

TECHNICAL MANUAL

**AVIATION UNIT AND INTERMEDIATE
MAINTENANCE MANUAL**

**ARMY MODEL
AH-1P (PROD)
AH-1E (ECAS)
AH-1F (MODERNIZED COBRA)
HELICOPTERS**

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

* This manual supersedes TM 55-1520-236-23-1, dated 8 May 1980, including all changes.

**HEADQUARTERS, DEPARTMENT OF THE ARMY
12 APRIL 1996**

TECHNICAL MANUAL

NO. 55-1520-236-23

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 12 April 1996AVIATION UNIT AND INTERMEDIATE MAINTENANCE MANUAL
ARMY MODEL**AH-1P (PROD)
AH-1E (ECAS)
AH-1F (MODERNIZED COBRA)
HELICOPTERS****REPORTING OF ERRORS**

You can help improve this manual, if you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to: Commander, U.S. Army Aviation and Troop Command, ATTN: AMSAT-I-MP 4300 Goodfellow Blvd., St Louis, MO 63120-1798. A reply will be furnished to you. You may also submit your recommended changes by E-mail directly to <mpmt%avma28@st-louis-emh7 army. mil>. A reply will be furnished to you

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

TABLE OF CONTENTS

		PARAGRAPH	PAGE
VOLUME 1			
CHAPTER 1	AIRCRAFT GENERAL		
Section I	Servicing.	1-1	1-1
Section II	Lubrication.	1-28	1-41
section III	Handling, jacking, mooring, hoisting, and sling loading	1-30	1-45
Section IV	Inspection requirements	1-55	1-58
section V	Overhaul and retirement schedule	1-58	1-87
section VI	Flight safety critical aircraft parts (FSCAP)	1-59	1-89
CHAPTER 2	AIRFRAME		
Section I	Structural repair	2-1	2-1
Section II	Fuselage	2-41	2-113
section III	Tailboom	2-281	2-229
section IV	Wing	2-335	2-245
Section V	Deleted	2-352	2-258
CHAPTER 3	LANDING GEAR		
Section I	Landing Gear.	3-1	3-1
Section II	Skids/Struts (Not Applicable)		3-29
Section III	Floats (Not Applicable)		3-29
Section IV	Skis (Not Applicable)		3-29
Section V	Brakes (Not Applicable).		3-29
CHAPTER 4	POWER PLANT		
Section I	Power plant	4-1	4-1
Section II	Cooling system (Not Applicable)		4-17

		PARAGRAPH	PAGE
Section III	Air induction system	4-24	4-18
Section IV	Exhaust system	4-39	4-36
Section V	Oil system	4-59	4-50.2
Section VI	Ignition system (Not Applicable)		4-69
Section VII	Power lever controls	4-98	4-69
Section VIII	Quick change assembly	4-114	4-79
CHAPTER 5	ROTORS		
Section I	Main rotor system	5-3	5-1
Section II	Main rotor hub and blades	5-8	5-2.2
Section III	Main rotor controls	5-47	5-103
Section IV	Tail rotor system	5-72	5-138
Section V	Tail rotor hub and blade assembly	5-79	5-141
Section VI	Tail rotor hub and controls	5-89	5-148
Section VII	Tail rotor blades	5-107	5-170
Section VIII	Tracking and balancing procedures	5-114	5-181
CHAPTER 6	DRIVE TRAIN SYSTEM		
Section I	Drive train	6-1	6-1
Section II	Main driveshaft	6-5	6-7
Section III	Main transmission	6-20	6-24
Section IV	Tail rotor driveshaft	6-75	6-75
Section V	Intermediate gearbox	6-96	6-86
Section VI	Tail rotor gearbox	6-113	6-103
Section VII	Transmission oil system	6-129	6-120.1
VOLUME II			
CHAPTER 7	HYDRAULIC AND PNEUMATIC SYSTEMS	-	7-1
CHAPTER 8	INSTRUMENTS SYSTEM		
Section I	Instrument maintenance	8-1	8-1
Section II	Engine instruments	8-10	8-7
Section III	Flight instruments	8-114	8-25
Section IV	Navigation instruments	8-185	8-36
Section V	Miscellaneous instruments	8-198	8-38
Section VI	Instrument panels	8-285	8-52
CHAPTER 9	ELECTRICAL SYSTEMS		
Section I	Electrical systems maintenance	9-1	9-1
Section II	Direct current power distribution system	9-37	9-27
Section III	Alternating current power distribution system	9-119	9-56
Section IV	Starting system	9-238	9-73
Section V	Ignition system	9-246	9-75
Section VI	Lighting provisions	9-254	9-76
Section VII	Miscellaneous equipment	9-340	9-102
Section VIII	P Armament systems circuitry	9-412	9-122

		PARAGRAPH	PAGE
Section IX	E Armament systems circuitry	9-442	9-154
Section X	M Armament and fire control systems circuitry	9-496	9-185
CHAPTER 10	FUEL SYSTEMS		
Section I	Fuel systems	10-1	10-1
Section II	Fuel cells	10-73	10-17
CHAPTER 11	FLIGHT CONTROLS		
Section I	Flight controls	11-1	11-1
Section II	Flight controls components	11-145	11-81
CHAPTER 12	UTILITY SYSTEMS		
Section I	Fire detection system	12-1	12-1
Section II	Rain removal system	12-9	12-4
Section III	Defroster system	12-10	12-4
Section IV	Low G Warning System	12-11	12-5
CHAPTER 13	ENVIRONMENTAL CONTROL SYSTEM		
Section I	Heating systems	13-1	13-1
Section II	Air cooling systems	13-125	13-37
CHAPTER 14	HOIST AND WINCHES (Not Applicable)	14-1	14-1
CHAPTER 15	AUXILIARY POWER PLANT (Not Applicable)	15-1	15-1
CHAPTER 16	MISSION Equipment	16-1	16-1
CHAPTER 17	EMERGENCY EQUIPMENT	17-1	17-1
APPENDIX A	REFERENCES		A-1
APPENDIX B	MAINTENANCE ALLOCATION CHART		B-1
APPENDIX C	AIRCRAFT INVENTORY MASTER GUIDE		C-1
VOLUME III			
APPENDIX D	ILLUSTRATED FIELD MANUFACTURE LIST		D-1
APPENDIX E	STORAGE OF AIRCRAFT		
Section I	General information	E-1	E-1
Section II	Flyable storage	E-6	E-2
Section III	Short term storage	E-10	E-4
Section IV	Intermediate storage	E-14	E-11
APPENDIX F	WIRING DIAGRAMS		F-1
APPENDIX G	WIRE LISTS		G-1
INDEX			Index-1
VOLUME IV			
FOLDOUTS			FO-1
VOLUME V			
FOLDOUTS			FO-143

LIST OF ILLUSTRATIONS

NUMBER	TITLE	PAGE
1-1	Servicing Points Diagram	1-2
1-1.1	Receiver and Cap Assembly	1-2.3
1-2	Deleted	
1-3	Deleted	
1-4	Deleted	
1-5	Lubrication Chart	1-42
1-6	Ground Handling Diagram	1-46
1-7	Work Aid for Towing Ground Handling Gear	1-48
1-8	Jacking and Mooring Fittings	1-50
1-9	Covers Diagram	1-53
1-9.1	AH-1 Paved Surface Mooring Configuration	1-54.2
1-10	Mooring Diagram	1-55
1-11	Maintenance Hoist, T101520	1-57
1-12	Inspection Area Diagram (Typical)	1-59
2-1	Fuselage Components and Tailboom	2-2.1
2-2	Structural Panels	2-4
2-3	Non-Structural Access Panels, Doors, and Fairings	2-8
2-4	Principal Dimensions - Airframe	2-14
2-5	Reference Lines - Airframe	2-16
2-6	Cleaning Chart	2-23
2-7	Type A - Damage, Body Panel Repairs	2-36
2-8	Type B - Damage, Body Panel Repairs	2-37
2-9	Type C - Damage, Body Panel Repairs	2-38
2-10	Type D - Damage, Body Panel Repairs	2-40
2-11	Primary Structural Caps - Left Side	2-42
2-12	Primary Structural Caps - Right Side	2-43
2-13	Pilot and Gunner Floor Panels	2-44
2-14	Bulkhead at Station 93.0	2-45
2-15	Bulkhead at Station 148.5 and 171.61	2-46
2-15.1	Ammo Floor Scuff Doubler Installation	2-46.1
2-16	Bulkhead at Stations 186.25 and 213.94	2-47
2-17	Bulkhead at Stations 250.0 and 268.5	2-48
2-18	R&L Main Beam Panels at Station 148.5 to 186.25	2-49
2-19	R&L Main Beam Panels at Station 213.94 to 250.0	2-50
2-20	Panel at Forward Fuel Cell at R.S. and Gunner Floor	2-51
2-21	R&L Beam Panels at Station 250 to B.S. 41.32	2-52
2-22	Ammo Floor, Support Panel and Forward Fuel Cell Panel at Station 213.9	2-53
2-23	Forward Fuel Cell Floor - Lower Panel Station 86 to 213	2-54
2-24	Lower Aft Fuel Cell Panel at Station 250 to B.S. 41.32	2-55
2-25	Engine Deck Installation at Station 213.94 to 298.75	2-56
2-26	Forward Fuel Cell Panels - Main Beam at Station 186 to 214	2-57
2-27	Edge Repair for Honeycomb Panels with Glass Skin Opposite Titanium	2-58
2-28	Edge Repair for Honeycomb Panels with Aluminum Alloy with Glass Edging	2-60
2-29	Edge Repair for Honeycomb Panels with Glass Finish at Channel	2-61
2-30	Typical Rivet Pattern for Channel Section Repair	2-62
2-31	Potted - Injection - Grommet Type Fasteners	2-64
2-31.1	HMPP Cowling Nut Plate Replacement	2-66.1
2-31.2	Stringer Repair	2-66.2
2-32	Longeron Damage Limits	2-82
2-33	Typical Tailboom Bulkhead Damage Limits	2-85
2-34	Tail Rotor Driveshaft Covers	2-87
2-35	Driveshaft Cover Hinges and Angles Damage	2-88
2-36	Damage Limits - Tailboom Attach Fitting	2-89
2-37	Damage Limits - Bearing Hanger Support Fitting	2-90

LIST OF ILLUSTRATIONS (CONT)

NUMBER	TITLE	PAGE
2-38	Damage Limits - Intermediate Gearbox Support Installation	2-91
2-39	Damage Limits - Tail Rotor Drive Support Fitting	2-92
2-40	Vertical Fin Honeycomb Panels Damage	2-96
2-41	Edge Repair on Vertical Fin	2-100
2-42	Tailboom Longerons	2-101
2-43	Longeron Repair	2-102
2-43.1	Longeron Material Chart	2-104
2-44	Damage Skin, Frame, and Bulkhead Repair	2-104.1
2-45	Repair - Damaged Ribs - Bulkhead	2-105
2-46	Repair - Bulkhead Flanged Member	2-106
2-46.1	Tailboom Structural Material	2-106.1
2-47	Repair - Bulkhead "T" Cap - Extensive Damage	2-107
2-48	Injection Tape Fastener (Insert) in Vertical Fin Panel	2-111
2-48.1	Vertical Fin Ballast Weight Panel	2-112.2
2-49	Sheet Metal Panels and Skin	2-115
2-50	P E Fairing - Cowling for Pylon, Transmission, Engine, and Tailpipe	2-123
2-51	M Fairing and Cowling - Pylon, Transmission, Engine and IR Suppressor	2-126
2-52	IR Suppressor Cowling Installation	2-132
2-53	Firewalls and Driveshaft Fireshield Installation	2-139
2-54	Forward Engine Firewall Assembly (Prior to Incorporation of MWO 55-1520-236-50-12)	2-142
2-54.1	I M Forward Engine Firewall Assembly (After Incorporation of MWO 55-1520-236-50-12)	2-144.3
2-55	Aft Engine Firewall and Cowl Support	2-146
2-56	Tail Rotor Driveshaft Fireshield Assembly	2-152
2-57	Engine Air Induction Baffle Installation (Prior to Incorporation of MWO 55-1520-236-50-12)	2-154
2-57.1	E M Centrisep Particle Separator Engine Air Induction Baffle Installation (After Incorporation of MWO 55-1520-236-50-12)	2-154.1
2-58	Engine Air Induction Baffle Assembly (Prior to Incorporation of MWO 55-1520-236-50-12)	2-155
2-58.1	E M Centrisep Particle Separator Engine Air Induction Baffle Assembly (After Incorporation of MWO 55-1520-236-50-12)	2-158.1
2-59	Pilot Door - Installation	2-161
2-60	Gunner Door - Installation	2-164
2-61	Pilot Door - Assembly	2-167
2-62	Gunner Door - Assembly	2-169
2-63	Gunner Door Latch Assembly	2-170
2-64	Canopy Window and Windshield - Installation	2-176
2-65	Canopy Frame - Installation	2-178
2-66	Pilot Seat - Installation	2-179
2-67	Gunner Seat - Installation	2-180
2-68	Pilot Seat - Assembly	2-183
2-69	Engine Armor - Installation	2-188
2-70	Soundproofing Blanket - Installation	2-190.1
2-70.1	Wire Strike Protection System	2-190.2
2-70.2	Damage Limits - Wire Strike Deflector	2-191
2-71	Engine Mount Installation	2-192
2-72	Damage Limits - Aft Engine Mount Assembly (Tripod)	2-196
2-73	Damage Limits - Fittings for Aft Engine Mount (Tripod)	2-199
2-74	Aft Engine Mount (Tripod) Assembly	2-200
2-75	Damage Limits - Engine Mount Pillow Blocks (Left and Right)	2-202
2-76	Diagonal Brace Tube - Installation	2-204
2-77	Pylon Support - Installation	2-206
2-77.1	Pylon Mount Bolt Inspection Criteria	2-206.1

LIST OF ILLUSTRATIONS (CON'T)

NUMBER	TITLE	PAGE
2-78	Access Hole for Damper to Damper Support Fitting Mount Bolts	2-209
2-79	Fifth Mount and Fifth Mount Support Fitting – Installation	2-210
2-79.1	Bushing and Bearing Tool Kit LT-40	2-212.2
2-79.2	Fifth Mount Assembly	2-212.3
2-79.3	Fifth Mount Bushing and Bearing Removal	2-212.3
2-79.4	Fifth Mount Bushing and Bearing Installation	2-212.4
2-79.5	Fifth Mount Bush Staking	2-212.4
2-80	Damper – Internal Yielding Inspection	2-214
2-81	Transmission Damper – Assembly	2-215
2-82	Damper Seal – Installation Tool	2-216
2-83	Damper Barrel Shim – Replacement	2-217
2-84	Damper Upper Shim – Replacement	2-218
2-85	Damper Lower Shim – Replacement	2-219
2-86	Hydraulic Fitting Supports – Installation	2-221
2-87	Damper Support Fitting – Elongated Holes	2-223
2-88	Damage Limits – Fifth Mount Support Fitting	2-224
2-89	Tow, Jack, and Mooring Fitting	2-226
2-90	Aft Section Assembly	2-230
2-91	Tail Boom Support Stand – Workaid	2-231
2-92	Tailboom Installation	2-232
2-92.1	Tailboom Installation	2-232.1
2-93	Tailboom and Elevator Skins	2-234
2-94	Tailboom and Synchronized Elevator – Structure	2-237
2-95	Tailskid – Installation	2-240
2-96	Aft Ballast – Installation	2-242
2-97	Synchronized Elevators – Installation	2-244
2-98	Wing Assembly – Installation	2-246
2-99	Wing Bushings – Limits Chart	2-250
2-100	Wing Skin Repair (External Hole)	2-251
2-101	Wing Skin Repair (External Crack)	2-252
2-102	Wing Skin Repair (Close to Frame, Spar, or Ribs)	2-253
2-103	Wing Skins, Fairings, Covers, Doors	2-254
2-104	Wing Fairing Repair (Leading – Trailing Edge)	2-256
2-105	Deleted	
3-1	Landing Gear and Support Installation	3-2
3-1.1	Crosstube Shim Fabrication	3-4.1
3-2	Crosstube – Deflection Inspection	3-5
3-3	Damage Limits – Crosstubes	3-6
3-4	Skid Tube – Repairs	3-9
3-4.1	Skid Shoes – Standard, Heavy Duty	3-10.2
3-5	Crosstube Fairing Assembly	3-12
3-6	Landing Gear Support Spacer Installation	3-15

LIST OF ILLUSTRATIONS (CONT)

NUMBER	TITLE	PAGE
3-7	Ground Handling Gear-Assembly	3-17
3-8	Ground Handling Gear Pump, P/N BU0953B-Assembly	3-19
3-9	Ground Handling Gear Pump, P/N HP9902-41-10	3-21
3-10	Work Aid - Packing Nut Tool Removal/Installation - Fabrication Instructions	3-23
3-11	Ground Handling Wheels -Adjustment Dimensions	3-25
4-1	Power Plant Installation - Right Side	4-2
4-2	Power Plant installation -Left Safe	4-2.2
4-3	Engine VibrationTest Equipment Cabling Tiedown	4-4
4-3.1	Deleted	
4-4	Engine Installation	4-7
4-5	Engine Mount Fittings (Trunnions) Installation	4-13
4-6	Damage Limits Aft Engine Mount Fittings (Trunnions) and Bearings	4-16
4-7	Particle Separator and FOD Screen Installation (Prior to Incorporation of MWO 55-1520-236-50-12)	4-19
4-7.1	E M Centrisep Particle Separator Installation (After Incorporation of MWO 55-1520-236-50-12)	4-22.2
4-8	Particle Separator-Air Flow Diagram (Prior to Incorporation of MWO 55-152-236-50-12)	4-23
4-8.1	E M Centrisep Particle Separator Air Flow Diagram (After Incorporation of MMO 55-1520-236-50-12)	4-24.1
4-9	Particle Separator and FOD Screen Assemblies (Prior to Incorporation of MWO 55-1520-236-50-12)	4-26
4-10	Inlet Vane Reinforcement Doubler - Fabrication	4-30
4-10.1	E M Centrisep Particle Separator Repair/Replacement (After Incorporation of MWO 55-1520-236-50-12)	4-30.1
4-11	FOD (Foreign Object Damage) Screen Installation	4-34
4-12	P E Exhaust System Components	4-37
4-13	P E Engine Tailpipe Repair	4-38
4-14	Engine Deck and Firewall Sealing	4-40
4-15	P E Exhaust System Components with IR Suppression Installation	4-41
4-15.1	Hot Metal Plus Plume suppressor	4-44.10
4-15.2	Outer Body Half - Section.	4-44.11
4-16	Repair Procedures - Infrared Suppression System	4-45
4-17	M Exhaust System Components with IR Suppression - Installation	4-47
4-17.1	M Suppresor Major Structural Elements.	4-50
4-18	Engine Oil System Installation	4-50.1
4-18.1	ODDS Oil Separator and Oil Filter Installation (MWO 1-1520-236-50-30)	4-50.3
4-19	Engine Oil System Schematic	4-54.3
4-19.1	Oil Separator (Lubriclone) Assembly	4-54.4
4-19.2	Deleted	
4-19.3	Engine External Oil Filter	4-54.7
4-20	Oil Tank Installation	4-57

LIST OF ILLUSTRATIONS (CONT)

NUMBER	TITLE	PAGE
4-21	Engine Oil Cooler Installation	4-60
4-22	Oil Cooler Cleaning Schematic	4-61
4-23	Engine Oil Cooler Turbine Fan Assembly	4-64
4-24	Oil Cooler Turbine Fan Assembly	4-66
4-25	Power Lever Control System Installation	4-70
4-26	Engine idle Stop installation	4-73
4-27	Droop Cmpensator Controls Installation	4-75
4-28	Rigging Procedures - Droop Compensator Controls	4-79
4-29	Engine Shipping Container	4-81
4-30	Ignition Unit	4-83
4-31	Aft Engine Trunnion installation	4-84
4-32	Trunnion, Cambox, and Linear Actuator Installation	4-85
4-33	Power Turbine Tachometer Generator, Oil Pressure Transducer, Oil Pressure Switch, and Fuel Pressure Switch Installation	4-86

LIST OF ILLUSTRATIONS (CONT)

NUMBER	TITLE	PAGE
4-34	Starter Generator and Gas Producer Tachometer Generator	4-87
4-35	Installation - Engine Torque Transducer Hose	4-89
4-36	Installation - Fuel Drain and Bleed Lines	4-91
4-37	Installation - Starter Fuel Filter and Oil Bypass Valve Hose	4-92
4-38	Installation - Bleed Air Tubing	4-93
4-39	Installation - Oil Hose	4-95
4-40	Installation - Heat Shield Tailpipe and Ejector	4-96
4-41	Electrical Cable Installation - Engine Left Side	4-97
4-42	Electrical Cable Installation - Engine Right Side	4-100
5-1	Main Rotor System	5-2
5-2	Main Rotor Installation	5-4
5-3	Main Rotor System Torque Values	5-6
5-4	Tool Application - Grip Lock Installation on Pitch Horn	5-7
5-4.1	Barrel Jack Installation	5-8
5-4.2	Barrel Jack Work Aid	5-8.1
5-5	Tool Application - Main Rotor Mast Nut Removal/Installation	5-8.2
5-6	Tool Application Alignment of Main Rotor Hub and Blade	5-9
5-7	Damage Limits - Cone Set	5-11
5-8	Pitch Link Assembly Adjustments	5-13
5-9	Pitch Link Assembly	5-14
5-10	Main Rotor Hub and Blade Assembly	5-16
5-11	Work Aid for Main Rotor Blade Bolt Removal Fabrication Instructions (AVIM)	5-17
5-12	Work Aid Application Main Rotor Blade Retaining Bolt Removal	5-18
5-13	B540 Main Rotor Blade	5-23
5-14	B540 Main Rotor Blade Authorized Patch Area (AVIM)	5-25
5-15	B540 Main Rotor Blade Trim Tab Installation	5-27
5-16	K747 Main Rotor Blade (Part Numbers K747-003-205, -209, -303)	5-30.1
5-16.1	K747 Main Rotor Blade (Part Numbers K747-003-309, -401, -403)	5-31
5-17	External Appearance Changes to K747-003-205/-309, -209/-401, and -303/-403 Blades Resulting from Improved Weight Retention Features	5-32
5-18	Internal Modification Incorporated in K747-003-205/-309, -209/-401, and -303/-403 Blades for Improved Weight Retention	5-33
5-19	Damage Limits - Root Fittings (K747 Blade)	5-36.2
5-19.1	Damage Limits - Root Fittings - Part Number K747-083-1 (K747 Blade)	5-37
5-20	Damage Limits - Drag Strut (P/N K747-072-1) (K747 Blade)	5-38
5-20.1	Damage Limits - Drag Strut - Part Number K747-082-1 (K747 Blade)	5-38.1
5-21	Inspection of K747-003-205/-309, -209/-401, -303/-403 Blades for Loss of Blade Weight Retention Integrity	5-39
5-22	Proximity Limits for Patches - K747 Main Rotor Blades	5-40
5-23	Balance Adjustment for Patches (K747 Blade)	5-43
5-24	Root Fitting Assembly (K747-205, -209, -303 Blades)	5-52
5-24.1	Root Fitting Assembly (-309, -401, -403 Blades)	5-52.1
5-24.2	Drag Strut Assembly (-309, -401, -403 Blades)	5-52.3
5-25	Application of Skin Patch (K747 Blade)	5-54
5-26	Curing Patch with Blade Repair Fixture (K747 Blade)	5-56
5-27	Installation of Plug Patch (K747 Blade)	5-60

LIST OF ILLUSTRATIONS (CONT)

NUMBER	TITLE	PAGE
5-28	Typical Double Plug Patch Repair (K747 Blade)	5-67
5-28.1	Application of Trailing Edge Doubler Patch (K747 Blade)	5-68
5-28.2	wine Repair (K747 Blade)	5-71
5-28.3	Rebinding Delaminated Leading Edge Erosion Guard (K747 Blade)	5-72.1
5-28.4	Typical Repair of fluorocarbon Erosion Guard Nicks and Cuts Using Kit, P/N 747-207	5-72.3
5-28.5	Application of Leading Edge Erosion Guard Patch (K747 Blade)	5-72.5
5-28.6	Placement of Erosion Guard Replacement Part (Kit, P/N K747-206-1) Method for Determining Current Boot Material and Thickness (K747 Blade Series)	5-72.7
5-28.7	K747 Blade Uralite Repair	5-72.10
5-28.8	Application of Vacuum Bagging Materials and Placement of Erosion Guard	5-72.11
5-28.9	Repair Parts and Specimen Orientation (Kit, P/N 747-206)	5-72.15
5-28.10	Vacuum Bagging for Installation of Erosion Guard Repair Kit, P/N K747-206	5-72.18
5-28.11	Improvised Mod for Casting Small Section of Leading Edge Filler	5-72.21
5-28.12	Repair Parts Orientation Use for Removal and Installation of Stainless Steel Erosion Guard - K747-003-303/403 and -303/403 Field Modified Blades	5-72.23
5-28.13	Preparation of K747-003/-403 Blade for Application of Sealant	5-72.24
5-28.14	Application of Sealant to Stainless Steel Guard for K747-003-303/403 Blade	5-72.26
5-28.15	Stainless Steel Erosion Guard Holding Fixture	5-72.27
5-28.16	Masking for Paint Touch-Up After installation of Kit K747-206	5-72.31
5-29	Main Rotor Hub Yoke Extension and Grip Assembly	5-72.35
5-30	Main Rotor Hub Yoke and Trunnion	5-74
5-31	Main Rotor Bearing Wear Patterns	5-77
5-32	Damage Limits - Main Rotor Hub Yoke Extension	5-78
5-33	Damage Limits - Main Rotor Hub Bolt Holes	5-79
5-34	Damage Limits - Main Rotor Hub Yoke	5-81
5-35	Damage Limits - Main Rotor Hub Grip	5-82
5-36	Damage Limits- Main Rotor Hub Strap Fitting	5-83
5-37	Damage Limits - Pitch Horn Bushing	5-85
5-38	Damage Limits - Main Rotor Hub Pitch Horn 209-010-109-5 (Prior to Accomplishment of MWO 55-1520 -244-50-6)	5-86
5-38.1	Damage Limits - Main Rotor Hub Pitch Horn 209-010-109-109 (After Accomplishment of MWO 55-1520-244-50-6 and MWO 55-1520-244-50-9)	5-86.1
5-39	Damage Limits -Main Rotor Drag Brace	5-87
5-40	Damage Limits- Main Rotor HubTrunnion	5-88
5-40.1	Damage Limits -Hub Moment Spring Plate	5-88.1
5-40.2	Damage Limits- Hub Moment Spring Strap	5-88.2
5-41	Damage Limits- Main Rotor Hub Elastomeric Bearing	5-89
5-42	Main Rotor Hub Yoke Chafing Pad Installation Dimensions	5-90
5-42.1	Main Rotor Hub Yoke Buffer Installation -Dimensions	5-90
5-43	Tool Application -Bearing Removal From Housing	5-90.2
5-44	Tool Application -Bearing Removal From Grip	5-92
5-45	Tool Application - Bearing and Seal Installation in Grip	5-93
5-46	Tool Application- Main Rotor Hub Trunnion Centering	5-96
5-47	Tool Application - Grip Spacing Adjustment	5-97
5-48	Main Rotor Hub Grip Dust Seal to Radius Ring Dimension	5-99
5-49	Rotor Balancing Kit P/N 7A050.	5-101
5-50	Tool Application - Main Rotor Hub Balancing	5-102
5-51	Main Rotor Controls Installation	5-104
5-52	Tool Application - Spline Plate Wear Measurement	5-107
5-52.1	Hub Moment Spring Support Assembly - Installation (MWO 55-1520-244-50-3 Incorporated)	5-108

LIST OF ILLUSTRATIONS (CONT)

NUMBER	TITLE	PAGE
5-53	Collective Lever Trust Washer Wear Limits	5-108.1
5-53.1	Rod End Clevis Movement	5-108.4
5-53.2	Rod End Bearing.	5-108.5
5-54	Damage Limits - Pitch Link Assembly (Prior to Accomplishment of MWO 55-1520-244-50-9)	5-109
5-54.1	Damage Limits - Pitch Link Assembly 209-010-520-103 (After Accomplishment of MWO 55-1520-244-50-9)	5-110.1
5-55	Damage Limits- Spline Plate.	5-110.2
5-56	Damage Limits - Collectivr Lever	5-111
5-57	Damage Limits - Collective Lever Idle Link	5-112
5-58	Collective Lever Idle Link Assembly	5-113
5-59	Damage Limits - Swashplate Anti-Drive Link	5-114
5-60	Swashplate Anti - Drive Link	5-115
5-61	Damage Limits - Swashplate Anti-Drive Assembly Bellcrank	5-116
5-62	Damage Limits - Swashplate Anti - Drive Assembly Support	5-117
5-63	Swashplate Anti - Drive Assembly	5-118
5-63.1	Damage Limits - Hub Moment Spring Support Set, P/N 209-011-212-101 (MWO 55-1520-244-50-3 Incorporated)	5-120.2
5-63.2	Damage Limits - Hub Moment Spring	5-120.3
5-64	Scissors and Sleeve Assembly	5-121
5-65	Damage Limits - Hub, Sleeve, Scissors and Link	5-124
5-65.1	Installation of Shims	5-130.1
5-65.2	Collet Work Aid	5-130.1
5-66	Swashplate and Support Assembly	5-132
5-67	Damage Limits - Swashplate and Support Assembly	5-135
5-68	Tail Rotor Installation	5-139
5-69	Tail Rotor Hub and Blade Assembly	5-144
5-70	Tool Application - Tail Rotor Hub and Blade Assembly Balancing	5-146
5-71	Tail Rotor Hub Assembly	5-150
5-72	Damage Limits - Tail Rotor Hub Yoke	5-151
6-73	Damage Limits - Tail Rotor Hub Trunnion Set	5-152
5-74	Bearing Staking Tool P/N T101577	5-153
5-75	Tool Application - Bearing Installation (Staking) in Tail Rotor Yoke	5-155
5-76	Tail Rotor Controls - Crosshead, Weights, Links and Control Tube	5-156
5-77	Damage Limits - Tail Rotor Control Crosshead	5-160
5-78	Damage Limits - Tail Rotor Control Counterweight Bellcrank	5-161
5-79	Damage Limits - Tail Rotor Controls Pitch Link	5-162
5-80	Damage Limits - Tail Rotor Control Counterweight Link	5-163
5-81	Damage Limits - Tail Rotor Control Counterweight Support	5-164
5-82	Damage Limits - Tail Rotor Control Tube	5-165
5-83	Damage Limits - Link Assembly	5-166
5-84	Damage Limits - Idler	5-167
5-85	Damage Limits - Lever	5-168

LIST OF ILLUSTRATIONS (cont)

NUMBER	TITLE	PAGE
5-86	Damage Limits – Tail Rotor Retention Nut	5-169
5-87	Tail Rotor Blade Pitch Horn Installation	5-171
5-88	Tail Rotor Blade Assembly	5-172
5-89	Tail Rotor Blade Station Diagram and Scratch –Type Damage Area Locations	5-173
5-90	Tail Rotor Blade – Area Authorized for Patch – Type Repair	5-174
5-91	Tail Rotor Blade Butt Area Repair	5-176
5-92	Damage Limits – Tail Rotor Blade Pitch Horn	5-178
5-93	Main Rotor Tracking Chart	5-182
5-94	Vertical Vibration Correction Chart	5-183
5-95	Vertical and Lateral Vibration Chart for K747 Rotor Blades	5-185
5-96	Lateral Vibration Correction Chart for B-540 Rotor Blades	5-187
5-97	Tracking Main Rotor	5-188
5-98	Tracking Main Rotor	5-189
5-99	Vibrex 4591 System Components and Carrying Case	5-191
5-100	A Main Rotor Balance Chart	5-194
5-101	Reading a Main Rotor Balance Chart	5-195
5-102	Reading a Main Rotor Balance Chart with an Incorrect “Clock Angle”	5-196
5-103	Reading the Tail – Rotor Charts	5-198
5-104	Magnetic Pickup and Double Interrupter Installation	5-200
5-105	Magnetic Pickup/Interrupter Installation	5-201
5-106	Magnetic Pickup Cable Installation	5-202
5-107	Balancer Installation	5-203
5-108	Lateral Accelerometer Installation	5-204

LIST OF ILLUSTRATIONS (CON'T)

NUMBER	TITLE	PAGE
5-109	Vertical Accelerometer Installation	5-205
5-110	Deleted	
5-111	Tip Targets Installation	5-208
5-112	Reflective Target Installation	5-209
5-113	Reading the Main Rotor Chart	5-210
5-114	Reading the Main Rotor Tracking Chart	5-212
5-115	Accelerometer Cable Installation (Typical)	5-214
5-116	Tracking Tail Rotor	5-215
5-117	Balancing Tail Rotor	5-217
6-1	Drive Train (Typical)	6-4
6-2	Gearbox Oil Contamination - Description and Corrective Action	6-5
6-2.1	Typical Oil System Debris at 6X Magnification	6-6.3
6-2.2	Deleted	
6-3	Main Driveshaft Installation	6-8
6-4	Tool Application - Transmission Positioning Jacks P/N T101440 (T35)	6-10
6-5	Tool Application - Engine to Transmission Driveshaft Alignment P/N T101419(T35)	6-11
6-6	Main Driveshaft Assembly	6-13
6-7	Inspection and Lubrication of Main Driveshaft	6-14.1
6-7.1	Main Driveshaft Internal Corrosion Area	6-17
6-8	Coupling Wear Criteria for Driveshaft	6-18
6-9	Damage Limits - Main Driveshaft Assembly	6-20
6-9.1	Main Driveshaft	6-20.1
6-9.2	Main Driveshaft Installation and Removal Tool	6-20.2
6-9.3	Work Aid Tool Installed on Main Driveshaft	6-20.2
6-9.4	Main Driveshaft Damage Limits	6-20.3
6-10	Transmission Quills	6-25
6-11	Transmission Installation	6-27
6-12	Transmission Buildup	6-28
6-13	P Transducer Bracket Installation	6-32
6-14	Damage Limits - Transmission	6-34
6-15	Transmission Shipping Covers, Caps, and Plugs	6-41
6-15.1	Lift Link Attaching Point	6-44.1
6-16	Main Input Quill Assembly	6-45
6-16.1	Transmission Input Quill Work Aid (Sheet 1 of 2)	6-46.1
6-16.2	Transmission Input Quill Work Aid (Sheet 2 of 2)	6-46.2
6-16.3	Input Drive Quill Wear Sleeve Replacement	6-46.3
6-17	Work Aid - Main Input Drive Quill Installation	6-47
6-18	Damage Limits - Tail Rotor Drive Quill	6-50
6-19	Tail Rotor Drive Quill Assembly	6-53
6-20	Hydraulic Pump and Tachometer Drive Quill Assembly	6-56
6-21	Fan Drive Quill Assembly	6-56
6-22	Work Aid - Quill Installation	6-59
6-23	E M Alternator Drive Quill Assembly	6-62
6-24	Main Rotor Mast Assembly	6-64
6-24.1	Inspection of Buffer and Plates	6-65
6-24.2	Workaid for Mast Buffer	6-66
6-25	Damage Limits - Main Rotor Mast Assembly	6-66.1
6-26	Deformation Limits - Main Rotor Mast	6-69
6-27	Damage Limits - Main Rotor Mast Bearing and Mast Bearing Retaining Plate	6-69
6-28	Transmission Top Case Dimension Check	6-73
6-29	Tail Rotor Driveshaft Installation	6-76
6-30	Tail Rotor Driveshaft Inspection Diagram	6-77
6-31	Tail Rotor Driveshaft Hanger Assembly	6-81

LIST OF ILLUSTRATIONS (CON'T)

NUMBER	TITLE	PAGE
6-32	Coupling Teeth Wear Patterns	6-82
6-33	Work Aid – Driveshaft Hanger Support Alignment	6-85
6-34	Intermediate Gearbox Installation	6-87
6-35	Intermediate Gearbox Quill, Seals, and Couplings (Typical)	6-88
6-35.1	Intermediate and Tail Rotor Gearbox Troubleshooting Chart	6-90.2
6-36	Damage Limits – Intermediate Gearbox	6-91
6-37	Oil Filler Cap Assembly	6-99
6-38	Tail Rotor Drive Gearbox Installation	6-103
6-39	Tail Rotor Drive Gearbox Assembly	6-105
6-40	Tail Rotor Drive Gearbox Input Quill	6-106
6-41	Damage Limits – Tail Rotor Drive Gearbox	6-108
6-42	Roller Bearing Wear Patterns	6-115
6-43	Tail Rotor Drive Gearbox Gear Patterns	6-116
6-44	Tool Application – Removal/Installation of Tail Rotor Drive Gearbox Input Quill Retainer Bolt	6-119
6-45	Tool Application – Removal/Installation of Tail Rotor Drive Gearbox Input Quill Retainer Nut	6-120
6-45.1	Driveshaft/Spherical Couplings	6-120.2
6-45.2	Coupling Inspection	6-120.2
6-46	Transmission Oil System Schematic (Typical)	6-126
6-47	Transmission Oil System Installation	6-127
6-48	Transmission Oil Pump	6-129
6-49	Transmission Oil Pump – Test Setup	6-131
6-50	Transmission Oil Cooler Installation	6-132
6-50.1	Oil Cooler Cleaning Schematic	6-132.2
6-51	Oil Cooler Automatic Emergency Bypass Valve Assembly	6-135
6-52	Damage Limits – Inlet Fitting	6-137
6-53	Damage Limits – Return Bypass Fitting	6-138
6-54	Damage Limits – Inlet Bypass Piston	6-139
6-55	Damage Limits – Piston	6-140

LIST OF ILLUSTRATIONS (CONT)

NUMBER	TITLE	PAGE
6-56	Damage Limits – Nozzles	6-141
6-57	Damage Limits – Sleeve	6-142
6-58	Damage Limits – Universal Fitting Bolt and Elbow	6-143
6-59	Damage Limits – Housing Assembly	6-144
6-60	Damage Limits – Plunger	6-146
6-61	Damage Limits – Elbow Fitting	6-147
6-62	Fittings – Repair	6-148
6-63	Nozzles – Repair	6-149
6-64	Plunger – Repair	6-149
6-65	Work Aid Application – Plunger and Piston	6-150
6-66	Oil Cooler Automatic Emergency Bypass Valve – Bench Test Schematic	6-151
6-67	Transmission External Oil Filter Installation (Typical)	6-153
6-67.1	Transmission External Oil Filter Installation (After Incorporation of MWO 1-1520-236-50-30)	6-154.3
6-67.2	Transmission External Oil Filter (After Incorporation of MWO 1-1520-236-50-30)	6-154.4
6-68	Transmission Oil Filter (Primary) Assembly	6-155
6-69	Transmission Oil Manifold Installation	6-158
6-70	Transmission Oil Pressure Relief Valve Assembly	6-159
7-1	P Hydraulic System	7-3
7-2	P Emergency (Electric Motor Driven) Hydraulic System	7-8
7-3	Dual Hydraulic Servo Cylinders Installation	7-9
7-4	Hydraulic Reservoirs	7-28
7-5	P Hydraulic Reservoir – Emergency System	7-29
7-6	Hydraulic Reservoir Assembly	7-31
7-7	Emergency Electric Motor Driven Hydraulic Pump Installation	7-37
7-8	Filter Element Installation	7-41
7-9	Non-Cleanable Filter Elements	7-42
7-10	P Accumulator and Lockout Valve Installation	7-43
7-11	Work Aid for Dual Hydraulic Cylinder Removal and Installation	7-46
7-12	Dual Hydraulic Cylinder	7-47
7-13	Tool Application – Cylinder Assembly Torque Fixture, Part Numbers T41000310-1 and T100619-2	7-49
7-14	Damage Limits for Hydraulic Cylinder Bearing Housing	7-52
7-15	Dual Hydraulic Cylinder Assembly (Typical)	7-53
7-16	Flight Control Hydraulic Cylinder and Servo Actuator Valve	7-55
7-17	P Dual Hydraulic Cylinder Valve Connections	7-59
7-18	Dual Hydraulic Cylinders to Swashplate and Collective Lever Installation	7-61
7-19	Dual Hydraulic Cylinder Servo Valve Installation	7-62
7-20	(SCAS) Servo Actuator Assembly	7-63
7-21	Tail Rotor Control Cylinder and Support Installation	7-66
7-22	Tail Rotor Control Cylinder and Support Assembly	7-67
7-22.1	Hydraulic Servocylinder, Part No. 1660 Series (Typical), Exploded View	7-68.4

LIST OF ILLUSTRATIONS (CONT)

NUMBER	TITLE	PAGE
7-22.2	Hydraulic Servocylinder, Part No. 1660 Series (Typical), Exploded View	7-68.6
7-23	Solenoid Valve P/N 204-076-504-3 Installation	7-73
7-24	Solenoid Valve P/N 204-076-504-3 FSCM 94641 P/N 1-U-1025-63 Assembly	7-75
7-25	Functional Test Setup for Solenoid Valve P/N 204-076-504-3 FSCM 94641 P/N 1-U-1025-63	7-80
7-26	Flow Diagram for Solenoid Valve P/N 204-076-504-3 FSCM 94641 P/N 1-U-1025-63 .	7-81
7-27	Pressure Drop Test Setup for Solenoid Valve P/N 204-076-504-3 FSCM 94641 P/N 1-U-1025-63	7-81
7-28	Solenoid Valves (SCAS System) - Installation	7-84
7-29	P Solenoid Valve P/N 7U7464 Installation	7-92
7-30	P Solenoid Valve P/N 7U7464 Assembly	7-95
7-31	P Functional Test Setup for Solenoid Valve P/N 7U7464	7-98
7-32	P Flow Diagram for Solenoid Valve P/N 7U7464	7-98
7-33	P Pressure Drop Test Setup for Solenoid Valve P/N 7U7464	7-98
7-34	Servo Actuator (Electrohydraulic) - Wing Pylon Armament	7-102
7-35	Work Aid for Wing Pylon Armament Servo Actuator Disassembly Assembly	7-104
7-36	Work Aid for Seal Installation on Wing Pylon Armament Servo Actuator	7-105
7-37	Sheet for Recording Test Data for Wing Pylon Armament Servo Actuator	7-107
7-38	Schematic Diagram Wing Pylon Armament Servo Actuator Connections for Bench Test .	7-108
7-39	Tool Application Wing Pylon Armament Servo Actuator Test Fixture	7-109
7-40	E M Hydraulic System	7-111
7-41	E M Emergency (Electric) Motor Driven Hydraulic System	7-117
7-42	E M Solenoid Valves P/N 204-076-504-3 Installation	7-144
7-43	E M Solenoid Valves (SCAS System) - Installation	7-149
8-1	P E Instrument System Equipment Location	8-2
8-2	Pitot - Static System	8-26.3
8-2.1	Connection for Pitot Leak Check (Typical)	8-26.4
8-2.2	Connection for Static Leak Check (Typical)	8-26.5
8-3	Test Circuit Setup for Fuel Tank Unit Capacitance and Resistance Tests	8-42
8-4	Test Circuit Setup for Fuel Quantity indicator Bench Test	8-43
8-5	Circuit Arrangement and Adapter Cable for Fuel Quantity Adjustment Procedures on . . . Installed System	8-44
8-5.1	Fuel Quantity Test Set P/N PSD60 - 1AF	8-44.4
8-5.2	Fuel Quantity "T" Cable P/N PSDAF - 537	8-44.5
8-5.3	Fuel Quantity Calibration Worksheet	8-44.6
8-6	Volt-Ammeter Test Set-up	8-49
9-1	P Simplified Electrical Wiring Schematic	9-2
9-2	E M Simplified Electrical Bus Wiring Schematic	9-3
9-3	P Electrical Equipment Location Forward Section	9-4
9-4	P Electrical Equipment Location Pilot Section	9-6

LIST OF ILLUSTRATIONS (CON'T)

NUMBER	TITLE	PAGE
8-5	P Electrical Equipment Location Gunner Section	9-8
9-6	E Electrical Equipment Location Aft Section	9-10
9-7	E Electrical Equipment Locaton Forward Section	9-13
9-8	E Electrical Equipment Location Pilot Section	9-13
9-9	E Electrical Equipment Location Gunner Section	9-18
9-10	E Electrical Equipment Location Aft Section	9-20
9-11	Environmental Connector Test Adapter	9-23
9-12	P Stanby Inverter Adjustment	9-66
9-13	P Pilot Caution Panel	9-80.1
9-14	E Pilot Caution Panel	9-80.1
9-14.1	Deleted	
9-15	M Pilot Caution Panel	9-81
9-15.1	Deleted	
9-16	P Gunner Caution Panel	9-82.1
9-17	E Gunner Caution Panel	9-82.1
9-17.1	Deleted	
9-17.2	Pilots Caution Panel Assembly	9-88.7
9-17.3	Pilots Caution Panel Subassembly	9-88.8
9-17.4	Housing Subassembly	9-88.11
9-17.5	Cover Assembly	9-88.11
9-17.6	Indicating Light Circuit Card	9-88.12
9-17.7	Contact Assembly	9-88.16
8-17.8	Polarizing Keys Lotion	9-88.17
9-17.9	Removal of Finish for Electrical Bonding	9-88.19

LIST OF ILLUSTRATIONS (CON'T)

NUMBER	TITLE	PAGE
9-17.10	Position of Contacts in Latch Base....	9-88.23
9-17.11	Gunners Caution Panel Schematic Diagram	9-88.25
9-17.12	Gunners Caution Panel.	9-88.32
9-17.13	Gunners Caution Panel Wiring Connections	9-88.35
9-18	Bench Test Set-Up for RPM Limits Warning Detector	9-93
9-19	P Amment Equipment Location	9-128
9-20	P TOWMissile Launcher Positions	9-131
9-21	P Wing Stores Armament Test Panel	9-139
9-22	P Wing Stores Armament Test Panel Schematic	9-140
9-23	F Armament Equipment Location	9-155
9-24	F TOW Missile Launcher Positions	9-164
9-25	E DU Digital Display Test	9-173
9-26	E LRUFault Identification and Location Test	9-173
9-27	F XM18 Minigun Circuitry Test Panel	9-175
9-28	F Wing Stores Circuitry Test Panel	9-180
9-29	M TOWMissile Launcher Positions	9-195
9-30	M DUDigital Display Test	9-204
9-31	M LRUFault Identification and Location Test	9-204
9-32	M XM18 Minigun Circuitry Test Panel	9-206
9-33	M Wing Stores Circuitry Test Panel	9-211
10-1	Fuel Systems Schematic	10-3
10-2	Fuel System.	10-4
10-3	Fuel Shutoff Valve	10-9
10-4	Fuel Boost Pump	10-12.1
10-4.1	Fuel Boost Pump Cartridge	10-12.2
10-4.2	Work Aid for Fuel Pump Cartridge Removal	10-12.3
10-5	Collapsing Forward Fuel Cell	10-22
10-6	Installed Forward Fuel Cell	10-24
10-7	Collapsing Aft Fuel Cell	10-26
11-1	Collective Controls,	11-4
11-2	Pilot Collective Stick Installation	11-8
11-3	Pilot Collective Stick Assembly.	11-9
11-4	Bearing Installation- Pilot Throttle Grip	11-14
11-5	Friction Lining Repair	11-16
11-6	Throttle Lever Bearing Installation	11-17
11-7	Collective Friction Tube Repairs.	11-18
11-8	Pilot Collective Stick Adjustments.	11-20
11-9	Gunner Collective Stick Installation	11-22
11-10	Gunner Collective Stick - Assembly	11-25
11-11	Gunner Collective Stick Adjustment	11-27
11-12	Force-And-Aft Cyclic Controls	11-30
11-13	Lateral Cyclic Controls	11-32
11-14	Work Aid for Rigging Swashplate	11-34

LIST OF ILLUSTRATIONS (CON'T)

NUMBER	TITLE	PAGE
11-15	Swashplate Rigging Dimensions.	11-35
11-16	Pilot Cyclic Stick Installation	11-36
11-17	Pilot Cyclic Stick Assembly.. . . .	11-40
11-18	Collar and Bushing Installation.	11-42
11-19	Pilot Cyclic Stick Friction Adjustment	11-44
11-20	Gunner Cyclic Stick Installation	11-46
11-21	Gunner Cyclic Stick Assembly.	11-48
11-22	Fore-And-Aft Cyclic Jackshaft Installation	11-51
11-23	Force Gradient Assembly	11-56.1
11-24	Tail Rotor Controls.	11-57
11-25	Tail Rotor Pedal Installation.	11-62
11-26	P Stability and Control Augmentation System (SCAB)	11-70
11-27	E M Stability and Control Augmentation System (SCAS)	11-71
11-27.1	SCAS Transducer Calibration	11-74.2
11-28	Elevator Control System	11-76
11-29	Elevator Installation.	11-79
11-30	Damage Limits - Fixed Length Flight Control Tubes and Links (Typical)	11-82
11-31	Control System Linkage Installation	11-85
11-32	Damage Limits - Anti-Torque System	11-95
11-33	Damage Limits - Elevator Control System	11-102
11-34	Damage Limits - Collective Control System	11-104
11-35	Damage Limits -Cyclic Control System	11-110
11-36	Flight Control System Bearings	11-118
11-37	Lateral Cyclic and Collective Controls Power Cylinder Support Installation	11-119
11-38	Fore-And-Aft Cyclic Controls Power Cylinder Support Installation.	11-120
11-39	Damage Limits- Power Cylinder Supports	11-121
12-1	Engine Fire Detection System.	12-3
12-2	Low G Warning System	12-5
12-3	Low G Warning Assembly 8A10.	12-9
12-4	Accelerometer 8A11	12-10
12-5	Low G Warning Light/Switch 8DS25	12-12
12-6	Converter 8M1	12-13
13-1	Environmental Control System	13-3
13-2	Environmental Control Unit.	13-5
13-3	Environmental Control System Schematic	13-7
13-4	Temperature Control Valve.. . . .	13-8
13-5	Temperature Control Valve Schematic	13-9
13-6	ECU Cooling Turbine	13-12
13-6.1	ECU Cooling Turbine Lubrication	13-12.1
13-7	Pressure Regulator and Shutoff Valve.	13-14
13-8	Pressure Regulator and Shutoff Valve Schematic	13-16
13-9	Blower Impeller Assembly	13-18
13-10	Vent Air Control Valve - Installation	13-21
13-11	Vent Air Control Valve	13-22
13-12	Vent Air Control Valve Test Set-Up	13-24
13-13	Rain Removal Manifold	13-28
13-14	Rain Removal Thermal Switch-Installation	13-30
13-15	Rain Removal Nozzle and Cleared Air Pattern	13-31
13-16	Rain Removal Valve	13-34
13-17	Limits Chart - Air Distribution Valve	13-36
13-18	Tool Application -Teflon Lip Seal Installation	13-38
16-1	E M Turret Installation	16-4
16-2	Special Tools for Ejector Racks.	16-12

NUMBER	TITLE	PAGE
16-3	Outboard Ejector Rack Installation	16-21
16-4	Ejector Rack Alignment	16-24
16-5	Outboard Ejector Rack Assembly	16-27
16-6	Inboard Ejector Rack Installation	16-32
16-6.1	Contact Protusion Inside Breech	16-32.1
16-6.2	Wiring Harness Assembly	16-32.2
16-7	Inboard Ejector Rack Assembly	16-34
16-8	Wing Stores Pylon and Fairings	16-35
17-1	Canopy Removal System	17-2
17-2	Damage Limits - Linear Shaped Charge Assembly	17-4
C-1	Inventory Item List	C-3
F-1	Wiring Identification Chart	F-5
F-1.1	Symbols Chart	F-6
F-1.2	P Altimeter Vibrator System Wiring Diagram	F-45
F-2	P External Power System Wiring Diagram	F-47
F-3	P Starter System Wiring Diagram	F-49
F-4	P Ignition System Wiring Diagram	F-50
F-5	P Anticollision and Position Lights System Wiring Diagram	F-51
F-6	P Searchlight System Wiring Diagram	F-52
F-7	P Engine De-Ice System Wiring Diagram	F-53
F-8	P Fuel Valve and Oil Valve System Wiring Diagram	F-54
F-9	P Fuel Boost System Wiring Diagram	F-55
F-10	P Governor Control System Wiring System	F-56
F-11	P Idle Stop System Wiring Diagram	F-57
F-12	P Force Trim System Wiring Diagram	F-58
F-13	P Environmental Control System Wiring Diagram	F-59
F-14	P Pitot Heater System Wiring Diagram	F-60
F-15	P TOW Blower Cooling System Wiring Diagram	F-61
F-16	P Attitude Indicating System Wiring Diagram	F-63
F-17	P FUEL Quantity Indicating System Wiring Diagram	F-64
F-17.1	P Turn and Slip Indicating System Wiring Diagram	F-65
F-18	P Radio Blower Cooling System Wiring Diagram	F-65
F-18.1	P Armament Relay Location	F-66
F-19	E AC Electrical Load Chart	F-67
F-20	E Altimeter Vibrator System Wiring Diagram	F-83
F-21	E External Power System Wiring Diagram	F-85
F-22	E Starter System Wiring Diagram	F-87
F-23	E Searchlight System Wiring Diagram	F-89
F-24	E Engine De-Ice System Wiring Diagram	F-90
F-25	E Fuel Valve and Engine Oil Valve System Wiring Diagram	F-91
F-26	E Fuel Boost System Wiring Diagram	F-92
F-27	E Governor Control System Wiring Diagram	F-93
F-28	E Idle Stop System Wiring Diagram	F-94
F-29	E Force Trim System Wiring Diagram	F-95
F-30	E Environmental Control System Wiring Diagram	F-97
F-31	E Pitot Heater System Wiring Diagram	F-98
F-32	E TOW Blower Cooling System Wiring Diagram	F-99
F-33	E Radio Blower Cooling System Wiring Diagram	F-100
F-34	E Attitude Indicating System Wiring Diagram	F-101
F-35	E Fuel Quantity Indicating System Wiring Diagram	F-102
F-36	E Tachometer Indicating System Wiring Diagram	F-103
F-36.1	E Centrisep Particle Separator Wiring Diagram (After Incorporation of MWO 55-1520-236-50-12)	F-104
F-37	E Turn and Slip Indicating System Wiring Diagram	F-105

LIST OF ILLUSTRATIONS (CONT)

NUMBER	TITLE	PAGE
F-38	E Electrical Equipment Component Replacement Wiring Diagram	F-106
F-38.1	E Armament Relay Location	F-106.1
F-39	M AC Electrical Load Chart	F-108
F-40	M DC Electrical Load Chart	F-109
F-41	M Tachometer Indicating System	F-110
F-42	M Pressure Indicating Systems	F-121
F-43	M Temperature Indicating Systems	F-131
F-44	M Attitude Indicating System (Equipment Location)	F-141
F-45	M Turn and Slip Indicating System	F-147
F-46	M Fuel Quantity Indicating System	F-151
F-47	M Altimeter Vibrator System	F-160
F-48	M DCGenerator Power System (Equipment Location)	F-167
F-49	M Battery System (Equipment Location)	F-177
F-50	M External Power Provisions	F-184
F-51	M DC Power Distribution and Interconnect Logic (Equipment Location)	F-189
F-52	M AC Power System (Equipment Location)	F-197
F-53	M Starter System.	F-207
F-54	M Ignition System	F-213
F-55	M Interior Lights System (Equipment Location)	F-221
F-56	M Caution Lights System (Equipment Location)	F-235
F-57	M RPM Limit Warning System [Equipment Location)	F-259
F-58	M Position Lights System	F-269
F-59	M Anticollision Light System	F-276
F-60	M Searchlight System.	F-279
F-61	M Engine De-Ice System	F-284
F-62	M Fuel Valve and Engine Oil Bypass Valve Systems	F-292
F-63	M Fuel Boost System	F-300
F-64	M Governor Control System	F-307
F-65	M Idle Stop System	F-316
F-66	M Force Trim System	F-322
F-67	M Hydraulic Control System (Equipment Location)	F-331
F-68	M Environmental Control System	F-341
F-69	M Pitot Heater System	F-350
F-70	M TOW Blower Cooling System	F-354
F-71	M Radio Blower Cooling System	F-361
F-71.1	M Centrisep Particle Separator Wiring Diagram (After Incorporation of MWO 55-1520-236-50-12)	F-366.1
F-72	M Universal Turret Subsystem (Equipment Location)	F-367
F-73	M TWMissile Armament Subsystem (Equipment Location)	F-383
F-74	M Fire Control System (Equipment Location)	F-399
F-75	M Wing Stores Armament Subsystem (Equipment Location)	F-413
F-76	M Electrical Equipment Component Replacement	F-425
F-77	M Electrical Equipment Component Replacement (After MWO 55-1520-236-50-4) . . .	F-466
F-78	MCN C-NITE Subsystem (Equipment Location)	F-469
F-79	MCN C-NITE Electrical Equipment Component Replacement.	F-471
F-80	MCN FLIR Subsystem Jumper Cable Assemblies	F-472
FO-1	P Hydraulic System Schematic	FO-1
FO-2	E M Hydraulic System Schematic	FO-2
FO-3	Balancer and Strobex Description	FO-3
FO-4	P AC Electrical Load Chart	FO-4
FO-5	P AC Electrical Load Chart	FO-5
FO-6	P AC Electrical Load Chart	FO-6

LIST OF ILLUSTRATIONS (CON'T)

NUMBER	TITLE	PAGE
FO-7	P AC Electrical Load Chart	FO-7
FO-8	P DC Electrical Load Chart	FO-8
FO-9	P DC Electrical Load Chart	FO-9
FO-10	P DC Electrical Load Chart	FO-10
FO-11	P DC Electrical Load Chart	FO-11
FO-12	P DC Electrical Load Chart	FO-12
FO-13	P DC Electrical Load Chart	FO-13
FO-14	P DC Electrical Load Chart	FO-14
FO-15	P DC Electrical Load Chart	FO-15
FO-16	P DC Electrical Load Chart	FO-16
FO-17	P Battery System	FO-17

LIST OF ILLUSTRATIONS (CON'T)

NUMBER	TITLE	PAGE
FO-18	P Generator and DC Bus System	FO-18
FO-19	P AC Power Supply	FO-19
FO-20	P Interior Lights Sysem	FO-20
FO-21	P Interior Lights System	FO-21
FO-21.1	P Interior Lights System	FO-21.1
FO-22	P Interior Lights System	FO-22
FO-22.1	P Interior Lights System	FO-22.1
FO-23	P Caution Lights System	FO-23
FO-24	P Caution Lights System	FO-24
FO-25	P RPM Limit Warning System	FO-25
FO-26	P Hydraulic Control System	FO-26
FO-27	P Armament Turret System	FO-27
FO-28	P Armament Turret System	FO-28
FO-29	P Armament Turret System	FO-29
FO-30	P Armament Wing Stores System	FO-30
FO-31	P Armament Wing Stores System	FO-31
FO-32	P Armament Wing Stores System	FO-32
FO-33	P Armament TOW Missile Wiring Diagram	FO-33
FO-34	P Armament TOW Missile Wiring Diagram	FO-34
FO-35	P Armament TOW Missile Wiring Diagram	FO-35
FO-36	P Armament TOW Missile Wiring Diagram	FO-36
FO-37	P Pressure Indicating System	FO-37
FO-38	P Tachtiometer Indicating Systems	FO-38
FO-39	P Temperature Indicating Systems	FO-39
FO-40	P RPM Limit Warning Test Set Schematic	FO-40
FO-41	E AC Electrical Load Chart	FO-41
FO-42	E DC Electrical Load Chart	FO-42
FO-43	E DC Electrical Load Chart	FO-43
FO-44	E Battery System	FO-44
FO-45	E DC Generator Power System	FO-45
FO-46	E DC Power Distribution and Interconnect Logic.	FO-46
FO-47	E DC Power Distribution and Interconnect Logic.	FO-47
FO-48	E AC Power System	FO-48
FO-49	E Ignition System	FO-49

LIST OF ILLUSTRATIONS (CON'T)

NUMBER	TITLE	PAGE
FO-50	E Interior Lights System	FO-50
FO-50.1	E Interior Lights System	FO-50.1
FO-51	E Interior Lights System	FO-51
FO-51.1	E Interior Lights System	FO-51.1
FO-52	E Interior Lights System	FO-52
FO-53	E Caution Lights System	FO-53
FO-54	E Caution Lights Lights System	FO-54
FO-54.1	E Caution Lights System (After Incorporation of MWO 1-1520-236-50-30)	FO-54.1
FO-54.2	E Caution Lights System (After Incorporation of MWO 1-1520-236-50-30)	FO-54.2
FO-54.3	E Caution Lights System (After Incorporation of MWO 1-1520-236-50-30)	FO-54.3
FO-54.4	E Caution Lights System (After Incorporation of MWO 1-1520-236-50-30)	FO-54.4
FO-55	E RPM Limit Warning System	FO-55
FO-56	E Anticollision and Position Lights System	FO-56
FO-57	E Hydraulic Control System	FO-57
FO-58	E Turret System	FO-58
FO-59	E Turret System	FO-59
FO-60	E Turret System	FO-60
FO-61	E Turret System	FO-61
FO-62	E Turret System	FO-62
FO-63	E Turret System	FO-63
FO-64	E Turret System	FO-64
FO-65	E Wing Stores System	FO-65
FO-66	E Wing Stores System	FO-66
FO-67	E Wing Stores System	FO-67
FO-68	E TOW Missile System	FO-68
FO-69	E TOW Missile System	FO-69
FO-70	E TOW Missile System	FO-70
FO-71	E TOW Missile System	FO-71
FO-72	E TOW Missile System	FO-72
FO-73	E TOW Missile System	FO-73
FO-74	E TOW Missile System	FO-74
FO-75	E TOW Missile System	FO-75
FO-76	E TOW Missile System	FO-76
FO-77	E TOW Missile System	FO-77

LIST OF ILLUSTRATIONS (CON'T)

NUMBER	TITLE	F
FO-78	E Pressure Indicating System	FO-78
FO-79	E Temperature Indicating System	FO-79
FO-80	E Electrical Equipment Component Replacement	FO-80
FO-81	E Electrical Equipment Component Replacement	FO-81
FO-81.1	E Electrical Equipment Component Replacement	FO-81.1
FO-82	E Electrical Equipment Component Replacement	FO-82
FO-83	E Electrical Equipment Component Replacement	FO-83
FO-84	E Electrical Equipment Component Replacement	FO-84
FO-85	E Electrical Equipment Component Replacement	FO-85
FO-86	E Electrical Equipment Component Replacement	FO-86
FO-87	E Electrical Equipment Component Replacement	FO-87
FO-88	E Electrical Equipment Component Replacement	FO-88
FO-89	E Electrical Equipment Component Replacement	FO-89
FO-90	E Electrical Equipment Component Replacement	FO-90
FO-91	M Pressure Indicating System	FO-91
FO-92	M Temperature Indicating Systems	FO-92
FO-93	M Attitude Indicating System	FO-93
FO-94	M DC Generator Power System	FO-94
FO-95	M Battery System	FO-95
FO-96	M DC Power Distribution and Interconnect Logic	FO-96
FO-97	M DC Power Distribution and Interconnect Logic	FO-97
FO-98	M AC Power System	FO-98
FO-99	M Ignition System	FO-99
FO-100	M Interior Lights System	FO-100
FO-100.1	M Interior Lights System	FO-100.1
FO-101	M Interior Lights System	FO-101
FO-101.1	M Interior Lights System	FO-101.1
FO-102	M Interior Lights System	FO-102
FO-102.1	M Interior Lights System	FO-102.1
FO-103	M Interior Lights System	FO-103
FO-104	M Caution Lights System	FO-104
FO-105	M Caution Lights System	FO-105
FO-106	M RPM Limit Warning System	FO-106
FO-107	M RPM Limit Warning Test Set Schematic	FO-107
FO-108	M Hydraulic Control System	FO-108
FO-109	M Universal Turret Subsystem	FO-109
FO-110	M Universal Turret Subsystem	FO-110

LIST OF ILLUSTRATIONS (CON'T)

NUMBER	TITLE	PAGE
FO-111	M Universal Turret Subsystem	FO-111
FO-112	M Universal Turret Subsystem	FO-112
FO-113	M Universal Turret Subsystem	FO-113
FO-114	M Universal Turret Subsystem	FO-114
FO-115	M Universal Turret Subsystem	FO-115
FO-116	M Universal Turret Subsystem	FO-116
FO-117	M Universal Turret Subsystem	FO-117
FO-118	M Universal Turret Subsystem	FO-118
FO-119	M TOW Missile Armament Subsystem	FO-119
FO-120	M TOW Missile Armament Subsystem	FO-120
FO-121	M TOW Missile Armament Subsystem	FO-121
FO-122	M TOW Missile Armament Subsystem	FO-122
FO-123	M TOW Missile Armament Subsystem	FO-123
FO-124	M TOW Missile Armament Subsystem	FO-124
FO-125	M TOW Missile Armament Subsystem	FO-125
FO-126	M TOW Missile Armament Subsystem	FO-126
FO-127	M TOW Missile Armament Subsystem	FO-127
FO-128	M TOW Missile Armament Subsystem	FO-128
FO-129	M TOW Missile Armament Subsystem	FO-129
FO-130	M Fire Control System	FO-130
FO-131	M Fire Control System	FO-131
FO-132	M Fire Control System	FO-132
FO-133	M Fire Control System	FO-133
FO-134	M Wing Stores Armament Subsystem	FO-134
FO-135	M Wing Stores Armament Subsystem	FO-135
FO-136	M Wing Stores Armament Subsystem	FO-136
FO-137	M Electrical Equipment Component Replacement	FO-137
FO-138	M Electrical Equipment Component Replacement	FO-138
FO-139	M Electrical Equipment Component Replacement	FO-139
FO-140	M Electrical Equipment Component Replacement	FO-140
FO-141	M Electrical Equipment Component Replacement	FO-141
FO-142	M Electrical Equipment Component Replacement	FO-142
FO-143	M C N TOW Missile Armament Subsystem	FO-143
FO-144	M C N Fire Control System	FO-199
FO-145	E M Low G Warning System	FO-211
FO-146	M AIM-1/EXL Laser Gunsight System	FO-213
FO-147	M GPS Trimpack System	FO-215

LIST OF TABLES

NUMBER	TITLE	PAGE
1-1	Engine Fuel Specifications	1-3
1-2	Approved Fuels	1-4
1-3	Consumable Maintenance Supplies and Materials	1-10.1
1-4	Special Tools and Test Equipment	1-19
1-5	Support Equipment	1-24.1
1-6	Root Mean Square/Abrasive Grit Equivalency	1-24.1
1-7	Deleted	
1-8	Deleted	
1-9	Deleted	
1-10	Deleted	
1-11	Adhesive Mix Ratio, Pot Life, and Cure Cycles	1-24.2
1-11.1	Mooring Hardware Chart	1-54.1
1-12	Flight Safety Parts	1-89
2-1	Main Beam Panels (Structural)	2-13
2-2	Structural Repair Materials	2-17
2-3	Forward Fuselage - Classification of Damage	2-26
2-4	Tailboom - Classification of Damage	2-69
2-5	Wing - Classification of Damage	2-248
4-1	Repair Methods - IR Suppression System (AVIM)	4-43
4-1.1	IR Suppressor Damage and Repair Limits (Non Structural Area)	4-44.4
4-1.2	IR Suppressor Damage and Repair Limits (Major Structural Elements Only)	4-44.8
4-2	Troubleshooting Engine Oil System	4-51
4-2.1	Oil Debris Classification Chart	4-54.5
4-3	Dimension Tolerance - Turbine Fan	4-67
5-1	Difference Between Models	5-34
5-1.1	Classification of Damage - K747 Main Rotor Blades	5-45
5-1.2	Classification of Damage - K747 Main Rotor Blades	5-49
5-2	Plug Patch Data	5-58
5-3	Troubleshooting - Tail Rotor System	5-140
5-4	Troubleshooting the VIBREX 4591 System with the VIBREX Tester, Model 11	5-218
6-1	Troubleshooting - Drive Train System	6-2
6-1.1	Oil Debris Classification Chart (Aircraft without ODDS)	6-6.2
6-1.2	Oil Debris Classification Chart (Aircraft with ODDS)	6-6.4
6-2	Gearbox Oil Debris Classification	6-90.1
6-3	Troubleshooting - Transmission Oil System	6-122
7-1	Maximum Allowable Leakage for Hydraulic System	7-11
7-2	P Emergency Hydraulic System Operational Switching Sequence	7-15
7-3	P Troubleshooting of Hydraulic System	7-20
7-4	Torque Values for Fluid Connections	7-34
7-4.1	Inspection Criteria	7-68.3
7-4.2	Troubleshooting Chart	7-68.6
7-4.3	Leading Particulars (T/R Control Cylinder)	7-68.7
7-5	Leading Particulars for Solenoid Valve P/N 204-076-504-3 FSCM 94641 (1-U-1025-63)	7-71

LIST OF TABLES (CON'T)

NUMBER	TITLE	PAGE
7-6	Non-Destructive Test Requirements for solenoid Valve P/N 204-076-504-3 FSCM 94641 P/N 1-U-1025-63 (AVIM)	7-76
7-7	Diametrical Clearance Requirements for Solenoid Valve P/N 204-076-504-3 FSCM 94641 P/N 1-U-1025-63 (AVIM)	7-77
7-8	Troubleshooting During Testing Solenoid Valve P/N 204-076-504-3 FSCM 94641 P/N 1-U-1025-63 (AVIM)	7-79
7-9	P Non-Destructive Test Requirements for Solenoid Valve P/N 7U7464 (AVIM)	7-94
7-10	P Diametrical Clearance Requirements for Solenoid Valve P/N 7U7464 (AVIM)	7-95
7-11	Troubleshooting During Testing of Solenoid Valve P/N 7U7464 (AVIM)	7-97
7-12	E M Emergency Hydraulic System Operational Switching Sequence	7-122
7-13	E M Troubleshooting Hydraulic System	7-125
7-14	Leading Particulars for Solenoid Valve P/N 204-076-504-3 FSCM 94641 P/N 1-U-1025-63	7-142
8-1	Troubleshooting -Tachometer Ind&tingSystem	8-8
8-2	Troubleshooting - Engine and Transmission Oil Temperature and Pressure indicating System	8-14
8-3	Troubleshooting - Turbine Gas Temperature Indicating System	8-20
8-4	Troubleshooting - Torque Pressure Indicating System	8-22
8-4.1	Tolerance - ($\pm$ Knots).	8-26
8-4.2	Vertial Speed Tolerance Scale Accuracy	8-26.1
8-4.3	Altimeter Scale Error	8-26.1
8-5	Troubleshooting - Airspeed Indicators	8-29
8-6	Troubleshooting - Altimeters	8-30
8-7	Troubleshooting - Attitude Indicators	8-32
8-8	Troubleshooting -Vertical Speed Indicators	8-34
8-9	Troubleshooting- Free Air Temperature Gage	8-38
8-10	Troubleshooting -Fuel Quantity indicating System	8-39
8-11	Fuel Tank Table of Limits	8-43
8-12	Troubleshooting - Voltmeter/Ammeter	8-48
8-13	P E Troubleshooting - Pilots Steering Indicator (PSI)	8-51
9-1	Troubleshooting - Battety System.	9-29
9-2	Troubleshooting - External Power System	9-34
9-3	P Troubleshooting - Generator and DC Bus System	9-37
9-4	P M Troubleshooting - DC Generator Power System	9-41
9-4.1	Voltage Regulator Adjustment Settings	9-44.2
9-5	P M Troubleshooting - TRU Power System	9-46
9-6	P M DC Power Distribution and Interconnect Logic Chart	9-49
9-7	P M Troubleshooting - DC Power Distribution and Interconnect Logic	9-50
9-8	P Troubleshooting - Inverter System	9-58
9-9	P M Troubleshooting - AC Power System	9-62
9-10	Troubleshooting -Starting System	9-74

LIST OF TABLES (CON'T)

NUMBER	TITLE	PAGE
9-11	Troubleshooting - Ignition System	9-75
9-12	Troubleshooting - Cockpit Lights	9-77
9-12.1	Dimmer Control input/Output Voltages	9-78.1
9-13	Troubleshooting -Console, Engine, Flight, and Tactical instrument Lights	9-79
9-14	Pilots Caution Panel Lights	9-83
9-15	Gunners Caution Panel Lights	9-83
9-15.1	Troubleshooting Pilots Caution Panel	9-88.2
9-15.2	Pilots Caution Panel Wiring Chart	9-88.21
9-15.3	Gunners Caution Panel Fault Inputs	9-88.27
9-15.4	Troubleshooting - Gunners Caution Panel	9-88.28
9-15.5	Gunners Caution Panel Wiring Chad	9-88.36
9-16	Troubleshooting - RPM Limit Warning System	9-91
9-16.1	Troubleshooting - Skid Landing Light System	9-94.1
9-16.2	Troubleshooting - ODDS	9-94.3
9-17	Troubleshooting - Position Lights System	9-95
9-18	Troubleshooting - Anticollision Light	9-98
9-19	Troubleshooting - Searchlight System	9-100
9-20	Troubleshooting - Transmission Oil Level Light	9-102
9-21	Troubleshooting - Engine De-Icing Circuitry	9-103
9-22	Troubleshooting -Engine Oil Bypass valve Circuitry	9-105
8-23	Troubleshooting -Fuel Valve Circuitry	9-106
9-24	Troubleshooting - Fuel Boost Pumps Circuitry	9-107
8-25	Troubleshooting - Governor Control Circuitry	9-108
9-26	Troubleshooting - Idle Stop Solenoid System Circuitry	9-110
9-26.1	E M Troubleshooting Centrisep Particle Separator Circuitry (After Incorporation of MWO 55-1520-236-50-12).	9-110.1
9-27	Troubleshooting - Force Trim System Circuitry	9-111
9-28	Troubleshooting - Hydraulic Control System Circuitry	9-113
9-29	Troubleshooting - Environmental Control System Circuitry	9-115
9-30	Troubleshooting - Pitot Heating System Circuitry	9-117
9-31	Troubleshooting - TOW Blower Cooling System	9-118
9-32	Troubleshooting - Radio Blower Cooling System	9-121
8-32.1	P Relay Matrix, Pilot in Control Mode	9-122.1
9-32.2	P Relay Matrix, Pilot in Fixed Forward Mode	9-122.3
8-32.3	P Relay Matrix, Gunner in Control Mode - HSS Controlling Turret	9-122.5
9-32.4	P Relay Matrix, Gunner in Control Mode - TSU Controlling Turret.	8-122.7
9-32.5	P Relay Matrix, Gunner Controlling TOW and Pilot Controlling Turret and Wing Stores Mode.	9-122.9
8-32.6	P Relay Matrix, TSU Acquisition of Target with Gunner or Pilot HSS Mode	9-122.11
9-32.7	P Relay Matix, Pilot Override Mode.	9-122.13
9-32.8	P Relay Matix, Gunner Jettison Mode	9-122.15

LIST OF TABLES (CON'T)

NUMBER	TITLE	PAGE
9-32.9	P Relay Matrix, Pilot Jettison Mode	9-122.16
9-33	P Wing Stores Jettison Checklist Chart	9-143
9-34	P Troubleshooting - Rocket Launcher Circuitry	9-145
9-35	P Troubleshooting - XM-18 Minigun Circuitry	9-150
9-36	P Troubleshooting - Wing Stores Jettison Circuitry	9-152
9-36.1	E Relay Matrix, Gunner in Control Mode - HSS Controlling Turret	9-156.1
9-36.2	E Relay Matrix, Gunner in Control Mode - TSU Controlling Turret	9-156.3
9-36.3	E Relay Matrix, Gunner Controlling TOW and Pilot Controlling Turret and Wing Stores Mode	9-156.5
9-36.4	E Relay Matrix, Pilot in Control Mode	9-156.7
9-36.5	E Relay Matrix, Pilot Override Mode	9-156.9
9-36.6	E Relay Matrix, TSU Acquisition of Target with Gunner or Pilot HSS Mode	9-156.11
9-36.7	E Relay Matrix, Gunner Jettison Mode	9-156.13
9-36.8	E Relay Matrix, Pilot Jettison Mode	9-156.14
9-37	E XM-18 Minigun Checkout Chart	9-176
9-38	E Troubleshooting - XM-18 Minigun Circuitry	9-177
9-39	E Wing Stores Jettison Checkout Chart	9-181
9-40	E Troubleshooting - Wing Stores Jettison Circuitry	9-183
9-41	M XM-18 Minigun Checkout Chart	9-207
9-42	M Troubleshooting - XM-18 Minigun Circuitry	9-208
9-43	M Wing Stores Jettison Checkout Chart	9-212
9-44	M Troubleshooting - Wing Stores Jettison Circuitry	9-214
10-1	Troubleshooting - Fuel System	10-1
11-1	Troubleshooting - Flight Control System	11-1
12-1	Troubleshooting - Engine Fire Detection System	12-6
12-2	Troubleshooting - Low G Warning System	13-1
13-1	Troubleshooting - ECU	13-32
13-2	Troubleshooting - Rain Removal Valve	16-13
16-1	P Troubleshooting Ejector Racks	16-16
16-2	E M Troubleshooting Ejector Racks	16-39
16-3	M Troubleshooting - AIM-1/EXL Laser Gunsight Subsystem	F-9
F-1	P Equipment List (Electrical)	F-15
F-2	P Equipment List (Armament)	F-19
F-3	E Equipment List (Electrical)	F-26
F-4	E Equipment List (Armament)	F-32
F-5	M Equipment List (Electrical)	F-39
F-6	M Equipment List (Armament)	

PREFACE

P-1. GENERAL.

a. This manual is the official document for Aviation Unit and Intermediate Maintenance of Army Model AH-1P/E/F Helicopters. Refer to the following for serial number effectivity.

1. AH-1P (Production).
(Coded **P**)
76-22567 through 76-22610
76-22692 through 76-22713
77-22729 through 77-22762
2. AH-1E (Enhanced Cobra Armament System)
(Code **E**)
78-22763 through 78-22810
78-23043 through 78-23092
3. AH-1F (Modernized Configuration)
(Coded **M**)
76-22567 and 76-22600 (Production Prototypes)
78-23093 through 78-23125 Selected aircraft-
66-15248 through 71-21052. All aircraft-78-
All aircraft-78-23093 and subsequent.

b. The purpose of this manual is to familiarize you with the maintenance functions to be performed at the Aviation Unit and Intermediate Maintenance levels. The Table of Contents for this manual is provided to assist in determining the chapter in the manual in which individual functions are covered. This manual provides all essential information for personnel to accomplish Aviation Unit and Intermediate Maintenance on the complete airframe, its components, and systems, excluding armament and avionics subsystems, as indicated for Aviation Unit and Intermediate Maintenance activities in the Maintenance Allocation Chart (MAC). Refer to Appendix B.

c. Designator symbols are used in conjunction with text contents, text headings and illustration titles to show limited affectivity of material. Designator symbols may precede a text heading or illustration title to indicate proper affectivity, unless the material applies to all series and configurations within the manual. Designator symbols precede procedural steps and designated material in the text. If the material applies to all series and configurations. no designator symbols will be used. Where practical, descriptive information is condensed and combined for all models to avoid duplication. Data in this manual are coded as follows:

- (1) **P** AH-1P (Production)
- (2) **E** AH-1E (Enhanced Cobra Armament System)
- (3) **M** AH-1F (Modernized Configuration)
 - (3.1) **MCN** AH-1F (Modernized Configuration with C-NITE)
- (4) No Code - All models
- (5) B540 Bell Helicopter Textron Main Rotor Blades
- (6) K747 Kaman Aircraft Corporation Main Rotor Blades

d. Changes, except as noted below, to the text and tables, including new material on added pages, are indicated by a vertical line in the outer margin extending close to the entire area of the material affected. Symbols show current changes only. A miniature pointing hand symbol is used to denote a change to an illustration. However, a vertical line in the outer margin, rather than miniature pointing hands, is utilized when there have been extensive changes made to an illustration. Change symbols are not utilized to indicate changes in the following:

- (1) Introductory material.
- (2) Indexes and tabular data where the change cannot be identified.
- (3) Blank space resulting from the deletion of text, an illustration, or a table.
- (4) Correction of minor inaccuracies, such as spelling, punctuation, relocation of material, etc., unless such correction changes the meaning of instructive information and procedures.

P-2. QUALITY ASSURANCE/QUALITY CONTROL (QA/QC).

Personnel will assure proper maintenance has been performed by verifying dimensions and tolerances contained throughout this technical manual have been complied with.

P-3. DESCRIPTION.

A. Fuselage. The helicopter is a two-place assault type with a narrow fuselage, single main and tail

rotors, short wings, and provisions for a variety of armament. The forward fuselage is built up on two main longitudinal beams with lateral bulkheads, floors, shear panels, and decks of honeycomb panel construction, forming a box beam. Crew compartments are arranged in tandem, with the pilot seated behind and above the gunner, and are covered by a transparent canopy with two doors. Both doors are sections of the canopy, hinged at top with the gunner door opening at left and the pilot door opening at right side. Both seats are protected by armor on backs, seats and sides of supports. The compartment area is ventilated by forced air from a transmission-drive blower. The short wings provide support for armament mounting pylons and also aid maneuverability by providing lift at higher airspeeds.

b. Tailboom Section. The tailboom section, attached to the forward fuselage by four bolts, is a tapered semimonocoque structure with a vertical fin slanting up and aft at the rear end to support the tail rotor. Ballast is added to the aft end of tailboom to control helicopter center of gravity limits. Lead shot is added inside the tailskid on **P** coded helicopters. Tail rotor driveshafts and gearboxes are mounted under rovers along the top of the tailboom and front of the vertical fin. A controllable elevator is also mounted on the tailboom.

c. Propulsion System. The propulsion system consists of a gas turbine engine, main driveshaft, transmission and mast, main rotor, and tail rotor with driveshafts and gearboxes. The transmission and engine are mounted on the fuselage aft of the crew compartment and covered by cowlings and fairings. The engine drives the transmission through the main driveshaft, rotating the mast and main rotor. Power is also taken off the transmission to drive the tail rotor, which compensates for main rotor torque to control the helicopter heading. Fuel tanks consist of two interconnected cells, located in the fuselage.

d. Flight Controls. Flight controls are direct mechanical linkages from sticks and pedals at pilot and gunner stations, assisted by hydraulic cylinders powered by transmission-driven hydraulic pumps. A stabilization and control augmentation system is also incorporated in the control linkage to steady the helicopter during use of armament.

e. Armament Provisions. Armament provisions include mounting, wiring, and hydraulic lines for an armament turret under the forward end of the fuselage, an ammunition compartment immediately aft of the turret location, sights and control panels at

crew stations, and mounting pylons for external armament pods on each wing. Helicopters coded **P** utilize hydraulically operated armament turrets. Helicopters code **T** and **M** utilize electrically operated armament turrets.

f. Landing Gear. Landing gear is skid type with arched cross tubes attached to the fuselage. Exposed portions of cross tubes are covered by streamlined fairings to reduce drag. A tail skid is provided to warn the pilot in the event of a tail-low landing.

P-4. Destruction of Army Material to Prevent Enemy Use.

For destruction of Army material to prevent enemy use, refer to TM 750-244-1-5.

P-5. Maintenance of Forms and Records.

Maintenance of forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by DA PAM 738-751.

P-6. Authority for Substitution.

Substitution or interchange of items of materiel for maintenance of Department of the Army helicopter shall not be authorized, nor shall orders be issued for shipment. Substitution or interchangeability shall only be authorized by US Army Aviation Systems Command (AVSCOM).

P-7. Special Tools and Equipment.

Aviation Unit and Intermediate Maintenance special tools and equipment will be found in TM 55-1520-236-23P (Repair Parts and Special Tools List). Use of special tools and equipment for complex tasks is described in this manual.

P-8. Calibration.

Equipment requiring calibration shall be indicated and reference made to publications containing the applicable procedures.

a. Helicopter components, accessories, and instruments requiring calibration shall be specified in Chapter 1.

b. Special tools and test equipment shall be calibrated as specified in TB 750-25, Army Metrology and Calibration System.

P-9. Storage.

Refer to TM 740-90-1 and Appendix E for Storage of helicopter.

P-10. Engineering Authorization.

All requests for engineering authorization, when required by this manual will be forwarded to USA

AVSCOM, ATTN: AMSAV-ME, 4300 Goodfellow Blvd., St. Louis, MO., 63120. Urgent requests shall be clearly identified to insure priority handling and response. The requests shall include detailed information on the problem, e.g., sketches, photographs, dimensional data, etc., to assist in the evaluation and prompt reply.

CHAPTER 1

AIRCRAFT GENERAL

SECTION I. SERVICING

1-1. SERVICING.

1-2. DESCRIPTION – SERVICING.

Servicing information and procedures are presented by system or components in the following paragraphs. Points used infrequent servicing and replenishment of fuels, oil, hydraulic fluid, and other materials are shown in figure 1-1.

1-3. SERVICING – FUEL SYSTEM.

a. The fuel supply tank consists of two cells, located in the fuselage forward and aft of the wings, interconnected by a crossover and vented through a common outlet line. Each cell has a sump and a fuel pump with drains (figure 1-1) accessible through doors in the fuselage lower skin. The fuel tank filler cap and static ground receptacle serve both tanks. **P E**

The cap and adapter assembly allows for gravity refueling. **M** A closed circuit fueling receiver allows for dosed port or open port gravity refueling.

b. Total tank capacity for the fuel system is 262 Us. gallons, and normal service capacity is 260 Us. gal fens.

WARNING

Servicing personnel shall comply with all safety precautions and procedures specified in FM 10-68, Aircraft Refueling field manual.

c. Closed Circuit Refueling (Power Off).

- (1) Refer to Figure 1-1 for fuel filter location.
- (2) Assure that fire guard is in position with fire extinguisher.
- (3) Ground servicing unit to ground stake.
- (4) Ground servicing unit to helicopter.
- (5) Ground fuel nozzle to ground receptacle located adjacent to fuel receptacle on helicopter.
- (6) Remove fuel filler cap, and assure that refueling module is in locked position (refer to figure 1-1.1).

(7) Remove nozzle cap and insert nozzle into fuel receptacle and lock into position.

(6) Activate flow control handle to ON or FLOW position. Fuel flow will automatically shut off when fuel cdl is full. Just prior to normal shut off, fuel flow may cycle several times, as maximum fuel level is reached.

(9) Assure that flow control handle is in OFF or NO FLOW position and remove nozzle.

(10) Replace fuel nozzle cap.

(11) Replace fuel filler cap.

(12) Disconnect fuel nozzle ground.

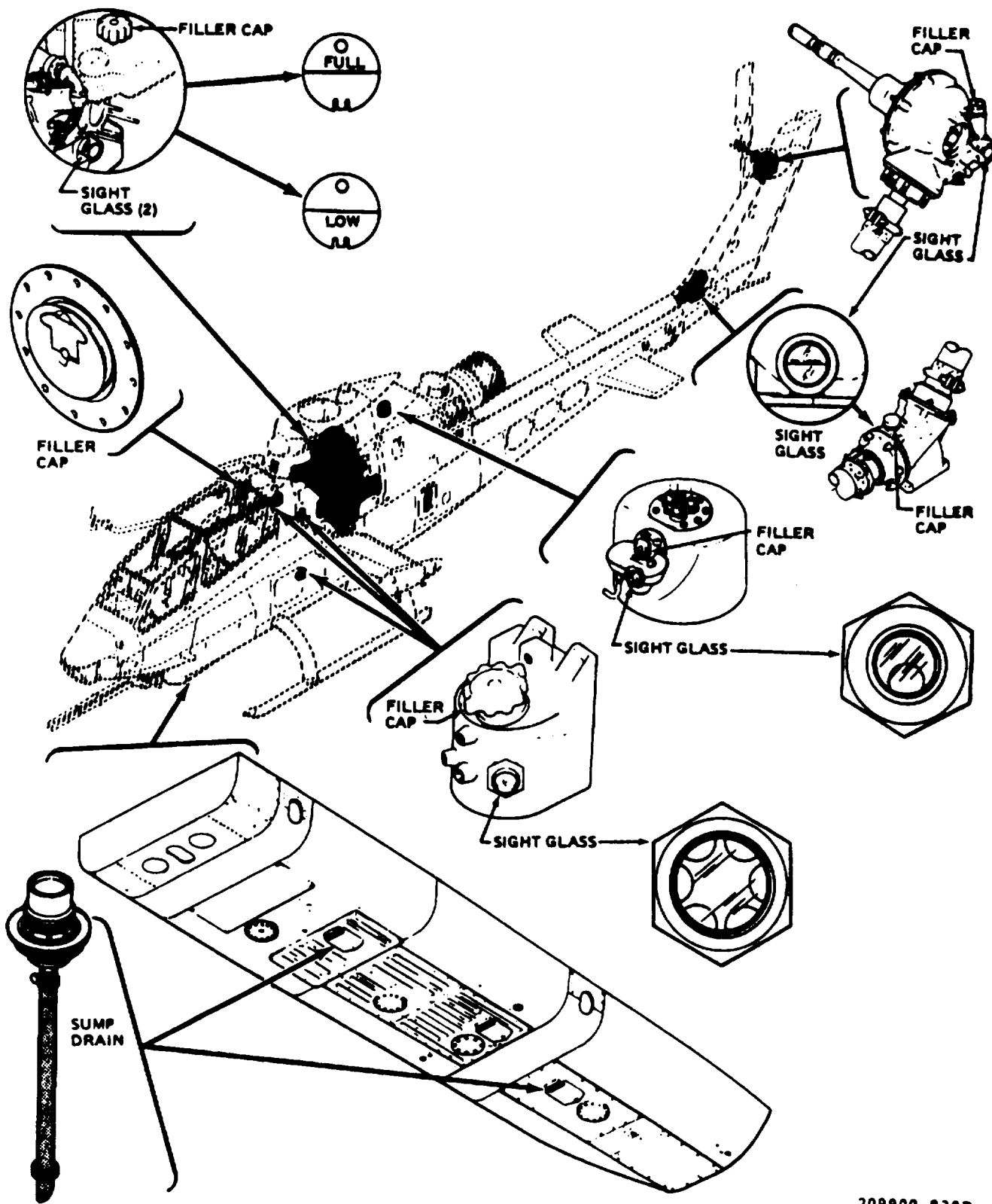
(13) Disconnect ground from helicopter to servicing unit.

(14) Disconnect servicing unit ground from ground stake.

(15) Return fire extinguisher to designated location.

c.1. Gravity or Open-Port Refueling (Power Off).

- (1) Refer to Figure 1-1 for fuel filler location.
- (2) Assure that fire guard is in position with fire extinguisher.
- (3) Ground servicing unit to ground stake.
- (4) Ground servicing unit to helicopter.
- (5) Ground fuel nozzle to ground receptacle located adjacent to fuel receptacle on helicopter.
- (6) Remove fuel filler cap.
- (7) Using latch tool, attached to filler cap cable open refueling module if equipped with dosed circuit receptacle (refer to figure 1-1.1).
- (8) Remove nozzle cap and insert nozzle into fuel receptacle.
- (9) Initiate fuel flow by squeezing trigger grip on nozzle. When using a CCR open-port/gravity nozzle adapter; prior to squeezing trigger grip, actuate flow control handle on CCR nozzle to ON or FLOW position.



209900-830B

Figure 1-1. Servicing Points Diagram (Typical)

(10) Closely monitor fuel quantity; when fuel is at desired level, release trigger grip to shut-off/stop fuel flow. When using a CCR open-port/Gravity nozzle adapter, actuate flow control handle to OFF or NO FLOW position. Remove nozzle.

(11) Replace fuel nozzle cap.

(12) Close refueling module by pulling cable until latch is in locked position, if equipped with dosed circuit receptacle (refer to figure 1-1.1).

(13) Replace fuel filler cap.

(14) Disconnect fuel nozzle ground.

(15) Disconnect ground from helicopter to servicing unit.

(16) Disconnect servicing unit ground from ground stake.

(17) Return fire extinguisher to designated location.

c.2. Rapid (Hot) Refueling (Closed Circuit).

(1) Before RAPID Refueling.

(a) Throttle – Idle.

(b) FORCE TRIM Switch – FORCE TRIM.

WARNING

In case of helicopter fire, observe fire emergency procedures in Chapter 9 of TM 55-1520-236-10.

(2) During RAPID Refueling. A crewmember, shall observe the refueling operation (performed by authorized refueling personnel) and stand fire guard as required. One crewmember shall remain in the helicopter to monitor controls. Only emergency radio transmission should be made during (rapid) refueling.

(3) Refer to figure 1-1 for fuel filler location.

(4) Assure that fire guard is in position with fire extinguisher.

(5) Ground servicing unit to ground stake.

(6) Ground servicing unit to helicopter.

(7) Ground fuel nozzle to ground receptacle located adjacent to fuel receptacle on helicopter.

(8) Remove fuel filler cap, end assure that refueling module is in dosed position (refer to figure 1-1.1.)

(9) Remove nozzle cap and insert nozzle into fuel receptacle and lock into position.

(10) Activate flow control handle to ON or FLOW position. Fuel flow will automatically shut off when fuel cell is full. Just prior to normal shutoff, fuel flow may cycle several times, as maximum fuel level is reached.

(11) Assure that flow control handle is in OFF or NO FLOW position and remove nozzle.

(12) Replace fuel nozzle cap.

(13) Replace fuel filler cap.

(14) Disconnect fuel nozzle ground.

(15) Disconnect ground from helicopter to servicing unit. AFTER RAPID REFUELING. The pilot shall be advised by the refueling crew that fuel cap is secure and grounding cables have been removed.

(16) Disconnect servicing unit ground from ground stake.

(17) Return fire extinguisher to designated location.

c.3. RAPID (HOT) GRAVITY Refueling.

(1) Before RAPID Refueling.

(a) Throttle – Idle.

(b) FORCE TRIM Switch – FORCE TRIM.

WARNING

In case of helicopter fire, observe fire emergency procedures in Chapter 9 of TM 55-1520-236-10.

(2) During RAPID Refueling. A crewmember, shall observe the refueling operation (performed by authorized refueling personnel) and stand fire guard as required. One crewmember shall remain in the helicopter to monitor controls. Only emergency radio transmission should be made during (rapid) refueling.

(3) Refer to figure 1-1 for fuel filler location.

(4) Assure that fire guard is in position with fire extinguisher.

(5) Ground servicing unit to ground stake.

(6) Ground servicing unit to helicopter.

(7) Ground fuel nozzle to ground receptacle located adjacent to fuel receptacle on helicopter.

(8) Remove fuel filler cap.