CHAPTER 30 — ICE AND RAIN PROTECTION

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FIGURES

TABLES

ICE AND RAIN PROTECTION

30-1. ICE AND RAIN PROTECTION

The ice and rain protection consists of pilot and copilot windshield wipers.

Additional ice protection is provided by:

1. Heating and ventilation system (Chapter 21).

2. Winterization heater (Chapter 21).

3. Pitot static system heaters (Chapter 96).

4. Anti-icing, de-icing, and snow removal (paragraph 30-21).

WINDSHIELD WIPER

30-2. WINDSHIELD WIPER ASSEMBLY

Each windshield wiper assembly consists of a converter and motor (7, Figure 30-1), arm (16), and wiper (25). The converter and motor drives the arm and the arm drives the wiper. The WIPER SEL switch (overhead console) permits selection of PILOT, COPILOT, or BOTH wipers. Separate switches for pilot and copilot windshield wipers are located in the overhead console. Each switch has the following positions: PARK, OFF, LOW, MEDIUM, AND HIGH. PARK is a spring loaded position (returns to OFF) for stowing wiper to a location where vision is not obstructed.

30-3. WINDSHIELD WIPER ASSEMBLY — TROUBLESHOOTING

For troubleshooting procedures, refer to Table 30-1.

Table 30-1. Windshield Wipers — Troubleshooting

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
BLADE DOES NOT CLEAN WINDSHIELD		
Damaged or deteriorated blade.	Inspect blade.	Replace blade (paragraph 30-6).
Improper blade pressure.	Check blade pressure.	Adjust blade pressure (paragraph 30-5).
CONVERTER AND MOTOR INOPERATIVE		
Opened circuit breaker.	Reset circuit breaker. If circuit breaker will not reset, check breaker and associated wiring.	Replace circuit breaker or make required circuit repairs (Chapter 96).
Damaged wiper switch.	Inspect for obvious damage. Make continuity check of switch.	Replace switch (Chapter 96).
Broken electrical wire or loose connections.	Check connections. Make continuity check of circuit.	Replace wire if necessary. Tighten connections or replace connectors or terminals as required (Chapter 96).
Converter and motor inoperative.	Substitute serviceable unit in place of suspected inoperative unit and make operational check.	Replace converter and motor (paragraph 30-18).

1. Screw
2. Special washer
3. Special washer
4. Screw
5. Bolt
6. Thin steel washer
7. Converter and motor
8. Bracket (part of structure)
9. Split washer
10. Bolt
11. Special washer
12. Bolt
13. Lockwire
14. Tension adjustment screw
15. Retaining pin hole
16. Arm
17. Nut
18. Nut
19. Cotter pin
20. Special washer
21. Special washer
22. Special washer
23. Movable serrated fitting
24. Fixed serrated fitting
25. Wiper
26. Wiper blade
27. Head guard
28. Park position dimension
29. Adjustment sleeve

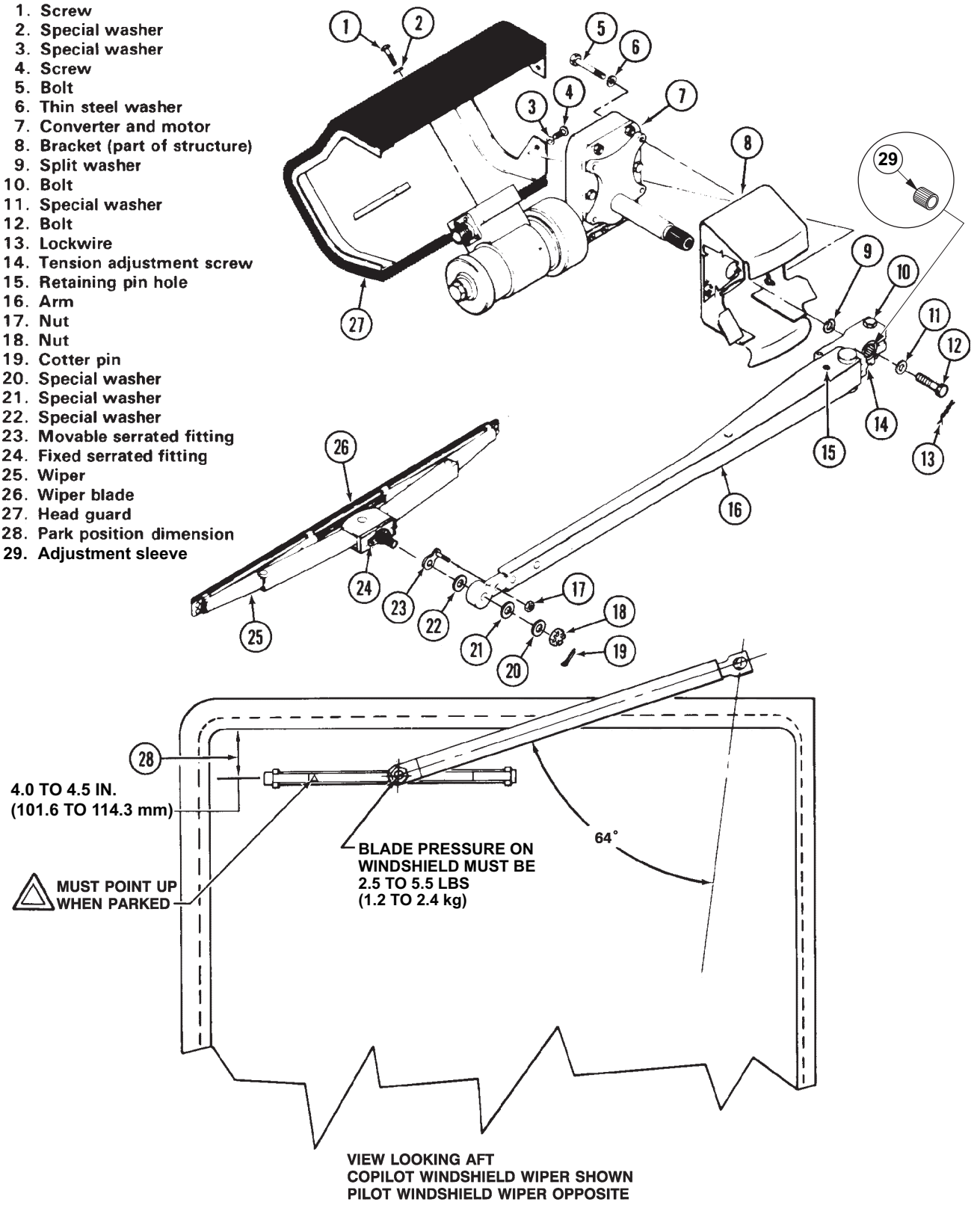

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Figure 30-1. Windshield Wiper

30-4. WINDSHIELD WIPER ASSEMBLY — INSPECTION

1. Inspect wiper blade (26, Figure 30-1) for deteriorated rubber.

2. Inspect wiper blade (26) for correct pressure on windshield (paragraph 30-5).

3. Inspect opposite wiper blade in similar manner.

30-5. WINDSHIELD WIPER ASSEMBLY — ADJUSTMENT

SPECIAL TOOLS REQUIRED

NUMBER	NOMENCLATURE
	Spring Scale, 0 - 10 Pounds (0 - 5 kg)
XW20509 or 02314-0023-001	Wrench

Adjustment to wiper is limited to adjusting wiper blade pressure on windshield.

1. Attach a spring scale to arm (16, Figure 30-1) at wiper (25) attach point.

2. Verify wiper blade (26) pressure is 2.5 to 5.5 pounds (1.2 to 2.4 kg).

3. If necessary, increase blade pressure by turning tension adjustment screw (14) counterclockwise with wrench (XW20509), clockwise to decrease blade pressure.

30-6. WINDSHIELD WIPER BLADE

30-7. Windshield Wiper Blade — Removal

1. Raise arm (16, Figure 30-1). Insert 0.125 inch (3.175 mm) diameter pin in retaining pin hole (15).

2. Bend tabs on wiper (25). Slide wiper blade (26) out of wiper.

3. Remove opposite blade in a similar manner.

30-8. Windshield Wiper Blade — Installation

1. Raise arm (16, Figure 30-1). Insert 0.125 inch (3.175 mm) diameter pin in retaining pin hole (15).

2. Slide wiper blade (26) on wiper (25).

3. Bend tabs on wiper (25) to secure wiper blade (26).

4. Remove pin from retaining pin hole (15).

5. Adjust wiper blade (26) pressure on windshield (paragraph 30-5).

6. Install opposite blade in similar manner.

30-9. WINDSHIELD WIPER

30-10. Windshield Wiper — Removal

1. Raise arm (16, Figure 30-1). Insert 0.125 inch (3.175 mm) diameter pin in retaining pin hole (15).

2. Remove cotter pin (19) and nut (18). Retain attaching hardware. Remove wiper (25).

3. Remove nut (17), movable serrated fitting (23), and special washer (22).

4. Remove opposite wiper in a similar manner.

30-11. Windshield Wiper — Installation

1. Raise arm (16, Figure 30-1). Insert 0.125 inch (3.175 mm) diameter pin in retaining pin hole (15).

2. If not previously accomplished, install fitting (23), special washer (22), and nut (17) on arm (16).

NOTE

Wiper (25) shall be positioned per metal stamp on wiper, "Δ MUST POINT UP WHEN PARKED."

3. Place threaded shaft of wiper (25) through movable serrated fitting (23), special washer (22), and arm (16). Install special washers (21 and 20) and nut (18). Do not tighten nut at this time.

4. Remove pin from retaining pin hole (15).

NOTE

If necessary to obtain alignment of castellations in nut (18) for installation of cotter pin (19), use thin or standard aluminum washers (21 or 22) as required.

5. Align wiper (25) parallel to top of windshield to the park position dimension (28). Tighten nut (18). Install cotter pin (19).

6. Adjust wiper blade (26) pressure on windshield (paragraph 30-5).

7. Install opposite wiper in a similar manner.

30-12. WINDSHIELD WIPER ARM

30-13. Windshield Wiper Arm — Removal

1. Raise arm (16, Figure 30-1). Insert 0.125 inch (3.175 mm) diameter pin in retaining pin hole (15).

2. Remove cotter pin (19) and nut (18). Retain attaching hardware. Remove wiper (25).

3. Loosen bolt (10). Remove bolt (12). Remove arm (16). Retain washers (9 and 11).

4. Remove opposite arm in a similar manner.

30-14. Windshield Wiper Arm — Installation

MATERIALS REQUIRED

Refer to BHT-ALL-SPM for specifications.

NUMBER	NOMENCLATURE
C-405	Lockwire

1. Straighten arm (16, Figure 30-1). Insert 0.125 inch (3.175 mm) diameter pin in retaining pin hole (15).

2. Place split washer (9) and arm (16) on converter and motor (7) serrated shaft.

NOTE

When adjusting park position dimension (28) take up converter assembly backlash by applying light upward (towards top of windshield) pressure on windshield wiper arm (16).

3. Adjust arm (16) as follows:

a. Operate converter (7) to Park position, as shown in Figure 30-1.

NOTE

Removable adjustment sleeve (29) in arm (16) hub has serrations every 7.2° inside the sleeve and on every 7.06° on the outside.

b. Adjust arm (16) wiper attach hole from top of windshield by removing and repositioning adjustment sleeve (29) to achieve 4.0 to 4.5 inches (101.6 to 114.3 mm) dimension, as shown in Figure 30-1.

4. Install special washers (11), bolt (12), and lockwire (C-405) on converter and motor (7) serrated shaft. Tighten bolt (10).

5. Install wiper (25) (paragraph 30-11).

6. Adjust wiper blade (26) pressure on windshield (paragraph 30-5).

CAUTION

DO NOT OPERATE WIPER ON DRY WINDSHIELD. IT CAN CAUSE DAMAGE TO THE WINDSHIELD.

7. Apply power to system.

8. Check 64° sweep of arm (16) by momentarily rotating WIPER control switch to LOW.

9. Install opposite arm in a similar manner.

30-15. WINDSHIELD WIPER HEAD GUARD

30-16. Windshield Wiper Head Guard — Removal

1. Remove screws (1 and 4, Figure 30-1). Retain special washers (2 and 3).

2. Remove head guard (27).

30-17. Windshield Wiper Head Guard — Installation

1. Position headguard (27, Figure 30-1) on converter and motor (7).

2. Install two special washers (2 and 3) and screws (1 and 4).

30-18. WINDSHIELD WIPER CONVERTER AND MOTOR

30-19. Windshield Wiper Converter and Motor — Removal

1. Raise arm (16, Figure 30-1). Insert 0.125 inch (3.175 mm) diameter pin in retaining pin hole (15).

2. Loosen bolt (10). Remove bolt (12). Remove arm (16) and wiper (25) as a single unit. Retain washers (9 and 11).

3. Remove screws (1 and 4). Retain special washers (2 and 3). Remove head guard (27).

CAUTION

BATTERY BUS 1 AND BATTERY BUS 2 SWITCHES SHALL BE OFF.

4. Place BATTERY BUS 1 and BATTERY BUS 2 switches OFF.

5. Disconnect electrical connector from converter and motor (7). Cover connector and receptacle with caps or tape.

6. Remove bolts (5) and thin steel washers (6). Remove converter and motor (7).

7. Remove opposite converter and motor in similar manner.

30-20. Windshield Wiper Converter and Motor — Installation

MATERIALS REQUIRED

Refer to BHT-ALL-SPM for specifications.

NUMBER	NOMENCLATURE
C-405	Lockwire

1. Position converter and motor (7, Figure 30-1) serrated shaft in windshield structure hole. Install thin steel washers (6) and bolts (5).

CAUTION

BATTERY BUS 1 AND BATTERY BUS 2 SWITCHES SHALL BE OFF.

2. Place BATTERY BUS 1 and BATTERY BUS 2 switches OFF.

3. Install electrical connector on converter and motor (7).

4. Position head guard (27). Install special washers (2), screws (1), special washers (3), and screws (4).

5. Position split washer (9) and arm (16) with wiper (25) attached, on converter and motor (7) serrated shaft.

6. Hold wiper (25) in park position dimension (28). Tighten bolt (10). Install special washer (11), bolt (12), and secure with lockwire (C-405).

7. Remove pin from retaining pin hole (15).

8. Adjust wiper blade (26) pressure on windshield (paragraph 30-5).

CAUTION

DO NOT OPERATE WIPERS ON DRY WINDSHIELD. IT CAN CAUSE DAMAGE TO THE WINDSHIELD.

9. Apply power to system.

10. Perform windshield wiper operation check (Chapter 96).

11. Install opposite converter and motor in similar manner.

30-21. ANTI-ICING, DE-ICING AND SNOW REMOVAL

MATERIALS REQUIRED

Refer to BHT-ALL-SPM for specifications.

NUMBER	NOMENCLATURE
C-394	De-icing fluid

WARNING

DE-ICING FLUID (C-394) CAN BE HARMFUL OR FATAL IF SWALLOWED. AVOID PROLONGED OR REPEATED BREATHING OF VAPOR. DO NOT TAKE INTERNALLY, IF SWALLOWED, INDUCE VOMITING. CALL A PHYSICIAN.

CAUTION

IT IS VERY DIFFICULT TO PREDICT ACCURATELY HOW LONG DE-ICING FLUID (C-394) ONCE APPLIED, WILL PREVENT ICE BUILDUP ON SURFACES. THE QUANTITY OF FLUID APPLIED, AMBIENT TEMPERATURES, THE RATE OF CONTINUED PRECIPITATION, WIND SPEED, AND OTHER FACTORS AFFECT THE LENGTH OF TIME THE FLUID WILL PREVENT THE REACCUMULATION OF FROST AND ICE. ICE-FREE SURFACES AND JOINTS CAN ONLY BE ASSURED THROUGH AN EFFECTIVE ANTI-ICING/ DE-ICING OPERATION AND CAREFUL VISUAL INSPECTION OF THE HELICOPTER.

1. De-icing.

a. Remove heavy snow deposits by brushing prior to spraying.

b. Dilute de-icing fluid (C-394) concentrate with 50% water to produce a 50% solution. A 40% may be used for light icing.

CAUTION

DO NOT APPLY HOT (180°F) SOLUTION FOR DE-ICING DIRECTLY TO COLD WINDSHIELDS AND WINDOWS. USE FLUID AT OR NEAR 70°F.

c. Heat solution up to 180°F for most efficient and effective ice removal from airframe. Allow solution to cool before applying to windshield or windows.

d. Apply the diluted solution to helicopter by spraying, using suitable spraying equipment. Use a course stream to loosen and remove ice.

2. Anti-icing: Spray or wipe concentrated de-icing fluid (C-394) onto helicopter surfaces to prevent ice and frost from sticking.

NOTE

The concentrated fluid will freeze at approximately -25°F. Some ice or slush may form at or below -25°F.

3. Removal: Anti-icing/de-icing solutions and residue may be removed from helicopter by washing with fresh water or with a water/detergent solution followed by a rinse using fresh water.