*TM 1-1520-238-CL

This copy is a reprint which includes current pages from Changes 1 through 4.

OPERATOR'S CHECKLIST

FOR

HELICOPTER, ATTACK, AH-64A APACHE

HEADQUARTERS
DEPARTMENT OF THE ARMY
31 AUGUST 1994

* This manual supersedes TM 55-1520-238-CL, dated 18 May 1987, including all changes.

CHANGE NO. 9

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 15 November 2002

Operator's Checklist
for
HELICOPTER, ATTACK, AH-64A APACHE

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

TM 1-1520-238-CL, 31 August 1994 is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
A and B	A and B
C/(D blank)	C/(D blank)
N-13 and N-14	N-13 and N-14
E-3 and E-4	E-3 and E-4
E-4.1 / (E-4.2 blank)	E-4.1 / (E-4.2 blank)
E-5 and E-6	E-5 and E-6
P-4.1 and P-4.2	P-4.1 and P-4.2
P-14.9 and P-14.10	P-14.9 and P-14.10
P-21 and P-22	P-21 and P-22

2. Retain these sheets in front of manual for reference purposes.

TM 1-1520-238-CL
C 9

By Order of the Secretary of the Army:

ERIC K. SHINSEKI
General, United States Army
Chief of Staff

Official:

JOEL B. HUDSON
Administrative Assistant to the
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CHANGE NO. 8

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 21 November 2001

Operator's Checklist
for
HELICOPTER, ATTACK, AH-64A APACHE

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

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1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
A and B	A and B
– – – – –	C/(D blank)
N-7 and N-8	N-7 and N-8
N-23 and N-24	N-23 and N-24
– – – – –	N-25/(N-26 blank)
E-1 through E-7/(E-8 blank)	E-1 through E-7/(E-8 blank)
E-11/(E-12 blank)	E-11/(E-12 blank)
E-17 and E-18	E-17 and E-18
P-3 and P-4	P-3 and P-4
P-13 and P-14	P-13 and P-14
P-14.1 through P-14.6	P-14.1 through P-14.6
– – – – –	P-14.7 through P-14.10

2. Retain these sheets in front of manual for reference purposes.

TM 1-1520-238-CL
C 8

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CHANGE NO. 7

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 18 January 2001

Operator's Checklist
for
HELICOPTER, ATTACK, AH-64A APACHE

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

TM 1-1520-238-CL, 31 August 1994 is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
———	A and B
N-13 and N-14	N-13 and N-14
N-14.1/(N-14.2 blank)	N-14.1/(N-14.2 blank)
P-1 and P-2	P-1 and P-2
P-4.1 and P-4.2	P-4.1 and P-4.2
P-5 and P-6	P-5 and P-6
P-9 through P-12	P-9 through P-12
P-14.5/(P-14.6 blank)	P-14.5 and P-14.6
P-15 and P-16	P-15 and P-16
P-19 and P-20	P-19 and P-20
———	P-20.1/(P-20.2 blank)
P-21 and P-22	P-21 and P-22

2. Retain these sheets in front of manual for reference purposes.

TM 1-1520-238-CL
C 7

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URGENT

TM 1-1520-238-CL
C 6

CHANGE NO. 6

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 15 December 1999

Operator's Checklist
for
ARMY AH-64A HELICOPTER

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited

TM 1-1520-238-CL, 31 August 1994 is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
E-7/(E-8 blank)	E-7/(E-8 blank)

2. Retain these sheets in front of manual for reference purposes.

URGENT

TM 1-1520-238-CL
C 6

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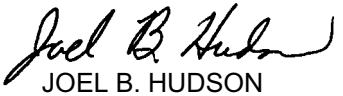

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CHANGE NO. 5

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 4 June 1999

Operator's Checklist
for
ARMY AH-64A HELICOPTER

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited

TM 1-1520-238-CL, 31 August 1994 is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
E-1 through E-6	E-1 through E-6
E-7/(E-8 blank)	E-7/(E-8 blank)
E-9/(E-10 blank)	E-9/(E-10 blank)
E-11/(E-12 blank)	E-11/(E-12 blank)
E-13 through E-16	E-13 through E-16
E-16.1/(E-16.2 blank)	– – – –
E-17 through E-25/(E-26 blank)	E-17 through E-26

2. Retain these sheets in front of manual for reference purposes.

TM 1-1520-238-CL
C 5

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CHANGE NO. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 30 July 1997

Operator's Checklist
for
ARMY AH-64A HELICOPTER

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

TM 1-1520-238-CL, 31 August 1994 is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
iii/(iv blank)	iii/(iv blank)
N-11 through N-14	N-11 through N-14
————————	N 14.1/(N-14.2 blank)
N-15 and N-16	N-15 and N-16
N-21 through N-24	N-21 through N-24
E-13 and E-14	E-13 and E-14
P-3 and P-4	P-3 and P-4
————————	P-4.1 and P-4.2
P-5 and P-6	P-5 and P-6
P-11 through P-14	P-11 through P-14
P-14.1 through P-14.4	P-14.1 through P-14.4
————————	P-14.5/(P-14.6 blank)
P-15 and P-16	P-15 and P-16

2. Retain these sheets in front of manual for reference purposes.

TM 1-1520-238-CL
C 4

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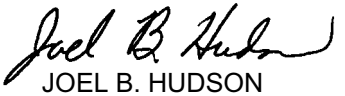
General, United States Army
Chief of Staff

Official:



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DISTRIBUTION:

To be distributed in accordance with DA Form 12−31−E, block no. 1324, requirements for TM 1−1520−238−CL

CHANGE NO. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 20 September1996

Operator's Checklist
for
HELICOPTER, ATTACK,
AH–64A APACHE

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited

TM 1–1520–238–CL, 31 August 1994 is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
N-3 through N-6	N-3 through N-6
N-11 through N-18	N-11 through N-18
N-21 and N-22	N-21 and N-22
E-5 and E-6	E-5 and E-6
E-9/(E-10blank)	E-9/(E-10blank)
E-17 and E-18	E-17 and E-18
P-3 through P-14	P-3 through P-14
P-14.3 and P-14.4	P-14.3 and P-14.4

2. Retain these sheets in front of manual for reference purposes.

TM 1-1520-238-CL
C 3

By Order of the Secretary of the Army:

DENNIS J. REIMER
General, United States Army
Chief of Staff

Official:

JOEL B. HUDSON
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CHANGE NO. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 5 February 1996

Operator's Checklist

HELICOPTER, ATTACK, AH–64 APACHE

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited

TM 1–1520–238–CL, 31 August 1994 is changed as follows:

1. Distribution statement is changed on the cover as shown above.

2. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
N-7 and N-8	N-7 and N-8
N-15 through N-18	N-15 through N-18
E-1 and E-2	E-1 and E-2
E-15 and E-16	E-15 and E-16
– – – –	E-16.1/(E-16.2 blank)
P-1 and P-2	P-1 and P-2
– – – –	P-2.1 and P-2.2

3. Retain these sheets in front of manual for reference purposes.

TM 1-1520-238-CL
C 2

By Order of the Secretary of the Army:

DENNIS J. REIMER
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Acting Administratrtive Assistant to the
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CHANGE NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 15 May 1995

Operator's Checklist
for
HELICOPTER, ATTACK, AH-64A APACHE

TM 1–1520–238–CL, 31 August 1994 is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
iii/(iv blank)	iii/(iv blank)
P-13 and P-14	P-13 and P-14
– – – –	P-14.1 thru P-14.4

2. Retain these sheets in front of manual for reference purposes.

TM 1-1520-238-CL
C 1

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
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LIST OF EFFECTIVE PAGES

INSERT LATEST CHANGED PAGES: DESTROY SUPERSEDED PAGES.

NOTE: The portion of the text affected by the changes is indicated by a vertical line in the outer margins of the page. Changes to illustrations are indicated by miniature pointing hands.

Date of issue for original and change pages are:

Original . . . . . 0 . . . . . 31 August 1994
Change . . . . . 1 . . . . . 15 May 1995
Change . . . . . 2 . . . . . 5 February 1996
Change . . . . . 3 . . . 20 September 1996
Change . . . . . 4 . . . . . 30 July 1997
Change . . . . . 5 . . . . . 4 June 1999
Change . . . . . 6 . . . . 15 December 1999
Change . . . . . 7 . . . . . 18 January 2001
Change . . . . . 8 . . . . 21 November 2001
Change . . . . . 9 . . . . 15 November 2002

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 129, CONSISTING OF THE FOLLOWING:

Page No.	*Change No.
Cover	1
Blank	1
A – B	9
C	9
D Blank	9
i – ii	0
iii	4
iv Blank	4
N-1 – N-2	0
N-3	3
N-4 – N-5	0
N-6	3
N-7	8
N-8 – N-10	0
N-11 – N-12	4
N-13	9
N-14	7

***Zero in this column indicates an original page.**

LIST OF EFFECTIVE PAGES

INSERT LATEST CHANGED PAGES: DESTROY SUPERSEDED PAGES.

Page No.	*Change No.
N-14.1	7
N-14.2 Blank	7
N-15	2
N-16	4
N-17	3
N-18 – N-20	0
N-21	3
N-22	4
N-23 – N-24	8
N-25 Added	8
N-26 Blank Added	8
E-1	8
E-2	5
E-3 – E-4	9
E-4.1 / (E-4.2 blank)	9
E-5	8
E-6	9
E-7	8
E-8 Blank	8
E-9	9
E-10 Blank	5
E-11	8
E-12 Blank	8
E-13	5
E-14	4
E-15 – E-16	5
E-17 – E-18	8
E-19 – E-26	5
P-1 – P-2	7
P-2.1 – P-2.2	2
P-3	8
P-4	4
P-4.1	9
P-4.2	7
P-5 – P-6	7
P-7 – P-9	3
P-10 – P-11	7

***Zero in this column indicates an original page.**

LIST OF EFFECTIVE PAGES

INSERT LATEST CHANGED PAGES: DESTROY SUPERSEDED PAGES.

Page No.	*Change No.
P-12 –P-13	4
P 14	8
P-14.1 – P-14.6	8
P-14.7 – P-14.9	8
P-14.10	9
P-15	7
P-16 – P-19	0
P-20	7
P-20.1	7
P-20.2 Blank	7
P-21	9
P-22 – P-57	0
P-58 Blank	0
Temp Conversion – Blank	0

***Zero in this column indicates an original page.**

GENERAL INFORMATION AND SCOPE.

SCOPE. This checklist contains the operators checks to be accomplished during normal and emergency operation.

General Information. This checklist consists of three parts: normal procedures, emergency procedures, and performance data. A thru flight section is provided in this section and consists of asterisk "Thru-Flight" items. In addition to thru flight, this checklist may be used for combat/tactical operations when authorized by the commander.

NOTE

This checklist does not replace the amplified version of the procedures in the operator's manual TM 1-1520-238-10, but is a condensed version of each procedure.

Normal Procedures Pages. The contents of the normal procedures of this manual are a condensation of the amplified checklist appearing in the normal procedures or crew duties portion of the applicable operator's manual.

* This manual supersedes TM 55-1520-238-CL 18 May 1987, including all changes.

Emergency Procedures Pages. The requirements for this section of the condensed checklist manual (CL) are identical to those for the normal procedures, except that the information is drawn from the amplified checks in the emergency procedures portion of the operator's manual. The emergency requirements are subdivided into 10 classifications as follows: engine; propeller/rotor; (PROP or ROTOR); fire; fuel; electrical (ELECT); hydraulic (HYD); landing and ditching (LDG/DTCH); flight controls (FLT CONT); bail out or ejection (BAILOUT) (EJECT), if applicable; and mission equipment (MSN/EQPT), as applicable. The underlined items are the steps that must be performed immediately without reference to the checklist.

Performance Data Pages. This section consists of charts, tables, and checklists for use during preflight, takeoff, cruise, landing, and shutdown.

Symbols Preceding Numbered Steps.

* –Indicates performance of steps is mandatory for all through flights.

N –Means performance of steps is mandatory for "Night Flights".

★ –Indicates a detailed procedure for this step is included in the performance checks section, located at the back of this checklist.

I –Indicates mandatory check for "Instrument Flights".

O –Indicates if installed.

④ –Indicates duties which are the responsibility of the copilot (CPG).

Designator Symbol. All AH-64A helicopters have BUCS equipment installed. In most helicopters, the system is deactivated; in some it is operable. The designator symbol B indicates text headings, text contents, and illustrations pertaining to helicopters with an operable BUCS.

Some AH-64A helicopters have T700-GE-701C engines installed. Those helicopters will have components, instrumentation, performance parameters, and procedures different from helicopters with T700-GE-701 engines installed. The designator symbols 701 and 701C indicate material pertaining to those specific engines.

Some AH-64A helicopters have the 7-319200005-11 Fire Control Computer (FCC) with –51 software installed (EGI Mod); others have the 7-319200005-9A Fire Control Computer (FCC) with –49A software installed; others yet have the 7-319200005-5 FCC with –45 software. Because of differences in operation, displays, etc. designator symbols –45, –49A and –51 will indicate material peculiar to that software installation.

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS.

You can help improve this publication. If you find any mistakes, or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of the applicable Aircraft Operator's manual, (when using the 2028-2 from the Operators manual, ensure the publication number and title reflect this CL) directly to: Commander, US Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA-NP, Redstone Arsenal, AL. 35898-5000. You may also submit your recommended changes by E-mail directly to <2028@redstone.army.mil.>. A reply will be furnished directly to you. Instructions for sending an electronic 2028 may be found at the end of TM 1-1520-238-10 immediately preceding the hard copy 2028.

NORMAL PROCEDURES

BEFORE EXTERIOR CHECK.

*1. Helicopter covers, locking devices, tiedowns, and grounding cables – removed and stowed, pylon safety pins installed.

2. Cockpit safety – Check.

3. Armament subsystems – Safe.

4. Cockpit general – Check.

5. Publications – Check.

6. Fuel sample – Check first flight of the day.

EXTERIOR CHECK.

RIGHT SIDE – UNDER SIDE FUSELAGE (AREA 1).

1. 30mm gun, and turret – Check.

2. Searchlight – Check.

RIGHT SIDE – LOWER CENTER FUSELAGE (AREA 2).

1. Radar warning antenna – Check.

2. Forward avionics bay – Check.

3. Static port – Unobstructed.

4. Right main landing gear – Check.

5. Portable fire extinguisher – Check.

*6. Refueling panel – Secure.

7. Forward gravity fuel cap – Secure.

8. Single point fuel access – Secure.

RIGHT SIDE – MAST (AREA 3).

*1. Main transmission – Check oil level.

*2. Nose gearbox – Check oil level; cowling secure.

3. Engine inlet – Unobstructed.

*4. Engine oil level – Check.

5. Upper flight controls and swashplate – Check.

*6. Main rotor head and blades – Check.

RIGHT SIDE – WING (AREA 4).

1. Wing – Check.

O 2. Pylons – Check.

O 3. HELLFIRE launchers – Check.

O 4. Rocket launchers – Check.

O 5. External fuel tanks – Check.

6. Pitot tube – Check.

7. Wing lighting – Check.

8. Ammunition bay access – Secure.

RIGHT SIDE – REAR CENTER FUSELAGE (AREA 5).

1. Nacelle fire louvers – Check open.

*2. APU oil level – Check and secure door.

3. Aft gravity fuel cap – Secure.

4. Aft avionics bay – Check.

5. APU exhaust – Check.

6. IR suppressor/engine exhaust – Check.

*7. Utility hydraulic accumulator – Check, 2600 psi minimum.

8. Survival kit bay – Check and secure door.

9. External power receptacle – Check.

10. Belly antennas – Check.

RIGHT SIDE-AFT FUSELAGE/EMPENNAGE (AREA 6).

1. Aft tail boom and empennage (right side) – Check.

2. Stabilator – Check condition.

3. Tail landing gear – Check.

LEFT SIDE – AFT FUSELAGE/EMPENNAGE (AREA 7).

1. Empennage (left side) – Check.

O 2. FM-AM whip antenna – Check.

O 3. GPS antenna – Check.

4. Tail rotor, controls, hub, and blades – Check.

5. Stabilator – Check.

LEFT SIDE – REAR CENTER FUSELAGE (AREA 8).

1. Aft tailboom – Check.

2. Transmission deck catwalk area for FOD, fire bottle for charge, and APU enclosure for security.

3. Transmission deck catwalk doors – Check security.

4. Survival kit bay – Check and secure door.

5. IR suppressor/engine exhaust – Check.

6. Aft stowage bay – Check and secure door.

7. Nacelle fire louvers – Check open.

*8. Fire extinguisher disc – Check that yellow disc visible.

9. Ammunition bay access – Secure.

LEFT SIDE – WING (AREA 9).

1. Wing – Check.

2. Wing lighting – Check.

3. Pitot tube – Check.

O 4. Pylons – Check.

O 5. HELLFIRE launchers – Check.

O 6. Rocket launchers – Check.

O 7. External fuel tanks – Check.

LEFT SIDE – MAST (AREA 10).

*1. Main transmission – Check oil level.

*2. Nose gearbox – Check oil level.

*3. Primary hydraulic manifold – Check oil level.

*4. Engine inlet – Unobstructed.

5. Engine oil level – Check and secure door.

6. Upper flight controls and swashplate – Check.

7. Main rotor head and blades – Check.

8. Air data sensor – Check.

LEFT SIDE – LOWER CENTER FUSELAGE AND NOSE (AREA 11).

1. Canopy – Check.

2. OAT gage extension – Check.

3. Static port – Unobstructed.

4. Utility hydraulic accumulator – Check.

5. Left main landing gear – Check.

6. Static ground cable – Check.

7. Forward avionics bay – Check.

8. Radar warning antenna – Check.

9. TADS/PNVS turrets – Check.

10. Crew briefing – Complete as required.

INTERIOR CHECK – PILOT.

*1. Canopy door – As desired.

*2. Loose equipment – Secured.

3. Seat – Adjust to design eye position.

*4. Restraint harness – Fasten and adjust.

5. Inertial reel lock – Check.

6. Pedals – Check.

*7. **PARK BRAKE** – Set.

8. **EDGE LT PNL** switches – As desired.

NOTE

The left and right nose gearbox heater circuit breakers shall be opened unless the system is required.

*9. Overhead circuit breakers – As desired.

10. Collective switches – As desired.

11. Auxiliary vent handle – Closed.

12. Utility light – As desired.

13. OAT gauge – Check.

14. **ANTI-ICE** panel switches – **OFF**.

*15. **EXT LT** and **INTR LT** – As desired.

*16. **FUEL** panel switches – Set.

17. **PWR** levers – **OFF**.

18. **ENG START** switches – **OFF**.

*19. **MASTER IGN** switch – **ON**.

20. **RTR BK** – **OFF**.

21. **ELEC PWR** panel switches – **OFF**.
22. **STORES JETT** select switches – Guard covers down.
*23. **ROCKET** control panel – Set.
24. **ECS** control panel – Set.
25. **TAIL WHEEL** switch – **LOCK**.
*26. **CANOPY JETTISON** pin – Remove and stow.
27. **ENG FIRE PULL** handles – In.
28. **FIRE BTL** select switch – Centered.
29. **FIRE CONTROL** panel – Set.
30. Magnetic compass – Check.
31. BRU – Check.
32. Instrument test panel switch – As desired.
33. Flight instruments – Check.
34. Clock – Set.
35. Accelerometer – Reset.
36. **HARS** – **OFF**.
37. **EMER HYD** switch – **OFF**.
38. **CSC** panel switches – As desired.
39. Right console avionics – Off.
40. **APU FIRE PULL** handle – In.
41. **APU FIRE BTL** select switch – Centered.

INTERIOR CHECK – CPG.

*1. Canopy door – As desired.

*2. Loose equipment – Secured.

3. Seat – Adjust to design eye position.

*4. Restraint harness – Fasten.

5. Inertial reel lock – Check.

6. Pedals – Check.

7. Collective switches – As desired.

*8. Circuit breakers – As desired.

9. Utility light – As desired.

*10. **INTR LT** panel – As desired.

*11. **FUEL** panel switches – Set.

12. **PWR** levers – **OFF**.

13. **EMER HYD PWR** switch – **OFF**, guard down.

14. **BAT OVRD** – **NRML**, guard down.

15. **ANTI-ICE** panel switches – Set.

16. **AUX** panel switches – Set.

17. **RECORDER** panel switches – As desired.

18. **MSL** panel switches – Set.

19. **DATA ENTRY** keyboard – **OFF**.

*20. **CANOPY JETTISON** pin – Remove and stow.

21. **ENG FIRE PULL** handles – In.
22. **FIRE BTL** select switch – Centered.
23. **FIRE CONTROL** panel switches – Set.
24. Engine instrument test panel switch – As desired.
25. Engine instruments – Check.
26. Flight instruments – Check.
27. Clock – Set.
28. **LT** switch – **OFF**.
29. **CSC** panel switches – As desired.
30. Right console avionics – Off.
31. **DPLR/NAV MODE** select switch – **OFF**.

BEFORE STARTING APU – PILOT.

*1. **BATT/EXT PWR** switch – **BATT** or **EXT PWR** as required.
2. ICS system – Check.
*3. **MASTER CAUTION** panel – Check.
4. **MASTER CAUTION** switch – **PRESS TO TEST** – Check.
5. Caution/warning panel – Check.
6. Fire detectors – Test.
7. Engine instrument test panel switch – **TST**.
8. Utility hydraulic pressure gauge – Check 2600 psi minimum.

BEFORE STARTING APU – CPG.

*1. **MASTER CAUTION** panel – Check.

2. **MASTER CAUTION** panel – **PRESS TO TEST** – Check.

3. Caution/warning panel – Check.

4. Instrument test panel switch – **TST**.

STARTING ENGINES – EXTERNAL PRESSURIZED AIR SOURCE – PILOT.

1. External air source – Connected.

2. Pressurized air – Verify available.

3. B Control locks – Remove.

★ 4. Engines – Start.

5. **GEN 1** and **GEN 2** switches – **GEN 1** and **2**.

6. **EXT PWR**/**BATT** switch – **BATT**.

7. External power – Disconnect.

8. External air source – Disconnect.

9. Continue with AFTER STARTING APU – PILOT AND CPG.

*STARTING APU – PILOT.

1. Fire guard – Posted, if available.
2. **APU** – **START**.
3. **GEN 1** and **GEN 2** switches – **GEN 1** and **2**.
4. B Control locks – Remove.
5. **EXT PWR**/**BATT** switch – **BATT**.
6. External power – Disconnect.

*AFTER STARTING APU – PILOT.

1. **PNVS** – As required, (verify TADS on).
2. Standby attitude indicator – Uncage.
3. VDU switch – As desired
4. Radar altimeter – On.
5. Avionics – As desired.
6. Canopy door – Secure.
7. FCC – Verify CPG entered present position.
8. Control sweep trim check – Perform.
9. Stabilator – Check full travel and position indicator function – Reset.
10. **HARS** control switch – for –49A and previous FCC software select **NORM**. For emeregency operations select **FAST.** For –51 FCC software select **NORM** for stationary starts, or **FAST** for airborne or moving starts.

★ 11. B BUCS – Test.

★ 12. **IHADSS** boresight – As required.

★ 13. FLIR operational check – As required.

14. Radar altimeter – Test.

*AFTER STARTING APU – CPG.

1. B Control locks – Remove.
2. Canopy door – Secure.
3. Avionics – As desired.
4. **ADSS** switch – On.
5. **FC SYM GEN** switch – As required.
6. **IHADSS** switch – As required (announce to pilot).
7. **TADS** switch – As required. (announce to pilot).
8. ★ Fire control system – Enter data/interrogate as desired.
9. ★ **IHADSS** boresight – Perform.
10. Doppler – Program as desired.
11. ★ TADS operational checks – Perform.
12. ★ TADS internal boresight – As required.
13. ★ TADS outfront boresight – As required.
14. ★ FLIR operational check – Perform.
15. Weapons systems – As desired.

*BEFORE STARTING ENGINES – PILOT.

1. **SHAFT DRIVEN COMP** caution light – Extinguished.
2. **ANTI-COL** switch – As desired.

*STARTING ENGINES – PILOT.

WARNING

701C Aborted engine starts may cause fuel to collect in the engine nacelle. Subsequent engine starts may be attempted only after the nacelle door/work platform is opened and the nacelle inspected for fuel. If during the initial start an abnormal TGT rise was evident, or fuel is evident in the nacelle, the ignition system shall be checked IAW standard maintenance procedures.

CAUTION

- **During a start with RTR BK switch set to LOCK, if rotor blades begin to rotate, set RTR BK switch to OFF.**
- **The T700–GE–701C engine exhibits inconsistent starting capability above 6000 feet density altitude. Starts above this density altitude may be unsuccessful and require "over temperature" abort by the pilot.**

1. Area – Clear.
2. **RTR BK** switch – **OFF** or **LOCK**.

★ 3. First engine – Start.

★ 4. Second engine – Start.

5. **RTR BK** switch – **OFF**.
6. **PWR** levers – **FLY**.
7. Np and N_r – 100%.
8. Caution/warning lights – Check.

9. **ANTI-ICE** panel **ENG INLET** switch – As required.

10. **APU** control switch – **OFF**.

*BEFORE TAXI CHECK.

1. Armament and pylon safety pins – Removed.

2. Chocks and external ICS cords – Removed.

3. **HARS** control switch – Check aligned then **OPR**.

4. DASE – As desired.

5. HIT check – As required.

6. **ASE** panel switches – As desired.

7. **EXT LT** switches – As desired.

8. **PARK BRAKE** – Release.

9. **TAIL WHEEL** switch – **UNLOCK**.

*TAXI CHECK.

1. Wheel brakes – Check.

2. Engine/rotor instruments – Check.

3. Flight instruments – Check.

*BEFORE TAKEOFF CHECK.

1. **HARS** switch – Verify **OPR**.
2. Weapons systems – Safe.
3. **TAIL WHEEL** switch – **LOCK**.
4. **PARK BRAKE** – As desired.
5. Systems – Check.
6. **PWR** levers – **FLY**.
7. Active **FLY–TO** or **TGT** – Check. If the DTC overwrites the active fly-to or target, it is necessary to de-select and re-select the active fly-to or target.
8. Power check – Perform.

BEFORE LANDING CHECK.

1. Weapons systems – Safe.
2. **ATTD**/**HOVER HOLD** switch **OFF**.
3. **TAIL WHEEL** switch – **LOCK**.
4. **PARK BRAKE** – As required.

AFTER LANDING CHECK.

1. **TAIL WHEEL** switch – As required.
2. **EXT LT** controls – As required.
3. Avionics – As required.
4. **ANTI-ICE** panel **TADS**/**PNVS** switch – **OFF**.
5. **ASE** panel switches – As desired.

ENGINE SHUTDOWN – PILOT.

1. **TAIL WHEEL** switch – **LOCK**.
2. **PARK BRAKE** – Set.
3. **APU** control switch. – **START**.

★ 4. Weapons systems switches – Secure.

5. DASE release switch – Press.
6. Standby attitude indicator – Cage.
7. VDU – **OFF**.
8. Radar altimeter – **OFF**.
9. **HARS** control switch – **OFF**.
10. **APU ON**, caution/warning light – On.
11. **SHAFT DRIVEN COMP** caution light – Extinguished.
12. **PWR** levers – **IDLE**.
13. **PWR** levers – **OFF** after engines have cooled for two minutes.

14. **FUEL** panel switches – Set.
15. **TGT** – Monitor.
16. **RTR BK** switch – **BRAKE**, below 50% N_r.
17. Avionics – Off.
18. Set stabilator – **0**° (zero).
19. Confirm with CPG that shutdown is complete.
20. **RTR BK** switch – **OFF** when rotor stops.
21. **SRCH LT** switch – **STOW**.
22. B Control locks – Install.
23. Torque gages – Note DECU 701C fault codes.
24. **GEN 2** and **GEN 1** switches – **OFF**.
25. **APU** control switch – **OFF**.
26. **BATT**/**EXT PWR** switch – **OFF**.
27. Ignition key – **OFF** and remove.
28. **CANOPY JETTISON** pin – Install.
29. Light switches – Off.

ENGINE SHUTDOWN – CPG.

1. **SIGHT SEL** control switch – **STBY**.

NOTE

Prior to turning TADS off, Ensure PNVS is turned off to allow proper data transfer into the TADS non–volatile memory.

2. **TADS** switch – **OFF** (verify **PNVS** Off).

NOTE

Prior to turning IHADSS off, confirm TADS power down sequence is complete by waiting 30–45 seconds after TADS is turned off and verifying ORT **SYM BRT** switch is inoperative.

3. ORT **SYM BRT** switch – Inoperative.
4. **IHADSS** switch – **OFF**.
5. **FC SYM GEN** switch – **OFF**.
6. Weapons select switches – **OFF**.
7. **CPG ARM/SAFE** switch – **OFF**.
8. **PLT/GND ORIDE** switch – **OFF**.
9. **ADSS** switch – **OFF**.
10. **MSL MODE** switch – **STBY**.
11. DEK **DATA ENTRY** switch – **OFF**.
12. **RECORDER MODE** switch – **OFF**.
13. Avionics – Off.
14. [B] Control locks – Install.
15. **CANOPY JETTISON** pin – Install.
16. Light switches – Off.

BEFORE LEAVING THE HELICOPTER.

1. Armament and pylon safety pins – Installed.
2. Conduct walkaround.
3. Complete forms.
4. Secure helicopter – As required.

THRU FLIGHT CHECKS

BEFORE EXTERIOR CHECK.

1. Helicopter covers, locking devices, tiedowns and ground cables – Removed and stowed, pylon safety pins installed.

RIGHT SIDE – LOWER CENTER FUSELAGE.

1. Refueling panel – Check.

RIGHT SIDE – MAST.

1. Main transmission – Check oil level.
2. Nose gearbox – Check oil level; cowling secured.
3. Engine oil level – Check.

RIGHT SIDE – REAR CENTER FUSELAGE.

1. APU oil level – Check.
2. Utility hydraulic accumulator – Check, 2600 psi minimum.

LEFT SIDE – REAR CENTER FUSELAGE.

1. Fire extinguisher disc – Check that yellow disc visible.

LEFT SIDE – MAST.

1. Main transmission – Check oil level.
2. Nose gearbox – Check.
3. Primary hydraulic manifold – Check oil level.
4. Engine oil level – Check and secure door.

INTERIOR CHECK – PILOT.

1. Canopy door – As desired.
2. Loose equipment – Secured.
3. Restraint harness – Fasten and adjusted.
4. **PARK BRAKE** – Set.
5. Overhead circuit breakers – As desired.
6. **EXT LT** and **INTR LT** panel switches – As desired.
7. **FUEL** panel switches – Set.
8. **MASTER IGN** switch – **ON**.
9. **ROCKETS** control panel – Check.
10. **CANOPY JETTISON** pin – Remove and stow.

INTERIOR CHECK – CPG.

1. Canopy door – As desired.
2. Loose equipment – Secure.
3. Restraint harness – Fasten and adjust.
4. Circuit breakers – As desired.
5. **INTR LT** panel – As desired.
6. **FUEL** panel switches – Set.
7. **CANOPY JETTISON** pin – Remove and stow.

BEFORE STARTING APU – PILOT.

1. **BATT**/**EXT PWR** switch – **BATT** or **EXT**, as required.
2. **MASTER CAUTION** panel – Check.

BEFORE STARTING APU – CPG.

1. **MASTER CAUTION** panel – Check.

STARTING APU – PILOT.

1. Fire guard – Posted, if available.
2. **APU** – **START**.
3. **GEN 1** and **GEN 2** switches – **GEN 1** and **2**.
4. B Control locks – Remove.
5. **EXT PWR**/**BATT** switch – **BATT**.
6. External power – Disconnect.

AFTER STARTING APU – PILOT.

NOTE

If both TADS/PNVS are to be used simultaneously, TADS must be turned on prior to PNVS power up to ensure proper operation of both systems.

1. **PNVS** – As required. (Verify TADS on).
2. Standby attitude indicator – Uncage.
3. VDU – Set.
4. Radar Altimeter – On.
5. Avionics – As desired.

6. Canopy door – Secure.
7. FCC – Verify CPG entered present position.
8. Control sweep and trim check – Perform.
9. **HARS** control switch – for –49A and previous FCC software select **NORM**. For emeregency operations select **FAST.** For –51 FCC software select **NORM** for stationary starts, or **FAST** for airborne or moving starts.
10. Stabilator for full travel and position indicator function – Reset.

★ 11. B BUCS – Test.

★ 12. IHADSS boresight – As required.

★ 13. FLIR operational check – As required.

14. Radar altimeter – Test.

AFTER STARTING APU – CPG.

1. B Control locks – Remove.
2. Canopy door – Closed.
3. Avionics – As desired.
4. **ADSS** switch – On.
5. **FC SYM GEN** switch – As required.
6. **IHADSS** switch – As required (announce to pilot).
7. **TADS** switch – As required. (announce to pilot).

★ 8. Fire control system – Enter data as desired.

★ 9. IHADSS boresight – As required.

10. Doppler – Program as desired.

★ 11. TADS operational checks – As required.

★ 12. TADS internal boresight – As required.

★ 13. TADS outfront boresight – As required.

★ 14. FLIR operational check – As required.

15. Weapons systems – As desired.

BEFORE STARTING ENGINES – PILOT.

1. **SHAFT DRIVEN COMP** light – Check, off.
2. **ANTI-COL** switch – As desired.

STARTING ENGINES – PILOT.

WARNING

701C Aborted engine starts may cause fuel to collect in the engine nacelle. Subsequent engine starts may be attempted only after the nacelle door/work platform is opened and the nacelle inspected for fuel. If during the initial start an abnormal TGT rise was evident, or fuel is evident in the nacelle, the ignition system shall be checked IAW standard maintenance procedures.

CAUTION

- **The T700–GE–701C engine exhibits inconsistent starting capability above 6000 feet density altitude. Starts above this density altitude may be unsuccessful and require "over temperature" abort by the pilot.**
- **During a start with RTR BK switch set to LOCK, if rotor blades begin to rotate, set RTR BK switch to OFF.**

1. Area – Clear.

2. **RTR BK** switch – **OFF** or **LOCK**.

★ 3. First engine – Start.

★ 4. Second engine – Start.

5. **RTR BK** switch – **OFF**.

6. **PWR** lever – **FLY**.

7. N_p and N_r – 100%.

8. Caution/warning lights – Check.

9. **ANTI-ICE** panel/**ENG INLET** switch – as desired.

10. **APU** control switch – **OFF**.

BEFORE TAXI CHECK.

1. Armament and pylon safety pins – Removed.
2. Chocks and external ICS cords – Removed.
3. **HARS** control switch – Check aligned then **OPR**.
4. DASE – As desired.
5. HIT check – As required.
6. **ASE** panel switches – As required.
7. **EXT LT** switches – As desired.
8. **PARK BRAKE** – Release.
9. **TAIL WHEEL** switch – **UNLOCK**.

TAXI CHECK.

1. Wheel brakes – Check.
2. Engine/rotor instruments – Check.
3. Flight instruments – Check.

BEFORE TAKEOFF CHECK.

1. **HARS** switch – Verify **OPR**.
2. Weapons system – Safe.
3. **TAIL WHEEL** switch – **LOCK**.
4. **PARK BRAKE** – As desired.
5. Systems – Check.
6. **PWR** levers – **FLY**.
7. Active **FLY–TO** or **TGT** – Check. If the DTC overwrites the active fly-to or target, it is necessary to de-select and re-select the active fly-to or target.
8. Power check – Perform.

ENGINE

EMERGENCY ENGINE SHUTDOWN.

1. **PWR** lever (affected engines) – **OFF**.
2. **FUEL** switch (affected engines) – **OFF**.

SINGLE-ENGINE FAILURE LOW ALTITUDE/ LOW AIRSPEED AND CRUISE.

1. AIRSPEED – ADJUST AS NECESSARY.

Continued flight is NOT possible.

2. WING STORES JETTISON

If conditions still do not support continued flight

3. LAND AS SOON AS POSSIBLE.

If continued flight is possible

4. LAND AS SOON AS PRACTICABLE

ENGINE EMERGENCY START. 701C

1. **ENG 1** or **ENG 2** circuit breaker – Out.
2. Engine – Start.
3. **ENG 1** or **ENG 2** circuit breaker – In.

DUAL ENGINE FAILURE LOW ALTITUDE/ LOW AIRSPEED AND CRUISE.

1. AUTOROTATE.
2. Chop collar – Reset (only if ENGINE CHOP light is illuminated).
3. **STORES JETT** switches – Activate as desired (time permitting).

HIGH RPM ROTOR (WARNING LIGHT ON) Np FAILED HIGH.

1. Collective – Adjust to maintain N_r to within limits.

If condition persists:

2. **PWR** lever (affected engine) – Retard to equalize torque on both engines.

3. LAND AS SOON AS PRACTICABLE.

LOW RPM ROTOR (WARNING LIGHT ON) Np FAILED LOW.

1. Collective – Adjust to maintain $\mathbf{N_r}$ to within limits.

If condition persists:

2. **PWR** lever (affected engine) – **LOCKOUT** – then retard to equalize torque output of both engines.

If manual control is not possible:

3. **PWR** lever (affected engine) – **IDLE**.

4. LAND AS SOON AS PRACTICABLE.

ENGINE COMPRESSOR STALL.

1. Collective – Reduce.

If condition persists:

2. **PWR** lever (affected engine) – Retard. (TGT should decrease.)

3. **PWR** lever (affected engine) – **FLY**.

If stall condition recurs:

4. **PWR** lever (affected engine) – **IDLE**.

5. LAND AS SOON AS PRACTICABLE.

ROTORS, TRANSMISSIONS, AND DRIVE SYSTEMS

LOSS OF TAIL ROTOR THRUST IN CRUISE FLIGHT.

Continued Flight Possible

1. Airspeed – 80 KIAS minimum (until 10 to 20 feet above touchdown).
2. Wing Stores Jettison – As appropriate.
3. **PWR** levers – Reduce as necessary (5 to 10 feet above touchdown).

Continued Flight Not Possible

4. AUTOROTATE.
5. **CHOP** Collar – **CHOP**.
6. WING STORES JETTISON – As appropriate
7. **PWR** levers – **OFF** (prior to touchdown).

LOSS OF TAIL ROTOR AT LOW AIRSPEED/HOVER.

1. Collective – Reduce.
2. **PWR** levers – **OFF** (5 to 10 feet above touchdown).

MAIN TRANSMISSION INPUT DRIVE CLUTCH FAILURE.

CAUTION

When clutch fails to disengage, damage to the affected engine will result (Due to lack of oil pressure) if both engines are not shut down simultaneously.

When clutch fails to engage, do not shut down both engines simultaneously. Damage may result if there is sudden engagement.

a. **In flight.**

1. **PWR** lever (affected engine) – **IDLE**.

If N_P (affected engine) is below N_R:
(indicating the clutch has disengaged):

2. EMER ENG SHUTDOWN (affected engine).

3. LAND AS SOON AS PRACTICABLE.

If N_P (affected engine) does not drop below N_R:
(indicating the clutch has failed to disengage):

4. LAND AS SOON AS POSSIBLE.

5. EMER ENG SHUTDOWN (both engines simultaneously).

b. **On ground with indications that a clutch has failed to engage**.

1. EMERG ENG SHUTDOWN (affected engine only).

2. Check N_G is less than 10% (affected engine).

3. Perform normal engine shutdown.

c. **On ground (with indications that a clutch has failed to disengage).**

1. EMER ENG SHUTDOWN -Perform (both engines simultaneously).

FIRE

WARNING

Prior to moving PWR lever or pulling any ENG FIRE PULL handle, either achieve safe single engine airspeed or prepare for a single engine landing.

ENGINE/FUSELAGE FIRE ON GROUND.

1. **PWR** levers – **OFF.**
2. Illuminated **ENG FIRE PULL** handle – Pull if applicable.
3. **FIRE BTL** switch – Activate if applicable.

APU FIRE HANDLE ILLUMINATION IN FLIGHT.

1. **APU FIRE PULL** handle – Pull.
2. **ECS** – Off.
3. **FIRE BTL** switch – activate
4. LAND AS SOON AS POSSIBLE.

APU COMPARTMENT FIRE.

1. **APU FIRE PULL** handle – Pull.
2. **FIRE BTL** switch – Activate.
3. **ECS** – Off.

ENGINE FIRE IN FLIGHT.

1. **PWR** lever (affected engine) – **OFF.**
2. Illuminated **ENG FIRE PULL** handle – Pull.
3. **FIRE BTL** switch – Activate.
4. LAND AS SOON AS POSSIBLE.

ELECTRICAL FIRE IN FLIGHT.

1. **GEN 2** and **GEN1** switches – **OFF**.
2. LAND AS SOON AS POSSIBLE.

SMOKE AND FUME ELIMINATION.

1. Airspeed – Slow to 20 KIAS maximum.
2. Canopy door (affected crew position) – Open to intermediate position.
3. LAND AS SOON AS POSSIBLE.

ABORTING ENGINE START.

CAUTION

Abort Start for any of the following reasons:

- **If it becomes apparent that TGT will exceed 852°C before N_G idle speed (63% or more) is attained.**
- **If TGT does not increase within 45 seconds after moving PWR lever to IDLE.**
- **If no N_p within 45 seconds after moving PWR lever to IDLE unless rotor is locked.**
- **If positive oil pressure indication does not occur within 45 seconds after moving PWR lever to IDLE.**
- **ENG START light extinguishes prior to 52% N_G.**

Abort start procedures are as follows:

(1) **PWR** lever – **OFF**.

(2) **ENG START** switch – **IGN OVRD** for 30 seconds or until TGT is below 540 °C.

HYDRAULIC SYSTEM MALFUNCTIONS

PRI HYD PSI AND UTIL HYD PSI LIGHT ON.

1. **EMERG HYD** switch – On.
2. LAND WITHOUT DELAY.
3. EMER ENGINES SHUTDOWN – Perform.

PRI HYD PSI AND OIL LOW UTIL HYD LIGHT ON.

1. LAND AS SOON AS POSSIBLE.

LANDING AND DITCHING

EMERGENCY LANDING IN WOODED AREAS (POWER OFF).

1. AUTOROTATE.
2. Collective – Adjust to maximum before main rotor contacts tree.

DITCHING (POWER ON).

1. Approach to hover.
2. Canopies – Jettison prior to entering water.
3. Pilot shoulder harness – Lock.
4. CPG – Exit helicopter.
5. Hover downwind a safe distance.
6. **PWR** levers – **OFF**.
7. Perform hovering autorotation.
8. Cyclic – Position in direction of roll.
9. Exit when main rotor has stopped.

DITCHING (POWER OFF).

1. AUTOROTATE.
2. Canopies – Jettison prior to entering water.
3. Cyclic – Position in direction of roll.
4. Exit when main rotor has stopped.

EMERGENCY EGRESS

1. Helmet visors – Down.
2. **CANOPY JETTISON** handle – Either crew member turn 90°, release, then push.

FLIGHT CONTROLS

FLIGHT CONTROL MALFUNCTIONS.

1. LAND AS SOON AS POSSIBLE.
2. EMERG ENG(s) SHUTDOWN after landing.

STABILATOR AUTOMATIC MODE FAILURE.

1. Stabilator **RESET** button – Press.

If automatic mode not restored:

2. Use manual stabilator.

STABILATOR AUTO/MANUAL MODE FAILURE.

1. Airspeed – Use placard limits. If both crew station indicators are inoperative (90 knots maximum).
2. LAND AS SOON AS PRACTICABLE.

DASE MALFUNCTION.

1. **ASE** release switch – Press.
2. SAS – Reengage unaffected axes.

BUCS FAILURE

1. LAND AS SOON AS POSSIBLE
2. APU – ON
3. EMER ENGINES SHUT DOWN – Perform

BUCS ON

1. LAND AS SOON AS POSSIBLE
2. APU – ON
3. EMER ENGINES SHUT DOWN – Perform

MISSION EQUIPMENT.

WING STORES JETTISON

a. Armament Wing Stores.

1. Airspeed – 120 KIAS maximum.
2. Selected **STORES JETT** switches – Activate.

If store(s) fail to separate:

3. **ST JETT** – Press.

b. External Fuel Wing Stores.

1. Airspeed – 100 KIAS maximum.
2. Selected **STORES JETT** switches – Activate.

OR

3. **ST JETT** – Press.

ENCU MALFUNCTION.

1. **ENCU** switch – **OFF**.
2. **ECS** panel – **STBY FAN** if desired.
3. Emergency crew station ventilation door – Open if desired.

PNVS FAILURE.

1. Pilot **NVS** Select switch – **TADS**.

IHADSS/HDU FAILURE..

a. PILOT

1. Establish visual flight.
2. VDU control switch – **PLT**.
3. **ACQ SEL** – **NVS FXD**.

OR

b. CPG

1. CPG **SIGHT SEL** switch – **NVS**.
2. **PLT/GND ORIDE** switch – **ORIDE**.
3. **NVS** select switch – **PNVS** or **TADS**.
4. CPG assume helicopter control.

DUAL IHADSS/HDU FAILURE

a. PILOT

1. Establish visual flight.
2. VDU control switch – **PLT**.
3. **ACQ SEL** – **NVS FXD**.

OR

b. CPG

1. Establish visual flight.
2. CPG assume helicopter control.

AH-64 CAUTION/WARNING LIGHT EMERGENCY PROCEDURES

Word Segment	Corrective Action
NOTE Illumination of a light that is Information/ System Status shows condition of System Components. Mission accomplishment may be degraded. Mission requirements will dictate further actions.	
MASTER CAUTION PANEL	
MASTER CAUTION	Check MASTER CAUTION and Caution/ Warning panels for other lights. If no other light is flashing LAND AS SOON AS POSSIBLE.
LOW RPM ROTOR	See LOW RPM ROTOR Light On/N_P Failed Low.
FIRE APU	See APU Compartment Fire.
ENGINE 1 OUT	See Single-Engine Failure Low Altitude/Low Airspeed and Cruise.
ENGINE CHOP	**CHOP** collar – Reset.

AH-64 CAUTION/WARNING LIGHT EMERGENCY PROCEDURES – continued

Word Segment	Corrective Action
ENGINE 2 OUT	See Single-Engine Failure Low Altitude/Low Airspeed and Cruise.
NOTE ENG 1 and 2. See Dual-Engine Failure Low Altitude/Low Airspeed and Cruise.	
HIGH RPM ROTOR	See HIGH RPM ROTOR Light On/N_P Failed High.
B BUCS FAIL	See BUCS Failure.
CAUTION/WARNING PANELS	
FUEL LOW FWD	LAND AS SOON AS PRACTICABLE.
EXT EMP	Information/system status.
FUEL XFR	Information/system status.
FUEL XFR (Green) Modified C/W panel	Information/system status.
FUEL XFR (Amber) Modified C/W panel	Evaluate remaining fuel per cell.
X FEED (Green) Modified C/W panel	Information/system status.

AH-64 CAUTION/WARNING LIGHT EMERGENCY PROCEDURES – continued

Word Segment	Corrective Action
X FEED (Amber) Modified C/W panel	Achieve safe single engine airspeed, restore previous switch position. If caution segment extinguishes, continue mission. If caution segment remains illuminated, be prepared for a single engine flame-out - LAND AS SOON AS PRACTICABLE.
PRI HYD PSI	LAND AS SOON AS POSSIBLE.
UTIL HYD PSI	LAND AS SOON AS POSSIBLE.
MAN STAB	With audio – Refer to emergency procedures. Light only – Information/ system status.
BUCS ON	Information/system status.
B BUCS ON	See BUCS ON.
ADS	Information/system status.
FUEL LOW AFT	LAND AS SOON AS PRACTICABLE.
BOOST PUMP ON	Information/system status.

AH-64 CAUTION/WARNING LIGHT EMERGENCY PROCEDURES – continued

Word Segment	Corrective Action
OIL LOW PRI HYD	LAND AS SOON AS PRACTICABLE.
OIL LOW UTIL HYD	LAND AS SOON AS PRACTICABLE.
PRI HYD PSI and UTIL HYD PSI	EMERG HYD switch–On. LAND WITHOUT DELAY.
NOTE • **OIL LOW PRI HYD and UTIL HYD PSI** – LAND AS SOON AS POSSIBLE. • **OIL LOW UTIL HYD and PRI HYD PSI** – LAND AS SOON AS POSSIBLE.	
OIL PSI ACC PUMP	IN FLIGHT – LAND AS SOON AS POSSIBLE. APU ONLY OPERATION – Shutdown APU immediately.
ASE	LAND AS SOON AS PRACTICABLE.
REFUEL VALVE OPEN	Information/system status.
CHIPS NOSE GRBX 1	PWR lever – IDLE when conditions permit. LAND AS SOON AS PRACTICABLE.

AH-64 CAUTION/WARNING LIGHT EMERGENCY PROCEDURES – continued

Word Segment	Corrective Action
OIL BYP PRI HYD	LAND AS SOON AS PRACTICABLE.
OIL BYP UTIL HYD	LAND AS SOON AS PRACTICABLE.
CHIPS NOSE GRBX 2	PWR lever – IDLE when conditions permit. LAND AS SOON AS PRACTICABLE.
CHIPS ENG 1	PWR lever – IDLE when conditions permit. LAND AS SOON AS PRACTICABLE.
OIL PSI NOSE GRBX 1	PWR lever – IDLE when conditions permit. LAND AS SOON AS PRACTICABLE.
OIL PSI MAIN XMSN 1	LAND AS SOON AS PRACTICABLE.
OIL PSI MAIN XMSN 2	LAND AS SOON AS PRACTICABLE.

NOTE

OIL PSI MAIN XMSN 1 and 2 – LAND AS SOON AS POSSIBLE.

OIL PSI NOSE GRBX 2	PWR lever – IDLE when conditions permit. LAND AS SOON AS PRACTICABLE.

AH-64 CAUTION/WARNING LIGHT EMERGENCY PROCEDURES – continued

Word Segment	Corrective Action
CHIPS ENG 2	PWR lever – IDLE when conditions permit. LAND AS SOON AS PRACTICABLE.
OIL PSI ENG 1	EMER ENG SHUTDOWN when conditions permit. LAND AS SOON AS PRACTICABLE.
OIL HOT NOSE GRBX 1	PWR lever – IDLE when conditions permit. LAND AS SOON AS PRACTICABLE.
OIL HOT MAIN XMSN 1	LAND AS SOON AS PRACTICABLE.
OIL HOT MAIN XMSN 2	LAND AS SOON AS PRACTICABLE.
NOTE **OIL HOT MAIN XMSN 1 and 2** – LAND AS SOON AS POSSIBLE.	
OIL HOT NOSE GRBX 2	PWR lever – IDLE when conditions permit. LAND AS SOON AS PRACTICABLE.

AH-64 CAUTION/WARNING LIGHT EMERGENCY PROCEDURES – continued

Word Segment	Corrective Action
OIL PSI ENG 2	EMERG ENG SHUTDOWN when conditions permit. LAND AS SOON AS PRACTICABLE.
OIL BYP ENG 1	PWR lever – IDLE when conditions permit. LAND AS SOON AS PRACTICABLE.
GEN 1 and GEN 2	GEN switches 1 and 2 – OFF/RESET – GEN. If power not restored, GEN switches – OFF/RESET. LAND AS SOON AS PRACTICABLE.
RECT 1 and RECT 2	LAND AS SOON AS PRACTICABLE.
GEN 1	GEN switch – OFF/RESET – GEN. If power is not restored – GEN switch – OFF/RESET.
RECT 1	Information/system status.
GEN 2	GEN switch – OFF/RESET – GEN. If power is not restored – GEN switch – OFF/RESET.

AH-64 CAUTION/WARNING LIGHT EMERGENCY PROCEDURES – continued

Word Segment	Corrective Action
RECT 2	Information/system status.
OIL BYP ENG 2	PWR lever – IDLE when conditions permit. LAND AS SOON AS PRACTICABLE.
FUEL BYP ENG 1	PWR lever – IDLE when conditions permit. LAND AS SOON AS PRACTICABLE.
HOT RECT 1	POWER XFMR RECT 1 circuit breaker – Out.
CHIPS MAIN XMSN	LAND AS SOON AS POSSIBLE.
TEMP INT	LAND AS SOON AS PRACTICABLE.
TEMP TR	LAND AS SOON AS PRACTICABLE.
HOT RECT 2	POWER XFMR RECT 2 circuit breaker – Out.
FUEL BYP ENG 2	PWR lever – IDLE when conditions permit. LAND AS SOON AS PRACTICABLE.

AH-64 CAUTION/WARNING LIGHT EMERGENCY PROCEDURES – continued

Word Segment	Corrective Action
FUEL PSI ENG 1	Achieve safe single-engine airspeed. LAND AS SOON AS PRACTICABLE.
PRI MUX	Information/system status.
RDR JAM	Information/system status.
SHAFT DRIVEN COMP	LAND AS SOON AS POSSIBLE.
VIB GRBX	LAND AS SOON AS POSSIBLE.
HOT BAT	BATT switch – OFF. LAND AS SOON AS PRACTICABLE.
CHARGER	Information/system status.
FUEL PSI ENG 2	Achieve safe single-engine-airspeed. LAND AS SOON AS PRACTICABLE.
FUEL PSI ENG 1 and ENG 2	Fuel CROSSFEED switch – AFT TK. Fuel BOOST switch – ON. LAND AS SOON AS POSSIBLE.
GUN	Information/system status.

AH-64 CAUTION/WARNING LIGHT EMERGENCY PROCEDURES – continued

Word Segment	Corrective Action
ROCKET	Information/system status.
IR JAM	Information/system status.
PNVS	See PNVS failure.
BLADE ANTI-ICE FAIL	Information/system status.
ENG ICE	ANTI-ICE panel switches – As desired.
RTR BK	RTR BK switch – OFF. LAND AS SOON AS POSSIBLE.
CANOPY	Information/system status.
EXT PWR	Information/system status.
MISSILE	Information/system status.
IFF	Information/system status.
ECS	Information/system status.
TADS	Information/system status.
CANOPY ANTI-ICE FAIL	Information/system status.
ENG 1 ANTI-ICE	Information/system status.
ENG 2 ANTI-ICE	Information/system status.
APU ON	Information/system status.

AH-64 CAUTION/WARNING LIGHT EMERGENCY PROCEDURES – continued

Word Segment	Corrective Action
APU FAIL	Information/system status.
– **(SPARE)**	LAND AS SOON AS POSSIBLE.
CPG CAUTION WARNING PANEL ONLY	
PRI HYD	Coordinate actions with pilot.
UTIL HYD	Coordinate actions with pilot.
MAIN XMSN 1	Coordinate actions with pilot.
MAIN XMSN 2	Coordinate actions with pilot.
ENG 1	Coordinate actions with pilot.
ENG 2	Coordinate actions with pilot.
ELEC SYS FAIL	Coordinate actions with pilot.
ENG ANTI-ICE	Coordinate actions with pilot.
VOICE CIPHER	Information/system status.
FUEL XFR (Green) Modified C/W panel	Information/system status.

AH-64 CAUTION/WARNING LIGHT EMERGENCY PROCEDURES – continued

Word Segment	Corrective Action
FUEL XFR (Amber) Modified C/W panel	Evaluate remaining fuel per cell.
X FEED (Green) Modified C/W panel	Information/system status.
X FEED (Amber) Modified C/W panel	Achieve safe single engine airspeed, restore previous switch position. If caution segment extinguishes, continue mission. If caution segment remains illuminated, be prepared for a single engine flame-out - LAND AS SOON AS PRACTICABLE.

PERFORMANCE DATA

B BUCS – TEST as follows:

CAUTION

Do not execute BUCS test or control sweep unless rotor is completely stopped.

1. **RTR BK** switch – **BRAKE**.
2. Controls – friction off, centered and cleared.

WARNING

During both PLT and CPG BUCS test, the crew should be aware that the flight controls will move. If the BUCS FAIL warning light illuminates during either test, DO NOT FLY THE HELICOPTER.

3. Announce to CPG – you are initiating a BUCS test. Remain clear of flight controls.
4. **BUCS TST** switch – **PLT** and hold. **BUCS ON** caution light should go out in approximately 20 seconds. Release switch and wait 15 seconds to see if **BUCS FAIL** warning light illuminates. If **BUCS FAIL** warning light illuminates, do not fly the helicopter. If not proceed to step 5.
5. **BUCS TST** switch – **CPG** and hold. **BUCS ON** caution light should go out in approximately 20 seconds. Release switch and wait 15 seconds to see if **BUCS FAIL** warning light illuminates. If **BUCS FAIL** warning light illuminates, do not fly the helicopter. If not, proceed to step 6.
6. BUCS select trigger switch (CPG) – Press. Verify illumination of **BUCS FAIL** warning light in both crew stations.

7. Collective – full down.

8. **RTR BK** switch – As desired.

IHADSS BORESIGHT – PILOT.

1. **SIGHT SEL** switch – **HMD**.

2. **VID SEL** switch – **GRAY SC**.

3. **BRT** and **CONTRAST** control – Adjust.

4. **VID SEL** switch – **PLT**.

5. **SYM BRT** control – Adjust

6. **IHADSS BRSIT** switch – **ON**.

7. **INST** lights control – Adjust BRU intensity.

8. Align HMD reticle with BRU.

9. **BRSIT HMD** switch – Actuate, then release.

10. **IHADSS BRSIT** switch – **OFF**.

11. **INTR LT** controls – As desired.

STARTING ENGINE (NO. 1 OR NO. 2).

NOTE

Use the procedures in steps 1 thru 5 for COLD and WARM 701 engine starts and for COLD 701C engine starts (more than 4 hours since last shutdown) and all IN-FLIGHT 701 and 701C engine starts. Use the procedures in steps 7.a. thru 7.h. for WARM 701C engine starts on the GROUND.

1. **START** switch – **START**.
2. **PWR** lever – **IDLE** after N_G speed increases and **TGT** is below 150 °C 701.
3. **ENG OIL** pressure gauge – Monitor.
4. **TGT** – Monitor.
5. N_G – Monitor.
6. Caution/warning lights – Check.
7. 701C WARM ENGINE START. Less than 4 hours since last shutdown. Do not use this procedure for inflight restarts. Start procedures are as follows:
   a. **START** switch – **IGN OVRD** until N_G reaches 18 - 20%.
   b. **START** switch – **OFF**. Allow N_G to spool down below 5%.
   c. **START** switch – **START**.
   d. **PWR** lever – **IDLE** after N_G speed increases and TGT is below 80 °C.
   e. **ENG OIL** pressure gauge – Monitor.
   f. **TGT** – Monitor.
   g. N_G – Monitor.
   h. Caution/warning lights – Check.

WEAPONS SYSTEMS SWITCHES – SECURE.

1. **SIGHT SEL** switch – **STBY**.
2. **PNVS** – Off (announce to CPG).
3. **ACQ SEL** – **OFF**.
4. **VID SEL** – **PLT**.
5. **ACM** – **OFF**.
6. Weapons select switches – **OFF**.
7. **MASTER ARM/SAFE** switch – **OFF**.

FIRE CONTROL SYSTEM – DATA ENTRY.

WARNING

Prior to helicopter operation ensure that the gun turret area is clear. Failure to clear the area could result in injury to personnel or damage to equipment.

Prior to initiating AWS FD/LS check, ensure the pilot ground override (PLT/GND ORIDE) switch is in the OFF position. Failure to perform this action may result in uncommanded gun turret slewing or uncommanded gun firing during a AWS FD/LS manual abort.

For –49A FCC software:

1. **DATA ENTRY** switch – **SP1**.
2. Enter time. Ex – 17:14:30.
3. Enter **PPOS**. Ex – 115QG55385172.
4. Enter field elevation. Ex – ALT0820.
5. Enter spheroid. Ex – SPHCL6.
6. Enter magnetic variation. Ex – MVE13.8.
7. **DATA ENTRY** switch – **FDLS**. Execute desired test.
8. **DATA ENTRY** switch – **TGT**. Enter mission preplanning coordinate data.
9. **DATA ENTRY** switch – **CODES**. Enter desired laser codes.

For –51 FCC software:

1. CDU **ADMIN** page – Enter time if required.
2. CDU **ADMIN** page – Enter date if required.
3. CDU **ADMIN** page – Enter Baro Pressure if required.
4. CDU **ADMIN** page – Enter Altitude if required.
5. CDU **NAV** page – Enter PPOS/Datum if required.
6. CDU **FDLS**.page – Execute desired test.
7. CDU **FPLN** page – Enter mission waypoint coordinate data.
8. CDU **TGT** page – Enter mission target coordinate data.
9. CDU **CODES**. page – Enter desired laser codes.

IHADSS BORESIGHT – CPG.

1. **SIGHT SEL** switch – **HMD** or **HMD TADS**.
2. **GS** switch – Press.
3. Adjust brightness and contrast.
4. **VID SEL** switch – **TADS**.
5. **SYM BRT** control – Adjust.
6. **IHADSS BRSIT** switch – On.
7. **INTR LT** controls – As desired.

8. Align HMD reticle with BRU.
9. **BRSIT HMD** switch – Actuate, then release.
10. **IHADSS BRSIT** switch – **OFF**.
11. **INST** light control – As desired.

TADS OPERATIONAL CHECKS – CPG.

1. **TADS** switch – **TADS** or **FLIR OFF**, (announce to pilot).
2. **SIGHT SEL** switch – **TADS**.
3. **ACQ SEL** switch – **FXD**
4. **GS** switch – Press.
5. Heads up and heads down displays – Adjust brightness and contrast as desired.
6. **VID SEL** switch – **TADS**.
7. Sensor select switch – **TV**.
8. **SLAVE** pushbutton – Press. Turret should return to manual track.
9. Thumbforce controller – Exercise turret.
10. Field of view select switch – Evaluate various FOVs.
11. **IAT**/**MAN** pushbutton – Engage image auto tracker and check for proper function.
12. Sensor select switch – **DVO**.
13. Field of view select switch – Evaluate various FOVs. If scene is not vertical in both FOVs, perform Pechan Alignment.
14. Sensor select switch – **FLIR**.

15. Adjust gain and level for optimum image, then engage **ACM**, as desired.

16. Field of view select switch – Evaluate various FOVs.

17. **IAT**/**MAN** pushbutton – Engage image auto tracker and check for proper performance.

18. Polarity reversal – Check, leave in white hot.

19. Sensor select switch – **TV** or **FLIR**.

20. Drift null – If Auto Drift Null does not reduce drift to desired level, perform Manual Servo Drift Null.

TADS INTERNAL BORESIGHT.

NOTE

TADS internal boresight shall be performed after performing a cue update, manual boresight adjust, or after replacement of the following TADS components: TADS Electronic Unit (TEU), Night Sensor Assembly (NSA), Day Sensor Assembly (DSA), Laser Tranceiver Unit (LTU), Television Sensor Assembly (TV), or Boresight Assembly (BSA).

1. DTV
   a. **PLT/GND ORIDE** switch – As required.
   b. **CPG ARM/SAFE** switch – **ARM**.
   c. **SIGHT SEL** switch – **TADS**.
   d. **BRSIT** and **TADS** – Confirm **INTERNAL BORESIGHT** message is present.
   e. **LSR** switch – **ON**.
   f. Sensor select switch – **TV**.
   g. Field of view select switch – **N**.
   h. Tracker **PLRT** – W/B.
   i. Laser trigger – Press and hold.
   j. Boresight Enable switch – UP. Observe tracking gates capture laser spot. Continue to fire laser until tracking gates disappear.
   k. Boresight Enable switch – CENTER.
   l. Laser trigger – Release.
   m. Field of view select switch – **Z**.
   n. Repeat steps i. thru l.

2. FLIR
    a. Sensor select switch – **FLIR**.
    b. Field of view select switch – **N**.
    c. **FLIR** – Adjust level fully counterclockwise.
    d. **FLIR –** Adjust gain midrange.
    e. Laser trigger – Press and hold.
    f. Observe laser spot and optimize.
    g. Boresight Enable switch – UP. Observe tracking gates capture laser spot. Continue to fire laser until tracking gates disappear.
    h. Boresight Enable switch – CENTER.
    i. Laser trigger – Release.
    j. Field of view select switch – **Z**.
    k. Repeat steps e thru i.
    l. **LSR** switch – **OFF**.
    m. **CPG ARM**/**SAFE** switch – **SAFE**.
    n. **PLT**/**GND ORIDE** switch – **OFF**.
3. DVO
    a. Sensor select switch – **DVO**.
    b. Field of view select switch – **N**.
    c. Observe position of DVO crosshairs, if coincident with TV reticle go to step g. below.
    d. Boresight Enable switch – DOWN.
    e. **DVO BRSIT** switch – Adjust DVO crosshairs into coincidence with TV reticle.

f. Boresight Enable switch – CENTER.

g. **BRSIT TADS** switch – **OFF**.

h. **ACQ SEL** switch – **FXD**.

i. **SLAVE** switch – Press. TADS returns to the fixed forward position.

TADS OUTFRONT BORESIGHT

WARNING

The narrow and zoom FOV TADS FLIR has inaccuracies for lasing and weapons direction following TADS internal boresight. TADS outfront boresight validation and adjustment, if necessary, shall be performed prior to using TADS FLIR imagery for laser or weapons operation.

1. Position helicopter, on the ground, over identified location for this procedure.
2. If on an approved laser firing range, fire laser to obtain range. Otherwise, enter, manually, the range from helicopter to the outfront boresight target.
3. Observe the outfront boresight target in NFOV FLIR, adjust gain and level for optimum autotracker image. Engage IAT.
4. Sensor select switch – **TV**, observe light source.

If not precisely centered on the TADS reticle execute the following:

5. **BRSIT TADS** switch – **TADS**.
6. Boresight Enable switch – UP.
7. Adjust AZ and EL pots to center the light source on the reticle.
8. Boresight Enable switch – CENTER.
9. **IAT** switch – **OFF**.
10. **BRSIT TADS** switch – **OFF**.

FLIR OPERATIONAL CHECK – PILOT/CPG.

1. **SIGHT SEL** switch – **NVS**, check turret function.
2. Adjust gain and level for optimum image.
3. Verify capability to select the various modes of flight symbology.
4. **FLIR PLRT** pushbutton – Check polarity reversal.
5. Registration – Check.
6. Alternate sensor – Check.

MANUAL SERVO DRIFT NULL.

1. **SLAVE** switch – Press and verify dotted crosshair is present on selected display (HOD or HDD).
2. **SIGHT SEL** switch – **TADS**.
3. Verify TADS turret slews to fixed forward position by observing solid crosshair coming to center of display and cueing LOS centering on cueing dot.

4. **SLAVE** switch – Press.
5. Sensor select switch – **TV** or **FLIR**.
6. Field of view select switch – **N**.
7. Aim reticle at an easily observed object.
8. Boresight Enable switch – UP, wait 5 seconds then adjust left and right thumbwheel controls for drift null.
9. Boresight Enable switch – CENTER.

TADS PECHAN ALIGNMENT.

NOTE

This procedure aligns the voltages used to erect the Pechan (DVO) lens. It should be used in order to establish a "Real World" relationship when viewing through the DVO. Should alignment be unsuccessful, refer to TM 9-1270-476-20.

1. Sensor select switch – **DVO**.
2. Field of view select switch – **N**.
3. TADS turret – Manual control.
4. Boresight Enable switch – UP.
5. Left thumbwheel control – Adjust as required to align horizontal crosshair with horizon.
6. Boresight Enable switch – CENTER.
7. Field of view select switch – **W**.
8. Recheck alignment of crosshair and horizon.
   a. If satisfactorily aligned, procedure is complete. Select desired operating mode.

b. If not satisfactorily aligned:

(1) Boresight Enable switch – UP.

(2) Adjust right thumbwheel control as required to align horizontal crosshair with horizon.

(3) Boresight Enable switch – CENTER.

(4) Field of view select switch – **N**.

(5) Reverify alignment of NFOV. If satisfactory, procedure is complete. If unsatisfactory, repeat steps 4 thru 8 above as required. If still unsatisfactory, see note above.

TADS MANUAL BORESIGHT ADJUST

NOTE

- The manual boresight procedure is used only to recapture or center the laser spot. It is not an acceptable boresight procedure for normal flight operations.
- TADS internal boresight shall be performed after performing TADS manual boresight adjustment.

1. **BRSIT TADS** switch – **TADS**. Confirm message **INTERNAL BORESIGHT** is present.
2. **LSR** select switch – **ON**.
3. Sensor select switch – **FLIR** or **TV**.
4. **FLIR PLRT** – Press to select white hot.
5. Field of view select switch – **N**.
6. **GAIN** – Midrange (If using FLIR).
7. **LVL** – Fully counterclockwise (If using FLIR).

WARNING

Ensure proper laser safety procedures are followed.

8. Laser trigger – Press.

NOTE

If the laser spot is too weak or not visible, perform Cue update.

9. Observe laser spot and optimize FLIR.

10. Boresight Enable switch – UP for 5 seconds. Then move to center position and continue firing laser. After 5 seconds, the left (azimuth) and right (elevation) thumbwheel controls will be active and the laser spot can be adjusted in azimuth and elevation.

11. Laser trigger – Release.

12. **LSR** switch – **OFF**.

CUE UPDATE PROCEDURE.

NOTE

- The CUE update procedure should be accomplished whenever the TADS FLIR is reported as being unable to be internally boresighted. Once the CUE update procedure has been accomplished and the TADS FLIR still cannot be boresighted, continue troubleshooting in accordance with TM 9-1270-476-20.
- TADS internal boresight shall be performed after a cue update procedure.

1. **SIGHT SEL** switch – **TADS**.

2. Sensor select switch – **TV**.

3. Field of view select switch – **W**.

4. **BRSIT** switch – **TADS**.

5. **SLAVE** switch – Actuate. Verify internal boresight message replaced by cue update message.

6. If reticle does not appear centered on the black cross execute the following:
   a. Boresight Enable switch – UP.
   b. Use thumbforce controller to position TV reticle in proximity to the black cross.
   c. Boresight Enable switch – CENTER.
   d. **SLAVE** switch – Actuate. Verify cue update message replaced by internal boresight message.
   e. **BRSIT TADS** switch – **OFF**. Procedure complete, continue as desired.

HARS SELF TEST

CAUTION

The helicopter must not move during HARS self test. Any movement will result in an invalid self test.

NOTE

- The HARS self test can be used only with HARS units having part numbers 86-9415-5 and above.
- The HARS self test should be performed on the ground with APU power only.

1. **FCC/MUX** switch – **ON**.
2. **MUX** switch – **PRI**.
3. **SYSTEM FC SYM GEN** switch – **FC SYM GEN**.

NOTE

–45 and –49A If the DEK is in the FD/LS position when the HARS alignment is initiated, the heading tape will not appear; set DEK switch to **STBY**.

4. **VDU** mode switch – **CPG**. View heading tape on VDU.

5. For –45 and –49A software. DEK – Enter **SP1 PPOS**, **ALT**, **MV** and spheroid data for present location as required. For –51 software, use CDU **ADMIN** and **NAV** pages to enter PPOS/Datum and altitude.

6. HSI compass card – Note helicopter heading.

NOTE

For –45 and –49A software, complete steps 7 through 13 below. For –51 software, steps 7 through 13 may be completed or perform the automated HARS Extended Alignment test via the CDU **FD**/**LS** page.

7. **HARS** switch – **NORM** for 5 seconds, then to **FAST**.

8. Wait for second rotation of HSI compass card (approximately 3 – 5 minutes after setting **HARS** switch to **FAST**). **HARS** switch – **NORM** during second rotation of the HSI compass card when HSI compass card is 180° from helicopter heading.

9. HSI **HDG** flag – Goes out of view within 3 minutes of setting **HARS** switch to **NORM**.

10. VDU – Heading tape remains in view.

11. If the **HDG** flag remains in view, or if the heading tape is no longer visible, the self test has failed. Set **HARS** switch to **OFF** and repeat steps 5. thru 10. above.

12. If the HARS passes the second test, the first failure was because of invalid data in the mission data memory. Set **HARS** switch to **OFF** and complete a normal alignment prior to moving helicopter.

13. If the HARS fails the second test, the HARS unit is faulty.

WEAPONS INITIALIZATION PROCEDURES

CAUTION

Insure that personnel are clear from the aircraft weapon systems when conducting weapons system initialization.

1. **MSL/ARCS PANEL SET**

   a. CPG

      (1) **MSL TYPE** – **LASER**

      (2) **MSL MODE** – **STBY**

      (3) **MSL LOAL** – **OFF**

   b. PLT

      (1) PLT MSL Panel **LOAL** – **OFF**

      (2) **ARCS** – SET: **ZONES**/**TYPE**, **PEN–M**, **QTY**, **RNG**

2. **FIRE CONTROL PANEL SET**

   a. CPG

      (1) **MSL UPR** and **LWR CHAN LSR CODES** and **QTY** – Select

      (2) **LST** and **LRF**/**D CODE** – Set

      (3) **LSR MSL** and **LRF**/**D CCM** Switch – **OFF**

      (4) **PLT**/**GND** – **ORIDE** (as required, announce to pilot)

      (5) **ARM**/**SAFE** – **SAFE** (announce to pilot)

      (6) **RKT** Switch – **NORM**

(7) **GUN** Switch – **NORM**

(8) **MSL** Switch – **ON**

(9) **LSR** Switch – **ON**

(10) Check **BIT IN PROGRESS** message in HAD

b. PLT

(1) **MASTER ARM**/**SAFE** Switch – **SAFE** (announce to CPG)

(2) **RKT** Switch – **NORM**

(3) **GUN** Switch – **NORM**

(4) **MSL** Switch – **ON**

(5) **SIGHT SEL** – **HMD** or **NVS**

NOTE

The crew must verify correct operation of each weapon system by observing weapon symbology, HAD messages, caution/warning lights and weapon action.

3. **ROCKET INITIALIZATION PROCEDURE**

a. **CPG SIGHT SEL** – **TADS**

b. **CPG WAS** – **RKT**, (On the ORT)

c. Pilot – Select **ZONE**

d. CPG – Exercise **TADS**, ensure movement of pylons and rocket steering cursor

e. **PLT WAS** – **RKT**, verify co-operative mode

f. **CPG WAS** – Deselect **RKT**

g. PLT – Confirm pilot control of rockets

h. **PLT WAS** – Deselect **RKT**

i. **CPG SIGHT SEL** – **HMD** or **NVS**

j. **CPG WAS** – **RKT** (On the cyclic), confirm CPG control of rockets

k. **CPG WAS** – Deselect **RKT**

4. **AERIAL WEAPON SYSTEM INITIALIZATION PROCEDURES**

a. **CPG WAS** – **GUN** (On the cyclic), confirm CPG control of the gun

b. **PLT WAS** – **GUN**, confirm pilot control of the gun

c. **CPG SIGHT SEL** – **TADS**

d. **CPG WAS** – **GUN** (On the ORT), confirm CPG control of the gun

e. **PLT WAS** – Deselect **GUN**

f. **CPG WAS** – Deselect **GUN**

5. **MISSILE INITIALIZATION PROCEDURE**

a. CPG check BIT complete and **SAFE** message in AND. If missile inventory indicates **SAFE** then momentarily place the **ARM**/**SAFE** switch to **ARM** then back to **SAFE** (announce to pilot). Verify missile inventory and status in the AND.

b. **CPG MSL MODE** Switch – **NORM**, select **UPR** or **LWR**, ensure laser codes download

c. **CPG WAS** – **MSL**

d. **CPG LOAL** Switch – **OFF**, check **LOBL**

e. **CPG LOAL** Switch – Check **DIR**, **LO**, and **HI**, (as desired)

f. **PLT WAS** – **MSL**, confirm pilot control of missiles

g. **PLT WAS** – Deselect **MSL**, confirm CPG control of missiles

h. **CPG WAS** – Deselect **MSL**

i. **ARM**/**SAFE** switches – As desired (announce switch positions)

j. **PLT**/**GND ORIDE** Switch – **OFF** (as required, announce to pilot)

k. Weapons switches – As desired (announce switch positions)

ARMAMENT – IN FLIGHT PROCEDURES

WARNING

Prior to initiating AWS FD/LS check, ensure the pilot ground override (PLT/GND ORIDE) switch is in the OFF position. Failure to perform this action may result in uncommanded gun turret slewing or uncommanded gun firing during a AWS FD/LS manual abort.

M-230E1, 30MM GUN SYSTEM – IN FLIGHT PROCEDURES.

1. **CPG ARM/SAFE** switch – **ARM**.
2. **GUN** select switch – As desired.
3. Crewmember desiring to fire – Establish range to target and track target with select sight.
4. WAS switch – **GUN**.
5. Weapons trigger – Press, continue to fire as required.
6. WAS switch – Deselect **GUN**.

AWS HARMONIZATION PROCEDURES –49A, –51.

1. Locate target approximately 1000 meters (±5) from aircraft position.
2. Hover aircraft 100 FT (±20) above target altitude and maintain heading (±5°) azimuth.
3. Sensor select switch – **TV**.
4. Field of view select switch – **N** or **Z**.
5. **LSR** select switch – **ON**.
6. Laser trigger – Press. Ensure the displayed range to target is accurate to ±10 meters.

7. Laser trigger – Press. Confirm range.

NOTE

Harmonization burst shall be accomplished in the narrowest field of view which the CPG can observe the rounds impact (wide/narrow).

8. Field of view select switch – **W** or **N**.

NOTE

A video recording may be used to verify impact area.

9. Fire one or two 10 round bursts. Note centroid of impact area.

10. Determine the appropriate sector from the appropriate field of view Correction Guides (figs P-1 and P-2) for harmonization offset values.

NOTE

A fraction of the offset values in a sector can be used to improve accuracy.

11. For –49A FCC software, enter modified correctors:

    a. DEK switch – **SP1**.

    b. Enter **G** on the DEK.

    c. The screen will display harmonization corrector Deltas and Totals in the following format:

AWS HARMONIZATION DELTAS
AZ=+00.0 MR EL=+00.0 MR
AWS HARMONIZATION TOTALS
AZ=+00.0 MR EL=+00.0 MR

    d. On the DEK enter **1** to access azimuth or **2** to access elevation corrector value(s) to be changed.

    e. Enter corrector Delta value(s) from the Corrector Guides (figs P-1 and P-2).

f. Repeat steps 1 thru 11 while reducing field of view as appropriate to DTV-NFOV until center of impact is verified to be within zoom FOV gates. When FOV gates are achieved, proceed to step g.

g. DEK **ENTER** button – Press. This will complete the modification.

12. For –51 enter modified correctors:

a. CDU – Select **PGM**.

b. CDU – Select **AWS HARM**.

c. Enter appropriate correction data (**AZ** or **EL**) on CDU scratchpad.

d. Depress VAB 2 (**AZ**) or VAB 6 (**EL**), as appropriate, to enter correction factors into FCC.

e. The CDU screen will display harmonization corrector Deltas and Totals in the following format:

AWS HARMONIZATION
DELTAS –MR–
AZ=+00.0 EL=+00.0
TOTALS –MR–
AZ=+00.0 EL=+00.0

f. Repeat steps 1 thru 10 and 12 while reducing field of view as appropriate to DTV-NFOV until center of impact is verified to be within zoom FOV gates. When FOV gates are achieved, proceed to step g.

g. Press **PGM** VAB to return to top level page.

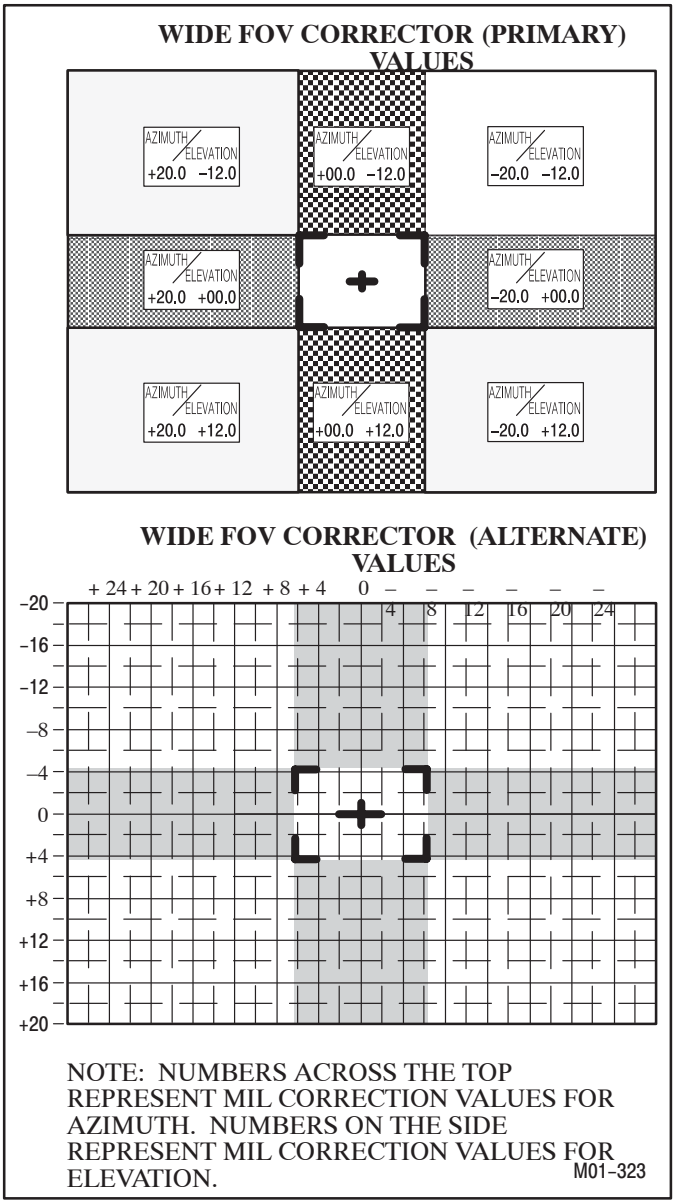

Figure P-1. AWS Harmonization Wide FOV Corrector Guide –49A / –51.

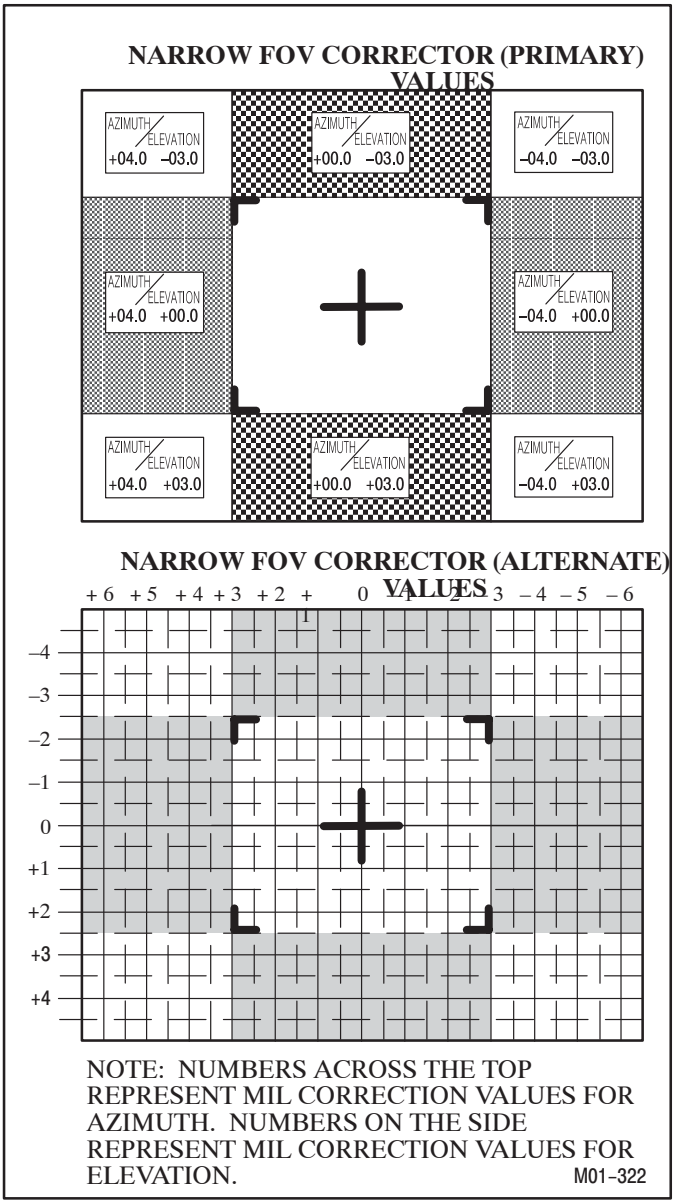

Figure P-2. AWS Harmonization Narrow FOV Corrector Guide –49A / –51.

AERIAL ROCKET CONTROL AND DELIVERY SYSTEM – IN FLIGHT PROCEDURES.

WARNING

To prevent inadvertent rocket firing, ensure ARCS panel inventory is complete prior to placing the pilot's or CPG's ARM/SAFE switch to the ARM position. At no time during takeoff or landing will the pilot's or CPG's ARM/SAFE switch be in the ARM position.

NOTE

If one or more pylons have failed, rocket firing from the failed pylon is disabled without inhibiting rocket firing from the remaining pylons.

1. COOPERATIVE ENGAGEMENT MODE.

   a. Pilot **MASTER ARM/SAFE** switch – **SAFE**.

   b. **CPG ARM/SAFE** switch – **SAFE**.

   c. **RKT** select switch – As desired.

   d. ARCS inventory – Complete.

   e. **ROCKETS** panel – Set **QTY, PEN–M** and **ZONE SEL**.

   f. Pilot **MASTER ARM/SAFE** switch – **ARM**.

   g. **CPG ARM/SAFE** switch – **ARM**.

   h. Desired target – Acquire and track with TADS.

i. Pilot WAS – **RKT**.

j. CPG ORT WAS – **RKT**.

k. Laser trigger – Press, establish range to target.

l. Pilot align rocket steering symbology.

m. Weapons trigger – Press until selected quantity has been fired or target neutralized.

n. Pilot WAS – Deselect **RKT**.

o. CPG ORT WAS – Deselect **RKT**.

2. DELETED.

3. PILOT/CPG INDEPENDENT ONLY MODE.

   a. **ARM**/**SAFE** switches – **SAFE**.

   b. **RKT** select switch – As desired.

   c. ARCS inventory – Complete.

   d. **ROCKETS** control panel – Set **QTY**, **PEN–M** and **ZONE SEL**.

   e. **ARM**/**SAFE** switches – **ARM**.

   f. Crewmember desiring to fire – Track target with HMD, maintain LOS reticle on target. Establish range.

   g. WAS – **RKT**.

   h. Align rocket steering symbology.

   i. Weapons trigger – Press until selected quantity has been fired or target neutralized.

   j. WAS – Deselect **RKT**.

POINT TARGET WEAPONS SYSTEM – IN FLIGHT PROCEDURES.

1. **MSL** switch – **ON**, observe "BIT IN PROGRESS".

2. Types of engagements.

   a. Normal mode – **LOBL**.

      (1) **MSL UPR/LWR CHAN CODE** – As desired.

      (2) **MSL UPR/LWR CHAN QTY** – As desired.

      (3) **MSL MODE** – **NORM**.

      (4) **CHAN SEL** switch – Establish priority channel.

      (5) Observe AND for missile selection, coding, and ready status.

      (6) **CPG ARM/SAFE** switch – **ARM**.

      (7) Lase target or call for remote designator.

      (8) Observe AND or HIGH ACTION display for proper missile track status.

      (9) CPG ORT WAS – **MSL**.

      (10) Pilot establish helicopter in constraints.

      (11) Weapons trigger – Press and release.

      (12) If autonomously designating, continue lasing until missile impact.

b. Normal mode – **LOAL**.

(1) **MSL UPR/LWR CHAN CODE** – As desired.

(2) **MSL UPR/LWR CHAN QTY** – As desired.

(3) **MSL MODE** – **NORM**.

(4) **CHAN SEL** switch – Establish priority channel.

(5) Observe AND or HIGH ACTION display for missile selection, coding, and ready status.

(6) **LOAL** select switch – As desired.

(7) **CPG ARM/SAFE** switch – **ARM**.

(8) CPG WAS – **MSL**.

(9) Pilot establish helicopter in constraints.

(10) Weapons trigger – Press and release.

(11) Lase target or call for remote designator in adequate time for terminal guidance.

c. Ripple mode – **LOBL**.

(1) **MSL UPR/LWR CHAN CODE** – As desired.

(2) **MSL UPR/LWR CHAN QTY** – As desired.

(3) **MSL MODE** – **RIPL**.

(4) **CHAN SEL** switch – Establish priority channel.

(5) Observe AND for missile selection, coding, and ready status.

(6) **CPG ARM/SAFE** switch – **ARM**.

(7) Lase target or call for remote designator.

(8) Observe AND or HIGH ACTION display for missile system message.

(9) CPG WAS – **MSL**.

(10) Pilot establish the helicopter in constraints.

(11) Weapons trigger – Press and release.

(12) Pilot establish helicopter in constraints.

(13) Repeat steps (10) thru (12) until desired number of missiles have been fired.

d. Ripple mode – **LOAL**.

(1) **MSL UPR/LWR CHAN CODE** – As desired.

(2) **MSL UPR/LWR CHAN QTY** – As desired.

(3) **MSL MODE** – **RIPL**.

(4) **CHAN SEL** switch – Establish priority channel.

(5) Observe AND or HIGH ACTION display for missile selection, coding, ready status.

(6) **LOAL** select switch – As desired.

(7) **CPG ARM/SAFE** switch – **ARM**.

(8) WAS – **MSL**.

(9) Pilot establish helicopter in constraints.

(10) Weapons trigger – Press and release.

(11) Pilot establish helicopter in constraints for alternate channel.

(12) Weapons trigger – Press and release.

(13) Lase target or call for terminal guidance.

(14) Execute steps (9) thru (13) until desired number of missiles have been fired.

e. Missile system shutdown procedures.

(1) **MSL MODE** – **STBY**.

(2) **LOAL** select switch – **OFF**.

(3) **CHAN SEL** – Actuate either direction.

(4) **MSL** switch – **OFF**.

RAPID REFUEL/REARM

RAPID (HOT) REFUELING (SINGLE ENGINE).

1. **TAIL WHEEL** switch – **LOCK**.
2. **PARKING BRAKE** – Set.
3. Weapons switches – Off.
4. **PLT/CPG GND ARM/SAFE** switch – **OFF**.
5. **PLT/GND ORIDE** switch – **OFF**.
6. **HARS** switch – **NORM**. (NON–EGI).
7. **NO. 2 PWR** lever – **IDLE** for 2 minutes, then **OFF**.
8. **ANTI-COL** switch – **OFF**.
9. Aft tank refueling (**CROSSFEED NORM**). Monitor until flow to aft tank has ceased.
10. **CROSSFEED** switch – **AFT TK**.
11. **FWD TK** refuel monitor.
12. **REFUEL VALVE OPEN** caution light – Verify off when refueling is complete.
13. Fuel caps/grounding cables – Installed/removed.
14. **ANTI-COL** switch –As desired.
15. Collective – Apply until 60% torque (#1 engine) is reached or aircraft is light on wheels.
16. Maintain power setting for 30 seconds (**CROSS-FEED** is still in **AFT** position).

17. **CROSSFEED** switch – **NORM**. Maintain power setting for 30 seconds.

18. Collective – Full down.

19. **NO. 2** engine – Start.

RAPID REARMING

1. **TAIL WHEEL** switch – **LOCK**.
2. **PARK BRAKE** – Set.
3. **HARS** switch – **NORM** (NON-EGI).
4. **RKT** select switch – **NORM**.
5. **CPG ARM/SAFE** switch – **SAFE**.
6. **PLT MASTER ARM/SAFE** switch – **SAFE**.
7. **PLT/GND ORIDE** switch – **ORIDE**.
8. **ROCKETS** control panel – Inventory.
9. **CPG ARM/SAFE** switch – **ARM**.
10. **PLT MASTER ARM/SAFE** switch – **ARM**.
11. Stray current check – Perform.
12. **RKT** select switch – **OFF**.
13. **CPG ARM/SAFE** switch – **OFF**.
14. **PLT MASTER ARM/SAFE** switch – **OFF**.
15. **PLT/GND ORIDE** switch – **OFF**.
16. Armament and pylon safety pins – Installed.
17. Rearming – Monitor.
18. **ANTI-COL** switch – As Desired.
19. Armament and pylon safety pins – Removed.

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701 ENGINES (ATF = 1.0)

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–60	–55	–50	–45	–40	–35	–30	–25	–20
0	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	81	81	82	83	83	84	85	85	86
	Q – IGE ∼ %	73	73	74	75	75	76	76	77	77
500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	81	82	82	83	84	84	85	86	86
	Q – IGE ∼ %	73	74	75	75	76	76	77	77	78
1000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	82	82	83	84	84	85	86	86	87
	Q – IGE ∼ %	74	74	75	76	76	77	77	78	79
1500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	82	83	84	84	85	86	86	87	88
	Q – IGE ∼ %	74	75	75	76	77	77	78	79	79
2000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	83	83	84	85	86	86	87	88	88
	Q – IGE ∼ %	75	75	76	77	77	78	78	79	80
2500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	83	84	85	85	86	87	88	88	89
	Q – IGE ∼ %	75	76	76	77	78	78	79	80	80

*GW∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at IRP, maximum torque transmission limit or gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701 ENGINES (ATF = 1.0)

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–60	–55	–50	–45	–40	–35	–30	–25	–20
3000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	84	85	85	86	87	87	88	89	90
	Q – IGE ∼ %	76	76	77	78	78	79	80	80	81
3500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	84	85	86	87	87	88	89	90	90
	Q – IGE ∼ %	76	77	78	78	79	79	80	81	81
4000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	85	86	87	87	88	89	90	90	91
	Q – IGE ∼ %	77	77	78	79	79	80	81	81	82
4500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	86	86	87	88	89	89	90	91	92
	Q – IGE ∼ %	77	78	79	79	80	81	81	82	83
5000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	86	87	88	89	89	90	91	92	92
	Q – IGE ∼ %	78	79	79	80	81	81	82	83	83

*GW∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at IRP, maximum torque transmission limit or gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701 ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–20	–15	–10	–5	0	+5	+10	+15	+20
0	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	86	86	87	88	88	89	90	90	91
	Q – IGE ∼ %	77	78	79	79	80	80	81	81	82
500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	86	87	88	88	89	90	90	91	92
	Q – IGE ∼ %	78	79	79	80	80	81	81	82	83
1000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	87	88	88	89	90	90	91	92	92
	Q – IGE ∼ %	79	79	80	80	81	81	82	83	83
1500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	88	88	89	90	90	91	92	92	93
	Q – IGE ∼ %	79	80	80	81	82	82	83	83	84
2000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	88	89	90	90	91	92	92	93	94
	Q – IGE ∼ %	80	80	81	81	82	83	83	84	84
2500	GW ∼ 100 LB	176	176	176	176	176	179	176	176	176
	Q – OGE ∼ %	89	90	90	91	92	92	93	94	95
	Q – IGE ∼ %	80	81	81	82	83	83	84	85	85

*GW∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at IRP, maximum torque transmission limit or gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701 ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–20	–15	–10	–5	0	+5	+10	+15	+20
3000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	90	90	91	92	92	93	94	95	95
	Q – IGE ∼ %	81	81	82	83	83	84	85	85	86
3500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	90	91	92	92	93	94	95	95	96
	Q – IGE ∼ %	81	82	83	83	84	85	85	86	86
4000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	91	92	92	93	94	95	95	96	97
	Q – IGE ∼ %	82	83	83	84	85	85	86	86	87
4500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	173
	Q – OGE ∼ %	92	92	93	94	95	95	96	97	95
	Q – IGE ∼ %	83	83	84	85	85	86	87	87	86
5000	GW ∼ 100 LB	176	176	176	176	176	176	176	174	170
	Q – OGE ∼ %	92	93	94	95	95	96	97	96	94
	Q – IGE ∼ %	83	84	85	85	86	87	87	87	85

*GW∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at IRP, maximum torque transmission limit or gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701 ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		+20	+25	+30	+35	+40	+45	+50	+55	+60
0	GW ~ 100 LB	176	176	176	176	176	176	169	162	155
	Q – OGE ~ %	91	92	92	93	94	94	89	85	80
	Q – IGE ~ %	82	83	83	84	84	84	80	76	72
500	GW ~ 100 LB	176	176	176	176	176	172	166	159	152
	Q – OGE ~ %	92	92	93	94	94	92	88	83	79
	Q – IGE ~ %	83	83	84	84	85	83	79	75	71
1000	GW ~ 100 LB	176	176	176	176	176	169	162	156	149
	Q – OGE ~ %	92	93	94	94	95	90	86	81	77
	Q – IGE ~ %	83	84	84	85	85	81	77	73	69
1500	GW ~ 100 LB	176	176	176	176	172	166	159	152	146
	Q – OGE ~ %	93	94	94	95	93	88	84	80	75
	Q – IGE ~ %	84	84	85	86	84	80	76	72	68
2000	GW ~ 100 LB	176	176	176	176	169	163	156	149	143
	Q – OGE ~ %	94	94	95	95	91	87	82	78	74
	Q – IGE ~ %	84	85	86	86	82	78	74	70	67
2500	GW ~ 100 LB	176	176	176	172	166	159	153	146	140
	Q – OGE ~ %	95	95	96	94	89	85	80	76	72
	Q – IGE ~ %	85	86	86	84	80	76	73	69	65

*GW~ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at IRP, maximum torque transmission limit or gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701 ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		+20	+25	+30	+35	+40	+45	+50	+55	+60
3000	GW ~ 100 LB	176	176	175	169	163	156	150	143	137
	Q – OGE ~ %	95	96	96	92	88	83	79	75	71
	Q – IGE ~ %	86	86	76	83	79	75	71	67	64
3500	GW ~ 100 LB	176	176	171	166	160	153	147	140	134
	Q – OGE ~ %	96	97	94	90	86	81	77	73	69
	Q – IGE ~ %	86	87	84	81	77	73	69	66	62
4000	GW ~ 100 LB	176	173	168	163	156	150	144	137	131
	Q – OGE ~ %	97	95	92	88	84	80	75	71	67
	Q – IGE ~ %	87	85	83	79	76	72	68	64	61
4500	GW ~ 100 LB	173	170	165	160	153	147	141	135	129
	Q – OGE ~ %	95	93	90	87	82	78	74	70	66
	Q – IGE ~ %	86	84	81	78	74	70	67	63	60
5000	GW ~ 100 LB	170	167	162	157	151	144	138	132	127
	Q – OGE ~ %	94	92	89	85	81	77	73	69	65
	Q – IGE ~ %	85	82	80	77	73	69	65	62	58

*GW~ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at IRP, maximum torque transmission limit or gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701 ENGINE (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–60	–55	–50	–45	–40	–35	–30	–25	–20
5000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	86	87	88	89	89	90	91	92	92
	Q – IGE ∼ %	78	79	79	80	81	81	82	83	83
5500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	87	88	88	89	90	91	92	92	93
	Q – IGE ∼ %	78	79	80	80	81	82	83	83	84
6000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	88	88	89	90	91	92	92	93	94
	Q – IGE ∼ %	79	80	80	81	82	82	83	84	85
6500	GW ∼ 100 LB	176	176	176	175	175	175	176	175	175
	Q – OGE ∼ %	88	89	90	90	90	91	93	93	94
	Q – IGE ∼ %	80	80	81	81	81	82	83	84	84
7000	GW ∼ 100 LB	176	174	173	172	171	171	172	172	171
	Q – OGE ∼ %	89	88	88	88	89	89	91	91	92
	Q – IGE ∼ %	80	80	79	80	80	81	82	82	83
7500	GW ∼ 100 LB	173	171	170	169	168	168	169	169	168
	Q – OGE ∼ %	87	87	86	87	87	88	89	90	90
	Q – IGE ∼ %	79	78	78	78	78	79	80	81	81

*GW∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at IRP, maximum torque transmission limit or gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701 ENGINE (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–60	–55	–50	–45	–40	–35	–30	–25	–20
8000	GW ∼ 100 LB	170	168	166	165	165	165	166	165	165
	Q – OGE ∼ %	86	85	85	85	85	86	88	88	88
	Q – IGE ∼ %	77	77	77	77	77	78	79	79	80
8500	GW ∼ 100 LB	167	164	163	162	162	162	163	162	162
	Q – OGE ∼ %	84	83	83	83	84	85	86	86	87
	Q – IGE ∼ %	76	75	75	75	76	76	77	78	78
9000	GW ∼ 100 LB	164	161	160	159	159	159	160	159	159
	Q – OGE ∼ %	83	82	82	82	82	83	84	85	85
	Q – IGE ∼ %	75	74	74	74	74	75	76	76	76
9500	GW ∼ 100 LB	161	158	157	156	156	156	157	156	156
	Q – OGE ∼ %	81	80	80	80	81	81	83	83	84
	Q – IGE ∼ %	73	72	72	72	73	73	75	75	75
10000	GW ∼ 100 LB	158	155	154	153	153	153	154	153	153
	Q – OGE ∼ %	80	79	79	79	79	80	81	82	82
	Q – IGE ∼ %	72	71	71	71	71	72	73	73	74

*GW∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at IRP, maximum torque transmission limit or gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701 ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–20	–15	–10	–5	–0	+5	+10	+15	+20
5000	GW ~ 100 LB	176	176	176	176	176	176	176	174	170
	Q – OGE ~ %	92	93	94	95	95	96	97	96	94
	Q – IGE ~ %	83	84	85	85	86	87	87	87	85
5500	GW ~ 100 LB	176	176	176	176	176	176	174	171	167
	Q – OGE ~ %	93	94	95	95	96	97	96	94	92
	Q – IGE ~ %	84	85	85	86	87	87	87	85	83
6000	GW ~ 100 LB	176	176	176	176	176	174	171	168	164
	Q – OGE ~ %	94	95	95	96	97	96	94	92	90
	Q – IGE ~ %	85	85	86	87	87	86	85	83	81
6500	GW ~ 100 LB	175	175	175	176	174	171	168	164	161
	Q – OGE ~ %	94	94	95	97	96	94	92	91	88
	Q – IGE ~ %	84	85	86	87	86	85	83	82	80
7000	GW ~ 100 LB	171	171	172	173	170	167	164	161	158
	Q – OGE ~ %	92	93	94	95	94	92	91	89	87
	Q – IGE ~ %	83	83	84	86	85	83	82	80	78
7500	GW ~ 100 LB	168	168	169	170	167	164	161	158	155
	Q – OGE ~ %	90	91	92	93	92	90	89	87	85
	Q – IGE ~ %	81	82	83	84	83	81	80	78	77

*GW~ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at IRP, maximum torque transmission limit or gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701 ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–20	–15	–10	–5	–0	+5	+10	+15	+20
8000	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	165 88 80	165 89 80	166 90 81	166 91 82	164 90 81	161 89 80	158 87 78	155 85 77	152 83 75
8500	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	162 87 78	162 88 79	162 88 80	163 89 81	160 88 79	157 87 78	155 85 77	152 84 75	149 82 73
9000	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	159 85 77	159 86 77	159 87 78	159 88 79	157 86 78	154 85 76	152 84 75	149 82 74	146 80 72
9500	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	156 84 75	156 84 76	156 85 77	156 86 77	154 85 76	151 83 75	149 82 74	146 80 72	143 78 70
10000	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	153 82 74	153 83 74	153 83 75	153 84 76	151 83 75	148 82 73	146 80 72	143 78 71	140 77 69

*GW∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at IRP, maximum torque transmission limit or gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701 ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		+20	+25	+30	+35	+40	+45	+50	+55	+60
5000	GW ~ 100 LB	170	167	162	157	151	144	138	132	127
	Q – OGE ~ %	94	92	89	85	81	77	73	69	65
	Q – IGE ~ %	85	82	80	77	73	69	65	62	58
5500	GW ~ 100 LB	167	163	159	153	147				
	Q – OGE ~ %	92	90	87	83	79				
	Q – IGE ~ %	83	81	78	75	71				
6000	GW ~ 100 LB	164	160	156	150	145				
	Q – OGE ~ %	90	88	85	81	78				
	Q – IGE ~ %	81	79	77	73	70				
6500	GW ~ 100 LB	161	157	153	147	142				
	Q – OGE ~ %	88	86	84	80	76				
	Q – IGE ~ %	80	78	75	72	68				
7000	GW ~ 100 LB	158	154	150	144	139				
	Q – OGE ~ %	87	84	82	78	74				
	Q – IGE ~ %	78	76	74	70	67				
7500	GW ~ 100 LB	155	151	147	141	136				
	Q – OGE ~ %	85	83	80	76	73				
	Q – IGE ~ %	77	75	72	69	65				

*GW~ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at IRP, maximum torque transmission limit or gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701 ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		+20	+25	+30	+35	+40	+45	+50	+55	+60
8000	GW ~ 100 LB Q – OGE ~ % Q – IGE ~ %	152 83 75	148 81 73	144 78 71	138 75 67	133 71 64				
8500	GW ~ 100 LB Q – OGE ~ % Q – IGE ~ %	149 82 73	145 79 71	141 77 69	135 73 66	130 69 62				
9000	GW ~ 100 LB Q – OGE ~ % Q – IGE ~ %	146 80 72	142 78 70	138 75 68	132 71 64	127 68 61				
9500	GW ~ 100 LB Q – OGE ~ % Q – IGE ~ %	143 78 70	139 76 68	135 73 66	130 70 63	124 66 59				
10000	GW ~ 100 LB Q – OGE ~ % Q – IGE ~ %	140 77 69	136 74 67	132 72 65	127 68 61	121 64 58				

*GW~ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at IRP, maximum torque transmission limit or gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701 ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–60	–55	–50	–45	–40	–35	–30	–25	–20
10000	GW ∼ 100 LB	158	155	154	153	153	153	154	153	153
	Q – OGE ∼ %	80	79	79	79	79	80	81	82	82
	Q – IGE ∼ %	72	71	71	71	71	72	73	73	74
10500	GW ∼ 100 LB	155	152	151	150	150	150	151	150	150
	Q – OGE ∼ %	78	77	77	77	78	78	80	80	80
	Q – IGE ∼ %	70	70	70	70	70	71	72	72	72
11000	GW ∼ 100 LB	152	149	148	148	147	147	148	148	147
	Q – OGE ∼ %	77	76	76	76	76	77	78	79	79
	Q – IGE ∼ %	69	68	68	68	69	69	70	71	71
11500	GW ∼ 100 LB	149	147	145	145	144	145	145	145	144
	Q – OGE ∼ %	75	74	74	74	75	76	77	77	77
	Q – IGE ∼ %	68	67	67	67	67	68	69	69	70
12000	GW ∼ 100 LB	146	144	143	142	142	142	142	142	142
	Q – OGE ∼ %	74	73	73	73	73	74	75	76	76
	Q – IGE ∼ %	66	66	66	66	66	67	68	68	68
12500	GW ∼ 100 LB	143	141	140	139	139	139	139	139	139
	Q – OGE ∼ %	72	72	71	72	72	73	74	74	75
	Q – IGE ∼ %	65	64	64	65	65	65	66	67	67

*GW∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at IRP, maximum torque transmission limit or gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701 ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–60	–55	–50	–45	–40	–35	–30	–25	–20
13000	GW ∼ 100 LB	140	138	137	137	136	136	137	137	136
	Q – OGE ∼ %	71	70	70	70	70	71	72	73	73
	Q – IGE ∼ %	64	63	63	63	63	64	65	66	66
13500	GW ∼ 100 LB	137	136	135	134	133	134	134	134	134
	Q – OGE ∼ %	69	69	69	69	69	70	71	71	72
	Q – IGE ∼ %	63	62	62	62	62	63	64	64	65
14000	GW ∼ 100 LB	135	133	132	131	131	131	131	132	131
	Q – OGE ∼ %	68	67	67	68	68	68	69	70	70
	Q – IGE ∼ %	61	61	61	61	61	62	62	63	63
14500	GW ∼ 100 LB	132	130	129	129	128	128	128	129	128
	Q – OGE ∼ %	67	66	66	66	66	67	68	69	69
	Q – IGE ∼ %	60	60	60	60	60	60	61	62	62
15000	GW ∼ 100 LB	129	128	127	126	125	126	126	127	126
	Q – OGE ∼ %	65	65	65	65	65	66	66	67	68
	Q – IGE ∼ %	59	58	58	58	58	59	60	61	61

*GW∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at IRP, maximum torque transmission limit or gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701 ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–20	–15	–10	–5	0	+5	+10	+15	+20
10000	GW ∼ 100 LB	153	153	153	153	151	148	146	143	140
	Q – OGE ∼ %	82	83	83	84	83	82	80	78	77
	Q – IGE ∼ %	74	74	75	76	75	73	72	71	69
10500	GW ∼ 100 LB	150	150	150	150	147	145	143	140	137
	Q – OGE ∼ %	80	81	82	82	81	80	78	77	75
	Q – IGE ∼ %	72	73	74	74	73	72	71	69	67
11000	GW ∼ 100 LB	147	147	147	147	144	142	140	137	134
	Q – OGE ∼ %	79	79	80	80	79	78	77	75	73
	Q – IGE ∼ %	71	72	72	72	71	70	69	67	66
11500	GW ∼ 100 LB	144	144	144	144	141	139	137	134	131
	Q – OGE ∼ %	77	78	79	79	77	76	75	73	72
	Q – IGE ∼ %	70	70	71	71	70	69	67	66	64
12000	GW ∼ 100 LB	142	141	141	141	138	136	133	131	128
	Q – OGE ∼ %	76	76	77	77	76	74	73	71	70
	Q – IGE ∼ %	68	69	69	69	68	67	66	64	63
12500	GW ∼ 100 LB	139	139	139	138	135	133	131	128	125
	Q – OGE ∼ %	75	75	75	75	74	73	71	70	68
	Q – IGE ∼ %	67	67	68	68	67	66	64	63	61

*GW∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at IRP, maximum torque transmission limit or gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701 ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–20	–15	–10	–5	0	+5	+10	+15	+20
13000	GW ∼ 100 LB	136	136	136	135	132	130	128	125	122
	Q – OGE ∼ %	73	73	74	74	72	71	70	68	66
	Q – IGE ∼ %	66	66	67	66	65	64	63	61	60
13500	GW ∼ 100 LB	134	133	133	132	129	127	125	122	119
	Q – OGE ∼ %	72	72	72	72	71	69	68	67	65
	Q – IGE ∼ %	65	65	65	65	64	63	61	60	58
14000	GW ∼ 100 LB	131	131	130	129	127	124	122	119	116
	Q – OGE ∼ %	70	70	71	70	69	68	67	65	63
	Q – IGE ∼ %	63	63	64	63	62	61	60	58	57
14500	GW ∼ 100 LB	128	128	128	126	124	122	119	117	114
	Q – OGE ∼ %	69	69	70	69	68	66	65	63	62
	Q – IGE ∼ %	62	62	63	62	61	60	58	57	55
15000	GW ∼ 100 LB	126	125	125	123	121	119	116	114	111
	Q – OGE ∼ %	68	68	68	67	66	65	63	62	60
	Q – IGE ∼ %	61	61	61	61	59	58	57	56	54

*GW∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at IRP, maximum torque transmission limit or gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701 ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		+20	+25	+30	+35	+40	+45	+50	+55	+60
10000	GW ~ 100 LB Q – OGE ~ % Q – IGE ~ %	140 77 69	136 74 67	132 72 65	127 68 61	121 64 58				
10500	GW ~ 100 LB Q – OGE ~ % Q – IGE ~ %	137 75 67	133 73 65	129 70 63	124 66 60	118 63 57				
11000	GW ~ 100 LB Q – OGE ~ % Q – IGE ~ %	134 73 66	130 71 64	126 68 61	121 65 58	115 61 55				
11500	GW ~ 100 LB Q – OGE ~ % Q – IGE ~ %	131 72 64	127 69 62	123 66 60						
12000	GW ~ 100 LB Q – OGE ~ % Q – IGE ~ %	128 70 63	124 68 61	120 65 58						
12500	GW ~ 100 LB Q – OGE ~ % Q – IGE ~ %	125 68 61	121 66 59	117 63 57						

*GW~ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at IRP, maximum torque transmission limit or gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701 ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		+20	+25	+30	+35	+40	+45	+50	+55	+60
13000	GW ~ 100 LB Q – OGE ~ % Q – IGE ~ %	122 66 60	119 64 58	114 61 55						
13500	GW ~ 100 LB Q – OGE ~ % Q – IGE ~ %	119 65 58	116 63 56	111 60 54						
14000	GW ~ 100 LB Q – OGE ~ % Q – IGE ~ %	116 63 57	113 61 55	108 58 52						
14500	GW ~ 100 LB Q – OGE ~ % Q – IGE ~ %	114 62 55	110 59 54	106 56 51						
15000	GW ~ 100 LB Q – OGE ~ % Q – IGE ~ %	111 60 54	108 58 52	103 55 49						

*GW~ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at IRP, maximum torque transmission limit or gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM TORQUE AVAILABLE* – 30 MIN LIMIT
ANTI-ICE OFF -701 ENGINE (ATF = 1.0)

PRES ALT FT	FREE AIR TEMPERATURE °C								
	–60	–55	–50	–45	–40	–35	–30	–25	–20
0	100	100	100	100	100	100	100	100	100
500	100	100	100	100	100	100	100	100	100
1000	100	100	100	100	100	100	100	100	100
1500	100	100	100	100	100	100	100	100	100
2000	100	100	100	100	100	100	100	100	100
2500	100	100	100	100	100	100	100	100	100
3000	100	100	100	100	100	100	100	100	100
3500	100	100	100	100	100	100	100	100	100
4000	99	99	99	99	99	100	100	100	100
4500	97	97	97	97	97	98	100	100	100
5000	95	95	95	95	96	96	98	98	99
5500	93	93	93	93	94	95	96	97	97
6000	92	92	92	92	92	93	94	95	95
6500	90	90	90	90	90	91	93	93	94
7000	89	88	88	88	89	89	91	91	92
7500	87	87	86	87	87	88	89	90	90

*Maximum torque available is limited to 100 by the 2-engine continuous torque limit.

MAXIMUM TORQUE AVAILABLE* – 30 MIN LIMIT ANTI-ICE OFF -701 ENGINE (ATF = 1.0) continued

PRES ALT FT	FREE AIR TEMPERATURE °C								
	–20	–15	–10	–5	0	+5	+10	+15	+20
0	100	100	100	100	100	100	100	100	100
500	100	100	100	100	100	100	100	100	100
1000	100	100	100	100	100	100	100	100	100
1500	100	100	100	100	100	100	100	100	100
2000	100	100	100	100	100	100	100	100	100
2500	100	100	100	100	100	100	100	100	100
3000	100	100	100	100	100	100	100	100	100
3500	100	100	100	100	100	100	100	100	99
4000	100	100	100	100	100	100	100	99	97
4500	100	100	100	100	100	100	99	98	95
5000	99	100	100	100	100	100	98	96	94
5500	97	98	99	100	100	98	96	94	92
6000	95	96	97	99	98	96	94	92	90
6500	94	94	95	97	96	94	92	91	88
7000	92	93	94	95	94	92	91	89	87
7500	90	91	92	93	92	90	89	87	85

*Maximum torque available is limited to 100 by the 2-engine continuous torque limit.

MAXIMUM TORQUE AVAILABLE* – 30 MIN LIMIT ANTI-ICE OFF -701 ENGINE (ATF = 1.0) continued

PRES ALT FT	FREE AIR TEMPERATURE °C								
	+20	+25	+30	+35	+40	+45	+50	+55	+60
0	100	100	100	100	98	94	89	85	80
500	100	100	100	100	96	92	88	83	79
1000	100	100	100	99	95	90	86	81	77
1500	100	100	100	97	93	88	84	80	75
2000	100	100	99	95	91	87	82	78	74
2500	100	100	98	94	89	85	80	76	72
3000	100	99	96	92	88	83	79	75	71
3500	99	97	94	90	86	81	77	73	69
4000	97	95	92	88	84	80	75	71	67
4500	95	93	90	87	82	78	74	70	66
5000	94	92	89	85	81	77	73	69	65
5500	92	90	87	83	79				
6000	90	88	85	81	78				
6500	88	86	84	80	76				
7000	87	84	82	78	74				
7500	85	83	80	76	73				

*Maximum torque available is limited to 100 by the 2-engine continuous torque limit.

MAXIMUM TORQUE AVAILABLE* – 30 MIN LIMIT ANTI-ICE OFF -701 ENGINE (ATF = 1.0) continued

PRES ALT FT	FREE AIR TEMPERATURE °C								
	–60	–55	–50	–45	–40	–35	–30	–25	–20
7500	87	87	86	87	87	88	89	90	90
8000	86	85	85	85	85	86	88	88	88
8500	84	83	83	83	84	85	86	86	87
9000	83	82	82	82	82	83	84	85	85
9500	81	80	80	80	81	81	83	83	84
10000	80	79	79	79	79	80	81	82	82
10500	78	77	77	77	78	78	80	80	80
11000	77	76	76	76	76	77	78	79	79
11500	75	74	74	74	75	76	77	77	77
12000	74	73	73	73	73	74	75	76	76
12500	72	72	71	72	72	73	74	74	75
13000	71	70	70	70	70	71	72	73	73
13500	69	69	69	69	69	70	71	71	72
14000	68	67	67	68	68	68	69	70	70
14500	67	66	66	66	66	67	68	69	69
15000	65	65	65	65	65	66	66	67	68

*Maximum torque available is limited to 100 by the 2-engine continuous torque limit.

MAXIMUM TORQUE AVAILABLE* – 30 MIN LIMIT ANTI-ICE OFF -701 ENGINE (ATF = 1.0) continued

PRES ALT FT	FREE AIR TEMPERATURE °C								
	–20	–15	–10	–5	0	+5	+10	+15	+20
7500	90	91	92	93	92	90	89	87	85
8000	88	89	90	91	90	89	87	85	83
8500	87	88	88	89	88	87	85	84	82
9000	85	86	87	88	86	85	84	82	80
9500	84	84	85	86	85	83	82	80	78
10000	82	83	83	84	83	82	80	78	77
10500	80	81	82	82	81	80	78	77	75
11000	79	79	80	80	79	78	77	75	73
11500	77	78	79	79	77	76	75	73	72
12000	76	76	77	77	76	74	73	71	70
12500	75	75	75	75	74	73	71	70	68
13000	73	73	74	74	72	71	70	68	66
13500	72	72	72	72	71	69	68	67	65
14000	70	70	71	70	69	68	67	65	63
14500	69	69	70	69	68	66	65	63	62
15000	68	68	68	67	66	65	63	62	60

*Maximum torque available is limited to 100 by the 2-engine continuous torque limit.

MAXIMUM TORQUE AVAILABLE* – 30 MIN LIMIT ANTI-ICE OFF -701 ENGINE (ATF = 1.0) continued

PRES ALT FT	FREE AIR TEMPERATURE °C								
	+20	+25	+30	+35	+40	+45	+50	+55	+60
7500	85	83	80	76	73				
8000	83	81	78	75	71				
8500	82	79	77	73	69				
9000	80	78	75	71	68				
9500	78	76	73	70	66				
10000	77	74	72	68	64				
10500	75	73	70	66	63				
11000	73	71	68	65	61				
11500	72	69	66						
12000	70	68	65						
12500	68	66	63						
13000	66	64	61						
13500	65	63	60						
14000	63	61	58						
14500	62	59	56						
15000	60	58	55						

*Maximum torque available is limited to 100 by the 2-engine continuous torque limit.

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701C ENGINES (ATF = 1.0)

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–60	–55	–50	–45	–40	–35	–30	–25	–20
0	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	81	81	82	83	83	84	85	85	86
	Q – IGE ∼ %	73	74	75	75	76	76	77	78	78
500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	81	82	83	83	84	85	85	86	87
	Q – IGE ∼ %	74	75	75	76	76	77	77	78	79
1000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	82	83	83	84	85	85	86	87	87
	Q – IGE ∼ %	74	75	76	76	77	77	78	79	79
1500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	82	83	84	84	85	86	87	87	88
	Q – IGE ∼ %	75	75	76	77	77	78	79	79	80
2000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	83	84	84	85	86	86	87	88	89
	Q – IGE ∼ %	75	76	77	77	78	78	79	80	80
2500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	84	84	85	86	86	87	88	89	89
	Q – IGE ∼ %	76	76	77	78	78	79	80	80	81

* GW ∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at MRP, maximum torque transmission limit or by maximum gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701C ENGINES (ATF = 1.0)

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–60	–55	–50	–45	–40	–35	–30	–25	–20
3000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	84	85	86	86	87	88	88	89	90
	Q – IGE ∼ %	76	77	78	78	79	80	80	81	81
3500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	85	85	86	87	88	88	89	90	91
	Q – IGE ∼ %	77	78	78	79	79	80	81	81	82
4000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	85	86	87	88	88	89	90	91	91
	Q – IGE ∼ %	77	78	79	79	80	81	81	82	83
4500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	86	87	87	88	89	90	90	91	92
	Q – IGE ∼ %	78	79	79	80	81	81	82	83	83
5000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	87	87	88	89	90	90	91	92	93
	Q – IGE ∼ %	78	79	80	81	81	82	83	83	84

* GW ∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at MRP, maximum torque transmission limit or by maximum gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701C ENGINES (ATF = 1.0) – continued

* GW ∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at MRP, maximum torque transmission limit or by maximum gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701C ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–20	–15	–10	–5	0	+5	+10	+15	+20
0	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	86	87	87	88	89	89	90	91	91
	Q – IGE ∼ %	78	79	79	80	80	81	81	82	83
500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	87	87	88	89	89	90	91	91	92
	Q – IGE ∼ %	79	79	80	80	81	82	82	83	83
1000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	87	88	89	89	90	91	91	92	93
	Q – IGE ∼ %	79	80	80	81	82	82	83	83	84
1500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	88	89	89	90	91	91	92	93	93
	Q – IGE ∼ %	80	80	81	82	82	83	83	84	85
2000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	89	89	90	91	91	92	93	93	94
	Q – IGE ∼ %	80	81	82	82	83	83	84	85	85
2500	GW ∼ 100 LB	176	176	176	176	176	179	176	176	176
	Q – OGE ∼ %	89	90	91	91	92	93	93	94	95
	Q – IGE ∼ %	81	82	82	83	83	84	85	85	86

* GW ∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at MRP, maximum torque transmission limit or by maximum gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701C ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–20	–15	–10	–5	0	+5	+10	+15	+20
3000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	90	91	91	92	93	93	94	95	96
	Q – IGE ∼ %	81	82	83	83	84	85	85	86	86
3500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	91	91	92	93	93	94	95	96	96
	Q – IGE ∼ %	82	83	83	84	85	85	86	86	87
4000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	91	92	93	93	94	95	96	96	97
	Q – IGE ∼ %	83	83	84	85	85	86	87	87	88
4500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	92	93	93	94	95	96	96	97	98
	Q – IGE ∼ %	83	84	85	85	86	87	87	88	89
5000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	93	93	94	95	96	96	97	98	99
	Q – IGE ∼ %	84	85	85	86	87	87	88	89	89

* GW ∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at MRP, maximum torque transmission limit or by maximum gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701C ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		+20	+25	+30	+35	+40	+45	+50	+55	+60
0	GW ∼ 100 LB	176	176	176	176	176	176	176	176	175
	Q – OGE ∼ %	91	92	93	93	94	94	95	96	96
	Q – IGE ∼ %	83	83	84	84	85	85	86	87	86
500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	
	Q – OGE ∼ %	92	93	93	94	94	95	96	96	
	Q – IGE ∼ %	83	84	84	85	86	86	87	87	
1000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	
	Q – OGE ∼ %	92	93	94	95	95	96	96	97	
	Q – IGE ∼ %	84	84	85	86	86	87	87	88	
1500	GW ∼ 100 LB	176	176	176	176	176	176	176	174	
	Q – OGE ∼ %	93	95	95	95	96	97	97	97	
	Q – IGE ∼ %	85	86	86	86	87	87	88	87	
2000	GW ∼ 100 LB	176	176	176	176	176	176	176	171	
	Q – OGE ∼ %	94	95	95	96	97	97	98	95	
	Q – IGE ∼ %	85	86	86	87	87	88	89	85	
2500	GW ∼ 100 LB	176	176	176	176	176	176	174		
	Q – OGE ∼ %	95	95	96	97	98	98	98		
	Q – IGE ∼ %	86	86	87	88	88	89	88		

* GW ∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at MRP, maximum torque transmission limit or by maximum gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701C ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		+20	+25	+30	+35	+40	+45	+50	+55	+60
3000	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	176 96 86	176 96 87	176 97 88	176 98 88	176 98 89	176 99 90	171 96 86		
3500	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	176 96 87	176 97 88	176 98 88	176 99 89	176 99 90	173 98 88	167 94 85		
4000	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	176 97 88	176 98 88	176 99 89	176 100 90	175 100 90	169 96 86	164 92 83		
4500	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	176 98 89	176 99 89	176 100 90	175 100 90	171 98 88	166 94 84			
5000	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	176 99 89	176 100 90	175 100 90	172 99 89	168 96 86	163 92 83			

* GW ∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at MRP, maximum torque transmission limit or by maximum gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701C ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–60	–55	–50	–45	–40	–35	–30	–25	–20
5000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	87	87	88	89	90	90	91	92	93
	Q – IGE ∼ %	78	79	80	81	81	82	83	83	84
5500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	87	88	89	90	90	91	92	93	93
	Q – IGE ∼ %	79	80	80	81	81	83	83	84	85
6000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	88	89	89	90	91	92	93	93	94
	Q – IGE ∼ %	80	80	81	82	82	83	84	85	85
6500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	88	89	90	91	92	92	93	94	95
	Q – IGE ∼ %	80	81	82	82	83	84	84	85	86
7000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	89	90	91	92	92	93	94	95	96
	Q – IGE ∼ %	81	82	82	83	84	84	85	86	87
7500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	90	91	91	92	93	94	95	96	96
	Q – IGE ∼ %	81	82	83	84	84	85	86	87	87

* GW ∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at MRP, maximum torque transmission limit or by maximum gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701C ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–60	–55	–50	–45	–40	–35	–30	–25	–20
8000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	90	91	92	93	94	95	96	96	97
	Q – IGE ∼ %	82	83	84	84	85	86	86	87	88
8500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	91	92	93	94	95	95	96	97	98
	Q – IGE ∼ %	83	83	84	85	86	86	87	88	89
9000	GW ∼ 100 LB	174	174	174	175	174	174	174	173	173
	Q – OGE ∼ %	91	92	93	94	94	95	96	96	97
	Q – IGE ∼ %	82	83	84	85	85	86	86	86	87
9500	GW ∼ 100 LB	172	171	171	171	171	170	170	171	169
	Q – OGE ∼ %	90	90	91	92	93	93	94	95	95
	Q – IGE ∼ %	81	81	82	83	84	84	85	85	85
10000	GW ∼ 100 LB	168	168	167	167	168	168	167	167	166
	Q – OGE ∼ %	88	89	89	90	91	92	92	93	93
	Q – IGE ∼ %	79	80	80	81	82	83	83	84	84

* GW ∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at MRP, maximum torque transmission limit or by maximum gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701C ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–20	–15	–10	–5	–0	+5	+10	+15	+20
5000	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	93	93	94	95	96	96	97	98	99
	Q – IGE ∼ %	84	85	85	86	87	87	88	89	89
5500	GW ∼ 100 LB	176	176	176	176	176	176	176	176	176
	Q – OGE ∼ %	93	94	95	96	96	97	98	99	100
	Q – IGE ∼ %	85	85	86	87	87	88	89	89	90
6000	GW ∼ 100 LB	176	176	176	176	176	176	176	175	174
	Q – OGE ∼ %	94	95	96	96	97	98	99	100	100
	Q – IGE ∼ %	85	86	87	87	88	89	90	90	90
6500	GW ∼ 100 LB	176	176	176	176	176	176	175	174	173
	Q – OGE ∼ %	95	96	96	97	98	99	100	100	100
	Q – IGE ∼ %	86	87	87	88	89	90	90	90	90
7000	GW ∼ 100 LB	176	176	176	176	176	175	174	173	171
	Q – OGE ∼ %	96	96	97	98	99	100	100	100	99
	Q – IGE ∼ %	87	87	88	89	90	90	90	90	89
7500	GW ∼ 100 LB	176	176	176	176	175	174	173	170	168
	Q – OGE ∼ %	96	97	98	99	100	100	100	98	97
	Q – IGE ∼ %	87	88	89	90	90	90	90	88	87

* GW ∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at MRP, maximum torque transmission limit or by maximum gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701C ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–20	–15	–10	–5	–0	+5	+10	+15	+20
8000	GW ∼ 100 LB	176	176	176	175	174	172	170	166	164
	Q – OGE ∼ %	97	98	99	100	100	99	98	96	95
	Q – IGE ∼ %	88	89	90	90	90	89	88	86	85
8500	GW ∼ 100 LB	176	176	175	174	172	168	166	163	161
	Q – OGE ∼ %	98	99	100	100	99	97	96	94	93
	Q – IGE ∼ %	89	90	90	90	89	87	86	84	83
9000	GW ∼ 100 LB	173	173	174	171	168	165	163	160	157
	Q – OGE ∼ %	97	98	100	98	97	95	94	92	91
	Q – IGE ∼ %	87	88	90	88	87	85	84	83	82
9500	GW ∼ 100 LB	169	169	171	167	165	162	159	156	154
	Q – OGE ∼ %	95	96	98	96	95	93	92	90	89
	Q – IGE ∼ %	85	86	88	86	85	84	83	81	80
10000	GW ∼ 100 LB	166	166	167	164	162	159	156	153	151
	Q – OGE ∼ %	93	94	96	94	93	92	90	88	87
	Q – IGE ∼ %	84	84	86	84	84	83	81	79	78

* GW ∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at MRP, maximum torque transmission limit or by maximum gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701C ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		+20	+25	+30	+35	+40	+45	+50	+55	+60
5000	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	176 99 89	176 100 90	175 100 90	179 99 89	168 96 86	163 92 83			
5500	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	176 100 90	174 100 90	173 100 90	169 97 87	165 94 84	159 90 81			
6000	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	174 100 90	173 100 90	171 99 89	166 95 85	161 92 83	156 88 79			
6500	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	173 100 90	171 99 89	168 97 87	162 93 84	158 90 81				
7000	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	171 99 89	168 97 87	164 95 85	159 91 82	155 88 79				
7500	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	168 97 87	164 95 85	161 93 83	156 89 80	151 86 77				

* GW ∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at MRP, maximum torque transmission limit or by maximum gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701C ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		+20	+25	+30	+35	+40	+45	+50	+55	+60
8000	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	164 95 85	161 93 83	158 91 82	153 88 79	148 84 75				
8500	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	161 93 83	158 91 82	154 89 80	150 86 77					
9000	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	157 91 82	154 89 80	151 87 78	147 84 75					
9500	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	154 89 80	151 87 78	148 85 76	144 82 74					
10000	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	151 87 78	148 85 76	145 83 74	140 80 72					

* GW ∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at MRP, maximum torque transmission limit or by maximum gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701C ENGINES (ATF = 1.0)

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–60	–55	–50	–45	–40	–35	–30	–25	–20
10000	GW ∼ 100 LB	168	168	167	167	168	168	167	167	166
	Q – OGE ∼ %	88	89	89	90	91	92	92	93	93
	Q – IGE ∼ %	79	80	80	81	82	83	83	84	84
10500	GW ∼ 100 LB	164	165	165	164	164	164	165	164	164
	Q – OGE ∼ %	86	87	88	88	89	90	91	91	92
	Q – IGE ∼ %	77	78	79	79	80	81	82	82	83
11000	GW ∼ 100 LB	162	161	161	162	161	161	161	160	160
	Q – OGE ∼ %	85	85	86	87	87	88	89	89	90
	Q – IGE ∼ %	77	77	77	78	78	79	80	80	81
11500	GW ∼ 100 LB	158	159	158	158	158	157	158	157	157
	Q – OGE ∼ %	83	84	84	85	86	86	87	87	88
	Q – IGE ∼ %	75	76	76	76	77	77	78	78	79
12000	GW ∼ 100 LB	155	155	155	154	155	155	154	154	153
	Q – OGE ∼ %	81	82	83	83	84	85	85	86	86
	Q – IGE ∼ %	73	74	75	75	76	76	76	77	77
12500	GW ∼ 100 LB	153	153	152	152	151	152	152	151	151
	Q – OGE ∼ %	80	81	81	82	82	83	84	85	85
	Q – IGE ∼ %	72	73	73	74	74	75	76	76	76

* GW ∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at MRP, maximum torque transmission limit or by maximum gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701C ENGINES (ATF = 1.0)

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–60	–55	–50	–45	–40	–35	–30	–25	–20
13000	GW ∼ 100 LB	149	149	150	149	149	148	149	148	148
	Q – OGE ∼ %	78	79	80	80	81	81	82	82	83
	Q – IGE ∼ %	70	71	72	72	73	73	74	75	75
13500	GW ∼ 100 LB	147	146	146	147	146	146	145	145	144
	Q – OGE ∼ %	77	77	78	79	79	80	80	81	81
	Q – IGE ∼ %	69	69	70	71	71	72	72	73	73
14000	GW ∼ 100 LB	143	144	144	143	143	143	143	142	142
	Q – OGE ∼ %	75	76	77	77	78	78	79	79	80
	Q – IGE ∼ %	67	68	69	69	70	70	71	71	72
14500	GW ∼ 100 LB	141	140	140	140	140	139	140	139	139
	Q – OGE ∼ %	74	74	75	75	76	76	77	77	78
	Q – IGE ∼ %	67	67	67	67	68	68	69	69	70
15000	GW ∼ 100 LB	137	138	137	137	137	137	136	137	137
	Q – OGE ∼ %	72	73	73	74	74	75	75	76	77
	Q – IGE ∼ %	65	66	66	67	67	67	67	68	69

* GW ∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at MRP, maximum torque transmission limit or by maximum gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701C ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–20	–15	–10	–5	0	+5	+10	+15	+20
10000	GW ∼ 100 LB	166	166	167	164	162	159	156	153	151
	Q – OGE ∼ %	93	94	96	94	93	92	90	88	87
	Q – IGE ∼ %	84	84	86	84	84	83	81	79	78
10500	GW ∼ 100 LB	164	164	164	161	158	156	153	151	148
	Q – OGE ∼ %	92	93	94	93	91	90	88	87	85
	Q – IGE ∼ %	83	84	84	84	82	81	79	78	76
11000	GW ∼ 100 LB	160	160	160	158	155	153	150	147	144
	Q – OGE ∼ %	90	91	92	91	89	88	86	85	83
	Q – IGE ∼ %	81	82	83	82	80	79	77	76	74
11500	GW ∼ 100 LB	157	157	157	155	152	149	146	144	142
	Q – OGE ∼ %	88	89	90	89	87	86	84	83	82
	Q – IGE ∼ %	79	80	81	80	78	77	75	74	74
12000	GW ∼ 100 LB	153	153	154	151	149	146	144	141	139
	Q – OGE ∼ %	86	87	88	87	86	84	83	81	80
	Q – IGE ∼ %	77	78	79	78	77	75	74	73	72
12500	GW ∼ 100 LB	151	151	151	148	146	144	141	139	136
	Q – OGE ∼ %	85	86	87	85	84	83	81	80	78
	Q – IGE ∼ %	76	77	78	76	75	74	73	72	70

* GW ∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at MRP, maximum torque transmission limit or by maximum gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701C ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		–20	–15	–10	–5	0	+5	+10	+15	+20
13000	GW ∼ 100 LB	148	148	148	146	143	141	138	136	134
	Q – OGE ∼ %	83	84	85	84	82	81	79	78	77
	Q – IGE ∼ %	75	75	76	75	74	73	72	70	69
13500	GW ∼ 100 LB	144	146	145	143	141	137	135	132	130
	Q – OGE ∼ %	81	83	83	82	81	79	78	76	75
	Q – IGE ∼ %	73	75	74	74	73	71	70	68	67
14000	GW ∼ 100 LB	142	142	141	139	137	134	132	130	127
	Q – OGE ∼ %	80	81	81	80	79	77	76	75	73
	Q – IGE ∼ %	72	73	73	72	71	69	68	67	65
14500	GW ∼ 100 LB	139	140	139	136	134	132	130	127	125
	Q – OGE ∼ %	78	80	80	78	77	76	75	73	72
	Q – IGE ∼ %	70	72	72	70	69	68	67	65	65
15000	GW ∼ 100 LB	137	137	136	134	132	129	127	125	122
	Q – OGE ∼ %	77	78	78	77	76	74	73	72	70
	Q – IGE ∼ %	69	70	70	69	68	66	65	65	63

* GW ∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at MRP, maximum torque transmission limit or by maximum gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701C ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		+20	+25	+30	+35	+40	+45	+50	+55	+60
10000	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	151 87 78	148 85 76	145 83 74	140 80 72					
10500	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	148 85 76	146 84 75	141 81 73						
11000	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	144 83 74	142 82 74	138 79 71						
11500	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	142 82 74	139 80 72	136 78 70						
12000	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	139 80 72	136 78 70	133 76 68						
12500	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	136 78 70	133 76 68							

* GW ∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at MRP, maximum torque transmission limit or by maximum gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM HOVER WEIGHT AND TORQUE REQUIRED WITH ANTI-ICE OFF -701C ENGINES (ATF = 1.0) – continued

PRES ALT FT	*	FREE AIR TEMPERATURE °C								
		+20	+25	+30	+35	+40	+45	+50	+55	+60
13000	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	134 77 69	131 75 67							
13500	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	130 75 67	127 73 65							
14000	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	127 73 65	125 72 65							
14500	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	125 72 65								
15000	GW ∼ 100 LB Q – OGE ∼ % Q – IGE ∼ %	122 70 63								

* GW ∼ 100LB = GW divided by 100 LB. Maximum hover weight is limited by engines at MRP, maximum torque transmission limit or by maximum gross weight.
Q = Torque %
IGE = 10 foot wheel height

MAXIMUM TORQUE AVAILABLE/IRP* – 30 MIN LIMIT ANTI-ICE OFF -701C ENGINE (ATF = 1.0)

PRES ALT FT	FREE AIR TEMPERATURE °C								
	–60	–55	–50	–45	–40	–35	–30	–25	–20
0	100	100	100	100	100	100	100	100	100
500	100	100	100	100	100	100	100	100	100
1000	100	100	100	100	100	100	100	100	100
1500	100	100	100	100	100	100	100	100	100
2000	100	100	100	100	100	100	100	100	100
2500	100	100	100	100	100	100	100	100	100
3000	100	100	100	100	100	100	100	100	100
3500	100	100	100	100	100	100	100	100	100
4000	100	100	100	100	100	100	100	100	100
4500	100	100	100	100	100	100	100	100	100
5000	100	100	100	100	100	100	100	100	100
5500	100	100	100	100	100	100	100	100	100
6000	100	100	100	100	100	100	100	100	100
6500	100	100	100	100	100	100	100	100	100
7000	98	99	100	100	100	100	100	100	100
7500	97	97	98	99	100	100	100	100	100

*Maximum torque available is limited to 100 by the 2-engine continuous torque limit.

MAXIMUM TORQUE AVAILABLE/IRP* – 30 MIN LIMIT ANTI-ICE OFF -701C ENGINE (ATF = 1.0) continued

PRES ALT FT	FREE AIR TEMPERATURE °C								
	–20	–15	–10	–5	0	+5	+10	+15	+20
0	100	100	100	100	100	100	100	100	100
500	100	100	100	100	100	100	100	100	100
1000	100	100	100	100	100	100	100	100	100
1500	100	100	100	100	100	100	100	100	100
2000	100	100	100	100	100	100	100	100	100
2500	100	100	100	100	100	100	100	100	100
3000	100	100	100	100	100	100	100	100	100
3500	100	100	100	100	100	100	100	100	100
4000	100	100	100	100	100	100	100	100	100
4500	100	100	100	100	100	100	100	100	100
5000	100	100	100	100	100	100	100	100	100
5500	100	100	100	100	100	100	100	100	99
6000	100	100	100	100	100	100	100	99	97
6500	100	100	100	100	100	100	99	97	95
7000	100	100	100	100	100	99	97	95	93
7500	100	100	100	100	99	97	95	93	91

*Maximum torque available is limited to 100 by the 2-engine continuous torque limit.

MAXIMUM TORQUE AVAILABLE/IRP* – 30 MIN LIMIT ANTI-ICE OFF -701C ENGINE (ATF = 1.0) continued

PRES ALT FT	FREE AIR TEMPERATURE °C								
	+20	+25	+30	+35	+40	+45	+50	+55	+60
0	100	100	100	100	100	100	97	92	87
500	100	100	100	100	100	100	95	90	
1000	100	100	100	100	100	98	93	88	
1500	100	100	100	100	100	96	91	86	
2000	100	100	100	100	99	94	89	84	
2500	100	100	100	100	97	92	87		
3000	100	100	100	99	95	90	86		
3500	100	100	100	98	93	88	84		
4000	100	100	100	96	91	87	82		
4500	100	100	98	94	89	85			
5000	100	99	96	92	88	83			
5500	99	97	94	90	86	81			
6000	97	95	92	88	84	80			
6500	95	93	90	86	82				
7000	93	91	88	84	80				
7500	91	89	86	83	79				

*Maximum torque available is limited to 100 by the 2-engine continuous torque limit.

MAXIMUM TORQUE AVAILABLE/IRP* – 30 MIN LIMIT ANTI-ICE OFF -701C ENGINE (ATF = 1.0) continued

PRES ALT FT	FREE AIR TEMPERATURE °C								
	–60	–55	–50	–45	–40	–35	–30	–25	–20
7500	97	97	98	99	100	100	100	100	100
8000	95	96	96	97	98	99	100	100	100
8500	93	94	95	95	96	97	98	98	99
9000	91	92	93	94	94	95	96	96	97
9500	90	90	91	92	93	93	94	95	95
10000	88	89	89	90	91	92	92	93	93
10500	86	87	88	88	89	90	91	91	92
11000	85	85	86	87	87	88	89	89	90
11500	83	84	84	85	86	86	87	87	88
12000	81	82	83	83	84	85	85	86	86
12500	80	81	81	82	82	83	84	84	85
13000	78	79	80	80	81	81	82	82	83
13500	77	77	78	79	79	80	80	81	81
14000	75	76	77	77	78	78	79	79	80
14500	74	74	75	75	76	76	77	77	78
15000	72	73	73	74	74	75	75	76	77

*Maximum torque available is limited to 100 by the 2-engine continuous torque limit.

MAXIMUM TORQUE AVAILABLE/IRP* – 30 MIN LIMIT ANTI-ICE OFF -701C ENGINE (ATF = 1.0) continued

PRES ALT FT	FREE AIR TEMPERATURE °C								
	–20	–15	–10	–5	0	+5	+10	+15	+20
7500	100	100	100	100	99	97	95	93	91
8000	100	100	100	98	97	95	93	91	90
8500	99	99	98	96	95	93	91	89	88
9000	97	97	96	94	93	91	89	88	86
9500	95	95	94	92	91	89	87	86	84
10000	93	93	92	91	89	87	86	84	82
10500	92	92	90	89	87	85	84	82	80
11000	90	90	88	87	85	84	82	80	78
11500	88	88	86	85	83	82	80	79	77
12000	86	86	85	83	82	80	79	77	75
12500	85	84	83	82	80	78	77	75	73
13000	83	82	81	80	78	77	75	74	71
13500	81	81	79	78	77	75	74	72	70
14000	80	79	78	76	75	73	72	70	68
14500	78	77	76	75	73	72	70	69	67
15000	77	76	74	73	72	70	69	67	65

*Maximum torque available is limited to 100 by the 2-engine continuous torque limit.

MAXIMUM TORQUE AVAILABLE/IRP* – 30 MIN LIMIT ANTI-ICE OFF -701C ENGINE (ATF = 1.0) continued

PRES ALT FT	FREE AIR TEMPERATURE °C								
	+20	+25	+30	+35	+40	+45	+50	+55	+60
7500	91	89	86	83	79				
8000	90	87	84	81	77				
8500	88	85	83	79					
9000	86	83	81	77					
9500	84	82	79	75					
10000	82	80	77	73					
10500	80	78	75						
11000	78	76	73						
11500	77	74	72						
12000	75	73	70						
12500	73	71							
13000	71	69							
13500	70	68							
14000	68	66							
14500	67								
15000	65								

*Maximum torque available is limited to 100 by the 2-engine continuous torque limit.

MAXIMUM TORQUE AVAILABLE/MRP* – 10 MIN LIMIT ANTI-ICE OFF -701C ENGINE (ATF = 1.0) continued

PRES ALT FT	FREE AIR TEMPERATURE °C								
	–60	–55	–50	–45	–40	–35	–30	–25	–20
0	100	100	100	100	100	100	100	100	100
500	100	100	100	100	100	100	100	100	100
1000	100	100	100	100	100	100	100	100	100
1500	100	100	100	100	100	100	100	100	100
2000	100	100	100	100	100	100	100	100	100
2500	100	100	100	100	100	100	100	100	100
3000	100	100	100	100	100	100	100	100	100
3500	100	100	100	100	100	100	100	100	100
4000	100	100	100	100	100	100	100	100	100
4500	100	100	100	100	100	100	100	100	100
5000	100	100	100	100	100	100	100	100	100
5500	100	100	100	100	100	100	100	100	100
6000	100	100	100	100	100	100	100	100	100
6500	100	100	100	100	100	100	100	100	100
7000	98	99	100	100	100	100	100	100	100
7500	97	97	98	99	100	100	100	100	100

*Maximum torque available is limited to 100 by the 2-engine continuous torque limit.

MAXIMUM TORQUE AVAILABLE/MRP* – 10 MIN LIMIT ANTI-ICE OFF -701C ENGINE (ATF = 1.0) continued

PRES ALT FT	FREE AIR TEMPERATURE °C								
	–20	–15	–10	–5	0	+5	+10	+15	+20
0	100	100	100	100	100	100	100	100	100
500	100	100	100	100	100	100	100	100	100
1000	100	100	100	100	100	100	100	100	100
1500	100	100	100	100	100	100	100	100	100
2000	100	100	100	100	100	100	100	100	100
2500	100	100	100	100	100	100	100	100	100
3000	100	100	100	100	100	100	100	100	100
3500	100	100	100	100	100	100	100	100	100
4000	100	100	100	100	100	100	100	100	100
4500	100	100	100	100	100	100	100	100	100
5000	100	100	100	100	100	100	100	100	100
5500	100	100	100	100	100	100	100	100	100
6000	100	100	100	100	100	100	100	100	100
6500	100	100	100	100	100	100	100	100	100
7000	100	100	100	100	100	100	100	100	99
7500	100	100	100	100	100	100	100	98	97

*Maximum torque available is limited to 100 by the 2-engine continuous torque limit.

MAXIMUM TORQUE AVAILABLE/MRP* – 10 MIN LIMIT ANTI-ICE OFF -701C ENGINE (ATF = 1.0) continued

PRES ALT FT	FREE AIR TEMPERATURE °C								
	+20	+25	+30	+35	+40	+45	+50	+55	+60
0	100	100	100	100	100	100	100	100	96
500	100	100	100	100	100	100	100	100	
1000	100	100	100	100	100	100	100	99	
1500	100	100	100	100	100	100	100	97	
2000	100	100	100	100	100	100	100	95	
2500	100	100	100	100	100	100	98		
3000	100	100	100	100	100	100	96		
3500	100	100	100	100	100	98	94		
4000	100	100	100	100	100	96	92		
4500	100	100	100	100	98	94			
5000	100	100	100	99	96	92			
5500	100	100	100	97	94	90			
6000	100	100	99	95	92	88			
6500	100	99	97	93	90				
7000	99	97	95	91	88				
7500	97	95	93	89	86				

*Maximum torque available is limited to 100 by the 2-engine continuous torque limit.

MAXIMUM TORQUE AVAILABLE/MRP* – 10 MIN LIMIT ANTI-ICE OFF -701C ENGINE (ATF = 1.0) continued

PRES ALT FT	FREE AIR TEMPERATURE °C								
	–60	–55	–50	–45	–40	–35	–30	–25	–20
7500	97	97	98	99	100	100	100	100	100
8000	95	96	96	97	98	99	100	100	100
8500	93	94	95	95	96	97	98	98	99
9000	91	92	93	94	94	95	96	96	97
9500	90	90	91	92	93	93	94	95	95
10000	88	89	89	90	91	92	92	93	93
10500	86	87	88	88	89	90	91	91	92
11000	85	85	86	87	87	88	89	89	90
11500	83	84	84	85	86	86	87	87	88
12000	81	82	83	83	84	85	85	86	86
12500	80	81	81	82	82	83	84	84	85
13000	78	79	80	80	81	81	82	82	83
13500	77	77	78	79	79	80	80	81	81
14000	75	76	77	77	78	78	79	79	80
14500	74	74	75	75	76	76	77	77	78
15000	72	73	73	74	74	75	75	76	77

*Maximum torque available is limited to 100 by the 2-engine continuous torque limit.

MAXIMUM TORQUE AVAILABLE/MRP* – 10 MIN LIMIT ANTI-ICE OFF -701C ENGINE (ATF = 1.0) continued

PRES ALT FT	FREE AIR TEMPERATURE °C								
	–20	–15	–10	–5	0	+5	+10	+15	+20
7500	100	100	100	100	100	100	100	98	97
8000	100	100	100	100	100	99	98	96	95
8500	99	100	100	100	99	97	96	94	93
9000	97	98	100	98	97	95	94	92	91
9500	95	96	98	96	95	93	92	90	89
10000	93	94	96	94	93	92	90	88	87
10500	92	93	94	93	91	90	88	87	85
11000	90	91	92	91	89	88	86	85	83
11500	88	89	90	89	87	86	84	83	82
12000	86	87	88	87	86	84	83	81	80
12500	85	86	87	85	84	83	81	80	78
13000	83	84	85	84	82	81	79	78	77
13500	81	83	83	82	81	79	78	76	75
14000	80	81	81	80	79	77	76	75	73
14500	78	80	80	78	77	76	75	73	72
15000	77	78	78	77	76	74	73	72	70

*Maximum torque available is limited to 100 by the 2-engine continuous torque limit.

MAXIMUM TORQUE AVAILABLE/MRP* – 10 MIN LIMIT ANTI-ICE OFF -701C ENGINE (ATF = 1.0) continued

PRES ALT FT	FREE AIR TEMPERATURE °C								
	+20	+25	+30	+35	+40	+45	+50	+55	+60
7500	97	95	93	89	86				
8000	95	93	91	88	84				
8500	93	91	89	86					
9000	91	89	87	84					
9500	89	87	85	82					
10000	87	85	83	80					
10500	85	84	81						
11000	83	82	79						
11500	82	80	78						
12000	80	78	76						
12500	78	76							
13000	77	75							
13500	75	73							
14000	73	72							
14500	72								
15000	70								

*Maximum torque available is limited to 100 by the 2-engine continuous torque limit.

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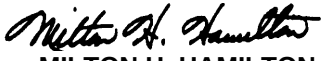

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Administrative Assistant to the
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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigrams = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Temperature (Exact)

° F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	° C

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