

TECHNICAL MANUAL

AVUM AND AVIM MAINTENANCE MANUAL

AH-1S (MOD)

This copy is a reprint which includes current pages from Changes 1 through 24.

HEADQUARTERS, DEPARTMENT OF THE ARMY
30 SEPTEMBER 1976

URGENT

TM 55-1520-234-23-2
C 25

CHANGE }
NO. 25 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 28 February 1995

**Aviation Unit and Intermediate
Maintenance Manual**

HELICOPTER, ATTACK AH-1S (MOD)

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Remove pages

Insert pages

E-3 through E-6

E-3 through E-6

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Aviation Unit and Intermediate
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HELICOPTER, ATTACK AH-1S (MOD)

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Remove pages

10-6A through 10-6C/10-6D
10-11 through 10-14
11-16A through 11-16D
11-35 and 11-36
16-15 and 16-16
B-19 and B-20
C-1 and C-2
E-5 and E-6
E-11/E-12

Insert pages

10-6A through 10-6C/10-6D
10-11 through 10-14
11-16A through 11-16D
11-35 and 11-36
16-15 and 16-16
B-19 and B-20
C-1 and C-2
E-5 and E-6
E-11 and E-12

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TM 55-1520-234-23-2
C 23

CHANGE }
NO. 23 }

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Aviation Unit and Intermediate
Maintenance Manual

HELICOPTER, ATTACK AH-1S (MOD)

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Insert pages

11-6L and 11-6M

11-6L and 11-6M

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CHANGE }
NO. 22 }

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Aviation Unit and Intermediate
Maintenance Manual

HELICOPTER, ATTACK AH-1S (MOD)

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Remove pages	Insert pages
vii and viii	vii and viii
10-7 and 10-8	10-7 and 10-8
11-6A and 11-6B	11-6A and 11-6B
11-11 and 11-12	11-11 and 11-12
11-13 and 11-14	11-13 and 11-14
11-16A and 11-16B	11-16A and 11-16B
11-17 and 11-18	11-17 and 11-18
11-33 and 11-34	11-33 and 11-34
13-33/13-34	13-33/13-34
16-7 and 16-8	16-7 and 16-8
16-11 through 16-14	16-11 through 16-14
D-7 and D-8	D-7 and D-8
D-49 and D-50	D-49 and D-50
D-63 and D-64	D-63 and D-64
F-13 and F-14	F-13 and F-14

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NO. 21 }

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TM 55-1520-234-23-2, 20 September 1976, is changed as follows:

1. Pages D-169 through D-171/D-172 should be removed if Change 17 appears on Page.
2. Pages F-125, F-126, F-127, F-128, F-129, F-130, F-133, F-134 were not printed correctly in the last reprint. Please remove and insert these pages with the pages supplied with this change.
3. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
10-1 and 10-2	10-1 and 10-2
10-5 and 10-6	10-5 and 10-6
10-6A and 10-6B	10-6A and 10-6B
11-5 and 11-6	11-5 and 11-6
11-6A and 11-6B	11-6A and 11-6B
11-6L and 11-6M	11-6L and 11-6M
11-7 and 11-8	11-7 and 11-8
11-13 through 11-16	11-13 through 11-16
11-16A through 11-16D	11-16A through 11-16D
11-17 and 11-18	11-17 and 11-18
11-35 and 11-36	11-35 and 11-36
11-38E and 11-38F	11-38E and 11-38F
12-3 and 12-4	12-3 and 12-4
13-33/13-34	13-33/13-34
16-11 through 16-16	16-11 through 16-16
16-23 and 16-24	16-23 and 16-24
17-1 and 17-2	17-1 and 17-2
17-2.1/17-2.2	17-2A/17-2B
17-3 and 17-4	17-3 and 17-4
A-1 and A-2	A-1 and A-2
C-3 and C-4	C-3 and C-4
D-1 through D-10	D-1 through D-10
D-61 and D-62	D-61 and D-62
D-81 and D-82	D-81 and D-82
D-89 and D-90	D-89 and D-90
- - -	D-134A/D-134B
D-159 and D-160	D-159 and D-160

Remove pages

Insert pages

-- -- --

E-3 through E-6
F-125 through F-130
F-133 and F-134

D-173 through D-176
E-3 through E-6
F-125 through F-130
F-133 and F-134

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**TM 55-1520-234-23-2
C 20**

CHANGE }
NO. 20 }

HEADQUARTERS
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Aviation Unit and Intermediate
Maintenance Manual

HELICOPTER, ATTACK AH-1S (MOD)

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

Remove pages

Insert pages

A-1 and A-2
F-85/F-86

A-1 and A-2
F-85/F-86

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CHANGE }
No. 19 }

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HELICOPTER, ATTACK AH-1S (MOD)

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

Remove pages

ix through xiv
11-37 and 11-38
11-38A and 11-38B
17-1 and 17-2
D-1 and D-2
D-63 and D-64
D-171/D-172

Insert pages

ix through xiv
11-37 and 11-38
11-38A and 11-38B
17-1 and 17-2
D-1 and D-2
D-63 and D-64
D-171 and D-172

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CHANGE }
NO. 18 }

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

Remove pages

c/d
10-3 and 10-4
10-4.1/10-4.2
10-5 and 10-6
11-7 and 11-8
11-22A/11-22B
13-23 and 12-24
13-33/13-34
17-1 and 17-2
17-11 and 17-12
C-3 and C-4
D-1 through D-4
D-123 and D-124
- - -
F-91/F-92

Insert pages

c and d
10-3 and 10-4
10-4A/10-4B
10-5 and 10-6
11-7 and 11-8
11-22A/11-22B
13-23 and 13-24
13-33/13-34
17-1 and 17-2
17-11 and 17-12
C-3 and C-4
D-1 through D-4
D-123 and D-124
D-169 through D-171/172
F-91/F-92

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This is a reprint of change 17.

TM 55-1520-234-23-2
C 17

CHANGE }
NO. 17 }

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Aviation Unit and Intermediate
Maintenance Manual

HELICOPTER, ATTACK AH-1S(MOD)

TM 55-1520-234-23-2, 30 September 1976, is changed as follows:

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Remove pages

iii through xiv
11-13 through 11-16
11-16A and 11-16B
11-17 and 11-18
D-1 through D-4
D-7 and D-8
D-63 and D-64
D-159 and D-160
-- -- --

Insert pages

iii through xiv
11-13 through 11-16
11-16A through 11-16D
11-17 and 11-18
D-1 through D-4
D-7 and D-8
D-63 and D-64
D-159 and D-160
D-169 through D-171/D-172

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CHANGE }
NO. 16 }

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Aviation Unit and Intermediate
Maintenance Manual

HELICOPTER, ATTACK AH-1S(MOD)

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Remove pages	Insert pages
iii and iv	iii through xiv
11-31 through 11-32A/11-32B	11-31 through 11-32A/11-32B
11-37 and 11-38	11-37 and 11-38
-- -- --	11-38A through 11-38H
11-39 and 11-40	11-39 and 11-40
13-29 through 13-30A/13-30B	13-29 through 13-30A/13-30B
16-25 and 16-26	16-25 and 16-26
17-11 and 17-12	17-11 and 17-12
A-1 and A-2	A-1 and A-2
B-3 and B-4	B-3 and B-4
-- -- --	B-8A/B-8B
B-9 and B-10	B-9 and B-10
B-15 and B-16	B-15 and B-16
B-33 and B-34	B-33 and B-34
D-3 and D-4	D-3 and D-4
D-149 and D-150	D-149 and D-150
D-165/D-166	D-165 through D-168
F-1 through F-16	F-1 through F-16
-- -- --	F-16A through F-16E/F-16F
-- -- --	F-88A/F-88B
F-95/F-96	F-95/F-96
F-149 and F-150	F-149 and F-150
Index 19 and Index 20	Index 19 and Index 20
-- -- --	Index 20A/Index 20B
Index 37 and Index 38	Index 37 and Index 38

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CHANGE }
NO. 15 }

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Maintenance Manual

HELICOPTER, ATTACK AH-1S (MOD)

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Remove pages

10-5 and 10-6
11-9 and 11-10
11-39 and 11-40
16-7 through 16-14
B-15 and B-16
C-3 and C-4
D-1 through D-4
D-83 and D-84
D-89 and D-90
D-95 and D-96
D-161/D-162

Insert pages

10-5 and 10-6
11-9 and 11-10
11-39 and 11-40
16-7 through 16-14
B-15 and B-16
C-3 and C-4
D-1 through D-4
D-83 and D-84
D-89 and D-90
D-95 and D-96
D-161 through D-165/D-166

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CHANGE }
NO. 14 }

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Maintenance Manual

HELICOPTER, ATTACK AH-1S (MOD)

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Remove pages

10-5 and 10-6
-- -- --
10-7 and 10-8
11-6A and 11-6B
11-15 and 11-16
11-16A and 11-16B
13-23 and 13-24
-- -- --
-- -- --
13-29 and 13-30
-- -- --
13-33/13-34
16-23 and 16-24
A-1 and A-2
B-1 and B-2
B-25 and B-26
D-1 and D-2
D-7 and D-8
D-61 through D-64
D-81 through D-88
D-93 and D-94
D-157/D-158
E-1 through E-4
E-11/E-12
F-89/F-90
F-117/F-118

Insert pages

10-5 and 10-6
10-6A through 10-6C/10-6D
10-7 and 10-8
11-6A and 11-6B
11-15 and 11-16
11-16A and 11-16B
13-23 and 13-24
13-24A/13-24B
13-28A/13-28B
13-29 and 13-30
13-30A/13-30B
13-33/13-34
16-23 and 16-24
A-1 and A-2
B-1 and B-2
B-25 and B-26
D-1 and D-2
D-7 and D-8
D-61 through D-64
D-81 through D-88
D-93 and D-94
D-157/D-158
E-1 through E-4
E-11/E-12
F-89/F-90
F-117/F-118

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CHANGE }
NO. 13 }

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AVUM and AVIM Maintenance Manual

AH-1S (MOD)

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Remove pages	Insert pages
11-7 and 11-8	11-7 and 11-8
11-16A and 11-16B	11-16A and 11-16B
11-17 and 11-18	11-17 and 11-18
16-21 and 16-22	16-21 and 16-22
17-11 and 17-12	17-11 and 17-12
-- -- --	17-12A/17-12B
B-31 and B-32	B-31 and B-32
C-3 and C-4	C-3 and C-4
D-1 and D-2	D-1 and D-2
D-5 through D-8	D-5 through D-8
D-17 and D-18	D-17 and D-18
D-25 through D-28	D-25 through D-28
D-39 and D-40	D-39 and D-40
D-117 and D-118	D-117 and D-118
D-127 and D-128	D-127 and D-128
D-141 and D-142	D-141 and D-142
F-153/F-154	F-153/F-154
F-155/F-156 through F-171/F-172	-- -- --

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URGENT

TM 55-1520-234-23-2
C 12

CHANGE }
NO. 12 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 31 October 1984

Aviation Unit and Intermediate
Maintenance Manual

HELICOPTER, ATTACK AH-1S(MOD)

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Remove pages

Insert pages

Warning pages

a and b

c/d

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CHANGE }
NO. 11 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C. 30 March 1984

AVIATION UNIT AND INTERMEDIATE
MAINTENANCE MANUAL

HELICOPTER, ATTACK AH-1S (MOD)

NOTE

PRIOR TO INCORPORATING CHANGE 11 INTO
MANUAL, REMOVE AND DISCARD ANY PAGES
BETWEEN F-75 AND F-154 WHICH ARE NOT IDENTIFIED AS CHANGE 4 OR CHANGE 8.

TM 55-1520-234-23-2, 30 September 1976, is changed as follows:

1. Remove and insert pages as indicated below.

	Remove pages	Insert Pages
Chapter 10	10-7 and 10-8	10-7 and 10-8
	10-13 and 10-14	10-13 and 10-14
Chapter 11	11-16A thru 11-18	11-16A thru 11-18
	11-22A/11-22B thru 11-24	11-22A/11-22B thru 11-24
	11-27 and 11-28	11-27 thru 11-28A/11-28B
	11-29 and 11-30	11-29 and 11-30
	11-31 thru 11-39/11-40	11-31 thru 11-32A/11-32B
	-----	11-33 thru 11-40
Chapter 13	13-1 and 13-2	13-1 and 13-2
	13-33/13-34	13-33/13-34
Chapter 16	16-15 and 16-16	16-15 and 16-16
Chapter 17	17-11 and 17-12	17-11 and 17-12
Appendix B	B-17 thru B-20	B-17 thru B-20
	B-25 and B-26	B-25 and B-26
Appendix C	C-3 and C-4	C-3 and C4
Appendix D	D-1 thru D-8	D-1 thru D-8
	D-39 and D-40	D-39 and D-40
	D-125 and D-126	D-125 thru D-126A/D-126B
	D-127 and D-128	D-127 and D-128
	D-131 and D-132	D-131 and D-132
	D-143 thru D-146	D-143 thru D-146
	D-149/D-1-150	D-149 thru D-157/D-158

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CHANGE }
No. 10 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 16 August 1983

AVIATION UNIT AND INTERMEDIATE
MAINTENANCE MANUAL

Helicopter, Attack AH-1S (MOD)

TM 55-1520-234-23-2, 30 September 1976, is changed as follows:

1. Remove and insert pages as indicated below.

	Remove pages	Insert pages
Chapter 11	11-33 and 11-34	11-33 and 11-34

2. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

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TM 55-1520-234-23-2

C 9

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NO. 9 }

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WASHINGTON, D. C., 2 May 1983

AVIATION UNIT AND INTERMEDIATE
MAINTENANCE MANUAL
HELICOPTER, ATTACK AH-1S (MOD)

TM 55-1520-234-23, 30 September 1976, is changed as follows:

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AVIATION UNIT AND INTERMEDIATE
MAINTENANCE MANUAL

Helicopter, Attack AH-1S (MOD)

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Helicopter, Attack AH-1S (MOD)

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AVUM and AVIM Maintenance Manual

AH-1S (MOD)

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1. Remove and insert pages as indicated below.

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TM 55-1520-234-23-2
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TM 55-1520-234-23-2, 30 September 1976, is changed as follows:

1. Remove and insert pages as indicated below.

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AVUM and AVIM Maintenance Manual

AH-1S (MOD)

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1. Remove and insert pages as indicated below.

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AVUM and AVIM Maintenance Manual

AH-1S (MOD)

TM 55-1520-234-23-2, 30 September 1976, is changed as follows:

1. Warning page is added as follows.
2. Introductory page is added as follows.
3. Remove and insert pages as indicated below.

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WARNING

Personnel performing instructions involving operations, procedures, and practices which are included, or implied in this technical manual, shall observe the following instructions. Disregard of these warnings and precautionary information can cause serious injury, **DEATH** or an aborted mission.

Starting and Operation of the helicopter will be performed only by authorized personnel in accordance with AR95-1.

HIGH VOLTAGE

The helicopter should be electrically grounded when parked. Turn off all power switches before making electrical connections or disconnections. Serious burns and electrical shock can result from contact with exposed electrical wires or connectors.

RADIATION HAZARD

Self-luminous dials contain radio active materials. If such an instrument is broken or becomes unsealed, avoid personal contact. Use forceps or gloves made of rubber or polyethylene to pick up contaminated material. Place material and gloves in a plastic bag. Seal bag and dispose of it as radio active waste in accordance with AR755-15 and TM 3-261 (Refer to TB 55-1500-314-24). Repair procedures shall conform to requirements in AR700-52.

DANGEROUS CHEMICALS

Exposure to high concentration of fire extinguishing agents can cause severe irritation of eyes or nose. Corrosive Battery Electrolyte (Potassium Hydroxide). Wear rubber gloves, apron, and face shield when handling leaking batteries. If potassium hydroxide is spilled on clothing, or other material wash immediately with clean water. If spilled on personnel, immediately start flushing the affected area with clean water. Continue washing until medical assistance arrives. Use solvent in a well ventilated area. Do not inhale vapors, or allow to come in contact with skin or eyes. Observe proper fire prevention rules.

ARMAMENT

When working on, or near an armed helicopter, take all possible precautions to avoid accidental firing or armament. Personnel shall not occupy possible firing pattern in front of or up to 20 feet behind rocket pods. Munitions shall be handled by authorized personnel only. All weapons shall be dry-fired. Dummy ammunition shall not be used.



HYDRAULIC FLUID, FUEL AND OIL

Lubricating oil used in engine, transmission and gear boxes may cause a skin rash if prolonged contact is allowed.
When handling fuel, observe precautions and procedures in TM 10-1101.
Prolonged contact with hydraulic fluid will cause burns.
When handling hydraulic fluid (MIL-H-83282), table 1-3, item 73A, observe the following:
Prolonged contact with liquid or mist can irritate eyes and skin.
After any prolonged contact with skin, immediately wash contacted area with soap and water.
If liquid contacts eyes, flush them immediately with clear water.
If liquid is swallowed, do not induce vomiting; get immediate medical attention.
Wear rubber gloves when handling liquid.
If prolonged contact with mist is likely, wear an appropriate respirator.
When fluid is decomposed by heating, toxic gases are released.

JETTISON

All ground safety pins must be removed before flight.
Failure to do so will prevent emergency jettison of stores.

JETTISON

Jettison circuit may be activated with battery switch OFF and pilot's wing stores jettison circuit breaker pulled. For positive deactivation of jettison circuit, open both the pilot's wing stores jettison circuit breaker and the jettison circuit breaker located in the aft electrical compartment. Serious injury can result from accidental ground jettison.

SANDING DUST

Sanding on glass cloth reinforced laminated produces fine dust that may cause skin irritations.
Observe necessary protective measures.

TRANSMISSION LEVELING

Do not attempt to level transmission with "Jacks Only"
Hoist must be used in conjunction with jacks while lifting transmission.

EXTERNAL STORES

Prior to any aircraft maintenance functions that require external stores be removed, ejector cartridge shall be removed.

Remove jettison cartridges from pylon stores ejection device prior to placing aircraft in a hangar, to prevent injury to personnel and damage to equipment.
Exception: Removal is not necessary when aircraft is to be stored in hangar for short-term, providing both circuit breakers are open, ground safety pins installed, jettison switches are OFF, and warning signs indicate that aircraft has an armed jettison system.

CANOPY REMOVAL SYSTEM

Ground safety pins must be installed in pilot's and gunner's arming/firing handles of canopy removal system whenever the helicopter is on the ground. Pins should be installed by crew.

EPOXY BASED ADHESIVE

Epoxy based adhesive, P/N EA934, contains an asbestos filler which could be inhaled or ingested during grinding, cutting, or sanding operations on cured epoxy material.

TOOLS

Use only chrome plated steel or unplated steel tools for disassembly or reassembly procedures described in this manual. Use of cadmium or zinc plated tools is not permitted.

GROUNDING

All aircraft parked outside will be grounded and bonded, in accordance with FM 1-500, to the aerospace ground equipment while servicing, i.e., fueling or defueling, arming (ammunition or explosives), oxygen, hydraulic fluids or any flammable liquids. Grounding is not necessary for aircraft parked outside unless one of the above is being accomplished.

INSPECTION OF REMOVED COMPONENT

When components are being removed from an aircraft, all inspections required by the next phase maintenance inspection must be accomplished prior to either immediate re-use or storage. Upon installation, the component will be inspected in accordance with the current phase (either that phase the receiving aircraft is in or if in between phase, the last phase performed). This will ensure that a re-used component will not overfly any PM inspections, and that it will be properly interfaced with the receiving aircraft phase sequence.

WARNING PAGE

**CLEANING HYDRAULIC
COMPONENTS**

The use of any alcohol in cleaning components which contact hydraulic fluids is prohibited. Formation of a polymeric residue can result, which could impair mechanical operation of the component.

d Change 18

**AVIATION UNIT AND INTERMEDIATE
MAINTENANCE MANUAL.**

HELICOPTER, ATTACK AH-IS (MOD)

NOTE:

This manual is printed in two volumes, as follows:

TM 55-1520-234-23-1, consisting of Table of Contents, preface, chapters 1 through 9.

TM 55-1520-234-23-2, consisting of Table of Contents, chapters 10 through 17, appendices A through F, and Index.

The Preface, Appendices and Index are applicable to Volumes I and II.

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistake 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 direct to: Commander, US Army Troop Support and Aviation Materiel Readiness Command, ATTN: DRSTS-MTPS, 4300 Goodfellow Blvd., St. Louis, MO 63120. A reply will be furnished directly to you.

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TECHNICAL MANUAL
No. 55-1520-234-23-2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 30 September 1976

**Aviation Unit and Aviation Intermediate
Maintenance Manual**

ARMY MODEL AH-1S (MOD) HELICOPTER

NOTE:

This manual is printed in two volumes, as follows:

TM 55-1520-234-23-1, consisting of Table of Contents, preface, chapters 1 through 9.

TM 55-1520-234-23-2, consisting of Table of Contents, chapters 10 through 17, appendices A through F, and Index.

The Appendices and Index are applicable to Volumes I and II.

Change 1

CHAPTER 10 FUEL SYSTEM

Section I. FUEL SYSTEMS

10-1. Fuel System.

a. The fuel supply is in two interconnected cells in the fuselage, located forward and aft of the pylon. (Refer to figure 10-1.) The system is filled at right side of the forward cell. A crossover hose allows free flow to the aft cell, and has a check valve that restricts flow from aft to forward cell to avoid sudden shifting of balance in nosedown flight attitude. Each cell has a transmitter probe for the fuel quantity gage system, and a float switch for the 10% FUEL caution panels. Sump drain valves are provided on both cells; the large valve on the aft cell is also used for system defueling. Vent lines from cells are connected together and to a single overboard line. The aft cell has a connection, with a check valve, for return of fuel bled from the engine fuel control overspeed governor.

b. Electrically operated boost pumps deliver fuel from each cell to a manifold containing two directional flow check valves, with thermal relief bypass provisions. From the manifold outlet, fuel passes through an electrically operated shut-off valve to the filter, which has an outlet coupling for the engine fuel control inlet hose. Two pressure switches on the manifold have electrical circuits to FWD FUEL BOOST and AFT FUEL BOOST caution panels, and the fuel pressure gage system transmitter is connected to the outlet side of the filter.

10-2. General Maintenance - Fuel Supply System.

Observe the following general instructions and precautions in maintenance of the fuel supply system. Operational checks will be in accordance with TM 55-1520-234-10. Servicing instructions are contained in Chapter 1; electrical circuit diagrams and information are in Chapter 9 of this manual. Fuel lines and components on the engine constitute the fuel control system and will be found in TM 55-2840-229-24.

CAUTION

After aircraft has been defueled a small amount of fuel may be present in the cells. Care should be taken to catch remaining fuel in a suitable container when removing fuel cell components.

a. Conduct any defueling or drainage of fuel in accordance with applicable directives, and with extreme care to avoid fire hazards. (Refer to chapter 1.)

b. Before removing any line or hose, be sure it is properly identified and its route understood for replacement in the same manner.

c. Cap or cover any open lines, fittings or exposed openings to protect fuel system from contamination. Be sure vent lines are not obstructed.

10-2A. Perform troubleshooting of the fuel system in accordance with Table 10-1.

10-3. Fuel Filter.

The filter (26, figure 10-1) is mounted on a bracket located on left side of the engine compartment deck. The filter contains a replaceable paper-type element (6) and has an internal bypass, with electrical connection to the FUEL FILTER caution panels to warn when the filter is about to be bypassed due to clogging. Piping connections on the filter include the inlet line, drain line, pressure transmitter line, and a quick disconnect outlet coupling.

a. Removal.

(1) Open left side of engine compartment cowling.

(2) Disconnect fuel hose from outlet coupling on top of filter.

(3) Drain fuel from filter by opening drain line valve. Use a suitable tool to slightly depress self-closing valve of filter outlet coupling to admit some air and assist drainage.

(4) Open coupling clamp (7) and remove bowl (4) and filter element (6) from filter head. Separate element (6) and packings (5) from bowl.

NOTE

Filter head will usually be left in place, but can be removed as in the following step.

(5) Disconnect electrical cable plug, and fuel inlet, pressure, and drain lines from filter head. Detach head assembly from bracket by removing four bolts, nuts and washers.

Table 10-1. Troubleshooting Fuel System

CONDITION	TEST OR INSPECTION	CORRECTIVE ACTION
1. FUEL FILTER lamp illuminated.	STEP 1. Remove filter element and check for clogged filter.	Replace filter element if dirty or clogged. Refer to paragraph 10-3.
2. AFT or FWD FUEL BOOST caution lamps illuminated.	STEP 1. Check for sound of pump running.	If pump is running, but there is no indication of fuel flow to engine, pump has failed or lines are loose or clogged or leaking. Check manifold and shutoff valves for malfunction if lights are off without flow to engine. Replace pump. Refer to paragraph 10-8.
	STEP 2. If pump is not running, check for electrical continuity.	If electrical continuity is not present, repair wiring. If continuity is normal, replace pump.
3. FUEL LOW lamp illuminated.	STEP 1. Defuel helicopter and refuel. FUEL LOW lamp should go out after approximately 26 gallons of fuel is in fuel cells.	If lamp remains on, check low level warning switch. Replace if defective.
	STEP 2. Check electrical circuit for continuity.	If continuity is not normal, repair as needed.

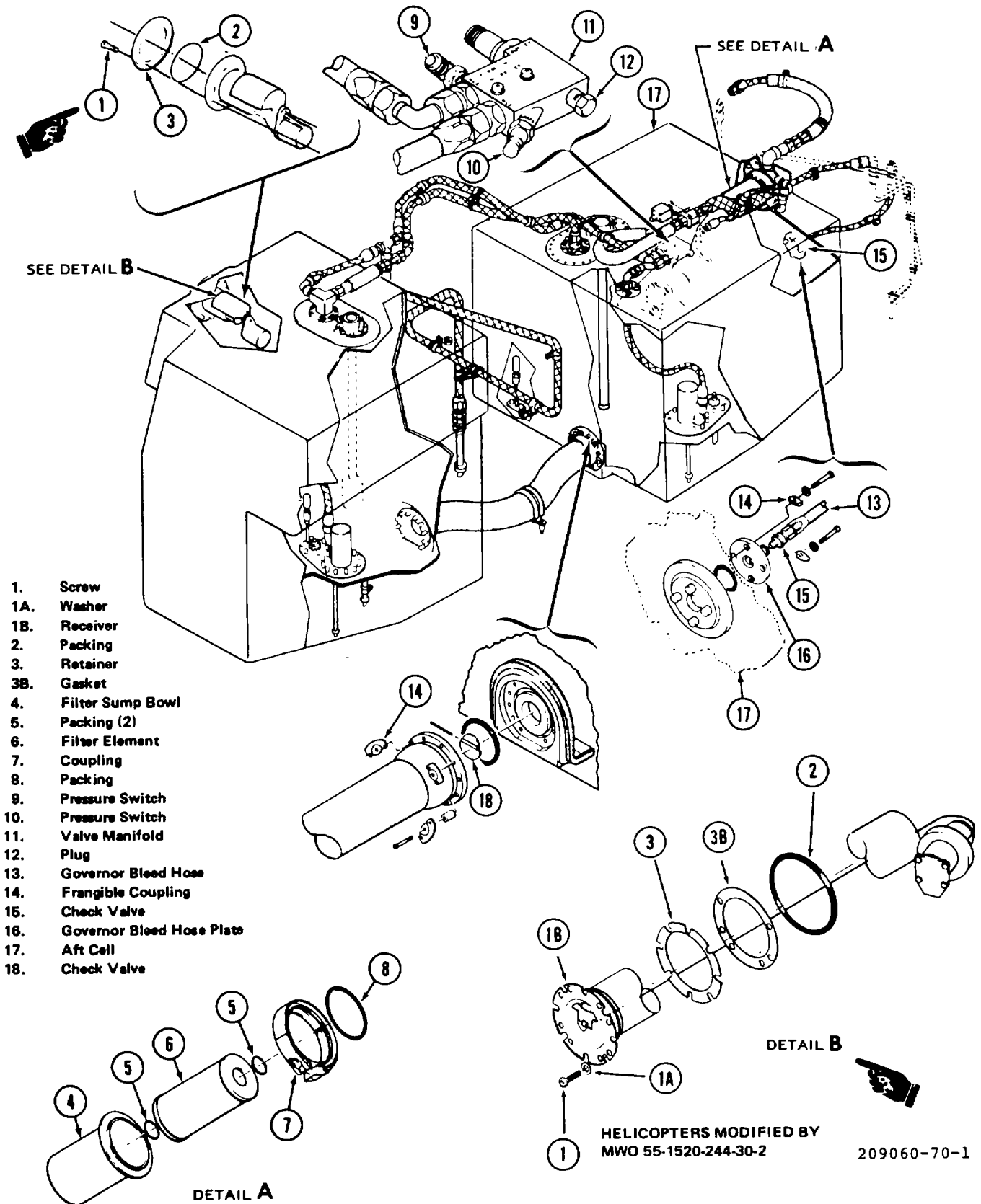
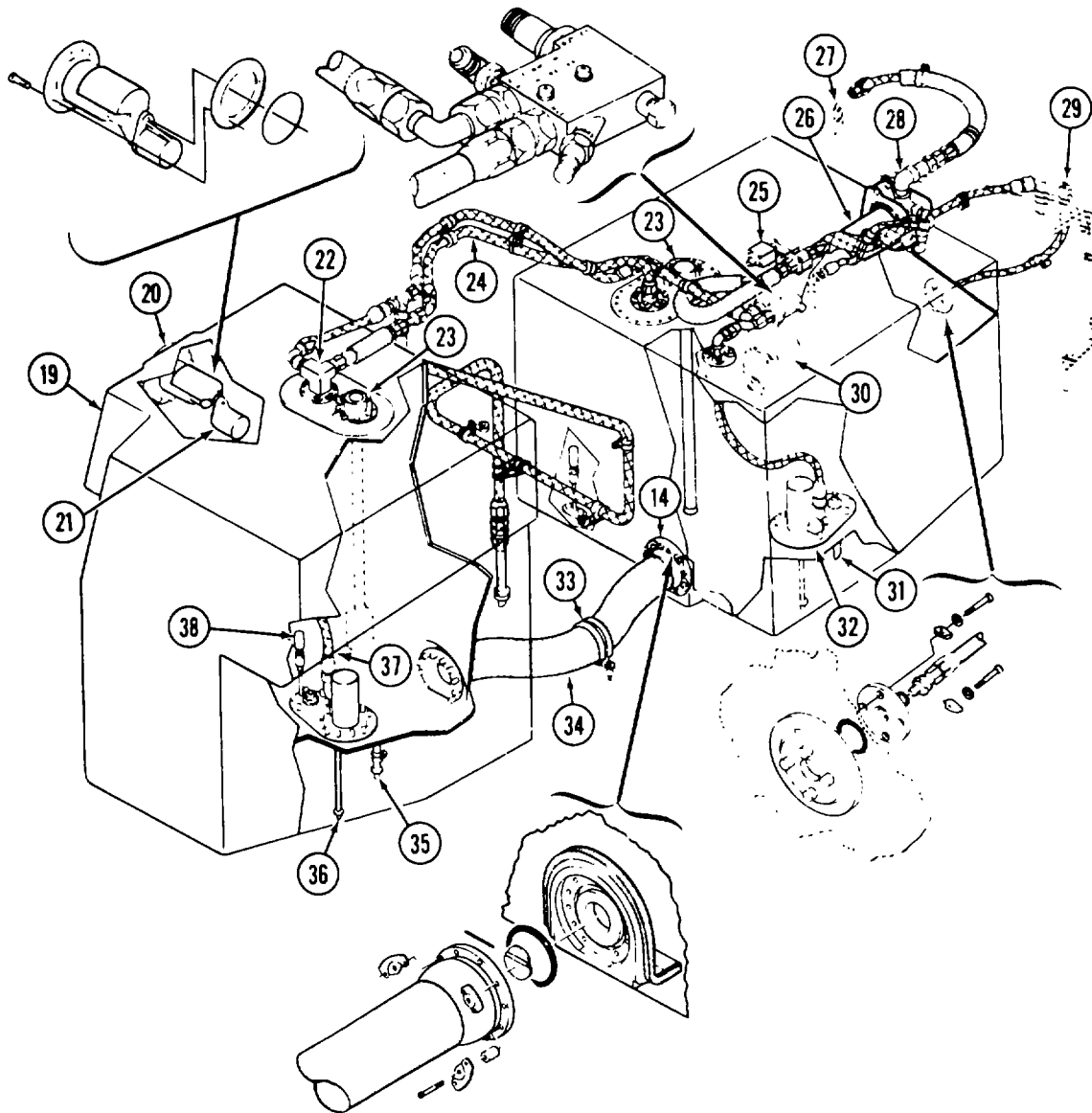


Figure 10-1. Fuel system (Sheet 1 of 2)



- | | |
|--|--|
| <ul style="list-style-type: none"> 19. Forward Cell 20. Filler Cap 21. Closed Circuit Receiver 22. Fuel and Vent Fitting 23. Fuel Quantity Probe (2) 24. Vent Lines 25. Shut-Off Valve 26. Filter 27. Engine Drain Coupling 28. Engine Fuel Coupling | <ul style="list-style-type: none"> 29. Governor Bleed Coupling 30. Pressure Transmitter 31. Drain and Defueling Valve 32. Boost Pump (2) 33. Fuel Crossover Clamp 34. Crossover Hose 35. Drain Valve 36. Seal Drain (2) 37. Fuel Hose 38. Low Level Float Switch |
|--|--|

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Figure 10-1. Fuel system (Sheet 2 of 2)

b. Inspection.

(1) Filter element (6) for contamination to determine if any corrective action is needed beyond replacement of element and packings.

(2) Filter head assembly and bowl (4) for damage. Fittings and attaching parts for serviceable condition.

(3) Fuel bypass switch for leakage and obvious damage. Electrical connector and pins for damage.

c. Cleaning. Clean bowl (4), coupling (7), and exposed surfaces of head assembly with solvent (C124), Remove excess solvent before reassembly. Clean pressure switch with clean dry cloth, wiping off exposed area.

d. Repair or Replacement.

(1) Replace filter element and packings. Replace fittings and gaskets if damaged or leaking. Replace filter head assembly if malfunction or damage occurs.

(2) Replace pressure switch, if defective, as follows:

(a) Remove four mounting screws and lock washers from outer edge of switch. Remove switch.

(b) Replace switch by installing two new packings and align holes in bypass switch with holes in filter head assembly.

CAUTION

If holes are not aligned properly and a fuel boost pump failure occurs, it will result in an engine failure.

(c) Install four screws and locking washers. Install electrical connector.

e. Installation.

(1) If removed, position filter head assembly on outboard side of mounting bracket. Install four bolts, secured at inboard side of bracket by nuts and washers. Connect drain, inlet, and pressure transmitter lines to fittings.

NOTE

Use a restrictor in pressure tap port of filter.

(2) Place new O-ring packing (5) on boss in bottom of filter bowl. Place new filter element (6) in bowl (4), seated firmly on boss.

(3) Install new packing (8) around lip of bowl (4), next to clamping flange.

(4) Place new O-ring packing (5) around center boss in filter head. Install bowl (4) and filter assembly (6) into head, pressing firmly to seat.

(5) Install coupling clamp (7) around mating flanges of filter head and bowl. **TORQUE NUT TO 50 INCH-POUND TORQUE.**

NOTE

Install V-band clamp assembly with clamp latch on left side of fuel filter and gap (drain) at the 6 o'clock position.

(6) Connect hose from engine fuel control inlet to outlet coupling on filter head. Ensure that a minimum of 1.5 inches exists between hose and engine air diffuser. Close cowling.

(7) During next ground run-up, check fuel filter and connections for leaks. Also check that FUEL FILTER caution panel segment does not light.

10-4. Fuel Shutoff Valve.

A motor-operated shutoff valve (25, figure 10-1) is used in the fuel supply system, connected between the check valve manifold and the fuel filter. The valve is mounted on front of the engine forward firewall at left side. An internal bypass valve allows thermal relief of fuel trapped on outlet side of the shutoff valve.

a. Removal.

(1) Open engine and transmission cowling doors at left side.

(2) Disconnect engine fuel inlet hose for filter outlet coupling. Open filter drain valve, and manually open shutoff valve to release trapped fuel. After short period of drainage, close both valves.

(3) Disconnect electrical connector from shutoff valve.

(4) Disconnect fuel inlet and outlet lines from valve. Cap open ends of lines.

(5) Remove four screws, nuts, and washers to detach and remove shutoff valve inlet and outlet connectors.

b. *Cleaning.* Clean connectors and valve with solvent, (C124). Do not allow solvent to enter electrical components.

c. *Inspection.*

(1) Valve for external damage and leakage.

(2) Connectors for damaged threads or mating surface.

d. *Repair or Replacement.*

(1) Replace damaged connectors.

(2) Replace valve assembly if malfunction or leakage occurs.

e. *Installation.*

(1) Assemble inlet and outlet connectors on shutoff valve.

(2) Position valve assembly to mounting holes at front of engine forward firewall, at left

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side just below induction baffle. Install four mounting screws secured with nuts and washers.

- (3) Connect fuel line for check valve manifold to inlet connector. Connect line from filter to valve outlet connector.
- (4) Connect electrical wiring connector to receptacle on valve motor. Lockwire connector.
- (5) Reconnect engine fuel inlet hose to outlet coupling of fuel filter. Ensure that a minimum of 1.5 inches exists between hose and engine air diffuser. Close cowling.
- (6) At next ground run-up, check shutoff valve for proper operation and for leaks.

10-5. Fuel Check Valve Manifold.

A valve manifold (11, figure 10-1) located just ahead of engine forward firewall at left side, is connected into fuel pressure lines ahead of the shutoff valve. The manifold contains two separate check valve elements which prevent reverse flow, except through bypasses which will relieve thermal expansion of trapped fuel. One outlet port of the manifold is used, another is plugged. Two pressure switches are installed in the inlet side of the manifold, to cause lighting of FWD FUEL BOOST or AFT FUEL BOOST caution panel segments if either fuel boost pump fails to deliver normal pressure.

a. Removal.

- (1) Open transmission cowling door at left side.
- (2) Disconnect electrical connectors from both pressure switches on check valve manifold.
- (3) Provide a small container to catch trapped fuel. Disconnect fuel lines from fittings at manifold inlets and outlet. Cap open ends of lines.
- (4) Detach and remove manifold from deck by removing two screws, washer and spacers.

b. Cleaning. Clean manifold with solvent (C124). If internal flushing is required, observe direction of flow. Drain solvent from manifold after cleaning.

c. Inspection. Manifold for cracks, and fittings for damaged threads.

d. Repair or Replacement.

- (1) Replace pressure switches if malfunction occurs.
- (2) Replace gaskets and elbow or plug at manifold outlets if leaking or damaged.
- (3) Replace manifold assembly if damaged or malfunction occurs. Transfer outlet fittings and pressure switches to replacement assembly as required.

e. Installation.

- (1) Check that fittings and pressure switches are properly installed, with gaskets, in manifold assembly (See figure 10-1.)
- (2) Hold manifold with flow arrows pointing aft, and outlet elbow at aft inboard side. Insert two screws, with washers under heads, downward through manifold. Place a spacer on lower end of each screw.
- (3) Align manifold assembly to mounting holes in deck, and tighten screws securely.
- (4) Connect fuel line from shutoff valve inlet elbow of manifold. Connect fuel pressure line and hose to manifold inlet fittings. Torque limits for installing U valve seats unions) are 150 to 210 inch pounds.
- (5) Connect electrical connectors to pressure switches.
- (6) Check for proper operation and for leaks.

10-6. Fuel Pressure Transmitter.

(Refer to Chapter 8)

10-7. Fuel Quantity Transmitters.

(Refer to Chapter 8).

10-8. Fuel Boost Pumps.

A electric motor-driven fuel boost pump (32, figure 10-1) is mounted into the bottom of each fuel cell, to deliver fuel at the rate of 990 pounds per hour at 5 to 30 psi pressure. Each pump is submerged in fuel, with its outlet connected to a hose leading to an external fuel line. Electrical leads and a seal drain line are provided on the lower exterior face of the pump.

- a. Removal.* Remove boost pump from forward or aft cell in the same manner, except for location and access.

- (1) Drain both fuel cells through sump drain and defueling valves (31 and 35, figure 10-1).
- (2) Remove screw mounted panel from underside of fuselage below forward or aft fuel cell.
- (3) Disconnect boost pump electrical leads from terminal block.
- (4) Remove seal drain tube (38, figure 10-1) from fitting on pump (32).
- (5) Remove 12 bolts and washers from mounting flange of pump. On crashworthy fuel systems remove the two frangible clips.
- (6) Lower pump assembly enough for access to hose connections on pump discharge fitting. Disconnect hose. Remove pump and gasket. Cover open port.

b. *Inspection.* Connectors and fittings for damaged threads.

c. *Repair or Replacement.*

- (1) Replace pump if malfunction occurs.
- (2) Replace gasket if leaking or damaged.
- (3) Refer to TM 55-2519-335-30&P for repair fuel boost pumps P/N 1C64-1.

NOTE

Drain line is not required for pump P/N 164A-168-1.

d. *Installation.* Install boost pump in forward or aft fuel cell in same manner, except for location and access.

(1) Place gasket on mounting flange of pump. Uncover mounting port of fuel cell. Insert pump partially into port, and connect discharge hose to outlet fitting.

(2) Install frangible clips at 7 and 10 o'clock position for forward cell and at 5 and 8 o'clock position for aft cell when looking up with reference to most aft pump bolt at 12 o'clock position. Install bolts and washers. **TORQUE BOLTS 45-55 INCH POUNDS.**

- (3) Connect seal drain tube to fitting on pump.
- (4) Connect electrical leads from pump to terminal block. (See circuit wiring diagram in Chapter 9.)
- (5) Service fuel cell and check for leaks. Check for proper operation of pump.
- (6) Reinstall access panel.

10-8A. Fuel Boost Pump Cartridge (Crashworthy).

a. *Removal.*

- (1) Disconnect electrical wiring from fuel pump cartridge (2, figure 10-1A.)

WARNING

A bent inlet shut off valve arm may prevent the shut off valve from completely opening causing a restricted flow.

CAUTION

Apply pressure directly over valve spring when opening or closing valve stem assembly. Trying to compress valve spring from free end of valve arm will cause valve arm to bend. When removing or installing shoulder screw, keep valve arm depressed.

- (2) Remove lockwire and screw (5). Turn arm (4) to 180° counterclockwise position.

NOTE

This arm shuts off fuel to the pumping cavity. Upon removal of the cartridge, approximately one pint of fuel will be lost.

- (3) Remove fuel pump drain plug (3) and drain residual fuel from fuel pump into suitable container.
- (4) Remove lockring (6) securing fuel pump cartridge (2) to fuel pump housing (1).
- (5) Remove fuel pump cartridge (2) from fuel pump housing (1) using cartridge remover tool (figure 10-1B). Discard packings (7).
- (6) Clean cartridge cavity and lockring of all foreign matter.

b. *Installation.*

NOTE

Do not use removal tool to install cartridge.

(1) Visually inspect that fuel bleed valve is installed on top of fuel pump housing (1, figure 10-1A) on cartridge type pumps.

WARNING

If fuel bleed valve is not installed, engine surging/flameout will occur when the fuel level is below the top of the fuel boost pump housing and the boost pump is off or inoperative.

(2) Lightly lubricate packings (7, figure 10-1A) using grease (C71). Install packings (7) on new cartridge (2). Insert fuel boost pump cartridge (2) into fuel pump housing (1) ensuring arrows on fuel pump and fuel pump housing align.

(3) Install lockring (6) securing fuel pump cartridge (2) to fuel pump housing (1).

(4) Install fuel pump drain plug (3) into fuel pump. Connect positive electrical lead with the short straight slot screw.

WARNING

A bent inlet shut off valve arm may prevent the shut off valve from completely opening causing a restricted flow.

CAUTION

Apply pressure directly over valve spring when opening or closing valve stem assembly. Trying to compress valve spring from free end of valve arm will cause valve arm to bend. When removing or installing shoulder screw, keep valve arm depressed.

(5) Turn fuel shut-off arm (4) clockwise into position, aligning arm and screw hole. Press shaft end of arm up, install screw (5) with negative electrical lead under screw head and lockwire (C151).

(6) Turn on master switch and fuel pump and check for proper fuel pressure.

10-9. Fuel Cell Fittings.

Fittings on the fuel cells include a filler cap and adapter, sumps, crossover tube elbows, vents, pressure line outlets, and the governor bleed line inlet.

a. Maintenance. Any fuel cell fitting can be removed for replacement of parts to correct leaks, or for access to parts within cells. Observe the following:

(1) Replace defective seal or packing under fitting. Be sure mating surfaces are clean and free of burrs and nicks:

NOTE

Note position of frangible clips on system and reinstall in same location.

(2) If crossover hose elbow on aft cell is removed, make certain that check valve and pin are correctly reinstalled. (See figure 10-1).

NOTE

If valve does not have a locating notch, install according to AFT marking.

(3) If governor bleed return inlet fitting is removed from rear side of aft fuel cell, make certain of correct reassembly. Check valve must be installed with its direction-of-flow arrow pointing into the cell.

(4) TORQUE BOLTS 50 TO 75 INCH-POUNDS.

b. Inspection. Check for leakage after refilling fuel cells and during initial operation.

10-9A. Closed Circuit Refueling Receiver.

a. Description. The closed circuit refueling receiver is located on the fuselage above and forward of the right wing. The receiver accepts either a closed circuit refueling nozzle or a gravity fill nozzle. The receiver is capable of accepting fuel at a rate of 100 gallons per minute (GPM). The receiver automatically shuts off when system fuel is full, system internal pressure exceeds 2.5 psi, or flow rate exceeds 130 GPM.

b. Removal.

(1) Defuel as required.

(2) Remove screws (1, figure 10-1) and washers (1A).

(3) Remove receiver assembly (1B) with retainer (3), gasket (3B), and packing (2).

- c. *Inspection.* Inspect for damage, freedom of operation, and corrosion.
- d. *Repair or Replacement.* Replace if defects in paragraph C are noted.
- e. *Installation.*

- (1) Position packing (2, figure 10-1), gasket (3B), retainer (3), and receiver (1B) into fuselage.
- (2) Install screws (1) and washers (1A). Torque bolts evenly 50 to 70 inch-pounds.

10-9B. Defuel and Sump Drain Valve (Aft Fuel Cell).

a. *Description.* A defuel and sump drain valve (45 and 47, figure 10-1) is installed on the bottom of the helicopter beneath the aft fuel cell. The valve is a two-piece valve which will automatically close the valve opening when the lower valve is removed for defueling and draining. A special fitting is required to open the upper valve for defueling and draining operations. The valve will drain fuel from both the forward and aft fuel cells.

b. *Removal.*

- (1) Defuel forward and aft fuel cells (paragraph 1-2c).
- (2) Remove access cover beneath aft fuel cell.
- (3) Disconnect clamp and remove hose (46, figure 10-1).
- (4) Cut lockwire and remove lower valve assembly (47).
- (5) Remove bolts (44), washers (43), frangible clips (42), and plate (41).

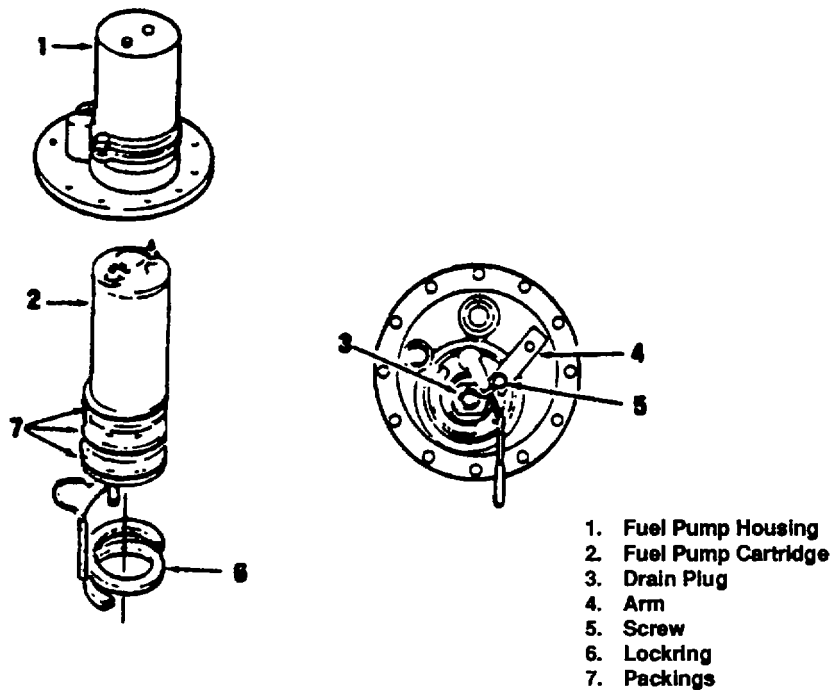


Figure 10-1A. Fuel Boost Pump Cartridge

(6) Remove nut (39) and upper valve (45). Remove packings (40, 48, and 49).

c. Inspection.

(1) Inspect valve for cracks and damaged threads.

(2) Inspect shutoff function of upper valve for damage that would allow leakage.

d. Repair and Replacement.

(1) Replace valve having cracks and/or damaged threads.

(2) Replace valve having faulty shutoff operation.

e. Installation.

(1) Place packing (49, figure 10-1) on upper valve (45), insert in plate (41), and install nut (39).

(2) Install packing (48), lower valve (47) and lockwire (C151).

(3) Connect hose (46) to lower valve.

(4) Place packing (40) in position and install plate (41) using frangible clips (42) at 5 and 8 o'clock positions, washer (43) and bolts (44). Torque bolts 50 to 70 inch-pounds.

(5) Install access cover.

10-9C. Sump Drain Valve (Forward Fuel Cell).

a. Description. The sump drain valve (57, figure 10-1) is located beneath the forward fuel cell. The valve provides a means of draining residual fuel from the forward fuel cell.

b. Removal.

(1) Defuel forward and aft fuel cells (paragraph 1-2c).

(2) Remove access cover.

(3) Disconnect clamp and remove hose (58, figure 10-1).

(4) Remove bolts (55), washers (54), frangible clips (53), and fitting assembly (52).

(5) Remove nut (51) and valve (57). Remove packings (50 and 56).

c. Inspection.

(1) Inspect valve for cracks and damaged threads.

(2) Inspect valve for correct operation of shutoff function.

d. Repair and Replacement.

(1) Replace valve having cracks and damaged threads.

(2) Replace valve having faulty shutoff operation.

e. Installation.

(1) Place packing (56, figure 10-1) on valve (57), insert in fitting assembly (52) and install nut (51).

(2) Place packing (50) in position and install fitting assembly (52) using frangible clips (53) at 2 and 5 o'clock position, washers (54) and bolts (55). Torque bolts 50 to 70 inch-pounds.

(3) Connect hose (58) to valve (57).

(4) Install access cover.

10-10. Hose and Tubing.

a. Inspection.

(1) Inspect hose for breaks, kinks, abrasions, deterioration and leaking fittings.

(2) Inspect tubes for bends, dents and leaking fittings.

b. Repair or Replacement. Replace hose and tubing if inspection requirements are not met.

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Section II. FUEL CELLS

10-11. Fuel Cells.

The two fuel cells are removable units enclosed in separate cavities in the fuselage between the two main longitudinal beams. All openings in cells are provided with metal fittings bonded into the laminated plies of the cell walls. Each fitting has a circle of threaded inserts for attachment of equipment or fuel line fittings and for securing the cell to fuselage structure by means of frangible clips. The inherent rigidity of the cells eliminates the need for hangers or nylon cords.

Premaintenance Requirements for Fuel Cells

Conditions	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	(S3) and (S6) Vapor Proof Flashlight
Minimum Personnel Required	Two
Consumable Materials	(C14) (C37) (C87) (C88) (C 119)
Special Environmental Conditions	70 ° or above

a. Inspection - Fwd Fuel Cell (Figure 10-1.)

- (1) Defuel aircraft. (Refer to Chapter 1.)

NOTE

The access panel just ahead of the wings can be removed without prior removal of the wing.

- (2) Remove 12 screws (1), retainer (3) and refueling receiver (21).
- (3) Feel the interior of the cell, horizontal shelf below the receiver, forward and aft vertical wall for activation.

CAUTION

Use safety precautions with electrical device. Use only a sealed battery powered light.

(4) A fuel cell may be questionable when inspected along the shelf area and an additional inspection may be required. Additional inspection is performed by completely draining the fuel system and removing the fuel pump and frangible mounting clips around the cell fitting. The feel test is then performed inside and outside the cell bottom. In addition to any sponginess that may be detected from the inside the cell, wetness that can be felt on the bottom exterior is cause for cell removal and possible additional inspection.

- (5) If the fuel cells have a separated or activated liner, remove and replace immediately.
- (6) If the packing (2) was pulled from its groove in the cell it must be replaced.
- (7) Remove and replace packing on fuel pump mounting flange.
- (8) Fuel cells that are acceptable Replace all items removed. **TORQUE SCREWS TO 45 55 INCH-POUNDS.**

b. Removal Forward Fuel Cell. (AVIM)

- (1) Defuel system and remove access panel.
- (2) Disconnect electrical leads and remove boost pump assembly (32, figure 10-1). (Refer to paragraph 10-8.) Disconnect fuel hose (6).

(3) Disconnect electrical leads of float switch (38). Disconnect drain hose from valve (35). Remove two bolts, spacers and frangible clips (14), securing cell to fuselage structure. Remove four remaining bolts securing sump fitting to fuel cell. Remove fitting with drain valve and float switch from aircraft.

- (3.1) Remove left wing (Refer to Chapter 2).
- (4) Remove screw mounted access panel from left side of fuselage just ahead of wing.
- (5) Remove left and right side access panels located below wings. Loosen clamp (33) on fuel

crossover. Remove four bolts, frangible clips, washers and spacers from bulkhead crossover flanges and fuel cell. Remove six bolts and washers from crossover and cell flange.

(6) Open hydraulic compartment access doors.

(7) Remove ECU (Refer to chapter 13).

(8) Remove fuel quantity transmitter probe (23). (Refer to Chapter 8.)

(9) Disconnect hose assemblies at vent and fuel discharge fitting installed in access plate cover at hydraulic compartment floor. Remove five bolts and frangible clips securing cell to fuselage structure. Remove remaining bolt securing fitting to fuel cell. Remove fitting from aircraft.

(10) Remove filler cap, closed circuit receiver, packing, retainer and mounting screws from right side of fuselage.

(11) Remove forged fitting, located on inner access panel near lower forward corner, by removing two bolts at base of fitting and four bolts and washers which secure fitting to panel. Keep bolts, radius block, and shim with fitting.

(12) Remove screw-mounted inner panel from fuselage beam.

(13) Remove screws which secure upper fuel cell access panel to left side of fuselage at contour. Remove panel

(14) Remove clamps and ties from structure and cable assemblies as necessary to obtain a clear area for cell removal from left side. Tie cable assemblies out of the way.

(15) Collapse upper portion of fuel cell inward to clear beam. Collapse cell downward and remove from cavity.

(16) Preserve fuel cell by fogging with oil (C91). Cover cell openings with barrier material (C30).

c. Removal Aft Fuel Cell. (AVIM)

(1) Defuel system and remove lower skin panel.

(2) Remove seal drain tube, (36, figure 10-1) and boost pump (32). (Refer to paragraph 10-8a.)

(3) Disconnect electrical leads of float switch. Remove nut and cover securing switch fitting to structure. Remove two bolts securing switch fitting to cell. Remove fitting and switch from aircraft.

(4) Remove clamp and hose from defuel and sump drain valve. Remove two bolts and frangible clips securing valve, plate and cell to fuselage structure. Remove four remaining bolts and washers securing valve and plate to fuel cell. Remove valve and plate from aircraft.

(5) Remove left and right side access panels located below wings. Loosen clamp (33) on fuel crossover. Remove four bolts, frangible clips, washers and spacers from bulkhead crossover flanges and fuel cell. Remove six bolts and washers from crossover and cell flange.

(6) Disconnect engine hose from governor bleed coupling (29). Remove oil cooler intake duct from left side of fuselage for access. Disconnect bleed line from check valve (15). Remove two bolts, frangible clips and washers securing plate (with check valve attached) and cell to structure. Remove two bolts and washers securing plate to cell.

(7) Open transmission cowling. Remove induction baffles for access to top ports of aft fuel tank cell. (Refer to Chapter 4.)

(8) Disconnect hose assembly (24) by removing six bolts and frangible clips securing hose fitting to fuselage structure.

(9) Remove fuel quantity transmitter probe (23). (Refer to paragraph 10-7a.) Remove four cell attachment screws and washers.

(10) Disconnect fuel pressure line hose from tank outlet fitting on left side of deck, behind valve manifold. Remove two bolts and frangible clips securing fitting to fuselage structure. Remove two bolts and washers securing fitting to cell. Remove fitting from aircraft.

(11) Install fitting and jack at aft jack point. Raise jack only until snug against fitting.

CAUTION

Prior to removal of aft fuel cell access panel, perform procedure outlined in paragraph 2-13.

(12) Remove mounting screws and aft fuel cell access panel from right side of fuselage directly behind wing attachments.

(13) Collapse and remove fuel cell.

(14) Preserve fuel cell by fogging with oil (C91). Cover cell openings with barrier material (C30).

d. Cleaning. (AVIM)

(1) Remove surface dirt and grime by scrubbing the fuel cell with warm, soapy water. Air dry surface.

Change 8 10-8A/(10-8B blank)

(2) Purge fuel cell thoroughly with fresh air; scrub and rinse with warm, soapy water; and rinse in clean, clear water. Air dry.

e. Inspection - Both Cells. (AVIM)

(1) Inspect all interior and exterior surfaces for loose seams, cuts, abrasions, scuffed surfaces, tears, blisters, and for any area that appears to have become soaked with fuel (activated).

NOTE

An activated fuel cell is a cell that has absorbed fuel in the inner liner. The walls of the cell are flabby and spongy. The inner liners are separated and ballooned from the structure. It must be understood that a serviceable cell may have blemishes. These blemishes do not have a spongy feeling. These blemishes are not cause for rejection.

(2) Inspect metal fittings to make certain protective finishes are intact and the coil-type inserts are installed in good condition.

(3) The following damages are prohibited for field repair and can be repaired only by an authorized fuel cell overhaul depot.

(a) Pass through holes (holes made by a projectile that enters through one surface of the fuel cell and exits through the opposite surface).

(b) Damage that extends into a corner or stepped-off area or that involves a cut longer than 4.0 inches, or that is caused by the seepage or diffusion of fuel between the fabric plies.

f. Repair. (AVIM)

(Information not available)

g. Installation Forward Fuel Cell. (AVIM)

(1) Check fuselage cavity, including access panels, to be free of any foreign objects or rough surfaces which could damage fuel cells.

(2) Wipe surfaces with a cloth saturated with solvent (C124) and wipe dry with a clean cloth before solvent evaporates. Use methyl-ethylketone (C87) on bare metal surfaces, aliphatic naphtha (C88) on surfaces of other materials.

(3) Remove old sealing compound from edges of access panels and mating surfaces on structure.

(4) Partially flatten fuel cell by pushing in on sides allowing cell to collapse downward (see figure 10-2). Apply straps or large diameter ropes vertically around cell to temporarily retain this shape. Sprinkle with talcum powder and place fuel tank cell in cavity, remove straps or ropes and allow cell to expand. Align all fittings with openings in structural panels.

NOTE

The materials and construction features of the cell used in the crashworthy system results in fuel cells that are rigid and self-supporting. Ease of installation of the cells is related to temperatures of the cells and the work area. As a general rule a temperature above 70°F is desirable in the work area when installing the cells. Heat can be applied to the cell provided a temperature of 120°F is not exceeded.

A "T" handle, fabricated per figure 10-3 can be used to align fuel cell fittings to structure openings. The tool is inserted through the hole in the structure and screwed into the fitting. Manipulate the fitting as desired by grasping the "T" handle.

CAUTION

Do not fold the fuel cell if the ambient temperature of the work area is less than 70 degrees F. Move cell into warm area before folding cell. Do not allow the fuel cell to remain in its folded condition for more than 30 minutes. Non-visible permanent damage to cell walls may occur. Do not use wire or other thin diameter material to restrain cell, permanent damage to self-sealing characteristics of the cell could result.

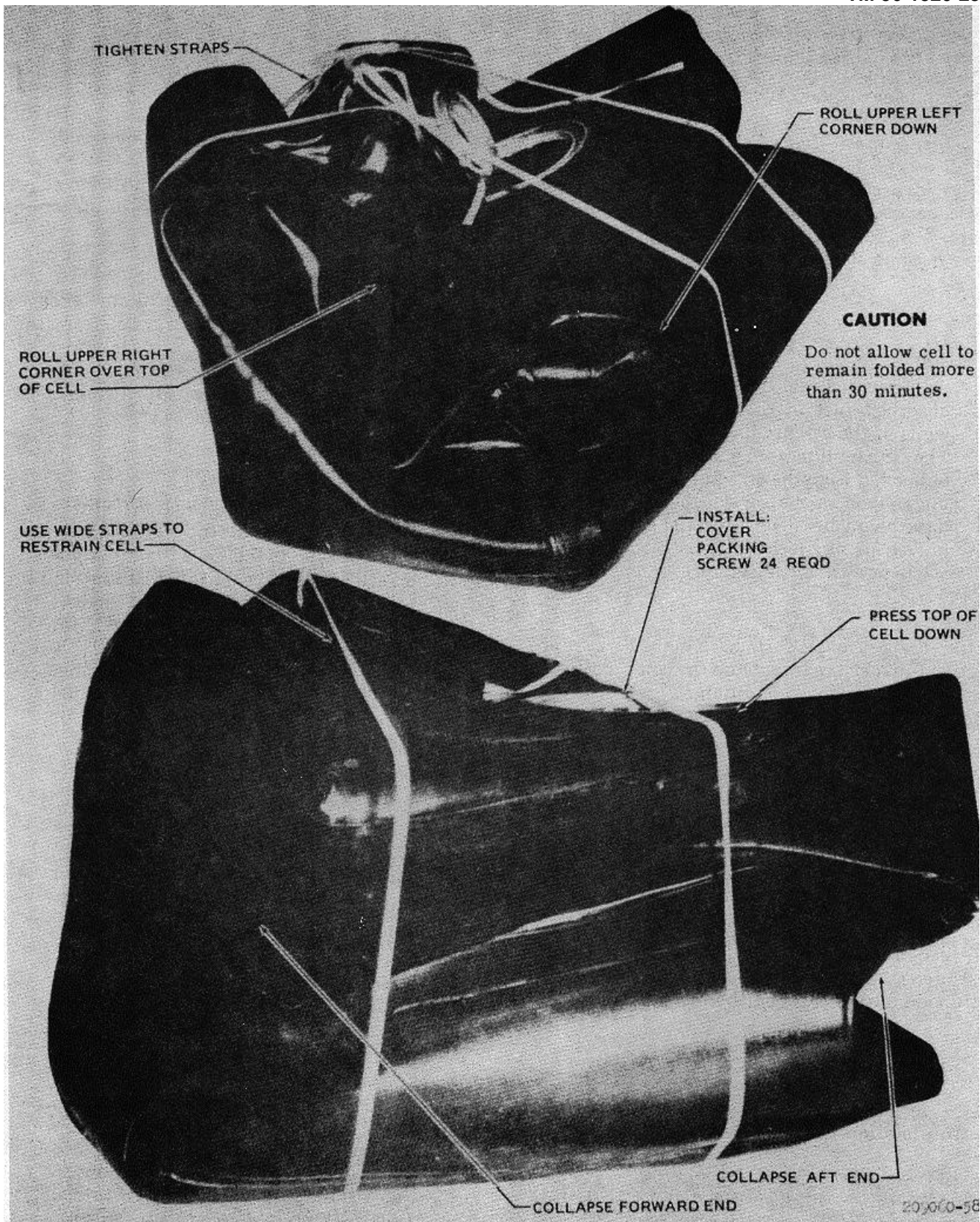


Figure 10-2. Collapsing forward fuel cell

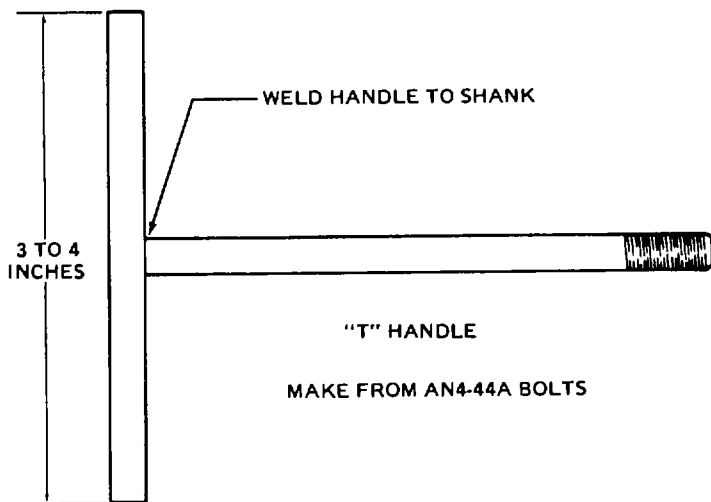
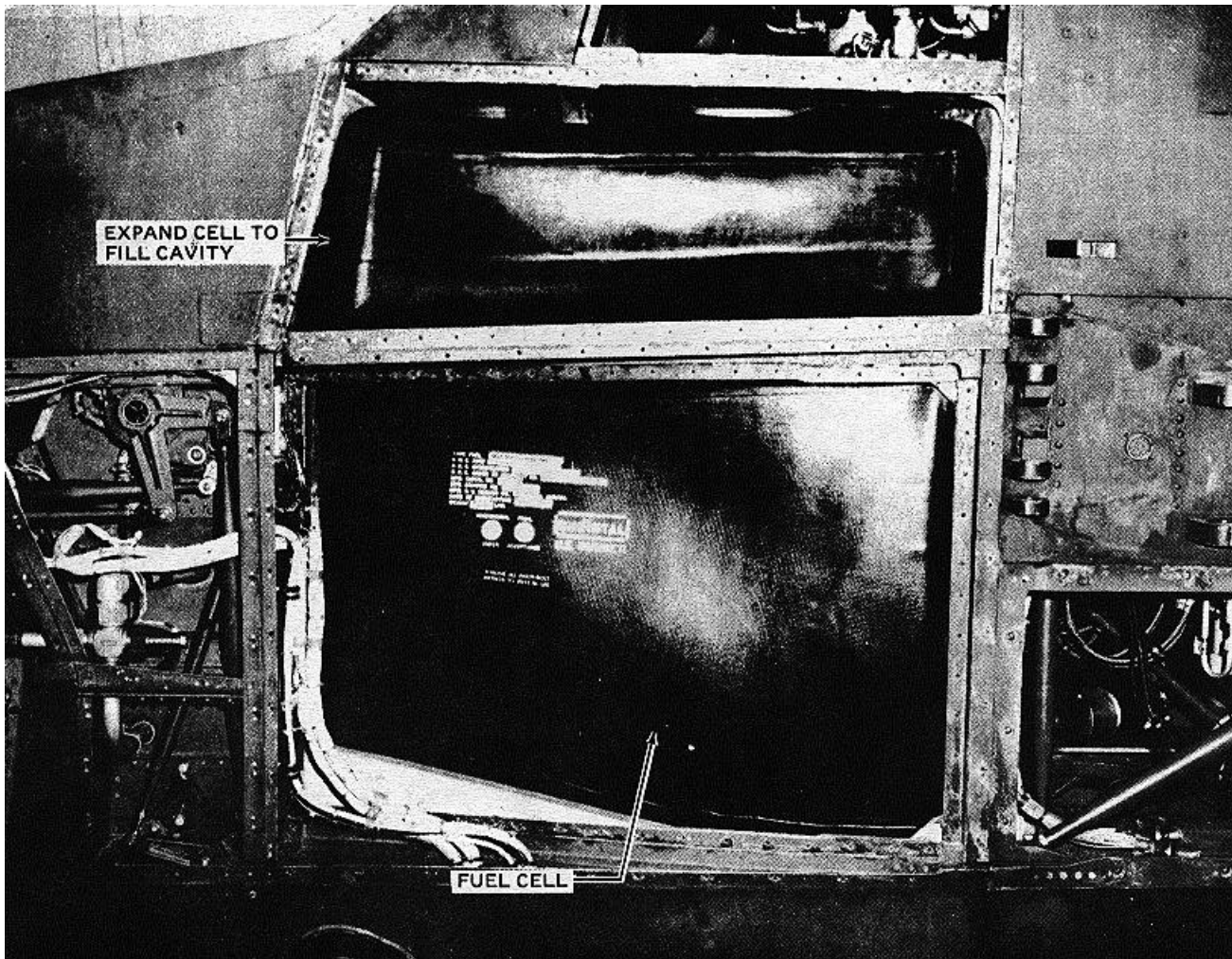


Figure 10-3. Installed forward fuel cell

NOTE

In the following instructions do not tighten bolts securing frangible clips to structure until all clips have been installed and fuel cell properly positioned. To ensure a satisfactory seal at bolted connections, alternately snug up and torque opposite bolts at each connection.

(5) Install vent and fuel discharge fitting (22, figure 10-1) and hose (37) in fuel cell access plate cover at hydraulic compartment floor.

(6) Install fuel quantity transmitter probe (23). (Refer to Chapter 8).

(7) Install retainer, packing and closed circuit receiver at right side of fuselage.

(8) Connect fuel hose and install boost pump assembly (32). (Refer to Chapter 8.)

(9) Install drain valve and float switch fitting in fuel cell and aircraft structure. Lockwire drain valve.

(10) Install fuel crossover hose to cells and aircraft structure. Install clamp.

(11) Install drain hose to valve (35). Install clamp.

(12) Adjust position of cell in cavity so that all frangible clips are bearing on aircraft structure. **TORQUE BOLTS SECURING CLIPS TO CELL AND STRUCTURE 45- 55 INCH-POUNDS.**

(13) Position inner access panel to opening in left main beam. Apply sealing compound (C119) to provide fume-tight seal between mating surfaces. Install screws and thin aluminum alloy washers.

(14) Position forged tension fitting on matching holes near lower forward corner of beam access panel. Reinstall shim underbase of fitting. Install high-tensile bolt (NAS 624-14), with radius block under head, in aft bolt hole of base. Install bolt (NAS 1304-8), with thin steel washer, in forward bolt hole of base. Install four bolts, with thin steel washers, through upright leg of fitting into inserts of panel.

(15) Connect electrical leads of float switch, boost pump and transmitter.

(16) Return cable assemblies installation to original configuration at left side access panel.

(17) Install outer access panel with screws on fuselage ahead of wing location.

(18) Install left wing. (Refer to Chapter 2.)

(19) Pressure test fuel system.

CAUTION

Do not use masking tape to seal openings.

(a) Cap main fuel lines and vent connections.

(b) Use regulated low pressure (3/4 to 1 PSI, IAW TM 55-1500-204-25/1) filtered, compressed air source with manometer or accurate gage and shutoff valve.

CAUTION

Do not apply excessive pressure, as severe damage to cell and structure may result.

(c) Apply pressure until gage indicates 3/4 to 1 PSI in cells and crossover tubes. Shut off air pressure. Cells should hold this pressure for 15 minutes.

(d) Locate and correct any leakage indicated by loss of pressure, and repeat tests until results are satisfactory.

(e) Refuel aircraft.

CAUTION

Do not operate electrical equipment while defueling or refueling aircraft.

(20) Install access panels below wings and on lower skin.

h. Installation-Aft Fuel Cell.

(1) Check fuselage cavity, including access panel for freedom from foreign objects or rough surfaces which could damage fuel cell.

(2) Wipe surfaces with a cloth saturated with solvent (C124) and wipe dry with a clean cloth before solvent evaporates. Use methyl-ethyl-ketone (C87) on bare metal surfaces, and aliphatic naphtha (C88) on surfaces of other materials.

(3) Remove old sealing compound from edges of access panel and mating surfaces on structure.

(4) Partially flatten fuel cell by pushing in on sides, allowing cell to collapse downward (see figure 10-4). Apply straps or ropes vertically around cell to temporarily retain this shape. Place fuel tank cell in cavity, remove straps or ropes and allow cell to expand.

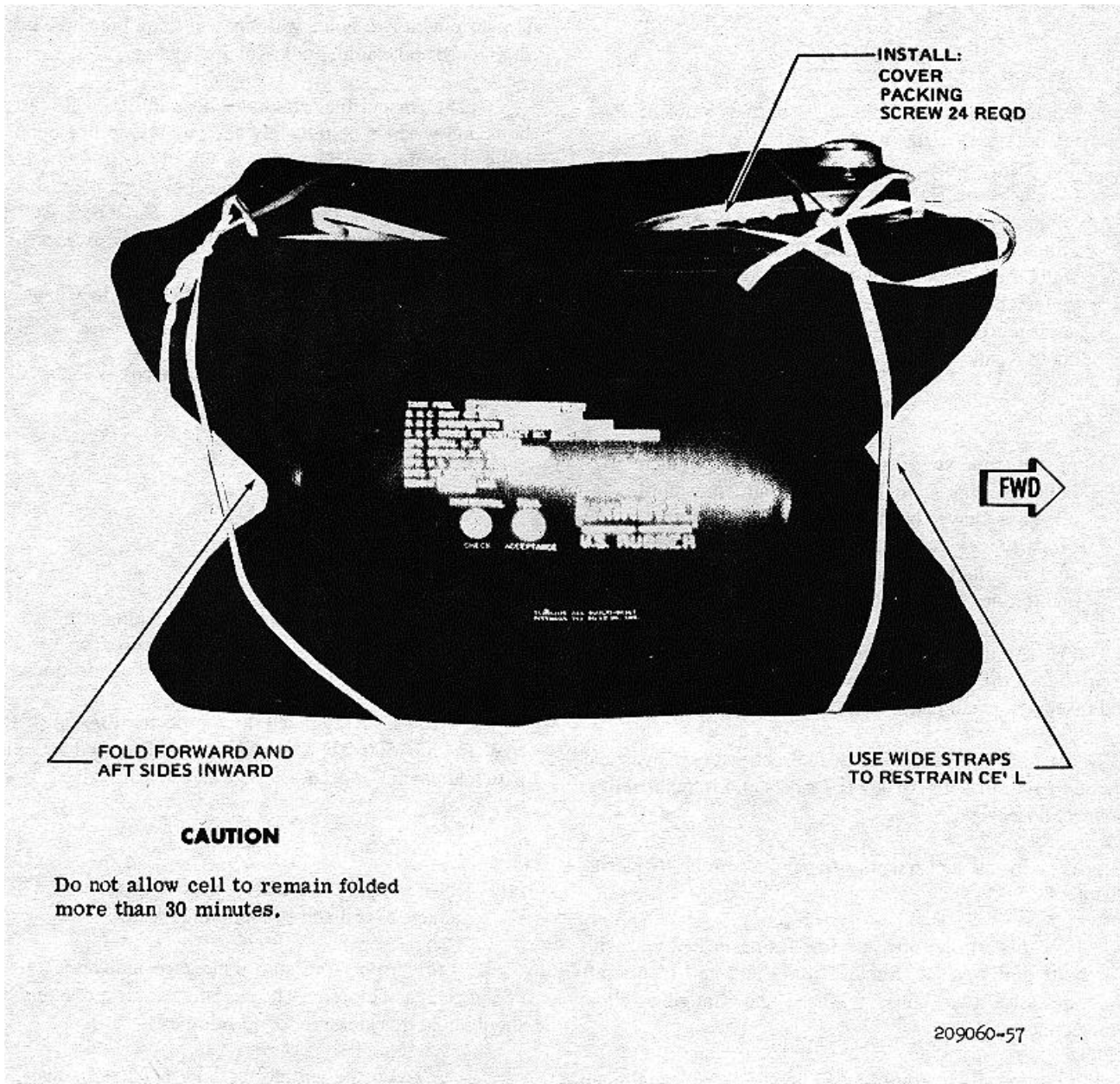


Figure 10-4. Collapsing aft fuel cell

Align all fittings with openings in structural panels.

CAUTION

Do not fold the fuel cell if the ambient temperature of the work area is less than 70 degrees F. Move cell into warm area before folding cell. Do not allow the fuel cell to remain in its folded condition for more than 30 minutes. Non-visible permanent damage to cell walls may occur. Do not use wire or other thin diameter material to restrain cell, as permanent damage to self-sealing characteristics of the cell could result.

NOTE

In the following instructions do not tighten bolts securing frangible clips to structure until all clips have been installed and fuel cell properly positioned. To ensure a satisfactory seal at bolted connections, alternately snug up and torque opposite bolts at each connection.

(5) Apply low-adhesion sealing compound (C119) to provide fume-tight seal between mating of access panel and fuselage. Install panel with mounting screws.

(6) Install vent fitting in fuel cell access cover and secure to aircraft with six bolts, washers and frangible clips. Connect hose.

(7) Install fuel quantity transmitter probe. (Refer to Chapter 8.)

(8) Install fuel pressure line fitting in fuel cell with two bolts and washers. Secure fitting and cell to aircraft structure with two bolts, washers and frangible clips. Connect hose

(9) Install governor bleed line check valve and plate to fuel cell with two bolts and washers. Secure plate to aircraft structure with two bolts, washers and frangible clips. Connect hose.

(10) Install boost pump and drain tube (refer to Chapter 8).

(11) Install float switch fitting with two washers and bolts. Secure fitting and cell to aircraft structure. Install nut and cover securing switch fitting to aircraft structure.

(12) Install defuel and sump drain valve in fuel cell with four washers and bolts. Secure valve, plate and cell to structure with two bolts, washers and frangible clips. Install drain hose and clamp. Lockwire drain valve.

(13) Install fuel crossover hose to fuel cell with six bolts and washers. Alternately snug up and torque opposite bolts to ensure a satisfactory seal. Install crossover hose and cell to fuselage structure with four bolts, washers, spacers and frangible clips. (See note above). **TORQUE BOLTS 45-55 INCH POUNDS.** Install clamp on crossover hose.

(14) Install induction baffles. (Refer to Chapter 4, Section III.)

(15) Close left and right side access panels below wings.

(16) Remove jack.

(17) Pressure test fuel system.

CAUTION

Do not use masking tape to seal openings.

(a) Cap main fuel lines and vent connections.

(b) Use regulated low pressure (3/4 to 1 PSI, IAW TM 55-1500-204-25/1) filtered, compressed air source with manometer or accurate gage and shutoff valve.

CAUTION

Do not apply excessive pressure, as severe damage to cell and structure may result.

(c) Apply pressure until gage indicates 3/4 to 1 PSI in cells and crossover tubes. Shut off air pressure. Cells should hold this pressure for 15 minutes.

(d) Locate and correct any leakage indicated by loss of pressure, and repeat tests until results are satisfactory.

(e) Refuel aircraft.

CAUTION

Do not operate electrical equipment while defueling or refueling aircraft.

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**CHAPTER 11
FLIGHT CONTROLS**

11-1. Flight Controls.

The primary flight control systems are the main rotor collective, fore-and-aft cyclic and lateral cyclic, and tail rotor controls. Each of these is a system of mechanical linkage, assisted by hydraulic servo cylinders, connecting the pilots and gunners control sticks and pedals to those mechanisms which rotate with and directly control the main rotor and tail rotor. Main rotor cyclic and tail rotor controls incorporate electrically operated magnetic brakes and force trims to steady the stick and pedals against movement of their own accord and to induce artificial control feel. The main rotor cyclic and tail rotor controls also incorporate a stability and control augmentation system (SCAS). The abbreviation (SAS) was used formerly and still appears on some control sticks and circuit breaker panels. The pilot has the option to use the SCAS system or to turn it off at the SCAS control panel. A separate system of control linkage for operation of the synchronized elevator is attached to the fore-and-aft cyclic control at the swashplate.

11-2. Troubleshooting.

The following information is provided as an aid in adjusting cyclic and collective sticks for proper feel and tension.

Table 11-1. Troubleshooting - Flight Controls

NOTE

Before you use this table, be sure you have performed all normal operational checks.

CONDITION

TEST OR INSPECTION

CORRECTIVE ACTION

1. Collective stick light or heavy in downstroke.

STEP 1. Balance spring on collective cylinder out of adjustment.

Adjust spring on servo valve to provide proper force to move collective equally in either direction. Refer to paragraph 7-11.)

STEP 2. Friction nut out of adjustment.

Adjust friction nut on pilot and gunners sticks and/or friction clamp at base of pilots collective stick. (Refer to paragraph 11-7.d.)

2. Cyclic feels loose, has tendency to fall to left or right.

STEP 1. Friction nut loose.

Adjust friction nut. (Refer to paragraph 11-10.f.)

Table 11-1. Troubleshooting - Flight Controls (Cont)

CONDITION	TEST OR INSPECTION	CORRECTIVE ACTION
-----------	--------------------	-------------------

	STEP 2. Tension weak on force gradient spring.	
--	--	--

		Replace spring. (Refer to paragraph 11-16.b.)
--	--	---

3.	Gunners cyclic stick will not remain AFFIXED in the neutral position.	
----	---	--

	STEP 1. Idler spring weak or broken.	
--	--------------------------------------	--

		Replace spring. (Refer to paragraph 11-9.)
--	--	--

11-3. Bellcranks, Levers, and Waking Beams - Cyclic, Collective, Anti-Torque and Synchronized Elevator Systems.

The cyclic, collective, anti-torque, and synchronized elevator systems include push-pull tubes, bellcranks, and walking beams to actuate the movement of controls from the control stick to the proper unit.

a. Removal.

- (1) Remove access cover.

NOTE

Parts of control system can be removed separately as need occurs, or completely in practical sequence. Take precautions against accidental movement of linkage while disconnected.

- (2) Remove component as required.

b. Inspection.

- (1) Inspect bearings for wear and/or damage in excess of limits. Refer to paragraph 115.

NOTE

Inspect all parts for corrosion and for mechanical damage in accordance with steps (2) through (5) following. In addition, specific damage limits are given in figures 11-IA through 11-ID. Further specific damage limits to be furnished.

- (2) Inspect for nicks, dents and scratches.

- (3) Inspect for corrosion.

- (4) Inspect bolt holes for wear. Maximum allowable elongation is 0.005 inch.

- (5) Inspect area on surfaces surrounding bolt holes for mechanical and corrosion damage. Maximum allowable repair of mechanical and/or corrosion damage within distance of one diameter from edge of hole is 25 percent of area.

c. Repair.

- (1) Polish out minor corrosion and mechanical damage that does not exceed inspection limits. Do not remove more material than necessary to blend repair smoothly into surrounding surface. Use fine to medium grade of sand paper (C112) or crocus cloth (C45). Do not use grinding wheels. Polish out mechanical damage only deep enough to remove traces of damage. Polish out corrosion damage to twice the depth of the deepest pit.

- (2) Touch up repair area on aluminum parts with chemical film (C37) and primer (C102). Touch up repair area on steel parts with primer (C102).

- (3) Refer to paragraph 11-5 if bearings are worn beyond inspection limits.

d. *Installation.*

- (1) Install components removed for inspection and repair. See illustrations in this Chapter and refer to TM 55-1520-234-23P for detail part descriptions.
- (2) Check complete control system for security and safetying of components.
- (3) Move controls through full throw and ensure there is no binding or interference.
- (4) Install access panels.

e. *Functional Check.*

- (1) Perform operational check of affected system.
- (2) Perform maintenance test flight.

11-4. Control Tubes - Cyclic, Collective, Anti-Torque and Synchronized Elevator Systems.

The flight control system control tubes (connecting links) are used in all the flight control systems. Fixed length connecting links are used as much as possible, but adjustable lengths are required in some locations to rig the controls.

Premaintenance Requirements for
Control Tubes - Cyclic, Collective,
Anti-Torque and Synchronized
Elevator System

Conditions	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	None
Test Equipment	Force Gauge (Fish Scale)
Support Equipment	None
Minimum Personnel Required	Two
Consumable Materials	(C37) (C45) (C102) (C112)
Special Environmental Conditions	None

a. *Removal.*

- (1) Remove access cover.

NOTE

Parts of control system can be removed separately as need occurs, or completely in practical sequence. Take precautions against accidental movement of linkage while disconnected.

(2) Remove control tubes as required.

b. Inspection.

(1) Inspect tube portion for scratches and score marks as follows:

(a) Maximum allowable dents when scratches and scores are less than 45 degrees to lengthwise center line of tube is **0.010** inch.

(b) Maximum allowable depth when scratches and score marks are more than 45 degrees to center line of tube is **0.005** inch.

(2) Inspect tube portion for corrosion damage. Maximum allowable depth is **0.005** inch before repair and **0.010** inch after repair.

(3) Maximum allowable width of repair area at any given section of tube is one-third of tube circumference.

(4) No thread damage is acceptable. No repair to any surface is acceptable if the repair will affect threads.

(5) Inspect devices and rod ends for nicks, scratches and corrosion. Maximum allowable depth of mechanical damage is **0.010** inch. Maximum allowable corrosion damage is **0.005** inch before repair and **0.010** after repair.

(6) Inspect bolt holes for wear. Maximum allowable wear is **0.005** inch.

(7) Inspect area on surfaces surrounding bolt holes for mechanical and corrosion damage. Maximum allowable repair of mechanical and/or corrosion damage within distance of one diameter from edge of hole is **25** percent of area.

(8) Inspect bearings for wear and/or damage in excess of limits. Refer to paragraph 11-5.

c. Repair.

(1) Polish out minor corrosion and mechanical damage that does not exceed TM 56-1620-23423 inspection limits. Do not remove more material than necessary to blend repair smoothly into surrounding surface. Use fine to medium grades of sandpaper (C112) or crocus cloth (C45). Do not use grinding wheels. Polish out mechanical damage only deep enough to remove traces of damage. Polish out corrosion damage to twice the depth of the deepest pit.

(2) Touch up repair area on aluminum parts with chemical film (C37) and primer (C102). Touch up repair area on steel parts with primer (C102).

(3) Refer to paragraph 11-5 if bearings are worn beyond inspection limits.

d. Installation.

(1) Install components removed for inspection and repair. See figures 11-1, 11-5, 11-6 and 11-11.

(2) Check complete control system for security and safetying of components.

(3) Work controls through full throw and ensure there is no binding or interference.

(4) Install access panels.

e. Functional Check.

(1) Perform operational check of affected system.

(2) Perform maintenance test flight. Refer to TM 55-1520-234-MTF.

11-5. Bearings - Cyclic, Collective, Anti-Torque, and Synchronized Elevator System.

Bearings in this paragraph are installed in force gradient rod ends, bellcranks, levers, and other components of the control systems. Inspect and replace in accordance with this paragraph and with TM 55-1500-204-25/1.

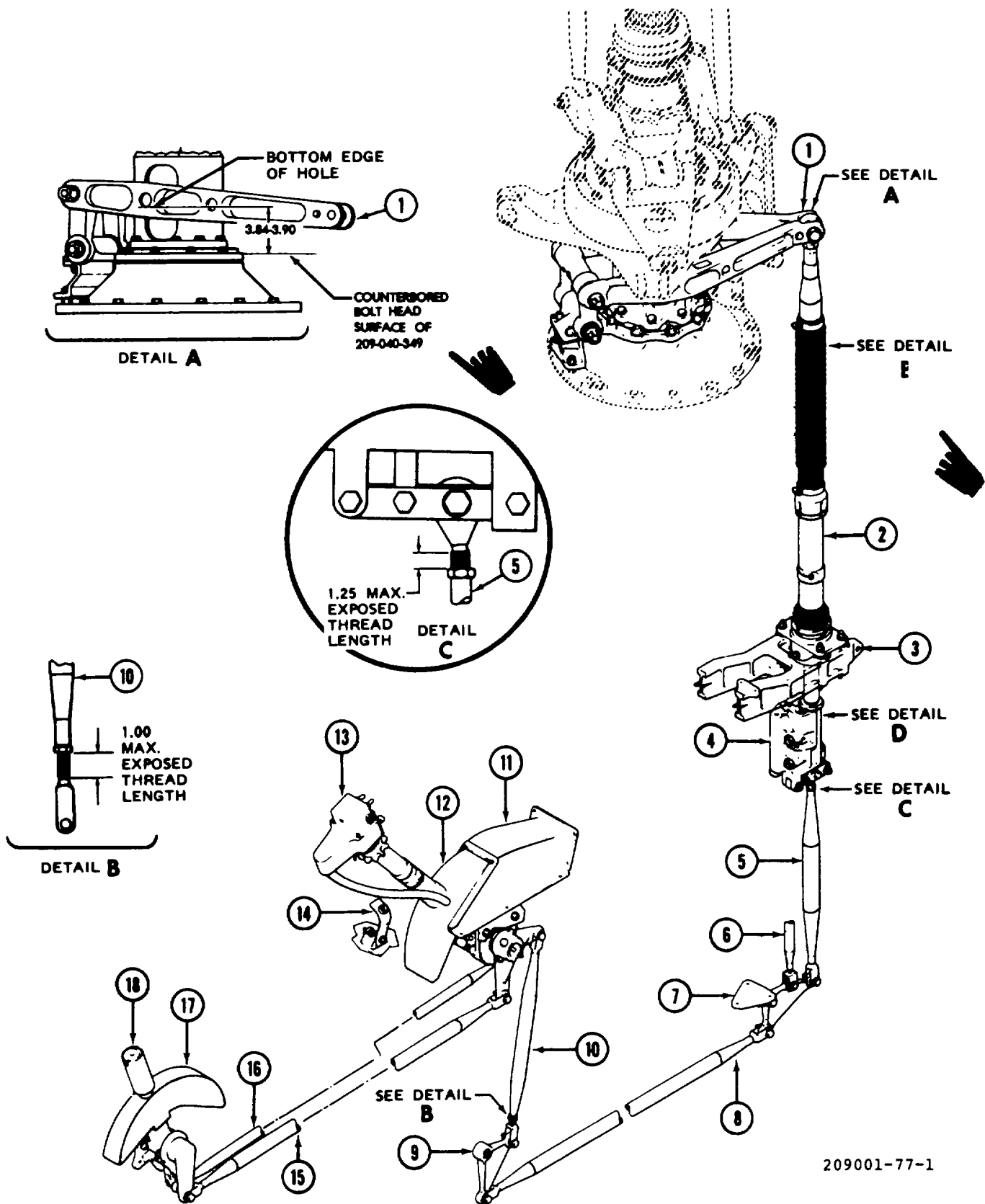
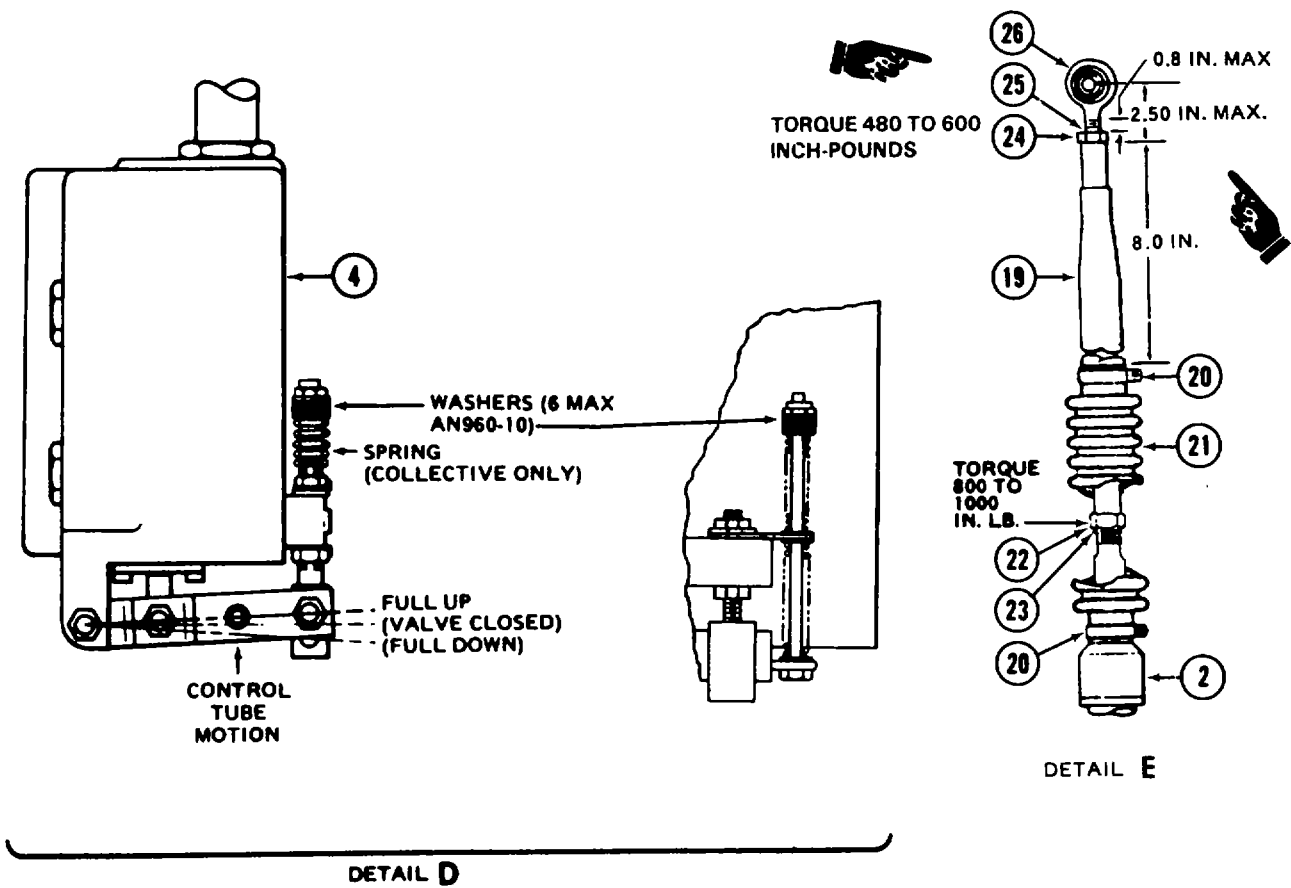


Figure 11-1. Collective controls (Sheet 1 of 2)



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- | | |
|-------------------------------------|--------------------------------------|
| 1. Collective Lever | 14. Down — Lock Strap |
| 2. Hydraulic Cylinder | 15. Connecting Link |
| 3. Cylinder Support | 16. Connecting Link |
| 4. Hydraulic Cylinder Valve | 17. Boot |
| 5. Tube Assembly | 18. Gunners Collective Control Stick |
| 6. Droop Compensator Control Tube | 19. Extension Tube |
| 7. Bellcrank and Support | 20. Clamp |
| 8. Connecting Link | 21. Boot |
| 9. Bellcrank | 22. Nut |
| 10. Connecting Link | 23. Lock |
| 11. Cover | 24. Nut |
| 12. Boot | 25. Lock |
| 13. Pilots Collective Control Stick | 26. Rod End Bearing |

Figure 11-1. Collective controls (Sheet 2 of 2)

Premaintenance Requirements for Bearings - Cyclic, Collective
Anti-Torque and Synchronized Elevator Systems

Conditions	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	Drill Press, Arbor Press, Roll Staking Tool
Minimum Personnel Required	Two
Consumable Materials	C36, C37, C87, C88, C102, C112
Special Environmental Conditions	None

a. *Removal.* Remove part in which bearing is installed if thorough bearing inspection is required.

b. *Inspection.* Inspect bearings in control system components for freedom and smoothness of operation. Refer to TM55-1500-204-25/1. Inspect for wear. The following wear limits apply:

(1) Force gradient rod ends:

0.012 inch radial

0.030 inch axial

(2) Pivot bearings in bellcranks, levers, walking beams, and pedals.

0.005 inch radial

0.030 inch axial

(3) Rod ends on dual hydraulic cylinder and control tube assemblies. Bearings other than pivots in bellcranks, levers, walking beams, pedal links, stick assemblies, jackshaft, and elevator horn.

0.012 inch radial

0.030 inch axial

c. *Repair.* Bearings in the flight control systems are replaced by one of the following methods:

(1) Bearings which have been staked into housing by roll staking parent metal of housing over chamfered edge of bearing race cannot be replaced. Refer to Detail A, figure 11-1E. Replace part containing bearing. In most cases this will be a pivot point bearing.

(2) Rod end bearings are replaced as a unit. Refer to figure 11-1D, detail C. Rod end may be replaced if it is not bonded into next higher assembly. If rod end is bonded in, replace next higher assembly.

(3) Pregrooved bearings which are roll staked into housing by forcing lip of bearing outer race over chamfer on bore of housing may be replaced. Refer to figure 11-1E, detail B. Replace bearing using steps d. through g.

d. *Removal - Pregrooved Bearings (AVIM).*

(1) Place housing over suitable support with clearance for bearing. Press on outer race to remove bearing. Refer to TM 55-1500-204-25/1.

WARNING

Use adequate ventilation when using methyl-ethyl-ketone (C87). Avoid breathing solvent vapors and avoid prolonged contact with skin.

(2) Clean housing with cheesecloth (C36) and methyl-ethyl-ketone (C87).

e. *Inspection - Housing (AVIM).*

(1) Inspect housing bore for damage. Maximum allowable bore damage is **0.002** inch deep for **one-fourth** of circumference.

- (2) Remove burrs and light scoring from bore and from chamfer with 320 grit or finer sandpaper (C112).

WARNING

Naphtha is extremely flammable. Ground container before dispensing. Use with adequate ventilation and avoid repeated skin contact.

- (3) Inspect housing by penetrant method. Refer to TM 551500-204-25/1. Clean with cheesecloth (C36) and naphtha (C88).

f. Installation Pregrooved Bearing (AVIM).

- (1) Apply chemical film (C37) to hole in housing. Allow to dry one to three minutes. Rinse with water. Dry with cloth, or force dry.

CAUTION

Avoid excessive application of primer (C102). Do not allow primer to enter bearing.

- (2) Apply one coat of primer (C102) to housing hole and bearing outer race just prior to installation.

CAUTION

If extreme interference fit occurs at beginning of press operation, stop and determine cause before proceeding. Do not install bearing with extreme interference fit as it will cause bearing to bind.

- (3) Press bearing into housing hole. Ensure bearing is started square and not cocked.

CAUTION

Undue forcing of the roll staking tool into the outer lip of the pregrooved bearing may cause excessive reduction of the outer lip metal thickness.

NOTE

Stake bearing using standard roll, or ring staking tools.

- (4) Roll or ring stake pregrooved bearings. Use Tool T57A or T57B to stake bearing. Attach tool to a stand type drill press. Operate drill press **250 TO 350 RPM**. Support bearing on lower part of tool and roll stake outer lip of bearing race over housing. Apply reasonably steady hand pressure on drill press for a minimum of ten seconds to allow staking tool to flow metal out. Oil (C93) may be sparingly and cautiously applied to staking area and rolls. Remove all oil immediately after staking. Refer to TM 55-1500-322-24 for complete bearing replacement.

g. Inspection After Staking (AVIM).

- (1) Inspect staked bearing.

(a) Check for correct staking. After staking there shall be no more than **0.008** inch gap between outer housing chamfer and staked lip. See detail B, figure 11-1E.

(b) Check that bearing is square to housing surface.

(c) Check bearing for freedom of movement.

(d) Check for looseness between race and housing. There must be no evidence of bearing walking or looseness.

- (2) Inspect housing by penetrant method. Refer to TM 55-1500-204-25/1.

11-5A. Power Cylinder Support - Lateral Cyclic and Collective Systems.

The flight control power cylinder support is the structural mounting point for the lateral cyclic power cylinder and the collective power cylinder.

The support is mounted at left side of the transmission bay.

a. *Inspection.* Refer to Chapter 2.

b. *Removal.*

- (1) Remove lateral cyclic and collective power cylinder assemblies. Refer to Chapter 7.
- (2) Remove nuts (6, figure 11-1F), washers (5 and 12), and four bolts (11) that attach support to lift beam.
- (3) Remove nuts (7), washers (8 and 9), and two bolts (10).
- (4) Remove nuts (1), washers (2 and 3), and two bolts (4) that attach support to airframe.
- (5) Remove support (13).

c. *Repair.* Refer to Chapter 2.

d. *Installation.*

(1) Attach power cylinder support (13, figure 11-1F) to lift beam with four bolts (11), washers (12 and 5), and nuts (6). Place one washer (12) under bolt head with countersunk side against head, and one washer (5) under nut. Do not tighten.

(2) Attach support to forward carry-through fitting with two bolts (10), washers (8 and 9), and nuts (7). Place one washer (9) under head with countersunk side against head, and one washer (8) under nut. Attach support to aft bulkhead with bolts (4), washers (2 and 3), and nuts (1). Place one washer (3) under head with countersunk side against head, and one washer (2) under nut.

(3) Torque nuts (5) **120 TO 145** inch-pounds. Torque nuts (6) **200 TO 250** inch-pounds. Torque nuts (1) **200 TO 250** inch-pounds.

(4) Install lateral cyclic and collective power cylinder assemblies. Refer to Chapter 7.

11-5B. Power Cylinder Support - Fore and Aft Cyclic System.

The flight control power cylinder support is the structural mounting point for the fore and aft cyclic power cylinder. Support is mounted at right side of the transmission bay.

a. *Inspection.* Refer to Chapter 2.

b. *Removal.*

- (1) Remove fore and aft cyclic power cylinder assembly. Refer to Chapter 7.
- (2) Remove System No. 2 hydraulic pump. Refer to Chapter 7.
- (3) Remove nuts (5, figure 11-1G), washers (2 and 4), and four bolts (1) that attach support (3) to lift beam.
- (4) Remove nuts (6), washers (7 and 8), and two bolts (9) that attach support to bulkhead fitting.
- (5) Remove support (3).

c. *Repair.* Refer to Chapter 2.

d. *Installation.*

(1) Attach power cylinder support (3, figure 11-1G) to lift beam with four bolts (1), washers (2 and 4), and nuts (5). Place one washer (2) under bolt head with countersunk side against head, and one washer (4) under nut. Do not tighten.

(2) Attach support to forward carry-through fitting with two bolts (9), washers (7 and 8), and nuts (6). Place one washer (8) under bolt head with countersunk side against head, and one washer (7) under nut.

(3) Torque nuts (7) **120 TO 146** inch-pounds. Torque nuts (6) **200 TO 250** inch-pounds. Torque nuts (1) **200 TO 250** inch-pounds.

(4) Install System No. 2 hydraulic pump. Refer to Chapter 7.

(5) Install fore and aft cyclic power cylinder assembly. Refer to Chapter 7.

11-6. Collective Controls System.

The collective controls system includes gunner and pilots collective stick assemblies, control tubes (connecting links), bellcranks, and a dual "hydraulic servo cylinder. The hydraulic servo cylinder is connected to the collective lever which actuates the mast-mounted scissors and sleeve assembly to control pitch of the main rotor blades.

Premaintenance Requirements for
Collective Controls

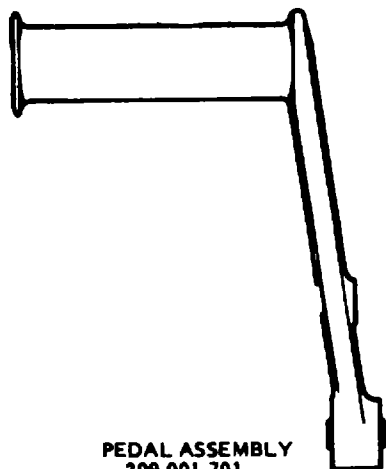
Conditions	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	N/A
Test Equipment	N/A
Support Equipment	Test Stand, Hydraulic
Minimum Personnel required	Two
Consumable Materials	None
Special Environmental Conditions	N/A

a. Inspection Installed Collective Controls System. See figure 11-1.

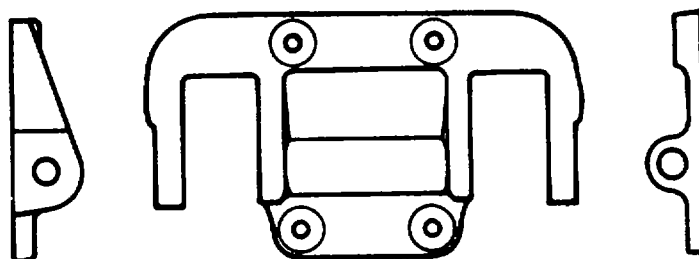
- (1) Inspect control system in place for secure installation, damage and freedom of operation through full throw.
- (2) If required, remove components for detailed inspection. Refer to paragraphs 11-3 and 11-4 for damage limits on bellcranks and control tubes (connecting links). Refer to Chapter 7 for damage limits on hydraulic control cylinder.

b. Rigging. See figure 11-1.

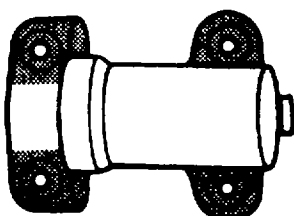
- (1) Accomplish rigging without hydraulic power unless otherwise stated.
- (2) Install all components of the collective control system with the following exceptions:
 - (a) Leave hydraulic cylinder (2) disconnected from collective lever (1).
 - (b) Leave tube assembly (5) disconnected from bellcrank (7).
 - (c) Leave connecting link(6) disconnected from bellcrank (7).
- (3) If connecting link (10) is adjustable, adjust it to length of **22.13** inches between rod end centers and install in helicopter.
- (4) Check breakaway force on collective lever (1) and adjust friction collet on mast if required. Refer to Chapter 5 for correct breakaway force and procedure to adjust friction.
- (5) Place pilots collective control stick (13) full down and apply stick friction to hold in position.
- (6) Loosen jam nut at upper end of tube assembly (5). Push tube assembly (5) up to bottom out piston in top of hydraulic cylinder. Hold pressure on tube assembly to keep piston bottomed and adjust length of tube to fit on bellcrank (7), then shorten length by three full turns to assure that piston will not bottom out during operation. Connect tube assembly (5) to bellcrank (7) and tighten jam nut on tube assembly (5).
- (7) Check rod end on tube assembly (5) to ensure that there is not more than **1.25** inch exposed threads. See detail C. If more than **1.25** inches of threads are exposed, adjust length of connecting link (10). Do not exceed one inch at exposed threads on connecting link (10). See detail B. Check bolt that attaches control tube (5) to hydraulic cylinder valve (4). Torque bolt finger tight and install cotter pin. The bolt must turn freely.
- (8) Position collective lever to 3.84 TO 3.90 inch dimension as shown in detail A.



PEDAL ASSEMBLY
209-001-701






PEDAL SUPPORT
209-001-702



PEDAL ADJUSTER SUPPORT
209-001-703

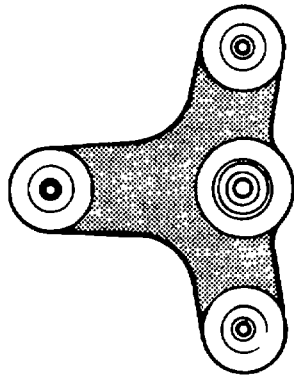


PEDAL ADJUSTER CLEVIS
209-001-704

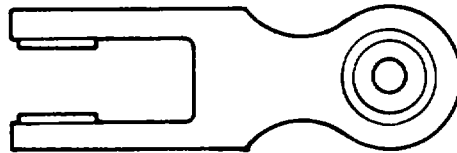
			
MECHANICAL DAMAGE	0.030	0.015	0.005
CORROSION DAMAGE (BEFORE CLEANUP) (AFTER CLEANUP)	0.015 0.030	0.0075 0.015	0.0025 0.005
MAXIMUM AREA PER FULL DEPTH REPAIR	1.0 In. Sq.	0.5 In. Sq.	0.1 In. Sq.
NUMBER OF REPAIRS	1 Per Area	1 Per Area	1 Per Area
EDGE CHAMFER	0.06	0.04	0.02
BORE DAMAGE	0.002 In. for 1/4 Circumference for all Components		
MAXIMUM THREAD DAMAGE	LENGTH	0.25 In.	
	DEPTH	0.005 In.	
	NUMBER	THREE	
NO CRACKS ALLOWED			

209001-124A

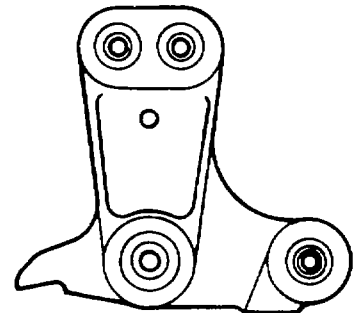
Figure 11-1A. Anti-torque system wear and damage limits (Sheet 1 of 7)



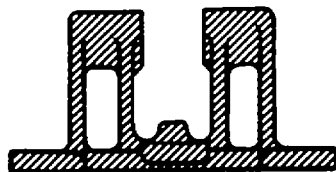
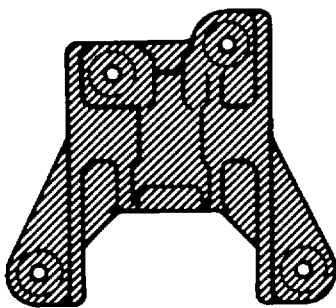
BELLCRANK
209-001-706



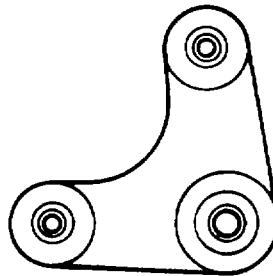
LINK
209-001-707



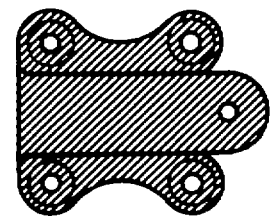
BELLCRANK
209-001-708






SUPPORT
209-001-709



BELLCRANK
209-001-710



SUPPORT
209-001-711

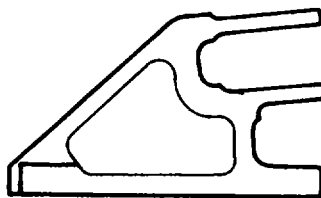
			
MECHANICAL DAMAGE	0.030 IN	0.015 IN	0.005 IN
CORROSION DAMAGE (BEFORE CLEANUP)	0.015 IN	0.0075 IN	0.0025 IN
(AFTER CLEANUP)	0.030 IN	0.015 IN	0.005 IN
MAXIMUM AREA PER FULL DEPTH REPAIR	1.0 IN Sq.	0.5 IN Sq.	0.1 IN Sq.
NUMBER OF REPAIRS	1 Per Area	1 Per Area	1 Per Area
EDGE CHAMFER	0.06 IN	0.04 IN	0.02 IN
BORE DAMAGE	0.002 In. for 1/4 Circumference for all Components		
NO CRACKS ALLOWED			

209001-127A

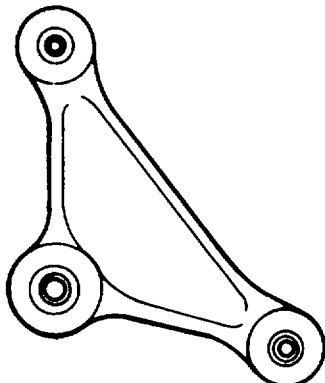
Figure 11-1A. Anti-torque system wear and damage limits (Sheet 2 of 7)



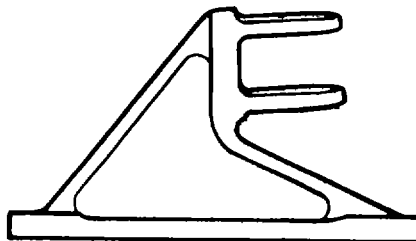
WALKING BEAM
209-001-712



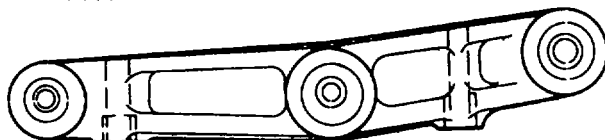
SUPPORT
209-001-713



BELLCRANK
209-001-714



SUPPORT
209-001-715



WALKING BEAM
209-001-720

TYPE OF DAMAGE

ALLOWABLE DAMAGE LIMITS



MECHANICAL DAMAGE

0.030 IN

CORROSION DAMAGE
(BEFORE CLEANUP)
(AFTER CLEANUP)

0.015 IN
0.030 IN

MAXIMUM AREA PER
FULL DEPTH REPAIR

1.0 IN Sq.

NUMBER OF REPAIRS

1 Per Area

EDGE CHAMFER

0.06

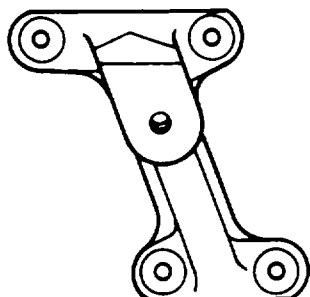
BORE DAMAGE

0.002 IN for 1/4
Circumference

NO CRACKS ALLOWED

209001-126A

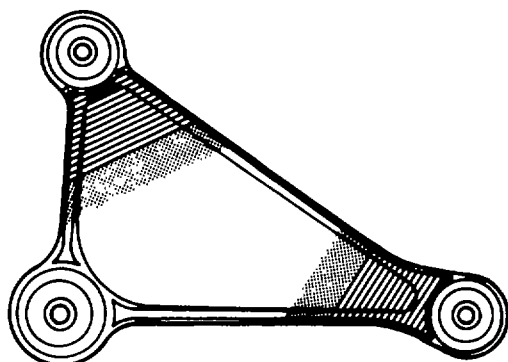
Figure 11-1A. Anti-torque System wear and damage limits (Sheet 3 of 7)



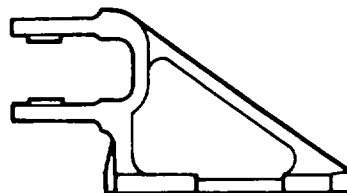
SUPPORT
209-001-717






LEVER
209-001-718



BELLCRANK
209-001-754

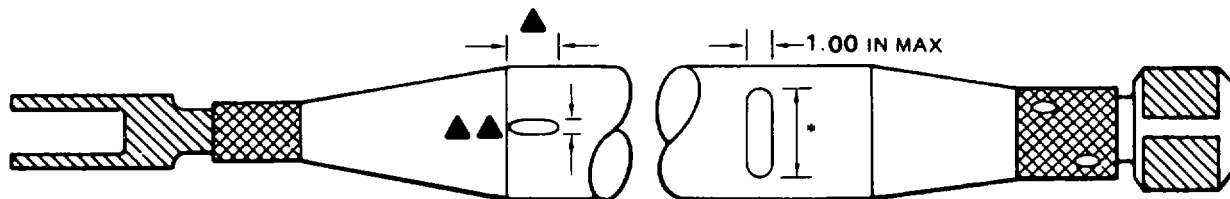


SUPPORT
209-001-904

			
MECHANICAL DAMAGE	0.030 In.	0.015 In.	0.005 In.
CORROSION DAMAGE (BEFORE CLEANUP)	0.015 In.	0.0075 In.	0.0025 In.
(AFTER CLEANUP)	0.030 In.	0.015 In.	0.005 In.
MAXIMUM AREA PER FULL DEPTH REPAIR	1.0 In. Sq.	0.5 In. Sq.	0.1 In. Sq.
NUMBER OF REPAIRS	1 Per Area	1 Per Area	1 Per Area
EDGE CHAMFER	0.06 In.	0.04 In.	0.02 In.
BORE DAMAGE	0.002 in. for 1/4 Circumference for all Components		
NO CRACKS ALLOWED			

209001-125A

Figure 11-1 A. Anti-torque system wear and damage limits (sheet 4 of 7)



LIMITS FOR SMOOTH DENTS ONLY

- ▲ 1.00 inch maximum length of dent in direction of tube length.
- ▲▲ Maximum diameter of dent must not exceed 0.2 times outer tube diameter.

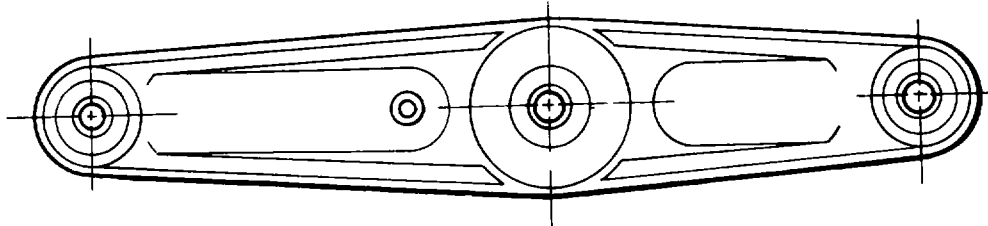
<u>ALLOWABLE DAMAGE LIMITS</u>	
<u>TYPE OF DAMAGE</u>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 20px; margin-right: 5px;"></div> <div style="text-align: center;"> 0.005 IN </div> <div style="text-align: center;"> No Damage Allowed </div> </div>
<u>MECHANICAL DAMAGE</u>	
<u>CORROSION DAMAGE</u>	
<u> BEFORE CLEANUP</u>	0.0025 IN
<u> AFTER CLEANUP</u>	0.005 IN
<u>AREA OF FULL DEPTH REPAIR</u>	0.1 SQ IN
<u>NUMBER OF REPAIRS</u>	One Per Area
<u>EDGE CHAMFER</u>	0.02 IN
<u>BORE DAMAGE</u>	0.002 IN for 1/4 Circumference
NO CRACKS ALLOWED	

LENGTH OF CIRCUMFERENCE (*) OVER WHICH REPAIR PERMITTED	0.25	25%	50%
Maximum Depth Of:			
Corrosion Damage Before Cleanup (**)	0.002 Inch	0.0015 Inch	0.001 Inch
Mechanical and Corrosion Repair After Cleanup (**)	0.004 Inch	0.003 Inch	0.002 Inch

** Values shown for a 0.035 wall thickness, in no case will the mechanical and corrosion depth after cleanup exceed 10% of the tube wall thickness, nor corrosion depth before cleanup exceed 5% of the tube wall thickness.

209001-136

Figure 11-1A. Anti-torque system wear and damage limits (Sheet 5 of 7)



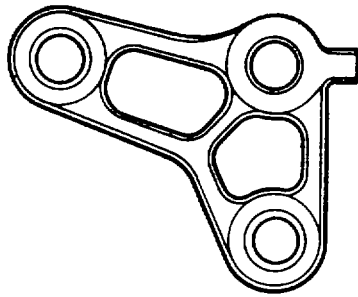
WALKING BEAM
209-001-761

MECHANICAL DAMAGE	0.010 IN
CORROSION DAMAGE BEFORE CLEANUP	0.005 IN
AFTER CLEANUP	0.010 IN
AREA OF FULL DEPTH REPAIR	Not Critical
NUMBER OF REPAIRS	Not Critical
BORE DAMAGE	0.002 IN For 1/4 Inch Circumference
NO CRACKS ALLOWED	

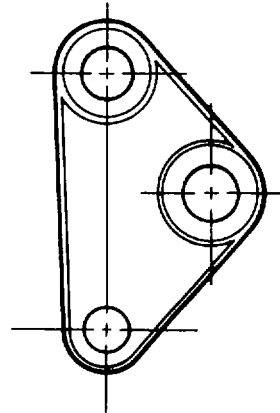
209001-137

Figure 11-1A. Anti-torque system wear and damage limits (Sheet 6 of 7)

Change 4 11-6J



209-001-764 BELLCRANK



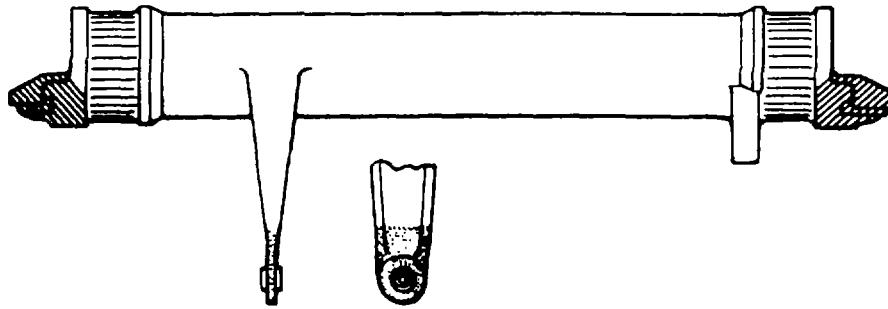
209-001-762 BELLCRANK

MECHANICAL DAMAGE	0.020 IN
CORROSION	
BEFORE CLEANUP	0.010 IN
AFTER CLEANUP	0.020 IN
MAXIMUM AREA OF FULL DEPTH REPAIR	Not Critical
NUMBER OF REPAIRS	Not Critical
BORE DAMAGE	0.002 IN For 1/4 Inch Circumference
NO CRACKS ALLOWED	

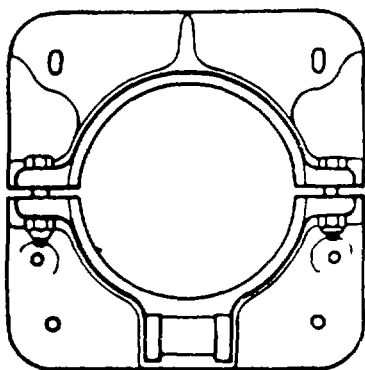
209001-138

Figure 11-1A. Anti-torque system wear end damage limits (Sheet 7 of 7)

Change 4 11-6K

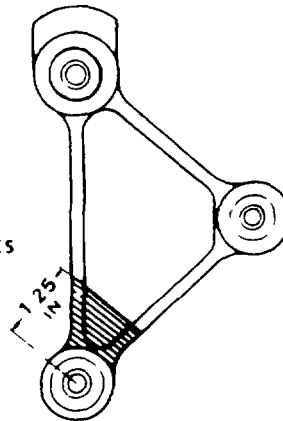


* ELEVATOR HORN
209 001 908







ELEVATOR SUPPORT
209-030 834-1

NO REPAIR
TO MATING SURFACES



BELLCRANK
209 001 900



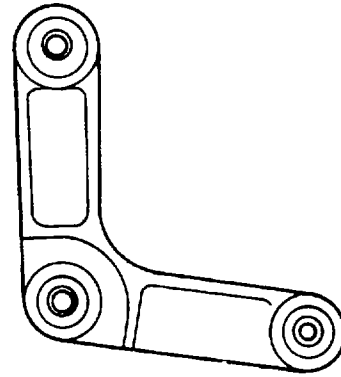
<u>TYPE OF DAMAGE</u>	<u>ALLOWABLE DAMAGE LIMITS</u>			
				
CRACKS	NONE	NONE	NONE	NONE
MECHANICAL DAMAGE	0.030 IN	0.015 IN	0.005 IN	0.005 IN
CORROSION DAMAGE (BEFORE CLEANUP)	0.015 IN	0.0075 IN	0.0025 IN	NONE
(AFTER CLEANUP)	0.030 IN	0.015 IN	0.005 IN	
MAXIMUM AREA PER FULL DEPTH REPAIR	1.0 IN SQ	0.5 IN SQ	0.1 IN SQ	NONE
NUMBER OF REPAIRS	1 PER AREA	1 PER AREA	1 PER AREA	NONE
EDGE CHAMBER	0.06 IN	0.04 IN	0.02 IN	
BORE DAMAGE	0.002 IN FOR 1/4 CIRCUMFERENCE FOR ALL COMPONENTS			
MINIMUM OUTSIDE DIAMETER	3.2475			

* The polished or shiny appearance on the bearing surfaces is considered normal wear. Normal wear is permitted as long as the hard anodic coating is present and the base metal is not exposed. No repairs, cracks, scratches, dents, or corrosion are allowed.

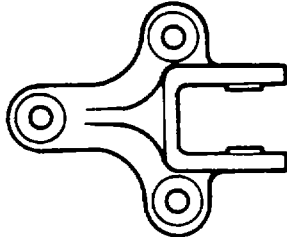
Figure 11-1B. Elevator Control System Wear and Damage Limits (Sheet 1 of 2)



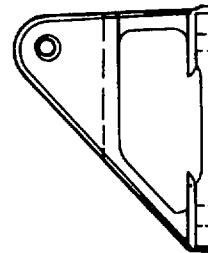
WALKING BEAM
209-001-905



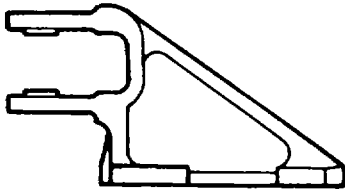

BELLCRANK
209-001-901



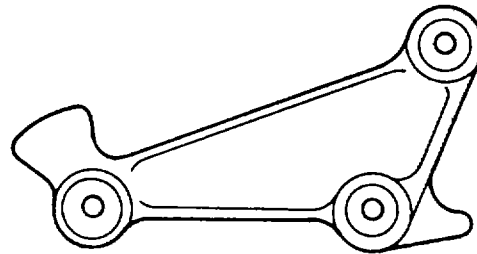
SUPPORT
209-001-906




SUPPORT
209-001-902



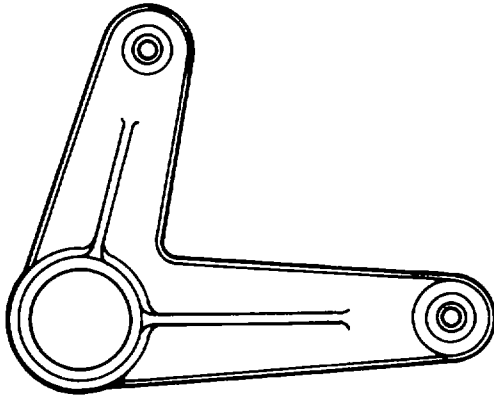
SUPPORT
209-001-904



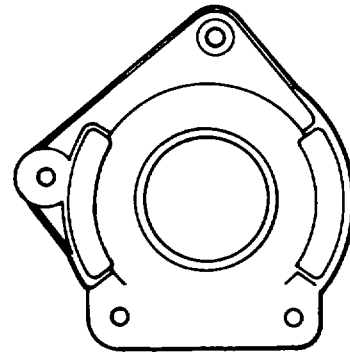

BELLCRANK
209-001-903

MECHANICAL DAMAGE (AFTER CLEANUP)	0.030 IN
CORROSION DAMAGE BEFORE CLEANUP	0.015 IN
AFTER CLEANUP	0.030 IN
AREA OF FULL DEPTH REPAIR	1.0 SQ IN
NUMBER OF REPAIRS	1 PER AREA
EDGE CHAMFER	0.06 IN
BORE DAMAGE	0.002 IN FOR 1/4 CIRCUMFERENCE
NOTE: NO CRACKS ALLOWED	209001-128A

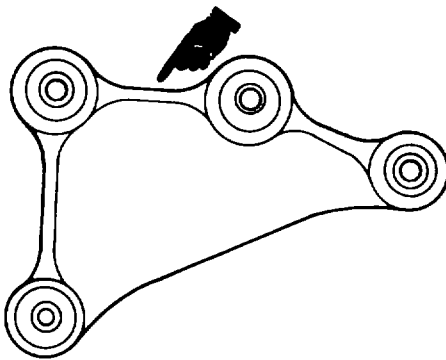
Figure 11-1B. Elevator Control System Wear And Damage Limits (Sheet 2 of 2)



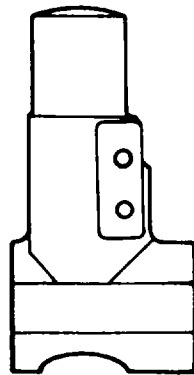
LEVER
209-001-115



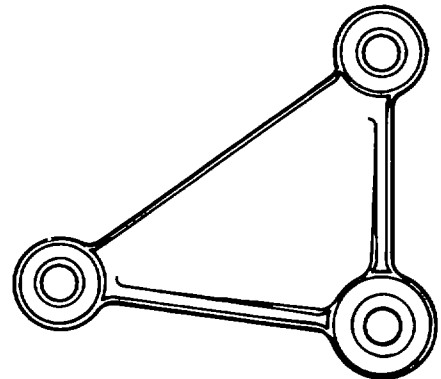
SUPPORT
209-001-103



BELLCRANK
209-001-107



ELBOW
209-001-118



BELLCRANK
209-001-105

MECHANICAL DAMAGE (AFTER CLEANUP)

0.030 IN

**CORROSION DAMAGE
BEFORE CLEANUP
AFTER CLEANUP**

**0.015 IN
0.030 IN**

AREA OF FULL DEPTH REPAIR

1.0 Sq. IN

NUMBER OF REPAIRS

ONE PER AREA

EDGE CHAMFER

0.06 IN

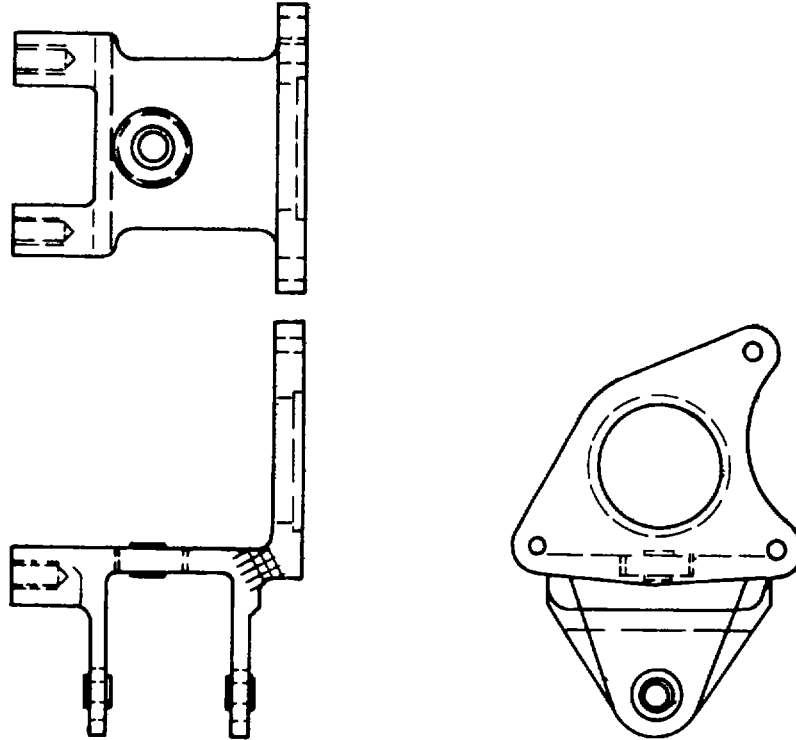
BORE DAMAGE

0.002 IN FOR 1/4 CIRCUMFERENCE

NO CRACKS ALLOWED

209001-130A

Figure 11-1C. Collective control system wear and damage limit (Sheet 1 of 6)



TYPE OF DAMAGE

ALLOWABLE DAMAGE LIMITS

**MECHANICAL DAMAGE
AFTER CLEANUP**

0.030 In.

0.015 In.

0.005 In.

**CORROSION DAMAGE
BEFORE CLEANUP
AFTER CLEANUP**

0.015 In.

0.0075 In.

0.0025 In.

0.030 In.

0.015 In.

0.005 In.

AREA OF FULL DEPTH REPAIR

1.0 Sq In.

0.5 Sq In.

0.1 Sq In.

NUMBER OF REPAIRS

ONE PER AREA

EDGE CHAMFER

0.06 In.

0.04 In.

0.02 In.

BORE DAMAGE

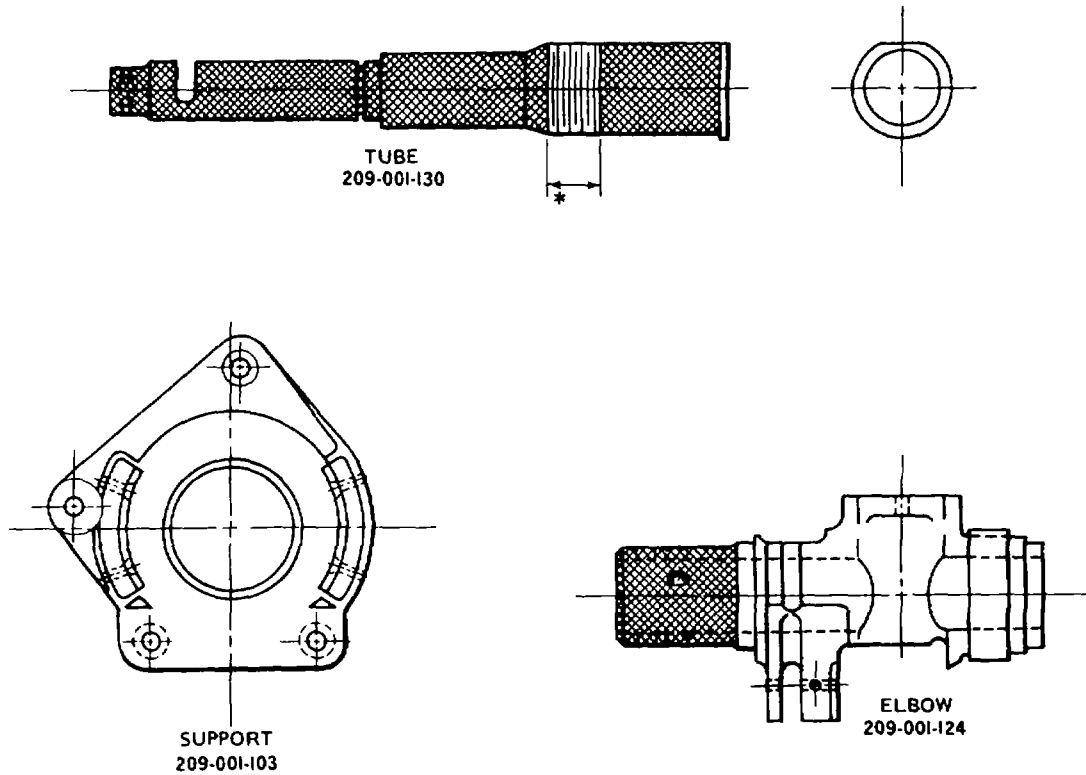
0.002 In. For 1/4 Of Circumference



NO CRACKS ALLOWED



209001-143

Figure 11-1C. Collective control system wear and damage limits (Sheet 2 of 6)



TYPE OF DAMAGE	ALLOWABLE DAMAGE LIMITS	
		
MECHANICAL DAMAGE (AFTER CLEANUP)	0.030 IN	0.005 IN
CORROSION DAMAGE BEFORE CLEANUP	0.015 IN	0.0025 IN
AFTER CLEANUP	0.030 IN	0.005 IN
AREA OF FULL DEPTH REPAIR	1.0 SQ IN	0.1 SQ IN
NUMBER OF REPAIRS	ONE PER AREA	ONE PER AREA
EDGE CHAMFER	0.06 IN	0.02 IN
BORE DAMAGE	0.002 IN FOR 1/4 CIRCUMFERENCE	

*NO THREAD DAMAGE IS ACCEPTABLE


NOTE: NO CRACKS ALLOWED

209001-139

Figure 11-1C. Collective control system wear and damage limits (Sheet 3 of 6)



SHAFT
204-001-258

	
MECHANICAL DAMAGE (AFTER CLEANUP)	0.005 IN
CORROSION DAMAGE BEFORE CLEANUP	0.0025 IN
AFTER CLEANUP	0.005 IN
AREA OF FULL DEPTH REPAIR	0.1 SQ IN
NUMBER OF REPAIRS	ONE PER AREA
EDGE CHAMFER	
BORE DAMAGE	

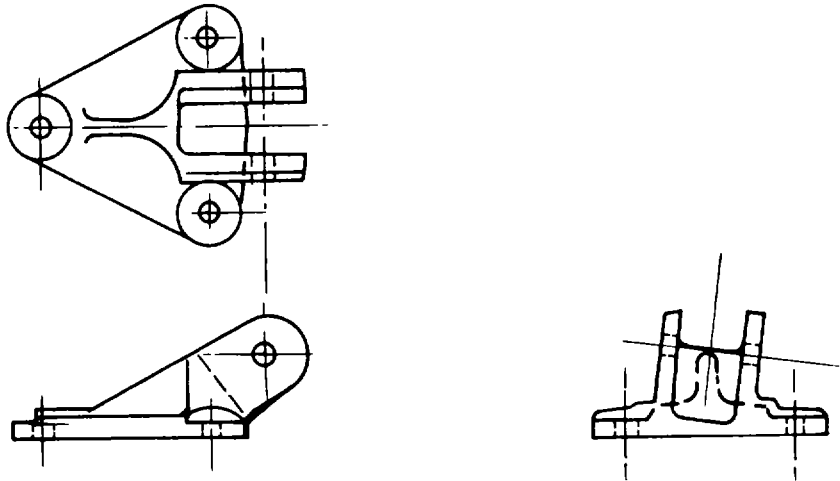
*NO THREAD DAMAGE IS ACCEPTABLE.

NOTE: NO CRACKS ALLOWED

209001-142

Figure 11-1C. Collective control system wear and damage limits (Sheet 4 of 6)

Change 4 11-6R



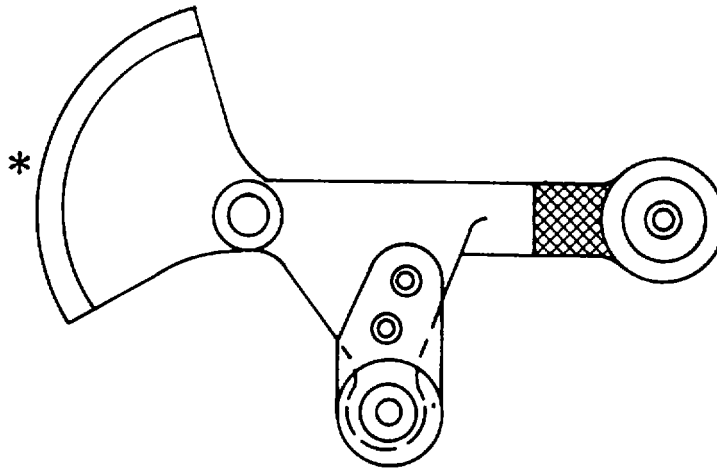
TYPE OF DAMAGE

ALLOWABLE DAMAGE LIMITS

MECHANICAL DAMAGE (AFTER CLEANUP)	0.030 IN
CORROSION DAMAGE BEFORE CLEANUP	0.015 IN
AFTER CLEANUP	0.030 IN
AREA OF FULL DEPTH REPAIR	1.0 SQ IN
NUMBER OF REPAIRS	ONE PER AREA
EDGE CHAMFER	0.06 IN
BORE DAMAGE	0.002 IN FOR 1/4 OF CIRCUMFERENCE
NO CRACKS ALLOWED	



209001-146

Figure 11-1C. Collective control system wear and damage limits (Sheet 5 of 6)



TYPE OF DAMAGE

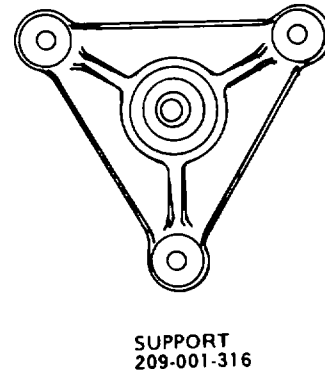
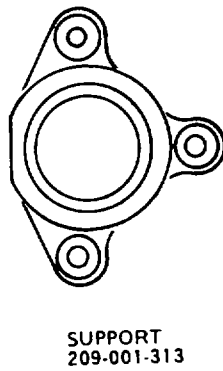
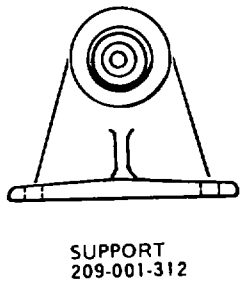
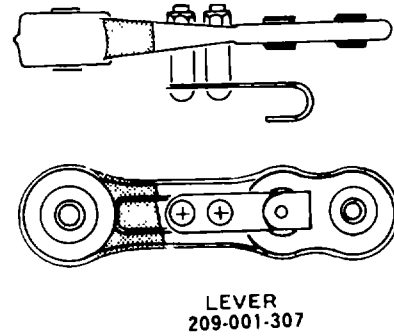
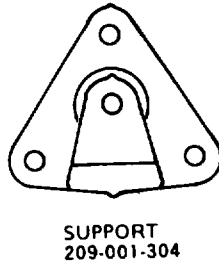
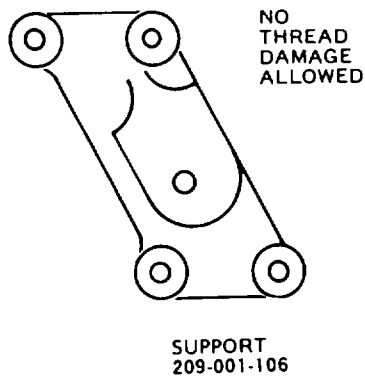
ALLOWABLE DAMAGE LIMITS



		
MECHANICAL DAMAGE AFTER CLEANUP	0.030 In.	0.005 In.
CORROSION DAMAGE BEFORE CLEANUP	0.015 In.	0.0025 In.
AFTER CLEANUP	0.030 In.	0.005 In.
AREA OF FULL DEPTH REPAIR	1.0 Sq. In.	0.1 Sq. In.
NUMBER OF REPAIRS	One Per Area	
EDGE CHAMFER	0.06 In.	0.02 In.
BORE DAMAGE	0.02 In. for 1/4 of Circumference	
NO CRACKS ALLOWED		

* NO THREAD DAMAGE IS ACCEPTABLE.

209001-145

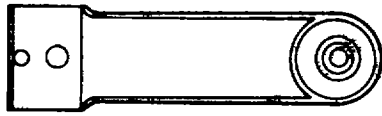
Figure 11-1C. Collective control system wear and damage limit (Sheet 6 of 6)



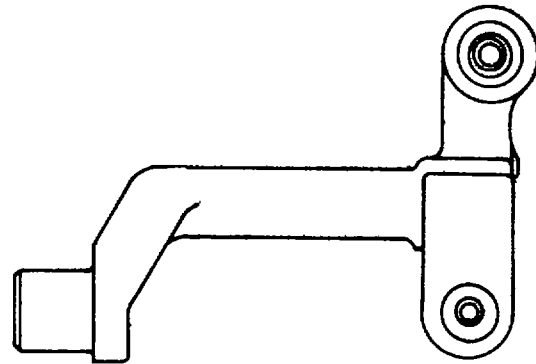
		
MECHANICAL DAMAGE	0.030 In.	0.015 In.
CORROSION DAMAGE (BEFORE CLEANUP) (AFTER CLEANUP)	0.015 In. 0.030 In.	0.0075 In. 0.015 In.
MAXIMUM AREA PER FULL DEPTH REPAIR	1.0 In. Sq.	0.5 In. Sq.
NUMBER OF REPAIRS	1 Per Area	1 Per Area
EDGE CHAMFER	0.06 In.	0.04 In.
BORE DAMAGE	0.002 In. for 1/4 Circumference for all Components	
NO CRACKS ALLOWED		

209001-131-1A

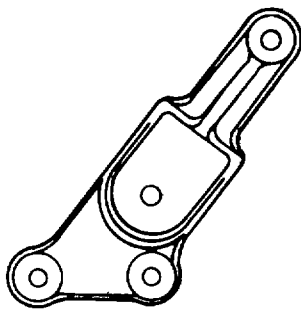
Figure 11-1D. Cyclic control system wear and damage limits (Sheet 1 of 5)



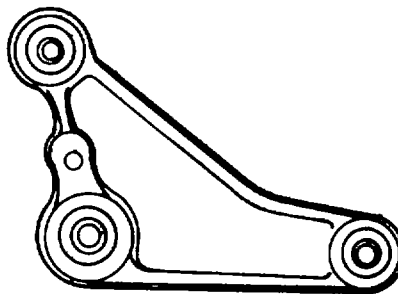
BELLCRANK
209-001-318



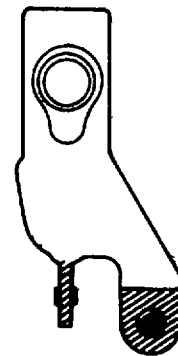
STICK
209-001-320





SUPPORT
209-001-322



BELLCRANK
290-001-324

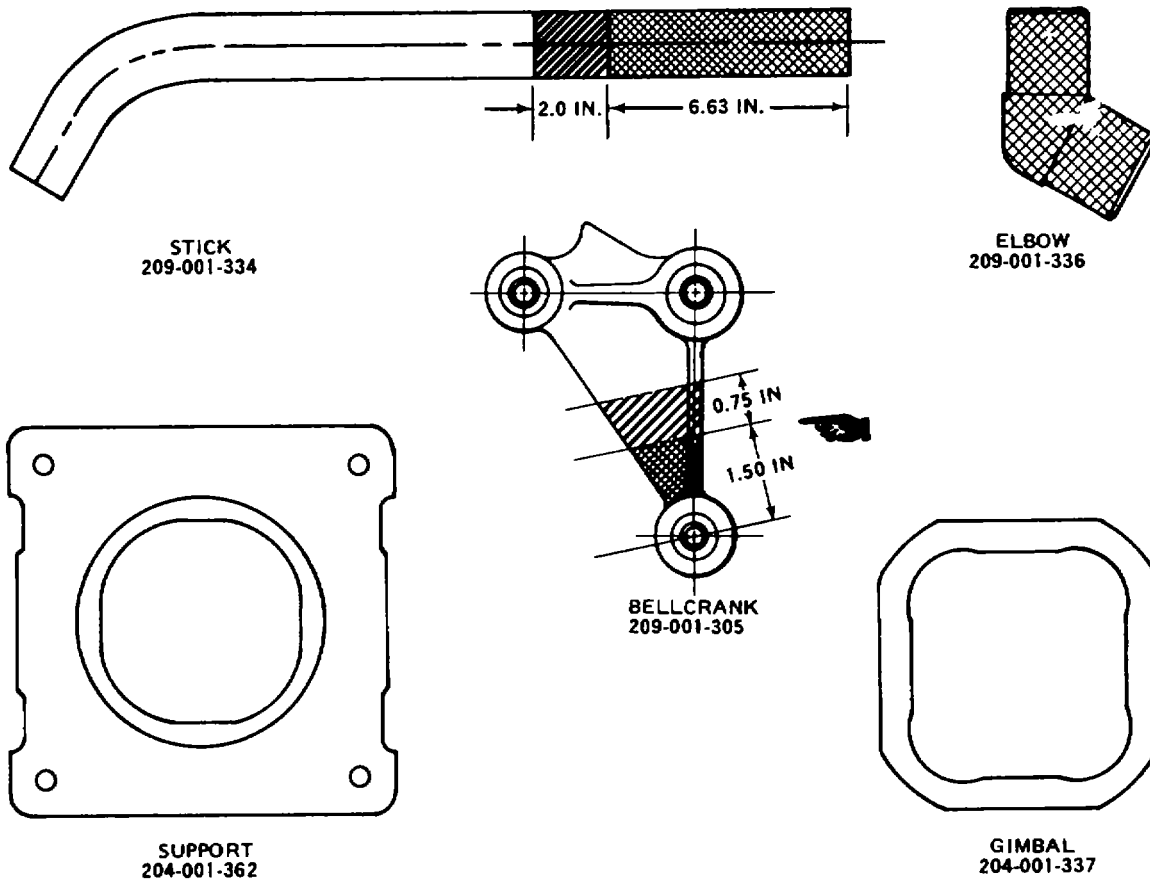





LEVER
209-001-326

		
MECHANICAL DAMAGE	0.030 In.	0.005 In.
CORROSION DAMAGE (BEFORE CLEANUP) (AFTER CLEANUP)	0.015 In. 0.030 In.	0.0025 In. 0.005 In.
MAXIMUM AREA PER FULL DEPTH REPAIR	1.0 In. Sq.	0.1 In. Sq.
NUMVER OF REPAIRS	1 Per Area	1 Per Area
EDGE CHAMFER	0.06 In.	0.02 In.
BORE DAMAGE	0.002 In. for 1/4 Circumference for all Components	
NO CRACKS ALLOWED		

209001-131-2A

Figure 11-1D. Cyclic control system wear and damage limits (Sheet 2 of 5)

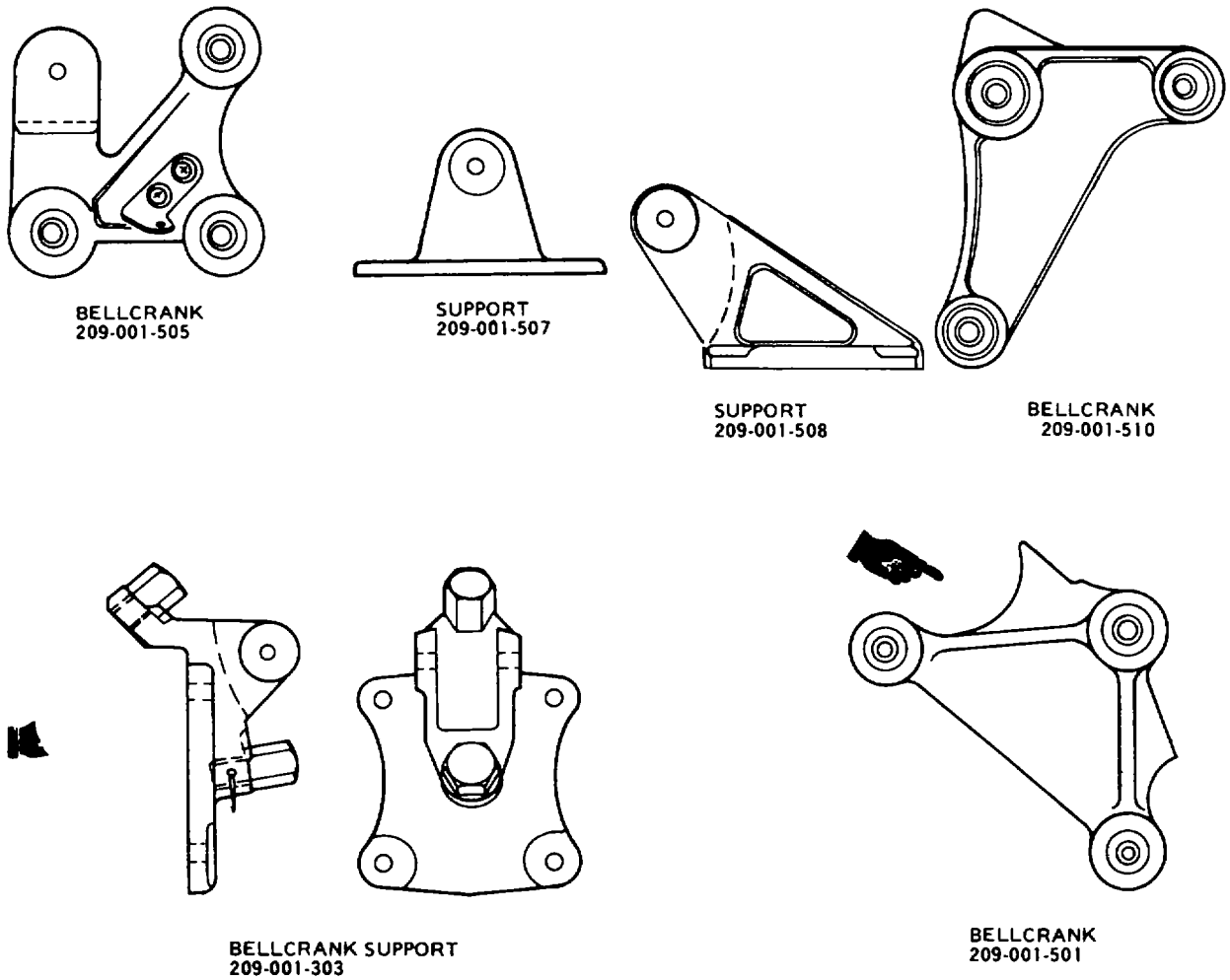


			
MECHANICAL DAMAGE	0.030 In.	0.015 In.	0.005 In.
CORROSION DAMAGE (BEFORE CLEANUP) (AFTER CLEANUP)	0.015 In. 0.030 In.	0.0075 In. 0.015 In.	0.0025 In. 0.005 In.
MAXIMUM AREA PER FULL DEPTH REPAIR	1.0 In. Sq.	0.5 In. Sq.	0.1 In. Sq.
NUMBER OF REPAIRS	1 Per Area	1 Per Area	1 Per Area
EDGE CHAMFER	0.06 In.	0.04 In.	0.02 In.
BORE DAMAGE	0.002 In. for 1/4 Circumference for all Components		

NO CRACKS ALLOWED

209001-131-3A

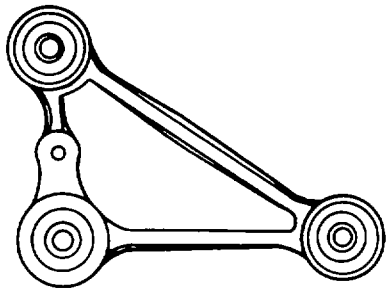
Figure 11-1D. Cyclic control system wear and damage limits (Sheet 3 of 5)



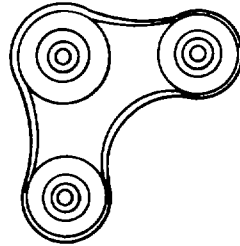
MECHANICAL DAMAGE	0.030 IN
CORROSION DAMAGE (BEFORE CLEANUP) (AFTER CLEANUP)	0.015 IN 0.030 IN
MAXIMUM AREA PER FULL DEPTH REPAIR	1.0 IN. SQ.
NUMBER OF REPAIRS	1 PER AREA
EDGE CHAMFER	0.06 IN
BORE DAMAGE	0.002 IN FOR 1/4 CIRCUMFERENCE
NO CRACKS ALLOWED	

209001-131-4A

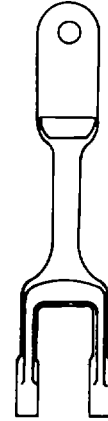
Figure 11-1D. Cyclic control system wear and damage limits (Sheet 4 of 5)



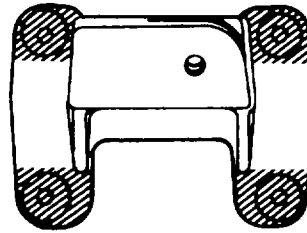
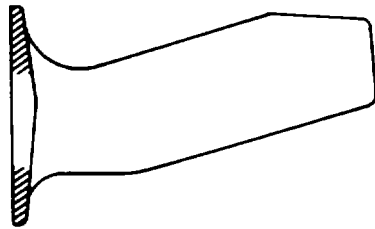
BELLCRANK
209-001-514





BELLCRANK
209-001-518



LINK
209-001-520

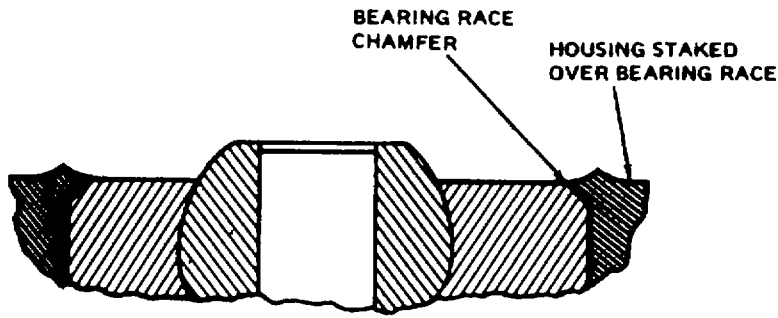


SUPPORT
209-001-522

		
MECHANICAL DAMAGE	0.030 IN	0.005 IN
CORROSION DAMAGE (BEFORE CLEANUP) (AFTER CLEANUP)	0.015 IN 0.030 IN	0.0025 IN 0.005 IN
MAXIMUM AREA PER FULL DEPTH REPAIR	1.0 IN SQ	0.1 IN SQ
NUMBER OF REPAIRS	1 PER AREA	1 PER AREA
EDGE CHAMFER	0.06 IN	0.02 IN
BORE DAMAGE	0.002 IN FOR 1/4 CIRCUMFERENCE FOR ALL COMPONENTS	
NO CRACKS ALLOWED		

209001-131-5A

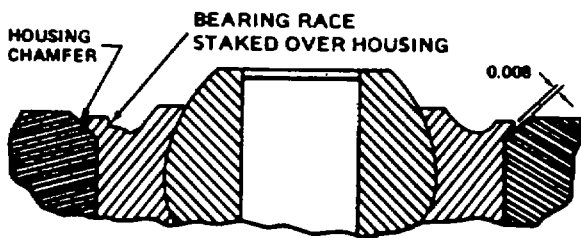
Figure 11-1D. Cyclic control system wear and damage limits (Sheet 5 of 5)



DETAIL A
BEARING WITH CHAMFER ON OUTER RACE
(TYPICAL)

NOTE

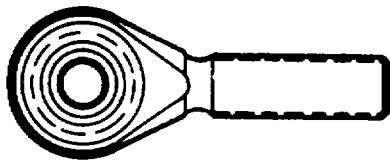
Bearing replacement
not recommended.



DETAIL B
PREGROOVED BEARING
(TYPICAL)

NOTE

Bearing may be replaced.
Refer to text.



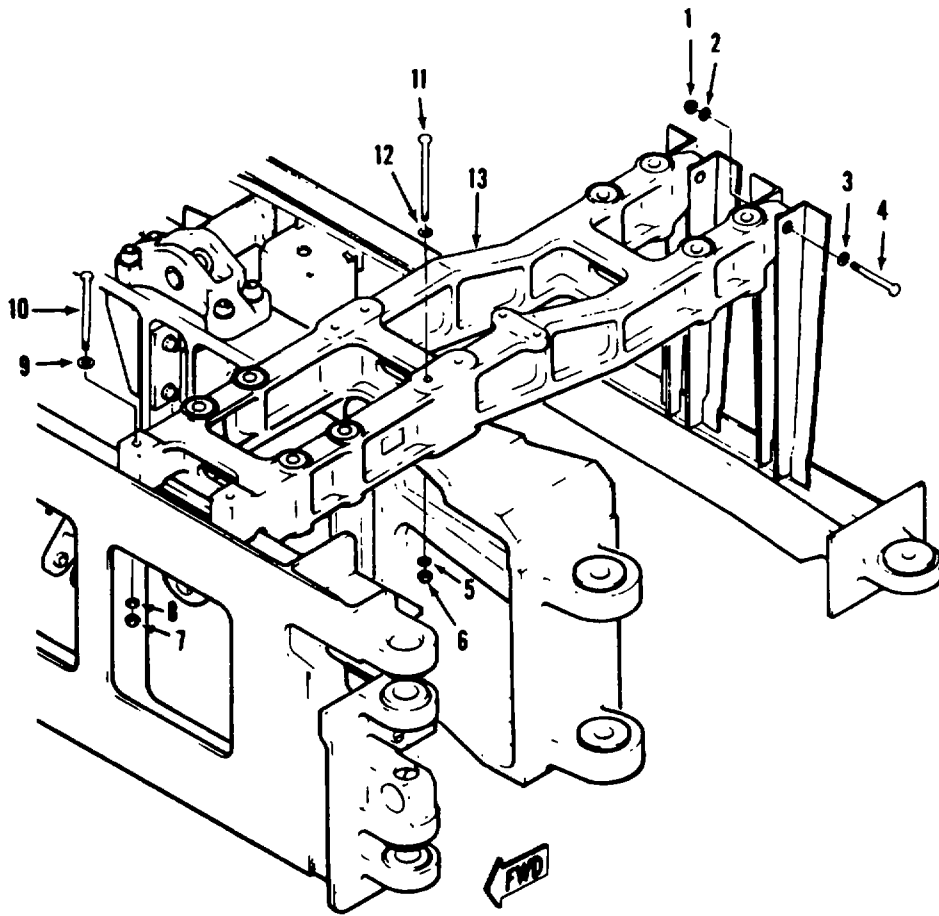
DETAIL C
ROD END BEARING
(TYPICAL)

NOTE

Typical rod end bearing
is replaced as a unit.
If bonded in, replace
next assembly.

209001-120

Figure 11-1E. Flight control system bearings

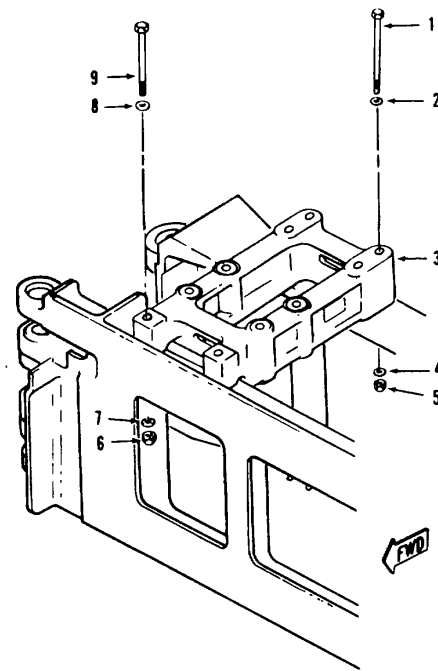


- | | |
|-----------|-------------|
| 1. NUT | 8. WASHER |
| 2. WASHER | 9. WASHER |
| 3. WASHER | 10. BOLT |
| 4. BOLT | 11. BOLT |
| 5. WASHER | 12. WASHER |
| 6. NUT | 13. SUPPORT |
| 7. NUT | |

210001-107

Figure 11-1F. Power cylinder support -- lateral cycle end collective controls

Change 4 11-7



1. BOLT
2. WASHER
3. SUPPORT
4. WASHER
5. NUT
6. NUT
7. WASHER
8. WASHER
9. BOLT

210001-108

Figure 11-1G. Power cylinder support - fore and aft cyclic controls

NOTE

Ensure that collective stick does not move from full down position during accomplishment of steps (9) and (10) or rigging will not be correct.

(9) Remove lockwire from retaining nut (24, Figure 11-1) and loosen nut.

(10) Push down on top of hydraulic cylinder. (2) to bottom cylinder valve lever at top of its travel. Adjust rod end (26) on extension tube (19) to fit on collective lever (1), then shorten by one full turn to compensate for the normal change which occurs when hydraulic power is applied. Torque nut (24) to **480 TO 600** inch-pounds and lockwire nut to lock (25) with wire (C152).

NOTE

Any rod end bearing which exceeds the 0.80 in. max or 2.50 in max dimensions should be readjusted within these limits. Rod ends with insufficient exposed threads to permit lock (25) engagement should also be readjusted. Final rigging adjustment should be made at the interface of the extension tube and hydraulic cylinder assembly.

(11) Position boot (21) on cylinder (2) and extension tube as shown on Detail E, figure 11-1. **TOP OF BOOT SHOULD BE 8.00 INCHES FROM BOTTOM OF LOCKNUT ON ROD END.** Tighten clamps (20) with boot in this position.

(12) Attach extension tube (19) to collective lever (1) in accordance with paragraph 7-11.

(13) Check low pitch blade angle of main rotor to ensure it is within limits. Refer to paragraph 5-3.

(14) Check complete collective control system for security and safetying of components.

(15) Apply hydraulic power with ground test unit. Check operation of controls through full range of travel. Check pilots collective control stick for correct friction adjustments. Refer to paragraph 11-7.

(16) With a force gauge (fish scale), check for force equal to within one (1) pound that is required to raise or to lower collective control stick with hydraulic boost on. If necessary, adjust by adding or removing AN960-10 washers at top of spring on hydraulic cylinder valve. See detail D. A maximum of six AN960-10 washers can be used.

NOTE

Washers (AN960PD10L) must be installed at each end of the two springs (total of 4) at time of assembly in addition to above specified washers.

(17) Connect droop compensator control tube (6) to bellcrank (7).

Change 21 11-8

(18) Perform maintenance test flight. Refer to TM 55-1520-234-MTF.

11-7. Collective Stick, Pilots. Refer to figure 11-2.

The pilots collective control stick is on the left side console. The stick assembly includes a switch box and electrical cable, a knobbed friction nut and rotating throttle grip for manual setting of the fuel control power lever, a knurled nut for control stick friction, a protective cover and boot, and a support assembly containing friction devices and having a bellcrank and throttle lever for control linkage. A strap with snap attachment is provided to secure the control stick in low pitch position.

Premaintenance Requirements for Pilots Collective Stick

Conditions	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	None
Test Equipment	Test Stand, Hydraulic
Support Equipment	Force Gauge (Fish Scale) with Range of 0 to 25 pounds
Minimum Personnel Required	Two
Consumable Materials	(C124)
Special Environmental Conditions	None

a. *Removal.* See figure 11-2.

- (1) Remove cover with attaching screws and washers.
- (2) Remove screw-mounted panel from left side of fuselage for access to lower end of stick assembly.
- (3) Disconnect collective system control tubes from bellcrank (10) and throttle system control tubes from throttle lever (11), by removing bolts, nuts and washers.
- (4) Disconnect electrical cable connector.
- (5) Remove bolt, screw, nuts, washers, and shims which secure outboard stick support (9) to structure. Measure and record thickness of shims. Tag shims for installation in same location. Remove three bolts, washers, and shim from in-board support (12). Measure and record thickness of shim. Tag shim for installation in same location. Move collective stick down through console to remove from helicopter.

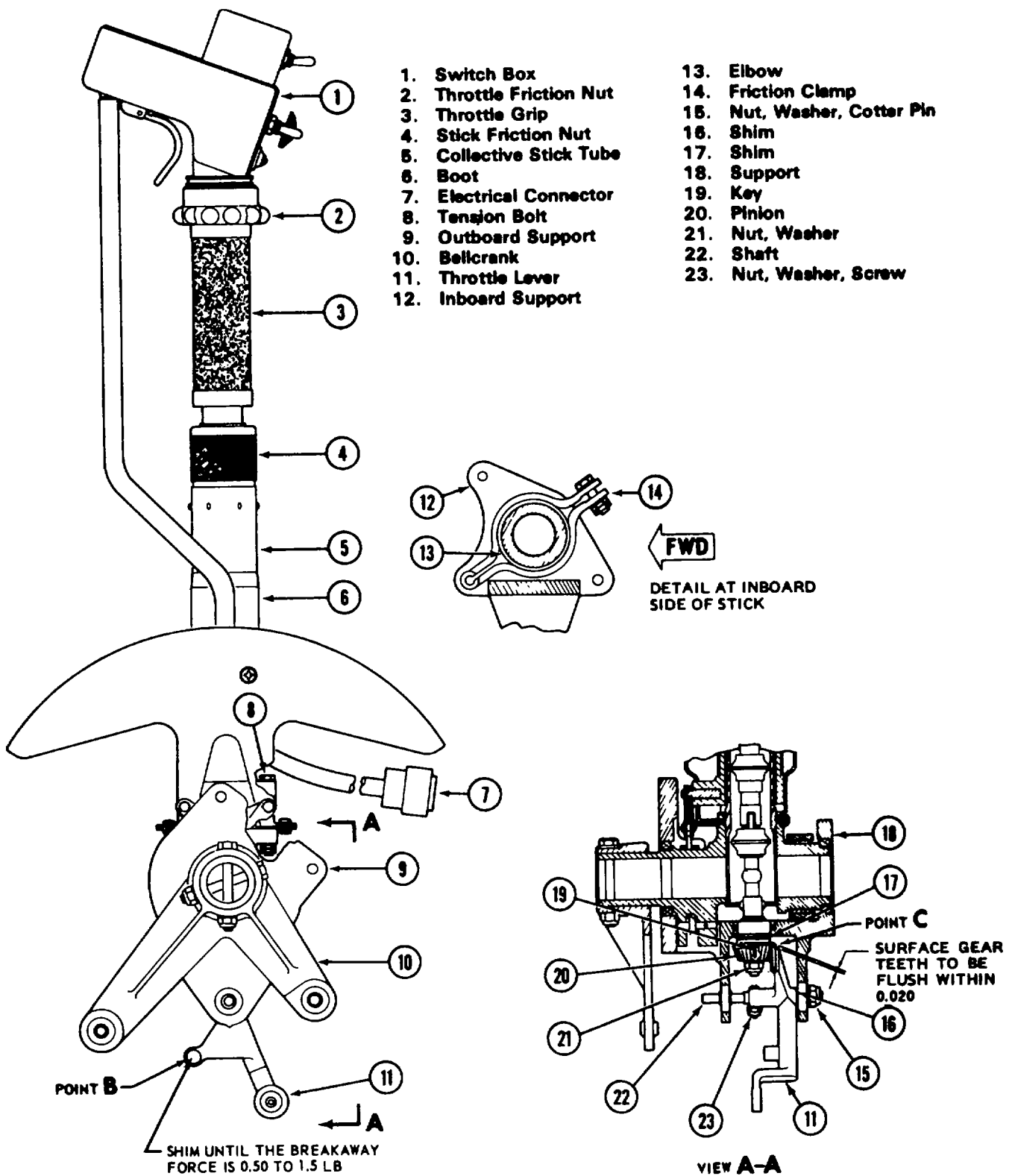


Figure 11-2. Pilots collective pitch stick

Change 4 11-8B

209001-78

b. *Inspection.* Inspect pilots collective stick for the following: (See figure 11-2).

- (1) Obvious damage to collective stick.
- (2) Wear in the mechanism.
- (3) Cleanliness.
- (4) Security of attachment.
- (5) Proper throttle friction adjustment.

c. *Repair.*

- (1) If damage is severe enough to affect function, repair or replace the collective stick.
- (2) Replace parts that are worn.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

- (3) Clean exposed surfaces by wiping with a dry cloth dampened with solvent (C124). Do not allow solvent to enter bearings or the switch box.
- (4) Tighten any loose screws on collective stick.
- (5) Adjust the pilots collective throttle friction adjustment as follows:
 - (a) Set pilots throttle friction adjuster on pilots collective lever adjacent to throttle twist grip to minimum friction setting. Measure breakaway force at point B on lever (1). Use a spring scale to apply force at point B in direction illustrated by arrows on lever (11). Record amount of force required to obtain movement of lever. If force required to move lever is not within **0.50 TO 1.50** pounds, adjust as outlined in steps (b) through (n).
 - (b) Remove cotter pin, nut and washer (15) from end of shaft (22).
 - (c) Remove nut, washer and screw (23) attaching throttle lever (11) to shaft (22).
 - (d) Remove lever (11) from assembly by removal of shaft (22) from lever (11), and shim (16), and support (18).
 - (e) Remove nut and washer (21) securing pinion (20) and shim (17) to shaft and key (19).
 - (f) Select new shims (16) and (17) that are thicker by an equal amount than the shims that were removed.

NOTE

It is necessary to equally add or remove laminations of shims (16) and (17) because tooth surfaces on pinion (20) and lever (11) must remain flush within 0.020 inch at point C.

- (g) Install new shim (17) on shaft and install pinion (20) and key (19) below the shim. Install washer and nut (21).
- (h) Place lever (11) at install position with teeth of lever contacting teeth of pinion (20) on same teeth of original installation (centered).
 - (i) Place new shim (16) between lever (11) and support (18) and install shaft (22).
 - (j) Install screw, washer and nut (23) attaching lever (11) on shaft (22).
 - (k) Install washer and nut (15) on shaft (22).
 - (l) Check gear tooth surfaces of pinion (20) and lever (11) to ensure they are flush within **0.020** inch at point C.
- (m) Repeat step (a) to determine whether breakaway force is now within tolerance. If necessary, repeat shimming procedure.
- (n) Install cotter pins to secure nuts (15) and (21).

d. *Installation.* See figure 11-2.

- (1) Replace attaching hardware, boot, or cover when damaged or otherwise unserviceable.
- (2) Place pilots collective stick into console opening from top, inserting electrical cable first.
- (3) Position inboard support (12) to mounting holes of beam and seat support. Install bolt through stick support, seat support, and beam, and secure with nut and washer at outside of beam. Install bolt with washer under head, through end of friction clamp (14), stick support, and beam.

Install bolt, with washer, in upper hole of stick support and beam.

(4) At outboard stick support (9) install shims between support and console structure and reduce gap to 0.003 inch maximum. Refer to figure 11-3. Install countersunk screw through forward hole of support and console, secure with a nut and washer.

(5) Connect throttle system control tubes to throttle lever below pinion gears of stick by installing bolts, washers, nuts and cotter pins. Connect collective system control tubes to bellcrank (10) of stick. Use one thin washer under each bolt head and two under each nut.

(6) Connect electrical cable connector (7) to receptacle in console.

(7) Install cover, secure with screws and washers to plate nuts of console.

(8) Check rigging of collective controls. Refer to paragraph 11-6.

(9) Adjust pilots collective stick friction to set minimum and maximum friction loads with use of hydraulic power as follows: See figure 11-2.

(a) Apply hydraulic power with hydraulic test stand.

(b) Set minimum stick friction as follows:

1 Place pilots collective stick at approximate mid-travel position.

2 Fully loosen friction adjusting nut (4).

3 Attach a force gauge (fish scale) to grip (3) within 1/2 inch of center and perpendicular to stick grip.

Check for breakaway force of nine to eleven pounds.

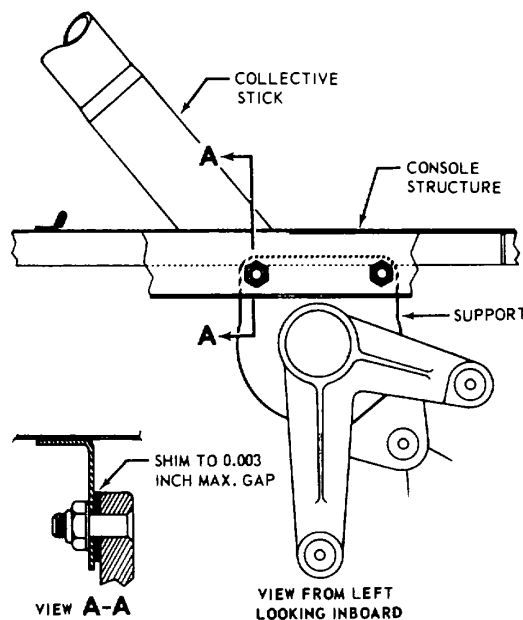
4 If breakaway force is not within limits, remove cover and adjust bolt and nut on friction clamp (14) to obtain breakaway force within limits.

NOTE

IPs collective friction may be set at 4 to 6 pounds on training aircraft only (TH-IS, TAH-IS).

(c) Set maximum stick friction as follows:

1 Place pilots collective stick at approximate mid-travel position.



209001-16

Figure 11-3. Pilots collective stick mounting details

2 Loosen nuts on tension bolt (8).

3 Attach a force gauge (fish scale) to stick grip within 1/2 inch of center and perpendicular to stick grip.

Check for breakaway force of 14 to 16 pounds. If breakaway force is not within limits, adjust friction nut (4) to obtain breakaway force within limits.

NOTE

Maximum stick friction must be set within limits to ensure that the gunners collective stick can be moved when the pilots friction nut (4) is fully tightened.

4 Tighten upper nut on tension bolt (8) finger tight and secure with locknut. Recheck breakaway force to ensure that it is within limits.

5 Disconnect hydraulic power ground test unit.

6 Check for security and safetying of collective control stick components.

(10) Perform maintenance test flight. Refer to TM 55-1520-234-MTF. Ensure that gunners collective stick can be moved when pilots collective stick friction nut (4) is fully tightened.

Change 4 11-10A/(11-10B blank)

11-8. Collective Stick, Gunners.

The collective control mounted in the gunners left side console is a dual control for occasional or emergency use, and has only the essential functions of collective pitch and no electrical switches.

Premaintenance requirements for gunners collective stick.

Conditions	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	None
Test Equipment	Force gage (Fish scale)
Support Equipment	None
Minimum Personnel Required	One
Consumable Materials	(C124)
Special Environmental Conditions	None

a. *Removal.* See figure 11-4.

(1) Remove screw-mounted panel from left side of fuselage above ammunition compartment for access to lower end of control stick.

(2) Disconnect collective system control tube from outboard lever, and throttle system control tube from throttle lever of control stick.

(3) Remove two bolts which secure stick support to structural beam. Lift stick assembly out of console.

b. *Inspection.* Inspect gunners collective stick for the following: See figure 11-4.

(1) Obvious damage to collective stick.

(2) Wear in the mechanism.

(3) Cleanliness.

(4) Security of attachment of parts.

c. *Repair.* See figures 11-4 and 11-4A.

(1) If damage is severe enough to affect function, repair or replace the collective stick tube.

(2) Replace parts that are worn.

WARNING

Use solvent in a well ventilated area. Avoid prolonged breathing of vapors and do not use in an area with open flame or high temperature.

(3) Clean exposed surfaces by wiping with dry cloth dampened with solvent (C124). Do not allow solvent to enter bearings.

(4) Tighten any loose screws on collective stick.

d. *Installation.* See figure 11-4.

(1) Replace attaching parts or protective boot if worn or otherwise unserviceable.

(2) Place control stick assembly into console from the top.

(3) Align stick support to mounting holes in beam. Install two bolts with washers.

(4) Connect throttle system control tube to throttle lever of stick, by bolt, washers, nut and cotter pin. Connect collective system control tube to lever on outer end of stick. Use one thin aluminum alloy washer under bolt head, and two under nut. Secure nut with cotter pin.

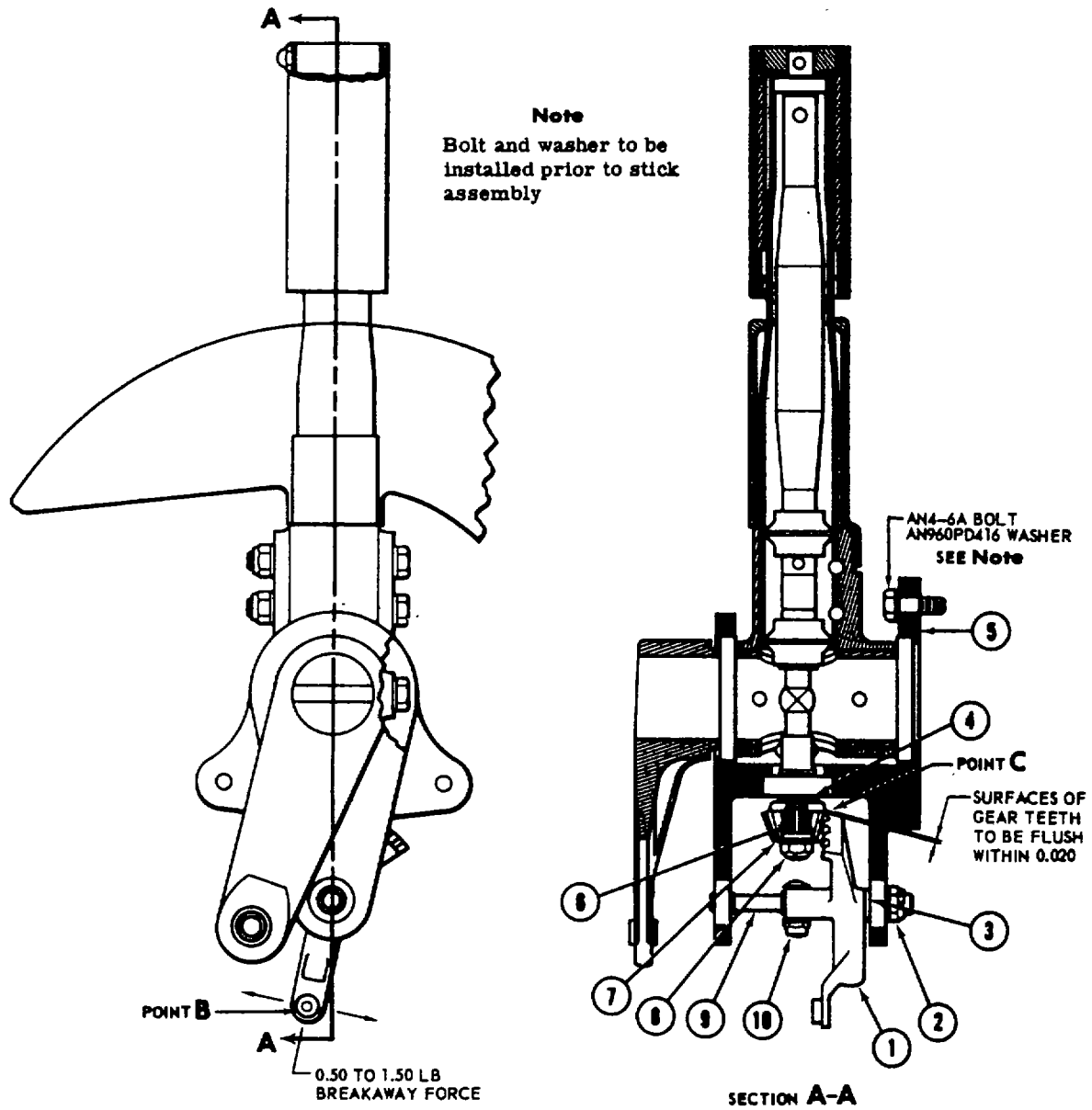
(5) Adjust the gunners collective throttle friction adjustment as follows:

(a) Set pilots throttle friction adjuster on pilots collective lever adjacent to throttle twist grip to minimum force friction setting. Measure breakaway at point B on lever (1, figure 11-4). Use a force gauge (fish scale) and apply force at point B in direction illustrated by arrows. Record amount of force required to obtain movement of lever. If force required to lever is not within **0.50 to 1.50** pounds, adjust as outlined in following steps.

1 Remove gunners collective control stick. Refer to paragraph 11-8.

2 Remove cotter pin, washer and nut (2) from end of shaft (9).

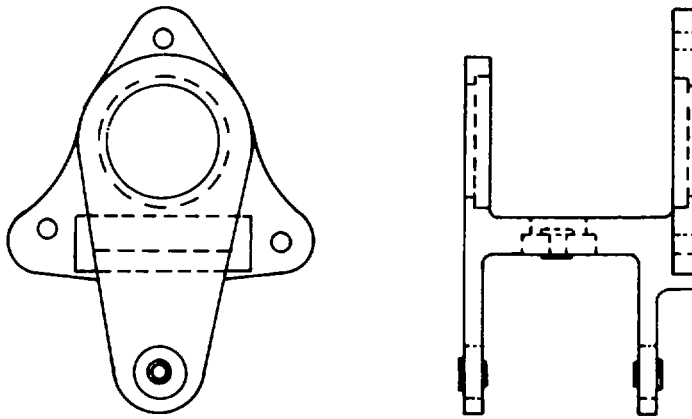
3 Remove nut, washers, and screw (10) and remove lever (1) by sliding shaft (9) out through lever, and support (5).



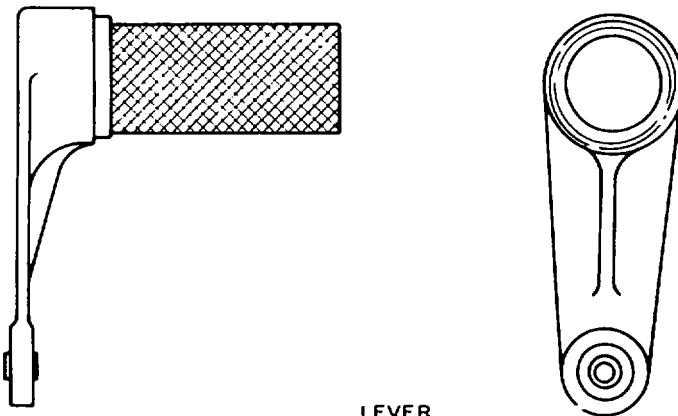
- 1. Lever
- 2. Nut, Washer, Cotter Pin
- 3. Shim
- 4. Shim
- 5. Support

- 6. Key
- 7. Pinion
- 8. Nut and Washer
- 9. Shaft
- 10. Nut, Washers, Screw



Figure 11-4. Gunners collective pitch stick



SUPPORT
209-001-104

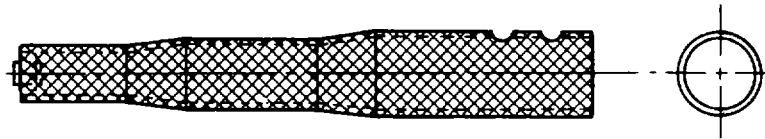


LEVER
209-001-114


TYPE OF DAMAGE	ALLOWABLE DAMAGE LIMITS	
		
MECHANICAL DAMAGE (AFTER CLEANUP)	0.030 IN	0.005 IN
CORROSION DAMAGE BEFORE CLEANUP	0.015 IN	0.0025 IN
AFTER CLEANUP	0.030 IN	0.005 IN
AREA OF FULL DEPTH REPAIR	1.0 Sq. IN	0.1 Sq. IN
NUMBER OF REPAIRS	One Per Area	
EDGE CHAMFER	0.06 IN	0.02 IN
BORE DAMAGE	0.002 IN for 1/4 Circumference	
NO CRACKS ALLOWED		

209001-141

Figure 11-4A. Gunners collective pitch stick - wear end damage limits (Sheet 1 of 3)



209-001-144 STICK

TYPE OF DAMAGE	ALLOWABLE DAMAGE LIMITS
	
MECHANICAL DAMAGE (AFTER CLEANUP)	0.005 IN
CORROSION DAMAGE BEFORE CLEANUP	0.0025 IN
AFTER CLEANUP	0.005 IN
AREA OF FULL DEPTH REPAIR	1.0 SQ. IN
NUMBER OF REPAIRS	ONE PER AREA
BORE DAMAGE	0.002 IN FOR 1/4 INCH CIRCUMFERENCE
NO CRACKS ALLOWED	

209001-140

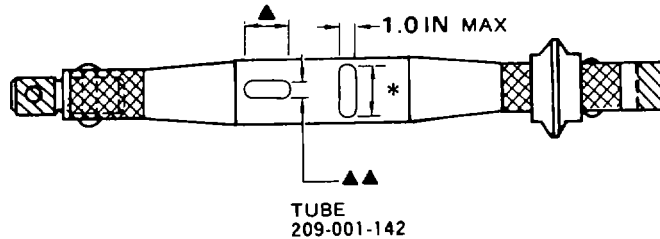
Figure 11-4A. Gunners collective pitch stick - wear and damage limits (Sheet 2 of 3)

Change 4 11-12B

LIMITS FOR SMOOTH DENTS ONLY

▲ 1.00 INCH MAX LENGTH OF DENT IN DIRECTION OF TUBE LENGTH

▲▲ MAX DIAMETER OF DENT MUST NOT EXCEED 0.2 TIMES OUTER TUBE DIAMETER



LENGTH OF CIRCUMFERENCE (*) OVER WHICH REPAIR PERMITTED	0.25 IN	25%	50%
** MAXIMUM DEPTH OF: CORROSION DAMAGE BEFORE CLEANUP	0.002 IN	0.0015 IN	0.001 IN
MECHANICAL AND CORROSION REPAIR AFTER CLEANUP	0.004 IN	0.003 IN	0.002 IN

TYPE OF DAMAGE

ALLOWABLE DAMAGE LIMITS

	□	▨	▩
MECHANICAL DAMAGE		0.015 IN	NO DAMAGE ALLOWED
CORROSION DAMAGE BEFORE CLEANUP		0.0025 IN	
AFTER CLEANUP		0.005 IN	
AREA OF FULL DEPTH REPAIR		0.1 SQ IN	
NUMBER OF REPAIRS		ONE PER AREA	
EDGE CHAMFER			
BORE DAMAGE			

SEE ABOVE
↑
TABLE
↓
0.002 IN FOR 1/4 OF CIRCUMFERENCE

** Values shown for a 0.035 wall thickness. In no case will the mechanical and corrosion depth after cleanup exceed 10 percent of the tube wall thickness, nor corrosion depth before cleanup exceed 5 percent of the tube wall thickness.

209001-144

NO CRACKS ALLOWED

Figure 11-4A. Gunners collective pitch stick - wear and damage limits (Sheet 3 of 3)

Change 4 11-12C/(11-12D blank)

- key (6).
 - 4 Remove nut and washer (8) and slide pinion gear (7) down off shaft and key (6). Remove
 - 5 Select new shims (3 and 4) that are thicker by an equal amount that the shims that were removed.

NOTE

It is necessary to equally add or remove laminations of shims (3 and 4) because tooth surface on pinion (7) and lever (1) must remain flush within 0.020 inch at point C.

- washer (8).
 - 6 Install new shim (4) on the shaft and install pinion (7) and key (6) below the shim. Install nut and
 - 7 Place lever (1) at install position with gear rack centered on teeth of pinion (7).
 - 8 Place new shim (3) between inboard side of support (5) and lever (1) and install shaft (9) through support and lever.
 - 9 Install screw, washers and nut (10) through lever (1) and shaft (9).
 - 10 Install washer and nut (2) on shaft (9).
 - 11 Check gear tooth surfaces of pinion (7) and lever (1) to ensure they are flush within 0.020 inch at point C.
 - 12 Install gunners collective control stick. Refer to paragraph 11-8.
 - (b) Repeat step (a) to determine whether breakaway force is now within tolerance. If necessary, repeat shimming procedure.
 - (c) After correct shims are installed, install cotter pins to secure nuts (2 and 8).

- (6) Install screw-mounted panel on fuselage above ammunition compartment.
- (7) Check complete control system for security and safetying of components.
- (8) Check installation for freedom of operation at first ground run.
- (9) Perform maintenance test flight. Refer to TM 55-1520-234-MTF.

11-9. Cyclic Control System.

The main rotor cyclic controls consist of interconnected control sticks in pilots and gunners compartments, and two separate systems of linkage to the swashplate. Each of the cyclic systems includes a dual hydraulic cylinder, a servo-actuator and a transducer of the SCAS (Stability and Control Augmentation System) and a force trim magnetic brake connected to control linkage through a spring-loaded force gradient assembly. The fore-and-aft cyclic controls extend aft from the control sticks to a jackshaft, then downward at right side of fuselage, then aft below the forward fuel cell, then upward to the hydraulic cylinder which is connected on the right forward horn of the swashplate. See figure 11-5. The lateral cyclic controls are interconnected between control sticks at right side of the fuselage, then extend aft and to left side, then downward and aft below the fuel cell, then upward to the hydraulic cylinder which is connected on the left forward horn of the swashplate. See figure 11-6.

Major auxiliary components of the system are as follows:

Servo actuators in both the fore and aft and lateral systems are part of the SCAS (Stability Control Augmentation System) servo for control input from the SCAS system.

Transducers in both the fore and aft and lateral systems are installed on bellcranks forward of the servo actuators.

A magnetic brake and force gradient assembly which are used for force trim, are installed in both the fore and aft and cyclic systems.

NOTE

Refer to TM 11-1520-221 series manuals for additional information on the SCAS (Stability Control Augmentation System).

Premaintenance Requirements for Cyclic Control System

Conditions	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	(T50)

- | | |
|-----------------------------|----------------------------------|
| 1. Swashplate | 17. Magnetic Brake |
| 2. Spring | 18. Pilots Cyclic Control Stick |
| 3. Elevator Control Tube | 19. Control Tube |
| 4. Hydraulic Cylinder | 20. Idler Assembly |
| 5. Cylinder Support | 21. Control Tube |
| 6. Hydraulic Cylinder Valve | 22. Gunners Cyclic Control Stick |
| 7. Adjustable Control Tube | 23. Spring |
| 8. Bellcrank | 24. Extension Tube |
| 9. Fixed Stops | 25. Clamp |
| 10. Servo Actuator (SCAS) | 26. Boot |
| 11. Bellcrank | 27. Nut |
| 12. Control Tube | 28. Lock |
| 13. Transducer (SCAS) | 29. Nut |
| 14. Force Gradient Assembly | 30. Lock |
| 15. Jackshaft | 31. Rod End Bearing |
| 16. Control Tube | |

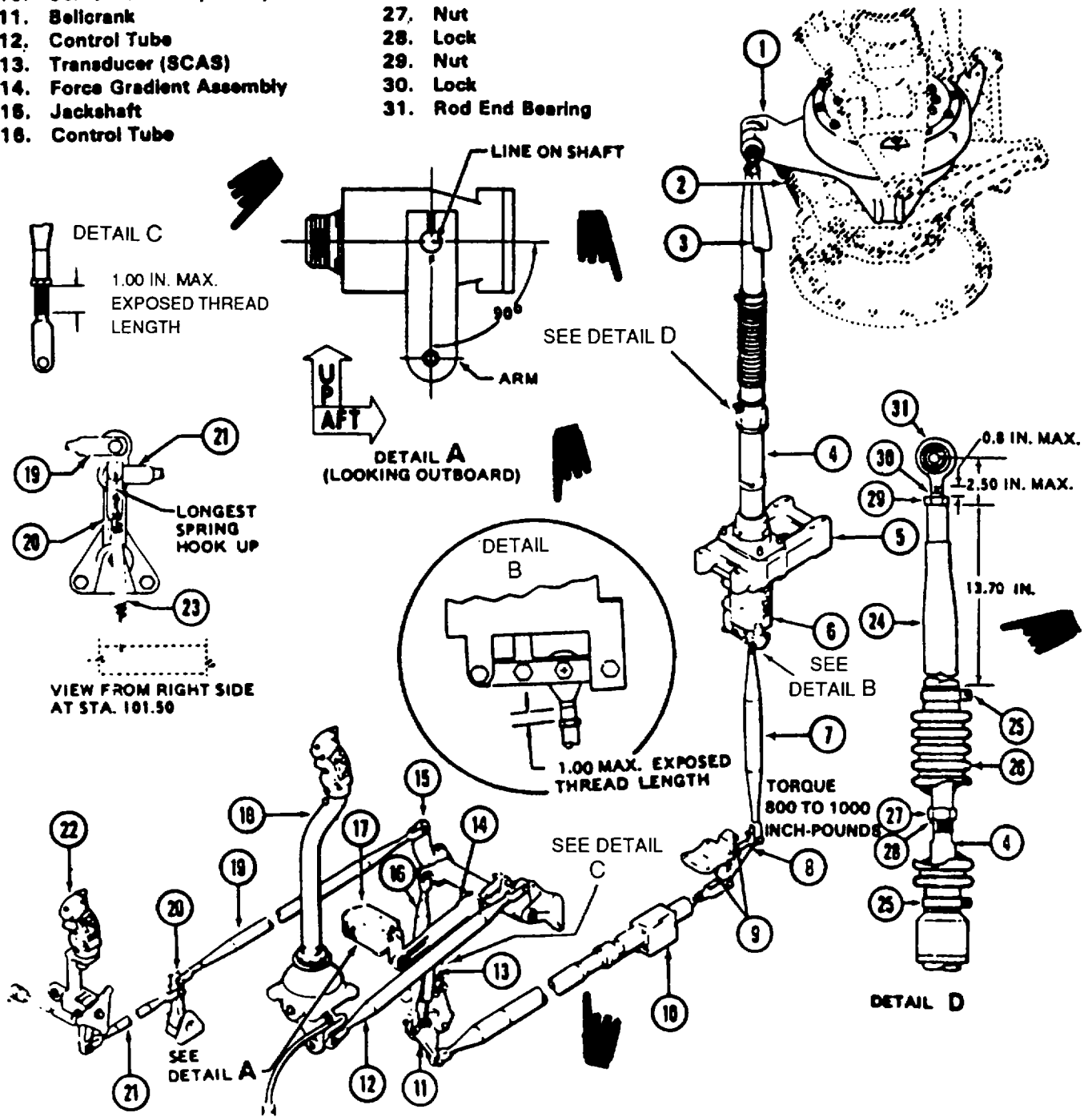
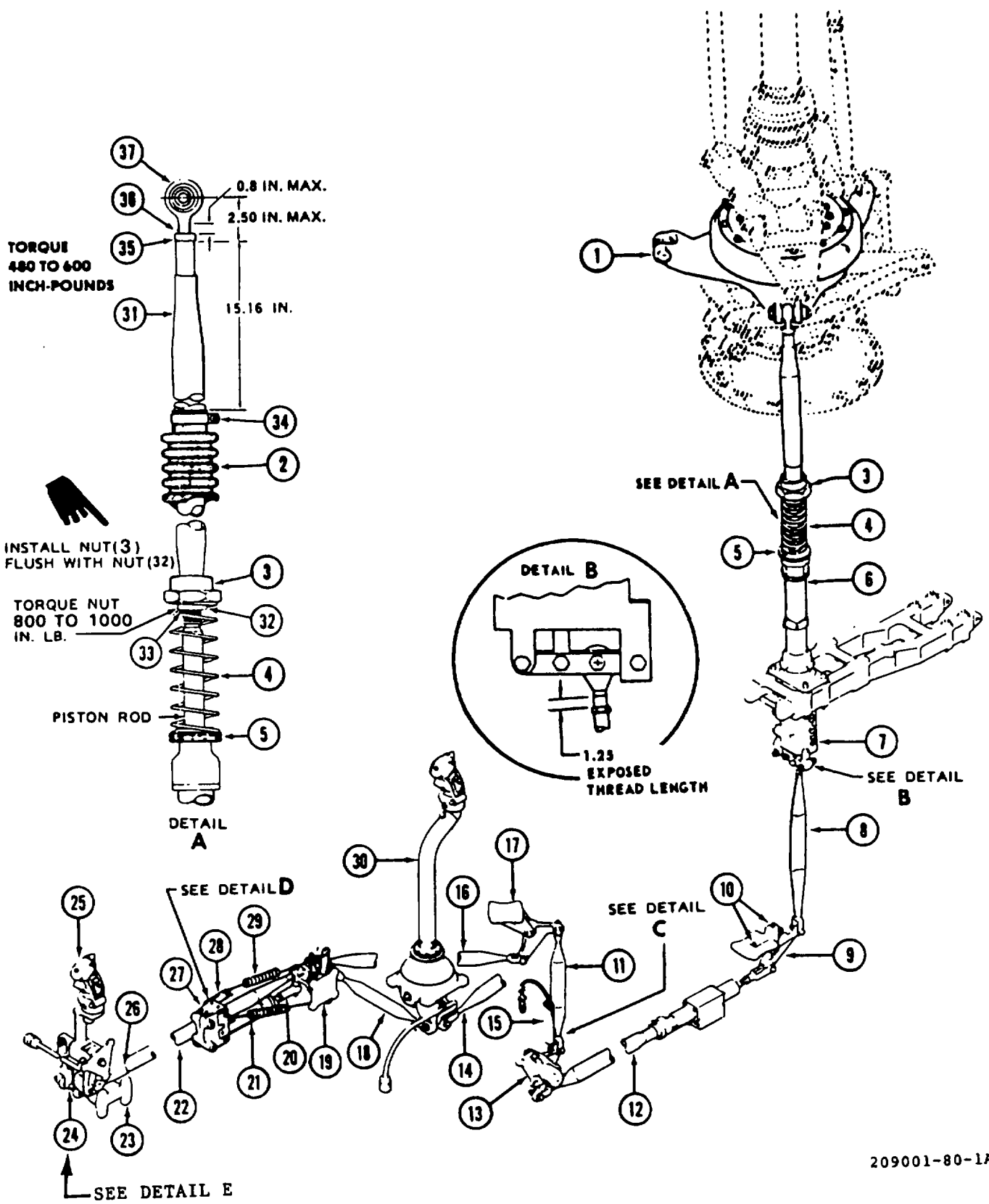


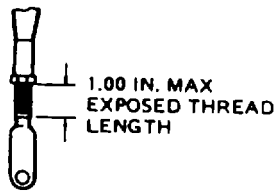
Figure 11-5. Fore-and-aft cyclic controls
Change 21 11-14



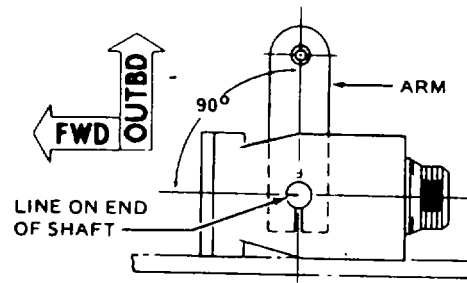
209001-80-1A

Figure 11-6. Lateral cyclic controls (Sheet 1 of 2)

Change 21 11-15



DETAIL C

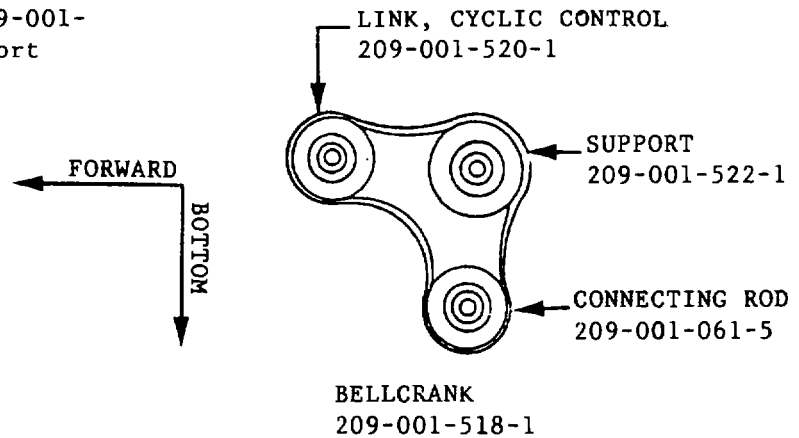


DETAIL D
(LOOKING DOWN)

209001-80-1B

CAUTION

Insure that connecting rod (209-001-061-5) is connected to bellcrank (209-001-518-1) on the lower side of support (209-001-522-1).



DETAIL E

- | | | |
|-----------------------------|----------------------------------|---------------------------------|
| 1. Swashplate | 14. Control Tube | 27. Magnetic Brake |
| 2. Boot | 15. Transducer (SCAS) | 28. Plate |
| 3. Retaining Nut | 16. Control Tube | 29. Springs |
| 4. Spring | 17. Bellcrank and Support | 30. Pilots Cyclic Control Stick |
| 5. Base | 18. Control Tube | 31. Extension Tube |
| 6. Hydraulic Cylinder | 19. Bellcrank and Support | 32. Nut |
| 7. Hydraulic Cylinder Valve | 20. Rod-End Bearing | 33. Lock |
| 8. Control Tube | 21. Force Gradient | 34. Clamp |
| 9. Bellcrank and Support | 22. Control Tube | 35. Nut |
| 10. Stop Bolts | 23. Bellcrank and Support | 36. Lock |
| 11. Control Tube | 24. Control Link | 37. Rod End Bearing |
| 12. Servo Actuator (SCAS) | 25. Gunners Cyclic Control Stick | |
| 13. Bellcrank and Support | 26. Control Stick Fore and Aft | |

Figure 11-6. Lateral cyclic controls (Sheet 2 of 2)

Change 14 11-16

**Premaintenance Requirements for
Cyclic Control System (Cont)**

Conditions	Requirements
Test Equipment	N/A
Support Equipment	Test Stand, Hydraulic
Minimum Personnel Required	Two
Consumable Materials	N/A
Special Environmental Conditions	N/A

- a. *Inspection Installed Cyclic Control System.* See figures 11-5 and 11-6.

CAUTION

Insure adequate clearance exists between the air distribution ducts and the control tubes of the cyclic system to allow free movement over the full range of tubes.

(1) Inspect control system in place for secure installation, damage, and freedom of operation through full throw.

(2) If required, remove components for detailed inspection. Refer to paragraphs 11-3 and 11-4 for damage limits on bellcranks and control tubes (connecting links). Refer to Chapter 7 for damage limits on hydraulic control cylinders.

a.1 Rigging (Preferred Method).

(1) Accomplish rigging with hydraulic power unless otherwise stated.

(2) Install components of the cyclic control system with the following exceptions:

(a) Leave hydraulic cylinders (4, figure 11-5, and 6, figure 11-6) disconnected from swashplate. Also, leave the elevator control tube (3, figure 11-5) and spring (2) disconnected.

(b) Leave tube control tube (7) disconnected from bellcrank (8) but connect to hydraulic cylinder valve lever.

(c) Leave control tube (8, figure 11-6) disconnected from bellcrank (9) by connect to hydraulic cylinder valve lever.

(d) Leave control tube (16, figure 11-5) and transducer (13) disconnected from bellcrank (11).

(e) Leave control tube (11, figure 11-6) and transducer (15) disconnected from bellcrank (13).

(3) Check and adjust cyclic stick friction (paragraph 11-10).

(4) Hold pilots cyclic stick full right

(5) Adjust control tube (11) to 14.36 inches between bolt hole centers and connect to bellcrank (13).

(6) Check that aft arm of bellcrank (9) is raised to its highest travel without touching aft stop bolt (10). If necessary, adjust stop bolt to clear.

(7) Push control tube (8) upward to bottom out piston in top of hydraulic cylinder (6) and hold lever of valve (7) at top of travel. Adjust control tube (8) length to fit on bellcrank with control stick full right, then shorten two full turns and connect tube to bellcrank. Check exposed threads to ensure that not more than one and one-quarter inch of thread is exposed (figure 11-6, detail B). If necessary, adjust length of control tube (11) and repeat adjustment procedure for tube (8). Ensure that there is not more than one inch exposed threads on tube (8) to hydraulic cylinder valve (7), torque bolt finger tight and install cotter pin. The bolt must turn freely.

CAUTION

Do not interchange control tube (7, figure 11-5) and control tube (8, figure 11-6).

(8) Adjust stop bolts (10, figure 11-6) for 0.005 to 0.015 inch clearance with bellcrank at full right and full left control positions.

(9) Install rigging fixture (T50) on pilots cyclic control stick.

(a) Remove four screws, washers, and nuts from holes in pilots floor outboard of stick support.

(b) Open clamp of rigging fixture (T50) and place over stick with open end of clamp aft. Engage pins in mounting holes.

(10) Clamp cyclic stick in aft hole "A" of rigging fixture (T50). Hold bellcrank (8, figure 11-5) against fixed stop (9). Adjust control tube (16) and connect to bellcrank (11).

(11) Push control tube (7) upward to bottom out piston in top of hydraulic cylinder (4) and hold lever of valve (6) at top of travel. Adjust control tube (7) length to fit on bellcrank (8), then shorten two full turns and connect to bellcrank. Check exposed threads on control tube (7) to ensure that not more than one inch of thread is exposed (figure 11-5, detail B). Check bolt that attaches control tube (7) to hydraulic cylinder valve (6), torque bolt finger tight and install cotter pin. The bolt must turn freely.

(12) Clamp cyclic control stick in center hole "N" of rigging fixture (T50).

(13) Fabricate a work aid as shown in figure 11-7 or use an 18 inch scale as a measuring instrument. Set both swashplate horns to 12.82 inches, measured from transmission flange to lower edge of bolt holes. Keep right horn at 12.82 inches \pm 0.06 and set left horn to 12.52 inches \pm 0.06 (figure 11-8).

(14) Remove lockwire from retaining nut (29, figure 11-5) and loosen nut.

(15) Adjust rod end (31) of extension tube (24) to fit right swashplate horn at its measured position. Do not attach hydraulic cylinder to swashplate at this time.

(16) Torque nut (29) 450 To 600 inch-pounds. Lockwire nut to lock (30) with lockwire (C152).

(17) Position boot (26) on cylinder (4) and extension tube as shown in figure 11-5, detail D. Top of boot should be 13.70 inches from bottom of locknut on rod end. Tighten clamps (25) with boot in this position.

(18) Remove lockwire from retaining nut (35, figure 11-6) and loosen nut.

(19) Adjust rod end (37) of extension tube to fit left swashplate horn at its measured position. Torque retaining nut (35) 480 To 600 inch-pounds and lockwire with wire (C152).

NOTE

Any rod end bearing which exceeds the 0.80 inch maximum or 2.50 inch maximum dimensions should be readjusted within these limits. Rod ends with insufficient exposed threads to permit lock (36) engagement should also be readjusted. Final rigging adjustment should be made at the interface of the extension tube and hydraulic cylinder assembly.

(20) Position bottom of boot (2) in groove provided on base (5). Position top of boot (2) on extension tube so that there is a distance of 15.16 inches from top of boot to bottom of locknut on rod end. Tighten clamp (34) with boot in this position (figure 11-6, detail A).

(21) Attach hydraulic cylinders adjusted in the two preceding steps to the swashplate. Connect spring (2, figure 11-5) to bracket at outer side of right horn.

(22) Remove rigging fixture (T50) from control stick.

(23) Hold control stick full forward. Position transducer (13) in retracted position, adjust rod end and connect on inboard side of bellcrank. Use large safety washer under screw head and aluminum alloy washers under nut and between rod end and bellcrank. Move control stick full aft and check that transducer does not bottom out.

(24) Hold cyclic full forward. Hold arm on magnetic brake (17) full aft. Adjust rod end of force gradient (14) and connect to arm on jackshaft (15). If there is not enough adjustment in force gradient (14), rotate the arm of the magnetic brake (17) one serration counter clockwise.

(25) Hold cyclic stick full right. Adjust and connect lateral SCAS transducer (15, figure 11-6) in retracted position on inboard side of bellcrank (13). Install safety washer and aluminum alloy washers in same manner described in step (23) above. Move cyclic stick full left and check that transducer does not bottom out.

(26) Hold cyclic stick at center position. Hold arm of magnetic brake (27) square to beam on which brake is mounted. Adjust force gradient rod end bearing (20) and connection bolt at underside of forward arm of bellcrank (19).

- (27) Check complete cyclic controls system for security and safetying of components.
- (28) Check operation by moving cyclic controls through full throw and ensure that there is no binding or interference.
- (29) Rig and connect synchronized elevator controls (paragraph 11-17).
- (30) Perform maintenance test flight (TM 55-1520-244-MTF)
- b. *Rigging.* (Alternate Method).
 - (1) Accomplish rigging without hydraulic power unless otherwise stated.
 - (2) Install all components of the cyclic control system with the following exceptions:
 - (a) Leave hydraulic cylinders (4, figure 11-5) and (6, figure 11-6) disconnected from swashplate. Also, leave the elevator control tube (3, figure 11-5) and spring (2) disconnected.
 - (b) Leave control tube (7, figure 11-5) disconnected from bellcrank (8) but connect to hydraulic cylinder valve lever.
 - (c) Leave control tube (8, figure 11-6) disconnected from bellcrank (9) but connect to hydraulic cylinder valve lever.
 - (d) Leave control tube (16, figure 11-5) and transducer (13) disconnected from bellcrank (11).
 - (e) Leave control tube (11, figure 11-6) and transducer (15) disconnected from bellcrank (13).
 - (3) Check and adjust cyclic stick friction. Refer to paragraph 11-10.
 - (4) Hold pilots cyclic control stick full right.
 - (5) Adjust control tube (11, figure 11-6) to 14.36 inches between bolt hole centers and connect to bellcrank (13).
 - (6) Check that aft arm of bellcrank (9, figure 11-6) is raised to its highest travel without touching aft stop bolt (10). If necessary, adjust stop bolt to clear.
 - (7) Push control tube (8, figure 11-6) upward to bottom out piston in top of hydraulic cylinder (6) and hold lever of valve (7) at top of travel. Adjust control tube (8) length to fit on bellcrank with control stick full right, then shorten two full turns and connect tube to bellcrank. Check exposed threads to ensure that not more than one and one-quarter inch of thread is exposed. See detail B. If necessary, adjust length of control tube (11) and repeat adjustment procedure for tube (8). Ensure that there is not more than one inch exposed threads on control tube (11). See detail C. Check bolt that attaches control tubes (8) to hydraulic cylinder valve (7), torque bolt finger tight and install cotter pin. The bolt must turn freely.

CAUTION

Do not interchange control tube (7, figure 11-5) and control tube (8, figure 11-6).

- (8) Adjust stop bolts (10, figure 11-6) for 0.005 to 0.015 inch clearance with bellcrank at full right and full left control positions.
- (9) Install rigging fixture (T50) on pilots cyclic control stick.
 - (a) Remove four screws, washers and nuts from holes in pilots floor outboard of stick support.
 - (b) Open clamp of rigging fixture (T50) and place over stick with open end of clamp aft. Engage pins in mounting holes.

Change 24 11-16C

(10) Clamp cyclic stick in aft hole "A" of rigging fixture (T50). Hold bellcrank (8, figure 11-5) against fixed stop (9). Adjust control tube (16) and connect to bellcrank (11).

(11) Push control tube (7, figure 11-5) upward to bottom out piston in top of hydraulic cylinder (4) and hold lever of valve (6) at top of travel. Adjust control tube (7) to length to fit on bellcrank (8), then shorten two full turns and connect to bellcrank. Check exposed threads on control tube (7) to ensure that they do not exceed one inch. See detail B. Check bolt that attaches control tube (7) to hydraulic cylinder valve (6). Torque bolt finger tight and install cotter pin. The bolt must turn freely.

(12) Clamp cyclic control stick in center hole "N" of rigging fixture (T50).

(13) Fabricate a work aid as shown on figure 11-7 or use an eighteen inch scale as a measuring instrument. Set both swashplate horns to **12.82** inches, measured from transmission flange to lower edges of bolt holes. Keep right horn at **12.82** inches \pm **0.06** inch and set left horn to **12.52** inches \pm **0.06** inch. See figure 11-8.

(14) Remove lockwire from retaining nut (29, figure 11-5) and loosen nut.

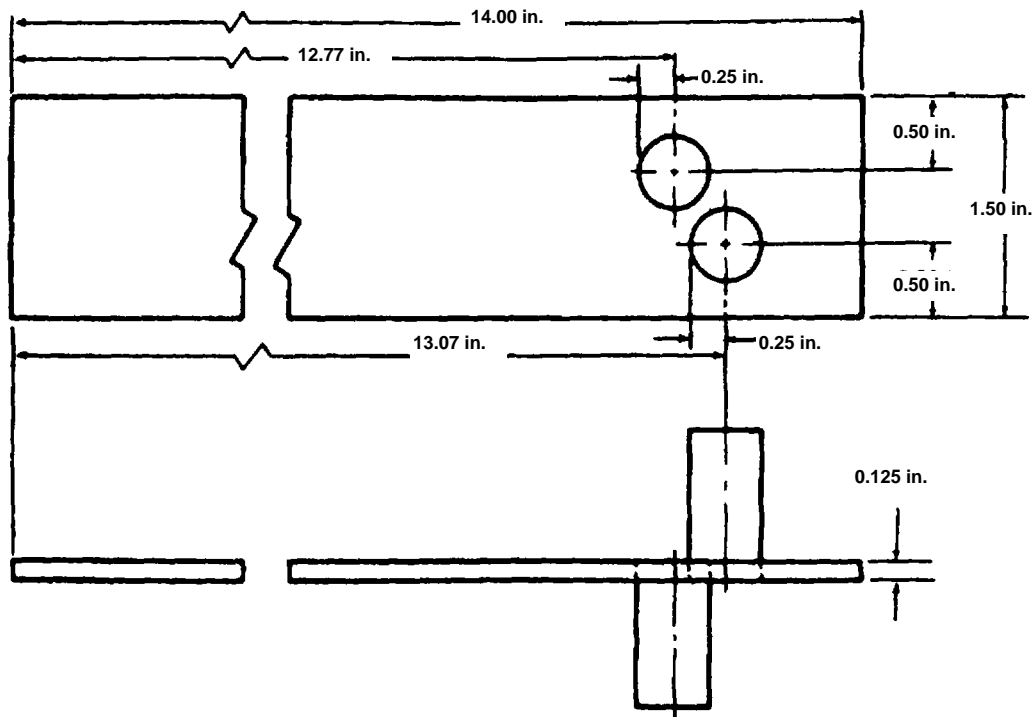
(15) Push down on upper tube of fore-and-aft hydraulic cylinder (4, figure 11-5) with just enough force to hold lever of valve (6) at top of travel. Adjust rod end (31) of extension tube (24) to fit right swashplate horn at its measured position, then shorten one full turn to compensate for normal change when hydraulic power is applied. Do not attach hydraulic cylinder to swashplate at this time.

(16) Torque nut (29) to **480 TO 600** inch-pounds.

Lockwire nut to lock (30) with wire (C152).

NOTE

When setting hydraulic cylinder valve levers to top of travel do not cause controls below cylinder to move or misrigging will occur.



Material: One Steel Strap 1.50 X 0.125 X 14 Inch
Two Steel Pins 1 Inch Long X 0.50 Inch Diameter

Drill holes in strap and install pins in strap at location illustrated with one pin on each side of strap. Solder or braze pins in position. Apply one coat of primer (C102) to prevent corrosion.

Figure 11-7. Work aid for rigging swashplate

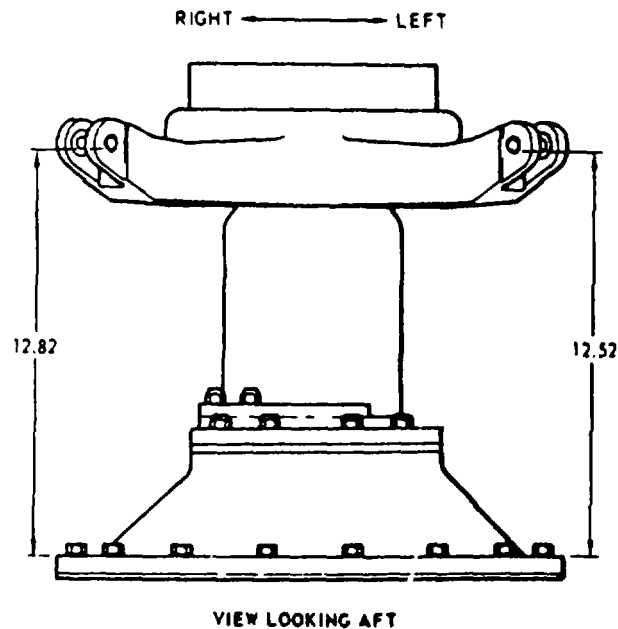


Figure 11-8. Swashplate rigging dimensions

(17) Position boot (26) on cylinder (4) and extension tube as shown in Detail D figure 11-5. **TOP OF BOOT SHOULD BE 13.70 INCHES FROM BOTTOM OF LOCKNUT ON ROD END.** Tighten clamps (25) with boot in this position.

(18) Remove lockwire from retaining nut (35, figure 1106) and loosen nut.

(18A) Loosen clamp (34) and remove boot (2) from base (5). Slide boot (2) up until nut (3) is exposed.

(18B) Remove lockwire, retaining nut (3), and spring (4).

(19) Press down on upper tube of hydraulic cylinder (6) with just enough force to hold lever of valve (7) at top of travel. Adjust rod end (37) of extension tube to fit left swashplate horn at its measured position, then shorten one full turn to compensate or normal change when hydraulic pressure is applied. Torque retaining nut (35) **480 TO 600** inch-pounds and lockwire nut to lock (36) with wire (C152).

NOTE

Any rod end bearing which exceeds the 0.80 in. max. or 2.50 in. max. dimensions should be readjusted within these limits. Rod ends with insufficient exposed threads to permit lock (36) engagement should also be readjusted. Final rigging readjustment should be made at the interface of the extension tube and hydraulic cylinder assembly.

(19A) Position spring (4) on base (5). Thread retaining nut (3) on nut (32) until top of retaining nut (3) is flush with top of nut (32).

(19B) Lockwire (C152) retaining nut (3) to nut (32), one positive and one negative safety.

(20) Position bottom of boot (2) in groove provided on base (5). **POSITION TOP OF BOOT (2) ON EXTENSION TUBE SO THAT THERE IS A DISTANCE OF 15.16 INCHES FROM TOP OF BOOT TO BOTTOM OF LOCKNUT ON ROD END.** Tighten clamp (34) with boot in this position. (See Detail "A", figure 11-6.)

(21) Attach hydraulic cylinders adjusted in the two preceding steps to the swashplate. Connect spring (2, figure 11-5) to bracket at outer side of right horn.

(22) Remove rigging fixture (T50) from control stick..

(23) Disconnect fore-and-aft SCAS actuator (10, figure 11-5) from bellcrank (11). Hold control stick full forward. Position transducer (13) in retracted position, adjust rod end and connect on inboard side of bellcrank. Use large safety washer under screw head and aluminum alloy washers under nut and between rod end and bellcrank. Move control stick full aft and check that transducer does not bottom out. Reconnect for and aft SCAS actuator (10).

(24) Hold cyclic stick full forward. Hold arm on magnetic brake (17, figure 11-5) full aft. Adjust rod end of force gradient (14) and connect to arm on jackshaft (15). If there is not enough adjustment in force gradient (14), rotate the arm of the magnetic brake (17) one serration counter-clockwise. Connect servo actuator (10) to bellcrank (11).

(25) Hold cyclic stick full right. Adjust and connect lateral SCAS transducer (15, figure 11-6) in retracted position on inboard side of bellcrank (13). Install safety washer and aluminum alloy washers in same manner described

in step (23). Move cyclic stick full left and check that transducer does not bottom out.

(26) Hold cyclic stick at center position. Hold arm of magnetic brake (27, figure 11-6) square to beam on which brake is mounted. Adjust force gradient rod end bearing (20) and connect on bolt at underside of forward arm of bellcrank (19).

(27) Check complete cyclic controls system for security and safetying of components.

(28) Check operation with hydraulic power from a hydraulic test stand if available; if not available, move cyclic controls through full throw.

(29) Rig and connect synchronized elevator controls. Refer to paragraph 11-17.

(30) Perform maintenance test flight. Refer to TM 55-1520-234-MTF.

11-10. Cyclic Stick, Pilots. See figure 11-9.

The conventional type control stick, mounted on the floor ahead of the pilots seat, consists of a grip with control switches on the stick assembly which is mounted through gimbal bearings in a bell-shaped support.

Premaintenance Requirements for Pilots Cyclic Stick

Conditions	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	None
Test Equipment (Fish scale)	Force gage
Support Equipment	None
Minimum Personnel Required	Two
Consumable Materials	(C115)(C116)(C124)
Special Environmental Conditions	None

Change 22 11-18

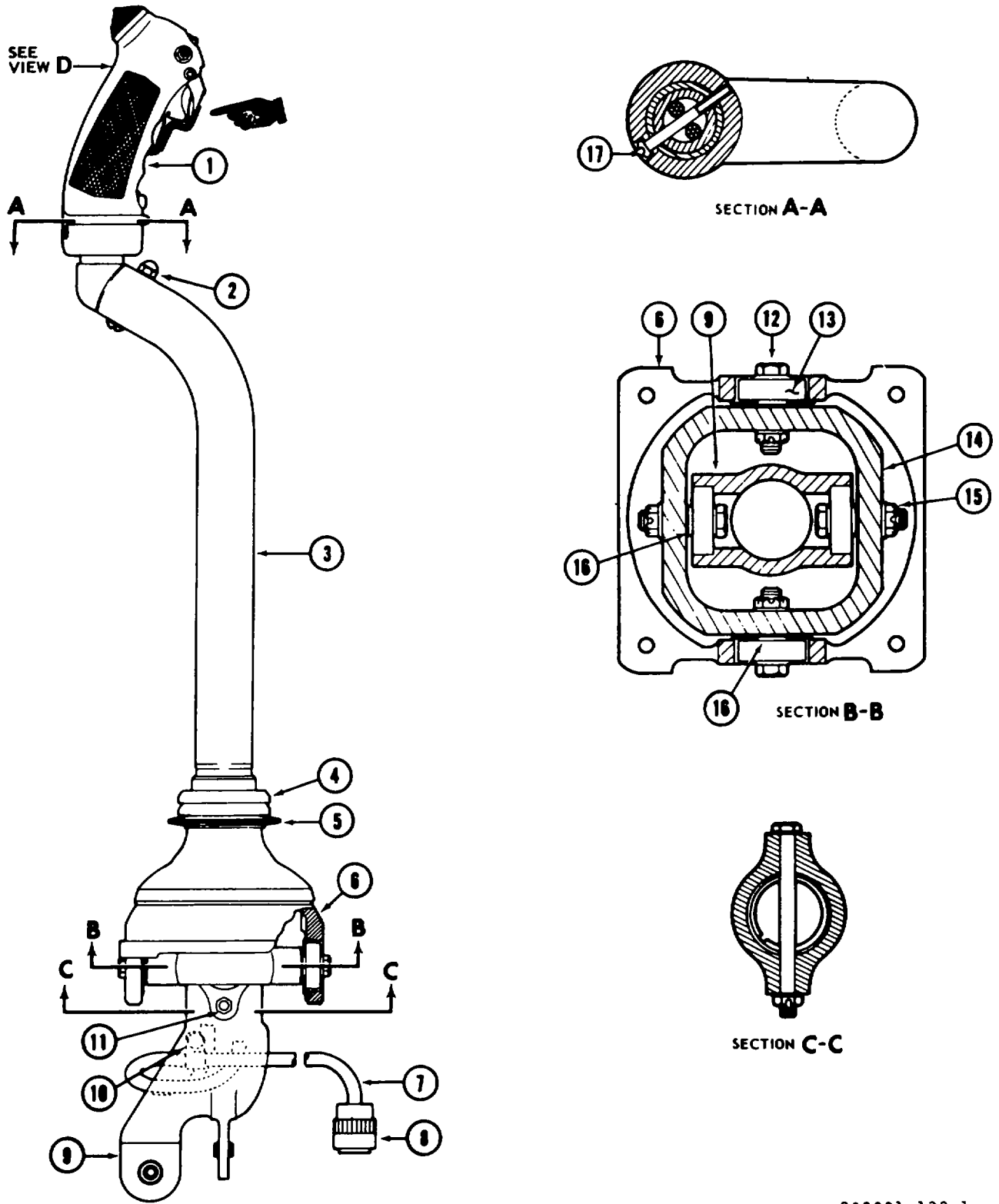
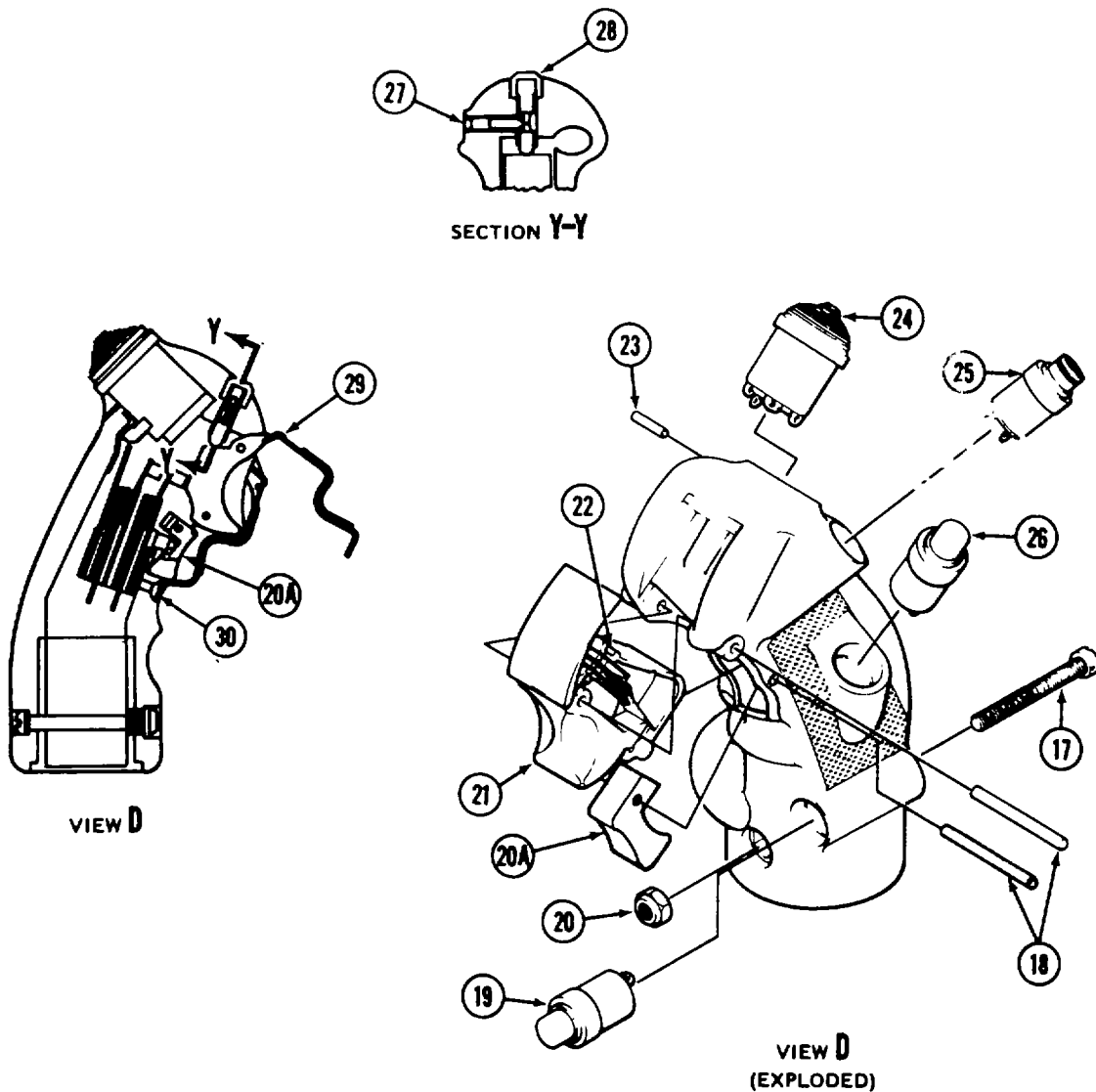


Figure 11-9. Pilots cyclic stick (Sheet 1 of 2)

Change 2 11-19

209001-132-1



- 1. Grip
- 2. Nut and screw
- 3. Stick
- 4. Nut (2)
- 5. Washer
- 6. Support
- 7. Cable
- 8. Plug
- 9. Lever
- 10. Bolt, clamp and washer
- 11. Bolt and nut
- 12. Bolt (2)
- 13. Bearing (4)
- 14. Gimbel
- 15. Bolt (2)
- 16. Shim

- 17. Screw
- 18. Pin
- 19. Force-trim switch
- 20. Nut
- 20A. Trigger action
- 21. Trigger
- 22. Trigger turret-fire switch
- 23. Pin
- 24. Radio-intercom switch
- 25. SAS release switch
- 26. Wing arm-fire switch
- 27. Screw, insert, spring and ball
- 28. Screw, insert, spring and ball
- 29. Guard and spring
- 30. Screw and washer

209001-132-2

Figure 11-9. Pilots cyclic stick (Sheet 2 of 2)

a. *Removal.*

- stick.
- (1) Obtain access to area below pilots floor through door in panel at top of ammunition compartment.
 - (2) Disconnect lateral system control tube and fore-and-aft control tube from levers on lower end of control stick.
 - (3) Disconnect electrical cable connector of control stick from the receptacle.
 - (4) Detach stick support from floor by removing four bolts, with nuts and washers.
 - (5) Lift stick assembly out of floor opening.

b. *Disassembly.* See figure 11-9.

- assembly.
- (1) Identify and tag wires of cable (7) for sequence of installation in plug (8); then remove plug (8) from cable assembly.
 - (2) Remove bolt, washer and clamp (10) attaching cable (7) to lever (9).
 - (3) Remove grip (1) from cyclic stick by removing screw (17).

NOTE

Use care when removing grip from stick because electrical wires of grip must be removed from inside of stick.

- (4) Separate stick (3) from lever (9) by removing attaching nut, washer and bolt (11).
- (5) Separate support (6) from gimbal (14) by removing two bolts (12).

NOTE

Be sure to save shims (16) located on bolts (12) between support (6) and gimbal (14).

- (6) Remove two bolts (15) and separate lever (9) from gimbal (14). Save shim (16) for reinstallation.
- (7) Rotate nuts (4) counterclockwise on stick (1) until clear of threads on stick.

c. *Inspection.* See figure 11-9.

- (1) Inspect washers (5) for damage which will affect serviceability.
- (2) Inspect bearings (13) for roughness and freedom of movement.
- (3) Inspect lever (9) and gimbal (14) using fluorescent penetrant.
- (4) Inspect shims (16) for wear and /or damage.
- (5) Inspect grip (1) for cracks. Inspect switches for operation of detent and obvious damage.
- (6) Inspect cable (7) for loose connections, broken terminals, pins and/or soldered connections. Inspect cable for obvious damage such as chafing.

d. *Repair.* See figure 11-9.

- (1) Replace washers (5) if deformed or otherwise unserviceable.
- (2) Replace bearings (13) in support (6) and lever (9), if rough or binding.
- (3) Replace lever (9) and gimbal (14) if cracked or unserviceable.
- (4) Replace shims (16) if worn or damaged.
- (5) Replace electrical cable (7) if it fails to meet inspection requirements.
- (6) Replace complete cyclic stick grip (1) or switches in the grip, as required.

NOTE

Take care to prevent damage to plastic surfaces of grip (1). It may be necessary to remove film of adhesive which is used to retain switches.

- (a) Radio-intercom switch (24, figure 11-9).

- 1 Remove pin (23) and carefully pry out switch (24).

- 2 Unsolder wires from terminals of switch. Tag wires for identification.
- 3 Solder wires to terminals of new switch.
- 4 Insert switch (24) in grip and secure with pin (23).

NOTE

Three push-button switches (19, 25, and 26) shall be firmly retained in grip housing using adhesive (C20). Use adhesive sparingly so that switches may be readily removable and replaceable in grip housing without damage to switches or grip housing.

(b) Force-trim switch (19) or SAS release switch (25) or wing arm-fire switch (26).

- 1 Pry out switch from grip.
- 2 Unsolder wires from switch terminals. Tag wires for identification.
- 3 Solder wires to terminals of new switch.
- 4 Apply adhesive (C20) sparingly to new switch and seat securely in grip.

(c) Trigger turret-fire switch (22).

- 1 Remove pin (18) securing switch (22) to grip (1).
- 2 Unsolder wires from terminals of switch. Tag wires for identification.
- 3 Solder wires to terminals of new switch.
- 4 Position switch (22) in grip (1) and secure with pin (18).

(d) Grip assembly (1).

- 1 Remove screw (17) and nut (20) securing grip to cyclic stick.
- 2 Remove switches (19, 22, 24, 25, and 26) from grip (1).
- 3 Detach grip (1) from cyclic stick assembly.
- 4 Position new grip on cyclic stick and route wires to proper switch opening.
- 5 Install switches (19, 22,24,25, and 26) on grip (1).

e. *Assembly.* See figure 11-9.

(1) Clean exposed surfaces with a clean cloth dampened with solvent (C124). Do not allow solvent to enter bearings or electrical components.

(2) Route electrical cable (7) down through stick (3) and attach grip (1) to stick with screw (17) and nut (20).

NOTE

Separate wires from grip (1) so that screw is between bundles.

(3) Install two bearings (13) in lever (9).

(4) Assemble lever (9) and gimbal (14) with sufficient shims (16) on attaching bolt (15) to prevent lever side play. Distribute shims (16) on each side so that the center line of bore in lever (9) is concentric within **0.005** inch with center of gimbal (14). Install bolts from inside of lever to outside of gimbal and secure with washer, nut and cotter key.

(5) Install bearings (13) in support (6). Insert end of cyclic stick (3) in original position in lever (9).

(6) Install bolts (12) from outside, through bearing with sufficient shims (16) on each bolt, between support and gimbal to prevent side play and maintain center of support (6), concentric within **0.005** inch of gimbal center.

(7) Secure bolts (12) with washer, nut, and cotter pin.

(8) Install bolt (11) through cyclic stick (3) and lever (9) with washer under bolthead and install washer and nut on opposite end. Secure with cotter pin.

(9) Attach cable assembly to lever (9), clamp bolt, and washer. At the same time, make sure that all slack is

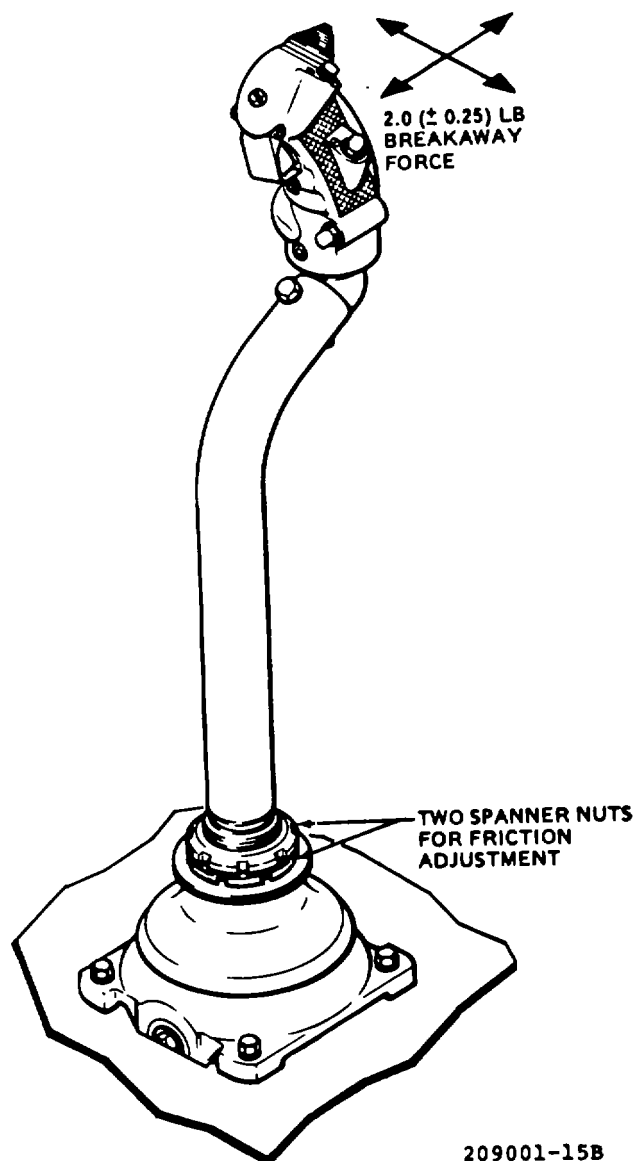


Figure 11-10. Pilots cyclic stick friction adjustment

removed from wires in stick and maximum distance between cable (7) and lever (9) is **0.50** inch.

(10) Install plug (8) on cable (7) with wires of cable installed in original plug position.

(11) Adjustment.

(a) Place support (6, figure 11-9) of cyclic stick in a suitable device to hold it immovable with stick (3) perpendicular to the support.

(b) Turn lower nut (4, figure 11-9) clockwise on threads until nut is adjacent to washers (5).

(c) Adjust stick friction as follows:

1 Adjust lower spanner nut (figure 11-10) to obtain **2.0 ± 0.25** pound breakaway force from neutral position. Measure breakaway force with a fish scale at center of stick grip.

2 Hold lower spanner nut (figure 11-10) and tighten upper spanner nut **450 TO 500** inch pounds. Recheck breakaway torque and readjust if required.

f. *Installation.* See figure 11-5.

(1) Place control stick in mounting hole of pilots floor.

(2) Align holes and install four bolts through stick support and floor.

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(3) Apply sealant (C116) to fill in structure fore-and-aft of stick support and form a fillet between support and floor.

(4) Connect control tube (12, figure 11-5). Use one washer under bolt head and one washer under nut. Secure with cotter pin.

(5) Connect control tube (18, figure 11-6). Use one washer under bolt head and one washer under nut. Secure with cotter pin.

(6) Connect electrical connector of stick to receptacle provided.

(7) Check complete control system for security and safetying of components.

g. Functional Check.

(1) Check operation of pilots cyclic stick through full range of movement.

(2) Reinstall access panel in top of ammunition compartment.

(3) Perform maintenance test flight. Refer to TM 55-1520-234-MTF.

11-11. Cyclic Stick, Gunners. See figure 11-11.

The cyclic control stick, mounted on gunners right side console, consist of a grip with control switches on a short stick, attached on a support through pivots which allow fore-and-aft lateral movements.

Premaintenance Requirements for Gunners Cyclic Stick

Conditions	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	Two
Consumable Materials	(C124)
Special Environmental Conditions	None

a. Removal. See figure 11-11.

(1) Remove screw-mounted panel from right side of fuselage above ammunition compartment, for access to stick within console.

(2) Disconnect electrical cable connector of stick from receptacle in console.

(3) Disconnect fore-and-aft system control link and lateral system control link from control stick.

(4) Detach boot from console by removing four screws and washers.

(5) Detach stick support from console structure by removing three bolts and washers. Lift stick assembly out of console.

b. Disassembly. See figure 11-11.

(1) Tag wires of cable assembly (2) for identification, number and installation sequence in plug (1) then remove plug (1) from cable assembly.

(2) Remove clamp (3) from cable assembly (2) at end of stick (4).

(3) Remove grip (7) from upper end of stick (5) by removing screw (6) and apply gentle, upward pressure on grip to prevent injury to attached cable assembly (2).

(4) Separate stick (5) from bellcrank (12) and support (8) by removing bolt (9).

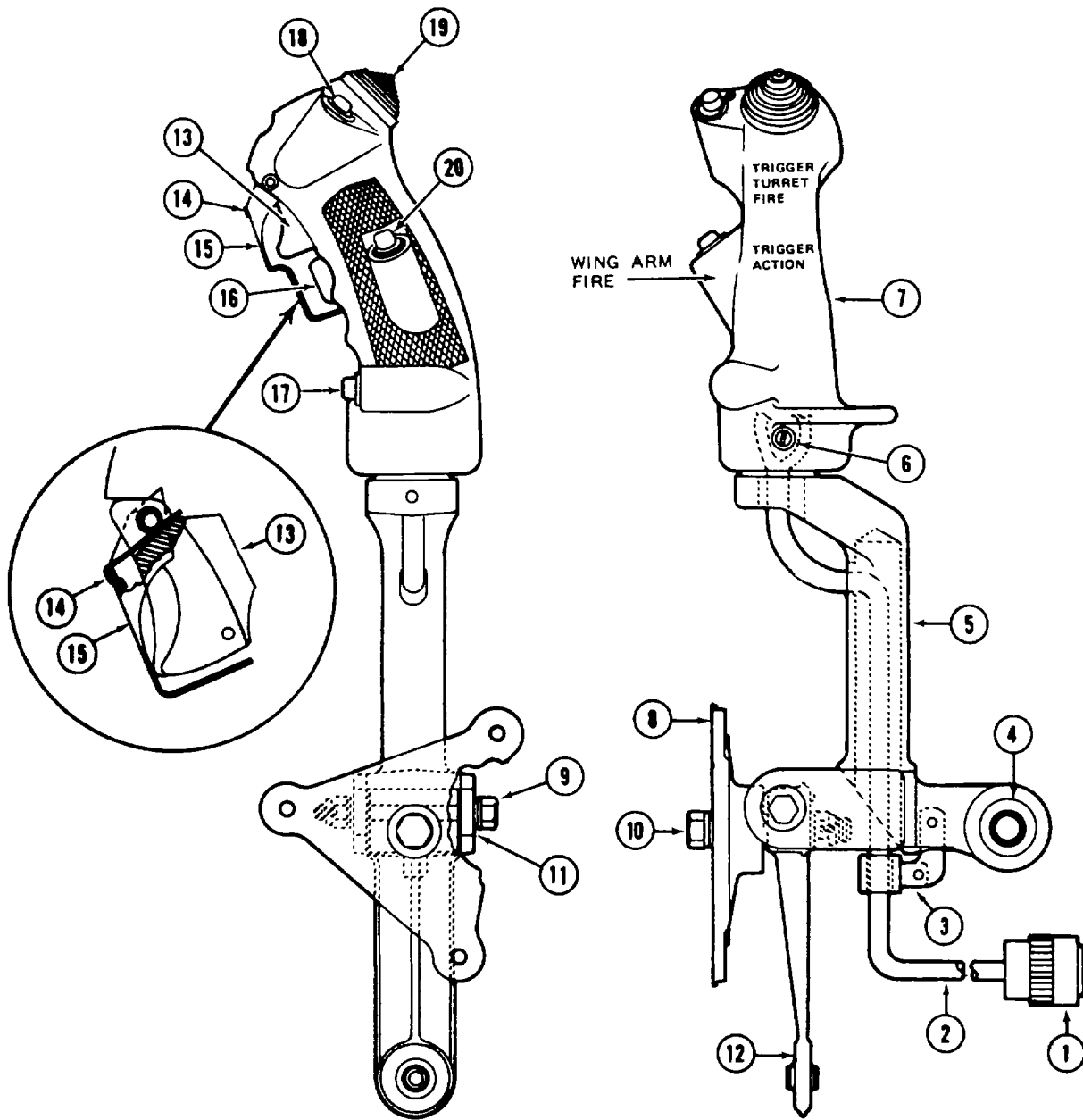
(5) Separate bellcrank (12) from support (8) by removing bolt (10).

c. Inspection. See figure 11-11.

(1) Inspect grip (7) for cracks. Inspect switches for detent and serviceability.

(2) Inspect cable (2) for loose connectors, broken terminals, pins, and/or soldered connections to switches in grip (7). Inspect cable wires for breaks and/or chafing.

(3) Inspect all bearings for freedom of movement in stick (5), support (8) and bellcrank (12).



- 1. Plug
- 2. Cable (Electrical)
- 3. Clamp
- 4. Bearing
- 5. Cyclic Stick
- 6. Screw
- 7. Grip

- 8. Support
- 9. Bolt
- 10. Bolt
- 11. Bearing
- 12. Bellcrank
- 13. Trigger Turret Fire
- 14. Spring

- 15. Trigger Guard
- 16. Trigger Action
- 17. S.A.S. Release
- 18. Force Trim
- 19. Radio-Intercom
- 20. Wing Arm Fire

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Figure 11-11. Gunners cyclic stick

(4) Inspect stick (5), support (8) and bellcrank (12) using fluorescent penetrant (MIL-I-6866 and TM 55-1500-204-25/1).

d. *Repair.* See figure 11-11.

(1) Replace grip (7) if cracked. Replace switches in grip if the detent is not functional or if the switch is otherwise unserviceable. See paragraph 11-10. d. (6). Repair is same as pilots grip.

(2) Tighten loose connections of wires in cable (2) to grip (7). Replace broken terminals and resolder broken or weak solder connections.

(3) Replace any or all bearings in stick (5), support (8), or bellcrank (12) for insufficient freedom of rotation or roughness of bearing.

(4) Replace stick (5), support (8) and bellcrank (12) if found unserviceable in the fluorescent penetrant inspection.

(5) Replace protective boot if unserviceable.

e. *Assembly.* See figure 11-11.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.

(1) Clean exposed surfaces by wiping with a cloth dampened with solvent (C124). Do not allow solvent to enter bearings or electrical components.

(2) Place a washer under head of bolt (10); insert bolt through support (8) and through bellcrank (12) and secure bolt with washer, nut and cotter pin.

(3) Install cable (2) from the top, down through stick (5) and attach grip (7) with screw (6).

NOTE

Separate two wire bundles in such a manner that the screw (6) is located between the two bundles.

(4) Install clamp (3) around cable (2) below stick (5) and attach clamp to clamp support with screw, two washers and a nut.

(5) Install bearing (11) into hinge portion of stick (5). Install bolt (9), with washer under bolt head through bearing (11), bellcrank (12), and bearing in opposite side of stick hinge and secure with washer, nut, and cotter pin.

(6) Solder free ends of wires into plug (1) in the same sequence as original installation. Solder per MIL-STD-440C.

f. *Installation.* See figure 11-11.

(1) Place stick assembly into opening of console, inserting electrical cable first.

(2) Align stick support to mounting holes of beam. Install three bolts, with thin aluminum alloy washers under heads.

(3) Connect fore-and-aft system control tube on vertical lever of stick, and lateral control system link on horizontal lever. Use one thin aluminum alloy washer under each bolt head, and two under each nut. Secure nuts with cotter pins.

(4) Connect electrical cable connector of stick to receptacle in console.

(5) Attach boot assembly to console with four screws and washers.

(6) Check complete control system for security and safetying of components.

(7) Install access panel.

g. *Functional Check.* Perform maintenance test flight. Refer to TM 55-1520-234-MTF.

11-12. Jackshaft, Fore and Aft Cyclic Controls.

Jackshaft integrates, fore-and-aft cyclic control input actions from the pilots and gunners stick into one output action. It changes direction of movement down and slightly forward to a bellcrank at station 144.75, WL 37.88. Jackshaft rotates on bearing supports at the fuselage attachment points between station 146.50 and 148.50.

a. *Removal.* (15, figure 11-5).

(1) Gain access to jackshaft by removing access panels (5, 9, 11, and 13, figure 2-3) from right side of fuselage and remove access panels (27 and 30) from bottom of fuselage.

(2) Open ammo compartment doors (8) and remove access panel on aft, center bulkhead inside compartment. Detach control tube assemblies (12, 16, and 19, figure 11-5) and force gradient assembly (14) from levers of jackshaft (15). Refer to paragraph 11-15 for force gradient assembly removal. Do not connect force gradient (9, figure 11-12).

(3) Remove nut (15, figure 11-11A), washers (14), and bolt (13) that attaches lower ear of support assembly (3) to right hand beam.

(4) Remove bolt (5) and washers (4) from remaining ears of support assembly (3).

(5) Remove support (7) for jackshaft and four bolts (9) and washers (8).

(6) Carefully guide outboard lever of jackshaft (1) through opening in right hand beam assembly. Remove jackshaft (1) with support (7) from fuselage through ammo compartment bulkhead access panel.

(7) Remove cotter pin (10), nut (11), washers (12) and remove support (7) from end of jackshaft.

(8) Remove support assembly (3) from bearing surface of jackshaft and guide support off end of jackshaft over lever.

b. Inspection. Inspect jackshaft as follows:

(1) Inspect jackshaft (1, figure 11-11A), support assembly (3), and support (7) using fluorescent penetrant (MIL-6866) in accordance with TM 55-1500-204-25/1.

(2) Inspect bearings (2) for roughness, freedom of movement, and wear in excess of **0.005** inch radial and **0.030** inch axial play.

(3) Inspect plug (6) for damaged threads and worn, peeled, or damaged plating.

(4) Inspect plating on bearing surface of jackshaft for wear, damage and peeling. Minimum allowable diameter of plated bearing surface is **1.560** inch.

(5) Inspect support bearing (2) for roughness and freedom of movement in excess of **4 TO 24** inch-ounce breakaway torque, and wear in excess of **0.005** inch radial and **0.030** inch axial play.

(6) Inspect jackshaft (1) and supports (3 and 7) for mechanical damage and corrosion. Refer to figure 11-11B for damage limits.

(7) Inspect bearing (16) in support (3) for roughness and freedom and wear in excess of **0.005** inch radial and **0.030** inch axial play.

(8) Inspect bearing in support (7) for roughness and freedom and wear in excess of **0.005** inch radial and **0.030** inch axial play.

c. Repair.

(1) Polish out scratches and corrosion at jackshaft (1, figure 11-11A) or supports (3 and 7) which do not exceed 0.005 inch depth using 180 grit or finer sandpaper (C112). Polish to a smooth, scratch-free finish with crocus cloth (C45). Blend edges of repair into surrounding area. Apply chemical film coating (C37) to repaired areas. Prime repaired areas with primer (C102).

(2) Replace jackshaft assembly (1) or supports (3 and 7) if found unserviceable during fluorescent penetrant inspection.

(3) Replace bearing (2) when wear or damage exceeds limits of paragraph 11-12. Refer to paragraph 11-5 for repair procedure.

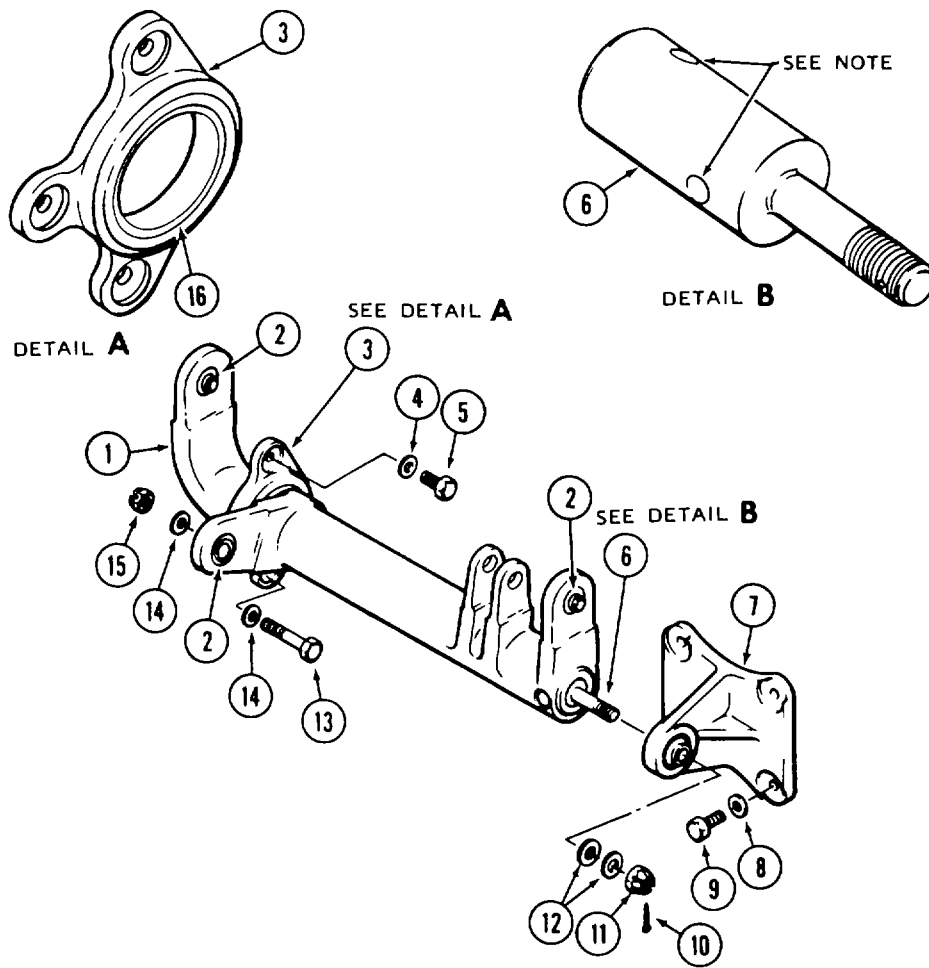
(4) Replace bearing in support (7) when wear or damage exceeds limits in paragraph 11-12. Refer to paragraph 11-5 for repair procedure.

(5) Replace bearing (16) in support (3) when wear or damage exceeds limits in paragraph 11-12. See detail A, figure 11-11A.

(a) Carefully press bearing from support.

WARNING

Cleaning solvent is flammable and toxic. Provide adequate ventilation. Avoid prolonged breathing of solvent vapors and contact with skin or eyes.



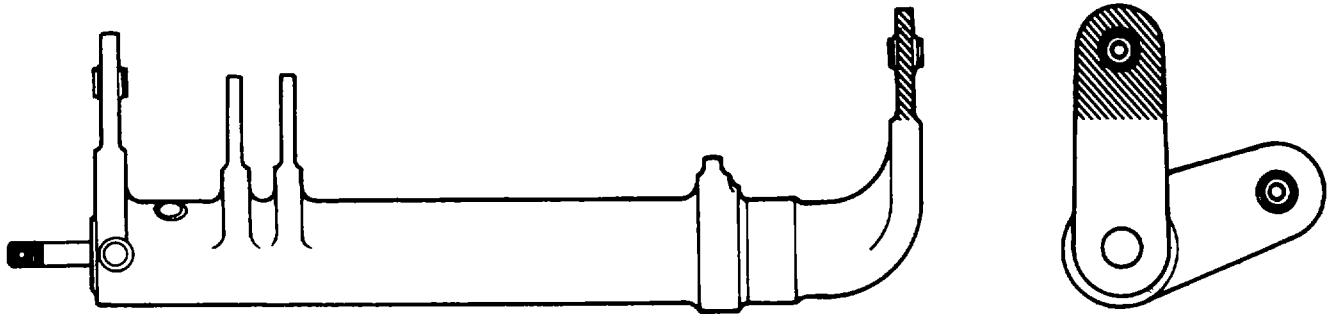
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NOTE: Drill two 0.191 to 0.196 diameter holes to match with holes in jackshaft




- | | |
|---------------------|----------------|
| 1. Jackshaft | 9. Bolt |
| 2. Bearing | 10. Cotter pin |
| 3. Support assembly | 11. Nut |
| 4. Washer | 12. Washer |
| 5. Bolt | 13. Bolt |
| 6. Plug | 14. Washer |
| 7. Support | 15. Nut |
| 8. Washer | 16. Bearing |

Figure 11-11 A. Fore and aft cyclic jackshaft

Change 2 11-26A



209-001-314 JACKSHAFT

TYPE OF DAMAGE	ALLOWABLE DAMAGE LIMITS	
		
MECHANICAL DAMAGE	0.030 In.	0.015 In.
CORROSION DAMAGE BEFORE CLEANUP AFTER CLEANUP	0.015 In. 0.030 In.	0.0075 In. 0.015 In.
AREA OF FULL DEPTH REPAIR	1 Sq. In.	0.5 Sq. In.
NUMBER OF REPAIRS	One Per Area	One Per Area
EDGE CHAMFER	0.06 In.	0.04 In.
BORE DAMAGE	0.002 Inch for 1/4 Circumference	
 NO CRACKS ALLOWED		

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Figure 11-11 B. Fore and aft cyclic jackshaft wear and damage limits

- (b) Clean inside of support with solvent (C124).
 - (c) Apply zinc chromate primer (C102) to outer race of bearing.
 - (d) Carefully press new bearing (16) into support.
- 11-12. (6) Replace jackshaft (1) when wear and damage to plated bearing surface is in excess of limits in paragraph 11-12.
- (7) Replace plug (6) in end of jackshaft when inspection reveals any damage.
 - (a) Remove two rivets that secure plug (6) inside jackshaft.
 - (b) Remove plug from inside jackshaft by using long aluminum rod or punch through holes in opposite end of jackshaft.
 - (c) Carefully press new plug (6) into jackshaft until shoulder of plug is flush within 0.02 inch.
 - (d) Drill two **0.19 TO 0.196** inch diameter holes in plug to match with holes in jackshaft. See note, figure 11-11A.
 - (e) Prime two MS20470DD6 rivets with primer (C102) and install through jackshaft and plug.

d. *Installation*

- (1) Install support assembly (3, figure 11-11A) on jackshaft (1) and position it on bearing surface.
- (2) Insert threaded end of plug (6) into support (7) bearing. Install two washers (12), nut (11), and cotter pin (10).
- (3) Carefully guide outboard lever of jackshaft (1) through opening in right hand beam assembly.
- (4) Align the three holes in support assembly (3) with holes in right hand beam. Install one bolt (5) with one washer (4) through bolt hole in top and forward ear of support assembly (3).
- (5) Align support (7) to four holes in bulkhead and install four bolts (9), each with one washer (8) under bolthead.
- (6) Install bolt (13) with one washer (14) under bolthead through hole in bottom ear of support (3). Secure with one washer (14) and nut (15).
- (7) Attach control tubes (12, 16 and 19, figure 11-5) and force gradient assembly (14) to levers of jackshaft (15).
- (8) Check complete control system for security and safetying of components.
- (9) Check cyclic system rigging. (Refer to paragraph 11-9.)
- (10) Install access panels (5, 9, 11, 13, 27 and 30, figure 2-3). Install access panel on aft, center bulkhead inside ammunition compartment and secure ammunition door (8).
- (11) Perform maintenance test flight. Refer to TM 556-1520-234-23 MTF.)

11-13. Tail Rotor Controls System.

Tail rotor control pedals are provided for both the pilot and the gunners stations. The control pedals are connected to a mechanical system consisting primarily of push-pull connecting links, bellcranks and levers which transmit control input at the pedals to the tail rotor control tube at the tail rotor gearbox. No cables or chains are used in this system.

Major auxiliary components of the system are as follows:

A servo actuator, which is part of the SCAS (Stability Control Augmentation System), serves for control input from the SCAS system.

A transducer, which is part of the SCAS system, is installed adjacent to the servo actuator.

A magnetic brake and force gradient assembly, which is used for force trim, is installed adjacent to pilots pedals.

A hydraulic cylinder and support, installed just forward of the tailboom, serves to reduce tail rotor pedal control forces and feedback from the tail rotor.

NOTE

Refer to TM 11-1520-221 series manuals for additional information on the SCAS (Stability Control Augmentation System).

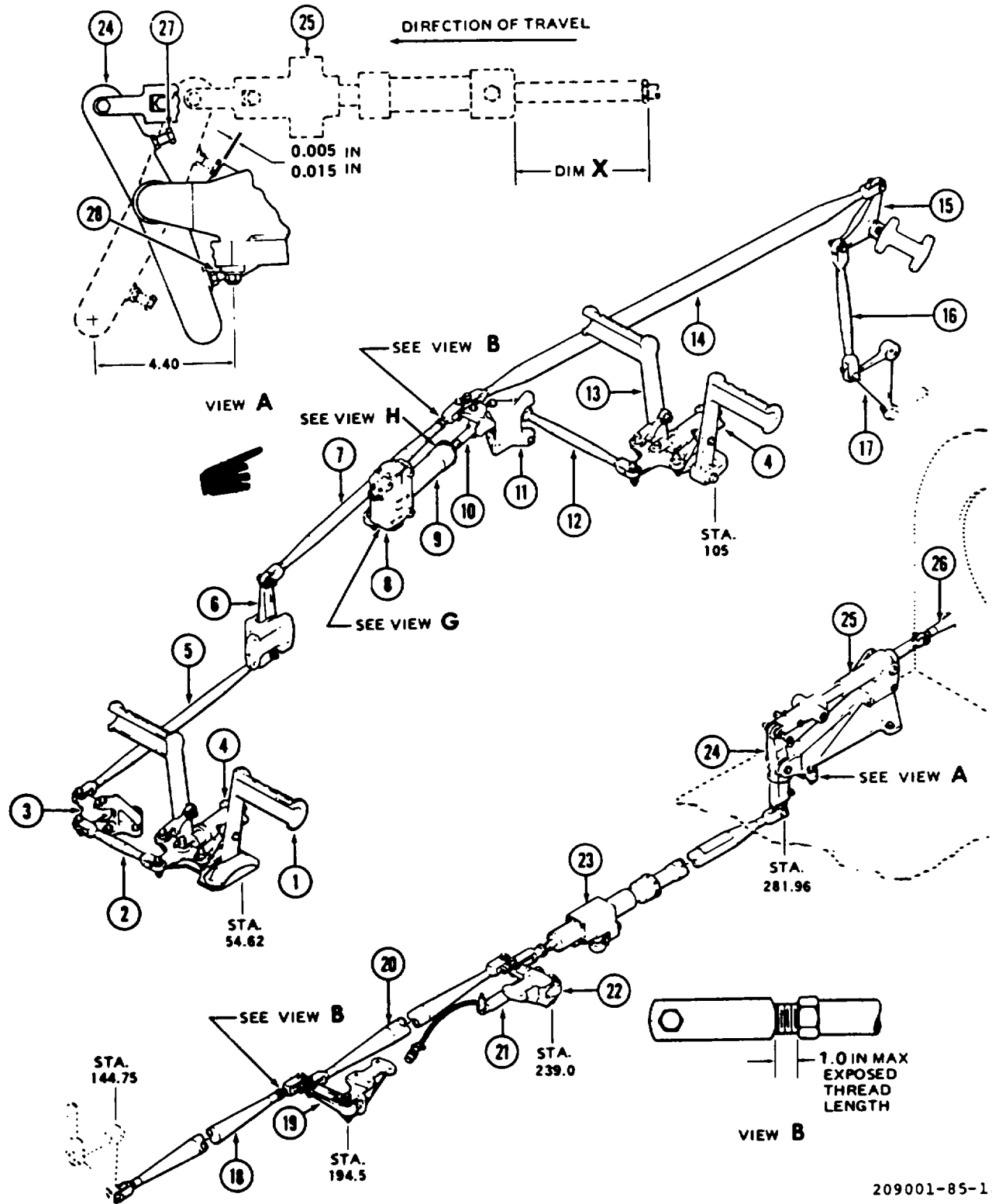
Premaintenance Requirements for Tail Rotor Controls

Conditions	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	Test Stand, Hydraulic
Minimum Personnel Required	Two
Consumable Materials	None
Special Environmental Conditions	N/A

a. *Rigging.* See figure 11-12.

- (1) Accomplish rigging without hydraulic power unless otherwise stated.
- (2) Make sure tail rotor control installation is complete except as follows:

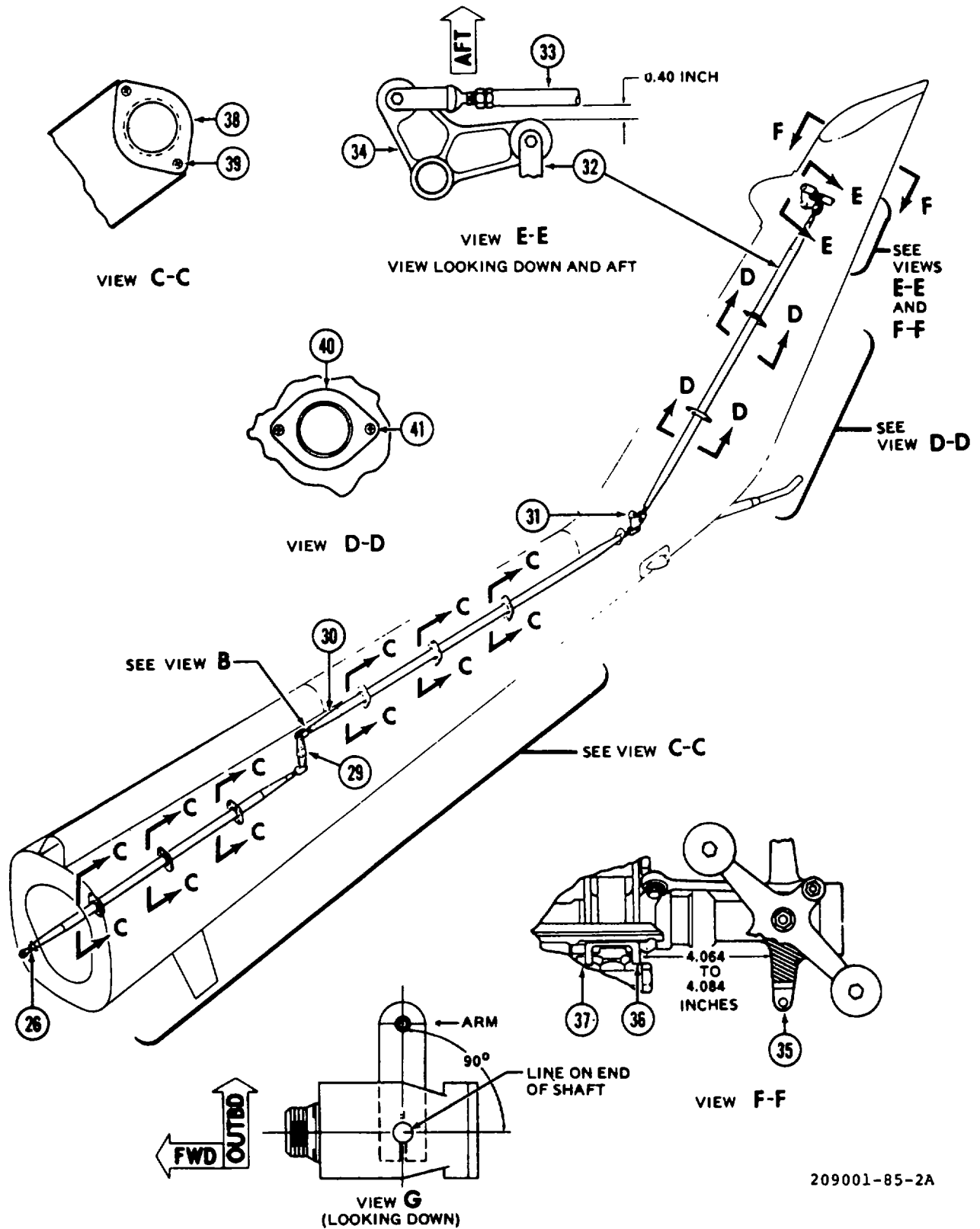
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Figure 11-12. Tail rotor controls (Sheet 1 of 4)

Change 11 11-27



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Figure 11-12. Tail rotor controls (Sheet 2 of 4)

Change 11 11-28

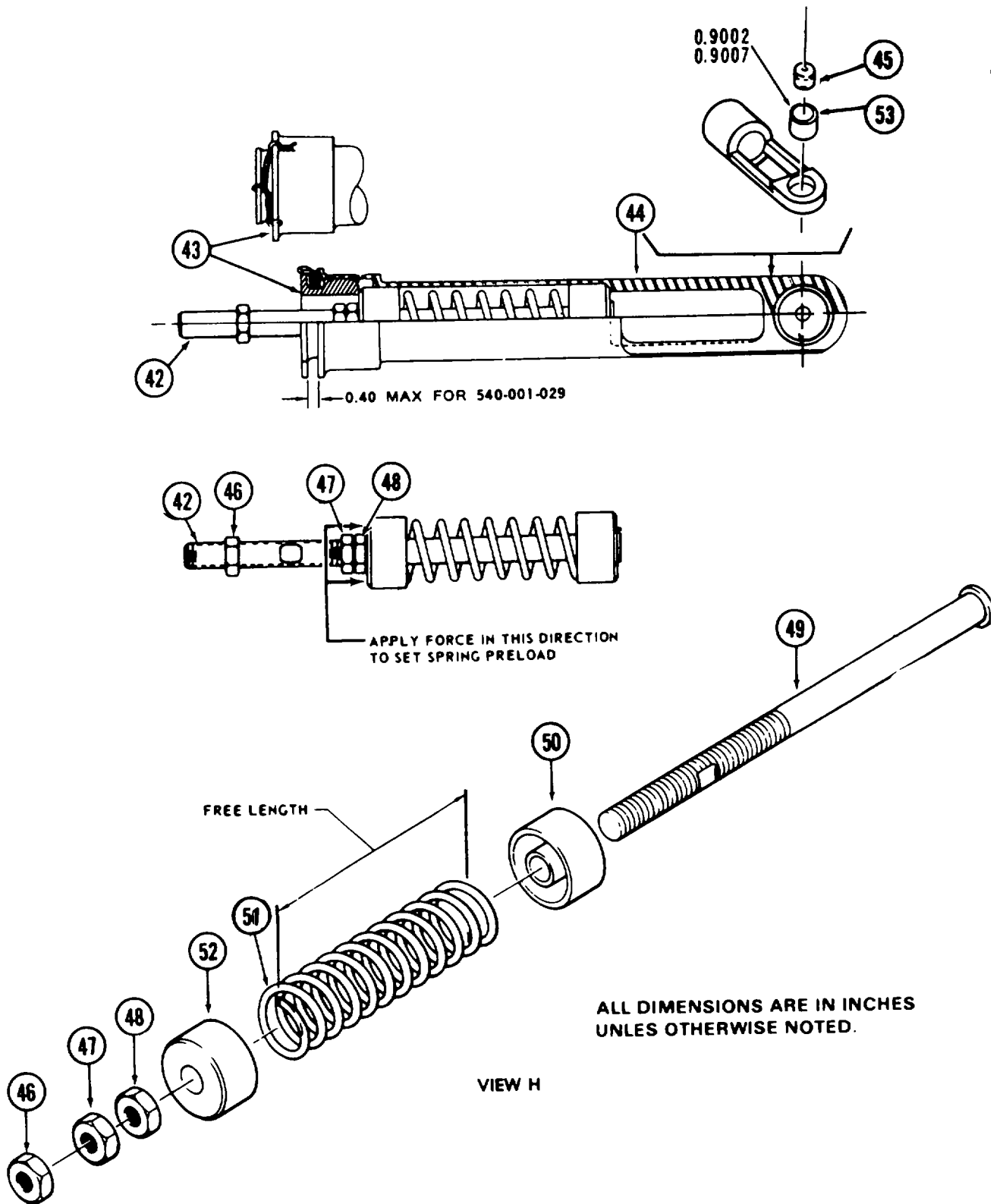


Figure 11-12. Tail rotor controls (Sheet 3 of 4)

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1. Gunners Control Pedals	27. Top Stop Bolt
2. Connecting Link	28. Bottom Stop Bolt
3. Bellcrank and Support	29. Lever
4. Adjuster Knob	30. Connecting Link
5. Connecting Link	31. Bellcrank
6. Bellcrank Assembly	32. Connecting Link
7. Connecting Link	33. Connecting Link
8. Magnetic Brake	34. Bellcrank
9. Force Gradient	35. Crosshead
10. Rod-End Bearing	36. Trunnion
11. Bellcrank and Support	37. Tail Rotor
12. Connecting Link	38. Guide
13. Pilots Control Pedals	39. Screw and Washer
14. Connecting Link	40. Guide
15. Bellcrank	41. Screw and Washer
16. Connecting Link	42. Spring assembly
17. Bellcrank	43. Cap
18. Connecting Link	44. Cylinder
19. Lever	45. Bearing
20. Connecting Link	46. Nut
21. Transducer	47. Nut
22. Lever	48. Nut
23. Servo Actuator (SCAS)	49. Shaft
24. Lever	50. Guide
25. Hydraulic Cylinder and Support	51. Spring
26. Connecting Link	52. Guide
	53. Sleeve

Figure 11-12. Toil rotor controls (Sheet 4 of 4)

- (a) Connecting link (7) and rod-end bearing (10) disconnected from bellcrank (11).
- (b) Connecting link (18) disconnected from lever (19).
- (c) Transducer (21) disconnected from lever (22).
- (d) Connecting link (30) disconnected from lever (29).
- (e) Connecting link (33) disconnected from bellcrank (34).
- (f) Do not connect force gradient (9).**

(3) Adjust pilot and gunners pedals to approximate mid-position with adjuster knobs (4).

(4) Position pilots pedals (13) even with each other. Position gunners pedals (1) even with each other. Adjust and install connecting link (7) to bellcrank (11). Make sure exposed threads on connecting link (7) do not exceed **one** inch as shown on view B. Tighten locknut to secure adjustment.

(5) Push pilots right pedal (13) forward against stop. Position lever (24) as shown in dashed outline in view A. Adjust and install connecting link (18) to lever (19). Ensure that exposed threads on connecting link (18) do not exceed **one** inch as shown in view B. Adjust top stop bolt (27) to clear support by **0.005 TO 0.015** inch as shown in view A. Tighten locknut to secure adjustment.

(6) Make sure pilots right pedal (13) is still forward against stop. Pull forward on piston rod of hydraulic cylinder (25) to bottom valve. Measure and record dimension X shown on view A. Pivot lever (24) toward position shown by solid outline in view A until dimension X is decreased by **3.02** inches. Keep hydraulic cylinder (25) valve bottomed. Keep SCAS servo actuator (23) centered. Adjust bottom stop bolt (28) to touch stop. Tighten locknut to secure adjustment.

(7) Make sure tail rotor blade pitch links have been adjusted to the nominal setting in accordance with Chapter 5. Exact adjustment will be accomplished during blade tracking.

(8) Adjust crosshead to **4.064 TO 4.084** inch dimension from outboard face of trunnion as shown in view F-F. Adjust and install connecting link (33) to bellcrank (34) to obtain **0.40** inch

clearance with bellcrank (34) as shown in view E-E. Tighten locknut to secure adjustment.

(9) Push pilots left pedal (13) forward against stop. Position bellcrank (34) as noted in preceding step. Push forward on piston rod of hydraulic cylinder (25) to bottom valve. Adjust connecting link (30) to fit, then lengthen tube by adjusting clevis one turn. Install connecting link (30) to lever (29). Ensure that exposed threads on connecting link (30) do not exceed **one** inch as shown in view B. Tighten locknut to ensure adjustment.

(10) Disconnect servo actuator (23) from lever (22). Move pilots pedals (13) through full travel and contact both stops at bellcrank (11). Ensure that transducer (21) will not bottom at either extreme position. Adjust rod end on transducer to avoid bottoming. Connect transducer to lever (22). Connect servo actuator (23) to lever (22). Tighten locknut to ensure adjustment.

(11) Place pilots control pedals (13) even with each other. Position arm of magnetic brake (8) square to the beam on which brake is mounted. Adjust force gradient (9) to connect to bellcrank (11) then extend length of rod end by **two and one half turns** and install bolt from the top. Use thin aluminum alloy washer under bolt head and standard steel washer under nut. Tighten locknut to ensure adjustment.

(12) Deleted.

(13) Check complete tail rotor control system for security and safetying of components.

(14) Check operation with hydraulic test stand if available; if not available, move controls through full travel manually and ensure there is no binding or interference.

(15) Perform tracking check of tail rotor. Refer to paragraph 5-11.

11-14. Tail Rotor Pedals.

The pilot and gunners pedal installations are similar. The pedals pivot in a support attached beneath the floor. The pedals are connected by short links to a bellcrank mounted on an adjuster which allows variable settings for the comfort and efficiency of crew members. A protective boot covers the openings around the pedals.

a. *Removal.* See figure 11-13.

NOTE

This procedure is the same for both the gunner and pilots tail rotor pedals.

(1) Disconnect control tube (1) from bellcrank (2) at front of pedal assembly.

(2) Disconnect bellcrank links (3) from each pedal (4), by removing bolt with washer, spacer, nut, and cotter pin.

(3) Obtain access to area under floor. Remove bolt, with nut and washers, that secures pedals to support (5). Remove pedals upward from support.

(4) Remove nuts and washers from lower ends of four bolts that pass through adjuster support (6), boot retainer (7), floor panel, and pedals support. Remove support below floor.

(5) Remove bolts, adjuster and bellcrank assembly, and boot assembly above floor.

(6) Detach bellcrank from links and adjuster clevis by removing bolts, nuts, washers, and cotter pins.

(7) If disassembly of adjuster is required, remove nut and retaining washer and unscrew knob (8) from threaded end of clevis (9). Slide clevis out of adjuster support. Handle parts with care to avoid damaging threads and mating surfaces coated with dry film lubricant.

b. *Cleaning.*

WARNING

Use solvent (C124) in a well ventilated area. Avoid prolonged breathing of vapors and do not use in an area with open flame or high temperature.

Clean parts with solvent (C124). Keep solvent out of bearings. Use care to avoid removing solid film lubrication from shank of adjuster clevis and interior surfaces of adjuster knob and housing.

c. *Inspection.*

- (1) Inspect all parts for cracks and wear. Refer to figure 11-1A.
- (2) Inspect bearings for wear, corrosion and damage. Refer to paragraph 11-5.

d. *Repair.*

- (1) Replace pedal, if cracked or worn excessively.
- (2) Refer to paragraph 11-5 if bearings are damaged or worn.
- (3) Repair corroded pedals.

e. *Installation.* See figure 11-13.

NOTE

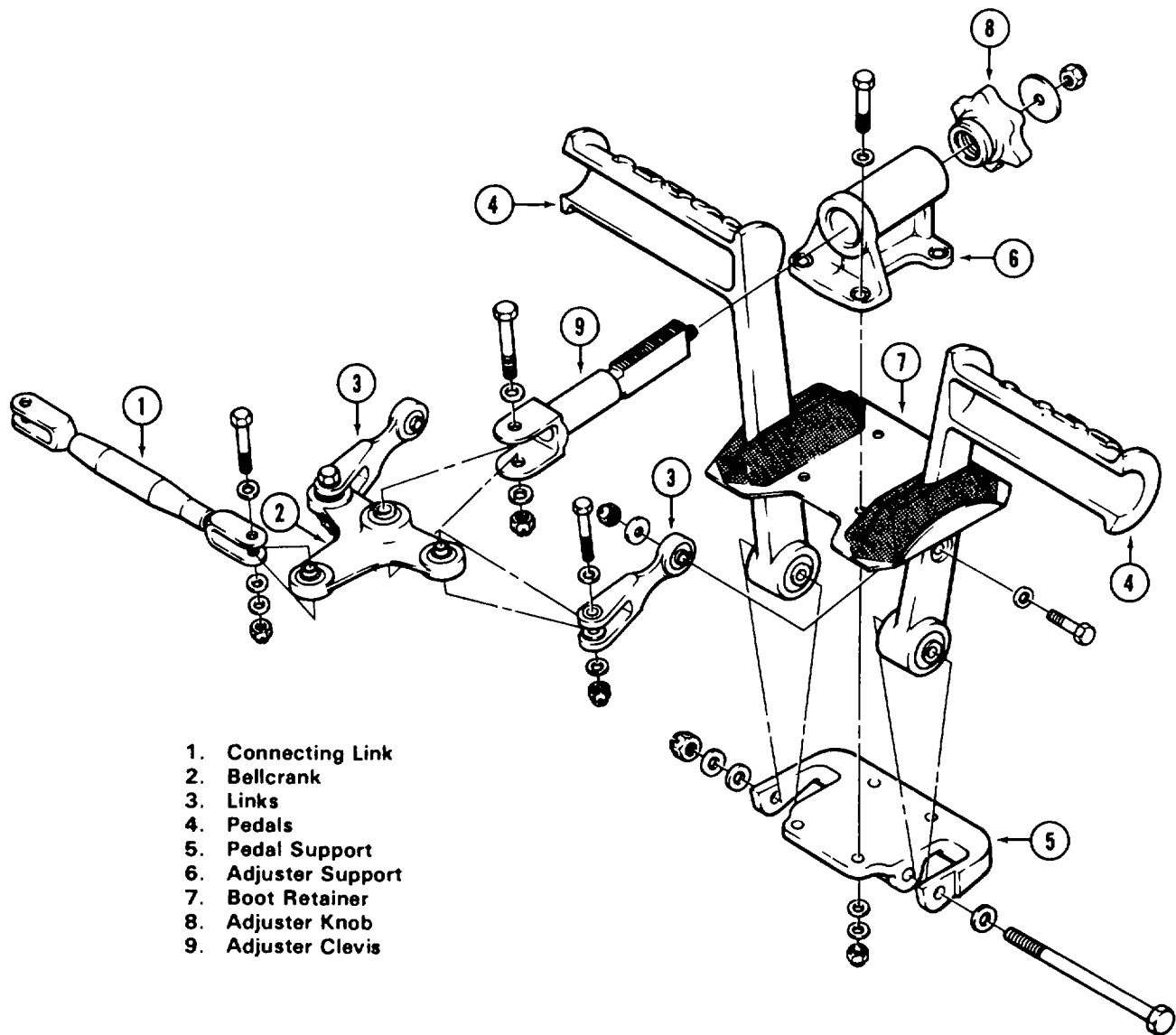
This procedure is typical for either pilot or gunners pedal and adjuster assemblies.

(1) Insert threaded end of clevis (9) into adjuster support (6) from flared lower end. Position knob (8) on opposite end, with lip engaged in retaining groove. Screw knob on clevis threads. Install retaining washer and nut on small threaded end.

(2) Align pedal interconnecting bellcrank (2) in adjuster clevis. Install bolt from top through clevis and bellcrank. Use aluminum alloy washers under bolt head and under nut. Secure nut with cotter pin. In the same manner, attach two links (3) to bellcrank.

(3) Position pedal support (5) under floor openings, with open sides of pedal slots forward. Place boot retainer (7) and adjuster assembly over

Change 2 11-30A/(11-30B blank)



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Figure 11-13. Tail rotor pedal installation

floor openings. Align holes and install four bolts through adjuster support, boot retainer, floor panel, and pedal support. Use one aluminum alloy washer under each bolt head and two under each nut.

(4) Insert pedals (4) down through boot slots. Align with holes in support. Install bolt, with one washer under head, from left side through support and both pedals. Install two washers and nut with cotter pin.

(5) Align a link from bellcrank to inner side of pedal. Place one washer on bolt, and insert through pedal and link. Install safety washer (spacer), nut and cotter pin on inboard end of bolt. Attach link to other pedals in the same manner.

(6) Align control tube connecting link (1) on forward end of bellcrank. Install bolt, with one washer under head, secured at lower side with two washers, nut and cotter pin.

(7) Check installation to ensure that all cotter pins are installed.

Change 16 11-31

- (8) Check to ensure that tail rotor pedals can be moved through full range without binding.
- (9) Reinstall panels removed for access.

f. *Functional Check.*

- (1) Track tail rotor. Refer to Chapter 5.
- (2) Perform maintenance test flight Refer to TM 55-1520-234-MTF.

11-15. Magnetic Brake and Force Gradient Assemblies in Cyclic Control System.

The cyclic control system consists of two separate systems, fore-and-aft, and lateral control. A magnetic brake and force gradient installation is used in each of the two cyclic control systems, for stick centering and force trim functions. The brake is secured to airframe structure and has an arm on its rotary shaft. The arm can be braked and held at any point in its travel by use of a switch on the cyclic stick. The force gradient is a link equipped with an internal spring and connects the brake arm to a lever or bellcrank in the cyclic control system. Brake and force gradient assemblies are alike for lateral and fore-and-aft cyclic systems but are different in positions of installation. See figures 11-5 and 11-6.

Premaintenance Requirements for
Magnetic Brake and Force Gradient
Assemblies in Cyclic Control System

Conditions	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	Two
Consumable Materials	(C102) (C124)
Special Environmental Conditions	None

a. *Inspection - Force Gradient.* See figures 11-5 and 11-6.

Inspect force gradient assembly for the following:

- (a) Damage, malfunction and faulty operation.
- (b) Rod end bearings for wear, freedom of movement and smoothness of operation. Refer to paragraph 11-5.
- (c) Force gradient cap for secure installation. Check lockwire on cap for proper installation to prevent cap from turning either direction.

b. *Removal - Force Gradient.* See figures 11-5 and 11-6.

- (1) Remove access panels. For the fore-and-aft system, remove panel in top of ammunition compartment. For lateral system, remove panel on right side of fuselage above ammunition compartment.
- (2) Disconnect force gradient from arm of magnetic brake and from bellcrank (lateral system) or the jackshaft (fore-and-aft system) by removing attaching bolts.

c. *Cleaning - Force Gradient.* Clean exposed surface of force gradient with dry cloth dampened with solvent (C124). Do not allow solvent to enter bearings or electrical components.

d. *Disassembly- Force Gradient.*

- (1) Cut lockwire and remove cap (43, figure 11-12) from cylinder (44).
- (2) Remove spring assembly (42) from cylinder (44).
- (3) Remove three nuts (46, 47 and 48) from shaft (49).
- (4) Remove spring guides (50 and 52) and spring 151).

e. *Repair - Force Gradient (Bearing Replacement).*

- (1) Fluorescent penetrant inspect housing per MIL-I-6866 (reference TM 55-1500-204-25/1) after bearing removal.
- (2) Roll stake sleeve both sides.
- (3) Chamfer 0.0030 inch depth x 45 degrees each side of hole in housing.
- (4) Coat sleeve ID and OD, bearing OD, and housing bore with wet zinc chromate primer (C102) during assembly.

f. *Assembly- Force Gradient.*

- (1) Assemble spring (51) and guides (50 and 52) on shaft (49) and install one nut (48) onto shaft with edge of nut adjacent to guide (52) on threaded end of shaft.
- (2) Preload spring (51) on shaft (49) as follows:
 - (a) Apply a load of 5.5 to 6.5 pounds on spring of gradient. Measure spring length while at this load and record length.

(a) above). (b) Tighten nut (48) against guide (52) until length of spring (51) is the same as when under load (step

(3) Install nut (47) on shaft (49) adjacent to nut (48).

(4) Hold nut (48) with wrench or other suitable device and tighten nut (47) tightly against it as a jam nut.

(5) Make certain preload on spring is still same as recorded in step (2)(a) above.

(6) Insert spring assembly (42) into cylinder (44).

(7) Slide center hole of cap (43) over end of spring shaft (49) with thread end of cap toward cylinder (44).

(8) Screw cap (43) into cylinder (44) until all noticeable end play of spring assembly (42) is removed.

(9) Lockwire cap (43) to cylinder (44) with lockwire (C152) as shown in figure 11-12 to eliminate motion in either direction.

(10) Install remaining nut (46) onto shaft of spring assembly (42) (to be used as jam nut against rod end at installation).

g. *Inspection - Magnetic Brake.* Inspect magnetic brake for the following:

(1) Faulty operation.

(2) Defective connector.

(3) Corrosion.

h. *Removal Magnetic Brake.* See figures 11-5 and 11-6.

(1) Remove access panels. For the fore-and-aft system, remove panel in top of ammunition compartment. For lateral system, remove panel on right side of fuselage above ammunition compartment.

(2) Disconnect force gradient from arm of magnetic brake and from bellcrank (lateral system) or the jackshaft (fore-and-aft system) by removing attaching bolts.

(3) Disconnect electrical connector from receptacle on magnetic brake.

(4) On lateral system only, unhook springs (29, figure 11-6) from plate (28). Detach plate (28) by removing two bolts.

(5) Detach magnetic brake assembly from structure by removing bolts and washers.

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i. Cleaning - Magnetic Brake. Clean exposed surface of magnetic brake with dry cloth dampened with solvent (C124). Do not allow solvent to enter bearings or electrical components.

j. Repair - Magnetic Brake.

(1) Replace magnetic brake assembly if damaged or malfunctioning.

(2) Clean up minor corrosion and touch up with primer (C102). If corrosion damage is severe enough to affect function, replace the magnetic brake assembly.

k. Installation. See figures 11-5 and 11-6.

(1) Before installation of force gradient assembly make the following inspections:

(a) Measure force required to move force gradient assembly shaft to ensure that the force gradient contains the correct spring for use in cyclic controls. The force required to move the shaft on the force gradient used in the cyclic controls is 5.5 to 6.5 pounds. The force required to move the shaft on force gradients used in the tail rotor controls is 2.5 to 3.0 pounds.

(b) Ensure that force gradient cap and spring assembly has no noticeable end play in cylinder

(2) Prior to installation of magnetic brake assembly check the magnetic brake assembly to make sure arm is properly located on the shaft. Mark "F" on the arm must be 90° from line on end of shaft. See detail A, figure 11-5 and detail D, figure 11-6.

(3) Position magnetic brake assembly to mounting holes of structure, and install four attaching bolts with washers.

(a) Install magnetic brake (27, figure 11-6) for the lateral cyclic system on the outboard side of beam in the right side console at fuselage station 105.78 with the electrical receptacle facing aft and the arm pointing outboard (to right) at mid-travel. Install plate (28, figure 11-6) on two aft bolts, on outboard side of brake body. Hook springs (29, figure 11-6) on plate (28).

NOTE

Springs (29) assist control stick movements by compensating for weight of the actuator (21) and will normally be attached in end holes of plate (28).

(b) Install magnetic brake (17, figure 11-5) for the fore-and-aft cyclic system on the underside of the pilots floor panel inboard of right side beam and aft of pilots control stick at fuselage station 133.76 with the electrical receptacle facing forward and the arm on the inboard side pointing down at mid-travel.

(4) Connect electrical connector to receptacle on magnetic brake.

(5) Connect cylinder end of force gradient assembly on arm of magnetic brake with special washer, nut and cotter pin. Leave rod end of force gradient disconnected, to be adjusted and connected after rigging cyclic controls.

(6) Attach force gradient assembly (14, figure 11-5) to jackshaft (15). Refer to paragraph 11-9 for rigging instructions of force gradient assembly.

(7) Attach force gradient assembly (21, figure 11-6) to bellcrank (19). Refer to paragraph 11-9 for rigging instructions of force gradient assembly.

(8) Check complete control system for security and safetying components.

l. Functional Check.

(1) Perform operational check of lateral and fore-and-aft cyclic system.

11-16. Magnetic Brakes and Force Gradient Assemblies in Anti-Torque Control Systems.

A magnetic brake and force gradient assembly are also connected to the linkage for force trim and control centering functions. The brake is secured on the right main beam, and has an arm on its rotary shaft which can be braked and held at any point of travel by use of a switch on the cyclic

control stick. The force gradient is a link with internal spring, and connects the brake arm to a push-pull tube in tail rotor controls.

**Premaintenance Requirements for
Magnetic Brake and Force Gradient
Assemblies in Anti-Torque Control System**

Conditions	Requirements
Model	AH-1S
Part No. or Serial No.	None
Special Tools	None
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	Two
Consumable Materials	(C102) (C124)
Special Environmental Conditions	None

a. *Inspection.* See figure 11-12.

(1) Inspect the force gradient for the following (a) Damage, malfunction and faulty operation.

(b) Rod-end bearings for wear, freedom of movement and smoothness of operation. Refer to paragraph 11-5.

(c) Force gradient cap for secure installation. Check lockwire and cap for proper installation to prevent cap from turning either direction.

(2) Inspect magnetic brake for the following: (a) Faulty operation.

(b) Defective connector.

(c) Corrosion.

b. *Removal.*

(1) Remove screw-mounted panel on right side of fuselage below gunners canopy. Disconnect electrical connector from receptacle on magnetic brake (8).

(2) Disconnect force gradient rod end bearing (10) from bellcrank (11).

(3) Remove four bolts and washers attaching brake assembly to beam.

(4) Disconnect force gradient assembly (9) from brake arm.

NOTE

If replacing force gradient assembly, remove rod end for use on replacement.

c. *Cleaning.* Clean exposed surface with cloth dampened with solvent (C124). Do not allow solvent to enter bearings or electrical components.

d. *Repair.* See figure 11-12.

(1) *Force gradient assembly.*

(a) Replace force gradient assembly if malfunctioning or damaged.

(b) Install rod end on the threaded end of spring shaft, with jamnut in place. Final adjustment is made in rigging procedure.

(c) After final adjustment, secure rod end (figure 11-12, sheet 1 of 3, item 10) with jam nut (figure 11-12, sheet 3 of 3, item 5) torqued 150 TO 200 inch-pounds.

(2) *Magnetic brake assembly.*

(a) Replace magnetic brake assembly if damaged or malfunctioning.

(b) Clean up minor corrosion and touch up with primer (C102). If corrosion damage is severe enough to affect function, replace the magnetic brake assembly.

e. *Installation.* See figure 11-12.

(1) Before installation of force gradient assembly, make the following inspections:

(a) Measure force required to move force gradient assembly shaft to ensure that the gradient contains the correct spring for use in tail rotor controls. The force required to move the shaft on the force gradient used in the tail rotor controls is **2.5 TO 3.0** pounds. The force required to move the shaft on force gradients used in the cyclic controls is **6.5 TO 6.5** pounds.

(b) Ensure that force gradient cap and spring assembly has no noticeable end play in cylinder.

(2) Prior to installation of magnetic brake assembly, check the magnetic brake assembly to make sure the arm is properly located on the shaft. Mark "F" on the arm must be 90° from line on end of shaft. See View G, figure 11-12.

(3) Position magnetic brake assembly (8) to mounting holes on outboard side of beam, in gunners right side console between walking beam and bellcrank with the electrical receptacle facing forward and the arm on lower side pointing outboard (to right) at mid-travel. Install four attaching bolts with washers.

(4) Connect electrical connector to receptacle on magnetic brake (8).

(5) Connect cylinder end of force gradient (9) on brake arm with special washer, nut and cotter pin.

(6) Leave rod end of force gradient disconnected, to be adjusted and connected after rigging tail rotor controls.

(7) Attach force gradient assembly (9, figure 11-12) to bellcrank and support (11). Refer to paragraph 11-13 for rigging instructions of force gradient assembly.

(8) Check complete control system for security and safetying of components.

f. *Functional Check.*

(1) Perform tracking check of anti-torque control system.

(2) Perform maintenance test flight. Refer to TM 55-1520-234-MTF.

11-17. Elevator Control System.

The elevator is actuated by movements of the fore-and-aft cyclic controls. Control linkage attached to the right forward swashplate horn to the elevator horn causes the elevator to move when the cyclic stick is moved forward or aft. See figure 11-13.

Premaintenance Requirements for Elevator Controls

Conditions	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	Test Stand, Hydraulic
Minimum Personnel Required	Two
Consumable Materials	None
Special Environmental Conditions	None

a. Inspection Installed Elevator Controls System. See figure 11-14.

(1) Inspect control system in place for secure installation, damage and freedom of operation through full throw.

(2) If required, remove components for detailed inspection. Refer to paragraphs 11-3 and 11-4 for damage limits on bellcranks, control tubes (connecting links) and walking beam. Refer to paragraph 11-5 for bearing inspection and repair.

NOTE

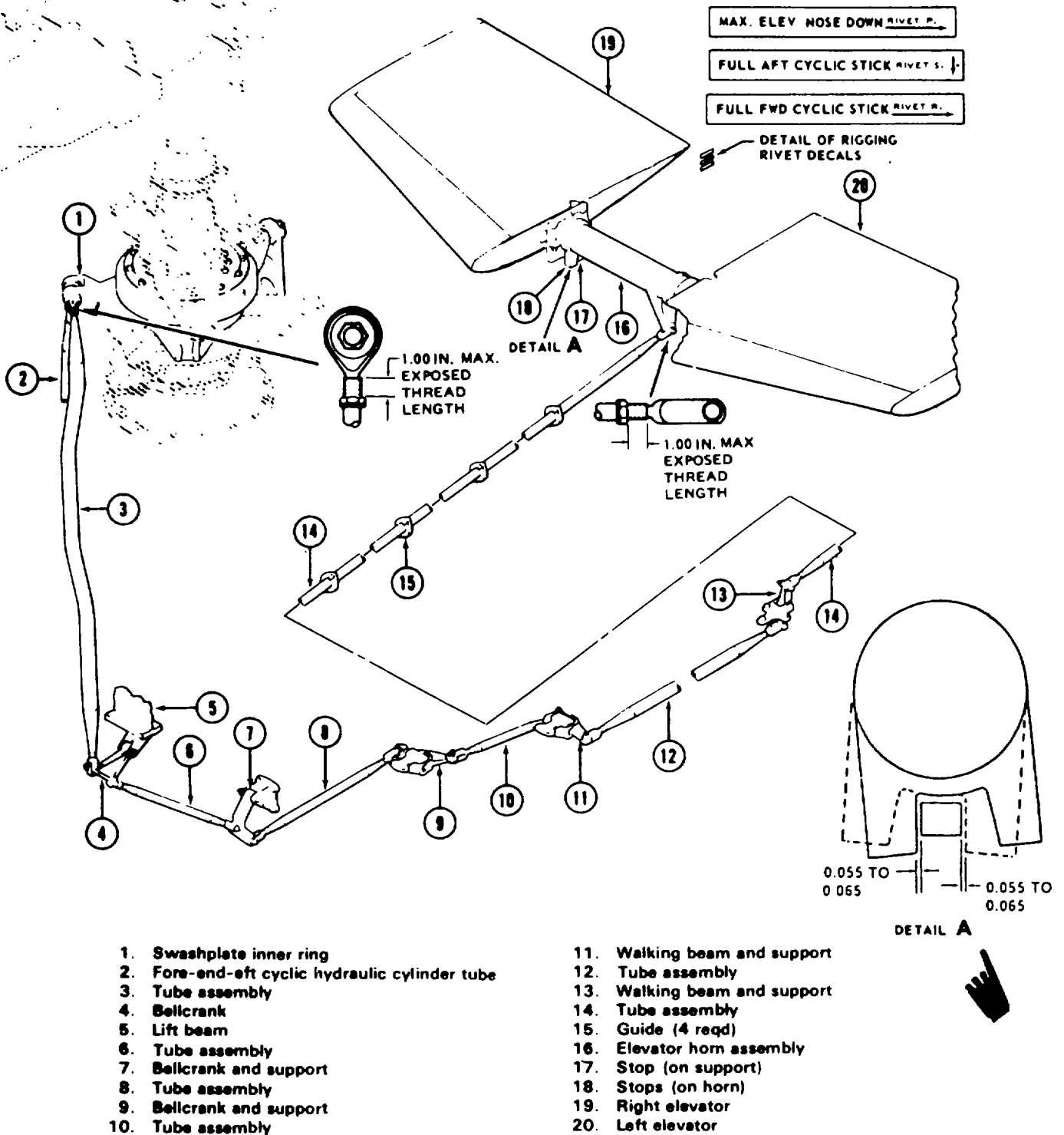
Refer to Chapter 2 for maintenance instructions for elevator and elevator horn assembly.

b. *Rigging.* See figure 11-14.

(1) Rig cyclic controls if not previously accomplished. Refer to paragraph 11-9.

(2) Install all components at the elevator control system but leave control tube (connecting link) (3) disconnected from swashplate inner ring (1), and control tube (connecting link) (14) disconnected from elevator horn. Support control tube (connecting link) (3) so that control linkage can be moved during rigging procedure.

(3) Position elevator so that there is **0.055 TO 0.065** inch clearance between forward side of support stop (17) and horn stop (18). Pull control tube (connecting link) (14) to its extreme aft position. Adjust length to fit elevator horn and install on horn. Do not exceed **1.0** inch exposed thread as shown on detail view.



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Figure 11-14. Elevators controls

(4) Hold pilots cyclic stick full forward against stop. Position elevator with trailing edge down so that there is 0.055 to 0.065 inch clearance between aft side of support stop and stop on horn (Figure 11-14, Detail A). Adjust and connect control tube (connecting link) on bolt at inboard side of right forward horn of swashplate inner ring (1). Ensure that not more than one inch of thread is showing at rod end. See detail view. Check trailing edge of right hand elevator to confirm that it aligns with rivet R on tailboom.

(5) Apply hydraulic power to helicopter with hydraulic test stand.

(6) Position pilots cyclic stick full forward and check that trailing edge of elevator points to rivet R on tailboom within 0.4 inch and that 0.055 to 0.065 inch clearance between stops is maintained as described in step (3). Adjust length of control tube (connecting link) (14) if necessary. Refer to step (3).

(7) Move pilots cyclic stick full aft against stop and check trailing edge of right hand elevator to ensure that it moves to rivet P plus-or-minus 0.4 inch and then stops at rivet S plus-or-minus 0.4 inch.

(8) Move pilots cyclic stick through full range fore and aft and ensure that there is no binding or interference in the elevator control system.

(9) Disconnect hydraulic test stand.

(10) Check complete elevator control system for security and safetying of components.

(11) Perform maintenance test flight. Refer to TM 55-1520-234-MTF.

11-18. Stability Control Augmentation System.

The primary flight control systems are the main rotor collective, fore-and-aft cyclic and lateral cyclic, and tail rotor controls. Each of these has a system of mechanical linkage assisted by hydraulic servo cylinders, connecting the pilots and gunners control sticks and pedals to the mechanisms which rotate with and directly control the main rotor and tail rotor. Hydraulic components of stability and control augmentation system SCAS (SAS) are the pitch, roll, and yaw servo actuators and associated pressure line filters, solenoid valves, and connecting lines. Each actuator assembly consists of an electro-hydraulic servo actuator, fitted with a tube assembly at one end and clevis at the other for connection into cyclic and the tail rotor. Filters, rated ten micron, are in pressure lines to protect each actuator. Solenoid valves have two positions, pressure to cylinder when electrically energized, or cylinder to return when de-energized. Each control channel (pitch, roll, and yaw) receive signals from an individual transducer installed in the helicopter control system. The transducers are the system signal source which allows the pilot to "fly" the system with no deterioration of control and at the same time provide positive helicopter flight stabilization. The use of SCAS (SAS) will provide more stable flight on a mission than is possible when the normal manual controls are used.

11-19. Troubleshooting and Operational Check - Stability Control Augmentation System . Refer to TM 11-1520 series manual.

11-20. Sensor Amplifier Unit.

The sensor amplifier unit, located in pilots left compartment is operationally the center of the SCAS and contains the components and circuitry to implement the stabilization of the helicopter. The sensor amplifier unit contains rate gyros to sense helicopter rates, power circuits to power other parts of system, and compensating networks and valve drives to provide command signals for the servo actuators. The sensor amplifier unit is housed in a metal case by four hold down attach points.

a. *Inspection.* Inspect sensor amplifier for the following:

(1) Loose mounting (loose mounting screws and insufficient electrical bonding).

(2) Loose or burned NO-GO indicator lights.

(3) Burned fuse.

(4) Loose or corroded module mounts.

(5) Corroded or damaged connectors, internal or external.

(6) Spare fuse availability.

b. *Removal.* Refer to TM 11-1520 series manual.

- c. *Repair.* Replace items if the inspection requirements are not met. Refer to TM 11-1520 series manual for instructions.
- d. *Installation.* Refer to TM 11-1520 series manual.
- e. *Troubleshooting.* Refer to TM 11-1520 series manual.
- f. *Test.* Refer to TM 11-1520 series manual.

11-21. Solenoid Valves, Stability Control Augmentation System.

One servo actuator is used in each of the following flight control systems: The fore-and-aft cyclic, lateral cyclic, and anti-torque systems. Each servo actuator has a solenoid valve as a part of the servo actuator. The three servo actuators are illustrated on figures 11-5, 11-6 and 11-12.

- a. *Inspection.* Inspect the solenoid valve for the following:
 - (1) Inspect for leaks.
 - (2) Inspect the electrical connection for corroded connectors.
 - (3) Inspect all fittings for damage.
- b. *Removal.* Refer to TM 11-1520 series manual.
- c. *Repair.* Refer to TM 11-1520 series manual.
- d. *Installation.* Refer to TM 11-1520 series manual.
- e. *Functional Check.* Refer to TM 11-1520 series manual.

11-22. Pylon Compensator Unit - Stability Control Augmentation System.

The pylon compensation unit is located aft and above the SCAS sensor amplifier unit.

- a. *Inspection.* Inspect the pylon compensation unit for the following:
 - (1) Loose mounting or bonding.
 - (2) Damaged or corroded connectors.
 - (3) Case damage.
- b. *Removal.* Refer to TM 11-1520 series manual.
- c. *Repair.* Refer to TM 11-1520 series manual.
- d. *Installation.* Refer to TM 11-1520 series manual.
- e. *Functional Check.* Refer to TM 11-1520 series manual.

11-23. Control Motion Transducers - Stability Control Augmentation System.

Each control channel (pitch, roll and yaw) receives signals from its individual transducer. The transducers sense motion inputs induced by the pilot, and originate signals to the affected channels. The transducers are the system signal source which allows the pilot to fly the system with no deterioration of control at the same time provide positive helicopter flight stabilization. The control motion transducer consists of an internal linear potentiometer, a cylindrical case, a moveable shaft, two attach points, and a connector for transferring the data.

- a. *Inspection.* Inspect the control motion transducers for the following:
 - (1) Mounting and security.
 - (2) Connector condition.
- b. *Removal.*
 - (1) Turn all electrical power off.
 - (2) Remove access panels.
 - (3) Disconnect electrical connector from fore-and-aft (pitch), lateral (roll), or directional (yaw) transducer (8, 13 or 14, figure 11-14A). Detach cylinder or transducer from fuselage structure by removing bolt, washer, and spacer. Detach adjustable rod end from bellcrank by removing nut, washers, and screw.
- c. *Repair.* Refer to TM 11-1520 series manual.
- d. *Installation.*
 - (1) Install pitch control motion transducer (13, figure 11-14B).
 - (2) Align pitch control motion transducer cylinder housing bearing to fuselage structure with electrical wire inboard.
 - (3) Position cylinder end bearing on inboard side of bracket at fuselage. Place washer on bolt, install bolt with washer through cylinder end bearings. Add spacer and washer to bolt, thread bolt into beam and torque.

NOTE**Attach rod end to bellcrank only after completion of rigging.**

- (4) Position washer on screw, install screw with washer through rod end bearing. With washer on each side of bellcrank, install rod end inboard of bellcrank, place screw through bellcrank and secure with nut.
- (5) Install roll control motion transducer (15, figure 11-14C).
- (6) Align roll control motion transducer cylinder housing bearing to fuselage structure with electrical wire inboard.
- (7) Position washer on bolt. Install bolt with washer through cylinder end bearing. Slide spacer on bolt, place washer next to beam and torque bolt.

NOTE**Attach rod end to bellcrank only after completion of rigging.**

- (8) Position washer on screw, install screw with washer through rod end bearing. With washer on both sides of bellcrank, position rod end outboard of bellcrank and secure with screw and nut.
- (9) Install yaw control motion transducer (21, figure 11-14D).
- (10) Align yaw control motion transducer cylinder housing bearing to fuselage structure.
- (11) Position washer on screw. Install screw with washer through cylinder end bearing. Install washer, spacer, washer on screw. Thread screw into panel and torque.

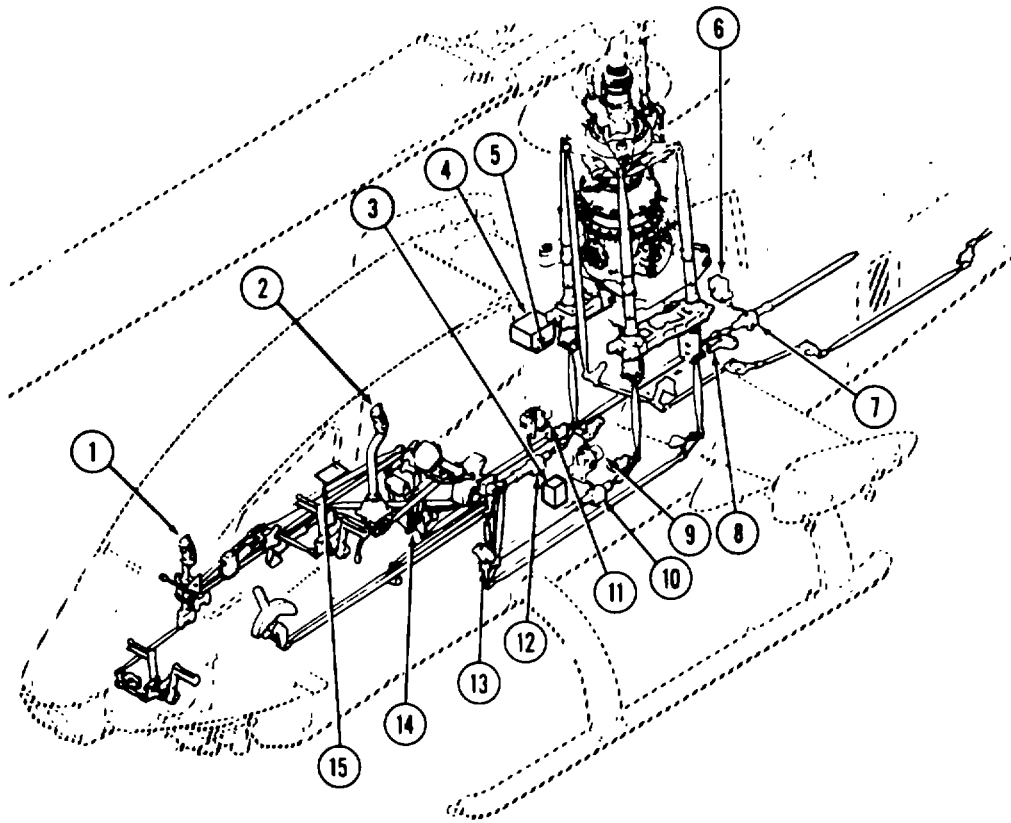
NOTE**Attach rod end to directional bellcrank only after completion of rigging.**

- (12) Position washer on bolt. Install bolt with washer through rod end bearing, slide spacer on bolt. Align bolt with hole on top of lever. Place washer between nut and lever. Torque nut and lock with cotter pin.
- e. *Calibration.*
 - (1) Disconnect the transducer from the aircraft wiring and airframe.
 - (2) Support the transducer in order to measure the position of the output shaft length per figure 11-15.
 - (3) Using multimeter (T-68 or T-69), measure the resistance across pins A and B.
 - (4) The resistance (ohms) at output shaft positions 1, 2 and 3 must be within the tolerance specified in figure 11-15.

11-24. Control Panel Stability Control Augmentation System.

The SCAS control panel is located on the left console in the pilots compartment.

- a. *Inspection.* Inspect SCAS control panel for obvious damage.
- b. *Removal.* Refer to TM 11-1520-series manual.
- c. *Repair.* Refer to TM 11-1520 series manual.
- d. *Installation.* Refer to TM 11-1520 series manual.
- e. *Functional Check.* Refer to TM 11-1520 series manual.



- | | |
|-------------------------------------|--|
| 1. Gunner SCAS release switch | 9. Roll hydraulic solenoid valve |
| 2. Pilot SCAS release switch | 10. Roll servo actuator (lateral cyclic) |
| 3. Armament compensation unit | 11. Pitch hydraulic solenoid valve |
| 4. Sensor amplifier unit (SCAS) | 12. Pitch servo actuator (fore-and-aft cyclic) |
| 5. Three-axis rate sensor | 13. Roll control motion transducer |
| 6. Yaw hydraulic solenoid valve | 14. Pitch control motion transducer |
| 7. Yaw servo actuator (anti-torque) | 15. SCAS control panel |
| 8. Yaw control motion transducer | |

Figure 11-14A. Stability and Control Augmentation System (SCAS)

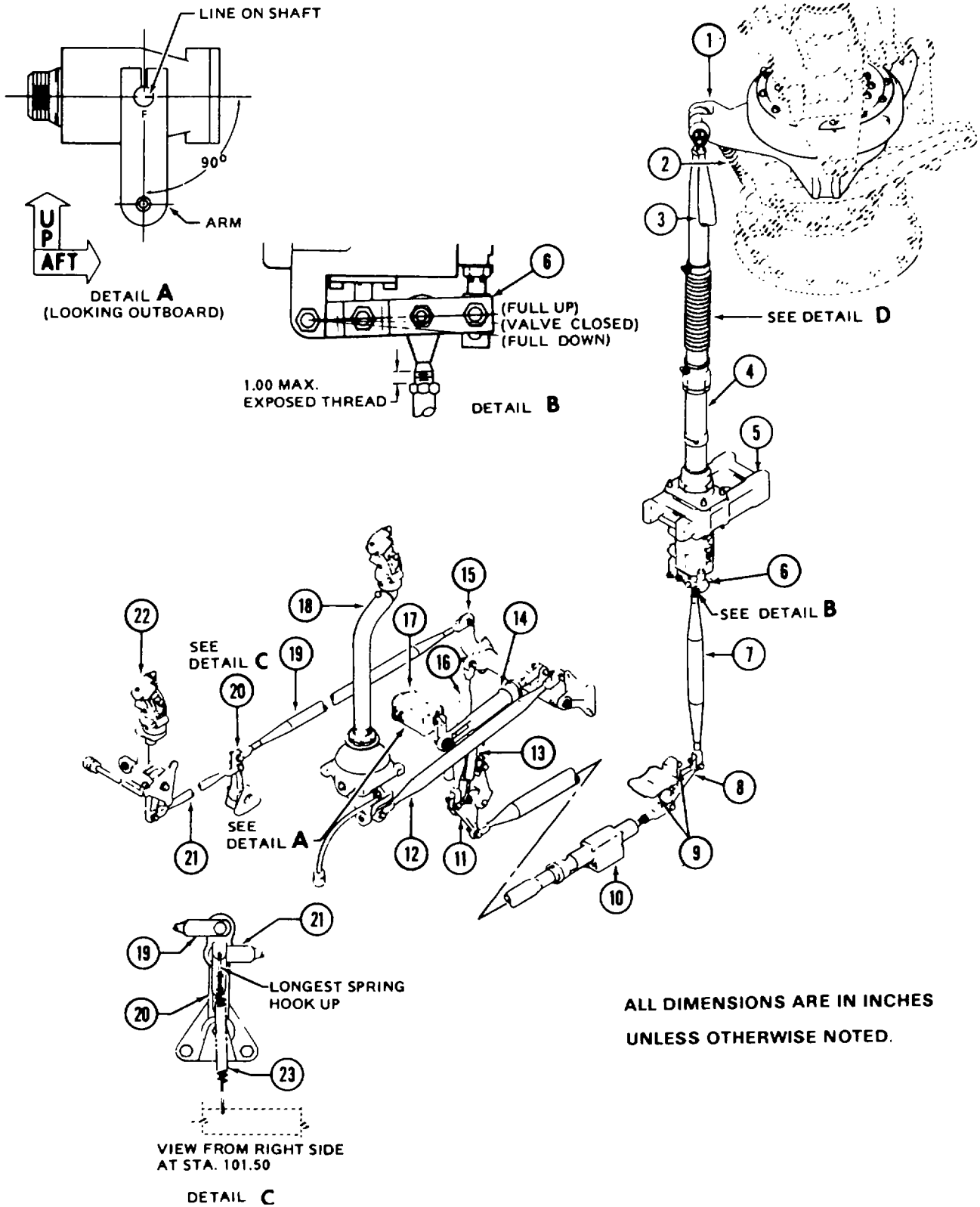
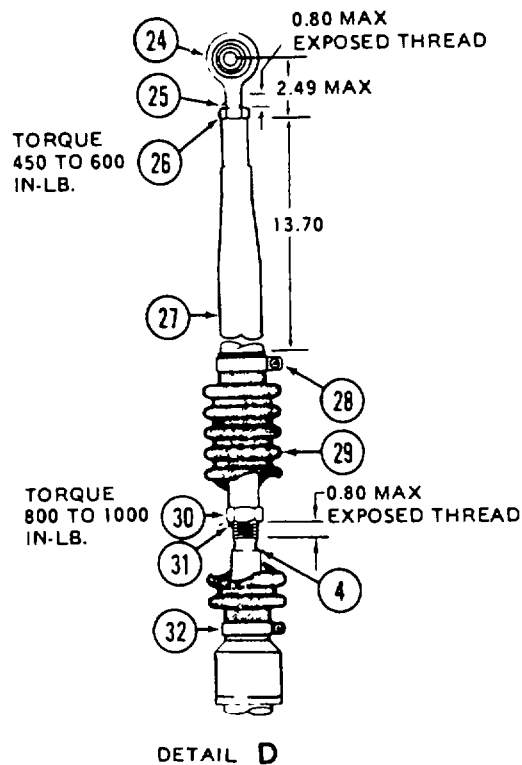


Figure 11-14B. Fore-and-Aft Cyclic Controls (Sheet 1 of 2)

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1. Swashplate
2. Spring
3. Elevator tube assembly
4. Hydraulic cylinder assembly
5. Cylinder support
6. Hydraulic cylinder valve lever
7. Tube assembly
8. Bellcrank
9. Fixed stops
10. Servo actuator (SCAS)
11. Bellcrank
12. Tube assembly
13. Transducer (SCAS)
14. Force gradient assembly
15. Jackshaft
16. Tube assembly
17. Magnetic brake
18. Pilot cyclic control stick
19. Tube assembly
20. Idler assembly
21. Tube assembly
22. Gunner cyclic control stick
23. Spring
24. Rod end bearing
25. Lock
26. Nut
27. Extension tube
28. Clamp
29. Boot
30. Nut
31. Lock
32. Clamp

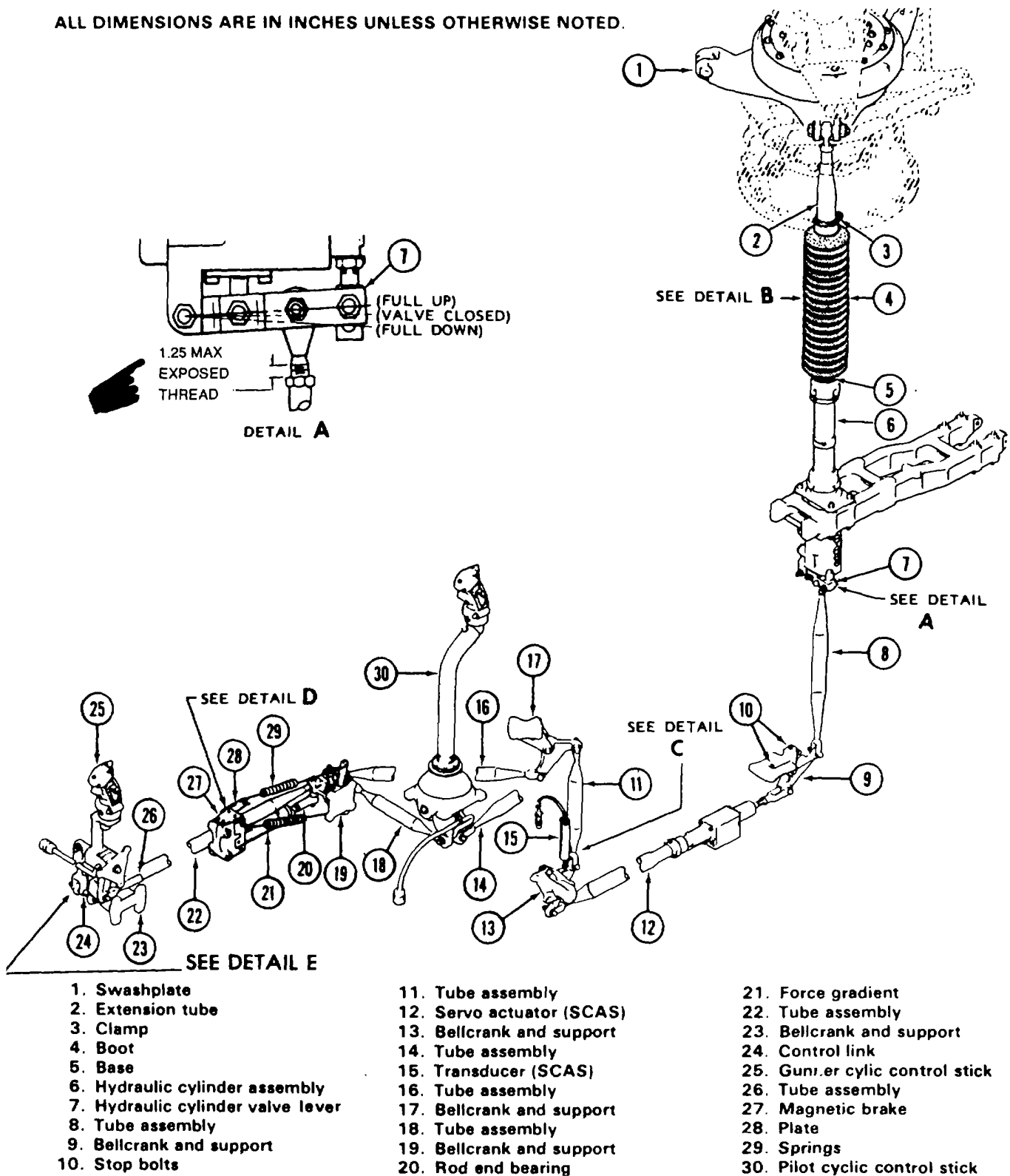
ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED.

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Figure 11-14B. Fore-and-Aft Cyclic Controls (Sheet 2 of 2)

11-38D Change 16

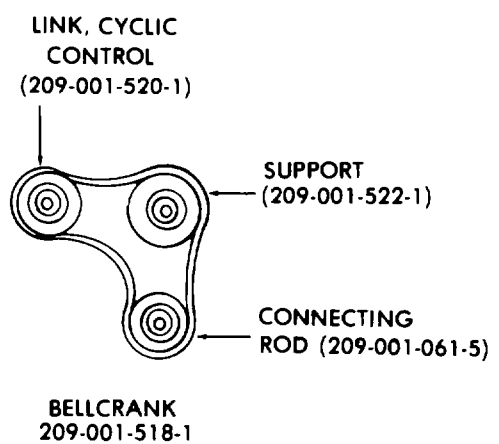
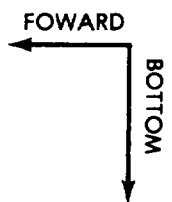
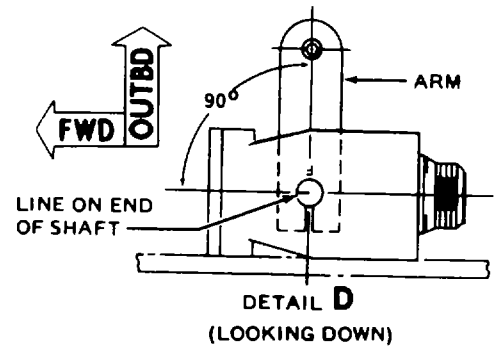
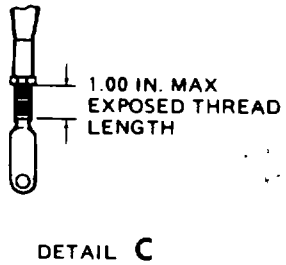
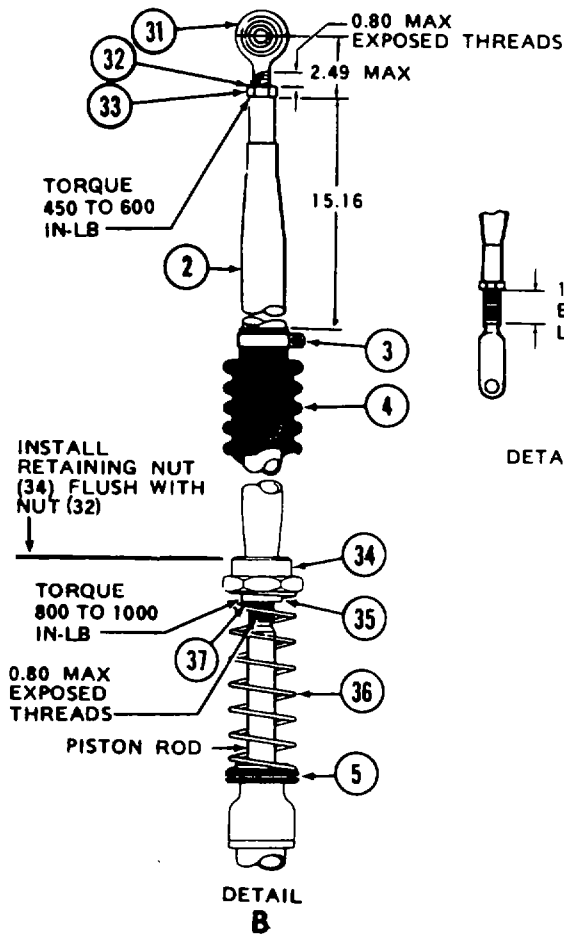
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- | | | |
|-----------------------------------|---------------------------|---------------------------------|
| 1. Swashplate | 11. Tube assembly | 21. Force gradient |
| 2. Extension tube | 12. Servo actuator (SCAS) | 22. Tube assembly |
| 3. Clamp | 13. Bellcrank and support | 23. Bellcrank and support |
| 4. Boot | 14. Tube assembly | 24. Control link |
| 5. Base | 15. Transducer (SCAS) | 25. Gunner cyclic control stick |
| 6. Hydraulic cylinder assembly | 16. Tube assembly | 26. Tube assembly |
| 7. Hydraulic cylinder valve lever | 17. Bellcrank and support | 27. Magnetic brake |
| 8. Tube assembly | 18. Tube assembly | 28. Plate |
| 9. Bellcrank and support | 19. Bellcrank and support | 29. Springs |
| 10. Stop bolts | 20. Rod end bearing | 30. Pilot cyclic control stick |

209001-162-1

Figure 11-14C. Lateral Cyclic Controls (Sheet 1 of 2)



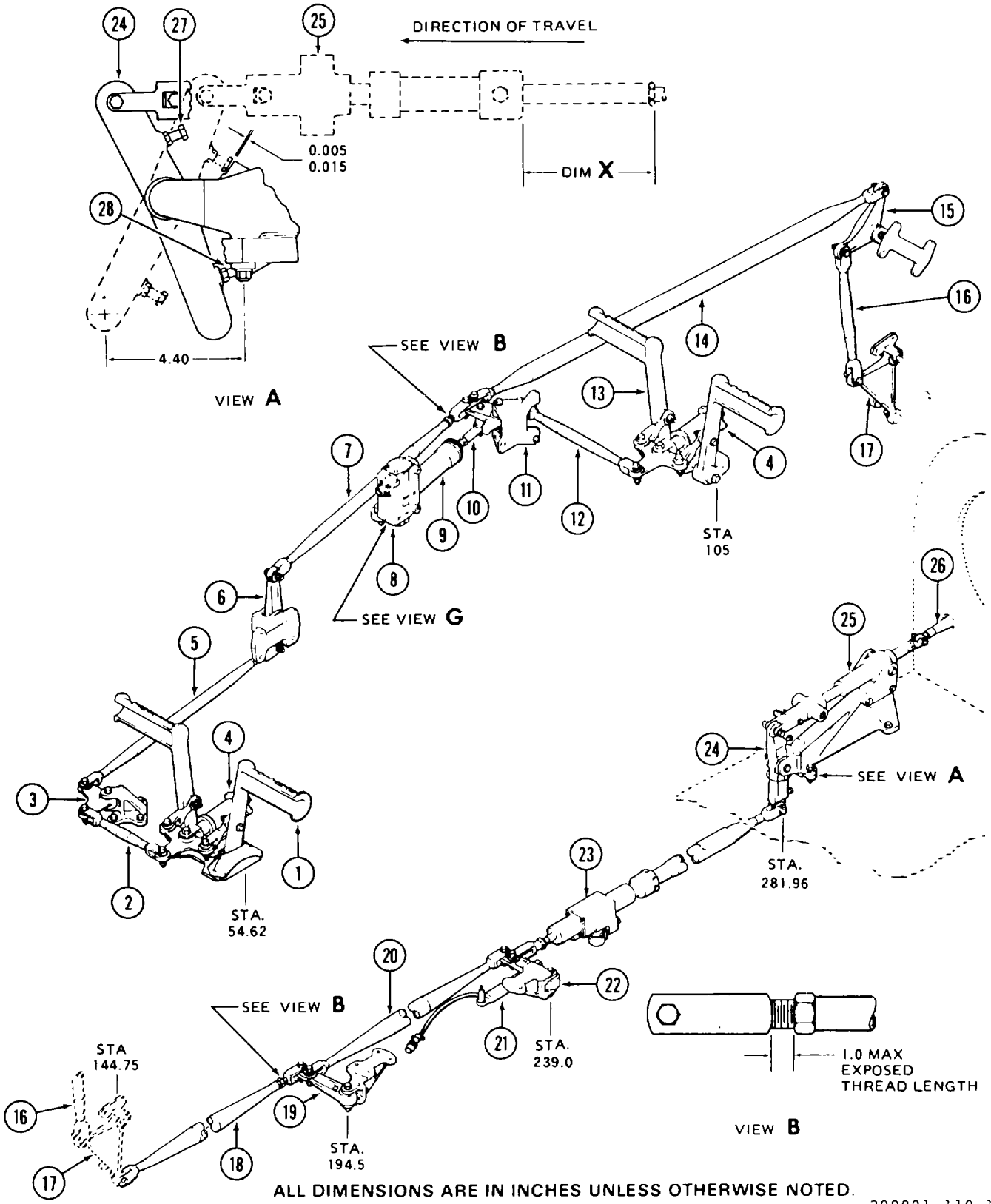
- 31. Rod end bearing
- 32. Lock
- 33. Nut
- 34. Retaining nut
- 35. Nut
- 36. Spring
- 37. Lock

CAUTION

Insure that connecting rod (209-001-061-5) is connected to bellcrank (209-001-518-1) on the lower side of support (209-001-522-1).

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

Figure 11-14C. Lateral Cyclic Controls (Sheet 2 of 2)

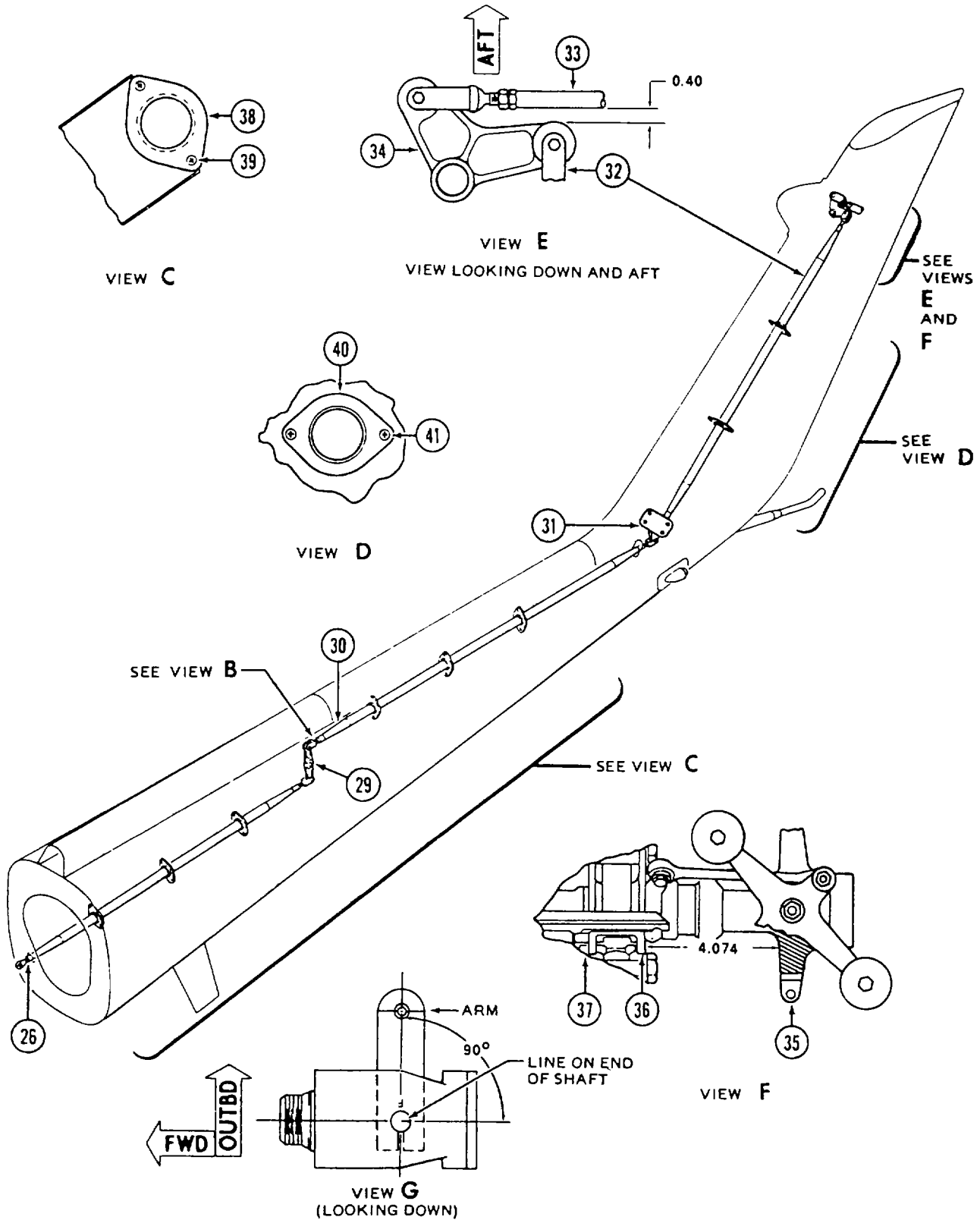


ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

209001-110-1A

Figure 11-14D. Tail Rotor Controls (Sheet 1 of 3)

Change 16 11-38G



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

209001-110-2A

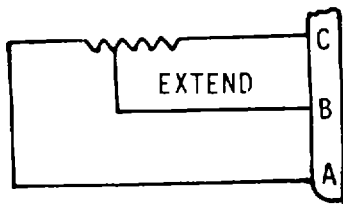
Figure 11-14D. Tall Rotor Controls (Sheet 2 of 3)

1. Gunner control pedals
2. Tube assembly
3. Bellcrank and support
4. Adjuster knob
5. Tube assembly
6. Bellcrank assembly
7. Tube assembly
8. Magnetic brake
9. Force gradient
10. Rod end bearing
11. Bellcrank and support
12. Tube assembly
13. Pilot control pedals
14. Tube assembly
15. Bellcrank
16. Tube assembly
17. Bellcrank
18. Tube assembly
19. Lever
20. Tube assembly
21. Transducer
22. Lever
23. Servo actuator (SCAS)
24. Lever
25. Hydraulic cylinder and support
26. Tube assembly
27. Top stop bolt
28. Bottom stop bolt
29. Lever
30. Tube assembly
31. Bellcrank
32. Tube assembly
33. Tube assembly
34. Bellcrank
35. Crosshead
36. Trunnion
37. Tail rotor
38. Guide
39. Screw and washer
40. Guide
41. Screw and washer

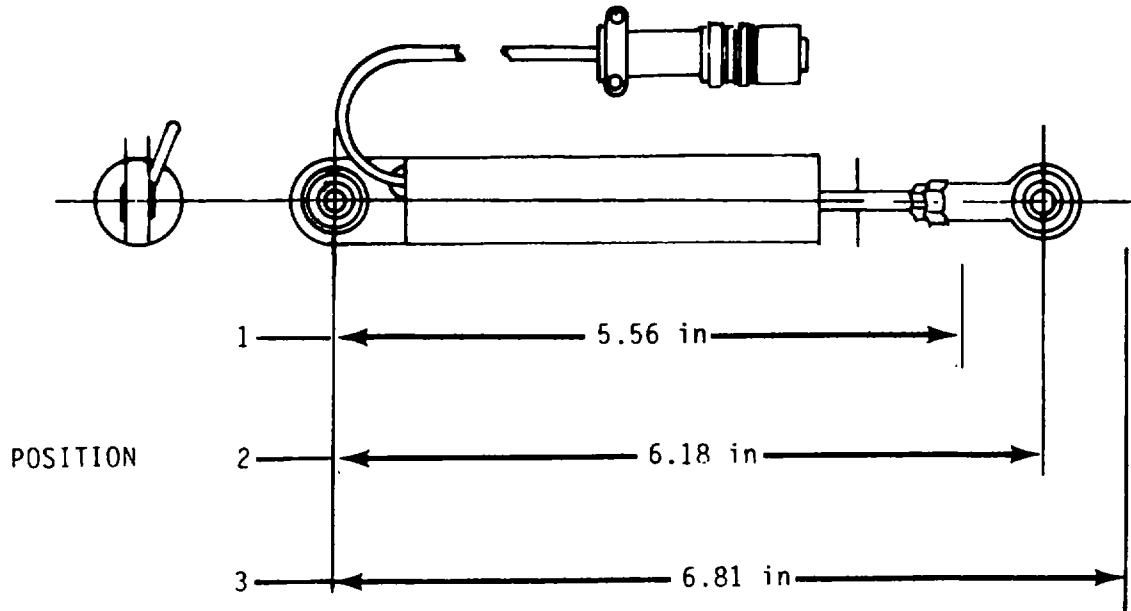
Figure 11-14D. Tail Rotor Controls (Sheet 3 of 3)

209001-110-3A

Change 16 11-39



SCHEMATIC



<u>POSITION</u>	<u>FROM PINS</u>	<u>RESISTANCE (OHMS)</u>	<u>TOLERANCE (OHMS)</u>
1	B TO C	1000	± 100
2	B TO C	500	± 50
*3	B TO C	0	± 10
Any Position	A TO C	1000	± 100

NOTES:

1. Extend and retract transducer and observe the resistance reading. Resistance should vary between 0-1000 ohms smoothly without any intermittent or erratic readings.
2. Nominal length of transducer neutral position should be adjusted to 6.18 inches prior to making resistance checks in positions 1, 2 and 3. (Refer to paragraph 11-23.e.)

Figure 11-15. SCAS Transducer Calibration

CHAPTER 12

UTILITY SYSTEM

12-1. Fire Detector System - Engine. Refer to figure 12-1.

The fire detector system consists of a control unit (1), fire indicator light (3) and a fire indicator test switch (10) both on the pilots instrument panel, and a heat sensing element (7) in the engine compartment.

- a. *Troubleshooting.* (Refer to table 12-1.)

Table 12-1. Troubleshooting - Fire Detector System

NOTE

Before you use this table, be sure you have performed all normal operational checks.

CONDITION

TEST OR INSPECTION

CORRECTIVE ACTION

1. Indicator light inoperative.

STEP 1. Burned out bulb.

Replace bulb. (Refer to paragraph 12-1.)

STEP 2. Defective test switch.

Replace switch. (Refer to paragraph 12-1.)

STEP 3. Loose electrical connections.

Tighten connections. (Refer to paragraph 12-1.)

STEP 4. Broken or disconnected detector wire.

Replace or connect detector wire. (Refer So paragraph 12-1.)

- b. *Removal.*

- (1) Turn battery switch to "OFF" position.
- (2) Disconnect sensing element (7) from connectors (6) at aft firewall. Cover openings with tape.
- (3) Remove sensing element (7) from 15 quick release clamps. Remove heat sensing unit from engine compartment.
- (4) Remove control unit (1) located in the pilots console as follows:

- 1. Control Unit
- 2. Connector
- 3. Pilots Indicator Light
- 4. Circuit Breaker Panel
- 5. Cable Assembly
- 6. Connector
- 7. Heat Sensing Element
- 8. Cable Assembly Clamps
- 9. Circuit Breaker
- 10. Fire Detector Test Switch

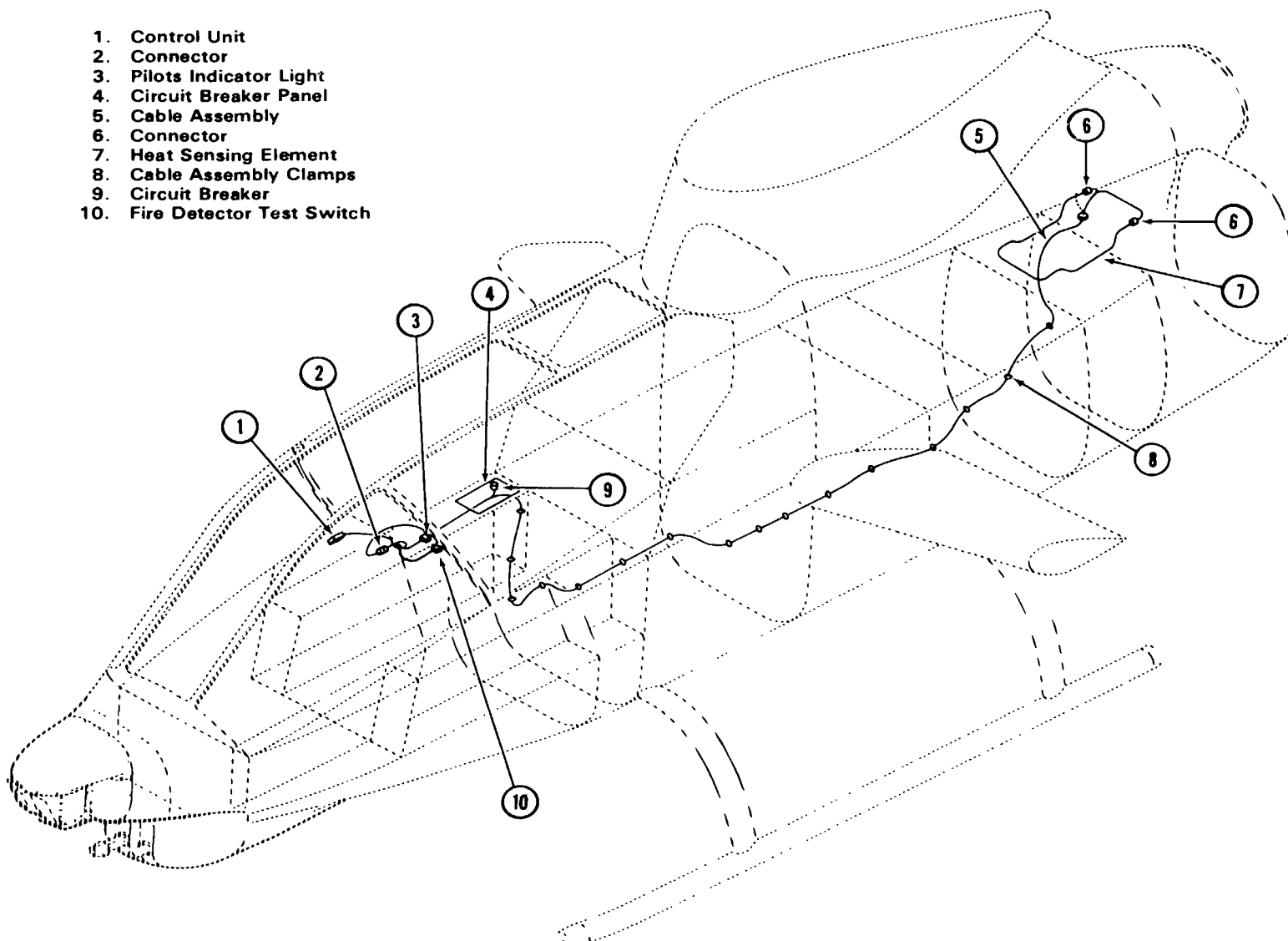


Figure 12-1. Fire detector system (Sheet 1 of 2)

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- (a) Disconnect cable connector from control unit.
- (b) Disconnect control unit ground cable.
- (c) Remove four screws, four washers, and four nuts, securing control unit to console. Remove control unit from console.

c. Inspection.

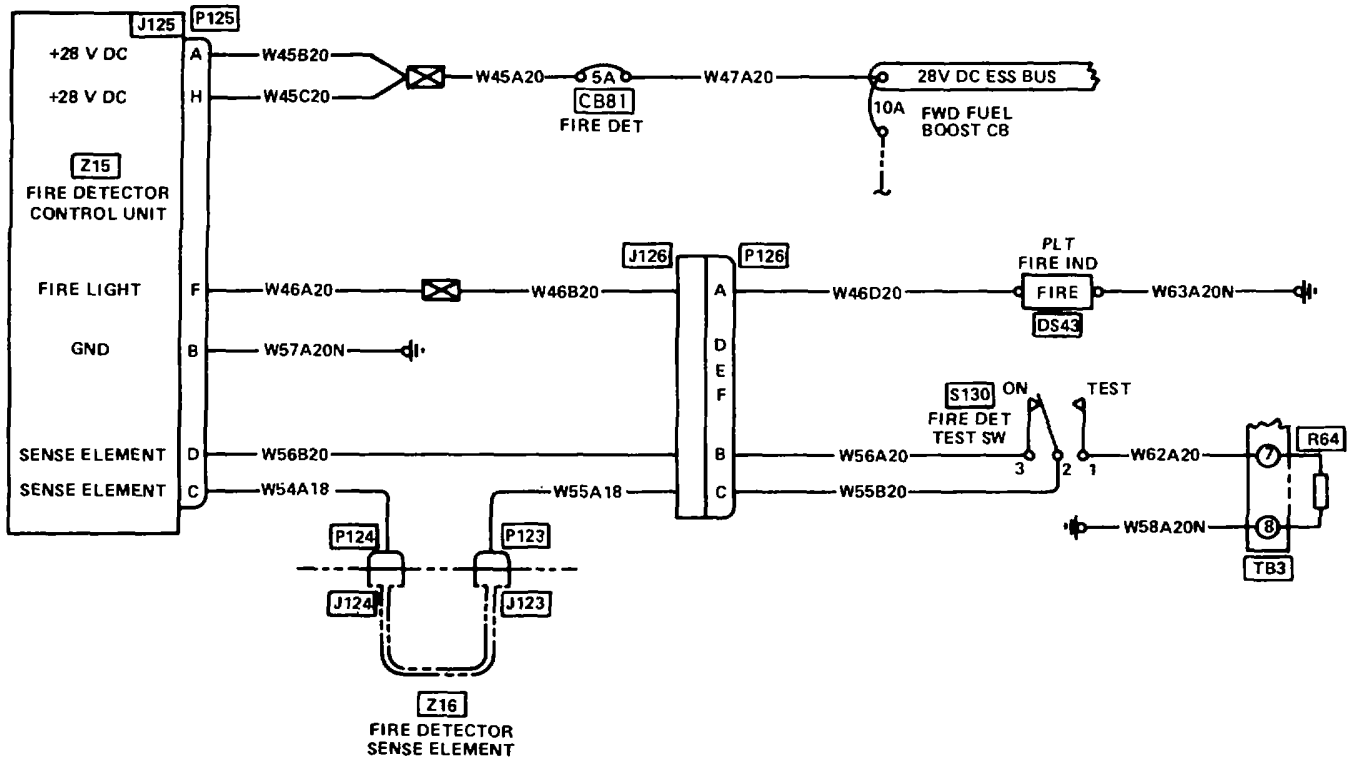
- (1) Inspect cable assembly (5) and heat sensing element (7) for damage and wear.
- (2) Inspect clamps (8) for cracks and serviceability.

d. Repair or Replacement.

- (1) Replace cable assembly (5) and heat sensing element (7) if damaged or worn.
- (2) Replace clamps (8) if broken, cracked or unserviceable.
- (3) Replace control unit (1) if case is cracked or damaged.

e. Installation.

- (1) Route sensing element (7) to position shown in figure 12-1.
- (2) Connect heat sensing element (7) to connectors (6) on aft firewall (both right and left side).
- (3) Insert sensing element (7) in place at 15 quick release clamps.
- (4) Install control unit (1) on console with four screws, four washers and four nuts.



EQUIPMENT

ITEM	DESCRIPTION
CB81	Circuit Breaker, Fire Detector
DS43	Light, Pilots Fire Indicator
J123	Receptacle, Fire Detector Element Disconnect
J124	Receptacle, Fire Detector Element Disconnect
J125	Receptacle, Fire Detector Control Unit
J126	Receptacle, Pilots Instrument Panel Disconnect
P123	Plug, Fire Detector Element Disconnect
P124	Plug, Fire Detector Element Disconnect
P125	Plug, Fire Detector Control Unit
P126	Plug, Pilot Instrument Panel Disconnect
R64	Resistor, Fire Detector Test
S130	Switch, Fire Detector
TB3	Terminal Board, Pilots Panel Light
Z15	Control Unit, Fire Detector
Z16	Fire Detector Sense Element

209060-74-2

Figure 12-1. Fire detector system (Sheet 2 of 2)

- (5) Connect cable connector to control unit and secure ground to structure.
- f. *Test.*
 - (1) Close FIRE DET circuit breaker (9).
 - (2) Depress fire detector test switch on the instrument panel. Check that fire detection control relay activates and causes the FIRE WARNING lights to illuminate.

12-2. Rain Removal System.

The rain removal system, consisting of a series of tubes from the engine compressor section to the nozzle next to upper center window and is vented to the windshield. This nozzle provides air to force moisture from the outer surface of windshield. Seven small nozzles are grouped together and distributes the air from the nozzle assembly. A selector switch on the pilot's instrument panel allows bleed air to flow through the tubes and out the vent to the windshield. A drain tube is provided to prevent the collection of moisture in tube system.

- a. *Inspection.* Inspect rain removal system for the following:
 - (1) Inspect the nozzle tubing for security, damage, and leaks.
 - (2) Inspect the drain valve for proper operation and couplings and preformed packings for leakage.
- b. *Repair or Replacement.*
 - (1) Tighten loose fittings, clamps, and replace tubes if damaged or unserviceable.
 - (2) Replace drain valve if defective and preformed packings if leaking.

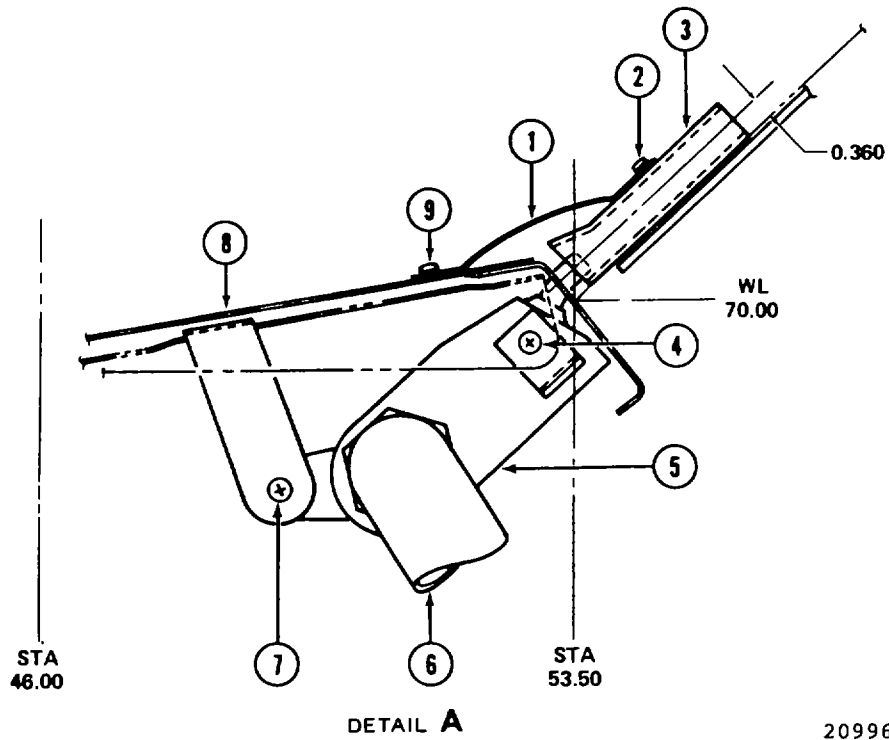
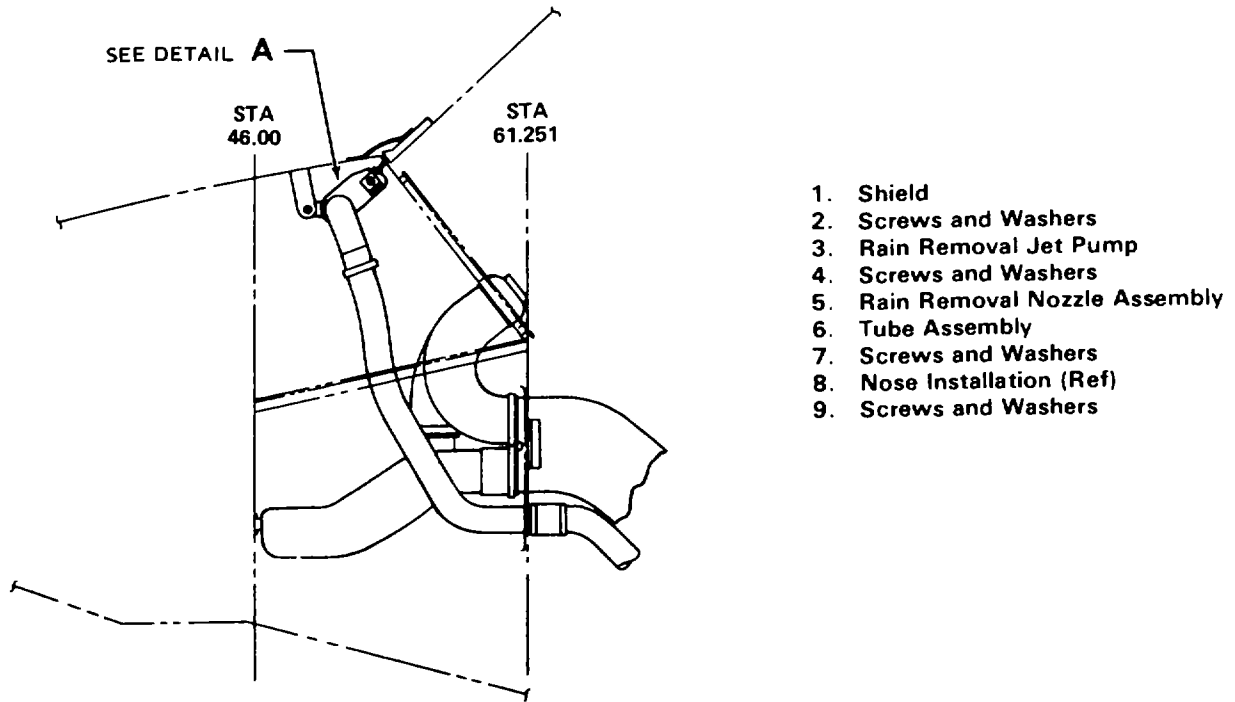
12-3. Rain Removal Nozzle. Refer to figure 12-2.

- a. *Removal.*
 - (1) Remove panel from the left side of the helicopter.
 - (2) Remove screws and washers (2 and 9, detail A) from shield (1). Remove the shield.
 - (3) Remove lockwire and disconnect tube assembly (6) from rain removal nozzle assembly (5).
 - (4) Remove forward screws and washers (7) and aft screws and washers (4) from rain nozzle assembly (5) brackets. Remove rain removal nozzle.
- b. *Inspection.* Inspect the rain removal nozzle for the following:
 - (1) Inspect for thread damage, security, and air leaks.
 - (2) Inspect rain removal nozzle assembly by fluorescent penetrant method. Refer to TM 55-1500-204-25/1.
- c. *Repair or Replacement.* Rain removal nozzle assemblies may be repaired including replacement of tubes. Replace any part found to be cracked or otherwise damaged.
- d. *Installation.*
 - (1) Position rain removal nozzle (5) to aft support brackets and secure with screws and washers (4).
 - (2) Secure rain removal nozzle (5) in forward support bracket with screws and washers (7).

NOTE

Use washers to center rain removal nozzle assembly (5) in rain removal jet pump (3) within ± 0.010 inches.

- (3) Install shield (1) to nose installation (8) with screws and washers (2 and 9).
- (4) Connect tube assembly (6) to rain removal nozzle assembly (5) and lockwire with lockwire (C152).
- (5) Perform functional check of rain removal system.
 - (a) Verify that dimensions specified in detail A are correct.
 - (b) Ground run helicopter at 6600 RPM.
 - (c) Spray windshield with water continually during functional check.



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Figure 12-2. Rain removal nozzle assembly

(d) Position bleed air switch to ON and compare the cleaned area on windshield with pattern shown on figure 12-3. If pattern does not meet requirements, replace nozzle.

(e) Position bleed air switch to OFF and stop engine.

(6) Install panel left side of helicopter.

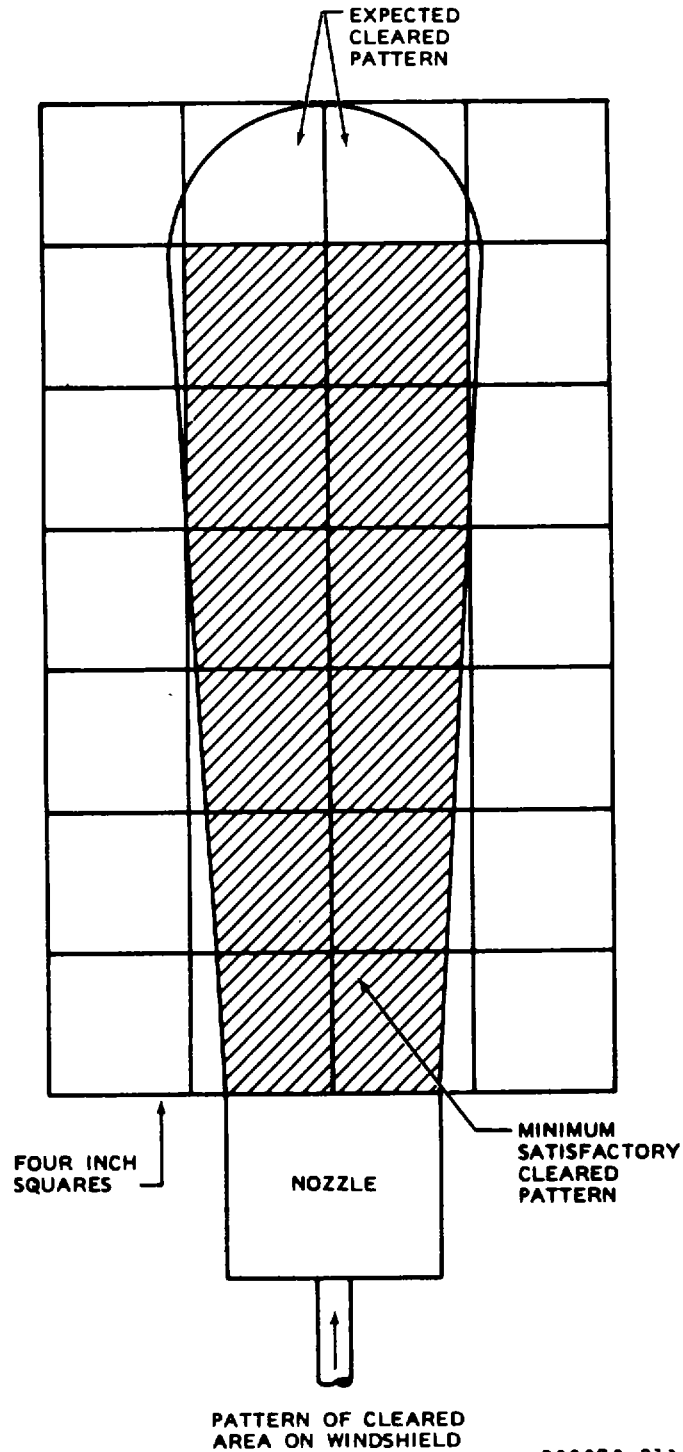


Figure 12-3. Rain removal nozzle and cleared area pattern

CHAPTER 13 ENVIRONMENTAL CONTROL SYSTEM

13-1. Environmental Control System

The environmental control system (figure 13-1) heats, cools, and removes moisture from the air supplied to the crew compartment. It is composed of the environmental control unit (figure 13-2), control valves, ducting, and controls for the pilot to operate the system. The ambient air ventilation system and rain removal system are described with the environmental control system theory of operation.

a. Theory of Operation.

NOTE

Refer to TM 55-1520-234-10, Operators Manual, for environmental control system instructions.

(1) When the COOL/WARM selector (14, figure 13-1) is rotated to full cold and the ENVR CONT/RAIN REMOVAL switch is positioned to ENVR CONT, the pressure regulator and shutoff valve (figure 13-3) opens. Bleed air from the engine at approximately 460°F flows through the venturi which restricts the flow to approximately 3.5 percent of engine through-flow. The bleed air flows from the venturi through the pressure regulator and shutoff valve to the environmental control unit. The pressure regulator limits pressure to 35 psi.

NOTE

The ENVR CONT switch will be positioned to OFF on takeoff and landings or when TGT exceeds 810°C.

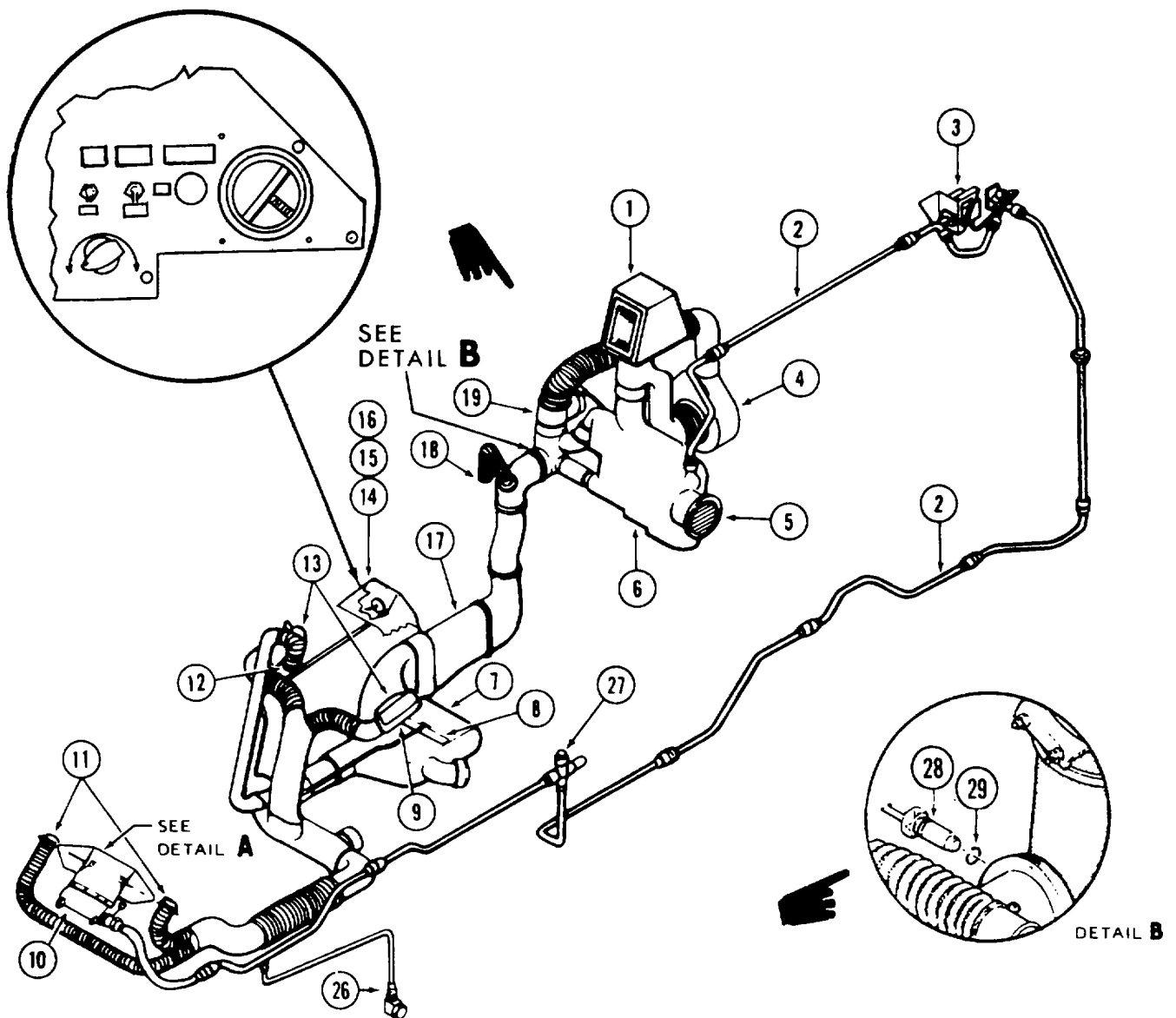
(2) The bleed air is cooled almost to ram air temperature in the heat exchanger (figure 13-3). Additional cooling to well below ram air temperature occurs in the reheater-condenser where the bleed air is cooled by recirculated cold turbine discharge air. Bleed air is usually cooled below its dew point in the reheater-condenser, and moisture condenses from the air. This condensed water is collected at the water separator and sprayed into the air inlet of the heat exchanger where it again evaporates and increases the cooling effectiveness at the heat exchanger.

(3) The cool high pressure air leaving the reheater-condenser (figure 13-3) is then expanded through the cooling turbine where its temperature is further reduced by the extraction of energy from the air. Shaft energy produced in the turbine drives a fan which induces the ram cooling airflow across the heat exchanger.

(4) The air leaving the turbine (figure 13-3) enters the primary nozzle of the jet pump where it induces recirculation airflow across the cold side of the reheater-condenser. This recirculation air is drawn from the conditioned air supply duct; it passes through the reheater-condenser where it cools the bleed air, then mixes with the cold turbine discharge air in the jet pump and returns to the conditioned air supply duct.

(5) The conditioned air temperature is controlled to a value which is selectable in the nominal range of 35°F to 180°F. This is accomplished by an integral control/sensor unit (figure 13-3), a temperature control valve and a temperature selector. The selector is mounted on the pilot's instrument panel and is set by the pilot to desired temperature. The control/sensor is installed with the sensor probe immersed in the reheater-condenser recirculation air duct. Since the reheater-condenser recirculation air is at the same temperature as the crew compartment supply air, the 35°F low limit effectively prevents freezing conditions from existing in the reheater-condenser. In operation, the signals from the pilot's COOL/WARM selector and the control/sensor probe are fed into the control section of the control/sensor. The control section output is supplied to the torque motor on the temperature control valve. The torque motor controls the valve to allow the correct amount of hot engine bleed air to bypass the turbine. The hot bleed air is mixed with cold air at the jet pump to obtain the selected temperature for the air ducted at the jet pump to obtain the selected temperature for the air ducted to the crew compartment.

(6) The air distribution valve (figure 13-3) is automatically positioned to prevent flow of ventilation air from the transmission-driven blower to the crew compartment when the environmental control unit is in operation. The air distribution valve is automatically positioned to direct the flow of ventilation air from the

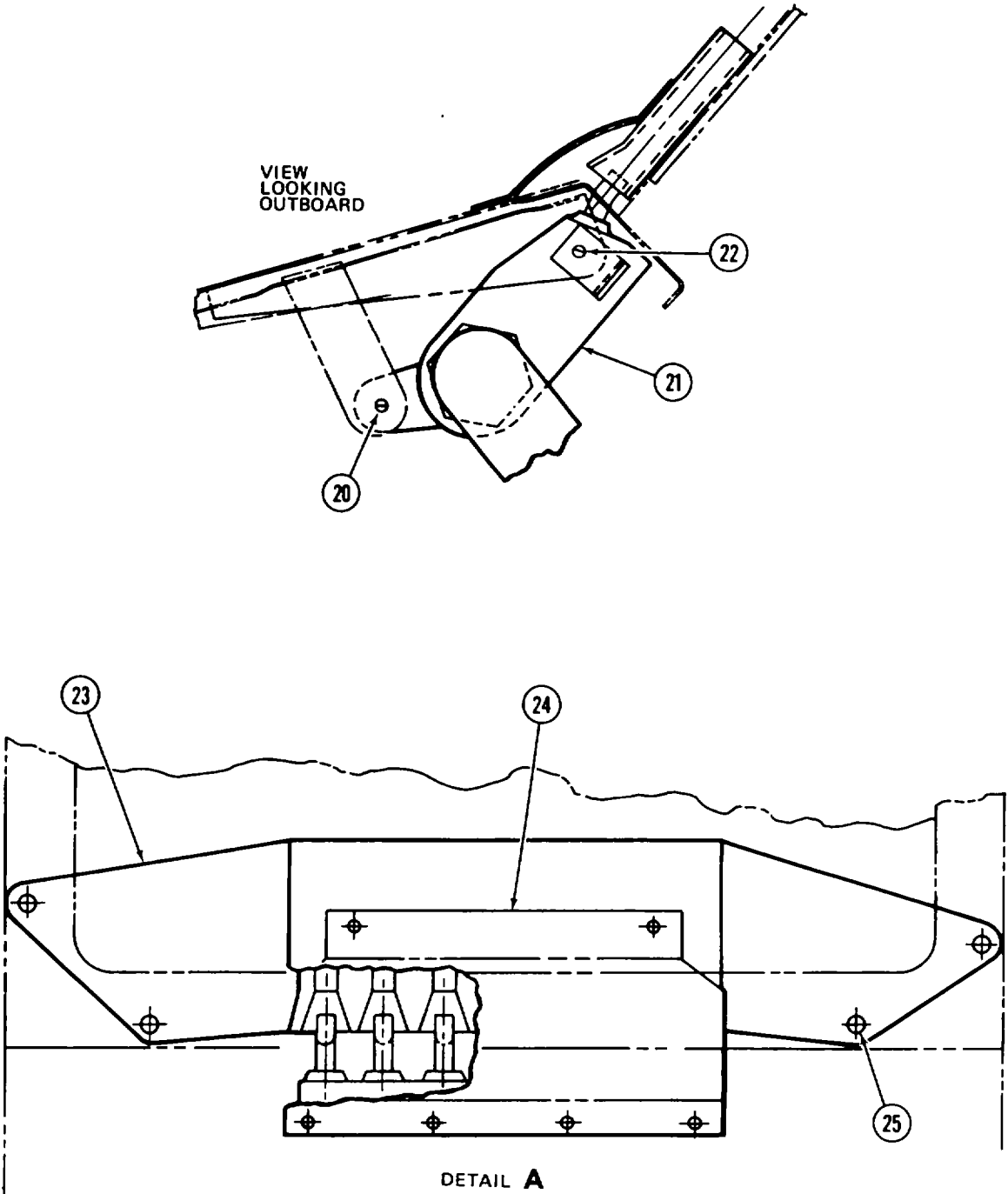


- 1. Ram Air Inlet
- 2. Bleed Air Line
- 3. Pressure Regulator and Shutoff Valve
- 4. Blower
- 5. Ram Air Outlet
- 6. Environmental Control Unit
- 7. Duct
- 8. Flapper Valve
- 9. Defrost Outlet
- 10. Rain Removal Outlet
- 11. Gunners Compartment Air Outlet
- 12. Gunners Cushion Air Outlet
- 13. Pilots Compartment Air Outlets
- 14. Selector Switch
- 15. Flapper Valve Control

- 16. Rain Removal Switch
- 17. Duct
- 18. Pilots Cushion Air Outlet
- 19. Ventilator Valve
- 20. Screw
- 21. Nozzle Assembly
- 22. Screw
- 23. Rain Removal Jet Pump
- 24. Shield
- 25. Screw
- 26. Drain Valve
- 27. Rain Removal Valve (Air Distribution Valve)
- 28. Overheat Switch
- 29. Packing

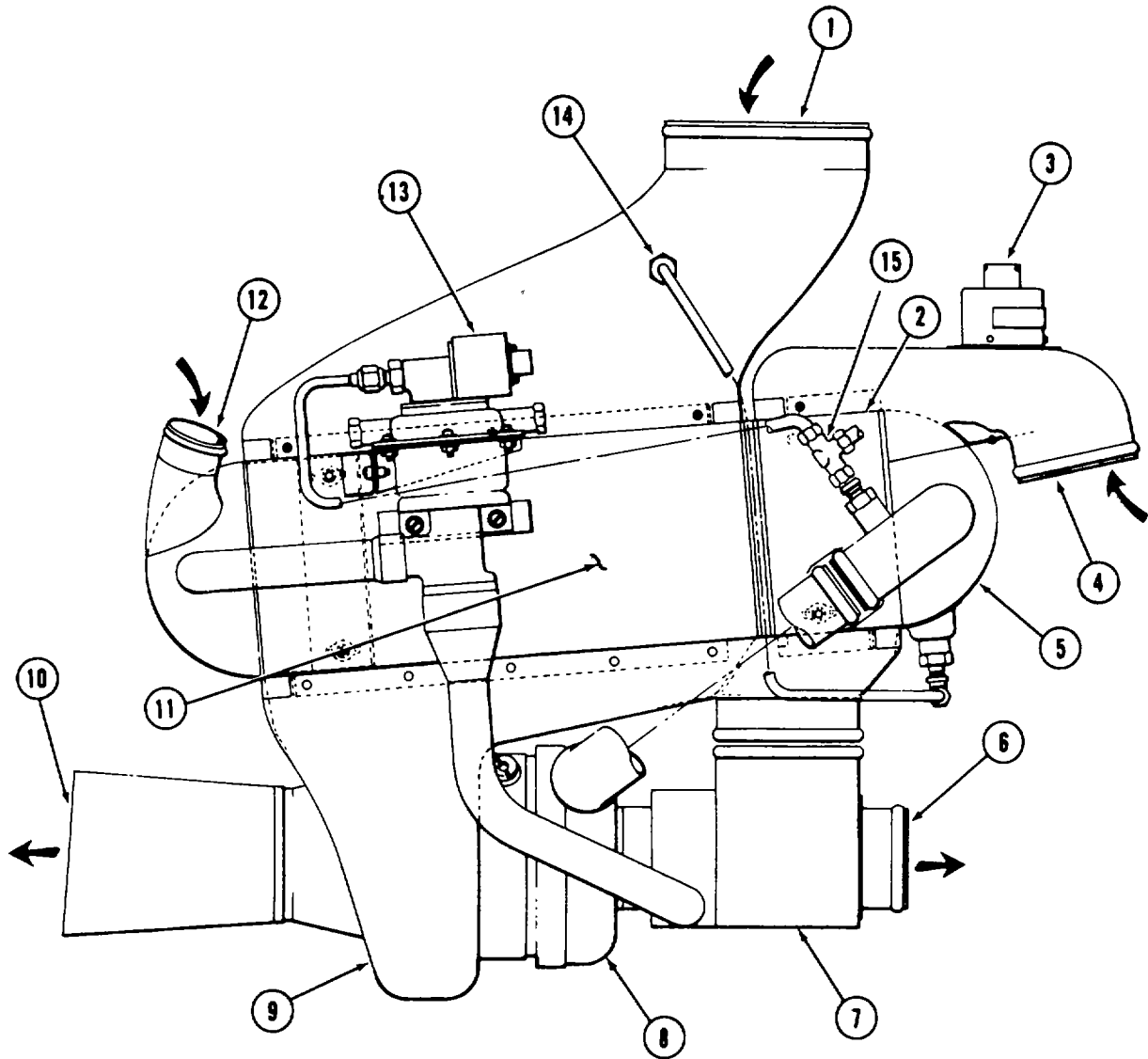
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Figure 13-1. Environmental control system (Sheet 1 of 2)



209070-175-2

Figure 13-1. Environmental control system (Sheet 2 of 2)



- | | |
|----------------------------------|--|
| 1. Ram Air Inlet | 9. Fan |
| 2. Reheater Condenser | 10. Ram Air Outlet |
| 3. Temperature Control/Sensor | 11. Heat Exchanger |
| 4. Recirculated Air Inlet | 12. Bleed Air Inlet |
| 5. Water Separator | 13. Temperature Control Valve and Torque Motor |
| 6. Conditioned Air Supply Outlet | 14. Water Injector |
| 7. Jet Pump | 15. Tee |
| 8. Cooling Turbine | |

209704-1A

Figure 13-2. Environmental control unit

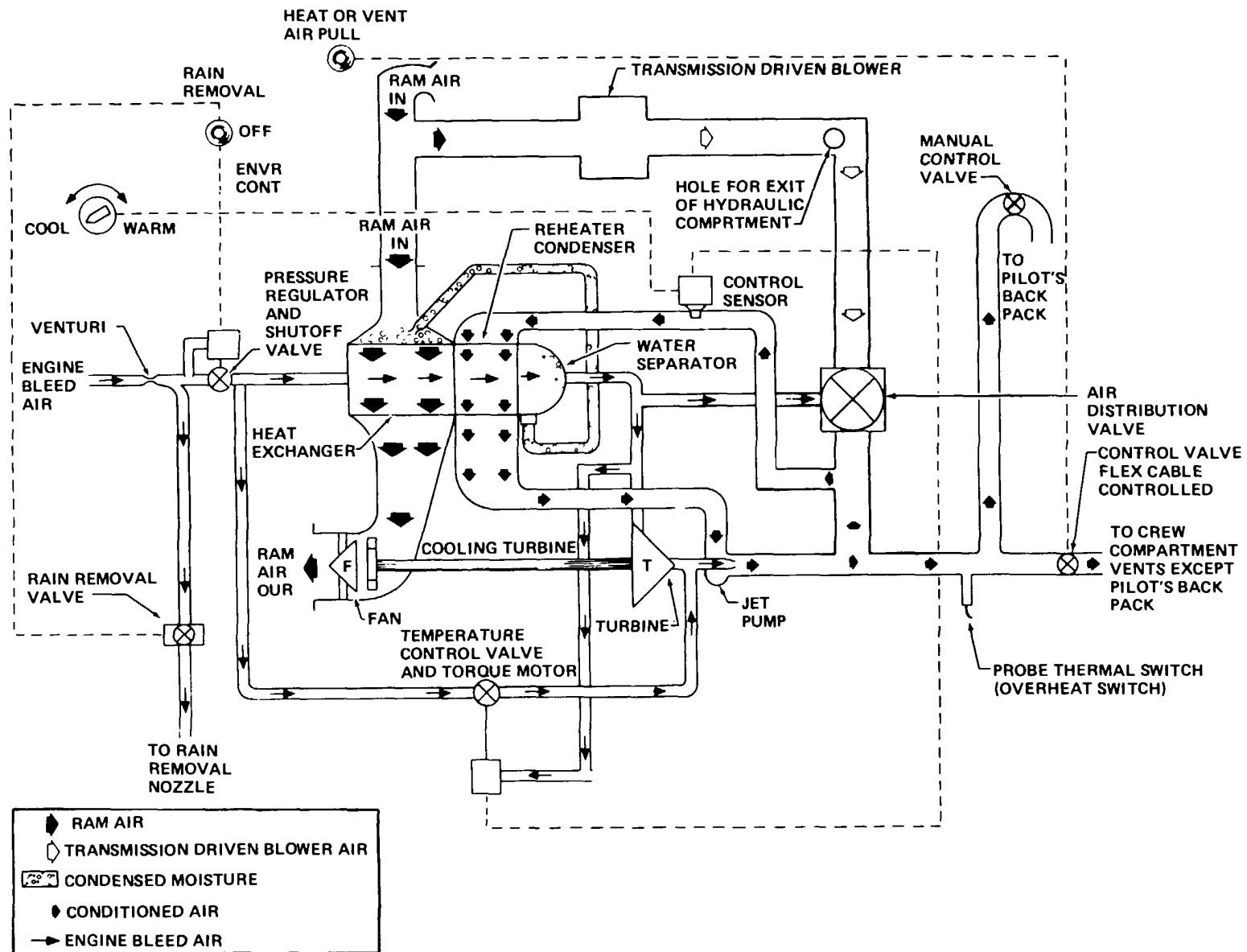


Figure 13-3. Environmental control system schematic

209070-32B

transmission-driven blower to the crew compartment when the environmental control unit is not in operation. This ventilation air is at ambient temperature.

(7) The probe thermal switch/overhaul switch (figure 13-3) serves to protect the system in the event of a malfunction permitting excessive hot engine bleed air to enter the ducting. Maximum temperature of conditioned air under normal conditions is **180°F**. If the temperature of the air at the thermal switch should increase to **260°F**, the environmental control unit will automatically be shut off. When the temperature decreases to **225°F**, the environmental control unit will come back on. Cycling will continue until the environmental control unit is turned off and the malfunction corrected.

(8) The rain removal valve (figure 13-3) controls the flow of hot engine bleed air to the rain removal nozzle at the lower front external surface of the windshield. When the rain removal switch is ON, bleed air will blow rain off the windshield.

b. *Troubleshooting.* (Refer to table 13-1.)

- (1) Operate engine at flat pitch (**6600 RPM**) when required.
- (2) Position the ECS switch to "ON" and listen for evidence of turbine coming up to speed.

NOTE

The following troubleshooting procedure is to be followed with the assistance of AVIM Intermediate personnel. All checks are to be made with engine operating except as indicated by *.

Table 13-1. Troubleshooting - Environmental Control System

NOTE

Before you use this table, be sure you have performed all normal operational checks.

CONDITION

TEST OR INSPECTION

CORRECTIVE ACTION

1. No airflow from outlets.

STEP 1. Manually operated flapper valve closed.

Open valve, adjust or replace linkage or replace valve. (Refer to paragraph 13-6. a.)

2. No airflow from outlets (ECS switch in "OFF" position.)

STEP 1. Ventilator valve defective.

Replace ventilator valve. (Refer to paragraph 13-6. a.)

Table 13-1. Troubleshooting - Environmental Control System (Cont)

CONDITION

TEST OR INSPECTION

CORRECTIVE ACTION

3. No airflow from outlets (ECS switch in "ON" position).
STEP 1. Defective or inoperative pressure regulator and shutoff valve.

Visually check pressure regulator and shutoff valve for valve stroke open and escape of air from relief valve. If no stroke open or escape of air from relief valve, perform test procedure as follows:

Disconnect J/P294 and check for 28 VDC at pin 3 of P294. Check for ground at pin 6 of P294. If 28 VDC is present at pin 3 of P294 and ground is present at pin 6 of P294 replace bleed air valve. If no power is found, check wiring circuitry following standard troubleshooting practices and repair. (Refer to paragraph 13-4. b.)

Change 2 13-6A/(13-6B blank)

Table 13-1. Troubleshooting Environmental Control System (Cont)

CONDITION

TEST OR INSPECTION

CORRECTIVE ACTION

4. Airflow from outlets does not become cool with temperature selector switch turned to full cold.

STEP 1. Defective or inoperative temperature selector switch.

Disconnect electrical connector/sensor. If system goes to full cold condition;

***(1) Connect ohmmeter (set at highest resistance position) to pins F and G of the male electrical connection (helicopters wiring). (Refer to paragraph 9-2. c.)**

***(2) Rotate temperature selector switch. The meter should show a change in resistance. (Refer to paragraph 9-2. c.)**

***(3) If resistance does not vary, replace temperature selector switch. (Refer to paragraph 13-5. b.)**

STEP 2. Defective or inoperative torque motor.

Disconnect regulated supply air line to torque motor on temperature control valve. If valve closes (goes to cold position) replace torque motor. (Refer to paragraph 13-12. b.)

STEP 3. Defective or inoperative temperature control valve.

Disconnect regulated supply air line to torque motor on temperature control valve. If torque motor is operative and valve remains open, replace valve. (Refer to paragraph 3-11. a.)

5. Excessive noise or visual evidence of damage to ECU turbine.

STEP 1. Rotating assembly binding or rubbing; bearings rough.

Replace ECU, refer to higher maintenance level for testing or repairing ECU. (Refer to paragraph 13-2. b.)

6. Airflow temperature does not become warmer when temperature selector switch is turned to full hot position.

STEP 1. Defective or inoperative environmental control/sensor.

If all preceding checks have been made, replace temperature control/sensor valve. (Refer to paragraph 13-11. a.)

STEP 2. Defective or inoperative environmental control unit.

If all preceding checks and tests have been made and all components are found operative, replace environmental control unit. (Refer to paragraph 13-2. b.)

13-2. Environmental Control Unit.

The environmental control unit (ECU) is the refrigeration unit of the environmental control system (ECS) and is basically composed of a heat exchanger, a reheater-condenser, an expansion turbine and a jet pump (see figure 13-2). This unit refrigerates the bleed air to conditioned air for the crew compartment.

a. Inspection.

- (1) Refer to troubleshooting chart for functional check.
- (2) ECU for visible damage or evidence of leakage.
- (3) ECU for security of attachment.

CAUTION

Due to excessive slack within the hydraulic compartment the FM homing antenna leads may be heat damaged by contact with the ECU hot section. During ECU inspection check to see if any such contact is evident. If either of the leads follow a routing that allows contact or near contact, disconnect leads, loop leads (loop no less than (3) inches in diameter) and tie using nylon cord, (C48) and connect leads.

(4) Check for interference between ECU turbine housing and hydraulic compartment floor. Minimum allowable clearance is **0.06** inch. When this clearance cannot be obtained, request assistance from higher level of maintenance (AVIM).

b. Repair or Replacement.

- (1) Replace ECU if ECU fails to meet inspection requirements.
- (2) Replace if damaged or leakage is evident.
- (3) Tighten hardware if not securely attached.

c. Removal.

- (1) Open hydraulic compartment door on left side. Remove attaching hardware and disconnect all ducts and tubes to ECU.
- (2) Disconnect electrical plugs from control/ sensor.
- (3) Remove hardware attaching ECU to bulkhead and remove ECU from helicopter.

d. Installation.

- (1) Position unit in hydraulic compartment and secure to bulkhead with attaching hardware.
- (2) Connect all ducts, tubes and electrical connectors.
- (3) Connect the wiggins fitting connecting bleed air line to ECU, and torque fitting to **17** foot-pounds. Secure wiggins fitting with lockwire (C151).

NOTE

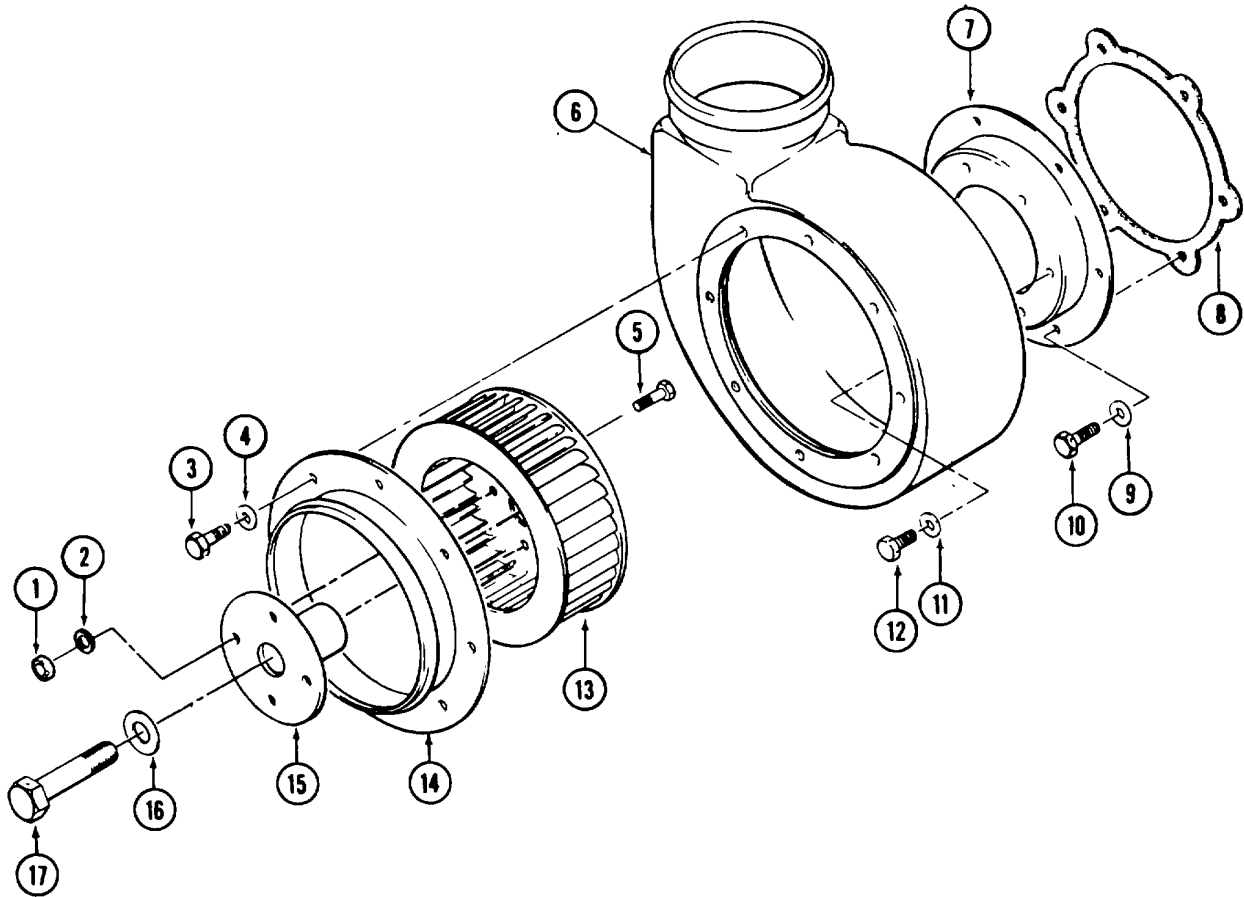
Ensure that clearance between ECU turbine housing and hydraulic compartment floor is 0.06 inch minimum. When this clearance cannot be obtained, request assistance from higher level of maintenance. (AVIM)

13-3. Blower - Ambient Air. See figure 13-4.

A continuously operated transmission driven blower (4, figure 13-1) is mounted on a pad provided the forward side of the transmission.

Premaintenance requirements for blower

Condition	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	Two
Consumable Materials	(C102) (C124)
Special Environmental Condition	None



- | | |
|------------|----------------------|
| 1. Nut | 10. Bolt |
| 2. Washer | 11. Washer |
| 3. Bolt | 12. Bolt |
| 4. Washer | 13. Impeller |
| 5. Bolt | 14. Inlet Adapter |
| 6. Housing | 15. Impeller Fitting |
| 7. Adapter | 16. Washer |
| 8. Gasket | 17. Bolt |
| 9. Washer | |

209072-2C

Figure 13-4. Blower impeller assembly P/N 209-072-436-1

13-3A. Blower - P/N209-072-436-1.*a. Removal.*

(1) Open hydraulic compartment door on right side of helicopter and remove right side transmission cowling to gain access to blower area.

(2) Remove intake and exhaust ducts by removing clamps and hardware.

b. Disassembly.

(1) Remove eight attaching bolts (3), washers (4), and remove inlet adapter (14).

(2) Cut lockwire and remove bolt (17) and washer (16).

(3) Separate housing (6) from transmission pad by cutting lockwire and remove bolts (10) and washers (9).

(4) Remove impeller (13) forward to clear housing (6) then remove housing and gasket (8).

(5) Remove impeller and separate impeller fitting (15) from impeller (13) by removing nuts (1), washers (2) and bolts (5).

(6) Remove bolts (12) and washers (11) and separate adapter (7) from housing (6).

*c. Cleaning.***WARNING**

Use solvent (C124) in a well ventilated area. Avoid prolonged breathing of vapors and do not use in an area with open flame or high temperature.

(1) Clean disassembled parts with solvent (C124).

(2) Dry with a clean lint-free cloth.

d. Inspection - Blower. Inspect blower assembly components as follows. Refer to figure 13-4.

(1) *Adapter.* Inspect adapters (7 and 14) for cracks or breaks in material, and for corrosion damage.

(2) *Housing.* Inspect blower housing (6) for dents and deformity, cracks, and for corrosion damage.

(3) *Impeller Fitting.* Inspect impeller fitting (15) for cracks, damaged internal splines, and for corrosion damage.

(4) *Impeller.* Inspect impeller (13) for deformity, broken welds, cracked or damaged blades, and for corrosion damage.

e. Repair or Replacement.(1) *Adapters.*

(a) Replace adapter (7 and 14) if cracked.

(b) Clean up minor corrosion damage and touch up with primer (C102). If corrosion damage is severe enough to affect function, replace the adapter.

(2) *Housing.*

(a) Replace blower housing (6) if cracked.

(b) Clean up minor corrosion damage and touch up primer (C102). If corrosion damage is severe enough to affect function, replace the housing.

(3) *Impeller Fitting.*

(a) Replace impeller fitting (15) if cracked or for damaged internal splines.

(b) Clean up minor corrosion damage and touch up with primer (C102). If corrosion damage is severe enough to affect function, replace the impeller fitting.

(4) *Impeller.*

(a) Replace impeller (13) for deformed or cracked blades, or broken welds.

NOTE

Damaged blades may be repaired if impeller balance is retained. Blades should not be disassembled to facilitate repairs.

(b) Clean up minor corrosion damage and touch up with primer (C102). If corrosion damage is severe enough to affect function, replace the impeller.

f. Assembly.

- (1) Attach impeller fitting (15) to impeller (13) with four bolts (5), aluminum washers (2) and nuts (1).
- (2) Attach adapter (7) to housing (6) with bolts (12) and aluminum washers (11).
- (3) Position impeller (13) in opening in firewall.
- (4) Place gasket (8) and housing (6) on transmission pad; install six bolts (10) with aluminum washers (9).

Lockwire bolts with lockwire (C151).

- (5) Position impeller (13) in housing (6).
- (6) Place washer (16) under head of bolt (17), and install bolt through fitting (15). Torque bolt (17) **80 TO 100** inch-pounds and lockwire to shank of bolt (5). Use lockwire (C152).

g. Installation.

- (1) Install intake and exhaust ducts with clamps and attaching hardware.
- (2) Close hydraulic compartment door, and transmission cowling.

13-3B. Blower - P/N 209-070-585-1 and P/N 197803-1, FSCM 89513.*a. Removal.*

- (1) Open transmission cowling to gain access to blower assembly.
- (2) Remove duct (2, figure 13-4A) and duct (1) by removing clamps and hardware.
- (3) Remove eight attaching bolts and washers (4), and remove inlet adapter (3).
- (4) Cut lockwire and remove bolt and washer (5).
- (5) Remove four bolts and washers (6) and separate fitting (7) from impeller (11).

NOTE

The nuts for bolts (6) are not illustrated.

- (6) Remove six bolts and washers (8) and remove blower housing (13) from adapter (9).

NOTE

Housing (13) omitted from figure 13-4A exploded for clarity.

- (7) Remove adapter (9) and gasket (12) from transmission pad by removing six bolts and washers (10).

b. Inspection.

- (1) Inspect adapters (3, figure 13-4A) and (9) for cracks or breaks in material.
- (2) Inspect blower housing for dents, cracks and deformity.
- (3) Inspect impeller fitting (7) for damaged internal splines and dye penetrant inspect for cracks.
- (4) Inspect impeller (11) for deformity, broken welds and for cracked or damaged blades.
- (5) Inspect bolt (5) visually for damaged threads and inspect by magnetic particle method for cracks.
- (6) Inspect gasket (12) for cuts, breaks and chafing.

c. Repair.

- (1) Replace blower if inoperative or if damaged or unservicable.
- (2) Tighten hardware as necessary to secure blower to transmission adapter and ducts.
- (3) Replace adapters (3 and 9) if cracked or broken.
- (4) Replace blower housing if cracked, dented or deformed.
- (5) Replace fitting (7) if cracked or if internal splines are damaged.
- (6) Replace impeller (11) if cracked or if blades are deformed.

1. INTAKE DUCT
2. EXHAUST DUCT
3. INLET ADAPTER
4. BOLTS AND WASHERS (8)
5. BOLT AND WASHER (FITTING)
6. BOLTS AND WASHERS (4)
7. IMPELLER FITTING
8. BOLTS AND WASHERS (6)
9. ADAPTER – BLOWER TO TRANSMISSION
10. BOLTS AND WASHERS (6)
11. IMPELLER
12. GASKET
13. HOUSING

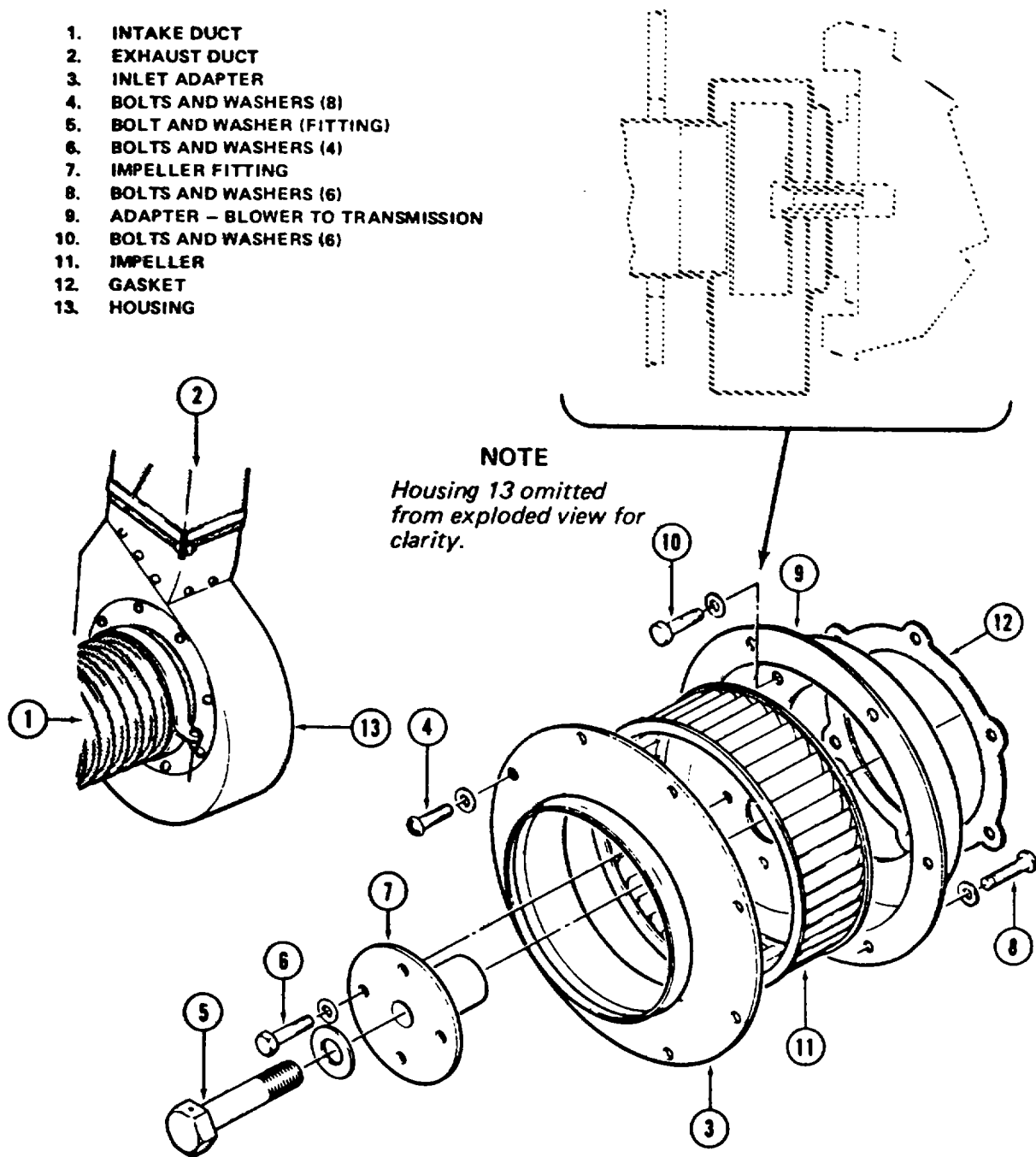


Figure 13-4A. Blower Impeller Installation Typical for Impeller P/N 209-070-585-1 and P/N 197803-1

- (7) Replace bolt (5) if threads are damaged or if cracks are detected during magnetic particle inspection.
- (8) Replace gasket (12) if cut, badly chafed, or worn.

- d. *Painting.* Refer to paragraph 1-12.
- e. *Assembly.*

(1) Place gasket (12, figure 13-4A) and adapter (9) in position and install on transmission pad with six bolts and washers (10). Lockwire bolts.

(2) Attach impeller fitting (7), to impeller (11) with four bolts and washers (6). (The nuts for bolt (6) are not illustrated.)

(3) Install blower housing by attachment of blower (13) to adapter (9) with six bolts and washers (8).

(4) Position impeller (11) and fitting (7) on transmission quill.

(5) Place washer under head of bolt (5) and install bolt through fitting (7) into shaft.

(6) Torque bolt (5) **80 TO 100** inch-pounds and (C151) lockwire.

(7) Attach adapter (3) on blower housing with eight bolts and washers (4).

(8) Install ducts (1) and (2) and attach with clamps and other attaching hardware.

13-4. Air Distribution Valve. Refer to figures 13-5 and 13-6 and 13-7.

The air distribution valve (27, figure 13-1) serves to route a portion of engine bleed air to the helicopter windshield rain removal nozzle. When the pilots Rain Removal/Environmental Control is positioned to Rain Removal, the solenoid actuated pilot valve allows a small amount of bleed air to vent through a series of flow-control orifices to atmosphere. This creates a pressure imbalance which causes line pressure to lift the poppet assembly off the seat inside the body. This allows bleed air to flow to the rain removal nozzle located at the base of the windshield.

Premaintenance requirements for air distribution valve

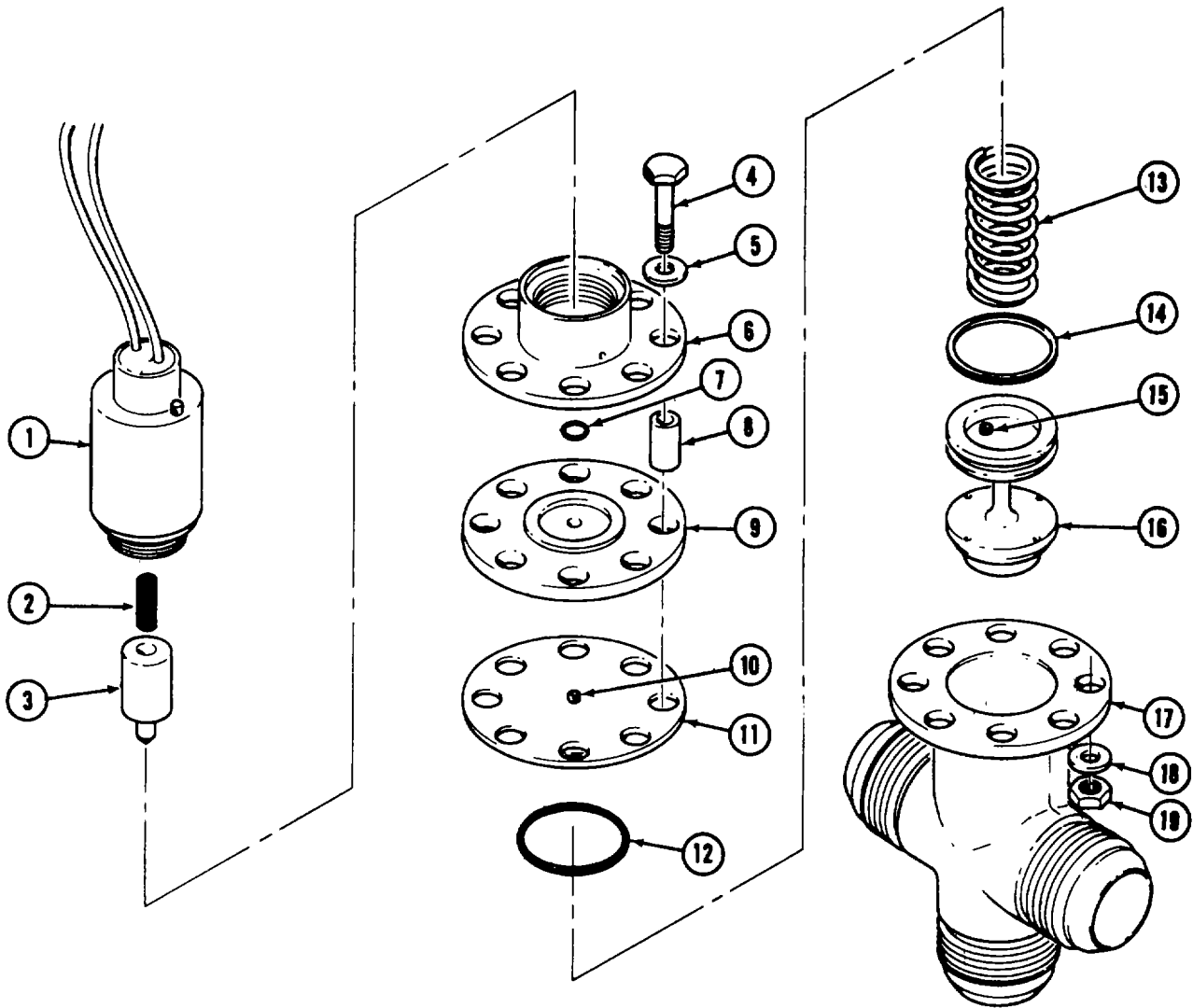
Condition	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	(T86)

Premaintenance requirements for air distribution valve (Cont)

Condition	Requirements
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	Two
Consumable Materials	(C37) (C44) (C45) (C71) (C124)
Special Environmental Condition	None

a. Characteristics:

- Type Solenoid Valve, Pilot Operated 3 way, two position
- Ports..... Per MS33656-16
- Pressure Rating:
 - Operating 0-100 PSIG
 - Proof 200 PSIG
 - Burst (Minimum.. 400 PSIG
- Temperature Range:
 - Operating 450°F
 - Maximum 545°F For 15 Minutes
- Leakage (Maximum):
 - Internal, Port 3 to Port 105 lb/min
 - External04 lb/min.
- Solenoid Electrical Rating:
 - Voltage 18-30 VDC
 - Coil Resistance... 37.8 OHMS 70°F Maximum
 - Duty..... Continuous



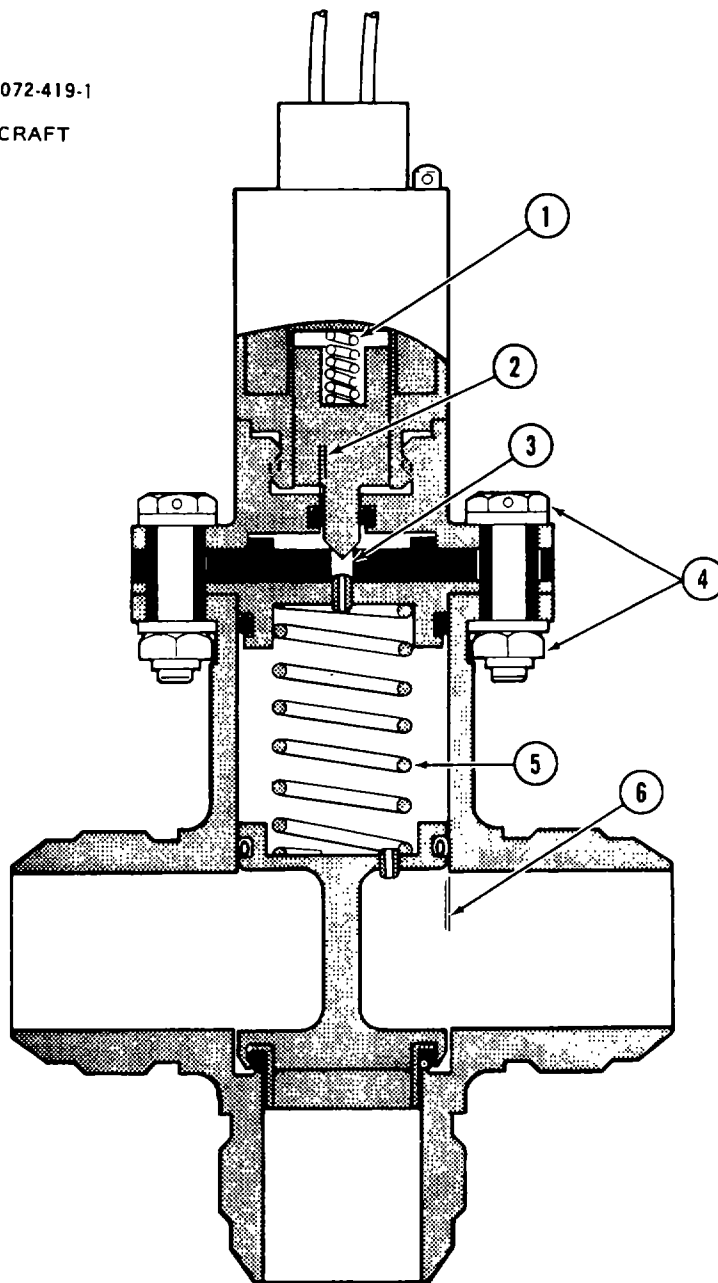
- 1. Solenoid Assembly
- 2. Spring
- 3. Armature
- 4. Bolt
- 5. Thin Steel Washer
- 6. Adapter
- 7. Packing
- 8. Spacer
- 9. Graphite Filled Teflon Gasket
- 10. Orifice

- 11. Cap
- 12. Packing
- 13. Spring
- 14. Teflon Lip Seal
- 15. Orifice
- 16. Poppet Assembly
- 17. Body
- 18. Thin Steel Washer
- 19. Nut

209072-7

Figure 13-5. Air distribution valve assembly

Part No.
BHC 209-072-419-1
FUTURECRAFT
200427-X



209072-8-1

Figure 13-6. Limits chart air distribution valve (Sheet 1 of 2)

ITEM	NOMENCLATURE	MIN.	MAX.	REPLACE
1	Armature Spring rating	58 in/lbs	71 in/lbs	Below or Above
2	Armature Poppet to Adapter bore	0.003	0.006	0.008
3	Seat Surface on Gasket bore (formation of seat surface to pointed poppet is permissible)	0.002R	0.005R	0.007R
4	Bolt to Nut torque	15 in/lbs	17 in/lbs	N/A
5	Poppet Spring rating	0.62 in/lbs	0.78 in/lbs	Below or Above
6	Sliding surfaces of Poppet to body bore	0.124	0.127	0.130
7	Seat surface in body bore	0.005R	0.010R	0.020R

209072-8-2

Figure 13-6. Limits chart - air distribution valve (Sheet 2 of 2)

Materials:

- Body 356-T6 Aluminum Alloy
- Poppet & Caps ... 2024-T4 Aluminum Alloy
- Spring 302 Stainless Steel
- Solenoid Mag Iron and Mild Steel,
Electroless Nickel Plated
- Seals Teflon and 15% graphite filled Teflon
- Thermal Barrier
- Basket 15% graphite filled teflon

b. *Removal*

- (1) Disconnect electrical connector from valve.
- (2) Disconnect lines and remove the valve.

c. *Disassembly (AVIM)*. Refer to figure 13-5.

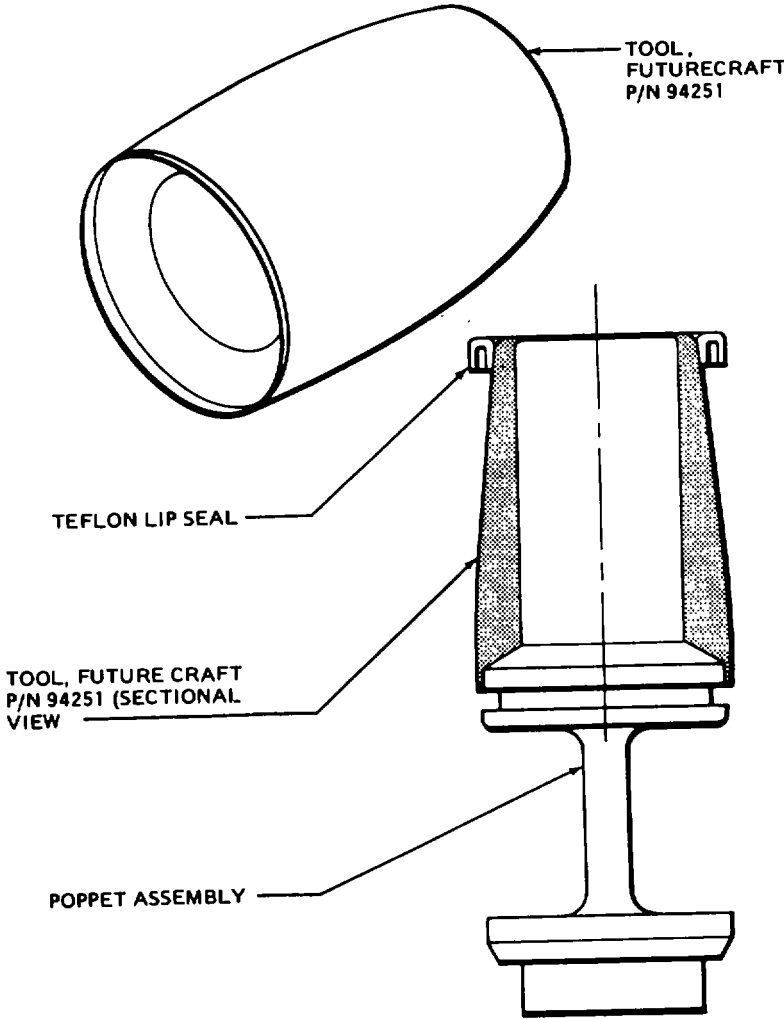
- (1) Index adapter (6), gasket (9), cap (11) and body (17) with indelible ink marker so that these parts can be reassembled in the same relative position.
- (2) Remove lockwire and remove solenoid (1), spring (2) and armature (3).
- (3) Hold nuts (19) and remove bolts (4) and washers (5 and 18).
- (4) Remove adapter (6), packing (7), spacer (8), gasket (9) and cap (11). Remove packing (12) from cap (11).
- (5) Remove spring (13) and poppet (16). Remove seal (14) from poppet.

d. *Cleaning (AVIM)*.

WARNING

Use solvent (C124) in a well ventilated area. Avoid prolonged breathing of vapors and do not use in an area with open flame or high temperature.

- (1) Clean disassembled parts with solvent (C124).
- (2) Dry with a clean lint-free cloth.



209900-357

Figure 13-7. Tool application - teflon lip seal installation on poppet

e. *Inspection.* (AVIM) Refer to figure 13-5 and 13-6.

- (1) Use a strong light and magnifying glass to perform visual inspections in the following steps.
- (2) Inspect solenoid (1, figure 13-5) for evidence of leakage and deterioration at seams. Inspect electrical wires and threads for damage. Check electrical resistance of the solenoid with a megohmmeter. Attach a lead from the megohmmeter to each solenoid wire. Read resistance on RX1 scale. If the reading does not fall between 35 and 38 ohms, mark the solenoid for replacement.
- (3) Inspect adapter (6, figure 13-5) for damaged threads, corrosion, mechanical damage, and distortion.
- (4) Inspect spacer (8, figure 13-5), cap (11), spring (2), and spring (13) for corrosion, mechanical damage and distortion. Inspect orifice (10) for damage and for secure installation in cap.

NOTE

The seat seal referred to in step (5) is installed in the poppet with a sleeve guide and then the lip of the poppet is spin-formed to retain these parts. See the sectional view of the poppet on figure 13-6 adjacent to index (7). The area between the poppet and the sleeve guide is sealed pressure tight with high temperature epoxy. The seat seal cannot be removed and replaced without destroying the holding lip, but minor damage can be dressed out. Refer to paragraph f.

(5) Inspect poppet (16, figure 13-5) for nicks in grooves for seal (14). Inspect sliding surface for galling and scoring. Inspect orifice (15) for damage and secure installation in poppet. Inspect seat seal in the end of poppet that contacts seat surface in body bore (7, figure 13-6) for scratches and nicks.

(6) Inspect gasket (9, figure 13-5) for breaks and distortion in the thin wall sections adjacent to belt holes. Inspect the pilot seat surface (3, figure 13-6) for radius of 0.007 inch or more which would require replacement. Also mark the gasket for replacement if nicks or scratches are found on the seat surface.

(7) Inspect armature (3, figure 13-5) at tapered seat area for roughness and wear.

(8) Inspect body (17, figure 13-5) for damaged threads. Inspect the sliding surfaces for scoring or scratches. Check seat surface (3, figure 13-6) for radius of 0.020 or more which would require replacement of the body. Also mark the body for replacement if the seat surface is nicked or pitted.

(9) Inspect spring rate for springs (1 and 5, figure 13-6) for rate within limits shown.

(10) Inspect armature to poppet bore (2, figure 13-6) for wear in excess of tolerance shown.

(11) Inspect poppet to body bore (6, figure 13-6) for wear in excess of tolerance shown.

f. *Repair or Replacement* (AVIM). Refer to figure 13-5 and 13-6.

(1) Install new packings (7 and 12, figure 13-6) and teflon lip seal (14) when the valve is assembled.

(2) Replace all parts which fail to pass inspections described in paragraph e.

(3) Polish out minor damage on the seat seal on poppet (16, figure 13-5). If the seat seal is nicked or damaged, replace the entire poppet (16).

(4) Polish out minor scoring, nicks, and burrs on outside areas. Work area until surface is smooth but do not alter concentricity. Use fine grit cloth (C44) on aluminum parts and then touch up with chemical film (C37). Use crocus cloth (C45) on other parts. Refer to paragraph 13-4a. "Characteristics" for listing of parts and the material from which they were made.

g. *Assembly.* (AVIM). Refer to figures 13-5, 13-6, and 13-7.

(1) Position tool, (T86), on poppet. See figure 13-7.

(2) Lubricate teflon lip seal with a thin film of silicone grease (C71) and position on tool with open end facing down as illustrated. Slide the seal down the tapered wall of the tool and into the groove on the poppet.

(3) Allow the Teflon lip seal to stabilize for five minutes, and then use a round tooth pick, or similar non-metallic blunted rod, to work the lip of the seal out until it extends past the surface of the poppet equally on all sides.

(4) Lubricate sliding surfaces of poppet (16, figure 13-5) and body (17) with a thin film of grease (C71). Slide poppet into position in body and place spring (13) on top of poppet.

(5) Lubricate packing (12, figure 13-5) with grease (C71) and install packing on cap (11).

(6) Observe index marks made on adapter (6, figure 13-5), gasket (9), cap (11) and body (17) at time of disassembly and install these parts with the index mark aligned and with spacers (8) in place. Install bolts (4), washers (5 and 18) and nuts (19). Hold nuts and tighten bolts evenly in small increments until a torque of 15 ± 2 inch-pounds is applied to each bolt.

(7) Lubricate packing (7, figure 13-5) and sliding surface of armature (3) with silicone grease (C71) and install packing in adapter (6). Install armature (3), spring (2) and solenoid (1). Lockwire solenoid from drilled hole in lug near leads to one of drilled head bolts (4) with lockwire (C151).

h. Perform proof pressure test on air distribution valve.

WARNING

Comply with requirement to proof pressure test the valve in a test box.

(1) Manifold all three ports of the valve and place the valve in a test box that will afford

Change 2 13-16A/(13-16B blank)

protection to test personnel. Attach a source of 200 PSIG compressed air or nitrogen to the manifold and apply 200 PSIG for three minutes.

(2) Depressurize and examine the valve for deformation or other visible damage. Reject the valve if any damage is detected. Remove manifold.

i. Perform functional test on air distribution valve.

NOTE

If there are any malfunctions during this test, refer to Troubleshooting Chart, paragraph j.

(1) Attach solenoid leads to a source of 18-30 VDC electrical power that is controlled by a switch.

(2) Cap one of the open ports on the valve body and attach a source of 100 PSIG compressed air to the opposite port. Turn the air pressure on and regulate to 100 PSIG.

(3) Cycle the valve ten times and record time required to open and close. The tolerance is **0.5 TO 2.0** seconds. After last actuation, measure leakage at the normally closed port. Maximum allowable leakage is **0.05** pound per minute.

j. *Troubleshooting.* (Refer to table 13-2.)

Table 13-2. Troubleshooting Air Distribution Valve

NOTE

Before you use this table, be sure you have performed all normal operational checks.

CONDITION

TEST OR INSPECTION

CORRECTIVE ACTION

1. Valve does not open when energized.

STEP 1. Solenoid assembly malfunction.

Perform solenoid coil resistance test. Replace solenoid if resistance is not within limits. Refer to paragraph 13-4. c.)

2. Valve does not open or close within allowable time limits.

STEP 1. Excessive friction on Teflon "Lip Seal" or roughness on sliding surfaces.

Disassemble the valve, polish out burrs, relubricate and reassemble. Refer to paragraph 13-4.

3. Valve leaks excessively in closed position.

STEP 1. Poppet assembly seat seal damaged or worn.

Dress-off surface of seat seal or, if damage is deep, replace the poppet assembly. (Refer to paragraph 13-4. i.)

STEP 2. Seal lip in "Valve Body" pitted or scratched.

Replace valve body. (Refer to paragraph 13-4. g.)

k. *Installation.*

- (1) Install electrical connector to the valve.
- (2) Connect lines to the valve.

13-5. Temperature Selector Switch.

The temperature selector switch is located on the instrument panel and is used to select temperature of conditioned air to the crew compartment.

a. *Inspection.* For freedom of operation in full range from "cold" to "warm".

b. *Repair or Replacement.* Replace switch if it fails to meet inspection requirements.

13-6. Ventilator Valve. Refer to figures 13-8, 13-9, and 13-10.

The ventilator valve located between the transmission-driven blower and the ducts distributing air to the crew compartment is an on off valve. When the ECS is functioning, the valve is normally closed. Lack of bleed air pressure against the valve permits the valve to open allowing the transmission driven blower to force ambient air into the crew compartment. (See figure 13-1.)

Premaintenance requirements for ventilator valve

Condition	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	None
Test Equipment	Air Pressure Regulator Jet (Janitrol Aero P/N 28C88) Water Manometer Air Flow Regulator Air Flow Meter Leakage Fixture. See figure 13-10.
Support Equipment	None

Premaintenance requirements for ventilator valve (Cont)

Condition	Requirements
Minimum Personnel Required	Two
Consumable Materials	(C18) (C74) (C84) (C124)
Special Environmental Condition	None

a. *Removal.* Refer to figure 13-8.

(1) Remove hydraulic compartment access door located on RH side of helicopter and aft of pilots door.

(2) Disconnect tube (3), from regulator (4), loosen nut on opposite end of tube (3), and rotate tube away from regulator.

(3) Remove screw (6) and slide clamp (7) up on flex duct (5) until it is clear of bracket (8).

(4) Remove screw (16) and slide clamp (15) up on coupling (14).

(5) Use a round-edged probe to separate coupling (14) from duct assembly (17), and flex duct (5) from valve (10).

(6) Remove screw (13) and slide clamp (11) off bracket (12). Lift valve (10), regulator (4) and coupling (14) out of the compartment.

(7) Cover open ends of tube (3) and ducts (5 and 17) to prevent entry of foreign material.

(8) Remove coupling (14) from valve (10).

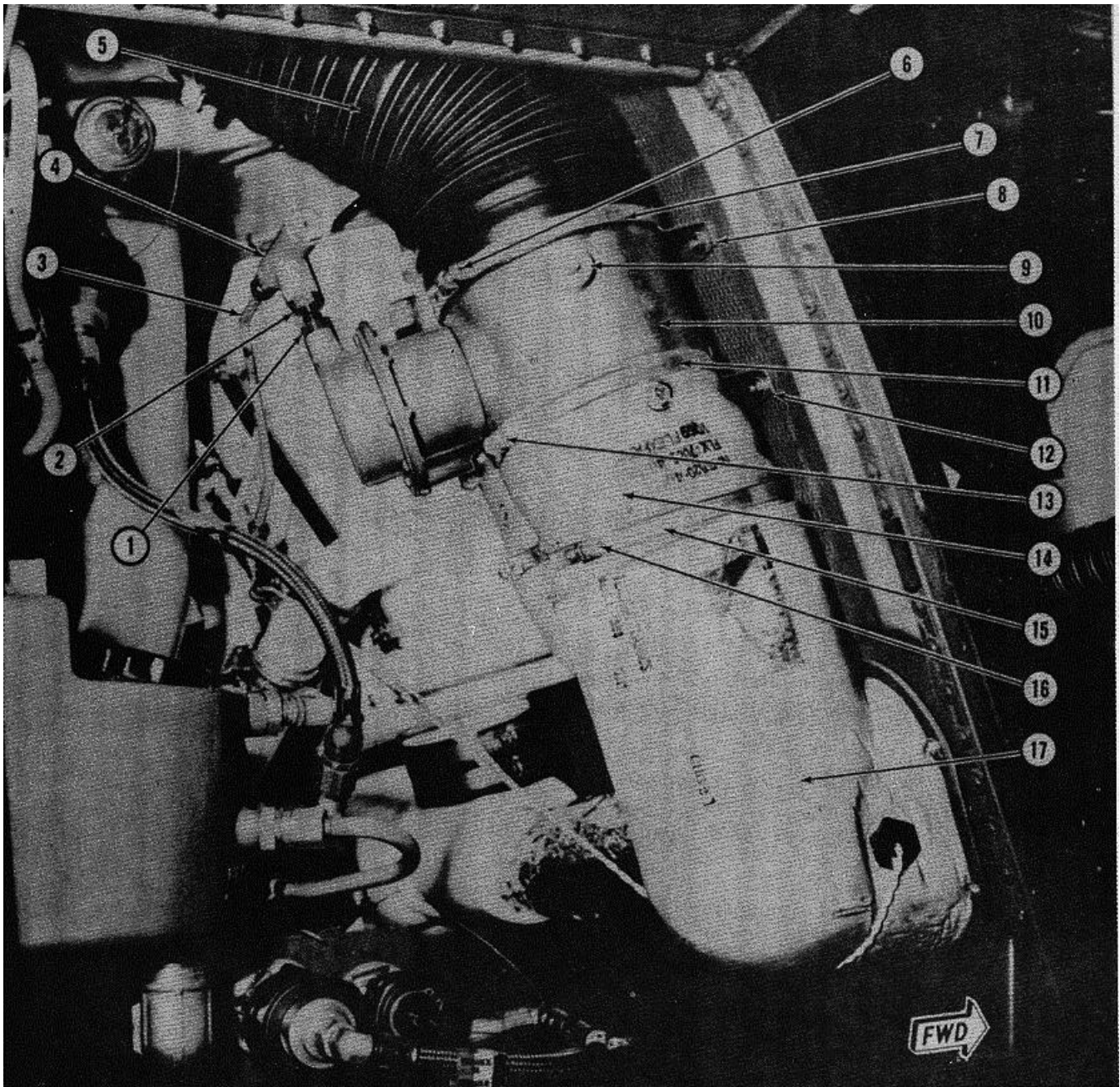
(9) Loosen nut (2) and remove regulator (4) from union (1). Remove union from valve (10).

b. *Disassembly.* (AVIM). Refer to figure 13-9.

(1) Remove nuts (12), screws (6) and cover (4).

(2) Remove cotter pin (27) and pin (19) to disconnect links (21 and 23) from rod end connector (9).

(3) Remove diaphragm (1) with assembled plate (2) and rod end connector (9). Remove spring (8).



- | | |
|--|---|
| 1. Union | 10. Vent Air Control Valve |
| 2. Nut | 11. Clamp |
| 3. Tube Assembly | 12. Bracket |
| 4. Regulator | 13. Screw, Thin Aluminum Washer and Nut |
| 5. Flex Duct | 14. Coupling |
| 6. Screw, Thin Aluminum Washer and Nut | 15. Clamp |
| 7. Clamp | 16. Screw, Thin Aluminum Washer and Nut |
| 8. Bracket | 17. Duct Assembly |
| 9. Boss for Butterfly Valve Shaft | |

209704-17

Figure 13-8. Vent air control valve - installation

- (4) Remove screw (3) rod end connector (9), plate (2) and cup (7).
- (5) Remove links (21 and 25) from butterfly assembly (22).
- (6) Remove screws (24), stiffener (23), and butterfly assembly (22).
- (7) Slide shaft (14) out of body and remove spacer (15), bearing (16), special washer (17), and spacer (18) from both sides of body assembly (10).

c. *Cleaning.* Refer to figure 13-9.

- (1) Clean bearings (16) with a clean, lint-free cloth.

WARNING

Use solvent (C124) in a well ventilated area. Avoid prolonged breathing of vapors and do not use in an area with open flame or high temperature.

- (2) Clean all parts except bearings with solvent (C124). Dry parts with filtered compressed air at 20-25 psig. Do not spin or dry bearings with compressed air.

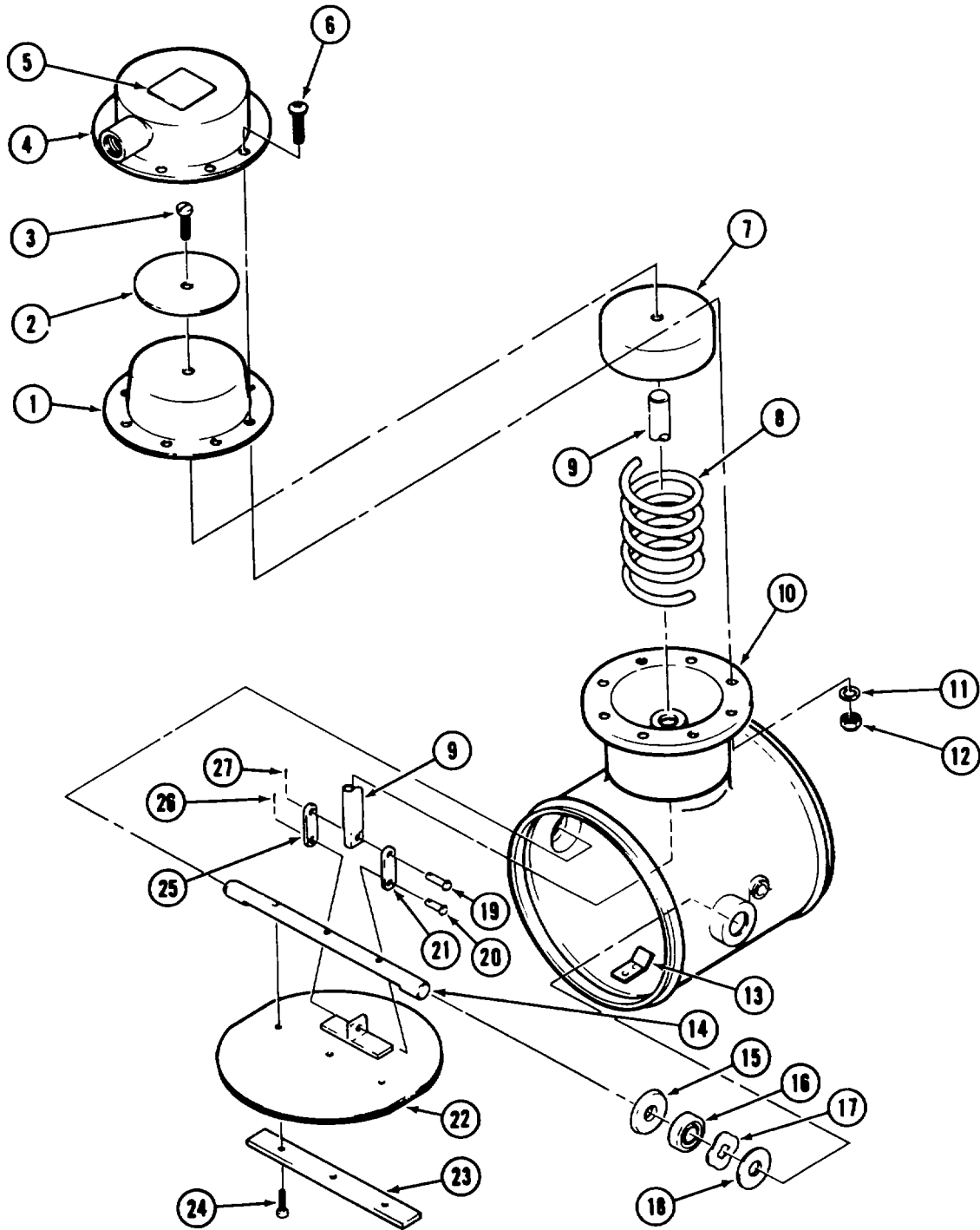
d. *Inspection.* (AVIM). Refer to figure 13-9.

- (1) Inspect cover assembly (4), for damaged threads in port.
- (2) Inspect rod end connector (9) for damaged threads and for wear. Minimum diameter is 0.370 inch.
- (3) Inspect plate (2) and cup (7) for distortion. Also check diameter of cup. Maximum outside diameter is 2.312 inches.
- (4) Inspect diaphragm (1) for tears, cracks and distortion.
- (5) Inspect spring (8) for deformation and for free length which should be 3-1/16 inch. Check spring tension. The weight required to compress the spring to 2.25 inches must be 10.4 to 12.4 pounds. The weight required to compress the spring to 0.95 inch must be 26.6 to 32.6 pounds.
- (6) Inspect holes in links (21 and 25) for wear. Manufacturing tolerance is 0.1245 to 0.1255. Center to center dimension is 0.745 to 0.755 inch. No distortion is allowed.
- (7) Inspect stiffener (23) for deformation.
- (8) Inspect butterfly (22) for distortion and wear. Minimum diameter is 4.893 inches. Minimum dimension across flats is 4.770 inches.
- (9) Inspect shaft (14) for deformation and for damaged threads. Check diameter. Minimum diameter is 0.3740 inch.
- (10) Inspect body assembly (10) for damaged bushings. No scoring is allowed. Inspect stop (13) for secure installation.
- (11) Inspect bearings (16) for galling and scoring. None allowed.
- (12) Inspect identification plate (5) for legibility and secure attachment.

e. *Repair or Replacement.* (AVIM). Do not attempt to repair any parts of the control valve. Replace any parts which fail to pass inspections described in paragraph d.

f. *Assembly.* (AVIM). Refer to figure 13-9.

- (1) Lubricate bearings (16) with lubricant (C84).
- (2) Slide shaft (14) partially into body (10) and position spacer (18), special washer (17), bearing (16), and spacer (15) on shaft in sequence illustrated. Install spacer (15) with the beveled side toward bearing (16). Position these parts in boss of body (10) and install corresponding bearing spacers and washer on opposite side.
- (3) Install links (21 and 25) on butterfly assembly (22) with pin (20) and cotter pin (27).
- (4) Position butterfly assembly on shaft (14) in same relative position illustrated so that it will be on the correct side of stop (13) when assembly is complete. Secure butterfly assembly to shaft (14) with stiffener (23) and three screws (24). Move the butterfly assembly manually to ensure that it moves freely through full range of travel.
- (5) Assemble rod end connector (9), cup (7), diaphragm (1), plate (2) and screw (3) in same relative positions illustrated. Install screw (3) snug but do not torque.



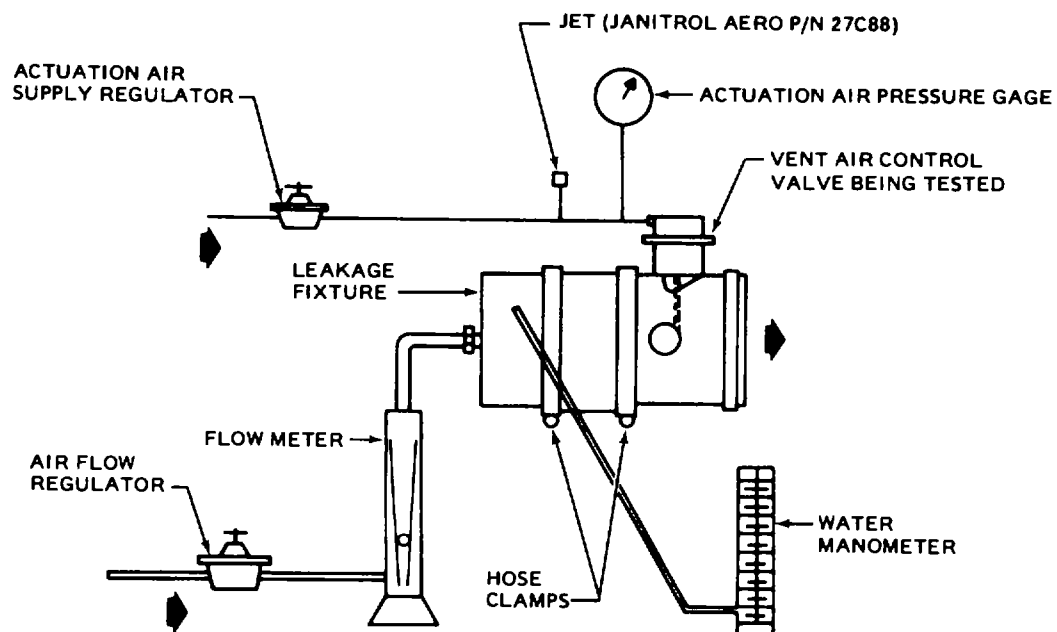
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Figure 13-9. Vent air control valve assembly (Sheet 1 of 2)

- | | |
|-------------------------|------------------------|
| 1. Diaphragm | 16. Bearing |
| 2. Plate | 17. Special Washer |
| 3. Screw | 18. Spacer |
| 4. Cover | 19. Pin |
| 5. Identification Plate | 20. Pin |
| 6. Screw | 21. Link |
| 7. Cup | 22. Butterfly Assembly |
| 8. Spring | 23. Stiffener |
| 9. Rod End Connector | 24. Screw |
| 10. Body Assembly | 25. Link |
| 11. Flat Washer | 26. Cotter Pin |
| 12. Self Locking Nut | 27. Cotter Pin |
| 13. Stop | |
| 14. Shaft | |
| 15. Spacer | |

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Figure 13-9. Vent air control valve assembly (Sheet 2 of 2)



209070-82

Figure 13-10. Vent air control valve set-up

(6) Make trial installation of parts assembled in preceding step. Align holes in diaphragm with holes in body (10) and insert three screws (6) to maintain alignment. Rotate rod end connector (9) so that it will align with links (21 and 25) and tighten screw (3). Remove diaphragm (1) and attached parts from body assembly.

(7) Position spring (8) in body assembly (10) and install diaphragm (1) with attached parts. Secure links (21 and 25) to rod end connector (9) with pin (19) and cotter pin (27). Check diaphragm to ensure that the holes line up with the holes in the body without twisting the diaphragm. Position cover assembly (4) on body assembly with threaded boss oriented with the body assembly (10) and stop (13) as illustrated. Install screws (6), washers (11) and nuts (12).

g. Testing After Repair. (AVIM). Refer to figures 13-9 and 13-10.

(1) If the test set-up shown on figure 13-10 is not available, perform functional check on helicopter after installation. Refer to paragraph h.

(2) If the test set-up shown on figure 13-10 is available, install the vent air control valve as illustrated.

(3) Adjust pressure at actuation air supply regulator to apply 7.0 ± 0.5 PSIG pressure to the vent air control valve. The butterfly assembly should move to full closed.

(4) Decrease pressure to vent air control valve to zero. The butterfly assembly should move to full open.

(5) Repeat steps (3) and (4) except apply 25 ± 1.0 PSIG pressure to the vent air control valve.

The butterfly assembly should be full open while pressure is applied and full closed when pressure is removed.

(6) Adjust pressure at the actuation air supply regulator to apply 7.0 ± 0.5 PSIG pressure to the vent air control valve and maintain pressure to keep butterfly assembly closed. Adjust air flow regulator to increase pressure until reading on the water manometer is 27.0 inches. Check the flow meter and record the leakage rate across the butterfly assembly. If the leakage rate is more than five cubic feet per minute, remove the vent air control valve from the test setup and remove one special washer (17, figure 13-9). Reassemble the vent air control valve and repeat the tests.

(7) If the vent air control valve fails to pass the tests in steps (2) through (7), forward the assembly to higher level of maintenance for disposition.

h. Installation. See figure 13-8.

(1) Thread nut (2) on union (1). Lubricate two packings lightly with hydraulic fluid (C74) or other suitable lubricant and position packings on union (1). Install union (1) on valve (10) and install regulator (4) on union (1). Do not tighten nut (2) at this time.

(2) Apply a light coat of adhesive (C18) to lower flange of valve (10). Position coupling (14) on valve. Install clamp (11) with screw, thin aluminum washer, and nut but do not tighten at this time.

(3) Place clamp (15) on duct (17) and place clamp (7) on flex duct (5).

(4) Position valve (10) in the RH side of the hydraulics component with the boss (6) uppermost as illustrated. Slide clamp (11) over bracket (12).

(5) Apply a light coat of adhesive (C18) to upper flange of valve (10). Position flex duct (5) on valve (10) and slide clamp (7) into position on the flex duct and also on bracket (8). Install screw, thin aluminum washer, and nut (6), but do not tighten at this time.

(6) Attach tube assembly (3) to regulator (4). Turn the regulator on union (1) and/or rotate valve (10) if required to obtain alignment with tube (3). Tighten nuts at each end of tube (3) and also nut (2).

(7) Check clamps (7, 11 and 15) to ensure that they are properly positioned on the ducts and valve and that the two upper clamps are positioned properly on the brackets. Tighten the nuts and screws on each of the three clamps.

(8) If the helicopter is operational, perform a functional check of the vent air control valve.

NOTE

The vent air control valve is normally open and is closed by bleed air pressure.

(a) Ground run the helicopter. Position the Rain Removal Heat (ECU) switch to off. Open one of the air outlet nozzles in the pilots compartment.

There should be a flow of air at ambient temperature. Move the ECU cool/warm selector to full warm and check temperature of air flowing from outlet by feel. Move temperature selector to full cool and check temperature of air flowing from outlet. The temperature should not change.

(b) Position the Rain Removal-heat (ECU) switch to ON. Repeat the check of temperature of air flow from outlet nozzle with the temperature selector at full warm and at full cool as outlined in step (a). The vent air control valve should be closed and the temperature of the air should change when the temperature selector is changed.

13-7. Ventilating Ducts.

- a. *Inspection.*
 - (1) Ducting and insulation for damage, chafing or leakage.
 - (2) Clamps and connections for security and for leakage around clamps.
 - (3) Intake screen for obstruction.
- b. *Removal.* Remove insulation, attaching hardware and/or clamps and remove components.
- c. *Repair or Replacement.*
 - (1) Replace damaged or leaking ducts.
 - (2) Clean intake screen if clogged, using compressed air.
 - (3) Tighten clamps or connection if loose or leaking.
 - (4) Repair insulation if torn or damaged.
- d. *Installation.*
 - (1) Position ducts and secure with hardware and/or clamps.

CAUTION

When installing ducts, insure that adequate clearance exists between the ducts and the cyclic control tubes to allow free movement over the full travel range of the tubes.

- (2) Install insulation and secure with tape.

13-8. Flapper Valve. Refer to figure 13-1.

A flapper valve, located in an outlet duct (figure 13-1), is operated by a cable control from the pilot's instrument panel to regulate amount of air entering the distribution system. When fully closed, all air to crew compartment is shut off, except to pilot's seat cushions.

- a. *Removal.*
 - (1) Remove cotter pin, washer and pin from control arm of flapper assembly (8), and control cable clevis.
 - (2) Remove four screws securing flapper assembly (8) to duct (7). Remove flapper assembly from duct.
- b. *Inspection.*
 - (1) Flapper valve in duct (7) for freedom of operation and range of travel from fully open to completely closed.
 - (2) Control cable for damage, security and freedom of operation.
- c. *Repair and Replacement.*
 - (1) Replace flapper valve if damaged or unserviceable.
 - (2) Replace control cable if damaged or unserviceable.
- d. *Installation.*
 - (1) Position flapper valve (8) in duct (7).
 - (2) Secure flapper valve (8) to duct (7) with four screws.
 - (3) Check for freedom of movement of the flapper valve.
 - (4) Attach control cable to control arm of flapper valve. Adjust cable to ensure full travel of flapper valve to close and open position.

13-9. Heat Exchanger Reheater Condenser.

- a. *Inspection.*
 - (1) For damage or leaks in ducts, brackets, pans and headers: No deterioration, cracks, or loose bonded joints allowed.

(2) Core for damage.

CAUTION

Avoid use of any of the ketone family solvents. They will attack the polycarbonate materials.

Change 14 13-24A/(13-24B blank)

b. Repair or Replacement.

(1) Repair minor damage to polycarbonate plastic items as follows:

(a) Stop drill cracks with a number 30 drill.

(b) Fabricate a patch from material (C98). Form the material to nest over the damaged area with a 0.75 inch overlap.

(c) Lightly sand the mating surfaces of the part to be repaired and the patch with 300 grit sandpaper (C112). Wipe clean areas with a clean cloth. Do not use solvents.

(d) Mix adhesive (C21) and apply to repair patch mating surface. Place patch on repair area and apply 5 to 20 psi pressure during cure cycle of seven days at 70 to 80°F or two hours at 160°F.

(e) After cure of adhesive apply a coat of Lexcote (C83).

(2) Repair damage or leaks in ducts, pans, brackets, and headers.

(3) Replace ECU if core is damaged or leaking.

c. Test.

(1) Perform pressure decay test.

NOTE

Perform test on helicopter if possible. The equipment required to perform pressure decay test is as follows: pressure gage (0-150 PSIG, and pneumatic source (150 PSIG).

(2) Block bleed air outlets. Attach a gage of 0-150 PSIG.

(3) Apply 100 PSIG pressure and hold. The pressure should not decay below 40 PSIG within one minute.

13-10. Temperature Control Sensor. Refer to figure 13-2.

a. Removal

(1) Disconnect electrical wiring from control/sensor.

(2) Remove hardware attaching temperature control/sensor (3) to recirculated air inlet duct (4) and lift control/sensor from duct.

b. Inspection. Visually inspect for cracks, dents, external damage, and faulty operation.

c. Repair and Replacement. Replace control/sensor if externally damaged or inoperative.

d. Test. Return to higher maintenance level for testing, repair or overhaul.

e. Installation.

(1) Position temperature control sensor (3) on recirculated air inlet duct (4) and secure with attaching hardware.

(2) Connect electrical plug.

13-11. Temperature Control Valve. Refer to figures 13-2 and 13-6 and 13-7.

Premaintenance requirements for temperature control valve

Condition	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	None
Test Equipment	Gage (0-25 PSIG) Milliammeter (0-150MA.) Flow control gate valve.
	Regulated pressure source of 15 to 16 PSIG.
	Pneumatic source (50 PSIG @ 20 lbs. per minute.) Variable VDC source (0-28 VDC).
Support Equipment	None
Minimum Personnel Required	One
Consumable Materials	None
Special Environmental Condition	None

a. *Removal.* Refer to figure 13-2.

- (1) Disconnect electrical plug from torque motor.
- (2) Remove attaching hardware and disconnect duct at inlet air port.
- (3) Remove attaching hardware and disconnect duct at outlet air flow port.
- (4) Disconnect tube at regulated pressure supply port.
- (5) Remove hardware attaching valve to bracket. Remove valve from helicopter.

b. *Inspection.*

- (1) All threads on parts for damage, crossing, cracks or breakage.
- (2) Check all valve parts for excessive wear or damage.

c. *Repair or Replacement.*

- (1) Replace valve if damaged, crossed, cracked or broken threads are found.
- (2) Replace valve if excessive leakage is detected or seat is damaged.

d. *Testing.* (AVIM). Refer to figures 13-11 and 13-12.

NOTE
Deleted

- (1) Connect a pressure gage (0-25 PSIG) to the test port (4, figure 13-11). Plug opposite port.
- (2) Connect a controlled pressure of 15 to 16 PSIG to the torque motor inlet (2).
- (3) Connect a pneumatic source of 32 to 38 PSIG with maximum flow of 14.5 to 15.5 lbs per minute.
- (4) Connect a variable source of 28VDC to pins L and M of the torque motor (1). Slowly increase current until the valve starts to open and a flow is observed. The actuation pressure on the gage should read 4 to 6 PSIG.
- (5) Slowly increase current until valve strokes full open. The actuation pressure on the gage should read 14 PSIG minimum.
- (6) Remove voltage supply from torque motor.
- (7) Increase inlet pressure. Check for excessive leakage. Check valve seat for damage or obstruction causing excessive leakage.

NOTE
A small amount of leakage is acceptable.

- (8) Decrease inlet pressure to zero and disconnect pressure source.
- (9) Disconnect pressure gage.
- (10) Disconnect pneumatic source.
- (11) Replace the temperature control valve if it does not operate within limits noted in paragraph d, testing.

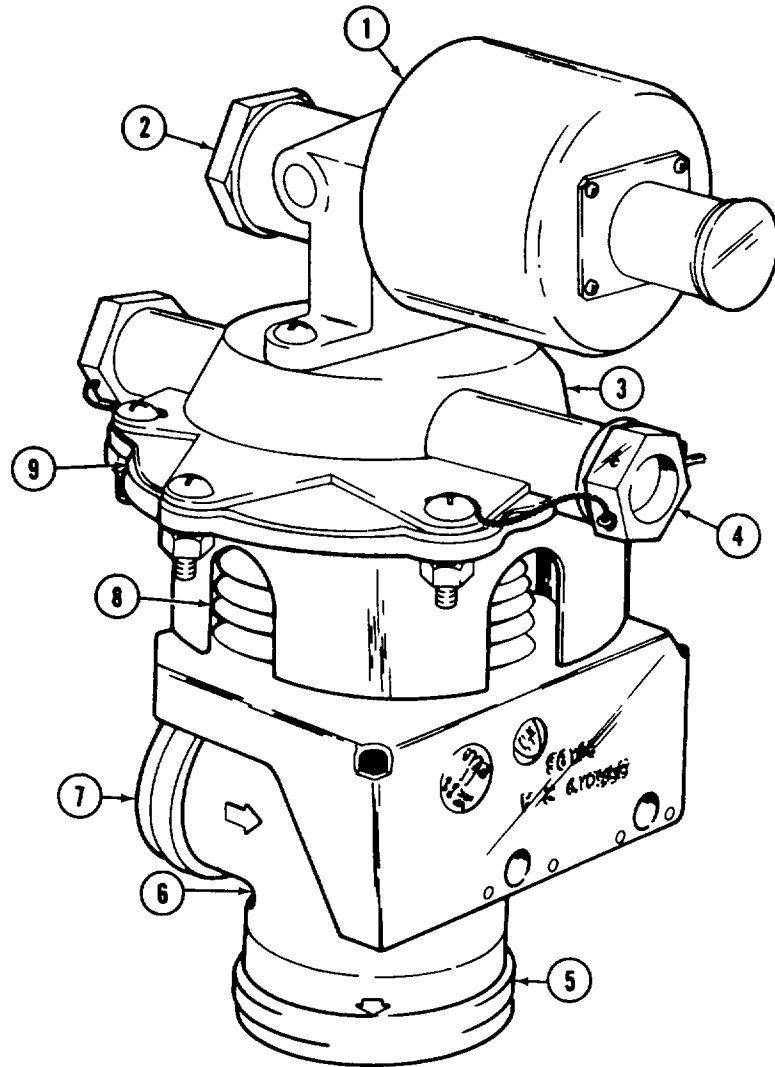
e. *Installation.* Refer to figure 13-2.

- (1) Position valve and secure to bracket with attaching hardware.
- (2) Connect tube to regulated pressure supply port.
- (3) Position duct to inlet air port and secure with attaching hardware.
- (4) Position duct to outlet air port and secure with attaching hardware.
- (5) Connect electrical plug to torque motor.

13-12. Torque Motor.

The torque motor is attached to the upper part of temperature control valve. As the electrical power to the torque motor is increased, the valve will start to open and allow the passage of air.

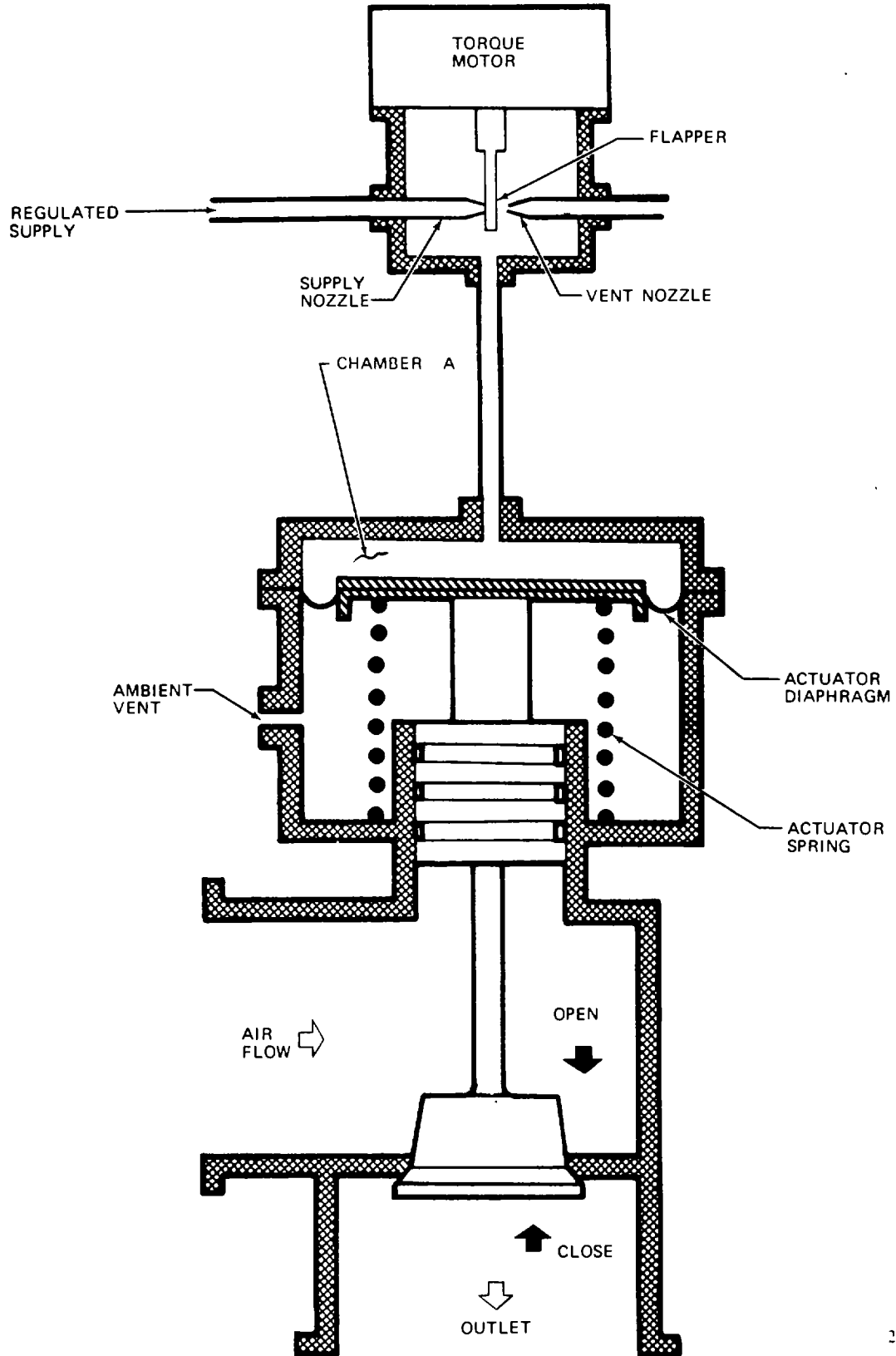
- a. *Inspection.* Inspect torque motor for damage and security.
- b. *Removal.* Refer to paragraph 13-11.



- | | | |
|------------------------|--------------------|-------------------|
| 1. Torque Motor | 4. Test Port | 7. Air Flow Inlet |
| 2. Torque Motor Inlets | 5. Air Flow Outlet | 8. Closing Spring |
| 3. Actuator Cover | 6. Valve Body | 9. Diaphragm |

209704-2

Figure 13-11. Temperature control valve



209704-3

Figure 13-12. Temperature control valve schematic

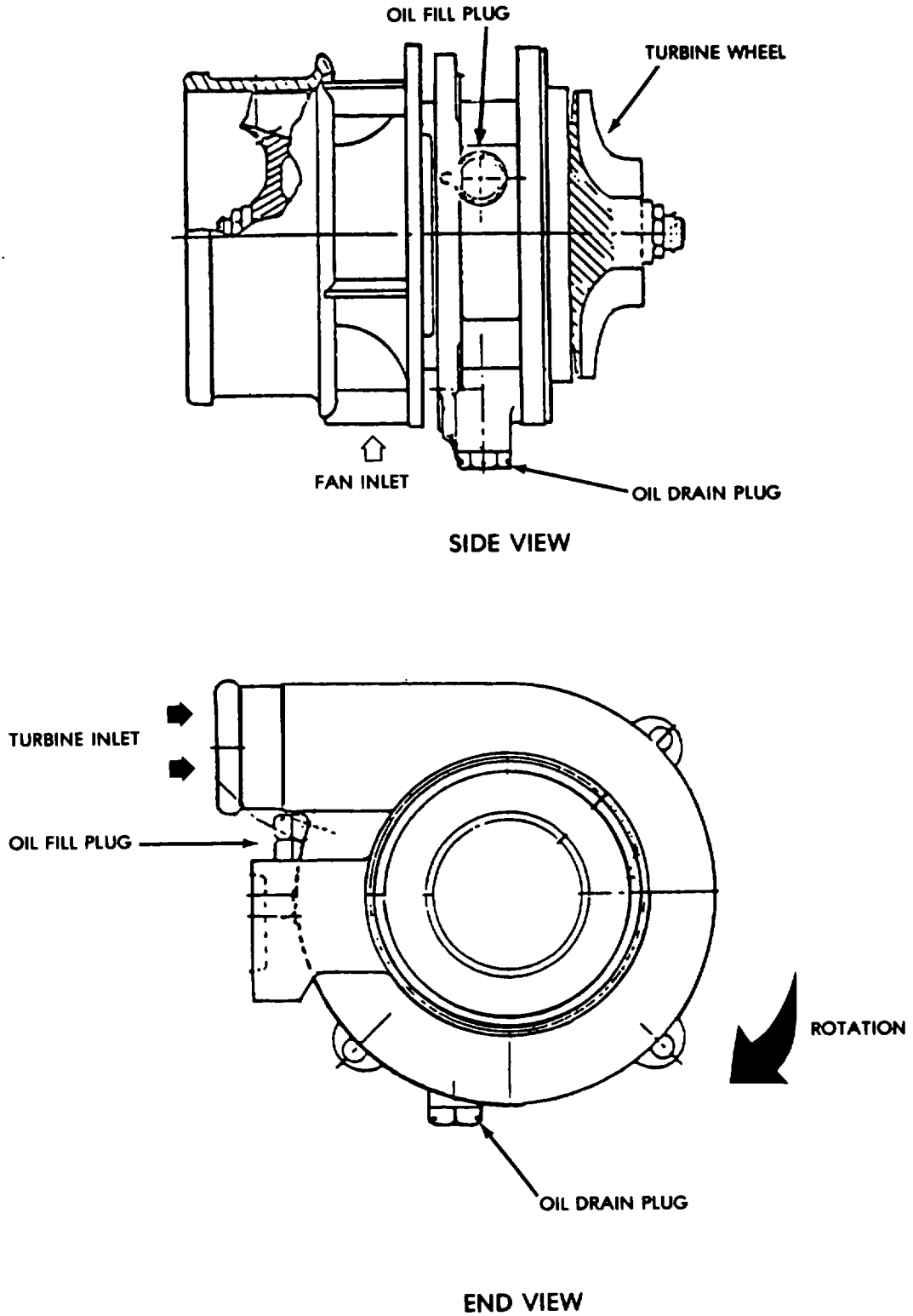


Figure 13-12A. ECU Cooling Turbine Lubrication

Change 14 13-28A/(13-28B blank)

(1) Remove temperature control valve. Refer to figure 13-2.

(2) Remove torque motor from temperature control valve.

c. Cleaning.

WARNING

Use solvent (C124) in a well ventilated area. Avoid prolonged breathing of vapors and do not use in an area with open flame or high temperature.

(1) Clean torque motor with solvent (C124).

(2) Dry with a clean lint-free cloth.

d. Inspect. Inspect torque motor for damage.

e. Repair or Replacement. Replace torque motor if it is damaged or fails to meet inspection requirements.

f. Installation. Position torque motor on temperature control valve and secure. Refer to figure 13-2.

13-13. Expansion Cooling Turbine. Refer to figure 13-1 and figure 13-2.

a. Removal. Refer to figure 13-1 and 13-2.

(1) Remove environmental control unit (ECU) (6), from helicopter.

(2) Remove expansion cooling tubing (8) from ECU.

b. Inspection. Inspect the expansion cooling turbine for the following.

(1) Inspect for unusual noises while operating.

(2) Inspect for binding rotating assembly, rough operation, or binding bearings, and rubbing of turbine blades in scroll.

(3) Do not perform any maintenance on the expansion cooling turbine except the inspection listed in steps (1) through (2).

c. Repair or Replacement. Replace expansion cooling turbine that fails to meet inspection requirements.

d. Lubrication.

(1) Remove filler plug (figure 13-12A).

(2) Add approximately 50cc of lubricating oil (C93 or C94).

(3) Allow two minutes for oil wicks to become saturated.

(4) Remove drain plug. Allow excess oil to drain out.

CAUTION

Excess oil drained from turbine must not be reused.

(5) Install drain plug and filler plugs. Tighten and safety with lockwire (C151).

(6) Insert wires into housing if protruding. Wires are utilized for functional test of turbine.

e. Installation. Install expansion cooling turbine (8) in ECU and secure. Refer to figure 13-2.

NOTE

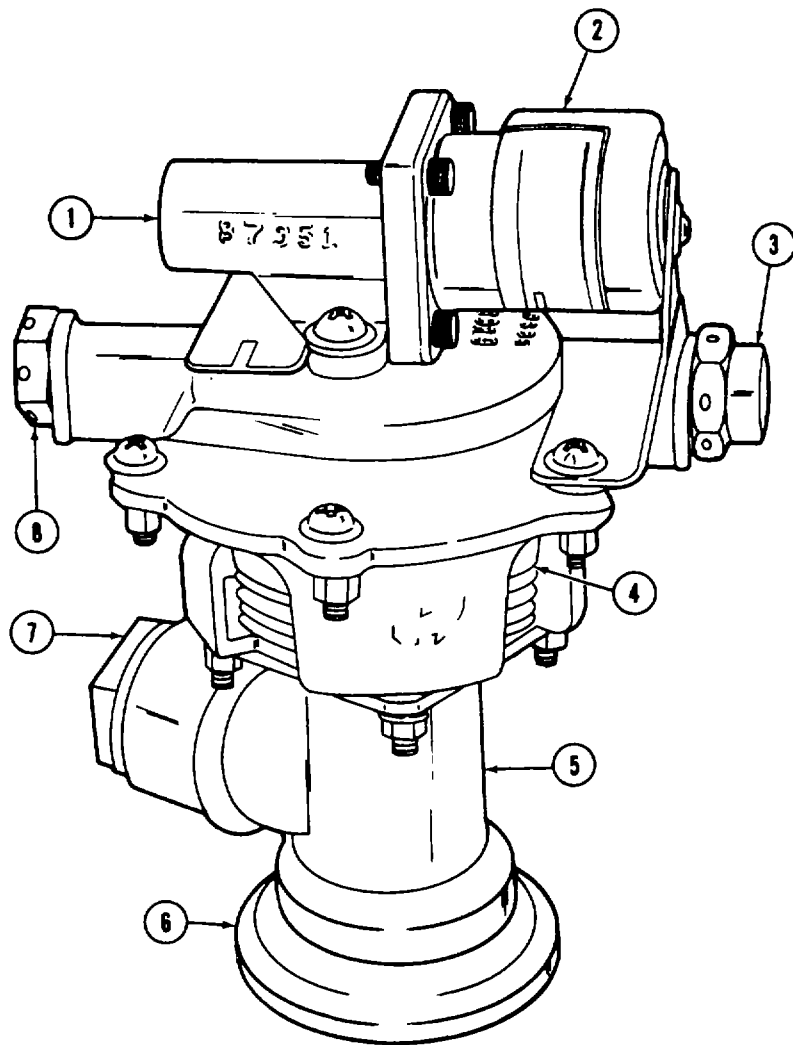
Refer to paragraph 13-13d for lubrication instructions prior to installation.

13-14. Pressure Regulating and Shutoff Valve. Refer to figures 13-13 and 13-14.

The pressure regulating and shutoff valve is located in the engine compartment and limits the flow of bleed air to the ECU and also acts as an ON-OFF valve for the ECS.

Premaintenance requirements for pressure regulating and shutoff valve.

Condition	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	None
Test Equipment	Gage (0-25 PSIG) Flow control gate. 28 VDC Power source. Pneumatic source (60 PSIG at 20 lbs per minute.)



209704-4

- | | | |
|-----------------|--------------------|-------------------|
| 1. Supply Inlet | 4. Closing Spring | 7. Air Flow Inlet |
| 2. Solenoid | 5. Valve Body | 8. Test Port |
| 3. Relief Valve | 6. Air Flow Outlet | |

Figure 13-13. Pressure regulator and shutoff valve

Condition	Requirements
Support Equipment	None
Minimum Personnel Required	Two
Consumable Materials	(C124)
Special Environmental Condition	None

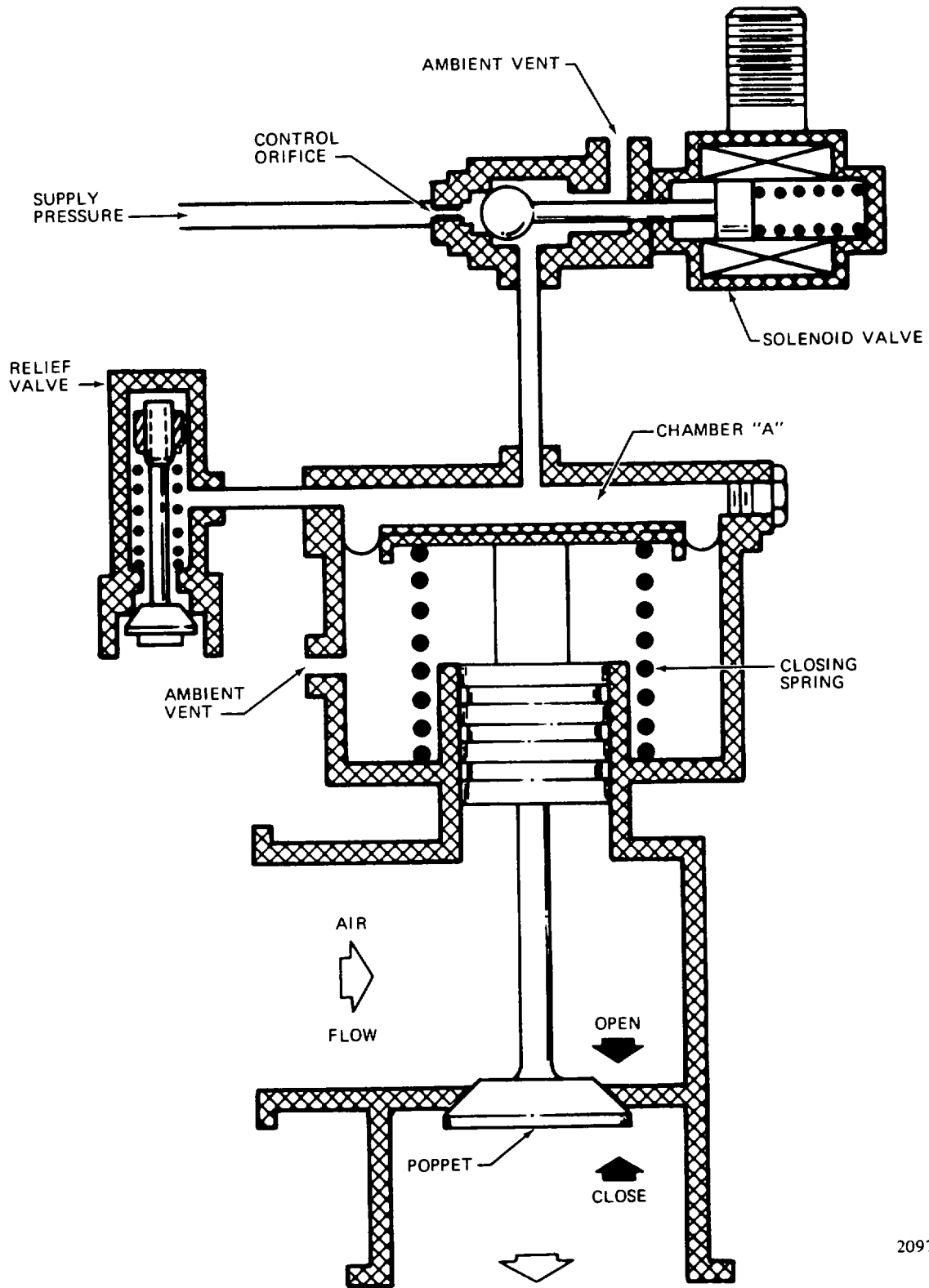
a. *Removal.*

(1) Open engine cowling on left side, and disconnect electrical plug from solenoid.

(2) Remove hardware and disconnect supply pressure inlet tube.

(3) Remove hardware and disconnect duct from inlet air port.

Change 16 13-30A/(13-30B blank)



209704-5

Figure 13-14. Pressure regulator and shutoff valve schematic

- (4) Remove hardware and disconnect outlet tube from valve port.
- (5) Remove hardware attaching valve to bracket. Remove valve.

b. Cleaning.

WARNING

Use solvent (C124) in a well ventilated area. Avoid prolonged breathing of vapors and do not use in an area with open flame or high temperature.

- (1) Clean pressure regulator and shutoff valve with solvent (C124).
- (2) Wipe dry with a clean lint-free cloth.

c. Inspection.

- (1) Visually inspect all threaded parts for crossed, broken or cracked threads.
- (2) Inspect for excessive wear or damage and leaking.

d. Repair or Replacement.

- (1) Replace valve if damaged, cracked, crossed or broken threads are found.
- (2) Replace valve if excessive leakage is detected or seat is damaged. (Refer to troubleshooting chart for operational check.)

e. Testing. (AVIM) Refer to figures 13-13 and 13-14.

NOTE

Perform all tests on helicopter if possible. Equipment required for testing the pressure regulating and shut off valve is listed in the premaintenance requirements.

- (1) Connect regulated air to supply inlet (1, figure 13-13.)
- (2) Connect pressure gage (0.25 PSIG) to test port (8).
- (3) Apply 28V DC power to pins 3 and 6 to energize solenoid (2). Confirm that solenoid shifts position by audible click when the power is applied.
- (4) Increase inlet pressure to 20 PSIG.
- (5) If valve fails to stroke open, replace solenoid (2).
- (6) Actuator head pressure should be between 7 to 8 PSIG. Relief valve (3) should relieve at 7 to 8 inch-pounds. If pressure exceeds 8 inch-pounds or no valve action is seen, replace relief valve.
- (7) Set down stream flow control gate to flow maximum of 14.5 to 15.5 lbs. per minute at 35 PSIG during test.
- (8) Reduce inlet pressure to 40 PSIG. Valve should regulate to 32 to 38 PSIG. If valve fails to regulate, replace valve.
- (9) De-energize solenoid (2). Valve should close.
- (10) Energize solenoid (2). Valve should open and regulate 32 to 38 PSIG.
- (11) De-energize solenoid (2) and increase inlet pressure. Check for leakage. Check valve seat for damage or obstruction causing excessive leakage.

NOTE

Some leakage is acceptable.

- (12) Decrease inlet pressure to zero and disconnect from valve.
- (13) Disconnect pressure gage.
- (14) Disconnect electrical power source.
- (15) Replace pressure regulating and shutoff valve if it fails to meet the inspection requirements.

f. Installation.

- (1) Position valve to bracket and secure with attaching hardware.
- (2) Position tube to outlet port of valve and secure with attaching hardware.

- (3) Position duct to inlet port of valve and secure with attaching hardware.
- (4) Connect electrical plug to solenoid of valve.
- (5) Install engine cowling on left side of helicopter.

13-15. Pressure Regulating and Shutoff Valve Solenoid. Refer to figure 13-13.

The solenoid is mounted on top of the pressure regulating and shutoff valve. Electrical current energizes the solenoid allowing the valve to control supply bleed air pressure.

a. Inspection. Inspect the pressure regulating and shutoff valve solenoid for faulty operation, connector condition, and for security and damage.

b. Repair or Replacement. Replace pressure regulating and shutoff valve for faulty operation and if damaged.

13-16. Pressure Regulating and Shutoff Valve Relief Valve. Refer to figure 13-13.

The pressure relief valve is installed in a port of the actuator cover of the pressure regulating and shutoff valve and is designed to relieve excessive pressure.

a. Inspection. Inspect pressure regulating and shutoff valve relief valve for faulty operation and security. Refer to troubleshooting chart of ECS for functional check.

b. Repair or Replacement. Replace pressure regulating and shutoff valve relief valve if it fails to meet inspection requirements.

13-17. Thermal Probe Switch

A thermal probe switch is installed in a duct in the outlet side of the ECU to prevent excessively hot air from entering the distribution system. If excessive heat reaches the overheat switch, the switch opens, actuating the solenoid valve to shut off the flow of bleed air to the ECU.

a. Removal. Remove electrical wiring. Remove thermal switch (28, figure 13-1) and packing (29) from duct.

b. Inspection. Inspect thermal switch for corrosion and condition.

c. Repair or Replacement Replace switch if it fails to meet inspection or operational requirements.

d. Installation. Place packing (29) on thermal probe switch (28) and install switch in duct. Connect electrical wiring.

13-18. Air Distribution Pressure Regulator Valve Solenoid Filter . Refer to figure 13-15.

The solenoid filter is located in the supply pressure port of the solenoid valve. The purpose of the filter is to filter supply air to the pressure solenoid.

a. Removal. Remove the pressure supply line and remove filter assembly from solenoid.

b. Cleaning. Disassemble filter and clean with solvent (C124). Dry with compressed air.

c. Inspection. Inspect filter for cleanliness and deformation. Reassemble filter.

d. Installation. Install filter assembly into solenoid and connect air supply line.

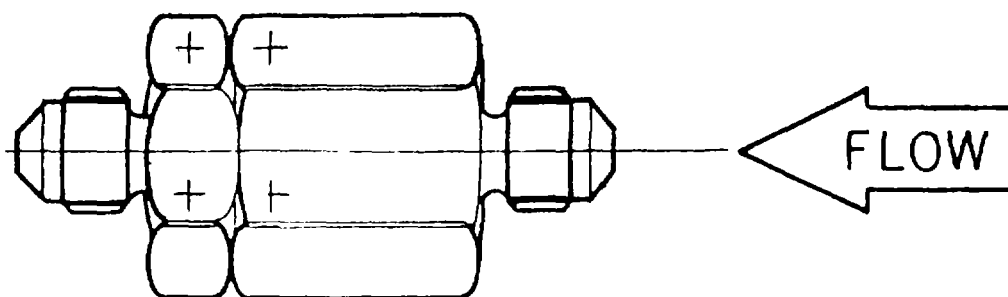


Figure 13-15. Air Distribution Pressure Regulator Valve Solenoid Filter

CHAPTER 14
HOISTS AND WINCHES

Not Applicable

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CHAPTER 15
AUXILIARY POWER PLANTS

Not Applicable

15-1/15-2 blank)

CHAPTER 16

MISSION EQUIPMENT

16-1. Turret Weapons Subsystem.

The AH-1S (MOD) helicopter is provisioned for the M28A1E turret weapons subsystem. The turret configuration is a 7.62 MM weapon on the right and 40 MM weapon on the left. The system consists of a control panel, a feed system and electronic components, a M73 reflex pilots sight and control panel. All necessary electrical and hydraulic disconnects are installed on the aft side of the forward ammunition compartment. Auxiliary equipment XM128 helmet sight subsystem (HSS) and the turret control portion of the stabilized telescopic sight (TSU) of the XM65 TOW missile subsystem complete this unit.

Helmet Sight Subsystem. The Helmet Sight System (HSS) is designed to interface with the M28A1E1 turret and the stabilized telescopic sight (TSU) of the XM65 TOW Missile Subsystem. The subsystem operates from the helicopter ac and dc power supply. Refer to TM 55-1520-234-10 for authorized armament configurations. The (HSS) consists of two helmet sight assemblies, one for each pilot and gunner, mounted on the SPH-4 helmets; two linkage assemblies, one each pilot and gunner, mounted to the cockpit left canopy side frame; and an electronic assembly mounted on the rear cockpit bulkhead. For maintenance information on the XM128 (HSS) refer to TM 9-1270-212-14.

16-2. Pilots Reflex Sight.

The pilots reflex sight assembly M73 is located above the pilots instrument panel. It provides an illuminated projected reticle image for the pilots use when firing the wing stores or turret weaponry from a target collision course. For the wing stores, the pilot uses the elevation/depression knob and ballistic data cards for obtaining ballistic information. For turret weaponry the range potentiometer is used for super elevation. For operation, servicing and overhaul instructions refer to proper technical manual.

a. *Removal.* Remove pilots reflex sight M73. Remove in accordance with instructions in TM 9-1090-203-12.

b. *Inspection.*

(1) Inspect for secure installation.

(2) Inspect reflex sight for damaged components. Visually inspect the body and lens for condensation and moisture.

c. *Repair or Replacement.* Replace reflex sight M73, if fog or condensation is found in the interior of body and lens assembly. Refer to TM 9-1090-203-12.

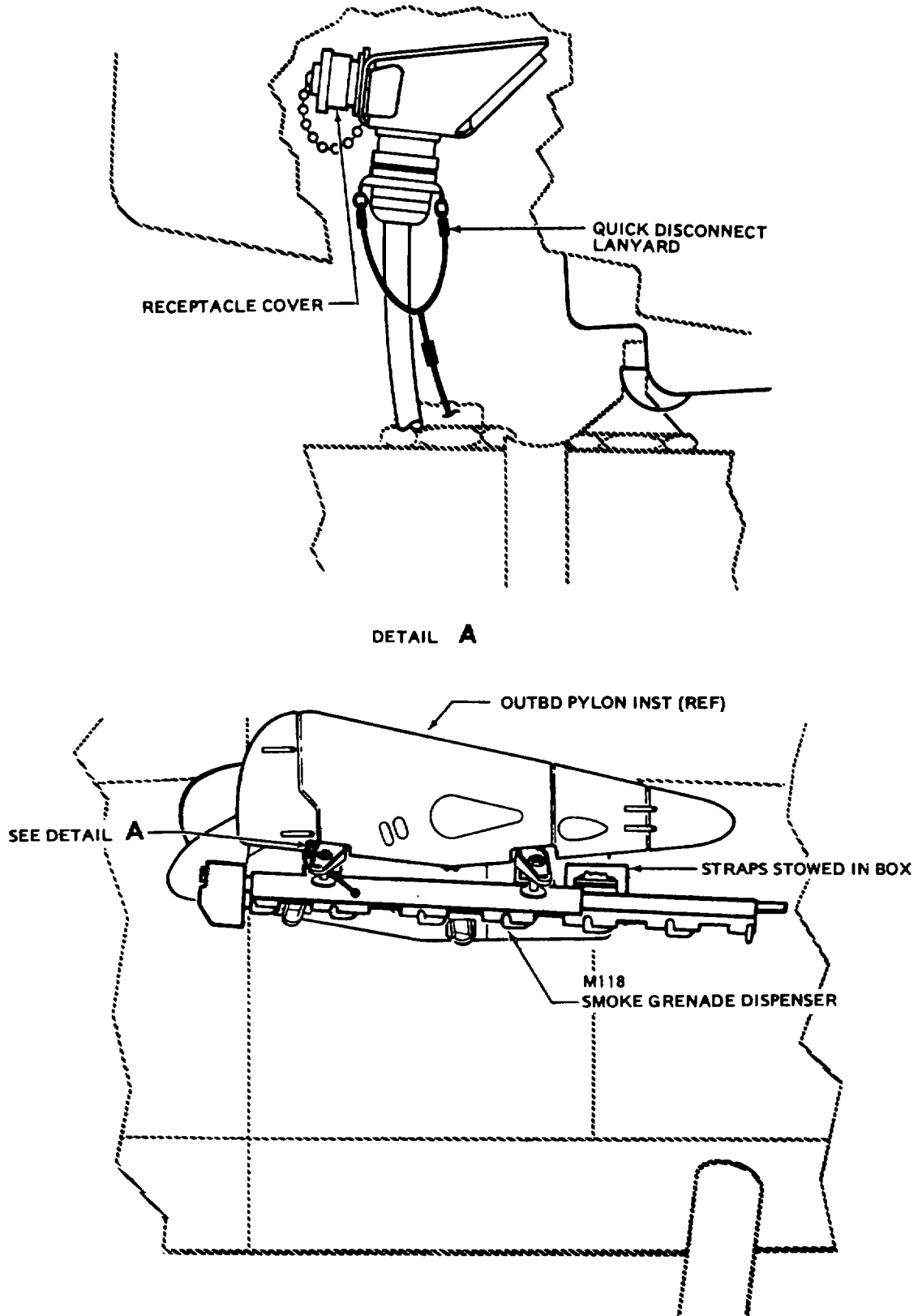
d. *Installation.* Install reflex sight M73.. Refer to TM 9-1090-203-12.

16-3. Wing Mounted Smoke Grenade Dispenser . Refer to figure 16-1.

The AH-1S helicopter is equipped for installation of smoke grenade dispensers at the outboard ejector rack or beneath the rocket launcher. Each dispenser is capable of holding and ejecting 12 smoke grenades, six each of four different colors when two racks are installed. Grenades may be ejected singly, in pairs, or four of different colors simultaneously. Arming switches for grenade dispensers are located on pilots wing stores smoke grenade launcher control panel. Release switch is located in pilots collective stick control head. Dispensers may be mounted on the outboard ejector rack or, as an alternate method, attached to the bottom of M158, or M200 rocket launcher with nylon straps. The dispensers are jettisonable by use of wing stores jettison system if installed on ejector rack. If attached to rocket launcher, it will jettison when rocket launcher is jettisoned. The pull type, breakaway electrical connection disconnects from the wing receptacle as the dispenser separates from the wing. The dispensers weigh approximately 16 pounds each without grenades.

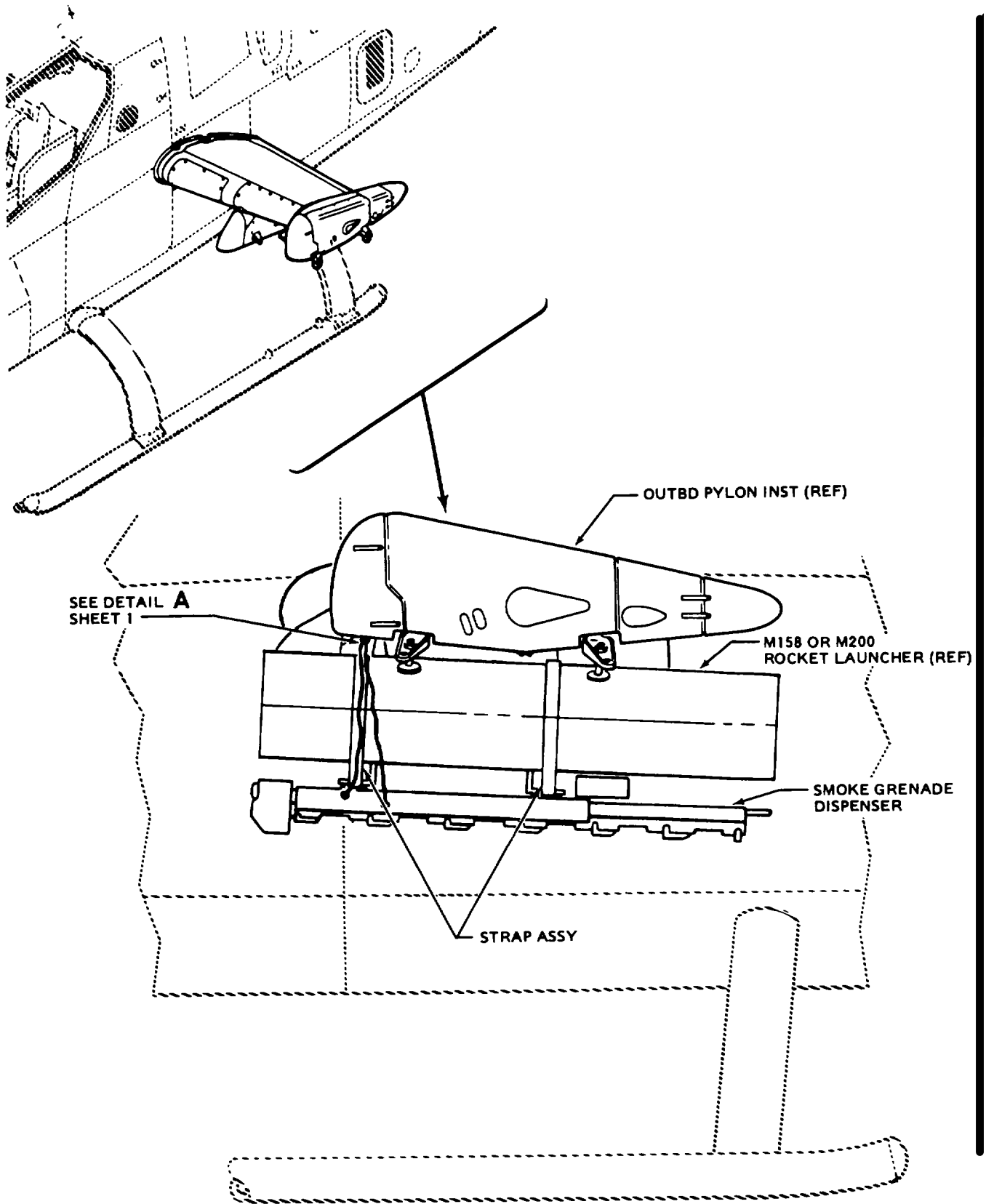
a. *Removal.*

(1) If dispenser is attached directly to ejector rack, disconnect and stow electrical cable inside dispenser. Install cover on wing receptacle. Support dispenser, remove ground safety pin (T72)



209071-353-1A

Figure 16-1. M118 wing mounted smoke grenade dispenser (Sheet 1 of 2)



209071-353-2A

Figure 16-1. M118 wing mounted smoke grenade dispenser (Sheet 2 of 2)
Change 2 16-3

and open rack hooks with rack release wrench (T71) and remove dispenser.

(2) If dispenser is attached to M158, or M200 rocket launcher, disconnect and stow electrical cable. Install cover on wing receptacle. Support dispenser and remove attaching straps. Stow straps in box provided on top of dispenser.

b. Inspection. Refer to TM 9-1330-208-25.

(1) Inspect smoke grenade dispenser for security of attachment when installed. Refer to TM 9-1330-208-25 for additional instructions.

(2) Inspect electrical components in accordance with Chapter 9, paragraph 9-4b.

c. Repair or Replacement.

(1) Repair damaged or unserviceable grenade dispensers. Refer to TM 9-1330-208-25.

(2) Repair or replace electrical components in accordance with the instructions in Chapter 9, paragraph 9-4d.

d. Installation. Refer to figures 16-2 and 16-3.

(1) If dispenser is to be attached to the ejector rack:

(a) Remove ground safety pin (T72) and use rack release wrench (T71) to open hooks on ejector rack. Refer to paragraph 16-4b.

(b) If cradle assemblies are not in stow position on dispensers proceed as follows:

1. Remove screws attaching cradle assembly to attaching lug (figure 16-2). Reposition cradle assemblies in stow position (cradle down) on grenade dispenser (with stowage clips aft).

2. Install attaching screws in forward cradle assembly with screw heads aft.

3. Install attaching screws in aft cradle assembly with screw heads forward.

4. Install two standoff assemblies on each cradle assembly as shown in figure 16-2, with two screws (one each standoff) (MS270391-11) and two washers (AN960PD10).

5. Install screw (MS27039-1-11) and washer (AN960PD10) in open holes of standoff assemblies.

(c) Engage attachment lugs of dispenser in ejector rack hooks, and close hooks with wrench (T71). Install safety pin (T72).

(d) Screw sway braces of rack evenly against dispenser pads and torque **50 TO 70** inch-pounds. Tighten jamnuts.

(2) If dispenser is to be attached to M158, or M200 rocket launcher:

(a) Remove attaching straps from storage box on top of dispenser.

(b) If cradle assemblies are not in position for installation on rockets proceed as follows:

1. Remove screws attaching cradle assembly to attaching lug (figure 16-3). Position cradle assemblies in up position on grenade dispenser (with stowage clips aft).

2. Install attaching screws in forward cradle assembly with screw heads aft.

3. Install attaching screws in aft cradle assembly with screw heads forward.

4. Install two standoff assemblies on each cradle assembly as shown in figure 16-3 with four screws (two each standoff) (MS27039-1-11) and four washers (AN960PD10).

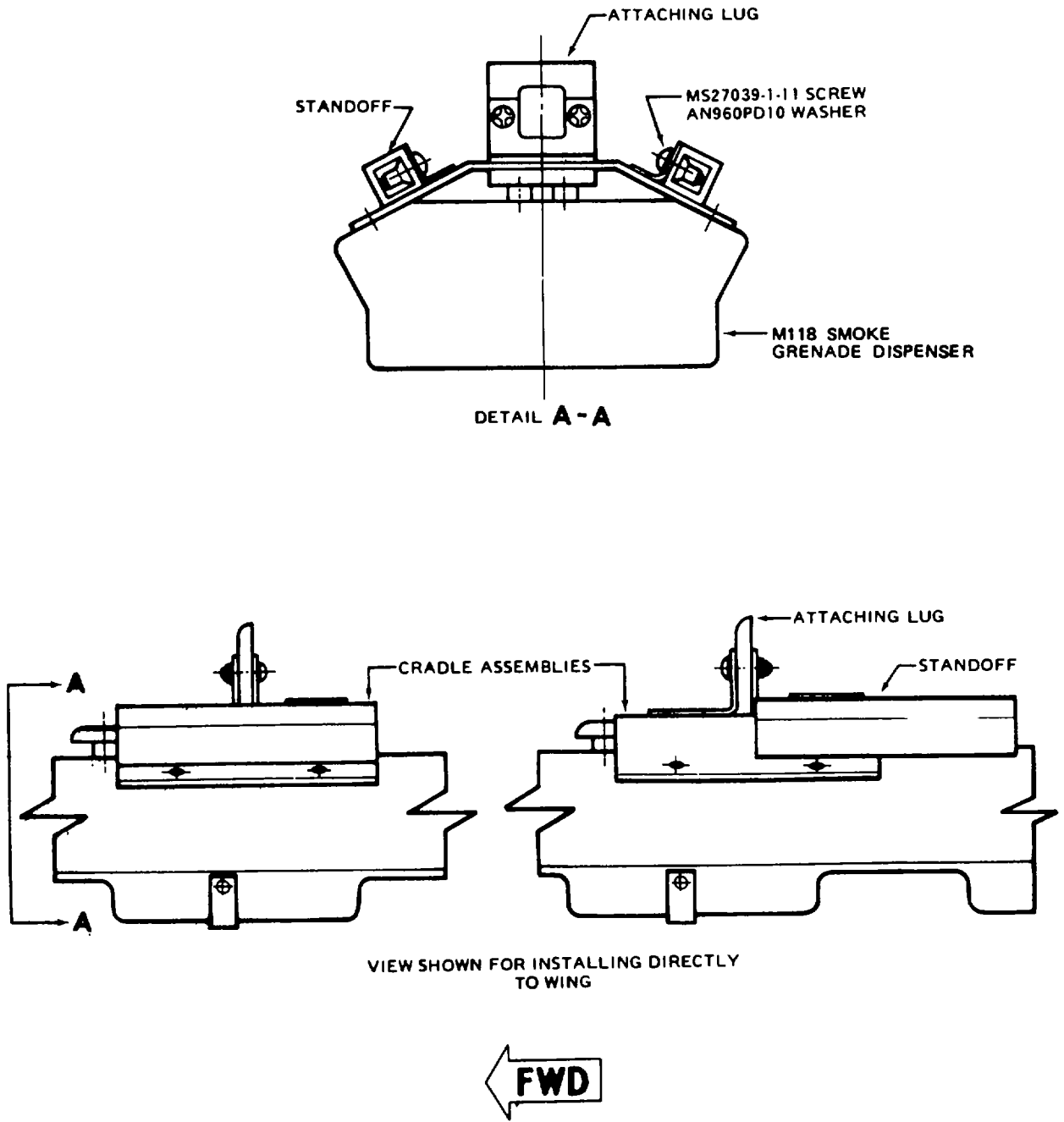
(c) Position dispenser against bottom of rocket launcher and install straps.

(3) Remove cover from electrical receptacle on leading edge of wing and stow on dummy receptacle. Connect cable from dispenser. Stow excess cable and lanyard inside dispenser.

(4) Perform functional test of dispenser. (Refer to Chapter 9, paragraph 9-88.)

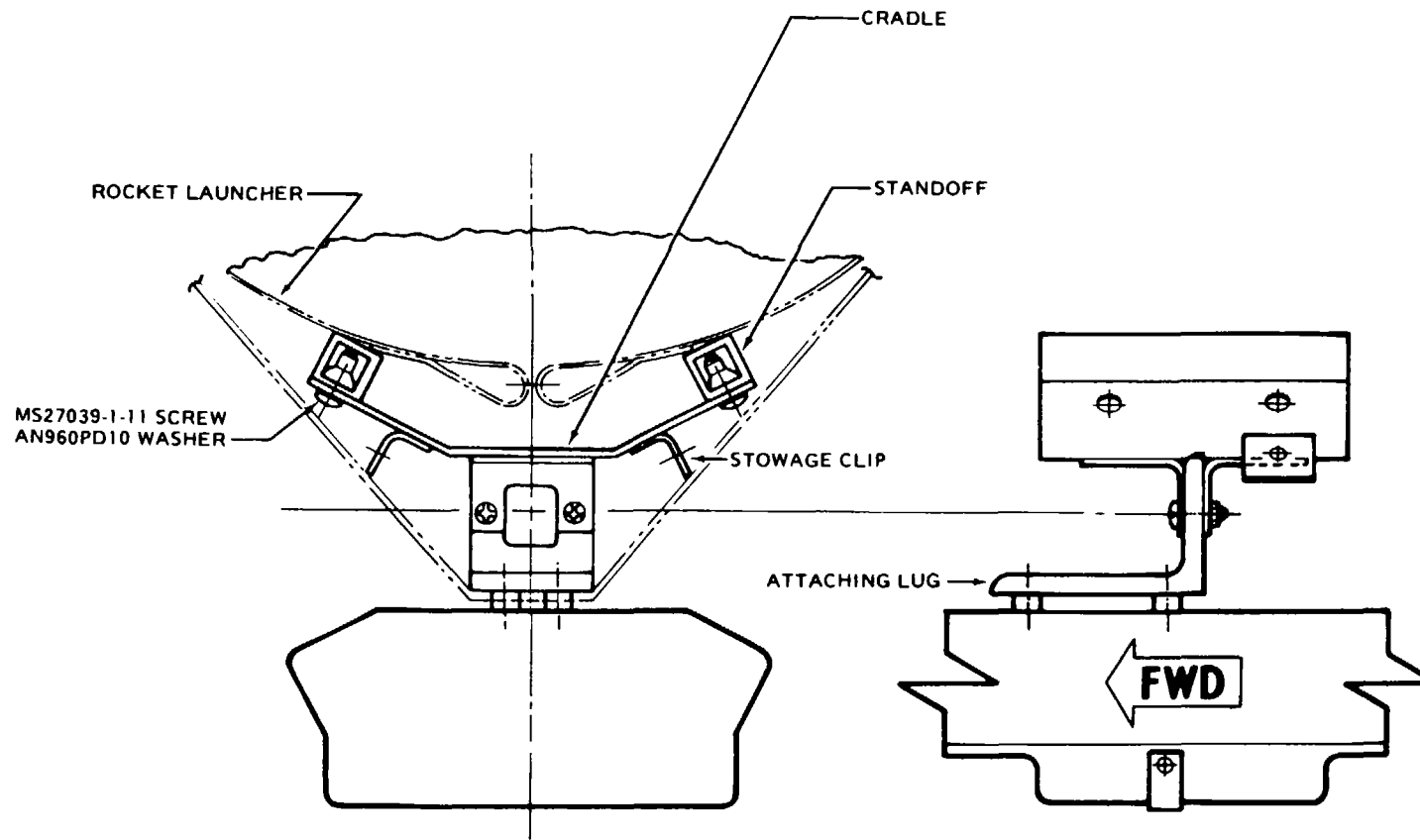
e. Troubleshooting. Refer to Chapter 9, paragraph 9-89, for smoke grenade dispenser circuitry.

16-4. Ejector Racks. Refer to figure 16-4 through 16-11; paragraph 16-6, for outboard racks and paragraph 16-8 for inboard racks.



209071-112A

Figure 16-2. Cradle assemblies in stow position for installation on outboard rack



VIEW SHOWING INSTALLATION OF M118 SMOKE GRENADE ROCKET LAUNCHER

209071-113B

Figure 16-3. Cradle assemblies in position for installation on rocket launcher
Change 2 16-6

Wing stores pylons consist of four ejector racks mounted with support fitting on the wings and covered by fairings. Each rack has a pair of hooks for attachment of an armament pod or other stores and incorporates a cartridge fired ejector device for emergency jettison of stores.

WARNING

All ground safety pins must be removed before flight. Failure to do so will prevent jettison in an emergency.

Remove jettison cartridges from pylon stores ejection device prior to placing aircraft in a hangar to prevent injury to personnel and damage to equipment.

Exception: Removal is not necessary when aircraft is to be stored in hangar for short-term, providing both circuit breakers are open, ground safety pins installed, jettison switches are OFF, and warning signs indicate that aircraft has an armed jettison system.

a. *Troubleshooting.* Refer to table 16-1.

Impulse cartridges shall be installed prior to loading ammunition/miles system, or when wing stores must be jettisoned to achieve an operational limitation.

Table 16-1. Troubleshooting - Ejector Racks

NOTE

Before using this table, be sure all normal operation checks have been performed.

CONDITION

TEST OR INSPECTION

CORRECTIVE ACTION

1. With WING STORES JETTISON circuit breaker closed, the appropriate wing stores are not jettisoned when WG ST JETTISON select switch is positioned to either INBD or OUTBD, and pilots WING STORES JETTISON switch is positioned to up position.

STEP 1. Check for defective wiring.

Repair wiring. (Refer to figure F-7.)

STEP 2. Check for defective pilots WING STORES JETTISON switch.

Replace switch. (Refer to paragraph 9-4c. and 9-4e.)

STEP 3. Check for defective WG ST JETTISON select switch.

Replace switch. (Refer to paragraphs 9-4c. and 9-4e.)

STEP 4. Check for defective diode between terminals 1 and 2 or 2 and 3 on terminal board (TB46).

Replace diode. (Refer to figure F-7.)

STEP 5. Check for defective inboard or outboard jettison relay (K42 or K43).

Replace relay. (Refer to figure F-7, and paragraphs 9-4c and 9-4e.)

Table 16-1. Troubleshooting-Ejector Racks (Cont)

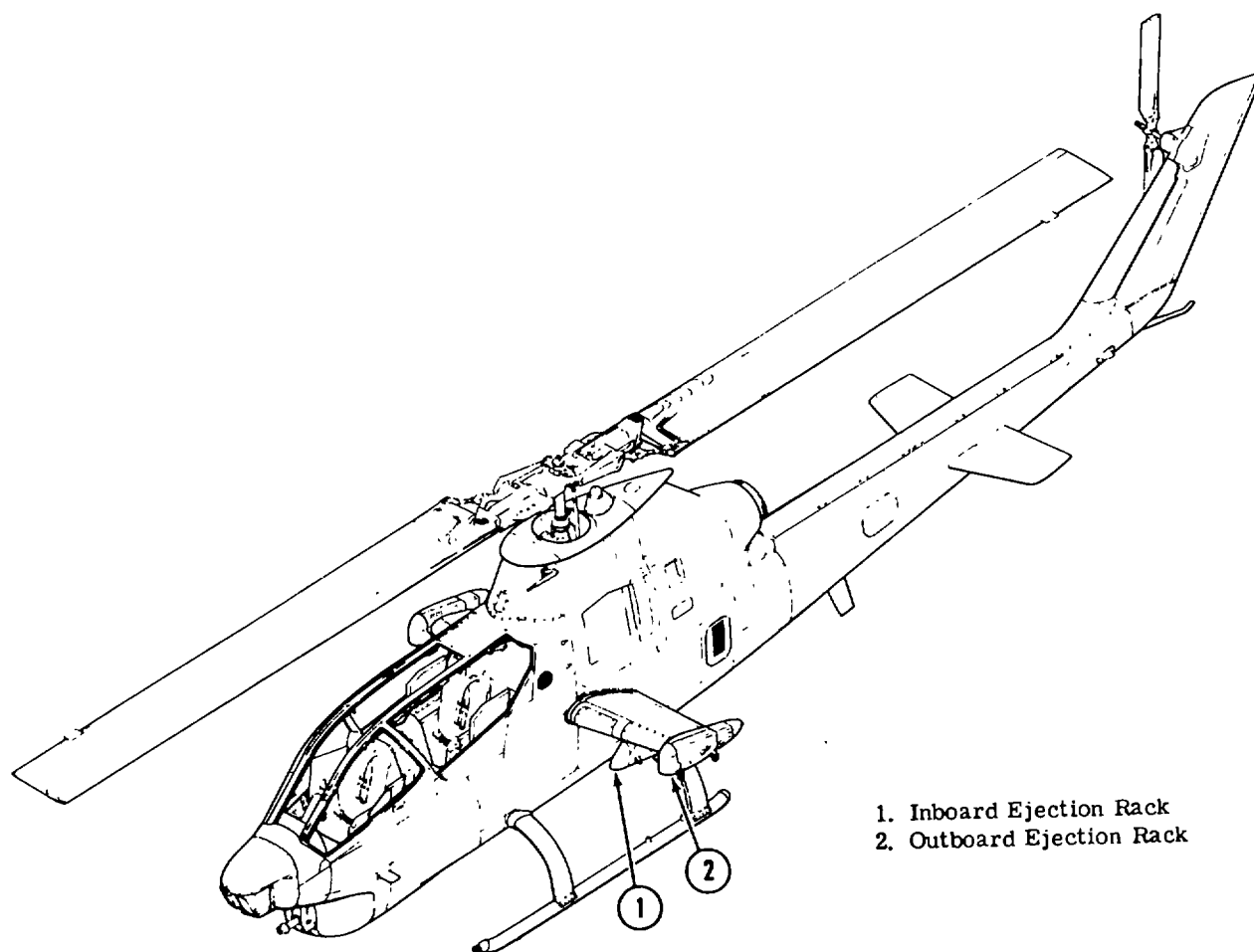
CONDITION	TEST OR INSPECTION	CORRECTIVE ACTION
	STEP 6.	Check for defective WING STORES JETTISON Relay (K91). Replace relay. (Refer to paragraphs 9-4c and 9-4e.)
2.	Wing stores jettison on one side but not on the opposite side.	
	STEP 1.	Check for defective or improperly installed ejector rack cartridge. Replace cartridges and tighten retainers to specified torque. (Refer to paragraph 16-5
	STEP 3.	Checks for defective wing disconnect connector on side which fails to jettison. Replace connector. (Refer to figure F-7 and paragraph 9-4c and 9-4e.)
	STEP 4.	Check for defective WING STORES JETTISON circuit breaker. Replace circuit breaker. (Refer to paragraphs 9-5c and 9-5e.)
	STEP 5.	Check for defective PILOTS WING STORES JETTISON or GUNNERS SALVO JETT switch. Replace switch. (Refer to paragraph 9-4c. and 9-4e.)

b. *Preparation for Maintenance.* Refer to figure 16-5.

WARNING

Jettison circuit may be activated with battery switch OFF and pilots WING JETTISON circuit breaker pulled. For positive deactivation of jettison circuit, open the pilots WING JETTISON circuit breaker and the JETTISON circuit breaker located in the aft electrical compartment. Serious injury can result from accidental ground jettison.

(1) Disconnect battery. Position all armament circuit breakers and switches to OFF.



1. Inboard Ejection Rack
2. Outboard Ejection Rack

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Figure 16-4. Wing stores pylon

- (2) Ensure all stores are properly supported before removing ground safety pin (T72) (1, figure 16-5).
- (3) Remove armament stores from rack with special rack release wrench (T71) (2, figure 16-5) for manual release.

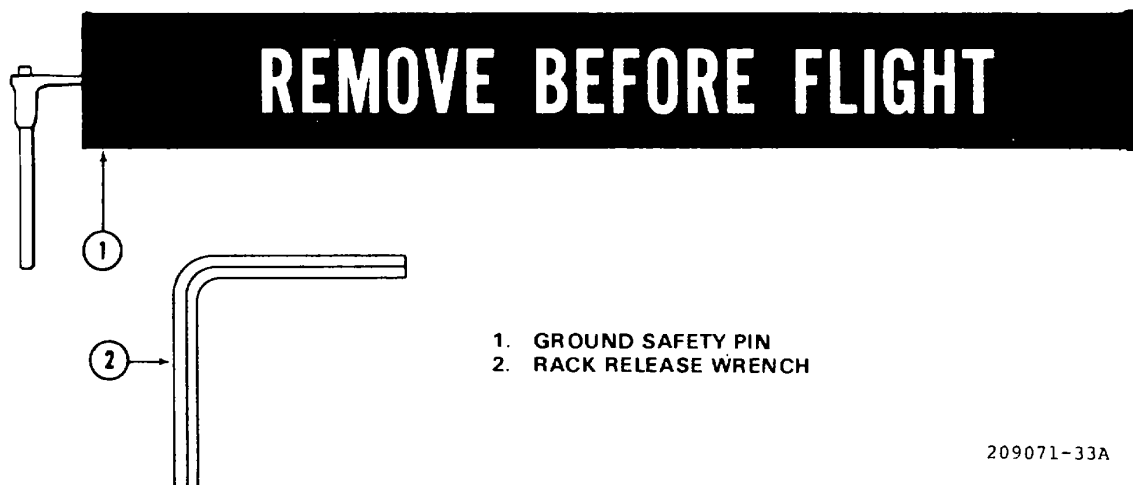
16-5. Impulse Cartridges Outboard Ejector Rack. Refer to figure 16-6.

Impulse cartridges are used as a power source to force the rack suspension hooks open and actuate a downward force on the ejector foot to eject stores clear of the helicopter. Each ejector rack contains two cartridges that can be fired electrically by the jettison switches. Electrical firing of one cartridge automatically detonates the other cartridge.

WARNING

Remove impulse cartridges from ejector rack breech prior to placing helicopter in a hangar, to prevent injury to personnel and damage to equipment.

Exception: Removal is not necessary when helicopter is to be stored in hangar for short-term, providing both jettison circuit breakers (one in the pilots compartment and one in the electrical compartment) are open, ground safety pins installed, jettison switches are OFF, and warning signs indicate that helicopter has an armed jettison system.



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Figure 16-5. Special tools for ejector rack

WARNING

Static electricity may cause inadvertent firing of ejector cartridges. Maintenance personnel should statically discharge themselves on a suitable ground prior to installation or removal of ejector cartridges.

a. *Removal.* Refer to paragraph 16-a. (1) through (4) for outboard rack cartridges, and paragraph 16-8a. (1) through (4) for inboard rack cartridges.

b. *Inspection.*

- (1) Inspect cartridges for damage and corrosion.
- (2) Inspect cartridges for service life requirements.

CAUTION

A cartridge is considered unserviceable after ten insertions and removals from ejector rack.

(2A) Each time a cartridge is removed, place a radial mark on the base of the cartridge with indelible ink (C74A). Monitor the service life by a record of inked markings and expiration data on cartridge case.

- (3) Inspect cartridges for self life requirements.

CAUTION

The maximum shelf life (storage life) for the cartridge is nine years from date of manufacture stamped in the cartridge. Cartridge must be used within 15 months from date of opening hermetically sealed shipping container.

(3A) When opening a container, the service life expiration date (month and year) shall be marked on the side of the cartridge with indelible ink (C74A).

c. *Installation.*

Premaintenance requirements for installation of impulse cartridges.

Conditions	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	T72
Test Equipment	T2A
Support Equipment	None
Minimum Personnel Required	One
Consumable Materials	(C74A) (C151)
Special Environmental Conditions	None

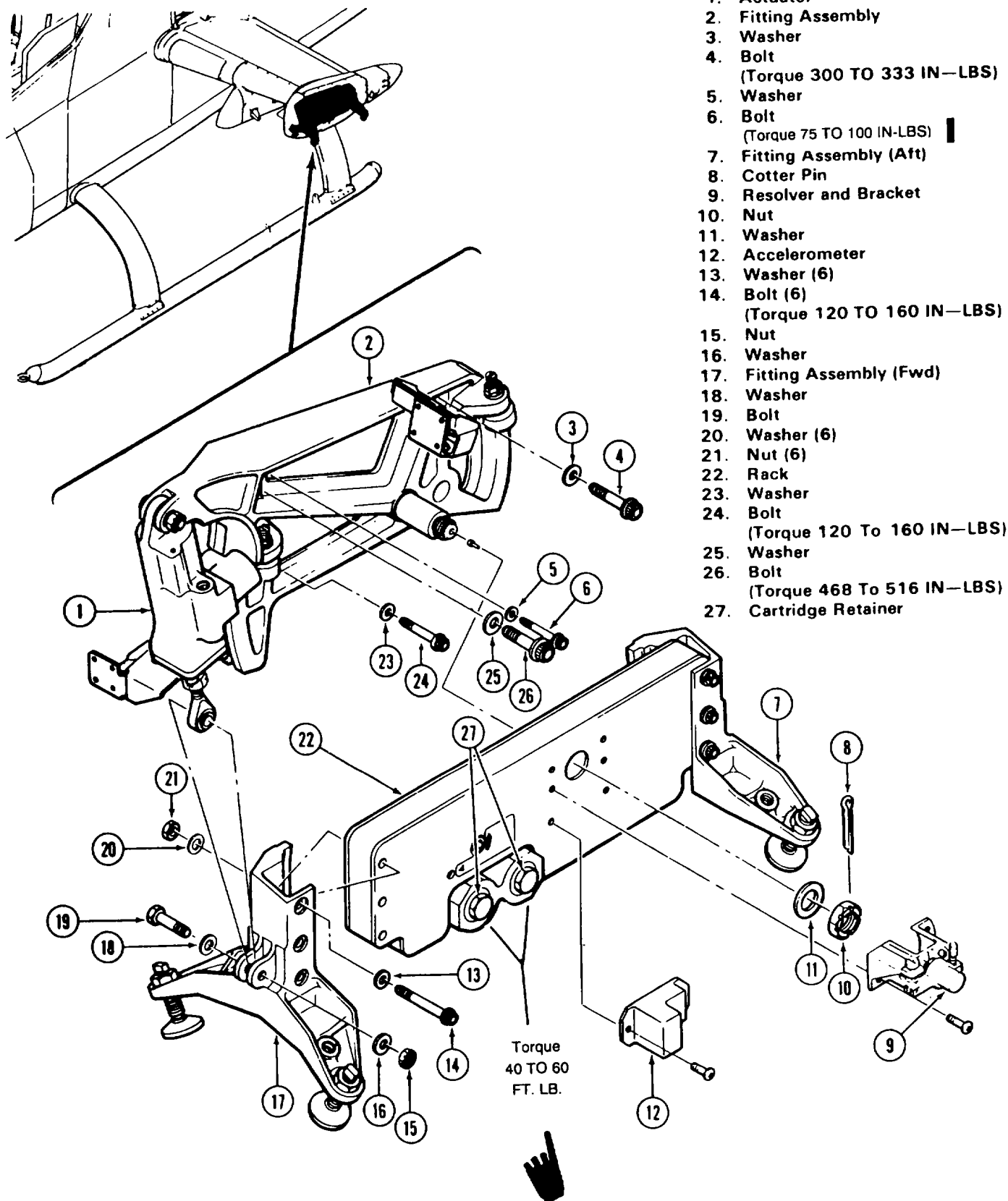


Figure 16-6. Outboard ejector rack installation
 Change 22 16-11

(1) Using multimeter USM 223 (T2A), set for testing voltage, attach one lead to breech assembly and attach other lead to one cartridge cavity firing contact, then the other. If no voltage is measured, proceed to step (2). If voltage is measured, trace jettison circuitry (refer to figure F-7) to locate and correct source before proceeding.

WARNING

Ensure that no external electrical power is applied to helicopter and that battery is disconnected before installing impulse cartridges.

(2) Visually inspect ejector rack and perform ground check, as required, to determine rack condition.

(3) Install ground safety pin (T72) (1, figure 16-5).

(4) Pull ejector piston out of housing to extend as far as possible.

(5) Place a cartridge into each of two cartridge retainers (27, figure 16-6) or (9, figure 16-8) and screw into breech assembly. Torque retainers 40 to 60 foot-pounds and lockwire (C151) cartridge retainers together.

(6) Push ejector piston back in housing and seat.

16-6. Outboard Ejector Racks. Refer to figures 16-5, 16-6 and 16-9.

The outboard ejector rack is vertically adjustable by means of a hydraulic actuator. Each rack has a pair of hooks for attachment of an armament pod or other stores. During normal operations stores are loaded or unloaded on the racks with a special wrench (T71) (2, figure 16-5) inserted into the HOOK MANUAL RELEASE and turned according to arrow markings. A special ground safety pin (T72) (1, figure 16-5) must be inserted in the GROUND SAFETY PIN HOLE inside of each rack when the helicopter is on the ground. The rack hooks will not open with the ground safety pins installed if the jettison mechanism is fired; however, the attached stores may be damaged by the ejector piston.

Premaintenance requirements for outboard ejector racks

Conditions	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	T7A, T59A, T71 T72, T72A
Test Equipment	T2A
Support Equipment	None
Minimum Personnel Required	Two
Consumable Materials	(C23) (C44A) (C45) (C59A) (C70) (C72) (C124) (C151)
Special Environmental Conditions	None

WARNING

All ground safety pins must be removed before flight. Failure to do so will prevent emergency jettison of stores.

a. *Removal-Outboard Ejector Rack.* Refer to figure 16-6.

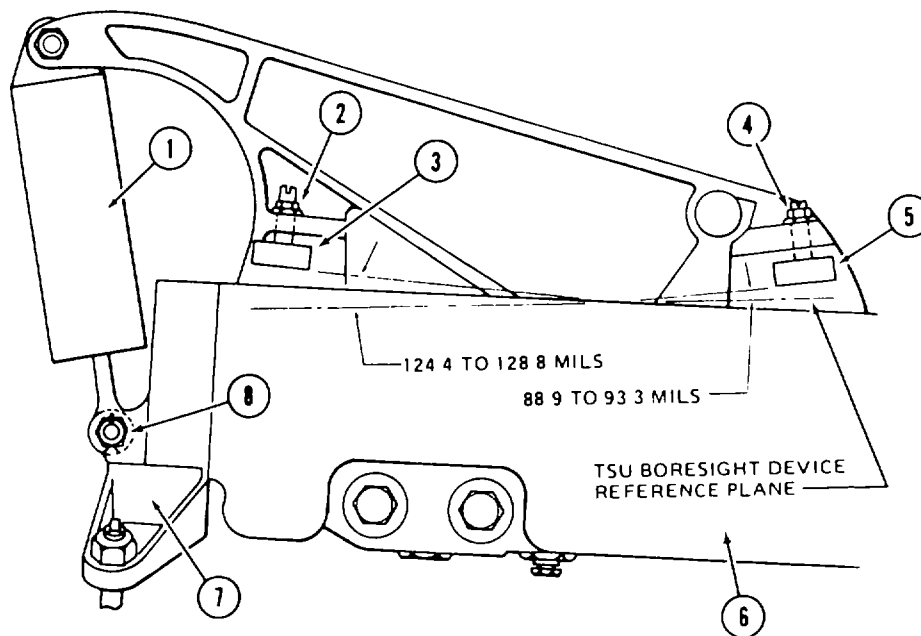
(1) Loosen four sway brace bolts, remove fairings for access to rack.

(2) Ensure all electrical power is OFF, all armament circuit breakers and switches in safe position.

(3) Disconnect electrical connectors from components on rack.

(4) Cut and remove lockwire from retainers (27). Remove jettison cartridges with retainers from rack.

(5) Remove resolver and bracket (9) from outboard side of rack (22).

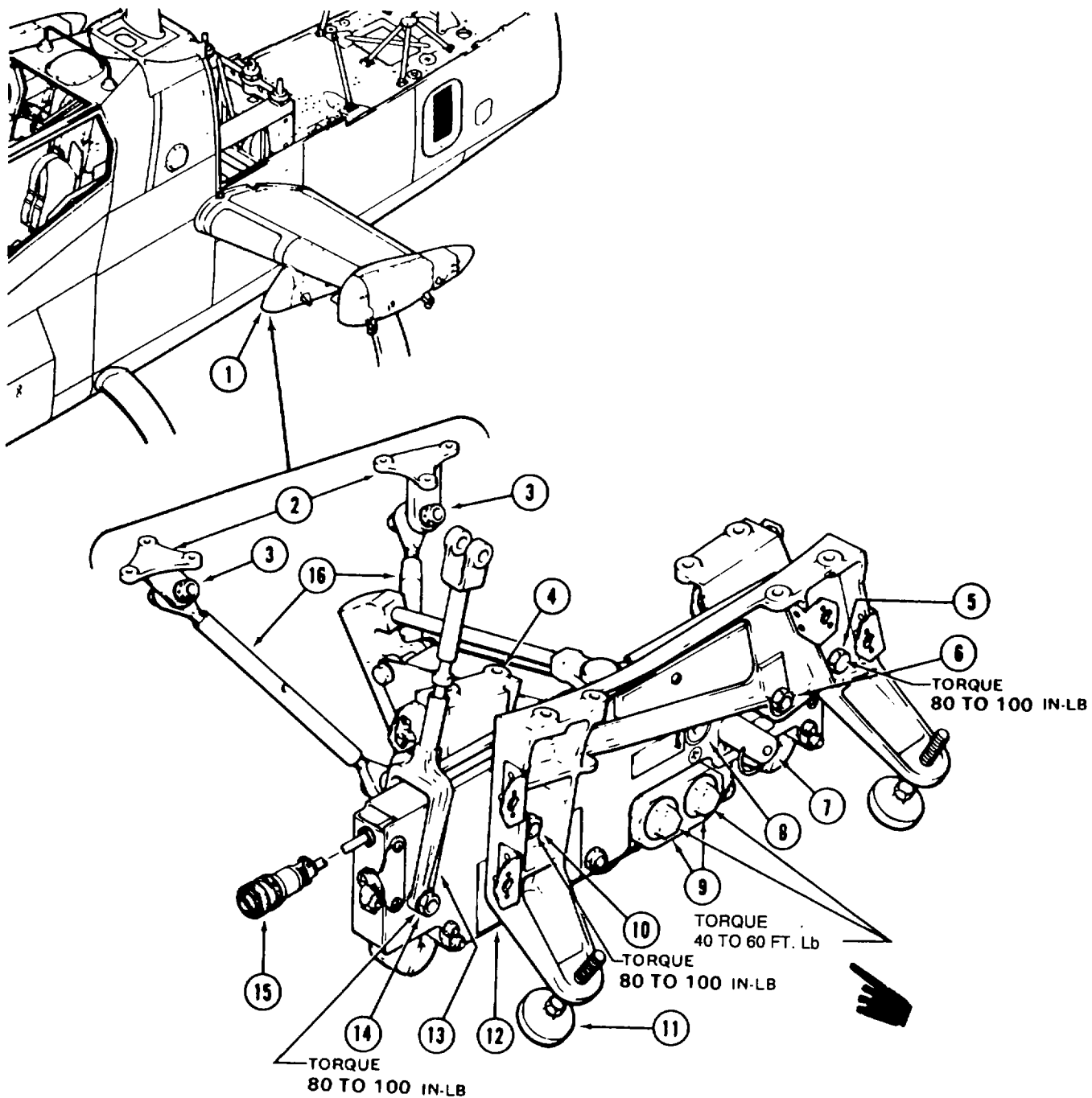


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1. Hydraulic actuator
2. Forward lock nut
3. Forward mechanical stop
4. Aft lock nut
5. Aft mechanical stop
6. Ejector rack assembly
7. Sway brace assembly
8. Bolt

Figure 16-7. Ejector rack alignment

- (6) Disconnect and remove accelerometer (12).
- (7) Remove bolt (19), washers (16 and 18) and nut (15) connecting actuator (1) to fitting assembly (17).
- (8) Remove three nuts (21), six washers (13 and 20), and three bolts (14) connecting fitting assembly (17) to forward end of rack (22).
- (9) Remove three nuts (21), six washers (13 and 20) and three bolts (14) connecting fitting assembly (7) to aft end of rack (22).
- (10) Remove nut (10), washer (11), and cotter pin (8) from bolt on fitting assembly (2) and lift rack outboard.
- (11) Remove fitting (2) from wing pylon as follows:
 - (a) Disconnect hydraulic line from actuator (1).
 - (b) Remove two bolts (4) and two washers (3).
 - (c) Remove bolt (6) and washer (5), bolt (26) and washer (25) and bolt (24) and washer (23) and lift fitting (2) from wing pylon.
- b. *Inspection.* Inspect outboard ejector rack for the following.
 - (1) Visually inspect hydraulic actuator (1) on ejector for leakage or damage.
 - (2) Inspect rack for fraying of wiring or damage to electrical connectors.
 - (3) Visually inspect accelerometer (12) and resolver (9) for evidence of mechanical damage, binding or misalignment.



- | | |
|-------------------|----------------|
| 1. Fairing | 9. Retainer |
| 2. Fitting | 10. Bolt |
| 3. Bolt | 11. Pad |
| 4. Fitting | 12. Rack |
| 5. Bolt | 13. Fork |
| 6. Bolt | 14. Bolt |
| 7. Pin | 15. Cable |
| 8. Manual release | 16. Turnbuckle |

Figure 16-8. Inboard ejector rack installation

(4) Inspect for cracks, external corrosion, and cleanliness. If the rack has been used for jettison of armament stores, perform cleaning of the rack. Refer to paragraph 16-6f.

(5) Inspect forward and aft sway brace assemblies.

(a) The clearance between the groove on the fitting assembly (2) and tongue of the sway braces (7 or 17) must not exceed 0.020 inch. Remove fairings and disconnect servo actuator from fitting (2), and move fitting (2) full up or full down. The clearances can be obtained by using a feeler gauge with all the components installed on the aircraft or by measuring the differences between the tongues and the grooves.

(b) If there is a high level of vibration transmitted into the aircraft due to excessive clearance, the sway braces will be replaced.

c. *Repair or Replacement.*

(1) Replace any cracked, damaged or unserviceable hydraulic fittings or flexible lines.

(2) Replace fairings if unserviceable.

(3) Remove external superficial corrosion from rack by using crocus cloth (C45) or phosphoric solution (C23).

(4) Replace rack hydraulic actuator (1) if unserviceable as follows:

(a) Remove hydraulic lines from actuator.

(b) Disconnect electrical connectors to actuator.

(c) Remove attaching bolt (19), nut (15) with washers (16 and 18) from upper end of actuator (1).

NOTE

Hydraulic actuator (1) is factory adjusted for proper length. Adjustment of actuator will be accomplished during final alignment and boresighting of system.

(d) Install hydraulic fittings into inlet and outlet ports of actuator.

(e) Install hydraulic actuator on rack assembly and secure with attaching bolts, nuts and washers.

(f) Connect hydraulic lines to actuator, bleed hydraulic system. (Refer to Chapter 7 for bleeding of hydraulic system.)

d. *Installation.* Refer to figure 16-6.

(1) Install fitting on wing pylon as follows:

(a) Position fitting (2) on wing pylon and connect hydraulic line to actuator (1).

(b) Install two bolts (4) and two washers (3). Install washers with countersink toward head of bolt. Torque bolt **300 TO 333** inch-pounds. Lockwire bolt.

(c) Install bolt (26) and washer (25). Install washer with countersink toward head of bolt. Torque bolt **468 TO 516** inch-pounds. Lockwire bolt.

(d) Install bolt (6) and washer (5). Install washer with countersink toward head of bolt. Torque bolt **75 TO 95** inch-pounds. Lockwire bolt.

(e) Install bolt (24) and washer (23). Install washer with countersink toward head of bolt. Torque bolt **120 TO 160** inch-pounds. Lockwire bolt.

(2) Install rack (22) on bolt of fitting (2) and install washer (11), nut (10) and cotter pin (8).

(3) Install fitting (17) on forward end of rack (22) with three bolts (14), six washers (13 and 20) and three nuts (21). Install washers with countersink side toward bolt head. Torque bolts **120 TO 160** inch-pounds.

(4) Install fitting (7) on aft end of rack (22) with three bolts (14), six washers (13 and 20) and three nuts (21). Install washers with countersink side toward bolt head. Torque bolts **120 TO 160** inch-pounds.

(5) Connect actuator (1) to fitting (17) with bolt (19), washers (16 and 18) and nut (15). Install cotter pin.

(6) Install resolver and bracket (9) with attaching screws.

(7) Install accelerometer (12) with screws.

(8) Connect all electrical connectors.

CAUTION

Do not install ejector cartridges in the ejector rack prior to alignment.

e. *Conduct alignment test.* (Refer to paragraph 16-7.)

f. *Cleaning After Jettison.* Perform this cleaning procedure as soon as possible after the ejector has been used to jettison stores.

NOTE

Cleaning schedule of outboard ejector racks consists of cleaning and inspection after each firing, and thorough cleaning and inspection after ten or more firings (or sooner if auxiliary piston becomes sticky).

(1) The ejector rack must be partially disassembled for cleaning components by removing outboard sideplate as follows: (Refer to figure 16-9.) Instructions outlined below are typical for left and right sides outboard racks.

WARNING

Make certain no live cartridges are installed in the breech prior to disassembly.

(a) Remove left side ejector rack from wing pylon and remove forward (17) and aft (7) fitting assemblies from rack. (Refer to paragraph 16-6.a. and figure 16-6.)

(b) Remove the two cartridge retainers (1, figure 16-9) and discard any fired cartridges.

NOTE

When outboard sideplate is removed from ejector rack the shackles and linkage will fall out if assembly is inverted. During disassembly, remove the required screws from inboard sideplate at bottom first, so rotation will not be required after outboard sideplate is loosened.

(c) Remove three screws (2) from inboard sideplate (32), two from aft closeout (33) and one in cylinder cap (24).

(d) Cut lockwire and remove retainer (3) with piston (4) and spring (8) from breech (34).

(e) Pull piston (4) out of retainer (3), then remove and discard preformed packings (5, 6 and 7).

(f) Remove ejection cylinder (9), ejection piston (11), foot (10) and packing (12) from breech (34) as an assembly.

(g) Unscrew foot (10) from ejection piston (11), and push ejection piston (11) up out of ejection cylinder (9). Remove and discard packing (12) from inside lower end of ejection cylinder (9).

(h) Remove nut (13), washer (14) and bolt (15), then place ejector rack on a clean workbench with the outboard sideplate (22) up for remainder of disassembly.

(i) Remove nut (16), washer (17) and screw (18) from forward end of breech (34) and outboard sideplate (22).

(j) Remove screws (19) that secure outboard sideplate (22) to the four spacers.

(k) Remove four screws (20) that secure outboard sideplate (22) to the mounting column.

(l) Remove four screws (21) that secure outboard sideplate (22) to the two bumper pads and forward closeout, then remove remaining screw (2) from cylinder cap (24).

(m) Carefully lift outboard sideplate (22) off assembly, tapping sideplate at openings where linkage, shackles, and spring retainers fit into bushings. Make sure outboard sideplate (22) separates from shackles and linkage trunnions that must remain seated in inboard sideplate (32).

(n) Move cylinder cap (24) out, slightly away from inboard sideplate (32) to clear pin from bushing and lift cylinder cap (24) off gas tube (26). Remove and discard packing (25) from inside cylinder cap (24).

(o) Pull gas tube (26) out of breech (34), then remove and discard the two packings (27).

(p) Clamp cylinder cap (24) in a vise with padded jaws. Cut lockwire and remove orifice holder (28) from cylinder cap (24). Remove and discard packings (29 and 31), and back-up ring (30).

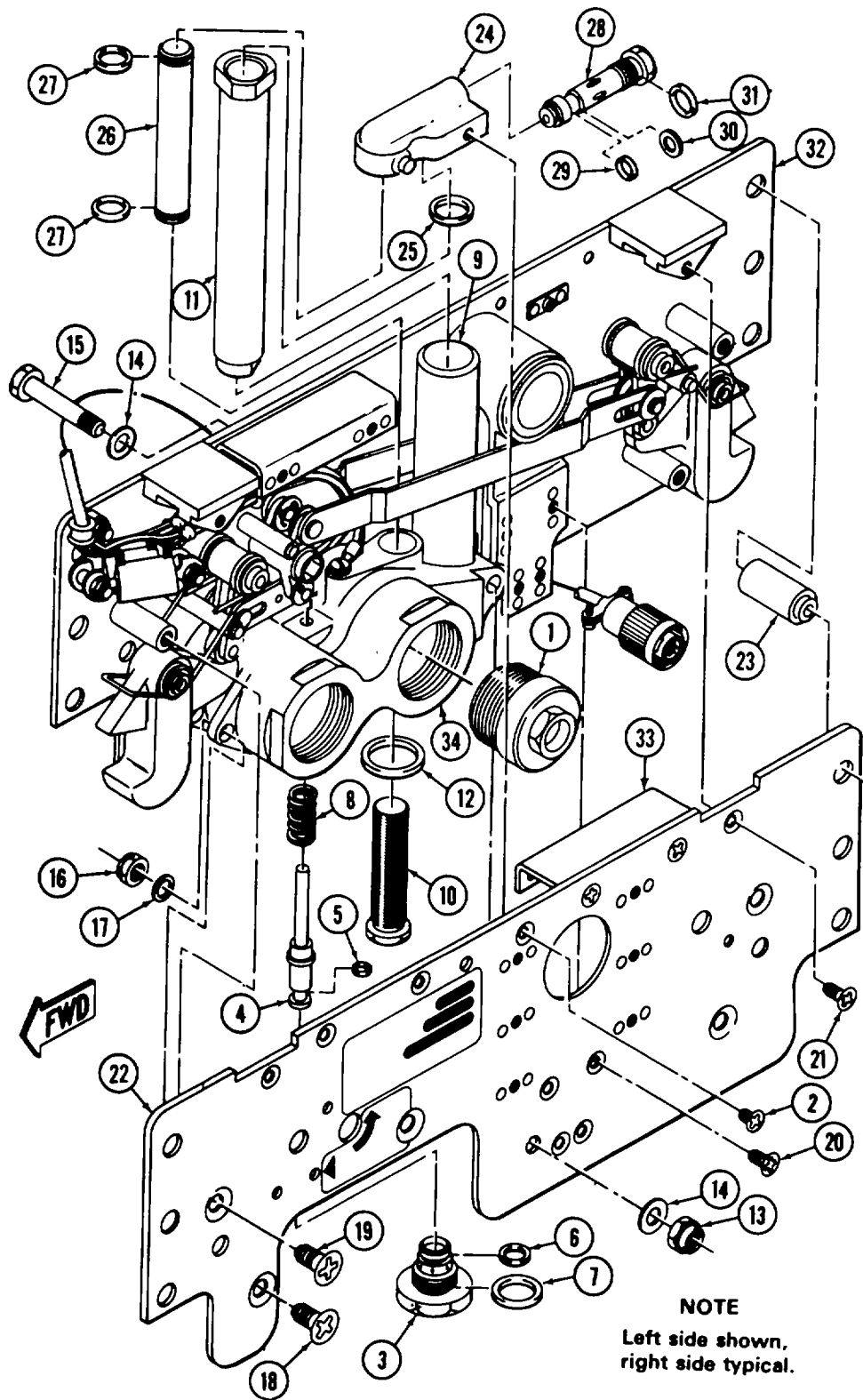


Figure 16-9. Outboard ejector rack - exploded view (Sheet 1 of 2)

- | | |
|-----------------------|------------------------|
| 1. Cartridge retainer | 18. Screw |
| 2. Screw | 19. Screw |
| 3. Retainer | 20. Screw |
| 4. Piston | 21. Screw |
| 5. Preformed pecking | 22. Outboard sideplate |
| 6. Preformed packing | 23. End spacer |
| 7. Preformed packing | 24. Cylinder cap |
| 8. Spring | 25. Preformed packing |
| 9. Ejection cylinder | 26. Gas tube |
| 10. Foot | 27. Preformed packing |
| 11. Ejection piston | 28. Orifice holder |
| 12. Preformed pecking | 29. Preformed packing |
| 13. Nut | 30. Back-up ring |
| 14. Washer | 31. Preformed packing |
| 16. Bolt | 32. Inboard sideplate |
| 16. Nut | 33. Aft closeout |
| 17. Washer | 34. Breech |

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Figure 16-9. Outboard ejector rack - exploded view (Sheet 2 of 2)

(2) Clean the following components after each firing using clean lint-free cloth (C44A), solution of water and mild detergent (C59A), and a soft bristle brush to loosen any caked residue. (See figure 16-9.)

WARNING

Cleaning materials are flammable and toxic. Avoid skin contact and breathing of solvent vapors. A wire brush may be used to clean parts with severe residue.

(a) Cartridge retainers (1). Clean thoroughly with special attention given to threaded portion of cartridge retainers. Clean parts with a severe residue using a wire brush. Rinse using dry cleaning solvent (C124). Dry with clean lint-free cloth and filtered low pressure air.

(b) Swab inside of cartridge breech (34) using a moist (not wet) rag. Remove all loose residue and dry breech with clean cloth and low pressure filtered air.

(c) Clean interior and exterior surfaces of ejection piston (11) and piston (4). Clean spring (8) and retainer (3). Dry all parts thoroughly after cleaning.

CAUTION

The sizes of openings in the orifice in orifice holder (28, figure 16-9) are critical and sharp objects such as drill bits are not to be used for cleaning out these openings. The shank of a drill bit may be used to check the orifice diameters. Use a soft copper or brass wire approximately 0.037 inch diameter to clean main openings. An increase in the 0.037 (± 0.0005) inch diameter of the center orifice will increase the thrust applied to the ejector piston. An increase of 0.002 inch above maximum can increase the thrust as much as 20 percent.

NOTE

When necessary, use the shank of a drill bit (0.037-inch diameter) to open center orifice (and 0.060-inch diameter for side orifices).

(d) Use a soft wire (copper or brass) approximately **0.037**-inch diameter to clean center orifice in orifice holder (28). Make sure center and

side openings are clear (approximately 0.060 -inch diameter). Dry orifice holder after cleaning.

(3) Inspect components removed for cleaning as follows: (Refer to figure 16-9.)

(a) Visually examine all parts for evidence of corrosion, cracks and damaged threads.

(b) Visually examine openings in orifice (28) for obstruction and obvious distortion such as dents or cuts in area around openings. If damage is suspected, compare dimensions as specified in CAUTION above. Distortions in orifice openings in excess of these dimensions are cause for rejection of part.

(c) Roll spring (8) across a flat surface to check for distortion. If dimensional or coil damage is evident replace spring.

(4) Reassemble ejector rack and install on wing pylon as follows: (Refer to figures 16-6 and 16-9.)

CAUTION

Exercise care in handling the partially disassembled ejector rack during assembly to prevent accidental disassembly of the shackles, linkage, and spring retainer spacers from bushings in the inboard sideplate. The parts are spring loaded and if loosened from the bushings will fall out of the partially assembled ejector rack causing additional assembly.

NOTE

New preformed packings and backup rings shall be lubricated and installed and removed ones discarded.

(a) Apply a light coating of silicone grease (C72) to preformed packings (29 and 31) and back-up ring (30) and install on orifice holder (28) in sequence shown in figure 16-9.

NOTE

Application of light coating of silicone grease (C72) applies to all new preformed packings installed below.

(b) Install assembled orifice holder (28 through 31) in cylinder cap (24). Clamp cylinder cap in a vise to permit tightening and torque orifice holder **95 TO 115** inch-pounds. Install lockwire (C151) between cylinder cap (24) and orifice holder (28) to prevent loosening.

(c) Install packing (25) inside groove in cylinder cap (24) to seal ejection cylinder (9).

(d) Install packing (27) on each end of gas tube (26) and insert gas tube in opening in cylinder cap (24). Make sure packing (27) remains seated in groove.

(e) Position cylinder cap (24) and gas tube (26) in partially assembled ejector rack, inserting end of gas tube in breech (34) and trunnion of cylinder cap in bushing of inboard sideplate (32).

(f) Install packing (12) in groove inside lower end of ejection cylinder (9), and insert ejection piston (11) inside ejection cylinder, extending end of piston out through end of cylinder. Do not bottom out piston in cylinder.

(g) Holding ejection piston (11) at wrenching flats on end of piston, thread foot (10) into end of ejection piston (11). Do not bottom out foot in piston.

(h) Install packings (6 and 7) in grooves in retainer (3).

(i) Install packing (5) in groove in piston (4) and insert base of piston into openings in retainer (3).

(j) Place spring (8) over piston (4) and install spring, piston and retainer (3) into breech (34) but do not tighten at this time.

(k) Apply a light coating of grease (C70) to the exposed trunnions of the two shackles, the two shackle locking link-trunnions, and the hexagon release wrench trunnion. Make sure all six end spacers (23) are in bushings in inboard sideplate (32).

NOTE

The spring retainer spacers in following step (1) can be aligned by inserting a blunt screwdriver in opening at bottom of ejector rack to carefully move spacers.

(l) Position outboard sideplate (22) over partially assembled ejector rack and, using a punch or other blunt object, align the shackle and linkage trunnions and spring retainer spacer to the bushing of the outboard sideplate. Install screws (19) in sideplate and four bushings to retain sideplate while aligning the trunnions and spacers to bushings.

(m) After the two shackle trunnions, the three linkage trunnions and the two spring retainer spacers are into bushings in inboard and outboard sideplates; check springs to ensure coils are not between shoulder of trunnions and sideplate, and tighten the four screws (19).

(n) Install and tighten screws (2, 20 and 21).

(o) Install bolt (15), washers (14) and nut (13), placing one washer under head of bolt and one under nut. Torque nut to a torque of **95 TO 115** inch-pounds.

(p) Install screw (18), washer (17) and nut (16). Torque nut (16) on screw through both sideplates to a torque of **50 TO 70** inch-pounds.

(q) Install assembled ejection cylinder (9), ejection piston (11), packing (12) and foot (10) into breech (34), inserting end of cylinder into cylinder cap (24).

(r) Torque retainer (3) in breech (34) to a torque of **95 TO 115** inch-pounds.

(s) Torque ejection cylinder (9) in breech (34) to a torque of **290 TO 310** inch-pounds and, using lockwire (C151), secure end of ejection cylinder (9) to retainer (3) to prevent loosening of both parts.

(t) Install two cartridge retainers (1) in breech (34). Tighten the two cartridge retainers finger-tight; do not install lockwire.

(u) Reinstall rack assembly on pylon. (Refer to paragraph 16-6, d.)

(5) After ten (10) firings perform cleaning and inspection of ejector rack components as outlined in steps f. (2) (a) through (2) (d), and f. (3) (a) through (3) (c), respectively, plus following steps (a) through (d).

NOTE

It is recommended that the orifice assembly and piston ejector rings be replaced after ten firings, even if they do not appear worn.

(a) Clean piston ejection cylinder (9, figure 16-9) inside and out using solution of water and mild detergent. Rinse cylinder with dry cleaning solvent (C124), and dry with clean lint free cloth and filtered low pressure air.

(b) Clean cylinder cap (24) and gas tube (26) same as in preceding step (a).

(c) Inspect the piston rings on ejector piston. Remove and clean rings if they do not rotate freely. Replace rings if severely damaged.

(d) Inspect all parts thoroughly. Reject those parts which show excessive wear and gas erosion. Particular attention shall be given to combustion chamber orifice (28), cartridge retainers (1) and breech.

(6) Reassemble ejector rack and install on wing pylon as outlined in steps f. (4) (a) through (u) above.

16-7. Alignment Test - Ejector Racks, Outboard. (Refer to figure 16-7.)**NOTE**

Alignment test consists of adjusting the mechanical stops and aligning the helicopter airframe and the outboard ejector rack pylon.

a. *Test Preparations.* Remove TSU nose fairing and outboard portions of outboard pylon fairings.

b. *Elastomeric Stop Adjustment.* The following procedure is used to set the mechanical stops to allow a total of 12 degrees of ejector rack travel:

- (1) Install TSU boresight device (T59A) on pitch and roll pads of TSU.
- (2) Loosen sway brace pads and install ejector rack alignment fixture (T72A) on ejector rack hooks. Finger tighten sway brace pads.
- (3) Disconnect hydraulic actuator (1, figure 16-7) from sway brace assembly (7) by removing bolt (8) from rod end of actuator.
- (4) Position hydraulic actuator (1) so that ejector rack assembly (6) can be manually rotated without interference with actuator.
- (5) Place gunners quadrant (T7A) on TSU boresight device, level the bubble, and record the angle. (Note the nose-up or nose-down attitude.)
- (6) Transfer gunners quadrant to ejector rack alignment fixture.
- (7) Manually rotate ejector rack assembly (6) toward a nose-up attitude. Adjust forward mechanical stop (3) until the maximum pitch-up attitude of ejector rack assembly is **124.4 TO 128.8** mils (7 degrees to 7 degrees, 15 minutes) greater than the angle recorded on TSU boresight device. (See step (5) and figure 16-7.) Tighten forward locknut (2).
- (8) Manually rotate ejector rack assembly (6) toward a nose-down attitude. Adjust aft mechanical stop (5) until the maximum pitchdown attitude of ejector rack assembly is **88.9 TO 93.3** mils (5 degrees to 5 degrees, 15 minutes) less than the angle recorded on TSU boresight device. (See step (5) and figure 16-7.) Tighten aft locknut (4).
- (9) Manually rotate ejector rack assembly toward a nose-up attitude. Adjust hydraulic actuator rod end until the nose-up attitude of the ejector rack is **71.1 (± 8.9)** mils (**4 ± 0.5**) degrees greater than the angle recorded on TSU boresight device. (See step (5) and figure 16-7.)

NOTE

One complete turn of hydraulic actuator rod end equals approximately 5 mils (0.25 degrees) elevation of the ejector rack.

- (10) Reconnect hydraulic actuator (1) to sway brace assembly (7).
 - (11) Transfer ejector rack alignment fixture to the opposite pylon and repeat steps (2) through (10).
- c. *Control Switch Positions.* Position following switches on pilots armament control panel as follows:
- | | |
|------------|--------|
| MASTER ARM | STBY |
| WPN CONT | GUNNER |
- d. *Electrical Power.* Check that helicopter battery is connected, then apply 28 Vdc power from electrical auxiliary power unit.
- e. *Circuit Breakers.* Engage all circuit breakers except the following:

STARTER RELAY
IGN SYS IGN SOL
RPM WARN SYS
WING STORES JETTISON (Cockpit)
WING STORES JETTISON (Aft Electrical Compartment)

- f. *Power Switch Positions.* Position the following switches as shown:

INV	MAIN
BAT	OFF
NON-ESS BUS	MANUAL
ELECTRIC PWR/ EMER OFF	ELEC PWR

CAUTION

Do not apply hydraulic power to system unless electrical power is applied.

- g. *Hydraulic Power.* Apply **1500 (± 25)** psi 6 gpm hydraulic power to system No. 2.

h. Alignment Procedures.

- (1) Turn MODE SELECT switch on the TCP to ARMED MAN.
- (2) Position HI/LOG MAG switch on left hand grip (LHG) to HI and verify that STOW/TRK/ACQ switch on sight hand control (SHC) is in the STOW position.
- (3) Install ejector rack alignment fixture (T72A) on ejector rack hooks and finger-tighten sway brace pads.
- (4) Activate left or right pylon with REMOTE LAUNCHER ACTIVATE switch located in left ammo bay on the aft wall.

WARNING

Before turning pilots MASTER ARM switch to ARM position, keep hands clear of articulating outboard ejector rack assembly. Racks may move rapidly up or down.

- (5) Position MASTER ARM switch to ARM.
- (6) Loosen four setscrews on ejector rack resolver mount assembly and finger-tighten coarse adjustment clamping screws.
- (7) Place gunners quadrant (T7A) on TSU boresight device, level the bubble, and record pitch angle. (Note the nose-up or nose-down attitude.)
- (8) Transfer gunners quadrant to ejector rack alignment fixture, maintaining same fore and aft orientation as measured on TSU boresight device.
- (9) Adjust fine adjustment screw on resolver mount assembly until the angle of ejector rack alignment fixture is **17.8 mils \pm 1.78 mils ($1^\circ \pm 0.1^\circ$)** greater than the angle recorded on TSU boresight device.

NOTE

If proper adjustment is achieved, proceed to step (12). If proper adjustment cannot be achieved, return fine adjustment screw to the mid-position and proceed to steps (10) and (11).

- (10) Loosen resolver coarse adjustment clamping screw and rotate body of resolver until approximate desired angle is achieved.

NOTE

If pylon will not stop at approximately desired angle, resolver may be out-of-phase. Rotate resolver 180 degrees and repeat step (10).

- (11) Tighten resolver coarse adjustment screw and repeat step (9).
- (12) Tighten four setscrews on resolver mount assembly.
- (13) Check that the 17.8 mil difference did not change after tightening setscrews. Loosen the coarse adjustment clamping screw.
- (14) Transfer ejector rack alignment fixture to opposite ejector rack hooks and repeat steps (4) through (13).

CAUTION

To prevent firing of cartridges DO NOT install cartridges in ejector racks prior to continuity test.

- i.* Using multimeter USM 223 perform electrical continuity test of wing stores jettison circuits. (Refer to paragraph 9-84.)
- j.* Install cartridges in breech assembly (Refer to paragraph 16-5C.)

16-8. Inboard Ejector Racks. Refer to figures 16-8 and 16-11.

An XM4 ejector rack (right side) and an XM50 rack (left side) are mounted under wing stations 42.5, attached by support fittings and turnbuckle braces. Ejector pistons are offset to inboard side of rack, and are angled so that jettison stores will be thrust down and outboard away from landing gear.

Premaintenance requirements for inboard ejector racks

Conditions	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	(T7A)
Test Equipment	Multimeter USM 223
Support Equipment	None
Minimum Personnel Required	Two
Consumable Materials	C23, C45, C72, C92, C124
Special Environmental Conditions	None

a. Removal.

- (1) Disconnect battery. Position all armament circuit breakers and switches to OFF.
- (2) Remove fairings from rack and from leading edge of wing.
- (3) Disconnect electrical cable of rack from connector in wing. See figure 16-10.
- (4) Cut lockwire and remove retainers (9, figure 16-8) and cartridges from rack.
- (5) Remove bolt (14), nut and washers to detach fork of elevation adjustment fitting from front end of rack. Do not change length of fitting.
- (6) Remove bolts (3), nuts and washers to detach turnbuckle assemblies (16) from fittings (2) on wing. Do not change length of turnbuckles.
- (7) Remove lockwire and eight bolts, with washers and shims, to detach rack fittings (4) and remove rack assembly from wing. Observe locations of any shims for reinstallation.

NOTE

If rack is being removed to clean ejector, steps (8) and (9) are not required.

- (8) Remove bolts (5, 6 and 10) to detach fittings from rack. Keep any shims found on bolt (5) for reinstallation.
- (9) When necessary, remove attaching nuts and screws to separate inboard fittings and brace.

b. Inspection. Inspect inboard ejector rack for the following:

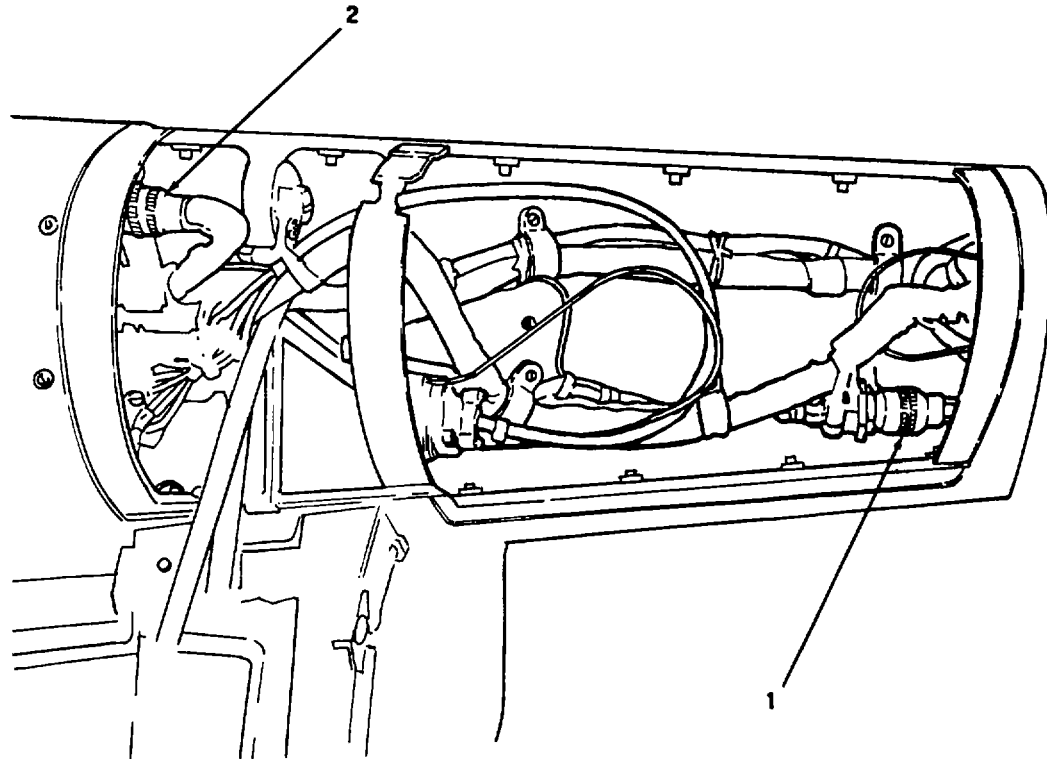
- (1) Visually inspect all fittings for cracks, damage and serviceable condition.
- (2) Inspect sway brace pads for security and ensure that locknut is securely in place.
- (3) Inspect fairing for damage and serviceable condition.
- (4) Inspect ejector rack for corrosion, distortion of any parts, and evidence of damage.
- (5) Inspect electrical cable for fraying or damaged connector.
- (6) Inspect rack for cleanliness. If rack has been used to jettison stores, perform cleaning and inspection of ejector parts. (Refer to figure 16-11.)

c. Repair or Replacement.

- (1) Replace any cracked, damaged, or unserviceable fittings.
- (2) Replace fairing if unserviceable.
- (3) Remove corrosion from rack by using crocus cloth (C45) or phosphoric solution (C23).

d. Installation. (Refer to figure 16-8.)

- (1) Assemble fittings (4), if removed, on ejector rack (12) with bolts (5, 6 and 10). Make sure that original shims are in place between fittings on bolts (5 and 10). Use thin steel washers under bolt heads and nuts, and do not fully tighten bolts at this time.



1. Outboard Rack Connection Plug
2. Inboard Rack Connection Plug

Figure 16-10. Electrical connections for ejector rack

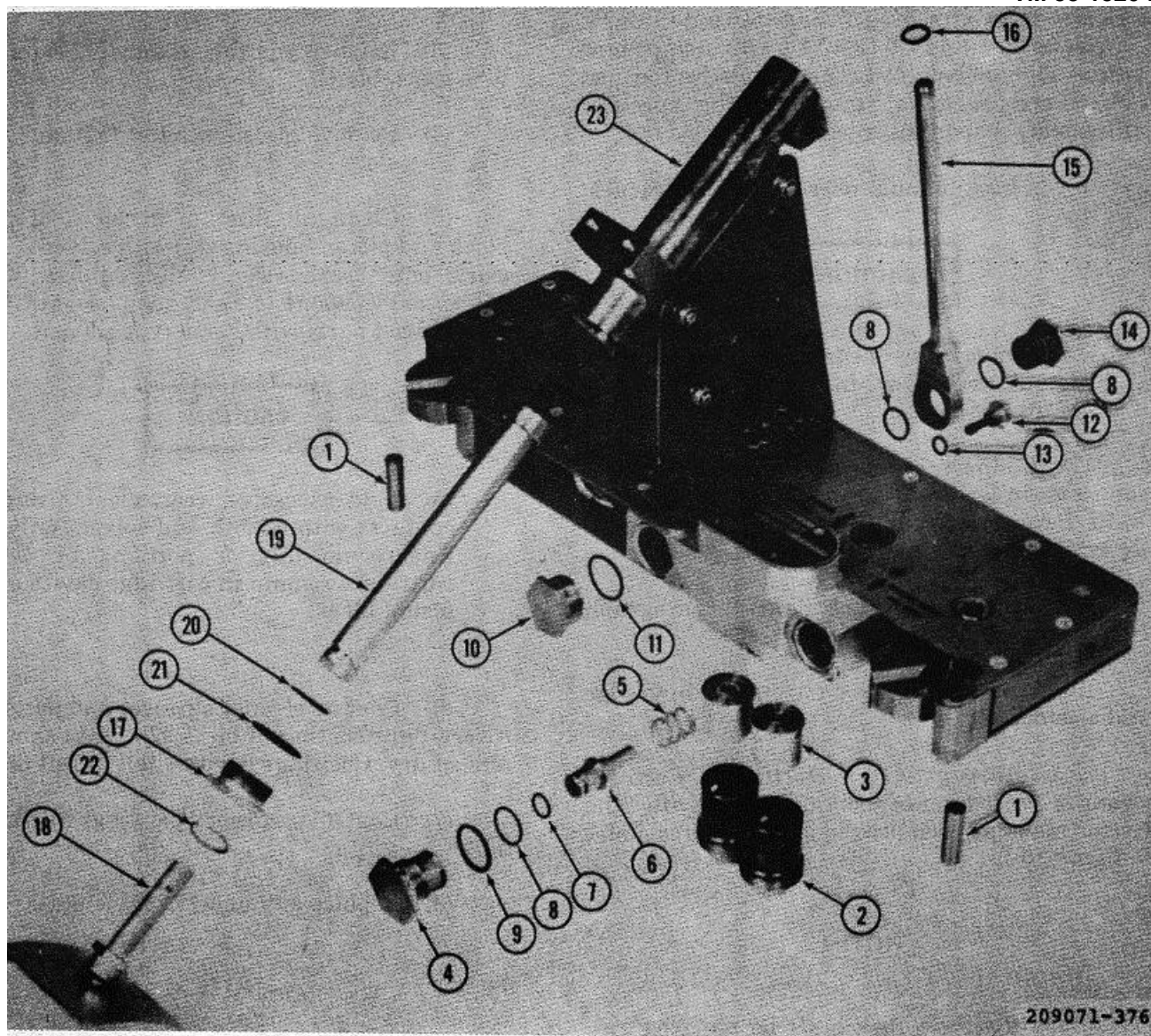
NOTE

Shims on bolts (5 and 10) provide 1.375 TO 1.380 dimensions between inside bosses of fittings at hole for bolt (6). If shims are lost or mixed, assemble fittings without rack and prepare shims for correct dimension, then proceed with step (2).

(2) Lift rack and fittings assembly in position. Align fittings (4) to mounting holes and install four pairs of bolts with washers, using shims between wing and fittings at locations noted during removal of rack. Torque bolts **100 TO 140** inch-pounds torque.

(3) Align fork of rod (13) to forward hook pivot of rack, and install bolt (14) with thin steel washers under head and nut. Align turnbuckles (16) to fittings (2), and install bolts (3) with thin washers under heads and nuts. Adjust rod ends of turnbuckles (16) as required to provide ease of installation of bolts (3).

(4) Using gunners quadrant (T7A), check rack for nose-up elevation of **71.1(±8.9)** mils (**4 (± 0.5)** degrees) with respect to fore and aft attitude or helicopter. If necessary to adjust rack, remove bolt (14) and adjust length of fork assembly (13). Reinstall fork (13) to rack with bolt (14) with washers and check for required angle.



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- | | | |
|-----------------------|-----------------------|-----------------------|
| 1. Pin | 9. Preformed Packing | 17. Piston Retainer |
| 2. Cartridge Retainer | 10. Breech Plug | 18. Ejector Foot Pad |
| 3. Cartridge | 11. Preformed Packing | 19. Piston |
| 4. Retaining Plug | 12. Plug | 20. Preformed Packing |
| 5. Compression Spring | 13. Preformed Packing | 21. Preformed Packing |
| 6. Slave Piston | 14. Gas Tube Retainer | 22. Retaining Ring |
| 7. Preformed Packing | 15. Gas Tube Assembly | 23. Piston Housing |
| 8. Preformed Packing | 16. Preformed Packing | |

Figure 16-11. Inboard rack with ejector disassembled

Repeat as necessary to achieve required angle.

(5) When alignment of rack is satisfactory, lockwire bolts attaching fitting to wing in pairs. Torque bolts (5 and 10) to **80 TO 100** inch-pounds torque. Tighten bolt (6). Adjust the ejector foot pad (18, figure 16-11) to snugly fit the specified armament weapon installed.

(6) Check manual release operation of rack.

CAUTION

To prevent firing of cartridges DO NOT install cartridges in rack prior to continuity test.

(7) Connect electrical cable of rack to connector in leading edge of wing. Refer to figure 16-10. Perform continuity test of jettison circuit. Refer to Chapter 9, paragraph 9-85.

(8) Install cartridges. Refer to paragraph 16-5.

(9) Install fairings on wing leading edge and ejector rack.

e. *Cleaning After Jettison.* Perform cleaning procedure as soon as possible after the ejector rack has been used to jettison stores. Refer to figure 16-1.

NOTE

Inboard ejector rack must be removed from wing, but fittings can remain attached to rack. Refer to paragraph 16-8a.

(1) Remove slave piston (6) and compression spring (5) by removing retaining plug (4) and preformed packings (9, 8 and 7).

NOTE

Pins (1) are not used in this rack installation. Cartridge retainers (2) and cartridges (3) will have been removed during removal of rack.

(2) Remove plug (12) and breech plug (10).

(3) Remove gas tube retainer (14) and gas tube assembly (15).

(4) Remove piston retainer (17) and piston (19).

(5) Clean all internal surfaces of piston block and piston housing (23) with solvent (C124), using bore brushes for 20MM, caliber .30 and caliber .50 weapons to clean gas passages. Clean all removed parts with same type solvent.

CAUTION

To avoid excessive wear, clean firing contacts with a cloth and solvent only. Ensure no dirt or portions of old cartridges remain in cartridge cavity of piston block.

(6) Coat all cleaned surfaces and parts with a very light coating of oil (C92). Parts should be almost dry. Cartridge cavity shall be left dry.

(7) Coat all preformed packings with grease (C72).

(8) Replace any unserviceable parts.

NOTE

Gas tube retainer (14), should be alternated between right and left inboard racks after each firing to minimize concentration of gas erosion on beveled surface at bottom of retainer. Retainer shall be replaced if erosion of beveled surface reaches center hole.

(9) Reassemble rack.

(10) Reinstall rack assembly on pylon.(Refer to paragraph 16-8d.).

16-9. Ejector Rack Fairings.

a. Inspection. Inspect inboard and outboard fairings for cracks, damage and serviceable condition. Refer to Chapter 2 for reparable damage limits.

b. Removal. Remove inboard and outboard fairings from rack and leading edge of wing by removing screws and releasing the fasteners.

c. Installation. Align fairings on wing and secure with screws. Snap fasteners in place.

16-10. Removal of Turret Gun.

When turret guns are removed, ballast (Appendix D, D-165) must be installed for weight and balance. (Refer to TM 9-1090-203-12.)

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CHAPTER 17
EMERGENCY EQUIPMENT

17-1. Canopy Removal System.

The canopy over the pilots and gunners station consists of formed transparent acrylic windows mounted in supporting framework of aluminum alloy tubes. Crew doors are incorporated in the canopy; the forward left side panel being the gunners door and the aft right side being the pilots door. Helicopters equipped with linear explosive type emergency canopy removal system (CRS) are marked by a triangle DANGER decal and a stenciled warning on each side of the fuselage below the canopy. Each window has a linear explosive window cutting assembly, installed around the inside of the frame and connected by flexible and shielded detonating cord lines to the two arming/firing mechanisms at the pilots and gunners station. Each arming/firing mechanism handle is marked with stripes and is secured by a safety pin. In emergency, either arming/firing handle is rotated 90 degrees clockwise to arm, then pulled to fire a primer charge which detonates all four window cutting assemblies. The explosive force is outward, cutting out and ejecting the four acrylic window glasses simultaneously.

WARNING

Ensure that both the pilot and gunners arming/firing mechanism handles are secured with safety pins prior to entry into the cockpit area.

NOTE

All unserviceable explosive items used in the CRS e.g., arm fire initiator, detonating cord, junction manifold, interconnect line shall be tagged with NSN, nomenclature, lot number, installation date, removal date, reason for removal, helicopter type/model, serial number and returned to supporting ammunition supply activity in the container used to transport the replacement item.

17-2. Window Cutting Assembly (WCA). Refer to figure 17-1.

WARNING

Activation of the canopy removal system when combustible fuel/vapors are present can result in an explosion/fire. Crew members survival knife may be used as an alternate means of egress.

The canopy removal system consists of four window cutting assemblies (WCA), flexible and rigid interconnecting lines junction manifolds, and two arming/firing (A/F) mechanisms. Each WCA consists of a slender lead or silver-sheathed tube of hexanitrostibene (HNSO) linear explosive held against the inside surface of the window by a resilient back-up cushion and a protecting retainer which is riveted to the window or door frame. Interconnecting lines of detonating cord are attached -by threaded connections to WCA adapters, junction manifolds, and A/F mechanisms.

Premaintenance Requirements for Window Cutting Assembly

Conditions	Requirements
Model	AH-1S
Part No. or Serial No.	All
Special Tools	None
Test Equipment	None
Support Equipment	None
Minimum Personnel Required	Two
Consumable Materials	(C19) (C21) (C22) (C46) (C83) (C87) (C88) (C112) (C116) (C135)
Special Environmental Conditions	None

WARNING

Ensure that both the pilot and gunners arming/firing mechanism handles are secured with safety pins prior to entry into the cockpit area.

Crews flying AH-1S with window cutting assemblies that do not meet inspection criteria or may be unreliable in emergencies, should have breakout tools or other suitable equipment to assist in egress from aircraft.

a. *Inspection.* Inspect the window cutting assembly (WCA) lead or silver - sheathed, linear explosive substance (LES) for the following:

- (1) Inspect for nicks, dents, scratches, and security.
- (2) Inspect linear explosive substance (LES) for breaks.

b. *Removal (AVIM).*

CAUTION

When the safety pin is to be removed for A/F mechanism replacement, safety wire will be installed in its place prior to disconnection and removal.

- (1) Remove the pilots and gunners door. Refer to Chapter 2.
- (2) Disconnect end fitting of interconnect line (detonating cord) from adapter of window cutting assembly. Install caps and plugs or equivalent protective cover.
- (3) Remove any screws through retainer of window cutting assembly, and drill out rivets attaching retainer to frame of door or window.

WARNING

Provide adequate ventilation when using methyl-ethyl-ketone. Avoid breathing solvent vapors and avoid prolonged skin contact.

CAUTION

Avoid use of any of the ketone family solvents. They will attack the polycarbonate materials.

WARNING

When handling an explosive component, position the end(s) of the article in the least hazardous direction.

CAUTION

Whenever an interconnect line or window linear explosive charge is outside the aircraft or storage container, a tag specifying an explosive shall be attached, to prevent handling by someone other than specific maintenance personnel.

- (4) Remove window cutting assembly. Use a putty knife or other suitable tool to loosen sealant. Clean sealant from glass with naphtha (C88), and from frame with methyl-ethyl-ketone (C87).

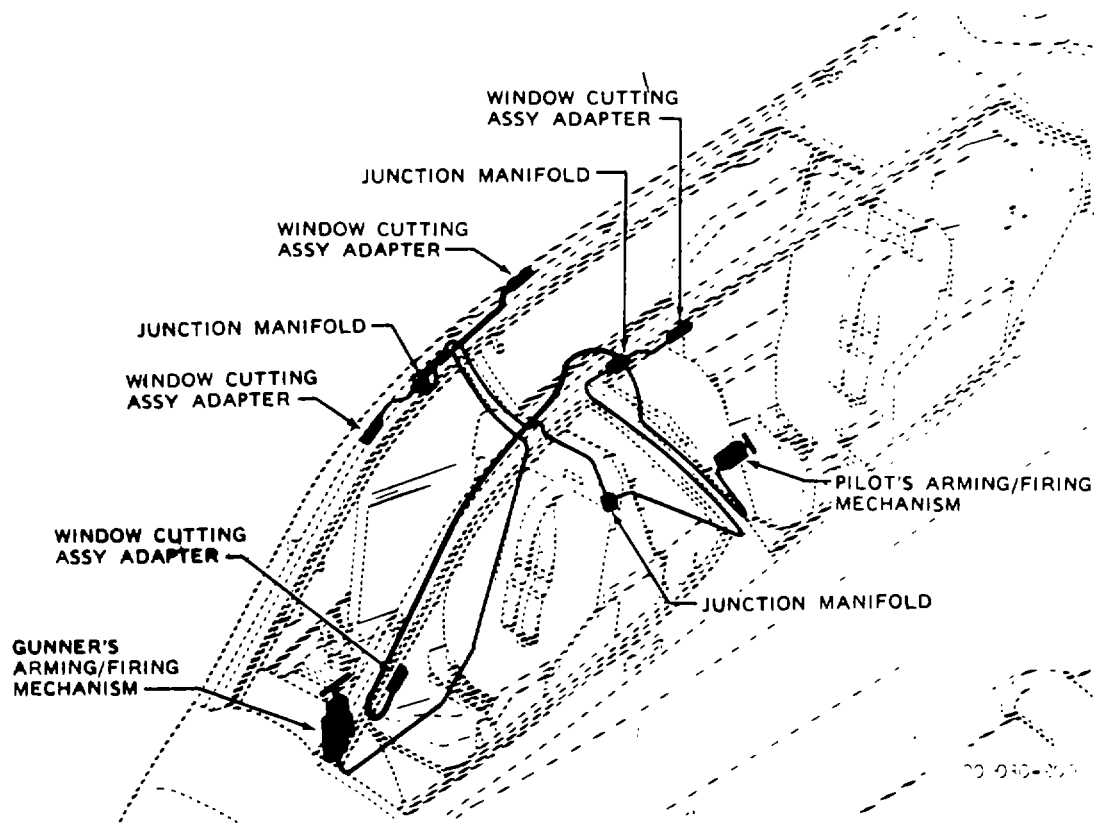


Figure 17-1. Canopy removal system interconnections

c. *Repair or Replacement (AVIM).*

WARNING

When the A/F mechanism is removed from the aircraft for reason other than replacement, the safety pin will be safety wired to the A/F mechanism.

- (1) If LES is broken, replace window cutting assembly.
- (2) Repair nicks, scratches, and small dents to polycarbonate material retainers as follows:
 - (a) Lightly sand and smooth nicks, scratches or dents with 180 grit sandpaper (C112).
 - (b) Touch up repaired area with Lexcote (C83) and allow to cure at room temperature for 3 days or, using a heat lamp, heat repaired area 150 to 200° F for 2 to 3 hours.
- (3) Repair cracks, tears, deep scratches or punctures of retainers by patching as follows:
 - (a) Remove minimum material to clean up damaged area.
 - (b) Cut four layers of cloth (C46) to overlap damaged area. Patch.

material must overlap edges of damaged area a minimum of 0.50 inch.

NOTE

Maintain original contour. Some areas require as many as eight plies if glass cloth is used.

(c) Sand area to be covered by patch, using 180 grit sandpaper (C112). Wipe sanded area with clean cloth moistened with alcohol (C22).

(d) Deleted.

(e) If glass cloth is to be used for patching, apply each layer of glass cloth saturated with adhesive (C21) and allow to cure as in (d) above. Sand repaired area to smooth finish with 400 grit sandpaper (C112) and wipe with clean cloth moistened with alcohol (C22).

(f) Touch up repaired area with Lexcote (C83) and allow to cure at room temperature for 3 days or cure at 150° to 200° F for 2 to 3 hours.

(4) If emergency window cutting assembly has been used, or damaged to the extent its function in emergency might be unreliable, or fails to meet inspection requirements, replace window cutting assembly.

d. *Installation (AVIM)*. Upon removal of the A/F mechanism from the storage container, inspect to assure the safety wire is in place. If there is no safety, turn the mechanism over to Explosive Ordnance Disposal personnel.

WARNING

Never attempt to reinstall a safety wire/safety pin in an A/F mechanism which is not connected to the canopy removal system.

CAUTION

Use extreme care in all handling of window cutting assembly after removal of shipping frame. Irreparable damage to linear explosive cutting insert can result if excessive bending occurs.

NOTE

Window cutting assemblies (WCA) are supplied in blank configuration, attached on a tabular frame for shipping and handling. The shipping frame and the protective covering over the assembly face should be kept in place as long as possible before actual installation.

(1) Position window cutting assembly on clean work area with mounting flange up. Carefully remove shipping frame.

(2) Apply masking tape (C135) to both sides of window or door glass, leaving an uncovered border approximately 2 inches wide around inside surface for installation of window cutting assembly.

(3) Lay out rivet locations according to applicable illustration, if frame is new and undrilled. See figures 17-2, 17-3, 17-4 and 17-5. If using frame previously drilled, pick up existing holes by using a hole finder.

(4) Carefully position window cutting assembly, with protective covering intact, into window or door frame. Align edges of mounting flange with as little distortion as possible, and secure with clamps and masking tape or other suitable means. Check that rivet locations will allow adequate edge distance.

(5) Drill No. 27 (0.144 inch diameter) rivet holes through window cutting assembly mounting flange and inner wall of frame tube. Use skin fasteners (Cleco or equivalent) as holes are drilled to maintain alignment. Mark any location where flange of window cutting assembly requires trimming.

(6) Observe requirements for particular window or door as follow:

(a) *Gunners Window (figure 17-2)*. At lower aft corner, locate and drill screw holes according to Detail A, through window, frame, and window cutting assembly flange. Holes are to be perpendicular to window and countersunk on exterior 100° X 0.342. Two cut-outs, 0.44 inch wide X 0.22 inch radius, are required on forward edge of window cutting assembly flange to clear existing rivnuts in frame.

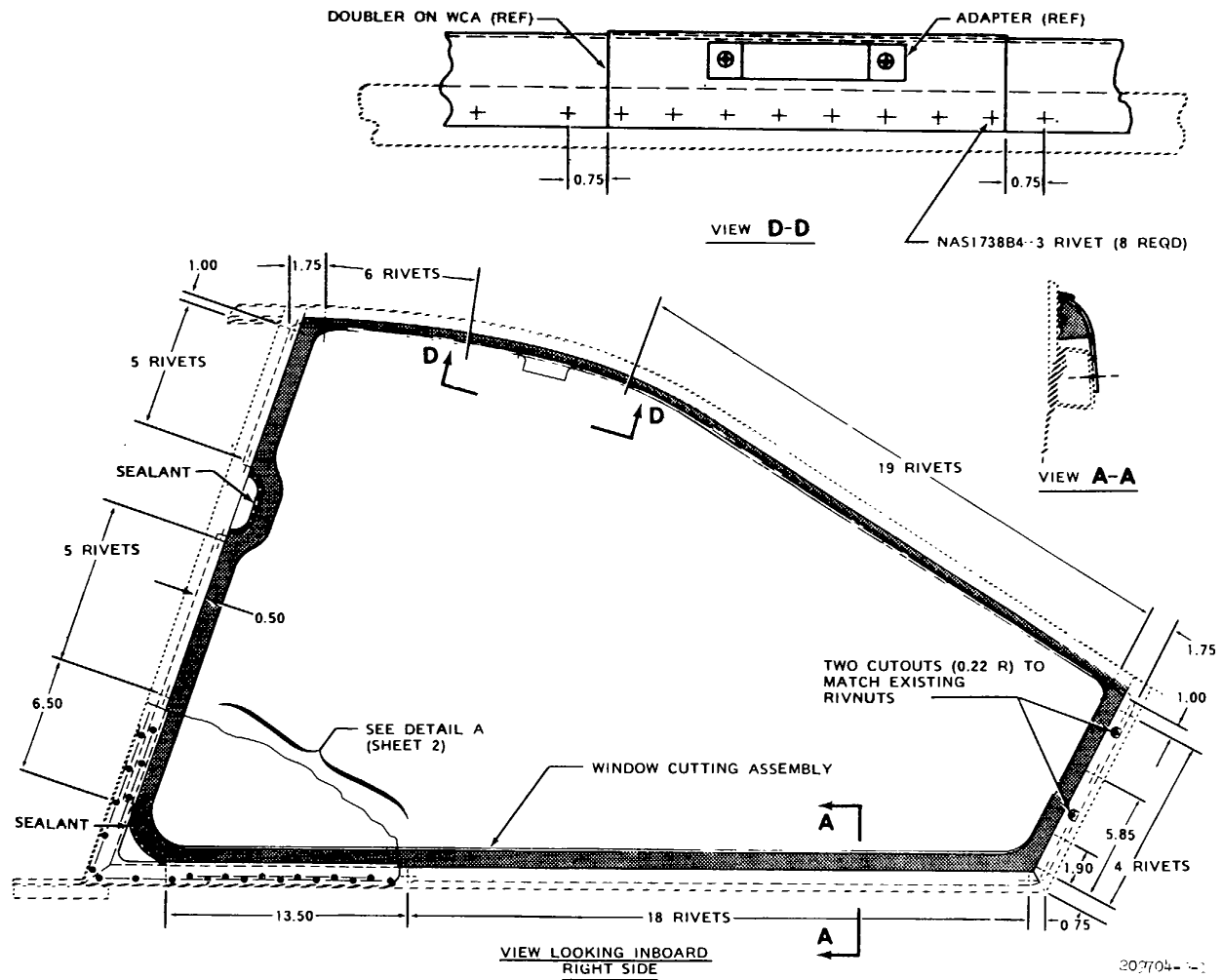


Figure 17-2. Installation of window cutting assembly in gunners window (Sheet 1 of 2).

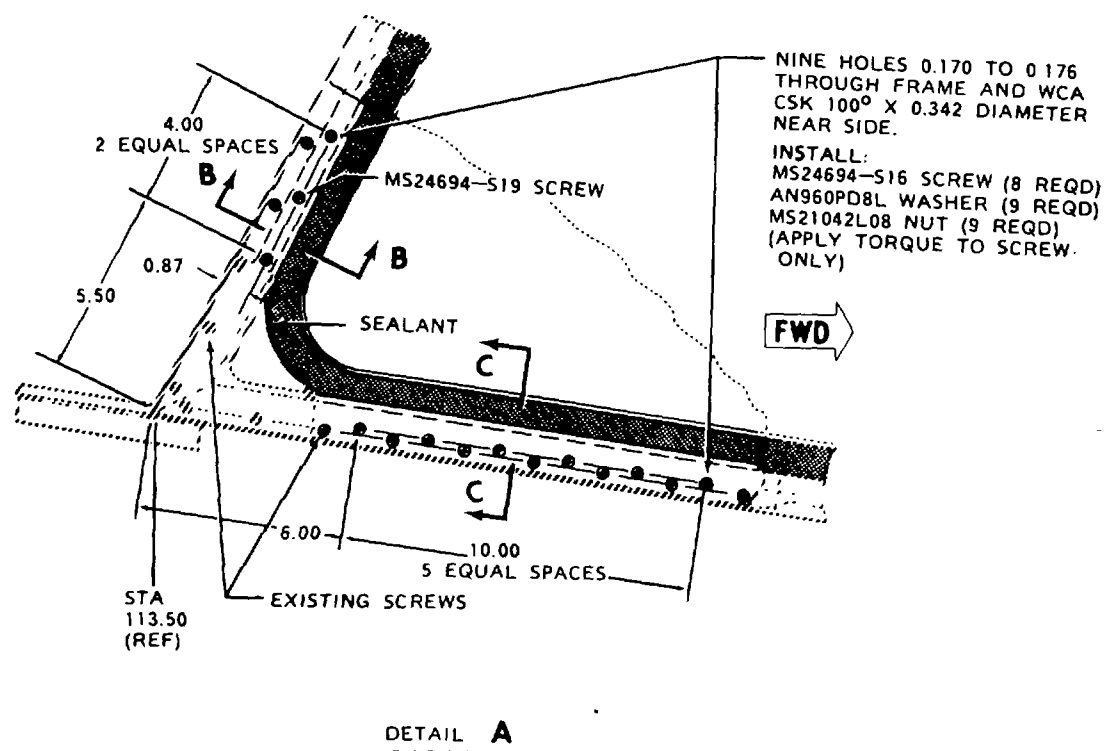
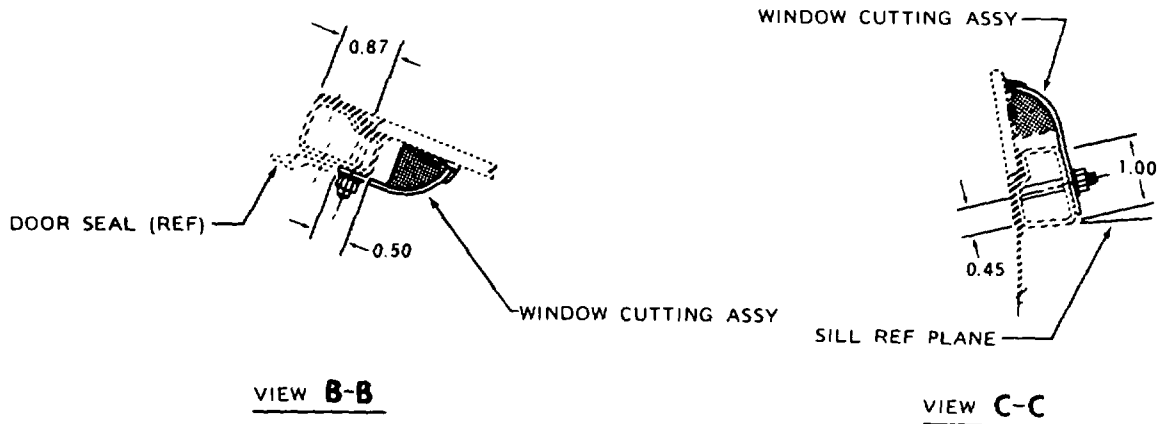


Figure 17-2. Installation of window cutting assembly in gunners window (Sheet 2 of 2)

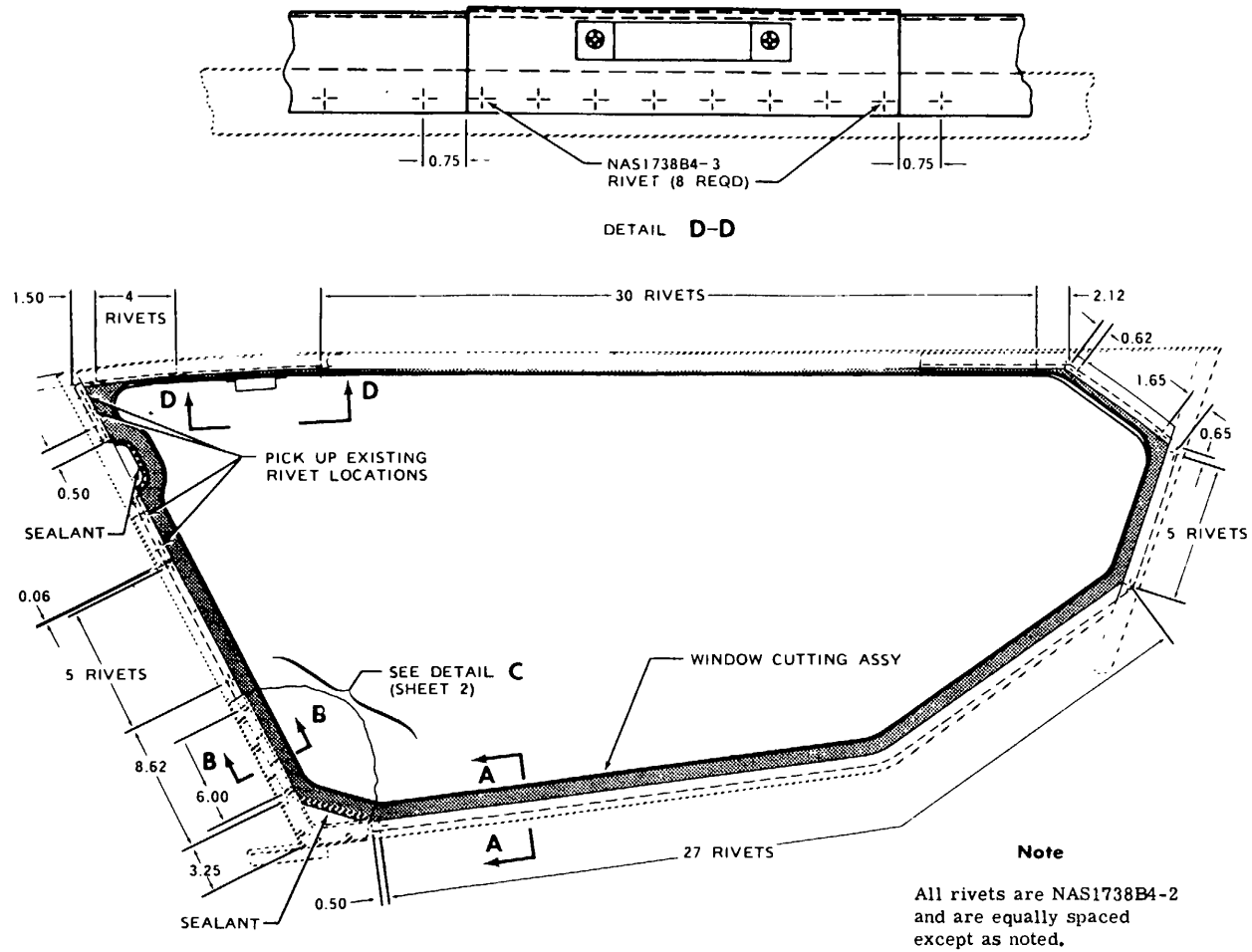
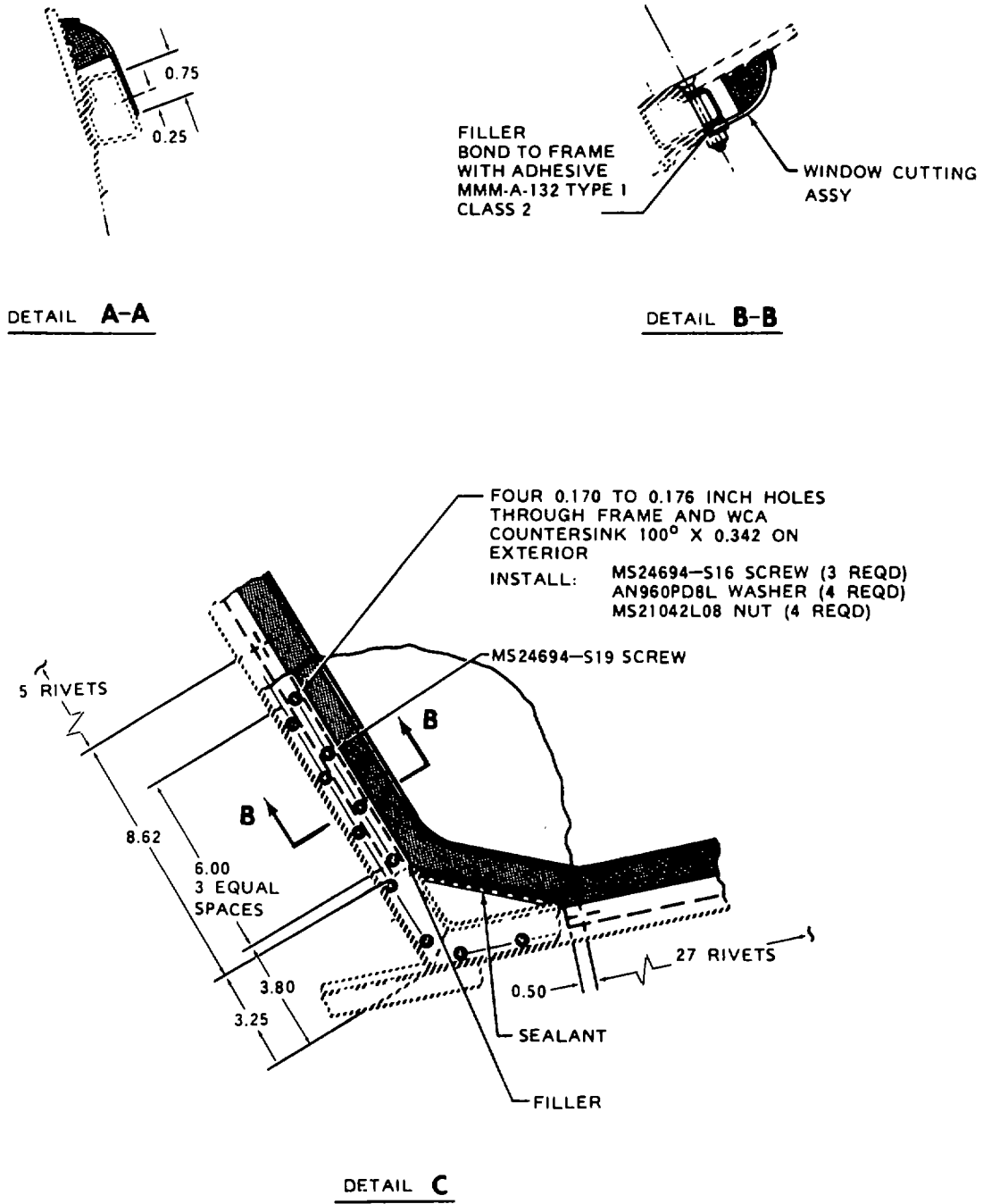


Figure 17-3. Installation of window cutting assembly in pilots window (Sheet 1 of 2)



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Figure 17-3. Installation of window cutting assembly in pilots window (Sheet 2 of 2)
 17-7

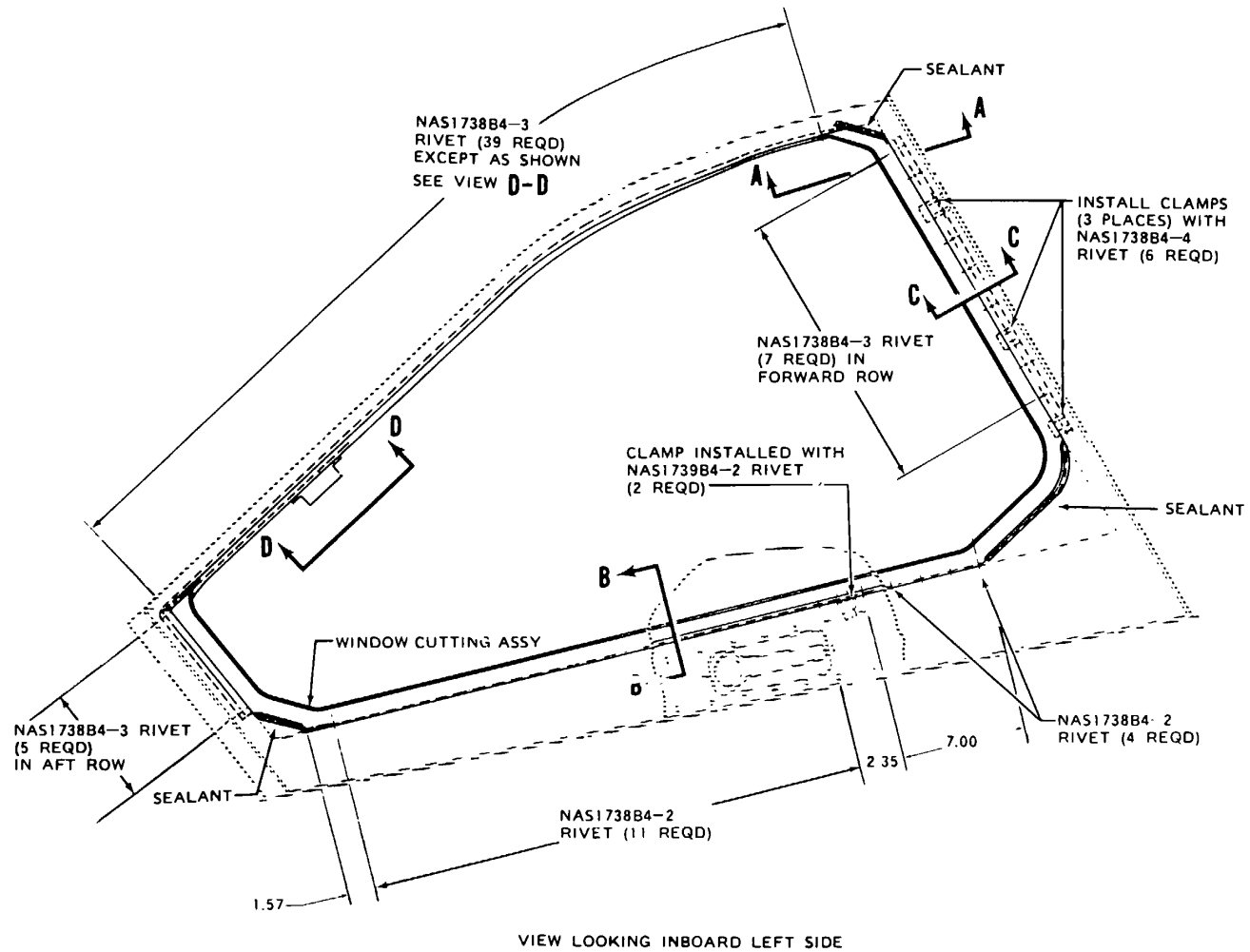
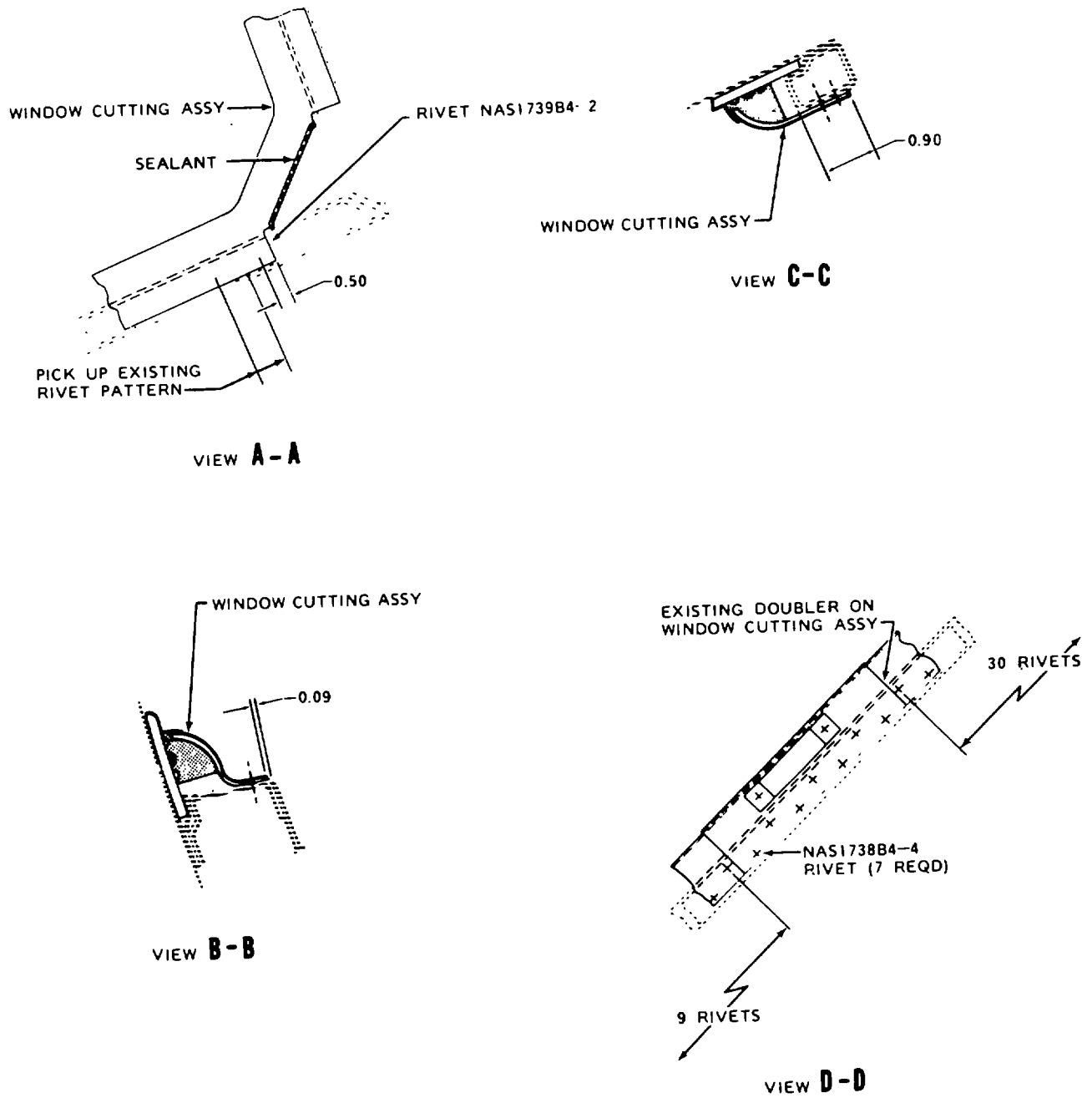


Figure 17-4. Installation of window cutting assembly in gunners door (Sheet 1 of 2)

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Figure 17-4. Installation of window cutting assembly in gunners door (Sheet 2 of 2)

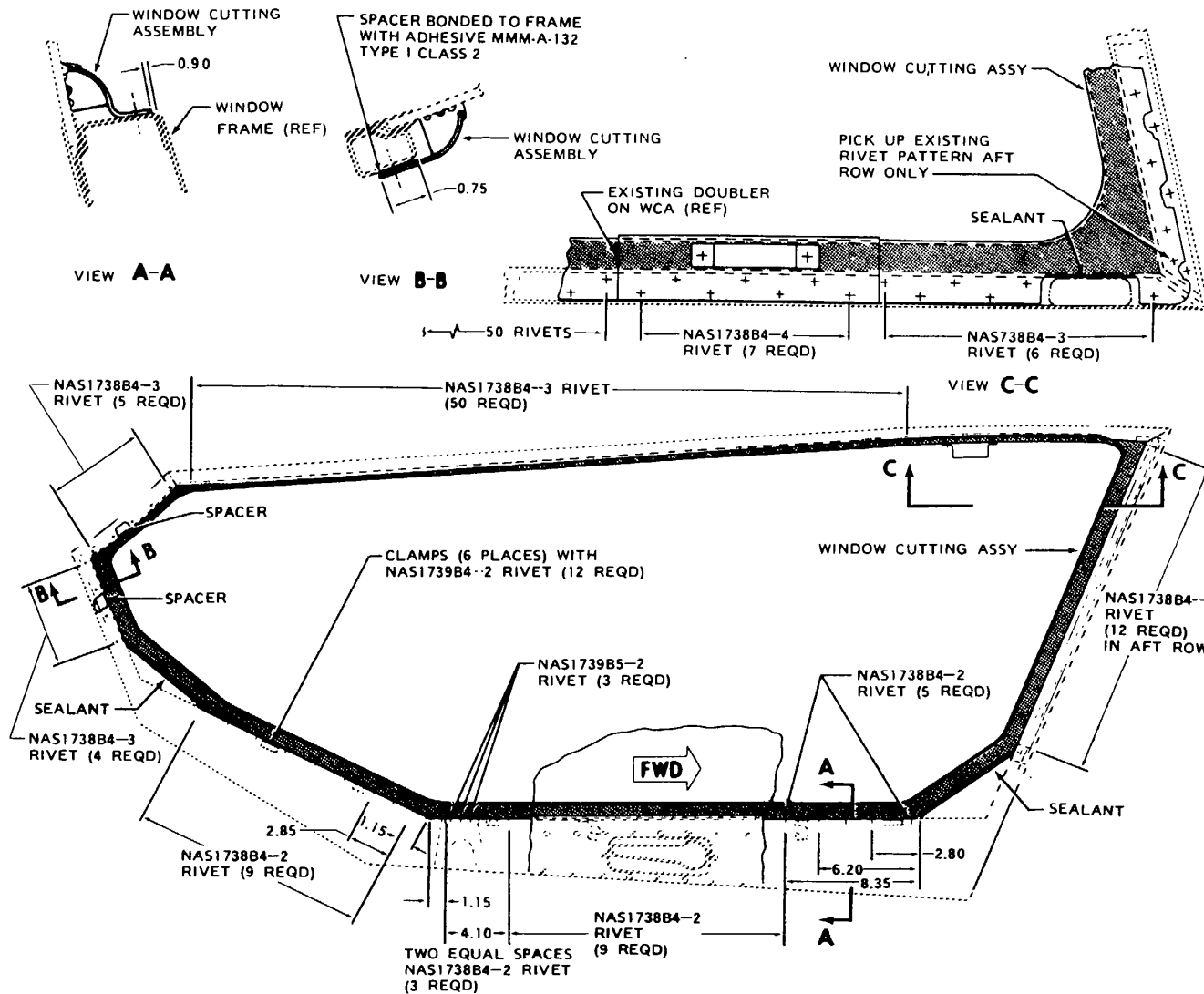


Figure 17-5. Installation of window cutting assembly - pilots door

(b) *Pilots Window (figure 17-3)*. Check that filler is bonded with adhesive (C19), along lower part of frame, adjacent to gunners door seal, according to Detail B-B. Check that forward edge of window cutting assembly flange butts against extrusion for gunners door seal. At lower forward corner, locate and drill screw holes according to Detail C through window frame and window cutting assembly flange. Holes are to be perpendicular to window and countersunk on exterior 100° X 0.342.

(c) *Gunners Door (figure 17-4)*. If cable clamps interfere, remove cable and clamps for reinstallation after installing window cutting assembly. Remove interfering rivets at forward and aft edges, and drill window cutting assembly flange to match holes.

(d) *Pilots Door (figure 17-5)*. Check that rivets securing brackets and clamps to lower window frame are installed in countersunk holes to avoid interference. Remove interfering rivets along forward and upper edges, and drill window cutting assembly flange to match holes. Check that spacers are bonded to aft edge of frame at locations shown.

(7) Carefully remove window cutting assembly from window or door frame, and place on clean work area.

(8) Remove burrs from holes in window cutting assembly window or door frame.

(9) Trim window cutting assembly flange where required. Touch up trimmed area in accordance with paragraph 17-2, c. (1) (b).

(10) Carefully clean all drill chips, debris, and dirt from window cutting assembly and from mating surfaces of window glass and frame.

CAUTION

After next step, avoid contact with exposed face of window cutting assembly back-up cushion and cutting insert.

(11) Remove protective covering from face of WCA.

(12) Carefully position window cutting assembly frame and secure with skin fasteners.

(13) Apply sealant (C116) in gaps between window and window cutting assembly retainer at strut fitting areas and corner locations as shown on figures 17-2, 17-3, 17-4, and 17-5. After installing window cutting assembly, check inner edges for areas where rubber seal does not contact window glass. If open areas are found, apply a fillet bead of sealant of minimum size and length to seal the window cutting assembly. When installing explosive cord, strive for zero clearance between cord and window for optimum performance.

NOTE

The clearance gaps may be taken visually by making an optical comparison through the windshield or by using an L-shaped work aid 0.10 and/or 0.25 inch thick.

(13a) Any gap between zero and 0.10 inch is acceptable over the entire perimeter of the window. For any gap between 0.10 and 0.25 inch, apply a bead of RTV 108 adhesive (C16A) directly between the explosive cord and the windshield. The adhesive should be centered directly over and in physical contact with the explosive cord.

(13b) The nominal adhesive bead width should be 0.25 in. Any larger bead widths should be minimized. Care should be exercised in minimizing filling the other cavities between the bulb seals and the windshield. Under no circumstances will any gap greater than 0.25 inch be acceptable. The window cutting assembly must be adjusted or replaced to eliminate any gaps that exceed 0.25 inch.

(14) Install rivets to secure window cutting assembly flange and adapter doubler. Also, install screws where required in pilots or gunners window. Tighten only at screw heads.

(15) On gunners door, insert release cable end into fitting at upper corner and reinstall cable clamps with rivets at original locations.

(16) Remove vinyl tape from window or door glass.

(17) Connect end fitting of interconnect line (detonating cord) to window cutting assembly adapter, torque fitting **30 TO 45** inch-pounds and lockwire.

(18) Install the pilots and gunners door. Refer to Chapter 2.

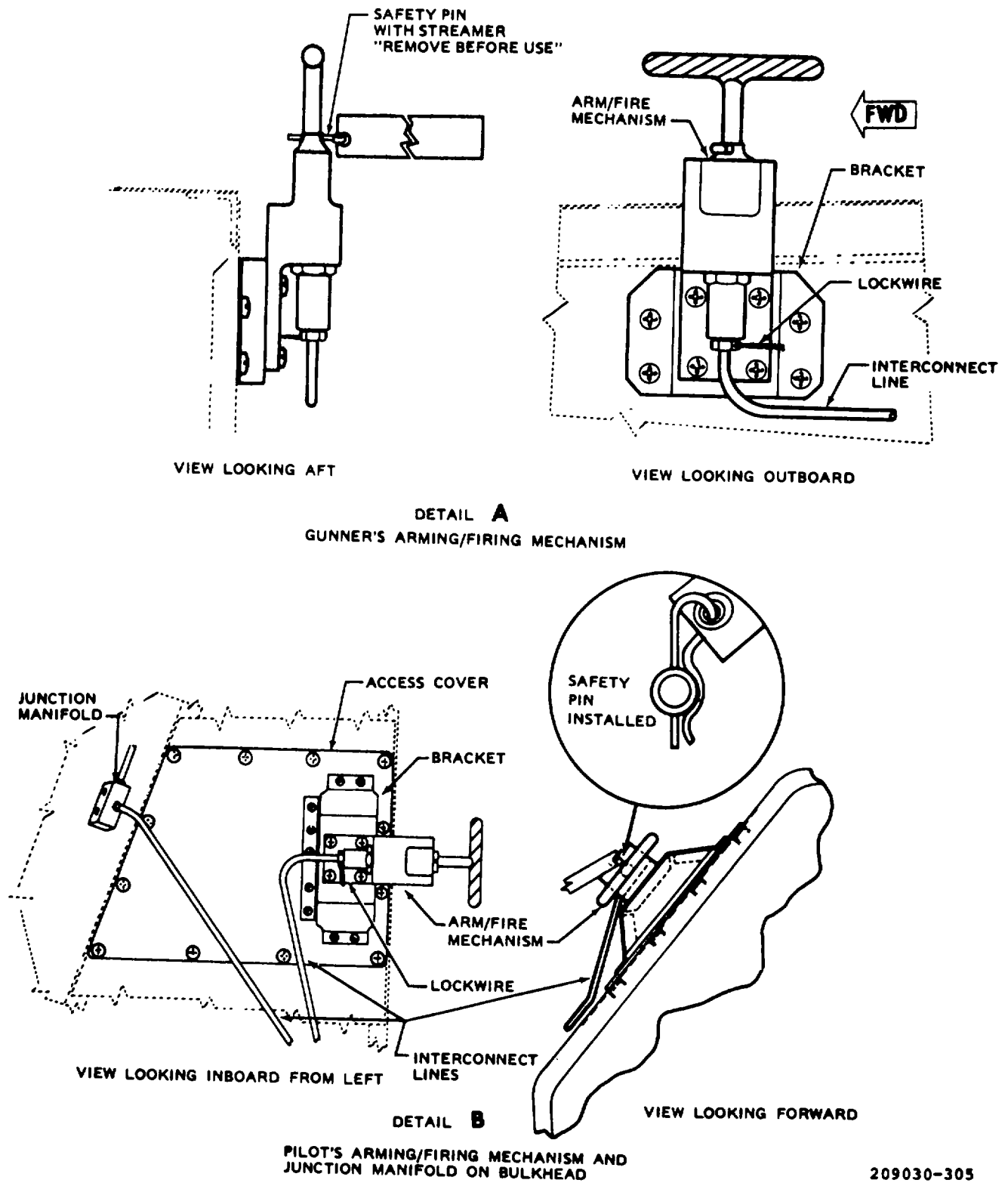
(19) Remove protective caps from interconnecting line and connect to adapter and lockwire.

17-3. Activating Mechanism. Refer to figure 17-6.

The activating mechanism consists of interconnecting lines of detonating cord with threaded connections for attachment to WCA adapters, junction manifolds, and A/F mechanism. The arming/firing mechanism is activated when the handle is rotated 90 degrees' clockwise to arm, then pulled to fire primer charge. The junction manifolds connect the system together.

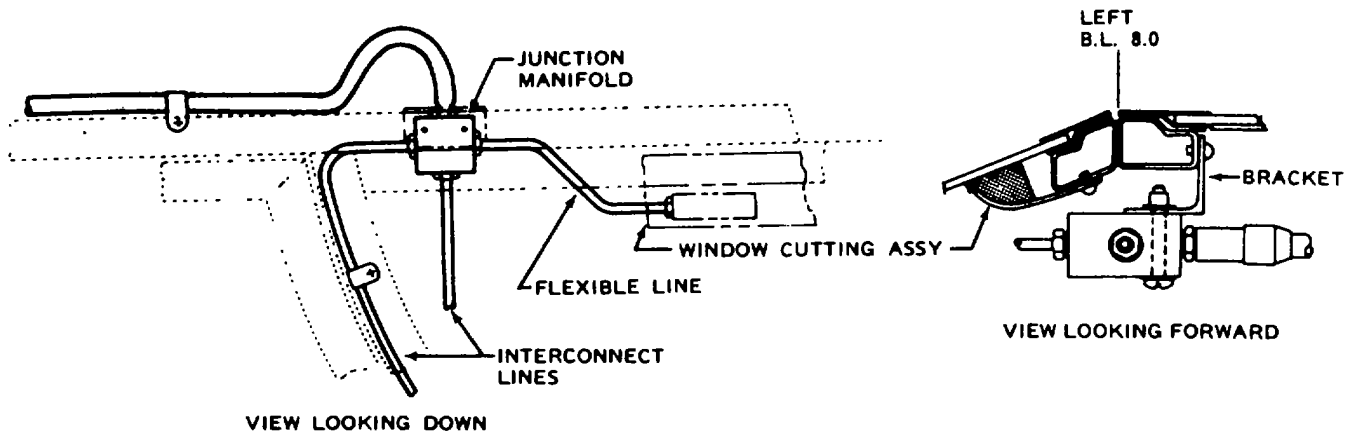
a. *Inspection.* Inspect the interconnect lines, arming/firing mechanism and junction manifold for the following:

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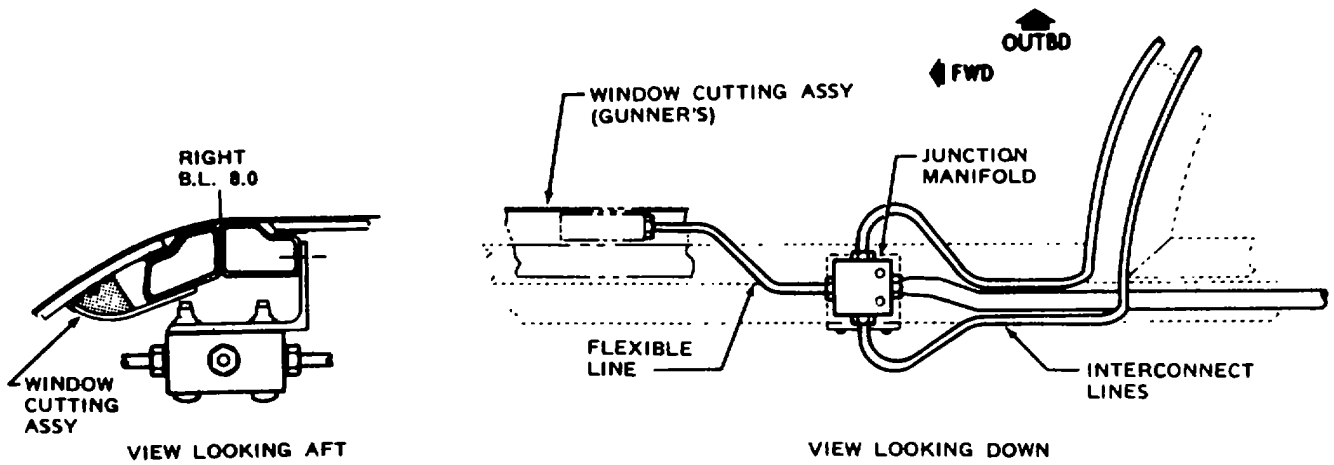


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Figure 17-6. Installation of Junction manifolds and arming/firing units in canopy removal system (Sheet 1 of 2)



DETAIL C - UPPER RIGHT JUNCTION MANIFOLD



DETAIL D - UPPER LEFT JUNCTION MANIFOLD

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Figure 17-6. Installation of junction manifolds and arming/firing units in canopy removal system (Sheet 2 of 2)

- (1) Inspect for corrosion, security, wear, and broken lines.

CAUTION

Do not turn arming/firing handle because this action will sever the nylon pin which gives resistance to prevent the handle from rotating.

- (2) Deleted

b. Removal.

(1) Interconnecting lines. Loosen jam nut one-half turn only, and turn hex nut and jam nut at same time to disconnect each end of line from junction manifold, WCA adapter, or A/F mechanism. Install protective caps and plugs. Remove clamps as necessary to detach line from structure.

NOTE

Do not remove jam nut from threaded end of CRS interconnect line.

(2) *Arming/firing mechanism.* Cut lockwire and disconnect end fitting of interconnect line from A/F unit. Install cap and plug. Remove four screws and washers to detach unit from bracket.

(3) *Junction manifolds.* Disconnect end fittings of interconnect lines and install protective caps and plugs. Remove two screws and washers to detach manifold from bracket or bulkhead.

c. Repair. Replace activating mechanisms, interconnect lines, arming/firing mechanism, and junction manifolds if inspection requirements are exceeded.

d. Installation - Interconnecting lines. Remove protective caps from the line. Start the line at both ends in the connection and turn the jam nut and hex nut at the same time. When secure turn jam nut one-half turn.

(1) Remove protective cap and plug from A/F unit. Install four screws and washers to secure unit to the bracket. Connect fitting of interconnecting line to A/F unit and lockwire jam nut of interconnecting line.

(2) *Junction manifold.* Install manifold to bracket or bulkhead and secure with two screws and two washers. Remove protective caps from interconnect lines and connect to manifold.

17-3A. Window Cutting Assembly Shells.

NOTE

When window cutting assembly shells have been installed over damaged window cutting assemblies (WCA) the following replacement instructions apply.

- a. Drill out rivets and replace part numbers 815478 shells. Refer to figure 17-7 for a typical installation.
- b. Replace rivets in accordance with figures 17-2 through 17-4 and table 17-1.
- c. Refer to table 17-1 for shell window effectivity.

Table 17-1. Shell Assemblies

APPLICATION	PART NUMBERS
Pilot's door	815478-1 (4 segments)
Gunner's door	815478-2 (4 segments)
Gunner's window	815478-3 (4 segments)
Pilot's window	815478-4 (4 segments)
Rivets	NAS 1738B4-4 AR
Rivets	NAS 1738B4-5 AR

17-4. First Aid Kit.

The first aid kit is fastened on the left side of the fire wall behind the pilots seat and snap fasteners.

- a. Inspection. Refer to TM 55-1500-328-25.
- b. Removal. Pull outward on kit to release fasteners.
- c. Installation. Position kit on fasteners and push to engage snaps.

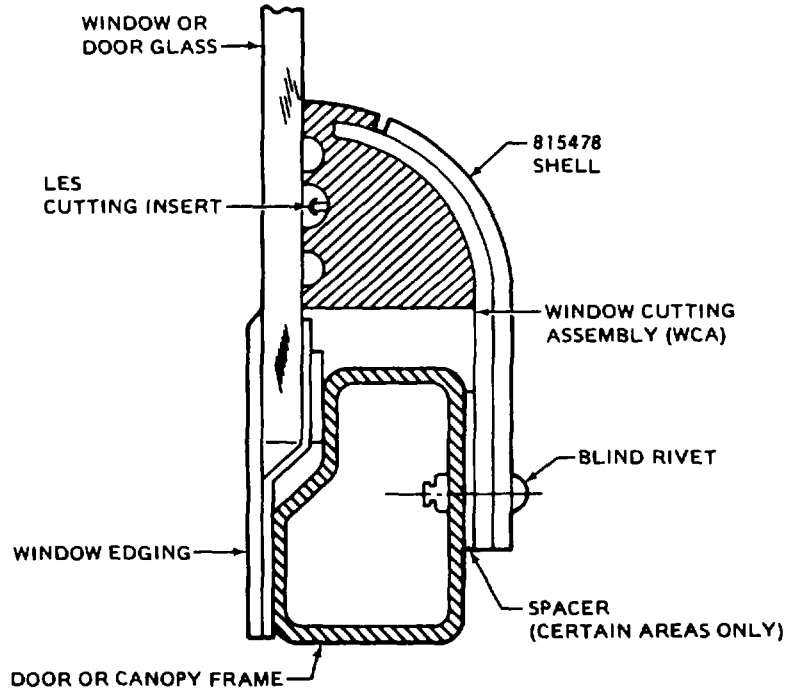


Figure 17-7. Typical shell installation

17-5. Fire Extinguisher.

The fire extinguisher is located on the bulkhead behind the gunners left shoulder.

WARNING

If fire extinguisher is left in the cockpit at temperature above 38 degrees C (100 degrees F), it may explode.

a. Inspection. All fire extinguishers should be weighed every six months to determine that they are fully charged. The fully charged weight of fire extinguishers must not be less than four ounces below the gross weight stamped on the nameplate. If this weight is not met the extinguisher must be replaced.

b. Removal.

- (1) Unlatch holding strap and lift extinguisher from bracket.
- (2) Remove retaining screws and washers and remove bracket from bulkhead.

c. Installation.

- (1) Attach bracket to bulkhead with screws and washers.
- (2) Place extinguisher in bracket and latch in place.

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APPENDIX A

REFERENCE

The following references, of the issue in effect, are required for use by aviation unit and intermediate maintenance personnel in performance of their duties.

NUMBER	TITLE
AR 95-3	Weight and Balance, Army Aircraft
AR 750-31	Technical Publication for Aircraft File
DA PAM 738-751	The Army Maintenance Management System (TAMMS)
FM 10-68	Aircraft Refueling
FM 10-69	Petroleum Handling and Operation
FM 55-413	Aerial Recovery of Aircraft
MIL-L-6866	Penetrant Method of Inspection
MIL-L-6868	Magnetic Particle Inspection Process
TB 43-0106	Army Oil Analysis Program
TB 55-1500-307-24	Aircraft Components Requiring Maintenance Management and Historical Data
TB 55-1560-276-24/1	Polish Kit, Glass, PN RS 69
TB 55-9150-200-24	Engine and Transmission Oils, Fuels, and Additives for Army Aircraft
TB 738-751	Use of Material Condition Tags and Labels on Army Aeronautical and Air Delivery Equipment
TB 746-93-2	Painting and Marking of Army Aircraft
TB 750-25	Maintenance of Supplies and Equipment: Army Metrology and Calibration System
TM 1-1500-328-25	Aeronautical Equipment Maintenance Management Policies and Procedures
TM 1-1520-250-23-1	General Tie-Down and Mooring Technical Manual Aviation Unit And Intermediate Maintenance All Series Army Models AH-64, UH-60, CH-47, UH- 1, AH-1, OH-58 Helicopters
TM 3-220	Chemical, Biological and Radiological (CBR) Decontamination
TM 9-1090-203-12	Operator and Organizational Maintenance Manual for Armament Subsystem, Helicopter 7.62 Millimeter Machine Gun - 40 Millimeter Grenade Launcher: M28 (used on AH-IS helicopters)
TM 9-1270-212-14	Operator, Organizational and Direct Support Maintenance: XM128 Helmet Sight Subsystem
TM 9-1330-208-25	Organizational, DS, GS and Depot Maintenance Manual (Including Spare Parts and Special Tools List) Dispenser, Grenade: Smoke, XM 118 (NSN 1330-00-133-7248)
TM 9-1425-473-20	Organizational Maintenance Manual for Armament Subsystem Helicopter TOW Guided Missile XM65

NUMBER	TITLE
TM 9-1425-473-34	Direct and General Support Maintenance Manual, Armament Subsystem, Helicopter TOW Guided Missile XM65
TM 11-1520-221-20	Organizational Maintenance Manual: Electronic Equipment Configurations
TM 11-6125-220-35	Motor Generator PU-543A (Standby Inverter)
TM 11-6125-246-25	Motor Generator PU 542A (Main Inverter)
TM 11-6140-203-14-2	Operator's Organizational Direct Support, General Support and Depot Nickel - Cadmium Batteries
TM 38-230	Preservation, Packaging and Packing of Military Supplies and Equipment
TM 55-1500-204-25/1	General Aircraft Maintenance Manual
TM 55-1500-220-PM	Phased Maintenance Checklist
TM 55-1500-220-PMD	Preventive Maintenance Daily
TM 55-1500-326-25	Standards of Serviceability for Transfer of Aircraft
TM 55-1500-333-24	Cleaning Procedure for Army Aircraft
TM 55-1500-334-15	Hydraulic Oil Conversion to Fire Retardant MIL-H-83282
TM 55-1500-335-23	Nondestructive Inspection Methods
TM 55-1500-339-S	AH-1 Shipping Manual
TM 55-1500-342-23	Army Aviation Maintenance Engineering Manual: Weight and Balance (formerly TM 55-405-9)
TM 55-1520-234-10	Operator's Manual
TM 55-1520-234-23P	Repair Parts and Special Tools List (AH-1S)
TM 55-2620-200-24	Inspection, Maintenance Instructions, Storage and Disposition of Aircraft Tires and Inner Tubes
TM 55-2840-229-23	AVUM/AVIM T53 Engine, Shaft Turbine
TM 55-4920-244-14	Tester, Exhaust Gas Temperature, Model BH 112-JA-36

NUMBER

TITLE

■ TM 740-90-1

Administrative Storage of Equipment

TM 750-244-1-5

Procedure for the Destruction of Aircraft and Associated Equipment to Prevent Enemy Use

■ TM 750-244-5-1

Destruction of Conventional Ammunition and Improved Conventional Munitions to Prevent Enemy Use

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APPENDIX B

MAINTENANCE ALLOCATION CHART

SECTION I. INTRODUCTION

B-1. MAINTENANCE ALLOCATION CHART

a. This Maintenance Allocation Chart (MAC) assigns maintenance functions in accordance with the Three Levels of Maintenance concept for army aircraft. These maintenance levels, Aviation Unit Maintenance (AVUM); Aviation Intermediate Maintenance (AVIM) and Depot Maintenance are depicted on the MAC as:

AVUM which corresponds to the 0 Code in the RPSTL

AVIM which corresponds to an F Code in the RPSTL

DEPOT which corresponds to a D Code in the RPSTL

b. The maintenance to be performed below depot and in the field is described as follows:

(1) Aviation Unit Maintenance (AVUM) activities will be staffed and equipped to perform high frequency "On-Aircraft" maintenance tasks required to retain or return aircraft to a serviceable condition. The maintenance capability of the AVUM will be governed by the Maintenance Allocation Chart (MAC) and limited by the amount and complexity of ground support equipment (GSE), facilities required, and number of spaces and critical skills available. The range and quantity of authorized spare modules/components will be consistent with the mobility requirements dictated by the air mobility concept. (Assignments of maintenance tasks to divisional company size aviation units will consider the overall maintenance capability of the division, the requirement to conserve personnel and equipment resources and air mobility requirements.)

(a) Company Size Aviation Units: Perform those tasks which consist primarily of preventive maintenance and maintenance repair and replacement functions associated with sustaining a high level of aircraft operational readiness. Perform maintenance inspections and servicing to include preflight, daily, intermediate, periodic, and special inspections as authorized by the MAC or higher headquarters. Identify the cause of equipment/system malfunctions using applicable technical manual troubleshooting instructions, built in-test equipment (BITE), installed aircraft instruments, or easy to use/interpret diagnostic/fault isolation devices (TMDE). Replace worn or damaged modules/components which do not require complex adjustments or system alignment and which can be removed/installed with available skills, tools and equipment. Perform operational and continuity checks and make minor repairs to the electrical system. Inspect, service, and make operational, capacity, and pressure checks to hydraulic systems. Perform servicing, functional adjustments, and minor repair/replacement to the flight control, propulsion, power train, and fuel systems. Accomplish air frame repair which does not require extensive disassembly, jiggling, or alignment. The manufacture of air frame parts will be limited to those items which can be fabricated with tools and equipment found in current air mobile tool and shop sets. Evacuate unserviceable modules/components and end items beyond the repair capability of AVUM to the supporting AVIM.

(b) Less than Company Size Aviation Units: Aviation elements organic to brigade, group, battalion headquarters, and detachment size units are normally small and have less than ten aircraft assigned. Maintenance tasks performed by these units will be those which can be accomplished by the aircraft crew chief or assigned aircraft repairman and will normally be limited to preventive maintenance, inspections, servicing, spot painting, stop drilling, application of nonstress patches, minor adjustments, module/component fault diagnosis, and replacement of selected modules/components. Repair functions will normally be accomplished by the supporting AVIM unit.

(2) Aviation Intermediate Maintenance (AVIM) provides mobile, responsive "One Stop"

maintenance support. (Maintenance functions which are not conducive to sustaining air mobility will be assigned to depot maintenance). Performs all maintenance functions authorized to be done at AVUM. Repair of equipment for return to user will emphasize support or operational readiness requirements. Authorized maintenance includes replacement and repair of modules/components and end items which can be accomplished efficiently with available skills, tools, and equipment. Established the Direct Exchange (DX) program for AVUM units by repairing selected items for return to stock when such repairs cannot be accomplished at the AVUM level. Inspects, troubleshoots, test diagnoses, repairs, adjusts, calibrates, and aligns aircraft system modules/components. AVIM units will have capability to determine the serviceability of specified modules/components removed prior to the expiration of the Time Between Overhaul (TBO) or finite life. Module/component disassembly and repair will support the DX program and will normally be limited to tasks requiring cleaning and the replacement of seals, fittings, and items of common hardware. Airframe repair and fabrication of parts will be limited to those maintenance tasks which can be performed with available tools and test equipment. Unserviceable reparable modules/components and end items which are beyond the capability of AVIM to repair will be evacuated to Depot Maintenance. This level will perform aircraft weight and balance inspections and other special inspections which exceed AVUM capability. Provides quick response maintenance support, including aircraft recovery and air evacuation, on-the-job training, and technical assistance through the use of mobile maintenance contact teams. Maintains authorized operational readiness float aircraft. Provides collection and classification services for serviceable/unserviceable material. Operates a cannibalization activity in accordance with AR 750-50. (The aircraft maintenance company within the maintenance battalion of a division will perform AVIM functions consistent with air mobility requirements and conservation of personnel and equipment resources. Additional intermediate maintenance support will be provided by the supporting nondivisional AVIM unit).

B-2. USE OF THE MAINTENANCE ALLOCATION CHART.

a. The Maintenance Allocation Chart assigns maintenance functions based on past experience and the following consideration:

- (1) Skills available.
- (2) Time required.
- (3) Tools and test equipment required and/or available.

b. The assigned levels of maintenance authorized to perform a maintenance function is indicated.

c. A maintenance function assigned to a lower maintenance level will automatically be authorized to be performed at any higher maintenance level.

d. A maintenance function that cannot be performed at the assigned level of maintenance for any reason may be evacuated to the next higher maintenance organization. Higher maintenance levels will perform the maintenance functions of lower maintenance levels when required or directed by the appropriate commander.

e. The assignment of a maintenance function will not be construed as authorization to carry the associated repair parts in stock. Information to requisition or otherwise secure the necessary repair parts will be as specified in the Repair Parts, Special Tools List.

f. Normally there will be no deviation from the assigned level of maintenance. In cases of operational necessity, maintenance functions assigned to a higher maintenance level may, on a one-time basis and at the request of the lower maintenance level, be specifically authorized by the maintenance officer of the higher level of maintenance to which the function is assigned. The special tools, equipment, etc. required by the lower level of maintenance to perform this function will be furnished by the maintenance level to which the function is assigned. This transfer of a maintenance function to a lower maintenance level does not relieve the higher maintenance level of the responsibility of the function. The higher level of maintenance has the authority to determine:

- (1) If the lower level is capable of performing the work.
- (2) If the lower level will require assistance or technical supervision and on-site inspection.
- (3) If the authorization will be granted.

g. Maintenance of the US Army Communications and Electronics Materiel Readiness Command equipment will be performed by designated US Army CERCOM personnel.

h. Changes to the Maintenance Allocation Chart will be based on continuing evaluation and analysis by responsible technical personnel and on reports received from field activities.

B-3. DEFINITIONS.

Maintenance functions. Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e. to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. Adjust. To maintain, with prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. Replace. The act of substituting a serviceable like type part, subassembly, or module, (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services or other maintenance actions to restore serviceability to an item by correcting specific damage, fault, malfunctions or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e. DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those service actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild in the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipments/components.

B-4. STANDARD GROUPS.

The standard groupings shown below are used, as applicable, throughout this MAC Maintenance manuals and RPSTLs reflect these standard groupings as individual chapters with sections in each chapter relative to the individual complete systems, subsystems, modules, components, assemblies, or specific parts noted.

B-5. SYMBOLS.

The letters "AVUM, AVIM and DEPOT" as placed on the Maintenance Allocation Chart indicate the level of maintenance responsible for performing the particular maintenance function based upon assigned skills, tools, and test equipment and time required to accomplish maintenance.

AIRFRAME ITEMS

GROUP NUMBER	DESCRIPTION
00	Aircraft System
01	Aircraft General Servicing, handling, inspection requirements, lubrication requirements, overhaul and retirement requirements, cleaning, mooring, towing, jacking, hoisting, preservation requirements, weight and balance requirements, spot painting, complete painting, and subassembly painting requirements.
02	Airframe Fuselage, empennage, pylons, wing mounts (engine and transmission), armor, seats, ramps, decks, tiedowns, and wire strike protection system.
03	Alighting Gear Landing gear, skids, floats, skis, struts, wheel brakes, and mechanical mechanisms.
04	Power Plant Installation Removal, installation, cooling systems, air induction, exhaust, oil systems, components, ignition systems, power control, harnesses, carburetors, fuel controls, pumps (engine driven), filters/particle separators, and Quick Change Assemblies (QCA). (See Power Plant Items, figure 2, for more detailed functions.)
05	Propellers/Rotors Systems Propellers, governors, rotors (main and tail), hubs, blades, dampeners, stabilizer bars, and swashplates.
06	Drive Train Systems Transmission, gearboxes, clutches, shafting, oil systems, bearings, hangers, oil tanks, and freewheeling units.
07	Hydraulic and Pneumatic Systems Pumps, filters, reservoirs, cylinders, valves, servos, motors, starters, and accumulators.
08	Instrument Systems Flight instruments, navigation instruments, engine Instruments, miscellaneous instruments (i.e. clocks) sending units, panels, and flow meters.
09	Electrical Systems Motors, actuators, regulators, generators, starters, batteries, lighting, caution and warning lights, inverters, fault isolation systems, rotor brakes, and avionics provisions.
10	Fuel Systems Tanks, cells, filters, pumps, valves, auxiliary fuel systems, and refueling systems.
11	Flight Controls System Control sticks, pedals, cables, pulleys, push-pull rods, torque tubes, quadrants, force gradients, control surfaces bellcranks, and trim actuators (mechanical).
12	Utility Systems Fire detecting/extinguishing systems, oxygen systems, windshield wiper systems, mirrors, and de-ice/anti-ice systems.

GROUP NUMBER	DESCRIPTION
13	Environmental Control Systems (ECS) Heaters, air conditioners, defrosters, control mixing valves, and ducts.
14	Hoists and Winches Cargo/rescue hoists, winches, hooks slings, loading systems, and emergency release systems.
15	Auxiliary Power Plants (APP) Fuel, exhaust, and ducting.
16	Mission Equipment Spraying equipment, stores, racks, armament, reconnaissance, photography pods, and litters.
17	Emergency Equipment Ejection seats, canopies, jettison system, portable fire extinguishers, axes, and first aid kits.
18	Installed Avionics Components Communications and Navigational Black Boxes

B-6. WORK TIME.

In the Maintenance Category column by the listing of a "work time" figure in the appropriate subcolumn(s), levels of maintenance authorized to perform the function are specified. This figure represents the active time (Man-hours) required to perform the specified function. The number of man-hours specified represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized.

NOTE

The times indicated in the Maintenance category columns were arrived at by simulated time study. Actual time required to perform the specified maintenance function on the helicopter may not necessarily be the same. As the -23 Maintenance manual is addressed to AVUM & AVIM maintenance levels the DEPOT column may be disregarded.

B-7. TOOLS AND TEST EQUIPMENT (SECTION III)

Special tools, test, and support equipment required to do maintenance functions are listed with a reference number to permit cross-referencing to column 5 in the MAC. In addition, the maintenance category authorized to use the device is listed along with the item National Stock Number and if applicable, the number to aid in identifying the tool/device.

B-8. REMARKS (SECTION IV)

Column 6 of the MAC contains alphabetic reference codes which are explained in Section IV of this appendix.

SECTION II. MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
	NOTE						
	The extent of maintenance to be performed by AVUM as indicated in this MAC is governed by the size of the unit and the tools authorized (Refer to paragraph B-1 b(1) a. and b). Specific notes are given to further identify or describe the extent or limit of maintenance to be performed.						
0100	Aircraft System (End Article Vehicle System)						
0100	Aircraft General						
0101	Clean		2.0			100,102	
0102	Moor		1.0			100,102	
0103	Tow		1.0			100,102	
0104	Jack		1.0			100,102	
0105	Hoist		1.0			100,102	
0106	Preservation		1.0			100,102	
0107	Weight and Balance			1.0		102,118	
0108	Spot Paint		1.0			100,102	
0109	Complete Painting				24.0		
0110	Sub-assembly Painting			4.0		102,118	
0111	Service		2.0			100,102	
0200	Airframe	Overhaul			100.0		
0201	Tailboom Assy	Inspect	2.0				
		Replace	2.0			100,102	
		Repair	4.0			100,102, 103	A
				8.0		102,117	
		Overhaul			60.0		

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0202	Fuselage	Inspect Repair	4.0 4.0	8.0		100,102, 103 103,107	A
0202 01	Sheet Metal for Structural Members and Honeycomb Panels not requiring Jigs and Fixtures	Inspect Replace	1.0 2.0	4.0		100,102, 103 102,103	A
		Repair	2.0	4.0		100,102, 103 103,117	A
0202 02	Sheet Metal for Structural Members and Honeycomb Panels that require Jigs and Fixtures	Inspect Replace Repair	1.0		4.0 8.0		
0202 03	Honeycomb Panels	Inspect Replace	1.0 2.0			100,102 100,102, 103	A
		Repair	2.0	4.0		103,117	C
0202 04	Wings	Inspect Replace Repair	1.0 4.0 2.0			100,102 100,102, 103	
0202 05	Transmission Mounts	Inspect Align	1.0 1.0			100,36, 32	
		Replace Repair	2.0			100,102 100,102	
0202 05	Transmission Mount Dampers	Inspect Replace Repair	1.0 2.0	2.0		100,102 102,103	D
0202 06 (02)	Windshield	Inspect Replace	1.0 8.0			101,102 101,102	S D
		Repair	1.0	4.0		102,103	

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0202 07	Doors	Inspect Adjust Replace Repair	1.0 1.0 3.0 2.0			100,102 100,102 100,102, 103	
0202 07	Window Assembly	Inspect Replace Repair	1.0 12.0 1.0	4.0		101,102, 103 101,102 102,103	S
0202 07 (02)	Striker Assembly	Inspect Replace Repair	1.0 2.0 2.0			100,102 100,102	
0202 07 (03)	Handle Assembly	Inspect Replace Repair	1.0 1.0 1.0			100,102 100,402	
0202 08	Seat Installation, Pilot and Gunner	Inspect Repair	1.0 2.0			100,102	
0202 08 (01)	Seat Belts and Shoulder Harness	Inspect Replace	1.0 2.0			100,102	
0202 08 (03)	Shoulder Harness Reel	Inspect Replace Repair	1.0 2.0 1.0			100,102 100,102	
0202 08 (03)	Seat Assembly	Inspect Replace Repair	1.0 6.0 4.0			100,102 100,102	
0202 08 (03) (01)	Armor	Inspect Replace Repair	1.0 2.0 1.0			100,102 100,102	
0202 09	Blanket Assembly, Soundproofing	Inspect Replace Repair	1.0 3.0 1.0			100,102 100,102	

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0202 10	Deck Assembly, Engine	Inspect Align Replace Repair	1.0	2.0 4.0 4.0		102 102 117	
0202 11	Mount Assembly	Inspect Align Replace Repair	1.0 1.0 4.0 2.0	4.0		100 100,102 100,102 102	A
0202 12	Cowl Assemblies	Inspect Replace Repair	1.0 4.0 4.0			100,102 100,102, 103	
0202 13	Firewall Assembly	Inspect Replace Repair	1.0 4.0 2.0			100,102, 103 101,102, 103	
0202 14	Heatshield Assembly	Inspect Replace Repair	1.0 4.0 2.0			101,102, 103 101,102, 103	
0202 15	Mount Installation, Engine						
0202 15 (01)	Support Arms (Brace Rods, Tripod, and Bipod)	Inspect Replace Repair	1.0 3.0 2.0			101,102 101,102	
0202 15 (02)	Pillow Block Assembly	Inspect Replace Repair	1.0 1.0 1.0			102 100,102	
0202 17	Map and Data Case	Inspect Replace	1.0 1.0			100,102	
0202 18	Wire Strike Protection System						

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0202 18 (01)	Wire Strike Cutter (Upper)	Inspect	1.0				
		Replace	1.0			100,101	
		Repair	4.0			100,101	
0202 18 (02)	Deflector Assembly (Canopy)	Inspect	1.0				
		Replace	2.0			100,101	
		Repair	4.0			100,101	
0202 18 (03)	Wire Strike Cutter (Nose)	Inspect	1.0				
		Replace	1.0			100,101	
		Repair	4.0			100,101	
0202 18 (04)	Wire Strike Cutter (Lower)	Inspect	1.0				
		Replace	1.0			100,101	
		Repair	4.0			100,101	
0202 18 (05)	Wire Strike Deflector (Nose)	Inspect	1.0				
		Replace	1.0			100,101	
		Repair	4.0			100,101	
0202 18 (06)	Nose Deflector	Inspect	1.0			100,101	
		Replace	1.0			100,101	
0300	Alighting Gear Assembly						
0301	Crosstubes	Inspect	1.0			100,102	

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0301 (Cont)	Cross Tubes (Cont)	Replace	4.0			100,102	A
		Repair	2.0			100,102, 103 102	
0302	Skid Tubes	Inspect	1.0	4.0			A
		Replace	4.0			100,102	
		Repair	2.0			100,102 102	
0303	Skid Shoes	Inspect	1.0			100,102	A
		Replace	2.0			100,102	
		Repair	2.0			102,120	
0304	Skid Saddles	Inspect	1.0	2.0			
		Replace	2.0			100,102	
0305	Ground Handling Wheels	Inspect	1.0				
		Repair	4.0			100,102 102	
0305	Pump Assembly	Service	1.0			100,102	
		Inspect	1.0			100,102	
		Test	1.0			100,102	
		Replace	1.0			100,102	
		Repair		4.0		102,104, 111	
0305 02	Cylinder Assembly	Inspect	1.0				
		Replace	1.0			100,102	
		Repair		1.0		102,111	
0305 03	Wheel Assembly	Inspect	1.0				
		Replace	1.0			100,102	
		Repair	2.0			100,102	
		Service	1.0			100,102	
0306	Skid Installation Tail	Inspect	1.0				
		Replace	2.0			100,102	
		Repair	2.0			100,102	
0400	Power Plant Installation						
0401	Engine (Complete Assembly)	Inspect	2.0				

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0401 (Cont)	Engine (Complete Assembly) (Cont)	Test	4.0	4.0		100,102 102,108, 118,119	H
		Service	2.0			100,102	
		Replace	30.0			100,102, 108,21, 40	
		Repair	8.0			100,102, 108	G
		Overhaul		16.0	50.0	112,118, 119	G
0401 01	Tail Pipe	Inspect	1.0				
		Replace	2.0			100,102	
		Repair	1.0	4.0		100,102 102,120	A
0401 02	Oil Strainers	Inspect	1.0				
		Replace	1.0			100,102	
0401 03	Droop Compensator	Inspect	1.0				
		Adjust	1.0			100,102	
		Replace	2.0			100,102	
		Repair	1.0			100,102	
0401 04	Actuator, Linear	Inspect	1.0				
		Adjust	1.0			100,102	
		Replace	2.0			100,102	
		Repair	1.0	24.0		100,102	V
0401 05	Hoses, Fittings, Couplings, and Tubing	Inspect	1.0				
		Replace	1.0			100,102	
0402	Particle Separator	Inspect	1.0				
		Replace	2.0			100,102	
		Repair	1.0	4.0		100,102 102,103, 112,117, 120	
0403	Controls, Power Lever	Inspect	1.0				
		Adjust	1.0			100,102	
		Replace	2.0			100,102	

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0403 (Cont)	Controls, Power Lever (Cont)	Repair	4.0			100,102	
0404	Oil Tank, Engine	Inspect	1.0			100,102	
		Test	1.0			100,102	
		Service	1.0			100,102	
		Replace	2.0			100,102	
		Repair	2.0			100,102	
				4.0		120	
0405	Hoses, Fittings, and Tubing	Inspect	1.0				
		Replace	1.0			100,102	
0406	Oil Cooler, Engine	Inspect	1.0				
		Test		4.0		102	
		Replace	2.0			100,102	
		Repair	4.0			100,102	
0407	Oil Cooler Shut-Off Valve	Inspect	1.0				
		Replace	1.0			100,102	
0408	Oil Cooler Blower, Turbine	Inspect	1.0				
		Replace	1.0			100,102	
		Repair		2.0		102,112, 118,119, 120	
0409	Chip Detector, Engine	Inspect	0.5				
		Test	1.5			100,102	
		Replace	1.0			100,102	
0410	Valves, Breakaway	Inspect	1.0				
		Replace	2.0			100,102	
0500	Rotor Systems						
0501	Pylon Assembly, External Components	Inspect	1.0				
		Replace	2.0			100,102	
		Repair	2.0			100,102, 103	
0502	Hub and Blade Assy, Main Rotor	Inspect	1.0				
		Adjust	2.0			101,102, 44,51	I

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0502 (Cont)	Hub and Blade Assy, Main Rotor (Cont)	Align	3.0			101,102, 26,30,31, 34,41,59 101,102, 13,14, 21,59	
		Replace	4.0				
0502 01	Hub Assembly	Inspect	1.0			101,102, 14,21,59 101,102, 109,13, 14,21,59 101,102 102,105, 109,113, 114,45, 47	J
		Align	2.0				
		Replace	4.0				
		Repair	2.0	4.0			
		Overhaul			40.0		
0502 01 (01)	Drag Brace Assembly	Inspect	1.0			101,102, 109 101,102, 109	
		Replace	1.0				
		Repair	2.0				
0502 01 (02)	Grip Assembly	Inspect	1.0			102,118 102,109, 112,113, 118	
		Replace		3.0			
		Repair		2.0			
0502 01 (03)	Housing Assembly	Inspect		1.0		102,109 102,109, 112,113, 118	
		Replace		2.0			
		Repair		2.0			
0502 01 (04)	Defector, Sand	Inspect	0.5			100,102, 109	
		Replace	1.0				
0502 01 (05)	Pitch Horn Assembly	Inspect	1.0	1.0		101,102 101,102	D
		Replace	2.0				
		Repair	1.0				

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0502 01 (05) (Cont)	Pitch Horn Assembly (Cont)			2.0		102,109, 112,113, 118	
0502 01 (06)	Extension Assembly	Inspect	1.0				
		Replace		4.0		102,109	
		Repair	1.0	4.0		101,102 102,109, 112,113, 118	
0502 01 (07)	Strap Assembly Tension	Inspect		1.0			
		Replace		4.0		102,112, 113,118	
0502 01 (08)	Bolt Assembly, Blade Retention	Inspect	1.0				
		Replace	1.0			101,102, 109	
		Repair	1.0			101,102, 109	
0502 01 (09)	Yoke Assembly	Inspect	1.0				
		Replace		4.0			
		Repair	1.0	2.0		101,102 102,109, 112,113	D
0502 01 (10)	Trunnion Assembly	Inspect	1.0	1.0			
		Replace		3.0			
		Repair	1.0	2.0		101,102 102,109, 112,113, 118	D
0502 01 (11)	Housing Assembly Trunnion	Inspect	1.0	1.0			
		Replace		3.0		102,109	
		Repair	1.0	2.0		101,102, 109 102,104	D
0502 02	Blade Assembly, Main Rotor	Inspect	1.0			101,41,51	
		Adjust	1.0			101,102,	
		Replace	3.0			109	

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0502 02 (Cont)	Blade Assembly, Main Rotor (Cont)	Repair	1.0	12.0	60.0	101,102 109,121	
		Overhaul					
0503	Scissors and Sleeve Assembly	Inspect	1.0			101,102	
		Replace	4.0			109	
		Repair	1.0	4.0		101,102 102,109 112,118 10,110,27, 28,35,87, 88	
0503 01	Link Assembly, Scissors	Inspect	1.0			101,102,	
		Replace		1.0		109	
		Repair		2.0		101,102 109,112	D
0503 02	Scissors Assembly	Inspect	1.0			101,102,	
		Replace	2.0			109	
		Repair	1.0	4.0		101,102 102,109, 112	D
0503 03	Hub Assembly	Inspect	1.0	1.0	4.0		
		Replace					
		Repair	1.0	2.0		101,102 102,109, 113	D
0503 04	Sleeve, Collective	Inspect	1.0		4.0		
		Replace					
		Repair	1.0			101,109	D
0504	Swashplate and Support Assembly	Inspect	1.0			101,102,	
		Replace	4.0			109	
		Repair	2.0	4.0		101,102 102,109	D
		Overhaul			40.0		

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0505	Rotor Installation, Tail	Inspect Replace	1.0 4.0			101,102, 109	
		Repair	2.0			100,102, 109	
0505 01	Link Assembly	Inspect Replace	1.0 1.0			100,102, 109	
		Repair	1.0			100,102, 109	
0505 02	Crosshead	Inspect Replace	1.0 2.0			100,102, 109	
		Repair	2.0			100,102, 109	
0505 03	Hub and Blade Assembly	Inspect Adjust Align	1.0 1.0 1.0			100,102 100,102, 109,82	I J
		Replace	4.0			100,102 109,90	
		Repair	2.0			100,102, 109	
				4.0		102,109, 90	
0505 03 (01)	Blade Assembly	Inspect Replace Repair	1.0 2.0 1.0			100,102 100,102 102,109	
				4.0			
0505 03 (02)	Hub Assembly	Inspect Service Adjust Replace	1.0 1.0 2.0 4.0			100,102 100,102 100,102, 109	
		Repair	1.0			100,102, 109	
				4.0		102,109	

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0600	Drive Train System						
0601	Intermediate and Tail Rotor Drive Gearboxes	Inspect	1.0				
		Service	1.0			100,102	
		Replace	4.5			100,102	
		Repair	1.5			100,102	
		Overhaul			22.5		
0601	Intermediate and Tail Rotor Drive Gearbox Quills	Inspect	1.5				
		Service	1.5			100,102	
		Replace	2.0			101,102, 23,25,24, 38,39,58	T
		Repair	1.5			23,24,25, 38,39,58	
		Overhaul			5.0		
0602	Tail Rotor Drive Shaft	Inspect	1.0				
		Replace	3.4			100,102	
		Repair	1.5			100,102	T
					2.0	102,109	
0603	Tail Rotor Drive Shaft Hanger Assemblies	Inspect					
		Service	1.0			102	
		Align	4.5			100,102	
		Replace	2.5			100,102	
		Repair	1.5			100,102, 109	M
				3.0		113	
0604	Main Transmission	Inspect	1.0				
		Service	2.0			102	
		Replace	6.5			101,105, 17	
		Repair	1.2			101,105, 17	
		Overhaul			2.5	102,105, 109,17	
					82.5		
0604	Drive Quill Assemblies	Inspect	1.5				
		Service	2.5			100,102	
		Replace	4.5			101,109, 24	

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0604 (Cont)	Drive Quill Assemblies (Cont)	Repair	2.5			101,109, 24,46	M
		Overhaul			5.5		
0605	Main Drive Shaft (Engine to Transmission)	Inspect	1.0			100,102 100,109, 32,36 100,102, 109 100,22,33	
		Service	1.5				
		Align	1.0				
		Replace	4.5				
0606	Lines, Manifolds and Fittings	Repair	1.5			100,102 100,102	
		Overhaul			6.5		
		Inspect	1.0				
0607	Sight Gages	Replace	2.0			100,102 100,102	
		Repair	1.0				
		Inspect	0.5				
0608	Oil Jets	Replace	0.5			100,102 100,102	
		Repair	0.5				
		Inspect	0.5				
0609	Filters, Filter Housings and Screens	Replace	1.0			100,102 100,102	
		Repair	2.5				
		Inspect	1.5				
0610	Transmission Oil Cooler Assembly	Replace	1.0			100,102 100,102	
		Repair	1.0				
		Inspect	1.0				
0611	Bypass Valve Assembly	Replace	1.0			100,102 52,53, 54,55	
		Repair	1.5				
		Inspect	1.5	2.0			
0612	Oil Pump	Replace	1.0			100,102 100,102 102	
		Test	2.5	1.0			
		Repair		1.5			
		Overhaul			4.5		

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0613	Mast Assembly	Inspect	1.0			101, 102, 13, 14 101, 109, 113, 12, 91	
		Replace	5.6				
		Repair	1.0				
		Overhaul			16.5		
0614	Friction Collet	Inspect	0.5			101, 109, 89 101, 109 101, 109	
		Adjust	6.5				
		Replace	6.5				
		Repair	1.0				
0700	Hydraulic and Pneumatic Systems						
0701	Pumps	Inspect	1.0			100, 102, 100, 102, 104	
		Replace	2.5				
		Repair	1.5				
		Overhaul			12.0		
0702	Reservoirs	Inspect	1.0			100, 102 100, 102, 104 100, 102, 104	
		Service	1.0				
		Replace	2.5				
		Repair	1.5				
0703	Valves	Inspect	1.0			101, 102, 104 104, 111	
		Replace	1.5				
		Repair		2.0			

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0705	Solenoid Valve	Inspect	1.5			101,102, 104 102, 104, 111	
		Replace	1.5				
		Repair		1.0			
0706	Hose, Tubing, and Fittings	Inspect	1.0			102,104	
		Replace	1.5				
0707	Hydraulic Module	Inspect	1.5			101, 102, 104 102, 104, 111	V
		Replace	2.4				
		Repair		1.5			
0708	Hydraulic Servo Cylinders	Inspect	1.5			100, 104, 23 102, 104, 111	
		Replace	2.0				
		Repair		1.5			
0709	Hydraulic Accumulator	Inspect	1.0			104, 111 100, 104 100,104 104,111	
		Test		0.5			
		Service	0.5				
		Replace	2.1				
0710	Accumulator Air Press Gage	Repair		1.0		100,111	
		Inspect	1.0				
0711	SCAS Servo Actuators	Replace				100,104	
		Inspect	1.5				
0711	SCAS Servo Actuators	Test		2.1		104,111 100, 104 104, 111	
		Replace	2.5				
		Repair		3.5			
		Overhaul			9.5		

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0800	Instrument Systems						
0801	Instrument Panels	Inspect Replace Repair	2.5	3.5 2.1		106 106	
0801 01	Miscellaneous Instruments						
0801	Clock	Inspect Replace Overhaul	1.5 1.5		3.0	100,106	
0801 0102	Free Air Temperature Gage	Inspect Test Replace	1.0 1.0 1.0			101,106 101,106	
0801 0103	Volt, Load and Ammeter	Inspect Adjust Replace	1.0 1.0 1.5			100,107 100,107	
0801 02	Fuel Quantity Indicator System						
0801 0201	Fuel Quantity Indicator and Amplifier	Inspect Test Adjust Replace Overhaul	1.0 2.5	2.5 2.5	8.0	101,110 110 106	U
0801 0202	Tank Sensor, Probes and Units	Inspect Test Replace		1.0 1.5 2.5		110 106	
0801 03	Flight Instruments						
0801 0301	Vertical Velocity Indicator	Inspect Test Replace Overhaul	0.5 1.0 1.5		8.0	100,106 100,106	
0801 0302	Standby Compass	Inspect Adjust Replace	0.5 0.5 1.0			100,106 100,106	

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0801 0303	Airspeed Indicator	Inspect	1.0				
		Test	1.0			100,106	
		Replace	2.0			100,106	
		Overhaul			7.5		
0801 0304	Altimeter	Inspect	1.0				
		Test	1.0			100,106	
		Replace	2.0			100,106	
		Overhaul			9.5		
0801 0305	Attitude Indicator	Inspect	0.5				
		Replace	0.5			100,106	
		Overhaul			8.5		
0801 0306	Turn and Slip Indicator	Inspect	0.5				
		Replace	0.5			100,106	
		Overhaul			8.5		
0801 0307	Pitot System	Inspect	0.5				
		Test	1.5			100,106	
		Calibrate		2.0		110	
		Repair	1.5			100,106	
0801 04	Engine Instruments						
0801 0401	Engine and Rotor Tachometer	Inspect	1.0				
		Test		2.0		110	
		Replace	1.0			100,106	
		Overhaul			11.5		
0801 0402	Turbine Gas, Temperature	Inspect	0.5				
		Test		1.5		110	
		Calibrate		2.0		110	
		Repair	1.5			100,106	
		Overhaul			6.5		
0801 0403	Engine Oil Temperature Gage	Inspect	0.5				
		Replace	1.0			100,106	
		Overhaul			4.0		

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0801 0404	Engine Oil Pressure Transmitter and Indicator	Inspect Replace Overhaul	0.5 1.5		3.5	100,106	
0801 0405	Fuel Pressure Indicator and Transmitter	Inspect Test Replace Overhaul	0.5 1.0	1.0	2.5	110 100,106	
0801 0406	Torquemeter and Transmitter	Inspect Replace Overhaul	0.5 1.0		2.5	100,106	
0801	Tachometer, Generators	Inspect Replace	0.5 1.0			100,106	
0801 05	Engine Instruments						
0801 0501	Gas Producer Tachometer	Inspect Test Replace Overhaul	0.5 1.5	1.0	3.0	110 100,106	
0801 06	Transmission Instruments						
0801 0601	Oil Temperature Gage	Inspect Replace Overhaul	0.5 0.5		3.5	100,106	
0801 0602	Oil Pressure Gage and Transmitter	Inspect Replace Overhaul	0.5 1.5		2.5	100,106	
0801 0603	Temperature Bulbs	Inspect Test Replace	0.5 0.5	0.5		110 100,106	

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0900	Electrical Systems						
0901	Inverters	Inspect Replace Repair	0.5 1.5 2.0			100,107 100,107	N
0902	Relays, Rheostats Switches, Circuit Breakers, Plugs, Leads, Connectors, Conduits, Receptacles, Shunts, and Circuit Boards	Inspect Test Replace Repair	0.5 1.0	0.5 0.5		110 100,107 107,110	
0903	Wiring	Inspect Test Replace Repair	4.5 8.5 1.0 10.5			100,107 100,107 100,107 100,107	
0904	Regulator	Inspect Adjust Replace Overhaul	0.5 0.5 1.0			100,107 100,107	
0905	Battery	Inspect Test Service Replace Repair	0.5 1.0		8.0		O O O
0906	Starter Generator	Inspect Test Replace Repair	1.5 2.0	2.0 2.5		107,110 100,107 107,110	P
0907	Cooling Blower	Inspect Replace Repair Overhaul	0.5 1.5 0.5			100,107 100,107	
0908	Lights	Inspect Replace	0.5 0.5			100,107	

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
0909	Alternator	Inspect	0.5				
		Replace	2.5			100,107	
		Repair	1.5			100,107	
		Overhaul				8.0	
0910	Navigation, Instrument, Interior Cabin, Anti-Collision, and Flasher Units	Inspect	1.0				
		Replace	1.5			100,102	
		Repair	1.5			100,102	
0911	Search Light Assembly	Inspect	0.5				
		Replace	0.5			100,107	
		Repair	1.5			100,107	
		Overhaul				5.5	
0912	Caution Panels	Inspect	0.5				
		Test	0.5			107,100	
		Replace	1.0			100,107	
		Repair	1.5	1.0		107,110	
0913	RPM Warning Control Box	Inspect	1.5				
		Adjust	3.5			100,106	
		Replace	1.5			100,106	
		Repair		0.5		106,110	
		Overhaul				9.5	
0914	Chip Detector System	Inspect	0.5				
		Replace	1.0			100,107	
1000	Fuel System						
1001	Main Fuel Tanks, both crashworthy and non-crashworthy	Inspect	1.5				
		Service	0.5			100,102	
		Replace		8.5		102	
		Repair		6.5		102,117	
1002	Fuel Low Level Warning System	Inspect	0.5				
		Test		2.0		100,102	
		Replace		4.5		100,102	
1003	Boost Pumps	Inspect	1.5				
		Replace	2.0			101,102	
		Repair		5.5			

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
1004	Valves and Fittings	Inspect Replace	0.5 1.0			100,102	
1005	Filter Assembly	Inspect Replace Repair	0.5 1.5 0.5			100,102 100,102	
1006	Hoses, Tubing and Filler Caps	Inspect Replace	0.5 1.5			100,102	
1100	Flight Control Systems						
1101	Main Rotor Control Tubes and Rod Ends	Inspect Adjust Replace Repair	3.5 2.5 4.0 2.5			100,102 101,102 101,102	
1102	Force Gradient Assembly	Inspect Adjust Replace Repair	0.5 3.0 1.0	2.0		100,102 101,102 102	
1103	Control Stick (Collective and Cyclic	Inspect Adjust Replace Repair	1.0 2.0	2.5 4.0		100,102 102,50 102,107	
1104	Synchronized Elevator	Inspect Adjust Replace Repair	2.0 3.0 4.0 2.0			100,102 101,102 101,103	
1105	Magnetic Brake	Inspect Adjust Replace Repair	0.5 0.5 1.0	4.0		100,102 101,102	
1106	Collective and Cyclic Linkage	Inspect Adjust Replace Repair	2.0 5.0 2.0 1.0			100,102 101,102 101,102	
1107	Tail Rotor Pedal Assy Linkage	Inspect Adjust	3.0 5.0			100,102	

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
1107 (Cont)	Tail Rotor Pedal Assy (Cont)	Replace	8.0			101,102	
		Repair	3.0			101,102	
1108	Pedal Adjusting Assembly	Inspect	1.5				
		Adjust	1.5			100,102	
		Replace	2.5			101,102	
		Repair	2.0			101,102	
1109	Tail Rotor Pitch Control Linkage	Inspect	1.5				
		Adjust	2.0			100,102	
		Replace	2.5			101,102	
		Repair	1.0			101,102	
1110	Tail Rotor Pitch Control Mechanism	Inspect	2.0			100,102	
		Adjust	3.0			101,102	
		Replace	2.0			101,102	
		Repair	2.0			101,102	
1111	Tail Rotor Pitch Change Rods and Links	Inspect	1.0				
		Adjust	1.5			100,102	
		Replace	2.0			101,102	
		Repair	1.0			101,102	
1112	Stabilization Equipment						
1112 01	Control Panel	Inspect	0.5				
		Replace					F
		Repair					F
1112 02	Control Box	Inspect	0.2				
		Test					N
		Replace	0.5			100,102	
		Repair					N
1112 03	Solenoid Valves, Hoses, Connectors	Inspect	1.0				
		Replace	1.5			100,102	
1112 04	Transducers	Inspect	0.5				
		Replace	1.0			100,102	

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
1200	Utility Systems						
1201	Fire Detector System- Engine	Inspect Replace	0.5 1.5			100,102	
1202	Anti-Icing System	Inspect Replace	0.5 1.5			100,102	
1300	Environmental Control System (ECS)						
1301	Bleed Air Heater System	Inspect Repair	0.5 2.0			100,102	
1302	Control Valves	Inspect Replace Repair Test	1.5 2.5	1.5 1.5		100,102 107,110 107,110	
1303	Vent Blower	Inspect Replace Repair	2.0 2.0 2.0			100,102 100,102	
1304	Ventilating Ducts, Inlet Door, and Control	Inspect Adjust Replace Repair	1.0 1.0 1.5 1.0			100,102 100,102 100,102, 103	
1305	Environmental Control Unit	Inspect Service Replace Repair Overhaul	1.0 1.0 3.0 1.0		45.0	100,102 101,102 101,102	
1306	Heater Exchanger	Inspect Replace Repair	0.5 2.0 2.0			100,102 100,102	
1307	Temperature Control/ Sensor	Inspect Replace Repair Overhaul	0.5 1.0	2.0	10.0	100,107 107,110	

MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS

HELICOPTER, ATTACK, AH-1

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
1308	Temperature Control/ Valve	Inspect Replace Repair Overhaul	0.5 1.5 2.0		10.0	100,107 100,107	
1308 01	Torque Motor	Inspect Replace Overhaul	0.5 1.0		8.0	100,102	
1308 02	Turbine Assembly	Inspect Replace Overhaul	0.5 7.0		18.0	101,102	
1308 03	Nozzles, Cockpit Outlet	Inspect Replace	0.5 1.0			100,102	
1309	Pressure Regulating and Shut-off Valve	Inspect Test Replace Overhaul	0.5 2.0	1.5	12.0	110,107 100,107	
1309 01	Solenoid Valve	Inspect Replace Overhaul	0.2 0.5		6.0	100,107	
1309 02	Pressure Relief Valve	Inspect Replace	0.2 0.5			100,107	
1309 03	Temperature Selector	Inspect Replace	0.5 0.5			100,102	
1310	Rain Removal System	Inspect Replace Repair	1.5 3.0 2.0			100,102 100,102	
1311	Hot Air Valve	Inspect Replace Overhaul	2.0 1.0		8.0	100,102	

MAINTENANCE ALLOCATION CHART								
NOMENCLATURE OF END ITEMS								
HELICOPTER, ATTACK, AH-1								
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS	
			AVUM	AVIM	DEPOT			
1400	Hoist and Winches (Not Applicable)							
1500	Auxiliary Power Plants (APP) (Not applicable)							
1600	Mission Equipment Armament (Aircraft Components)							
				NOTE				
			Organizational maintenance of the armament system will be performed by Aircraft Armament Sub-system Repairmen.					
1601	Turret Weapons System							
1601 01	Pilot Gun Sight	Inspect Replace	0.5				R	
1601 02	Pilot Gunner's Control Panels	Inspect Test Replace Repair	0.5				R R R R	
1602	External Stores							
1601 01	Emergency Jettison System	Inspect Adjust Replace Repair Test	1.0 0.5 7.5 3.0 1.5			101,102 101,102 101,102 101,102		
1602 02	Ejector Rack	Inspect Adjust Replace Repair Overhaul	0.5 5.0 2.0 1.0			100,102 100,102 100,102		
					12.0			
1602 03	Grenade Dispenser	Inspect Replace	0.5 1.0			100,102		

MAINTENANCE ALLOCATION CHART							
NOMENCLATURE OF END ITEMS							
HELICOPTER, ATTACK, AH-1							
(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
1602 04	Accelerometer Resolver	Inspect	0.2				
		Adjust	0.5			100,102	
		Replace	0.5			100,102	
1602 05	Servo-electronic Control Unit	Repair	8.0			101,102	
		Inspect	0.5				
		Adjust	1.0			101,107	
		Replace	2.0			101,107	
		Repair	1.0	2.0		101,107	
1602 06	Hydraulic Power Cylinder	Overhaul			24.0		
		Inspect	0.5				
		Replace	1.0			101,102	
		Repair	3.0			101,104	
1700	Emergency Equipment	Overhaul			16.0		
1701	Canopy Removal System	Inspect	0.5				
		Replace		5.0		102	
		Repair		10.0		102	
1800	Installed Avionics Components						
			NOTE				
TM 11-1520-221-30 contains maintenance instructions for avionics.							

SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOL OR TEST EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
5	O	Bit, Screwdriver	5120-00-863-4941	HTS-6
6	O	Socket, Adapter	5120-00-937-8481	HTS-10
10	F	Stand Assy, Scissors and Sleeve		PD 1468
11	F	Socket, Wrench, Face Spanner		PD1469
12	O	Socket, Splined	5120-00-619-9773	PD 2658
13	O	Socket, Mast Nut	5120-00-619-9779	PD 2659
14	O	Adapter, Reaction	5120-00-619-9776	PD 2660
17	F	Transmission Adapter	4920-00-676-2307	SWE13852-40
21	O	Sling, Aircraft Maint	1730-00-099-8099	T100220
22	O	Wrench, Transmission	4920-00-797-3672	T101306
23	O	Wrench, Tail Rotor	4920-00-718-6533	T101307
24	O	Jack Screw Set	4920-00-710-7946	T101308
25	O	Jack Screw Set	4920-00-765-4410	T101338
26	O	Build Up Bench	4920-00-678-5431	T101356
27	F	Support Scissors and Sleeve	4920-00-786-1756	T101369
28	F	Ram Adapter, Scissors & Sleeve	4920-00-713-5555	T101382
30	O	Scope Assy Blade Alignment	4920-00-718-6674	T101401
31	O	Socket, Wrench, Face Spanner	5120-00-044-1426	T101414
32	O	Tool Set, Alignment	5120-00-894-6540	T101419
33	O	Fixture, Holding Shaft	4920-00-876-0103	T101420

Change 6 B-32

SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOL OR TEST EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
34	O	Plate	4920-00-898-0015	T101421
35	O	Bar, Bearing Removal	4920-00-876-0102	T101424
36	O	Jack Set	4920-00-805-5123	T101440
38	O	Socket, Wrench, Face, Spanner	5120-00-967-7699	T101449
39	O	Plate Assy	4920-00-967-7651	T101455
40	O	Hoisting Unit, Engine	1730-00-073-9258	T101452
41	O	Support, Main Rotor	4920-00-907-7649	T101467
44	O	Bending Gage, Trim	5210-00-919-2374	T101485
45	O	Installation Tool, Seal	5120-00-925-5085	T101487
46	F	Wrench, Input Quill	5120-00-932-3670	T101488
47	F	Puller, Bearing	5120-00-999-5306	T101491
50	O	Fixture, Rigging, Stick Cycle	4920-00-848-4930	T101524
51	O	Tab Bender, Main Rotor Blade	5120-00-844-7757	T101525
52	O	Fixture, Holding	4920-00-176-3708	T101549
53	O	Disassembly Tool, Valve	5120-00-176-3698	T101550
54	O	Puller, plug	5120-00-400-7724	T101551
55	O	Tool Set, Plunger Assy	5180-00-176-3701	T101553
57	O	Staking Tool	5120-00-409-9524	T101577
58	O	Wrench, Spanner	5120-00-412-7401	T101600
59	O	Lock Grip, Main Rotor	5120-00-451-2956	T101864
60	F	Sealing Tool, Pylon Damper	4920-00-423-5239	1570-EG-00
82	O	Plate Adapter	4920-00-437-5112	7HEL074
87	F	Socket Collective Sleeve Bearing		PD 1470
88	F	Extension, Socket Wrench	5120-00-033-2112	PD 1471

SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOL OR TEST EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
89	O	Scale Dial Indicator	6670-00-246-0347	AAAS133
90	O	Crowfoot Attachment	5120-00-184-8413	GGGW641
91	F	Socket, Splined Reaction	5120-00-619-9774	PD 2657
92	O	Key Socket Head	5120-01-016-5635	GGGK275
100	O	Tool Set, Avum, Set No. 1	4920-00-159-8727	
101	O	Tool Set, AVUM, Set No. 2	4920-00-567-0476	
102	O	Tool Kit, Aircraft Mechanics, General	5180-00-323-4692	
103	O	Tool Kit, Airframe Repairmans	5180-00-323-4876	
104	O	Tool Kit, Hydraulic Repairmans	5180-00-323-4891	
105	O	Tool Kit, Prop and Rotor Repairmans	5180-00-323-4909	
106	O	Tool Kit, Instrument Repairmans	5180-00-323-4913	
107	O	Tool Kit, Electrical Repairmans	5180-00-323-4915	
108	O	Tool Kit, Eng Repair	5180-00-323-4944	
109	O	Tool Kit, Power Train Repairmans	5180-00-003-5267	
110	F	Shop Set, AVIM, Electrical Instrument	4920-00-165-1453	
111	F	Shop Set, AVIM, Hydraulic	4920-00-165-1454	
112	F	Shop Set, AVIM, Machine Shop	4920-00-405-9279	
113	F	Shop Set, AVIM, Powertrain	4920-00-001-4132	
116	F	Shop Set, AVIM, Rotor Shop	4920-00-405-9270	
117	F	Shop Set, AVIM, Sheet	4920-00-166-5505	
118	F	Shop Set, AVIM, Tool Crib	4920-00-472-4183	
119	F	Shop Set, AVIM, Turbine Engine	4920-00-224-3684	
120	F	Shop Set, AVIM, Welding	4920-00-163-5093	
121	F	Repair Kit, Rotor Blade	4920-01-035-0324	K747-401

SECTION IV. REMARKS

REFERENCE CODE	REMARKS
A	Limited to airframe repairman's tool kit and portable hand tools
B	Not including build up
C	Epoxy
D	Removal of nicks and scratches
E	Limited to hand stitching only
F	Refer to TM 11-1520-221-23 for removal and repair instructions
G	Refer to TM 55-2840-229-24
H	METS - Modular Engine Test System
I	Track
J	Balance
K	Seal and Coupling Replacement
L	Scratch Blending
M	Seal Replacement
N	Refer to TM 11-1520-221-20
O	Refer to TM 11-6140-203-35-2
P	Based on distribution of generator test stand
Q	Replacement of worn or elongated bushings
R	Refer to TM 9-1090-203 for Maintenance Instructions
S	Requires 2 people and excessive time
T	Restricted to AVUM units with 10 or more aircraft. Use extreme care in removal.
U	If electronic test is required, accomplish with AVIM support.
V	Limited to Non-Divisional AVIM only

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APPENDIX C

AIRCRAFT INVENTORY MASTER GUIDE

C-1. Introduction.

Appendix C lists those items of installed or loose equipment required by and authorized for using organizations to accomplish their primary or alternate mission. This list will serve to standardize present inventory procedures, using the inventory master guide to determine the inventoriable items of installed and loose equipment. Insofar as possible, items of equipment are listed in the sequence of their physical location within the aircraft area.

Aircraft inventory is subject to change as a result of authorized changes (MWO's), addition or deletions of property for special missions requirements; therefore, the selection of items of inventory from the inventory master guide may or may not provide a complete inventory list. When it is known that the master guide does not provide a complete inventory list, it will be necessary to research authorized changes (MWO's) and local command directives in order to compile an accurate and exact inventory list.

Refer to DA PAM 738-751 for applicable forms and records.

C-2. Requirements.

a. Security. It is desired that inventory records be unclassified. Therefore when equipment bearing a security classification or the installation of unclassified equipment is of a confidential or secret nature accomplishment of the classification will be in accordance with security regulations.

b. Inventoriable Items. The selection of inventoriable items is without regard to the agency, governmental or contractual, furnishing the items.

(1) Items to be listed are:

(a) Items essential to the execution of the designated mission of the aircraft, such as electronic, photographic, armament, special mission instruments, and safety and comfort equipment.

(b) Loose equipment delivered with the aircraft and items subject to pilferage or readily converted to personal use.

(c) Modification kits which are issued or distributed to using organizations for installation and which are not immediately placed in work will be recorded on the affected aircraft's DA Form 2408-17 (Aircraft Inventory Record) and identified as loose equipment until modification is completed.

(d) Equipment required for operation in special environment.

(2) Items to be excluded are:

(a) Nonaccountable items coded as expendable in the applicable stock lists.

(b) Personal issue or furnished on unit allowance or other authority.

(c) Items or components considered as basic or integral parts of the aircraft or basic aircraft such as engines, propellers, wheels and standard instruments.

(d) Equipment publications, check lists, and aircraft forms.

c. Periods of Inventory. Inventoriable items will be checked against the Aircraft Inventory Record (DA Form 2408-17) at the following periods:

(1) Upon receipt of the aircraft.

(2) Prior to transfer of the aircraft to another organization.

(3) Upon placing aircraft in storage and upon removing from storage. Aircraft need not be inventoried while in storage.

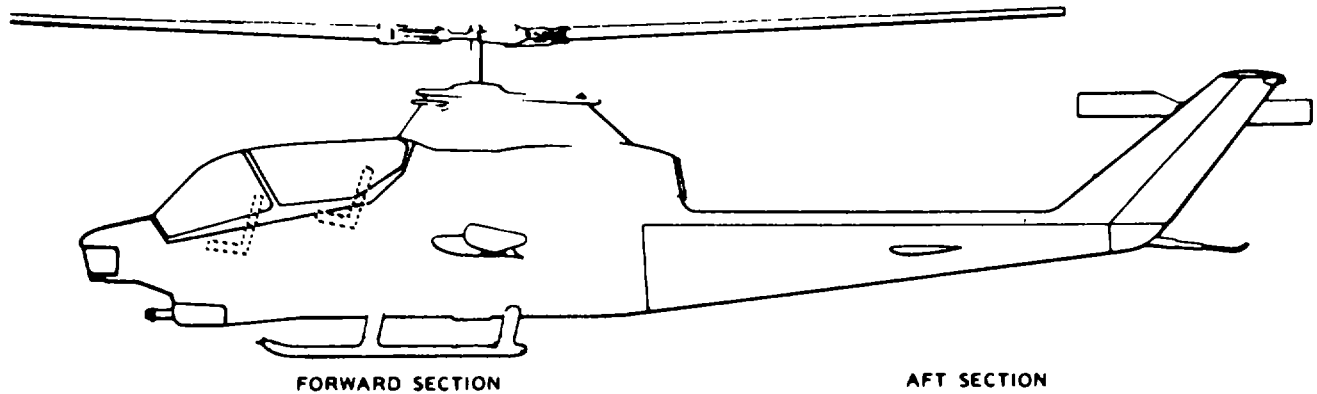
(4) Twelve months elapsed time since last inventory.

(5) Loose equipment shipped under separate cover is inventoried upon transfer by the sending activity and immediately upon receipt by the receiving activity.

d. Inventory Items List. (Refer to figure C-1.)

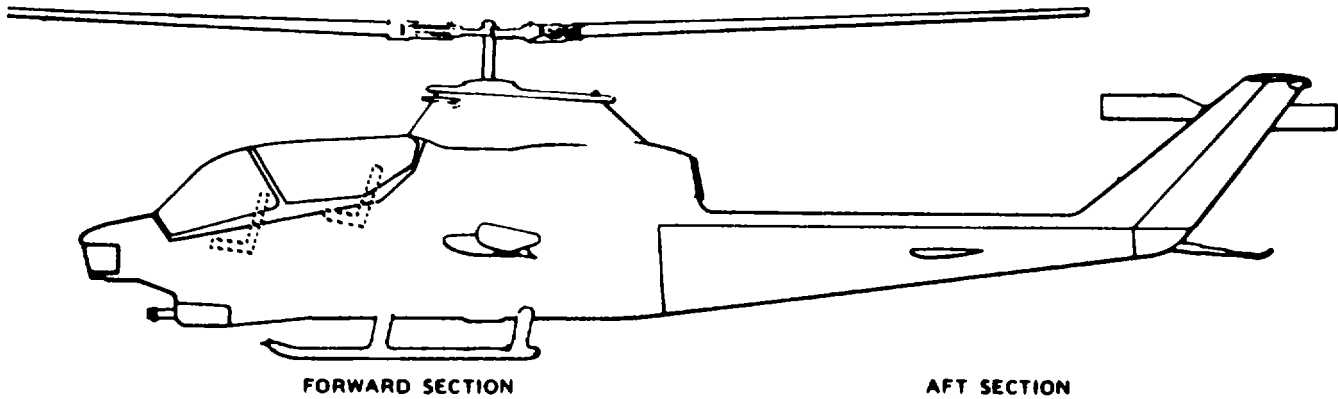
NOTE

Only those items listed which are installed or assigned to a particular aircraft are to be listed on a DA Form 2408-17. (Aircraft Inventory Record) for aircraft.



AIRCRAFT SERIES AND NUMBER OF ITEMS NORMALLY INSTALLED	
NOMENCLATURE	AH-1S REMARKS
Forward Section (Pilot/Gunner Compartment)	
Aircraft Manufacturer's Data Plate (100-030-1)	1
Seat Belt and Shoulder Harness, Pilot	1
Seat Belt and Shoulder Harness, Gunner	1
C-1611A/AIC, Intercommunications	2
Clock	1
Compass, Magnetic, Pilot Standby	1
First Aid Kit	1
Fire Extinguisher	1
Electronic Control Subassembly, 7.62MM Gun (1169L622)	1
Ignition Key	2
Canopy Lock	1
Canopy Lock Key	2
Telescopic Sight Unit (M-65)	1
Sight Hand Control (M-65)	1
Tow Control Panel (M-65)	1
Missile Status Panel (M-65)	1
Pilot Steering Indicator (M-65)	1
KY-28 Speech Security Equipment	1
Forward Section (Electronic Compartment)	
AN/ARN-83, Direction Finder Set (ADF)	1
CN/998/ASN-43 Gyro Directional	1
Forward Section (General)	
Cover, Pitot Tube	1
Cover, Canopy	1
Shield, Engine Inlet	2
Cover, Tail Pipe	1
Cable Assembly, External Intercommunication for Ground Cres	2
Fitting, Jack	4
Gun, 7.62MM & 40MM	1
Drum, Ammunition, Rotary; 7.62 MM	1
Drum, Ammunition, LH: 40 MM	1

Figure C-1. Inventory Items List (sheet 1 of 2).



**AIRCRAFT SERIES AND NUMBER
OF ITEMS NORMALLY INSTALLED**

NOMENCLATURE		AH-1G	REMARKS
Comparator	CM-440	1	
Control	C-9328	1	
Indicator	IP-1150	1	
Receiver	R-1838	2	
Antenna Blade	AS-2890	1	
Antenna	AS-2892	2	
Antenna	AS-2891	2	
TOW Missile Launcher (M-65)		4	
Aft Section			
Main Rotor Tie-Down (SW-4738-1)		1	
Tail Rotor Tie-Down (204-070-450-19)		1	
AN/APX-72 Transponder		1	
AN/ARC-51BX Receiver-Transmitter (UHF)		1	
AN/ARC-54 or AN/ARC-131 Receiver-Transmitter (FM)		1	
AN/ARC-134 or ARC-186 Receiver-Transmitter (VHF)		1	
T-611/ASN Transmitter-Induction Compass		1	
Electronic Power Supply (M-65)		1	209070-176
Missile Command Amplifier (M-65)		1	
Stabilization Control Amplifier (M-65)		1	

Figure C-1. Inventory Items List (sheet 2 of 2).

APPENDIX D

ILLUSTRATED FIELD MANUFACTURE ITEM LIST

This appendix includes complete instructions, including bills of material, for field manufacture of all items listed in TM55-1520-234-23P, Aviation Unit Repair Parts and Special Tools List bearing MO source code. The part number index lists all items in part number order with a cross-reference to the figure in which the item appears. All materials necessary for manufacture of an item are listed by National Stock Number, in the bill of material for the item.

INDEX

PART NUMBER	FIGURE NO.	PART NUMBER	FIGURE NO.
AN743-13	D-142	MS87028G0204B	D-103
MS18029-1S3	D-75	MS87028K0082B	D-103
MS18029-1S4	D-75	MS87028K200J043	D-103
MS18029-1S5	D-75	MS87028K224D200	D-103
MS18029-1S6	D-75	MS87029M0234E105	D-103
MS18029-1S7	D-75	NAS521-20-10	D-158
MS20253-1-82	D-156	S9380-04B094	D-186
MS20253-2-190	D-156	T666035-4-0137	D-150
MS20253-2-7590	D-156	T666035-6-0145	D-150
MS20253P2-300	D-156	T666319-8-0250	D-150
MS25226-8-2	D-54	10-003-1	D-49
MS27212-1-1	D-137	110-033-1	D-78
MS27212-1-2	D-137	130-005-10-13	D-158
MS27212-1-3	D-137	130-005-10-8	D-158
MS27212-1-4	D-137	130005-6-30	D-158
MS27212-1-5	D-137	130-05-6-36	D-158
MS27212-1-6	D-137	130-005-9-13	D-158
MS27212-1-7	D-137	130-005-9-26	D-158
MS27212-1-11	D-137	130-005-9-30	D-158
MS27212-5-2	D-94	130-005-9-36	D-158
MS27253-1	D-31	1560-AH1-061-5	D-166
MS273814C	D-103	1560-AH1-080-3	D-171
MS8000E070A	D-103	1560-AH1-081-17	D-197
MS8000E091C	D-103	1560-AH1-081-18	D-198
MS8000E094C	D-103	1560-AH1-081-19	D-199
MS8000E097A	D-103	1560-AH1-081-25	D-200
MS8000E100A	D-103	1560-AH1-081-68	D-176
MS8000E112E210	D-103	1560-AH1-082	D-165
MS8000E226E120	D-103	1730-EG-026	D-188
MS8000E304F345	D-103	2-323749-3	D-194
MS8000E350E258	D-103	20-012-35-31-28	D-193
MS8000J061J	D-103	20-032-2	D-60
MS8000J107G	D-103	204-001-257-1	D-18
MS8000J114J	D-103	204-010-794-1	D-19
MS8000J190G	D-103	204-011-708-1	D-157
MS8000J220H	D-103	204-011-708-3	D-157
MS8000K324H	D-103	204-030-159-1	D-160
MS8000M430H	D-103	204-030-840-1	D-155
MS8001E084A	D-103	204-040-215-19	D-131
MS8001E122B	D-103	204-040-215-27	D-131
MS8001E164C	D-103	204-040-299-1	D-138
MS8001E214A	D-103	204-040-732-1	D-17
MS8001E224A	D-103	204-040-838-1	D-131
MS8001E244A	D-103	204-060-031-11	D-64
MS8001E264A	D-103	204-060-045-1	D-132
MS8001F114C	D-103	204-060-084-1	D-20
MS8001F120A	D-103	204-070-048-1	D-129
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MS8001G204A	D-103	204-070-839-1	D-160
MS8001G244A	D-103	204-070-848-3	D-108
MS8001C274A	D-103	204-070-855-7	D-124
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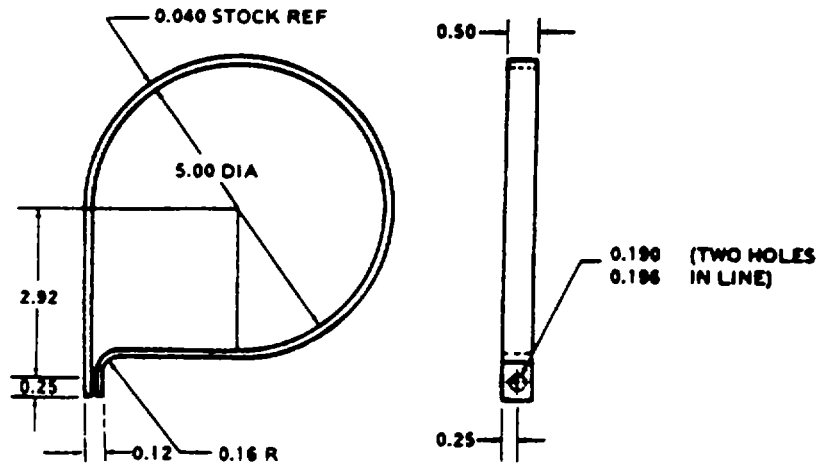
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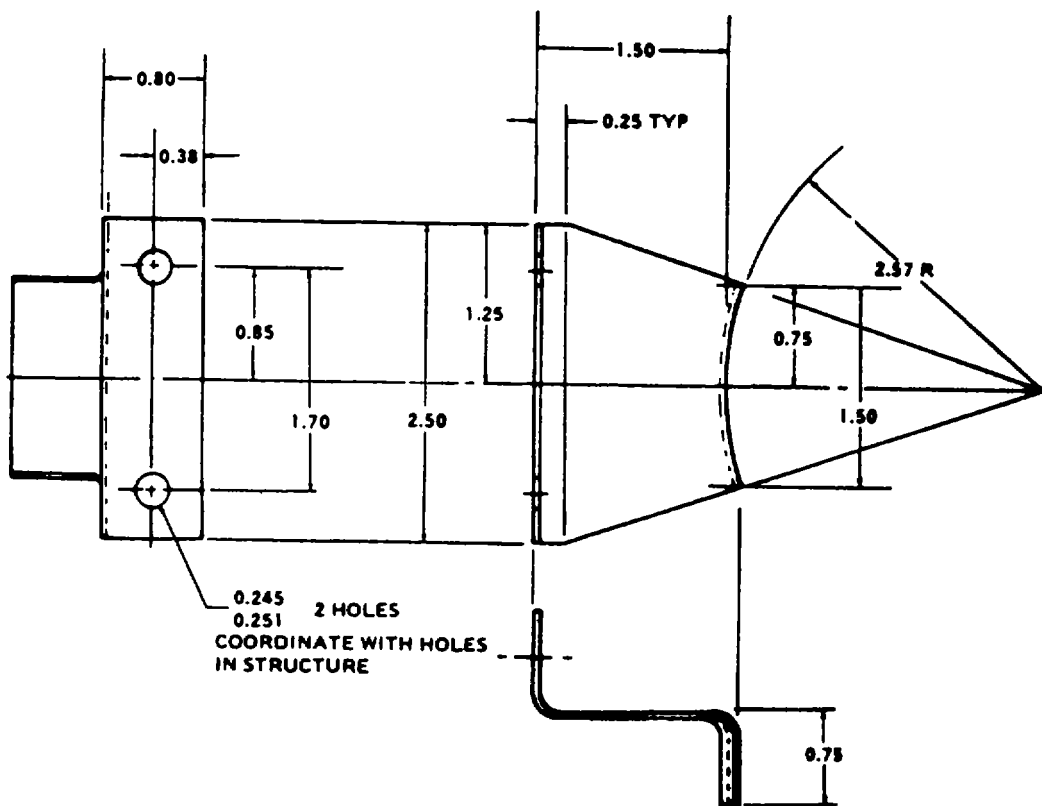
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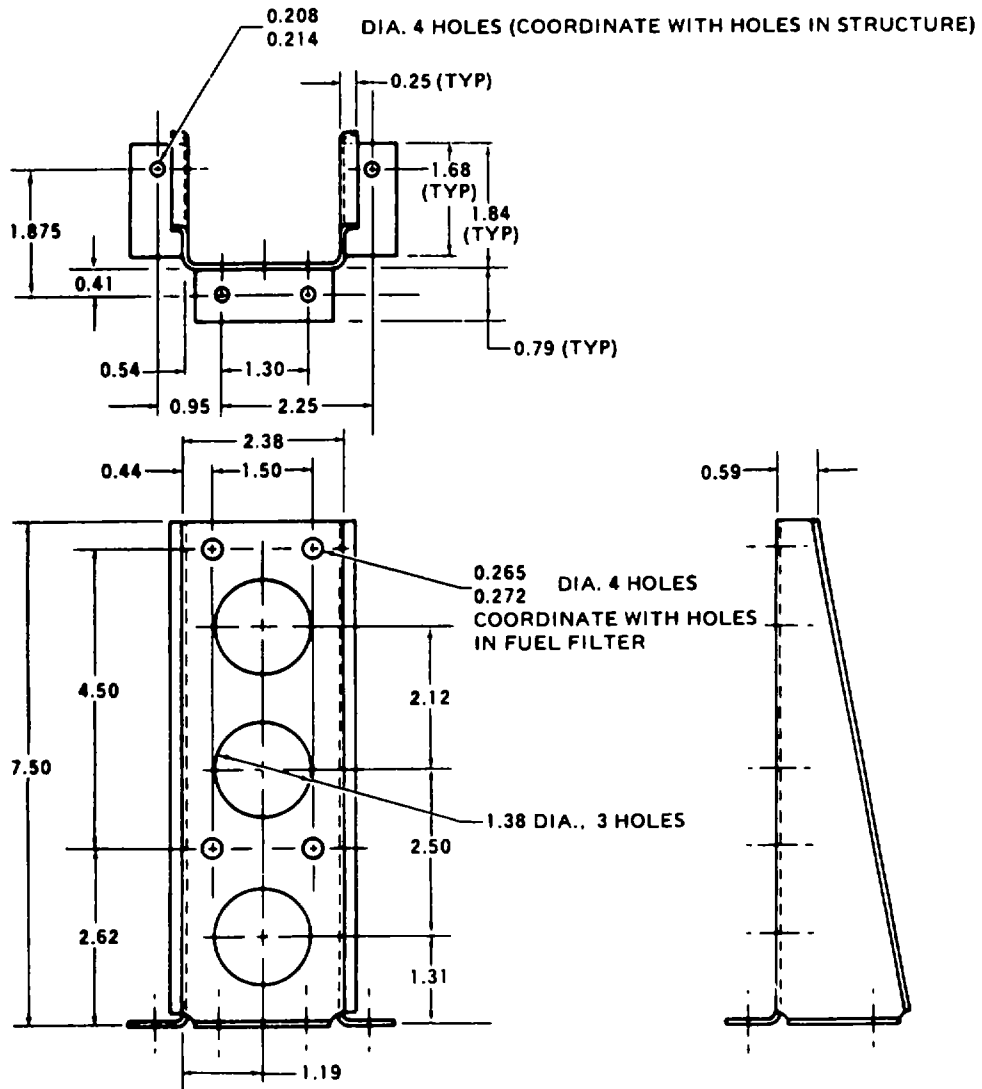
Part Number: 209-070-440-1 CLAMP, Loop
 Fabricate from: NSN 9535-00-167-2290
 Material: 2024T3 Al Aly Sheet QQA250/5
 0.040 inch thick, 1.0 inch wide, 18.7 inch long

Figure D-1



Part Number: 209-070-474-1 BRACKET
 Fabricate from: NSN 9535-00-167-2290
 Material: 2024T3 Al Aly Sheet QQA250/5
 0.040 inch thick, 3.0 inch wide, 3.7 inch long

Figure D-2



Part Number: 209-070-750-1 RETAINER, Boot
 Fabricate from: NSN 9515-00-878-4332
 Material: MIL-S-5059 Comp 301 1/4 Hard
 0.050 inch thick, 7.0 inch wide, 8.5 inch long

Figure D-3

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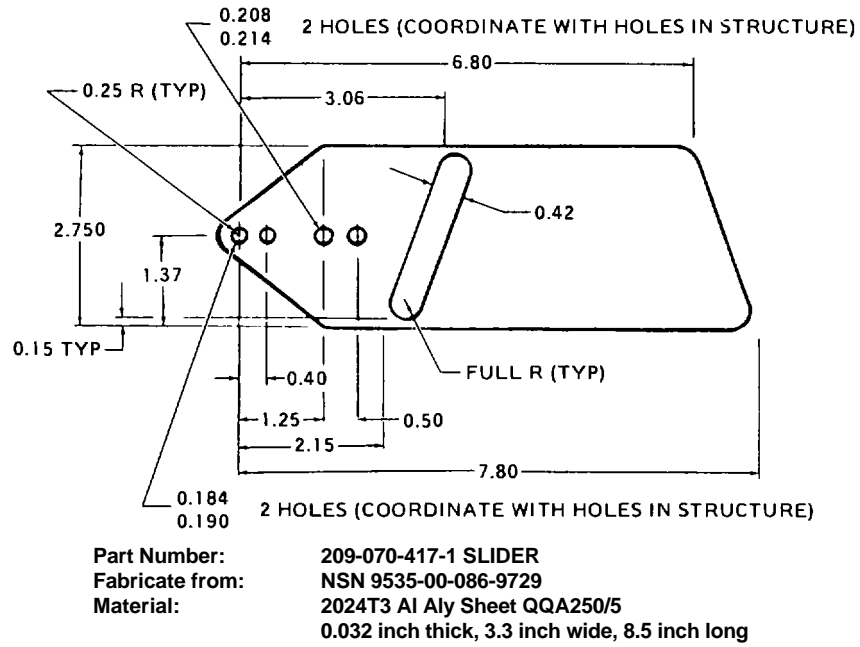


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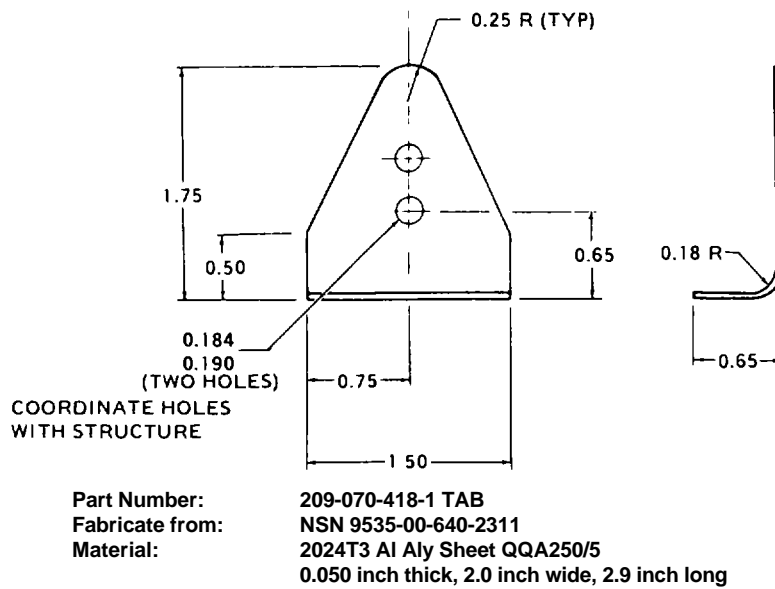
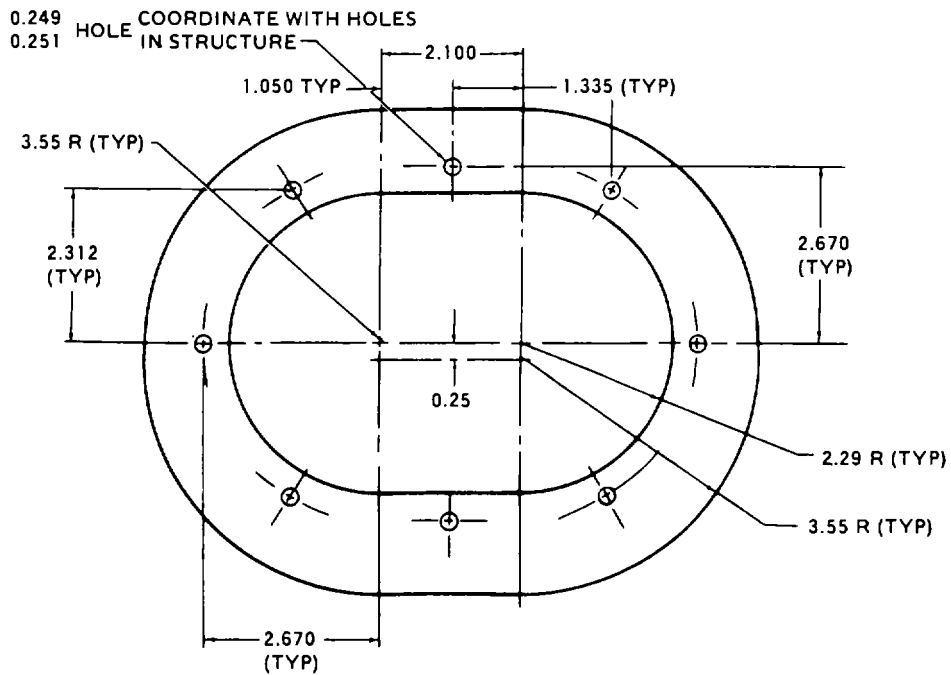
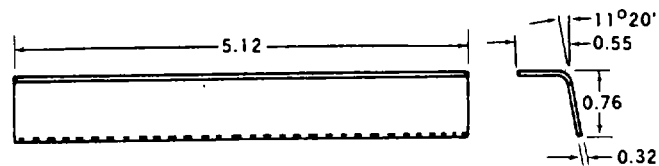


Figure D-5



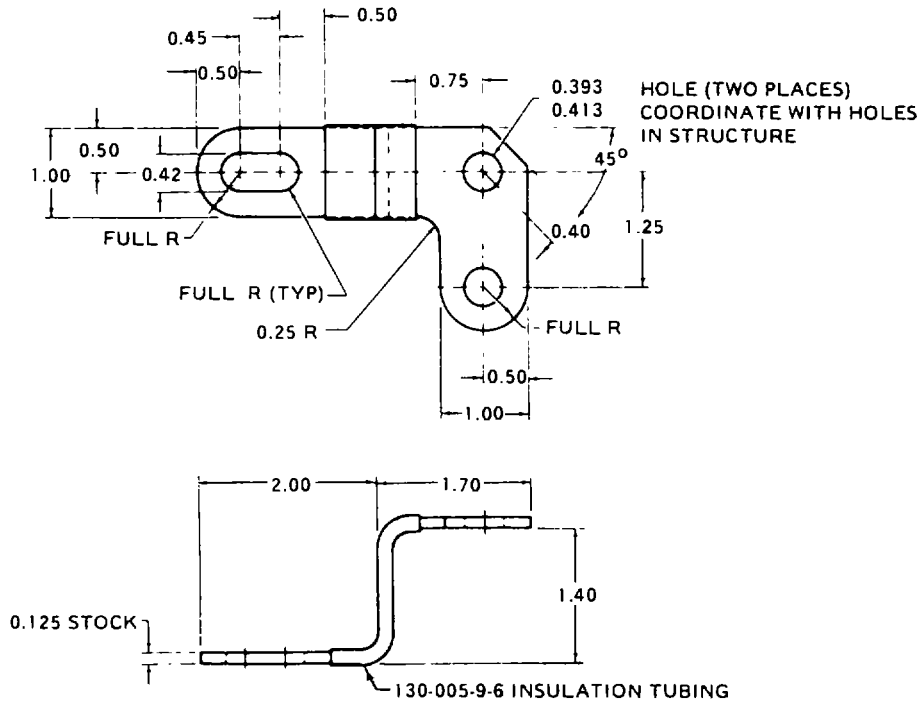
Part Number: 209-060-903-33 DIAPHRAGM
 Fabricate from: NSN 5330-00-938-1719
 Material: JM 89-3-64-92798
 TRIM TO FIT OPENING

Figure D-6



Part Number: 209-020-107-15 BRACKET
 Fabricate from: NSN 9535-00-167-2279
 Material: Al Aly 2024T3 QQA250/5
 0.032 inch thick, 1.8 inch wide, 5.6 inch long
 Part Number: 209-020-107-16 BRACKET
 Fabricate from: NSN 9535-00-167-2279
 Material: Al Aly 2024T3 QQA250/5
 0.032 inch thick, 1.8 inch wide, 5.6 inch long

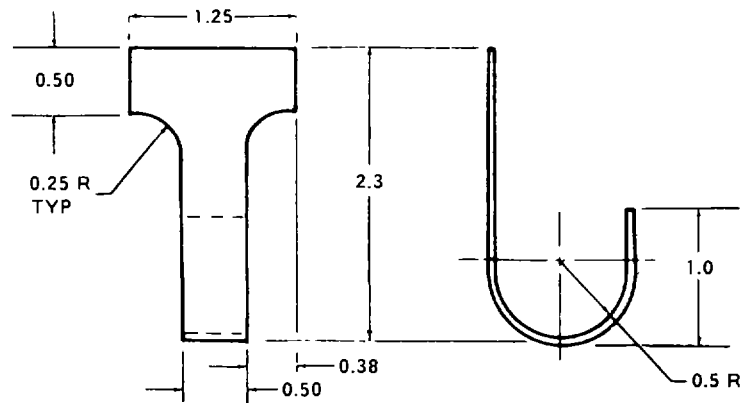
Figure D-7



209-075-263-1 BUS BAR ASSEMBLY

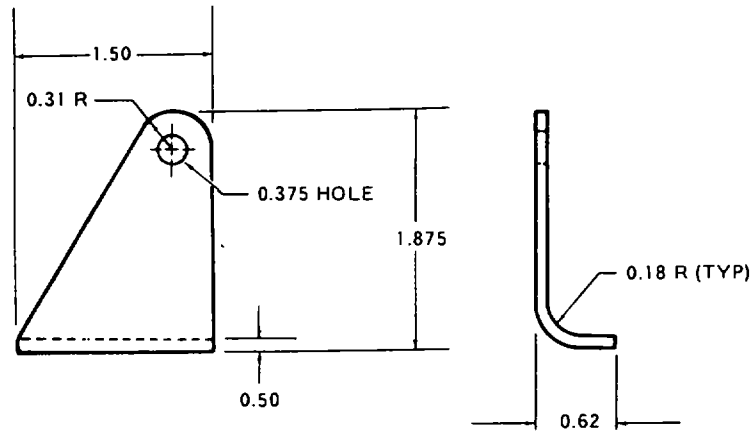
Part Number: 209-020-263-1 BUS BAR
 Fabricate from: NSN 9535-00-232-0479
 Material: 1100 Al Aly QQA250/1
 0.125 inch thick, 2.8 inch wide, 5.6 inch long
 Part Number: 130-005-9-6 TUBING, INSULATION
 Fabricate from: NSN 5970-00-914-3118

Figure D-8



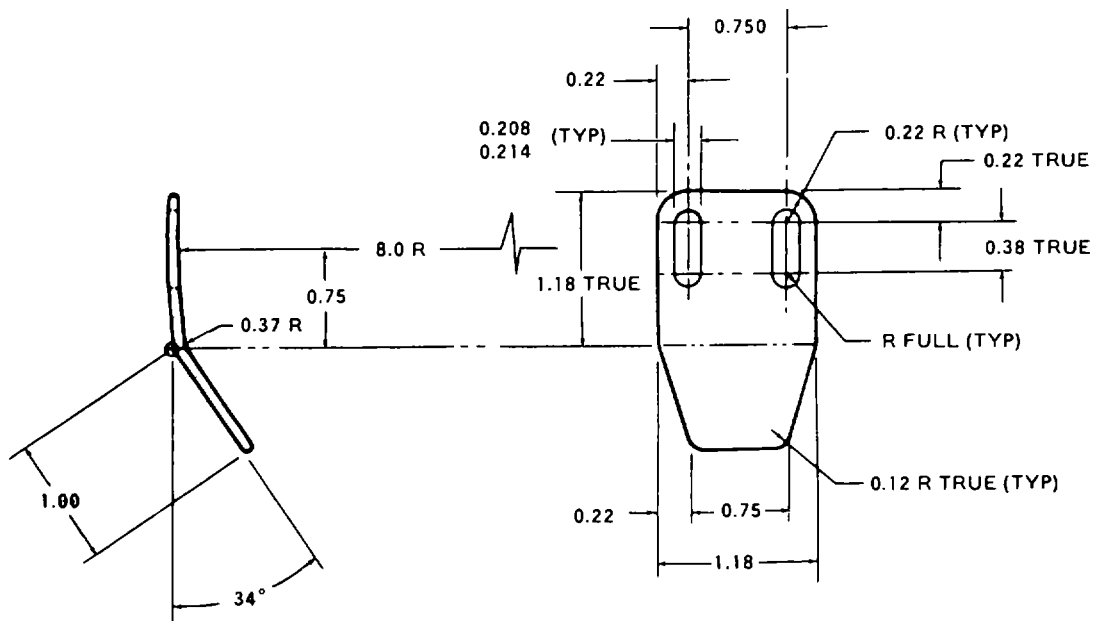
Part Number: 209-070-119-1 HOOK
 Fabricate from: NSN 9515-00-235-7609
 Material: 18-8 CRES MIL-S-059 COMP 301 Half Hard
 0.050 inch thick, 1.8 inch wide, 4.7 inch long

Figure D-9



Part Number: 209-030-585-37 CLIP
 209-030-585-38 CLIP
 Fabricate from: NSN 9535-00-640-2311
 Material: 0.050 x 3.0 2024T3 Al Aly QQA250/5

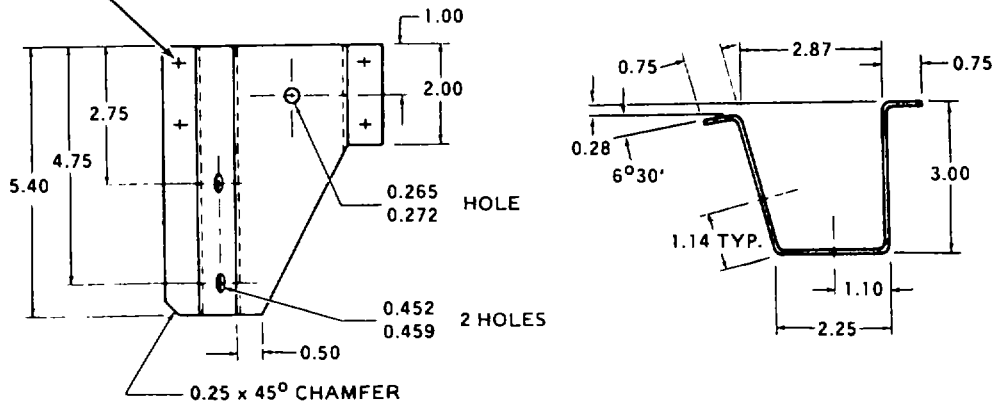
Figure D-10



Part Number: 209-030-591-1 RETAINER, Door
 Fabricate from: NSN 9535-00-232-0405
 Material: 2024T3 Al Aly QQA250/5
 0.090 inch thick, 1.7 inch wide, 2.7 inch long

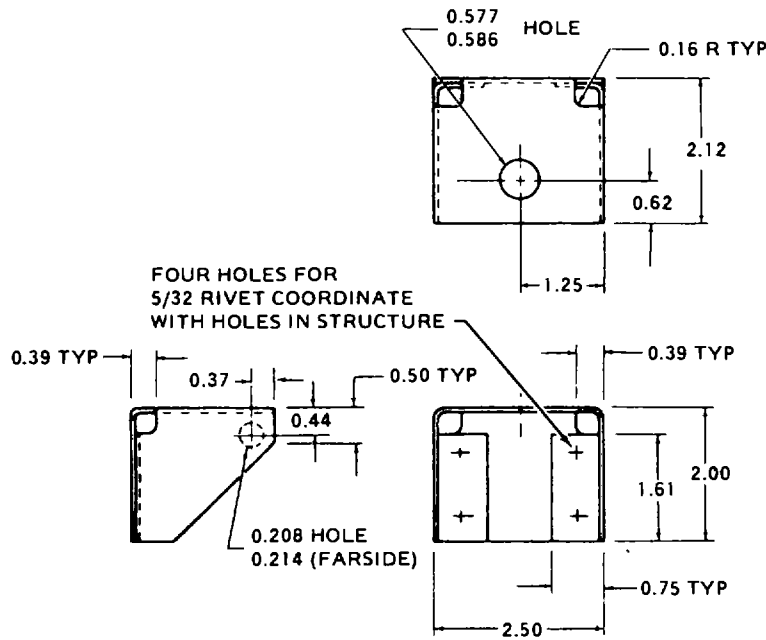
Figure D-11

FOUR HOLES FOR
5/32 RIVETS - COORDINATE
WITH HOLES IN STRUCTURE



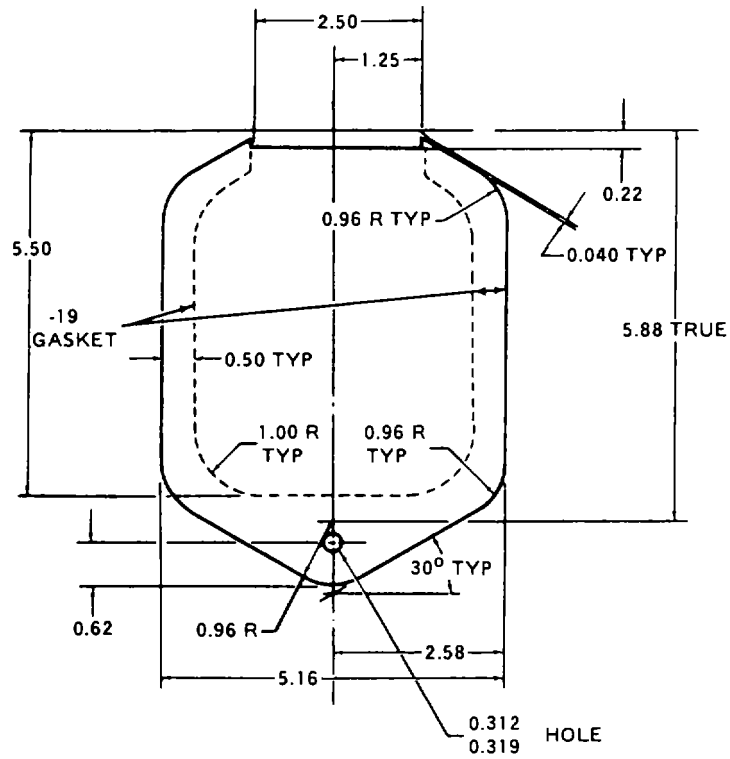
Part Number: 209-030-253-15 SUPPORT
 Fabricate from: NSN 9535-00-640-2311
 Material: 2024T3 Al Aly Sheet QQA250/5
 0.050 inch thick, 5.9 inch wide, 10.1 inch long

Figure D-12



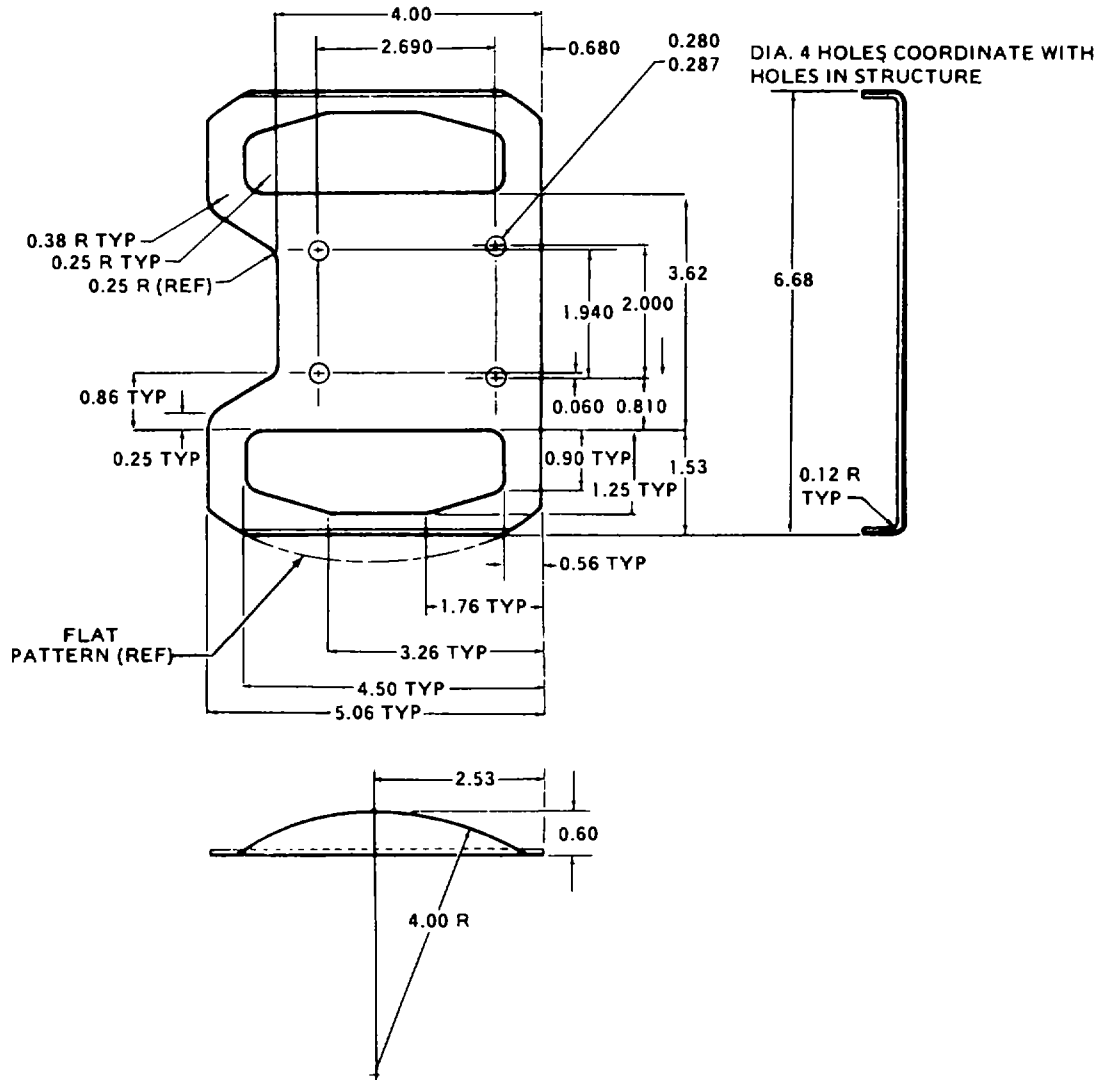
Part Number: 209-030-253-17 SUPPORT
 Fabricate from: NSN 9535-00-167-2280
 Material: 2024T3 Al Aly Sheet QQA250/5
 0.040 inch thick, 4.6 inch wide, 7.0 inch long

Figure D-13



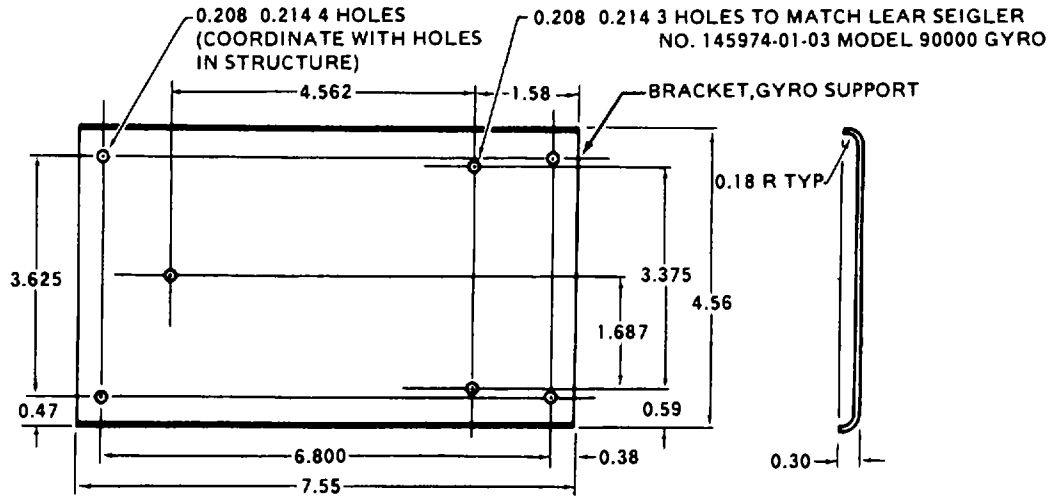
- Part Number: 209-030-139-3 DOOR, Access, Aircraft
 Fabricate from: NSN 9535-00-167-2174
 Material: 2024T3 Al Aly Sheet QQA250/5
 0.025 inch thick, 5.8 inch wide, 7.3 inch long
- Part Number: 209-030-139-19 GASKET
 Fabricate from: NSN 9320-00-241-9740
 Material: TAK Rubber Sheet MIL-R-6855 Class 2, Grade 40,
 0.032 inch thick, 6.0 inch wide, 8.0 inch long

Figure D-14



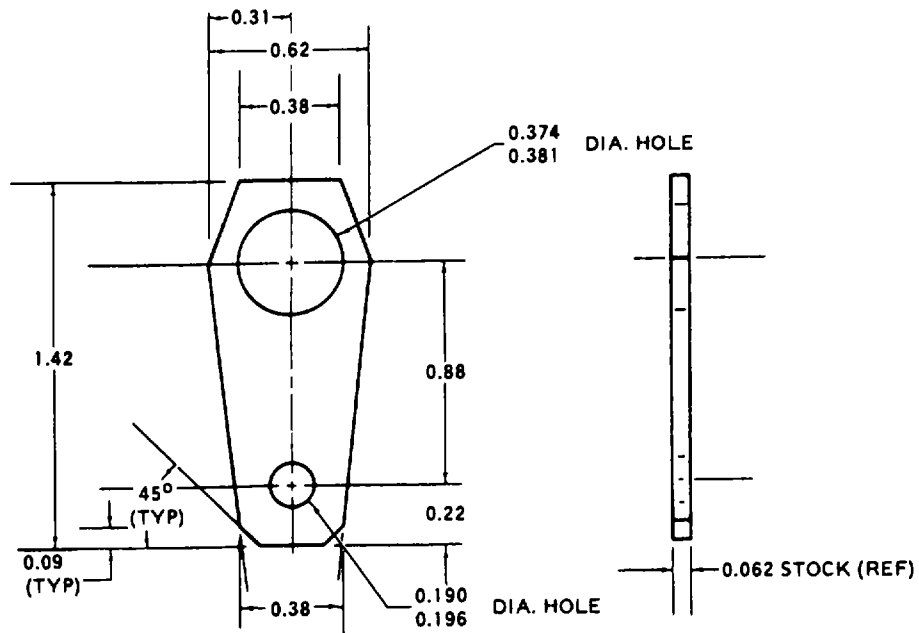
Part Number: 209-001-750-1 RETAINER, Boot
 Fabricate from: NSN 9535-00-086-9729
 Material: 2024T3 Al Aly Sheet QQA250/5
 0.032 inch thick, 5.6 inch wide, 8.4 inch long

Figure D-15



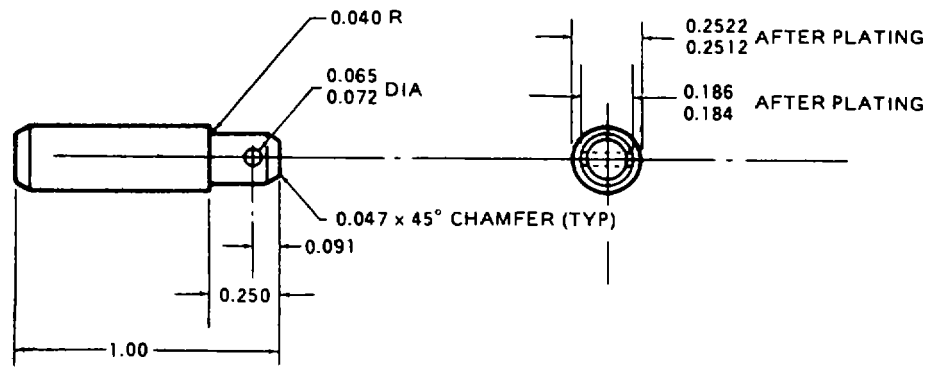
Part Number: 209-075-290-1 BRACKET
 Fabricate from: NSN 9535-00-640-2311
 Material: 2024T3 Al Aly Sheet QQ-A-250/5
 0.050 inch thick, 5.5 inch wide, 8.0 inch long

Figure D-16



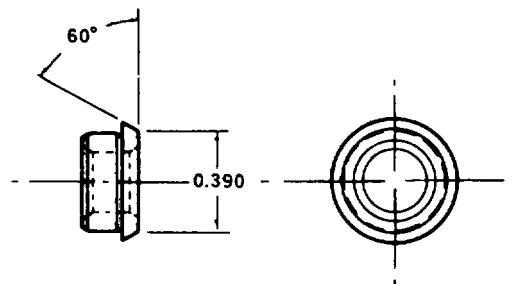
Part Number: 209-040-732-1 CLIP
 Fabricate from: NSN 9515-00-184-8808
 Material: Steel Sheet MIL-S-18729 Cond N
 0.063 inch thick, 0.75 inch wide, 1.5 inch long

Figure D-17



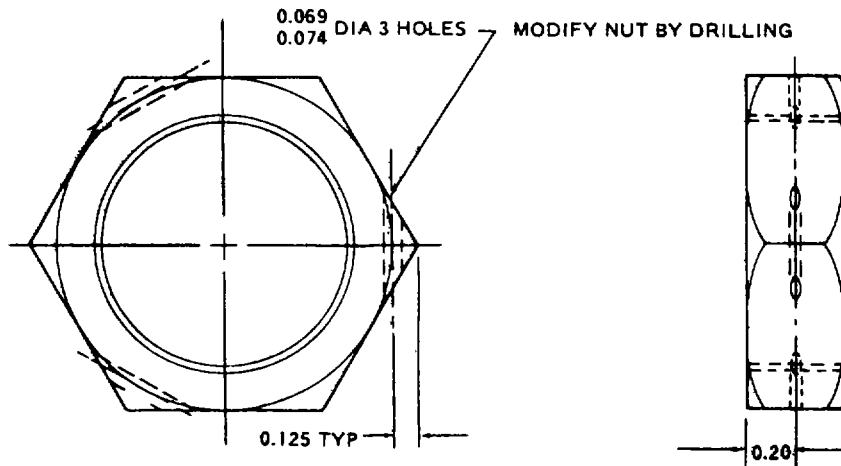
Part Number: 204-001-257-1 PIN
 Fabricate from: NSN 9510-00-234-4279
 Material: 4130 Stl Rod MIL-S6758 Cond D4
 0.3125 Diameter, 1.2 inch long

Figure D-18



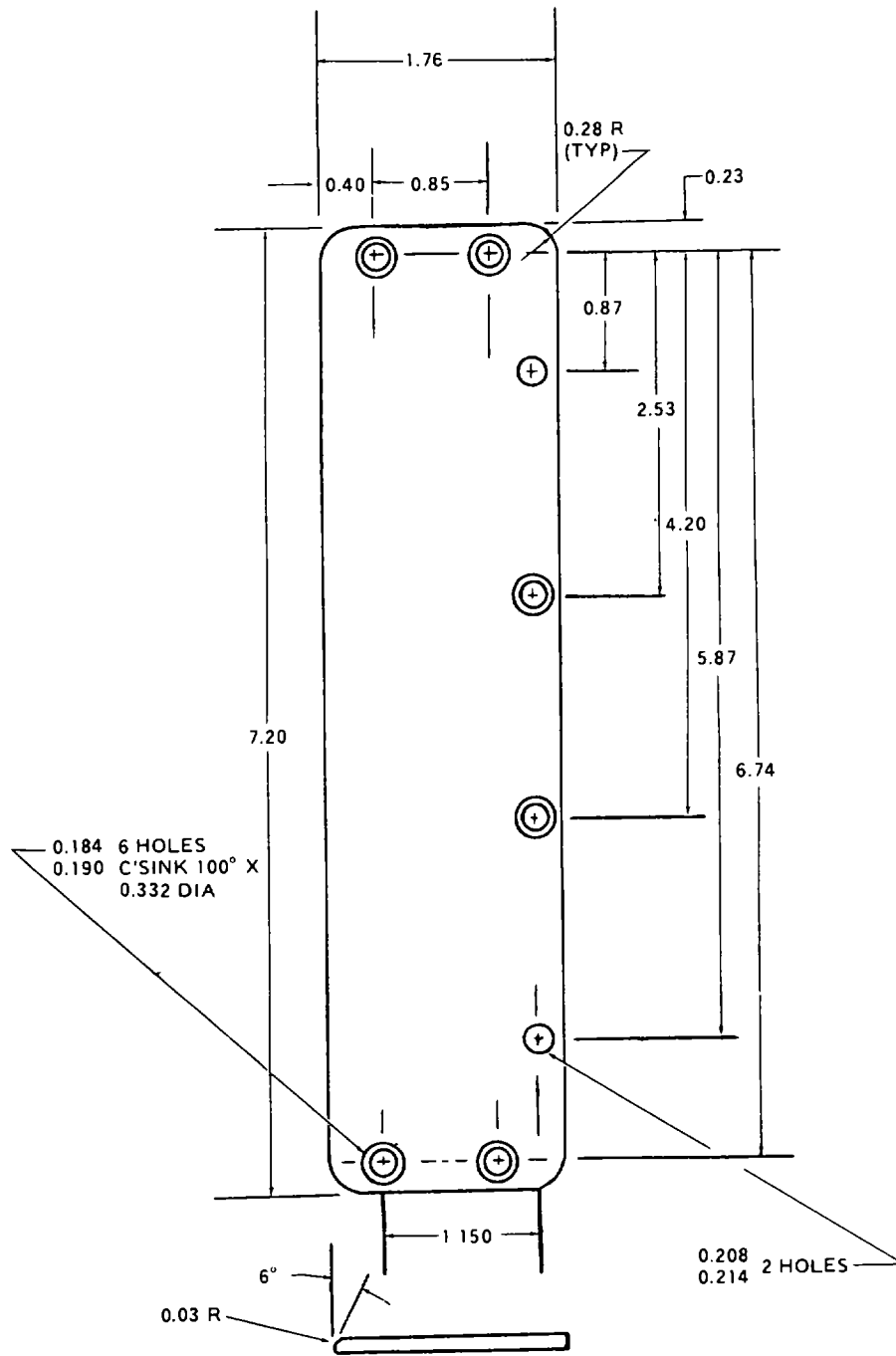
Part Number: 204-010-794-1 BUSHING
 Fabricate from: NSN 3120-00-625-0056
 Material: 22-006B15-13-16 FMC 97449

Figure D-19



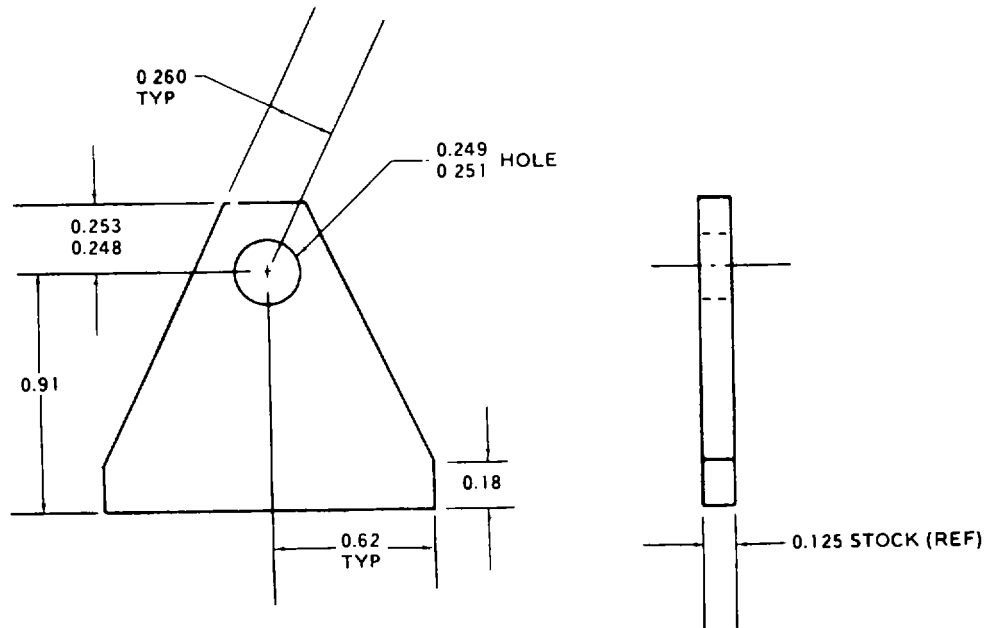
Part Number: 270-580-292-12 JAM NUT
 Fabricate from: NSN 5310-00-601-7515
 Material: MS24400D12

Figure D-20



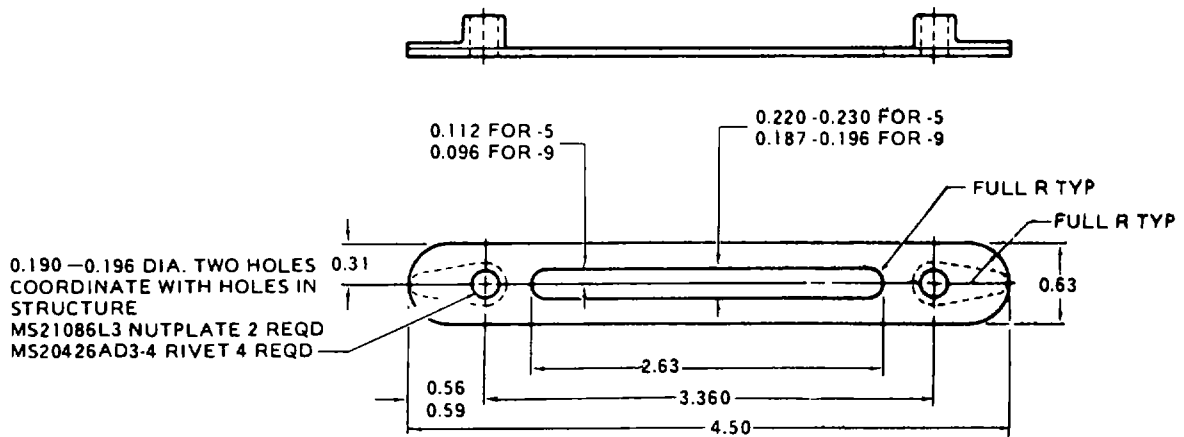
Part Number: 209-070-466-1 PLATE
Fabricate from: NSN 9535-00-167-2247

Figure D-21



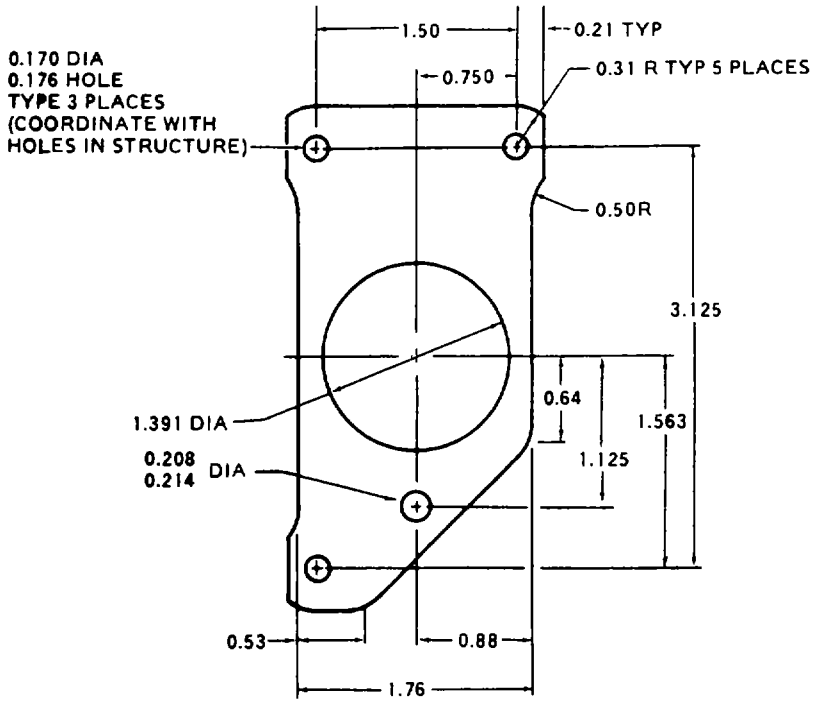
Part Number: 540-011-179-1 CLAMP, Strap Retention
 Fabricate from: NSN 9515-00-184-8811
 Material: 4130 Aly Stl Federal Specification MIL-S-18729
 Cond N 0.125 inch thick, 1.4 inch wide, 1.4 inch long

Figure D-22



Part Number: 209-030-564-5, -9 GUIDEPLATE
 Fabricate from: NSN 9515-00-184-8808
 Material: 4130 Aly Stl Federal Specification MIL-S-18729
 Cond N 0.063 inch thick, 0.8 inch, wide, 5.0 inch long
 MS21086L3 Nutplate (2 Reqd)
 NSN 5310-00-021-3884
 MS20426AD3-4 Rivet (4 Reqd)
 NSN 5320-00-117-6938

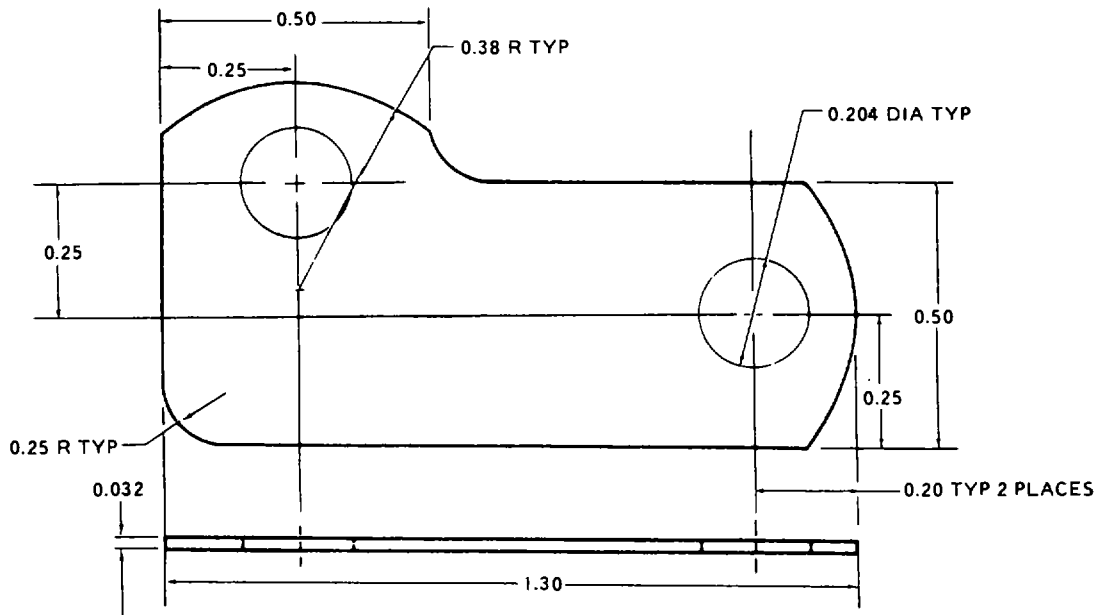
Figure D-23



0.170 DIA
0.176 HOLE
TYPE 3 PLACES
(COORDINATE WITH
HOLES IN STRUCTURE)

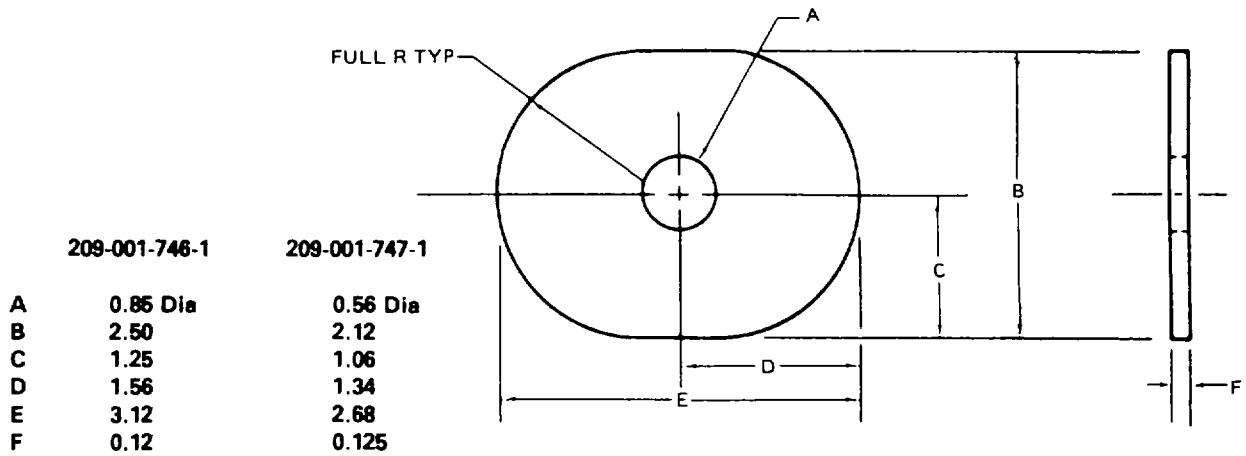
Part Number: 209-001-152-1 PLATE, Boot
Fabricate from: NSN 9535-00-232-0378
Material: 2024T3 A1 Aly Sheet QQA250/4
0.063 inch thick, 2.7 inch wide, 4.2 inch long

Figure D-24



Part Number: 209-001-338-1 SUPPORT Clamp, Gunners Stick
 Fabricate from: NSN 9535-00-086-9729
 Material: 2024T3 Al Aly Sheet QQA355
 0.032 inch thick, 1.7 inch wide, 1.8 inch long

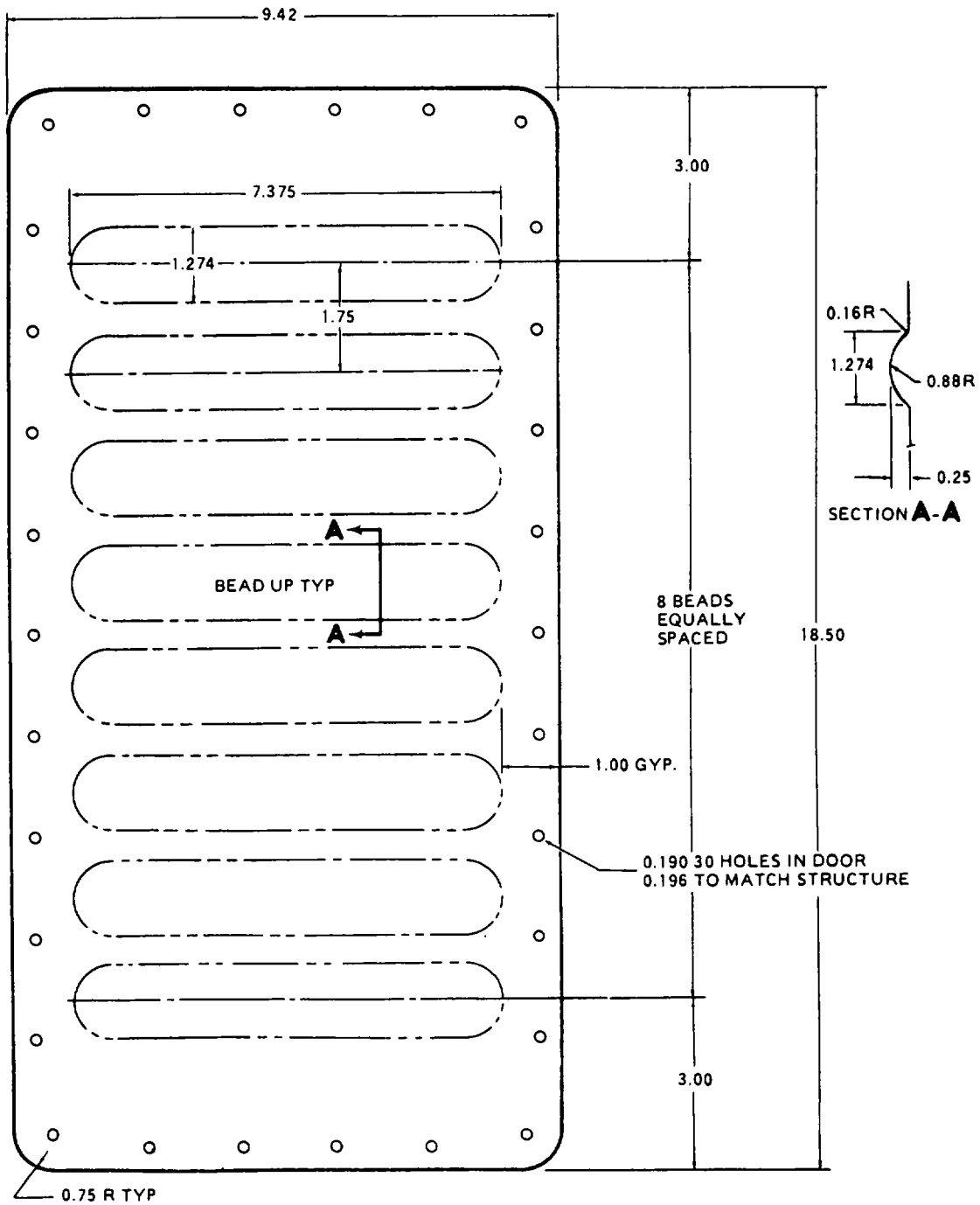
Figure D-25



Part Number: 209-001-746-1 SEAL
 Fabricate from: NSN 9320-00-291-0416
 Material: Rubber Sheet MIL-R-6130, Type II Grade A Soft
 0.12 inch thick, 3.0 inch wide, 3.5 inch long

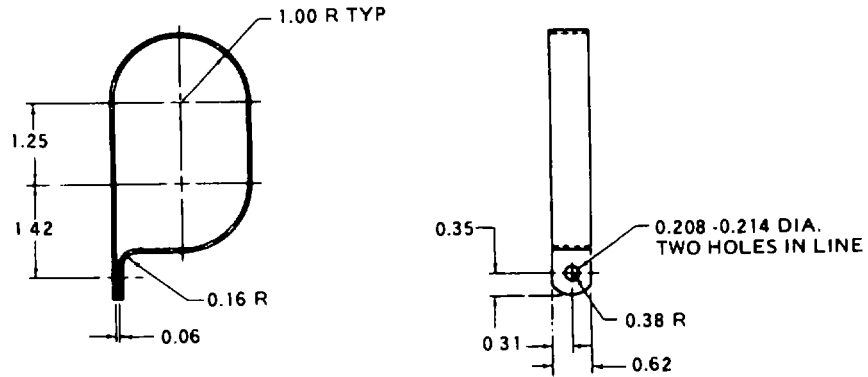
Part Number: 209-001-747-1 SEAL
 Fabricate from: NSN 9320-00-291-0416
 Material: Rubber Sheet MIL-R-6130, Type II Grade A Soft
 0.125 inch thick, 2.5 inch wide, 3.0 inch long

Figure D-26



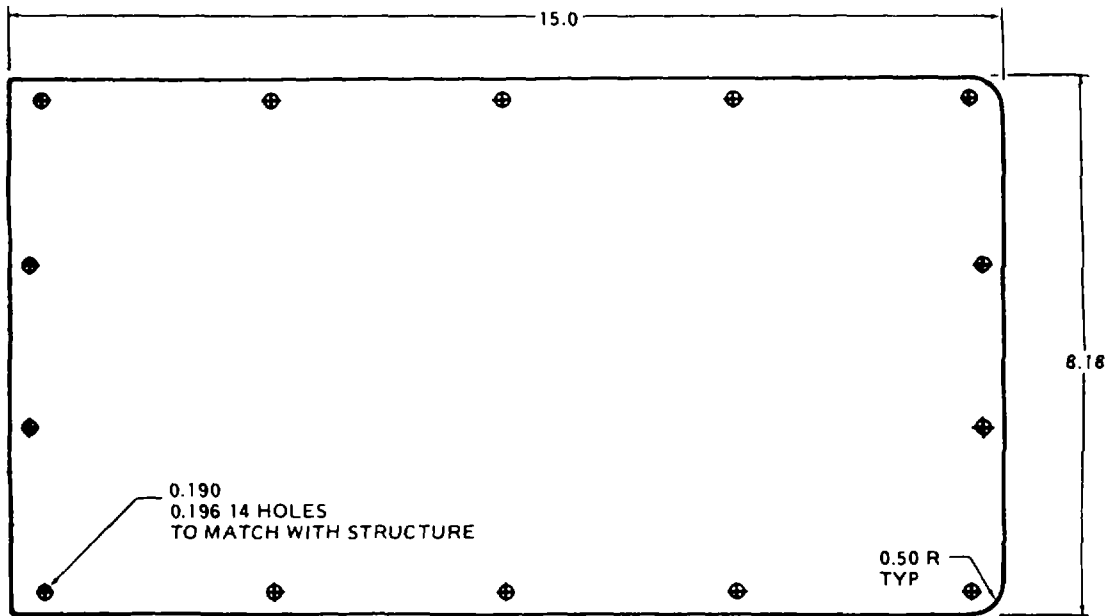
Part Number: 209-030-103-43 DOOR
 Fabricate from: NSN 9535-00-167-2280
 Material: 2024T42 Al Aly Sheet QQA250/5
 0.040 inch thick, 10.0 inch wide, 19.0 inch long

Figure D-27



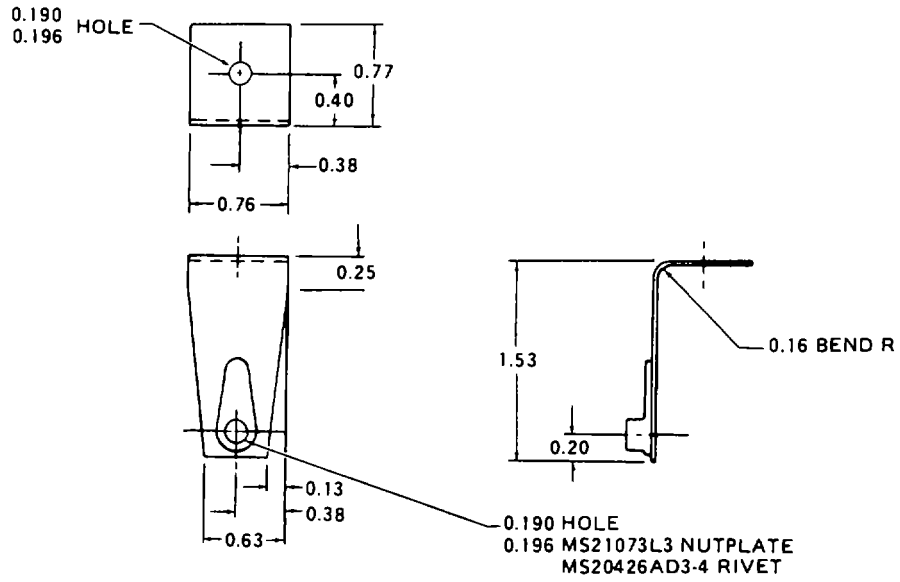
Part Number: 209-070-531-1 CLAMP, Hose
 Fabricate from: NSN 9535-00-137-2280
 Material: 2024T3 Al Aly QQA250/5
 0.040 inch thick, 1.12 inch wide, 11.2 inch long

Figure D-28



Part Number: 209-030-203-47 COVER
 Fabricate from: NSN 9535-00-086-9729
 Material: 2024T3 Al Aly QQA250/5
 0.032 inch thick, 9.0 inch wide, 16.0 inch long

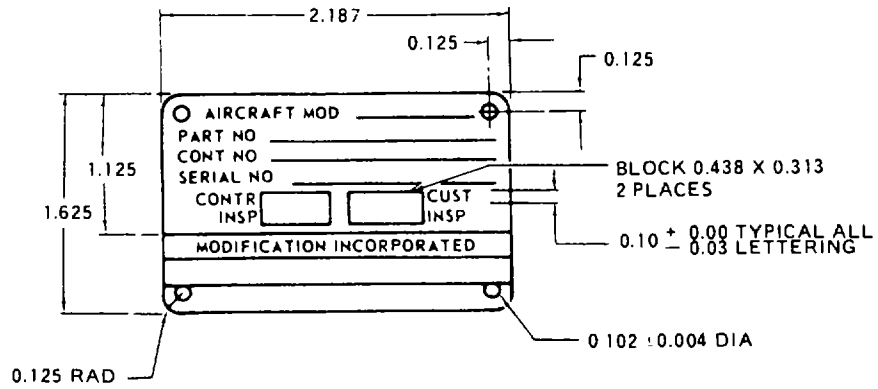
Figure D-29



209-070-438-1 CLIP ASSEMBLY

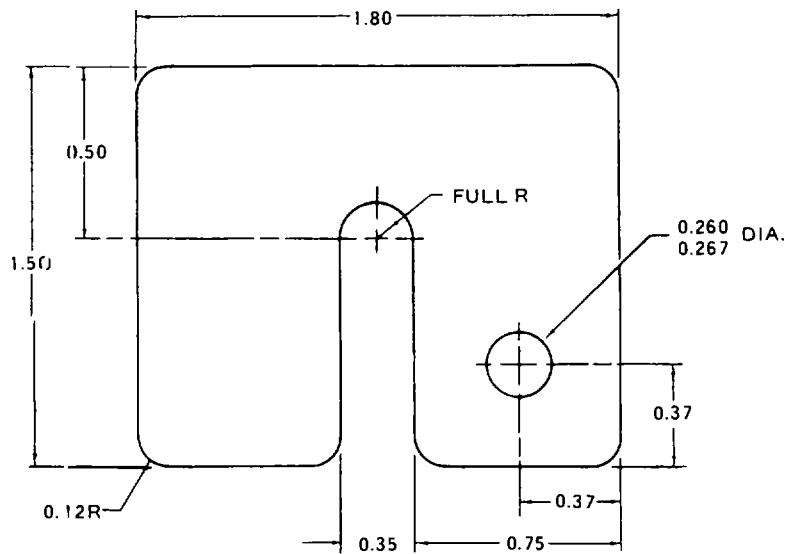
Part Number: 209-070-438-1 CLIP
 Fabricate from: NSN 9535-00-167-2280
 Material: 2024T3 Al Aly QQA250/5
 2.5 inch long
 Part Number: MS2104713 NUTPLATE
 Fabricate from: NSN 5310-00-734-1850
 Material: MS20426AD3-4 RIVET
 Fabricate from: NSN 5320-00-117-6938

Figure D-30



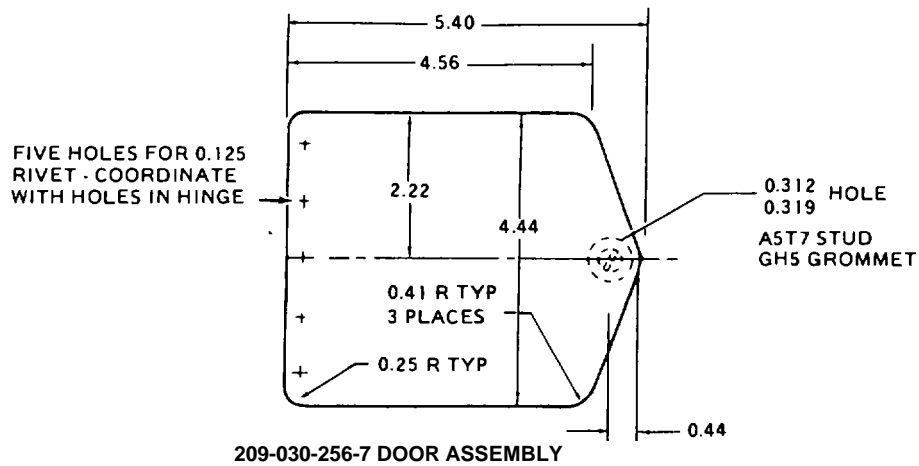
Part Number: MS272531-1 PLATE
 Fabricate from: NSN 9905-00-532-2497

Figure D-31



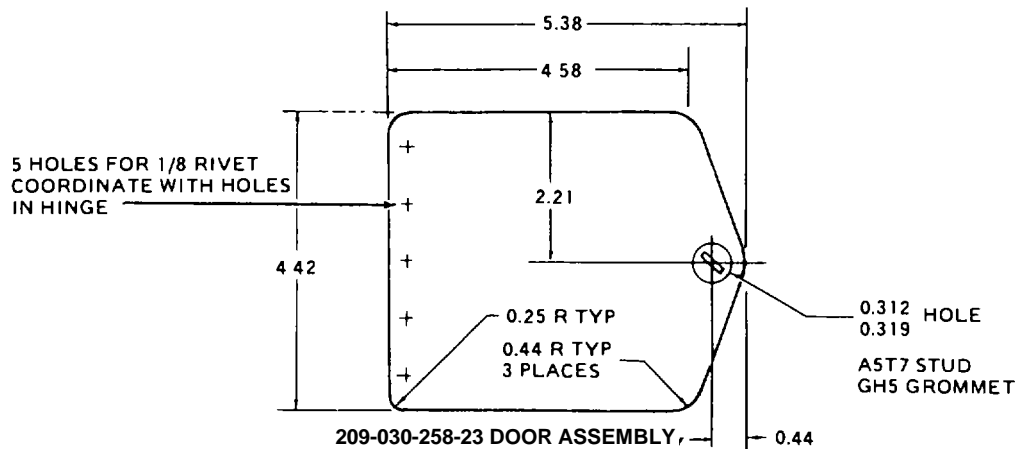
Part Number: 209-060-802-1 SPACER
 Fabricate from: NSN 9535-00-232-0378
 Material: 2024T3 Al Aly QQA250/5
 0.063 inch thick, 2.0 inch wide, 2.2 inch long

Figure D-32



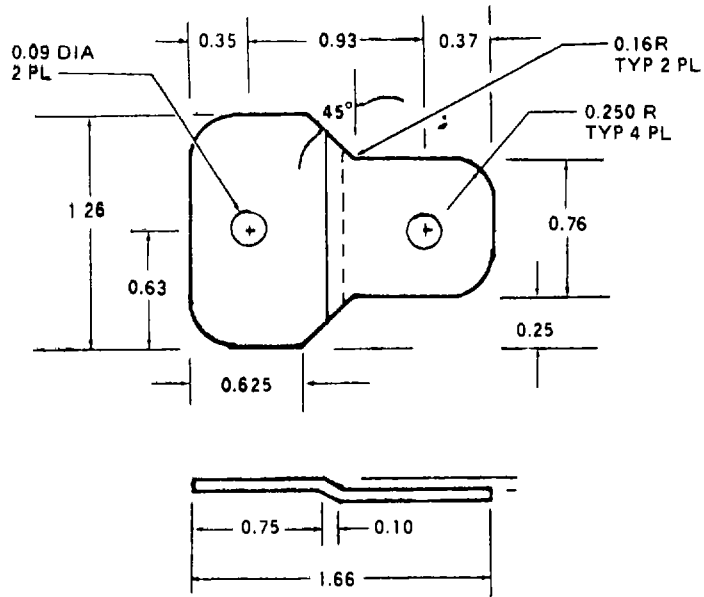
Part Number: 209-030-256-27 DOOR
 Fabricate from: NSN 9535-00-167-2279
 Material: 2024T3 Al Aly QQA250/5
 0.032 inch thick, 5.0 inch wide, 6.0 inch long
 Part Number: GH5 GROMMET
 Fabricate from: NSN 5325-00-141-4002
 Part Number: A5T7 STUD
 Fabricate from: NSN 5325-00-550-1966

Figure D-33



Part Number: 209-030-258-23 DOOR
 Fabricate from: NSN 9635-00-086-9729
 Material: 0.032 2024T3 Al Aly Sheet QQA250/5
 0.032 inch thick, 5.0 inch wide, 5.9 inch long
 Part Number: 209-030-258-25 HINGE
 Fabricate from: NSN 5340-00-664-8140
 Part Number: GH5 GROMMET
 Fabricate from: NSN 5325-00-141-4002
 Part Number: A5T7 STUD
 Fabricate from: NSN 5325-00-550-1966

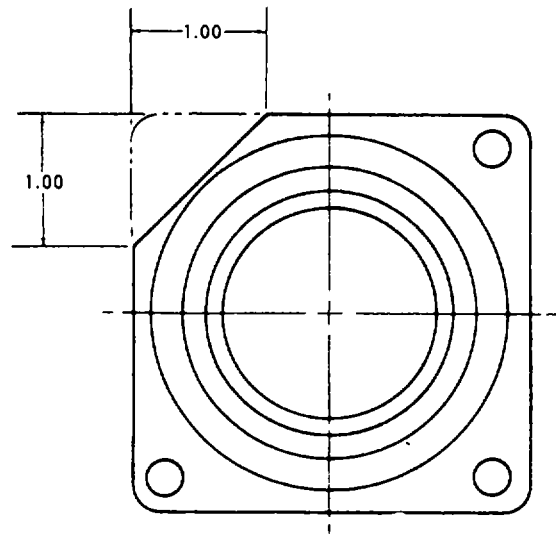
Figure D-34



Part Number: 209-030-262-17
 Fabricate from: NSN 9535-00-640-2311
 Material: 2024T3 Al Aly Sheet QQA250/5
 0.050 inch thick, 1.8 inch wide, 2.2 inch long

NOTE
 209-030-262-17 may
 be used in lieu of
 -15, -16, -23 and
 -24.

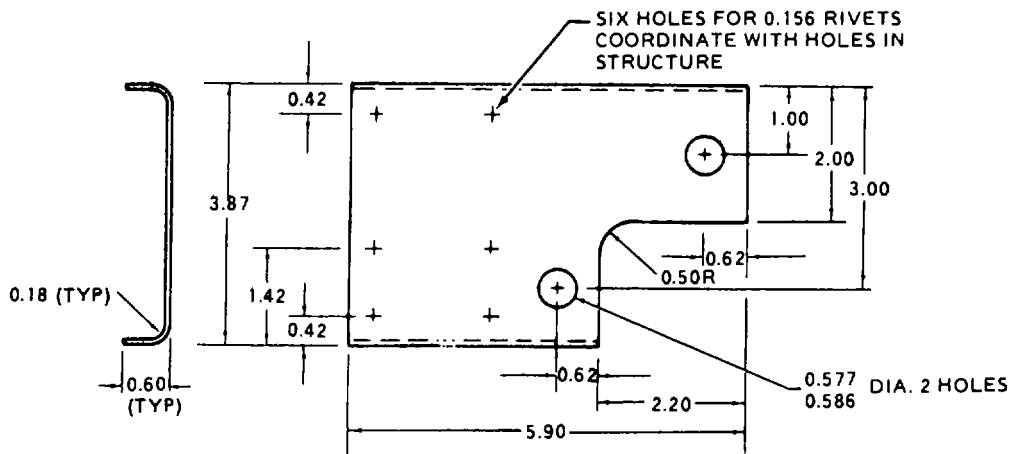
Figure D-35



Part Number: 209-070-416-1 VALVE ASSEMBLY
 Fabricate from: NSN 1660-00-561-7982
 Part Number: 209-070-529-3

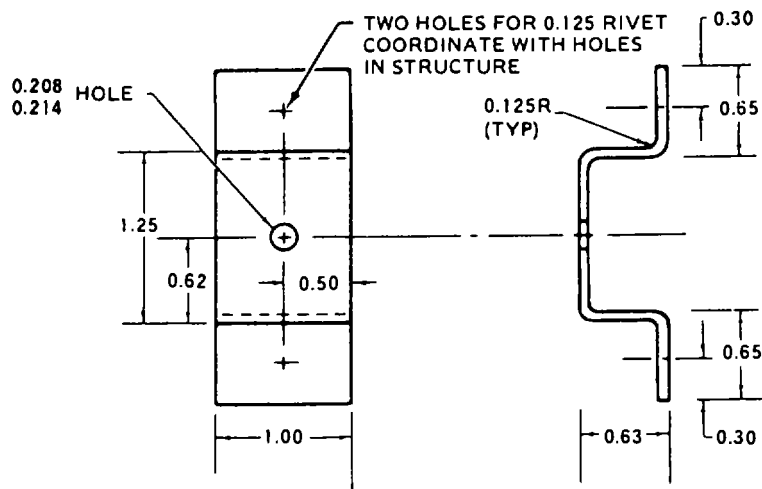
D-36

D-28 Change 13



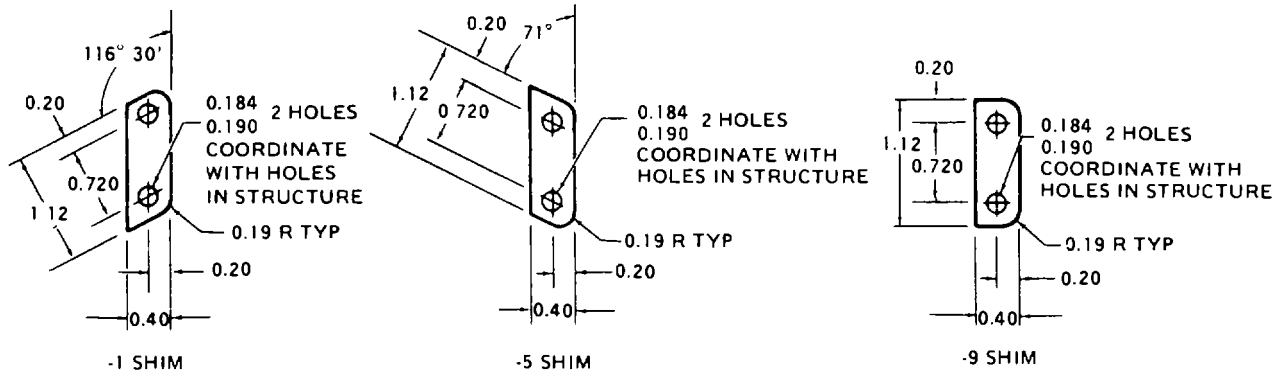
Part Number: 209-030-267-17 SUPPORT
 Fabricate from: NSN 9535-00-232-0569
 Material: 2024T3 Al Aly Sheet QQA250/5
 0.050 inch thick, 5.3 inch wide, 6.1 inch long

Figure D-37



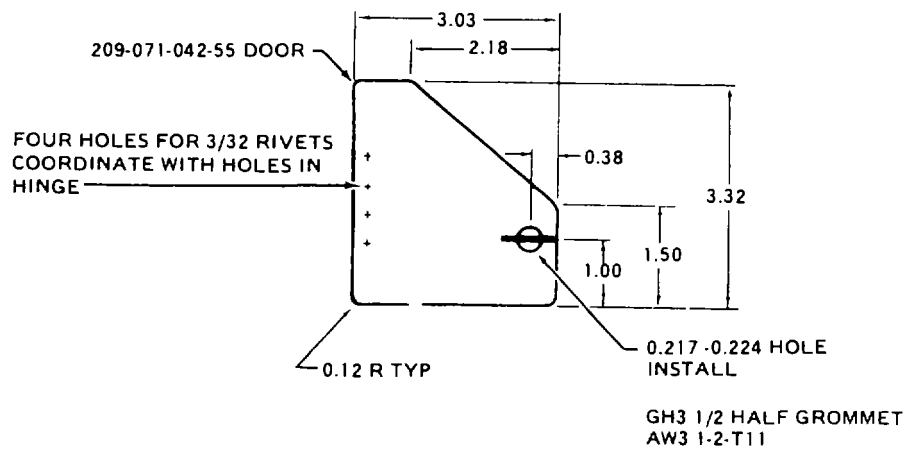
Part Number: 209-030-2286-29 SUPPORT ACCESS DOOR
 Fabricate from: NSN 9535-00-640-2311
 Material: 2024T3 Al Aly Sheet QQA050/5
 0.050 inch thick, 1.1 inch wide, 4.0 inch long

Figure D-38



Part Number: 209-030-554-1 SHIM
 Part Number: 209-030-554-5 SHIM
 Part Number: 209-030-554-9 SHIM
 Fabricate from: NSN 9535-00-232-0378
 Material: 2024T3 Al Aly Sheet QQA250/5
 0.063 inch thick, 0.9 inch wide, 1.9 inch long

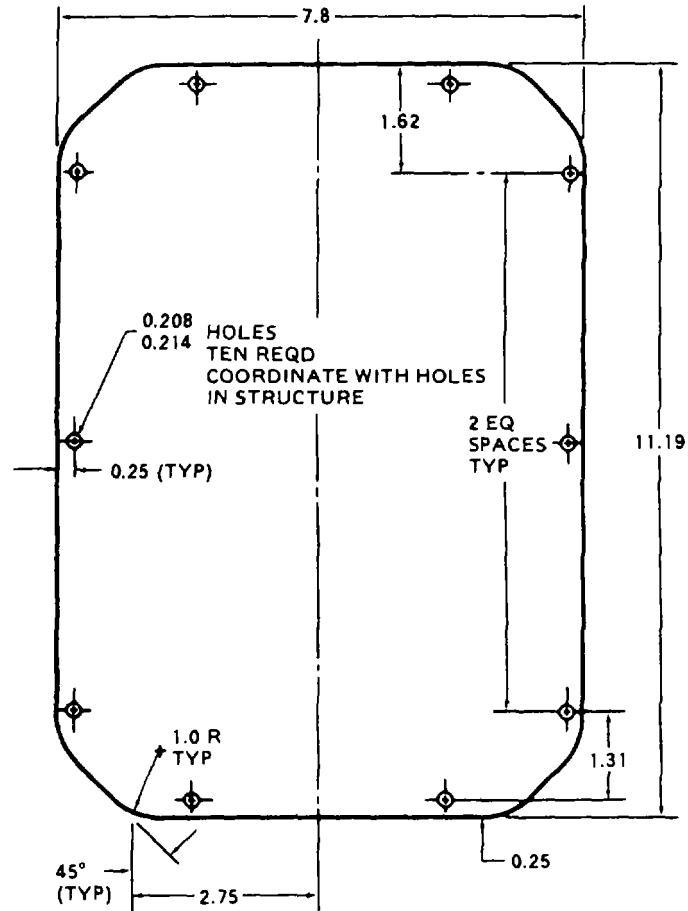
Figure D-39



209-071-042-53 DOOR ASSEMBLY, Shown
 209-071-042-53 DOOR ASSEMBLY, Opposite

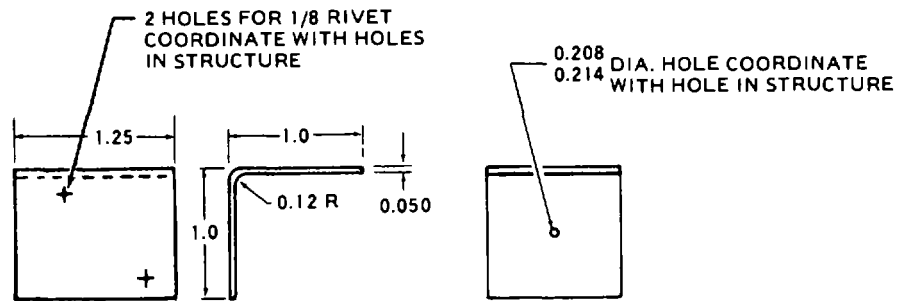
Part Number: 209-071-042-55 DOOR, Shown
 Part Number: 209-071-042-56 DOOR, Opposite
 Fabricate from: NSN 9535-00-084-4551
 Material: 2024T3 Al Aly Sheet QQA250/5
 0.040 inch thick, 3.5 inch wide, 4.5 inch long
 Part Number: AW3 1-2-T11 STUD (1 each)
 Fabricate from: NSN 5325-00-285-3285
 Part Number: GH3 1-2 GROMMET (1 each)
 Fabricate from: NSN 5325-00-281-4969

Figure D-40



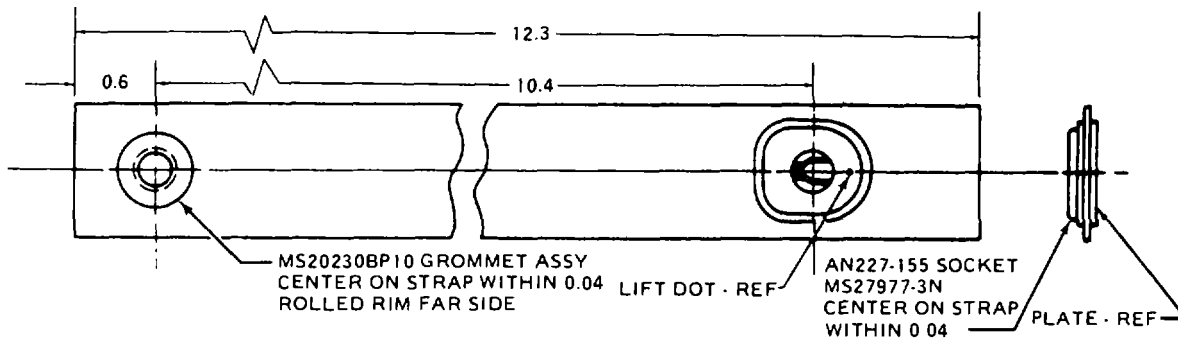
Part Number: 209-030-582-57 DOOR
 Fabricate from: NSN 9535-00-167-2174
 Material: 2024T3 Al Aly Sheet QQA250/5
 0.025 inch thick, 7.9 inch wide, 11.7 inch long

Figure D-41



Part Number: 209-060-811-75 CLIP. Pylon
 Fabricate from: NSN 9535-00-640-2311
 Material: 2024T3, Al Aly Sheet QQA250/5
 0.050 inch thick, 1.5 inch wide, 2.5 inch long

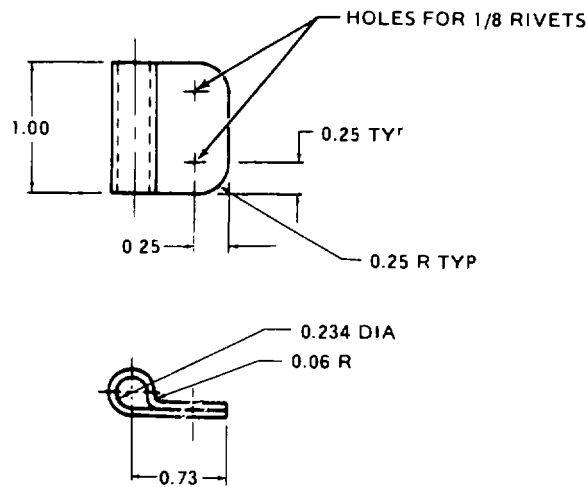
Figure D-42



209-001-138-1 STRAP ASSEMBLY

- Part Number: 209-001-138-3 STRAP
- Fabricate from: NSN 8305-00-811-1617
- Material: Nylon Web
- Part Number: MS20230BP10 GROMMET ASSY
- Fabricate from: NSN 5325-00-728-6045
- Part Number: MS27977-3N PLATE
- Fabricate from: NSN 5325-00-276-4282
- Part Number: AN227-15S SOCKET
- Fabricate from: NSN 5325-00-291-8359

Figure D-43



- Part Number: 209-030-539-1 CLAMP
- Fabricate from: NSN 9535-00-167-2280
- Material: 2024T2 Al Aly Sheet QQA250/5
0.032 inch thick, 1.30 inch wide, 2.5 inch long

Figure D-44

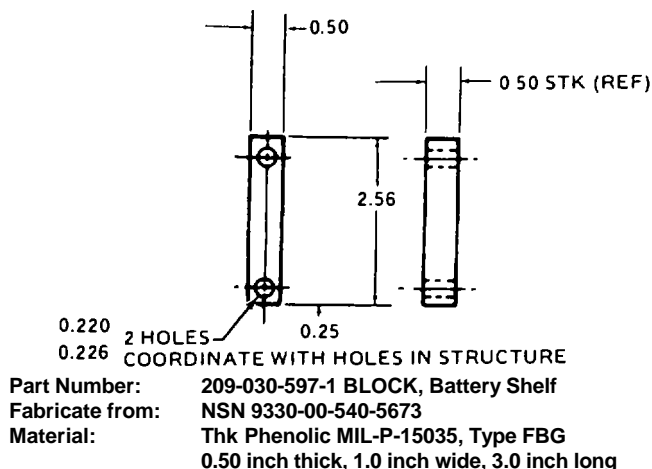
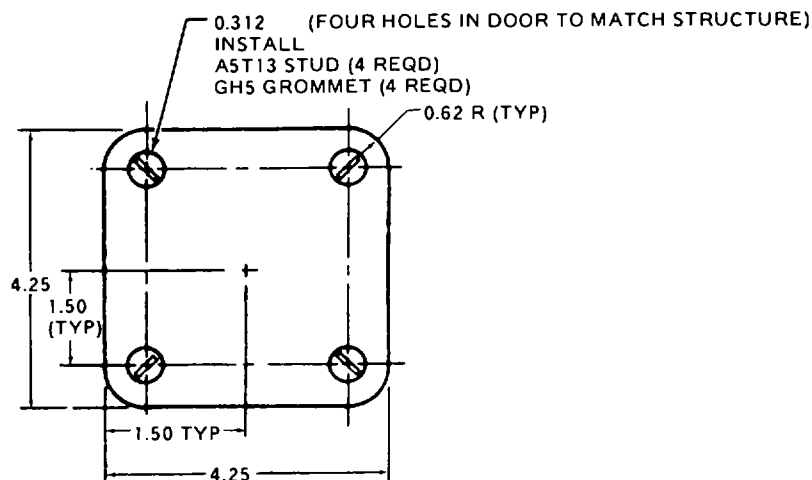


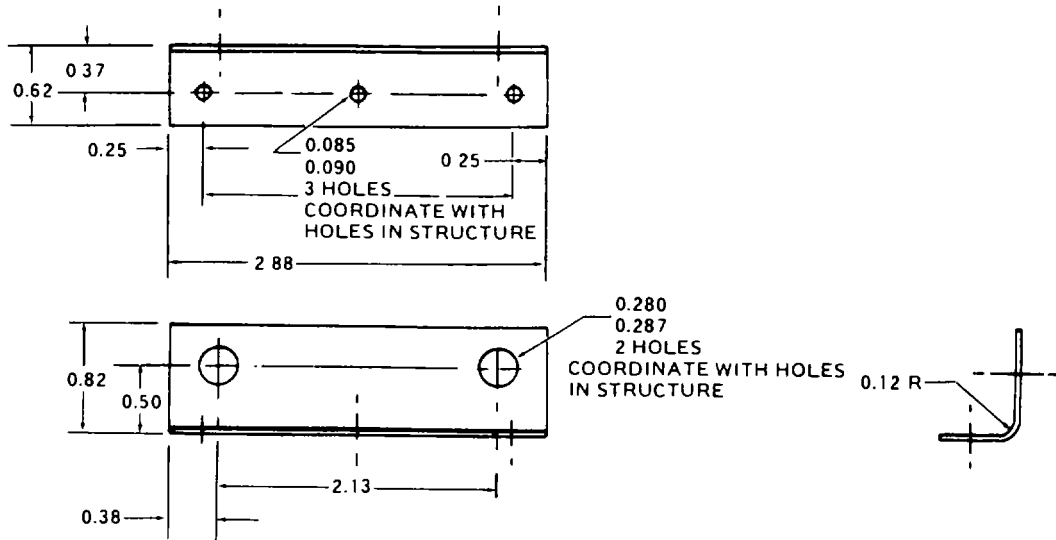
Figure D-45



209-706-006-11 DOOR ASSEMBLY

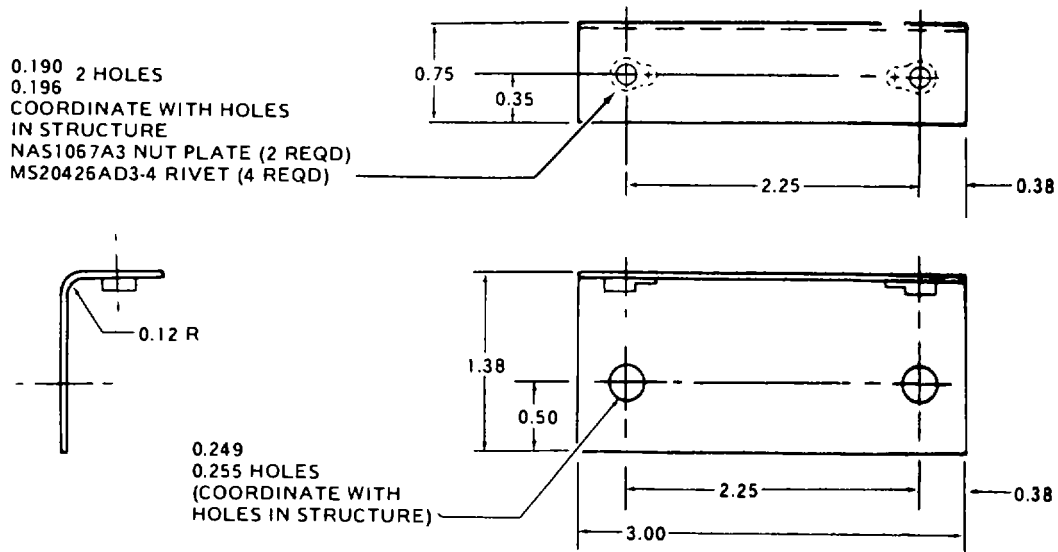
- Part Number: 209-706-006-11 DOOR
Fabricate from: NSN 9535-00-086-9729
Material: 2024T3 Al Aly QQA250/5
0.040 inch thick, 5.0 inch wide, 5.0 inch long
- Part Number: A5T13 STUD 4 Reqd
Fabricate from: NSN 5325-00-639-6283
- Part Number: GH5 GROMMET 4 Reqd
Fabricate from: NSN 5325-00-141-4002

Figure D-46



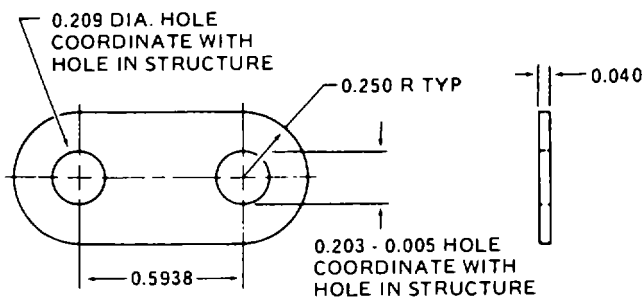
Part Number: 209-070-432-1 BRACKET, Angle
 Fabricate from: NSN 9535-00-086-9729
 Material: 2024T3 Al Aly QQA250/5
 0.032 inch thick, 2.5 inch wide, 3.5 inch long

Figure D-47



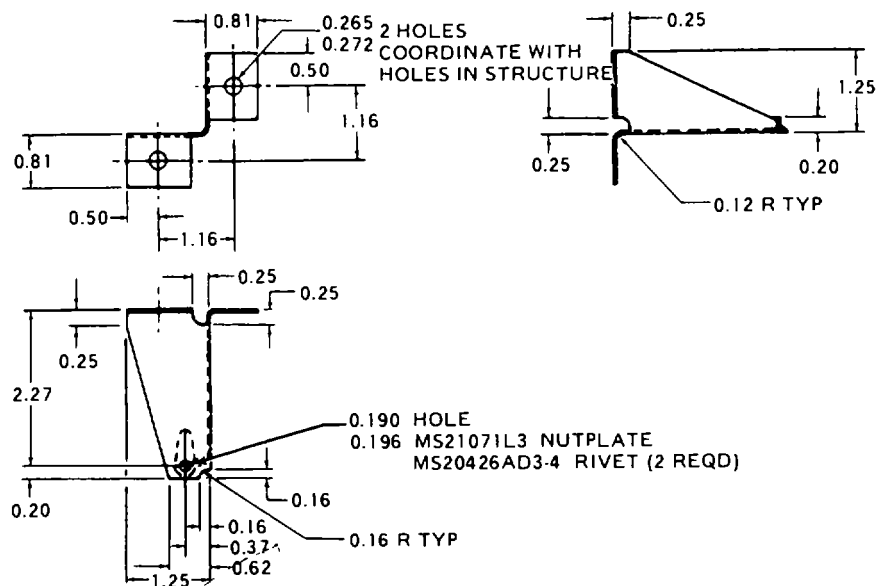
Part Number: 209-070-437-3 BRACKET, Angle
 Fabricate from: NSN 9535-00-086-9729
 Material: 2024T3 Al Aly QQA250/5
 0.032 inch thick, 2.6 inch wide, 3.5 inch long
 MS21086L3 NUTPLATE (2 Reqd)
 NSN 5310-00-021-3884
 MS20426AD3-4 RIVET (4 Reqd)
 NSN 5320-00-117-6938

Figure D-48



Part Number: 10-003-1
 Fabricate from: NSN 9515-00-640-4144
 Material: Steel Sae 1025
 0.040 inch thick, 1.0 inch wide, 2.0 inch long

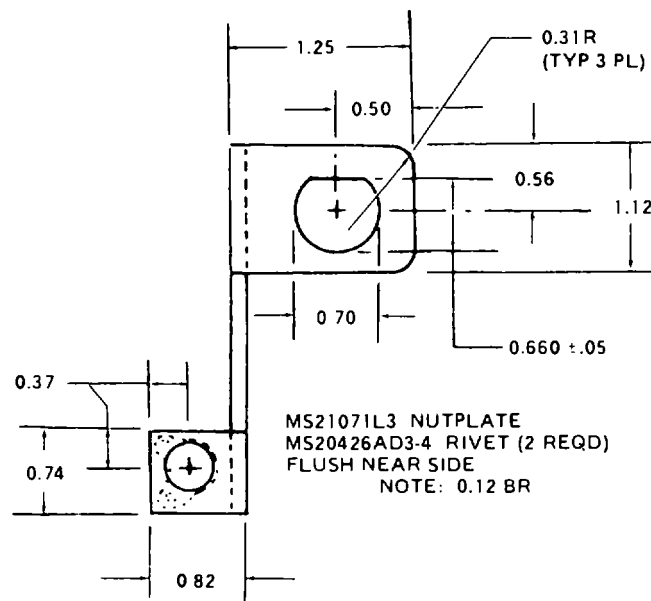
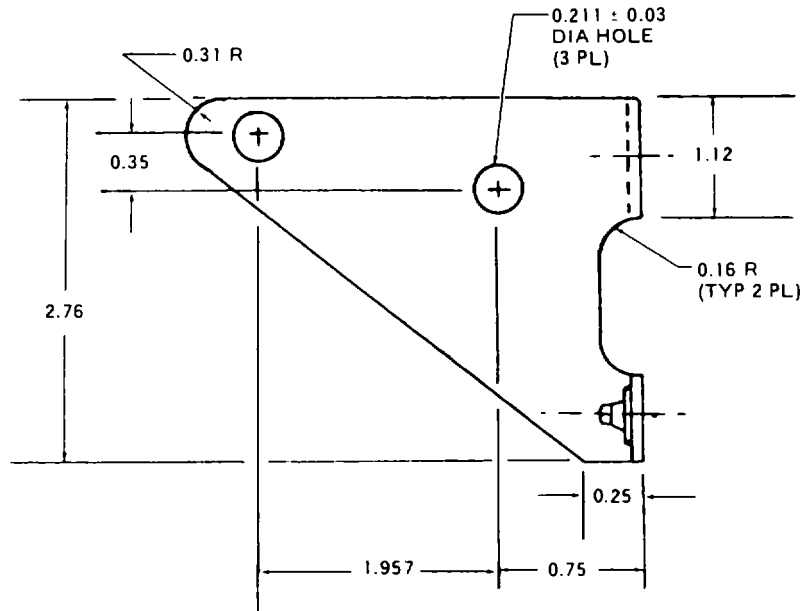
Figure D-49



209-070-439-1 CLIP ASSEMBLY, Shown
 209-070-439-2 CLIP ASSEMBLY, Opposite

Part Number: 209-070-439-3 CLIP, Shown
 Fabricate from: NSN 9535-00-086-9729
 Material: 2024T4 Al Aly, Sheet QQA250/5
 0.032 inch thick, 2.8 inch wide, 3.7 inch long
 Part Number: 209-070-439-4 CLIP, Opposite
 Fabricate from: NSN 9535-00-086-9729
 Material: 2024T3 Al Aly, Sheet QQA250/5
 0.032 inch thick, 2.8 inch wide, 3.7 inch long
 Part Number: MS21071L3 NUTPLATE
 Fabricate from: NSN 5310-00-734-1850
 Part Number: MS20426AD3-4 RIVET
 Fabricate from: NSN 5320-00-117-6938

Figure D-50



- Part Number: 209-071-021-5, -6 BRACKET
 Fabricate from: NSN 9535-00-232-0378
 Material: 2024T42 Al Aly QQA250/5
 0.063 inch thick, 2.3 inch wide, 3.0 inch long
 Part Number: MS21071L3 NUTPLATE
 Fabricate from: NSN 5310-00-734-1850
 Part Number: MS20426AD3-4 RIVET (2 Reqd)
 Fabricate from: NSN 5320-00-117-6938

Figure D-51

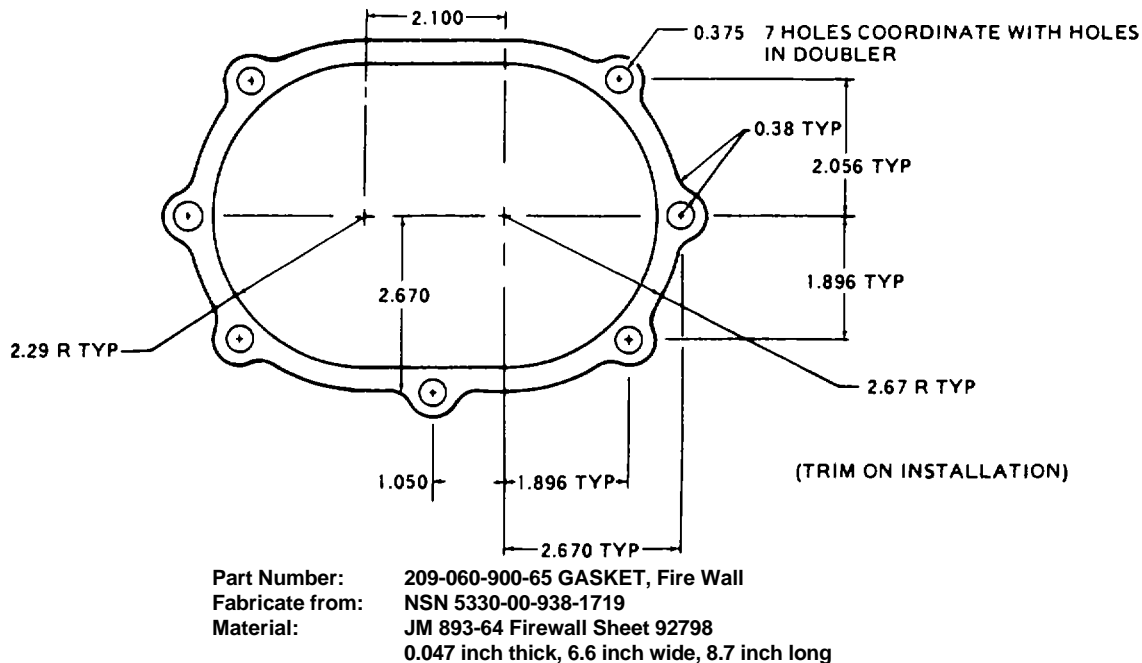


Figure D-52

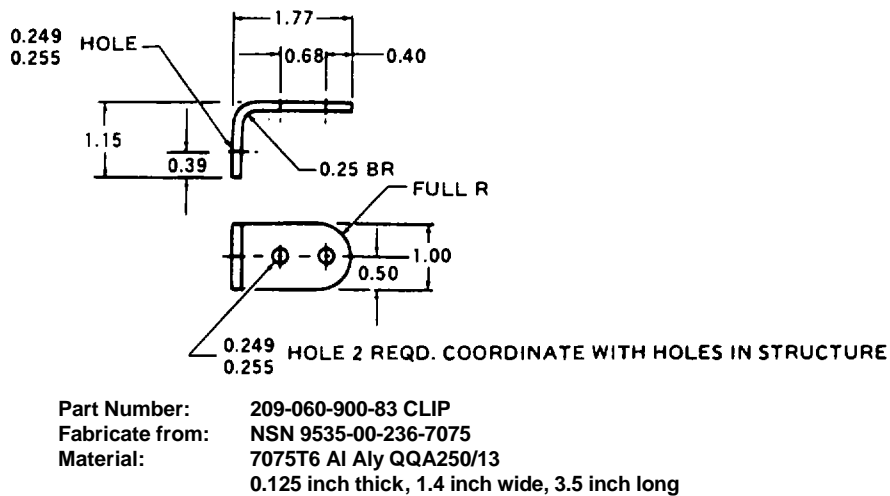
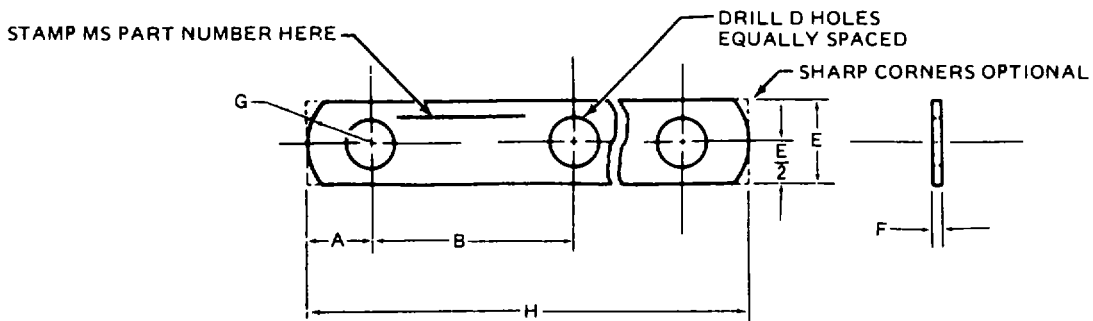
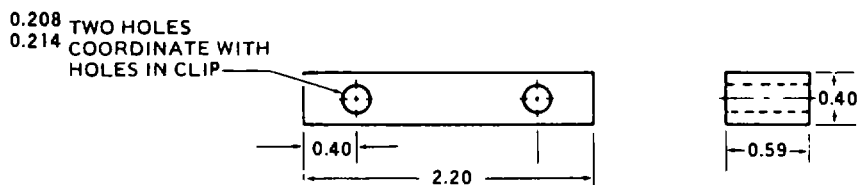


Figure D-53



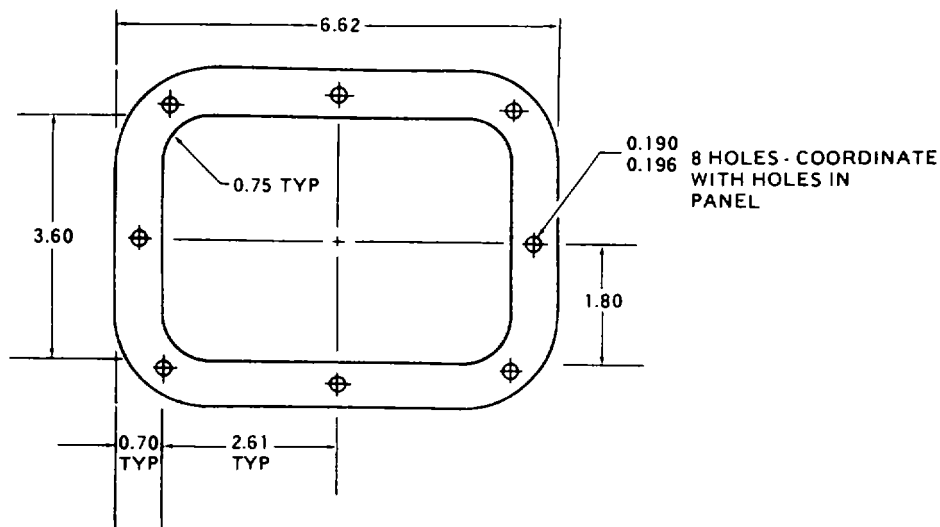
Part No.	A	B ± 0.010	D Drill	E	F ± 0.003	G ± 0.030	H	Fabricate from
MS25226-8-2	0.312	1.500	0.386	0.625	0.051	0.50R	2.125	5940-00-932-9064

Figure D-54



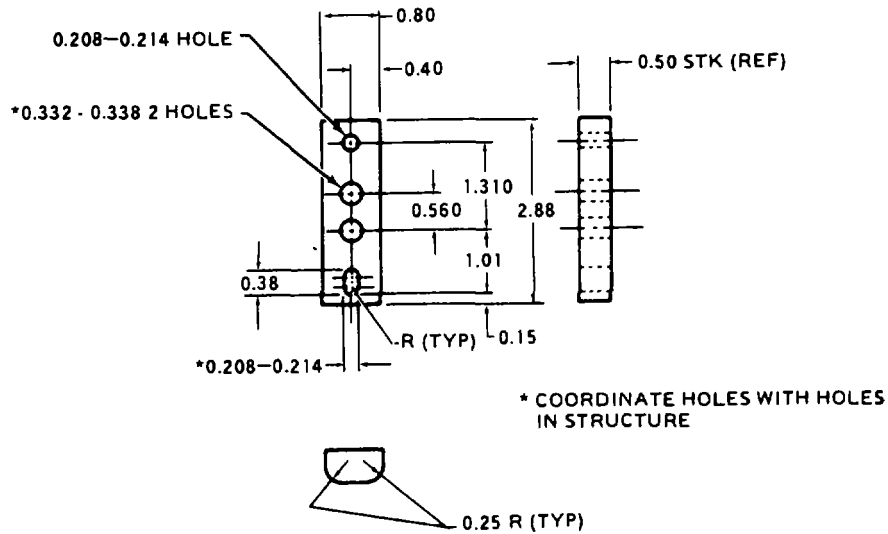
Part Number: 205-060-425-15 SEAL
 Fabricate from: NSN 9320-00-618-3180
 Material: 0.50 MIL-R-6130 Grade A, Type II
 0.050 inch thick, 1.0 inch wide, 2.70 inch long

Figure D-55



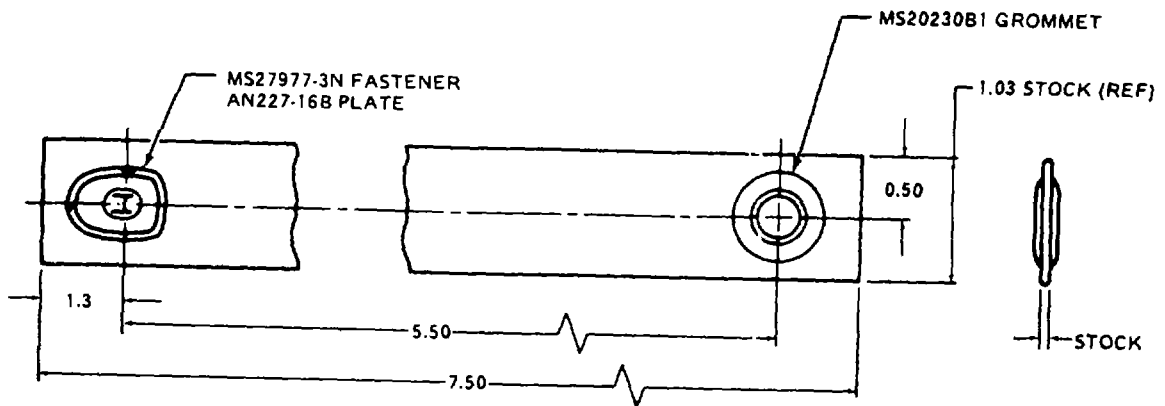
Part Number: 209-030-193-29 SEAL
 Fabricate from: NSN 9320-00-202-1846
 Material: MIL-R 6130 GRB Type 2 Rubber Sheet
 0.062 inch thick, 5.3 inch wide, 7.0 inch long

Figure D-56



Part Number: 209-030-597-5 BLOCK
 Fabricate from: NSN 9330-00-540-5673
 Material: Phenolic Block MIL-P-15035 Type FGB
 0.50 inch thick, 1.00 inch wide, 3.0 inch long

Figure D-57

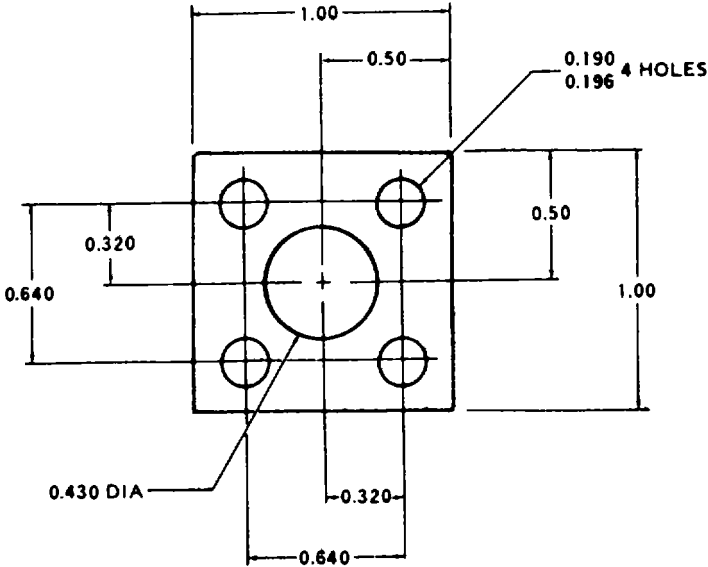


209-060-899-1 STRAP ASSEMBLY

Part Number: MS20230B2 Grommet
 Fabricate from: NSN 5325-00-231-6590
 Part Number: MILW4088 Webbing Textile
 Fabricate from: NSN 8305-00-264-6151

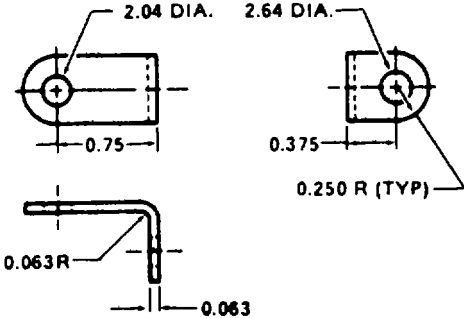
Part Number: MS27977-1B Socket Snap
 Fabricate from: NSN 5325-00-281-4356
 Part Number: MS27977-3N Clinch Plate
 Fabricate from: NSN 5325-00-276-4282

Figure D-58



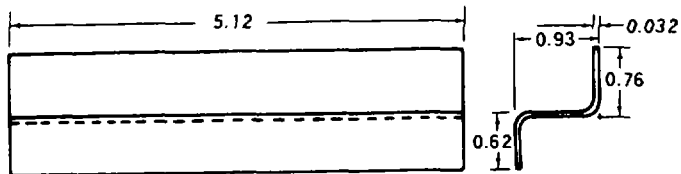
Part Number: 209-070-712-1 SPACER, Plate
Fabricate from: NSN 9515-00-184-8808
Material: 4130 Steel Sheet MIL-S-18729 Cond N
0.063 inch thick, 1.2 inch wide, 1.2 inch long

Figure D-59



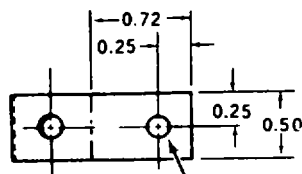
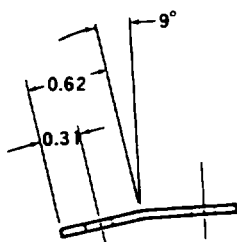
Part Number: 20-032-2
Fabricate from: NSN 9535-00-232-0378
Material: Al Aly 2024 QQ-A-362 MIL-H-6088

Figure D-60



Part Number: 209-020-107-17 BRACKET
 Fabricate from: NSN 9535-00-167-2279
 Material: Al Aly 2024T3 QQA250/5
 0.032 inch thick, 2.8 inch wide, 5.6 inch long
 Part Number: 209-020-107-18 BRACKET
 Fabricate from: NSN 5935-00-167-2279
 Material: 0.032 inch thick, 2.8 inch wide, 5.6 inch long

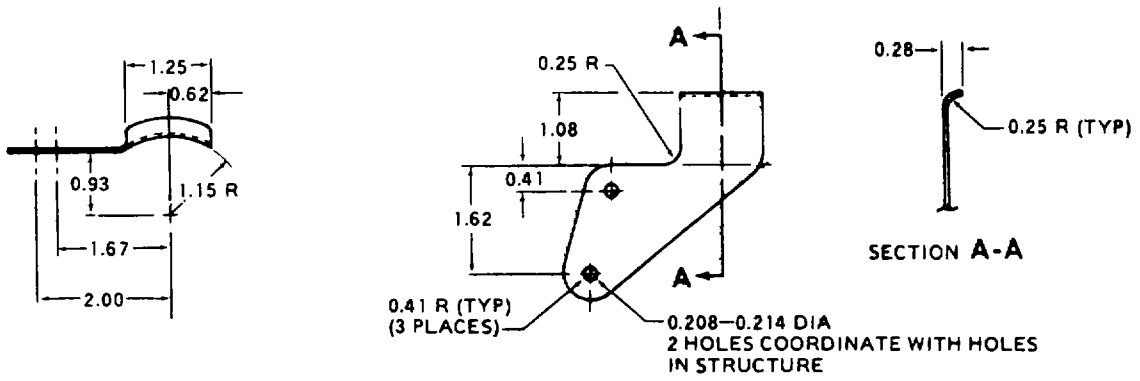
Figure D-61



0.190 - 0.196 2 HOLES
 COORDINATE WITH HOLES
 IN STRUCTURE

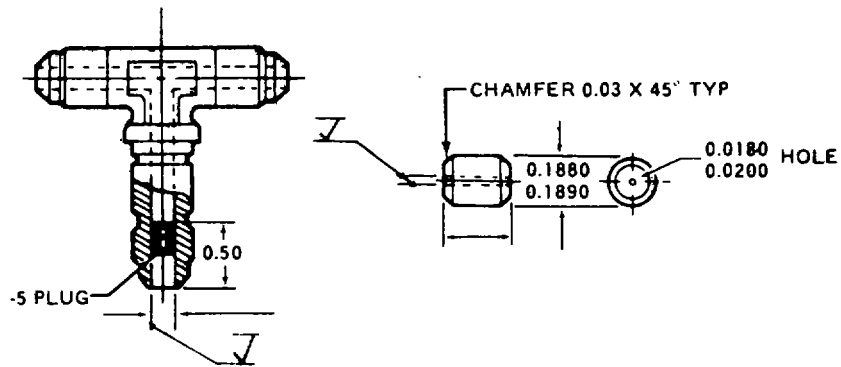
Part Number: 209-070-540-1 SUPPORT
 Fabricate from: NSN 9535-00-232-0378
 Material: 2024T3 Al Aly QQA250/5
 0.063 inch thick, 1.0 inch wide, 1.9 inch long

Figure D-62



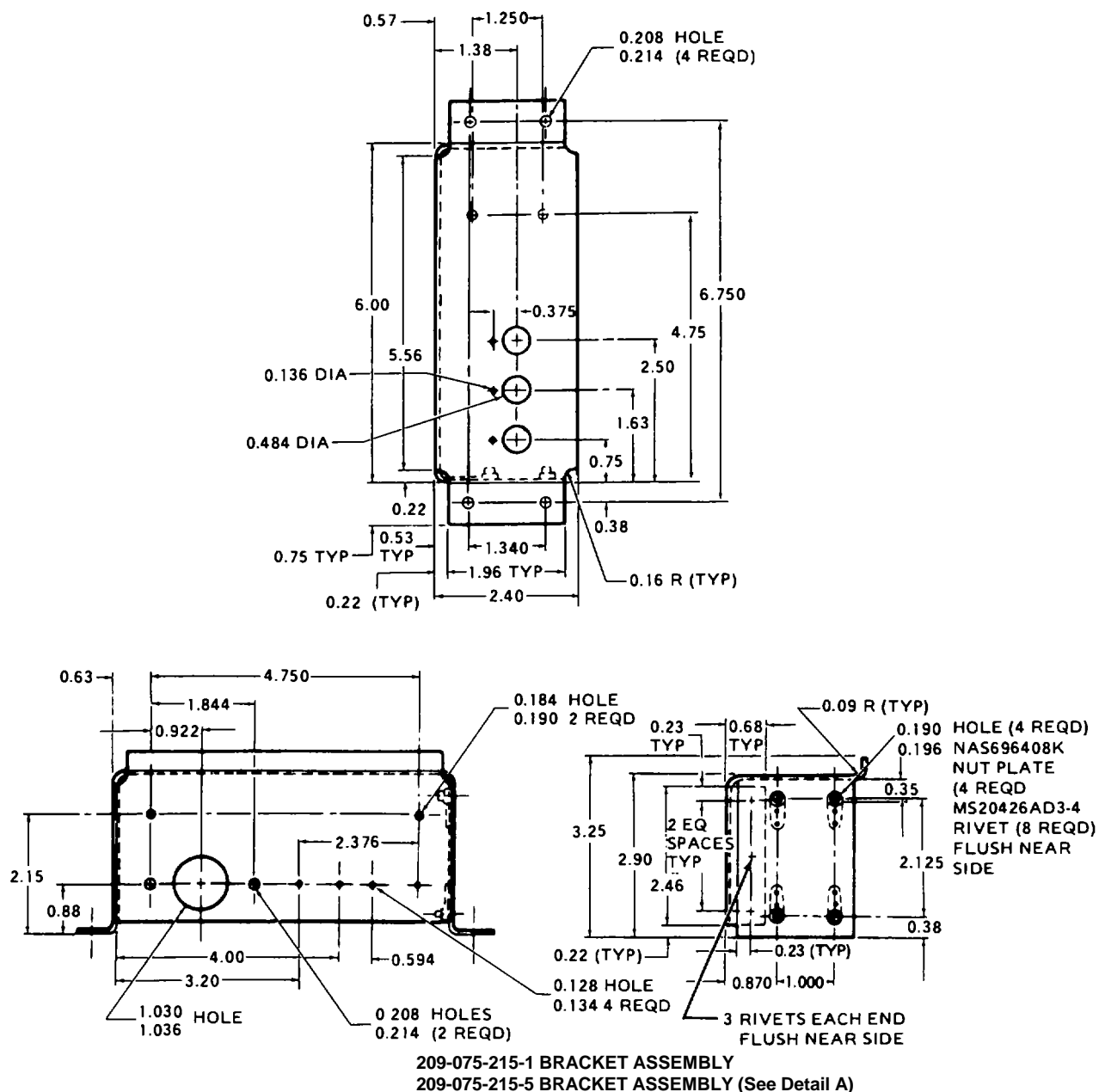
Part Number: 209-070-549-1 BRACKET
 Fabricate from: NSN 9535-00-554-1417
 Material: 2024T3 Al Aly QQA250/5
 0.063 inch thick, 3.2 inch wide, 3.4 inch long

Figure D-63



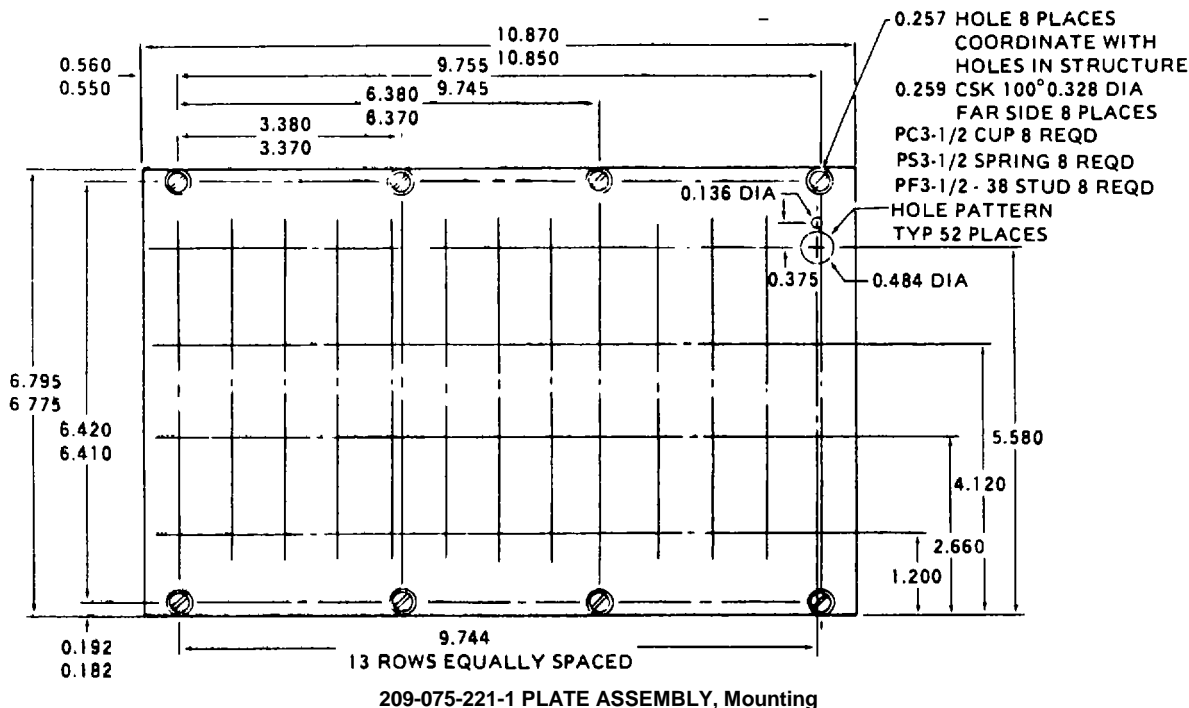
Part Number: 204-060-031-11
 Fabricate from: NSN 4730-00-277-5107 PLUG
 Fabricate from: NSN 4730-00-684-6903 PLUG

Figure D-64



- Part Number: 209-075-215-3 BRACKET
- Fabricate from: NSN 9535-00-167-2778
- Material: 0.025 2024T3 Al Aly QQA250/5
- Part Number: NAS696A08K NUTPLATE
- Fabricate from: NSN 5310-00-582-9528
- Part Number: MS20426AD3-4 RIVET
- Fabricate from: NSN 5320-00-117-6938

Figure D-65



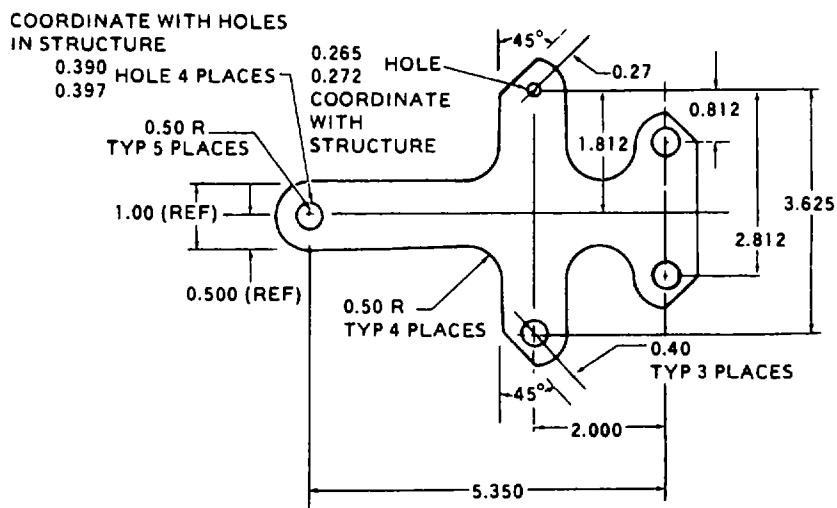
Part Number: 209-075-221-3 PLATE
Fabricate from: NSN 9535-00-232-0378
Material: 5052 Al Aly Sheet QQA250/8
0.063 X 7.3 X 11.4

Part Number: PC 3 1/2 CUP
Fabricate from: NSN 5325-00-291-9360

Part Number: PS 3 1/2 SPRING
Fabricate from: NSN 5340-00-201-0272

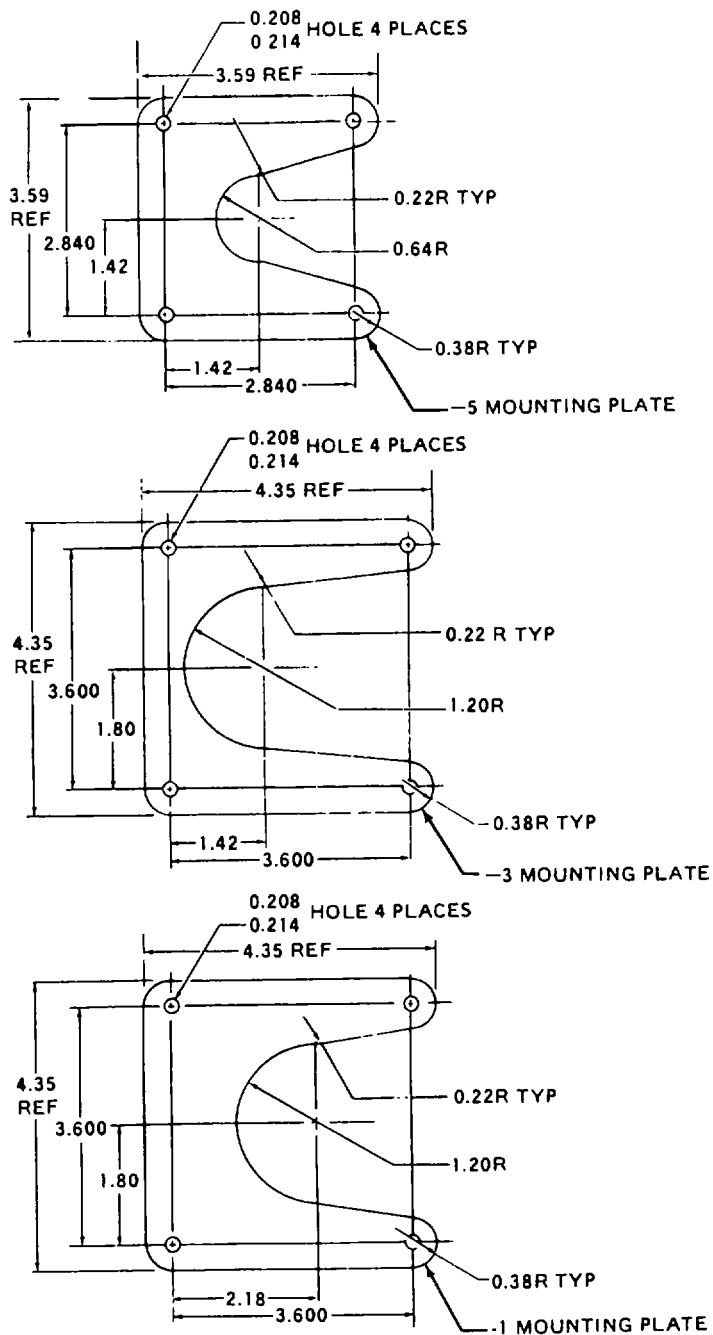
Part Number: PF 3 1/2 - 38 STUD
Fabricate from: NSN 5325-00-543-2418

Figure D-66



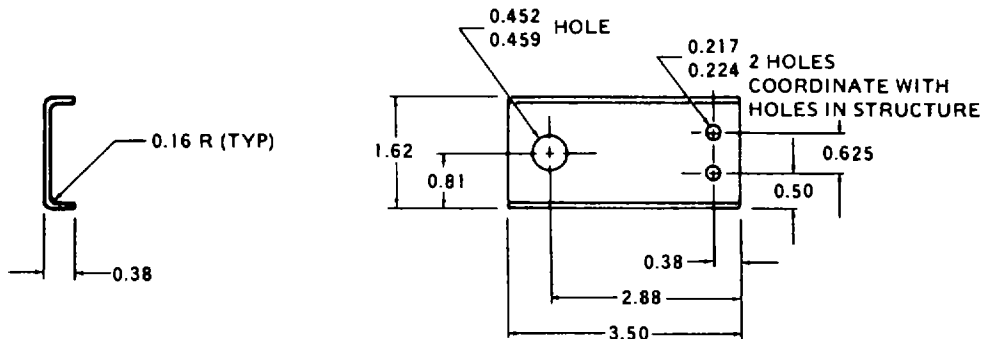
Part Number: 209-075-233-1 BUS BAR
Fabricate from: NSN 9535-00-580-6889
Material: 1100 Al Aly Sheet QQA250/1 TEMP 0
0.125 x 5.7 x 7.4

Figure D-67



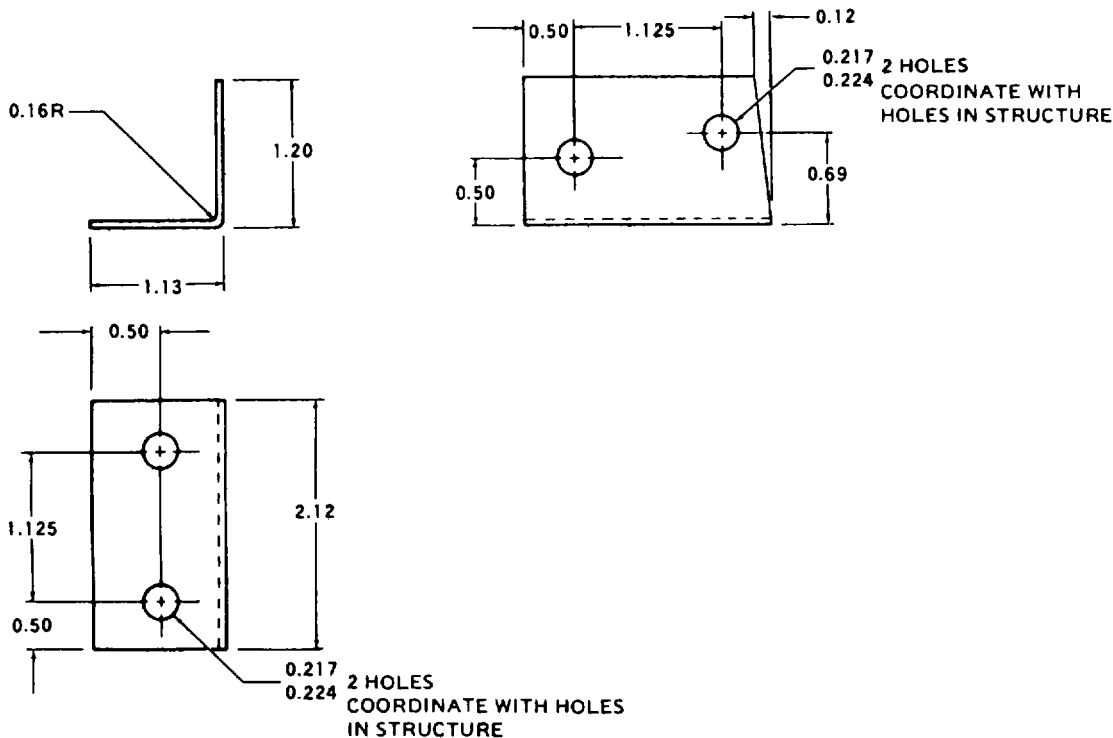
Part Number: 209-075-247-1 PLATE, Mounting
 209-075-247-3 PLATE, Mounting
 209-075-247-5 PLATE, Mounting
 Fabricate from: NSN 9535-00-086-9729
 Material: 0.032 2024T3 Al Aly Sheet QQA250/5

Figure D-68



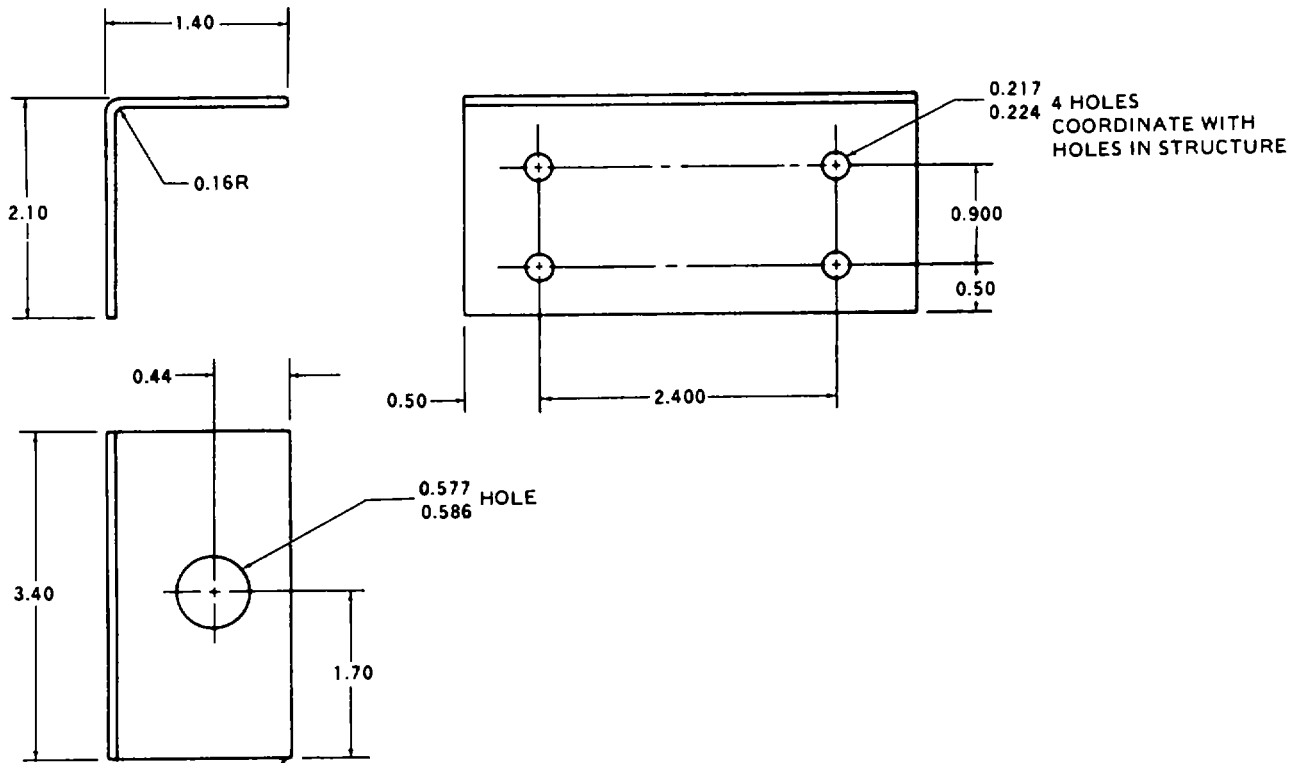
Part Number: 209-076-111-1 BRACKET, Angle
 Fabricate from: NSN 9535-00-167-2280
 Material: 2024T3 Al Aly QQA250/5
 0.040 inch thick, 3.0 inch wide, 4.0 inch long

Figure D-69



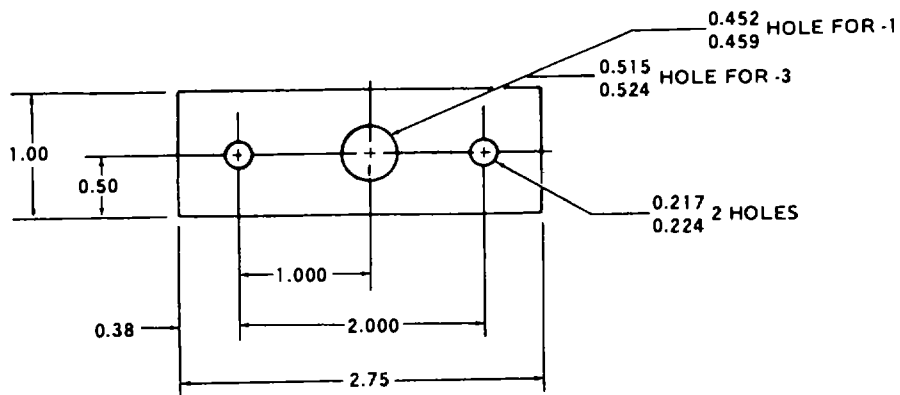
Part Number: 209-076-113-1 BRACKET, Angle
 Fabricate from: NSN 9535-00-167-2280
 Material: 2024T3 Al Aly QQA250/5
 0.040 inch thick, 2.6 inch wide, 3.1 inch long

Figure D-70



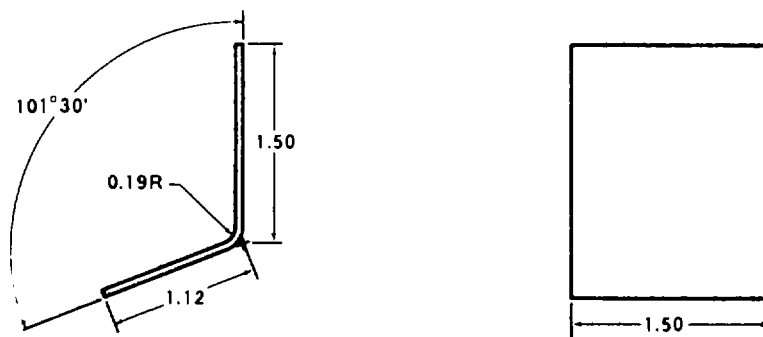
Part Number: 209-076-114-1 BRACKET, Angle
 Fabricate from: NSN 9535-00-167-2280
 Material: 2024T3 Al Aly QQA250/5
 0.040 inch thick, 4.0 inch wide, 4.0 inch long

Figure D-71



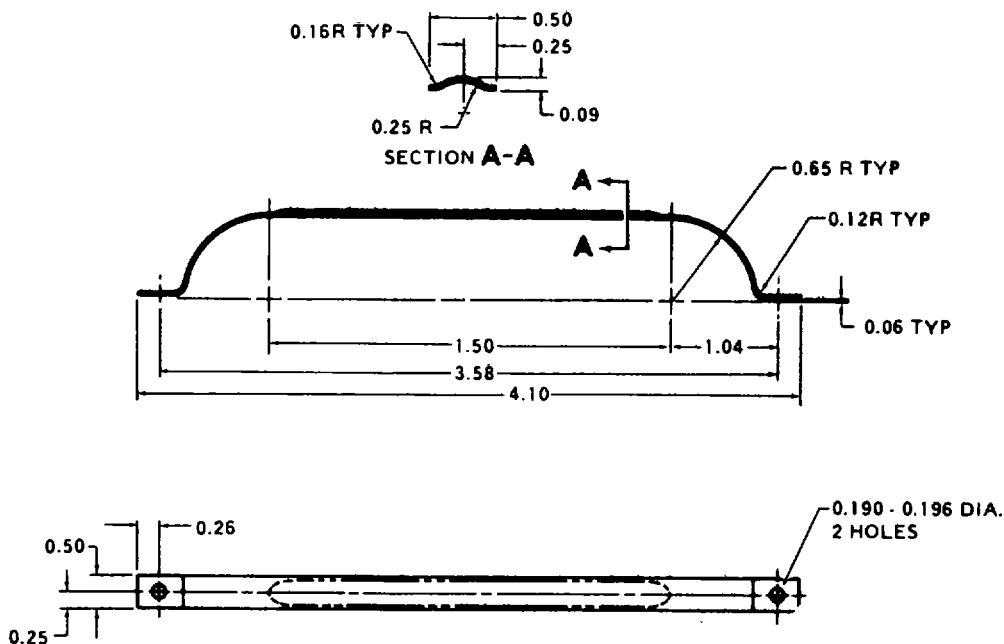
Part Number: 209-076-116-1 PLATE, Feed Thru
 209-076-116-3 PLATE, Feed Thru
 Fabricate from: NSN 9535-00-232-0378
 Material: 2024T3 Al Aly QQA250/5
 0.063 inch thick, 1.5 inch wide, 3.2 inch long

Figure D-72



Part Number: 209-030-223-37 CLIP
 Fabricate from: NSN 9535-00-640-2311
 Material: 2024T3 Al Aly QQA250/5
 0.050 inch thick, 2.0 inch wide, 3.2 inch long

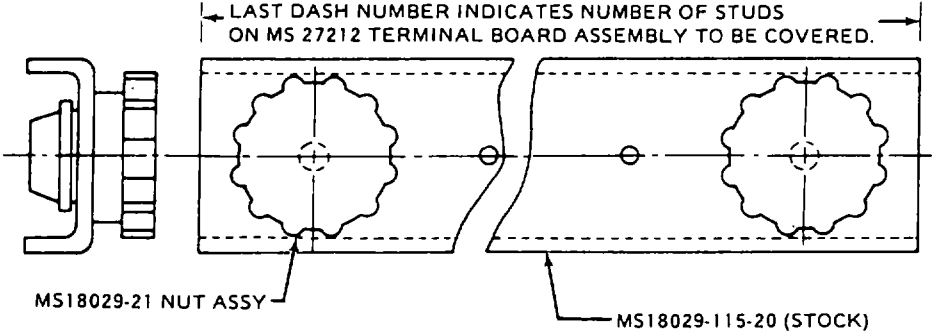
Figure D-73



209-070-462-7 CLAMP ASSEMBLY, DUCT

Part Number: 209-070-462-5 CLAMP
 Fabricate from: NSN 5340-00-851-5854
 Material: 0.032 2024T42 Al Aly QQ-A-250/5
 Part Number: MS21075L3 (2 each) NUTPLATE
 Fabricate from: NSN 5310-00-772-3720
 Part Number: MS20426AD3-5 (4 each) RIVET
 Fabricate from: NSN 5320-00-117-6939

Figure D-74

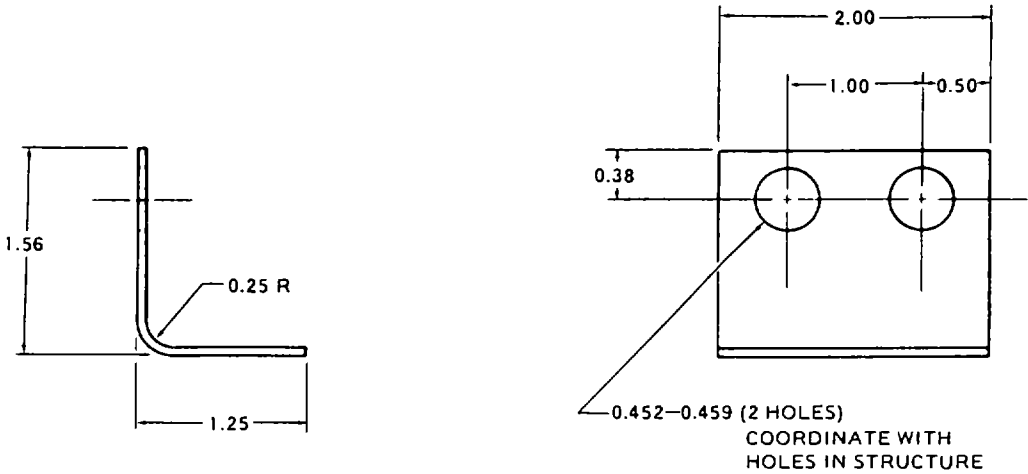


TERMINAL BOARD COVER

Part Number: MS18029-1S3
 MS18029-1S4
 MS18029-1S5
 MS18029-1S7
 MS18029-1S7

Fabricate from: NSN 5940-00-082-4642, MS18029-11S20 COVER
 NSN 5940-00-907-5939, M218029-21 NUT ASSY

Figure D-75

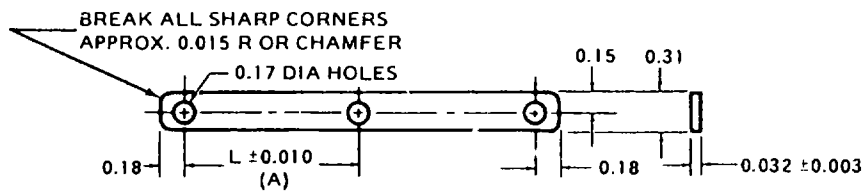


Part Number: 209-076-336-1 BRACKET

Fabricate from: NSN 9535-00-232-0378

Material: 2024T3 Al Aly QQA250/5
 0.063 inch thick, 2.3 inch wide, 2.3 inch long

Figure D-76



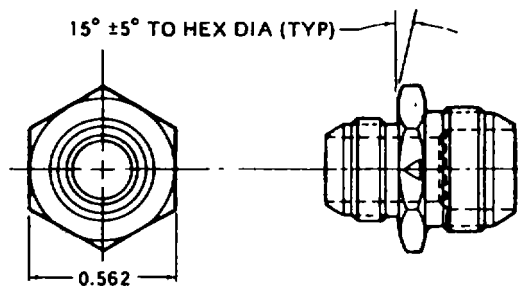
(A) TOLERANCE BETWEEN ANY TWO HOLES OF THE BUS BAR SHALL BE WITHIN THAT SHOWN FOR THE "L" DIMENSION

FINISH: CADMIUM PLATE FINISH, QQ-P-416, TYPE I, CLASS I.

HOLES: FIRST DASH NUMBER INDICATES NUMBER OF HOLES
 SECOND DASH NUMBER INDICATES LENGTH "L" BETWEEN HOLES
 IN 1/32 INCREMENTS.

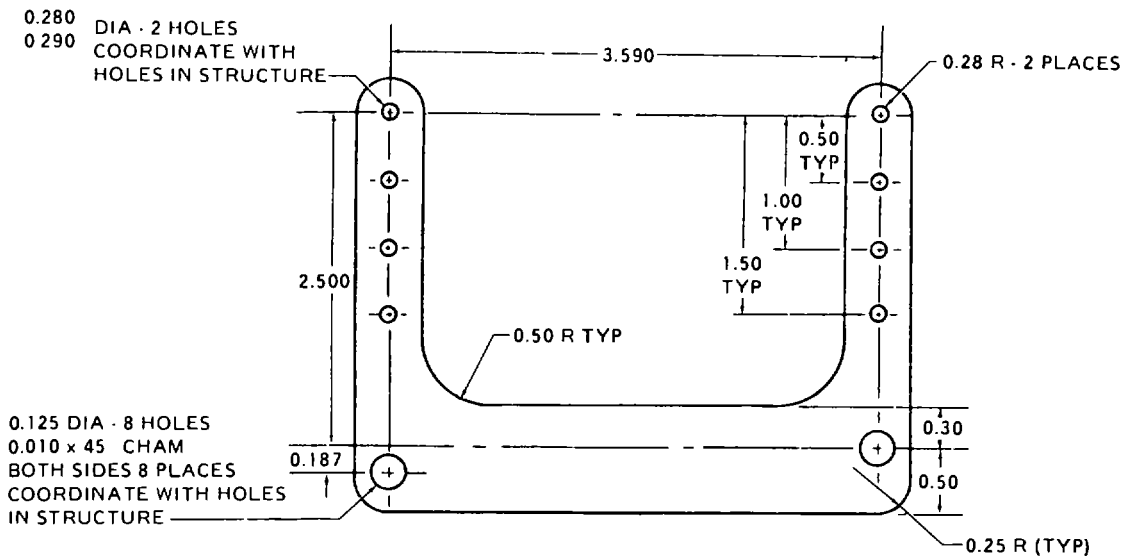
Part Number: 30-006-4-26 BUSBAR
 30-006-5-26 BUSBAR
 30-006-6-26 BUSBAR
 Fabricate from: NSN 9535-00-232-2293
 Material: Copper, QQ-C-576, Temper, Cold Rolled Half Hard

Figure D-77



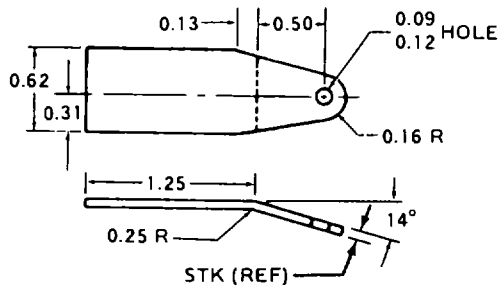
Part Number: 110-033-1 REDUCER
 Fabricate from: NSN 4730-00-828-9974
 Material: MS24399D2 FMC 96906

Figure D-78



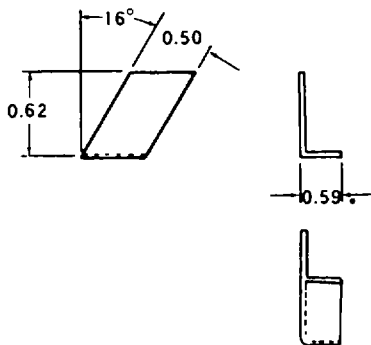
Part Number: 209-001-516-1 PLATE
Fabricate from: NSN 9515-00-640-4145
Material: 4130 Aly Stl MIL-S-18729 Cond N
0.032 inch thick, 4.0 inch wide, 5.0 inch long

Figure D-79



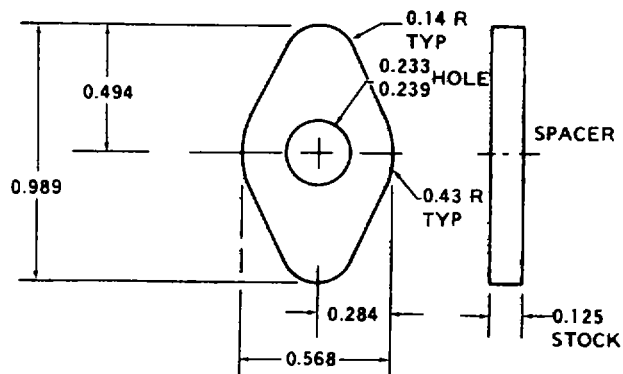
Part Number: 209-030-659-1 HANGER, Spacing
Fabricate from: NSN 9515-00-184-8807
Material: 4130 Stl Sht MIL-S-18729 Cond N
0.050 inch thick, 1.0 inch wide, 2.3 inch long

Figure D-80



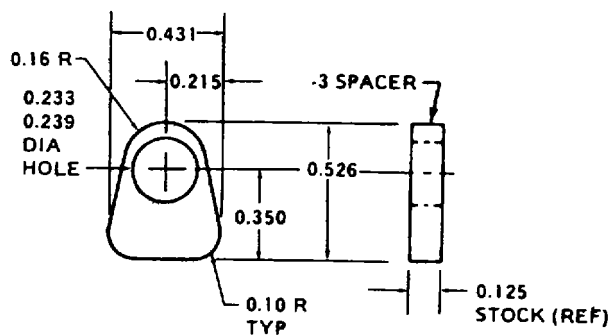
Part Number: 209-060-810-127 CLIP
Fabricate from: NSN 9535-00-086-9729
Material: 2024T3 Al Aly QQA250/5
0.032 inch thick, 1.0 inch wide, 1.7 inch long

Figure D-81



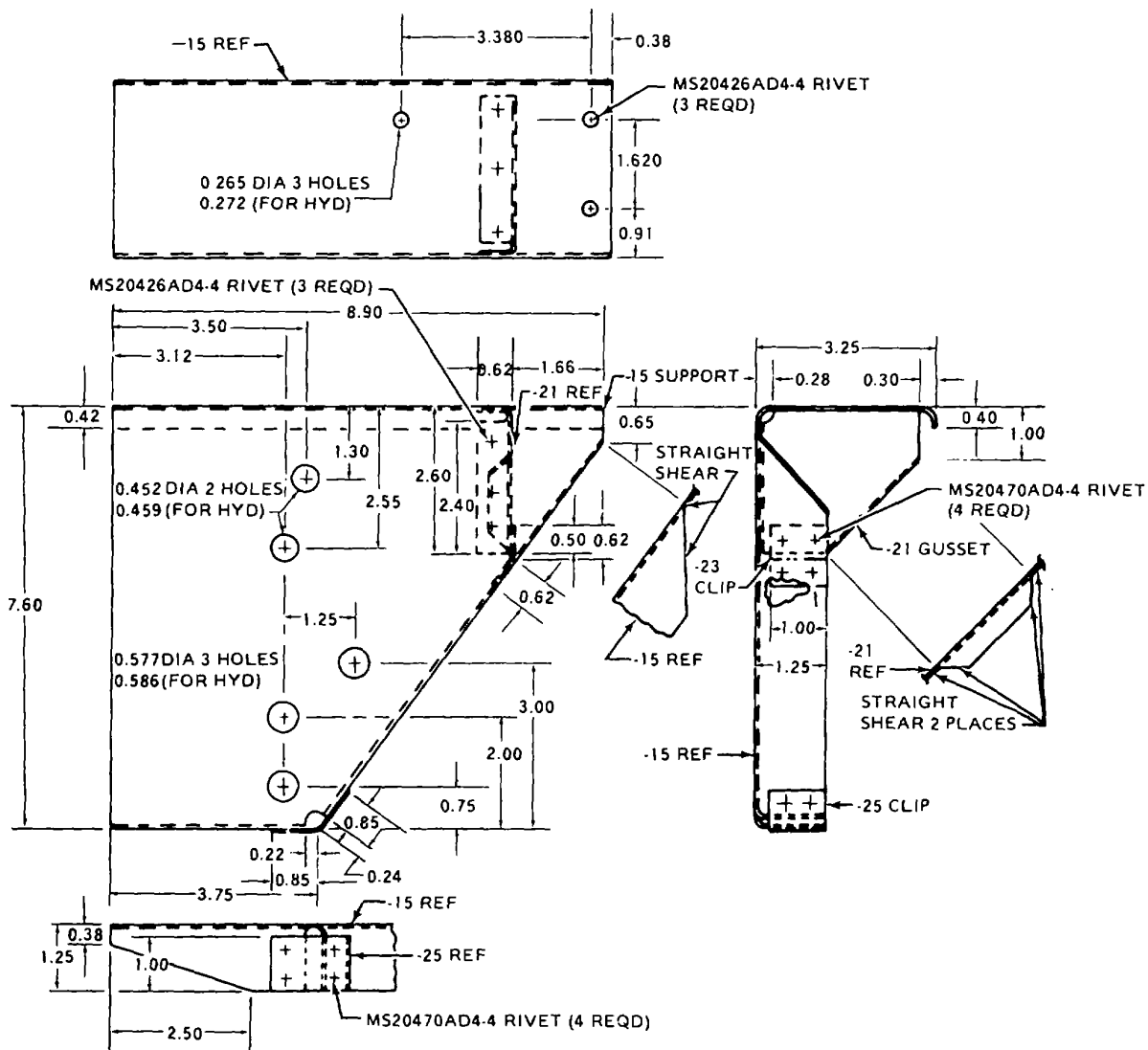
Part Number: 209-030-314-1 SPACER, Fuel
 Fabricate from: 2024T3 NSN 9535-00-232-0418
 Material: Al Aly Sheet QQA250/5
 0.125 inch thick, 1.6 inch wide, 2.0 inch long

Figure D-82



Part Number: 209-030-314-3 SPACER, Fuel
 Fabricate from: 2024T3 NSN 9535-00-232-0418
 Material: Al Aly Sheet QQA250/5
 0.125 inch thick, 1.6 inch wide, 1.6 inch long

Figure D-83



- Part Number: 209-030-267-15 SUPPORT
 Fabricate from: NSN 9535-00-232-0569
 Material: 2024T3 Al Aly QQA250/5
 0.050 inch thick, 9.1 inch wide, 12.8 inch long
- Part Number: 209-030-267-21 GUSSET
 Fabricate from: NSN 9535-00-232-0569
 Material: 2024T3 Al Aly QQA250/5
 0.050 inch thick, 3.5 inch wide, 3.8 inch long
- Part Number: 209-030-267-23 CLIP
 Fabricate from: NSN 9535-00-232-0583
 Material: 2024T3 Al Aly QQA250/5
 0.040 inch thick, 1.2 inch wide, 2.1 inch long
- Part Number: 209-030-267-25 CLIP
 Fabricate from: NSN 9535-00-232-0583
 Material: 2024T3 Al Aly QQA250/5
 0.040 inch thick, 1.2 inch wide, 2.1 inch long
- Part Number: MS20470AD4-4 RIVET
 Fabricate from: NSN 5320-00-117-6826
- Part Number: MS20426AD4-4 RIVET
 Fabricate from: NSN 5320-00-117-6949

Figure D-84

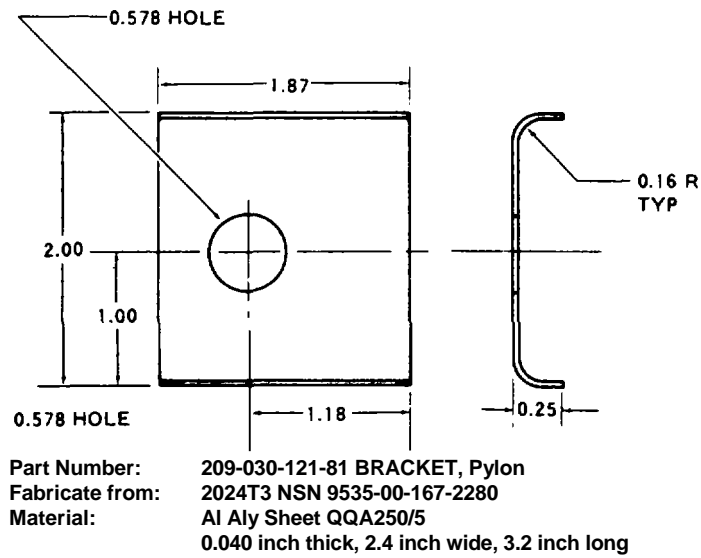


Figure D-85

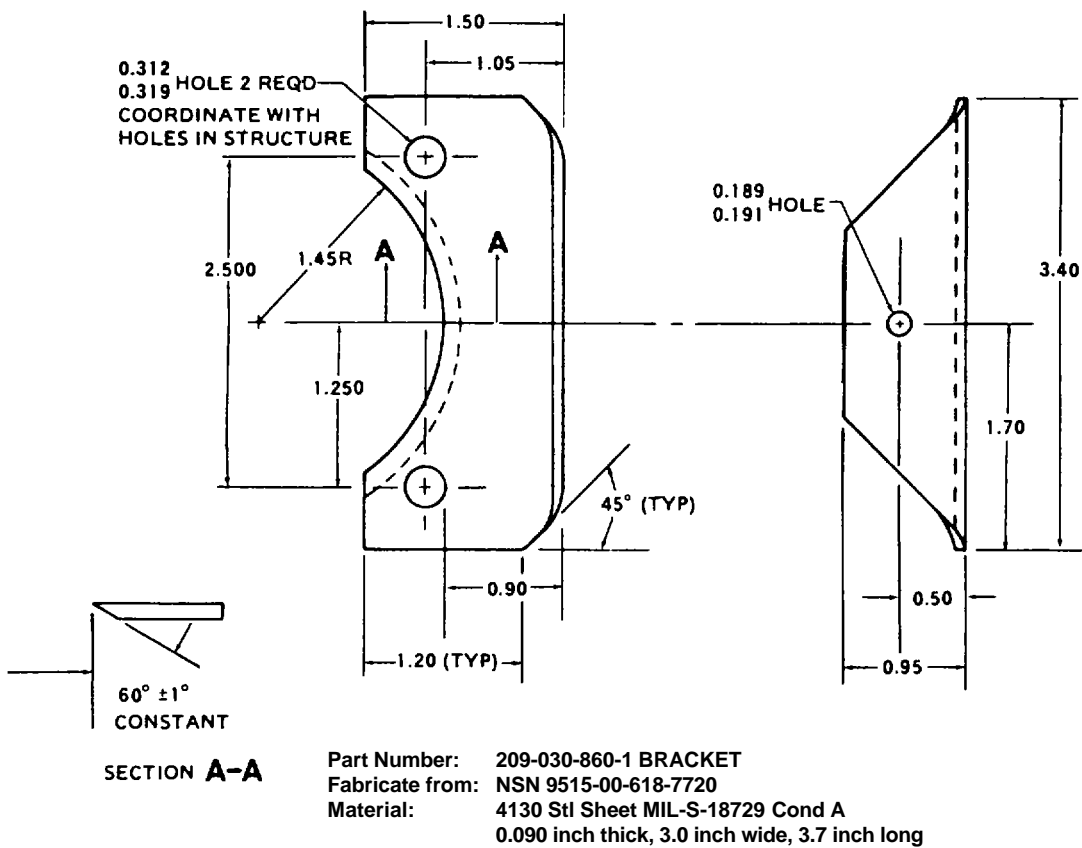


Figure D-86

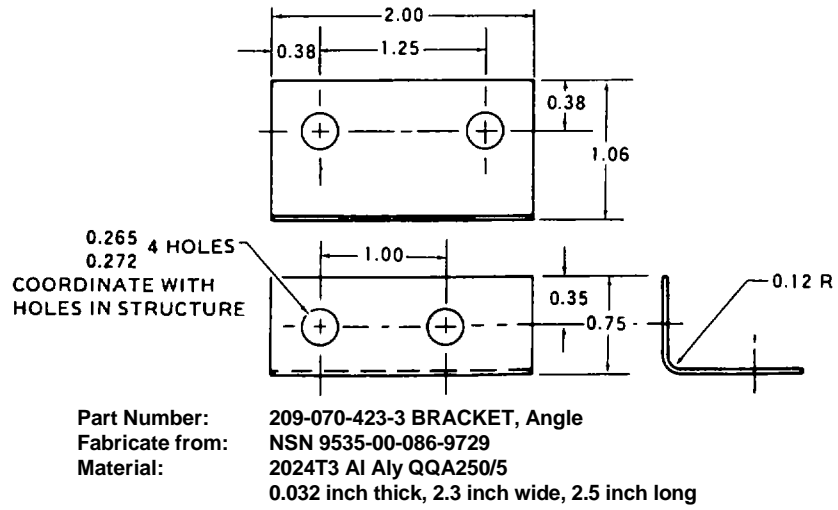
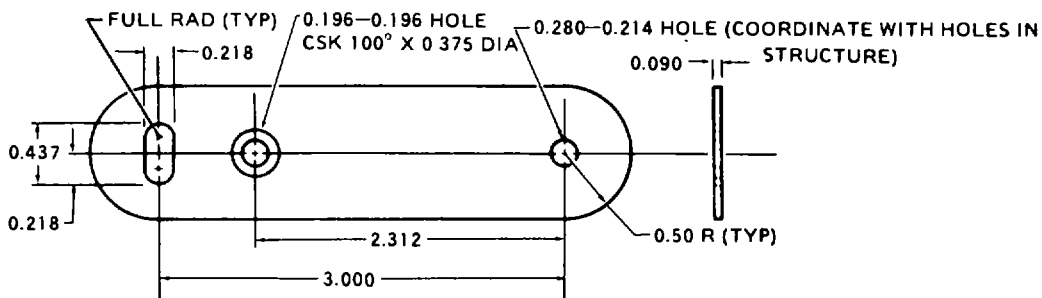


Figure D-87



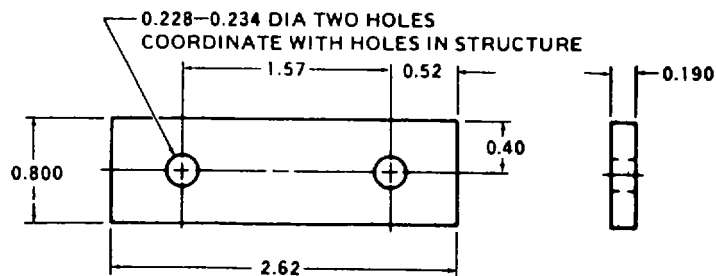
Part Number: 205-040-156-1 CLAMP
Fabricate from: NSN 5340-00-989-4572
Material: MS21919DG15

Figure D-88



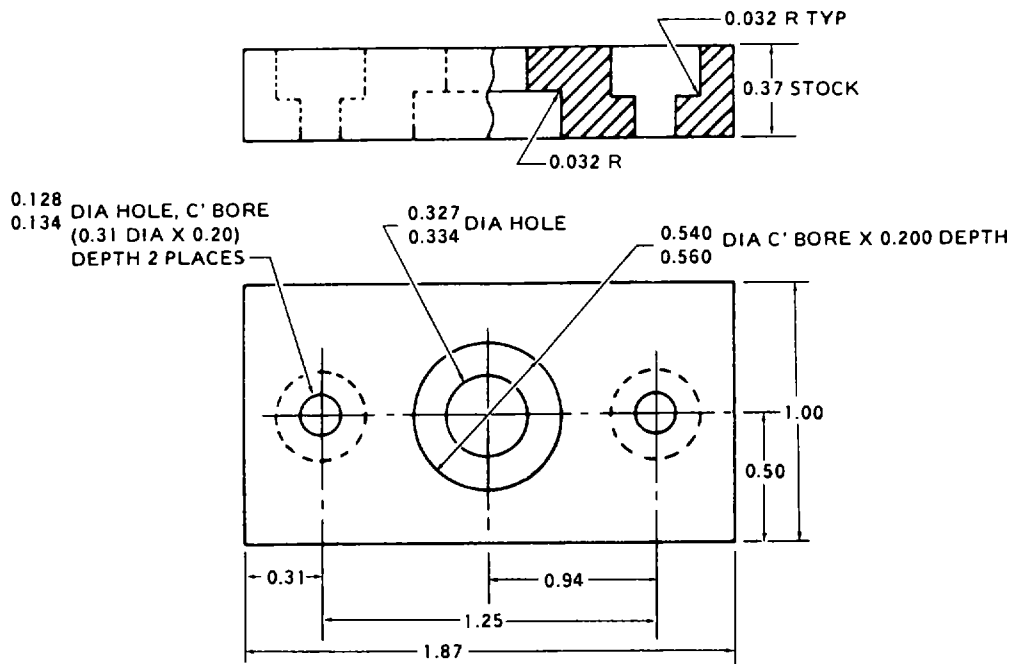
Part Number: 209-060-588-1 PLATE
 Fabricate from: NSN 9535-00-288-0675
 Material: 2024T3 Al Aly QQA250/5
 0.090 inch thick, 1.5 inch wide, 4.5 inch long

Figure D-89



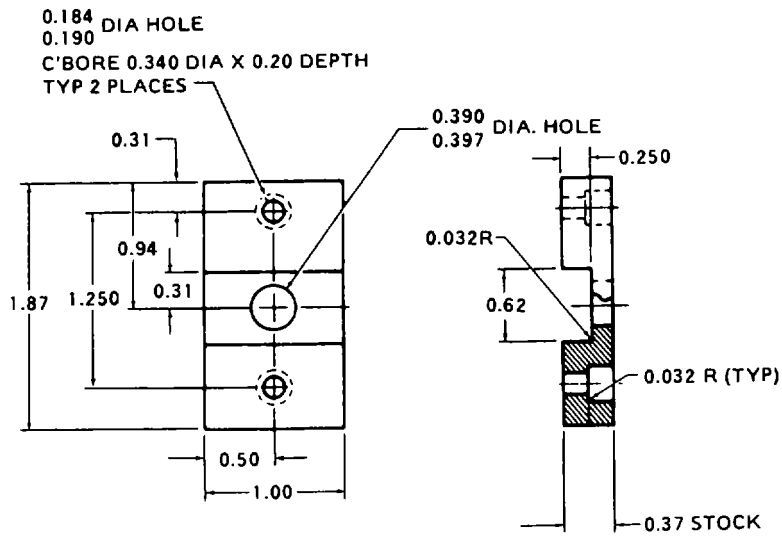
Part Number: 209-030-260-37 SHIM
 Fabricate from: NSN 9535-00-580-6889
 Material: Shim Stock AMS4013 (Laminated)
 0.190 inch thick, 1.3 inch wide, 3.1 inch long

Figure D-90



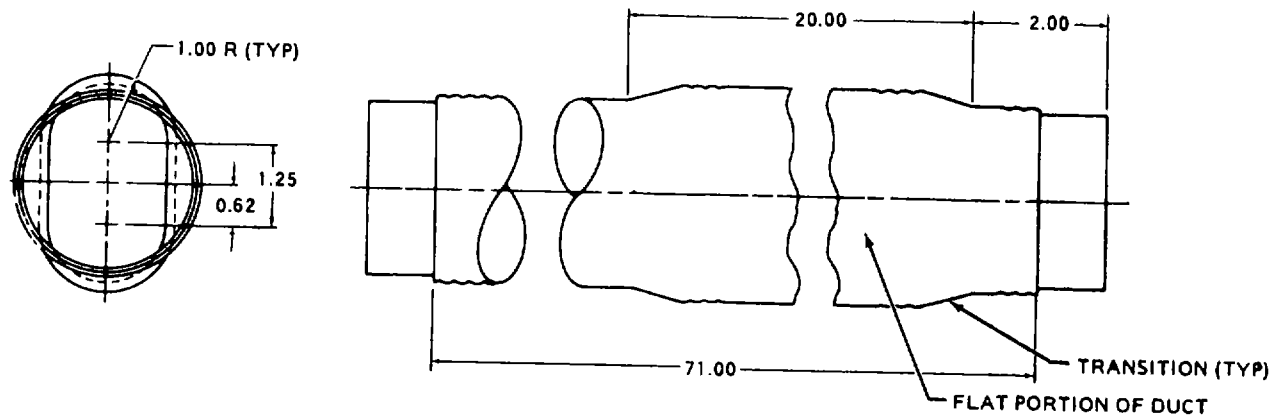
Part Number: 209-075-252-1 JUNCTION, Block
 Fabricate from: NSN 9535-00-585-8761
 Material: Phenolic, MIL-P-15035 FBM
 0.37 inch thick, 1.5 inch wide, 2.4 inch long

Figure D-91



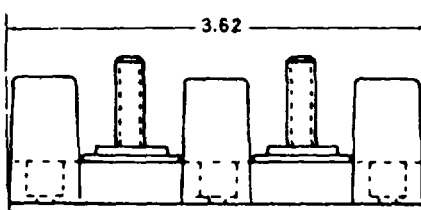
Part Number: 209-075-252-3 BLOCK, Junction
 Fabricate from: NSN 9330-00-585-8761
 Material: MIL-P-15035 FBM
 0.37 inch thick, 1.5 inch wide, 2.4 inch long

Figure D-92



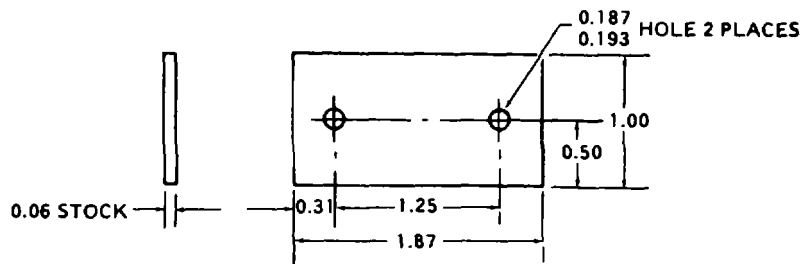
Part Number: 209-070-530-1 HOSE, Air Duct Flexible
 Fabricate from: NSN 4720-00-071-7900
 Material: NAS1374A10CA284

Figure D-93



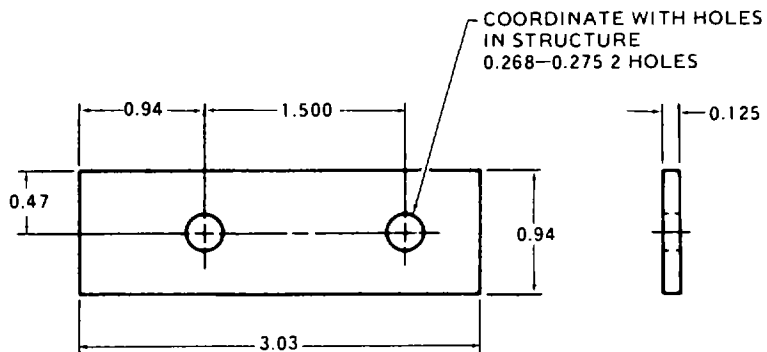
Part Number: MS27212-5-2 TERMINAL
 Fabricate from: NSN 5940-00-950-7781
 Material: MS27212-5-8

Figure D-94



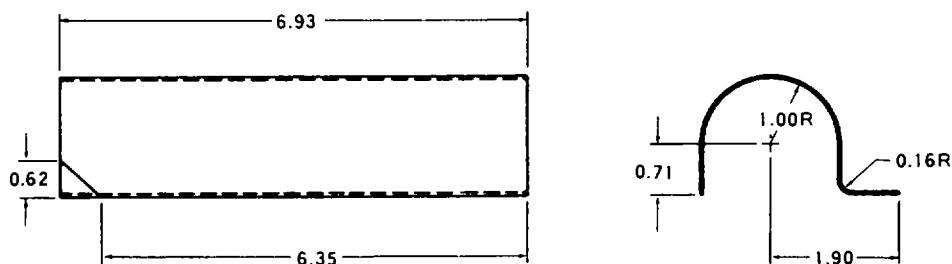
Part Number: 209-075-253-1 SPACER, Plate
 Fabricate from: NSN 9330-00-576-3980
 Material: Phenolic MIL-L-15053 FBM
 0.06 inch thick, 1.5 inch wide, 2.4 inch long

Figure D-95



Part Number: 209-030-322-1 SHIM
 Fabricate from: NSN 9535-00-580-6889
 Material: 5052 Al Aly AMS 4013 (Laminated)
 0.125 inch thick, 1.4 inch wide, 3.7 inch long

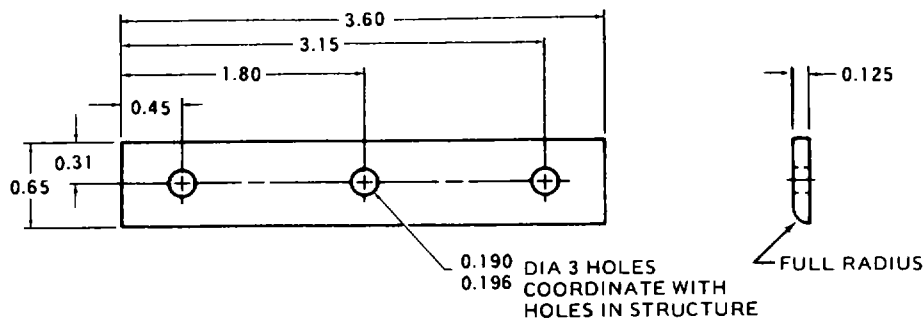
Figure D-96



Part Number: 209-030-327-3 STRIP, Chafing, shown
 Fabricate from: NSN 9515-00-580-8255
 Material: Cres Sheet MIL-S-6721 Comp 321 Cond A
 0.040 inch thick, 6.2 inch wide, 7.5 inch long

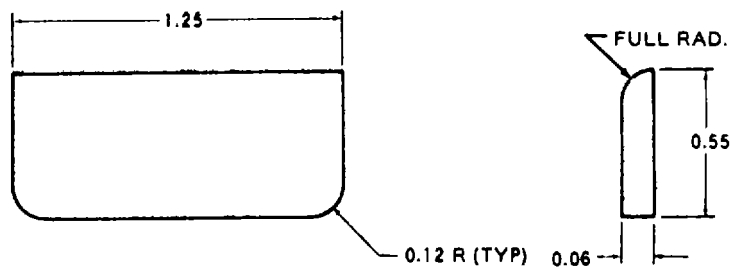
Part Number: 209-030-327-4 STRIP, Chafing, opposite
 Fabricate from: NSN 9515-00-580-8255
 Material: Cres Sheet MIL-S-6721 Comp 321 Cond A
 0.040 inch thick, 6.2 inch wide, 7.5 inch long

Figure D-97



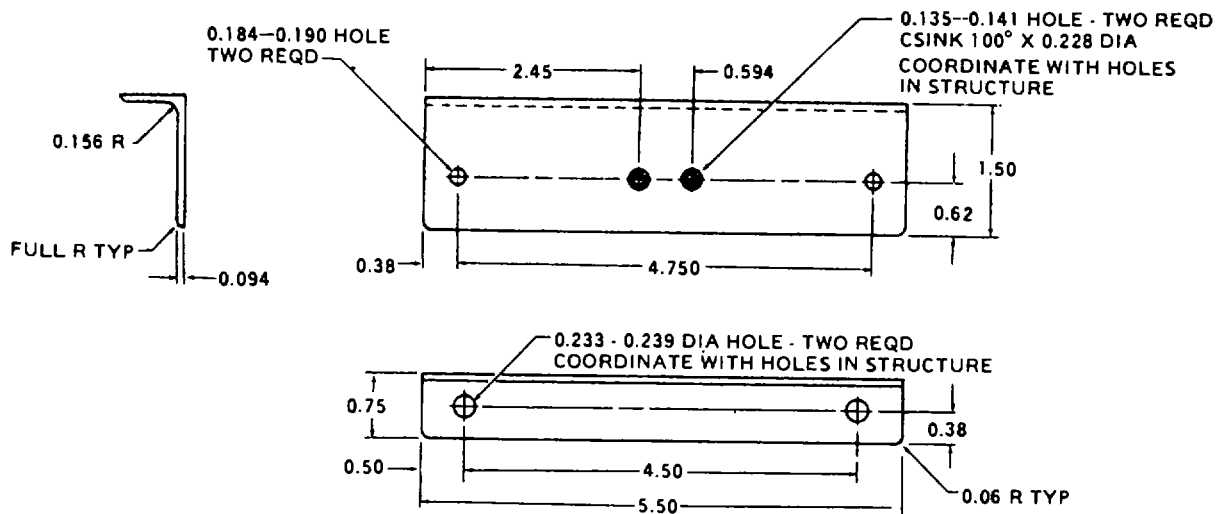
Part Number: 209-030-322-1 BLOCK, Filler
 Fabricate from: NSN 9535-00-232-0479
 Material: 2024T3 Al Aly QQA250/5
 0.125 inch thick, 1.2 inch wide, 4.1 inch long

Figure D-98



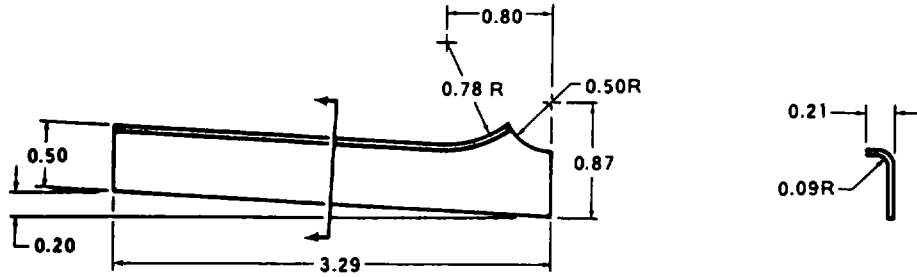
Part Number: 209-030-627-1 BLOCK, Radius
 Fabricate from: NSN 9535-00-232-0378
 Material: 2024T4 Al Aly QQA250/5
 0.06 inch thick, 1.0 inch wide, 1.7 inch long

Figure D-99



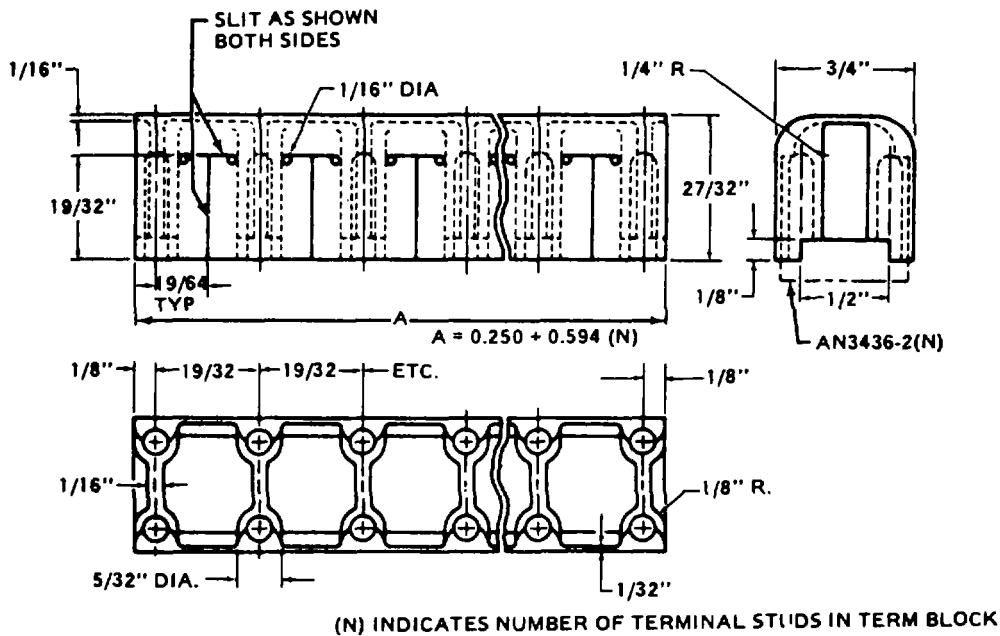
Part Number: 209-075-215-9 BRACKET
 Fabricate from: NSN 9535-00-167-2779
 Material: Al. Angle, AND 10134-0401 x 6.0
 Part Number: NAS696AD8 NUTPLATE (2 each)
 Fabricate from: NSN 5310-00-582-9525

Figure D-100



Part Number: 209-060-900-123 SEAL, L.H. Shown
 Fabricate from: NSN 9535-00-232-0489
 Material: 2024T42 Al Aly QQ-A-250/5
 0.032 inch thick, 2.0 inch wide, 5.0 inch long
 Part Number: 209-060-900-124 SEAL, R.H. Opposite
 Fabricate from: NSN 9535-00-232-0489
 Material: 0.032 2024T42 Al Aly QQ-A-250/5

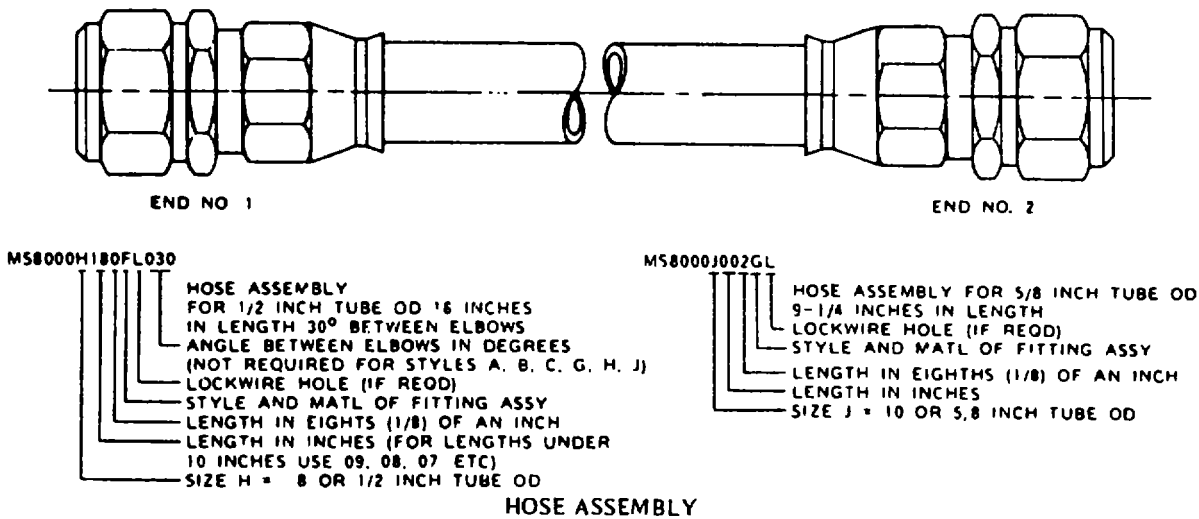
Figure D-101



COVER, Electrical Terminal Block

Part Number: 397-1
 Fabricate from: NSN 5940-00-082-4642
 Part Number: 397-2
 Fabricate from: NSN 5940-00-082-4642

Figure D-102



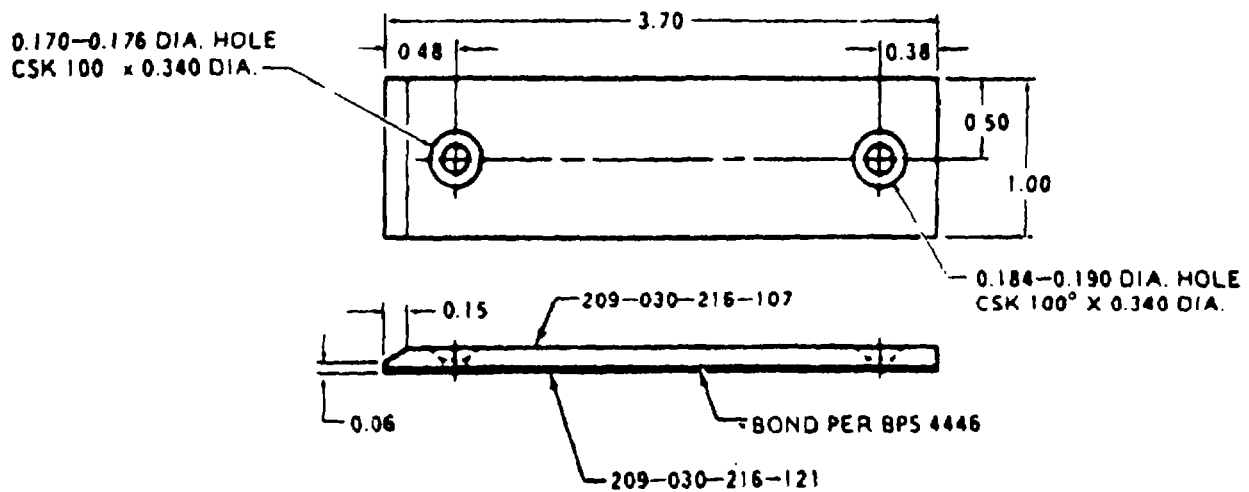
PART NUMBER	TUBE NSN	FITTING END NO.1		FITTING END NO.2	
		PART NO.	NSN	PART NO.	NSN
MS8000E070A	4720-00-857-1732	MS27053-4C	4730-00-889-2474	MS27053-4C	4730-00-889-2474
MS8000E091C	4720-00-857-1732	MS27053-4C	4730-00-889-2474	MS27060-4C	4730-00-013-6970
MS8000E094C	4720-00-857-1732	MS27053-4C	4730-00-889-2474	MS27060-4C	4730-00-013-6970
MS8000E097A	4720-00-857-1732	MS27053-4C	4730-00-889-2474	MS27053-4C	4730-00-889-2474
MS8000E100A	4720-00-857-1732	MS27053-4C	4730-00-889-2474	MS27053-4C	4730-00-889-2474
MS8000E112E210	4720-00-857-1732	MS27059-4C	4730-00-889-2465	MS27060-4C	4730-00-013-6970
MS8000E226E120	4720-00-857-1732	MS27059-4C	4730-00-889-2465	MS27060-4C	4730-00-013-6970
MS8000E304F345	4720-00-857-1732	MS27060-4C	4730-00-013-6970	MS27060-4C	4730-00-013-6970
MS8000E350E258	4720-00-857-1732	MS27060-4C	4730-00-013-6970	MS27059-4C	4730-00-889-2465
MS8000J061J	4720-00-857-1730	MS27053-10	4730-00-618-8490	MS27057-10	4730-00-935-9384
MS8000J107G	4720-00-857-1730	MS27053-10	4730-00-618-8490	MS27053-10	4730-00-618-8490
MS8000J114J	4720-00-857-1730	MS27053-10	4730-00-618-8490	MS27057-10	4730-00-935-9384
MS8000J190G	4720-00-857-1730	MS27053-10C	4730-00-889-2477	MS27053-10C	4730-00-889-2477
MS8000J220H	4720-00-857-1730	MS27055-10	4730-00-922-2687	MS27053-10	4730-00-618-8490
MS8000K324H	4720-00-857-1734	MS27053-12	4730-00-935-9383	MS27055-12	4730-00-935-9383
MS8000M430H	4720-00-857-1729	MS27053-16	4730-00-889-2473	MS27055-16	4730-00-884-1231
MS8001E084A	4720-00-857-1732	MS27381-4C	4730-00-054-7650	MS27381-4C	4730-00-054-7650
MS8001E122B	4720-00-857-1732	MS27381-4C	4730-00-054-7650	MS27384-4C	4730-00-057-0665
MS0001E164C	4720-00-857-1732	MS27381-4C	4730-00-054-7650	MS27385-4C	4730-00-057-0664
MS8001E214A	4720-00-857-1732	MS27381-4C	4730-00-054-7650	MS27381-4C	4730-00-054-7650
MS8001E224A	4720-00-857-1732	MS27381-4C	4730-00-054-7650	MS27381-4C	4730-00-054-7650

Figure D-103 (Sheet 1 of 2)

HOSE ASSEMBLY (Cont)

PART NUMBER	TUBE NSN	FITTING END NO.1		FITTING END NO.2	
		PART NO.	NSN	PART NO.	NSN
MS8001E244A	4720-00-857-1732	MS27381-4C	4730-00-054-7650	MS27381-4C	4730-00-054-7650
MS8001E264A	4720-00-857-1732	MS27381-4C	4730-00-054-7650	MS27381-4C	4730-00-054-7650
MS8001F114C	4720-00-857-1736	MS27381-5C	4730-00-877-9876	MS27385-5C	4730-00-143-9192
MS8001F120A	4720-00-857-1736	MS27381-5C	4730-00-877-9876	MS27381-5C	4730-00-877-9876
MS8001F124A	4720-00-857-1736	MS27381-5C	4730-00-877-9876	MS27381-5C	4730-00-877-9876
MS8001G120E330	4720-00-857-1731	MS27385-6C	4730-00-053-0380	MS27384-6C	4730-00-128-9819
MS8001G204A	4720-00-857-1731	MS27381-6C	4730-00-053-0379	MS27381-6	4730-00-053-0379
MS8001G224C	4720-00-857-1731	MS27381-6C	4730-00-053-0379	MS27381C	4730-00-053-0379
MS8001G244A	4720-00-857-1731	MS27381-6C	4730-00-053-0379	MS27381-6C	4730-00-053-0379
MS8001G274A	4720-00-857-1731	MS27381-6C	4730-00-053-0379	MS27381-6C	4730-00-053-0379
MS8001H70E270	4720-00-815-6354	MS27385-8C	4730-00-119-9854	MS27804-8C	4730-00-143-9179
MS8001M174J	4720-00-857-1729	MS27381-16	4730-00-053-0416	MS27383-16	4730-00-057-6427
MS87028G0204B	4720-00-611-2548	MS87018-6	4730-00-613-1859	MS87019-6	4730-00-541-8234
MS87028K0082B	4720-00-555-3499	MS87018-12	4730-00-541-1957	MS87019-12	4730-00-618-7382
MS87028K200J043	4720-00-555-3499	MS87019-12	4730-00-618-7382	MS87020-12	4730-00-238-5338
MS87028K224D200	4720-00-555-3499	MS87019-12	4730-00-618-7382	MS87019-12	4730-00-618-7382
MS87029M0234E105	4720-00-540-6434	MS870220-16	4730-00-087-1016	MS87023-16	4730-00-403-0886

Figure D-103 (Sheet 2 of 2)

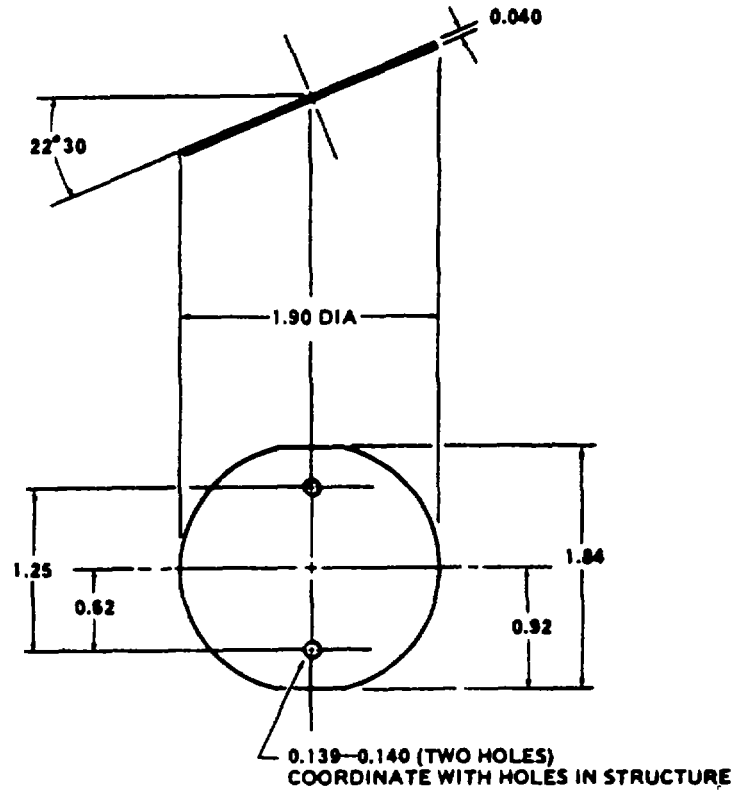


209-030-216-125 STRIP, ASSEMBLY, RUB

Part Number: 209-030-216-121 STRIP PLATE
 Fabricate from: NSN 9635-00-167-2278
 Material: 0.025 2024T3 Al Aly QQ-A-250/5
 Part Number: 209-00-216-107 RUB STRIP
 Material: 0.125 Plastic MIL-P-2224 (TFE)

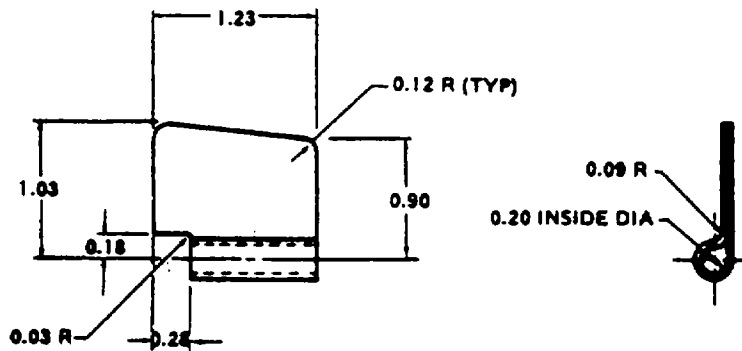
Figure D-104

Change 22 D-63



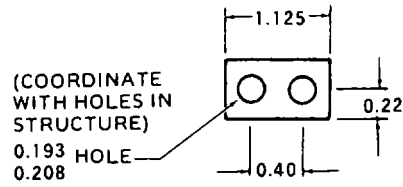
Part Number: 209-070-478-1 FLAP
 Fabricate from: NSN 9535-00-084-4551
 Material: 2024T3 Al Aly Sheet QQ-A-250/5
 0.040 inch thick, 2.4 inch wide, 2.4 inch long

Figure D-105



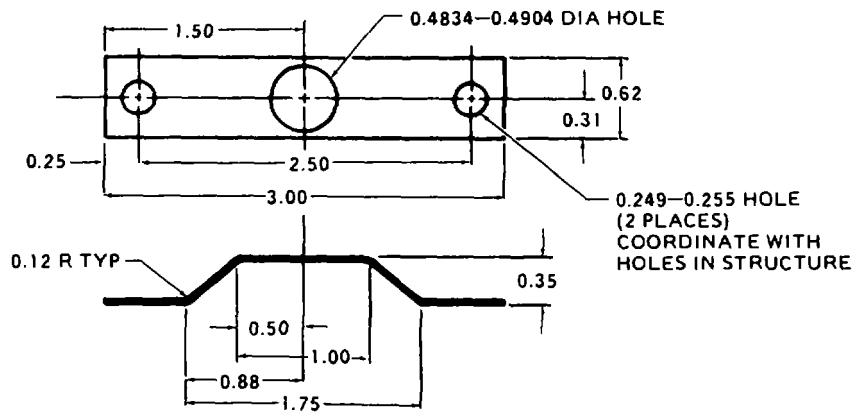
Part Number: 209-030-339-1 CLAMP
 Fabricate from: NSN 9535-00-085-4157
 Material: 2024T42 Al Aly QQ-A-250/5
 0.032 inch thick, 1.7 inch wide, 2.8 inch long

Figure D-106



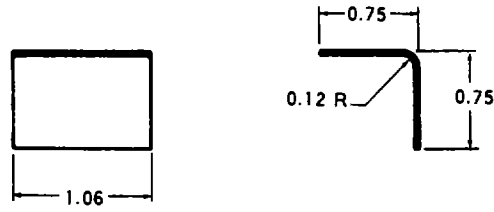
Part Number: 209-070-419-1 SPACER, Plate
 Fabricate from: NSN 5970-00-964-8708
 Material: MS 25227-3A96906

Figure D-107



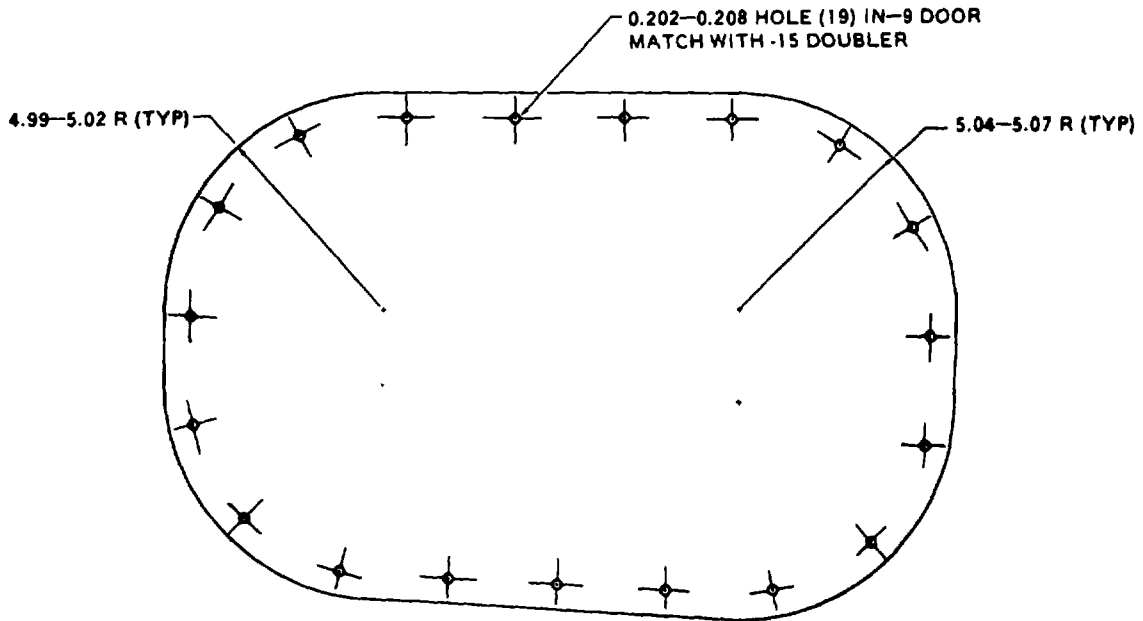
Part Number: 204-070-848-3 RETAINER
 Fabricate from: NSN 9535-00-086-9729
 Material: 2024T3 Al Aly Sheet QQ-A-362
 0.032 inch thick, 1.0 inch wide, 3.5 inch long

Figure D-108



Part Number: 209-961-025-17 CLIP
 Fabricate from: NSN 9535-086-9729
 Material: 2024T3 Al Aly QQ-A-250/5
 0.032 inch thick, 1.5 inch wide, 2.0 inch long

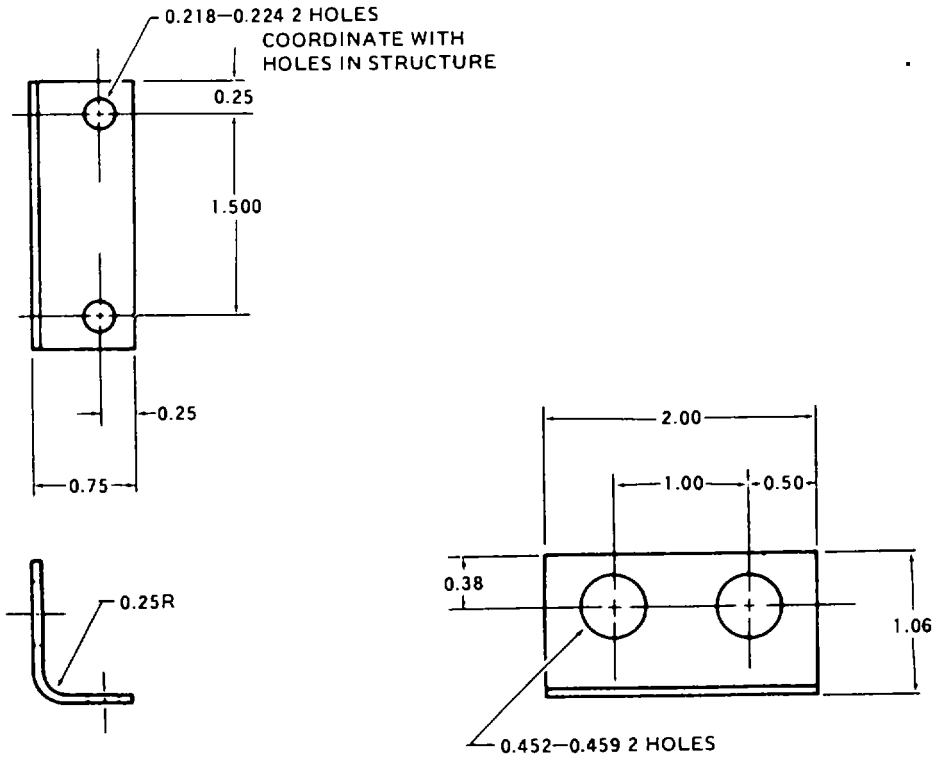
Figure D-109



Part Number: 209-030-846-9 DOOR
 Fabricate from: NSN 9535-00-249-5809
 Material: 7075T6 Al Aly QQ-A-250/13
 0.050 inch thick, 13.5 inch wide, 19.5 inch long

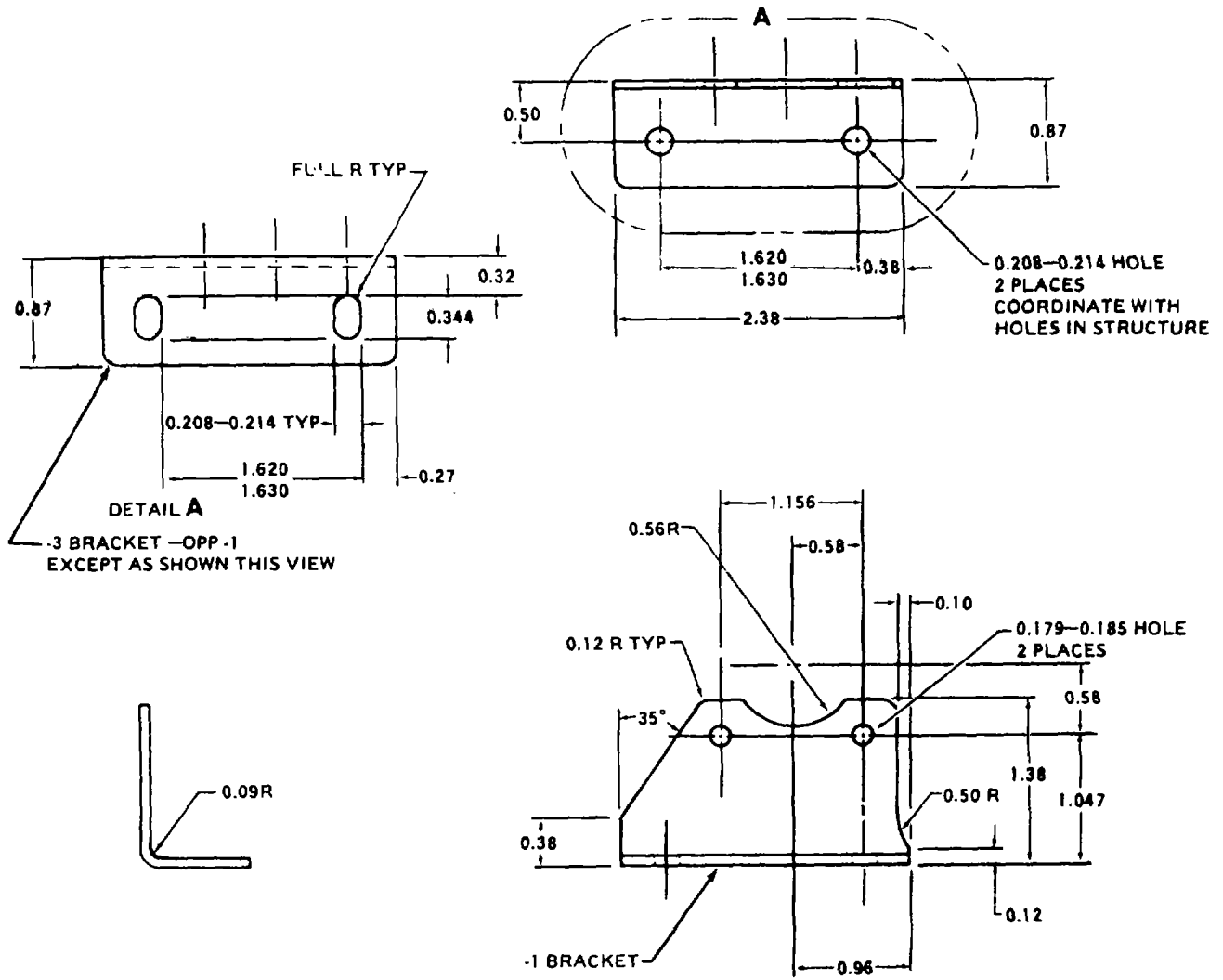
Trim to Fit Opening

Figure D-110



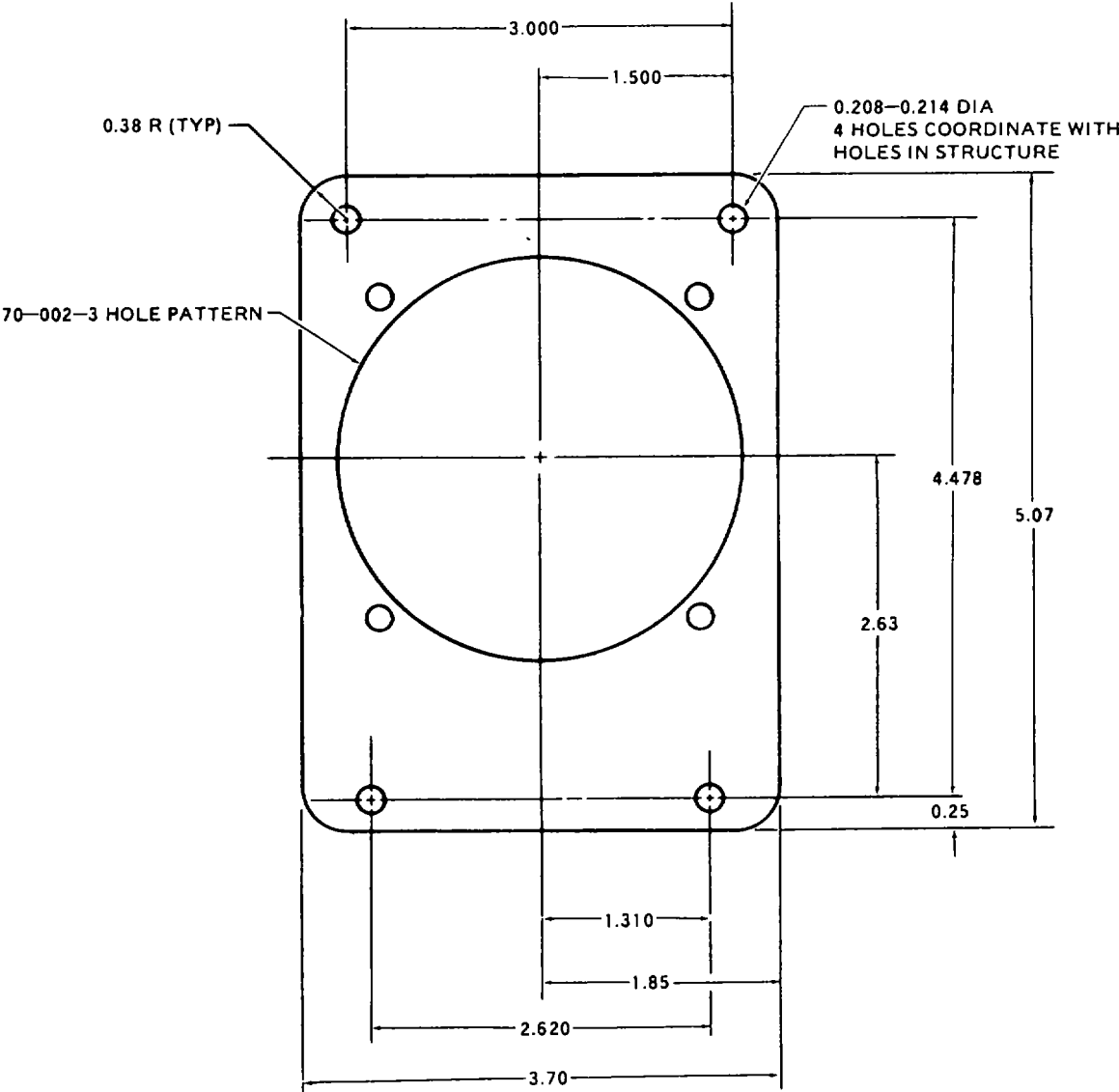
Part Number: 209-076-335-1 BRACKET
Fabricate from: NSN 9535-00-232-0378
Material: 2024T3 Al Aly QQ-A-250/5
0.063 inch thick, 2.3 inch wide, 2.5 inch long

Figure D-111



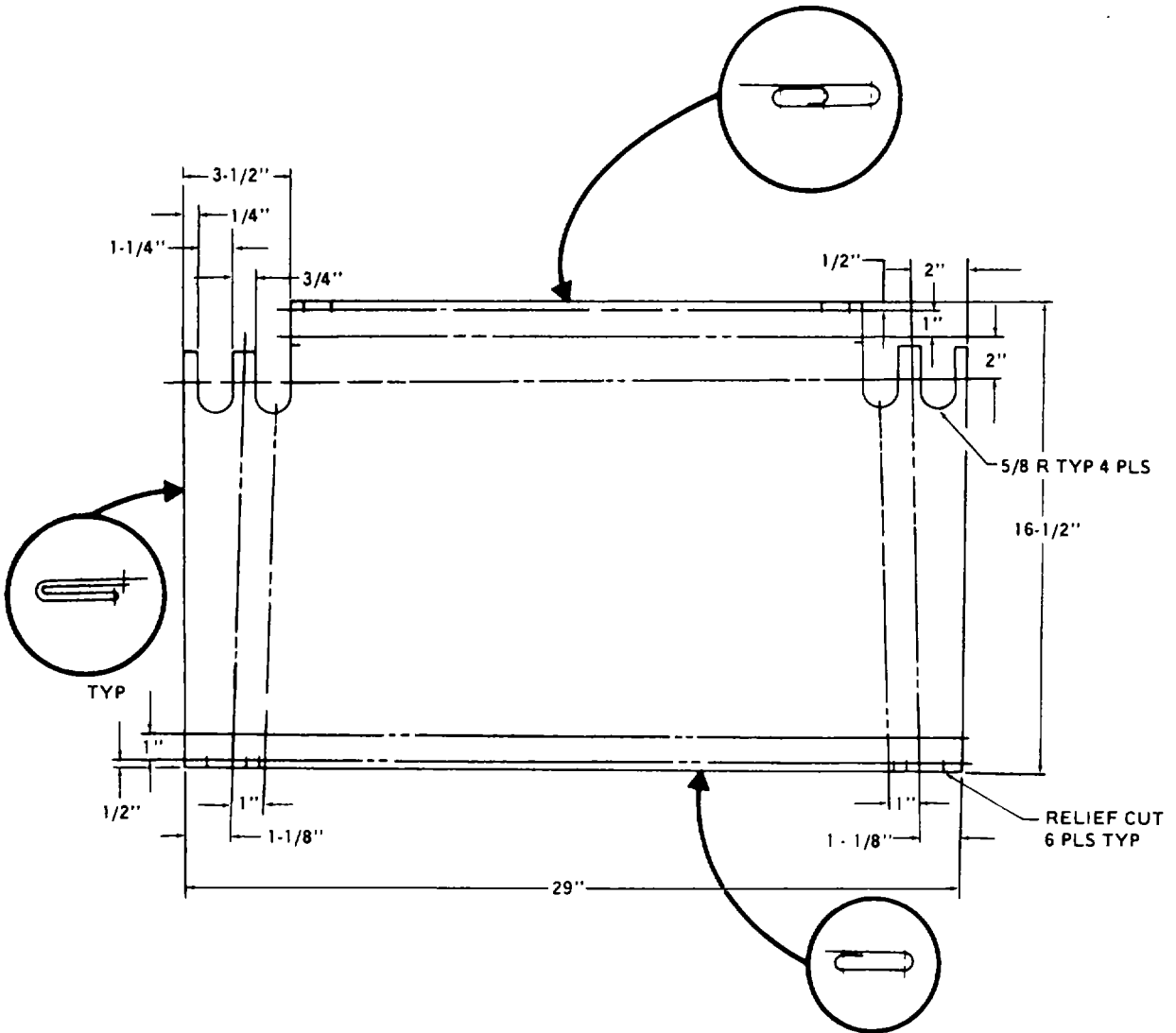
Part Number: 209-060-527-1 BRACKET
 209-060-527-3 BRACKET
 Fabricate from: NSN 9535-00-232-0405
 Material: 6061T42 Al Aly Sheet QQ-A-250/11
 0.090 inch thick, 2.6 inch wide, 2.6 inch long

Figure D-112



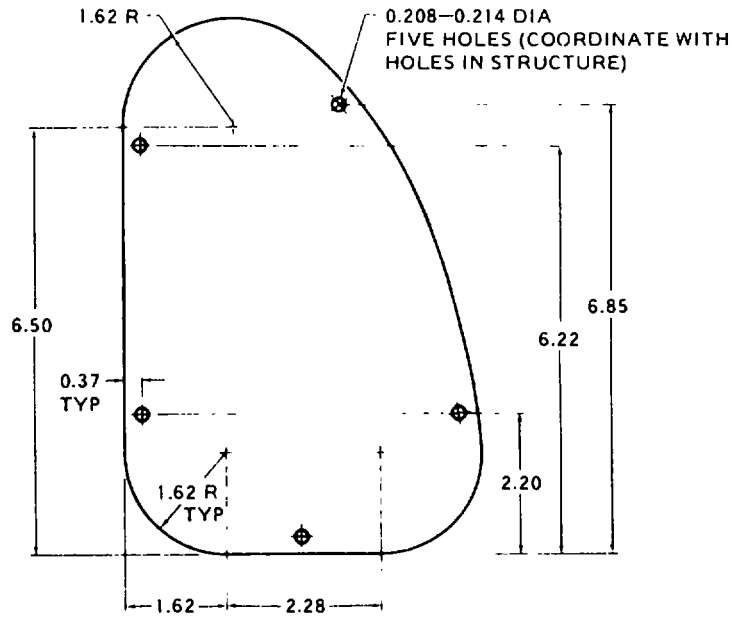
Part Number: 209-070-174-1 ADAPTER
Fabricate from: NSN 9535-00-288-0675
Material: 2024T3 Al Aly QQ-A-250/5
0.100 inch thick, 4.2 inch wide, 5.6 inch long

Figure D-113



Part Number:	209-070-532-1 SHIELD	FMC 97499
Fabricate from:	Leather CCA700CL2	AR NSN 8305-00-273-8650
	Thread VT276TY1A3	AR NSN 8310-00-187-3920

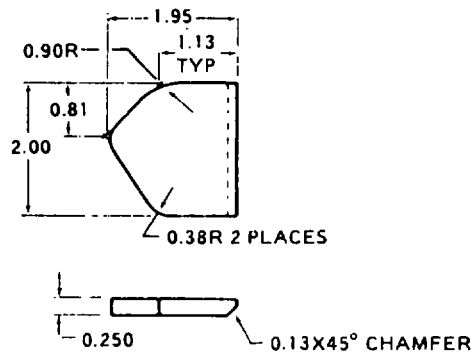
Figure D-114



Part Number: 209-030-582-21 DOOR
 Fabricate from: NSN 9535-00-167-2174
 Material: 2024T3 Al Aly QQ-A-250/5
 0.025 inch thick, 5.8 inch wide, 8.7 inch long

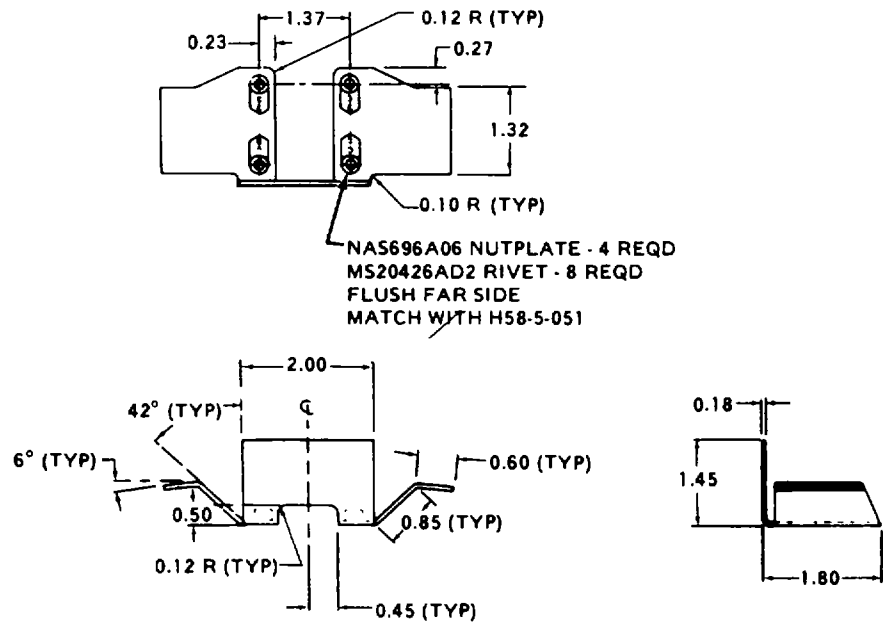
Trim to Fit Opening

Figure D-115



Part Number: 209-030-334-1 SPACER, Shown
 Fabricate from: NSN 9535-00-232-6947
 Material: 2024T3 Al Aly QQ-A-250/5
 0.250 inch thick, 2.5 inch wide, 2.5 inch long
 Part Number: 209-030-334-2 SPACER, Opposite

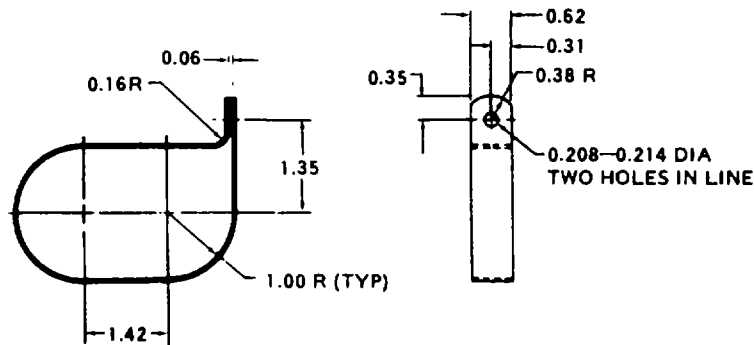
Figure D-116



Part Number: 209-060-814-1 BRACKET
Fabricate from: NSN 9535-00-232-0378
Material: 2024T42 Al Aly QQ-A-250/4
0.063 inch thick, 3.6 inch wide, 5.4 inch long

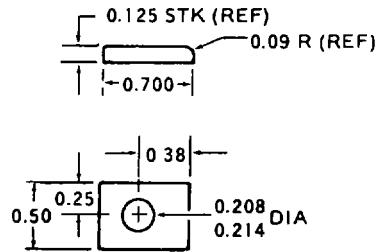
Part Number: NAS696A06 NUTPLATE
Fabricate from: NSN 5310-00-619-3547
Part Number: MS20426A2-4 RIVET
Fabricate from: NSN 5320-00-117-6929

Figure D-117



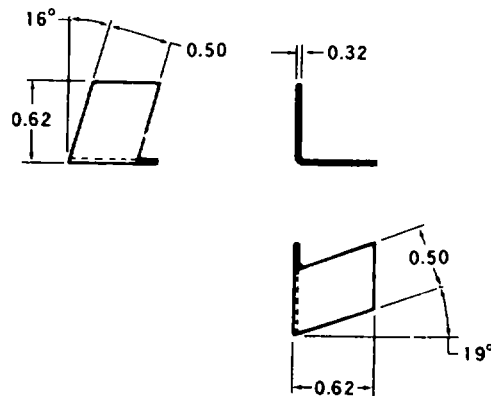
Part Number: 209-070-531-5 CLAMP, Hose
Fabricate from: NSN 5935-00-167-2280
Material: 2024T3 Al Aly QQ-A-250/5
0.040 inch thick, 1.12 inch wide, 11.2 inch long

Figure D-118



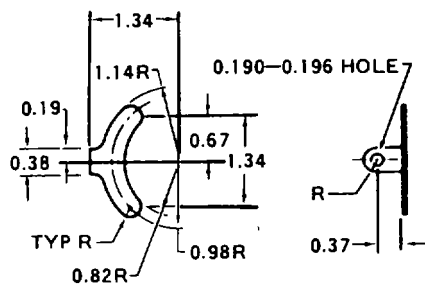
Part Number: 209-070-486-1 SPACER, Plate
 Fabricate from: NSN 9535-00-232-0418
 Material: 2024T3 Al Aly Sheet QQA362
 0.125 inch thick, 0.50 inch wide, 1.0 inch long

Figure D-119



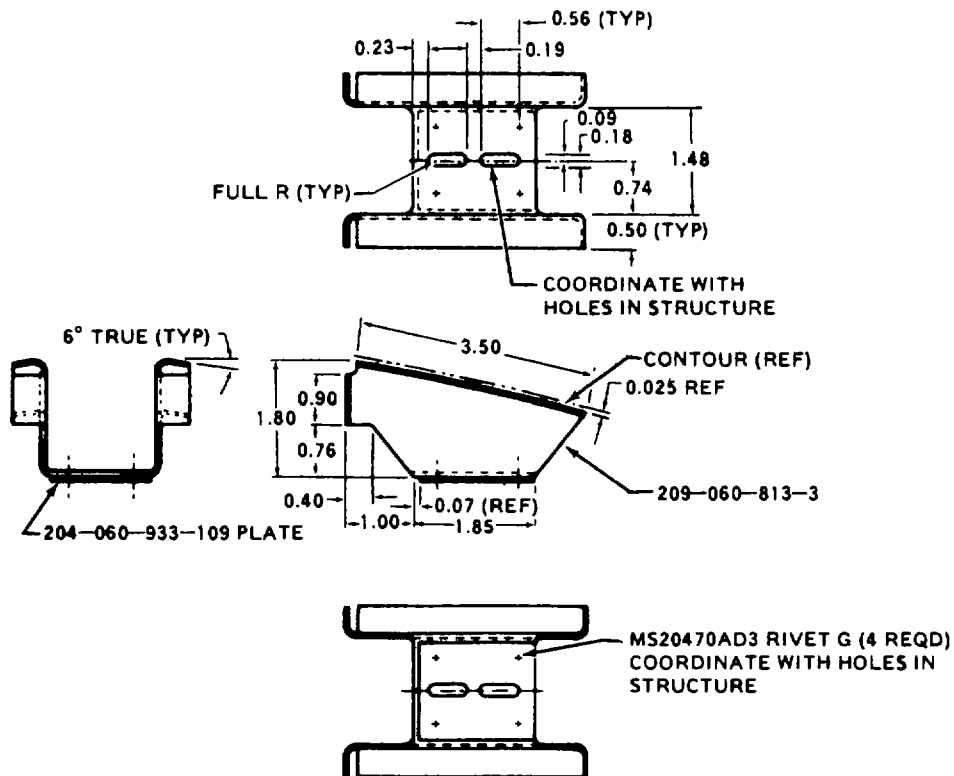
Part Number: 209-060-810-129 CLIP, Shown
 209-060-810-129 CLIP, Opposite
 Fabricate from: NSN 9535-00-086-9729
 Material: 2024T3 Al Aly QQA250/5
 0.032 inch thick, 1.0 inch wide, 1.7 inch long

Figure D-120



Part Number: 209-071-042-43 PLATE
 Fabricate from: NSN 9535-00-086-9729
 Material: 2024T3 Al Aly QQ-A-250/5
 0.032 inch thick, 2.0 inch wide, 2.4 inch long

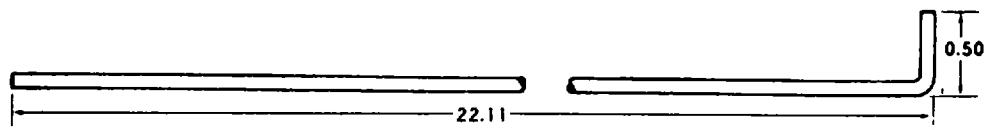
Figure D-121



209-060-813-1 BRACKET ASSEMBLY

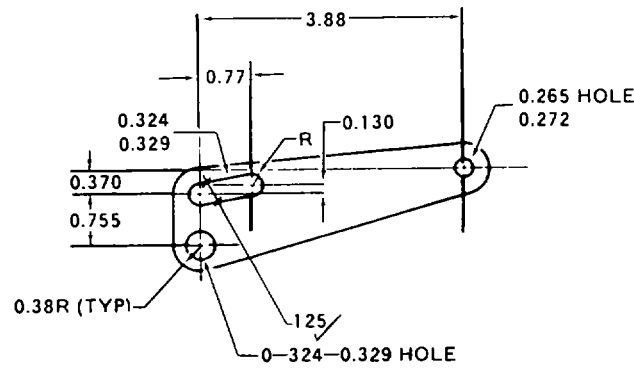
- Part Number: 209-060-813-3 BRACKET
- Fabricate from: NSN 9535-00-544-1417
- Material: 2024T42 Al Aly QQ-A-250/4
0.063 inch thick, 4.7 inch wide, 4.9 inch long
- Part Number: 209-060-933-109 PLATE
- Fabricate from: NSN 9535-00-232-0378
- Material: 2024T3 Al Aly QQ-A-250/5
0.063 inch thick, 1.7 inch wide, 1.9 inch long

Figure D-122



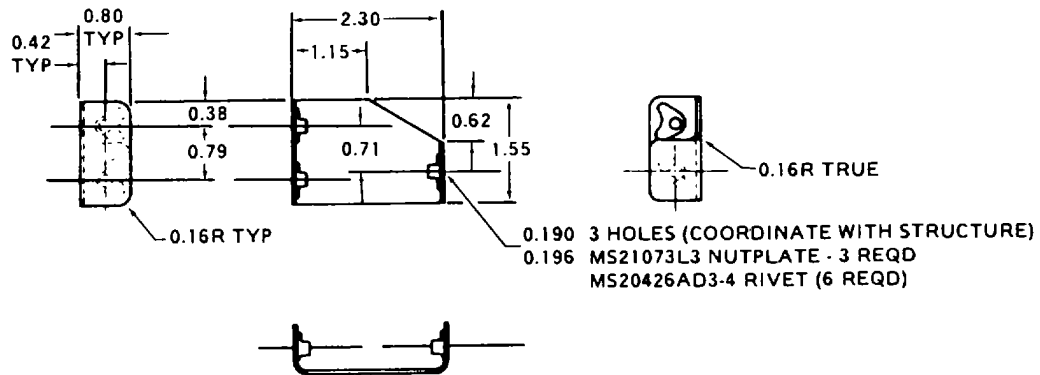
- Part Number: 209-030-216-89 PIN
- Fabricate from: NSN 5340-00-043-3723
- Material: Part No. MS 20253-2-7200

Figure D-123



Part Number: 204-070-855-7 PLATE
 Fabricate from: NSN 9535-00-232-0406
 Material: 2024T3 Al Aly Sheet QQ-A-362
 0.090 inch thick, 2.4 inch wide, 5.1 inch long

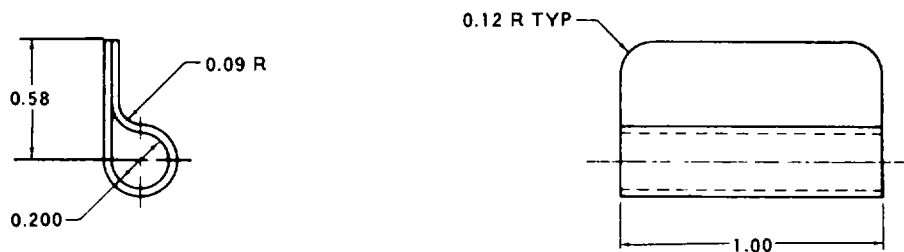
Figure D-124



Part Number: 209-020-106-15 BRACKET, Shown
 Fabricate from: NSN 9535-00-232-0378
 Material: 2.0 x 4.5 2024T4 Al Aly, Sheet Q-A-250/5
 0.063 inch thick, 2.0 inch wide, 4.5 inch long

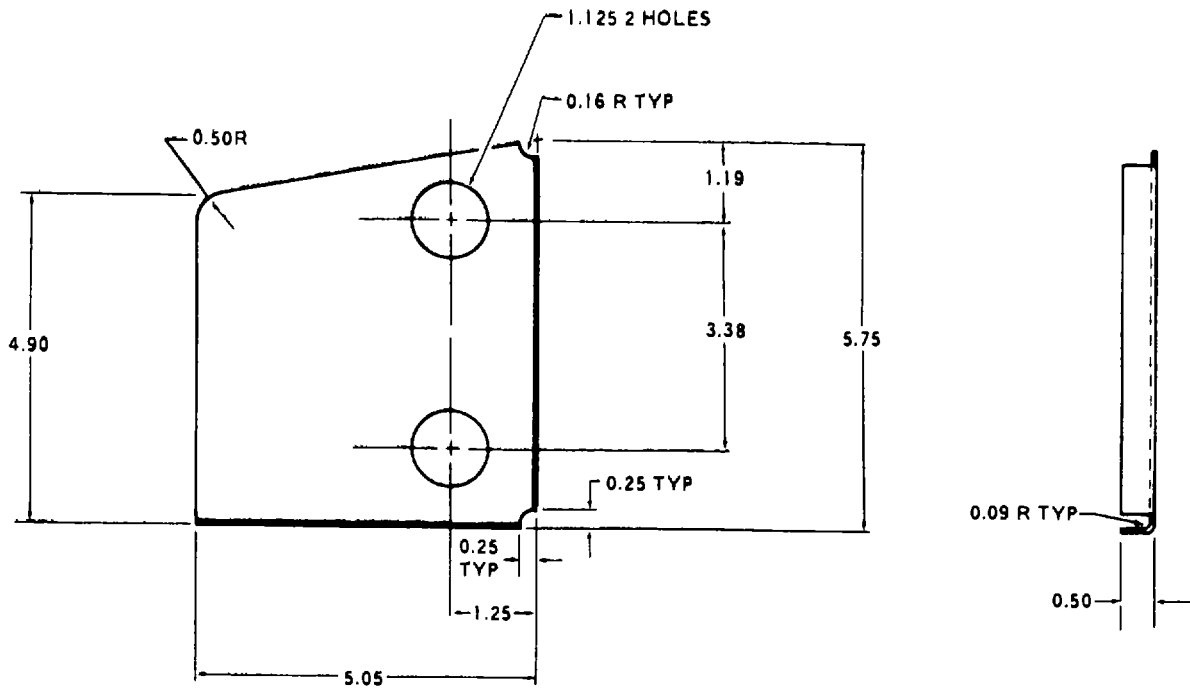
Part Number: 209-020-106-16 BRACKET, Opposite
 Fabricate from: NSN 9535-00-232-0378
 Part Number: MS21073L3 NUTPLATE (3 each)
 Fabricate from: NSN 5320-00-761-4221
 Part Number: MS20426AD3-4 RIVET (6 Reqd)
 Fabricate from: NSN 5320-00-117-6938

Figure D-125



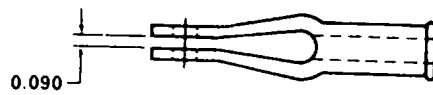
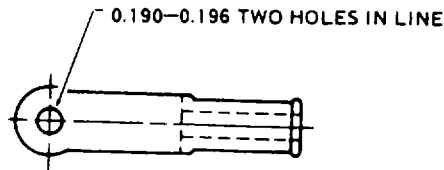
Part Number: 204-030-677-1 CLAMP, Support
 Fabricate from: NSN 9535-00-167-2280
 Material: 2024T42 Al Aly QQA250/5
 0.032 inch thick, 1.4 inch wide, 2.0 inch long

Figure D-126



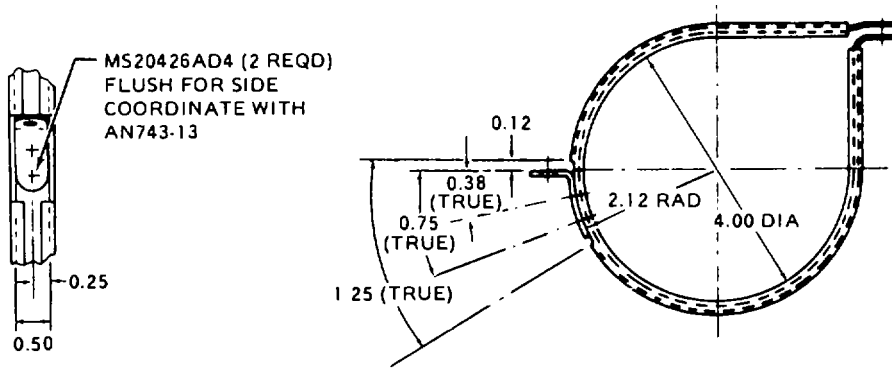
Part Number: 209-060-508-15 BRACKET
 Fabricate from: NSN 9535-00-640-2311
 Material: 2024-T42 Al Aly Sheet QQ-A-250/5
 0.050 inch thick, 6.0 inch wide, 6.8 inch long

Figure D-127



Part Number: 209-070-161-1 ROD END, Clevis
 Fabricate from: NSN 5340-00-838-1591
 Material: MS27975-4

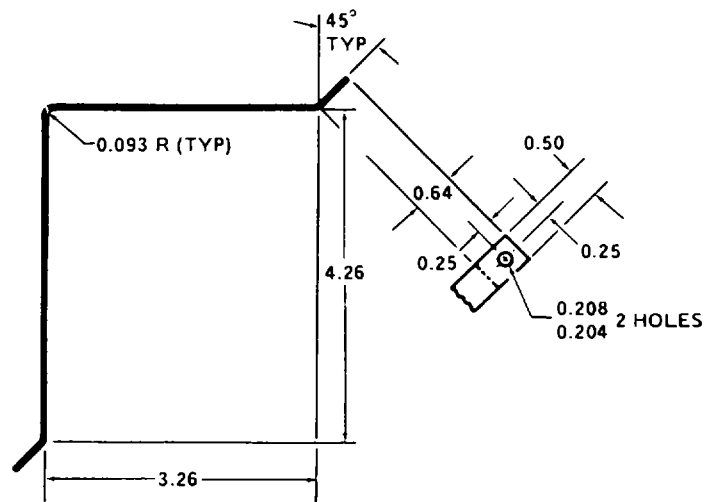
Figure D-128



204-070-048-1, CLAMP ASSEMBLY

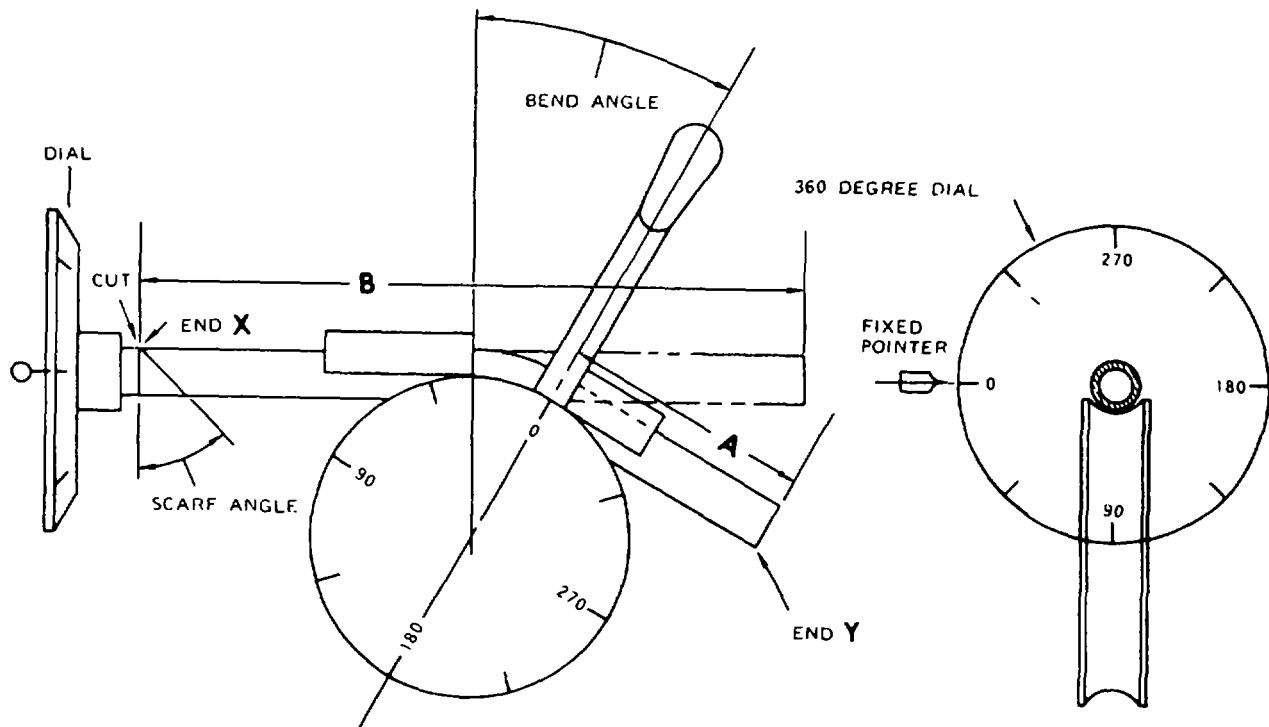
Part Number: 204-070-048-3 CLAMP
 Fabricate from: NSN 5340-00-597-6152
 Material: Make from MS21919DG64
 Part Number: 204-070-048-5 BRACKET
 Fabricate from: NSN 5340-00-721-8182
 Material: Make from AN743-13

Figure D-129



Part Number: 204-072-253-3 BRACKET, Heat Exchanger
 Fabricate from: NSN 9535-00-167-2779
 Material: 2024T3 Al Aly Sheet QQAA250/5

Figure D-130



NOTES

1. Select material and end fittings from Table D-1.
2. Refer to Tube Bending Data, Table D-2, for all dimensions, angles, and dial settings.
3. Mark dimension "A" for each bend, and dimension "B" prior to bending.
4. Make first bend with dial set at 0 deg. and rotate dial to "Right (clockwise) and make remaining bends at specified dial settings.
5. Cut "X" End after bending. If scarf is required set dial and cut to specified angle.
6. Trim and burr Ends "X" and "Y" as necessary.
7. Bend radii shall conform to MS33611.
8. Nuts and sleeves installed per MS33566.
9. Pressure test to PSI called out in Tube Bending Data, Table D-2, if applicable.
10. Identify tube assembly by marking Part Number with rubber ink stamp or felt pen.

TYPE OF ENDS

- I Single Flare - MS33584
- II Bead - MS33660
Type "A" unless noted
- III Double Flare - MS33583
- IV Plain Square
- V Angle - 45° scarf unless noted

Figure D-131 (Sheet 1 of 3)

D-1. TUBE BENDING DATA. The information contained in this section discloses as applicable, quantities of material and fitting, bend radii, angles, dimensions and all other data required for fabrication of tube assemblies.

- a. Table D-1 gives the material, NSN's and quantities of the stock required to fabricate each tube assembly. The stock dimension column will indicate a length of 2 to 3 inches longer than is actually required for the finished tube. The last column includes the applicable system for each tube assembly, such as, Fuel, Lubrication, etc.
- b. Figure D-131 illustrates the type of dial marking, end references (X and Y), and dimensional references (A and B), to coincide with the data on Table D-2. The Type of Ends (I through VI) are defined and the "Notes" are provided for additional information.
- c. Table D-2 includes all the dimensions (inches), angles (degrees) and other information required to fabricate the tube assemblies. The use of Table D-2 is described in the following example. The columns are numbered for reference only.

EXAMPLE

1	2	3	4	5	6	7
PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "Y"	PRESSURE TEST	
205-061-619-1	1	1 1/16	9/16	0	45	Y - AN 818-4D MS20819-4D
	2	9 1/8	9/16	185	68	
			11 3/8	III	V	N/A

Column 1. PART NUMBER - Tube Part Number in alpha numerical order.

Column 2. BEND NO. - Bend Number 1, 2, etc numbering from "Y" end of tube. The last block in Column 2 will be blank.

Column 3. DIMENSION "A" FROM "Y" END - Refer to Figure D-131. Dimension A is the distance from Y End, before bending, to the beginning point of each bend to be preformed. (See Example.) "A" dimension for No. 1 bend is 1 1/16 inch. "A" dimension for No. 2 bend is 9 1/8 inch.

DIMENSION "B" - Dimension "B" is along centerline of tube from end X to end Y before tube is bent including allowances for flaring or beading ends. (See Example.) "B" Dimension is 11 3/8 inch.

Column 4. BEND RADIUS - Specifies the radius of each bend. (See Example.) Bend Radius for No. 1 and 2 bends is 9/16 inch.

TYPE END "Y" - Refers to type of end (1 through VI). See Figure D-131, "Type of Ends" for definition. (See Example.) Type of End "Y" is "III", indicating a Double Flare.

Figure D-131 (Sheet 2 of 3)

Column 5. DIAL SETTING - The dial setting is the degree of tube rotation from plane of first bend. The dial setting (degree of tube rotation) will depend on the type of dial marking used. The dial settings referenced in Table D-2 correspond to the type of dial marking illustrated in Figure D-131.

TYPE OF END "X" - Refers to type of End (I through VI). See Figure D-131 "Type of Ends" for definition. (See Example.) Type of End X is V, indicating "Angle - 45 degree scarf."

Column 6. BEND ANGLE - Specifies the degree of bend through which the tube is bent as shown in Figure D-131. (See Example.) The bend angle (degree of bend), for 1st bend is 45 degrees, 2nd bend is 68 degrees.

NOTE

This is the actual number of degrees required in the bend. When pressure is released from the tube bender, a small amount of "spring back" varying in proportion to hardness and elongation characteristics of the tubing will necessitate a certain amount of over-run to accomplish the exact bend angle.

PRESSURE TEST - The pressure test, if applicable, is indicated in PSI (pounds per square inch). (See Example.) Pressure test is indicated as N/A, meaning Not Applicable.

Column 7. END FITTINGS AND NOTES - The Part Number of End Fittings, if required and their identity to the correct End (X and Y) is referenced. Additional notes will be included in this column as required. (See Example.) The End Fittings for Y End are AN818-4D and MS20819-4D. For X End no fittings are required. A scarf is cut, on End X, with dial setting at 320.

Figure D-131 (Sheet 3 of 3)

TUBE ASSY PART NO.	FABRICATE FROM NSN	STOCK DIM			END FITTING				SYS- TEM
		O.D.	W.T	L.	NUT NSN	QTY	SLEEVE NSN	QTY	
204-040-215-19	4710-00-278-8726	3/8	.035	12	4730-00-142-2167	2	4730-00-278-0070	2	Lub
204-040-215-27	4710-00-278-8726	3/8	.035	12	4730-00-142-2167	2	4730-00-278-6070	2	Lub
204-040-838-1	4710-00-278-8745	3/4	.035	23	4730-00-287-0285	2	4730-00-287-0067	2	Lub
209-030-311-1	4710-00-278-6402	3/8	.028	10	4730-00-142-2167	2	4730-00-278-6070	2	Fuel
209-030-312-1	4710-00-278-6402	3/8	.028	9	4730-00-142-2167	2	4730-00-278-6070	2	Fuel
209-030-661-1	4710-00-278-6402	3/8	.028	24	4730-00-142-2167	2	4730-00-278-6070	2	Drain
209-030-662-1	4710-00-287-6402	3/8	.028	11	4730-00-142-2167	2	4730-00-278-6070	2	Drain
209-030-663-1	4710-00-287-6402	3/8	.028	32	4730-00-142-2167	2	4730-00-278-6070	2	Drain
209-030-664-1	4710-00-287-6402	3/8	.028	21	4730-00-142-2167	2	4730-00-278-6070	2	Drain
209-030-665-1	4710-00-287-6402	3/8	.028	13	4730-00-142-2167	2	4730-00-278-6070	2	Drain
209-030-666-1	4710-00-287-6402	3/8	.028	14	4730-00-142-2167	2	4730-00 278-6070	2	Drain
209-040-211-1	4710-00-595-2416	5/8	.028	47	4730-00-287-0290	2	4730-00-277-5358	2	Lub
209-040-214-1	4710-00-595-2416	5/8	.028	37	4730-00-287-0290	2	4730-00-277-5358	2	Lub
209-040-215-1	4710-00-595-2416	5/8	.028	8	4739-00-287-0290	2	4730-00-277-5358	2	Lub
209-040-216-1	4710-00-278-6402	3/8	.028	11	4730-00-142-2167	1	4730-00-278-6070	1	Lub
209-040-511-1	4710-00-278-8726	3/8	.035	8	4730-00-142-2167	2	4730-00-278-6070	2	Lub
209-060-224-1	4710-00-278-8723	1	.035	21	4730-00-222-1915	1	4730-00-237-0065	1	Drain
209-060-427-1	4710-00-825-5894	1/4	.020	16	4730-01-096-7986	2	4730-00-278-0678	2	Pneu.
209-060-505-1	4710-00-278-8726	3/8	.035	6	4730-00-142-2167	2	4730-00-278-6070	2	Lub
209-060-506-1	4710-00-278-8726	3/8	.035	29	4730-00-142-2167	2	4730-00-278-6070	2	Lub
209-060-507-1	4710-00-278-8726	3/8	.035	29	4730 00-142-2167	2	4730-00-278-6070	2	Lub
209-060-537-1	4710-00-595-2416	5/8	.028	25	4730-00-287-0290	2	4730-00-277-5358	2	Lub
209-060-541-1	4710-00-595-2416	5/8	.028	33	4730-00-287-0290	2	4730-00-277-5358	2	Lub
209-060-544-1	4710-00-278-6398	1/4	.035	44	4730-00-287-0289	2	4730-00-302-8641	2	Lub
209-060-545-1	4710-00-278-6398	1/4	.035	11	4730-00-287 0239	1	4730-00-302-8641	1	Lub
209-060-558-1	4710-00-278-6402	3/8	.028	42	4730-00-142-2167	2	4730-00-278-6070	2	Lub
209-060-559-1	4710-00-278-6402	3/8	.028	11	4730-00-142-2167	2	4730-00-278-6070	2	Lub
209-060-560-1	4710-00-278-6402	3/8	.028	44	4730-00-142-2167	2	4730-00 278-6070	2	Lub
209-060-567-1	4710-00-278-6402	5/8	.028	20	4730-00-287-0290	2	4730-00-277-5358	2	Lub

Table D-1 (Sheet 1 of 7)

Change 21 D-81

TUBE ASSY PART NO.	FABRICATE FROM NSN	STOCK DIM			END FITTING				SYS- TEM
		O.D.	W.T	L.	NUT NSN	QTY	SLEEVE NSN	QTY	
209-060-568-1	4710-00-278-8745	3/4	.035	23	4730-00-287-0285	2	4730-00-287-0067	2	Lub
209-060-571-1	4710-00-278-6402	3/8	.028	13	4730-00-142-2167	2	4730-00-278-6070	2	Lub
209-060-572-1	4710-00-278-6402	3/8	.028	10	4730-00-142-2167	2	4730-00-278-6070	2	Lub
209-060-574-1	4710-00-595-2416	5/8	.028	13	4730-00-287-0290	2	4730-00-277-5358	2	Lub
209-060-575-1	4710-00-278-7954	3/4	.028	7	4730-00-287-0285	2	4730-00-287-0067	2	Lub
209-060-587-1	4710-00-541-4932	1/4	.028	10	4730-00-287-0289	2	4730-00-302-8641	2	Lub
209-060-608-1	4710-00-541-4932	1/4	.028	21	4730-00-287-0289	2	4730-00-302-8641	2	Fuel
209-060-610-1	4710-00-278-7954	3/4	.028	57	4730-00-287-0285	2	4730-00-287-0067	2	Fuel
209-060-611-1	4710-00-278-7954	3/4	.028	19	4730-00-287-0285	2	4730-00-287-0067	2	Fuel
209-060-614-1	4710-00-541-4932	1/4	.028	12	4730-00-287-0289	1	4730-00-302-8641	1	Fuel
209-060-615-1	4710-00-278-6402	3/8	.028	12	4730-00-142-2167	1	4730-00-278-6070	1	Fuel
209-060-616-1	4710-00-541-8621	1/4	.028	19	4730-00-222-1912	2	4730-00-278-0678	2	Fuel
209-060-617-1	4710-00-540-6725	5/8	.028	16	4730-00-287-0295	2	4730-00-277-5357	2	Fuel
209-060-618-1	4710-00-595-2416	5/8	.028	15	4730-00-287-0290	2	4730-00-277-5358	2	Fuel
209-060-619-1	4710-00-595-2416	5/8	.028	15	4730-00-287-0290	2	4730-00-277-5358	2	Fuel
209-060-620-1	4710-00-595-2416	5/8	.028	34	4730-00-287-0290	2	4730-00-277-5358	2	Fuel
209-060-621-1	4710-00-278-6402	3/8	.028	15	4730-00-142-2167	2	4730-00-278-6070	2	Fuel
209-060-622-1	4710-00-278-6402	3/8	.028	40	4730-00-142-2167	1	4730-00-278-6070	1	Fuel
209-060-624-1	4720-00-278-7954	3/4	.028	12	4730-00-287-0285	1	4730-00-287-0067	1	Fuel
209-060-625-1	4710-00-278-6402	3/8	.028	61	4730-00-142-2167	1	4730-00-278-6070	1	Fuel
209-060-634-1	4710-00-541-8621	1/4	.028	13	4730-00-287-0289	2	4730-00-302-8641	2	Fuel
209-060-635-1	4710-00-278-2858	1/4	.028	13	4730-00-287-0289	2	4730-00-302-8641	2	Fuel
209-060-636-1	4710-00-541-8621	1/4	.028	12	4730-00-287-0289	2	4730-00-302-8641	2	Lub
209-060-637-1	4710-00-541-4932	1/4	.028	11	4730-00-287-0289	2	4730-00-302-8641	2	Lub
209-060-638-1	4710-00-279-0195	1	.035	43	N/A	N/A	N/A	N/A	Pneu.
209-060-639-1	4710-00-541-4932	1/4	.028	8	4730-00-287-0289	2	4730-00-302-8641	2	Fuel
209-060-640-1	4710-00-541-4932	1/4	.028	8	4730-00-287-0289	2	4730-00-302-8641	2	Lub
209-060-643-1	4710-00-595-2416	5/8	.028	15	4730-00-287-0290	1	4730-00-277-5358	1	Fuel
209-060-646-1	4710-00-278-7954	3/4	.028	26	4730-00-287-0285	2	4730-00-287-0067	2	Fuel

Table D-1 (Sheet 2 of 7)

Change 14 D-82

TUBE ASSY PART NO.	FABRICATE FROM NSN	STOCK DIM			END FITTING				SYS- TEM
		O.D.	W.T	L.	NUT NSN	QTY	SLEEVE NSN	QTY	
209-060-647-1	4710-00-595-2416	5/8	.028	23	4730-00-287-0290	2	4730-00-277-5358	2	Fuel
209-060-648-1	4710-00-278-7954	3/4	.028	17	4730-00-287-0285	2	4730-00-287-0067	2	Fuel
209-060-649-1	4710-00-278-7954	3/4	.028	30	4730-00-287-0285	2	4730-00-287-0067	2	Fuel
209-060-680-1	4710-00-541-8621	1/4	.028	13	4730-00-287-0285	1	4730-00-302-0678	1	Fuel
209-070-401-1	4710-00-278-8723	1	.035	32	N/A	N/A	N/A		Pneu.
209-070-447-1	4710-00-279-0195	1	.035	32	N/A	N/A	N/A	N/A	Pneu.
209-070-450-1	4710-00-278-7959	1	.028	14	4730-00-287-0063	1	4730-00-287-0065	1	Pneu.
209-070-487-1	4710-00-279-0195	1	.035	17	N/A	N/A	N/A	N/A	Pneu.
209-070-489-1	4710-00-278-6402	3/8	.028	31	4730-00-142-2167	2	4730-00-287-6070	2	Pneu.
209-070-497-1	4710-00-279-0195	1	.035	17	N/A	N/A	N/A	N/A	Pneu.
209-070-525-1	4710-00-279-0195	1	.035	26	N/A	N/A	N/A	N/A	Pneu.
209-070-527-1	4710-00-278-8723	1	.035	43	4730-00-287-0063	1	4730-00-287-0065	1	Pneu.
209-070-543-1	4710-00-279-0195	1	.035	11	N/A	N/A	N/A	N/A	Pneu.
209-070-565-1	4710-00-541-4932	1/4	.028	10	4730-00-287-0289	2	4730-00-302-8641	2	Pneu.
209-076-118-1	4710-00-287-1841	3/8	.035	18	4730-00-554-7397	2	4730-00-554-7398	2	Hyd.
209-076-119-1	4710-00-278-8726	3/8	.035	19	4730-00-142-2167 4730-00-554-7397	1 1	4730-00-278-6070 4730-00-554-7398	1 1	Hyd.
209-076-137-1	4710-00-142-3010	1/2	.035	46	4730-00-555-0595	2	4730-00-580-2120	2	Arm. Pyl.
209-076-138-1	4710-00-142-3010	1/2	.035	14	4730-00-555-0595	2	4730-00-580-2120	2	Arm. Pyl.
209-076-139-1	4710-00-142-3010	1/2	.035	24	4730-00-555-0595	2	4730-00-580-2120	2	Arm. Pyl.
209-076140-1	4710-00-142-3010	1/2	.035	25	4730-00-555-0595	2	4730-00-580-2120	2	Arm. Pyl.
209-076-141-1	4710-00-142-3010	1/2	.035	16	4730-00-555-0595	2	4730-00-580-2120		Arm Pyl.
209-076-142-1	4710-00-142-3010	1/4	.035	17	4730-00-555-8203	2	4730-00-289-8619	2	Arm. Pyl.

Table D-1 (Sheet 3 of 7)

Change 15 D-83

TUBE ASSY PART NO.	FABRICATE FROM NSN	STOCK DIM			END FITTING				SYS- TEM
		O.D.	W.T	L.	NUT NSN	QTY	SLEEVE NSN	QTY	
209-076-143-1	4710-00-142-3010	1/2	.035	25	4730-00-555-0595	2	4730-00-580-2120		Arm. Pyl.
209-076-144-1	4710-00-289-2788	1/4	.035	17	4730-00-555-8203	2	4730-00-289-8619	2	Arm. Pyl.
209-076-145-1	4710-00-287-1841	3/8	.035	25	4730-00-554-7397	2	4730-00-554-7398	2	Arm. Pyl.
209-076-146-1	4710-00-287-1841	3/8	.035	46	4730-00-554-7397	2	4730-00-554-7398	2	Arm. Pyl.
209-076-147-1	4710-00-267-1841	3/8	.035	26	4730-00-554-7397	2	4730-00-554-7398	2	Arm. Pyl.
209-076-148-1	4710-00-287-1841	3/8	.035	29	4730-00-554-7397	2	4730-00-554-7398	2	Arm. Pyl.
209-076-149-1	4710-00-287-1841	3/8	.035	14	4730-00-554-7397	2	4730-00-554-7398	2	Arm. Pyl.
209-076-150-1	4710-00-287-1841	3/8	.035	12	4730-00-554-7397	2	4730-00-554-7398	2	Arm. Pyl.
209-076-151-1	4710-00-287-1841	3/8	.035	13	4730-00-554-7397	2	4730-00-554-7398	2	Arm. Pyl.
209-076-152-1	4710-00-287-1841	3/8	.035	12	4730-00-554-7397	2	4730-00-554-7398	2	Arm. Pyl.
209-076-153-1	4710-00-287-1841	3/8	.035	24	4730-00-554-7397	2	4730-00-554-7398	2	Arm. Pyl.
209-076-154-1	4710-00-287-1841	3/8	.035	19	4730-00-554-7397	2	4730-00-554-7398	2	Arm. Pyl.
209-076-155-1	4710-00-287-1841	3/8	.035	19	4730-00-554-7397	2	4730-00-554-7398	2	Arm. Pyl.
209-076-156-1	4710-00-287-1841	3/8	.035	24	4730-00-554-7397	2	4730-00-554-7398	2	Arm. Pyl.
209-076-202-1	4710-00-142-3010	1/2	.035	23	4730-00-555-0595	2	4730-00-554-7398	2	Hyd.
209-076-205-1	4710-00-142-3010	1/2	.035	16	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-207-1	4710-00-142-3010	1/2	.035	22	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-208-1	4710-00-287-1841	3/8	.035	17	4730-00-554-7397	2	4730-00-554-7398	2	Hyd.
209-076-209-1	4710-00-289-2537	1	.049	12	4730-00-555-8196	2	4730-00-289-8623	2	Hyd.
209-076-211-1	4710-00-142-3010	1/2	.035	36	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-212-1	4710-00-142-3010	1/2	.035	52	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-213-1	4710-00-287-1841	3/8	.035	14	4730-00-554-7397	2	4730-00-554-7398	2	Hyd.
209-076-214-1	4710-00-142-3010	1/2	.035	40	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.

Table D-1 (Sheet 4 of 7)

D-84 Change 14 D-84

TUBE ASSY PART NO.	FABRICATE FROM NSN	STOCK DIM			END FITTING				SYS- TEM
		O.D.	W.T	L.	NUT NSN	QTY	SLEEVE NSN	QTY	
209-076-215-1	4710-00-142-3010	1/2	.035	30	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-216-1	4710-00-287-1841	3/8	.035	23	4730-00-554-7397	2	4730-00-554-7398	2	Hyd.
209-076-217-1	4710-00-287-1841	3/8	.035	15	4730-00-554-7397	2	4730-00-554-7398	2	Hyd.
209-076-219-1	4710-00-142-3010	1/2	.035	18	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-220-1	4710-00-142-3010	1/2	.035	29	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-221-1	4710-00-289-2781	1/4	.035	12	4730-00-565-8203	2	4730-00-289-8619	2	Hyd.
209-076-222-1	4710-00-287-1841	3/8	.035	34	4730-00-554-7397	2	4730-00-554-7398	2	Hyd.
209-076-223-1	4710-00-287-1841	3/8	.035	28	4730-00-554-7397	2	4730-00-554-7398	2	Hyd.
209-076-224-1	4710-00-289-2781	1/4	.035	21	4730-00-555-8203	2	4730-00-289-8619	2	Hyd.
209-076-225-1	4710-00-142-3009	5/16	.035	15	4730-00-555-8012	2	4730-00-289-8620	2	Hyd.
209-076-226-1	4710-00-289-2781	1/4	.035	9	4730-00-555-8203	2	4730-00-289-8619	2	Hyd.
209-076-227-1	4710-00-289-2781	1/4	.035	9	4730-00-555-8203	2	4730-00-289-8619	2	Hyd.
209-076-228-1	4710-00-289-2781	1/4	.035	14	4730-00-555-8203	2	4730-00-289-8619	2	Hyd.
209-076-229-1	4710-00-287-1841	3/8	.035	12	4730-00-554-7397	2	4730-00-554-7398	2	Hyd.
209-076-230-1	4710-00-287-1841	3/8	.035	16	4730-00-554-7397	2	4730-00-554-7399	2	Hyd.
209-076-231-1	4710-00-287-1841	3/8	.035	12	4730-00-534-7397	2	4730-00-554-7398	2	Hyd.
209-076-232-1	4710-00-142-3009	5/16	.035	8	4730-00-555-8012	2	4730-00-289-8620	2	Hyd.
209-076-234-1	4710-00-287-1841	3/8	.035	11	4730-00-554-7397	2	4730-00-564-7398	2	Hyd.
209-076-236-1	4710-00-289-2781	1/4	.035	17	4730-00-555-8203	2	4730-00-289-8619	2	Hyd.
209-076-236-1	4710-00-142-3010	1/2	.035	28	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-237-1	4710-00-289-2781	1/4	.035	14	4730-00-555-8203	2	4730-00-289-8619	2	Hyd.
209-076-238-1	4710-00-289-2781	1/4	.035	6	4730-00-555-8203	2	4730-00-289-8619	2	Hyd.
209-076-239-1	4710-00-289-2781	1/4	.035	8	4730-00-555-8203	2	4730-00-289-8619	2	Hyd.
209-076-240-1	4710-00-287-1841	3/8	.035	9	4730-00-554-7397	2	4730-00-554-7398	2	Hyd.
209-076-241-1	4710-00-289-2781	1/4	.035	36	4730-00-555-8203	2	4730-00-289-8619	2	Hyd.
209-076-242-1	4710-00-142-3009	5/16	.035	11	4730-00-555-8012	2	4730-00-289-8620	2	Hyd.
209-076-243-1	4710-00-289-2781	1/4	.035	11	4730-00-555-8203	2	4730-00-289-8619	2	Hyd.
209-076-244-1	4710-00-289-2781	1/4	.035	15	4730-00-555-8203	2	4730-00-289-8619	2	Hyd.
209-076-246-1	4710-00-142-3009	5/16	.035	13	4730-00-555-8012	2	4730-00-289-8620	2	Hyd.
209-076-246-1	4710-00-142-3009	5/16	.035	19	4730-00-555-8012	2	4730-00-289-8620	2	Hyd.

Table D-1 (Sheet 5 of 7)

Change 14 D-85

TUBE ASSY PART NO.	FABRICATE FROM NSN	STOCK DIM			END FITTING				SYS- TEM
		O.D.	W.T	L.	NUT NSN	QTY	SLEEVE NSN	QTY	
209-076-247-1	4710-00-289-2781	1/4	.035	22	4730-00-555-8203	2	4730-00-289-8619	2	Hyd.
209-076-248-1	4710-00-289-2781	1/4	.035	14	4730-00-555-8203	2	4730-00-289-8619	2	Hyd.
209-076-250-1	4710-00-142-3010	1/2	.035	48	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-251-1	4710-00-142-3010	1/2	.035	48	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-256-1	4710-00-142-3010	1/2	.035	18	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-258-1	4710-00-142-3010	1/2	.035	23	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-264-1	4710-00-289-2781	1/4	.035	15	4730-00-555-8203	2	4730-00-289-8619	2	Hyd.
209-076-265-1	4710-00-289-2781	1/4	.035	14	4730-00-555-8203	2	4730-00-289-8619	2	Hyd.
209-076-266-1	4710-00-289-2781	1/4	.035	25	4730-00-555-8203	2	4730-00-289-8619	2	Hyd.
209-076-267-1	4710-00-289-2781	1/4	.035	24	4730-00-555-8203	2	4730-00-289-8619	2	Hyd.
209-076-268-1	4710-00-287-1841	3/8	.035	29	4730-00-554-7397	2	4730-00-554-7398	2	Hyd.
209-076-269-1	4710-00-287-1841	3/8	.035	26	4730-00-554-7397	2	4730-00-554-7398	2	Hyd.
209-076-270-1	4710-00-287-1841	3/8	.035	18	4730-00-554-7397	2	4730-00-554-7398	2	Hyd.
209-076-271-1	4710-00-287-1841	3/8	.035	10	4730-00-554-7397	2	4730-00-554-8398	2	Hyd.
209-076-272-1	2710-00-287-1841	3/8	.035	19	4730-00-554-7397	2	4730-00-554-7399	2	Hyd.
209-076-273-1	4710-00-287-1841	3/8	.035	19	4730-00-554-7397	2	4730-00-554-7398	2	Hyd.
209-076-274-1	4710-00-287-1841	3/8	.035	9	4730-00-554-7397	2	4730-00-554-7398	2	Hyd.
209-076-276-1	4710-00-278-8726	3/8	.035	34	4730-00-142-2167	2	4730-00-278-6070	2	Hyd.
209-076-278-1	4710-00-289-2781	1/4	.035	23	4730-00-555-8203	2	4730-00-289-8619	2	Hyd.
209-076-279-1	4710-00-142-3009	5/16	.035	19	4730-00-555-8012	2	4730-00-289-8620	2	Hyd.
209-076-280-1	4710-00-142-3009	5/16	.035	16	4730-00-555-8012	2	4730-00-289-8620	2	Hyd.
209-076-285-1	4710-00-142-3010	1/2	.035	12	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-286-1	4710-00-142-3010	1/2	.035	29	4730-00-555-5059	2	4730-00-580-2120	2	Hyd.
209-076-291-1	4710-00-142-3010	1/2	.035	19	4730-00-555-0595	2	4730-00-581-2120	2	Hyd.
209-076-292-1	4710-00-278-6411	1/2	.058	6	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-295-1	4710-00-278-6411	1/2	.058	20	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-296-1	4710-00-278-6411	1/2	.058	12	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-297-1	4710-00-278-6411	1/2	.058	23	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-298-1	4710-00-289-2781	1/4	.035	13	4730-00-555-8203	2	4730-00-289-8619	2	Hyd.
209-076-299-1	4710-00-142-3010	1/2	.035	20	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.

Table D-1 (Sheet 6 of 7)

Change 14 D-86

TUBE ASSY PART NO.	FABRICATE FROM NSN	STOCK DIM			END FITTING				SYS- TEM
		O.D.	W.T	L.	NUT NSN	QTY	SLEEVE NSN	QTY	
209-076-300-1	4710-00-278-6411	1/2	.058	6	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-302-1	4710-00-142-3010	1/2	.035	12	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-303-1	4710-00-289-2786	1/2	.035	24	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-304-1	4710-00-289-2781	1/4	.035	24	4730-00-555-8203	2	4730-00-289-8619	2	Hyd.
209-076-305-1	4710-00-142-3009	5/16	.035	23	4730-00-555-8012	2	4730-00-289-8620	2	Hyd.
209-076-306-1	4710-00-289-2781	1/4	.035	9	4730-00-555-8203	2	4730-00-289-8619	2	Hyd.
209-076-307-1	4710-00-142-3009	5/16	.035	13	4730-00-555-8012	2	4730-00-289-8620	2	Hyd.
209-076-308-1	4710-00-142-3009	5/16	.035	19	4730-00-555-8012	2	4730-00-289-8620	2	Hyd.
209-076-309-1	4710-00-287-1841	3/8	.035	17	4730-00-142-2167	2	4730-00-278-6070	2	Hyd.
209-076-310-1	4710-00-142-3010	1/2	.035	46	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-312-1	4710-00-541-4949	1/2	.035	53	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-313-1	4710-00-142-3010	1/2	.035	54	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-314-1	4710-00-287-1841	3/8	.035	6	4730-00-142-2167	2	4730-00-278-6070	2	Hyd.
209-076-315-1	4710-00-287-1841	3/8	.035	17	4730-00-142 2167	2	4730-00-278-6070	2	Hyd.
209-076-316-1	4710-00-142-3010	1/2	.035	35	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-317-1	4710-00-287-1841	3/8	.035	21	4730-00-142-2167	2	4730-00-278-6070	2	Hyd.
209-076-318-1	4710-00-142-3010	1/2	.035	34	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-364-1	4710-00-287-1841	3/8	.035	29	4730-00-554-7397	2	4730-00-554-7398	2	Hyd.
209-076-366-1	4710-00-142-3010	1/2	.035	11	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-368-1	4710-00-287-1841	3/8	.035	33	4730-00-554-7397	2	4730-00-554-7398	2	Hyd.
209-076-370-1	4710-00-287-1841	3/8	.035	29	4730-00-554-7397	2	4730-00-554-7398	2	Hyd.
209-076-371-1	4710-00-142-3010	1/2	.035	17	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-381-1	4710-00-287-1841	3/8	.035	13	4730-00-554-7397	2	4730-00-554-7398	2	Hyd.
209-076-394-1	4710-00-287-1841	3/8	.035	13	4730-00-554-7397	2	4730-00-554-7398	2	Hyd.
209-076-395-1	4710-00-142-3010	1/2	.035	18	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-396-1	4710-00-287-1841	3/8	.035	28	4730-00-554-7397	2	4730-00-554-7398	2	Hyd.
209-076-397-1	4710-00-142-3010	1/2	.035	16	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-398-1	4710-00-142-3010	1/2	.035	23	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.
209-076-414-1	4710-00-142-3010	1/2	.035	18	4730-00-555-0595	2	4730-00-580-2120	2	Hyd.

Table D-1 (Sheet 7 of 7)

Change 14 D-87

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
204-040-215-19	1	2	15/16	0	90	Y - AN818-6D MS20819-6D
	2	4 1/2	15/16	0	90	
			10 3/16	III	III	N/A
204-040-215-27	1	2 7/8	15/16	0	90	Y - AN818-6D MS20819-6D
	2	7	15/16	90	22	
			10 3/8	III	III	N/A
204-040-733-1	1	1 1/8	1 3/4	0	60	Y - AN818-12D MS20819-12D
		6 19/32	I	I	100 PSI	
204-040-838-1	1	5 11/16	1 3/4	0	91	Y - AN818-12D MS20819-12D
	2	14 3/8	1 3/4	137	109	
		19 1/16	I	I	120 PSI	X - AN818-12D MS20819-12D
209-030-311-1	1	1 1/16	1	0	90	Y - AN818-6D MS20819-6D
		7 1/8	III	III	N/A	
209-030-312-1	1	1 1/4	1	0	90	Y - AN818-6D MS20819-6D
		6 7/8	III	III	N/A	
209-030-661-1	1	1 1/4	1	0	78	Y - AN818-6D MS20819-6D
	2	3 13/16	1	90	25	
	3	18 1/4	1	0	18	X - AN818-6D MS20819-6D
		22 3/8	III	III	N/A	

Table D-2 (Sheet 1 of 27)

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-030-662-1	1	2 1/8	1	0	85	Y - AN818-6D MS20819-6D X - AN818-6D MS20819-6D
	2	6 3/8	1	300	12	
		9 1/4	III	III	N/A	
209-030-663-1	1	1 1/7	1	0	107	Y - AN818-6D MS20819-6D X - N/A
	2	7 1/4	1	90	75	
	3	19 1/2	1	145	75	
	4	22 13/16	1	60	35	
	5	25 7/16	1	335	82	
		30 7/16	III	IV	N/A	
209-030-664-1	1	1 5/16	1	0	122	Y - AN818-6D MS20819-6D X - AN818-6D MS20819-6D
	2	4 15/16	1	180	34	
	3	7 1/2	1	70	85	
	4	11 5/16	1	150	25	
		19 5/16	III	III	N/A	
209-030-665-1	1	1 1/8	1	0	120	Y - AN818-6D MS20819-6D X - AN818-6D MS20819-6D
	2	4 1/2	1	130	35	
	3	6 1/2	1	0	35	
	4	8 3/8	1	275	90	
		II	III	III	N/A	
209-030-666-1	1	1 5/8	1	0	25	Y - AN818-6D MS20819-6D X - AN818-6D MS20819-6D
	2	3 5/8	1	175	28	
		12 5/16	III	III	N/A	
209-040-211-1	1	1 3/16	1 1/2	0	80	Y - AN818-10D MS20819-10D X - AN818-10D MS20819-10D
	2	8 5/16	1 1/2	178	76	
	3	25 1/2	1 1/2	198	88	
	4	32 7/16	1 1/2	18	88	
	5	42 1/2	1 1/2	193	30	
		44 7/8	I	I	N/A	
209-040-214-1	1	2 1/8	1 1/2	0	84	Y - AN818-10D MS20819-10D X - AN818-10D MS20819-10D
	2	9 3/8	1 1/2	180	82	
	3	24 13/16	1 1/2	180	90	
	4	30 3/4	1 1/2	0	40	
		34 1/8	I	I	N/A	
209-040-215-1	1	1 13/16	1 1/2	0	37	Y - AN818-10D MS20819-10D X - AN818-10D MS20819-10D
	2	4 7/16	1 1/2	180	13	
		5 15/16	I	I	N/A	
209-040-216-1	1	2 1/2	1	0	18	Y - AN818-6D MS20819-6D X - N/A
	2	4 1/2	1	180	15	
		8 1/8	III	III	N/A	
209-040-511-1	1	1 3/8	1	0	88	Y - AN818-6D MS20819-6D X - AN818-6D MS20819-6D
		5 1/8	III	III	N/A	

Table D-2 (Sheet 2 of 27)

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-060-223-1	1	30.75	3.0	0	81	Y - AN818-16D MS20819-16 X - AN818-16D MS20819-16
	2	24.69	3.0	190	89	
	3	13.87	30	60	14	
	4	8.87	3.0	260	43	
	5	3.94	3.0	80	40	
			31.81	1	1	
209-060-224-1	1	1	3	0	35	Y - AN818-16D MS20819-16D X - Scarf Dial Setting 191
	2	5	3	180	35	
	3	9 13/16	3	113	39	
	4	14 7/8	3	293	39	
			18 3/4	I	V	
209-060-410-1	1	1 1/4	9/16	0	87	Y - AN818-4 MS20819-4 X - AN818-4 MS20819-4
	2	12 3/16	9/16	122	77	
		13 15/16	I	I	100 PSI	
209-060-505-1	1	1 3/16	1	0	90	Y - AN818-6D MS20819-6D X - AN818-6D MS20819-6D
		3 15/16	III	III	N/A	
209-060-506-1	1	1 9/16	1	0	80	Y - AN818-6D MS20819-6D X - AN818-6D MS20819-6D
	2	7 5/8	1	255	100	
	3	18 7/8	1	190	75	
	4	22 1/8	1	92	25	
		26 5/8	III	III	N/A	
209-060-507-1	1	1 3/8	1	0	90	Y - AN818-6D MS20819-6D X - N/A
	2	7 3/4	1	270	11	
	3	16 3/8	1	180	80	
	4	19 1/8	1	250	80	
	5	22 1/4	1	80	82	
		26 1/2	III	IV	N/A	
209-060-537-1	1	2 1/16	1 1/2	0	35	Y - AN818-10D MS20819-10D X - AN818-10D MS20819-10D
	2	11 5/8	1 1/2	180	20	
		22 5/8	I	I	35 PSI	
209-060-541-1	1	2 9/16	1 1/2	0	88	Y - AN818-10D MS20819-10D X - AN818-10D MS20819-10D
	2	7 1/2	1 1/2	270	21	
	3	12	1 1/2	180	88	
	4	27 1/2	1 1/2	198	22	
		30 9/16	I	I	35 PSI	
209-060-544-1	1	1 3/4	9/16	0	90	Y - AN818-4D MS20819-4D X - AN818-4D MS20819-4D
	2	10 13/16	9/16	176	88	
	3	15 11/16	9/16	260	84	
	4	21 1/2	9/16	75	82	
	5	34 5/8	9/16	67	59	
	6	38 5/8	9/16	255	57	
		41 3/8	III	III	N/A	

Table D-2 (Sheet 3 of 27)

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-060-545-1	1	15/16	9/16	0	52	Y - AN818-4D MS20819-4D X - Scarf Dial Setting 335
	2	5 3/4	9/16	247	40	
		8 1/8	III	V	N/A	
209-060-558-1	1	1 3/16	1	0	86	Y - AN818-6D MS20819-6D
	2	4	1	180	16	
	3	13 1/4	1	180	75	X - AN818-6D MS20819-6D
	4	21	1	90	18	
	5	22 3/4	1	270	20	
	6	37 3/16	1	180	72	
		39 15/16	III	III	N/A	
209-060-559-1	1	1	1	0	109	Y - AN818-6D MS20819-6D
	2	5 3/8	1	262	75	
		8 1/8	III	III	N/A	X - AN818-6D MS20819-6D
209-060-560-1	1	1 3/4	1	0	25	Y - AN818-6D MS20819-6D
	2	3 5/8	1	172	23	
	3	7 3/4	1	82	75	X - AN818-6D MS20819-6D
	4	14 5/8	1	260	86	
	5	32	1	280	66	
		41 7/8	III	III	N/A	
209-060-567-1	1	1 1/4	1 1/2	0	129	Y - AN818-10D MS20819-10D
	2	10 5/8	1 1/2	0	47	
		18	I	I	35 PSI	X - AN818-10D MS20819-10D
209-060-568-1	1	1 13/16	1 3/4	0	132	Y - AN818-12D MS20819-12D
	2	13	1 3/4	0	45	
		20 1/16	I	I	35 PSI	X - AN818-12D MS20819-12D
209-060-571-1	1	1 3/8	1	0	87	Y - AN818-6D MS20819-6D
	2	4 3/4	1	270	43	
	3	7 1/2	1	220	46	X - AN818-6D MS20819-6D
		10 1/16	III	III	N/A	
209-060-572-1	1	1	1	0	89	Y - AN818-6D MS20819-6D
	2	4 13/16	1	180	89	
			7 5/8	III	III	N/A

Table D-2 (Sheet 4 of 27)

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-060-574-1	1	1 1/2	1 1/2	0	10	Y - AN818-10D MS20819-10D X - AN818-10D MS20819-10D
	2	4 3/4	1 1/2	180	10	
	3	7 13/16	1 1/2	90	36	
		10 5/16	I	I	35 PSI	
209-060-575-1	N/A	(STRAIGHT TUBE)				Y - AN818-12D MS20819-12D X - AN818-12D MS20819-12D
		4 3/16	I	I	35 PSI	
209-060-587-1	1	13/16	9/16	0	160	Y - AN818-4D MS20819-4D X - AN818-4D MS20819-4D
	2	5 5/16	9/16	53	58	
		7 11/16	III	III	100 PSI	
209-060-608-1	1	3 1/4	9/16	0	83	Y - AN818-4D MS20819-4D X - AN818-4D MS20819-4D
	2	11 3/8	9/16	180	70	
	3	15 1/2 18 9/16	9/16 III	40 III	70 N/A	
209-060-610-1	1	2	1 3/4	0	40	Y - AN818-12D MS20819-12D X - AN818-12D MS20819-12D
	2	7 5/8	1 3/4	175	40	
	3	20 11/16	1 3/4	200	27	
	4	24	1 3/4	115	90	
	5	38 1/2 54 3/8	1 3/4 I	50 I	90 N/A	
209-060-611-1	1	2 5/8	1 3/4	0	128	Y - AN818-12D MS20819-12D X - AN818-12D MS20819-12D
	2	10 3/4 16 1/4	1 3/4 I	140 I	46 N/A	

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PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-060-614-1	1	3 5/8	9/16	0	32	Y - AN818-4D MS20819-4D
	2	7 1/8	9/16	180	30	
			9 1/2	III	V	N/A
209-060-615-1	1	1 7/8	1	0	58	Y - AN818-6D MS20819-6D
	2	5 3/4	1	235	65	
	3	7 5/8	1	132	48	X - Scarf Dial Setting 312
			9 1/2	III	V	
209-060-616-1	1	1 1/16	9/16	0	90	Y - AN818-4 MS20819-4
	2	7 9/16	9/16	10	37	
	3	12	9/16	187	78	X - AN818-4 MS20819-4
			16 3/16	I	I	
209-060-617-1	1	1 11/16	1 1/2	0	40	Y - AN818-10 MS20819-10
	2	8 3/16	1 1/2	220	40	
			13 7/16	I	I	N/A
209-060-618-1	1	1 15/16	1 1/2	0	90	Y - AN818-10D MS20819-10D
	2	6 3/16	1 1/2	325	90	
			12 3/16	I	I	35 PSI
209-060-619-1	1	3	1 1/2	0	56	Y - AN818-10D MS20819-10D
	2	8 1/16	1 1/2	180	56	
			12 7/16	I	I	35 PSI
209-060-620-1	1	2 3/8	1 1/2	0	65	Y - AN818-10D MS20819-10D
	2	6 5/16	1 1/2	180	65	
	3	24 3/4	1 1/2	150	38	X - AN818-10D MS20819-10D
	4	28 5/8	1 1/2	150	49	
			31 1/4	I	I	
209-060-621-1	1	1 5/16	1	0	57	Y - AN818-6D MS20819-6D
	2	4 1/8	1	180	22	
	3	10 1/2	1	180	35	X - AN818-6D MS20819-6D
			12 3/16	III	III	

Table D-2 (Sheet 6 of 27)

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-060-622-1	1	1 7/16	1	0	90	Y - AN818-6D MS20819-6D X - N/A
	2	4 3/8	1	90	20	
	3	10 9/16	1	180	90	
	4	29 7/16	1	150	82	
	5	33 3/4	1	335	85	
			37 1/2	III	IV	
209-060-624-1	1	1 3/4	1 3/4	0	45	Y - AN818-6D MS20819-6D X - Scarf Dial Setting 90
	2	5 1/2	1 3/4	180	45	
		9 1/8	I	V	N/A	
209-060-625-1	1	2 1/2	1	0	90	Y - AN818-6D MS20819-6D X - N/A
	2	12 3/8	1	252	90	
	3	40	1	137	85	
	4	48 7/8	1	212	70	
	5	53 7/8	1	42	75	
			58 5/8	III	IV	
209-060-634-1	1	1 1/4	9/16	0	90	Y - AN818-4D MS20819-4D X - AN818-4D MS20819-4D
	2	7 3/8	9/16	90	50	
		10 3/4	III	III	N/A	
209-060-635-1	1	7/8	9/16	0	34	Y - AN818-4D MS20819-4D X - AN818-4D MS20819-4D
	2	7 11/16	9/16	163	40	
		10 1/16	III	III	N/A	
209-060-636-1	1	1 3/16	9/16	0	170	Y - AN818-4D MS20819-4D X - AN818-4D MS20819-4D
	2	7 1/2	9/16	325	42	
		9 3/8	III	III	100 PSI	
209-060-637-1	1	1 3/16	9/16	0	140	Y - AN818-4D MS20819-4D X - AN818-4D MS20819-4D
	2	5 7/16	9/16	30	27	
	3	7 1/16	9/16	135	67	
		9 7/8	III	III	100 PSI	
206-060-638-1	1	3 3/4	3	0	58	Y - N/A X - N/A
	2	13 3/16	3	305	33	
	3	20 5/8	3	85	41	
	4	28 1/8	3	310	42	
	5	37 5/8	3	125	35	
			40 3/4	II	II	

Table D-2 (Sheet 7 of 27)

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-060-639-1	1	1 1/8	9/16	0	110	Y - AN818-4D MS20819-4D
	2	3 3/8	9/16	0	70	
			6	III	III	100 PSI
209-060-640-1	1	1 3/16	9/16	0	115	Y - AN818-4D MS20819-4D
	2	3 3/8	9/16	0	65	
			6	III	III	100 PSI
209-060-643-1	1	1 1/16	1 1/2	0	87	Y - AN818-10D MS20819-10D
	2	5 1/4	1 1/2	122	82	
	3	9 3/8	1 1/2	212	63	X - AN818-10D MS20819-10D
			12 1/8	I	V	
209-060-646-1	1	6 5/16	1 3/4	0	89	Y - AN818-12D MS20819-12D
	2	14 7/8	1 3/4	88	32	
	3	19 1/6	1 3/4	270	32	X - AN818-12D MS20819-12D
			23 11/16	I	I	
209-060-647-1	1	4 5/8	1 1/2	0	27	Y - AN818-10D MS20819-10D
	2	7 5/8	1 1/2	270	90	
			20 1/16	I	I	35 PSI
209-060-648-1	1	4 5/16	1 3/4	0	83	Y - AN818-12D MS20819-12D
	2	12 1/4	1 3/4	83	17	
			14 13/16	I	I	N/A
209-060-649-1	1	2 1/16	1 3/4	0	81	Y - AN818-12D MS20819-12D
	2	8 11/16	1 3/4	180	81	
	3	19 3/8	1 3/4	40	34	
	4	23 15/16	1 3/4	172	52	X - AN818-12D MS20819-12D
			27 1/8	I	I	
209-060-680-1	1	9	1/2	0	54 1/2	Y - AN818-12D MS20819-12D
	2	3 3/8	1/2	180	54 1/2	
			11 1/2	2	5	N/A
209-070-401-1	1	4 3/8	3	0	80	Y - N/A
	2	11 3/4	3	0	3	
	3	18	3	263	78	X - N/A
	4	25 1/8	3	73	8	
			29 1/4	II	II	
209-070-447-1	1	23 3/8	3	0	20	Y - N/A
	2	26 5/8	3	180	20	X - N/A
			29 3/16	II	II	N/A

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PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-070-450-1	1	2 1/4	3	0	93	Y - AN818-16D MS20819-16D X - N/A
	2	8 13/16	3	180	8	
		11 3/16	I	II	N/A	
209-070-487-1	1	2	3	0	86	Y - N/A X - N/A
	2	8 1/2	3	90	93	
		14 1/2	II	II	N/A	
209-070-489-1	1	1 5/8	1	0	86	Y - AN818-6D MS20819-6D X - AN818-6D MS20819-6D
	2	12	1	180	86	
		28 13/16	III	III	150 PSI	
209-070-497-1	1	1 3/4	3	0	7	Y - N/A X - N/A
		14 3/16	II	II	N/A	
209-070-525-1	1	1 1/4	3	0	85	Y - N/A X - N/A
	2	10 3/8	3	92	49	
		23 3/8	II	II	N/A	
209-070-527-1	1	3 3/4	3	0	16	Y - AN818-16D MS20819-16D X - N/A
	2	6 3/16	3	180	18	
	3	27 15/16	3	175	22	
	4	33 1/4	3	355	22	
		40 1/2	II	I	N/A	

Table D-2 (Sheet 9 of 27)

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-070-543-1	N/A	(STRAIGHT TUBE)				Y - N/A
		8 13/16	II	II	N/A	X - N/A
209-070-565-1	1	1 3/4	9/16	0	48	Y - AN818-4D MS20819-4D
	2	5 7/8 7 15/16	9/16 III	200 III	25 150 PSI	X - AN818-4D MS20819-4D
209-076-118-1	1	3 1/2	1	0	67	Y - MS21921-6D
	2	12 9/16	1	182	68	MS21922-6
		15 13/16	IV	IV	3000 PSI	X - MS21921-6D MS21922-6
209-076-119-1	1	1 1/2	1	0	117	Y - AN818-6D
	2	4 5/8	1	180	26	MS20819-6D
	3	11 1/4 16 1/4	1 IV	270 III	16 1500 PSI	X - MS21921-6D MS21922-6
209-076-137-1	1	10.50	1 1/4	0	64	Y - MS21921-8D MS21922-8
	2	23.44	1 1/4	180	58	X - MS21921-8D MS21922-8
		38.69	IV	IV	3000 psi	
209-076-138-1	1	1.47	1 1/4	0	45	Y - MS21921-8D MS21922-8
	2	4.15	1 1/4	37	54	X - MS21921-8D MS21922-8
		8.03	IV	IV	3000 psi	
209-076-139-1	1	3.94	1 1/4	0	88	Y - MS21921-8D MS21922-8
	2	13.12	1 1/4	180	90	X - MS21921-8D MS21922-8
		18.0	IV	IV	3000 psi	
209-076-140-1	1	2.25	1 1/4	0	44	Y - MS21921-8D MS21922-8
	2	4.87	1 1/4	158 1/2	43 1/2	X - MS21921-8D MS21922-8
	3	13.25	1 1/4	243 1/2	105	
		16.81	IV	IV	3000 psi	
209-076-141-1	1	2.56	1 1/4	0	87	Y - MS21921-8D MS21922-8
	2	5.56	1 1/4	183 1/2	87	X - MS21921-8D
		11.56	IV	IV	3000 psi	MS21922-8

Table D-2 (Sheet 10 of 27)

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-076-142-1	1	1.31	0.56	0	91	Y - MS21921-4D MS21922-4 X - MS21921-4D MS21922-4
	2	3.62	0.56	102 1/2	46	
	3	4.81	0.56	287	46	
	4	7.0	0.56	208	21	
	5	9.06	0.56	214	161	
		11.81	IV	IV	3000 psi	
209-076-143-1	1	2.25	1 1/4	0	1	Y - MS21921-8D MS21922-8 X - MS21921-8D MS21922-8
	2	5.60	1 1/4	273 1/2	5	
	3	12.94	1 1/4	178	73	
	4	16.12	1 1/2	92 1/2	10	
		18.5	IV	IV	3000 psi	
209-076-144-1	1	1.06	0.56	0	56	Y - MS21921-4D MS21922-4 X - MS21921-4D MS21922-4
	2	3.0	0.56	276	17	
	3	9.87	0.56	356	121	
		12.75	IV	IV	3000 psi	
209-076-145-1	1	1.63	1.0	0	87	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	4.81	1.0	271	83	
	3	7.81	1.0	91 1/2	49	
	4	13.56	1.0	84 1/2	51	
	5	17.31	1.0	191	54	
	6	19.5	1.0	355	48	
		21.25	IV	IV	3000 psi	
209-076-146-1	1	1.66	1.0	0	41	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	4.13	1.0	177	39	
	3	8.57	1.0	134	17	
	4	9.94	1.0	302	40	
	5	12.19	1.0	110 1/2	22	
	6	24.19	1.0	32	86	
	7	33.50	1.0	291 1/2	46	
	8	36.18	1.0	206	52	
	9	38.44	1.0	27	65	
		40.69	IV	IV	3000 psi	
209-076-147-1	1	.94	1.0	0	55	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	3.19	1.0	179 1/2	51	
	3	5.81	1.0	279	46	
	4	9.06	1.0	16 1/2	91	
	5	13.87	1.0	228	44	
	6	15.81	1.0	50	40	
		22.75	IV	IV	3000 psi	

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PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-076-148-1	1	2.5	1.0	0	60	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	4.56	1.0	102	57	
	3	10.62	1.0	316	85	
	4	18.56	1.0	224 1/2	11	
	5	20.69	1.0	42	30	
	6	22.87	1.0	225	28	
		25.31	IV	IV	3000 psi	
209-076-149-1	1	2.19	1.0	0	32 1/2	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	4.94	1.0	197	38	
		8.88	IV	IV		
209-076-150-1	1	2.68	1.0	0	35	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	5.12	1.0	166 1/2	43	
		8.62	IV	IV	3000 psi	
209-076-151-1	1	1.87	1.0	0	43 1/2	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	4.81	1.0	192	46	
		9.25	IV	IV	3000 psi	
209-076-152-1	1	1.63	1.0	0	36	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	5.44	1.0	170	35	
		8.94	IV	IV	3000 psi	
209-076-153-1	1	1.25	1.0	0	67	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	5.06	1.0	182	60	
	3	11.31	1.0	213	69	
	4	15.94	1.0	42	68	
		18.56	IV	IV	3000 psi	

Table D-2 (Sheet 12 of 27)

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-076-154-1	1	.87	1.0	0	72	Y - MS21921-6D MS21922-6 MS21921-6D MS21922-6
	2	3.75	1.0	184	67	
	3	12.19	1.0	165	36	
	4	14.25	1.0	348	30	
			15.75	IV	IV	
209-076-155-1	1	.87	1.0	0	77	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	3.87	1.0	178 1/2	68	
	3	12.37	1.0	211	34 1/2	
	4	14.43	1.0	35	28	
			16.12	IV	IV	
209-076-156-1	1	1.32	1.0	0	73	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	4.88	1.0	173	65	
	3	11.13	1.0	157	67	
	4	15.88	1.0	329 1/2	62 1/2	
			18.44	IV	IV	
209-076-202-1	1	1 9/16	1 1/4	0	114	Y - MS21921-8D MS21922-8 X - MS21921-8D MS21922-8
	2	7 11/16	1 1/4	184	23	
	3	14 7/16	1 1/4	94	26	
	4	17 1/4	1 1/4	271	39	
				IV	IV	

Table D-2 (Sheet 13 of 27)

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-076-205-1	1	1	1 1/4	0	112	Y - MS21921-8D MS21922-8 X - MS21921-8D MS21922-8
	2	5 3/8	1 1/4	180	26	
	3	8 3/4	1 1/4	90	120	
		13 7/8	IV	IV	3000 PSI	
209-076-207-1	1	1 1/2	1 1/4	0	113	Y - MS21921-8D MS21922-8 X - MS21921-8D MS21922-8
	2	7 9/16	1 1/4	180	23	
	3	14 1/8	1 1/4	270	27	
	4	17	1 1/4	92	36	
		19 13/16	IV	IV	3000 PSI	
209-076-208-1	1	1 1/2	1	0	104	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	6 13/16	1	166	101	
	3	12 1/2	1	270	85	
		15	IV	IV	3000 PSI	
209-076-209-1	1	1 5/8	3	0	99	Y - MS21921-16D MS21922-16 X - MS21921-16D MS21922-16
		9 9/16	IV	IV	500 PSI	
209-076-211-1	1	4 1/8	1 1/4	0	63	Y - MS21921-8D MS21922-8 X - MS21921-8D MS21922-8
	2	10 11/16	1 1/4	3	59	
	3	14 15/16	1 1/4	183	56	
	4	23 5/16	1 1/4	277	40	
	5	26 7/16	1 1/4	102	37	
		33 3/8	IV	IV	3000 PSI	

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PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-076-212-1	1	1 1/8	1 1/4	0	88	Y - MS21921-8D MS21922-8
	2	5 11/16	1 1/4	180	90	
	3	21 1/4	1 1/4	183	70	X - MS21921-8D MS21921-8
	4	33 1/2	1 1/4	3	64	
		49 1/16	IV	IV	3000 PSI	
209-076-213-1	1	1 3/4	1	0	49	Y - MS21921-6D MS21922-6
	2	7 3/8	1	177	55	
		11 7/16	IV	IV	3000 PSI	X - MS21921-6D MS21922-6
209-076-214-1	1	4 13/16	1 1/4	0	71	Y - MS21921-8D MS21922-8
	2	23 1/8	1 1/4	328	23	
	3	27 5/8	1 1/4	148	29	X - MS21921-8D MS21922-8
		37 3/16	IV	IV	3000 PSI	
209-076-215-1	1	6 11/16	1 1/4	0	25	Y - MS21921-8D MS21922-8
	2	10 5/8	1 1/4	190	23	
	3	23 15/16	1 1/4	325	16	X - MS21921-8D MS21922-8
		27 13/16	IV	IV	3000 PSI	
209-076-216-1	1	4 7/8	1	0	61	Y - MS21921-6D MS21922-6
	2	18 5/8	1	300	50	
		20 3/4	IV	IV	3000 PSI	X - MS21921-6D MS21922-6
209-076-217-1	1	1 1/8	1	0	86	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
		12 1/2	IV	IV	3000 PSI	
209-076-219-1	1	4 1/4	1 1/4	0	89	Y - MS21921-8D MS21922-8 X - MS21921-8D MS21922-8
		15 7/16	IV	IV		
209-076-220-1	1	3 1/2	1 1/4	0	22	Y - MS21921-8D MS21922-8
	2	9 3/8	1 1/4	91	33	
	3	11 3/8	1 1/4	271	29	X - MS21921-8D MS21922-8
	4	16	1 1/4	274	93	
		26 1/16	IV	IV	3000 PSI	

Table D-2 (Sheet 15 of 27)

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-076-221-1	1	4 3/16	9/16	0	87	Y - MS21921-4D MS21922-4
	2	6 1/4	9 1/16	270	32	
		9 9/16	IV	IV	3000 PSI	X - MS21921-4D MS21922-4
209-076-222-1	1	1	1	0	165	Y - MS21921-6D MS21922-6
	2	7 9/16	1	235	26	
	3	23 5/8	1	304	90	
	4	27	1	214	13	X - MS21921-6D MS21922-6
	5	29 1/2	1	34	13	
		31 3/4	IV	IV	3000 PSI	
209-076-223-1	1	1 3/16	1	0	176	Y - MS21921-6D MS21922-6
	2	5 13/16	1	296	10	
	3	11 1/16	1	296	25	
	4	12 7/16	1	116	50	X - MS21921-6D MS21922-6
	5	14	1	296	25	
	6	19 3/8	1	26	89	
	7	22 5/8	1	26	92	
		25 5/16	IV	IV	3000 PSI	
209-076-224-1	1	1 1/16	9/16	0	56	Y - MS21921-4D MS21922-4
	2	6 1/16	9/16	187	56	
		18 15/16	IV	IV	3000 PSI	X - MS21921-4D MS21922-4
209-076-225-1	N/A	(STRAIGHT TUBE)				Y - MS21921-5D MS21922-5 X - MS21921-5D MS21922-5
		12 3/16	IV	IV	3000 PSI	
209-076-226-1	1	2 3/16	9/16	0	72	Y - MS21921-4D MS21922-4
	2	4 1/8	9/16	185	54	
		6 5/8	IV	IV	3000 PSI	X - MS21921-4D MS21922-4
209-076-227-1	1	15/16	9/16	0	149	Y - MS21921-4D MS21922-4
	2	4 5/8	9/16	80	93	
		6 3/4	IV	IV	3000 PSI	X - MS21921-4D MS21922-4
209-076-228-1	1	1	9/16	0	125	Y - MS21921-4D MS21922-4
	2	6	9/16	181	32	
	3	8 5/16	9/16	353	75	X - MS21921-4D MS21922-4
		11 3/16	IV	IV	3000 PSI	

Table D-2 (Sheet 16 of 27)

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-076-229-1	1	1 1/4	1	0	98	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	4 1/16	1	270	36	
	3	6 1/8	1	193	97	
		9 1/8	IV	IV	3000 PSI	
209-076-230-1	1	1 1/8	1	0	93	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	6 5/8	1	355	48	
	3	9 9/16	1	149	60	
		13 3/16	IV	IV	3000 PSI	
209-076-231-1	1	2 5/8	1	0	162	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	6 5/8	1	170	72	
		9 1/8	IV	IV	3000 PSI	
209-076-232-1	1	1 1/8	1	0	30	Y - MS21921-5D MS21922-5 X - MS21921-5D MS21922-5
	2	2 7/8	1	90	90	
		15 15/16	IV	IV	3000 PSI	
209-076-234-1	1	2 5/16	1	0	90	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
		8 15/16	IV	IV	3000 PSI	
209-076-235-1	1	5 1/8	9/16	0	90	Y - MS21921-4D MS21922-4 X - MS21921-4D MS21922-4
		14 1/8	IV	IV	3000 PSI	
209-076-236-1	1	1 1/4	1 1/4	0	87	Y - MS21921-8D MS21922-8 X - MS21921-8D MS21922-8
	2	7 3/4	1 1/4	2	84	
	3	16 7/8	1 1/4	267	8	
	4	21 5/8	1 1/4	190	83	
		25 7/8	IV	IV	3000 PSI	
209-076-237-1	1	2 3/16	9/16	0	90	Y - MS21921-4D MS21922-4 X - MS21921-4D MS21922-4
	2	8 1/16	9/16	270	7	
		11 3/8	IV	IV	3000 PSI	

Table D-2 (Sheet 17 of 27)

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-076-238-1	1	1 7/16	9/16	0	88	Y - MS21921-4D MS21922-4
	2	3 1/16	9/16	90	37	
		5 5/16	IV	IV	3000 PSI	X - MS21921-4D MS21922-4
209-076-239-1	1	2 1/8	9/16	0	88	Y - MS21921-4D MS21922-4
	2	3 15/16	9/16	92	16	
		5 7/8	IV	IV	3000 PSI	X - MS21921-4D MS21922-4
209-076-240-1	1	1 7/16	1	0	112	Y - MS21921-6D MS21922-6
	2	4 7/16	1	177	23	
		6 11/16	IV	IV	3000 PSI	X - MS21921-6D MS21922-6
209-076-241-1	1	1 7/16	9/16	0	89	Y - MS21921-4D MS21922-4
	2	14 3/4	9/16	0	87	
	3	28 5/8	9/16	180	82	X - MS21921-4D MS21922-4
		33 5/8	IV	IV	3000 PSI	
209-076-242-1	1	1 1/2	3/4	0	90	Y - MS21921-5D MS21922-5
	2	5 11/16	3/4	0	90	
		8 1/4	IV	IV	3000 PSI	X - MS21921-5D MS21922-5
209-076-243-1	1	1 1/2	9/16	0	104	Y - MS21921-4D MS21922-4
	2	6 3/8	9/16	0	52	
		9	IV	IV	3000 PSI	X - MS21921-4D MS21922-4
209-076-244-1	1	1 3/4	9/16	0	85	Y - MS21921-4D MS21922-4
	2	7 1/4	9/16	0	24	
	3	9 3/4	9/16	268	70	X - MS21921-4D MS21922-4
		12 3/4	IV	IV	3000 PSI	
209-076-245-1	1	1 1/8	3/4	0	105	Y - MS21921-5D MS21922-5
	2	7 3/8	3/4	270	61	
		10 13/16	IV	IV	3000 PSI	X - MS21921-5D MS21922-5

Table D-2 (Sheet 18 of 27)

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-076-246-1	1	1	3/4	0	119	Y - MS21921-5D MS21922-5
	2	3 7/8	3/4	193	34	
	3	10 5/8	3/4	183	82	X - MS21921-5D MS21922-5
	4	12 7/8	3/4	345	90	
		16 5/8	IV	IV	3000 PSI	
209-076-247-1	1	15/16	9/16	0	120	Y - MS21921-4D MS21922-4
	2	3 7/16	9/16	180	28	
	3	8 3/4	9/16	90	67	X - MS21921-4D MS21922-4
	4	14 15/16	9/16	173	38	
	5	17 1/4	9/16	283	67	
		19 3/8	IV	IV	3000 PSI	
209-076-248-1	1	1 1/4	9/16	0	87	Y - MS21921-4D MS21922-4
	2	3 1/16	9/16	90	91	
	3	7 3/8	9/16	92	92	X - MS21921-4D MS21922-4
	4	9 7/16	9/16	3	89	
		11 9/16	IV	IV	3000 PSI	
209-076-250-1	1	1 3/4	1 1/4	0	53	Y - MS21921-8D MS21922-8
	2	28 5/8	1 1/4	90	88	
	3	33 15/16	1 1/4	92	33	X - MS21921-8D MS21922-8
	4	35 7/8	1 1/4	3	89	
		45 3/8	IV	IV	3000 PSI	
209-076-251-1	1	1 1/2	1 1/4	0	50	Y - MS21921-8D MS21922-8
	2	27	1 1/4	2	92	
	3	31 15/16	1 1/4	92	34	X - MS21921-8D MS21922-8
	4	34 7/16	1 1/4	182	94	
		45 13/16	IV	IV	3000 PSI	
209-076-256-1	1	3	1 1/4	0	15	Y - MS21921-8D MS21922-8
	2	5 5/16	1 1/4	80	90	
	3	10 1/16	1 1/4	80	10	X - MS21921-8D MS21922-8
	4	12	1 1/4	160	70	
		15 5/8	IV	IV	3000 PSI	
209-076-258-1	1	2 1/8	1 1/4	0	10	Y - MS21921-8D MS21922-8
	2	4 1/8	1 1/4	90	90	
	3	13 3/8	1 1/4	160	15	X - MS21921-8D MS21922-8
	4	15 5/8	1 1/4	65	90	
		20 3/4	IV	IV	3000 PSI	

Table D-2 (Sheet 19 of 27)

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-076-264-1	1	1	9/16	0	89	Y - MS21921-4D MS21922-4 X - MS21921-4D MS21922-4
	2	10 1/8	9/16	123	5	
		12 7/16	IV	IV	3000 PSI	
209-076-265-1	1	1	9/16	0	69	Y - MS21921-4D MS21922-4 X - MS21921-4D MS21922-4
	2	9 1/8	9/16	0	22	
		11 3/8	IV	IV	3000 PSI	
209-076-266-1	1	2 1/4	9/16	0	92	Y - MS21921-4D MS21922-4 X - MS21921-4D MS21922-4
	2	5 1/16	9/16	90	10	
	3	9 11/16	9/16	270	50	
	4	11 9/16	9/16	90	37	
	5	17 9/16	9/16	267	14	
	6	20 7/16	9/16	358	90	
		22 3/16	IV	IV	3000 PSI	
209-076-267-1	1	1	9/16	0	110	Y - MS21921-4D MS21922-4 X - MS21921-4D MS21922-4
	2	4 5/16	9/14	165	23	
	3	11 9/16	9/16	264	21	
	4	13 1/4	9/16	77	39	
	5	18 15/16	9/16	352	87	
		21 1/8	IV	IV	3000 PSI	
209-076-268-1	1	3	1	0	60	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	6 1/4	1	288	65	
	3	21 1/16	1	346	94	
		26 1/8	IV	IV	3000 PSI	
209-076-269-1	1	2	1	0	90	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	7 1/2	1	272	30	
	3	17 13/16	1	272	6	
	4	20 1/4	1	2	90	
		24	IV	IV	3000 PSI	
209-076-270-1	1	1 11/16	1	0	76	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	12 3/16	1	310	23	
		15 5/16	IV	IV	3000 PSI	

Table D-2 (Sheet 20 of 27)

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-076-271-1	1	1 5/16	1	0	177	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
		7 5/16	IV	IV	3000 PSI	
209-076-272-1	1	1 3/16	1	0	178	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	6 7/8	1	95	4	
	3	13 1/2	1	185	115	
		16 7/8	IV	IV	3000 PSI	
209-076-273-1	1	1	1	0	105	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	13 3/4	1	180	104	
		16 3/4	IV	IV	3000 PSI	
209-076-274-1	1	2 3/8	1	0	108	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
		6 7/16	IV	IV	3000 PSI	
209-076-276-1	1	1 13/16	1	0	84	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	5 3/4	1	266	32	
	3	8	1	182	83	
	4	15 1/4	1	171	41	
	5	17 1/4	1	351	41	
	6	20 1/8	1	261	87	
	7	26 5/8	1	344	6	
		31 1/8	III	III	1500 PSI	
209-076-278-1	1	2 13/16	9/16	0	93	Y - MS21921-4D MS21922-4 X - MS21921-4D MS21922-4
	2	10 1/8	9/16	90	52	
		20 5/8	IV	IV	3000 PSI	
209-076-279-1	1	1 3/4	3/4	0	90	Y - MS21921-5D MS21922-5 X - MS21921-5D MS21922-5
	2	4 5/8	3/4	83	30	
		17 5/16	IV	IV	3000 PSI	

Table D-2 (Sheet 21 of 27)

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-076-280-1	1	1 1/16	3/4	0	127	Y - MS21921-5D MS21922-5 X - MS21921-5D MS21922-5
	2	8 3/8	3/4	8	51	
		13 15/16	IV	IV	3000 PSI	
209-076-285-1	1	1 1/2	1 1/4	0	114	Y - MS21921-8D MS21922-8 X - MS21921-8D MS21922-8
	2	7 11/16	1 1/4	223	34	
		9 13/16	IV	IV	3000 PSI	
209-076-286-1	1	3 1/16	1 1/4	0	28	Y - MS21921-8D MS21922-8 X - MS21921-8D MS21922-8
	2	5 3/4	1 1/4	90	90	
	3	10	1 1/4	180	57	
	4	14 1/4	1 1/4	2	57	
	5	22 1/2	1 1/4	326	13	
		26 7/16	IV	IV	3000 PSI	

Table D-2 (Sheet 22 of 27)

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-076-291-1	1	3 1/4	1 1/4	0	29	Y - MS21921-8D MS21922-8
	2	6 1/8	1 1/4	75	90	
	3	9 1/2	1 1/4	160	57	X - MS21921-8D MS21922-8
	4	13 13/16	1 1/4	335	55	
		16 3/16	IV	IV	3000 PSI	
209-076-292-1	1	1 1/2	1 1/4	0	12	Y - MS21921-8D MS21922-8 X - MS21921-8D MS21922-8
		4	IV	IV	6000 PSI	
209-076-295-1	1	1 3/8	1 1/4	0	95	Y - MS21921-8D MS21922-8
	2	11 1/2	1 1/4	270	90	
			17 7/16	IV	IV	6000 PSI
209-076-296-1	1	1 1/2	1 1/4	0	114	Y - MS21921-8D MS21922-8
	2	7 11/16	1 1/4	223	34	
			9 13/16	IV	IV	6000 PSI
209-076-297-1	1	1 3/8	1 1/4	0	10	Y - MS21921-8D MS21922-8
	2	4 1/4	1 1/4	90	90	
	3	13 3/8	1 1/4	160	15	X - MS21921-8D MS21922-8
	4	15 5/8	1 1/4	65	90	
			20 7/8	IV	IV	

Table D-2 (Sheet 23 of 27)

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-076-298-1	1	1 5/8	9/16	0	90	Y - MS21921-4D MS21922-4 X - MS21921-4D MS21922-4
	2	8	9/16	0	90	
		10 3/4	IV	IV	3000 PSI	
209-076-299-1	1	1 3/8	1 1/4	0	89	Y - MS21921-8D MS21922-8 X - MS21921-8D MS21922-8
	2	11 1/2	1 1/4	90	95	
		17 5/8	IV	IV	3000 PSI	
209-076-300-1	1	1 1/4 3 15/16	1 1/4	0	15	Y - MS21921-8D MS21922-8 X - MS21921-8D MS21922-8
209-076-302-1	1	1 1/8	1 1/4	0	115	Y - MS21921-8D MS21922-8 X - MS21921-8D MS21922-8
	2	6 3/8	1 1/4	120	40	
		9 3/4	IV	I	3000 PSI	
209-076-303-1	1	2	1 1/4	0	16	Y - MS21921-8D MS21922-8 X - MS21921-8D MS21922-8
	2	4 3/8	1 1/4	270	90	
	3	14 1/4	1 1/4	180	5	
	4	16 1/16	1 1/4	270	90	
		21 3/16	IV	IV	3000 PSI	
209-076-304-1	1	2 3/16	9/16	0	86	Y - MS21921-4D MS21922-4 X - MS21921-4D MS21922-4
		21 1/16	IV	IV	3000 PSI	
209-076-305-1	1	2	3/4	0	88	Y - MS21921-5D MS21922-5 X - MS21921-5D MS21922-5
		21	IV	IV	3000 PSI	
209-076-306-1	1	2 1/4	9/16	0	10	Y - MS21921-4D MS21922-4 X - MS21921-4D MS21922-4
	2	3 3/4	9/16	270	90	
		6 1/2	IV	IV	3000 PSI	
209-076-307-1	1	2 1/16	3/4	0	90	Y - MS21921-5D MS21922-5 X - MS21921-5D MS21922-5
	2	5 1/4	3/4	73	50	
	3	8 7/8	3/4	118	52	
		10 3/8	IV	IV	3000 PSI	

Table D-2 (Sheet 24 of 27)

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-076-308-1	1	2 1/8	3/4	0	26	Y - MS21921-5D MS21922-5
	2	7 1/4	3/4	180	26	
			16 3/16	IV	IV	3000 PSI
209-076-309-1	1	1	1	0	45	Y - MS21921-6D MS21922-6
	2	3 1/2	1	105	43	
	3	12 1/2	1	255	64	X - MS21921-6D MS21922-6
			15	IV	IV	
209-076-310-1	1	2 1/2	1 1/4	0	50	Y - MS21921-8D MS21922-8
	2	7 3/8	1 1/4	224	42	
	3	28 5/8	1 1/4	51	40	X - MS21921-8D MS21922-8
	4	37 7/8	1 1/4	317	22	
	5	39 3/4	1 1/4	127	20	
	6	41 5/8	1 1/4	217	46	
			43 7/8	IV	IV	
209-076-312-1	1	4 3/8	1 1/4	0	34	Y - MS21921-8D MS21922-8
	2	14 5/8	1 1/4	295	73	
	3	35 3/16	1 1/4	320	43	X - MS21921-8D MS21922-8
	4	43 11/16	1 1/4	240	24	
	5	45 1/2	1 1/4	52	28	
	6	48 7/16	1 1/4	142	42	
			51 1/2	IV	IV	
209-076-313-1	1	4 3/8	1 1/4	0	34	Y - MS21921-8D MS21922-8
	2	14 5/8	1 1/4	295	73	
	3	35 3/16	1 1/4	320	43	X - MS21921-8D MS21922-8
	4	43 11/16	1 1/4	240	24	
	5	45 1/2	1 1/4	52	28	
	6	48 7/16	1 1/4	142	42	
		51 1/2	IV	IV	3000 PSI	
209-076-314-1	N/A	(STRAIGHT TUBE) 3 5/8	IV	IV	3000 PSI	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
209-076-315	1	1 3/8	1	0	25	Y - MS21921-6D MS21922-6
	2	3 5/8	1	110	41	
	3	11 7/8	1	270	63	X - MS21921-6D MS21922-6
			14 1/8	IV	IV	

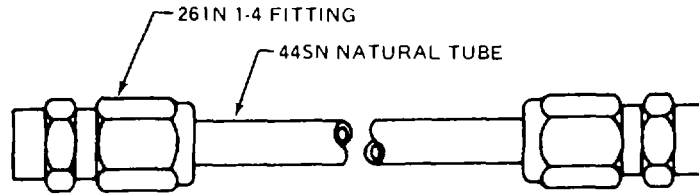
Table D-2 (Sheet 25 of 27)

PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-076-316-1	1	4	1 1/4	0	63	Y - MS21921-8D MS21922-8
	2	10 5/8	1 1/4	3	60	
	3	14 3/4	1 1/4	183	56	X - MS21921-8D MS21922-8
	4	23	1 1/4	273	36	
	5	26 1/2	1 1/4	113	39	
		32 1/4	IV	IV	3000 PSI	
209-076-317-1	1	1 3/4	1	0	102	Y - MS21921-6D MS21922-6
	2	7	1	100	51	
	3	12 7/8	1	0	28	X - MS21921-6D MS21922-6
	4	15 5/16	1	90	34	
		19	IV	IV	3000 PSI	
209-076-318-1	1	1	1 1/4	0	102	Y - MS21921-8D MS21922-8
	2	8 1/2	1 1/4	185	14	
	3	19 3/8	1 1/4	346	80	X - MS21921-8D MS21922-8
	4	24 1/4	1 1/4	171	80	
		31 1/4	IV	IV	3000 PSI	
209-076-364-1	1	1	1	0	130	Y - MS21921-6D MS21922-6
	2	10	1	95	71	
	3	13 7/8	1	207	88	X - MS21921-6D MS21922-6
	4	17 15/16	1	35	82	
	5	23 1/2	1	35	94	
		26 5/16	IV	IV	3000 PSI	
209-076-366-1	1	7/8	1 1/4	0	89	Y - MS21921-8D MS21922-8
	2	6 1/2	1 1/4	40	47	
		9	IV	IV	3000 PSI	X - MS21921-8D MS21922-8
209-076-368-1	1	1	1	0	155	Y - MS21921-6D MS21922-6
	2	5 7/8	1	280	17	
	3	12 5/8	1	15	39	X - MS21921-6D MS21922-6
	4	14 3/4	1	290	87	
	5	21 13/16	1	195	64	
	6	26 15/16	1	10	63	
		30 1/4	IV	IV	3000 PSI	

Table D-2 (Sheet 26 of 27)

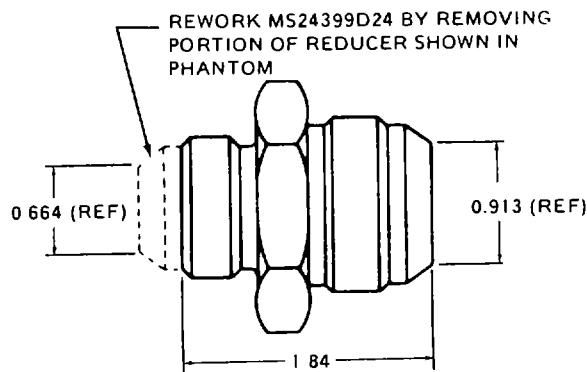
PART NUMBER	BEND NO.	DIMENSION "A" FROM "Y" END	BEND RADIUS	DIAL SETTING	BEND ANGLE	END FITTING AND NOTES
		DIMENSION "B"	TYPE END "Y"	TYPE END "X"	PRESSURE TEST	
209-076-370-1	1	1	1	0	107	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	7 3/8	1	243	42	
	3	10 1/8	1	95	92	
	4	23	1	180	90	
		26 3/4	IV	IV	3000 PSI	
209-076-371-1	1	1	1 1/4	0	175	Y - MS21921-8D MS21922-8 X - MS21921-8D MS21922-8
	2	7 1/8	1 1/4	25	23	
	3	11 1/2	1 1/4	320	87	
		14 1/2	IV	IV	3000 PSI	
209-076-381-1	1	1 1/2	1	0	108	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	7 9/16	1	358	73	
		10 1/2	IV	IV	1500 PSI	
209-076-394-1	1	3 15/16	1	0	90	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	7 11/16	1	228	15	
	3	8 13/16	1	48	15	
		10 9/16	IV	IV	3000 PSI	
209-076-395-1	1	7/8	1 1/4	0	116	Y - MS21921-8D MS21922-8 X - MS21921-8D MS21922-8
	2	5 13/16	1 1/4	260	72	
	3	10 15/16	1 1/4	285	85	
		15 5/16	IV	IV	3000 PSI	
209-076-396-1	1	1 3/8	1	0	116	Y - MS21921-6D MS21922-6 X - MS21921-6D MS21922-6
	2	7	1	85	75	
	3	12 13/16	1	50	75	
	4	18 3/4	1	120	13	
	5	22 13/16	1	230	64	
		25 3/8	IV	IV	3000 PSI	
209-076-397-1	1	2	1 1/4	0	60	Y - MS21921-8D MS21922-8 X - MS21921-8D MS21922-8
	2	5 7/8	1 1/4	186	71	
		13 1/2	IV	IV	3000 PSI	
209-076-398-1	1	15/16	1 1/4	0	100	Y - MS21921-8D MS21922-8 X - MS21921-8D MS21922-8
	2	11	1 1/4	104	44	
	3	18 1/8	1 1/4	175	90	
		20 7/8	IV	IV	3000 PSI	
209-076-414-1	1	2 13/16	1 1/4	0	77	Y - MS21921-8D MS21922-8 X - MS21921-8D MS21922-8
	2	5 57/64	1 1/4	0	13	
	3	8 7/32	1 1/4	27	66	
	4	12	1 1/4	287	115	
		15 19/32	IV	IV	3000 PSI	

Table D-2 (Sheet 27 of 27)



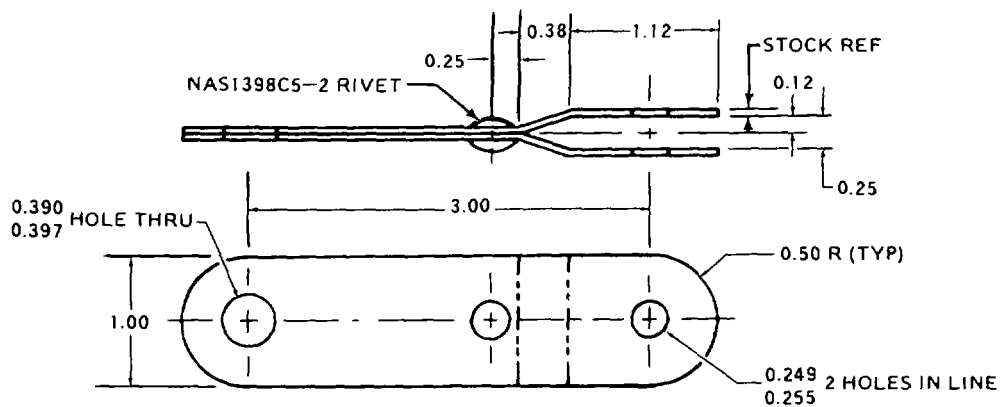
PART NUMBER	TUBE NSN	TUBE LENGTH	FITTING NSN
209-706-005-7	9330-00-931-7097	6.50	4730-00-863-9135
209-706-005-9	9330-00-931-7097	5.50	4730-00-863-9135

Figure D-132



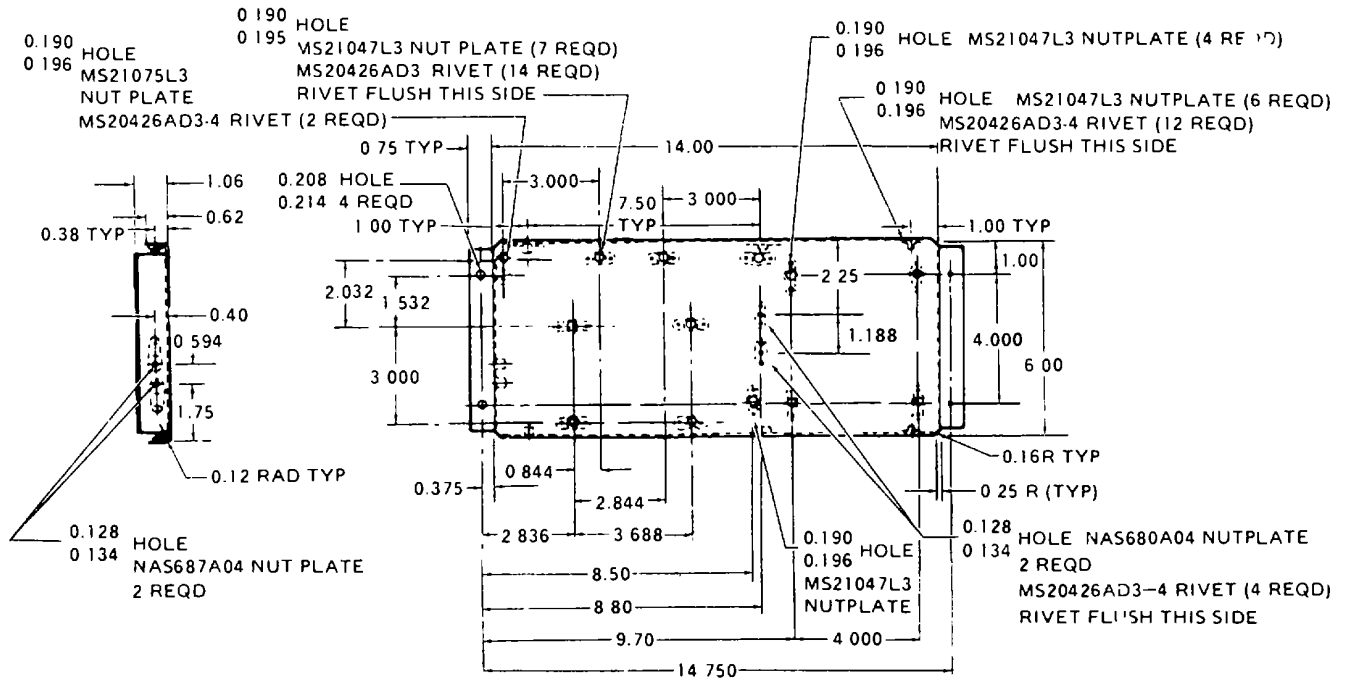
Part Number: 204-060-045-1 REDUCER
 Fabricate from: NSN 4730-00-684-7446
 Material: P/N MS 24399D24

Figure D-133



Part Number: 204-070-727-1 STRAP, Assy
 Fabricate from: NSN 9515-00-878-4322
 Material: .050 CRES 18-8 MIL-S-5059 Comp, 301 1-4 Hard
 0.050 inch thick, 1.5 inch wide, 4.5 inch long
 NAS 1398C5-2 Rivet

Figure D-134

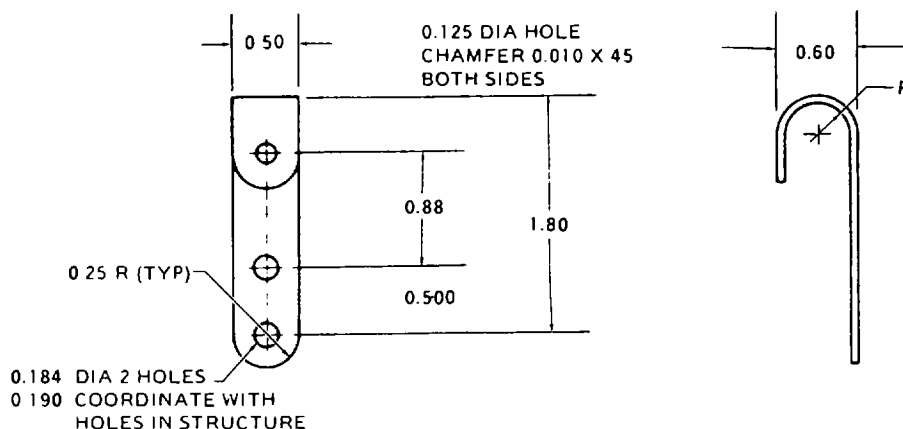


209-075-214-1 BRACKET ASSEMBLY

Part Number: 204-075-214-3 BRACKET
 Fabricate from: NSN 9535-00-086-9729
 Material: 2024T3 Al Aly Sheet QQA250/5
 0.032 inch thick, 7.8 inch wide, 18.4 inch long
 Part Number: MS21047L3 NUTPLATE (18 Reqd)
 Fabricate from: NSN 5310-00-764-7282
 Part Number: MS21051L3 NUTPLATE
 Fabricate from: NSN 5310-00-773-8635

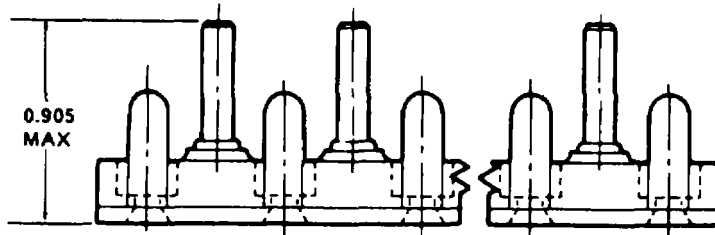
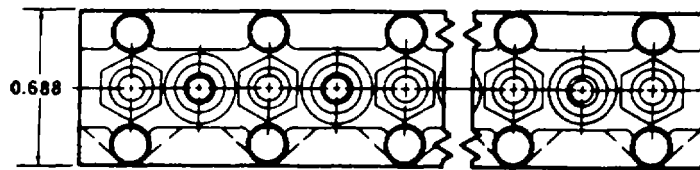
Part Number: NAS680A04 NUTPLATE (3 Reqd)
 Fabricate from: NSN 5310-00-822-8940
 Part Number: NAS687A04 NUTPLATE (2 Reqd)
 Fabricate from: NSN 5310-00-054-5725
 Part Number: MS20426D3-4 RIVET (46 Reqd)
 Fabricate from: NSN 5320-00-117-6938

Figure D-135



Part Number: 209-001-334-1 CLIP
 Fabricate from: NSN 9515-00-184-8807
 Material: 4130 Aly Steel MIL-S-19729 Cond N
 0.050 inch thick, 1.0 inch wide, 3.8 inch long

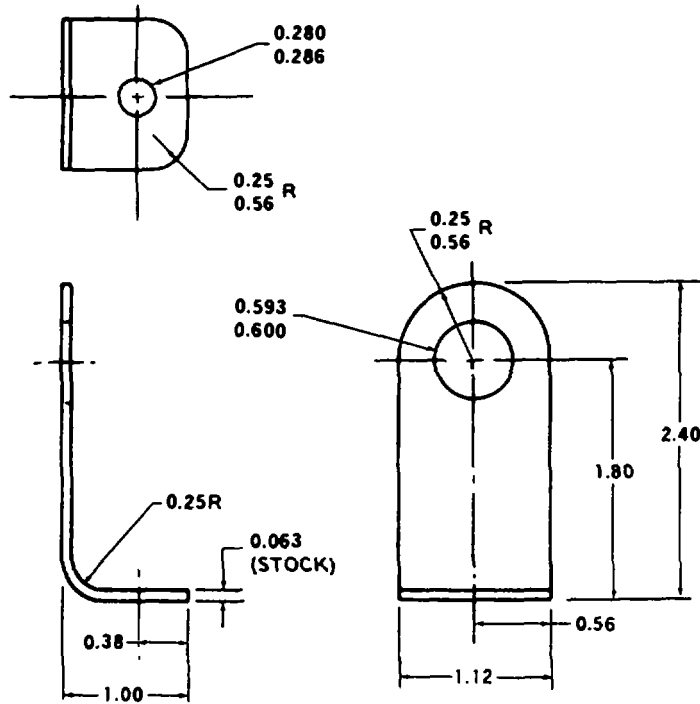
Figure D-136



LAST DASH NUMBER INDICATES NUMBER OF 6-32 UNC-2A STUDS IN ASSEMBLY

Part Number: MS27212-1-1 thru -1-7 and 1-11 TERMINAL BOARD
 Fabricate from: NSN 5940-00-950-1610
 Material: MS27212-1-20 FMC 96906

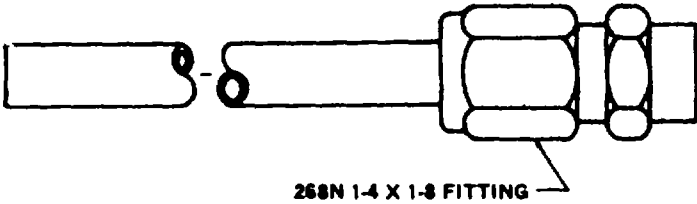
Figure D-137



Part Number: 204-040-299-1 BRACKET
 Fabricate from: NSN 9535-00-232-0378
 Material: Al Aly Sheet 2024 QQA362
 0.063 inch thick, 1.3 inch wide, 3.7 inch long

Figure D-138

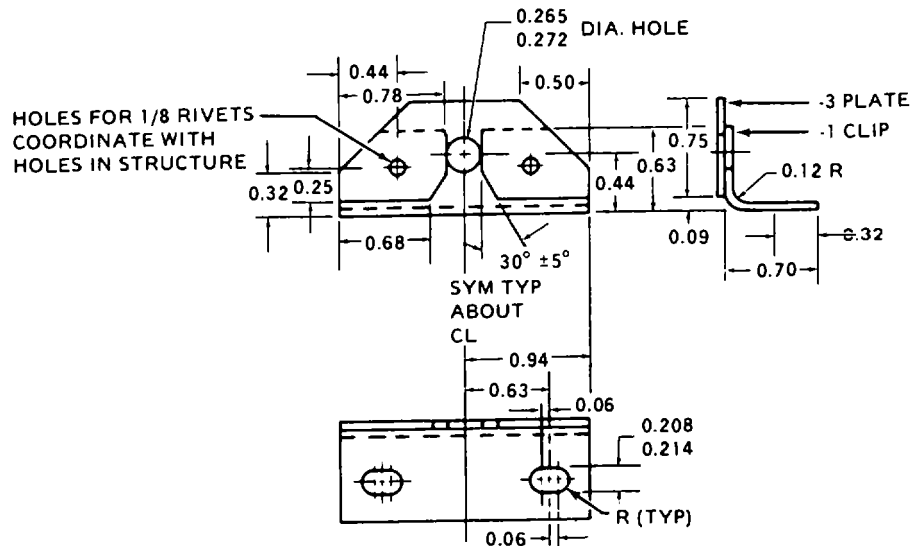
Change 8 D-117



Part Number	LENGTH	TUBE	FITTING
209-071-026-15 TUBE	7.7	4720-00-916-7092 P5361-1	4730-00-975-0533 268N 1-4 X 1-8
209-071-026-17 TUBE	7.5	4720-00-916-7092 P5361-1	4730-00-975-0533 268N 1-4 X 1-8

Figure D-139

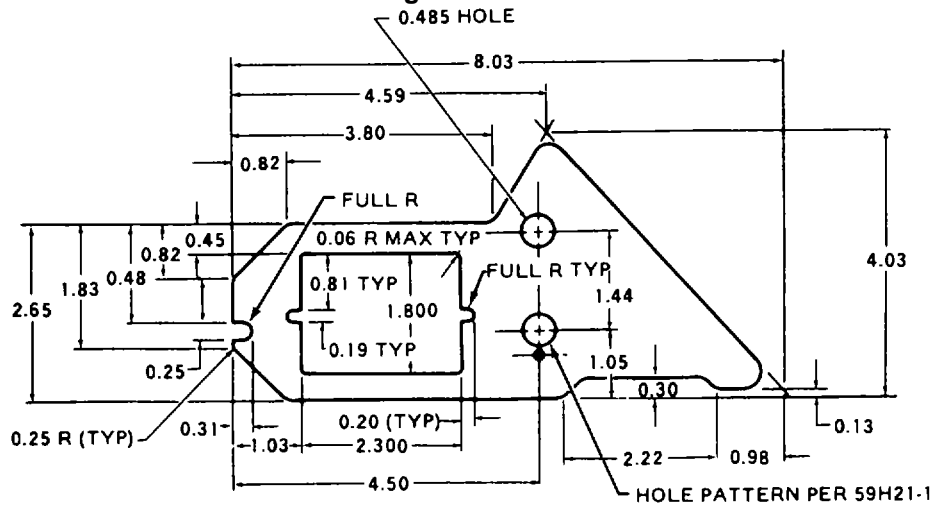
Change 13 D-118



Part Number: 209-030-646-1 CLIP
 Fabricate from: NSN 9535-00-232-0569
 Material: 2024T42 Al Aly QQA250/5
 0.050 inch thick, 1.6 inch wide, 2.5 inch long

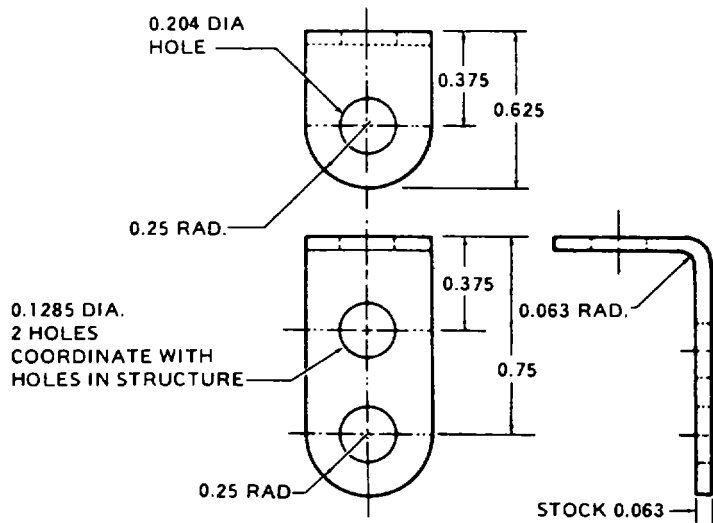
Part Number: 209-030-646-3 PLATE
 Fabricate from: NSN 9535-00-232-0569
 Material: 2024T3 Al Aly QQA250/5
 0.050 inch thick, 1.0 inch wide, 2.5 inch long

Figure D-140



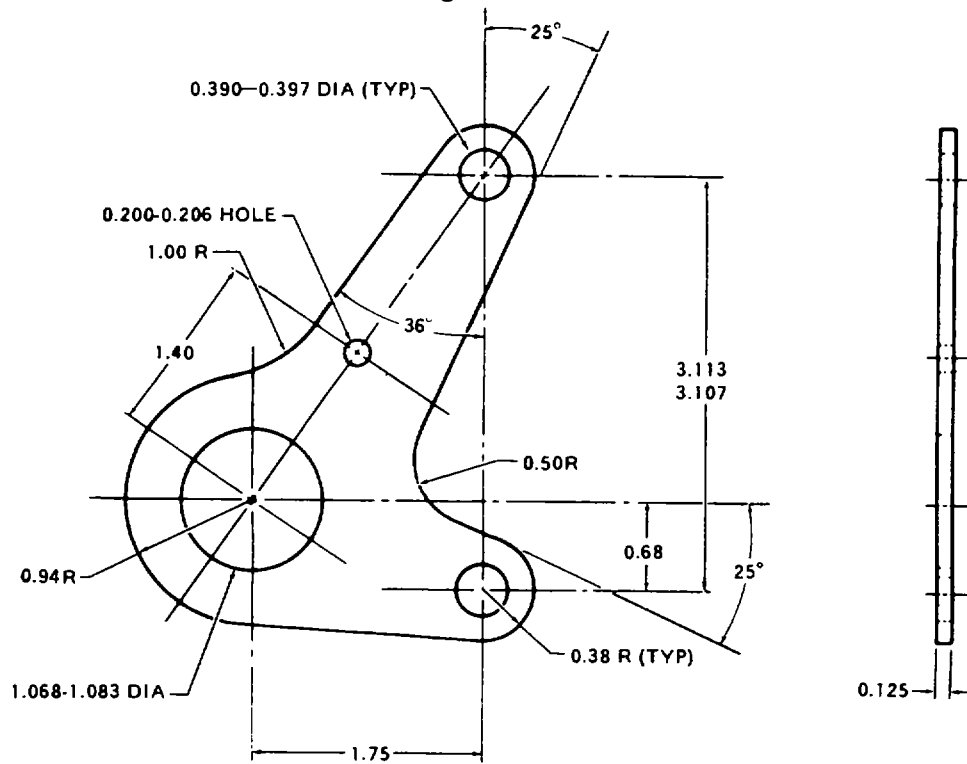
Part Number: 209-070-182-1 PANEL
 Fabricate from: NSN 9535-00-232-0378
 Material: 2024T3 Al Aly QQA250/5
 0.063 inch thick, 4.6 inch wide, 8.6 inch long

Figure D-141



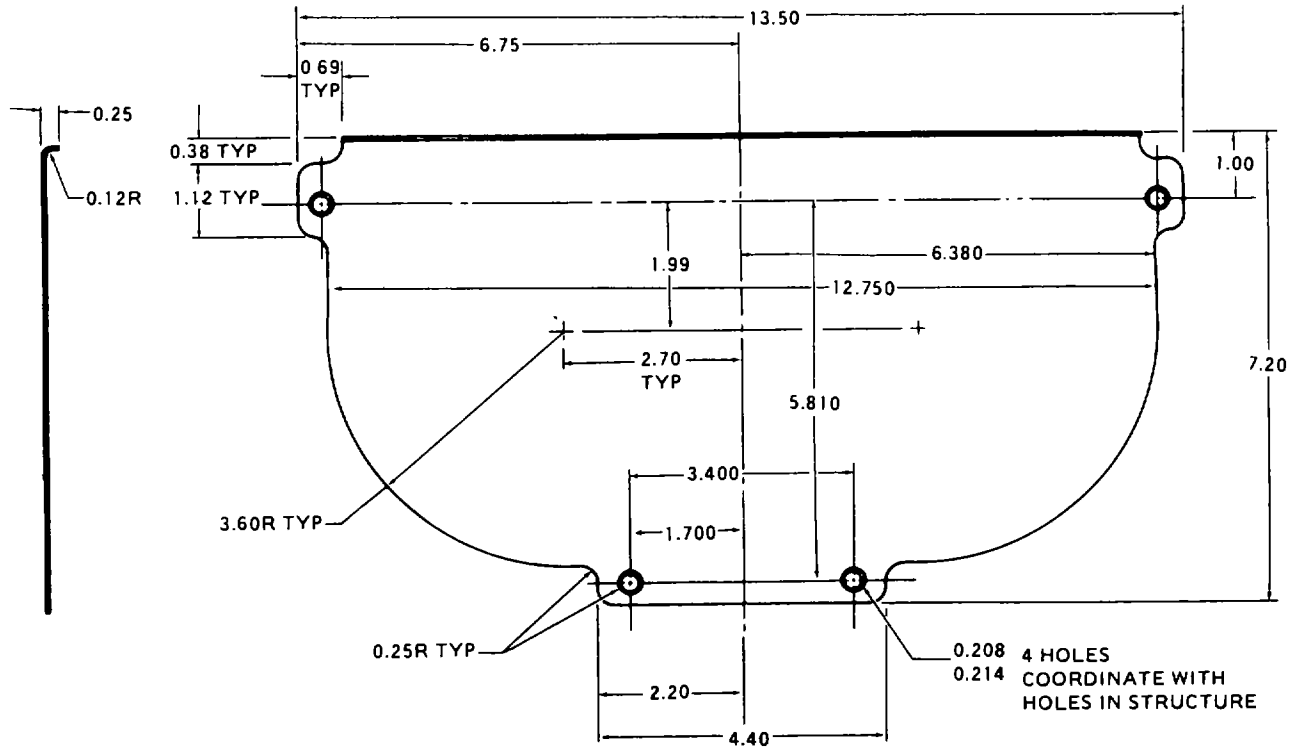
Part Number: AN743-13 BRACKET, Support Clamp
 Fabricate from: NSN 9535-00-232-0378
 Material: EA B620 FMC 81996

Figure D-142



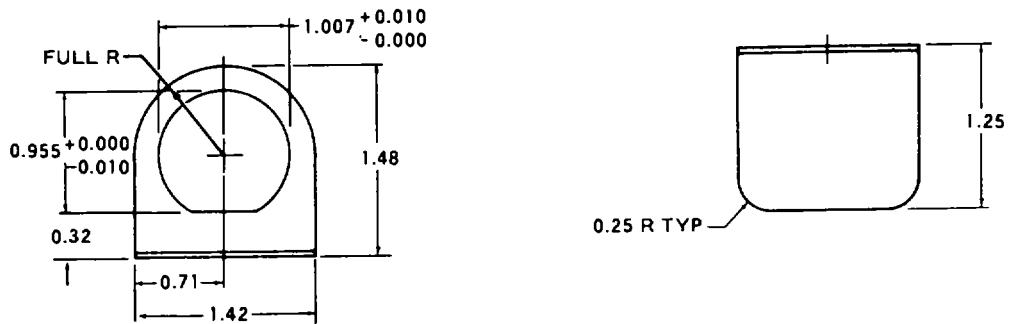
Part Number: 209-040-155-1 BRACKET
 Fabricate from: NSN 9535-00-232-0479
 Material: 2024T3 Al Aly QQA250/5
 0.125 inch thick, 3.5 inch wide, 4.5 inch long

Figure D-143



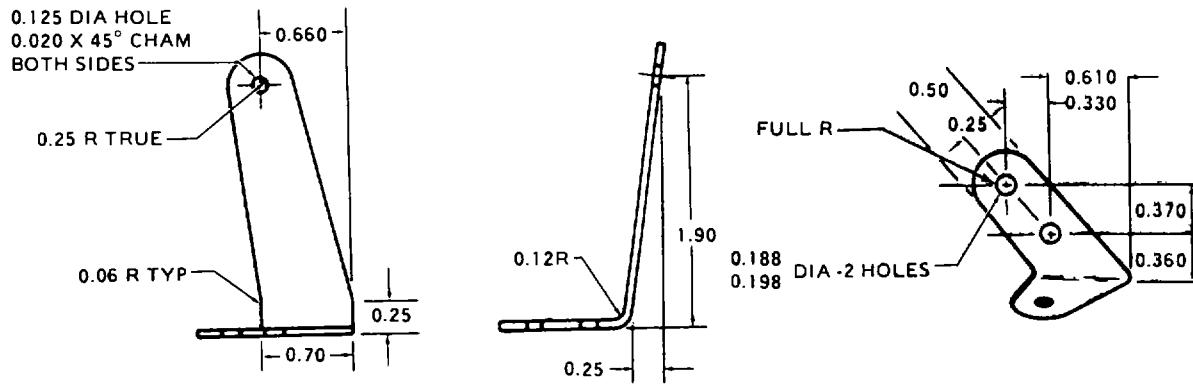
Part Number: 209-030-336-3 COVER
 Fabricate from: NSN 9535-00-086-9729
 Material: 2024T3 Al Aly QQ-A-250/5
 0.032 inch thick, 8.0 inch wide, 14.0 inch long

Figure D-144



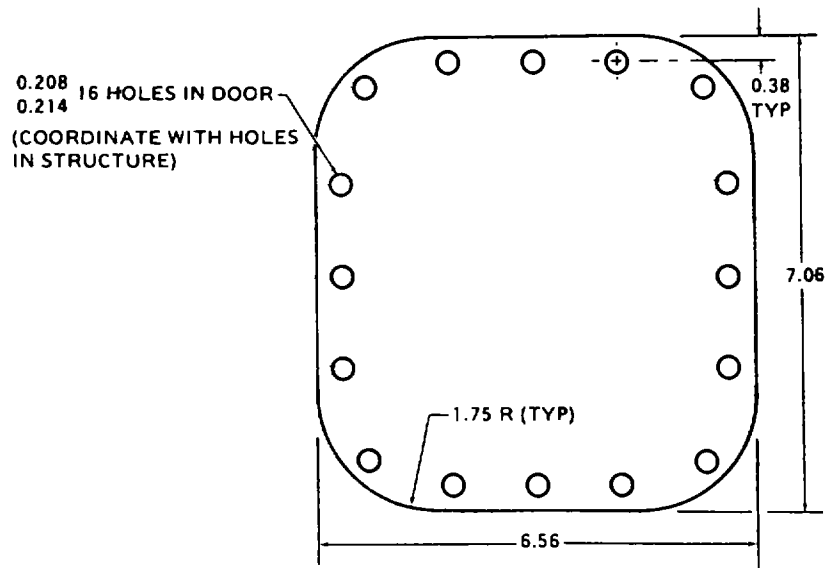
Part Number: 209-060-808-151 CLIP, Electrical
 Fabricate from: NSN 9535-00-167-2280
 Material: 2024T3 Al Aly QQA250/5
 0.040 inch thick, 1.9 inch wide, 2.7 inch long

Figure D-145



Part Number: 209-001-517-1 BRACKET
 Fabricate from: NSN 9515-00-184-8808
 Material: 4130 Aly Stl MIL-S-18729 Cond N
 0.063 inch thick, 3.0 inch wide, 4.5 inch long
 Part Number: 209-001-517-2 BRACKET
 Fabricate from: NSN 9515-00-184-8808
 Material: 4130 Aly Stl MIL-S-18729 Cond N
 0.063 inch thick, 3.0 inch wide, 4.5 inch long

Figure D-146



Part Number: 209-030-220-97 DOOR, Access
 Fabricate from: NSN 9535-00-086-9729
 Material: 2024T3 Al Aly QQA250/5
 0.032 inch thick, 6.8 inch wide, 7.3 inch long

Figure D-147

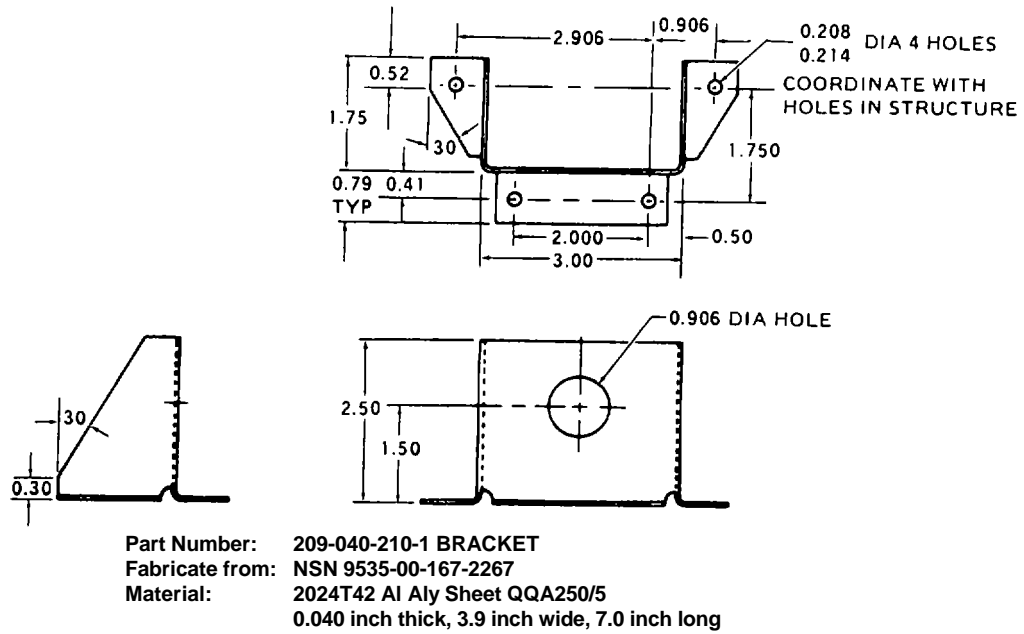


Figure D-148

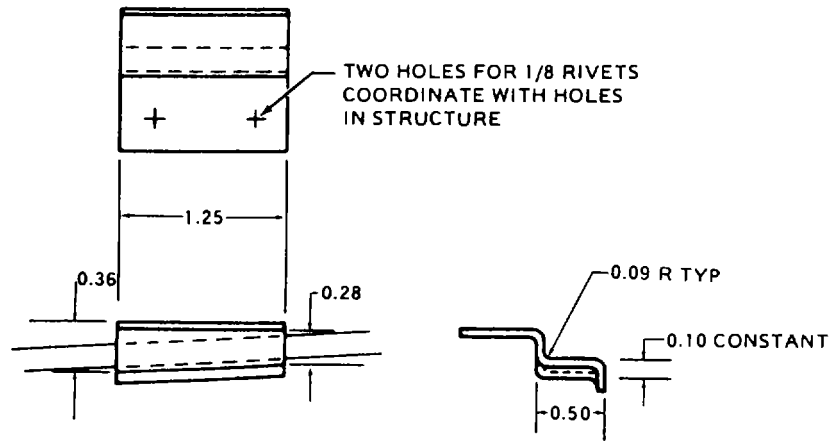
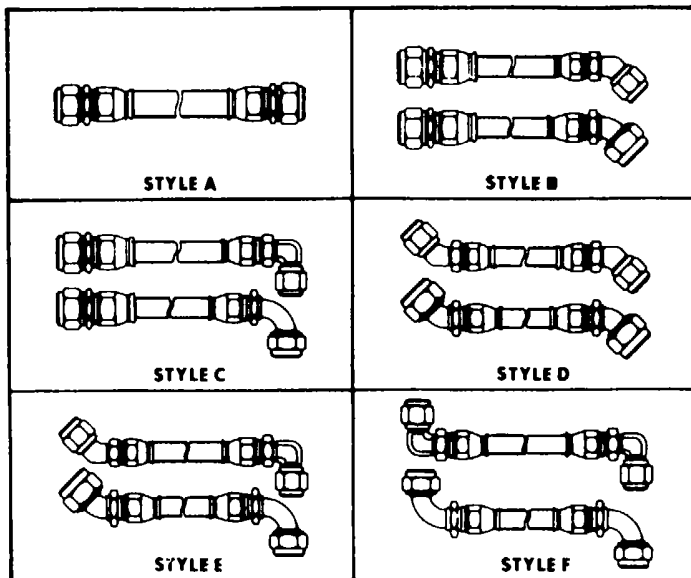
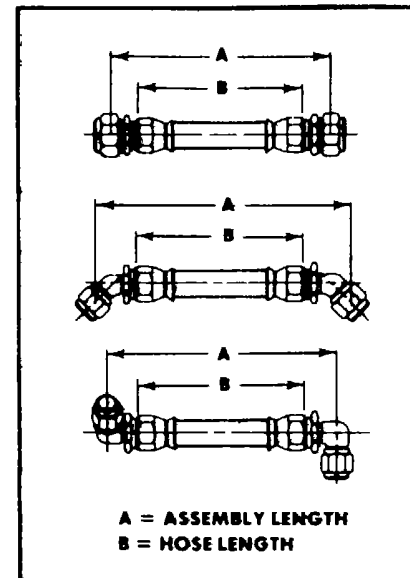


Figure D-149



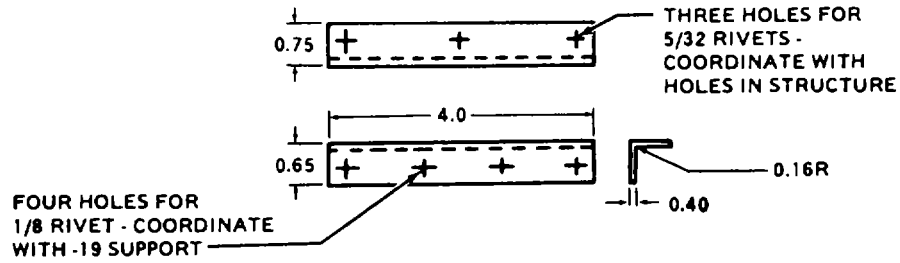
HOSE STYLES



EXAMPLE OF HOSE AND HOSE ASSEMBLY LENGTH

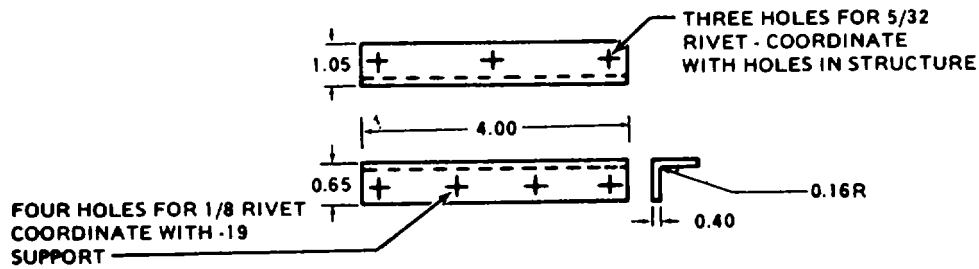
PART NUMBER	HOSE STYLE	HOSE NSN & P/N	END 1 FITTING ASSEMBLY		END 2 FITTING ASSEMBLY		ASSEMBLY LENGTH	DUST PLUG NSN
			NSN	P/N	NSN	P/N		
T666035-4-0137	A	4720-00-857-1732 MIL-H-27267-4	4730-00-054-7650 4730-00-910-8879 4730-00-697-9513 4730-00-967-9521	MS27381-4C MS27386-4C MS27069-4C MS27070-4C	4730-00-054-7650 4730-00-910-8879 4730-00-697-9513 4730-00-967-9521	MS27381-4C MS27386-4C MS27069-4C MS27070-4C	13.875	5340-00-904-6633
T66035-6-0145	A	4720-00-857-1731 MIL-H-27267-6	4730-00-053-0379 4930-01-008-0461 4730-00-951-9515 4730-00-967-9523	MS27381-6C MS27386-6C MS27069-6C MS27070-6C	4730-00-053-0379 4730-01-008-0461 4730-00-967-9515 4730-00-967-9523	MS27381-6C MS27386-6C MS27069-6C MS27070-6C	14.625	5340-00-904-6634
T666319-8-0250	C	4720-00-815-6354 MIL-H-27267-8	4730-00-910-8881 4730-00-967-9516 4730-0-967-9524	G65018-8 MS27069-8C MS27070-8C	4730-00-910-8875 4730-00-967-9516 4730-00-967-9524	G67113-8 MS27069-8C MS27070-8C	25.00	5340-00-904-6635

Figure D-150



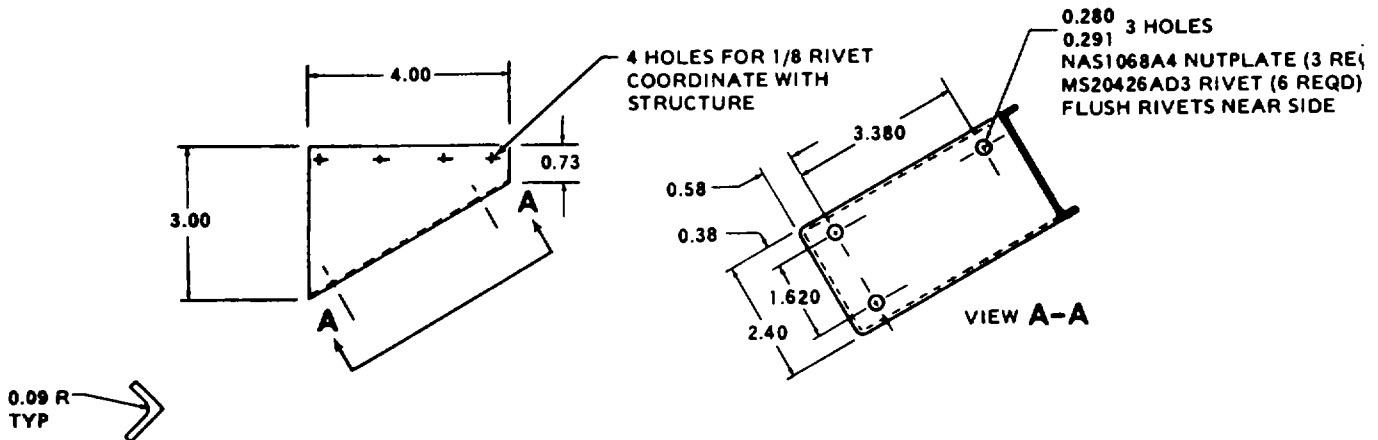
Part Number: 209-030-253-23 CLIP
 Fabricate from: NSN 9535-00-167-2280
 Material: 2024T3 Al Aly QQA250/5
 0.040 inch thick, 1.9 inch wide, 4.5 inch long

Figure D-151



Part Number: 209-030-253-21 CLIP
 Fabricate from: NSN 9535-00-167-2280
 Material: 2024T3 Al Aly QQA250/5
 0.040 inch thick, 2.2 inch wide, 4.5 inch long

Figure D-152



Part Number: 209-030-253-19 SUPPORT
 Fabricate from: NSN 9535-00-167-2280
 Material: 2024T42 Al Aly QQA250/5
 0.040 inch thick, 5.5 inch wide, 8.1 inch long

Figure D-153,

HOSE ASSEMBLY

Fabricated from

PART NO.	FAB. FROM NSN	END FITTING	SOCKET	SLEEVE	DUST PLUG
4720-EG006-12-0200-043	4720-00-857-1734	4730-00-017-8846 4730-00-017-8887	4730-00-96-9518	4730-00-967-9526	

FABRICATION NOTES AND INSTRUCTIONS

To maintain the correct Hose Assembly length, allowances must be made for the various end fittings and the bulk hose cut accordingly. To calculate the correct length of bulk hose (J) use Table. After the allowance (,) are obtained subtract the total from the hose assembly length (L) to obtain bulk hose length (J).

Example: P/N 4720EG007-4C0170 has an assembled length of 17 inches and would use the allowances found in Table under 4720EG007-, Hose Size 4 which is 1.92 from 17 inches to obtain correct bulk hose length (J) of 15.08.

TABLE

Fitting Allowances									
P/Ns With Prefix 4720EG									
	HOSE SIZE								
	3	4	5	6	8	10	12	16	20
4720EG003	1.40	1.48	1.54	1.62	1.86	2.10	2.26	2.60	2.88
4720EG004	1.56	1.65	1.74	1.84	2.24	2.46	3.05	3.35	3.78
4720EG007	1.78	1.92	1.99	2.10	2.72	2.63	3.18	3.44	3.86
4720EG006	1.94	2.09	2.19	2.32	3.10	2.99	3.97	4.19	4.76

FABRICATION NOTES

- To Specify A Required Angle A, Suffix Part No. With Angle in Degrees. Angle Measured Counter Clockwise From Lower Vertical Axis. If Angle Is Not Specified Elbows Shall Point Down At 0° ±3° On Lengths Up To 24 Inches And ±5° On Lengths 24 Inches Or Longer.
- After Proof Testing In Accordance With MIL-H-25579, Flush With Dry Cleaning Solvent NSN 6850-00-264-9037, And Install Protective Plug In Each Fitting
- Permanent Plug In Each Fitting

NSN _____

P/N _____

OPERATING PRESSURE _____

DATE OF PRESSURE TEST _____

EXAMPLE OF LENGTH: P/N 472EG000-00-0000

- Assembly Length Tolerance Up to 9 Inches ±1/16

9 Inches 50 18 Inches ±1/8

18 Inches to 36 Inches ±1/4

36 Inches to 50 Inches ±1/2

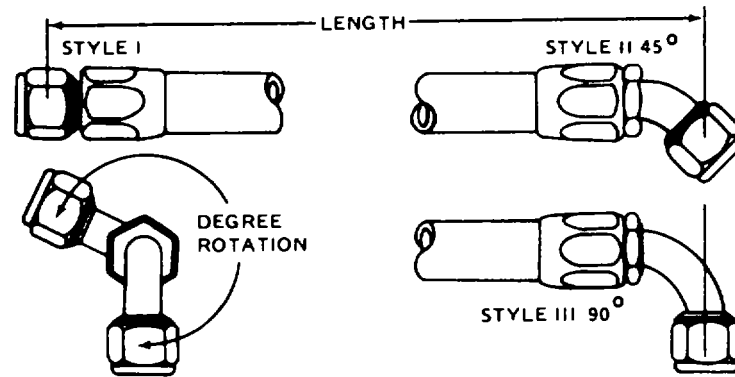
Over 50 Inches ±1% of Length

INDICATES LENGTH IN INCHES

INDICATES LENGTH in 1/8 INCH. INCREMENTS

- Assembly Length Is Measured From Sealing Surface To Sealing Surface. On Elbow Fittings The Measuring Point Is The Intersection Of The Centerline Of The Elbow With The Face Of The Sealing Surface.

Figure D-154 (Sheet 1 of 3)



PART NO. CODE: 70-010 J 240 C 48 4 FRACTIONAL LENGTH CODED IN
 BASIC NO. _____ 1/4 INCH INCREMENTS SEE NOTE 1
 HOSE SIZE _____ LENGTH IN INCHES
 DEGREE ROTATION _____ END FITTING
 COMBINATION CODE

HOSE SIZE	3	4	5	6	8	10	12	16	20	24	32	= TUBING O.D.
WITHOUT CHAFE GUARD	E	F	G	H	J	K	L	M	N	P	R	IN 1/16 IN.
WITH CHAFE GUARD SEE NOTE 2	S	T	U	V	W	X	Y	Z	A	B	C	INCREMENTS

COMBINATIONS CODE	STYLES AND MATERIALS OF END FITTINGS (FLARED)			
	MATERIAL	FITTING STYLE	MATERIAL	FITTING STYLE
A	Alum	I	Alum	I
B	Alum	II	Alum	II
C	Alum	III	Alum	III
D	Steel	I	Steel	I
E	Steel	II	Steel	II
F	Steel	III	Steel	III
G	Alum	I	Steel	III
H	Alum	I	Steel	II
T	Alum	I	Alum	II
V	Alum	I	Alum	III
W	Alum	II	Alum	III
X	Steel	I	Steel	II
Y	Steel	I	Steel	III
Z	Steel	II	Steel	III

Figure D-154 (Sheet 2 of 3)

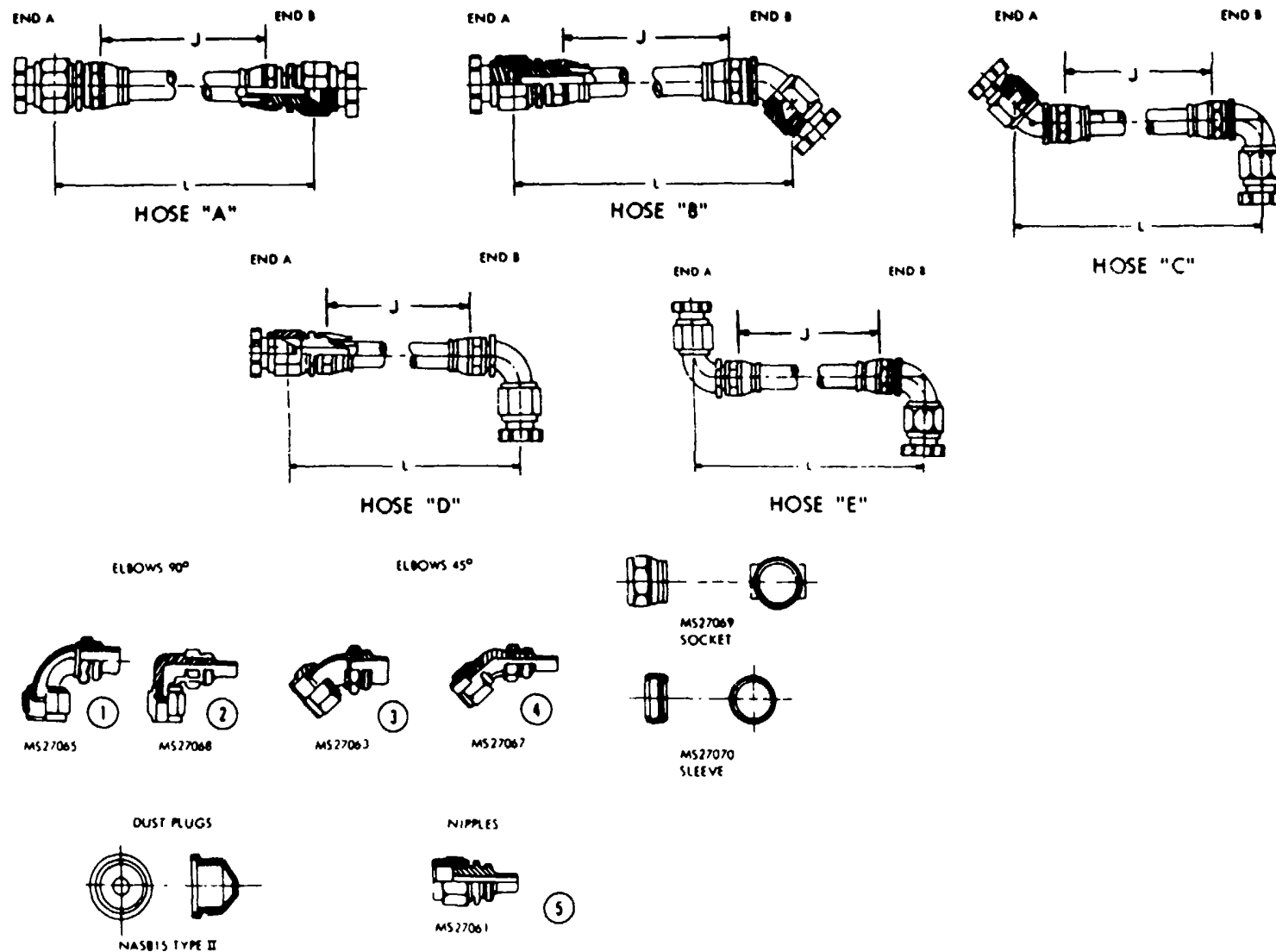
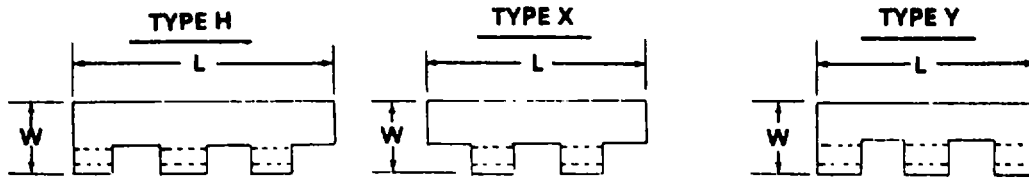


Figure D-154 (Sheet 3 of 3)

Change 11 D-127

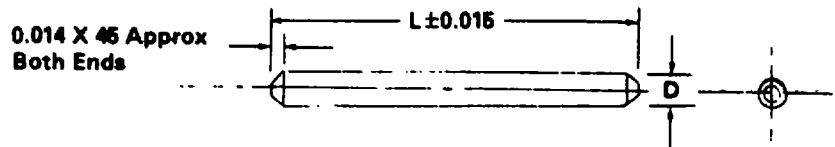


NOTES:

1. REMOVE CENTER LOOP.
2. CRIMP ENDS OF HINGE TO RETAIN HINGE PINS.
3. MOUNTING HOLES TO BE DRILLED AT TIME OF INSTALLATION.

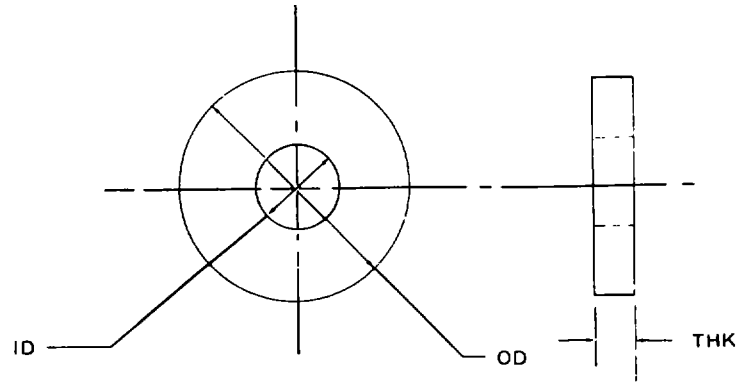
Part Number	Fabricate From NSN	DIM "L"	DIM "W"	STYLE	NOTES
204-030-840-1	5340-00-993-1461	14.50	STOCK	H	3
209-030-139-17	5340-00-664-8140	2.50	STOCK	H	2,3
209-030-203-45	5340-00-664-8118	45.50	STOCK	H	1,3
209-030-203-46	5340-00-664-8118	45.50	STOCK	H	1,3
209-030-216-57	5340-00-664-8118	45.50	STOCK	Y	3
209-071-038-25	5340-00-250-4970	2.50	STOCK	H	2,3
209-071-041-15	5340-00-250-4970	2.50	.033	H	3

Figure D-155 HINGES



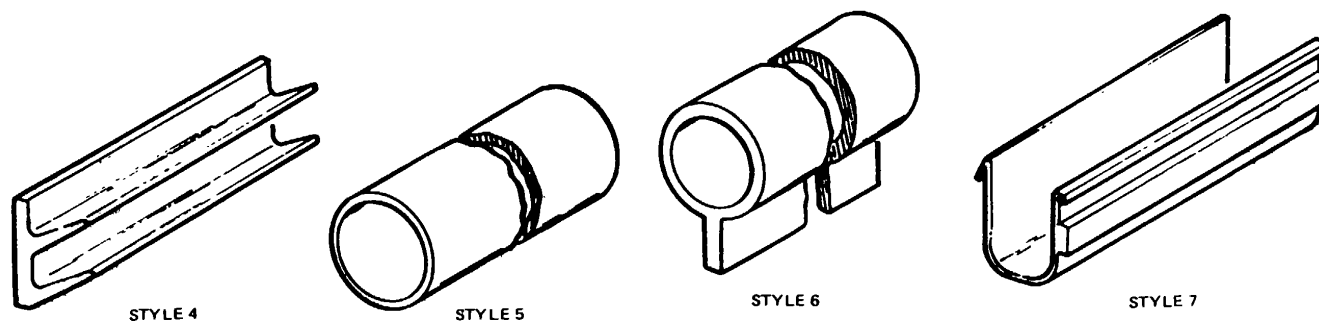
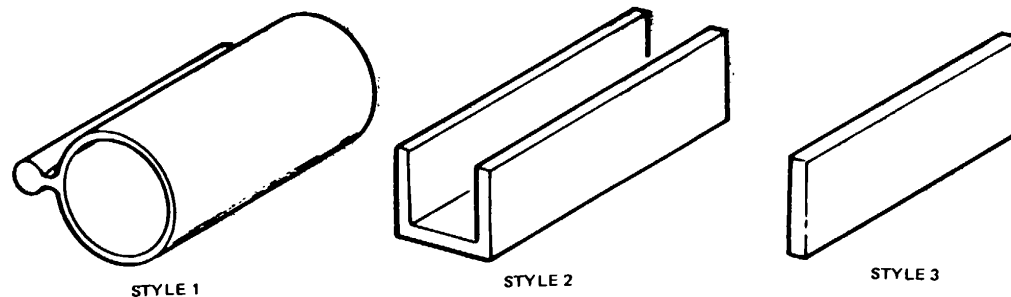
Part Number	Fabricate From NSN	DIM "L"	DIM "D"	NOTES
MS20253-1-82	5340-00-573-0079	0.82	0.062	
MS20253-2-190	5340-00-817-8688	1.90	0.089	
MS20253P2-300	5340-00-043-3723	3.00	0.089	
MS20253-2-7950	9505-00-596-1662	79.50	0.089	
209-961-014-45	5340-00-043-3724	22.50	0.179	
209-961-014-47	5340-00-043-3724	22.50	0.179	

Figure D-156 PIN, STRAIGHT HEADLESS



Part Number	Item Name	Fabricate From NSN	OD DIM	ID DIM	THK
204-011-708-1	WASHER	5310-00-167-1766	1.125	.454	0.063
204-011-708-3	WASHER	5310-00-167-0768	1.625	.454	0.063
209-030-585-41	PLATE	9535-00-167-2278	2.000	.473	0.025
540-011-130-3	DISK	9515-00-234-7950	2.400		0.025

Figure D-157



NOTES:

1. SEE DETAIL A.
2. SEE DETAIL B.
3. BOND WITH NSN 8040-00-262-9011
4. BOND WITH NSN 8040-00-145-0019.
5. DRILL 7 HOLES 0.38 DIA ON INSTALLATION TO MATCH PYLON PANEL SUPPORT 209-030-213-31.
6. DRILL 5 HOLES 0.38 DIA ON INSTALLATION TO MATCH PYLON PANEL SUPPORT 209-030-213-29 *et al* -30.

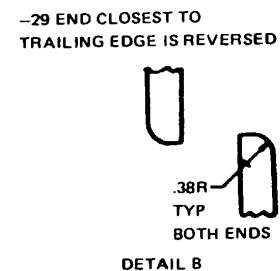
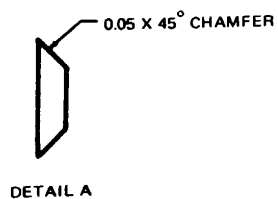


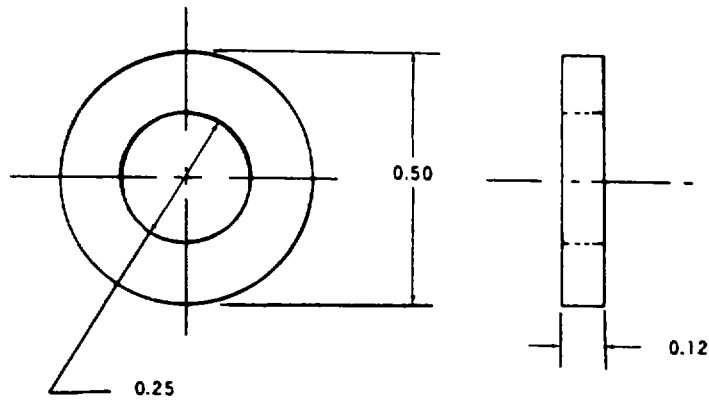
Figure D-158 (Sheet 1 of 4)

PART NUMBER	ITEM NAME	FABRICATE FROM NSN	STYLE	LENGTH	WIDTH	NOTES
NAS521-20-10	HOSE, AIR DUCT	4720-00-921-0649	5	2.500		
130-005-6-30	TUBE	5970-00-815-1295	5	15.000		
130-005-6-36	TUBE	5970-00-815-1295	5	18.000		
130-005-9-13	TUBE	5970-00-914-3118	5	6.500		
130-005-9-26	TUBE	5970-00-914-3118	5	13.000		
130-005-9-30	TUBE	5970-00-914-3118	5	15.000		
130-005-9-36	TUBE	5970-00-914-3118	5	18.000		
130-005-10-8	TUBE	5970-00-822-2775	5	4.000		
130-005-10-13	TUBE	5970-00-822-2775	5	6.500		
209-020-001-29	BUMPER	9390-00-103-0060	2	21.000		2,3
209-020-001-31	BUMPER	9390-00-103-0060	2	9.000		2,3
209-020-001-33	BUMPER	9390-00-103-0060	2	17.000		2,3
209-020-001-35	BUMPER	9390-00-103-0060	2	8.500		2,3
209-020-001-37	BUMPER	9390-00-103-0060	2	14.500		2,3
209-020-001-47	COVER, WING	9535-00-086-9729	3	16.500	14.500	
209-020-001-48	COVER	9535-00-086-9729	3	16.500	14.500	
209-030-002-21	SEAL	9330-00-089-8033	3	24.500	0.750	
209-030-002-23	SEAL	9330-00-089-8033	3	24.500	0.750	
209-030-128-17	VENT, BATTERY	4710-00-279-0955	5	4.000		
209-030-128-25	VENT, BATTERY	4710-00-279-0955	5	3.500		
209-030-128-27	VENT, BATTERY	4710-00-278-8010	5	3.000		
209-020-128-29	VENT, BATTERY	4710-00-278-8010	5	4.500		
209-030-210-17	BRUSH	7920-00-898-9088	7	3.300		4
209-030-210-31	BRUSH	7920-00-898-9088	7	10.900		4
209-030-210-33	BRUSH	7920-00-898-9088	7	2.400		4
209-030-216-137	STRIP PLATE	9535-00-640-2311	3	16.000	0.500	1
209-030-216-141	SHIM STRIP	9535-00-086-9729	3	16.000	0.400	
209-030-217-25	GASKET	9320-00-878-6507	3	120.00	0.750	
209-030-286-21	SEAL, PLAIN	9320-00-202-1846	3	22.000	0.062	
209-030-286-23	SEAL, PLAIN	9320-00-202-1846	3	23.000	0.062	
209-030-286-25	SEAL, PLAIN	9320-00-202-1846	3	22.500	0.062	
209-030-500-93	SEAL	9390-00-900-3214	1	54.000		
209-030-500-95	SEAL	9390-00-900-3214	1	16.000		
209-030-500-97	SEAL	9390-00-900-3214	1	46.000		
209-030-500-99	SEAL	9390-00-900-3214	1	67.000		
209-030-500-101	SEAL	9390-00-900-3214	1	46.00		
209-030-500-103	SEAL	9390-00-900-3214	1	12.00		
209-030-500-105	SEAL	9390-00-900-3214	1	13.00		
209-030-500-211	RUBBER, SPECIAL SHAPE	9390-00-142-6107	4	17.50		
209-030-500-229	RUBBER, SPECIAL SHAPE	9390-00-142-6107	4	53.00		
209-030-500-231	RUBBER, SPECIAL SHAPE	9390-00-142-6107	4	42.00		
209-030-503-15	FILLER	9535-00-232-0378	3	1.00	0.380	

Figure D-158 (Sheet 2 of 4)

PART NUMBER	ITEM NAME	FABRICATE FROM NSN	STYLE	LENGTH	WIDTH	NOTES
209-030-504-15	FILLER	9535-00-232-0378	3	1.25	0.380	
209-030-583-27	PAD	9535-00-232-2473	3	1.70	0.500	
209-030-803-17	TUBE INSULATION	9330-00-931-7097	5	17.00		
209-030-838-19	STRIP	8135-00-923-0591	3	40.00	0.800	
209-030-838-21	FILLER	9535-00-232-0546	3	1.56	0.750	
209-060-805-31	SEAL	9320-00-202-1846	3	21.00	0.750	
209-060-805-33	SEAL	9320-00-202-1846	3	18.00	0.750	
209-060-805-39	CHAFING STRIP	9390-00-103-0060	2	57.00		
209-060-810-13	SEAL, PLAIN	9390-00-851-9178	6	26.00		
209-060-810-39	SEAL	5330-00-938-1719	3	28.00	5.500	
209-060-810-111	GASKET	9320-00-404-6053	3	30.00	0.680	
209-060-811-113	GASKET	9320-00-404-6054	3	8.00	0.620	
209-060-811-41	SEAL, PYLON FAIRING	9320-00-202-1846	3	19.00	1.000	
209-060-811-51	SEAL, PYLON FAIRING	9320-00-202-1846	3	2.00	1.000	
209-060-811-65	SEAL, PYLON	9320-00-241-9742	3	35.60	1.000	
209-060-811-67	SEAL	9320-00-241-9740	3	4.50	1.000	
209-060-811-69	SEAL, PYLON	9320-00-241-9742	3	28.20	1.000	
209-060-811-71	SEAL	9320-00-241-9740	3	4.00	1.000	
209-060-811-91	SEAL, PYLON	9320-00-202-1846	3	80.00	0.500	
209-060-889-5	GASKET	9320-00-143-7111	3	10.00	0.750	
209-060-889-6	GASKET	9320-00-143-7111	3	10.00	0.750	
209-060-889-7	GASKET	9320-00-143-3711	3	36.00	5.000	
209-060-900-61	GASKET	5330-00-938-1719	3	102.00	0.800	
209-060-900-63	GASKET, FIREWALL	5330-00-938-1719	3	36.50	0.700	
209-060-900-67	SEAL, PLAIN	9390-00-851-9178	6	102.00		
209-060-900-119	SEAL, PLAIN	9390-00-851-9178	6	4.00		
209-060-900-120	SEAL, PLAIN	9390-00-851-9178	6	4.00		
209-060-902-49	GASKET	5330-00-938-1719	6	3.60	1.000	
209-060-902-51	SEAL, PLAIN	9390-00-851-9178	6	3.90		
209-060-903-35	SEAL, PLAIN	9390-00-851-9178	6	13.20		
209-060-903-37	SEAL, PLAIN	9390-00-851-9178	6	13.20		
209-060-903-39	SEAL	5330-00-938-1719	3	18.50	1.00	
209-060-903-41	SEAL	5330-00-938-1719	3	16.50	1.00	
209-060-903-43	SEAL	5330-00-938-1719	3	8.50	1.00	
209-060-903-45	SEAL	5330-00-938-1719	3	5.50	1.00	
209-060-903-47	SEAL	5330-00-938-1719	3	13.00	1.00	
209-060-903-49	SEAL	5330-00-938-1719	3	18.50	1.00	
209-070-102-3	TUBE	9330-00-931-7097	5	7.80		
209-070-102-15	TUBE	9330-00-931-7097	5	8.90		
209-070-102-17	TUBE	9330-00-931-7097	5	13.80		
209-070-102-19	TUBE	9330-00-931-7097	5	5.50		
209-070-102-21	TUBE	9330-00-931-7097	5	24.00		
209-070-102-23	TUBE	9330-00-931-7097	5	24.00		
209-070-102-29	TUBE	9330-00-931-7097	5	35.00		

Figure D-158 (Sheet 3 of 4)
D-132 Change 11



Part Number: 209-060-894-5 BUMPER
Fabricate from: NSN 9390-00-988-8636
1/4 x 1/8 Wall Syn Rubber
Tubing MIL-R-6855 Class II
Grade 40

Figure D-159

**NOTES:**

1. Make from Tape 425 Aluminum 0.003 in thick and purchase from Minnesota Mining and Manufacturing Comp. Code Ident. 76381.
2. Alternate material Uralene 8450 Barrier Material 0.005 inch thick May be purchased from Furalene Plastics Inc., Los Angeles, Calif., Code Ident. 99384.

Part Number: 209-072-439-27 VAPOR BARRIER
Fabricate from: NSN 7510-00-720-7516
Material: Barrier Tape, Aluminum Foil, 0.003 in thk

Figure D-159A**Change 21 D-134A/(D-134B blank)**

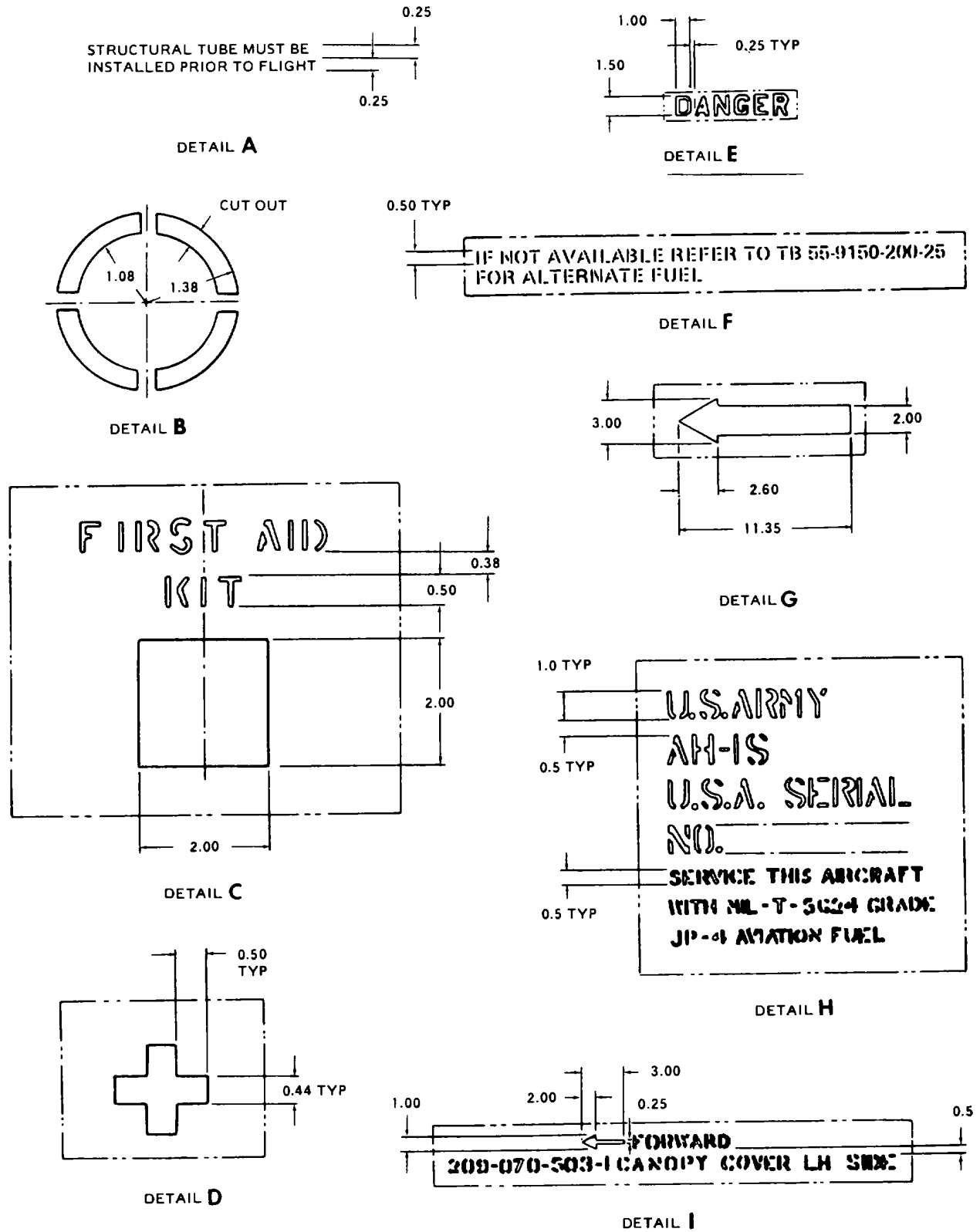


Figure D-160 STENCILS (Sheet 1 of 3)

TIE DOWN
 ALLOWABLE LOAD
 2000 LBS

0.25 (TYP)
 0.15 TYP

DETAIL J

0.25 TYP
 0.15 (TYP)
 AIR TRANSPORT
 WEGHT 4205 LBS
 C.G. STA 205.5

DETAIL K

NO STEPS

1.00

DETAIL M

0.20
 0.40
 0.75
 FWD
 0.50

DETAIL N

3.00
 2.00
 0.25
 FORWARD
 CANOPY COVER RH SIDE
 0.5 1.00

DETAIL L

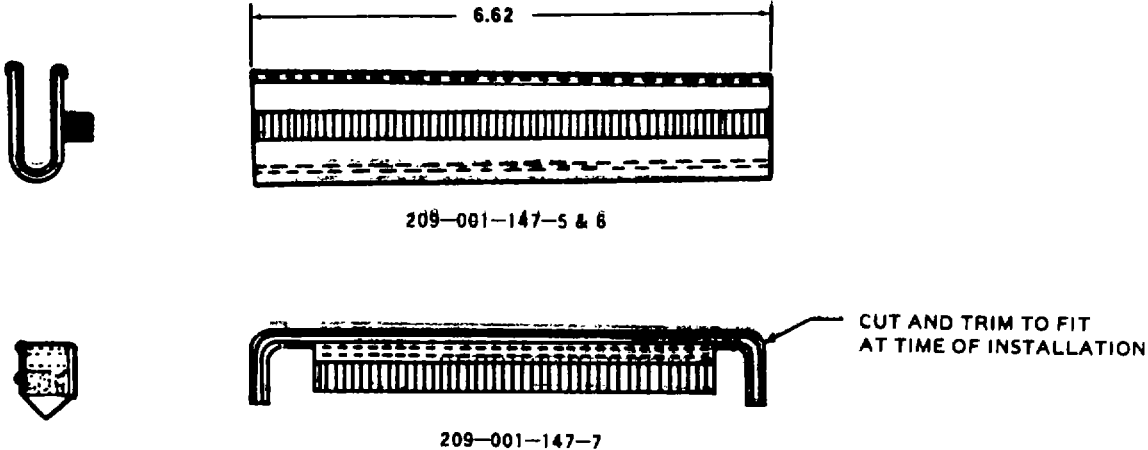
0.25 TYP
 0.18 TYP
 TIE DOWN FITTING
 MAX. ALLOWABLE
 LOAD 17000 LBS.

DETAIL O

Figure D-160 STENCILS (Sheet 2 of 3)

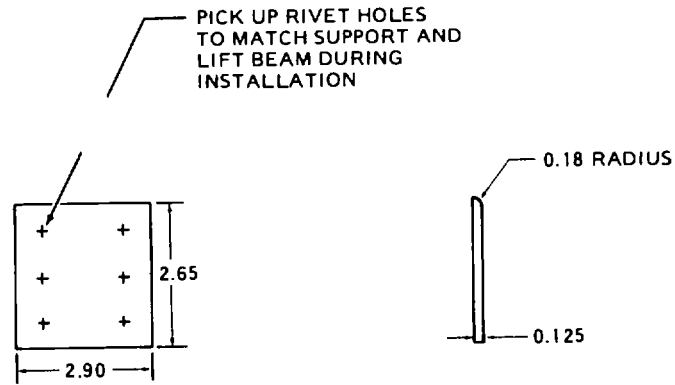
PART NUMBER	FABRICATE FROM NSN	DETAIL
204-030-159-1	9310-00-265-6797	A
204-070-806-3	9310-00-265-6797	B
204-070-838-1	9310-00-265-6797	C
204-070-839-1	9310-00-265-6797	D
205-070-801-1	9310-00-265-6797	F
209-070-603-1	9310-00-265-6797	E
209-070-603-3	9310-00-265-6797	G
209-070-698-1	9310-00-265-6797	H
209-070-611-1	9310-00-265-6797	I
209-070-611-3	9310-00-265-6797	L
209-070-616-1	9310-00-265-6797	J
209-070-617-1	9310-00-160-7858	K
209-070-623-1	9310-00-265-6797	M
209-070-630-1	9310-00-160-7858	N
209-078-031-1	9310-00-160-7858	O

Figure D-160 STENCILS (Sheet 3 of 3)**D-137**



Part Numbers: 209-001-147-5, 6 & 7
Fabricate from: NSN 7920-00-898-9088

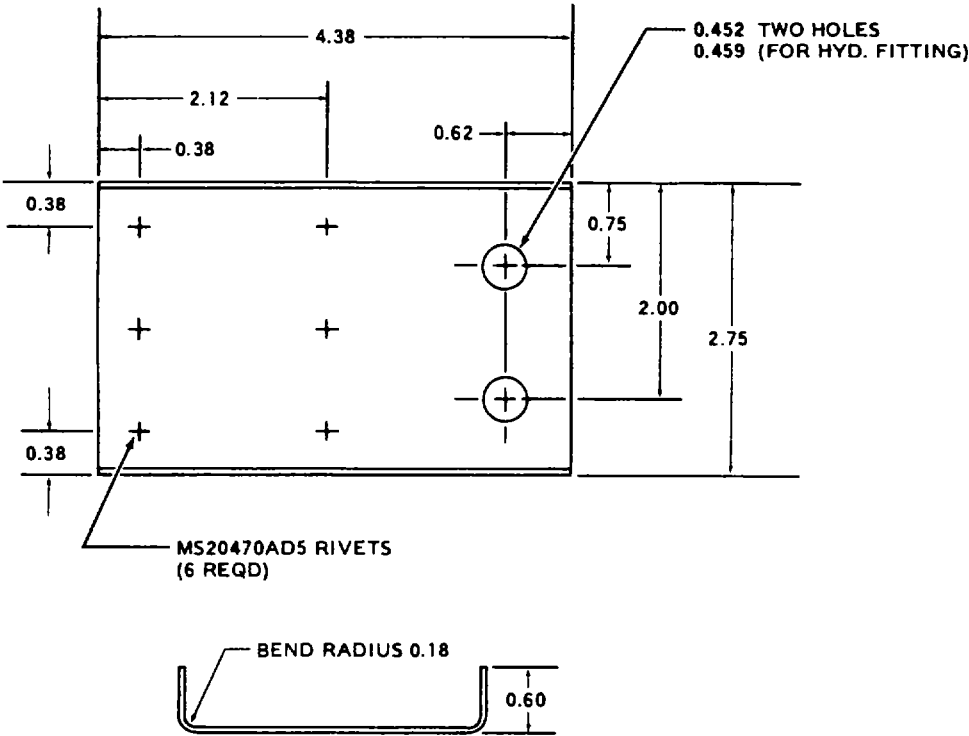
Figure D-161



Part Number: 209-030-267-35 RADIUS, Block
Fabricate from: NSN 9535-00-232-418
Material: 2024 Al Aly QQ-A-250/5 T3
0.125 Inch Thick, 2.75 Inch Wide,
3.0 Inch Long

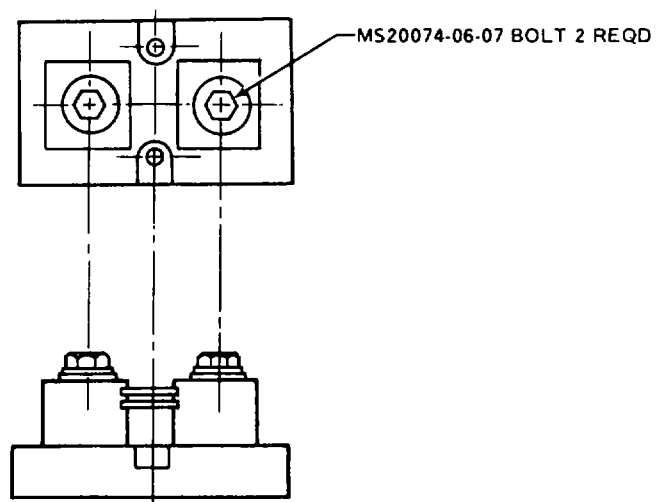
Figure D-162

D-139



Part Number: 209-030-267-29 SUPPORT, Fitting
Fabricate from: NSN 9535-00-232-418
Material: 2024 Al Aly QQ-A-250/5 T3
0.050 Inch Thick, 4.2 Inch Wide,
4.6 Inch Long.

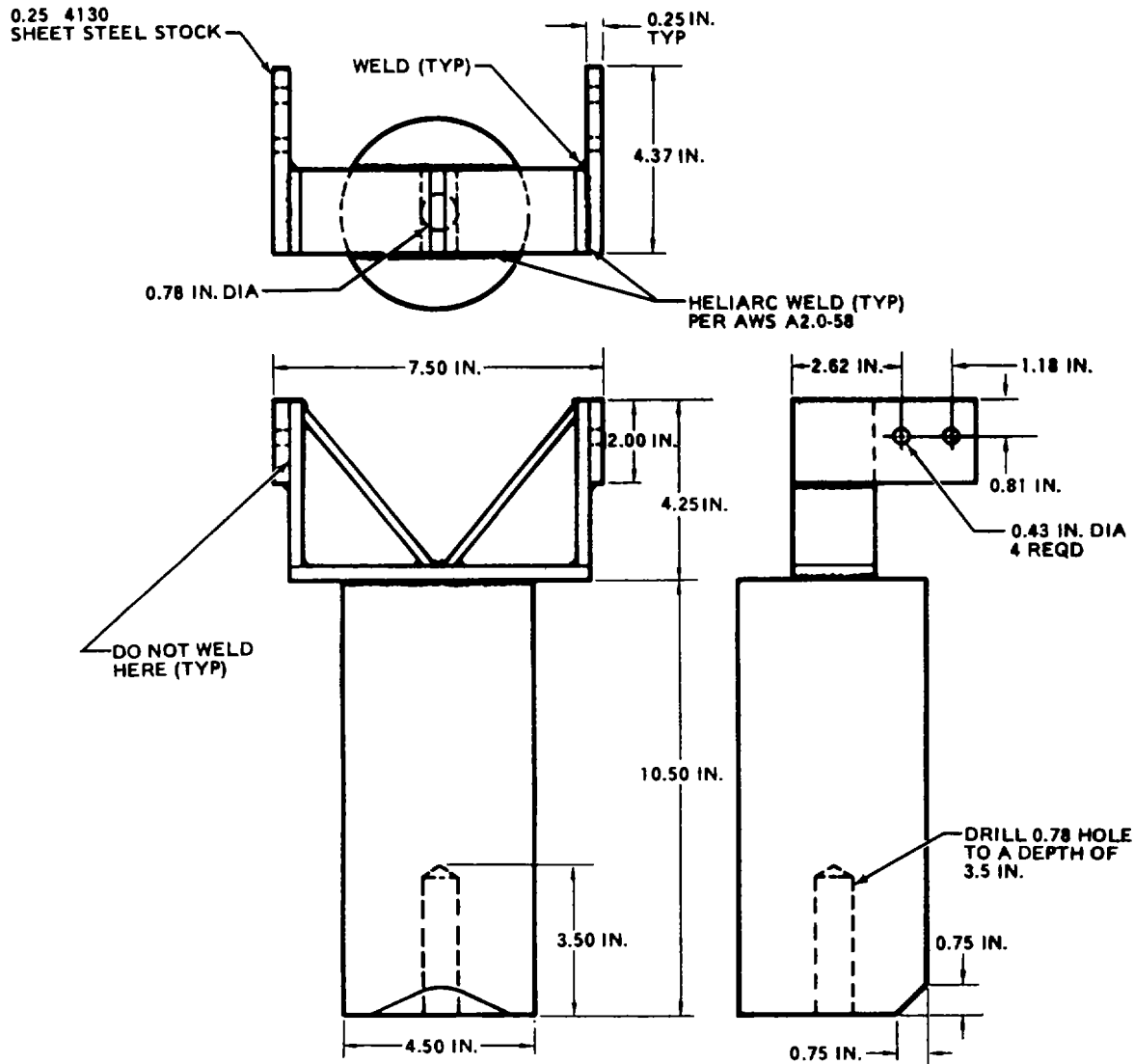
Figure D-163



Part Number: 209-075-152-3 Shunt Assembly
Fabricate from: MS91587-4 Shunt, NSN 6625-00-166-1005
Material: MS91587-4 Shunt
 Install MS20074-06-07 bolts in lieu of
 furnished bolts and washers

Figure D-164.

D-141 Change 4



COUNTERWEIGHT
1560-AH-1-082

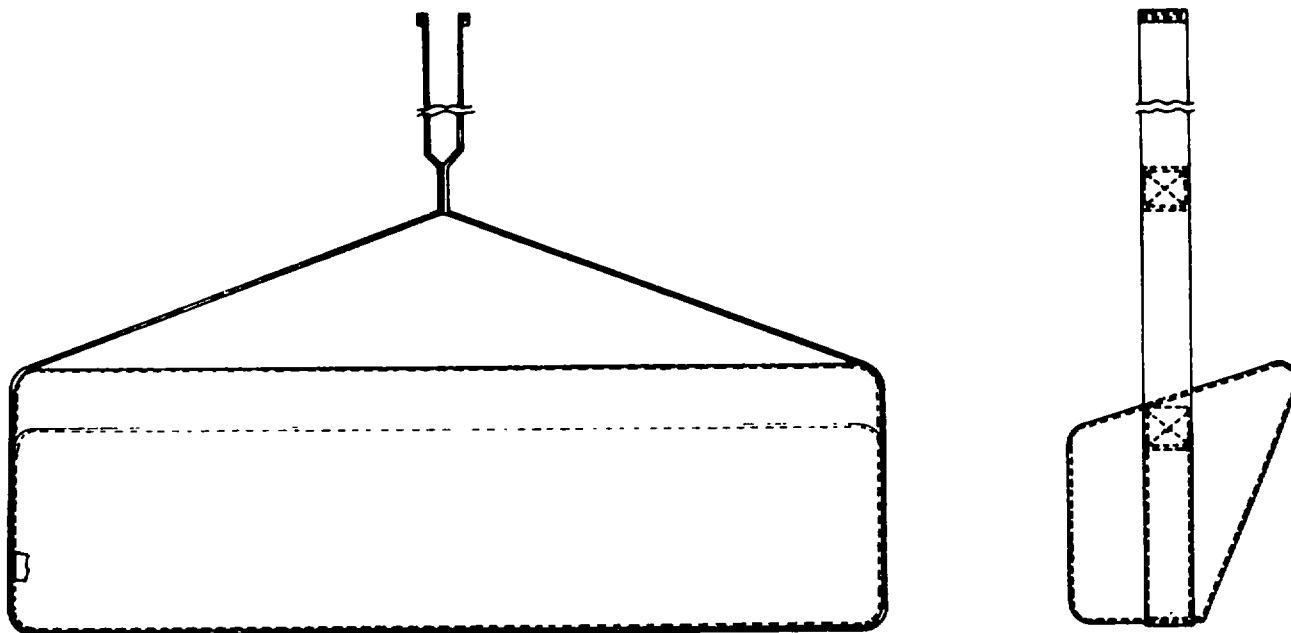
NOTES:

- *1. Braces 0.25 x 2.00, 4130 sheet steel stock.
- **2. Cylinder of counterweight, 4130 steel rod, 4.50 inch diameter.
- 3. Heliarc welded using heliarc weld rod, A5.18-69E70S1B.
- 4. Sandblast and paint O.D.
- 5. Two weights per helicopter 50 pounds each secured by quick release pins, MS17986C610, NSN 5340- 00-904-6859.
- 6. Fillet welds per MIL-W-864.

COUNTERWEIGHT, NOSE

- * MIL-S-18729, 4130 sheet steel stock.
NSN 9515-234-7944L, 0.250 inch.
- ** MIL-S-6758, 4130 steel rod.
NSN 9510-528-4990, 4.50 inch diameter

Figure D-165.



Part Number: 1560-AH1-061-5 SHIELD ASSEMBLY
(FSCM 81996)

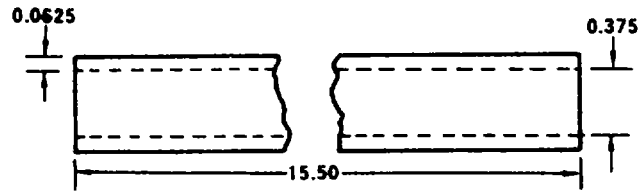
Fabricate from: 8135-00-052-9070
8305-00-811-1617
8305-00-003-6179
8310-00-187-3920

Material: Cloth, Duck

- NOTES: 1. Shield assembly P/N 1560AH1-061-5 is used in lieu of shield assemblies P/N 209-070-502-1 and P/N 209-070-532-1.
2. Make all sewing Federal Standard 751, Stitch Type, 301, Seam Type LS-2.
3. Shield assembly may be purchased from Bell Helicopter, Fort Worth, Texas.

Figure D-166

Change 8 D-143



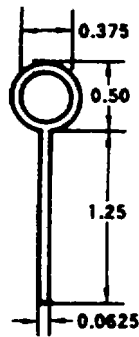
NOTE:

1. Make from Rubber Stock

PART NO.	LENGTH
209-062-600-11	15.50
209-061-600-13	15.50
209-704-062-11	15.50
209-704-062-13	15.50

Part Number: 209-061-600-11 HOSE
 209-061-600-13 HOSE
 Fabricate from: NSN 4720-00-088-4495
 Material: Hose Synthetic Rubber, Federal Specification MIL-R-6855, Class I, Grade 40, 0.375 in ID, 0.0625 in Wall

Figure D-167



PART NUMBER	LENGTH
209-060-200-17	9.8
209-060-200-29	30.0
209-060-200-101	6.0
209-060-200-103	8.0

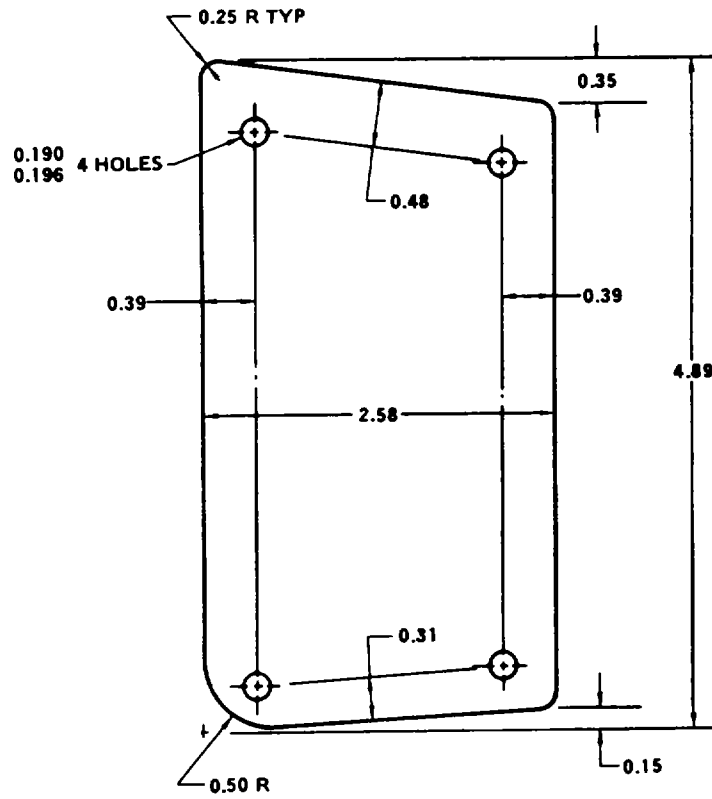
NOTES:

1. Make from extrusion no. X-962. Purchase from Atlantic India Rubber Co., Chicago, Ill. Code ident 70485

Part Number: 209-060-200-17
 209-060-200-29
 209-060-200-101
 209-060-200-103

Fabricate from: NSN 9390-01-130-1886
 Material: Extrusion, BUNA-N Rubber

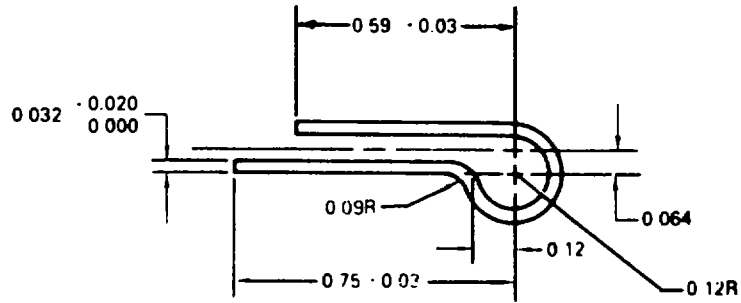
Figure D-168



Part Number: 209-030-113-27 COVER
 Fabricate From: NSN 9535-00-086-9890
 Material: 7075 Al Aly QQ-A-250/13 #T6
 0.10 inch thick, 3.0 inch wide, 5.0 inch long

Figure D-169

Change 8 D-145



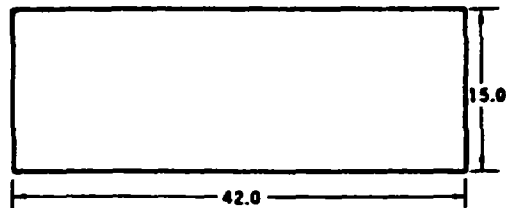
PART NO.	NOMENCLATURE	MAKE FROM NSN	LENGTH
209-071-037-25	EDGING	9390-01-057-9738	26.2
209-071-038-37	EDGING	9390-01-057-9738	16.0
209-071-039-29	EDGING	9390-01-057-9738	9.0

Part Number: (See chart) EDGING
 Fabricate From: NSN 9390-01-057-9738
 Material: Rubber Extrusion, Federal Specification MIL-R-6855, Class III, Grade 60, Synthetic, Color Black

NOTES:

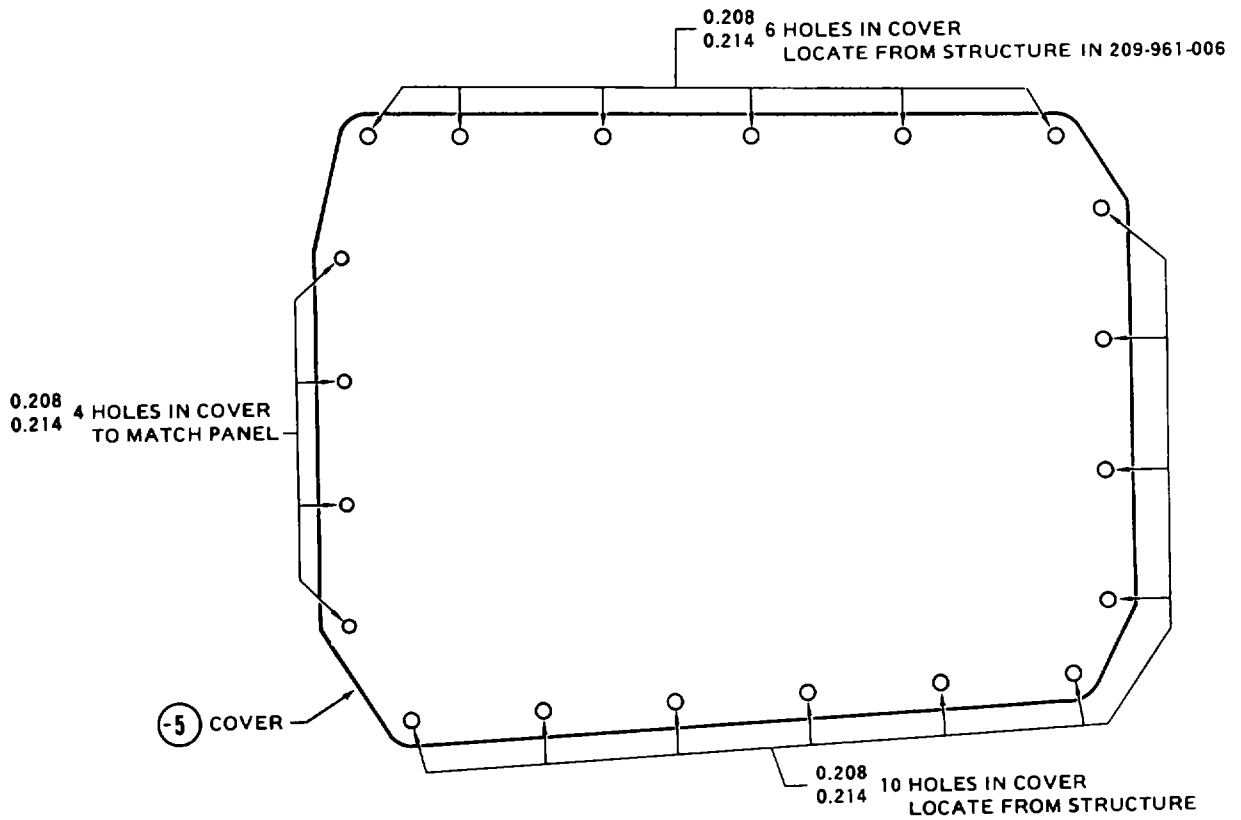
1. Make from Bell Standard 40-001 Stock and purchase from Bell Helicopter, Code Ident 97499

Figure D-170.



Part Number: 1560-AH1-080-3 FOD SCREEN WIRE
 Fabricate From: NSN 5335-00-228-9829
 Material: Stainless Steel, MIL-S-25057A
 15.0 In. Wide, 42.0 In. Long

Figure D-171

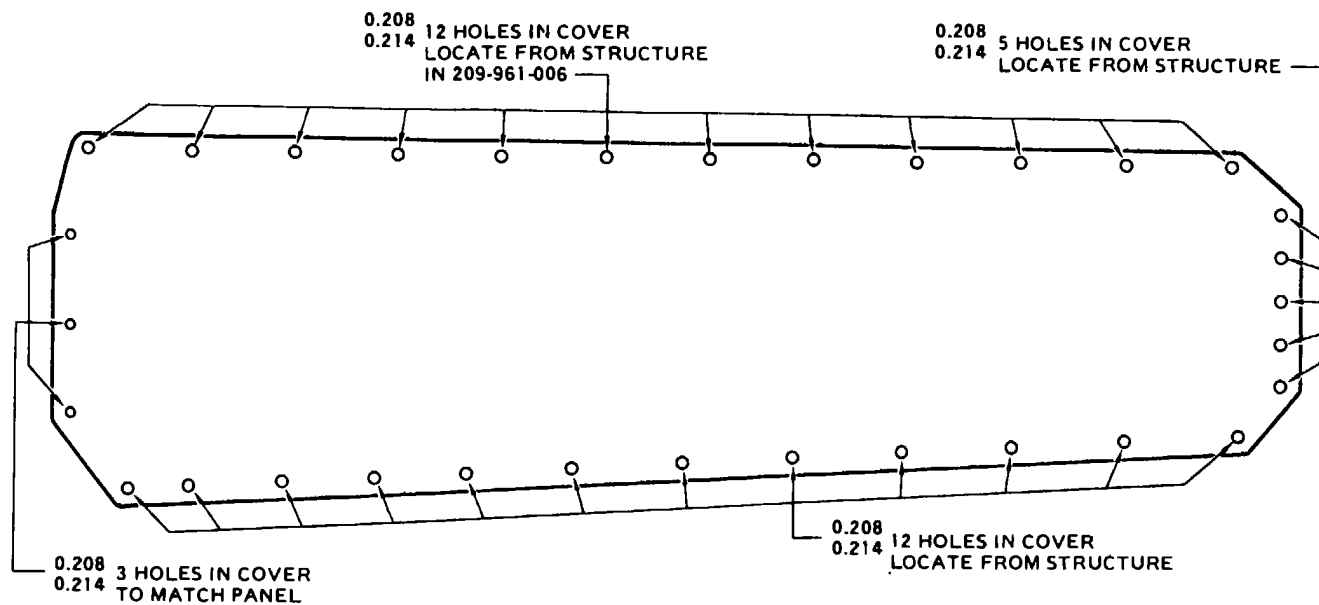


Part Number: 209-961-008-5
Fabricate From: NSN 9535-00-232-0378
Material: 2023 T3 Al Aly QQ-A-250/5
0.63 inch thick, 9.9 inch wide, 12.9 inch long

NOTE: USE EXISTING PANEL AS PATTERN

Figure D-172

Change 8 D-147

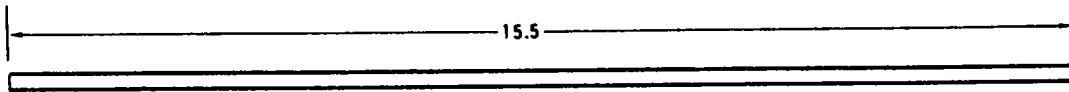


Part Number: 209-961-008-7 COVER
 Fabricate From: NSN 9535-00-232-0569
 Material: 2024 Al Aly, QQ-A-250/5, Temp. T3, 0.050 inch thick, 8.4 inch wide,
 27.0 inch long

NOTE: USE EXISTING PANEL AS PATTERN

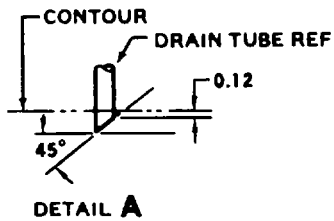
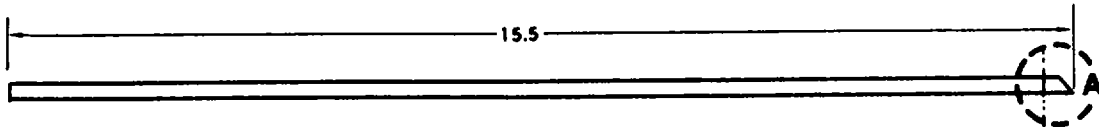
Figure D-173

D-148 Change 8



Part Number: 209-704-062-11 HOSE
Fabricate From: NSN 4720-00-088-4495
Material: Syn Rubber Tubing 0.375 in. ID, 0.0625 in. wall,
MIL-R-6855, Class I

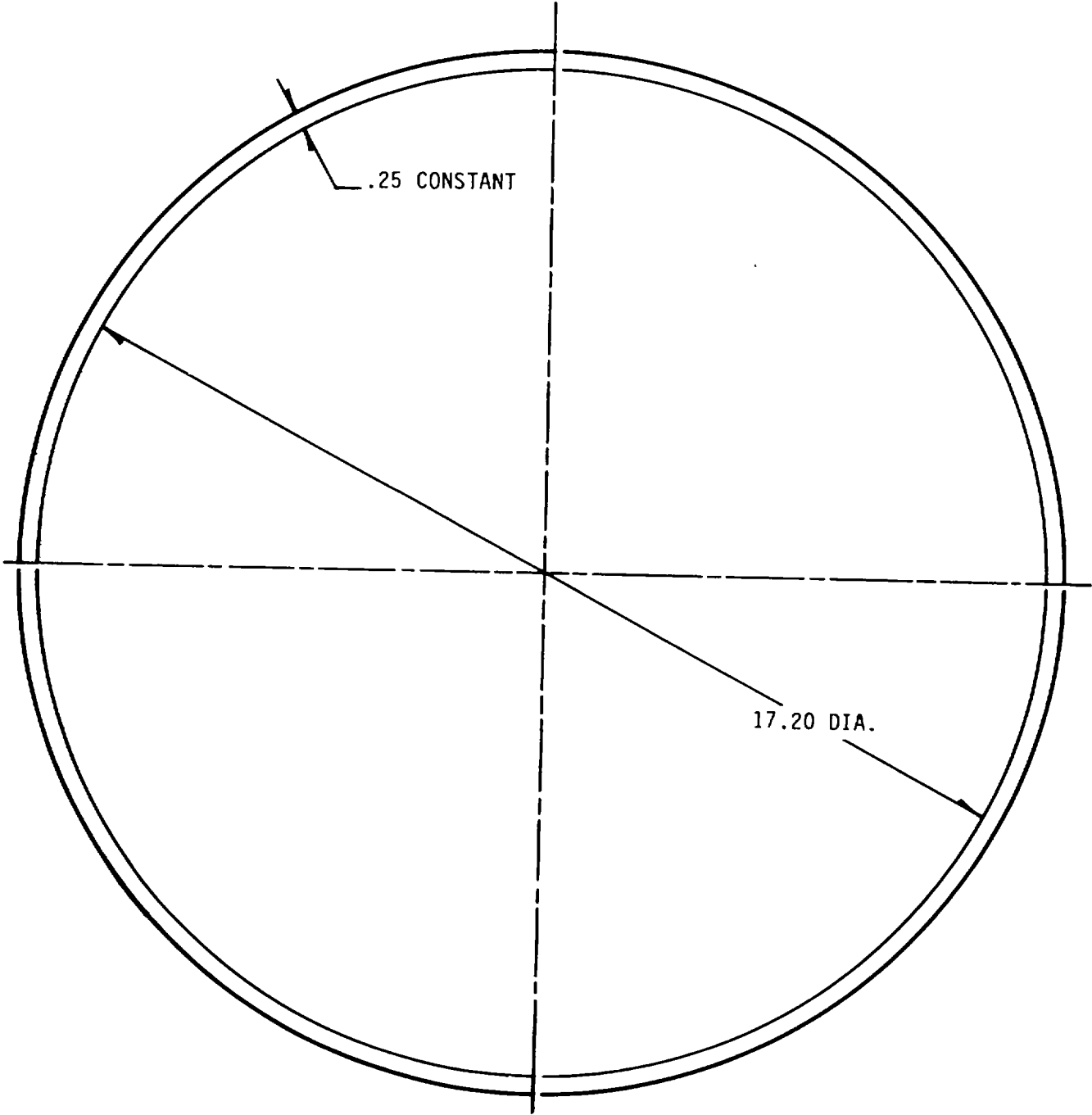
Figure D-174



Part Number: 209-704-062-13 HOSE
Fabricate From: NSN 4720-00-088-4495
Material: Syn Rubber Tubing 0.375 in. ID, 0.0625 in. wall,
MIL-R-6855, Class I

Figure D-175

Change 16 D-149



Part Number: 1560-AH1-081-68 GASKET
Fabricate From: NSN 5330-00-938-1719
Material: JM STYLE 89 3/64 IN. THK.

Figure D-176

Change 11 D-150



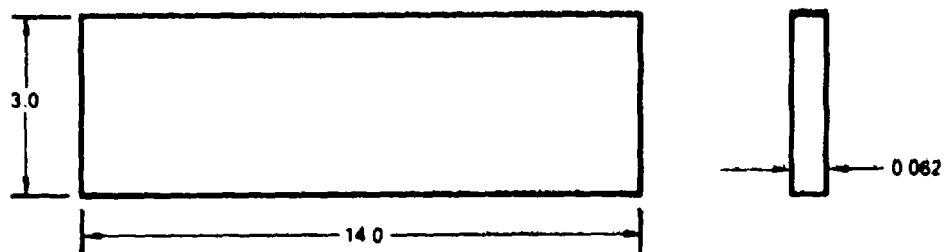
NOTES:

1. Make from X-224 by 1.0 LM Rubber and purchase from Atlantic India Rubber Works, Chicago, Ill., Code Ident 74084.
2. Length is 1.0 inch.

Part Number: 209-060-811-77 BUMPER
Fabricate From: NSN 9320-00-241-9763
Material: Rubber, Federal Specification MIL-R-6855 CLD,
Grade 60, Extrusion X-224, and 1.0 in long.

Figure D-177

Change 11 D-151



NOTES:

1. Make from Silicon Rubber.

PART NUMBER: 209-060-200-19 GASKET

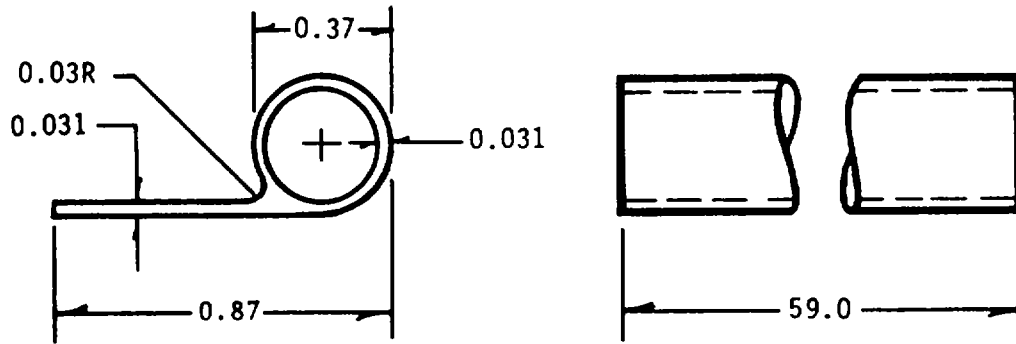
209-060-200-21 GASKET

FABRICATE FROM: NSN 5330-00-871-7859

MATERIAL: RUBBER SHEET, SILICON, 0.063
IN. THICK, 3.0 IN. WIDE,
14.0 IN. LONG

Figure D-178.

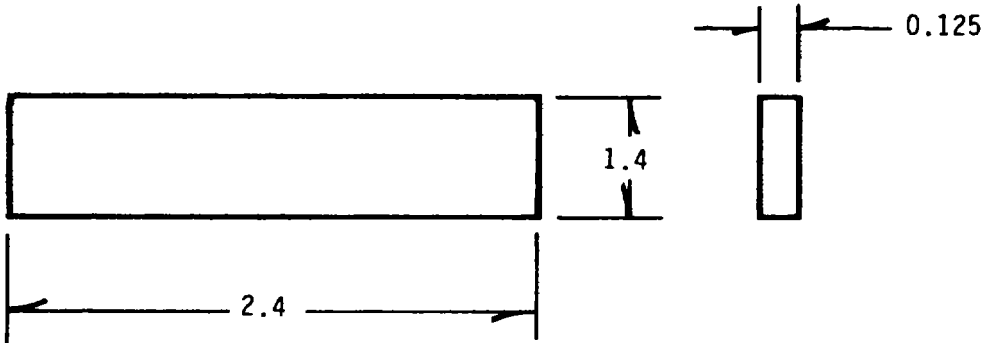
Change 11 D-152



PART NUMBER: 209-060-525-15 RUBBER EXTRUSION
FABRICATE FROM: NSN 9390-00-027-3340
MATERIAL: SYNTHETIC: MIL-R-6855
CLASS I, GRADE 60

Figure D-179

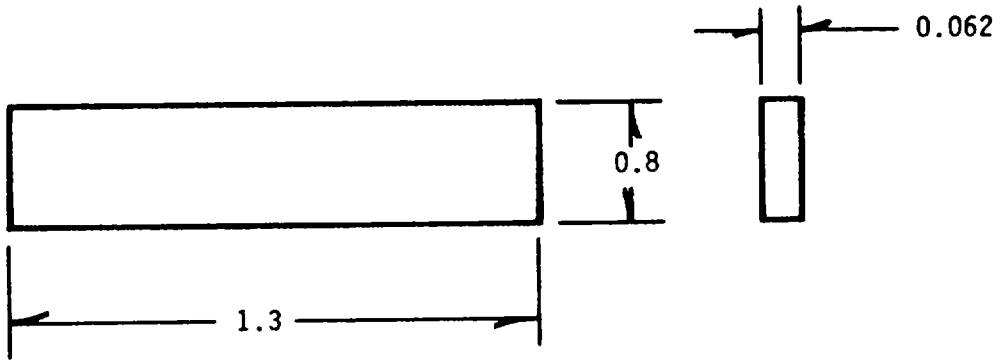
Change 11 D-153



PART NUMBER: 209-033-148-69
FABRICATE FROM: NSN 9535-00-400-3622
MATERIAL: AMS 4013

Figure D-180

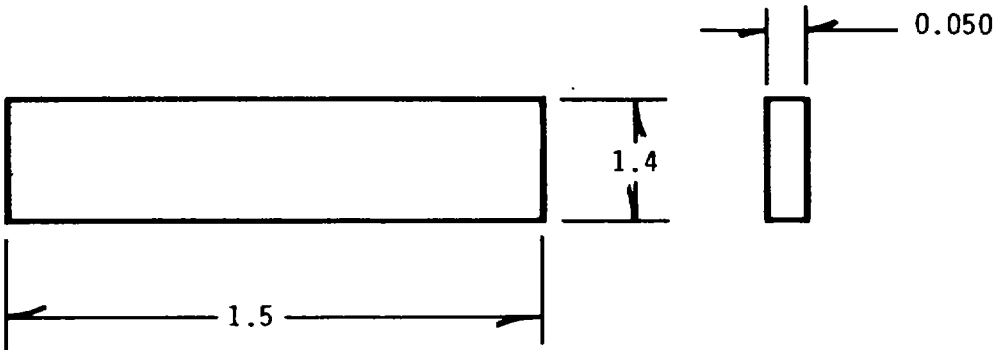
Change 11 D-154



PART NUMBER: 209-030-242-3
FABRICATE FROM: NSN 9535-00-400-3622
MATERIAL: AMS 4013

Figure D-181

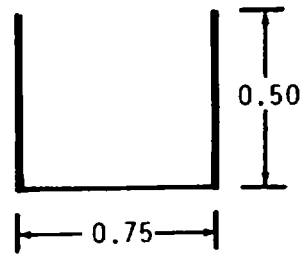
Change 11 D-155



PART NUMBER: 209-030-224-17
FABRICATE FROM: NSN 9535-00-640-2311
MATERIAL: 2024,T3 ALUMINUM ALLOY

Figure D-182

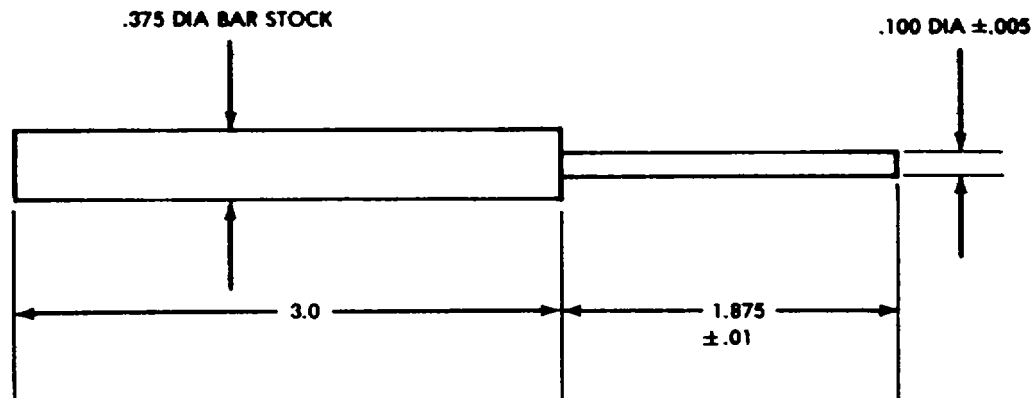
Change 11 D-156



<u>Part Number</u>	<u>Nomenclature</u>	<u>Make from NSN</u>	<u>Length</u>
500-101-961-4	Rubber Channel	9320-00-107-4517	31.5 inches
500-101-960-3	Rubber Channel	9320-00-107-4517	31.5 inches
500-101-959-3	Rubber Channel	9320-00-107-4517	19.5 inches
500-101-958-3	Rubber Channel	9320-00-107-4517	19.5 inches
500-101-956-3	Rubber Channel	9320-00-107-4517	31.5 inches
500-101-955-3	Rubber Channel	9320-00-107-4517	29.5 inches
500-101-954-3	Rubber Channel	9320-00-107-4517	21.0 inches
500-101-953-3	Rubber Channel	9320-00-107-4517	21.0 inches

Figure D-183

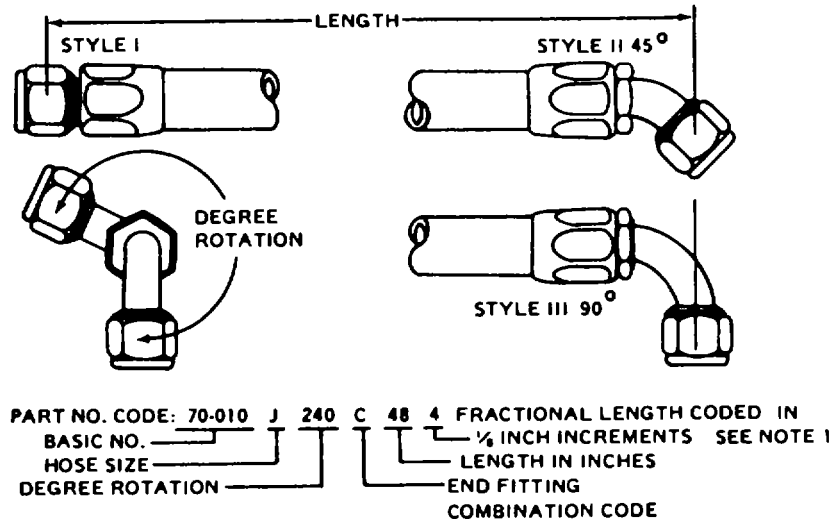
Change 14 D-157



PART NUMBER 5120-AH1-001 SWASHPLATE ALIGNMENT TOOL
FABRICATE FROM NSN 9510-00-960-2463
MATERIAL STEEL, ASTM A322, GRADE 4140

Figure D-184

Change 14 D-158



HOSE SIZE	3	4	5	6	8	10	12	16	20	24	32	= TUBING O.D.
WITHOUT CHAFE GUARD	E	F	G	H	J	K	L	M	N	P	R	IN 1/16 IN.
WITH CHAFE GUARD SEE NOTE 2	S	T	U	V	W	X	Y	Z	A	B	C	INCREMENTS

COMBINATIONS CODE	STYLES AND MATERIALS OF END FITTINGS (FLARED)			
	MATERIAL	FITTING STYLE	MATERIAL	FITTING STYLE
A	Alum	I	Alum	I
B	Alum	II	Alum	II
C	Alum	III	Alum	III
D	Steel	I	Steel	I
E	Steel	II	Steel	II
F	Steel	III	Steel	III
G	Alum	I	Steel	III
H	Alum	I	Steel	II
T	Alum	I	Alum	II
V	Alum	I	Alum	III
W	Alum	II	Alum	III
X	Steel	I	Steel	II
Y	Steel	I	Steel	III
Z	Steel	II	Steel	III

Figure D-185 (Sheet 1 of 2)

EXAMPLE OF CALLOUT:

70-010J240C484 = Hose assembly-non fire resistant, 0.5 inch O.D. 240° rotation, 90° aluminum fittings both ends, 48.5 inches long, without chafe guard.

70-010W000C480 = Hose assembly-non fire resistant, 0.5 inch O.D., 0° rotation, 90° aluminum fittings both ends, 48.0 inches long, with chafe guard.

Notes: 1. Fractional length hoses are in the following increments only:

(a) Under 18 inches long = 1/4 inch increments only. (2, 4, or 6 only)

(b) Over 19 inches long = 1/2 inch only (4 only)

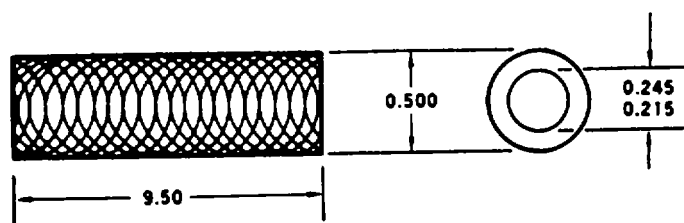
2. Chafe guard is translucent vinyl plastic per MIL-L-7444 type I. Ends of chafe guard must be within 0.19 inches of fittings.

HOSE ASSEMBLY, NON-FIRE RESISTANT

HOSE PART NUMBER	HOSE MATERIAL NSN	END FITTING NSN	END FITTING NSN
70-010F000CD200	4720-00-541-9281	4730-00-618-7378	4730-00-618-7378
70-010F000F190	4720-00-541-9281	4730-00-618-8862	4730-00-618-8862
70-010F000X060	4720-00-541-9281	4730-00-618-7378	4730-00-709-3887
70-010F000Y124	4720-00-541-9281	4730-00-618-7378	4730-00-618-8862
70-010F000Y196	4720-00-541-9281	4730-00-618-7378	4730-00-618-8862
70-010F180Z120	4720-00-541-9281	4730-00-709-3837	4730-00-618-8862
70-010F332F126	4720-00-541-9281	4730-00-618-8862	4730-00-618-8862
70-010H000T204	4720-00-611-2548	4730-00-541-8234	4730-00-613-1859
70-010H045W130	4720-00-611-2548	4730-00-541-8234	4730-00-720-116
70-010K000A320	4720-00-541-8328	4730-00-541-9105	4730-00-541-9105
70-010K000A494	4720-00-541-8328	4730-00-541-9105	4730-00-541-9105
70-010K000V132	4720-00-541-8328	4730-00-541-9105	4730-00-919-6785
70-010L000A840	4720-00-555-3499	4730-00-541-1957	4730-00-541-1957
70-010L000V072	4720-00-555-3499	4730-00-541-1957	4730-00-238-5338
70-010L090B194	4720-00-555-3499	4730-00-618-7382	4730-00-618-7382
70-012H000A146	4720-00-857-1731	4330-00-053-0379	4330-00-053-0379
70-012J000A150	4720-00-815-6354	4730-00-053-0389	4730-00-053-0389

Figure D-185 (Sheet 2 of 2)

Change 21 D-160



- NOTES:**
1. All dimensions are in inches unless otherwise noted.
 2. Burst pressure - 150 PSI at 70 °F (21 °C)

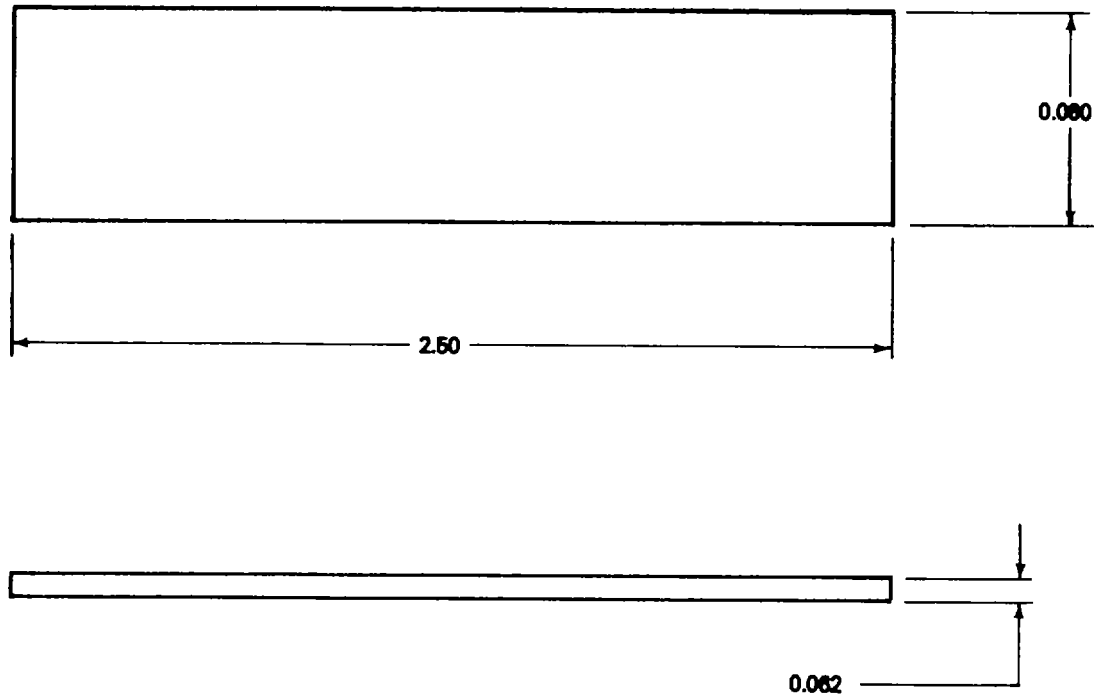
Part Number: S9380-04B094, Tube

Fabricate from: NSN 4720-01-201-8499
P/N 2201859-15

Material: Vinyl Tubing, Black, Nylon Braid Reinforced

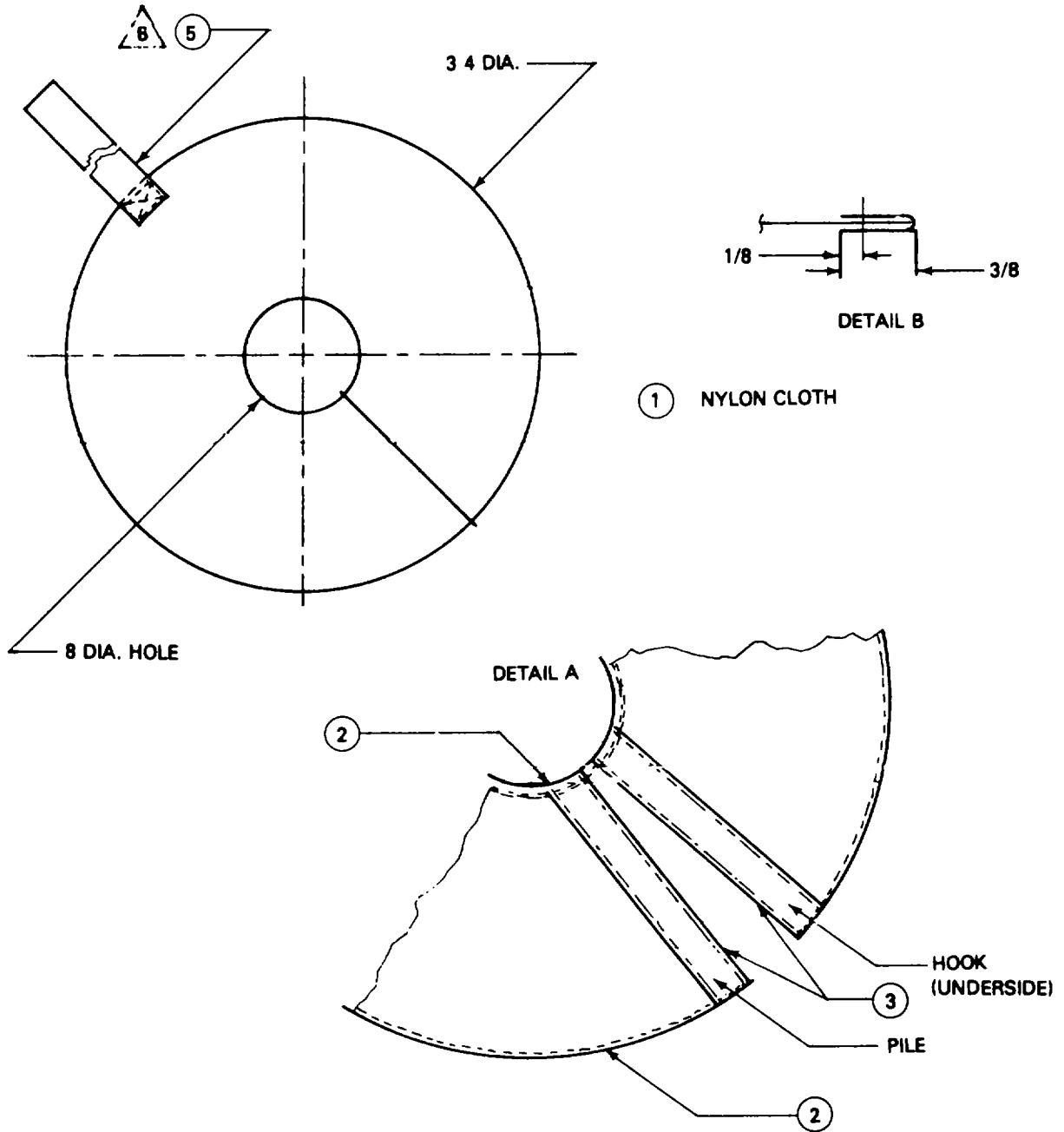
Figure D-186

Change 15 D-161



Part Number: 209-030-624-1 SHIM
Fabricate from: NSN 9535-00-400-3622
Material: Aluminum Alloy AMS4013
0.062 inch thick, 2.50 inch long,
0.60 inch wide

Figure D-187



Part Number: 1730-EG-026 Engine FOD Cover

Fabricate from: See Sheet 2

Material: See Sheet 2

Figure D-188 (Sheet 1 of 2)

Change 15 D-163

NOTES:

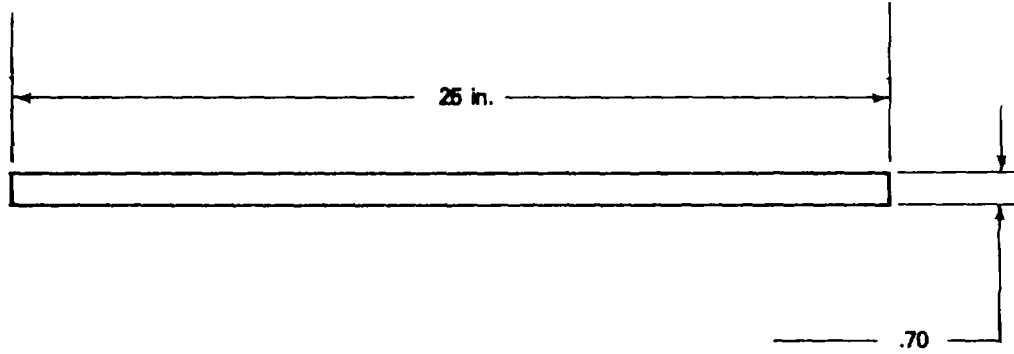
1. Part number 1730-EG-026 Engine FOD Cover consists of the following:

1	8305-01-052-9381	MIL-C-20696, Type II, Class 2	Cloth, NylIn	1 sq yd
2	8305-10-432-8179	MIL-W-5664, Type II, 3/4 in wide	Webbing, Textile, Elastic	2 yds
3	8315-00-926-4931	MIL-F-21840, Class 1, 2 in wide	Fastener, Hook	15 in.
3	8315-00-926-4930	MIL-F-21840, Class 1, 2 in wide	Fastener, Pile	15 in.
4	8310-00-204-3749	V-T-295, Type I, Class A	Thread, Nylon	As reqd
5	8345-01-137-4795	NAS-1756-12	Streamer, Warning	1

2. Sew velcro strip to 13 inch radial edge of cover as shown in detail A. Maintain 1/4 inch distance between stitching and edge of velcro strip.
3. Sew 56 inch strip of elastic around outer diameter as shown in detail A and B, gathering cover edge as necessary to fit.
4. Sew 12-1/2 inch strip of elastic around inner diameter as shown in detail A and B, gathering cover edge as necessary to fit.
5. All sewing in accordance with FED-STD-171, Type 301.
- (6.) Sew warning streamer to cover as indicated.

Figure D-188 (Sheet 2 of 2)

Change 15 D-164



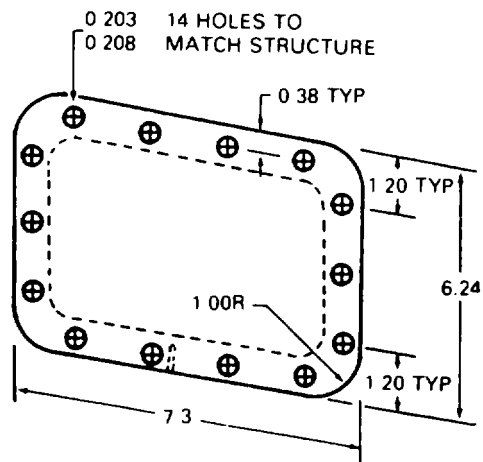
Part Number: 209-030-244-13 RUB STRIP

Fabricate from: NSN 9330-00-580-6886

Material: MIL-P-22241 Plastic Sheet

Figure D-189

Change 16 D-165



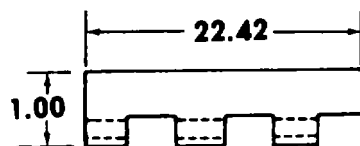
Part Number: 209-020-001-111 DOOR SHOWN
209-020-011-112 DOOR OPPOSITE

Fabricate from: NSN 9535-00-088-6599

Material: Aluminum Alloy 7075,
Federal Specification QQ-A-250/13, T3,
0.063 In. Thk, 6.5 In. Wide, 8.1 In. Long

Figure D-190

Change 16 D-166

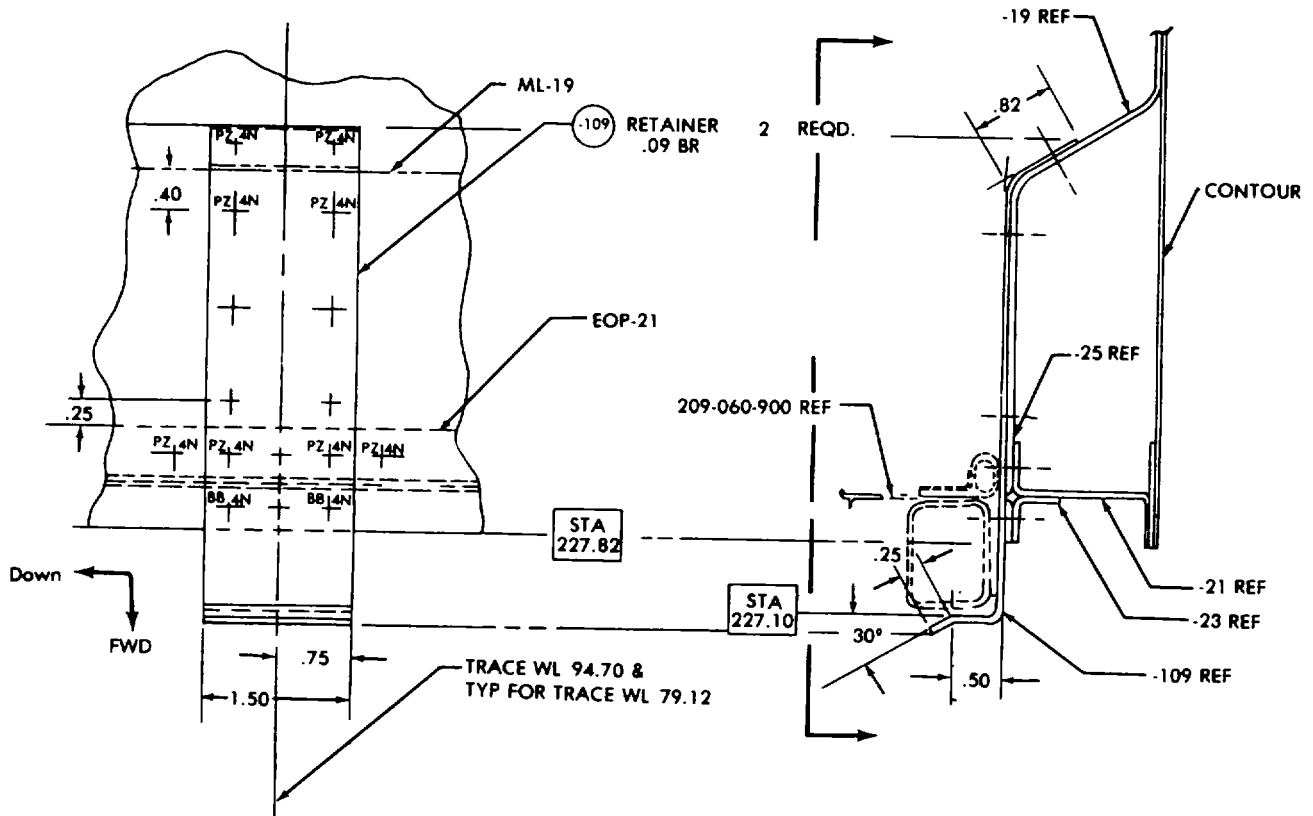


NOTES:

1. Make from MS20257HC5 Hinge Stock
Part Number: 209-030-836-25 Hinge Half
209-030-836-27 Hinge Half
Fabricate from: NSN 5340-00-616-4803
Material: Hinge Butt, Cres, 0.062 in thk,
1.00 in wide, 22.42 in long

Figure D-191

Change 16 D-167



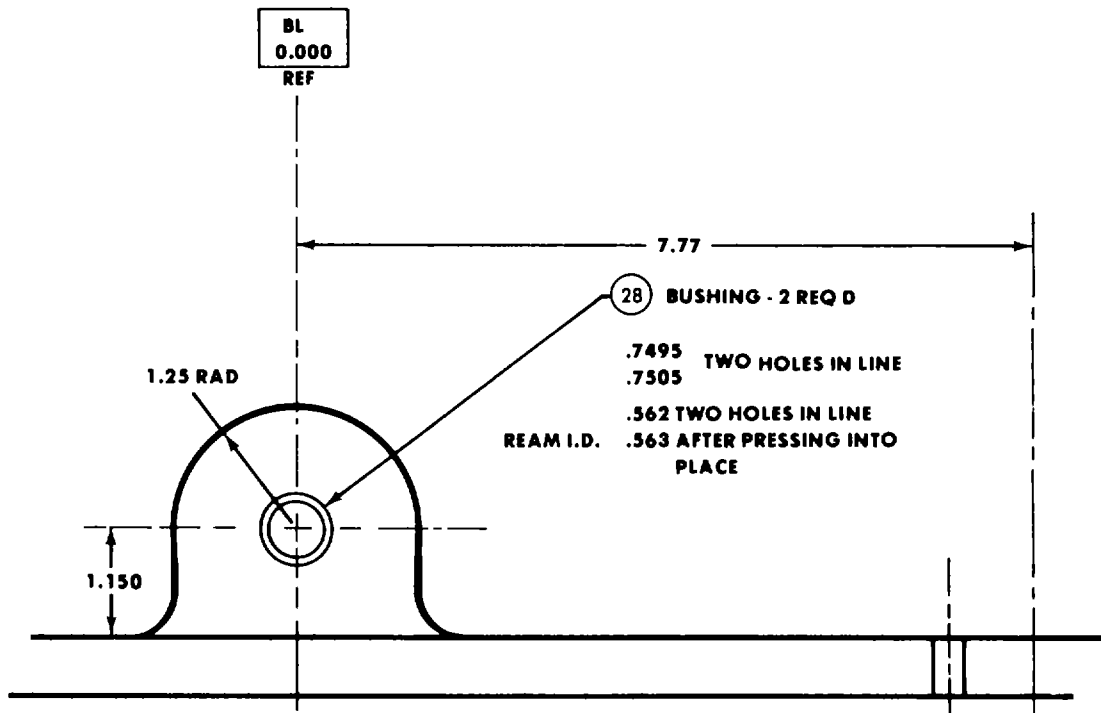
Part Number: 209-060-809-109 RETAINER

Fabricate from: NSN 9535-00-554-1417

Material: Aluminum Alloy 2024 Fed Spec QQ-A-250/5,
0.063 in. thk, 2 in. wide, 6.5 in. long,
(Heat treat to T42)

Figure D-192

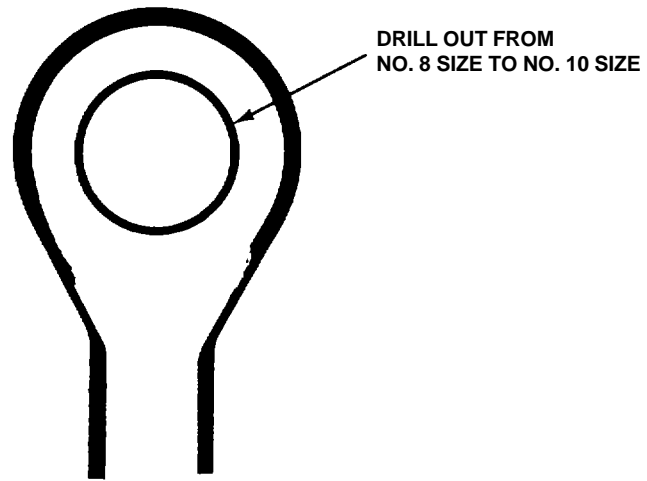
Change 16 D-168



PART NUMBER: 20-012-35-31-28, BUSHING
 FABRICATE FROM: NSN 4710-00-278-2373
 MATERIAL: QQ-P-416, TYPE II

Figure D-193

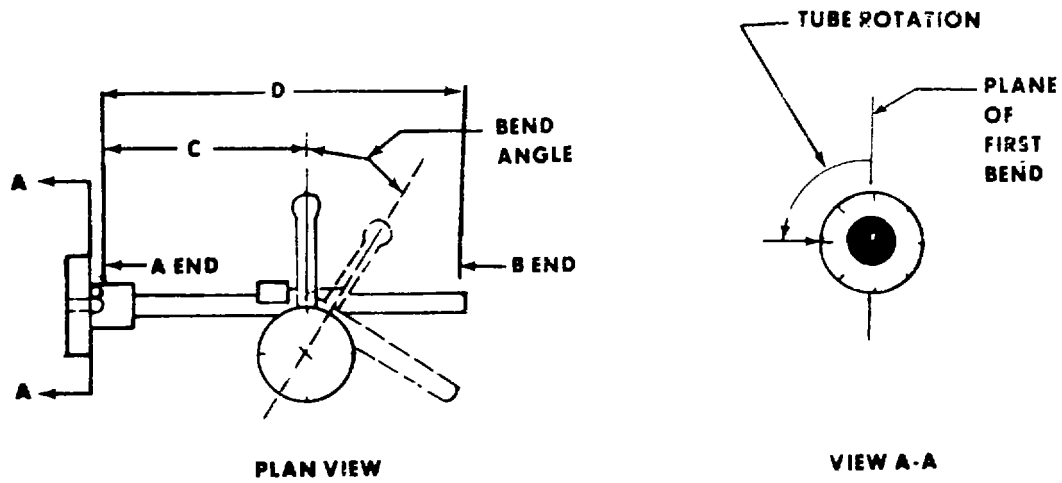
Change 18 D-169



PART NUMBER: 2-323749-3, TERMINAL LUG
FABRICATE FROM: NSN 5940-00-878-5892

Figure D-194

Change 18 D-170



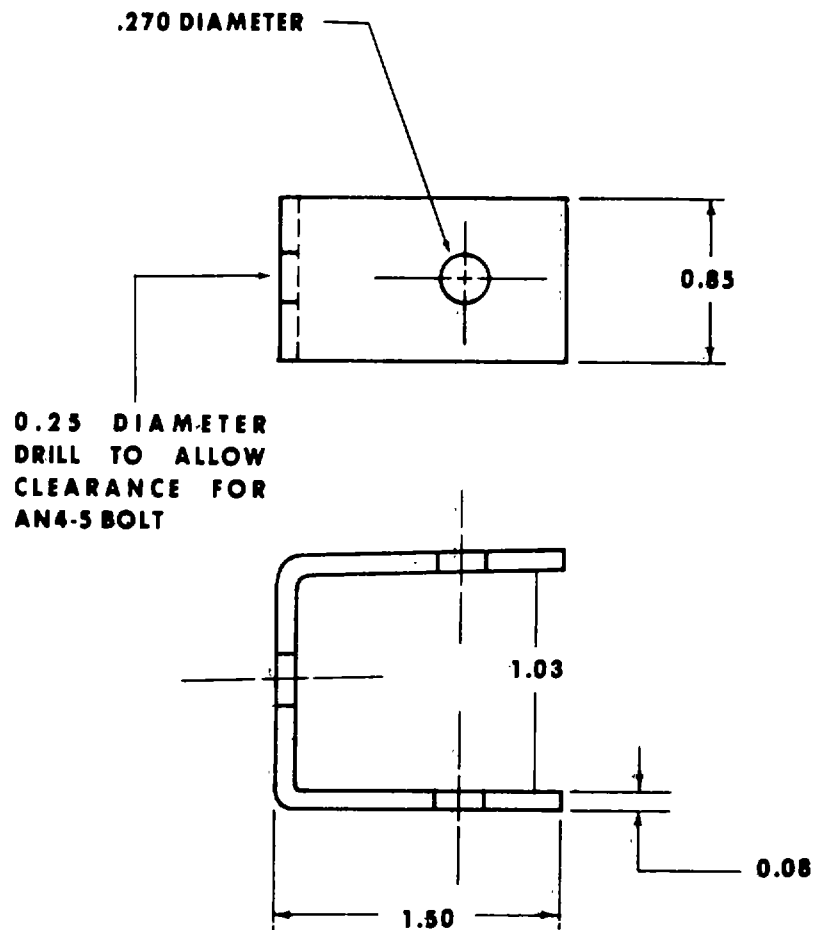
Part Number: 209-076-416-1, Hydraulic Tube Assembly

Fabricate from: Tube NSN 4710-00-289-2537
 Fitting NSN 4730-00-580-2120, Qty 2
 Fitting NSN 4730-00-555-0595, Qty 2

Tube is 1/2 in. O.D., wall 0.035, length 15.0
 6061 AL ALY, MIL-T-7981, Temp T6
 Finished tube dimensions: 6.81 in., 1.25 bend radius in.,
 0 rotation, 48 bend angle degrees. 2.69 in., 1.25 bend
 radius in., 311 tube rotation, 61 bend angle degrees.

Figure D-195

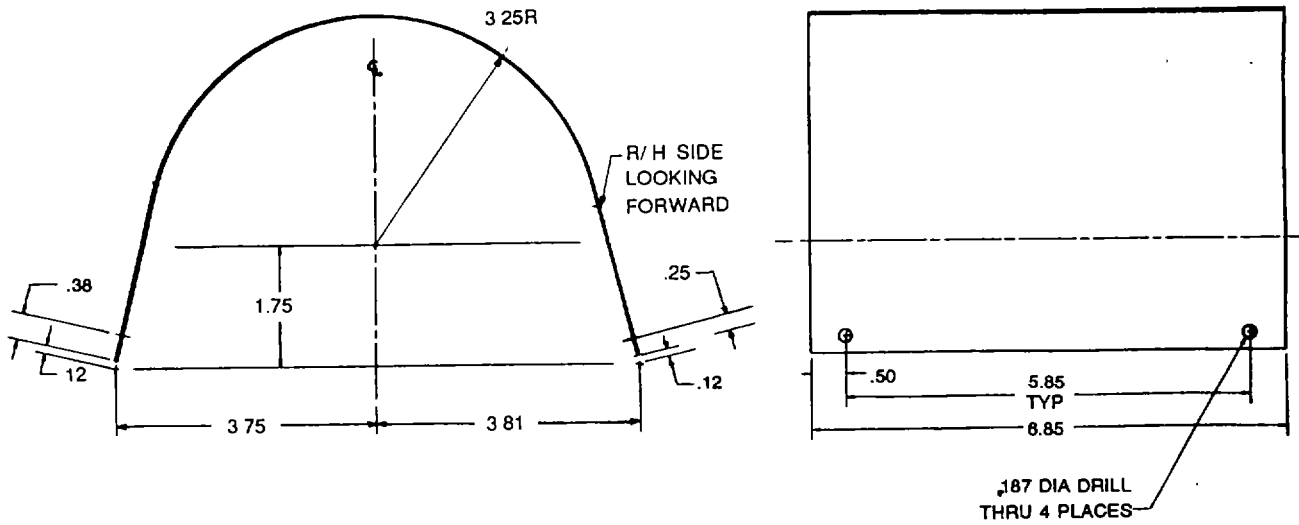
Change 19 D-171



Part Number: EGD-0856-2, Bracket
Fabricate From: NSN 9515-00-006-2678
Material: MIL-S-5059 Stainless Steel
0.80 inch thick

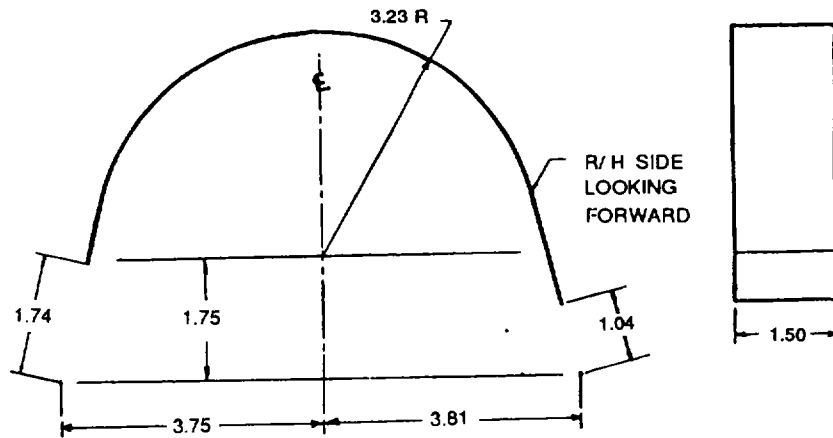
Figure D-196

Change 19 D-172



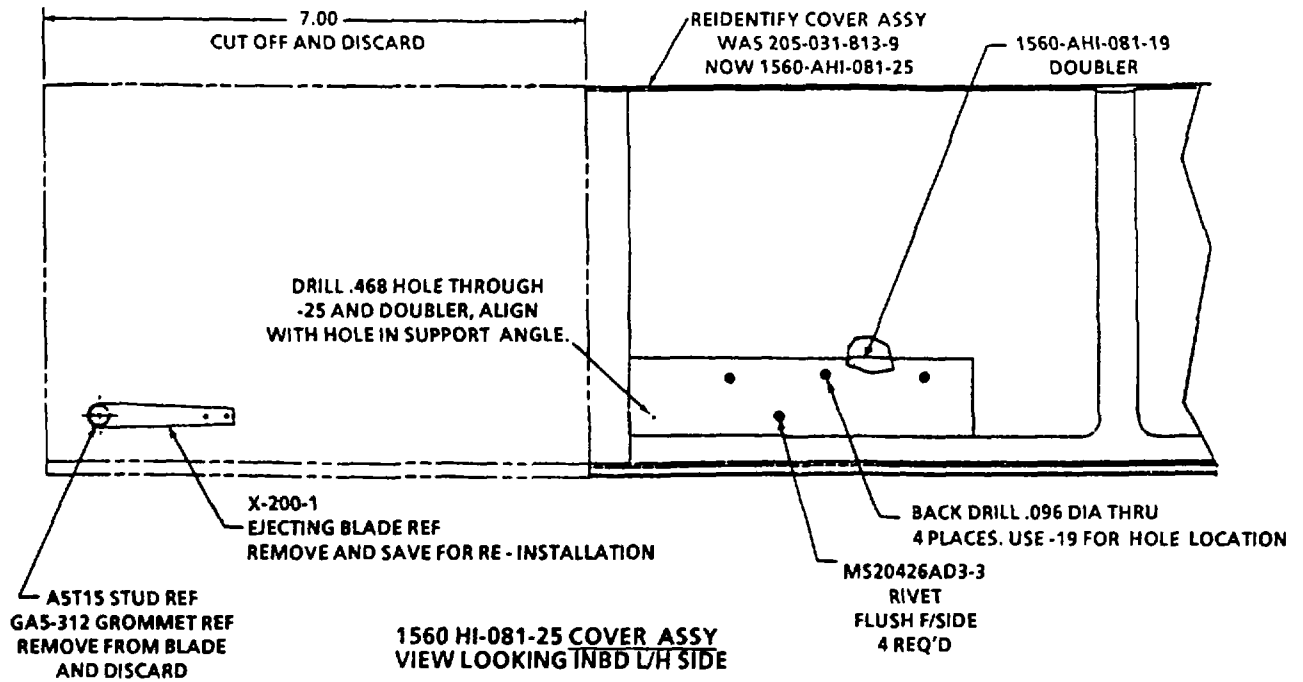
Part Number: 1560-AH1-081-17 COVER
 Fabricate from: NSN 9535-00-167-2267
 Material: 0.040 2024 ALUM. ALY.
 QQ-A-250/5, T3
 .040 x 6.85 x 13.72 inch

Figure D-197



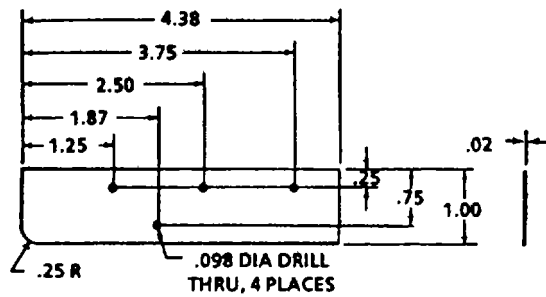
Part Number: 1560-AH1-081-18 LIP
 Fabricate from: NSN 9535-00-167-2277
 Material: 0.020 2024 ALUM. ALY.
 QQ-A-250/5, T3
 .020 x 1.50 x 11.07 inch

Figure D-198



Part Number: 1560-AH1-081-25
 Fabricate from: NSN 1615-00-851-9168
 Material: PN 205-031-813-9

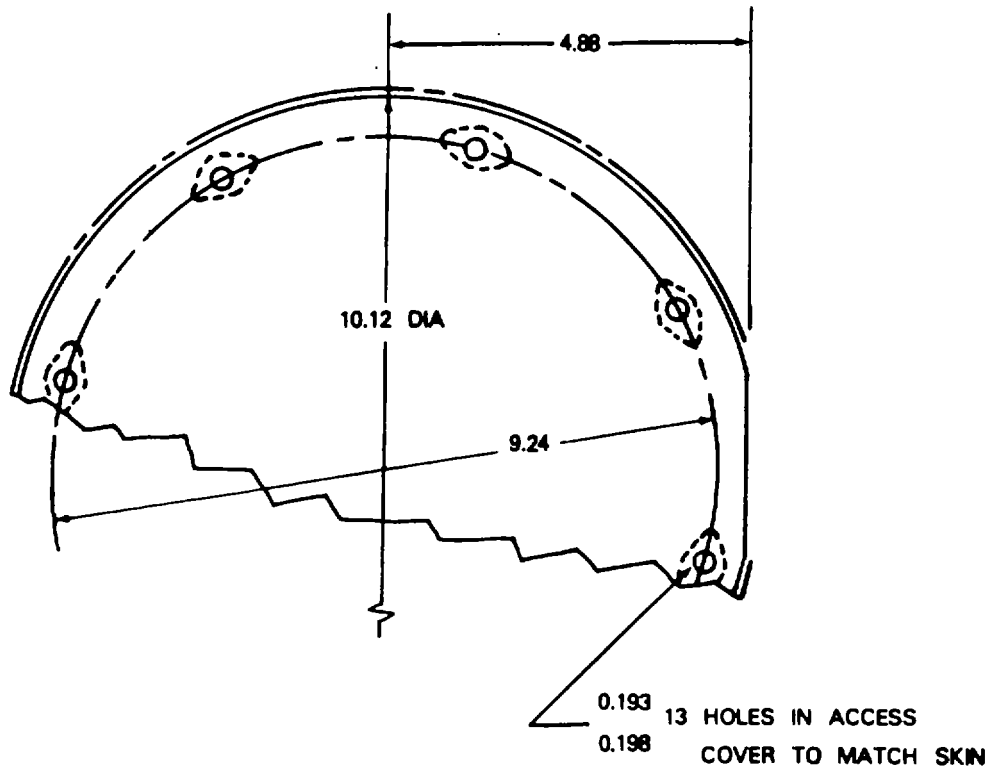
Figure D-199



1560-AHI-081-19 DOUBLER

Part Number: 1560-AH1-081-19
 Fabricate from: NSN 9535-00-167-2277
 Material: 0.020 IN. 2024 ALUM. ALY.
 QQ-A-250/5, T3
 .020 x 1.0 x 4.38

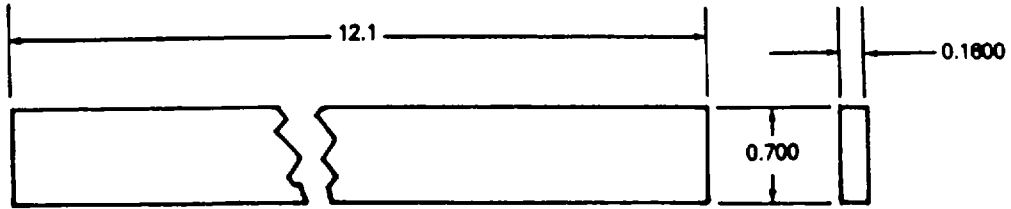
Figure D-200



Part Number: 209-033-005-35 ACCESS COVER
Fabricate from: NSN 9535-00-232-0378
Material: Aluminum Alloy, 2024
Federal Specification QQ-A-250/5, T3
0.063 in. thk, 8.0 in. wide, 8.0 in long

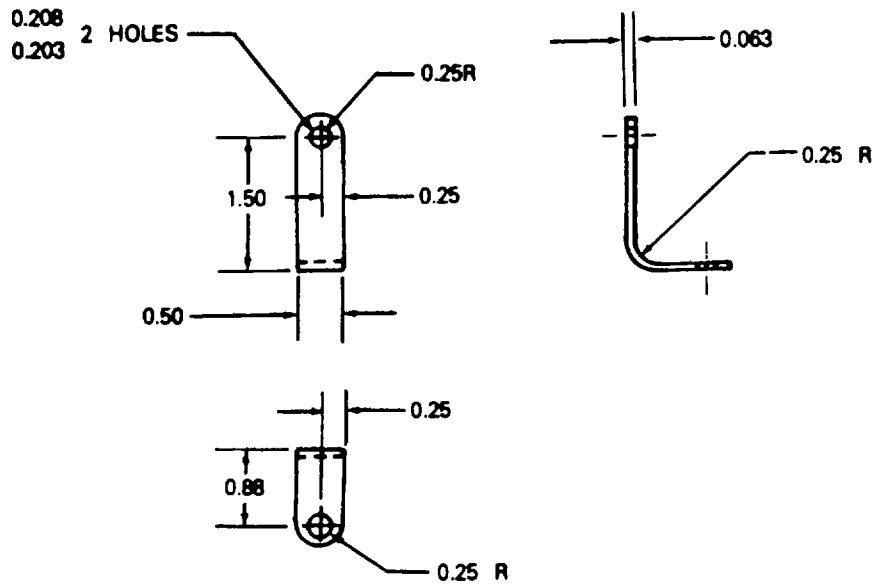
Figure D-201

Change 21 D-175



Part Number: 209-961-518-153 Spacer
 Fabricate from:
 Material: 2024-0. -AL-ALY., QQ-A-250/5
 0.1600 x 0.700 x 12.1

Figure D-202



Part Number: 209-577-002-107 Bracket
 Fabricate from: NSN 9535-00-232-0378
 Material: 2024, T4, AL-ALY., QQ-A-250/5
 0.0630-0.500-2.9

Figure D-203

Change 21 D-176

APPENDIX E

STORAGE OF AIRCRAFT

Section I. GENERAL INFORMATION

E-1. Purpose

This appendix provides detailed preparation procedures to place an AH-1S in storage for a period of six months or less, inspection requirements during storage, and necessary depreservation procedures to activate the helicopter after storage. Categories of storage are:

a. *Flyable Storage* (no time limit). Flyable storage implies maintaining the helicopter in operable condition. It entails mooring the AH-1S, installing protective covers, a daily inspection every seven days and a ground runup every 14 days.

b. *Short Term Storage* (1-45 days). This type storage includes a ground runup, preservation of the engine, fuel system, oil system, and exposed helicopter components. It also requires removal of classified communications equipment, clock, fire extinguishers, and first aid kit. The AH-1S is moored, protective covers installed, and a daily inspection performed every seven days.

c. *Intermediate Storage* (46-180 days). Intermediate storage includes all requirements of Short Term Storage. In addition, the fuel system is preserved and a corrosion control program established.

E-2. Storage Responsibility

The local maintenance officer is responsible for processing the helicopter for storage, taking into consideration anticipated duration of storage and local climatic conditions.

a. *Records*. The processing organization is responsible for performing a receiving check of the helicopter, and for record-keeping requirements during storage. Refer to TM 38-750, Army Equipment Record Procedures, for forms used for equipment inventory.

b. *Removed Equipment*. Equipment and Components removed from the helicopter as part of storage procedures shall be stored, and records maintained in accordance with current supply directives.

NOTE

Do not preserve any component removed because of accident or material failure. Rather, ship in present condition.

c. *Classified Equipment*. Removal of classified equipment other than communications equipment is discretionary with the Commanding Officer. His decision will consider local storage procedures, climatic conditions affecting deterioration or corrosion, and manhours required to remove and reinstall such equipment. Take appropriate security measures for all classified equipment either removed or left installed.

E-3. Inaction of Stored Helicopter.

NOTE

Aircraft that are inactive for seven or more consecutive days must be placed in storage.

The aviation unit Maintenance officer is responsible for establishing an inspection program to ensure that the helicopter remains properly preserved. AH-1S in Flyable Storage require a daily inspection at least every seven days and an engine runup at least once every 14 days. Helicopters in Short Term or Intermediate Storage will be inspected for corrosion every 15 days where relative humidity exceeds 40 percent. Helicopters in any storage will be inspected for condition of protective covers whenever they experience high winds (exceeding 40 MPH). In addition, the following general inspection procedures apply to all types of storage:

a. Provide adequate helicopter ventilation and preservation. Determine cockpit temperature by thermometer. When in excess of **135** degrees F (**57** degrees C), ventilate to prevent condensation, mildew, and corrosion.

- b. Check that all fuselage, wings, center section, control surfaces, and empennage drains are open.
- c. If covers are used, check that they are not accumulating water. Provide drains as necessary. Replace damaged or deteriorated covers.
- d. Regularly inspect and treat the AH-1 for corrosion as necessary. Local humidity conditions will determine inspection frequency. Give close attention to areas where moisture does not evaporate readily. Evidence of corrosion is not as obvious on painted surfaces as on bare metal. However, corrosion can attack metal through paint, and is indicated by blisters or scaly appearance.
- e. Inspect static ground wires, tiedown straps, and mooring devices (ropes, cables, rods, eyes) at regular intervals, and immediately after AH-1 is subjected to winds exceeding **40** mph. Replace ground wires, mooring devices or tiedown straps which are deformed or deteriorated.
- f. Inspect communications equipment for fungus and corrosion. At the first indication of deterioration, remove, clean, preserve, and package any affected component in accordance with MIL-P-116. Stow these items in the helicopter from which removed.
- g. Enter inspection data in the aircraft log book.

Section II - Flyable Storage

E-4. Inspection Prior to Flyable Storage

AH-1's in this storage category will be maintained in a serviceable condition. Perform a Daily Inspection (TM 55-1520-234-PMS) prior to performing the requirements of the following paragraphs. Enter the type and date of storage in the aircraft log book.

NOTE

General requirements in Section I form a part of this procedure.

E-5. Preservation

a. *Power Train.*

(1) Check the power train lubrication system, including sight gages. Service the system in accordance with Chapter I.

(2) The preservation runup prescribed in paragraph E-5.6. completes the preservation of transmission and gearboxes.

b. *Engine.*

WARNING

Solvent is flammable. Avoid breathing vapors. Avoid skin contact.

(1) Use every precaution to keep the engine and accessories clean. Keep the air intake duct, plenum chamber, and compressor inlet screens clean and free of any foreign materials. Use solvent (C124) to clean external surfaces.

(2) Start engine in accordance with TM 55 1520-234-10.

NOTE

This runup may be omitted if the helicopter was recently operated and known to be dry.

(3) Limit the run to that necessary to normalize engine temperatures.

(4) Shut down engine in accordance with TM 55-1520-234-10.

(5) After engine cools, install engine inlet and exhaust protective covers. If these are not available, seal the openings with barrier material (C30) and secure with tape (C136).

(6) Cover additional engine cowling openings with barrier material (C30) and secure with tape (C136).

(7) Record the date engines are placed in Flyable Storage in the aircraft log book.

c. *Hydraulic System.*

CAUTION

Do not mix hydraulic fluid (C73) with fire retardant hydraulic fluid (C73A). Refer to TB 55-1500-334-24.

Check hydraulic reservoirs, and fill as necessary with hydraulic fluid (C73).

d. *Fuel System.*

Service fuel tanks to normal capacity after each engine run-up. Drain water from fuel tanks before adding fuel.

NOTE

Fuel tanks minimize fuel contamination by condensation. The maintenance officer will determine the interval of periodic drainage.

e. *Battery.*

(1) Check that all cockpit switches are OFF.

(2) Clean battery as necessary, but leave it in the helicopter unless the temperature is expected to be colder than **-40°F**.

(3) Service battery in accordance with TM 11-6140-203-152.

f. *Airframe.*

(1) Install pitot tube cover, or wrap pitot tube with barrier material (C30) and secure with tape (C136).

(2) Close canopy.

(3) Install static ground wire.

(4) Install aircraft covers, if available, in accordance with instructions accompanying covers.

E-6. Maintenance of Preservation.

a. Inspect helicopters in Flyable Storage in accordance with local directives and requirements of paragraph E-3.

b. Perform a preventive maintenance daily inspection in accordance with TM 55-1500-220-PMD every seven days and an engine run-up at least once every 14 days.

E-7. Depreservation After Storage.

a. Remove protective covers, clean, and return to storage.

WARNING

Solvent is flammable. Avoid breathing vapors. Avoid skin contact.

b. Remove all barrier material and tape.

Remove tape residue with solvent (C124).

c. Clean helicopter as necessary, in accordance with Chapter I.

d. Open canopy for ventilation.

e. Remove all tiedowns.

f. Perform preventive maintenance daily inspection in accordance with TM 55-1500-220-PMD.

g. Remove and stow static ground wire.

h. Indicate on aircraft maintenance records that helicopter has been depreserved and removed from storage.

Section III SHORT TERM STORAGE

E-8. Inspection Prior to Storage.

NOTE

General requirements of Section I form a part of this procedure.

a. Ensure that all removed components are preserved and stowed within the helicopter in suitable containers.

b. Record all removed or disconnected parts in the aircraft log book.

c. Coat bolts, washers, nuts, etc., which are removed during disassembly, with a light coat of corrosion preventive compound (C52). Reinstall as removed from the major component, unless otherwise specified.

d. Check fuel, oil, and hydraulic lines and hoses for leakage.

e. Lubricate the AH-1 for the 150-hour interval in accordance with Chapter 1.

f. Record the date and type of storage in the aircraft log book.

E-9. Preservation.

a. *Power Train.*

WARNING

Solvent is flammable. Avoid breathing vapors. Avoid skin contact.

(1) Clean exposed metal surfaces with a clean cloth dampened with solvent (C124). Coat with corrosion preventive compound (C52).

(2) Deleted.

(3) Check power train lubrication levels, including sight gages and service in accordance with Chapter 1.

(4) Deleted.

(5) Deleted.

(6) Cover breather holes in transmission and gearboxes with barrier material (C30), and secure with tape (C136). This completes preservation of the transmission and gearbox.

(7) If engine is inoperable, preserve power train as follows:

(a) Remove main rotor blades in accordance with Chapter 5.

(b) Remove mast assembly in accordance with Chapter 5.

(c) Spray inside of transmission through top opening with one gallon of lubricating oil (C94). While spraying, manually rotate internal gears and bearings with input driver quill.

(d) Reinstall mast assembly in accordance with Chapter 5.

(e) Apply fingerprint remover (C55) to all unpainted surfaces of mast assembly. Remove residue with solvent (C124) on a clean lint-free cloth.

(f) Apply corrosion preventive compound (C52) to all unpainted surfaces.

(g) Reinstall main rotor in accordance with Chapter 5.

(h) Ensure that intermediate and tail rotor gearboxes are filled with lubricating oil (C94) to the proper operating level.

(i) Cover breather holes in transmission and gearboxes with barrier material (C30) and secure with tape (C136).

c. *Operable Engine.*

WARNING

Solvent is flammable. Avoid breathing vapors. Avoid skin contact.

(1) Use every precaution to keep the engine and its accessories clean. Keep the air intake ducts, plenum chambers, and compressor inlet screens clean and free of any foreign material. Use solvent (C124) for external cleaning.

(2) Check oil level; service as necessary in accordance with Chapter 1. Remove any lubricating oil spilled on painted surfaces with a clean cloth dampened with solvent (C124).

CAUTION

To prevent accidental firing of the engine, ensure that ignition system circuit breaker is OPEN (pulled out).

- (3) Open ignition system circuit breaker and secure red tag stating: DO NOT CLOSE
- (4) Remove fuel inlet strainer and pump discharge strainer from fuel control. Clean with solvent (C124); reinstall. Replace servo supply filter.
- (5) Disconnect main fuel hose from inlet side of starting fuel solenoid valve, and from main fuel flow divider at fuel control.
- (6) Install temporary lines on ends of hoses to allow drainage into a suitable container.
- (7) Connect hose from a source of lubricating oil (C91) to fuel control inlet fitting.
- (8) When engine has cooled enough to prevent auto-ignition, set throttle arm to IDLE.

CAUTION

Do not operate starter in excess of operating limits: three runs of 40 seconds each during any 60 minute period is maximum. Three minutes cooling time between starts is required. Do not engage starter until engine comes to a complete stop.

- (9) Motor engine with starter to pump lubricating oil into fuel system.
- (10) Motor engine until fuel-free oil flows from start fuel hose.
- (11) Cap start fuel hose and motor engine until fuel-free oil flows from main fuel hose.
- (12) Disconnect lubricating oil hose from fuel control and connect fuel inlet line.
- (13) Remove temporary lines from fuel hoses: connect main fuel hose to main fuel flow divider. Connect starting fuel hose to starting fuel solenoid valve.
- (14) With engine stopped, spray power turbine rotor with sufficient corrosion preventive compound (C93, C94) to cover blades.

NOTE

Use only dehydrated air for spraying operation.

- (15) Remove warning tag. Circuit breaker remains open.
- (16) Install engine inlet and exhaust covers. If covers are not available, seal opening with barrier material (C30) and secure with tape (C136).
- (17) Remove, disassemble, and clean oil filter. Immerse in operating lubricant, reassemble, and reinstall.
- (18) Attach a tag to the controls stating: ENGINE PRESERVED: FUEL CONTROL PRESERVED WITH MIL-L-6081 OIL FLUSH WITH STANDARD FUEL BEFORE PLACING IN SERVICE.
- (19) Visually check entire engine to ensure that:
 - (a) All holes are plugged.
 - (b) All ports are capped.
 - (c) All external parts are complete and secure.
 - (d) All bare metal, including internal and external threads, is covered with a film of corrosion preventive compound (C49).
- (20) Record date and extent of engine preservation in the engine historical records.
- (21) Deleted.

d. *Inoperable Engine.***WARNING****Solvent is flammable. Avoid breathing vapors. Avoid skin contact.**

(1) Use every precaution to keep engine and its accessories clean. Keep air intake ducts, plenum chambers, and compressor inlet screens clean and free of any foreign material. Use solvent (C124) for external cleaning.

CAUTION**To prevent accidental firing of the engine, ensure that ignition system circuit breaker is OPEN (pulled out).**

- (2) Open ignition system circuit breaker and secure red tag stating: DO NOT CLOSE.
- (3) Disconnect fuel lines from fuel control inlet and outlet ports.
- (4) Remove fuel control drain plug, and drain fuel from fuel control and hoses.
- (5) Remove overspeed governor and drain fuel.
- (6) Reconnect fuel hoses and replace drain plug.
- (7) Lockwire throttle arm into closed position.
- (8) Pour lubricating oil (C91) into openings made accessible by removal of overspeed governor, until fuel regulator is filled.
- (9) Pour lubricating oil into overspeed governor, while rotating the driveshaft by hand.
- (10) Pour excess oil from overspeed governor and reinstall.
- (11) Install engine inlet and exhaust covers, or seal openings with barrier material (C30) and secure with tape (C136).
- (12) Seal the gap between bleed band and compressor housing by encircling the engine with a narrow strip of barrier material (C30) and secure with tape (C136).
- (13) Visually check entire engine to ensure that:
 - (a) All holes are plugged;
 - (b) All ports are capped;
 - (c) All external parts are complete and secure; and
 - (d) All bare metal, including internal and external threads, is covered with a film of corrosion preventive compound (C49).
- (14) Attach a tag to controls stating: FUEL CONTROL PRESERVED WITH MIL-6081 OIL FLUSH WITH STANDARD FUEL BEFORE PLACING IN SERVICE.
- (15) Record date and extent of engine preservation in engine historical records.

e. *Rotors and Controls.***WARNING****Solvent is flammable. Avoid breathing vapors. Avoid skin contact.**

- (1) Lubricate rotor system in accordance with Lubrication Order, Chapter 1.
- (2) Apply fingerprint remover (C55) to all unpainted metal surfaces. Remove any residue with a cloth dampened with solvent (C124).
- (3) Wipe all parts dry with a clean, lint-free cloth. Apply corrosion preventive compound (C52) on all unpainted metal surfaces not in contact with bearings.
- (4) Clean surfaces of rotor blades with mild soap and water solution. Wipe blades completely dry with a lint-free cloth.
- (5) Apply a light, even coat of wax (C149) to entire painted area of rotor blades.

f. *Landing Gear.*

- (1) Place blocks or shoring under skid tubes to provide free air passage.

(2) Clean cross tubes and skid tubes. Treat for corrosion in accordance with TM 55-1500-204-25/1.

(3) Repaint any exposed metal surfaces. If paint cannot be touched up, coat bare metal surfaces with corrosion preventive compound (C52).

g. Hydraulic System:

CAUTION

Do not mix hydraulic fluid (C73) with fire retardant hydraulic fluid (C73A). Refer to TB 55-1500-334-25.

(1) Fill hydraulic reservoir with fluid (C73) or (C73A).

(2) Wipe exposed portions of hydraulic boost cylinder actuator pistons with lint-free cloth moistened with hydraulic preservative fluid (C74).

h. Avionic Equipment.

(1) Remove, attach condition tags, and turn in all head-sets and microphones to supply.

(2) Leave all unclassified avionic equipment installed in aircraft.

i. Fuel System. Maintain fuel tanks FULL for the duration of the storage period, to preclude fuel contamination. Drain any water from tanks before adding fuel. If tanks are required to be drained, refer to Intermediate Storage.

j. Battery.

(1) Disconnect battery, and turn in to battery shop.

(2) Clean battery compartment, quick disconnect plug, cables, battery shelf, and vent hoses with a solution of 5 ounces boric acid crystals dissolved in 1 gallon water. Rinse with clean water and allow to dry.

(3) Seal battery vent tubes and wrap quick disconnect with barrier material (C30), secured with tape (C136).

k. Airframe.

(1) Park and moor AH-1 with main and tail rotor tiedowns installed. (See Chapter 1.)

(2) Remove clock, fire extinguishers, and first aid kits. Tag for condition and transfer to Supply to prevent possible pilferage.

(3) Apply pitot tube cover, or cover pitot head and static ports with barrier material (C30) secured with tape (C136).

(4) Close canopy.

(5) Close all openings not already covered with barrier material (C30) secured with tape (C136).

(6) Install canopy cover, or cover canopy with barrier material (C30) secured with tape (C136).

(7) Install static ground wire.

(8) Install storage covers, if available, in accordance with the directions accompanying the covers.

(9) Annotate aircraft records to reflect date and type of storage.

E-10. Maintenance of Preservation.

a. Inspect AH-1's in accordance with local directives and those requirements outlined in paragraph E-3.

b. If conditions change so that the helicopter must remain in storage longer than 45 days, represerve it in accordance with Section IV.

NOTE

DO NOT RENEW SHORT TERM STORAGE.

E-11. Depreservation After Short Term Storage.

a. Airframe.

(1) Remove storage covers, clean, and return to Supply.

- (2) Remove static ground wire.
- (3) Remove, clean, and store windshield covers.

WARNING

Solvent is flammable. Avoid breathing vapors. Avoid skin contact.

- (4) Remove all barrier material and tape. Remove tape residue with solvent (C124).
- (5) Open canopy and compartment doors to ventilate helicopter.
- (6) Remove pitot tube cover; ensure that static ports are open and free of tape residue.
- (7) Replace clock, fire extinguisher, and first-aid kit.
- (8) Remove main and tail rotor tiedowns.

b. Battery.

- (1) Remove barrier material and tape from vent tubes and quick disconnect plug in battery compartment.
- (2) Ensure that all switches are OFF.
- (3) Install battery and connect quick disconnect plug.

c. Fuel System.

- (1) Check fuel tanks for water; drain as necessary.
- (2) Inspect fittings and clamps.
- (3) Fill fuel tanks as necessary, in accordance with Chapter 1.

d. Avionics. Obtain headsets and microphones from Supply; install in helicopter.*e. Hydraulic System.*

- (1) Check reservoir level and inspect system for leaks.
- (2) Clean exposed portion of hydraulic boost cylinder actuator pistons with a clean cloth dampened with hydraulic fluid (C73).
- (3) Coat hydraulic pistons with a light coat of hydraulic fluid (C73).

f. Landing Gear. Remove blocks or shoring from under skid gear.*g. Rotors and Controls.***WARNING**

Solvent is flammable. Avoid breathing vapors. Avoid skin contact.

- (1) Clean main and tail rotor assemblies with solvent (C 124). Wipe dry with lint-free cloths.
- (2) Lubricate in accordance with Lubrication Order, Chapter 1.

*h. Power Train.***WARNING**

Solvent is flammable. Avoid breathing vapors. Avoid skin contact.

- (1) Use solvent (C124) to clean all surfaces coated with corrosion preventive compound. Wipe dry with a clean cloth.
- (2) Check sight gages for proper lubricant levels. Service as necessary in accordance with Chapter 1.
- (3) Check and clean transmission oil filters.

i. Engine.

- (1) Remove covers or barrier material from engine exhaust, inlet, and bleed band areas.

WARNING

Solvent is flammable. Avoid breathing vapors. Avoid skin contact.

(2) Inspect openings for foreign materials and corrosion. Wipe clean with solvent (C124).

(3) Remove chip detector from accessory drive gearbox and drain plugs from fuel control. Allow oil to drain. Clean and replace chip detector and plugs.

CAUTION

To prevent accidental engine firing, ensure that ignition system circuit breaker is OPEN (pulled out).

(4) Open ignition system circuit breaker and secure red tag to it stating: DO NOT CLOSE.

(5) Disconnect main fuel hose from main fuel flow divider; drain into a container of at least two-gallon capacity.

(6) Check oil level; service as necessary.

CAUTION

Do not exceed starter limitations.

(7) Operate aircraft boost pump to prime fuel system, then motor engine with starter.

(8) Move throttle arm to maximum open until a solid stream of fuel with no air bubbles flows into container. At least one gallon of fuel must flow into container.

NOTE

Engine lubrication system is fully primed when oil pressure gage shows a steady positive indication.

(9) Connect main fuel hose to main fuel flow divider, and inspect engine for leakage.

(10) Remove warning tag and close ignition system circuit breaker.

(11) Operate engine for approximately **10** minutes at a minimum N2 RPM of **5500**. Restrict engine operations at IDLE position to a maximum of **two** minutes in each period. Check all instruments for normal operation, and ensure that engine temperature has stabilized. (Refer to TM 55-1520-234-10.)

(12) Shut down engine.

(13) Remove oil filter, check for excessive condensation, clean and reinstall.

(14) Remove chip detector. Check for excessive contamination, clean and reinstall.

(15) Remove fuel inlet strainer and pump discharge strainer from fuel control, check for contamination; clean with solvent (C124); reinstall. Replace servo supply filter.

(16) If no contamination is evident, engine is ready for ground test.

(17) If there is slight contamination, drain oil and refill system with new oil. Repeat steps (11) through (16). Evidence of continued oil contamination requires a thorough investigation.

NOTE

If there are fewer than ten hours operating time on engine since new or last overhaul, repeat steps (11) through (14) until no contamination is evident or analysis of the contamination determines that engine must be replaced.

j. Miscellaneous.

(1) Clean AH-1 as necessary in accordance with Chapter 1.

(2) Check helicopter records for removed or disconnected components. Ensure that all have been replaced and connected.

(3) Ensure that all related systems have been properly depreserved and serviced before any system or component operational check is run.

(4) Perform daily inspection in accordance with Chapter 1.

(5) Record the date the AH-1 was prepared for service in the aircraft log book.

SECTION IV - INTERMEDIATE STORAGE

E-12. Inspection Prior to Storage.

NOTE

General requirements of Section I are a part of this procedure.

- a. Ensure that all removed components are preserved and stowed either in the helicopter or at a designated location.
- b. Ensure that all removed or disconnected components are entered in the aircraft records.
- c. Check fuel, oil, and hydraulic lines and hoses for leakage.
- d. Lubricate the helicopter for the 50 and 100 hour intervals, in accordance with Chapter 1.
- e. Ensure that all bolts, washers, nuts, etc., removed during disassembly are coated with corrosion preventive compound (C52), and reinstalled exactly as removed from the major component unless otherwise specified.
- f. Record the date and type of storage in the aircraft log book.

E-13. Preservation.

- a. *Power Train.* Preserve power train in accordance with paragraph E-9.a.
- b. *Engine.* Preserve operable/inoperable engines in accordance with paragraph E-9.b. and E-9.c.
- c. *Rotors and Controls.*
 - (1) Preserve in accordance with paragraph E-9.d.
 - (2) Color code main rotor blades and hubs. Remove blades, clean with mild soap and water, place in blade containers, and store under cover.
 - (3) If storage covers are to be used, remove tail rotor blades and secure inside of cockpit.
- d. *Landing Gear.* Process landing gear in accordance with paragraph E-9.e.
- e. *Hydraulic System.* Preserve in accordance with paragraph E-9.f.
- f. *Avionic Equipment.* Process in accordance with paragraph E-9.g.
- g. *Fuel System.*

WARNING

Observe all safety precautions when purging fuel cells. Use only approved equipment and methods. Refer to TM 55-1500-204-25/1.

- (1) Drain fuel tanks in accordance with Chapter 1.
 - (2) Add five gallons diesel fuel, and drain. This should remove any residual fuel puddled on the tank bottom.
 - (3) Open fuel line and activate boost pump to remove fuel at pump sump.
 - (4) Repeat steps (2) and (3) using lubricating oil (C91).
 - (5) Drain the oil and test tanks with a Combustible Gas Indicator. If a dangerous level of fumes exists, flush tanks with fresh lubricating oil until a safe reading is obtained.
 - (6) Spray inside of the tanks through the access opening with lubricating oil (C91).
 - (7) Tag fuel cap with: FUEL SYSTEM PRESERVED WITH MIL-L-6081 OIL FLUSH WITH STANDARD FUEL BEFORE PLACING IN SERVICE.
- h. *Damaged Fuel System.*
 - (1) Drain tanks in accordance with Chapter 1.
 - (2) Open fuel cells in accordance with Chapter 1. Ventilate tanks with rapidly moving

dry air until fumes are below the danger level when tested with a Combustible Gas Indicator.

- (3) Spray inside of the tanks through the access opening with lubricating oil (C91).
- (4) Tag fuel system with: TANKS PRESERVED WITH MIL-L-6081 OIL.

- i. Battery.* Preserve in accordance with paragraph E-9.i.
- j. Airframe.* Except for rotor blade removal, prepare airframe in accordance with paragraph E-9.j.

E-14. Maintenance of Preservation During Storage.

- a.* Inspect AH-1 in accordance with local directives and those requirements outlined in paragraph E-3.
- b.* Perform applicable portions of preventive maintenance daily inspection at least once every 30 days in accordance with TM 55-1500-220-PMD.
- c.* If conditions change so that the AH-1 must remain in storage for a longer period of time, represerve it at the end of 180 days.

E-15. Depreservation After Intermediate Storage.

- a. Airframe.* Depreserve AH-1 in accordance with paragraph E-11.a.
- b. Battery.* Prepare for flight in accordance with paragraph E-11.b.
- c. Avionic Equipment.* Prepare for flight in accordance with paragraph E-11.d.
- d. Hydraulic System.* Depreserve in accordance with paragraph E-11.e.
- e. Landing Gear.* Remove blocks or shoring from under skid tubes.
- f. Rotors and Controls.*
 - (1) Depreserve in accordance with paragraph E-11.g.
 - (2) Replace main (and tail, if applicable) rotor blades on hubs in same position as before removal.
- g. Power Train.* Depreserve in accordance with paragraph E-11.h.
- h. Engine/Fuel System.*
 - (1) Drain fuel tanks of any accumulated oil.
 - (2) Add 5 gallons operating fuel to flush tanks. Drain.
 - (3) Fill tanks with operating fuel. (Check for leaks.)
 - (4) Depreserve engine in accordance with paragraph E-11.i.
- i. Miscellaneous.*
 - (1) Clean helicopter as necessary in accordance with Chapter 1.
 - (2) Ensure that all removed and disconnected components have been reinstalled and connected.
 - (3) Check that all related systems are properly depreserved and serviced before performing any system or operational check.
 - (4) Perform any necessary inspection required by helicopter records in accordance with Chapter 1.
 - (5) Remove static ground wire.
 - (6) Ensure that all necessary entries are made in AH-1 records, indicating in the log book the date the helicopter was prepared for service.

Section V. STORAGE OF AIRCRAFT UNDERGOING MAINTENANCE.

E-16. Helicopters in this category require individual determination as to the degree of protection and inspection necessary while undergoing maintenance. Varying environmental conditions may justify an increase or decrease in the degree of protection needed. Some factors which should be considered are: humidity, temperature, actual location of aircraft (hangered or outside). Depending on the nature of the maintenance being performed certain inspections may not be necessary.

E-17. Preservation.

In general, when appropriate, the preservation requirement of aircraft in flyable storage are applicable to this storage category. Aircraft that are hangered are relieved from the ground run-up, installation of protective covers, and the requirement for full fuel tanks. If deemed appropriate, additional preservation measures from sections III and IV may be taken.

E-18. Maintenance of Preservation of Aircraft Undergoing Maintenance.

a. Daily inspections shall be scheduled at the discretion of the maintenance officer.

b. Helicopter shall be inspected in accordance with local directives and requirements of preceding paragraph E-3 when applicable.

E-19. Depreservation After Storage During Maintenance.

General maintenance procedures shall be followed for release of aircraft after maintenance action has been completed.

Change 24 E-12

- (2) Check and clean transmission oil filters.
- (3) Clean drive shafts as necessary with solvent (C124).

k. *Engine.*

- (1) Remove, if applicable, covers or barrier material from engine exhaust, inlet and bleed band area.
- (2) Inspect openings for foreign material and corrosion. Wipe clean with solvent (C124).
- (3) Remove chip detector from accessory drive gearbox and drain plugs from fuel control. Allow oil to drain. Clean and replace chip detector and plugs.

CAUTION

To prevent accidental firing of the engine make sure IGNITION SYSTEM CIRCUIT BREAKER is OPEN (Pulled out).

- (4) Open IGNITION SYSTEM CIRCUIT BREAKER and secure red tag to it stating DO NOT CLOSE.
- (5) Disconnect main fuel hose from main fuel flow divider and drain into a container of at least a two-gallon capacity.
- (6) Check oil level; service if necessary.
- (7) Operate aircraft boost pump to prime fuel system and motor engine with starter.

CAUTION

Do not exceed starter limitations.

- (8) Move throttle arm to maximum until a solid stream of fuel with no air bubbles is observed flowing into container. At least one gallon of fuel must flow into container.

NOTE

Engine fuel system is fully primed when fuel pressure gage shows a steady positive indication.

- (9) Connect main fuel hose to main fuel flow divider and inspect engine for leakage.
- (10) Remove warning tag and close ignition system circuit breaker.
- (11) Operate the engine for approximately 10 minutes as a minimum N2 RPM of 5500. Restrict the operation of the engine at flight idle position to a maximum to two minutes at each period. Check all instruments for normal operation and ensure that the engine temperature has stabilized (refer to TM 55-1520-234-10).
- (12) Shut down engine.
- (13) Remove ail filter. Check for excessive contamination and replace.
- (14) Remove chip detector. Check for excessive contamination, clean, and reinstall.
- (15) Remove fuel inlet strainer and pump discharge strainer from fuel control, check for contamination, clean with solvent (C124) and reinstall. Replace servo supply filter.
- (16) If no contamination is evident, the engine is ready for ground test.
- (17) If oil system accumulation is slight, drain the oil and refill system with new oil.
- (18) Repeat steps (11) through (14). Evidence of continued contamination in oil system requires a thorough investigation.

NOTE

If there is less than ten hours operating time on engine since new, or since last overhaul, repeat steps (11) through (14) until no contamination is evident, or analysis of the contamination determines engine shall be replaced

I. Miscellaneous.

- (1) Clean helicopter as necessary in accordance with Chapter 1.
- (2) Ensure all removed components have been reinstalled on the aircraft. Check the aircraft log book for a record of components that have been removed or disconnected. Check for subsequent installation or connection.
- (3) Ensure related systems have been properly depreserved and serviced before any system or component operational check has been performed.
- (4) Perform necessary inspection required by aircraft log book in accordance with Chapter 1.
- (5) Remove static ground wire installed for storage.
- (6) Record the date the helicopter was prepared for service in aircraft log book.

Section VI. Demolition

(Refer to TM 750-244-5 for demolition instructions.)

APPENDIX F

WIRING DIAGRAMS AND LOAD CHARTS

F-1. Wiring Diagrams and Load Charts.

This appendix contains wiring diagrams, load charts, and essential wiring information for all electrical systems and circuits.

F-2. Wiring Data.

a. Wire Identification. All wires on diagrams are identified by coded wire numbers exactly as they are marked in the helicopter. The coded wire numbers indicate circuit function wire number, wire segment letter, and wire size (gage). (See figure F-1.)

NOTE

TM 9-1425-473-34 should be consulted for all material that is transcribed verbatim. Changes may have been accomplished in TM 9 that have not been accomplished in this TM.

b. Abbreviations. Abbreviations are in accordance with MIL-STD-12C and AR 310-50, except when the abbreviations depicts a marking or decal contained in or on the helicopter.

c. Symbols. Wiring diagram component symbols are drawn in accordance with ANSI Y14.15, Part 1. The symbols chart (figure F-2) illustrates electrical symbols used on the wiring diagrams.

F-3. Equipment Lists.

Tables F-1 and F-2 list each item of equipment shown on the electrical systems wiring diagrams and the armament master wiring diagram. Each item of equipment is identified by the reference designator, part number, and nomenclature. Table F-2 contains zone references for each item to aid in locating components on the multiple sheet armament systems master wiring diagram (figure F-7). Zones are indicated on figure F-7 vertically by letters (A, B, C, and D) and horizontally by numbers. Figure F-7 also contains zone references from sheet to sheet for continuity purposes.

F-4. XM65 Interconnection Wire List.

The wire list (table F-3) presents a tabular listing of XM65 interconnection wiring to aid in circuit tracing, continuity checks, and maintenance of XM65 interconnection wiring. The FROM column lists the origin of wire. Lower case alphabetical pin assignments are listed using the corresponding upper case letter preceded by a dash. The TO column lists of termination of the wire. The following termination points are explained; TSD 6A is terminal splice D6A; Test 1 is J330 (aft TSGMS connector); Test 2 is J332 (forward TSGMS connector); XK is relay socket; TB is terminal board; CB is circuit breaker; GND is ground; and NC is no connection. The WIRE IDENTIFICATION column lists the gage of the wire. Airframe wire identification numbers are listed for wires from the XM65 to airframe connectors and terminal boards. The CABLE NO. column lists a code number assigned to each twisted, shielded group of wires. The first digit in the code number indicates the number of wires within the shield. The SHIELD column lists the termination pin of each shielded wire and is preceded by the character @. The SHLD OR BDL CODE column lists the shield and bundle identification code. The NOMENCLATURE column lists the signal name.

F-5. Load Charts.

The ac and dc load charts (figures F-3 and F-4) list each electrical load, component nomenclature or part number, and individual load requirements in tabular form. The ac load chart also presents a computation of the total ac load supplied by the inverters and the dc load chart presents a computation of the total dc loads during typical flight regimes.

F-6. Wiring Diagram Index.

The following wiring diagrams are contained in this appendix:

<u>Title</u>	<u>Figure</u>
Ac power system	F-5
Anti-collision and position lights systems	F-6
Armament systems	F-7

<u>Title</u>	<u>Figure</u>
Attitude indicating system	F-8
Battery system	F-9
Caution lights system	F-10
Caution panel internal schematic	F-11
Engine de-ice system	F-12
Environmental control system	F-13
External power system	F-14
Force trim system	F-15
Fuel valve and engine oil valve system	F-16
Fuel boost system	F-17
Fuel quantity indicating system	F-18
Generator and dc bus system	F-19
Governor control system	F-20

<u>Title</u>	<u>Figure</u>
Hydraulic control system	F-21
Idle stop system	F-22
Igniter system	F-23
Interior lights system	F-24
Pitot heater system	F-25
Pressure indicating systems	F-26
Rpm limit warning system	F-27
Rpm test set schematic	F-28
Searchlight system	F-29
Starter system	F-30
Tachometer indicating systems	F-31
Temperature indicating systems	F-32
TOW blower cooling system	F-33
Turn and slip indicating system	F-34

Table F-1. Equipment list (electrical) (Cont)

Ref Des	Part Number	Nomenclature
A1	209-075-200-1	PNL, CONT - ELECT PWR, PILOTS
A2	209-075-206-3	PNL, CONT - ENGINE, PILOTS
A3	204-075-705-43	PNL, CAUTION - PILOTS
A4	209-075-203-1	PNL, CONT - LIGHTS PILOTS
A5	209-075-225-1	PNL, CONT- MISC, PILOTS
A7	209-075-217-3	PNL, MISC CONTROL, GUNNERS
A8	204-075-705-41	PNL, CAUTION - GUNNERS
A10	209-075-220-1	PNL, DC CKT BKR, PILOTS
B1	205-060-606-3	MOTOR, FUEL BOOST PUMP FWD
B2	205-060-606-3	MOTOR, FUEL BOOST PUMP AFT
B3	204-062-520-3	MOTOR, FUEL SHUTOFF VALVE
B5	AV23B1106B	MOTOR, BYPASS VALVE - OIL
B6	204-060-762-1	MOTOR, GOV RPM ACTUATOR
B7	MIL-T-26638, 318-100A	PRESS XMTR, ENG OIL
B8	MIL-T-26638, 318-100A	PRESS XMTR, XMSN OIL
B9	MS28005-1	PRESS XMTR, FUEL
B10	MIL-T-26638, 318-100A	PRESS XMTR, TORQUE, PILOT
B11	MIL-T-26638, 318-100A	PRESS XMTR, TORQUE, GNR
B16	SEE Z12 (1)	VALVE, TEMP SENSING
B17	M54218-1A	BLOWER, TOW
BT1	CA21H-1	BATTERY
C2	CP5381FB106K1	CAPACITOR, PF CORRECTION
C6	T6W1N	CAPACITOR, PF CORR
CB1	MS22073-5	CB, STARTER RELAY
CB2	MS22073-10	CB, IGNITION SYS SOL
CB3	MS25244-15	CB, GOV CONT
CB4	MS25244-20	CB, IDLE STOP SOL
CB5	MS25244-25	CB, FUEL AND OIL VALVE
CB6	MS22073-10	CB, FUEL BOOST FWD
CB7	MS22073-10	CB, FUEL BOOST AFT
CB8	MS22073-1	CB. INVERTER MAIN
CB9	MS22073-5	CB. ECU CONT
CB10	MS22073-5	CB, PITOT HTR
CB11	MS22073-5	CB, HYD CONT
CB12	MS26574-5	CB, ENG DE-ICE
CB14	MS22073-5	CB, FORCE TRIM
CB15	MS22073-5	CB. RPM WARN SYS
CB16	MS22073-5	CB, ENG AND XMSN TEMP IND
CB17	MS22073-5	CB, TURN AND SLIP IND
CB18	MS22073-5	CB, D.C. VOLT METER
CB19	MS22073-5	CB, GEN BUS RESET
CB20	MS22075-10	CB, GEN FIELD
CB21	MS22073-5	CB, GUNNERS INST LT
CB22	MS22073-5	CB, PILOTS INST LT
CB29	MS22073-5	CB, CAUTION LT
CB31	MS22073-5	CB, COCKPIT LT
CB32	MS25244-25	CB, SEARCH LT PWR
CB33	MS22073-5	CB, SEARCH LT CONT

Table F-1. Equipment list (electrical) (Cont)

Ref Des	Part Number	Nomenclature
CB34	MS22073-5	CB, POSITION LT
CB35	MS22073-5	CB, ANTI-COLL LT
CB39	MS22073-1	CB, INVERTER STBY
CB48	MS26574-1	CB, ENG VIB METER
CB50	MS26574-1	CB, PWR FACTORY CORR
CB51	MS26574-1	CB, 28 VAC INST XMFR
CB52	MS26574-1	CB, AC FAIL RELAY
CB53	MS26574-1	CB, FUEL QTY IND
CB54	MS26574-1	CB, SAS POWER
CB55	MS26574-1	CB, GYRO COMPASS IND
CB56	MS26574-1	CB, PILOT ATT IND
CB57	MS26574-1	CB, ADF RCVR
CB58	MS26574-1	CB, FUEL PRESS
CB59	MS26574-1	CB, ENG OIL PRESS
CB60	MS26574-1	CB, XMSN OIL PRESS
CB61	MS26574-1	CB, TORQUE PRESS
CB62	MS26574-1	CB, GUNNER ATT IND
CB63	MS26574-1	CB, COURSE IND
CB64	MS22073-10	CB, XMSN OIL LEVEL LT
CB66	MS26574-5	CB, SHUNT +
CB67	MS26574-5	CB, SHUNT-
CB68	MS25244-20	CB, UNSW PWR
CB73	MS26574-1	CB, SECU
CB76	30-052-2	CB, TOW
CB77	30-052-1	CB, REF XFMR
CB78	MS26574-1	CB, HSS
CB79	MS22073-1	CB, TOW BLO
CR1	30-037-1	DIODE ASSY, EXTERNAL PWR
CR2	IN2071	DIODE, CHIP DET TEST SW
CR3	30-037-1	DIODE ASSY, ENG BYPASS CAU
CR4	30-037-3	DIODE ASSY, BATTERY SEL
CR5	30-037-3	DIODE ASSY, BATTERY SEL
CR18	30-037-1	DIODE ASSY, K3 ARC SUPPR
CR19	30-037-1	DIODE ASSY, K44 ARC SUPPR
CR20	30-037-1	DIODE. ASSY, K50 ARC SUPPR
CR32	30-037-1	DIODE, ARC SUPPR
CR33	30-037-1	DIODE, ARC SUPPR
CR37	30-037-1	DIODE, ARC SUPPR
CR66	2N1850	DIODE, TOW OVHT SW
DS1	A-6750-24	LIGHT, PANEL AND INSTR
DS2	MS25027-2	LIGHT, XMSN OIL LEVEL
DS3	15-0007-43	LIGHT, COCKPIT - PILOTS
DS4	15-0007-43	LIGHT, COCKPIT - GUNNERS
DS6	204-075-705-37	LIGHT, MASTER CAUTION, PLT
DS7	204-075-705-39	LIGHT, ENG RPM WARNING, PLT
DS8	AN3033-12	LIGHT, NAV - LEFT
DS9	AN3033-13	LIGHT, NAV - RIGHT
DS11	68400-8-24	LIGHT, ANTI-COLLISION

Table F-1. Equipment list (electrical) (Cont)

Ref Des	Part Number	Nomenclature
DS12	TYPE MA-3 MIL-L-26998	LIGHT, SEARCH
DS13	205-074-001-001	CONT ASSY, ENG RPM WARNING
DS14	MS24577-2	FLASHER UNIT, NAV LIGHTS
DS15	2C212	LAMP ASSY, CHIP DETECTOR
DS18	204-075-527-3	LIGHT, TAIL POSITION
DS20	A-6815-24	LIGHT, PILOT COLLECTIVE STICK
DS26	A-6750-24	LIGHT, INSTR, TORQUE METER
DS27	A-6815-24	LIGHT, INSTR, DUAL TACH
DS28	A-6815-24	LIGHT, INSTR, DUAL TACH
DS29	B-6618	LIGHT, INSTR, ID-250
DS30	B-6618	LIGHT, INSTR, AIRSPEED
DS31	A-6750-24	LIGHT, INSTR, TGT
DS32	B-6619	LIGHT, INSTR, ALTIMETER
DS33	A-6750-24	LIGHT, INSTR, GAS PROD TACH
DS34	MS25010B11A327	LIGHT, EDGE, GUNNERS MISC PNL
DS35	MS25010B11A327	LIGHT, EDGE, GUNNERS MISC PNL
DS36	MS25010B11A327	LIGHT, EDGE, GUNNERS MISC PNL
DS37	A-6815-24	LIGHT, INSTR, DUAL TACH
DS38	A-6815-24	LIGHT, INSTR, DUAL TACH
DS39	B-6618	LIGHT, INSTR, AIRSPEED
DS40	A-6750-24	LIGHT, INSTR, FUEL PRESS
DS41	209-075-325-31	LIGHT, MASTER CAUTION, GNR
DS42	A-6750-24	LIGHT, INSTR, TORQUE METER
DS43	B-6618	LIGHT, INSTR, VERTICAL VELOCITY
DS44	B-6618	LIGHT, INSTR, ALTIMETER
DS45	B-6618	LIGHT, INSTR, VERTICAL VELOCITY
DS46	A-6815-24	LIGHT, INSTR, CLOCK
DS47	A-6750-24	LIGHT, INSTR, XMSN OIL PRESS
DS48	A-6750-24	LIGHT, INSTR, XMSN OIL TEMP
DS49	A-6750-24	LIGHT, INSTR, ENG OIL TEMP
DS50	A-6750-24	LIGHT, INSTR, ENG OIL PRESS
DS51	A-6750-24	LIGHT, INSTR, GAS PROD TACH
DS52	A-6750-24	LIGHT, INSTR, TGT
DS53	A-6815-24	LIGHT, INSTR, VOLT/LOAD METER
DS54	B-6618	LIGHT, INSTR, FM HOME IND
DS55	MS25010B11A327	LIGHT, EDGE, PLT LT CONT PNL
DS56	MS25010B11A327	LIGHT, EDGE, PLT LT CONT PNL
DS57	MS25010B11A327	LIGHT, EDGE, PLT LT CONT PNL
G1	204-060-200-15	GENERATOR, STARTER 28 VDC 300A
G2	MIL-G-26611 TYPE GEU-7/A	GENERATOR, TACH, GAS PRODUCER
G3	MIL-G-26611 TYPE GEU-7/A	GENERATOR, TACH, PWR TURBINE
G4	MIL-G-26611 TYPE GEU-7/A	GENERATOR, TACH, MAIN ROTOR
HR1	AN5813-1	HEATER, PITOT TUBE
J1	MS3124F14-15S	RCPT, PILOTS ELEC CONT PNL
J2	MS3124F16-26S	RCPT, PILOTS ENGINE CONT PNL
J3	SEE A3 (1)	RCPT, PILOTS CAUTION PNL
J4	MS3124F14-19S	RCPT, PILOTS LIGHTING CONT PNL
J5	MS3124F12-10S	RCPT, PILOTS MISC CONT PNL

Table F-1. Equipment list (electrical) (Cont)

Ref Des	Part Number	Nomenclature
J6	MS3124F14-5S	RCPT, PILOTS ELEC CONT PNL
J8	MS3124F18-32S	RCPT, PILOTS INSTR PNL DISC
J9	MS3124F14-19S	RCPT, GUNNERS INSTR PNL DISC
J10	MS3124F16-26S	RCPT, GUNNERS MISC CONT PNL
J11	SEE A8 (1)	RCPT, GUNNERS CAUTION PNL
J13	SEE M18 (1)	RCPT, PILOTS DUAL TACH IND - ROTOR
J14	SEE M18 (1)	RCPT, PILOTS DUAL TACH IND - TURB
J16	SEE M15 (1)	RCPT, PILOTS FUEL PRESS IND
J17	SEE M2 (1)	RCPT, PILOTS FUEL QTY IND
J18	SEE M16 (1)	RCPT, PILOTS TORQUE METER IND
J19	SEE M11 (1)	RCPT, PILOTS TURN AND SLIP IND
J20	SEE M3 (1)	RCPT, PILOTS ENG OIL PRESS IND
J21	SEE M5 (1)	RCPT, PILOTS ENG OIL TEMP IND
J22	SEE M12 (1)	RCPT, PILOTS GAS PROD TACH IND
J23	SEE M4 (1)	RCPT, PILOTS XMSN OIL PRESS IND
J24	SEE M6 (1)	RCPT, PILOTS XMSN OIL TEMP IND
J25	SEE M13 (1)	RCPT, GUNNERS GAS PROD TACH IND
J26	SEE M19 (1)	RCPT, GUNNERS DUAL TACH IND - ROTOR
J27	SEE M19 (1)	RCPT, GUNNERS DUAL TACH IND - TURB
J29	SEE M17 (1)	RCPT, GUNNERS TORQUE METER
J30	SEE M9 (1)	RCPT, GUNNERS STANDBY COMPASS
J32	SEE BT1 (1)	RCPT, BATTERY DISC
J34	MS3124F14-19S	RCPT, PILOTS CYCLIC STICK DISC
J35	SEE K18 (1)	RCPT, ANTI-TORQUE MAG BRAKE
J36	SEE M19 (1)	RCPT FORE AND AFT MAG BRAKE
J37	SEE K20 (1)	RCPT, LATERAL MAG BRAKE
J38	SEE DS13 (1)	RCPT, ENG RPM WARNING CONT
J40	SEE S60 (1)	RCPT, ENG AIR PRESS SW
J42	FURNISHED WITH ENGINE (2)	RCPT, DEICING HOT AIR VALVE
J44	SEE K21 (1)	RCPT, BYPASS SOL-HYD SYS NO. 1
J45	SEE S28 (1)	RCPT, BYPASS SW-HYD SYS NO. 1
J46	SEE K22 (1)	RCPT, BYPASS SOL-HYD SYS NO. 2
J47	SEE S29 (1)	RCPT, PRESS SW-HYD SYS NO. 2
J48	SEE S34 (1)	RCPT, XMSN OIL PRESS SW
J49	SEE B8 (1)	RCPT, XMSN OIL PRESS XMTR
J50	SEE RT1 (1)	RCPT, XMSN OIL TEMP BULB
J51	SEE HR1 (1)	RCPT, PITOT TUBE HEATER
J52	SEE G4 (1)	RCPT, XMSN ROTOR TACH GEN
J53	SEE B3 (1)	RCPT, FUEL SHUT OFF VALVE
J54	209-060-602-1 OR -9	RCPT, FUEL QTY XMTR - FWD CELL
J55	209-060-602-1 OR -9	RCPT, FUEL QTY XMTR - FWD CELL
J56	209-060-602-9 OR -1	RCPT, FUEL QTY XMTR - FWD CELL
J57	209-060-602-3 OR -11	RCPT, FUEL QTY XMTR - AFT CELL
J58	209-060-602-11 OR -3	RCPT, FUEL QTY XMTR - AFT CELL
J59	SEE S33 (1)	RCPT, FUEL FILTER BYPASS PRESS SW
J60	SEE S32 (1)	RCPT, ENG OIL PRESS WARNING SW
J61	FURNISHED WITH ENGINE (2)	RCPT, ENG ACCESS DISC
J62	SEE B7 (1)	RCPT, ENG OIL PRESS XMTR

Table F-1. Equipment list (electrical) (Cont)

Ref Des	Part Number	Nomenclature
J63	SEE B10 (1)	RCPT, ENG TORQUE PRESS XMTR - PLT
J64	SEE B11 (1)	RCPT, ENG TORQUE PRESS XMTR - GNR
J65	CA20314-1998	RCPT, ENG STARTER - GEN DISC
J66	CA20312-3116	RCPT, ENG MAIN DISC
J67	SEE B9 (1)	RCPT, FUEL PRESS XMTR
J68	MS3124F12-10S	RCPT, PYLON DISC
J69	MS3124E14-5S	RCPT, LH COWL DISC
J70	SEE RT2 (1)	RCPT, ENG ACCESS OIL TEMP BULB
J71	SEE G3 (1)	RCPT, ENG ACCESS PWR TURB TACH
J72	SEE G2 (1)	RCPT, ENG ACCESS GAS PROD TACH
J73	SEE Z1 (1)	RCPT, ENG ACCESS IGNITION PACK
J74	SEE K13 (1)	RCPT, ENG ACCESS PRIMER VALVE
J75	SEE K14 (1)	RCPT, ENG ACCESS FUEL CONT VALVE
J76	SEE MG1 (1)	RCPT, MAIN INVERTER
J77	SEE MG3 (1)	RCPT, STANDBY INVERTER
J78	MS3124F16-26S	RCPT, PILOTS COLL STICK DISC
J79	SEE DS11 (1)	RCPT ANTI-COLLISION LIGHT
J80	MS3120F10-6S	RCPT, ANTI-COLLISION LT DISC
J81	BTOOM-12S-51P	RCPT, ENG EXHAUST TEMP DISC
J82	MS25458-1	RCPT, GEN - FIELD RELAY
J83	MS3120F10-6P	RCPT TAIL LT-CHIP DET DISC
J84	MS3120F20-39S	RCPT, LH WING BASE DISC
J85	MS3120F20-39S	RCPT, RH WING BASE DISC
J86	SEE B5 (1)	RCPT, BYPASS - OIL VALVE
J87	MS3124E-14-5S	RCPT, RH COWL DISC
J88	MS3124F14-5S	RCPT, GUNNERS MISC CONT PNL
J89	SEE VR1 (1)	RCPT, GEN VOLTAGE REGULATOR
J90	MS3124F14-12S	RCPT, PILOTS ENG CONT PNL
J91	MS3124F14-19S	RCPT, GUNNERS CYCLIC STK DISC
J92	SEE S36 (1)	RCPT, FUEL BOOST PRESS SW-FWD
J93	SEE S37 (1)	RCPT, FUEL BOOST PRESS SW-AFT
J94	SEE DS14 (1)	RCPT, FLASHER - NAV LIGHTS
J95	5256	RCPT, ENG VIBRATION METER
J97	AN2552-3A	RCPT, EXT PWR
J99	SEE K37	RCPT, EMER COLL HYD SOL
J100	MS3120E10-6P	RCPT, OIL LEVEL DISC
J195	MS3450W20-18P	RCPT, TAILBOOM
J237	MS3124E12-3S	RCPT, TSGMS TEST POWER
J244	MS3120E20-41P	RCPT, GNR CONT PNL
J246	MS3124E12-10S	RCPT, PITOT
J265	MS3120E20-41P	RCPT, PLT CONT PNL
J291	FURNISHED WITH ENGINE (2)	RCPT, TEMP SENSE VALVE
J293	FURNISHED WITH ENGINE (2)	RCPT, ECU
J294	FURNISHED WITH ENGINE (2)	RCPT, BLEED AIR VALVE
J422	FURNISHED WITH ENGINE (2)	RCPT, ATTITUDE GYRO
J423	FURNISHED WITH ENGINE (2)	RCPT, PILOTS ATTITUDE IND
J424	FURNISHED WITH ENGINE (2)	RCPT, RATE SWITCH
J425	FURNISHED WITH INDICATOR (2)	RCPT, GUNNERS ATTITUDE IND

Table F-1. Equipment list (electrical) (Cont)

Ref Des	Part Number	Nomenclature
K1	MS24183D1	RLY, EXT PWR
K2	MS21483D1	RLY, STARTER
K4	MS24182D1	RLY, NON-ESSENTIAL BUS
K5	205-075-642-1	RLY, REVERSE CURRENT
K6	MS25457D1	RLY, GEN FIELD
K7	MS24149D1	RLY, BUS CONT
K9	MS24149D1	RLY, INVERTER TRANSFER
K10	TYPE D-1 MIL-R-8373	RLY, AC FAILURE
K12	MS2414901	RLY, HEATER CONT
K13	FURNISHED (1)	SOLENOID, ENG PRIMER VALVE
K14	FURNISHED (1)	SOLENOID, ENG FUEL CONT VALVE
K16	FURNISHED WITH ENGINE (2)	SOLENOID, ENG HOT AIR DEICE VALVE
K17	L-2540	SOLENOID, IDLE STOP RELEASE
K18	R460M15-3	MAG BRAKE, ANTI-TORQUE FORCE TRIM
K19	R460M15-3	MAG BRAKE, FORE AND AFT FORCE TRIM
K20	P460M15-3	MAG BRAKE, LATERAL FORCE TRIM
K21	SEE S28 (1)	SOLENOID, HYD VALVE SYS NO. 1
K22	SEE S29 (1)	SOLENOID, HYD VALVE SYS NO. 2
K23	43070	SOLENOID, RAIN REMOVAL
K25	MHB-6D-26VDC	RLY, OIL BYPASS
K26	352791G200F-9	RLY, LOW LEVEL - FUEL
K32	209-076-023-1	SOLENOID, HYD VALVE-PITCH
K33	209-076-023-1	SOLENOID, HYD VALVE-ROLL
K34	209-076-023-1	SOLENOID, HYD VALVE-YAW
K37	209-076-439-1	RLY, EMER COLL HYD
K44	MS24183D1	RLY, BUS PWR
K50	MS24183D1	RLY, FEEDER POWER
K52	MS24181D1	RLY, MAIN INVTR CONT
K68	MS24181D1	RLY, TOW BLO
K69	MS24140D2	RLY, MAIN INVTR
K73	110-078D1	RLY, INVTR
K77	110-077D1	RLY, AC PWR CONT
L1	397580-1-1	VALVE, BLEED AIR
M2	209-060-602-5	IND, FUEL QTY
M3	MIL-I-25438, 217A-100A	IND, ENG OIL PRESS
M4	MIL-I-25438, 217A-100A	IND, XMSN OIL PRESS
M5	MIL-I-6669 MS28009-2	IND, ENG OIL TEMP
M6	MIL-I-6669 MS28009-2	IND, XMSN OIL PRESS
M9	MIL-C-36044 TYPE MB-1	IND, COMPASS, MAGNETIC STBY
M11	MIL-I-7805A MS28024-3	IND, TURN AND SLIP-PILOTS
M12	MIL-25623 TYPE MU-1	IND, TACH-GAS PROD-PLT
M13	MIL-25623 TYPE MU-1	IND, TACH-GAS PROD-GNR
M15	MS28010-1	IND, FUEL PRESS - PILOTS
M16	MIL-I-25438, 217A-100A	IND, TORQUE METER-PLT
M17	MIL-I-25438, 217A-100A	IND, TORQUE METER-GNR
M18	204-070-155-1	IND, DUAL TACH - PILOTS
M19	204-070-155-1	IND, DUAL TACH-GUNNERS
M20	TYPE MJ-2	IND, EXH GAS TEMP-PLT

Table F-1. Equipment list (electrical) (Cont)

Ref Des	Part Number	Nomenclature
M21	TYPE MJ-2	IND, EXH GAS TEMP-GNR
M26	260173 MODEL 832	METER, VOLT AMMETER-PLT
M35	4003AH	IND, ATTITUDE-PILOTS
M36	4003AH	IND, ATTITUDE-GUNNERS
MG1	MS17406-3	INVTR, STBY
MG3	209-075-213-3	INVTR, STBY
P1	MS3126F14-15P	PLUG, PILOTS ELEC CONT PNL
P2	MS3126F16-26P	PLUG, PILOTS ENG CONT PNL
P3	MS3126F16-26S	PLUG, PILOTS CAUTION PNL
P4	MS3126F14-19P	PLUG, PILOTS LIGHTING CONT PNL
P5	MS3126F12-10P	PLUG, PILOTS MISC CONT PNL
P6	MS3126F14-5P	PLUG, PILOTS ELEC CONT PNL
P8	MS3126F18-32P	PLUG, PILOTS INSTR PNL DISC
P9	MS3126F14-19P	PLUG, GUNNERS INSTR PNL DISC
P10	MS3126F16-26P	PLUG, GUNNERS MISC CONT PNL
P11	MS3126E16-26S	PLUG, GUNNERS CAUTION PNL
P13	MS3106R14S-7S	PLUG, PILOTS DUAL TACH IND - ROTOR
P14	MS3106R14S-7S	PLUG, PILOTS DUAL TACH IND - TURB
P16	MS3106R14S-2S	PLUG, PILOTS FUEL PRESS IND
P17	AMPHENOL 165-61-1008	PLUG, PILOTS FUEL QTY IND
P18	MS3106R10SL-3S	PLUG, PILOTS TORQUE METER IND
P19	MS3106R10SL-3S	PLUG, PILOTS TURN AND SLIP IND
P20	MS3106R10SL-3S	PLUG, PILOTS ENG OIL PRESS IND
P21	MS3106R14S-2S	PLUG, PILOTS ENG OIL TEMP IND
P22	MS3106R10SL-3S	PLUG, PILOTS GAS PROD TACH IND
P23	MS3106R10SL-3S	PLUG, PILOTS XMSN OIL PRESS IND
P24	MS3106R14S-2S	PLUG, PILOTS XMSN OIL TEMP IND
P25	MS3106R10SL-3S	PLUG, GUNNERS GAS PROD TACH IND
P26	MS3106R14S-7S	PLUG, GUNNERS DUAL TACH IND - ROTOR
P27	MS3106R14S-7S	PLUG, GUNNERS DUAL TACH IND - TURB
P29	MS3106R10SL-3S	PLUG, GUNNERS TORQUE METER
P30	AN3116-2	PLUG, GUNNERS STBY COMPASS
P32	E30130-1	PLUG, BATTERY DISC
P34	MS3126F14-19P	PLUG, PILOTS CYCLIC STICK DISC
P35	CA3108B14S-9S	PLUG, ANTI-TORQUE MAG BRAKE
P36	CA3108B14S-9S	PLUG, FORE AND AFT MAG BRAKE
P37	CA3108B14S-9S	PLUG, LATERAL MAG BRAKE
P38	MS3126F14-19S	PLUG, ENG RPM WARNING CONT
P40	MS3106R10SL-3S	PLUG, ENG AIR PRESS SW
P42	FURNISHED WITH ENGINE (2)	PLUG, DEICING HOT AIR VALVE
P44	SC 06P-10SL-4S	PLUG, BYPASS SOL HYD SYS NO. 1
P45	MS25183A10SL-3S	PLUG, PRESS SW HYD SYS NO. 1
P46	SC06P-10SL-4S	PLUG, BYPASS SOL HYD SYS NO. 2
P47	MS25183A10SL-3S	PLUG, PRESS SW HYD SYS NO. 2
P48	MS3106R12S-3S	PLUG, XMSN OIL PRESS SW
P49	MS3106R10SL-3S	PLUG, XMSN OIL PRESS XMTR
P50	MS3108R12S-3S	PLUG, XMSN OIL TEMP BULB
P51	AN3115-1	PLUG, PITOT TUBE HEATER
P52	MS3103R12S-3S	PLUG, XMSN ROTOR TACH GEN

Table F-1. Equipment list (electrical) (Cont)

Ref Des	Part Number	Nomenclature
P53	MS3106R14S-3S	PLUG, FUEL SHUT OFF VALVE
P54	PC-250-A	PLUG, FUEL QTY XMTR-FWD CELL
P55	PC-210-B	PLUG, FUEL QTY XMTR-FWD CELL
P56	PC-250-A	PLUG, FUEL QTY XMTR-FWD CELL SH
P57	PC-250-A	PLUG, FUEL QTY XMTR-AFT CELL
P58	PC-200-F	PLUG, FUEL QTY XMTR-AFT CELL SH
P59	PT06E8-2S	PLUG, FUEL FILTER BYPASS SW
P60	MS3108R12S-3S	PLUG, ENG OIL PRESS SW
P61	MS3108R22-14S	PLUG, ENG ACCESSORY DISC
P62	MS3106R10SL-3S	PLUG, ENG OIL PRESS XMTR
P63	MS3106R10SL-3S	PLUG, ENG TORQUE PRESS XMTR PLT
P64	MS3106R10SL-3S	PLUG, ENG TORQUE PRESS XMTR GNR
P65	MS3106R36-6P	PLUG, STARTER - GEN DISC
P66	MS3106R28-21P	PLUG, ENG MAIN DISC
P67	MS3106R10SL-3S	PLUG, FUEL PRESS XMTR
P68	MS3126F12-10P	PLUG, PYLON DISC
P69	MS3126F14-5P	PLUG, LH COWL DISC
P70	FURNISHED WITH ENGINE (2)	PLUG, ENG ACCESS-OIL TEMP BULB
P71	FURNISHED WITH ENGINE (2)	PLUG, ENG ACCESS-PWR TURBO TACH
P72	FURNISHED WITH ENGINE (2)	PLUG, ENG ACCESS-GAS PROD TACH
P73	FURNISHED WITH ENGINE (2)	PLUG, ENG ACCESS-IGNITION PACK
P74	FURNISHED WITH ENGINE (2)	PLUG, ENG ACCESS-PRIMER VALVE
P75	FURNISHED WITH ENGINE (2)	PLUG, ENG ACCESS-FUEL CONT VALVE
P76	MS3108R20-4S	PLUG, MAIN INVERTER
P77	MS3126E14-5S	PLUG, STANDBY INVERTER
P78	MS3126F16-26P	PLUG, PILOTS COLL STICK DISC
P79	MS3108R10SL-3S	PLUG, ANTI-COLLISION LIGHT
P80	MS3126F10-6P	PLUG, ANTI-COLLISION LIGHT DISC
P81	FURNISHED ON THERMOCOUPLE (1)	PLUG, ENG EXH TEMP DISC
P82	SEE K6 (1)	PLUG, GEN FIELD RLY
P84	30-040F20-39P	PLUG, LH WING BASE DISC
P85	30-040F20-39P	PLUG, RH WING BASE DISC
P86	MS3106R14S-5S	PLUG, VALVE BYPASS-OIL
P87	MS3126F14-5P	PLUG, RH COWL DISC
P88	MS3126F14-5P	PLUG, GUNNERS MISC CONT PNL
P89	MS3126F14-5S	PLUG, GEN VOLTAGE REGULATOR
P90	MS3126F14-12P	PLUG, PILOTS ENG CONT PNL
P91	MS3126F14-19P	PLUG, GUNNERS CYCLIC STICK DISC
P92	MS3106R10SL-3S	PLUG, FUEL BOOST PRESS SW-FWD
P93	MS3106R10SL-3S	PLUG, FUEL BOOST PRESS SW-AFT
P94	MS3106R16S-8S	PLUG, FLASHER - NAV LIGHTS
P99	SC06P-10SL-4S	PLUG, EMER COLL HYD SOL
P100	MS3126E10-6S	PLUG, OIL LEVEL DISC
P114	MS3456W16-11S	PLUG, TOW BLO
P116	30-145-7S	PLUG, MAIN INVTR
P117	MS3456N22-5P	PLUG, MAIN INVTR
P121	M2874816-A10L1A	PLUG, GNR CA LT
P122	MS3126E14-19S	PLUG, REF XFMR

Table F-1. Equipment list (electrical) (Cont)

Ref Des	Part Number	Nomenclature
P195	MS3456W20-18S	PLUG, TAILBOOM
P244	MS3126E20-41S	PLUG, GNR CONT PNL
P246	MS3126E12-10P	PLUG, PITOT
P265	MS3126E20-41S	PLUG, PLT CONT PNL
P291	DM970D-75	PLUG, TEMP SENSE VALVE DISC
P293	MS3126F14-19S	PLUG, ECU DISC
P294	MS3137E7-50S	PLUG, BLEED AIR VALVE DISC
P422	MS3126E16-26S	PLUG, ATTITUDE GYRO
P423	KPSE08P14-19S	PLUG, PILOTS ATTITUDE IND
P424	MS3106R14S-5S	PLUG, RATE SWITCH
P425	MS3126E14-19S	PLUG, GUNNERS ATTITUDE IND
PS1	209-075-572-1	INVTR, MAIN
R1	MS91587-4MSB301	SHUNT, GEN AMMETER
R3	209-075-607-1	RHEO, GNR INSTR/PNL LT DIM
R4	209-075-607-1	RHEO, PLT INSTR LTS DIM
R5	209-075-607-1	RHEO, PLT CONSOLE LTS DIM
R6	(MIL-R-26)RW22G120	RES, NAV LTS DIM
R7	AN5534-2	RES, SPOOL-ENG EXH TEMP
R31	RV4NAYS502A	RHEO, ECU TEMP CONT
RT1	MS28034-3	TEMP BULB, XMSN OIL
RT2	MS28034-1	TEMP BULB, ENG OIL
S1	MS35058-24	SW, BATTERY
S2	MS35059-31	SW, GEN RESET
S3	MS35059-21	SW, INVERTER MAIN-SPARE
S4	MS35058-23	SW, NON-ESSENTIAL BUS
S5	MS24660-23G	SW, FUEL
S6	MICRO 1TL144-3G	SW, GOVERNOR AUTO EMER
S7	MICRO 5ET1-S	SW, ENG RPM WARNING
S8	MS24658-27E	SW, HYD TEST SYS 1 AND 2
S9	MS35058-23	SW, FORCE TRIM PLT ENG PNL
S10	MS25201-4	SW, ENG DEICE PLT ENG PNL
S11	MS35059-21	SW, NAV LTS, STEADY-FLASH
S12	MS35058-23	SW, NAV LTS, DIM-BRIGHT
S13	MS35058-23	SW, ANTI-COLLISION LIGHT
S16	2D9	SW, CHIP DETECTOR
S17	1TL144-3G	SW, GOV AUTO-EMER
S18	13AT66	SW, ENG RPM-INCR-DECR
S19	MS25201-4	SW, ENG DE-ICE - GNR PNL
S20	MS35058-23	SW, FORCE TRIM - GNR PNL
S21	MS24659-23G	SW, ELEC PWR, EMER OFF
S22	W960-18	SW, XMSN OIL LEVEL LT
S24	MS25026-1	SW, EXT PWR RECP-DOOR
S25	H20078	SW, STARTER-PILOTS COLL
S26	MS25089-4C	SW, FUEL QTY TEST - PLT INSTR PNL
S27	MIL-S-8805	SW, FORCE TRIM-PLT CYC
S28	88700	SW, HYD PRESS SYS NO. 1
S29	88700	SW, HYD PRESS SYS NO. 2
S30	MIL-S-8805	SW, FORCE TRIM-GNR CYC

Table F-1. Equipment list (electrical) (Cont)

Ref Des	Part Number	Nomenclature
S31	MS35058-23	SW, PITOT HTR-PLT INSTR PNL
S32	204-062-542-1	SW, ENG OIL PRESS WARNING
S33	204-040-760-5	SW, FUEL FILTER BYPASS
S34	204-040-376-3	SW, XMSN OIL PRESS
S35	12411-2-250	SW, XMSN OIL HOT
S36	204-062-542-3	SW, FUEL BOOST PRESS-FWD
S37	204-062-542-3	SW, FUEL BOOST PRESS-AFT
S46	13A766	SW, INC-DEC RPM-PLT COLL
S47	C100E2-39	SW, IDLE STOP REL-PLT COLL
S48	X-646A	SW, SEARCH LIGHT-PLT COLL
S49	MS35058-21	SW, SEARCH LT STOW-PLT COLL
S50	FURNISHED WITH ENGINE (2)	SW, ENG FUEL PUMP PRESS
S51	FURNISHED WITH ENGINE (2)	SW, ENG FUEL PUMP PRESS
S52	8G344	SW, ENG OIL LOW LEVEL
S53	MS25069-46	SW, CHIP DET TEST
S54	MS35058-30	SW, IDLE STOP REL GRN
S56	7638	SW, XMSN OIL BYPASS
S57	MS35059-21	SW, HEATER
S59	21548-4-1-6	SW, HEATER OVERHEAT
S60	42D128	SW, ENG AIR PRESS
S61	B7669A	DETECTOR, MAG CHIP-XMSN
S62	B752G	DETECTOR, MAG CHIP-900 GR BOX
S63	B752G	DETECTOR, MAG CHIP-420 GR BOX
S64	FURNISHED WITH ENGINE (2)	DETECTOR, MAG CHIP-ENGINE
S67	F-74356	SW, LOW LEVEL-FWD
S68	F-74356	SW, LOW LEVEL-AFT
S69	MS35058-23	SW, ENG OIL BYPASS
S79	MS24523-23	SW, EMER COLL HYD-PLT
S80	MS24523-23	SW, EMER COLL HYD-GNR
S88	7235-1-35	SW, MAIN INVERTER CONT
S125	212-075-236-15	SW, TOW COMPT BLO
S126	212-075-236-17	SW, INVTR OVLD
S127	M24236/1-1470	SW, TOW COMPT OVHT
T1	9T39Y5	XFMR, 115V/28V-AC
T4	130-029-3	XFMR, REF PWR
TB2	MS27212-1-5	TB, GNR INSTR AND CSL LT
TB3	MS27212-1-8	TB, PLT INSTR PNL LT
TB4	MS27212-1-7	TB, PILOT INSTR GND
TB5	MS27212-1-7	TB, INSTR JUNCT PLT AND GNR
TB6	MS27212-1-4	TB, PLT CONSOLE LTS BUS
TB7	MS27212-1-1	TB, ENG TERMOCOUPLE
TB8	MS27212-1-3	TB, FUEL CELL JCT
TB9	MS27212-1-3	TB, FWD FUEL BST PUMP
TB10	MS27212-1-4	TB, AFT FUEL BST PUMP
TB11	MS27212-1-4	TB, ENG INSTR GRD BUS
TB12	MS27212-1-3	TB, NAV LT DIMMING BUS
TB13	MS27212-1-2	TB, THERMOCOUPLE WIRE JCT
TB14	MS27212-1-2	TB, OIL LEVEL FLOAT SW
TB16	MS27212-1-1	TB, GRD JCT AFT COMPT

Table F-1. Equipment list (electrical) (Cont)

Ref Des	Part Number	Nomenclature
TB17	MS27212-1-3	TB, BST PUMP PRESS SW JCT
TB18	MS27212-1-2	TB, EXT PWR DIODE MOUNT
TB19	MS27212-1-2	TB, TAIL LIGHT
TB26	209-075-252-3	TB, BATTERY RELAY
TB28	MS27212-1-6	TB, ROCKET FIRE DIODE MT
TB31	MS27212-1-4	TB, DIODE MOUNT
TB32	209-075-252-1	TB, FEEDER PWR RLY
TB44	MS27212-1-5	TB, TOW PWR
TC1	FURNISHED WITH ENGINE (2)	THERMOCOUPLE, EXHAUST
VR1	209-075-228-1	GEN, VOLTAGE REGULATOR
Z7	209-060-602-3	FUEL QTY XMTR, AFT FUEL CELL
Z8	209-060-602-1	FUEL QTY XMTR, FWD FUEL CELL
Z12	617528-1-1	ENVIRONMENTAL CONT UNIT

NOTES:
(1) Reference implies the part is attached and/or is a part of a component.
(2) Reference implies the part is supplied with engine.

Table F-2. Equipment list (armament)

Ref Des	Part Number	Nomenclature	Zone (Fig. F-7)
A10	209-075-220-1	PNL, DC CIRCUIT BREAKER	D/23
A11	C-1611()/A/C	PRESSURE XDCR	D/19
A13	209-961-139-1	PNL - PLT W/S ARMT	C/16, D/25
A14	209-075-580-1	PNL - PLT ARMT	A-19
A21	209-075-315-1	PNL, SMOKE GRENADE CONTROL	D/24
A24	209-075-582-1	PNL, GNR ARMT	A/14
A26	209-001-010-3	GNR CYCUC	C/10
A27	209-001-010-3	PLT CYCLIC	D10
A28	209-074-001-1	IFCU	A/8, 0/43
A29	209-074-052-1	SECU	D/51
A30	209-071-121-1	UNIVAC INTFC UNIT	D/9
C5	209-075-285-3	CAPACITOR, DROP SIGNAL	B/24
CB23	MS22073-5	CB, WPN FIRE	D/23
CB24	MS25244-5	CB, TURRET PWR	C/23
CB25	MS22073-10	CB, W/S JETTISON	C/23
CB26	MS22073-10	CB, SMK GRE LH	D/23
CB27	MS22073-10	CB, SMK GRE RH	D/23
C836	MS25244-15	CB, WG ST GUN LH	C/23
CB37	MS25244-15	CB, WG ST GUN RH	C/23
CB38	MS22073-7 1/2	CB, WG ST RKT	B/23
CB49	MS26574-1	CB, WPN AC PWR	D/19
CB61	MS26574-1	CB, TUR OVRL	A/1
CB65	MS22073-10	CB, WG ST JTSN	C/18
CB68	MS25244-20	CB, TUR OVRL	A/1
CB69	MS39065-4	CB, TUR OVRL	A/1
CB73	MS26574-1	CB, SECU PWR	D/48
CB76	30-052-1	CB, TOW PWR	D/48
CB78	MS26574-1	CB, HSS PWR	B/7
CB82	MS25244-35	CB, TOW PWR	C/46, D/74
CB105	MS25244-10	CB, TASTS PWR	C/46, D/74
CR8	1N2071	DIODE, ARC SUPR-TB25	D/13
CR9	1N2071	DIODE, ARC SUPR-TB25	D/13
CR15	1N2071	DIODE, ARC SUPR-TB28	C/16
CR16	1N2071	DIODE, ARC SUPR-TB28	C/16
CR22	30-124-4006	DIODE, ARC SUPR-M37	A/15, A/24
CR23	30-124-4006	DIODE, ARC SUPR-M38	A/15
CR35	30-037-1	DIODE, ARC SUPR-K31	C/15
CR36	30-124-4006	DIODE, ARC SUPR-K49	D/16
CR38	30-037-3	DIODE, LAUNCHER ACT	A/49
CR39	30-037-3	DIODE, LAUNCHER ACT	A/49
CR41	30-037-3	DIODE, ARMT BLOCKING	A/4
CR42	30-037-3	DIODE, FLEX MODE	A/4
CR43	30-124-4006	DIODE, LAUNCHER	A/35
CR44	30-124-4006	DIODE, ACTION	B/18
CR45	30-124-4006	DIODE, ACTIVATE	A/35
CR46	30-124-4006	DIODE, ACTIVATE	A/35
CR58	30-124-4006	DIODE, GNR ACO	A/35
CR59	30-124-4006	DIODE, PLT ACQ	A/35
CR61	30-124-4006	DIODE, LOGIC	B/18

Table F-2. Equipment list (armament)

Ref Des	Part Number	Nomenclature	Zone (Fig. F-7)
CR62	30-124-4006	DIODE, LOGIC	B/18
CR63	30-124-4006	DIODE, LOGIC	B/18
CR67	30-037-3	DIODE, PLT IN CONT	A/4
CR68	30-124-4006	DIODE, LOGIC	A/18
CR69	30-124-4006	DIODE, LOGIC	A/18
DS36	209-075-577-1	IND, PILOT ARM/STBY	A/21
DS37	209-075-955-1	IND, PILOT WPN SEL	B/20
DS38	209-075-577-1	IND, GNR ARM/STBY	B/15
DS39	209-075-955-1	IND, GNR WPN SEL	A/14
DS40	MS25041-10-327	IND, PILOT IN CONT	A/15
DS41	209-075-325-31	IND, GNR MASTER CAUT LT	B/16
J7	MS90335-3	RCPT - PLT ARMT PNL LT	A/19
J8	MS3124F18-32S	RCPT - PILOTS INSTR DISC	D/19
J9	MS3124F14-19S	RCPT - GUNNERS INSTR DISC	C/18
J12	MS90335-3	RCPT - GNR ARMT PNL LT	A/18
J34	MS3124F14-19S	RCPT - PILOTS CYCLIC DISC	D/10
J78	MS3124F16-26S	RCPT - PILOTS COLLECTIVE DISC	C/20
J84	MS3120F20-39S	RCPT, LH WING BASE DISC	D/27
J84A	FURNISHED (1)	RCPT, LH WING	D/26
J85	MS3120F20-39S	RCPT, RH WING BASE DISC	D/28
J85A	FURNISHED (1)	RCPT, RH WING	D/29
J91	MS3124F14-19S	RCPT, GUNNER CYCLIC DISC	C/10
J109	MS90335-3	RCPT, GUNNERS ARMT PNL LT	A/18
J195	MS3450W2C-18P	RCPT, TAILBOOM DISC	D/74
J209	FURNISHED (1)	RCPT, PLATE RETAINER	C/27
J210	FURNISHED (1)	RCPT, PLATE RETAINER	D/27
1211	FURNISHED (1)	RCPT, PLATE RETAINER	D/27
J213	MS3124E18-32S	RCPT, PILOTS ARMT PNL-WING STORES	C/16, D/25
J213A	FURNISHED (1)	RCPT, PLTS ARMT PNL-WG STRS	D/25
J215	MS3120F20-39S	RCPT, LH WING BASE DISC	D/33, B/53
J216	MS3124F10-6S	RCPT, RH WING JETTISON, OUTBD	A/29
J217	MS3124F10-6S	RCPT, RH WING JETTISON, INBD	B/35
J218	FURNISHED (1)	RCPT, RH WING INBD ROCKET POD	D/35
J221	FURNISHED (1)	RCPT, RH WING OUTBD ROCKET POD	D/29
J222	MS3120F20-39S	RCPT, RH WING BASE DISC	D/34, B/54
J223	MS3124F10-6S	RCPT, LH WING JETTISON, OUTBD	A/26
J224	MS3124F10-6S	RCPT, LH WING JETTISON, INBD	B/31
J225	MS3124F10-6S	RCPT, LH WING OUTBD ROCKET POD	D/26
J226	FURNISHED (1)	RCPT, ARMAMENT HYD SOL	D/19
J228	FURNISHED (1)	RCPT, RH WING XM-18, INBD	B/29
J229	FURNISHED (1)	RCPT, LH WING XM-18, INBD	B/26
J232	FURNISHED (1)	RCPT, LH WING INBD ROCKET POD	D/31
J237	MS3124E12-3S	RCPT, TSGMS TEST CONN POWER	C/46
J238	FURNISHED (1)	RCPT, PLATE RETAINER	D/33
J239	FURNISHED (1)	RCPT, PLATE RETAINER	D/33
J240	FURNISHED (1)	RCPT, PLATE RETAINER	D/33
J244	MS3120E20-41P	RCPT, GNR CONT PNL	B/13
J248	SEE K29 (1)	RCPT, RELAY TIME DELAY	B/4

Table F-2. Equipment list (armament)

Ref Des	Part Number	Nomenclature	Zone (Fig. F-7)
J249	SEE K45 (1)	RCPT, RELAY XM28 CLEARING TD	D/17
J250	MS3120E18-32P	RCPT, XM-28 SIGHT	D/4
J251	MS3124F18-32PW	RCPT, GNR CONT PNL XM-28	D/4
J252	MS3124F22-55P	RCPT, XM-28 CONT UNIT	D/1
J253	MS3120F22-55S	RCPT, TURRET	C/1
J259	FURNISHED (1)	RCPT, SPEED CONT INTERCONNECT	A/2
J262	FURNISHED (1)	RCPT, SPEED CONT-RIGHT	A/2
J263	FURNISHED (1)	RCPT, LEFT AMMO BOX	A/3
J264	FURNISHED (1)	RCPT, RIGHT AMMO BOX	A/3
J265	MS3120E20-41P	RCPT, PLT ARMT PNL	B/19
J266	MS3124F22-55S	RCPT, XM-28 CONT UNIT	C/3
J267	MS3126F10-65W	RCPT, RANGE POT	C/4
J268	MS3126E10-6S	RCPT, SIGHT POT	D/4
J269	FURNISHED (1)	RCPT, SIGHT DISC RETICLE LT	D/3
J287	PT00E8-2F(SR)	RCPT, SIGHT DISC AUX LT	D/3
J288	MS3124E14-19P	RCPT, SMOKE GRENADE PANEL DISC	D/23
J289	MS3124E12-10S	RCPT, RH SMK GRENADE LCHR DISC	D/29
J290	MS3124E12-10S	RCPT, LH SMK GRENADE LCHR DISC	B/26
J291	MS90335-3	RCPT, INTEGRAL LIGHTING DISC	D/24
J297	FURNISHED (1)	RCPT, RCDS PROGRAMMER LH	D/30
J298	FURNISHED (1)	RCPT, RCDS PROGRAMMER RH	D/31
J315	MS3120E10-6S	RCPT, RESOLVER DISC	B/53
J316	MS3120E10-6S	RCPT, RESOLVER DISC	B-54
J321	MS3120E20-41S	RCPT, LH WING DISC	A/53, C/55
J322	MS3120E20-41S	RCPT, RH WING DISC	A/54, C/57
J323	MS3120E22-21S	RCPT, TAILBOOM DISC	A/61
J324	MS3120E24-61S	RCPT, TAILBOOM DISC	A/59
J325	MS3120E24-61SW	RCPT, TAILBOOM DISC	A/61
J326	MS3120E22-41SW	RCPT, TAILBOOM DISC	A/61, D/61
J327	MS3120E24-61SX	RCPT, TAILBOOM DISC	D/59
J328	MS3120E22-41S	RCPT, TAILBOOM DISC	D/62
J330	MS3120E20-39S	RCPT, TSGMS AFT TEST CONN (TEST 1)	D/71
J331	MS3120E22-55SW	RCPT, TSGMS SECU TEST CONN (TEST 3)	A/51
J332	MS3120E24-61S	RCPT, FWD TEST CONN (TEST 2)	C/46
JB255	TBF24-10PSW	RCPT, BHD LH SPEED CONT FEED THRU	B/1
JB256	TBF24-10PS	RCPT, BHD RH SPEED CONT FEED THRU	A/2
JB257	MS3119E-14-5	RCPT, BHD RH AMMO DRUM DRIVE	A/2
JB258	MS3119E-14-5	RCPT, BHD LH AMMO DRUM DRIVE	A/2
K29	2003-3	RLY, TIME DELAY	B/4
K31	MS24568-D1	RLY, MASTER ARM	D/15
K36	7-U-7464	SOLENOID, ARMT HYDR	D/19
K39	2045-1	RLY, SALVO JTSN TIME DELAY	D/21
K41	2045-1	RLY, SEL JETTISON DELAY	D/20
K42	MS24149-D1	RLY, OUTBD SEL JETTISON	D/22
K43	MS24149-D1	RLY, INBD SEL JETTISON	C/22
K45	92481	RLY, XM-28 CLEARING TIME DELAY	D/17
K49	MS27418-2B	RLY, MASTER ARM SAFE	D/16
K54	3S2791G200F-9	RLY, DROP SIGNAL	B/23

Table F-2. Equipment list (armament) (Cont)

Ref Des	Part Number	Nomenclature	Zone (Fig. F-7)
K55	MS24149-D1	RLY, SMOKE GRENADE SAFE	B/24
K56	MS24149-D1	RLY, FIRE CONTROL	B/26
K59	110-111-1	RLY, PLT/GNR CONT	D/13
K91	110-128-1	RLY, W/S JETTISON	D/48
K72	110-128-1	RLY, 40 MM TRIG ENBL	C/12
K74	FURNISHED (1)	SOLENOID, HYDR VALVE	A/50
K80	110-111-1	RLY, GNR PLT OVERRIDE	D/14
K81	110-127-1	RLY, FIXED/FWD	B/12
K82	209-075-370-1	RLY, PLT TRIG DSBL	C/11
K83	110-128-1	RLY, PLT ACTN DISC	C/5
K84	110-127-1	RLY, GNR ACTN DISC	B/5
K85	110-128-1	RLY, PLT TRIG, ACTN SW DISC	A/11
K86	110-128-1	RLY, PLT TRIG, ACTN SW ACTVT	A/10
K87	110-127-1	RLY, TOW/TURRET	D/11
K88	110-128-1	RLY, ACTN INTRPT	D/16
K89	110-128-1	RLY, WING STORES DSBL	D/12
K91	110-128-1	RLY, WING STORES JETTISON	D/48
M37	17680	COUNTER, LH ROUNDS	A/15
M38	17680	COUNTER, RH ROUNDS	A/5
P8	MS3126F18-32P	PLUG, PILOTS INSTR DISC	D/19
P8J	209-071-139-1	GUIDED MISSILE LAUNCHER (LH)	C/56
P8J01	JTP00RE20-41S	RCPT, WING TIP LH MSL	C/56
P9	MS3126F14-19P	PLUG, GUNNERS INSTR DISC	C/18
P34	MS3126F14-19P	PLUG, PLT CYCLIC DISC	D/10
P78	MS3126F16-26P	PLUG, PILOTS CLTV STICK DISC	C/20
P84	30-040F20-39P	PLUG, LH WING	D/26
P84A	FURNISHED (1)	PLUG, LH WING	D/27
P85	30-040F20-39P	PLUG, RH WING	D/29
P85A	FURNISHED (1)	PLUG, RH WING	D/28
P91	MS3126F14-19P	PLUG, GNR CYCLIC DISC	C/10
P120	SC06P-10SL-4S	PLUG, HYDR SOL VALVE	A/50
P122	MS3126E1419S	PLUG, REF XFMR	C/9, D/47
P195	MS3456W20-18S	PLUG, TAILBOOM DISC	D/74
P201	MS3106R10SL-3S	PLUG, AIR DATA XDCL	D/9
P209	MS3126F14-12S	PLUG, PLATE RETAINING	C/27
P210	MS3126F14-19PX	PLUG, PLATE RETAINING	D/27
P211	MS3126F14-19P	PLUG, PLATE RETAINING	D/28
P213	MS3126F18-32P	PLUG, PLTS ARMT PNL (WG STRS)	C/16, D/25
P213A	FURNISHED (1)	PLUG, PLTS ARMT PNL (WG STRS)	D/25
P215	PT08SE20-39P(SR)	PLUG, LH WING BASE DISC	B/53, D/32
P216	SEE SQ3 (1)	PLUG, RH WING JETTISON OUTBD	A/29
P217	SEE SQ4 (1)	PLUG, RH WING JETTISON INBD	B/35
P218	30-039P16-26S	PLUG, RH WING INBD ROCKET POD	D/35
P221	30-039P16-26S	PLUG, RH WING OUTBD ROCKET POD	D/29
P222	PT08SE20-39P(SR)	PLUG, RH WING BASE DISC	B/54, D/34
P223	SEE SQ1 (1)	PLUG, LH WING JETTISON OUTBD	A/26
P224	SEE SQ2 (1)	PLUG, RH WING JETTISON INBD	B/31
P225	30-039P16-26S	PLUG, LH WING OUTBD ROCKET POD	D/26

Table F-2. Equipment list (armament) (Cont)

Ref Des	Part Number	Nomenclature	Zone (Fig. F-7)
P226	MS3106-10SL-4S	PLUG, ARMAMENT HYDR SOL	D/19
P228	30-043-1	PLUG, RH WING XM-18 INBD	B/29
P229	30-043-1	PLUG, LH WING XM-18 INBD	B/26
P232	30-039P16-26S	PLUG, LH WING INBD ROCKET POD	D/31
P238	MS3126F14-12S	PLUG, PLATE RETAINING	D/33
P239	MS3126F12-10S	PLUG, RELAY, XM-28 CLEARING TD	D/33
P240	MS3126F12-10S	PLUG, PLATE RETAINER	C/33
P244	MS3126F20-41S	PLUG, GNR CONT PNL	B/13
P245	MS3126E12-10S	PLUG, RLY HYDR SOL DISC	C/11
P247	30-165-1	PLUG, GNR HELMET DISC	B/6
P248	MS3126F12-10S	PLUG, RELAY TIME DELAY	B/4
P249	MS3126F12-10S	PLUG, RELAY XM-28 CLEARING TD	D/17
P250B	MS3126F18-32S	PLUG, XM-28 SIGHT	D/4
P251	MS3124F18-32SW	PLUG, GNR CONT PNL XM-28	D/4
P252	FURNISHED (1)	PLUG, XM-28 CONT UNIT	D/1
P253	MS3126F22-55P	PLUG, TURRET	B/1
P255A	MS3106A24-11S	PLUG, SPEED CONT TURRET LEFT	B/1
P255B	MS3106A24-11P	PLUG, SPEED CONT TURRET LEFT	B/1
P256A	MS3106A24-11S	PLUG, SPEED CONT TURRET RIGHT	B/2
P256B	MS3106A24-11P	PLUG, SPEED CONT TURRET RIGHT	B/2
P257A	FURNISHED (1)	PLUG, RH AMMO DRUM DRIVE	B/2
P257B	FURNISHED (1)	PLUG, RH AMMO DRUM DRIVE	B/2
P258A	FURNISHED (1)	PLUG, LH AMMO DRUM DRIVE	B/1
P258B	FURNISHED (1)	PLUG, LH AMMO DRUM DRIVE	B/1
P259	FURNISHED (1)	PLUG, SPEED CONT INTERCONNECT	A/2
P260	30-165-1	PLUG, PLT HELMET DISC	D/6
P261	MS3126E22-55S	PLUG, HSS INTFC BOX	C/9, D/9
P262	MS3126F16-26S	PLUG, SPEED CONT - RIGHT	A/2
P263	MS3126F12-10S	PLUG, LEFT AMMO BOX	A/3
P264	MS3126F12-10S	PLUG, RIGHT AMMO BOX	A/3
P265	MS3126E20-41S	PLUG, PLT ARMT CONT PNL	B/19
P266	FURNISHED (1)	PLUG, XM-28 CONT UNIT	C/3
P267	FURNISHED (1)	PLUG, RANGE POT	C/4
P268	FURNISHED (1)	PLUG, SIGHT POT	D/4
P269	FURNISHED (1)	PLUG, SIGHT POT	D/3
P287	FURNISHED (1)	PLUG, SIGHT SUPPORT	D/3
P288	MS3126F14-19S	PLUG, SMOKE GRENADE PANEL DISC	D/23
P289	FURNISHED (1)	PLUG, RH SMK GRENADE LCHR DISC	B/29
P290	FURNISHED (1)	PLUG, LH SMK GRENADE LCHR DISC	B/26
P291	FURNISHED (1)	PLUG, INTEGRAL LIGHTING DISC	B/24
P297	FURNISHED (1)	PLUG, PROGRAMMER LH	D/30
P298	FURNISHED (1)	PLUG, PROGRAMMER RH	D/31
P311	MS3126E22-55S	PLUG, BHC INTFC ASSY	D/7
P312	MS3126E20-41F	PLUG, BHC INTFC ASSY	D/8
P313	MS3126E20-41PW	PLUG, BHC INTFC ASSY	A/8, D/43
P314	MS3126E18-32SW	PLUG, SECU BOX, STBD	D/49
P315	MS3116F10-6P	PLUG, LH RESOLVER DISC	B/53

Table F-2. Equipment list (armament) (Cont)

Ref Des	Part Number	Nomenclature	Zone (Fig. F-7)
P316	MS3116F10-6P	PLUG, RH RESOLVER DISC	B/54
P317	DEJ-9MS	PLUG, LH ACCELEROMETER	A/53
P318	DEJ-9MS	PLUG, RH ACCELEROMETER	A/54
P319	MS3126E10-6S	PLUG, LH ACTUATOR	B/53
P320	MS3126E10-6S	PLUG, RH ACTUATOR	A/54
P321	MS3723-14R2041N	PLUG, LH WING DISC	A/53, C/55
P322	MS3723-14R2041N	PLUG, RH WING DISC	A/54, C/57
P323	MS3126E22-21P	PLUG, TAILBOOM DISC	A/61
P324	MS3126E24-61 P	PLUG, TAILBOOM DISC	B/59
P325	MS3126E24-61PW	PLUG, TAILBOOM DISC	A/61
P326	MS3126E22-41PW	PLUG, TAILBOOM DISC	C/61
P327	MS3126E24-61PX	PLUG, TAILBOOM DISC	C/59
P328	MS3126E22-41P	PLUG, TAILBOOM DISC	C/62
P329	MS3126F18-32S	PLUG, SECU, PORT	D/51
R30	110-054E751JM	RHEO, PLT SIGHT LT DIM	D/3
R57	209-075-532-9	RES, DROP SIGNAL	B/24
R62	RA20NBSD101A	RHEO, GNR RET LT CONT	A/17
R63	RA20NBSD101A	RHEO, PLT RET LT CONT	A/22
S8J	209-071-139-1	GUIDED MSL LAUNCHER, RH	C/58
S8J01	JTP00RE20-41S	RCPT, WING TIP RH MSL	C/58
S38	SEE A26 AND A27 (1)	SW, PLT CYCLIC TRIGGER	D/10
S40	SEE A26 AND A27 (1)	SW, WING STORES	C/10
S42	SEE A26 AND A27 (1)	SW, GUNNERS CYCLIC TRIGGER	C/10
S45	SEE A26 AND A27 (1)	SW, WING STORES TRIGGER	B/10
S81	MS35059-21	SW, SALVO JETTISON - PILOTS	D/19
S82	MS24523-23	SW, SALVO JETTISON - GUNNERS	D/18
S83	MS35059-21	SW, PILOTS SIGHT LIGHT	D/3
S90	12TW1-3	SW, RH OUTBD ARMED	D/24
S91	12TW1-3	SW, RH INBD ARMED	D/24
S92	12TW1-3	SW, LH INBD ARMED	C/24
S93	12TW1-3	SW, LH OUTBD ARMED	C/24
S95	MS25089-4CR	SW, SMOKE GRENADE TRIGGER	C/20
S107	MS27408-1N	SW, PLT MASTER ARM	B/19
S108	MS27406-1	SW, WPN CONT	B/19
S109	MS27407-1	SW, PLT WPN SEL	B/20
S110	MS24523-23	SW, GNR COMPEN	A/15
S111	MS27407-1	SW, GNR WPN SEL	B/13
S112	MS24659-23F	SW, GNR'S PLT OVRD	A/16
S113	MS27407-1	SW, GNR RANGE	B/16
S114	SEE A26 AND A27 (1)	SW, PLT ACTION	C/10
S115	SEE A26 AND A27 (1)	SW, GNR ACTION	B/10
S118	MS24523-21	SW, GNR W/S SEL	A/13
S119	MS24523-30	SW, GNR RET LAMP TEST	A/17
S120	MS24523-30	SW, BIT INITIATE	A/17
S121	MS24523-23	SW, GUN DEPR LIMIT	A/17
S122	MS27718-26	SW, PLT RET LAMP TEST	B/22
S123	SEE R62 (1)	SW, GNR RET LT CONT	A/17
S124	SEE R63 (1)	SW, PLT RET LT CONT	A/22

Table F-2. Equipment list (armament) (Cont)

Ref Des	Part Number	Nomenclature	Zone (Fig. F-7)
S129	MS24658-21E	SW, LAUNCHER TEST	B/50
SQ1	863-1	SQUIB, LH WING OUTBD	A/26
SQ2	863-1	SQUIB, LH WING INBD	B/31
SQ3	863-1	SQUIB., RH WING OUTBD	A/29
SQ4	863-1	SQUIB, RH WING INBD	B/35
T4	130-029-3	XFMR, REFERENCE	D/9, D/47
TB2	MS27212-1-5	TB, GNR INSTR LT	C/17, C/40
TB6	MS27212-1-4	TB, PLT CSL LT	D/40
TB24	MS27212-1-3	TB, TURRET	C/13
TB25	MS27212-1-11	TB, GNR CONT BUS	A/4, D/13
TB27	MS27212-5-2	TB, TURRET	B/1
TB28	MS27212-1-6	TB, ROCKET FIRE	C/16, C/47
TB30	209-075-252-3	TB, ARMAMENT RELAY	A/1
TB37	MS27212-1-4	TB, DROP SIGNAL	C/24
TB40	MS27212-1-6	TB, PILOT ICS	C/21
TB44	MS27212-1-5	TB, TOW POWER	D/73
TB46	MS27212-1-12	TB, LAUNCHERS	A/50
TB51	M81714/2	TB, ARMAMENT	B/35, C/18
XK59	120-090-1	SKT, PLT GNR CONT RLY	D/14
XK72	120-070-3	SKT, 40MM TRIG ENBL RLY	C/12
XK80	120-090-1	SKT, GNR PLT OVRD RLY	D/14
XK81	120-088-1	SKT, FIXED/FWD RLY	B/12
XK83	120-076-3	SKT, PLT ACTN RLY	C/5
XK84	120-088-1	SKT, GNR ACTN RLY	B/5
XK85	120-076-3	SKT, PLT TRIG, ACT SW RLY	A/11
XK86	120-076-3	SKT, PLT TRIG, ACT SW ACTVT RLY	A/10
XK87	120-088-1	SKT, TOW/TURRET RLY	D/11
XK88	120-076-3	SKT, ACTN INTRP RLY	D/16
XK89	120-076-3	SKT, WING STORES DSBL RLY	D/12
XK91	120-076-3	SKT, W/S JETTISON RLY	C/48
Z10	FURNISHED (1)	SPEED CONT AND DYN BK, LH WPN	A/1
Z11	FURNISHED (1)	SPEED CONT AND DYN BK, RH WPN	A/2
Z13	FURNISHED (1)	PROGRAMMER, LH	C/30
Z14	FURNISHED (1)	PROGRAMMER, RH	C/31
Z15	FURNISHED (1)	PLATE RETAINING LH	D/27
Z16	FURNISHED (1)	PLATE RETAINING RH	D/33
Z17	209-075-933-1 (1)	RLY ASSY	A/14, A/21
1P	209-071-128-1	TELESCOPIC SIGHT UNIT	A/38, A/46
2P	209-071-129-1	STABILIZATION CONT AMPL	D/64, D/68
4P	209-071-130-1	TOW CONT PANEL	D/38
5P	209-071-131-1	MISSILE COMMAND AMPL	A/68, A/73
6P	209-071-132-1	SIGHT HAND CONTROL	D/36
7P	209-071-133-1	ELECTRONIC PWR SUPPLY	A/61, A/64
10P	209-071-135-1	PILOT STEERING IND	A/36
15P	209-071-134-1	MISSILE STATUS PNL	D/42
16P	209-071-140-1	GNR ACCY CONT PNL	D/40
1J09	MS3126E18-32SW	PLUG, TSU	A/45
1P01	MS3126E22-55S	PLUG, TSU	A/39

Table F-2. Equipment list (armament) (Cont)

Ref Des	Part Number	Nomenclature	Zone (Fig. F-7)
1P02	MS3126E14-19SX	PLUG, TSU TEST CONN	A/47
1P03	MS3126E20-41S	PLUG, TSU	A/46
1P04	MS3126E22-55SX	PLUG, TSU	A/41
1P05	MS3126E20-41SW	PLUG, TSU	A/43
1P06	MS3126E22-55SX	PLUG, TSU	A/37
1P11	MS3456W16S-1S	PLUG, TSU	A/37
2P01	MS3723-13R2241W	PLUG, SCA	D/64
2P02	MS3723-13R2255N	PLUG, SCA	D/65
2P03	MS3723-14R2255N	PLUG, SCA	D/67
2P04	MS3723-13R2461W	PLUG, SCA	D/68
4P01	MS3126E20-39S	PLUG, TCP	D/37
4P02	MS3126E24-61P	PLUG, TCP	D/38
5P01	M83723-13R2241N	PLUG, MCA	A/70
5P02	M83723-14R2241N	PLUG, MCA	A/68
5P03	M83723-13R2461N	PLUG, MCA	A/71
5P04	M83723-14R2461X	PLUG, MCA	A/73
6P01	MS3126E18-32S	PLUG, SHC	D/35
7P01	M83723-13R2241X	PLUG, EPS	A/64
7P02	M83723-14R2241W	PLUG, EPS	A/65
7P03	M83723-14R2341X	PLUG, EPS	A/67
10P01	MS3126E14-19S	PLUG, PSI	A/36
15P01	MS3126E20-41 SX	PLUG, MSP	D/41
16P01	MS3126E16-26S	PLUG, GACP	D/40

NOTE:

(1) Reference implies the part is attached and/or is a part of a component.

Table F-3. XM65 Interconnection wire list

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
1J				3234001-110			SIGHT UNIT, STABILIZED TELESCOPE
1J09				CONNECTOR			M83723-03F1832W M83723-15S18F
1J09	A	NC					SPARE
1J09	B	NC					SPARE
1J09	C	NC					SPARE
1J09	D	NC					SPARE
1J09	E	SHIELDS			22		CHASSIS GROUND
1J09	F	XK 87-D2		TG155A22			WEAPON TRIG 1ST DETENT
1J09	G	XK 87-C2		TG156A22			WEAPON TRIG 2ND DETENT
1J09	H	TS D 15A		TG157B22			TRIG ENABLE 1ST DETENT
1J09	J	TS D 15B		TG157C22			TRIG ENABLE 2ND DETENT
1J09	K	NC					GUN LIGHT
1J09	L	NC					SPARE
1J09	M	NC					SPARE
1J09	N	NC					SPARE
1J09	P	2P04	H		22	2020 @E	MAG LO SELECT-SCA
1J09	R	NC					LASER FLAG/LIGHT
1J09	S	NC					28V DC LASER ON
1J09	T	NC					LASER INTERLOCK 1
1J09	U	NC					LASER INTERLOCK 2
1J09	V	2P04	-S		22	2020 @E	MAG HI SELECT-SCA
1J09	W	1P05	N		22		WEAPON ACTION-TSU
1J09	X	2P01	P		22		WEAPON ACTION-SCA
1J09	Y	TS D	39B		22		WEAPON ACTION-BHC
1J09	Z	TS D	45A	TG159A22			WEAPON ACTION ENABLE
1J09	-A	1P03	A		22	2077 @E	28V MAG HI SELECT
1J09	-B	1P03	X		22	2077 @E	28V MAG LO SELECT
1J09	-C	NC					SPARE
1J09	-D	NC					SPARE
1J09	-E	2P03	-B		22	@E	GUN FLAG/LIGHT
1J09	-F	2P03	-C		22	@E	READY FLAG/LIGHT
1J09	-G	2P03	-D		22	@E	ATTACK FLAG/LIGHT

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
1J09	-H	7P03	-R	22	2076	@E	28V DC-TSU
1J09	-J	7P03	-E	22	2076	@E	28V DC RETURN
1P01				CONNECTOR			M83723-13F2255N
1P01	A	5P03	AA	22		@GG	M83723-15S22F
1P01	B	2P03	-E	22		@GG	AZ SAMPLE PULSE
1P01	C	NC					AZ MED. B/S ADJUST
1P01	D	NC					SPARE
1P01	E	NC					SPARE
1P01	F	NC					SPARE
1P01	G	NC					SPARE
1P01	H	2P03	GG	22		@GG	EL MED. B/S ADJUST
1P01	J	NC					SPARE
1P01	K	2P02	V	22		@GG	VS 1 RETURN
1P01	L	NC					SPARE
1P01	M	NC					EL BANDPASS INSTR
1P01	N	NC					SPARE
1P01	P	NC					SPARE
1P01	R	NC					SPARE
1P01	S	7P02	-S	22		@-G	10V DC
1P01	T	2P02	K	22	2085	@GG	AZ BANDPASS RETURN
1P01	U	2P02	J	22	2085	@GG	AZ BANDPASS
1P01	V	5P03	GG	22			K1 *T* INITIATE
1P01	W	5P03	BB	22		@GG	EL SAMPLE PULSE
1P01	X	NC					SPARE
1P01	Y	NC					SPARE
1P01	Z	NC					SPARE
1P01	-A	NC					SPARE
1P01	-B	NC					SPARE
1P01	-C	5P02	K	22			BIT 4
1P01	-D	NC					SPARE
1P01	-E	NC					SPARE
1P01	-F	16P01	U	22	3024	@GG	VS 1 RETURN
1P01	-G	SHIELDS		22			CHASSIS GROUND
1P01	-H	NC					AZ BANDPASS INSTR

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
1P01	-I	7P02	-P	22		@-G	20V DC
1P01	-J	7P02	W	20		@-G	DC RETURN-TSU
1P01	-K	7P02	-Q	22		@-G	20V DC
1P01	-M	2P02	M	22	2068	@GG	EL BANDPASS RETURN
1P01	-N	2P02	L	22	068	@GG	EL BANDPASS
1P01	-P	NC					SPARE
1P01	-Q	TS D	34A	22			K1 *T* BIT PASS
1P01	-R	TS D	11A	22			BIT 3
1P01	-S	TS D	12A	22			BIT 5
1P01	-T	TS D	13A	22			BIT 6
1P01	-U	NC					LASER SYNC SIGNAL
1P01	-V	5P03	LL	22		@GG	K1 *T* CHANGE
1P01	-W	2P02	U	22		@GG	EL VS 1
1P01	-X	16P01	T	22	3024	@GG	EL VS 1
1P01	-Y	16P01	S	22	3024	@GG	AZ VS 1
1P01	-Z	2P02	X	22	2045	@GG	B/S POT. EXCIT MINUS
1P01	AA	2P02	W	22	2045	@GG	B/S POT. EXCIT PLUS
1P01	BB	5P03	NN	22		@GG	WIDE-MEDIUM SWITCH
1P01	CC	16P01	R	22		@GG	N FOV MAX GAIN
1P01	DD	5P03	EE	22			AGC CLAMP RELEASE
1P01	EE	5P03	KK	22		@GG	CARRIER FREQ CHANGE
1P01	FF	2P02	T	22		@GG	AZ VS 1
1P01	GG	SHIELDS		22			CHASSIS GROUND
1P01	HH	5P03	JJ	22		@GG	MEDIUM-NARROW SWITCH
1P02				CONNECTOR			M83723-13F1419X M83723-15S14F
1P02	A	TS D	1A	22		@M	AZ BANDPASS
1P02	B	TEST 2	N	22			15V DC
1P02	C	TEST 2	U	22			-15V DC
1P02	D	TEST 2	F	22		@M	AZ REF SINE WAVE
1P02	E	NC					SPARE
1P02	F	NC					SPARE

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
1P02	G	TEST 2	G	22			EL SAMPLE PULSE
1P02	H	TEST 2	H	22			AZ SAMPLE PULSE
1P02	J	TS D	3A	22		@M	EL VS 1
1P02	K	NC					SPARE
1P02	L	NC					SPARE
1P02	M	SHIELDS		22			CHASSIS GROUND
1P02	N	NC					AZ BANDPASS RETURN
1P02	P	TS D	2A	22		@M	EL BANDPASS
1P02	R	TS D	4A	22		@M	DC RETURN-TSU
1P02	S	TEST 2	S	22		@M	EL REF SINE WAVE
1P02	T	NC					VS 1 RETURN
1P02	U	NC					EL BANDPASS RETURN
1P02	V	TS D	5A	22		@M	AZ VS 1
1P03				CONNECTOR			M83723-13F2041N
1P03	A	1J09	-A	22	2077	@K	M83723-15S20F
1P03	B	7P01	B	20	3004	@B	28V MAG HI SELECT
1P03	C	7P01	D	20	3004	@B	115V 400 HZ PH A
1P03	D	SHIELDS		22			115V 400 HZ RTN *PH B*
1P03	E	4P02	-J	22		@D	CHASSIS GROUND
1P03	F	7P03	A	20		@D	TSU RETICLE ADJUST
1P03	G	5P02	-C	22		@D	28V DC RTN-TSU
1P03	H	2P03	-I	20	3003	@B	MANGIN MIRROR DRIVE
1P03	J	2P03	-H	20	3003	@B	N F DIODE DRIVE RTN
1P03	K	2P03	-G	20	3003	@B	DIODE DRIVE POWER
1P03	L	2P03	-M	22	2044	@M	W F DIODE DRIVE RTN
1P03	M	NC					BORESIGHT MTR REF RTN
1P03	N	NC					SPARE
1P03	P	NC					SPARE
1P03	R	NC					SPARE
1P03	S	NC					SPARE
1P03	T	NC					SPARE
1P03	U	NC					SPARE
1P03	V	NC					SPARE

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
1P03	W	NC					SPARE
1P03	X	1J09	-B	22	2077	@K	28V MAG LO SELECT
1P03	Y	NC					SPARE
1P03	Z	7P01	C	20	3004	@B	115V 400 HZ PH C
1P03	-A	NC					SPARE
1P03	-B	SHIELDS		22			CHASSIS GROUND
1P03	-C	2P03	-P	22	3010	@M	BORESIGHT DRIVE 2
1P03	-D	2P03	-K	22	2044	@M	BORESIGHT MTR REF
1P03	-E	NC					SPARE
1P03	-F	NC					SPARE
1P03	-G	NC					SPARE
1P03	-H	NC					SPARE
1P03	-I	NC					SPARE
1P03	-J	NC					SPARE
1P03	-K	SHIELDS		22			CHASSIS GROUND
1P03	-M	SHIELDS		22			CHASSIS GROUND
1P03	-N	2P03	-Q	22	3010	@M	BORESIGHT DRIVE RTN
1P03	-P	2P03	-N	22	3010	@M	BORESIGHT DRIVE 1
1P03	-Q	NC					SPARE
1P03	-R	NC					SPARE
1P03	-S	NC					SPARE
1P03	-T	NC					SPARE
1P04				CONNECTOR			M83723-13F2255X
							M83723-15S22F
1P04	A	NC					SPARE
1P04	B	NC					SPARE
1P04	C	NC					SPARE
1P04	D	NC					SPARE
1P04	E	2P03	-T	22	3013	@L	RHO COMP RES RETURN 1
1P04	F	2P02	S	22	2028	@L	RHO SERVO RETURN B

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
1P04	G	NC					11.8 COS ETA
1P04	H	NC					SPARE
1P04	J	2P02	DD	22	2027	@L	DEROT SERVO TACH
1P04	K	2P02	EE	22	2027	@L	DEROT SERVO TACH RTN
1P04	L	SHIELDS		22			CHASSIS GROUND
1P04	M	2P02	G	22	2291	@L	11.8 COS EPSILON
1P04	N	NC					SPARE
1P04	P	NC					SPARE
1P04	R	7P01	S	20	3054	@L	115V 400 HZ PH C
1P04	S	TS D	8A	22	3009	@L	10 SIN EPSILON SUB -G
1P04	T	TS D	6A	22	3009	@L	EPSILON SUB -G RTN
1P04	U	TS D	7A	22	3009	@L	10 COS EPSILON SUB -G
1P04	V	7P01	X	20	3054	@L	115V 400 HZ PH A
1P04	W	NC					SPARE
1P04	X	NC					SPARE
1P04	Y	NC					SPARE
1P04	Z	2P03	-S	22	3013	@L	-11.8 TAN THETA
1P04	-A	2P02	R	22	2028	@L	11.8 SIN RHO
1P04	-B	2P02	C	22			WINDOW LIMIT SW A
1P04	-C	NC					11.8 COS ETA RTN
1P04	-D	2P02	-T	22	2029	@L	WINDOW SERVO TACH RTN
1P04	-E	2P03	EE	20	3005	@L	DEROT MOTOR DR B
1P04	-F	NC					SPARE
1P04	-G	2P02	H	22	2291	@L	11.8 COS EPSILON RTN
1P04	-H	2P02	-D	22	2043	@L	11.8 COS RHO
1P04	-I	NC					11.8 COS ETA RTN
1P04	-J	7P02	-N	22		@L	-40V DC
1P04	-K	NC					DEROT SERVO ERROR COS
1P04	-M	2P02	HH	22	2058	@L	DEROT SERVO ERROR RTN
1P04	-N	2P02	GG	22	2058	@L	DEROT SERVO ERROR SIN
1P04	-P	7P01	Y	20	3054	@L	115V 400 HZ RTN *PH B*
1P04	-Q	2P03	CC	16	3007	@L	WINDOW MOTOR DR C.T.

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
1P04	-R	NC					SPARE
1P04	-S	2P03	-R	22	3013	@L	11.8 SIN PHI
1P04	-T	2P02	D	22			WINDOW LIMIT SW B
1P04	-U	2P02	-S	22	2029	@L	WINDOW SERVO TACH
1P04	-V	2P03	DD	20	3005	@L	DEROT MOTOR DR A
1P04	-W	2P02	-E	22	2043	@L	RHO SERVO RETURN A
1P04	-X	2P03	-V	22	2025	@L	RHO COMP RES RETURN Z
1P04	-Y	NC					11.8 COS ETA
1P04	-Z	7P02	-R	22		@L	40V DC
1P04	AA	NC					DEROT SERVO ERROR RTN
1P04	BB	P122	C	TG593F22 BLU 2059		@L	26V 400 HZ A PLUS 90
1P04	CC	2P03	AA	16	3007	@L	WINDOW MOTOR DR A
1P04	DD	2P03	BB	16	3007	@L	WINDOW MOTOR DR B
1P04	EE	2P03	FF	20	3005	@L	DEROT MOTOR DR C.T.
1P04	FF	2P03	-U	22	2025	@L	11.8 COS PHI
1P04	GG	NC					SPARE
1P04	HH	P122	P	TG591F22 WHT	2059	@L	26V 400 HZ A MINUS 90
1P05				CONNECTOR			M83723-13F2041W M83723-1 5S20F
1P05	A	TEST 2	D	22	3008	@W	10 COS ETA SUB -G
1P05	B	2P02	-Z	22	2037	@W	AZ SIGNAL GEN
1P05	C	2P02	AA	22	2037	@W	AZ SIGNAL GEN RETURN
1P05	D	2P02	-Q	22	2002	@W	WINDOW SERVO ERROR SIN
1P05	E	2P02	-R	22	2002	@W	WINDOW SERVO ERROR RTN
1P05	F	NC					SPARE
1P05	G	NC					SPARE
1P05	H	2P02	-J	22	3049	@W	10 SIN EPSILON SUB -G
1P05	J	NC					SPARE
1P05	K	7P03	W	20	2038	@W	28V DC-TSU
1P05	L	P329	-H	TG141B22 WHT	2030	@W	SIN EPSILON SUB -G RTN
1P05	M	7P03	X	20	2038	@W	28V DC RETURN
1P05	N	1J09	W	22			WEAPON ACTION-TSU
1P05	P	4P02	-K	22			WEAPON SELECT-TSU

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
1P05	R	TS D	9C	22	2289	@W	10V 400 HZ A PLUS 90
1P05	S	2P04	J	22			TEST 9 *H*
1P05	T	2P02	-X	22	3011	@W	A SUB E BUF OUTPUT
1P05	U	7P02	F	20		@W	DC RETURN-TSU
1P05	V	7P02	C	22		@W	20V DC
1P05	W	SHIELDS		22			CHASSIS GROUND
1P05	X	2P02	-H	22	3012	@W	10 COS ETA SUB -G
1P05	Y	2P02	BB	22	2036	@W	EL SIGNAL GEN
1P05	Z	2P02	CC	22	2036	@W	EL SIGNAL GEN RETURN
1P05	-A	2P02	-I	22	3049	@W	10 COS EPSILON SUB -G
1P05	-B	2P02	-K	22	3049	@W	EPSILON SUB -G RTN
1P05	-C	TS D	8C	22	3050	@W	10 SIN EPSILON SUB -G
1P05	-D	P329	-G		2030	@W	10 SIN EPSILON SUB -G
1P05	-E	P329	-F		2075	@W	COS EPSILON SUB -G RTN
1P05	-F	TS D	10C	22	2289	@W	100V 400 HZ RETURN
1P05	-G	2P02	B	22			5 VOLT LOGIC RTN
1P05	-H	2P02	-W	22	3011	@W	A SUB D BUF OUTPUT
1P05	-I	2P02	-Y	22	3011	@W	ACC BUF RETURN
1P05	-J	7P02	D	22		@W	-20V DC
1P05	-K	2P02	-G	22	3012	@W	ETA SUB -G RTN
1P05	-M	TS D	7C	22	3050	@W	10 COS EPSILON SUB -G
1P05	-N	TS D	6C	22	3050	@W	EPSILON SUB -G RTN
1P05	-P	P329	-E		2075	@W	10 COS EPSILON SUB -G
1P05	-Q	2P02	A	22			5 VOLT LOGIC
1P05	-R	TEST 2	GG	22	3008	@W	10 SIN ETA SUB -G
1P05	-S	TEST 2	HH	22	3008	@W	ETA SUB -G RTN
1P05	-T	2P02	-F	22	3012	@W	10 SIN ETA SUB -G
1P06				CONNECTOR			M83723-13F22557 M83723-15S22F
1P06	A	2P01	-C	16	2034	@K	EL MOTOR DRIVE A
1P06	B	7P03	E	22	2024	@K	20V RMS 4 KHZ
1P06	C	7P02	B	22		@K	40V DC
1P06	D	NC					SPARE
1P06	E	NC					SPARE

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION		CABLE NO.	SHIELD	NOMENCLATURE
1P06	F	NC						SPARE
1P06	G	NC						SPARE
1P06	H	2P03	-Y		22	2033	@K	EL GYRO TORQUER DR A
1P06	J	2P03	-Z		22	2033	@K	EL GYRO TORQUER DR B
1P06	K	SHIELDS			22			CHASSIS GROUND
1P06	L	2P02	-B		22	2074	@K	EL GUN ERROR BIT RTN
1P06	M	P313	-N	TG35A22	WHT	2040	@S	EL GUN COMMAND RETURN
1P06	N	TS D	23A		22	2035	@S	-J SUB -T RETURN
1P06	P	TS D	21A		22	2039	@S	-I SUB -T RETURN
1P06	R	TS D	25A		22	2021	@S	-K SUB -T RETURN
1P06	S	SHIELDS			22			CHASSIS GROUND
1P06	T	P313	X	TG43A22	WHT	2052	@K	-I SUB -G RETURN
1P06	U	P313	W	TG44A22	BLU	2052	@K	-I SUB-G
1P06	V	NC						SPARE
1P06	W	2P01	-E		16	2034	@K	EL MOTOR DRIVE B
1P06	X	7P03	-B		22	2024	@K	20V RMS 4 KHZ RETURN
1P06	Y	7P02	A		22		@K	-40V DC
1P06	Z	NC						SPARE
1P06	-A	NC						SPARE
1P06	-B	NC						SPARE
1P06	-C	2P03	-W		22	2031	@K	AZ GYRO TORQUER DR A
1P06	-D	2P03	-X		22	2031	@K	AZ GYRO TORQUER DR B
1P06	-E	NC						10V DC
1P06	-F	2P02	-A		22	2074	@K	EL GUN ERROR BIT
1P06	-G	2P02	Z		22	2073	@K	AZ GUN ERROR BIT RTN
1P06	-H	P313	-B	TG34A22	BLU	2040	@S	EL GUN COMMAND
1P06	-I	TS D	22A		22	2035	@S	-J SUB -T
1P06	-J	TS D	20A		22	2039	@S	-I SUB -T
1P06	-K	TS D	24A		22	2021	@S	-K SUB -T
1P06	-M	P313	F	TG45A22	WHT	2042	@K	AZ GUN COMMAND RTN
1P06	-N	P313	E	TG46A22	BLU	2042	@K	AZ GUN COMMAND
1P06	-P	2P01	Z		16	2032	@K	AZ MOTOR DRIVE A
1P06	-Q	NC						SPARE
1P06	-R	7P03	-F		16	3001	@K	7V 900 HZ PH A
1P06	-S	7P03	M		16	3001	@K	7V 900 HZ PH B
1P06	-T	7P03	N		16	3001	@K	7V 900 HZ RETURN

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION		CABLE NO.	SHIELD	NOMENCLATURE
1P06	-U	NC						SPARE
1P06	-V	NC						MOTOR OVERHEAT
1P06	-W	2P02	Y		22	2073	@K	AZ GUN ERROR BIT
1P06	-X	P313	-J	TG47A22	WHT	2057	@K	-J SUB -G RETURN
1P06	-Y	P313	-I	TG49A22	WHT	2065	@K	-K SUB -G RETURN
1P06	-Z	P313	-Q	TG51A22	WHT	2055	@K	RANGE SELECT REF RTN
1P06	AA	P313	-P	TG52A22	BLU	2055	@K	RANGE SELECT REF
1P06	BB	2P01	-A		16	2032	@K	AZ MOTOR DRIVE B
1P06	CC	NC						SPARE
1P06	DD	NC						SPARE
1P06	EE	2P01	B		22	2019	@K	10V DC
1P06	FF	P313	V	TG48A22	BLU	2057	@K	-J SUB -G
1P06	GG	P313	U	TG50A22	BLU	2065	@K	-K SUB -G
1P06	HH	2P01	A		22	2019	@K	MOTOR OVERHEAT
1P11				CONNECTOR				M83723-23F1701 N
								M83723-35S 17F
1P11	A	7P03	-K		20	2083	@F	28V DC RETURN
1P11	B	7P03	-M		20	2083	@F	28V DC-CAMERA
1P11	C	4P02	-Q		22		@F	CAMERA START
1P11	D	4P02	-R		22		@F	BRIGHT
1P11	E	4P02	-S		22		@F	HAZY
1P11	F	4P02	-T		22		@F	DULL
1P11	G	NC						OPERATING INDICATION
2P				3234002-110				AMPLIFIER, ELECTRONIC
				CONNECTOR				CONTROL, STABILIZATION
2P01								M83723-13F2241W
								M83723-15S22F
2P01	A	1P06	HH		22	2019	@E	MOTOR OVERHEAT
2P01	B	1P06	EE		22	2019	@E	10V DC
2P01	C	NC						EL LASER ERROR
2P01	D	NC						EL LASER ERROR RTN

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION		CABLE NO.	SHIELD	NOMENCLATURE
2P01	E	SHIELDS			22			CHASSIS GROUND
2P01	F	7P03	C		22	2060	@E	20V RMS 4 KHZ
2P01	G	7P03	D		22	2060	@E	20V RMS 4 KHZ RETURN
2P01	H	NC						SPARE
2P01	J	P327	E	TG338B22	BLU	2064	@E	AIRSPPEED
2P01	K	P327	F	TG339B22	WHT	2064	@E	AIRSPPEED RETURN
2P01	L	7P01	H		22	3022	@E	115V 400 HZ PH A
2P01	M	7P01	J		22	3022	@E	115V 400 HZ PH C
2P01	N	7P01	K		22	3022	@E	115V 400 HZ RTN *PH B*
2P01	P	1JO9	X		22			WEAPON ACTION-SCA
2P01	R	J325	DD	TG539D22	BLU	3002	@E	26V 400 HZ A PLUS 90
2P01	S	J325	EE	TG591D22	ORN	3002	@E	26V 400 HZ,A MINUS 90
2P01	T	J325	CC	TG592D22	ORN	3002	@E	26V 400 HZ RETURN
2P01	U	NC						LASER ON
2P01	V	NC						AZ LASER ERROR
2P01	W	NC						AZ LASER ERROR RTN
2P01	X	7P03	K		22	2061	@E	7V 900 HZ PH A
2P01	Y	7P03	L		22	2061	@E	7V 900 HZ RETURN
2P01	Z	1P06	-P		16	2032	@E	AZ MOTOR DRIVE A
2P01	-A	1P06	BB		16	2032	@E	AZ MOTOR DRIVE B
2P01	-B	J325	NN	TG366D22				PORT LAUNCH POS STATUS
2P01	-C	1P06	A		16	2034	@E	EL MOTOR DRIVE A
2P01	-D	J325	JJ	TG367D22				STBD LAUNCH POS STATUS
2P01	-E	1P06	W		16	2034	@E	EL MOTOR DRIVE B
2P01	-F	6P01	Z		22			ACQUISITION
2P01	-G	7P03	-S		16	2026	@E	28V DC-SCA
2P01	-H	TS B			22			STOW
2P01	-I	7P03	-I		16	2026	@E	28V DC RETURN
2P01	-J	P325	-Y	TG337B22			@E	TURRET STATUS
2P01	-K	7P02	-G		22		@E	40V DC
2P01	-M	7P02	-E		20		@E	20V DC
2P01	-N	7P02	-C		20		@E	10V DC
2P01	-P	7P02	-I		16		@E	DC RETURN-SCA
2P01	-Q	7P02	-K		20		@E	-20V DC
2P01	-R	7P02	-M		22		@E	-40V DC
2P01	-S	7P03	-Q		16	2056	@E	28V DC-SCA

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
2P01	-T	7P03	-C	16	2056	@E	28V DC RETURN
2P02				CONNECTOR			M83723-13F2255N M83723-15S22F
2P02	A	1P05	-Q	22			5 VOLT LOGIC
2P02	B	1P05	-G	22			5 VOLTS LOGIC RTN
2P02	C	1P04	-B	22			WINDOW LIMIT SW A
2P02	D	1P04	-T	22			WINDOW LIMIT SW B
2P02	E	SHIELDS		22			CHASSIS GROUND
2P02	F	NC					SPARE
2P02	G	1P04	M	22	2291	@E	11.8 COS EPSILON
2P02	H	1P04	-G	22	2291	@E	11.8 COS EPSILON RTN
2P02	J	1P01	U	22	2085	@E	AZ BANDPASS
2P02	K	1P01	T	22	2085	@E	AZ BANDPASS RETURN
2P02	L	1P01	-N	22	2068	@E	EL BANDPASS
2P02	M	1P01	-M	22	2068	@E	EL BANDPASS RETURN
2P02	N	NC					SPARE
2P02	P	NC					SPARE
2P02	R	1P04	-A	22	2028	@E	11.8 SIN RHO
2P02	S	1P04	F	22	2028	@E	RHO SERVO RETURN B
2P02	T	1P01	FF	22		@E	AZ VS 1
2P02	U	1P01	-W	22		@E	EL VS 1
2P02	V	1P01	K	22		@E	VS 1 RETURN
2P02	W	1P01	AA	22	2045	@E	B/S POT. EXCIT PLUS
2P02	X	1P01	-Z	22	2045	@E	B/S POT. EXCIT MINUS
2P02	Y	1P06	-W	22	2073	@E	AZ GUN ERROR BIT
2P02	Z	1P06	-G	22	2073	@E	AZ GUN ERROR BIT RTN
2P02	-A	1P06	-F	22	2074	@E	EL GUN ERROT BIT
2P02	-B	1P06	L	22	2074	@E	EL GUN ERROR BIT RTN
2P02	-C	NC					SPARE
2P02	-D	1P04	-H	22	2043	@E	11.8 COS RHO
2P02	-E	1P04	-W	22	2043	@E	RHO SERVO RETURN A

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
2P02	-F	1P05	-T	22	3012	@E	10 SIN ETA SUB -G
2P02	-G	1P05	-K	22	3012	@E	ETA SUB -G RTN
2P02	-H	1P05	X	22	3012	@E	10 COS ETA SUB -G
2P02	-I	1P05	-A	22	3049	@E	10 COS EPSILON SUB -G
2P02	-J	1P05	H	22	3049	@E	10 SIN EPSILON SUB -G
2P02	-K	1P05	-B	22	3049	@E	EPSILON SUB -G RTN
2P02	-M	NC					SPARE
2P02	-N	NC					SPARE
2P02	-P	NC					SPARE
2P02	-Q	1P05	D	22	2002	@E	WINDOW SERVO ERROR SIN
2P02	-R	1P05	E	22	2002	@E	WINDOW SERVO ERROR RTN
2P02	-S	1P04	-U	22	2029	@E	WINDOW SERVO TACH
2P02	-T	1P04	-D	22	2029	@E	WINDOW SERVO TACH RTN
2P02	-U	NC					SPARE
2P02	-V	NC					SPARE
2P02	-W	1P05	-H	22	3011	@E	A SUB D BUF OUTPUT
2P02	-X	1P05	T	22	3011	@E	A SUB E BUF OUTPUT
2P02	-Y	1P05	-I	22	3011	@E	ACC BUF RETURN
2P02	-Z	1P05	B	22	2037	@E	AZ SIGNAL GEN
2P02	AA	1P05	C	22	2037	@E	AZ SIGNAL GEN RETURN
2P02	BB	1P05	Y	22	2036	@E	EL SIGNAL GEN
2P02	CC	1P05	Z	22	2036	@E	EL SIGNAL GEN RETURN
2P02	DD	1P04	J	22	2027	@E	DEROT SERVO TACH
2P02	EE	1P04	K	22	2027	@E	DEROT SERVO TACH RTN
2P02	FF	NC					SPARE
2P02	GG	1P04	-N	22	2058	@E	DEROT SERVO ERROR SIN
2P02	HH	1P04	-M	22	2058	@E	DEROT SERVO ERROR RTN
2P03				CONNECTOR			M83723-14F2255N M83723-15S22F
2P03	A	NC					SPARE
2P03	B	NC					SPARE

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
2P03	C	NC					SPARE
2P03	D	NC					SPARE
2P03	E	SHIELDS		22			CHASSIS GROUND
2P03	F	NC		22			SPARE
2P03	G	NC					SPARE
2P03	H	NC					SPARE
2P03	J	J325	A	TG368F22			PORT LAUNCHER ACTIVATE
2P03	K	J323	B	TG369F22			STBD LAUNCHER ACTIVATE
2P03	L	5P02	X		22		SCA BIT PASS
2P03	M	5P01	-J		22		AIRSPPEED OVER 35 KNOTS
2P03	N	5P03	-Y		22	@E	YAW OPEN LOOP
2P03	P	NC					SPARE
2P03	R	5P03	-S		22	@E	PITCH LOS RATE
2P03	S	NC					SPARE
2P03	T	5P03	-U		22	@E	YAW LOS RATE
2P03	U	5P03	PP		22	@E	SIGMA Z GRTR THAN -3 D
2P03	V	5P03	-N		22	@E	PITCH ERROR
2P03	W	5P03	HH		22	@E	10 SIN SIGMA Z
2P03	X	5P03	-Q		22	@E	YAW ERROR
2P03	Y	5P03	-R		22	@E	ANALOG SIGNAL RETURN
2P03	Z	5P01	X		22		LAUNCH CONSTRAINTS
2P03	-A	NC					IRT POWER ON-EPS
2P03	-B	1J09	-E		22	@E	GUN FLAG/LIGHT
2P03	-C	1J09	-F		22	@E	READY FLAG/LIGHT
2P03	-D	1J09	-G		22	@E	ATTACK FLAG/LIGHT
2P03	-E	1P01	B		22	@E	AZ MED. B/S ADJUST
2P03	-F	NC					SPARE
2P03	-G	1P03	K		20	3003	W F DIODE DRIVE RTN
2P03	-H	1P03	J		20	3003	DIODE DRIVE POWER
2P03	-I	1P03	H		20	3003	N F DIODE DRIVE RTN
2P03	-J	7P01	-J		22		IRT POWER ON-EPS
2P03	-K	1P03	-D		22	2044	BORESIGHT MTR REF
2P03	-M	1P03	L		22	2044	BORESIGHT MTR REF RTN
2P03	-N	1P03	-P		22	3010	BORESIGHT DRIVE 1
2P03	-P	1P03	-C		22	3010	BORESIGHT DRIVE 2
2P03	-Q	1P03	-N		22	3010	BORESIGHT DRIVE RTN

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
2P03	-R	1P04	-S	22	3013	@E	11.8 SIN PHI
2P03	-S	1P04	Z	22	3013	@E	-11.8 TAN THETA
2P03	-T	1P04	E	22	3013	@E	RHO COMP RES RETURN 1
2P03	-U	1P04	FF	22	2025	@E	11.8 COS PHI
2P03	-V	1P04	-X	22	2025	@E	RHO COMP RES RETURN 2
2P03	-W	1P06	-C	22	2031	@E	AZ GYRO TORQUER DR A
2P03	-X	1P06	-D	22	2031	@E	AZ GYRO TORQUER DR B
2P03	-Y	1P06	H	22	2033	@E	EL GYRO TORQUER DR A
2P03	-Z	1P06	J	22	2033	@E	EL GYRO TORQUER DR B
2P03	AA	1P04	CC	16	3007	@E	WINDOW MOTOR DR A
2P03	BB	1P04	DD	16	3007	@E	WINDOW MOTOR DR B
2P03	CC	1P04	-Q	16	3007	@E	WINDOW MOTOR DR C.T.
2P03	DD	1P04	-V	20	3005	@E	DEROT MOTOR DR A
2P03	EE	1P04	-E	20	3005	@E	DEROT MOTOR DR B
2P03	FF	1P04	EE	20	3005	@E	DEROT MOTOR DR C.T.
2P03	GG	1P01	H	22		@E	EL MED. B/S ADJUST
2P03	HH	NC					SPARE
2P04				CONNECTOR			M83723-13F2461W
							M83723-15S24F
							SPARE
							SPARE
							SPARE
2P04	A	NC					REMOTE ON CMD INTLKD
2P04	B	NC					CHASSIS GROUND
2P04	C	NC					ASCEND/DESCEND RETURN
2P04	D	7P01	M	22			REMOTE ON COMMAND
2P04	E	SHIELDS					MAG LO SELECT-SCA
2P04	F	10P01	U	22	3025	@E	TEST 9 *H*
2P04	G	J237	NN				AIRSPPEED OVER 66 KNOTS
2P04	H	1J09	P	22	2020	@E	AZ ACQUISITION CMD
2P04	J	1P05	S	22			AZ ACQUISITION CMD RTN
2P04	K	NC					EL ACQUISITION CMD
2P04	L	TS D	30A	22	2062	@E	EL ACQUISITION CMD RTN
2P04	M	TS D	31A	22	2062	@E	
2P04	N	TS D	32A	22	2063	@E	
2P04	P	TS D	33A	22	2063	@E	

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION		CABLE NO.	SHIELD	NOMENCLATURE
2P04	R	J327	-W	TG432B22	WHT	3020	@E	ROLL SYN RESOL PH A
2P04	S	J327	-X	TG433B22	BLU	3020	@E	ROLL SYN RESOL PH B
2P04	T	J327	-Y	TG434B22	ORN	3020	@E	ROLL SYN RESOL PH C
2P04	U	J327	-Z	TG435B22	WHT	3019	@E	PITCH SYN RESOL PH A
2P04	V	J327	AA	TG436B22	BLU	3019	@E	PITCH SYN RESOL PH B
2P04	W	J327	BB	TG437B22	ORN	3019	@E	PITCH SYN RESOL PH C
2P04	X	10P01	B		22	2080	@E	AZ BAR DRIVE
2P04	Y	10P01	A		22	2080	@E	AZ BAR DRIVE RETURN
2P04	Z	10P01	D		22	2046	@E	EL BAR DRIVE
2P04	-A	10P01	C		22	2046	@E	EL BAR DRIVE RETURN
2P04	-B	10P01	F		22			ATTACK PSI
2P04	-C	10P01	H		22			READY PSI
2P04	-D	10P01	K		22			FIRE PSI
2P04	-E	10P01	N		22	3025	@E	ASCEND
2P04	-F	10P01	P		22	3025	@E	DESCEND
2P04	-G	10P01	S		22	2082	@E	AZ POINTER DR
2P04	-H	10P01	R		22	2082	@E	AZ POINTER DR RETURN
2P04	-I	6P01	R		22	2078	@E	AZ RATE BIAS
2P04	-J	6P01	S		22	2078	@E	AZ RATE BIAS RETURN
2P04	-K	6P01	T		22	2079	@E	EL RATE BIAS
2P04	-M	6P01	U		22	2079	@E	EL RATE BIAS RETURN
2P04	-N	6P01	V		22	2071	@E	AZ TRACK STICK CMD
2P04	-P	6P01	W		22	2071	@E	AZ TRACK STICK CMD RTN
2P04	-Q	6P01	X		22	2072	@E	EL TRACK STICK CMD
2P04	-R	6P01	Y		22	2072	@E	EL TRACK STICK CMD RTN
2P04	-S	1J09	V		22	2020	@E	MAG HI SELECT-SCA
2P04	-T	4P02	Z		22			WEAPON SELECT-SCA
2P04	-U	4P02	-A		22			MSL PRESENT/SELECTED
2P04	-V	4P02	-B		22			INDICATOR TEST
2P04	-W	4P02	-C		22			PORT/STBD SELECT
2P04	-X	16P01	N		22		@E	MOTION COMP ENABLE
2P04	-Y	TS C	17B		22			BIT 4
2P04	-Z	TS C	18A		22			SYNTHETIC FIRST MOTION
2P04	AA	5P03	CC		22			D RHO CLUTCH ENGAGE
2P04	BB	5P01	R		22			DELTA RHO RESET
2P04	CC	5P02	S		22			SCA BITE LATCH

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
2P04	DD	5P02	M	22			SCA BITE RESET
2P04	EE	5P02	U	22			IN TEST-SCA
2P04	FF	TS C	1A	22			BIT 1
2P04	GG	TS C	2A	22			BIT 2
2P04	HH	5P02	C	22			BIT 3
2P04	JJ	5P02	D	22			BIT 5
2P04	KK	5P02	E	22			BIT 6
2P04	LL	TS C	4A	22			BIT 7
2P04	MM	TS C	5A	22			BIT 8
2P04	NN	TS C	6A	22			BIT 9
2P04	PP	TS C	7A	22			BIT 10
2P05				CONNECTOR			M83723-14F2461W
							M83723-15S24F
2P05	A	NC					SPARE
2P05	B	NC					11.8 SIN THETA
2P05	C	NC					SPARE
2P05	D	NC					SPARE
2P05	E	NC					CHASSIS GROUND
2P05	F	NC					COS THETA REF
2P05	G	NC					MOTION COMP SW
2P05	H	NC					EL TRACK STICK CMD
2P05	J	NC					AZ TRACK STICK CMD
2P05	K	NC					MANUAL
2P05	L	NC					AZ MANUAL CONTROL
2P05	M	NC					EL MANUAL CONTROL
2P05	N	NC					BIT COMPARATOR 1
2P05	P	NC					BIT COMPARATOR 2
2P05	R	NC					BIT COMPARATOR 3
2P05	S	NC					BIT COMPARATOR 4
2P05	T	NC					EL TORQUER DR BUFF
2P05	U	NC					AZ TORQUER DR BUFF
2P05	V	NC					EL TRACK CMD *100 D/S*
2P05	W	NC					AZ TRACK CMD *100 D/S*

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO	WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
2P05	X	NC				DEROT SERVO RATE
2P05	Y	NC				WINDOW SERVO RATE
2P05	Z	NC				AZ SIGNAL CUT
2P05	-A	NC				AZ SIGNAL IN
2P05	-B	NC				AZ ERROR
2P05	-C	NC				EL SIGNAL OUT
2P05	-D	NC				EL SIGNAL IN
2P05	-E	NC				EL ERROR
2P05	-F	NC				RHO SERVO ERROR
2P05	-G	NC				RHO SERVO RATE
2P05	-H	NC				CLUTCH ENGAGE
2P05	-I	NC				SCA TEST PASS
2P05	-J	NC				EL ACQUISITION CMD
2P05	-K	NC				AZ ACQUISITION CMD
2P05	-M	NC				28V DC RETURN
2P05	-N	NC				DEROT SERVO ERROR
2P05	-P	NC				SIGMA Z GRTR THAN -3 D
2P05	-Q	NC				EL GIMBAL ANGLE
2P05	-R	NC				DC RETURN
2P05	-S	NC				AZ GIMBAL ANGLE
2P05	-T	NC				EL MOTION COMP CMD
2P05	-U	NC				AZ MOTION COMP CMD
2P05	-V	NC				EL TORQUER CURRENT
2P05	-W	NC				AZ TORQUER CURRENT
2P05	-X	NC				YAW ERROR
2P05	-Y	NC				GYRO ALIGN
2P05	-Z	NC				PITCH ERROR
2P05	AA	NC				11.8 COS PHI
2P05	BB	NC				YAW LOS RATE
2P05	CC	NC				PITCH LOS RATE
2P05	DD	NC				YAW OPEN LOOP
2P05	EE	NC				ANALOG SIGNAL RETURN
2P05	FF	NC				AIRSPPEED
2P05	GG	NC				LAUNCH CONSTRAINT
2P05	HH	NC				11.8 SIN PHI
2P05	JJ	NC				10 SIN SIGMA Z

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
2P05	KK	NC					AZ TRACK CMD *50 MRIS*
2P05	LL	NC					EL TRACK CMD *50 MRIS*
2P05	MM	NC					WINDOW SERVO ERROR
2P05	NN	NC					11.8 COS RHO
2P05	PP	NC					11.8 SIN RHO
4P				3234004-110			CONTROL PANEL, TOW
4P01				CONNECTOR			M83723-13F2039N M83723-1 5S20F
4P01	A	NC					SPARE
4P01	B	NC					SPARE
4P01	C	NC					SPARE
4P01	D	NC					SPARE
4P01	E	SHIELDS		22			CHASSIS GROUND
4P01	F	NC					SPARE
4P01	G	NC					SPARE
4P01	H	NC					SPARE
4P01	J	NC					SPARE
4P01	K	NC					SPARE
4P01	L	NC					SPARE
4P01	M	PSJ01	-G	22			MISSILE 1 PRESENT-TCP
4P01	N	P8J01	-I	22			MISSILE 3 PRESENT-TCP
4P01	P	TS D	41A	22			MISSILE 5 PRESENT-TCP
4P01	R	P8J01	-H	22			MISSILE 7 PRESENT-TCP
4P01	S	S8J01	-I	22			MISSILE 2 PRESENT-TCP
4P01	T	S8J01	-G	22			MISSILE 4 PRESENT-TCP
4P01	U	S8J01	-H	22			MISSILE 6 PRESENT-TCP
4P01	V	S8J01	-F	22			MISSILE 8 PRESENT-TCP
4P01	W	16P01	W	22			CAMERA
4P01	X	NC					SPARE
4P01	Y	TB 51-C1		TG234A22			TOW TRIGGER
4P01	Z	K80-F3		TG236A22			TMS POWER ON
4P01	-A	TS D	46A	TG235A22			ARMED-PILOT MASTER ARM
4P01	-B	TB 2-5		TG237A2	BLU	2091	@E DIMMABLE POWER
4P01	-C	GND		TG238A22	WHT	2091	@E DIMMABLE POWER RETURN

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
4P01	-D	15P01	D	20			SQUIB CONNECT/CAMERA 2
4P01	-E	5P02	V	22			IN TEST-TCP
4P01	-F	NC					SPARE
4P01	-G	5P02	-E	22			MCA BIT FAIL
4P01	-H	5P02	-H	22			SCA BIT FAIL
4P01	-I	7P01	F	22			EPS BIT FAIL
4P01	-J	5P02	-J	22			TSU BIT FAIL
4P01	-K	7P02	S	20		@E	10V DC
4P01	-M	7P03	-T	16	2090	@E	28V DC-TCP
4P01	-N	NC					SPARE
4P01	-P	7P02	-T	20		@E	DC RETURN-TCP
4P01	-Q	NC					SPARE
4P01	-R	7P03	-G	16	2090	@E	28V DC RETURN
4P02				CONNECTOR			M83723-14F2461N
							M83723-15S24F
							SPARE
4P02	A	NC					WEAPON SELECT
4P02	B	TS D	37C	22			WEAPONS ARMED
4P02	C	16P01	V	22			SPARE
4P02	D	NC					CHASSIS GROUND
4P02	E	SHIELDS		22			M1 SELECT-MSP
4P02	F	15P01	G	22			M2 SELECT-MSP
4P02	G	15P01	H	22			M3 SELECT-MSP
4P02	H	15P01	J	22			M4 SELECT-MSP
4P02	J	15P01	K	22			M5 SELECT-MSP
4P02	K	15P01	L	22			M6 SELECT-MSP
4P02	L	15P01	M	22			M7 SELECT-MSP
4P02	M	15P01	N	22			M8 SELECT-MSP
4P02	N	15P01	P	22			M1 SELECT
4P02	P	P8J01	-K	22			M3 SELECT
4P02	R	P8J01	-N	22			M5 SELECT
4P02	S	P8J01	-J	22			M7 SELECT
4P02	T	P8J01	-M	22			M2 SELECT
4P02	U	S8J01	-N	22			

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
4P02	V	S8J01	-K		22		M4 SELECT
4P02	W	S8J01	-M		22		M6 SELECT
4P02	X	S8J01	-J		22		M8 SELECT
4P02	Y	P329	-C	TG271A20			REMOTE ON COMMAND
*4P02	Y	6P01	-B	TG215A22			SIGHT HAND CONTROL
4P02	Z	2P04	-T		22		WEAPON SELECT-SCA
4P02	-A	2P04	-U		22		MSL PRESENT/SELECTED
4P02	-B	2P04	-V		22		INDICATOR TEST
4P02	-C	2P04	-W		22		PORT/STBD SELECT
4P02	-D	5P01	V		22	@E	TOW TRIGGER ARMED
4P02	-E	NC					SPARE
4P02	-F	5P01	T		22		AUTO SELECT INTLK
4P02	-G	5P01	-B		20	@E	ARMED 28V DC
4P02	-H	5P02	L		22		BITE RESET
4P02	4	TS D	42A		22	@E	MANUAL WIRE CUT-TOP
4P02	-J	1P03	E		22	@E	TSU RETICLE ADJUST
4P02	-K	1P05	P		22		WEAPON SELECT-TSU
4P02	-M	NC					SPARE
4P02	-N	NC					SPARE
4P02	-P	NC					SPARE
4P02	-Q	1P11	C		22	@E	CAMERA START
4P02	-R	1P11	D		22	@E	BRIGHT
4P02	-S	1P11	E		22	@E	HAZY
4P02	-T	1P11	F		22	@E	DULL
4P02	-U	NC					SPARE
4P02	-V	NC					SPARE
4P02	-W	NC					SPARE
4P02	-X	NC					SPARE
4P02	-Y	15P01	R		22		MISSILE 1 PRESENT-MSP
4P02	-Z	15P01	S		22		MISSILE 2 PRESENT-MSP
4P02	AA	15P01	T		22		MISSILE 3 PRESENT-MSP
4P02	BB	15P01	U		22		MISSILE 4 PRESENT-MSP
4P02	CC	15P01	V		22		MISSILE 5 PRESENT-MSP
4P02	DD	15P01	W		22		MISSILE 6 PRESENT-MSP
4P02	EE	15P01	X		22		MISSILE 7 PRESENT-MSP
4P02	FF	15P01	Y		22		MISSILE 8 PRESENT-MSP
4P02	GG	NC					SPARE

*After MWO 55-1500-220-30-2.

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
4P02	HH	NC					SPARE
4P02	JJ	NC					SPARE
4P02	KK	NC					SPARE
4P02	LL	NC					SPARE
4P02	MM	NC					SPARE
4P02	NN	NC					SPARE
4P02	PP	NC					SPARE
5P				3234005-110			AMPLIFIER, ELECTRONIC CONTROL, MISSILE CMD
5P01				CONNECTOR			M83723-13F2241N M83723-15S22F
5P01	A	7P01	P	22	2001	@Y	115V 400 HZ PH C
5P01	B	7P01	R	22	2001	@Y	115V 400 HZ RTN *PH B*
5P01	C	NC					SPARE
5P01	D	NC					SPARE
5P01	E	NC					SPARE
5P01	F	NC					SPARE
5P01	G	NC					SPARE
5P01	H	NC					SPARE
5P01	J	NC					SPARE
5P01	K	7P02	-J	22		@Y	-40V DC
5P01	L	7P02	-D	22		@Y	-20V DC
5P01	M	7P02	-H	22		@Y	20V DC
5P01	N	NC					SPARE
5P01	P	TS D	42B	22		@Y	MANUAL WIRE CUT-TCP
5P01	R	2P04	BB	22			DELTA RHO RESET
5P01	S	NC					SPARE
5P01	T	4P02	-F	22			AUTO SELECT INTLK
5P01	U	TS D	35A	20			SQUIB CONNECT/CAMERA 1
5P01	V	4P02	-D	22		@Y	TOW TRIGGER ARMED
5P01	W	TS B	48	22			STOW
5P01	X	2P03	Z	22			LAUNCH CONSTRAINTS
5P01	Y	SHIELDS		22			CHASSIS GROUND

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION		CABLE NO.	SHIELD	NOMENCLATURE
5P01	Z	NC						SPARE 16
5P01	-A	NC						SPARE 16
5P01	-B	4P02	-G		20		@Y	ARMED 28V DC
5P01	-C	NC						SPARE 16
5P01	-D	6P01	N		22			CONSTRAINTS OVERRIDE
5P01	-E	NC						SPARE 16
5P01	-F	7P02	-B		22		@Y	40V DC
5P01	-G	7P02	Z		16		@Y	DC RETURN-MCA
5P01	-H	NC						SPARE
5P01	-I	7P02	-A		22		@Y	10V DC
5P01	-J	2P03	M		22			AIRSPEED OVER 35 KNOTS
5P01	-K	NC						SPARE 16
5P01	-M	NC						SPARE 16
5P01	-N	NC						SPARE 16
5P01	-P	NC						SPARE 16
5P01	-Q	7P03	-A		20	2003	@Y	28V DC RETURN
5P01	-R	7P03	-P		20	2003	@Y	28V DC-MCA
5P01	-S	TB 44-4		TG439A16	WHT	2004	@Y	28V DC SQUIB PWR RET
5P01	-T	TS C	8B		16	2004	@Y	28V DC SQUIB PWR
5P02				CONNECTOR				M83723-14F2241N
								M83723-15S22F
5P02	A	TS C	1B		22			BIT 1
5P02	B	TS C	2B		22			BIT 2
5P02	C	2P04	HH		22			BIT 3
5P02	D	2P04	JJ		22			BIT 5
5P02	E	2P04	KK		22			BIT 6
5P02	F	TS C	4B		22			BIT 7
5P02	G	TS C	5B		22			BIT 8
5P02	H	TS C	6B		22			BIT 9
5P02	J	TS C	7B		22			BIT 10
5P02	K	1P01	-C		22			BIT 4
5P02	L	4P02	-H		22			BITE RESET
5P02	M	2P04	DD		22			SCA BITE RESET

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
5P02	N	NC					SPARE
5P02	P	7P01	T	22			EPS BITE RESET
5P02	R	TS C	17A	22			BIT 4
5P02	S	2P04	CC	22			SCA BITE LATCH
5P02	T	NC					SPARE
5P02	U	2P04	EE	22			IN TEST-SCA
5P02	V	4P01	-E	22			IN TEST-TCP
5P02	W	TS D	34C	22			K1 *T* BIT PASS
5P02	X	2P03	L	22			SCA BIT PASS
5P02	Y	SHIELDS		22			CHASSIS GROUND
5P02	Z	TS A	1A	16	2005	@Y	PORT PREFIRE
5P02	-A	TS B	1A	16	2006	@Y	STBD PREFIRE
5P02	-B	TS D	11C	22			BIT 3
5P02	-C	1P03	G	22		@Y	MANGIN MIRROR DRIVE
5P02	-D	TS D	12C	22			BIT 5
5P02	-E	4P01	-G	22			MCA BIT FAIL
5P02	-F	TS D	13C	22			BIT 6
5P02	-G	S8J01	Z	16	2010	@Y	STBD WIRE CUT RETURN
5P02	-H	4P01	-H	22			SCA BIT FAIL
5P02	-I	P8J01	-B	16	2009	@Y	PORT FIRE RETURN
5P02	-J	4P01	-J	22			TSU BIT FAIL
5P02	-K	TS A	2A	16	2005	@Y	PORT PREFIRE RETURN
5P02	-M	TS B	2A	16	2006	@Y	STBD PREFIRE RETURN
5P02	-N	P8J01	Y	16	2007	@Y	PORT WIRE CUT
5P02	-P	P8J01	Z	16	2007	@Y	PORT WIRE CUT RETURN
5P02	-Q	S8J01	Y	16	2010	@Y	STBD WIRE CUT
5P02	-R	S8J01	-B	16	2008	@Y	STBD FIRE RETURN
5P02	-S	P8J01	-A	16	2009	@Y	PORT FIRE
5P02	-T	S8J01	-A	16	2008	@Y	STBD FIRE
5P03				CONNECTOR			M83723-13F2461N
							M83723-15S24F
5P03	A	NC					SPARE
5P03	B	NC					SPARE
5P03	C	NC					SPARE

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO	WIRE IDENTIFICATION		CABLE NO.	SHIELD	NOMENCLATURE
5P03	D	NC					SPARE
5P03	E	NC					SPARE
5P03	F	NC					SPARE
5P03	G	NC					SPARE
5P03	H	NC					SPARE
5P03	J	NC					SPARE
5P03	K	NC					SPARE
5P03	L	NC					SPARE
5P03	M	NC					SPARE
5P03	N	NC					SPARE
5P03	P	NC					SPARE
5P03	R	NC					SPARE
5P03	S	NC					SPARE
5P03	T	NC					SPARE
5P03	U	NC					SPARE
5P03	V	NC					SPARE
5P03	W	NC					SPARE
5P03	X	NC					SPARE
5P03	Y	NC					SPARE
5P03	Z	SHIELDS	22				CHASSIS GROUND
5P03	-A	P8J01	W	22	2011	@Z	PORT WIRE COMMAND A
5P03	-B	P8J01	X	22	2011	@Z	PORT WIRE COMMAND B
5P03	-C	S8J01	W	22	2012	@Z	STBD WIRE COMMAND A
5P03	-D	S8J01	X	22	2012	@Z	STBD WIRE COMMAND B
5P03	-E	P8J01	S	22	2013	@Z	PORT PITCH SELF-BAL A
5P03	-F	P8J01	T	22	2013	@Z	PORT PITCH SELF-BAL B
5P03	-G	P8J01	U	22	2014	@Z	PORT YAW SELF-BAL A
5P03	-H	P8J01	V	22	2014	@Z	PORT YAW SELF-BAL B
5P03	-I	S8J01	S	22	2015	@Z	STBD PITCH SELF-BAL A
5P03	-J	S8J01	T	22	2015	@Z	STBD PITCH SELF-BAL B
5P03	-K	S8J01	U	22	2016	@Z	STBD YAW SELF-BAL A
5P03	-M	S8J01	V	22	2016	@Z	STBD YAW SELF-BAL B
5P03	-N	2P03	V	22		@Z	PITCH ERROR
5P03	-P	NC					SPARE
5P03	-Q	2P03	X	22		@Z	YAW ERROR
5P03	-R	2P03	Y	22		@Z	ANALOG SIGNAL RETURN

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
5P03	-S	2P03	R	22		@Z	PITCH LOS RATE
5P03	-T	NC					SPARE
5P03	-U	2P03	T	22		@Z	YAW LOS RATE
5P03	-V	NC					SPARE
5P03	-W	NC					SPARE
5P03	-X	NC					SPARE
5P03	-Y	2P03	N	22		@Z	YAW OPEN LOOP
5P03	-Z	NC					SPARE
5P03	AA	1P01	A	22		@Z	AZ SAMPLE PULSE
5P03	BB	1P10	W	22		@Z	EL SAMPLE PULSE
5P03	CC	2P04	AA	22			D RHO CLUTCH ENGAGE
5P03	DD	TS C	18B	22			SYNTHETIC FIRST MOTION
5P03	EE	1P01	DD	22			AGC CLAMP RELEASE
5P03	FF	NC					SPARE
5P03	GG	1P01	V	22			K1 *T* INITIATE
5P03	HH	2P03	W	22		@Z	10 SIN SIGMA Z
5P03	JJ	1P01	HH	22		@Z	MEDIUM-NARROW SWITCH
5P03	KK	1P01	EE	22		@Z	CARRIER FREQ CHANGE
5P03	LL	1P01	-V	22		@Z	K1 *T* CHANGE
5P03	MM	NC					WIDE-MEDIUM SWITCH
5P03	NN	1P01	BB	22		@Z	WIDE-MEDIUM SWITCH
5P03	PP	2P03	U	22		@Z	SIGMA Z GRTR THAN -3D
5P04				CONNECTOR			M83723-14F2461X
							M83723-15S24F
5P04	A	NC					SPARE
5P04	B	NC					PITCH ERROR OUTPUT SW
5P04	C	NC					YAW ERROR OUTPUT SW
5P04	D	NC					CVAC SWITCH DRIVE
5P04	E	SHIELDS		22			CHASSIS GROUND
5P04	F	NC					TIME -0.04
5P04	G	NC					TIME 0.43
5P04	H	NC					TIME 1.05

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
5P04	J	NC					TIME 17.92
5P04	K	TEST 1	S	22		@E	PITCH VCO DISABLE
5P04	L	TEST 1	T	22		@E	YAW VCO DISABLE
5P04	M	TSC	13A	22		@E	PITCH OUTPUT
5P04	N	TSC	14A	22		@E	YAW OUTPUT
5P04	P	TSC	15A	22		@E	PITCH LIM & SUM
5P04	R	TSC	16A	22		@E	YAW LIM & SUM
5P04	S	TEST 1	U	22			PITCH SELF BAL INTEG
5P04	T	TEST 1	V	22			YAW SELF BAL INTEG
5P04	U	TEST 1	-M	22			G-BIAS SUM AMP
5P04	V	TEST 1	-K	22			CVAC
5P04	W	TSC	19A	22			PROGRAMMER INTERRUPT
5P04	X	TEST 1	C	22			TIMER START
5P04	Y	TEST 1	D	22			TIME 00.00
5P04	Z	TEST 1	F	22			TIME 00.17
5P04	-A	NC					TIME 00.47
5P04	-B	TEST 1	H	22			TIME 00.79
5P04	-C	TEST 1	J	22			TIME 01.35
5P04	-D	TEST 1	K	22			TIME 02.34
5P04	-E	TEST 1	L	22			TIME 04.325
5P04	-F	NC					TIME 08.89
5P04	-G	TEST 1	X	22			TIME 13.48
5P04	-H	TEST 1	P	22			IN TEST
5P04	-I	NC					TEST 1 PASS
5P04	-J	NC					TEST 2 PASS
5P04	-K	NC					TEST 3 PASS
5P04	-M	NC					TEST 4 PASS
5P04	-N	NC					TEST 5 PASS
5P04	-P	NC					TEST 6 PASS
5P04	-Q	NC					TEST 7 PASS
5P04	-R	NC					TEST 8 PASS
5P04	-S	NC					TEST 9 PASS
5P04	-T	NC					TEST 10 PASS
5P04	-U	NC					PITCH BIT PASS
5P04	-V	NC					YAW BIT PASS
5P04	-W	NC					OUTPUT BIT PASS

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
5P04	-X	NC					G & C BIT PASS
5P04	-Y	NC					PROGRAMMER BIT PASS
5P04	-Z	TEST 1	-F	22			MCA BIT PASS
5P04	AA	TEST 1	-B	22			PREFIRE/FIRE/WIRE CUT
5P04	BB	NC					28V DC RETURN
5P04	CC	TS C	11A	22		@E	PROGRAMMER SEQUENCE
5P04	DD	TS C	12A	22		@E	DC RETURN-MCA
5P04	EE	INST	12	22	2098	@E	WIRE COMMAND A
5P04	FF	INST	13	22	2098	@E	WIRE COMMAND B
5P04	GG	NC					PITCH OUTPUT
5P04	HH	NC					YAW OUTPUT
5P04	JJ	NC					PITCH LIM & SUM
5P04	KK	NC					YAW LIM & SUM
5P04	LL	NC					PITCH SELF-BAL A
5P04	MM	NC					PITCH SELF-BAL B
5P04	NN	NC					YAW SELF-BAL A
5P04	PP	NC					YAW SELF-BAL B
6P							CONTROL, SIGHT UNIT,
6P01							M83723-13F1832N
							M83723-15S18F
6P01	A	NC					SPARE
6P01	B	NC					SPARE
6P01	C	NC					SPARE
6P01	D	NC					SPARE
6P01	E	SHIELDS		22			CHASSIS GROUND
6P01	F	NC					SPARE
6P01	G	NC					SPARE
6P01	H	NC					SPARE
6P01	J	NC					SPARE
6P01	K	TS D	36A	22			TRACK MODE
6P01	L	TS D	38A	22			PILOT ACQUISITION
6P01	M	TB 51-G5					GUNNER ACQUISITION
							TG202B22

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
6P01	N	5P01	-D	22			CONSTRAINTS OVERRIDE
6P01	P	TS B	4C	22			STOW
6P01	R	2P04	-I	22	2078	@E	AZ RATE BIAS
6P01	S	2P04	-J	22	2078	@E	AZ RATE BIAS RETURN
6P01	T	2P04	-K	22	2079	@E	EL RATE BIAS
6P01	U	2P04	-M	22	2079	@E	EL RATE BIAS RETURN
6P01	V	2P04	-N	22	2071	@E	AZ TRACK STICK CMD
6P01	W	2P04	-P	22	2071	@E	AZ TRACK STICK CMD RTN
6P01	X	2P04	-Q	22	2072	@E	EL TRACK STICK CMD
6P01	Y	2P04	-R	22	2072	@E	EL TRACK STICK CMD RTN
6P01	Z	2P01	-F	22			ACQUISITION
6P01	-A	NC					SPARE
6P01	-B	7P03	R	CAPPED		@E	28V DC-SHC
*6P01	-B	4P02	Y	TG215A22			TCP
6P01	-C	NC					SPARE
6P01	-D	P122	C	TG593E22	BLU	2070	26V 400 HZ PH A
6P01	-E	P122	R	TG592E22	WHT	2070	26V 400 HZ RETURN
6P01	-F	TB 51-D6		TG199A22			STOW-BHC
6P01	-G	7P02	Y	22		@E	40V DC
6P01	-H	7P02	V	22		@E	DC RETURN-SHC
6P01	-J	7P02	M	22		@E	-40V DC
7P				3234007-110			POWER SUPPLY
				CONNECTOR			ELECTRONIC
							M83723-1 3F2241 X
							M83723-15S22
							SPARE
7P01	A	NC					SPARE
7P01	B	1P03	B	20	3004	@-D	115V 400 HZ PH A
7P01	C	1P03	Z	20	3004	@-D	115V 400 HZ PH C
7P01	D	1P03	C	20	3004	@-D	115V 400 HZ PTN PH B
7P01	E	NC					SPARE
7P01	F	4P01	I	22			EPS BH FAL
7P01	G	NC					SPARE
7P01	H	2P01	L	22	3022	@-D	115V 400 HZ PH A
7P01	J	2P01	M	22	3022	@-D	115V 400 HZ PH C

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Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION		CABLE NO.	SHIELD	NOMENCLATURE
7P01	K	2P01	N	22	3022	@-D	115V 40 HZ RTN *PH B*	
7P01	L	NC					SPARE	
7P01	M	2P04	D	22			REMOTE ON CMD INTLKD	
7P01	N	NC					SPARE	
7P01	P	5P01	A	22	2001	@-D	115V 400 HZ PH C	
7P01	R	5P01	B	22	2001	@-D	115V 400 HZ RTN *PH B*	
7P01	S	1P04	R	20	3054	@-D	115V 400 HZ PH C	
7P01	T	5P02	P	22			EPS BITE RESET	
7P01	U	NC					SPARE	
7P01	V	NC					115V 400 HZ PH A	
7P01	W	NC					115V 400 HZ PH B	
7P01	X	1P04	V	20	3054	@-D	115V 400 HZ PH A	
7P01	Y	1P04	-P	20	3054	@-D	115V 400 HZ RTN *PH B*	
7P01	Z	TS C	3B	20	3026	@-D	115V 400 HZ PH A	
7P01	-A	TS C	10B	20	3026	@-D	115V 400 HZ RTN *PH B*	
7P01	-B	NC					SPARE	
7P01	-C	NC					SPARE	
7P01	-D	SHIELDS		22			CHASSIS GROUND	
7P 01	-E	TB 44-2		TG545A16	BLU	2106	@-D 28V DC	
7P01	-F	NC					SPARE	
7P01	-G	TB 44-4		TG546A16	WHT	2106	@-D 28V DC RETURN	
7P01	-H	NC					MEDIUM-NARROW SWITCH	
7P01	-I	TB 44-4		TG547A16	WHT	2107	@-D 28V DC RETURN	
7P01	-J	2P03	-J	22			IRT POWER ON-EPS	
7P01	-K	TS C	9B	20	3026	@-D	115V 400 HZ PH C	
7P01	-M	P323	U	TG412H16N			CHASSIS GROUND	
7P01	-N	P323	T	TG462H16N			CHASSIS GROUND	
7P01	-P	TB 44-2		TG548A16	BLU	2107	@-D 28V DC	
7P01	-Q	TB 44-2		TG549A16	BLU	2017	@-D 28V DC	
7P01	-R	TB 44-5		TG550A16	WHT	2017	@-D 28V DC RETURN	
7P01	-S	TB 44-5		TG551A16	WHT	2018	@-D 28V DC RETURN	
7P01	-T	TB 44-3		TG552A16	BLU	2018	@-D 28V DC	

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
7P02				CONNECTOR			M83723-14F2241W M83723-15S22F
7P02	A	1P06	Y	22		@E	-40V DC
7P02	B	1P06	C	22		@E	40V DC
7P02	C	1P05	V	22		@E	20V DC
7P02	D	1P05	-J	22		@E	-20V DC
7P02	E	SHIELDS		22			CHASSIS GROUND
7P02	F	1P05	U	20		@E	DC RETURN-TSU
7P02	G	P8J01	-T	20		@E	AIRFRAME GROUND
7P02	H	NC					SPARE
7P02	J	15P01	-J	22		@E	10V DC
7P02	K	NC					DC RETURN
7P02	L	16P01	Z	22		@E	-20V DC
7P02	M	6P01	-J	22		@E	-40V DC
7P02	N	NC					-20V DC
7P02	P	NC					SPARE
7P02	R	S8J01	-T	20		@E	AIRFRAME GROUND
7P02	S	4P01	-K	20		@E	10V DC
7P02	T	NC					10V DC
7P02	U	16P01	-C	22		@E	DC RETURN-GACP
7P02	V	6P01	-H	22		@E	DC RETURN-SHC
7P02	W	1P01	-J	20		@E	DC RETURN-TSU
7P02	X	16P01	-B	22		@E	20V DC
7P02	Y	6P01	-G	22		@E	40V DC
7P02	Z	5P01	-G	16		@E	DC RETURN-MCA
7P02	-A	5P01	-I	22		@E	10V DC
7P02	-B	5P01	-F	22		@E	40V DC
7P02	-C	2P01	-N	20		@E	10V DC
7P02	-D	5P01	L	22		@E	-20V DC
7P02	-E	2P01	-M	20		@E	20V DC
7P02	-F	NC					20V DC
7P02	-G	2P01	-K	22		@E	40V DC
7P02	-H	5P01	M	22		@E	20V DC
7P02	-I	2P01	-P	16		@E	DC RETURN-SCA
7P02	-J	5P01	K	22		@E	-40V DC

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
7P02	-K	2P01	-Q	20		@E	-20V DC
7P02	-M	2P01	-R	22		@E	40V DC
7P02	-N	1P04	-J	22		@E	-40V DC
7P02	-P	1P01	-I	22		@E	-20V DC
7P02	-Q	1P01	-K	22		@E	20V DC
7P02	-R	1P04	-Z	22		@E	40V DC
7P02	-S	1P01	S	22		@E	10V DC
7P02	-T	4P01	-P	20		@E	DC RETURN-TCP
7P03				CONNECTOR			M83723-14F2241X M83723-15SS22F
7P03	A	1P03	F	20		@D	28V DC RTN-TSU
7P03	B	NC					SPARE
7P03	C	2P01	F	22	2060	@D	20V RMS 4 KHZ
7P03	D	2P01	G	22	2060	@D	20V RMS 4 KHZ RETURN
7P03	E	1P06	B	22	2024	@D	20V RMS 4 KHZ
7P03	F	NC					SPARE
7P03	G	NC					40V 400 HZ
7P03	H	NC					40V 400 HZ RETURN
7P03	J	NC					SPARE
7P03	K	2P01	X	22	2061	@D	7V 900 HZ PH A
7P03	L	2P01	Y	22	2061	@D	7V 900 HZ RETURN
7P03	M	1P06	-S	16	3001	@D	7V 900 HZ PH B
7P03	N	1P06	-T	16	3001	@D	7V 900 HZ RETURN
7P03	P	NC					SPARE
7P03	R	6P01	-B	22		@D	28V DC-SHC
*7P03	R	P324	A	22			CAPPED SPARE
7P03	S	NC					28V DC
7P03	T	NC					SPARE
7P03	U	NC					SPARE
7P03	V	16P01	X	22	2081	@D	28V DC-GACP
7P03	W	1P05	K	20	2038	@D	28V DC-TSU
7P03	X	1P05	M	20	2038	@D	28V DC RETURN
7P03	Y	1OPOI	T	22			28V DC RETURN
7P03	Z	NC					28V DC RETURN
7P03	-A	5P01	-Q	20	2003	@D	28V DC RETURN

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Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
7P03	-B	1P06	X	22	2024	@D	20V RMS 4 KHZ RETURN
7P03	-C	2P01	-T	16	2056	@D	28V DC RETURN
7P03	-D	SHIELDS		22			CHASSIS GROUND
7P03	-E	1J09	-J	22	2076	@D	28V DC RETURN
7P03	-F	1P06	-R	16	3001	@D	7V 900 HZ PH A
7P03	-G	4P01	-R	16	2090	@D	28V DC RETURN
7P03	-H	NC					28V DC RETURN
7P03	-I	2P01	-I	16	2026	@D	28V DC RETURN
7P03	-J	16P01	Y	22	2081	@D	28V DC RETURN
7P03	-K	1P11	A	20	2083	@D	28V DC RETURN
7P03	-M	1P11	B	20	2083	@D	28V DC-CAMERA
7P03	-N	NC					28V DC
7P03	-P	5P01	-R	20	2003	@D	28V DC-MCA
7P03	-Q	2P01	-S	16	2056	@D	28V DC-SCA
7P03	-R	1J09	-H	22	2076	@D	28V DC-TSU
7P03	-S	2P01	-G	16	2026	@D	28V DC-SCA
7P03	-T	4P01	-M	16	2090	@D	28V DC-TCP
7P04				CONNECTOR			M83723-14F1626W M83723-15S16F
7P04	A	NC					SPARE
7P04	B	NC					SPARE
7P04	C	NC					SPARE
7P04	D	NC					SPARE
7P04	E	NC					CHASSIS GROUND
7P04	F	NC					20V RMS 4 KHZ
7P04	G	NC					SPARE
7P04	H	NC					7V 900 HZ PH A
7P04	J	NC					7V 900 HZ PH B
7P04	K	NC					40V 400 HZ/500 HZ
7P04	L	NC					-40V DC
7P04	M	NC					-20V DC
7P04	N	NC					DC RETURN
7P04	P	NC					10V DC

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
7P04	R	NC					20V DC
7P04	S	NC					40V DC
7P04	T	NC					28V DC POWER ON
7P04	U	NC					28V DC
7P04	V	NC					28V DC RETURN
7P04	W	NC					SPARE
7P04	X	NC					SPARE
7P04	Y	NC					SPARE
7P04	Z	NC					SPARE
7P04	-A	NC					12V BIAS
7P04	-B	NC					-12V BIAS
7P04	-C	NC					SPARE
P8J				3234008-110			LAUNCHER, GUIDED MISSILE
P8J01				CONNECTOR			JTPOORE-20-41S-SR
P8J01	A	P322	A	TG441B22			PORT LAUNCHER IDENT
P8J01	B	NC					UPPER LAUNCHER PRESENT
P8J01	C	P322	C	TG443F22			LOWER LAUNCHER PRESENT
P8J01	D	NC					SPARE
P8J01	E	NC					SPARE
P8J01	F	NC					SPARE
P8J01	G	NC					SPARE
P8J01	H	NC					SPARE
P8J01	J	SHIELDS			22		SHIELD GROUND
P8J01	K	TS A	1B		20	2092	@J PORT PREFIRE
P8J01	L	TS A	2B		20	2092	@J PORT PREFIRE RETURN
P8J01	M	TS A	1C		20	2093	@J PORT PREFIRE
P8J01	N	TS A	2C		20	2093	@J PORT PREFIRE RETURN
P8J01	P	TS A	1D		20	2094	@J PORT PREFIRE
P8J01	R	TS A	2D		20	2094	@J PORT PREFIRE RETURN
P8J01	S	5P03	-E		22	2013	@J PORT PITCH SELF-BAL A
P8J01	T	5P03	-F		22	2013	@J PORT PITCH SELF-BAL B
P8J01	U	5P03	-G		22	2014	@J PORT YAW SELF-BAL A

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
P8J01	V	5P03	-H	22	2014	@J	PORT YAW SELF-BAL B
P8J01	W	5P03	-A	22	2011	@J	PORT WIRE COMMAND A
P8J01	X	5P03	-B	22	2011	@J	PORT WIRE COMMAND B
P8J01	Y	5P02	-N	16	2007	@J	PORT WIRE CUT
P8J01	Z	5P02	-P	16	2007	@J	PORT WIRE CUT RETURN
P8J01	-A	5P02	-S	16	2009	@J	PORT FIRE
P8J01	-B	5P02	-I	16	2009	@J	PORT FIRE RETURN
P8J01	-C	TS A	4C	20			MANUAL WIRE CUT
P8J01	-D	NC					SPARE
P8J01	-E	P321	B	TG583A20N		@J	28V DC RETURN
P8J01	-F	TS D	41B	22			MISSILE 5 PRESENT-TCP
P8J01	-G	4P01	M	22			MISSILE 1 PRESENT-TCP
P8J01	-H	4P01	R	22			MISSILE 7 PRESENT-TCP
P8J01	-I	4P01	N	22			MISSILE 3 PRESENT-TCP
P8J01	-J	4P02	S	22			M5 SELECT
P8J01	-K	4P02	P	22			M1 SELECT
P8J01	-M	4P02	T	22			M7 SELECT
P8J01	-N	4P02	R	22			M3 SELECT
P8J01	-P	TS D	14A	TG412C20N			M5 LNCHR CHASSIS GND
P8J01	-Q	TS D	14B	TG412D20N			M1 LNCHR CHASSIS GND
P8J01	-R	TS D	14C	TG412E20N			M7 LNCHR CHASSIS GND
P8J01	-S	TS D	14D	TG412F20N			M3 LNCHR CHASSIS GND
P8J01	-T	7P02	G	20		@J	AIRFRAME GROUND
S8J				3234008-110			LAUNCHER, GUIDED MISSILE
S8J01				CONNECTOR			JTP00RE-20-41S-SR
S8J01	A	P321	A	TG391B22			STBD LAUNCHER IDENT
S8J01	B	NC					UPPER LAUNCHER PRESENT
S8J01	C	P321	C	TG393F22			LOWER LAUNCHER PRESENT
S8J01	D	NC					SPARE
S8J01	E	NC					SPARE
S8J01	F	NC					SPARE
S8J01	G	NC					SPARE

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
S8J01	H	NC					SPARE
S8J01	J	SHIELDS		22			SHIELD GROUND
S8J01	K	TS B	1B	20	2095	@J	STBD PREFIRE
S8J01	L	TS B	2B	20	2095	@J	STBD PREFIRE RETURN
S8J01	M	TS B	1C	20	2096	@J	STBD PREFIRE
S8J01	N	TS B	2C	20	2096	@J	STBD PREFIRE RETURN
S8J01	P	TS B	1D	20	2097	@J	STBD PREFIRE
S8J01	R	TS B	2D	20	2097	@J	STBD PREFIRE RETURN
S8J01	S	5P03	-I	22	2015	@J	STBD PITCH SELF-BAL A
S8J01	T	5P03	-J	22	2015	@J	STBD PITCH SELF-BAL B
S8J01	U	5P03	-K	22	2016	@J	STBD YAW SELF-BAL A
S8J01	V	5P03	-M	22	2016	@J	STBD YAW SELF-BAL B
S8J01	W	5P03	-C	22	2012	@J	STBD WIRE COMMAND A
S8J01	X	5P03	-D	22	2012	@J	STBD WIRE COMMAND B
S8J01	Y	5P02	-Q	16	2010	@J	STBD WIRE CUT
S8J01	Z	5P02	-G	16	2010	@J	STBD WIRE CUT RETURN
S8J01	-A	5P02	-T	16	2008	@J	STBD FIRE
S8J01	-B	5P02	-R	16	2008	@J	STBD FIRE RETURN
S8J01	-C	TS A	4B	20			MANUAL WIRE CUT
S8J01	-D	NC					SPARE
S8J01	-E	P322	-F	TG231B22		@J	28V DC RETURN
S8J01	-F	4P01	V	22			MISSILE 8 PRESENT-TCP
S8J01	-G	4P01	T	22			MISSILE 4 PRESENT-TCP
S8J01	-H	4P01	U	22			MISSILE 6 PRESENT-TCP
S8J01	-I	4P01	S	22			MISSILE 2 PRESENT-TCP
S8J01	-J	4P02	X	22			M8 SELECT
S8J01	-K	4P02	V	22			M4 SELECT
SJo01	-M	4P02	W	22			M6 SELECT
S8J01	-N	4P02	U	22			M2 SELECT
S8J01	-P	TS D	44A	TG462C20N			M8 LNCHR CHASSIS GND
S8J01	-Q	TS D	44B	TG462D20N			M4 LNCHR CHASSIS GND

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE	
S8J01	-R	TS D	44C	TG462E20N			M6 LNCHR CHASSIS GND	
S8J01	-S	TS D	44D	TG462F20N			M2 LNCHR CHASSIS GND	
S8J01	-T	7P02	R		20	@J	AIRFRAME GROUND	
10P				3234010-110			INDICATOR, PILOT	
10P01				CONNECTOR			STEERING	
							M83723-13F1419N	
							M83723-15A14F	
10P01	A	2P04	Y		22	2080	@V	AZ BAR DRIVE RETURN
10P01	B	2P04	X		22	2080	@V	AZ BAR DRIVE
10P01	C	2P04	-A		22	2046	@V	EL BAR DRIVE RETURN
10P01	D	2P04	Z		22	2046	@V	EL BAR DRIVE
10P01	E	NC						SPARE
10P01	F	2P04	-B		22			ATTACK PSI
10P01	G	NC						SPARE
10P01	H	2P04	-C		22			READY PSI
10P01	J	NC						SPARE
10P01	K	2P04	-D		22			FIRE PSI
10P01	L	TB 6	-1	TG312A22 BLU	2069	@V		DIMMABLE PWR
10P01	M	GND		TG313A22 WHT	2069	@V		DIMMABLE PWR RETURN
10P01	N	2P04	-E		3025	@V		ASCEND
10P01	P	2P04	-F		22	3025	@V	DESCEND
10P01	R	2P04	-H		22	2082	@V	AZ POINTER DR RETURN
10P01	S	2P04	-G		22	2082	@V	AZ POINTER DR
10P01	T	7P03	Y		22		@V	28V DC RETURN
10P01	U	2P04	F		22	3025	@V	ASCEND/DESCEND RETURN
10P01	V	SHIELDS			22			CHASSIS GROUND
15P				3234015-110				PANEL, MISSILE STATUS
15P01				CONNECTOR				M83723-13F2041X
								M83723-15S20F
15P01	A	TB 51	D4	A528R20				28V DC SQUIB
15P01	B	TS A	4A		20			MANUAL WIRE CUT

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
15P01	C	TS D	43A	20			SQUIB CONNECT/CAMERA 1
15P01	D	4P01	-D	20			SQUIB CONNECT/CAMERA 2
15P01	E	SHIELDS		22			CHASSIS GROUND
15P01	F	NC					SPARE
15P01	G	4P02	F	22			M1 SELECT-MSP
15P01	H	4P02	G	22			M2 SELECT-MSP
15P01	J	4P02	H	22			M3 SELECT-MSP
15P01	K	4P02	J	22			M4 SELECT-MSP
15P01	L	4P02	K	22			M5 SELECT-MSP
15P01	M	4P02	L	22			M6 SELECT-MSP
15P01	N	4P02	M	22			M7 SELECT-MSP
15P01	P	4P02	N	22			M8 SELECT-MSP
15P01	R	4P02	-Y	22			MISSILE 1 PRESENT-MSP
15P01	S	4P02	-Z	22			MISSILE 2 PRESENT-MSP
15P01	T	4P02	AA	22			MISSILE 3 PRESENT-MSP
15P01	U	4P02	BB	22			MISSILE 4 PRESENT-MSP
15P01	V	4P02	CC	22			MISSILE 5 PRESENT-MSP
15P01	W	4P02	DD	22			MISSILE 6 PRESENT-MSP
15P01	X	4P02	EE	22			MISSILE 7 PRESENT-MSP
15P01	Y	4P02	FF	22			MISSILE 8 PRESENT-MSP
15P01	Z	TB 6	3		2102	@E	DIMMABLE POWER
15P01	-A	GND			2102	@E	DIMMABLE POWER RETURN
15P01	-B	NC					SPARE
15P01	-C	NC					SPARE
15P01	-D	NC					SPARE
15P01	-E	NC					SPARE
15P01	-F	NC					SPARE
15P01	-G	NC					SPARE
15P01	-H	NC					SPARE
15P01	-I	NC					SPARE
15P01	-J	7P02	J	22		@E	10V DC
15P01	-K	NC					SPARE
15P01	-M	NC					SPARE
15P01	-N	NC					SPARE
15P01	-P	NC					SPARE
15P01	-Q	NC					SPARE

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
15P01	-R	NC					SPARE
15P01	-S	NC					SPARE
15P01	-T	NC					SPARE
16P				3234016-110			PANEL, GUNNER ACCY, CONT
16P01				CONNECTOR			M83723-13F1626N M83723-15S16F
16P01	A	NC					SPARE
16P01	B	TS C	19B	22			PROGRAMMER INTERRUPT
16P01	C	TS C	18C	22			SYNTHETIC FIRST MOTION
16P01	D	TS D	41C	22			MISSILE 5 PRESENT-TCP
16P01	E	SHIELDS		22			CHASSIS GROUND
16P01	F	TS D	43B	20			SQUIB CONNECT/CAMERA 1
16P01	G	TS D	42C	22		CE	MANUAL WIRE CUT-TCP
16P01	H	TB 6	2		2023	@E	DIMMABLE POWER
16P01	J	GND			2023	@E	DIMMABLE POWER RETURN
16P01	K	NC					SPARE
16P01	L	NC					SPARE
16P01	M	NC					SPARE
16P01	N	2P04	-X	22		@E	MOTION COMP ENABLE
16P01	P	NC					SPARE
16P01	R	1P01	CC	22		@E	N FOV MAX GAIN
16P01	S	1P01	-Y	22	3024	@E	AZ VS 1
16P01	T	1P01	-X	22	3024	@E	EL VS 1
16P01	U	1P01	-F	22	3024	@E	VS 1 RETURN
16P01	V	4P02	C	22			WEAPONS ARMED
16P01	W	4P01	W	22			CAMERA
16P01	X	7P03	V	22	2081	@E	28V DC-GACP
16P01	Y	7P03	-J	22	2081	@E	28V DC RETURN
16P01	Z	7P02	L	22		@E	-20V DC

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
16P01	-A	NC					SPARE
16P01	-B	7P02	X	22		@E	20V DC
16P01	-C	7P02	U	22		@E	DC RETURN-GACP
INST							INSTRUMENTATION
INST	1	TS C	11C	22		@17	PROGRAMMER SEQUENCE
INST	2	TS C	12C	22		@17	DC RETURN-MCA
INST	3	TS C	13C	22		@17	PITCH OUTPUT
INST	4	TS C	14C	22		@17	YAW OUTPUT
INST	5	TS C	15C	22		@17	PITCH LIM & SUM
INST	6	TS C	16C	22		@17	YAW LIM & SUM
INST	7	TS D	1C	22		@17	AZ BANDPASS
INST	8	TS D	2C	22		@17	EL BANDPASS
INST	9	TS D	3C	22		@17	EL VS 1
INST	10	TS D	4C	22		@17	DC RETURN-TSU
INST	11	TS D	5C	22		@17	AZ VS 1
INST	12	5P04	EE	22	2098	F	WIRE COMMAND A
INST	13	5P04	FF	22	2098	F	WIRE COMMAND B
INST	14	NC				@17	28V DC
INST	15	NC				@17	AIRCRAFT GROUND
INST	16	NC				@17	115V 400 HZ PH C
INST	17	SHIELDS					CHASSIS GROUND
TEST 1							AFT TEST RECEPTACLE
TEST 1				CONNECTOR			MS3120E-20-39S
TEST 1	A	NC					SPARE
TEST 1	B	TS C	19C	22			PROGRAMMER INTERRUPT
TEST 1	C	5P04	X	22			TIMER START
TEST 1	D	5P04	Y	22			TIME 00.00
TEST 1	E	SHIELDS		22			CHASSIS GROUND
TEST 1	F	5P04	Z	22			TIME 00.17

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
TEST 1	G	NC					SPARE
TEST 1	H	5P04	-B	22			TIME 00.79
TEST 1	J	5P04	-C	22			TIME 01.35
TEST 1	K	5P04	-D	22			TIME 02.34
TEST 1	L	5P04	-F	22			TIME 04.325
TEST 1	M	NC					SPARE
TEST 1	N	TS C	1C	22			BIT 1
TEST 1	P	5P04	-H	22			IN TEST
TEST 1	R	TS C	2C	22			BIT 2
TEST 1	S	5P04	K	22	@E		PITCH VCO DISABLE
TEST 1	T	5P04	L	22	@E		YAW VCO DISABLE
TEST 1	U	5P04	S	22			PITCH SELF BAL INTEG
TEST 1	V	5P04	T	22			YAW SELF BAL INTEG
TEST 1	W	TS C	8C	22	@E		28V DC SQUIB PWR
TEST 1	X	5P04	-G	22			TIME 13.48
TEST 1	Y	TS C	3C	22	@E		115V 400 HZ PH A
TEST 1	Z	TS C	10C	22	@E		115V 400 HZ RTN *PH B*
TEST 1	-A	TS C	9C	22	@E		115V 400 HZ PH C
TEST 1	-B	5P04	AA	22			PREFIRE/FIRE/WIRE CUT
TEST 1	-C	TS C	11B	22	@E		PROGRAMMER SEQUENCE
TEST 1	-D	TS C	17C	22			BIT 4
TEST 1	-E	TS C	12B	22	@E		DC RETURN-MCA
TEST 1	-F	5P04	-Z	22			MCA BIT PASS
TEST 1	-G	TS C	13B	22	@E		PITCH OUTPUT
TEST 1	-H	TS C	14B	22	@E		YAW OUTPUT
TEST 1	-I	TS C	15B	22	@E		PITCH LIM & SUM
TEST 1	J	TS C	16B	22	@E		YAW LIM & SUM
TEST 1	-K	5P04	V	22			CVAC
TEST 1	-M	5P04	U	22			G-BIAS SUM AMP
TEST 1	-N	TS C	4C	22			BIT 7
TEST 1	-P	TS C	5C	22			BIT 8
TEST 1	-Q	TS C	6C	22			BIT 9
TEST 1	-R	TS C	7C	22			BIT 10

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION		CABLE NO.	SHIELD	NOMENCLATURE
TEST 2								FWD TEST RECEPTACLE
TEST 2				CONNECTOR				MS3120E-24-61S
TEST 2	A	NC						SPARE
TEST 2	B	NC						SPARE
TEST 2	C	NC						SPARE
TEST 2	D	1P05	A	22	3008	@E		10 COS ETA SUB -G
TEST 2	E	SHIELD		22				CHASSIS GROUND
TEST 2	F	1P02	D	22		@E		AZ REF SINE WAVE
TEST 2	G	1P02	G	22				EL SAMPLE PULSE
TEST 2	H	1P02	H	22				AZ SAMPLE PULSE
TEST 2	J	TS D	3B	22		@E		EL VS 1
TEST 2	K	TS D	6B	22	3053	@E		EPSILON SUB -G RTN
TEST 2	L	TS D	7B	22	3053	@E		10 COS EPSILON SUB -G
TEST 2	M	TS D	8B	22	3053	@E		10 SIN EPSILON SUB -G
TEST 2	N	1P02	B	22				15V DC
TEST 2	P	TS D	1B	22		@E		AZ BANDPASS
TEST 2	R	TS D	4B	22		@E		DC RETURN-TSU
TEST 2	S	1P02	S	22		@E		EL REF SINE WAVE
TEST 2	T	TS D	2B	22		@E		EL BANDPASS
TEST 2	U	1P02	C	22				-15V DC
TEST 2	V	TS D	5B	22		@E		AZ VS 1
TEST 2	W	TS D	9B	22	2290	@E		10V 400 HZ A PLUS 90
TEST 2	X	TS D	10B	22	2290	@E		10V 400 HZ RETURN
TEST 2	Y	TS D	11B	22				BIT 3
TEST 2	Z	TS D	12B	22				BIT 5
TEST 2	-A	TS D	13B	22				BIT 6
TEST 2	-B	TS D	47A	A118B22	BLU	2084	@E	-I SUB -G
TEST 2	-C	TS D	48A	A120B22	WHT	2084	@E	-I SUB -G RETURN
TEST 2	-D	TS D	49A	A122B22	BLU	2087	@E	-J SUB -G
TEST 2	-E	TS D	50A	A124B22	WHT	2087	@E	-J SUB -G RETURN
TEST 2	-F	TS D	51A	A114B22	BLU	2282	@E	-K SUB -G
TEST 2	-G	TS D	52A	A116B22	WHT	2282	@E	-K SUB -G RETURN
TEST 2	-H	TS D	20B			2283	@E	-I SUB -T
TEST 2	-I	TS D	21B			2283	@E	-I SUB -T RETURN

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION		CABLE NO.	SHIELD	NOMENCLATURE
TEST 2	-J	TS D	22B		22	2285	@E	J SUB -T
TEST 2	-K	TS D	23B		22	2285	@E	J SUB -T RETURN
TEST 2	-M	TS D	24B		22	2286	@E	-K SUB -T
TEST 2	-N	TS D	25B		22	2286	@E	-K SUB -T RETURN
TEST 2	-P	TS D	53A	A101B22	BLU	2287	@E	AZ GUN COMMAND
TEST 2	-Q	TS D	54A	A102B22	WHT	2287	@E	AZ GUN COMMAND RTN
TEST 2	-R	TS D	55A	A103B22	BLU	2099	@E	EL GUN COMMAND
TEST 2	-S	TS D	56A	A104B22	WHT	2099	@E	EL GUN COMMAND RTN
TEST 2	-T	NC						SPARE
TEST 2	-U	NC						SPARE
TEST 2	-V	TS D	30B		22	2100	@E	AZ ACQUISITION CMD
TEST 2	-W	TS D	32B		22	2101	@E	EL ACQUISITION CMD
TEST 2	-X	TS D	31B		22	2100	@E	AZ ACQUISITION CMD RTN
TEST 2	-Y	TS D	33B		22	2101	@E	EL ACQUISITION CMD RTN
TEST 2	-Z	TS D	34B		22			K1 *T* BIT PASS
TEST 2	AA	TS D	40A		22			SQUIB CONNECT/CAMERA 1
TEST 2	BB	NC						SPARE
TEST 2	CC	NC						SPARE
TEST 2	DD	NC						SPARE
TEST 2	EE	TS D	36B		22			TRACK MODE
TEST 2	FF	TS D	37B		22			WEAPON SELECT
TEST 2	GG	1P05	-R		22	3008	@E	10 SIN ETA SUB -G
TEST 2	HH	1P05	-S		22	3008	@E	ETA SUB -G RTN
TEST 2	JJ	NC						SPARE
TEST 2	KK	NC						SPARE
TEST 2	LL	NC						SPARE
TEST 2	MM	J237	A	A440B18				28V DC
TEST 2	NN	TS D	39C		22			WEAPON ACTION-BHC
TEST 2	PP	TS D	38B		22			PILOT ACQUISITION
TS A								TERMINAL SPLICE
TS A	1A	5P02	Z		16	2005	@3	PORT PREFIRE
TS A	1B	PSJ01	K		20	2092	@3	PORT PREFIRE
TS A	1C	P8J01	M		20	2093	@3	PORT PREFIRE
TS A	1D	PSJ01	P		20	2094	@3	PORT PREFIRE

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
TS A	2A	5P02	-K	16	2005	@3	PORT PREFIRE RETURN
TS A	2B	P8J01	L	20	2092	@3	PORT PREFIRE RETURN
TS A	2C	P8J01	N	20	2093	@3	PORT PREFIRE RETURN
TS A	2D	P8J01	R	20	2094	@3	PORT PREFIRE RETURN
TS A	3A	SHIELD		22			SHIELD FROM TS A 1A,2A
TS A	3B	SHIELD		22			SHIELD FROM TS A 1B,2B
TS A	3C	SHIELD		22			SHIELD FROM TS A 1C,2C
TS A	3D	SHIELD		22			SHIELD FROM TS A 1D,2D
TS A	4A	15P01	B	20			MANUAL WIRE CUT
TS A	4B	S8J01	-C	20			MANUAL WIRE CUT
TS A	4C	P8J01	-C	20			MANUAL WIRE CUT
TS B							TERMINAL SPLICE
TS B	1A	5P02	-A	16	2006	@3	STBD PREFIRE
TS B	1B	28J01	K	20	2095	@3	STBD PREFIRE
TS B	1C	28J01	M	20	2096	@3	STBD PREFIRE
TS B	1D	28J01	P	20	2097	@3	STBD PREFIRE
TS B	2A	5P02	-M	16	2006	@3	STBD PREFIRE RETURN
TS B	2B	S8J01	L	20	2095	@3	STBD PREFIRE RETURN
TS B	2C	S8J01	N	20	2096	@3	STBD PREFIRE RETURN
TS B	2D	S8J01	R	20	2097	@3	STBD PREFIRE RETURN
TS B	3A	SHIELD		22			SHIELD FROM TS B 1A,2A
TS B	3B	SHIELD		22			SHIELD FROM TS B 1B,2B
TS B	3C	SHIELD		22			SHIELD FROM TS B 1C,2C
TS B	3D	SHIELD		22			SHIELD FROM TS B 1D,2D
TS B	4A	2P01	-H	22			STOW
TS B	4B	5P01	W	22			STOW
TS B	4C	6P01	P	22			STOW

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION		CABLE NO.	SHIELD	NOMENCLATURE
TSC								TERMINAL SPLICE
TSC	1A	2P04	FF	22				BIT 1
TSC	1B	5P02	A	22				BIT 1
TSC	1C	TEST 1	N	22				BIT 1
TSC	2A	2P04	GG	22				BIT 2
TSC	2B	5P02	B	22				BIT 2
TSC	2C	TEST 1	R	22				BIT 2
TSC	3A	TOW PWR CB 76		TG429A22	BLU	3006	C	115V 400 HZ PH A
TSC	3B	7P01	Z	20		3026	C	115V 400 HZ PH A
TSC	3C	TEST 1	Y	22			C	115V 400 HZ PH A
TSC	4A	2P04	LL	22				BIT 7
TSC	4B	5P02	F	22				BIT 7
TSC	4C	TEST 1	-N	22				BIT 7
TSC	5A	2P04	MM	22				BIT 8
TSC	5B	5P02	G	22				BIT 8
TSC	5C	TEST 1	-P	22				BIT 8
TSC	6A	2P04	NN	22				BIT 9
TSC	6B	5P02	H	22				BIT 9
TSC	6C	TEST 1	-Q	22				BIT 9
TSC	7A	2P04	PP	22				BIT 10
TSC	7B	5P02	J	22				BIT 10
TSC	7C	TEST 1	-R	22				BIT 10
TSC	8A	TB44	2	TG438A16	BLU	2004	C	28V DC SQUIB PWR
TSC	8B	5P01	-T	16		2004	C	28V DC SQUIB PWR
TSC	8C	TEST 1	W	22			C	28V DC SQUIB PWR
TSC	9A	J234	-AA	TG430B20	ORN	3006	C	115V 400 HZ PH C
TSC	9B	7P01	-K	20		3026	C	115V 400 HZ PH C
TSC	9C	TEST 1	-A	22			C	115V 400 HZ PH C

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
TSC	10A	J330	Z	TG431A22 WHT	3006	C	115V 400 HZ RTN *PH B*
TSC	10B	7P01	-A	20	3026	C	115V 400 HZ RTN *PH B*
TSC	10C	TEST 1	Z	22		C	115V 400 HZ RTN *PH B*
TSC	11A	5P04	CC	22		C	PROGRAMMER SEQUENCE
TSC	11B	TEST 1	-C	22		C	PROGRAMMER SEQUENCE
TSC	11C	INST	1	22		C	PROGRAMMER SEQUENCE
TSC	12A	5P04	DD	22		C	DC RETURN-MCA
TSC	12B	TEST 1	-E	22		C	DC RETURN-MCA
TSC	12C	INST	2	22		C	DC RETURN-MCA
TSC	13A	5P04	M	22		C	PITCH OUTPUT
TSC	13B	TEST 1	-G	22		C	PITCH OUTPUT
TSC	13C	INST	3	22		C	PITCH OUTPUT
TSC	14A	5P04	N	22		C	YAW OUTPUT
TSC	14B	TEST 1	-H	22		C	YAW OUTPUT
TSC	14C	INST	4	22		C	YAW OUTPUT
TSC	15A	5P04	P	22		C	PITCH LIM & SUM
TSC	15B	TEST 1	-I	22		C	PITCH LIM & SUM
TSC	15C	INST	5	22		C	PITCH LIM & SUM
TSC	16A	5P04	R	22		C	YAW LIM & SUM
TSC	16B	TEST 1	-J	22		C	YAW LIM & SUM
TSC	16C	INST	6	22		C	YAW LIM & SUM
TSC	17A	5P02	R	22			BIT 4
TSC	17B	2P04	-Y	22			BIT 4
TSC	17C	TEST 1	-D	22			BIT 4
TSC	18A	2P04	-Z	22			SYNTHETIC FIRST MOTION
TSC	18B	5P03	DD	22			SYNTHETIC FIRST MOTION
TSC	18C	16P01	C	22			SYNTHETIC FIRST MOTION

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
TS C	19A	5P04	W	22			PROGRAMMER INTERRUPT
TS C	19B	16P01	B	22			PROGRAMMER INTERRUPT
TS C	19C	TEST 1	B	22			PROGRAMMER INTERRUPT
TS D							TERMINAL SPLICE
TS D	1A	1P02	A	22		C	AZ BANDPASS
TS D	1B	TEST 2	P	22		C	AZ BANDPASS
TS D	1C	INST	7	22		C	AZ BANDPASS
TS D	2A	1P02	P	22		C	EL BANDPASS
TS D	2B	TEST 2	T	22		C	EL BANDPASS
TS D	2C	INST	8	22		C	EL BANDPASS
TS D	3A	1P02	J	22		C	EL VS 1
TS D	3B	TEST 2	J	22		C	EL VS 1
TS D	3C	INST	9	22		C	EL VS 1
TS D	4A	1P02	R	22		C	DC RETURN-TSU
TS D	4B	TEST 2	R	22		C	DC RETURN-TSU
TS D	4C	INST	10	22		C	DC RETURN-TSU
TS D	5A	1P02	V	22		C	AZ VS 1
TS D	5B	TEST 2	V	22		C	AZ VS 1
TS D	5C	INST	11	22		C	AZ VS 1
TS D	6A	1P04	T	22	3009	C	EPSILON SUB -G RTN
TS D	6B	TEST 2	K	22	3053	C	EPSILON SUB -G RTN
TS D	6C	1P05	-N	22	3050	C	EPSILON SUB -G RTN
TS D	7A	1P04	U	22	3009	C	10 COS EPSILON SUB -G
TS D	7B	TEST 2	L	22	3053	C	10 COS EPSILON SUB -G
TS D	7C	1P05	-M	22	3050	C	10 COS EPSILON SUB -G
TS D	8A	1P04	S	22	3009	C	10 SIN EPSILON SUB -G
TS D	8B	TEST 2	M	22	3053	C	10 SIN EPSILON SUB -G
TS D	8C	1P05	-C	22	3050	C	10 SIN EPSILON SUB -G

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
TS D	9A	P122	D	TG594A22	2041	C	10V 400 HZ A PLUS 90
TS D	9B	TEST 2	W	22	2290	C	10V 400 HZ A PLUS 90
TS D	9C	1P05	R	22	2289	C	10V 400 HZ A PLUS 90
TS D	10A	P122	E	TG595A22	2041	C	10V 400 HZ RETURN
TS D	10B	TEST 2	X	22	2290	C	10V 400 HZ RETURN
TS D	10C	1P05	-F	22	2289	C	10V 400 HZ RETURN
TS D	11A	1P01	-R	22			BIT 3
TS D	11B	TEST 2	Y	22			BIT 3
TS D	11C	5P02	-B	22			BIT 3
TS D	12A	1P01	-S	22			BIT 5
TS D	12B	TEST 2	Z	22			BIT 5
TS D	12C	5P02	-D	22			BIT 5
TS D	13A	1P01	-T	22			BIT 6
TS D	13B	TEST 2	-A	22			BIT 6
TS D	13C	5P02	-F	22			BIT 6
TS D	14A	P8J01	-P	TG412C20N			M5 LNCHR CHASSIS GND
TS D	14B	P8J01	-Q	TG412D20N			M1 LNCHR CHASSIS GND
TS D	14C	P8J01	-R	TG412E20N			M7 LNCHR CHASSIS GND
TS D	14D	P8J01	-S	TG412F20N			M3 LNCHR CHASSIS GND
TS D	14E	P321	-S	TG412B20N			RACK CHASSIS GND
TS D	15A	1J09	H	TG157B22			TRIG ENABLE 1ST DETENT
TS D	15B	1J09	J	TG157C22			TRIG ENABLE 2ND DETENT
TS D	15C	TS D	16A	TG157A22			TRIG ENABLE
TS D	16A	TS D	15C	TG157A22			TRIG ENABLE
TS D	16B	XK87	B2	A969F20			TRIG ENABLE
TS D	16C	XK80	D3	A969D20			TRIG ENABLE
TS D	17A						UNASSIGNED

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION		CABLE NO.	SHIELD	NOMENCLATURE
TS D	18A							UNASSIGNED
TS D	19A							UNASSIGNED
TS D	20A	1P06	-J		22	2039	C	-I SUB -T
TS D	20B	TEST 2	-H		22	2283	C	-I SUB -T
TS D	20C	P313	A	TG39A22	BLU	2049	C	-I SUB -T
TS D	21A	1P06	P		22	2039	C	-I SUB -T RETURN
TS D	21B	TEST 2	-I		22	2283	C	-I SUB -T RETURN
TS D	21C	P313	B	TG38A22	WHT	2049	C	-I SUB -T RETURN
TS D	22A	1P06	-I		22	2035	C	-J SUB -T
TS D	22B	TEST 2	-J		22	2285	C	-J SUB -T
TS D	22C	P313	C	TG37A22	BLU	2050	C	-J SUB -T
TS D	23A	1P06	N		22	2035	C	-J SUB -T RETURN
TS D	23B	TEST 2	-K		22	2285	C	-J SUB -T RETURN
TS D	23C	P313	Y	TG36A22	WHT	2050	C	-J SUB -T RETURN
TS D	24A	1P06	-K		22	2021	C	-K SUB -T
TS D	24B	TEST 2	-M		22	2286	C	-K SUB -T
TS D	24C	P313	D	TG41A22	BLU	2051	C	-K SUB -T
TS D	25A	1P06	R		22	2021	C	-K SUB -T RETURN
TS D	25B	TEST 2	-N		22	2286	C	-K SUB -T RETURN
TS D	25C	P313	Z	TG40A22	WHT	2051	C	-K SUB -T RETURN
TS D	26A							UNASSIGNED
TS D	27A							UNASSIGNED

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION		CABLE NO.	SHIELD	NOMENCLATURE
TS D	28A							UNASSIGNED
TS D	28A							UNASSIGNED
TS D	29A							UNASSIGNED
TS D	30A	2P04	L		22	2062	C	AZ ACQUISITION CMD
TS D	30B	TEST 2	-V		22	2100	C	AZ ACQUISITION CMD
TS D	30C	J327	-R	TG342D22	BLU	2066	C	AZ ACQUISITION CMD
TS D	31A	2P04	M		22	2062	C	AZ ACQUISITION CMD RTN
TS D	31B	TEST 2	-X		22	2100	C	AZ ACQUISITION CMD RTN
TS D	31C	J327	-S	TG343D22	WHT	2066	C	AZ ACQUISITION CMD RTN
TS D	32A	2P04	N		22	2063	C	EL ACQUISITION CMD
TS D	32B	TEST 2	-W		22	2101	C	EL ACQUISITION CMD
TS D	32C	J327	-P	TG340D22	BLU	2067	C	EL ACQUISITION CMD
TS D	33A	2P04	P		22	2063	C	EL ACQUISITION CMD RTN
TS D	33B	TEST 2	-Y		22	2101	C	EL ACQUISITION CMD RTN
TS D	33C	J327	-Q	TG341D22	WHT	2067	C	EL ACQUISITION CMD RTN
TS D	34A	1P01	-Q		22			K1 *T* BIT PASS
TS D	34B	TEST 2	-Z		22			K1 *T* BIT PASS
TS D	34C	5P02	W		22			K1 *T* BIT PASS
TS D	35A	5P01	U		20			SQUIB CONNECT/CAMERA 1
TS D	35B	TS D	40B		22			SQUIB CONNECT/CAMERA 1
TS D	35C	J326	C	TS239E20				SQUIB CONNECT/CAMERA 1
TS D	36A	6P01	K		22			TRACK MODE
TS D	368	TEST 2	EE		22			TRACK MODE
TS D	36C	P313	N	TG200A22				TRACK MODE
TS D	37A	XK87	X1	TG251A22				WEAPON SELECT
TS D	37B	TEST 2	FF		22			WEAPON SELECT
TS D	37C	4P02	B		22			WEAPON SELECT

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION	CABLE NO.	SHIELD	NOMENCLATURE
TS D	38A	6P01	L		22		PILOT ACQUISITION
TS D	38B	TEST 2	PP		22		PILOT ACQUISITION
TS D	38C	TB51	K5	TG201B22			PILOT ACQUISITION
TS D	39A	XK87	A2	TG158A22			WEAPON ACTION-BHC
TS D	39B	1J09	Y		22		WEAPON ACTION-BHC
TS D	39C	TEST 2	NN		22		WEAPON ACTION-BHC
TS D	40A	TEST 2	AA		22		SQUIB CONNECT/CAMERA 1
TS D	40B	TS D	35B		22		SQUIB CONNECT/CAMERA 1
TS D	40C	TS D	43C		20		SQUIB CONNECT/CAMERA 1
TS D	41A	4P01	P		22		MISSILE 5 PRESENT-TCP
TS D	41B	P8J01	-F		22		MISSILE 5 PRESENT-TCP
TS D	41C	16P01	D		22		MISSILE 5 PRESENT-TCP
TS D	42A	4P02	-I		22	C	MANUAL WIRE CUT-TCP
TS D	42B	5P01	P		22	C	MANUAL WIRE CUT-TCP
TS D	42C	16P01	G		22	C	MANUAL WIRE CUT-TCP
TS D	43A	15P01	C		20		SQUIB CONNECT/CAMERA 1
TS D	43B	16P01	F		20		SQUIB CONNECT/CAMERA 1
TS D	43C	TS D	40C		20		SQUIB CONNECT/CAMERA 1
TS D	44A	S8J01	-P	TG462C20N			M8 LNCHR CHASSIS GND
TS D	44B	S8J01	-Q	TG462D20N			M4 LNCHR CHASSIS GND
TS D	44C	S8J01	-R	TG462E20N			M6 LNCHR CHASSIS GND
TS D	44D	S8J01	-S	TG462F20N			M2 LNCHR CHASSIS GND
TS D	44E	P322	-S	TG462B20N			RACK CHASSIS GND
TS D	45A	1J09	Z	TG159A22			WEAPON ACTION ENABLE
TS D	45B	P265	-A	A970B22			WEAPON ACTION ENABLE
TS D	45C	XK86	A2	A970C22			WEAPON ACTION ENABLE

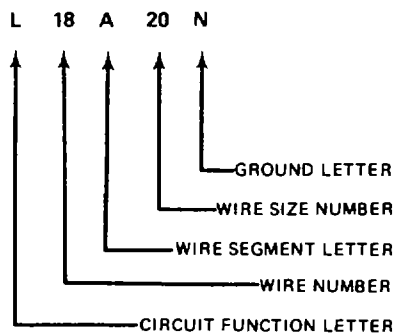
Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION		CABLE NO.	SHIELD	NOMENCLATURE
TS D	46A	4P01	-A	TG235A22				ARMED-PILOT MASTER ARM
TS D	46B	XK82	K	A170B20				ARMED-PILOT MASTER ARM
TS D	46C	XK86	X1	A170C20				ARMED-PILOT MASTER ARM
TS D	47A	TEST 2	-B	A118B22	BLU			-I SUB-G
TS D	47B	P312	V	A118A22	BLU			-I SUB-G
TS D	47C	P262	B	A118C22	BLU			-I SUB-G
TS D	48A	TEST 2	-C	A120B22	WHT			-I SUB-G RETURN
TS D	48B	P132	J	A120A22	WHT			-I SUB-G RETURN
TS D	48C	P261	X	A120C22	WHT			-I SUB-G RETURN
TS D	49A	TEST 2	-D	A122B22	BLU			-J SUB -G
TS D	49B	P312	U	A122A22	BLU			-J SUB -G
TS D	49C	P261	C	A122C22	BLU			-J SUB -G
TS D	50A	TEST 2	-E	A124B22	WHT			-J SUB -G RETURN
TS D	50B	P312	-I	A124A22	WHT			-J SUB -G RETURN
TS D	50C	P261	Y	A124C22	WHT			-J SUB -G RETURN
TS D	51A	TEST 2	-F	A114B22	BLU			-K SUB -G
TS D	51B	P312	W	A114A22	BLU			-K SUB -G
TS D	51C	P261	A	A114C22	BLU			-K SUB -G
TS D	52A	TEST 2	-G	A116B22	WHT			-K SUB -G RETURN
TS D	52B	P312	X	A116A22	WHT			-K SUB -G RETURN
TS D	52C	P261	W	A116C22	WHT			-K SUB -G RETURN
TS D	53A	TEST 2	-P	A101B22	BLU			AZ GUN COMMAND
TS D	53B	P311	T	A101C22	BLU			AZ GUN COMMAND
TS D	53C	J250	K	A101A22	BLU			AZ GUN COMMAND
TS D	54A	TEST 2	-Q	A102B22	WHT			AZ GUN COMMAND RTN
TS D	54B	P311	-M	A102C22	WHT			AZ GUN COMMAND RTN
TS D	54C	J250	J	A102A22	WHT			AZ GUN COMMAND RTN

Table F-3. XM65 Interconnection wire list (Cont)

FROM		TO		WIRE IDENTIFICATION		CABLE NO.	SHIELD	NOMENCLATURE
TS D	55A	TEST2	-R	A103B22	BLU			EL GUN COMMAND
TS D	55B	P311	S	A103C22	BLU			EL GUN COMMAND
TS D	55C	J250	E	A103A22	BLU			EL GUN COMMAND
TS D	56A	TEST 2	-S	A104B22	WHT			EL GUN COMMAND RTN
TS D	56B	P311	-K	A104C22	WHT			EL GUN COMMAND RTN
TS D	56C	J250	D	A104A22	WHT			EL GUN COMMAND RTN

WIRING IDENTIFICATION CODE

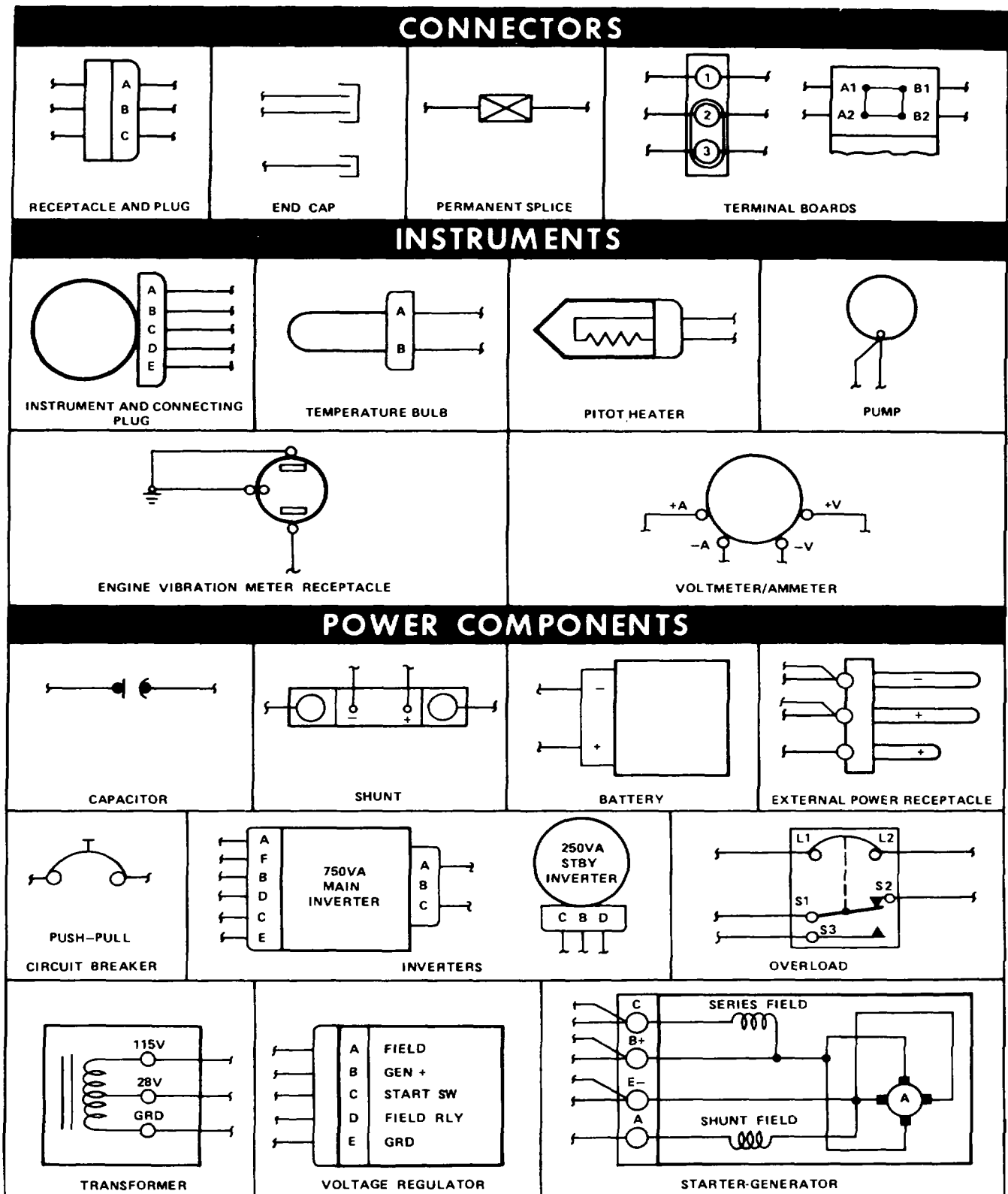


CIRCUIT FUNCTIONS

<u>CODE</u>	<u>NOMENCLATURE</u>	<u>CODE</u>	<u>NOMENCLATURE</u>
A	ARMAMENT	M	MISCELLANEOUS ELECTRIC
C	CONTROL SURFACES	N	GROUND
D	INSTRUMENTS (OTHER THAN FLIGHT OR ENGINE	P	DC POWER
E	ENGINE INSTRUMENTS	Q	FUEL AND OIL
F	FLIGHT INSTRUMENTS	TG	TOW GUIDANCE AND CONTROL
H	HEATING, VENTILATING AND DE-ICING	V	DC POWER AND DC CONTROL CABLES FOR AC SYSTEM
J	IGNITION	W	WARNING AND EMERGENCY
K	ENGINE CONTROL	X	AC POWER
L	LIGHTING		

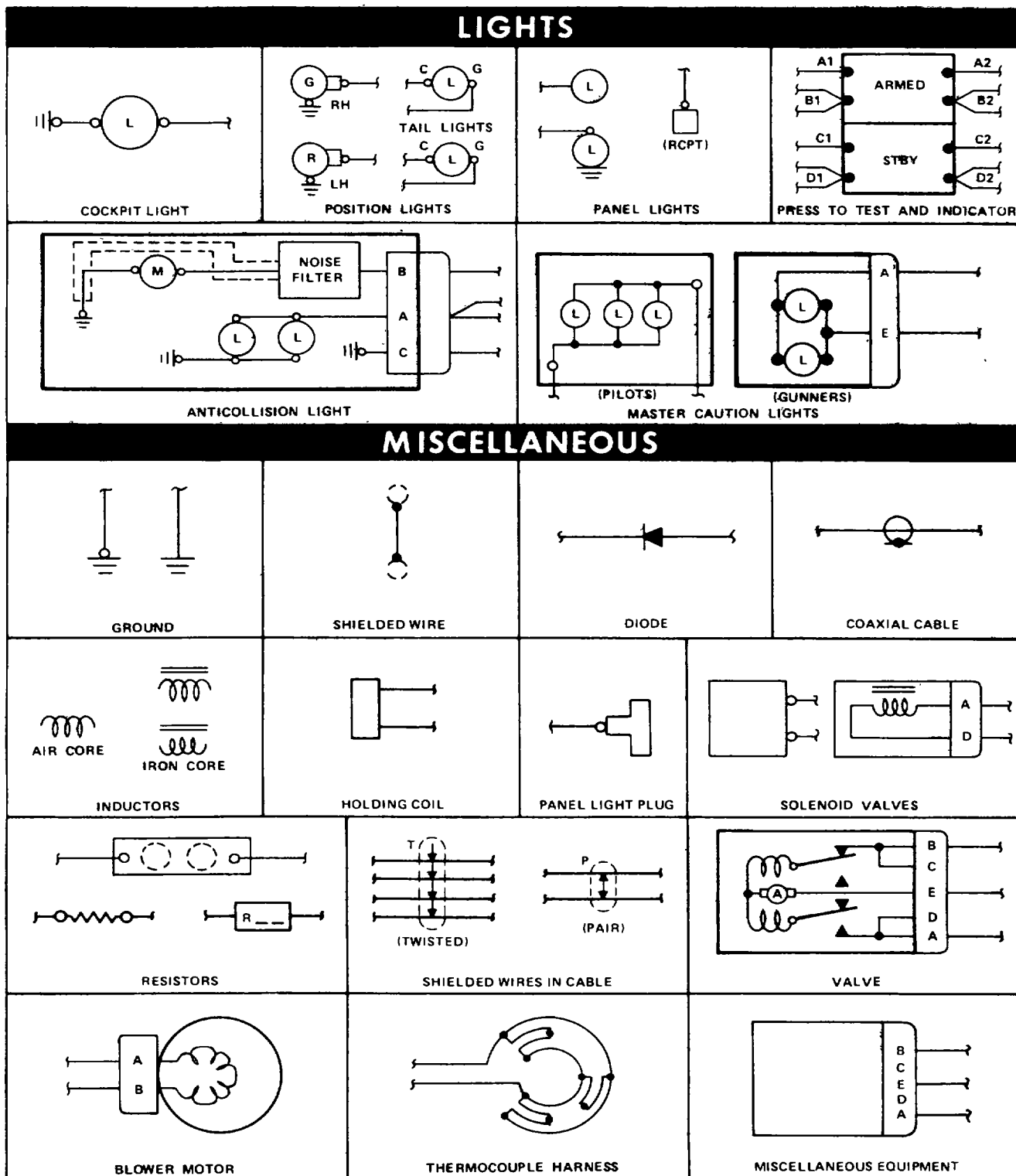
209075-294

Figure F-1. Wiring identification code



209475-361-1

Figure F-2. Symbols chart (Sheet 1 of 3)



209475-361-2

Figure F-2. Symbols chart (Sheet 2 of 3)

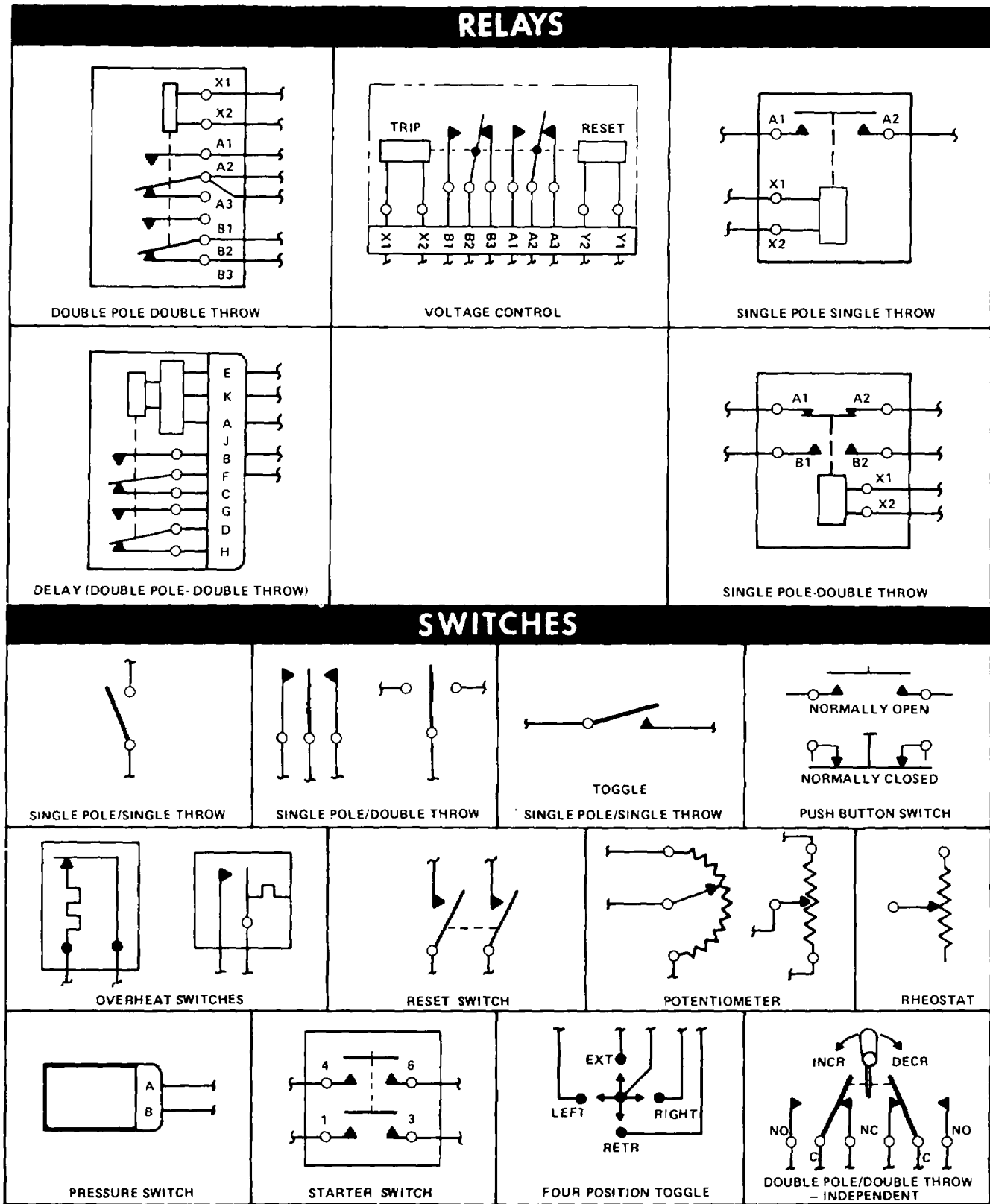


Figure F-2. Symbols chart (Sheet 3 of 3)
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AC LOAD ANALYSIS FOR MODEL AH-1S (MOD)				ELECTRICAL REQUIREMENTS PER UNIT										CONNECTED LOADS																						
CODE NO.	EQUIPMENT	PART DESIGNATION	NO-TESTS	NO OF UNITS	OPER TIME MIN	115 VOLTS, 3 PHASE			115 VOLTS, 1 PHASE			26 VOLTS, 1 PHASE			VOLTAGE MIN	VOLTAGE MAX	FREQ MIN	FREQ MAX	PWR SOR INF	PWR FACT	PHASE A TO B		PHASE B TO C		PHASE C TO A											
						VA	WATTS	VAR	VA	WATTS	VAR	VA	WATTS	VAR							WATTS	VAR	WATTS	VAR	WATTS	VAR	WATTS	VAR								
TOW CONFIGURATION																																				
26 VAC (WITH TOW ENERGIZED)																																				
INSTRUMENTS																																				
D012	XMNOILPINO	EDISDN217A-100AMI		D	1	15 00				1 68	0 30	1 65	24 5	27 5	360	440	MEA	0 180			0 30	1 65														
D013	XMNOILPXMR	EDISON318-100A-MI			1	15 00				2 44	0 44	2 40	24 5	27 5	360	440	MEA	0 180			0 44	2 40														
ENGINE INSTRUMENTS																																				
E040	ENGOILPINO	EDISON217A-100AMI		E	1	15 00				1 68	0 30	1 65	24 5	27 5	360	440	MEA	0 180			0 30	1 65														
E041	ENGOILPXMR	EDISON318-100A-MI			1	15 00				2 44	0 44	2 40	24 5	27 5	360	440	MEA	0 180			0 44	2 40														
E042	FUELPREIND	MS28010-1			1	15 00				2 04	0 29	2 02	24 5	27 5	360	440	MEA	0 140			0 29	2 02														
E043	FUELPREXMR	MS28005-1			1	15 00				2 55	0 36	2 52	24 5	27 5	360	440	MEA	0 140			0 36	2 52														
E044	TOR PREIND	EDISON217A-100AMI			2	15 00				1 68	0 30	1 65	24 5	27 5	360	440	MEA	0 180			0 60	3 31														
E045	TOR PREXMR	EDISON318-100A-MI			2	15 00				2 44	0 44	2 40	24 5	27 5	360	440	MEA	0 180			0 88	4 80														
FLIGHT INSTRUMENTS																																				
F016	PLT CORIND	ID-998()/ASN		F	1	15 00				16 73	3 91	16 27	24 5	27 5	360	440	MEA	0 234			3 91	16 27														
F017	CPLTCORIND	ID-250()/ASN			1	15 00				4 58	1 64	4 28	24 5	27 5	360	440	MEA	0 358			1 64	4 28														
RADIO NAV & COMM																																				
R023	ADFRADCOMP	AN/ARN-83		R	1	15 00				9 56	6 45	7 05	24 5	27 5	380	420	MEA	0 675			6 45	7 05														
R023A	ADFRECEIVR	R-1391/ARN-83			1	15 00				5 47	1 60	5 23	24 5	27 5	380	420	MEA	0 292			1 60	5 23														
R023B	ADF CONT	C-8899/ARN-83			1	15 00																														
AC POWER																																				
X008	PF COR CAP	CP53-B1-FB106K1		X	2	15 00				16 93	1 71	16 84	24 5	27 5	360	440	MEA	0 101			3 42	33 69														
TOTAL 26 VAC (WITH TOW ENERGIZED)																																				
																					20 63		19 90		28 66 VA AT		0 720 PF LAG									
115 VAC (WITH TOW ENERGIZED)																																				
ARMAMENT																																				
A001	TOW REF SI	XM-65		A	1	15 00	108 89	107 98	14 01				108 0	118 0	380	420	MEA	0 992			51 54	13 72	66 26	5 68	93 26	5 97										
A002	TOW MIS SY	XM-65			1	15 00	276 11	264 79	78 25				108 0	118 0	380	420	MEA	0 959			119 54	119 54	54 85	60 49	90 40	19 20										
A005	TURRARM3PH	AM-28			1	15 00	17 81	9 21	15 24				108 0	118 0	360	440	MEA	0 517			3 07	5 08	3 07	5 08	3 07	5 08										
FLIGHT CONTROLS																																				
C010	STARAUGSYS	570-947-001		C	1	15 00				16 59	15 21	6 62	108 0	118 0	380	420	MEA	0 917			15 21	6 62														
ENGINE INSTRUMENTS																																				
E046	FUELQTSYS	209-080-602		E	1	15 00				2 92	2 91	0 26	108 0	118 0	360	440	MEA	0 996			2 91	0 26														
E046A	FUELQTYIND				1																															
E046B	FUELQTYXMR				2																															
FLIGHT INSTRUMENTS																																				
F018	COMPASSSYS	AN/ASN-43		F	1	15 00				16 39	15 36	5 73	108 0	118 0	380	420	MEA	0 937			15 36	5 73														
F018A	DIR GYRO	CH/998()/ANS-			1																															
F018B	XMTR	T-811()/ASN /			1																															
F018C	SERVO AMP	AM-3209/ASN			1	15 00				12 32	12 00	2 79	108 0	118 0	380	420	MEA	-0 974			12 00	2 79														
F024	ATT IND3PH	LEAR-SIGLER4003AH			2	15 00	9 52	8 94	3 27				108 0	118 0	360	440	MEA	0 939			5 96	2 18	5 96	2 18	5 96	2 18										
F025	ATT GYRO	LEAR-SIGLER 9000C			1	15 00	17 94	15 93	8 25				108 0	118 0	380	420	MEA	0 888			5 31	2 75	5 31	2 75	5 31	2 75										
F026	RATESWGYRO	TYPE MC-1			1	15 00	4 89	1 20	4 74				108 0	118 0	380	420	MEA	0 245			0 40	1 58	0 40	1 58	0 40	1 58										
AC POWER																																				
X009	AC FAILRLY	TYPE D1 MIL-RB373		X	1	15 00				3 89	2 80	2 70	108 0	118 0	360	440	MEA	70 720			2 80	2 70														
X010	PF COR CAP	CQ7281EF105K1			3	15 00				33 48	3 38	11 31	108 0	118 0	360	440	MEA	-0 101			3 38	33 31														
TOTAL 115 VAC (WITH TOW ENERGIZED)																																				
																					103 66		151 27		166 59		88 11		198 40		33 60		183 38 VA AT 0 565 PF LAG			
																											0700						201 23 VA AT 0 986 PF LAG			
																																	0 884 PF LEAD			
TOTAL/PER PHASE 26 VAC & 115 VAC TOW CONFIGURATION																																				
																					103 66		151 27		187 22		68 22		198 40		33 60		183 38 VA AT 0 565 PF LAG			
																																	199 26 VA AT 0 949 PF LEAD			
																																	201 23 VA AT 0 986 PF LAG			
TOTAL/3 PHASE TOW CONFIGURATION																																				
																									489 28		116 65		503 00 VA AT 0 973 PF LAGGING							
TOTAL/PER PHASE (BASIC CONFIGURATION WITHOUT TOW ENERGIZED)																																				
																					78 41		35 10		47 99		22 83		126 40							
																																	53 14 VA AT 0 903 PF LAG			
																																	139 05 VA AT 0 909 PF LAGGING			
TOTAL/3 PHASE (BASIC CONFIGURATION WITHOUT TOW ENERGIZED)																																				

Figure F-3. Ac load analysis chart (Sheet 3 of 3)

EQUIPMENT	PART DESIGNATION	NO. TES	NO. OF UNITS	AMPS PER UNIT	OPER TIME MIN.	MIN. VOLT	MAX. VOLT	PWR SOR INF	CONN LOAD	OPERATING CONDITIONS						OPERATING CONDITIONS						OPERATING CONDITIONS					
										START AND WARM-UP			TAKE-OFF			CRUISE			CRUISE - COMBAT			LAND			EMERGENCY		
										5 SEC	2 MIN	15 MIN	5 SEC	2 MIN	15 MIN	5 SEC	2 MIN	15 MIN	5 SEC	2 MIN	15 MIN	5 SEC	2 MIN	15 MIN	5 SEC	2 MIN	15 MIN
ESSENTIAL DC BUS WITHOUT APR-39																											
ARMAMENT																											
A006	NOSE ARMAMENT	M28A1E1	A	1																							
A006A	GUN DRIVE MTR		⚠	2	0.0	2.00	24.00	28.50	SPEC	120.00																	
A006B	GUN CONTROL PR		⚠	1	23.00	2.00	24.00	28.50	SPEC	23.00																	
A007	WING STORESARM		⚠	1																							
A007A	MACH GUN FIRE		⚠	2	1.00	0.25	24.00	28.50	MEA	2.00																	
A007B	MACHINE GUN	XM-18(7.62MM)	⚠	2	0.0	0.0	24.00	28.50	MEA	0.0																	
A007C	MACH GUNBATCHG		⚠	2	9.90	0.50	24.00	28.50	MEA	19.80																	
A007D	TOW MISSILE	XM-65	⚠	1	15.20	15.00	24.00	28.50	SPEC	15.20																	
A007E	SQUIB WGN STJT	ARD863-1	⚠	8	1.60	0.0	24.00	28.50	MEA	12.80																	
A007G	ROCKET LAUNCH	PHC("C" INTERVAL 0)	⚠	2	2.50	0.0	24.00	28.50	SPEC	5.00																	
FLIGHT CONTROLS																											
C010	STAB AUG SYS	570-947-001	C	1	0.92	15.00	24.00	28.50	SPEC	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92					
C011	HYD VALVE SOL	HYD RESEARC 87700	⚠	2	2.20	0.0	24.00	28.50	SPEC	4.40																	
C012	HYDEMERCOLLSOL	204-076-439-1	⚠	1	0.06	15.00	24.00	28.50	SPEC	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06					
C013	MAG BKE FR-TRM	ABN ACC R460M15-3	⚠	3	0.35	15.00	24.00	28.50	MEA	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05					
INSTRUMENTS																											
D014	XMSNOILTAMPIND	MI 6669,MS28009-2	D	1	0.03	15.00	24.00	28.50	SPEC	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03					
ENGINE INSTRUMENTS																											
E047	ENG OILTAMPIND	MI 6669,MS28009-2	E	1	0.03	15.00	24.00	28.50	SPEC	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03					
FLIGHT INSTRUMENTS																											
F027	TURN&SLIP IND	MI 7806AMS28024-3	F	1	0.10	15.00	24.00	28.50	SPEC	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10					
HEATING																											
H018	DEICING VALVE	VAPAIR 25830029	H	1	0.90	15.00	24.00	28.50	SPEC	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90					
ENGINE IGNITION																											
J009	IGNITOR SYSTEM	PART OF ENGINE	J	1	2.15	0.0	24.00	28.50	SPEC	2.15																	
J009A	IGNITOR PACK	PART OF ENGINE	⚠	1																							
J009B	ENG PRIM SOL	PART OF ENGINE	⚠	1																							
ENGINE CONTROLS																											
K013	STARTER RELAY	MS24183D1	K	1	0.37	0.0	24.00	28.50	MEA	0.37																	
K014	ENG AIR FILMTR	209-060-218	⚠	2	0.0	0.0	24.00	28.50	SPEC	0.0																	
K015	ENG AIR FIRRLY	MS24149D1	⚠	1	0.17	0.0	24.00	28.50	SPEC	0.17																	
LIGHTING																											
L018	INST&EDGE LTS	MS25237-327 LAMP	L	126	0.04	15.00	24.00	28.50	MEA	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04					
L043	COCKPIT LIGHT	GRIMES 15-007-43	⚠	3	0.17	1.00	24.00	28.50	SPEC	0.51	0.51	0.25	0.07	0.51	0.25	0.07	0.51	0.25	0.07	0.51	0.25	0.07					
POWER																											
P024	BATTERY CHNGING	BB-649/A	P	1		15.00	24.00	28.50	SPEC	67.45	49.84	22.07	21.99	20.10	10.11	10.07	9.17	4.78	4.77	4.44	3.09	3.09					
P025	FEEDER PWR RLY	MS24183D1	⚠	1	0.37	15.00	24.00	28.50	SPEC	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37					
P026	NONESS BUS RLY	MS24182D1	⚠	1	0.31	15.00	24.00	28.50	SPEC	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31					
P027	BUS CONT RLY	MS24149D1	⚠	1	0.17	15.00	24.00	28.50	SPEC	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17					
P028	BUS CONT RLY	MS24183D1	⚠	1	0.37	15.00	24.00	28.50	SPEC	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37					
FUEL CONTROL																											
Q001	FUEL BOOSTPUMP	205-060-606	Q	1	3.20	15.00	24.00	28.50	MEA	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20					
Q003	FUEL SOFFVALVE	204-062-520	⚠	1	2.00	0.02	24.00	28.50	MEA	2.00	0.45	0.02	0.00														
Q016	FUEL CONTVALVE	GW LISK CECO	⚠	1	1.30	15.00	24.00	28.50	SPEC	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30					
Q017	GOV RPM ACT	204-060-762	⚠	1	0.90	1.00	24.00	28.50	SPEC	0.90	0.90	0.45	0.06	0.90	0.45	0.06	0.90	0.45	0.06	0.90	0.45	0.06					
Q023	IDLE STOP SOL	GW LISK L 2540	⚠	1	4.60	0.03	24.00	28.50	SPEC	4.60																	
Q024	FUEL LOW RLY	GE 352791G200F-9	⚠	1	0.0	0.0	24.00	28.50	SPEC	0.0																	
Q025	OIL BY-PASSOL	AV23P11068	⚠	1	2.00	0.05	24.00	28.50	SPEC	2.00	1.20	0.05	0.01														
Q026	OIL BY-PASSRLY	ALLIED MH8-60	⚠	1	0.11	0.0	24.00	28.50	SPEC	0.11																	
RADIO NAV & COMM																											
R009	UHF RADIO	AN/ARC 518X	R	1																							
R009A	UHF RADIO REC	AN/ARC 518X	⚠	1	5.80	15.00	24.00	28.50	SPEC	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80						
R009B	UHF RADIO XMTR	AN/ARC 518X	⚠	1	3.80	1.00	24.00	28.50	SPEC	3.80	1.90	0.53	0.53	3.80	1.90	0.53	0.53	3.80	1.90	0.53	0.53						
R033	INTERCOM PNL	C-16111 J/AIC	⚠	2	0.16	15.00	24.00	28.50	SPEC	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32					

POWER SOURCE COMPONENT DATA

ITEM	STARTER-GENERATOR	BATTERY
No. Unit	1	1
Rating	300A(1)	22AH
Voltage	30V DC	24V DC
Frequency	-	-
Power Factor	-	-
Configuration	-	-
Manufacturer	-	-
Model No.	204-060-200-1	BB-649/A
Voltage Reg.	± 2%	-
Regulator P/N	209-075-228-1	-
Frequency Reg.	-	-

Derated to 200 amperes in this installation

ELECTRICAL LOAD ANALYSIS

- NOTES:
- ⚠ THIS EQUIPMENT IS NORMALLY DEENERGIZED.
 - ⚠ ONE MINUTE OPERATION OUT OF EACH TEN MINUTES.
 - ⚠ ENERGIZED EXCEPT DURING DEICING.
 - ⚠ BATTERY LOAD DURING STARTING.
 - ⚠ BATTERY CHARGING VALUES CALCULATED.
 - ⚠ BATTERY IS REMOVED FROM MAIN DC BUS DURING FIRING TO SUPPLY GUN DRIVE POWER.
 - ⚠ SEVERAL WING STORES CONFIGURATIONS ARE POSSIBLE. THIS ANALYSIS IS BASED ON THE CONFIGURATION RESULTING IN THE HIGHEST DC LOAD, THAT IS, 2XM-18 MINI GUNS ON INBOARD STATIONS AND 4 TOW MISSILES AT EACH OUTBOARD STATION.
 - ⚠ PROVISIONS ONLY.
 - ⚠ EITHER THE AN/ARC54 OR THE AN/ARC131 IS INSTALLED. THE HIGHEST LOAD IS SHOWN FOR THIS ANALYSIS.

Figure F-4. Dc load analysis chart (Sheet 1 of 2)

Change 4 F-81/(F-82 blank)

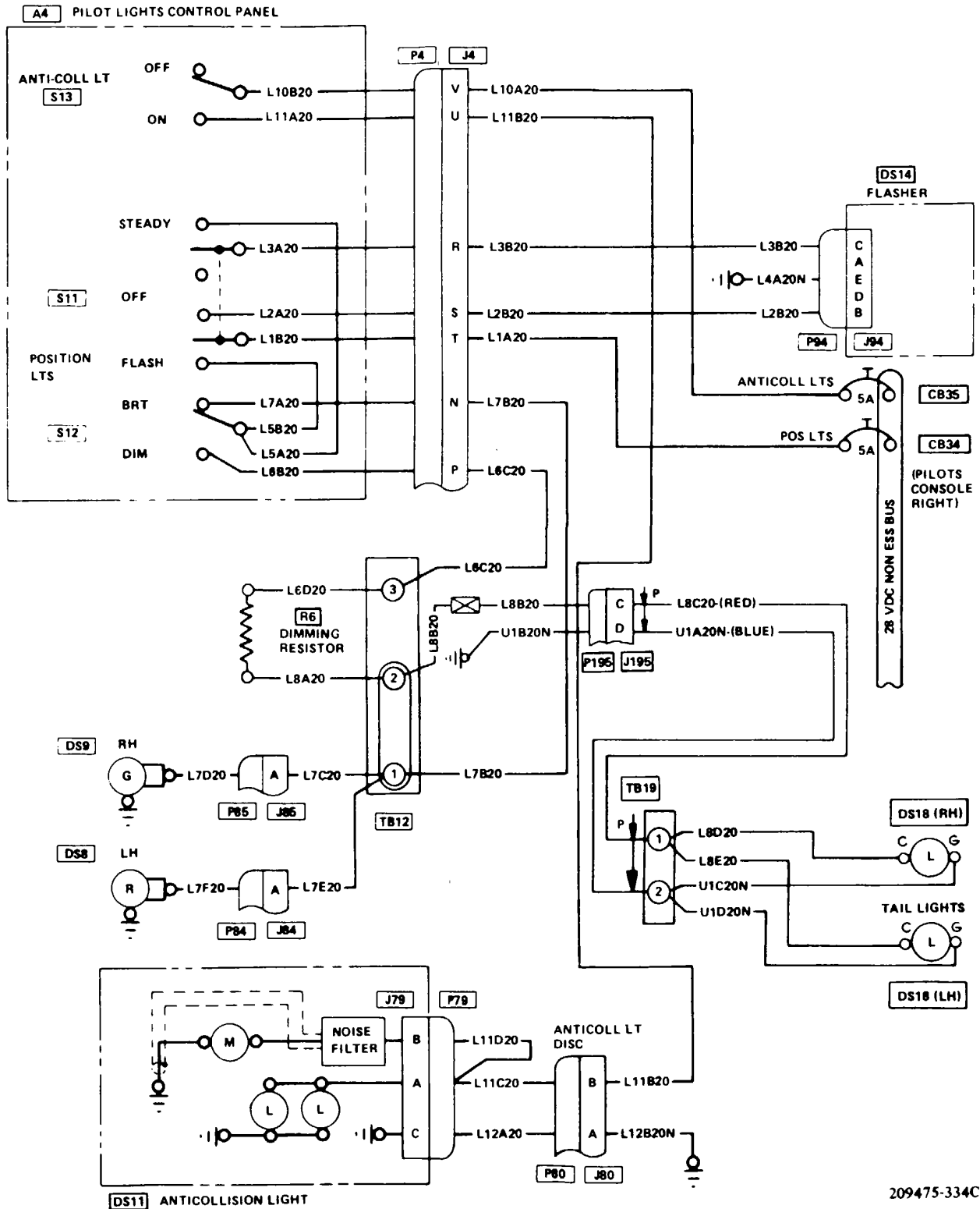


Figure F-6. Anticollision and position lights systems

Change 4 F-87/(F-88 blank)

209475-334C

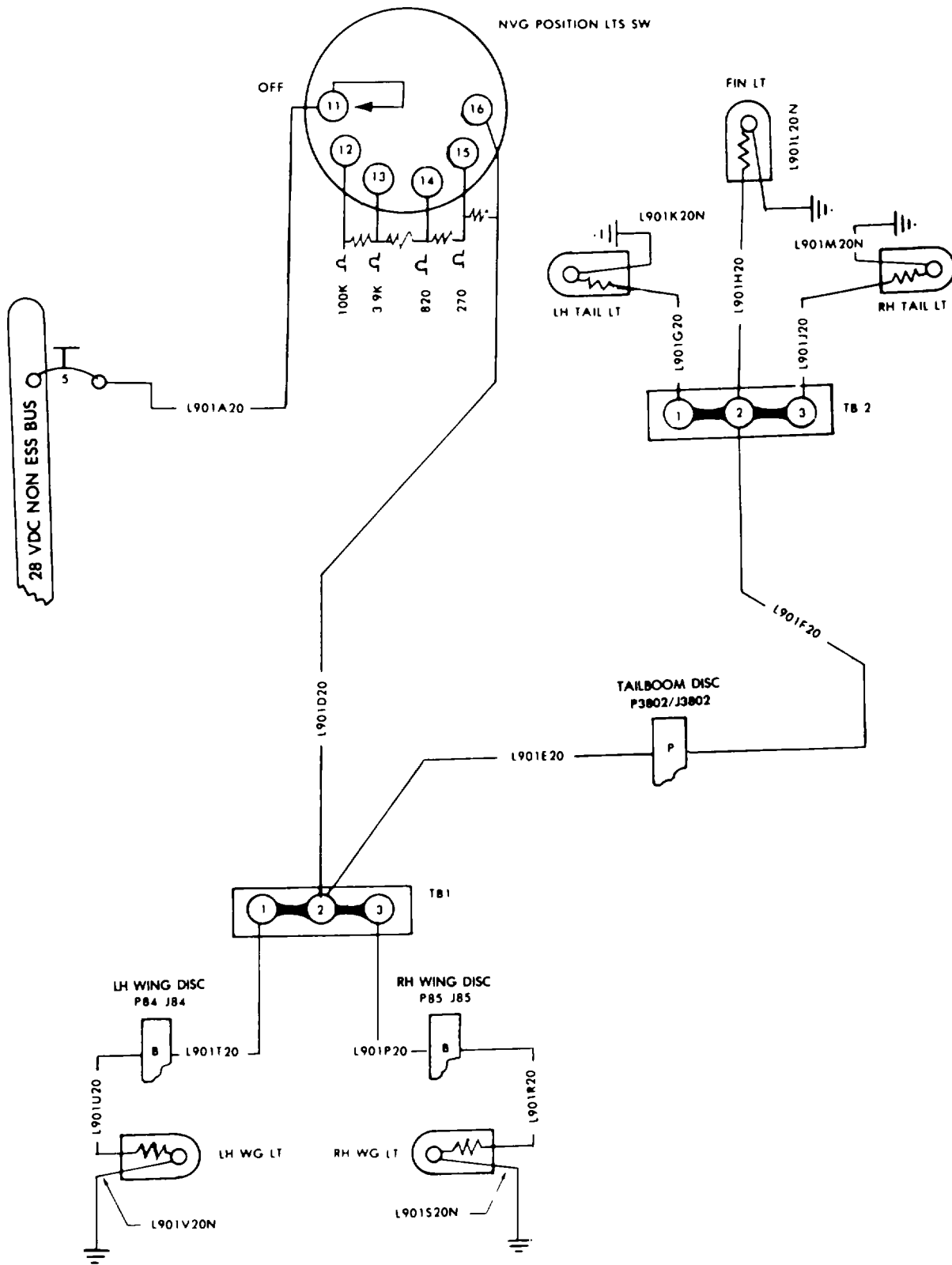


Figure F-6A. NVG Position Lights System

Change 16 F-88A/(F-88B blank)

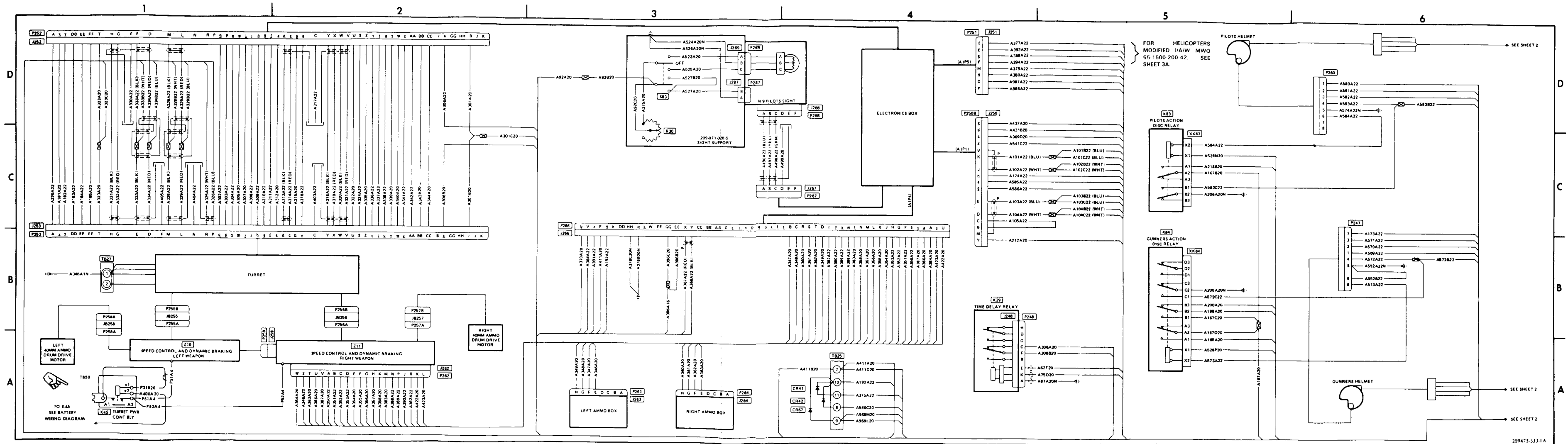


Figure F-7. Armament systems wiring diagram (Sheet 1 of 13)

Change 14 F-89/(F-90 blank)

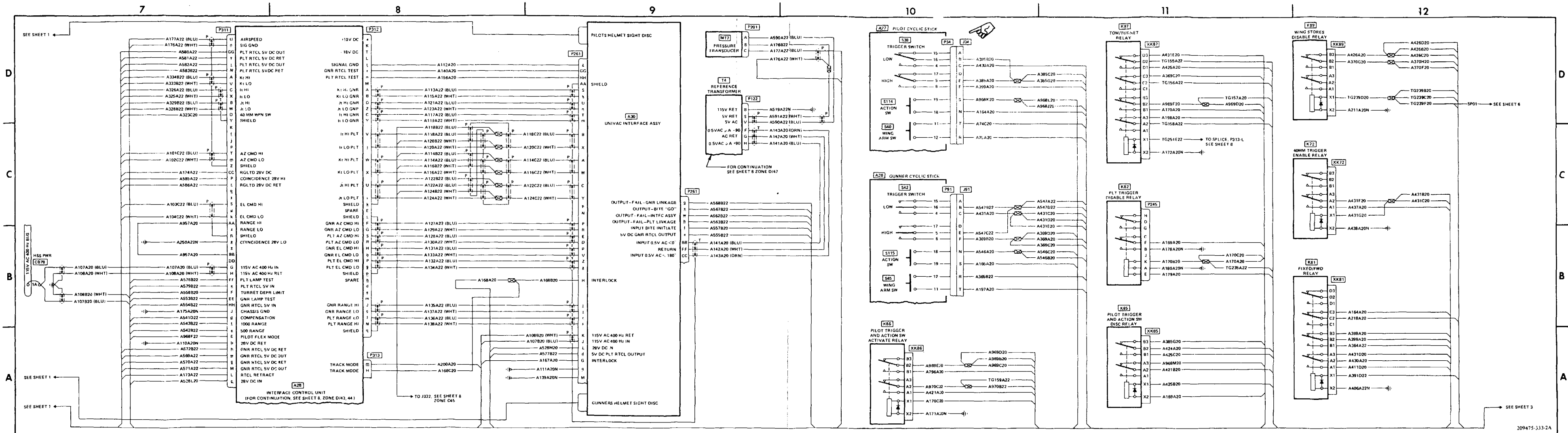


Figure F-7. Armament systems wiring diagram (Sheet 2 of 13)

Change 18 F-91/(F-92 blank)

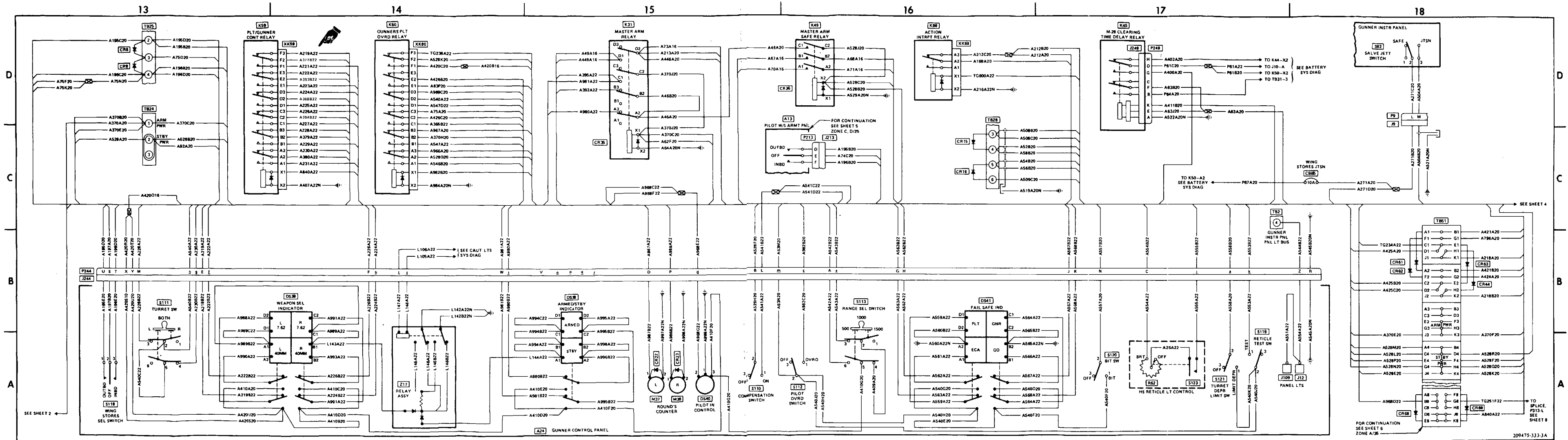


Figure F-7. Armament systems wiring diagram (Sheet 3 of 13)

Change 8 F-93/(F-94 blank)

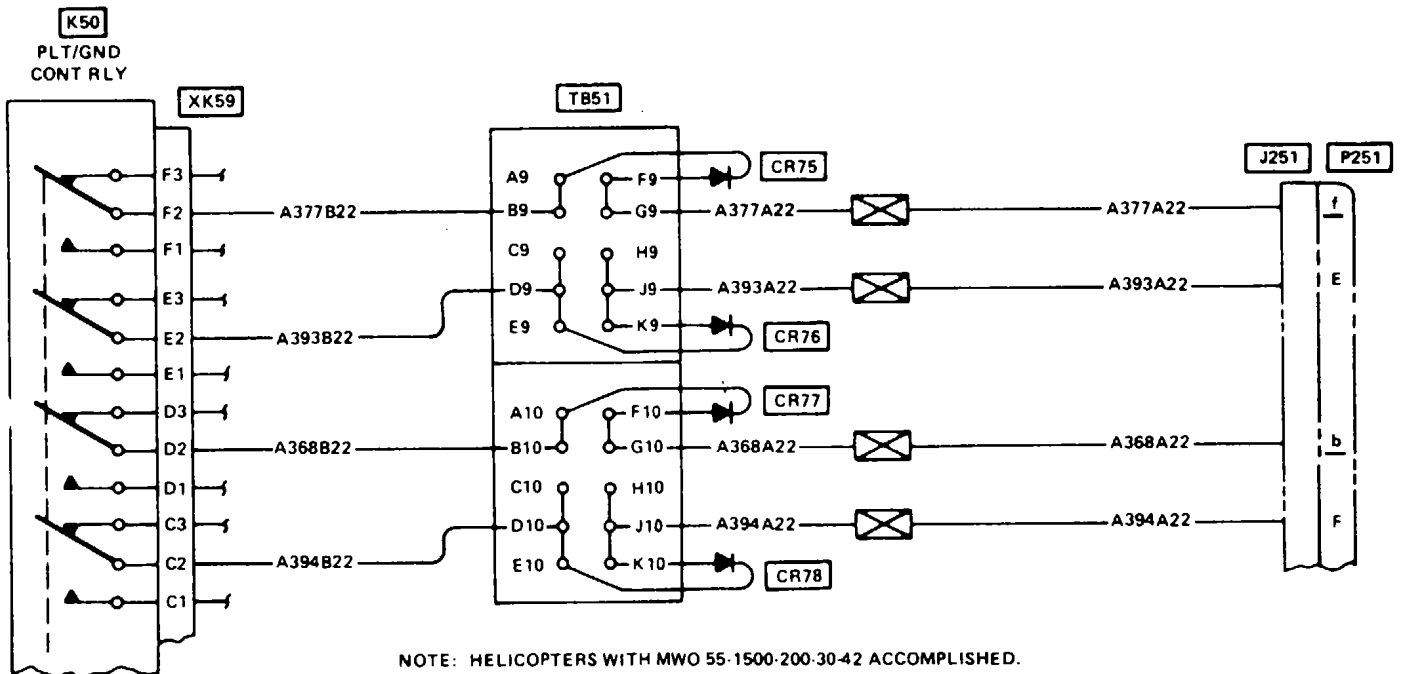


Figure F-7. Armament systems wiring diagram (Sheet 3A of 13)

Change 8 F-94A/(F-94B blank)

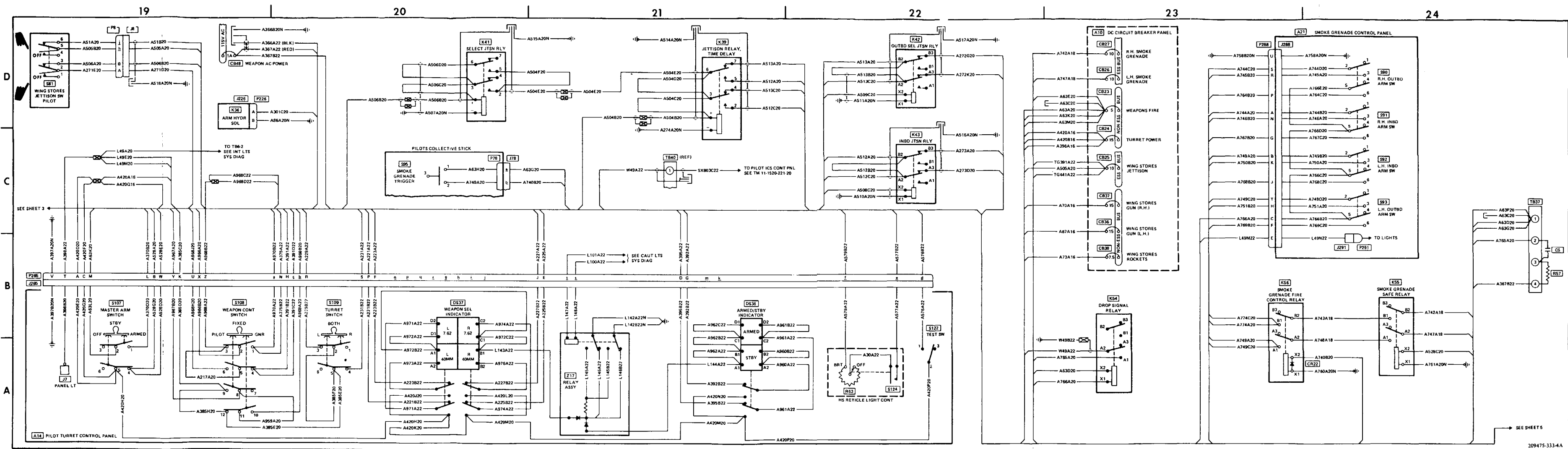


Figure F-7. Armament systems wiring diagram (Sheet 4 of 13)

Change 16 F-95/(F-96 blank)

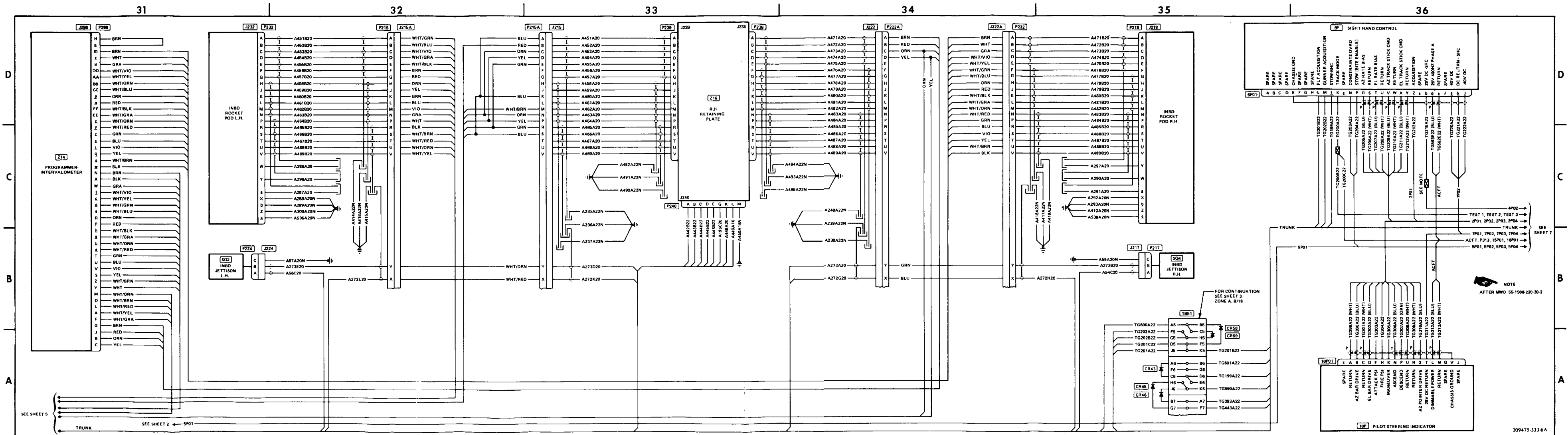


Figure F-7. Armament systems wiring diagram (Sheet 6 of 13)
Change 4 F-99/(F-100 blank)

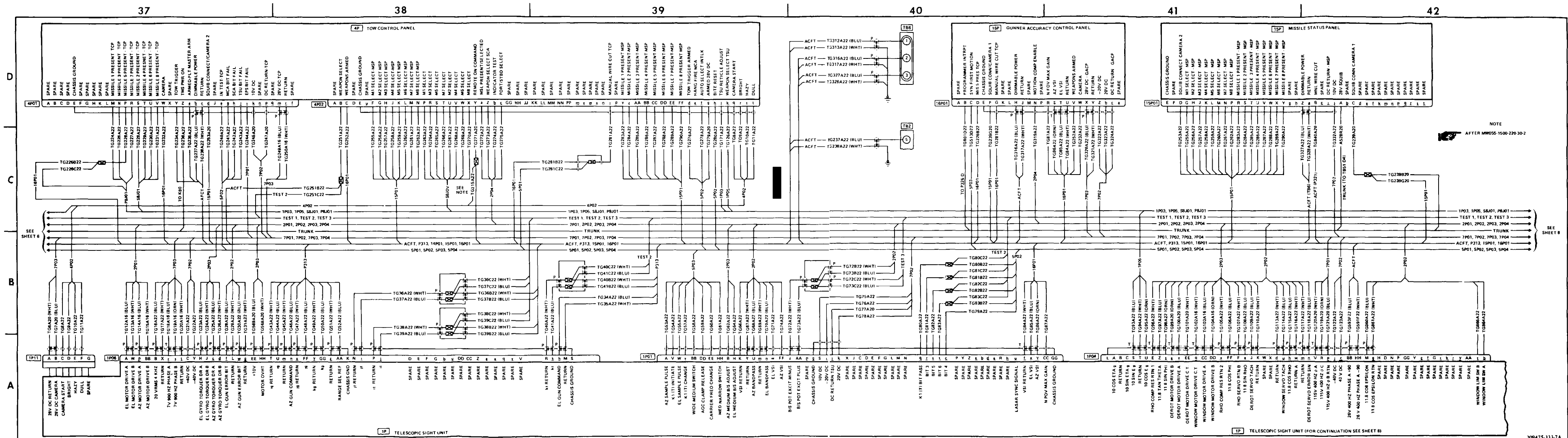


Figure F-7. Armament systems wiring diagram (Sheet 7 of 13)
 Change 4 F-101/(F-102 blank)

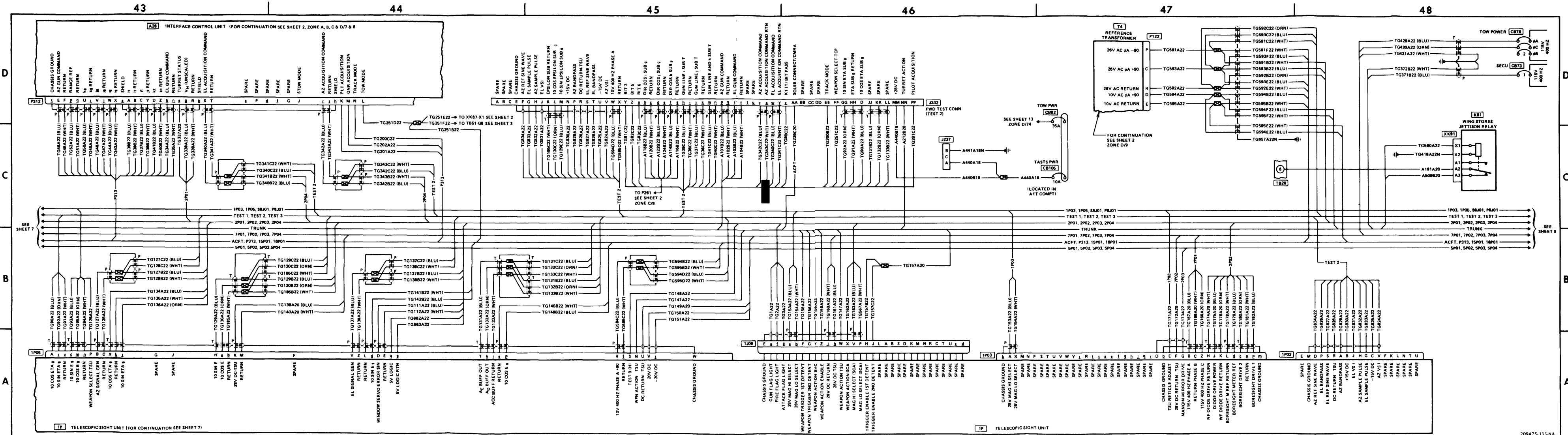


Figure F-7. Armament systems wiring diagram (Sheet 8 of 13)
 Change 4 F-103/(F-104 blank)

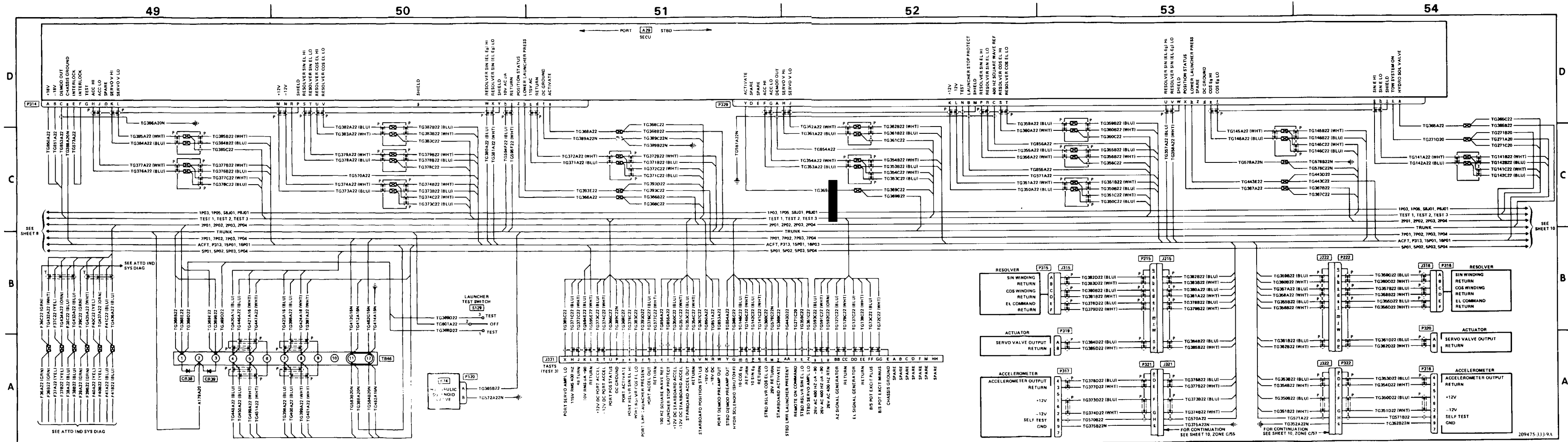


Figure F-7. Armament systems wiring diagram (Sheet 9 of 13)
Change 4 F-105/(F-106 blank)

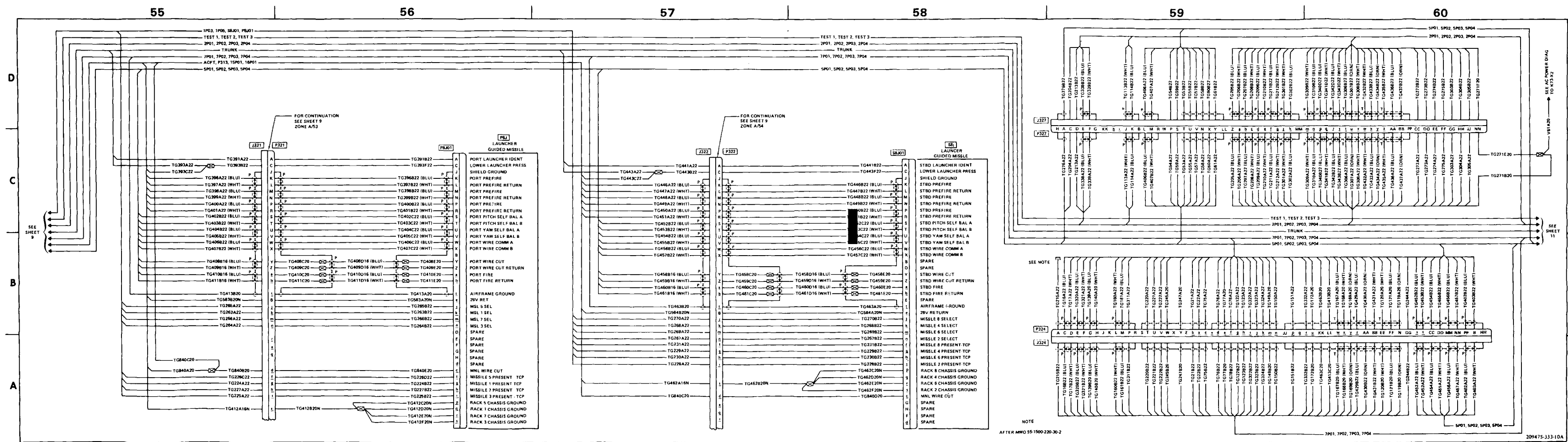


Figure F-7. Armament systems wiring diagram (Sheet 10 of 13)
Change 4 F-107/(F-108 blank)

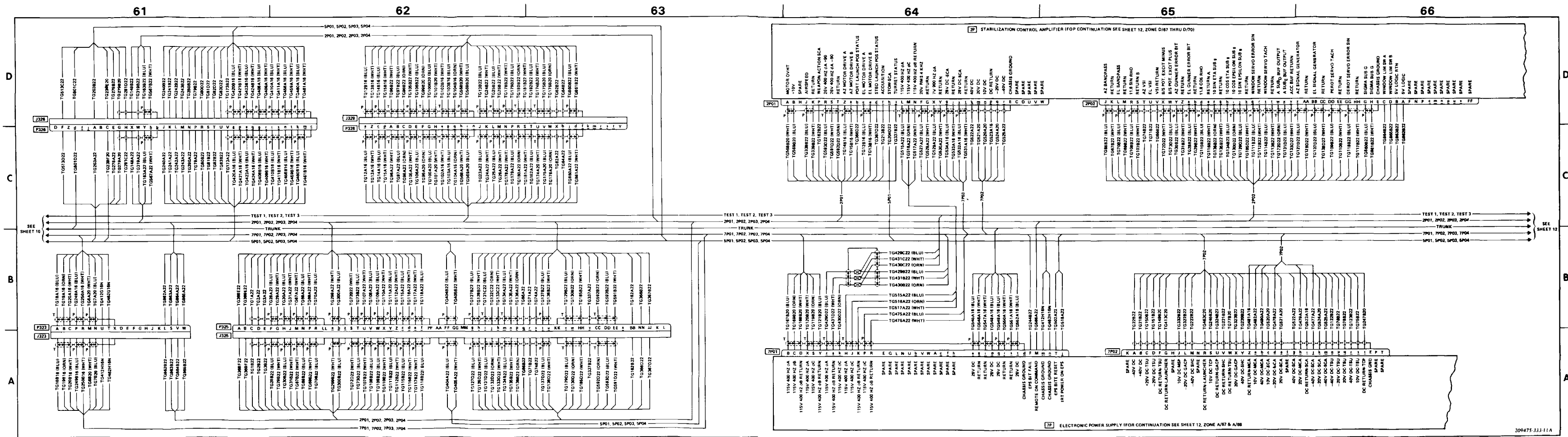


Figure F-7. Armament systems wiring diagram (Sheet 11 of 13)
Change 4 F-109/(F-110 blank)

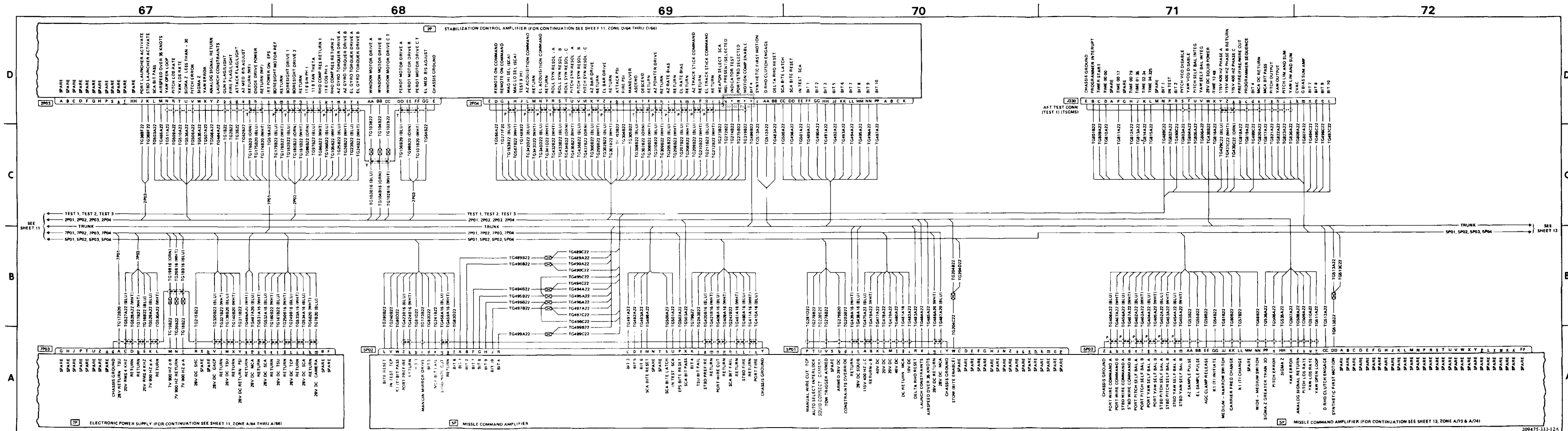


Figure F-7. Armament systems wiring diagram (Sheet 12 of 13)
Change 4 F-111/(F-112 blank)

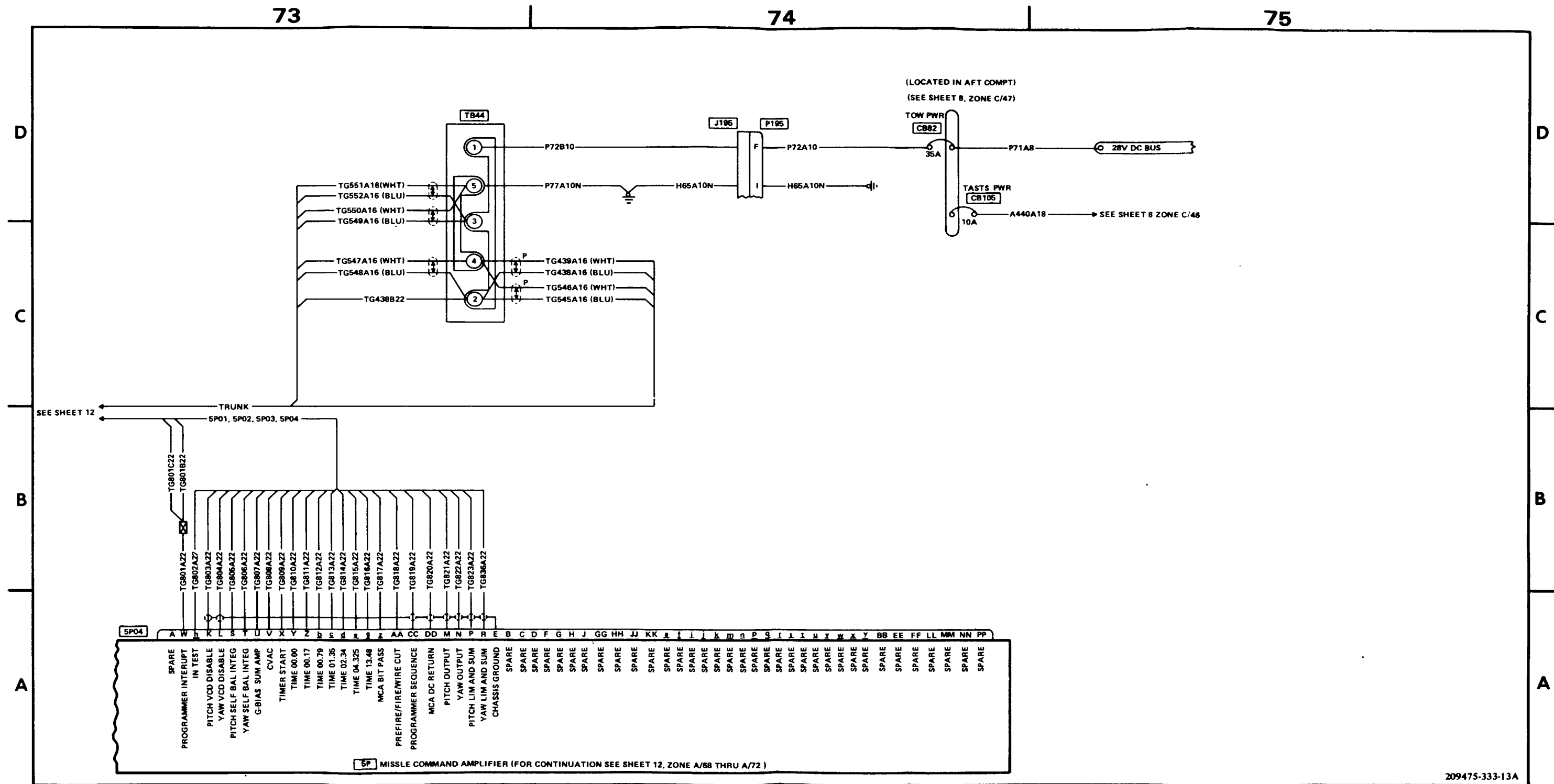


Figure F-7. Armament systems wiring diagram (Sheet 13 of 13)
Change 4 F-113/(F-114 blank)

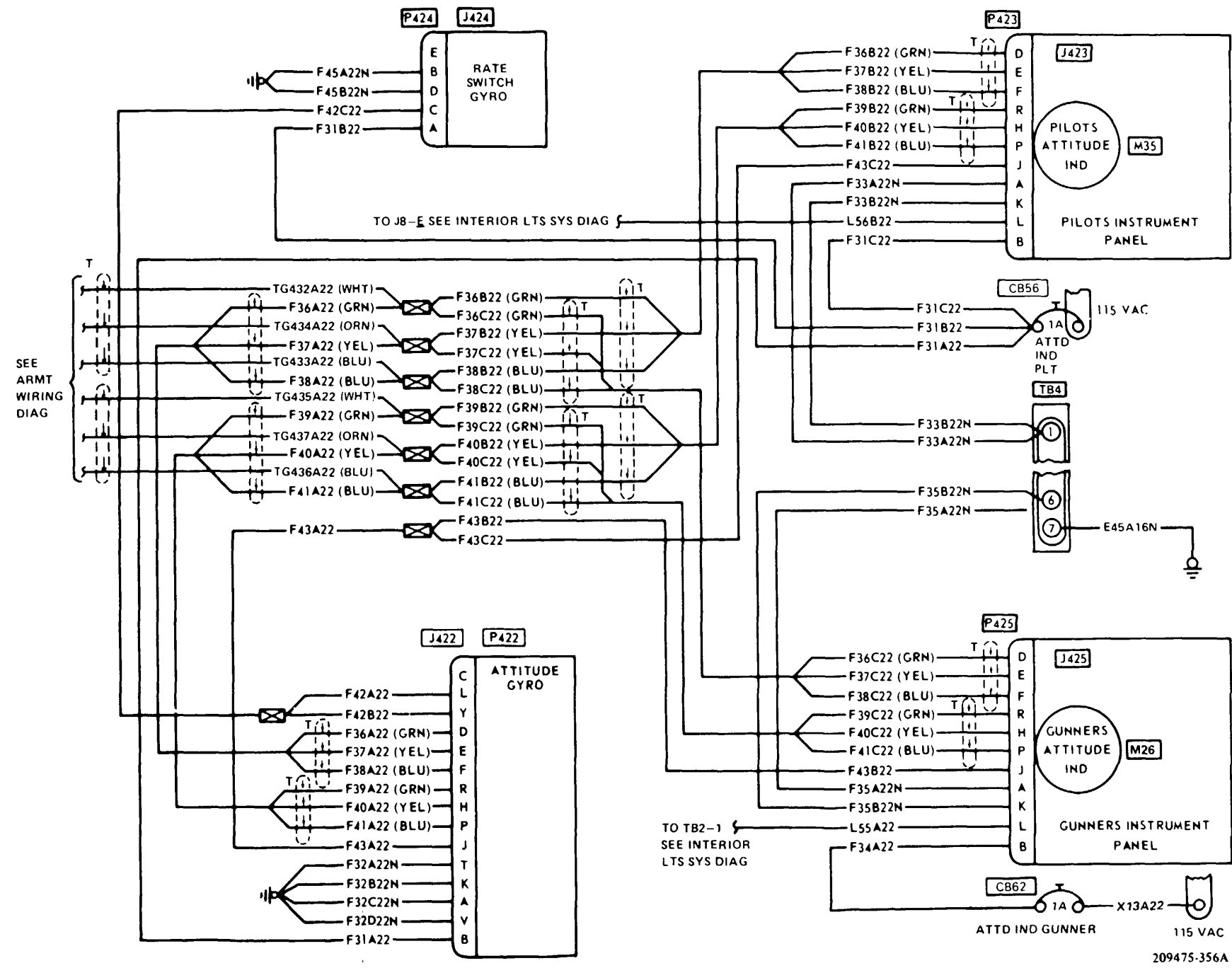


Figure F-8. Attitude indicating system wiring diagram
Change 4 F-115/(F-116 blank)

209475-356A

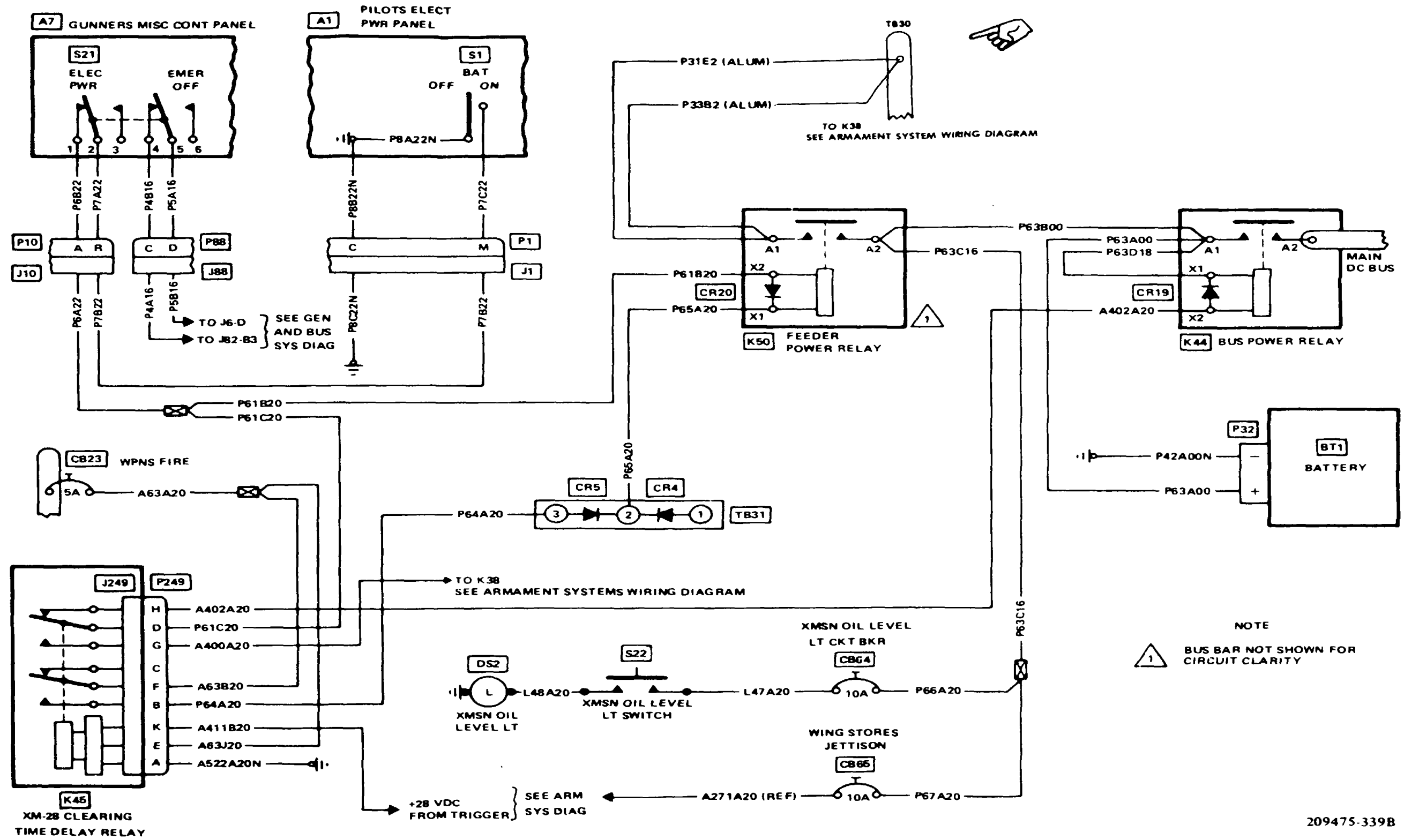


Figure F-9. Battery system wiring diagram
Change 14 F-117/(F-118 blank)

209475-339B

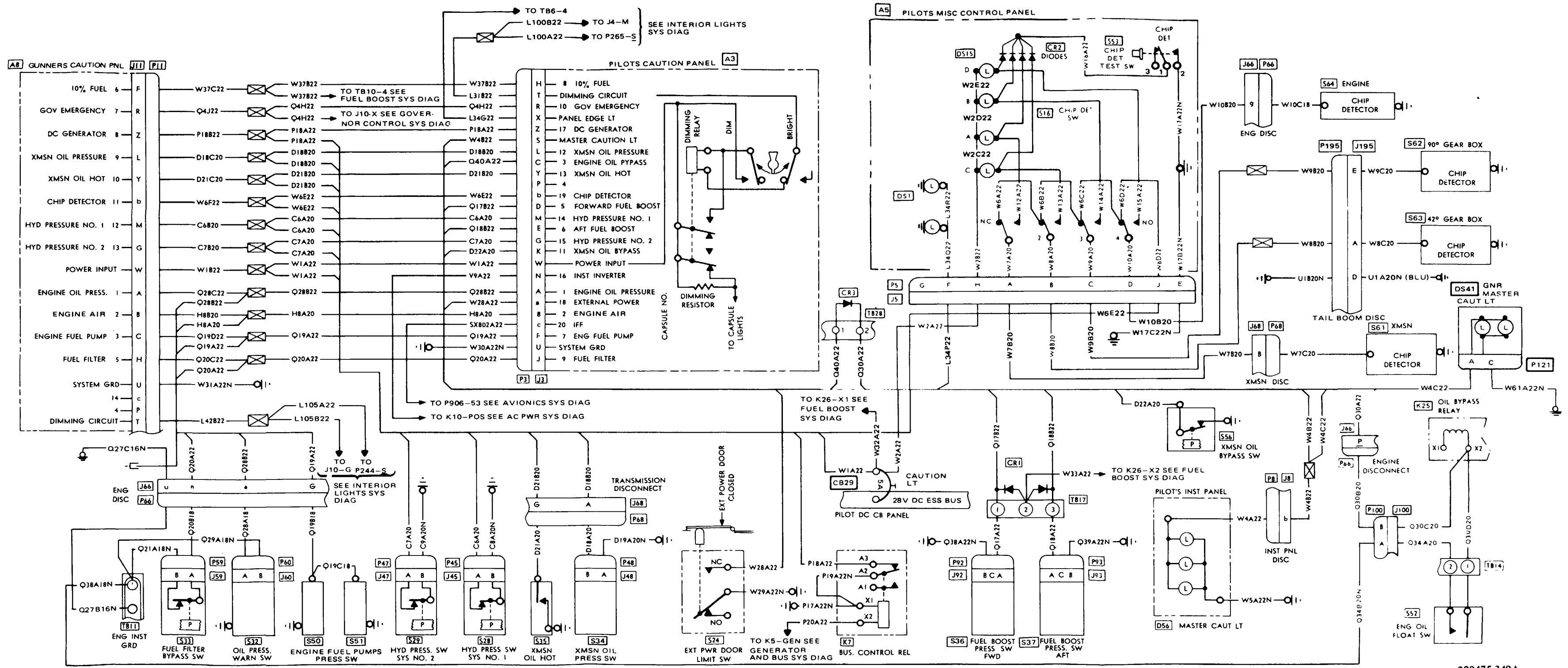


Figure F-10. Caution lights system wiring diagram
Change 4 F-119/(F-120 blank)

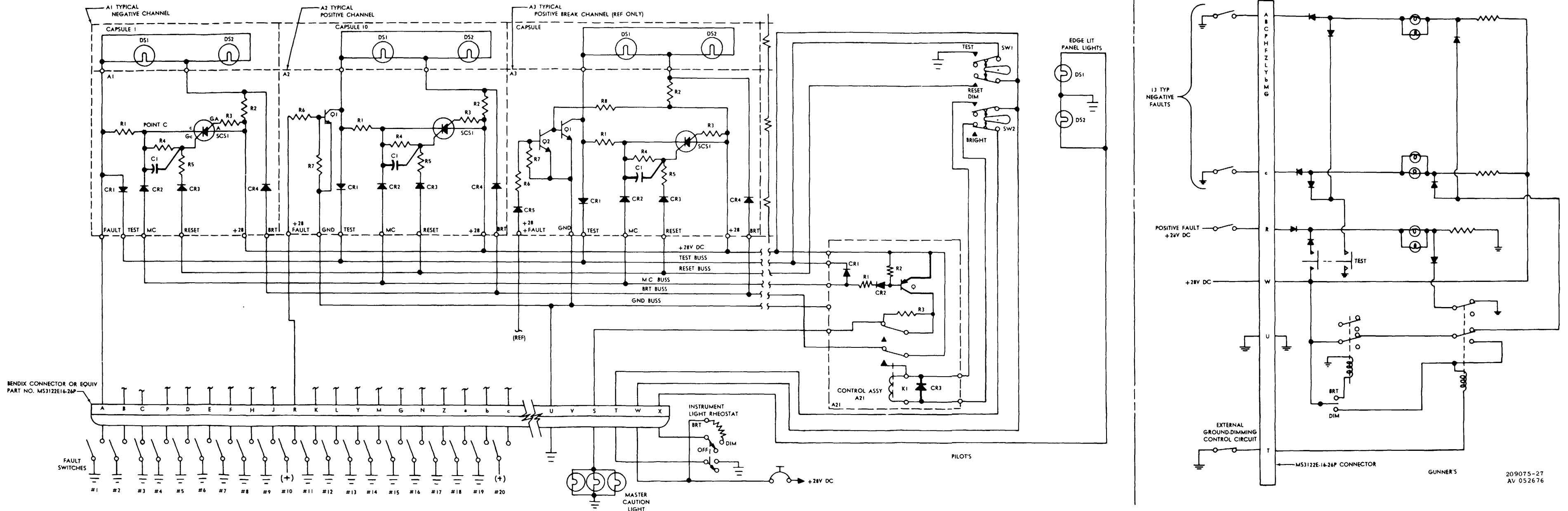
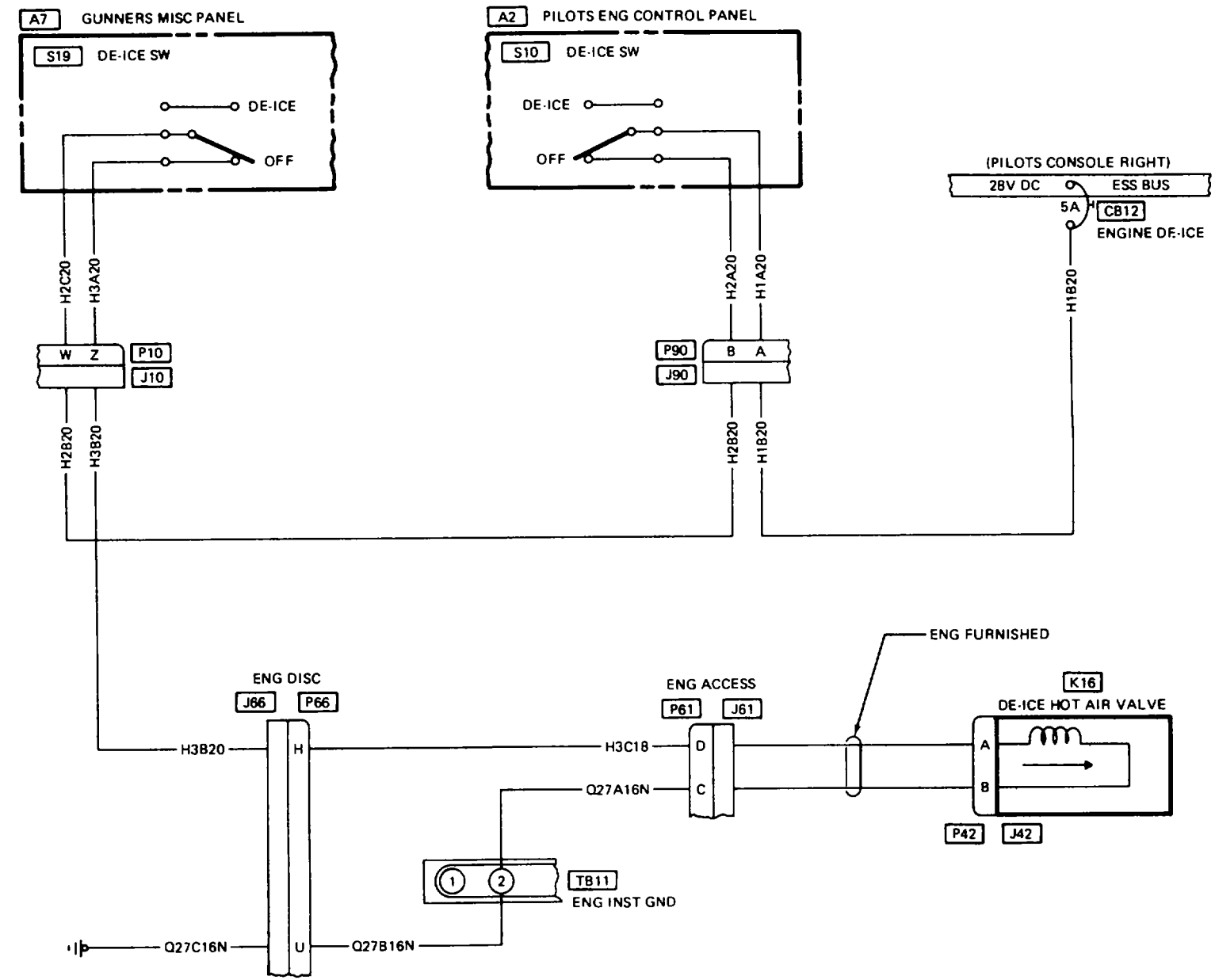


Figure F-11. Caution Panel internal schematic diagram

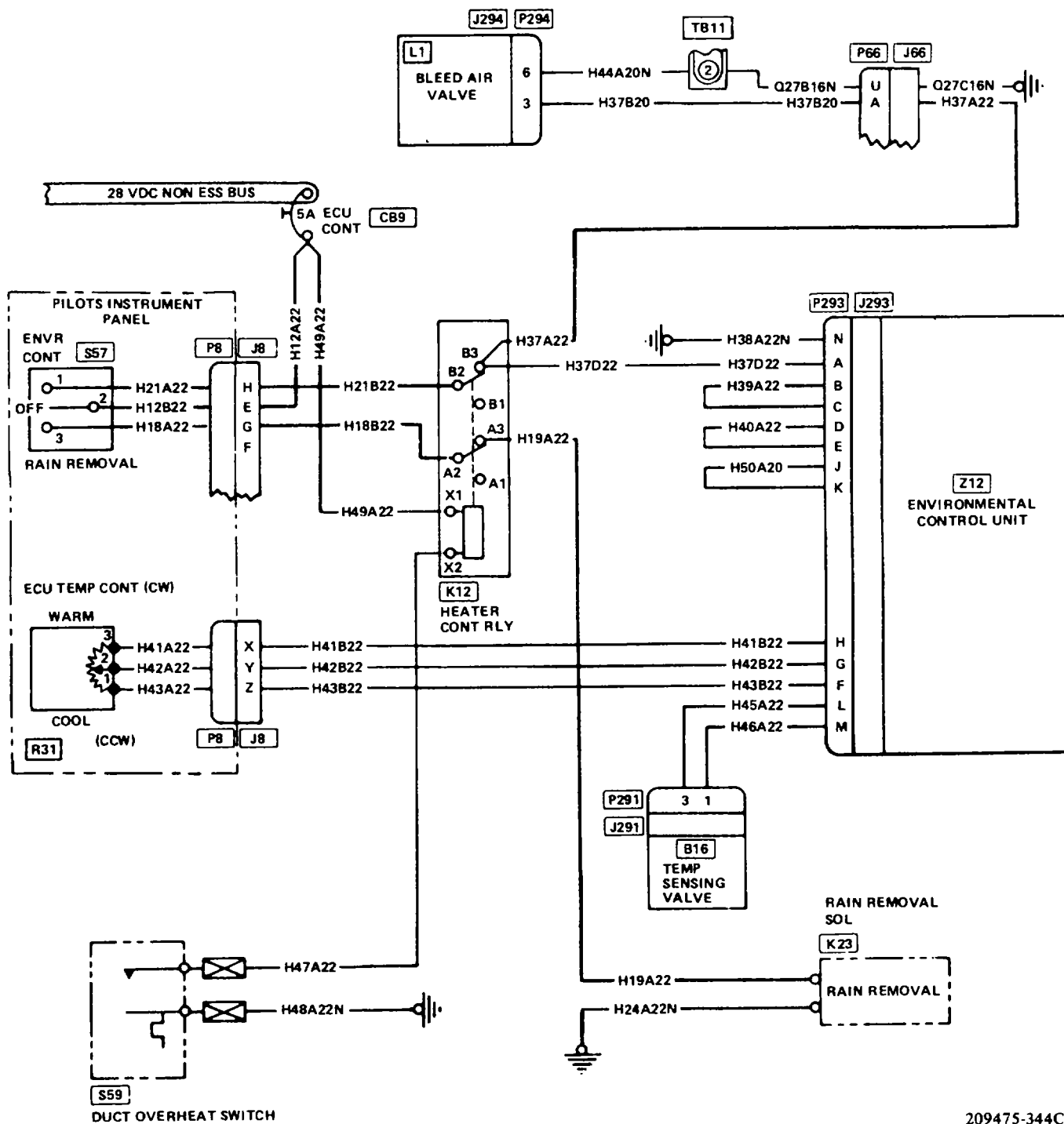
Change 4 F-121/(F-122 blank)



209475-347

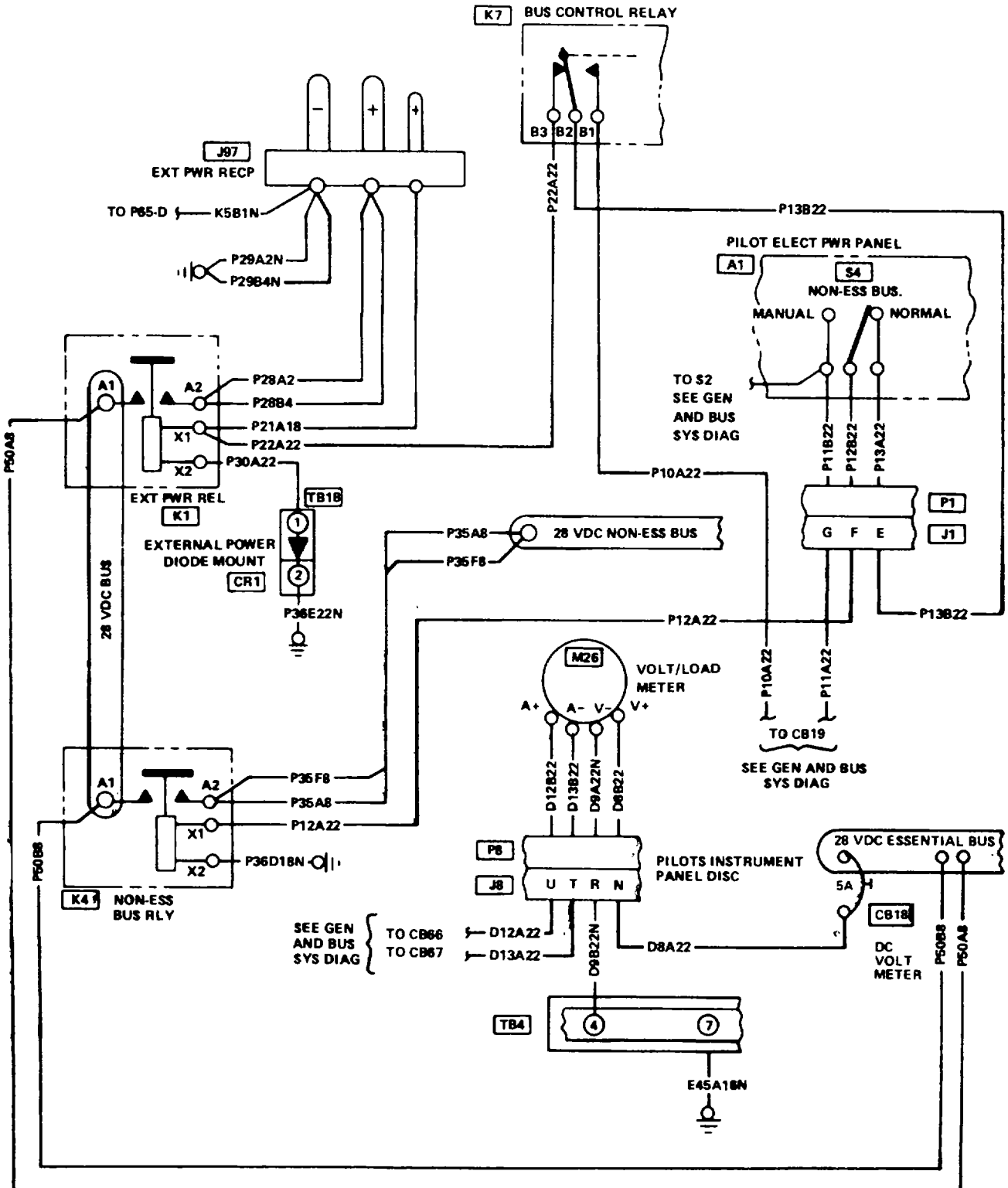
Figure F-12. Engine de-ice system wiring diagram

Change 4 F-123/ (F-124 blank)



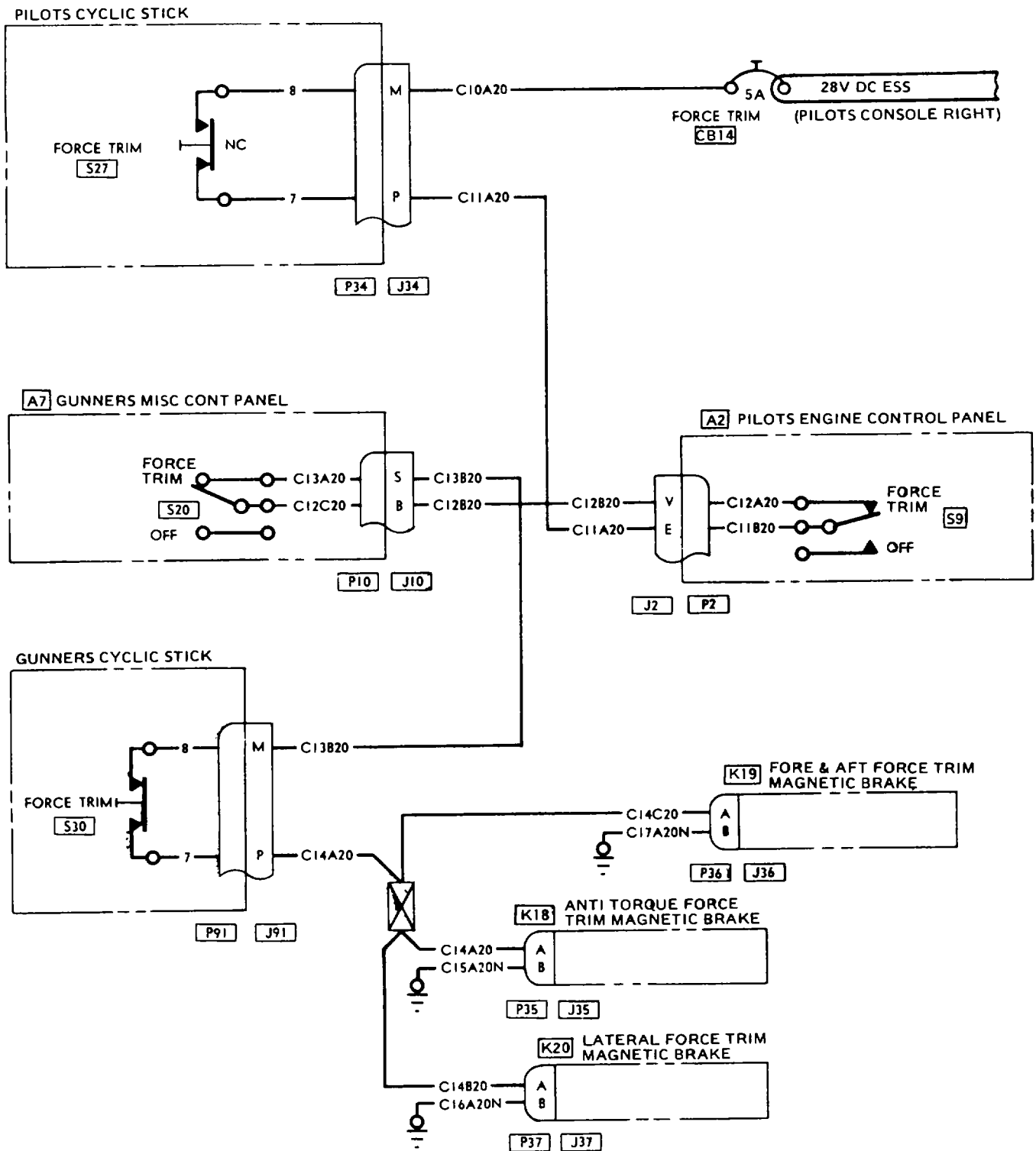
209475-344C

Figure F-13. Environmental control system wiring diagram



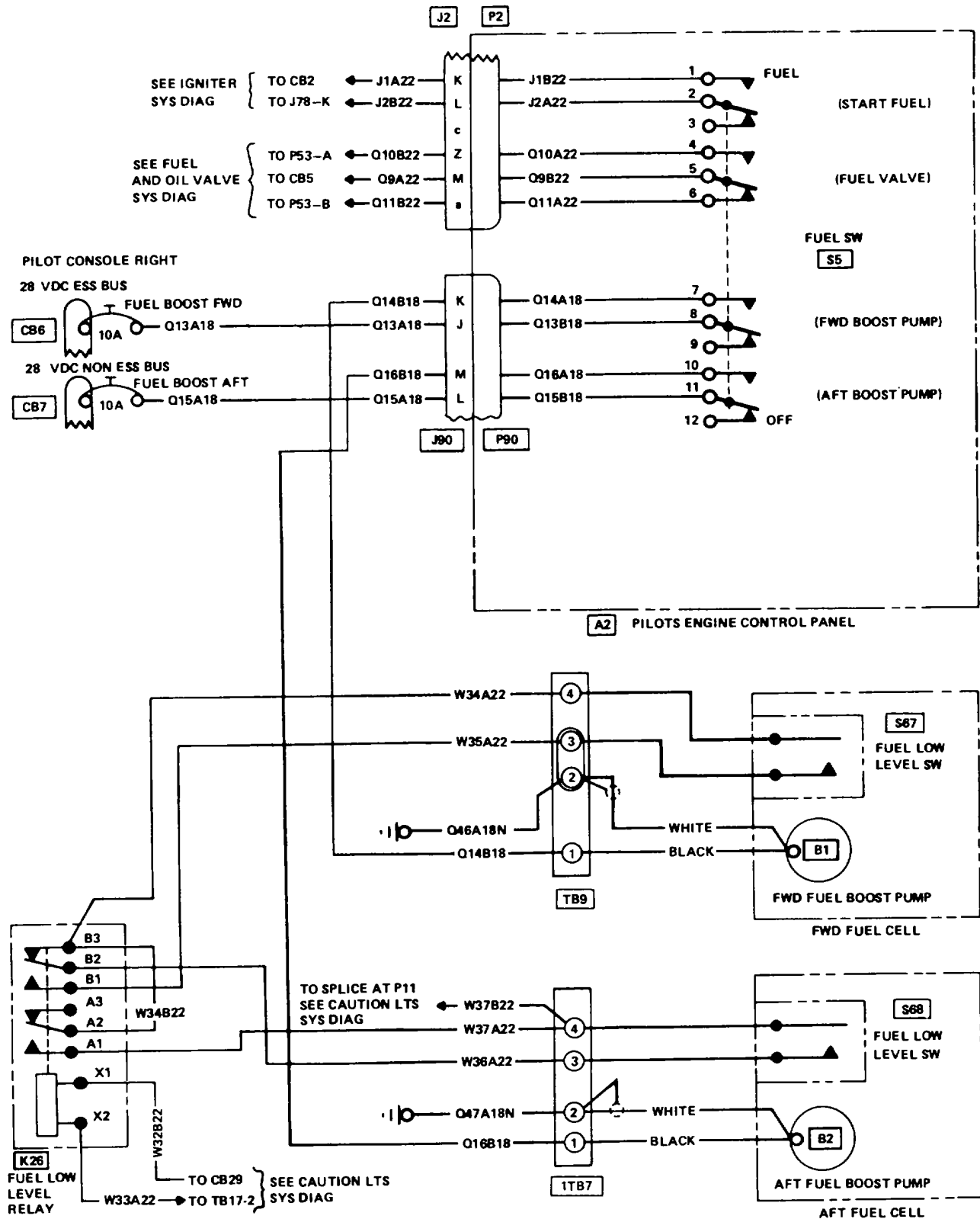
209475-351B

Figure F-14. External power system wiring diagram



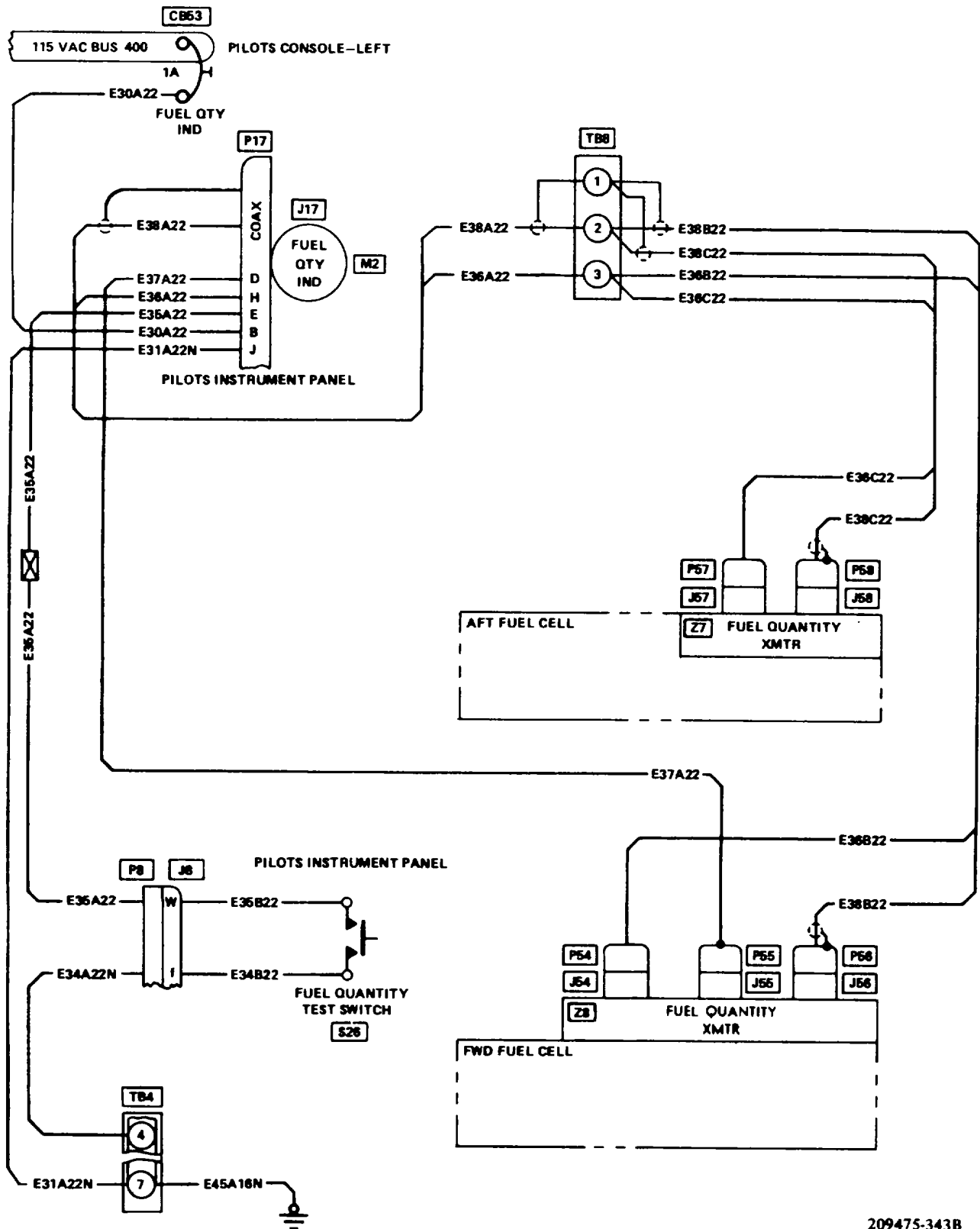
209475-348

Figure F-15. Force trim system wiring diagram



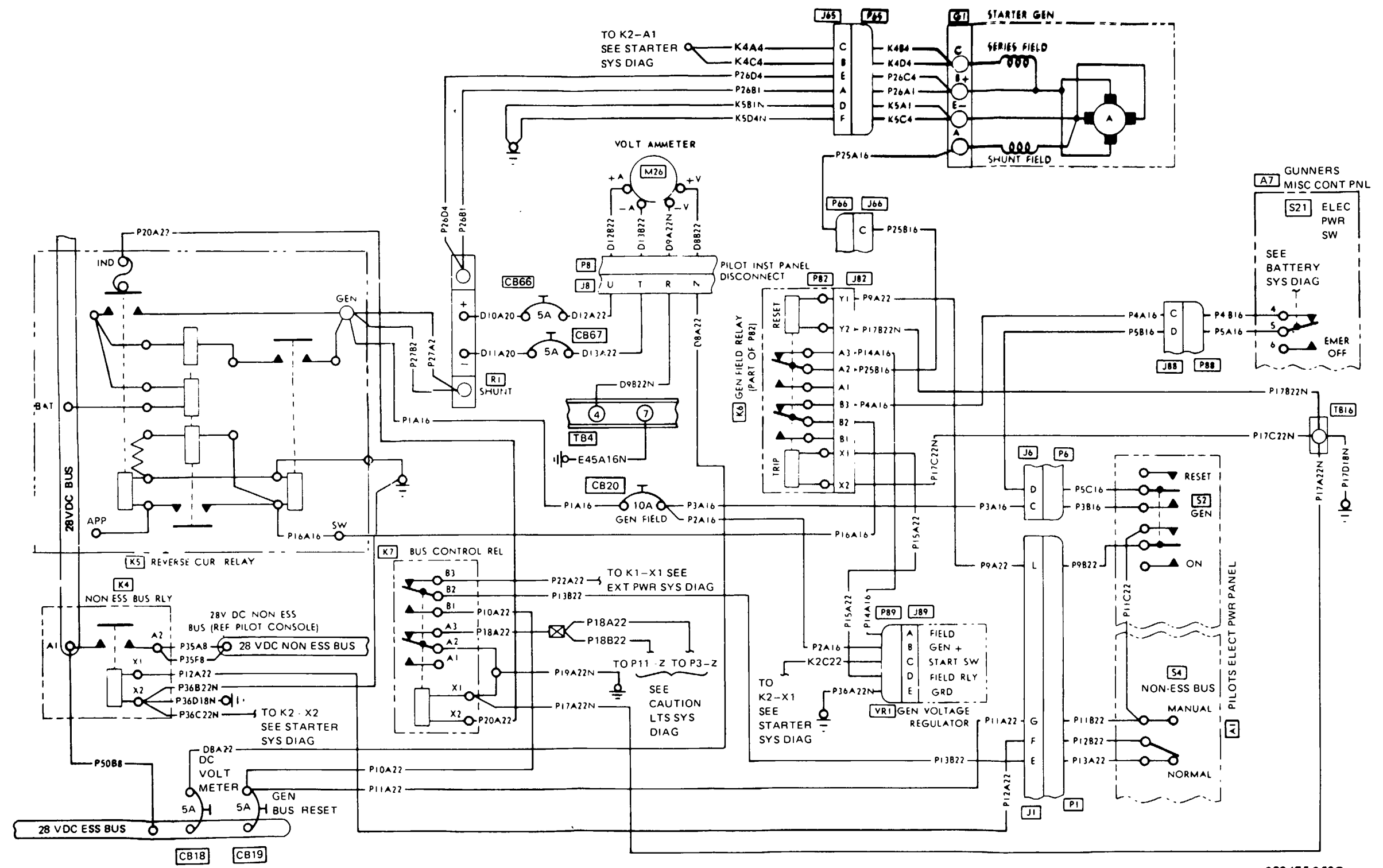
209475-359B

Figure F-17. Fuel boost system wiring diagram



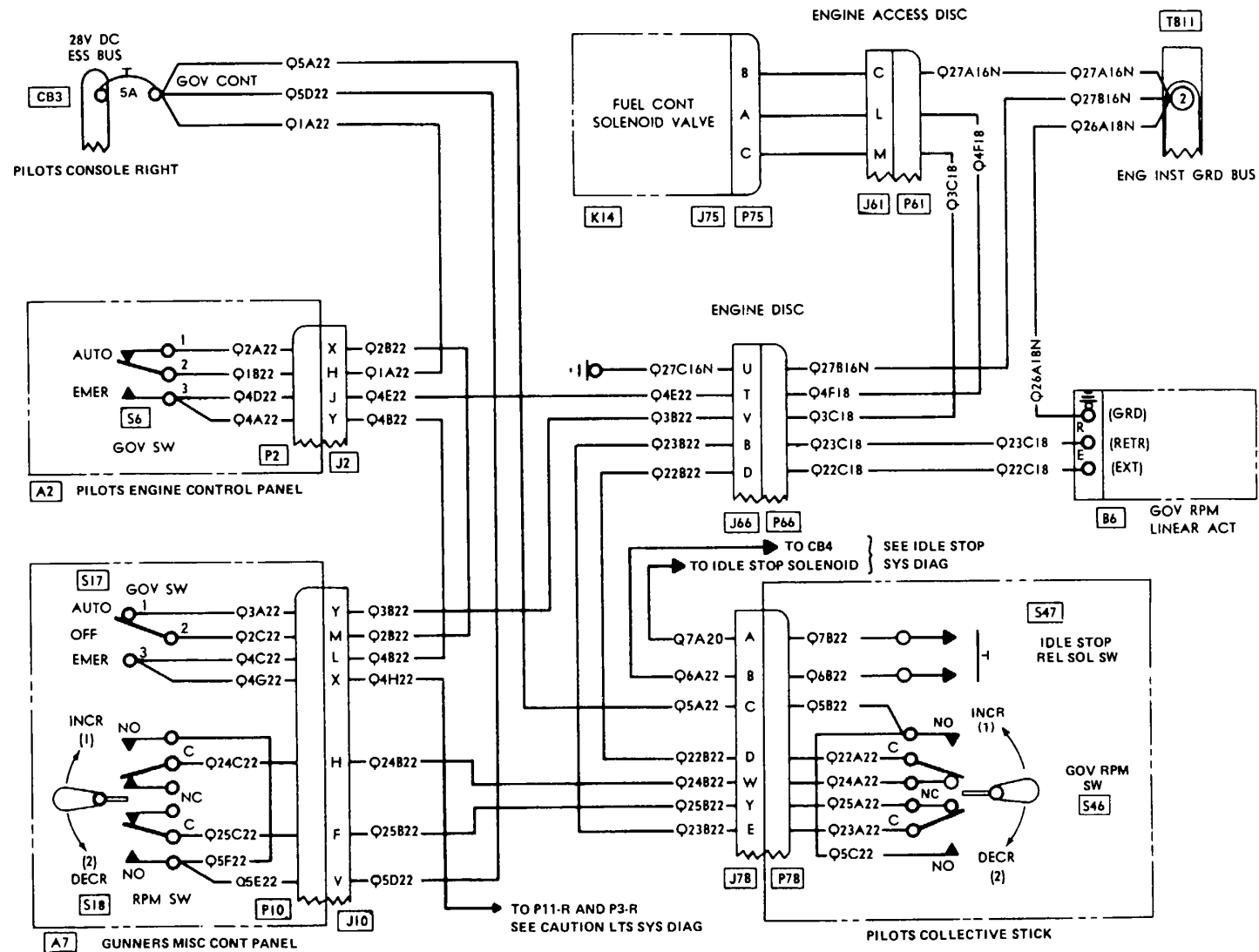
209475-343B

Figure F-18. Fuel quantity indicating system wiring diagram



209475-350C

Figure F-19. Generator and dc bus system wiring diagram
Change 4 F-131/F-132 blank)



209475-338

Figure F-20. Governor control system wiring diagram
Change 4 F-133

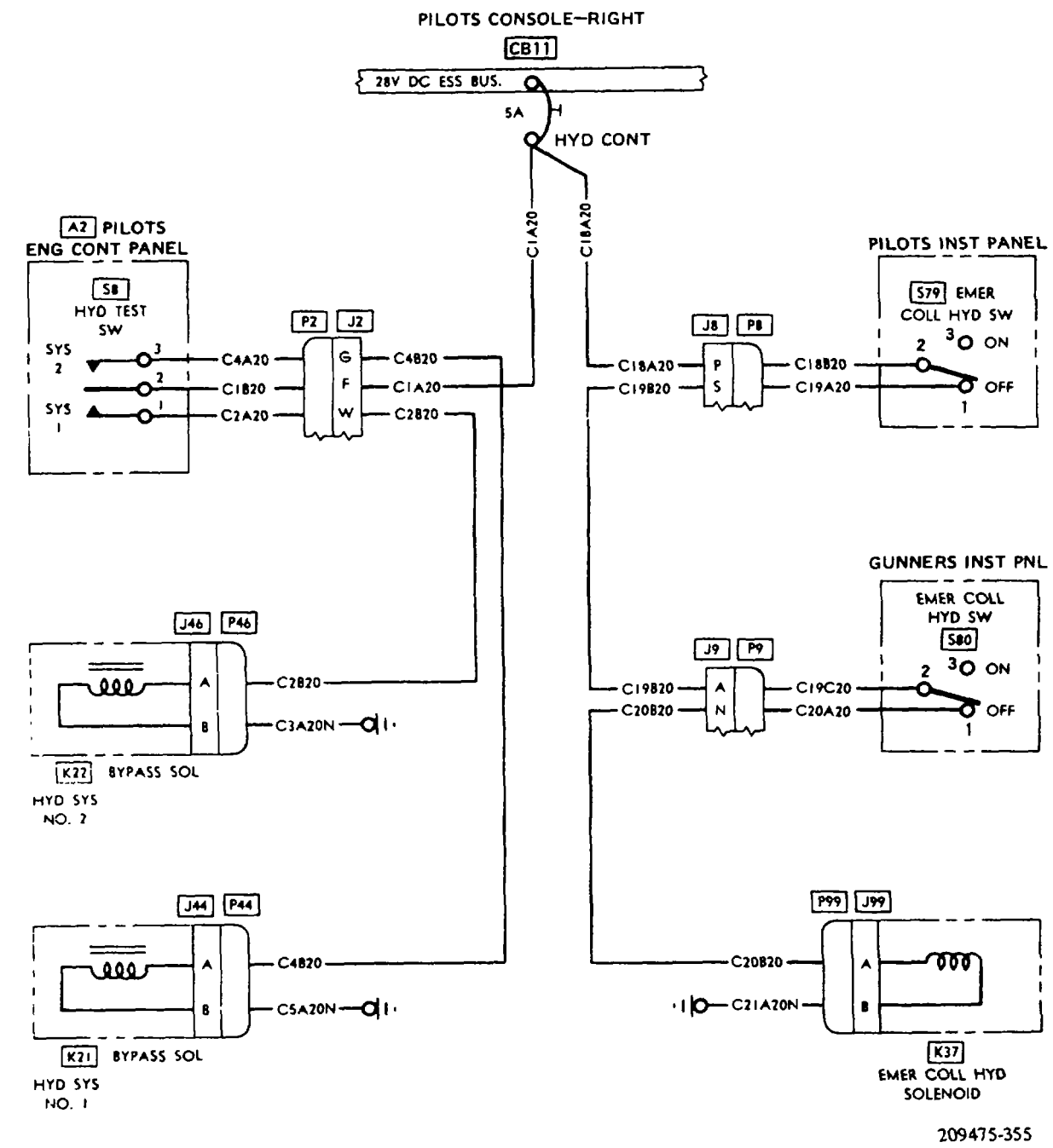
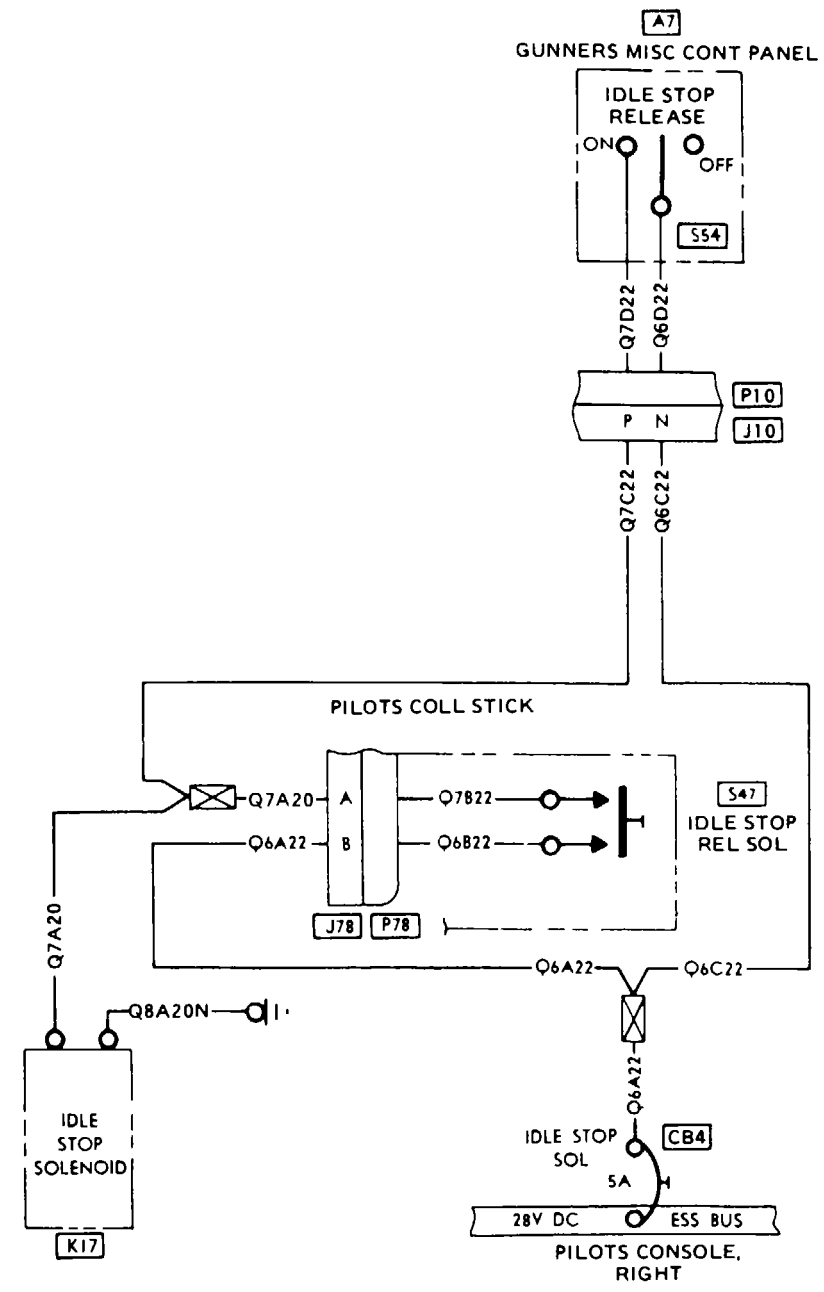


Figure F-21. Hydraulic control system wiring diagram



209475-354

Figure F-22. Idle stop system wiring diagram

Change 4 F-135/(F-136 blank)

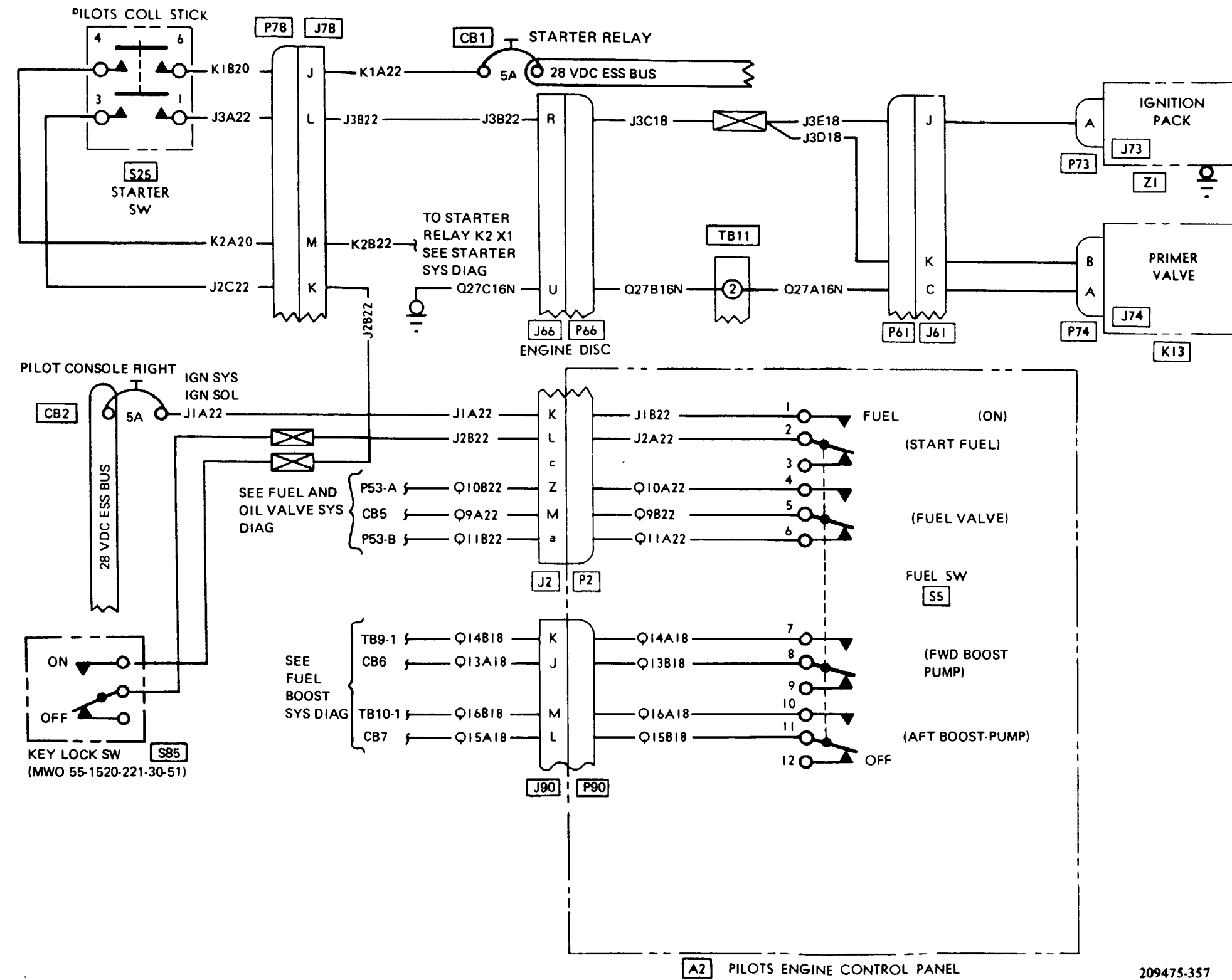
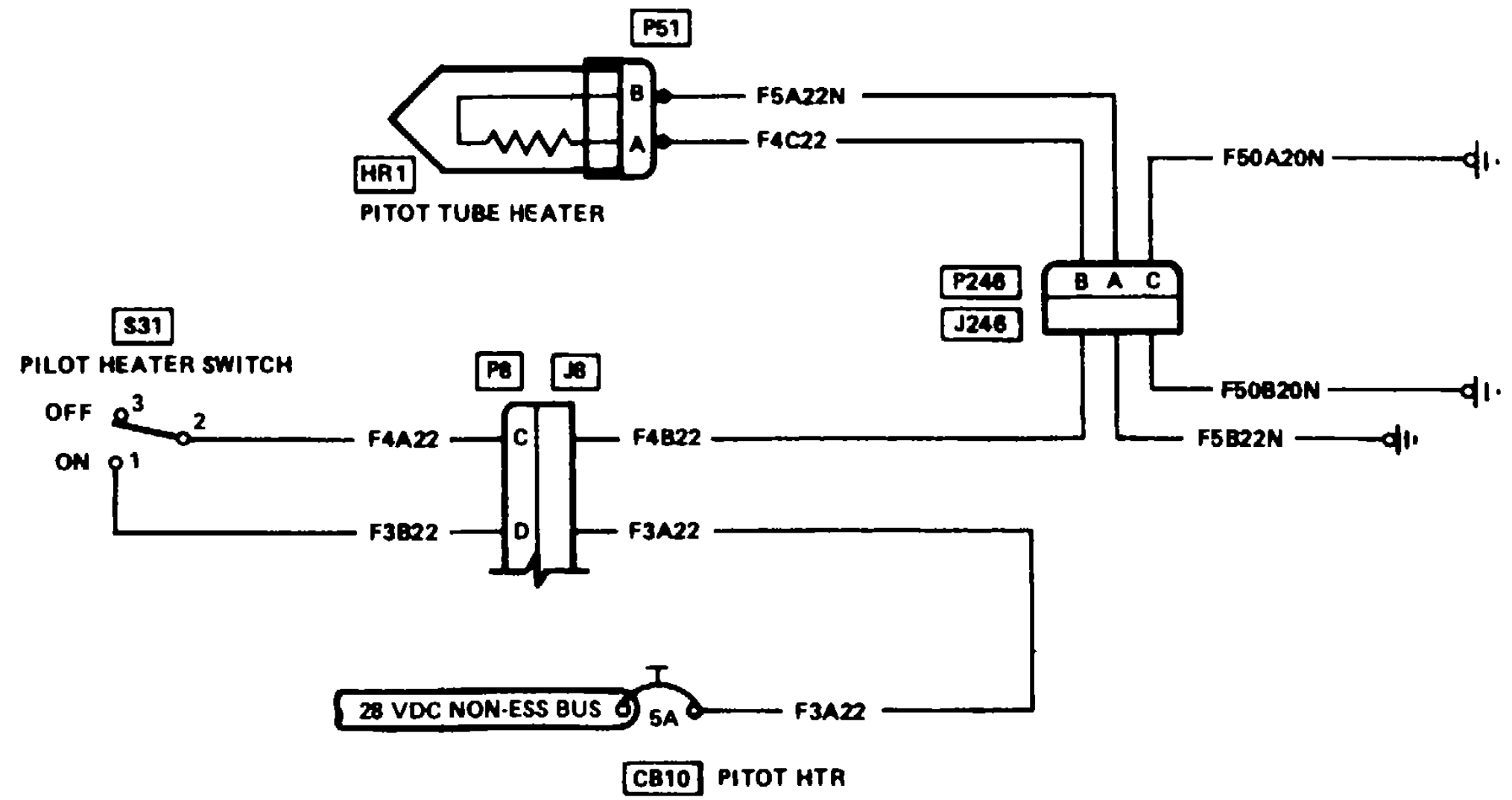


Figure F-23. Igniter system wiring diagram

Change 4 F137/F-138 blank)

209475-357

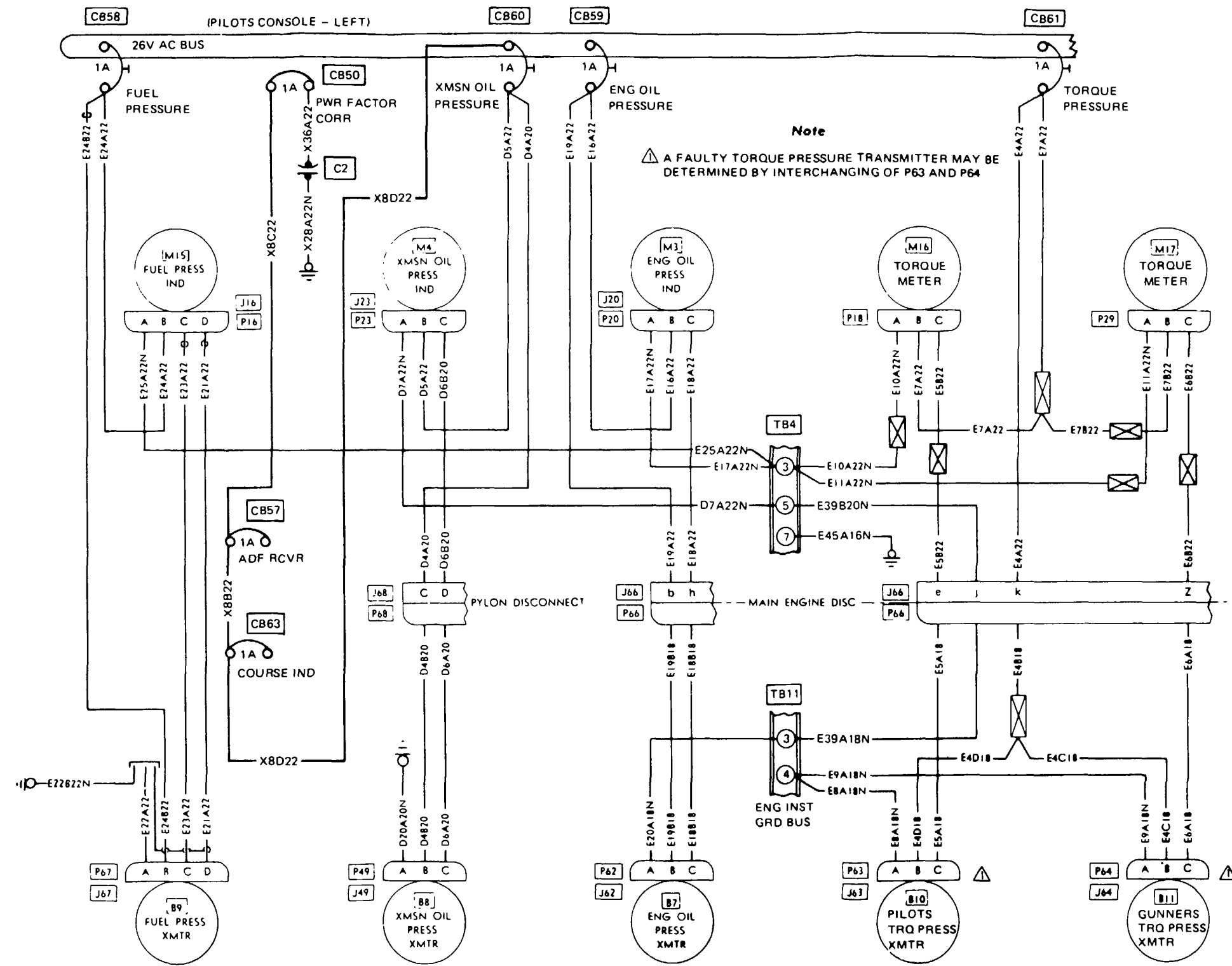


209475-342B

Figure F-25. Pilot heat system wiring diagram

Change 4 F-141/(F-142 blank)

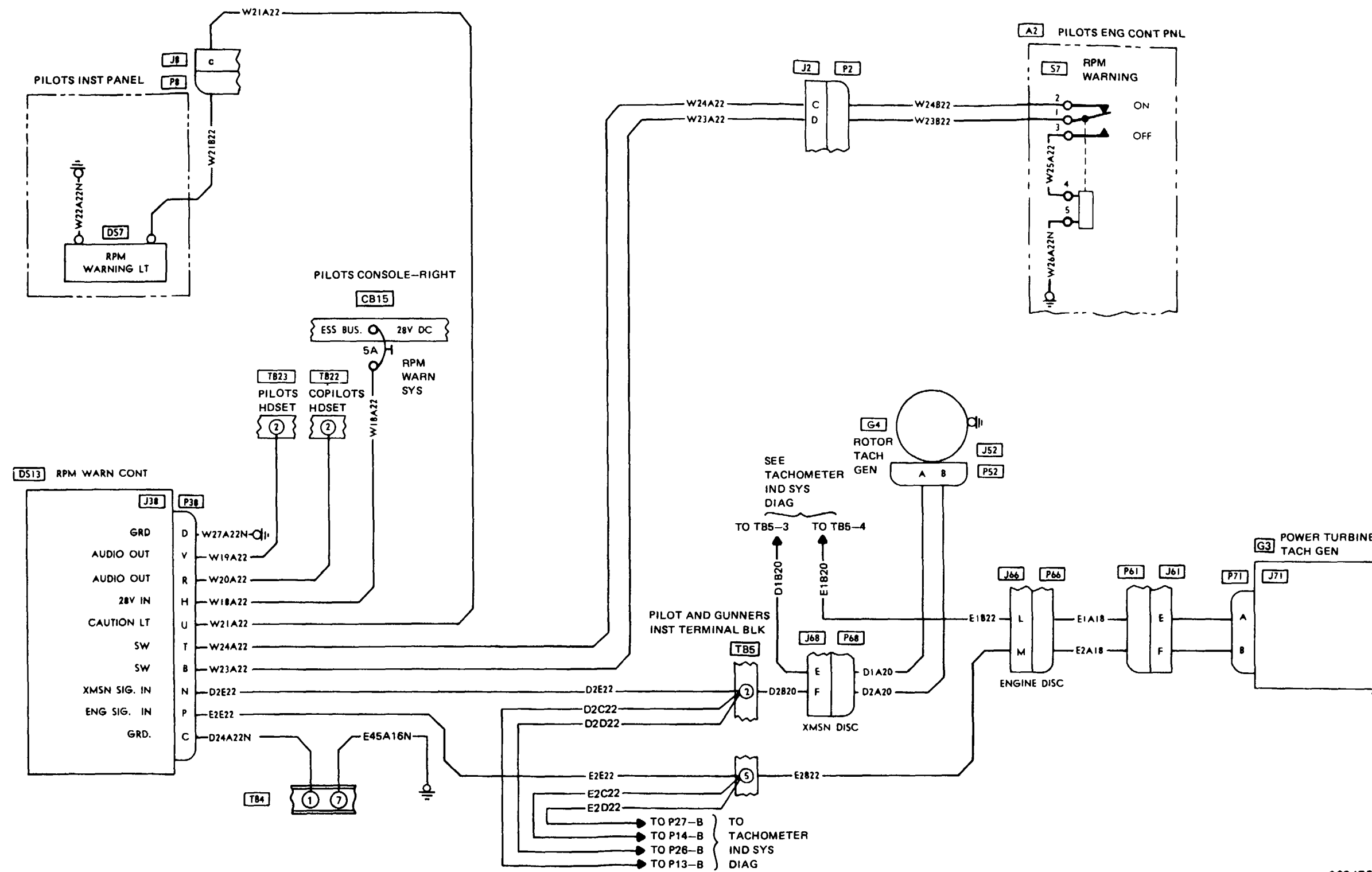




209475-341A

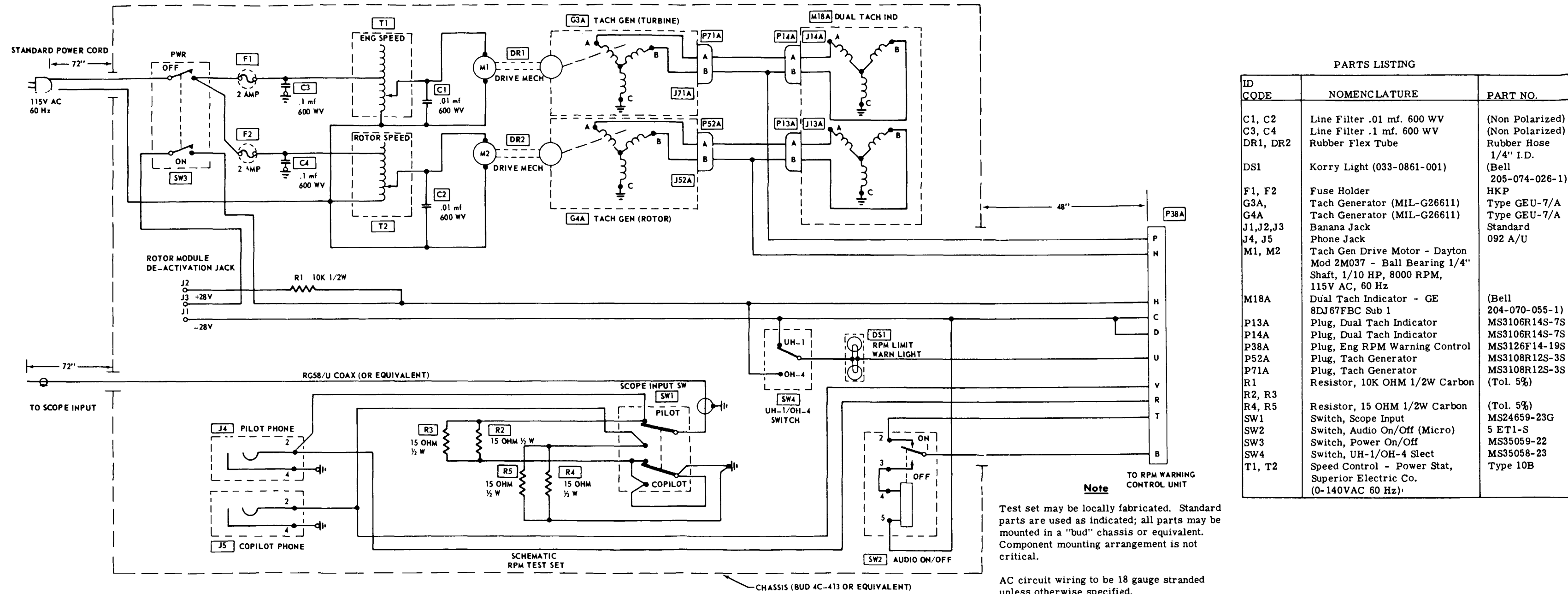
Figure F-26. Pressure indicating systems wiring diagram

Change 4 F-143/(F-144 blank)



209475-360C

Figure F-27. Rpm limit warning system wiring diagram
Change 4 F-145/ (F-146 blank)



PARTS LISTING		
ID CODE	NOMENCLATURE	PART NO.
C1, C2	Line Filter .01 mf. 600 WV	(Non Polarized)
C3, C4	Line Filter .1 mf. 600 WV	(Non Polarized)
DR1, DR2	Rubber Flex Tube	Rubber Hose 1/4" I.D.
DS1	Korry Light (033-0861-001)	(Bell 205-074-026-1)
F1, F2	Fuse Holder	HKP
G3A, G4A	Tach Generator (MIL-G26611)	Type GEU-7/A
J1, J2, J3	Banana Jack	Type GEU-7/A
J4, J5	Phone Jack	Standard 092 A/U
M1, M2	Tach Gen Drive Motor - Dayton Mod 2M037 - Ball Bearing 1/4" Shaft, 1/10 HP, 8000 RPM, 115V AC, 60 Hz	
M18A	Dual Tach Indicator - GE 8DJ67FBC Sub 1	(Bell 204-070-055-1)
P13A	Plug, Dual Tach Indicator	MS3106R14S-7S
P14A	Plug, Dual Tach Indicator	MS3106R14S-7S
P38A	Plug, Eng RPM Warning Control	MS3126F14-19S
P52A	Plug, Tach Generator	MS3108R12S-3S
P71A	Plug, Tach Generator	MS3108R12S-3S
R1	Resistor, 10K OHM 1/2W Carbon	(Tol. 5%)
R2, R3	Resistor, 15 OHM 1/2W Carbon	(Tol. 5%)
R4, R5	Resistor, 15 OHM 1/2W Carbon	(Tol. 5%)
SW1	Switch, Scope Input	MS24659-23G
SW2	Switch, Audio On/Off (Micro)	5 ET1-S
SW3	Switch, Power On/Off	MS35059-22
SW4	Switch, UH-1/OH-4 Slect	MS35058-23
T1, T2	Speed Control - Power Stat, Superior Electric Co. (0-140VAC 60 Hz)	Type 10B

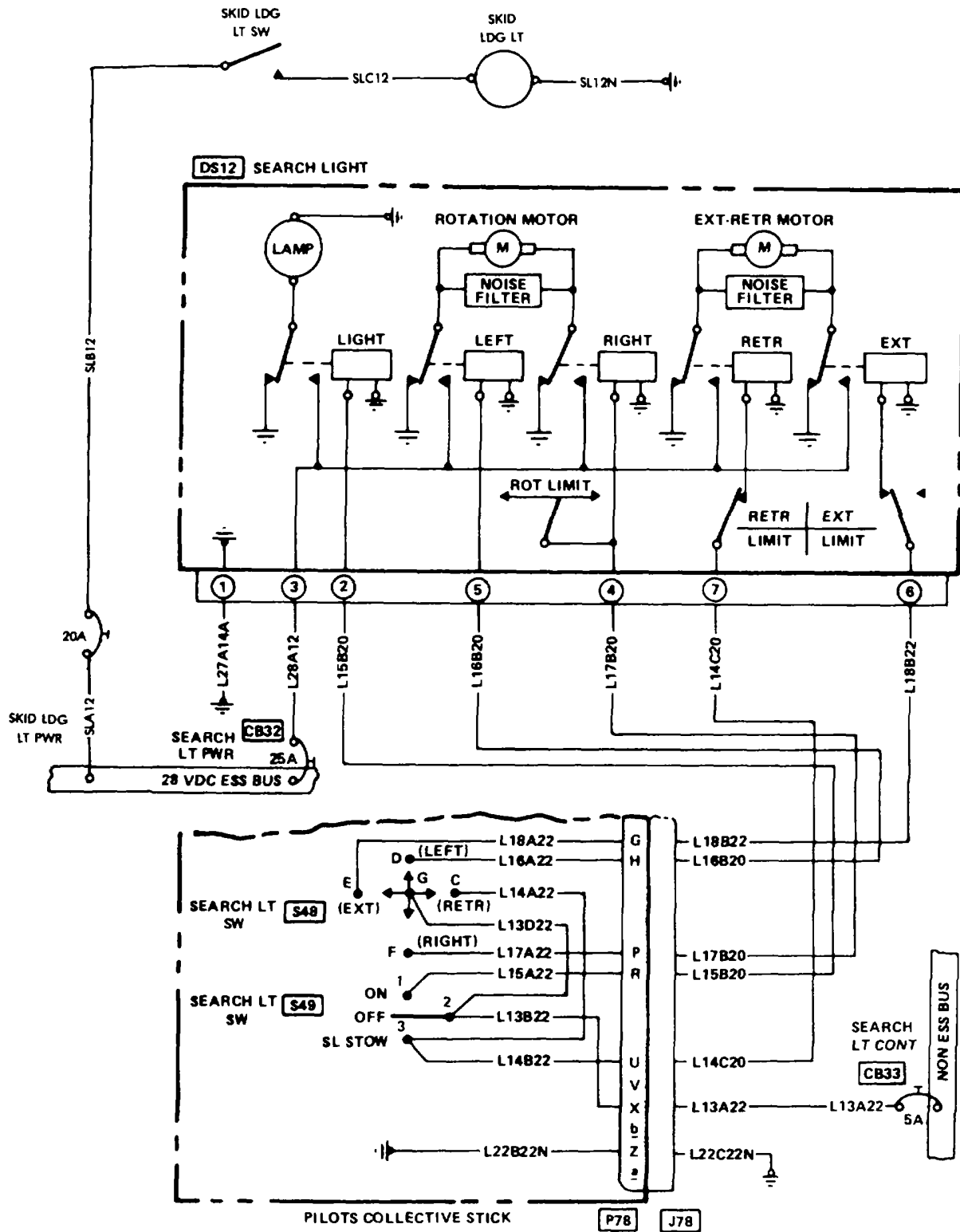
Note
Test set may be locally fabricated. Standard parts are used as indicated; all parts may be mounted in a "bud" chassis or equivalent. Component mounting arrangement is not critical.

AC circuit wiring to be 18 gauge stranded unless otherwise specified.

DC circuit wiring to be 22 gauge stranded unless otherwise specified.

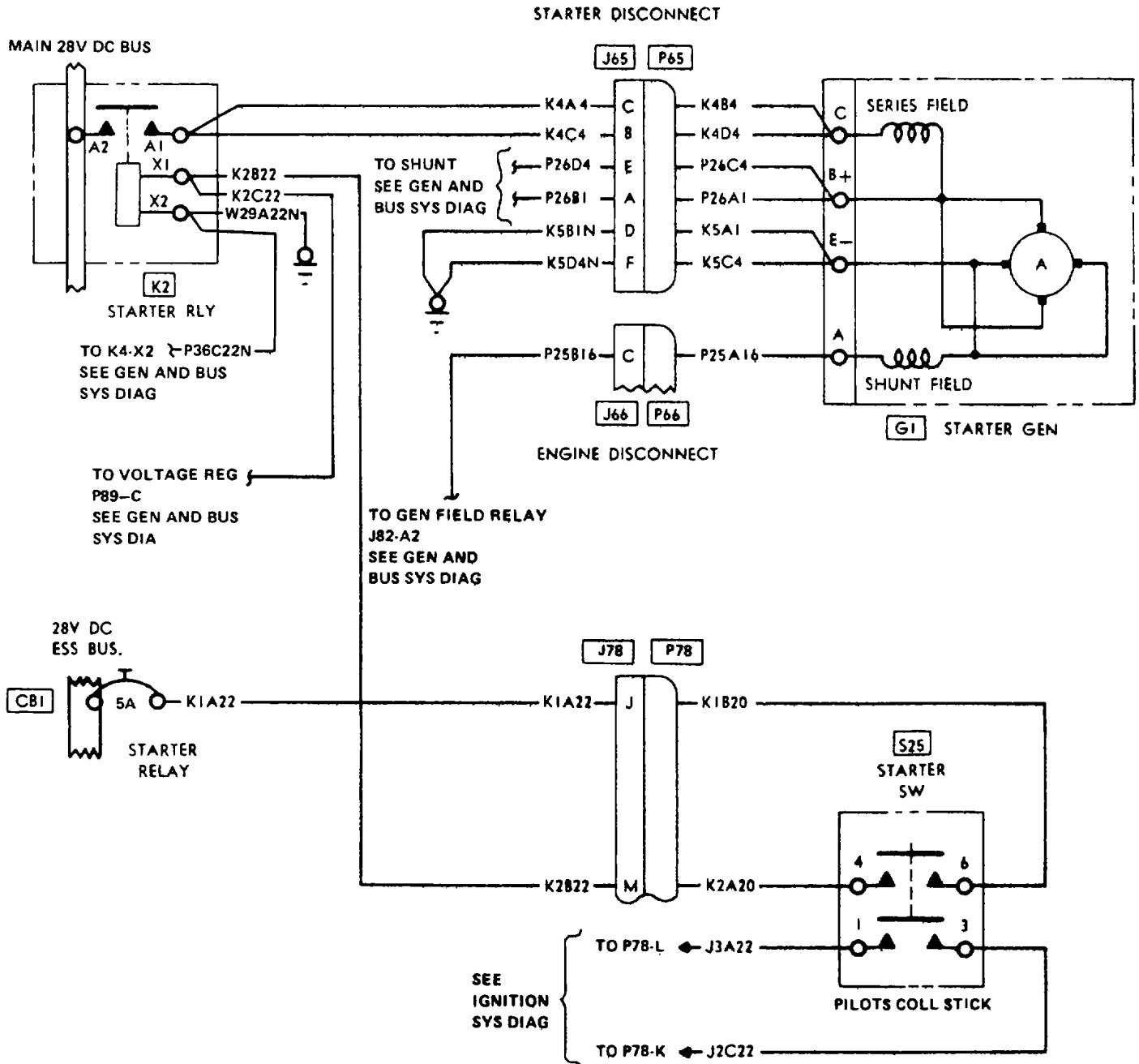
Figure F-28. Rpm test set schematic diagram

Change 4 F-147/ (F-148 blank)



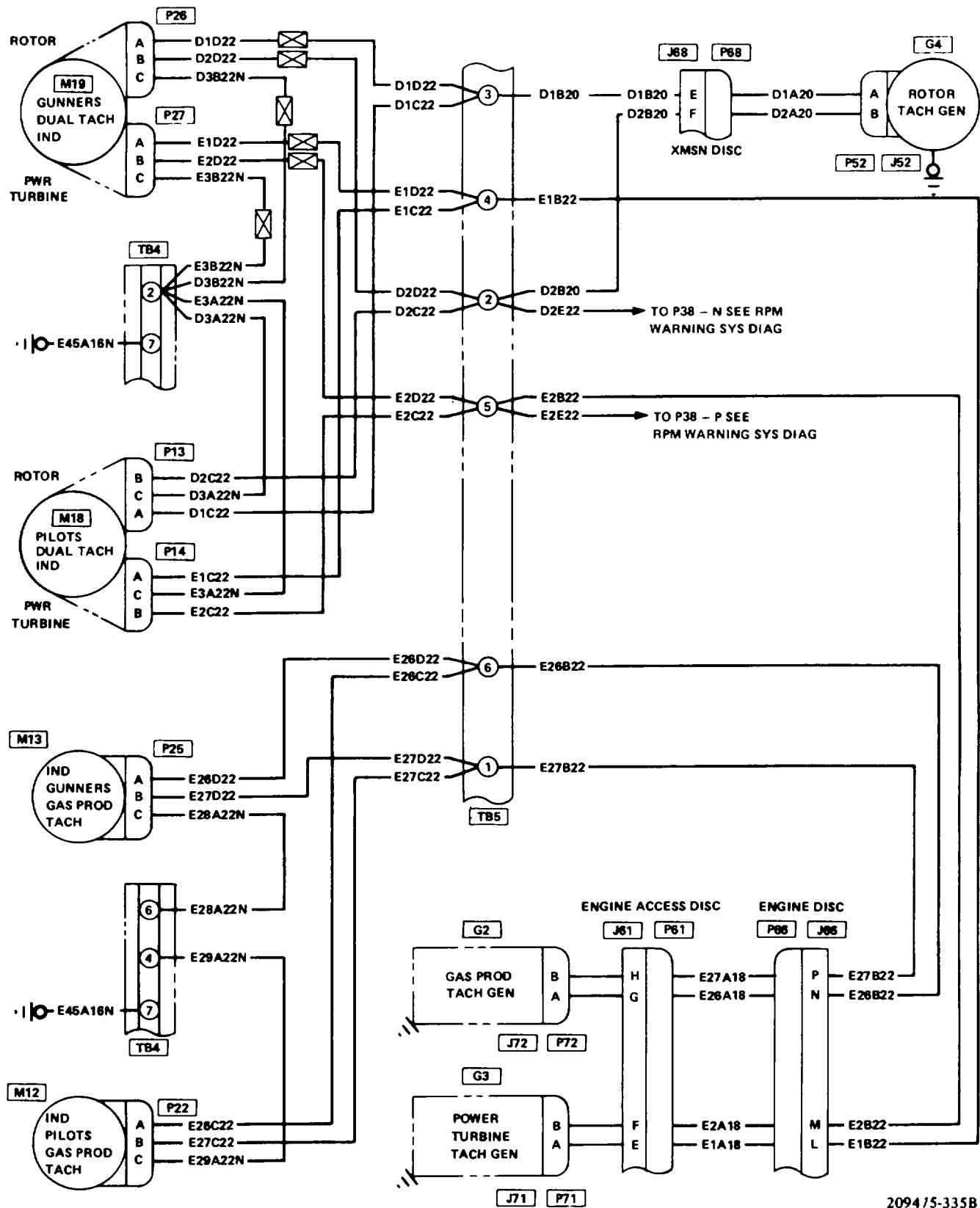
209475-345C

Figure F-29. Searchlight and Skid landing Light Systems



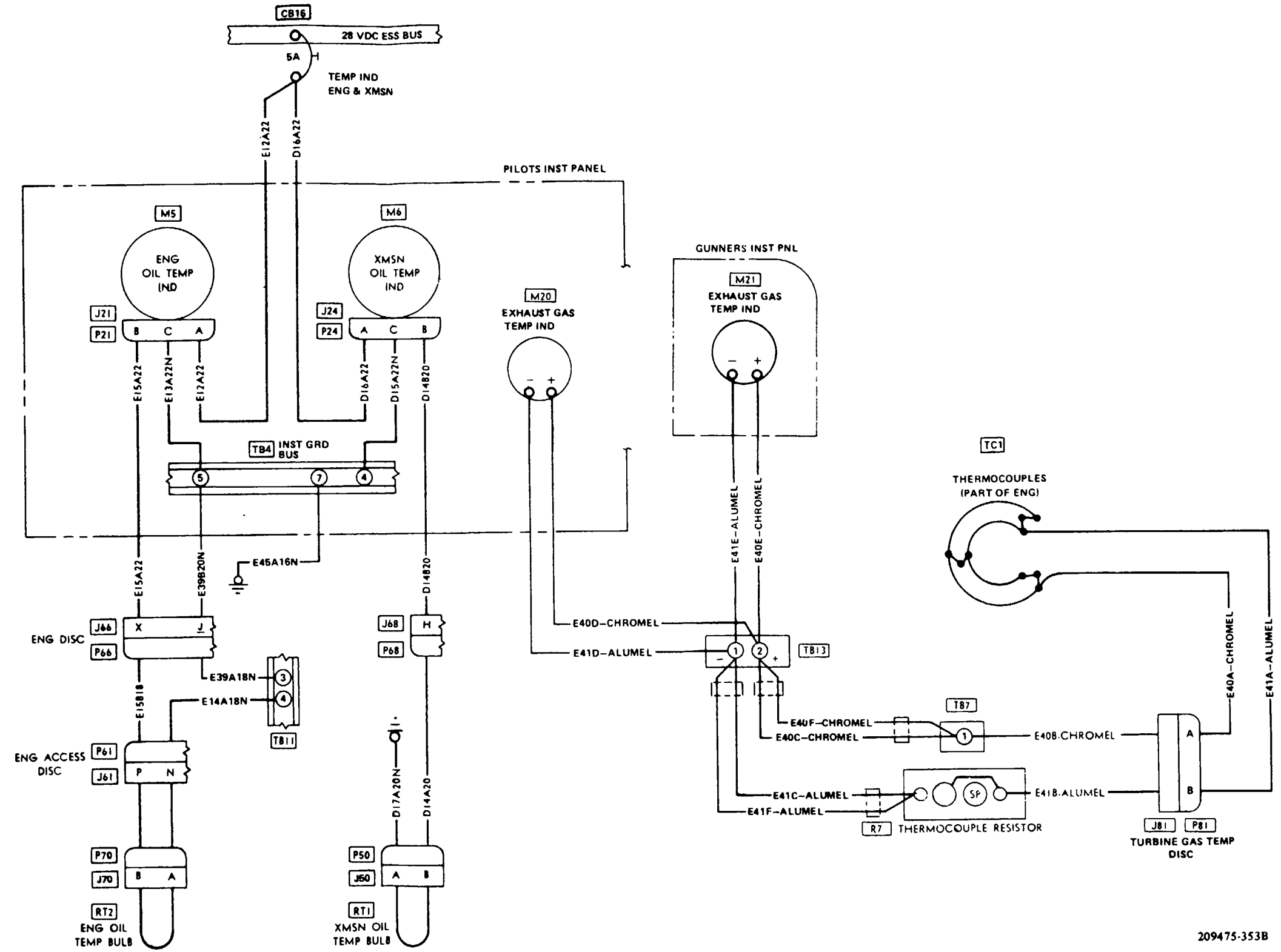
209475-352

Figure F-30. Starter system wiring diagram



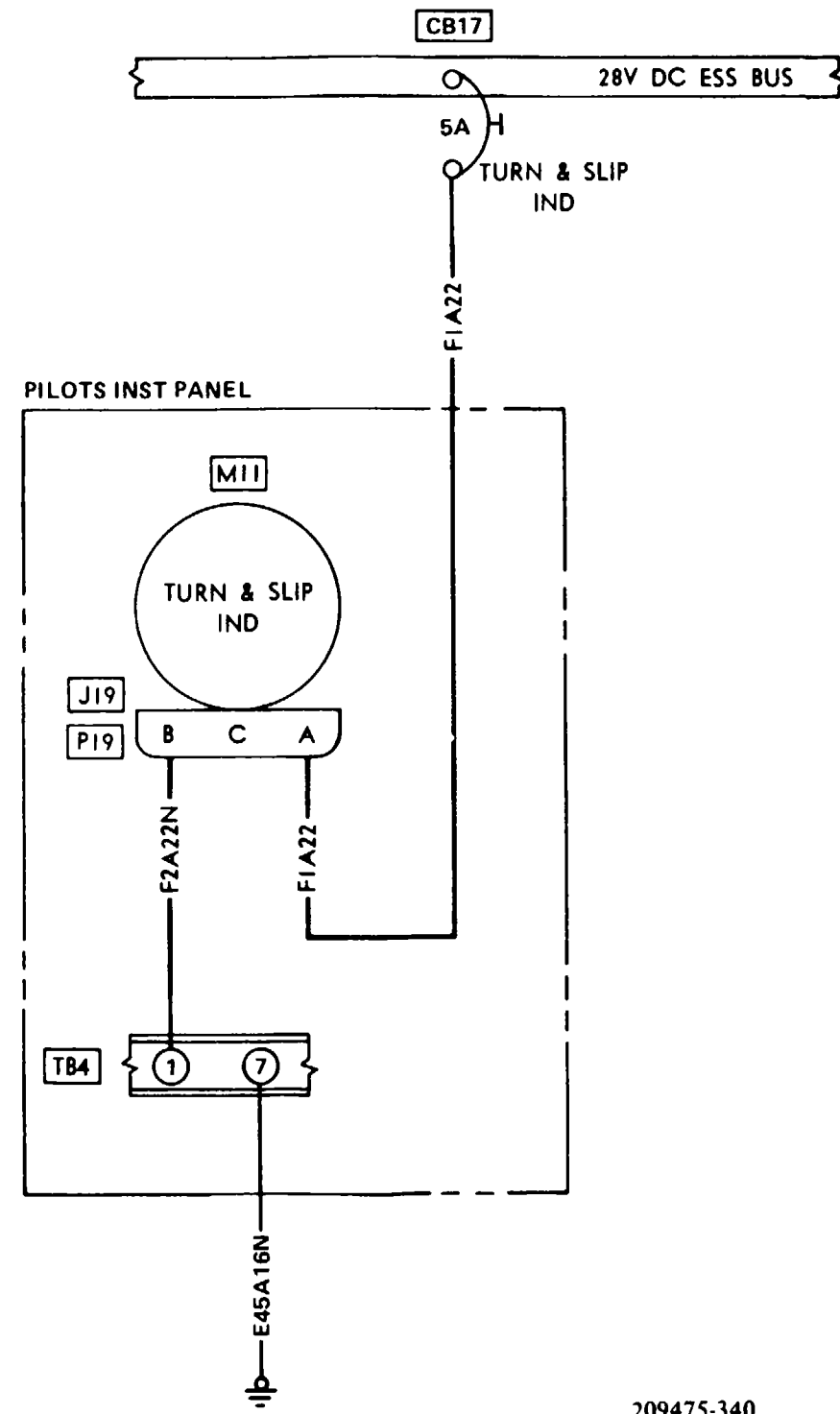
209475-335B

Figure F-31. Tachometer indicating systems wiring diagram



209475-353B

Figure F-32. Temperature indicating systems wiring diagram
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