined by dividing total moment by total weight.

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ANNUNCIATOR PANEL (cont'd)

The COWL DOOR segment is illuminated when the fuel filler cowl door or baggage door is not closed. On later aircraft, the COWL DOOR segment also illuminates when an engine cowl door is not closed. The AIR FILTER segment illuminates when pressure drop across the filter opens bypass doors, allowing unfiltered air to the engine.

On later aircraft, the HYD segment illuminates when the hydraulic system is switched off.

The EMU (Engine Monitoring Unit) segment indicates the EMU status with either steady, flashing, or no illumination. The EMU segment will illuminate only when the test button is depressed.

The test button at the annunciator panel should cause all segments on the panel, as well as the ROTOR BRAKE light, to illuminate when depressed. The LOW FUEL and < 12 GAL FUEL segments take approximately two seconds before they illuminate due to a time delay in the circuit. (The time delay prevents sloshing fuel from giving a false indication.) If the LOW FUEL segment illuminates immediately after the test button is depressed, a fault is indicated and should be investigated by a qualified mechanic. The EMU takes approximately ten seconds to perform a self-test after the battery is switched ON before the EMU segment will illuminate. The test button may be used on the ground or in flight to verify all circuits are functioning.

AUDIO ALERTS

All R66 helicopters have a low-RPM horn which sounds when rotor RPM is below 95%. The horn is muted when the collective is fully down. On earlier aircraft, the horn is provided by speakers in the side of the instrument console. On later aircraft, a tone generator in the audio system provides the horn through crew headsets.

AUDIO ALERTS (cont'd)

Later aircraft also have audio alerts in the headsets for high rotor RPM and high engine torque/MGT. For high RPM, a warble tone (high/low tone) indicates rotor RPM above 105%. For high engine torque/MGT, a beeping tone indicates torque above 100% or MGT above 782°C (5-minute limits). High torque is indicated by four beeps per second, increasing to 12 beeps per second if torque exceeds 108%. High MGT is indicated by 12 beeps per second. The beep tone will also come on during start if MGT exceeds 860°C, indicating an abnormally hot start.

Test buttons on the instrument panel permit pre-flight or in-flight tests of the high RPM and high torque/MGT tones. For high torque/MGT, depressing the test button give four beeps per second for two seconds followed by 12 beeps per second.

Additional audio alerts may be provided in the headsets depending on optional equipment installed, such as terrain warnings, traffic warnings, and autopilot modes.

AUDIO SYSTEM

A five-place audio system is standard. An audio control panel allows control of communication radios, intercom, and music (or other external audio) input.

Audio control panels from several manufacturers are offered. Pilots should consult the manufacturer's operating instructions for the specific brand of audio panel in the aircraft they fly.

Headset jacks are located in the ceiling near each seat. Pilot and copilot intercom and transmit are controlled by trigger switches on the cyclic grips. The trigger has two detents; the first detent activates the intercom and the second detent transmits. Additional intercom buttons are located on the forward side of the rear seats and on the left forward floor or seat support. Intercom may also be set to be voice activated. Music or other external audio may be plugged into a jack on the circuit breaker panel. For most installations and settings, this input is muted during radio communication.

CABIN HEATING AND VENTILATION

Fresh air vents are located in each door and in the nose. Door vents are opened and closed using the knob near the vent door hinge. A rotating knob is provided to seal and lock vents closed. For maximum ventilation, open door vents wide during hover but only one inch or less during cruise. The rotating knob can be used to hold vents partially open.

The fresh air inlet in the nose is opened by pulling the vent handle on the console face. Rotating the vent handle clockwise will lock its position. Air from the nose inlet is directed along the inside surface of the windshield for defogging as well as for ventilation.

Bleed air from the engine compressor is used for cabin heat. Tubing routes hot air from the engine to outlets forward of the tail rotor pedals and in the rear footwells. A heater control knob located to the left of the cyclic stick actuates a valve in the aft end of the control tunnel through a push-pull cable to control cabin heat. Because the cabin heat uses engine compressor air, some performance degradation occurs with heat ON (see Section 5).

CAUTION

In case of engine fire, cabin heat should be turned OFF.

SEATS, BELTS, AND BAGGAGE

The seats are not adjustable but the pilot-side pedals are adjustable. Each helicopter is supplied with a removable back cushion to position the pilot farther forward. This allows shorter pilots to reach the pedals, the cyclic grip in its most forward position, and the controls on the center console.

Heated seat bottoms and backrests for the forward seats and outboard rear seats are an option. Switches to control low and high heat settings are located on the panel above the right-side collective boot. The seat heaters operate only when the generator switch is in the ON position to reduce the likelihood of inadvertently draining the battery before the engine is started.

Each seat is equipped with a combined lap belt and inertia reel shoulder strap. The inertia reel is normally free but will lock if there is sudden movement as would occur in an accident.

Five-point harnesses are optional for the front seats. The lap belts on these harnesses should be adjusted to eliminate slack. The lower strap should be adjusted as necessary to ensure that the buckle does not interfere with the cyclic grip at aft cyclic. The harness is equipped with a webbing stop located above the inertia reel. The stop limits shoulder strap retraction and should be adjusted so the straps are comfortable without excessive slack.

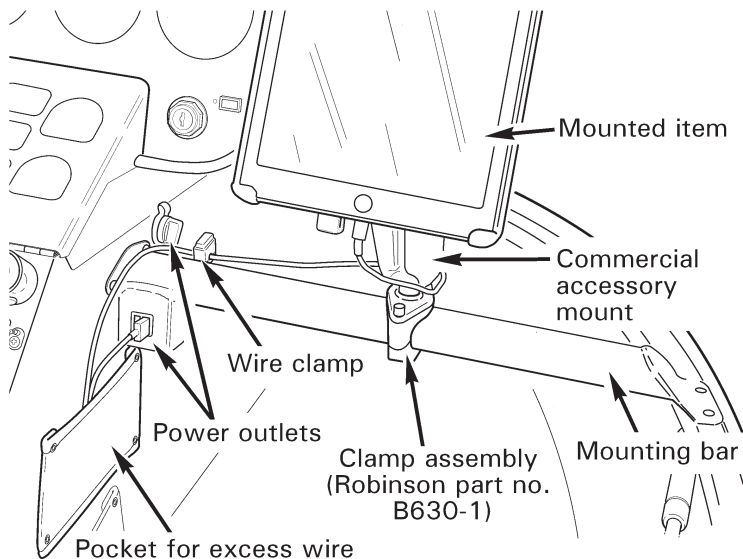
Optional anchor loops located in the cabin ceiling above the door posts provide attachment points for a safety tether for equipment or occupants during doors-off operation.

The main baggage compartment is located between the cabin and the engine compartment. It is accessed via a large door on the aircraft right side. The cowl door annunciator illuminates to warn the pilot when the door is not latched. A light illuminates the compartment when the battery switch is ON. Tie down anchors are provided for securing items in the baggage compartment. Observe placarded weight limits.

ACCESSORY MOUNTS (OPTIONAL)

Provisions for mounting small, portable items are an option. The provisions use mounting bars located forward of the pilot's seat, the copilot's seat, or both. The bars are fitted with one or more clamp assemblies which are compatible with a variety of commercially available accessory mounts. There is a 10 lb total weight limit for items attached to each bar. USB and cigarette-lighter-style power outlets are installed near the inboard end of the mounting bars. The power outlets are protected by the Aux Power circuit breaker and in-line fuses and are placarded with voltage/current ratings. Wire clamps and a pocket for securing excess wire are also provided.

The accessory mounts are intended to provide a safe means of mounting small items such as portable electronic devices. The mounting bar, clamp assembly, and power outlets are approved as part of the aircraft type design, but any items attached are the responsibility of the pilot in command under appropriate operating rules. Ensure that any items attached are secure and do not interfere with flight controls or primary field of view. Route any wires through the wire clamps or secure them to the bar with cable ties or tape.



COCKPIT CAMERA (OPTIONAL)

An optional video camera may be installed in the cabin ceiling. The camera records 4K video, intercom/comm audio, and GPS position both internally and to a removable flash drive inserted in the front of the camera housing. The internal memory retains only recent video and is not user accessible. Recording starts automatically when the helicopter battery is switched on and stops when it is switched off.

Recording to the flash drive can be stopped or audio muted using the record and audio switches on the front of the camera housing. Do not remove the flash drive while a recording is in progress as this will corrupt the video file. To remove a flash drive when the helicopter battery switch is on, first stop the recording using the record switch and wait for the blue light to stop flashing.

A blue flashing light on the camera housing indicates video is being recorded to the flash drive. A green steady light indicates the camera is powered and operating normally. The green light will change to an amber flashing light if an internal camera fault is detected, in which case video may not be recorded.

Video recorded on the flash drive can be viewed on a Windows PC or Mac computer. Video is recorded in sequential 4 GB files with each file approximately 25 minutes in length. Video files are labeled HELICAM_XXXX.MP4, where XXXX is a sequential number. GPS position and altitude are optionally displayed in the video and are also recorded separately to files labeled HELICAM_XXXX.GPX. A 128 GB flash drive (as supplied with helicopter) will record approximately 10 hours of video. When full, the earliest video file is overwritten with the last recording.

NOTE

Flash drives must meet the criteria described in the *Cockpit Camera User Guide* in order to function reliably.

COCKPIT CAMERA (OPTIONAL) (cont'd)

The *Cockpit Camera User Guide* is available on the Robinson website, www.robinsonheli.com, and includes additional information on camera operation, playback options, and troubleshooting.

CYCLIC GUARD (OPTIONAL)

The optional cyclic guard is a bar that extends from the inboard corner of the left front seat to the instrument console. It is intended to act as a barrier to help prevent inadvertent interference with the cyclic control. The guard also provides a hand grip for a passenger's right hand.

In order to access the under seat compartment with the guard installed, pull the silver spring knob at the forward end of the guard and allow the aft end to rotate down away from the seat hinge. To re-secure the guard, lift the aft end and allow the spring knob to lock back in place.

It is recommended that the guard be installed whenever a non-pilot passenger occupies the left front seat. A pilot flying from the left seat may find that the guard contacts the right leg when feet are on the pedals. The guard should be removed prior to flight if the pilot finds it objectionable.

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PARKING

1. Place cyclic control in neutral and apply friction.
2. Put collective full down and apply friction.
3. Align rotor blades approximately fore and aft. Apply rotor brake. Use blade tie-downs in windy conditions.

CAUTION

If using rotor blade tie-downs, do not overtighten tie-down straps (5 lb max tension). Do not pull down on blades to teeter rotor. To lower a blade, push up on opposite blade.

4. During storm conditions, helicopter should be hangared or moved to a safe area.

CABIN DOORS

All four cabin doors may be removed and installed by maintenance personnel or pilots. To remove a door, disconnect door strut by lifting inboard end of strut while holding door in full open position, remove cotter rings in upper and lower hinge pins, and then lift door off. To install doors, use reverse procedure. Adjust weight and balance as required when removing or installing doors.

ENGINE OIL AND FILTER

Full oil quantity is six quarts and minimum quantity for takeoff is four quarts. Quantity is indicated as follows:

- Six quart indication is top of knurled section of dipstick.
- Four quart indication is bottom of knurled section of dipstick or center of oil tank sight gage.

If shut down for more than 15 minutes, some oil may drain from the oil tank to the engine giving a false low oil quantity indication. If oil level appears low, motor the engine with the starter (ignition switch off) for 30 seconds and re-check level before adding oil.

Only turbine engine oil per specification AS 5780 HPC is approved. The following products are known to meet the specification and are approved by Rolls-Royce.

| <u>Product</u> | <u>Manufacturer</u> |
|--------------------|--------------------------|
| MJO 254 or MJO 387 | Exxon Mobil Lubricants |
| BPTO 2197 | Air BP Lubricants |
| ETO 2197 | Eastman Chemical Company |

The engine oil filter is located on top of the engine and is accessible via a right side cowl door. A red indicator pin (impending bypass indicator) extends from the end of the filter housing if the filter becomes contaminated. Operation with a contaminated filter may allow oil to bypass the filter element. Oil will still be supplied to the engine but will be unfiltered. If erroneous indication is suspected, the bypass indicator may be reset by pushing it back in. If the indicator extends during next engine run or flight, service the filter. Refer to RR300 Series Operation and Maintenance Manual for servicing instructions.

Recommended engine oil change intervals are every 400 hours or 12 months. See R66 Maintenance Manual.

SECTION 9

SUPPLEMENTS

OPTIONAL EQUIPMENT SUPPLEMENTS

Information contained in the following supplements applies only when the related equipment is installed.

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NON-U.S. SUPPLEMENTS

The following supplements contain additional information required by certain countries:

- Argentine Supplement
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- FATA Supplement (Russia)
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- Ukrainian Supplement
- Uruguayan Supplement

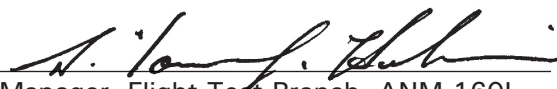
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FAA APPROVED
R66 PILOT'S OPERATING HANDBOOK

HELISAS AUTOPILOT SUPPLEMENT

This supplement must be included in the FAA-approved Pilot's Operating Handbook when the HeliSAS autopilot is installed.

The information contained herein supplements or supersedes the basic manual only in those areas listed in this supplement. For limitations, procedures, and performance information not contained in this supplement, consult the basic Pilot's Operating Handbook.

APPROVED BY: 
Manager, Flight Test Branch, ANM-160L
Federal Aviation Administration, LAACO
Transport Airplane Directorate

DATE: January 20, 2015

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| 9-6.7* | 16 Feb 22 | | |

* Manufacturer's data, not FAA approved.

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APPROVED BY:

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Date: 2022.02.16 12:33:27 -08'00' Acting,
Manager, West Flight Test Section, AIR-716
Federal Aviation Administration
Los Angeles

DATE: 16 FEB 2022

SECTION 1: GENERAL

INTRODUCTION

This supplement contains the changes and additional data applicable when the HeliSAS autopilot is installed.

There are two versions of the HeliSAS autopilot. The earlier version (designated Version 51) has a BC (backcourse) button on the control panel. The later version (designated Version 52) replaces the BC button with a SPD (speed) button on the control panel.

The autopilot's primary Stability Augmentation System (SAS) mode maintains a steady helicopter attitude by applying corrective inputs to the cyclic. Additional modes providing heading hold, altitude hold, airspeed control (Version 52), and navigation functionality are also selectable. The autopilot does not provide any collective or pedal inputs. The system is designed as a "fly through" system meaning the pilot can override as desired for maneuvering without disengaging the system. Only a few pounds of force at the cyclic are required for override, and the system will not disconnect due to pilot cyclic inputs.

CAUTION

The autopilot is intended to enhance safety by reducing pilot workload. It is not a substitute for adequate pilot skill nor does it relieve the pilot of the responsibility to monitor the flight controls and maintain adequate outside visual reference.

SECTION 2: LIMITATIONS

FLIGHT AND MANEUVER LIMITATIONS

Pilot's hand must be on cyclic grip under the following conditions:

During autopilot engagement or intentional disengagement

At altitudes less than 200 feet AGL

Minimum altitude for use of autopilot ALT mode is 200 feet AGL.

For practice instrument approaches, minimum altitude for use of autopilot VRT mode is 50 feet AGL.

SECTION 3: EMERGENCY PROCEDURES

AUTOPILOT DISENGAGEMENT OR FAILURE

The autopilot is designed to automatically disengage if the system detects a fault. Disengagement is normally indicated by four beeps in the headset. If the autopilot does not automatically disengage, failure may be recognized by erratic cyclic control motion, abnormal cyclic stick forces, or deviations in pitch or roll.

1. Continue flight using manual control. If autopilot has not disengaged, manually disengage using cyclic AP OFF button or control panel SAS button.
2. If SAS annunciator on control panel is steady white, re-engagement may be attempted at pilot's discretion.

CAUTION

Although unlikely, it is possible for certain faults to cause disengagement without the four-beep aural warning.

SECTION 3: EMERGENCY PROCEDURES (cont'd)

AUTOPILOT DISENGAGEMENT OR FAILURE (cont'd)

CAUTION

Due to the unstable nature of helicopters, autopilot disengagement requires immediate pilot attention. Always monitor helicopter attitude and flight controls, and be prepared to take manual control.

NOTE

The system automatically switches off all modes except SAS mode at airspeeds below 44 KIAS or above 140 KIAS, accompanied by a single beep. This is by design and not a system failure. The high speed limit is not intended to provide V_{ne} protection. It is the pilot's responsibility to observe V_{ne} limits.

SECTION 4: NORMAL PROCEDURES

GENERAL

Autopilot controls and operating modes are described in Section 7, Systems Description.

NOTE

Cyclic friction must be fully off for autopilot to work properly. Cyclic friction will degrade autopilot performance.

SECTION 4: NORMAL PROCEDURES (cont'd)

STARTING ENGINE AND RUN-UP

After "Hydraulic system", add:

Autopilot Check

Airspeed and altitude bugs Set (Version 52)

NOTE

For autopilot check, wear headset and ensure cyclic friction is off. Engage SAS mode. Verify cyclic exhibits centering tendency and SAS annunciator on control panel turns green. Disengage. Verify 4 beeps in headset, cyclic reverts to normal hydraulic system feel, and SAS annunciator turns white.

TAKEOFF PROCEDURE

Autopilot SAS mode may be engaged as desired on the ground or at any time during the takeoff procedure. Re-trim as necessary to eliminate undesirable cyclic forces.

CRUISE

Add:

Engage autopilot modes as desired. In SAS mode, re-trim as necessary to eliminate undesirable cyclic forces.

CAUTION

It is the pilot's responsibility to monitor flight controls, aircraft flightpath, traffic, and terrain even while the autopilot is engaged. The autopilot is designed to disengage in the event of a fault. Be prepared to take control if required.

SECTION 5: PERFORMANCE

No change.

SECTION 6: WEIGHT AND BALANCE

No change.

SECTION 7: SYSTEMS DESCRIPTION

AUTOPILOT

The HeliSAS autopilot system consists of two electric servomotors, a flight control computer, an autopilot control panel, and control buttons on the cyclic grip. One servomotor controls pitch and is installed in the control tunnel forward of the cyclic stick. The other servomotor controls roll and is installed under the pilot's seat. The servomotors are connected to the cyclic through electromagnetic clutches.

The flight control computer is installed on the forward panel under the pilot's seat, and the autopilot control panel is installed in the avionics stack.

The autopilot senses aircraft attitude using a combination of sensors in the flight control computer and an independent onboard attitude source such as the Attitude Heading Reference System (AHRS) for the Primary Flight Display (PFD). The computer then sends signals to the servomotors which are connected to the bottom of the cyclic in the control tunnel.

The primary autopilot mode is Stability Augmentation System (SAS) mode which maintains a steady helicopter attitude by applying corrective inputs to the cyclic. This is felt as a light cyclic centering force. Additional modes may be layered on top of SAS mode and are described below. The pilot can override as desired for maneuvering without disengaging the system. Only a few pounds of force at the cyclic are required for override, and the system will not disconnect due to pilot cyclic inputs.

The control panel has a row of buttons to control autopilot modes and annunciators to indicate mode status. A dark annunciator indicates that a mode is off, a white annunciator indicates that a mode is armed or on standby, and a green annunciator indicates that a mode is active.

SECTION 7: SYSTEMS DESCRIPTION (cont'd)

AUTOPILOT (cont'd)

When the avionics master is switched on, the autopilot performs a self-test and then enters SAS standby mode. All of the control panel indicators flash alternating white and green during the self-test. Four headset beeps occur at the beginning of the self-test as a check of the aural warning function. The SAS annunciator on the control panel turns steady white when the self-test is complete.

NOTE

Autopilot will not enter standby mode if attitude indicator is not functioning or indicated bank angle is greater than 6 degrees.

The autopilot SAS mode is engaged either by pressing the SAS button on the control panel or by pressing the TRIM button on the cyclic for more than 1.25 seconds. Additional modes are engaged by pressing the appropriate button on the control panel. The additional modes are disabled and will not engage at airspeeds below 44 KIAS or above 140 KIAS.

To disengage any mode, push the appropriate button on the control panel.

NOTE

Disengaging SAS mode will also disengage all other modes.

Modes may also be disengaged using the AP OFF button on the cyclic. If only SAS mode is engaged, push the AP OFF button once to disengage. If additional modes are engaged, push the AP OFF button once to disengage all modes except SAS and a second time to disengage SAS mode, or push and hold the AP OFF button to disengage all modes including SAS.

SECTION 7: SYSTEMS DESCRIPTION (cont'd)

AUTOPILOT (cont'd)

NOTE

SAS disengagement should always be accompanied by four beeps in the headset. If beeps do not occur, maintenance is required.

Safety monitors automatically disengage individual modes or the entire system if a fault is detected. Automatic disengagement of SAS mode (or the entire system) is indicated by four beeps in the headset. Automatic disengagement of any mode other than SAS is indicated by a single beep in the headset. There is no audio indication for intentional disengagement of modes other than SAS.

NOTE

The system also automatically reverts to SAS mode at airspeeds below 44 KIAS or above 140 KIAS, accompanied by a single beep. The high speed limit is not intended to provide V_{ne} protection. It is the pilot's responsibility to observe V_{ne} limits.

The TRIM button is used to re-set the target attitude (to re-trim) while in SAS mode. Use a small amount of force to override the autopilot and then push and release the TRIM button at the new desired condition. If the force to override is objectionable, the TRIM button may be held down during maneuvers. The system will re-trim to the attitude at which the TRIM button is released. For Version 52, stick forces felt during override will gradually wash out to near zero without use of TRIM button if override is maintained.

NOTE

The system will not re-trim to angles more than approximately 10° in pitch or roll.

SECTION 7: SYSTEMS DESCRIPTION (cont'd)

AUTOPILOT (cont'd)

NOTE

When engaging SAS mode from standby, for angles of less than approximately 10° in pitch and roll, SAS holds the current angles. If either pitch or roll is larger than approximately 10°, the system assumes an unusual attitude and gently levels the helicopter.

The autopilot is protected by a dedicated circuit breaker on the avionics bus (autopilot is not powered with the avionics master switch off).

Heading Mode (HDG) – maintains the heading selected by the heading bug on the directional gyro or Horizontal Situation Indicator (HSI) display. Aircraft can be steered using the heading bug.

Altitude Mode (ALT) – maintains altitude at the time of engagement or of last TRIM button release. The target altitude is reset each time the TRIM button is pressed and released.

NOTE

The autopilot uses pitch attitude to maintain altitude or follow an approach glidepath. It does not have any control of power setting. The pilot must manage power with the collective to control speed and rate of climb or descent. Make small, smooth power changes to allow the system to adjust to new power settings.

SECTION 7: SYSTEMS DESCRIPTION (cont'd)

AUTOPILOT (cont'd)

Navigation Mode (NAV) – tracks the active GPS or VLOC course displayed on the Course Deviation Indicator (CDI). If no CDI is installed, NAV will only track the active GPS course displayed on the GPS.

NAV may be armed prior to intercepting the active course. NAV annunciator is white when NAV is armed and turns green at course intercept. If HDG is active when NAV is armed, the autopilot will fly the selected heading until course intercept. If HDG is not active, the autopilot will select a 45° intercept angle.

Vertical Navigation Mode (VRT) – tracks an ILS glideslope or GPS approach vertical guidance. Arm VRT (annunciator turns white when armed) prior to intercepting the glidepath. VRT annunciator will turn green at glidepath intercept.

NOTE

Pushing the ALT button while VRT is armed or active will turn off VRT. VRT must be re-armed or re-engaged as desired.

NOTE

Reducing power to approach setting just prior to glidepath intercept is recommended.

Speed Mode (SPD) (Version 52 only)

Speed mode uses cyclic pitch to control airspeed. Exact behavior varies with configuration of airspeed and altitude bugs on the PFD as described below.

The altitude bug is displayed above the altitude tape and the airspeed bug is displayed above the airspeed tape. The appearance of all dashes or a blank field indicates a bug is not set.

SECTION 7: SYSTEMS DESCRIPTION (cont'd)

AUTOPILOT (cont'd)

Speed Mode (SPD) (Version 52 only) (cont'd)

If an airspeed bug is not set, selecting SPD holds the current airspeed. The target speed is reset each time the trim button is pressed and released.

If an airspeed bug is set, selecting SPD holds airspeed at the bug setting. Changing the bug will change the target airspeed.

If an altitude bug is set, selecting SPD will also arm ALT (ALT LED white) for altitude capture. The mode will switch from SPD to ALT if the selected altitude is crossed. There will be a brief period in capture mode with the ALT LED flashing white/green.

NOTE

Do not change the selected altitude during ALT capture (ALT LED flashing white/green). System may pitch up or down to chase bug and may not capture altitude.

NOTE

Different brands of PFD behave differently in terms of bug settings at power up and how bugs are manually set. Refer to PFD manufacturer's documents for proper use. Verify desired bug settings before engaging SPD mode.

SECTION 7: SYSTEMS DESCRIPTION (cont'd)

AUTOPILOT (cont'd)

Backcourse Mode (BC) (Version 51 only) – reverse CDI sensing for backcourse approaches. Course on HSI should be set so that tail of course pointer points toward runway (set to inbound front course).

Airspeed Protection (Version 52 only) – Minimizes the possibility of the ALT mode to fly the helicopter to an airspeed below 44 KIAS due to insufficient power, or the VRT mode to fly the helicopter to an airspeed above 140 KIAS due to excess power when flying a precision approach glideslope. When triggered, it causes the longitudinal mode to change from ALT (at low airspeed) or VRT (at high airspeed) to SAS mode with a commanded pitch attitude of 2 degrees nose down. Since the mode change is not commanded by the pilot, a single warning beep is annunciated.

REMOVABLE FLIGHT CONTROLS

On later aircraft, disconnect the electrical connector for the left-hand trim button located near the quick release pin before removing the left cyclic grip. Reconnect the connector when installing the left cyclic grip.

SECTION 8: HANDLING AND MAINTENANCE

No change.

SECTION 10: SAFETY TIPS

The autopilot is intended to reduce pilot workload and enhance safety. It is important that pilots do not misuse this capability and allow their attention to be diverted. Pilots should continue monitoring the flight controls and helicopter attitude as well as looking for traffic and other obstacles. Autopilot disengagement requires immediate pilot attention. Pilots must always be prepared to take manual control.

The autopilot is not certified for flight in Instrument Meteorological Conditions (IMC). Adhering to appropriate VFR weather minimums is essential for safety.

If an inadvertent loss of outside visual reference occurs, the pilot must regain visual conditions as quickly as possible while avoiding abrupt, disorienting maneuvers. The following procedure is recommended:

1. If not already engaged, immediately engage autopilot SAS mode and allow autopilot to recover from unusual attitude if one has occurred.
2. Select a heading and altitude to ensure terrain and obstacle clearance. Turns and/or climbs may be required. Engage additional autopilot modes as desired for workload reduction.
3. While maintaining terrain and obstacle clearance, maneuver toward conditions of improved visibility.

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R66 PILOT'S OPERATING HANDBOOK

LITHIUM-ION BATTERY SUPPLEMENT

This supplement must be included in the FAA-approved Pilot's Operating Handbook when the lithium-ion main battery is installed.

Information contained herein supplements or supersedes the basic manual only in those areas listed in this supplement. For limitations, procedures, and performance information not contained in this supplement, consult the basic Pilot's Operating Handbook.

APPROVED BY:


for Manager, Flight Test Branch ANM-160L
Federal Aviation Administration
Los Angeles Aircraft Certification Office,
Transport Airplane Directorate

DATE:

January 17, 2017

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| 9-8.3 | 23 Dec 2022 | 9-8.6 * | 23 Dec 2022 |

* Manufacturer's data, not FAA approved.

REVISIONS

APPROVED BY:

Nevada Ryan

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Manager, West Flight Test Section, AIR-716
Federal Aviation Administration
Los Angeles, CA

DATE: 23 DEC 2022

SECTION 1: GENERAL

INTRODUCTION

This supplement contains changes and additional data applicable when the lithium-ion main battery is installed.

SECTION 2: LIMITATIONS

No change.

SECTION 3: EMERGENCY PROCEDURES

AMBER CAUTION INDICATORS

BATT FAULT Indicates abnormal battery operation. Charging, discharging, or both may be disabled. Land as soon as practical. Generator will continue to supply power in flight.

NOTE

Battery's internal circuitry may disable charge/discharge functions due to over-temperature, over/under voltage, or excessive current draw. A flashing light means the fault may be recoverable (battery will reset itself) either when the condition improves or during a power cycle at the next landing. A steady light means battery maintenance or replacement will likely be necessary.

COLD WEATHER OPERATION

STARTING ENGINE AND RUN-UP

Battery heater indicator light Extinguished

A battery without sufficient charge to start the engine will not have the normal indications of starter sluggishness associated with a lead-acid battery. Instead, the battery's monitoring circuit will suddenly interrupt power to the starter. If this occurs, immediately abort start by pulling fuel cutoff.

SECTION 6: WEIGHT AND BALANCE No change.

SECTION 7: SYSTEMS DESCRIPTION

ELECTRICAL SYSTEM

A 17 amp-hour lithium-ion battery replaces the lead-acid main battery. The battery includes built-in circuitry that monitors temperature, voltage, and current draw and manages battery charge and discharge. The circuitry automatically disables charge and/or discharge if any electrical or thermal problems are detected. The battery uses lithium-iron-phosphate chemistry which is less susceptible to thermal runaway than some other lithium battery chemistries.

The metal battery case is designed to contain any heat or gases generated within the battery and is vented overboard on the left side of the aircraft. No venting should occur during normal operation.

Two annunciator panel segments, BATT FAULT and BATT HEATER, indicate battery status. Earlier aircraft have two indicator lights located to the left of the annunciator panel.

BATT FAULT illuminates if the battery has an over- or under-voltage condition, an over-temperature condition, or if current draw exceeds limits. A flashing light indicates a recoverable fault. The light may go out if the fault corrects itself (e.g. temperature decrease) or may go out as a result of a power cycle at the next landing. A steady light indicates battery maintenance or replacement may be required. The emergency procedure for a fault light (flashing or steady) is to land as soon as practical. The generator will continue to supply electrical power during the landing.

SECTION 7: SYSTEMS DESCRIPTION (cont'd)

ELECTRICAL SYSTEM (cont'd)

The battery incorporates an internal heater for cold weather operation. The heater attempts to maintain a battery temperature of at least 50°F (10°C). When the battery is switched ON, BATT HEATER illuminates while the heater is warming the battery and extinguishes when the battery is warm enough to attempt an engine start. On very cold days, the heating cycle may take 10 minutes or more. The heater light is disabled while the engine is running but the heater will continue to function as long as the battery switch is ON.

If a start is attempted with insufficient charge, the battery's safety monitors may interrupt power. In the event of a power interruption, a small backup power supply will allow the MGT and N₁ gages as well as the Engine Monitoring Unit to continue functioning. The backup power supply also provides power to the map light. The backup power supply consists of two 9-volt batteries installed in the compartment under the left front seat. The 9-volt batteries are non-rechargeable and should be replaced periodically as indicated in the R66 Maintenance Manual.

NOTE

The backup batteries will discharge if the battery switch is ON and the main battery is discharged or disconnected. Backup batteries should be replaced if battery switch was left ON without main battery power.

SECTION 8: HANDLING AND MAINTENANCE

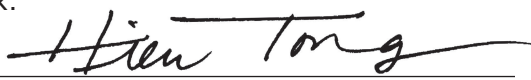
Nominal charging voltage for the lithium-ion battery is 28.8 volts. Some lead-acid chargers may not provide enough voltage to fully charge the battery. Ensure charging equipment is compatible with lithium-ion batteries.

Refer to the R66 Maintenance Manual for additional handling and maintenance instructions.

**FAA APPROVED
R66 PILOT'S OPERATING HANDBOOK
CARGO HOOK EQUIPMENT SUPPLEMENT**

This supplement must be included in the FAA-approved Pilot's Operating Handbook when the factory-supplied cargo hook and associated equipment is installed.

Information contained herein supplements or supersedes the basic manual only in those areas listed in this supplement. For limitations, procedures, and performance information not contained in this supplement, consult the basic Pilot's Operating Handbook.

APPROVED BY: 
Acting Manager, West Flight Test Section, AIR-716
 Federal Aviation Administration
 Los Angeles, CA
 DATE: July 6, 2018

LOG OF REVISIONS

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| 9-10.10 | 6 Jul 18 | 9-10.21* | 27 Apr 21 |
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* Manufacturer's data, not FAA approved.

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 Manager, West Flight Test Section, AIR-716
 Federal Aviation Administration
 Los Angeles, CA

SECTION 1: GENERAL

INTRODUCTION

This supplement applies to:

- Belly-mounted cargo hook
- Electric and manual cargo release systems
- Left side cyclic control with hydraulic switch and left side collective control with start button
- Load-weigh system
- Provisions for remote control of equipment carried by cargo hook
- Forward door(s) with large bubble window
- Skid-mounted cargo mirror(s)

Limitations are found in Section 2 and equipment descriptions are found in Section 7 of this supplement.

All of the following combinations of hook-related equipment are approved flight configurations:

- Cargo hook installed or removed
- Left side cyclic with hydraulic switch and/or left side collective with start button installed or removed

NOTE

Controls without switch/button may also be substituted. In this case, observe right seat solo flight limitation from basic handbook.

- One or both doors with large bubble window installed or removed
- One or both skid mirrors installed or removed

The cargo hook installation is not compatible with pop-out floats.

SECTION 4: NORMAL PROCEDURES

RECOMMENDED AIRSPEEDS

Recommended airspeeds are not applicable with external load. Observe 80 KIAS external load speed limitation. Some loads may require lower speeds.

DAILY OR PREFLIGHT CHECKS

Add to Item 4, Belly:

Verify hook secure, no damage to hook, wiring, or surrounding structure.

Swivel hook to travel extremes. Verify no binding of release cable or wiring.

Check release cable rigging through window in manual release cover. Lightly depress manual release lever and verify slack in cable.

CAUTION

Verify no cargo lines pass over landing gear skid tubes or struts.

Add to Item 7, Nose:

Verify skid mirrors (if installed) secure, no damage.

Add to Item 8, Cabin Area:

Verify electrical plug at base of left-sided collective is inserted if collective is installed.

CAUTION

If removing or inserting plug, ensure battery switch is OFF. Removing or inserting plug is equivalent to pressing start button.

Cycle hook release buttons and manual release controls to verify proper hook function.

Cycle external load control switches to verify proper function (if applicable).

Verify cargo instruments (load meter, MGT, Torque) are unobstructed and have no visible damage.

Zero load meter (as required).

SECTION 4: NORMAL PROCEDURES (cont'd)

CARGO HOOK USE

Prior to external load operations, verify ground crew has been properly instructed regarding electrical grounding and discharge of static electricity. Helicopter should be electrically grounded prior to attaching or removing external load in order to prevent static discharge arc.

Rig external load such that only one primary load ring is in contact with the cargo hook. Do not use multiple load rings, rope, or straps directly on the hook.

CAUTION

It is the responsibility of the operator to ensure safe rigging configuration for each load carried.

Prior to lifting an external load, ground crew should verify that the hook lock indicator on the side of the hook is in the fully locked position. (Lock indicator diamond must align with engraved lines on the manual release cover).

Apply collective smoothly when lifting load.

CAUTION

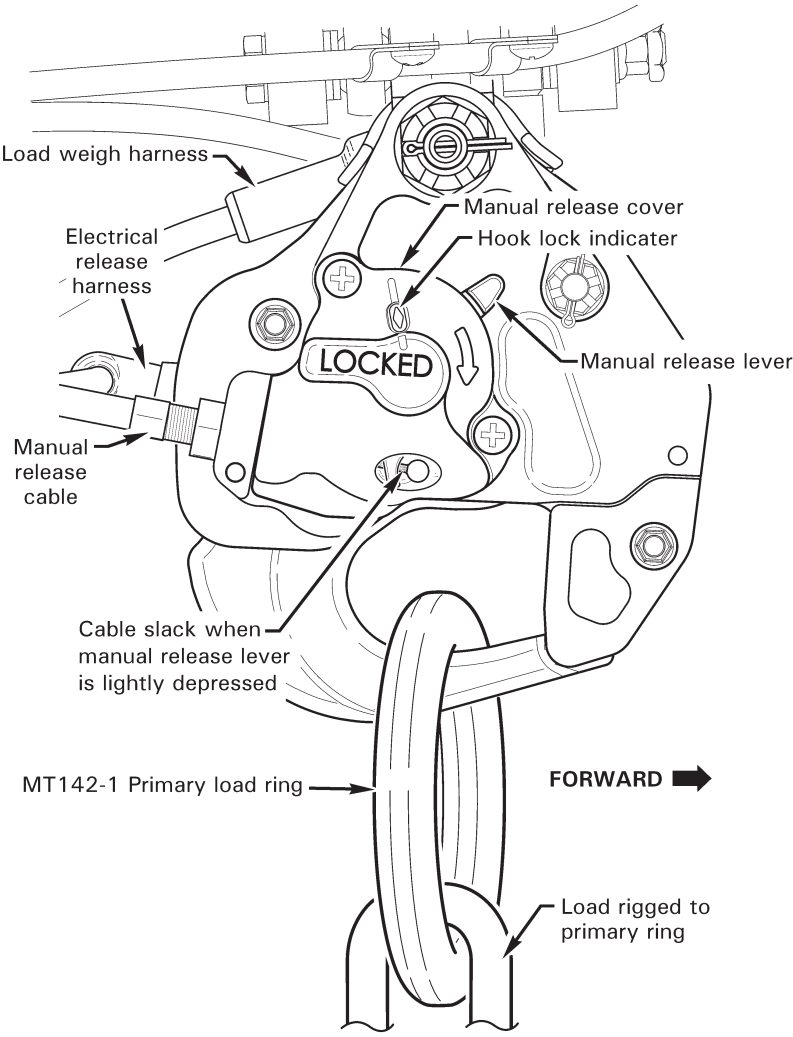
Size and shape of load as well as load rigging may affect flight characteristics. It is the responsibility of the operator to establish safe operational limits for each specific load.

The hook release button at the cyclic grip opens the cargo hook to release the external load. The manual release knob may also be used to release the load.

The external load control switch at the cyclic grip controls remote functions for equipment attached to the hook.

SECTION 7: SYSTEMS DESCRIPTION (cont'd)

CARGO HOOK (cont'd)



CARGO HOOK INSTALLATION

SECTION 7: SYSTEMS DESCRIPTION (cont'd)

FLIGHT CONTROLS

A HOOK RELEASE button is to the right of the hydraulic switch on each cyclic grip.

The left-side cyclic for the cargo hook includes a hydraulic switch and radio control buttons similar to the right-side cyclic.

A padded elbow rest is provided at the base of the left-side collective. This allows the left-side pilot to brace against the elbow rest for stability while leaning out to see external loads. The elbow rest is adjustable up and down via a friction knob on the front face of its support. It is also removable by completely unscrewing the knob.

NOTE

When the left side cyclic for the cargo hook is installed, both hydraulic switches must be ON to enable the system.

REMOVABLE FLIGHT CONTROLS

There is an additional electrical plug where the left-side grip mates with the cyclic cross tube and an additional electrical plug at the base of the left-side collective.

CAUTION

Ensure battery switch is OFF when removing or inserting electrical plug at the base of the collective. Removing or inserting plug makes electrical contact equivalent to momentarily pressing start button.

ENGINE CONTROLS

The left-side collective incorporates an engine start button.

**FAA APPROVED
R66 PILOT’S OPERATING HANDBOOK
PRESSURE FUELING SUPPLEMENT**

This supplement must be included in the FAA-approved Pilot’s Operating Handbook when the pressure fueling system is installed.

Information contained herein supplements or supersedes the basic manual only in those areas listed in this supplement. For limitations, procedures, and performance information not contained in this supplement, consult the basic Pilot’s Operating Handbook.

APPROVED BY:

Nevada Ryan

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Manager, West Flight Test Section, AIR-716
Federal Aviation Administration
Los Angeles, CA

DATE: 30 NOV 2022

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| 9-12.3 | 30 Nov 22 | 9-12.6* | 30 Nov 22 |

* Manufacturer’s data, not FAA approved.

SECTION 1: GENERAL

INTRODUCTION

This supplement contains changes and additional data applicable when the pressure fueling system is installed. The pressure fueling port is compatible with an Emco Wheaton J71 coupler.

SECTION 2: LIMITATIONS

PLACARDS

Near pressure fueling port:

**FUEL: GRADE JET A, JET A-1, JET B
OR AS SPECIFIED IN PILOT'S HANDBOOK**

MAX PRESSURE: 50 PSI (3.5 BAR)

NO DEFUELING

SECTION 3: EMERGENCY PROCEDURES

RED WARNING INDICATORS

| | |
|-----------------------------|---|
| TANK | Indicates high pressure in fuel tank. |
| PRESSURE | Shut-off valve will latch closed preventing further fueling. Have maintenance personnel inspect system before flight. |
| (on pressure fueling panel) | |

AMBER CAUTION INDICATORS

| | |
|-----------------------------|--|
| VALVE OPEN | Indicates shut-off valves are open, allowing fuel flow from fueling port to fuel tank. |
| (on pressure fueling panel) | |

AUDIO ALERTS

"FUEL HOSE" sounds if collective is raised off down stop with a fuel hose connected to the fueling port.

SECTION 4: NORMAL PROCEDURES

DAILY OR PREFLIGHT CHECKS

Add to item 1, Pilot's Station:

Test tank pressure warning circuit.

Verify pressure fueling power switch is OFF.

NOTE

For tank pressure warning circuit test, turn pressure fueling power switch ON and press one test button. Verify red light illuminates and stays on. Turn pressure fueling power switch OFF and verify light turns off. Repeat for 2nd test button.

Add to item 2, Fuselage Right Side:

Verify fueling port cap (if installed) is secure.

NOTE

The cap is provided for protection from contamination in dirty environments or for long term non-use. Installation of the cap is not required for flight.

SECTION 4: NORMAL PROCEDURES (cont'd)

PRESSURE FUELING

To accept fuel at the pressure fueling port: With collective full down, switch power ON at the pressure fueling control panel and select desired quantity (full or 40 gallons) using the quantity switch. The VALVE OPEN light indicates that the shut-off valves are open, allowing fuel flow from the fueling port to the fuel tank. A shut-off valve will automatically close to stop fuel flow when fuel quantity reaches the selected level. To fuel to other quantities, switch pressure fueling power OFF at the desired fuel level.

NOTE

The selectable fuel quantities are determined by float switches inside the fuel tank. Fueling on a non-level surface will affect actual fuel load.

TAKEOFF PROCEDURE

Verify fuel hose is disconnected before takeoff.

SECTION 5: PERFORMANCE

No change.

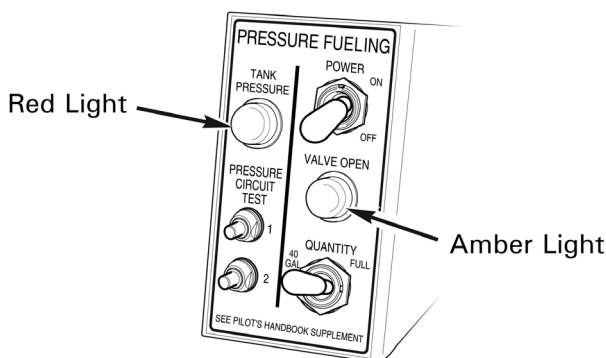
SECTION 6: WEIGHT AND BALANCE

No change.

SECTION 7: SYSTEMS DESCRIPTION

The pressure fueling system consists of a fueling port on the right side of the fuselage, two shut-off valves in series just downstream of the port, a hose from the valves to an inlet at the top of the fuel tank, fuel tank level and pressure sensors, and a control panel on the instrument panel. The fueling port is compatible with an Emco Wheaton J71 dry-break coupler (recommended Emco Wheaton part no. J71C-AVN1-E004, which fits a fuel hose with a one inch male NPT threaded fitting).

Two shut-off valves are used to provide redundant protection against overfueling. Both valves must be open to allow fuel to flow. Each valve is connected to an independent float switch in the fuel tank to close the valve when the tank is full as well as an independent pressure switch to close the valve if fuel tank overpressure is detected. One of the valves is also connected to a second float switch to shut off at 40 gallons (151 liters).



TYPICAL CONTROL PANEL

The pressure fueling control panel includes a power switch, a quantity selector switch, a VALVE OPEN light, and a TANK PRESSURE warning light with two test buttons for testing the overpressure warning circuits. The power switch enables refueling by providing power to open the two shut-off valves. The fuel cap should be installed during pressure fueling to prevent overflow. Fueling may be accomplished with or without engine running. If the helicopter is running, the collective must be on the down

SECTION 7: SYSTEMS DESCRIPTION (cont'd)

stop for the valves to operate. The VALVE OPEN light illuminates when both shut-off valves are open, indicating the system is ready to accept fuel. The TANK PRESSURE light illuminates when excessive pressure is detected in the fuel tank. Excessive pressure will latch a shut-off valve closed until power to the system is cycled.

The pressure fueling system feeds fuel to the top of the main fuel tank. The system cannot be used for defueling and it will not add fuel to the optional auxiliary tank in the baggage compartment. Maximum allowable pressure for ground equipment connected to the fueling port is 50 psi (3.5 bar), which provides approximately 50 gallons per minute (190 liters per minute) fuel flow. Approximate flow rates at lower pressures are 30 gpm at 20 psi, 20 gpm at 10 psi, or 100 lpm at 1 bar.

The fueling port and recommended Emco Wheaton coupler are both dry-break fittings, allowing the external fueling equipment to be connected or disconnected without fuel spillage regardless of whether the shut-off valves are open or closed. A cap is provided which may be installed on the fueling port when the system is not in use.

An optical sensor near the fueling port will detect a fuel hose if the hose is connected to the port. If the collective is raised off the down stop while a hose is connected, a “fuel hose” audio alert will repeat in the headsets. The alert is muted 15 seconds after the collective is raised to prevent a distraction in case of a false alert.

CAUTION

The audio alert is only an aid. Do not rely on audio alert to verify hose is disconnected. Pilots must visually confirm fuel hose is disconnected and area is clear before takeoff.

SECTION 8: HANDLING AND MAINTENANCE

No change.

**FAA APPROVED
R66 PILOT’S OPERATING HANDBOOK
NVG COMPATIBILITY SUPPLEMENT**

This supplement must be included in the FAA-Approved Pilot’s Operating Handbook for helicopters configured as Night Vision Goggle (NVG) compatible.

Information contained herein supplements or supersedes the basic manual only in those areas listed in this supplement. For limitations, procedures, and performance information not contained in this supplement, consult the basic Pilot’s Operating Handbook.

APPROVED BY: **Nevada Jo Ryan**
Digitally signed by Nevada Jo Ryan
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DATE: 30 SEP 2022

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* Manufacturer’s data, not FAA approved.

SECTION 1: GENERAL

INTRODUCTION

This supplement contains the changes and additional data applicable for Night Vision Goggle (NVG) compatibility.

NVG compatibility is only valid for aircraft configured exactly as delivered from the factory and subject to the limitations in this supplement. Any modification, including mission-specific equipment, involving a light emitting or reflecting device requires reassessment of the cockpit to ensure NVG compatibility.

SECTION 2: LIMITATIONS

NVG COMPATIBILITY

The following NVGs are compatible with the installed lighting:

ITT AN/AVS-9 (F4949F-YG) Generation 3 Pinnacle with Class B filter. These goggles have TSO-C164 certification.

Litton/L3 AN/AVS-9 (M949) Gen III Night Vision with Class B filter. These goggles have TSO-C164 certification.

FLIGHT AND MANEUVER LIMITATIONS

During single-pilot NVG operations into and out of unimproved sites, an additional NVG-trained crewmember must use NVGs to assist in obstacle identification and clearance.

A functioning radar altimeter is required for operations using NVGs.

Use of non-NVG-compatible carry-on or personal equipment in the cockpit is prohibited during NVG operations.

KINDS OF OPERATION LIMITATIONS

The NVG-compatible configuration does not approve flight operations with night vision goggles. The operator must coordinate with the appropriate FAA Flight Standards District Office (or equivalent authority in countries other than the US) to obtain operational authorization.

PLACARDS

In clear view of pilot:

| |
|--|
| <p>THIS AIRCRAFT CERTIFIED AS NVG COMPATIBLE ANY MODIFICATION REQUIRES RECERTIFICATION SEE PILOT HANDBOOK SUPPLEMENT</p> |
|--|

SECTION 3: EMERGENCY PROCEDURES

NIGHT VISION LIGHTING FAILURE

If any portion of the cockpit or exterior lighting fails or develops characteristics which degrade operation with NVGs, transition to unaided flight.

NIGHT VISION GOGGLE FAILURE

If the NVGs fail or perform abnormally, transition to unaided flight.

SECTION 4: NORMAL PROCEDURES

DAILY OR PREFLIGHT CHECKS

Add to Item 1, Pilot's Station

Verify any non-NVG-compatible carry-on or personal equipment is switched off and stowed.

Verify NVG settings, adjustment, and focus.

Verify interior and exterior lighting function and lighting levels with and without NVGs.

TAKEOFF PROCEDURE, CRUISE, DESCENT, APPROACH, AND LANDING

NVG-aided or un-aided flight is at pilot's discretion. Lighting controls are the same as for the basic aircraft.

SECTION 5: PERFORMANCE

No change.

SECTION 6: WEIGHT AND BALANCE

No change.

SECTION 7: SYSTEMS DESCRIPTION

NIGHT VISION GOGGLE COMPATIBILITY

Night vision goggle compatibility consists of the helicopter interior and exterior configuration, instruments, and avionics compatible for use with Night Vision Goggles (NVGs). The primary concern is cockpit lighting, but overall geometry for reflections and external lighting has also been shown to be compatible. NVG compatibility has been demonstrated for dual tube ITT AN/AVS-9 (F4949F-YG) and Litton/L3 AN/AVS-9 (M949) Generation 3 goggles with Class B filter. The goggles are TSO-C164 certified, self-powered, and do not interface with any helicopter systems.

The NVG-compatible configuration has also been tested for unaided flight to ensure that all lighting levels and colors remain appropriate.

All installed lighting is compatible with both aided and unaided flight. There is no need to switch lighting sources. Compatibility was achieved through the installation of instruments, avionics, and lighting specifically designed to be NVG compatible. No modification should be made to these items without specialized knowledge and a re-test for compatibility.

The goggles themselves are not supplied as part of the factory installation. Use of the specified goggles is the responsibility of the operator.

Pilot certification for NVG operations is the responsibility of the operator.

SECTION 8: HANDLING AND MAINTENANCE

Any modifications to lighting, instruments, or avionics must be retested and certified for NVG compatibility.

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**FAA APPROVED
R66 PILOT’S OPERATING HANDBOOK
LASER ILLUMINATOR SUPPLEMENT**

This supplement must be included in the FAA-Approved Pilot’s Operating Handbook when provisions for a laser illuminator are installed.

Information contained herein supplements or supersedes the basic manual only in those areas listed in this supplement. For limitations, procedures, and performance information not contained in this supplement, consult the basic Pilot’s Operating Handbook.

APPROVED BY: **Nevada Jo Ryan** Digitally signed by Nevada Jo Ryan
Date: 2022.09.30 08:02:09 -07’00’
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* Manufacturer’s data, not FAA approved.

SECTION 1: GENERAL

INTRODUCTION

This supplement contains the changes and additional data applicable when provisions for a laser illuminator are installed.

The laser illuminator is included inside certain gimbal-mounted cameras on police-version helicopters and provides the ability to illuminate a target on the ground with a light that is outside the visible spectrum. The camera operator is able to illuminate a point of interest on the ground with a spot that is only visible with the aid of night vision equipment. This is primarily to allow the camera operator to identify the target of interest to ground personnel and the pilot to facilitate maintaining the helicopter's position relative to the target.

The laser illuminator is not FAA approved for civil aircraft operations and is disabled upon delivery from the factory. Provisions are provided to allow public-use operation. Title 49 U.S.C. § 40102(a)(41) provides the definition of "public aircraft" and § 40125 provides the qualifications for public aircraft status. These statutory provisions provide the legal basis for operation of public aircraft in the United States.

SECTION 2: LIMITATIONS

FLIGHT AND MANEUVER LIMITATIONS

The laser illuminator is not FAA approved for civil aircraft operations and is disabled upon delivery from the factory.

CAUTION

The FAA has not assessed all potential hazards associated with the laser and has not validated the manufacturer's laser safety or hazard assessments.

PLACARDS

On laser arming control panel:

| |
|---|
| <p>LASER OPERATION NOT FAA APPROVED</p> |
|---|

SECTION 3: EMERGENCY PROCEDURES

No change.

SECTION 4: NORMAL PROCEDURES

DAILY OR PREFLIGHT CHECKS

For FAA civil aircraft operations, verify laser illuminator is disabled. As a visual indication to the pilot, the laser arming control panel is located on the left side of the main instrument console. When the laser illuminator is properly disabled, the laser arming control panel should be removed from the aircraft.

SECTION 5: PERFORMANCE

No change.

SECTION 6: WEIGHT AND BALANCE

No change.

SECTION 7: SYSTEMS DESCRIPTION

LASER ILLUMINATOR

The laser illuminator is not FAA approved for civil aircraft operations and is disabled upon delivery from the factory. Provisions are provided to allow public-use operation.

The laser illuminator is a Class 3B laser making the direct beam hazardous to the skin and an immediate eye hazard when viewed directly at close range.

The laser illuminator has Food and Drug Administration (FDA) approval (Accession No. RH18A0084). 21 CFR 1040 requires specific purpose laser products such as the laser illuminator to meet certain Accessible Emission Limits (AELs) or obtain a variance for exceeding the established limits. The laser illuminator has been issued variance number FDA 2018 V 1069.

It is the responsibility of the public use operator to comply with the variance limitations.

SECTION 8: HANDLING AND MAINTENANCE

The laser illuminator must be disabled for all FAA civil aircraft operations. Instructions for properly disabling the laser illuminator are contained in the R66 Maintenance Manual.