OFF AIRCRAFT MAINTENANCE WITH ILLUSTRATED PARTS BREAKDOWN

CLEANING AND INSPECTION

A/A24A-56 HELMET UNIT, INTEGRATED (JOINT HELMET MOUNTED CUEING SYSTEM)

Reference Material

Testing and Troubleshooting WP004 00
A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System) WP008 00
Upper Helmet Vehicle Interface WP009 00
Helmet Display Unit WP010 00
Visor Assembly WP011 00
Purge Relay Optics Assembly WP012 00
Organizational and Intermediate Maintenance with Illustrated Parts
Breakdown - TTU-551/E Leakage Tester, Part Number 3549AS100 . . . . . NAVAIR 17-15GB-505
The Naval Aviation Maintenance Program (NAMP) . . . . . OPNAVINST 4790.2 (series)

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Record of Applicable Technical Directives

None

1. INTRODUCTION.

2. This work package (WP) provides cleaning and inspection procedures for the Visor Assembly, Cathode Ray Tube Assembly, Relay Optics Assembly, Upper Helmet Vehicle Interface, Zetaliner, TPL assembly and helmet assembly.

3. PREFLIGHT/POSTFLIGHT INSPECTIONS. The Preflight Inspection on the A/A24A-56 Helmet Unit, Integrated (Joint Helmet Mounted Cueing System) is made up of a visual inspection done by the aircrewmember, as well as, a functional test (WP004 00) done by the survival equipmentman (PR) and aircrewmember before each flight. To do the visual inspection, inspect for the general condition of the helmet assembly. Refer to INSPECTION, this WP.

4. The Postflight Inspection is a visual inspection done after the flight by the aircrewmember.

5. SPECIAL INSPECTIONS. The Special Inspection shall be done each 90 days at the organizational level and shall be made up of a visual inspection, a functional test and a thorough cleaning of the helmet assembly.

5A. HDU usage should be recorded monthly using the Helmet Display Unit (HDU) Usage Log (WP010 00 paragraph 22A). ETI readings should be taken as close to the last day of the month as possible.

6. The helmet bladder leakage test is to be done each 360 days or as required and documented in accordance with OPNAVINST 4790.2 series. Refer to INSPECTION, this WP.

7. After cleaning and inspection procedures are done, refer to WP004 00 for testing on the HMDTS.

8. CLEANING.

Support Equipment Required

None

Materials Required

Nomenclature	Specification or Part Number
Antifogging Compound	O-A-549, NIIN 00-754-2672
Brush, Soft	A-A-2076 TYPE 1
Canned Air	MS-222
Cloth, Lens	73
Cloth, Lint-free	MIL-C-85043 TYPE 1
Detergent, General Purpose	MIL-D-16791 TYPE 1, NIIN 00-282-9699
Distilled Water	COMMERCIAL
Double-Sided Masking Tape	4962
Isopropyl Alcohol	TT-I-735 or MIL-I-10428, NIIN 00-855-1158, NIIN 00-855-6160, NIIN 01-190-2538, NIIN 01-220-9907

CAUTION

Make sure water is not allowed to get in the Universal Connector or the Helmet Release Connector.

9. VISOR. (WP011 00)

a. Using canned air, remove any loose dirt, dust, or foreign material on visor.

DETERGENT, GENERAL, PURPOSE, MIL-D-16791, TYPE 1 **203**

b. Wash off remaining dust and dirt with general purpose detergent and clean lint-free cloth.

c. Lightly pat dry visor with lint-free cloth.

ANTIFOGGING COMPOUND, O-A-549 1091

d. After cleaning visor, apply an antifogging compound to the visor using a dry lint-free cloth.

10. CATHODE RAY TUBE ASSEMBLY. (WP010 00)

CAUTION

CRT assembly is fragile and can be damaged easily. Be careful in handling to prevent scratching. Do not use abrasive cleaner or polish on CRT assembly.

a. Using canned air, remove any loose dirt, dust, or foreign material on cathode ray tube assembly.

b. Wash off remaining dust and dirt using distilled water and a clean lint-free cloth.

c. Lightly pat dry CRT with lens cloth.

11. RELAY OPTICS ASSEMBLY. (WP012 00)

CAUTION

Relay optics assembly is fragile and can be damaged easily. Be careful in handling to prevent scratching and breakage. Do not use abrasive cleaners or polish on relay optics assembly.

a. Using canned air, remove any loose dirt, dust, or foreign material on relay optics assembly.

b. Wash off remaining dust and dirt using distilled water and a clean lint-free cloth.

c. Lightly pat dry relay optics assembly with lens cloth.

12. HDU OPTICS AND PUPPER CLEANING. (WP010 00)

a. Using canned air, remove any loose dirt, dust, or foreign material on HDU optics and puppers.

b. Wash off remaining dust, dirt, smudges, or film from relay optics or pupper using distilled water and a lint-free cloth.

ISOPROPYL ALCOHOL, TT-I-735 OR MIL-I-10428 1001

c. If further cleaning is required, clean using a lint-free cloth and isopropyl alcohol. Apply liberally, exercising caution, with force not to damage optics. On completion of cleaning, wipe with lint-free cloth.

13. UPPER HELMET VEHICLE INTERFACE AND QDC. (WP009 00)

a. Using canned air, remove any loose dirt, dust, or foreign material on upper helmet vehicle interface (HVI) and QDC.

ISOPROPYL ALCOHOL, TT-I-735 OR MIL-I-10428 1001

b. Wash off remaining dust particles, lint, or cloth fibers by brushing with isopropyl alcohol. Do not bend pins. On completion of cleaning, blow out connector using canned air.

14. ZETALINER. (WP008 00)

DETERGENT, GENERAL, PURPOSE, MIL-D-16791, TYPE 1 203

a. Using general purpose detergent, hand wash or machine wash, gentle cycle, the zetaliner. To remove excess water, rinse and squeeze lightly.

b. Hang to dry in a warm location. Make sure the zetaliner is completely dry before reinstalling in the helmet.

15. TPL ASSEMBLY. (WP008 00)

a. Remove cover assembly from TPL assembly.

DETERGENT, GENERAL, PURPOSE, MIL-D-16791, TYPE 1 **203**

b. Clean cover assembly and TPL by hand washing using general purpose detergent and distilled water.

c. Thoroughly rinse in clean water and air dry.

d. Apply new double-sided masking tape to cover assembly and reassemble TPL assembly.

16. HELMET ASSEMBLY. (WP008 00)

DETERGENT, GENERAL, PURPOSE, MIL-D-16791, TYPE 1 **203**

a. Clean helmet assembly using general purpose detergent and lint-free cloth. Mild abrasive scouring powder may be used to remove stains or scuff marks.

b. Wipe helmet assembly clean using water dampened lint-free cloth to remove general purpose detergent.

c. Clean chin/nape strap assembly and fitting pads using a lint-free cloth dampened with general purpose detergent.

d. Wipe clean using lint-free cloth dampened with clean water.

17. INSPECTION.

Support Equipment Required

Nomenclature	Type Designation/ Part Number	CAGE
Navy Combat Edge Leakage Tester, TTU-551/E	3549AS100	30003
Stop Watch	LCD-200	86582
Tensioning Tool	MS90387-1	96906

Materials Required

Nomenclature	Specification or Part Number
Brush, Soft	A-A-2076 TYPE 1
Canned Air	MS-222
Cloth, Lint-free	MIL-C-85043 TYPE 1
Correction Fluid	A-A-212 TYPE 1
Isopropyl Alcohol	TT-I-735 or MIL-I-10428, NIIN 00-855-1158, NIIN 00-855-6160, NIIN 01-190-2538, NIIN 01-220-9907
Leak Test Compound	SNOOP 8 OZ
Oxygen, Aviator's	MIL-O-27210 TYPE 1

18. VISOR. (WP011 00)

a. Inspect visor assembly for damage, cracks, scratches, and any signs of stress. Any distortion of symbology is cause for rejection.

b. Inspect visor tangs on visor assembly for integrity and correct configuration.

c. Make sure all latches are intact and work correctly.

19. CATHODE RAY TUBE ASSEMBLY. (WP010 00)

a. Inspect CRT and CCA for damaged and loose wiring.

b. Inspect helmet visor for possible damage due to CRT.

20. RELAY OPTICS ASSEMBLY. (WP012 00)

a. Inspect relay optics assembly for damage and moisture/fogging. If moisture/fogging exists, purge relay optics assembly per WP012 00.

21. HDU CORROSION CONTROL.

a. Visually inspect the HDU connector, CRT, and mating helmet connector for FOD or corrosion. If FOD exists on connector, blow out using canned air.

ISOPROPYL ALCOHOL, TT-I-735 OR MIL-I-10428 **1001**

b. Remove corrosion from HDU connector or CRT using a soft brush and isopropyl alcohol. Apply liberally, exercising caution, with force not to bend pins. Continue cleaning until corrosion is removed. On completion of cleaning, wipe CRT with lint-free cloth, and blow out HDU connector using canned air.

c. If corrosions continue, return HDU to depot.

22. UPPER HELMET VEHICLE INTERFACE. (WP009 00)

a. Inspect the upper HVI for damaged or broken wires.

b. Inspect nomex braiding for breaks or fraying.

c. Inspect QDC and UC connectors for damaged pins or sign of arcing near high voltage pins.

d. Visually inspect QDC and UC seals, using a magnifying glass, looking for cracks, tears, or brittleness.

e. QDC and UC seals must be replaced each 90 days. Refer to WP009 00. (QA)

23. HVI QDC. (WP009 00)

CAUTION

Components of the HDU are extremely sensitive. Be careful when handling this equipment.

a. Inspect QDC contacts for corrosion, FOD, or damage.

CAUTION

Replacement of seals will be done on a 90 day interval to prevent damage to equipment.

b. Visually inspect the High Voltage Seals using a magnifying glass. Look for excessive wear (tearing, fraying, or potted), signs of arching, or seal discoloration. If seals are damaged refer to HVI QDC HIGH VOLTAGE SEAL REPLACEMENT, WP009 00.

c. High Voltage Seals must be replaced each 90 days. Refer to HVI QDC HIGH VOLTAGE SEAL REPLACEMENT, WP009 00. (QA)

d. Inspect positioning disk located on back side of the pilot side QDC on the lower end of the HVI Cable Assembly for evidence of edge chipping, cracking or broken/missing pieces. If chipping, cracking or broken/missing pieces are found, replace the UHVI QDC Cable Assembly (WP009 00).

24. ZETALINER. (WP008 00)

a. Remove the zetaliner from the helmet.

b. Inspect zetaliner cover fabric for cleanliness, deterioration, worn spots, tears, cuts, broken or skipped stitches.

c. Inspect the conform foam for deterioration of material.

d. Replace as required.

e. Make sure zetaliner has been marked with correction fluid. Two dots in the front and one dot in rear.

f. Reinstall the zetaliner.

g. Restore communication cord to its correct location.

25. TPL ASSEMBLY. (WP008 00)

a. Remove TPL assembly from helmet.

b. Inspect TPL assembly for cleanliness, deterioration, worn spots, tears or cuts.

c. Replace as required.

d. Reinstall TPL assembly in helmet.

26. HELMET ASSEMBLY. (WP008 00)

a. Inspect chin/nape strap assembly for loose or broken stitching, snap fastener retention and fraying.

b. Inspect helmet assembly for splits, cracks, chips and delamination.

c. Inspect all other hardware for damage, security, corrosion and other defects.

d. Inspect edgeroll for rips, tears, splits or loosening from helmet shell.

e. Inspect communication cables and cordsets for cut, split or abraded insulation.

f. Inspect earcup assembly for correct retention to helmet shell assembly.

g. Inspect earpads for sound attenuation and pliability.

h. Inspect oxygen mask receivers for correct function and tension to helmet shell assembly.

27. HELMET BLADDER LEAKAGE TEST.

28. Frequency Of Test. This test is to be done each 360 days or as required and documented per OPNAVINST 4790.2 series.

WARNING

When working with oxygen, make sure that clothing, tubing, fittings and equipment are free of oil, fuel, hydraulic fluid and/or combustible material. Fire or explosion can result when even slight traces of combustible materials come in contact with oxygen under pressure.

CAUTION

Make sure hoses are not kinked when doing helmet bladder leakage test.

NOTE

Do not try to do any maintenance without becoming thoroughly familiarized with TTU-551/E Navy Combat Edge Leakage Tester.

Before doing leakage test, make sure a pretest has been done on the TTU-551/E Navy Combat Edge Leakage Tester per NAVAIR 17-15GB-505.

NOTE

For index numbers referred to in this WP, refer to figure 1.

29. Test Setup.

a. Make sure test set INLET pressure valve (7, figure 1) is OFF and oxygen supply cylinder valve is fully closed.

b. Connect regulator (2) to oxygen supply cylinder. Make sure regulator (2) is not loaded by turning pressure adjustment handle counterclockwise until spring tension is released.

c. Make sure oxygen flow control valve (3) attached to regulator (2) is closed.

d. Fully open the oxygen supply cylinder slowly. Relieve any excess pressure indicated on regulator outlet gage (10) by opening and closing the oxygen flow control valve (3).

e. Connect oxygen hose (5) to quick disconnect fitting (4) of regulator and connect the other end of oxygen hose (5) to the test set oxygen INLET (6).

f. Open oxygen flow control valve (3).

g. Adjust regulator (2) until 1.0 psig is indicated on regulator outlet gage (10).

h. Attach helmet bladder hose assembly (13) to oxygen OUTLET quick connect (9) port. Attach intermediate helmet bladder hose assembly (16) to helmet bladder adapter (11) of helmet bladder hose assembly (13). Connect helmet bladder hose (12) to intermediate helmet bladder hose assembly (16) using quick disconnects.

30. System Test.

CAUTION

Inflating the bladder to pressures that exceed 2.5 psig will damage the bladder. Any helmet bladder subjected to pressure in excess of 2.5 psig must be removed from service.

NOTE

No adjustment to regulator (2) should be required during the filling process.

a. Prepare the helmet bladder by removing the thermo-plastic liner (TPL) or zetaliner and loosen the helmet bladder from the energy absorbent liner in the helmet shell.

b. Turn test set INLET pressure valve (7) to the ON position.

c. Allow the pressure reading on low pressure gage (8) to stabilize. Pressure in the bladder should indicate 1.0±0.1 psig. Adjust pressure reading on low pressure gage (8) by turning pressure adjusting handle on regulator (2) as required to get 1.0±0.1 psig.

d. Turn test set INLET pressure valve (7) to the OFF position.

e. Using stop watch, time low pressure gage (8) reading. Leakage shall not exceed 0.1 psig in 30 seconds. If leakage exceeds allowable limit, do Leak Isolation per paragraph 31, this WP.

f. Disconnect intermediate helmet bladder hose assembly (16) from the helmet bladder hose (12).

g. Secure helmet bladder to the energy absorbent liner in the helmet shell and reinstall TPL or zetaliner.

h. If more helmet bladders are to be tested, attach the intermediate helmet bladder hose assembly (16) to the helmet bladder adapter (11) and repeat System Test per paragraph 30, this WP.

31. Leak Isolation.

a. Turn test set INLET pressure valve (7) to the ON position.

b. Using leak test compound, test for leakage of helmet bladder quick disconnects and hose. If leakage is detected, do substeps below:

(1) Turn INLET pressure valve (7) to OFF.

(2) Replace helmet bladder quick disconnects and/or hose as required. Attach replacement connector and/or hose using a cable tie with tension set to 3.

(3) Retest helmet bladder assembly. Do System Test per paragraph 30, this WP.

c. If no leakage is indicated while using leak detection compound, do Bladder Decay Test per paragraph 31, this WP.

32. Bladder Decay Test.

a. Turn test set INLET pressure valve (7) to the OFF position.

b. Disconnect helmet bladder hose (12) from intermediate helmet bladder hose assembly (16).

c. Remove intermediate helmet bladder hose assembly (16) from helmet bladder adapter (11).

CAUTION

Cut through head of cable tie using diagonal cut pliers. Do not try to cut strap underneath head.

d. Carefully cut the cable tie securing the male connector to the helmet bladder hose (12) and remove the connector.

e. Connect helmet bladder adapter (11) of helmet bladder hose assembly (13) to the helmet bladder hose (12).

CAUTION

Inflating the bladder to pressures that exceed 2.5 psig will damage the bladder. Any helmet bladder subjected to pressure in excess of 2.5 psig must be removed from service.

NOTE

No adjustment to regulator (2) should be required during the filling process.

f. Turn test set INLET pressure valve (7) to the ON position.

g. Allow the pressure reading on low pressure gage (8) to stabilize. Pressure in the bladder should indicate 1.0±0.1 psig. Adjust pressure reading on low pressure gage (8) by turning pressure adjusting handle on regulator (2) as required to get 1.0±0.1 psig.

h. Turn test set INLET pressure valve (7) to the OFF position.

i. Using stop watch, time low pressure gage (8) reading. Leakage shall not exceed 0.1 psig in 30

seconds. If helmet bladder leakage exceeds allowable leakage limits, disconnect helmet bladder hose (12) from helmet bladder adapter (11), replace helmet bladder (WP008 00) and do System Test per paragraph 30, this WP.

j. If more helmet bladders are to be tested, attach the intermediate helmet bladder hose assembly (16) to the helmet bladder adapter (11) and repeat Bladder Decay Test per paragraph 32, this WP.

k. Document in accordance with OPNAVINST 4790.2 series. (QA)

33. Securing Test Set.

a. Disconnect intermediate helmet bladder hose assembly (16) from helmet bladder hose assembly (13).

b. Disconnect helmet bladder hose assembly (13) from test set oxygen OUTLET quick connect (9).

c. Close oxygen supply cylinder.

d. Turn test set INLET pressure valve (7) to the ON position to bleed pressure from test set.

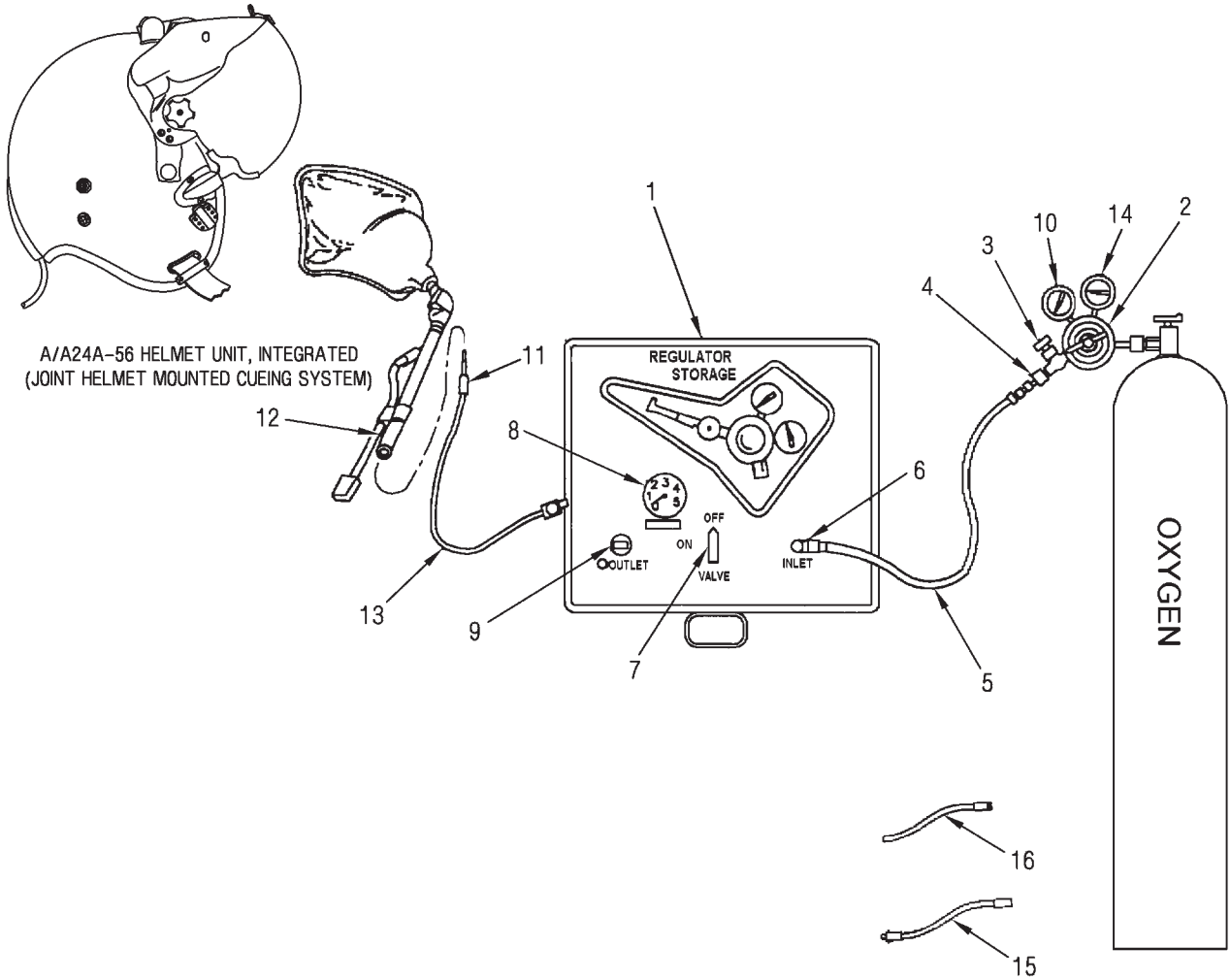
e. Turn regulator (2) counterclockwise until spring tension is released.

f. Close oxygen flow control valve (3) and turn test set INLET pressure valve (7) to the OFF position.

g. Disconnect all hoses from test set and regulator (2) and stow in lid of test set.

h. Disconnect regulator (2) from oxygen supply cylinder and stow in space provided in test set.

i. Stow all hoses and fittings/caps in space provided in test set.



LEGEND

1. LEAKAGE TESTER TEST SET
2. REGULATOR
3. OXYGEN FLOW CONTROL VALVE
4. QUICK DISCONNECT FITTING
5. OXYGEN HOSE
6. OXYGEN INLET (QUICK DISCONNECT)
7. INLET PRESSURE VALVE
8. LOW PRESSURE GAGE (0-5 PSIG)
9. OXYGEN OUTLET QUICK CONNECT
10. REGULATOR OUTLET GAGE
11. HELMET BLADDER ADAPTER
12. HELMET BLADDER HOSE
13. HELMET BLADDER HOSE ASSEMBLY
14. REGULATOR INLET GAGE
15. ADAPTER CAP ASSEMBLY
16. INTERMEDIATE HELMET BLADDER HOSE ASSEMBLY

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Figure 1. TTU-551/E Leakage Tester

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