

TECHNICAL MANUAL
AVIATION UNIT AND INTERMEDIATE
TROUBLESHOOTING MANUAL
FOR
ARMY MODEL
AH-64A HELICOPTER
(NSN 1520-01-106-9519) (EIC: RHA)

CHAPTER 9 ELECTRICAL SYSTEM

SUPERSEDURE NOTICE: This manual supersedes TM 55-1520-238-T-2, dated 15 DECEMBER 1985, including all changes.

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

HEADQUARTERS, DEPARTMENT OF THE ARMY
30 June 1992

CHANGE
NO. 10



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

TECHNICAL MANUAL
AVIATION UNIT AND INTERMEDIATE
TROUBLESHOOTING MANUAL
FOR
ARMY MODEL AH-64A HELICOPTER
NSN: (1520-01-106-9519) EIC: (RHA)

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

OZONE DEPLETING CHEMICAL INFORMATION

This document has been reviewed for the presence of Class I Ozone depleting chemicals. As of Change 7 dated 27 February 1998, all references to Class I Ozone depleting chemicals have been removed from this document by substitution with chemicals that do not cause atmospheric Ozone depletion.

TM 1-1520-238-T-6, 30 June 1992, is changed as follows:

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

Remove pages	Insert pages
A and B	A and B
i and ii	i and ii
9-197 and 9-198	9-197 and 9-198
9-319 and 9-320	9-319 and 9-320
9-657 and 9-658	9-657 and 9-658

2. Retain this sheet in front of manual for reference purposes.

By Order of the Secretary of the Army:

Official:

JOEL B. HUDSON
*Administrative Assistant to the
Secretary of the Army*
0201611

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

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CHANGE }
NO. 9 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 25 May 2001

TECHNICAL MANUAL
AVIATION UNIT AND INTERMEDIATE
TROUBLESHOOTING MANUAL
FOR
ARMY MODEL
AH-64A HELICOPTER
(NSN 1520-01-106-9519) (EIC: RHA)

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

Remove pages

Insert pages

A and B
9-173 and 9-174

A and B
9-173 and 9-174

2. Retain this sheet in front of manual for reference purposes.

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*Administrative Assistant to the
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ERIC K. SHINSEKI
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CHANGE }
NO. 8 }

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WASHINGTON, D.C., 3 May 2000

TECHNICAL MANUAL
AVIATION UNIT AND INTERMEDIATE
TROUBLESHOOTING MANUAL
FOR
ARMY MODEL
AH-64A HELICOPTER
(NSN 1520-01-106-9519) (EIC: RHA)

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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

9-161 through 9-166

9-167 through 9-170
9-179 and 9-180
9-189 through 9-194
9-205 and 9-206
9-227 and 9-228
9-235 and 9-236
9-255 and 9-256
9-469 and 9-470

Insert pages

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9-161 through 9-166
9-166.1 and 9-166.2
(9-167 blank)/9-168 through 9-170
9-179 and 9-180
9-189 through 9-194
9-205 and 9-206
9-227 and 9-228
9-235 and 9-236
9-255 and 9-256
9-469 and 9-470

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By Order of the Secretary of the Army:

Official:



JOEL B. HUDSON
*Administrative Assistant to the
Secretary of the Army*

0007002

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

DISTRIBUTION:

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CHANGE }
NO. 7 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 27 February 1998

TECHNICAL MANUAL
AVIATION UNIT AND INTERMEDIATE
TROUBLESHOOTING MANUAL
FOR
ARMY MODEL
AH-64A HELICOPTER
(NSN 1520-01-106-9519) (EIC: RHA)

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

TM 1-1520-238-T-6, dated 30 June 1992, is changed as follows:

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

Remove pages

iii and iv
9-45 and 9-46
9-375 and 9-376
9-485 through 9-492

Insert pages

iii and iv
9-45 and 9-46
9-375 and 9-376
9-485 through 9-492
9-502.1/(9-502.2 blank)

2. Retain this sheet in front of manual for reference purposes.

By Order of the Secretary of the Army:

Official:



JOEL B. HUDSON
*Administrative Assistant to the
Secretary of the Army*

04809

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

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CHANGE }
NO. 6 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 19 December 1997

TECHNICAL MANUAL
AVIATION UNIT AND INTERMEDIATE
TROUBLESHOOTING MANUAL
FOR
ARMY MODEL
AH-64A HELICOPTER
NSN: (1520-01-106-9519) (EIC: RHA)

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TM 1-1520-238-T-6, dated 30 June 1992, is changed as follows:

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

Remove pages	Insert pages
a and b i and ii	a and b i and ii

2. Retain this sheet in front of manual for reference purposes.

By Order of the Secretary of the Army:

Official:



JOEL B. HUDSON

*Administrative Assistant to the
Secretary of the Army*

04556

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

DISTRIBUTION:

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CHANGE }
NO. 5 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 30 September 1996

TECHNICAL MANUAL
AVIATION UNIT AND INTERMEDIATE
TROUBLESHOOTING MANUAL
FOR
ARMY MODEL
AH-64A HELICOPTER
(NSN 1520-01-106-9519) (EIC: RHA)

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TM 1-1520-238-T-6, dated 30 June 1992, is changed as follows:

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

Remove pages	Insert pages
i through iv	i through iv
9-31 and 9-32	9-31 and 9-32
9-45 through 9-48	9-45 through 9-48
9-59 and 9-60	9-59 and 9-60
9-67 and 9-68	9-67 and 9-68
9-83 and 9-84	9-83 and 9-84
9-223 and 9-224	9-223 and 9-224
9-231 and 9-232	9-231 and 9-232
9-237 through 9-240	9-237 through 9-240
9-257 and 9-258	9-257 and 9-258
9-261 and 9-262	9-261 and 9-262
9-325 and 9-326	9-325 and 9-326
9-351 and 9-352	9-351 and 9-352
9-375 and 9-376	9-375 and 9-376
9-383 and 9-384	9-383 and 9-384
9-485 and 9-486	9-485 and 9-486
9-503 through 9-510	9-503 through 9-510
—	9-524.1 and 9-524.2
9-529 and 9-530	9-529 and 9-530
9-553 and 9-554	9-553 and 9-554
9-581 and 9-582	9-581 and 9-582
9-649 through 9-652	9-649 through 9-652
9-659 and 9-660	9-659 and 9-660
9-687 through 9-690	9-687 through (9-689 blank)/9-690
9-705 and 9-706	9-705 and 9-706

2. Retain this sheet in front of manual for reference purposes.

By Order of the Secretary of the Army:

Official:



JOEL B. HUDSON
*Administrative Assistant to the
Secretary of the Army*
02596

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

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CHANGE }
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AVIATION UNIT AND INTERMEDIATE
TROUBLESHOOTING MANUAL
FOR
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AH-64A HELICOPTER
(NSN 1520-01-106-9519) (EIC: RHA)

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Remove pages

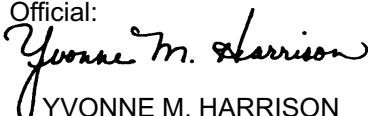
iii and iv
9-91 and 9-92
9-233 and 9-234
9-635 through 9-646
9-653 through 9-656

Insert pages

iii and iv
9-91 and 9-92
9-233 and 9-234
9-635 through 9-646
9-653 through 9-656
9-664.1 and 9-664.2

2. Retain this sheet in front of manual for reference purposes.

By Order of the Secretary of the Army:

Official:

YVONNE M. HARRISON
Administrative Assistant to the
Secretary of the Army
01254

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

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CHANGE }
NO. 3 }

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DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 28 December 1994

AVIATION UNIT AND INTERMEDIATE
TROUBLESHOOTING MANUAL
FOR
ARMY MODEL
AH-64A HELICOPTER
(NSN 1520-01-106-9519) (EIC: RHA)

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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

9-207 and 9-208
9-243 and 9-244
9-439 through 9-442
9-737 through 9-740
9-747 through 9-754

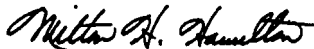
Insert pages

9-207 and 9-208
9-243 and 9-244
9-439 through 9-442
9-737 through 9-740
9-747 through 9-754

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By Order of the Secretary of the Army:

Official:



MILTON H. HAMILTON
*Administrative Assistant to the
Secretary of the Army*
07873

GORDON R. SULLIVAN
*General, United States Army
Chief of Staff*

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CHANGE }
NO. 2 }

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WASHINGTON, D.C., 31 August 1993

Aviation Unit and Intermediate
Troubleshooting Manual
For
ARMY MODEL
AH-64A HELICOPTER
(NSN 1520-01-106-9519) (EIC: RHA)

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

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Remove pages

iii and iv
9-325 and 9-326
9-647 and 9-648
9-651 through 9-654
9-689 and 9-690
9-695 and 9-696

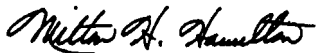
Insert pages

iii and iv
9-325 and 9-326
9-647 and 9-648
9-651 through 9-654
9-689 and 9-690
9-695 and 9-696

2. Retain this sheet in front of manual for reference purposes.

By Order of the Secretary of the Army:

Official:



MILTON H. HAMILTON
*Administrative Assistant to the
Secretary of the Army*
05327

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CHANGE }
NO. 1 }

HEADQUARTERS
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WASHINGTON, D.C., 15 January 1993

Aviation Unit and Intermediate
Troubleshooting Manual

AH-64A HELICOPTER

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

TM 1-1520-238-T-6 dated 30 April 1992 is changed as follows:

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Remove pages

iii and iv
v/(vi blank)
9-265 and 9-266
9-371 through 9-374
9-491 and 9-492
9-555 and 9-556
9-691 and 9-692
9-695 through 9-698
9-747 through 9-752

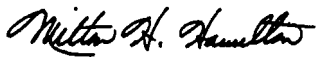
Insert pages

iii and iv
v/(vi blank)
9-265 and 9-266
9-371 through 9-374
9-491 and 9-492
9-555 and 9-556
9-691 and 9-692
9-695 through 9-698
9-747 through 9-752

2. Retain this sheet in front of manual for reference purposes.

By Order of the Secretary of the Army:

Official:



MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
03466

GORDON R. SULLIVAN
General, United States Army
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DISTRIBUTION:

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The WARNINGS on these pages are to notify you of operating or maintenance procedures, practices or conditions, which, if not strictly observed, could result in long term health hazards, injury or death to personnel. If injury occurs, seek medical aid immediately. These WARNINGS must be obeyed by all personnel using this volume.

WARNING**NOISE**

Personnel in the area of jet engine operation will wear approved ear protection to protect their hearing.

WARNING**ELECTRICAL POWER**

- Voltages used may cause arcing. Remove rings, watches, and other jewelry which may cause a shock/burn hazard.
- Voltages used may cause severe shock or death on contact. Use caution to avoid contact with energized components.
- Turn off power before detaching or attaching wires and connectors. Failure to do so could result in death or serious injury.
- When opening a circuit breaker during system checks, tag circuit breaker to prevent unforeseen closing, which may cause injury or death to personnel.
- For artificial respiration, refer to FM 21-11.

WARNING**PITOT TUBES**

Do not touch Pitot tubes when heating switch is set to on. Heaters in these tubes can cause serious burns. If burns occur, obtain medical help.

WARNING**SOLVENTS AND CHEMICALS (INCLUDING HYDRAULIC FLUID)**

Solvents and chemicals, including hydraulic fluid, are flammable and toxic to eyes, skin, and respiratory tract. Skin and eye protection is required. Use solvents and chemicals only with adequate ventilation. If solvents or chemicals touch the eyes or skin, flush with water and seek medical aid immediately.

WARNING

HYDRAULIC PRESSURE

Hydraulic system operates at 3000 psi. Do not perform maintenance on system until hydraulic pressure is removed from helicopter. Be certain that trapped hydraulic pressure is released before loosening any connections. Failure to do so could result in death or serious injury. If injury occurs, get medical aid immediately.

WARNING

PRESSURIZED AIR

Remove pressurized air before removing electrical power to avoid pressurized lines in the nitrogen inerting system. The sudden release of pressurized air can injure personnel. If injury occurs, get medical aid immediately.

WARNING

CONTROL MOVEMENTS

Maintenance personnel must be warned verbally prior to moving the collective or cyclic stick. Any control activated can result in sudden blade movement that can sever or crush fingers or hands.

INSERT LATEST CHANGED PAGES: DESTROY SUPERSEDED PAGES.

LIST OF EFFECTIVE PAGES

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

Date of issue for original and change pages are:

Original 0 30 June 1992	Change 6 19 December 1997
Change 1 15 January 1993	Change 7 27 February 1998
Change 2 31 August 1993	Change 8 3 May 2000
Change 3 28 December 1994	Change 9 25 May 2001
Change 4 1 February 1996	Change 10 15 February 2002
Change 5 30 September 1996	

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 808, CONSISTING OF THE FOLLOWING:

Page No.	*Change No.	Page No.	*Change No.
Cover	0	9-194 – 9-197	0
Blank	0	9-198	10
a	6	9-199 – 9-205	0
b	0	9-206	8
A – B	10	9-207	0
i	10	9-208	3
ii	0	9-209 – 9-222	0
iii	1	9-223 – 9-224	5
iv	7	9-225 – 9-227	0
v	1	9-228	8
vi Blank	1	9-229 – 9-231	0
9-1 – 9-4	0	9-232	5
9-5 – 9-31	0	9-233	4
9-32	5	9-234 – 9-235	0
9-33 – 9-44	0	9-236	8
9-45	5	9-237 – 9-239	5
9-46	7	9-240 – 9-243	0
9-47	0	9-244	3
9-48	5	9-245 – 9-255	0
9-49 – 9-59	0	9-256	8
9-60	5	9-257	5
9-61 – 9-66	0	9-258 – 9-260	0
9-67 – 9-82	5	9-261	5
9-83 – 9-84	5	9-262 – 9-264	0
9-85 – 9-91	0	9-265	1
9-92	4	9-266 – 9-319	0
9-93 – 9-160	0	9-320	10
9-161 – 9-166	8	9-321 – 9-324	0
9-166.1 – 9-166.2 Added	8	9-325	2
9-167 Blank Added	8	9-326	5
9-168 – 9-169	8	9-327 – 9-350	0
9-170 – 9-172	0	9-351	5
9-173	9	9-352 – 9-371	0
9-174 – 7-178	0	9-372 – 9-373	1
9-179	8	9-374	0
9-180 – 9-188	0	9-375	7
9-189	8	9-376 – 9-383	0
9-190	0	9-384	5
9-191	8	9-385 – 9-439	0
9-192	0	9-440 – 9-442	3
9-193	8	9-443 – 9-468	0

*Zero in this column indicates an original page.

INSERT LATEST CHANGED PAGES: DESTROY SUPERSEDED PAGES.

LIST OF EFFECTIVE PAGES

Page No.	*Change No.	Page No.	*Change No.
9-469	8	9-655	4
9-470 – 9-485	0	9-656	0
9-486 – 9-491	7	9-657	10
9-492	1	9-658	0
9-493 – 9-502	0	9-659 – 9-660	5
9-502.1 Added	7	9-661 – 9-664	0
9-502.2 Blank	7	9-664.1 – 9-664.2 Added	2
9-503	0	9-665 – 9-687	0
9-504 – 9-509	5	9-688	5
9-510 – 9-524	0	9-689 Blank	5
9-524.1 – 9-524.2 Added	5	9-690	5
9-525 – 9-529	0	9-691	0
9-530	5	9-692	1
9-531 – 9-553	0	9-693 – 9-695	0
9-554	5	9-696	2
9-555	1	9-697	1
9-556 – 9-580	0	9-698 – 9-704	0
9-581	5	9-705	5
9-582 – 9-635	0	9-706 – 9-737	0
9-636 – 9-643	4	9-738	3
9-644 – 9-645	0	9-739	3
9-646	4	9-740 – 7-746	0
9-647	2	9-747	3
9-648 – 9-649	0	9-748 – 9-749	0
9-650 – 9-652	5	9-750 – 9-753	3
9-653	4	9-754 – 9-786	0
9-654	0		

*Zero in this column indicates an original page.

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 30 June 1992

TECHNICAL MANUAL
AVIATION UNIT AND INTERMEDIATE
TROUBLESHOOTING MANUAL
FOR
ARMY MODEL
AH-64A HELICOPTER
NSN: (1520-01-106-9519) EIC: (RHA)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to: Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA-NP, Redstone Arsenal, AL 35898-5230. A reply will be furnished to you.

You may also send in your comments electronically to our e-mail address: 2028@redstone.army.mil or by fax 205-842-6546/DSN 788-6546. Instructions for sending an electronic 2028 may be found at the end of this manual immediately preceding the hard copy 2028.

OZONE DEPLETING CHEMICAL INFORMATION:

This document has been reviewed for the presence of Class I Ozone depleting chemicals. As of Change 7 dated 27 February 1998, all references to Class I Ozone depleting chemicals have been removed from this document by substitution with chemicals that do not cause atmospheric Ozone depletion.

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Section III	Troubleshooting Procedures	9-109

* **SUPERSEDURE NOTICE:** This manual supersedes TM 55-1520-238-T-6, dated 15 DECEMBER 1985, including all changes.

HOW TO USE THIS VOLUME

OVERVIEW

If you can't find information, you can't do the job. Learn how to use the Integrated Troubleshooting Manual System and this volume. Refer to TM 1-1520-238-T-2 for instructions on how to use the troubleshooting manual system and TM 1-1520-238-T-4 for instructions on how to use this volume.

USING AH-64A HELICOPTER EFFECTIVITY CODES


Helicopter effectivity codes designate differences between helicopters by helicopter serial numbers. These codes consist of three letters representing various helicopter serial number blocks. They are used throughout this volume as necessary to aid the helicopter troubleshooting effort.

The codes are used to designate serial number block differences as follows:

- When used within narrative text and fault isolation procedures (FIPs), effectivity codes appear within parentheses.

For Example: Narrative text and FIPs (AAA)

- When used inside wiring interconnect diagrams, effectivity codes appear within triangular borders and are placed on the line which represents that particular helicopter's configuration.

For Example: Wiring interconnect diagrams 

This volume uses these effectivity codes and corresponding helicopter serial numbers for reference.

To use the helicopter effectivity codes, note the helicopter serial number on the left side of the fuselage directly below the CPG window. Use this serial number to determine which procedure or path in a wiring interconnect diagram or FIP to use.

The effectivity codes and helicopter serial number blocks applicable to this volume are as follows:

<u>Effectivity Code</u>	<u>Helicopter Serial No.</u>
AAA	82-23355 thru 82-23365
AAB	82-23355 thru 83-23798
AAC	82-23355 thru 83-23814
AAD	85-25424 and subsequent
AAE	82-23355 thru 84-24231
AAF	84-24216 and subsequent
AAG	82-23355 thru 84-24289
AAH	82-23355 thru 85-25398
AAJ	85-25351 and subsequent
AAK	82-23355 thru 85-25488
AAL	88-0215 and subsequent

HOW TO USE THIS VOLUME (cont)

<u>Effectivity Code</u>	<u>Helicopter Serial No.</u>
AAM	85-25465 and subsequent
AAN	83-23787 thru 85-25415
AAP	82-23355 thru 88-0214
AAQ	82-23355 thru 84-24311
AAR	82-23355 thru 84-24239
AAS	84-24240 and subsequent
AAT	82-23355 thru 83-23804
AAU	83-23787 and subsequent
AAV	83-23805 and subsequent
AAW	83-23799 and subsequent
AAX	83-23799 thru 84-24245
AAZ	83-23799 thru 85-25470
AAZ	83-23815 and subsequent
ABA	84-24200 and subsequent
ABB	84-24246 and subsequent
ABC	84-24290 and subsequent
ABD	82-23355 thru 85-25415
ABE	82-23355 thru 84-24295
ABF	84-24296 and subsequent
ABG	85-25399 and subsequent
ABH	82-23355 thru 84-24245
ABJ	85-25447 and subsequent
ABK	82-23355 thru 85-24446
ABL	82-23355 thru 89-0215
ABM	84-24290 thru 88-0199
ABN	89-0192 and subsequent
ABP	85-25471 and subsequent
ABQ	86-8940 and subsequent
ABR	82-23355 thru 84-24232
ABS	84-24233 and subsequent
ABT	82-23355 thru 83-23816
ABU	83-23817 thru 85-25415
ABV	84-24246 thru 85-25398
ABW	82-23355 thru 83-23795
ABX	83-23796 and subsequent

HOW TO USE THIS VOLUME (cont)

Effectivity Code**Helicopter Serial No.**

ABY	With T700-GE 701 engines
ABZ	With T700-GE 701C engines
ACA	82-23355 thru 88-0199
ACB	88-0200 and subsequent
ACC	82-23355 thru 83-23834
ACD	85-25416 and subsequent
ACE	82-23355 thru 86-9011
ACF	82-23355 thru 88-0284
ACG	89-0192 and subsequent
ACH	82-23355 thru 85-25423
ACJ	82-23355 thru 90-0290, 90-0292 thru 90-0301 (Before MWO 1-1520-238-50-07)
ACK	82-23355 thru 90-0290, 90-0292 thru 90-0301 (After MWO 1-1520-238-50-07) 90-0291, 90-0302 and subsequent
ACL	82-23355 thru 83-23814
ACM	83-23815 and subsequent
ACN	85-25471 thru 90-0448 (Before MWO 1-1520-238-50-37)
ACP	85-25471 thru 90-0448 (After MWO 1-1520-238-50-37) 90-0449 and subsequent
ACQ	82-23355 thru 90-0448 (Before MWO 1-1520-238-50-36)
ACR	82-23355 thru 90-0448 (After MWO 1-1520-238-50-36) 90-0449 and subsequent
ACS	82-23355 thru 90-0437
ACT	90-0438 and subsequent
ACU	82-23355 thru 90-0436
ACV	89-0192 thru 90-0434 with T700-GE-701C engines (Before MWO 1-1520-238-50-38)
ACW	89-0192 thru 90-0434 with T700-GE-701C engines (After MWO 1-1520-238-50-38) 90-0435 and subsequent with T700-GE-701C engines
ADA	Before MWO 1-1520-238-40
ADB	After MWO 1-1520-238-40
ADC	Before MWO 1-1520-238-50-49
ADD	After MWO 1-1520-238-50-49
ADP	After MWO 1-1520-238-50-50

HOW TO USE THIS VOLUME (cont)

USING THE ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (ECLC) INDEX

The ECLC index will help you find electrical components and their connectors on the helicopter during troubleshooting. The ECLC is located at the beginning of the troubleshooting procedures of each chapter (when applicable). This index is a list of connectors and applicable wiring harnesses which are illustrated by component location. Component locations are shown from the helicopter's forward sections to its aft sections by horizontal and vertical grid numbers. Connectors are listed numerically in the **FROM COLUMN Connector Ref Des** columns of the index. Every connector is referenced to a grid area within the illustrations.

EXAMPLE OF ECLC INDEX

FROM COLUMN		TO COLUMN		Grid Area	Access
Connector Ref Des	Component/Harness	Connector Ref Des	Component/Harness		
P1	A76/W605	J1	A402	8B	PLT STATION
P402	W170	J402	W211	13E	R295 DOOR

Use the index to find connectors on the aircraft by first locating the connector reference designator number in the **FROM COLUMN Connector Ref Des** column of the index. Then, cross-reference the **FROM COLUMN Connector Ref Des** column with the following:

- **FROM COLUMN Component/Harness** column to locate the component or wire harness number.
- **TO COLUMN Connector Ref Des** column to locate the mating connector number.
- **TO COLUMN Component/Harness** column to locate the mating connector or wire harness number.
- **Grid Area** column to find the grid zone (within the illustration) depicting the location of the connector on the aircraft.
- **Access** column to find where access can be obtained (TM 55-1520-238-23).

For example, to locate connector P1 on the aircraft find connector P1 in the **FROM COLUMN Connector Ref Des** column, then refer to the **FROM COLUMN Component/Harness** column. This column shows that P1 is part of component/harness A76/W605. The **TO COLUMN Connector Ref Des** column shows that P1 connects to J1 on component A402 (**TO COLUMN Component/Harness** column). The **Grid Area** column indicates that P1 is depicted at illustration grid zone 8B, and that **Access** to the connector is obtained through the PLT STATION.

CHAPTER 9 ELECTRICAL SYSTEM

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SECTION I. Equipment Description and Data

9-1. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

9-1

a. Characteristics.

(1) The ac electrical power generation system generates and distributes ac electrical power required to operate the helicopter systems. AC electrical power is supplied to two transformer/rectifiers (T/R) which produce 28 VDC for systems requiring dc power. The dc electrical power generation system rectifies 3-phase, 115/200 VAC, 400 hertz (Hz) power to provide 28 VDC to the helicopter circuits requiring dc voltage. Major components of the system consist of two T/Rs and a dc bus tie contactor. The battery supplies dc voltage for APU starting and emergency operation in case of total electrical system failure. The external power system allows external ac electrical power application for systems operation and/or checkout. The ground service utility receptacle provides aircraft ac and dc power for lights, hand tools, etc.

b. Capabilities and Features.

(1) **AC Electrical Power.** AC electrical power generation consists of two identical and redundant electrical power systems. The system generates 3-phase, 115/200 VAC, 400 Hz ac power at 35 Kilo-Volt Amperes (KVA). Either system is capable of supplying all electrical power requirements. If either system malfunctions, automatic switching ensures continued electrical operation. The system is monitored internally and electrically shuts down if an overvoltage, undervoltage, underfrequency (on ground only), or an overcurrent fault is detected.

(2) **DC Electrical Power.** Each T/R is capable of providing 28 VDC at 250 amperes. DC electrical power generation maintains output voltage limits of 25 to 29 VDC at loads of 10 to 250 amperes. Each T/R provides its own forced air cooling and radio noise suppression. In the event of an over temperature condition, which is normally due to failure of the cooling fan, a thermal sensor is activated. The thermal sensor completes a circuit to light the appropriate **HOT RECT** indicator on the pilot caution/warning panel. The dc bus tie contactor connects the output of the T/R to the emergency dc bus, dc bus 1, dc bus 2, and dc bus 3. The contactor connects dc busses 1 and 2 in the event one T/R is not operating and prevents paralleling of the T/R outputs.

(3) **External Power.** The external power system supplies 3-phase, 115/200 VAC, 400 Hz ac power to aircraft ac distribution points. All major components are line replaceable units (LRUs). The system monitors input external power for over/under voltage, over/under frequency, and phase sequence. If a fault is detected, the system electrically disconnects external power.

(4) **Battery and Battery Relay.** The battery is connected to the emergency dc bus when the battery relay is energized by 18 VDC or greater. The battery supplies 24 VDC and contains 19 individual removable cells of 1.25 volts per cell.

(5) **Battery Charger.** The battery charger completely recharges a discharged battery within 2 hours. Charging is stopped if battery temperature rises above $122^{\circ} \pm 5^{\circ} \text{ F}$ ($50^{\circ} \pm 3^{\circ} \text{ C}$) and resumes charging when the temperature drops below $115^{\circ} \pm 5^{\circ} \text{ F}$ ($46^{\circ} \pm 3^{\circ} \text{ C}$). Battery charging is stopped if an open or short circuit occurs in the battery temperature transducer circuitry. Battery charging is stopped or inhibited if the tenth cell voltage falls below or exceeds 45 to 60% of battery terminal voltage for more than 3 ± 0.6 minutes. Battery charging is stopped when external power is applied to the helicopter to prevent buildup of explosive gases.

(6) **Navigation Lights.** Navigation lights are arranged in the conventional configuration:

- Left side red.
- Right side green.
- Aft white.

(7) **Formation Lights.** Formation lights consist of four green lights. Light intensity is adjustable from dim to bright.

(8) **Anti-Collision Lights.** Anti-collision lights are day/night high-intensity strobe lights. The lights are omni directional and flash alternately at a rate of 35 times per minute.

(9) **Searchlight.** The searchlight is capable of extending up and down through an arc of 130° and rotating 360° left or right.

(10) **Maintenance Light.** The maintenance light can be attached at either of two points on the aircraft making it possible to perform maintenance in low visibility conditions anywhere on the aircraft.

(11) **Utility Light.** The pilot and CPG utility light is a standard hand-held light with a coil extension cord so that the light can be detached from its mount and shown around the cockpit. The light has built-in red and clear lenses. The pilot or CPG can select either lens at will.

(12) **Secondary Lights.** Secondary lights are standard 28 VDC aviation floodlight assemblies which provide emergency illumination of the pilot and CPG's instrument panels in case of instrument lighting failure.

(13) **Edge-Lights.** Edge-lights provide pilot and CPG station instrument and panel lighting as follows:

- Engine instruments.
- Flight instruments.
- All panel and console lighting.
- Caution/warning/advisory panels.
- All remote indicator lights.

(a) Control of the pilot and CPG edge-lights are divided into four channels:

- Channel 1 controls the lights on the right-hand instrument panels.
- Channel 2 controls the lights on the left-hand instrument panels.
- Channel 3 controls the lights on the pilot right-hand and center consoles and the CPG right-hand console.
- Channel 4 controls the lights on the left-hand consoles, circuit breaker panels, and collective stick grips.

(b) Pilot circuit breaker panel edge-lighting is controlled by a separate **ON/OFF** switch.

(14) Circuit Protection.

- (a) Pilot station ac essential bus 1 circuit protection includes 31 circuit breakers on the pilot circuit breaker panel. These circuit breakers provide thermal protection for the ac essential bus 1 circuit.
- (b) CPG station ac essential bus 1 circuit protection includes seven circuit breakers on CPG circuit breaker panel 1 and three circuit breakers on CPG circuit breaker panel 2. These circuit breakers provide thermal protection for the ac essential bus 1 circuits.
- (c) Pilot station ac essential bus 2 circuit protection includes seven circuit breakers on the pilot aft circuit breaker panel. These circuit breakers provide thermal protection for the ac essential bus 2 circuits.
- (d) CPG station ac essential bus 2 circuit protection includes four circuit breakers on CPG circuit breaker panel 1. These circuit breakers provide thermal protection for the ac essential bus 2 circuits.
- (e) Pilot station dc essential bus 1 circuit protection includes six circuit breakers on the pilot aft circuit breaker panel. These circuit breakers provide thermal protection for the dc essential bus circuits.
- (f) CPG station dc essential bus 1 circuit protection includes two circuit breakers on CPG circuit breaker panel 2. These circuit breakers provide thermal protection for the dc essential bus 1 circuits.
- (g) Pilot station dc essential bus 2 circuit protection includes 10 circuit breakers on the pilot circuit breaker panel. These circuit breakers provide thermal protection for the dc essential bus 2 circuits.
- (h) Pilot station dc essential bus 3 circuit protection includes 13 circuit breakers on the pilot circuit breaker panel. These circuit breakers provide thermal protection for the dc essential bus 3 circuits.
- (i) CPG station dc essential bus 3 circuit protection includes 10 circuit breakers on CPG circuit breaker panel 1 and one circuit breaker on CPG circuit breaker panel 2. These circuit breakers provide thermal protection for the dc essential bus 3 circuits.
- (j) Pilot station dc emergency bus circuit protection includes 36 circuit breakers on the pilot circuit breaker panel. These circuit breakers provide thermal protection for the dc emergency bus circuits.
- (k) CPG station dc emergency bus circuit protection includes five circuit breakers on CPG circuit breaker panel 1. These circuit breakers provide thermal protection for the dc emergency bus circuits.
- (l) Pilot station dc ground circuit protection includes two circuit breakers on the pilot circuit breaker panel. These circuit breakers provide thermal protection for the dc ground circuit protection system.
- (m) CPG station dc ground circuit protection includes five circuit breakers on CPG circuit breaker panel 1. These circuit breakers provide thermal protection for the dc ground circuit protection system.
- (n) The pilot circuit breaker edge-light panels provide edge-lighting for the pilot forward, center, and aft circuit breaker panels. The panels are controlled through multi-channel dimming controller channel 4.
- (o) The CPG circuit breaker edge-light panels provide edge-lighting for CPG circuit breaker panels 1 and 2. The panels are controlled through channel 4 of the multi-channel dimming controller.

9-1. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

9-1

(15) Caution/Warning.

(a) The pilot and CPG caution/warning system accepts discrete fault signals and alerts the pilot and CPG to hazardous conditions by lighting caution and/or warning indicators in the instrument panel. When a fault signal is received, the caution or warning indicator is lighted and flashes at 2 Hz while the **MASTER CAUTION** indicator on the master caution/warning panel simultaneously flashes at 5 Hz. Pressing the **MASTER CAUTION** indicator acknowledges the fault and turns the **MASTER CAUTION** indicator off which causes the caution or warning indicator to remain steady-on. When the fault condition is removed, the indicator turns off.

(b) The audio warning system provides audible hazard warning signals to the pilot and CPG headsets. Audio warning signals are generated when the following conditions occur:

- Engine out.
- Rotor low.
- Stabilator failure.

(16) **Squat Switch System.** The squat switch, a magnetic proximity switch located in the left-hand forward avionics bay (FAB), is mounted to the airframe and the target is mounted on the main landing gear (MLG). When the helicopter is on the ground the switch acts as a safety device for some systems while enabling fault detection capabilities for other systems.

9-2. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

9-2

a. **AC Electrical Power Generation System.** The ac electrical power generation system (fig. 9-1) consists of two identical ac generators, two generator control units (GCUs), and two ac contactors.

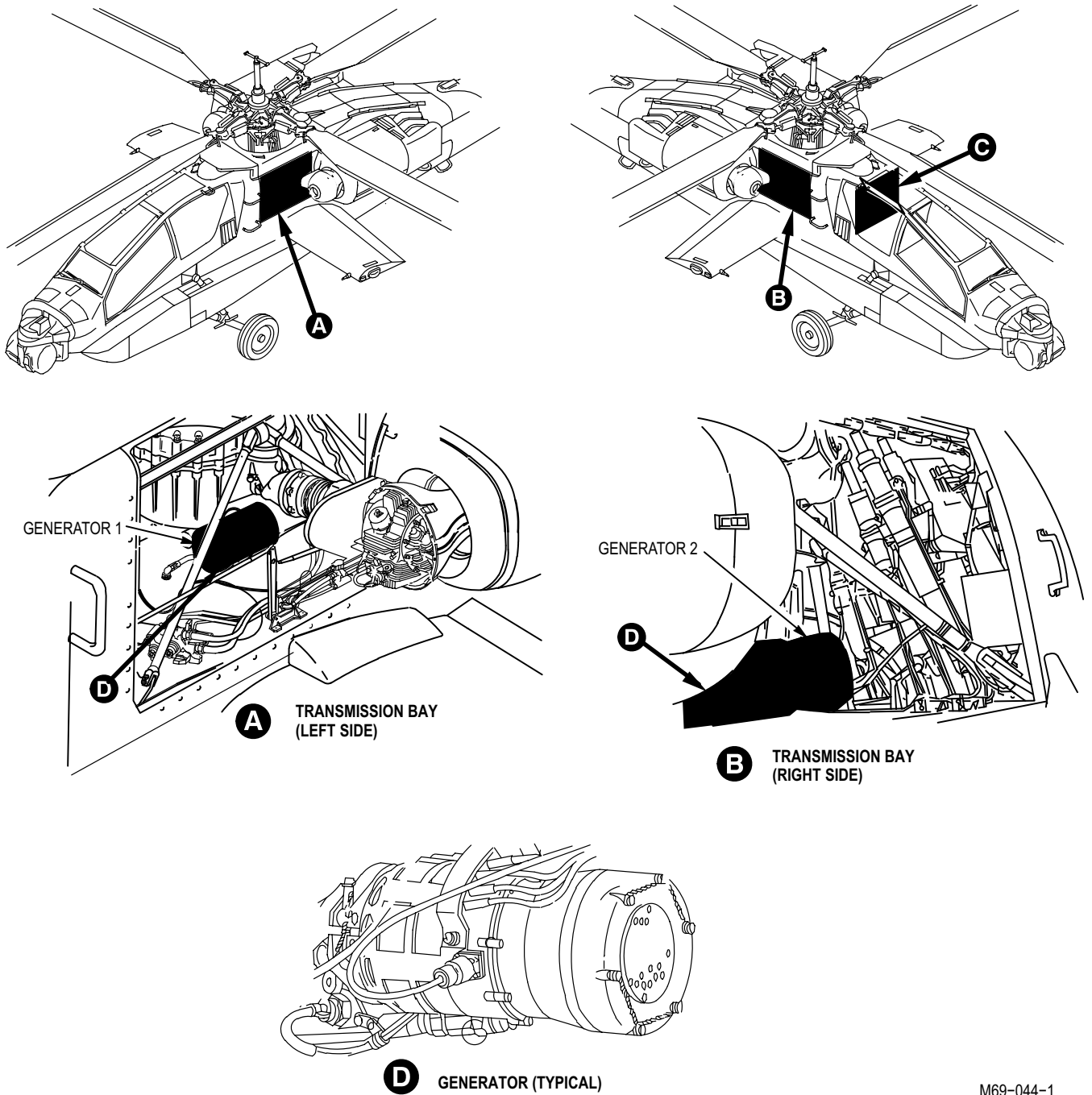
(1) **AC Generators 1 and 2.** Two ac generators, located in the main transmission bay, are mounted on and driven by the accessory section of the main transmission. Each ac generator is capable of producing all ac electrical power required by the aircraft. Two quick disconnect receptacles and four terminal studs are mounted on each generator for power and control connections. Each ac generator is self-excited, brushless, air-cooled with pre-lubricated bearings and is rated at 115/200 VAC, 400 Hz 35 KVA. Each ac generator weighs approximately 45 lbs.

b. **GCUs 1 and 2.** Two GCUs, located in the electrical power distribution box, control and protect the ac generators. Each GCU is a solid state LRU with a single quick disconnect receptacle which consists of five major circuits, two printed wiring boards, three hermetically sealed relays, and a base assembly enclosed in a metal case.

c. **Generator Contactors K1 and K2.** Two generator contactors, located behind the pilot in the electrical power distribution box, control connections between the ac generators and ac buses 1 and 2. Each generator contactor is a solid state LRU with nine terminal studs and one quick disconnect receptacle on the front face for power and control connections.

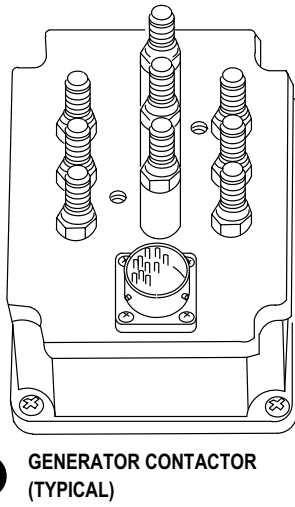
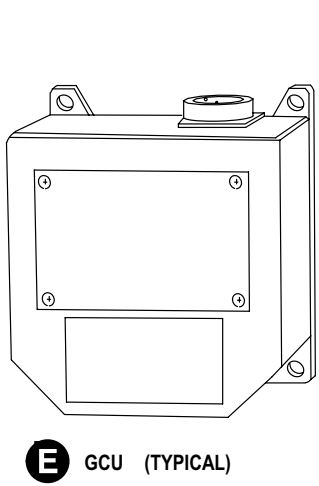
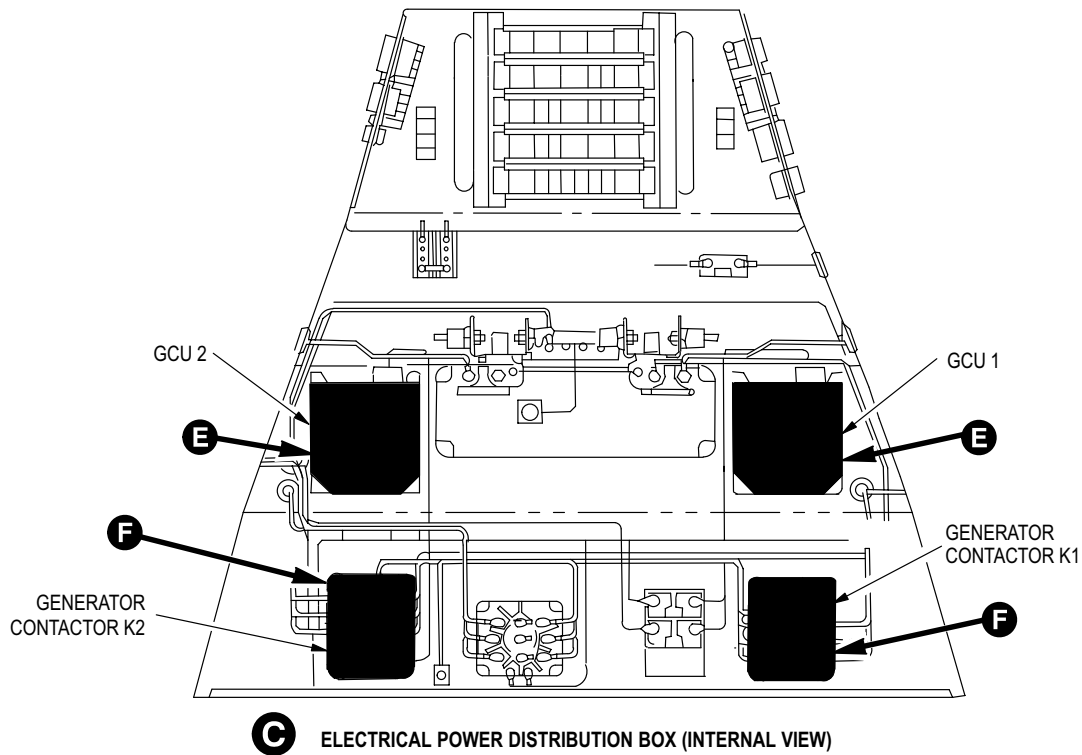
9-2. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

9-2



M69-044-1

Figure 9-1. AC Electrical Power Generation System Major Components Location (Sheet 1 of 2)



M69-044-2

Figure 9-1. AC Electrical Power Generation System Major Components Location (Sheet 2 of 2)

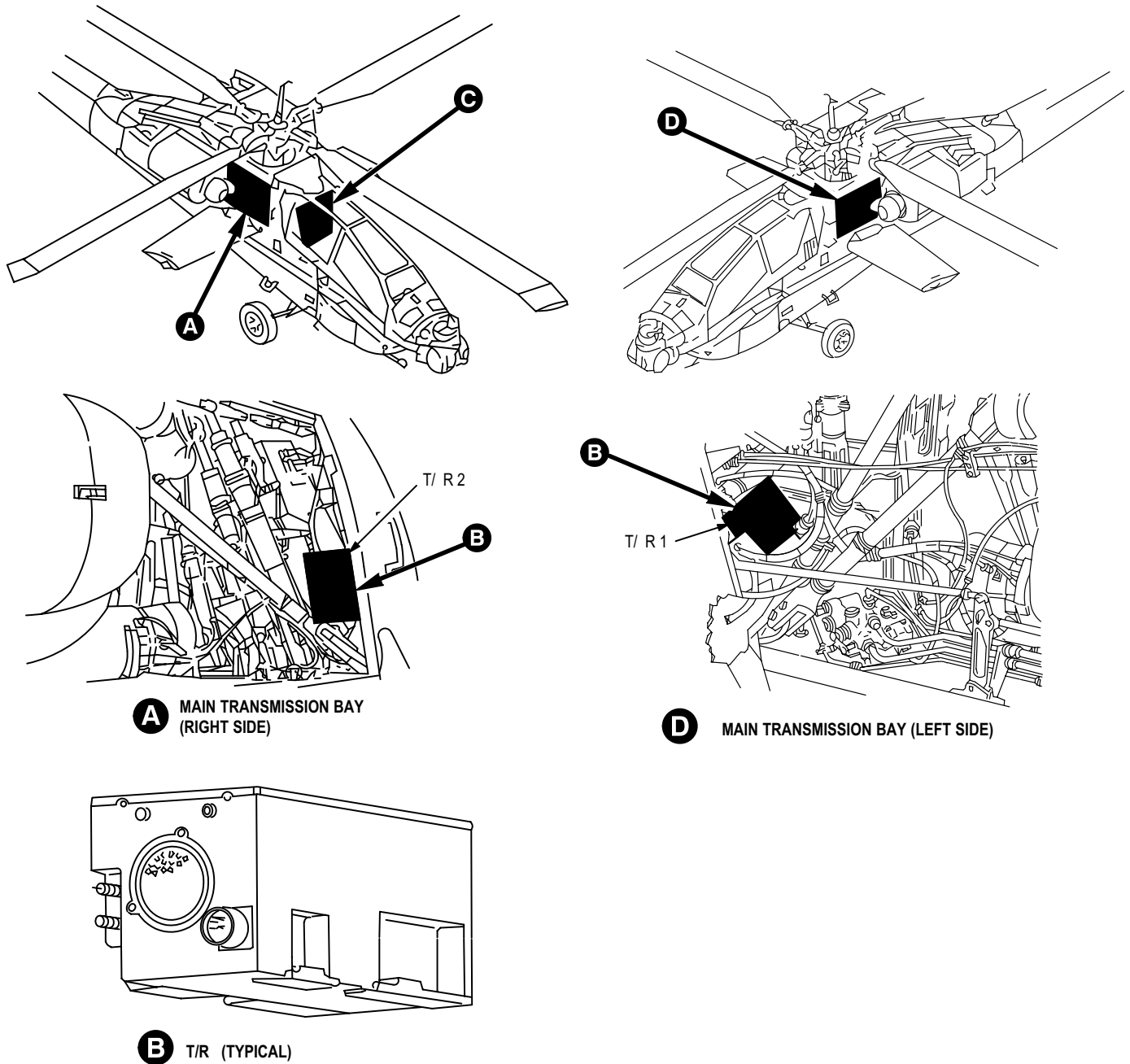
d. **DC Electrical Power Generation System.** The dc electrical power generation system (fig. 9-2) consists of T/R 1 and 2, and a dc bus tie contactor.

(1) **T/R.** T/R 1 is mounted in the forward left side of the main transmission bay. T/R 2 is mounted in the forward right side of the main transmission bay. Each T/R is a solid state LRU containing one electrical connector and two terminal studs for power and control connections.

9-2. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

9-2

(2) **DC Bus Tie Contactor.** The dc bus tie contactor, a solid state LRU located inside the electrical power distribution box, has four terminal studs and one electrical connector for power and control connections.



M69-068-1

Figure 9-2. DC Electrical Power Generation System Major Components Location (Sheet 1 of 2)

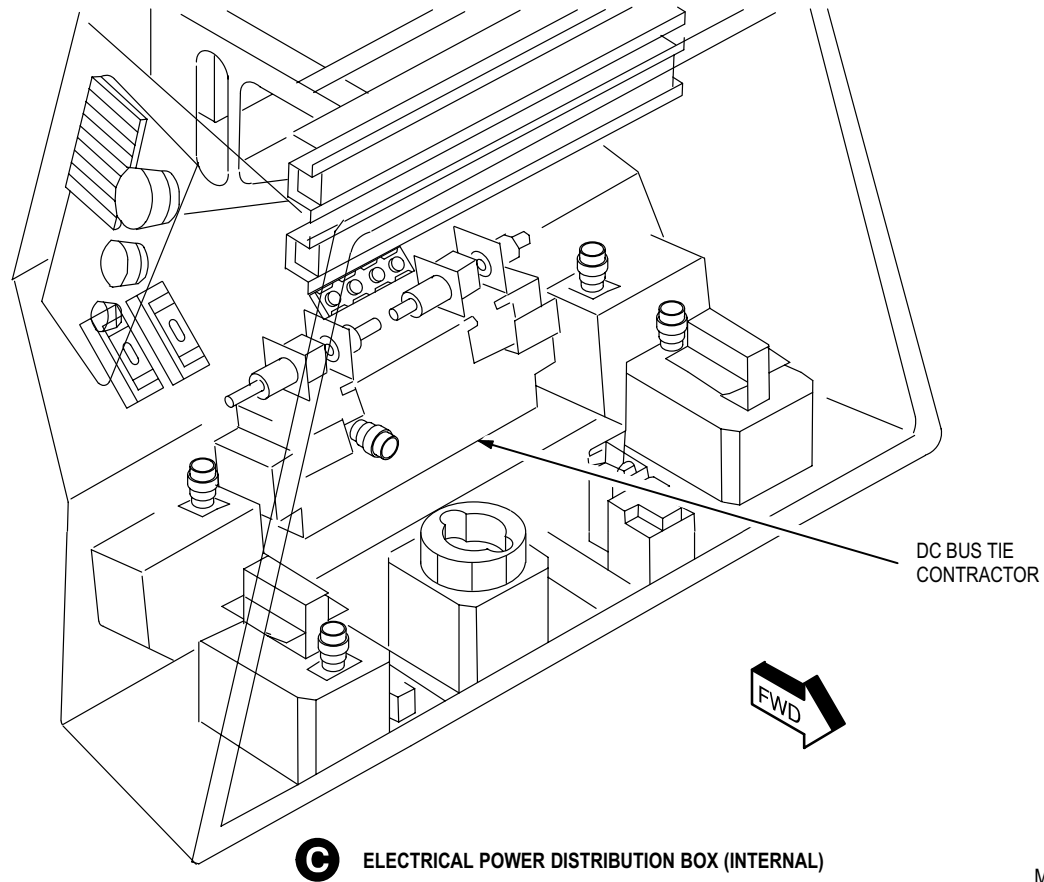


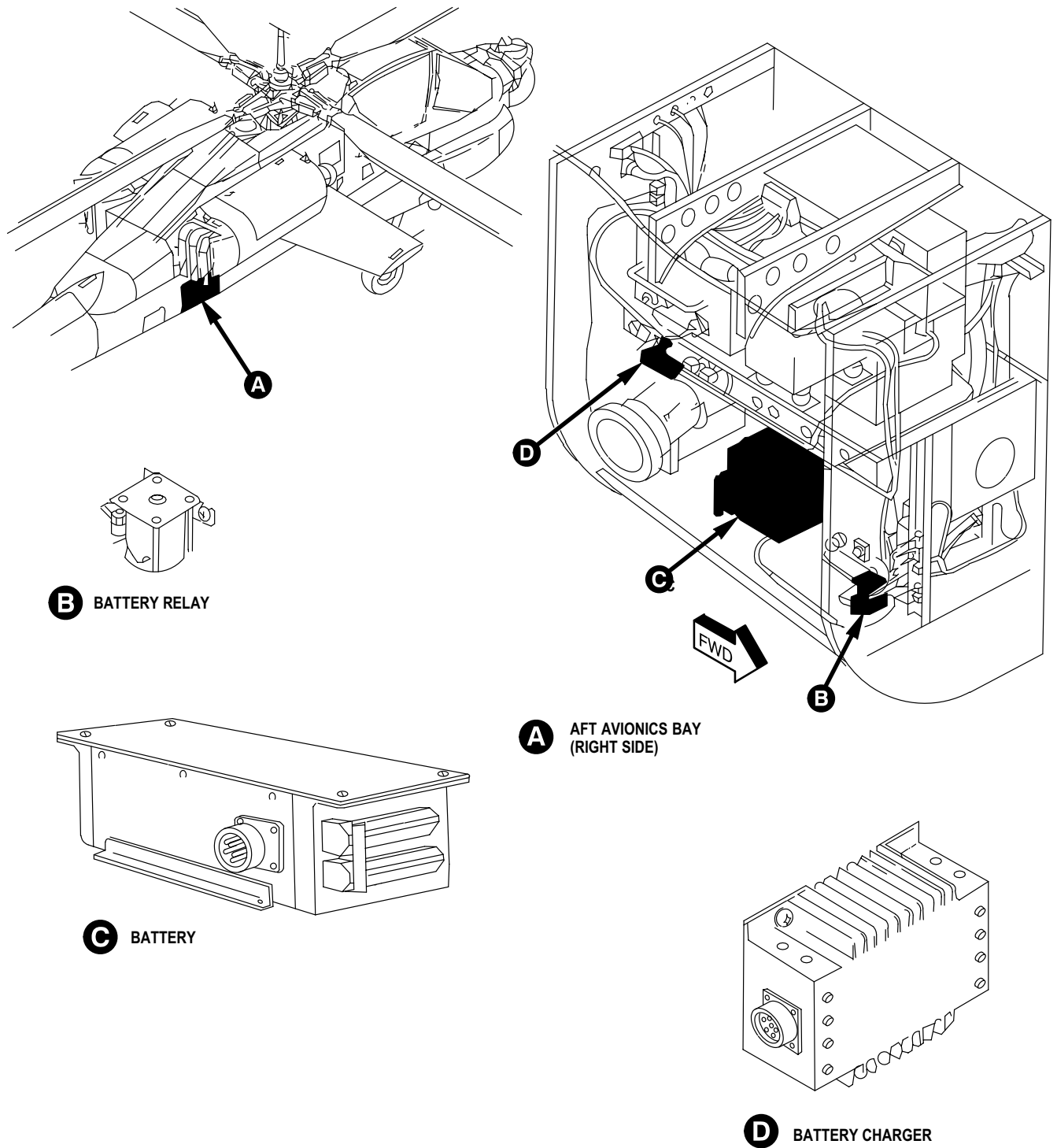
Figure 9-2. DC Electrical Power Generation System Major Components Location (Sheet 2 of 2)

e. **Battery System.** The battery system (fig. 9-3) consists of a battery, a battery relay, and a battery charger.

(1) **Battery.** The battery, an emergency dc component, is made of nickel cadmium (Ni-Cad) and contains two connector receptacles for aircraft power and control connections. The battery is located inside the lower shelf of the aft avionics bay.

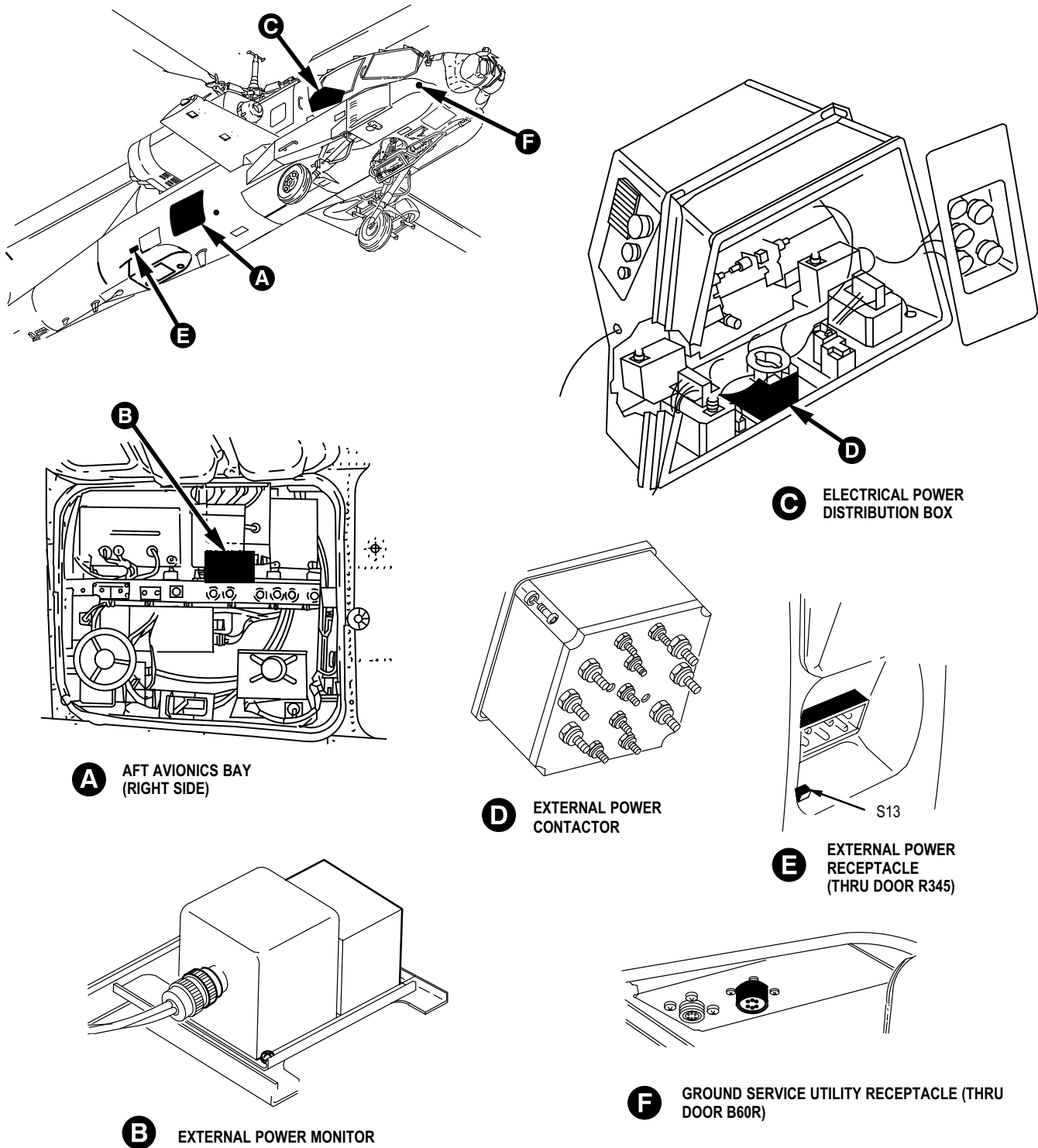
(2) **Battery Relay.** The battery relay, located on the forward wall of the aft avionics bay, has two large and two small terminal studs for power and control connections.

(3) **Battery Charger.** The battery charger, located on the lower shelf inside aft avionics bay, controls battery charging, battery to emergency bus connection, and **HOT BAT** and **CHARGER** caution indicators on the pilot caution/warning panel. It contains one connector receptacle for aircraft power and control.



M69-082

Figure 9-3. Battery System Major Components Location



M69-083A

Figure 9-4. External Power and Ground Service Utility Major Components Location

9-2. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

9-2

f. **External Power and Ground Service Utility Receptacle** (fig. 9-4). The external power consists of an external power monitor, an external power contactor, and an external power receptacle. Ground service utility consists of a ground service receptacle capable of providing both ac and dc electrical power for external application.

(1) **External Power Monitor.** The external power monitor, located in the aft avionics bay, is a solid state LRU with one electrical receptacle and is capable of producing 28 VDC at 5 amperes from an internal power supply. It also prevents application of improper external power to the aircraft ac electrical power system and controls power to the external power contactor.

(2) **External Power Contactor.** The external power contactor, located inside the electrical power distribution box, is a LRU with terminal studs on the front face. When the external power contactor is energized, the contactor connects incoming external power to the aircraft ac electrical power system. The contactor is energized by 28 VDC from the external power monitor.

(3) **External Power Receptacle.** The external power receptacle, located behind the external power access door R345 on the right side of the aircraft, provides a means of connecting a 3-phase, 115/200 VAC, 400 Hz ground power source to the aircraft. The external power access door activates a switch (S13) which lights the **EXT PWR** indicator on the pilot caution/warning panel when the door is open.

(4) **Ground Service Utility Receptacle.** The ground service utility receptacle, located behind ground service utility door B60R under the front end of the right FAB, supplies three phase, 115/200 VAC and 28 VDC aircraft power for external applications. Overload protection for the ac circuit is provided by the **AC ELEC UTIL PWR** circuit breaker (CB6). Overload protection for the dc circuit is provided by the **DC ELEC UTIL PWR** circuit breaker (CB7).

g. **Navigation Lights.** Navigation lights (fig. 9-5) consist of a red navigation light which is teardrop shaped and located on the left wingtip, a green navigation light which is teardrop shaped and located on the right wingtip, and the white navigation light which is round and located on top of the vertical stabilizer.

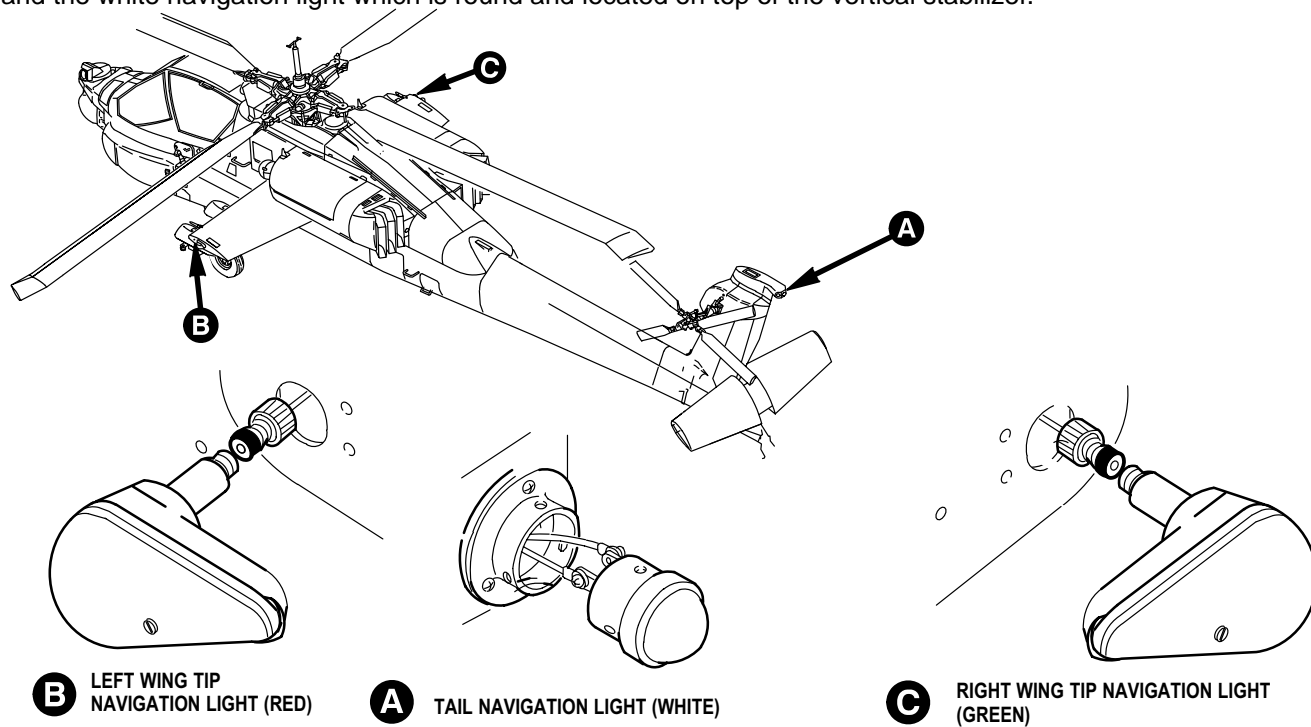


Figure 9-5. Navigation Lights Major Components Location

M69-129

h. **Formation Lights.** Formation lights (fig. 9-6) are flush-mounted electro-luminescent lamps which consist of a formation light which is located on top of each wingtip, a formation light which is located on top of the fuselage aft of the equipment bay, and a formation light which is located on top of the vertical stabilizer.

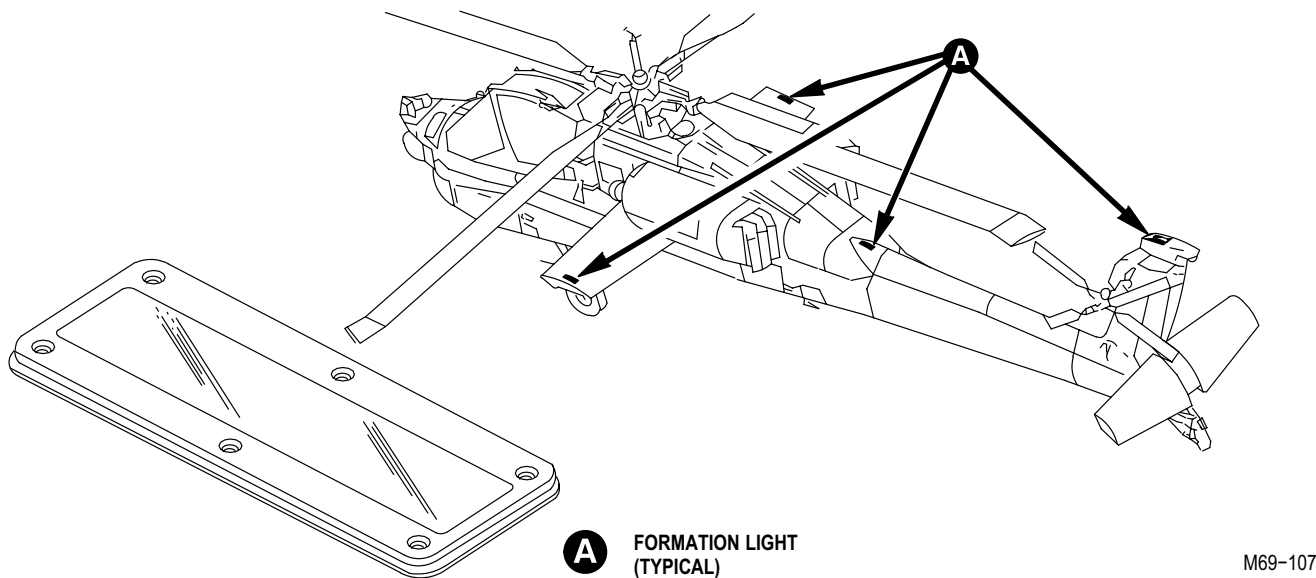


Figure 9-6. Formation Lights Major Components Location

i. **Anti-Collision Lights.** Anti-collision lights (fig. 9-7) consist of two anti-collision light assemblies and a power supply. One anti-collision light assembly is located on each wingtip. Each lamp assembly contains one white lamp and one red lamp for day and night operations. The anti-collision light power supply is a LRU which contains capacitors and circuitry to change 115 VAC inputs to 200-400 VDC outputs. The power supply is mounted on a bulkhead on the left side of the main transmission bay.

j. **Landing/Search Light Assembly.** The landing/search light assembly (fig. 9-8) consists of a lamp, a motor for extension/retraction, and a motor for rotation. The landing/search light provides illumination for landing, taxiing, hovering, takeoff, and search operations. The light assembly is mounted in a fairing on the bottom right side of the helicopter, forward of the landing gear.

k. **Maintenance and Utility Lights.** Maintenance lights (fig. 9-9) are hand-held detachable lamps. Each lamp has a long electrical cord and a rheostat for adjusting the intensity of the light and can be attached at either of two power source points on the aircraft:

- Connector J111 in the aft avionics bay.
- Connector J112, behind ground service utility door B60R under the front end of the right hand FAB.

l. **Utility and Secondary Lights.** The pilot and CPG utility lights (fig. 9-10) are located in the pilot and CPG stations, on the left bulkhead above the lighting control panel. A utility light mounting bracket retains the light and provides for quick detachment for use. A switch/rheostat, mounted on the back of the light, provides on/off and dim/bright control. There are seven (DS1 through DS7) secondary lights spaced across the glareshield (fig. 9-10) above the pilot and CPG's instrument panel. Each secondary light is a floodlight assembly which consists of a lamp, a lamp retainer, and a lamp cover with a blue lens.

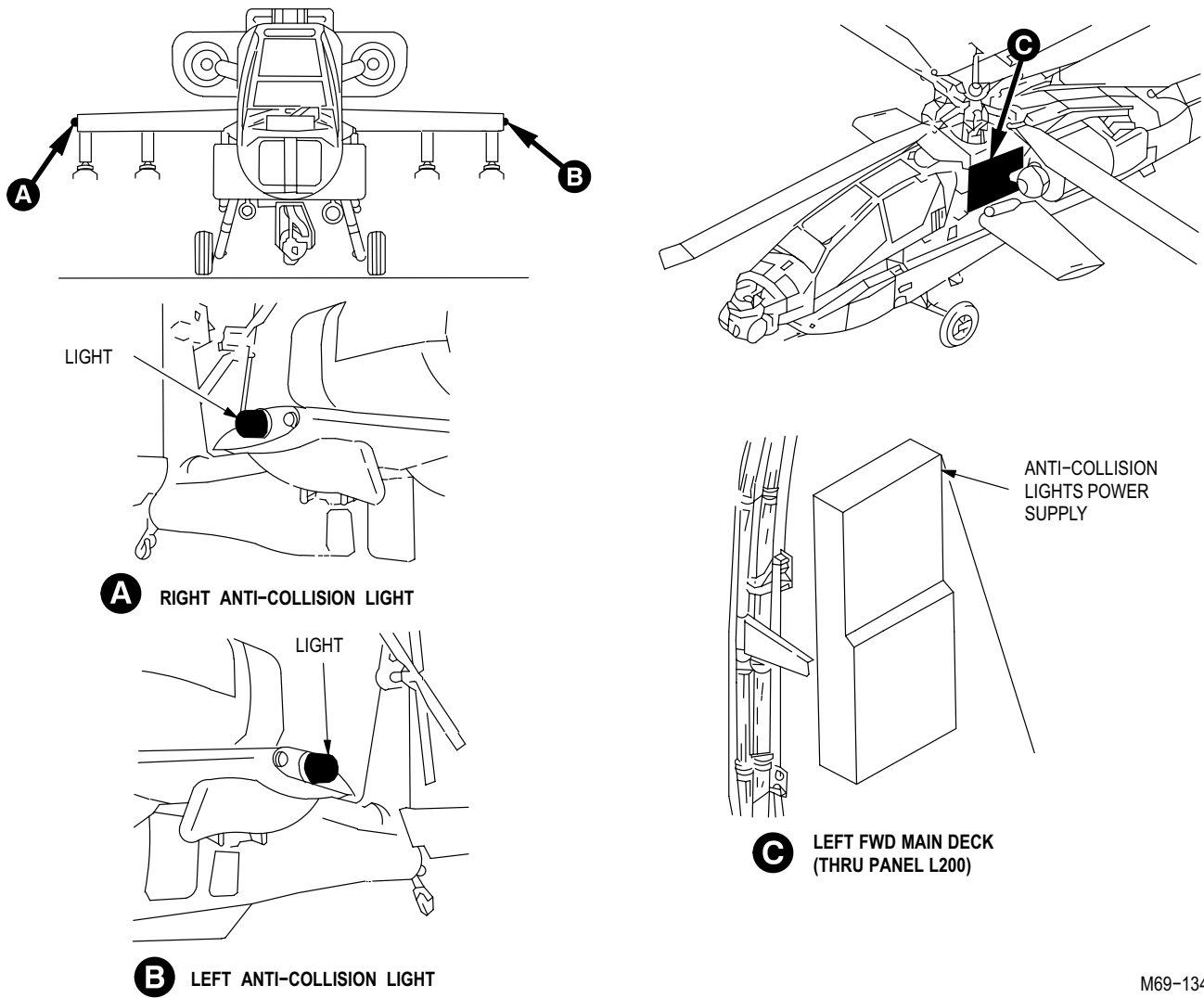


Figure 9-7. Anti-Collision Lights Major Components Location

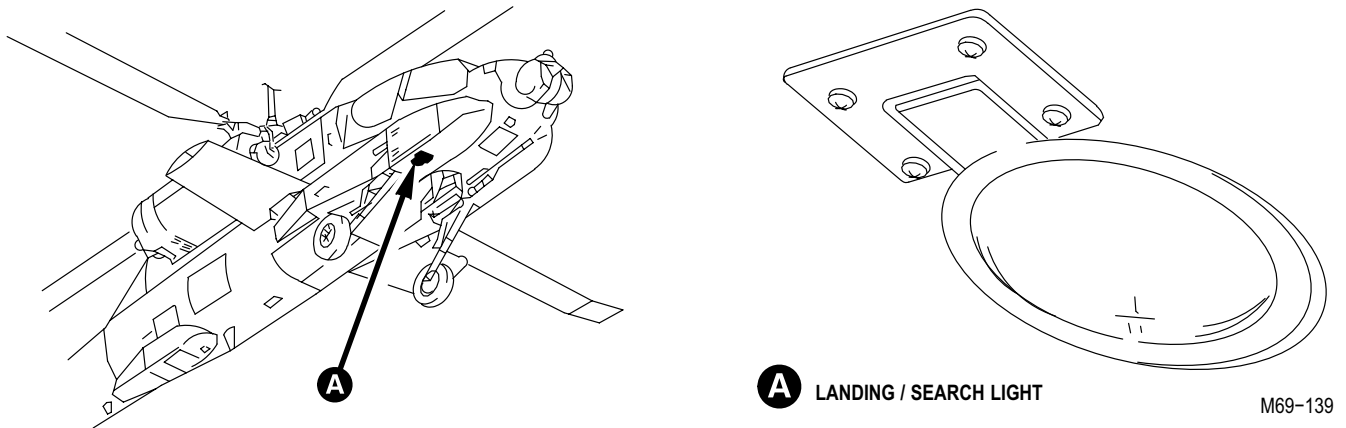
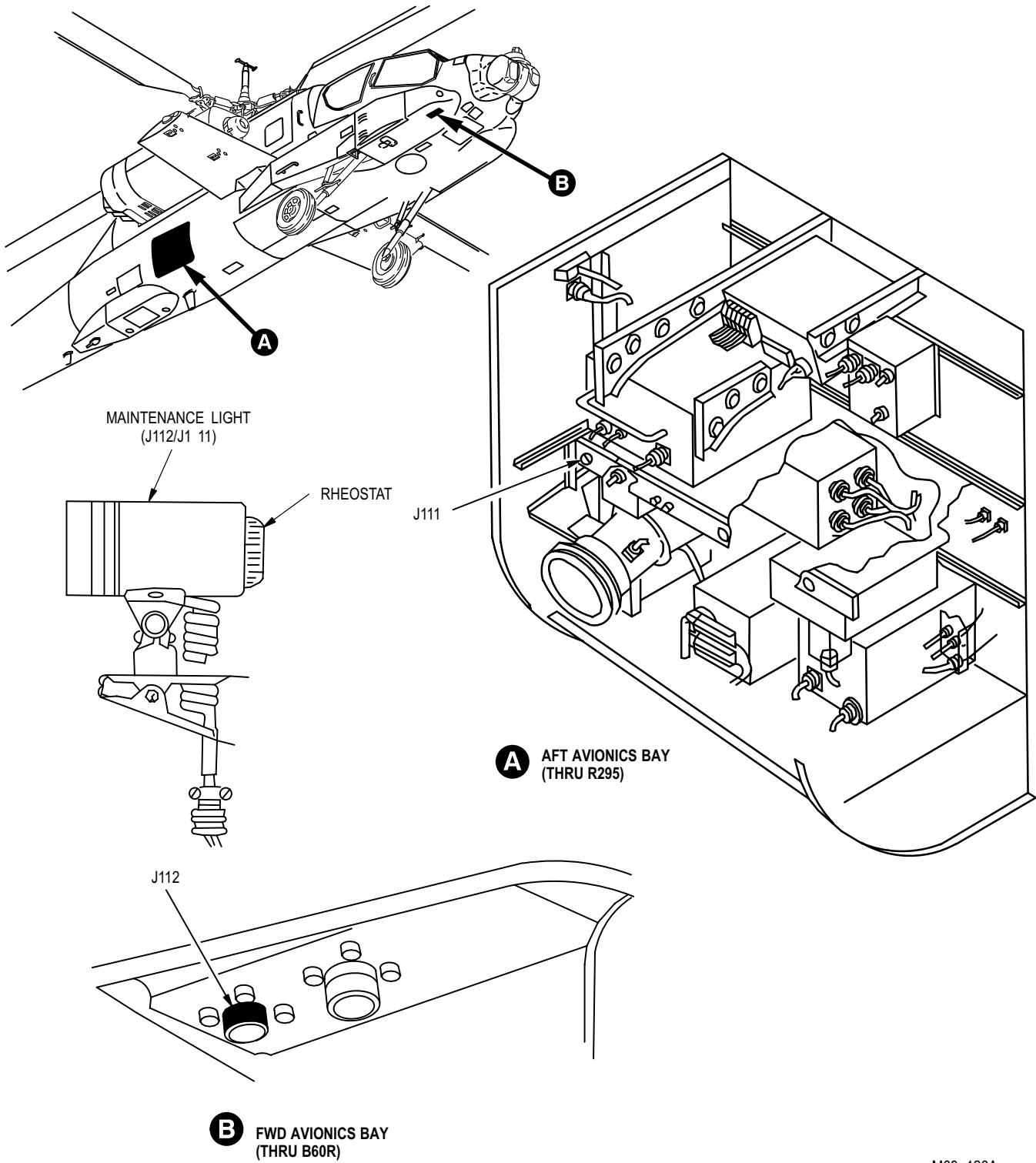


Figure 9-8. Landing/Search Light Major Components Location

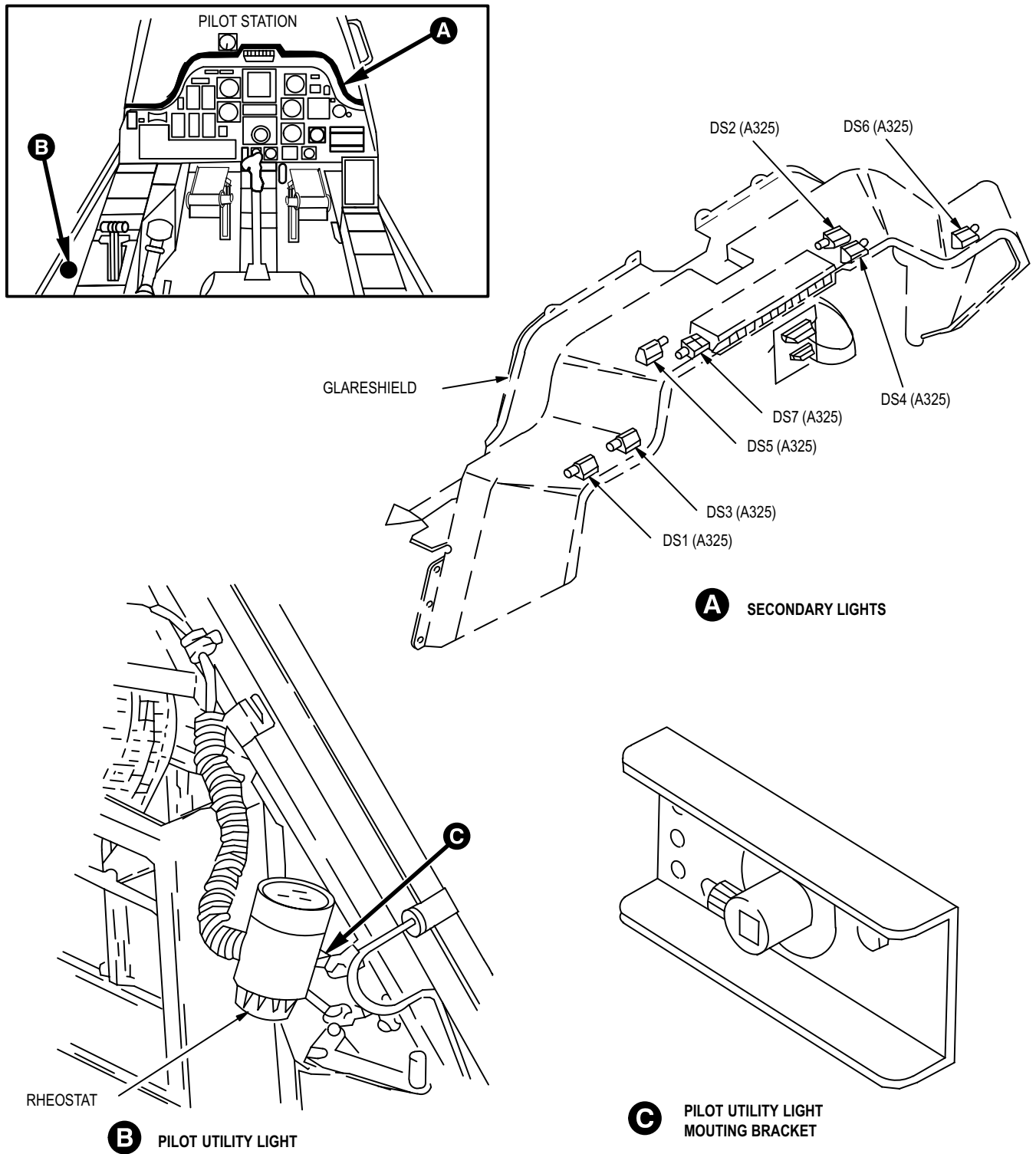
M69-134A

M69-139



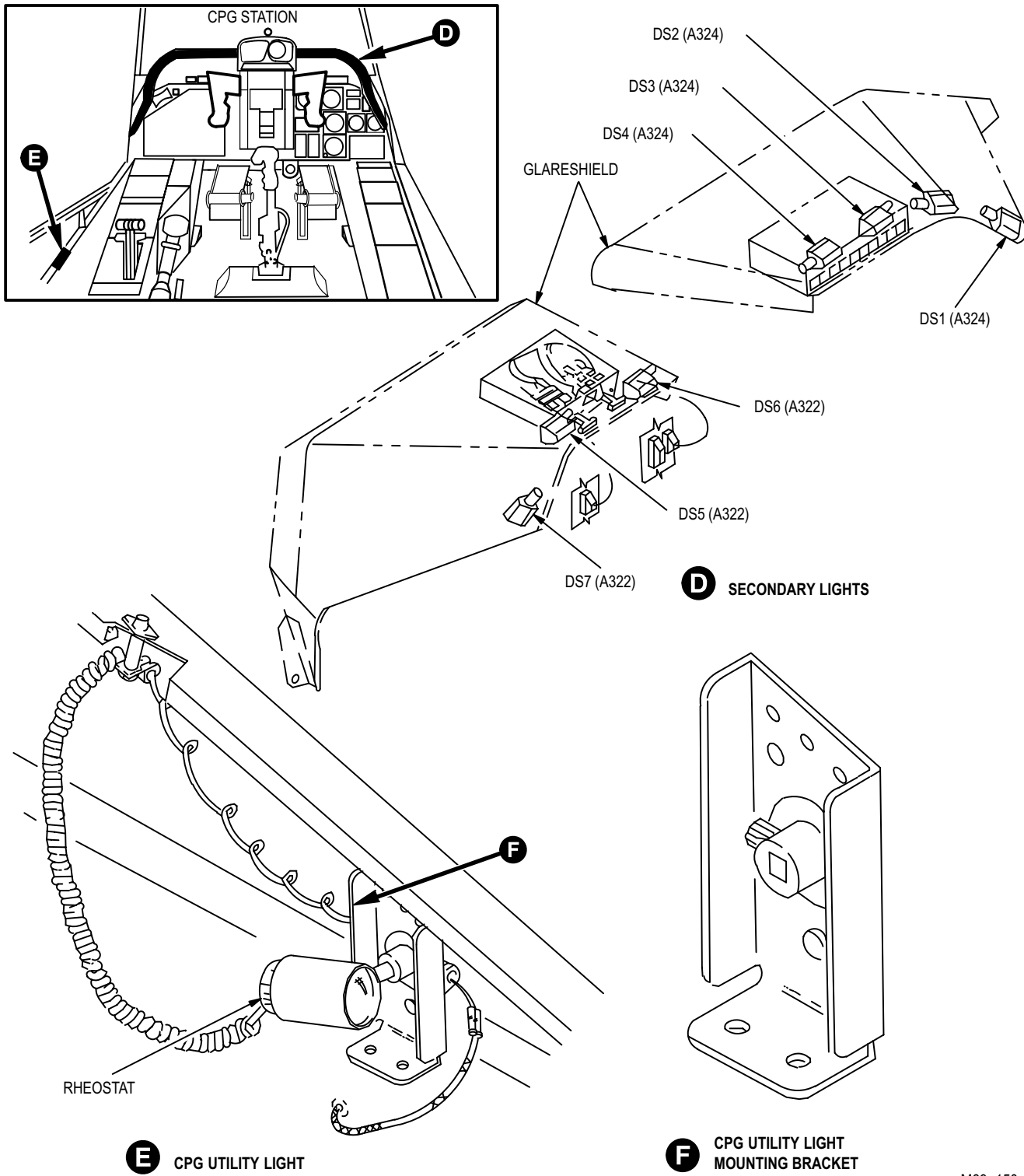
M69-128A

Figure 9-9. Maintenance Lights Major Components Location



M69-150-1A

Figure 9-10. Pilot and CPG Utility and Secondary Lights Components (Sheet 1 of 2)

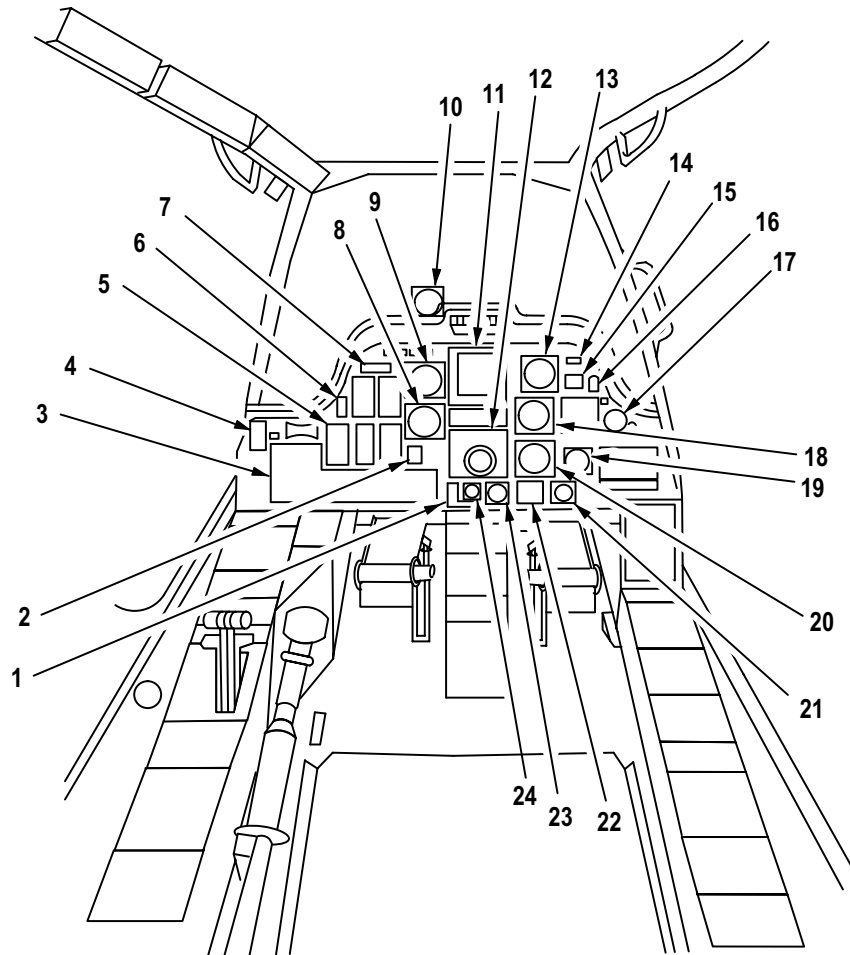


M69-150-2

Figure 9-10. Pilot and CPG Utility and Secondary Lights Components (Sheet 2 of 2)

9-2. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

9-2



CHANNEL 1 NO. 1

- 11. PILOT VIDEO DISPLAY UNIT
- 14. PILOT RADIO CALL PLACARD
- 16. PILOT STABILATOR AIRSPEED PLACARD
- 18. PILOT PRESSURE ALTIMETER
- 19. PILOT CLOCK
- 20. PILOT VERTICAL SPEED INDICATOR
- 21. PILOT ACCELEROMETER

CHANNEL 2 NO. 1

- 2. PILOT ENG OIL INDICATOR
- 5. PILOT FUEL QUANTITY INDICATOR
- 6. PILOT DIM / TEST PANEL
- 7. PILOT FIRE BOTTLE SELECT
- 8. PILOT STANDBY ATTITUDE INDICATOR
- 10. PILOT MAGNETIC COMPASS

CHANNEL 1 NO. 2

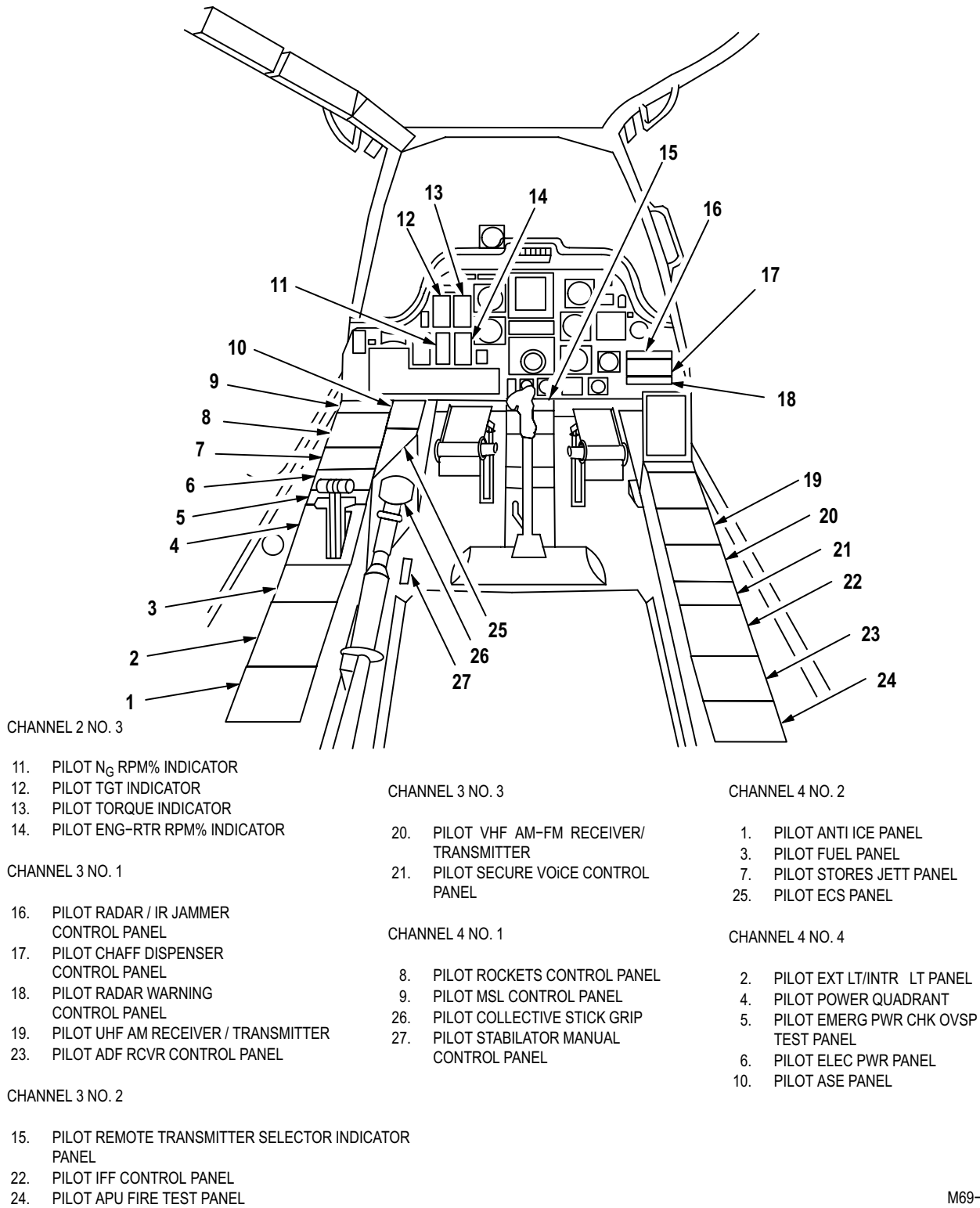
- 1. PILOT EMERGENCY HYDRAULIC CONTROL PANEL
- 4. PILOT TAIL WHEEL LOCK PANEL
- 12. PILOT HORIZONTAL SITUATION INDICATOR
- 13. PILOT RADAR ALTIMETER
- 15. PILOT STAB POS INDICATOR
- 17. PILOT ICING SEVERITY METER
- 22. PILOT HARS CONTROL PANEL
- 23. PILOT HYDRAULIC PRESSURE INDICATOR
- 24. PILOT EMERGENCY HYDRAULIC PRESSURE INDICATOR

CHANNEL 2 NO. 2

- 3. PILOT FIRE CONTROL PANEL
- 9. PILOT AIRSPEED INDICATOR

M69-423-1

Figure 9-11. Pilot Edge-Lights (Sheet 1 of 2)

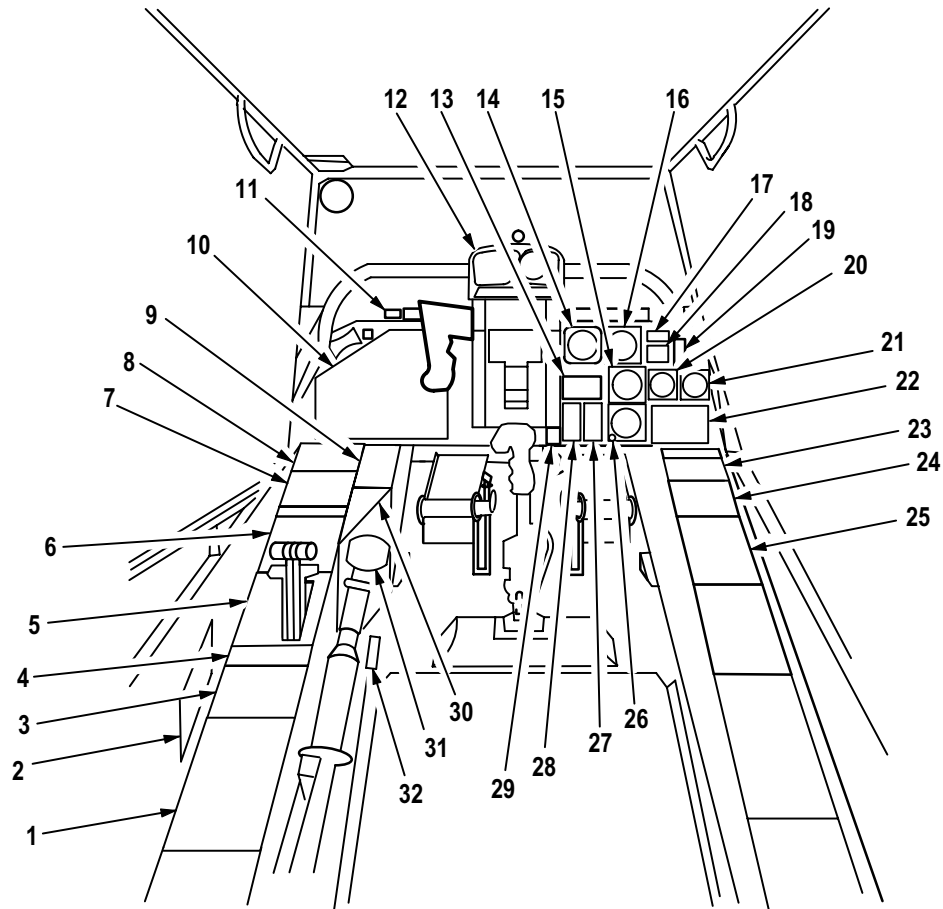


M69-423-2

Figure 9-11. Pilot Edge-Lights (Sheet 2 of 2)

9-2. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

9-2



CHANNEL 1 NO. 1

- 13. CPG SELECTABLE DIGITAL DISPLAY
- 14. CPG AIRSPEED INDICATOR
- 17. CPG RADIO CALL PLACARD
- 18. CPG STAB POS INDICATOR
- 19. CPG STABILATOR PLACARD
- 27. CPG ENG-RTR RPM% INDICATOR
- 28. CPG TORQUE INDICATOR
- 29. CPG DIM / TEST PANEL

CHANNEL 1 NO. 2

- 15. CPG RADIO MAGNETIC INDICATOR
- 16. CPG ATTITUDE INDICATOR
- 20. CPG VERTICAL SPEED INDICATOR
- 21. CPG CLOCK
- 22. CPG CAUTION / WARNING PANEL
- 26. CPG PRESSURE ALTIMETER

CHANNEL 2 NO. 1

- 10. CPG FIRE CONTROL PANEL
- 11. CPG FIRE BOTTLE SELECT PANEL
- 12. CPG OPTICAL RELAY TUBE

CHANNEL 3 NO. 1

- 23. CPG COMMUNICATION SYSTEM CONTROL PANEL
- 24. CPG VHF AM - FM RECEIVER / TRANSMITTER

CHANNEL 3 NO. 2

- 25. CPG DPLR NAV PANEL

CHANNEL 4 NO. 1

- 2. CPG CIRCUIT BREAKER PANEL 2
- 7. CPG VIDEO RECORDER CONTROL PANEL
- 8. CPG MSL CONTROL PANEL
- 9. CPG DATA ENTRY KEYBOARD
- 30. CPG RADIO MONITOR PLACARD

CHANNEL 4 NO. 2

- 4. CPG FUEL PANEL
- 5. CPG POWER QUADRANT
- 6. CPG AUX / ANTI-ICE PANEL
- 32. CPG STABILATOR MANUAL CONTROL PANEL

CHANNEL 4 NO. 3

- 1. CPG CIRCUIT BREAKER PANEL 1
- 3. CPG INTR LT PANEL
- 31. CPG COLLECTIVE STICK GRIP

M69-425

Figure 9-12. CPG Edge-Lights

m. **Pilots Edge-Lights.**

- (1) The pilot edge-light channel 1 is divided into two sub-channels.
 - (a) Channel 1 No. 1 (fig. 9-11) provides edge-lighting for the following:
 - Pilot vertical speed indicator (VSI).
 - Pilot video display unit (VDU).
 - Pilot radio call placard.
 - Pilot stabilator airspeed placard.
 - Pilot pressure altimeter.
 - Pilot clock.
 - Pilot accelerometer.
 - (b) Channel 1 No. 2 (fig. 9-11) provides edge-lighting for the following:
 - Pilot **TAIL WHEEL** lock panel.
 - Pilot radar altimeter.
 - Pilot stabilator position (**STAB POS**) indicator.
 - Pilot horizontal situation indicator (HSI).
 - Pilot icing severity meter.
 - Pilot **HARS** control panel.
 - Pilot hydraulic pressure indicator.
 - Pilot emergency hydraulic pressure indicator.
 - Pilot emergency hydraulic control panel.
- (2) The pilot edge-light channel 2 is divided into three sub-channels.
 - (a) Channel 2 No. 1 (fig. 9-11) provides edge-lighting for the following:
 - Pilot magnetic compass.
 - Pilot **FIRE BTL** select panel.
 - Pilot standby attitude indicator.
 - Pilot **ENG OIL** indicator.
 - Pilot **FUEL** quantity indicator.
 - Pilot dim/test panel.
 - (b) Channel 2 No. 2 (fig. 9-11) provides edge-lighting for the following:
 - Pilot **FIRE CONTROL** panel.
 - Pilot airspeed indicator.

9-2. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

9-2

(c) Channel 2 No. 3 (fig. 9-11) provides edge-lighting for the following:

- Pilot **ENG-RTR RPM%** indicator.
- Pilot **N_G RPM%** indicator.
- Pilot **TGT** indicator.
- Pilot **TORQUE** indicator.

(3) Channel 3 is divided into three sub-channels.

(a) Channel 3 No. 1 (fig. 9-11) provides edge-lighting for the following:

- Pilot radar/IR jammer control panel.
- Pilot chaff dispenser control panel.
- Pilot radar warning control panel.
- Pilot **UHF** AM receiver/transmitter.
- Pilot **ADF RCVR** control panel.

(b) Channel 3 No. 2 (fig. 9-11) provides edge-lighting for the following:

- Pilot remote select transmitter.
- Pilot **IFF** control panel.
- Pilot **APU** fire test panel.

(c) Channel 3 No. 3 (fig. 9-11) provides edge-lighting for the following:

- Pilot remote select transmitter.
- Pilot **VHF** AM-FM receiver/transmitter.
- Pilot **KY-28** secure voice control panel.

(4) Channel 4 is divided into three sub-channels:

(a) Channel 4 No. 1 (fig. 9-11) provides edge-lighting for the following:

- Pilot **MSL** control panel.
- Pilot **ROCKETS** control panel.
- Pilot collective stick grip.
- Pilot stabilator manual control panel.

(b) Channel 4 No. 2 (fig. 9-11) provides edge-lighting for the following:

- Pilot **ANTI ICE** panel.
- Pilot **FUEL** control panel.
- Pilot **STORES JETT** panel.
- Pilot **ECS** panel.

(c) Channel 4 No. 4 (fig. 9-11) provides edge-lighting for the following:

- Pilot **EXT LT/INTR LT** panel.
- Pilot power quadrant.
- Pilot **ENG OVSP CHK TEST** panel.
- Pilot **ELEC PWR** panel.
- Pilot **ASE** panel.

n. **CPG Edge-Lights** (fig. 9-12).

(1) Channel 1 is divided into two sub-channels.

(a) Channel 1 No. 1 provides edge-lighting for the following:

- CPG airspeed indicator.
- CPG radio call placard.
- CPG stabilator position (**STAB POS**) indicator.
- CPG stabilator placard.
- CPG selectable digital display.
- CPG **ENG-RTR RPM%** indicator.
- CPG **TORQUE** indicator.
- CPG dim/test panel.

(b) Channel 1 No. 2 provides edge-lighting for the following:

- CPG standby attitude indicator (SAI).
- CPG radio magnetic indicator (RMI).
- CPG clock.
- CPG vertical speed indicator (VSI).
- CPG caution/warning panel.
- CPG pressure altimeter.

(2) Channel 2 uses one sub-channel. Channel 2 No. 1 provides edge-lighting for the following:

- CPG **FIRE CONTROL** panel.
- CPG **FIRE BTL** select panel.
- CPG optical relay tube (ORT).

9-2. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

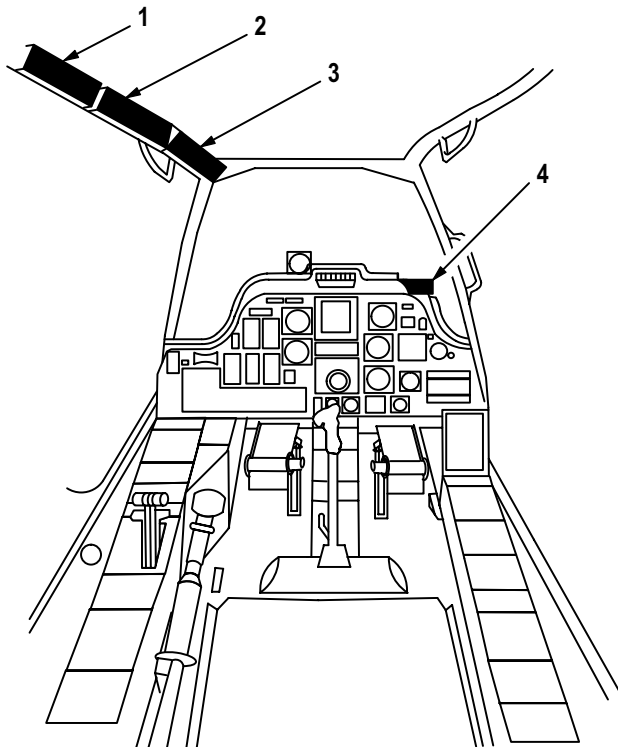
9-2

- (3) Channel 3 is divided into two sub-channels.
- (a) Channel 3 No. 1 (fig. 9-12) provides edge-lighting for the following:
- CPG communication system control (CSC) panel.
 - CPG **VHF** AM-FM receiver/transmitter.
- (b) Channel 3 No. 2 provides edge-lighting for the CPG **DPLR NAV** panel.
- (4) Channel 4 is divided into three sub-channels:
- (a) Channel 4 No. 1 provides edge-lighting for the following:
- CPG data entry keyboard (DEK).
 - CPG **MSL** control panel.
 - CPG video **RECORDER** control panel.
 - CPG radio monitor placard.
 - CPG circuit breaker panel 2.
- (b) Channel 4 No. 2 (fig. 9-12) provides edge-lighting for the following:
- CPG **AUX/ANTI-ICE** panel.
 - CPG power quadrant.
 - CPG **FUEL** panel.
 - CPG stabilator manual control panel.
- (c) Channel 4 No. 3 provides edge-lighting for the following:
- CPG collective stick grip.
 - CPG **INTR LT** panel.
 - CPG circuit breaker panel 1.

o. Circuit Breaker Edge-Light Panels.

NOTE

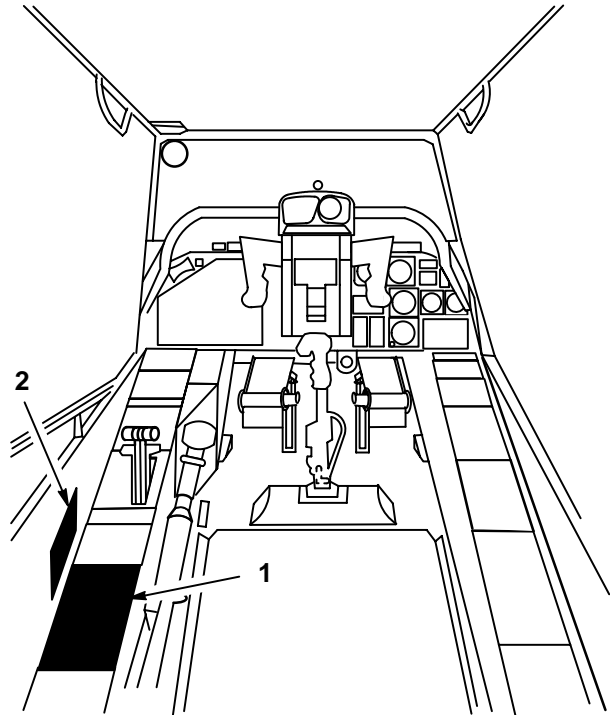
Refer to pilot station (fig. 9-13) and CPG station (fig. 9-14) for cockpit configuration and equipment.



- 1. PILOT AFT CIRCUIT BREAKER PANEL
- 2. PILOT CENTER CIRCUIT BREAKER PANEL
- 3. PILOT FORWARD CIRCUIT BREAKER PANEL
- 4. PILOT MATRIX MODULE

M69-266

Figure 9-13. Pilot Station



- 1. CPG CIRCUIT BREAKER PANEL 1
- 2. CPG CIRCUIT BREAKER PANEL 2

M69-267

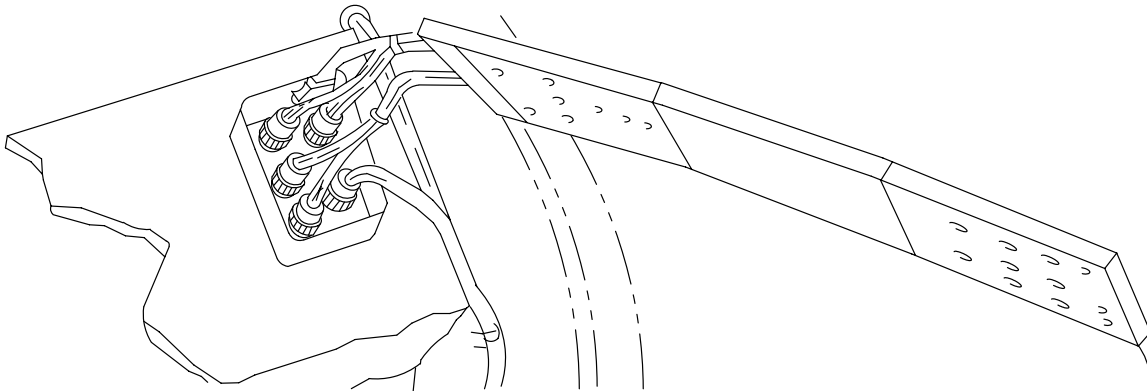
Figure 9-14. CPG Station

p. **Pilot Station Circuit Breaker Panel Edge-Lights.** The pilot station circuit breaker panel edge-lights (fig. 9-15) are located in the pilot forward, center, and aft circuit breaker panels. The major components of the circuit breaker edge-light panels are the pilot station circuit breaker panels edge-lights (fig. 9-16).

- (1) The pilot aft circuit breaker panel edge-light (A76)DS3 is installed in socket (A76)XDS3.
- (2) The pilot center circuit breaker panel edge-light (A76)DS2 is installed in socket (A76)XDS2.
- (3) The pilot forward circuit breaker panel edge-light (A76)DS1 is installed in socket (A76)XDS1.

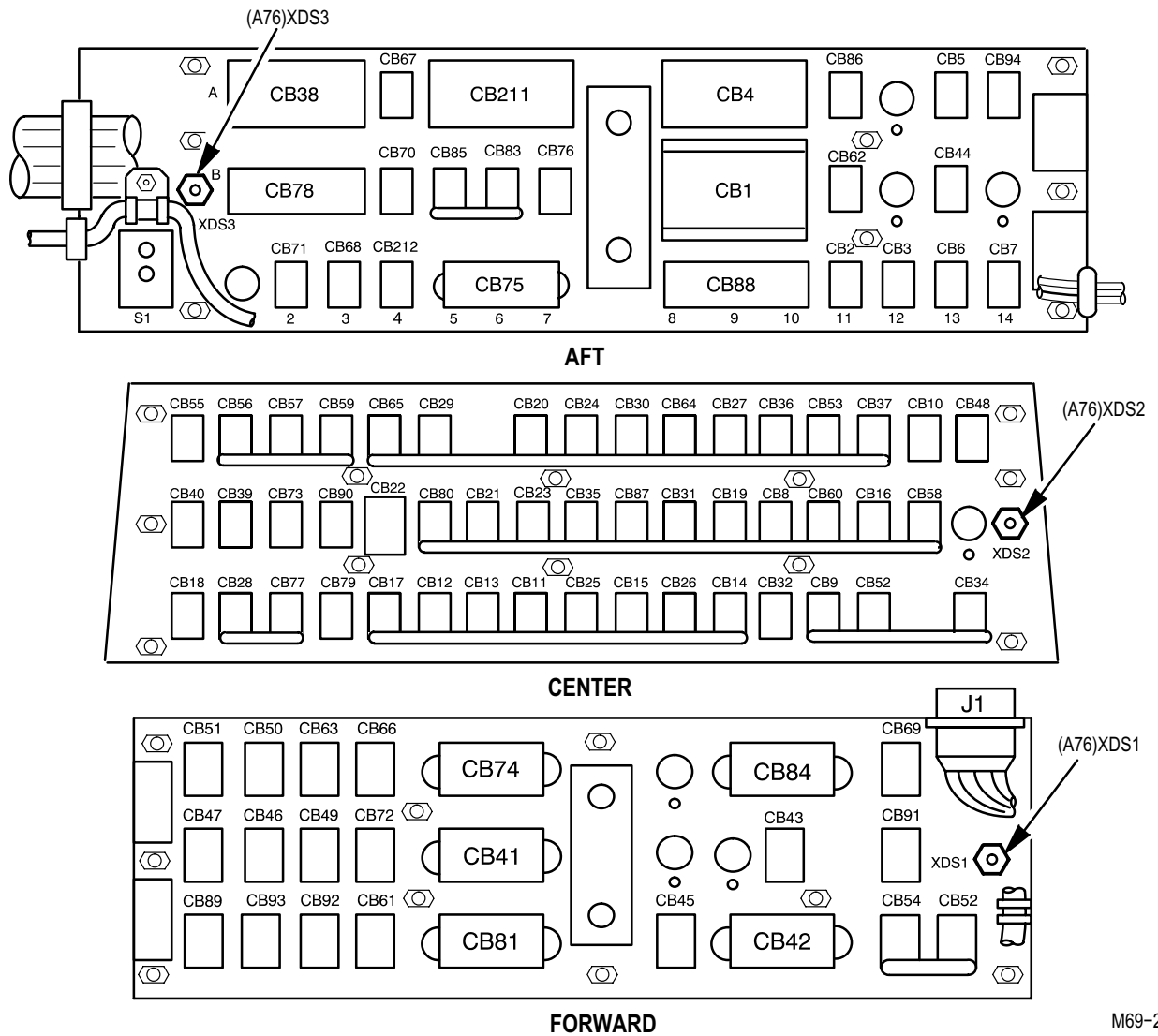
9-2. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

9-2



M69-271

Figure 9-15. Pilot Circuit Breaker Edge-Light Panels

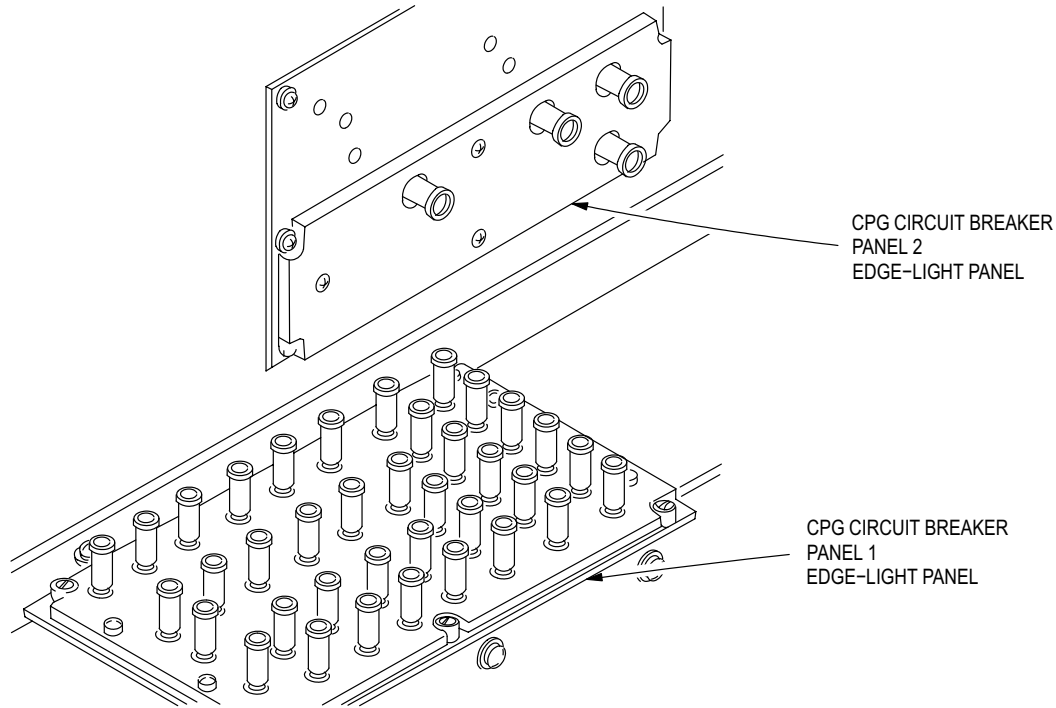


M69-268A

Figure 9-16. Pilot Aft, Center, and Forward Circuit Breaker Panels (Rear Side Shown)

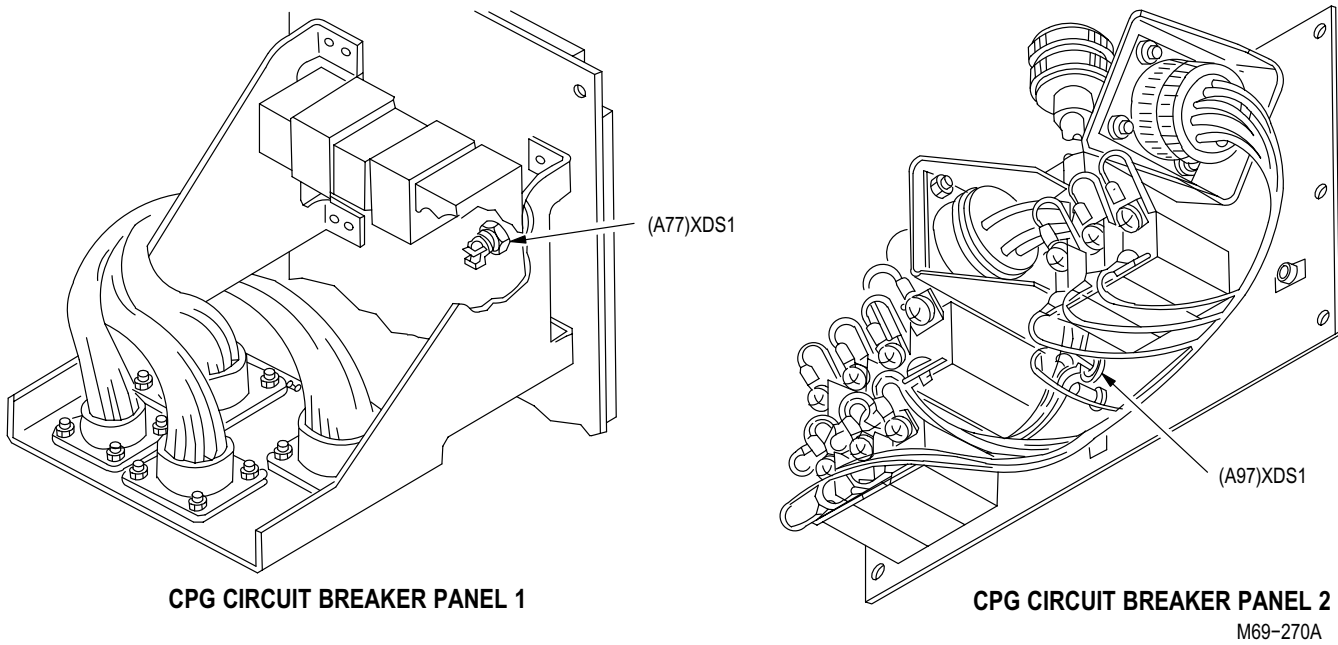
q. **CPG Station Circuit Breaker Panel Edge-Lights.** The CPG station circuit breaker edge-lights (fig. 9-17), located in CPG circuit breaker panels 1 and 2 (fig. 9-18), consist of the following:

- CPG circuit breaker panel 1 edge-light (A77)DS1 is installed in socket (A77)XDS1.
- CPG circuit breaker panel 2 edge-light (A97)DS1 is installed in socket (A97)XDS1.



M69-272

Figure 9-17. CPG Circuit Breaker Edge-Light Panels



M69-270A

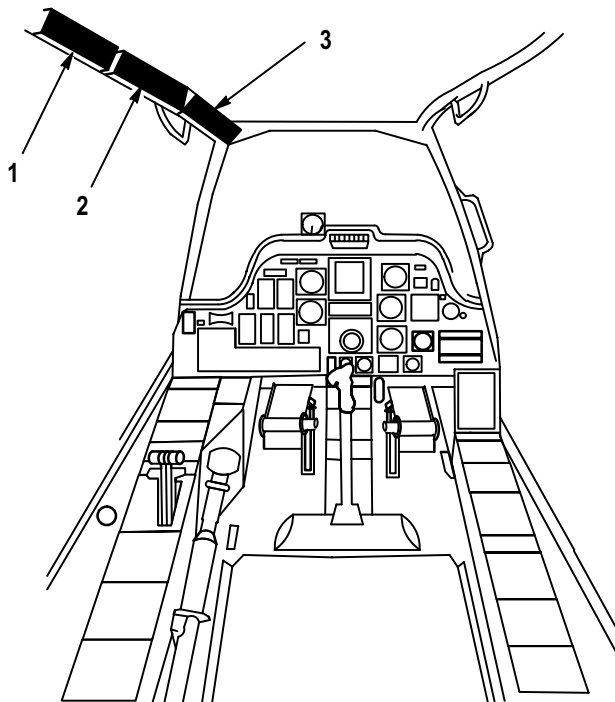
Figure 9-18. CPG Circuit Breaker Panels 1 and 2

r. **Circuit Protection System.**

(1) Pilot station ac essential bus 1 circuit protection.

NOTE

Refer to pilot station (fig. 9-19) for configuration and component locations.



- 1. PILOT AFT CIRCUIT BREAKER PANEL
- 2. PILOT CENTER CIRCUIT BREAKER PANEL
- 3. PILOT FORWARD CIRCUIT BREAKER PANEL

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Figure 9-19. Pilot Station

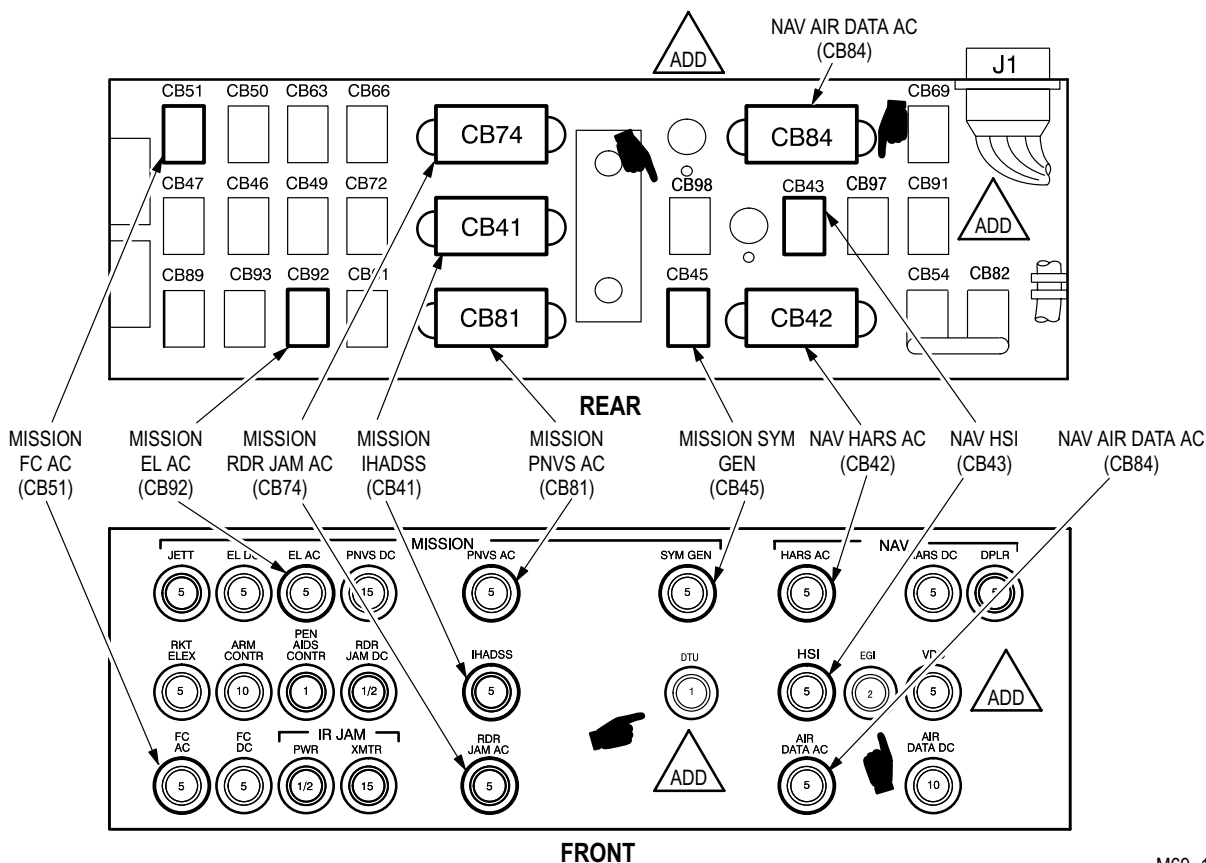
Table 9-13 contains a listing of the circuit breakers associated with the pilot station ac essential bus 1, along with each circuit breaker's rating in amps.

Table 9-13. Pilot Station AC Essential Bus 1 Circuit Protection

Pilot Forward Circuit Breaker Panel (fig. 9-20)		
CB NO.	CB NAME	RATING
CB41	MISSION IHADSS	5 amp
CB42	NAV HARS AC	5 amp
CB43	NAV HSI	5 amp
CB45	MISSION SYM GEN	5 amp
CB51	MISSION FC AC	5 amp
CB74	MISSION RDR JAM AC	5 amp

Table 9-13. Pilot Station AC Essential Bus 1 Circuit Protection (cont)

Pilot Forward Circuit Breaker Panel (cont) (fig. 9-20)		
CB NO.	CB NAME	RATING
CB81	MISSION PNVS AC	5 amp
CB84	NAV AIR DATA AC	5 amp
CB92	MISSION EL AC	5 amp



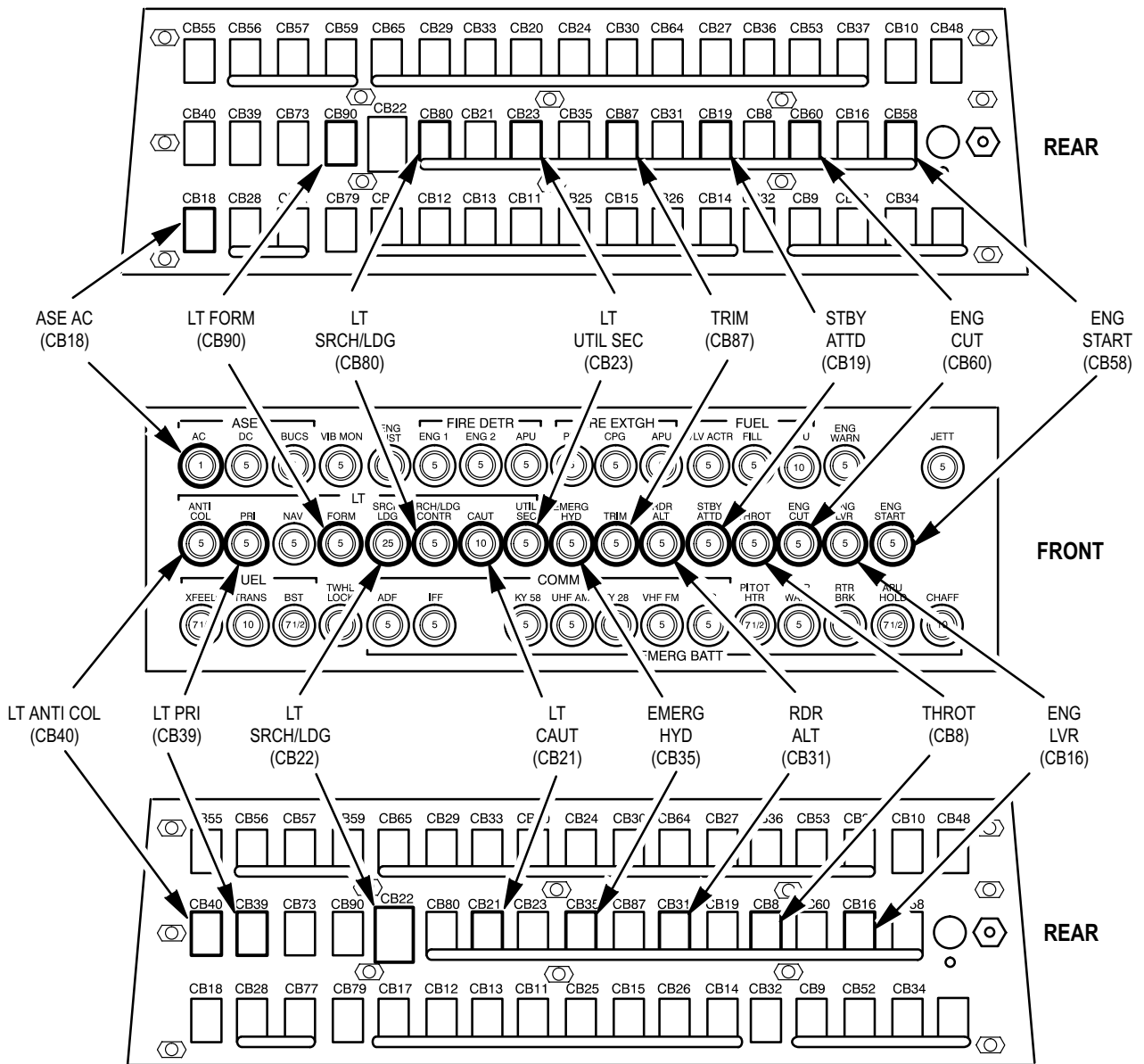
M69-193A

Figure 9-20. Pilot Forward Circuit Breaker Panel

Pilot Center Circuit Breaker Panel (fig. 9-21)		
CB NO.	CB NAME	RATING
CB8	THROT	5 amp
CB16	ENG LVR	5 amp
CB18	ASE AC	1 amp

Table 9-13. Pilot Station AC Essential Bus 1 Circuit Protection (cont)

Pilot Center Circuit Breaker Panel (fig. 9-21)		
CB NO.	CB NAME	RATING
CB19	STBY ATTD	5 amp
CB21	LT CAUT	10 amp
CB22	LT SRCH/LDG	25 amp

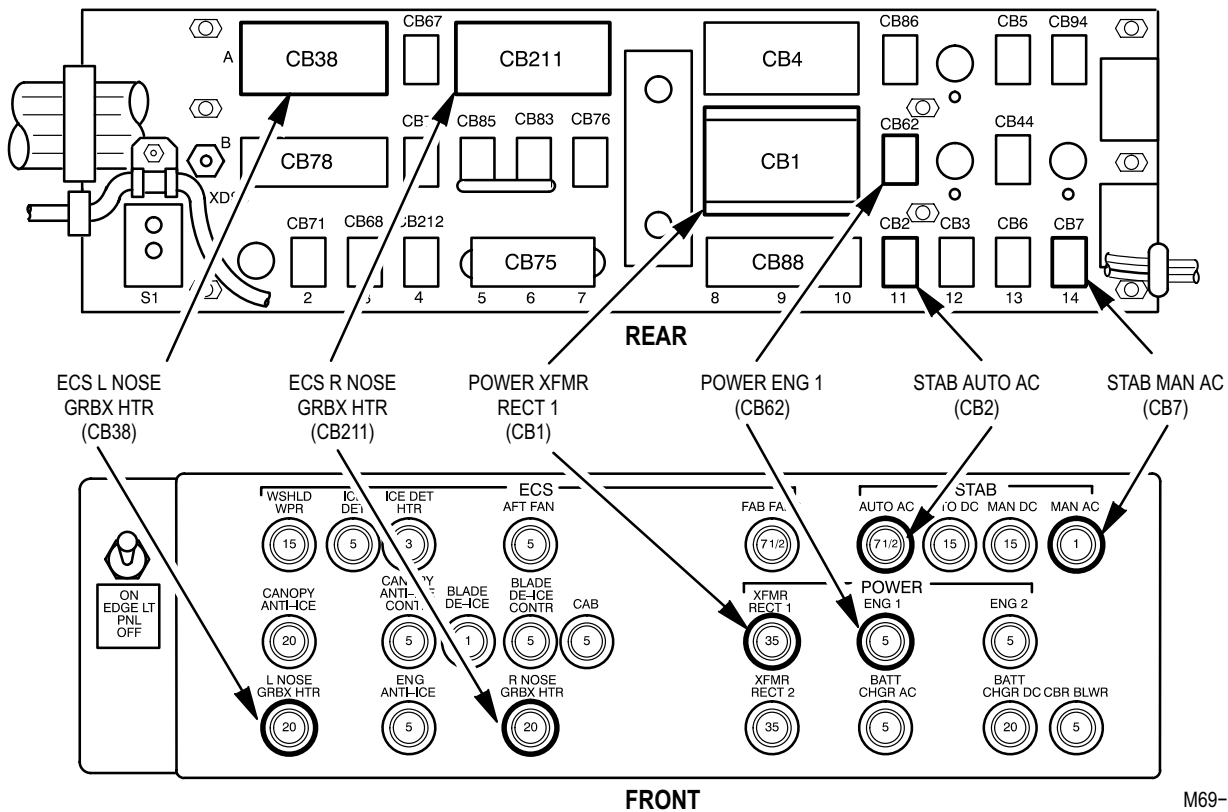


M69-194

Figure 9-21. Pilot Center Circuit Breaker Panel

Table 9-13. Pilot Station AC Essential Bus 1 Circuit Protection (cont)

Pilot Center Circuit Breaker Panel (cont) (fig. 9-21)		
CB NO.	CB NAME	RATING
CB23	LT UTIL SEC	5 amp
CB31	RDR ALT	5 amp
CB35	EMERG HYD	5 amp
CB39	LT PRI	5 amp
CB40	LT ANTI COL	5 amp
CB58	ENG START	5 amp
CB60	ENG CUT	5 amp
CB80	LT SRCH/LDG CONTR	5 amp
CB87	TRIM	5 amp
CB90	LT FORM	5 amp



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Figure 9-22. Pilot Aft Circuit Breaker Panel

9-2. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

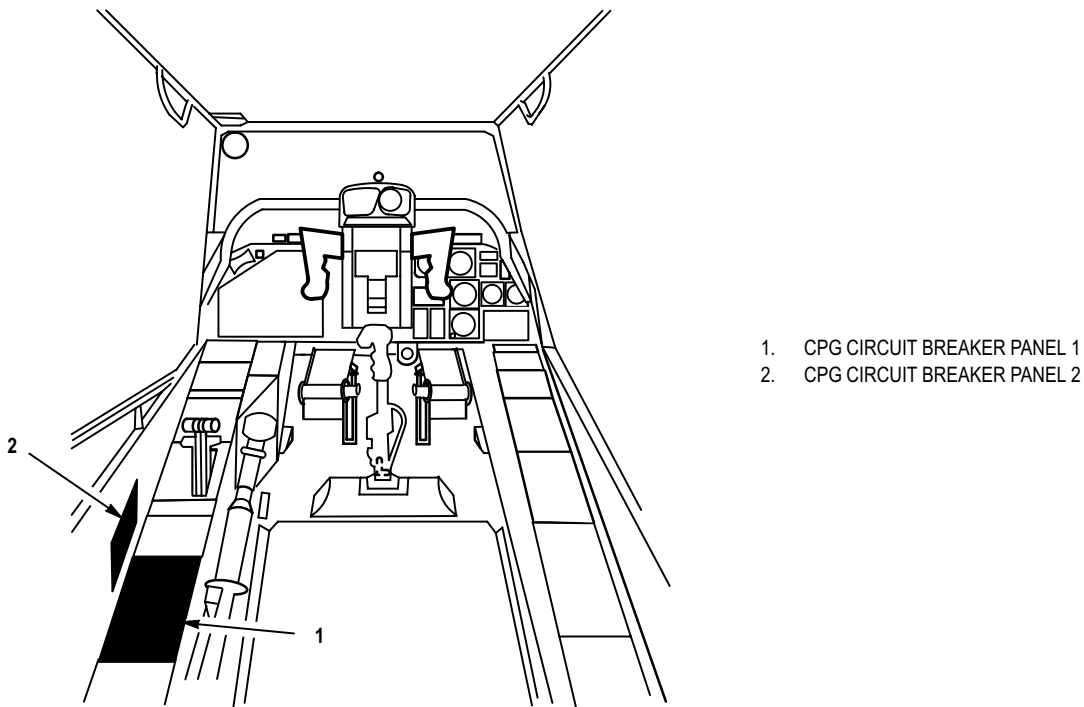
Table 9-13. Pilot Station AC Essential Bus 1 Circuit Protection (cont)

Pilot Aft Circuit Breaker Panel (fig. 9-22)		
CB NO.	CB NAME	RATING
CB1	POWER XFMR RECT 1	35 amp
CB2	STAB AUTO AC	7.5 amp
CB7	STAB MAN AC	1 amp
CB38	ECS L NOSE GRBX HTR	20 amp
CB62	POWER ENG 1	5 amp
CB211	ECS R NOSE GRBX HTR	20 amp

(2) CPG station ac essential bus 1 circuit protection.

NOTE

Refer to CPG station (fig. 9-23) for configuration and component locations



- 1. CPG CIRCUIT BREAKER PANEL 1
- 2. CPG CIRCUIT BREAKER PANEL 2

M69-199

Figure 9-23. CPG Station

Table 9-14 contains a listing of the circuit breakers associated with the CPG station ac essential bus 1, along with each circuit breaker's rating in amps.

Table 9-14. CPG Station AC Essential Bus 1 Circuit Protection

CPG Circuit Breaker Panel 1 (fig. 9-24)		
CB NO.	CB NAME	RATING
CB11	AWS AWS AC	5 amp
CB16	FC FCC AC	5 amp
CB18	MSL R OUTBD LCHR AC	2 amp
CB20	ATTD IND	5 amp
CB21	MSL R INBD LCHR AC	2 amp
CB24	MSL L INBD LCHR AC	2 amp
CB26	MSL L OUTBD LCHR AC	2 amp

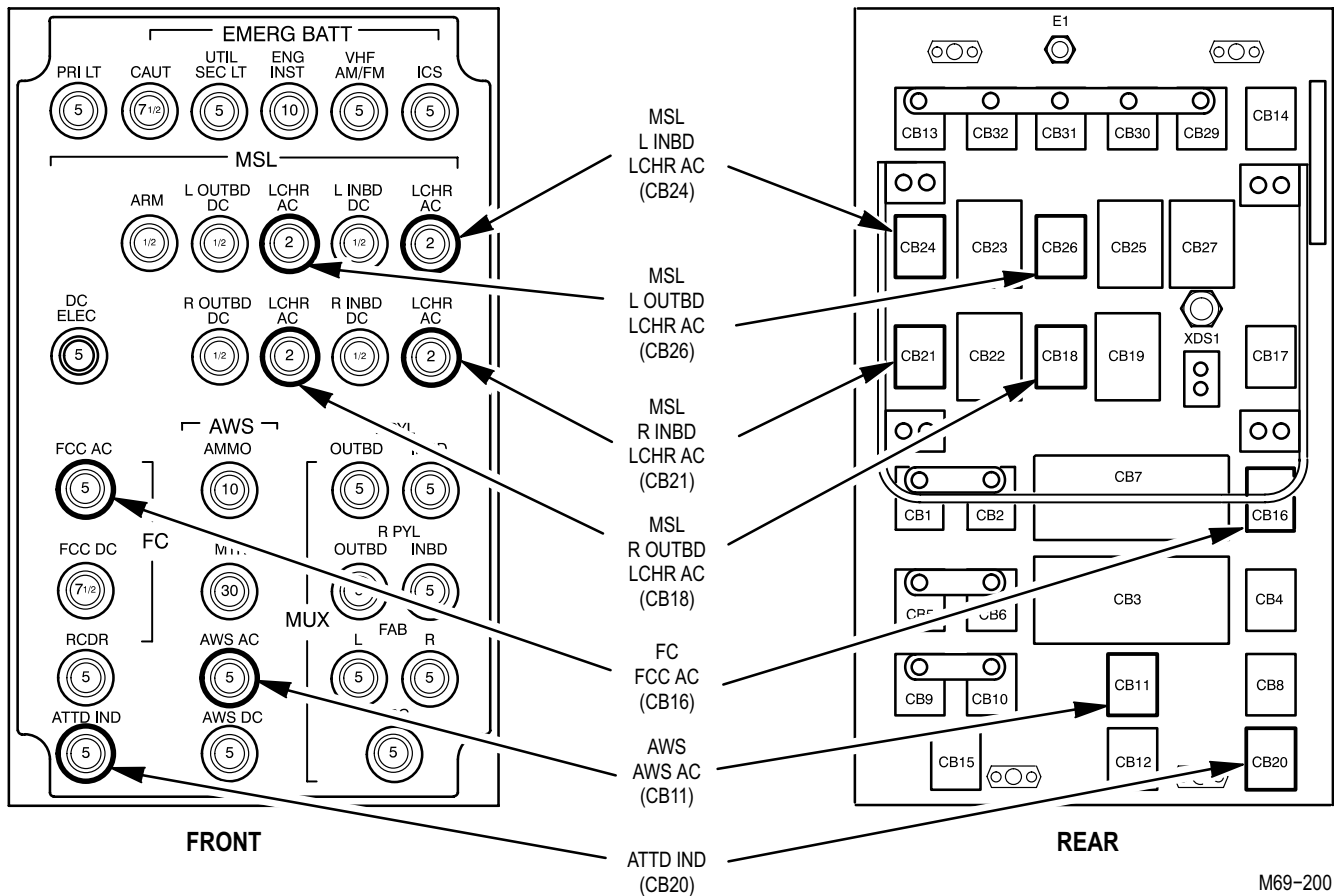


Figure 9-24. CPG Circuit Breaker Panel 1

Table 9-14. CPG Station AC Essential Bus 1 Circuit Protection (cont)

CPG Circuit Breaker Panel 2 (fig. 9-25)		
CB NO.	CB NAME	RATING
CB1	IHADSS	5 amp
CB3	TADS AC	10 amp
CB4	LASER	2 amp

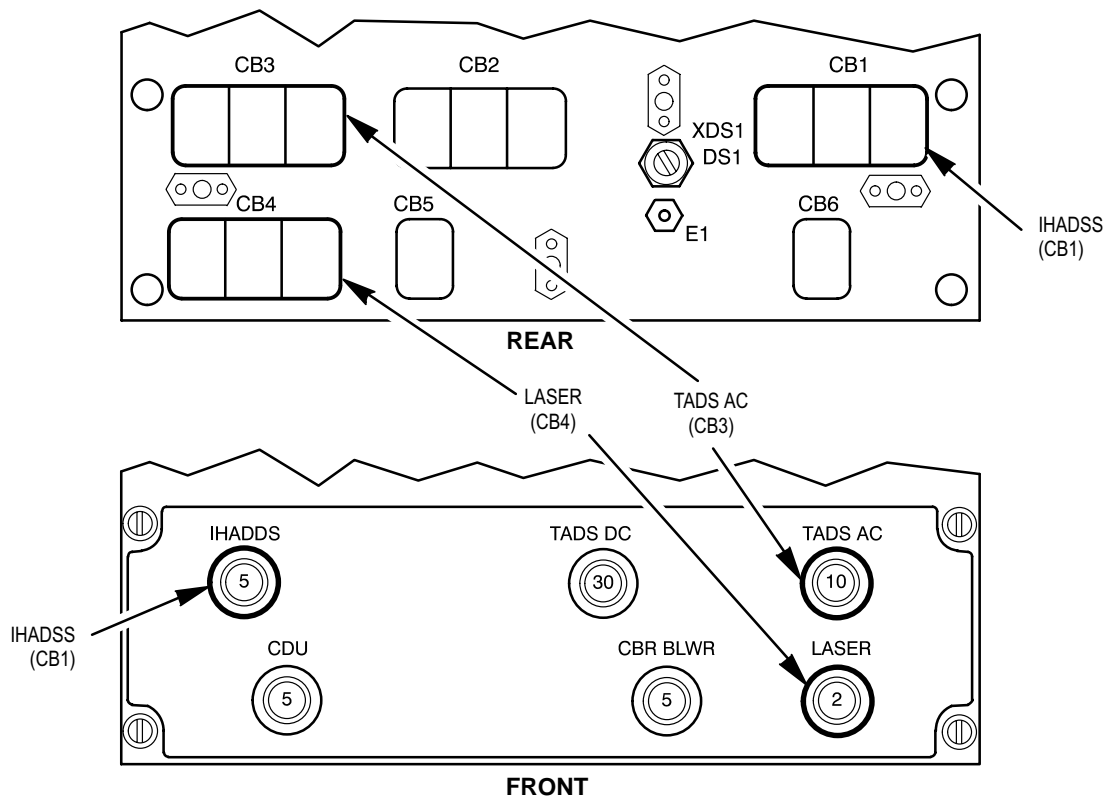


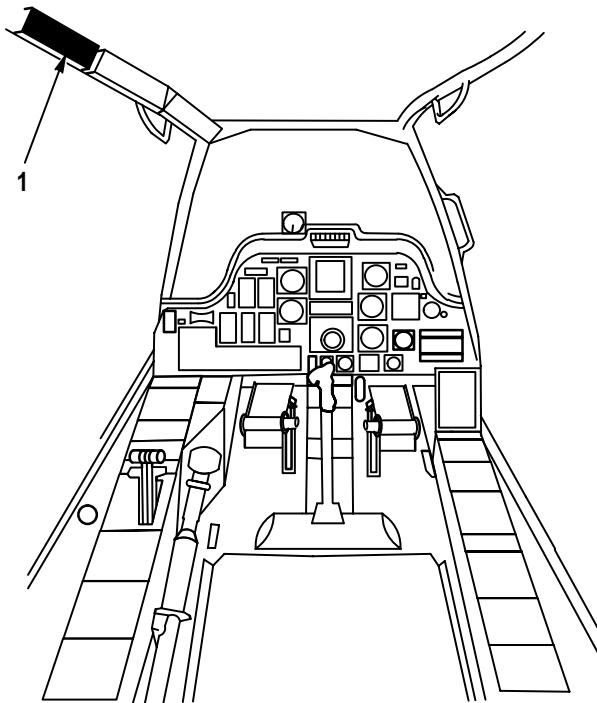
Figure 9-25. CPG Circuit Breaker Panel 2

M69-202

(3) Pilot station ac essential bus 2 circuit protection.

NOTE

Refer to pilot station (fig. 9-26) for configuration and component locations.



1. PILOT AFT CIRCUIT BREAKER PANEL

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Figure 9-26. Pilot Station

Table 9-15 contains a listing of the circuit breakers associated with the pilot station ac essential bus 2, along with each circuit breaker's rating in amps.

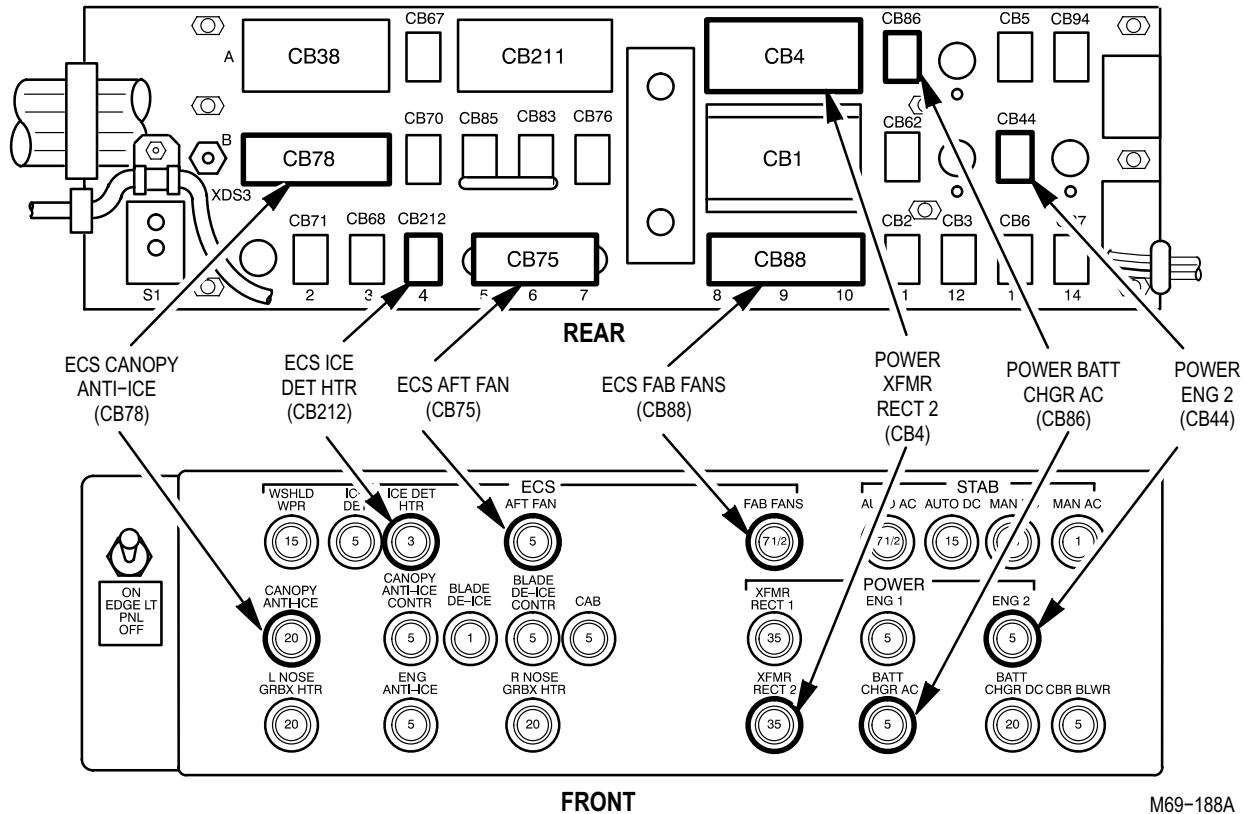
Table 9-15. Pilot Station AC Essential Bus 2 Circuit Protection

Pilot Aft Circuit Breaker Panel (fig. 9-27)		
CB NO.	CB NAME	RATING
CB4	POWER XFMR RECT 2	35 amp
CB44	POWER ENG 2	5 amp
CB75	ECS AFT FAN	5 amp
CB78	ECS CANOPY ANTI-ICE	20 amp
CB86	POWER BATT CHGR AC	5 amp
CB88	ECS FAB FANS	7.5 amp
CB212	ECS ICE DET HTR	3 amp

9-2. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

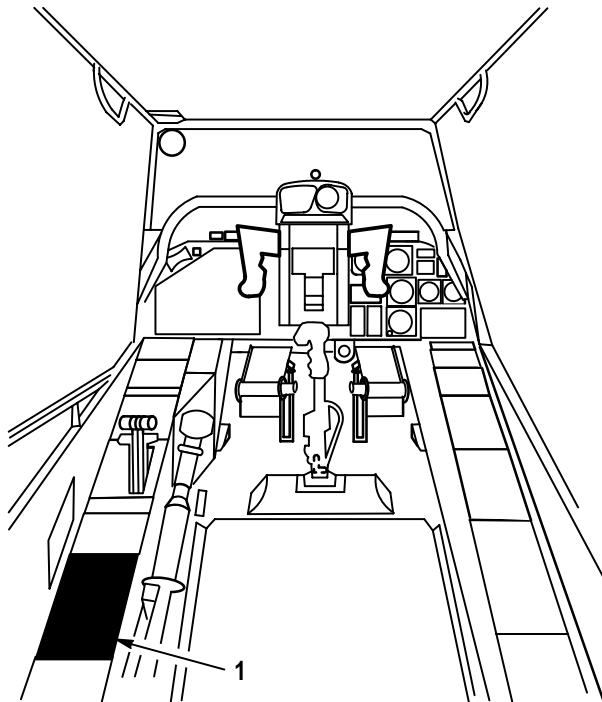
9-2

Table 9-15. Pilot Station AC Essential Bus 2 Circuit Protection (cont)



M69-188A

Figure 9-27. Pilot Aft Circuit Breaker Panel



- 1. CPG CIRCUIT BREAKER PANEL 1

M69-208

Figure 9-28. CPG Station

(4) CPG station ac essential bus 2 circuit protection.

NOTE

Refer to CPG station (fig. 9-28) for configuration and component locations.

Table 9-16 contains a listing of the circuit breakers associated with the CPG station ac essential bus 2, along with each circuit breaker's rating in amps.

Table 9-16. CPG Station AC Essential Bus 2 Circuit Protection

CPG Circuit Breaker Panel 1 (fig. 9-29)		
CB NO.	CB NAME	RATING
CB3	AWS MTR	30 amp
CB7	AWS AMMO	10 amp
CB8	FC RCDR	5 amp
CB14	PRI LT	5 amp

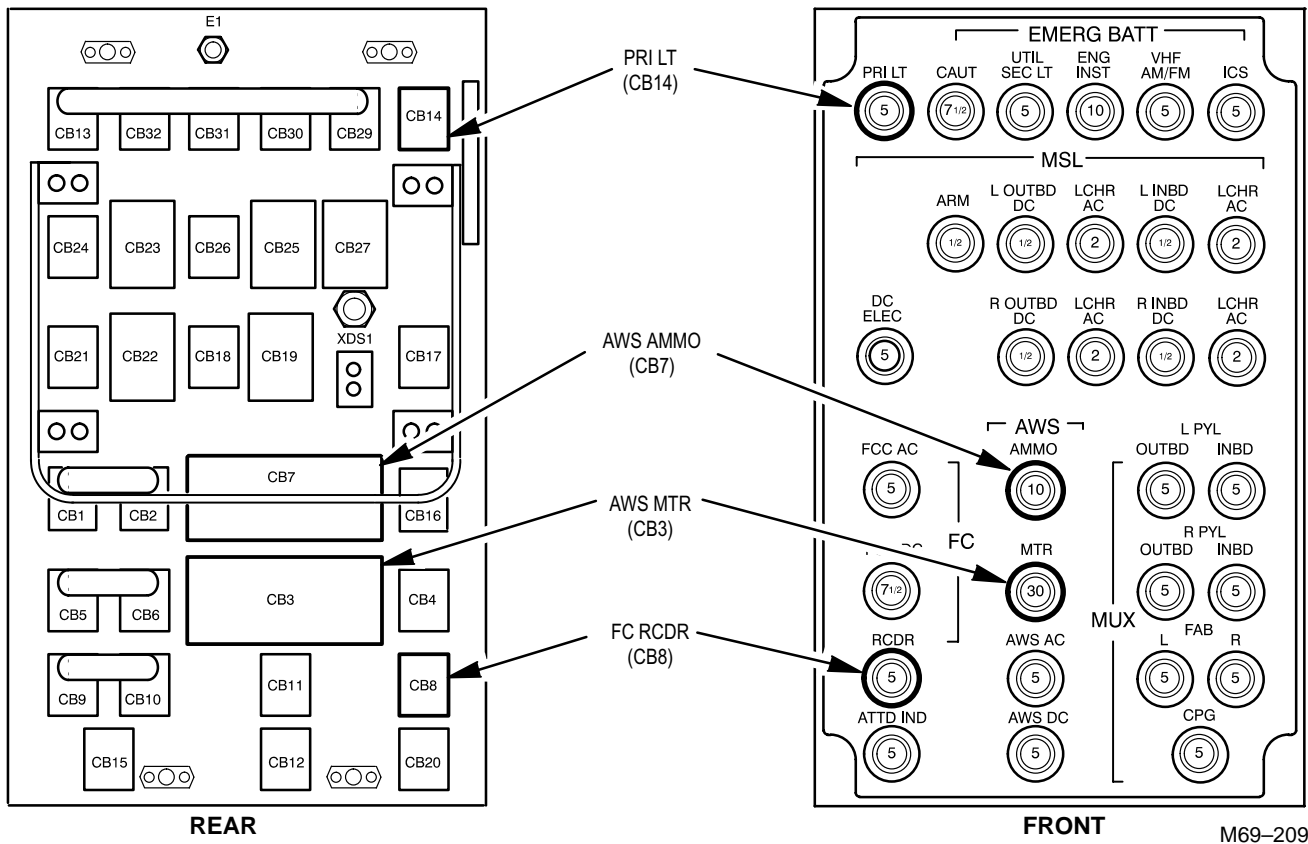
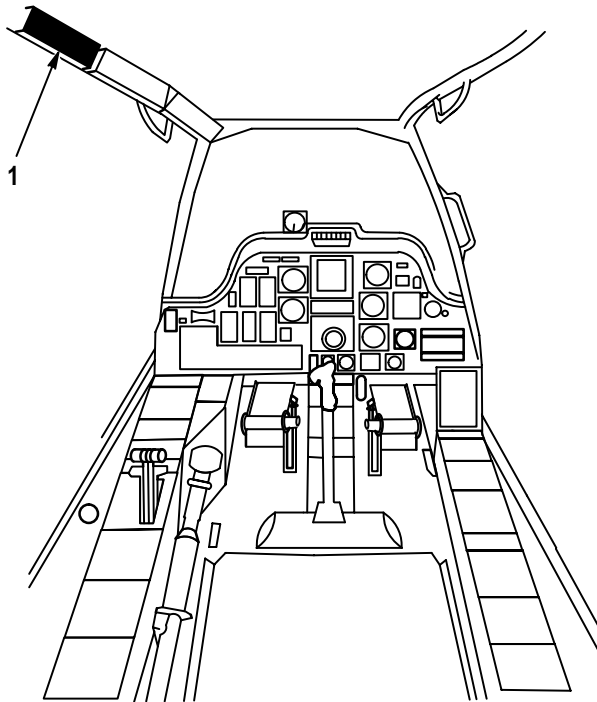


Figure 9-29. CPG Circuit Breaker Panel 1

(5) Pilot station dc essential bus 1 circuit protection.

NOTE

Refer to pilot station (fig. 9-30) for configuration and component locations.



1. PILOT AFT CIRCUIT BREAKER PANEL

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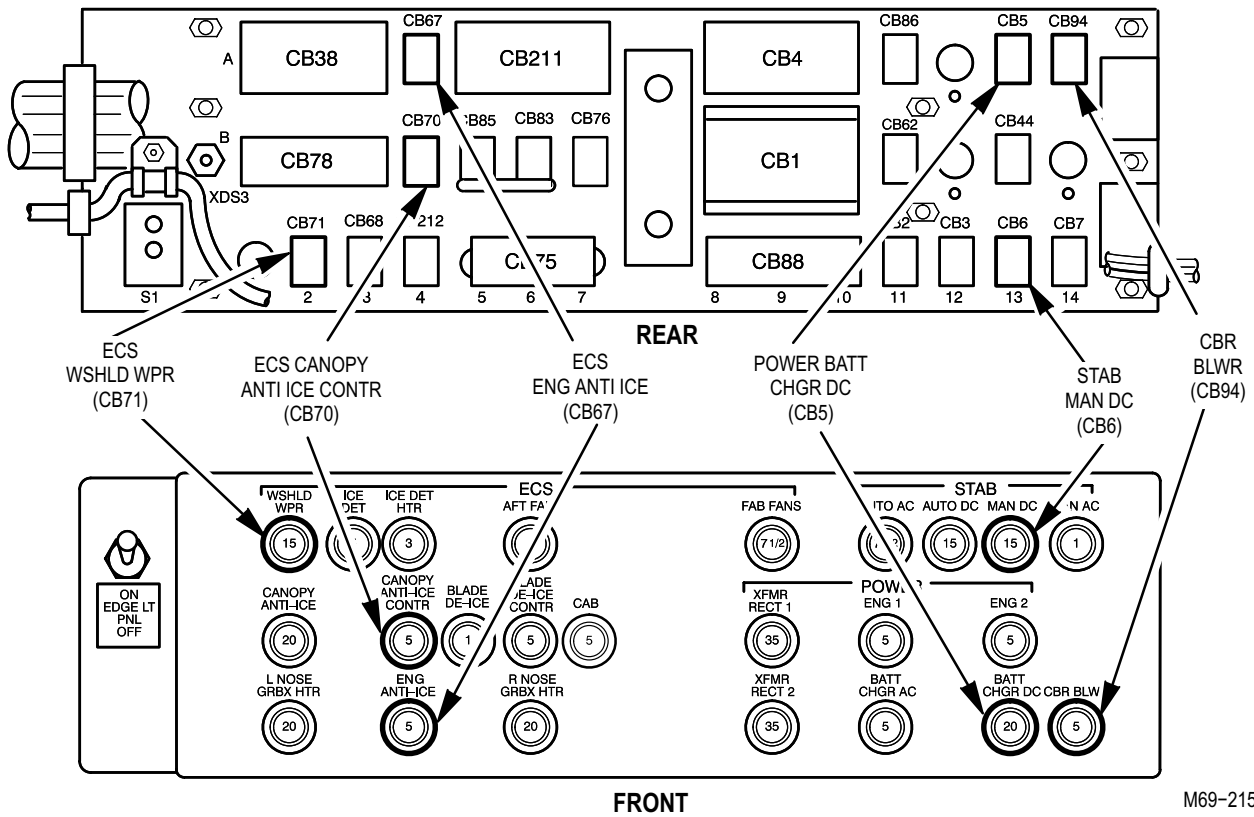
Figure 9-30. Pilot Station

Table 9-17 contains a listing of the circuit breakers associated with the pilot station dc essential bus 1, along with each circuit breaker's rating in amps.

Table 9-17. Pilot Station DC Essential Bus 1 Circuit Protection

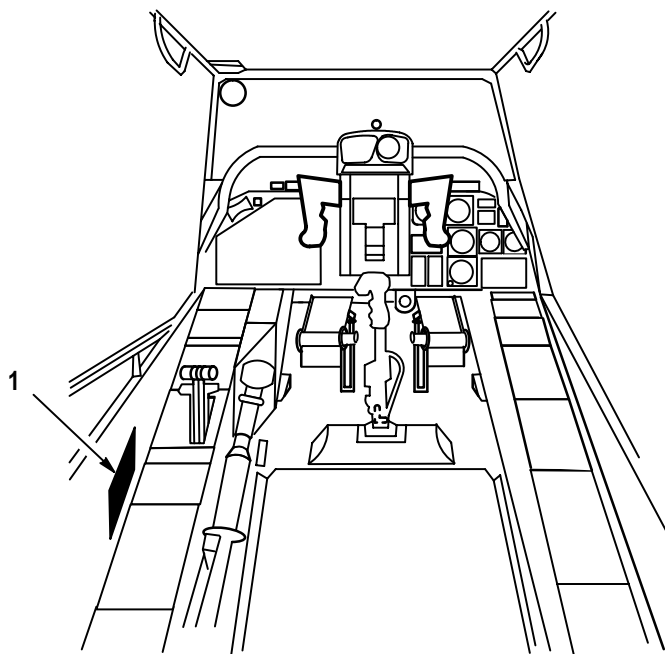
Pilot Aft Circuit Breaker Panel (fig. 9-31)		
CB NO.	CB NAME	RATING
CB5	POWER BATT CHGR DC	20 amp
CB6	STAB MAN DC	15 amp
CB67	ECS ENG ANTI-ICE	5 amp
CB70	ECS CANOPY ANTI-ICE CONTR	5 amp
CB71	ECS WSHLD WPR	15 amp
CB94	CBR BLWR	5 amp

Table 9-17. Pilot Station DC Essential Bus 1 Circuit Protection (cont)



M69-215

Figure 9-31. Pilot Aft Circuit Breaker Panel



1. CPG CIRCUIT BREAKER PANEL 2

M69-225

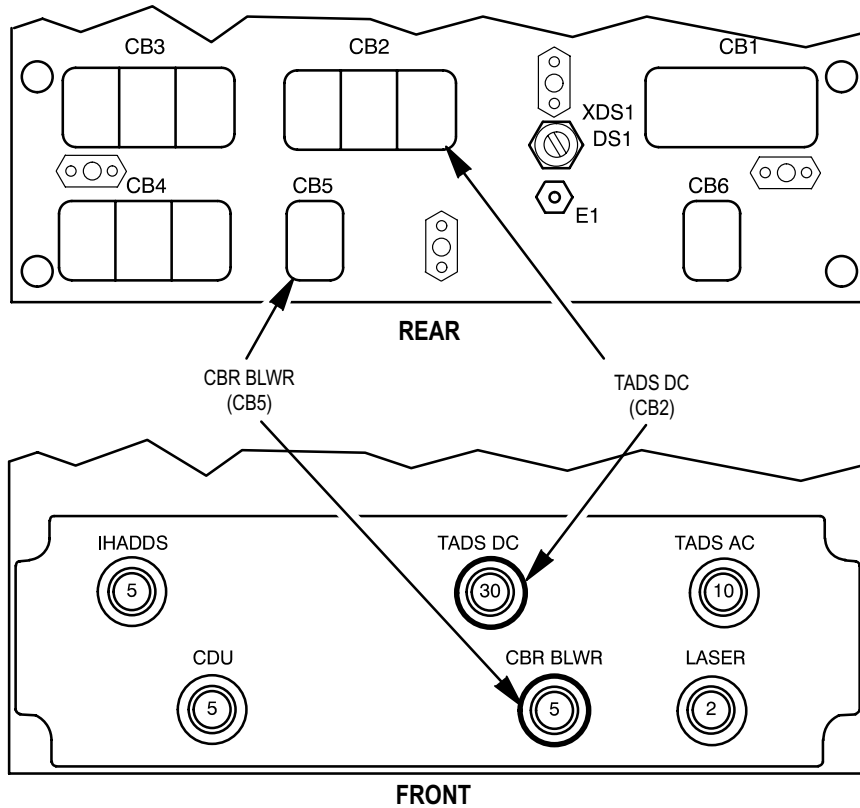
Figure 9-32. CPG Station

9-2. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

(6) CPG station dc essential bus 1 circuit protection.

NOTE

Refer to CPG station (fig. 9-32) for configuration and component locations.



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Figure 9-33. CPG Circuit Breaker Panel 2

Table 9-18 contains a listing of the circuit breakers associated with the CPG station dc essential bus 1, along with each circuit breaker's rating in amps.

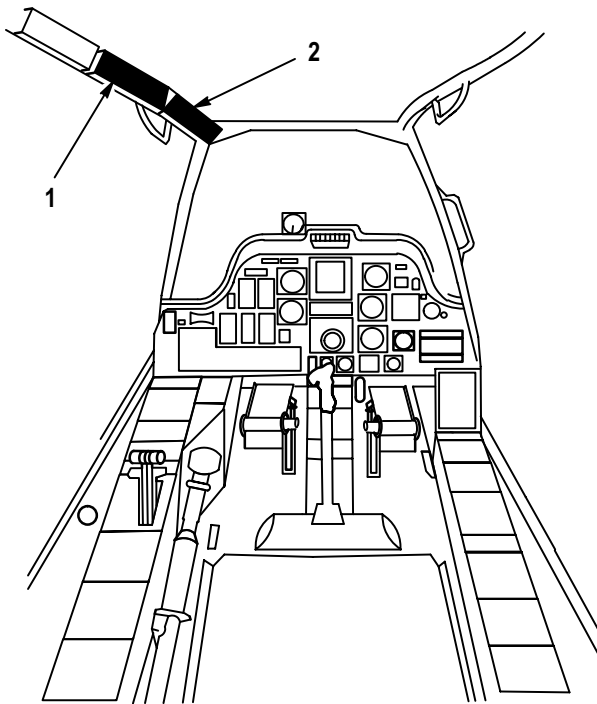
Table 9-18. CPG Station DC Essential Bus 1 Circuit Protection

CPG Circuit Breaker Panel 2 (fig. 9-33)		
CB NO.	CB NAME	RATING
CB2	TADS DC	30 amp
CB5	CBR BLWR	5 amp

(7) Pilot station dc essential bus 2 circuit protection.

NOTE

Refer to pilot station (fig. 9-34) for configuration and component locations.



- 1. PILOT CENTER CIRCUIT BREAKER PANEL
- 2. PILOT FORWARD CIRCUIT BREAKER PANEL

M69-219

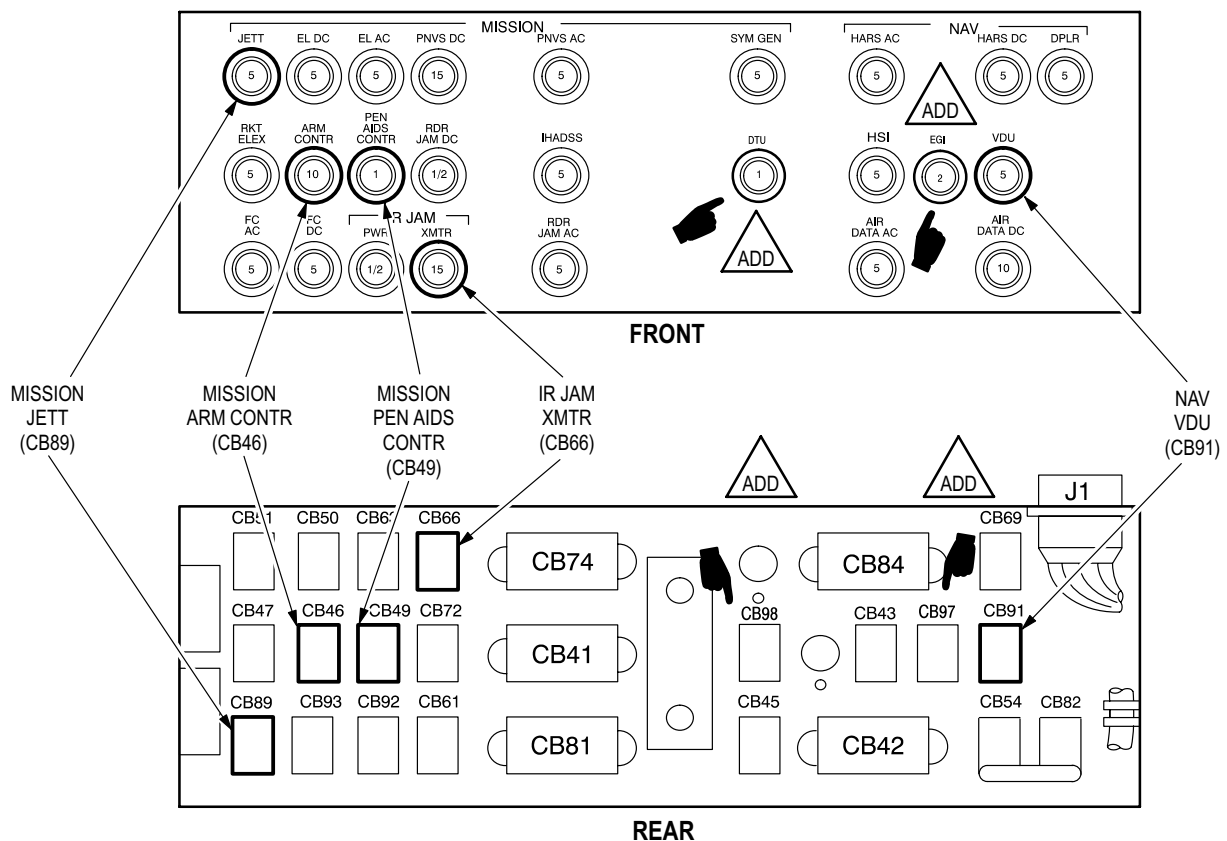
Figure 9-34. Pilot Station

9-2. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

Table 9-19 contains a listing of the circuit breakers associated with the pilot station dc essential bus 2, along with each circuit breaker's rating in amps.

Table 9-19. Pilot Station DC Essential Bus 2 Circuit Protection

Pilot Forward Circuit Breaker Panel (fig. 9-35)		
CB NO.	CB NAME	RATING
CB46	MISSION ARM CONTR	10 amp
CB49	MISSION PEN AIDS CONTR	1 amp
CB66	IR JAM XMTR	15 amp
CB89	MISSION JETT	5 amp
CB91	NAV VDU	5 amp
CB93	MISSION EL DC	5 amp



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Figure 9-35. Pilot Forward Circuit Breaker Panel

Table 9-19. Pilot Station DC Essential Bus 2 Circuit Protection (cont)

Pilot Center Circuit Breaker Panel (fig. 9-36)		
CB NO.	CB NAME	RATING
CB56	FUEL TRANS	10 amp
CB57	FUEL BST	7.5 amp
CB59	TWHL LOCK	5 amp
CB73	LT NAV	5 amp
CB79	VIB MON	5 amp
CB96	LSR DET (ADP)	5 amp

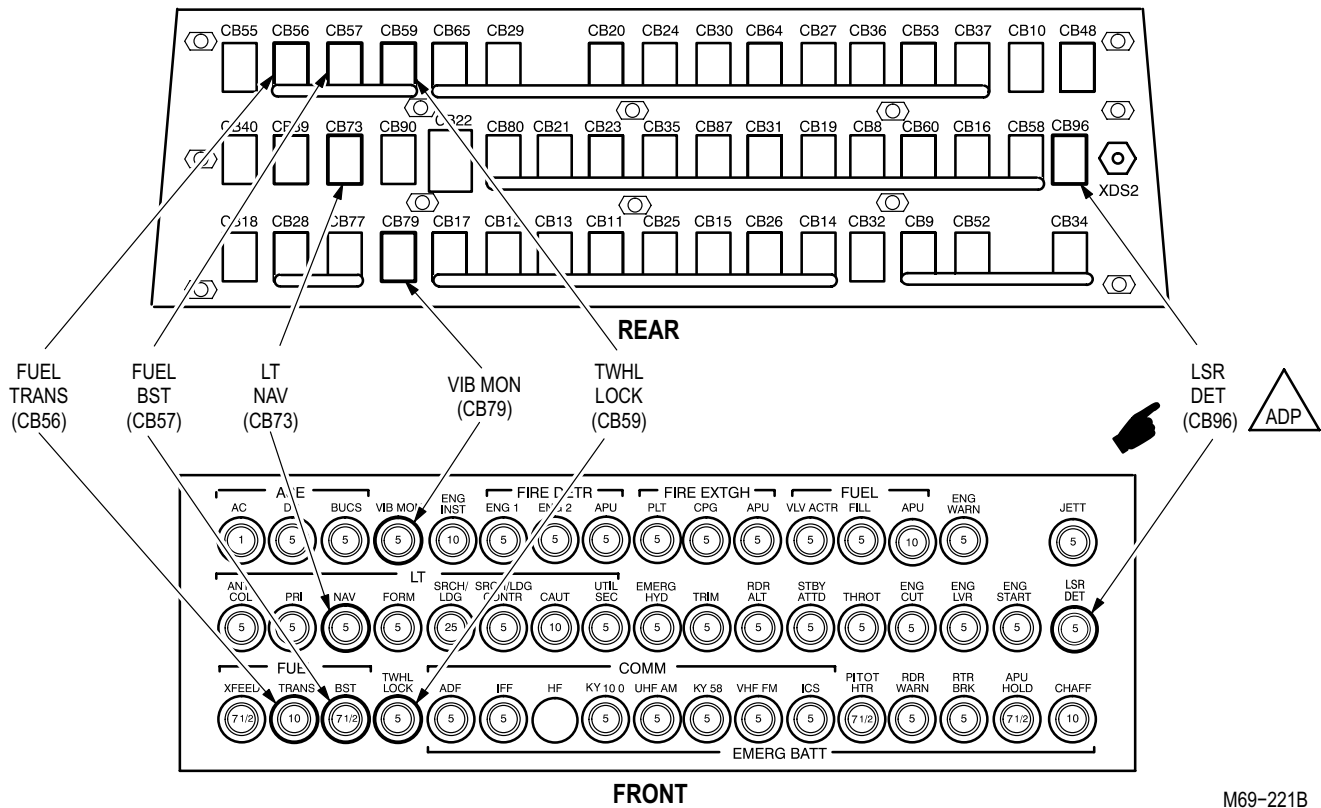


Figure 9-36. Pilot Center Circuit Breaker Panel

M69-221B

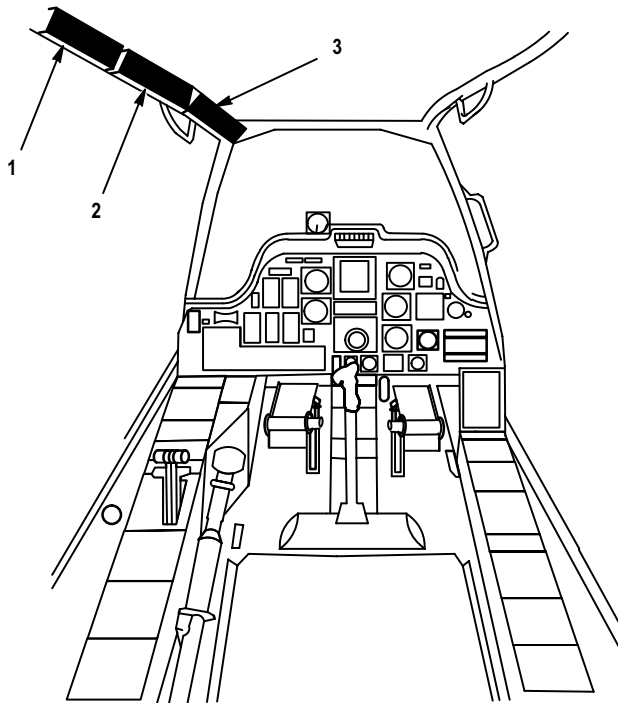
9-2. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

9-2

(8) Pilot station dc essential bus 3 circuit protection.

NOTE

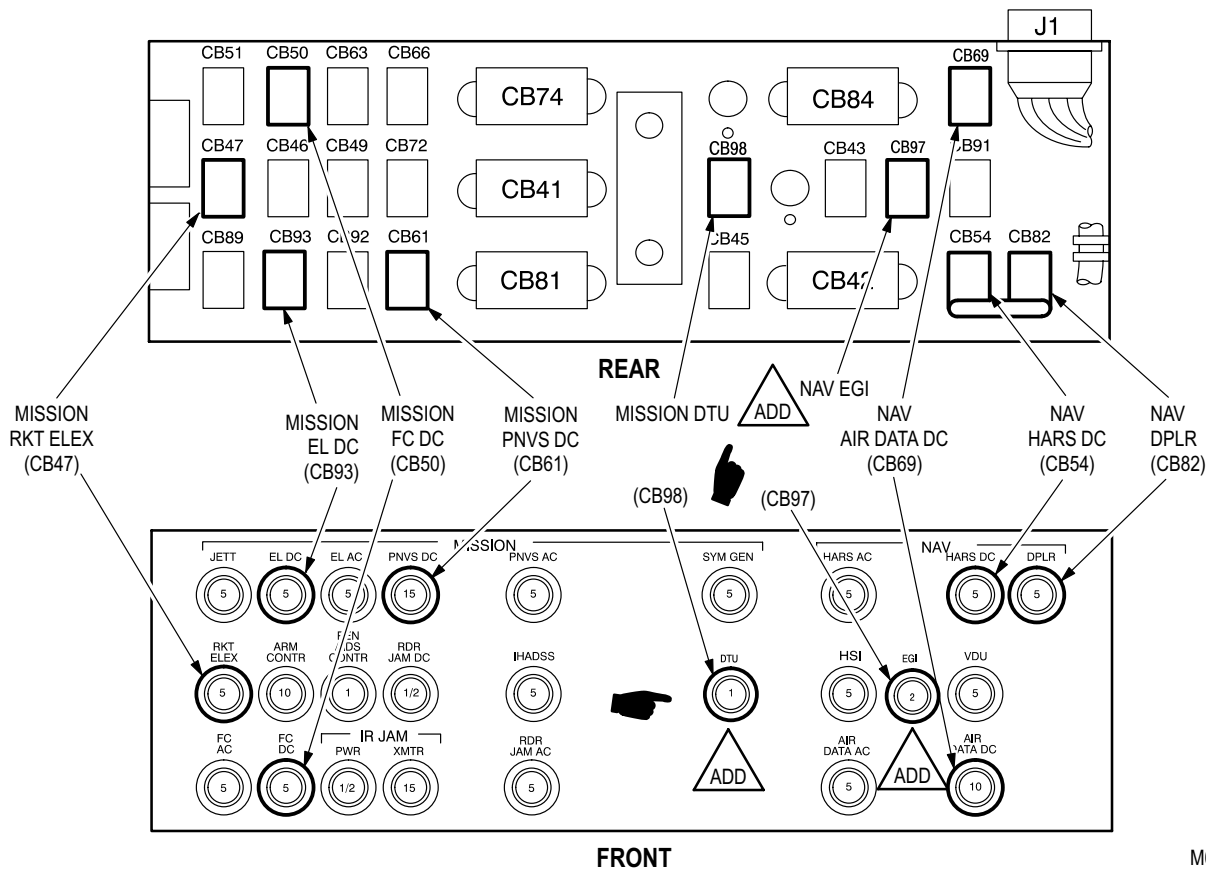
Refer to pilot station (fig. 9-37) for configuration and component locations.



1. PILOT AFT CIRCUIT BREAKER PANEL
2. PILOT CENTER CIRCUIT BREAKER PANEL
3. PILOT FORWARD CIRCUIT BREAKER PANEL

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Figure 9-37. Pilot Station



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Figure 9-38. Pilot forward Circuit Breaker Panel

Table 9-20 contains a listing of the circuit breakers associated with the pilot station dc essential bus 3, along with each circuit breaker's rating in amps.

Table 9-20. Pilot Station DC Essential Bus 3 Circuit Protection

Pilot Forward Circuit Breaker Panel (fig. 9-38)		
CB NO.	CB NAME	RATING
CB47	MISSION RKT ELEX	5 amp
CB50	MISSION FC DC	5 amp
CB54	NAV HARS DC	5 amp
CB61	MISSION PNVs DC	15 amp
CB69	NAV AIR DATA DC	10 amp
CB82	NAV DPLR	5 amp
CB93	MISSION EL DC	5 amp
CB97	NAV EGI (ADD)	2 amp
CB98	MISSION DTU (ADD)	1 amp

Table 9-20. Pilot Station DC Essential Bus 3 Circuit Protection (cont)

Pilot Center Circuit Breaker Panel (fig. 9-39)		
CB NO.	CB NAME	RATING
CB28	ASE DC	5 amp
CB77	ASE BUCS	5 amp

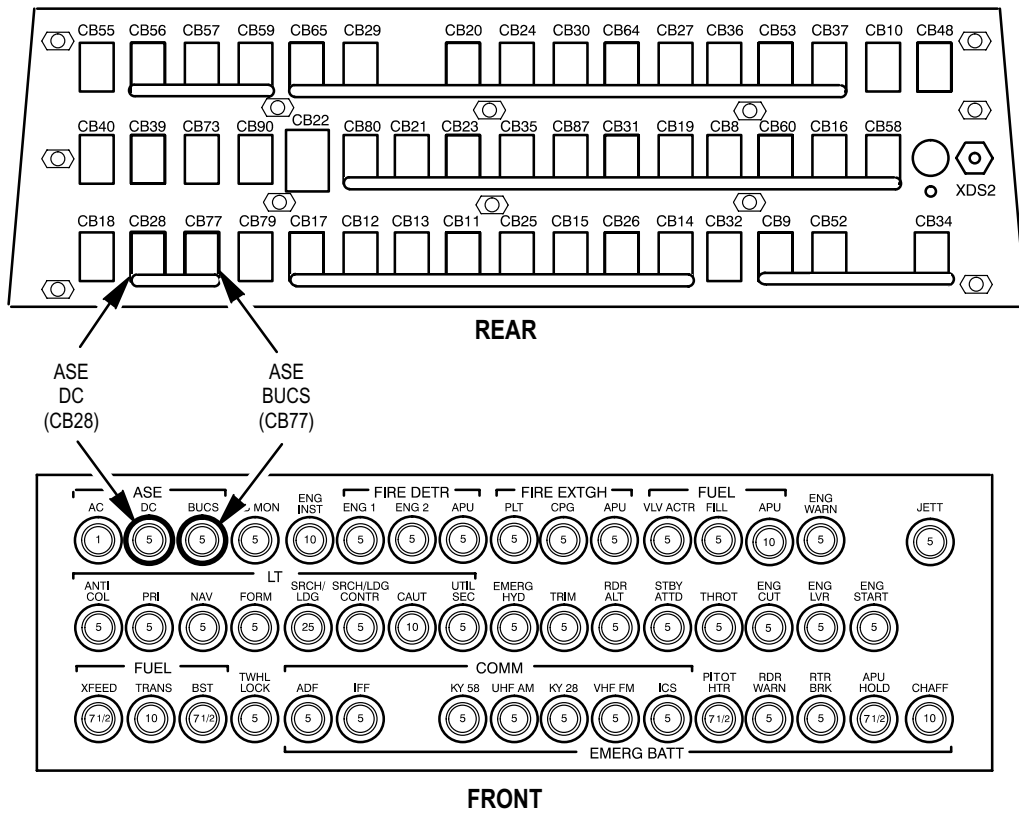


Figure 9-39. Pilot Center Circuit Breaker Panel

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Table 9-20. Pilot Station DC Essential Bus 3 Circuit Protection (cont)

Pilot Aft Circuit Breaker Panel (fig. 9-40)		
CB NO.	CB NAME	RATING
CB3	STAB AUTO DC	15 amp
CB68	ECS ICE DET	5 amp
CB83	ECS BLADE DE-ICE CONTR	5 amp
CB85	ECS BLADE DE-ICE	1 amp

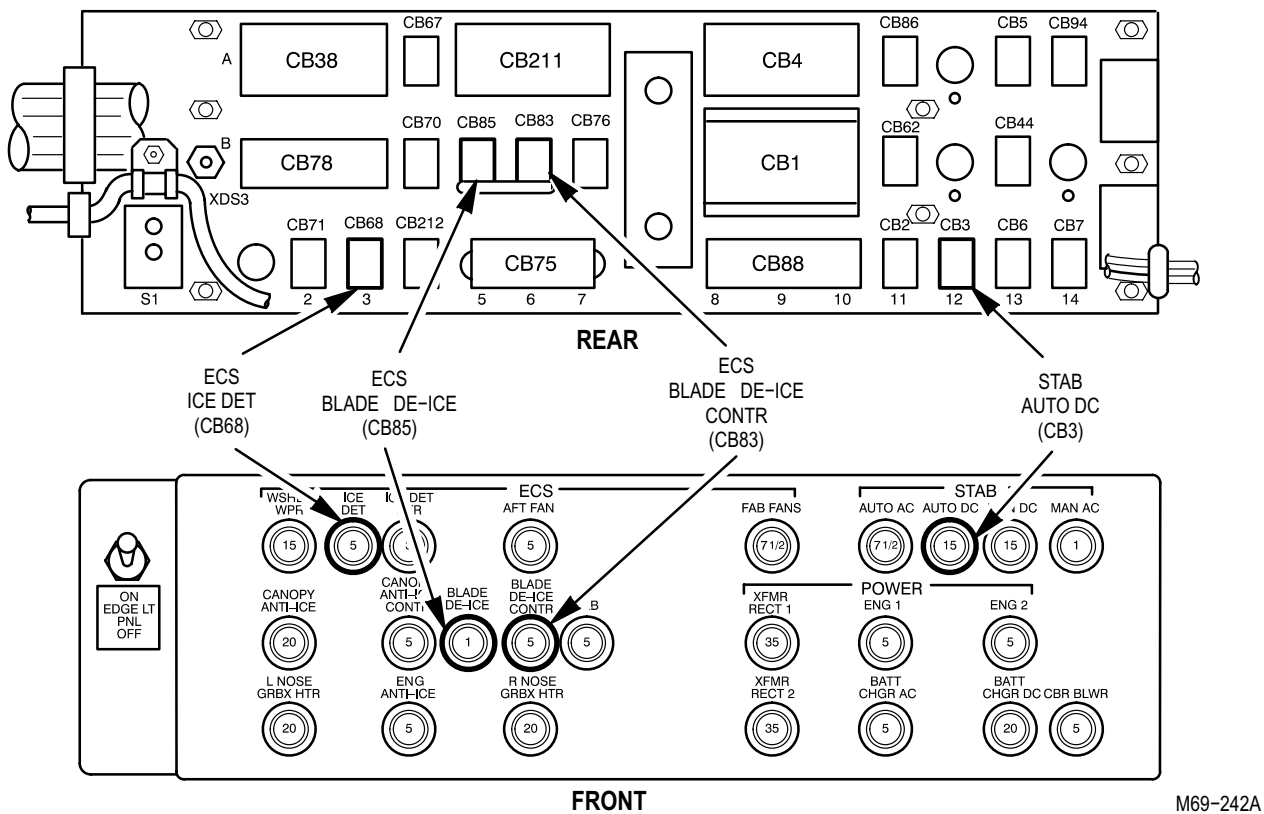


Figure 9-40. Pilot Aft Circuit Breaker Panel

(9) CPG station dc essential bus 3 circuit protection.

NOTE

Refer to CPG station (fig. 9-41) for configuration and component locations.

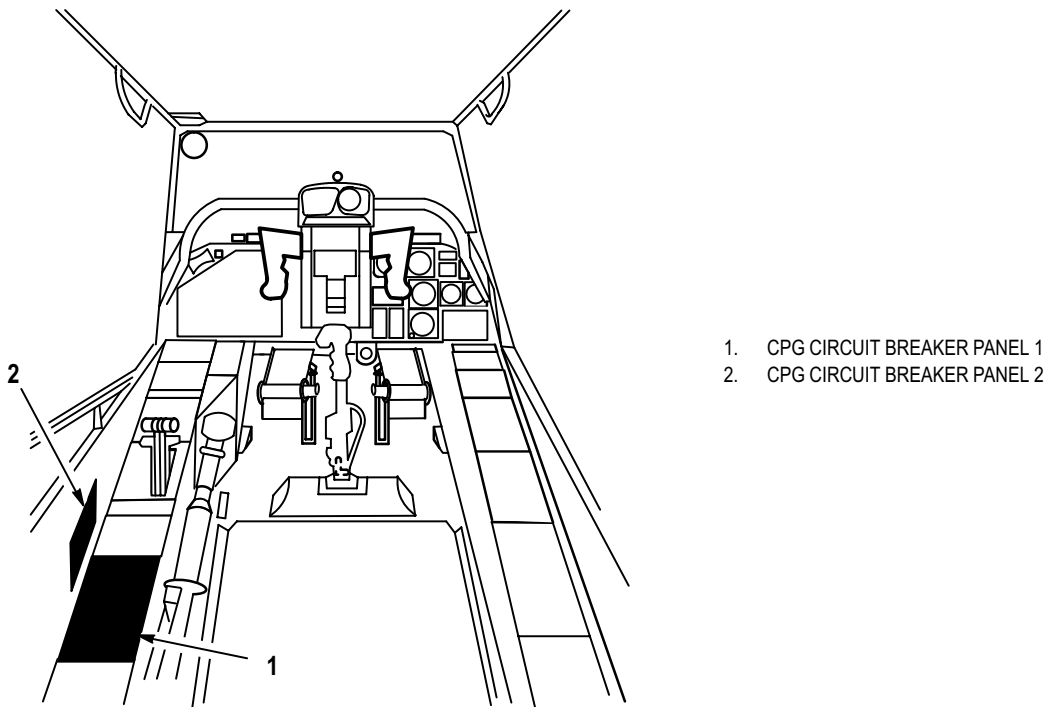


Figure 9-41. CPG Station

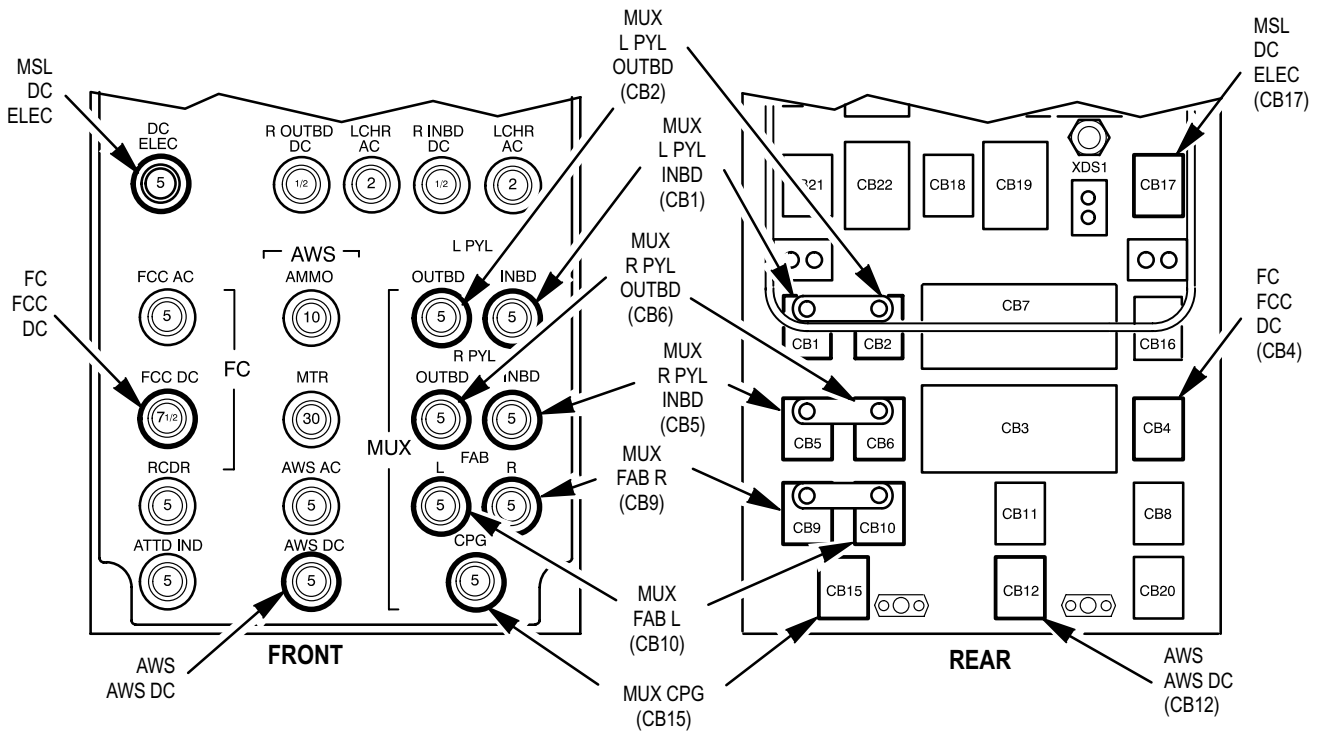
Table 9-21 contains a listing of the circuit breakers associated with the CPG station dc essential bus 3, along with each circuit breaker's rating in amps.

Table 9-21. CPG Station DC Essential Bus 3 Circuit Protection

CPG Circuit Breaker Panel 1 (fig. 9-42)		
CB NO.	CB NAME	RATING
CB1	MUX L PYL INBD	5 amp
CB2	MUX L PYL OUTBD	5 amp
CB4	FC FCC DC	7.5 amp
CB5	MUX R PYL INBD	5 amp
CB6	MUX R PYL OUTBD	5 amp
CB9	MUX FAB R	5 amp
CB10	MUX FAB L	5 amp
CB12	AWS AWS DC	5 amp

Table 9-21. CPG Station DC Essential Bus 3 Circuit Protection (cont)

CPG Circuit Breaker Panel 1 (cont) (fig. 9-42)		
CB NO.	CB NAME	RATING
CB15	MUX CPG	5 amp
CB17	MSL DC ELEC	5 amp

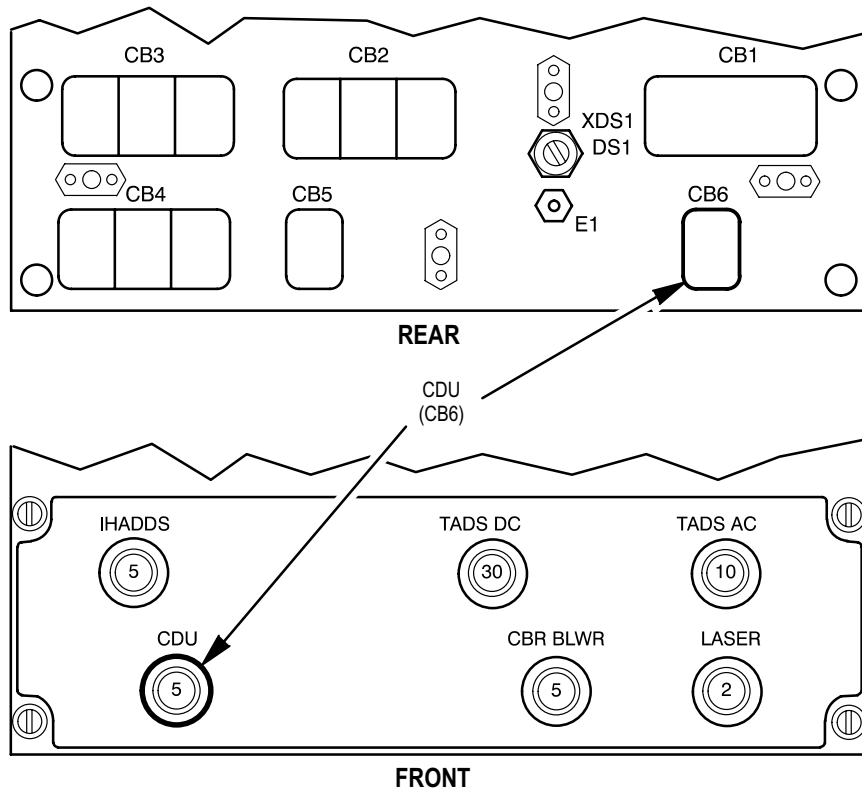


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Figure 9-42. CPG Circuit Breaker Panel 1

CPG Circuit Breaker Panel 2 (fig. 9-43)		
CB NO.	CB NAME	RATING
CB6	CDU	5 amp

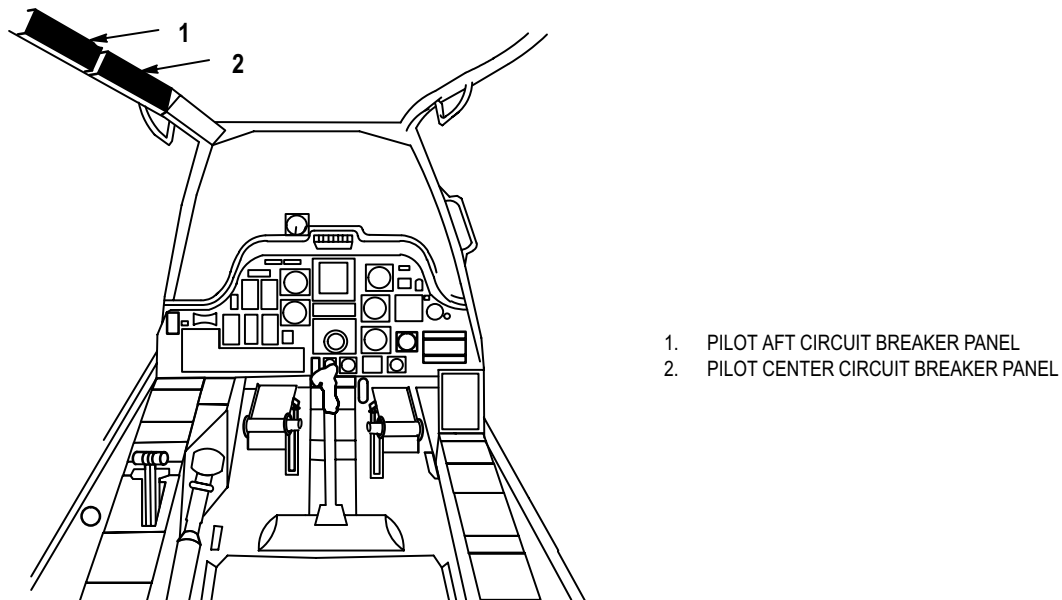
Table 9-21. CPG Station DC Essential Bus 3 Circuit Protection (cont)



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Figure 9-43. CPG Circuit Breaker Panel 2

(10) Pilot station dc emergency bus 3 circuit protection.



- 1. PILOT AFT CIRCUIT BREAKER PANEL
- 2. PILOT CENTER CIRCUIT BREAKER PANEL

M69-246

Figure 9-44. Pilot Station

NOTE

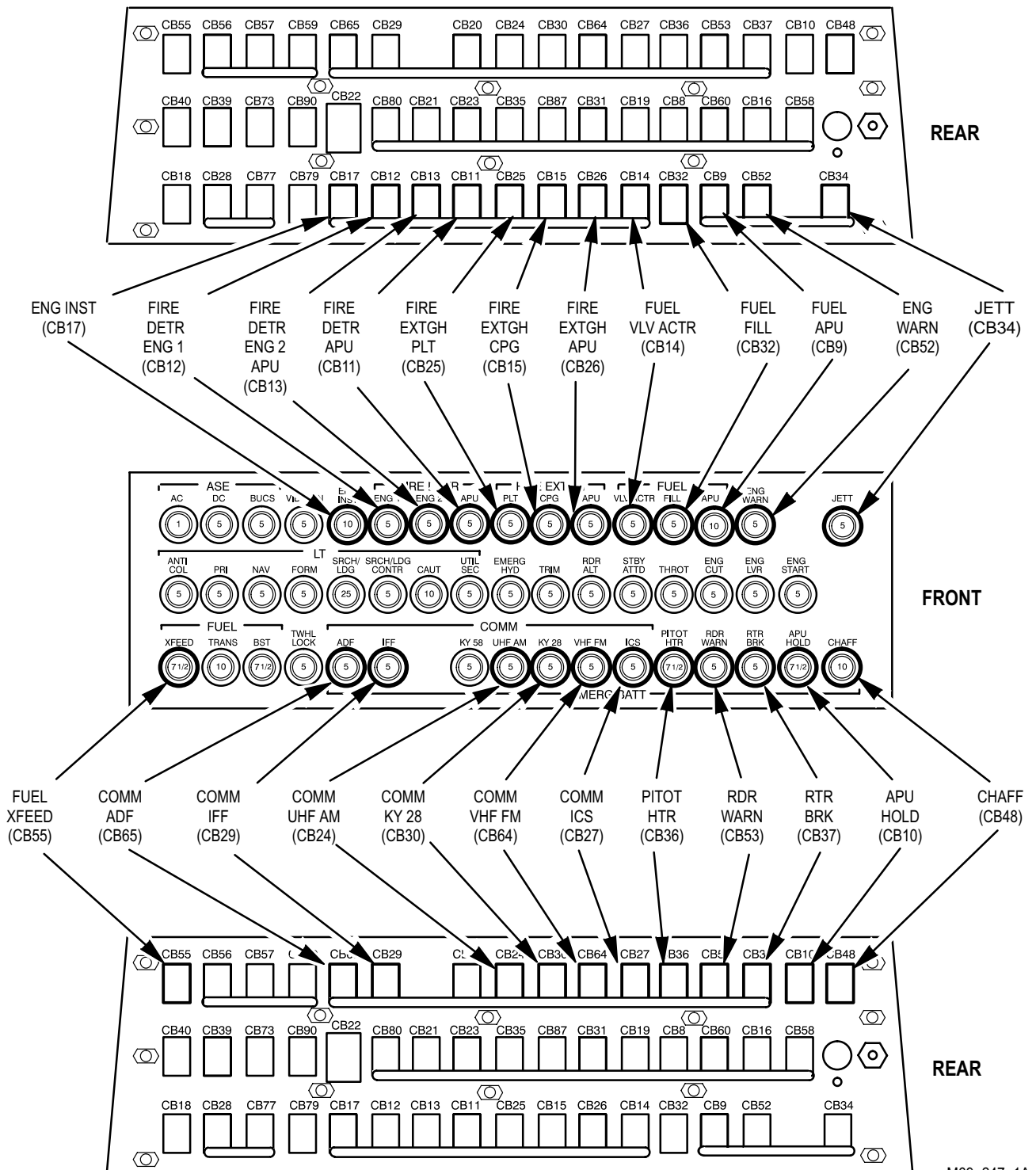
Refer to pilot station (fig. 9-44) for configuration and component locations.

Table 9-22 contains a listing of the circuit breakers associated with the pilot station dc emergency bus, along with each circuit breaker's rating in amps.

Table 9-22. Pilot Station DC Emergency Bus Circuit Protection

Pilot Center Circuit Breaker Panel (fig. 9-45 sheet 1 of 2)		
CB NO.	CB NAME	RATING
CB9	FUEL APU	10 amp
CB10	APU HOLD	7.5 amp
CB11	FIRE DETR APU	5 amp
CB12	FIRE DETR ENG 1	5 amp
CB13	FIRE DETR ENG 2	5 amp
CB14	FUEL VLV ACTR	5 amp
CB15	FIRE EXTGH CPG	5 amp
CB17	ENG INST	10 amp
CB24	COMM UHF AM	5 amp
CB25	FIRE EXTGH PLT	5 amp
CB26	FIRE EXTGH APU	5 amp
CB27	COMM ICS	5 amp
CB29	COMM IFF	5 amp
CB30	COMM KY 28	5 amp
CB32	FUEL FILL	5 amp
CB34	JETT	5 amp
CB36	PITOT HTR	7.5 amp
CB37	RTR BRK	5 amp
CB48	CHAFF	10 amp
CB52	ENG WARN	5 amp
CB53	RDR WARN	5 amp
CB55	FUEL XFEED	7.5 amp
CB64	COMM VHF FM	5 amp
CB65	COMM ADF	5 amp

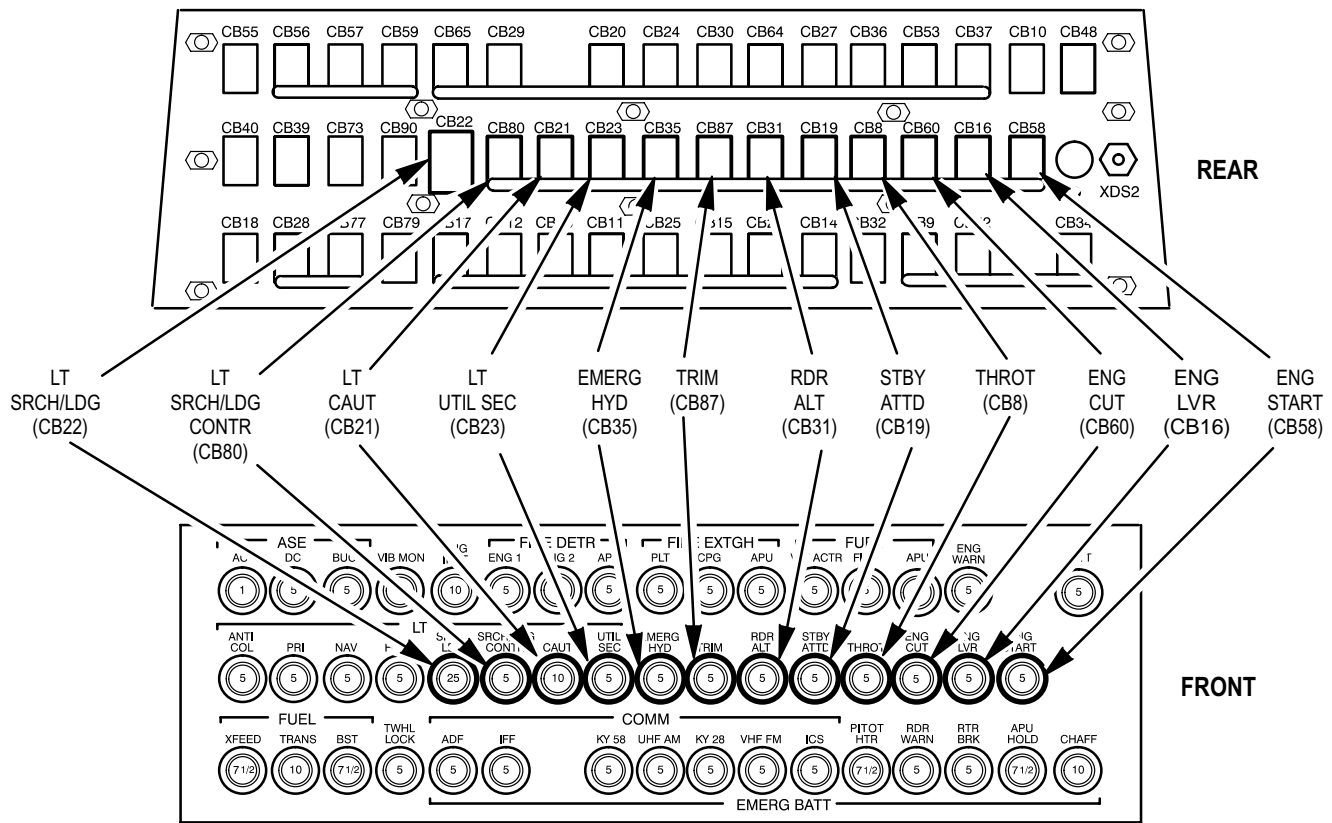
Table 9-22. Pilot Station DC Emergency Bus Circuit Protection (cont)



M69-247-1A

Figure 9-45. Pilot Center Circuit Breaker Panel (Sheet 1 of 2)

Table 9-22. Pilot Station DC Emergency Bus Circuit Protection (cont)



M69-247-2A

Figure 9-45. Pilot Center Circuit Breaker Panel (Sheet 2 of 2)

Pilot Center Circuit Breaker Panel (cont) (fig. 9-45 sheet 2 of 2)		
CB NO.	CB NAME	RATING

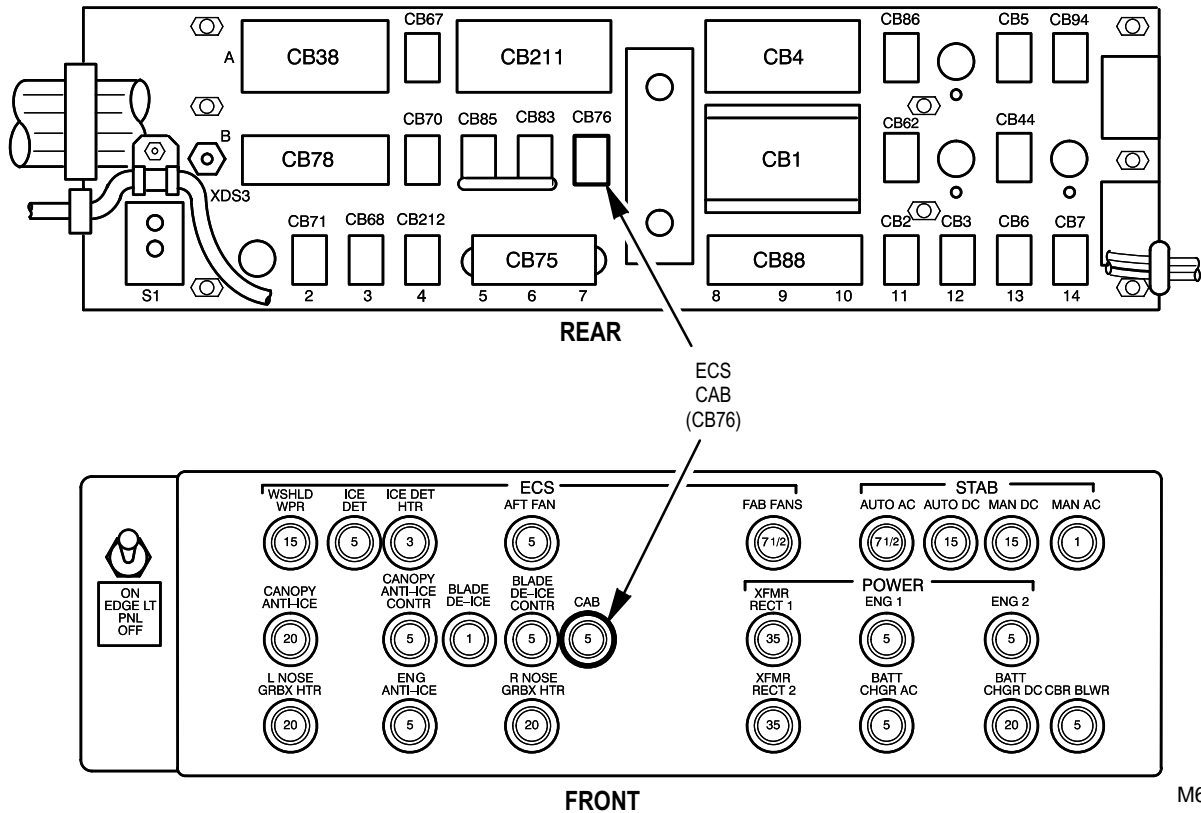
CB8	THROT	5 amp
CB16	ENG LVR	5 amp
CB19	STBY ATTD	5 amp
CB21	LT CAUT	10 amp
CB22	LT SRCH/LDG	25 amp
CB23	LT UTIL SEC	5 amp
CB31	RDR ALT	5 amp
CB35	EMERG HYD	5 amp
CB58	ENG START	5 amp
CB60	ENG CUT	5 amp
CB80	LT SRCH/LDG CONTR	5 amp
CB87	TRIM	5 amp

9-2. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

9-2

Table 9-22. Pilot Station DC Emergency Bus Circuit Protection (cont)

Pilot Aft Circuit Breaker Panel (fig. 9-46)		
CB NO.	CB NAME	RATING
CB76	ECS CAB	5 amp



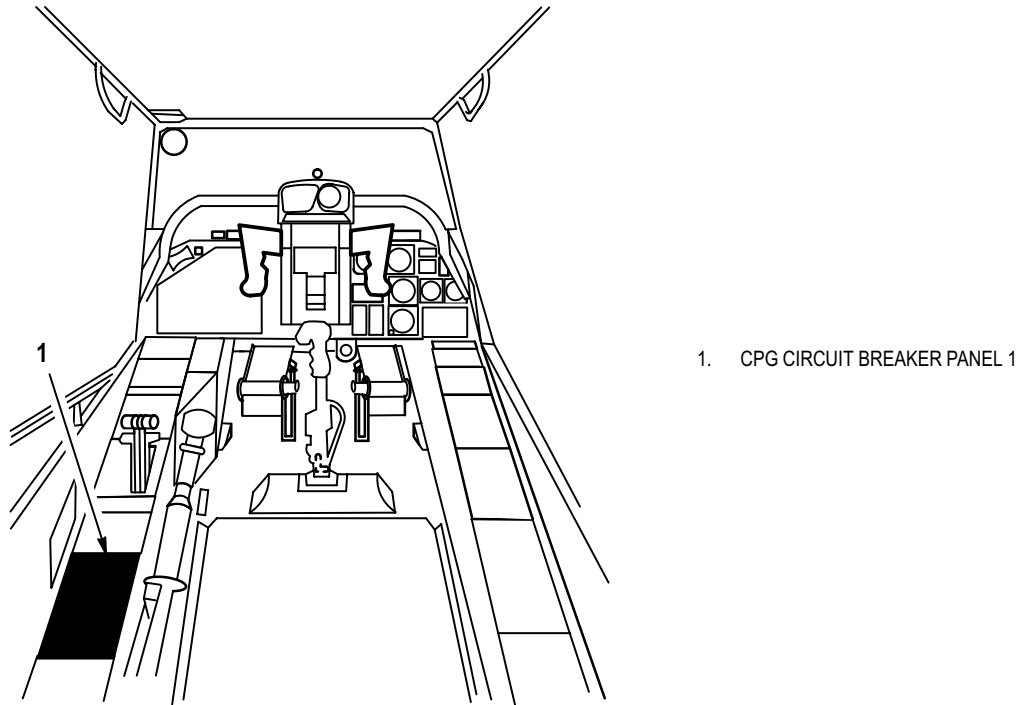
M69-246

Figure 9-46. Pilot Aft Circuit Breaker Panel

(11) CPG station dc emergency bus 3 circuit protection.

NOTE

Refer to CPG station (fig. 9-47) for configuration and component locations.



M69-252

Figure 9-47. CPG Station

Table 9-23 contains a listing of the circuit breakers associated with the CPG station dc emergency bus, along with each circuit breaker's rating in amps.

Table 9-23. CPG Station DC Emergency Bus Circuit Protection

CPG Circuit Breaker Panel 1 (fig. 9-48)		
CB NO.	CB NAME	RATING
CB13	EMERG BATT ICS	5 amp
CB29	EMERG BATT CAUT	7.5 amp
CB30	EMERG BATT UTIL SEC LT	5 amp
CB31	EMERG BATT ENG INST	10 amp
CB32	EMERG BATT VHF AM/FM	5 amp

Table 9-23. CPG Station DC Emergency Bus Circuit Protection (cont)

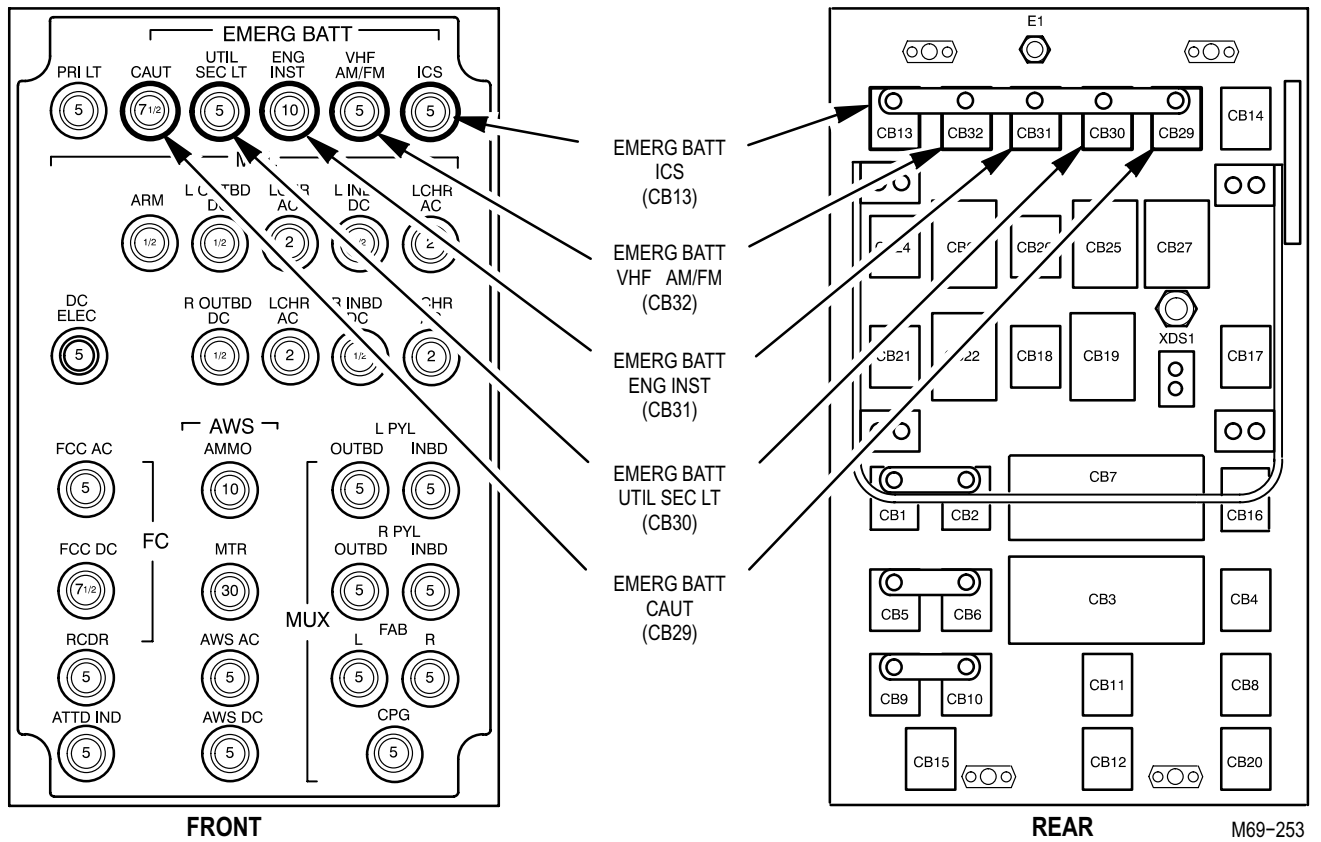
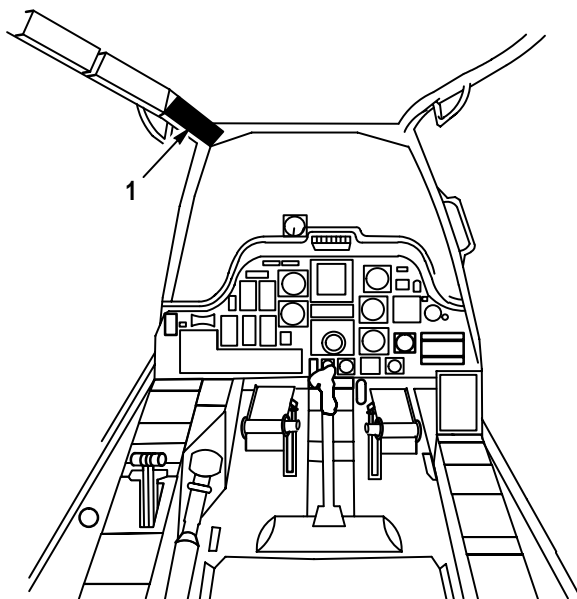


Figure 9-48. CPG Circuit Breaker Panel 1



1. PILOT FORWARD CIRCUIT BREAKER PANEL

Figure 9-49. Pilot Station

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(12) Pilot station dc ground circuit protection.

NOTE

Refer to pilot station (fig. 9-49) for configuration and component locations.

Table 9-24 contains a listing of the circuit breakers associated with the pilot station dc ground protection system, along with each circuit breaker's rating in amps.

Table 9-24. Pilot Station DC Ground Protection

Pilot Forward Circuit Breaker Panel (fig. 9-50)		
CB NO.	CB NAME	RATING
CB63	IR JAM PWR	0.5 amps
CB72	MISSION RDR JAM DC	0.5 amps

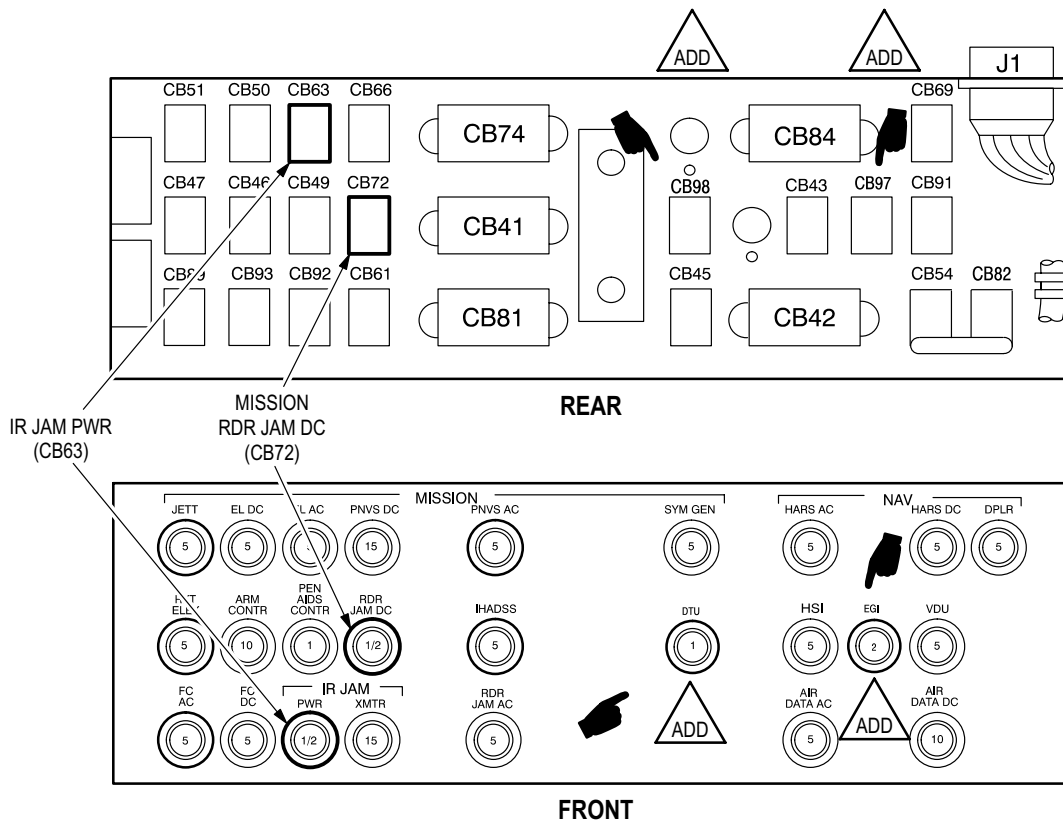


Figure 9-50. Pilot Forward Circuit Breaker Panel

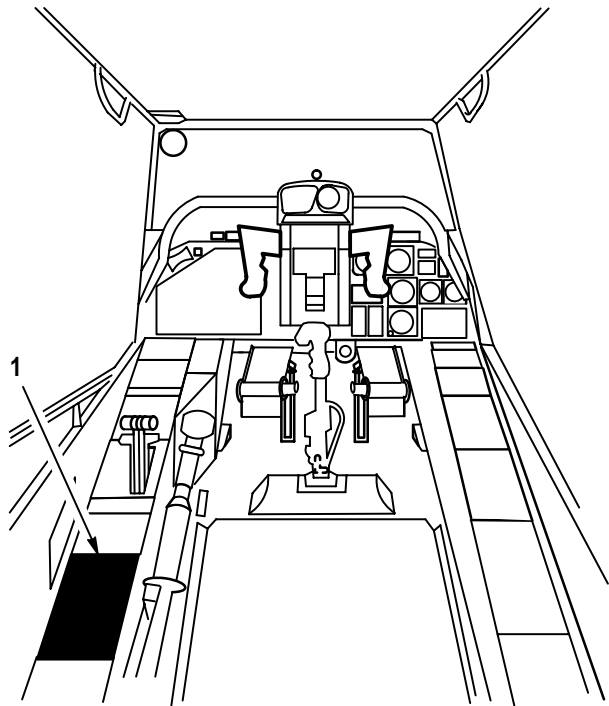
M69-259A

9-2. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

s. CPG station dc ground circuit protection.

NOTE

Refer to CPG station (fig. 9-51) for configuration and component locations.



1. CPG CIRCUIT BREAKER PANEL 1

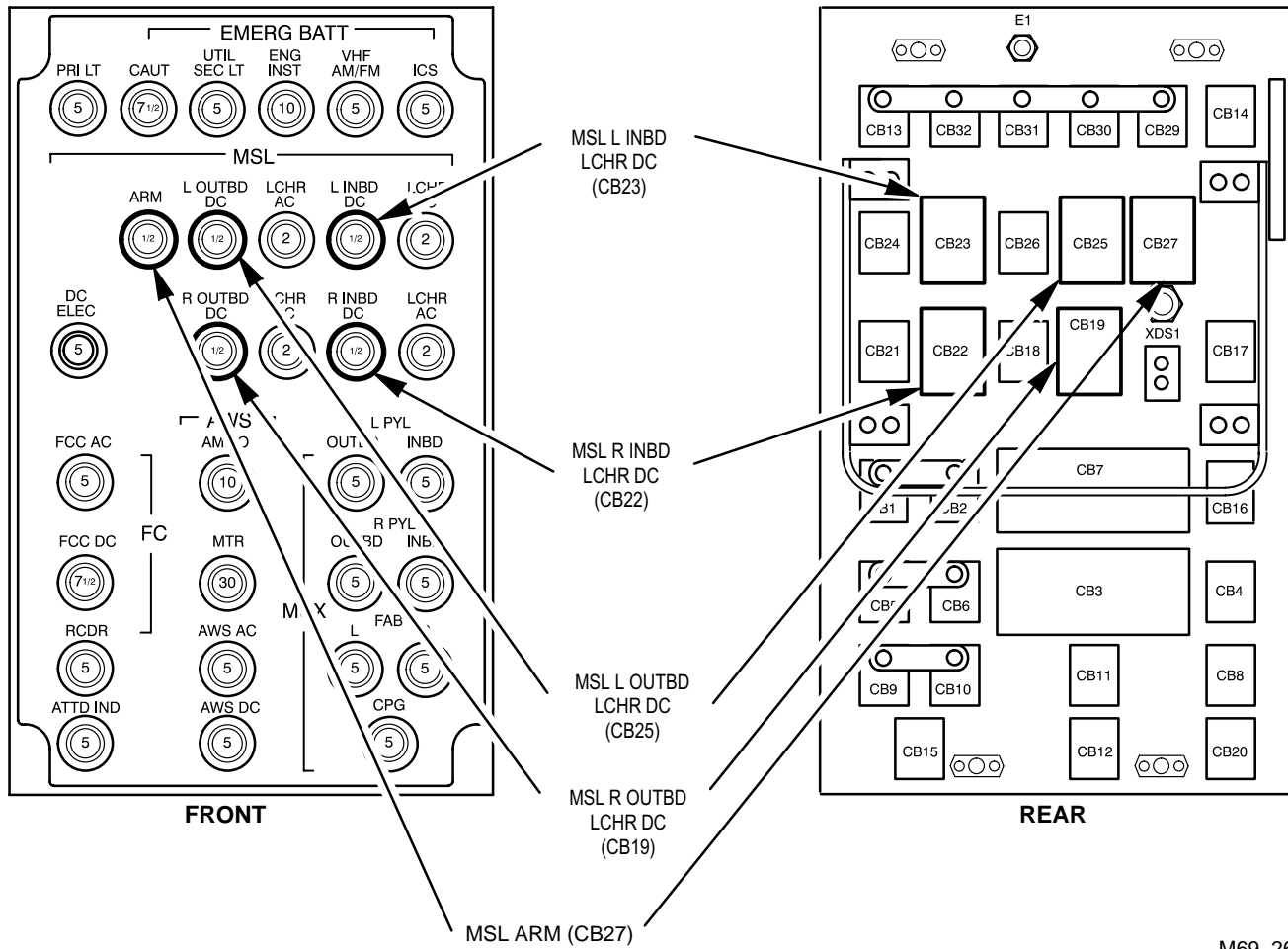
M69-263

Figure 9-51. CPG Station

Table 9-25 contains a listing of the circuit breakers associated with the CPG station dc ground circuit protection, along with each circuit breaker's rating in amps.

Table 9-25. CPG Station DC Ground Circuit Protection

CPG Circuit Breaker Panel 1 (fig. 9-52)		
CB NO.	CB NAME	RATING
CB19	MSL R OUTBD LCHR DC	0.5 amp
CB22	MSL R INBD LCHR DC	0.5 amp
CB23	MSL L INBD LCHR DC	0.5 amp
CB25	MSL L OUTBD LCHR DC	0.5 amp
CB27	MSL ARM	0.5 amp



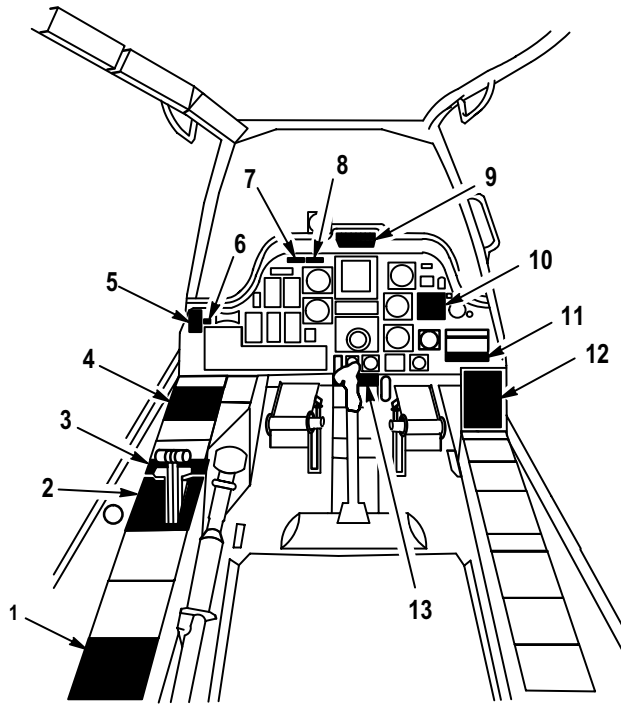
M69-264

Figure 9-52. CPG Circuit Breaker Panel 1

t. Caution/Warning System.

NOTE

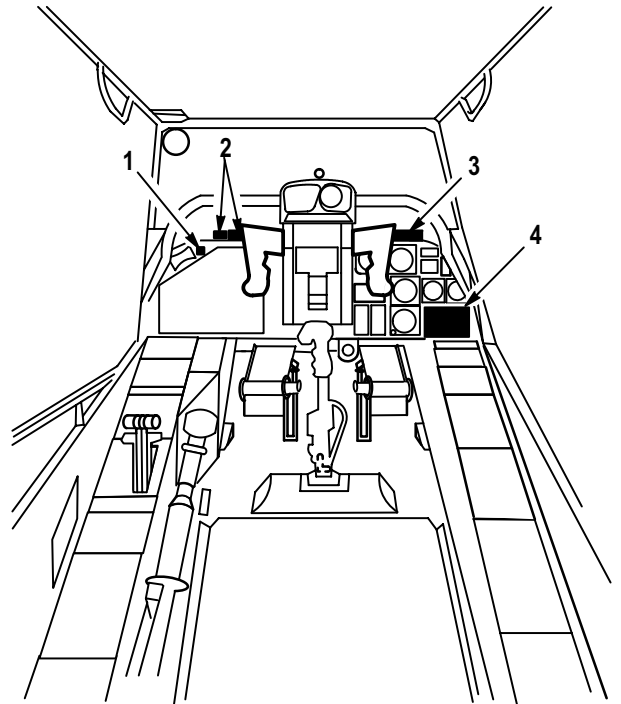
Refer to pilot station (fig. 9-53) and CPG station (fig. 9-54) for cockpit configuration and equipment.



- 1. PILOT ANTIICE PANEL
- 2. PILOT POWER QUADRANT
- 3. PILOT EMERG PWR CHK OVSP TEST PANEL
- 4. PILOT ROCKETS CONTROL PANEL
- 5. PILOT TAIL WHEEL PANEL
- 6. PILOT ARM / SAFE INDICATOR
- 7. PILOT ENG 1 FIRE PULL INDICATOR
- 8. PILOT ENG 2 FIRE PULL INDICATOR
- 9. PILOT MASTER CAUTION/WARNING PANEL
- 10. PILOT RADAR WARNING INDICATOR
- 11. PILOT RADAR WARNING CONTROL PANEL
- 12. PILOT CAUTION/WARNING PANEL
- 13. PILOT REMOTE TRANSMITTER SELECTOR INDICATOR PANEL

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Figure 9-53. Pilot Station



- 1. CPG ARM / SAFE INDICATOR
- 2. CPG ENG 1 / ENG 2 FIRE PULL INDICATORS
- 3. CPG MASTER CAUTION / WARNING PANEL
- 4. CPG CAUTION / WARNING PANEL

M69-347

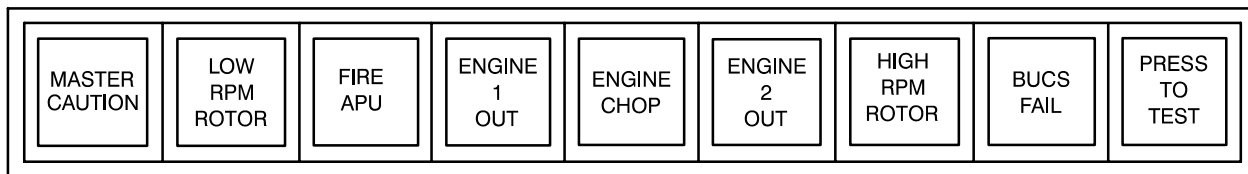
Figure 9-54. CPG Station

9-2. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

Table 9-26 lists the major components of the pilot caution/warning system, along with the component location and a figure reference.

Table 9-26. Pilot Caution/Warning System Major Components

COMPONENT	LOCATION	FIGURE
Master caution/warning panel	Instrument panel	9-55
Caution/warning panel	Instrument panel	9-56
BLADE indicator	ANTI ICE panel	9-57
ENG INLET ENG 1 indicator	ANTI ICE panel	9-57
ENG INLET ENG 2 indicator	ANTI ICE panel	9-57
ENG START ENG 1 indicator	Power quadrant	9-58
ENG START ENG 2 indicator	Power quadrant	9-58
EMERG PWR indicator	EMERG PWR CHK OVSP TEST panel	9-59
TAIL WHEEL indicator	Instrument panel	9-60
ENG 1 FIRE PULL indicator	Instrument panel	9-61
ENG 2 FIRE PULL indicator	Instrument panel	9-61
MA indicator	Radar warning indicator	9-62
VHF PLT indicator	Remote transmitter selector indicator panel	9-63
UHF indicator	Remote transmitter selector indicator panel	9-63
VHF CPG indicator	Remote transmitter selector indicator panel	9-63
SELF TEST indicator	Radar warning control panel	9-64
QTY REM indicator	ROCKETS control panel	9-65
ZONE SEL indicator	ROCKETS control panel	9-65
ARM/SAFE indicators	Instrument panel	9-66



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Figure 9-55. Master Caution/Warning Panel

9-2. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

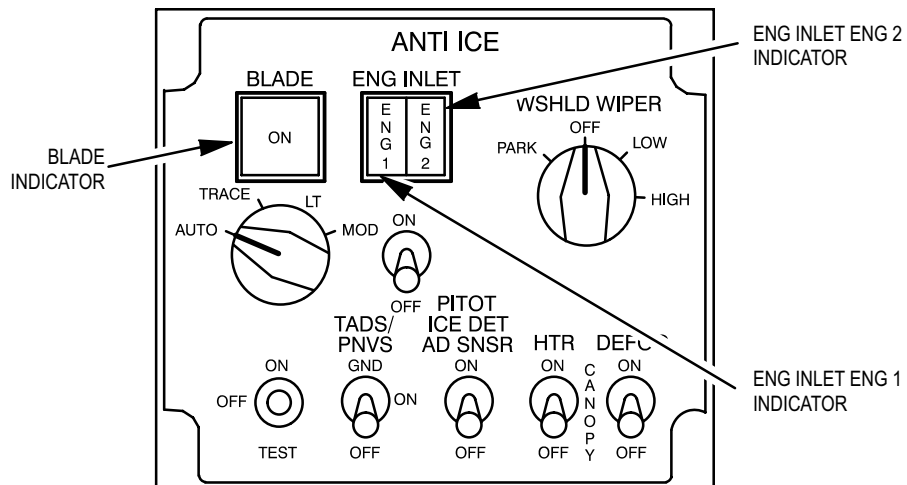
9-2

Table 9-26. Pilot Caution/Warning System Major Components (cont)

FUEL LOW FWD	EXT EMP FUEL XFR	PRI HYD PSI	UTIL HYD PSI	MAN STAB	BUCS ON ADS
FUEL LOW AFT	BOOST PMP ON	OIL LOW PRI HYD	OIL LOW UTIL HYD	OIL PSI ACC PUMP	ASE
REFUEL VALVE OPEN	CHIPS NOSE GRBX 1	OIL BYP PRI HYD	OIL BYP UTIL HYD	CHIPS NOSE GRBX 2	---
CHIPS ENG 1	OIL PSI NOSE GRBX 1	OIL PSI MAIN XMSN 1	OIL PSI MAIN XMSN 2	OIL PSI NOSE GRBX 2	CHIPS ENG 2
OIL PSI ENG 1	OIL HOT NOSE GRBX 1	OIL HOT MAIN XMSN 1	OIL HOT MAIN XMSN 2	OIL HOT NOSE GRBX 2	OIL PSI ENG 2
OIL BYP ENG 1	GEN 1 RECT 1	---	---	GEN 2 RECT 2	OIL BYP ENG 2
FUEL BYP ENG 1	HOT RECT 1	CHIPS MAIN XMSN	TEMP INT TEMP TR	HOT RECT 2	FUEL BYP ENG 2
FUEL PSI ENG 1	PRI MUX RDR JAM	SHAFT DRIVEN COMP	VIB GRBX	HOT BAT CHARGER	FUEL PSI ENG 2
GUN ROCKET	IR JAM PNVS	BLADE ANTI ICE FAIL	ENG ICE	RTR BK	CANOPY EXT PWR
MISSILE IFF	ECS TADS	CANOPY ANTI ICE FAIL	ENG 1 ANTI ICE	ENG 2 ANTI ICE	APU ON APU FAIL

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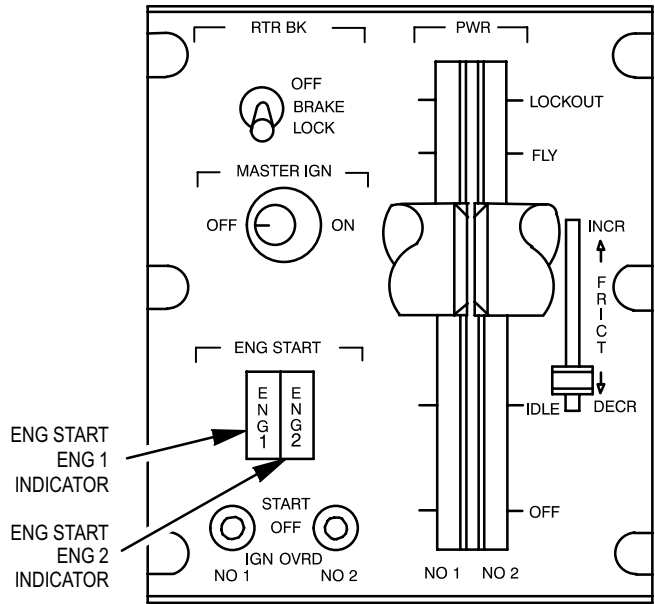
Figure 9-56. Pilot Caution/Warning Panel



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Figure 9-57. Pilot ANTI ICE Panel

Table 9-26. Pilot Caution/Warning System Major Components (cont)

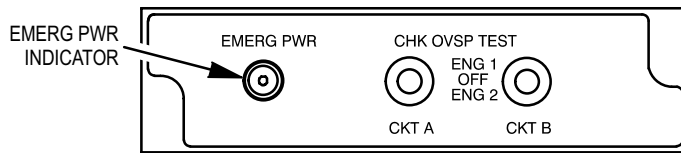


ENG START
ENG 1
INDICATOR

ENG START
ENG 2
INDICATOR

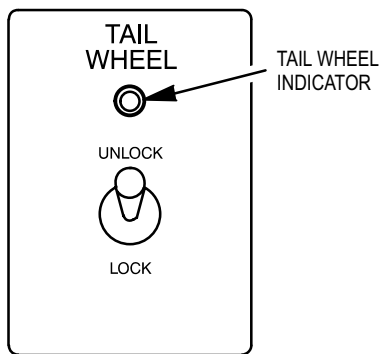
M69-292

Figure 9-58. Pilot Power Quadrant



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Figure 9-59. Pilot EMERG PWR CHK OVSP TEST Panel



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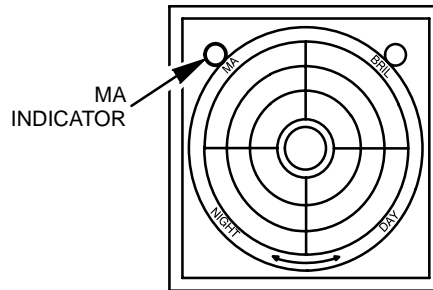
Figure 9-60. Pilot TAIL WHEEL Panel



M69-295

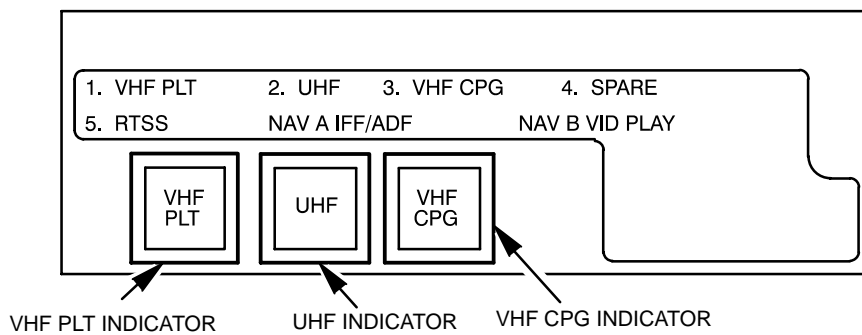
Figure 9-61. ENG 1 and ENG 2 FIRE PULL Indicators

Table 9-26. Pilot Caution/Warning System Major Components (cont)



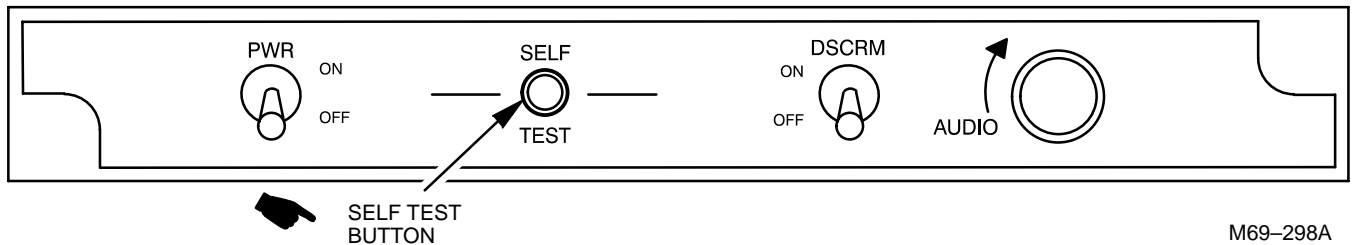
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Figure 9-62. Pilot Radar Warning Indicator



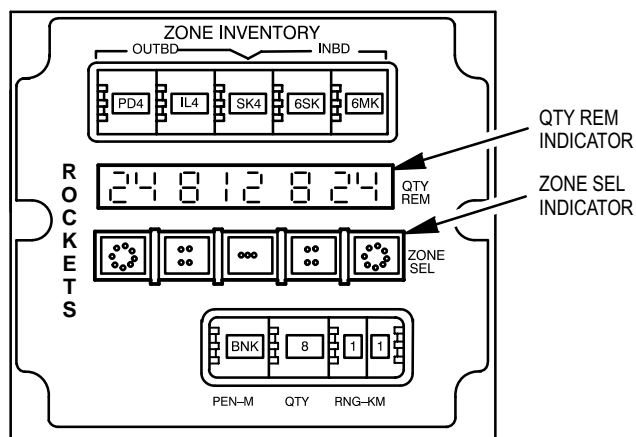
M69-297

Figure 9-63. Pilot Remote Transmitter Selector Indicator Panel



M69-298A

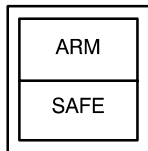
Figure 9-64. Pilot Radar Warning Control Panel



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Figure 9-65. Pilot ROCKETS Control Panel

Table 9-26. Pilot Caution/Warning System Major Components (cont)



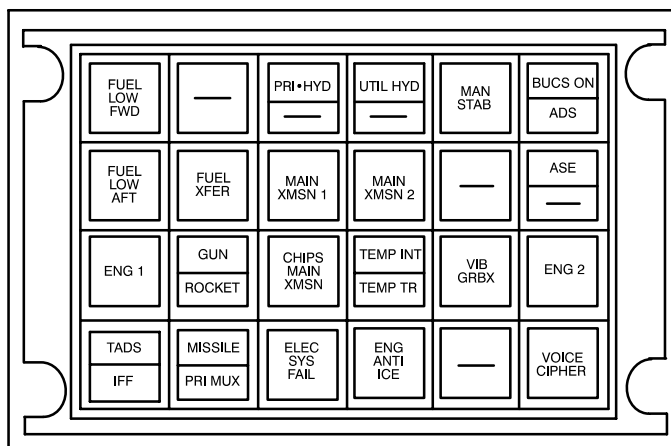
M69-291

Figure 9-66. ARM/SAFE Indicator

Table 9-27 lists the major components of the CPG caution/warning system, along with the component location and a figure reference.

Table 9-27. CPG Caution/Warning System Major Components

COMPONENT	LOCATION	FIGURE
Master caution/warning panel	Instrument panel	9-55
ENG 1 FIRE PULL indicator	Instrument panel	9-61
ENG 2 FIRE PULL indicator	Instrument panel	9-61
ARM/SAFE indicator	Instrument panel	9-66
Caution/warning panel	Instrument panel	9-67



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Figure 9-67. CPG Caution/Warning Panel

u. **Squat Switch System.** Squat switch (S350) (fig. 9-68) controls relays (A402): K4-1/2 and K4-9/10.

(1) Relay (A402)K4-1/2 provides ground mode and flight mode operations to the following:

- GCU 1.
- GCU 2.
- Digital automatic stabilization equipment computer (DASE).

9-2. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (cont)

9-2

- CPG **FIRE CONTROL** panel (FCP).
- External stores controller.
- IFF KIT 1A/TSEC.

(2) Relay (A402)K4-9/10 provides ground mode and flight mode operations to the following:

- Audio junction box.
- Turret control box.
- Pilot **ANTI ICE** panel.
- CPG **AUX/ANTI-ICE** panel.

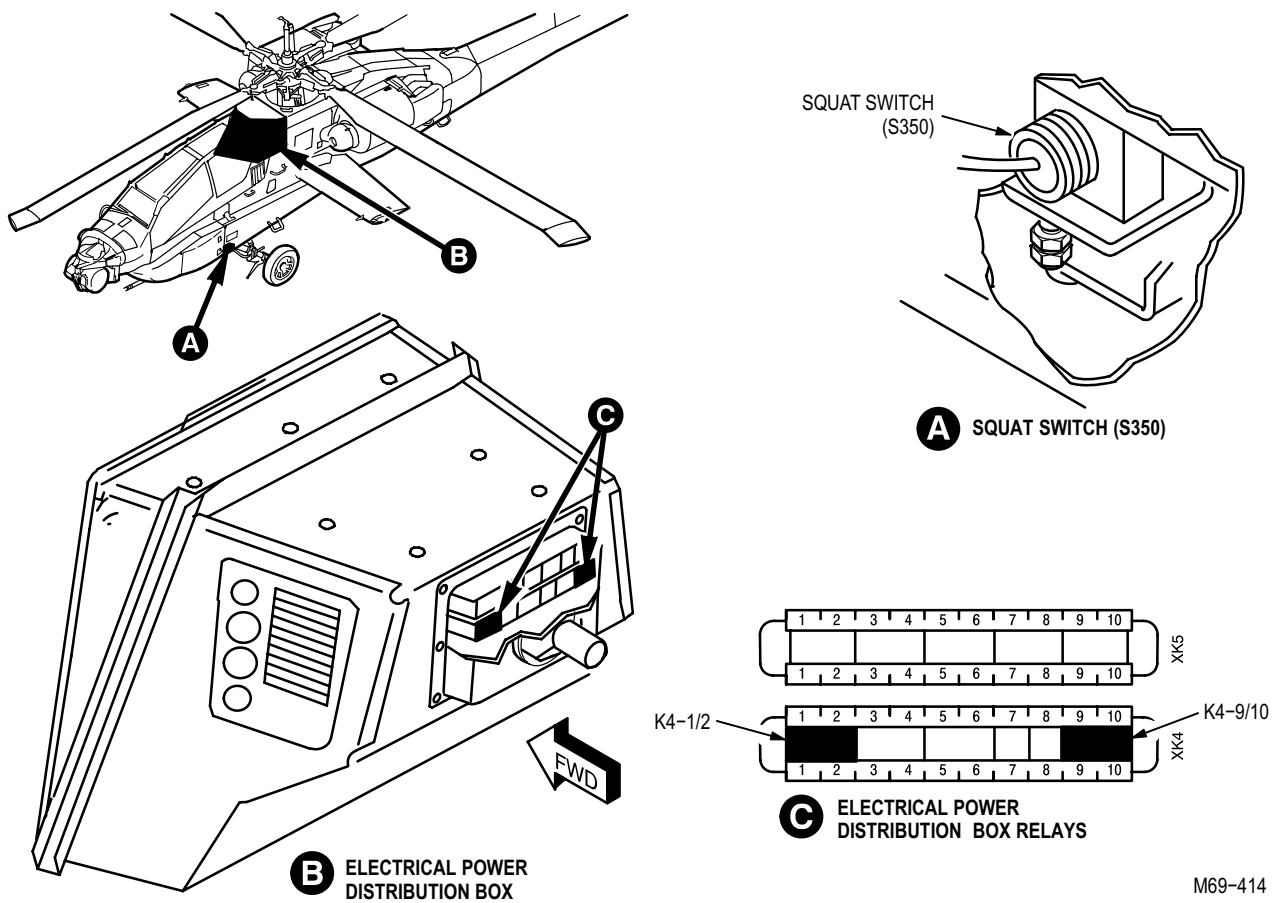


Figure 9-68. Squat Switch System Components

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9-3. EQUIPMENT DATA

9-3

AC Electrical Power Generation System Produces:

2000 amperes for 0.050 seconds

1400 amperes for one second

1000 amperes for six seconds

Battery

Power rating 33 amperes for 12 minutes

Navigation Lights

Power requirement 28 VDC

Formation Lights

Power requirement 115 VAC, single phase

Anti-Collision Lights

Power requirement 115 VAC

Power supply output 400 VDC anode voltage
200 VDC trigger voltage

Squat Switch

Power requirement 28 VDC

9-4. EQUIPMENT CONFIGURATION

9-4

Not applicable.

9-5. SAFETY, CARE AND HANDLING OF EQUIPMENT

9-5

Not applicable.

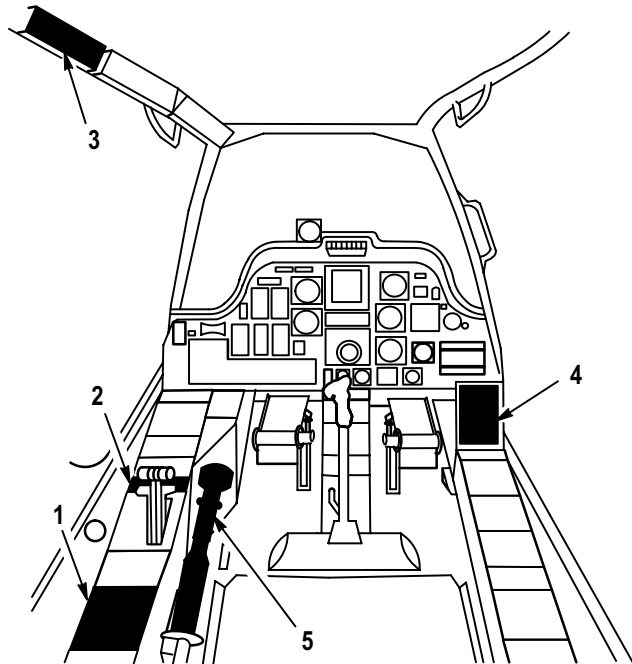
9-6. CONTROLS AND INDICATORS

9-6

The electrical system is controlled by switches in the pilot station (fig. 9-69) and provides fault signals to the caution/warning/advisory system in both the pilot station and the CPG station (fig. 9-70). Table 9-1 provides a listing of the controls, switches and indicators pertaining to the electrical system along with a description of their function.

NOTE

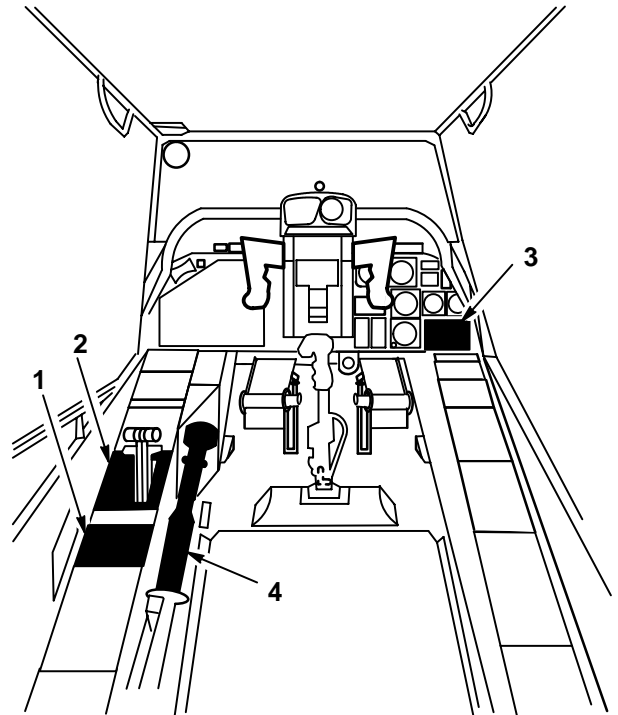
Refer to pilot station (fig. 9-69) and CPG station (fig. 9-70) for cockpit configuration and equipment.



- 1. PILOT EXT LT/INTR LT PANEL
- 2. PILOT ELEC PWR PANEL
- 3. PILOT AFT CIRCUIT BREAKER PANEL
- 4. PILOT CAUTION/WARNING PANEL
- 5. PILOT COLLECTIVE STICK

M69-045A

Figure 9-69. Pilot Station



- 1. CPG INTR LT PANEL
- 2. CPG POWER QUADRANT
- 3. CPG CAUTION/WARNING PANEL
- 4. CPG COLLECTIVE STICK

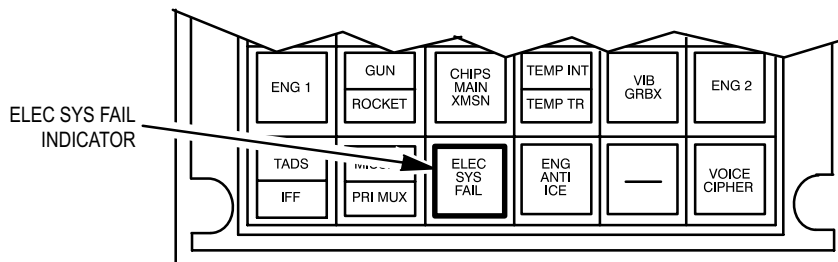
M69-048A

Figure 9-70. CPG Station

Table 9-1. Electrical System Controls and Indicators

CPG Caution/Warning Panel		
SWITCH/INDICATOR	POSITION	FUNCTION

ELEC SYS FAIL indicator	RED	Lights when both generators and/or both T/Rs have failed.
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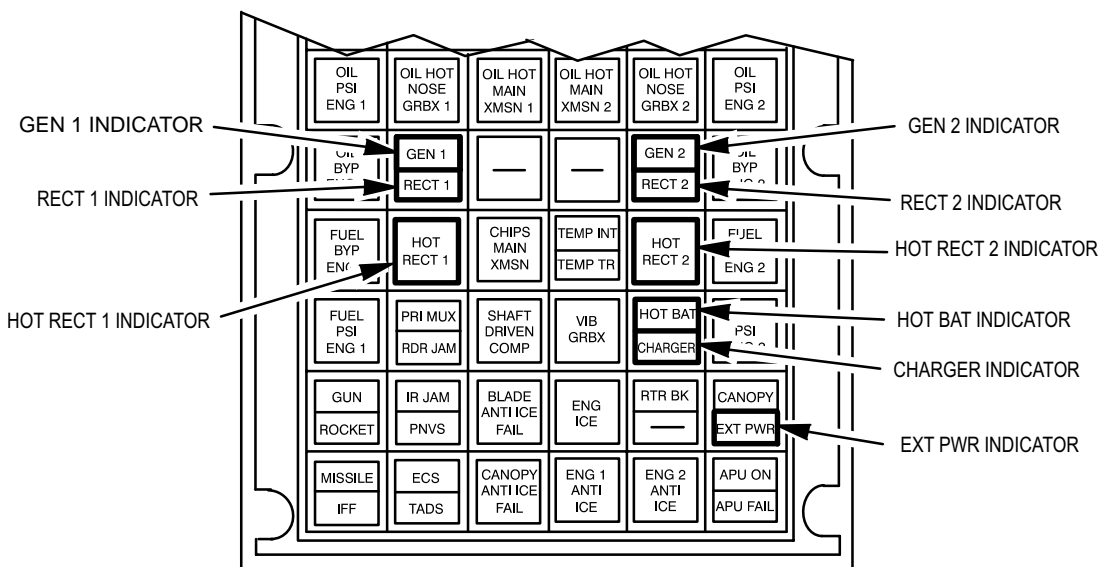


CPG Caution/Warning Panel

M69-049

Table 9-1. Electrical System Controls and Indicators (cont)

Pilot Caution/Warning Panel		
SWITCH/INDICATOR	POSITION	FUNCTION
GEN 1 indicator	AMBER	Lights when generator 1 is not on-line or faulty generator 1 shutdown. Signal received from GCU 1.
GEN 2 indicator	AMBER	Lights when generator 2 is not on-line or faulty generator 2 shutdown. Signal received from GCU 2.
RECT 1 indicator	AMBER	Lights when T/R 1 has malfunctioned or is not connected to associated bus.
RECT 2 indicator	AMBER	Lights when T/R 2 has malfunctioned or is not connected to associated bus.
HOT RECT 1 indicator	AMBER	Lights when T/R 1 has overheated, an indication of impending failure only. T/R continues to operate until failure.
HOT RECT 2 indicator	AMBER	Lights when T/R 2 has overheated, an indication of impending failure only. T/R continues to operate until failure.
HOT BAT indicator	AMBER	Lights when battery temperature exceeds 134°F (57°C), or a defective cell has been detected (battery charging is discontinued).
CHARGER indicator	AMBER	Lights when battery charger has failed to charge during a programmed charging cycle.
EXT PWR indicator	AMBER	Lights when external power connector door is open.

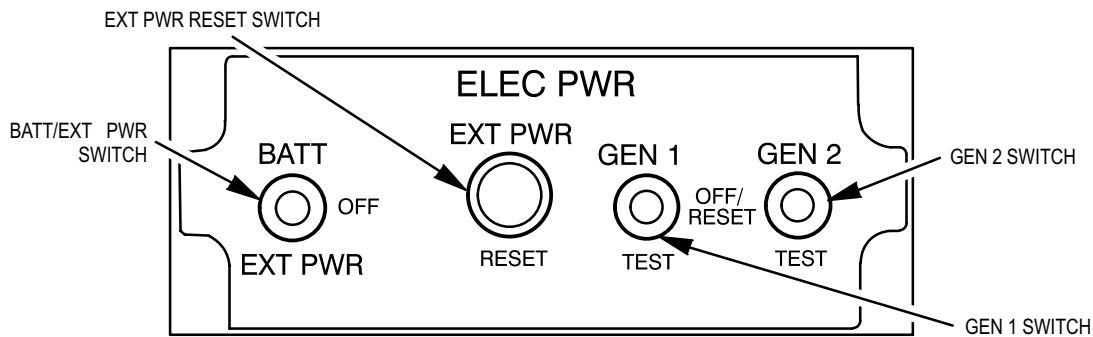


Pilot Caution/Warning Panel

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Table 9-1. Electrical System Controls and Indicators (cont)

Pilot ELEC PWR Panel		
SWITCH/INDICATOR	POSITION	FUNCTION
GEN 1 switch	GEN 1	Deenergizes ac generator 1 from associated bus and resets GCU 1 fault sensing logic.
	OFF/RESET	Energizes ac generator 1.
	TEST	Press momentarily to test ac generator 1 output without connecting associated bus.
GEN 2 switch	GEN 2	Energizes ac generator 2.
	OFF/RESET	Deenergizes ac generator 2 from associated bus and resets GCU 2 fault sensing logic.
	TEST	Press momentarily to test ac generator 2 output without connecting associated bus.
BATT/EXT PWR 3-position toggle switch	BATT	Energizes battery relay to connect the battery to the dc emergency bus.
	OFF	Deenergizes battery relay circuitry.
	EXT PWR	Enables electrical connection of external power to the bus system if voltage, frequency, and phase sequence are correct.
EXT PWR RESET momentary contact pushbutton switch	RESET	Press to reset external power monitor fault sensing logic.



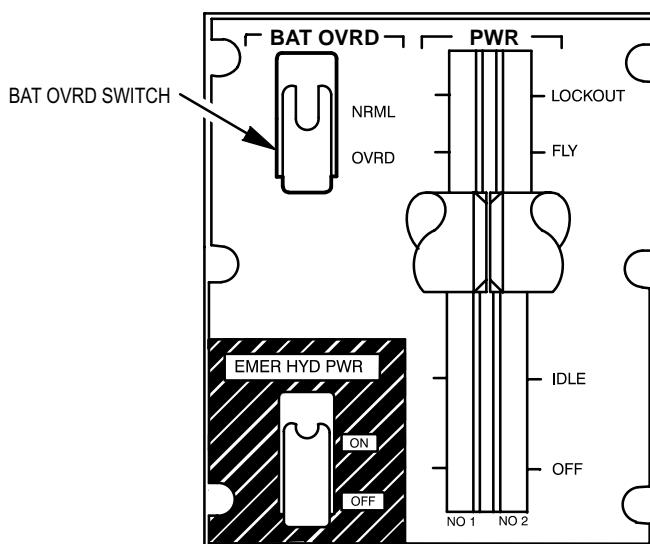
M69-047A

Pilot ELEC PWR Panel

Table 9-1. Electrical System Controls and Indicators (cont)

CPG Power Quadrant		
SWITCH/INDICATOR	POSITION	FUNCTION

BAT OVRD 2-position switch with red plastic guard	NRML	Enables the BATT position of the BATT/EXT PWR switch on the pilot's ELEC PWR panel.
	OVRD	Deenergizes the battery relay and disables the pilot's BATT position.



M69-074A

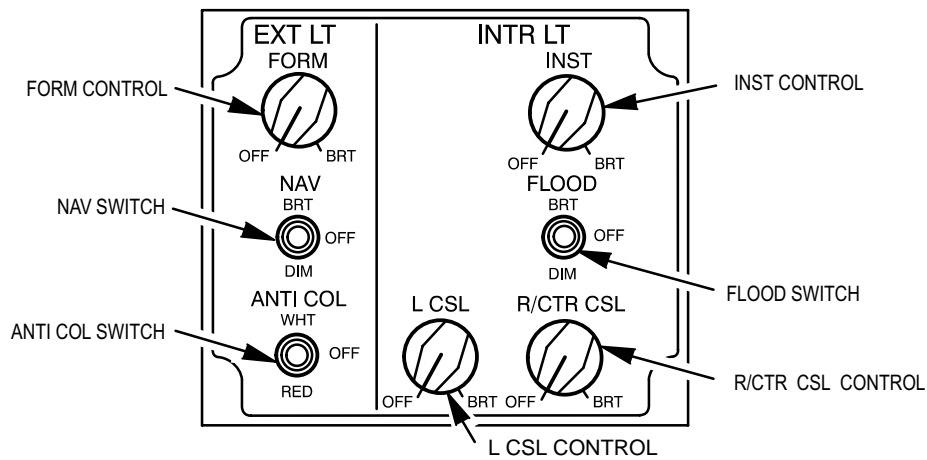
CPG Power Quadrant

Pilot EXT LT/INT LT Panel		
SWITCH/INDICATOR	POSITION	FUNCTION

INST control	OFF	Removes power to edge-lights. All pilot caution/warning indicators, including remote indicators, are set to bright.
	BRT	Rotating clockwise turns edge-lights on to dim. Grows progressively brighter until BRT position is reached (controls channels 1 and 2).
FLOOD switch	BRT	Turns secondary lights to full brightness.
	OFF	Removes power to secondary lights.
	DIM	Turns secondary lights to dim.

Table 9-1. Electrical System Controls and Indicators (cont)

Pilot EXT LT/INT LT Panel (cont)		
SWITCH/INDICATOR	POSITION	FUNCTION
R/CTR CSL control	OFF	Removes power to edge-lights.
	BRT	Rotating clockwise turns edge-lights to on dim. Grows progressively brighter until BRT position is reached (controls channel 3).
L CSL control	OFF	Removes electrical power to edge-lights.
	BRT	Rotating clockwise turns edge-lights on to dim. Grows progressively brighter until BRT position is reached. (Controls channel 4.)
ANTI COL switch	WHT	Turns on the white anti-collision light.
	OFF	Removes power to the anti-collision lights.
	RED	Turns on the red anti-collision light.
NAV switch	BRT	Turns navigation lights to full brightness.
	OFF	Removes electrical power to navigation lights.
	DIM	Turns navigation lights to dim.
FORM control	OFF	Removes electrical power to formation lights.
	BRT	Rotating clockwise varies the formation lights intensity from dim to bright.



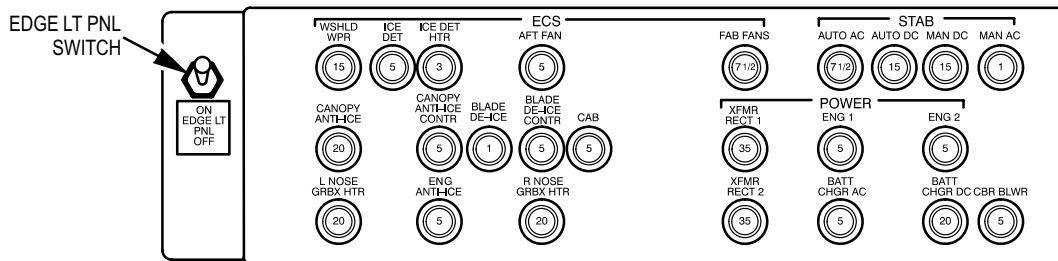
M69-130A

Pilot EXT LT/INTR LT Panel

Table 9-1. Electrical System Controls and Indicators (cont)

Pilot Aft Circuit Breaker Panel		
SWITCH/INDICATOR	POSITION	FUNCTION

EDGE LT PNL toggle switch	ON	Energizes pilot forward, center, and aft edge-light panels.
	OFF	Deenergizes pilot forward, center, and aft edge-light panels.

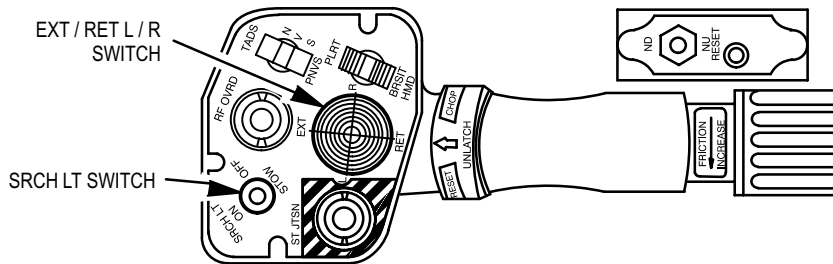


M69-168

Pilot Aft Circuit Breaker Panel

Collective Stick		
SWITCH/INDICATOR	POSITION	FUNCTION

SRCH LT switch	OFF	Deenergizes landing/search light.
	ON	Energizes landing/search light.
	STOW	Automatically retracts and centers landing/search light to the stow position.
EXT/RET L/R momentary 4-position switch	EXT	Allows landing/search light to be extended.
	RET	Allows landing search light to be retracted.
	L/R	Allows landing search light to be rotated 360°.

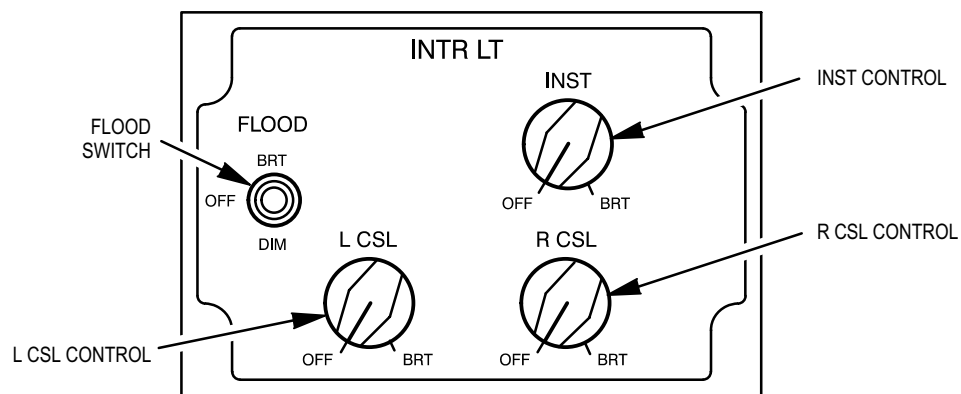


M69-142

Collective Stick

Table 9-1. Electrical System Controls and Indicators (cont)

CPG INTR LT Panel		
SWITCH/INDICATOR	POSITION	FUNCTION
INST control	OFF	Removes power from edge-lights. All CPG caution/warning indicators, including remote indicators, are set to bright.
	BRT	Rotating clockwise turns edge-lights on dim. Grows progressively brighter until the BRT position is reached (controls channels 1 and 2).
R CSL control	OFF	Removes electrical power to edge-lights.
	BRT	Rotating clockwise turns edge-lights on to dim. Grows progressively brighter until BRT position is reached (controls channel 3).
L CSL control	OFF	Removes power to edge-lights.
	BRT	Rotating clockwise turns edge-lights on dim. Grows progressively brighter until the BRT position is reached (controls channel 4).
FLOOD switch	BRT	Turns secondary lights to full brightness.
	OFF	Removes electrical power to secondary lights in the CPG station.
	DIM	Turns secondary lights to dim.



CPG INTR LT Panel

M69-182

SECTION II. THEORY OF OPERATION

9-7. SYSTEM DESCRIPTION

9-7

a. **Electrical System.** The electrical system (fig. 9-71) generates, controls, and distributes power throughout the aircraft.

(1) The power generation portion of the system consists of two 35 KVA ac generators, two T/Rs, and a Ni-cad battery. The ac generators provide 3-phase, 115 VAC, 400 Hz electrical power for aircraft operation. The T/Rs convert ac to dc electrical power.

(2) The output of each generator is controlled by a GCU which monitors the output of its respective ac generator and corrects for undervoltage, overvoltage, or underfrequency.

(3) The power distribution portion of the system consists of two ac contactors, two dc contactors, two ac essential buses, three dc essential buses, a dc emergency bus, and an electrical power distribution box. The contactors provide appropriate routing of the ac and dc voltages to the buses. The electrical power distribution box distributes the voltages through out the aircraft.

(4) If either ac generator fails, power is automatically generated from the other generator through the ac contactor to the ac essential bus of the failed generator.

(5) If either of the T/Rs fail, power automatically is applied through a dc tie bus contactor to the dc essential bus of the failed T/R.

(6) In the event of a complete electrical system failure, the battery provides a source of emergency power for flight critical instruments and components.

(7) An external power receptacle is provided to allow the electrical power system to operate from an external power source for extended periods of time without operating the APU or engines. When external power is applied to the aircraft, the external power contactor routes the ac power to the ac essential buses 1 and 2, and to T/R 1 and 2. The dc tie bus contactor routes dc power from T/R 1 and 2 to dc essential buses 1, 2, and 3, and the emergency dc bus.

b. **Purpose.** The electrical power system generates and distributes electrical power required to operate the helicopter systems. The electrical power system supplies ac power to two T/Rs to produce dc for helicopter systems requiring dc power.

c. **System operation.**

(1) **AC Electrical Power Generation System.** The ac electrical power generation system (fig. 9-72) is the primary source of electrical power.

(a) Two 35 KVA generators are driven by the accessory gearbox of the main transmission. The output of the generators are 3-phase, 115/200 VAC, 400 Hz. Each generator supports an identical and redundant system and supplies one-half of the helicopter load. Two ac contactors control connections between the generators and the ac buses 1 and 2.

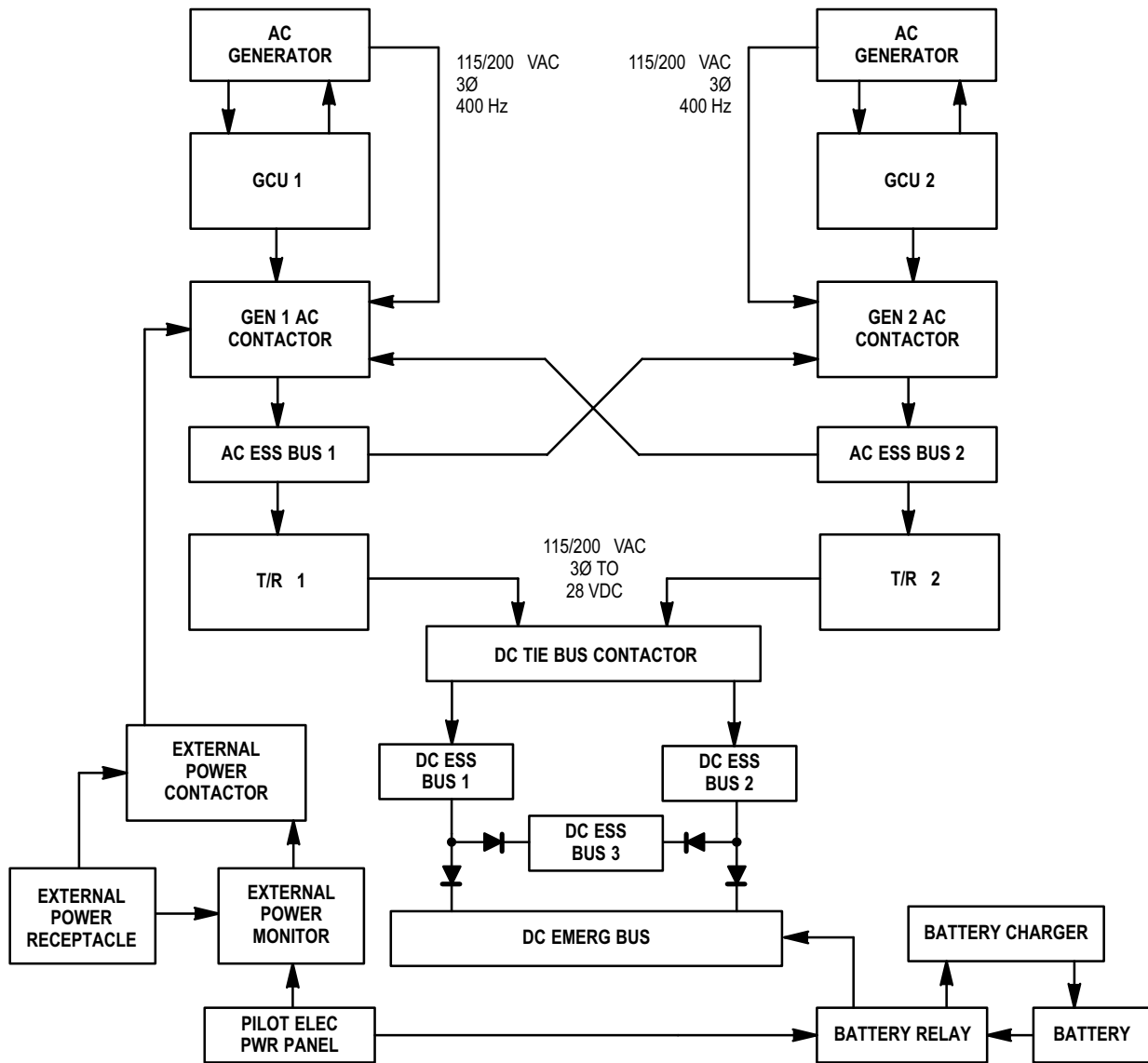
(b) The GCUs monitor and protect the generator output against overvoltage, undervoltage, underfrequency (on ground only), and overcurrent. If a fault is detected, the GCU shuts the generator down and the **GEN 1** or **GEN 2** indicator on the pilot's caution/warning panel lights. If a generator fails, the GCU switches the failed load to the other generator. The generators can be reset through the use of the **GEN 1** and **GEN 2** switches located on the pilot **ELEC PWR** panel.

9-7. SYSTEM DESCRIPTION (cont)

9-7

(c) The external power monitor checks the input power from the auxilliary ground power unit (AGPU). If the power checks good, the external power contactor connects external power to the ac bus 1. The **EXT PWR** indicator on the pilot's caution/warning panel lights whenever the access door to the external power receptacle is opened.

(d) Power from ac bus 2 is directed to the ground service utility receptacle. The circuit is protected by **AC ELEC UTIL PWR** circuit breaker (CB6).



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Figure 9-71. Electrical System Functional Block Diagram

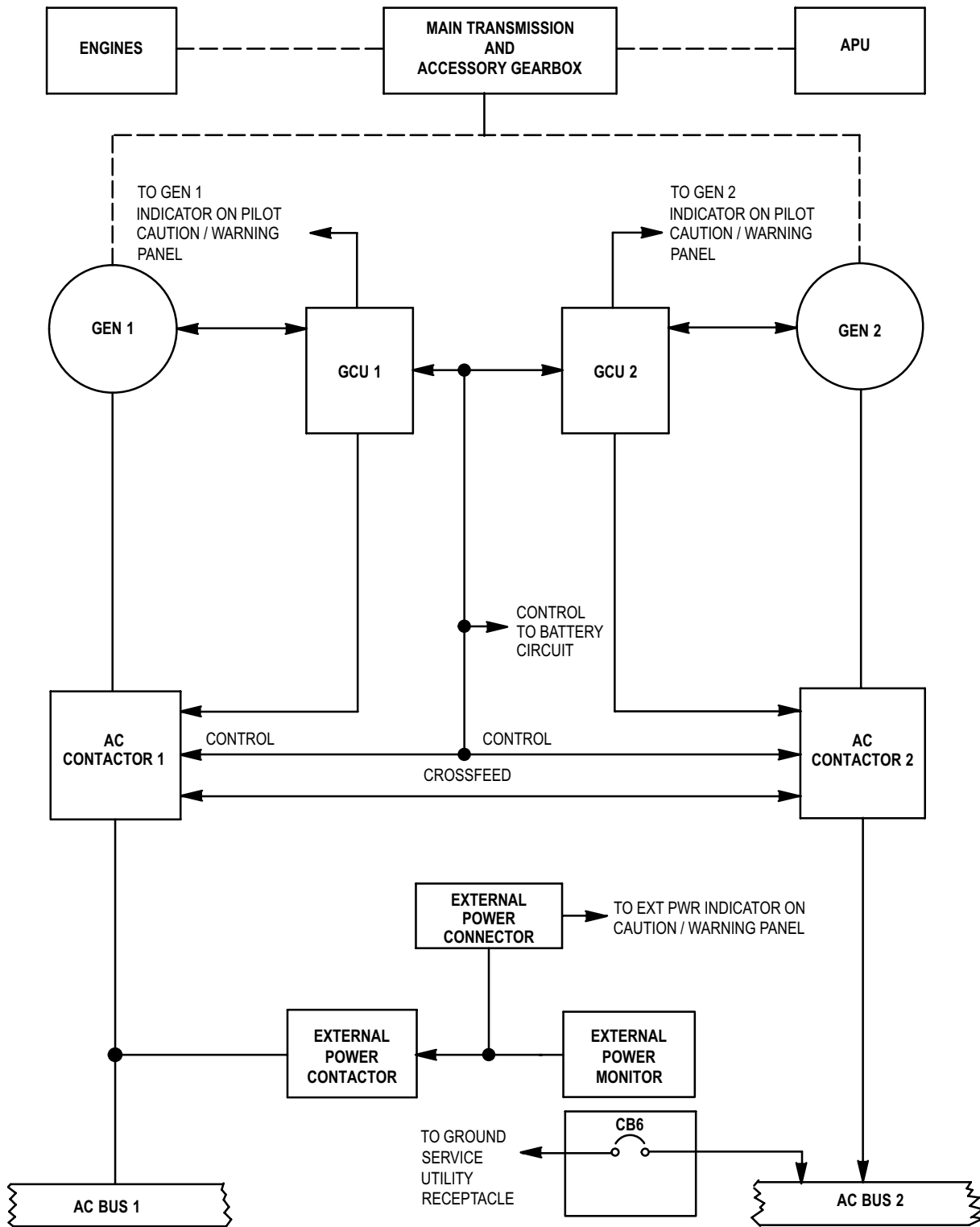


Figure 9-72. AC Electrical Power Generation System Interface Diagram

9-7. SYSTEM DESCRIPTION (cont)

9-7

(e) The ac generators (fig. 9-73) convert mechanical energy to electrical energy. A generator consists of a permanent magnetic generator (PMG), exciter and main generator. The PMG provides 3-phase, 22 VAC self-excitation for exciter field current when the accessory gearbox in the main transmission is turning.

(f) The exciter field current is controlled by a voltage regulator circuit in the GCU. The current source is the rectified PMG voltage. The stationary exciter control field current induces ac voltage in the rotating exciter field. The rotating exciter field voltage is rectified by the diode assembly and applied to the rotating main field.

(g) The main generator rotating field induces 115 VAC in each of the main field stationary windings (three). The output is 115 VAC, 3-phase, 400 Hz. Current sensing transformers provide phase current inputs to the GCU for overcurrent protection.

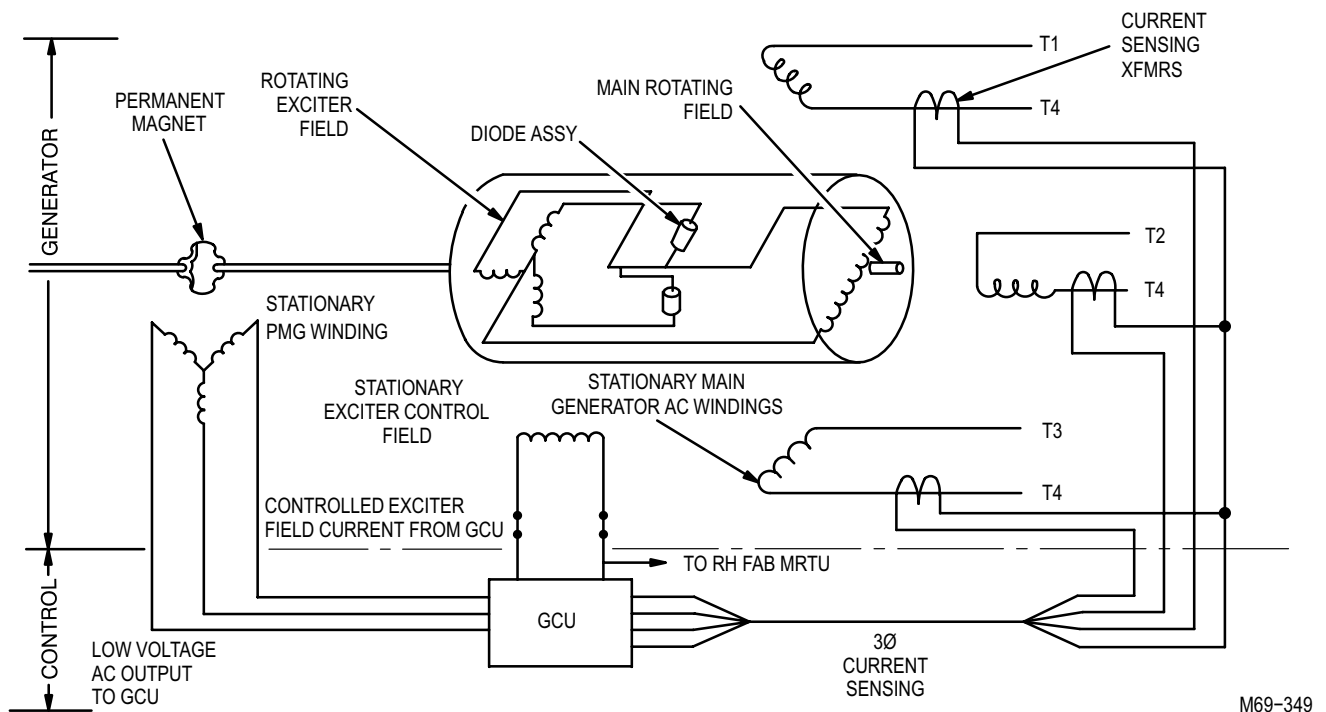


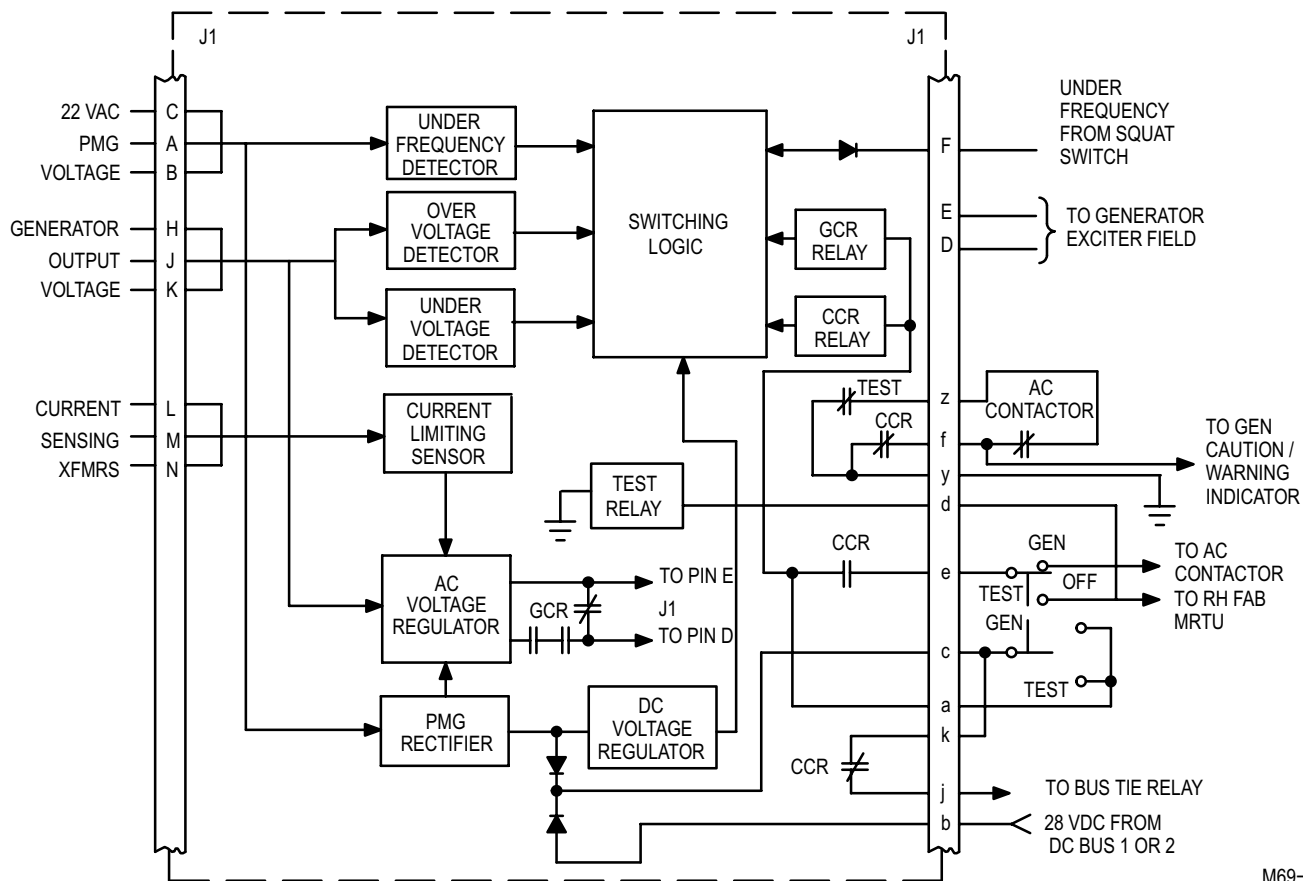
Figure 9-73. AC Generator Functional Block Diagram

(h) The GCU (fig. 9-74) provides circuit protection and controls the operation of the generators. In normal operation, the GCU energizes the generator control relay (GCR) and contactor control relay (CCR).

(i) The PMG input voltage is checked for underfrequency (on ground only), rectified, and sent to the ac and dc voltage regulators. The squat switch provides an underfrequency ground only protection. If underfrequency occurs, the generator is disconnected from the bus by the GCR.

(j) The generator output voltage is monitored for overvoltage/undervoltage and is regulated by the ac voltage regulator. If output voltage varies, the ac regulator provides feedback to the generator exciter field to offset the voltage variation. If the voltage remains out-of-limits, the switching unit deenergizes the CCR, disconnecting the generator from the bus.

(k) The current sensing transformers are monitored by the current limiting sensor. If an overcurrent condition exists, the ac regulator provides feedback to the generator exciter field to reduce the voltage. If the overcurrent condition persists, the voltage drops enough to trip the undervoltage detector. The switching unit then deenergizes the CCR, disconnecting the generator from the bus.



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Figure 9-74. GCU Functional Block Diagram

(l) The ac contactor (fig. 9-75) connects the ac generator to the appropriate ac essential bus, provides bus tie operation if one generator fails, prevents application of external power if one of the generators is operating, and prevents operation of the generators if external power is applied.

(m) The ac contactor contains two relays (generator contactor and bus tie). A deenergized GCR provides a ground path for the bus tie relay through pins 5 and 6. Pins 7 and 8 complete a path to light the **GEN 1** indicator on the pilot's caution/warning panel. Pins A3, B3, and C3 are disconnected from the bus. Pins 9 and 10 complete a path for external power.

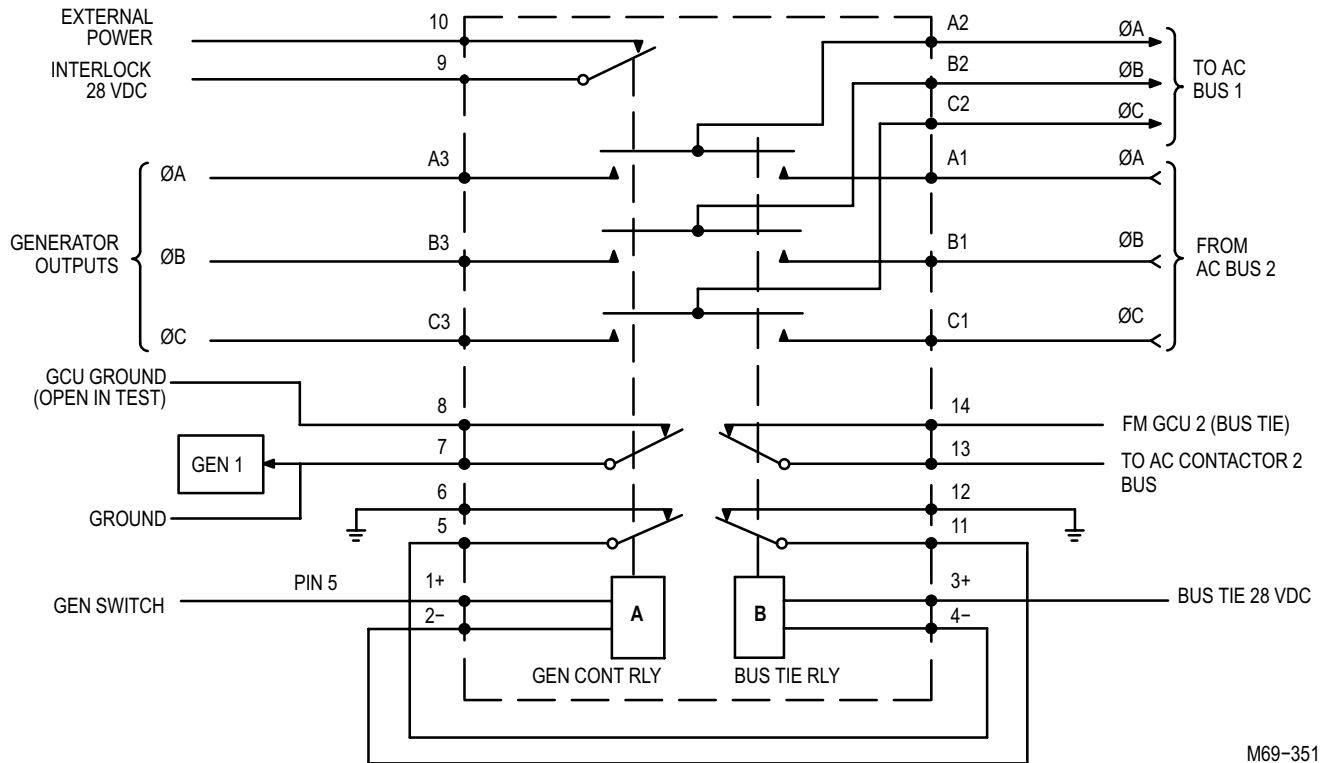
(n) When the **GEN** switch on the pilot's **ELEC PWR** panel is placed in the **GEN** position and the generator and GCU are operating normally, the generator contactor relay is energized from voltage supplied by the GCU through the **GEN** switch to relay coil A. Ground for the circuit is provided through pins 11 and 12 of the bus tie relay. Pins 5 and 6 open which remove ground from the bus tie relay coil. Pins 7 and 8 open which remove the **GEN 1** indicator pilot's caution/warning panel path. Pin A3 mates with A2, B3 mates with B2, and C3 mates with C2 applying power to the bus. Pins 9 and 10 open which remove the external power interlock.

9-7. SYSTEM DESCRIPTION (cont)

9-7

(o) A deenergized bus tie relay provides a ground through pins 11 and 12 to energize the GCR. Pins 13 and 14 provide a bus tie path from GCU 2 to ac contactor 2. Pins A2, B2, and C2 are disconnected from bus 2 pins A1, B1, and C1.

(p) The bus tie relay is energized when the generator contactor is deenergized. The ground path is through pins 6 and 5 of the GCR, to relay coil B. The voltage is supplied by the dc bus tie contactor. Pins 13 and 14 open the bus tie path to ac contactor 2. Pin A2 mates with A1, B2 mates with B1, and C2 mates with C1 connecting ac essential bus 1 to ac essential bus 2.



M69-351

Figure 9-75. AC Contactor Simplified Functional Block Diagram

(2) **DC Electrical Power Generation System.** The dc electrical power generation system (fig. 9-76) contains two T/Rs which convert 115 VAC from ac essential buses 1 and 2 to 28 VDC. Each T/R supports an identical and redundant system and supplies one-half of the helicopter T/Rs load. The T/Rs are protected by the **XFMR RECT 1** circuit breaker (CB1) and **XFMR RECT 2** circuit breaker (CB2). A heat sensor in each T/R monitors for an overheat condition. When an overheat condition exists, **HOT RECT 1** or **HOT RECT 2** indicator on the pilot's caution/warning panel is lighted.

(a) The outputs of the T/Rs are connected to dc essential bus 1, dc essential bus 2, dc essential bus 3, and the emergency dc bus through a dc bus tie contactor. The bus tie contactor contains contactors, switching relays and a bus tie relay. In event of failure, the dc bus tie contactor connects the buses together and lights the **RECT 1** or **RECT 2** indicator on the pilot's caution/warning panel. The operating T/R then supplies the full dc load.

(b) DC essential bus 3 is powered by dc essential bus 1, dc essential bus 2, or both dc essential buses 1 and 2 through isolation diodes CR3 and CR4. The isolation diodes allow current to flow from dc essential bus 1 and 2 to dc essential bus 3 but prevents current from flowing from dc essential bus 3 to dc essential buses 1 or 2.

(c) The battery system utilizes the 28 VDC from bus 1 to charge the battery and control the battery relay. If a complete dc system failure occurs, the battery charger uses the battery power to energize the battery relay. The battery charger controls the **HOT BATT** and **CHARGER** indicators on the pilot's caution/warning panel.

(d) The battery relay, when energized, connects the battery to the dc emergency bus. The relay can be energized only when both T/Rs are inoperative, the pilot's **ELEC PWR** panel's **BATT/EXT PWR** switch is in **BATT**, and the CPG's power quadrant's **BAT OVRD** switch is in **NRML**.

(e) The battery provides 24 VDC to the dc emergency bus if a complete 28 VDC failure occurs. The battery can power the emergency loads until a safe landing can be made.

(f) The T/R (fig. 9-77) receives 115 VAC across the primary winding of transformer T1. Voltage induced in the secondary winding of T1 is rectified by diodes CR1 through CR12. The rectified voltage is filtered by a network consisting of capacitors C4, C5, C6, and C7, inductor L1 and resistor R1. The output voltage of 28 VDC is then routed to the dc bus tie contactor.

(g) Fan motor B1 is driven by the applied ac power. Capacitors C1, C2, and C3 provide filtration for the fan motor.

(h) In event of an overtemperature condition, the thermal sensor is activated which completes a circuit to turn on the **HOT RECT** indicator on the pilot caution/warning panel.

(i) The dc bus tie contactor (fig. 9-78) connects the T/R outputs to the appropriate dc essential buses. The dc bus tie contactor contains two contactors (K8 and K9), two switching relays (K3 and K4), an overcurrent sensor and limiter (OC), and a bus tie relay (K5). The 28 VDC inputs from T/R 1 and T/R 2 energize the coils of contactors K8 and K9 respectively. When K8 is energized, the T/R 1 is connected to dc essential bus 1 and the path to the **RECT 1** indicator on the pilot caution/warning panel is opened extinguishing the indicator. When K9 is energized, T/R 2 is connected to dc essential bus 2 and the path to the **RECT 2** indicator on the pilot caution/warning panel is opened extinguishing the indicator. Both dc essential buses 1 and 2 are connected to dc essential bus 3 through isolation diodes. Either one or both dc essential buses power dc essential bus 3.

(j) Switching relays K3 and K4 are energized by K8 and K9. K3 and K4 connect the emergency dc bus power and open the path for K5 to energize. Keeping K5 deenergized with both T/Rs operating prevents paralleling of the buses.

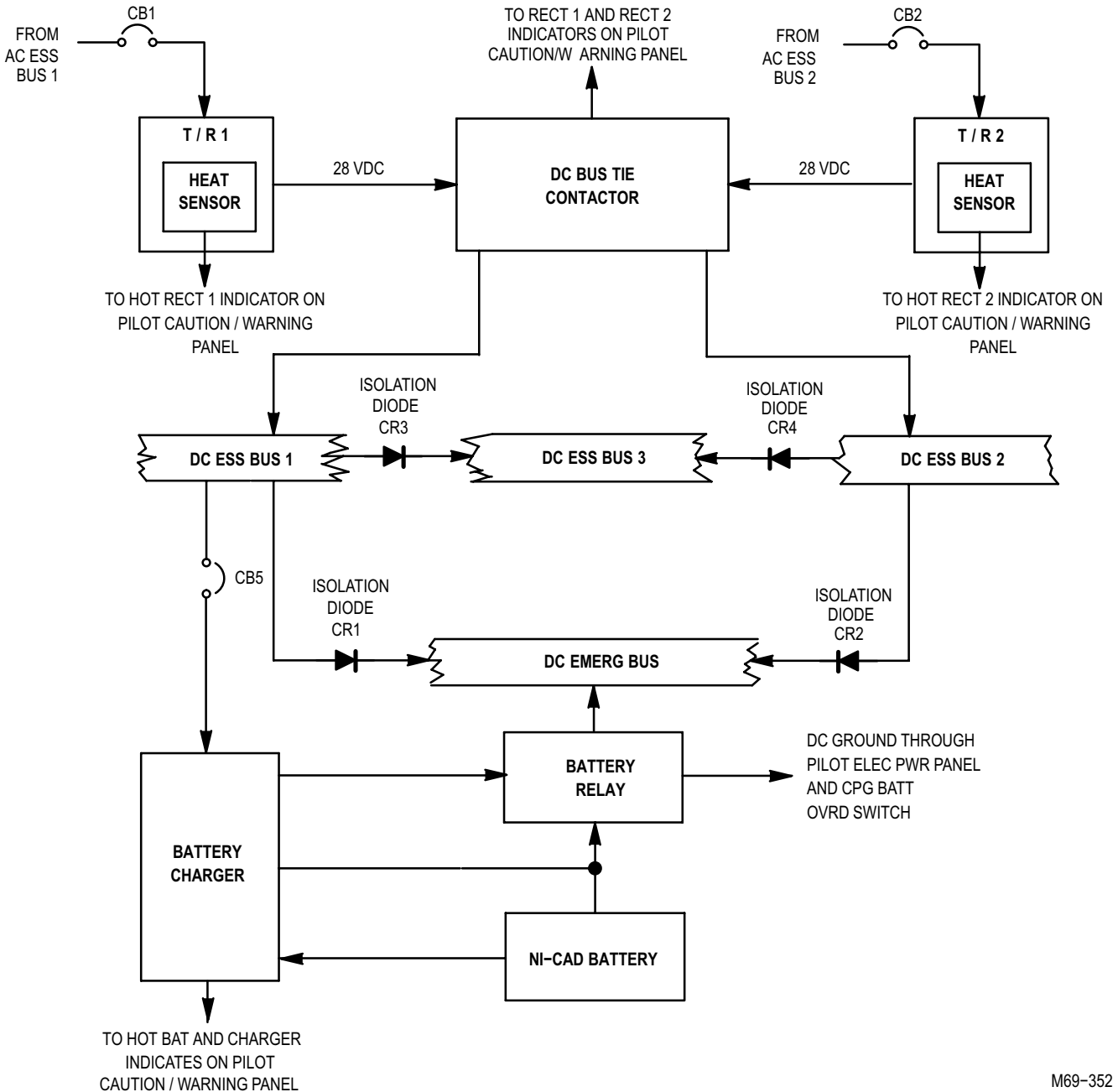
(k) When T/R 1 fails, voltage to the coil of K8 is removed, deenergizing K8 and lighting the **RECT 1** indicator on the pilot's caution/warning panel. When K8 deenergizes, emergency dc bus voltage is removed from the coil of K3. When K3 is deenergized and K4 is energized, K3 connects emergency dc bus voltage to the coil of K5. With K5 energized, dc essential bus 1 is connected to and powered by dc essential bus 2. DC essential buses 1, 2, 3, and the emergency dc bus are now powered by T/R 2.

(l) When T/R 2 fails, voltage to the coil of K9 is removed, deenergizing K9 and lighting the **RECT 2** indicator on the pilot's caution/warning panel. When K9 deenergizes, emergency dc bus voltage is removed from the coil of K4. When K4 is deenergized and K3 is energized, K4 connects emergency dc bus voltage to the coil of K5. With K5 energized, dc essential bus 2 is connected to and powered by dc essential bus 1. DC essential buses 1, 2, 3, and the emergency dc bus are now powered by T/R 1.

9-7. SYSTEM DESCRIPTION (cont)

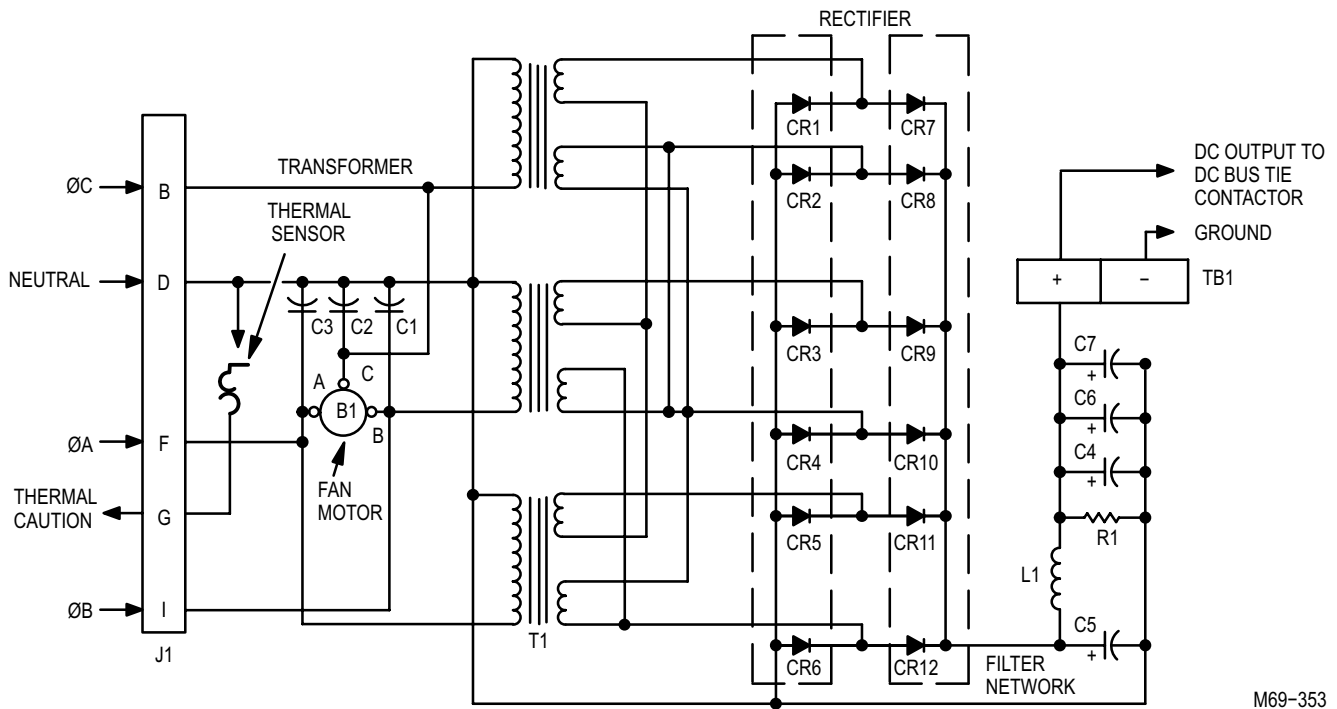
9-7

(m) Overcurrent protection is available when only one T/R is operating (bus tie relay energized). When the bus tie relay is energized, 28 VDC is routed through the overcurrent (OC) sensing coil. If current flow through the bus tie relay exceeds 300 ± 30 amps, the overcurrent relay will energize. When the OC relay energizes, the coil to the bus tie relay is opened, deenergizing the bus tie relay. The shorted bus will be deenergized when the overcurrent relay is energized.



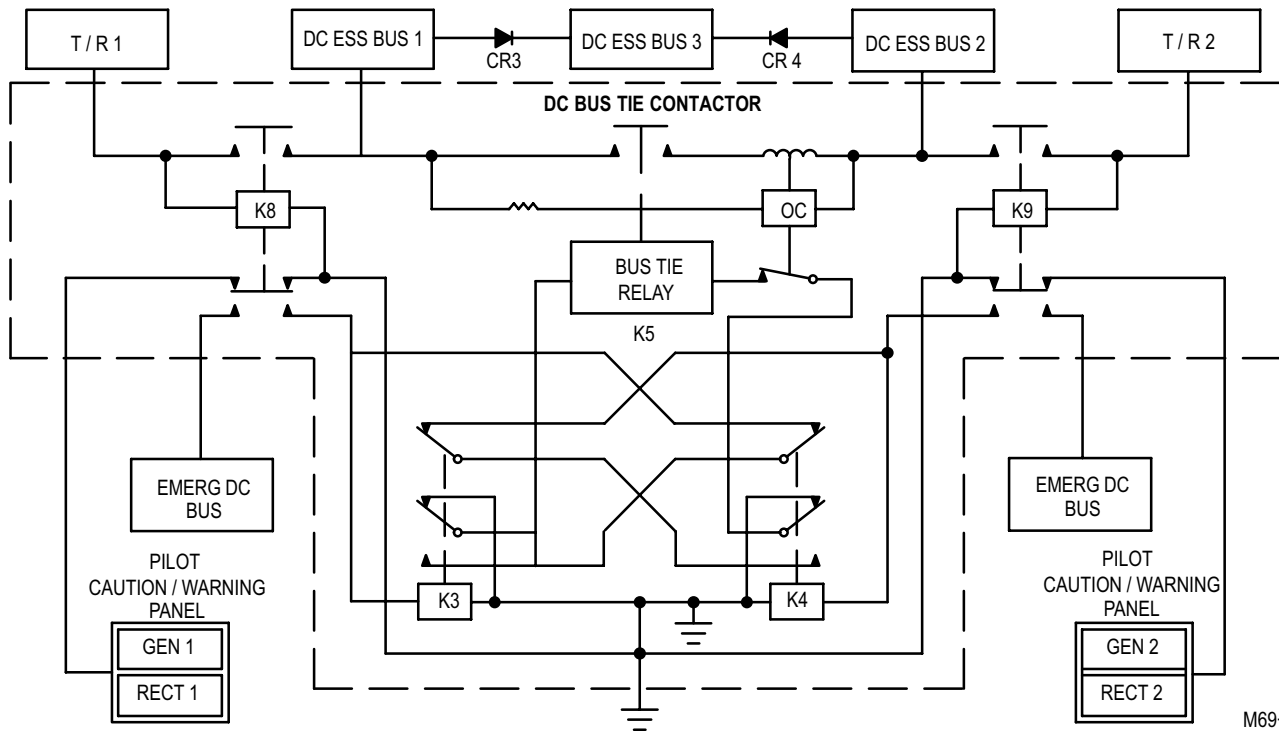
M69-352

Figure 9-76. DC Electrical Power Generation System Interface Diagram



M69-353

Figure 9-77. Transformer/Rectifier Functional Schematic Diagram



M69-354

Figure 9-78. DC Bus Tie Contactor Functional Diagram

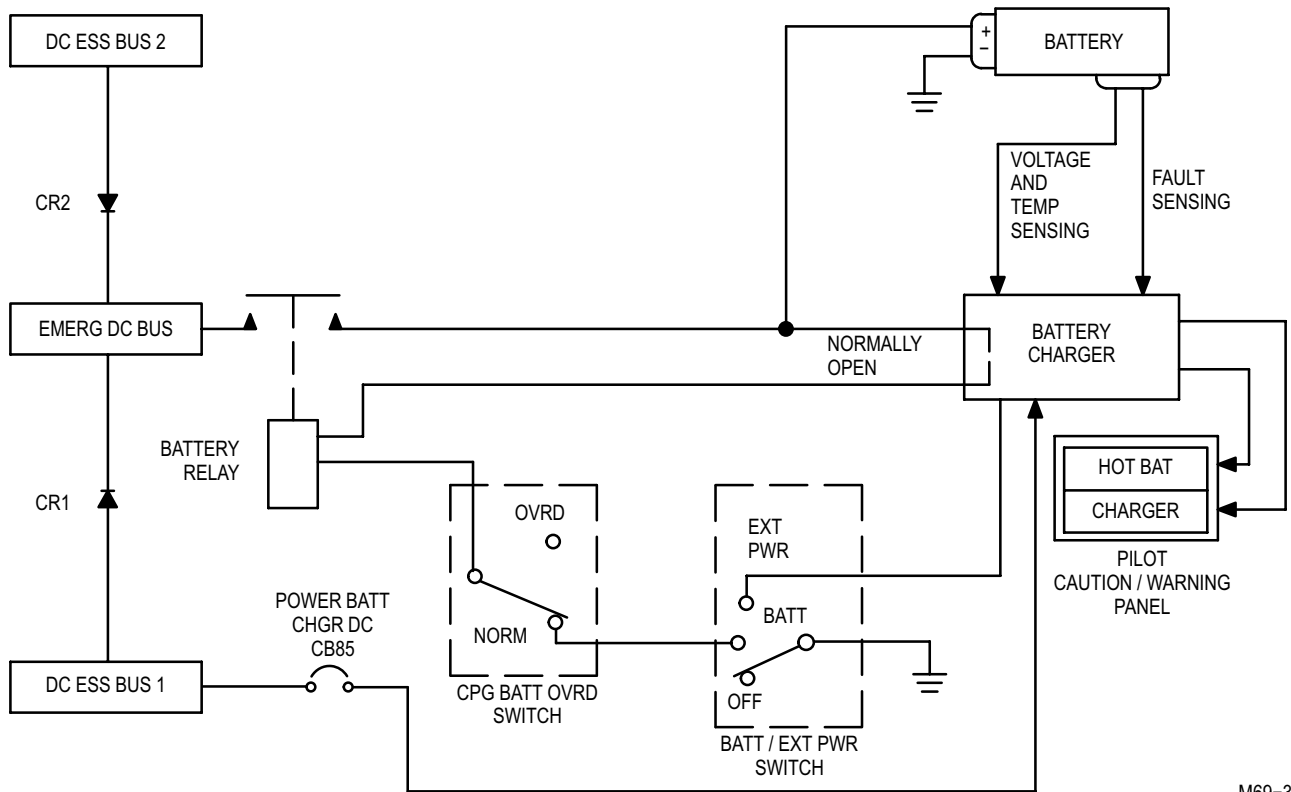
9-7. SYSTEM DESCRIPTION (cont)

(3) **Battery.** The battery supplies 24 VDC for APU starting and emergency dc operation with a total electrical failure.

(a) When the battery quick disconnect connectors (fig. 9-79) are connected, battery voltage is applied to the battery charger, the open contacts of the battery relay, and the coil of the battery relay through the battery charger. With no other source of electrical power on the helicopter and the CPG's power quadrant's **BAT OVRD** switch in the **NRML** position, placing the pilot's **ELEC PWR** panel's **BATT/EXT PWR** switch in the **BATT** position applies a ground to the coil of the battery relay. The battery relay energizes, using battery voltage from the charger. The battery relay connects the battery to the emergency dc bus which is isolated from dc essential buses 1 and 2 by CR1 and CR2.

(b) When either generator comes on line, power is supplied to dc essential bus 1 which supplies 28 VDC to the battery charger through the **POWER BATT CHGR DC** circuit breaker (CB85). The battery charger deenergizes the battery relay by opening the circuit to the battery relay coil. As long as dc essential bus 1 has at least 18 VDC applied, the battery charger maintains an open circuit to the coil of the battery relay and keeps the battery in a charged state. When dc essential bus 1 falls below 18 VDC, the battery charger closes the circuit to the battery relay coil, connecting the battery to the dc emergency bus. The battery remains connected to the dc emergency as long as dc essential bus 1 remains below 18 VDC or until battery voltage falls below 9 VDC.

(c) The pilot's caution/warning panel contains two indicators (**HOT BAT** and **CHARGER**) which monitor the battery. The **HOT BAT** indicator advises that the battery has overheated, a cell imbalance exists, or heater current is insufficient. The **CHARGER** indicator advises that the charger is not charging the battery. Refer to TM 11-1520-238-23-2/TM 11-6140-203-14-2 for additional information on the battery and battery charger.



M69-355

Figure 9-79. Emergency DC Bus Functional Block Diagram

(4) **External Power and Ground Service Utility Receptacle.** The purpose of the external power and ground service utility receptacle system is to provide a means of connecting a 3-phase, 115/200 VAC, 400 Hz ground power source to the helicopter.

(a) When the external power access door (fig. 9-80) is opened, a switch is activated which lights the **EXT PWR** indicator on the pilot caution/warning panel. An external 3-phase, 115/200 VAC, 400 Hz power source is applied through the external power receptacle to an external power monitor and an external power contactor. The external power monitor checks the incoming power for proper frequency, voltage, and phasing. If the incoming power is correct, the external power monitor develops a 28 VDC interlock voltage. The interlock voltage is applied through two pins in the external power receptacle to generator 2 contactor. Voltage flows through the two pins to ensure that the external power connector is properly seated in the external power receptacle.

(b) If generator 2 contactor is operating, the interlock voltage is interrupted and external power cannot be applied. If generator 2 is not operating, power is applied through generator 2 contactor to the **BATT/EXT PWR** switch on the pilot **ELEC PWR** panel. When the **BATT/EXT PWR** switch is placed in the **EXT PWR** position the interlock path is completed to the generator 1 contactor. If generator 1 contactor is operating, the interlock voltage is interrupted and external power cannot be applied. If generator 1 is not operating, power is applied through generator 1 contactor to the external power contactor. When the external power contactor is energized, 3-phase external voltage is connected to ac essential bus 1. The 28 VDC interlock signal is routed back to energize the bus tie relay in the generator 1 contactor. When the bus tie relay is energized, external power from ac essential bus 1 is supplied to ac essential bus 2.

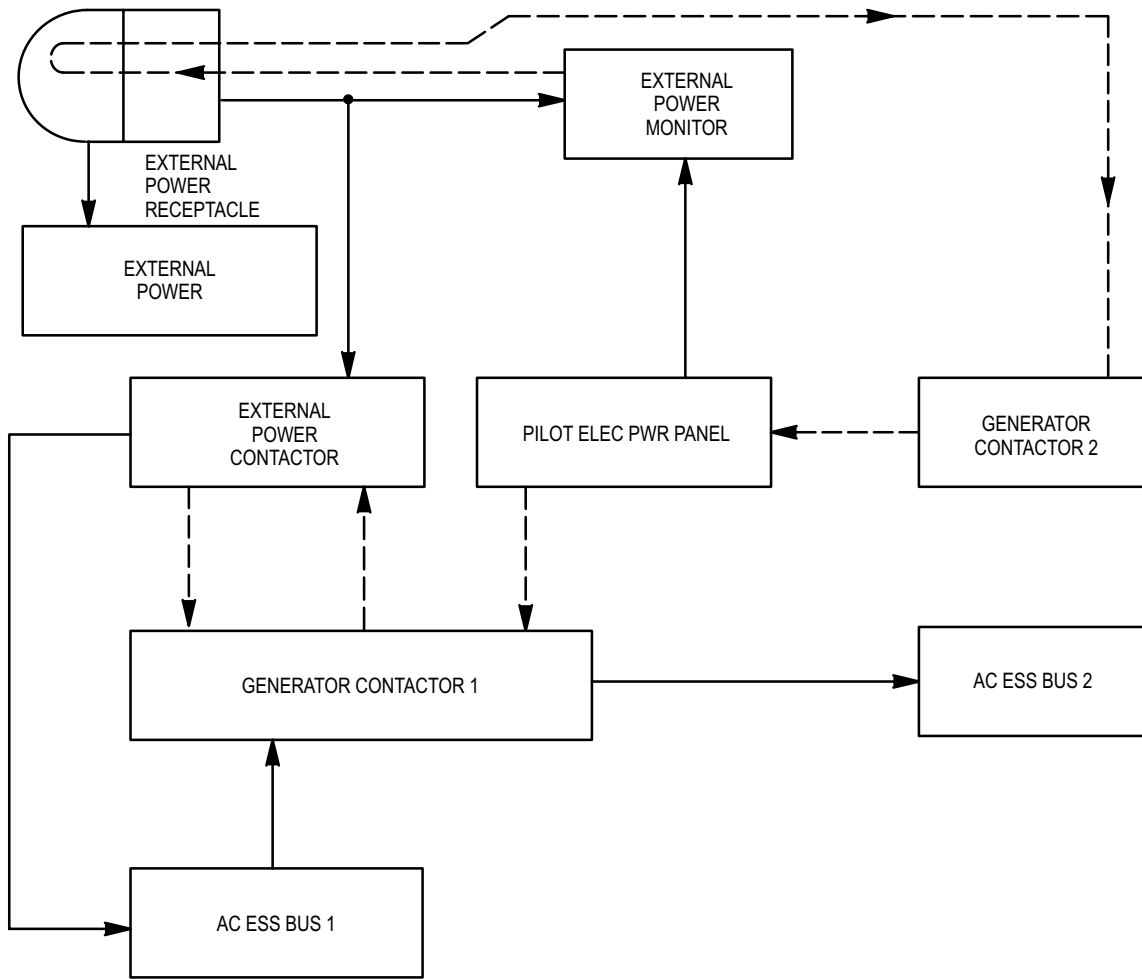
(c) If the power monitor detects an incoming power failure, interlock voltage is removed. This deenergizes the interlock voltage, the external power contactor, and removes external ac power.

(d) The external power monitor (fig. 9-81) monitors the incoming external ac power for proper voltage level, frequency and phase sequence. If the input power is within tolerance, the external power monitor develops a 28 VDC interlock signal which energizes the external power contactor. When the external power contactor is energized, external power is applied to the helicopter ac essential buses.

(e) If out-of-tolerance external power parameters exist, the power monitor does not develop the 28 VDC interlock signal. The external power contactor either cannot be energized or if energized, is deenergized. The deenergized external power contactor prevents application of external power to the helicopter's ac essential buses.

(f) External power is locked out until the external power monitor is reset by the **EXT PWR RESET** switch on the pilot **ELEC PWR** panel. The external power monitor checks the input voltage and if still out-of-tolerance, the system remains locked out. If the external power is within tolerance, the external power operation sequence begins.

(g) The external power contactor K7 (fig. 9-80) connects the incoming external power to the helicopter's ac essential buses. K7 is deenergized without external power applied. Contacts B2 and B3 provide the ground path to energize ac contactor 2 during normal operation. Contacts L1, L2, and L3 are open, preventing application of external power. Contacts A2 and A3 route bus tie voltage to generator 1 contactor bus tie relay if generator 1 fails. If external power is applied and checks good, the 28 VDC external power interlock signal developed by the external power monitor energizes K7. When K7 energizes, contacts B2 and B3 deenergize ac contactor 2. Contact T3 mates with L3, T2 mates with L2, and T1 mates with L1, applying external ac power to ac essential bus 1. Contacts A1 and A2 provide 28 VDC to bus 1 tie relay which connects ac essential buses 1 and 2 together.

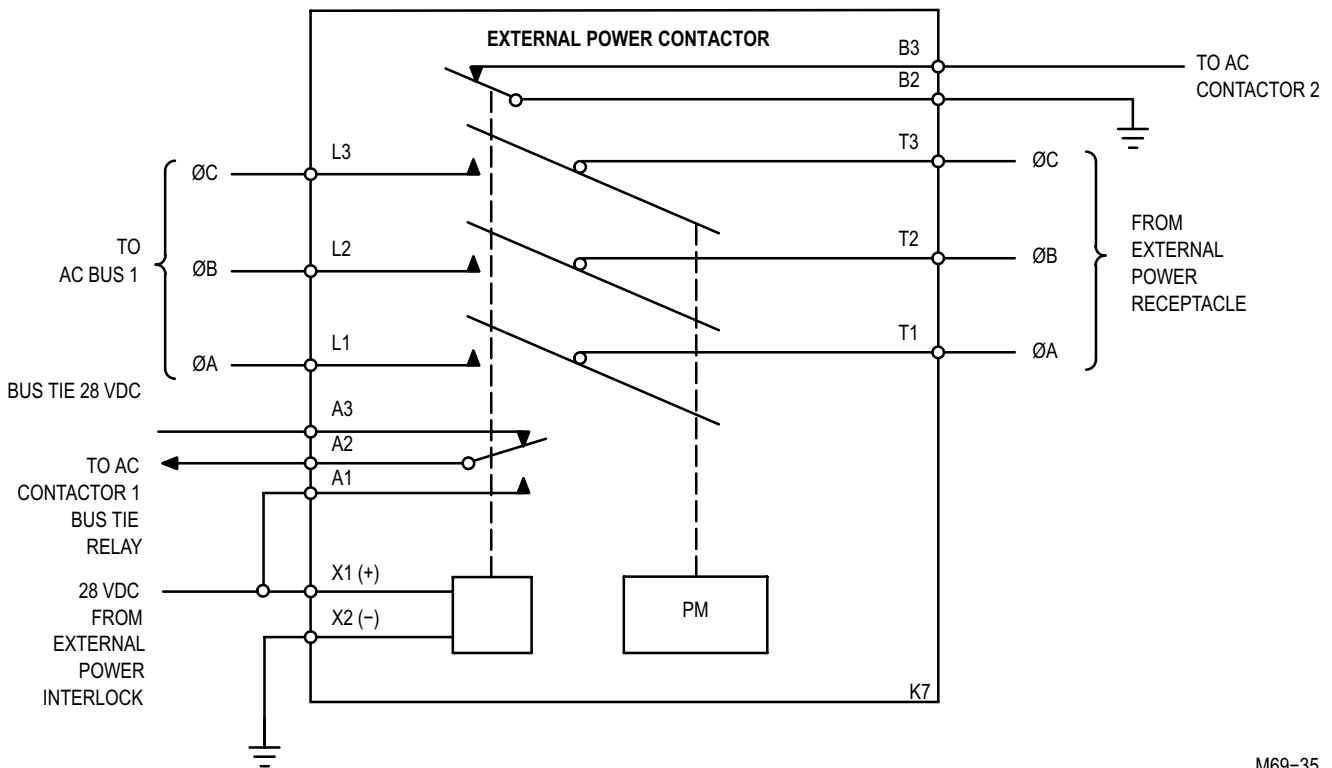
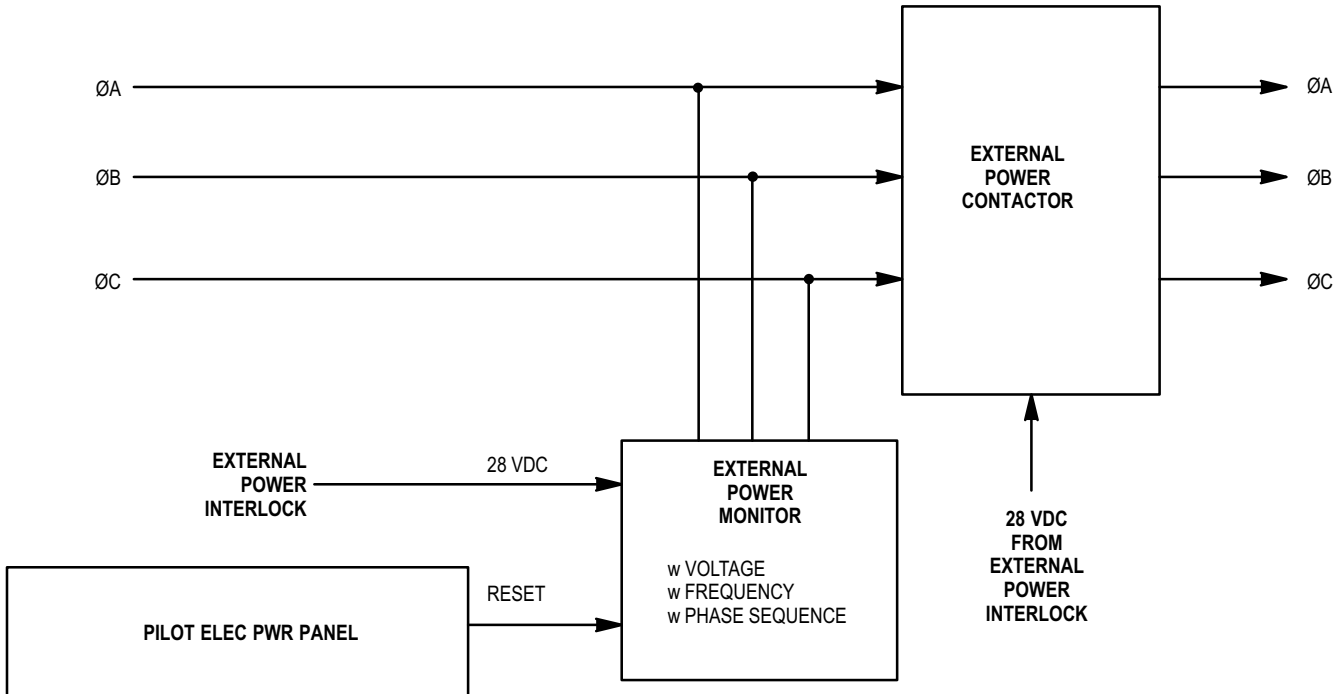


NOTES:

1. - - - - INDICATES DC
2. ——— INDICATES AC

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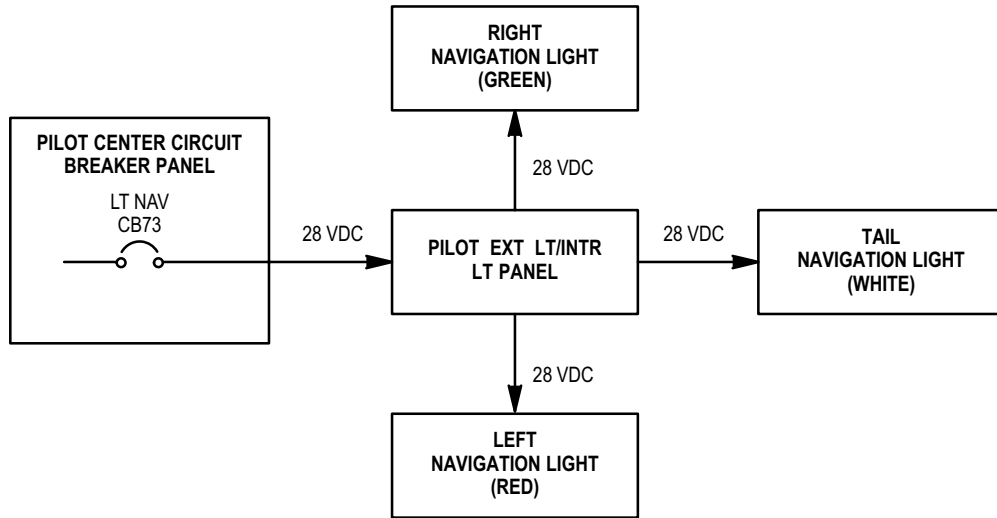
Figure 9-80. External Power Functional Block Diagram



M69-35
7

Figure 9-81. External Power Monitor and Power Contactor Functional Block Diagram

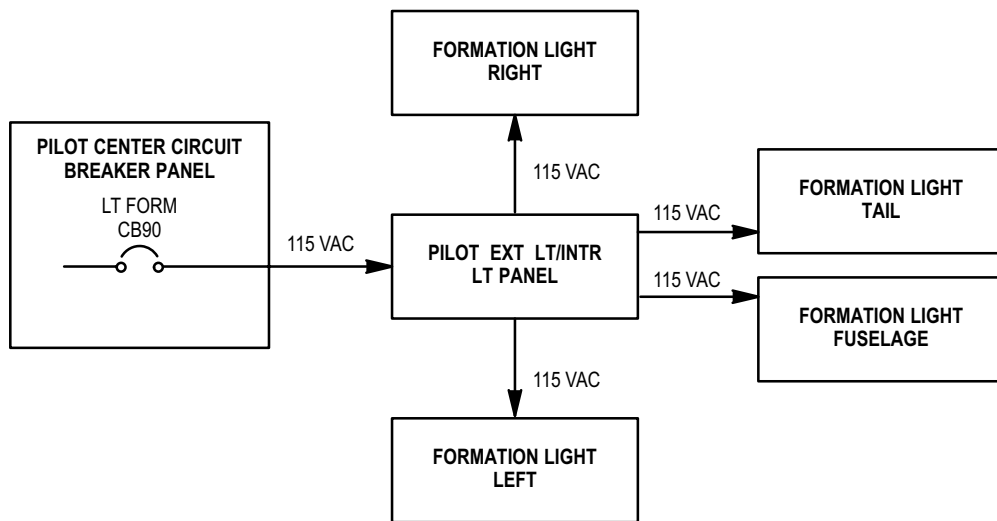
(5) **Navigation Lights.** The navigation lights (fig. 9-82) provide position and direction information to other aircraft during flight. **LT NAV** circuit breaker (CB73), on the pilot's center circuit breaker panel, supplies 28 VDC to the pilot **EXT LT/INTR LT** panel. Setting the **NAV** switch on the pilot **EXT LT/INTR LT** panel from **OFF** to **BRT** supplies 28 VDC to the right, left, and aft navigation lights. Setting the **NAV** switch to **DIM** routes the circuit through two resistors, reducing the voltage and dimming the lights.



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Figure 9-82. Navigation Lights Functional Block Diagram

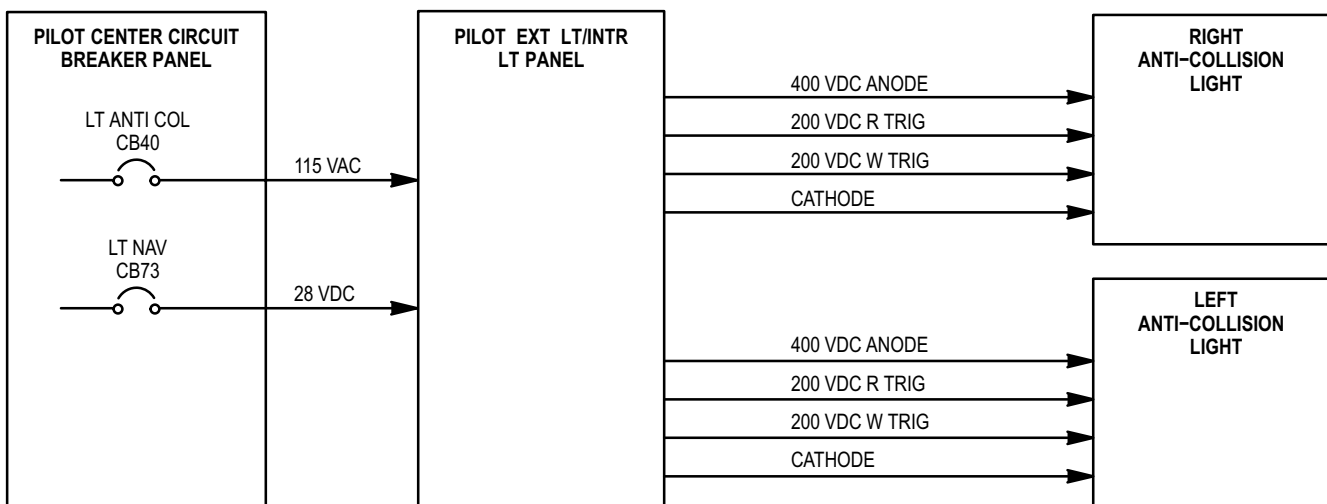
(6) **Formation Lights.** The formation lights (fig. 9-83) provide a visual indication of formation position and type of aircraft during flight. **LT FORM** circuit breaker (CB90), on the pilot's center circuit breaker panel, supplies 115 VAC to the pilot **EXT LT/INTR LT** panel. Rotating the **FORM** switch from **OFF** to **BRT** supplies 115 VAC to the right, left, tail, and fuselage formation lights.



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Figure 9-83. Formation Lights Functional Block Diagram

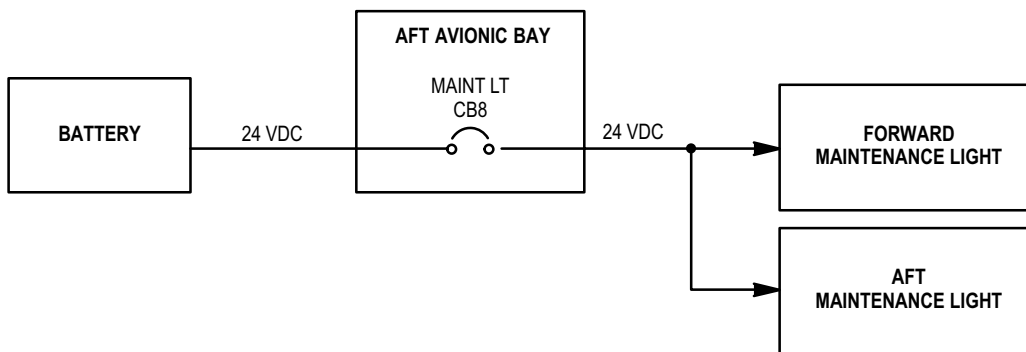
(7) **Anti-Collision Lights.** The anti-collision (fig. 9-84) lights provide a visual anti-collision warning (red or white). **LT ANTI COL** circuit breaker (CB40), on the pilot's center circuit breaker panel, supplies 115 VAC to the pilot **EXT LT/INTR LT** panel and anti-collision light power supply. **LT NAV** circuit breaker (CB73), on the pilot's center circuit breaker panel, supplies 28 VDC to the pilot **EXT LT/INTR LT** panel and anti-collision light power supply. Setting the **ANTI COL** switch from **OFF** to **WHT** or **RED** supplies 400 VDC anode voltage and 200 VDC red or white trigger voltage to the anti-collision strobe lights.



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Figure 9-84. Anti-Collision Lights Block Diagram

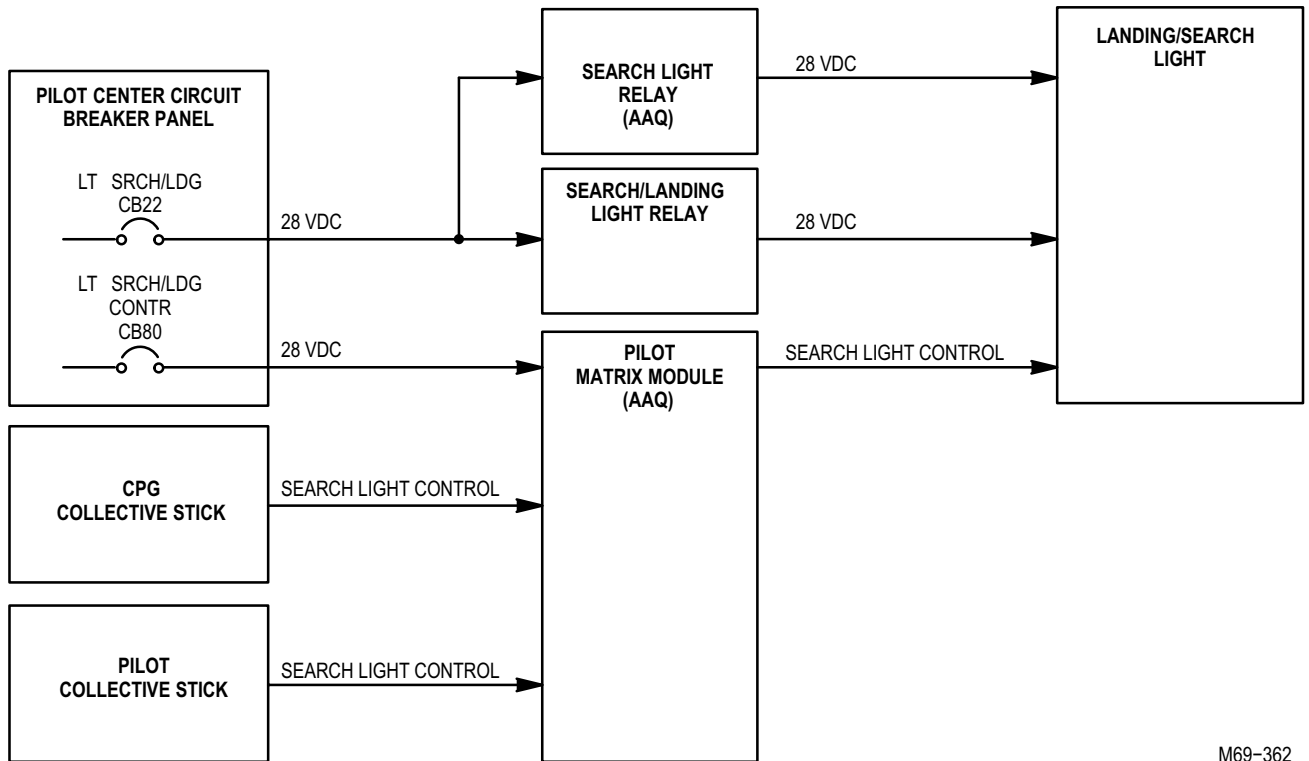
(8) **Maintenance Lights.** The maintenance lights (fig. 9-85) are used to facilitate inspection and maintenance at all points on the helicopter. A battery voltage of 24 VDC is routed through the **MAINT LT** circuit breaker (CB8) in the aft avionics bay to the forward and aft maintenance light receptacles. Operation of the maintenance light is controlled by an **OFF/BRT** rheostat switch, which is an integral part of the light.



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Figure 9-85. Maintenance Lights Block Diagram

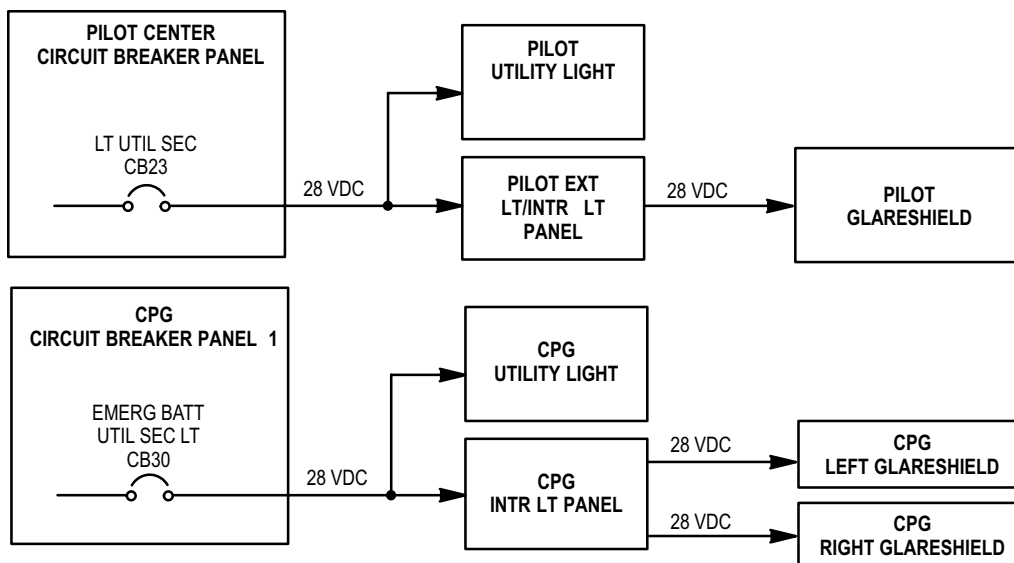
(9) **Landing/Search Light.** The landing/search light (fig. 9-86) provides omnidirectional landing and search visibility during low-visibility conditions. **LT SRCH/LDG** circuit breaker (CB22), on the pilot's center circuit breaker panel, supplies 28 VDC through the search/landing light relay to the landing/search light. **LT SRCH/LDG CONTR** circuit breaker (CB80), on the pilot's center circuit breaker panel, supplies 28 VDC through the pilot matrix module for landing/searchlight control. Setting the **SRCH LT** switch on the collective sticks from **OFF** to **ON** supplies 28 VDC to turn on the landing/search light. Directional control of the landing/search light is through the use of the **RET/L/R/EXT** search light switch.



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Figure 9-86. Landing/Search Light Functional Block Diagram

(10) **Pilot Utility and Secondary Lights.** The pilot and CPG utility and secondary lights (fig. 9-87) and CPG utility and secondary lights provide emergency lighting in the event of instrument lighting failure. **LT UTIL SEC** circuit breaker (CB23), on the pilot's center circuit breaker panel, supplies 28 VDC from the emergency bus to the pilot utility light and the pilot **EXT LT/INTR LT** panel. The pilot **EXT LT/INTR LT** panel controls the operation of the seven secondary lights installed under the pilot's glareshield. **EMERG BATT UTIL SEC LT** circuit breaker (CB30), on the CPG's circuit breaker panel 1, supplies 28 VDC from the emergency bus to the CPG utility light and the CPG **INTR LT** panel. The CPG **INTR LT** panel controls the operation of seven secondary lights installed under the CPG's glareshield. Operation of the pilot's and CPG's panels are controlled by the respective **FLOOD** switch. When the switch is positioned to **BRT**, the blue-green secondary lights are set to the highest brightness level. When the switch is positioned to **DIM**, the blue-green secondary lights are set to the lowest brightness level. The utility light provides emergency red or white lighting in case of instrument panel lighting failure. The light is operated by an integral **OFF/BRT** rheostat switch. Rotating the front part of the light selects red or white lighting.



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Figure 9-87. Pilot and CPG Utility and Secondary Lights Functional Block Diagram

(11) **Pilot and CPG Edge-Lighting.** Edge-lighting illuminates panel markings and the clear edging around each switch, indicator and circuit breaker.

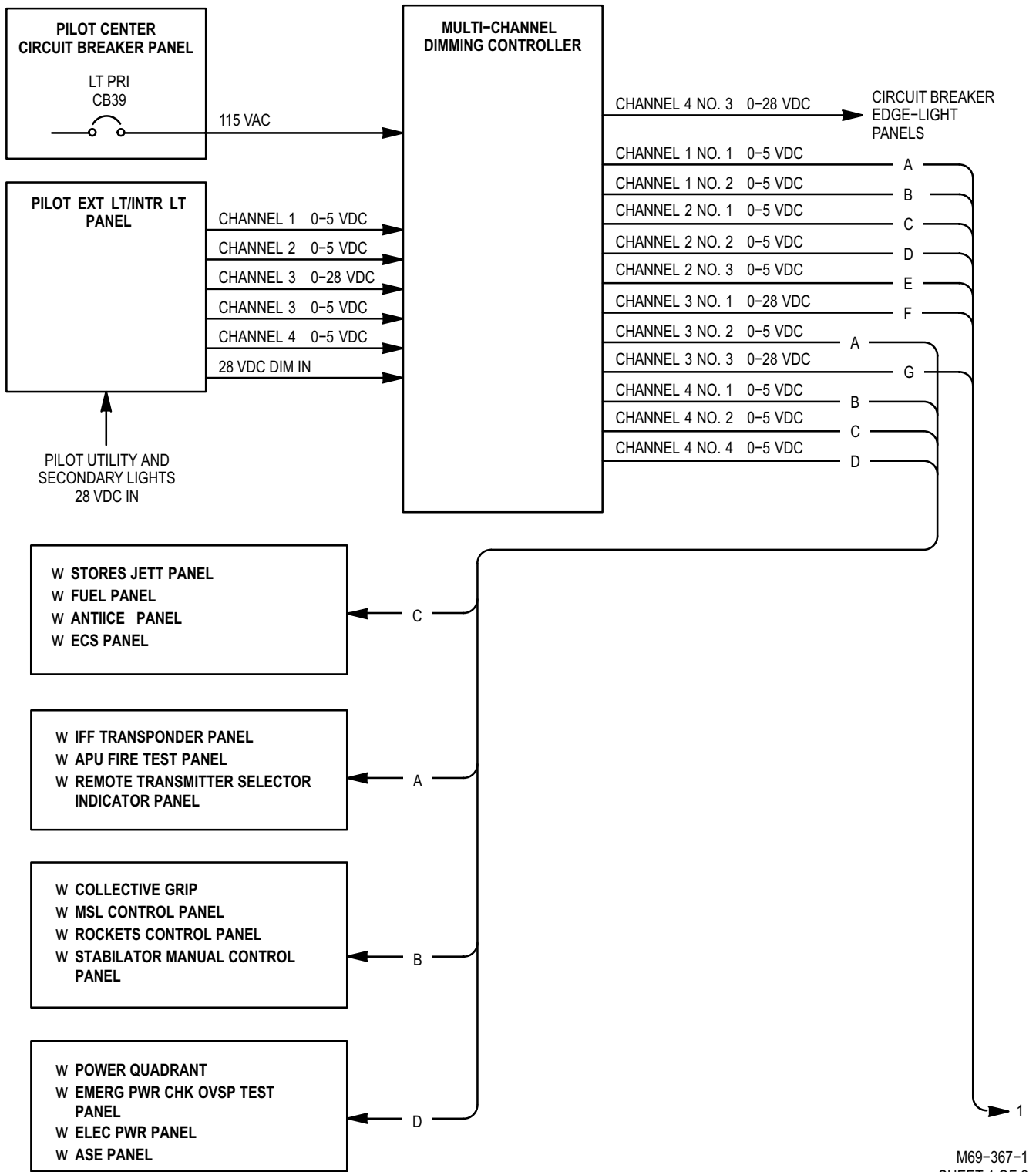
(a) Pilot edge-lighting (fig. 9-88) is controlled by three **INTR LT** rheostat switches located on the pilot **EXT LT/INTR LT** panel. The **INST** rheostat switch controls channels 1 and 2, the **R/CTR CSL** rheostat switch controls channel 3, and the **L CSL** rheostat switch controls channel 4 of the multi-channel dimming controller. Each channel varies from 0 to 5 VDC. The pilot also has an **EDGE LT PNL ON/OFF** switch, located on the overhead circuit breaker panel, to independently turn off circuit breaker edge-lighting. The pilot utility and secondary lights supply 28 VDC through the pilot **EXT LT/INTR LT** panel to the multi-channel dimming controller for **DIM** in voltage.

(b) CPG edge-lighting (fig. 9-89) is controlled by three **INTR LT** rheostat switches located on the CPG **INTR LT** panel. The **INST** rheostat switch controls channels 1 and 2, the **R CSL** rheostat switch controls channel 3, and the **L CSL** rheostat switch controls channel 4 of the multi-channel dimming controller. Each channel varies from 0 to 5 VDC.

(c) Edge-lighting circuit breakers (fig. 9-90) consist of the **LT PRI** circuit breaker (CB39), on the pilot's center circuit breaker panel, and the **PRI LT** circuit breaker (CB14), on the CPG's circuit breaker panel 1. The edge-lighting circuit breakers supply 115 VAC to the multi-channel dimming controller which converts 115 VAC into the proper dc levels for four channels. **EMERG BATT UTIL SEC LT** circuit breaker (CB30), on the CPG's circuit breaker panel 1, supplies 28 VDC through the CPG **INTR LT** panel to the multi-channel dimming controller.

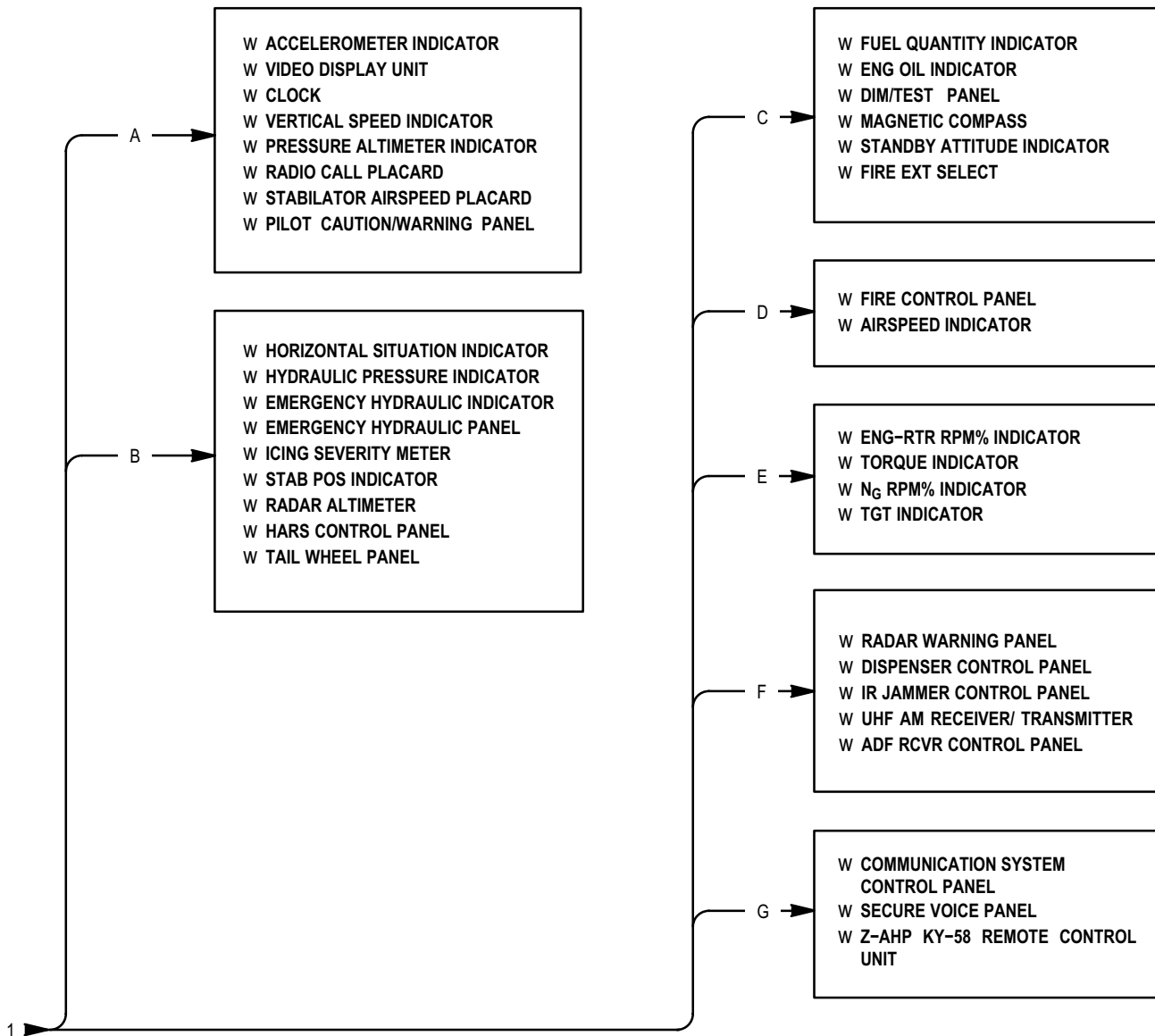
9-7. SYSTEM DESCRIPTION (cont)

9-7



M69-367-1
SHEET 1 OF 2

Figure 9-88. Pilot Edge-Lights Block Diagram (Sheet 1 of 2)

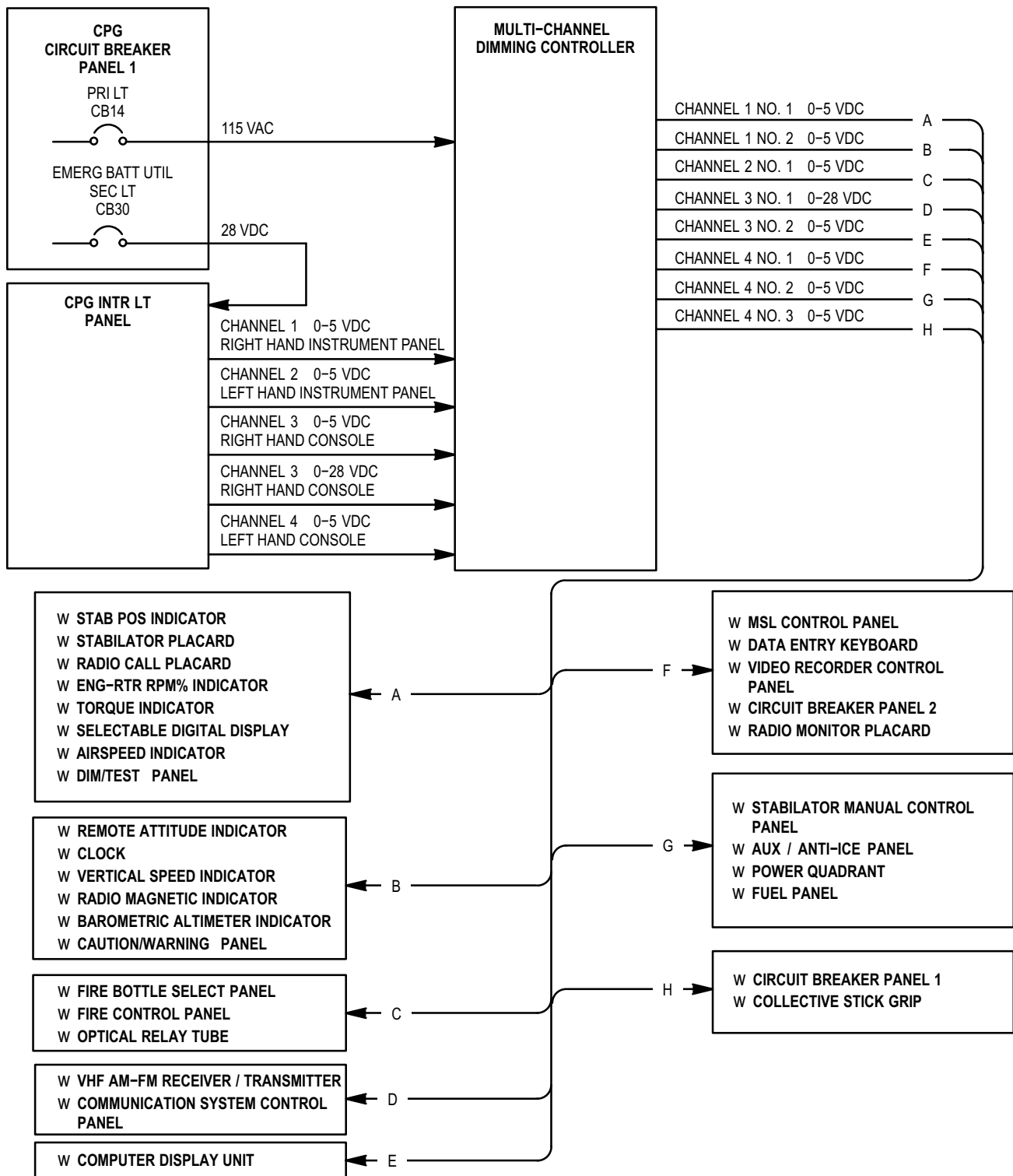


M69-367-2
SHEET 2 OF 2

Figure 9-88. Pilot Edge-Lights Block Diagram (Sheet 2 of 2)

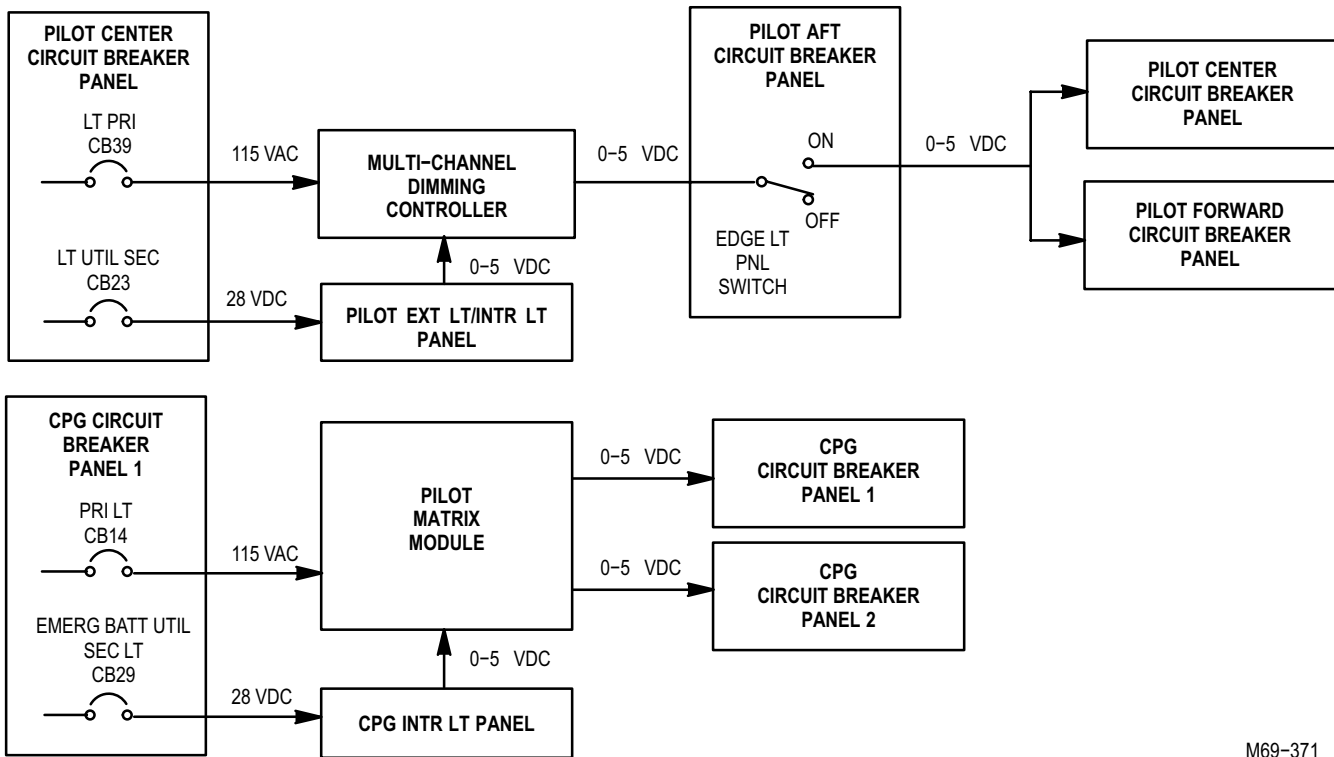
9-7. SYSTEM DESCRIPTION (cont)

9-7



M69-368

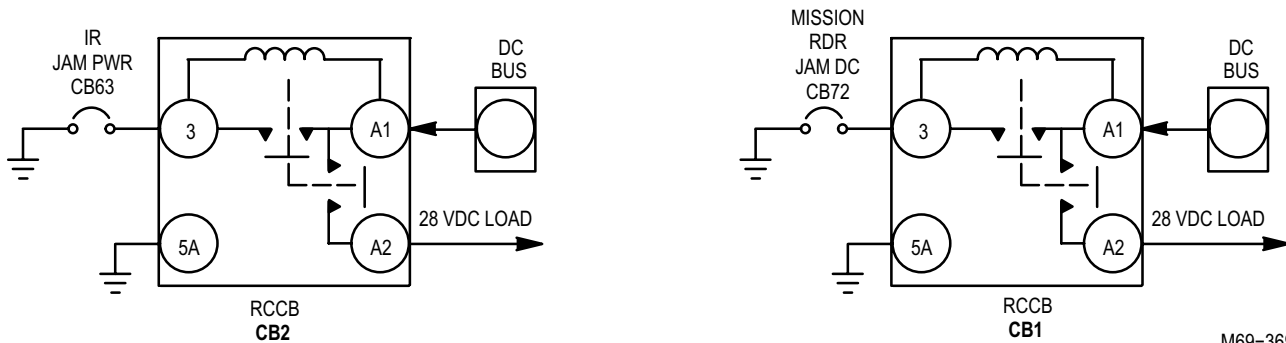
Figure 9-89. CPG Edge-Lighting Block Diagram (Sheet 1 of 2)



M69-371

Figure 9-90. Edge-Lighting Circuit Breakers Functional Block Diagram

(12) **Pilot Station DC Ground Circuit Protection System.** The pilot station dc ground circuit protection system (fig. 9-91) saves weight by eliminating large portions of heavy wiring, reduces cost, maintains a constant load voltage due to parallel circuitry, and protects the IR jammer. When power is applied to the IR jammer, current flows from ground through **IR JAM PWR** circuit breaker (CB63) to the RCCB. Current flows from contact 3 of the RCCB through the coil to contact A1 energizing the RCCB. When the RCCB is energized, the dc bus is connected to the dc load. When an overload condition occurs, the current through the **IR JAM PWR** circuit breaker (CB63) increases, opening the **IR JAM PWR** circuit breaker (CB63). When the **IR JAM PWR** circuit breaker (CB63) is opened, the RCCB deenergizes removing the load from the dc bus.



M69-369

Figure 9-91. Pilot Station DC Ground Circuit Protection System Interface Diagram

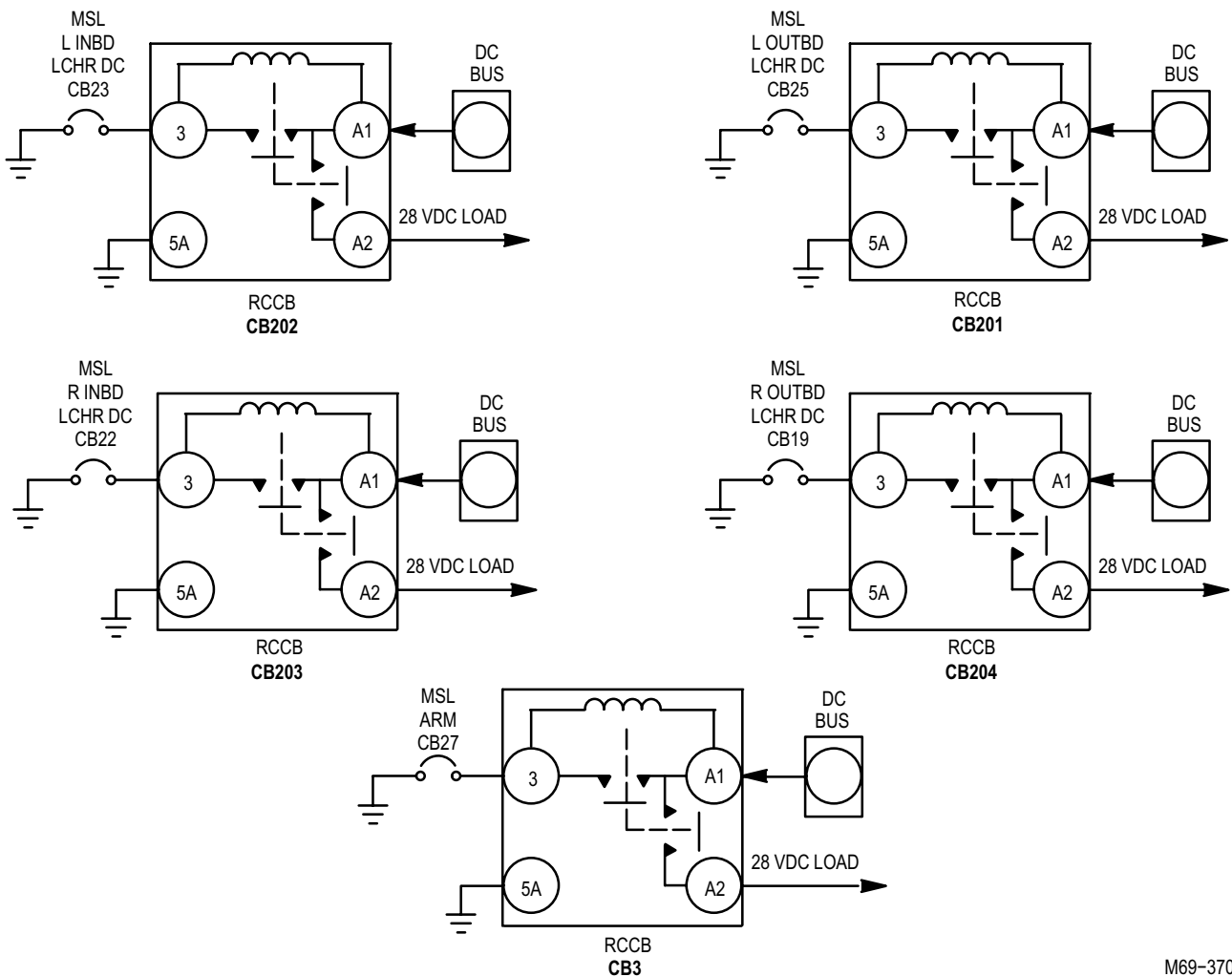
9-7. SYSTEM DESCRIPTION (cont)

9-7

(13) **CPG Station DC Ground Circuit Protection System.** The CPG station dc ground circuit protection system (fig. 9-92) saves weight by eliminating large portions of heavy wiring, reduces cost, maintains a constant load voltage due to parallel circuitry, and protects the hellfire mission equipment (HME).

(a) Operation of the **L OUTBD LCHR DC** circuit breaker (CB25) in conjunction with a RCCB is the same for HME circuit breakers and associated RCCBs. Only the **L OUTBD LCHR DC** circuit breaker (CB25) and associated RCCB is explained.

(b) When power is applied to the missile system, current flows from ground through **L OUTBD LCHR DC** circuit breaker (CB25) to the RCCB. Current flows from contact 3 of the RCCB through the coil to contact A1 energizing the RCCB. When the RCCB is energized, the dc bus is connected to the left outboard launcher dc load. When an overload condition occurs, the current through the **L OUTBD LCHR DC** circuit breaker increases (CB25), opening the **L OUTBD LCHR DC** circuit breaker (CB25). When the **L OUTBD LCHR DC** circuit breaker (CB25) is opened, the RCCB deenergizes, removing the left outboard launcher load from the dc bus.



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Figure 9-92. CPG Station DC Ground Circuit Protection System Interface Diagram

(14) **Pilot Caution/Warning System.** The pilot caution/warning system (fig. 9-93) provides indications of hazardous conditions, master caution indications, master caution resets, audio warning resets and lamp press to test functions in the pilot station.

(a) **LT CAUT** circuit breaker (CB21), on the pilot's center circuit breaker panel, supplies 28 VDC to the pilot matrix module. **FIRE DETR APU** circuit breaker (CB11), on the pilot's center circuit breaker panel, supplies 28 VDC to the pilot **APU** fire test panel. **FIRE DETR ENG 1** circuit breaker (CB12), on the pilot's center circuit breaker panel, supplies 28 VDC to the multi-channel dimming controller. **FIRE DETR ENG 2** circuit breaker (CB13), on the pilot's center circuit breaker panel, supplies 28 VDC to the multi-channel dimming controller.

(b) The multi-channel dimming controller receives engine fire detection, APU fire detection, tail wheel unlock, anti-ice, engine starter and engine overspeed inputs to provide indications of caution and warning conditions on the applicable remote indicator lights. When the **PRESS TO TEST** indicator on the pilot's master caution/warning panel is pressed, the multi-channel dimming controller outputs voltage to light the following remote indicators:

- Pilot **BTL DISCHARGE** indicators.
- Pilot fire extinguisher **ENG FIRE PULL** handles.
- Pilot **ANTI ICE** indicators.
- Pilot power quadrant indicators.
- Pilot **TAIL WHEEL** indicator.
- Pilot **EMERG PWR CHK OVSP TEST** panel indicators.
- Pilot remote transmitter selector indicator panel indicators.
- Radar warning display **MA** indicator.
- Radar warning control **SELF-TEST** indicator.
- Pilot **ARM/SAFE** indicators (through the CPG and pilot fire control panels).

(c) The pilot matrix module supplies 28 VDC to the pilot master caution/warning panel and the pilot caution/warning panel. The pilot matrix module also supplies 0 to 5 VDC edge-lighting to the pilot caution/warning panel. When the **PRESS TO TEST** indicator on the pilot's master caution/warning panel is pressed, the pilot matrix module outputs voltage to enable the tail rotor gearbox temp alarm and to light the pilot **ROCKETS** control panel remote indicators. The pilot matrix module supplies 28 VDC to the CPG isolation relay. When an APU fire is detected the APU flame detector supplies a ground to the CPG isolation relay enabling the **FIRE APU** master caution/warning indicators.

(d) The pilot caution/warning panel receives inputs from the CPG caution/warning panel and DASE to provide indications of caution and warning. The pilot caution/warning panel outputs 28 VDC to the master caution/warning panel for reset voltage and caution and warning indicators. The pilot caution/warning panel also outputs 5 VDC to the master caution/warning panel for **PRESS TO TEST** indicator voltage.

(e) The **MASTER CAUTION** light on the pilot's master caution/warning panel lights when a n indicator on the pilot's caution/warning panel lights. The **PRESS TO TEST** indicator on the pilot's master caution/warning panel tests (lights) caution/warning panel indicators and all remote caution/warning indicators. Pressing **ENGINE 1 OUT** or **ENGINE 2 OUT** indicator resets the audio alarms from the engine out warning unit.

9-7. SYSTEM DESCRIPTION (cont)

9-7

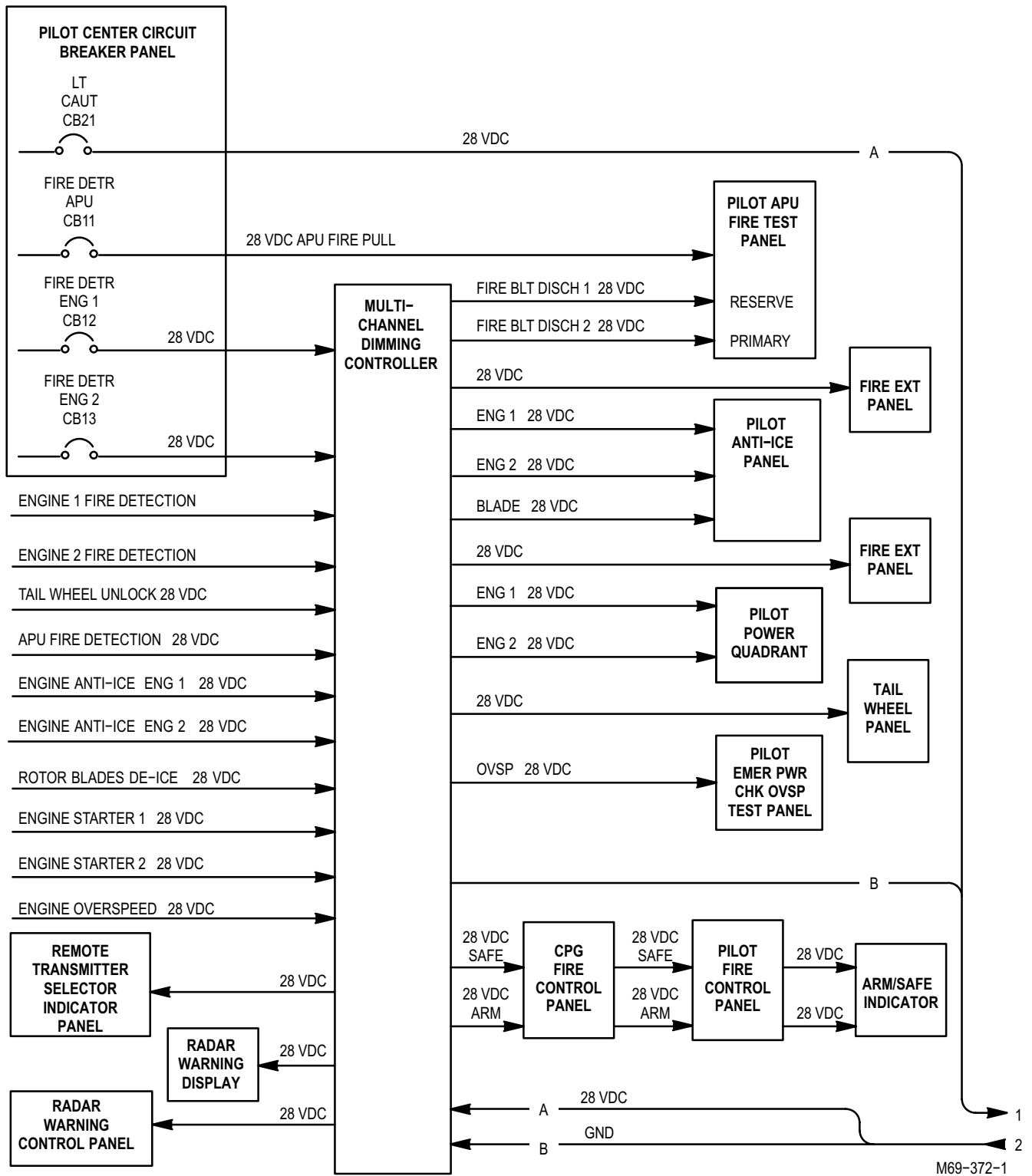
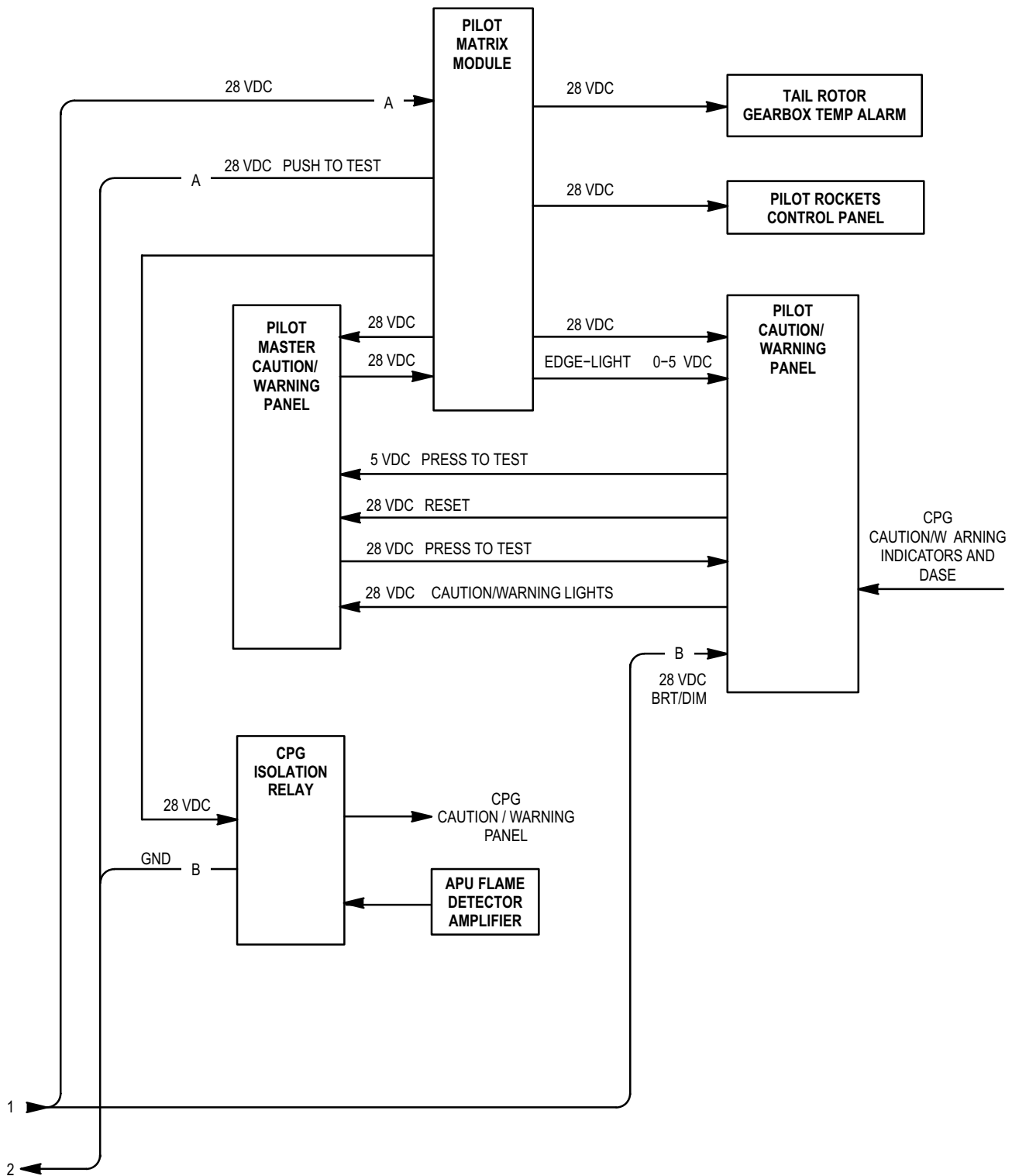


Figure 9-93. Pilot Caution/Warning System Interface Diagram (Sheet 1 of 2)



M69-372-2

Figure 9-93. Pilot Caution/Warning System Interface Diagram (Sheet 2 of 2)

9-7. SYSTEM DESCRIPTION (cont)

9-7

(15) **CPG Caution /Warning System.** The CPG caution/warning system(fig. 9-94) provides indications of hazardous conditions, master caution indications, master caution resets, audio warning resets and lamp press to test functions in the CPG station.

(a) **MISSION FC DC** circuit breaker (CB50), on the pilot's forward circuit breaker panel, supplies 28 VDC through the pilot and CPG **FIRE CONTROL** panels to the CPG **ARM/SAFE** indicators. **EMERG BATT CAUT** circuit breaker (CB29) on the CPG circuit breaker panel 1, supplies 28 VDC to the pilot matrix module. The pilot matrix module receives DASE and power plants input to provide indications of caution and warning. The pilot matrix module supplies 28 VDC to the multi-channel dimming controller, CPG caution/warning panel, CPG master caution/warning panel and the CPG caution/warning panel caution/warning indicators, and 0 to 5 VDC edge-lighting to the CPG caution/warning panel. When the **PRESS TO TEST** indicator on the CPG's master caution/warning panel is pressed, the intermediate gearbox temperature alarm is enabled.

(b) The multi-channel dimming controller receives engine fire detection to provide indications of caution/warning conditions on the CPG fire extinguisher **ENG FIRE PULL** handles. When the **PRESS TO TEST** indicator on the CPG's master caution/warning panel is pressed, the multi-channel dimming controller controls the lighting of the CPG fire extinguisher **ENG FIRE PULL** handle indicators and the CPG **ARM/SAFE** indicators. The multi-channel dimming controller also supplies 28 VDC bright/dim voltage to the CPG caution/warning panel.

(c) The CPG caution/warning panel outputs 28 VDC to the master caution/warning panel for reset and **PRESS TO TEST** indicator voltage.

(d) The **MASTER CAUTION** light on the CPG's master caution/warning panel lights when an indicator on the CPG's caution/warning panel lights. The **PRESS TO TEST** indicator on the CPG's master caution/warning panel tests (lights) caution/warning panel indicators and all remote caution and warning indicators. Pressing **ENGINE 1 OUT** or **ENGINE 2 OUT** indicator resets the audio alarms from the engine out warning unit.

9-7. SYSTEM DESCRIPTION (cont)

9-7

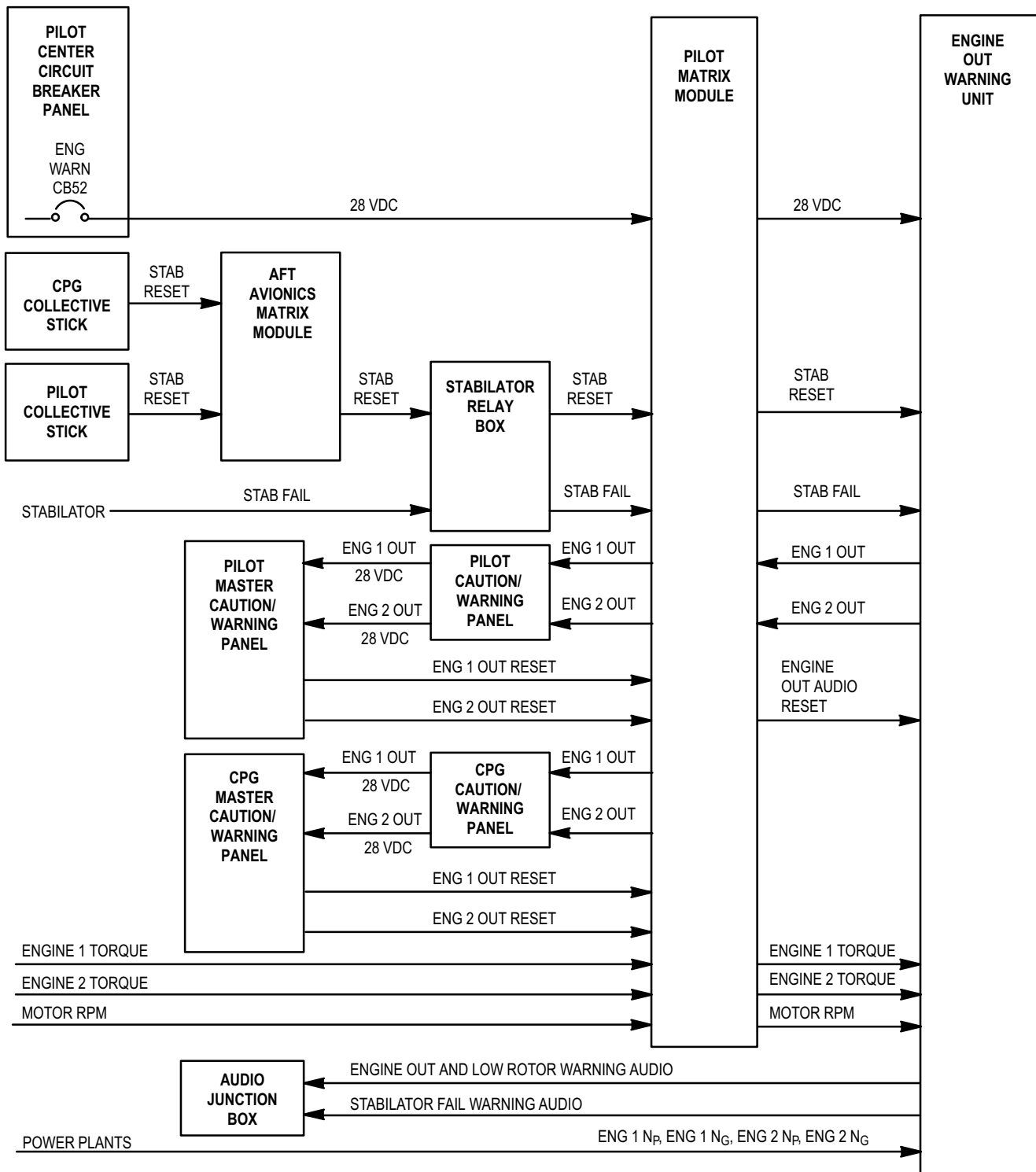
(16) **Audio Warning System.** The audio warning system (fig. 9-95) provides auditory signals to alert the pilot and CPG of hazardous engine, main rotor speed or stabilator conditions.

(a) **ENG WARN** circuit breaker (CB52), located on the pilot center circuit breaker panel, supplies 28 VDC emergency dc bus power to the engine out warning unit.

(b) The engine out warning unit monitors both engine power turbine speeds (N_P), engine gas turbine speeds (N_G), the power lever position of both engines, and torque developed by each engine. N_P sensing is disabled when the respective engine torque is above 100 foot-pounds. N_P sensing is also disabled when the respective **PWR** lever is not in the **FLY** position. With the **PWR** lever in the **FLY** position, if N_P decreases to 92% and torque is below 100 ± 20 foot-pounds, the respective engine out sensor develops a signal to turn on the respective **ENGINE OUT** indicator on the pilot and CPG master/caution warning panels and triggers the engine out warning unit. The engine out warning unit generates a 700-1700 Hz sweep tone to the pilot and CPG headsets. If the **PWR** levers are moved from the **FLY** position, N_P sensing is disabled. However, when N_G decreases to 63%, the engine out warning is triggered. The engine out warning tone can be reset by pressing either the **ENGINE 1 OUT** or **ENGINE 2 OUT** indicator on the master caution/warning panel.

(c) If the speed of the main rotor (N_R) decreases to 92% (266 rpm), the engine out warning unit develops a signal to turn on the **LOW RPM ROTOR** indicator on the pilot and CPG master/caution warning panel and triggers a 700-1700 Hz sweep tone to the pilot and CPG headsets. If the rotor rpm increases to 104% (301 rpm), the **HIGH ROTOR** indicator turns on, but an audio tone is not generated. The low rotor speed warning tone can be reset by pressing either the **ENGINE 1 OUT** or **ENGINE 2 OUT** indicator on the master caution/warning panel.

(d) If the stabilator automatic control system fails, the stabilator triggers the engine out warning unit. The engine out warning unit outputs a 1000 Hz continuous tone to the pilot and CPG headsets. The stabilator tone is reset by the stabilator **RESET** button on the respective collective stick.



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Figure 9-95. Audio Warning System Interface Diagram

NOTE

The PLT/GND ORIDE switch can be used to override the squat switch in all modes and the CPG switch can be used to control SAFE/ARM power.

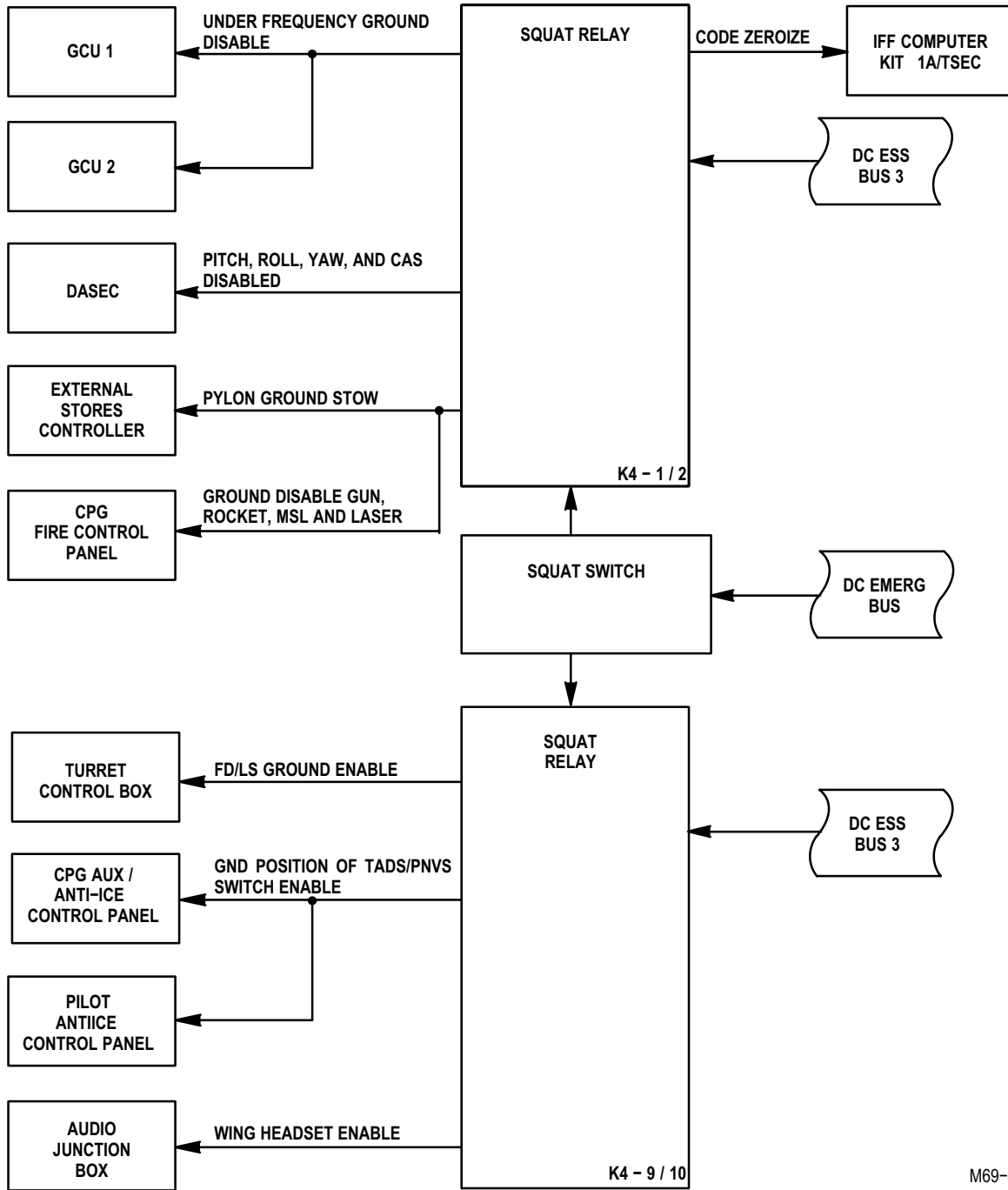
(17) **Squat Switch System.** The squat switch system (fig. 9-96) indicates to the helicopter when flight mode (weight off wheels) or ground mode (weight on wheels) conditions exist. The squat switch acts as a safety device which deactivates certain functions of some systems and enables fault detection of other systems via squat relays: K4-1/2 and K4-9/10.

(a) In the flight mode the squat relays perform the following functions:

- Removes the ground supplied to the generator control circuits which deactivates generators 1 and 2 underfrequency controls to prevent loss of electrical power due to low generator rpm.
- Disables intercommunication system (ICS) wing communications.
- Enables all DASEC channels and disables the backup control system (BUCS) self-test.
- Enables the **ON** position of the **TADS/PNVS** switch and disables the **GND** position on the pilot **ANTI ICE** panel.

(b) In the ground mode the squat relays perform the following functions:

- Supplies a ground to the generator control circuits which activates generator 1 and 2 underfrequency controls.
- Supplies a ground to the audio junction box ICS wing disable circuit which enables ICS wing communications.
- Removes the ground supplied to the DASEC which deactivates the YAW command augmentation system (CAS) and activates the BUCS self-test.
- Supplies a ground to the KIT 1A/TSEC computer. The IFF code is zeroized unless the **CODE** switch on the **IFF** panel is set to **HOLD** in flight mode before landing.
- Causes 28 VDC to be applied through the CPG **FIRE CONTROL** panel and the LH fab MRTU type II which activates FD/LS verification of proper CPG **FIRE CONTROL** panel connection and deactivates weapons systems arming.
- Sends 28 VDC to the external stores controller which moves the pylons to the ground stow position.
- Supplies a ground to the gun turret control box which disables gun movement.
- Enables the **GND** position and disables the **ON** position of the **TADS/PNVS** switch on the pilot **ANTI ICE** panel.



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Figure 9-96. Squat Switch System Functional Block Diagram

Multiplex read codes are applicable to ac electrical power generation. Refer to TM 1-1520-238-T-3 for generator multiplex read codes.

SECTION III. TROUBLESHOOTING PROCEDURES

9-9. ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (ECLC) INDEX

9-9

Use the information in Table 9-2 to locate the electrical components and their connectors to perform the troubleshooting tasks in this chapter. Table 9-2 includes locator illustrations which supplement the ECLC listing. The listing entry in the grid area column in the listing tells you where to locate the component in the illustrations.

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing

FROM COLUMN		TO COLUMN		Grid Area	Access
Connector Ref Des	Component/Harness	Connector Ref Des	Component/Harness		
D17	CPG UTL LT		W119	19D	CPG STATION
DS11	LDG/LT		W118	9C	BOTTOM FWD FUSELAGE
DS16	PLT UTL LT		W119	67C	PLT STATION
EXT PWR	SERV PLUG	J14	W108	111B	R345 DOOR
GRD SERV	SERV PLUG	J112	W118	15B	B60R DOOR
GRD SERV	SERV PLUG	J16	W118	15B	B60R DOOR
K1 RELAY	LDG RELAY	XK1	W118	13D	R90 DOOR
K320 RELAY	LDG RELAY	XK320	W118	13D	R90 DOOR
K4-1/2 RELAY	RELAY MODULE	XK4-1/2	W668	74E	ELEC PWR BOX
K4-9/10 RELAY	RELAY MODULE	XK4-9/10	W668	74E	ELEC PWR BOX
P1	W668	J1	A1	76D	ELECT PWR BOX
P1	W605/A76	J1	A402	72A	ELECT PWR BOX
P1	DS28	J164	W118	44C	PLT STATION

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)

FROM COLUMN		TO COLUMN		Grid Area	Access
Connector Ref Des	Component/Harness	Connector Ref Des	Component/Harness		
P1	DS31	J166	W118	3E	CPG STATION
P1	DS31	J166	W118	28C	CPG STATION
P1	A324	J168	W119	28C	CPG STATION
P1	A325	J530	W119	43C	PLT STATION
P1	A97	J764	W116	20C	CPG LEFT CSL
P1	A641	J993	W648	18B	CPG STATION
P1	A641	J994	W119	66B	PLT STATION
P1	W119	J1039	A322	27B	CPG STATION
P100	W119	J1	A133	62C	PLT STATION
P101	W119	J1	A181	18D	CPG STATION
P1012	W154	J1012	W171	117C	L540 FAIRING
P102	W119	J1	PS5	86C	L200 PANEL
P103	W119	J2	PS5	86D	L200 PANEL
P104	W118	J3	PS5	88D	L200 PANEL
P105	W155	J1	DS8	89D	LW8 COVER
P106	W156	J1	DS9	92A	RW8 COVER
P1077	W211	J1	A329	100E	L325 DOOR
P107	A81	J107	W119	64B	PLT STATION
P108	A80	J108	W119	18B	CPG STATION
P109	W119	J3	A403	32D	L90 DOOR
P11	W668	J1	K2	74B	ELECT PWR BOX
P110	W119	J4	A403	32D	L90 DOOR
P115	W155	J115	W119	92D	LW9 COVER
P116	W156	J116	W118	89B	RW9 COVER
P12	W668	J1	PS2	83C	R200 PANEL

9-9. ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (ECLC) INDEX (cont)

9-9

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)

FROM COLUMN		TO COLUMN		Grid Area	Access
Connector Ref Des	Component/Harness	Connector Ref Des	Component/Harness		
P124	W171	J124	W170	118A	R510 FAIRING
P13	W108	J1	PMI	104D	R295 DOOR
P14	W668	J1	A4	74B	ELECT PWR BOX
P172	W119	J1	A125	63D	PLT STATION
P173	W119	J1	A24	62C	PLT STATION
P175	W119	J1	A78	62D	PLT STATION
P176	W118	J1	A138	40D	PLT STATION
P178	W119	J1	A135	61B	PLT STATION
P18	W118	J1	A106	33D	CPG STATION
P19	W118	J1	A157	1C	R40 COVER
P190	W119	J1	A29	23C	CPG STATION
P2	W119	J2	G1	85B	L200 PANEL
P2	W605/A76	J2	A402	72A	PLT STATION
P20	W118	J2	A106	34C	CPG STATION
P200	W170	J1	A419	116D	R545 COVER
P201	W170	J1	A418	115C	R545 COVER
P277	W117	J1	A102	A102	CPG STATION
P279	W117	J1	A156	5D	L40 COVER
P281	W117	J3	A156	5C	L40 COVER
P3	W119	J1	G1	87B	L200 PANEL
P3	W605/A76	J3	A402	71C	ELECT PWR BOX
P300	W265	J1	A110	65B	PLT CTR CSL
P302	W266	J1	EQ300	13B	R295 DOOR
P31	W118	J2	A157	2B	R40 COVER
P318	W266	J5	EQ300	13B	R90 DOOR
P350	W266	1J1	RE305	100D	L325 DOOR

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)

FROM COLUMN		TO COLUMN		Grid Area	Access
Connector Ref Des	Component/Harness	Connector Ref Des	Component/Harness		
P4	W605	J4	A402	72B	ELECT PWR BOX
P403	W119	J403	W117	20B	CL7 PANEL
P405	W261	J3	A326	39B	CPG STATION
P409	W261	J4	A326	59B	CPG STATION
P410	W170	J410	W211	101E	R295 DOOR
P416	W118	J416	W255	1C	R40 NOSE
P419	W117	J13	A402	69E	L200 PANEL
P423	W117	J11	A402	71D	ELECT PWR BOX
P425	W117	J12	A402	71D	L200 PANEL
P426	W116	J9	A402	71D	L200 PANEL
P427	W211	J28	A402	69D	L200 PANEL
P429	W119	J23	A402	71E	L200 PANEL
P430	W108	J6	A402	69B	ELECT PWR BOX
P431	W211	J27	A402	71D	ELECT PWR BOX
P432	W266	J30	A402	69B	R200 PANEL
P433	W119	J20	A402	69E	ELECT PWR BOX
P435	W261	J7	A326	59A	CPG STATION
P436	W102	J436	W118	54D	R200 PANEL
P437	W119	J25	A402	69E	L200 PANEL
P438	W118	J15	A402	69C	L200 PANEL
P439	W119	J21	A402	40D	ELECT PWR BOX
P440	W118	J16	A402	69C	ELECT PWR BOX
P441	W119	J24	A402	71D	ELECT PWR BOX
P442	W102	J5	A402	69B	ELECT PWR BOX
P448	W118	J448	W119	65C	PLT STATION

9-9. ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (ECLC) INDEX (cont)

9-9

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)

FROM COLUMN		TO COLUMN		Grid Area	Access
Connector Ref Des	Component/Harness	Connector Ref Des	Component/Harness		
P449	W211	J449	W119	86E	T205L FAIRING
P453	W117	J14	A402	69D	L200 PANEL
P454	W116	J10	A402	69B	R200 PANEL
P456	W118	J456	W211	65D	PLT STATION
P457	W119	J22	A402	71E	ELECT PWR BOX
P461	W145	J32	A402	72B	ELECT PWR BOX
P463	W119	J1	A76	68D	PLT STATION
P465	W119	J12	A326	59C	CPG STATION
P466	W108	J14	A326	57E	CPG STATION
P467	W261	J4	A326	59A	CPG STATION
P468	W266	J17	A326	57D	CPG STATION
P469	W119	J2	A326	59B	CPG STATION
P470	W264	J19	A646	57D	CPG STATION
P471	W117	J1	A326	59D	CPG STATION
P472	W118	J14	A646	57E	CPG STATION
P472	W118	J14	A646	57E	CPG STATION
P473	W119	J6	A326	59D	CPG STATION
P475	W119	J475	A327	52B	CPG STATION
P477	W119	J8	A326	60E	CPG STATION
P478	W119	J17	A402	69C	L200 PANEL
P479	W261	J11	A326	59B	CPG STATION
P480	W118	J16	A326	57E	CPG STATION
P481	W119	J13	A326	59C	CPG STATION
P482	W118	J18	A326	57D	CPG STATION
P483	W117	J26	A402	69E	L200 PANEL

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)

FROM COLUMN		TO COLUMN		Grid Area	Access
Connector Ref Des	Component/Harness	Connector Ref Des	Component/Harness		
P487	W119	J9	A326	27C	CPG STATION
P488	W118	J18	A402	69C	ELECT PWR BOX
P49	W261	J1	A9	78B	L140 FAIRING
P491	W211	J6	A323	101D	R295 DOOR
P5	W605/A76	J29	A402	72C	ELECT PWR BOX
P5	W668	J1	K1	76D	ELECT PWR BOX
P504	W117	J1	A404	63C	PLT STATION
P523	W117	J523	W255	29B	R60 FAIRING
P524	W116	J524	W118	15E	R90 DOOR
P527	W119	J528	W645	52B	R90 DOOR
P6	W668	J1	PS1	88B	L200 PANEL
P668	W255	J4	A61	3B	R40 COVER
P671	W116	J4	A62	16D	R60 FAIRING
P672	W116	J3	A62	16B	R90 COVER
P699	W255	J3	A61	2B	R40 COVER
P7	W668	J1	A2	73C	ELECT PWR BOX
P717	W118	J1	A53	47B	PLT STATION
P718	W118	J1	A120	46A	PLT STATION
P747	W119	J1	A403	32E	L90 DOOR
P748	W119	J2	A403	30E	L90 DOOR
P761	W255	J1	A97	19E	PLT STATION
P763	W145	J2	A97	19D	CPG STATION
P766	W119	J1	A77	21B	CPG STATION
P767	W117	J2	A77	22D	CPG STATION
P769	W145	J4	A77	22B	CPG STATION

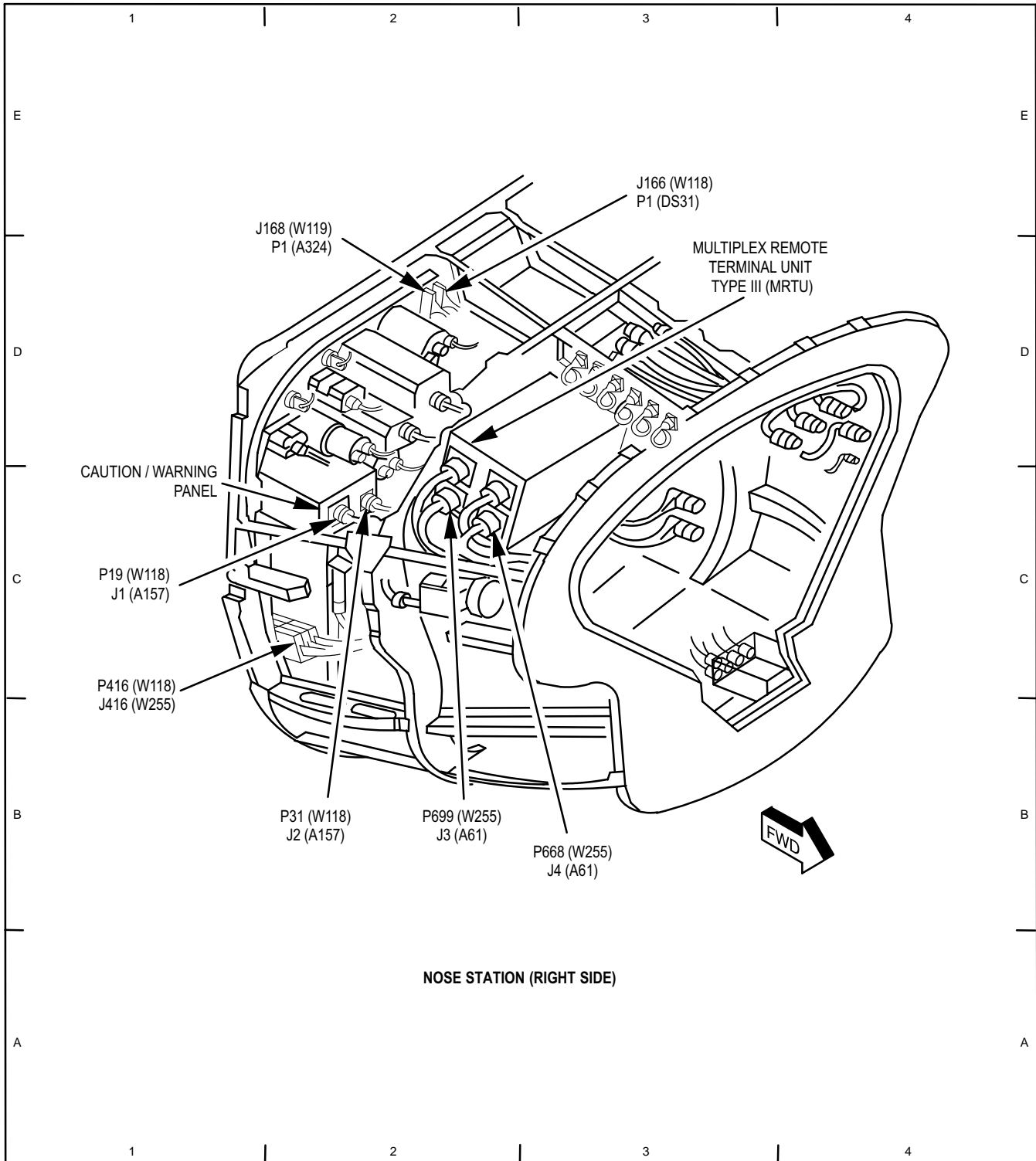
9-9. ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (ECLC) INDEX (cont)

9-9

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)

FROM COLUMN		TO COLUMN		Grid Area	Access
Connector Ref Des	Component/Harness	Connector Ref Des	Component/Harness		
P8	W118	J2	G2	84C	R200 PANEL
P80	W108	J1	BT2	105D	R295 DOOR
P81	W108	J1	BT1	105C	R295 DOOR
P85	W118	J1	AR1	96C	L325 DOOR
P87	W108	J3	BT1	106B	R295 DOOR
P9	W118	J1	G2	83C	R200 PANEL
P907	W266	J907	W261	17B	CPG STATION
P908	W118	J908	W119	17C	CPG STATION
P909	W266	J909	W119	17B	CPG STATION
P912	W118	J912	W119	17C	CPG STATION
P914	W118	J914	W119	17B	PLT STATION
P915	W118	J915	W251	17B	PLT STATION
P921	W116	J921	W117	17C	CPG STATION
P997	W117	J1	A147	17E	CPG STATION
S350	SQUAT SWITCH	P433	W119	10C	L90 DOOR

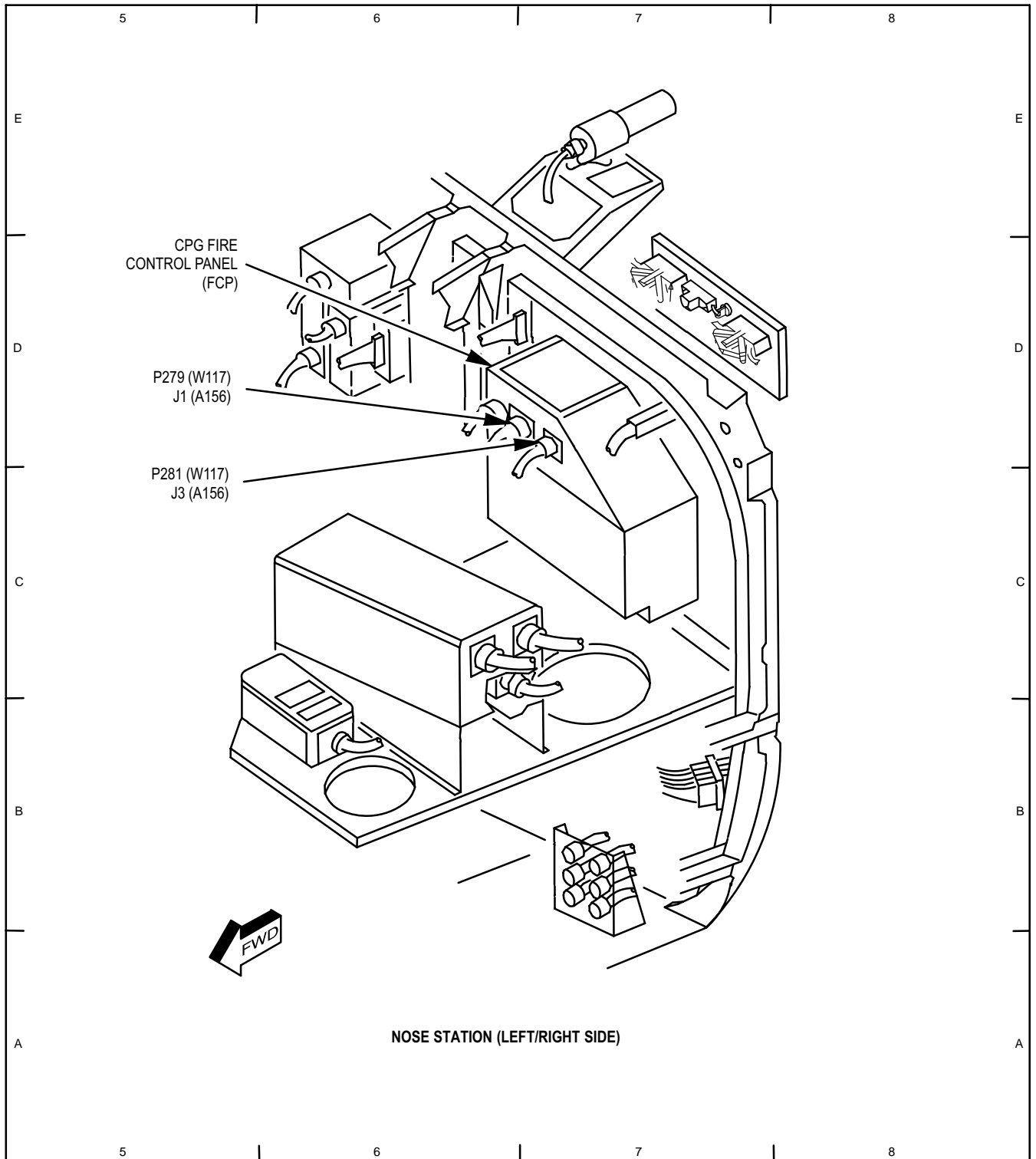
Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)



M69-093A

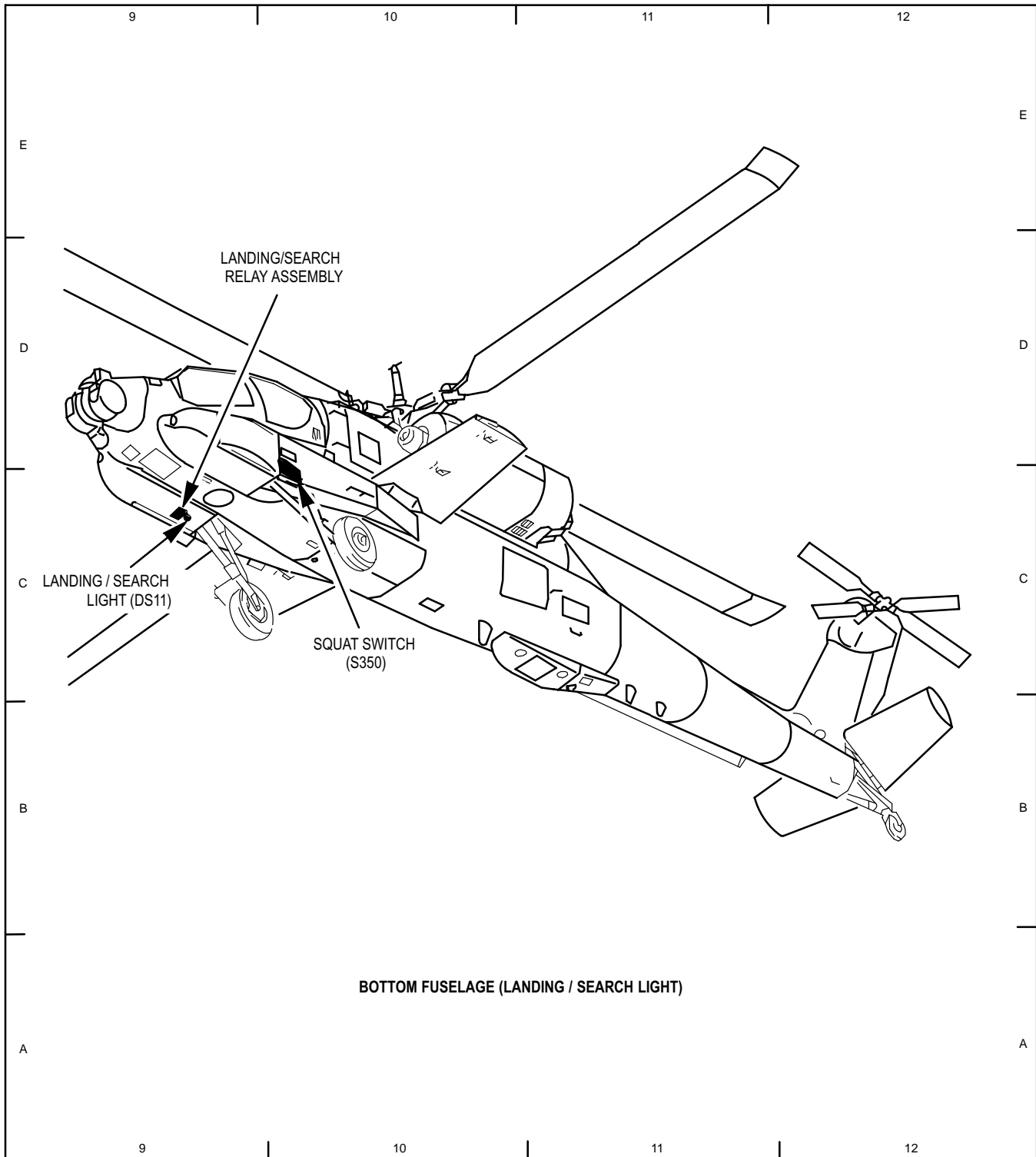
9-9. ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (ECLC) INDEX (cont)

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)



M69-401

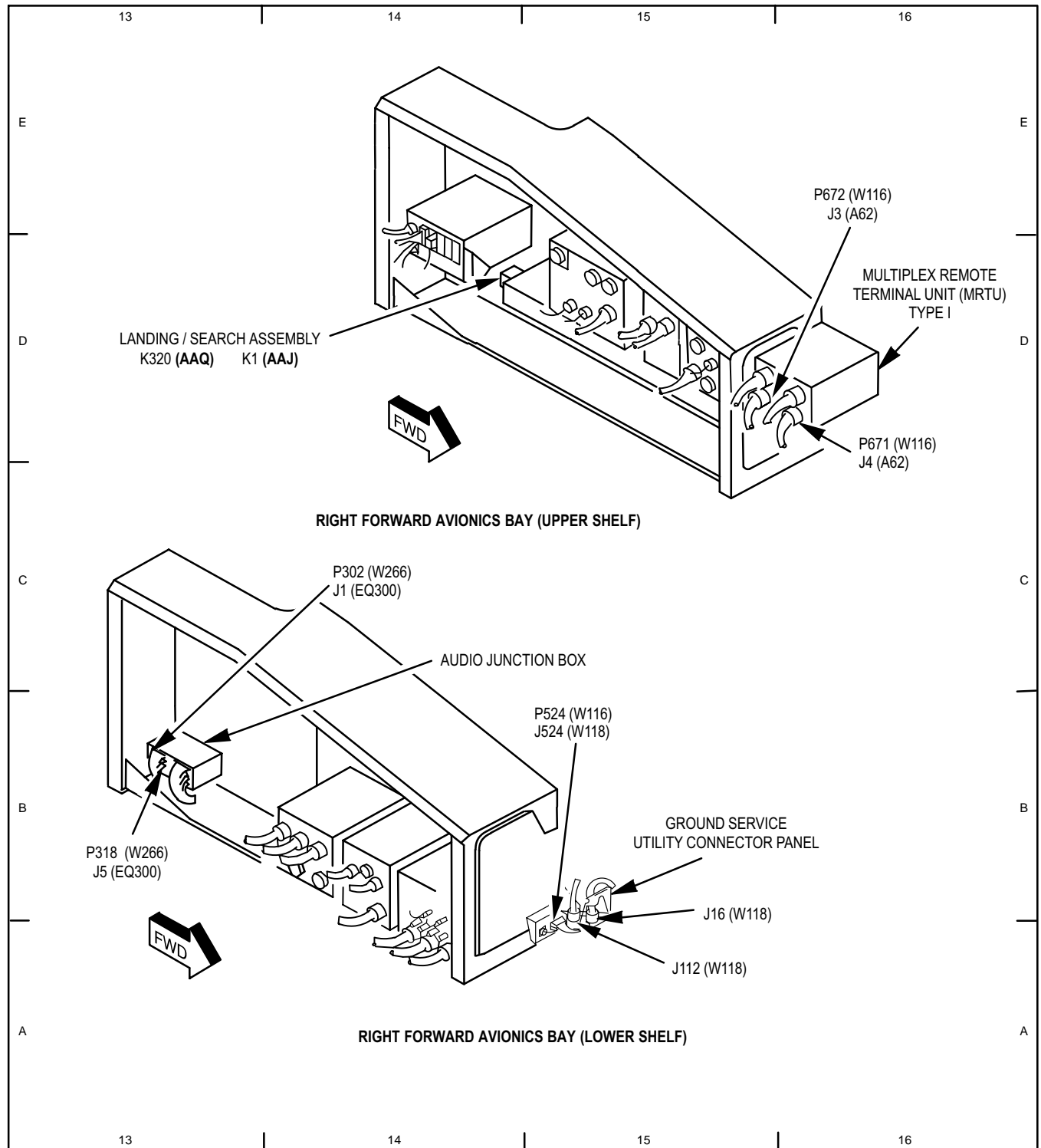
Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)



M69-120B

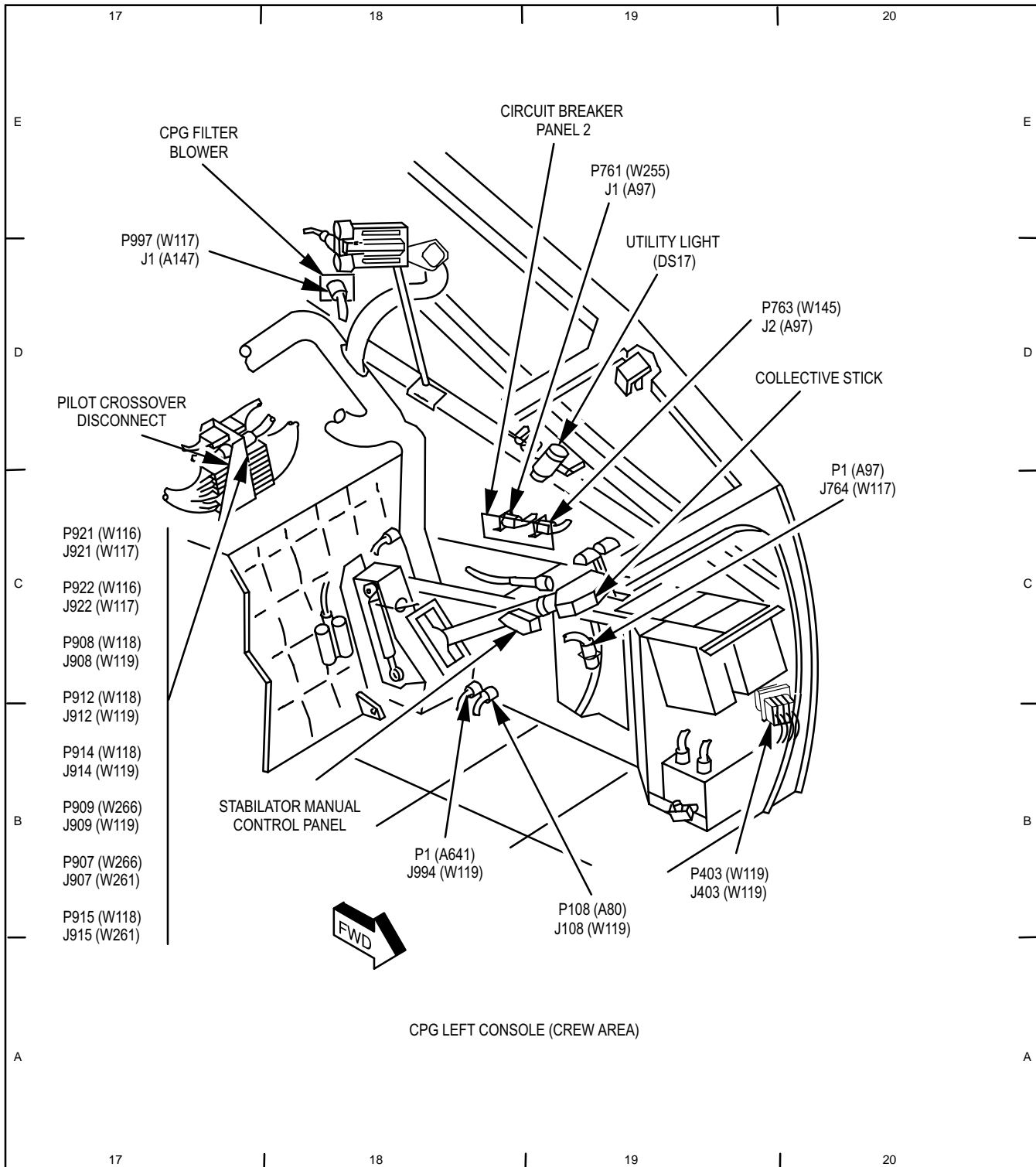
9-9. ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (ECLC) INDEX (cont)

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)



M69-095A

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)

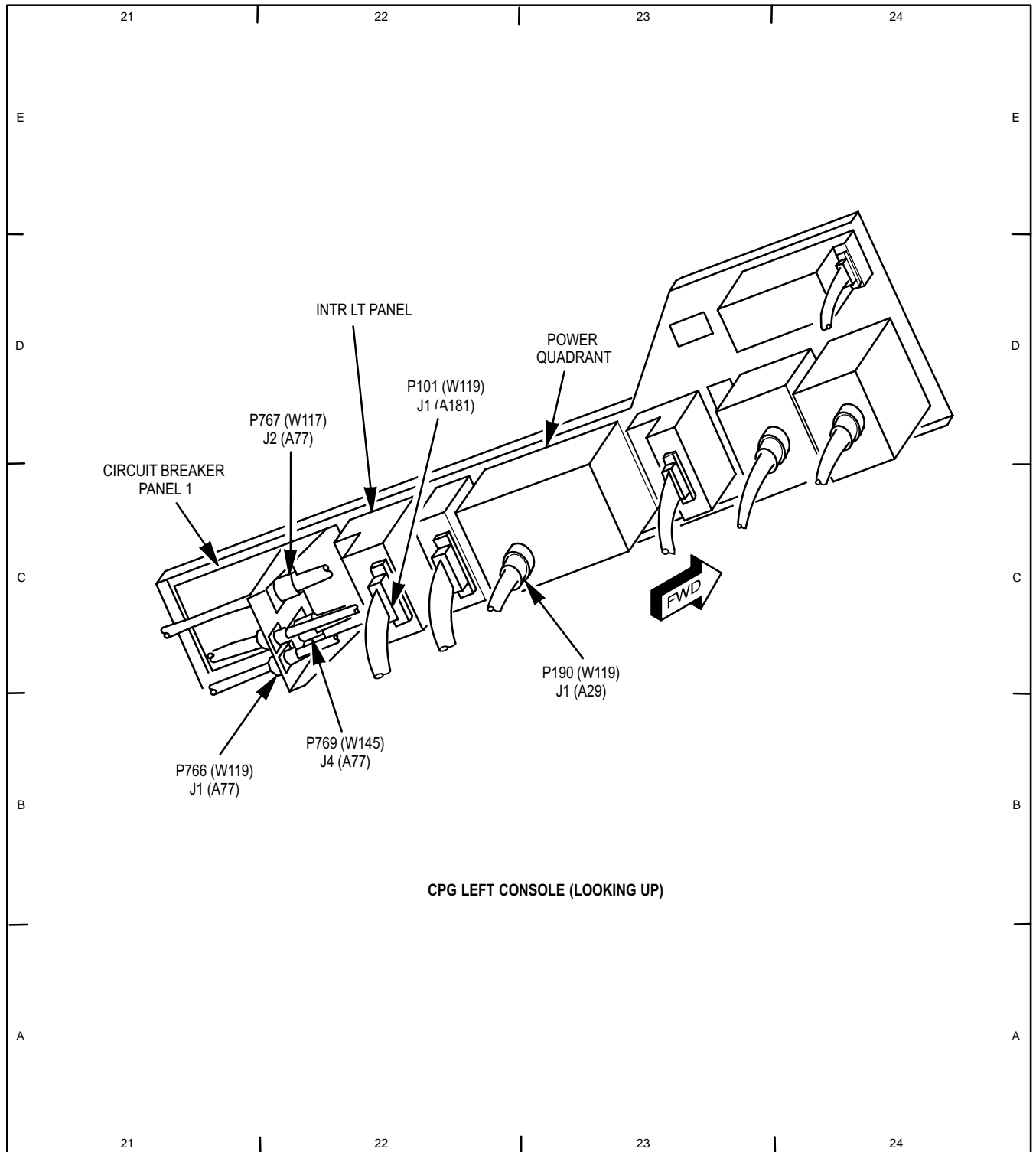


M69-096A

9-9. ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (ECLC) INDEX (cont)

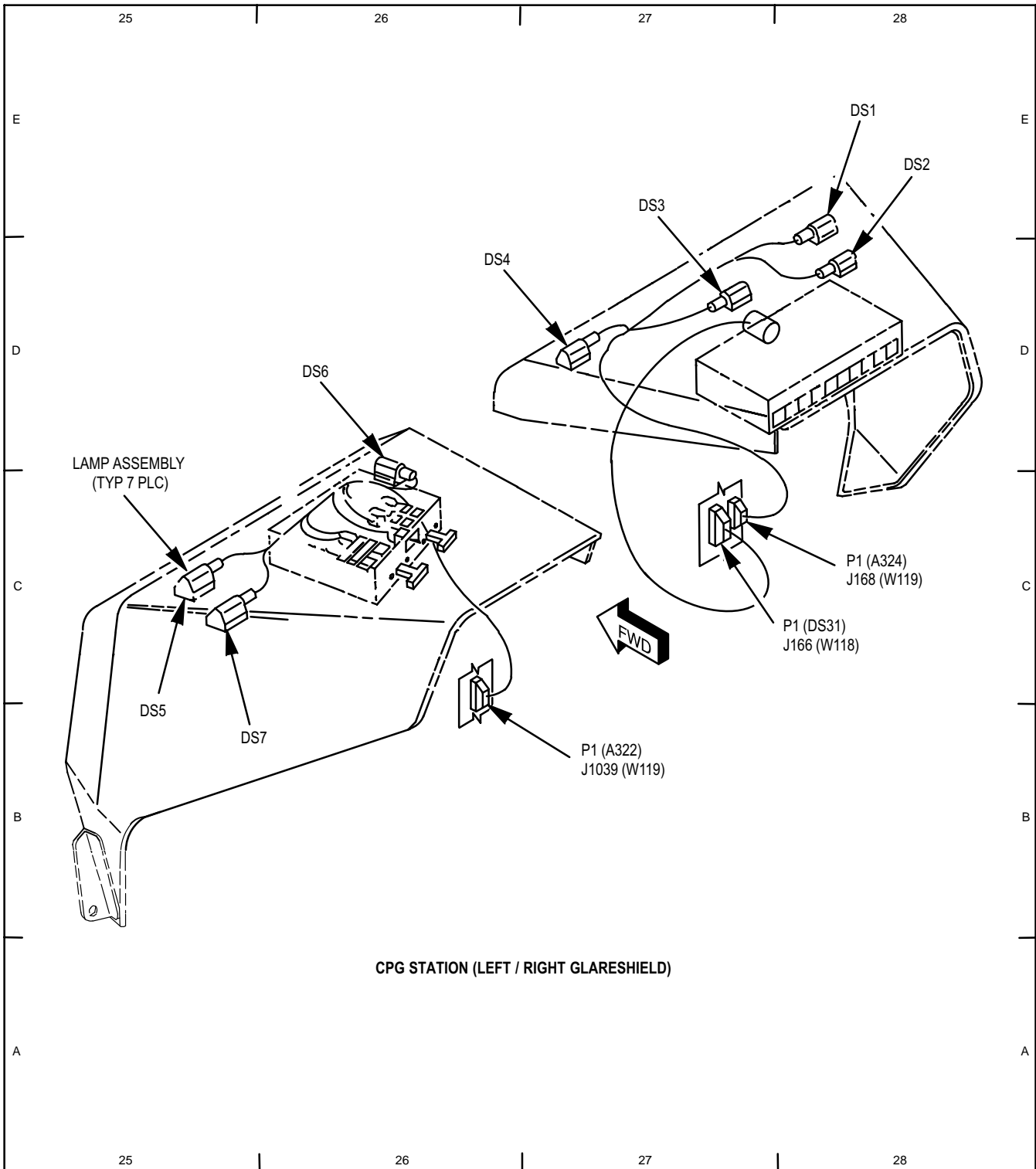
9-9

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)



M69-097A

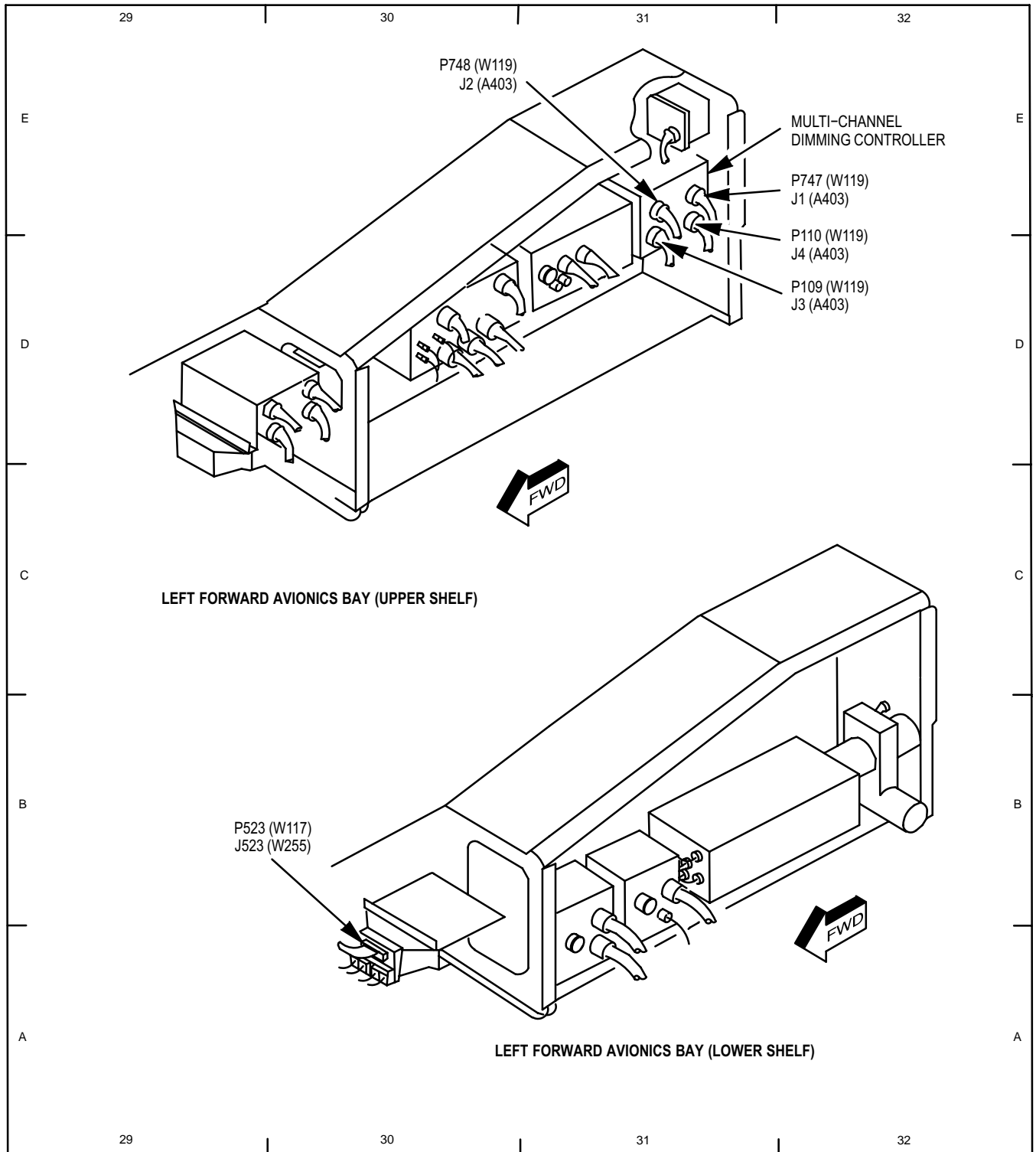
Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)



M69-101A

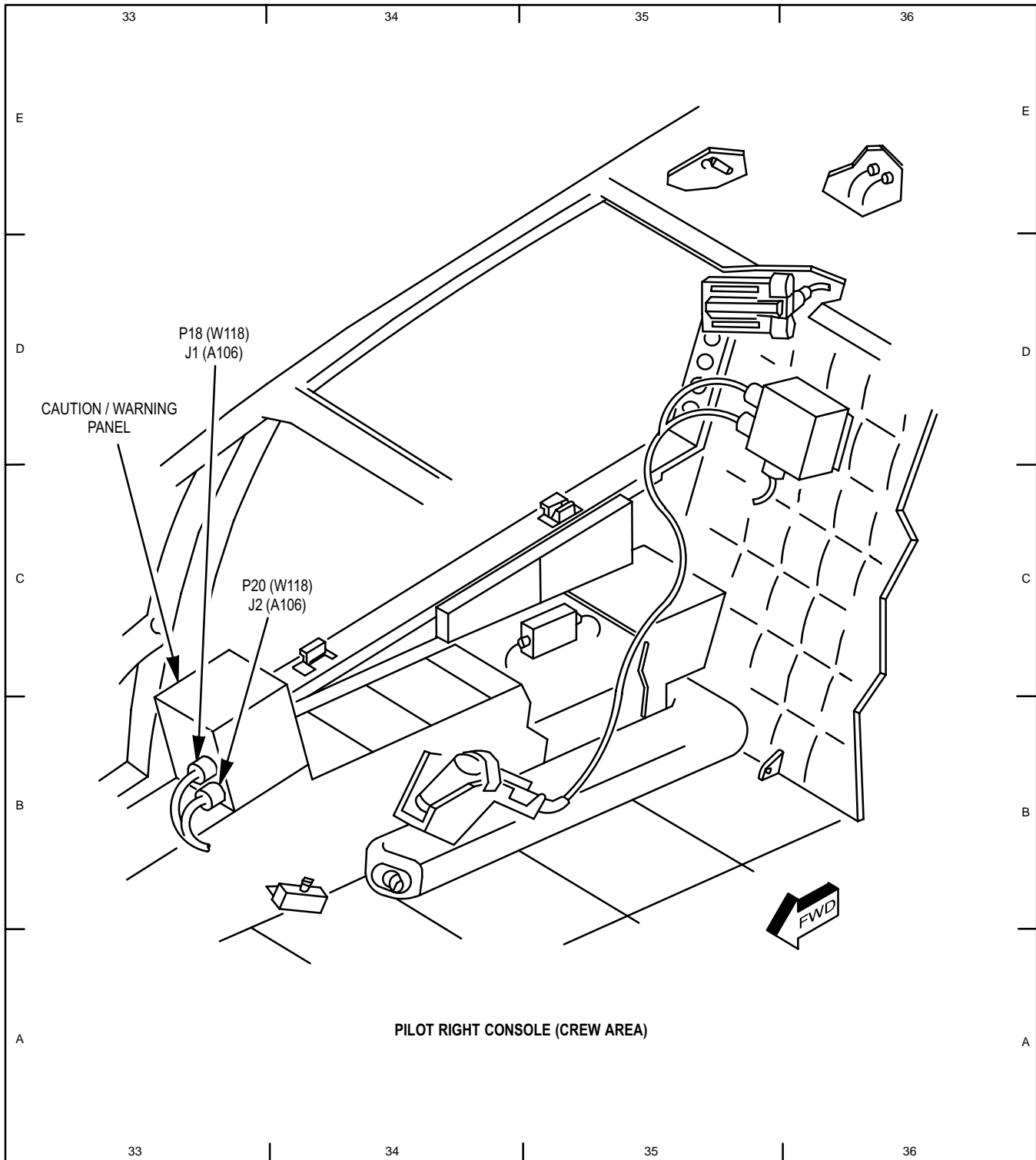
9-9. ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (ECLC) INDEX (cont)

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)



M69-402

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)

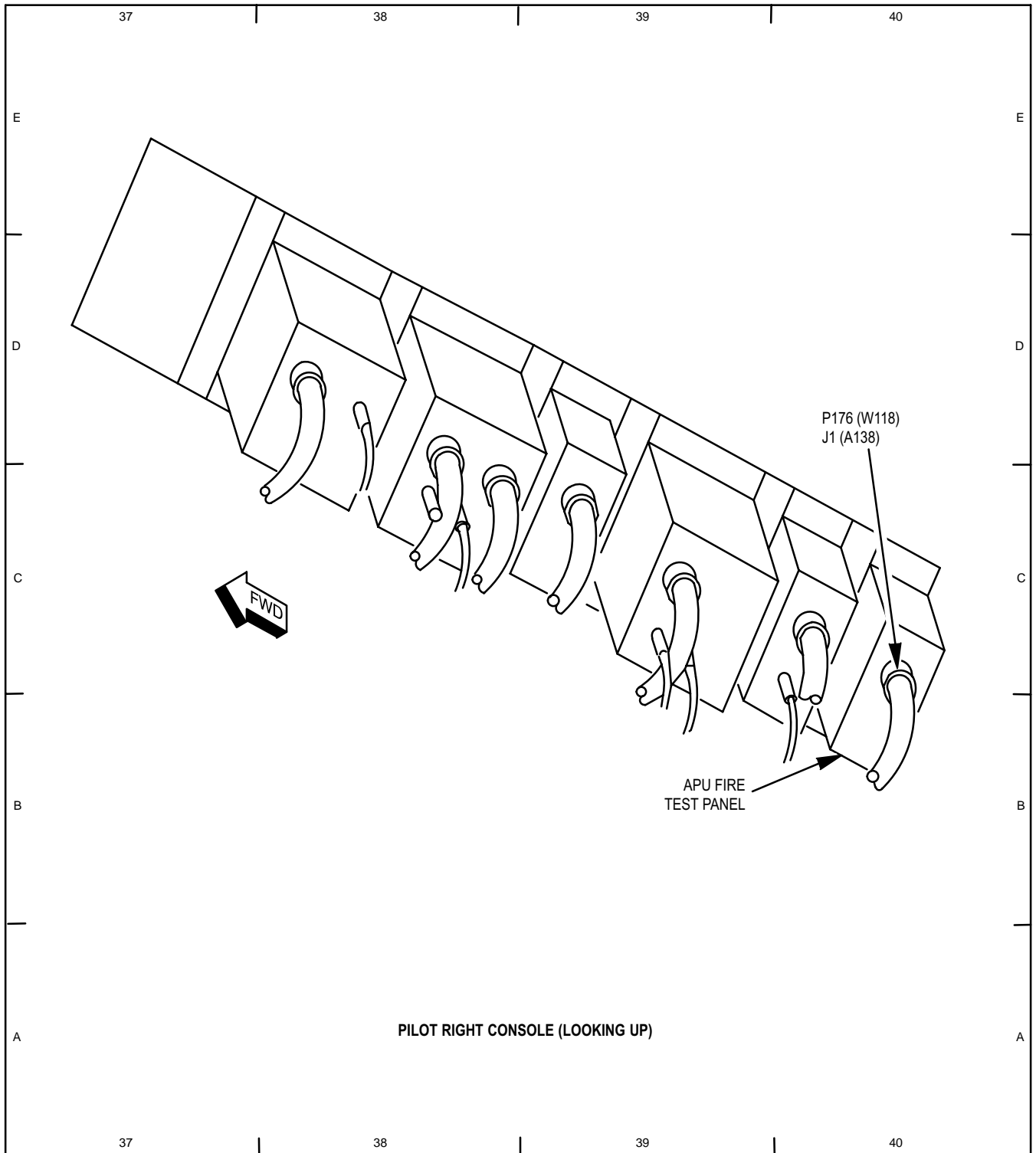


M69-098A

9-9. ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (ECLC) INDEX (cont)

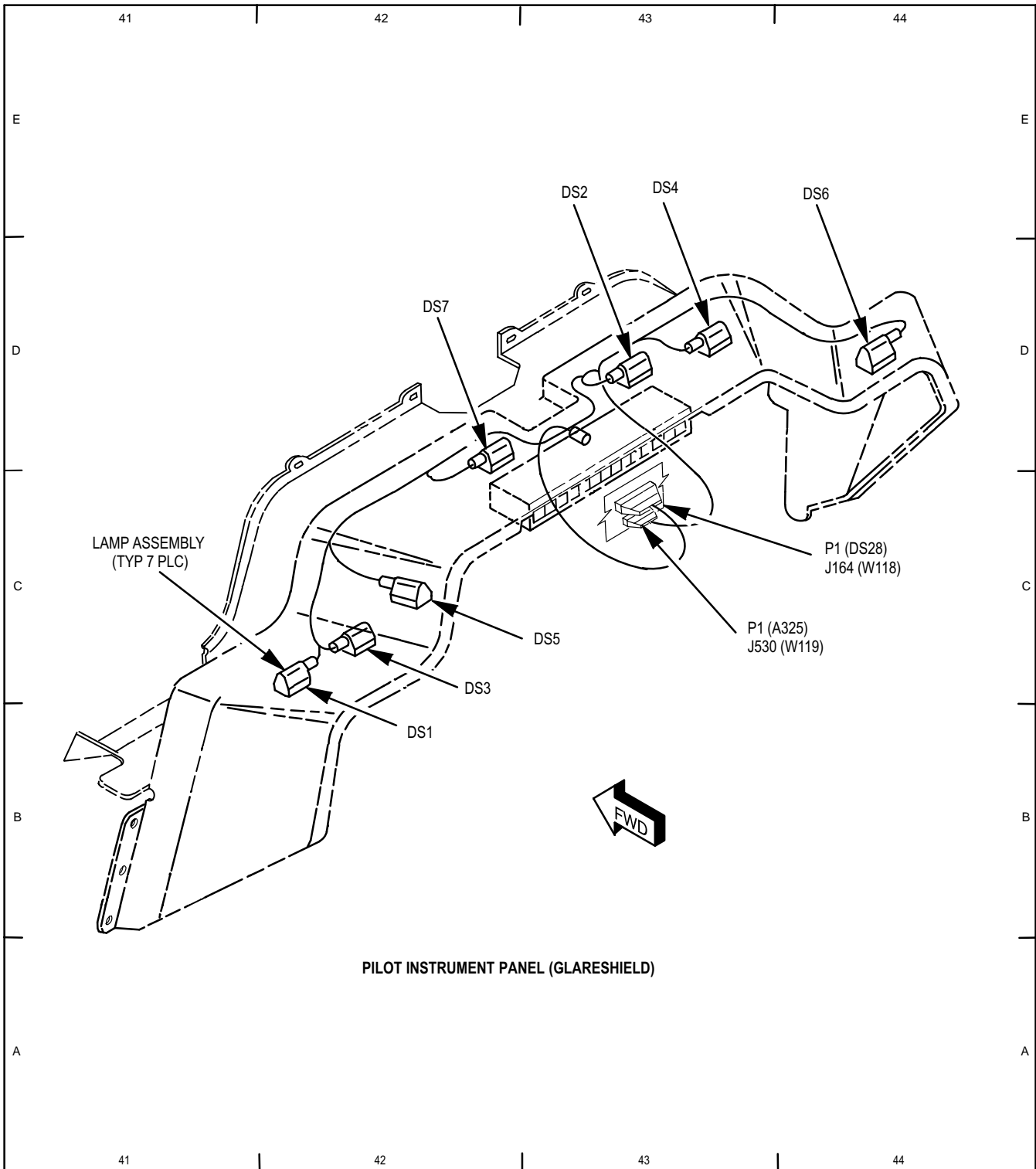
9-9

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)



M69-403

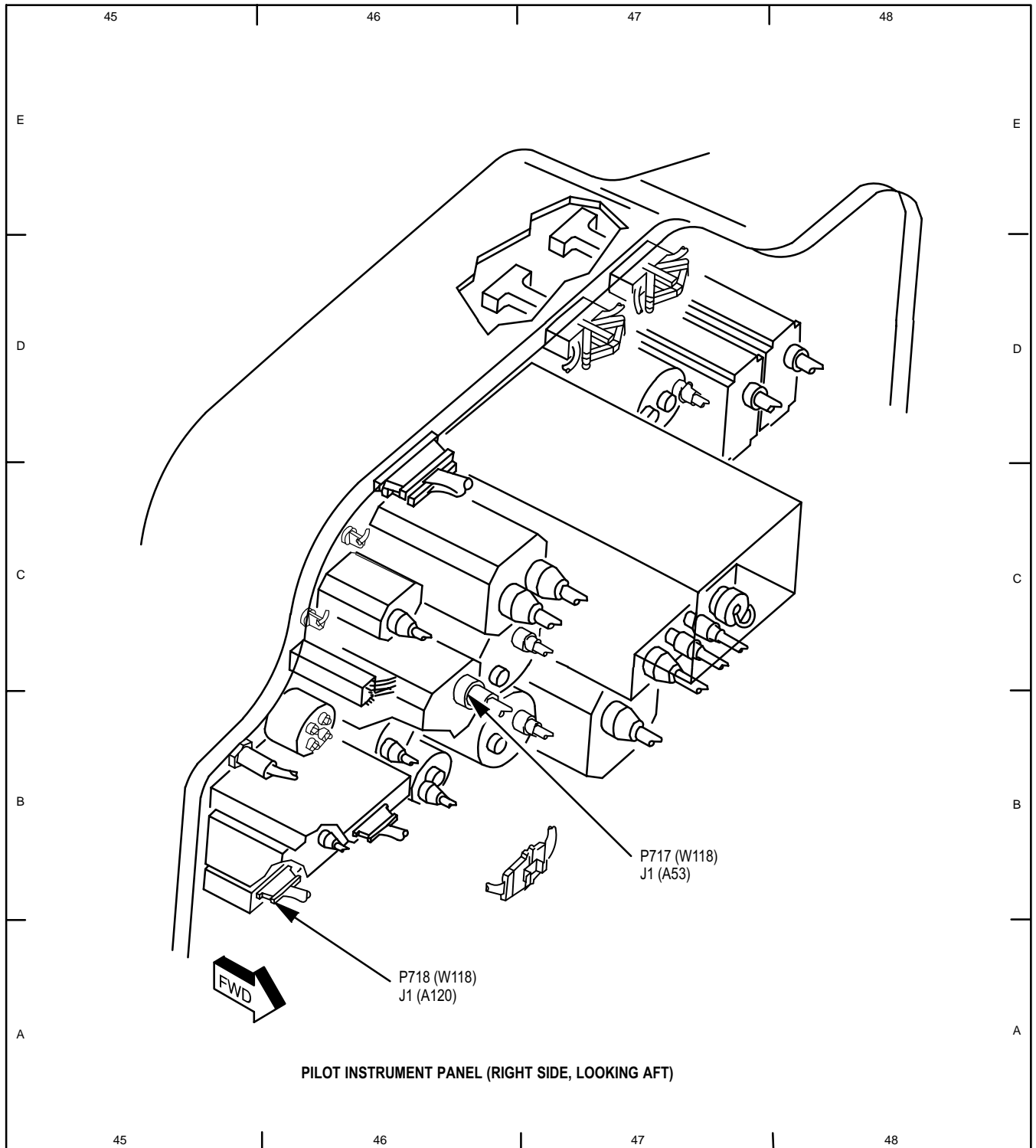
Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)



M69-105A

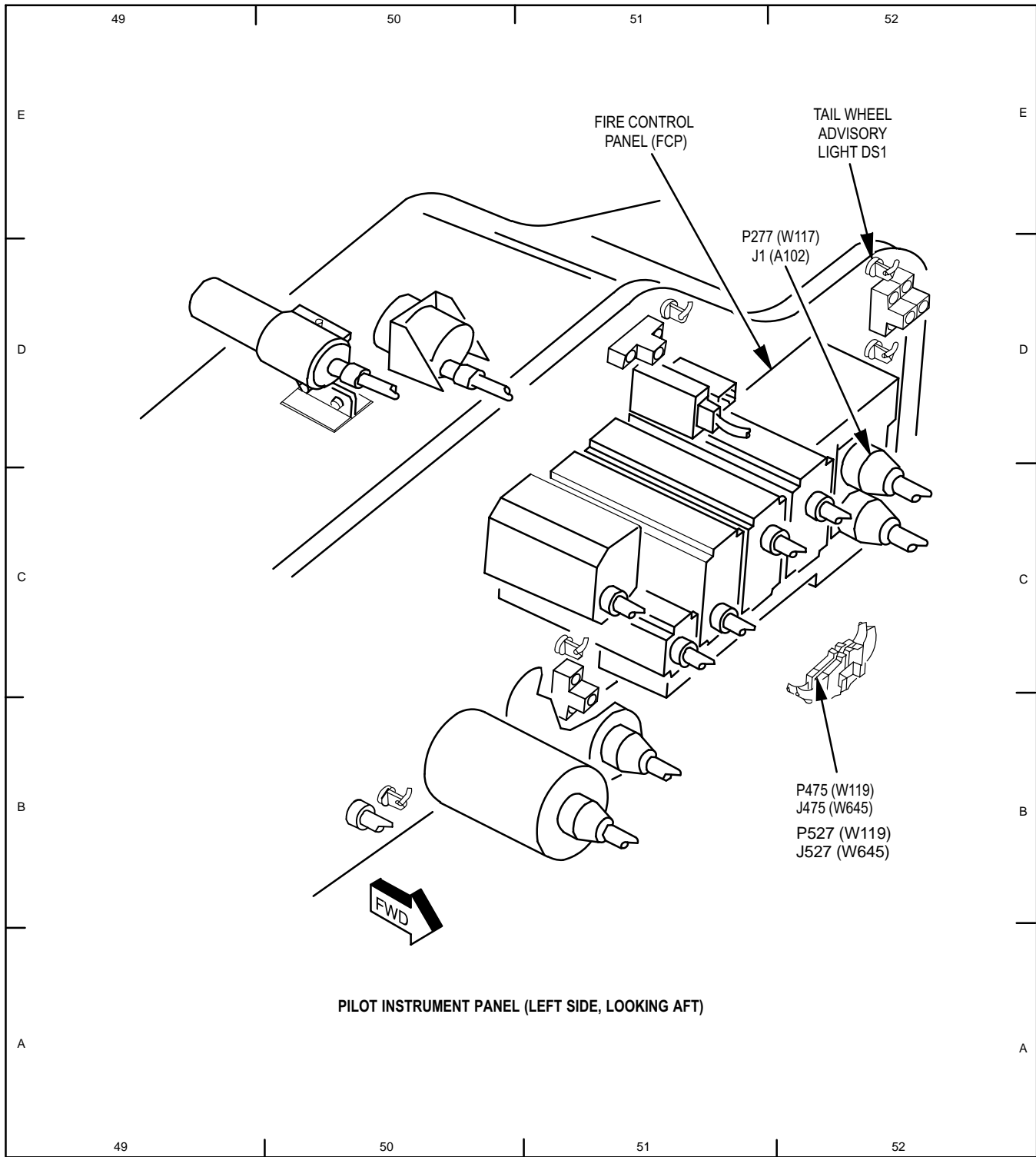
9-9. ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (ECLC) INDEX (cont)

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)



M69-404

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)

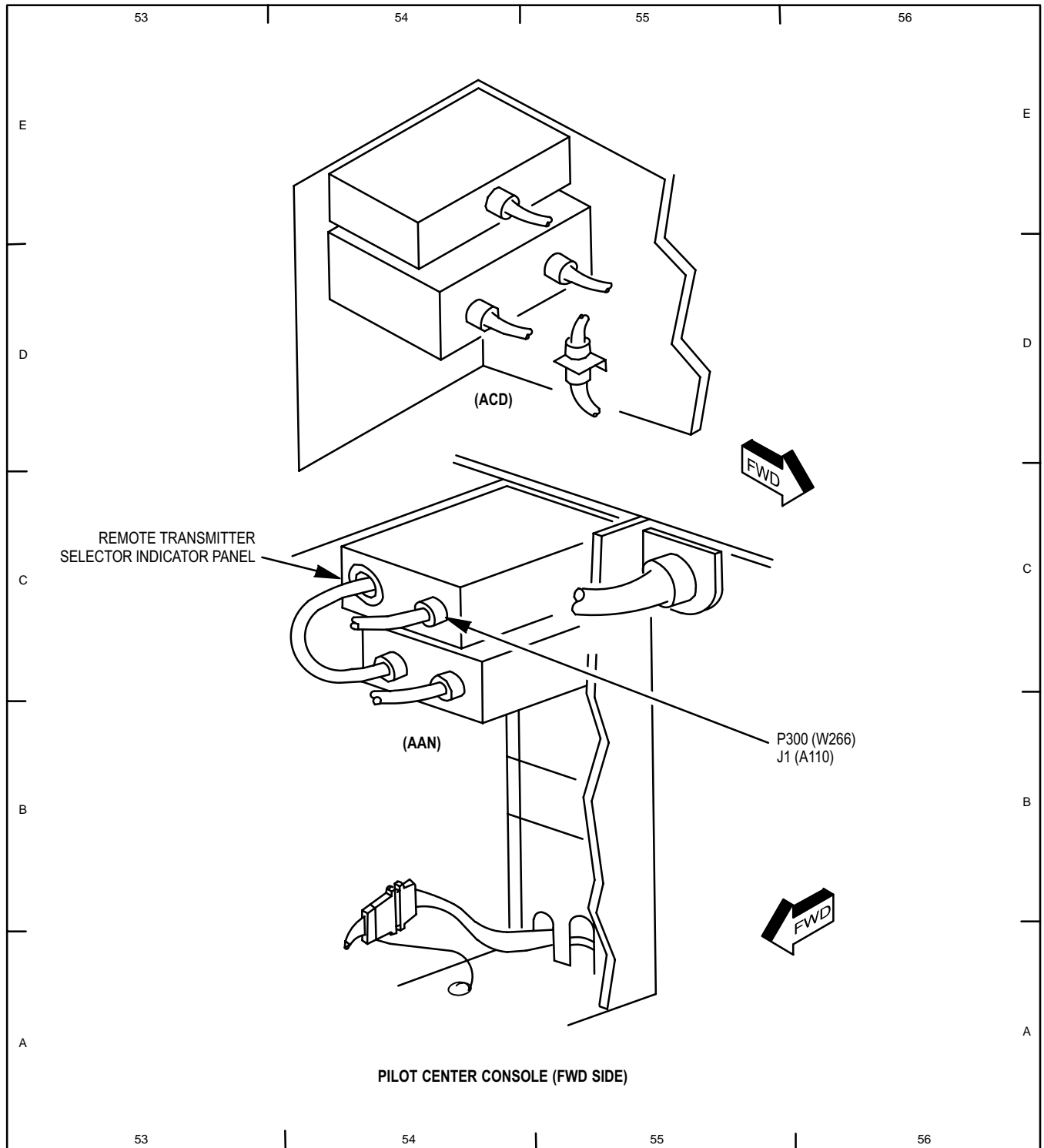


M69-405

9-9. ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (ECLC) INDEX (cont)

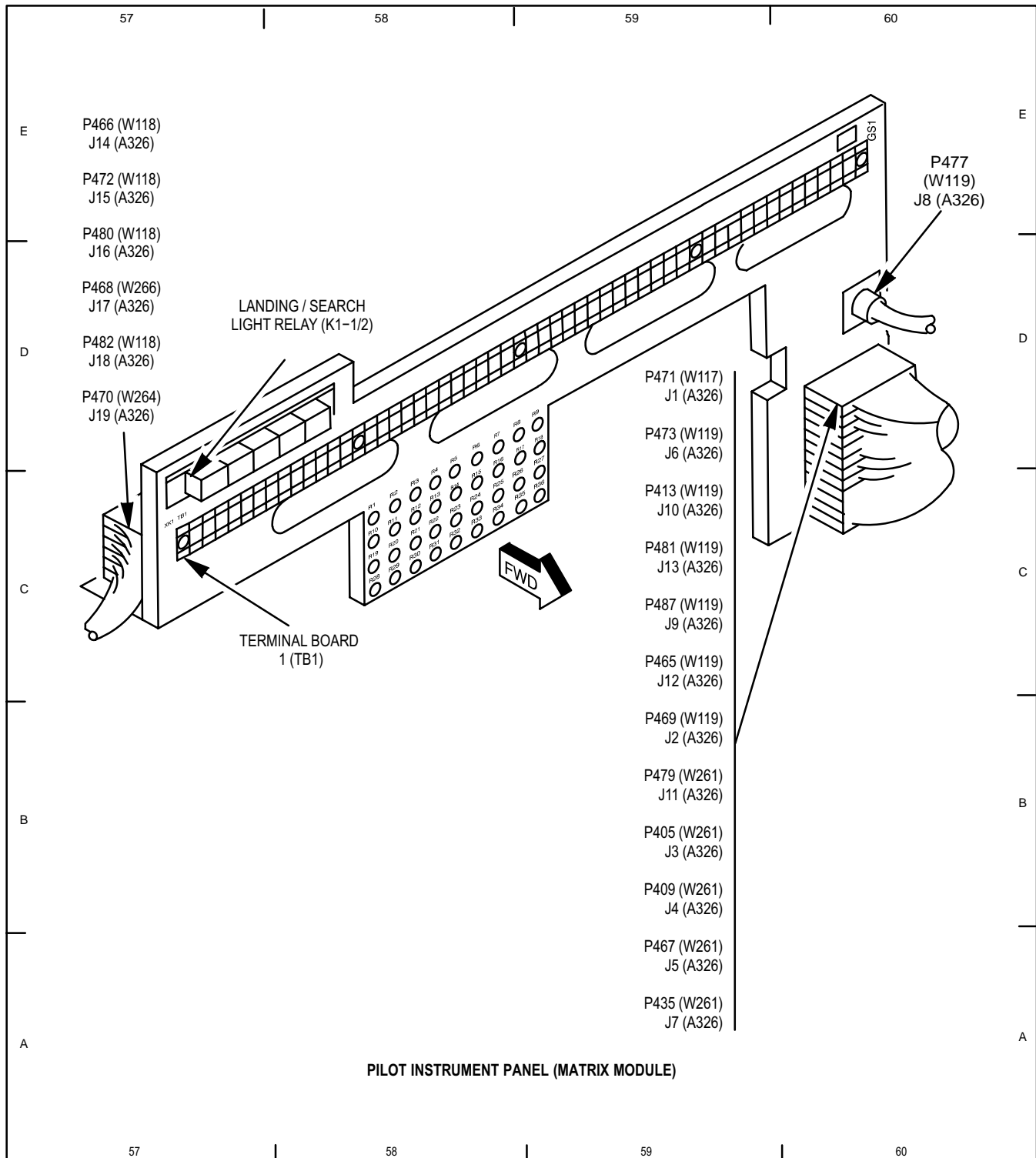
9-9

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)



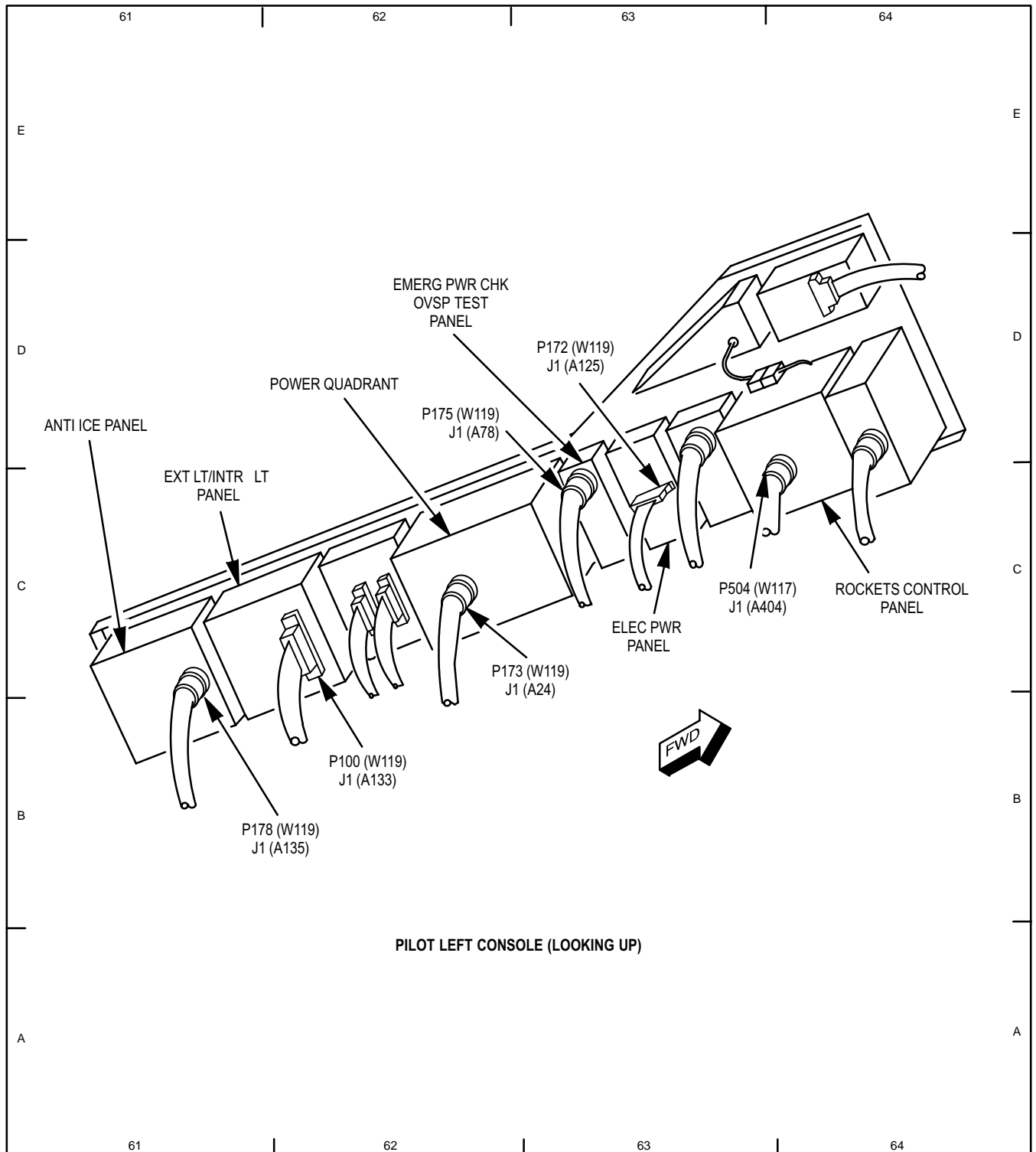
M69-406

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)



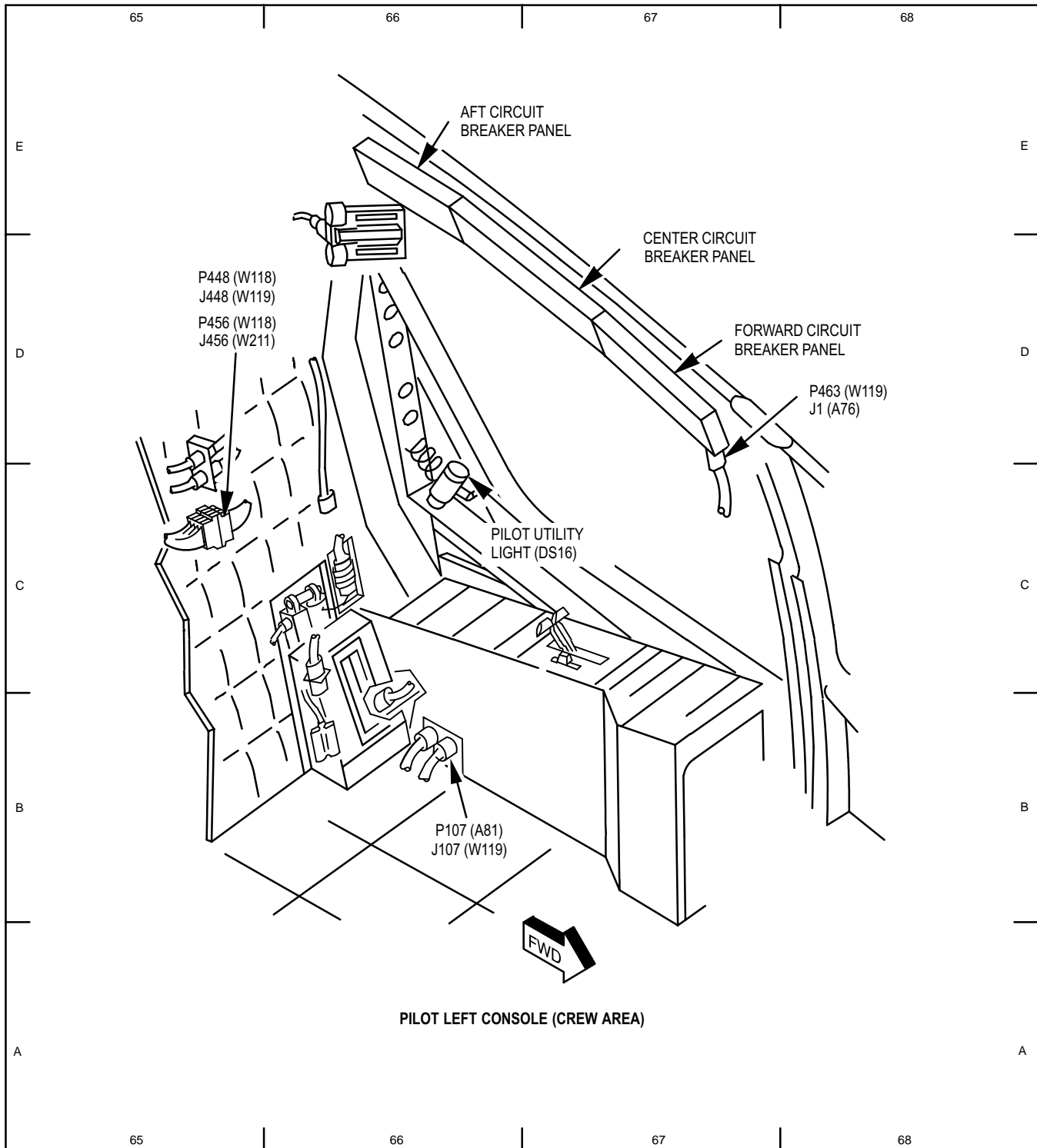
9-9. ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (ECLC) INDEX (cont)

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)



M69-114A

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)



M69-113A

9-9. ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (ECLC) INDEX (cont)

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)

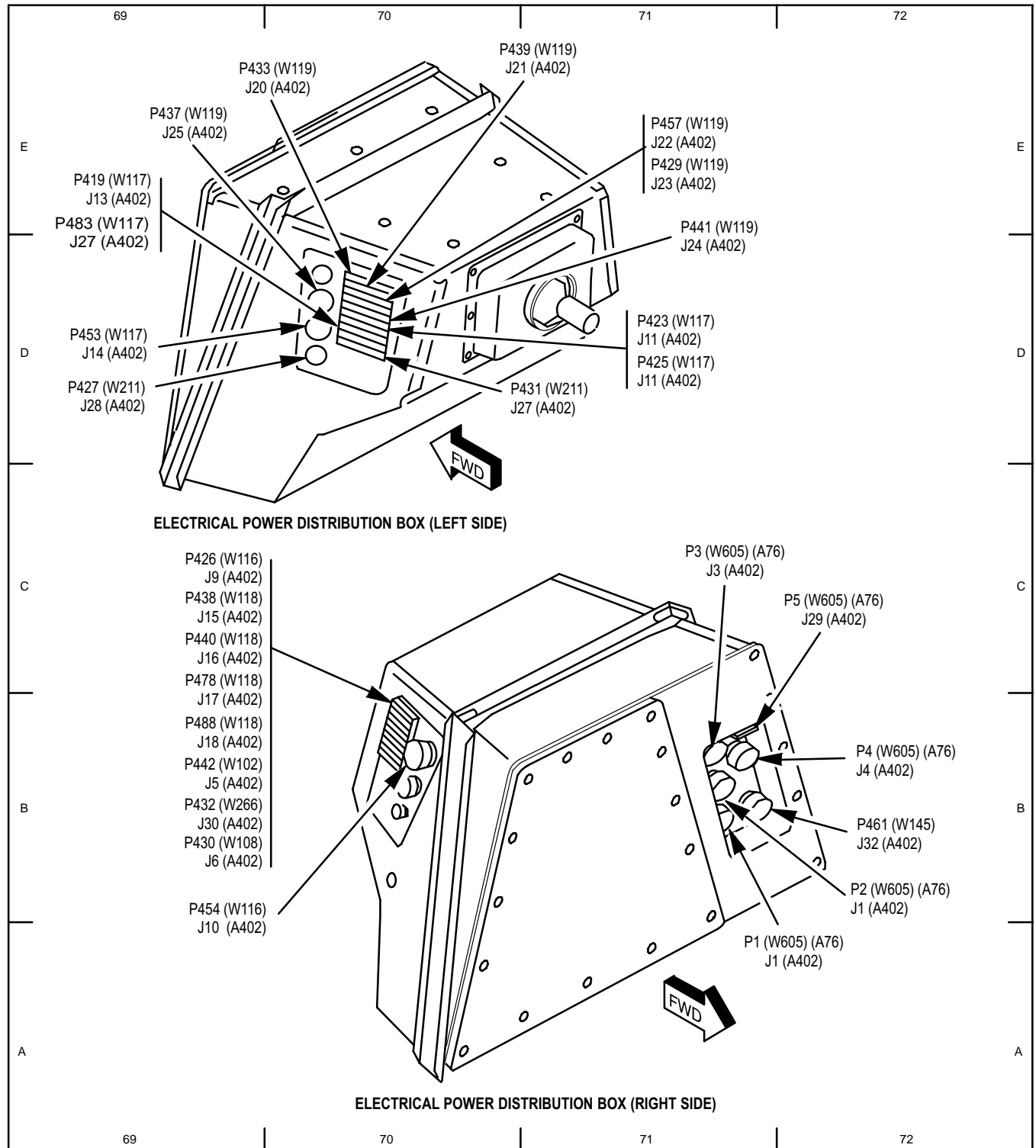
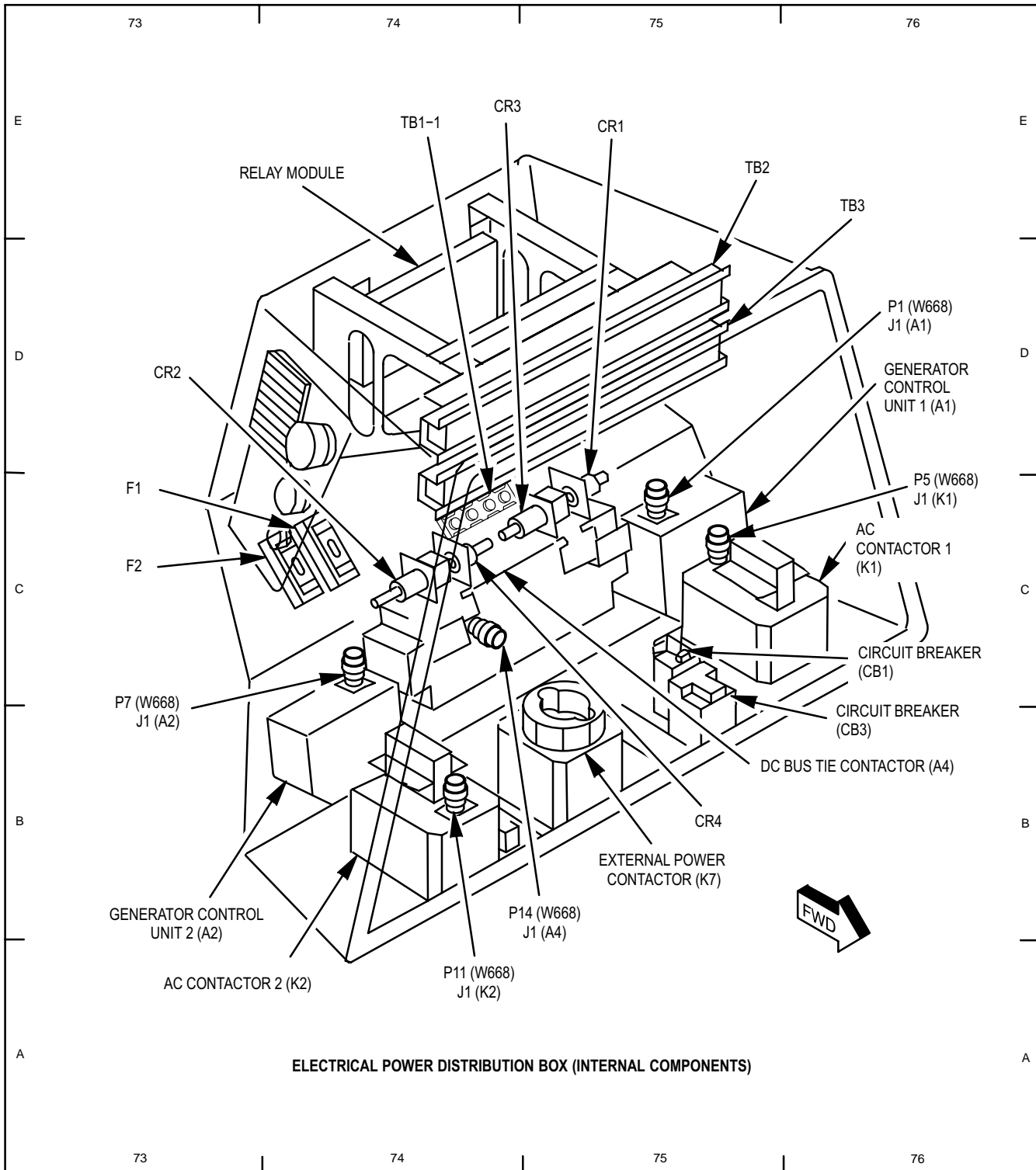


Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)

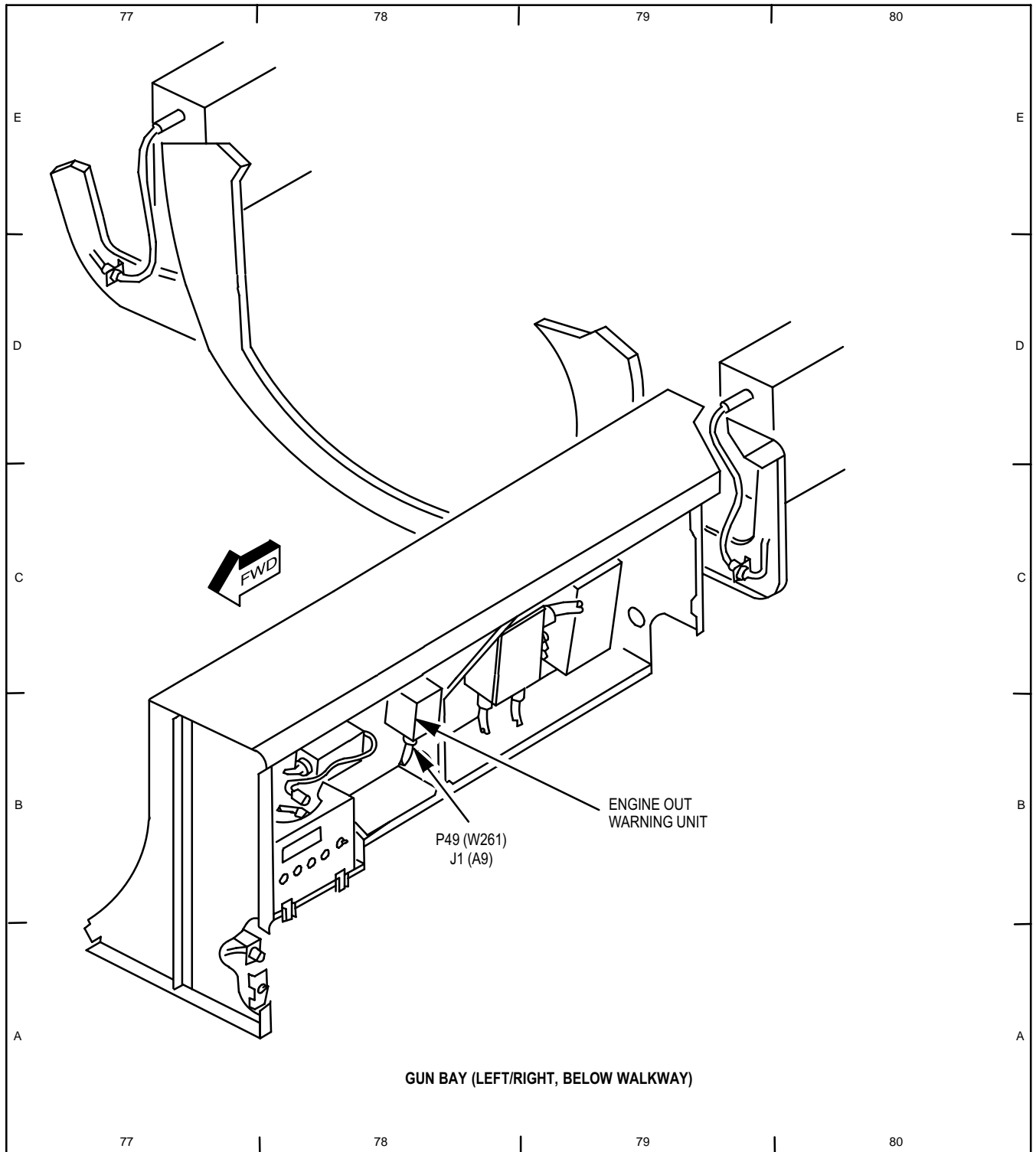


M69-102A

9-9. ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (ECLC) INDEX (cont)

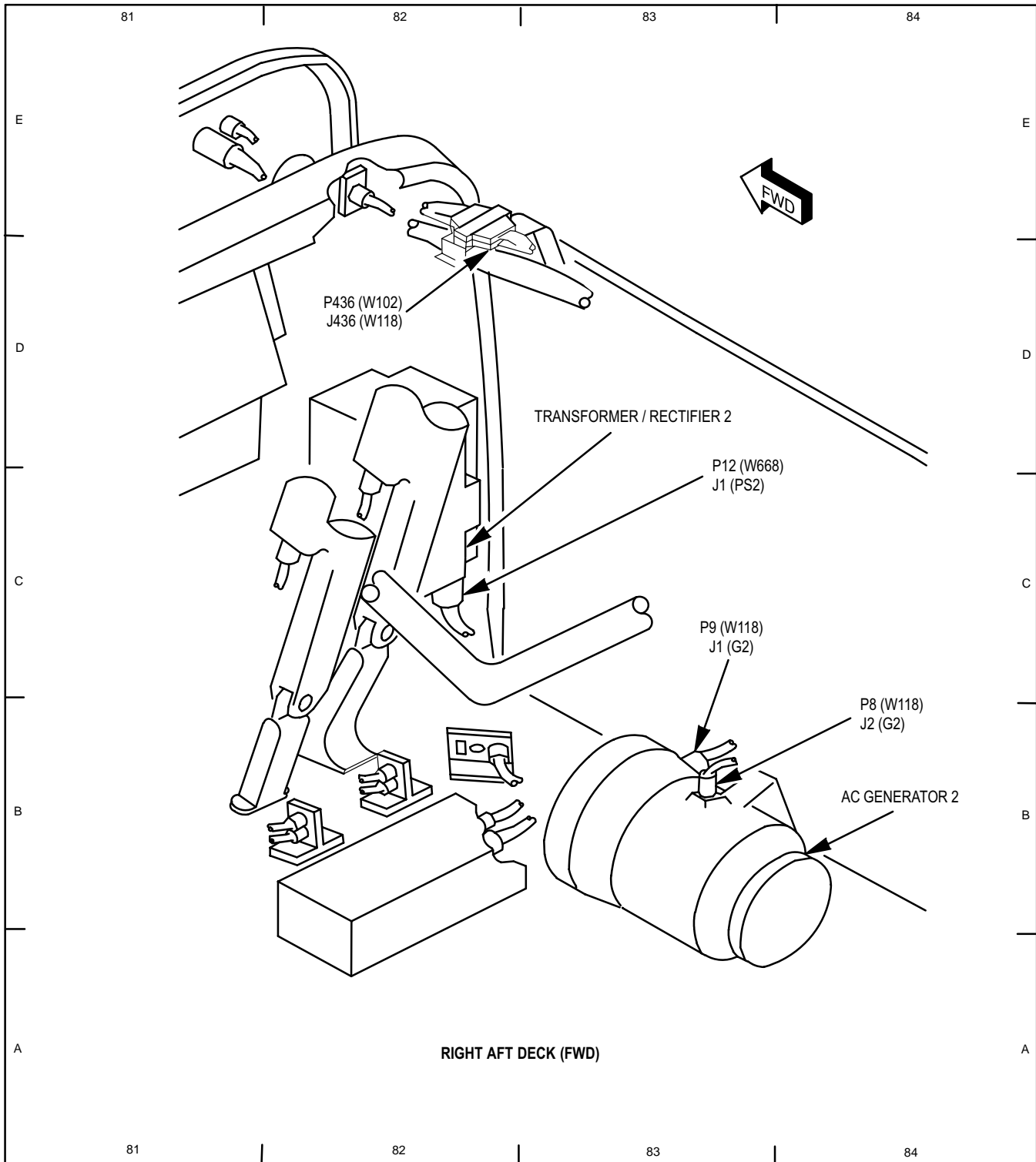
9-9

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)



M69-407

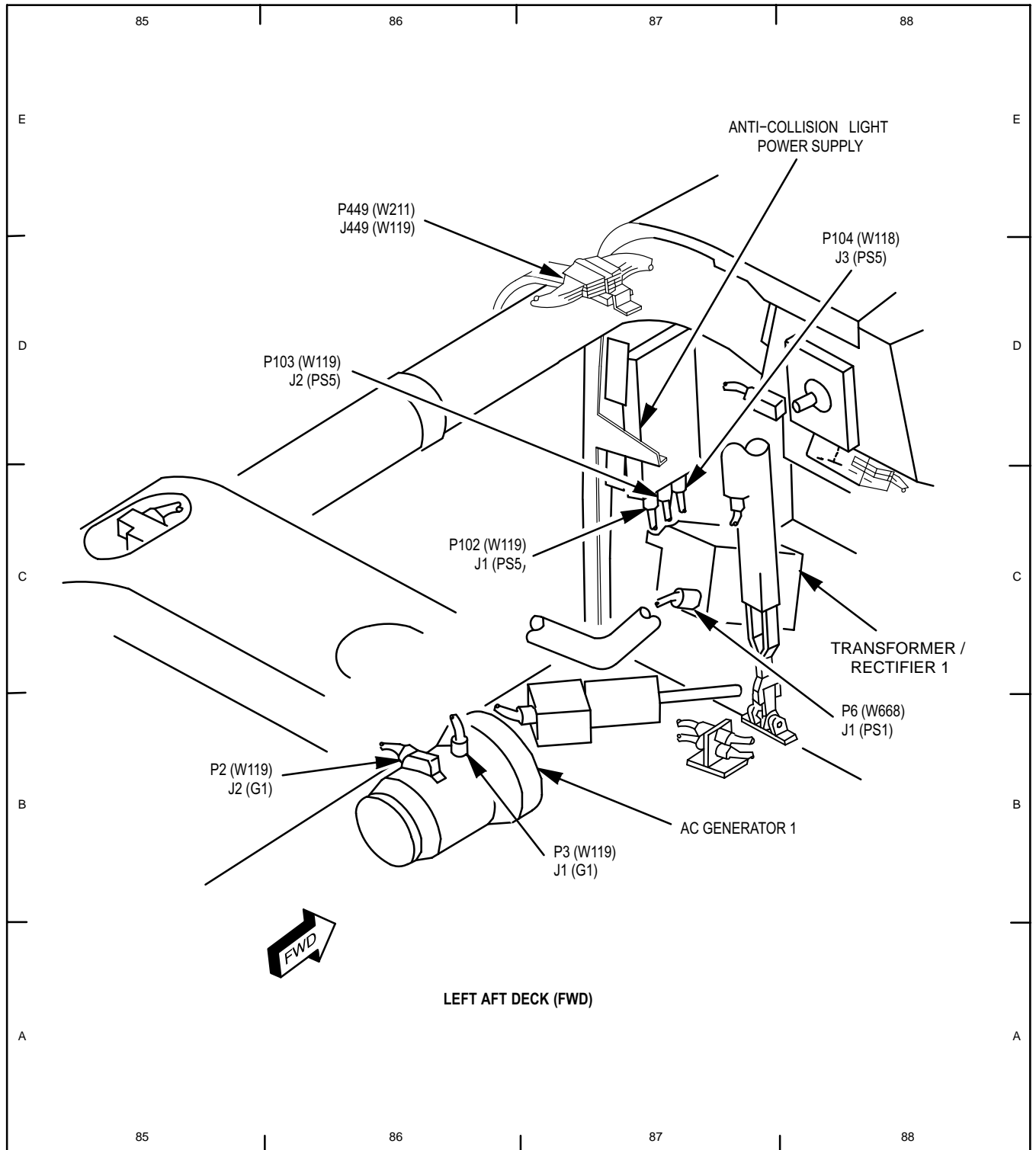
Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)



M69-116A

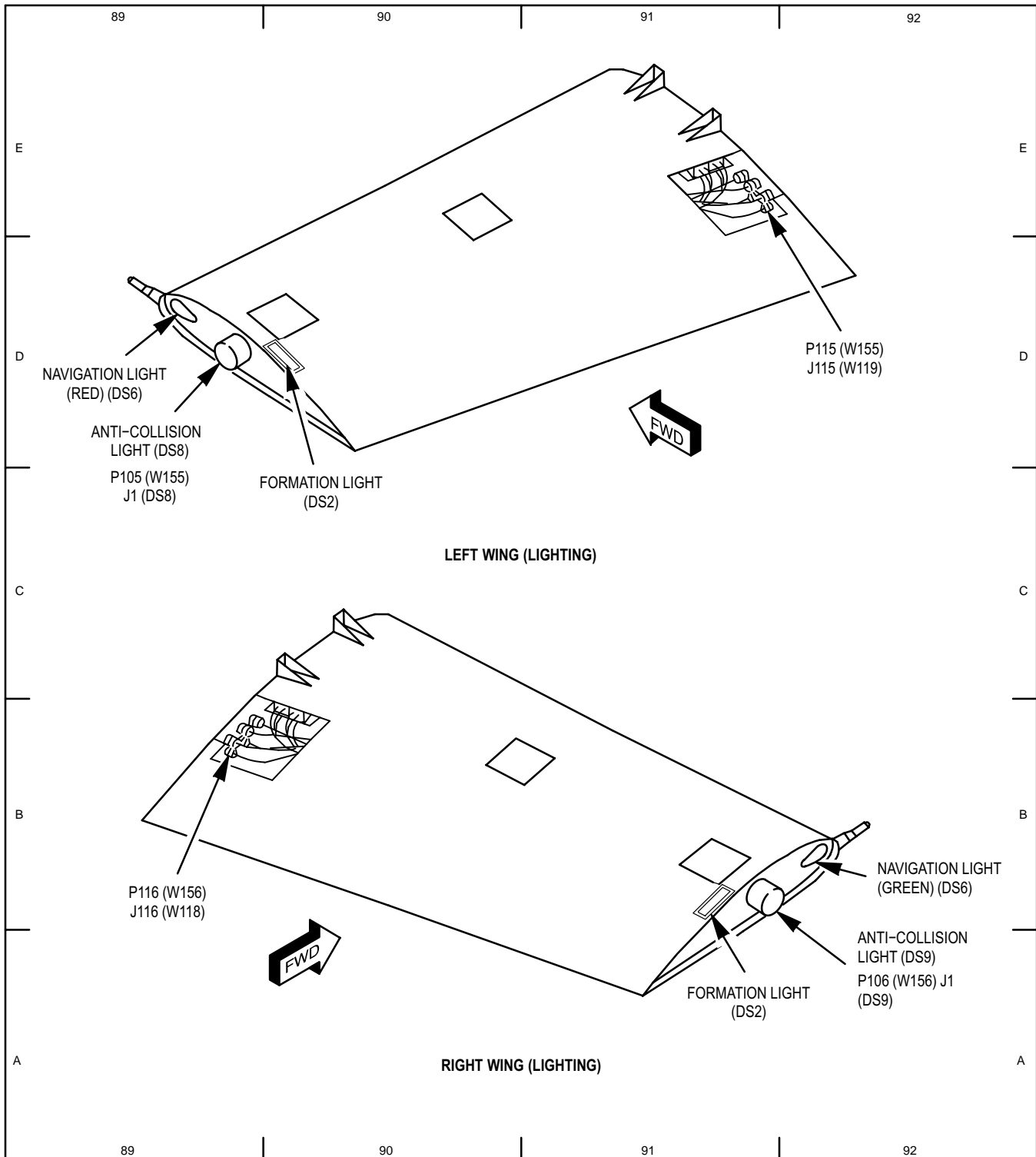
9-9. ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (ECLC) INDEX (cont)

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)



M69-115A

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)

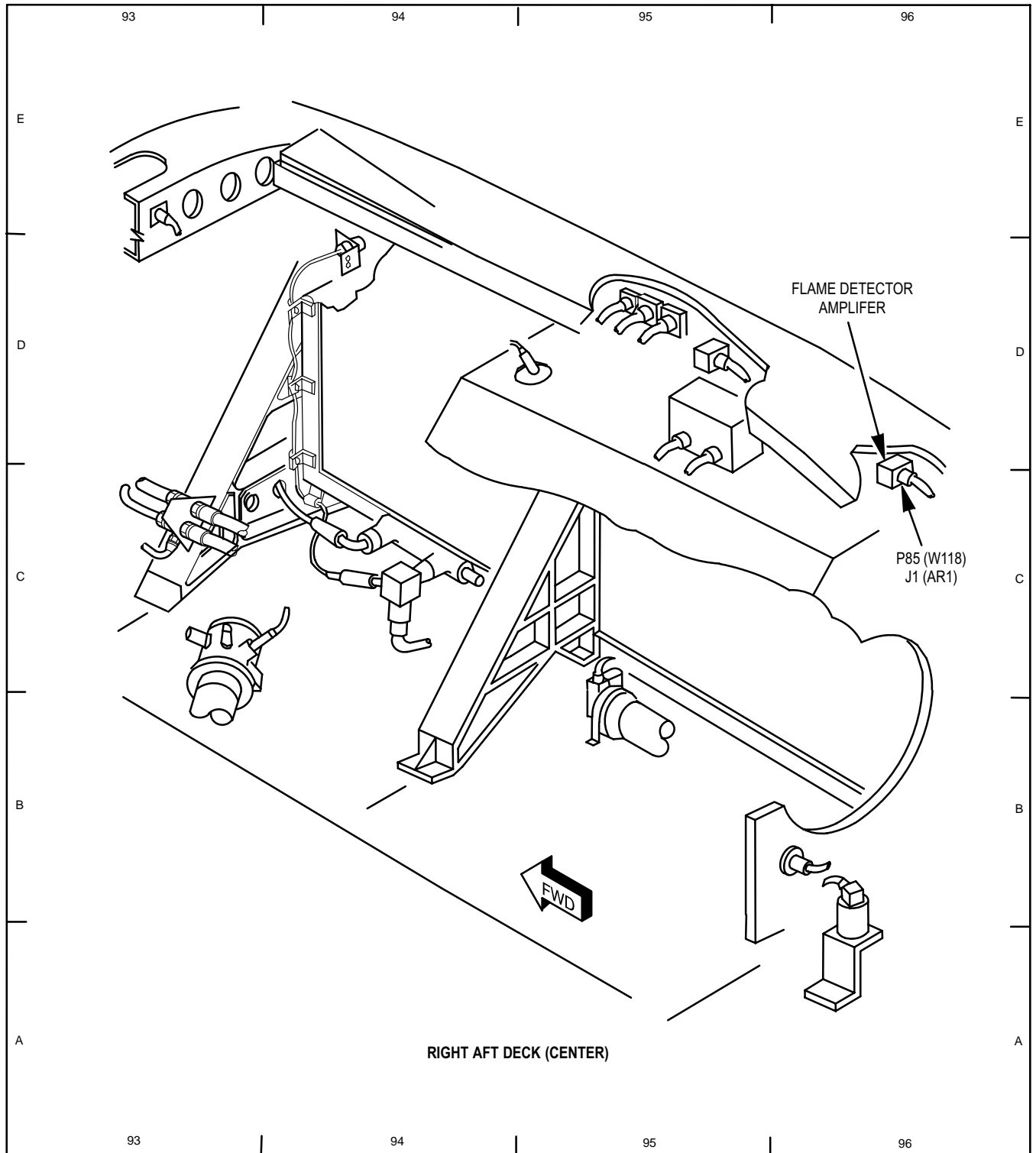


M69-103A

9-9. ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (ECLC) INDEX (cont)

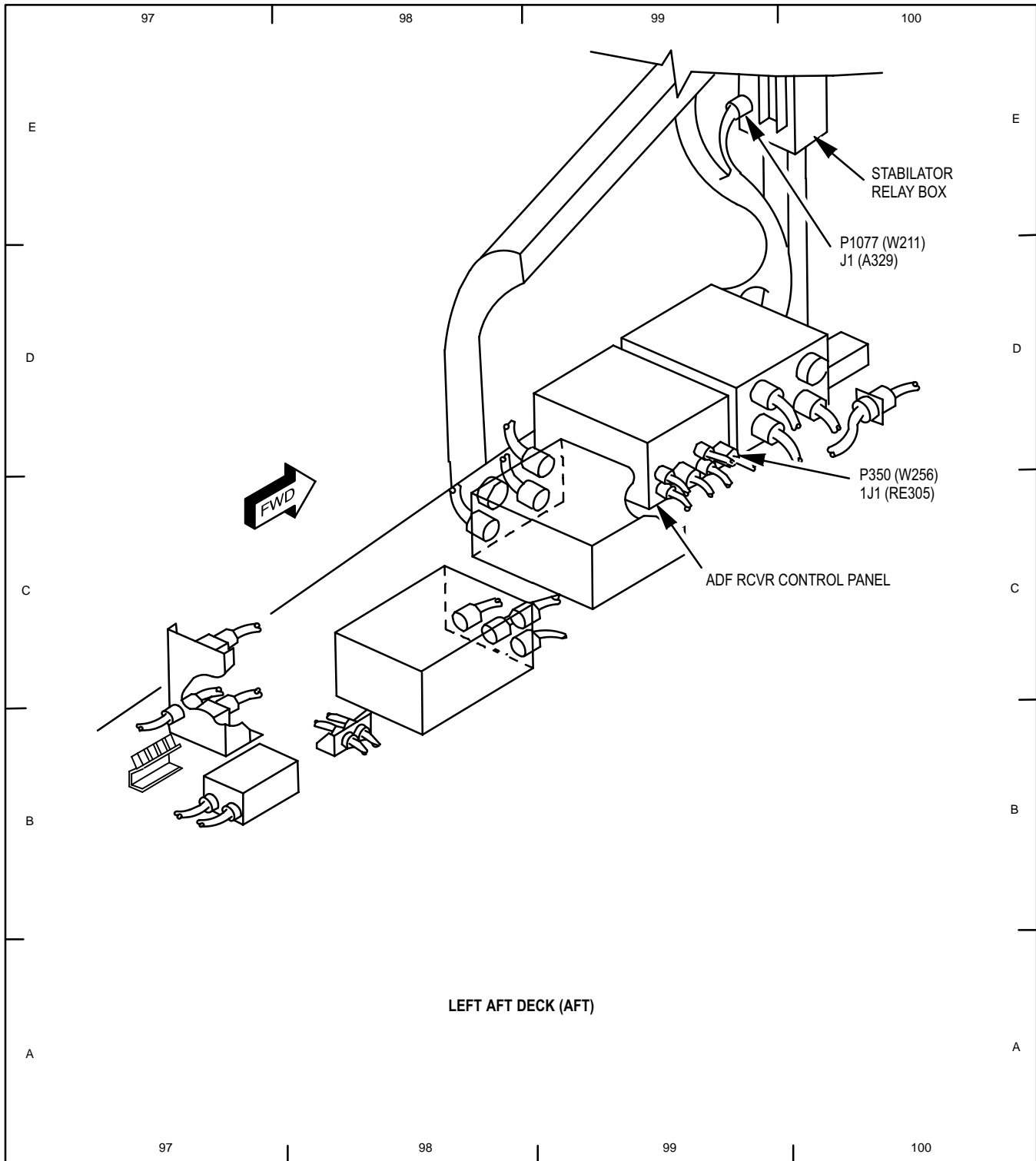
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Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)



M69-408

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)

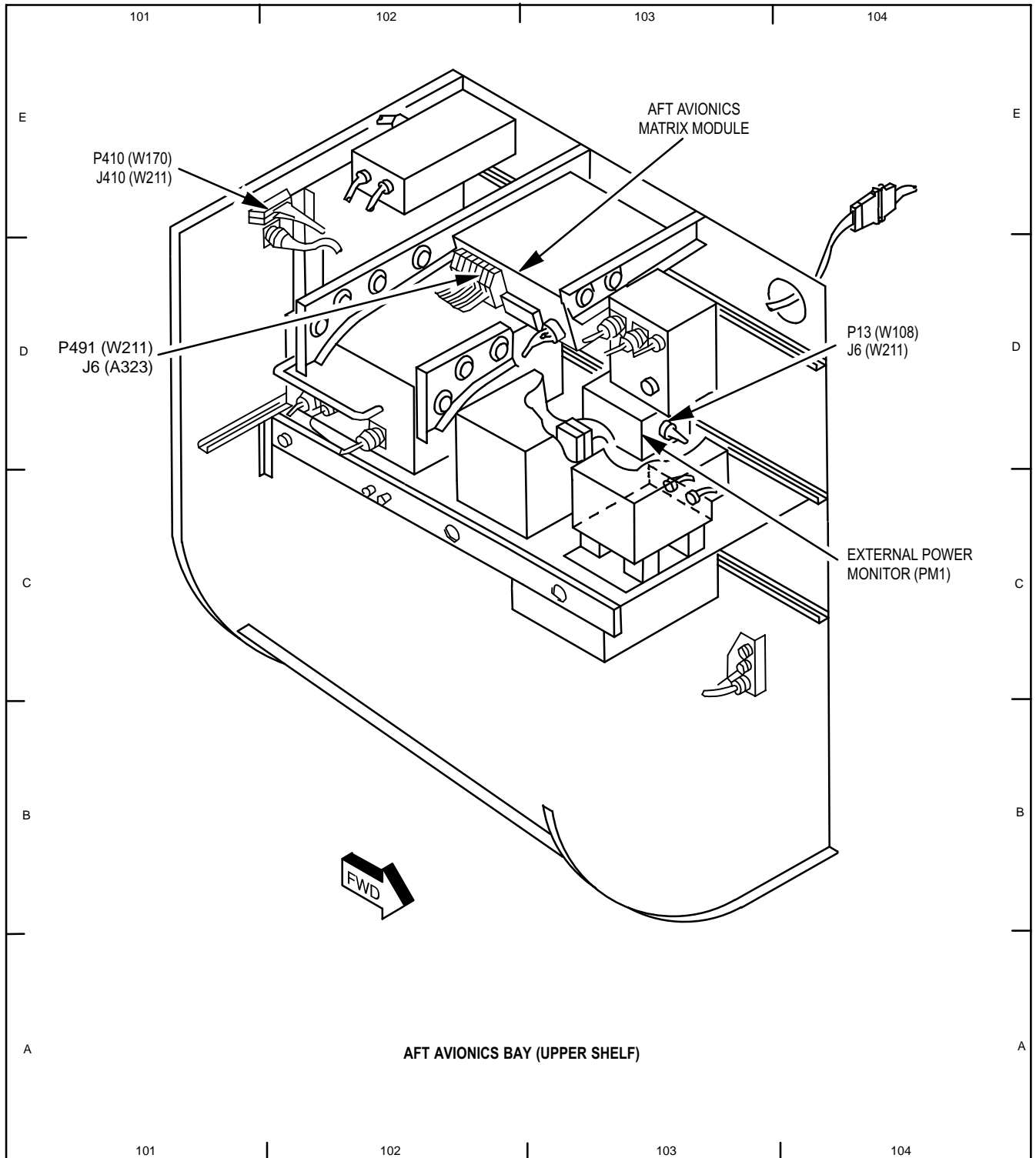


M69-409

9-9. ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (ECLC) INDEX (cont)

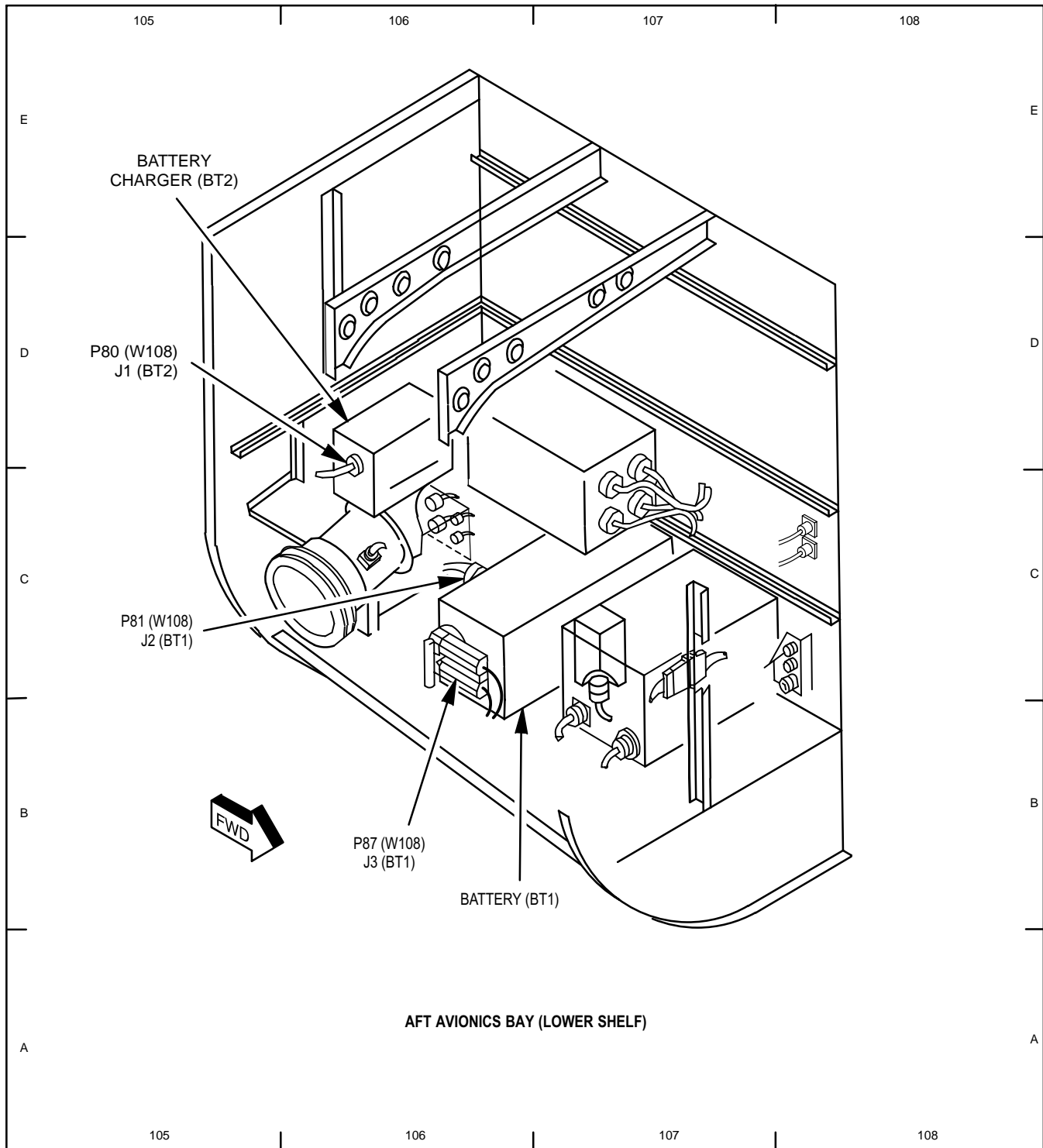
9-9

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)



M69-118A

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)

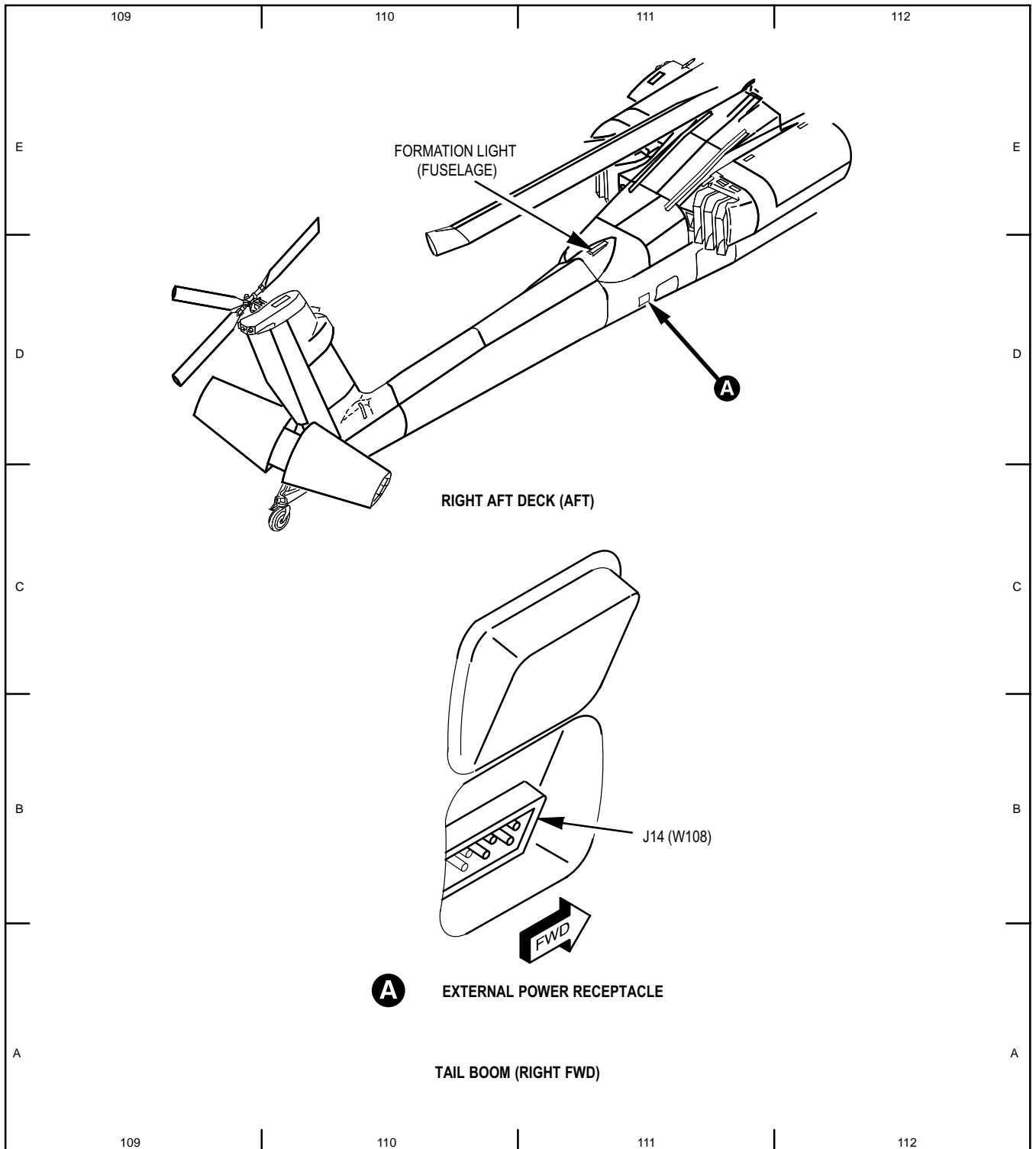


M69-119A

9-9. ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (ECLC) INDEX (cont)

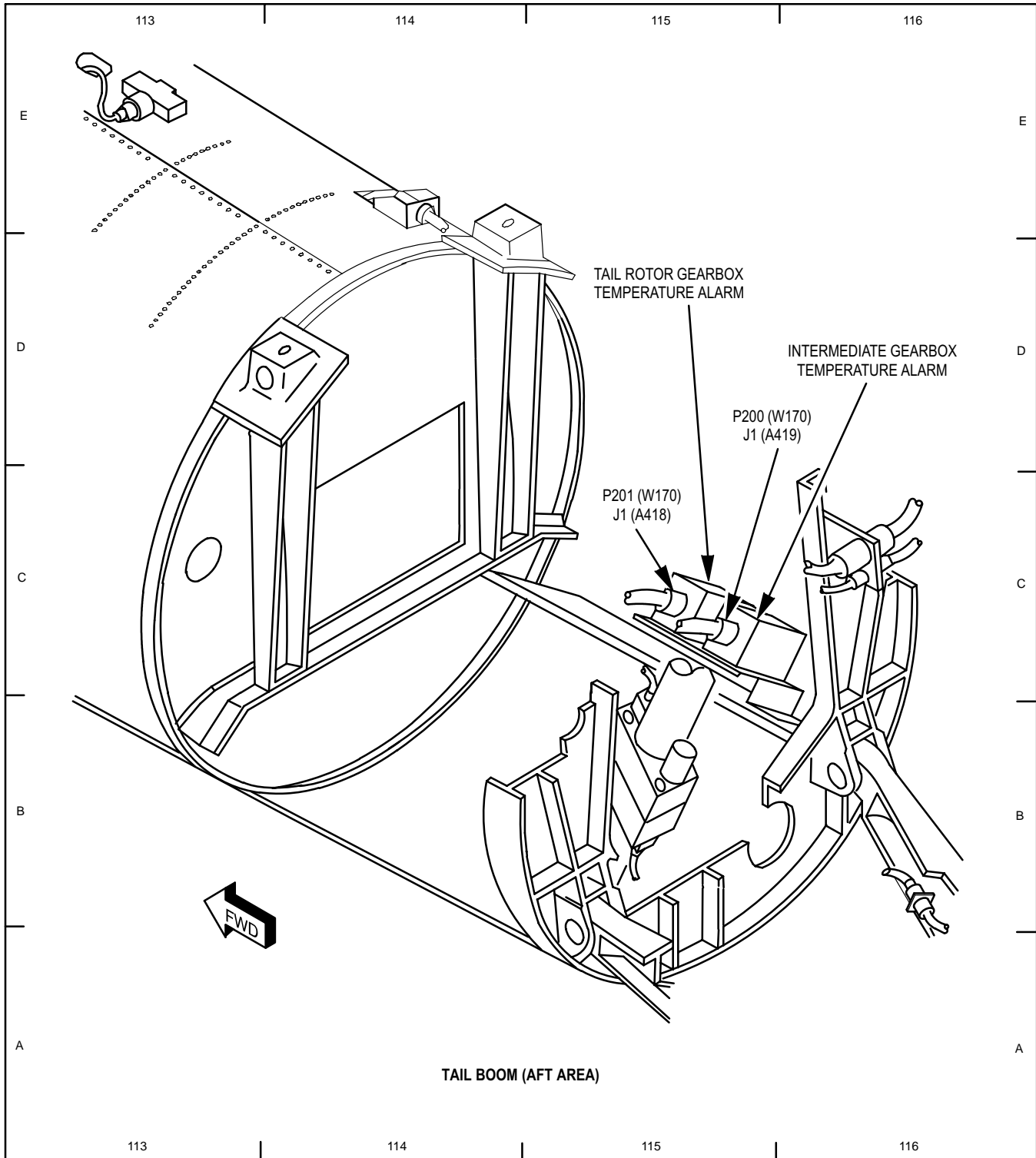
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Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)



M69-104A

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)

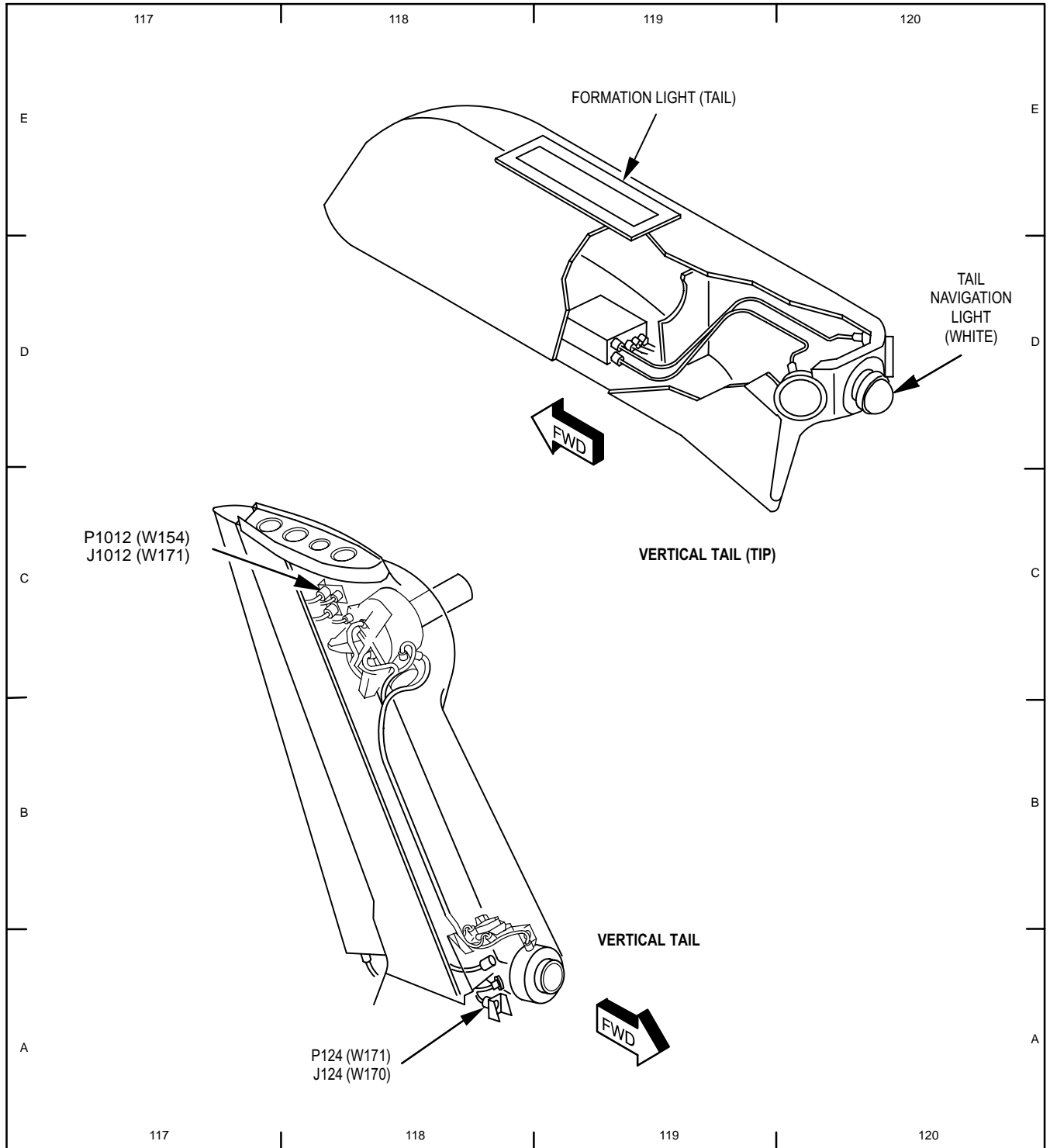


M69-410

9-9. ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (ECLC) INDEX (cont)

9-9

Table 9-2. Electrical Component Location and Configuration (ECLC) Index Listing (cont)



M69-117A

9-10. AC ELECTRICAL POWER GENERATION – POWER UP

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06

References:

TM 1-1520-238-T-8
TM 1-1520-238-23

Equipment Conditions:

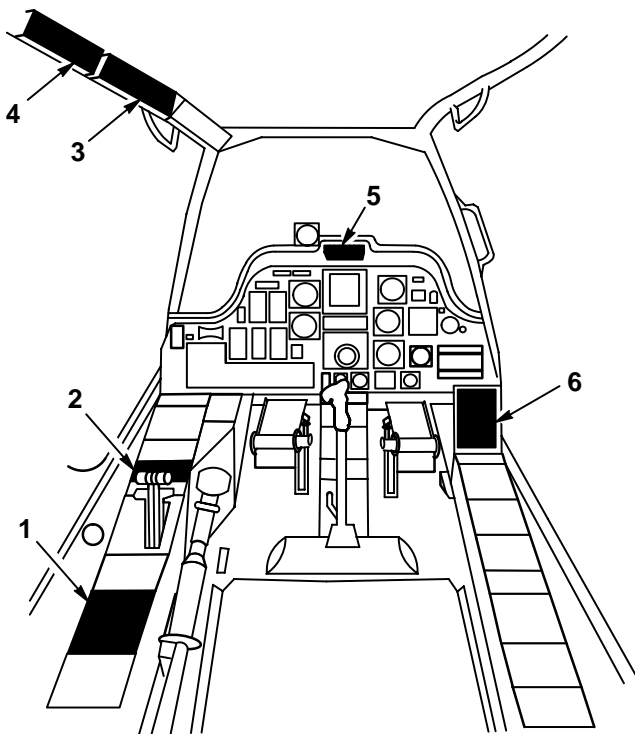
<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23 Paragraph 9-45	Battery installed EXTERNAL POWER – POWER UP completed

Personnel Required:

68X Armament/Electrical Systems Repairer

NOTE

Refer to pilot station (fig. 9-97) and for cockpit configuration and equipment.



1. PILOT EXT LT / INTR LT PANEL
2. PILOT ELEC PWR PANEL
3. PILOT CENTER CIRCUIT BREAKER PANEL
4. PILOT AFT CIRCUIT BREAKER PANEL
5. PILOT MASTER CAUTION / WARNING PANEL
6. PILOT CAUTION / WARNING PANEL

M69-050

Figure 9-97. Pilot Station

9-10. AC ELECTRICAL POWER GENERATION – POWER UP (cont)

9-10

NOTE

If any of the following circuit breakers do not stay closed, continue with this power up procedure. Circuit breaker troubleshooting is included in the maintenance operational check.

1. On pilot circuit breaker panel (fig. 9-98), check that the following circuit breakers are closed:

Circuit Breaker Panel	Circuit Breaker	Circuit Breaker Panel	Circuit Breaker
Center	LT CAUT	Center	APU HOLD
Center	FIRE DETR APU	Aft	POWER XFMR RECT 1
Center	FIRE EXTGH APU	Aft	POWER XFMR RECT 2
Center	FUEL APU	Center	FUEL BST
Center	ENG WARN		

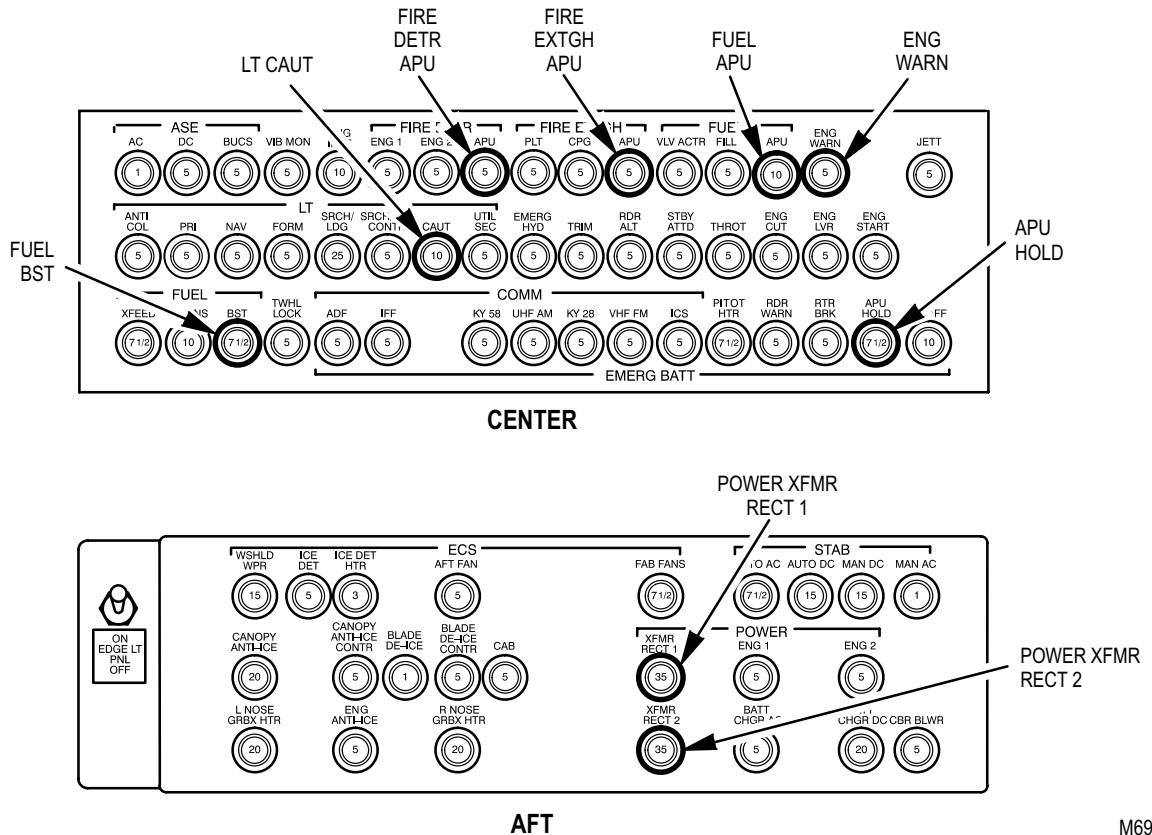
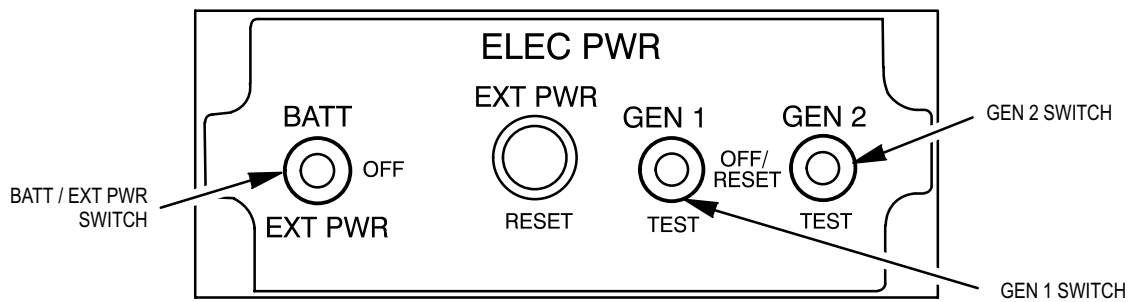


Figure 9-98. Pilot Circuit Breaker Panels

M69-052A

2. On pilot **ELEC PWR** panel (fig. 9-99), set **BATT/EXT PWR** switch to **BATT**.



M69-057

Figure 9-99. Pilot ELEC PWR Panel

3. Perform AUXILIARY POWER UNIT-POWER UP (TM 1-1520-238-T-8).
4. On pilot **ELEC PWR** panel, set **GEN 1** and **GEN 2** switches to **GEN 1** and **GEN 2**.

END OF TASK

9-11. AC ELECTRICAL POWER GENERATION – POWER DOWN

9-11

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06

References:

TM 1-1520-238-T-8

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-10	AC ELECTRICAL POWER GENERATION – POWER UP completed

Personnel Required:

68X Armament/Electrical Systems Repairer

NOTE

Refer to pilot station (fig. 9-97) for configuration and component locations.

1. On pilot **ELEC PWR** panel (fig. 9-99), set **GEN 1** and **GEN 2** switches to **OFF**.
2. Perform AUXILIARY POWER UNIT – POWER DOWN (TM 1-1520-238-T-8).
3. Perform EXTERNAL POWER – POWER DOWN (para 9-46).

END OF TASK

9-12. AC ELECTRICAL POWER GENERATION – MAINTENANCE OPERATIONAL CHECK

9-12

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-45	EXTERNAL POWER – POWER UP completed
Paragraph 9-10	AC ELECTRICAL POWER GENERATION – POWER UP completed

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

- TM 1-1520-238-T-1
- TM 1-1520-238-T-3
- TM 1-1520-238-T-4
- TM 1-1520-238-T-8
- TM 1-1520-238-23

NOTE

- Refer to pilot station (fig. 9-97) for configuration and component locations.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.

1. Perform GEN FD/LS (TM 1-1520-238-T-1).

NOTE

If a discrepancy is noted during the FD/LS check, perform the corrective action indicated in TM 1-1520-238-T-1. If the discrepancy still exists after performing the corrective action required, continue performing the maintenance operational check.

If **GENERATOR 1 NO-GO LH XMSN BAY** appears on heads up display (HOD) and no fault is found, then replace generator 1 (TM 1-1520-238-23).

If **GENERATOR 1 CONTROL NO-GO PLT ELEC PWR CNTR** appears on HOD and no fault is found, then replace generator 1 control (TM 1-1520-238-23).

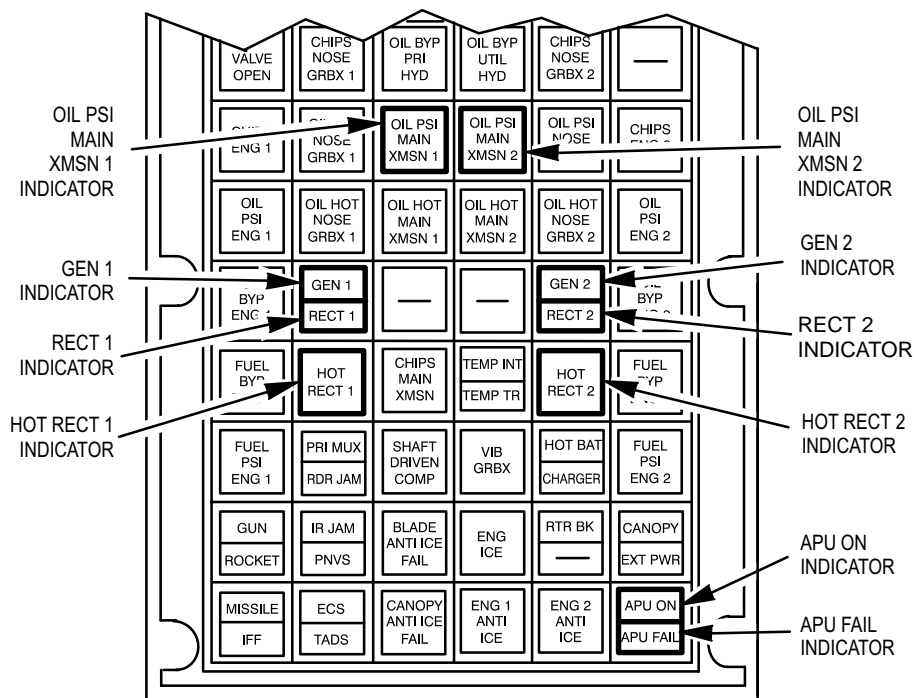
If **GENERATOR 2 NO-GO RH XMSN BAY** appears on HOD and no fault is found, then replace generator 2 (TM 1-1520-238-23).

9-12. AC ELECTRICAL POWER GENERATION – MAINTENANCE OPERATIONAL CHECK (cont)

If **GENERATOR 2 CONTROL NO-GO PLT ELEC PWR CNTR** appears on HOD and no fault is found, then replace generator 2 control (TM 1-1520-238-23).

2. Perform maintenance operational check as follows:

Task	Result
a. On pilot caution/warning panel (fig. 9-100), check that APU ON indicator is lighted.	If APU ON indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, refer to TM 1-1520-238-T-8 to troubleshoot APU.



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Figure 9-100. Pilot Caution/Warning Panel

- | | |
|--|---|
| <p>b. On pilot caution/warning panel, check that OIL PSI MAIN XMSN 1, and OIL PSI MAIN XMSN 2 indicators are not lighted.</p> | <p>If OIL PSI MAIN XMSN 1 or OIL PSI MAIN XMSN 2 indicators are lighted, refer to TM 1-1520-238-T-4 to troubleshoot drive system.</p> |
| <p>c. On pilot ELEC PWR panel (fig. 9-99), set BATT/EXT PWR switch to EXT PWR and GEN 1 and GEN 2 switches to OFF/RESET.</p> | |

9-12. AC ELECTRICAL POWER GENERATION – MAINTENANCE OPERATIONAL CHECK (cont) 9-12

- d. On pilot center circuit breaker panel (fig. 9-98), check that **LT CAUT** circuit breaker is closed.

If **LT CAUT** circuit breaker does not stay closed, go to paragraph 9-263 to troubleshoot dc emergency bus – pilot station.
- e. On pilot center circuit breaker panel, check that **LT PRI** circuit breaker is closed.

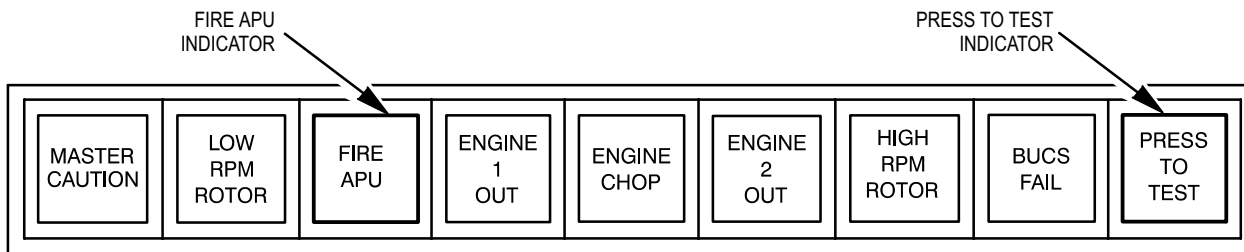
If **LT PRI** circuit breaker does not stay closed, go to paragraph 9-113 to troubleshoot pilot edge-lights.
- f. On pilot aft circuit breaker panel, check that **POWER XFMR RECT 1** and **POWER XFMR RECT 2** circuit breakers are closed.

If **POWER XFMR RECT 1** circuit breaker does not stay closed, go to paragraph 9-23 to troubleshoot dc electrical power generation.

If **POWER XFMR RECT 2** circuit breaker does not stay closed, go to paragraph 9-23 to troubleshoot dc electrical power generation.
- g. On pilot caution/warning panel (fig. 9-100), check that **GEN 1** and **GEN 2** indicators are lighted.

If **GEN 1** indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-14.

If **GEN 2** indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-15.
- h. On pilot master caution/warning panel (fig. 9-101), press and hold **PRESS TO TEST** indicator.



M69-054

Figure 9-101. Master Caution/Warning Panel

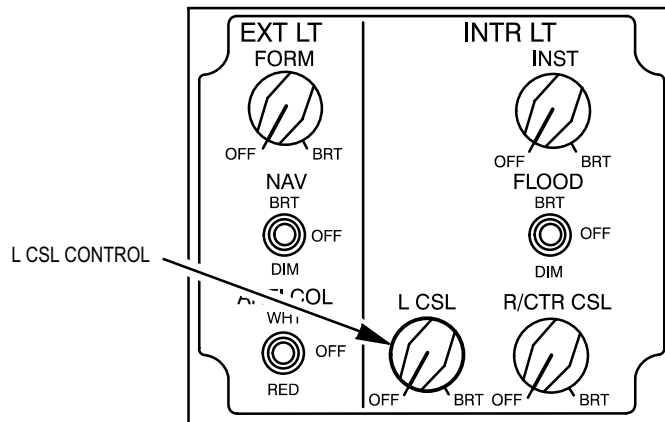
- i. On pilot master caution/warning panel and pilot caution/warning panel, check that all indicators are lighted.

If any indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-333 to troubleshoot pilot caution/warning system.
- j. On pilot **ELEC PWR** panel (fig. 9-99), set and hold **GEN 1** switch to **TEST**.
- k. On pilot caution/warning panel, check that **GEN 1** indicator is not lighted.

If **GEN 1** indicator is lighted, refer to TM 1-1520-238-T-3 (Generators Multiplex Read Codes) and perform troubleshooting. Then, if no fault is found, go to paragraph 9-16.

9-12. AC ELECTRICAL POWER GENERATION – MAINTENANCE OPERATIONAL CHECK (cont)**9-12**

- | | |
|---|--|
| <p>l. On pilot ELEC PWR panel (fig. 9-99), set and hold GEN 2 switch to TEST.</p> | |
| <p>m. On pilot caution/warning panel (fig. 9-100), check that GEN 2 indicator is not lighted.</p> | <p>If GEN 2 indicator is lighted, refer to TM 1-1520-238-T-3 (Generators Multiplex Read Codes) and perform troubleshooting. Then, if no fault is found, go to paragraph 9-17.</p> |
| <p>n. On pilot ELEC PWR panel, set BATT/EXT PWR switch to BATT.</p> | |
| <p>o. Remove external power – electrical (TM 1-1520-238-23).</p> | |
| <p>p. On pilot ELEC PWR panel, set GEN 1 and GEN 2 switches to GEN 1 and GEN 2.</p> | <p>If GEN 1 indicator is lighted, go to paragraph 9-18.</p> <p>If GEN 2 indicator is lighted, go to paragraph 9-19.</p> |
| <p>q. On pilot ELEC PWR panel, set GEN 1 switch to OFF/RESET position. On pilot caution/warning panel, check that RECT 1 indicator is not lighted.</p> | <p>If RECT 1 indicator is lighted, go to paragraph 9-20.</p> |
| <p>r. On pilot ELEC PWR panel, set GEN 1 switch to GEN 1 position and GEN 2 switch to OFF/RESET position. On pilot caution/warning panel, check that RECT 2 indicator is not lighted.</p> | <p>If GEN 1 indicator is lighted, go to paragraph 9-18.</p> <p>If RECT 2 indicator is lighted, go to paragraph 9-21.</p> |
| <p>s. On pilot ELEC PWR panel, set GEN 2 switch to GEN 2 position.</p> | <p>If GEN 2 indicator is lighted, go to paragraph 9-20.</p> |
| <p>t. On pilot EXT LT/INTR LT panel (fig. 9-102), turn L CSL control to BRT.</p> | <p>If pilot ELEC PWR panel edge-lighting does not light, go to paragraph 9-22.</p> |
| <p>u. On pilot EXT LT/INTR LT panel, set L CSL switch to OFF.</p> | |
| <p>v. On pilot ELEC PWR panel, set GEN 1 and GEN 2 switches to OFF/RESET position.</p> | |



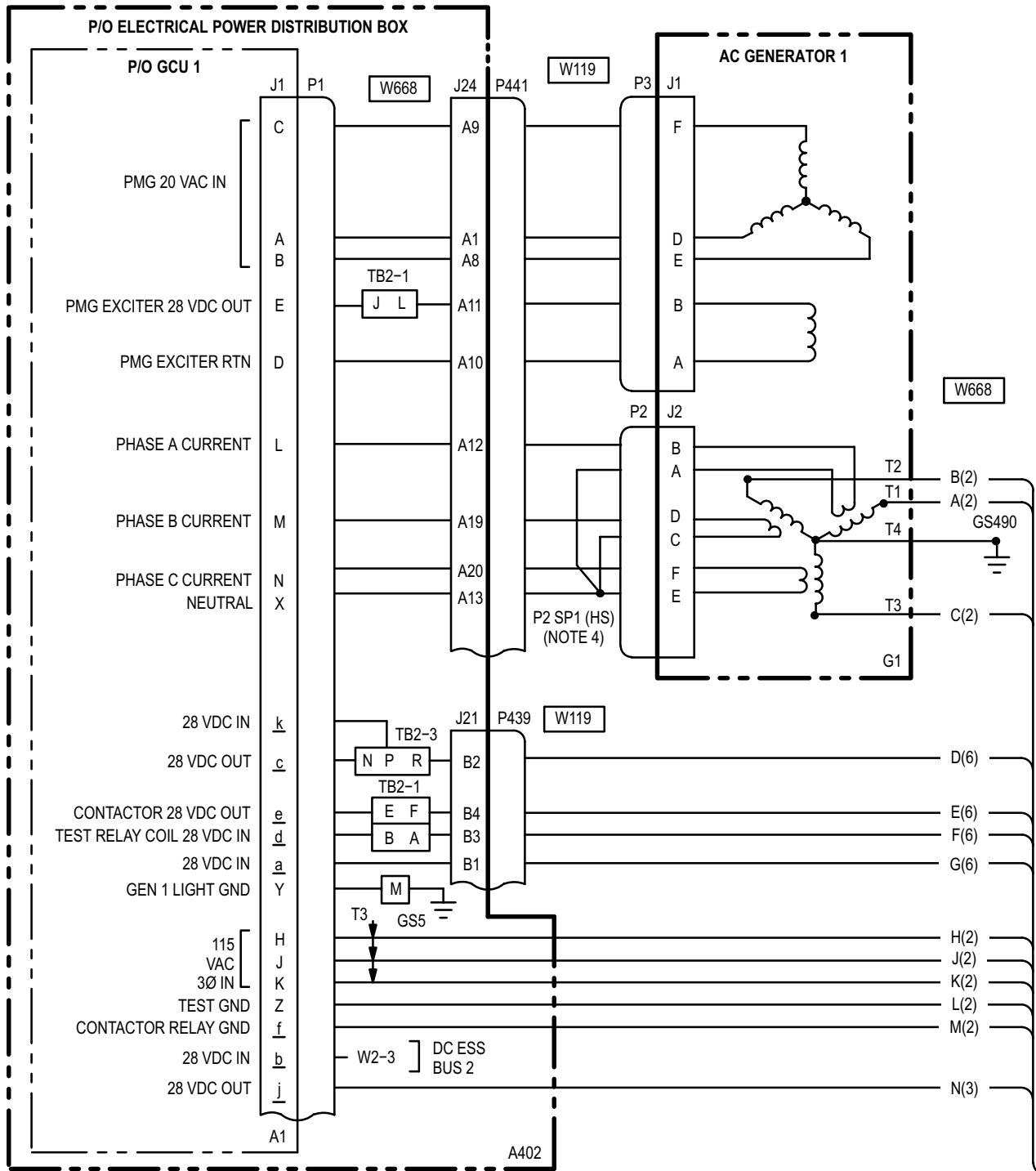
M69-058

Figure 9-102. Pilot EXT LT/INTR LT Panel

3. Perform AC ELECTRICAL POWER GENERATION – POWER DOWN (para 9-11).

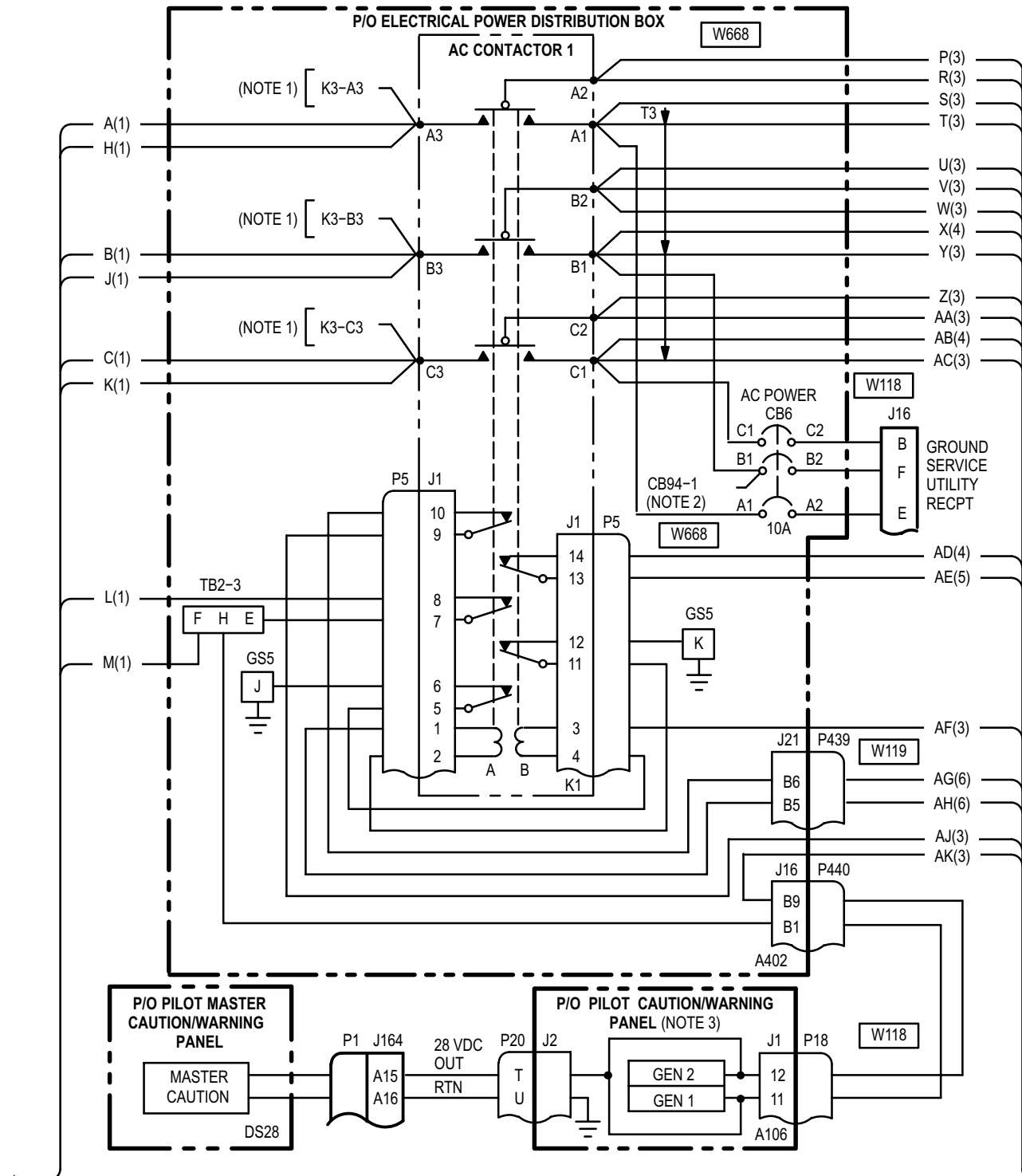
END OF TASK

9-13. AC ELECTRICAL POWER GENERATION - WIRING INTERCONNECT DIAGRAM

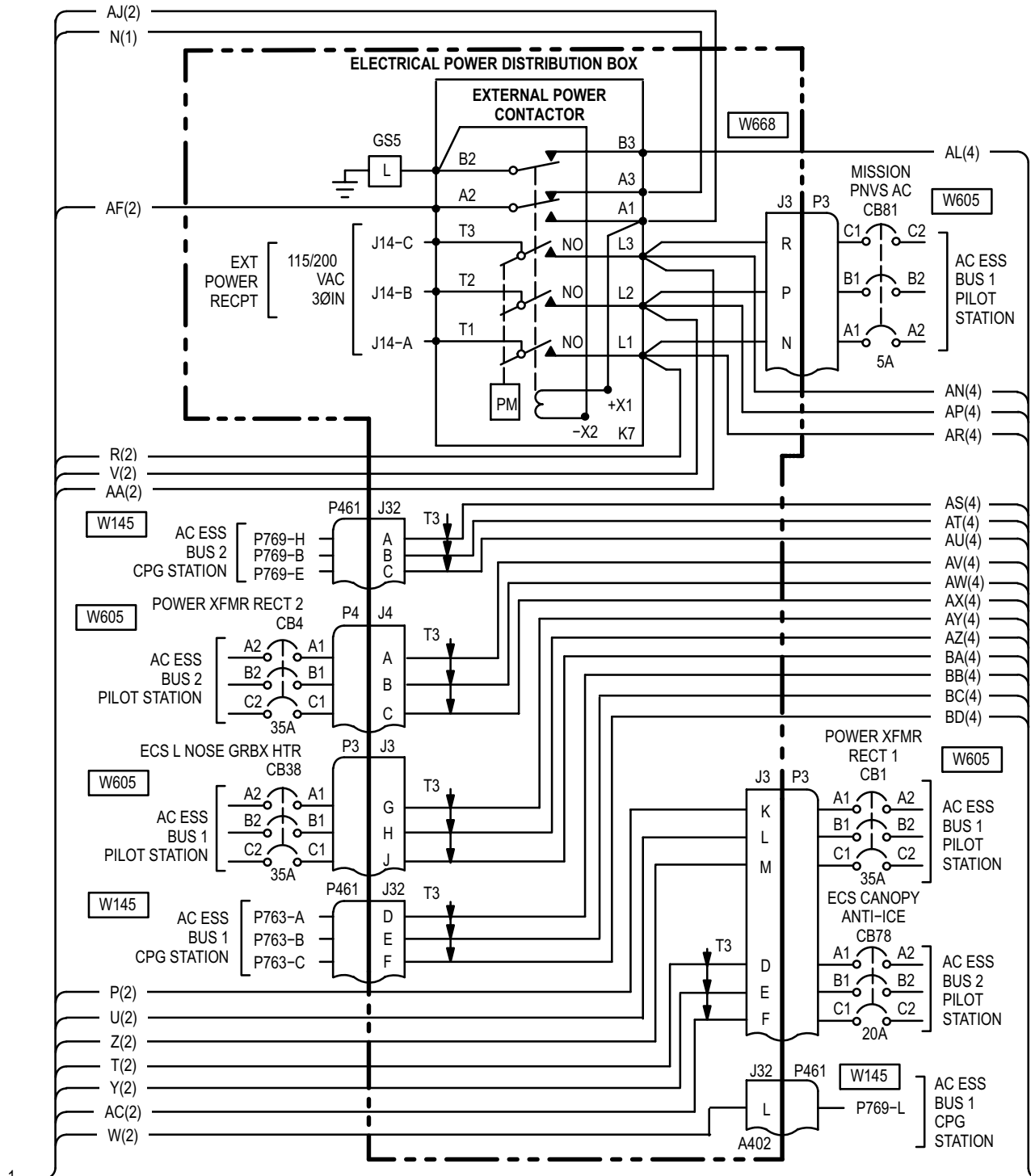


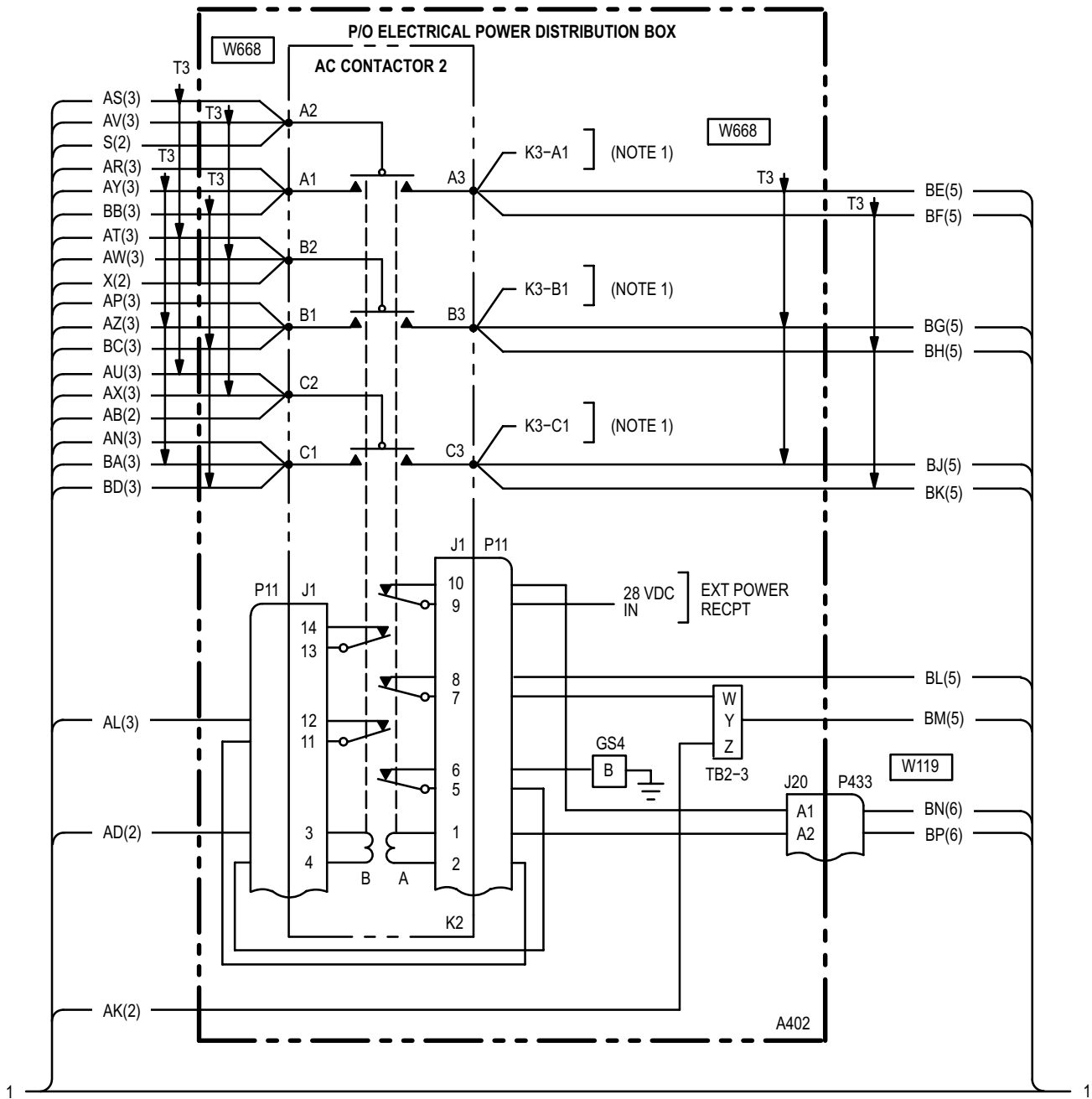
1

9-13. AC ELECTRICAL POWER GENERATION – WIRING INTERCONNECT DIAGRAM (cont)

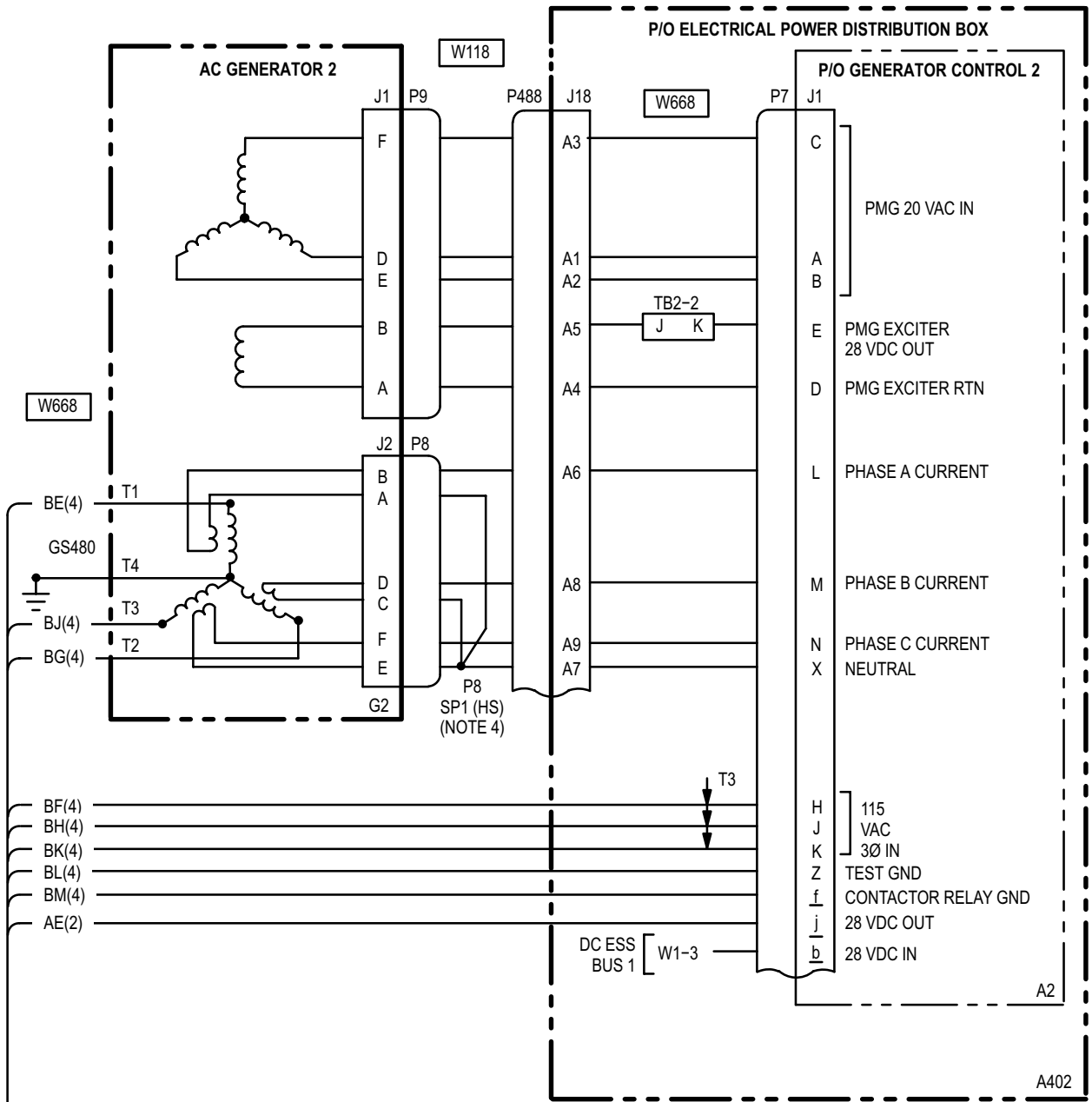


9-13. AC ELECTRICAL POWER GENERATION - WIRING INTERCONNECT DIAGRAM (cont)





9-13. AC ELECTRICAL POWER GENERATION – WIRING INTERCONNECT DIAGRAM (cont)



1

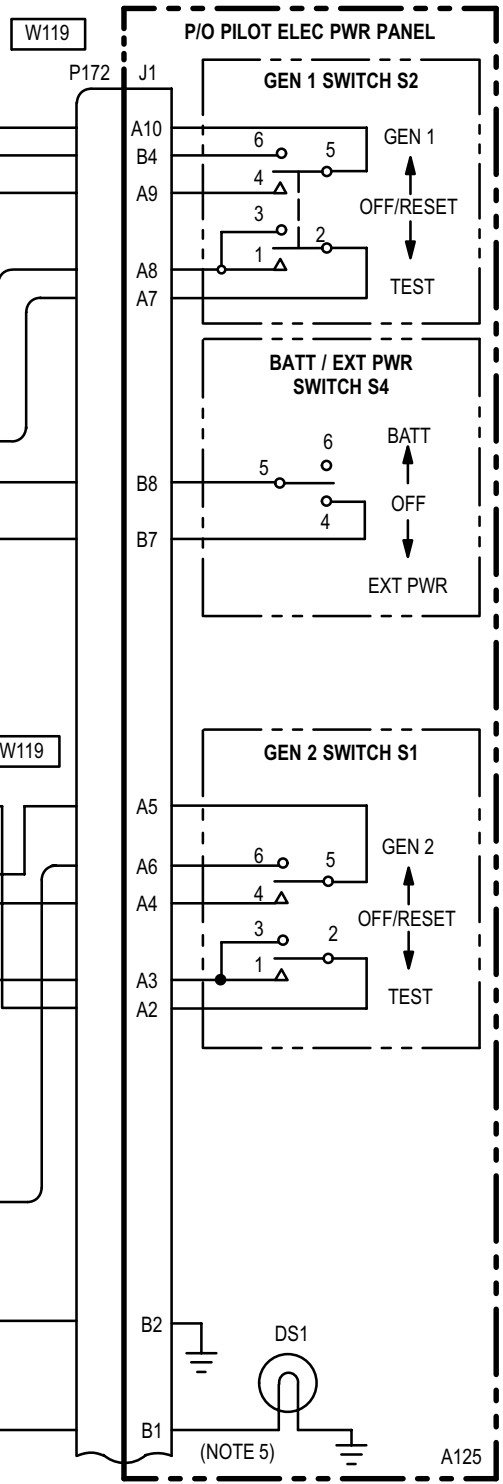
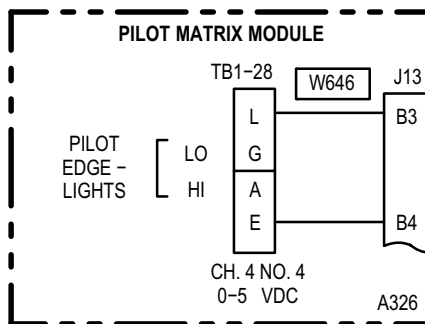
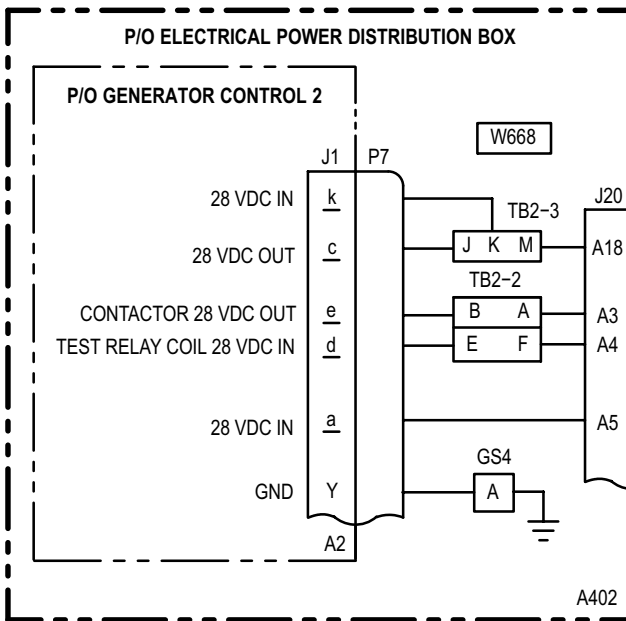
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NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

1. UTILITY SYSTEM (TM 1-1520-238-T-8).
2. FUEL SYSTEM (TM 1-1520-238-T-7).
3. FAILURE SIGNALS THAT LIGHT EITHER ONE OR BOTH GEN 1 OR GEN 2 INDICATORS ALSO LIGHT MASTER CAUTION LIGHT.
4. HS DESIGNATES A HARD SPLICE WHICH CANNOT BE DISCONNECTED. M DESIGNATES A SOFT SPLICE WHICH MAY BE DISCONNECTED FOR A WIRING CHECK.

E(1)
 AH(2)
 F(1)
 G(1)
 D(1)
 AG(2)
 BN(4)



M69-001-6A
 SHEET 6 OF 6

9-14. GEN 1 INDICATOR – IS NOT LIGHTED WITH GENERATOR 1 OFF LINE

9-14

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution box cover removed

3. Check for open between (A402-A1): J1-f and J1-Y, J1-Z and J1-Y.

Does open exist?

YES	Replace GCU 1 (TM 1-1520-238-23).
NO	Replace generator 1 contactor (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot caution/warning panel, check for open between P18-11 and ground.

Does open exist?

YES	Go to step 2.
NO	Go to paragraph 9-333 to troubleshoot pilot caution/warning system.

2. Check for open between: P18-11 and P440-B1; (A402)J16-B1 and TB2-3-H, (A402)TB2-3-F and P1-f, (A402)TB2-3-E and P5-7, (A402)P5-8 and P1-Z, (A402) P1-Y and ground.

Does open exist?

YES	Repair open wire. Go to paragraph 9-12.
NO	Go to step 3.

END OF TASK

9-15. GEN 2 INDICATOR - IS NOT LIGHTED WITH GENERATOR 2 OFF LINE

9-15

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

3. Check for open between (A402-A2):
J1-f and J1-Y,
J1-Z and J1-Y.

Does open exist?

YES	Replace GCU 2 (TM 1-1520-238-23).
NO	Replace generator 2 contactor (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot caution/warning panel, check for open between P18-12 and ground.

Does open exist?

YES	Go to step 2.
NO	Go to paragraph 9-333 to troubleshoot pilot caution/warning system.

2. Check for open between:
P18-12 and P440-B9;
(A402)J16-B9 and TB2-3-Z,
(A402)TB2-3-Y and P7-f,
(A402)TB2-3-W and P11-7,
(A402-XK2)P11-8 and P7-Z,
(A402)P7-Y and ground.

Does open exist?

YES	Repair open wire. Go to paragraph 9-12.
NO	Go to step 3.

END OF TASK

9-16. GEN 1 INDICATOR - IS LIGHTED

9-16

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution box cover removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28VDC at (A402)P1-b.
Is voltage present?
 - YES Go to step 3.
 - NO Go to step 2.

2. Check for open between (A402)P1-b and (A402)W2-3.
Does open exist?
 - YES Repair open wire between (A402)P1-b and (A402)W2-3. Go to paragraph 9-12.

 - NO Go to paragraph 9-23 to troubleshoot DC electrical power generation.

3. Check for open between: (A402)P1-a and (A125)P172-A8, (A402)P1-d and (A125)P172-A9, (A402)P1-e and (A125)P172-A10, (A402)P1-c and (A125)P172-A7.
Does open exist?
 - YES Repair open wire. Go to paragraph 9-12.

 - NO Go to step 4.

4. On pilot **ELEC PWR** panel, set and hold **GEN 1** switch in **TEST**. Check for open between (A125): J1-A7 and J1-A8, J1-A9 and J1-A10.
Does open exist?
 - YES Go to step 5.

 - NO Replace GCU 1 (TM 1-1520-238-23).

5. Check for open between (A125): J1-A10 and S2-5, J1-A9 and S2-4, J1-A8 and S2-3, J1-A7 and S2-2.
Does open exist?
 - YES Repair open wire. Go to paragraph 9-12.

 - NO Replace switch (A125)S2 (TM 1-1520-238-23).

END OF TASK

9-17. GEN 2 INDICATOR - IS LIGHTED

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution box cover removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28VDC at (A402)P7-b.
Is voltage present?

YES Go to step 3.
NO Go to step 2.

2. Check for open between (A402)P7-b and (A402)W1-3.

Does open exist?

YES Repair open wire between (A402)P7-b and (A402)W1-3. Go to paragraph 9-12.
NO Go to paragraph 9-23 to troubleshoot DC electrical power generation.

3. Check for open between:
(A402)P7-a and (A125)P172-A3,
(A402)P7-d and (A125)P172-A4,
(A402)P7-e and (A125)P172-A5,
(A402)P7-c and (A125)P172-A2.

Does open exist?

YES Repair open wire. Go to paragraph 9-12.
NO Go to step 4.

4. On pilot **ELEC PWR** panel, set and hold **GEN 2** switch in **TEST**. Check for open between (A125):
J1-A2 and J1-A3,
J1-A4 and J1-A5.

Does open exist?

YES Go to step 5.
NO Replace GCU 2 (TM 1-1520-238-23).

5. Check for open between (A125):
J1-A5 and S1-5,
J1-A4 and S1-4,
J1-A3 and S1-3,
J1-A2 and S1-2.

Does open exist?

YES Repair open wire. Go to paragraph 9-12.
NO Replace switch (A125)S1 (TM 1-1520-238-23).

END OF TASK

9-18. GEN 1 INDICATOR - IS LIGHTED WITH GEN 1 SWITCH IN GEN 1 POSITION

9-18

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Generator 1 inspected Electrical power distribution box cover removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between:
(A402)P1-A and (G1)P3-D,
(A402)P1-B and (G1)P3-E,
(A402)P1-C and (G1)P3-F,
(A402)P1-D and (G1)P3-A,
(A402)P1-E and (G1)P3-B,
(A402)P1-L and (G1)P2-B,
(A402)P1-M and (G1)P2-D,
(A402)P1-N and (G1)P2-F,
(A402)P1-X and (G1)P2-A,
(A402)P1-X and (G1)P2-C,
(A402)P1-X and (G1)P2-E.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-12. |
| NO | Go to step 2. |

2. APU online, GEN 1 and GEN 2 switches in the GEN 1 / GEN 2 position, place GEN 2 switch to the OFF position.

Does all AC electrical power cease and GEN 2/RECT 2 caution/warning lights illuminate?

YES Go to step 3.

NO Go to paragraph 9-333 to troubleshoot pilot caution warning system.

3. Check for 28VDC at (A402)P1-b.
Is voltage present?

YES Go to step 4.

NO Go to paragraph 9-23 to troubleshoot DC electrical power generation.

4. Check for 28VDC at (A402)TB2-1-E.
Is voltage present?

YES Go to step 6.

NO Go to step 5.

5. Check for open between (A402): TB2-1-E and P1-e.

Does open exist?

YES Repair open wire.
Go to paragraph 9-12.

NO Replace GCU 1
(TM 1-1520-238-23).

6. On pilot **ELEC PWR** panel, set **GEN 1** switch to **GEN 1**. Check for 28 VDC at (A402)P5-1.

Is voltage present?

YES Go to step 7.

NO Go to step 8.

7. Check for open between (A402):

P5-2 and P5-11,
P5-12 and ground.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire.
Go to paragraph 9-12. |
| NO | Replace ac contactor 1
(TM 1-1520-238-23). |

8. Check for open between:

P172-B4 and (A402)P5-1,
P172-A10 and (A402)P1-e,
P172-A8 and (A402)P1-a,
P172-A7 and (A402)P1-c.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-12. |
| NO | Go to step 9. |

9. Check for open between (A125):

J1-A7 and S2-2,
J1-A8 and S2-3,
J1-B4 and S2-6,
J1-A10 and S2-5.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-12. |
| NO | Replace switch (A125)S2
(TM 1-1520-238-23). |

END OF TASK

9-19. GEN 2 INDICATOR - IS LIGHTED WITH GEN 2 SWITCH IN GEN 2 POSITION

9-19

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Generator 2 inspected Electrical power distribution box cover removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between:
(A402)P7-A and (G2)P9-D,
(A402)P7-B and (G2)P9-E,
(A402)P7-C and (G2)P9-F,
(A402)P7-D and (G2)P9-A,
(A402)P7-E and (G2)P9-B,
(A402)P7-L and (G2)P8-B,
(A402)P7-M and (G2)P8-D,
(A402)P7-N and (G2)P8-F,
(A402)P7-X and (G2)P8-A,
(A402)P7-X and (G2)P8-C,
(A402)P7-X and (G2)P8-E.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-12. |
| NO | Go to step 2. |

2. APU online, GEN 1 and GEN 2 switches in the GEN 1 / GEN 2 position, place GEN 1 switch to the OFF position.

Does all AC electrical power cease and GEN 1/RECT 1 caution/warning lights illuminate?

- | | |
|-----|---|
| YES | Go to step 3. |
| NO | Go to paragraph 9-333 to troubleshoot pilot caution warning system. |

3. Check for 28VDC at (A402)P7-b.
Is voltage present?

- | | |
|-----|--|
| YES | Go to step 4. |
| NO | Go to paragraph 9-23 to troubleshoot DC electrical power generation. |

4. Check for 28VDC at (A402)B2-2-B.
Is voltage present?

- | | |
|-----|---------------|
| YES | Go to step 6. |
| NO | Go to step 5. |

5. Check for open between (A402)TB2-2-B and P7-e.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-12. |
| NO | Replace GCU 1
(TM 1-1520-238-23). |

6. On pilot **ELEC PWR** panel, set **GEN 2** switch to **GEN 2**. Check for 28 VDC at (A402)P11-1.

Is voltage present?

- | | |
|-----|----------------|
| YES | Go to step 7. |
| NO | Go to step 10. |

7. Check for open between (A402):
P11-2 and P11-11,
P11-12 and (K7)B3.
Does open exist?
- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-12. |
| NO | Go to step 8. |
8. Check for open between (A402):
B3 and B2.
Does open exist?
- | | |
|-----|---|
| YES | Replace external power
contactor (TM 1-1520-238-23). |
| NO | Go to step 9. |
9. Check for open between (A402):
B2 and ground.
Does open exist?
- | | |
|-----|---|
| YES | Repair open wire.
Go to paragraph 9-12. |
| NO | Replace ac contactor 2
(TM 1-1520-238-23). |
10. Check for open between:
P172-A6 and (A402)P11-1,
P172-A5 and (A402)P7-e,
P172-A3 and (A402)P7-a,
P172-A2 and (A402)P1-c.
Does open exist?
- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-12. |
| NO | Go to step 11. |
11. Check for open between (A125):
J1-A2 and S1-2,
J1-A3 and S1-3,
J1-A6 and S1-6,
J1-A5 and S1-5.
Does open exist?
- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-12. |
| NO | Replace switch (A125)S1
(TM 1-1520-238-23). |

END OF TASK

9-20. RECT 1 INDICATOR - IS LIGHTED WITH GEN 1 SWITCH OFF

9-20

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution box cover removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 20-70 ohms resistance between (A402-K1)J1-3 and J1-4 and less than 1 ohm between (A402-K1)J1-5 and J1-6.

Is resistance correct?

- YES Go to step 2.
- NO Replace ac contactor 1 (TM 1-1520-238-23).

2. Check for open between (A402):
P5-6 and ground,
P5-5 and P5-4,
P5-3 and K7-A2,
K7-A3 and P1-j.

- YES Repair open wire. Go to paragraph 9-12.
- NO Go to step 3.

3. Check for 28 VDC at (A402-K7)-A3.
Is voltage present?

- YES Go to step 5.
- NO Go to step 4.

4. Check for 28 VDC at (A402)P1-b.
Is voltage present?

- YES Replace GCU 1 (TM 1-1520-238-23).
- NO Go to paragraph 9-23 to troubleshoot DC electrical power generation.

5. Check for 28 VDC at (A402)K7-A2.
Is voltage present?

- YES Go to step 6.
- NO Replace external power contactor (TM 1-1520-238-23).

6. Check for open between (A402)P1-c and P1-k.
Does open exist?

- YES Repair open wire. Go to paragraph 9-12.
- NO Replace GCU 1 (TM 1-1520-238-23).

END OF TASK

9-21. RECT 2 INDICATOR - IS LIGHTED WITH GEN 2 SWITCH OFF AND GEN 1 SWITCH SET TO GEN 1

9-21

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution box cover removed

3. Check for 28 VDC at (A402-K1)P5-13.
Is voltage present?

- | | |
|-----|--|
| YES | Replace AC contactor 1 (TM 1-1520-238-23). |
| NO | Go to step 4. |

4. Check for 28 VDC at (A402)P7-b.
Is voltage present?

- | | |
|-----|--|
| YES | Go to step 5. |
| NO | Go to paragraph 9-23 to troubleshoot DC electrical power generation. |

5. Check for open between (A402)P7-c and P7-k.
Does open exist?

- | | |
|-----|---|
| YES | Repair open wire. Go to paragraph 9-12. |
| NO | Replace GCU 2 (TM 1-1520-238-23). |

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 20-70 ohms resistance between (A402-K2)J1-3 and J1-4 and less than 1 ohm between (A402-K2)J1-5 and J1-6.

Is resistance correct?

- | | |
|-----|--|
| YES | Go to step 2. |
| NO | Replace ac contactor 2 (TM 1-1520-238-23). |

2. Check for open between (A402):
P11-6 and ground,
P11-5 and P11-4,
P11-3 and P5-14,
P5-13 and P7-j.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire. Go to paragraph 9-12. |
| NO | Go to step 3. |

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Pilot ELEC PWR panel removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 5 VDC at XDS1 center contact.
Is voltage present?

YES	Replace pilot ELEC PWR panel (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:
P172-B1 and P481-B4,
(A326)J13-B4 and (A326)TB1-28-E.
Does open exist?

YES	Repair open wire. Go to paragraph 9-12.
NO	Go to paragraph 9-113 to troubleshoot pilot edge-lights.

END OF TASK

9-23. DC ELECTRICAL POWER GENERATION – MAINTENANCE OPERATIONAL CHECK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

References:

TM 1-1520-238-23

Equipment Conditions:

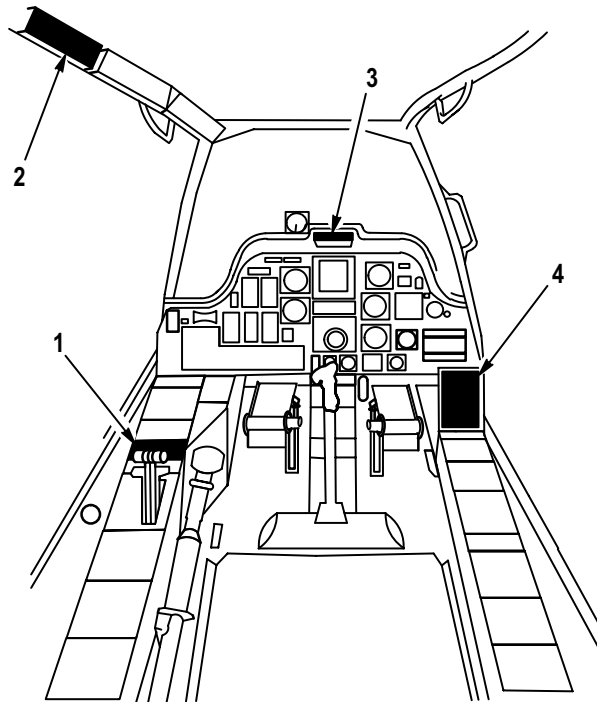
<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution box cover removed
Paragraph 9-45	EXTERNAL POWER – POWER UP completed

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.



1. PILOT ELEC PWR PANEL
2. PILOT AFT CIRCUIT BREAKER PANEL
3. PILOT MASTER CAUTION / WARNING PANEL
4. PILOT CAUTION / WARNING PANEL

M69-063

Figure 9-103. Pilot Station

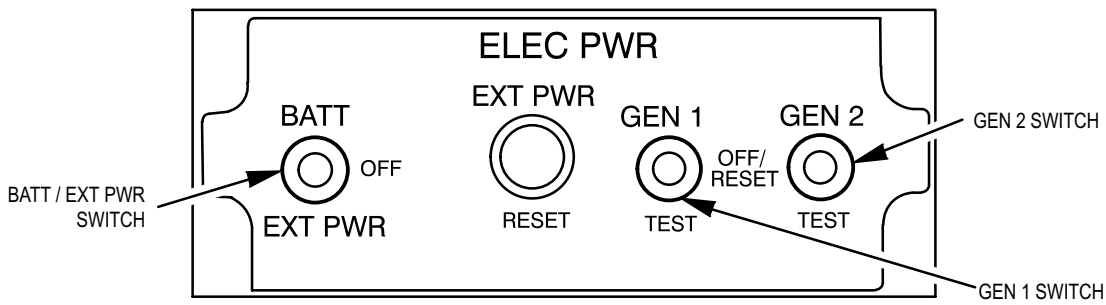
9-23. DC ELECTRICAL POWER GENERATION – MAINTENANCE OPERATIONAL CHECK (cont)

NOTE

- Refer to pilot station (fig. 9-103) for configuration and component locations.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.

1. Perform the maintenance operational check as follows:

Task	Result
a. Connect battery (TM 1-1520-238-23).	
b. On pilot ELEC PWR panel (fig. 9-104), place BATT/EXT PWR switch to BATT .	



M69-064

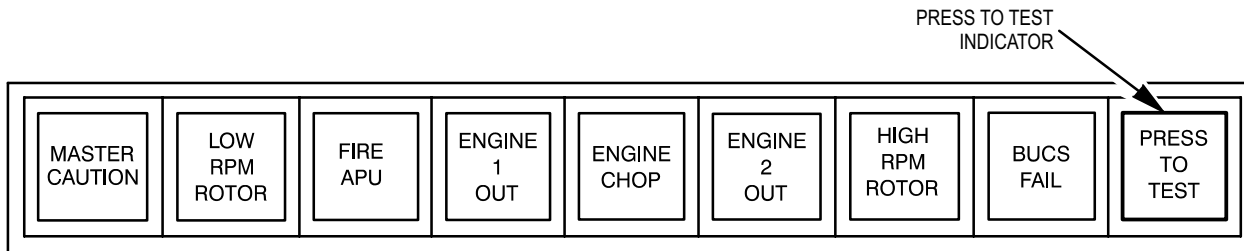
Figure 9-104. Pilot ELEC PWR Panel

c. On pilot master caution/warning panel (fig. 9-105), press and hold the **PRESS TO TEST** indicator. Verify that all indicators are lighted.

If caution/warning indicators are lighted, go to paragraph 9-41 to troubleshoot battery.

If **RECT 1** indicator does not light, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-25.

If **RECT 2** indicator does not light, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-26.

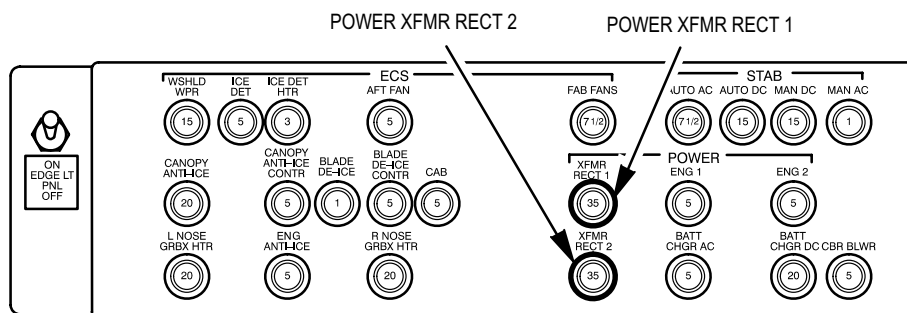


M69-065

Figure 9-105. Pilot Master Caution/Warning Panel

9-23. DC ELECTRICAL POWER GENERATION – MAINTENANCE OPERATIONAL CHECK (cont)

Task	Result
<p>d. On pilot aft circuit breaker panel (fig. 9-106), ensure the POWER XFMR RECT 1 circuit breaker (CB1) and POWER XFMR RECT 2 circuit breaker (CB4) are closed.</p>	<p>If both circuit breakers do not stay closed, go to paragraph 9-27.</p> <p>If POWER XFMR RECT 1 circuit breaker (CB1) does not stay closed, go to paragraph 9-28.</p>
<p>e. On pilot ELEC PWR panel (fig. 9-104), set BATT/EXT PWR switch to OFF.</p>	<p>If POWER XFMR RECT 2 circuit breaker (CB4) does not stay closed, go to paragraph 9-29.</p>

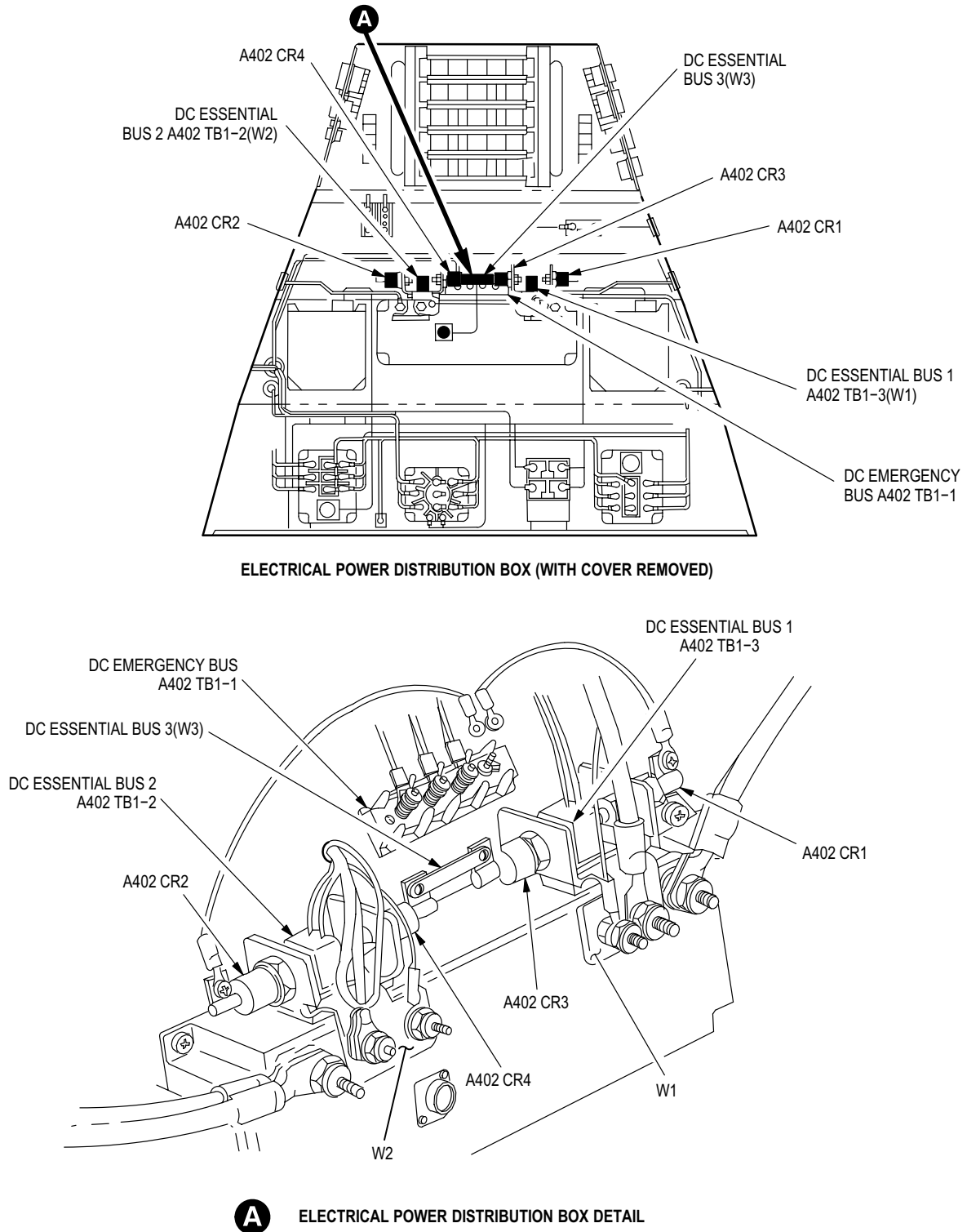


M69-066

Figure 9-106. Pilot Aft Circuit Breaker Panel

- | | |
|--|--|
| <p>f. On electrical power distribution box (fig. 9-107), detach P4, P5, and P461.</p> | |
| <p>g. On pilot ELEC PWR panel (fig. 9-104), set BATT/EXT PWR switch to EXT PWR.</p> | |
| <p>h. Check for 28 VDC at (A402): J4-M, J4-N and J32-K (dc essential bus 1).</p> | <p>If voltage is not present at (A402): J32-K, J4-M, and J4-N, go to paragraph 9-30.</p> <p>If voltage is not present on one pin and present on the others, go to paragraph 9-31.</p> |
| <p>i. Check for 28 VDC at (A402): J4-G and J4-J (dc essential bus 2).</p> | <p>If voltage is not present at (A402): J4-G and J4-J, go to paragraph 9-32.</p> <p>If voltage is not present on one pin and present on the others, go to paragraph 9-33.</p> |
| <p>j. Check for 28 VDC at (A402): J4-K, J4-L, J32-H, and J32-J (dc essential bus 3).</p> | <p>If voltage is not present at (A402): J32-H, J32-J, J4-K and J4-L, go to paragraph 9-34.</p> <p>If voltage is not present on one pin and present on the others, go to paragraph 9-35.3</p> |

9-23. DC ELECTRICAL POWER GENERATION – MAINTENANCE OPERATIONAL CHECK (cont)



M69-433

Figure 9-107. Electrical Power Distribution Box DC Electrical Components

9-23. DC ELECTRICAL POWER GENERATION – MAINTENANCE OPERATIONAL CHECK (cont)

Task	Result
<p>k. Check for 28 VDC at (A402): J29-1, J29-2, J29-3 and J32-G (pilot dc emergency bus).</p>	<p>If voltage is not present on one pin and is present on the others, go to paragraph 9-36.</p>
<p>l. On pilot ELEC PWR panel (fig. 9-104), set BATT/EXT PWR switch to OFF.</p>	
<p>m. Reconnect P4, P5, and P461 to their mating connectors. Install cover on electrical power distribution box.</p>	
<p>n. Perform AUXILIARY POWER UNIT – POWER UP (TM 1-1520-238-T-8).</p>	
<p>o. On pilot ELEC PWR panel, set and hold GEN 1 switch to TEST. On pilot caution/warning panel (fig. 9-108), check that GEN 1 indicator is not lighted.</p>	<p>If GEN 1 indicator is lighted, go to paragraph 9-12 to troubleshoot ac electrical power generation.</p>

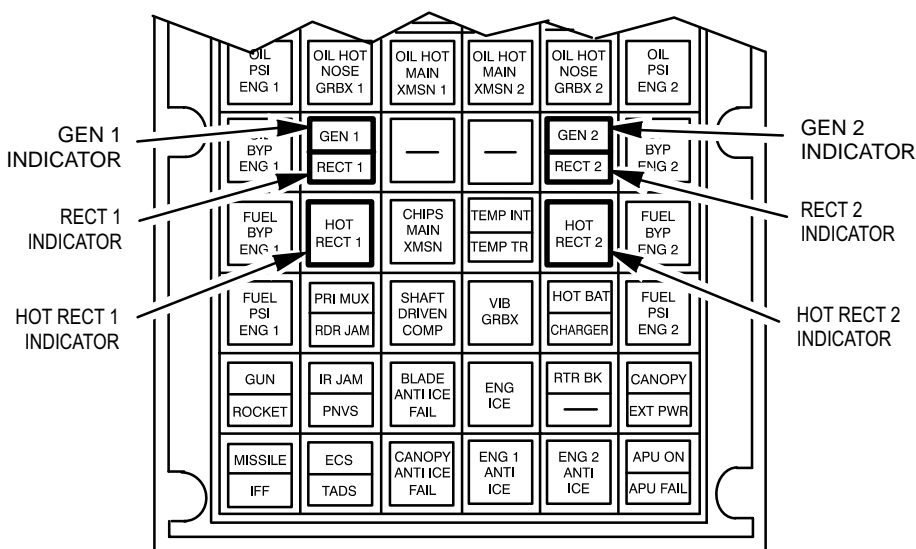


Figure 9-108. Pilot Caution/Warning Panel

M69-067

<p>p. Release GEN 1 switch. Set and hold GEN 2 switch to TEST. On pilot caution/warning panel check that GEN 2 indicator is not lighted.</p>	<p>If GEN 2 indicator is lighted, go to paragraph 9-12 to troubleshoot ac electrical power generation.</p>
<p>q. On pilot ELEC PWR panel (fig. 9-104), release GEN 2 switch. Set GEN 1 switch to GEN 1. On pilot caution/warning panel check that RECT 1 and HOT RECT 1 indicators are not lighted.</p>	<p>If RECT 1 indicator is lighted, go to paragraph 9-37.</p> <p>If HOT RECT 1 indicator is lighted, go to paragraph 9-38.</p>

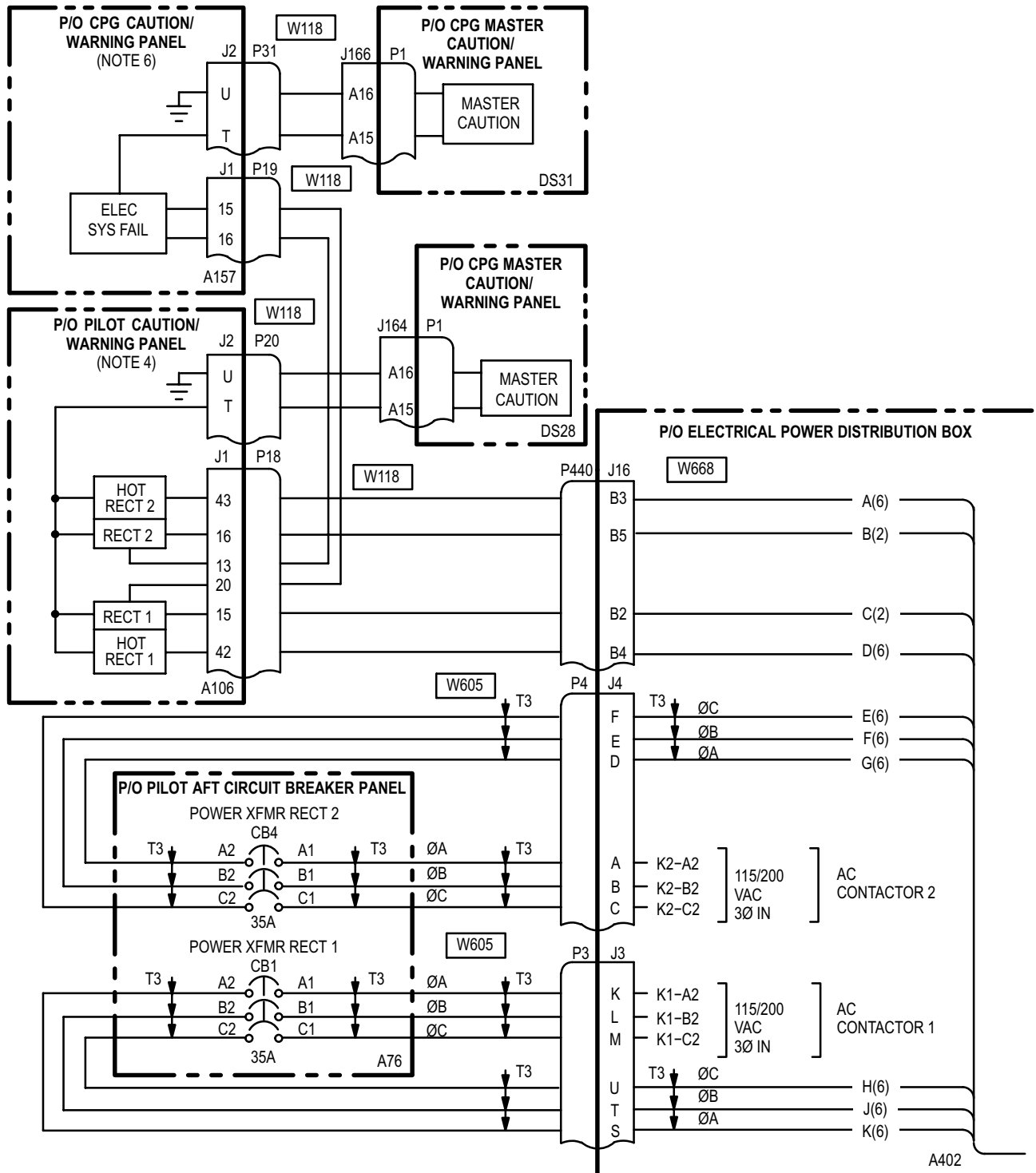
9-23. DC ELECTRICAL POWER GENERATION – MAINTENANCE OPERATIONAL CHECK (cont)

Task	Result
r. Set GEN 2 switch to GEN 2 . On pilot caution/warning panel (fig. 9-108), check that RECT 2 and HOT RECT 2 indicators are not lighted.	If RECT 2 indicator is lighted, go to paragraph 9-39. If HOT RECT 2 indicator is lighted, go to paragraph 9-40.

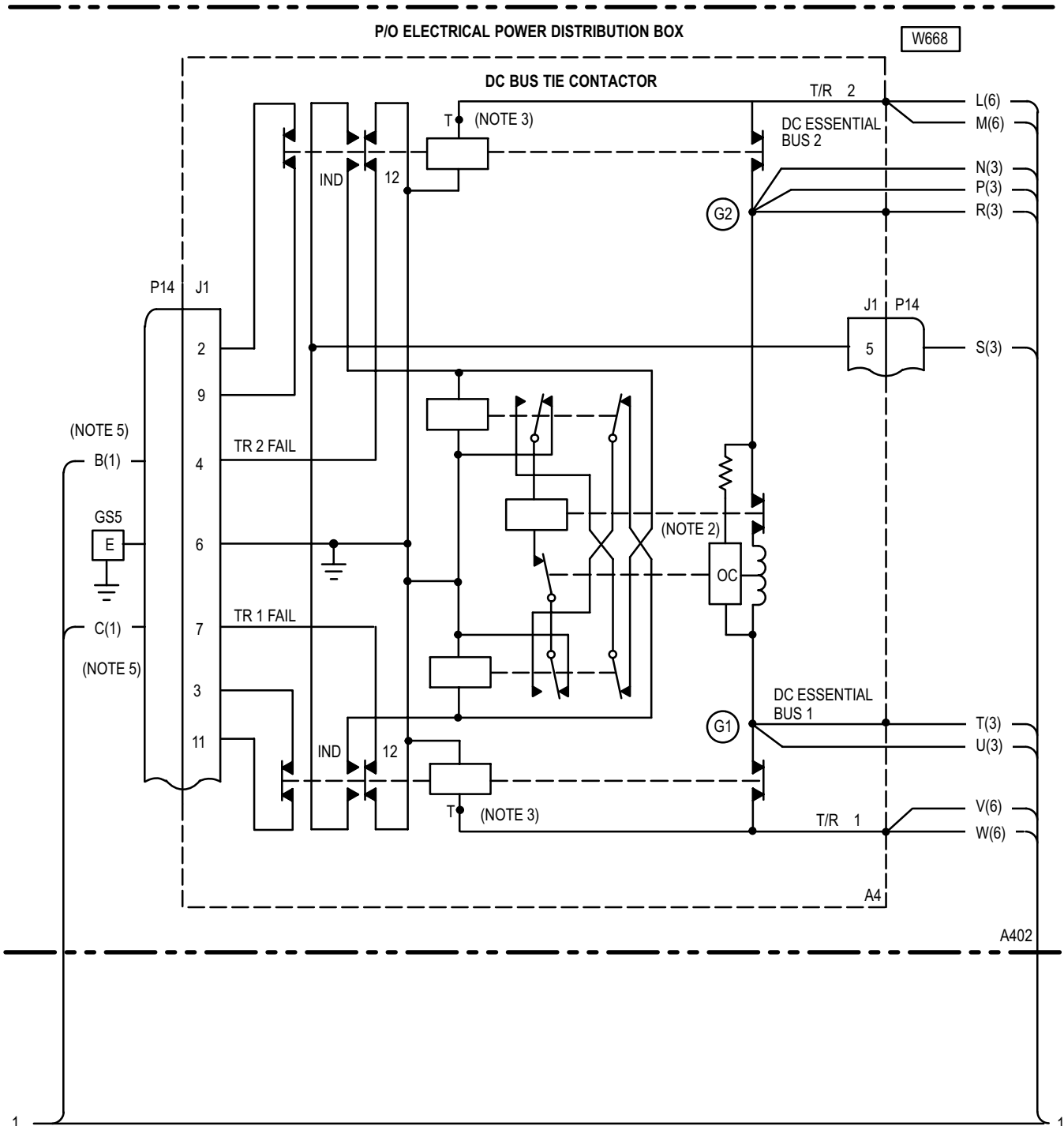
2. Perform AUXILIARY POWER UNIT – POWER DOWN (TM 1-1520-238-T-8).
3. Perform EXTERNAL POWER – POWER DOWN (para 9-46).
4. Electrical power distribution box cover installed (TM 1-1520-238-23).

END OF TASK

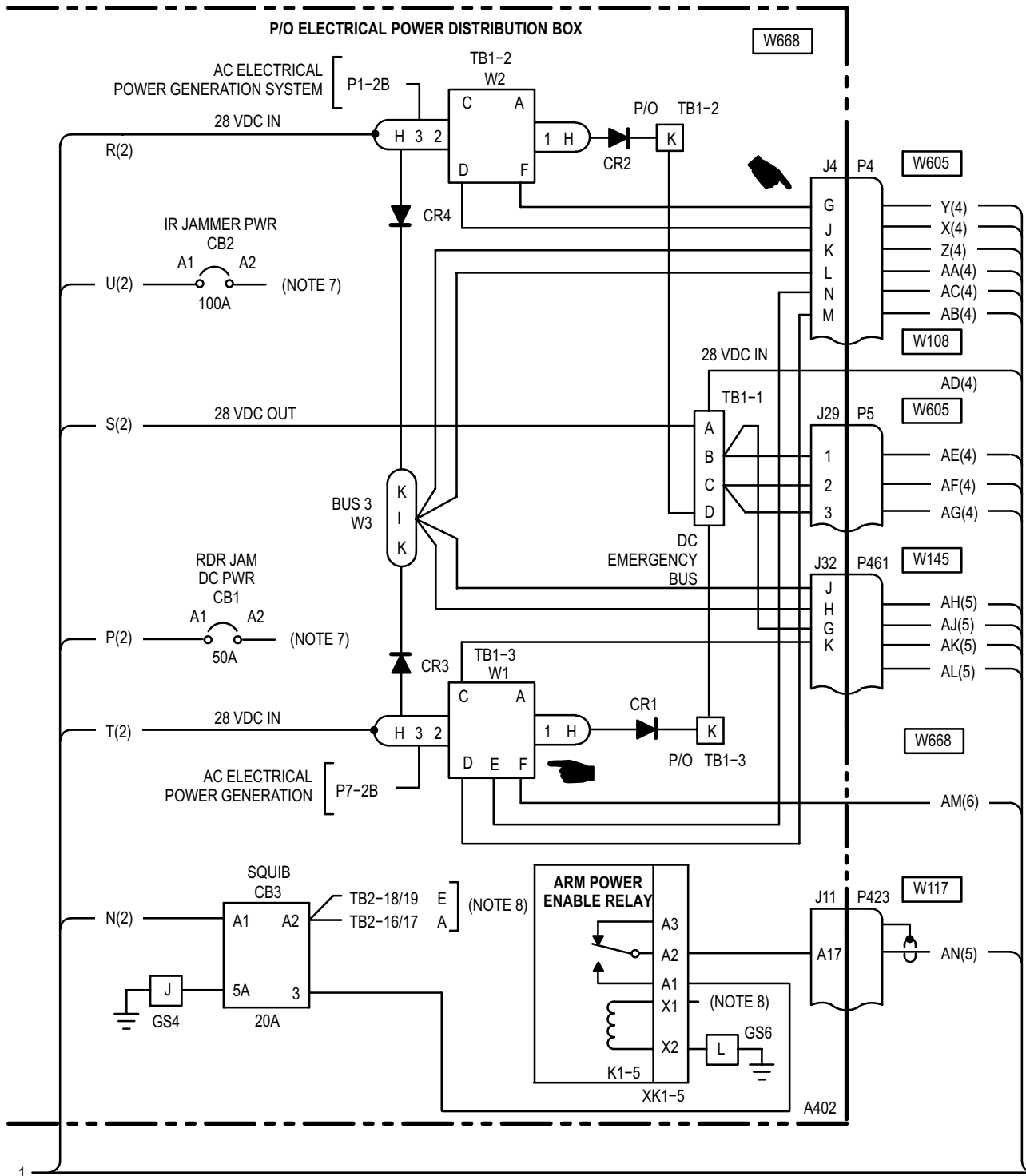
9-24. DC ELECTRICAL POWER GENERATION – WIRING INTERCONNECT DIAGRAM

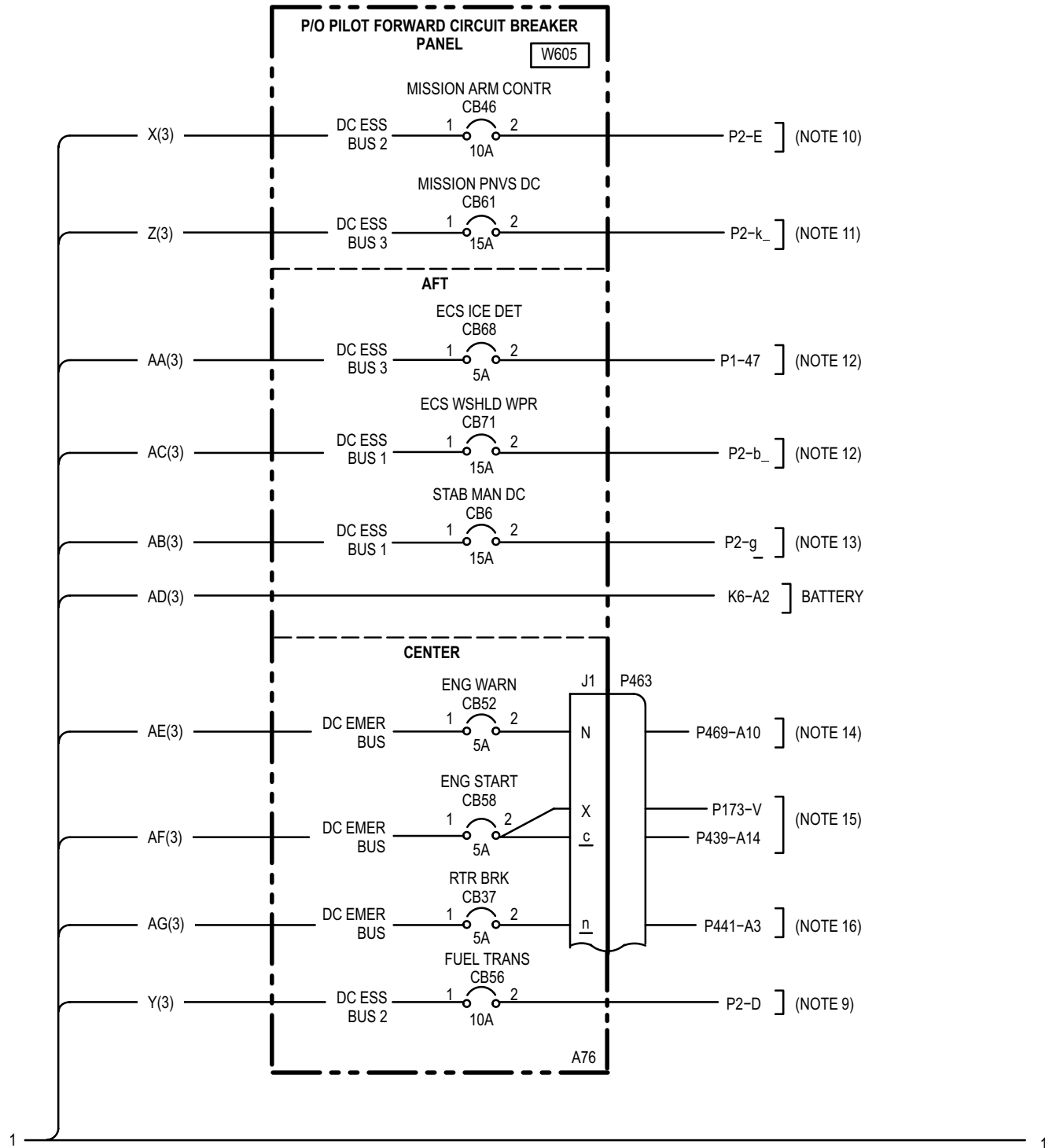


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SHEET 1 OF 6



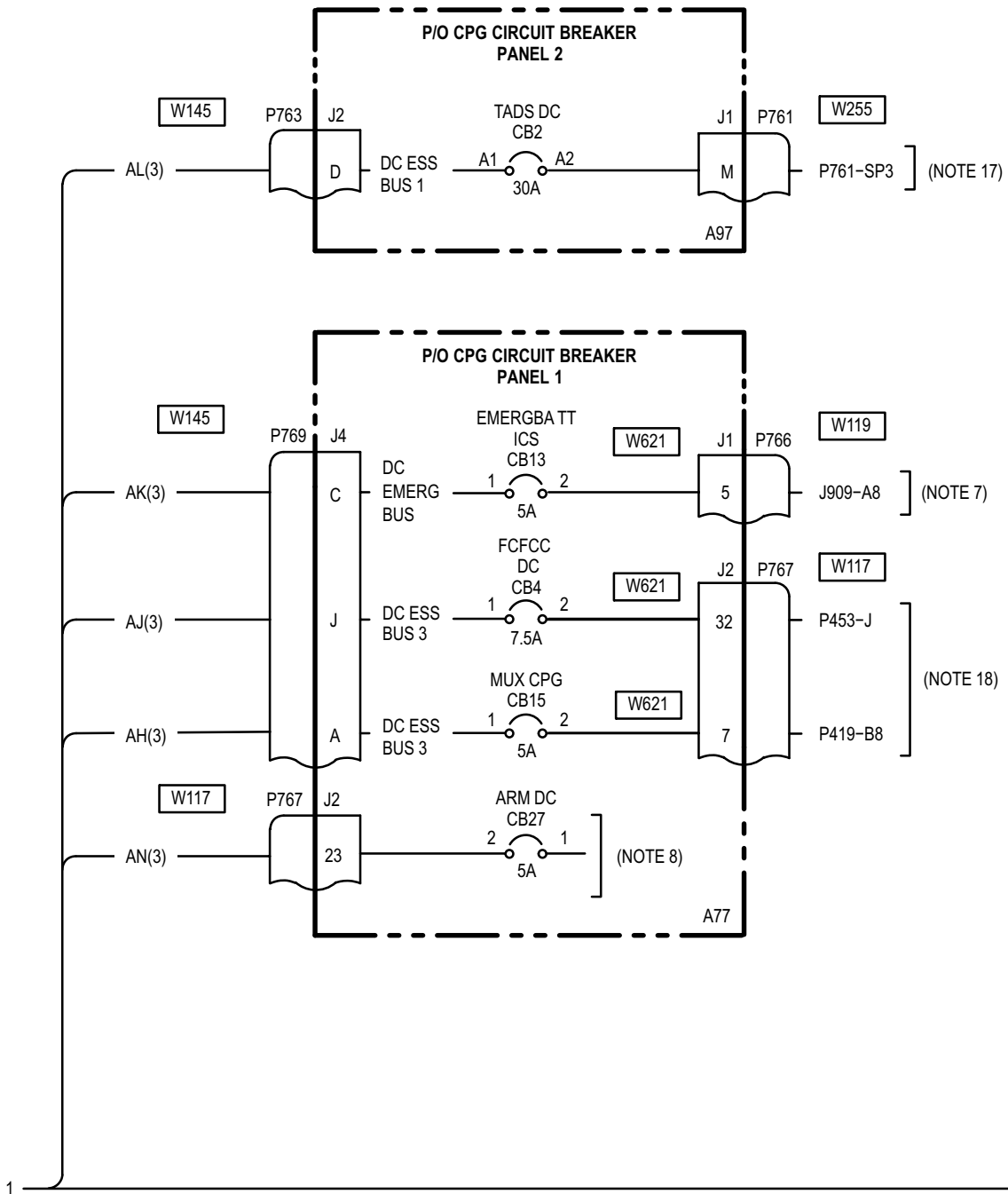
9-24. DC ELECTRICAL POWER GENERATION – WIRING INTERCONNECT DIAGRAM (cont)

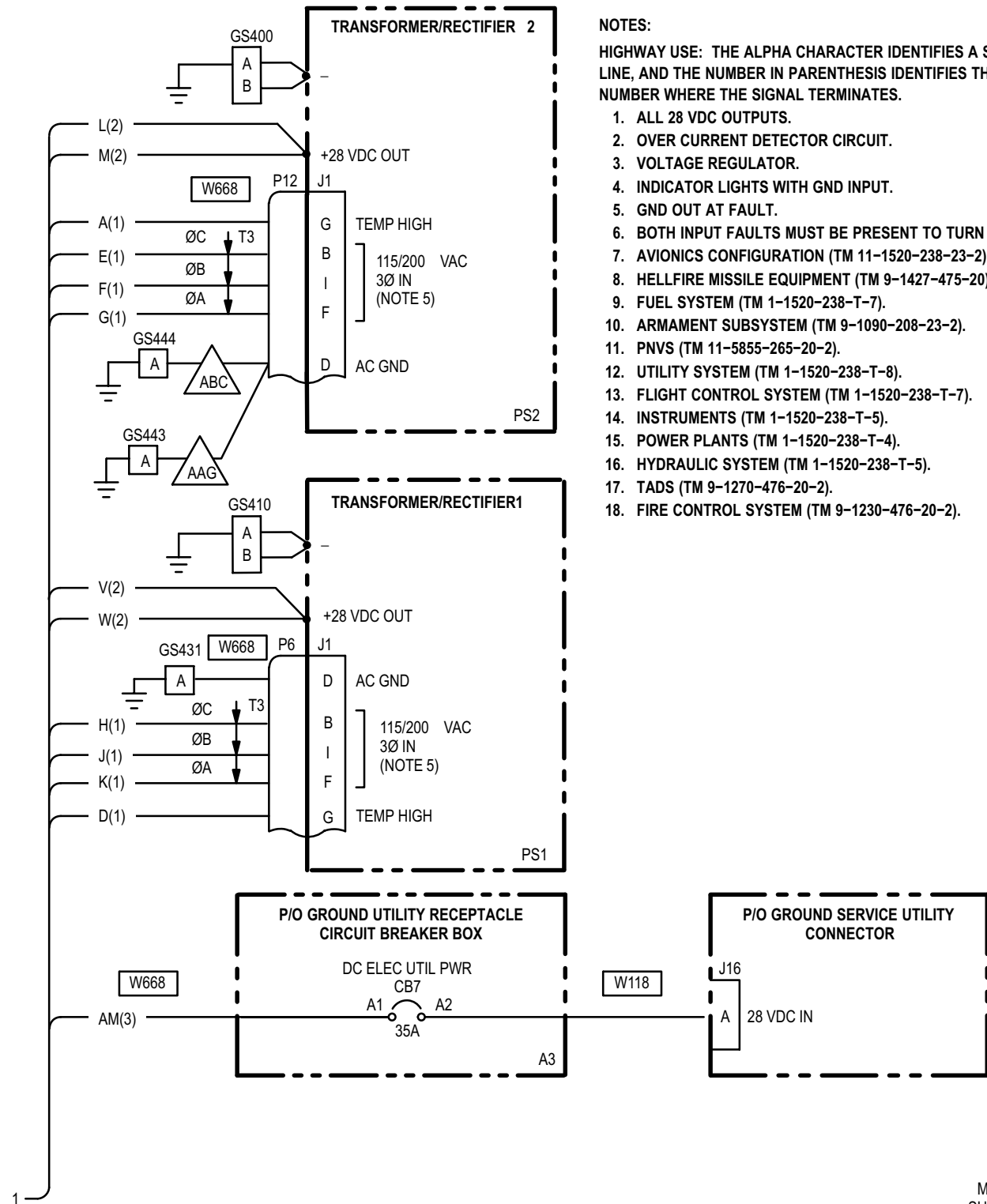




9-24. DC ELECTRICAL POWER GENERATION – WIRING INTERCONNECT DIAGRAM (cont)

9-24





NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

1. ALL 28 VDC OUTPUTS.
2. OVER CURRENT DETECTOR CIRCUIT.
3. VOLTAGE REGULATOR.
4. INDICATOR LIGHTS WITH GND INPUT.
5. GND OUT AT FAULT.
6. BOTH INPUT FAULTS MUST BE PRESENT TO TURN ON LIGHT.
7. AVIONICS CONFIGURATION (TM 11-1520-238-23-2).
8. HELLFIRE MISSILE EQUIPMENT (TM 9-1427-475-20).
9. FUEL SYSTEM (TM 1-1520-238-T-7).
10. ARMAMENT SUBSYSTEM (TM 9-1090-208-23-2).
11. PNVS (TM 11-5855-265-20-2).
12. UTILITY SYSTEM (TM 1-1520-238-T-8).
13. FLIGHT CONTROL SYSTEM (TM 1-1520-238-T-7).
14. INSTRUMENTS (TM 1-1520-238-T-5).
15. POWER PLANTS (TM 1-1520-238-T-4).
16. HYDRAULIC SYSTEM (TM 1-1520-238-T-5).
17. TADS (TM 9-1270-476-20-2).
18. FIRE CONTROL SYSTEM (TM 9-1230-476-20-2).

9-25. RECT 1 INDICATOR – DOES NOT LIGHT

9-25

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution cover removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between:
P18-15 and P440-B2,
(A402)J16-B2 and P14-7.

Does open exist?

YES	Repair open wire. Go to paragraph 9-23.
NO	Go to step 2.

2. On dc contactor, check for open between:
P14-6 and ground,
(A4)J1-7 and (A4)J1-6.

Does open exist?

YES	Replace dc bus tie contactor (TM 55-1520-238-23).
NO	Replace pilot caution/warning paneTM 55-1520-238-23).

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution cover removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between:
P18-16 and P440-B5,
(A402)J16-B5 and P14-4.

Does open exist?

YES Repair open wire.
 Go to paragraph 9-23.

NO Go to step 2.

2. On dc contactor, check for open between:
P14-6 and ground.
(A4)J1-4 and (A4)J1-6.

Does open exist?

YES Replace dc bus tie contactor
 ((TM 1-1520-238-23).

NO Replace pilot caution/warning
 panel ((TM 1-1520-238-23)

END OF TASK

9-27. POWER XFMR RECT 1 CIRCUIT BREAKER (CB1) AND POWER XFMR RECT 2 CIRCUIT BREAKER (CB4) – DO NOT STAY CLOSED

9-27

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution cover removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check (A402):
 dc emergency bus (TB1-1),
 dc essential bus 1 (W1),
 dc essential bus 2 (W2),
 dc essential bus 3 (W3)
 for physical damage (TM 1-1520-238-23).
Is physical damage or foreign material present?

YES	Replace all damaged buses and remove all foreign material from the electrical power distribution box as necessary (TM 1-1520-238-23)
NO	Go to step 2.

2. Check (A402):
 dc emergency bus (TB1-1),
 dc essential bus 1 (W1 and TB1-3),
 dc essential bus 2 (W2 and TB1-2),
 dc essential bus 3 (W3)
 for security of connections (TM 1-1520-238-23).
Are bus and terminal connections secure?

YES	Go to step 3.
NO	Tighten all connections that are not secure (TM 1-1520-238-23).

3. Check area around buses for foreign material.
Is foreign material present?

YES	Remove all foreign material. Go to paragraph 9-23.
NO	Replace dc contactor (TM 1-1520-238-23).

END OF TASK

9-28. POWER XFMR RECT 1 CIRCUIT BREAKER (CB1) – DOES NOT STAY CLOSED

9-28

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – L200 panel removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Detach wires from (PS1)+28 VDC out **POS** terminal. On pilot aft circuit breaker panel, close **POWER XFMR RECT 1** circuit breaker (CB1). **Does POWER XFMR RECT 1 circuit breaker (CB1) stay closed?**

YES Go to step 2.
NO Go to step 3.

2. Detach wires from T/R 1 terminal. Check for short between wire ends and ground. **Does short exist?**

YES Repair shorted wires between: T/R 1 and (PS1) + 28 VDC out. Go to paragraph 9-23.
NO Replace dc bus tie contactor (TM 1-1520-238-23).

3. Open **POWER XFMR RECT 1** circuit breaker (CB1). Check for short between: P3-S and ground, P3-(TS) and ground, P3-(US) and ground. **Does short exist?**

YES Repair shorted wires between : CB1-A2 and P3-S, CB1-B2 and P3-T, CB1-C2 and P3-U. Go to paragraph 9-23.
NO Go to step 4.

4. Detach P6. Check for short between (A402): J3-S and ground, J3-T and ground, J3-U and ground. **Does short exist?**

YES Repair shorted wires between : (A402)J3-S and P6-F, (A402)J3-T and P6-I, (A402)J3-U and P6-B. Go to paragraph 9-23.
NO Replace T/R 1 (TM 1-1520-238-23).

END OF TASK

9-29. POWER XFMR RECT 2 CIRCUIT BREAKER (CB4) – DOES NOT STAY CLOSED

9-29

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – L200 panel removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Detach wires from (PS2)+28 VDC out **POS** terminal. On pilot aft circuit breaker panel, close **POWER XFMR RECT 2** circuit breaker (CB4). **Does POWER XFMR RECT 2 circuit breaker (CB4) stay closed?**

YES Go to step 2.
NO Go to step 3.

2. Detach wires from (A4)T/R 2 terminal. Check for short between wire ends and ground. **Does short exist?**

YES Repair shorted wires between T/R 2 and (PS2) + 28 VDC out. Go to paragraph 9-23.
NO Replace dc bus tie contactor (TM 1-1520-238-23).

3. Open **POWER XFMR RECT 2** circuit breaker (CB4). Check for short between: P4-D and ground, P4-E and ground, P4-F and ground.

Does short exist?

YES Repair shorted wires between: CB4A2 and P4-D, CB4B2 and P4-E, CB4C2 and P4-F. Go to paragraph 9-23.
NO Go to step 4.

4. Detach P12. Check for short between (A402): J4-D and ground, J4-E and ground, J4-F and ground.

Does short exist?

YES Repair shorted wires between: (A402)J4-D and P12-F, (A402)J4-E and P12-I, (A402)J4-F and P12-B. Go to paragraph 9-23.
NO Replace T/R 2 (TM 1-1520-238-23).

END OF TASK

9-30. DC ESSENTIAL BUS 1 – DOES NOT HAVE POWER

9-30

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC at dc contactor bus 1 terminal.
Is voltage present?

YES	Go to step 4.
NO	Go to step 2.

2. Check for open between P14-6 and ground.
Does open exist?

YES	Repair open wire. Go to paragraph 9-23.
NO	Go to step 3.

3. Check for 28 VDC at T/R 1 input terminals on dc contactor.
Is voltage present?

YES	Replace dc contactor (TM 1-1520-238-23).
NO	Repair open wire between T/R 1 positive terminal and T/R 1 input. Go to paragraph 9-23.

4. Check mounting of (A402):
TB1-4 on bus bar W1 for security (TM 55-1520-238-23).
Is mounting secure?

YES	Go to step 5.
NO	Secure terminal board and bus bar (TM 1-1520-238-23).

5. Check (A402):
TB1-3 on bus bar W1 for physical damage (TM 55-1520-238-23).
Is physical damage present?

YES	Replace bus bar (A402)W2 (TM 1-1520-238-23).
NO	Replace terminal board (A402)TB1-2 (TM 1-1520-238-23).

END OF TASK

9-31. POWER – IS NOT AVAILABLE TO ALL DC ESSENTIAL BUS 1 CIRCUIT BREAKERS

9-31

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution cover removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Detach wires from (A402):
TB1-3-C, TB1-3-D, and TB1-3-E.
Check for open between wire ends of (A402):
TB1-3-C and J32-K,
TB1-3-D and J4-M,
TB1-3-E and J4-N.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-23. |
| NO | Go to step 2. |

2. Check for open between wire ends of (A402):
W1-H and A4-G1.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire.
Go to paragraph 9-23. |
| NO | Replace dc bus tie contactor
(TM 1-1520-238-23). |

END OF TASK

9-32. DC ESSENTIAL BUS 2 – DOES NOT HAVE POWER

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution cover removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC at dc contactor bus 2 terminal.

Is voltage present?

- YES Go to step 4.
- NO Go to step 2.

2. Check for open between P14-6 and ground.

Does open exist?

- YES Repair open wire. Go to paragraph 9-23.
- NO Go to step 3.

3. Check for 28 VDC at T/R 1 and T/R 2 input terminals on dc contactor.

Is voltage present?

- YES Replace dc contactor (TM 1-1520-238-23).
- NO Repair open wire between: T/R 1 positive terminal and T/R 1 input, T/R 2 positive terminal and T/R 2 input. Go to paragraph 9-23.

4. Check mounting of (A402): TB1-2 on bus bar W2 for security ().

Is mounting secure?

- YES Go to step 5.
- NO Secure terminal board and bus bar (TM 1-1520-238-23).

5. Check (A402): TB1-2 on bus bar W2 for physical damage (TM 55-1520-238-23).

Is physical damage present?

- YES Replace bus bar (A402)W2 (TM 1-1520-238-23).
- NO Replace terminal board (A402)TB1-2 (TM 1-1520-238-23).

END OF TASK

9-33. POWER – IS NOT AVAILABLE TO ALL DC ESSENTIAL BUS 2 CIRCUIT BREAKERS

9-33

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution cover removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Detach wires from (A402):
TB1-2-D and TB1-2-F.
Check for open between wire end of (A402):
TB1-2-D and J4-J,
TB1-2-F and J4-F.
Does open exist?

YES	Repair open wire. Go to paragraph 9-23.
NO	Go to step 2.

2. Check for open between wire ends of (A402):
W1-H and A4-G2.
Does open exist?

YES	Repair open wire. Go to paragraph 9-23.
NO	Replace dc bus tie contactor (TM 1-1520-238-23).

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution cover removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Check for open between (A402):
TB1-2-K and TB1-1-D.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-23. |
| NO | Replace (A402)CR2
(TM 1-1520-238-23). |

END OF TASK

9-35. POWER – IS NOT AVAILABLE TO ALL DC ESSENTIAL BUS 3 CIRCUIT BREAKERS

9-35

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution cover removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

■ Detach wire (A402)W3-I. Check wire ends for open between (A402):

■ W3-I and J4-K,
W3-I and J4-L,
W3-I and J32-J.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-23. |
| NO | Repair open wire between (A402):
W3-I and J32-H.
Go to paragraph 9-23. |

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution cover removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Detach wire (A402):
 TB1-1-B and TB1-1-C. Check for open between wire ends of (A402):
 TB1-1-C and J29-2,
 TB1-1-C and J29-3,
 TB1-1-B and J29-1.

Does open exist?

- YES Repair open wire.
 Go to paragraph 9-23.

- NO Repair open between (A402):
 TB1-1-B and J32-G.
 Go to paragraph 9-23.

END OF TASK

9-37. RECT 1 INDICATOR ON PILOT CAUTION/WARNING PANEL – IS LIGHTED

9-37

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – L200 panel removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC at T/R 1 POS (+) output terminal.

Is voltage present?

YES	Go to step 2.
NO	Go to step 6.

2. Check for open between T/R 1 POS (+) output terminal and dc contactor POS (+) input terminal.

Does open exist?

YES	Repair open wire. Go to paragraph 9-23.
NO	Go to step 3.

3. Detach P440.

Is RECT 1 indicator lighted?

YES	Go to step 4.
NO	Go to step 5.

4. Check for short between: P440-B2 and ground, P18-15 and ground.

Does short exist?

YES	Repair shorted wire. Go to paragraph 9-23.
NO	Go to paragraph 9-333 to troubleshoot pilot caution/warning system.

5. Check for short between (A402): J16-B2 and ground, P14-7 and ground.

Does short exist?

YES	Repair shorted wire. Go to paragraph 9-23.
NO	Replace dc bus tie contactor (TM 1-1520-238-23).

6. Check for open between: T/R 1 negative (-) terminal and ground, P6-D and ground.

Does open exist?

YES	Repair open wire. Go to paragraph 9-23.
NO	Go to step 7.

7. Check for 115 VAC at: P6-B, P6-I, P6-F.

Is voltage present?

YES	Replace T/R 1 (TM 1-1520-238-23).
NO	Go to step 8.

9-37. RECT 1 INDICATOR ON PILOT CAUTION/WARNING PANEL – IS LIGHTED (cont)

9-37

8. Check for 115 VAC at:

P3-S,

P3-T,

P3-U.

Is voltage present?

- | | |
|-----|--|
| YES | Repair open wire between:
(A402)J3-S and P6-F,
(A402)J3-T and P6-I,
(A402)J3-U and P6-B.
Go to paragraph 9-23. |
| NO | Go to paragraph 9-304 to
troubleshoot circuit protection
system (dc emergency bus –
CPG station). |

END OF TASK

9-38. HOT RECT 1 INDICATOR – IS LIGHTED

9-38

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Detach P18 from pilot caution/warning panel.
Does indicator stay lighted?

YES	Replace pilot caution/warning panel (TM 1-1520-238-23).
NO	Go to step 2.

2. Detach P440. Check for short between P18-42 and ground.
Does short exist?

YES	Repair shorted wire between P18-42 and P440-B4. Go to paragraph 9-23.
NO	Go to step 3.

3. Detach P6 from T/R 1. Check for short between P6-G and ground.
Does short exist?

YES	Repair shorted wire between P6-G and (A402)J16-B4. Go to paragraph 9-23.
NO	Replace T/R 1 (TM 1-1520-238-23).

END OF TASK

9-39. RECT 2 INDICATOR ON PILOT CAUTION/WARNING PANEL – IS LIGHTED

9-39

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – R200 panel removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC at T/R 2 positive (+) output terminal.

Is voltage present?

YES Go to step 4.
NO Go to step 2.

2. Check for open between: T/R 2 negative (-) terminal and ground, P12 and ground.

Does open exist?

YES Repair open wire.
Go to paragraph 9-23.
NO Go to step 3.

3. Check for 115 VAC at: P12-B, P12-I, P12-F.

Is voltage present?

YES Replace T/R 2 (TM 1-1520-238-23).
NO Go to step 4.

4. Check for 115 VAC at: P4-F, P4-E, P4-D.

Is voltage present?

YES Repair open wire between: (A402)J4-F and P12-B, (A402)J4-E and P12-I, (A402)J4-D and P12-F. Go to paragraph 9-23.
NO Go to paragraph 9-150 to troubleshoot circuit protection system (ac essential bus 1 – pilot station).

5. Check for open between T/R 2 POS (+) output terminal and dc contactors POS (+) input terminal.

Does open exist?

YES Repair open wire.
Go to paragraph 9-23.
NO Go to step 6.

6. Detach P440.

Is RECT 2 indicator lighted?

YES Go to step 7.
NO Go to step 8.

7. Check for short to ground between P440-B5 and P18-16.

Does short exist?

YES Repair shorted wire.
Go to paragraph 9-23.
NO Go to paragraph 9-333 to troubleshoot pilot caution/warning system.

9-39. RECT 2 INDICATOR ON PILOT CAUTION/WARNING PANEL – IS LIGHTED (cont)

9-39

8. Check for short between (A402):

J16-B5 and ground,

P14-4 and ground.

Does short exist?

- | | |
|-----|---|
| YES | Repair shorted wire.
Go to paragraph 9-23. |
| NO | Replace dc bus tie contactor
(TM 1-1520-238-23). |

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Detach P18 from pilot caution/warning panel.

Does indicator stay lighted?

YES	Replace pilot caution/warning panel (TM 1-1520-238-23).
NO	Go to step 2.

2. Detach P440. Check for short between P18-43 and ground.

Does short exist?

YES	Repair shorted wire between P18-43 and P440-B5. Go to paragraph 9-23.
NO	Go to step 3.

3. Detach P12 from T/R 2. Check for short between P12-G and ground.

Does short exist?

YES	Repair shorted wire between P12-G and (A402)J16-B5. Go to paragraph 9-23.
NO	Replace T/R 2 (TM 1-1520-238-23).

END OF TASK

9-41. BATTERY – MAINTENANCE OPERATIONAL CHECK

9-41

Tools:

Nomenclature	Part Number
Tool Kit, Electrical Repairer's	SC518099CLA06

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

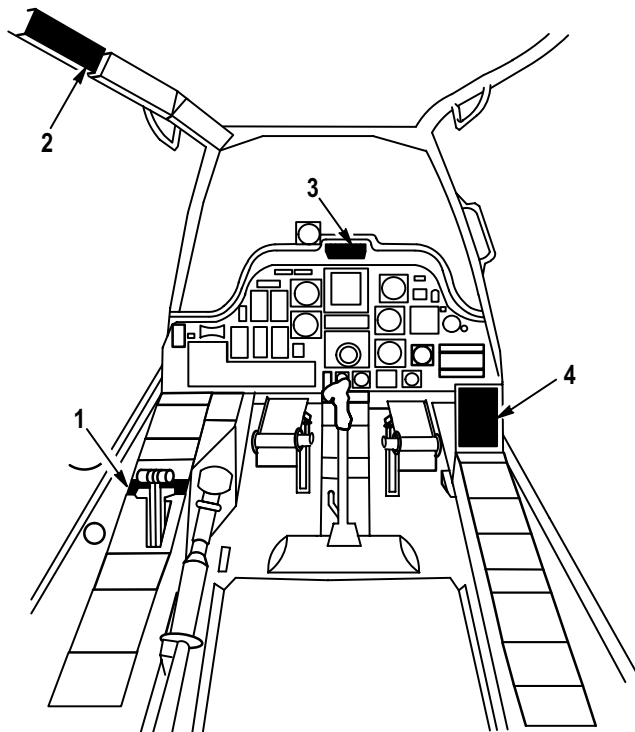
TM 11-1520-238-23-2
 TM 1-1520-238-23

Equipment Conditions:

Ref	Condition
TM 1-1520-238-23	Helicopter safed Battery connected Access provisions – R295 door opened

NOTE

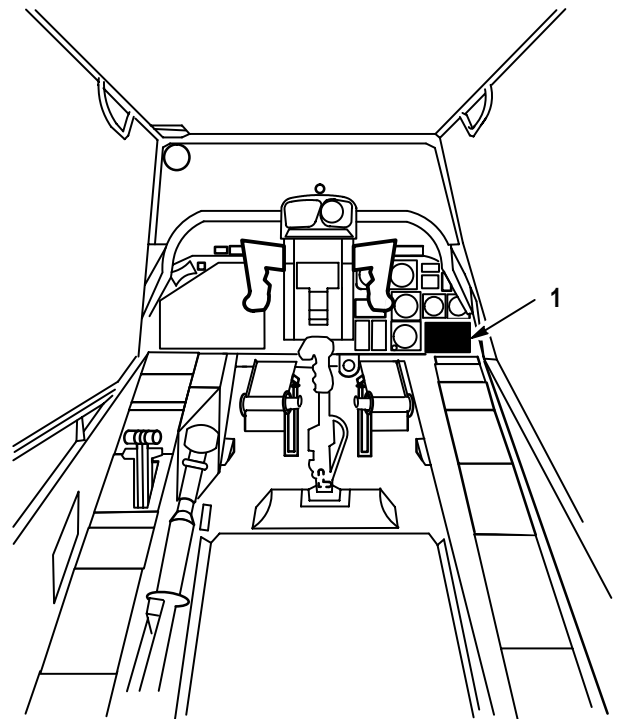
Refer to pilot station (fig. 9-109) and CPG station (fig. 9-110) for cockpit configuration and equipment.



- 1. PILOT ELEC PWR PANEL
- 2. PILOT AFT CIRCUIT BREAKER PANEL
- 3. PILOT MASTER CAUTION / WARNING PANEL
- 4. PILOT CAUTION / WARNING PANEL

M69-075

Figure 9-109. Pilot Station



- 1. CPG CAUTION / WARNING PANEL

M69-076

Figure 9-110. CPG Station

WARNING

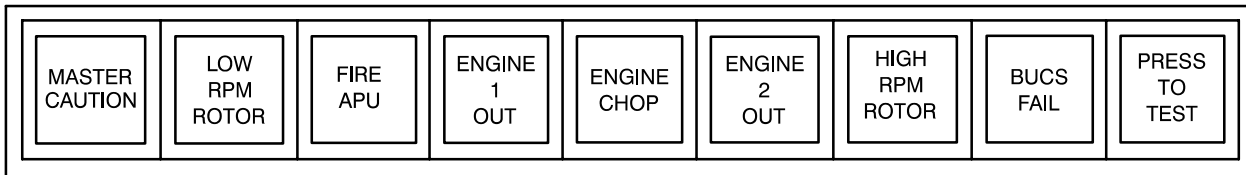
Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

NOTE

If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.

1. Perform the maintenance operational check as follows:

Task	Result
a. On pilot master caution/warning panel (fig. 9-111) and pilot caution/warning panel (fig. 9-112), check that all caution/warning indicators are off.	If caution/warning indicators are lighted, go to paragraph 9-43.



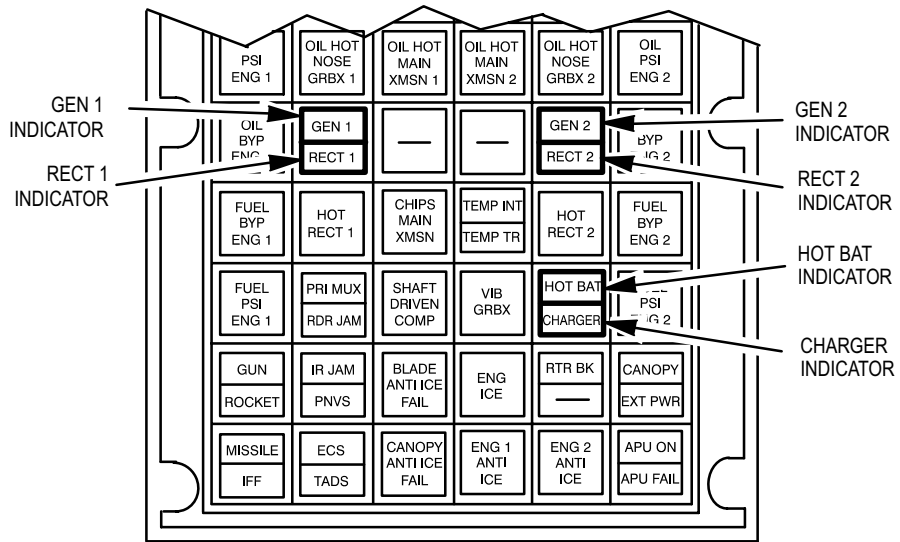
M69-077

Figure 9-111. Master Caution/Warning Panel

- b. On pilot aft circuit breaker panel (fig. 9-113), close **POWER BATT CHGR AC** circuit breaker (CB86) and **POWER BATT CHGR DC** circuit breaker (CB5).
 - If **POWER BATT CHGR AC** circuit breaker (CB86) does not stay closed, refer to TM 11-1520-238-23-2 to troubleshoot the battery charger.
 - If **POWER BATT CHGR DC** circuit breaker (CB5) does not stay closed refer to TM 11-1520-238-23-2 to troubleshoot the battery charger.

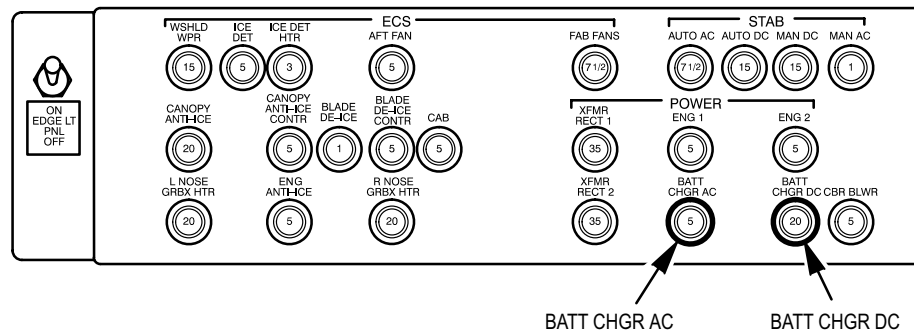
9-41. BATTERY – MAINTENANCE OPERATIONAL CHECK (cont)

9-41



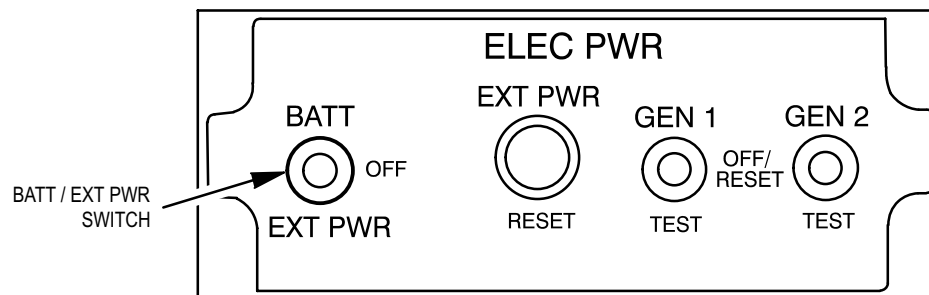
M69-080

Figure 9-112. Pilot Caution/Warning Panel



M69-078

Figure 9-113. Pilot Aft Circuit Breaker Panel



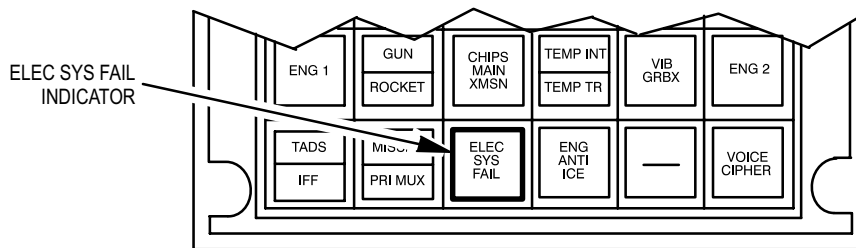
M69-079

Figure 9-114. Pilot ELEC PWR Panel

9-41. BATTERY – MAINTENANCE OPERATIONAL CHECK (cont)

9-41

Task	Result
c. On pilot ELEC PWR panel (fig. 9-114), place BATT/EXT PWR switch to BATT .	If POWER BATT CHGR AC circuit breaker (CB86) or POWER BATT CHGR DC circuit breaker (CB5) do not stay closed, replace battery charger (TM 11-1520-238-23-2). If HOT BAT or CHARGER indicators are lighted, refer to TM 11-1520-238-23-2 to troubleshoot the battery charger.
d. On pilot master caution/warning panel (fig. 9-111), press and hold PRESS TO TEST indicator. Check that caution/ warning indicators are lighted.	If no caution/warning indicators are lighted, go to paragraph 9-44.
e. On pilot ELEC PWR panel, check that GEN 1 , GEN 2 , RECT 1 , and RECT 2 indicators are lighted.	If GEN 1 indicator is not lighted, replace lamp (TM 55-1520-238-23). If lamp still does not light, go to paragraph 9-12 to troubleshoot ac electrical power generation. If GEN 2 indicator is not lighted, replace lamp (TM 55-1520-238-23). If lamp still does not light, go to paragraph 9-12 to troubleshoot ac electrical power generation.
f. On CPG caution/warning panel (fig. 9-115), check ELEC SYS FAIL indicator is lighted.	If ELEC SYS FAIL indicator is not lighted, replace lamp (TM 55-1520-238-23). If lamp still does not light, go to paragraph 9-364 to troubleshoot CPG caution/warning system.



M69-081

Figure 9-115. CPG Caution/Warning Panel

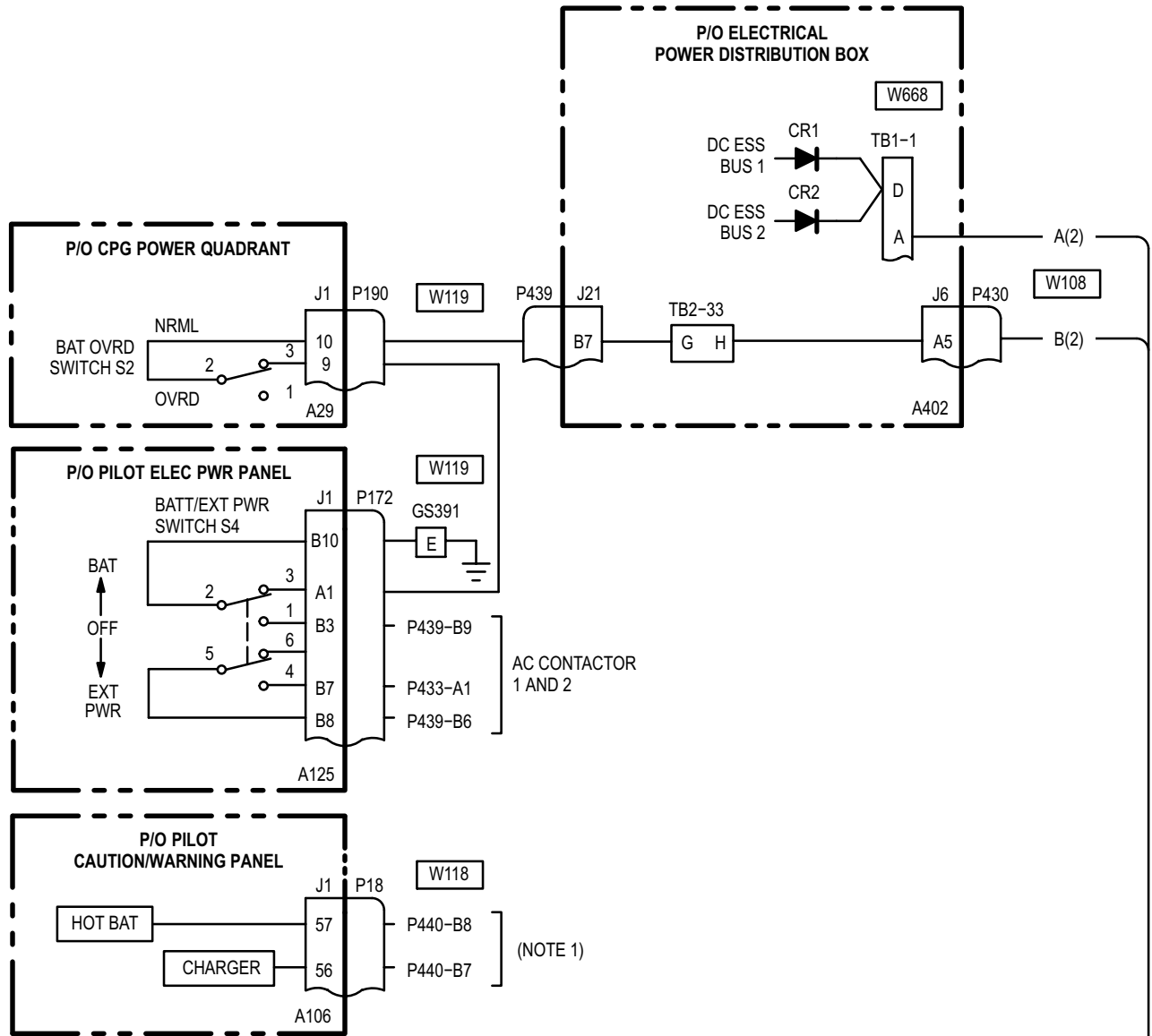
g. On pilot **ELEC PWR** panel, place **BATT/EXT PWR** switch to **OFF**.

2. Disconnect battery (TM 55-1520-238-23).
3. Secure R295 door (TM 55-1520-238-23).

END OF TASK

9-42. BATTERY - WIRING INTERCONNECT DIAGRAM

9-42



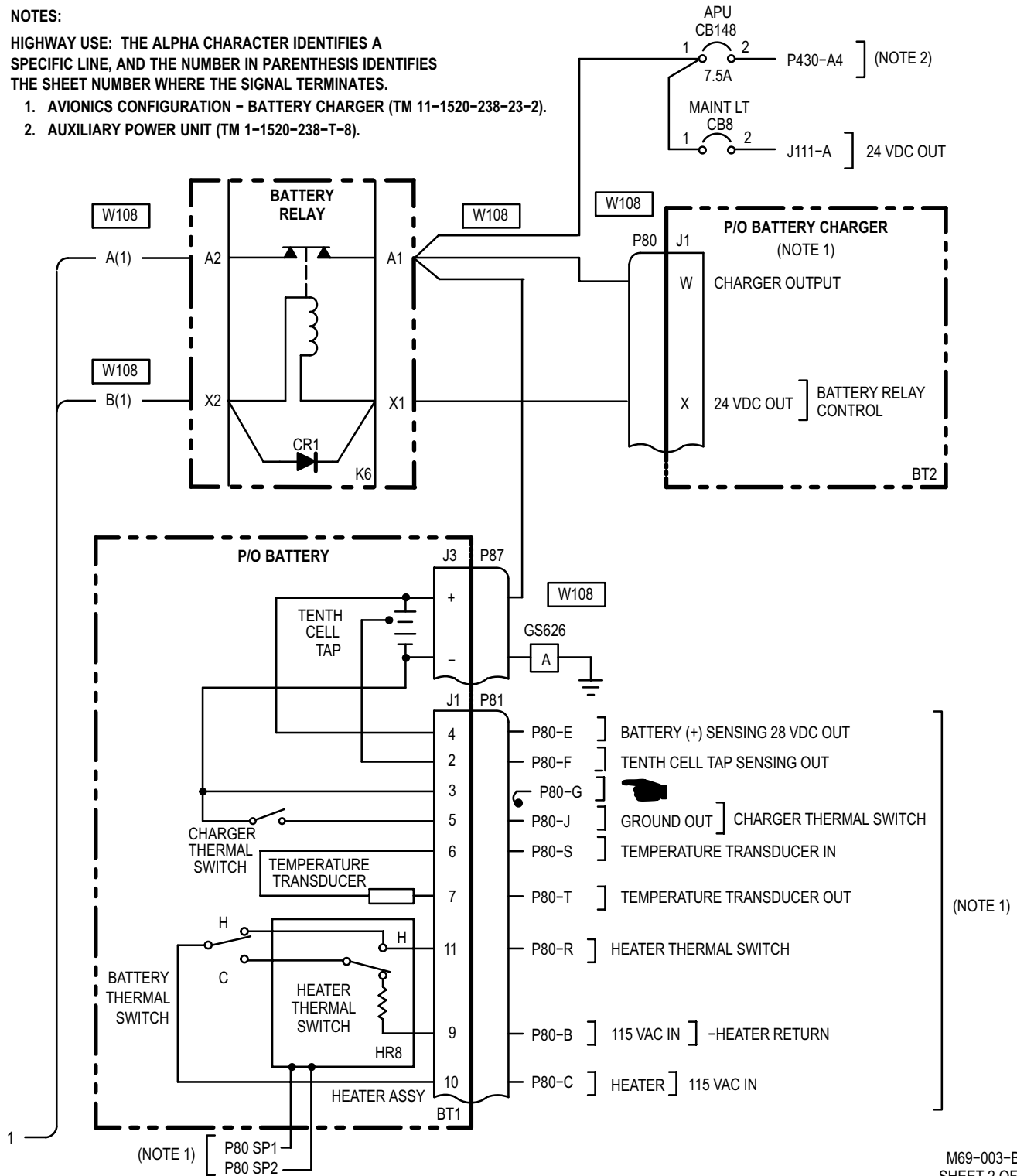
1

9-42. BATTERY - WIRING INTERCONNECT DIAGRAM (cont)

NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

1. AVIONICS CONFIGURATION - BATTERY CHARGER (TM 11-1520-238-23-2).
2. AUXILIARY POWER UNIT (TM 1-1520-238-T-8).



9-43. CAUTION/WARNING INDICATORS – ARE LIGHTED WITH POWER OFF AND BATTERY CONNECTED

9-43

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

3. Check for short between (A125)J1-A1 and ground.

Does short exist?

YES	Replace pilot ELEC PWR panel (TM 1-1520-238-23)
NO	Replace CPG power quadrant (TM 1-1520-238-23.)

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Detach P190 and P172. Check for short between ground and P190-10.

Does short exist?

YES	Repair shorted wire between: P190-10 and P439-B7, P430-A5 and wire end of K6-X2, (A402)J21-B7 and (A402)J6-A5. Go to paragraph 9-41.
NO	Go to step 2.

2. Check for short between P190-9 and ground.

Does short exist?

YES	Repair shorted wire between P190-9 and P172-A1. Go to paragraph 9-41.
NO	Go to step 3.

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 11-1520-238-23-1
TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – R295 door opened



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 24 VDC at positive terminal of (BT1)J3.

Is voltage present?

- YES Go to step 3.
- NO Go to step 2.

2. Detach wire from battery relay K6-A1. Open circuit breakers **MAINT LT** (CB8) and **APU** (CB148). Check for short between: P87 positive terminal and ground, CB8-1 and ground, P80-W and ground.

Does short exist?

- YES Repair shorted wire and replace battery (TM 1-1520-238-23)
- NO Replace battery (TM 1-1520-238-23)

3. Check for open between: P87 negative terminal and ground, P87 positive terminal and K6-A1, K6-A2 and (A402)TB1-1-A.

Does open exist?

- YES Repair open wire. Go to paragraph 9-41.
- NO Go to step 4.

4. Check for open between K6-X1 and K6-X2.

Does open exist?

- YES Replace battery relay K6 (TM 1-1520-238-23)
- NO Go to step 5.

5. Check for 24 VDC at battery relay K6-X1.

Is voltage present?

- YES Go to step 7.
- NO Go to step 6.

6. Check for open between:

K6-1 and P80-W,
K6-X1 and P80-X.

Does open exist?

- YES Repair open wire. Go to paragraph 9-41.
- NO Replace battery charger (TM 11-1520-238-23-1).

9-44. CAUTION/WARNING INDICATORS – ARE NOT LIGHTED WITH BATTERY ON (cont)

9-44

7. Check for open between:

K6-X2 and P430-A5,
P439-B7 and P190-10,
P190-9 and P172-A1,
P172-B10 and ground,
(A402)J6-A5 and (A402)J21-B7.

Does open exist?

YES Repair open wire.
 Go to paragraph 9-41.

NO Go to step 8.

8. On CPG power quadrant panel, place **BAT OVRD** switch to **NRML**. Check for open between (A29)J1-9 and (A29)J1-10.

Does open exist?

YES Replace CPG power quadrant
 (TM 1-1520-238-23).

NO Go to step 9.

9. On pilot **ELEC PWR** panel set **BATT/EXT PWR** switch to **BATT**. Check for open between (A125)J1-A1 and (A125)J1-B10.

Does open exist?

YES Replace pilot **ELEC PWR** panel
 (TM 1-1520-238-23).

NO Replace battery relay K6
 (TM 1-1520-238-23).

END OF TASK

Tools:

Nomenclature	Part Number
Tool Kit, Electrical Repairer's	SC518099CLA06

Equipment Conditions:

Ref	Condition
TM 1-1520-238-10	Helicopter safed External power application – Electrical Access provisions – B60R door opened

Personnel Required:

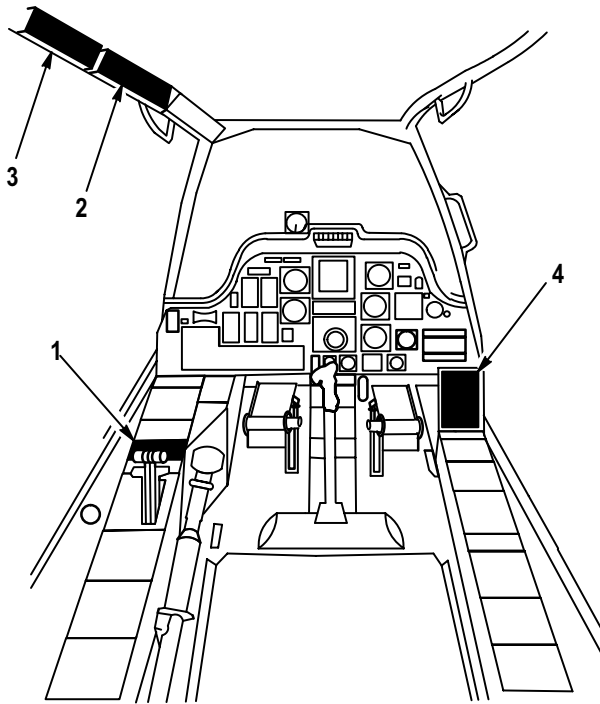
68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-10

NOTE

Refer to pilot station (fig. 9-116) for configuration and component locations.



1. PILOT ELEC PWR PANEL
2. PILOT CENTER CIRCUIT BREAKER PANEL
3. PILOT AFT CIRCUIT BREAKER PANEL
4. PILOT CAUTION / WARNING PANEL

M69-087

Figure 9-116. Pilot Station

NOTE

If any of the following circuit breakers do not stay closed, continue with this power up procedure. Circuit breaker troubleshooting is included in the maintenance operational check.

1. On pilot circuit breaker panels (fig. 9-117), check that the following circuit breakers are closed:

<u>Circuit Breaker Panel</u>	<u>Circuit Breaker</u>
Aft	POWER XFMR RECT 1
Aft	POWER XFMR RECT 2
Center	LT CAUT

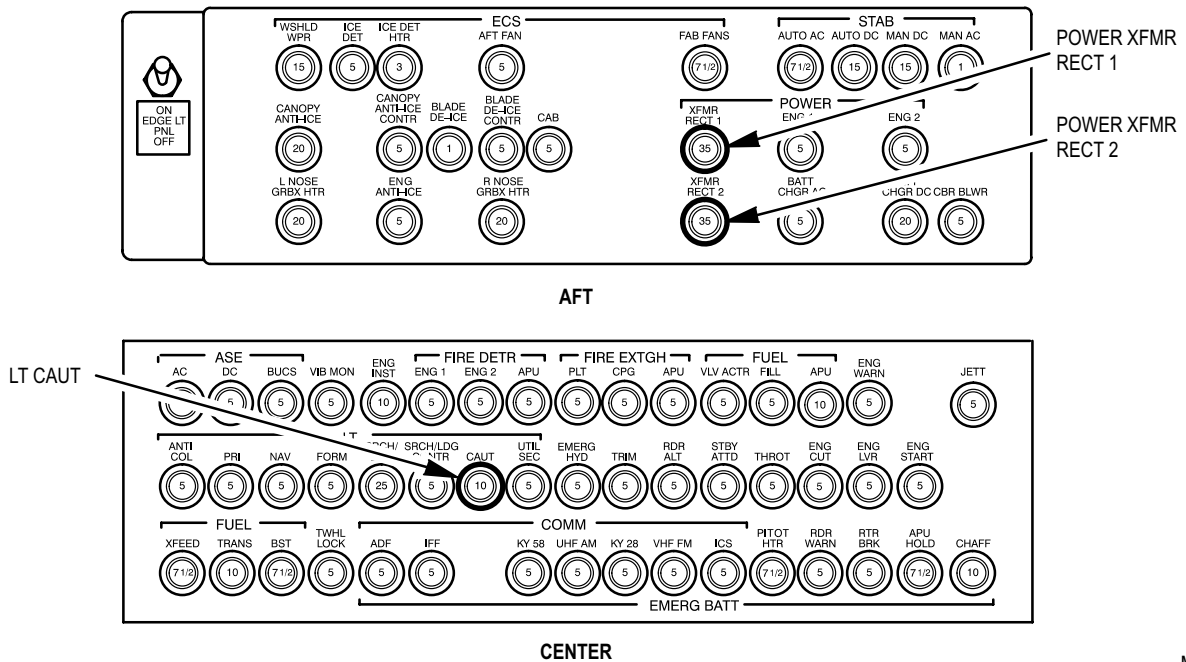
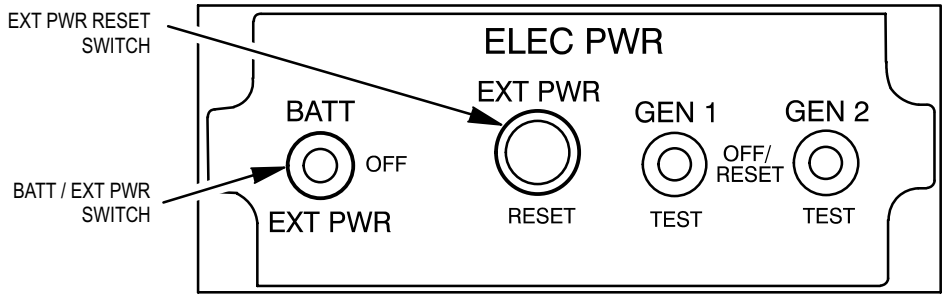


Figure 9-117. Pilot Circuit Breaker Panels

2. Perform the external power power up as follows:

<u>Task</u>	<u>Result</u>
a. On pilot ELEC PWR panel (fig. 9-118), place BATT/EXT PWR switch to EXT PWR . Check that power comes on.	If power does not come on, press the EXT PWR RESET switch. If power still does not come on, go to paragraph 9-49 to troubleshoot external power and ground service utility receptacle.

M69-089



M69-088

Figure 9-118. Pilot ELEC PWR Panel

END OF TASK

9-46. EXTERNAL POWER – POWER DOWN

9-46**Tools:**

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-10

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-45	EXTERNAL POWER – POWER UP completed

NOTE

Refer to pilot station (fig. 9-116) for configuration and component locations.

1. On pilot **ELEC PWR** panel (fig. 9-118), place **BATT/EXT PWR** switch to **OFF**.
2. Remove external power – electrical (TM 55-1520-238-23).
3. Secure door B60R (TM 55-1520-238-23).

END OF TASK

9-47. EXTERNAL POWER AND GROUND SERVICE UTILITY RECEPTACLE – MAINTENANCE OPERATIONAL CHECK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 55-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-45	EXTERNAL POWER – POWER UP completed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

NOTE

- Refer to pilot station (fig. 9-116) for configuration and component locations.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.

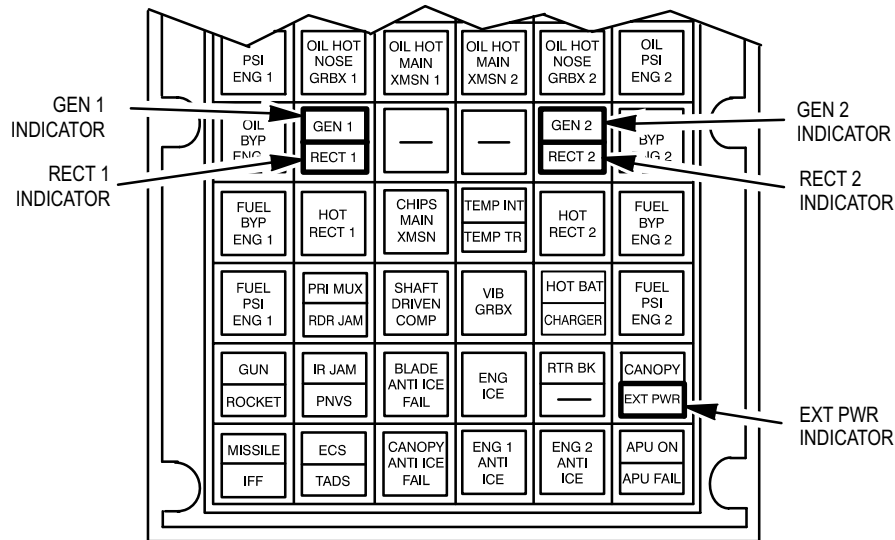
1. Perform the maintenance operational check as follows:

Task	Result
a. On pilot circuit breaker panel (fig. 9-117), check that POWER XFMR RECT 1 circuit breaker (CB1), POWER XFMR RECT 2 circuit breaker (CB4), and LT CAUT circuit breaker (CB21) are closed.	If POWER XFMR RECT 1 circuit breaker (CB1) does not stay closed, go to paragraph 9-23 to troubleshoot dc electrical power generation. If POWER XFMR RECT 2 circuit breaker (CB4) does not stay closed, go to paragraph 9-23 to troubleshoot dc electrical power generation. If LT CAUT circuit breaker does (CB21) not stay closed, go to paragraph 9-333 to troubleshoot pilot caution/warning system.

9-47. EXTERNAL POWER AND GROUND SERVICE UTILITY RECEPTACLE – MAINTENANCE OPERATIONAL CHECK (cont)

9-47

Task	Result
<p>b. On pilot caution/warning panel (fig. 9-119), check that GEN 1, GEN 2 and EXT PWR indicators are lighted.</p>	<p>If lights are not lighted, go to paragraph 9-333 to troubleshoot pilot caution/warning system.</p> <p>If GEN 1 indicator is not lighted, replace lamp (TM 55-1520-238-23). If lamp still does not light, go to paragraph 9-12 to troubleshoot ac electrical power generation.</p> <p>If GEN 2 indicator is not lighted, replace lamp (TM 55-1520-238-23). If lamp still does not light, go to paragraph 9-12 to troubleshoot ac electrical power generation.</p> <p>If EXT PWR indicator is not lighted, replace lamp (TM 55-1520-238-23). If lamp still does not light, go to paragraph 9-50.</p>
<p>c. On pilot caution/warning panel, check that RECT 1 and RECT 2 indicators are not lighted.</p>	<p>If RECT 1 indicator is lighted, go to paragraph 9-23 to troubleshoot dc electrical power generation.</p> <p>If RECT 2 indicator is lighted, go to paragraph 9-23 to troubleshoot dc electrical power generation.</p> <p>If both indicators are lighted, go to paragraph 9-51.</p>



M69-091A

Figure 9-119. Pilot Caution/Warning Panel

9-47. EXTERNAL POWER AND GROUND SERVICE UTILITY RECEPTACLE – MAINTENANCE OPERATIONAL CHECK (cont)

9-47

Task	Result
<p>d. Check for 115 VAC from AC ELEC UTIL PWR circuit breaker (CB6) on ground service utility receptacle (fig. 9-120), at J16-B, J16-F, and J16-E.</p>	<p>If 115 VAC is not present from AC ELEC UTIL PWR circuit breaker (CB6), go to paragraph 9-52.</p>
<p>e. Check for 28 VDC from DC ELEC UTIL PWR circuit breaker (CB7) on ground service utility receptacle at J16-A.</p>	<p>If 28 VDC is not present from DC ELEC UTIL PWR circuit breaker (CB7), go to paragraph 9-53.</p>

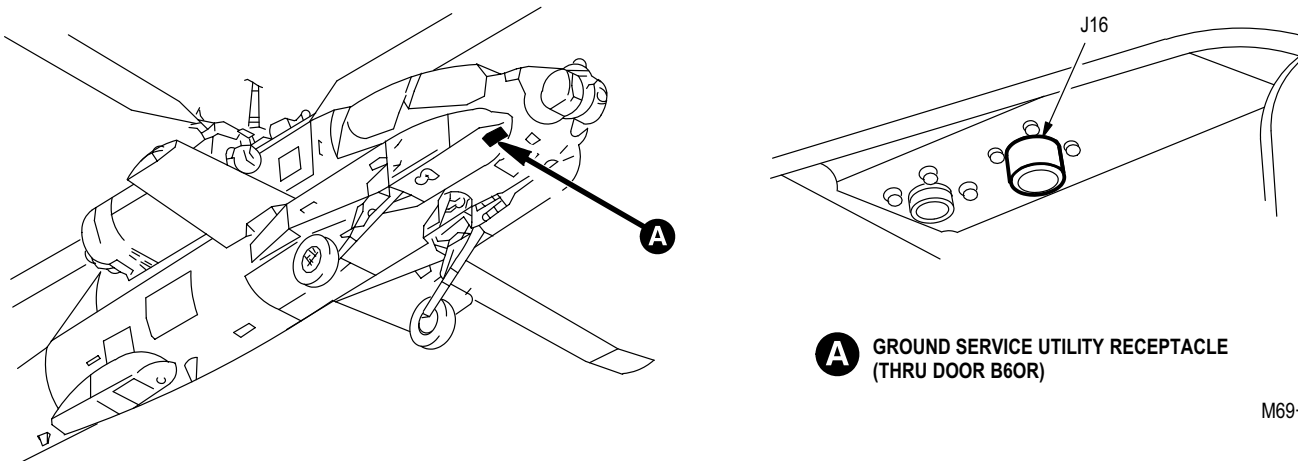


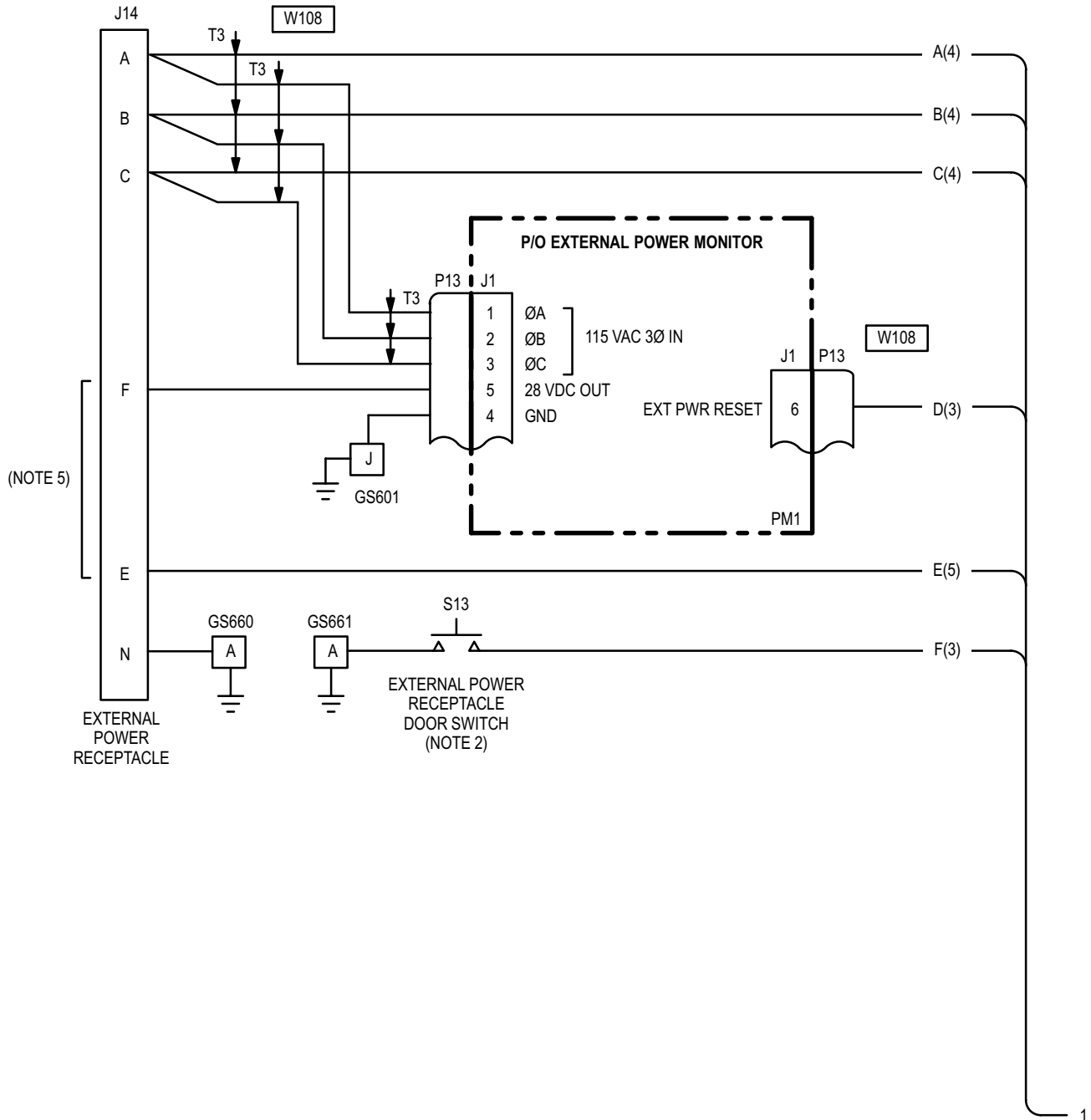
Figure 9-120. Ground Service Utility Receptacle

- f. Perform EXTERNAL POWER - POWER DOWN (para 9-46).
- g. On pilot **ELEC PWR** panel (fig. 9-118), set **BATT/EXT PWR** switch to **BATT** position.
- h. On pilot caution/warning panel (fig. 9-119), check that **EXT PWR** indicator is not lighted. If **EXT PWR** indicator is lighted, go to paragraph 9-54.
- i. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF**.

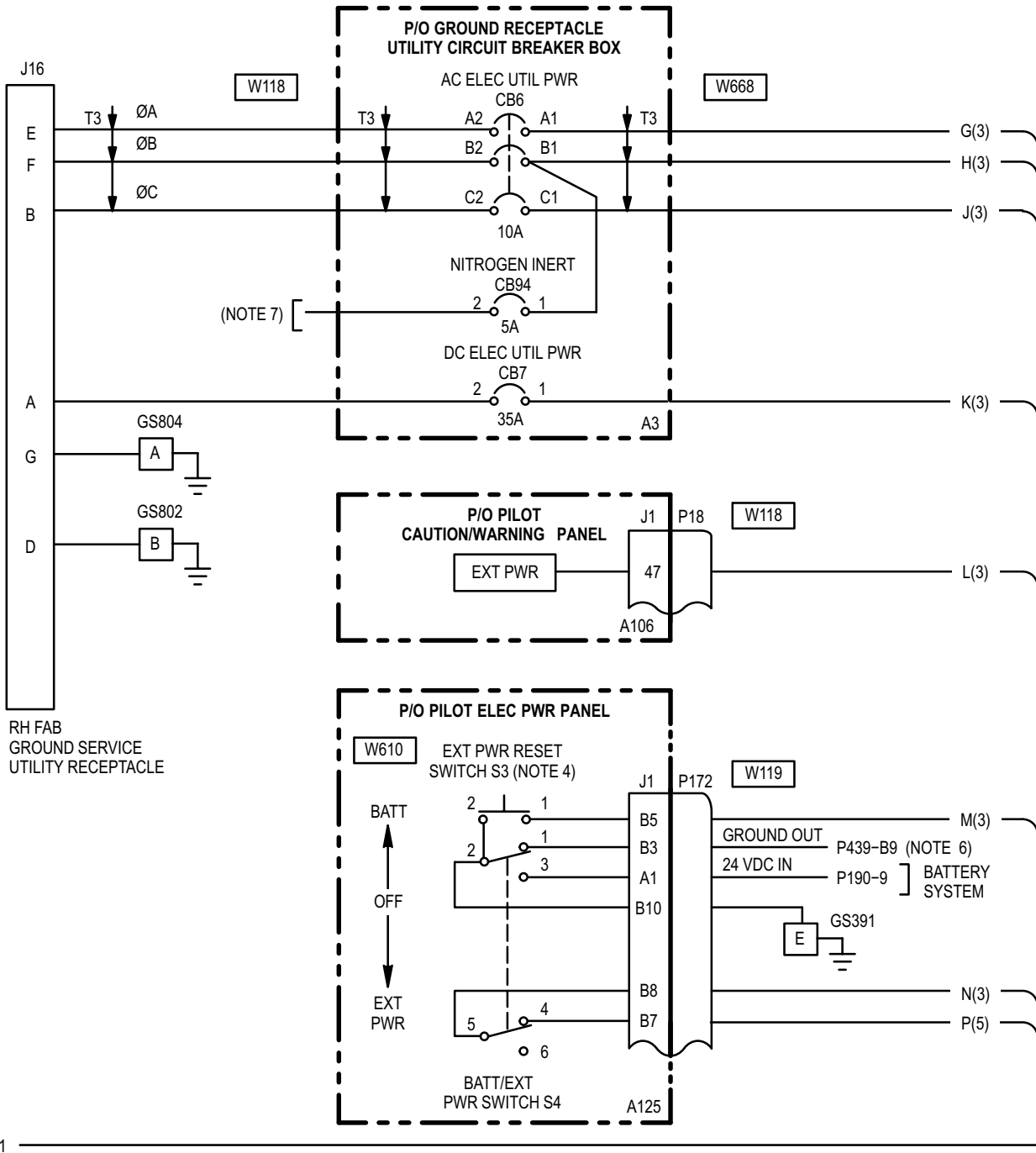
END OF TASK

9-48. EXTERNAL POWER AND GROUND SERVICE UTILITY RECEPTACLE - WIRING INTERCONNECT DIAGRAM

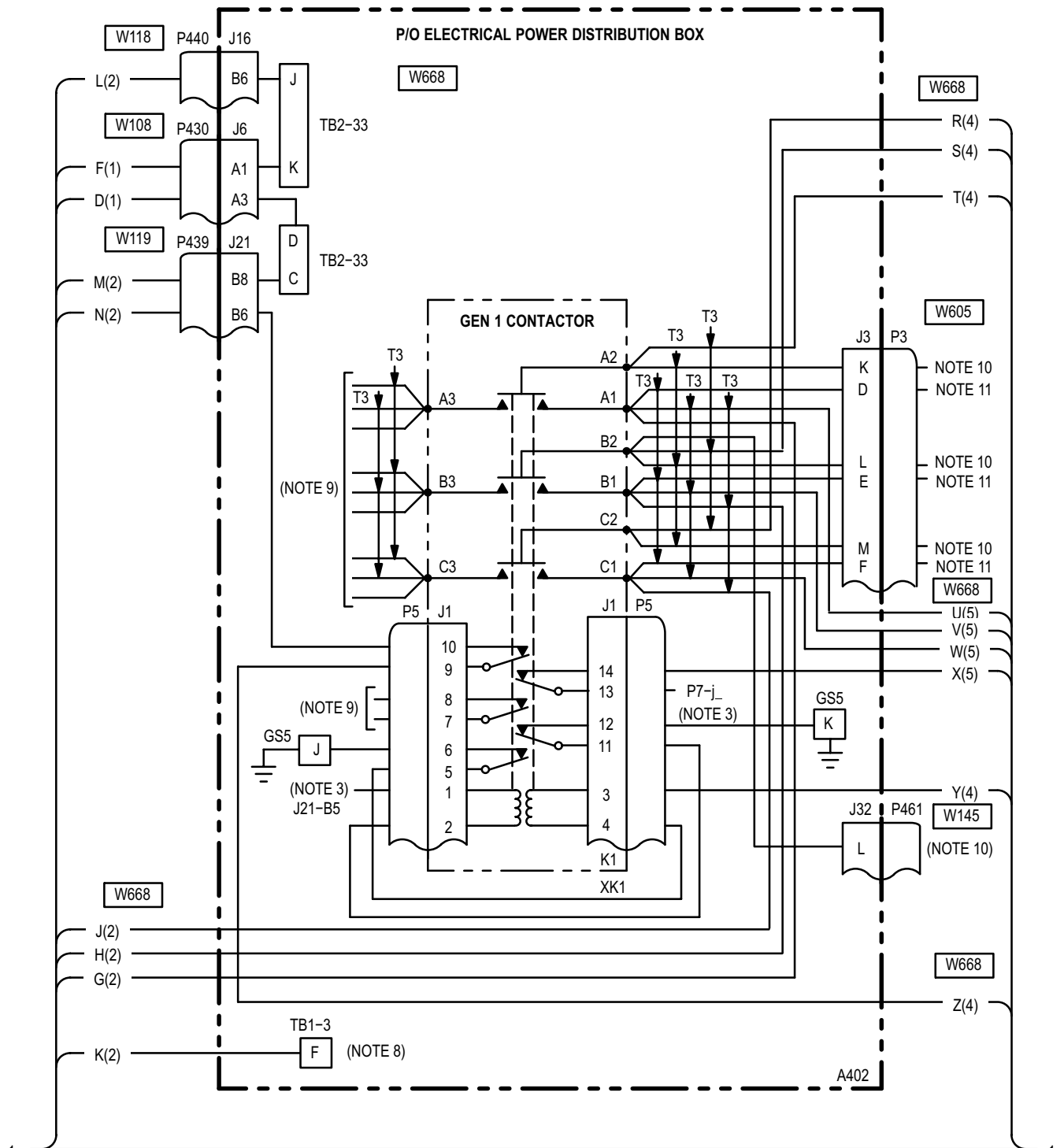
9-48



9-48. EXTERNAL POWER AND GROUND SERVICE UTILITY RECEPTACLE - WIRING INTERCONNECT DIAGRAM (cont)



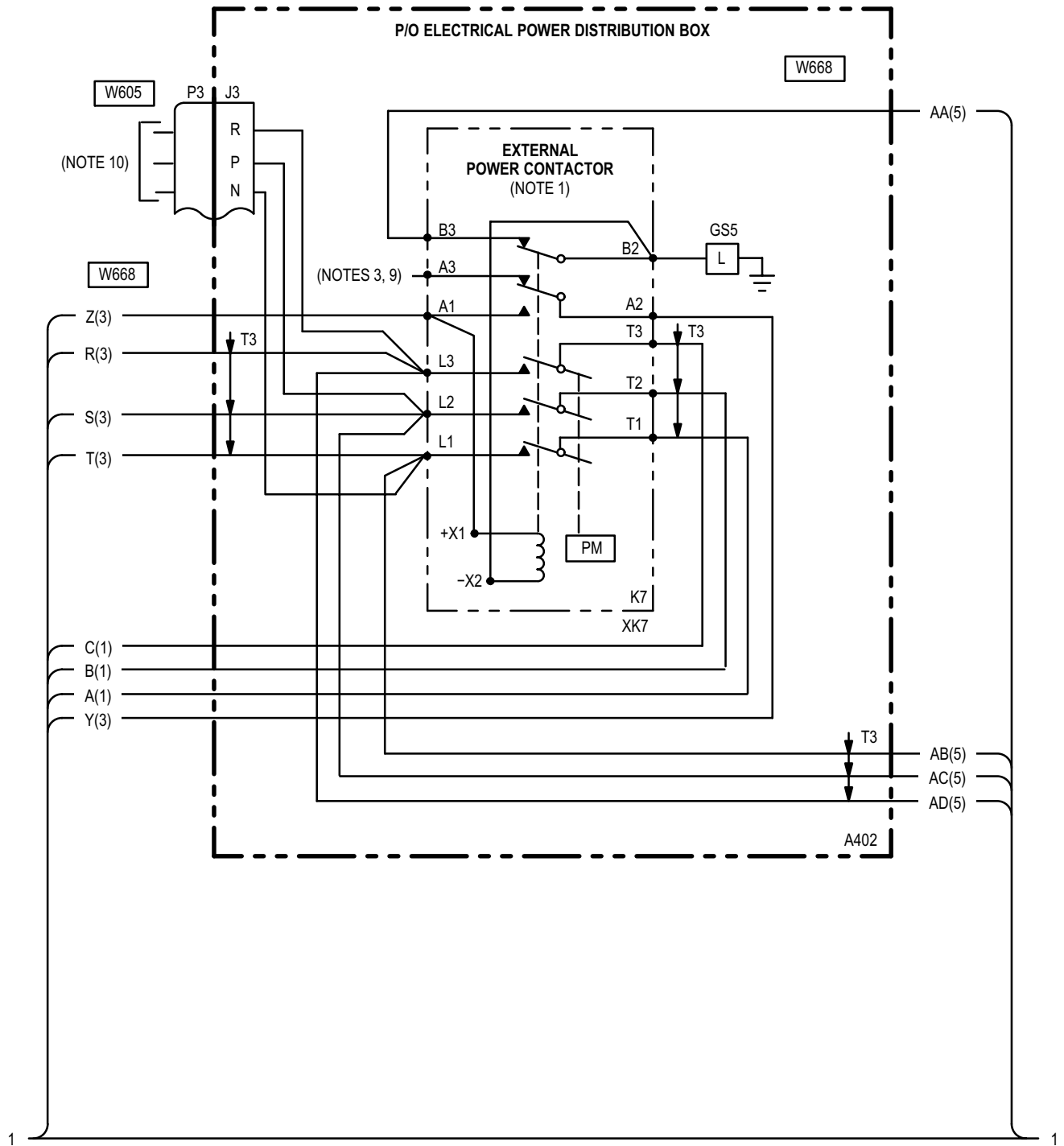
9-48. EXTERNAL POWER AND GROUND SERVICE UTILITY RECEPTACLE -
WIRING INTERCONNECT DIAGRAM (cont)



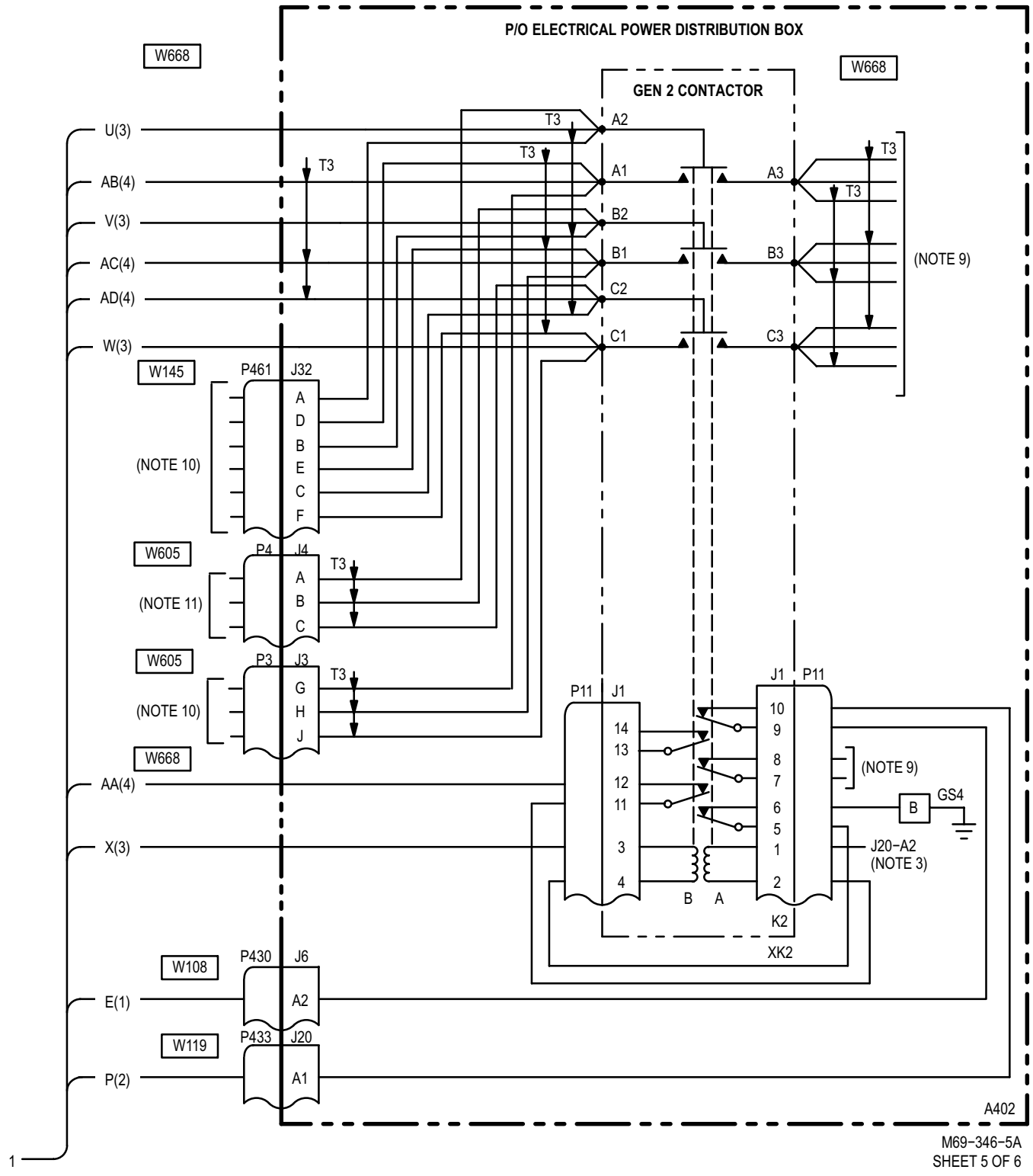
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9-48. EXTERNAL POWER AND GROUND SERVICE UTILITY RECEPTACLE -
WIRING INTERCONNECT DIAGRAM (cont)



9-48. EXTERNAL POWER AND GROUND SERVICE UTILITY RECEPTACLE -
WIRING INTERCONNECT DIAGRAM (cont)



NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

1. CLOSES WHEN 28 VDC IS APPLIED TO K7 SOLENOID THROUGH EXT PWR POSITION OF BATT / EXT PWR SWITCH S3. THIS APPLIES 115/200 VAC, 3Ø POWER FROM EXT POWER RECEPTACLE TO AC CONTACTORS FOR AC BUS POWER.
2. SHOWN WITH RECEPTACLE DOOR (R345) CLOSED. OPEN DOOR CLOSES SWITCH 13, WHICH PROVIDES GROUND FOR EXT PWR LIGHT INDICATOR.
3. 28 VDC FROM GENERATOR CONTROL SWITCH CLOSES CONTACTOR, WHICH APPLIES 115/200 VAC, 3Ø POWER FROM GENERATOR TO AC BUS (GENERATOR CONTROL SWITCHING LOGIC).
4. MANUALLY RESETS EXTERNAL POWER MONITOR AFTER INCORRECT PHASE OR UNDER OR OVER VOLTAGE OR FREQUENCY CONDITION.
5. JUMPER WIRE IN MATING PLUG OF GPU.
6. AVIONICS CONFIGURATION – BATTERY CHARGER (TM 11-1520-238-23-2).
7. FUEL SYSTEM (TM 1-1520-238-T-7).
8. DC ELECTRICAL POWER GENERATION.
9. AC ELECTRICAL POWER GENERATION.
10. CIRCUIT PROTECTION SYSTEM AC ESS BUS 1 – PILOT STATION.
11. CIRCUIT PROTECTION SYSTEM AC ESS BUS 2 – PILOT STATION.

9-49. ELECTRICAL POWER – DOES NOT COME ON AFTER EXT PWR RESET SWITCH HAS BEEN PRESSED

9-49

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, press and hold **EXT PWR RESET** switch. Check for open between P13-6 and ground.
Does open exist?

YES	Go to step 2.
NO	Go to step 5.
2. Check for open between P13-6 and P172-B5.
Does open exist?

YES	Repair open wire between: P172-B5 and (A402)J6-A3, P13-6 and P430-A3. Go to paragraph 9-45.
NO	Go to step 3.
3. On pilot **ELECT PWR** panel, press and hold **EXT PWR RESET** switch. Check for open between (A125)J1-B5 and (A125)J1-B10.
Does open exist?

YES	Repair open wire between P172-B10 and ground. Go to paragraph 9-45.
NO	Go to step 4.

4. Check for open between: (A125)J1-B5 and S3-1, (A125)J1-B10 and S3-2.
Does open exist?

YES	Replace EXT PWR RESET switch (TM 1-1520-238-23).
NO	Repair open wire between: (A125)J1-B5 and S3-1, S3-2 and S4-2, (A125)J1-B10 and S4-2. Go to paragraph 9-45.
5. Check for resistance of approximately 480 ohms between J14-E and ground.
Is resistance present?

YES	Go to step 6.
NO	Go to step 9.
6. Check for open between J14-F and P13-5.
Does open exist?

YES	Repair open wire. Go to paragraph 9-45.
NO	Go to step 7.
7. Check for open between: P13-1 and J14-A, P13-2 and J14-B, P13-3 and J14-C.
Does open exist?

YES	Repair open wire. Go to paragraph 9-45.
NO	Go to step 8.
8. Check for open between P13-4 and ground.
Does open exist?

YES	Repair open wire. Go to paragraph 9-45.
NO	Replace external power monitor (TM 1-1520-238-23).
9. Check for open between P172-B7 and J14-E.
Does open exist?

YES	Go to step 10.
NO	Go to step 11.

9-49. ELECTRICAL POWER – DOES NOT COME ON AFTER EXT PWR RESET SWITCH HAS BEEN PRESSED (cont)

10. Check for open between(A402)K2: J1-9 and J1-10.

Does open exist?

- YES Replace generator 2 contactor (TM 1-1520-238-23).
- NO Repair open wire between: J14-E and P433-A1, P172-B7 and P430-A2, (A402)J20-A1 and (A402)P11-10, (A402)J6-A2 and (A402)P11-9. Go to paragraph 9-45.

15. Check for open between (A402)K1: J1-9 and J1-10.

Does open exist?

- YES Replace generator 1 contactor (TM 55-1520-238-23).
- NO Repair open wire between: P439-B6 and P172-B8, (A402)P5-9 and (A402)K7-A1, (A402)P5-10 and (A402)J21-B6. Go to paragraph 9-45.

11. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**. Check for open between (A125)J1-B7 and (A125)J1-B8.

Does open exist?

- YES Go to step 12.
- NO Go to step 13.

12. Check for open between (A125): J1-B7 and S4-4, J1-B8 and S4-5.

Does open exist?

- YES Repair open wire. Go to paragraph 9-45.
- NO Replace **BATT/EXT PWR** switch (A125)S4 (TM 55-1520-238-23).

13. Check for open between P172-B8 and (A402)K7-A1.

Does open exist?

- YES Go to step 15.
- NO Go to step 14.

14. Check for open between (A402)K7-B2 and ground.

Does open exist?

- YES Repair open wire. Go to paragraph 9-45.
- NO Replace external power contactor ((TM 55-1520-238-23).

END OF TASK

9-50. EXT PWR INDICATOR – IS NOT LIGHTED

9-50

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

3. Check for open between wired terminal of EXT PWR receptacle door switch S13 and P18-47.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire between: S13 and P430-A1, P440-B6 and P18-47, (A402)J6-A1 and (A402)TB2-33-K, (A402)J16-B6 and (A402)TB2-33-J. Go to paragraph 9-47. |
| NO | Repair open wire between S13 and GS661-A. Go to paragraph 9-47. |



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot master caution/warning panel, press and hold **PRESS TO TEST** indicator.

Is EXT PWR indicator lighted?

- | | |
|-----|---|
| YES | Go to step 2. |
| NO | Go to paragraph 9-333 to troubleshoot the pilot caution/warning system. |

2. Check for open across wired terminals of external power access door EXT PWR receptacle door switch (S13).

Does open exist?

- | | |
|-----|--|
| YES | Replace EXT PWR receptacle door switch (S13) (TM 1-1520-238-23). |
| NO | Go to step 3. |

END OF TASK

9-51. EXTERNAL POWER – DOES NOT COME THROUGH EXTERNAL POWER CONTACTOR

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution box cover removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between:

J14-A and (A402)K7-T1,
J14-B and (A402)K7-T2,
J14-C and (A402)K7-T3.

Does open exist?

YES Repair open wire.
Go to paragraph 9-47.

NO Go to step 2.

2. Detach P13. Detach wire at J14-A, J14-B, and J14-C. Check for short between all wire ends and ground.

Does short exist?

YES Repair shorted wire.
Go to paragraph 9-47.

NO Go to step 3.

3. Attach J14 wire ends. Check for open between: J14-A and P13-1, J14-B and P13-2, J14-C and P13-3,

Does open exist?

YES Repair open wire.
Go to paragraph 9-47.

NO Go to step 4.

4. Check for open between:

P13-4 and ground,
P13-5 and J14-F,
J14-E and P430-A2.

Does open exist?

YES Repair open wire.
Go to paragraph 9-47.

NO Go to step 5.

5. Check for 28 VDC at P430-A2.

Is voltage present?

YES Go to step 6.

NO Replace external power monitor (TM 1-1520-238-23).

6. Check for open between (A402):

J6-A2 and P11-9,
P11-10 and J20-A1.

Does open exist?

YES Repair open wire.
Go to paragraph 9-47.

NO Go to step 7.

7. Check for open between (A402)K2:

J1-9 and J1-10.

Does open exist?

YES Replace generator 2 contactor (TM 1-1520-238-23).

NO Go to step 8.

9-51. EXTERNAL POWER – DOES NOT COME THROUGH EXTERNAL POWER CONTACTOR (cont)

9-51

8. Check for open between:
P433-A1 and P172-B7,
P172-B8 and P439-B6.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-47. |
| NO | Go to step 9. |

13. Check for open between (A402)K1:
J1-5 and J1-6.

Does open exist?

- | | |
|-----|---|
| YES | Replace generator 1 contactor
(TM 1-1520-238-23). |
| NO | Replace external power
contactor (TM 1-1520-238-23). |

9. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**. Check for open between (A125):
J1-B7 and J1-B8.

Does open exist?

- | | |
|-----|--|
| YES | Replace pilot ELEC PWR panel
(TM 1-1520-238-23). |
| NO | Go to step 10. |

10. Check for open between (A402):
J21-B6 and P5-10,
P5-9 and XK7-A1.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-47. |
| NO | Go to step 11. |

11. Check for open between (A402):
K7-A1 and K7-X1,
K7-X2 and K7-B2,
K7-X1 and K7-X2.

Does open exist?

- | | |
|-----|---|
| YES | Replace external power
contactor (TM 1-1520-238-23). |
| NO | Go to step 12. |

12. Check for open between (A402):
XK7-A2 and P5-3,
P5-4 and P5-5,
P5-6 and GS5-J.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-47. |
| NO | Go to step 13. |

END OF TASK

9-52. 115 VAC IS NOT PRESENT – FROM AC ELEC UTIL PWR CIRCUIT BREAKER (CB6)

9-52

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-T-7
TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – R295 door opened

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. With power applied, and on ground service utility receptacle circuit breaker panel, check that **AC ELEC UTIL PWR** circuit breaker (CB6) is closed.

Does AC ELEC UTIL PWR circuit breaker (CB6) stay closed?

- | | |
|-----|---------------|
| YES | Go to step 3. |
| NO | Go to step 2. |

2. Open **AC ELEC UTIL PWR** circuit breaker (CB6). Check for short between:

J16-B and ground,
J16-F and ground,
J16-E and ground.

Does short exist?

YES Repair shorted wire.
Go to paragraph 9-47.

NO Replace **AC ELEC UTIL PWR** circuit breaker (TM 1-1520-238-23).

3. Check for open between:

CB6-A2 and J16-E,
CB6-B2 and J16-F,
CB6-C2 and J16-B.

Does open exist?

YES Repair open wire.
Go to paragraph 9-47.

NO Go to step 4.

4. With **AC ELEC UTIL PWR** circuit breaker (CB6) closed, check for continuity (less than 1 ohm) between:

CB6-A1 and CB6-A2,
CB6-B1 and CB6-B2,
CB6-C1 and CB6-C2.

Does continuity exist?

YES Go to step 5.

NO Replace **AC ELEC UTIL PWR** circuit breaker (TM 1-1520-238-23).

5. Check for open between:
(A402)XK1-A1 and CB6-A1,
(A402)XK1-B1 and CB6-B1,
(A402)XK1-C1 and CB6-C1.

Does open exist?

YES Repair open wire.
Go to paragraph 9-47.

NO Go to paragraph 9-12 to troubleshoot ac electrical power generation.

END OF TASK

9-53. 28 VDC IS NOT PRESENT – FROM DC ELEC UTIL PWR CIRCUIT BREAKER (CB7)

9-53

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – R295 door opened

3. Check for open between:
CB7-2 and J16-A,
CB7-1 and (A402)TB1-3-F.
Does open exist?

YES	Repair open wire. Go to paragraph 9-47.
NO	Go to paragraph 9-23 to troubleshoot dc electrical power generation.



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On the ground service utility receptacle circuit breaker panel, check that **DC ELEC UTIL PWR** circuit breaker (CB7) is closed.

Does DC ELEC UTIL PWR circuit breaker (CB7) stay closed?

YES	Go to step 3.
NO	Go to step 2.

2. Detach wire end at CB7-2. Check for short between ground and wire end.

Does short exist?

YES	Repair shorted wire between CB7-2 and J16-A. Go to paragraph 9-47.
NO	Replace DC ELEC UTIL PWR circuit breaker (CB7) (TM 1-1520-238-23).

END OF TASK

9-54. EXT PWR INDICATOR – IS LIGHTED WHEN EXT PWR ACCESS DOOR IS CLOSED

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

- Identify and detach wires from (A402):TB2-33-K and TB2-33-J. Check for short between: P430-A1 and ground, J16-B6 and ground, P440-B6 and ground, (A402)J6-A1 and ground.

Does short exist?

YES	Repair shorted wire. Go to paragraph 9-47.
NO	Replace terminal board (A402)TB2-33 (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- Detach P18.

Does EXT PWR indicator stay lighted?

YES	Go to paragraph 9-333 to troubleshoot pilot caution/warning system.
NO	Go to step 2.

- Detach wires from EXT PWR access door switch S13.

Does EXT PWR indicator stay lighted?

YES	Go to step 3.
NO	Replace EXT PWR access door switch S13 (TM 1-1520-238-23).

END OF TASK

9-55. NAVIGATION LIGHTS – MAINTENANCE OPERATIONAL CHECK

9-55

Tools:

Nomenclature	Part Number
Tool Kit, Electrical Repairer's	SC518099CLA06

Personnel Required:

68X	Armament/Electrical Systems Repairer
	One person to assist

References:

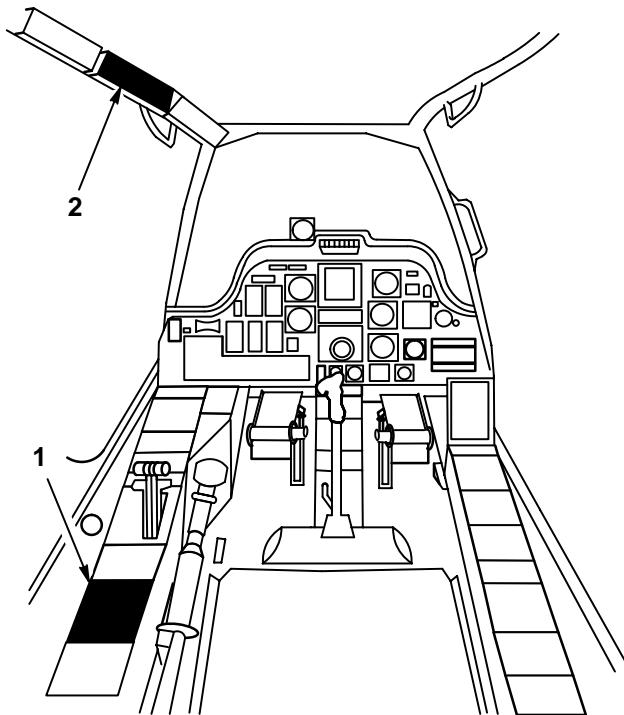
TM 1-1520-238-23

Equipment Conditions:

Ref	Condition
TM 1-1520-238-23	Navigation lights visual inspection performed
Paragraph 9-45	EXTERNAL POWER – POWER UP completed

NOTE

- Refer to pilot station (fig. 9-121) for configuration and component locations.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.



1. PILOT EXT LT / INTR LT PANEL
2. PILOT CENTER CIRCUIT BREAKER PANEL

M69-131

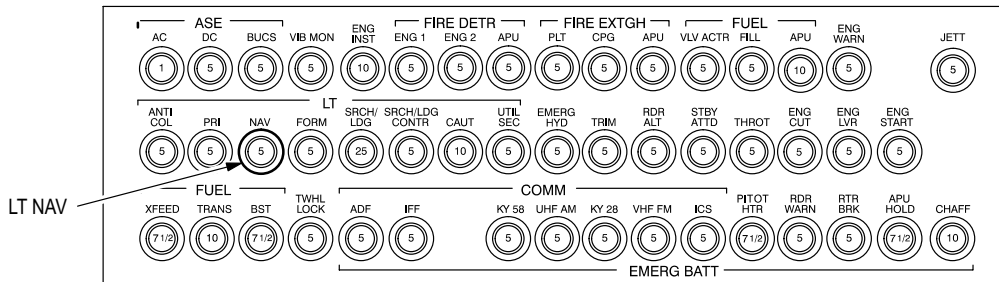
Figure 9-121. Pilot Station

9-55. NAVIGATION LIGHTS – MAINTENANCE OPERATIONAL CHECK (cont)

9-55

1. Perform the maintenance operational check as follows:

Task	Result
a. On pilot center circuit breaker panel (fig. 9-122), check that LT NAV circuit breaker (CB73) is closed.	If LT NAV circuit breaker (CB73) does not stay closed, go to paragraph 9-57.



M69-132

Figure 9-122. Pilot Center Circuit Breaker Panel

b. On pilot **EXT LT/INTR LT** panel (fig. 9-123), set **NAV** switch to **DIM** position, and then to **BRT** position. Check that left, right, and tail navigation lights function properly in each position.

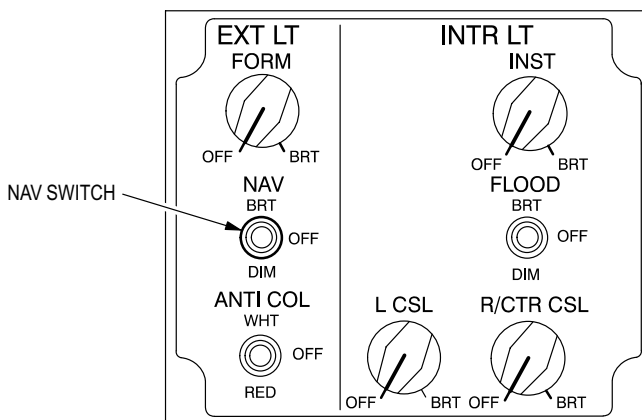
If **LT NAV** circuit breaker (CB73) does not stay closed, go to paragraph 9-57.

If left, right, and tail navigation lights do not light properly, go to paragraph 9-58.

If left navigation light does not light properly in both positions, go to paragraph 9-59.

If right navigation light does not light properly in both positions, go to paragraph 9-60.

If tail navigation light does not light properly in both positions, go to paragraph 9-61.



M69-133

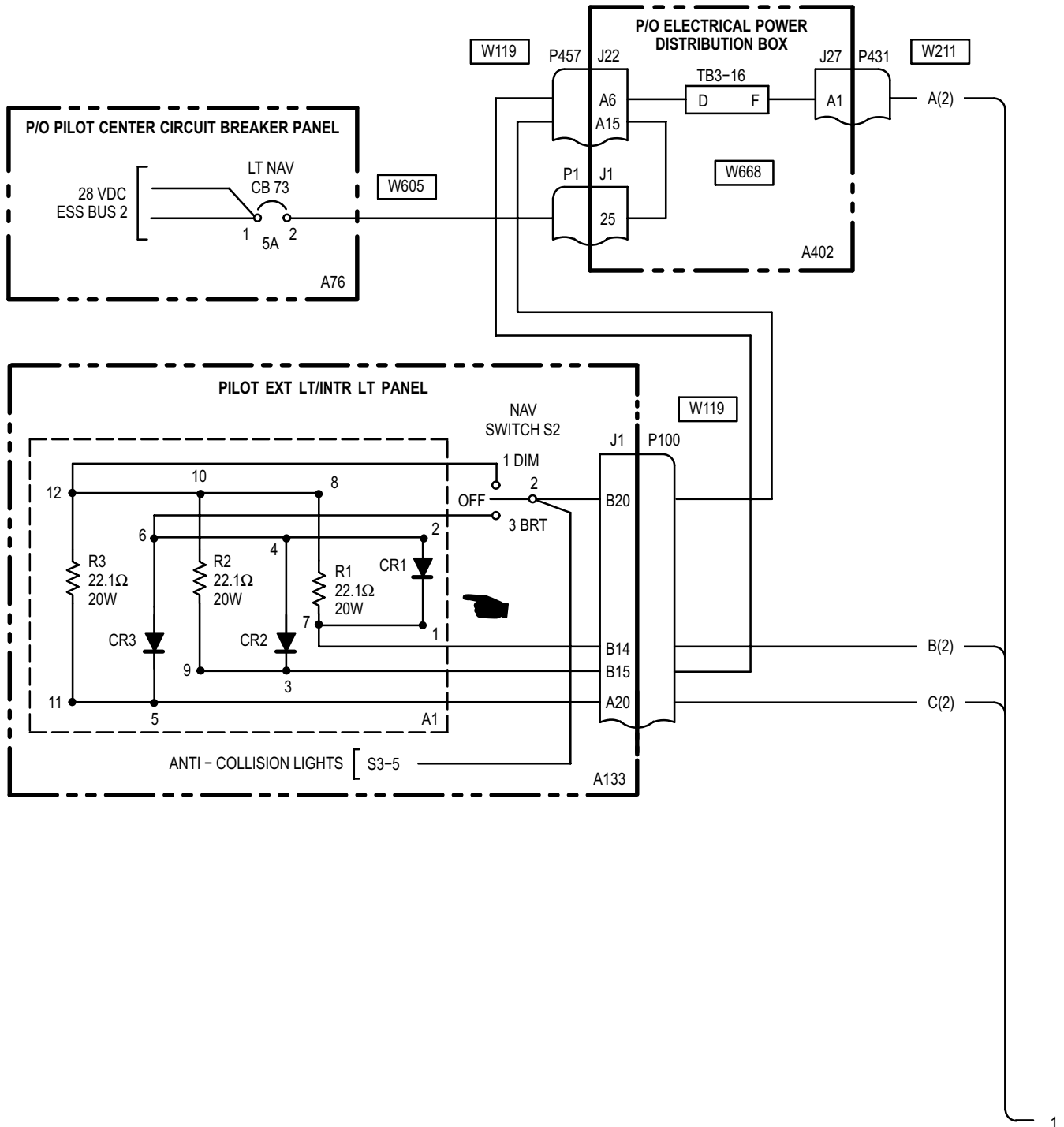
Figure 9-123. Pilot EXT LT/INTR LT Panel

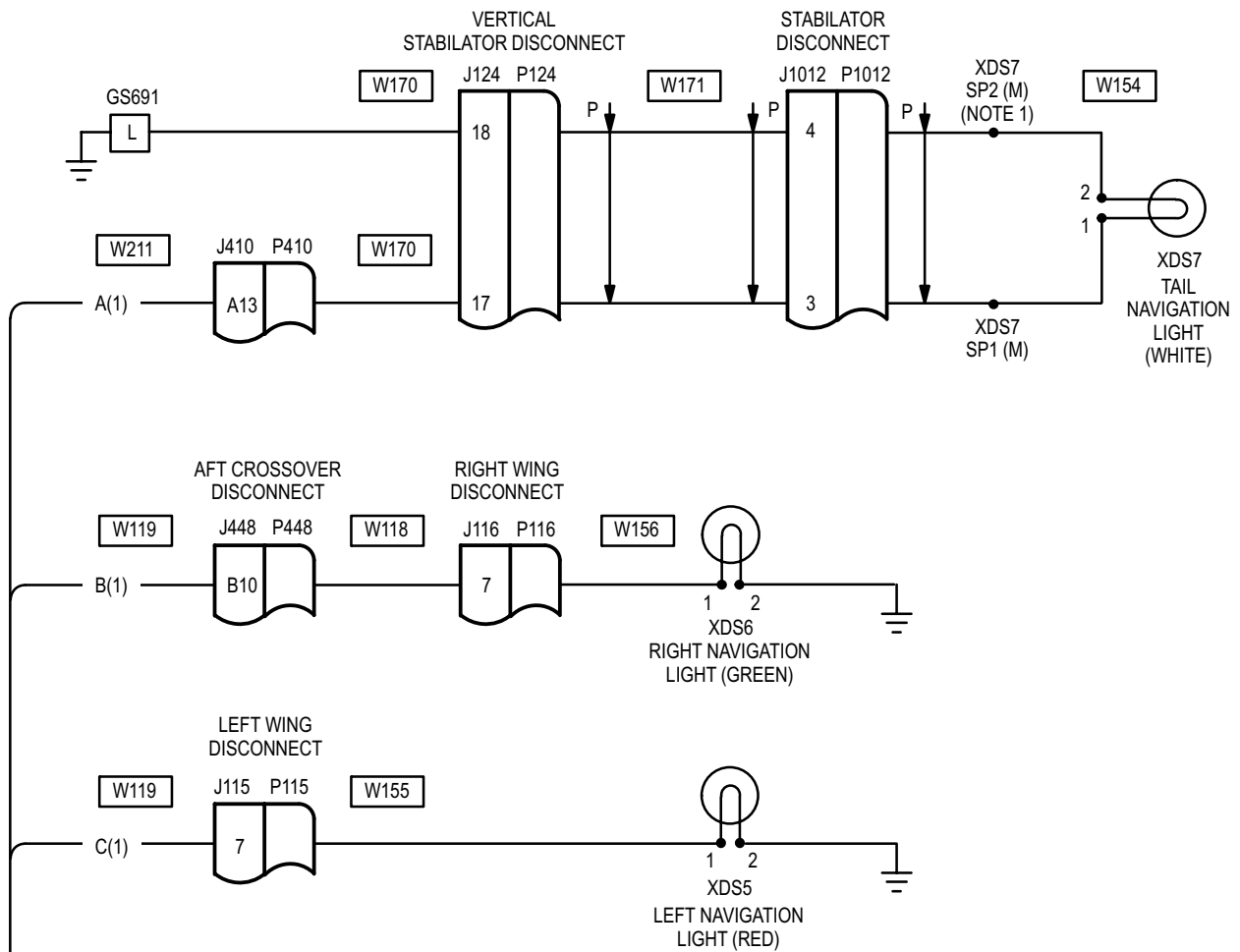
2. Perform **EXTERNAL POWER – POWER DOWN** (para 9-46).

END OF TASK

9-56. NAVIGATION LIGHTS - WIRING INTERCONNECT DIAGRAM

9-56





NOTE:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

1. M DESIGNATES A SOFT SPLICE WHICH MAY BE DISCONNECTED FOR A WIRING CHECK.

1

9-57. LT NAV CIRCUIT BREAKER (CB73) – DOES NOT STAY CLOSED

9-57

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot center circuit breaker panel, open **NAV LT** circuit breaker (CB73). Check for short between P1-25 and ground.
Does short exist?
 - YES Go to paragraph 9-220 to troubleshoot circuit protection system (dc essential bus 2 – pilot station).
 - NO Go to step 2.
- Detach P1. Check for short between P100-B20 and ground.
Does short exist?
 - YES Repair shorted wire between: P100-B20 and P457-A1, (A402)J1-25 and (A402)J22-A15. Go to paragraph 9-55.
 - NO Go to step 3.

- Remove left navigation light (TM 1-1520-238-23). Check for short between P100-A20 and ground.
Does short exist?
 - YES Repair shorted wire between: P100-A20 and J115-7, P115-7 and XDS5-1. Go to paragraph 9-55.
 - NO Go to step 4.
- Remove right navigation light (TM 55-1520-238-23). Check for short between P100-B14 and ground.
Does short exist?
 - YES Repair shorted wire between: P100-B14 and J448-B10, P448-B10 and J116-7, P116-7 and XDS6-1. Go to paragraph 9-55.
 - NO Go to step 5.
- Remove tail navigation light (TM 55-1520-238-23). Check for short between P100-B15 and ground.
Does short exist?
 - YES Repair shorted wire between: P100-B15 and P457-A6, P431-A1 and J410-A13, P410-A13 and J124-17, P124-17 and J1012-3, P1012-3 and XDS7-1, (A402)J22-A6 and (A402)TB3-16-D, (A402)TB3-16-E and (A402)J27-A1. Go to paragraph 9-55.
 - NO Replace pilot **EXT LT/INTR LT** panel (TM 1-1520-238-23).

END OF TASK

9-58. ALL NAVIGATION LIGHTS – DO NOT LIGHT

9-58

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC at P1-25.

Is voltage present?

- | | |
|-----|---|
| YES | Go to step 2. |
| NO | Go to paragraph 9-220 to troubleshoot circuit protection system (dc essential bus 2 – pilot station). |

2. Check for 28 VDC at P100-B20.

Is voltage present?

- | | |
|-----|---|
| YES | Go to step 3. |
| NO | Repair open wire between: P100-B20 and P457-A15, (A402)J22-A15 and (A402)J1-25. Go to paragraph 9-55. |

3. Check for open between (A133)J1-B20 and (A133)S2-2.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire. Go to paragraph 9-55. |
| NO | Go to step 4. |

4. With **NAV** Switch (A133)S2 set to **DIM**, check for open between (A133)S2-2 and (A133)S2-1.

Does open exist?

- | | |
|-----|--|
| YES | Replace NAV Switch (A133)S2 (TM 1-1520-238-23). |
| NO | Go to step 5. |

5. With **NAV** Switch (A133)S2 set to **BRT**, check for open between (A133)S2-2 and (A133)S2-3.

Does open exist?

- | | |
|-----|---|
| YES | Replace NAV Switch (A133)S2 (TM 1-1520-238-23). |
| NO | Replace pilot EXT LT/INTR LT panel (TM 1-1520-238-23). |

END OF TASK

9-59. LEFT NAVIGATION LIGHT – DOES NOT LIGHT**9-59****Tools:**

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **EXT LT/INTR LT** panel, cycle **NAV** switch to **BRT** then **DIM**.
Does left navigation light function properly in one position and not the other?

YES	Replace pilot EXT LT/INTR LT panel (TM 1-1520-238-23).
NO	Go to step 2.
- Remove DS5. Check for 28 VDC between XDS5-1 and XDS5-2.
Is voltage present?

YES	Replace left navigation light (TM 1-1520-238-23).
NO	Repair open wire between P100-A20 and XDS5-1, XDS5-2 and ground. Go to paragraph 9-55.

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **EXT LT/INTR LT** panel, cycle **NAV** switch to **BRT** then **DIM**.
Does right navigation light function properly in one position and not the other?

YES	Replace pilot EXT LT/INTR LT panel (TM 1-1520-238-23).
NO	Go to step 2.

2. Remove DS6. Check for 28 VDC between XDS6-1 and XDS6-2.
Is voltage present?

YES	Replace right navigation light (TM 1-1520-238-23).
NO	Repair open wire between P100-B14 and XDS6-1, XDS6-2 and ground. Go to paragraph 9-55.

END OF TASK

9-61. TAIL NAVIGATION LIGHT – DOES NOT LIGHT

9-61

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **EXT LT/INTR LT** panel, cycle **NAV** switch to **BRT** then **DIM**.
Does tail navigation light function properly in one position and not the other?

YES	Replace pilot EXT LT/INTR LT panel (TM 1-1520-238-23).
NO	Go to step 2.
- Remove DS7. Check for 28 VDC between XDS7-1 and XDS7-2.
Is voltage present?

YES	Replace tail navigation light (TM 1-1520-238-23).
NO	Go to step 3.
- Check for open between P100-B15 and XDS7-1.
Does open exist?

YES	Repair open wire. Go to paragraph 9-55.
NO	Repair open wire between XDS7-2 and ground. Go to paragraph 9-55.

END OF TASK

9-62. FORMATION LIGHTS – MAINTENANCE OPERATIONAL CHECK

9-62

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06

References:

TM 55-1520-238-23

Equipment Conditions:

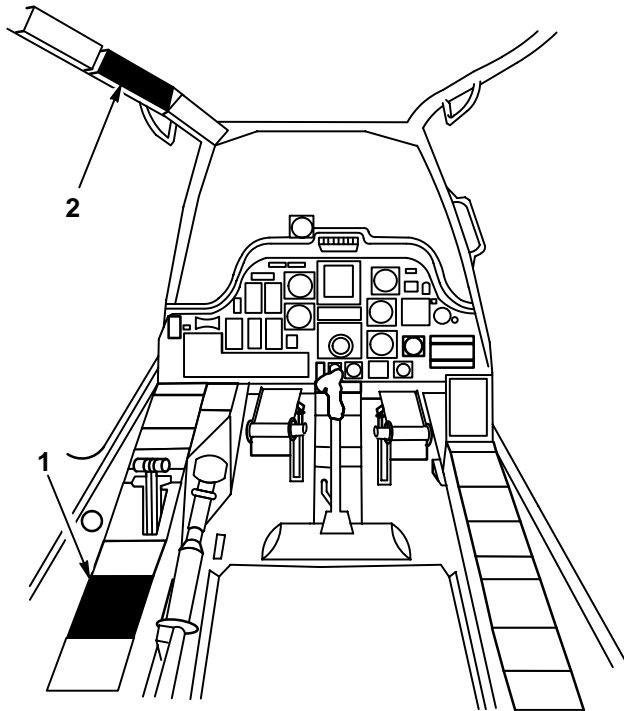
<u>Ref</u>	<u>Condition</u>
TM 55-1520-238-23	Formation lights visual inspection performed
Paragraph 9-45	EXTERNAL POWER – POWER UP completed

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

NOTE

- Refer to pilot station (fig. 9-124) for configuration and component locations.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.



1. PILOT EXT LT / INTR LT PANEL
2. PILOT CENTER CIRCUIT BREAKER PANEL

M69-110

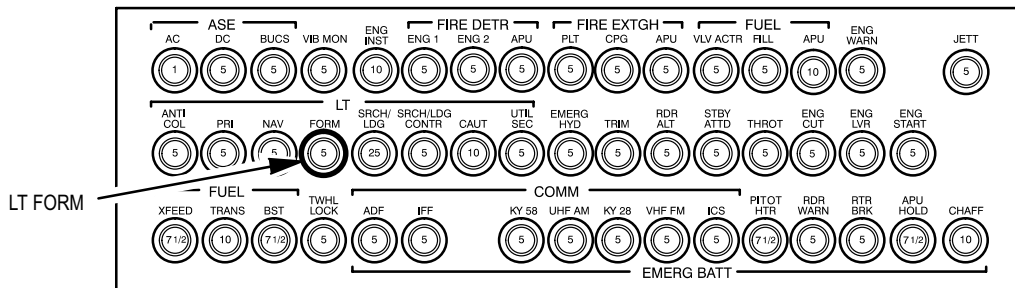
Figure 9-124. Pilot Station

9-62. FORMATION LIGHTS – MAINTENANCE OPERATIONAL CHECK (cont)

9-62

1. Perform the maintenance operational check as follows:

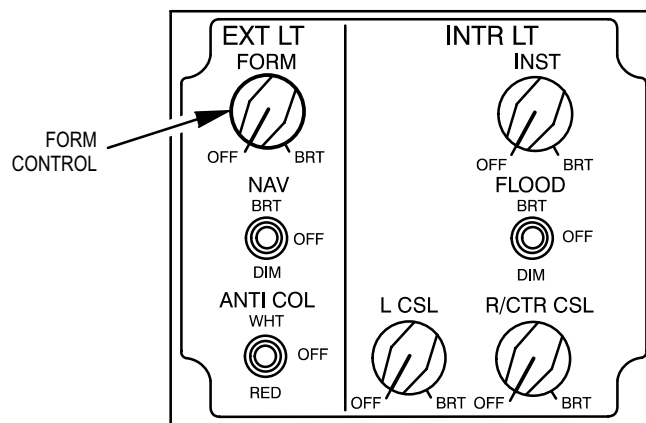
Task	Result
a. On pilot center circuit breaker panel (fig. 9-125), check that LT FORM circuit breaker (CB90) is closed.	If LT FORM circuit breaker (CB90) does not stay closed, go to paragraph 9-64.



M69-111

Figure 9-125. Pilot Center Circuit Breaker Panel

b. On pilot EXT LT/INTR LT panel (fig. 9-126), set FORM control to BRT . Check that all formation lights function.	<p>If left, right, tail, and fuselage formation lights do not light, go to paragraph 9-65.</p> <p>If left, formation light does not light, go to paragraph 9-66.</p> <p>If right formation light does not light, go to paragraph 9-67.</p> <p>If tail formation light does not light, go to paragraph 9-68.</p> <p>If fuselage formation light does not light, go to paragraph 9-69.</p>
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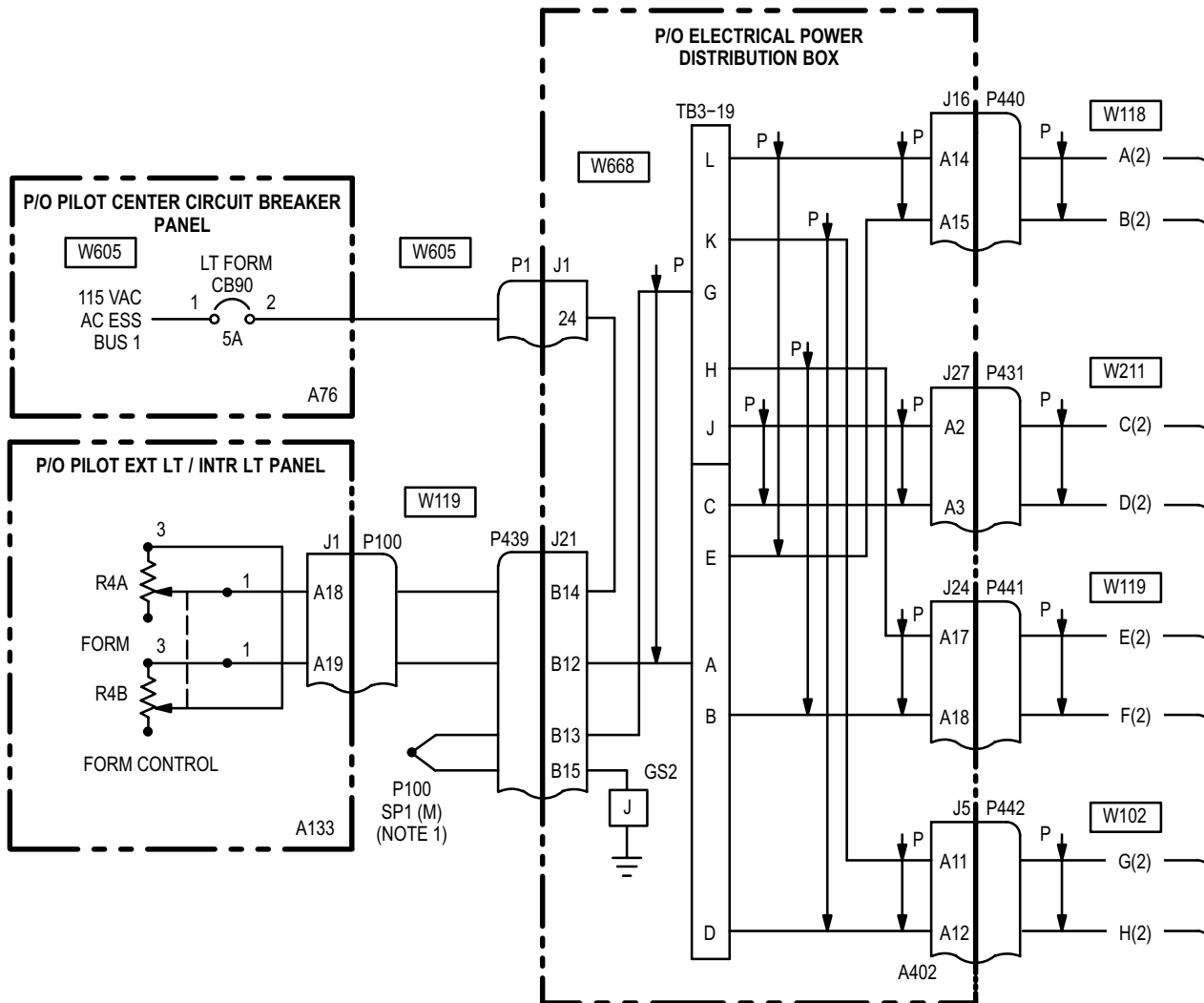


M69-112

Figure 9-126. Pilot EXT LT/INTR LT Panel

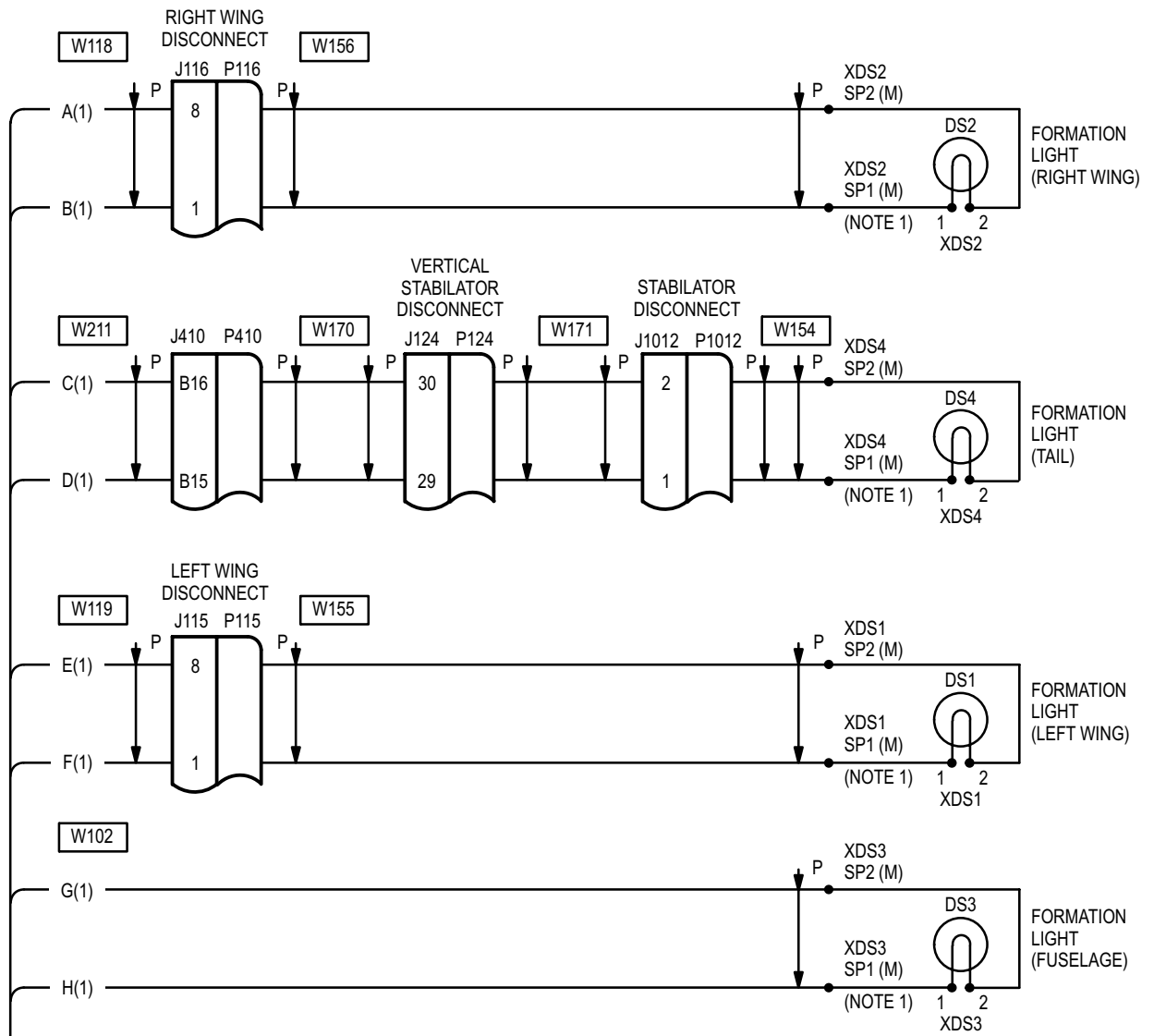
2. Perform EXTERNAL POWER – POWER DOWN (para 9-46).

END OF TASK



1

9-63. FORMATION LIGHTS – WIRING INTERCONNECT DIAGRAM (cont)



NOTE:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

- 1. M DESIGNATES A SOFT SPLICE WHICH MAY BE DISCONNECTED FOR A WIRING CHECK.

1

9-64. LT FORM CIRCUIT BREAKER (CB90) – DOES NOT STAY CLOSED

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for short between P1-24 and ground.

Does short exist?

- | | |
|-----|---|
| YES | Go to paragraph 9-150 to troubleshoot circuit protection system (ac essential bus 1 – pilot station). |
| NO | Go to step 2. |

2. Check for short between (A402)J21-B12 and ground.

Does short exist?

- | | |
|-----|---------------|
| YES | Go to step 4. |
| NO | Go to step 3. |

3. Check for short between:
P100-A18 and ground,
P100-A19 and ground.

Does short exist?

- | | |
|-----|--|
| YES | Repair shorted wire between:
P100-A18 and P439-B14,
(A402)J21-B14 and
(A402)J1-24,
P100-A19 and P439-B12.
Go to paragraph 9-62. |
| NO | Replace pilot EXT LT/INTR LT panel (TM 1-1520-238-23). |

4. Detach P440, P441, P442, P431.
Check for short between (A402)J21-B12 and ground.

Does short exist?

- | | |
|-----|---|
| YES | Repair shorted wire between (A402):
J21-B12 and TB3-19-A,
J24-A18 and TB3-19-B,
J27-A3 and TB3-19-C,
J5-A12 and TB3-19-D,
J16-A15 and TB3-19-E.
Go to paragraph 9-62. |
| NO | Go to step 5. |

5. Check for short between P441-A18 and ground.

Does short exist?

- | | |
|-----|---------------|
| YES | Go to step 6. |
| NO | Go to step 7. |

9-64. LT FORM CIRCUIT BREAKER (CB90) – DOES NOT STAY CLOSED (cont)

9-64

6. Detach wire from XDS1 SP2. Check for short between:

P115-8 and ground,
P441-A17 and ground.

Does short exist?

YES Repair shorted wire between:
P441-A17 and J115-8,
P115-8 and XDS1 SP2.
Go to paragraph 9-62.

NO Replace left wing formation light
(TM 1-1520-238-23).

7. Check for short between P431-A3 and ground.

Does short exist?

YES Go to step 8.

NO Go to step 9.

8. Detach wire from XDS4 SP2. Check for short between:

P431-A3 and ground,
P410-B15 and ground,
P124-29 and ground,
P1012-1 and ground.

Does short exist?

YES Repair shorted wire between:
P431-A3 and J410-B15,
P410-B15 and J124-29,
P124-29 and J1012-1,
P1012-1 and XDS4 SP2.
Go to paragraph 9-62.

NO Replace tail formation light
(TM 1-1520-238-23).

9. Check for short between P442-A12 and ground.

Does short exist?

YES Go to step 11.

NO Go to step 10.

10. Detach wire from XDS2 SP2. Check for short between:

P116-1 and ground,
P440-A15 and ground.

Does short exist?

YES Repair shorted wire between:
P440-A15 and J116-1,
P116-1 and XDS2 SP2.
Go to paragraph 9-62.

NO Replace right wing formation light
(TM 1-1520-238-23).

11. Detach wire from XDS3 SP1. Check for short between P442-A12 and ground.

Does short exist?

YES Repair shorted wire between
P442-A12 and XDS3 SP1.
Go to paragraph 9-62.

NO Replace fuselage formation light
(TM 1-1520-238-23).

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 115 VAC at P1-24.

Is voltage present?

YES	Go to step 2.
NO	Go to paragraph 9-150 to troubleshoot circuit protection system (ac essential bus 1 – pilot station).

2. Check for open between:

(A402)J1-24 and P100-A18,
P100-A19 and (A402)TB3-19-A,
(A402)TB3-19-G and ground.

Does open exist?

YES	Repair open wire. Go to paragraph 9-62.
NO	Replace pilot EXT LT/INTR LT panel (TM 1-1520-238-23).

END OF TASK

9-66. LEFT WING FORMATION LIGHT – DOES NOT LIGHT

9-66

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution box cover removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Check for open between:
(A402)TB3-19-B and XDS1 SP1,
(A402)TB3-19-H and XDS1 SP2.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-62. |
| NO | Replace left wing formation light
(TM 1-1520-238-23). |

END OF TASK

9-67. RIGHT WING FORMATION LIGHT – DOES NOT LIGHT

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution box cover removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Check for open between:
 (A402)TB3-19-E and XDS2 SP1,
 (A402)TB3-19-L and XDS2 SP2.

Does open exist?

- YES Repair open wire.
 Go to paragraph 9-62.

- NO Replace right wing formation
 light (TM 1-1520-238-23).

END OF TASK

9-68. TAIL FORMATION LIGHT – DOES NOT LIGHT

9-68

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution box cover removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Check for open between:
(A402)TB3-19-C and XDS4 SP1,
(A402)TB3-19-J and XDS4 SP2.

Does open exist?

YES	Repair open wire. Go to paragraph 9-62.
NO	Replace tail formation light (TM 1-1520-238-23).

END OF TASK

9-69. FUSELAGE FORMATION LIGHT – DOES NOT LIGHT

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution box cover removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Check for open between:
 (A402)TB3-19-D and XDS3 SP1,
 (A402)TB3-19-K and XDS3 SP2.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-62. |
| NO | Replace fuselage formation light (TM 1-1520-238-23). |

END OF TASK

9-70. ANTI-COLLISION LIGHTS – MAINTENANCE OPERATIONAL CHECK

9-70

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

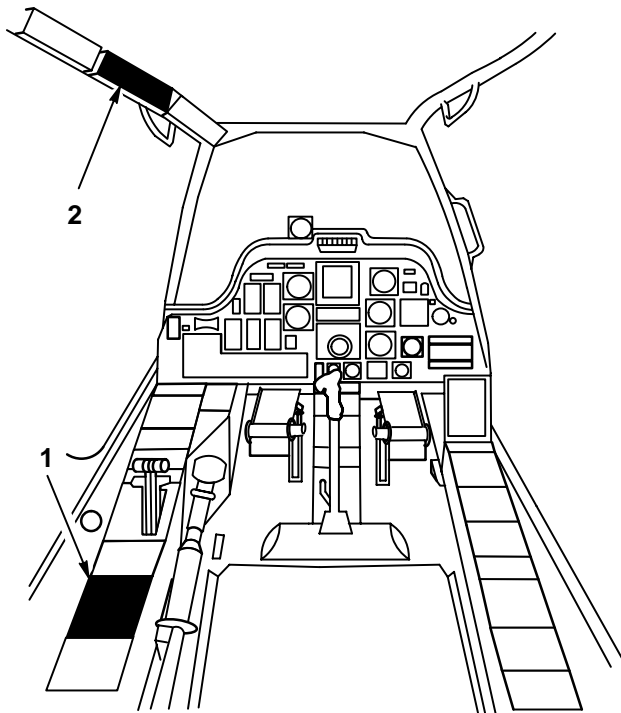
TM 55-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 55-1520-238-23	Anti-collision lights visual inspection performed
Paragraph 9-45	EXTERNAL POWER – POWER UP completed

NOTE

- Refer to pilot station (fig. 9-127) for configuration and component locations.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.



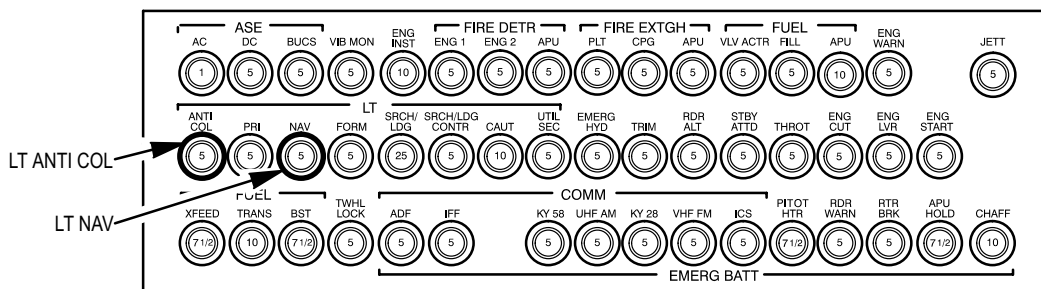
1. PILOT EXT LT / INTR LT PANEL
2. PILOT CENTER CIRCUIT BREAKER PANEL

M69-136

Figure 9-127. Pilot Station

1. Perform the maintenance operational check as follows:

Task	Result
a. On pilot center circuit breaker panel (fig. 9-128), check that LT NAV circuit breaker (CB73) and LT ANTI COL circuit breaker (CB40) are closed.	<p>If LT NAV circuit breaker (CB73) does not stay closed, go to paragraph 9-55 to troubleshoot navigation lights.</p> <p>If LT ANTI COL circuit breaker (CB40) does not stay closed, go to paragraph 9-72.</p>



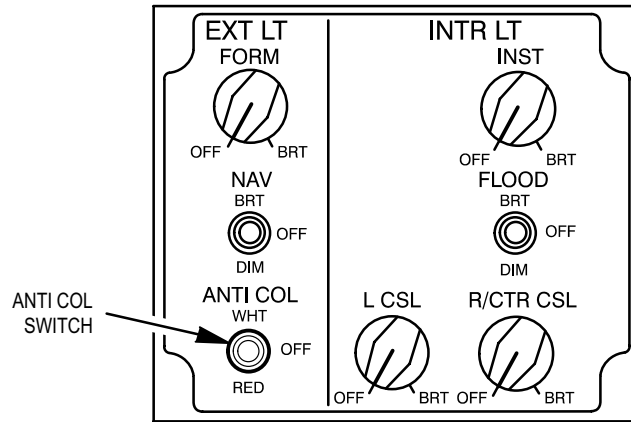
M69-137

Figure 9-128. Pilot Center Circuit Breaker Panel

WARNING

Anti-collision lights are high intensity strobe lights. Excessive viewing of lights could cause temporary blindness. If injury occurs, seek medical aid.

- | | |
|--|--|
| b. On pilot EXT LT/INTR LT panel (fig. 9-129), set ANTI COL switch to RED . Check that left and right red anti-collision lights are flashing. | <p>If left and right red anti-collision lights do not flash, go to paragraph 9-73.</p> <p>If left red anti-collision light does not flash, go to paragraph 9-74.</p> <p>If right red anti-collision light does not flash, go to paragraph 9-75.</p> |
| c. Set ANTI COL switch to WHT , check that left and right white anti-collision lights are flashing. | <p>If LT NAV circuit breaker (CB73) does not stay closed, go to paragraph 9-76.</p> <p>If left and right white anti-collision lights do not flash, go to paragraph 9-77.</p> <p>If left white anti-collision light does not flash, go to paragraph 9-78.</p> <p>If right white anti-collision light does not flash, go to paragraph 9-79.</p> |



M69-138A

Figure 9-129. Pilot EXT LT/INTR LT Panel

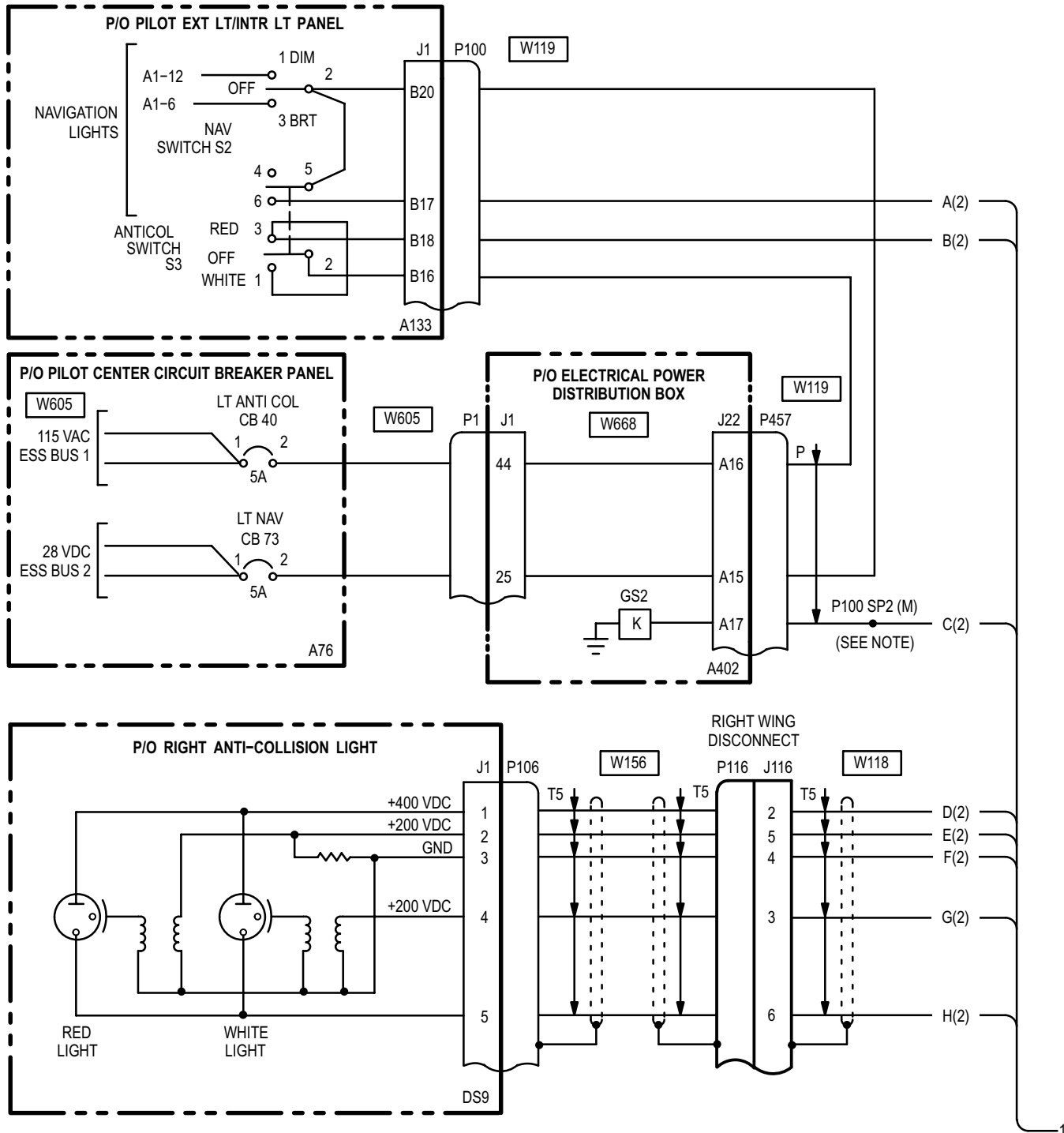
Task	Result
d. On pilot EXT LT/INTR LT panel (fig. 9-129), set ANTI COL switch to OFF .	

2. Perform EXTERNAL POWER – POWER DOWN (para 9-46).

END OF TASK

9-71. ANTI-COLLISION LIGHTS – WIRING INTERCONNECT DIAGRAM

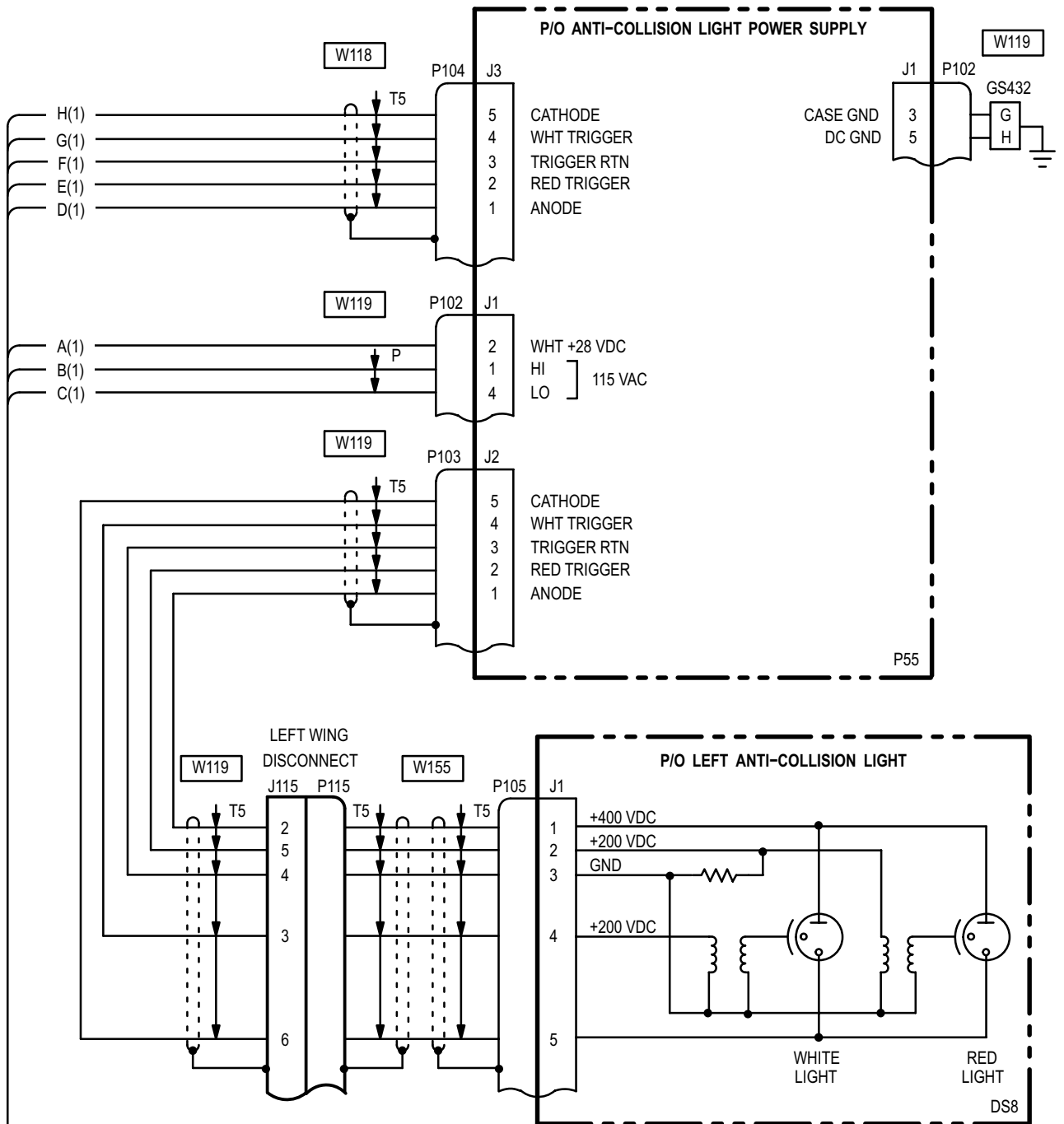
9-71



M69-006-1A
SHEET 1 OF 2

9-71. ANTI-COLLISION LIGHTS – WIRING INTERCONNECT DIAGRAM (cont)

9-71



1

NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

- 1. M DESIGNATES A SOFT SPLICE WHICH MAY BE DISCONNECTED FOR A WIRING CHECK.

M69-006-2A
SHEET 2 OF 2

9-72. LT ANTI COL CIRCUIT BREAKER (CB40) – DOES NOT STAY CLOSED

9-72

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

- With Anti Col Switch (A133)S3 in Off, Red, and White, check for short between:
P100-B16 and ground,
P100-B18 and ground.

Does short exist?

YES	Replace pilot EXT LT/INTR LT panel (TM 1-1520-238-23).
NO	Replace anti-collision light power supply (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot center circuit breaker panel, open **LT ANTI COL** circuit breaker (CB40). Check for short between P100-B16 and ground.

Does short exist?

YES	Repair shorted wire between: P100-B16 and P457-A16, (A402)J22-A16 and J1-44, P1-44 and CB40-2. Go to paragraph 9-70.
NO	Go to step 2.

- With P102 detached, check for short between P100-B18 and ground.

Does short exist?

YES	Repair shorted wire between P100-B18 and P102-1. Go to paragraph 9-70.
NO	Go to step 3.

END OF TASK

9-73. LEFT AND RIGHT RED ANTI-COLLISION LIGHTS – DO NOT FLASH

9-73

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

- **Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.**
- **Anti-collision lights are high intensity strobe lights. Excessive viewing of lights could cause temporary blindness. If injury occurs, seek medical aid.**

1. Check for 115 VAC at P1-44.
Is voltage present?

YES	Go to step 2.
NO	Go to paragraph 9-150 to troubleshoot circuit protection system (ac essential bus 1 – pilot station).

2. Check for 115 VAC at P100-B16.
Is voltage present?

YES	Go to step 3.
NO	Repair open between: P100-B-16 and P457-A16, (A402)J22-A16 and (A402)J1-44. Go to paragraph 9-70.

3. Check for 115 VAC between P102-1 and P102-5.

Is voltage present?

- | | |
|-----|---------------|
| YES | Go to step 5. |
| NO | Go to step 4. |

4. Check for open between P102-1 and P100-B18.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire.
Go to paragraph 9-70. |
| NO | Replace pilot EXT LT/INTR LT panel (TM 1-1520-238-23). |

5. Check for open between P102-4 and ground.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire.
Go to paragraph 9-70. |
| NO | Replace anti-collision light power supply (TM 1-1520-238-23). |

END OF TASK

9-74. LEFT RED ANTI-COLLISION LIGHT – DOES NOT FLASH

9-74

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – LW8 cover removed



- Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.
- Anti-collision lights are high intensity strobe lights. Excessive viewing of lights could cause temporary blindness. If injury occurs, seek medical aid.

1. Check for pulsating 200 VDC between P105-2 and ground. Check for 400 VDC between P105-1 and ground.

Is voltage present?

- | | |
|-----|---------------|
| YES | Go to step 4. |
| NO | Go to step 2. |

2. Check for 200 VDC between J115-5 and ground. Check for 400 VDC between J115-2 and ground.

Is voltage present?

- | | |
|-----|---|
| YES | Repair open wire between: P115-2 and P105-1, P115-5 and P105-2. Go to paragraph 9-70. |
| NO | Go to step 3. |

3. Check for open between: P103-1 and J115-2, P103-2 and J115-5.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire. Go to paragraph 9-70. |
| NO | Replace anti-collision light power supply (TM 1-1520-238-23). |

4. Check for open between: P105-3 and P103-3, P105-5 and P103-5.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire. Go to paragraph 9-70. |
| NO | Replace left anti-collision light (TM 1-1520-238-23). |

END OF TASK

9-75. RIGHT RED ANTI-COLLISION LIGHT – DOES NOT FLASH

9-75

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – RW8 cover removed



- **Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.**
- **Anti-collision lights are high intensity strobe lights. Excessive viewing of lights could cause temporary blindness. If injury occurs, seek medical aid.**

1. Check for pulsating 200 VDC between P106-2 and ground. Check for 400 VDC between P106-1 and ground.

Is voltage present?

YES Go to step 4.
NO Go to step 2.

2. Check for 200 VDC between J116-5 and ground. Check for 400 VDC between J116-2 and ground.

Is voltage present?

YES Repair open wire between: P116-2 and P106-1, P116-5 and P106-2. Go to paragraph 9-70.
NO Go to step 3.

3. Check for open between: P104-1 and J116-2, P104-2 and J116-5.

Does open exist?

YES Repair open wire. Go to paragraph 9-70.
NO Replace anti-collision light power supply (TM 1-1520-238-23).

4. Check for open between: P106-3 and P104-3, P106-5 and P104-5.

Does open exist?

YES Repair open wire. Go to paragraph 9-70.
NO Replace right anti-collision light (TM 1-1520-238-23).

END OF TASK

9-76. LT NAV CIRCUIT BREAKER (CB73) – DOES NOT STAY CLOSED

9-76

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Detach P102. Check for short between P100-B17 and ground.

Does short exist?

YES	Repair short between P100-B17 and P102-2. Go to paragraph 9-70.
NO	Replace anti-collision light power supply (TM 1-1520-238-23).

END OF TASK

9-77. LEFT AND RIGHT WHITE ANTI-COLLISION LIGHTS – DO NOT FLASH

9-77

9-265

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

- Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.
- Anti-collision lights are high intensity strobe lights. Excessive viewing of lights could cause temporary blindness. If injury occurs, seek medical aid.

1. Check for 28 VDC at P1-25.

Does open exist?

- | | |
|-----|---|
| YES | Go to step 2. |
| NO | Go to paragraph 9-220 to troubleshoot circuit protection system (dc essential bus 2 – pilot station). |

2. Check for 28 VDC at P100-B20.

Does open exist?

- | | |
|-----|---|
| YES | Go to step 3. |
| NO | Repair open between: P100-B20 and P457-A15, (A402)J22-A15 and (A402)J1-25.
Go to paragraph 9-70. |

3. Check for 28 VDC at P102-2.

Does open exist?

- | | |
|-----|---------------|
| YES | Go to step 5. |
| NO | Go to step 4. |

4. Check for open between: P102-2 and P100-B17, P102-5 and ground, P102-3 and ground.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire.
Go to paragraph 9-70. |
| NO | Replace pilot EXT LT/INTR LT panel (TM 1-1520-238-23). |

5. Check for open between and P102-5 and ground.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire.
Go to paragraph 9-70. |
| NO | Replace anti-collision light power supply (TM 1-1520-238-23). |

END OF TASK

9-78. LEFT WHITE ANTI-COLLISION LIGHT – DOES NOT FLASH

9-78

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – LW8 cover removed

3. Check for open between: P103-4 and J115-3.

Does open exist?

YES	Repair open wire. Go to paragraph 9-70.
NO	Replace anti-collision light power supply (TM 1-1520-238-23).

WARNING

- Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.
- Anti-collision lights are high intensity strobe lights. Excessive viewing of lights could cause temporary blindness. If injury occurs, seek medical aid.

1. Check for pulsating 200 VDC between P105-4 and ground.

Is voltage present?

YES	Replace left anti-collision light DS8 (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for pulsating 200 VDC between J115-3 and ground.

Is voltage present?

YES	Repair open wire between P105-4 and P115-3. Go to paragraph 9-70.
NO	Go to step 3.

END OF TASK

9-79. RIGHT WHITE ANTI-COLLISION LIGHT – DOES NOT FLASH

9-79

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – RW8 cover removed

2. Check for pulsating 200 VDC between J116-3 and ground.

Is voltage present?

YES	Repair open wire between P106-4 and P116-3. Go to paragraph 9-70.
NO	Go to step 3.

3. Check for open between P104-4 and J116-3.

Does open exist?

YES	Repair open wire. Go to paragraph 9-70.
NO	Replace anti-collision light power supply (TM 1-1520-238-23).

WARNING

- Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.
- Anti-collision lights are high intensity strobe lights. Excessive viewing of lights could cause temporary blindness. If injury occurs, seek medical aid.

1. Check for pulsating 200 VDC between P106-4 and ground.

Is voltage present?

YES	Replace right anti-collision light (DS9) (TM 1-1520-238-23).
NO	Go to step 2.

END OF TASK

9-80. LANDING/SEARCH LIGHT – MAINTENANCE OPERATIONAL CHECK

9-80

Tools:

Nomenclature	Part Number
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

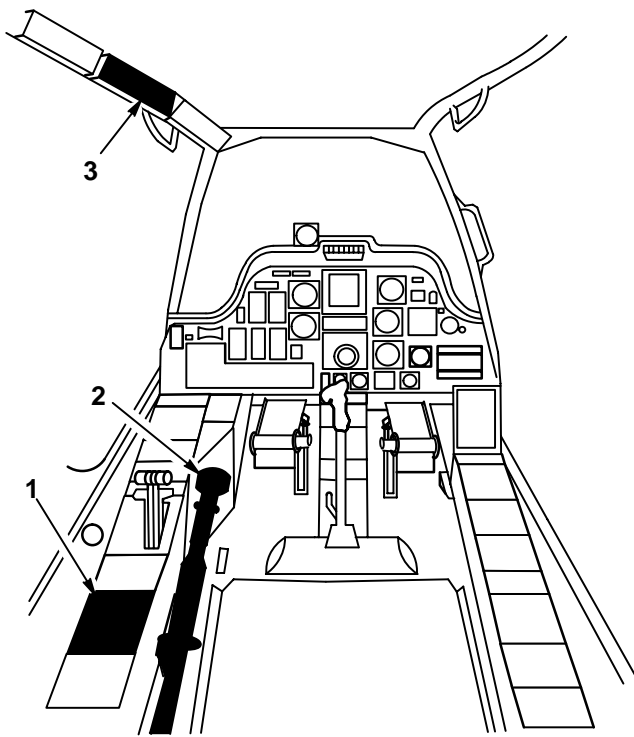
TM 1-1520-238-23

Equipment Conditions:

Ref	Condition
Paragraph 9-45	EXTERNAL POWER – POWER UP completed

NOTE

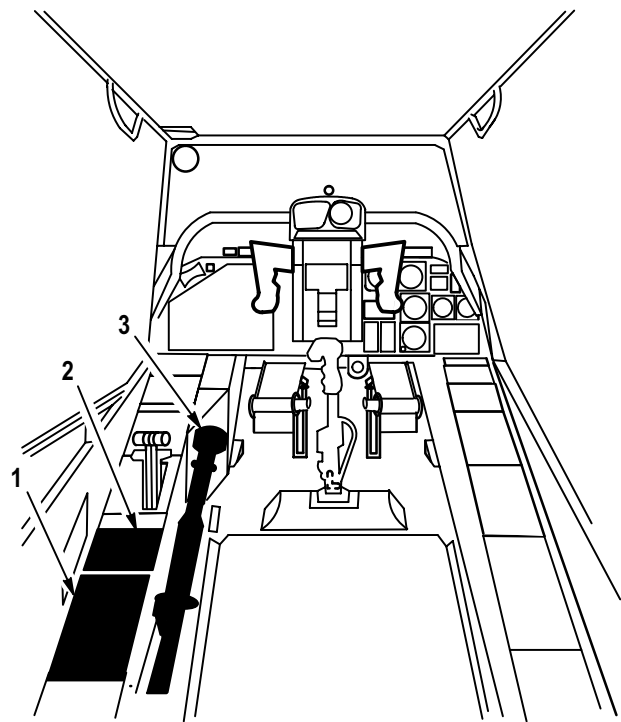
- Refer to pilot station (fig. 9-130) and CPG station (fig. 9-131) for cockpit configuration and equipment.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.



1. PILOT EXT LT / INTR LT PANEL
2. PILOT COLLECTIVE STICK
3. PILOT CENTER CIRCUIT BREAKER PANEL

M69-143

Figure 9-130. Pilot Station



1. CPG CIRCUIT BREAKER PANEL 1
2. CPG INTR LT PANEL
3. CPG COLLECTIVE STICK

M69-144

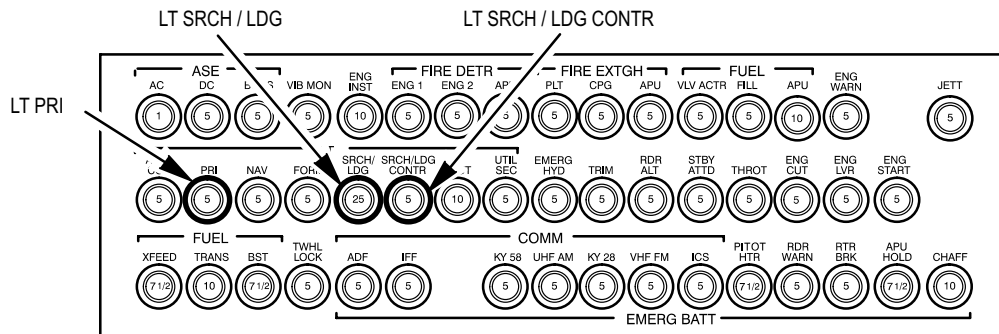
Figure 9-131. CPG Station

9-80. LANDING/SEARCH LIGHT – MAINTENANCE OPERATIONAL CHECK (cont)

9-80

1. Perform the maintenance operational check as follows:

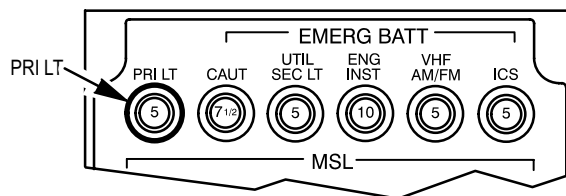
Task	Result
<p>a. On pilot center circuit breaker panel (fig. 9-132), check that LT SRCH/LDG circuit breaker (CB22), LT SRCH/LDG CONTR circuit breaker (CB80), and LT PRI circuit breaker (CB39) are closed.</p>	<p>If LT SRCH/LDG circuit breaker (CB22) does not stay closed, go to paragraph 9-82.</p> <p>If LT SRCH/LDG CONTR circuit breaker (CB80) does not stay closed, go to paragraph 9-83.</p> <p>If LT PRI circuit breaker (CB39) does not stay closed, go to paragraph 9-113 to troubleshoot pilot edge-lights.</p>



M69-145

Figure 9-132. Pilot Center Circuit Breaker Panel

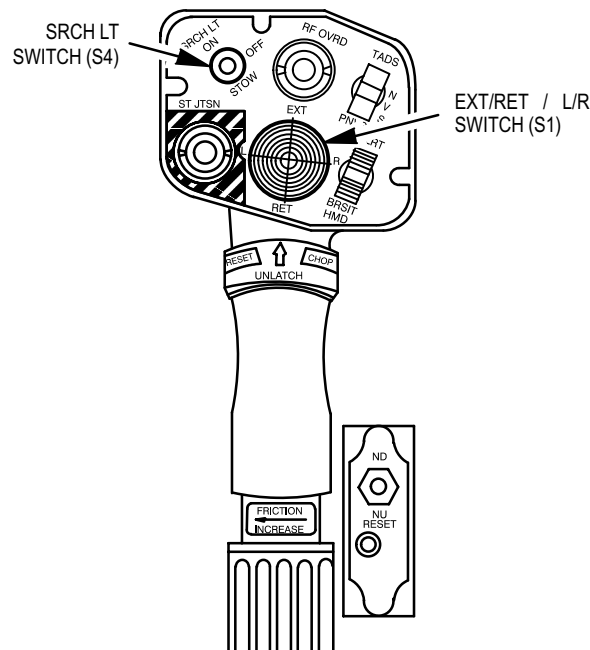
<p>b. On CPG circuit breaker panel 1 (fig. 9-133), check that PRI LT circuit breaker (CB14) is closed.</p>	<p>If PRI LT circuit breaker (CB14) does not stay closed, go to paragraph 9-132 to troubleshoot CPG edge-lights.</p>
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M69-146

Figure 9-133. CPG Circuit Breaker Panel 1

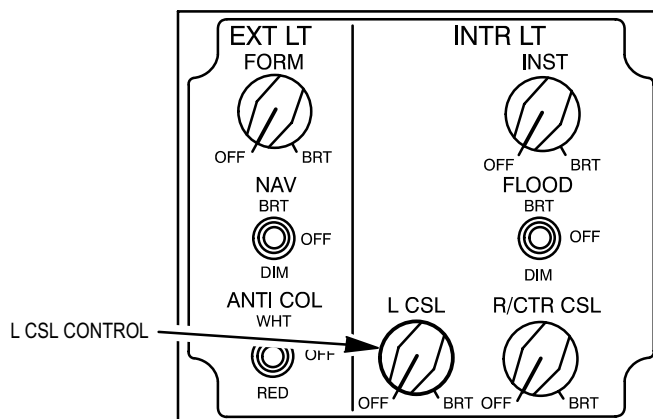
<p>c. On pilot collective stick (fig. 9-134), set and hold EXT/RET/L/R switch (S1) to EXT. Check that landing/search light is extended.</p>	<p>If landing/search light does not extend, go to paragraph 9-84.</p>
<p>d. On pilot collective stick, set and hold EXT/RET/L/R switch (S1) to L. Check that landing/search light rotates to the right 180°.</p>	<p>If landing/search light does not rotate to the left 180°, go to paragraph 9-85.</p>
<p>e. On pilot collective stick, set and hold EXT/RET/L/R switch (S1) to R. Check that landing/search light rotates to the right 180°.</p>	<p>If landing/search light does not rotate to the right 180°, go to paragraph 9-86.</p>



M69-147

Figure 9-134. Collective Stick

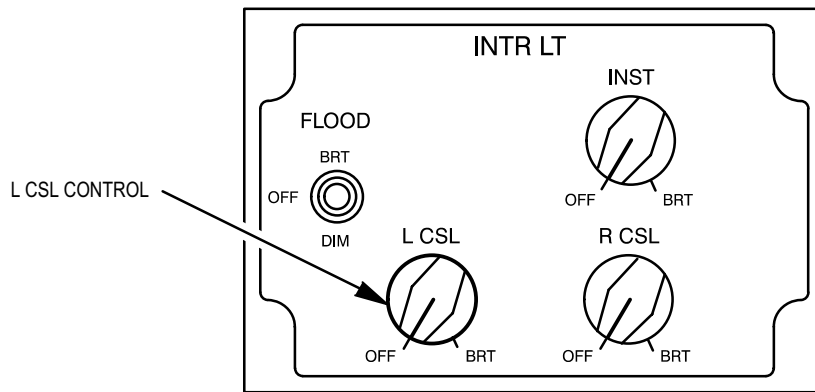
Task	Result
f. On pilot collective stick (fig. 9-134), set and hold EXT/RET/L/R switch (S1) to RET . Check that landing/search light retracts.	If landing/search light does not retract, go to paragraph 9-87.
g. On pilot collective stick, set and hold EXT/RET/L/R switch (S1) to EXT .	
h. On pilot collective stick, set SRCH LT switch (S4) to ON . Check that LT SRCH/LDG circuit breaker (CB22) is closed and landing/search light is lighted.	If LT SRCH/LDG circuit breaker (CB22) does not stay closed, go to paragraph 9-82. If landing/search light does not light, go to paragraph 9-88.
i. On pilot collective stick, momentarily set SRCH LT switch (S4) to STOW and then to OFF . Check that landing/search light is stowed and not lighted.	If landing/search light does not stow, go to paragraph 9-89.
j. On pilot EXT LT/INTR LT panel (fig. 9-135), set L CSL control to BRT . Check that pilot collective stick edge-light is lighted.	If pilot collective stick edge-light is not lighted, go to paragraph 9-90.
k. On pilot EXT LT/INTR LT panel, turn L CSL control to OFF .	



M69-148

Figure 9-135. Pilot EXT LT/INTR LT Panel

- | | |
|---|---|
| <p>l. On CPG collective stick (fig. 9-134), set and hold EXT/RET/L/R switch (S1) to EXT. Check that landing/search light is extended.</p> | <p>If landing/search light does not extend, go to paragraph 9-91.</p> |
| <p>m. On CPG collective stick, set and hold EXT/RET/L/R switch (S1) to L. Check that landing/search light rotates to the left 180°.</p> | <p>If landing/search light does not rotate to the left 180°, go to paragraph 9-92.</p> |
| <p>n. On CPG collective stick, set and hold EXT/RET/L/R switch (S1) to R. Check that landing/search light rotates to the right 180°.</p> | <p>If landing/search light does not rotate to the right 180°, go to paragraph 9-93.</p> |
| <p>o. On CPG collective stick, set and hold EXT/RET/L/R switch (S1) to RET. Check that landing/search light retracts.</p> | <p>If landing/search light does not retract, go to paragraph 9-94.</p> |
| <p>p. On CPG collective stick, set and hold EXT/RET/L/R switch (S1) to EXT.</p> | |
| <p>q. On CPG collective stick, set SRCH LT switch (S4) to ON. Check that landing/search light is lighted.</p> | <p>If landing/search light does not light, go to paragraph 9-95.</p> |
| <p>r. On CPG collective stick, momentarily set SRCH LT switch (S4) to STOW and then to OFF. Check that landing/search is stowed and not lighted.</p> | <p>If landing/search light does not stow, go to paragraph 9-96.</p> |
| <p>s. On CPG INTR LT panel (fig. 9-136), turn L CSL control to BRT. Check that CPG collective stick edge-light is lighted.</p> | <p>If CPG collective stick edge-light is not lighted, go to paragraph 9-97.</p> |
| <p>t. On CPG INTR LT panel, turn L CSL control to OFF.</p> | |



M69-149

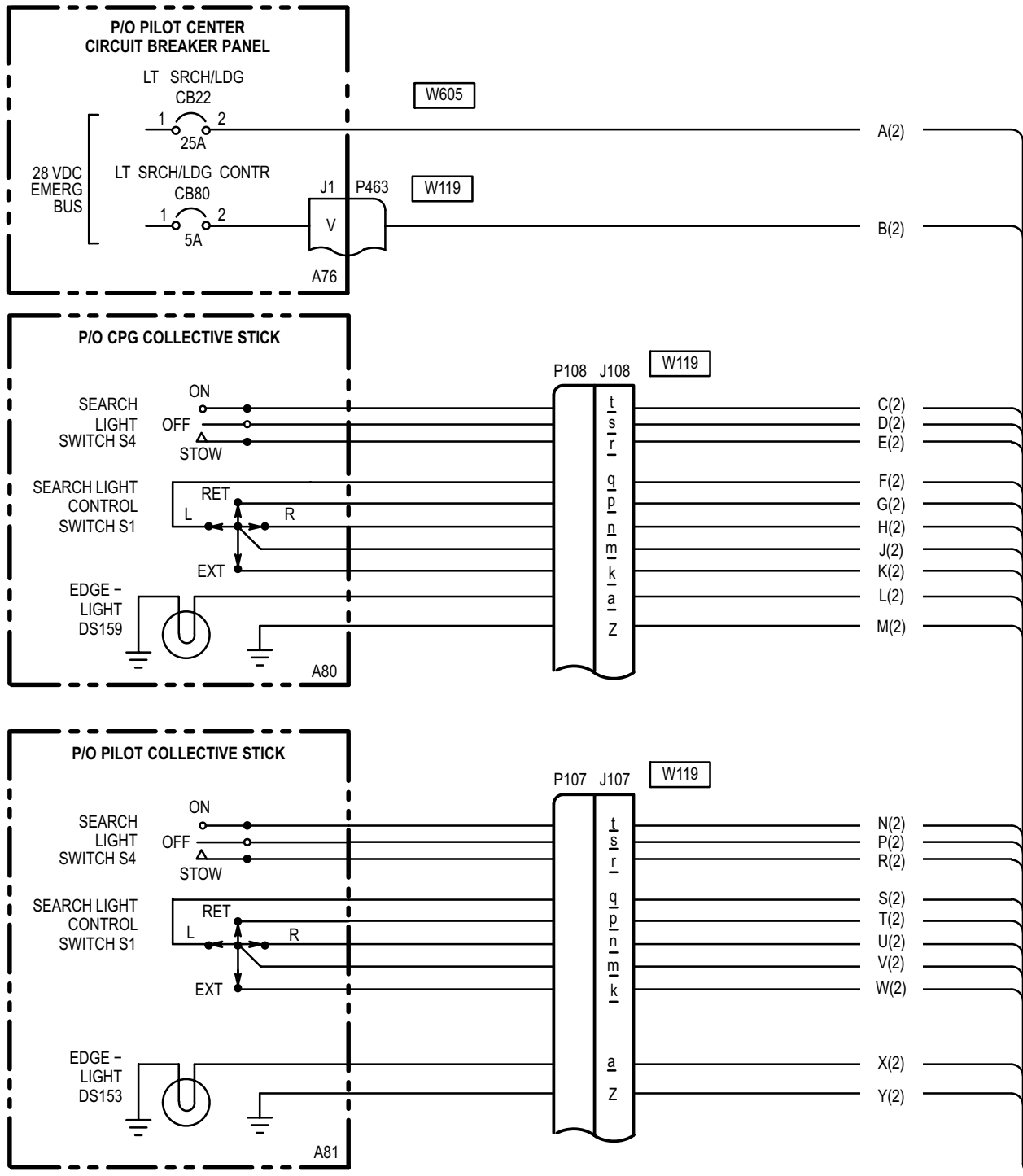
Figure 9-136. CPG INTR LT Panel

2. Perform EXTERNAL POWER – POWER DOWN (para 9-46).

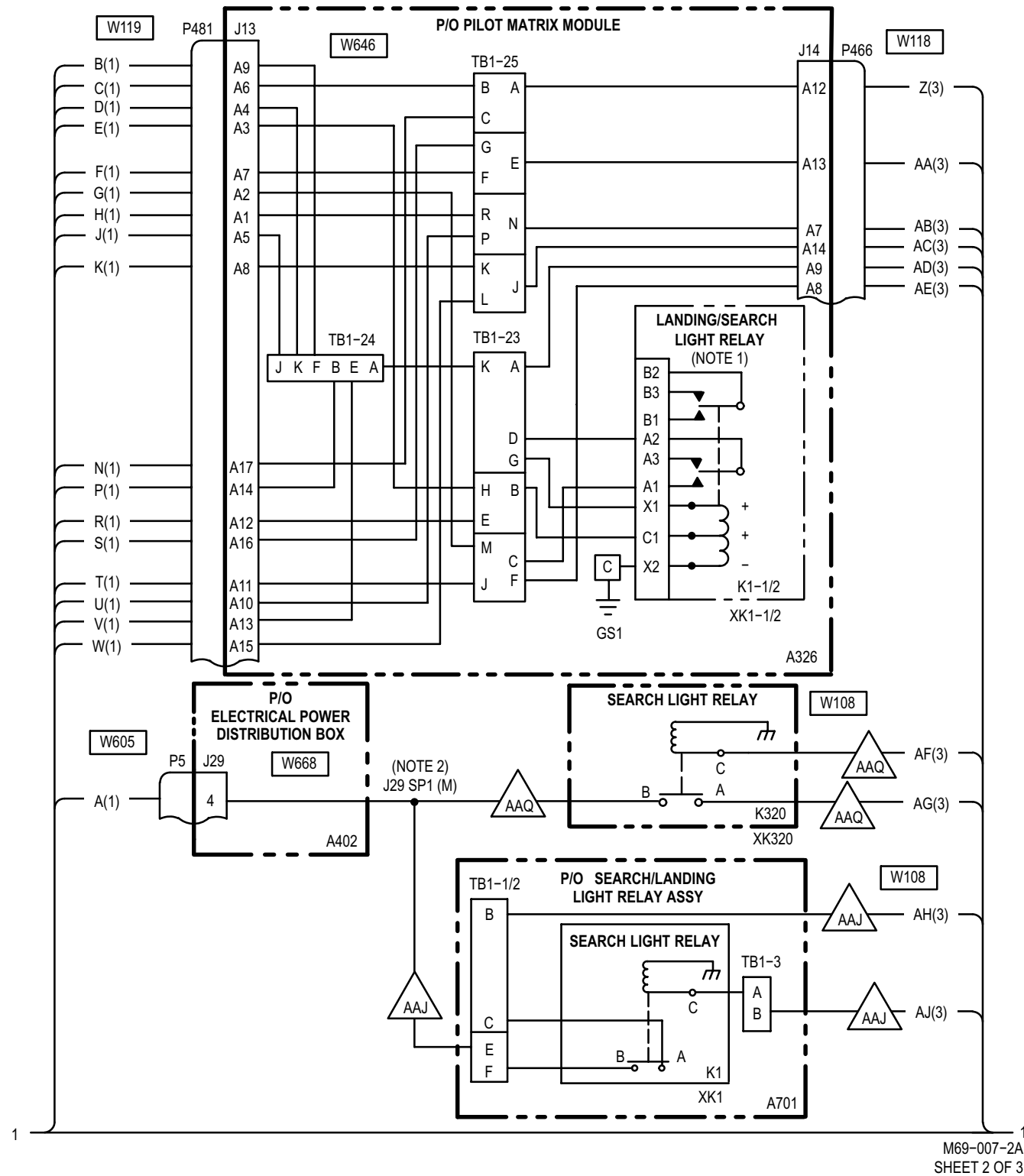
END OF TASK

9-81. LANDING/SEARCH LIGHT - WIRING INTERCONNECT DIAGRAM

9-81

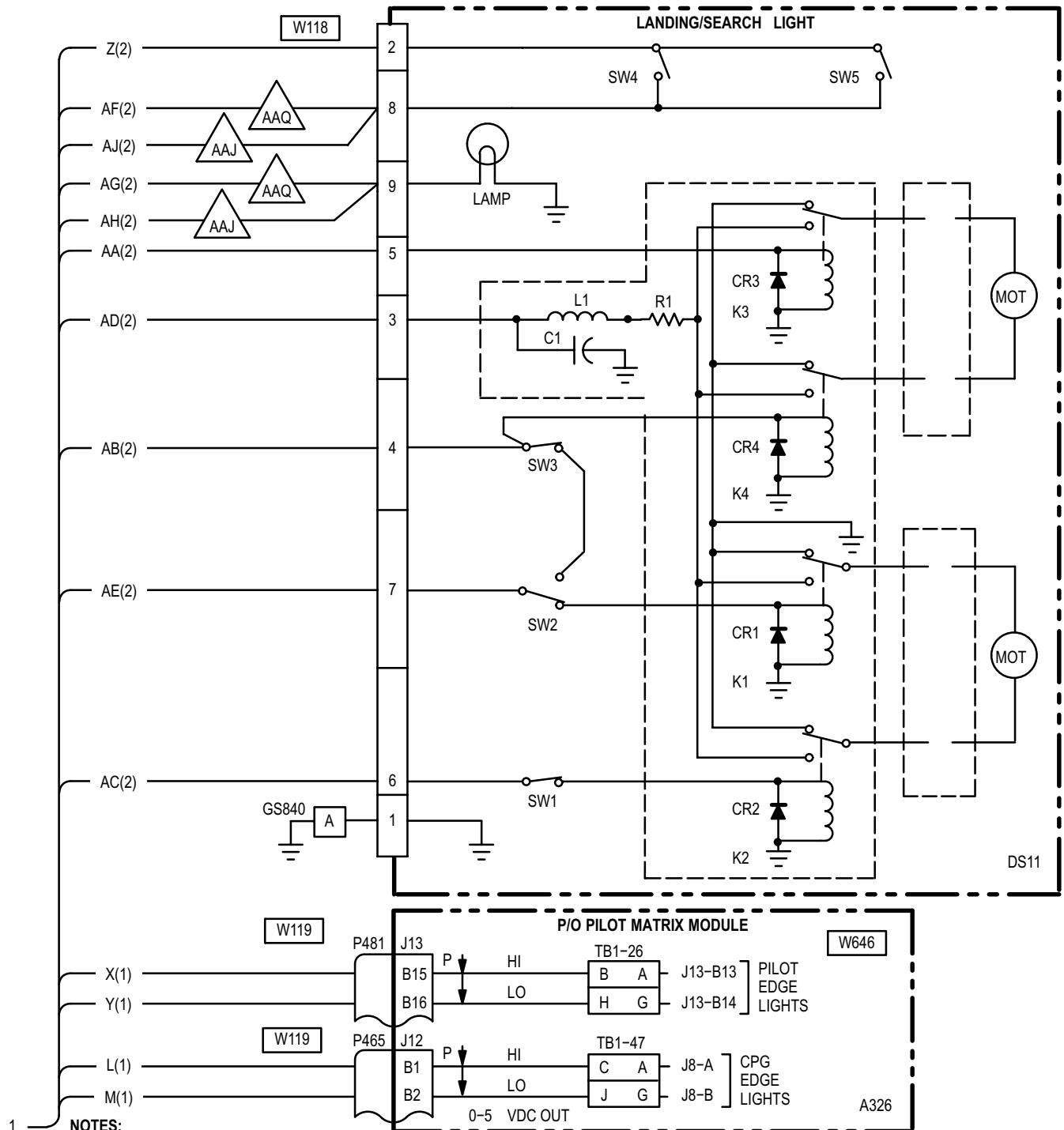


M69-007-1A
SHEET 1 OF 3



9-81. LANDING/SEARCH LIGHT - WIRING INTERCONNECT DIAGRAM (cont)

9-81



NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

1. 60-SECOND TIME DELAY RELEASE.
2. M DESIGNATES A SOFT SPLICE WHICH MAY BE DISCONNECTED FOR A WIRING CHECK.

M69-007-3A
SHEET 3 OF 3

9-82. LT SRCH/LDG CIRCUIT BREAKER (CB22) – DOES NOT STAY CLOSED

9-82

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.



If access to search light unit is required, unit must be suspended with suitable lockwire to prevent damage to electrical wiring. Failure to comply could result in damage to equipment.

1. On pilot center circuit breaker panel, open **LT SRCH/LDG** circuit breaker (CB22). Check P5-4 for short to ground.

Does short exist?

- YES Refer to paragraph 9-263 to troubleshoot circuit protection system (dc emergency bus – pilot station).
- NO **(AAQ)** Go to step 2.
(AAJ) Go to step 6.

2. **(AAQ)** Check for short between (A402)J29-4 and ground.

Does short exist?

- YES Go to step 3.
- NO Go to step 4.

3. Detach wire K320-B. Check K320-B for short to ground.

Does short exist?

- YES Replace search light relay K320 (TM 1-1520-238-23).
- NO Repair shorted wire between (A402):
J29-4 and J29 SP1,
J29 SP1 and XK320-B.
Go to paragraph 9-80.

4. Detach wire DS11-9. Check wire end for short to ground.

Does short exist?

- YES Go to step 5.
- NO Replace landing/search light (TM 1-1520-238-23).

5. Detach wire K320-A. Check wire end for short to ground.

Does short exist?

- YES Repair open wire.
Go to paragraph 9-80.
- NO Replace search light relay K320 (TM 1-1520-238-23).

6. **(AAJ)** Check (A402)J29-4 for short to ground.

Does short exist?

- YES Go to step 7.
- NO Go to step 9.

7. Detach wire (A402)TB1-1/2-F. Check wire end for short to ground.

Does short exist?

- YES Go to step 8.
- NO Repair shorted wire between (A402):
J29-4 and J29 SP1,
J29 SP1 and TB1-1/2-E.
Go to paragraph 9-80.

9-82. LT SRCH/LDG CIRCUIT BREAKER (CB22) – DOES NOT STAY CLOSED (cont)

9-82

8. Detach wire (A701)K1-B. Check (A701)K1-B for short to ground.

Does short exist?

YES Replace search light relay
(A701)K1 (TM 1-1520-238-23).

NO Repair shorted wire.
Go to paragraph 9-80.

9. Detach wire DS11-9. Check wire end for short to ground.

Does short exist?

YES Go to step 10.

NO Replace landing/search light
(TM 1-1520-238-23).

10. Detach wire (A701)TB1-1/2-C. Check wire end for short to ground.

Does short exist?

YES Go to step 11.

NO Repair shorted wire between
DS11-9 and (A701)TB1-1/2-B.
Go to paragraph 9-80.

11. Detach wire from (A701)K1-A. Check wire end for short to ground.

Does short exist?

YES Repair shorted wire.
Go to paragraph 9-80.

NO Replace search light relay
(A701)K1 (TM 1-1520-238-23).

END OF TASK

9-83. LT SRCH/LDG CONTR CIRCUIT BREAKER (CB80) – DOES NOT STAY CLOSED

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot circuit breaker panel, open **LT SRCH/LDG CONTR** circuit breaker (CB80). Check for short between (A76)J1-V and ground.

Does short exist?

- | | |
|-----|---|
| YES | Go to paragraph 9-263 to troubleshoot circuit protection system (dc emergency bus – pilot station). |
| NO | Go to step 2. |

2. Detach wire from (A326)TB1-24-F. Check for short between P463-V and ground.

Does short exist?

- | | |
|-----|--|
| YES | Repair shorted wire. Go to paragraph 9-80. |
| NO | Go to step 3. |

3. Detach wire from (A326)TB1-24-A. Check for short between wire end at (A326)TB1-24-A and ground.

Does short exist?

- | | |
|-----|---------------|
| YES | Go to step 4. |
| NO | Go to step 6. |

4. With relay (A326)K1-1/2 removed, check for short between (A326):
XK1-1/2-A2 and case,
XK1-1/2-X1 and case.

Does short exist?

- | | |
|-----|---|
| YES | Replace landing/searchlight relay (A326)K1-1/2. |
| NO | Go to step 5. |

5. Detach wire from DS11-3. Check for short between wire end at (A326)TB1-24-A and ground.

Does short exist?

- | | |
|-----|---|
| YES | Repair shorted wire between: DS11-3 and P466-A9, (A326):
J14-A9 and TB1-23-A,
TB1-23-K and TB1-24-A,
TB1-23-D and XK1-1/2-A2,
TB1-23-G and XK1-1/2-X1.
Go to paragraph 9-80. |
| NO | Replace landing/search light (TM 1-1520-238-23). |

6. Identify and detach wires from (A326):
TB1-24-J and TB1-24-K.
Check for short between wire end at (A326):
TB1-24-J and ground,
TB1-24-K and ground.

Does short exist?

- | | |
|-----|---------------|
| YES | Go to step 9. |
| NO | Go to step 7. |

7. Check for short between P107-s and ground.

Does short exist?

- | | |
|-----|--|
| YES | Replace pilot SRCH LT switch (S4) (TM 1-1520-238-23). |
| NO | Go to step 8. |

9-83. LT SRCH/LDG CONTR CIRCUIT BREAKER (CB80) – DOES NOT STAY CLOSED (cont)

9-83

8. Check for short between P107-m and ground.

Does short exist?

- | | |
|-----|--|
| YES | Replace pilot EXT/RET/L/R switch (S1) (TM 1-1520-238-23). |
| NO | Repair shorted wire between: J107-m and (A326)TB1-24-E, J107-s and (A326)TB1-24-B. Go to paragraph 9-80. |

9. Check for short between P108-m and ground.

Does short exist?

- | | |
|-----|--|
| YES | Replace CPG EXT/RET/L/R switch (S1) (TM 1-1520-238-23). |
| NO | Go to step 10. |

10. Check for short between P108-s and ground.

Does short exist?

- | | |
|-----|--|
| YES | Replace CPG SRCH LT switch (S4) (TM 1-1520-238-23). |
| NO | Repair shorted wire between: J108-m and (A326)TB1-24-J, J108-s and (A326)TB1-24-K. Go to paragraph 9-80. |

END OF TASK

9-84. PILOT COLLECTIVE STICK – DOES NOT EXTEND LANDING/SEARCH LIGHT

9-84

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

- On pilot collective stick, set and hold **EXT/RET/L/R** switch (S1) to **EXT**, check for open between P107-m and P107-k.

Does open exist?

YES	Replace pilot EXT/RET/L/R switch (S1) (TM 1-1520-238-23).
NO	Replace landing/search light (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- Check for 28 VDC at (A76)J1-V.

Is voltage present?

YES	Go to step 2.
NO	Go to paragraph 9-263 to troubleshoot circuit protection system (dc emergency bus – pilot station).

- Check for open between:

P463-V and J107-m,
DS11-1 and ground,
J107-k and DS11-6.

Does open exist?

YES	Repair open wire. Go to paragraph 9-80.
NO	Go to step 3.

END OF TASK

9-85. PILOT COLLECTIVE STICK – DOES NOT ROTATE LANDING/SEARCH LIGHT TO THE LEFT

9-85

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Crew station seat (pilot) removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between J107-q and DS11-5.
Does open exist?

YES	Repair open wire. Go to paragraph 9-80.
NO	Go to step 2.

2. On pilot collective stick, set and hold **EXT/RET/L/R** switch (S1) to **L**, check for open between J107-m and J107-q.
Does open exist?

YES	Replace pilot EXT/RET/L/R switch (S1) (TM 1-1520-238-23).
NO	Replace landing/search light (TM 1-1520-238-23).

END OF TASK

9-86. PILOT COLLECTIVE STICK – DOES NOT ROTATE LANDING/SEARCH LIGHT TO THE RIGHT

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Crew station seat (pilot) removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between J107-n and DS11-4.
Does open exist?

YES	Repair open wire. Go to paragraph 9-80.
NO	Go to step 2.

2. On pilot collective stick, set and hold **EXT/RET/L/R** switch (S1) to **R**, check for open between J107-m and J107-n.
Does open exist?

YES	Replace pilot EXT/RET/L/R switch (S1) (TM 1-1520-238-23).
NO	Replace landing/search light (TM 1-1520-238-23).

END OF TASK

9-87. PILOT COLLECTIVE STICK – DOES NOT RETRACT LANDING/SEARCH LIGHT

9-87

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Crew station seat (pilot) removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between J107-p and DS11-7.

Does open exist?

YES	Repair open wire. Go to paragraph 9-80.
NO	Go to step 2.

2. On pilot collective stick, set and hold **EXT/RET/L/R** switch (S1) to **RET**, check for open between J107-m and J107-p.

Does open exist?

YES	Replace pilot EXT/RET/L/R switch (S1) (TM 1-1520-238-23).
NO	Replace landing/search light (TM 1-1520-238-23).

END OF TASK

Tools:

Nomenclature	Part Number
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot collective stick, set **SRCH LT** switch to **ON**, check for 28 VDC at DS11-2.

Is voltage present?

- YES (AAQ) Go to step 4.
(AAJ) Go to step 10.
- NO Go to step 2.

2. Check for 28 VDC at J107-s.

Is voltage present?

- YES Go to step 3.
- NO Repair open wire between J107-s and (A326)TB1-24-B. Go to paragraph 9-80.

3. Check for open between J107-t and DS11-2.

Does open exist?

- YES Repair open wire. Go to paragraph 9-80.
- NO Replace pilot **SRCH LT** switch (S4) (TM 1-1520-238-23).

4. (AAQ) Check for 28 VDC at (A326)XK320-C.
Is voltage present?

- YES Go to step 6.
- NO Go to step 5.

5. Check for open between (A326)XK320-C and DS11-8.

Does open exist?

- YES Repair open wire. Go to paragraph 9-80.
- NO Replace landing/search light (TM 1-1520-238-23).

6. Check for 28 VDC at (A326)XK320-B.
Is voltage present?

- YES Go to step 8.
- NO Go to step 7.

7. Check for open between (A326)XK320-B and (A402)J29-4.

Does open exist?

- YES Repair open wire. Go to paragraph 9-80.
- NO Go to paragraph 9-263 to troubleshoot circuit protection system (dc emergency bus – pilot station).

8. Check for 28 VDC at (A326)XK320-A.
Is voltage present?

- YES Go to step 9.
- NO Replace search light relay (A326)K320 (TM 1-1520-238-23).

9. Check for open between (A326)XK320-A and DS11-9.

Does open exist?

- YES Repair open wire. Go to paragraph 9-80.
- NO Replace landing/search light (TM 1-1520-238-23).

9-88. PILOT COLLECTIVE STICK – DOES NOT LIGHT LANDING/SEARCH LIGHT (cont)**9-88**

10. (AAJ) Check for 28 VDC at (A701)XK1-C.

Is voltage present?

YES Go to step 12.

NO Go to step 11.

11. Check for open between:

(A701)XK1-C and (A701)TB1-3-A,

(A701)TB1-3-B and DS11-8.

Does open exist?YES Repair open wire.
Go to paragraph 9-80.NO Replace landing/search light
(TM 1-1520-238-23).

12. Check for 28 VDC at (A701)XK1-B.

Is voltage present?

YES Go to step 14.

NO Go to step 13.

13. Check for open between:

(A701)XK1-B and (A701)TB1-1/2-F,

(A701)TB1-1/2-E and (A402)J29-4.

Does open exist?YES Repair open wire.
Go to paragraph 9-80.NO Go to paragraph 9-263 to
troubleshoot circuit protection
system (dc emergency bus –
pilot station).

14. Check for 28 VDC at (A701)XK1-A.

Is voltage present?

YES Go to step 15.

NO Replace search light relay
(A701)K1 (TM 1-1520-238-23).

15. Check for open between:

(A701)XK1-A and (A701)TB1-1/2-C,

(A701)TB1-1/2-B and DS11-9.

Does open exist?YES Repair open wire.
Go to paragraph 9-80.NO Replace landing/search light
(TM 1-1520-238-23).

END OF TASK

9-89. PILOT COLLECTIVE STICK – DOES NOT STOW LANDING/SEARCH LIGHT

9-89

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier and crew station seat (pilot) removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between:
 J107-r and (A326)TB1-23-E,
 (A326)XK1-1/2-C1 and (A326)TB1-23-B,
 (A326)XK1-1/2-A2 and (A326)TB1-23-D,
 (A326)XK1-1/2-A1 and (A326)TB1-23-C,
 (A326)XK1-1/2-X2 and ground.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-80. |
| NO | Go to step 2. |

2. On pilot collective stick, set and hold **SRCH LT** switch (S4) to **STOW**, check for open between P107-r and P107-s.

Does open exist?

- | | |
|-----|--|
| YES | Replace pilot SRCH LT switch (S4) (TM 1-1520-238-23). |
| NO | Replace search light relay (A326)K1 (TM 1-1520-238-23). |

END OF TASK

9-90. PILOT COLLECTIVE STICK EDGE-LIGHT – IS NOT LIGHTED

9-90

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

3. Check for open between:
P481-B15 and J107-a,
P481-B16 and J107-Z.

Does open exist?

YES	Repair open wire. Go to paragraph 9-80.
NO	Replace pilot collective stick edge-light (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **EXT LT/INTR LT** panel, place **L CSL** control to **BRT**. Check for 5 VDC between (A326):

J13-B15 and J13-B16.

Is voltage present?

YES Go to step 3.

NO Go to step 2.

2. Check for open between (A326):

J13-B15 and TB1-26-B,
J13-B16 and TB1-26-H.

Does open exist?

YES Repair open wire.
Go to paragraph 9-80.

NO Refer to paragraph 9-113 to
troubleshoot pilot edge-lights.

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier and crew station seat (CPG) removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC at J108-m.

Is voltage present?

YES	Go to step 2.
NO	Repair open wire between J108-m and (A326)TB1-24-J. Go to paragraph 9-80.

2. Check for open between J108-k and (A326)TB1-25-K.

Does open exist?

YES	Repair open wire. Go to paragraph 9-80.
NO	Replace CPG EXT/RET/L/R switch (S1) (TM 1-1520-238-23).

END OF TASK

9-92. CPG COLLECTIVE STICK – DOES NOT ROTATE LANDING/SEARCH LIGHT TO THE LEFT

9-92

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier and crew station seat (CPG) removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Check for open between J108-q and (A326)TB1-25-F.

Does open exist?

- YES Repair open wire.
 Go to paragraph 9-80.

- NO Replace CPG **EXT/RET/L/R**
 switch (S1)
 (TM 1-1520-238-23).

END OF TASK

9-93. CPG COLLECTIVE STICK – DOES NOT ROTATE LANDING/SEARCH LIGHT TO THE RIGHT

9-93

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Crew station seat (CPG) removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On CPG collective stick, set and hold **EXT/RET/L/R** switch (S1) to R. Check for open between P108-n and P108-m.

Does open exist?

YES	Replace CPG EXT/RET/L/R switch (S1) (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:
J108-n and (A326)TB1-25-R,
J108-m and (A326)TB1-24-J.

Does open exist?

YES	Repair open wire. Go to paragraph 9-80.
NO	Replace landing/search light (TM 1-1520-238-23).

END OF TASK

9-94. CPG COLLECTIVE STICK – DOES NOT RETRACT LANDING/SEARCH LIGHT

9-94

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier and crew station seat (CPG) removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Check for open between J108-p and (A326)TB1-23-M.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-80. |
| NO | Replace CPG EXT/RET/L/R
switch (S1)
(TM 1-1520-238-23). |

END OF TASK

9-95. CPG COLLECTIVE STICK – DOES NOT LIGHT LANDING/SEARCH LIGHT

9-95

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Crew station seat (CPG) removed

3. Check for open between (A326):
J13-A6 and TB1-25-B,
J13-A4 and TB1-24-K.

Does open exist?

YES	Repair open wire. Go to paragraph 9-80.
NO	Replace landing/search light (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On CPG collective stick, set **SRCH LT** switch (S4) to **ON**. Check for open between P108-t and P108-s.

Does open exist?

YES	Replace CPG SRCH LT switch (S4) (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:
J108-t and P481-A6,
J108-s and P481-A4.

Does open exist?

YES	Repair open wire. Go to paragraph 9-80.
NO	Go to step 3.

END OF TASK

9-96. CPG COLLECTIVE STICK – DOES NOT STOW LANDING/SEARCH LIGHT

9-96

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier and crew station seat (CPG) removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Check for open between J108-r and (A326)TB1-23-H.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-80. |
| NO | Replace CPG SRCH LT switch (S4) (TM 1-1520-238-23). |

END OF TASK

9-97. CPG COLLECTIVE STICK EDGE-LIGHT – IS NOT LIGHTED

9-97

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed

3. Check for open between: P465-B1 and J108-a, P465-B2 and J108-Z.

Does open exist?

YES	Repair open wire. Go to paragraph 9-80.
NO	Replace CPG collective stick edge-light panel (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On CPG **INTR LT** panel, place **L CSL** control to **BRT**. Check for 5 VDC between (A326): J12-B1 and J12-B2.

Is voltage present?

YES	Go to step 3.
NO	Go to step 2.

2. Check for open between (A326): J12-B1 and TB1-47-C, J12-B2 and TB1-47-J.

Does open exist?

YES	Repair open wire. Go to paragraph 9-80.
NO	Go to paragraph 9-132 to troubleshoot CPG edge-lights.

END OF TASK

9-98. MAINTENANCE LIGHTS – MAINTENANCE OPERATIONAL CHECK

9-98

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital Maintenance Light Assembly	AN/PSM-45 7-116122072

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Helicopter safed Access provisions – B60R and R295 access doors opened

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

NOTE

- Refer to (fig. 9-137) for location and configuration of maintenance light.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.

1. Connect battery (TM 55-1520-238-23).
2. Perform the maintenance operational check as follows:

<u>Task</u>	<u>Result</u>
a. In aft avionics bay, check that MAINT LT (CB8) circuit breaker (fig. 9-137) is closed.	If MAINT LT circuit breaker (CB8) does not stay closed, go to paragraph 9-100.
b. With maintenance light attached to J111 in aft avionics bay (fig. 9-137), turn rheostat to BRT . Check that maintenance light is lighted.	If light is not lighted, go to paragraph 9-101.
c. With maintenance light attached to J112 in right FAB, turn rheostat to BRT . Check that maintenance light is lighted.	If maintenance light does not light, go to paragraph 9-102.

3. Disconnect battery (TM 1-1520-238-23).
4. Secure B60R and R295 access doors (TM 1-1520-238-23).

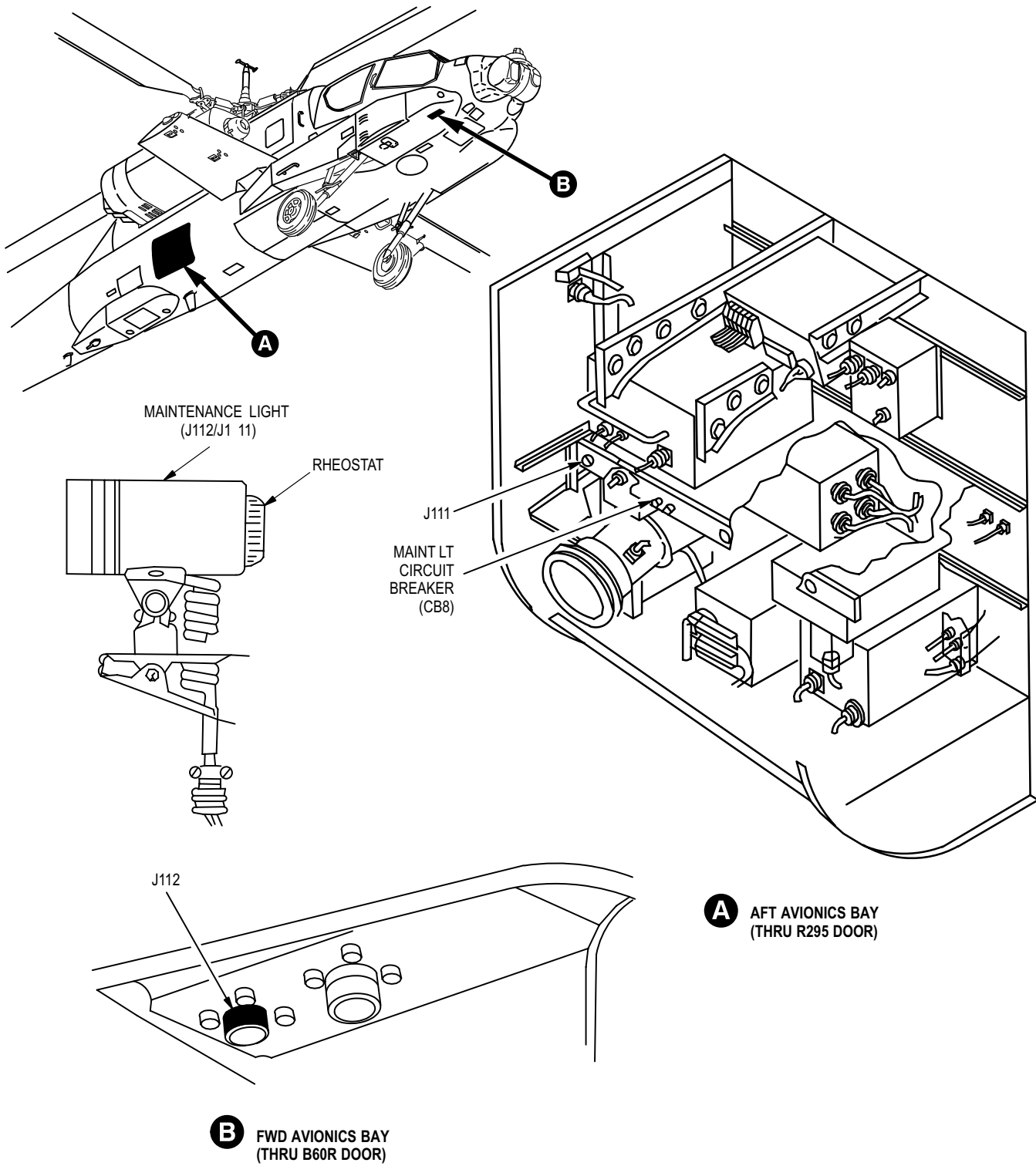


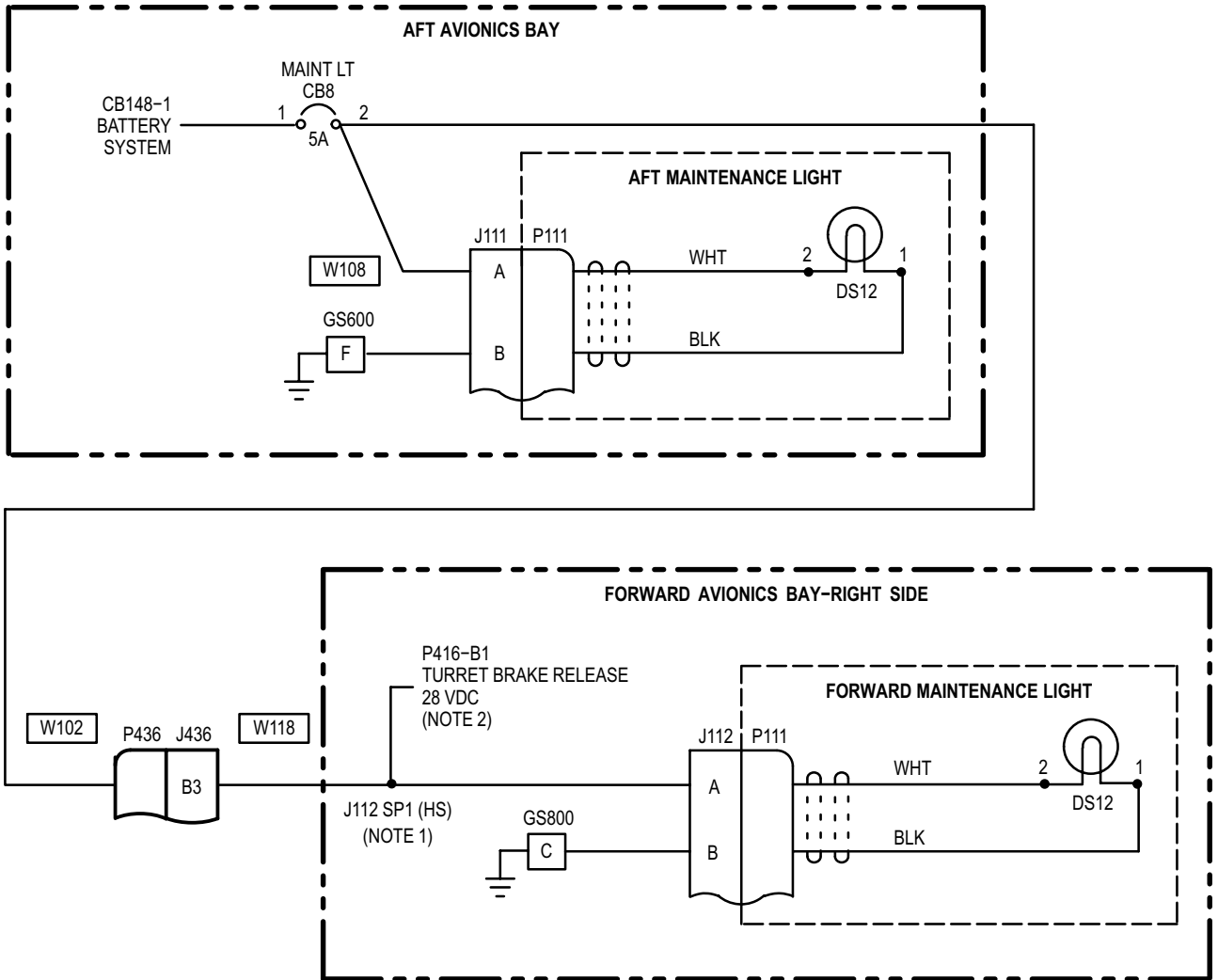
Figure 9-137. Maintenance Lights Components

M69-421

END OF TASK

9-99. MAINTENANCE LIGHTS – WIRING INTERCONNECT DIAGRAM

9-99



NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

1. HS DESIGNATES A HARD SPLICE WHICH MAY NOT BE DISCONNECTED FOR A WIRING CHECK.
2. PNV5 (TM 1-5855-265-T).

9-100. MAINT LT CIRCUIT BREAKER (CB8) – DOES NOT STAY CLOSED

9-100

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1270-476-T
 TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-149	Pilot circuit breaker panel accessing – completed

2. Detach P416 and open CB8. Check for short between J112-A and ground.

Does short exist?

YES	Repair shorted wire between J112-A and CB8-2. Go to paragraph 9-98.
NO	Refer to TM 1-1270-476-T to troubleshoot target acquisition display system/pilot night vision system (TADS/PNVS) turret brake release.

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Detach wire at CB8-2. Check for short between J111-A and ground.

Does short exist?

YES	Repair shorted wire between J111-A and CB8-2. Go to paragraph 9-98.
NO	Go to step 2.

END OF TASK

9-101. MAINTENANCE LIGHT – DOES NOT LIGHT IN AFT AVIONICS BAY

9-101

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
MMultimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – R295 door opened

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC at CB8-1.

Is voltage present?

YES	Go to step 2.
NO	Go to paragraph 9-41 to troubleshoot battery.

2. Check for open between:

CB8-2 and J111-A,
J111-B and ground.

Does open exist?

YES	Repair open wire. Go to paragraph 9-98.
NO	Replace MAINT LT circuit breaker (CB8) (TM 1-1520-238-23).

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – R295 and B60R doors opened



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Check for open between J112-B and CB8-2.
Does open exist?

- | | |
|-----|---|
| YES | Repair open between J112-B and CB8-2.
Go to paragraph 9-98. |
| NO | Repair open between J112-A and ground.
Go to paragraph 9-98. |

END OF TASK

9-103. PILOT UTILITY AND SECONDARY LIGHTS – MAINTENANCE OPERATIONAL CHECK

9-103

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
 One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

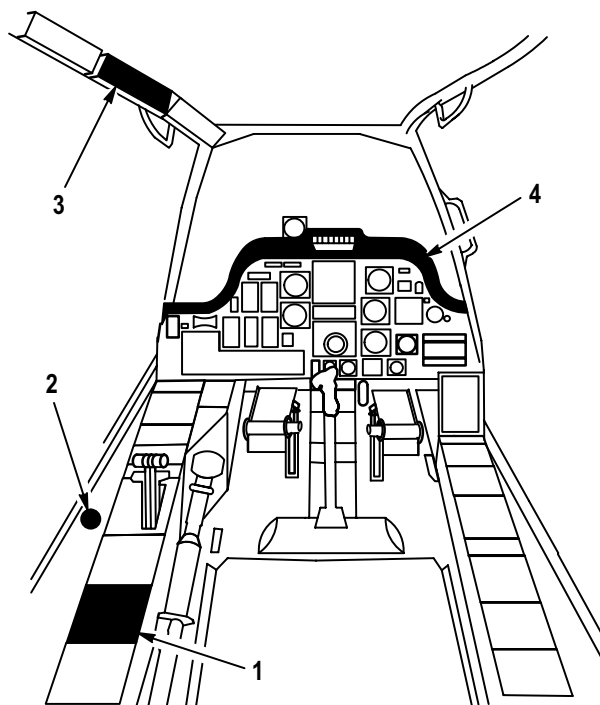
<u>Ref</u>	<u>Condition</u>
Paragraph 9-45	EXTERNAL POWER – POWER UP completed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

NOTE

- Refer to pilot station (fig. 9-138) for configuration and component locations.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.



1. PILOT EXT LT / INTR LT PANEL
2. PILOT UTILITY LIGHT
3. PILOT CENTER CIRCUIT BREAKER PANEL
4. PILOT GLARESHIELD

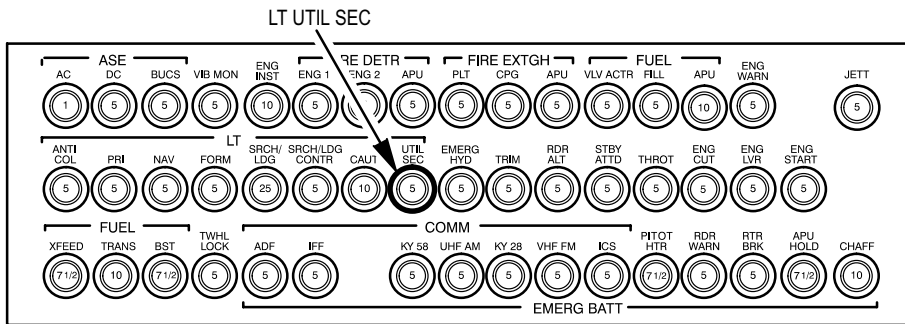
M69-152

Figure 9-138. Pilot Station

9-103. PILOT UTILITY AND SECONDARY LIGHTS – MAINTENANCE OPERATIONAL CHECK (cont)

1. Perform the maintenance operational check as follows:

Task	Result
a. On pilot center circuit breaker panel (fig. 9-139), check that LT UTIL SEC circuit breaker (CB23) is closed.	If LT UTIL SEC circuit breaker (CB23) does not stay closed, go to paragraph 9-105.



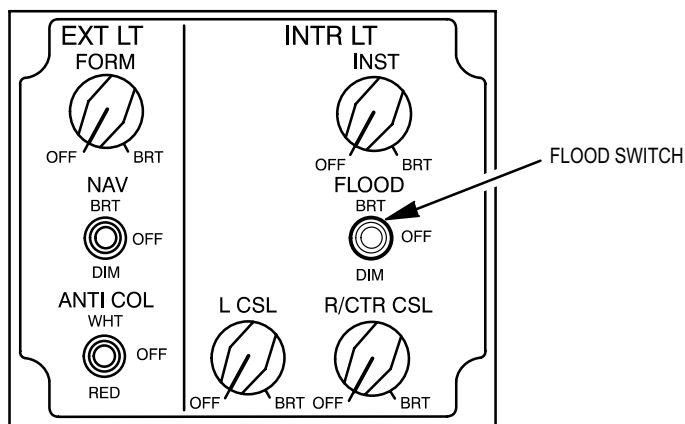
M69-153

Figure 9-139. Pilot Center Circuit Breaker Panel

b. On pilot EXT LT/INTR LT panel (fig. 9-140), set FLOOD switch (S1) to DIM , and then to BRT . Check that all glareshield secondary lights light in both positions.	If all secondary lights light in one position and not the other, replace pilot EXT LT/INTR LT panel (TM 1-1520-238-23).
--	--

If **LT UTIL SEC** circuit breaker (CB23) does not stay closed, go to paragraph 9-105.

If one or more lights do not light in both positions, go to paragraph 9-106.



M69-154

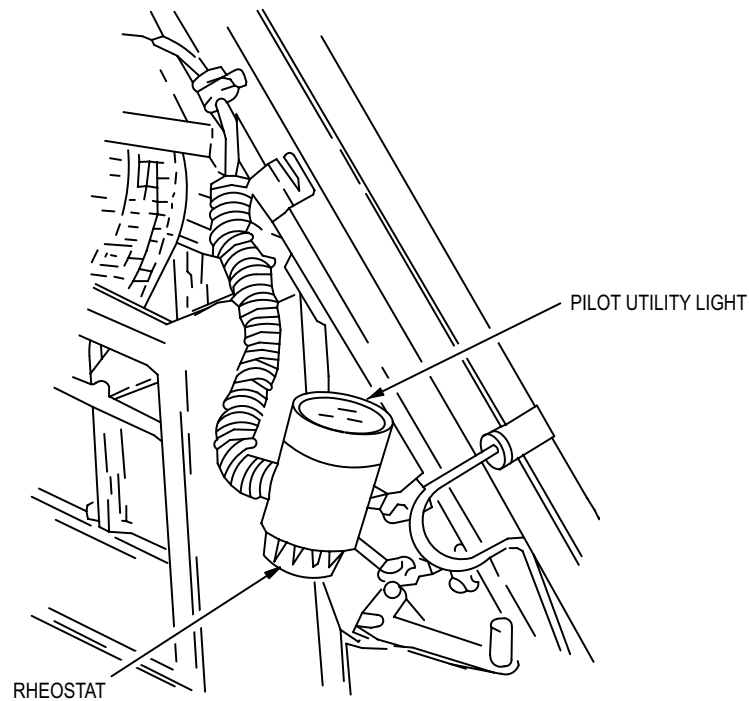
Figure 9-140. Pilot EXT LT/INTR LT Panel

c. Remove pilot utility light (fig. 9-141) from mounting bracket.	
d. While holding pilot utility light, turn rheostat to BRT . Check that utility light is lighted.	If utility light does not light, go to paragraph 9-107.

9-103. PILOT UTILITY AND SECONDARY LIGHTS – MAINTENANCE OPERATIONAL CHECK (cont)

9-103

Task	Result
e. On pilot utility light (fig. 9-141), turn rheostat to OFF .	
f. Reinstall pilot utility light onto mounting bracket.	
g. On pilot EXT LT/INTR LT panel (fig. 9-140), set FLOOD switch to OFF .	

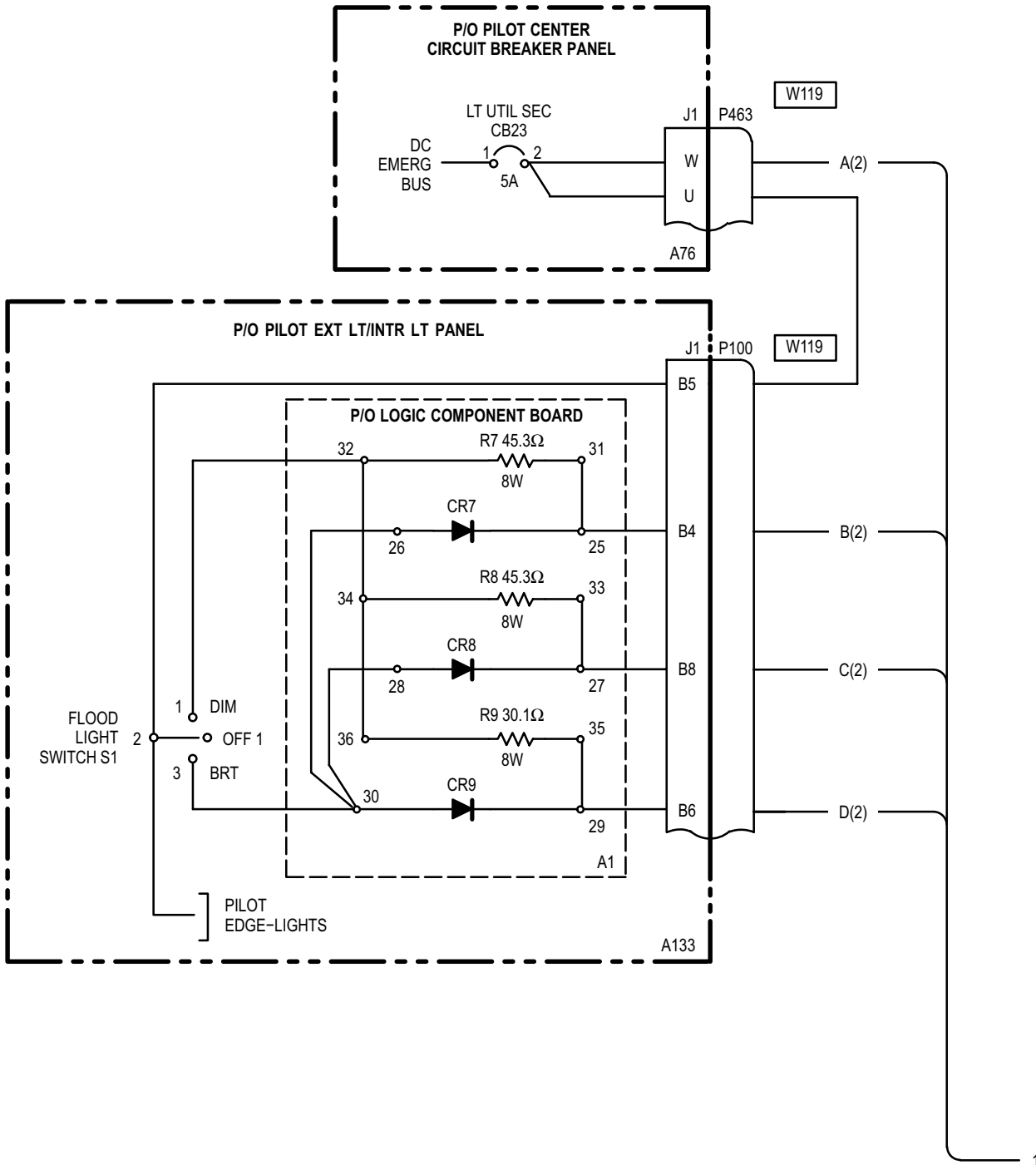


M69-430

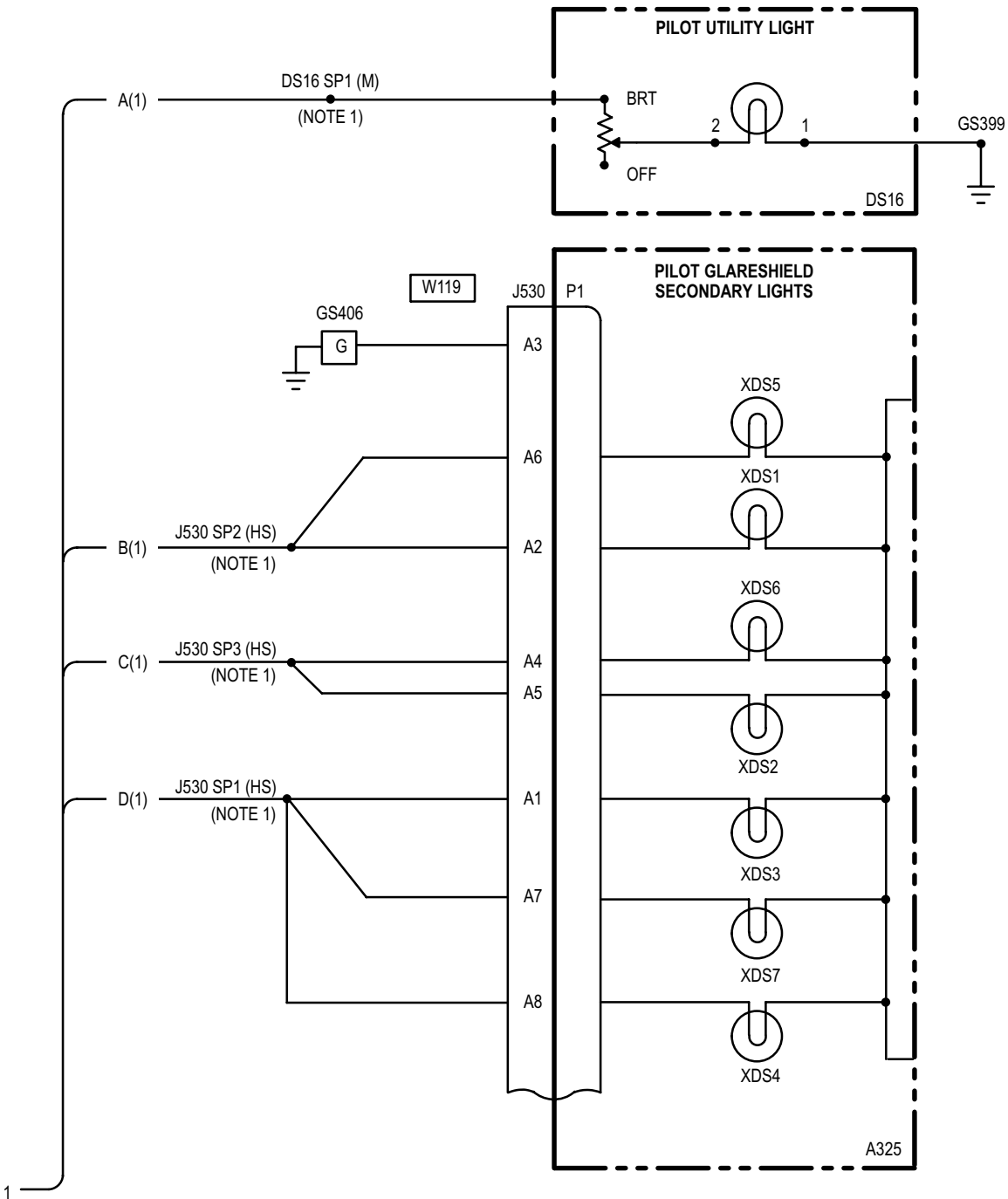
Figure 9-141. Pilot Utility Light

-
2. Perform EXTERNAL POWER – POWER DOWN (para 9-46).

END OF TASK



9-104. PILOT UTILITY AND SECONDARY LIGHTS - WIRING INTERCONNECT DIAGRAM (cont)



NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

- 1. HS DESIGNATES A HARD SPLICE WHICH CANNOT BE DISCONNECTED.
M DESIGNATES A SOFT SPLICE WHICH MAY BE DISCONNECTED FOR A WIRING CHECK.

9-105. LT UTIL SEC CIRCUIT BREAKER (CB23) – DOES NOT STAY CLOSED

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for short between (A76):
J1-U and ground,
J1-W and ground.

Does short exist?

- | | |
|-----|---|
| YES | Go to paragraph 9-263 to troubleshoot circuit protection system (dc emergency bus – pilot station). |
| NO | Go to step 2. |

2. Detach DS16 SP1. Check for short between P463-w and ground.

Does short exist?

- | | |
|-----|---|
| YES | Repair shorted wire between P463-W and DS16 SP1. Go to paragraph 9-104. |
| NO | Go to step 3. |

3. Attach DS16 SP1. Check for resistance between P463-W and ground.

Is resistance present?

- | | |
|-----|---|
| YES | Go to step 4. |
| NO | Replace pilot utility light (TM 1-1520-238-23). |

4. Detach P100. On pilot center circuit breaker panel, open **LT UTIL SEC** circuit breaker (CB23). On pilot **EXT LT/INTR LT** panel, set **FLOOD** switch to **OFF**. Check for short between DS16 SP1 and ground.
Does short exist?

- | | |
|-----|--|
| YES | Repair shorted wire between: DS16 SP1 and P463-W, P463-U and P100-B5. Go to paragraph 9-103. |
| NO | Go to step 5. |

5. Check for resistance between (A325):
P1-A1 and ground,
P1-A2 and ground,
P1-A4 and ground,
P1-A5 and ground,
P1-A6 and ground,
P1-A7 and ground,
P1-A8 and ground.

Is resistance present?

- | | |
|-----|--|
| YES | Replace pilot EXT LT/INTR LT panel (TM 1-1520-238-23). |
| NO | Repair shorted wire between (A325):
P1-A1 and XDS3,
P1-A2 and XDS1,
P1-A4 and XDS6,
P1-A5 and XDS2,
P1-A6 and XDS5,
P1-A7 and XDS7,
P1-A8 and XDS4.
Go to paragraph 9-103. |

END OF TASK

9-106. ONE OR MORE PILOT SECONDARY LIGHTS – DO NOT LIGHT

9-106

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC at (A76)J1-U.
Is voltage present?

YES	Go to step 2.
NO	Go to paragraph 9-263 to troubleshoot circuit protection system (dc emergency bus – pilot station).

2. Check for open between:

P100-B5 and P463-U,
P100-B4 and J530-A6,
P100-B4 and J530-A2,
P100-B8 and J530-A4,
P100-B8 and J530-A5,
P100-B6 and J530-A1,
P100-B6 and J530-A7,
P100-B6 and J530-A8.

Does open exist?

YES	Repair open wire. Go to paragraph 9-103.
NO	Repair open wire between (A325): P1-A1 and XDS3-1, P1-A2 and XDS1-1, P1-A4 and XDS6-1, P1-A5 and XDS2-1, P1-A6 and XDS5-1, P1-A7 and XDS7-1, P1-A8 and XDS4-1. Go to paragraph 9-103.

END OF TASK

9-107. PILOT UTILITY LIGHT – DOES NOT LIGHT

9-107

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot circuit breaker panel, check for 28 VDC at (A76)J1-W.

Is voltage present?

YES	Go to step 2.
NO	Go to paragraph 9-263 to troubleshoot circuit protection system (dc emergency bus – pilot station).

2. Check for open between P463-W and DS16 SP1.

Does open exist?

YES	Repair open wire. Go to paragraph 9-103.
NO	Replace pilot utility light (TM 1-1520-238-23).

END OF TASK

9-108. CPG UTILITY AND SECONDARY LIGHTS – MAINTENANCE OPERATIONAL CHECK

9-108

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

- 68X Armament/Electrical Systems Repairer
- One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-45	EXTERNAL POWER – POWER UP completed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

NOTE

- Refer to CPG station (fig. 9-142) for cockpit configuration and equipment.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.

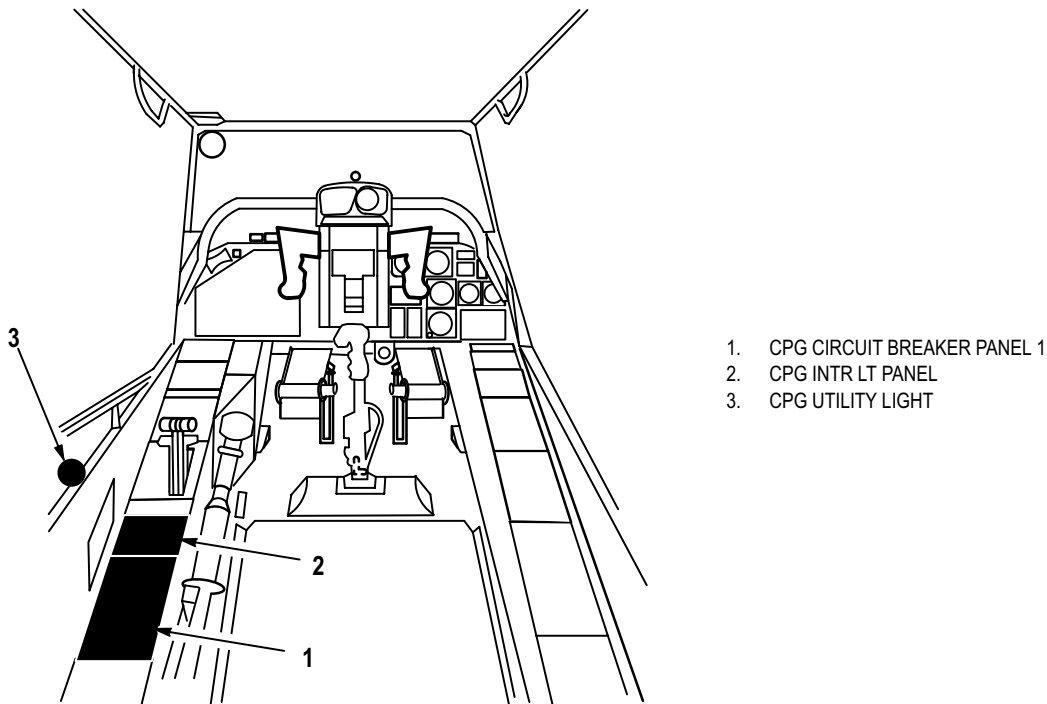


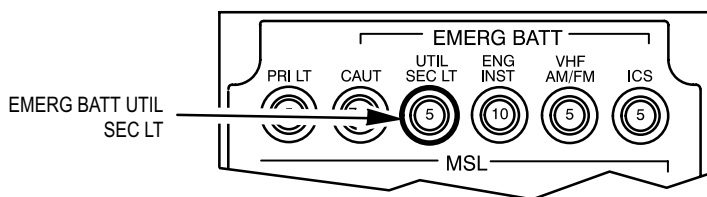
Figure 9-142. CPG Station

M69-125

9-108. CPG UTILITY AND SECONDARY LIGHTS – MAINTENANCE OPERATIONAL CHECK (cont) 9-108

1. Perform the maintenance operational check as follows:

Task	Result
a. Check for continuity between J168-A1 and ground.	If continuity does not exist, repair open wire between J168-A1 and GS250-J.
b. Check for continuity between J1039-B15 and ground.	If continuity does not exist, repair open wire between J1039-B15 and GS250-K.
c. On CPG circuit breaker panel 1 (fig. 9-143), check that EMERG BATT UTIL SEC LT circuit breaker (CB30) is closed.	If EMERG BATT UTIL SEC LT circuit breaker (CB30) does not stay closed, go to paragraph 9-110.

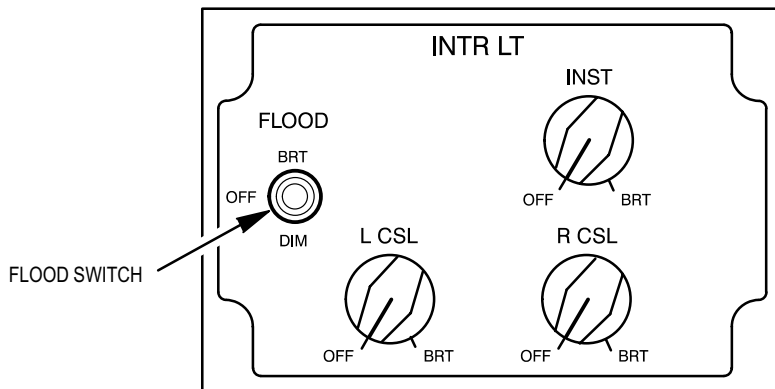


M69-126

Figure 9-143. CPG Circuit Breaker Panel 1

d. On CPG INTR LT panel (fig. 9-144), place FLOOD switch to DIM , and then to BRT . Check that all glareshield secondary lights are lighted in both switch positions.	If all glareshield secondary lights light in one position and not the other, replace CPG INTR LT panel (TM 1-1520-238-23).
---	---

If one or more glareshield secondary lights do not light in both switch positions, go to paragraph 9-111.

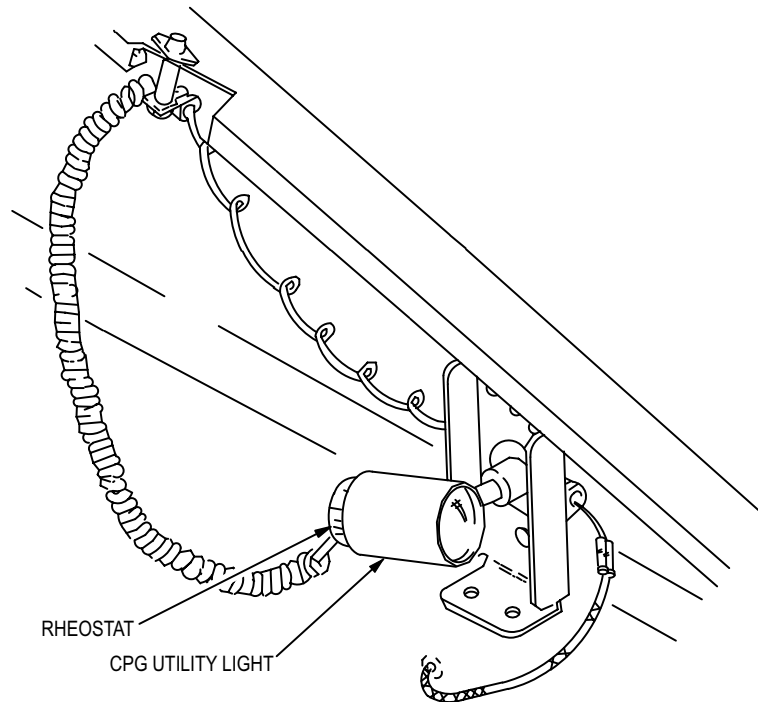


M69-127

Figure 9-144. CPG INTR LT Panel

e. Remove CPG utility light (fig. 9-145) from mounting bracket.	
f. While holding CPG utility light, turn rheostat to BRT . Check that utility light is lighted.	If CPG utility light does not light, go to paragraph 9-112.

9-108. CPG UTILITY AND SECONDARY LIGHTS – MAINTENANCE OPERATIONAL CHECK (cont) 9-108



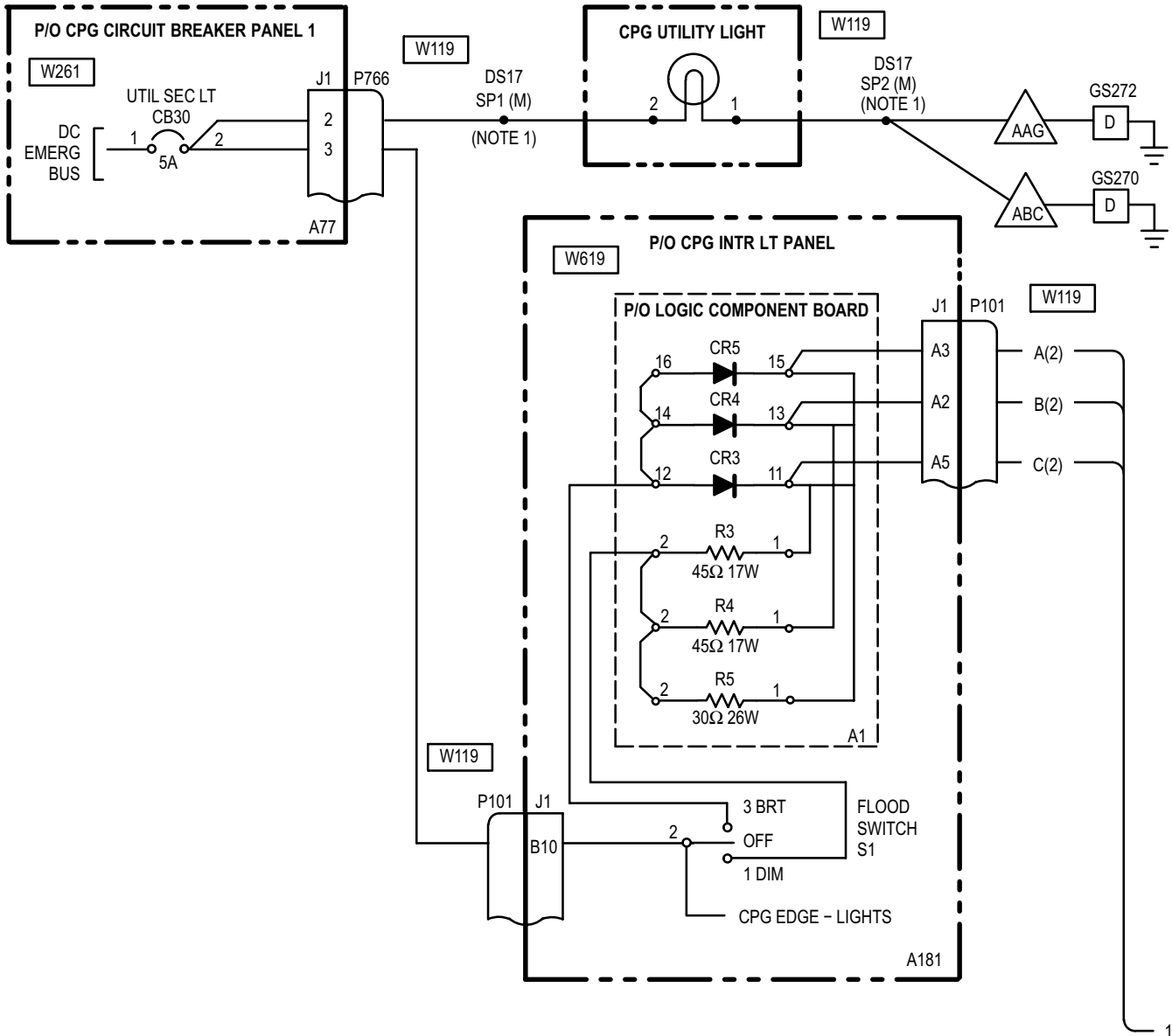
M69-429

Figure 9-145. CPG Utility Light

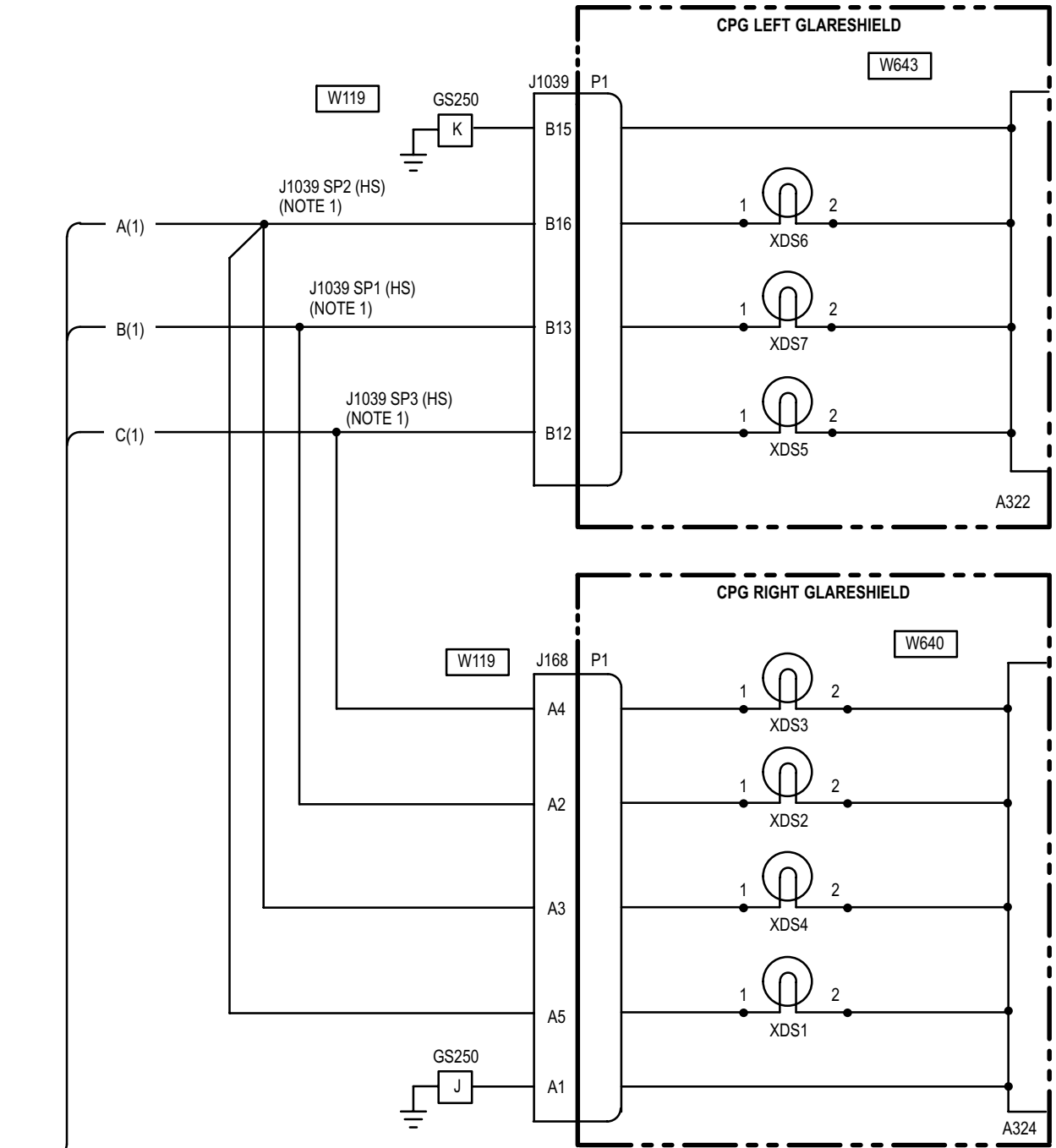
Task	Result
g. On CPG utility light (fig. 9-145), turn rheostat to OFF .	
h. Install CPG utility light onto mounting bracket.	
i. On CPG INTR LT panel (fig. 9-144), place FLOOD switch to OFF .	

2. Perform EXTERNAL POWER – POWER DOWN (para 9-46).

END OF TASK



9-109. CPG UTILITY AND SECONDARY LIGHTS - WIRING INTERCONNECT DIAGRAM (cont)



NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

- 1. HS DESIGNATES A HARD SPLICE WHICH CANNOT BE DISCONNECTED.
- M DESIGNATES A SOFT SPLICE WHICH MAY BE DISCONNECTED FOR A WIRING CHECK.

M69-010-2A
SHEET 2 OF 2

9-110. EMERG BATT UTIL SEC LT CIRCUIT BREAKER (CB30) – DOES NOT STAY CLOSED

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for short between (A77):
J1-2 and ground,
J1-3 and ground.
Does short exist?

YES	Go to paragraph 9-304 to troubleshoot circuit protection system (dc emergency bus – CPG station).
NO	Go to step 2.

2. Detach DS17 SP1. Check for short between P766-2 and ground.
Does short exist?

YES	Repair shorted wire between P766-2 and DS17 SP1. Go to paragraph 9-108.
NO	Go to step 3.

3. Attach DS17 SP1. Check for resistance between P766-2 and ground.
Is resistance present?

YES	Go to step 4.
NO	Replace CPG utility light (TM 1-1520-238-23).

4. Check for short between P101-B10 and ground.
Does short exist?

YES	Repair shorted wire between P101-B10 and P766-3. Go to paragraph 9-108.
NO	Go to step 5.

5. Detach J168 and J1039. Check for short between:
P101-A2 and ground,
P101-A3 and ground,
P101-A5 and ground.
Does short exist?

YES	Repair shorted wire between: P101-A2 and J1039-B13, P101-A2 and J168-A2, P101-A3 and J1039-B16, P101-A3 and J168-A3, P101-A3 and J168-A5, P101-A5 and J1039-B12, P101-A5 and J168-A4. Go to paragraph 9-108.
NO	Go to step 6.

6. Check for resistance between (A322):
P1-B12 and ground,
P1-B13 and ground,
P1-B16 and ground.
Is resistance present?

YES	Repair shorted wire between (A322): P1-B12 and XDS5-1, P1-B13 and XDS7-1, P1-B16 and XDS6-1. Go to paragraph 9-108.
NO	Go to step 7.

9-110. EMERG BATT UTIL SEC LT CIRCUIT BREAKER (CB30) – DOES NOT STAY CLOSED (cont) 9-110

7. Check for resistance between (A324):

P1-A2 and ground,

P1-A3 and ground,

P1-A4 and ground,

P1-A5 and ground.

Is resistance present?

YES Replace CPG **INTR LT** panel
(TM 1-1520-238-23).

NO Repair shorted wire between
(A324):
P1-A2 and XDS2-1,
P1-A3 and XDS4-1,
P1-A4 and XDS3-1,
P1-A5 and XDS1-1.
Go to paragraph 9-108.

END OF TASK

9-111. ONE OR MORE CPG SECONDARY LIGHTS – DO NOT LIGHT

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC at (A77)J1-3.

Is voltage present?

- | | |
|-----|---|
| YES | Go to step 2. |
| NO | Go to paragraph 9-304 to troubleshoot circuit protection system (dc emergency bus – CPG station). |

2. On CPG **INTR LT** panel, set **FLOOD** switch to **DIM**, check for open between (A181):

J1-B10 and J1-A5.

Does open exist?

- | | |
|-----|--|
| YES | Replace CPG INTR LT panel (TM 1-1520-238-23). |
| NO | Go to step 3. |

3. Check for open between:

P766-3 and P101-B10,
 P101-A3 and J1039-B16,
 P101-A2 and J1039-B13,
 P101-A5 and J1039-B12,
 P101-A3 and J168-A5,
 P101-A3 and J168-A3,
 P101-A2 and J168-A2,
 P101-A5 and J168-A4,
 J1059-B15 and GS250-K,
 J168-A1 and GS250-J

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-108. |
| NO | Repair open wire between (A322):
P1-B16 and XDS6-1,
P1-B13 and XDS7-1,
P1-B12 and XDS5-1,
P1-A4 and XDS3-1,
P1-A2 and XDS2-1,
P1-A3 and XDS4-1,
P1-A5 and XDS1-1.
Go to paragraph 9-108. |

END OF TASK

9-112. CPG UTILITY LIGHT – DOES NOT LIGHT

9-112

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On CPG circuit breaker panel 1, check for 28 VDC at (A77)J1-2.

Is voltage present?

YES	Go to step 2.
NO	Go to paragraph 9-304 to troubleshoot circuit protection system (dc emergency bus – CPG station).

2. Check for open between P766-2 and DS17 SP1.

Does open exist?

YES	Repair open wire. Go to paragraph 9-108.
NO	Go to step 3.

3. Check for open between DS17 SP2 and ground.

Does open exist?

YES	Repair open wire. Go to paragraph 9-108.
NO	Replace CPG utility light (TM 1-1520-238-23).

END OF TASK

9-113. PILOT EDGE-LIGHTS – MAINTENANCE OPERATIONAL CHECK

9-113

Tools:

Nomenclature

Tool Kit, Electrical
Repairer's

Part Number

SC518099CLA06

References:

TM 1-1520-238-23

Equipment Conditions:

Ref

Paragraph 9-45

Condition

EXTERNAL POWER
– POWER UP completed

Personnel Required:

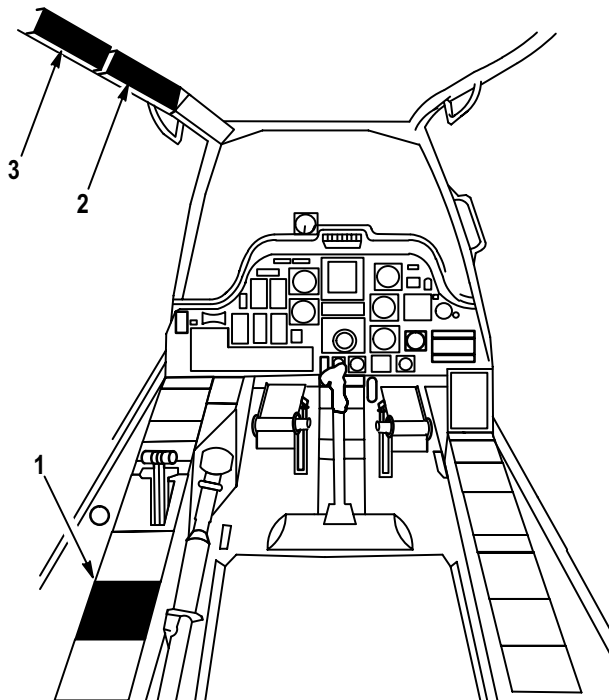
68X Armament/Electrical Systems Repairer

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

NOTE

- Refer to pilot station (fig. 9-146) for configuration and component locations.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.



1. PILOT EXT LT / INTR LT PANEL
2. PILOT CENTER CIRCUIT BREAKER PANEL
3. PILOT AFT CIRCUIT BREAKER PANEL

M69-170

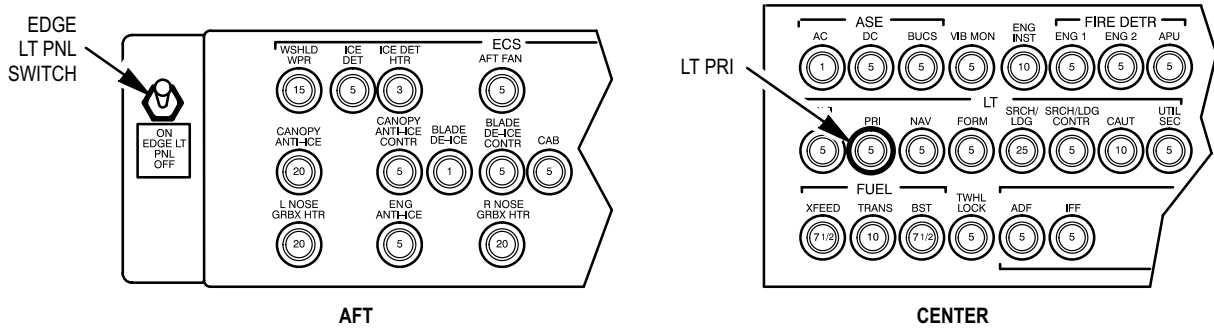
Figure 9-146. Pilot Station

9-113. PILOT EDGE-LIGHTS – MAINTENANCE OPERATIONAL CHECK (cont)

9-113

1. Perform the maintenance operational check as follows:

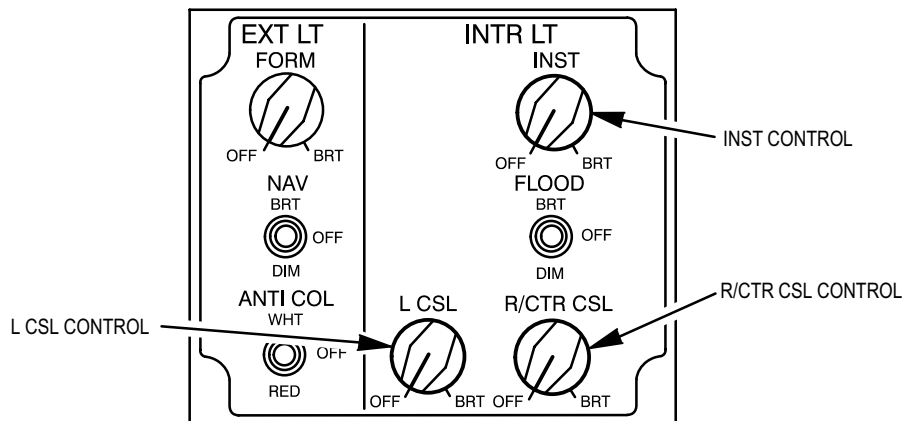
Task	Result
a. On pilot center circuit breaker panel (fig. 9-147), check that LT PRI circuit breaker (CB39) is closed.	If LT PRI circuit breaker (CB39) does not stay closed, go to paragraph 9-115.
b. On pilot aft circuit breaker panel, set EDGE LT PNL switch to ON .	



M69-171

Figure 9-147. Pilot Circuit Breaker Panels

c. On pilot EXT LT/INTR LT panel (fig. 9-148), place L CSL , R/CTR CSL , and INST controls to BRT .	If pilot edge-lights are not lighted, go to paragraph 9-116.
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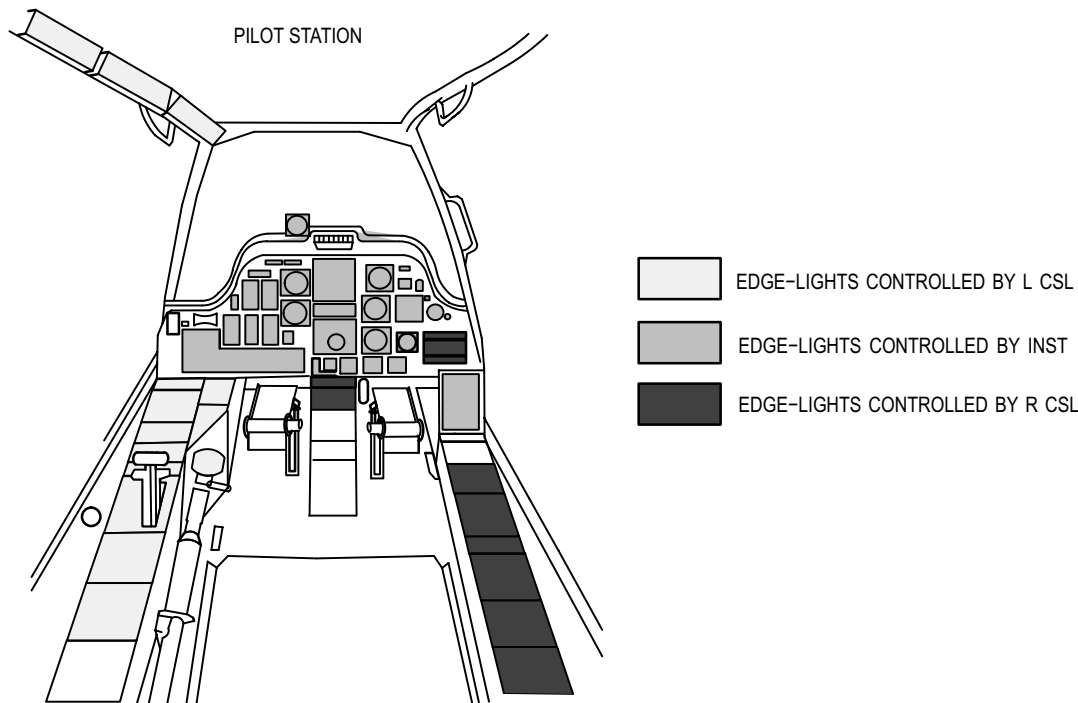
M69-172

Figure 9-148. Pilot EXT LT/INTR LT Panel

d. On pilot left console, check that all edge-lights controlled by L CSL are lighted (fig. 9-149).	If all pilot left console edge-lights do not light, go to paragraph 9-117.
e. On pilot right/center console, check that all edge-lights controlled by R/CTR CSL are lighted (fig. 9-149).	If all pilot right/center console edge-lights do not light, go to paragraph 9-118.

NOTE

Refer to (fig. 9-149) for location of panels and instruments controlled by the INST, L CSL, and R CSL controls on the pilot's EXT LT/ INTR LT panel.



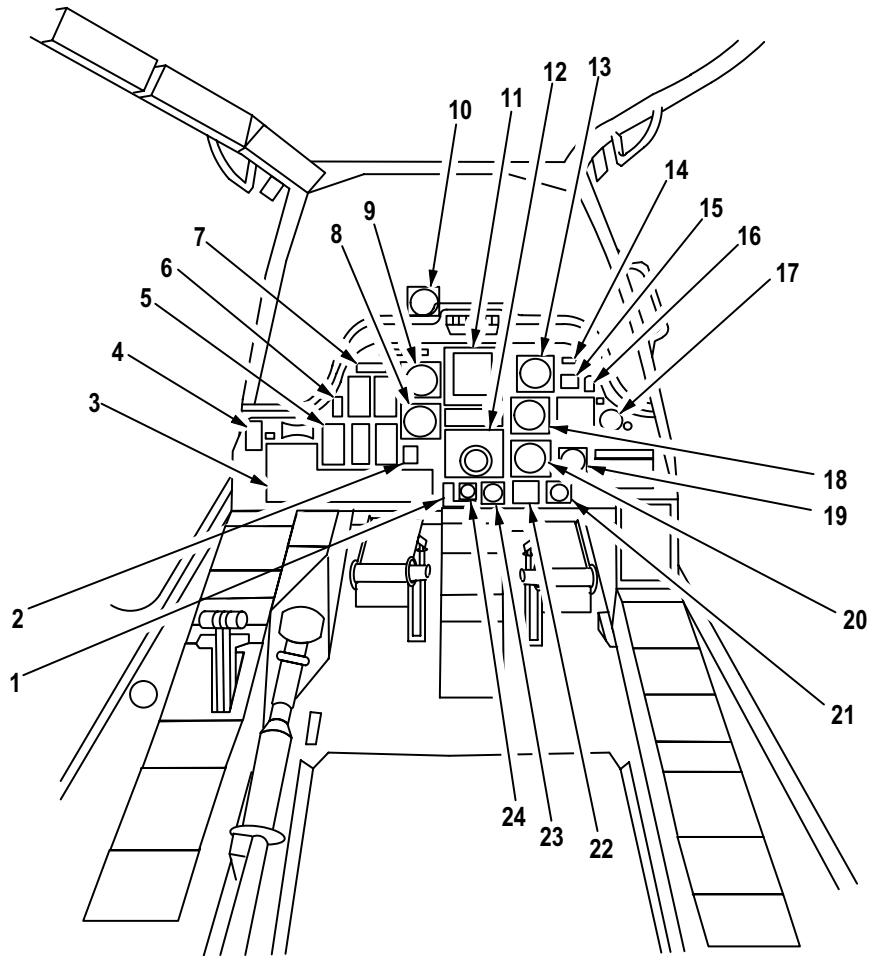
M69-431

Figure 9-149. Pilot Edge-Light Controls

Task	Result
f. On pilot instrument panel, check that all edge-lights controlled by INST are lighted (fig. 9-149).	If all pilot instrument panel edge-lights are not light, go to paragraph 9-119.
g. Check that pilot EXT LT/INTR LT edge-light panel is lighted (fig. 9-150).	If EXT LT/INTR LT edge-light panel does not light, go to paragraph 9-120.
h. Check that all channel 1, No. 1 indicators edge-lights are lighted (fig. 9-150).	If all channel 1, No. 1 indicators do not light, go to paragraph 9-121.
i. Check that all channel 1, No. 2 indicators are lighted.	If all channel 1, No. 2 indicators do not light, go to paragraph 9-122.
j. Check that all channel 2, No. 1 indicators are lighted.	If all channel 2, No. 1 indicators do not light, go to paragraph 9-123.
k. Check that all channel 2, No. 2 indicators are lighted.	If all channel 2, No. 2 indicators do not light, go to paragraph 9-124.

9-113. PILOT EDGE-LIGHTS – MAINTENANCE OPERATIONAL CHECK (cont)

9-113



CHANNEL 1 NO. 1

- 11. PILOT VIDEO DISPLAY UNIT
- 14. PILOT RADIO CALL PLACARD
- 16. PILOT STABILATOR AIRSPEED PLACARD
- 18. PILOT PRESSURE ALTIMETER
- 19. PILOT CLOCK
- 20. PILOT VERTICAL SPEED INDICATOR
- 21. PILOT ACCELEROMETER

CHANNEL 2 NO. 1

- 2. PILOT ENG OIL INDICATOR
- 5. PILOT FUEL QUANTITY INDICATOR
- 6. PILOT DIM / TEST PANEL
- 7. PILOT FIRE BOTTLE SELECT
- 8. PILOT STANDBY ATTITUDE INDICATOR
- 10. PILOT MAGNETIC COMPAS

CHANNEL 1 NO. 2

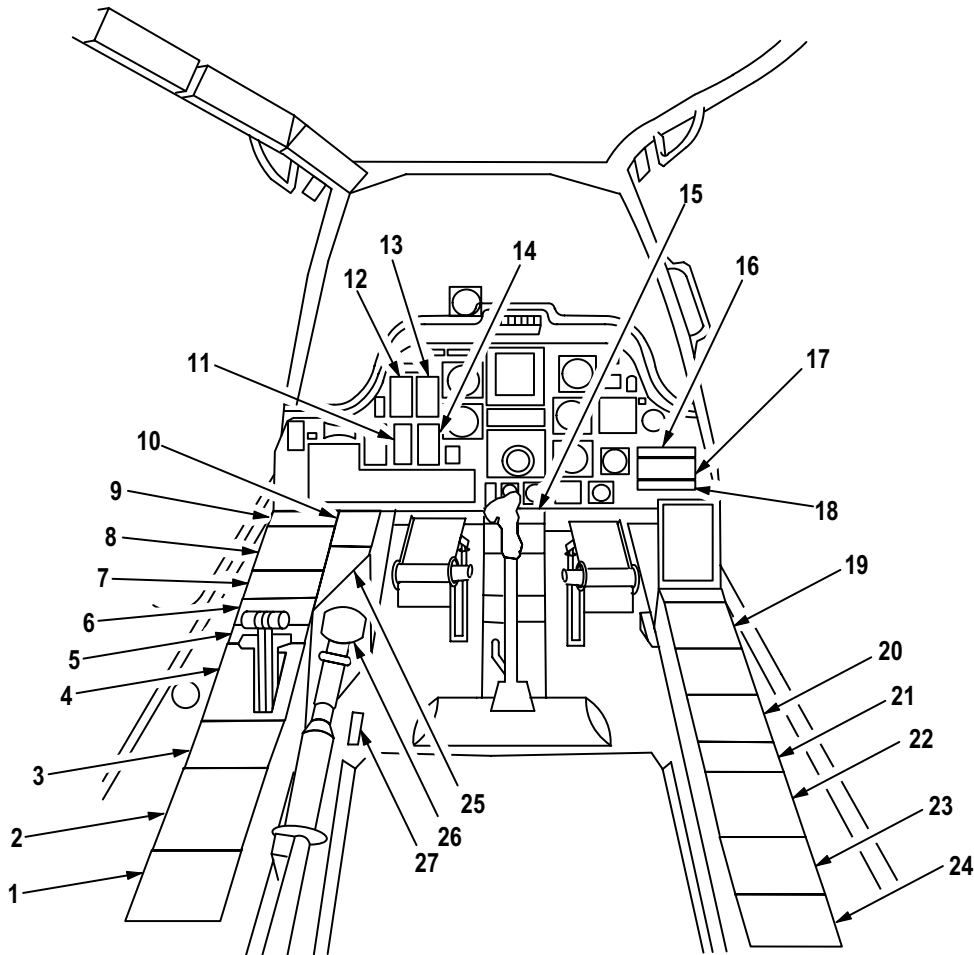
- 1. PILOT EMERGENCY HYDRAULIC CONTROL PANEL
- 4. PILOT TAIL WHEEL PANEL
- 12. PILOT HORIZONTAL SITUATION INDICATOR
- 13. PILOT RADAR ALTIMETER
- 15. PILOT STAB POSITION INDICATOR
- 17. PILOT ICING SEVERITY METER
- 22. PILOT HARS CONTROL PANEL
- 23. PILOT HYDRAULIC PRESSURE INDICATOR
- 24. PILOT EMERGENCY HYDRAULIC PRESSURE INDICATOR

CHANNEL 2 NO. 2

- 3. PILOT FIRE CONTROL PANEL
- 9. PILOT AIRSPEED INDICATOR

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Figure 9-150. Pilot Edge-Lights (Sheet 1 of 2)



CHANNEL 2 NO. 3

- 11. PILOT N_G RPM% INDICATOR
- 12. PILOT TGT INDICATOR
- 13. PILOT TORQUE INDICATOR
- 14. PILOT ENG-RTR RPM% INDICATOR

CHANNEL 3 NO. 1

- 16. PILOT RADAR / IR JAMMER CONTROL PANEL
- 17. PILOT CHAFF DISPENSER CONTROL PANEL
- 18. PILOT RADAR WARNING CONTROL PANEL
- 19. PILOT UHF AM RECEIVER / TRANSMITTER
- 23. PILOT ADF RCVR CONTROL PANEL

CHANNEL 3 NO. 2

- 15. PILOT REMOTE TRANSMITTER SELECTOR INDICATOR PANEL
- 22. PILOT IFF CONTROL PANEL
- 24. PILOT BTL DISCHARGE/APU PANEL

CHANNEL 3 NO. 3

- 20. PILOT VHF AM-FM RECEIVER/ TRANSMITTER
- 21. PILOT SECURE VOICE CONTROL PANEL

CHANNEL 4 NO. 1

- 8. PILOT ROCKETS CONTROL PANEL
- 9. PILOT MSL CONTROL PANEL
- 26. PILOT COLLECTIVE STICK GRIP
- 27. PILOT STABILATOR MANUAL CONTROL PANEL

CHANNEL 4 NO. 2

- 1. PILOT ANTI ICE PANEL
- 3. PILOT FUEL PANEL
- 7. PILOT STORES JETT PANEL
- 25. PILOT ECS PANEL

CHANNEL 4 NO. 4

- 2. PILOT EXT LT/INTR LT PANEL
- 4. PILOT POWER QUADRANT
- 5. PILOT EMERG PWR CHK OVSP TEST PANEL
- 6. PILOT ELEC PWR PANEL
- 10. PILOT ASE PANEL

M69-426-2

Figure 9-150. Pilot Edge-Lights (Sheet 2 of 2)

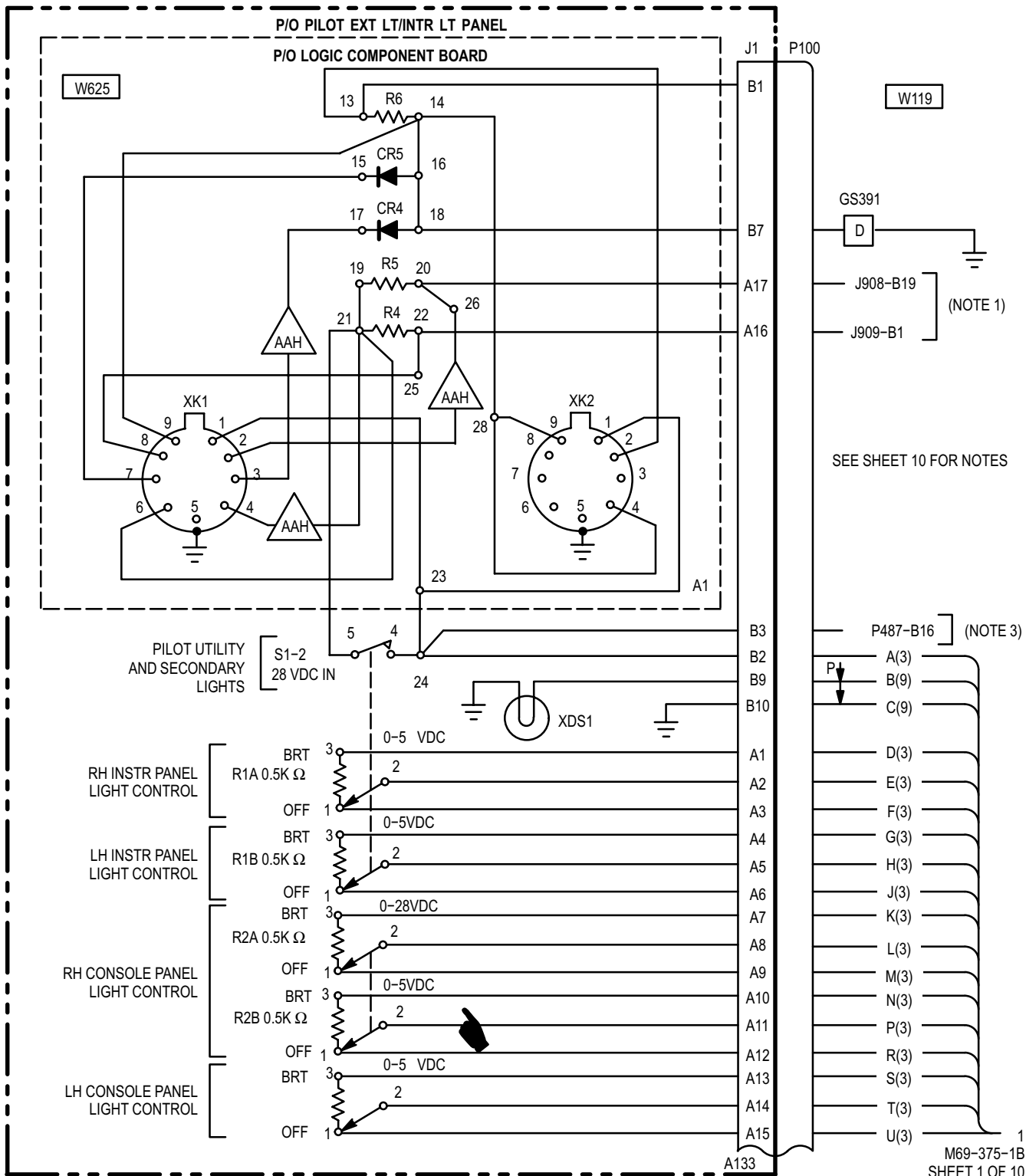
9-113. PILOT EDGE-LIGHTS – MAINTENANCE OPERATIONAL CHECK (cont)**9-113**

Task	Result
l. Check that all channel 2, No. 3 indicators are lighted (fig. 9-150).	If all channel 2, No. 3 indicators do not light, go to paragraph 9-125.
m. Place INST control to OFF . Check that all channel 3 No. 1 control panel edge-lights are lighted.	If all channel 3, No. 1 control panels do not light, go to paragraph 9-126.
n. Check that all channel 3, No. 2 indicators are lighted.	If all channel 3, No. 2 control panels do not light, go to paragraph 9-127.
o. Check that all channel 3, No. 3 indicators are lighted.	If all channel 3, No. 3 control panels do not light, go to paragraph 9-128.
p. Place R/CTR CSL control to OFF . Check that all channel 4, No. 1 control panel edge-lights are lighted (fig. 9-149).	If all channel 4, No. 1 control panels do not light, go to paragraph 9-129.
q. Check that all channel 4, No. 2 indicators are lighted.	If all channel 4, No. 2 control panels do not light, go to paragraph 9-130.
r. Check that all channel 4, No. 4 indicators are lighted.	If all channel 4, No. 4 control panels do not light, go to paragraph 9-131.

2. On pilot aft circuit breaker panel (fig. 9-147), set **EDGE LT PNL** switch to **OFF**.
3. On pilot **EXT LT/INTR LT** panel (fig. 9-148), place **L CSL** control to **OFF**.
4. Perform EXTERNAL POWER – POWER DOWN (para 9-46).

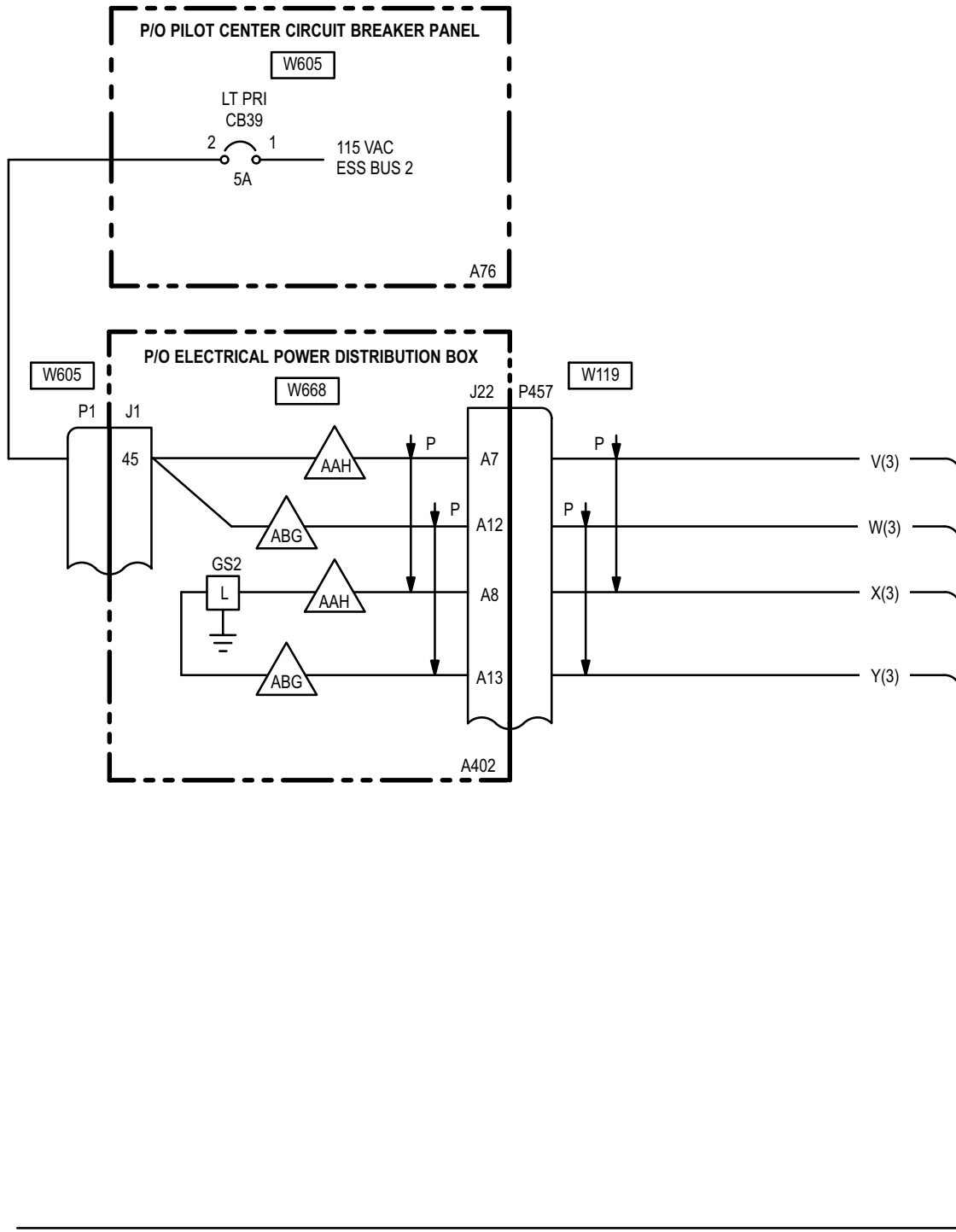
END OF TASK

9-114. PILOT EDGE-LIGHTS - WIRING INTERCONNECT DIAGRAM

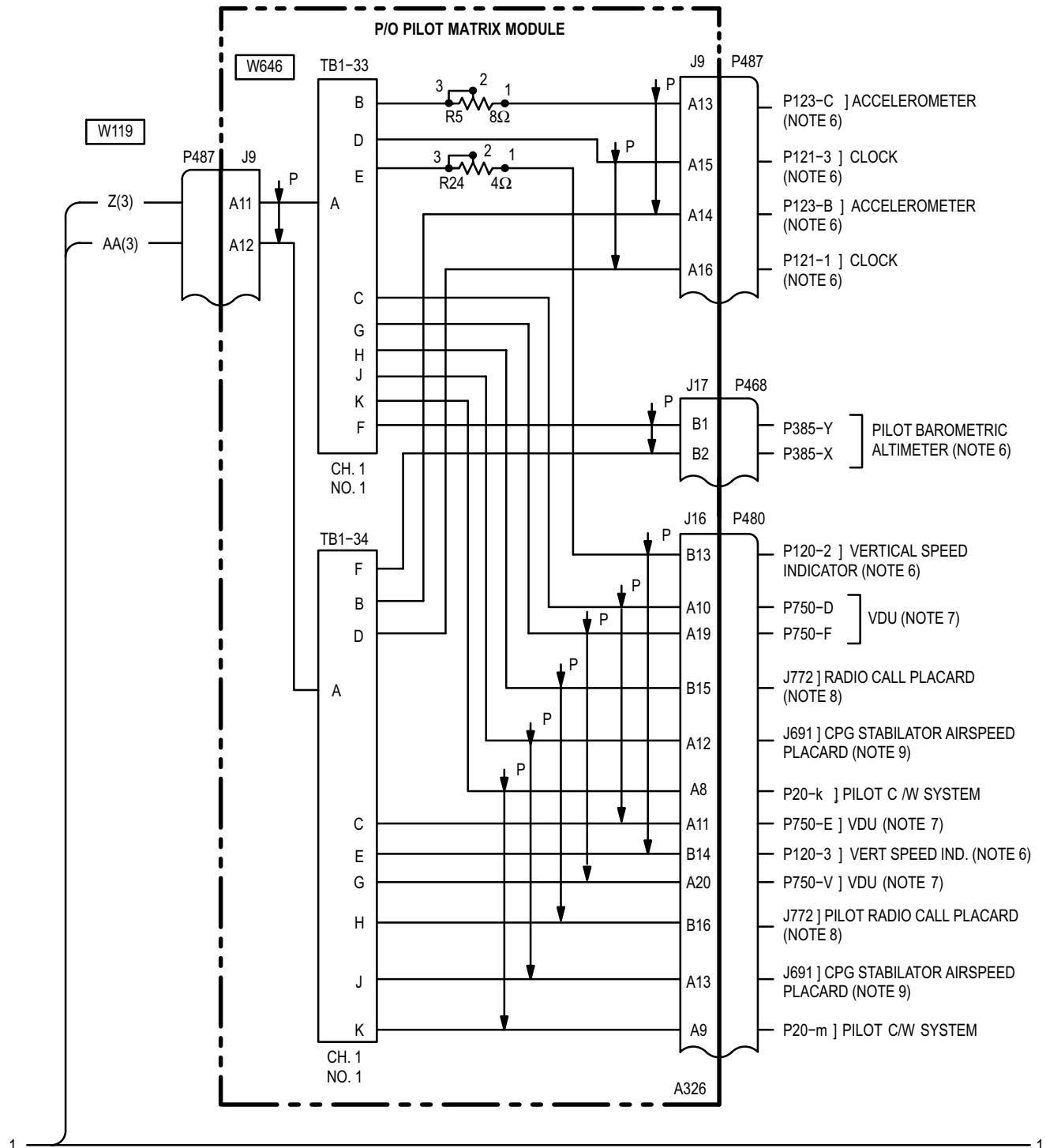


9-114. PILOT EDGE-LIGHTS – WIRING INTERCONNECT DIAGRAM (cont)

9-114

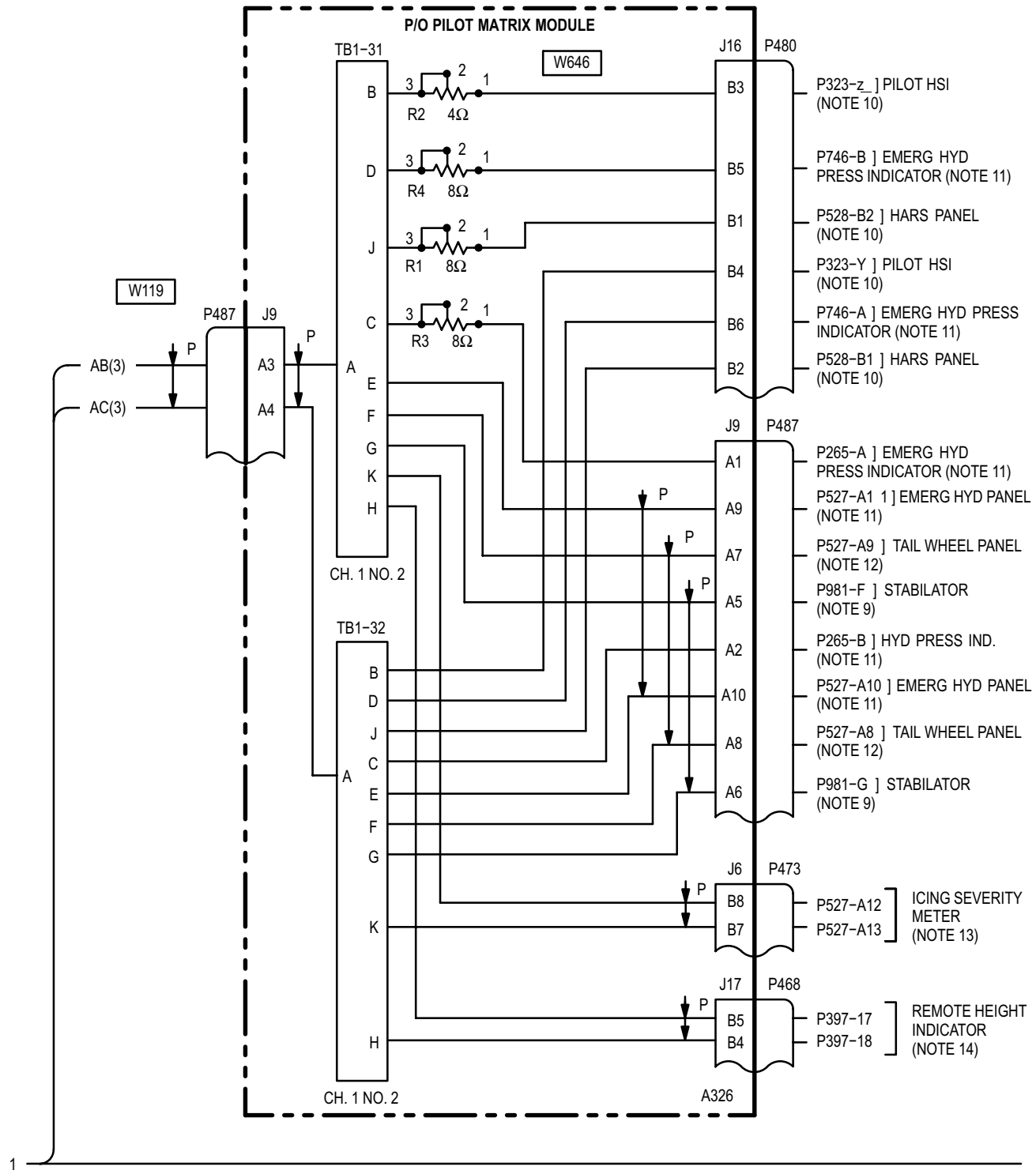


9-114. PILOT EDGE-LIGHTS – WIRING INTERCONNECT DIAGRAM (cont)

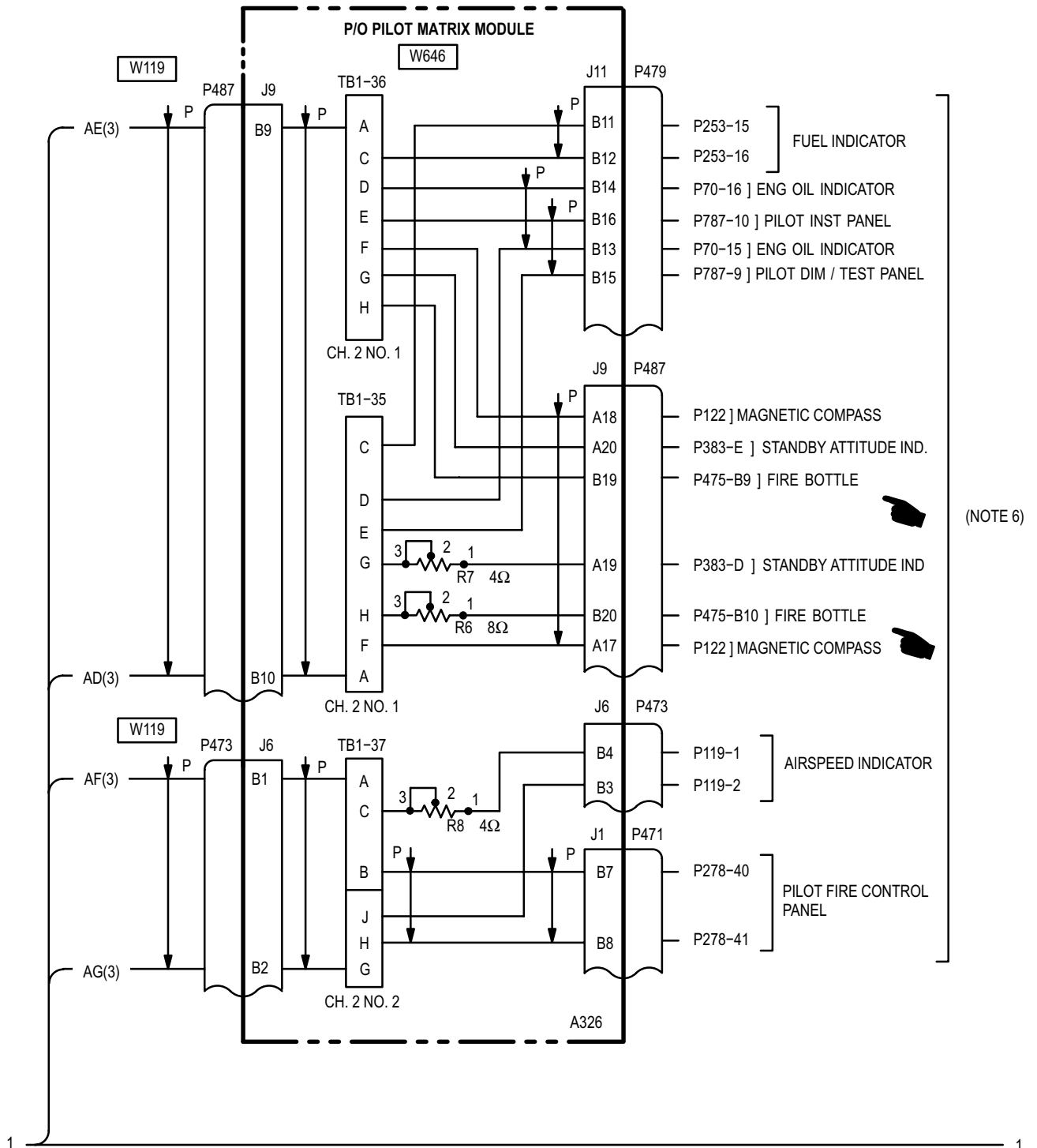


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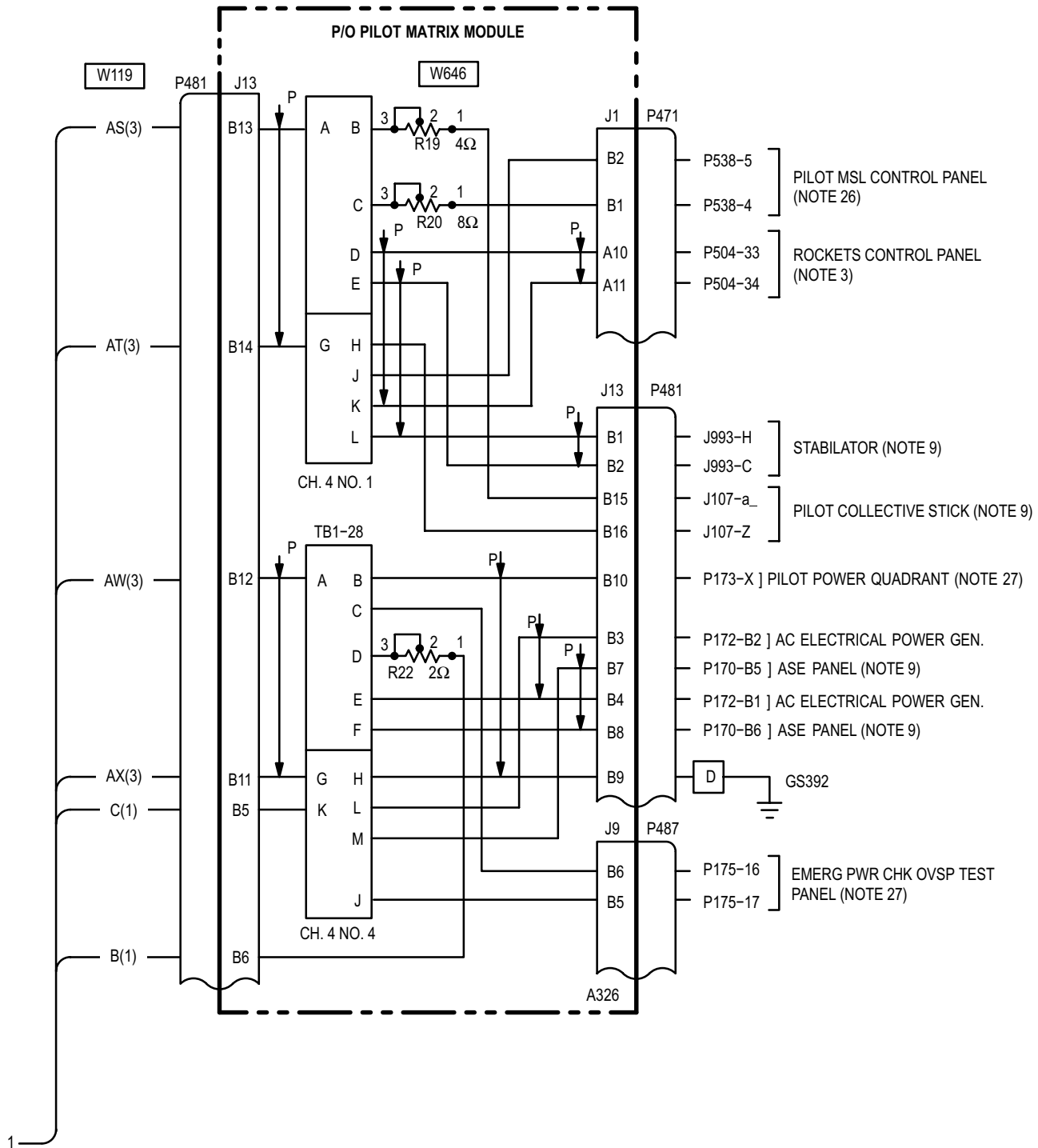
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9-114. PILOT EDGE-LIGHTS – WIRING INTERCONNECT DIAGRAM (cont)



9-114. PILOT EDGE-LIGHTS – WIRING INTERCONNECT DIAGRAM (cont)



NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

1. AVIONICS CONFIGURATION-RADAR JAMMER AN/ALQ-136 (TM 11-1520-238-23-2).
2. CW-28 VDC OUT, ARM-0 TO 28 VDC IN, CCW-RTN.
3. AERIAL ROCKET CONTROL SYSTEM-ARMAMENT (TM 9-1090-208-23-2).
4. HS DESIGNATES A HARD SPLICE WHICH CANNOT BE DISCONNECTED.
M DESIGNATES A SOFT SPLICE WHICH MAY BE DISCONNECTED FOR A WIRING CHECK.
5. CW-5 VDC OUT, ARM 0 TO 5 VDC IN, CCW-RTN.
6. INSTRUMENTS (TM 1-1520-238-T-5).
7. AVIONICS CONFIGURATION-VIDEO DISPLAY UNIT (TM 11-1520-238-23-2).
8. AVIONICS CONFIGURATION-VHF / UHF RADIO SETS (TM 11-1520-238-23-2).
9. FLIGHT CONTROL SYSTEM (TM 1-1520-238-T-7).
10. AVIONICS CONFIGURATION-HARS (TM 11-1520-238-23-2).
11. HYDRAULIC SYSTEM (TM 1-1520-238-T-5).
12. LANDING GEAR SYSTEM (TM 1-1520-238-T-4).
13. UTILITY SYSTEM-ROTOR BLADES DE-ICE (TM 1-1520-238-T4).
14. AVIONICS CONFIGURATION-RADAR ALTIMETER SET (TM 11-1520-238-23-2).
15. AVIONICS CONFIGURATION-RADAR WARNING (TM 11-1520-238-23-2).
16. AREA WEAPON SYSTEM-ARMAMENT (TM 9-1090-208-23-2).
17. AVIONICS CONFIGURATION-IR JAMMER AN/ALQ-144 (TM 11-1520-238-23-2).
18. AUXILIARY POWER UNIT (TM 1-1520-238-T-8).
19. AVIONICS CONFIGURATION-ADF (TM 11-1520-238-23-2).
20. AVIONICS CONFIGURATION-IFF (TM 11-1520-238-23-2).
21. UTILITY SYSTEM-CANOPY DE-FOG AND ANTI-ICE (TM 1-1520-238-T-8).
22. FUEL SYSTEM (TM 1-1520-238-T-7).
23. ENVIRONMENTAL SYSTEM (TM 1-1520-238-T-8).
24. MISSION EQUIPMENT (TM 1-1520-238-T-8).
25. AVIONICS CONFIGURATION-KY58 SECURITY SYSTEM (TM 11-1520-238-23-2).
26. HELLFIRE MISSILE SYSTEM (TM 9-1427-475-20).
27. POWER PLANTS (TM 1-1520-238-T-4).

9-115. PILOT LT PRI CIRCUIT BREAKER (CB39) – DOES NOT STAY CLOSED

9-115

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

3. Detach P109. Check for short between P457-A7 and ground.

Does short exist?

YES	Repair shorted wire. Go to paragraph 9-113.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot center circuit breaker panel, open **LT PRI** circuit breaker (CB39). Check for short between ground and P1-45.

Does short exist?

YES	Go to paragraph 9-150 to troubleshoot circuit protection system (ac essential bus 1 – pilot station).
NO	Go to step 2.

2. Detach P457. Check for short between (A402)J1-45 and ground.

Does short exist?

YES	Repair shorted wire. Go to paragraph 9-113.
NO	Go to step 3.

END OF TASK

9-116. PILOT EDGE-LIGHTS – ARE NOT LIGHTED

9-116

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

3. Check for open between:
P457-A12 and P109-JJ,
P457-A12 and P109-KK,
(A402)J22-A12 and (A402)J1-45.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire.
Go to paragraph 9-113. |
| NO | Go to paragraph 9-150 to troubleshoot circuit protection system (ac essential bus 1 – pilot station). |

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 115 VAC between:
P109-JJ and ground,
P109-KK and ground.

Is voltage present?

- | | |
|-----|---------------|
| YES | Go to step 2. |
| NO | Go to step 3. |

2. Check for open between
P109-JJ and ground.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire between:
(A402)J22-A13 and GS2-L,
P457-A13 and P109-LL.
Go to paragraph 9-113. |
| NO | Replace multi-channel dimming controller (TM 1-1520-238-23). |

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 5 VDC at P100-A13.

Is voltage present?

YES	Go to step 2.
NO	Go to step 3.

2. Check for open between P100-A13 and P109-q.

Does open exist?

YES	Replace multi-channel dimming controller (TM 55-1520-238-23).
NO	Repair open wire. Go to paragraph 9-113.

3. Check for open between:

P100-A14 and P109-r,
P100-A15 and P109-s.

Does open exist?

YES	Repair open wire. Go to paragraph 9-113.
NO	Replace pilot EXT LT/INTR LT panel (TM 1-1520-238-23).

END OF TASK

9-118. ALL PILOT RIGHT/CENTER CONSOLE EDGE-LIGHTED PANELS – DO NOT LIGHT

9-118

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – L90 door opened

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Check for open between:

P100-A7 and P109-g,
P100-A8 and P109-h,
P100-A9 and P109-k,
P100-A10 and P109-m,
P100-A11 and P109-n,
P100-A12 and P109-p.

Does open exist?

YES	Repair open wire. Go to paragraph 9-113.
NO	Replace pilot EXT LT/INTR LT panel (TM 1-1520-238-23).

END OF TASK

9-119. ALL PILOT INSTRUMENT EDGE-LIGHTED PANELS – DO NOT LIGHT

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 5 VDC at P100-A1.
Is voltage present?

YES	Go to step 3.
NO	Go to step 2.

2. Check for open between P109-a and P100-A1.
Does open exist?

YES	Repair open wire. Go to paragraph 9-113.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

3. Check for 5 VDC at P100-A4.
Is voltage present?

YES	Go to step 5.
NO	Go to step 4.

4. Check for open between P109-d and P100-A4.
Does open exist?

YES	Repair open wire. Go to paragraph 9-113.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

5. Check for open between:
P100-A2 and P109-b,
P100-A3 and P109-c,
P100-A5 and P109-e,
P100-A6 and P109-f.

Does open exist?

YES	Repair open wire. Go to paragraph 9-113.
NO	Replace pilot EXT LT/INTR LT panel (TM 1-1520-238-23).

END OF TASK

9-120. EXT LT/INTR LT EDGE-LIGHT – DOES NOT LIGHT

9-120

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 5 VDC between (A326): TB1-28-D and TB1-28-K.

Does open exist?

YES	Go to step 4.
NO	Go to step 2.

2. Check for 5 VDC between (A326): TB1-28-A and TB1-28-G.

Does open exist?

YES	Replace terminal board (A326)TB1-28 (TM 1-1520-238-23).
NO	Go to step 3.

3. Check for open between: (A326)TB1-28-A and P109-DD, (A326)TB1-28-G and P109-HH.

Does open exist?

YES	Repair open wire. Go to paragraph 9-113.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

4. Check for open between (A326)TB1-28-D and P100-B9.

Does open exist?

YES	Go to step 5.
NO	Go to step 6.

5. Check for open between: (A326)TB1-28-D and (A326)R22-3, (A326)R22-1 and P100-B9.

Does open exist?

YES	Repair open wire. Go to paragraph 9-113.
NO	Replace resistor (A326)R22 (TM 1-1520-238-23).

6. Check for open between (A326)TB1-28-K and P100-B10.

Does open exist?

YES	Repair open wire. Go to paragraph 9-113.
NO	Replace pilot EXT LT/INTR LT panel (TM 1-1520-238-23).

END OF TASK

9-121. ALL CHANNEL 1 NO. 1 EDGE-LIGHT PANELS – DO NOT LIGHT

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 5 VDC between (A326): TB1-33-A and TB1-34-A.

Does open exist?

YES	Go to step 2.
NO	Go to step 3.

2. Check for open between (A326): TB1-33-A and TB1-33-B, TB1-33-A and TB1-33-C, TB1-33-A and TB1-33-D, TB1-33-A and TB1-33-E, TB1-33-A and TB1-33-F, TB1-33-A and TB1-33-G, TB1-33-A and TB1-33-H, TB1-33-A and TB1-33-J, TB1-33-A and TB1-33-K.

Does open exist?

YES	Replace terminal board (A326)TB1-33 (TM 1-1520-238-23).
NO	Replace terminal board (A326)TB1-34 (TM 1-1520-238-23).

3. Check for open between: P109-A and (A326)TB1-33-A, P109-C and (A326)TB1-34-A.

Does open exist?

YES	Repair open wire. Go to paragraph 9-113.
NO	Go to step 4.

4. Detach wire ends from (A326): TB1-33-A and TB1-34-A. Check for short between: P109-A and ground, P109-C and ground.

Does short exist?

YES	Repair shorted wire. Go to paragraph 9-113.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-122. ALL CHANNEL 1 NO. 2 EDGE-LIGHT PANELS – DO NOT LIGHT

9-122

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 5 VDC between (A326): TB1-31-A and TB1-32-A.

Does open exist?

YES	Go to step 2.
NO	Go to step 3.

2. Check for open between (A326): TB1-31-A and TB1-31-B, TB1-31-A and TB1-31-C, TB1-31-A and TB1-31-D, TB1-31-A and TB1-31-E, TB1-31-A and TB1-31-F, TB1-31-A and TB1-31-G, TB1-31-A and TB1-31-H, TB1-31-A and TB1-31-J, TB1-31-A and TB1-31-K.

Does open exist?

YES	Replace terminal board (A326)TB1-31 (TM 1-1520-238-23).
NO	Replace terminal board (A326)TB1-32 (TM 1-1520-238-23).

3. Check for open between: P109-B and (A326)TB1-31-A, P109-D and (A326)TB1-32-A.

Does open exist?

YES	Repair open wire. Go to paragraph 9-113.
NO	Go to step 4.

4. Detach wire ends from (A326): TB1-31-A and TB1-32-A. Check for short between: P109-B and ground, P109-D and ground.

Does short exist?

YES	Repair shorted wire. Go to paragraph 9-113.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 5 VDC between (A326):
TB1-35-A and TB1-36-A.
Is voltage present?

YES	Go to step 2.
NO	Go to step 3.

2. Check for open between (A326):
TB1-35-A and TB1-35-C,
TB1-35-A and TB1-35-D,
TB1-35-A and TB1-35-E,
TB1-35-A and TB1-35-F,
TB1-35-A and TB1-35-G.
Does open exist?

YES	Replace terminal board (A326)TB1-35 (TM 1-1520-238-23).
NO	Replace terminal board (A326)TB1-36 (TM 1-1520-238-23).

3. Check for open between:
P109-F and (A326)TB1-35-A,
P109-J and (A326)TB1-36-A.
Does open exist?

YES	Repair open wire. Go to paragraph 9-113.
NO	Go to step 4.

4. Detach wire ends from (A326):
TB1-35-A and TB1-36-A. Check for short between:
P109-F and ground,
P109-J and ground.
Does short exist?

YES	Repair shorted wire. Go to paragraph 9-113.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-124. ALL CHANNEL 2 NO. 2 EDGE-LIGHT PANELS – DO NOT LIGHT

9-124

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 5 VDC between (A326):
TB1-37-A and TB1-37-G.

Is voltage present?

YES	Replace terminal board (A326)TB1-37 (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:
P109-G and (A326)TB1-37-A,
P109-K and (A326)TB1-37-G.

Does open exist?

YES	Repair open wire. Go to paragraph 9-113.
NO	Go to step 3.

3. Detach wire from (A326):
TB1-37-A and TB1-37-G. Check for short between:
P109-G and ground,
P109-K and ground.
Does short exist?

YES	Repair shorted wire. Go to paragraph 9-113.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-125. ALL CHANNEL 2 NO. 3 EDGE-LIGHT PANELS – DO NOT LIGHT

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC between (A326):
TB1-38-A and TB1-38-G.

Is voltage present?

YES	Replace terminal board (A326)TB1-38 (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:
P109-H and (A326)TB1-38-A,
P109-L and (A326)TB1-38-G.

Does open exist?

YES	Repair open wire. Go to paragraph 9-113.
NO	Go to step 3.

3. Detach wire from (A326):
TB1-38-A and TB1-38-G. Check for short between:
P109-H and ground,
P109-L and ground.

Does short exist?

YES	Repair shorted wire. Go to paragraph 9-113.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-126. ALL CHANNEL 3 NO. 1 EDGE-LIGHT PANELS – DO NOT LIGHT

9-126

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC between (A326):
TB1-29-A and TB1-29-G.

Is voltage present?

YES	Replace terminal board (A326)TB1-29 (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:
P109-N and (A326)TB1-29-A
P109-R and (A326)TB1-29-G.

Does open exist?

YES	Repair open wire. Go to paragraph 9-113.
NO	Go to step 3.

3. Detach wire from (A326):
TB1-29-A and TB1-29-G. Check for short between:
P109-N and ground,
P109-R and ground.
Does short exist?

YES	Repair shorted wire. Go to paragraph 9-113.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-127. ALL CHANNEL 3 NO. 2 EDGE-LIGHT PANELS – DO NOT LIGHT

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC between (A326):
TB1-30-A and TB1-30-G.

Is voltage present?

YES	Replace terminal board (A326)TB1-30 (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:
P109-U and (A326)TB1-30-A,
P109-W and (A326)TB1-30-G.

Does open exist?

YES	Repair open wire. Go to paragraph 9-113.
NO	Go to step 3.

3. Detach wire from (A326):
TB1-30-A and TB1-30-G. Check for short between:
P109-U and ground,
P109-W and ground.

Does short exist?

YES	Repair shorted wire. Go to paragraph 9-113.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-128. ALL CHANNEL 3 NO. 3 EDGE-LIGHT PANELS – DO NOT LIGHT

9-128

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 5 VDC between (A326):
TB1-39-A and TB1-39-G.

Is voltage present?

YES	Replace terminal board (A326)TB1-39 (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:
P109-P and (A326)TB1-39-A,
P109-S and (A326)TB1-39-G.

Does open exist?

YES	Repair open wire. Go to paragraph 9-113.
NO	Go to step 3.

3. Detach wire from (A326):
TB1-39-A and TB1-39-G. Check for short between:
P109-P and ground,
P109-S and ground.
Does short exist?

YES	Repair shorted wire. Go to paragraph 9-113.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 5 VDC between (A326):
TB1-26-A and TB1-26-G.

Is voltage present?

YES	Replace terminal board (A326)TB1-26 (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:
P109-CC and (A326)TB1-26-A,
P109-GG and (A326)TB1-26-G.

Does open exist?

YES	Repair open wire. Go to paragraph 9-113.
NO	Go to step 3.

3. Detach wire from (A326):
TB1-26-A and TB1-26-G. Check for short between:
P109-CC and ground,
P109-GG and ground.
Does short exist?

YES	Repair shorted wire. Go to paragraph 9-113.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-130. ALL CHANNEL 4 NO. 2 EDGE-LIGHT PANELS – DO NOT LIGHT

9-130

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 5 VDC between (A326):
TB1-27-A and TB1-27-G.

Is voltage present?

YES	Replace terminal board (A326)TB1-27 (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:
P109-BB and (A326)TB1-27-A,
P109-FF and (A326)TB1-27-G.

Does open exist?

YES	Repair open wire. Go to paragraph 9-113.
NO	Go to step 3.

3. Detach wire from (A326):
TB1-27-A and TB1-27-G. Check for short between:
P109-BB and ground,
P109-FF and ground.

Does short exist?

YES	Repair shorted wire. Go to paragraph 9-113.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-131. ALL CHANNEL 4 NO. 4 EDGE-LIGHT PANELS – DO NOT LIGHT

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 5 VDC between (A326):
TB1-28-A and TB1-28-G.

Is voltage present?

YES	Replace terminal board (A326)TB1-28 (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:
P109-DD and (A326)TB1-28-A,
P109-HH and (A326)TB1-28-G.

Does open exist?

YES	Repair open wire. Go to paragraph 9-113.
NO	Go to step 3.

3. Detach wire ends from (A326):
TB1-28-A and TB1-28-G. Check for short between:
P109-DD and ground,
P109-HH and ground.

Does short exist?

YES	Repair shorted wire. Go to paragraph 9-113.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-132. CPG EDGE-LIGHTS – MAINTENANCE OPERATIONAL CHECK

9-132

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-45	EXTERNAL POWER – POWER UP completed

NOTE

- Refer to pilot station (fig. 9-151) for configuration and component locations.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.

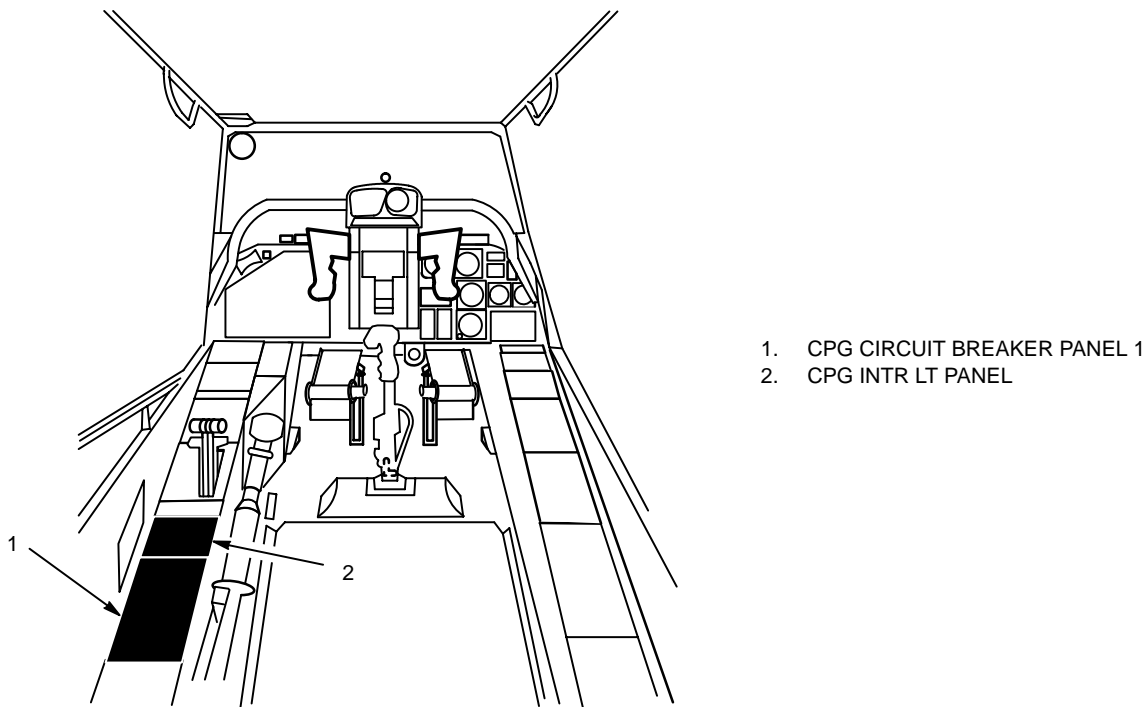


Figure 9-151. CPG Station

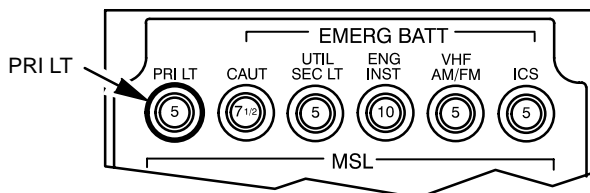
M69-184

9-132. CPG EDGE-LIGHTS – MAINTENANCE OPERATIONAL CHECK (cont)

9-132

1. Perform the maintenance operational check as follows:

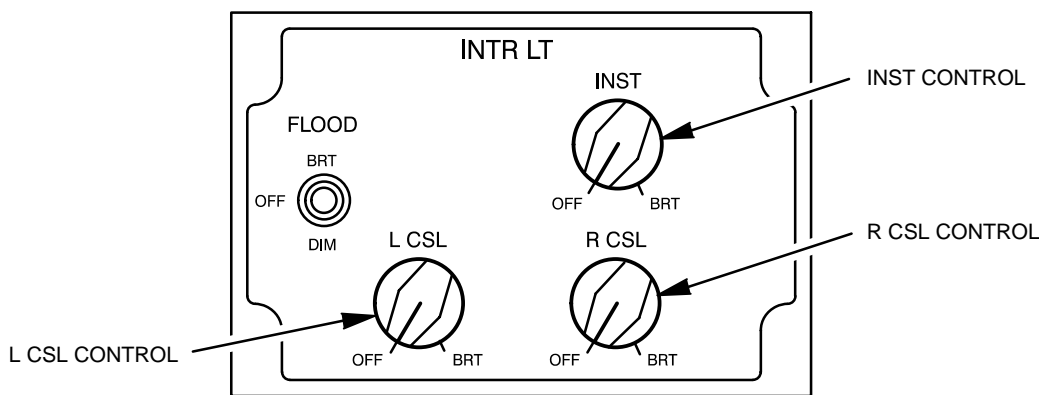
Task	Result
a. On CPG circuit breaker panel 1 (fig. 9-152), check that the PRI LT circuit breaker (CB14) is closed.	If PRI LT circuit breaker (CB14) does not stay closed, go to paragraph 9-134.



M69-185

Figure 9-152. CPG Circuit Breaker Panel 1

b. On CPG INTR LT panel (fig. 9-153), place L CSL , R CSL , and INST to BRT .	If CPG edge-lights are not lighted, go to paragraph 9-135.
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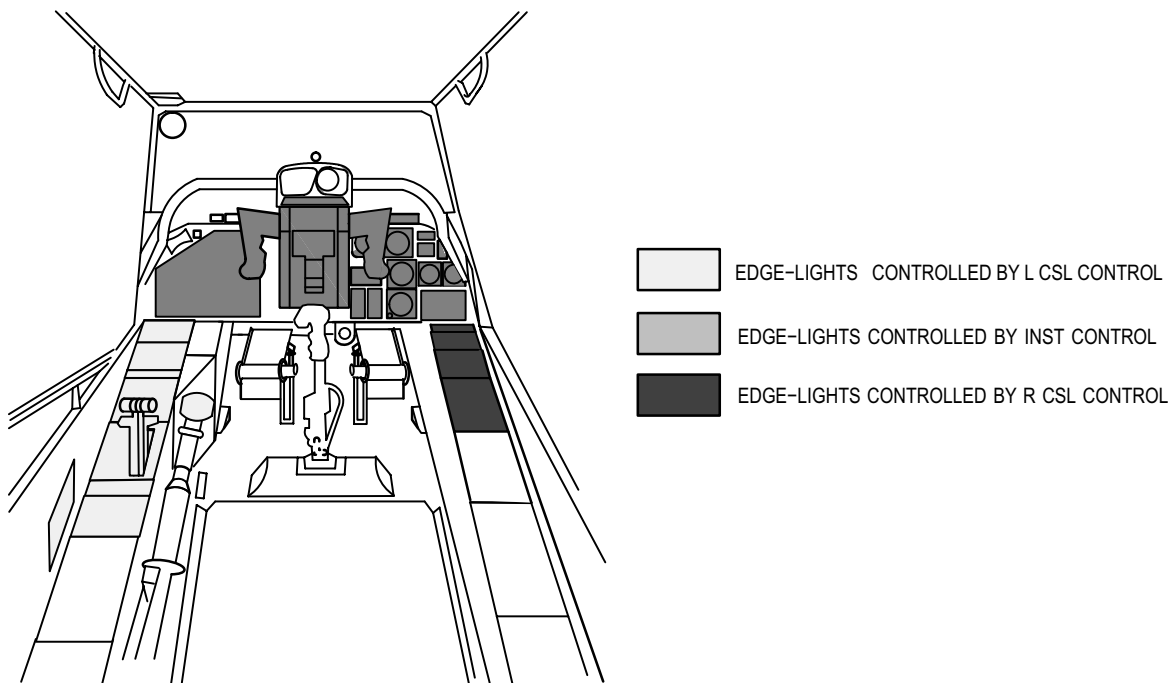
M69-186

Figure 9-153. CPG INTR LT Panel

c. On CPG INTR LT panel (fig. 9-153), check that all edge-lights controlled by L CSL are lighted (fig. 9-154).	If all CPG left console edge-lights do not light, go to paragraph 9-136.
d. On CPG INTR LT panel, check that all edge-lights controlled by R CSL are lighted.	If all CPG right console edge-lights do not light, go to paragraph 9-137.
e. On CPG INTR LT panel, check that all edge-lights controlled by INST are lighted.	If all CPG instrument panel edge-lights do not light, go to paragraph 9-138.
f. Check that CPG INTR LT panel edge-light is lighted (fig. 9-153).	If CPG INTR LT edge-light panel does not light, go to paragraph 9-139.
g. Check that all channel 1 No. 1 indicators are lighted (fig. 9-155).	If all channel 1 No. 1 indicators do not light, go to paragraph 9-140.
h. Check that all channel 1 No. 2 indicators are lighted.	If all channel 1 No. 2 indicators do not light, go to paragraph 9-141.

NOTE

Refer to (fig. 9-154) to locate panels and instruments controlled by the INST, L CSL, and R CSL controls on the CPG's INTR LT panel.



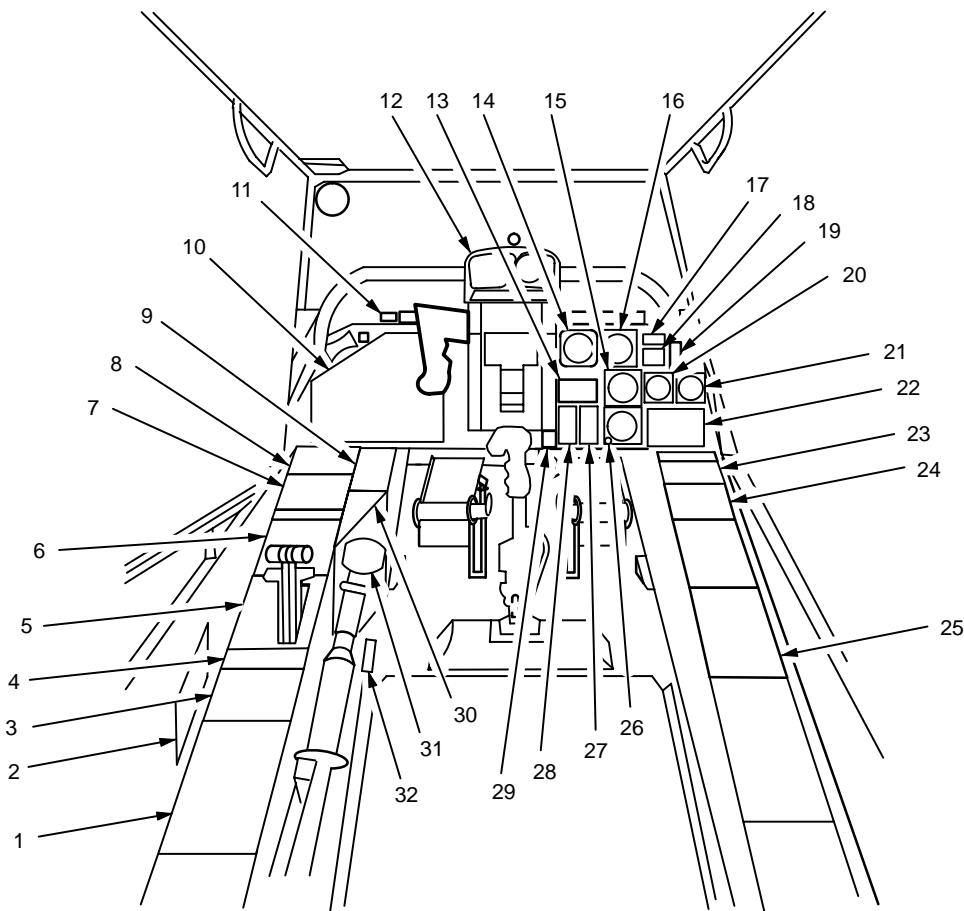
M69-432

Figure 9-154. CPG Edge-Lights Control

- | | |
|---|--|
| i. Check that all channel 2 No. 1 indicators are lighted (fig. 9-155). | If all channel 2 No. 1 indicators do light, go to paragraph 9-142. |
| j. On CPG INTR LT panel (fig. 9-153), rotate INST control to OFF . Check that all channel 3 No. 1 control panel edge-lights are lighted. | If all channel 3 No. 1 control panels do not light, go to paragraph 9-143. |
| k. Check that all channel 3 No. 2 control panels are lighted. | If all channel 3 No. 2 control panels do not light, go to paragraph 9-144. |
| l. Rotate R CSL control to OFF . Check that all channel 4 No. 1 control panel edge-lights are lighted. | If all channel 4 No. 1 control panels do not light, go to paragraph 9-145. |
| m. Check that all channel 4 No. 2 control panels are lighted. | If all channel 4 No. 2 control panels do not light, go to paragraph 9-146. |
| n. Check that all channel 4 No. 3 control panels are lighted. | If all channel 4 No. 3 control panels do not light, go to paragraph 9-147. |

2. On CPG **INTR LT** panel, place **L CSL** control to **OFF**.

3. Perform EXTERNAL POWER – POWER DOWN (para 9-46).



CHANNEL 1 NO. 1

- 13. CPG SELECTABLE DIGITAL DISPLAY
- 14. CPG AIRSPEED INDICATOR
- 17. CPG RADIO CALL PLACARD
- 18. CPG STAB POS INDICATOR
- 19. CPG STABILATOR PLACARD
- 27. CPG ENG-RTR RPM% INDICATOR
- 28. CPG TORQUE INDICATOR
- 29. CPG DIM / TEST PANEL

CHANNEL 1 NO. 2

- 15. CPG RADIO MAGNETIC INDICATOR
- 16. CPG ATTITUDE INDICATOR
- 20. CPG VERTICAL SPEED INDICATOR
- 21. CPG CLOCK
- 22. CPG CAUTION / WARNING PANEL
- 26. CPG PRESSURE ALTIMETER

CHANNEL 2 NO. 1

- 10. CPG FIRE CONTROL PANEL
- 11. CPG FIRE BOTTLE SELECT PANEL
- 12. CPG OPTICAL RELAY TUBE

CHANNEL 3 NO. 1

- 23. CPG COMMUNICATION SYSTEM CONTROL PANEL
- 24. CPG VHF AM – FM RECEIVER / TRANSMITTER

CHANNEL 3 NO. 2

- 25. CPG DPLR NAV PANEL

CHANNEL 4 NO. 1

- 2. CPG CIRCUIT BREAKER PANEL 2
- 7. CPG VIDEO RECORDER CONTROL PANEL
- 8. CPG MSL CONTROL PANEL
- 9. CPG DATA ENTRY KEYBOARD
- 30. CPG RADIO MONITOR PLACARD

CHANNEL 4 NO. 2

- 4. CPG FUEL PANEL
- 5. CPG POWER QUADRANT
- 6. CPG AUX / ANTI – ICE PANEL
- 32. CPG STABILATOR MANUAL CONTROL PANEL

CHANNEL 4 NO. 3

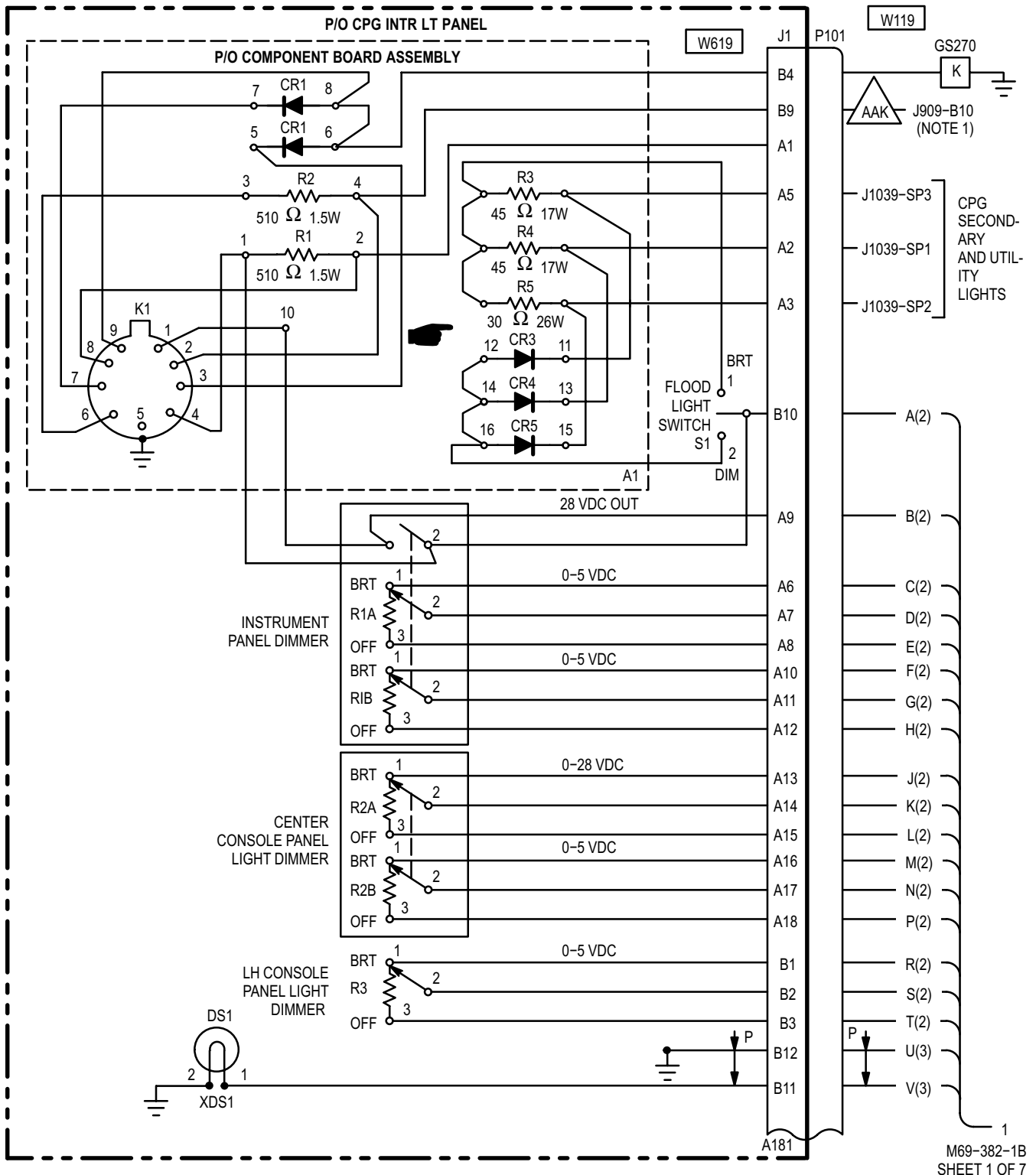
- 1. CPG CIRCUIT BREAKER PANEL 1
- 3. CPG INTR LT PANEL
- 31. CPG COLLECTIVE STICK GRIP

M69-428

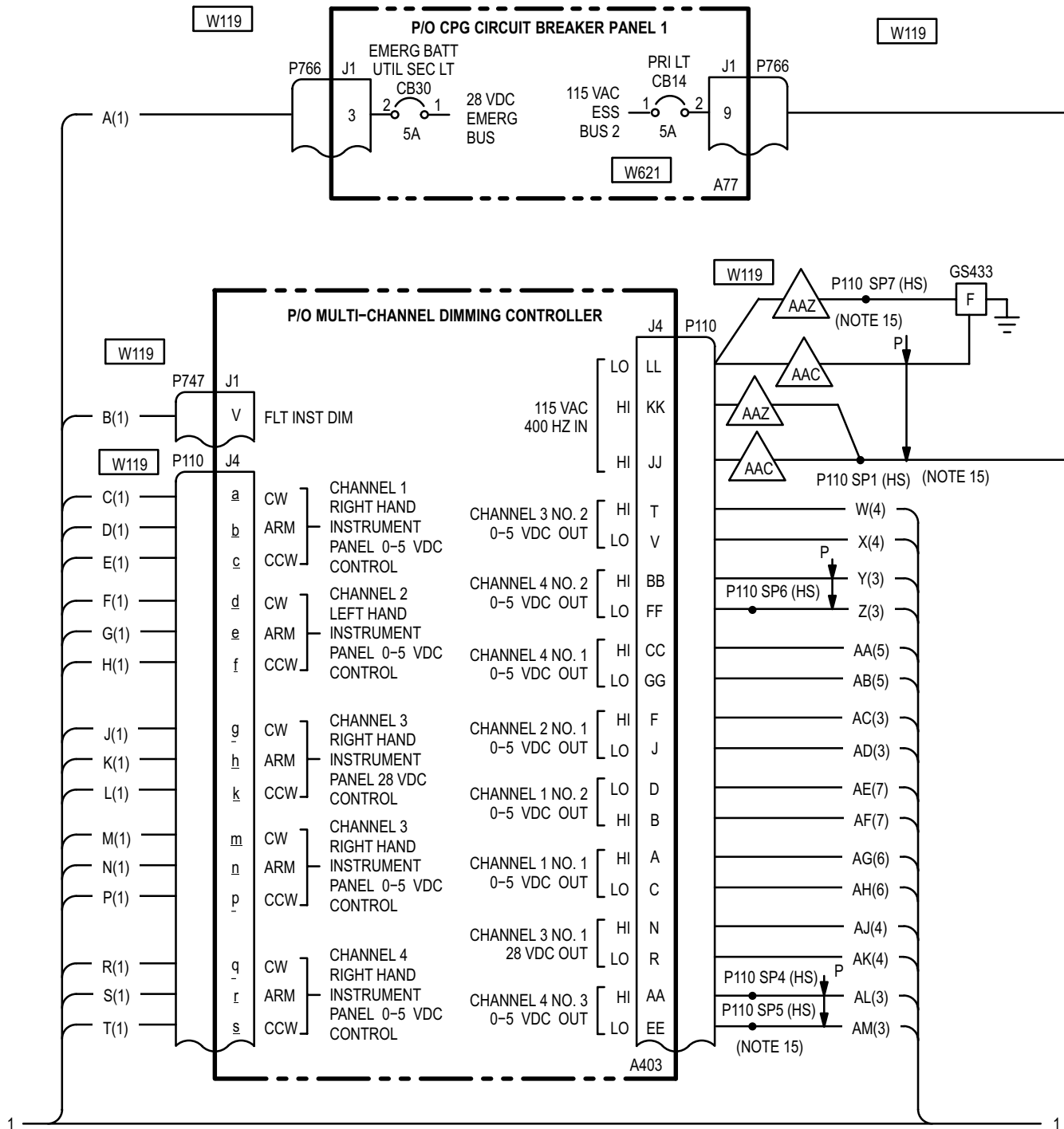
Figure 9-155. CPG Edge-Lights Components Location

END OF TASK

9-133. CPG EDGE-LIGHTS - WIRING INTERCONNECT DIAGRAM

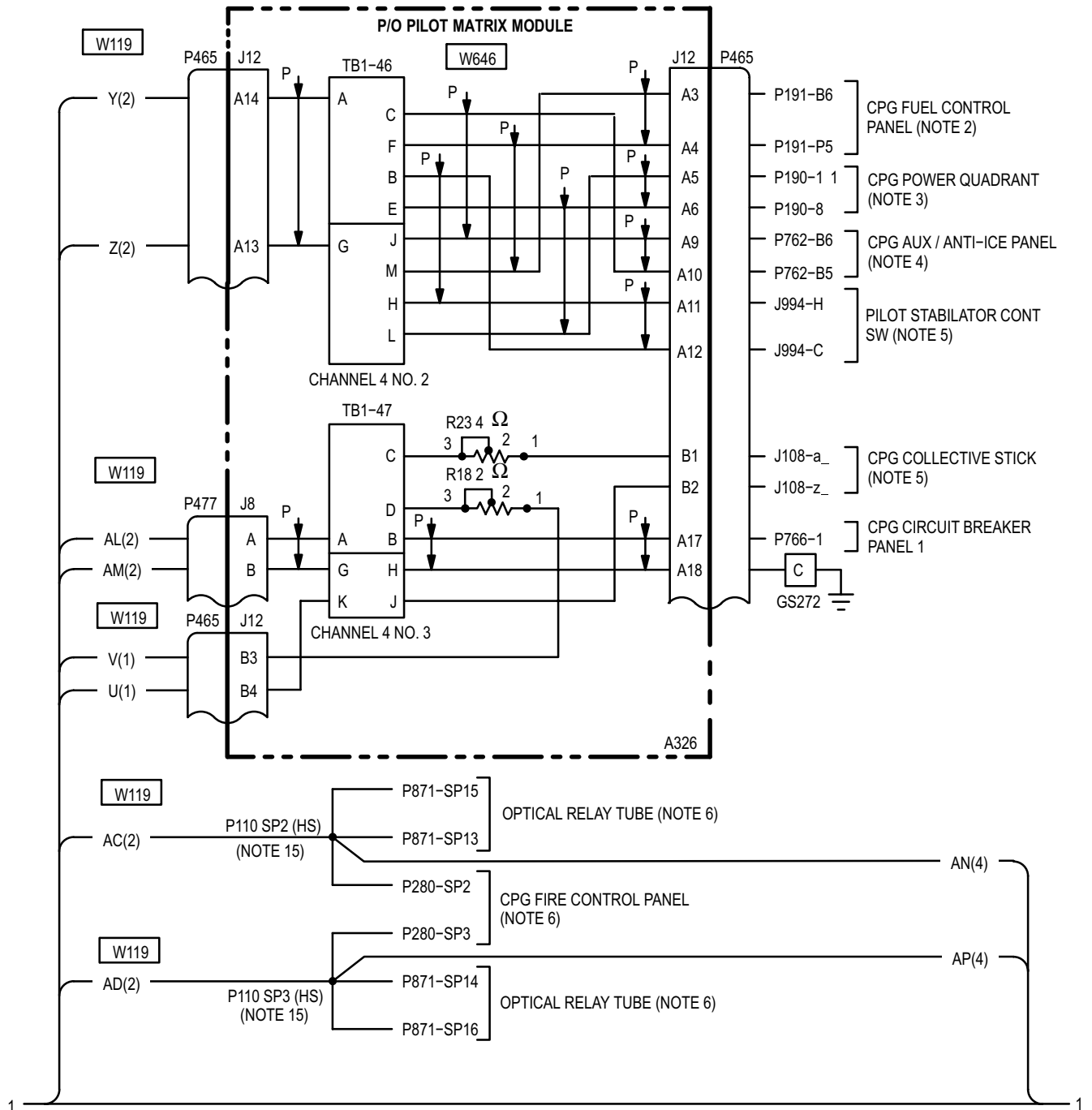


9-133. CPG EDGE-LIGHTS - WIRING INTERCONNECT DIAGRAM (cont)

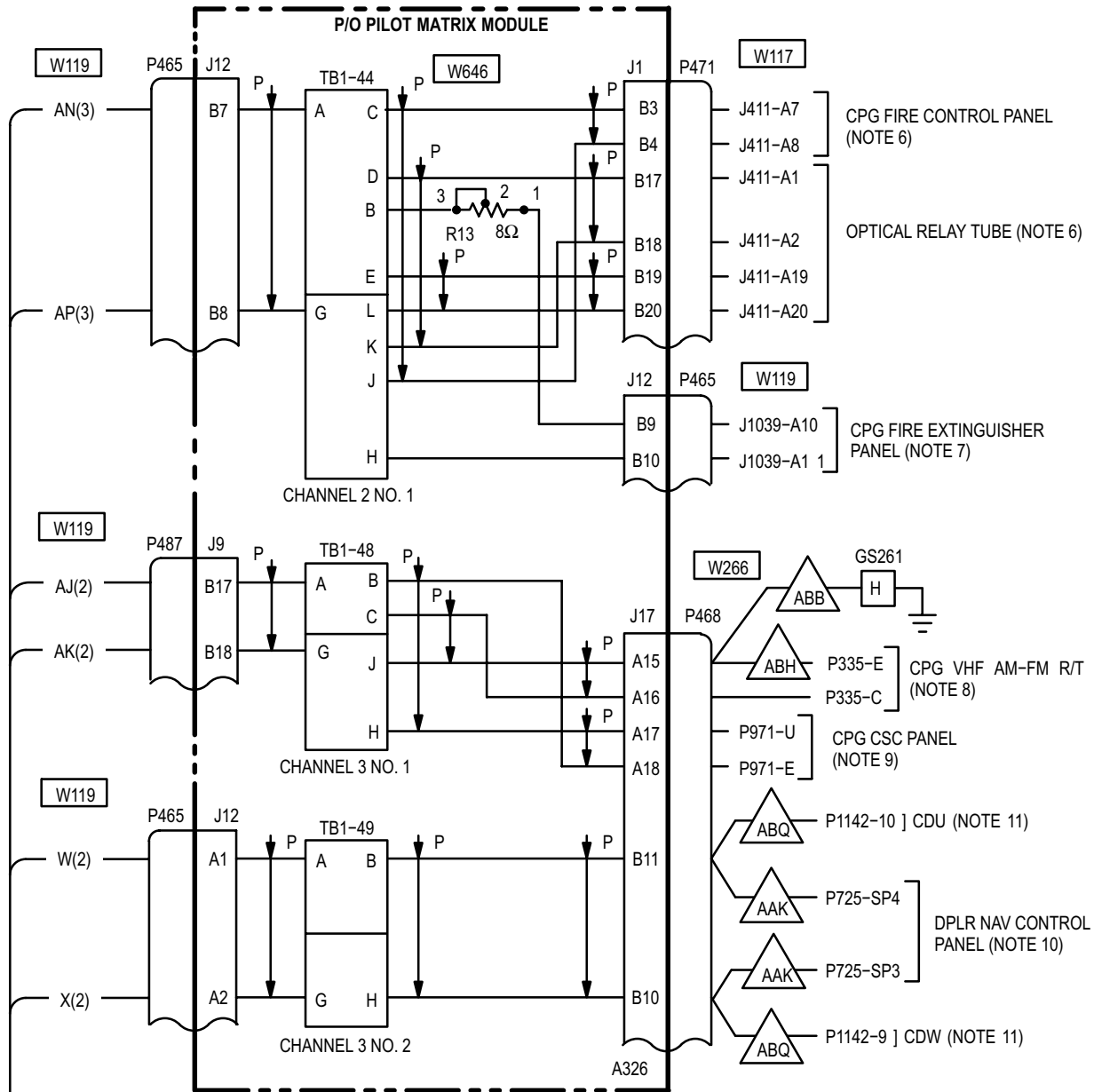


9-133. CPG EDGE-LIGHTS - WIRING INTERCONNECT DIAGRAM (cont)

9-133



9-133. CPG EDGE-LIGHTS - WIRING INTERCONNECT DIAGRAM (cont)

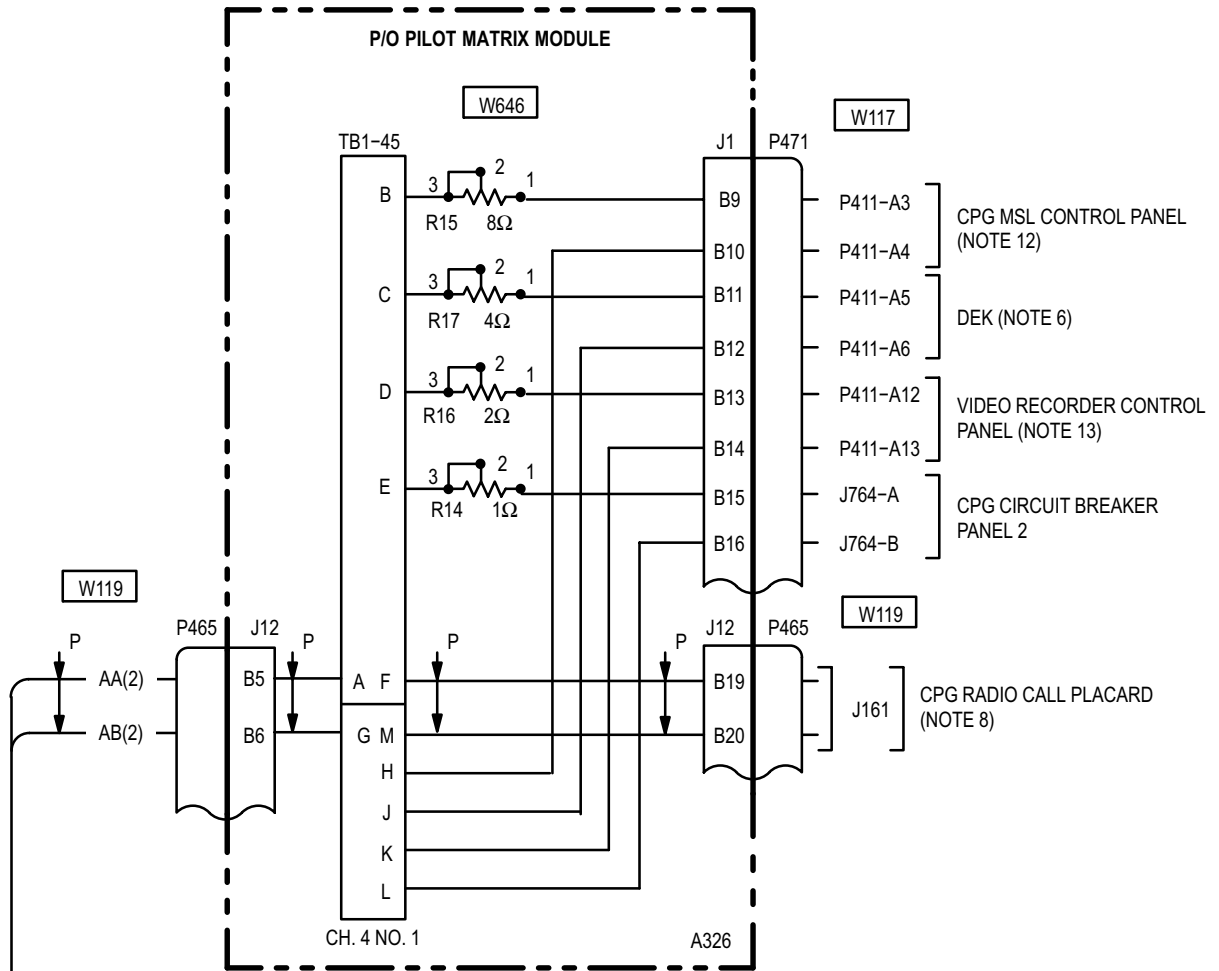


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9-133. CPG EDGE-LIGHTS - WIRING INTERCONNECT DIAGRAM (cont)

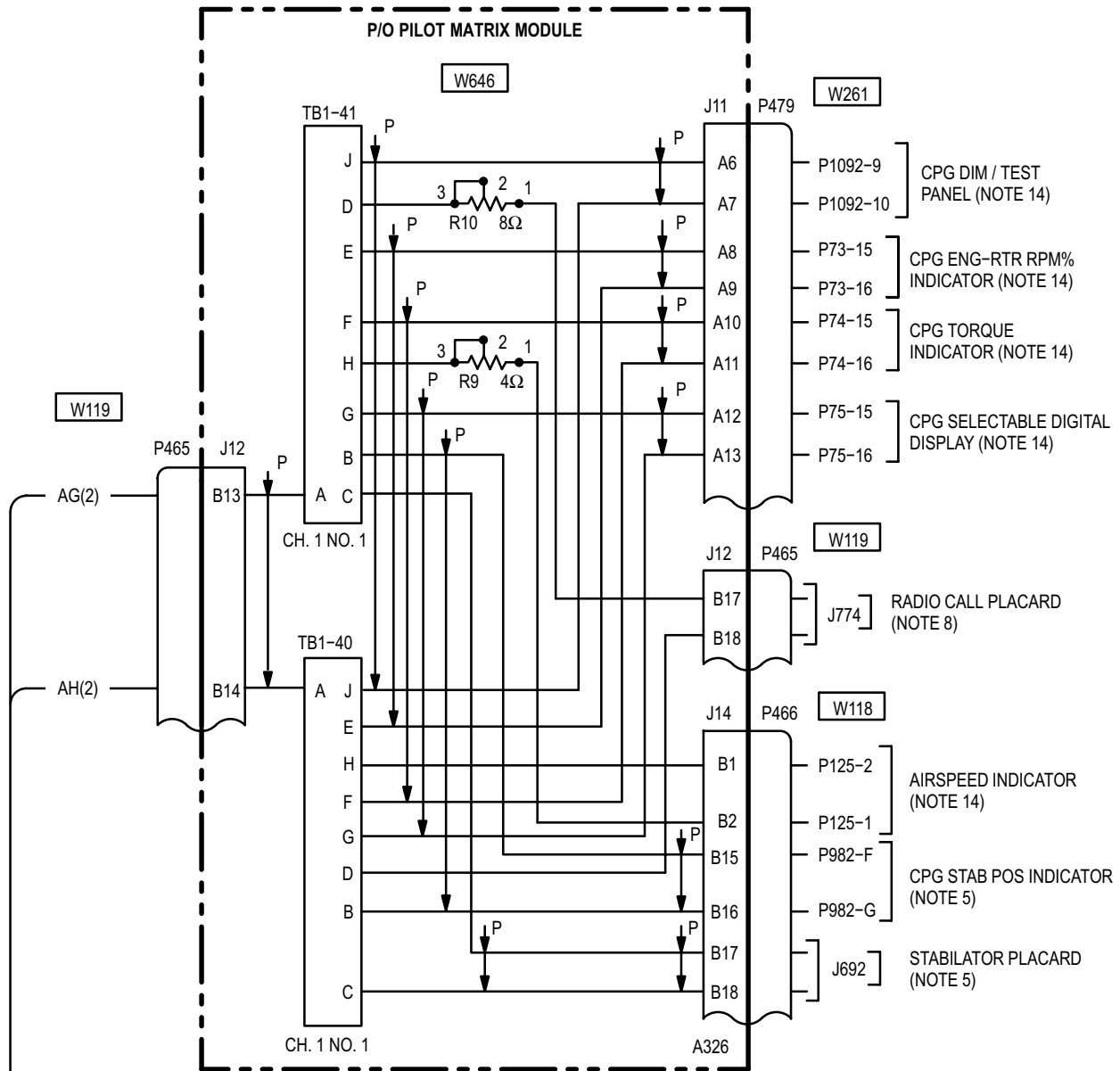
9-133



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M69-382-5A
SHEET 5 OF 7

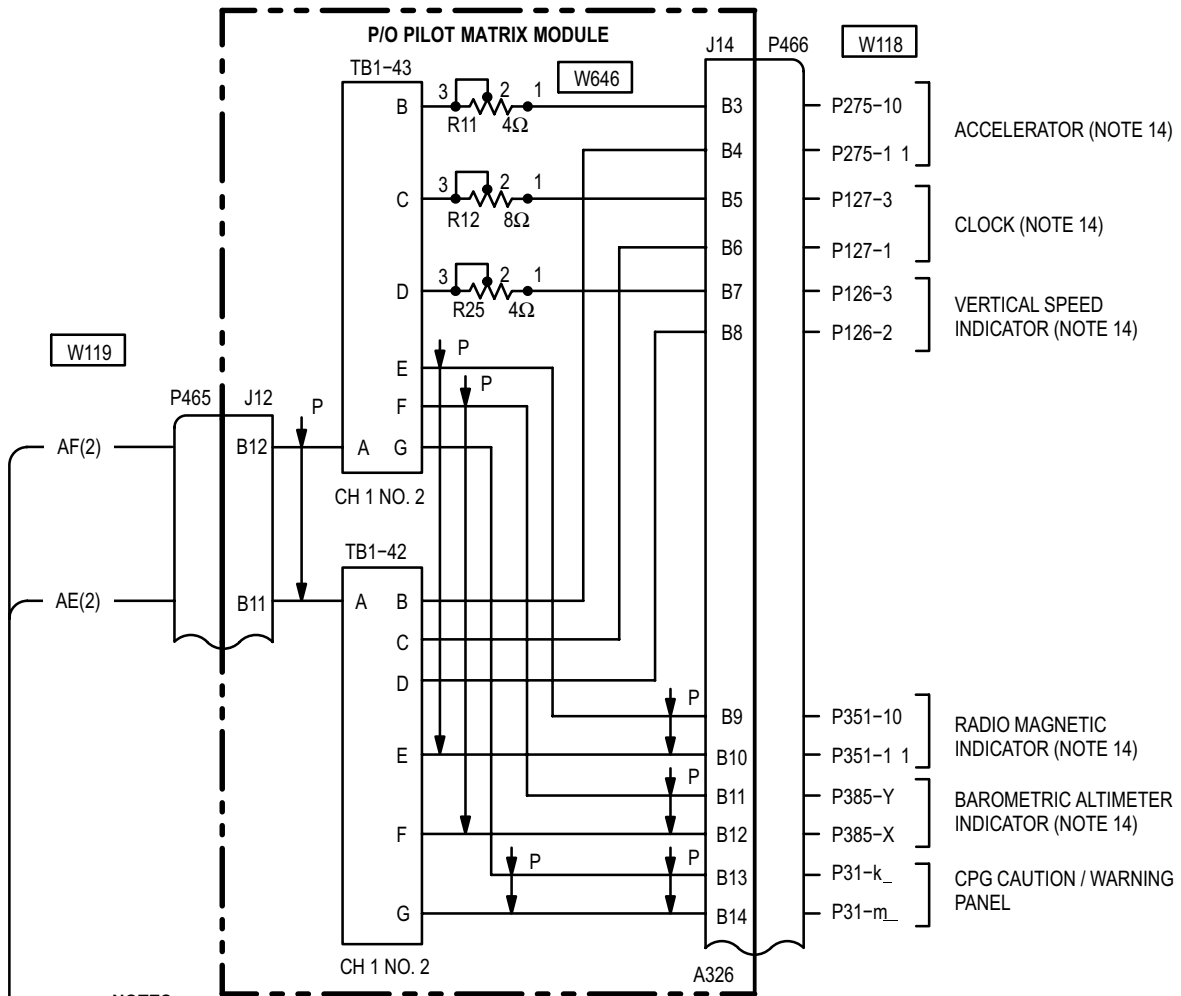
9-133. CPG EDGE-LIGHTS – WIRING INTERCONNECT DIAGRAM (cont)



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9-133. CPG EDGE-LIGHTS – WIRING INTERCONNECT DIAGRAM (cont)



NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

1. AVIONICS CONFIGURATION-NAVIGATION INSTRUMENTS (TM 11-1520-238-23-2).
2. FUEL SYSTEM (TM 1-1520-238-T-7).
3. POWER PLANTS (TM 1-1520-238-T-4).
4. UTILITY SYSTEM-ANTI-ICE (TM 1-1520-238-T-8).
5. FLIGHT CONTROL SYSTEM (TM 1-1520-238-T-7).
6. FIRE CONTROL SYSTEM (TM 9-1230-476-20-2).
7. UTILITY SYSTEM-FIRE DETECTION SYSTEM (TM 1-1520-238-T-8).
8. AVIONICS CONFIGURATION-VHF AM-FM RADIO SET (TM 11-1520-238-23-2).
9. AVIONICS CONFIGURATION-INTERCOMMUNICATIONS SYSTEM (TM 11-1520-238-23-2).
10. AVIONICS CONFIGURATION-DOPPLER NAVIGATION AN/ASN-128 (TM 11-1520-238-23-2).
11. AVIONICS CONFIGURATION-DOPPLER NAVIGATION AN/ASN-137 (TM 11-1520-238-23-2).
12. HELLFIRE MISSILE EQUIPMENT (TM 9-1270-221-23).
13. AVIONICS CONFIGURATION-VDU (TM 11-1520-238-23-2).
14. INSTRUMENTS (TM 1-1520-238-T-5).
15. HS DESIGNATES A HARD SPLICE WHICH CANNOT BE DISCONNECTED.
M DESIGNATES A SOFT SPLICE WHICH MAY BE DISCONNECTED FOR A WIRING CHECK.

9-134. CPG PRI LT CIRCUIT BREAKER (CB14) – DOES NOT STAY CLOSED

9-134

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Detach P766. With external power applied, close **LT PRI** circuit breaker (CB14). Set **BATT/EXT PWR** switch to **EXT PWR**.
Does LT PRI circuit breaker (CB14) stay closed?

YES	Go to step 2.
NO	Go to paragraph 9-199 to troubleshoot circuit protection system (ac essential bus 2 – CPG station).

2. Detach P766 and P110. Check for short between:
(AAZ) P766-9 and ground,
(AAC) P110-KK and ground,
P110-JJ and ground.
Does short exist?

YES	Repair shorted wire. Go to paragraph 9-132.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-135. CPG EDGE-LIGHTS – ARE NOT LIGHTED

9-135

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

3. Check for open between:
P110-LL and ground.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-132. |
| NO | Replace multi-channel dimming controller (TM 1-1520-238-23). |



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 115 VAC between:

(AAC) P110-JJ and ground,
(AAZ) P110-KK and ground.

Is voltage present?

- | | |
|-----|---------------|
| YES | Go to step 3. |
| NO | Go to step 2. |

2. Check for open between:

(AAC) P766-9 and P110-JJ,
(AAZ) P766-9 and P110-KK.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire.
Go to paragraph 9-132. |
| NO | Go to paragraph 9-199 to troubleshoot circuit protection system (ac essential bus 2 – CPG station). |

END OF TASK

9-136. ALL CPG LEFT CONSOLE EDGE-LIGHTED PANELS – DO NOT LIGHT

9-136

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Check for open between:

P110-q and P101-B1,
P110-r and P101-B2,
P110-s and P101-B3.

Does open exist?

YES	Repair open wire. Go to paragraph 9-132.
NO	Replace CPG INTR LT panel (TM 1-1520-238-23).

END OF TASK

9-137. ALL CPG RIGHT CONSOLE EDGE-LIGHTED PANELS – DO NOT LIGHT

9-137

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC at P101-A13.
Is voltage present?

YES	Go to step 3.
NO	Go to step 2.

2. Check for open between P101-A13 and P110-g.
Does open exist?

YES	Repair open wire. Go to paragraph 9-132.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

3. Check for 28 VDC at P101-A16.
Is voltage present?

YES	Go to step 5.
NO	Go to step 4.

4. Check for open between P101-A16 and P110-m.
Does open exist?

YES	Repair open wire. Go to paragraph 9-132.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

5. Check for open between:
P101-A14 and P110-h,
P101-A15 and P110-k,
P101-A17 and P110-n,
P101-A18 and P110-p.
Does open exist?

YES	Repair open wire. Go to paragraph 9-132.
NO	Replace CPG INTR LT panel (TM 1-1520-238-23).

END OF TASK

9-138. ALL CPG INSTRUMENT EDGE-LIGHTED PANELS – DO NOT LIGHT

9-138

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Check for open between:

P110-a and P101-A6,
P110-b and P101-A7,
P110-c and P101-A8,
P110-d and P101-A10,
P110-e and P101-A11,
P110-f and P101-A12.

Does open exist?

YES	Repair open wire. Go to paragraph 9-132.
NO	Replace CPG INTR LT panel (TM 1-1520-238-23).

END OF TASK

9-139. CPG INTR LT PANEL EDGE-LIGHT – DOES NOT LIGHT

9-139

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed

3. Check for 5 VDC between (A326):
TB1-47-A and TB1-47-G.

Does open exist?

YES	Replace terminal board (A326)TB1-47 (TM 1-1520-238-23).
NO	Go to step 4.

4. Check for open between:
(A326)TB1-47-A and P110-AA,
(A326)TB1-47-G and P110-EE.

Does open exist?

YES	Repair open wire. Go to paragraph 9-132.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 5 VDC between (A326):
TB1-47-D and TB1-47-K.

Is voltage present?

YES	Go to step 2.
NO	Go to step 3.

2. Check for open between:
(A326)TB1-47-D and P101-B11,
(A326)TB1-47-K and P101-B12.

Does open exist?

YES	Repair open wire. Go to paragraph 9-132.
NO	Replace CPG INTR LT panel (TM 1-1520-238-23).

END OF TASK

9-140. ALL CHANNEL 1 NO. 1 EDGE-LIGHT PANELS – DO NOT LIGHT

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 5 VDC between (A326):
TB1-40-A and TB1-41-A

Does open exist?

YES Go to step 2.
NO Go to step 3.

2. Check for open between (A326):
TB1-40-A and TB1-40-B,
TB1-40-A and TB1-40-C,
TB1-40-A and TB1-40-D,
TB1-40-A and TB1-40-E,
TB1-40-A and TB1-40-F,
TB1-40-A and TB1-40-G,
TB1-40-A and TB1-40-H,
TB1-40-A and TB1-40-J,
TB1-40-A and TB1-40-K.

Does open exist?

YES Replace terminal board (A326)TB1-40 (TM 1-1520-238-23).
NO Replace terminal board (A326)TB1-41 (TM 1-1520-238-23).

3. Check for open between:
P110-A and (A326)TB1-41-A,
P110-C and (A326)TB1-40-A.

Does open exist?

YES Repair open wire. Go to paragraph 9-132.
NO Go to step 4.

4. Detach wire ends from (A326):
TB1-40-A and TB1-41-A. Check for short between:
P110-A and ground,
P110-C and ground.

Does short exist?

YES Repair shorted wire. Go to paragraph 9-132.
NO Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-141. ALL CHANNEL 1 NO. 2 EDGE-LIGHT PANELS – DO NOT LIGHT

9-141

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 5 VDC between (A326):
TB1-42-A and TB1-43-A.
Does open exist?

YES	Go to step 2.
NO	Go to step 3.

2. Check for open between (A326):
TB1-42-A and TB1-42-B,
TB1-42-A and TB1-42-C,
TB1-42-A and TB1-42-D,
TB1-42-A and TB1-42-E,
TB1-42-A and TB1-42-F,
TB1-42-A and TB1-42-G.
Does open exist?

YES	Replace terminal board (A326)TB1-42 (TM 1-1520-238-23).
NO	Replace terminal board (A326)TB1-43 (TM 1-1520-238-23).

3. Check for open between:
P110-B and (A326)TB1-43-A,
P110-D and (A326)TB1-42-A.
Does open exist?

YES	Repair open wire. Go to paragraph 9-132.
NO	Go to step 4.

4. Detach wire ends from (A326):
TB1-42-A and TB1-43-A. Check for short between:
P110-B and ground,
P110-D and ground.
Does short exist?

YES	Repair shorted wire. Go to paragraph 9-132.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-142. ALL CHANNEL 2 NO. 1 EDGE-LIGHT PANELS – DO NOT LIGHT

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 5 VDC between (A326):
TB1-44-A and TB1-44-G.

Is voltage present?

YES	Replace terminal board (A326)TB1-44 (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:
P110-F and (A326)TB1-44-A,
P110-J and (A326)TB1-44-G.

Does open exist?

YES	Repair open wire. Go to paragraph 9-132.
NO	Go to step 3.

3. Detach wire ends from (A326):
TB1-44-A and TB1-44-G. Check for short between:
P110-F and ground,
P110-J and ground.
Does short exist?

YES	Repair shorted wire. Go to paragraph 9-132.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-143. ALL CHANNEL 3 NO. 1 EDGE-LIGHT PANELS – DO NOT LIGHT

9-143

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC between (A326):
TB1-48-A and TB1-48-G.

Is voltage present?

YES	Replace terminal board (A326)TB1-48 (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:
P110-N and (A326)TB1-48-A,
P110-R and (A326)TB1-48-G.

Does open exist?

YES	Repair open wire. Go to paragraph 9-132.
NO	Go to step 3.

3. Detach wire ends from (A326):
TB1-48-A and TB1-48-G. Check for short between:
P110-N and ground,
P110-R and ground.
Does short exist?

YES	Repair shorted wire. Go to paragraph 9-132.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-144. ALL CHANNEL 3 NO. 2 EDGE-LIGHT PANELS – DO NOT LIGHT

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 5 VDC between (A326):
TB1-49-A and TB1-49-G.

Is voltage present?

YES	Replace terminal board (A326)TB1-49 (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:
P110-T and (A326)TB1-49-A,
P110-V and (A326)TB1-49-G.

Does open exist?

YES	Repair open wire. Go to paragraph 9-132.
NO	Go to step 3.

3. Detach wire from (A326):
TB1-49-A and TB1-49-G. Check for short between:
P110-T and ground,
P110-V and ground.

Does short exist?

YES	Repair shorted wire. Go to paragraph 9-132.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-145. ALL CHANNEL 4 NO. 1 EDGE-LIGHT PANELS – DO NOT LIGHT

9-145

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 5 VDC between (A326):
TB1-45-A and TB1-45-G.

Is voltage present?

YES	Replace terminal board (A326)TB1-45 (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:
P110-CC and (A326)TB1-45-A,
P110-GG and (A326)TB1-45-G.

Does open exist?

YES	Repair open wire. Go to paragraph 9-132.
NO	Go to step 3.

3. Detach wire ends from (A326):
TB1-45-A and TB1-45-G. Check for short between:
P110-CC and ground,
P110-GG and ground.
Does short exist?

YES	Repair shorted wire. Go to paragraph 9-132.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
 One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 5 VDC between (A326):
 TB1-46-A and TB1-46-G.

Is voltage present?

YES	Replace terminal board (A326)TB1-46 (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:
 P110-BB and (A326)TB1-46-A,
 P110-FF and (A326)TB1-46-G.

Does open exist?

YES	Repair open wire. Go to paragraph 9-132.
NO	Go to step 3.

3. Detach wire ends from (A326):
 TB1-46-A and TB1-46-G. Check for short between:
 P110-BB and ground,
 P110-FF and ground.
Does short exist?

YES	Repair shorted wire. Go to paragraph 9-132.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-147. ALL CHANNEL 4 NO. 3 EDGE-LIGHT PANELS – DO NOT LIGHT

9-147

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 5 VDC between (A326):
TB1-47-A and TB1-47-G.

Is voltage present?

YES	Replace terminal board (A326)TB1-47 (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:
P110-AA and (A326)TB1-47-A,
P110-EE and (A326)TB1-47-G.

Does open exist?

YES	Repair open wire. Go to paragraph 9-132.
NO	Go to step 3.

3. Detach wire ends from (A326):
TB1-47-A and TB1-47-G. Check for short between:
P110-AA and ground,
P110-EE and ground.
Does short exist?

YES	Repair shorted wire. Go to paragraph 9-132.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-148. CIRCUIT BREAKER REFERENCE LIST

9-148

Use the circuit breaker reference list in Table 9-29 to locate information about each circuit breaker and to identify the appropriate MOC paragraph number for troubleshooting the circuit breaker.

Table 9-29. Circuit Breaker Reference List

PILOT CIRCUIT BREAKER PANEL (A76)						
<u>CB NO.</u>	<u>NAME</u>	<u>POWER VOLTAGE</u>	<u>AMPS</u>	<u>BUS OR TYPE</u>	<u>CIRCUIT BREAKER OUTPUT</u>	<u>MOC PARA NO.</u>
1	POWER XFMR RECT 1	115 VAC	35	AC ESS 1	P3-S, P3-T	9-23 9-150
2	STAB AUTO AC	115 VAC	7.5	AC ESS 1	P1-36	9-150
3	STAB AUTO DC	28 VDC	15	DC ESS 3	P2-f	9-233
4	POWER XFMR RECT 2	115 VAC	35	AC ESS 2	P4-D, P4-E, P4-F	9-23 9-189
5	POWER BATT CHGR DC	28 VDC	20	DC ESS 1	P2-a	9-206
6	STAB MAN DC	28 VDC	15	DC ESS 1	P2-g	9-206
7	STAB MAN AC	115 VAC	1	AC ESS 1	P1-37	9-150
8	THROT	28 VDC	5	DC EMERG	J1-d	9-263
9	FUEL APU	28 VDC	10	DC EMERG	J1-z	9-263
10	APU HOLD	28 VDC	7.5	DC EMERG	J1-B	9-263
11	FIRE DETR APU	28 VDC	5	DC EMERG	J1-E	9-263
12	FIRE DETR ENG 1	28 VDC	5	DC EMERG	J1-F	9-263
13	FIRE DETR ENG 2	28 VDC	5	DC EMERG	J1-G	9-263
14	FUEL VLV ACTR	28 VDC	5	DC EMERG	J1-C	9-263
15	FIRE EXTGH CPG	28 VDC	5	DC EMERG	J1-H	9-263
16	ENG LVR	28 VDC	5	DC EMERG	J1-K	9-263
17	ENG INST	28 VDC	10	DC EMERG	J1-L, J1-M	9-263
18	ASE AC	115 VAC	1	AC ESS 1	P1-54	9-150
19	STBY ATTD	28 VDC	5	DC EMERG	J1-e	9-263
21	LT CAUT	28 VDC	10	DC EMERG	J1-y	9-263
22	LT SRCH/LDG	28 VDC	25	DC EMERG	P5-4	9-80 9-263
23	LT UTIL SEC	28 VDC	5	DC EMERG	J1-U, J1-W	9-103 9-263
24	COMM UHF AM	28 VDC	5	DC EMERG	J1-v	9-263
25	FIRE EXTGH PLT	28 VDC	5	DC EMERG	JA-D	9-263

Table 9-29. Circuit Breaker Reference List (cont)

PILOT CIRCUIT BREAKER PANEL (A76) (cont)						
CB NO.	NAME	POWER VOLTAGE	AMPS	BUS OR TYPE	CIRCUIT BREAKER OUTPUT	MOC PARA NO.
26	FIRE EXTGH APU	28 VDC	5	DC EMERG	J1-J	9-263
27	COMM ICS	28 VDC	5	DC EMERG	J1-a	9-263
28	ASE DC	28 VDC	5	DC ESS 3	P1-34	9-263
29	COMM IFF	28 VDC	5	DC EMERG	J1-S	9-263
30	COMM KY28	28 VDC	5	DC EMERG	J1-p	9-263
31	RDR ALT	28 VDC	5	DC EMERG	J1-f, J1-g	9-263
32	FUEL FILL	28 VDC	5	DC EMERG	J1-A	9-263
34	JETT	28 VDC	5	DC EMERG	J1-P, J1-R	9-263
35	EMERG HYD	28 VDC	5	DC EMERG	J1-k, J1-m	9-263
36	PITOT HTR	28 VDC	7.5	DC EMERG	J1-s	9-263
37	RTR BRK	28 VDC	5	DC EMERG	J1-n	9-263
38	ECS L NOSE GRBX HTR	28 VDC	20	AC ESS 1	P2-m, P2-n, P2-p	9-150
39	LT PRI	115 VAC	5	AC ESS 1	P1-45	9-115
						9-150
40	LT ANTI COL	115 VAC	5	AC ESS 1	P1-44	9-70
						9-150
41	MISSION IHADSS	115 VAC	5	AC ESS 1	P1-11, P1-12, P1-13	9-150
42	NAV HARS AC	115 VAC	5	AC ESS 1	P1-38, P1-39, P1-40	9-150
43	NAV HSI	115 VAC	5	AC ESS 1	P1-26	9-150
44	POWER ENG 2	115 VAC	5	AC ESS 2	P1-23	9-189
45	MISSION SYM GEN	115 VAC	5	AC ESS 1	P1-52	9-150
46	MISSION ARM CONTR	28 VDC	10	DC ESS 2	P2-E	9-220
47	MISSION RKT ELEX	28 VDC	5	DC ESS 3	P1-27	9-233
48	CHAFF	28 VDC	10	DC EMERG	J1-t	9-263
49	MISSION PEN AIDS CONTR	28 VDC	1	DC ESS 2	P1-49	9-220
50	MISSION FC DC	28 VDC	5	DC ESS 3	P1-17	9-233
51	MISSION FC AC	115 VAC	5	AC ESS 1	P1-28	9-150
52	ENG WARN	28 VDC	5	DC EMERG	J1-N	9-263
						9-395
53	RDR WARN	28 VDC	5	DC EMERG	J1-q	9-263
54	NAV HARS DC	28 VDC	5	DC ESS 3	P1-46	9-233
55	FUEL XFEED	28 VDC	7.5	DC EMERG	P1-32	9-263

Table 9-29. Circuit Breaker Reference List (cont)

PILOT CIRCUIT BREAKER PANEL (A76) (cont)

<u>CB NO.</u>	<u>NAME</u>	<u>POWER VOLTAGE</u>	<u>AMPS</u>	<u>BUS OR TYPE</u>	<u>CIRCUIT BREAKER OUTPUT</u>	<u>MOC PARA NO.</u>
56	FUEL TRANS	28 VDC	10	DC ESS 2	P2-D	9-220
57	FUEL BST	28 VDC	7.5	DC ESS 2	P1-31, P1-48	9-220
58	ENG START	28 VDC	5	DC EMERG	J1-X, J1-c	9-263
59	TWHL LOCK	28 VDC	5	DC ESS 2	P1-15	9-220
60	ENG CUT	28 VDC	5	DC EMERG	J1-b	9-263
61	MISSION PNVS DC	28 VDC	15	DC ESS 3	P2-k	9-233
62	POWER ENG 1	115 VAC	5	AC ESS 1	P1-22	9-150
63	IR JAM PWR	GROUND	0.5	DC GND	P1-50	9-312
64	COMM VHF FM	28 VDC	5	DC EMERG	J1-w	9-263
65	COMM ADF	28 VDC	5	DC EMERG	J1-r	9-263
66	IR JAM XMTR	28 VDC	15	DC ESS 2	P2-h	9-220
67	ECS ENG ANTI ICE	28 VDC	5	DC ESS 1	P1-4	9-220
68	ECS ICE DET	28 VDC	5	DC ESS 3	P1-47	9-233
69	NAV AIR DATA DC	28 VDC	20	DC ESS 3	P2-J	9-233
70	ECS CANOPY ANTI ICE CONTR	28 VDC	5	DC ESS 1	P1-3	9-206
71	ECS WSHLD WPR	28 VDC	15	DC ESS 1	P2-b	9-206
72	MISSION RDR JAM DC	GROUND	.0.5	DC GND	P1-1	9-312
73	LT NAV	28 VDC	5	DC ESS 2	P1-25	9-55 9-70 9-220
74	MISSION RDR JAM AC	115 VAC	5	AC ESS 1	P1-5, P1-6, P1-7	9-150
75	ECS AFT FAN	115 VAC	5	AC ESS 2	P2-A, P2-B, P2-C	9-189
76	ECS CAB	28 VDC	5	DC EMERG	P1-2	9-263
77	ASE BUCS	28 VDC	5	DC ESS 3	P1-33	9-233
78	ECS CANOPY ANTI ICE	115 VAC	20	AC ESS 2	P2-c, P2-d, P2-e	9-189
79	VIB MON	28 VDC	5	DC ESS 2	P1-10	9-220
80	LT SRCH/LDG CONTR	28 VDC	5	DC EMERG	J1-V	9-80 9-263
81	MISSION PNVS AC	115 VAC	5	AC ESS 1	P2-N, P2-P, P2-R	9-150
82	NAV DPLR	28 VDC	5	DC ESS 3	P1-51	9-233

Table 9-29. Circuit Breaker Reference List (cont)

PILOT CIRCUIT BREAKER PANEL (A76)						
<u>CB NO.</u>	<u>NAME</u>	<u>POWER VOLTAGE</u>	<u>AMPS</u>	<u>BUS OR TYPE</u>	<u>CIRCUIT BREAKER OUTPUT</u>	<u>MOC PARA NO.</u>
83	ECS BLADE DE ICE CONTR	28 VDC	5	DC ESS 3	P1-14	9-233
84	NAV AIR DATA AC	115 VAC	5	AC ESS 1	P2-F, P2-G, P2-H	9-150
85	ECS BLADE DE ICE	28 VDC	1	DC ESS 3	P1-53	9-233
86	POWER BATT CHGR AC	115 VAC	5	AC ESS 2	P1-35	9-189
87	TRIM	28 VDC	5	DC EMERG	J1-Y, J1-Z	9-263
88	ECS FAB FANS	115 VAC	7.5	AC ESS 2	P2-K, P2-L, P2-M	9-189
89	MISSION JETT	28 VDC	5	DC ESS 2	P1-18	9-220
90	LT FORM	115 VAC	5	AC ESS 1	P1-24	9-62 9-150
91	NAV VDU	28 VDC	5	DC ESS 2	P1-41, P1-42	9-220
92	MISSION EL AC	115 VAC	5	AC ESS 1	P1-30	9-150
93	MISSION EL DC	28 VDC	5	DC ESS 3	P1-29	9-233
94	CBR BLWR	28 VDC	5	DC ESS 1	P1-19	9-206
96	LSR DET (ADP)	28 VDC	5	DC ESS 2	J1-AA	9-220
97	NAV EGI (ADD)	28 VDC	2	DC ESS 3	J1-GG	9-233
98	MISSION DTU (ADD)	28 VDC	1	DC ESS 3	J1-HH	9-233
211	ECS R NOSE GRBX HTR	115 VAC	20	AC ESS 1	P2-q, P2-r, P2-s	9-150
212	ECS ICE DET HTR	115 VAC	3	AC ESS 2	P1-9	9-189
CPG CIRCUIT BREAKER PANEL 1 (A77)						
1	MUX L PYL INBD	28 VDC	5	DC ESS 3	P2-9	9-249
2	MUX L PYL OUTBD	28 VDC	5	DC ESS 3	J2-11	9-249
3	AWS MTR	115 VAC	30	AC ESS 2	J3-4, J3-5, J3-6	9-199
4	FC FCC DC	28 VDC	7.5	DC ESS 3	J2-32	9-249
5	MUX R PYL INBD	28 VDC	5	DC ESS 3	J2-8	9-249
6	MUX R PYL OUTBD	28 VDC	5	DC ESS 3	J2-10	9-249
7	AWS AMMO	115 VAC	15	AC ESS 2	J2-1, J2-15, J2-22	9-199
8	FC RCDR	115 VAC	5	AC ESS 2	J2-16	9-199
9	MUX FAB R	28 VDC	5	DC ESS 3	J2-13	9-249
10	MUX FAB L	28 VDC	5	DC ESS 3	J2-14	9-249
11	AWS AWS AC	115 VAC	5	AC ESS 1	J2-12, J2-19	9-150
12	AWS AWS DC	28 VDC	5	DC ESS 3	J2-24, J2-33	9-249
13	EMERG BATT OCS	28 VDC	5	DC EMERG	J1-5	9-304

Table 9-29. Circuit Breaker Reference List (cont)

CPG CIRCUIT BREAKER PANEL 1 (A77) (cont)						
<u>CB NO.</u>	<u>NAME</u>	<u>POWER VOLTAGE</u>	<u>AMPS</u>	<u>BUS OR TYPE</u>	<u>CIRCUIT BREAKER OUTPUT</u>	<u>MOC PARA NO.</u>
14	PRI LT	115 VAC	5	AC ESS 2	J1-9	9-134 9-199
15	MUX CPG	28 VDC	5	DC ESS 3	J2-7	9-249
16	FC FCC AC	115 VAC	5	AC ESS 1	J2-35	9-172
17	MSL DC ELEC	28 VDC	5	DC ESS 3	J2-20, J2-21	9-249
18	MSL R OUTBD LCHR AC	115 VAC	2	AC ESS 1	J2-5	9-172
19	MSL R OUTBD LCHR DC	GROUND	0.5	DC GND	J2-18	9-317
20	ATTD IND	115 VAC	5	AC ESS 1	J1-6	9-172
21	MSL R INBD LCHR AC	115 VAC	2	AC ESS 1	J2-4	9-172
22	MSL R INBD LCHR DC	GROUND	0.5	DC GND	J2-25	9-317
23	MSL L INBD LCHR DC	GROUND	2	DC GND	J2-3	9-317
24	MSL L INBD LCHR AC	115 VAC	0.5	AC ESS 1	J2-6	9-172
25	MSL L OUTBD LCHR DC	GROUND	0.5	DC GND	J2-17	9-317
26	MSL L OUTBD LCHR AC	115 VAC	2	AC ESS 1	K2-2	9-172
27	MSL ARM	GROUND	0.5	DC GND	J2-23	9-317
29	EMERG BATT CAUT	28 VDC	7.5	DC EMERG	J1-4	9-304 9-364
30	EMERG BATT UTIL SEC LT	28 VDC	5	DC EMERG	J1-2, J1-3	9-304 9-304
31	EMERG BATT ENG INST	28 VDC	10	DC EMERG	J1-10, J1-8	9-304
32	EMERG BATT VHF AM/FM	28 VDC	5	DC EMERG	J1-7	9-304
CPG CIRCUIT BREAKER PANEL 2 (A97)						
1	IHADSS	115 VAC	5	AC ESS 1	P1-C, P1-D, P1-E	9-172
2	TADS DC	28 VDC	30	DC ESS 1	J1-C, J1-G, J1-L, J1-M	9-215
3	TADS AC	115 VAC	10	AC ESS 1	J1-E, J1-F, J1-H	9-172
4	LASER	115 VAC	2	AC ESS 1	J1-A, J1-B, J1-D	9-172
5	CBR BLWR	28 VDC	5	DC ESS 1	J1-K	9-215
6	CDU	28 VDC	5	DC ESS 3	P1-H	9-249

Table 9-29. Circuit Breaker Reference List (cont)

UTILITY POWER DISTRIBUTION CIRCUIT BREAKERS (A3)						
<u>CB NO.</u>	<u>NAME</u>	<u>POWER VOLTAGE</u>	<u>AMPS</u>	<u>BUS OR TYPE</u>	<u>CIRCUIT BREAKER OUTPUT</u>	<u>MOC PARA NO.</u>
6	AC ELEC UTIL PWR	115 VAC	10	AC ESS 2	J16-E, J16-F, J16-B	9-47
7	DC ELEC UTIL PWR	28 VDC	35	DC ESS 1	J16-A	9-47
94	NITROGEN INERT	115 VAC	5	AC ESS 2	P1085-1	10-67

AFT AVIONICS BAY CIRCUIT BREAKERS						
<u>CB NO.</u>	<u>NAME</u>	<u>POWER VOLTAGE</u>	<u>AMPS</u>	<u>BUS OR TYPE</u>	<u>CIRCUIT BREAKER OUTPUT</u>	<u>MOC PARA NO.</u>
8	MAINT LT	24 VDC	5	BATTERY	J111-A, P463-B3	9-98
148	APU	24 VDC	7.5	BATTERY	P430-A4	15-12

Tools:

Nomenclature

Tool Kit, Electrical
Repairer's

Part Number

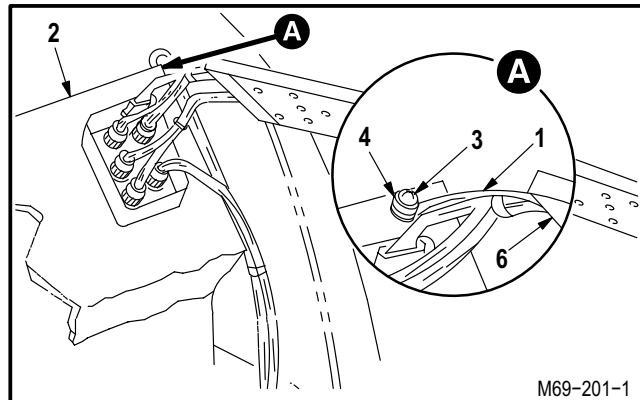
SC518099CLA06

Personnel Required:

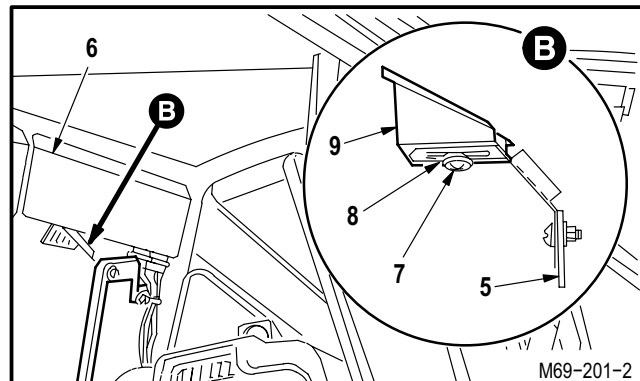
68X Armament/Electrical Systems Repairer

1. Removal

- a. **Remove bonding strap (1) from airframe (2).** Remove one screw (3) and washer (4) that secures bond strap (1) to airframe (2).



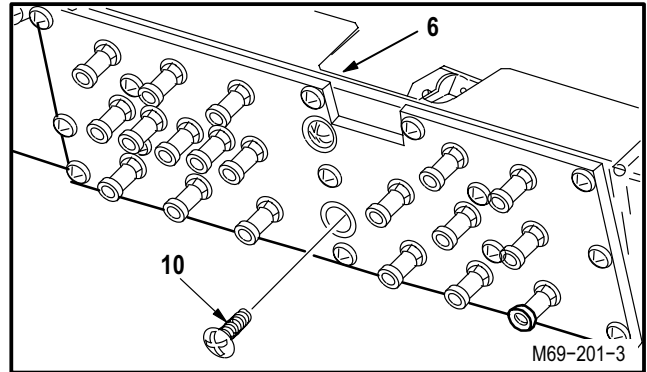
- b. **Detach left vertical glareshield (5) from pilot circuit breaker panel (6).** Remove one screw (7) and washer (8) that secures glareshield (5) to bracket (9).





Remove two aft screws first, then support forward end of panel while removing remaining two screws to prevent damage to transparent barrier or pilot glareshield.

- c. Remove circuit breaker panel (6). Remove screws (10).

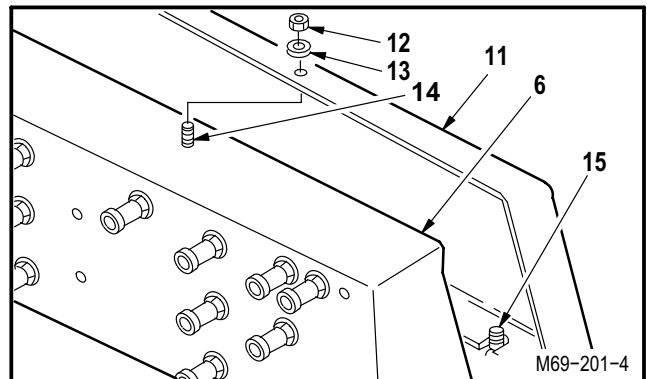


- d. Remove back cover (11) from panel (6). Remove nuts (12) and washers (13) from studs (14) and screws (15) as required.

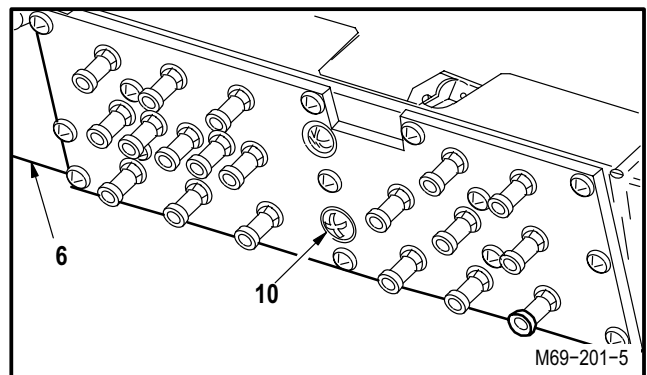
2. Installation

- a. Install back cover (11) on panel (6).

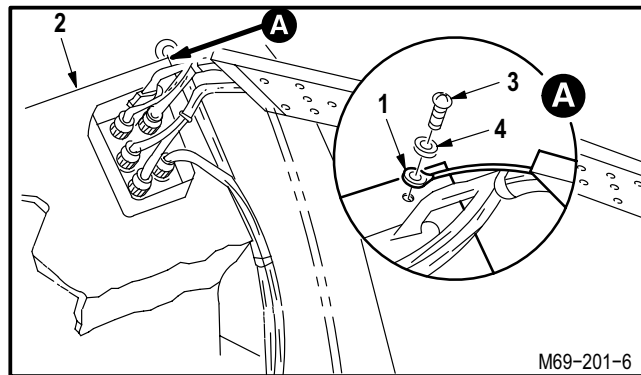
- (1) Position cover (11) over studs (14).
- (2) Install washers (13) and nuts (12) on studs (14) install screws (15) as required.



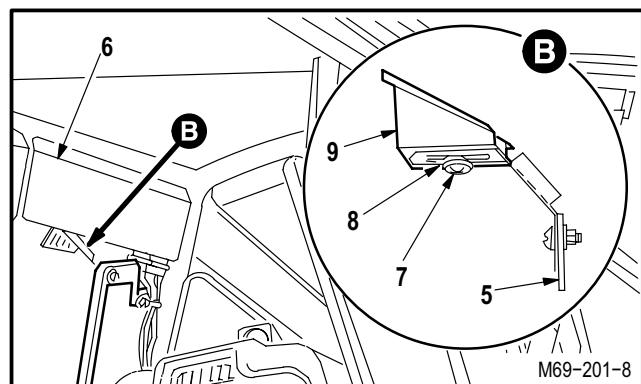
- b. Fasten pilot circuit breaker panel (6) to mounting bracket. Install screws (10).



- c. Install bonding strap (1) on airframe (2) by installing one washer (4) and screw (3).



- d. Install left vertical glare shield (5) mount bracket (9) on pilot circuit breaker panel (6). Position bracket (9) on pilot circuit breaker panel (6). Install washer (8) and screw (7) through glare shield (5) mount bracket (9) into pilot circuit breaker panel (6).



END OF TASK

9-150. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 1 – PILOT STATION) – MAINTENANCE OPERATIONAL CHECK

9-150

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-45	EXTERNAL POWER – POWER UP completed

Personnel Required:

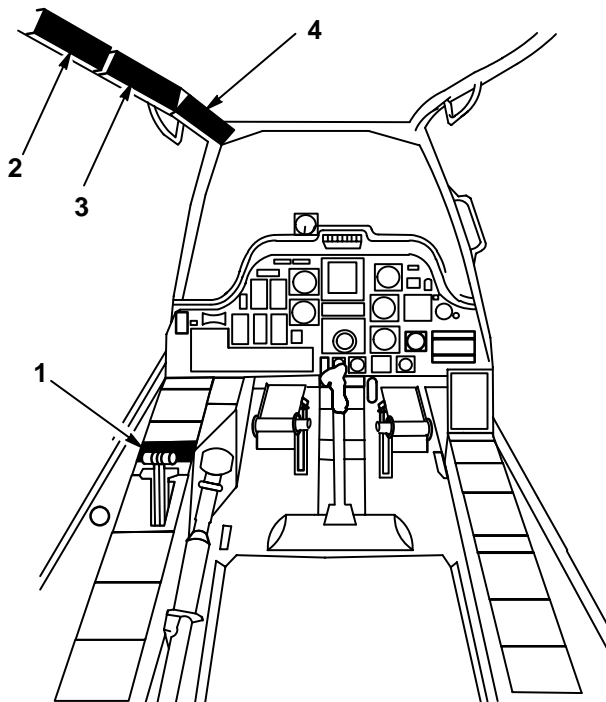
68X Armament/Electrical Systems Repairer
One person to assist

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

NOTE

- Refer to pilot station (fig. 9-156) for configuration and component locations.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.



1. PILOT ELEC PWR PANEL
2. PILOT AFT CIRCUIT BREAKER PANEL
3. PILOT CENTER CIRCUIT BREAKER PANEL
4. PILOT FORWARD CIRCUIT BREAKER PANEL

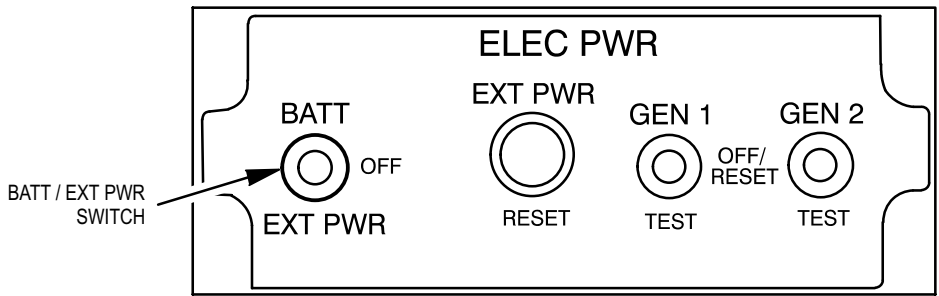
M69-196

Figure 9-156. Pilot Station

9-150. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 1 – PILOT STATION) – MAINTENANCE OPERATIONAL CHECK (cont)

1. Perform the maintenance operational check as follows:

Task	Result
a. On electrical power distribution box, detach P1, P2, and P3.	
b. Check for short between: P3-G and ground, P3-H and ground, P3-J and ground, P3-K and ground, P3-L and ground, P3-M and ground, P3-N and ground, P3-P and ground, P3-R and ground.	If short exists, go to paragraph 9-152.
c. On pilot ELEC PWR panel (fig. 9-157), set BATT/EXT PWR switch to EXT PWR .	



M69-197

Figure 9-157. Pilot ELEC PWR Panel

- | | |
|--|--|
| <p>d. On electrical power distribution box, check for 115 VAC at (A402):
J3-G,
J3-H,
J3-J,
J3-K,
J3-L,
J3-M,
J3-N,
J3-P,
J3-R.</p> | <p>If 115 VAC is not present, go to paragraph 9-153.</p> |
| <p>e. On pilot ELEC PWR panel, set BATT/EXT PWR switch to OFF and attach P1, P2, and P3 on electrical power distribution box.</p> | |
| <p>f. On pilot ELEC PWR panel, set BATT/EXT PWR switch to EXT PWR.</p> | |

**9-150. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 1 – PILOT STATION) –
MAINTENANCE OPERATIONAL CHECK (cont)**

9-150

Task	Result
<p>g. On pilot forward circuit breaker panel (fig. 9-158), close the following circuit breakers: MISSION PNVS AC (CB81), MISSION IHADSS (CB41), MISSION RDR JAM AC (CB74), MISSION SYM GEN (CB45), MISSION EL AC (CB92), MISSION FC AC (CB51), NAV HARS AC (CB42), NAV HSI (CB43), NAV AIR DATA AC (CB84).</p>	<p>If MISSION PNVS AC circuit breaker (CB81) does not stay closed, go to paragraph 9-153.</p> <p>If MISSION IHADSS circuit breaker (CB41) does not stay closed, go to paragraph 9-154.</p> <p>If MISSION RDR JAM AC circuit breaker (CB74) does not stay closed, go to paragraph 9-155.</p> <p>If MISSION SYM GEN circuit breaker (CB45) does not stay closed, go to paragraph 9-156.</p> <p>If MISSION EL AC circuit breaker (CB92) does not stay closed, go to paragraph 9-157.</p> <p>If MISSION FC AC circuit breaker (CB51) does not stay closed, go to paragraph 9-158.</p> <p>If NAV HARS AC circuit breaker (CB42) does not stay closed, go to paragraph 9-159.</p> <p>If NAV HSI circuit breaker (CB43) does not stay closed, go to paragraph 9-160.</p> <p>If NAV AIR DATA AC circuit breaker (CB84) does not stay closed, go to paragraph 9-161.</p>
<p>h. On pilot center circuit breaker panel, close the following circuit breakers: LT PRI (CB39), LT ANTI COL (CB40), LT FORM (CB90), ASE AC (CB18).</p>	<p>If LT PRI circuit breaker (CB39) does not stay closed, go to paragraph 9-162.</p> <p>If LT ANTI COL circuit breaker (CB40) does not stay closed, go to paragraph 9-163.</p> <p>If LT FORM circuit breaker (CB90) does not stay closed, go to paragraph 9-164.</p> <p>If ASE AC circuit breaker (CB18) does not stay closed, go to paragraph 9-165.</p>
<p>i. On pilot aft circuit breaker panel, close the following circuit breakers: ECS L NOSE GRBX HTR (CB38), POWER XFMR RECT 1 (CB1), POWER ENG 1 (CB62), STAB AUTO AC (CB2), STAB MAN AC (CB7), ECS R NOSE GRBX HTR (CB211).</p>	<p>If ECS L NOSE GRBX HTR circuit breaker (CB38) does not stay closed, go to paragraph 9-166.</p> <p>If POWER XFMR RECT 1 circuit breaker (CB1) does not stay closed, go to paragraph 9-167.</p> <p>If POWER ENG 1 circuit breaker (CB62) does not stay closed, go to paragraph 9-168.</p> <p>If STAB AUTO AC circuit breaker (CB2) does not stay closed, go to paragraph 9-169.</p>

9-150. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 1 – PILOT STATION) – MAINTENANCE OPERATIONAL CHECK (cont)

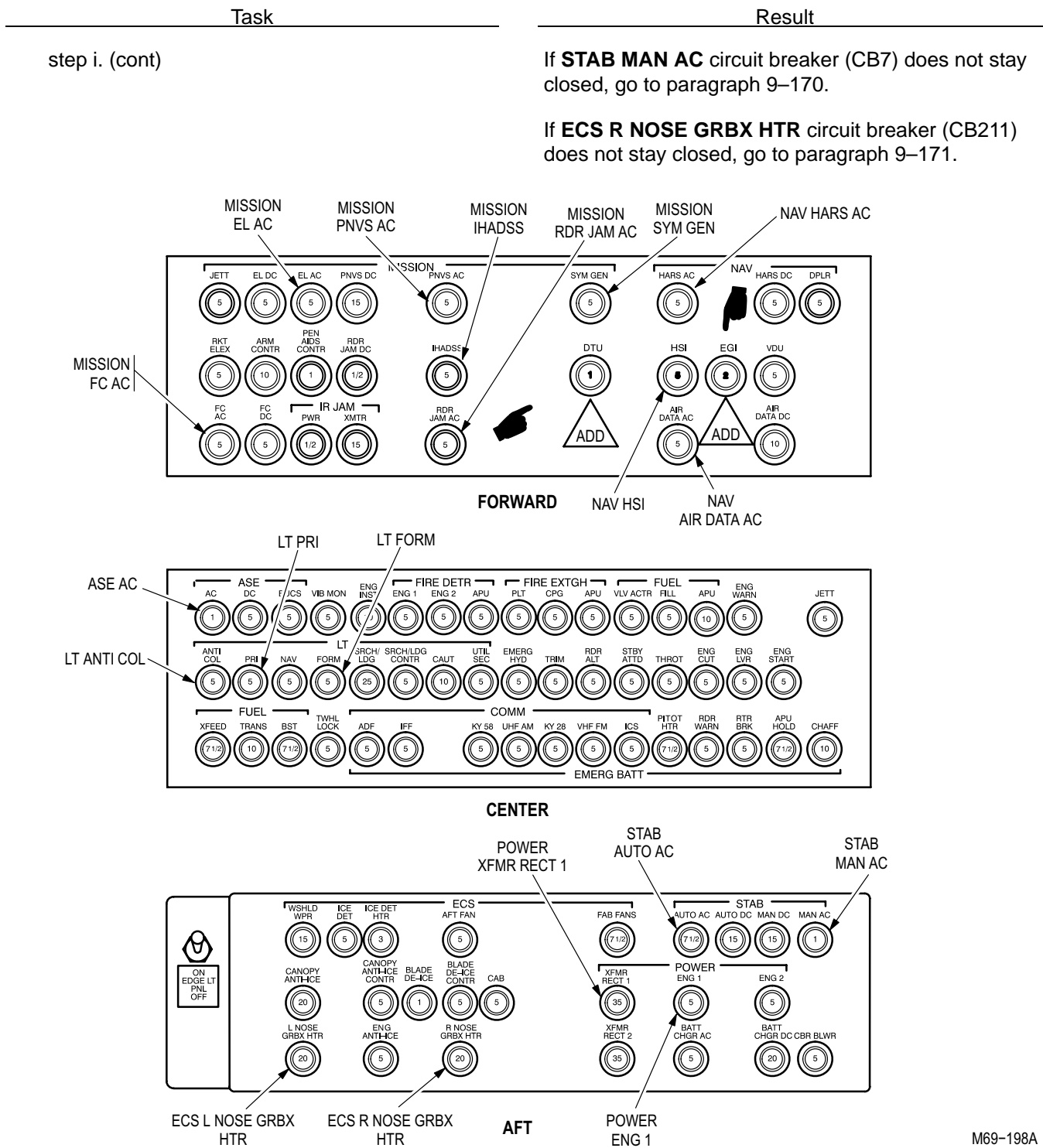


Figure 9-158. Pilot Circuit Breaker Panels

M69-198A

**9-150. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 1 – PILOT STATION) –
MAINTENANCE OPERATIONAL CHECK (cont)**

9-150

Task	Result
j. On pilot ELEC PWR panel (fig. 9-157), set BATT/EXT PWR switch to OFF .	
k. On electrical power distribution box, detach P2.	
l. On pilot ELEC PWR panel, set BATT/EXT PWR switch to EXT PWR .	
m. Check for 115 VAC at: P2-N, P2-P, P2-R.	If 115 VAC is not present, go to paragraph 9-153.
n. Check for 115 VAC at: P2-F, P2-G, P2-H.	If 115 VAC is not present, go to paragraph 9-161.
o. Check for 115 VAC at: P2-p, P2-n, P2-m.	If 115 VAC is not present, go to paragraph 9-166.
p. Check for 115 VAC at: P2-q, P2-r, P2-s.	If 115 VAC is not present, go to paragraph 9-171.
q. On pilot ELEC PWR panel, set BATT/EXT PWR switch to OFF .	
r. On electrical power distribution box, attach P2 and detach P1.	
s. On pilot ELEC PWR panel, set BATT/EXT PWR switch to EXT PWR .	
t. Check for 115 VAC at: P1-5, P1-6, P1-7.	If 115 VAC is not present, go to paragraph 9-155.
u. Check for 115 VAC at: P1-11, P1-12, P1-13.	If 115 VAC is not present, go to paragraph 9-154.
v. Check for 115 VAC at: P1-38, P1-39, P1-40.	If 115 VAC is not present, go to paragraph 9-159.
w. Check for 115 VAC at P1-52.	If 115 VAC is not present, go to paragraph 9-156.

**9-150. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 1 – PILOT STATION) –
MAINTENANCE OPERATIONAL CHECK (cont)**

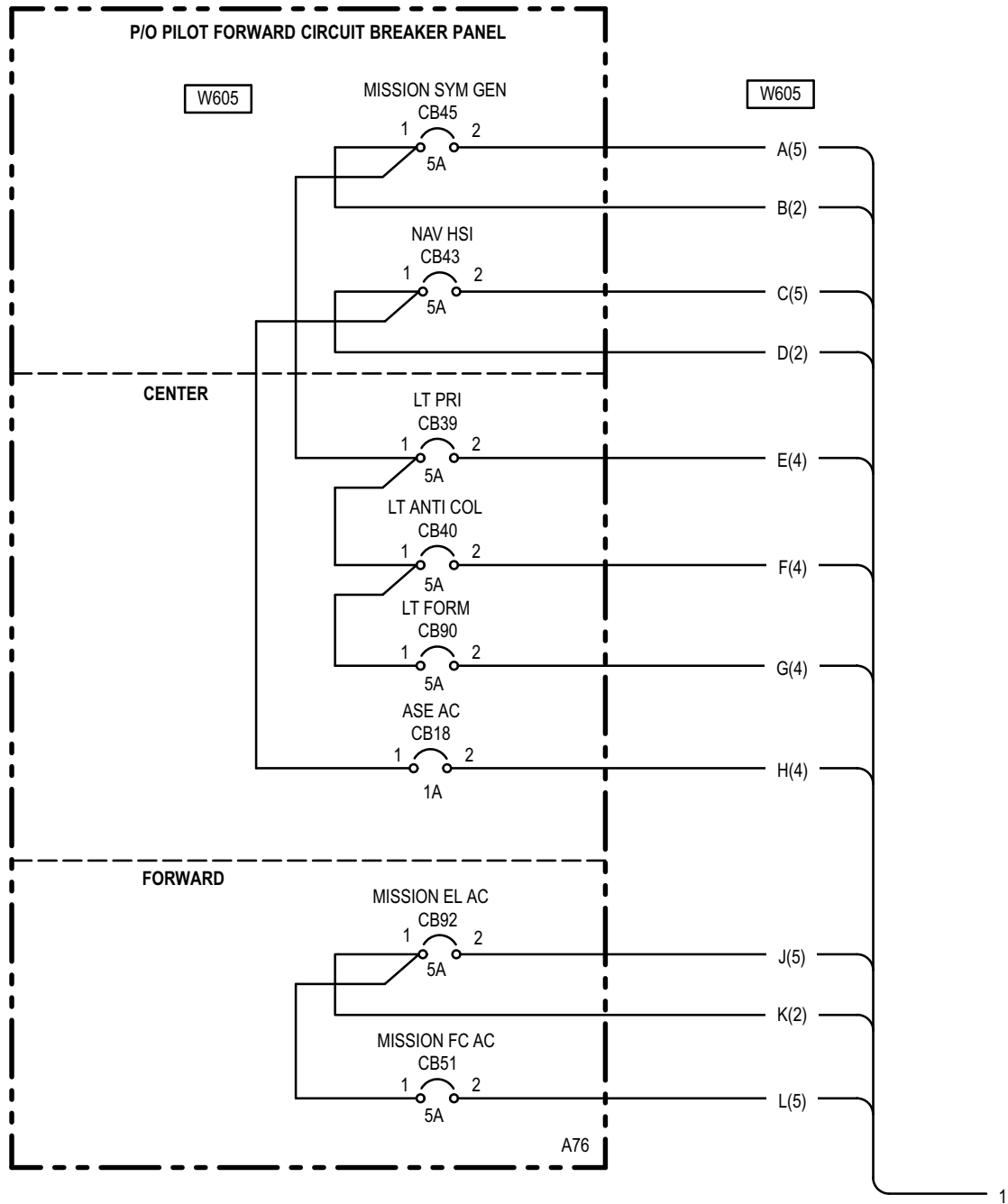
9-150

Task	Result
x. Check for 115 VAC at P1-45.	If 115 VAC is not present, go to paragraph 9-162.
y. Check for 115 VAC at P1-44.	If 115 VAC is not present, go to paragraph 9-163.
z. Check for 115 VAC at P1-24.	If 115 VAC is not present, go to paragraph 9-164.
aa. Check for 115 VAC at P1-26.	If 115 VAC is not present, go to paragraph 9-160.
ab. Check for 115 VAC at P1-54.	If 115 VAC is not present, go to paragraph 9-165.
ac. Check for 115 VAC at P1-30.	If 115 VAC is not present, go to paragraph 9-157.
ad. Check for 115 VAC at P1-28.	If 115 VAC is not present, go to paragraph 9-158.
ae. Check for 115 VAC at P1-22.	If 115 VAC is not present, go to paragraph 9-168.
af. Check for 115 VAC at P1-36.	If 115 VAC is not present, go to paragraph 9-169.
ag. Check for 115 VAC at P1-37.	If 115 VAC is not present, go to paragraph 9-170.
ah. On pilot ELEC PWR panel (fig. 9-157), set BATT/EXT PWR switch to OFF .	
ai. On electrical power distribution box, attach P1 and detach P3.	
aj. On pilot aft circuit breaker panel (fig. 9-158), check that POWER XFMR RECT 1 circuit breaker (CB1) is closed.	If POWER XFMR RECT 1 circuit breaker (CB1) does not stay closed, go to paragraph 9-167.
ak. On electrical power distribution box, attach P3.	

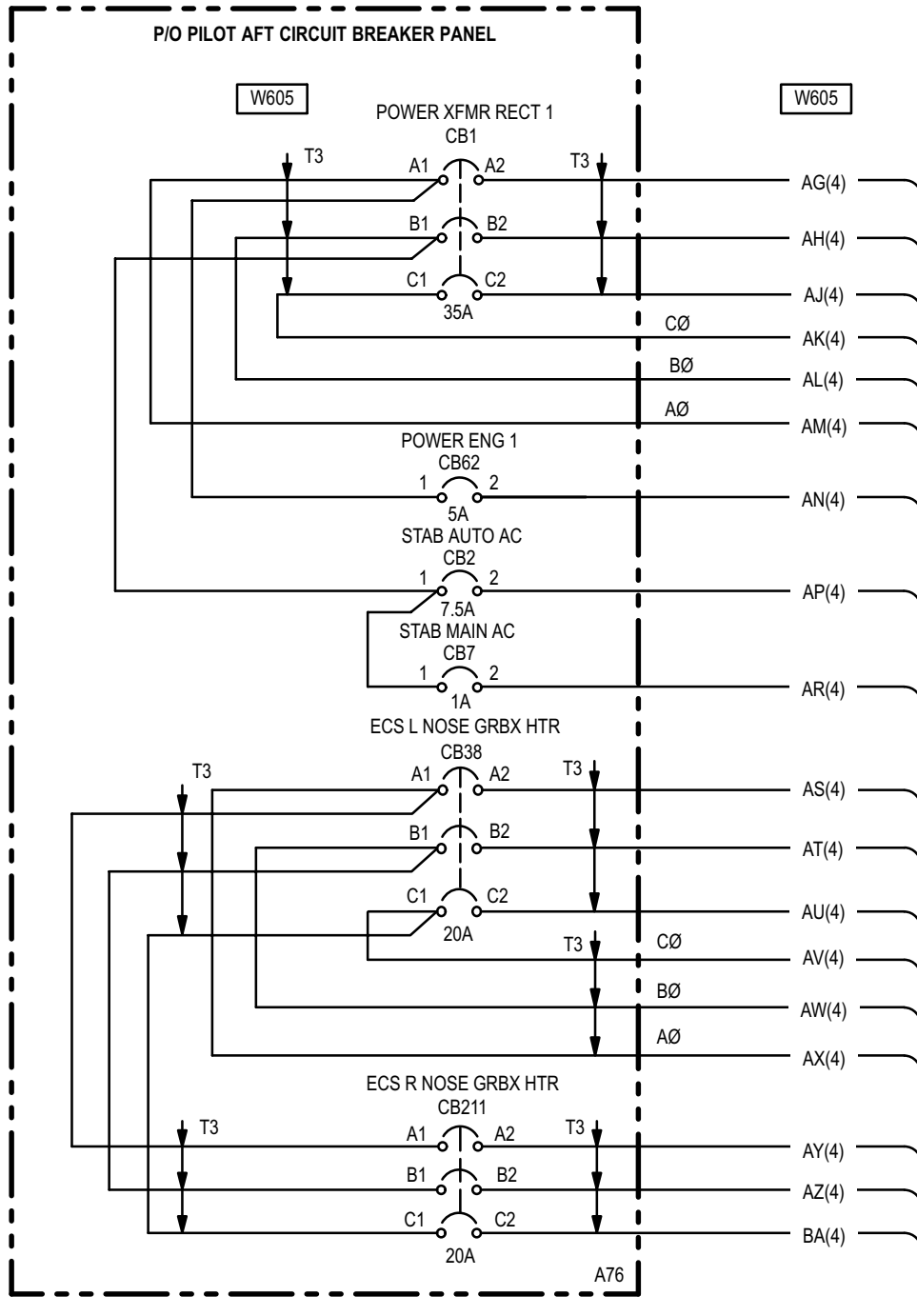
2. Perform EXTERNAL POWER – POWER DOWN (para 9-46).

END OF TASK

9-151. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 1 - PILOT STATION) -
WIRING INTERCONNECT DIAGRAM



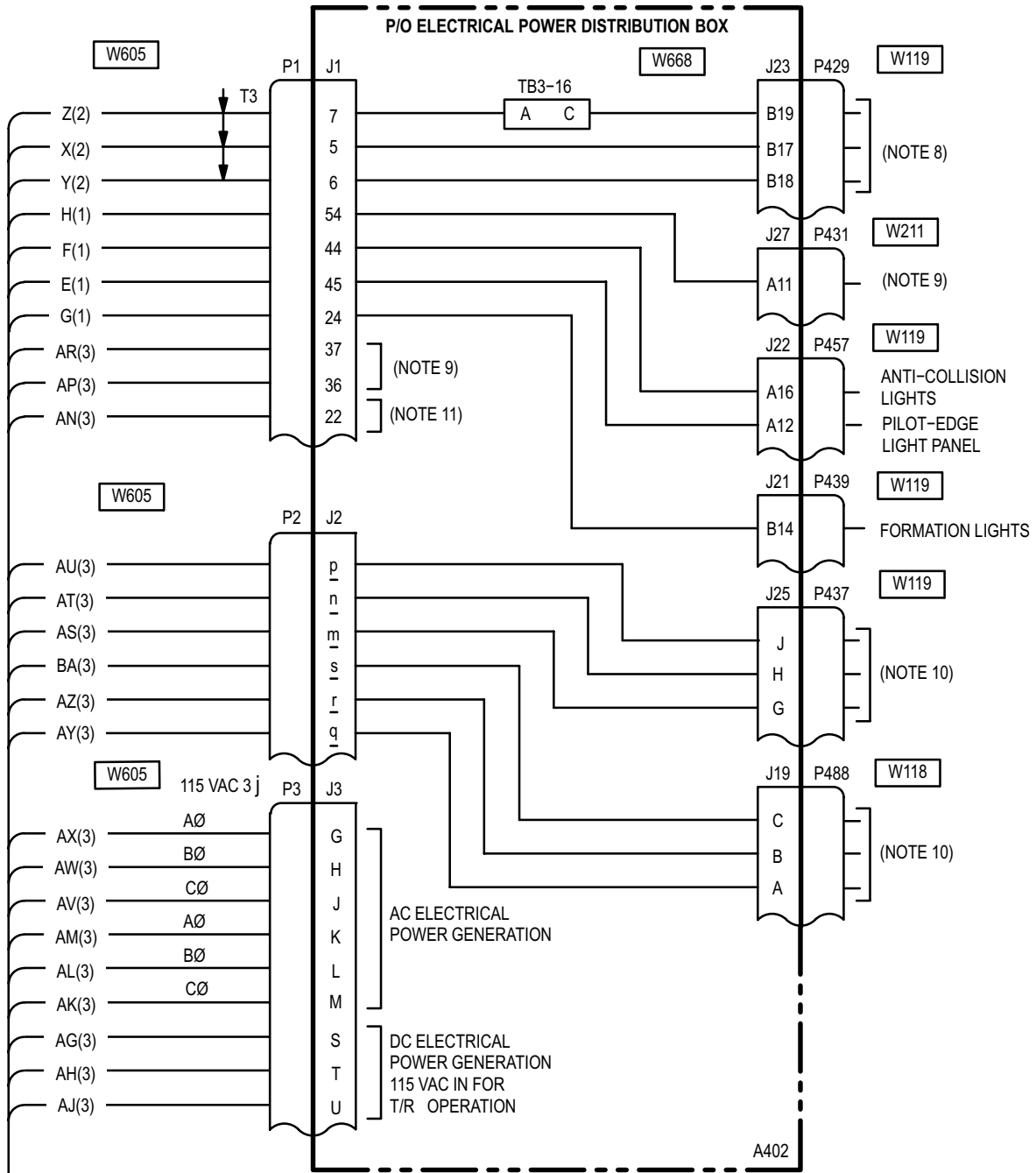
9-151. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 1 – PILOT STATION) –
WIRING INTERCONNECT DIAGRAM (cont)



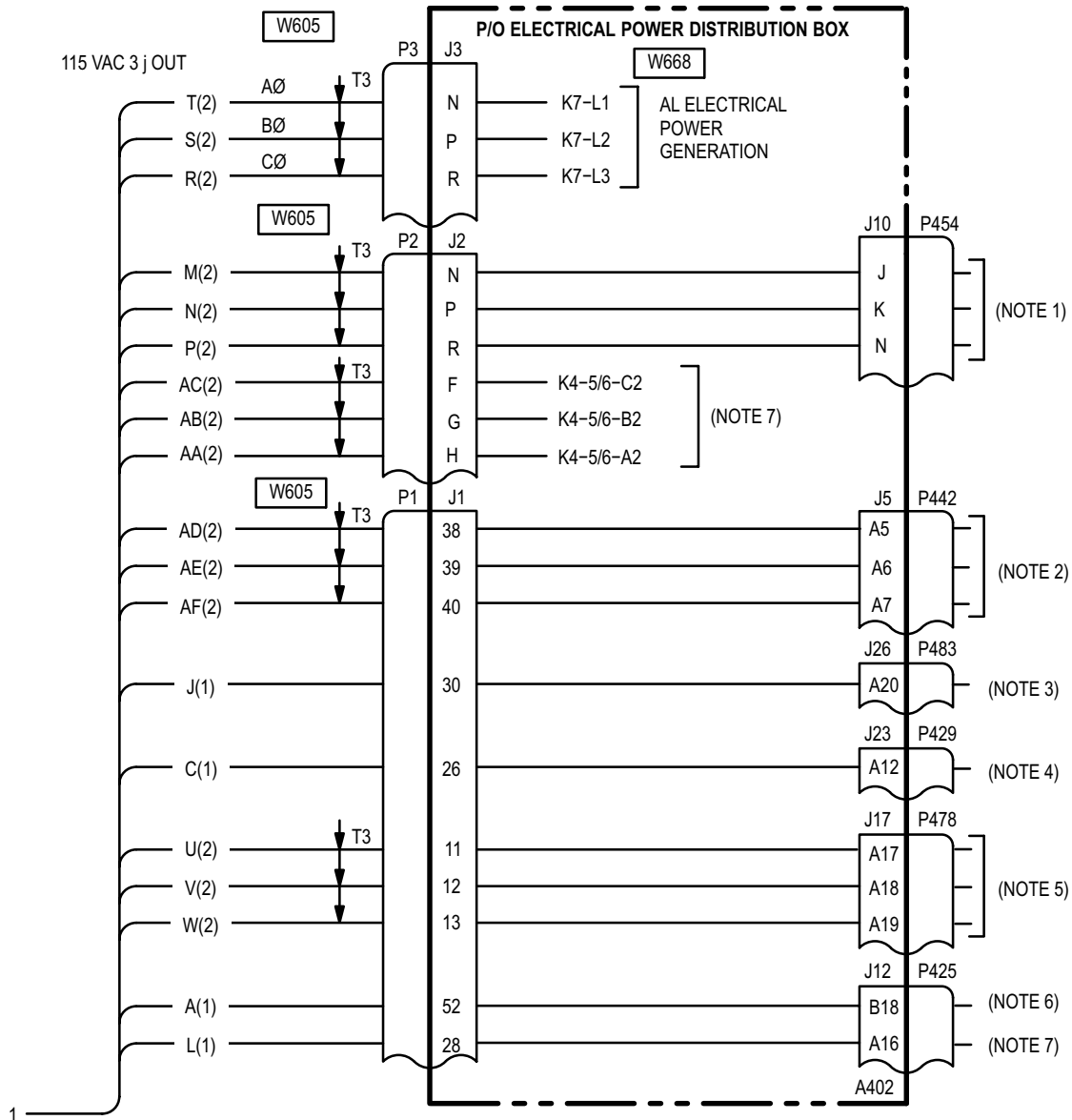
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9-151. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 1 - PILOT STATION) -
WIRING INTERCONNECT DIAGRAM (cont)



9-151. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 1 - PILOT STATION) -
WIRING INTERCONNECT DIAGRAM (cont)



NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

1. PILOTS NIGHT VISION SENSOR (PNVS) SYSTEM (TM 11-5855-265-T).
2. AVIONICS CONFIGURATION-HARS (TM 11-1520-238-23-2).
3. ARMAMENT-AREA WEAPONS SYSTEM (TM 9-1090-208-23-2).
4. AVIONICS CONFIGURATION-NAVIGATION INSTRUMENTS (TM 11-1520-238-23-2).
5. IHADSS (TM 9-1270-221-23).
6. AVIONICS CONFIGURATION-SYMBOL GENERATOR (TM 11-1520-238-23-2).
7. FIRE CONTROL SYSTEM (TM 9-1230-476-20-2).
8. AVIONICS CONFIGURATION-RADAR WARNING SYSTEM (TM 11-1520-238-23-2).
9. FLIGHT CONTROL SYSTEM (TM 1-1520-238-T-7).
10. UTILITY SYSTEM-ENGINE ANTI-ICE (TM 1-1520-238-T-8).
11. POWER PLANTS (TM 1-1520-238-T-4).

9-152. SHORT – EXISTS BETWEEN: P3-G, P3-H, P3-J AND GROUND; P3-K, P3-L, P3-M OR P3-N, P3-P, P3-R AND GROUND

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-148	All pilot ac essential bus 1 circuit breakers open



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for short between:
P3-G and ground,
P3-H and ground,
P3-J and ground.

Does short exist?

YES	Repair shorted wire between: P3-G and CB38-A1, P3-H and CB38-B1, P3-J and CB38-C1. Go to paragraph 9-150.
NO	Go to step 2.

2. Check for short between:
P3-K and ground,
P3-L and ground,
P3-M and ground.

Does short exist?

YES	Go to step 14.
NO	Go to step 3.

3. Check for short between P3-N and ground.
Does short exist?

YES	Go to step 4.
NO	Go to step 9.

4. Detach wire at CB81-A1. Check for short between P3-N and ground.

Does short exist?

YES	Repair shorted wire between P3-N and CB81-A1. Go to paragraph 9-150.
NO	Go to step 5.

5. Attach wire ends at CB81. Detach wire at CB41-A1. Check for short between P3-N and ground.

Does short exist?

YES	Repair shorted wire between CB81-A1 and CB41-A1. Go to paragraph 9-150.
NO	Go to step 6.

6. Attach wire ends at CB41. Detach wire at CB74-A1. Check for short between P3-N and ground.

Does short exist?

YES	Repair shorted wire between CB41-A1 and CB74-A1. Go to paragraph 9-150.
NO	Go to step 7.

9-153. MISSION PNVS AC CIRCUIT BREAKER (CB81) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT: P2-N, P2-P, P2-R

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-5855-265-T



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does MISSION PNVS AC circuit breaker (CB81) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Open CB81. Set **BATT/EXT PWR** switch to **OFF**.

Check for short between:
P2-N and ground,
P2-P and ground,
P2-R and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 1-5855-265-T to troubleshoot PNVS system.

3. Detach wire ends at CB81-A2, CB81-B2, and CB81-C2. Check for short between:
P2-N and ground,
P2-P and ground,
P2-R and ground.

Does short exist?

- YES Repair shorted wire.
Go to paragraph 9-150.
- NO Replace **MISSION PNVS AC** circuit breaker (CB81) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:

P3-N and CB81-A1,
P3-P and CB81-B1,
P3-R and CB81-C1,
P2-N and CB81-A2,
P2-P and CB81-B2,
P2-R and CB81-C2.

Does open exist?

- YES Repair open wire.
Go to paragraph 9-150.
- NO Replace **MISSION PNVS AC** circuit breaker (CB81) (TM 1-1520-238-23).

END OF TASK

9-154. MISSION IHADSS CIRCUIT BREAKER (CB41) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT: P1-11, P1-12, P1-13

9-154

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1270-221-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does MISSION IHADSS circuit breaker (CB41) stay closed?

YES Go to step 4.
NO Go to step 2.

2. Open CB41. Set **BATT/EXT PWR** switch to **OFF**. Check for short between:
P1-11 and ground,
P1-12 and ground,
P1-13 and ground.

Does short exist?

YES Go to step 3.
NO Refer to TM 9-1270-221-23 to troubleshoot IHADSS system.

3. Detach wire ends at CB41-A2, CB41-B2, and CB41-C2. Check for short between:
P1-11 and ground,
P1-12 and ground,
P1-13 and ground.

Does short exist?

YES Repair shorted wire.
Go to paragraph 9-150.

NO Replace **MISSION PNVS AC** circuit breaker (CB81) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:

CB41-A1 and CB81-A1,
CB41-B1 and CB81-B1,
CB41-C1 and CB81-C1,
CB41-A2 and P1-11,
CB41-B2 and P1-12,
CB41-C2 and P1-13.

Does open exist?

YES Repair open wire.
Go to paragraph 9-150.

NO Replace **MISSION IHADSS** circuit breaker (CB41) (TM 1-1520-238-23).

END OF TASK

9-155. MISSION RDR JAM AC CIRCUIT BREAKER (CB74) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT: P1-5, P1-6, P1-7

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does MISSION RDR JAM AC circuit breaker (CB74) stay closed?

YES Go to step 4.
NO Go to step 2.

- Open CB74. Set **BATT/EXT PWR** switch to **OFF**. Check for short between:
P1-5 and ground,
P1-6 and ground,
P1-7 and ground.

Does short exist?

YES Go to step 3.
NO Refer to TM 11-1520-238-23-2 to troubleshoot radar jamming system.

- Detach wire ends at CB74-A2, CB74-B2, and CB74-C2. Check for short between:
P1-5 and ground,
P1-6 and ground,
P1-7 and ground.

Does short exist?

YES Repair shorted wire.
Go to paragraph 9-150.

NO Replace **MISSION RDR JAM AC** circuit breaker (CB74) (TM 1-1520-238-23).

- Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB74-A1 and CB41-A1,
CB74-B1 and CB41-B1,
CB74-C1 and CB41-C1,
CB74-A2 and P1-5,
CB74-B2 and P1-6,
CB74-C2 and P1-7.

Does open exist?

YES Repair open wire.
Go to paragraph 9-150.

NO Replace **MISSION RDR JAM AC** circuit breaker (CB74) (TM 1-1520-238-23).

END OF TASK

9-156. MISSION SYM GEN CIRCUIT BREAKER (CB45) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT P1-52

9-156

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-5895-1184-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does MISSION SYM GEN circuit breaker (CB45) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Open CB45. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-52 and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 11-5895-1184-23 to troubleshoot symbol generator system.

3. Detach wire at CB45-2. Check for short between P1-52 and ground.

Does short exist?

- YES Repair shorted wire between CB45-2 and P1-52. Go to paragraph 9-150.
- NO Replace **MISSION SYM GEN** circuit breaker (CB45) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between: CB45-1 and CB42-A1, CB45-2 and P1-52.

Does open exist?

- YES Repair open wire. Go to paragraph 9-150.
- NO Replace **MISSION SYM GEN** circuit breaker (CB45) (TM 1-1520-238-23).

END OF TASK

9-157. MISSION EL AC CIRCUIT BREAKER (CB92) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT P1-30 **9-157**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1090-208-23-2

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does MISSION EL AC circuit breaker (CB92) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. Open CB92. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-30 and ground.
Does open exist?
 - YES Go to step 3.
 - NO Refer to TM 9-1090-208-23-2 to troubleshoot external stores control system.

3. Detach wire at CB92-2. Check for short between P1-30 and ground.
Does open exist?
 - YES Repair shorted wire.
Go to paragraph 9-150.
 - NO Replace **MISSION EL AC** circuit breaker (CB92)
(TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB92-1 and CB42-C1,
CB92-2 and P1-30.
Does open exist?
 - YES Repair open wire.
Go to paragraph 9-150.
 - NO Replace **MISSION EL AC** circuit breaker (CB92)
(TM 1-1520-238-23).

END OF TASK

9-158. MISSION PC AC CIRCUIT BREAKER (CB51) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT P1-28

9-158

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does MISSION FC AC circuit breaker (CB51) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. Open CB51. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-28 and ground
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 9-1230-476-20-2 to troubleshoot MRTU.

3. Detach wire at CB51-2. Check for short between P1-28 and ground.
Does short exist?
 - YES Repair shorted wire between CB51-2 and P1-28.
Go to paragraph 9-150.
 - NO Replace **MISSION FC AC** circuit breaker (CB51)
(TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB51-1 and CB92-1,
CB51-2 and P1-28.
Does open exist?
 - YES Repair open wire.
Go to paragraph 9-150.
 - NO Replace **MISSION FC AC** circuit breaker (CB51)
(TM 1-1520-238-23).

END OF TASK

**9-159. NAV HARS DATA AC CIRCUIT BREAKER (CB42) – DOES NOT STAY CLOSED
OR 115 VAC IS NOT PRESENT AT: P1-38, P1-39, P1-40**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-6605-300-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does NAV HARS AC circuit breaker (CB42) stay closed?

YES Go to step 4.
NO Go to step 2.

2. Open CB42. Set **BATT/EXT PWR** switch to **OFF**. Check for short between:
P1-38 and ground,
P1-39 and ground,
P1-40 and ground.

Does short exist?

YES Go to step 3.
NO Refer to TM 11-6605-300-23 to troubleshoot HARS system.

3. Detach wire ends at CB42-A2, CB42-B2, and CB42-C2. Check for short between:
P1-38 and ground,
P1-39 and ground,
P1-40 and ground.

Does short exist?

YES Repair shorted wire.
 Go to paragraph 9-150.

NO Replace **NAV HARS AC** circuit breaker (CB42) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB42-A1 and CB84-A1,
CB42-B1 and CB84-B1,
CB42-C1 and CB84-C1,
CB42-A2 and P1-38,
CB42-B2 and P1-39,
CB42-C2 and P1-40.

Does open exist?

YES Repair open wire.
 Go to paragraph 9-150.

NO Replace **NAV HARS AC** circuit breaker (CB42) (TM 1-1520-238-23).

END OF TASK

9-160. NAV HSI CIRCUIT BREAKER (CB43) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT P1-26

9-160

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does NAV HSI circuit breaker (CB43) stay closed?

YES	Go to step 4.
NO	Go to step 2.

2. Open CB43. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-26 and ground.
Does short exist?

YES	Go to step 3.
NO	Refer to TM 11-1520-238-23-2 to troubleshoot HARS.

3. Detach wire at CB43-2. Check for short between P1-26 and ground.
Does short exist?

YES	Repair shorted wire between CB43-2 and P1-26. Go to paragraph 9-150.
NO	Replace NAV HSI circuit breaker (CB43) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between: CB43-1 and CB42-B1, CB43-2 and P1-26.
Does open exist?

YES	Repair open wire. Go to paragraph 9-150.
NO	Replace NAV HSI circuit breaker (CB43) (TM 1-1520-238-23).

END OF TASK

9-161. NAV AIR DATA AC CIRCUIT BREAKER (CB84) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT: P2-H, P2-G, P2-F

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does NAV AIR DATA AC circuit breaker (CB84) stay closed?

YES Go to step 4.
NO Go to step 2.

- Open CB84. Set **BATT/EXT PWR** switch to **OFF**. Check for short between:
P2-H and ground,
P2-G and ground,
P2-F and ground.

Does short exist?

YES Go to step 3.
NO Refer to TM 9-1230-476-20-2 to troubleshoot air data subsystem.

- Detach wire ends at CB84-A2, CB84-B2, and CB84-C2. Check for short between:
P2-H and ground,
P2-G and ground,
P2-F and ground.

Does short exist?

YES Repair shorted wire.
Go to paragraph 9-150.

NO Replace **NAV AIR DATA AC** circuit breaker (CB84) (TM 1-1520-238-23).

- Set **BATT/EXT PWR** switch to **OFF**. Check for open between:

CB84-A1 and CB74-A1,
CB84-B1 and CB74-B1,
CB84-C1 and CB74-C1,
CB84-A2 and P2-H,
CB84-B2 and P2-G,
CB84-C2 and P2-F.

Does open exist?

YES Repair open wire.
Go to paragraph 9-150.

NO Replace **NAV AIR DATA AC** circuit breaker (CB84) (TM 1-1520-238-23).

END OF TASK

9-162. LT PRI CIRCUIT BREAKER (CB39) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT P1-45

9-162

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does LT PRI circuit breaker (CB39) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Open CB39. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-45 and ground.

Does short exist?

- YES Go to step 3.
- NO Go to paragraph 9-113 to troubleshoot pilot edge-lights.

3. Detach wire at CB39-2. Check for short between P1-45 and ground.

Does short exist?

- YES Repair shorted wire between CB39-2 and P1-45.
Go to paragraph 9-150.
- NO Replace **LT PRI** circuit breaker (CB39) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB39-1 and CB45-1,
CB39-2 and P1-45.

Does open exist?

- YES Repair open wire.
Go to paragraph 9-150.
- NO Replace **LT PRI** circuit breaker (CB39) (TM 1-1520-238-23).

END OF TASK

9-163. LT ANTI COL CIRCUIT BREAKER (CB40) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT P1-44

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does LT ANTI COL circuit breaker (CB40) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Open CB40. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-44 and ground.

Does short exist?

- YES Go to step 3.
- NO Go to paragraph 9-70 to troubleshoot collision lights.

3. Detach wire at CB40-2. Check for short between P1-44 and ground.

Does short exist?

- YES Repair shorted wire between CB40-2 and P1-44. Go to paragraph 9-150.
- NO Replace **LT ANTI COL** circuit breaker (CB40) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between: CB40-1 and CB39-1, CB40-2 and P1-44.

Does open exist?

- YES Repair open wire. Go to paragraph 9-150.
- NO Replace **LT ANTI COL** circuit breaker (CB40) (TM 1-1520-238-23).

END OF TASK

9-164. LT FORM CIRCUIT BREAKER (CB90) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT P1-24

9-164

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does LT FORM circuit breaker (CB90) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Open CB90. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-24 and ground.

Does short exist?

- YES Go to step 3.
- NO Go to paragraph 9-62 to troubleshoot formation lights.

3. Detach wire at CB90-2. Check for short between P1-24 and ground.

Does short exist?

- YES Repair shorted wire between CB90-2 and P1-24. Go to paragraph 9-150.
- NO Replace **LT FORM** circuit breaker (CB90) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between: CB90-1 and CB40-1, CB90-2 and P1-24.

Does open exist?

- YES Repair open wire. Go to paragraph 9-150.
- NO Replace **LT FORM** circuit breaker (CB90) (TM 1-1520-238-23).

END OF TASK

9-165. ASE AC CIRCUIT BREAKER (CB18) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT P1-54

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-7



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does ASE AC circuit breaker (CB18) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Open CB18. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-54 and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 1-1520-238-T-7 to troubleshoot DASE.

3. Detach wire at CB18-2. Check for short between P1-54 and ground.

Does short exist?

- YES Repair shorted wire between CB18-2 and P1-54.
Go to paragraph 9-150.
- NO Replace **ASE AC** circuit breaker (CB18) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB18-1 and CB43-1,
CB18-2 and P1-54.

Does open exist?

- YES Repair open wire.
Go to paragraph 9-150.
- NO Replace **ASE AC** circuit breaker (CB18) (TM 1-1520-238-23).

END OF TASK

9-166. ECS L NOSE GRBX HTR CIRCUIT BREAKER (CB38) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT: P2-m, P2-n, P2-p

9-166

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does ECS L NOSE GRBX HTR Circuit breaker (CB38) stay closed?

YES Go to step 4.
NO Go to step 2.

- Open CB38. Set **BATT/EXT PWR** switch to **OFF**. Check for short between:
P2-m and ground,
P2-n and ground,
P2-p and ground.

Does short exist?

YES Go to step 3.
NO Refer to TM 1-1520-238-T-8 to troubleshoot engine anti-ice.

- Detach wire at CB38-A2, CB38-B2, and CB38-C2. Check for short between:
P2-m and ground,
P2-n and ground,
P2-p and ground.

Does short exist?

YES Repair shorted wire.
Go to paragraph 9-150.

NO Replace **ECS L NOSE GRBX HTR** circuit breaker (CB38) (TM 1-1520-238-23).

- Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB38-A1 and P3-G,
CB38-B1 and P3-H,
CB38-C1 and P3-J,
CB38-A2 and P2-m,
CB38-B2 and P2-n,
CB38-C2 and P2-p.

Does open exist?

YES Repair open wire.
Go to paragraph 9-150.

NO Replace **ECS L NOSE GRBX HTR** circuit breaker (CB38) (TM 1-1520-238-23).

END OF TASK

9-167. POWER XFMR RECT 1 CIRCUIT BREAKER (CB1) – DOES NOT STAY CLOSED OR CONTINUITY DOES EXIST BETWEEN: P3-K AND P3-S, P3-L AND P3-T, P3 -M AND P3-U

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does POWER XFMR RECT 1 circuit breaker (CB1) stay closed?

YES Go to step 4.
NO Go to step 2.

- Open CB1. Set **BATT/EXT PWR** switch to **OFF**.
Check for short between:
P3-S and ground,
P3-T and ground,
P3-U and ground.

Does short exist?

YES Go to step 3.
NO Go to paragraph 9-23 to troubleshoot dc electrical power generation.

- Detach wire at CB1-A2, CB1-B2, and CB1-C2.
Check for short between:
P3-S and ground,
P3-T and ground,
P3-U and ground.

Does short exist?

YES Repair shorted wire.
Go to paragraph 9-150.

NO Replace **POWER XFMR RECT 1** circuit breaker (CB1) (TM 1-1520-238-23).

- Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB1-A1 and P3-K,
CB1-B1 and P3-L,
CB1-C1 and P3-M,
CB1-A2 and P3-S,
CB1-B2 and P3-T,
CB1-C2 and P3-U.

Does open exist?

YES Repair open wire.
Go to paragraph 9-150.

NO Replace **POWER XFMR RECT 1** circuit breaker (CB1) (TM 1-1520-238-23).

END OF TASK

9-168. POWER ENG 1 CIRCUIT BREAKER (CB62) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT P1-22

9-168

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-4



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does POWER ENG 1 circuit breaker (CB62) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. Open CB62. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-22 and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 1-1520-238-T-4 to troubleshoot power plants.

3. Detach wire at CB62-2. Check for short between P1-22 and ground.
Does short exist?
 - YES Repair shorted wire between CB62-2 and P1-22. Go to paragraph 9-150.
 - NO Replace **POWER ENG 1** circuit breaker (CB62) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between: CB62-1 and CB1-A1, CB62-2 and P1-22.
Does open exist?
 - YES Repair open wire. Go to paragraph 9-150.
 - NO Replace **POWER ENG 1** circuit breaker (CB62) (TM 1-1520-238-23).

END OF TASK

9-169. STAB AUTO AC CIRCUIT BREAKER (CB2) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT P1-36

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-7



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does STAB AUTO AC circuit breaker (CB2) stay closed?

- | | |
|-----|---------------|
| YES | Go to step 4. |
| NO | Go to step 2. |

- Open CB2. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-36 and ground.

Does short exist?

- | | |
|-----|--|
| YES | Go to step 3. |
| NO | Refer to TM 1-1520-238-T-7 to troubleshoot stabilator. |

- Detach wire ends at CB2-2. Check for short between P1-36 and ground.

Does short exist?

- | | |
|-----|--|
| YES | Repair shorted wire between CB2-2 and P1-36.
Go to paragraph 9-150. |
| NO | Replace STAB AUTO AC circuit breaker (CB2)
(TM 1-1520-238-23). |

- Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB2-1 and CB1-B1,
CB2-2 and P1-36.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-150. |
| NO | Replace STAB AUTO AC circuit breaker (CB2)
(TM 1-1520-238-23). |

END OF TASK

9-170. STAB MAN AC CIRCUIT BREAKER (CB7) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT P1-37 **9-170**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-7

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does STAB MAN AC circuit breaker (CB7) stay closed?

YES	Go to step 4.
NO	Go to step 2.

2. Open CB7. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-3 and ground.
Does short exist?

YES	Go to step 3.
NO	Refer to TM 1-1520-238-T-7 to troubleshoot stabilator.

3. Detach wire at CB7-2. Check for short between P1-37 and ground.
Does short exist?

YES	Repair shorted wire between CB7-2 and P1-37. Go to paragraph 9-150.
NO	Replace STAB MAN AC circuit breaker (CB7) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB7-1 and CB2-1,
CB7-2 and P1-37.
Does open exist?

YES	Repair open wire. Go to paragraph 9-150.
NO	Replace STAB MAN AC circuit breaker (CB7) (TM 1-1520-238-23).

END OF TASK

9-171. ECS R NOSE GRBX HTR CIRCUIT BREAKER (CB211) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT: P2-q, P2-r, P2-s 9-171

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does ECS R NOSE GRBX HTR circuit breaker (CB211) stay closed?

YES	Go to step 4.
NO	Go to step 2.

- Open CB211. Set **BATT/EXT PWR** switch to **OFF**. Check for short between:
CB211-A2 and ground,
CB211-B2 and ground,
CB211-C2 and ground.

Does short exist?

YES	Go to step 3.
NO	Refer to TM 1-1520-238-T-8 to troubleshoot engine anti-ice.

- Detach wire at CB211-A2, CB211-B2, and CB211-C2. Check for short between:
P2-q and ground,
P2-r and ground,
P2-s and ground.

Does short exist?

YES	Repair shorted wire between: P2-q and CB211-A2, P2-r and CB211-B2, P2-s and CB211-C2. Go to paragraph 9-150.
-----	--

NO	Replace ECS R NOSE GRBX HTR circuit breaker (CB211) (TM 1-1520-238-23).
----	--

- Set **BATT/EXT PWR** switch to **OFF**.

Check for open between:
CB38-A1 and CB211-A1,
CB38-B1 and CB211-B1,
CB38-C1 and CB211-C1,
P2-q and CB211-A2,
P2-r and CB211-B2,
P2-s and CB211-C2.

Does open exist?

YES	Repair open wire. Go to paragraph 9-150.
-----	---

NO	Replace ECS R NOSE GRBX HTR circuit breaker (CB211) (TM 1-1520-238-23).
----	--

END OF TASK

9-172. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 1 – CPG STATION) – MAINTENANCE OPERATIONAL CHECK

9-172

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

- 68X Armament/Electrical Systems Repairer
- One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

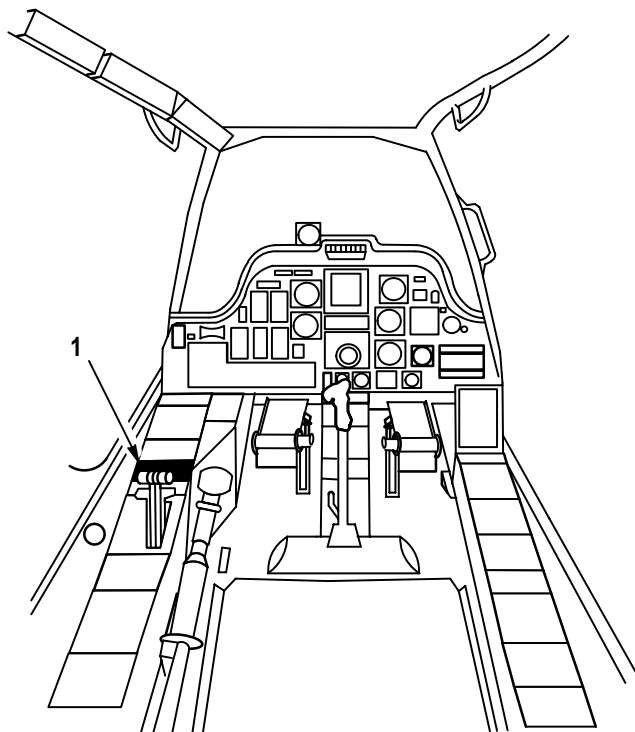
<u>Ref</u>	<u>Condition</u>
Paragraph 9-45	EXTERNAL POWER – POWER UP completed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

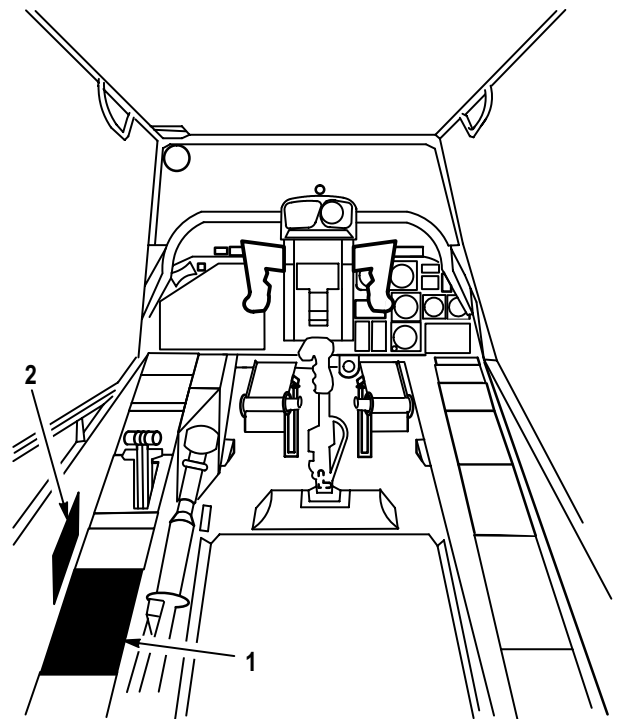
NOTE

Refer to pilot station (fig. 9-159) and CPG station (fig. 9-160) for cockpit configuration and equipment.



1. PILOT ELEC PWR PANEL

M69-203



1. CPG CIRCUIT BREAKER PANEL 1
2. CPG CIRCUIT BREAKER PANEL 2

M69-204

Figure 9-159. Pilot Station

Figure 9-160. CPG Station

NOTE

- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.

1. Complete the maintenance operational check as follows:

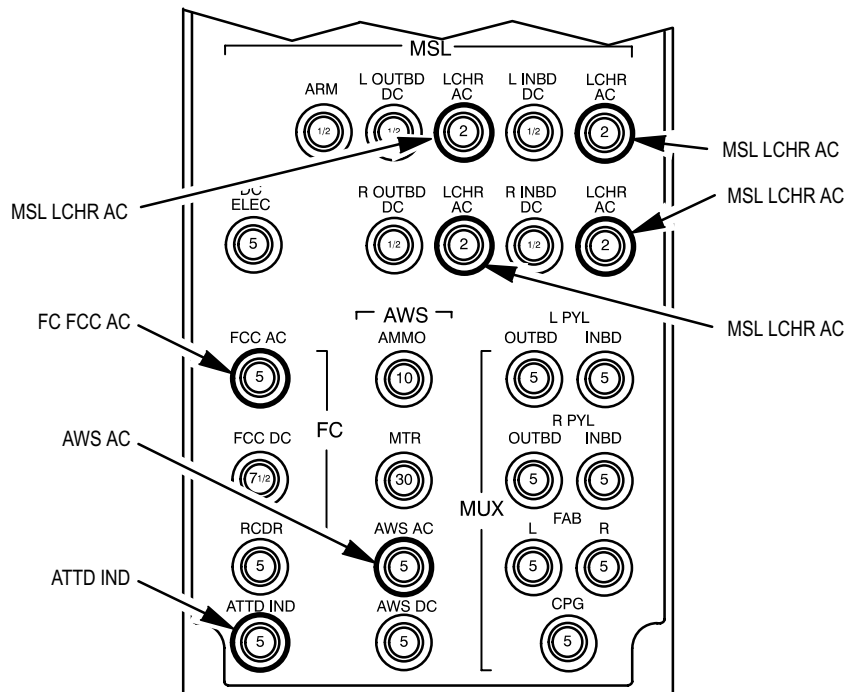
Task	Result
------	--------

- a. On electrical power distribution box, detach P461.

WARNING

Avoid touching circuit breaker panels to airframe, or crossing circuit breaker terminals with any tools. Failure to do so could result in death or serious injury.

- b. On CPG circuit breaker panel 1 (fig. 9-161), open **AWS AWS AC** circuit breaker (CB11), **FC FCC AC** circuit breaker (CB16), and **ATTD IND** circuit breaker (CB20).



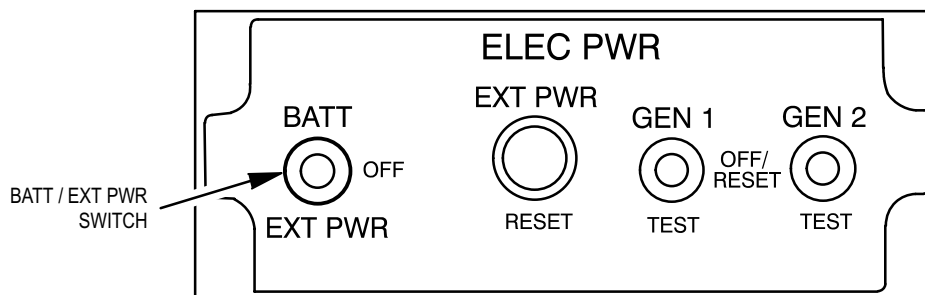
M69-206

Figure 9-161. CPG Circuit Breaker Panel 1

**9-172. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 1 – CPG STATION) –
MAINTENANCE OPERATIONAL CHECK (cont)**

9-172

Task	Result
c. Check for short between: P461-D and ground, P461-E and ground, P461-F and ground.	If short exists, go to paragraph 9-174.
d. Check for short between ground and P461-L.	If short exists, go to paragraph 9-175.
e. On pilot ELEC PWR panel (fig. 9-162), place BATT/EXT PWR switch to EXT PWR .	



M69-205

Figure 9-162. Pilot ELEC PWR Panel

- | | |
|--|--|
| <p>f. On electrical power distribution box, check for 115 VAC at (A402):
J32-D,
J32-E,
J32-F,
J32-L.</p> <p>g. On pilot ELEC PWR panel, place BATT/EXT PWR switch to OFF.</p> <p>h. Attach P461.</p> <p>i. On pilot ELEC PWR panel (fig. 9-162), place BATT/EXT PWR switch to EXT PWR.</p> <p>j. On CPG circuit breaker panel 1 (fig. 9-161), close AWS AWS AC circuit breaker (CB11), FC FCC AC circuit breaker (CB16), and ATTD IND circuit breaker (CB20).</p> | <p>If 115 VAC is not present, go to paragraph 9-12 to troubleshoot ac electrical power generation.</p> |
|--|--|

**9-172. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 1 – CPG STATION) –
MAINTENANCE OPERATIONAL CHECK (cont)**

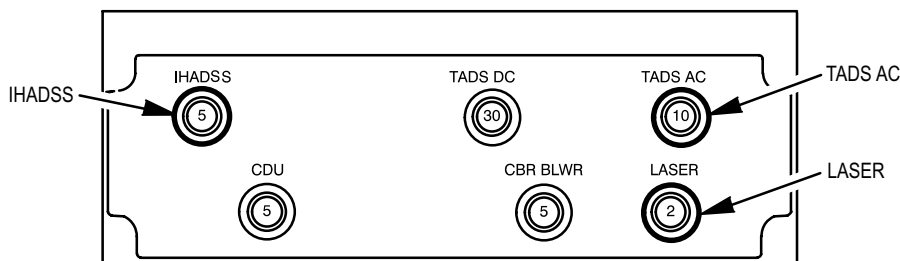
9-172

Task	Result
<p>k. On CPG circuit breaker panel 1 (fig. 9-161), check that AWS AWS AC (CB11), MSL R LCHR AC (CB18), MSL R LCHR AC (CB21), MSL L LCHR AC (CB24), MSL L LCHR AC (CB26), FC FCC AC (CB16), and ATTD IND (CB20) circuit breakers are closed.</p>	<p>If AWS AWS AC circuit breaker (CB11) does not stay closed, go to paragraph 9-176.</p> <p>If MSL R LCHR AC circuit breaker (CB18) does not stay closed, go to paragraph 9-177.</p> <p>If MSL R LCHR AC circuit breaker (CB21) does not stay closed, go to paragraph 9-178.</p> <p>If MSL L LCHR AC circuit breaker (CB24) does not stay closed, go to paragraph 9-179.</p> <p>If MSL L LCHR AC circuit breaker (CB26) does not stay closed, go to paragraph 9-180.</p> <p>If FC FCC AC circuit breaker (CB16) does not stay closed, go to paragraph 9-181.</p> <p>If ATTD IND circuit breaker (CB20) does not stay closed, go to paragraph 9-182.</p>
<p>l. On pilot ELEC PWR panel (fig. 9-162), set BATT/EXT PWR switch to OFF.</p>	
<p>m. On CPG circuit breaker panel 1, detach P766, P767, and P769.</p>	
<p>n. On pilot ELEC PWR panel, place BATT/EXT PWR switch to EXT PWR.</p>	
<p>o. Check for 115 VAC at P769-L.</p>	<p>If 115 VAC is not present, go to paragraph 9-175.</p>
<p>p. (AAK) Check for 115 VAC at P767-30 and P767-31. (ABQ) Check for 115 VAC at P767-31.</p>	<p>If 115 VAC is not present, go to paragraph 9-183.</p>
<p>q. On pilot ELEC PWR panel, place BATT/EXT PWR switch to OFF.</p>	
<p>r. Check for continuity between (A77): J4-L, J2-12, and J2-19.</p>	<p>If continuity does not exist, go to paragraph 9-176.</p>
<p>s. Check for continuity between (A77): J2-31 and J2-5.</p>	<p>If continuity does not exist, go to paragraph 9-177.</p>
<p>t. Check for continuity between (A77): J2-31 and J2-4.</p>	<p>If continuity does not exist, go to paragraph 9-178.</p>
<p>u. Check for continuity between (A77): J2-31 and J2-3.</p>	<p>If continuity does not exist, go to paragraph 9-179.</p>
<p>v. Check for continuity between (A77): J2-31 and J2-2.</p>	<p>If continuity does not exist, go to paragraph 9-180.</p>

9-172. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 1 – CPG STATION) – MAINTENANCE OPERATIONAL CHECK (cont)

9-172

Task	Result
w. (AAK) Check for continuity between (A77)J2-30 and (A97)J2-35.	If continuity does not exist, go to paragraph 9-181.
x. (ABQ) Check for continuity between (A77):J4-L and J2-35.	If continuity does not exist, go to paragraph 9-184.
y. (AAK) Check for continuity between (A77):J2-30 and J1-6.	If continuity does not exist, go to paragraph 9-182.
z. (ABQ) Check for continuity between (A77):J4-L and J1-6.	If continuity does not exist, go to paragraph 9-185.
aa. On CPG circuit breaker panel 1 (fig. 9-161), reconnect P766, P767, and P769.	
ab. On CPG circuit breaker panel 2, check that LASER (CB4), TADS AC (CB3) and IHADSS (CB1) circuit breakers are closed.	
ac. On pilot ELEC PWR panel (fig. 9-162), place BATT/EXT PWR switch to EXT PWR .	
ad. Check that circuit breakers closed in step aa. remain closed.	If LASER circuit breaker (CB4 does not stay closed, go to paragraph 9-186.
	If TADS AC circuit breaker (CB3 does not stay closed, go to paragraph 9-187.
	If IHADSS circuit breaker (CB1) does not stay closed, go to paragraph 9-188.
ae. On pilot ELEC PWR panel, place BATT/EXT PWR switch to OFF .	
af. On CPG circuit breaker panel 2 (fig. 9-163), detach P761 and P1.	



M69-207

Figure 9-163. CPG Circuit Breaker Panel 2

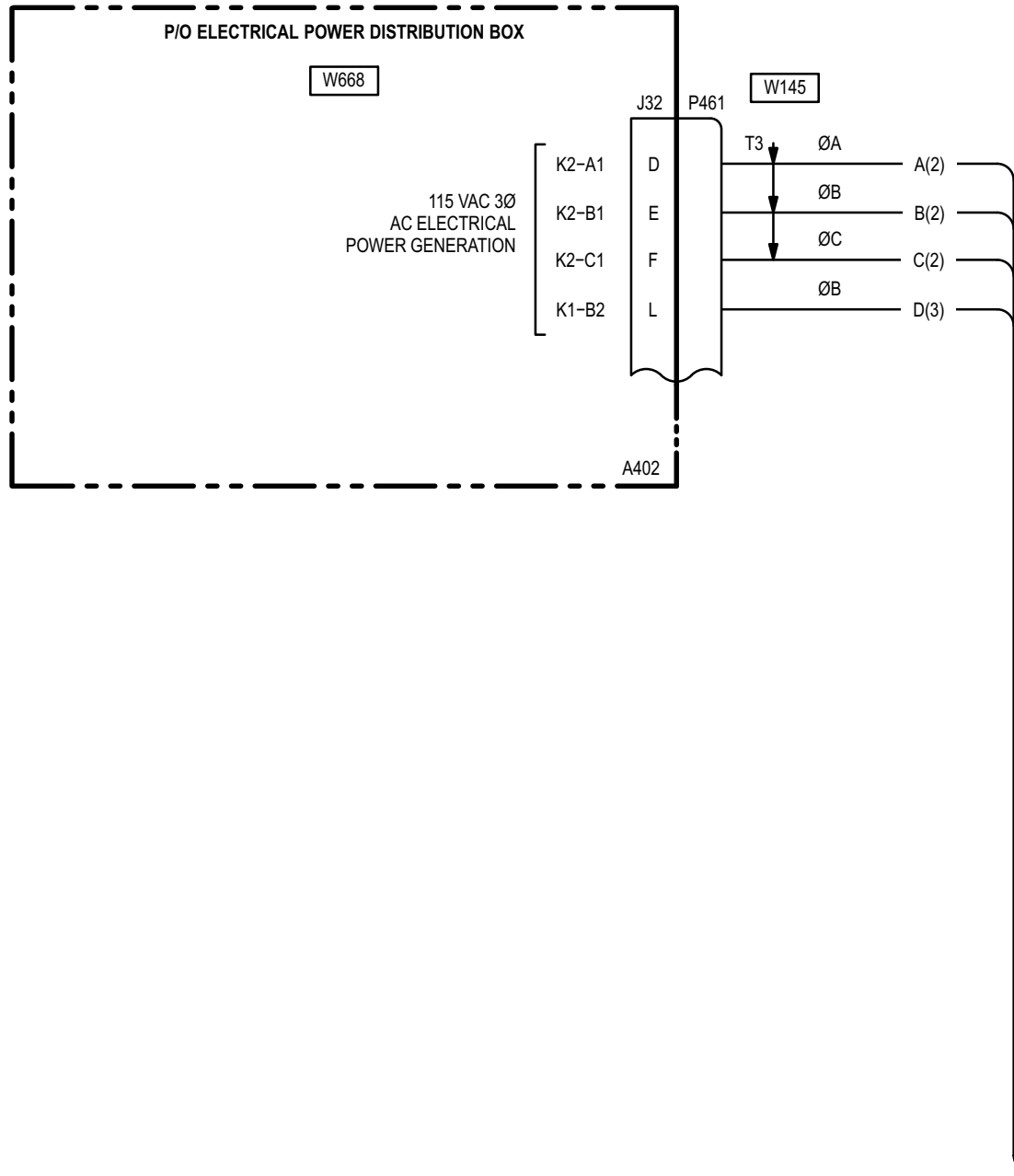
**9-172. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 1 – CPG STATION) –
MAINTENANCE OPERATIONAL CHECK (cont)**

Task	Result
ag. On pilot ELEC PWR panel (fig. 9-162), place BATT/EXT PWR switch to EXT PWR .	
ah. Check for 115 VAC at (A97): J1-D, J1-B, J1-A.	If 115 VAC is not present, go to paragraph 9-186.
ai. Check for 115 VAC at (A97): J1-H, J1-F, J1-E.	If 115 VAC is not present, go to paragraph 9-187.
aj. Check for 115 VAC at (A97): J1-E, J1-D, J1-C.	If 115 VAC is not present, go to paragraph 9-188.
ak. On CPG circuit breaker panel 1 (fig. 9-161), attach P766, P767, and P769.	
al. On CPG circuit breaker panel 2 (fig. 9-163), attach P761 and P1.	

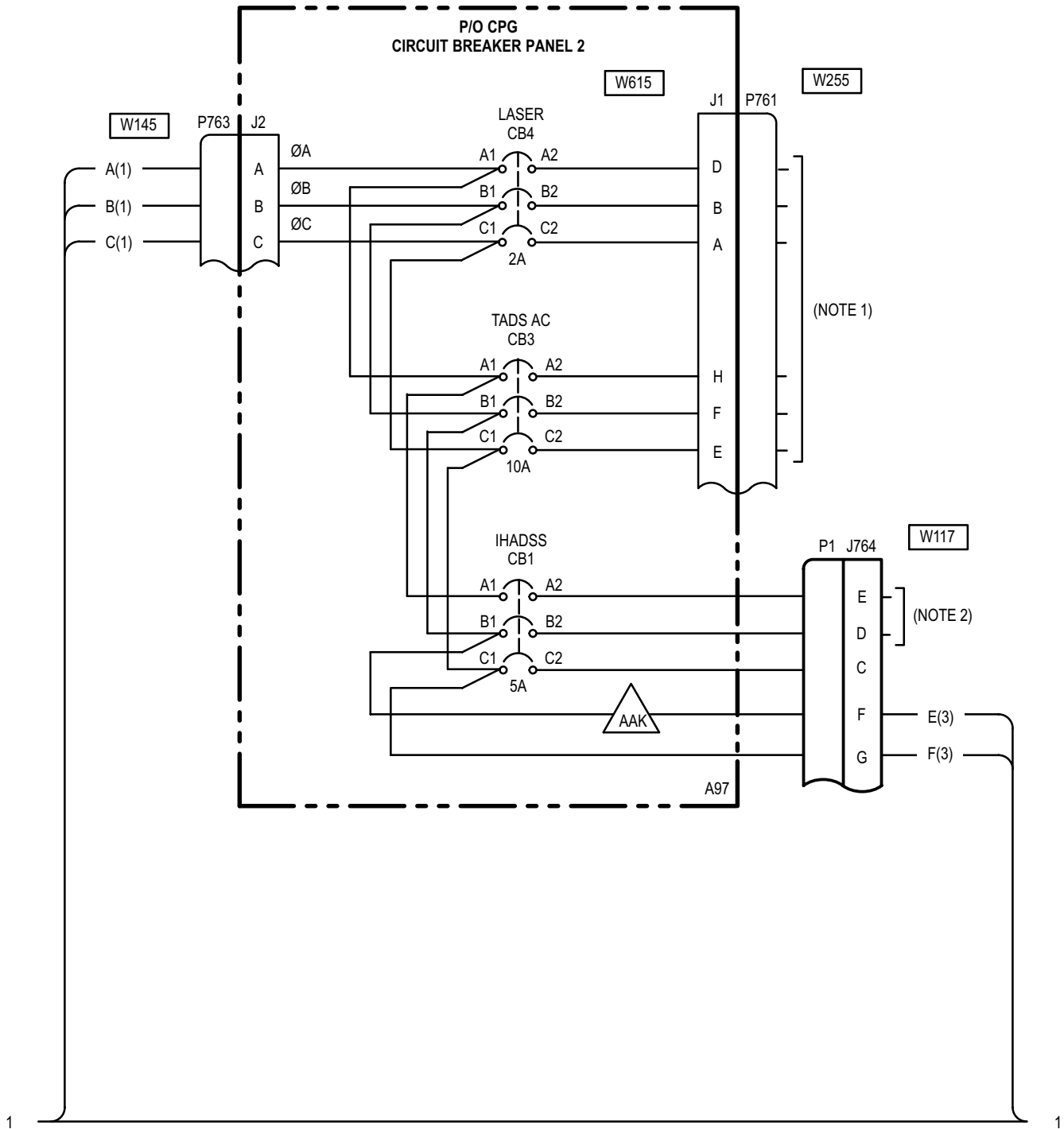
2. On pilot **ELEC PWR** panel, place **BATT/EXT PWR** switch to **OFF**.
3. Perform EXTERNAL POWER – POWER DOWN (para 9-46).

END OF TASK

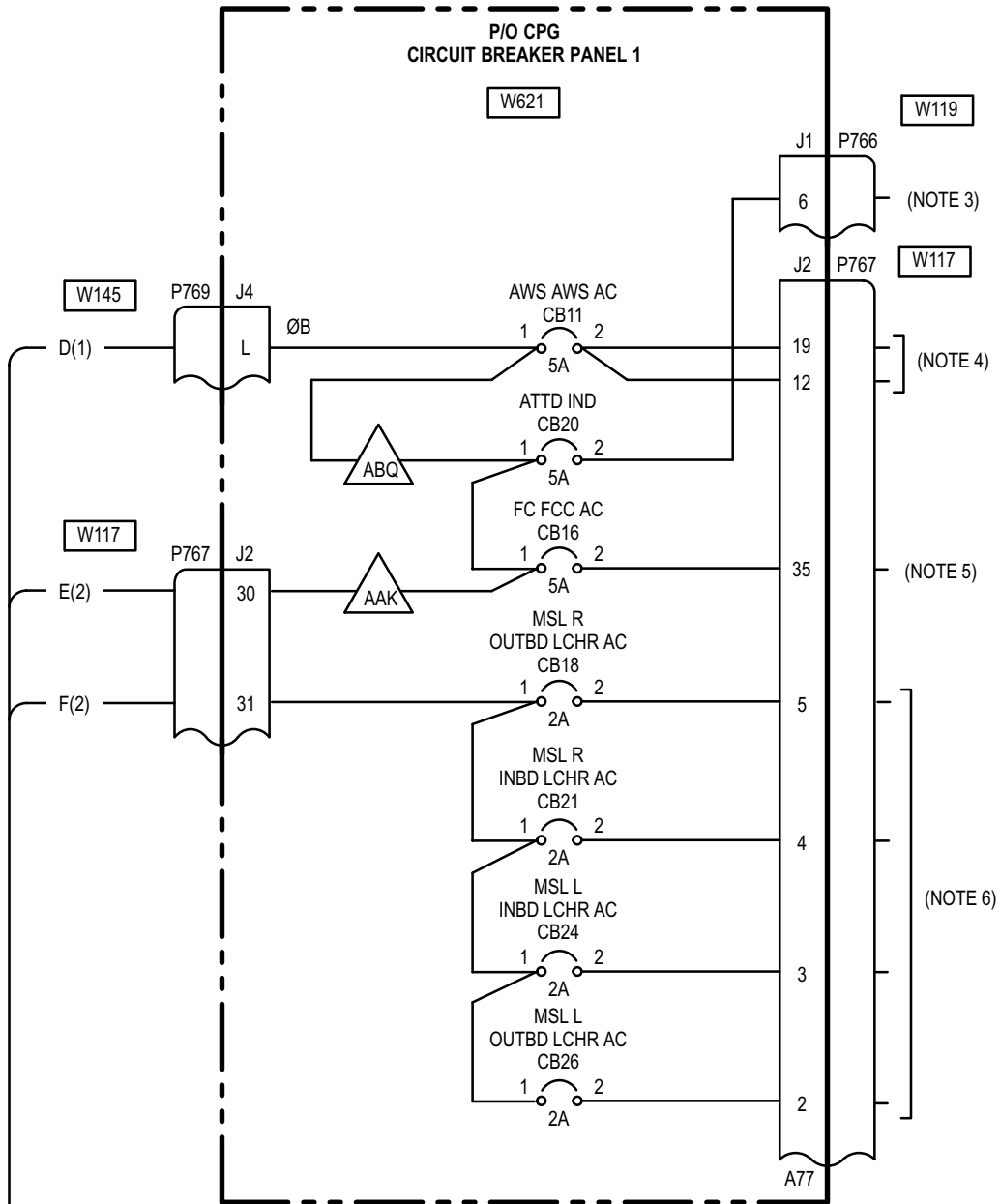
9-173. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 1 – CPG STATION) –
WIRING INTERCONNECT DIAGRAM



9-173. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 1 – CPG STATION) –
WIRING INTERCONNECT DIAGRAM (cont)



9-173. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 1 – CPG STATION) – WIRING INTERCONNECT DIAGRAM (cont)



NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

1. TADS (TM 1-1270-476-T).
2. IHADSS (TM 9-1270-221-23).
3. INSTRUMENTS (TM 1-1520-238-T-5).
4. ARMAMENT-AREA WEAPON SYSTEM (TM 9-1090-208-23-2).
5. FIRE CONTROL SYSTEM (TM 9-1230-476-20-2).
6. HELLFIRE MISSILE SYSTEM (TM 9-1427-475-20).

1

9-174. SHORT – EXISTS BETWEEN P461-D, P461-E, OR P461-F AND GROUND

9-174

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-148	All CPG ac essential bus 1 circuit breakers open



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Detach P763. Check for short between: P461-D and ground, P461-E and ground, P461-F and ground.

Does short exist?

YES Repair shorted wire between: P461-D and P763-A, P461-E and P763-B, P461-F and P763-C. Go to paragraph 9-172.

NO Go to step 2.

2. Check for short between J764-F and ground.

Does short exist?

YES Go to step 3.

NO Go to step 11.

3. Check for short between (A77)J2-30 and ground.

Does short exist?

YES Go to step 4.

NO Repair shorted wire between P767-30 and J764-F. Go to paragraph 9-172.

4. Detach wire ends at CB18-1. Check for short between (A77)J2-30 and ground.

Does short exist?

YES Repair shorted wire between (A77)J2-31 and CB18-1. Go to paragraph 9-172.

NO Go to step 5.

5. Check for short between CB18-1 and ground.

Does short exist?

YES Replace **MSL R OUTBD LCHR AC** circuit breaker (CB18) (TM 1-1520-238-23).

NO Go to step 6.

6. With CB18 attached, detach wire at CB21-1. Check for short between (A77)J2-30 and ground.

Does short exist?

YES Repair shorted wire between CB21-1 and CB18-1. Go to paragraph 9-172.

NO Go to step 7.

7. Check for short between CB21-1 and ground.

Does short exist?

YES Replace **MSL R INBD LCHR AC** circuit breaker (CB21) (TM 1-1520-238-23).

NO Go to step 8.

9-174. SHORT – EXISTS BETWEEN P461-D, P461-E, OR P461-F AND GROUND (cont)

9-174

- | | |
|---|---|
| <p>8. With CB21 attached, detach wire at CB24-1. Check for short between (A77)J2-30 and ground.
Does short exist?</p> <p>YES Repair shorted wire between CB24-1 and CB21-1.
 Go to paragraph 9-172.</p> <p>NO Go to step 9.</p> <p>9. Check for short between CB24-1 and ground.
Does short exist?</p> <p>YES Replace MSL L INBD LCHR AC circuit breaker (CB24) (TM 1-1520-238-23).</p> <p>NO Go to step 10.</p> <p>10. Attach CB24, detach wire at CB26-1. Check for short between (A77)J2-30 and ground.
Does short exist?</p> <p>YES Repair shorted wire between CB26-1 and CB24-1.
 Go to paragraph 9-172.</p> <p>NO Replace MSL L OUTBD LCHR AC circuit breaker (CB26) (TM 1-1520-238-23).</p> <p>11. Check for short between J764-G and ground.
Does short exist?</p> <p>YES Go to step 12.</p> <p>NO Go to step 16.</p> <p>12. Check for short between (A77)J2-31 and ground.
Does short exist?</p> <p>YES Go to step 13.</p> <p>NO Repair shorted wire between P767-31 and J764-G.
 Go to paragraph 9-172.</p> | <p>13. Detach wire at CB16-1. Check for short between (A77)J2-31 and ground.
Does short exist?</p> <p>YES Repair shorted wire between (A77)J2-30 and CB16-1.
 Go to paragraph 9-172.</p> <p>NO Go to step 14.</p> <p>14. Check for short between CB16-1 and ground.
Does short exist?</p> <p>YES Replace FC FCC AC circuit breaker (CB16) (TM 1-1520-238-23).</p> <p>NO Go to step 15.</p> <p>15. With CB16 attached, detach wire at CB20-1. Check for short between (A77)J2-31 and ground.
Does short exist?</p> <p>YES Repair shorted wire between CB20-1 and CB16-1.
 Go to paragraph 9-172.</p> <p>NO Replace ATTD IND circuit breaker (CB20) ((TM 1-1520-238-23).</p> <p>16. Detach wire ends at CB4-A1, CB4-B1, and CB4-C1. Check for short between (A97): J2-A and ground, J2-B and ground, J2-C and ground.
Does short exist?</p> <p>YES Repair shorted wire between: (A97)J2-A and CB4-A1, (A97)J2-B and CB4-B1, (A97)J2-C and CB4-C1.
 Go to paragraph 9-172.</p> <p>NO Go to step 17.</p> |
|---|---|

9-174. SHORT – EXISTS BETWEEN P461-D, P461-E, OR P461-F AND GROUND (cont)

9-174

17. Check for short between:

- CB4-A1 and ground,
- CB4-B1 and ground,
- CB4-C1 and ground.

Does short exist?

- YES Replace **LASER** circuit breaker (CB4) (TM 1-1520-238-23).
- NO Go to step 18.

18. With CB4 attached, detach wire at CB3-A1, CB3-B1, CB3-C1. Check for short between (A97):

- J2-A and ground,
- J2-B and ground,
- J2-C and ground.

Does short exist?

- YES Repair shorted wire between: CB3-A1 and CB4-A1, CB3-B1 and CB4-B1, CB3-C1 and CB4-C1. Go to paragraph 9-172.
- NO Go to step 19.

19. Check for short between:

- CB3-A1 and ground,
- CB3-B1 and ground,
- CB3-C1 and ground.

Does short exist?

- YES Replace **TADS AC** circuit breaker (CB3) (TM 1-1520-238-23).
- NO Go to step 20.

20. With CB3 attached, detach wire ends at CB1-A1, CB1-B1, CB1-C1. Check for short between (A97):

- J2-A and ground,
- J2-B and ground,
- J2-C and ground.

Does short exist?

- YES Repair shorted wire between: CB1-A1 and CB3-A1, CB1-B1 and CB3-B1, CB1-C1 and CB3-C1. Go to paragraph 9-172.
- NO Go to step 21.

21. Check for short between:

- CB1-A1 and ground,
- CB1-B1 and ground,
- CB1-C1 and ground.

Does short exist?

- YES Replace **IHADSS** circuit breaker (CB1) (TM 1-1520-238-23).
- NO Repair shorted wire between: CB1-B1 and P1-F, CB1-C1 and P1-G. Go to paragraph 9-172.

END OF TASK

9-175. SHORT – EXISTS BETWEEN P461-L AND GROUND

9-175

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-148	All CPG ac essential bus 1 circuit breakers open

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for short between (A77)J4-L and ground.

Does short exist?

YES	Go to step 2.
NO	Repair shorted wire between P461-L and P769-L. Go to paragraph 9-172.

2. Detach wire end at CB11-1. Check for short between (A77)J4-L and ground.

Does short exist?

YES	Repair shorted wire between CB11-1 and (A77)J4-L. Go to paragraph 9-172.
NO	Replace AWS AWS AC circuit breaker (CB11) (TM 1-1520-238-23).

END OF TASK

9-176. AWS AWS AC CIRCUIT BREAKER (CB11) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J4-L, J2-12, J2-19

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1090-208-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does AWS AWS AC circuit breaker (CB11) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Open CB11. Set **BATT/EXT PWR** switch to **OFF**.

Check for short between (A77):
J2-12 and ground,
J2-19 and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 9-1090-208-23-2 to troubleshoot area weapon system.

3. Detach wire at CB11-2. Check for short between (A77):

J2-12 and ground,
J2-19 and ground.

Does short exist?

- YES Repair shorted wire.
Go to paragraph 9-172.

- NO Replace **AWS AWS AC** circuit breaker (CB11)
(TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open wire between:

(A77)J4-L and CB11-1,
(A77)J2-12 and CB11-2,
(A77)J2-19 and CB11-2.

Does open exist?

- YES Repair shorted wire.
Go to paragraph 9-172.

- NO Replace **AWS AWS AC** circuit breaker (CB11)
(TM 1-1520-238-23).

END OF TASK

9-177. MSL R OUTBD LCHR AC CIRCUIT BREAKER (CB18) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J2-5 AND J2-31

9-177

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1427-475-20



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does MSL R OUTBD LCHR AC circuit breaker (CB18) stay closed?
 - YES Go to step 2.
 - NO Go to step 3.

- Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
(A77)J2-31 and CB18-1,
(A77)J2-5 and CB18-2.
Does open exist?
 - YES Repair open wire.
 Go to paragraph 9-172.

 - NO Replace **MSL R OUTBD LCHR AC** circuit breaker (CB18)
 (TM 1-1520-238-23).

- Open CB18 and set **BATT/EXT PWR** switch to **OFF**. Check for short between (A77)J2-5 and ground.

Does short exist?

- YES Go to step 4.
- NO Refer to TM 9-1427-475-20 to troubleshoot HME.

- Detach wire at CB18-2. Check for short between (A77)J2-5 and ground.

Does short exist?

- YES Repair shorted wire.
 Go to paragraph 9-172.

- NO Replace **MSL R OUTBD LCHR AC** circuit breaker (CB18)
 (TM 1-1520-238-23).

END OF TASK

9-178. MSL R INBD LCHR AC CIRCUIT BREAKER (CB21) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J2-31 AND J2-4

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1427-475-20



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does MSL R INBD LCHR AC curcuit breaker (CB21) stay closed?

- YES Go to step 2.
- NO Go to step 3.

2. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB18-1 and CB21-1,
(A77)J2-4 and CB21-2.

Does open exist?

- YES Repair open wire.
Go to paragraph 9-172.
- NO Replace **MSL R INBD LCHR AC** circuit breaker (CB21) (TM 1-1520-238-23).

3. Open CB21 and set **BATT/EXT PWR** switch to **OFF**. Check for short between (A77)J2-4 and ground.

Does open exist?

- YES Go to step 4.
- NO Refer to TM 9-1427-475-20 to troubleshoot HME.

4. Detach wire at CB21-2. Check for short between (A77)J2-4 and ground.

Does open exist?

- YES Repair shorted wire.
Go to paragraph 9-172.
- NO Replace **MSL R INBD LCHR AC** circuit breaker (CB21) (TM 1-1520-238-23).

END OF TASK

9-179. MSL L INBD LCHR AC CIRCUIT BREAKER (CB24) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J2-31 AND J2-3

9-179

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1427-475-20

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does MSL L INBD LCHR AC circuit breaker (CB24) stay closed?
 - YES Go to step 2.
 - NO Go to step 3.

2. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB24-1 and CB21-1,
CB24-2 and (A77)J2-3.
Does open exist?
 - YES Repair open wire.
 Go to paragraph 9-172.

 - NO Replace **MSL L INBD LCHR AC**
 circuit breaker (CB24)
 (TM 1-1520-238-23).

3. Open CB24 and set **BATT/EXT PWR** switch to **OFF**. Check for short between (A77)J2-3 and ground.
Does short exist?
 - YES Go to step 4.
 - NO Refer to TM 9-1427-475-20 to troubleshoot HME.

4. Detach wire at CB24-2. Check for short between (A77)J2-3 and ground.
Does short exist?
 - YES Repair shorted wire.
 Go to paragraph 9-172.

 - NO Replace **MSL L INBD LCHR AC**
 circuit breaker (CB24)
 (TM 1-1520-238-23).

END OF TASK

9-180. MSL L OUTBD LCHR AC CIRCUIT BREAKER (CB26) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J2-31 AND J2-2 **9-180**

Tools:

Nomenclature	Part Number
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1427-475-20

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does MSL L OUTBD LCHR AC circuit breaker (CB26) stay closed?

YES	Go to step 2.
NO	Go to step 3.

2. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB26-1 and CB24-1,
CB26-2 and (A77)J2-2.
Does open exist?

YES	Repair open wire. Go to paragraph 9-172.
NO	Replace MSL L OUTBD LCHR AC circuit breaker (CB26) (TM 1-1520-238-23).

3. Open CB26 and set **BATT/EXT PWR** switch to **OFF**. Check for short between (A77)J2-2 and ground.
Does short exist?

YES	Go to step 4.
NO	Refer to TM 9-1427-475-20 to troubleshoot HME.

4. Detach wire at CB26-2. Check for short between (A77)J2-2 and ground.
Does short exist?

YES	Repair shorted wire. Go to paragraph 9-172.
NO	Replace MSL L OUTBD LCHR AC circuit breaker (CB26) (TM 1-1520-238-23).

END OF TASK

9-181. FC FCC AC CIRCUIT BREAKER (CB16) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J2-30 AND J2-35

9-181

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does FC FCC AC circuit breaker (CB16) stay closed?
 - YES Go to step 2.
 - NO Go to step 3.

2. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
(A77)J2-30 and CB16-1,
(A77)J2-35 and CB16-2.
Does open exist?
 - YES Repair open wire.
 Go to paragraph 9-172.
 - NO Replace **FC FCC AC** circuit breaker (CB16)
 (TM 1-1520-238-23).

3. Open CB16 and set **BATT/EXT PWR** switch to **OFF**. Check for short between (A77)J2-35 and ground.
Does short exist?
 - YES Go to step 4.
 - NO Refer to TM 9-1230-476-20-2 to troubleshoot multiplex subsystem.

4. Detach wire at CB16-2. Check for short between (A77)J2-35 and ground.
Does short exist?
 - YES Repair shorted wire.
 Go to paragraph 9-172.
 - NO Replace **FC FCC AC** circuit breaker (CB16)
 (TM 1-1520-238-23).

END OF TASK

9-182. ATTD IND CIRCUIT BREAKER (CB20) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J2-30 AND J1-6 **9-182**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23
 TM 11-1520-238-23-2

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does ATTD IND circuit breaker (CB20) stay closed.

- | | |
|-----|---------------|
| YES | Go to step 2. |
| NO | Go to step 3. |

2. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
 CB20-1 and CB16-1,
 CB20-2 and (A77)J1-6.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-172. |
| NO | Replace ATTD IND circuit breaker (CB20) (TM 1-1520-238-23). |

3. Open CB20 and set **BATT/EXT PWR** switch to **OFF**. Check for short between (A77)J1-6 and ground.

Does short exist?

- | | |
|-----|--|
| YES | Go to step 4. |
| NO | Refer to TM 11-1520-238-23-2 to troubleshoot navigation instruments. |

4. Detach wire at CB20-2. Check for short between (A77)J1-6 and ground.

Does short exist?

- | | |
|-----|--|
| YES | Repair shorted wire.
Go to paragraph 9-172. |
| NO | Replace ATTD IND circuit breaker (CB20) (TM 1-1520-238-23). |

END OF TASK

9-183. 115 VAC – IS NOT PRESENT AT P767-30, P767-31 OR 115 VAC IS NOT PRESENT AT P767-31

9-183

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-148	All CPG ac essential bus 1 circuit breakers open



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between:

J2-B and CB1-B1,
J2-C and CB1-C.

Does open exist?

YES Repair open wire.
Go to paragraph 9-172.

NO **(AAK)** Go to step 2.
(ABQ) Go to step 3.

2. **(AAK)** Check for open between:

(A97)P1-F and CB1-B1,
(A97)P1-G and CB1-C1.

Does open exist?

YES Repair open wire.
Go to paragraph 9-172.

NO Repair open wire between:
J764-F and P767-30,
J764-G and P767-31.
Go to paragraph 9-172.

3. **(ABQ)** Check for open between P1-G and CB1-C1.

Does open exist?

YES Repair open wire.
Go to paragraph 9-172.

NO Repair open wire between J764-G and P767-31.
Go to paragraph 9-172.

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Open **FC FCC AC** circuit breaker (CB16). Check for open between:
 CB16-1 and CB20-1,
 CB16-2 and (A77)J2-35,
 (A77)J4-L and CB11-1,
 CB11-1 and CB20-1.

Does open exist?

YES	Repair open wire. Go to paragraph 9-172.
NO	Replace FC FCC AC circuit breaker (CB16) (TM 1-1520-238-23).

END OF TASK

9-185. CONTINUITY – DOES NOT EXIST BETWEEN (A77): J4-L AND J1-6

9-185

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Open **ATTD IND** circuit breaker (CB20). Check for open between:

(A77)J4-L and CB20-1,
(A77)J1-6 and CB20-2.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire.
Go to paragraph 9-172. |
| NO | Replace ATTD IND circuit breaker (CB20)
(TM 1-1520-238-23). |

END OF TASK

9-186. LASER CIRCUIT BREAKER (CB4) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT (A97): J1-A, J1-B, J1-D

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23
 TM 1-1270-476-T

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does LASER circuit breaker (CB4) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Open CB4. Set **BATT/EXT PWR** switch to **OFF**.

Check for short between (A97):

J1-D and ground,
 J1-B and ground,
 J1-A and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 1-1270-476-T to troubleshoot TADS.

3. Detach wire at CB4-A2, CB4-B2, CB4-C2.

Check for short between (A97):

J1-A and ground,
 J1-B and ground,
 J1-D and ground.

Does short exist?

- YES Repair shorted wire.
 Go to paragraph 9-172.

- NO Replace **LASER** circuit breaker (CB4) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for short between:

CB4-A1 and (A97)J2-A,
 CB4-B1 and (A97)J2-B,
 CB4-C1 and (A97)J2-C,
 CB4-A2 and (A97)J1-D,
 CB4-B2 and (A97)J1-B,
 CB4-C2 and (A97)J1-A.

Does open exist?

- YES Repair open wire.
 Go to paragraph 9-172.

- NO Replace **LASER** circuit breaker (CB4) (TM 1-1520-238-23).

END OF TASK

9-187. TADS AC CIRCUIT BREAKER (CB3) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT (A97): J1-H, J1-F, J1-E **9-187**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68F Aircraft Electrician

References:

TM 1-1520-238-23
 TM 1-1270-476-T

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does TADS AC circuit breaker (CB3) stay closed?

- | | |
|-----|---------------|
| YES | Go to step 4. |
| NO | Go to step 2. |

2. Open CB3 and set **BATT/EXT PWR** switch to **OFF**. Check for short between (A97):
 J1-H and ground,
 J1-F and ground,
 J1-E and ground.

Does short exist?

- | | |
|-----|--|
| YES | Go to step 3. |
| NO | Refer to TM 1-1270-476-T to troubleshoot TADS. |

3. Detach wire at CB4-A2, CB4-B2, CB4-C2. Check for short between (A97):

J1-H and ground,
 J1-F and ground,
 J1-E and ground.

Does short exist?

- | | |
|-----|--|
| YES | Repair shorted wire.
Go to paragraph 9-172. |
| NO | Replace TADS AC circuit breaker (CB3) (TM 1-1520-238-23). |

4. Set **BATT/EXT PWR** switch to **OFF**. Check for short between:

CB3-A1 and CB4-A1,
 CB3-B1 and CB4-B1,
 CB3-C1 and CB4-C1,
 CB3-A2 and (A97)J1-H,
 CB3-B2 and (A97)J1-F,
 CB3-C2 and (A97)J1-E.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-172. |
| NO | Replace TADS AC circuit breaker (CB3) (TM 1-1520-238-23). |

END OF TASK

9-188. IHADSS CIRCUIT BREAKER (CB1) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT: P1-E, P1-D, P1-C

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

References:

- TM 1-1520-238-23
- TM 9-1270-221-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does IHADSS circuit breaker (CB1) stay closed.

- YES Go to step 2.
- NO Go to step 3.

2. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:

CB1-A1 and CB3-A1,
 CB1-B1 and CB3-B1,
 CB1-C1 and CB3-C1,
 CB1-A2 and P1-E,
 CB1-B2 and P1-D,
 CB1-C2 and P1-C.

Does open exist?

- YES Repair open wire.
 Go to paragraph 9-172.
- NO Replace **IHADSS** circuit breaker (CB1) (TM 1-1520-238-23).

3. Open CB1 and set **BATT/EXT PWR** switch to **OFF**. Check for short between:

P1-C and ground,
 P1-D and ground,
 P1-E and ground.

Does short exist?

- YES Go to step 4.
- NO Refer to TM 9-1270-221-23 to troubleshoot IHADSS.

4. Detach wire at CB4-A2, CB4-B2, CB4-C2.

Check for short between:

P1-C and ground,
 P1-D and ground,
 P1-E and ground.

Does short exist?

- YES Repair shorted wire.
 Go to paragraph 9-172.
- NO Replace **IHADSS** circuit breaker (CB1) (TM 1-1520-238-23).

END OF TASK

9-189. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 2 – PILOT STATION) – MAINTENANCE OPERATIONAL CHECK

9-189

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

References:

TM 1-1520-238-23

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

Equipment Conditions:

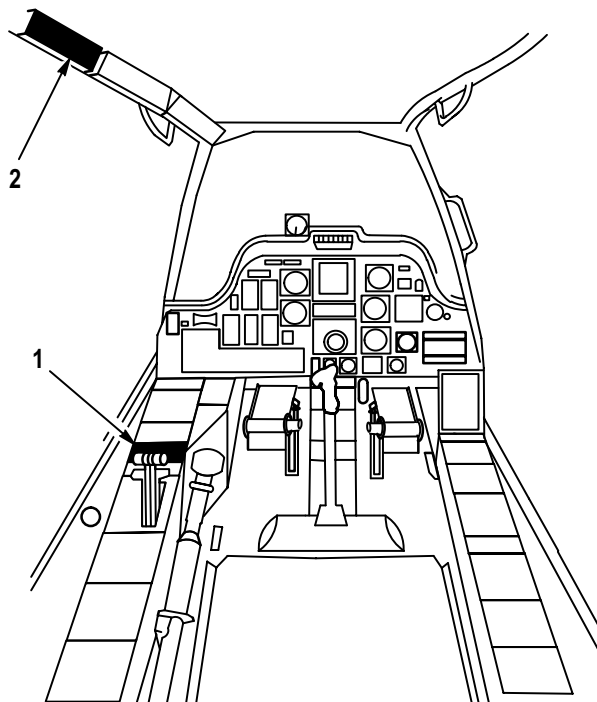
<u>Ref</u>	<u>Condition</u>
Paragraph 9-45	EXTERNAL POWER – POWER UP completed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

NOTE

- Refer to pilot station (fig. 9-164) for configuration and component locations.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.



1. PILOT ELEC PWR PANEL
2. PILOT AFT CIRCUIT BREAKER PANEL

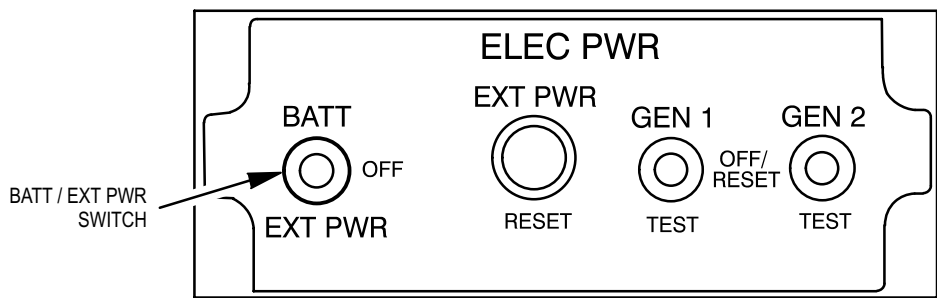
M69-189

Figure 9-164. Pilot Station

9-189. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 2 – PILOT STATION) – MAINTENANCE OPERATIONAL CHECK (cont)

1. Perform the maintenance operational check as follows:

Task	Result
<p>a. On pilot aft circuit breaker panel (fig. 9-166), open the following circuit breakers: ECS ICE DET HTR (CB212), ECS AFT FAN (CB75), ECS FAB FANS (CB88), POWER XFMR RECT 2 (CB4), ECS CANOPY ANTI ICE (CB78), POWER ENG 2 (CB44), POWER BATT CHGR AC (CB86).</p>	
<p>b. Detach P3 and P4.</p>	
<p>c. Check for short between: P3-D and ground, P3-E, and ground, P3-F and ground, P4-A and ground, P4-B and ground, P4-C and ground.</p>	<p>If short exists, go to paragraph 9-191.</p>
<p>d. On pilot ELEC PWR panel (fig. 9-165), set BATT/EXT PWR switch to EXT PWR.</p>	



M69-190

Figure 9-165. Pilot ELEC PWR Panel

<p>e. Check for 115 VAC at (A402): J3-D, J3-E, J3-F.</p>	<p>If 115 VAC is not present, go to paragraph 9-12 to troubleshoot ac electrical power generation.</p>
<p>f. Check for 115 VAC at (A402): J4-A, J4-B, J4-C.</p>	<p>If 115 VAC is not present, go to paragraph 9-12 to troubleshoot ac electrical power generation.</p>

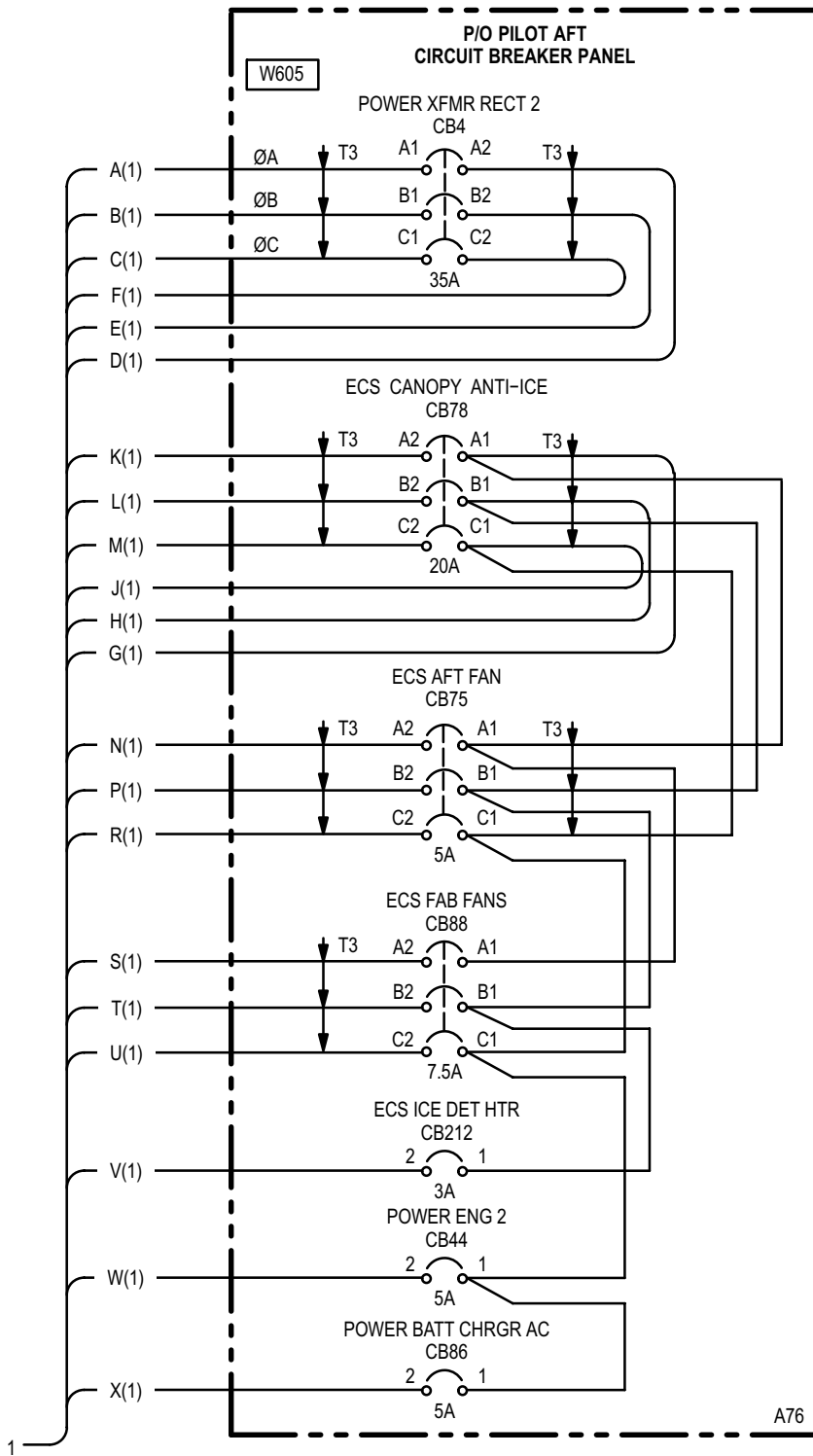
**9-189. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 2 – PILOT STATION) –
MAINTENANCE OPERATIONAL CHECK (cont)**

Task	Result
i. On pilot ELEC PWR panel, set BATT/EXT PWR switch to OFF . Detach P1 and P2.	
m. On pilot ELEC PWR panel (fig. 9-165), set BATT/EXT PWR switch to EXT PWR . Check for 115 VAC at P2-c, P2-d, and P2-e.	If 115 VAC is not present, go to paragraph 9-196.
n. Check for 115 VAC at P2-A, P2-B, and P2-C.	If 115 VAC is not present, go to paragraph 9-193.
o. Check for 115 VAC at P2-K, P2-L, and P2-M.	If 115 VAC is not present, go to paragraph 9-194.
p. Check for 115 VAC at P1-23.	If 115 VAC is not present, go to paragraph 9-197.
q. Check for 115 VAC at P1-35.	If 115 VAC is not present, go to paragraph 9-198.
r. Check for 115 VAC at P1-9.	If 115 VAC is not present, go to paragraph 9-192.
s. On pilot ELEC PWR panel, set BATT/EXT PWR switch to OFF . Attach P1 and P2.	

2. Perform EXTERNAL POWER – POWER DOWN (para 9-46).

END OF TASK

9-190. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 2 - PILOT STATION) -
WIRING INTERCONNECT DIAGRAM (cont)



NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

1. UTILITY SYSTEM-CANOPY DEFOG AND ANTI-ICE (TM 1-1520-238-T-8).
2. ENVIRONMENTAL CONTROL SYSTEM (TM 1-1520-238-T-8).
3. AVIONICS CONFIGURATION-BATTERY CHARGER (TM 11-1520-238-23-2).
4. UTILITY SYSTEM-ROTOR BLADES DE-ICE (TM 1-1520-238-T-8).
5. POWER PLANTS (TM 1-1520-238-T-4).

9-191. SHORT – EXISTS BETWEEN: P3-D, P3-E, P3-F OR P4-A, P4-B, P4-C AND GROUND

9-191

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-149	Pilot circuit breaker panel accessing completed
Paragraph 9-148	All ac essential bus 2 pilot station circuit breakers open

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for short between:
P4-A and ground,
P4-B and ground,
P4-C and ground.

Does short exist?

YES Repair shorted wire between:
P4-A and CB4-A1,
P4-B and CB4-B1,
P4-C and CB4-C1.
Go to paragraph 9-189.

NO Go to step 2.

2. Check for short between
P3-D and ground.

Does short exist?

YES Go to step 3.

NO Go to step 4.

3. Detach wire ends at CB78-A1 and CB78-B1.
Check for short between:
P3-D and ground,
P3-E and ground.

Does short exist?

YES Repair shorted wire between:
P3-D and CB78-A1,
P3-E and CB78-B1.
Go to paragraph 9-189.

NO Repair shorted wire between:
CB78-A1 and CB78-B1,
CB75-A1 and CB75-B1,
CB88-A1 and CB88-B1.
Go to paragraph 9-189.

4. Detach wire ends at CB78-C1. Check for short between P3-F and ground.

Does short exist?

YES Repair shorted wire between
P3-F and CB78-C1.
Go to paragraph 9-189.

NO Go to step 5.

5. Attach CB78. Detach wire ends at CB75-C1.
Check for short between P3-F and ground.

Does short exist?

YES Repair shorted wire between
CB78-C1 and CB75-C1.
Go to paragraph 9-189.

NO Repair shorted wire between:
CB75-C1 and CB88-C1,
CB88-C1 and CB44-1,
CB44-1 and CB86-1.
Go to paragraph 9-189.

END OF TASK

9-192. ECS ICE DET HTR CIRCUIT BREAKER (CB212) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT P1-9

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does ECS ICE DET HTR circuit breaker (CB212) stay closed?

- | | |
|-----|---------------|
| YES | Go to step 2. |
| NO | Go to step 3. |

2. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB88-B1 and CB212-1,
CB212-2 and P1-9.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-189. |
| NO | Replace ECS ICE DET HTR circuit breaker (CB212) (TM 1-1520-238-23). |

3. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-9 and ground.

Does short exist?

- | | |
|-----|--|
| YES | Go to step 4. |
| NO | Refer to TM 1-1520-238-T-8 to troubleshoot rotor blade de-ice. |

4. Detach wire at CB212-2. Check for short between P1-9 and ground.

Does short exist?

- | | |
|-----|--|
| YES | Repair shorted wire.
Go to paragraph 9-189. |
| NO | Replace ECS ICE DET HTR circuit breaker (CB212) (TM 1-1520-238-23). |

END OF TASK

9-193. ECS AFT FAN CIRCUIT BREAKER (CB75) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT P2-A, P2-B, P2-C

9-193

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23
 TM 1-1520-238-T-8

- Detach wire at CB75-A2, CB75-B2 and CB75-C2. Check for short between:
 P2-A and ground,
 P2-B and ground,
 P2-C and ground.

Does short exist?

YES Repair shorted wire.
 Go to paragraph 9-189.

NO Replace **ECS AFT FAN** circuit breaker (CB75)
 (TM 1-1520-238-23).

- Open CB75. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
 CB78-A1 and CB75-A1,
 CB78-B1 and CB75-B1,
 CB78-C1 and CB75-C1,
 P2-A and CB75-A2,
 P2-B and CB75-B2,
 P2-C and CB75-C2.

Does open exist?

YES Repair open wire.
 Go to paragraph 9-189.

NO Replace **ECS AFT FAN** circuit breaker (CB75)
 (TM 1-1520-238-23).



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does ECS AFT FAN circuit breaker (CB75) stay closed?

YES Go to step 4.
 NO Go to step 2.

- Set **BATT/EXT PWR** switch to **OFF**. Check for short between:
 P2-A and ground,
 P2-B and ground,
 P2-C and ground.

Does short exist?

YES Go to step 3.
 NO Refer to TM 1-1520-238-T-8 to troubleshoot environmental control system.

END OF TASK

9-194. ECS FAB FANS CIRCUIT BREAKER (CB88) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT P2-K, P2-L, P2-M **9-194**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does ECS FAB FANS circuit breaker (CB88) stay closed?

YES	Go to step 4.
NO	Go to step 2.

- Set **BATT/EXT PWR** switch to **OFF**. Check for short between:
P2-K and ground,
P2-L and ground,
P2-M and ground.

Does short exist?

YES	Go to step 3.
NO	Refer to TM 1-1520-238-T-8 to troubleshoot environmental control system.

- Detach wire at CB88-A2, CB88-B2 and CB88-C2. Check for short between:
P2-K and ground,
P2-L and ground,
P2-M and ground.

Does short exist?

YES	Repair shorted wire. Go to paragraph 9-189.
NO	Replace ECS FAB FANS circuit breaker (CB88) (TM 1-1520-238-23).

- Open CB88. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB75-A1 and CB88-A1,
CB75-B1 and CB88-B1,
CB75-C1 and CB88-C1,
P2-K and CB88-A2,
P2-L and CB88-B2,
P2-M and CB88-C2.

Does open exist?

YES	Repair open wire. Go to paragraph 9-189.
NO	Replace ECS FAB FANS circuit breaker (CB88) (TM 1-1520-238-23).

END OF TASK

9-195. POWER XFMR RECT 2 CIRCUIT BREAKER (CB4) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN: P4-A AND P4-D, P4-B AND P4-E, P4-C AND P4-F **9-195**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel set **BATT/EXT PWR** switch to **EXT PWR**.

Does POWER XFMR RECT 2 circuit breaker (CB4) stay closed?

- | | |
|-----|---------------|
| YES | Go to step 4. |
| NO | Go to step 2. |

2. Open CB4. Set **BATT/EXT PWR** switch to **OFF**. Check for short between:
P4-D and ground,
P4-E and ground,
P4-F and ground.

Does short exist?

- | | |
|-----|--|
| YES | Go to step 3. |
| NO | Go to paragraph 9-12 to troubleshoot ac electrical power generation. |

3. Detach wire at CB4-A2, CB4-B2, and CB4-C2. Check for short between:
P4-D and ground,
P4-E and ground,
P4-F and ground.

Does short exist?

- | | |
|-----|--|
| YES | Repair shorted wire. Go to paragraph 9-189. |
| NO | Replace POWER XFMR RECT 2 circuit breaker (CB4) (TM 1-1520-238-23). |

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
P4-A and CB4-A1,
P4-B and CB4-B1,
P4-C and CB4-C1,
P4-D and CB4-A2,
P4-E and CB4-B2,
P4-F and CB4-C2.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire. Go to paragraph 9-189. |
| NO | Replace POWER XFMR RECT 2 circuit breaker (CB4) (TM 1-1520-238-23). |

END OF TASK

9-196. ECS CANOPY ANTI-ICE CIRCUIT BREAKER (CB78) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT P2-c, P2-d, P2-e 9-196

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23
 TM 1-1520-238-T-8

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does ECS CANOPY ANTI-ICE circuit breaker (CB78) stay closed?

- | | |
|-----|---------------|
| YES | Go to step 4. |
| NO | Go to step 2. |

2. With **BATT/EXT PWR** switch to **OFF**. Check for short between:
 P2-c and ground,
 P2-d and ground,
 P2-e and ground.

Does short exist?

- | | |
|-----|--|
| YES | Go to step 3. |
| NO | Refer to TM 1-1520-238-T-8 to troubleshoot environmental control system. |

3. Detach wire at CB78-A2, CB78-B2 and CB78-C2. Check for short between:
 P2-c and ground,
 P2-d and ground,
 P2-e and ground.

Does short exist?

- | | |
|-----|---|
| YES | Repair shorted wire.
Go to paragraph 9-189. |
| NO | Replace ECS CANOPY ANTI-ICE circuit breaker (CB78) (TM 1-1520-238-23). |

4. Open CB78. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
 P3-D and CB78-A1,
 P3-E and CB78-B1,
 P3-F and CB78-C1,
 P2-c and CB78-A2,
 P2-d and CB78-B2,
 P2-e and CB78-C2.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire.
Go to paragraph 9-189. |
| NO | Replace ECS CANOPY ANTI-ICE circuit breaker (CB78) (TM 1-1520-238-23). |

END OF TASK

9-197. POWER ENG 2 CIRCUIT BREAKER (CB44) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT P1-23

9-197

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-4

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does POWER ENG 2 circuit breaker (CB44) stay closed?
 - YES Go to step 2.
 - NO Go to step 3.

2. Set **BATT/EXT PWR** switch to **OFF**. Check for short between:
CB88-C1 and CB44-1,
P1-23 and CB44-2.
Does open exist?
 - YES Repair open wire.
 Go to paragraph 9-189.

 - NO Replace **POWER ENG 2** circuit breaker (CB44)
 (TM 1-1520-238-23).

3. Open CB44 and set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-23 and ground.
Does short exist?
 - YES Go to step 4.

 - NO Refer to TM 1-1520-238-T-4 to troubleshoot engine 2 power plant.

4. Detach wire at CB44-2. Check for short between P1-23 and ground.
Does short exist?
 - YES Repair shorted wire.
 Go to paragraph 9-189.

 - NO Replace **POWER ENG 2** circuit breaker (CB44)
 (TM 1-1520-238-23).

END OF TASK

9-198. POWER BATT CHRGR AC CIRCUIT BREAKER (CB86) – DOES NOT STAY CLOSED OR 115 VAC IS NOT PRESENT AT P1-35 9-198

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does POWER BATT CHRGR AC circuit breaker (CB86) stay closed?

- YES Go to step 2.
- NO Go to step 3.

2. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB44-1 and CB86-1,
P1-35 and CB86-2.

Does open exist?

- YES Repair open wire.
Go to paragraph 9-189.
- NO Replace **POWER BATT CHRGR AC** circuit breaker (CB86) (TM 1-1520-238-23).

3. Open CB86 and set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-35 and ground.

Does short exist?

- YES Go to step 4.
- NO Refer to TM 11-1520-238-23-2 to troubleshoot battery charger.

4. Detach wire at C86-2. Check for short between P1-35 and ground.

Does short exist?

- YES Repair shorted wire.
Go to paragraph 9-189.
- NO Replace **POWER BATT CHRGR AC** circuit breaker (CB86) (TM 1-1520-238-23).

END OF TASK

9-199. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 2 – CPG STATION) – MAINTENANCE OPERATIONAL CHECK

9-199

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

References:

TM 1-1520-238-23

Equipment Conditions:

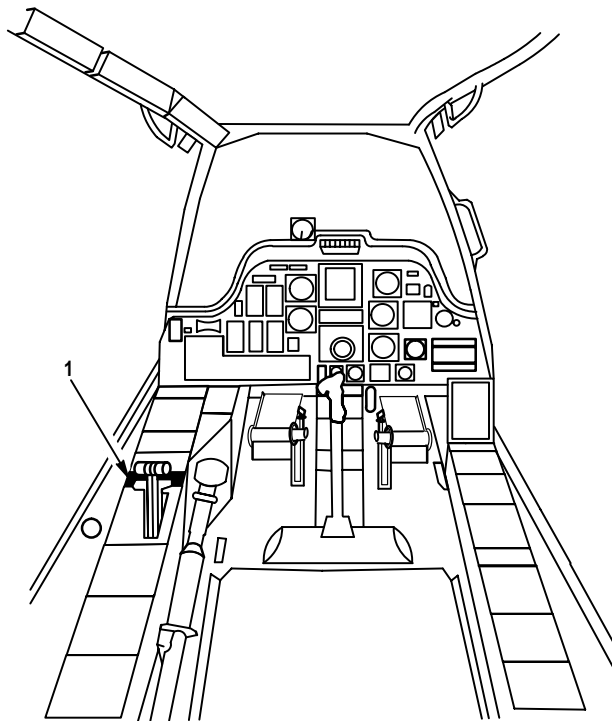
<u>Ref</u>	<u>Condition</u>
Paragraph 9-45	EXTERNAL POWER – POWER UP completed

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

WARNING

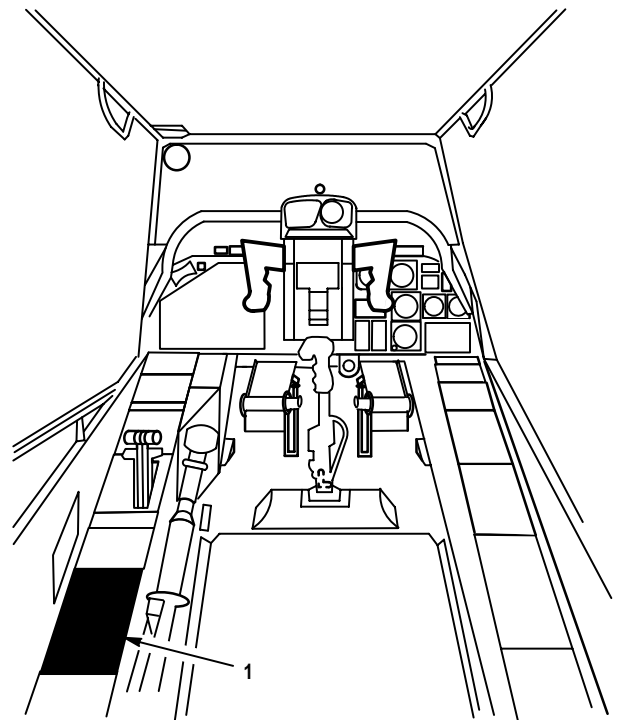
Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.



1. PILOT ELEC PWR PANEL

M69-436

Figure 9-167. Pilot Station



1. CPG CIRCUIT BREAKER PANEL 1

M69-211A

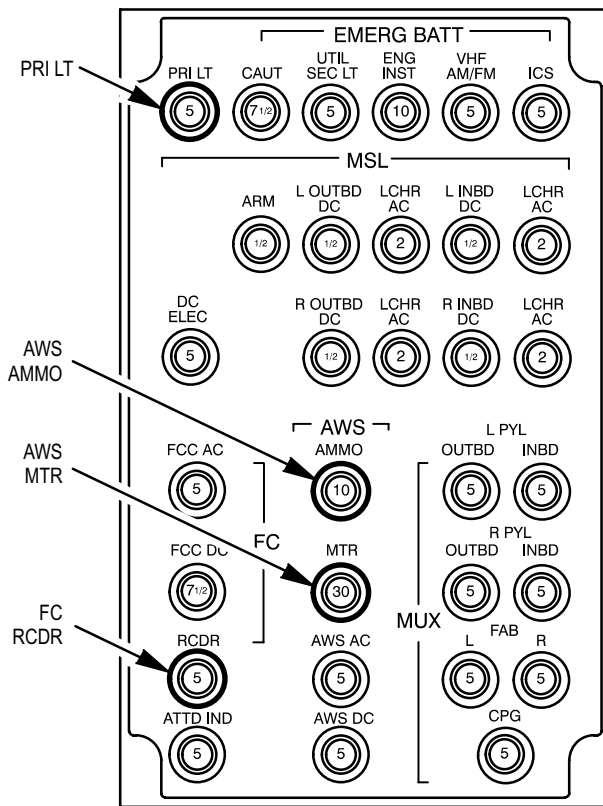
Figure 9-168. CPG Station

NOTE

- Refer to pilot station (fig. 9-167) and CPG station (fig. 9-168) for configuration and component locations.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.

1. Perform the maintenance operational check as follows:

Task	Result
a. On CPG circuit breaker panel 1 (fig. 9-169), check that the following circuit breakers are closed: AWS MTR (CB3), AWS AMMO (CB7), PRI LT (CB14), FC RCDR (CB8).	If AWS MTR circuit breaker (CB3) does not stay closed, go to paragraph 9-201. If AWS AMMO circuit breaker (CB7) does not stay closed, go to paragraph 9-202. If PRI LT circuit breaker (CB14) does not stay closed, go to paragraph 9-203. If FC RCDR circuit breaker (CB8) does not stay closed, go to paragraph 9-204.



M69-213

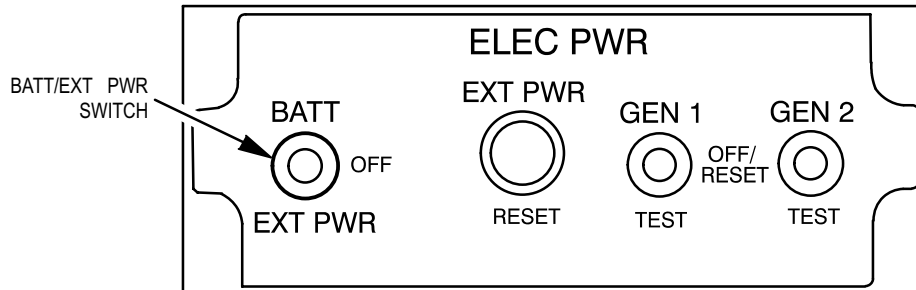
Figure 9-169. CPG Circuit Breaker Panel 1

9-199. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 2 – CPG STATION) – MAINTENANCE OPERATIONAL CHECK (cont)

9-199

Task	Result
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- b. On pilot **ELEC PWR** panel (fig. 9-170), set **BATT/EXT PWR** switch to **OFF**.



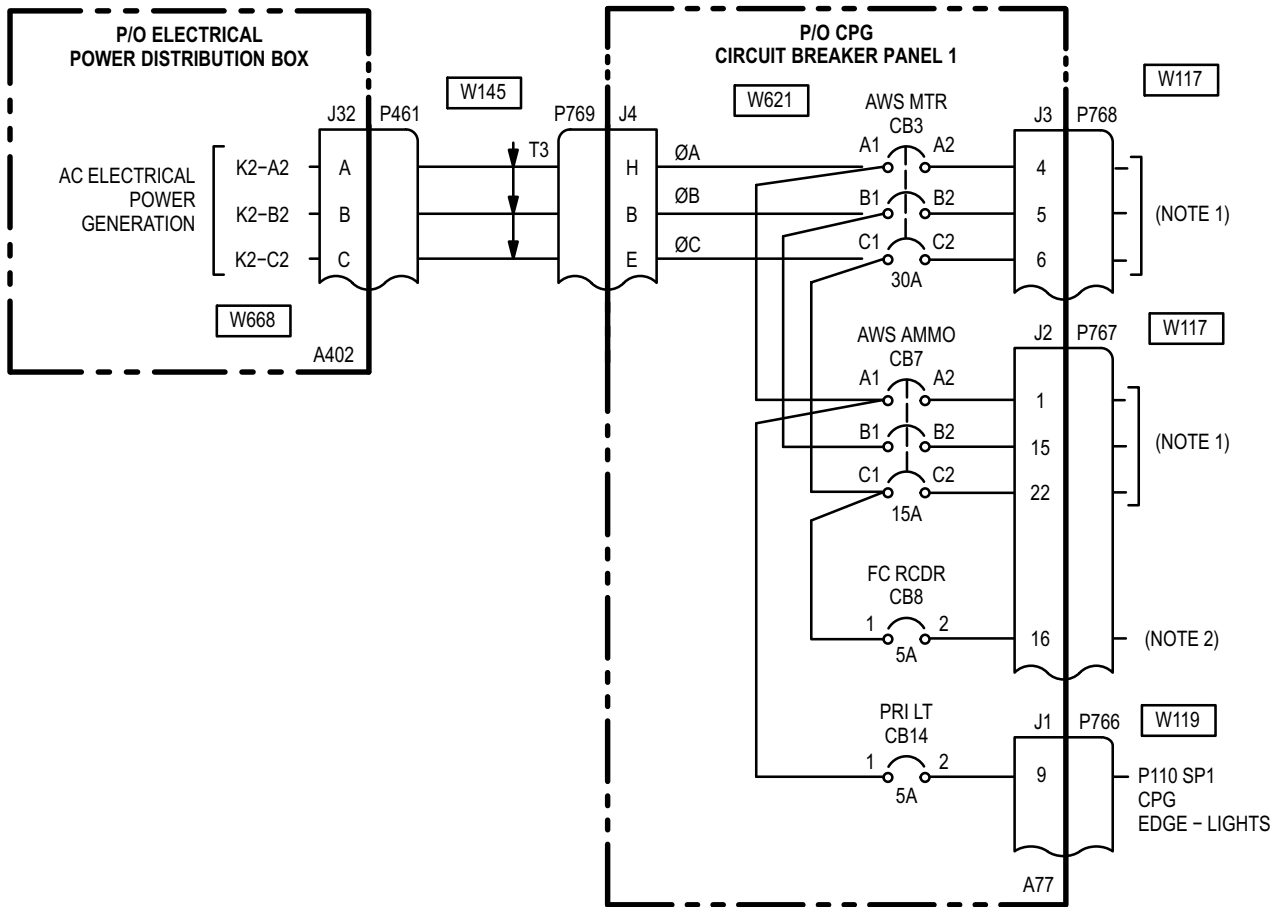
M69-435

Figure 9-170. Pilot ELEC PWR Panel

- c. Remove CPG circuit breaker panel 1 (TM 1-1520-238-23).
- d. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
- e. Check for 115 VAC at:
 P769-H
 P769-B,
 P769-E. If 115 VAC is not present, go to paragraph 9-205.
- f. Check for continuity between (A77):
 J4-H and J3-4,
 J4-B and J3-5,
 J4-E and J3-6. If continuity does not exist, go to paragraph 9-201.
- g. Check for continuity between (A77):
 J4-H and J2-1,
 J4-B and J2-15,
 J4-E and J2-22. If continuity does not exist, go to paragraph 9-202.
- h. Check for continuity between (A77):
 J4-E and J2-16. If continuity does not exist, go to paragraph 9-204.
- i. Check for continuity between (A77):
 J4-H and J1-9. If continuity does not exist, go to paragraph 9-203.

- 2. Reinstall CPG circuit breaker panel 1 (TM 1-1520-238-23).
- 3. Perform EXTERNAL POWER – POWER DOWN (para 9-46).

9-200. CIRCUIT PROTECTION SYSTEM (AC ESSENTIAL BUS 2 – CPG STATION) –
WIRING INTERCONNECT DIAGRAM



NOTES:

1. ARMAMENT-AREA WEAPON SYSTEM (TM 9-1090-208-23-2).
2. AVIONICS CONFIGURATION-VIDEO RECORDER (TM 11-1520-238-23-2).

9-201. AWS MTR CIRCUIT BREAKER (CB3) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J4-H AND J3-4, J4-B AND J3-5, J4-E AND J3-6 **9-201**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1090-208-23-2

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does circuit breaker AWS MTR circuit breaker (CB3) stay closed?

YES	Go to step 4.
NO	Go to step 2.

2. Open CB3. Set **BATT/EXT PWR** switch to **OFF**.

Check for short between (A77):
J3-4 and ground,
J3-5 and ground,
J3-6 and ground.

Does short exist?

YES	Go to step 3.
NO	Refer to TM 9-1090-208-23-2 to troubleshoot area weapon system.

3. Detach wires at CB3-A2, CB3-B2, and CB3-C2. Check for short between (A77):

J3-4 and ground,
J3-5 and ground,
J3-6 and ground.

Does short exist?

YES	Repair shorted wire. Go to paragraph 9-199.
-----	--

NO	Replace AWS MTR circuit breaker (CB3) (TM 1-1520-238-23).
----	---

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:

CB3-A1 and (A77)J4-H,
CB3-B1 and (A77)J4-B,
CB3-C1 and (A77)J4-E,
CB3-A2 and (A77)J3-4,
CB3-B2 and (A77)J3-5,
CB3-C2 and (A77)J3-6.

Does open exist?

YES	Repair open wire. Go to paragraph 9-199.
-----	---

NO	Replace AWS MTR circuit breaker (CB3) (TM 1-1520-238-23).
----	---

END OF TASK

9-202. AWS AMMO CIRCUIT BREAKER (CB7) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J4-H AND J2-1, J4-B AND J2-15, J4-E AND J2-22 **9-202**

Tools:

Nomenclature	Part Number
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1090-208-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does AWS AMMO circuit breaker (CB7) stay closed?

YES	Go to step 4.
NO	Go to step 2.

- Open CB7. Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A77):
J2-1 and ground,
J2-15 and ground,
J2-22 and ground.

Does short exist?

YES	Go to step 3.
NO	Refer to TM 9-1090-208-23-2 to troubleshoot area weapon system.

- Detach wires at CB7-A2, CB7-B2, and CB7-C2. Check for short between (A77):

J2-1 and ground,
J2-15 and ground,
J2-22 and ground.

Does short exist?

YES	Repair shorted wire. Go to paragraph 9-199.
-----	--

NO	Replace AWS AMMO circuit breaker (CB7) (TM 1-1520-238-23).
----	--

- Set **BATT/EXT PWR** switch to **OFF**. Check for open between:

CB7-A1 and CB3-A1,
CB7-B1 and CB3-B1,
CB7-C1 and CB3-C1,
CB7-A2 and (A77)J2-1,
CB7-B2 and (A77)J2-15,
CB7-C2 and (A77)J2-22.

Does open exist?

YES	Repair open wire. Go to paragraph 9-199.
-----	---

NO	Replace AWS AMMO circuit breaker (CB7) (TM 1-1520-238-23).
----	--

END OF TASK

9-203. PRI LT CIRCUIT BREAKER (CB14) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J4-H AND J1-9 **9-203**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB14-1 and CB7-C1,
CB14-2 and (A77)J1-9.

Does open exist?

YES	Repair open wire. Go to paragraph 9-199.
NO	Replace PRI LT circuit breaker (CB14) (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does PRI LT circuit breaker (CB14) stay closed?

YES	Go to step 4.
NO	Go to step 2.

2. Open CB14. Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A77)J1-9 and ground.

Does short exist?

YES	Go to step 3.
NO	Go to paragraph 9-132 to troubleshoot CPG edge-lights.

3. Detach wire ends at CB14-2. Check for short between (A77)J1-9 and ground.

Does short exist?

YES	Repair shorted wire. Go to paragraph 9-199.
NO	Replace PRI LT circuit breaker (CB14) (TM 1-1520-238-23).

END OF TASK

9-204. FC RCDR CIRCUIT BREAKER (CB8) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J4-E AND J2-16

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does FC RCDR circuit breaker (CB8) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Open CB8. Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A77)J2-16 and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 11-1520-238-23-2 to troubleshoot video recorder system.

3. Detach wire at CB8-2. Check for short between (A77)J2-16 and ground.

Does short exist?

- YES Repair shorted wire.
Go to paragraph 9-199.

- NO Replace **FC RCDR** circuit breaker (CB8) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:

CB8-1 and CB7-A1,
CB8-2 and (A77)J2-16.

Does open exist?

- YES Repair open wire.
Go to paragraph 9-199.

- NO Replace **FC RCDR** circuit breaker (CB8) (TM 1-1520-238-23).

END OF TASK

9-205. 115 VAC – IS NOT PRESENT AT: P769-H, P769-B, P769-E

9-205

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-199	All ac essential bus 2 CPG station circuit breakers open



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**. Check for 115 VAC at (A402):
J32-A,
J32-B,
J32-C.

Is voltage present?

YES	Repair open wire between: P461-A and P769-H, P461-B and P769-B, P461-C and P769-E. Go to paragraph 9-199.
NO	Go to step 2.

2. Set **BATT/EXT PWR** switch to **OFF**. Check for short between:
P461-A, P461-B,
P461-C and ground.
Does short exist?
YES Go to step 3.
NO Go to paragraph 9-12 to troubleshoot ac electrical power generation.

3. Check for short between (A77):
J4-H and ground,
J4-B and ground,
J4-E and ground.
Does short exist?
YES Go to step 4.
NO Repair shorted wire between: P461-A and P769-H, P461-B and P769-B, P461-C and P769-E. Go to paragraph 9-199.

4. Detach wire ends at CB3-A1, CB3-B1, and CB3-C1. Check for short between (A77):
J4-H and ground,
J4-B and ground,
J4-E and ground.
Does short exist?
YES Repair shorted wire. Go to paragraph 9-199.
NO Go to step 5.

5. Check for short between:
CB3-A1 and ground,
CB3-B1 and ground,
CB3-C1 and ground.
Does short exist?
YES Replace **AWS MTR** circuit breaker (CB3) (TM 1-1520-238-23).
NO Go to step 6.

6. With CB3 wire attached, detach wire ends at CB7-A1, CB7-B1, and CB7-C1. Check for short between (A77):
 J4-H and ground,
 J4-B and ground,
 J4-E and ground,
Does short exist?

- YES Repair shorted wire.
 Go to paragraph 9-199.
- NO Go to step 7.

7. Check for short between:
 CB7-A1 and ground,
 CB7-B1 and ground,
 CB7-C1 and ground.
Does short exist?

- YES Replace **AWS AMMO** circuit
 breaker (CB7)
 (TM 1-1520-238-23).
- NO Go to step 8.

8. With CB7 wire attached, detach wire end at CB8-1. Check for short between (A77)J4-H and ground.
Does short exist?

- YES Repair shorted wire between
 CB8-1 and CB7-A1.
 Go to paragraph 9-199.
- NO Go to step 9.

9. Check for short between CB8-1 and ground.
Does short exist?

- YES Replace **FC RCDR** circuit
 breaker (CB8)
 (TM 1-1520-238-23).
- NO Go to step 10.

10. With CB8 wire attached, detach wire end at CB14-1. Check for short between (A77)J4-E and ground.

Does short exist?

- YES Repair shorted wire between
 CB14-1 and CB7-C1.
 Go to paragraph 9-199.
- NO Replace **PRI LT** circuit breaker
 (CB14) (TM 1-1520-238-23).

END OF TASK

9-206. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 1 – PILOT STATION) – MAINTENANCE OPERATIONAL CHECK

9-206

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Multimeter, Digital	AN/PSM-45

References:

TM 55-1520-238-23

Equipment Conditions:

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

Ref

Paragraph 9-45

Condition

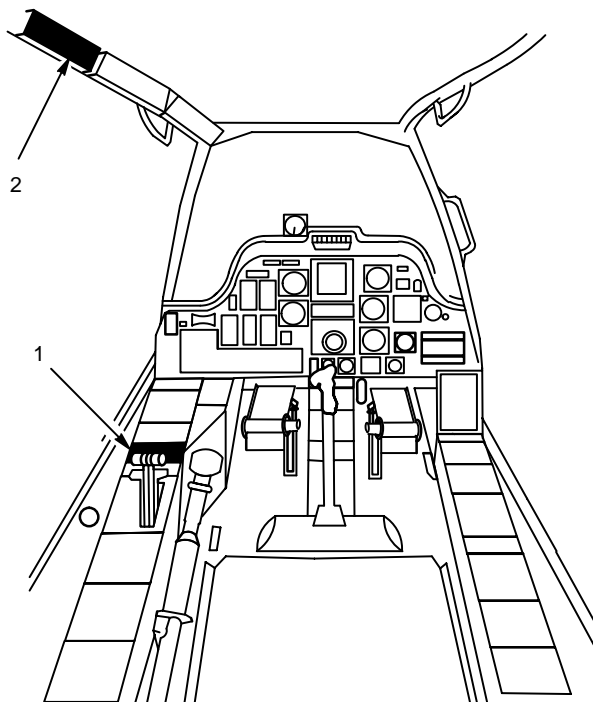
EXTERNAL POWER
– POWER UP completed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

NOTE

- Refer to pilot station (fig. 9-171) for configuration and component locations.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.



- 1. PILOT ELEC PWR PANEL
- 2. PILOT AFT CIRCUIT BREAKER PANEL

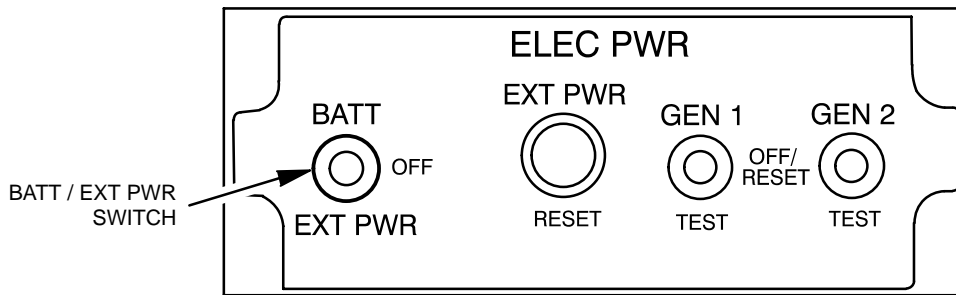
M69-216

Figure 9-171. Pilot Station

**9-206. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 1 – PILOT STATION) –
MAINTENANCE OPERATIONAL CHECK (cont)**

1. Perform the maintenance operational check as follows:

Task	Result
a. On electrical power distribution box, detach P4.	If short exists, go to paragraph 9-208.
b. Check for short between: P4-M and ground, P4-N and ground.	
c. On pilot ELEC PWR panel (fig. 9-172), set BATT/EXT PWR switch to EXT PWR .	



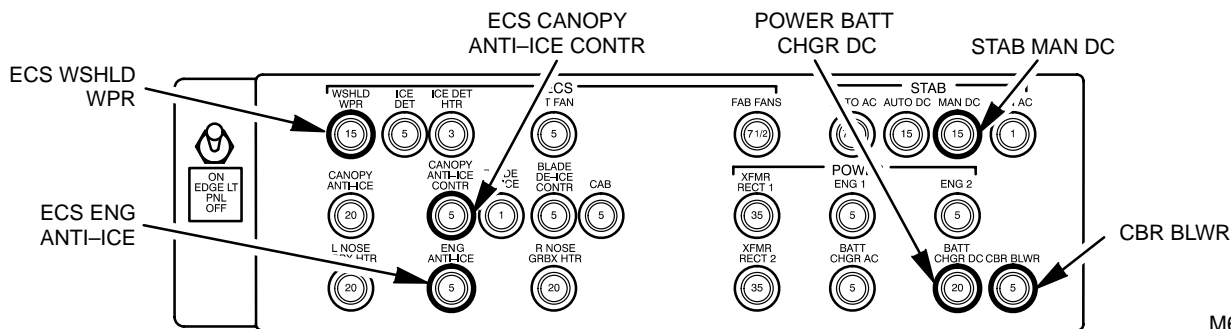
M69-217

Figure 9-172. Pilot ELEC PWR Panel

- | | |
|--|---|
| <p>d. Check for 28 VDC at (A402):
J4-M and J4-N.</p> | <p>If 28 VDC is not present, go to paragraph 9-23 to troubleshoot dc electrical power generation.</p> |
| <p>e. On pilot ELEC PWR panel, set BATT/EXT PWR switch to OFF.</p> | |
| <p>f. On electrical power distribution box, attach P4.</p> | |
| <p>g. On pilot aft circuit breaker panel (fig. 9-173) check that the following circuit breakers are closed:
STAB MAN DC (CB6),
ECS CANOPY ANTI-ICE CONTR (CB70),
ECS WSHLD WPR (CB71),
ECS ENG ANTI-ICE (CB67),
POWER BATT CHGR DC (CB5),
and CBR BLWR (CB94).</p> | |
| <p>h. On pilot ELEC PWR panel, set BATT/EXT PWR switch to EXT PWR.</p> | |

9-206. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 1 – PILOT STATION) – MAINTENANCE OPERATIONAL CHECK (cont)

9-206



M69-218

Figure 9-173. Pilot Aft Circuit Breaker Panel

Task	Result
<p>i. Check that circuit breakers closed in step g. remain closed.</p>	<p>If STAB MAN DC circuit breaker (CB6) does not stay closed, go to paragraph 9-209.</p>
	<p>If ECS CANOPY ANTI-ICE CONTR circuit breaker (CB70) does not stay closed, go to paragraph 9-210.</p>
	<p>If ECS WSHLD WPR circuit breaker (CB71) does not stay closed, go to paragraph 9-211.</p>
	<p>If ECS ENG ANTI-ICE circuit breaker (CB67) does not stay closed, go to paragraph 9-212.</p>
	<p>If POWER BATT CHGR DC circuit breaker (CB5) does not stay closed, go to paragraph 9-213.</p>
	<p>If CBR BLWR circuit breaker (CB94) does not stay closed, go to paragraph 9-214.</p>
<p>j. On pilot ELEC PWR panel (fig. 9-172), set BATT/EXT PWR switch to OFF.</p>	
<p>k. On electrical power distribution box, detach P1 and P2.</p>	
<p>l. On pilot ELEC PWR panel, set BATT/EXT PWR switch to EXT PWR.</p>	
<p>m. Check for 28 VDC at P2-g.</p>	<p>If 28 VDC is not present, go to paragraph 9-209.</p>
<p>n. Check for 28 VDC at P1-3.</p>	<p>If 28 VDC is not present, go to paragraph 9-210.</p>
<p>o. Check for 28 VDC at P2-b.</p>	<p>If 28 VDC is not present, go to paragraph 9-211.</p>
<p>p. Check for 28 VDC at P1-4.</p>	<p>If 28 VDC is not present, go to paragraph 9-212.</p>

**9-206. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 1 – PILOT STATION) –
MAINTENANCE OPERATIONAL CHECK (cont)**

9-206

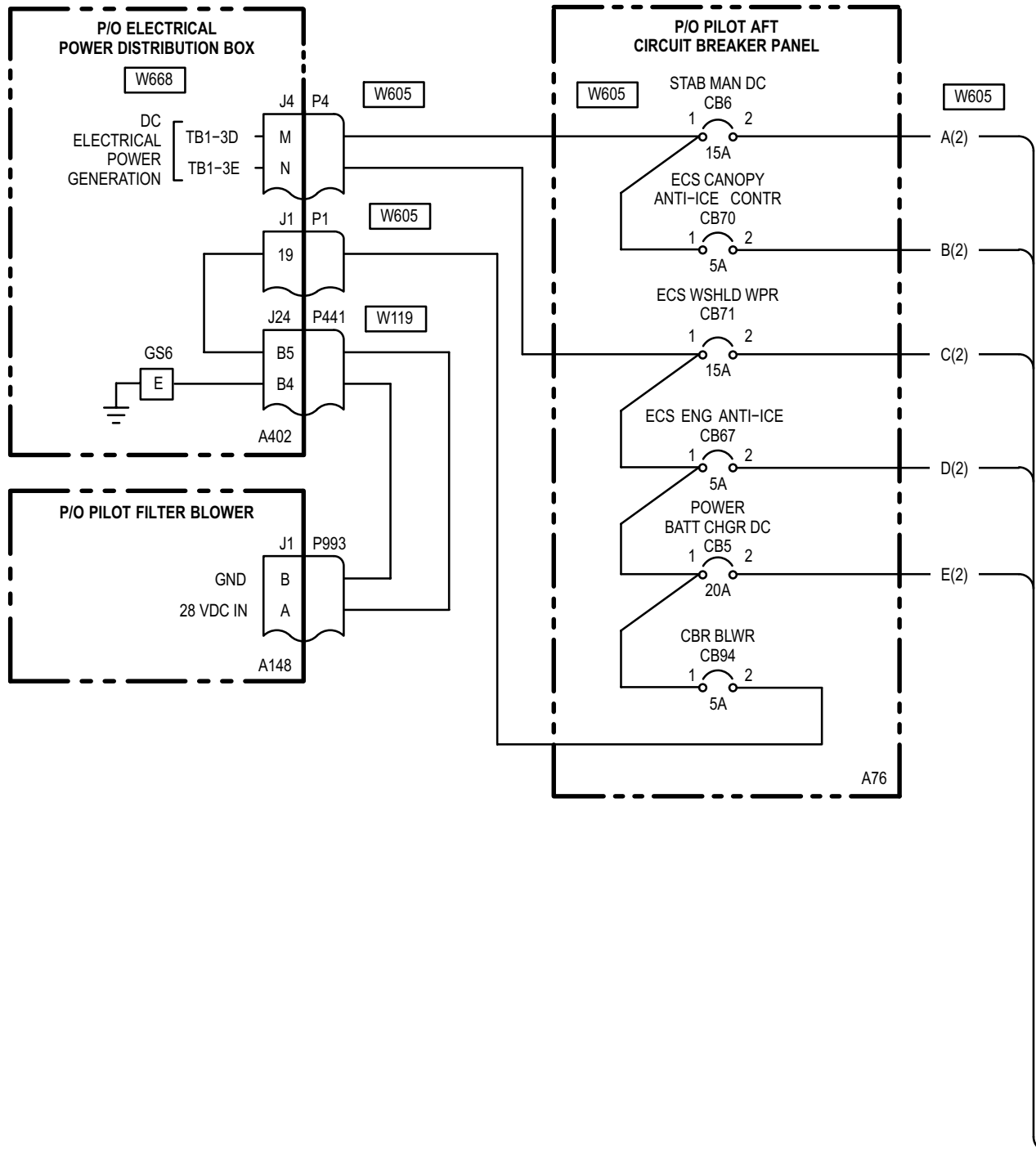
Task	Result
q. Check for 28 VDC at P2-a.	If 28 VDC is not present, go to paragraph 9-213.
r. Check for 28 VDC at P1-19.	If 28 VDC is not present, go to paragraph 9-214.
s. On electrical power distribution box, attach P1 and P2.	

2. On pilot **ELEC PWR** panel (fig. 9-172), set **BATT/EXT PWR** switch to **OFF**.
3. Perform EXTERNAL POWER – POWER DOWN (para 9-46).

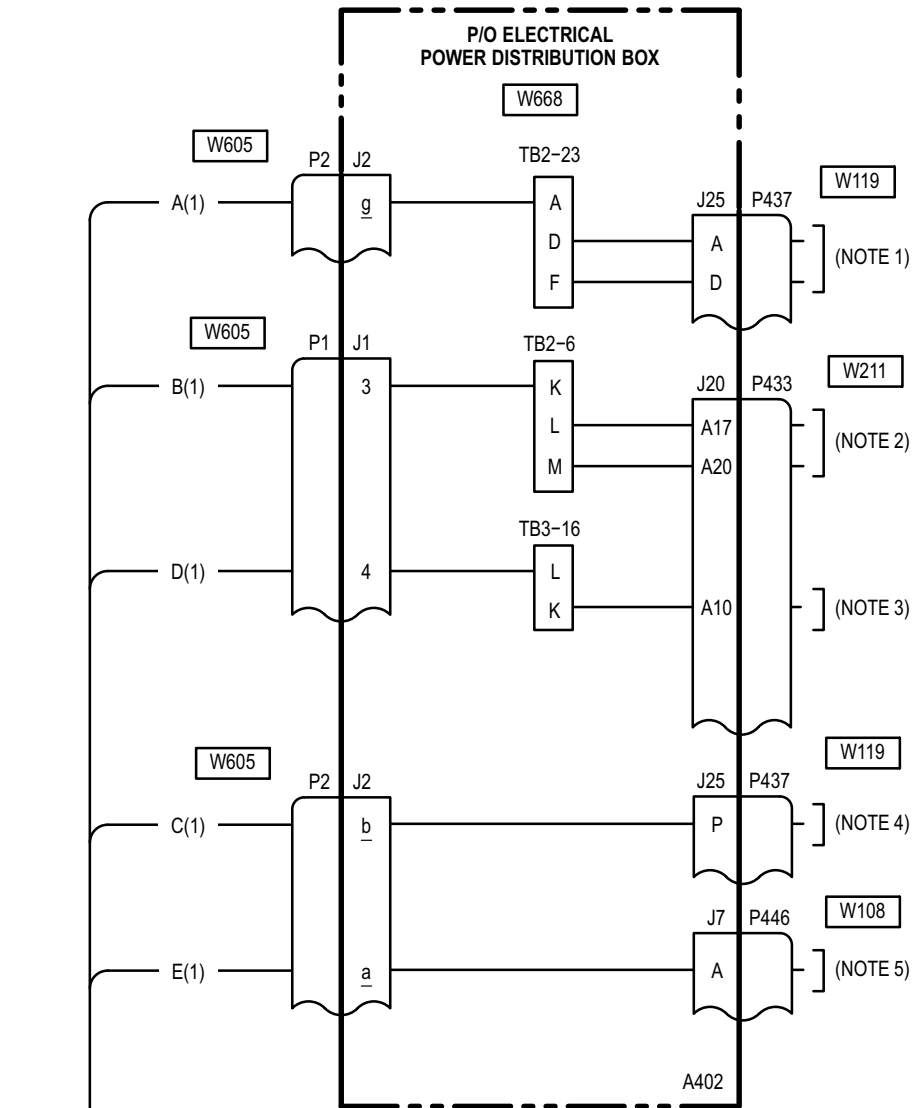
END OF TASK

9-207. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 1 – PILOT STATION) –
WIRING INTERCONNECT DIAGRAM

9-207



9-207. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 1 – PILOT STATION) –
WIRING INTERCONNECT DIAGRAM (cont)



NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

1. STABILATOR-FLIGHT CONTROL SYSTEM (TM 1-1520-238-T-7).
2. UTILITY SYSTEM-CANOPY DEFOG AND ANTI-ICE (TM 1-1520-238-T-8).
3. UTILITY SYSTEM-ENGINE ANTI-ICE (TM 1-1520-238-T-8).
4. UTILITY SYSTEM-WINDSHIELD WIPERS (TM 1-1520-238-T-8).
5. AVIONICS CONFIGURATION-BATTERY CHARGER (TM 11-1520-238-23-2).

9-208. SHORT – EXISTS BETWEEN P4-M OR P4-N AND GROUND

9-208

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-148	All dc essential bus 1 pilot station circuit breakers open

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On Pilot Aft Circuit Breaker Panel, open the following circuit breakers:
STAB MAN DC (CB6), ECS CANOPY ANTI-ICE CONTR (CB70), ECS WSHLD WPR (CB71), ECS ENG ANTI-ICE (CB67), POWER BATT CHGR DC (CB5), and CBR BLWR (CB94).
 Check for short between P4-N and ground.
Does short exist?

- YES Go to step 2.
- NO Go to step 3.

2. Detach wire ends at CB71-1. Check for short between P4-N and ground.

Does short exist?

- YES Repair shorted wire between P4-N and CB71-1.
Go to paragraph 9-206.
- NO Repair shorted wire between: CB71-1 and CB67-1, CB67-1 and CB5-1, CB5-1 and CB94-1.
Go to paragraph 9-206.

3. Detach wire ends at CB6-1. Check for short between P4-M and ground.

Does short exist?

- YES Repair shorted wire between P4-M and CB6-1.
Go to paragraph 9-206.
- NO Repair shorted wire between CB6-1 and CB70-1.
Go to paragraph 9-206.

END OF TASK

9-209. STAB MAN DC CIRCUIT BREAKER (CB6) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P2-g

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-7

3. Open CB6 and set **BATT/EXT PWR** switch to **OFF**. Check for short between P2-g and ground.
Does short exist?

- | | |
|-----|--|
| YES | Go to step 4. |
| NO | Refer to TM 1-1520-238-T-7 to troubleshoot stabilator. |

4. Detach wire at CB6-2. Check for short between P2-g and ground.

Does short exist?

- | | |
|-----|--|
| YES | Repair shorted wire.
Go to paragraph 9-206. |
| NO | Replace STAB MAN DC circuit breaker (CB6) (TM 1-1520-238-23). |



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does STAB MAN DC circuit breaker (CB6) stay closed?

- | | |
|-----|---------------|
| YES | Go to step 2. |
| NO | Go to step 3. |

2. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:

P4-M and CB6-1,
P2-g and CB6-2.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-206. |
| NO | Replace STAB MAN DC circuit breaker (CB6) (TM 1-1520-238-23). |

END OF TASK

9-210. ECS CANOPY ANTI-ICE CONTR CIRCUIT BREAKER (CB70) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-3

9-210

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does ECS CANOPY ANTI-ICE CONTR circuit breaker (CB70) stay closed?

- | | |
|-----|---------------|
| YES | Go to step 2. |
| NO | Go to step 3. |

2. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB70-1 and CB6-1,
CB70-2 and P1-3.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-206. |
| NO | Replace ECS CANOPY ANTI-ICE CONTR circuit breaker (CB70)
(TM 1-1520-238-23). |

3. Open CB70 and set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-3 and ground.
Does short exist?

- | | |
|-----|---|
| YES | Go to step 4. |
| NO | Refer to TM 1-1520-238-T-8 to troubleshoot canopy defog and anti-ice. |

4. Detach wire at CB70-2. Check for short between P1-3 and ground.

Does short exist?

- | | |
|-----|--|
| YES | Repair shorted wire.
Go to paragraph 9-206. |
| NO | Replace ECS CANOPY ANTI-ICE CONTR circuit breaker (CB70)
(TM 1-1520-238-23). |

END OF TASK

9-211. ECS WSHLD WPR CIRCUIT BREAKER (CB71) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P2-b

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does ECS WSHLD WPR circuit breaker (CB71) stay closed?

- | | |
|-----|---------------|
| YES | Go to step 2. |
| NO | Go to step 3. |

2. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB71-1 and P4-N,
CB71-2 and P2-b.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire.
Go to paragraph 9-206. |
| NO | Replace ECS WSHLD WPR circuit breaker (CB71) (TM 1-1520-238-23). |

3. Open CB71 and set **BATT/EXT PWR** switch to **OFF**. Check for short between P2-b and ground.
Does short exist?

- | | |
|-----|---|
| YES | Go to step 4. |
| NO | Refer to TM 1-1520-238-T-8 to troubleshoot windshield wipers. |

4. Detach wire at CB71-2. Check for short between P2-b and ground.

Does short exist?

- | | |
|-----|---|
| YES | Repair shorted wire.
Go to paragraph 9-206. |
| NO | Replace ECS WSHLD WPR circuit breaker (CB71) (TM 1-1520-238-23). |

END OF TASK

9-212. ECS ENG ANTI-ICE CIRCUIT BREAKER (CB67) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-4

9-212

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does ECS ENG ANTI-ICE circuit breaker (CB67) stay closed?

YES	Go to step 2.
NO	Go to step 3.

2. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB67-1 and CB71-1,
CB67-2 and P1-4.
Does open exist?

YES	Repair open wire. Go to paragraph 9-206.
NO	Replace ECS ENG ANTI-ICE circuit breaker (CB67) (TM 1-1520-238-23).

3. Open CB67 and set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-4 and ground.
Does short exist?

YES	Go to step 4.
NO	Refer to TM 1-1520-238-T-8 to troubleshoot engine anti-ice.

4. Detach wire at CB67-2. Check for short between P1-4 and ground.
Does short exist?

YES	Repair shorted wire. Go to paragraph 9-206.
NO	Replace ECS ENG ANTI-ICE circuit breaker (CB67) (TM 1-1520-238-23).

END OF TASK

9-213. POWER BATT CHGR DC CIRCUIT BREAKER (CB5) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P2-a

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does POWER BATT CHGR DC circuit breaker (CB5) stay closed?
 - YES Go to step 2.
 - NO Go to step 3.

2. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB5-1 and CB67-1,
CB5-2 and P2-a.
Does open exist?
 - YES Repair open wire.
 Go to paragraph 9-206.

 - NO Replace **POWER BATT CHGR DC** circuit breaker (CB5) (TM 1-1520-238-23).

3. Open CB5 and set **BATT/EXT PWR** switch to **OFF**. Check for short between P2-a and ground.
Does short exist?
 - YES Go to step 4.
 - NO Refer to TM 11-1520-238-23-2 to troubleshoot battery charger.

4. Detach wire at CB5-2. Check for short between P2-a and ground.
Does short exist?
 - YES Repair shorted wire.
 Go to paragraph 9-206.

 - NO Replace **POWER BATT CHGR DC** circuit breaker (CB5) (TM 1-1520-238-23).

END OF TASK

9-214. PILOT CBR BLWR CIRCUIT BREAKER (CB94) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-19

9-214

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 3-4240-312-12&P

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot aft circuit breaker panel, close **CBR BLWR** circuit breaker (CB94).
Does CBR BLWR circuit breaker stay closed?

YES	Go to step 2.
NO	Go to step 4.

2. Detach P993 and check for short between P993-A and P993-B.
Does short exist?

YES	Replace pilot CBR filter blower (TM 3-4240-312-12&P).
NO	Go to step 3.

3. On pilot aft circuit breaker panel, detach P1. Check for short between P1-19 and ground.
Does short exist?

YES	Repair shorted wire between CB94-2 and P1-19. Go to paragraph 9-206.
NO	Repair shorted wire between (A402): J1-19 and J24-B5. Go to paragraph 9-206.

4. Check for 28 VDC between P993-A and ground.
Is voltage present?

YES	Repair open wire between P993-B and ground. Go to paragraph 9-206.
NO	Go to step 5.

5. Check for 28 VDC at (A402)J4-N.
Is voltage present?

YES	Go to step 6.
NO	Go to paragraph 9-30.

6. Check for continuity between P4-N and P1-19.
Does continuity exist?

YES	Repair open wire between (A402)J1-19 and P993-B. Go to paragraph 9-206.
NO	Repair open wire between P4-N and P1-19. Go to paragraph 9-206.

END OF TASK

**9-215. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 1 – CPG STATION) –
MAINTENANCE OPERATIONAL CHECK**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06

References:

TM 1-1520-238-23

Equipment Conditions:

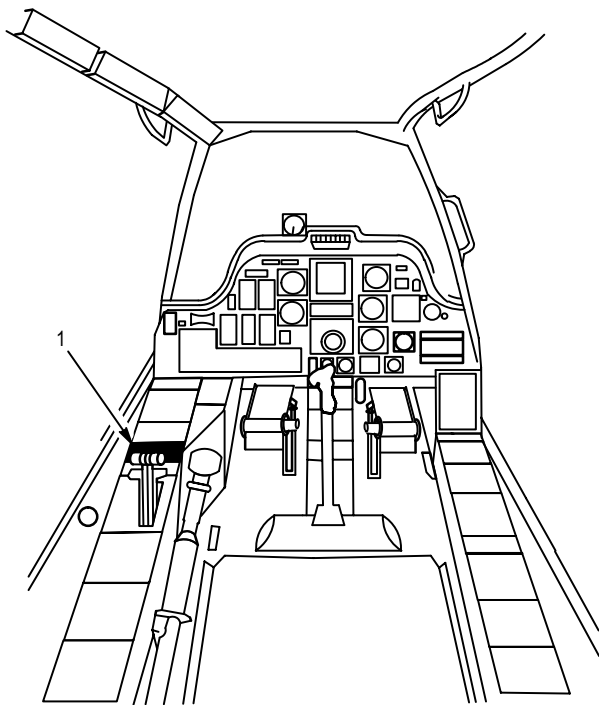
<u>Ref</u>	<u>Condition</u>
Paragraph 9-45	EXTERNAL POWER – POWER UP completed

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

WARNING

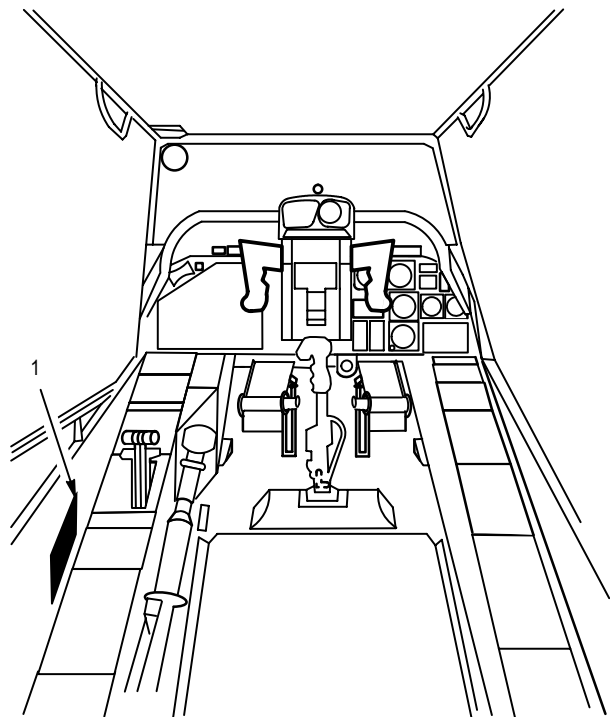
Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.



1. PILOT ELEC PWR PANEL

M69-227

Figure 9-174. Pilot Station



1. CPG CIRCUIT BREAKER PANEL 2

M69-228

Figure 9-175. CPG Station

9-215. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 1 – CPG STATION) – MAINTENANCE OPERATIONAL CHECK (cont)

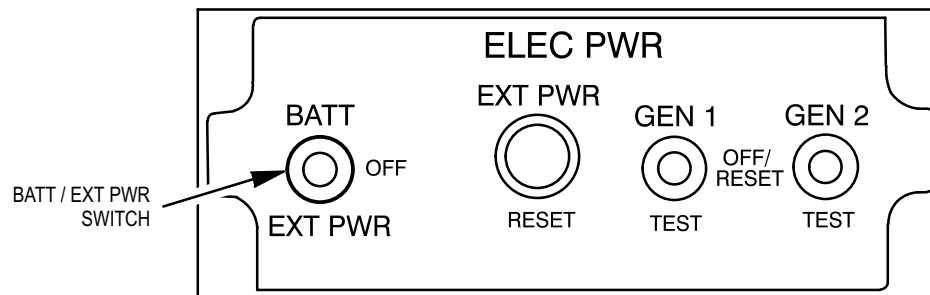
9-215

NOTE

- Refer to pilot station (fig. 9-174) and CPG station (fig. 9-175) for cockpit configuration and equipment.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.

1. Perform the maintenance operational check as follows:

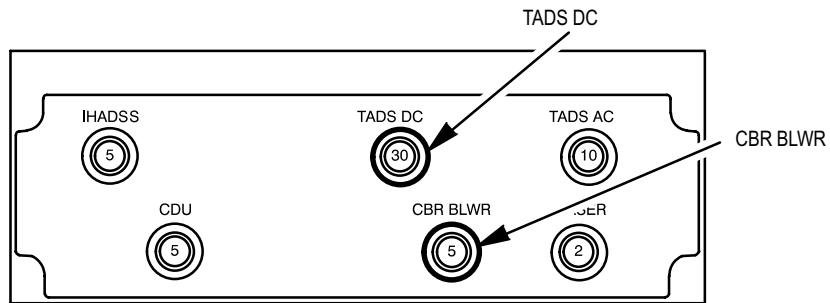
Task	Result
a. Detach P763.	
b. On pilot ELEC PWR panel (fig. 9-176), set BATT/EXT PWR switch to EXT PWR .	



M69-229

Figure 9-176. Pilot ELEC PWR Panel

- | | |
|--|--|
| <p>c. Check for 28 VDC at P763-D.</p> | <p>If 28 VDC is not present, go to paragraph 9-217.</p> |
| <p>d. On pilot ELEC PWR panel, set BATT/EXT PWR switch to OFF and attach P763.</p> | |
| <p>e. On pilot ELEC PWR panel, set BATT/EXT PWR switch to EXT PWR.</p> | |
| <p>f. On CPG circuit breaker panel 2 (fig. 9-177), check that TADS DC circuit breaker (CB2) and CBR BLWR circuit breaker (CB5) are closed.</p> | <p>If TADS DC circuit breaker (CB2) does not stay closed, go to paragraph 9-218.</p> <p>If CBR BLWR circuit breaker (CB5) does not stay closed, go to paragraph 9-219.</p> |



M69-230

Figure 9-177. CPG Circuit Breaker Panel 2

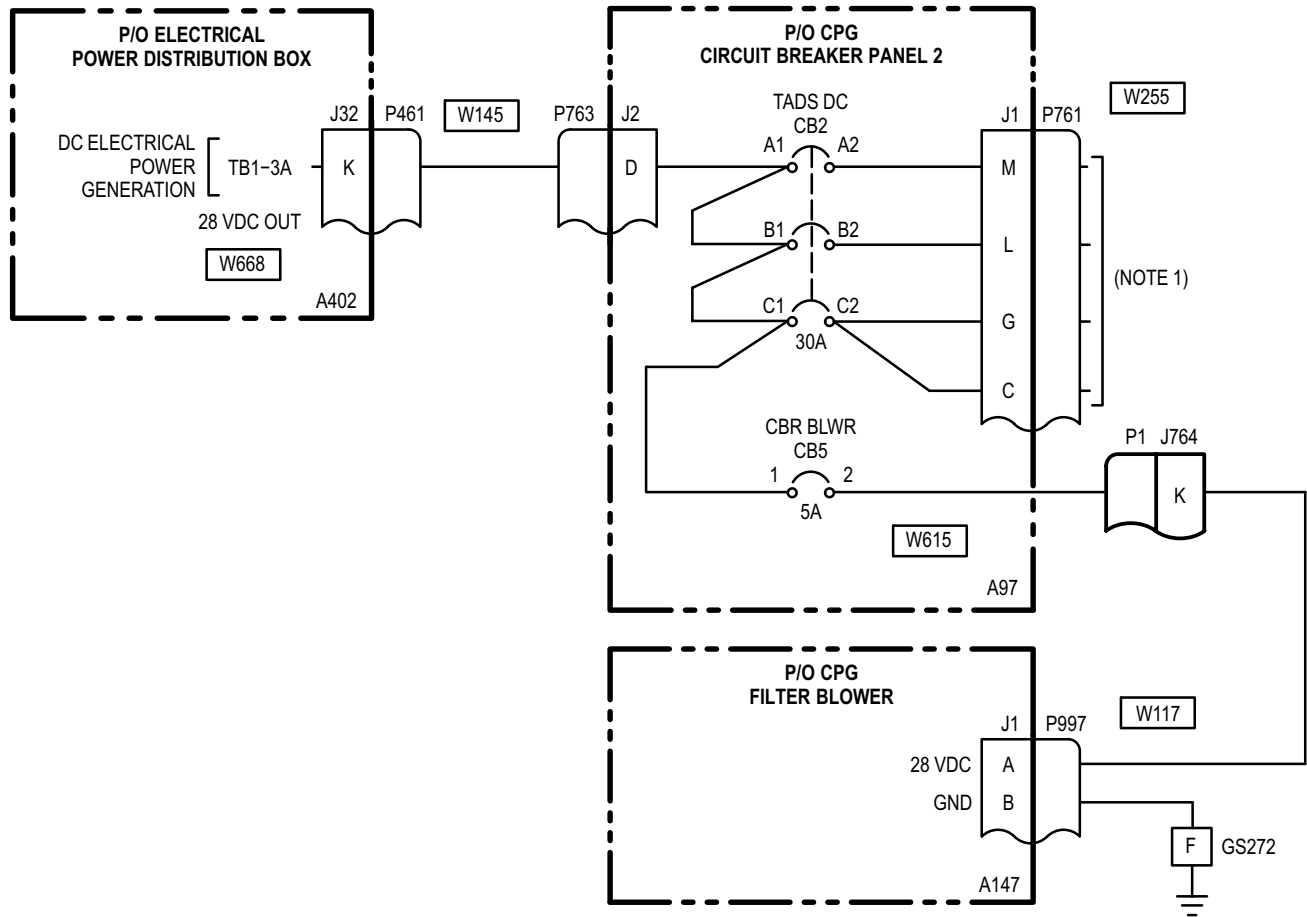
Task	Result
g. On pilot ELEC PWR panel (fig. 9-176), set BATT/EXT PWR switch to OFF and detach P761 and P997.	
h. With BATT/EXT PWR switch to EXT PWR , check for 28 VDC at (A97): J1-C, J1-G, J1-L, J1-M.	If 28 VDC is not present, go to paragraph 9-218.
i. Check for 28 VDC at P997-A and P997-B.	If 28 VDC is not present, go to paragraph 9-219.
j. Attach P761 and P997.	

2. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF**.
3. Perform EXTERNAL POWER – POWER DOWN (para 9-46).

END OF TASK

9-216. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 1 – CPG STATION) –
WIRING INTERCONNECT DIAGRAM

9-216



NOTES:

1. TADS (TM 9-1270-476-20-2).

M69-385A
SHEET 1 OF 1

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution box cover removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**. Check for 28 VDC at (A402)J32-K.
Is voltage present?

YES	Repair open wire between P461-K and P763-D. Go to paragraph 9-215.
NO	Go to step 2.

- Open CB2 and set **BATT/EXT PWR** switch to **OFF**. Check for short between P461-K and ground.

Does short exist?

YES	Go to step 3.
NO	Go to paragraph 9-23 to troubleshoot dc electrical power generation.

- Check for short between (A97)J2-D and ground.
Does short exist?

YES	Go to step 4.
NO	Repair shorted wire between P461-K and P763-D. Go to paragraph 9-215.

- Detach wire ends at CB2-A1. Check for short between (A97)J2-D and ground.

Does short exist?

YES	Repair shorted wire between (A97)J2-D and CB2-A1. Go to paragraph 9-215.
NO	Go to step 5.

- Check for short between CB2-A1 and ground.
Does short exist?

YES	Replace TADS DC circuit breaker (CB2) (TM 1-1520-238-23).
NO	Go to step 6.

- Attach wires at CB2-A1 and detach wire ends at CB2-B1. Check for short between (A97)J2-D and ground.

Does short exist?

YES	Repair shorted wire between CB2-A1 and CB2-B1. Go to paragraph 9-215.
NO	Go to step 7.

- Check for short between CB2-B1 and ground.
Does short exist?

YES	Replace TADS DC circuit breaker (CB2) (TM 1-1520-238-23).
NO	Go to step 8.

9-217. 28 VDC – IS NOT PRESENT AT P763-D (cont)

9-217

8. Attach wires at CB2-B1 and detach wire end at CB2-C1. Check for short between (A97)J2-D and ground.

Does short exist?

- | | |
|-----|--|
| YES | Repair shorted wire between CB2-B1 and CB2-C1.
Go to paragraph 9-215. |
| NO | Replace TADS DC circuit breaker (CB2)
(TM 1-1520-238-23). |

END OF TASK

9-218. TADS DC CIRCUIT BREAKER (CB2) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A97): J1-M, J1-L, J1-G, J1-C

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1270-467-20-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does TADS DC circuit breaker (CB2) stay closed?

YES Go to step 4.
NO Go to step 2.

2. Open CB2 and set **BATT/EXT PWR** switch to **OFF**. Check for short between (A97):

J1-M and ground,
J1-L and ground,
J1-G and ground,
J1-C and ground.

Does short exist?

YES Go to step 3.
NO Refer to TM 9-1270-476-20-2 to troubleshoot TADS.

3. Detach wires at:
CB2-A2, CB2-B2, CB2-C2.
Check for short between (A97):
J1-M and ground,
J1-L and ground,
J1-G and ground,
J1-C and ground.

Does short exist?

YES Repair shorted wire.
 Go to paragraph 9-215.

NO Replace **TADS DC** circuit breaker (CB2) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:

CB2-A1 and (A97)J2-D,
CB2-B1 and (A97)J2-D,
CB2-C1 and (A97)J2-D,
CB2-A2 and (A97)J1-M,
CB2-B2 and (A97)J1-L,
CB2-C2 and (A97)J1-G,
CB2-C2 and (A97)J1-C.

Does open exist?

YES Repair open wire.
 Go to paragraph 9-215.

NO Replace **TADS DC** circuit breaker (CB2) (TM 1-1520-238-23).

END OF TASK

9-219. CPG CBR BLWR CIRCUIT BREAKER (CB5) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT BETWEEN P997-A AND P997-B

9-219

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 3-4240-312-12&P

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On CPG circuit breaker panel 2, close **CBR BLWR** circuit breaker (CB5).
Does CBR BLWR circuit breaker (CB5) stay closed?

YES	Go to step 4.
NO	Go to step 2.

- Detach P997 and check for short between P997-A and ground.
Does short exist?

YES	Go to step 3.
NO	Refer to TM 3-4240-312-12&P to troubleshoot CBR blower system.

- Check for short between P1-K and ground.
Does short exist?

YES	Repair shorted wire between J764-K and P997-A. Go to paragraph 9-215.
NO	Repair shorted wire between P1-K and CB5-2. Go to paragraph 9-215.

- Check for 28 VDC at P997-A.
Is voltage present?

YES	Go to step 6.
NO	Go to step 5.

- Check for 28 VDC at (A402)J32-K.
Is voltage present?

YES	Repair open wire between P461-K and P997-A. Go to paragraph 9-215.
NO	Go to paragraph 9-23 to troubleshoot dc electrical power generation.

- Check for open between P997-B and ground.
Does open exist?

YES	Repair open wire between P997-B and ground. Go to paragraph 9-215.
NO	Refer to TM 3-4240-312-12&P to troubleshoot CBR blower system.

END OF TASK

**9-220. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 2 – PILOT STATION) –
MAINTENANCE OPERATIONAL CHECK**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

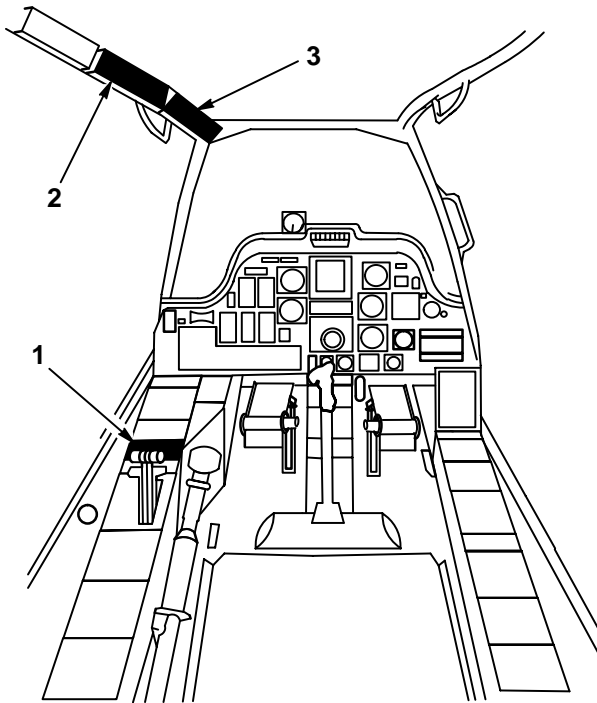
TM 1-1520-238-23
TM 1-1520-238-T-4

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-45	EXTERNAL POWER – POWER UP completed
TM 1-1520-238-T-4	Maintenance headset connected

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.



1. PILOT ELEC PWR PANEL
2. PILOT CENTER CIRCUIT BREAKER PANEL
3. PILOT FORWARD CIRCUIT BREAKER PANEL

M69-222

Figure 9-178. Pilot Station

9-220. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 2 – PILOT STATION) – MAINTENANCE OPERATIONAL CHECK (cont)

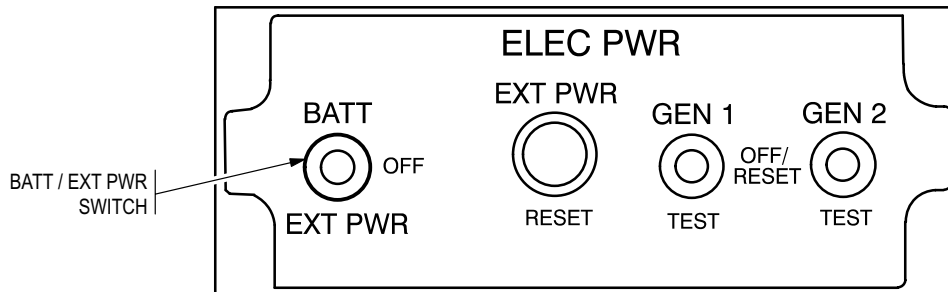
9-220

NOTE

- Refer to (fig. 9-178) for pilot station configuration and component locations.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.

1. Complete the maintenance operational check as follows:

Task	Result
a. Detach P4.	
b. Check for short between: P4-J and ground, P4-G and ground.	If short exists, go to paragraph 9-222.
c. On pilot ELEC PWR panel (fig. 9-179), set BATT/EXT PWR switch to EXT PWR .	



M69-223

Figure 9-179. Pilot ELEC PWR Panel

- | | |
|--|---|
| <p>d. Check for 28 VDC at (A402):
J4-J and J4-G.</p> | <p>If 28 VDC is not present, go to paragraph 9-23 to troubleshoot dc electrical power generation.</p> |
| <p>e. On pilot ELEC PWR panel, set BATT/EXT PWR switch to OFF and connect P4.</p> | |

9-220. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 2 – PILOT STATION) – MAINTENANCE OPERATIONAL CHECK (cont)

Task	Result
------	--------

- f. On pilot circuit breaker panels (fig. 9-180), check that the following circuit breakers are closed:

**MISSION ARM CONTR (CB46),
 IR JAM XMTR (CB66),
 MISSION PEN AIDS CONTR (CB49),
 MISSION JETT (CB89),
 NAV VDU (CB91),
 FUEL TRANS (CB56),
 FUEL BST (CB57),
 TWHL LOCK (CB59),
 LT NAV (CB73),
 VIB MON (CB79), and
 LSR DET (CB96) (ADP).**

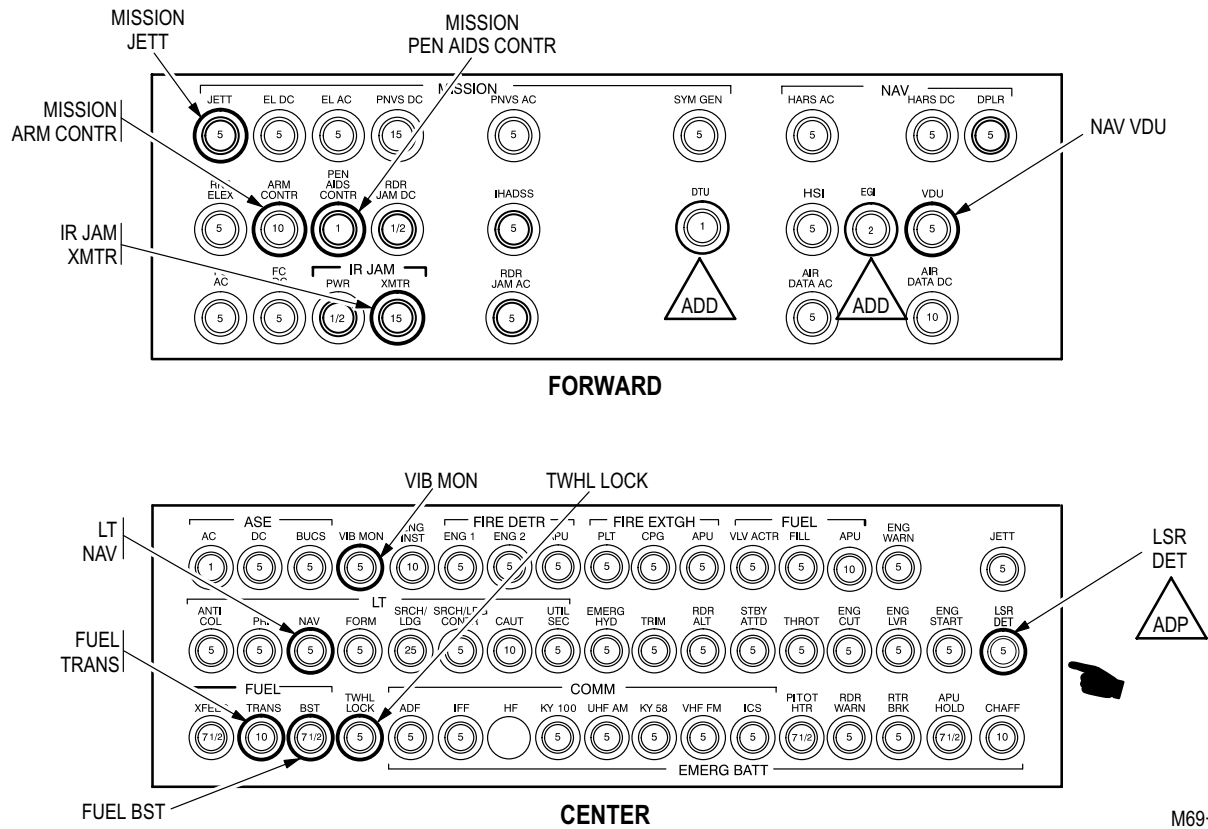


Figure 9-180. Pilot Circuit Breaker Panels

- g. On pilot ELEC PWR panel (fig. 9-179), set BATT/EXT PWR switch to EXT PWR.

**9-220. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 2 – PILOT STATION) –
MAINTENANCE OPERATIONAL CHECK (cont)**

9-220

Task	Result
<p>h. Check that circuit breakers in step f. remain closed.</p>	<p>If MISSION ARM CONTR circuit breaker (CB46) does not stay closed, go to paragraph 9-223.</p> <p>If IR JAM XMTR circuit breaker (CB66) does not stay closed, go to paragraph 9-224.</p> <p>If MISSION PEN AIDS CONTR circuit breaker (CB49) does not stay closed, go to paragraph 9-225.</p> <p>If MISSION JETT circuit breaker (CB89) does not stay closed, go to paragraph 9-226.</p> <p>If NAV VDU circuit breaker (CB91) does not stay closed, go to paragraph 9-227.</p> <p>If FUEL TRANS circuit breaker (CB56) does not stay closed, go to paragraph 9-228.</p> <p>If FUEL BST circuit breaker (CB57) does not stay closed, go to paragraph 9-229.</p> <p>If TWHL LOCK circuit breaker (CB59) does not stay closed, go to paragraph 9-230.</p> <p>If LT NAV circuit breaker (CB73) does not stay closed, go to paragraph 9-231.</p> <p>If VIB MON circuit breaker (CB79) does not stay closed, go to paragraph 9-232.</p> <p>If LSR DET circuit breaker (CB96) does not stay closed, go to paragraph 9-232.1.</p>
<p>i. On pilot ELEC PWR panel (fig. 9-179), set BATT/EXT PWR switch to OFF and detach P1 and P2.</p> <p>j. On pilot ELEC PWR panel, set BATT/EXT PWR switch to EXT PWR.</p> <p>k. Check for 28 VDC at P2-E.</p> <p>l. Check for 28 VDC at P2-h.</p> <p>m. Check for 28 VDC at P2-D.</p> <p>n. Check for 28 VDC at P1-49.</p> <p>o. Check for 28 VDC at P1-18.</p> <p>p. Check for 28 VDC at P1-41 and P1-42.</p>	<p>If 28 VDC is not present, go to paragraph 9-223.</p> <p>If 28 VDC is not present, go to paragraph 9-224.</p> <p>If 28 VDC is not present, go to paragraph 9-228.</p> <p>If 28 VDC is not present, go to paragraph 9-225.</p> <p>If 28 VDC is not present, go to paragraph 9-226.</p> <p>If 28 VDC is not present, go to paragraph 9-227.</p>

**9-220. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 2 – PILOT STATION) –
MAINTENANCE OPERATIONAL CHECK (cont)**

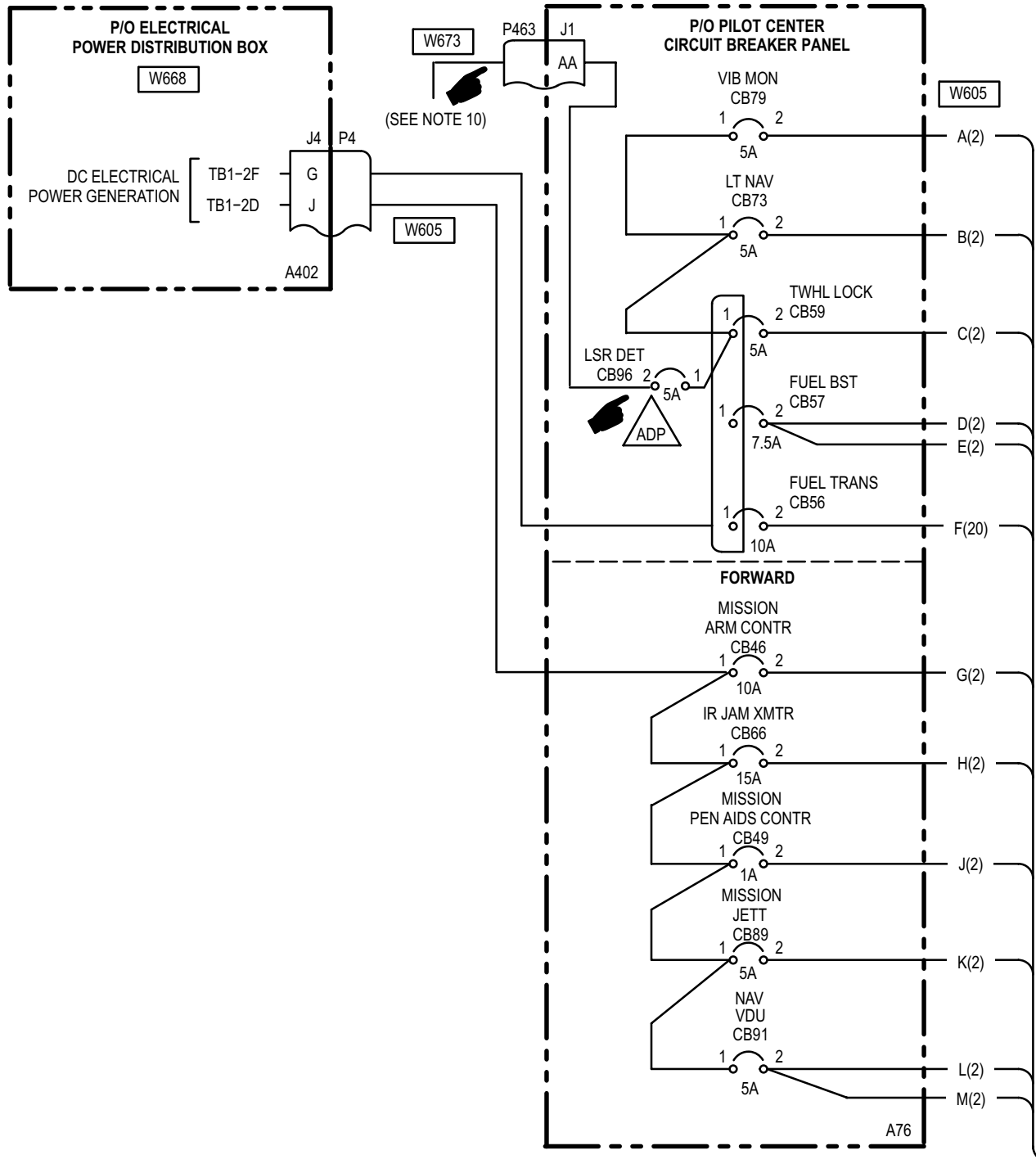
9-220

Task	Result
q. Check for 28 VDC at P1-31 and P1-48.	If 28 VDC is not present, go to paragraph 9-229.
r. Check for 28 VDC at P1-15.	If 28 VDC is not present, go to paragraph 9-230.
s. Check for 28 VDC at P1-25.	If 28 VDC is not present, go to paragraph 9-231.
t. Check for 28 VDC at P1-10.	If 28 VDC is not present, go to paragraph 9-232.
u. Check for 28 VDC at (A76) J1-AA.	If 28 VDC is not present, go to paragraph 9-232.1.
v. Attach P1 and P2.	

2. On pilot **ELEC PWR** panel (fig. 9-179), set **BATT/EXT PWR** switch to **OFF**.
3. Disconnect maintenance headset (TM 1-1520-238-T-4).
4. Perform **EXTERNAL POWER – POWER DOWN** (para 9-46).

END OF TASK

9-221. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 2 – PILOT STATION) –
WIRING INTERCONNECT DIAGRAM



M69-389-1B
SHEET 1 OF 3

**9-221. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 2 – PILOT STATION) –
WIRING INTERCONNECT DIAGRAM (cont)**

9-221

NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

1. DRIVE SYSTEM (TM 1-1520-238-T-4).
2. HYDRAULIC SYSTEM (TM 1-1520-238-T-5).
3. FUEL SYSTEM (TM 1-1520-238-T-7).
4. AUXILIARY POWER UNIT (TM 1-1520-238-T-8).
5. AVIONICS CONFIGURATION-IR JAMMER AN/ALQ-144 (TM 11-1520-238-23-2).
6. MISSION EQUIPMENT-EXTERNAL STORES CONTROL SYSTEM (TM 1-1520-238-T-8).
7. AVIONICS CONFIGURATION-VIDEO DISPLAY UNIT (TM 11-1520-238-23-2).
8. MISSION EQUIPMENT-EXTERNAL STORES JETTISON SYSTEM (TM 1-1520-238-T-8).
9. ARMAMENT-AERIAL ROCKET CONTROL SYSTEM (TM 9-1090-208-23-2).
10. AVIONICS CONFIGURATION - LASER DETECTING SET AN/AVR-2A(V)1 (TM 11-1520-238-23-2) (ADP)

M69-389-3A
SHEET 3 OF 3

9-222. SHORT – EXISTS BETWEEN P4-J OR P4-G AND GROUND

9-222

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-148	All dc essential bus 2 pilot station circuit breakers open



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for short between P4-G and ground.

Does short exist?

YES	Go to step 2.
NO	Go to step 5.

2. Detach wire end at CB56-1. Check for short between P4-G and ground.

Does short exist?

YES	Repair shorted wire between CB56-1 and P4-G. Go to paragraph 9-220.
NO	Go to step 3.

3. Attach CB56 wire and detach wire end at CB59-1. Check for short between P4-G and ground.

Does short exist?

YES	Replace bus bar between CB56 and CB59, and check for foreign material (TM 1-1520-238-23).
NO	Go to step 4.

4. Attach CB59 wire and detach wire ends at CB73-1. Check for short between P4-G and ground.

Does short exist?

YES	Repair shorted wire between CB59-1 and CB73-1. Go to paragraph 9-220.
NO	Repair shorted wire between CB79-1 and CB73-1. Go to paragraph 9-220.

5. Detach wire at CB46-1. Check for short between P4-J and ground.

Does short exist?

YES	Repair shorted wire between CB46-1 and P4-J. Go to paragraph 9-220.
NO	Go to step 6.

6. Attach wire CB46-1 and detach wire end at CB91-1. Check for short between P4-J and ground.

Does short exist?

YES	Repair shorted wire between: CB46-1 and CB66-1, CB49-1 and CB89-1. Go to paragraph 9-220.
NO	Repair shorted bus bar between CB89-1 and CB91-1, and check for foreign material (TM 1-1520-238-23).

END OF TASK

9-223. MISSION ARM CONTR CIRCUIT BREAKER (CB46) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P2-E

9-223

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23
 TM 9-1090-208-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does MISSION ARM CONTR circuit breaker (CB46) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. Open CB46 and set **BATT/EXT PWR** switch to **OFF**. Check for short between P2-E and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 9-1090-208-23-2 to troubleshoot external stores control system.

3. Detach wire at CB46-2. Check for short between P2-E and ground.

Does short exist?

- YES Repair shorted wire between CB46-2 and P2-E.
 Go to paragraph 9-220.

- NO Replace **MISSION ARM CONTR** circuit breaker (CB46) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:

CB46-1 and P4-J,
 CB46-2 and P2-E.

Does open exist?

- YES Repair open wire.
 Go to paragraph 9-220.

- NO Replace **MISSION ARM CONTR** circuit breaker (CB4) (TM 1-1520-238-23.).

END OF TASK

9-224. IR JAM XMTR CIRCUIT BREAKER (CB66) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P2-h

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does IR JAM XMTR circuit breaker (CB66) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Open CB66 and set **BATT/EXT PWR** switch to **OFF**. Check for short between P2-h and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 11-1520-238-23-2 to troubleshoot IR jammer.

3. Detach wire at CB66-2. Check for short between P2-h and ground.

Does short exist?

- YES Repair shorted wire between CB66-2 and P2-h. Go to paragraph 9-220.
- NO Replace **IR JAM XMTR** circuit breaker (CB66) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between: CB66-1 and CB46-1, CB66-2 and P2-h.

Does open exist?

- YES Repair open wire. Go to paragraph 9-220.
- NO Replace **IR JAM XMTR** circuit breaker (CB66) (TM 1-1520-238-23).

END OF TASK

9-225. MISSION PEN AIDS CONTR CIRCUIT BREAKER (CB49) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-49

9-225

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does MISSION PEN AIDS CONTR circuit breaker (CB49) stay closed?

YES Go to step 4.
NO Go to step 2.

2. Open CB49 and set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-49 and ground.

Does short exist?

YES Go to step 3.
NO Refer to TM 11-1520-238-23-2 to troubleshoot radar warning system.

3. Detach wire at CB49-2. Check for short between P1-49 and ground.

Does short exist?

YES Repair shorted wire between CB49-2 and P1-49.
Go to paragraph 9-220.

NO Replace **MISSION PEN AIDS CONTR** circuit breaker (CB49) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB49-1 and CB66-1,
CB49-2 and P1-49.

Does open exist?

YES Repair open wire.
Go to paragraph 9-220.

NO Replace **MISSION PEN AIDS CONTR** circuit breaker (CB4) (TM 1-1520-238-23.).

END OF TASK

9-226. MISSION JETT CIRCUIT BREAKER (CB89) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-18

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does MISSION JETT circuit breaker (CB89) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Open CB89 and set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-18 and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 1-1520-238-T-8 to troubleshoot external stores jettison system.

3. Detach wire at CB89-2. Check for short between P1-18 and ground.

Does short exist?

- YES Repair shorted wire between CB89-2 and P1-18. Go to paragraph 9-220.
- NO Replace **MISSION JETT** circuit breaker (CB89) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB89-1 and CB49-1.

Does open exist?

- YES Go to step 5.
- NO Replace **MISSION JETT** circuit breaker (CB89) (TM 1-1520-238-23).

5. Check for open between CB89-2 and P1-18.

Does open exist?

- YES Repair open wire. Go to paragraph 9-220.
- NO Repair open wire between CB91-1 and CB89-1. Go to paragraph 9-220.

END OF TASK

9-227. NAV VDU CIRCUIT BREAKER (CB91) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-41 AND P1-42

9-227

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23
 TM 11-1520-238-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does NAV VDU circuit breaker (CB91) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Open CB91 and set **BATT/EXT PWR** switch to **OFF**. Check for short between: P1-41 and ground, P1-42 and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 11-1520-238-23-2 to troubleshoot video recorder system.

3. Detach wire at CB91-2. Check for short between: P1-41 and ground, P1-42 and ground.

Does short exist?

- YES Repair shorted wire. Go to paragraph 9-220.

- NO Replace **NAV VDU** circuit breaker (CB91) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:

CB91-1 and CB89-1,
 CB91-2 and P1-41,
 CB91-2 and P1-42.

Does open exist?

- YES Repair open wire. Go to paragraph 9-220.

- NO Replace **NAV VDU** circuit breaker (CB91) (TM 1-1520-238-23).

END OF TASK

9-228. FUEL TRANS CIRCUIT BREAKER (CB56) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P2-D

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-7

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does FUEL TRANS circuit breaker (CB56) stay closed?

YES Go to step 4.
NO Go to step 2.

2. Open CB56 and set **BATT/EXT PWR** switch to **OFF**. Check for short between P2-D and ground.

Does short exist?

YES Go to step 3.
NO Refer to TM 1-1520-238-T-7 to troubleshoot fuel quantity indication/transfer system.

3. Detach wire at CB56-2. Check for short between P2-D and ground.

Does short exist?

YES Repair shorted wire between CB56-2 and P2-D.
Go to paragraph 9-220.

NO Replace **FUEL TRANS** circuit breaker (CB56)
(TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB56-1 and P4-G,
CB56-2 and P2-D.

Does open exist?

YES Repair open wire.
Go to paragraph 9-220.

NO Replace **FUEL TRANS** circuit breaker (CB56)
(TM 1-1520-238-23).

END OF TASK

9-229. FUEL BST CIRCUIT BREAKER (CB57) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-31 AND P1-48

9-229

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-7

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does FUEL BST circuit breaker (CB57) stay closed?

YES	Go to step 4.
NO	Go to step 2.

2. Open CB57 and set **BATT/EXT PWR** switch to **OFF**. Check for short between: P1-31 and ground, P1-48 and ground.
Does short exist?

YES	Go to step 3.
NO	Refer to TM 1-1520-238-T-7 to troubleshoot fuel crossfeed/boost system.

3. Detach wire at CB57-2. Check for short between: P1-31 and ground, P1-48 and ground.
Does short exist?

YES	Repair shorted wire. Go to paragraph 9-220.
NO	Replace FUEL BST circuit breaker (CB57) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between: CB56-1 and P1-31, CB56-1 and P1-48.
Does open exist?

YES	Go to step 5.
NO	Replace FUEL BST circuit breaker (CB57) (TM 1-1520-238-23).

5. Check for open between: CB57-2 and P1-31, CB57-2 and P1-48.
Does open exist?

YES	Repair open wire. Go to paragraph 9-220.
NO	Replace bus bar connecting CB56, CB57, CB59, and check for foreign material (TM 1-1520-238-23).

END OF TASK

9-230. TWHL LOCK CIRCUIT BREAKER (CB59) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-15

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-4



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does TWHL LOCK circuit breaker (CB59) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Open CB59 and set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-15 and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 1-1520-238-T-4 to troubleshoot tail landing gear system.

3. Detach wire at CB59-2. Check for short between P1-15 and ground.

Does short exist?

- YES Repair shorted wire between CB59-2 and P1-15. Go to paragraph 9-220.
- NO Replace **TWHL LOCK** circuit breaker (CB59) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB59-1 and P1-15.

Does open exist?

- YES Go to step 5.
- NO Replace **TWHL LOCK** circuit breaker (CB59) (TM 1-1520-238-23).

5. Check for open between CB59-2 and P1-15.

Does open exist?

- YES Repair open wire. Go to paragraph 9-220.
- NO Replace bus bar connecting CB56, CB57, CB59, and check for foreign material (TM 1-1520-238-23).

END OF TASK

9-231. LT NAV CIRCUIT BREAKER (CB73) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-25

9-231

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB73-1 and CB59-1,
CB73-2 and P1-25.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-220. |
| NO | Replace LT NAV circuit breaker (CB73) (TM 1-1520-238-23). |

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does LT NAV circuit breaker (CB73) stay closed?

- | | |
|-----|---------------|
| YES | Go to step 4. |
| NO | Go to step 2. |

2. Open CB73 and set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-25 and ground.

Does short exist?

- | | |
|-----|---|
| YES | Go to step 3. |
| NO | Go to paragraph 9-55 to troubleshoot navigation lights. |

3. Detach wire at CB73-2. Check for short between P1-25 and ground.

Does short exist?

- | | |
|-----|---|
| YES | Repair shorted wire between CB73-2 and P1-25.
Go to paragraph 9-220. |
| NO | Replace LT NAV circuit breaker (CB73) (TM 1-1520-238-23). |

END OF TASK

9-232. VIB MON CIRCUIT BREAKER (CB79) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-10

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-4



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does circuit breaker (CB79) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Open CB79 and set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-10 and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 1-1520-238-T-4 to troubleshoot drive system.

3. Detach wire at CB79-2. Check for short between P1-10 and ground.

Does short exist?

- YES Repair shorted between CB79-2 and P1-10.
Go to paragraph 9-220.
- NO Replace **VIB MON** circuit breaker (CB79)
(TM 1-1520-238-23).

4. Set **BATT** switch to **OFF**. Check for open between:
CB79-1 and CB73-1,
CB79-2 and P1-10.

Does open exist?

- YES Repair open wire.
Go to paragraph 9-220.
- NO Replace **VIB MON** circuit breaker (CB79)
(TM 1-1520-238-23).

END OF TASK

9-232.1. LSR DET CIRCUIT BREAKER (CB96) – DOES NOT STAY CLOSED OR 28VDC IS NOT PRESENT AT (A76) J1-AA

9-232.1

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-4

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does LSR DET circuit breaker (CB96) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Open CB96. Check for short between (A76) J1-AA and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 11-1520-238-23-2 to troubleshoot laser detecting set.

3. Detach wire at CB96-2. Check for short between (A76) J1-AA and ground.

Does short exist?

- YES Repair shorted between CB96-2 and (A76) J1-AA (TM 55-1500-323-24). Go to paragraph 9-220.
- NO Replace **LSR DET** circuit breaker (CB96) (TM 1-1520-238-23).

4. Check for open between: CB96-1 and CB59-1, CB96-2 and (A76) J1-AA.

Does open exist?

- YES Repair open wire (TM 55-1500-323-24). Go to paragraph 9-220.
- NO Replace **LSR DET** circuit breaker (CB96) (TM 1-1520-238-23).

END OF TASK

**9-233. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 3 – PILOT STATION) –
MAINTENANCE OPERATIONAL CHECK**

9-233

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

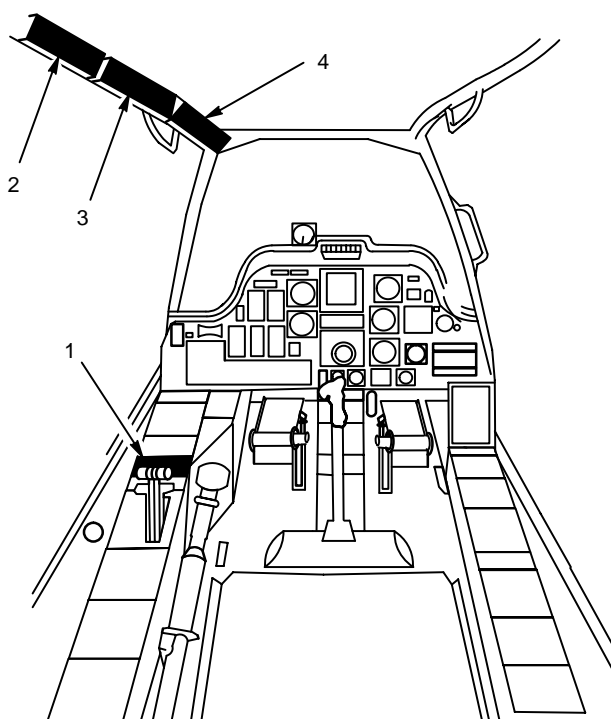
TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-45	EXTERNAL POWER – POWER UP completed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.



1. PILOT ELEC PWR PANEL
2. PILOT AFT CIRCUIT BREAKER PANEL
3. PILOT CENTER CIRCUIT BREAKER PANEL
4. PILOT FORWARD CIRCUIT BREAKER PANEL

M69-243

Figure 9-181. Pilot Station

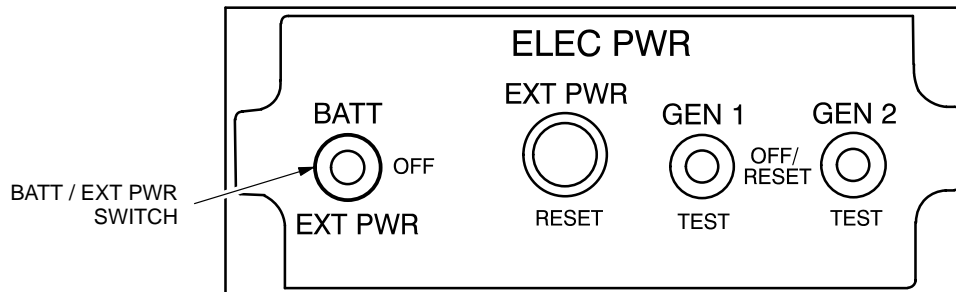
NOTE

- Refer to pilot station (fig. 9-181) for cockpit configuration and equipment.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.

9-233. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 3 – PILOT STATION) – MAINTENANCE OPERATIONAL CHECK (cont)

1. Perform the maintenance operational check as follows:

Task	Result
a. Detach P1, P2 and P4.	
b. Check for short between P4-K and P4-L and ground.	If short exists, go to paragraph 9-235.
c. On pilot ELEC PWR panel (fig. 9-182), set BATT/EXT PWR switch to EXT PWR .	



M69-244

Figure 9-182. Pilot ELEC PWR Panel

- d. Check for 28 VDC at (A402): J4-K and J4-L. If 28 VDC is not present, go to paragraph 9-23 to troubleshoot dc electrical power generation.
- e. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF** and attach P1, P2, and P4.
- f. On pilot circuit breaker panel (fig. 9-183), check that the following circuit breakers are closed:

Circuit Breaker

- MISSION PNVS DC (CB61)
- NAV HARS DC (CB54)
- NAV DPLR (CB82)
- NAV AIR DATA DC (CB69)
- NAV EGI (CB97)
- MISSION FC DC (CB50)
- MISSION RKT ELEX (CB47)
- ASE DC (CB28)
- ECS ICE DET (CB68)
- ECS BLADE DE-ICE CONTR (CB85)
- ECS BLADE DE-ICE (CB3)
- STAB AUTO DC (CB93)
- MISSION EL DC (CB83)
- MISSION DTU (CB98)

9-233. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 3 – PILOT STATION) – MAINTENANCE OPERATIONAL CHECK (cont)

9-233

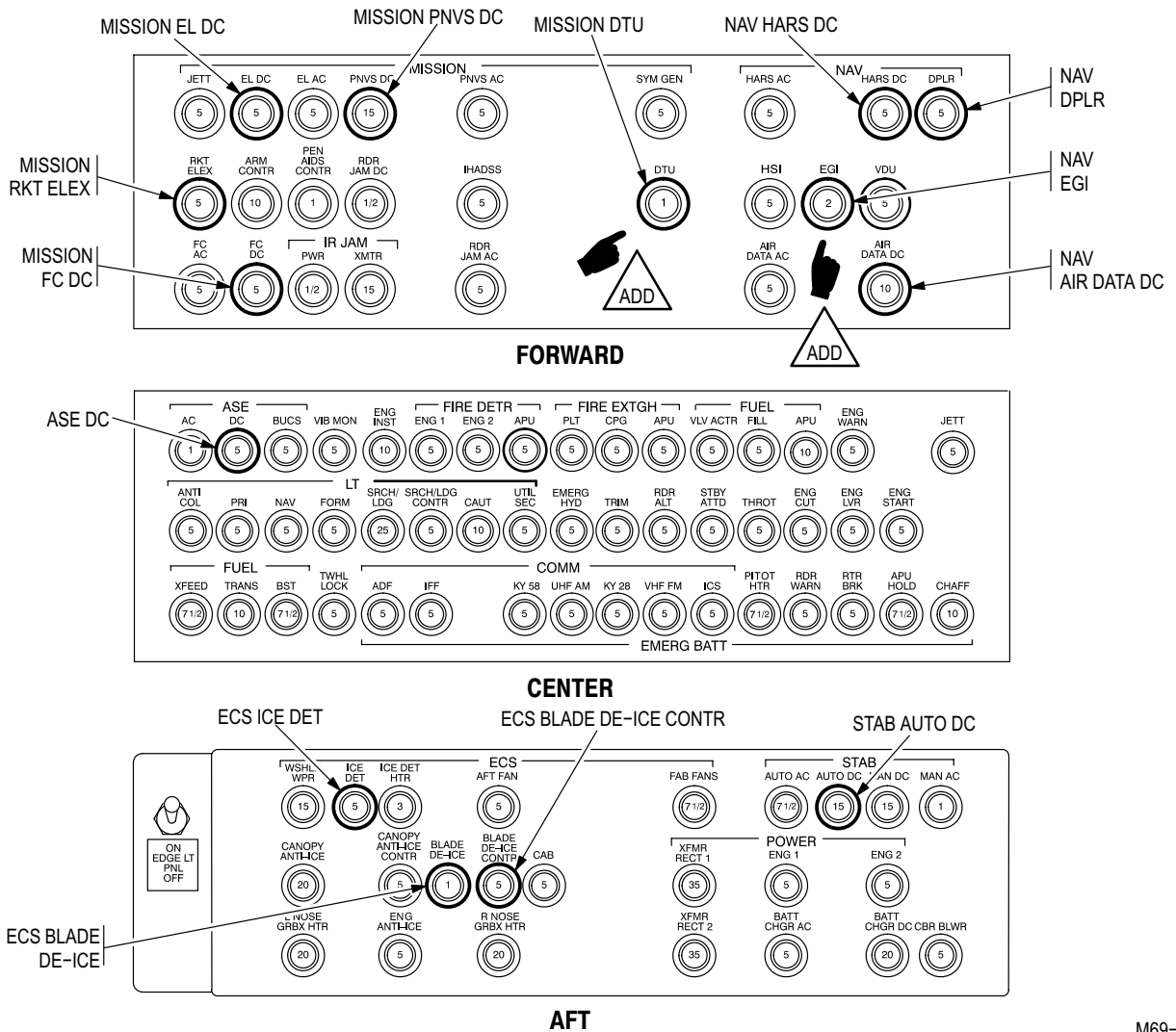


Figure 9-183. Pilot Circuit Breaker Panels

M69-245A

Task	Result
g. On pilot ELEC PWR panel, set BATT/EXT PWR switch to EXT PWR .	
h. Check that circuit breakers listed in step f. remain closed.	<p>If MISSION PNVs DC circuit breaker (CB61) does not stay closed, go to paragraph 9-236.</p> <p>If NAV HARS DC circuit breaker (CB54) does not stay closed, go to paragraph 9-237.</p> <p>If NAV DPLR circuit breaker (CB82) does not stay closed, go to paragraph 9-238.</p> <p>If NAV AIR DATA DC circuit breaker (CB69) does not stay closed, go to paragraph 9-239.</p> <p>If MISSION FC DC circuit breaker (CB50) does not stay closed, go to paragraph 9-240.</p>

**9-233. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 3 – PILOT STATION) –
MAINTENANCE OPERATIONAL CHECK (cont)**

9-233

Task	Result
Step h. (cont)	<p>If MISSION RKT ELEX circuit breaker (CB47) does not stay closed, go to paragraph 9-241.</p> <p>If ASE DC circuit breaker (CB28) does not stay closed, go to paragraph 9-242.</p> <p>If ECS ICE DET circuit breaker (CB68) does not stay closed, go to paragraph 9-243.</p> <p>If ECS BLADE DE-ICE CONTR circuit breaker (CB83) does not stay closed, go to paragraph 9-244.</p> <p>If ECS BLADE DE-ICE circuit breaker (CB85) does not stay closed, go to paragraph 9-245.</p> <p>If STAB AUTO DC circuit breaker (CB3) does not stay closed, go to paragraph 9-246.</p> <p>If MISSION EL DC circuit breaker (CB93) does not stay closed, go to paragraph 9-247.</p> <p>If NAV EGI circuit breaker (CB97) does not stay closed, go to paragraph 9-248A.</p> <p>If MISSION DTU circuit breaker (CB98) does not stay closed, go to paragraph 9-248B.</p>

NOTE

For helicopters with BUCS deactivated, the ASE BUCS circuit breaker shall be open and locked.

- | | |
|--|--|
| i. On helicopters with BUCS activated (ACA), close and check that ASE BUCS circuit breaker stays closed. | If ASE BUCS circuit breaker (CB77) does not stay closed, go to paragraph 9-248. |
| j. On pilot ELEC PWR panel (fig. 9-182), set BATT/EXT PWR switch to OFF and detach P2. | |
| k. On pilot ELEC PWR panel, set BATT/EXT PWR switch to EXT PWR . | |
| l. Check for 28 VDC at P2-k. | If 28 VDC is not present, go to paragraph 9-236. |
| m. Check for 28 VDC at P2-J. | If 28 VDC is not present, go to paragraph 9-239. |
| n. On pilot ELEC PWR panel (fig. 9-182), set BATT/EXT PWR switch to OFF . Attach P2 and detach P1. | |
| o. On pilot ELEC PWR panel, set BATT/EXT PWR switch to EXT PWR . | |
| p. Check for 28 VDC at P1-46. | If 28 VDC is not present, go to paragraph 9-237. |

**9-233. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 3 – PILOT STATION) –
MAINTENANCE OPERATIONAL CHECK (cont)**

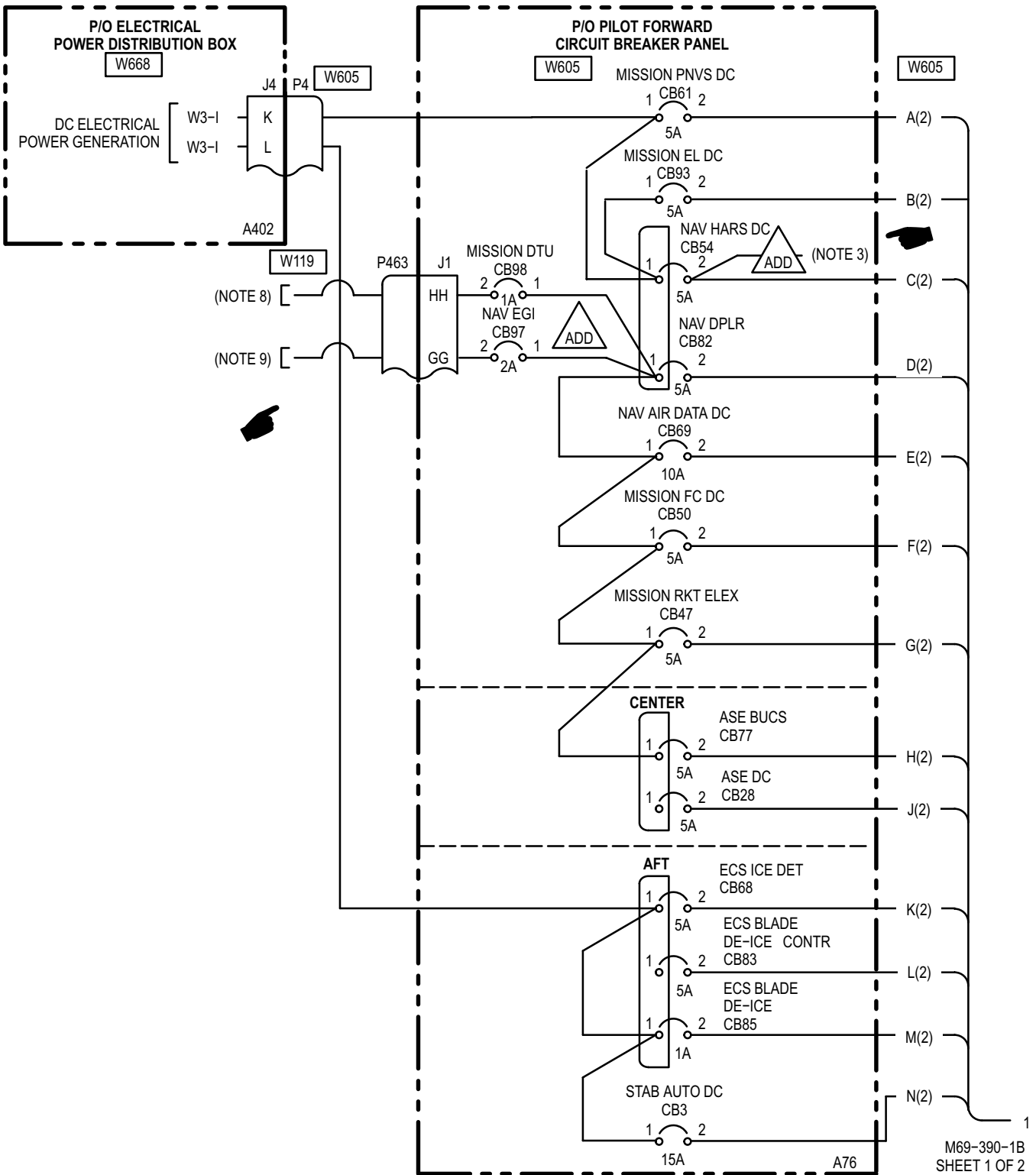
9-233

Task	Result
q. Check for 28 VDC at P1-51.	If 28 VDC is not present, go to paragraph 9-238.
r. Check for 28 VDC at P1-17.	If 28 VDC is not present, go to paragraph 9-240.
s. Check for 28 VDC at P1-27.	If 28 VDC is not present, go to paragraph 9-241.
t. Check for 28 VDC at P1-34.	If 28 VDC is not present, go to paragraph 9-242.
u. Check for 28 VDC at P1-47.	If 28 VDC is not present, go to paragraph 9-243.
v. Check for 28 VDC at P1-14.	If 28 VDC is not present, go to paragraph 9-244.
w. Check for 28 VDC at P1-53.	If 28 VDC is not present, go to paragraph 9-245.
x. Check for 28 VDC at P1-29.	If 28 VDC is not present, go to paragraph 9-247.
y. On helicopters with BUCS activated (ACA), check for 28 VDC at P1-33.	If 28 VDC is not present, go to paragraph 9-248.
z. Attach P1.	

2. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF**.

3. Perform EXTERNAL POWER – POWER DOWN (para 9-46).

9-234. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 3 – PILOT STATION) –
WIRING INTERCONNECT DIAGRAM



9-235. SHORT – EXISTS BETWEEN P4-L OR P4-K AND GROUND

9-235

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-148	All dc essential bus 3 pilot station circuit breakers open



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for short between P4-L and ground.

Does short exist?

YES Go to step 2.
NO Go to step 4.

2. Detach wire at CB68-1. Check for short between P4-L and ground.

Does short exist?

YES Repair shorted wire between P4-L and CB68-1. Go to paragraph 9-233.
NO Go to step 3.

3. Attach CB68 wire. Detach wire at CB85-1. Check for short between P4-L and ground.

Does short exist?

YES Replace bus bar between CB68 and CB85, and check for foreign material (TM 1-1520-238-23).
NO Repair shorted wire between CB85-1 and CB3-1. Go to paragraph 9-233.

4. Detach wires at CB61-1. Check for short between P4-K and ground.

Does short exist?

YES Repair shorted wire between P4-K and CB61-1. Go to paragraph 9-233.
NO Go to step 5.

5. Attach CB61 wire. Detach wire at CB54-1. Check for short between P4-K and ground.

Does short exist?

YES Repair shorted wire between CB61-1 and CB54-1. Go to paragraph 9-233.
NO Go to step 6.

6. Attach CB54 wire. Detach wire at CB82-1. Check for short between P4-K and ground.

Does short exist?

YES Replace bus bar between CB54 and CB82, and check for foreign material (TM 1-1520-238-23).
NO Go to step 7.

7. Attach CB82 wire. Detach wires at CB69-1. Check for short between P4-K and ground.

Does short exist?

YES Repair shorted wire between CB82-1 and CB69-1. Go to paragraph 9-233.
NO Go to step 8.

9-235. SHORT – EXISTS BETWEEN P4-L OR P4-K AND GROUND (cont)

9-235

8. Attach CB69 wire. Detach wires at CB50-1.
Check for short between P4-K and ground.

Does short exist?

YES Repair shorted wire between
 CB69-1 and CB50-1.
 Go to paragraph 9-233.

NO Go to step 9.

9. Attach CB50 wire. Detach wire at CB28-1.
Check for short between P4-K and ground.

Does short exist?

YES Repair shorted wire between
 CB50-1 and CB47-1.
 Go to paragraph 9-233.

NO Replace bus bar between CB28
 and CB77, and check for foreign
 material (TM 1-1520-238-23).

END OF TASK

9-236. MISSION PNVS DC CIRCUIT BREAKER (CB61) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P2-k

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-5855-265-T

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does MISSION PNVS DC circuit breaker (CB61) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Open CB61. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P2-k and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 1-5855-265-T to troubleshoot PNVS.

3. Detach wire at CB61-2. Check for short between P2-k and ground.

Does short exist?

- YES Repair shorted wire between CB61-2 and P2-k. Go to paragraph 9-233.
- NO Replace **MISSION PNVS DC** circuit breaker (CB61) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between: CB61-1 and P4-K, CB61-2 and P2-k.

Does open exist?

- YES Repair open wire. Go to paragraph 9-233.
- NO Replace **MISSION PNVS DC** circuit breaker (CB61) (TM 1-1520-238-23).

END OF TASK

9-237. NAV HARS DC CIRCUIT BREAKER (CB54) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-46

9-237

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does NAV HARS DC circuit breaker (CB54) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.
2. Open CB54. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-46 and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 11-1520-238-23-2 to troubleshoot HARS.
3. Detach wire at CB54-2. Check for short between P1-46 and ground.
Does short exist?
 - YES Repair shorted wire between CB54-2 and P1-46. Go to paragraph 9-233.
 - NO Replace **NAV HARS DC** circuit breaker (CB54) (TM 1-1520-238-23).
4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between: CB54-1 and CB61-1, CB54-2 and P1-46.
Does open exist?
 - YES Repair open wire. Go to paragraph 9-233.
 - NO Replace **NAV HARS DC** circuit breaker (CB54) (TM 1-1520-238-23).

END OF TASK

9-238. NAV DPLR CIRCUIT BREAKER (CB82) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-51

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does NAV DPLR circuit breaker (CB82) stay closed?

YES Go to step 4.
NO Go to step 2.

- Open CB82. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-51 and ground.
Does short exist?

YES Go to step 3.
NO Refer to TM 11-1520-238-23-2 to troubleshoot IFF system.

- Detach wire at CB82-2. Check for short between P1-51 and ground.

Does short exist?

YES Repair shorted wire between CB82-2 and P1-51.
Go to paragraph 9-233.

NO Replace **NAV DPLR** circuit breaker (CB82) (TM 1-1520-238-23).

- Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB61-1 and P4-K,
CB61-2 and P2-k.

Does open exist?

YES Go to step 5.

NO Replace **NAV DPLR** circuit breaker (CB82) (TM 1-1520-238-23).

- Check for open between CB82-2 and P1-51.
Does open exist?

YES Repair open wire
Go to paragraph 9-233.

NO Replace bus bar between CB54 and CB82, and check for foreign material (TM 1-1520-238-23).

END OF TASK

9-239. NAV AIR DATA DC CIRCUIT BREAKER (CB69) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P2-J

9-239

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does NAV AIR DATA DC circuit breaker (CB69) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Open CB69. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P2-J and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 9-1230-476-20-2 to troubleshoot air data system.

3. Detach wire at CB69-2. Check for short between P2-J and ground.

Does short exist?

- YES Repair shorted wire between CB69-2 and P2-J. Go to paragraph 9-233.
- NO Replace **NAV AIR DATA DC** circuit breaker (CB69) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between: CB69-1 and CB82-1, CB69-2 and P2-J.

Does open exist?

- YES Repair shorted wire between CB69-2 and P2-J. Go to paragraph 9-233.
- NO Replace **NAV AIR DATA DC** circuit breaker (CB69) (TM 1-1520-238-23).

END OF TASK

9-240. MISSION FC DC CIRCUIT BREAKER (CB50) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-17

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does MISSION FC DC circuit breaker (CB50) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Open CB50. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-17 and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 9-1230-476-20-2 to troubleshoot fire control system.

3. Detach wire at CB50-2. Check for short between P1-17 and ground.

Does short exist?

- YES Repair shorted wire between CB50-2 and P1-17.
Go to paragraph 9-233.
- NO Replace **MISSION FC DC** circuit breaker (CB50) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB50-1 and CB69-1,
CB50-2 and P1-17.

Does open exist?

- YES Repair open wire.
Go to paragraph 9-233.
- NO Replace **MISSION FC DC** circuit breaker (CB50) (TM 1-1520-238-23).

END OF TASK

9-241. MISSION RKT ELEX CIRCUIT BREAKER (CB47) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-27

9-241

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1090-208-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does MISSION RKT ELEX circuit breaker (CB47) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Open CB47. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-27 and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 9-1090-208-23-2 to troubleshoot aerial rocket control system.

3. Detach wire at CB47-2. Check for short between P1-27 and ground.

Does short exist?

- YES Repair shorted wire between CB47-2 and P1-27.
Go to paragraph 9-233.
- NO Replace **MISSION RKT ELEX** circuit breaker (CB47) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB47-1 and CB50-1,
CB47-2 and P1-27.

Does open exist?

- YES Repair open wire.
Go to paragraph 9-233.
- NO Replace **MISSION RKT ELEX** circuit breaker (CB47) (TM 1-1520-238-23).

END OF TASK

9-242. ASE DC CIRCUIT BREAKER (CB28) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-34

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-7



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does ASE DC circuit breaker (CB28) stay closed.

YES Go to step 4.
NO Go to step 2.

2. Open CB28. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-34 and ground.
Does short exist?

YES Go to step 3.
NO Refer to TM 1-1520-238-T-7 to troubleshoot DASE.

3. Detach wire at CB28-2. Check for short between P1-34 and ground.

Does short exist?

YES Repair shorted wire between CB28-2 and P1-34.
Go to paragraph 9-233.
NO Replace **ASE DC** circuit breaker (CB28) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB77-1 and P1-34.

Does open exist?

YES Go to step 5.
NO Replace **ASE DC** circuit breaker (CB28) (TM 1-1520-238-23).

5. Check for open between CB28-2 and P1-34.

Does open exist?

YES Repair open wire.
Go to paragraph 9-233.
NO Replace bus bar between CB28 and CB77, and check for foreign material (TM 1-1520-238-23).

END OF TASK

9-243. ECS ICE DET CIRCUIT BREAKER (CB68) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-47

9-243

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does ECS ICS DET circuit breaker (CB68) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. Open CB68. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-47 and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 1-1520-238-T-8 to troubleshoot rotor blade de-ice system.

3. Detach wire at CB68-2. Check for short between P1-47 and ground.
Does short exist?
 - YES Repair shorted wire between CB68-2 and P1-47.
Go to paragraph 9-233.
 - NO Replace **ECS ICS DET** circuit breaker (CB68)
(TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB68-1 and P4-L,
CB68-2 and P1-47.
Does open exist?
 - YES Repair open wire.
Go to paragraph 9-233.
 - NO Replace **ECS ICE DET** circuit breaker (CB68)
(TM 1-1520-238-23).

END OF TASK

9-244. ECS BLADE DE-ICE CONTR CIRCUIT BREAKER (CB83) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-14 **9-244**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does ECS BLADE DE-ICE CONTR circuit breaker (CB83) stay closed?

YES	Go to step 4.
NO	Go to step 2.

2. Open CB83. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-14 and ground.
Does short exist?

YES	Go to step 3.
NO	Refer to TM 1-1520-238-T-8 to troubleshoot rotor blade de-ice system.

3. Detach wire at CB83-2. Check for short between P1-14 and ground.
Does short exist?

YES	Repair shorted wire between CB83-2 and P1-14. Go to paragraph 9-233.
NO	Replace ECS BLADE DE-ICE CONTR circuit breaker (CB83) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB68-1 and P1-14.
Does open exist?

YES	Repair open wire. Go to paragraph 9-233.
NO	Replace ECS BLADE DE-ICE CONTR circuit breaker (CB83) (TM 1-1520-238-23).

5. Check for open between CB83-2 and P1-14.
Does open exist?

YES	Repair open wire. Go to paragraph 9-233.
NO	Replace bus bar between CB68 and CB85, check for foreign material (TM 1-1520-238-23).

END OF TASK

9-245. ECS BLADE DE-ICE CIRCUIT BREAKER (CB85) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-53

9-245

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-T-8
TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does ECS BLADE DE-ICE circuit breaker (CB85) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. Open CB85. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-53 and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 1-1520-238-T-8 to troubleshoot rotor blade de-ice system.

3. Detach wire at CB85-2. Check for short between P1-53 and ground.
Does short exist?
 - YES Repair shorted wire between CB85-2 and P1-53. Go to paragraph 9-233.
 - NO Replace **ECS BLADE DE-ICE** circuit breaker (CB85) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB68-1 and P1-53.
Does open exist?
 - YES Go to step 5.
 - NO Replace **ECS BLADE DE-ICE** circuit breaker (CB85) (TM 1-1520-238-23).

5. Check for open between CB85-2 and P1-53.
Does open exist?
 - YES Repair open wire. Go to paragraph 9-233.
 - NO Replace bus bar between CB85 and CB68, check for foreign material (TM 1-1520-238-23).

END OF TASK

9-246. STAB AUTO DC CIRCUIT BREAKER (CB3) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P2-f **9-246**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-7



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **ELEC PWR** panel, place **BATT/EXT PWR** switch to **EXT PWR**.
Does STAB AUTO DC circuit breaker (CB3) stay closed?

YES Go to step 4.
NO Go to step 2.

- Open CB3. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P2-f and ground.
Does short exist?

YES Go to step 3.
NO Refer to TM 1-1520-238-T-7 to troubleshoot stabilator.

- Detach wire at CB3-2. Check for short between P2-f and ground.

Does short exist?

YES Repair shorted wire between CB3-2 and P2-f.
Go to paragraph 9-233.

NO Replace **STAB AUTO DC** circuit breaker (CB3)
(TM 1-1520-238-23).

- Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB3-1 and CB85-1
CB3-2 and P2-f.

Does open exist?

YES Repair open wire.
Go to paragraph 9-233.

NO Replace **STAB AUTO DC** circuit breaker (CB3)
(TM 1-1520-238-23).

END OF TASK

9-247. MISSION EL DC CIRCUIT BREAKER (CB93) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-29

9-247

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1090-208-23-2

3. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB93-1 and CB54-1,
CB93-2 and P1-29.
Does open exist?

YES	Repair open wire. Go to paragraph 9-233.
NO	Replace MISSION EL DC circuit breaker (CB93) (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does MISSION EL DC circuit breaker (CB93) stay closed?

YES	Go to step 3.
NO	Go to step 2.

2. Open CB93. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-29 and ground.
Does short exist?

YES	Repair shorted wire between CB93-2 and P1-29. Go to paragraph 9-233.
NO	Refer to TM 9-1090-208-23-2 to troubleshoot external stores control system.

END OF TASK

9-248. ASE BUCS CIRCUIT BREAKER (CB77) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-33

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-7



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does ASE BUCS circuit breaker (CB77) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. Open CB77. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-33 and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 1-1520-238-T-7 to troubleshoot DASE.

3. Detach wire at CB77-2. Check for short between P1-33 and ground.
Does short exist?
 - YES Repair shorted wire between CB77-2 and P1-33.
Go to paragraph 9-233.
 - NO Replace **ASE BUCS** circuit breaker (CB77)
(TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB47-1 and CB77-1.
Does open exist?
 - YES Repair open wire.
Go to paragraph 9-233.
 - NO Go to step 5.

5. Check for open between CB28-2 and P1-34.
Does open exist?
 - YES Repair open wire.
Go to paragraph 9-233.
 - NO Replace **ASE BUCS** circuit breaker (CB77)
(TM 1-1520-238-23).

END OF TASK

9-248A. NAV EGI CIRCUIT BREAKER (CB97) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT J1-GG

9-248A

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does NAV EGI circuit breaker (CB97) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. Open CB97. Set **BATT/EXT PWR** switch to **OFF**. Check for short between J1-GG and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 11-1520-238-23-2 to troubleshoot EGI.

3. Detach wire at CB97-2. Check for short between J1-GG and ground.
Does short exist?
 - YES Repair shorted wire between CB97-2 and J1-GG. Go to paragraph 9-233.
 - NO Replace **NAV EGI** circuit breaker (CB97) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB97-1 and CB82-1.
Does open exist?
 - YES Repair open wire. Go to paragraph 9-233.
 - NO Go to step 5.

5. Check for open between CB97-2 and J1-GG.
Does open exist?
 - YES Repair open wire. Go to paragraph 9-233.
 - NO Replace **NAV EGI** circuit breaker (CB97) (TM 1-1520-238-23).

END OF TASK

9-248B. MISSION DTU CIRCUIT BREAKER (CB98) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT J1-HH

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does MISSION DTU circuit breaker (CB98) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. Open CB98. Set **BATT/EXT PWR** switch to **OFF**. Check for short between J1-HH and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 11-1520-238-23-2 to troubleshoot DTU.

3. Detach wire at CB98-2. Check for short between J1-HH and ground.
Does short exist?
 - YES Repair shorted wire between CB98-2 and J1-HH. Go to paragraph 9-233.
 - NO Replace **MISSION DTU** circuit breaker (CB98) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB98-1 and CB82-1.
Does open exist?
 - YES Repair open wire. Go to paragraph 9-233.
 - NO Go to step 5.

5. Check for open between CB98-2 and J1-HH.
Does open exist?
 - YES Repair open wire. Go to paragraph 9-233.
 - NO Replace **MISSION DTU** circuit breaker (CB98) (TM 1-1520-238-23).

END OF TASK

9-249. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 3 – CPG STATION) – MAINTENANCE OPERATIONAL CHECK

9-249

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

- 68X Armament/Electrical Systems Repairer
- One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

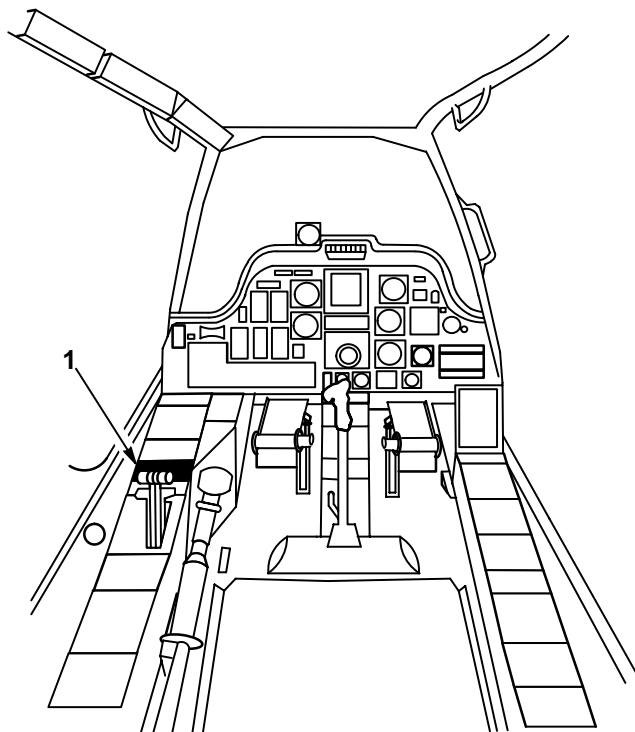
<u>Ref</u>	<u>Condition</u>
Paragraph 9-45	EXTERNAL POWER – POWER UP completed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

NOTE

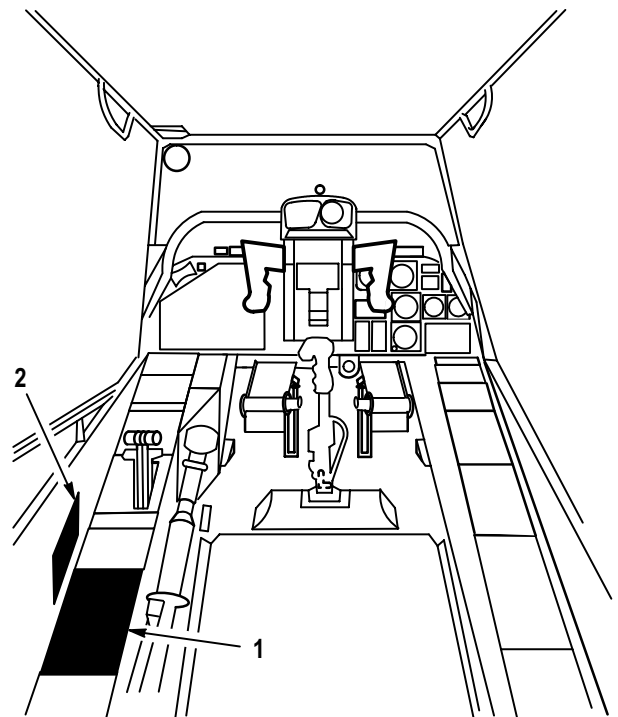
Refer to pilot station (fig. 9-184) and CPG station (fig. 9-185) for cockpit configuration and equipment.



1. PILOT ELEC PWR PANEL

M69-234

Figure 9-184. Pilot Station



1. CPG CIRCUIT BREAKER PANEL 1
2. CPG CIRCUIT BREAKER PANEL 2

M69-235

Figure 9-185. CPG Station

WARNING

Avoid touching circuit breaker panels to airframe, or crossing circuit breaker terminals with any tools. Failure to do so could result in death or serious injury.

NOTE

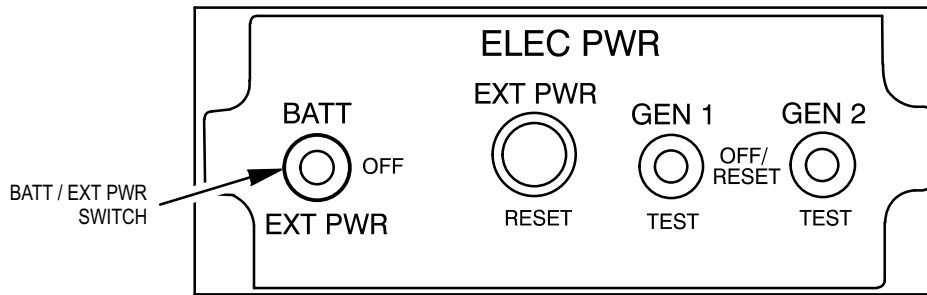
If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.

1. Perform the maintenance operational check as follows:

Task	Result
<ol style="list-style-type: none"> a. On CPG circuit breaker panel 1 (fig. 9-187), close AWS AWS DC (CB12) circuit breaker. b. On pilot ELEC PWR panel (fig. 9-186), set BATT/EXT PWR switch to EXT PWR. c. On CPG circuit breaker panel 1 (fig. 9-187), check that the following circuit breaker panels are closed: FC FCC DC (CB4), AWS AWS DC (CB12), MSL DC ELEC (CB17), MUX CPG (CB15), MUX L PYLON OUTBD (CB2), MUX L PYLON INBD (CB1), MUX R PYLON INBD (CB5), MUX R PYLON OUTBD (CB6), MUX FAB L (CB10), MUX FAB R (CB9). 	<p>If FC FCC DC circuit breaker (CB4) does not stay closed, go to paragraph 9-251.</p> <p>If AWS AWS DC circuit breaker (CB12) does not stay closed, go to paragraph 9-252.</p> <p>If MSL DC ELEC circuit breaker (CB17) does not stay closed, go to paragraph 9-253.</p> <p>If MUX CPG circuit breaker (CB15) does not stay closed, go to paragraph 9-254.</p> <p>If MUX L PYLON OUTBD circuit breaker (CB2) does not stay closed, go to paragraph 9-255.</p> <p>If MUX R PYLON INBD circuit breaker (CB1) does not stay closed, go to paragraph 9-256.</p> <p>If MUX R PYLON INBD circuit breaker (CB5) does not stay closed, go to paragraph 9-257.</p> <p>If MUX R PYLON OUTBD circuit breaker (CB6) does not stay closed, go to paragraph 9-258.</p>

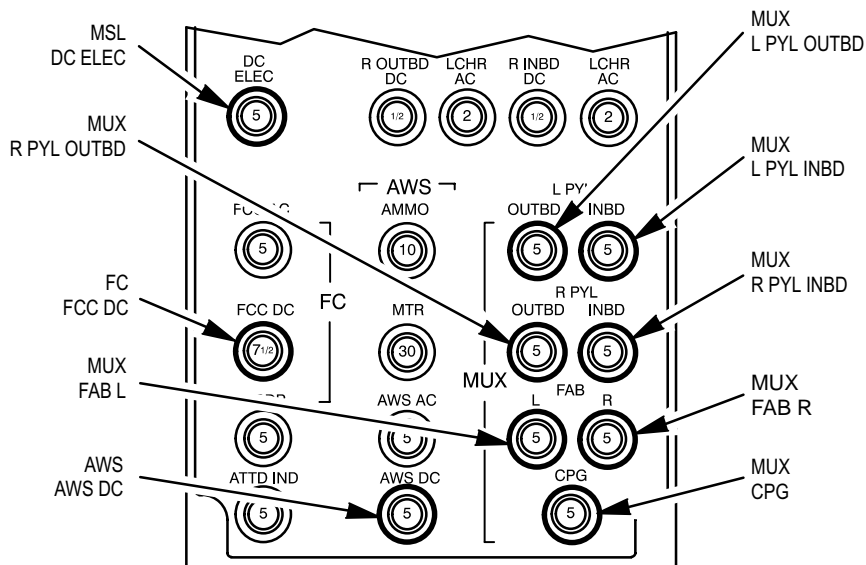
9-249. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 3 – CPG STATION) – MAINTENANCE OPERATIONAL CHECK (cont)

9-249



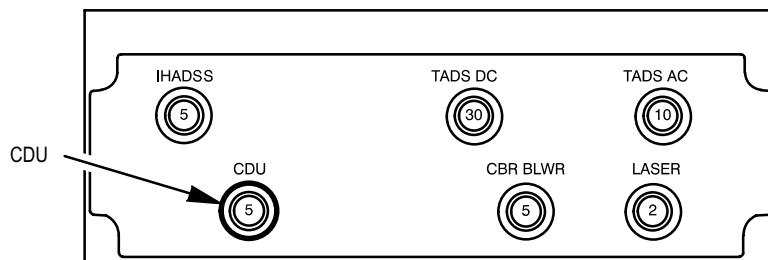
M69-236

Figure 9-186. Pilot ELEC PWR Panel



M69-237

Figure 9-187. CPG Circuit Breaker Panel 1



M69-238

Figure 9-188. CPG Circuit Breaker Panel 2

Task	Result
Step c. (cont)	If MUX FAB R circuit breaker (CB9) does not stay closed, go to paragraph 9-259.
	If MUX FAB L circuit breaker (CB10) does not stay closed, go to paragraph 9-260.

**9-249. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 3 – CPG STATION) –
MAINTENANCE OPERATIONAL CHECK (cont)**

9-249

Task	Result
d. On CPG circuit breaker panel 2 (fig. 9-188), check that CDU (CB6) circuit breaker stays closed.	If CDU circuit breaker (CB6) does not stay closed, go to paragraph 9-261.
e. On pilot ELEC PWR panel (fig. 9-186), set BATT/EXT PWR switch to OFF .	
f. Remove to gain access, CPG circuit breaker panel 1 (TM 1-1520-238-23).	
g. On pilot ELEC PWR panel (fig. 9-186), set BATT/EXT PWR switch to EXT PWR .	
h. Check for 28 VDC at P769-A and P769-J.	If 28 VDC is not present, go to paragraph 9-262.
i. On pilot ELEC PWR panel, set BATT/EXT PWR switch to OFF .	
j. Check for continuity between (A77): J4-J and J2-32.	If continuity does not exist, go to paragraph 9-251.
k. Check for continuity between (A77): J4-J and J2-24, J4-J and J2-33.	If continuity does not exist, go to paragraph 9-252.
l. Check for continuity between (A77): J4-J and J2-20, J4-J and J2-21.	If continuity does not exist, go to paragraph 9-253.
m. Check for continuity between (A77): J4-A and J2-7.	If continuity does not exist, go to paragraph 9-254.
n. Check for continuity between (A77): J4-A and J2-11.	If continuity does not exist, go to paragraph 9-255.
o. Check for continuity between (A77): J4-A and J2-9.	If continuity does not exist, go to paragraph 9-256.
p. Check for continuity between (A77): J4-A and J2-8.	If continuity does not exist, go to paragraph 9-257.
q. Check for continuity between (A77): J4-A and J2-10.	If continuity does not exist, go to paragraph 9-258.
r. Check for continuity between (A77): J4-A and J2-14.	If continuity does not exist, go to paragraph 9-260.
s. Check for continuity between (A77): J4-A and J2-13.	If continuity does not exist, go to paragraph 9-259.

**9-249. CIRCUIT PROTECTION SYSTEM (DC ESSENTIAL BUS 3 – CPG STATION) –
MAINTENANCE OPERATIONAL CHECK (cont)**

9-249

2. Install CPG circuit breaker panel 1 (TM 1-1520-238-23).
3. Perform EXTERNAL POWER – POWER DOWN (para 9-46).

END OF TASK

9-529

9-251. FC FCC DC CIRCUIT BREAKER (CB4) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J4–J AND J2–32

9-251

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1090-208-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does FC FCC DC circuit breaker (CB4) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A77)J2-32 and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 9-1090-208-23-2 to troubleshoot multiplex subsystem.

3. Detach wire at CB4-2. Check for short between (A77)J2-32 and ground.

Does short exist?

- YES Repair shorted wire between CB4-2 and (A77)J2-32. Go to paragraph 9-249.
- NO Replace **FC FCC DC** circuit breaker (CB4) (TM 1-1520-238-23).

4. Open CB4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between: CB4-1 and (A77)J4-J, CB4-2 and (A77)J2-32.

Does open exist?

- YES Repair open wire. Go to paragraph 9-249.
- NO Replace **FC FCC DC** circuit breaker (CB4) (TM 1-1520-238-23).

END OF TASK

9-252. AWS AWS DC CIRCUIT BREAKER (CB12) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J4-J AND J2-24, J4-J AND J2-33 **9-252**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 55-1520-238-23
TM 9-1090-208-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does AWS AWS DC circuit breaker (CB12) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A77):
J2-24 and ground,
J2-33 and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 9-1090-208-23-2 to troubleshoot area weapon system.

3. Detach wire at CB12-2. Check for short between (A77):
J2-24 and ground,
J2-33 and ground.
Does short exist?
 - YES Repair shorted wire.
Go to paragraph 9-249.
 - NO Replace **AWS AWS DC** circuit breaker (CB12)
(TM 1-1520-238-23).

4. Open CB12. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB12-1 and CB4-1,
CB12-2 and (A77)J2-24,
CB12-2 and (A77)J2-33.
Does open exist?
 - YES Repair open wire.
Go to paragraph 9-249.
 - NO Replace **AWS AWS DC** circuit breaker (CB12)
(TM 1-1520-238-23).

END OF TASK

9-253. MSL DC ELEC CIRCUIT BREAKER (CB17) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J4-J AND J2-20, J4-J AND J2-21 **9-253**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1427-475-20

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does MSL DC ELEC circuit breaker (CB17) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A77)J2-20 and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 9-1427-475-20 to troubleshoot hellfire missile equipment.

3. Detach wire at CB17-2. Check for short between (A77)J2-20 and ground.

Does short exist?

- YES Repair shorted wire.
Go to paragraph 9-249.
- NO Replace **MSL DC ELEC** circuit breaker (CB17) (TM 1-1520-238-23).

4. Open CB17. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:

CB17-1 and CB12-1,
CB17-2 and (A77)J2-20,
CB17-2 and (A77)J2-21.

Does open exist?

- YES Repair open wire.
Go to paragraph 9-249.
- NO Replace **MSL DC ELEC** circuit breaker (CB17) (TM 1-1520-238-23).

END OF TASK

9-254. MUX CPG CIRCUIT BREAKER (CB15) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J4-A AND J2-7 **9-254**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does MUX CPG circuit breaker (CB15) stay closed?

- YES Go to step 4.
- NO Go to step 2.

- Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A77)J2-7 and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 9-1230-476-20-2 to troubleshoot multiplex subsystem.

- Detach wire at CB15-2. Check for short between (A77)J2-7 and ground.

Does short exist?

- YES Repair shorted wire between CB15-2 and (A77)J2-7. Go to paragraph 9-249.
- NO Replace **MUX CPG** circuit breaker (CB15) (TM 1-1520-238-23).

- Open CB15. Set **BATT/EXT PWR** switch to **OFF**. Check for open between: CB15-1 and (A77)J4-A, CB15-2 and (A77)J2-7.

Does open exist?

- YES Repair open wire. Go to paragraph 9-249.
- NO Replace **MUX CPG** circuit breaker (CB15) (TM 1-1520-238-23).

END OF TASK

9-255. MUX L PYL OUTBD CIRCUIT BREAKER (CB2) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J4-A AND J2-11

9-255

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does MUX L PYL OUTBD circuit breaker (CB2) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A77)J2-11 and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 9-1230-476-20-2 to troubleshoot multiplex subsystem.

3. Detach wire at CB2-2. Check for short between (A77)J2-32 and ground.
Does short exist?
 - YES Repair shorted wire between CB2-2 and (A77)J2-11. Go to paragraph 9-249.
 - NO Replace **MUX L PYL OUTBD** circuit breaker (CB2) (TM 1-1520-238-23).

4. Open CB2. Set **BATT/EXT PWR** switch to **OFF**. Check for open between: CB2-1 and CB15-1, CB2-2 and (A77)J2-11.
Does open exist?
 - YES Repair open wire. Go to paragraph 9-249.
 - NO Replace **MUX L PYL OUTBD** circuit breaker (CB2) (TM 1-1520-238-23).

END OF TASK

9-256. MUX L PYL INBD CIRCUIT BREAKER (CB1) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J4-A AND J2-9

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does MUX L PYL INBD circuit breaker (CB1) stay closed?

YES	Go to step 4.
NO	Go to step 2.

2. Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A77)J2-9 and ground.
Does short exist?

YES	Go to step 3.
NO	Refer to TM 9-1230-476-20-2 to troubleshoot multiplex subsystem.

3. Detach wire at CB1-2. Check for short between (A77)J2-9 and ground.
Does short exist?

YES	Repair shorted wire between CB1-2 and (A77)J2-9. Go to paragraph 9-249.
NO	Replace MUX L PYL INBD circuit breaker (CB1) (TM 1-1520-238-23).

4. Open CB1. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB1-2 and (A77)J2-9.
Does open exist?

YES	Repair open wire. Go to paragraph 9-249.
NO	Go to step 5.

5. Check for open between J4-A and CB15-1.
Does open exist?

YES	Repair open wire. Go to paragraph 9-249.
NO	Go to step 6.

6. Check for open between CB15-1 and CB2-1.
Does open exist?

YES	Repair open wire. Go to paragraph 9-249.
NO	Go to step 7.

7. Check for open between CB2-1 and CB1-1.
Does open exist?

YES	Replace bus bar between CB2 and CB1, and check for foreign material (TM 1-1520-238-23).
NO	Replace MUX L PYL INBD circuit breaker (CB1) (TM 1-1520-238-23).

END OF TASK

9-257. MUX R PYL INBD CIRCUIT BREAKER (CB5) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J4-A AND J2-8

9-257

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does MUX R PYL INBD circuit breaker (CB5) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A77)J2-8 and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 9-1230-476-20-2 to troubleshoot multiplex subsystem.

3. Detach wire at CB5-2. Check for short between (A77)J2-8 and ground.

Does short exist?

- YES Repair shorted wire between CB5-2 and (A77)J2-8. Go to paragraph 9-249.
- NO Replace **MUX R PYL INBD** circuit breaker (CB5) (TM 1-1520-238-23).

4. Open CB5. Set **BATT/EXT PWR** switch to **OFF**. Check for open between: CB5-1 and CB1-1, CB5-2 and (A77)J2-8.

Does open exist?

- YES Repair open wire Go to paragraph 9-249.
- NO Replace **MUX R PYL INBD** circuit breaker (CB5) (TM 1-1520-238-23).

END OF TASK

9-258. MUX R PYL OUTBD CIRCUIT BREAKER (CB6) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J4-A AND J2-10 **9-258**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does MUX R PYL OUTBD circuit breaker (CB6) stay closed?

YES	Go to step 4.
NO	Go to step 2.

2. Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A77)J2-10 and ground.
Does short exist?

YES	Go to step 3.
NO	Refer to TM 9-1230-476-20-2 to troubleshoot multiplex subsystem.

3. Detach wire at CB6-2. Check for short between (A77)J2-10 and ground.
Does short exist?

YES	Repair shorted wire between CB6-2 and (A77)J2-10. Go to paragraph 9-249.
NO	Replace MUX R PYL OUTBD circuit breaker (CB6) (TM 1-1520-238-23).

4. Open CB6. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB6-2 and (A77)J2-10.
Does open exist?

YES	Repair open wire. Go to paragraph 9-249.
NO	Go to step 5.

5. Check for open between J4-A and CB15-1.
Does open exist?

YES	Repair open wire. Go to paragraph 9-249.
NO	Go to step 6.

6. Check for open between CB15-1 and CB2-1.
Does open exist?

YES	Repair open wire. Go to paragraph 9-249.
NO	Go to step 7.

7. Check for open between CB2-1 and CB1-1.
Does open exist?

YES	Replace bus bar between CB2 and CB1, and check for foreign material (TM 1-1520-238-23).
NO	Go to step 8.

8. Check for open between CB1-1 and CB5-1.
Does open exist?

YES	Repair open wire. Go to paragraph 9-249.
NO	Go to step 9.

9-258. MUX R PYL OUTBD CIRCUIT BREAKER (CB6) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J4-A AND J2-10 (cont) (cont)

9-258

9. Check for open between CB5-1 and CB6-1.

Does open exist?

- | | |
|-----|---|
| YES | Replace bus bar between CB5 and CB6, and check for foreign material (TM 1-1520-238-23). |
| NO | Replace MUX R PYL INBD circuit breaker (CB6) (TM 1-1520-238-23). |

END OF TASK

9-259. MUX FAB R CIRCUIT BREAKER (CB9) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J4-A AND J2-13

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does MUX FAB R circuit breaker (CB9) stay closed?

YES Go to step 4.
NO Go to step 2.

- Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A77)J2-13 and ground.
Does short exist?

YES Go to step 3.
NO Refer to TM 9-1230-476-20-2 to troubleshoot multiplex system.

- Detach wire at CB9-2. Check for short between (A77)J2-13 and ground.

Does short exist?

YES Repair shorted wire between CB9-2 and (A77)J2-13. Go to paragraph 9-249.
NO Replace **MUX FAB R** circuit breaker (CB9) (TM 1-1520-238-23).

- Open CB9. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB10-1 and (A77)J2-13.

Does open exist?

YES Go to step 5.
NO Replace **MUX FAB R** circuit breaker (CB9) (TM 1-1520-238-23).

- Check for open between CB9-2 and (A77)J2-13.
Does open exist?

YES Repair open wire. Go to paragraph 9-249.
NO Replace bus bar between CB9 and CB10, and check for foreign material (TM 1-1520-238-23).

END OF TASK

9-260. MUX FAB L CIRCUIT BREAKER (CB10) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J4-A AND J2-14

9-260

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does MUX FAB L circuit breaker (CB10) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A77)J2-14 and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 9-1230-476-20-2 to troubleshoot multiplex subsystem.

3. Detach wire at CB10-2. Check for short between (A77)J2-14 and ground.
Does short exist?
 - YES Repair shorted wire between CB10-2 and (A77)J2-14. Go to paragraph 9-249.
 - NO Replace **MUX FAB L** circuit breaker (CB10) (TM 1-1520-238-23).

4. Open CB10. Set **BATT/EXT PWR** switch to **OFF**. Check for open between: CB10-1 and CB6-1, CB10-2 and (A77)J2-14.
Does open exist?
 - YES Repair open wire. Go to paragraph 9-249.
 - NO Replace **MUX FAB L** circuit breaker CB10 (TM 1-1520-238-23).

END OF TASK

9-261. CDU CIRCUIT BREAKER (CB6) – DOES NOT STAY CLOSED

9-261

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23
 TM 11-1520-238-23-2

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-148	All dc essential bus 2 pilot station circuit breakers open

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for short between P1-J and ground.

Does short exist?

YES	Go to step 2.
NO	Refer to TM 11-1520-238-23-2 to troubleshoot navigation instruments.

2. Detach wire at CB6-2. Check for short between P1-J and ground.

Does short exist?

YES	Repair shorted wire between CB6-2 and P1-J. Go to paragraph 9-249.
NO	Replace CDU circuit breaker (CB6) (TM 1-1520-238-23).

END OF TASK

9-262. 28 VDC – IS NOT PRESENT AT P769-A AND P769-J

9-262

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-148	All dc essential bus 3 pilot station circuit breakers open



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**. Check for 28 VDC at P769-A.

Is voltage present?

- YES Go to step 15.
- NO Go to step 2.

2. Check for 28 VDC at (A402)J32-J.

Is voltage present?

- YES Repair open wire between P461-J and P769-A. Go to paragraph 9-249.
- NO Go to step 3.

3. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P461-J and ground.

Does short exist?

- YES Go to step 4.
- NO Go to paragraph 9-23 to troubleshoot dc electrical power generation.

4. Check for short between (A77)J4-A and ground.

Does short exist?

- YES Go to step 5.
- NO Repair shorted wire between P461-J and P769-A. Go to paragraph 9-249.

5. Detach wire at CB15-1. Check for short between (A77)J4-A and ground.

Does short exist?

- YES Repair shorted wire between CB15-1 and (A77)J4-A. Go to paragraph 9-249.
- NO Go to step 6.

6. Check for short between CB15-1 and ground.

Does short exist?

- YES Replace **MUX CPG** circuit breaker (CB15) (TM 1-1520-238-23).
- NO Go to step 7.

7. Attach CB15 wire and detach wire at CB2-1. Check for short between (A77)J4-A and ground.

Does short exist?

- YES Repair shorted wire between CB2-1 and CB15-1. Go to paragraph 9-249.
- NO Go to step 8.

9-262. 28 VDC – IS NOT PRESENT AT P769-A AND P769-J (cont)

9-262

8. Detach wire at CB1-1. Check for short between CB2-1 and ground.
Does short exist?
- | | |
|-----|----------------|
| YES | Go to step 9. |
| NO | Go to step 10. |
9. Remove bus bar between CB1 and CB2. Check for short between CB1 and ground.
Does short exist?
- | | |
|-----|---|
| YES | Replace shorted MUX L PYL INBD circuit breaker (CB1). |
| NO | Replace shorted MUX L PYL OUTBD circuit breaker (CB2). |
10. Attach CB2 and CB1 wire. Detach wire at CB5-1. Check for short between (A77)J4-A and ground.
Does short exist?
- | | |
|-----|--|
| YES | Repair shorted wire between CB1-1 and CB5-1.
Go to paragraph 9-249. |
| NO | Go to step 11. |
11. Detach wire at CB6-1. Check for short between CB5-1 and ground.
Does short exist?
- | | |
|-----|----------------|
| YES | Go to step 12. |
| NO | Go to step 13. |
12. Remove bus bar between CB5 and CB6. Check for short between CB5 and ground.
Does short exist?
- | | |
|-----|---|
| YES | Replace MUX R PYL INBD circuit breaker (CB5)
(TM 1-1520-238-23). |
| NO | Replace MUX R PYL OUTBD circuit breaker (CB6)
(TM 1-1520-238-23). |
13. Attach CB5 and CB6 wire. Detach wire at CB10-1. Check for short between (A77)J4-A and ground.
Does short exist?
- | | |
|-----|---|
| YES | Go to step 14. |
| NO | Repair shorted wire between CB10-1 and CB6-1.
Go to paragraph 9-249. |
14. Remove bus bar between CB5 and CB6. Check for short between CB5 and ground.
Does short exist?
- | | |
|-----|--|
| YES | Replace MUX FAB R circuit breaker (CB9)
(TM 1-1520-238-23). |
| NO | Replace MUX FAB L circuit breaker (CB10)
(TM 1-1520-238-23). |
15. Check for 28 VDC at (A402)J32-H.
Is voltage present?
- | | |
|-----|---|
| YES | Repair open wire between P461-H and P769-J.
Go to paragraph 9-249. |
| NO | Go to step 16. |
16. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P461-H and ground.
Does short exist?
- | | |
|-----|--|
| YES | Go to step 17. |
| NO | Go to paragraph 9-23 to troubleshoot dc electrical power generation. |
17. Check for short between (A77)J4-J and ground.
Does short exist?
- | | |
|-----|--|
| YES | Go to step 18. |
| NO | Repair shorted wire between P461-H and P769-J.
Go to paragraph 9-249. |

9-262. 28 VDC – IS NOT PRESENT AT P769-A AND P769-J (cont)

9-262

18. Detach wire at CB4-1. Check for short between (A77)J4-J and ground.

Does short exist?

- | | |
|-----|--|
| YES | Repair shorted wire between (A77)J4-J and CB4-1.
Go to paragraph 9-249. |
| NO | Go to step 19. |

19. Check for short between CB4-1 and ground.

Does short exist?

- | | |
|-----|---|
| YES | Replace FC FCC DC circuit breaker (CB4)
(TM 1-1520-238-23). |
| NO | Go to step 20. |

20. Attach CB4 wire. Detach wire at CB12-1. Check for short between (A77)J4-J and ground.

Does short exist?

- | | |
|-----|---|
| YES | Repair shorted wire between CB4-1 and CB12-1.
Go to paragraph 9-249. |
| NO | Go to step 21. |

21. Check for short between CB12-1.

Does short exist?

- | | |
|-----|---|
| YES | Replace AWS AWS DC circuit breaker (CB12)
(TM 1-1520-238-23). |
| NO | Go to step 22. |

22. Attach CB12 wire. Detach wire at CB17-1. Check for short between (A77)J4-J and ground.

Does short exist?

- | | |
|-----|--|
| YES | Repair shorted wire between CB12-1 and CB17-1.
Go to paragraph 9-249. |
| NO | Replace MSL DC ELEC circuit breaker (CB17)
(TM 1-1520-238-23). |

END OF TASK

9-263. CIRCUIT PROTECTION SYSTEM (DC EMERGENCY BUS – PILOT STATION) – MAINTENANCE OPERATIONAL CHECK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

References:

TM 1-1520-238-23

Equipment Conditions:

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

Ref

Paragraph 9-45

Condition

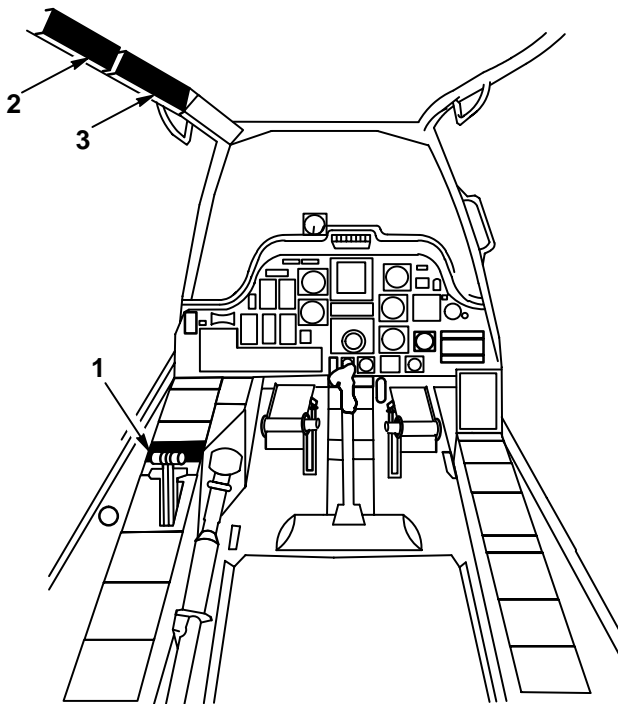
EXTERNAL POWER
– POWER UP completed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

NOTE

- Refer to pilot station (fig. 9-189) for cockpit configuration and equipment.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.



1. PILOT ELEC PWR PANEL
2. PILOT AFT CIRCUIT BREAKER
3. PILOT CENTER CIRCUIT BREAKER PANEL

M69-249

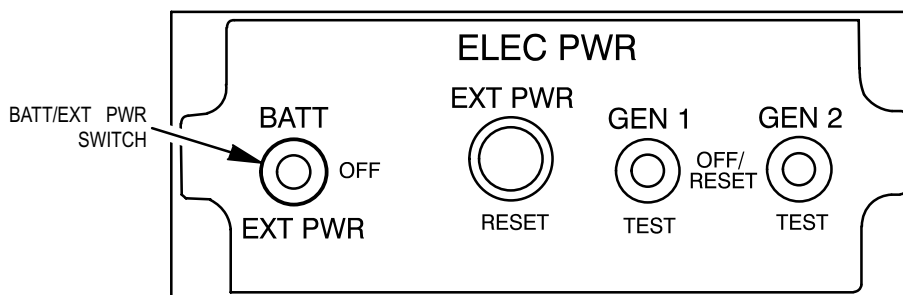
Figure 9-189. Pilot Station

9-263. CIRCUIT PROTECTION SYSTEM (DC EMERGENCY BUS – PILOT STATION) – MAINTENANCE OPERATIONAL CHECK(CONT)

9-263

1. In aft avionics bay, check that CB148 is closed and battery is connected.
2. Perform the maintenance operational check as follows:

Task	Result
a. Detach P1, P5 and P463.	
b. Check for short between : P5-1 and ground, P5-2 and ground, P5-3 and ground.	If short exists, go to paragraph 9-265.
c. Check for continuity between (A76): J1-h and J1-B.	If continuity does not exist, go to paragraph 9-266.
d. Check for continuity between (A76): J1-h and J1-A.	If continuity does not exist, go to paragraph 9-267.
e. Check for continuity between: P5-2 and P5-1, P5-2 and P5-3.	If continuity does not exist, go to paragraph 9-268.
f. Check for continuity between P5-2 and P5-4.	If continuity does not exist, go to paragraph 9-269.
g. On pilot ELEC PWR panel (fig. 9-190), set BATT/EXT PWR switch in EXT PWR .	



M69-250

Figure 9-190. Pilot ELEC PWR Panel

- | | |
|--|---|
| <ol style="list-style-type: none"> h. Check for 28 VDC at (A402):
J29-1,
J29-2,
J29-3. i. Check for 28 VDC at (A76)J1-h. j. On pilot ELEC PWR panel, set BATT/EXT PWR switch in OFF. | <p>If 28 VDC is not present, go to paragraph 9-23 to troubleshoot dc electrical power generation.</p> <p>If 28 VDC is not present, go to paragraph 9-266.</p> |
|--|---|

9-263. CIRCUIT PROTECTION SYSTEM (DC EMERGENCY BUS – PILOT STATION) – MAINTENANCE OPERATIONAL CHECK(CONT)

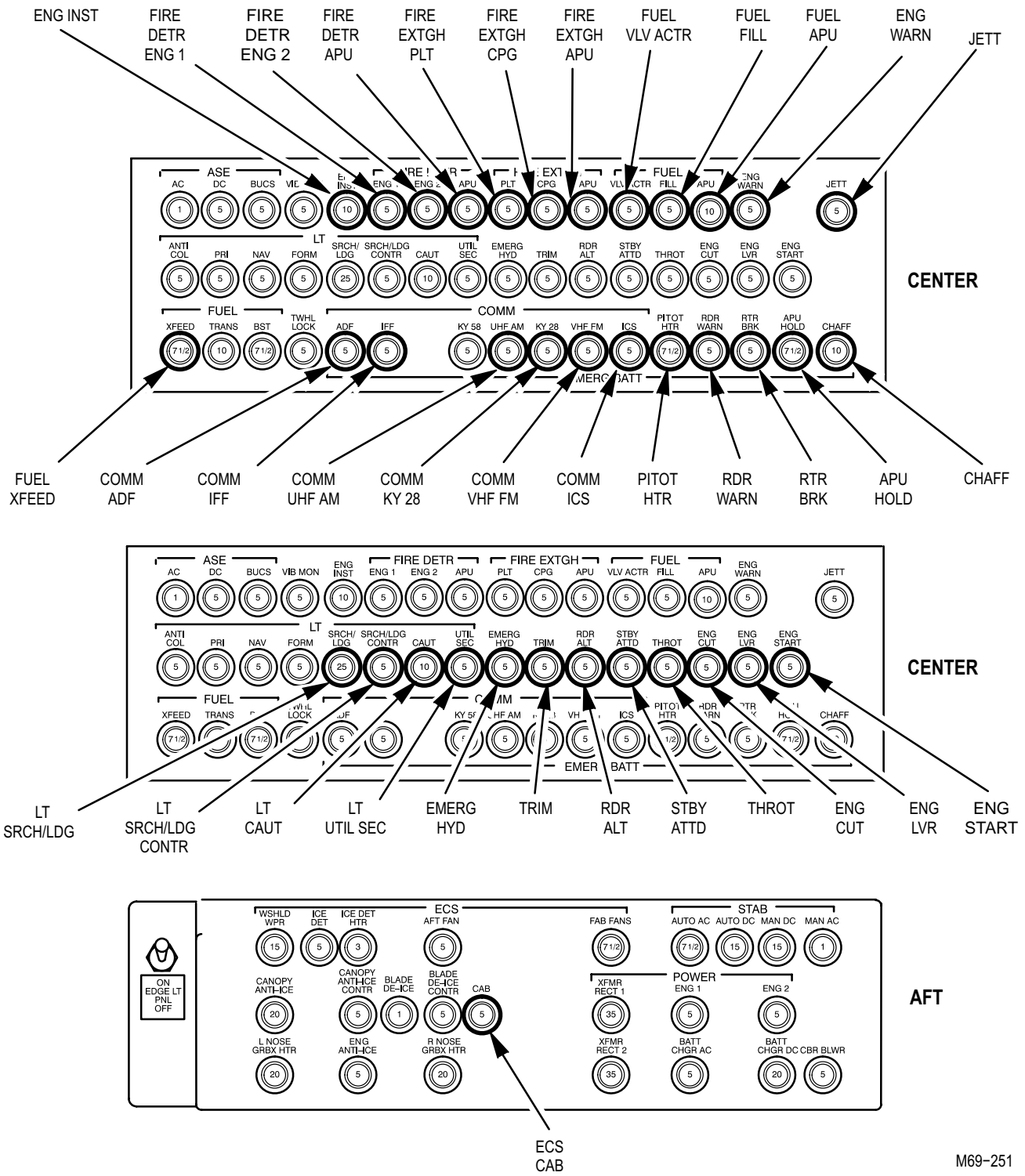


Figure 9-191. Pilot Circuit Breaker Panels

**9-263. CIRCUIT PROTECTION SYSTEM (DC EMERGENCY BUS – PILOT STATION) –
MAINTENANCE OPERATIONAL CHECK(CONT)**

9-263

Task	Result
k. Attach P1, P5, and P463. Check that all pilot emergency battery circuit breakers are closed.	
l. On pilot ELEC PWR panel, set BATT/EXT PWR switch in EXT PWR .	
m. Check that all pilot dc emergency bus circuit breakers (fig. 9-191) remain closed.	<p>If JETT circuit breaker (CB34) does not stay closed, go to paragraph 9-270.</p> <p>If ENG WARN circuit breaker (CB52) does not stay closed, go to paragraph 9-271.</p> <p>If FUEL APU circuit breaker (CB9) does not stay closed, go to paragraph 9-272.</p> <p>If FUEL VLV ACTR circuit breaker (CB14) does not stay closed, go to paragraph 9-273.</p> <p>If FIRE EXTGH APU circuit breaker (CB26) does not stay closed, go to paragraph 9-274.</p> <p>If FIRE EXTGH CPG circuit breaker (CB15) does not stay closed, go to paragraph 9-275.</p> <p>If FIRE EXTGH PLT circuit breaker (CB25) does not stay closed, go to paragraph 9-276.</p> <p>If FIRE DETR APU circuit breaker (CB11) does not stay closed, go to paragraph 9-277.</p> <p>If FIRE DETR ENG 2 circuit breaker (CB13) does not stay closed, go to paragraph 9-278.</p> <p>If FIRE DETR ENG 1 circuit breaker (CB12) does not stay closed, go to paragraph 9-279.</p> <p>If ENG INST circuit breaker (CB17) does not stay closed, go to paragraph 9-280.</p> <p>If ENG START circuit breaker (CB58) does not stay closed, go to paragraph 9-281.</p> <p>If ENG LVR circuit breaker (CB16) does not stay closed, go to paragraph 9-282.</p> <p>If FUEL XFEED circuit breaker (CB55) does not stay closed, go to paragraph 9-283.</p> <p>If ENG CUT circuit breaker (CB60) does not stay closed, go to paragraph 9-284.</p> <p>If THROT circuit breaker (CB8) does not stay closed, go to paragraph 9-285.</p> <p>If STBY ATTD circuit breaker (CB19) does not stay closed, go to paragraph 9-286.</p> <p>If RDR ALT circuit breaker (CB31) does not stay closed, go to paragraph 9-287.</p>

**9-263. CIRCUIT PROTECTION SYSTEM (DC EMERGENCY BUS – PILOT STATION) –
MAINTENANCE OPERATIONAL CHECK(CONT)**

9-263

Task	Result
Step m. (cont)	<p>If TRIM circuit breaker (CB87) does not stay closed, go to paragraph 9-288.</p> <p>If EMERG HYD circuit breaker (CB35) does not stay closed, go to paragraph 9-289.</p> <p>If LT UTIL SEC circuit breaker (CB23) does not stay closed, go to paragraph 9-290.</p> <p>If LT CAUT circuit breaker (CB21) does not stay closed, go to paragraph 9-291.</p> <p>If LT SRCH/LDG CONTR circuit breaker (CB80) does not stay closed, go to paragraph 9-292.</p> <p>If LT SRCH/LDG circuit breaker (CB22) does not stay closed, go to paragraph 9-269.</p> <p>If CHAFF circuit breaker (CB48) does not stay closed, go to paragraph 9-293.</p> <p>If RTR BRK circuit breaker (CB37) does not stay closed, go to paragraph 9-294.</p> <p>If RDR WARN circuit breaker (CB53) does not stay closed, go to paragraph 9-295.</p> <p>If PITOT HTR circuit breaker (CB36) does not stay closed, go to paragraph 9-296.</p> <p>If COMM ICS circuit breaker (CB27) does not stay closed, go to paragraph 9-297.</p> <p>If COMM VHF FM circuit breaker (CB64) does not stay closed, go to paragraph 9-298.</p> <p>If COMM KY-28 circuit breaker (CB30) does not stay closed, go to paragraph 9-299.</p> <p>If COMM UHF AM circuit breaker (CB24) does not stay closed, go to paragraph 9-300.</p> <p>If COMM IFF circuit breaker (CB29) does not stay closed, go to paragraph 9-301.</p> <p>If COMM ADF circuit breaker (CB65) does not stay closed, go to paragraph 9-302.</p> <p>If APU HOLD circuit breaker (CB10) does not stay closed, go to paragraph 9-266.</p> <p>If FUEL FILL circuit breaker (CB32) does not stay closed, go to paragraph 9-267.</p> <p>If ECS CAB circuit breaker (CB76) does not stay closed, go to paragraph 9-303.</p>

**9-263. CIRCUIT PROTECTION SYSTEM (DC EMERGENCY BUS – PILOT STATION) –
MAINTENANCE OPERATIONAL CHECK(CONT)**

9-263

Task	Result
n. Check for 28 VDC at (A76): J1-P and J1-R.	If 28 VDC is not present, go to paragraph 9-270.
o. Check for 28 VDC at (A76)J1-N.	If 28 VDC is not present, go to paragraph 9-271.
p. Check for 28 VDC at (A76)J1-z.	If 28 VDC is not present, go to paragraph 9-272.
q. Check for 28 VDC at (A76)J1-C.	If 28 VDC is not present, go to paragraph 9-273.
r. Check for 28 VDC at (A76)J1-J.	If 28 VDC is not present, go to paragraph 9-274.
s. Check for 28 VDC at (A76)J1-H.	If 28 VDC is not present, go to paragraph 9-275.
t. Check for 28 VDC at (A76)J1-D.	If 28 VDC is not present, go to paragraph 9-276.
u. Check for 28 VDC at (A76)J1-E.	If 28 VDC is not present, go to paragraph 9-277.
v. Check for 28 VDC at (A76)J1-G.	If 28 VDC is not present, go to paragraph 9-278.
w. Check for 28 VDC at (A76)J1-F.	If 28 VDC is not present, go to paragraph 9-279.
x. Check for 28 VDC at (A76): J1-L and J1-M.	If 28 VDC is not present, go to paragraph 9-280.
y. Check for 28 VDC at (A76): J1-c and J1-X.	If 28 VDC is not present, go to paragraph 9-281.
z. Check for 28 VDC at (A76)J1-K.	If 28 VDC is not present, go to paragraph 9-282.
aa. Check for 28 VDC at (A76)J1-b.	If 28 VDC is not present, go to paragraph 9-284.
ab. Check for 28 VDC at (A76)J1-d.	If 28 VDC is not present, go to paragraph 9-285.
ac. Check for 28 VDC at (A76)J1-e.	If 28 VDC is not present, go to paragraph 9-286.
ad. Check for 28 VDC at (A76): J1-f and J1-g.	If 28 VDC is not present, go to paragraph 9-287.
ae. Check for 28 VDC at (A76): J1-Y and J1-Z.	If 28 VDC is not present, go to paragraph 9-288.
af. Check for 28 VDC at (A76): J1-k and J1-m.	If 28 VDC is not present, go to paragraph 9-289.

**9-263. CIRCUIT PROTECTION SYSTEM (DC EMERGENCY BUS – PILOT STATION) –
MAINTENANCE OPERATIONAL CHECK(CONT)**

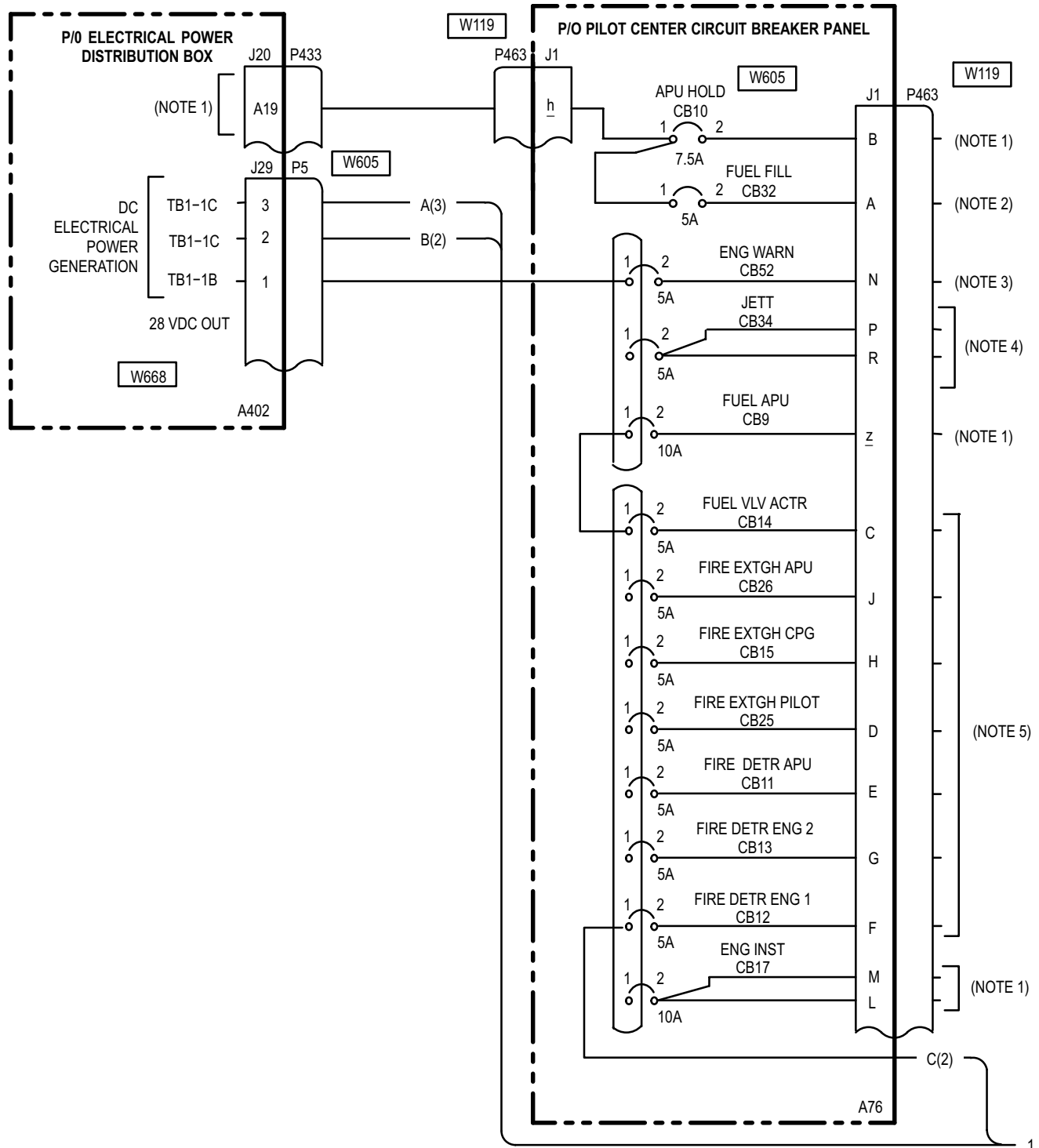
9-263

Task	Result
ag. On pilot ELEC PWR panel (fig. 9-190), set BATT/EXT PWR switch to OFF and detach P463.	
ah. On pilot ELEC PWR panel, set BATT/EXT PWR switch to EXT PWR .	
ai. Check for 28 VDC at (A76): J1-U and J1-W.	If 28 VDC is not present, go to paragraph 9-290.
aj. Check for 28 VDC at (A76)J1-V.	If 28 VDC is not present, go to paragraph 9-292.
ak. Check for 28 VDC at (A76)J1-y.	If 28 VDC is not present, go to paragraph 9-291.
al. Check for 28 VDC at (A76)J1-t.	If 28 VDC is not present, go to paragraph 9-293.
am. Check for 28 VDC at (A76)J1-n.	If 28 VDC is not present, go to paragraph 9-294.
an. Check for 28 VDC at (A76)J1-q.	If 28 VDC is not present, go to paragraph 9-295.
ao. Check for 28 VDC at (A76)J1-s.	If 28 VDC is not present, go to paragraph 9-296.
ap. Check for 28 VDC at (A76)J1-a.	If 28 VDC is not present, go to paragraph 9-297.
aq. Check for 28 VDC at (A76)J1-w.	If 28 VDC is not present, go to paragraph 9-298.
ar. Check for 28 VDC at (A76)J1-p.	If 28 VDC is not present, go to paragraph 9-299.
as. Check for 28 VDC at (A76)J1-v.	If 28 VDC is not present, go to paragraph 9-300.
at. Check for 28 VDC at (A76)J1-S.	If 28 VDC is not present, go to paragraph 9-301.
au. Check for 28 VDC at (A76)J1-r.	If 28 VDC is not present, go to paragraph 9-302.
av. Check for 28 VDC at P1-2.	If 28 VDC is not present, go to paragraph 9-303.
aw. Check for 28 VDC at P1-32.	If 28 VDC is not present, go to paragraph 9-283.

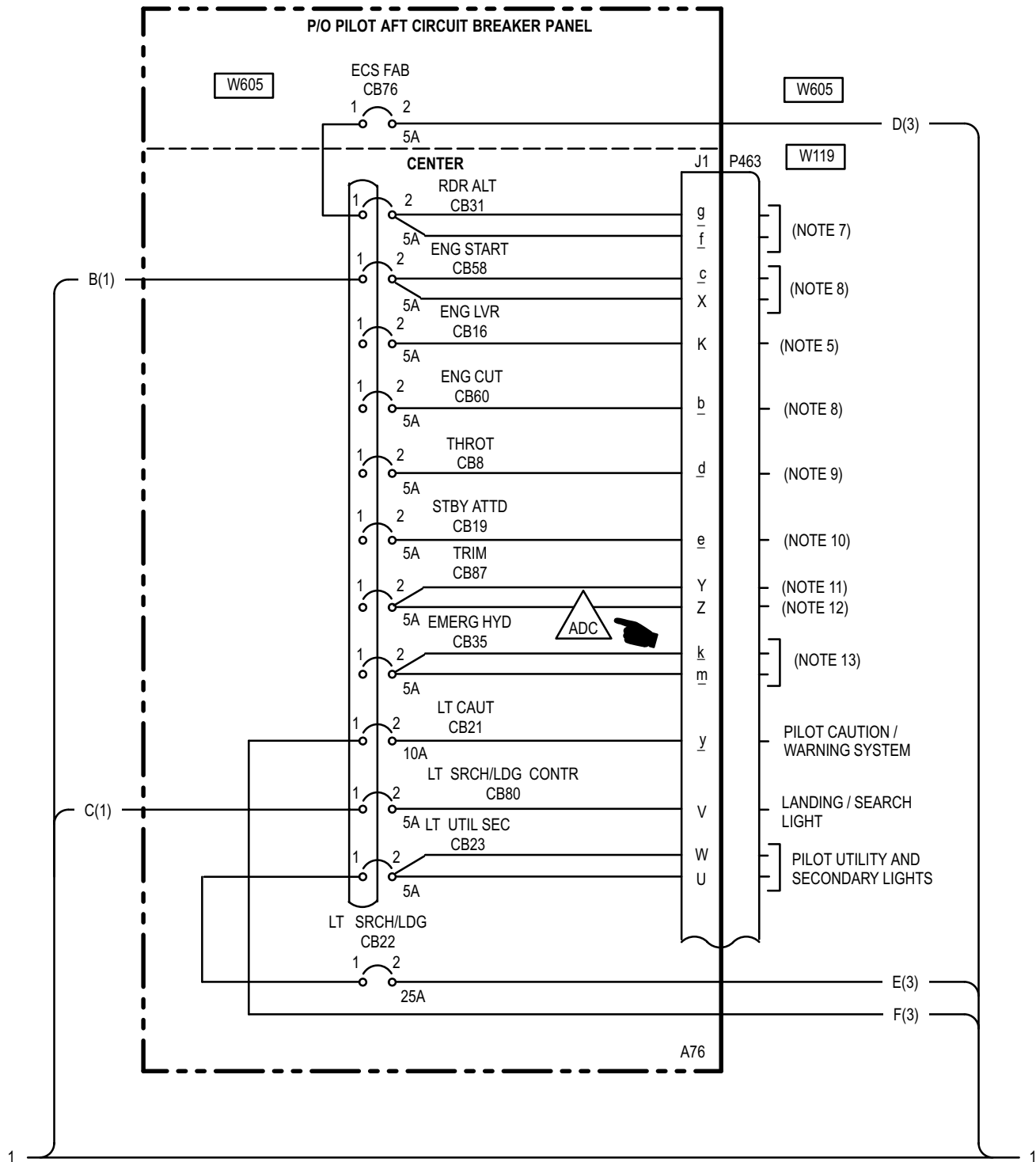
3. On pilot **ELEC PWR** panel (fig. 9-190), set **BATT/EXT PWR** switch to **OFF**.

4. Perform EXTERNAL POWER – POWER DOWN (para 9-46).

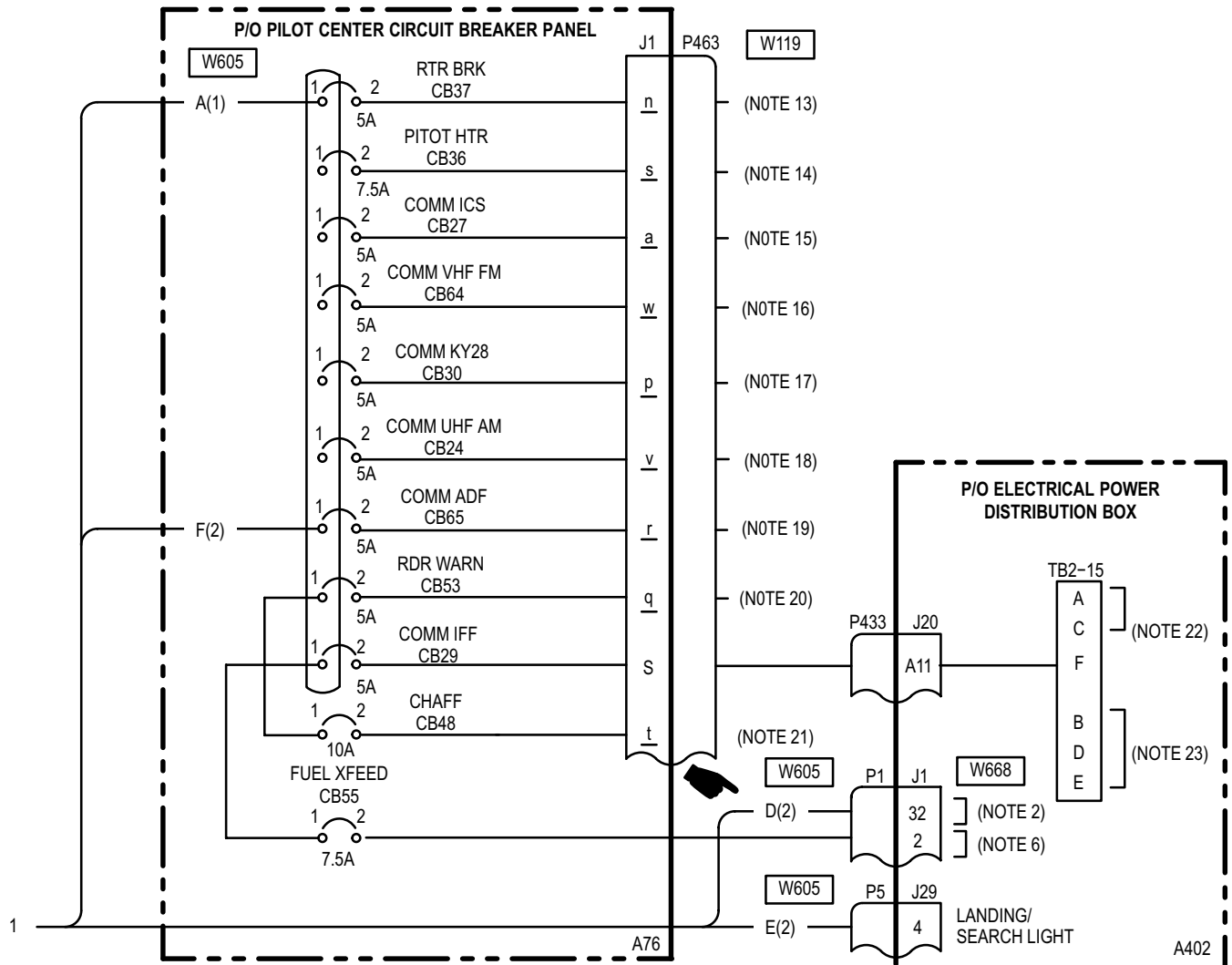
9-264. CIRCUIT PROTECTION SYSTEM (DC EMERGENCY BUS – PILOT STATION) – WIRING INTERCONNECT DIAGRAM



9-264. CIRCUIT PROTECTION SYSTEM (DC EMERGENCY BUS – PILOT STATION) –
WIRING INTERCONNECT DIAGRAM (cont)



9-264. CIRCUIT PROTECTION SYSTEM (DC EMERGENCY BUS – PILOT STATION) – WIRING INTERCONNECT DIAGRAM (cont)



NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

1. AUXILIARY POWER UNIT (TM 1-1520-238-T-8).
2. FUEL SYSTEM (TM 1-1520-238-T-7).
3. AVIONICS CONFIGURATION - INTEGRATED AUDIO WARNING SYSTEM (TM 11-1520-238-23-2).
4. MISSION EQUIPMENT (TM 1-1520-238-T-8).
5. UTILITY SYSTEM - FIRE DETECTION (TM 1-1520-238-T-8).
6. ENVIRONMENTAL CONTROL SYSTEM (TM 1-1520-238-T-8).
7. AVIONICS CONFIGURATION - RADAR ALTIMETER SET (TM 11-1520-238-23-2).
8. DRIVE SYSTEM (TM 1-1520-238-T-4).
9. POWER PLANTS (TM 1-1520-238-T-4).
10. INSTRUMENTS (TM 1-1520-238-T-5).
11. FLIGHT CONTROL SYSTEM (TM 1-1520-238-T-7).
12. AVIONICS CONFIGURATION-HARS (TM 11-1520-238-23-2).
13. HYDRAULIC SYSTEM (TM 1-1520-238-T-5).
14. UTILITY SYSTEM - PITOT ANTI-ICE (TM 1-1520-238-T-8).
15. AVIONICS CONFIGURATION - INTERCOMMUNICATION SYSTEM (TM 11-1520-238-23-2).
16. AVIONICS CONFIGURATION - VHF AM - FM RADIO SET (TM 11-1520-238-23-2).
17. AVIONICS CONFIGURATION - TSEC/KY-28 COMMUNICATIONS (TM 11-1520-238-23-2).
18. AVIONICS CONFIGURATION - UHF AM RADIO SET (TM 11-1520-238-23-2).
19. AVIONICS CONFIGURATION - ADF SET (TM 11-1520-238-23-2).
20. AVIONICS CONFIGURATION - RADAR WARNING SYSTEM (TM 11-1520-238-23-2).
21. ARMAMENT - CHAFF DISPENSER SYSTEM (TM 9-1090-208-23-2).
22. AVIONICS CONFIGURATION - IFF (TM 11-1520-238-23-2).
23. ARMAMENT - AREA WEAPON SYSTEM (TM 9-1090-208-23-2).

M69-392-3B
SHEET 3 OF 3

9-265. SHORT – EXISTS BETWEEN P5-1, P5-2, P5-3 AND GROUND

9-265

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-149	Pilot circuit breaker panel accessing – completed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Detach wire at CB12-1. Check for short between P5-1 and ground.

Does short exist?

YES	Go to step 2.
NO	Go to step 5.

2. Detach wire at CB52-1. Check for short between P5-1 and ground.

Does short exist?

YES	Repair shorted wire between P5-1 and CB52-1. Go to paragraph 9-263.
NO	Go to step 3.

3. Attach CB52 wire. Detach wire at CB9-1. Check for short between P5-1 and ground.

Does short exist?

YES	Replace bus bar between CB52 and CB9, and check for foreign material (TM 1-1520-238-23).
NO	Go to step 4.

4. Attach CB9 wire. Detach wire at CB14-1. Check for short between P5-1.

Does short exist?

YES	Repair shorted wire between CB9-1 and CB14-1. Go to paragraph 9-263.
NO	Replace bus bar between CB14 and CB17, and check for foreign material (TM 1-1520-238-23).

5. Detach wire at CB21-1. Check for short between P5-3 and ground.

Does short exist?

YES	Go to step 6.
NO	Go to step 10.

6. Detach wire at CB37-1. Check for short between P5-3 and ground.

Does short exist?

YES	Repair shorted wire between P5-3 and CB37-1. Go to paragraph 9-263.
NO	Go to step 7.

7. Attach CB37 wire. Detach wires at CB85-1, CB53-1 and CB29-1. Check for short between P5-3 and ground.

Does short exist?

YES	Replace bus bar between CB37 and CB39, and check for foreign material (TM 1-1520-238-23).
NO	Go to step 8.

9-265. SHORT – EXISTS BETWEEN P5-1, P5-2, P5-3 AND GROUND (cont)**9-265**

8. Attach CB53 wire. Check for short between P5-3 and ground.

Does short exist?

YES Repair shorted wire between
CB53-1 and CB48-1.
Go to paragraph 9-263.

NO Go to step 9.

9. Attach CB29 wire. Check for short between P5-3 and ground.

Does short exist?

YES Repair shorted wire between
CB29-1 and CB55-1.
Go to paragraph 9-263.

NO Repair shorted wire between
CB65-1 and CB21-1.
Go to paragraph 9-263.

10. Detach wire at CB58-1. Check for short between P5-2 and ground.

Does short exist?

YES Repair shorted wire between
P5-2 and CB58-1.
Go to paragraph 9-263.

NO Go to step 11.

11. Attach CB58 wire. Detach wires at CB31-1, CB80-1 and CB23-1. Check for short between P5-2 and ground.

Does short exist?

YES Replace bus bar between CB31
and CB23, and check for foreign
material (TM 1-1520-238-23).

NO Go to step 12.

12. Attach CB31 wire. Check for short between P5-2 and ground.

Does short exist?

YES Repair shorted wire between
CB31-1 and CB76-1.
Go to paragraph 9-263.

NO Go to step 13.

13. Attach CB23 wire. Check for short between P5-2 and ground.

Does short exist?

YES Repair shorted wire between
CB23-1 and CB22-1.
Go to paragraph 9-263.

NO Repair shorted wire between
CB12-1 and CB80-1.
Go to paragraph 9-263.

END OF TASK

9-266. APU HOLD CIRCUIT BREAKER (CB10) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A76): J1-h AND J1-B

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does APU HOLD circuit breaker (CB10) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. Open CB10. Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-B and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 1-1520-238-T-8 to troubleshoot auxiliary power unit.

3. Detach wire at CB10-2. Check for short between (A76)J1-B and ground.

Does short exist?

- YES Repair shorted wire between CB10-2 and (A76)J1-B. Go to paragraph 9-263.
- NO Replace **APU HOLD** circuit breaker (CB10) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:

CB10-1 and (A76)J1-h,
CB10-2 and (A76)J1-B.

Does open exist?

- YES Repair open wire. Go to paragraph 9-263.
- NO Replace **APU HOLD** circuit breaker (CB10) (TM 1-1520-238-23).

END OF TASK

9-267. FUEL FILL CIRCUIT BREAKER (CB32) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A76): J1-h AND J1-A

9-267

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-7

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does FUEL FILL circuit breaker (CB32) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. Open CB32. Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-A and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 1-1520-238-T-7 to troubleshoot fuel pressure refueling/defueling system.

3. Detach wire at CB32-2. Check for short between (A76)J1-A and ground.
Does short exist?
 - YES Repair shorted wire between CB32-2 and (A76)J1-A. Go to paragraph 9-263.
 - NO Replace **FUEL FILL** circuit breaker (CB32) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB32-1 and CB10-1,
CB32-2 and (A76)J1-A.
Does open exist?
 - YES Repair open wire. Go to paragraph 9-263.
 - NO Replace **FUEL FILL** circuit breaker (CB32) (TM 1-1520-238-23).

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-149	Pilot circuit breaker panel accessing completed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between P5-1 and P5-2.

Does open exist?

- YES Go to step 2.
- NO Go to step 8.

2. Check for open between P5-2 and CB58-1.

Does open exist?

- YES Repair open wire between P5-2 and CB58-1. Go to paragraph 9-263.
- NO Go to step 3.

3. Check for open between CB58-1 and CB80-1.

Does open exist?

- YES Replace bus bar between CB31 and CB23, and check for foreign material (TM 1-1520-238-23).
- NO Go to step 4.

4. Check for open between CB80-1 and CB12-1.

Does open exist?

- YES Repair open wire. Go to paragraph 9-263.
- NO Go to step 5.

5. Check for open between CB12-1 and CB14-1.

Does open exist?

- YES Replace bus bar between CB12 and CB14, and check for foreign material (TM 1-1520-238-23).
- NO Go to step 6.

6. Check for open between CB14-1 and CB9-1.

Does open exist?

- YES Repair open wire. Go to paragraph 9-263.
- NO Go to step 7.

7. Check for open between CB9-1 and CB52-1.

Does open exist?

- YES Replace bus bar between CB9 and CB52, and check for foreign material (TM 1-1520-238-23).
- NO Repair open wire between P5-1 and CB52-1. Go to paragraph 9-263.

9-268. CONTINUITY – DOES NOT EXIST BETWEEN P5-2 AND P5-1, P5-2 AND P5-3 (cont)

9-268

8. Check for open between P5-3 and CB37-1.

Does open exist?

YES Repair open wire.
 Go to paragraph 9-263.

NO Go to step 9.

9. Check for open between CB37-1 and CB65-1.

Does open exist?

YES Replace bus bar between CB37
 and CB29, and check for foreign
 material (TM 1-1520-238-23).

NO Go to step 10.

10. Check for open between CB65-1 and CB21-1.

Does open exist?

YES Repair open wire.
 Go to paragraph 9-263.

NO Go to step 11.

11. Check for open between CB21-1 and CB58-1.

Does open exist?

YES Replace bus bar between CB23
 and CB21, and check for foreign
 material (TM 1-1520-238-23).

NO Repair open wire between
 CB58-1 and P5-2.
 Go to paragraph 9-263.

END OF TASK

9-269. LT SRCH/LDG CIRCUIT BREAKER (CB22) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN P5-2 AND P5-4

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does LT SRCH/LDG circuit breaker (CB22) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. On pilot center circuit breaker panel, open **LT SRCH/LDG** circuit breaker (CB22). Set **BATT/EXT PWR** switch to **OFF**. Check for short between P5-4 and ground.

Does short exist?

- YES Go to step 3.
- NO Go to paragraph 9-80 to troubleshoot landing/search light.

3. Detach wire at CB22-2. Check for short between P5-4 and ground.

Does short exist?

- YES Repair shorted wire between CB22-2 and P5-4. Go to paragraph 9-263.
- NO Replace **LT SRCH/LDG** circuit breaker (CB22) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between: CB22-1 and CB23-1, CB22-2 and P5-4.

Does open exist?

- YES Repair open wire. Go to paragraph 9-263.
- NO Replace **LT SRCH/LDG** circuit breaker (CB22) (TM 1-1520-238-23).

END OF TASK

9-270. JETT CIRCUIT BREAKER (CB34) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76): J1-P AND J1-R

9-270

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does JETT circuit breaker (CB34) stay closed?

- | | |
|-----|---------------|
| YES | Go to step 4. |
| NO | Go to step 2. |

2. On pilot center circuit breaker panel, open **JETT** circuit breaker (CB34). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76): J1-P and ground, J1-R and ground.

Does short exist?

- | | |
|-----|--|
| YES | Go to step 3. |
| NO | Refer to TM 1-1520-238-T-8 to troubleshoot external stores jettison. |

3. Detach wire at CB34-2. Check for short between (A76): J1-P and ground, J1-R and ground.

Does short exist?

- | | |
|-----|--|
| YES | Repair shorted wire.
Go to paragraph 9-263. |
| NO | Replace JETT circuit breaker (CB34) (TM 1-1520-238-23). |

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between: CB34-2 and (A76)J1-P, CB34-2 and (A76)J1-R.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-263. |
| NO | Replace JETT circuit breaker (CB34) (TM 1-1520-238-23). |

END OF TASK

9-271. ENG WARN CIRCUIT BREAKER (CB52) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-N

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-4



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does ENG WARN circuit breaker (CB52) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. On pilot center circuit breaker panel, open **ENG WARN** circuit breaker (CB52). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-N and ground.

Does short exist?

- YES Go to step 3.
- NO Go to paragraph 9-395 to troubleshoot audio warning system.

3. Detach wire at CB52-2. Check for short between (A76)J1-N and ground.

Does short exist?

- YES Repair shorted wire between CB52-2 and (A76)J1-N. Go to paragraph 9-263.
- NO Replace **ENG WARN** circuit breaker (CB52) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB52-2 and (A76)J1-N.

Does open exist?

- YES Repair open wire. Go to paragraph 9-263.
- NO Replace **ENG WARN** circuit breaker (CB52) (TM 1-1520-238-23).

END OF TASK

9-272. FUEL APU CIRCUIT BREAKER (CB9) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-z

9-272

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-7

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does FUEL APU circuit breaker (CB9) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. On pilot center circuit breaker panel, open **FUEL APU** circuit breaker (CB9). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-z and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 1-1520-238-T-8 to troubleshoot auxiliary power unit.

3. Detach wire at CB9-2. Check for short between (A76)J1-z and ground.
Does short exist?
 - YES Repair shorted wire between CB9-2 and (A76)J1-z. Go to paragraph 9-263.
 - NO Replace **FUEL APU** circuit breaker (CB9) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB9-2 and (A76)J1-z.
Does open exist?
 - YES Repair open wire. Go to paragraph 9-263.
 - NO Replace **FUEL APU** circuit breaker (CB9) (TM 1-1520-238-23).

END OF TASK

9-273. FUEL VLV ACTR CIRCUIT BREAKER (CB14) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-C **9-273**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does FUEL VLV ACTR circuit breaker (CB14) stay closed?

YES	Go to step 4.
NO	Go to step 2.

2. On pilot center circuit breaker panel, open **FUEL VLV ACTR** circuit breaker (CB14). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-C and ground.
Does short exist?

YES	Go to step 3.
NO	Refer to TM 1-1520-238-T-8 to troubleshoot fire extinguishers.

3. Detach wire at CB14-2. Check for short between (A76)J1-C and ground.
Does short exist?

YES	Repair shorted wire between CB14-2 and (A76)J1-C. Go to paragraph 9-263.
NO	Replace FUEL VLV ACTR circuit breaker (CB14) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB14-2 and (A76)J1-C.
Does open exist?

YES	Repair open wire. Go to paragraph 9-263.
NO	Replace FUEL VLV ACTR circuit breaker (CB14) (TM 1-1520-238-23).

END OF TASK

9-274. FIRE EXTGH APU CIRCUIT BREAKER (CB26) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT (A76)J1-J 9-274

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does FIRE EXTGH APU circuit breaker (CB26) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. On pilot center circuit breaker panel, open **FIRE EXTGH APU** circuit breaker (CB26). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-J and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 1-1520-238-T-8 to troubleshoot fire extinguishers.

3. Detach wire at CB26-2. Check for short between (A76)J1-J and ground.
Does short exist?
 - YES Repair shorted wire between CB26-2 and (A76)J1-J. Go to paragraph 9-263.
 - NO Replace **FIRE EXTGH APU** circuit breaker (CB26) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB26-2 and (A76)J1-J.
Does open exist?
 - YES Repair open wire. Go to paragraph 9-263.
 - NO Replace **FIRE EXTGH APU** circuit breaker (CB26) (TM 1-1520-238-23).

END OF TASK

9-275. FIRE EXTGH CPG CIRCUIT BREAKER (CB15) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-H

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does FIRE EXTGH CPG circuit breaker (CB15) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. On pilot center circuit breaker panel, open **FIRE EXTGH CPG** circuit breaker (CB15). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-H and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 1-1520-238-T-8 to troubleshoot fire extinguishers.

3. Detach wire at CB15-2. Check for short between (A76)J1-H and ground.

Does short exist?

- YES Repair shorted wire between CB15-2 and (A76)J1-H. Go to paragraph 9-263.
- NO Replace **FIRE EXTGH** circuit breaker (CB15) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB15-2 and (A76)J1-H.

Does open exist?

- YES Repair open wire. Go to paragraph 9-263.
- NO Replace **FIRE EXTGH** circuit breaker (CB15) (TM 1-1520-238-23).

END OF TASK

9-276. FIRE EXTGH PLT CIRCUIT BREAKER (CB25) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-D

9-276

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does FIRE EXTGH PLT circuit breaker (CB25) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. On pilot center circuit breaker panel, open **FIRE EXTGH PLT** circuit breaker (CB25). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-D and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 1-1520-238-T-8 to troubleshoot fire extinguishers.

3. Detach wire at CB25-2. Check for short between (A76)J1-D and ground.
Does short exist?
 - YES Repair shorted wire between CB25-2 and (A76)J1-D. Go to paragraph 9-263.
 - NO Replace **FIRE EXTGH PLT** circuit breaker (CB25) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB25-2 and (A76)J1-D.
Does open exist?
 - YES Repair open wire. Go to paragraph 9-263.
 - NO Replace **FIRE EXTGH PLT** circuit breaker (CB25) (TM 1-1520-238-23).

END OF TASK

9-277. FIRE DETR APU CIRCUIT BREAKER (CB11) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-E

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does FIRE DETR APU circuit breaker (CB11) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. On pilot center circuit breaker panel, open **FIRE DETR APU** circuit breaker (CB11). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-E and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 1-1520-238-T-8 to troubleshoot APU fire detection.

3. Detach wire at CB11-2. Check for short between (A76)J1-E and ground.

Does short exist?

- YES Repair shorted wire between CB11-2 and (A76)J1-E. Go to paragraph 9-263.
- NO Replace **FIRE DETR APU** circuit breaker (CB11) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB11-2 and (A76)J1-E.

Does open exist?

- YES Repair open wire. Go to paragraph 9-263.
- NO Replace **FIRE DETR APU** circuit breaker (CB11) (TM 1-1520-238-23).

END OF TASK

9-278. FIRE DETR ENG 2 CIRCUIT BREAKER (CB13) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-G

9-278

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does FIRE DETR ENG 2 circuit breaker (CB13) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. On pilot center circuit breaker panel, open **FIRE DETR ENG 2** circuit breaker (CB13). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-G and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 1-1520-238-T-8 to troubleshoot engine fire detection.

3. Detach wire at CB13-2. Check for short between (A76)J1-G and ground.

Does short exist?

- YES Repair shorted wire between CB13-2 and (A76)J1-G. Go to paragraph 9-263.
- NO Replace **FIRE DETR ENG 2** circuit breaker (CB13) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB13-2 and (A76)J1-G.

Does open exist?

- YES Repair open wire. Go to paragraph 9-263.
- NO Replace **FIRE DETR ENG 2** circuit breaker (CB13) (TM 1-1520-238-23).

END OF TASK

9-279. FIRE DETR ENG 1 CIRCUIT BREAKER (CB12) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-F

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does FIRE DETR ENG 1 circuit breaker (CB12) stay closed?

YES	Go to step 4.
NO	Go to step 2.
- On pilot center circuit breaker panel, open **FIRE DETR ENG 1** circuit breaker (CB12). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-F and ground.
Does short exist?

YES	Go to step 3.
NO	Refer to TM 1-1520-238-T-8 to troubleshoot engine fire detection.

- Detach wire at CB12-2. Check for short between (A76)J1-F and ground.
Does short exist?

YES	Repair shorted wire between CB12-2 and (A76)J1-F. Go to paragraph 9-263.
NO	Replace FIRE DETR ENG 1 circuit breaker (CB12) (TM 1-1520-238-23).
- Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB12-2 and (A76)J1-F.
Does open exist?

YES	Repair open wire. Go to paragraph 9-263.
NO	Replace FIRE DETR ENG 1 circuit breaker (CB12) (TM 1-1520-238-23).

END OF TASK

9-280. ENG INST CIRCUIT BREAKER (CB17) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76): J1-L AND J1-M **9-280**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-5

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does ENG INST circuit breaker (CB17) stay closed?

YES	Go to step 4.
NO	Go to step 2.

2. On pilot center circuit breaker panel, open **ENG INST** circuit breaker (CB17). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-L and ground.
Does short exist?

YES	Go to step 3.
NO	Refer to TM 1-1520-238-T-5 to troubleshoot engine instruments.

3. Detach wire at CB17-2. Check for short between (A76)J1-L and ground.
Does short exist?

YES	Repair shorted wire. Go to paragraph 9-263.
NO	Replace ENG INST circuit breaker (CB17) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB17-2 and (A76)J1-L,
CB17-2 and (A76)J1-M.
Does open exist?

YES	Repair open wire. Go to paragraph 9-263.
NO	Replace ENG INST circuit breaker (CB17) (TM 1-1520-238-23).

END OF TASK

9-281. ENG START CIRCUIT BREAKER (CB 58) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76): J1-c AND J1-X

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-4



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does ENG START circuit breaker (CB58) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. On pilot center circuit breaker panel, open **ENG START** circuit breaker (CB58). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76):

J1-c and ground,
J1-X and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 1-1520-238-T-4 to troubleshoot power plants.

3. Detach wire at CB58-2. Check for short between (A76):

J1-c and ground,
J1-X and ground.

Does short exist?

- YES Repair shorted wire.
Go to paragraph 9-263.

- NO Replace **ENG START** circuit breaker (CB58)
(TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:

CB58-2 and (A76)J1-c,
CB58-2 and (A76)J1-X.

Does open exist?

- YES Repair open wire.
Go to paragraph 9-263.

- NO Replace **ENG START** circuit breaker (CB58)
(TM 1-1520-238-23).

END OF TASK

9-282. ENG LVR CIRCUIT BREAKER (CB16) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-K

9-282

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does ENG LVR circuit breaker (CB16) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. On pilot center circuit breaker panel, open **ENG LVR** circuit breaker (CB16). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-K and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 1-1520-238-T-8 to troubleshoot fire extinguishers.

3. Detach wire at CB16-2. Check for short between (A76)J1-K and ground.

Does short exist?

- YES Repair shorted wire between CB16-2 and (A76)J1-K. Go to paragraph 9-263.
- NO Replace **ENG LVR** circuit breaker (CB16) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB16-2 and (A76)J1-K.

Does open exist?

- YES Repair open wire. Go to paragraph 9-263.
- NO Replace **ENG LVR** circuit breaker (CB16) (TM 1-1520-238-23).

END OF TASK

9-283. FUEL XFEED CIRCUIT BREAKER (CB55) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-32 **9-283**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-7



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does FUEL XFEED circuit breaker (CB55) stay closed?

- | | |
|-----|---------------|
| YES | Go to step 4. |
| NO | Go to step 2. |

2. On pilot center circuit breaker panel, open **FUEL XFEED** circuit breaker (CB55). Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-32 and ground.

Does short exist?

- | | |
|-----|---|
| YES | Go to step 3. |
| NO | Refer to TM 1-1520-238-T-7 to troubleshoot fuel crossfeed/boost system. |

3. Detach wire at CB55-2. Check for short between P1-32 and ground.

Does short exist?

- | | |
|-----|---|
| YES | Repair shorted wire.
Go to paragraph 9-263. |
| NO | Replace FUEL XFEED circuit breaker (CB55)
(TM 1-1520-238-23). |

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:
CB55-1 and CB29-1,
CB55-2 and P1-32.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire.
Go to paragraph 9-263. |
| NO | Replace FUEL XFEED circuit breaker (CB55)
(TM 1-1520-238-23). |

END OF TASK

9-284. ENG CUT CIRCUIT BREAKER (CB60) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-b

9-284

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-4

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does ENG CUT circuit breaker (CB60) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. On pilot center circuit breaker panel, open **ENG CUT** circuit breaker (CB60). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-b and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 1-1520-238-T-4 to troubleshoot power plants.

3. Detach wire at CB60-2. Check for short between (A76)J1-b and ground.
Does short exist?
 - YES Repair shorted wire between CB60-2 and (A76)J1-b. Go to paragraph 9-263.
 - NO Replace **ENG CUT** circuit breaker (CB60) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB60-2 and (A76)J1-b.
Does open exist?
 - YES Repair open wire. Go to paragraph 9-263.
 - NO Replace **ENG CUT** circuit breaker (CB60) (TM 1-1520-238-23).

END OF TASK

9-285. THROT CIRCUIT BREAKER (CB8) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-d

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-4



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does THROT circuit breaker (CB8) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. On pilot center circuit breaker panel, open **THROT** circuit breaker (CB8). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-d and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 1-1520-238-T-4 to troubleshoot power plants.

3. Detach wire at CB8-2. Check for short between (A76)J1-d and ground.

Does short exist?

- YES Repair shorted wire between CB8-2 and (A76)J1-d. Go to paragraph 9-263.
- NO Replace **THROT** circuit breaker (CB8) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB8-2 and (A76)J1-d.

Does open exist?

- YES Repair open wire. Go to paragraph 9-263.
- NO Replace **THROT** circuit breaker (CB8) (TM 1-1520-238-23).

END OF TASK

9-286. STBY ATTD CIRCUIT BREAKER (CB19) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-e

9-286

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does STBY ATTD circuit breaker (CB19) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. On pilot center circuit breaker panel, open **STBY ATTD** circuit breaker (CB19). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-e and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 11-1520-238-23-2 to troubleshoot navigation instruments.

3. Detach wire at CB19-2. Check for short between (A76)J1-e and ground.
Does short exist?
 - YES Repair shorted wire between CB19-2 and (A76)J1-e. Go to paragraph 9-263.
 - NO Replace **STBY ATTD** circuit breaker (CB19) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB19-2 and (A76)J1-e.
Does open exist?
 - YES Repair open wire. Go to paragraph 9-263.
 - NO Replace **STBY ATTD** circuit breaker (CB19) (TM 1-1520-238-23).

END OF TASK

9-287. RDR ALT CIRCUIT BREAKER (CB31) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76): J1-f AND J1-g

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does RDR ALT circuit breaker (CB31) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. On pilot center circuit breaker panel, open **RDR ALT** circuit breaker (CB31). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76): J1-f and ground, J1-g and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 11-1520-238-23-2 to troubleshoot radar altimeter set.

3. Detach wire at CB31-2. Check for short between (A76):

J1-f and ground,
J1-g and ground.

Does short exist?

- YES Repair shorted wire.
Go to paragraph 9-263.

- NO Replace **RDR ALT** circuit breaker (CB31)
(TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:

CB31-2 and (A76)J1-f,
CB31-2 and (A76)J1-g.

Does open exist?

- YES Repair open wire.
Go to paragraph 9-263.

- NO Replace **RDR ALT** circuit breaker (CB31)
(TM 1-1520-238-23).

END OF TASK

9-288. TRIM CIRCUIT BREAKER (CB87) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76): J1-Y AND J1-Z

9-288

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-7
TM 11-1520-238-23-2

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does TRIM circuit breaker (CB87) stay closed?

YES Go to step 5.
NO Go to step 2.

- On pilot center circuit breaker panel, open **TRIM** circuit breaker (CB87). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76): J1-Y and ground, J1-Z and ground.

Does short exist?

YES Go to step 4.
NO Go to step 3.

- Check for short between P463-y and ground.
Does short exist?

YES Refer to TM 1-1520-238-T-7 to troubleshoot flight control system.
NO Refer to TM 11-1520-238-23-2 to troubleshoot HARS (ADC).

- Detach wire at CB87-2. Check for short between (A76): J1-Y and ground, J1-Z and ground.

Does short exist?

YES Repair shorted wire. Go to paragraph 9-263.
NO Replace **TRIM** circuit breaker (CB87) (TM 1-1520-238-23).

- Set **BATT/EXT PWR** switch to **OFF**. Check for open between: CB87-2 and (A76)J1-Y, CB87-2 and (A76)J1-Z.

Does open exist?

YES Repair open wire. Go to paragraph 9-263.
NO Replace **TRIM** circuit breaker (CB87) (TM 1-1520-238-23)..

END OF TASK

9-289. EMERG HYD CIRCUIT BREAKER (CB35) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76): J1-k AND J1-m

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-5



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does EMERG HYD circuit breaker (CB35) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. On pilot center circuit breaker panel, open **EMERG HYD** circuit breaker (CB35). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76):
J1-k and ground,
J1-m and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 1-1520-238-T-5 to troubleshoot utility hydraulic system.

3. Detach wire at CB35-2. Check for short between (A76):
J1-k and ground,
J1-m and ground.

Does short exist?

- YES Repair shorted wire.
Go to paragraph 9-263.

- NO Replace **EMERG HYD** circuit breaker (CB35)
(TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:

CB35-2 and (A76)J1-k,
CB35-2 and (A76)J1-m.

Does open exist?

- YES Repair open wire.
Go to paragraph 9-263.

- NO Replace **EMERG HYD** circuit breaker (CB35)
(TM 1-1520-238-23).

END OF TASK

9-290. LT UTIL SEC CIRCUIT BREAKER (CB23) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76): J1-U AND J1-W

9-290

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does LT UTIL SEC circuit breaker (CB23) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. On pilot center circuit breaker panel, open **LT UTIL SEC** circuit breaker (CB23). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76):

J1-U and ground,
J1-W and ground.

Does short exist?

- YES Go to step 3.
- NO Go to paragraph 9-103 to troubleshoot pilot utility and secondary lights.

3. Detach wire at CB23-2. Check for short between (A76):

J1-U and ground,
J1-W and ground.

Does short exist?

- YES Repair shorted wire.
Go to paragraph 9-263.
- NO Replace **LT UTIL SEC** circuit breaker (CB23) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between:

CB23-2 and (A76)J1-U,
CB23-2 and (A76)J1-W.

Does open exist?

- YES Repair open wire.
Go to paragraph 9-263.
- NO Replace **LT UTIL SEC** circuit breaker (CB23) (TM 1-1520-238-23).

END OF TASK

9-291. LT CAUT CIRCUIT BREAKER (CB21) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-y **9-291**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does LT CAUT circuit breaker (CB21) stay closed?

- | | |
|-----|---------------|
| YES | Go to step 4. |
| NO | Go to step 2. |

2. On pilot center circuit breaker panel, open **LT CAUT** circuit breaker (CB21). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-y and ground.

Does short exist?

- | | |
|-----|---|
| YES | Go to step 3. |
| NO | Go to paragraph 9-333 to troubleshoot pilot caution/warning system. |

3. Detach wire at CB21-2. Check for short between (A76)J1-y and ground.

Does short exist?

- | | |
|-----|--|
| YES | Repair shorted wire.
Go to paragraph 9-263. |
| NO | Replace LT CAUT circuit breaker (CB21)
(TM 1-1520-238-23). |

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB21-2 and (A76)J1-y.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-263. |
| NO | Replace LT CAUT circuit breaker (CB21)
(TM 1-1520-238-23). |

END OF TASK

9-292. LT SRCH/LDG CONTR CIRCUIT BREAKER (CB80) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-V

9-292

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does LT SRCH/LDG CONTR circuit breaker (CB80) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. On pilot center circuit breaker panel, open **LT SRCH/LDG CONTR** circuit breaker (CB80). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-V and ground.

Does short exist?

- YES Go to step 3.
- NO Go to paragraph 9-80 to troubleshoot landing/search light.

3. Detach wire at CB80-2. Check for short between (A76)J1-V and ground.

Does short exist?

- YES Repair shorted wire.
Go to paragraph 9-263.
- NO Replace **LT SRCH/LDG CONTR** circuit breaker (CB80) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB80-2 and (A76)J1-V.

Does open exist?

- YES Repair open wire.
Go to paragraph 9-263.
- NO Replace **LT SRCH/LDG CONTR** circuit breaker (CB80) (TM 1-1520-238-23).

END OF TASK

9-293. CHAFF CIRCUIT BREAKER (CB48) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-t

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1090-208-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does CHAFF circuit breaker (CB48) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. On pilot center circuit breaker panel, open **CHAFF** circuit breaker (CB48). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-t and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 9-1090-208-23-2 to troubleshoot chaff dispenser system.

3. Detach wire at CB48-2. Check for short between (A76)J1-t and ground.

Does short exist?

- YES Repair shorted wire.
Go to paragraph 9-263.
- NO Replace **CHAFF** circuit breaker (CB48) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB48-2 and (A76)J1-t.

Does open exist?

- YES Repair open wire.
Go to paragraph 9-263.
- NO Replace **CHAFF** circuit breaker (CB48) (TM 1-1520-238-23).

END OF TASK

9-294. RTR BRK CIRCUIT BREAKER (CB37) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-n

9-294

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-4

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does RTR BRK circuit breaker (CB37) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. On pilot center circuit breaker panel, open **RTR BRK** circuit breaker (CB31). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-n and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 1-1520-238-T-5 to troubleshoot utility hydraulic system.

3. Detach wire at CB37-2. Check for short between (A76)J1-n and ground.
Does short exist?
 - YES Repair shorted wire.
Go to paragraph 9-263.
 - NO Replace **RTR BRK** circuit breaker (CB37) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB37-2 and (A76)J1-n.
Does open exist?
 - YES Repair open wire.
Go to paragraph 9-263.
 - NO Replace **RTR BRK** circuit breaker (CB37) (TM 1-1520-238-23).

END OF TASK

9-295. RDR WARN CIRCUIT BREAKER (CB53) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-q **9-295**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does RDR WARN circuit breaker (CB53) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. On pilot center circuit breaker panel, open **RDR WARN** circuit breaker (CB53). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-q and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 11-1520-238-23-2 to troubleshoot radar warning system.

3. Detach wire at CB53-2. Check for short between (A76)J1-q and ground.
Does short exist?
 - YES Repair shorted wire.
Go to paragraph 9-263.
 - NO Replace **RDR WARN** circuit breaker (CB53) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB53-2 and (A76)J1-q.
Does open exist?
 - YES Repair open wire.
Go to paragraph 9-263.
 - NO Replace **RDR WARN** circuit breaker (CB53) (TM 1-1520-238-23).

END OF TASK

9-296. PITOT HTR CIRCUIT BREAKER (CB36) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-s

9-296

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does PITOT HTR circuit breaker (CB36) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. On pilot center circuit breaker panel, open **PITOT HTR** circuit breaker (CB36). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-s and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 1-1520-238-T-8 to troubleshoot Pitot anti-ice system.

3. Detach wire at CB36-2. Check for short between (A76)J1-s and ground.

Does short exist?

- YES Repair shorted wire.
Go to paragraph 9-263.
- NO Replace **PITOT HTR** circuit breaker (CB36) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB36-2 and (A76)J1-s.

Does open exist?

- YES Repair open wire.
Go to paragraph 9-263.
- NO Replace **PITOT HTR** circuit breaker (CB36) (TM 1-1520-238-23).

END OF TASK

9-297. COMM ICS CIRCUIT BREAKER (CB27) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-a

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does COMM ICS circuit breaker (CB27) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. On pilot center circuit breaker panel, open **COMM ICS** circuit breaker (CB27). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-a and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 11-1520-238-23-2 to troubleshoot intercommunication system.

3. Detach wire at CB27-2. Check for short between (A76)J1-a and ground.

Does short exist?

- YES Repair shorted wire. Go to paragraph 9-263.
- NO Replace **COMM ICS** circuit breaker (CB27) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB27-2 and (A76)J1-a.

Does open exist?

- YES Repair open wire. Go to paragraph 9-263.
- NO Replace **COMM ICS** circuit breaker (CB27) (TM 1-1520-238-23).

END OF TASK

9-298. COMM VHF FM CIRCUIT BREAKER (CB64) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-w

9-298

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does COMM VHF FM circuit breaker (CB64) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. On pilot center circuit breaker panel, open **COMM VHF FM** circuit breaker (CB64). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-w and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 11-1520-238-23-2 to troubleshoot VHF AM-FM radio set.

3. Detach wire at CB64-2. Check for short between (A76)J1-w and ground.
Does short exist?
 - YES Repair shorted wire.
Go to paragraph 9-263.
 - NO Replace **COMM VHF FM** circuit breaker (CB64) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB64-2 and (A76)J1-w.
Does open exist?
 - YES Repair open wire.
Go to paragraph 9-263.
 - NO Replace **COMM VHF FM** circuit breaker (CB64) (TM 1-1520-238-23).

END OF TASK

9-299. COMM KY28 CIRCUIT BREAKER (CB30) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-p

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does COMM KY28 circuit breaker (CB30) stay closed?

YES Go to step 4.
NO Go to step 2.

- On pilot center circuit breaker panel, open **COMM KY28** circuit breaker (CB30). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-p and ground.
Does short exist?

YES Go to step 3.
NO Refer to TM 11-1520-238-23-2 to troubleshoot communications security equipment.

- Detach wire at CB30-2. Check for short between (A76)J1-p and ground.

Does short exist?

YES Repair shorted wire.
Go to paragraph 9-263.

NO Replace **COMM KY28** circuit breaker (CB30) (TM 1-1520-238-23).

- Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB30-2 and (A76)J1-p.

Does open exist?

YES Repair open wire.
Go to paragraph 9-263.

NO Replace **COMM KY28** circuit breaker (CB30) (TM 1-1520-238-23).

END OF TASK

9-300. COMM UHF AM CIRCUIT BREAKER (CB24) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-v

9-300

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does COMM UHF AM circuit breaker (CB24) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. On pilot center circuit breaker panel, open **COMM UHF AM** circuit breaker (CB24). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-v and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 11-1520-238-23-2 to troubleshoot UHF AM radio set.

3. Detach wire at CB24-2. Check for short between (A76)J1-v and ground.
Does short exist?
 - YES Repair shorted wire.
Go to paragraph 9-263.
 - NO Replace **COMM UHF AM** circuit breaker (CB24) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB24-2 and (A76)J1-v.
Does open exist?
 - YES Repair open wire.
Go to paragraph 9-263.
 - NO Replace **COMM UHF AM** circuit breaker (CB24) (TM 1-1520-238-23).

END OF TASK

9-301. COMM IFF CIRCUIT BREAKER (CB29) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-S

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does COMM IFF circuit breaker (CB29) stay closed?

- YES Go to step 4.
- NO Go to step 2.

2. On pilot center circuit breaker panel, open **COMM IFF** circuit breaker (CB29). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-S and ground.

Does short exist?

- YES Go to step 3.
- NO Refer to TM 11-1520-238-23-2 to troubleshoot IFF system.

3. Detach wire at CB29-2. Check for short between (A76)J1-S and ground.

Does short exist?

- YES Repair shorted wire.
Go to paragraph 9-263.
- NO Replace **COMM IFF** circuit breaker (CB29) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB29-2 and (A76)J1-S.

Does open exist?

- YES Repair open wire.
Go to paragraph 9-263.
- NO Replace **COMM IFF** circuit breaker (CB29) (TM 1-1520-238-23).

END OF TASK

9-302. COMM ADF CIRCUIT BREAKER (CB65) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT (A76)J1-r

9-302

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does COMM ADF circuit breaker (CB65) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. On pilot center circuit breaker panel, open **COMM ADF** circuit breaker (CB65). Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A76)J1-r and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 11-1520-238-23-2 to troubleshoot ADF set.

3. Detach wire at CB65-2. Check for short between (A76)J1-r and ground.
Does short exist?
 - YES Repair shorted wire.
Go to paragraph 9-263.
 - NO Replace **COMM ADF** circuit breaker (CB65) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB65-2 and (A76)J1-r.
Does open exist?
 - YES Repair open wire.
Go to paragraph 9-263.
 - NO Replace **COMM ADF** circuit breaker (CB65) (TM 1-1520-238-23).

END OF TASK

9-303. ECS CAB CIRCUIT BREAKER (CB76) – DOES NOT STAY CLOSED OR 28 VDC IS NOT PRESENT AT P1-2

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-8

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

Does ECS CAB circuit breaker (CB76) stay closed?

- | | |
|-----|---------------|
| YES | Go to step 4. |
| NO | Go to step 2. |

- Set **BATT/EXT PWR** switch to **OFF**. Check for short between:

CB76-1 and CB31-1,
CB76-2 and P1-2.

Does short exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-263. |
| NO | Replace ECS CAB circuit breaker (CB76)
(TM 1-1520-238-23). |

- On pilot aft circuit breaker panel, open **ECS CAB** circuit breaker (CB76). Set **BATT/EXT PWR** switch to **OFF**. Check for short between P1-2 and ground.

Does short exist?

- | | |
|-----|--|
| YES | Go to step 4. |
| NO | Refer to TM 1-1520-238-T-8 to troubleshoot environmental control system. |

- Detach wire end at CB76-2. Check for short between P1-2 and ground.

Does short exist?

- | | |
|-----|--|
| YES | Repair shorted wire between P1-2 and CB76-2.
Go to paragraph 9-263. |
| NO | Replace ECS CAB circuit breaker (CB76)
(TM 1-1520-238-23). |

END OF TASK

9-304. CIRCUIT PROTECTION SYSTEM (DC EMERGENCY BUS – CPG STATION) – MAINTENANCE OPERATIONAL CHECK

9-304

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

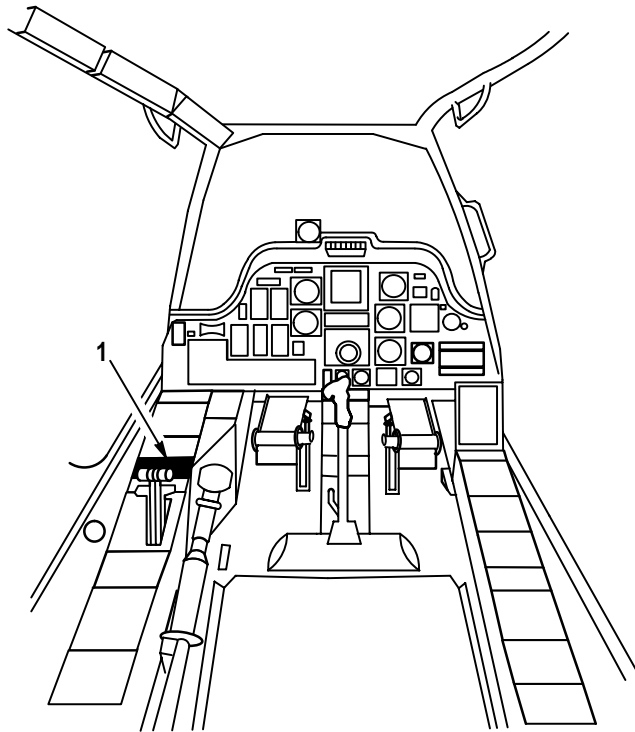
<u>Ref</u>	<u>Condition</u>
Paragraph 9-45	EXTERNAL POWER – POWER UP completed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

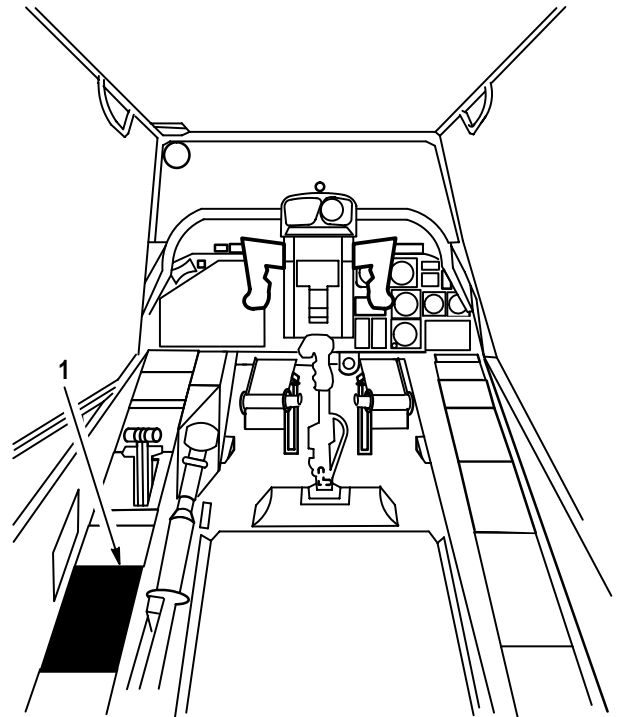
NOTE

Refer to pilot station (fig. 9-192) and CPG station (fig. 9-193) for cockpit configuration and equipment.



1. PILOT ELEC PWR PANEL

M69-254



1. CPG CIRCUIT BREAKER PANEL 1

M69-255

Figure 9-192. Pilot Station

Figure 9-193. CPG Station

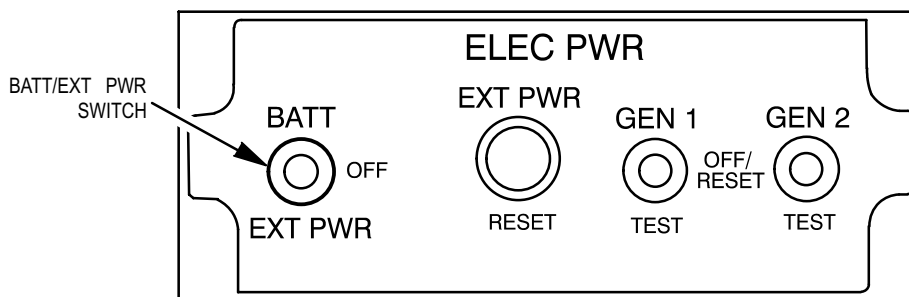
NOTE

If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.

1. Complete the maintenance operational check as follows:

Task	Result
------	--------

- a. On pilot **ELEC PWR** panel (fig. 9-194), place **BATT/EXT PWR** switch to **EXT PWR**.



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Figure 9-194. Pilot ELEC PWR Panel

- b. Close all CPG dc emergency circuit breakers (fig. 9-195).

If **EMERG BATT ICS** circuit breaker (CB13) does not stay closed go to paragraph 9-306.

If **EMERG BATT VHF AM/FM** circuit breaker (CB32) does not stay closed, go to paragraph 9-307.

If **EMERG BATT ENG INST** circuit breaker (CB31) does not stay closed, go to paragraph 9-308.

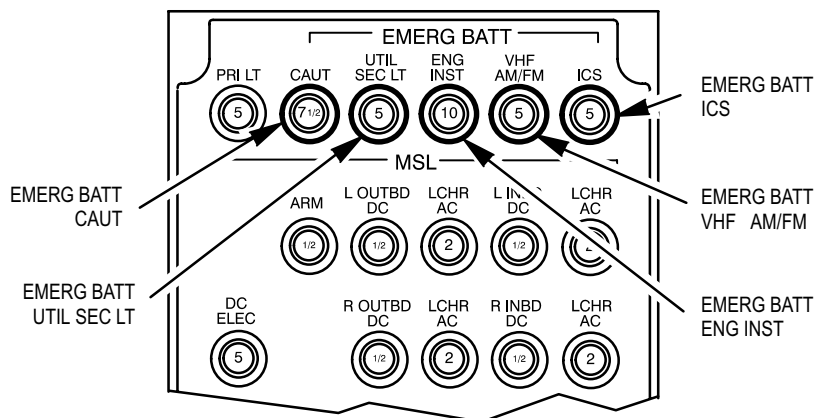
If **EMERG BATT UTIL SEC LT** circuit breaker (CB30) does not stay closed, go to paragraph 9-309.

If **EMERG BATT CAUT** circuit breaker (CB29) does not stay closed, go to paragraph 9-310.

- c. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF** and remove CPG circuit breaker panel 1 (TM 1-1520-238-23). Detach P766 and P769.

9-304. CIRCUIT PROTECTION SYSTEM (DC EMERGENCY BUS – CPG STATION) – MAINTENANCE OPERATIONAL CHECK (cont)

9-304



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Figure 9-195. CPG Circuit Breaker Panel 1

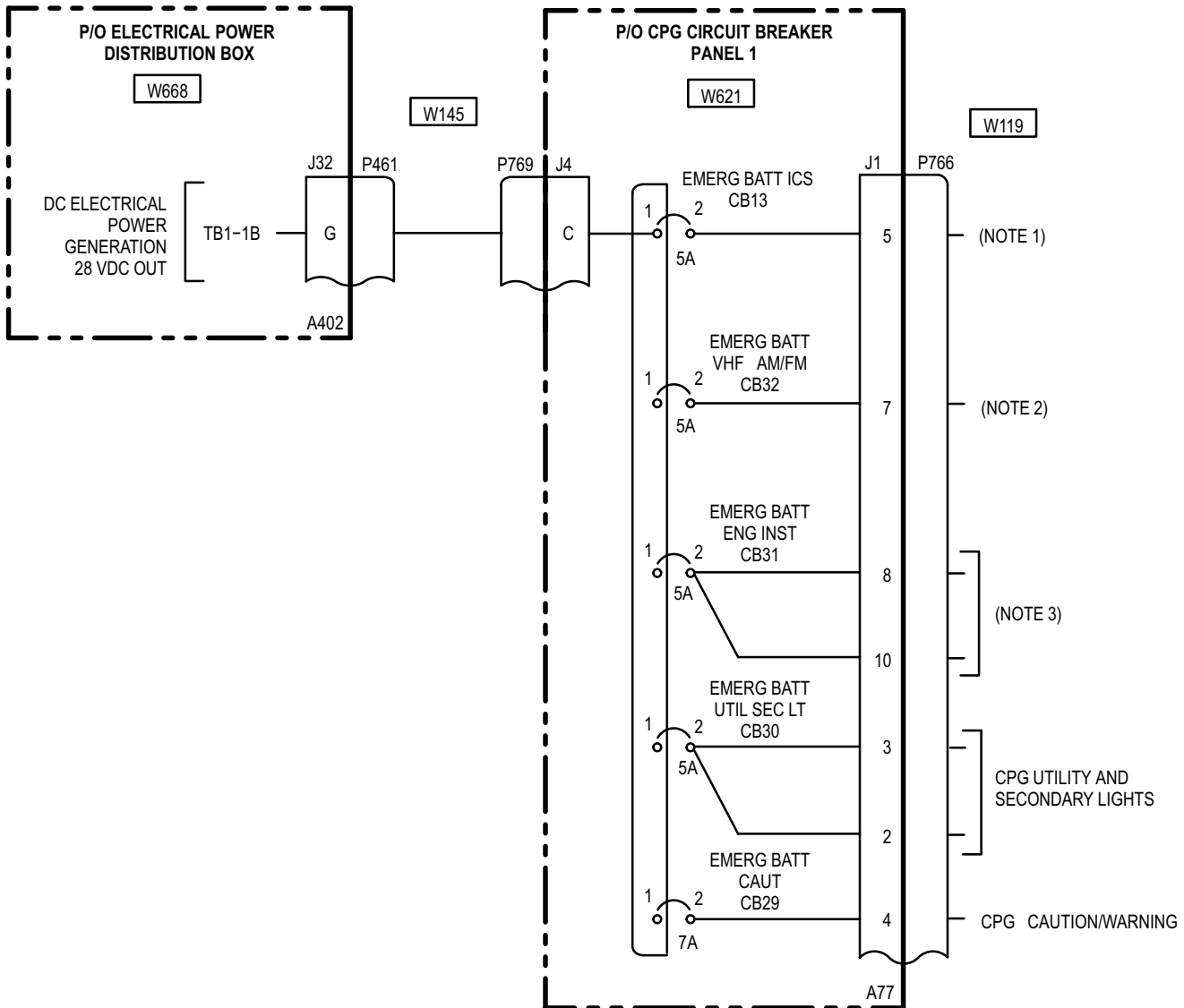
Task	Result
d. On pilot ELEC PWR panel (fig. 9-194), set BATT/EXT PWR switch to EXT PWR . Check for 28 VDC at P769-C.	If 28 VDC is not present at, go to paragraph 9-311.
e. On pilot ELEC PWR panel, set BATT/EXT PWR switch to OFF and check for continuity between (A77)J4-C and CB29-1.	If continuity does not exist, go to paragraph 9-311.
f. Check for continuity between (A77): J4-C and J1-5.	If continuity does not exist, go to paragraph 9-306.
g. Check for continuity between (A77): J4-C and J1-7.	If continuity does not exist, go to paragraph 9-307.
h. Check for continuity between (A77): J4-C and J1-8, J4-C and J1-10.	If continuity does not exist, go to paragraph 9-308.
i. Check for continuity between (A77): J4-C and J1-2, J4-C and J1-3.	If continuity does not exist, go to paragraph 9-310.
j. Check for continuity between (A77): J4-C and J1-4.	If continuity does not exist, go to paragraph 9-310.

2. Install CPG circuit breaker panel 1 (TM 1-1520-238-23).

3. Perform EXTERNAL POWER – POWER DOWN (para 9-46).

END OF TASK

9-305. CIRCUIT PROTECTION SYSTEM (DC EMERGENCY BUS – CPG STATION) –
WIRING INTERCONNECT DIAGRAM



NOTES:

1. AVIONICS CONFIGURATION – INTERCOMMUNICATION (TM 11-1520-238-23-2).
2. AVIONICS CONFIGURATION – VHF AM-FM RADIO SET (TM 11-1520-238-23-2).
3. INSTRUMENTS (TM 1-1520-238-T-5).

9-306. EMERG BATT ICS CIRCUIT BREAKER (CB13) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J4-C AND J1-5

9-306

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – CPG circuit breaker panel 1 removed

3. Check for open between CB13-2 and (A77)J1-5.
Does open exist?

YES	Repair open wire. Go to paragraph 9-304.
NO	Replace EMERG BATT ICS circuit breaker (CB13) (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Close CB13. Check for short between (A77)J1-5 and ground.

Does short exist?

YES	Go to step 2.
NO	Go to step 3.

2. Detach wire at CB13-2. Check for short between (A77)J1-5 and ground.

Does short exist?

YES	Repair shorted wire between CB13-2 and (A77)J1-5. Go to paragraph 9-304.
NO	Replace EMERG BATT ICS circuit breaker (CB13) (TM 1-1520-238-23).

END OF TASK

9-307. EMERG BATT VHF AM/FM CIRCUIT BREAKER (CB32) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J4-C AND J1-7 **9-307**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.
Does EMERG BATT VHF AM/FM circuit breaker (CB32) stay closed?
 - YES Go to step 4.
 - NO Go to step 2.

2. Open CB32. Set **BATT/EXT PWR** switch to **OFF**. Check for short between (A77)J1-7 and ground.
Does short exist?
 - YES Go to step 3.
 - NO Refer to TM 11-1520-238-23-2 to troubleshoot VHF AM-FM radio set.

3. Detach wire at CB32-2. Check for short between (A77)J1-7 and ground.
Does short exist?
 - YES Repair shorted wire between CB32-2 and (A77)J1-7. Go to paragraph 9-304.
 - NO Replace **EMERG BATT VHF AM/FM** circuit breaker (CB32) (TM 1-1520-238-23).

4. Set **BATT/EXT PWR** switch to **OFF**. Check for open between CB32-2 and (A77)J1-7.
Does open exist?
 - YES Repair open wire. Go to paragraph 9-304.
 - NO Replace **EMERG BATT VHF AM/FM** circuit breaker (CB32) (TM 1-1520-238-23).

END OF TASK

9-308. EMERG BATT ENG INST CIRCUIT BREAKER (CB31) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J4-C AND J1-8, J4-C AND J1-10 **9-308**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – CPG circuit breaker panel 1 removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Open CB31. Set **BATT/EXT PWR** switch to **OFF**.
 Check for short between (A77):
 J1-8 and ground,
 J1-10 and ground.
Does open exist?

YES	Go to step 2.
NO	Go to step 3.

2. Detach wire at CB31-2. Check for short between (A77):
 J1-8 and ground,
 J1-10 and ground.
Does open exist?

YES	Repair shorted wire. Go to paragraph 9-304.
NO	Replace EMERG BATT ENG INST circuit breaker (CB31) (TM 1-1520-238-23).

3. Check for open between:
 CB31-2 and (A77)J1-8,
 CB31-2 and (A77)J1-10.
Does open exist?

YES	Repair open wire. Go to paragraph 9-304.
NO	Replace EMERG BATT ENG INST circuit breaker (CB31) (TM 1-1520-238-23).

END OF TASK

9-309. EMERG BATT UTIL SEC LT CIRCUIT BREAKER (CB30) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J4-C, J1-2, J1-3 **9-309**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – CPG circuit breaker panel 1 removed

3. Check for open between:

CB30-2 and (A77)J1-2,
CB30-2 and (A77)J1-3.

Does open exist?

YES	Repair shorted wire. Go to paragraph 9-304.
NO	Replace EMERG BATT UTIL SEC LT circuit breaker (CB30) (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for short between (A77):

J1-2 and ground,
J1-3 and ground.

Does short exist?

YES	Go to step 2.
NO	Go to step 3.

2. Detach wire at CB30-2. Check for short between (A77):

J1-2 and ground,
J1-3 and ground.

Does short exist?

YES	Repair shorted wire. Go to paragraph 9-304.
NO	Replace EMERG BATT UTIL SEC LT circuit breaker (CB30) (TM 1-1520-238-23).

END OF TASK

9-310. EMERG BATT CAUT CIRCUIT BREAKER (CB29) – DOES NOT STAY CLOSED OR CONTINUITY DOES NOT EXIST BETWEEN (A77): J4-C AND J1-4 **9-310**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – CPG circuit breaker panel 1 removed

3. Check for open between CB29-2 and (A77)J1-4.
Does open exist?

YES	Repair open wire. Go to paragraph 9-304.
NO	Replace EMERG BATT CAUT circuit breaker (CB29) (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On CPG circuit breaker panel 1, close **EMERG BATT CAUT** circuit breaker (CB29). Check for short between (A77)J1-4 and ground.
Does short exist?

YES	Go to step 2.
NO	Go to step 3.

2. Detach wire at CB29-2. Check for short between (A77)J1-4 and ground.
Does short exist?

YES	Repair shorted wire between CB29-2 and (A77)J1-4. Go to paragraph 9-304.
NO	Replace EMERG BATT CAUT circuit breaker (CB29) (TM 1-1520-238-23).

END OF TASK

9-311. CONTINUITY – DOES NOT EXIST BETWEEN (A77)J4-C AND CB29-1 OR 28 VDC IS NOT PRESENT AT P769-C

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution box cover removed
Paragraph 9-304	All dc emergency circuit breakers open

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**. Check for 28 VDC at (A402)J32-G.

Does short exist?

- YES Go to step 2.
- NO Go to step 3.

2. Set **BATT/EXT PWR** switch to **OFF**. Check for open between (A77)J4-C and CB29-1.

Does short exist?

- YES Repair open wire between (A77)J4-C and CB13-1. Go to paragraph 9-304.
- NO Repair open wire between P461-G and P769-C. Go to paragraph 9-304.

3. Set **BATT/EXT PWR** switch to **OFF**. Check for short between P461-G and ground.

Does open exist?

- YES Go to step 4.
- NO Go to paragraph 9-23 to troubleshoot dc electrical power generation.

4. Check for short between (A77)J4-C and ground.

Does short exist?

- YES Go to step 5.
- NO Repair shorted wire between P461-G and P769-C. Go to paragraph 9-304.

5. Detach wire at CB13-1. Check for short between (A77)J4-C and ground.

Does short exist?

- YES Repair shorted wire between (A77)J4-C and CB13-1. Go to paragraph 9-304.
- NO Replace bus bar between CB29 and CB13, and check for foreign material (TM 1-1520-238-23).

END OF TASK

9-312. CIRCUIT PROTECTION SYSTEM (DC GROUND CIRCUIT BREAKERS – PILOT STATION) – MAINTENANCE OPERATIONAL CHECK

9-312

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2

Equipment Conditions:

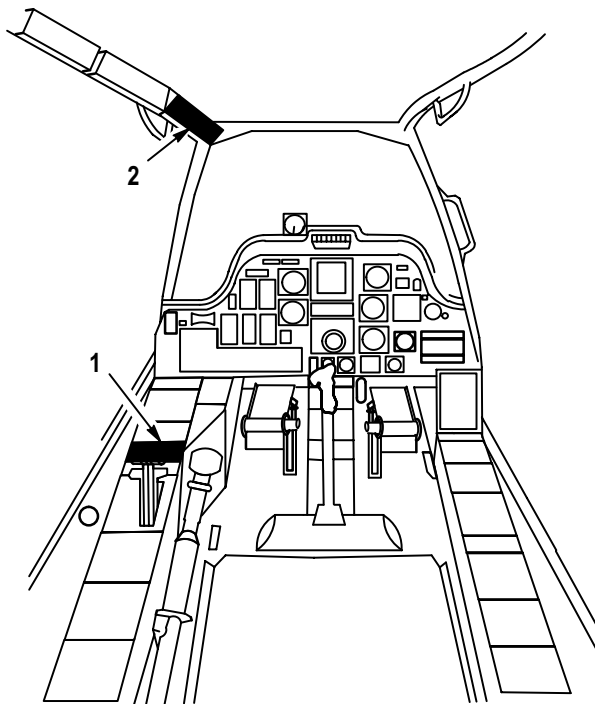
<u>Ref</u>	<u>Condition</u>
Paragraph 9-45	EXTERNAL POWER – POWER UP completed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

NOTE

Refer to pilot station (fig. 9-196) for configuration and component locations.



1. PILOT ELEC PWR PANEL
2. PILOT FORWARD CIRCUIT BREAKER PANEL

M69-260

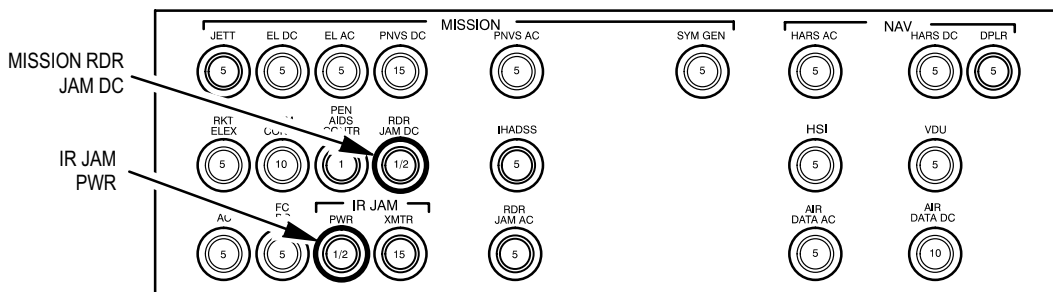
Figure 9-196. Pilot Station

NOTE

If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.

1. Perform the maintenance operational check as follows:

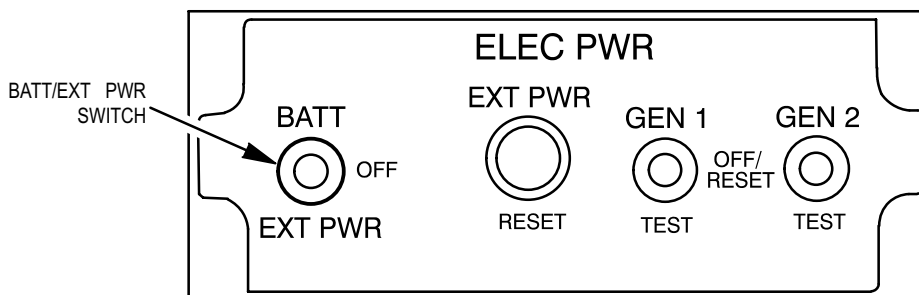
Task	Result
a. On pilot forward circuit breaker panel (fig. 9-197), check that MISSION RDR JAM DC circuit breaker (CB72) and IR JAM PWR circuit breaker (CB63) are closed.	If IR JAM PWR circuit breaker (CB63) or MISSION RDR JAM DC circuit breaker (CB72) do not stay closed, refer to TM 11-1520-238-23-2 to troubleshoot radar and IR jammer systems.



M69-262

Figure 9-197. Pilot Forward Circuit Breaker Panel

- b. On pilot **ELEC PWR** panel (fig. 9-198), set **BATT/EXT PWR** switch to **OFF**.



M69-261

Figure 9-198. Pilot ELEC PWR Panel

- c. Detach P1.
- d. Check for short between P1-50 and ground. If short exists, go to paragraph 9-314.
- e. Check for short between P1-1 and ground. If short exists, go to paragraph 9-315.
- f. Check for open between P1-50 and P1-16. If open exists, go to paragraph 9-314.

9-312. CIRCUIT PROTECTION SYSTEM (DC GROUND CIRCUIT BREAKERS – PILOT STATION) – MAINTENANCE OPERATIONAL CHECK (cont)

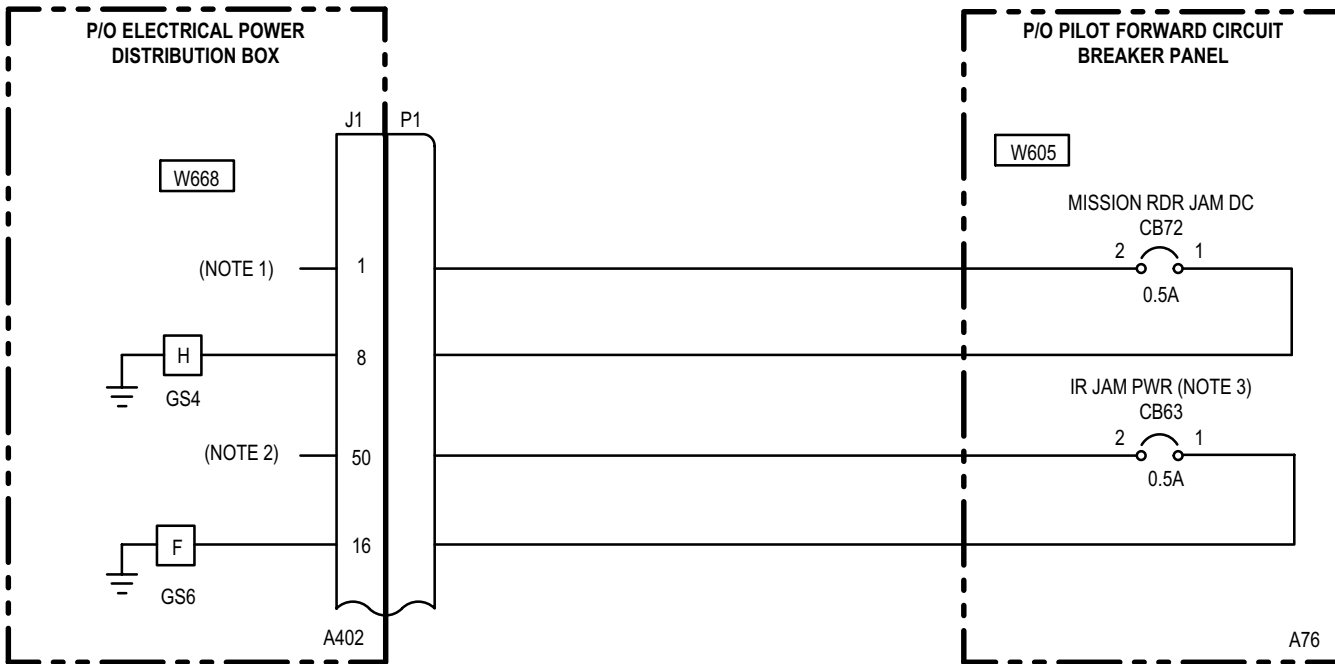
9-312

Task	Result
g. Check for open between P1-1 and P1-8.	If open exists, go to paragraph 9-315.
h. Check for open between (A402): J1-8 and J1-16.	If open exists, go to paragraph 9-315.
i. Attach P1.	

2. Perform EXTERNAL POWER – POWER DOWN (para 9-46).

END OF TASK

9-313. CIRCUIT PROTECTION SYSTEM (DC GROUND CIRCUIT BREAKERS – PILOT STATION) – WIRING INTERCONNECT DIAGRAM



NOTES:

1. AVIONICS CONFIGURATION - RADAR JAMMER AN/ALQ-136 (TM 11-1520-238-23-2).
2. AVIONICS CONFIGURATION - RADAR JAMMER AN/ALQ-144 (TM 11-1520-238-23-2).
3. CB63 AND CB72 PROVIDE A GROUND PATH FOR RCCBS IN THE RADAR WARNING SYSTEM AND OPEN ONLY WHEN AN OVERLOAD CONDITION EXISTS.

M69-395
SHEET 1 OF 1

9-314. OPEN – EXISTS BETWEEN P1-50 AND P1-16 OR A SHORT EXISTS BETWEEN P1-50 AND GROUND **9-314**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

4. Check for open between:
CB63-1 and P1-16,
CB63-2 and P1-50.

Does open exist?

YES	Repair open wire. Go to paragraph 9-312.
NO	Replace IR JAM PWR circuit breaker (CB63) (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot forward circuit breaker panel, close **IR JAM PWR** circuit breaker (CB63). Check for short between P1-16 and ground.
Does short exist?

YES	Go to step 2.
NO	Go to step 4.

2. Detach wire at CB63-1. Check for short between P1-16 and ground.
Does short exist?

YES	Repair shorted wire between P1-16 and CB63-1. Go to paragraph 9-312.
NO	Go to step 3.

3. Detach wire at CB63-2. Check for short between P1-50 and ground.
Does short exist?

YES	Repair shorted wire between P1-50 and CB63-2. Go to paragraph 9-312.
NO	Replace IR JAM PWR circuit breaker (CB63) (TM 1-1520-238-23).

END OF TASK

9-315. OPEN – EXISTS BETWEEN P1-1 AND P1-8 OR A SHORT EXISTS BETWEEN P1-1 AND GROUND

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

4. Check for open between:
 CB72-1 and P1-8,
 CB72-2 and P1-1.

Does open exist?

YES	Repair open wire. Go to paragraph 9-312.
NO	Replace MISSION RDR JAM DC circuit breaker (CB72) (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot forward circuit breaker panel, close **MISSION RDR JAM DC** circuit breaker (CB72). Check for short between P1-8 and ground.
Does short exist?

YES	Go to step 2.
NO	Go to step 4.

2. Detach wire at CB72-1. Check for short between P1-8 and ground.
Does short exist?

YES	Repair shorted wire between P1-8 and CB72-1. Go to paragraph 9-312.
NO	Go to step 3.

3. Detach wire at CB72-2. Check for short between P1-1 and ground.
Does short exist?

YES	Repair shorted wire between P1-1 and CB72-2. Go to paragraph 9-312.
NO	Replace MISSION RDR JAM DC circuit breaker (CB72) (TM 1-1520-238-23).

END OF TASK

9-316. OPEN – EXISTS BETWEEN (A402): J1-8 AND J1-16

9-316

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution box cover removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- Check for open between (A402):
J1-8 and GS4-H,
J1-16 and GS6-F.
Does open exist?

YES	Repair open wire. Go to paragraph 9-312.
NO	Go to step 2.
- With positive meter lead inserted in (A402)GS4-H and negative meter lead on ground, check for open.
Does open exist?

YES	Replace ground stud (A402)GS4 (TM 1-1520-238-23).
NO	Replace ground stud (A402)GS6 (TM 1-1520-238-23).

END OF TASK

9-317. CIRCUIT PROTECTION SYSTEM (DC GROUND CIRCUIT BREAKERS – CPG STATION) – MAINTENANCE OPERATIONAL CHECK 9-317

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

References:

TM 1-1520-238-23
 TM 9-1427-475-20

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Helicopter safed CPG circuit breaker panel 1 removed

Personnel Required:

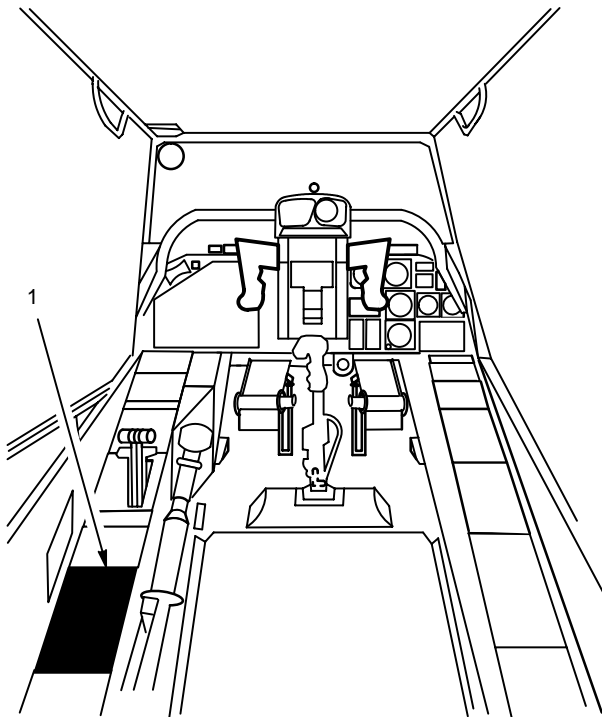
68X Armament/Electrical Systems Repairer

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

NOTE

- Refer to CPG station (fig. 9-199) for configuration and component locations.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.



1. CPG CIRCUIT BREAKER PANEL 1

M69-397

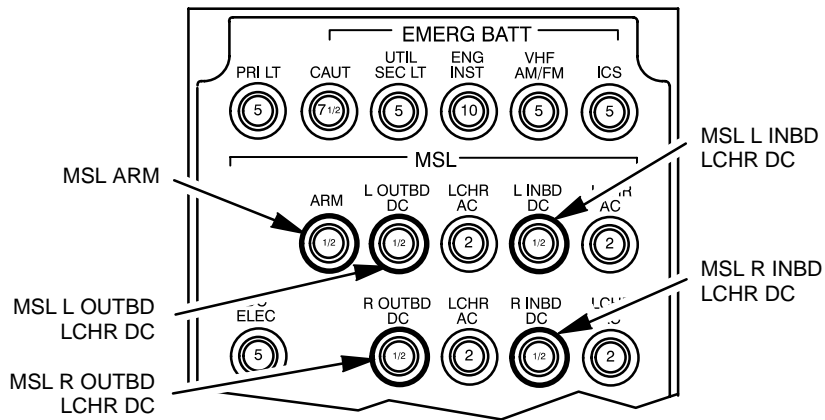
Figure 9-199. CPG Station

9-317. CIRCUIT PROTECTION SYSTEM (DC GROUND CIRCUIT BREAKERS – CPG STATION) – MAINTENANCE OPERATIONAL CHECK (cont) **9-317**

1. Perform the maintenance operational check as follows:

Task	Result
------	--------

- a. Open all CPG dc ground circuit breakers (fig. 9-200).



M69-265

Figure 9-200. CPG Circuit Breaker Panel 1

- | | |
|---|---|
| b. Detach P767. | |
| c. Check for short between (A77)J2-39 and ground. | If short exists, go to paragraph 9-319. |
| d. Check for short between (A77)J2-6 and ground. | If short exists, go to paragraph 9-320. |
| e. Check for short between (A77)J2-17 and ground. | If short exists, go to paragraph 9-321. |
| f. Check for short between (A77)J2-23 and ground. | If short exists, go to paragraph 9-322. |
| g. Check for short between (A77)J2-25 and ground. | If short exists, go to paragraph 9-323. |
| h. Check for short between (A77)J2-18 and ground. | If short exists, go to paragraph 9-324. |

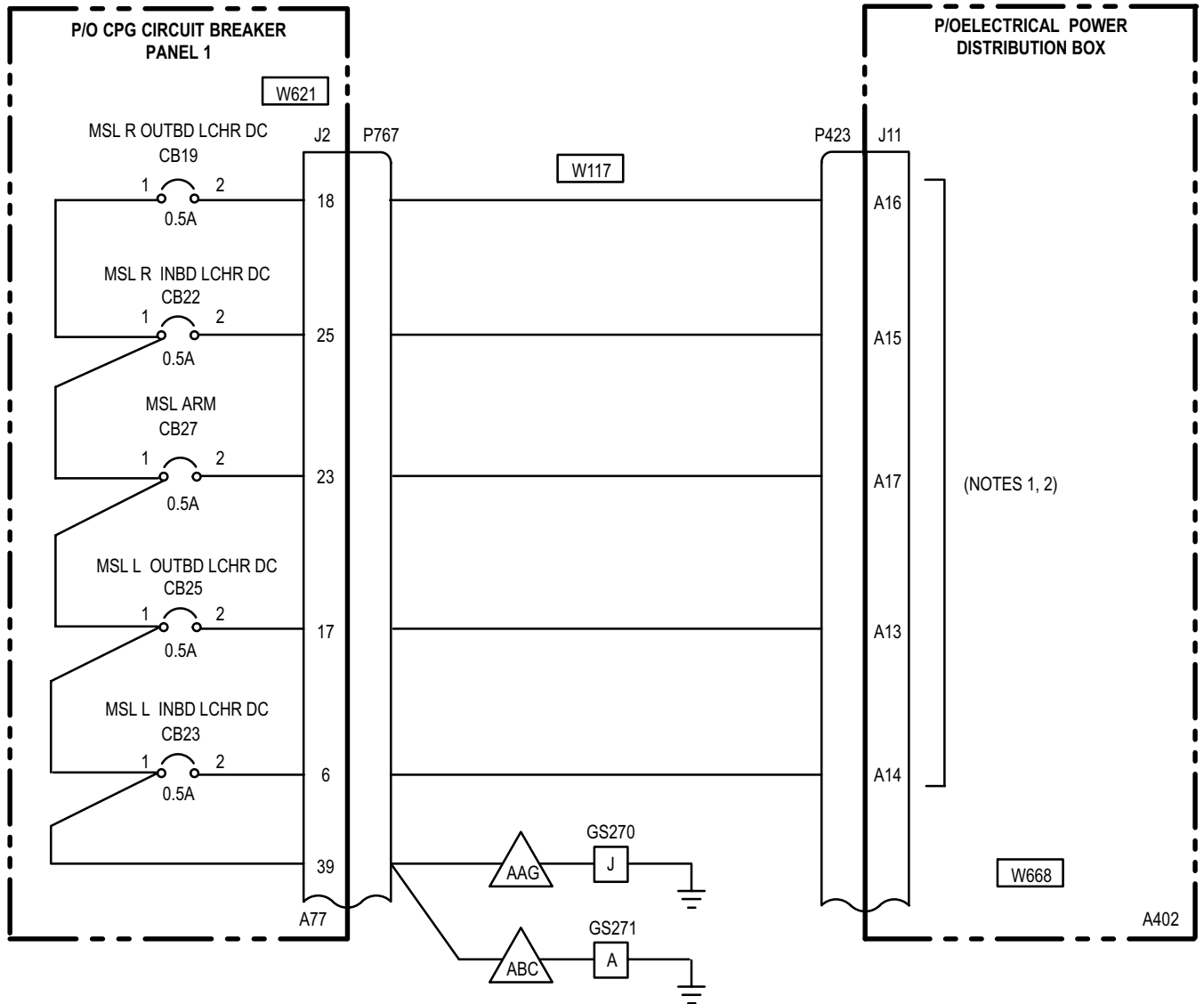
**9-317. CIRCUIT PROTECTION SYSTEM (DC GROUND CIRCUIT BREAKERS – CPG STATION) – 9-317
MAINTENANCE OPERATIONAL CHECK (cont)**

Task	Result
<p>i. Close all CPG dc ground circuit breakers (fig. 9-200).</p>	<p>If MSL R OUTBD LCHR DC circuit breaker (CB19) does not stay closed, refer to TM 9-1427-475-20 to troubleshoot hellfire missile equipment.</p> <p>If MSL R INBD LCHR DC circuit breaker (CB22) does not stay closed, refer to TM 9-1427-475-20 to troubleshoot hellfire missile equipment.</p> <p>If MSL L INBD LCHR DC circuit breaker (CB23) does not stay closed, refer to TM 9-1427-475-20 to troubleshoot hellfire missile equipment.</p> <p>If MSL L OUTBD LCHR DC circuit breaker (CB25) does not stay closed, refer to TM 9-1427-475-20 to troubleshoot hellfire missile equipment.</p> <p>If MSL ARM circuit breaker (CB27) does not stay closed, refer to TM 9-1427-475-20 to troubleshoot hellfire missile equipment.</p>
<p>j. Check for continuity between (A77): J2-39 and J2-6.</p>	<p>If continuity does not exist, go to paragraph 9-320.</p>
<p>k. Check for continuity between (A77): J2-39 and J2-17.</p>	<p>If continuity does not exist, go to paragraph 9-321.</p>
<p>l. Check for continuity between (A77): J2-39 and J2-23.</p>	<p>If continuity does not exist, go to paragraph 9-322.</p>
<p>m. Check for continuity between (A77): J2-39 and J2-25.</p>	<p>If continuity does not exist, go to paragraph 9-323.</p>
<p>n. Check for continuity between (A77): J2-39 and J2-18.</p>	<p>If continuity does not exist, go to paragraph 9-324.</p>
<p>o. Check for continuity between P767-39 and ground.</p>	<p>If continuity does not exist, go to paragraph 9-325.</p>
<p>p. Attach P767.</p>	

2. Install CPG circuit breaker panel 1 (TM 1-1520-238-23).

END OF TASK

9-318. CIRCUIT PROTECTION SYSTEM (DC GROUND CIRCUIT BREAKERS – CPG STATION) – 9-318
WIRING INTERCONNECT DIAGRAM



NOTES:

1. HELLFIRE MISSILE EQUIPMENT (TM 9-1427-475-20).
2. CIRCUIT BREAKERS PROVIDE A GROUND PATH FOR REMOTE CONTROL CIRCUIT BREAKERS IN THE HELLFIRE MISSILE SYSTEM AND OPEN ONLY WHEN AN OVERLOAD CONDITION EXISTS.

9-319. SHORT – EXISTS BETWEEN (A77)J2-39 AND GROUND

9-319

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-149	Pilot circuit breaker panel accessing – completed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Detach wire at CB23-1. Check for short between (A77)J2-39 and ground.

Does short exist?

YES	Repair shorted wire between (A77)J2-39 and CB23-1. Go to paragraph 9-317.
NO	Go to step 2.

2. Check for short between CB23-1 and ground.

Does short exist?

YES	Replace MSL L INBD LCHR DC circuit breaker (CB23) (TM 1-1520-238-23).
NO	Go to step 3.

3. With CB23 wires attached, detach wires at CB25-1. Check for short between (A77)J2-39 and ground.

Does short exist?

YES	Repair shorted wire between CB23-1 and CB25-1. Go to paragraph 9-317.
NO	Go to step 4.

4. Check for short between CB25-1 and ground.

Does short exist?

YES	Replace MSL L OUTBD LCHR DC circuit breaker (CB25) (TM 1-1520-238-23).
NO	Go to step 5.

5. With CB25 wires attached, detach wires at CB27-1. Check for short between (A77)J2-39 and ground.

Does short exist?

YES	Repair shorted wire between CB25-1 and CB27-1. Go to paragraph 9-317.
NO	Go to step 6.

6. Check for short between CB27-1 and ground.

Does short exist?

YES	Replace MSL ARM circuit breaker (CB27) (TM 1-1520-238-23).
NO	Go to step 7.

7. With CB27 wires attached, detach wires at CB22-1. Check for short between (A77)J2-39 and ground.

Does short exist?

YES	Repair shorted wire between CB27-1 and CB22-1. Go to paragraph 9-317.
NO	Go to step 8.

9-319. SHORT – EXISTS BETWEEN (A77)J2-39 AND GROUND (cont)

9-319

8. Check for short between CB22-1 and ground.

Does short exist?

- | | |
|-----|--|
| YES | Replace MSL R INBD LCHR DC circuit breaker (CB22) (TM 1-1520-238-23). |
| NO | Go to step 9. |

9. With CB22 wires attached, detach wires at CB19-1. Check for short between (A77)J2-39 and ground.

Does short exist?

- | | |
|-----|---|
| YES | Repair shorted wire between CB22-1 and CB19-1.
Go to paragraph 9-317. |
| NO | Replace MSL R OUTBD LCHR DC circuit breaker (CB19) (TM 1-1520-238-23). |

END OF TASK

9-320. CONTINUITY BETWEEN (A77): J2-39 AND J2-6 – DOES NOT EXIST OR SHORT EXISTS BETWEEN J2-6 AND GROUND

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-149	Pilot circuit breaker panel accessing completed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between (A77): J2-39 and J2-6.

Does open exist?

- | | |
|-----|---------------|
| YES | Go to step 2. |
| NO | Go to step 4. |

2. Check for open between (A77)J2-39 and CB23-1.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire.
Go to paragraph 9-317. |
| NO | Go to step 3. |

3. Check for open between (A77)J2-6 and CB23-2.
Does open exist?

- | | |
|-----|---|
| YES | Repair open wire.
Go to paragraph 9-317. |
| NO | Replace MSL L INBD LCHR DC circuit breaker (CB23)
(TM 1-1520-238-23). |

4. Detach wire at CB23-2. Check for short between (A77)J2-6 and ground.
Does short exist?

- | | |
|-----|---|
| YES | Repair shorted wire.
Go to paragraph 9-317. |
| NO | Replace MSL L INBD LCHR DC circuit breaker (CB23)
(TM 1-1520-238-23). |

END OF TASK

9-321. CONTINUITY BETWEEN (A77): J2-39 AND J2-17 – DOES NOT EXIST OR SHORT EXISTS BETWEEN J2-17 AND GROUND

9-321

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-149	Pilot circuit breaker panel accessing completed

3. Check for open between (A77)J2-17 and CB25-2.

Does open exist?

YES Repair open wire.
Go to paragraph 9-317.

NO Replace **MSL L OUTBD LCHR DC** circuit breaker (CB25) (TM 1-1520-238-23).

4. Detach wire at CB25-2. Check for short between (A77)J2-17 and ground.

Does short exist?

YES Repair shorted wire.
Go to paragraph 9-317.

NO Replace **MSL L OUTBD LCHR DC** circuit breaker (CB25) (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between (A77): J2-39 and J2-17.

Does open exist?

YES Go to step 2.

NO Go to step 4.

2. Check for open between (A77)J2-39 and CB25-1.

Does open exist?

YES Repair open wire between (A77)J2-39 and CB25-1.
Go to paragraph 9-317.

NO Go to step 3.

END OF TASK

9-322. CONTINUITY BETWEEN (A77): J2-39 AND J2-23 – DOES NOT EXIST OR SHORT EXISTS BETWEEN (A77)J2-23 AND GROUND

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-149	Pilot circuit breaker panel accessing completed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

3. Check for open between (A77)J2-23 and CB27-2.

Does open exist?

YES Repair open wire.
Go to paragraph 9-317.

NO Replace **MSL ARM** circuit breaker (CB27) (TM 1-1520-238-23).

4. Detach wire at CB27-2. Check for short between (A77)J2-23 and ground.

Does short exist?

YES Repair shorted wire between (A77)J2-23 and CB27-2.
Go to paragraph 9-317.

NO Replace **MSL ARM** circuit breaker (CB27) (TM 1-1520-238-23).

1. Check for open between (A77): J2-39 and J2-23.

Does open exist?

YES Go to step 2.

NO Go to step 4.

2. Check for open between (A77)J2-39 and CB27-1.

Does open exist?

YES Repair open wire between CB25-1 and CB27-1.
Go to paragraph 9-317.

NO Go to step 3.

END OF TASK

9-323. CONTINUITY BETWEEN (A77): J2-39 AND J2-25 – DOES NOT EXIST OR SHORT EXISTS BETWEEN J2-25 AND GROUND

9-323

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-149	Pilot circuit breaker panel accessing completed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between (A77): J2-39 and J2-25.

Does open exist?

- | | |
|-----|---------------|
| YES | Go to step 2. |
| NO | Go to step 4. |

2. Check for open between (A77)J2-39 and CB22-1.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire between CB27-1 and CB22-1.
Go to paragraph 9-317. |
| NO | Go to step 3. |

3. Check for open between (A77)J2-25 and CB22-2.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-317. |
| NO | Replace MSL R INBD LCHR DC circuit breaker (CB22) (TM 1-1520-238-23). |

4. Detach wire at CB22-2. Check for short between (A77)J2-25 and ground.

Does short exist?

- | | |
|-----|--|
| YES | Repair shorted wire between (A77)J2-25 and CB22-2.
Go to paragraph 9-317. |
| NO | Replace MSL R INBD LCHR DC circuit breaker (CB22) (TM 1-1520-238-23). |

END OF TASK

9-324. CONTINUITY BETWEEN (A77): J2-39 AND J2-18 – DOES NOT EXIST OR SHORT EXISTS BETWEEN J2-18 AND GROUND

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-149	Pilot circuit breaker panel accessing completed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

3. Check for open between (A77)J2-18 and CB19-2.

Does open exist?

YES Repair open wire.
Go to paragraph 9-317.

NO Replace **MSL R OUTBD LCHR DC** circuit breaker (CB19) (TM 1-1520-238-23).

4. Detach wire at CB19-2. Check for short between (A77)J2-18 and ground.

Does short exist?

YES Repair shorted wire between (A77)J2-18 and CB19-2.
Go to paragraph 9-317.

NO Replace **MSL R OUTBD LCHR DC** circuit breaker (CB19) (TM 1-1520-238-23).

1. Check for open between (A77): J2-39 and (A77)J2-18.

Does open exist?

YES Go to step 2.

NO Go to step 4.

2. Check for open between (A77)J2-39 and CB19-1.

Does open exist?

YES Repair open wire.
Go to paragraph 9-317.

NO Go to step 3.

END OF TASK

9-325. CONTINUITY – DOES NOT EXIST BETWEEN P767-39 AND GROUND

9-325**Tools:**

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Check for open between:

(AAG) P767-39 and GS270-J.**(ABC)** P767-39 and GS271-A.**Does open exist?**

YES	Repair open wire. Go to paragraph 9-317.
NO	Replace ground stud (TM 1-1520-238-23).

END OF TASK

9-326. CIRCUIT BREAKER EDGE-LIGHT PANELS – MAINTENANCE OPERATIONAL CHECK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-45	EXTERNAL POWER – POWER UP completed

Personnel Required:

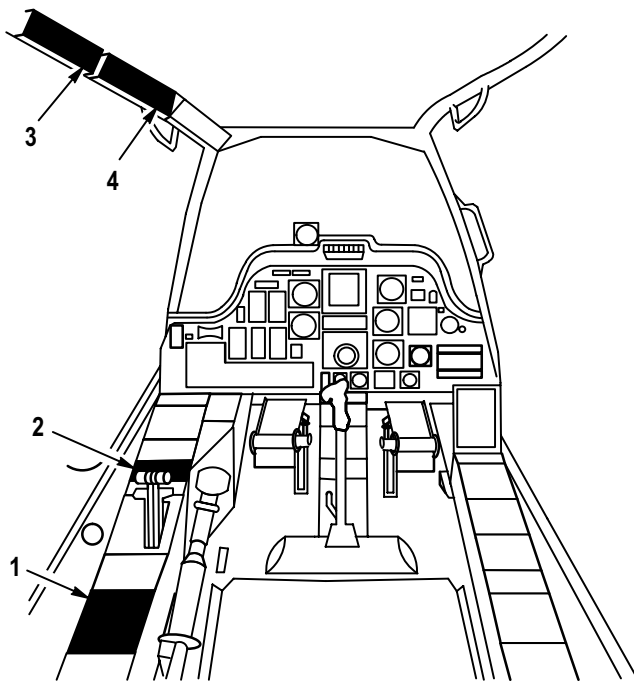
68X Armament/Electrical Systems Repairer
One person to assist

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

NOTE

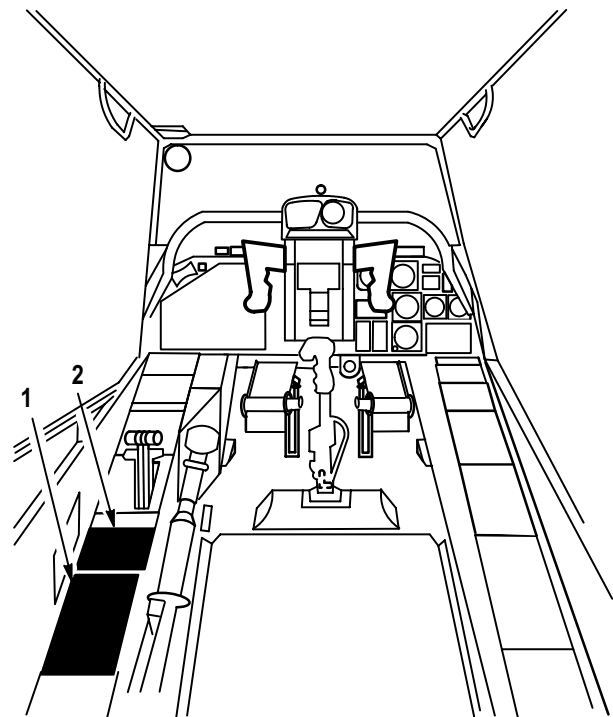
Refer to pilot station (fig. 9-201) and CPG station (fig. 9-202) for cockpit configuration and equipment.



1. PILOT EXT LT/INTR LT PANEL
2. PILOT ELEC PWR PANEL
3. PILOT AFT CIRCUIT BREAKER PANEL
4. PILOT CENTER CIRCUIT BREAKER PANEL

M69-278

Figure 9-201. Pilot Station



1. CPG CIRCUIT BREAKER PANEL 1
2. CPG INTR LT PANEL

M69-279

Figure 9-202. CPG Station

9-326. CIRCUIT BREAKER EDGE-LIGHT PANELS – MAINTENANCE OPERATIONAL CHECK (cont)

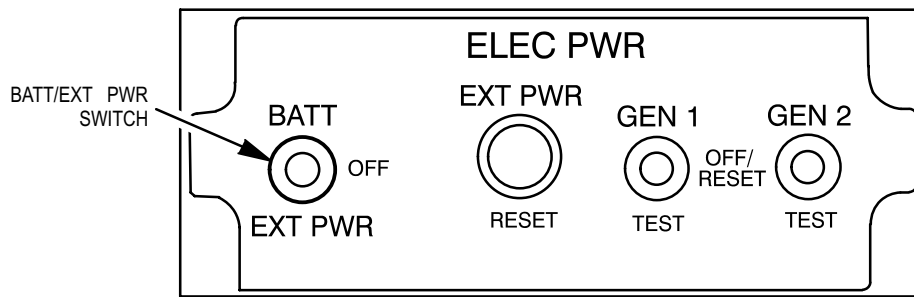
NOTE

If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.

1. Complete the maintenance operational check as follows:

Task	Result
------	--------

- a. On **ELEC PWR** panel (fig. 9-203), set **BATT/EXT PWR** switch to **EXT PWR**.

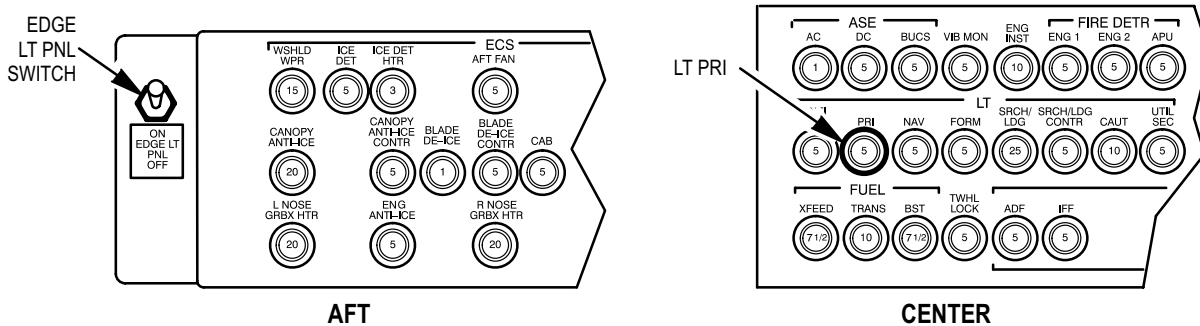


M69-280

Figure 9-203. Pilot ELEC PWR Panel

- b. On pilot center circuit breaker panel (fig. 9-204), check that **LT PRI** circuit breaker (CB39) is closed.

If **LT PRI** circuit breaker (CB39) does not stay closed, go to paragraph 9-113 to troubleshoot pilot edge-lights.

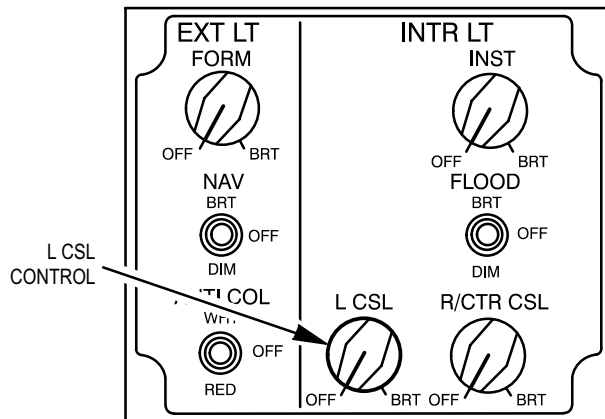


M69-282

Figure 9-204. Pilot Circuit Breaker Panels

- c. On pilot aft circuit breaker panel, set **EDGE LT PNL** switch to **ON**. On pilot **EXT LT/INTR LT** panel (fig. 9-205), set **L CSL** control to **BRT**. Check that all three circuit breaker edge-light panels are lighted.

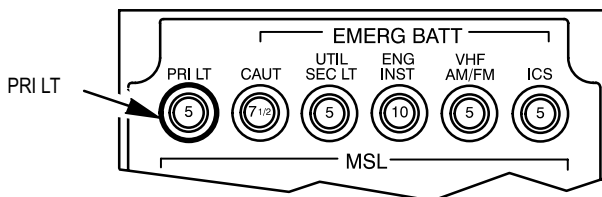
If some of the panel lamps are not lighted replace lamps (TM 1-1520-238-23). If lamps still do not light, go to paragraph 9-328.



M69-281

Figure 9-205. Pilot EXT LT/INTR Panel

Task	Result
d. On CPG circuit breaker panel 1 (fig. 9-206), check that PRI LT circuit breaker (CB14) is closed.	If PRI LT circuit breaker (CB14) does not stay closed, go to paragraph 9-132 to troubleshoot CPG edge-lights.



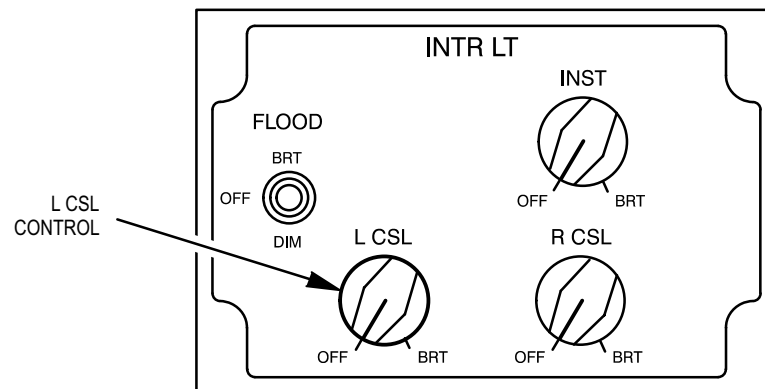
M69-283

Figure 9-206. CPG Circuit Breaker Panel 1

- | | |
|--|--|
| e. On CPG INTR LT panel (fig. 9-207), set L CSL control to BRT . Check that both CPG circuit breaker panel edge-light panels are lighted. | If CPG circuit breaker panel 1 is not lighted, replace panel lamps (TM 1-1520-238-23). If lamps still do not light, go to paragraph 9-329. |
| f. On CPG INTR LT panel, set L CSL control to OFF . | If CPG circuit breaker panel 2 is not lighted, replace panel lamps (TM 1-1520-238-23). If lamps still do not light, go to paragraph 9-330. |

9-326. CIRCUIT BREAKER EDGE-LIGHT PANELS – MAINTENANCE OPERATIONAL CHECK (cont)

9-326

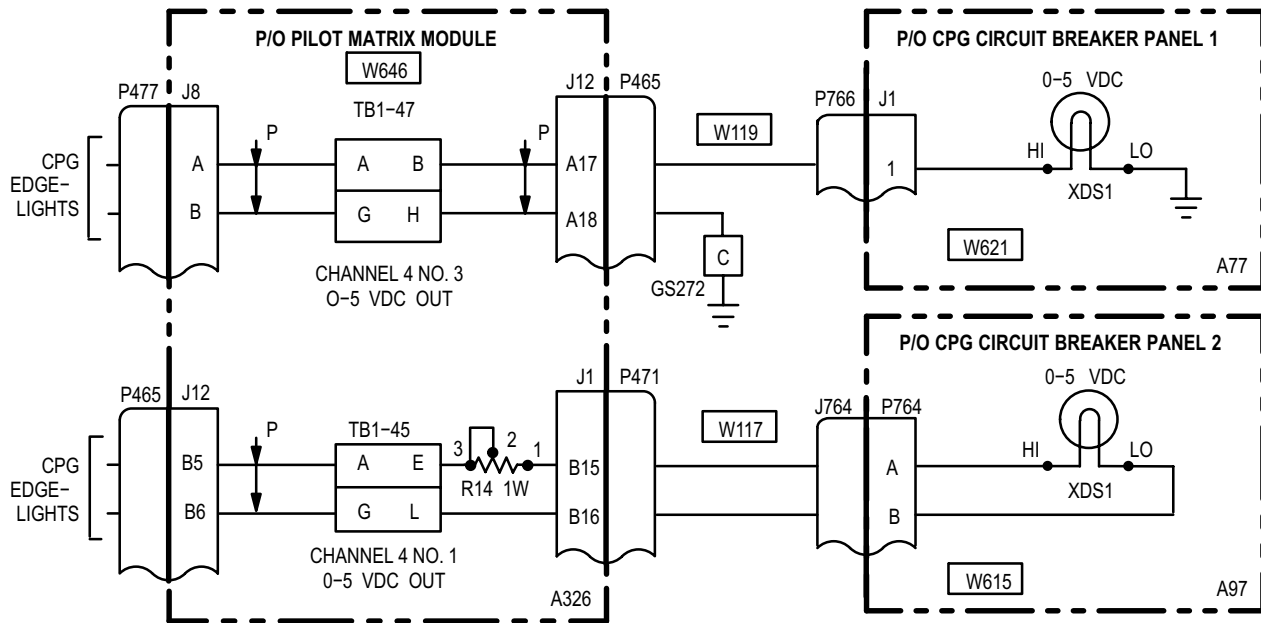
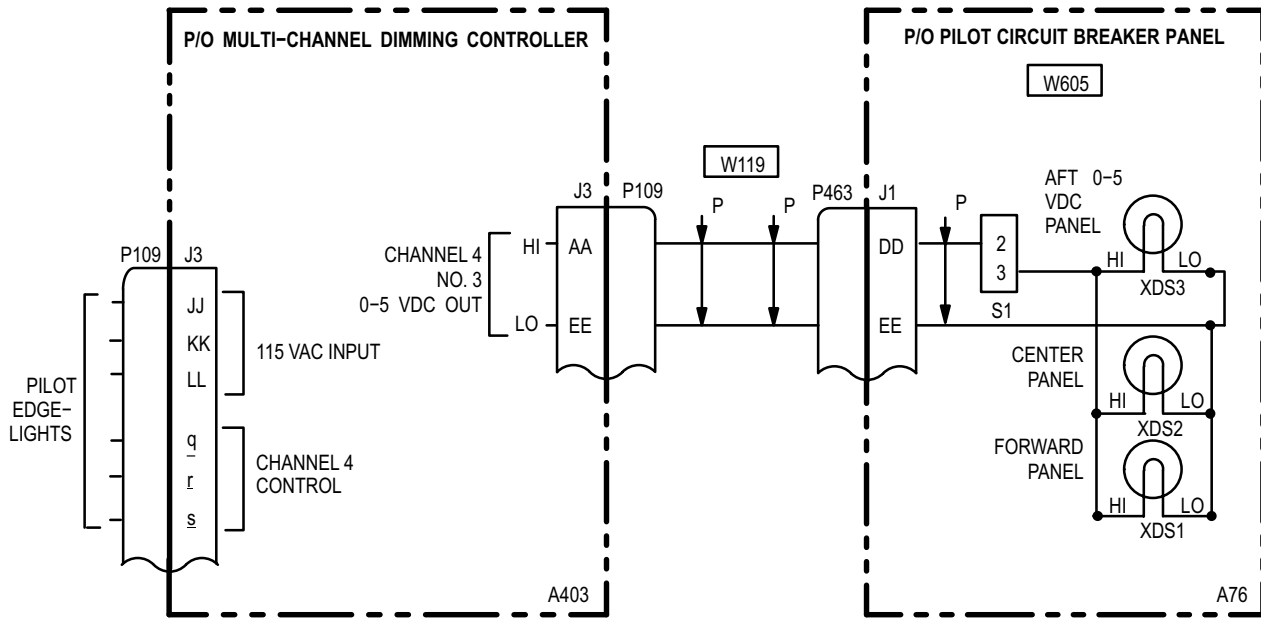


M69-399

Figure 9-207. CPG INTR LT Panel

-
2. On pilot **EXT LT/INTR LT** panel (fig. 9-205), set **L CSL** control to **OFF**.
 3. Perform **EXTERNAL POWER – POWER DOWN** (para 9-46).

END OF TASK



9-328. PILOT CIRCUIT BREAKER EDGE-LIGHT PANELS – DO NOT LIGHT

9-328

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

4. Check for 5 VDC at (A76)S1-3.

Is voltage present?

YES Repair open wire between (A76):
S1-3 and XDS3-HI,
XDS3-HI and XDS2-HI,
XDS2-1 and XDS1-HI.
Go to paragraph 9-326.

NO Replace pilot **EDGE LT PNL** switch (A76)S1 (TM 1-1520-238-23).



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **EXT LT/INTR LT** panel, set **L CSL** control to **BRT**. Check for 5 VDC at P463-DD.
Is voltage present?

YES Go to step 3.
NO Go to step 2.

2. Check for open between:
P463-DD and P109-AA,
P463-EE and P109-EE.

Does open exist?

YES Repair open wire.
Go to paragraph 9-326.
NO Go to paragraph 9-113 to troubleshoot pilot edge-lights.

3. Attach P463. Check for 5 VDC at (A76)S1-2.
Is voltage present?

YES Go to step 4.
NO Repair open wire between (A76):
J1-DD and S1-2.
Go to paragraph 9-326.

END OF TASK

9-329. CPG CIRCUIT BREAKER PANEL 1 EDGE-LIGHT – DOES NOT LIGHT

9-329

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

3. Check for open between (A77):
J1-1 and XDS1-HI.

Does open exist?

YES	Repair open wire. Go to paragraph 9-326.
NO	Replace CPG circuit breaker panel 1 edge-light panel (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On CPG **INTR LT** panel, set **L CSL** control to **BRT**. Check for 5 VDC between (A326):
TB1-47-A and TB1-47-G.

Is voltage present?

YES	Go to step 2.
NO	Go to paragraph 9-132 to troubleshoot CPG edge-lights.

2. Check for open between:
(A326)TB1-47-A and P766-1,
(A326)TB1-47-G and ground.

Does open exist?

YES	Repair open wire. Go to paragraph 9-326.
NO	Go to step 3.

END OF TASK

9-330. CPG CIRCUIT BREAKER PANEL 2 EDGE-LIGHT – DOES NOT LIGHT

9-330

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Detach J764. On CPG **INTR LT** panel, set **L CSL** to **BRT**. Check for 5 VDC at J764-A.
Is voltage present?

YES Go to step 4.
NO Go to step 2.

2. Detach P471. Check for 5 VDC at (A326)J1-B15.
Is voltage present?

YES Go to step 3.
NO Repair open wire between P471-B15 and J764-A.
 Go to paragraph 9-326.

3. Check for 5 VDC at (A326)TB1-45-E.
Is voltage present?

YES Repair open wire between (A326):
 TB1-45-E and J1-B15.
 Go to paragraph 9-326.
NO Go to paragraph 9-132 to troubleshoot pilot edge-lights.

4. Check for open between (A97): J1-A and XDS1-HI.

Does open exist?

YES Replace edge-light connector on CPG circuit breaker panel 2 (TM 1-1520-238-23).
NO Go to step 5.

5. Check for open between (A97): J1-B and XDS1-LO.

Does open exist?

YES Replace edge-light connector on CPG circuit breaker panel 2 (TM 1-1520-238-23).
NO Replace (A97)DS1 (TM 1-1520-238-23).

END OF TASK

**9-331. PILOT AND CPG CAUTION/WARNING PANELS – INDICATORS
FUNCTIONAL DATA**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

References:

TM 1-1520-238-23

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

Equipment Conditions:

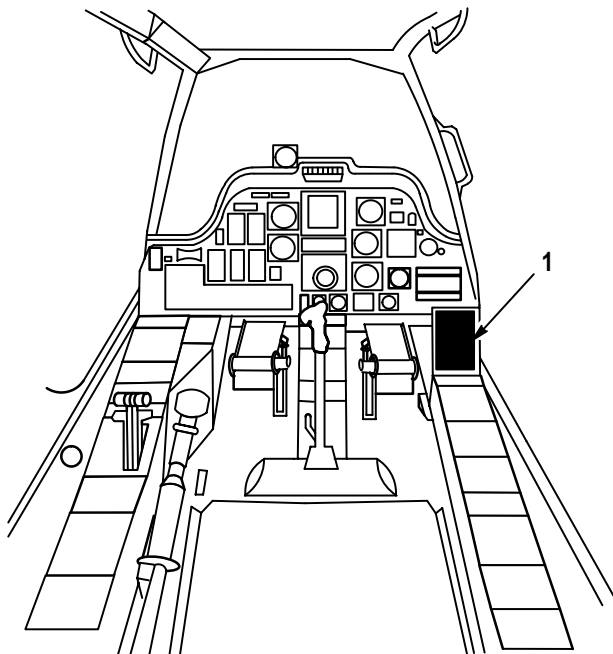
<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Helicopter safed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

NOTE

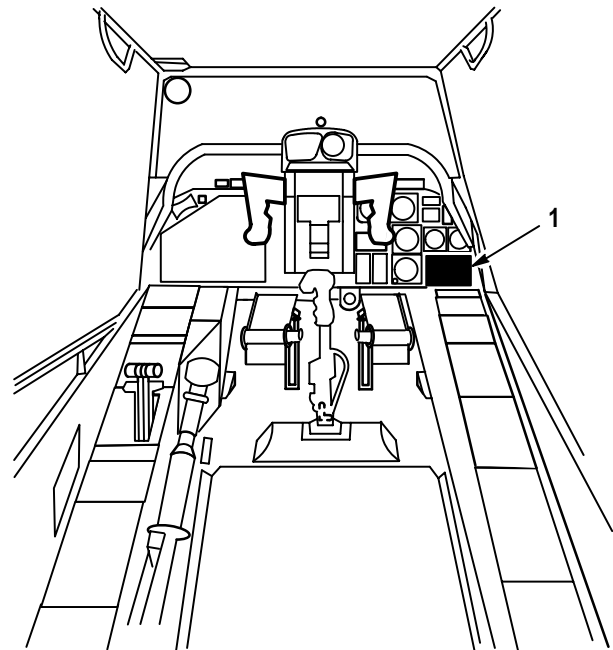
Refer to pilot station (fig. 9-208) and CPG station (fig. 9-209) for cockpit configuration and equipment.



1. PILOT CAUTION / WARNING PANEL

M69-284

Figure 9-208. Pilot Station



1. CPG CAUTION / WARNING PANEL

M69-285

Figure 9-209. CPG station

9-331. PILOT AND CPG CAUTION/WARNING PANELS – INDICATORS
FUNCTIONAL DATA (cont)

9-331

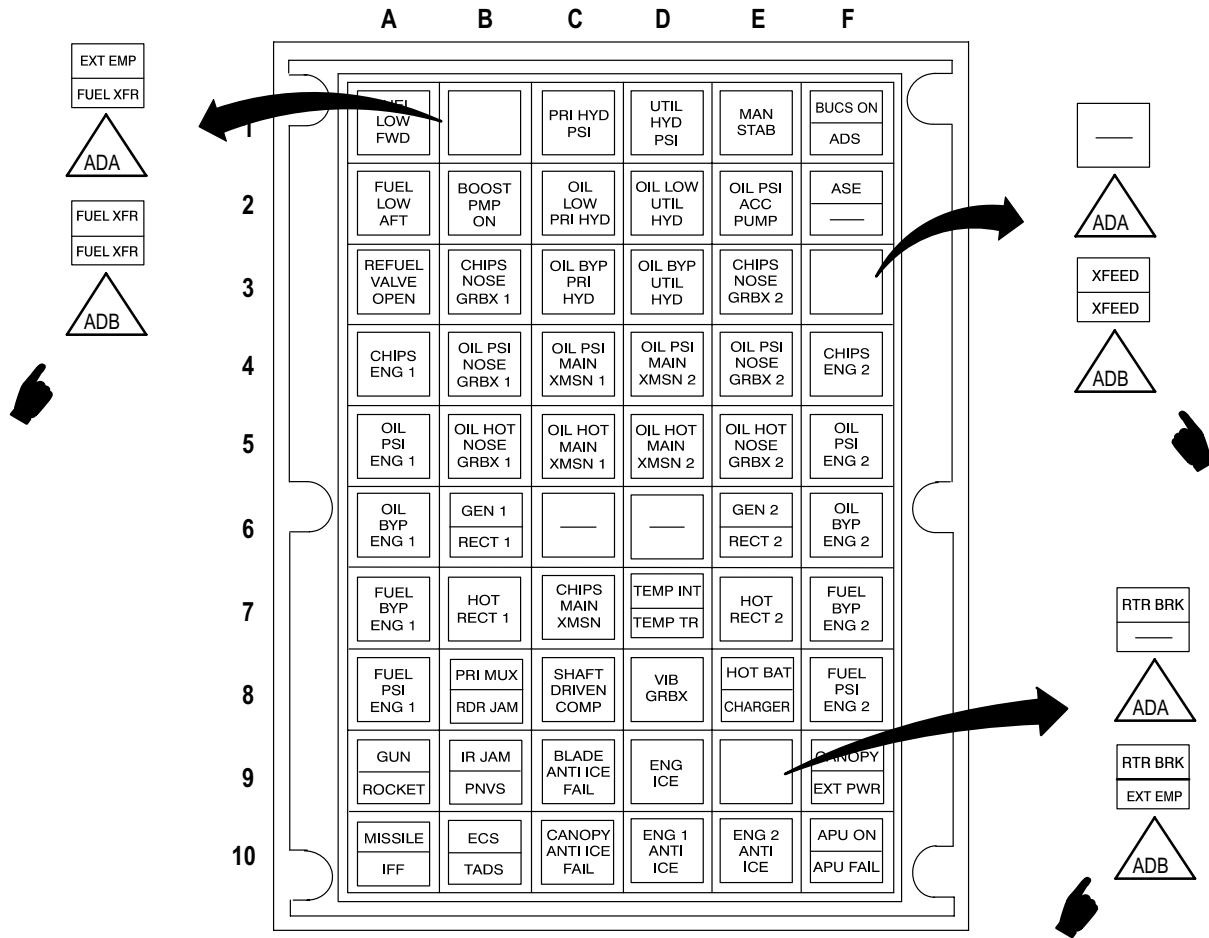
NOTE

If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.

1. Use caution/warning panel functional data as follows:

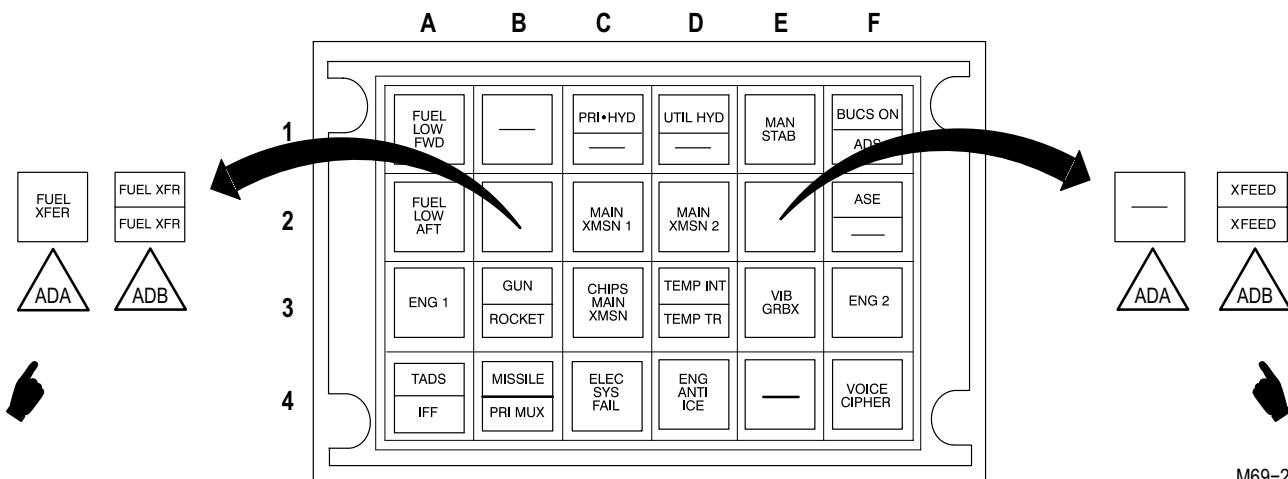
Task	Result
<p>a. On pilot caution/warning panel (fig. 9-210), remove P18. Apply input signal to pilot panel input pin numbers. For example: ASE indicator (pilot lamp key F2), supply ground at pin (A157)J1-46. Check that ASE indicator is lighted.</p>	<p>If indicator does not light, replace lamp (TM 1-1520-238-23). Apply input signal to pin. Check that indicator is lighted. If replaced lamp still does not light, replace pilot caution/warning panel (TM 1-1520-238-23).</p>
<p>b. On CPG caution/warning panel (fig. 9-211), apply input signals through P18 pins to indicators that receive input signals from pilot caution/warning panel, or directly to CPG caution/warning panel input pin numbers. For example: IFF indicator (CPG lamp key A4), apply 28 VDC at pin P18-117. Check that IFF indicator is lighted.</p>	<p>If indicator does not light, detach P19 from CPG caution/warning panel. Apply input signal to CPG panel input pin. For CPG IFF indicator, apply 28 VDC at (A157)J1-1. Check that IFF indicator is lighted.</p> <p>If indicator is lighted, check for short or open in wire between pilot panel output pin (P18) and CPG panel input (P19). For CPG IFF indicator check for open between P18-117 and P19-1, check for short between ground and P18-117. Repair shorted wire.</p> <p>If indicator does not light with input signal applied directly to CPG panel, replace lamps (TM 1-1520-238-23). Apply input signal to pin, check that indicator is lighted. If lamps still does not light, replace CPG caution/warning panel (TM 1-1520-238-23).</p>

9-331. PILOT AND CPG CAUTION/WARNING PANELS – INDICATORS
FUNCTIONAL DATA (cont)



M69-286A

Figure 9-210. Pilot Caution /Warning Panel



M69-287A

Figure 9-211. CPG Caution /Warning Panel

**9-331. PILOT AND CPG CAUTION/WARNING PANELS – INDICATORS
FUNCTIONAL DATA (cont)**

9-331

Table 9-30. Pilot and CPG Caution/Warning Panels – Indicator Functional Data

<u>PILOT LAMP KEY</u>	<u>POILOT INDICATOR LEGEND</u>	<u>PILOT PANEL INPUT PIN NO. (P18)</u>	<u>FAULT INPUT SIGNAL (LAMP ON)</u>	<u>PILOT PANEL OUTPUT PIN NO. (P18)</u>	<u>CPG PANEL INPUT PIN NO. (P19)</u>	<u>CPG INDICATOR LEGEND</u>	<u>CPG LAMP KEY</u>
A1	FUEL LOW FWD	J1-21	GROUND	J1-128	J1-21	FUEL LOW FWD	A1
B1	EXT EMP(ADA) FUEL XFR(ADB)	J1-51 J1-93	GROUND GROUND	J1-102	J1-11	FUEL XFR(ADB)	B2
B1	FUEL XFR	J1-95	GROUND	J1-94	J1-95	FUEL XFER(ADA) FUEL XFR(ADB)	B2 B2
C1	PRI HYD PSI	J1-71	GROUND	J1-121	J1-71	PRI HYD	C1
D1	UTIL HYD PSI	J1-72	GROUND	J1-122	J1-72	UTIL HYD	D1
E1	MAN STAB	J1-97	GROUND	J1-90	J1-93	MAN STAB	E1
F1	BUCS ON	J1-40	GROUND	J1-114	J1-40	BUCS ON	F1
F1	ADS	J1-98	+28 VDC	J1-100	J1-98	ADS	F1
A2	FUEL LOW AFT	J1-22	GROUND	J1-119	J1-22	FUEL LOW AFT	A2
B2	BOOST PMP ON	J1-96	+28 VDC				
C2	OIL LOW PRI HYD	J1-68	GROUND				
D2	OIL LOW UTIL HYD	J1-67	GROUND				
E2	OIL PSI ACC PUMP	J1-4	GROUND				
F2	ASE	J1-46	GROUND	J1-116	J1-46	ASE	F2
A3	REFUEL VALVE OPEN	J1-76	GROUND				
B3	CHIPS NOSE GRBX 1	J1-36	GROUND	J1-103	J1-36	ENG 1	A3

**9-331. PILOT AND CPG CAUTION/WARNING PANELS – INDICATORS
FUNCTIONAL DATA (cont)**

9-331

Table 9-30. Pilot and CPG Caution/Warning Panels – Indicator Functional Data (cont)

<u>PILOT LAMP KEY</u>	<u>POILOT INDICATOR LEGEND</u>	<u>PILOT PANEL INPUT PIN NO. (P18)</u>	<u>FAULT INPUT SIGNAL (LAMP ON)</u>	<u>PILOT PANEL OUTPUT PIN NO. (P18)</u>	<u>CPG PANEL INPUT PIN NO. (P19)</u>	<u>CPG INDICATOR LEGEND</u>	<u>CPG LAMP KEY</u>
C3	OIL BYP PRI HYD	J1-69	GROUND				
D3	OIL BYP UTIL HYD	J1-70	GROUND				
E3	CHIPS NOSE GRBX 2	J1-37	GROUND				
F3	XFEED(ADB)	J1-125	GROUND	J1-118	J1-12	XFEED(ADB)	E2
F3	XFEED(ADB)	J1-60	GROUND	J1-61	J1-6	XFEED(ADB)	E2
A4	CHIPS ENG 1	J1-29	GROUND	J1-58	J1-29	ENG 1	A3
B4	OIL PSI NOSE GRBX 1	J1-44	GROUND	J1-105	J1-44	ENG1	A3
C4	OIL PSI MAIN XMSN 1	J1-9	GROUND	J1-93	J1-9	MAIN XMSN 1	C2
D4	OIL PSI MAIN XMSN 2	J1-10	GROUND	J1-84	J1-10	MAIN XMSN 2	D2
E4	OIL PSI NOSE GRBX 2	J1-45	GROUND	J1-106	J1-45	ENG 2	F3
F4	CHIPS ENG 2	J1-30	GROUND	J1-59	J1-30	ENG 2	F3
A5	OIL PSI ENG 1	J1-7	GROUND	J1-81	J1-7	ENG 1	A3
B5	OIL HOT NOSE GRBX 1	J1-52	GROUND	J1-107	J1-52	ENG 1	A3
C5	OIL HOT MAIN XMSN 1	J1-65	GROUND	J1-109	J1-65	MAIN XMSN 1	C2
D5	OIL HOT MAIN XMSN 2	J1-66	GROUND	J1-110	J1-66	MAIN XMSN 2	D2

**9-331. PILOT AND CPG CAUTION/WARNING PANELS – INDICATORS
FUNCTIONAL DATA (cont)**

9-331

Table 9-30. Pilot and CPG Caution/Warning Panels – Indicator Functional Data (cont)

<u>PILOT LAMP KEY</u>	<u>POILOT INDICATOR LEGEND</u>	<u>PILOT PANEL INPUT PIN NO. (P18)</u>	<u>FAULT INPUT SIGNAL (LAMP ON)</u>	<u>PILOT PANEL OUTPUT PIN NO. (P18)</u>	<u>CPG PANEL INPUT PIN NO. (P19)</u>	<u>CPG INDICATOR LEGEND</u>	<u>CPG LAMP KEY</u>
E5	OIL HOT NOSE GRBX 2	J1-53	GROUND	J1-108	J1-53	ENG 2	F3
F5	OIL PSI ENG 2	J1-8	GROUND	J1-82	J1-8	ENG 2	FC
A6	OIL BYP ENG 1	J1-17	GROUND	J1-87	J1-17	ENG 1	A3
B6	GEN 1	J1-11	GROUND				
B1	RECT 1	J1-15	GROUND	J1-20	J1-15	ELEC SYS FAIL	C4
E6	GEN 2	J1-12	GROUND				
E6	RECT 2	J1-16	GROUND	J1-13	J1-16	ELEC SYS FAIL	C4
F6	OIL BYP ENG 2	J1-18	GROUND	J1-88	J1-18	ENG 2	F3
A7	FUEL BYP ENG 1	J1-23	GROUND	J1-91	J1-23	ENG1	A3
B7	HOT RECT 1	J1-42	GROUND				
C7	CHIPS MAIN XMSN	J1-3	GROUND	J1-80	J1-3	CHIPS MAIN XMSN	C3
D7	TEMP INT	J1-26	GROUND	J1-33	J1-26	TEMP INT	D3
D7	TEMP TR	J1-25	GROUND	J1-64	J1-25	TEMP TR	D3
E7	HOT RECT 2	J1-43	GROUND				
F7	FUEL BYP ENG 2	J1-24	GROUND	J1-92	J1-24	ENG 2	F3
A8	FUEL PSI ENG 1	J1-78	GROUND	J1-5	J1-78	ENG 1	A3
B8	PRI MUX	J1-49	+28 VDC				
B8	RDR JAM	J1-101	GROUND				

**9-331. PILOT AND CPG CAUTION/WARNING PANELS – INDICATORS
FUNCTIONAL DATA (cont)**

Table 9-30. Pilot and CPG Caution/Warning Panels – Indicator Functional Data (cont)

<u>PILOT LAMP KEY</u>	<u>POILOT INDICATOR LEGEND</u>	<u>PILOT PANEL INPUT PIN NO. (P18)</u>	<u>FAULT INPUT SIGNAL (LAMP ON)</u>	<u>PILOT PANEL OUTPUT PIN NO. (P18)</u>	<u>CPG PANEL INPUT PIN NO. (P19)</u>	<u>CPG INDICATOR LEGEND</u>	<u>CPG LAMP KEY</u>
C8	SHAFT DRIVEN COMP	J1-38	GROUND				
D8	VIB GRBX	J1-31	GROUND	J1-48	J1-31	VIB GRBX	E3
E8	HOT BAT	J1-57	GROUND				
E8	CHARGER	J1-56	GROUND				
F8	FUEL PSI ENG 2	J1-79	GROUND	J1-6	J1-79	ENG 2	F3
A9	GUN	J1-27	+28 VDC				
A9	ROCKET	J1-28	+28 VDC				
B9	IR JAM	J1-99	GROUND				
B9	PNVS	J1-77	+28 VDC				
C9	BLADE ANTI ICE FAIL	J1-75	GROUND				
D9	ENG ICE	J1-73	+28 VDC				
E9	RTR BK	J1-2	+28 VDC				
E9	EXT EMP(ADB)	J1-51	GROUND				
F9	CANOPY	J1-32	GROUND				
F9	EXT PWR	J1-47	GROUND				
A10	MISSILE	J1-35	+28 VDC				
A10	IFF	J-1	+28 VDC	J1-117	J1-1	IFF	A4

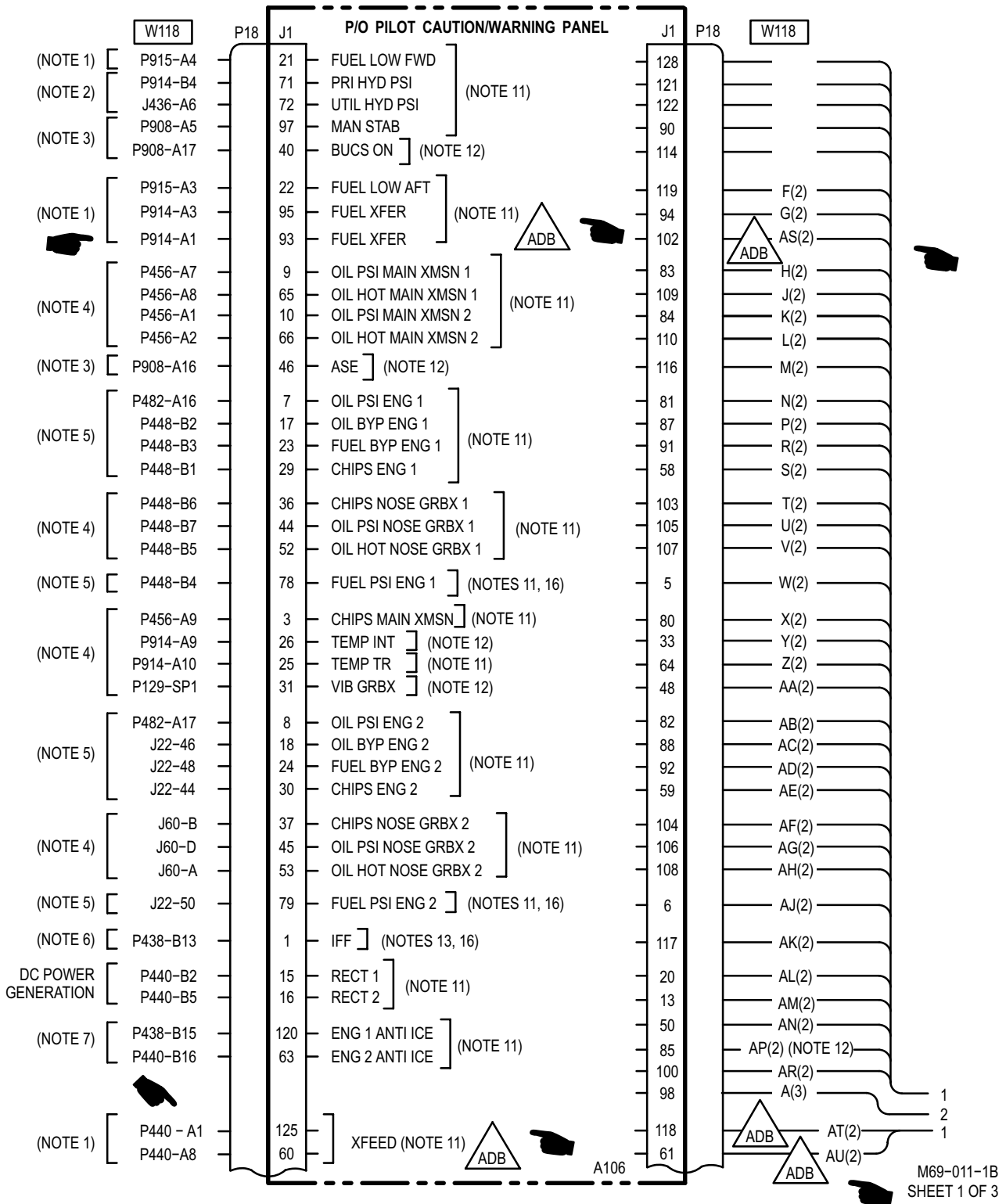
**9-331. PILOT AND CPG CAUTION/WARNING PANELS – INDICATORS
FUNCTIONAL DATA (cont)**

9-331

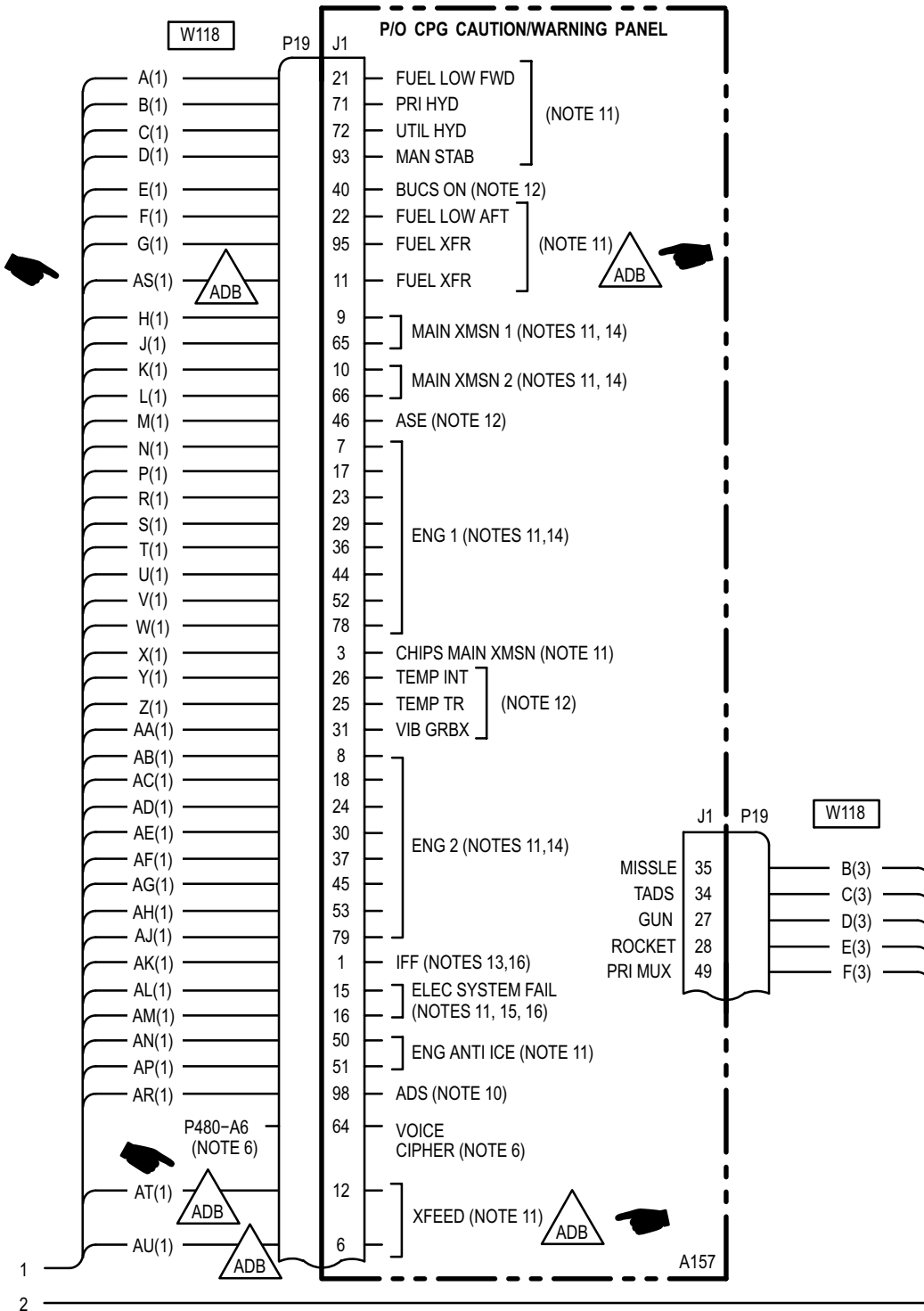
Table 9-30. Pilot and CPG Caution/Warning Panels – Indicator Functional Data (cont)

<u>PILOT LAMP KEY</u>	<u>POILOT INDICATOR LEGEND</u>	<u>PILOT PANEL INPUT PIN NO. (P18)</u>	<u>FAULT INPUT SIGNAL (LAMP ON)</u>	<u>PILOT PANEL OUTPUT PIN NO. (P18)</u>	<u>CPG PANEL INPUT PIN NO. (P19)</u>	<u>CPG INDICATOR LEGEND</u>	<u>CPG LAMP KEY</u>
B10	ECS	J1-39	+28 VDC				
B10	TADS	J1-34	+28 VDC				
C10	CANOPY ANTI ICE FAIL	J1-74	GROUND				
D10	ENG 1 ANTI ICE	J1-120	GROUND	J1-50	J1-50	ENG ANTI ICE	D4
E10	ENG 2 ANTI ICE	J1-63	GROUND	J1-85	J1-51	ENG ANTI ICE	D4
F10	APU ON	J1-54	+28 VDC				
F10	APU FAIL	J1-55	GROUND				
			+28 VDC		J1-34	TADS	A4
			+28 VDC		J1-27	GUN	B3
			+28 VDC		J1-28	ROCKET	B3
			+28 VDC		J1-35	MISSILE	B4
			+28 VDC		J1-49	PRI MUX	B4
			+28 VDC		J1-64	VOICE CIPHER	F4

9-332. PILOT AND CPG CAUTION/WARNING PANELS - WIRING INTERCONNECT DIAGRAM



9-332. PILOT AND CPG CAUTION/WARNING PANELS - WIRING INTERCONNECT DIAGRAM (cont)

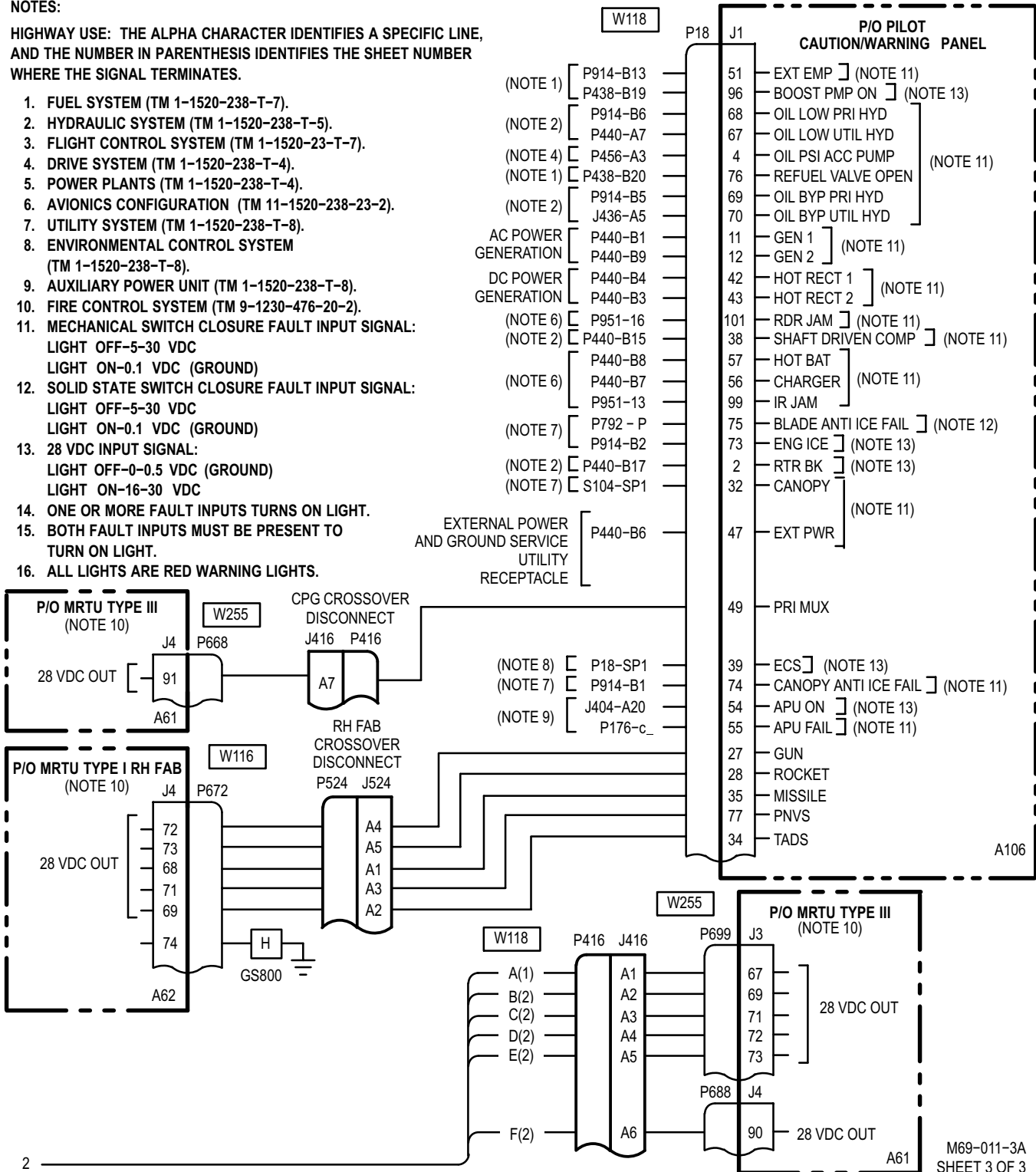


9-332. PILOT AND CPG CAUTION/WARNING PANELS - WIRING INTERCONNECT DIAGRAM (cont)

NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

1. FUEL SYSTEM (TM 1-1520-238-T-7).
2. HYDRAULIC SYSTEM (TM 1-1520-238-T-5).
3. FLIGHT CONTROL SYSTEM (TM 1-1520-23-T-7).
4. DRIVE SYSTEM (TM 1-1520-238-T-4).
5. POWER PLANTS (TM 1-1520-238-T-4).
6. AVIONICS CONFIGURATION (TM 11-1520-238-23-2).
7. UTILITY SYSTEM (TM 1-1520-238-T-8).
8. ENVIRONMENTAL CONTROL SYSTEM (TM 1-1520-238-T-8).
9. AUXILIARY POWER UNIT (TM 1-1520-238-T-8).
10. FIRE CONTROL SYSTEM (TM 9-1230-476-20-2).
11. MECHANICAL SWITCH CLOSURE FAULT INPUT SIGNAL:
LIGHT OFF-5-30 VDC
LIGHT ON-0.1 VDC (GROUND)
12. SOLID STATE SWITCH CLOSURE FAULT INPUT SIGNAL:
LIGHT OFF-5-30 VDC
LIGHT ON-0.1 VDC (GROUND)
13. 28 VDC INPUT SIGNAL:
LIGHT OFF-0-0.5 VDC (GROUND)
LIGHT ON-16-30 VDC
14. ONE OR MORE FAULT INPUTS TURNS ON LIGHT.
15. BOTH FAULT INPUTS MUST BE PRESENT TO TURN ON LIGHT.
16. ALL LIGHTS ARE RED WARNING LIGHTS.



9-333. PILOT CAUTION AND WARNING SYSTEM – MAINTENANCE OPERATIONAL CHECK

9-333

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06

References:

TM 1-1520-238-23

Equipment Conditions:

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

Ref

Paragraph 9-45

Condition

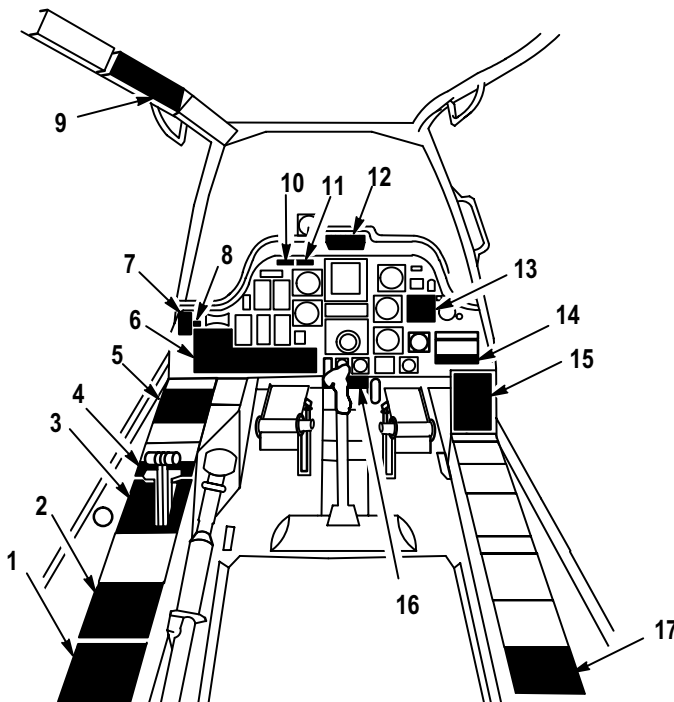
EXTERNAL POWER
– POWER UP completed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

NOTE

- Refer to pilot station (fig. 9-212) for cockpit configuration and equipment.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.



1. PILOT ANTI ICE PANEL
2. PILOT EXT LT/INTR LT PANEL
3. PILOT POWER QUADRANT
4. PILOT EMERG PWR CHK OVSP TEST PANEL
5. PILOT ROCKETS CONTROL PANEL
6. PILOT FIRE CONTROL PANEL
7. PILOT TAIL WHEEL PANEL
8. PILOT ARM / SAFE INDICATOR
9. PILOT CENTER CIRCUIT BREAKER PANEL
10. PILOT ENG 1 FIRE PULL INDICATOR
11. PILOT ENG 2 FIRE PULL INDICATOR
12. PILOT MASTER CAUTION/WARNING PANEL
13. PILOT RADAR WARNING INDICATOR
14. PILOT RADAR WARNING CONTROL PANEL
15. PILOT CAUTION/WARNING PANEL
16. PILOT REMOTE TRANSMITTER SELECTOR INDICATOR PANEL
17. PILOT APU FIRE TEST PANEL

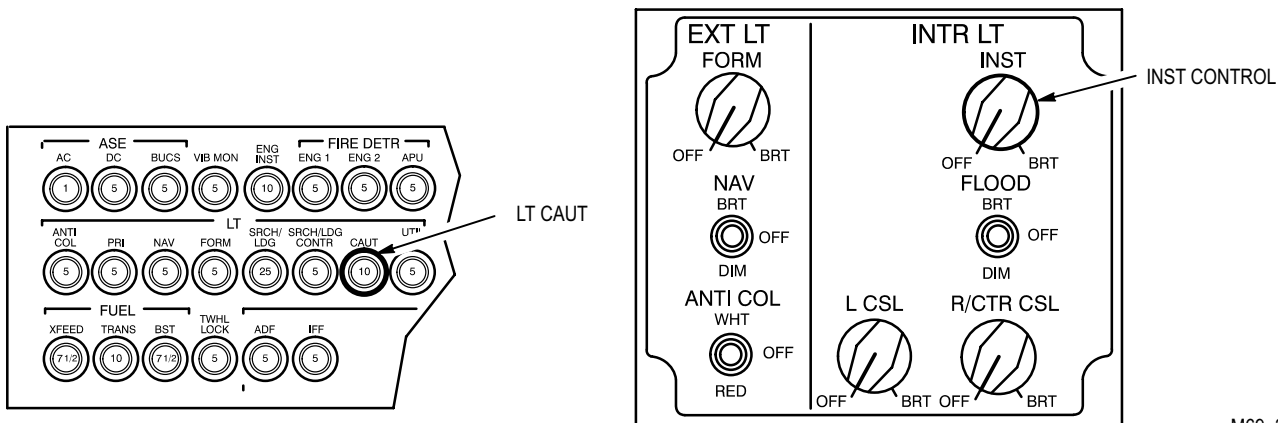
M69-302

Figure 9-212. Pilot Station

9-333. PILOT CAUTION AND WARNING SYSTEM – MAINTENANCE OPERATIONAL CHECK (cont)

1. Perform the maintenance operational check as follows:

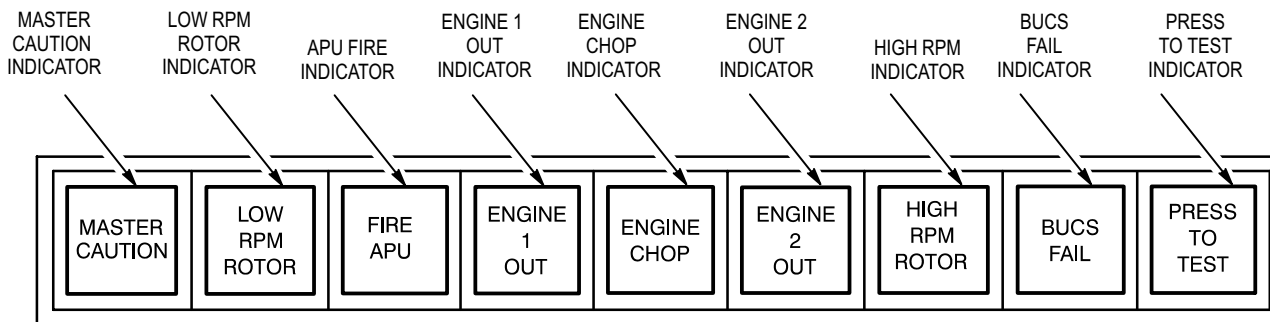
Task	Result
a. On pilot center circuit breaker panel (fig. 9-213), check that LT CAUT circuit breaker (CB21) is closed.	If LT CAUT circuit breaker (CB21) does not stay closed, go to paragraph 9-335.
b. On pilot EXT LT/INTR LT panel (fig. 9-213), place INST control to BRT .	If pilot caution/warning edge-lighted panel is not lighted, go to paragraph 9-336A.



M69-304

Figure 9-213. Pilot Center Circuit Breaker and EXT LT/INTR LT Panels

c. On pilot master caution/warning panel (fig. 9-214), check that PRESS TO TEST indicator is lighted.	If PRESS TO TEST indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-336.
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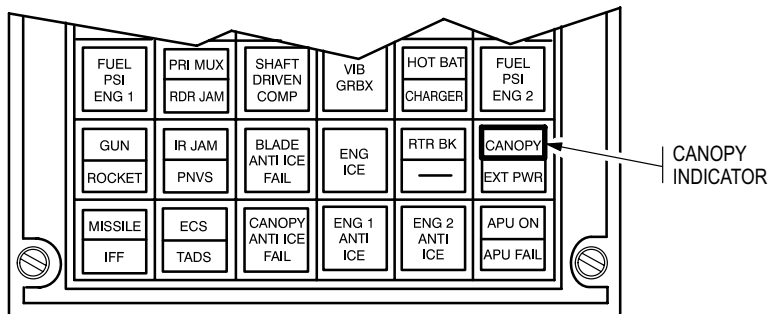
M69-305

Figure 9-214. Pilot Master Caution/Warning Panel

9-333. PILOT CAUTION AND WARNING SYSTEM – MAINTENANCE OPERATIONAL CHECK (cont)

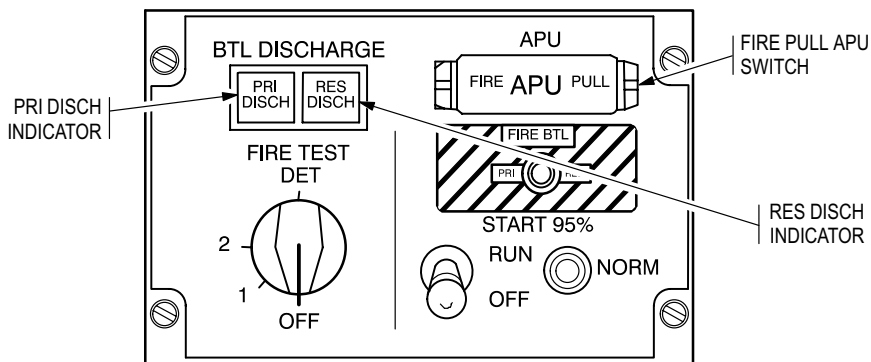
9-333

Task	Result
<p>d. On pilot master caution/warning panel, press and hold PRESS TO TEST indicator.</p>	<p>If all master caution/warning indicators are not lighted, go to paragraph 9-337.</p> <p>If MASTER CAUTION indicator is not lighted and flashing, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-338.</p> <p>If LOW RPM ROTOR indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-339.</p> <p>If FIRE APU indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-340.</p> <p>If ENGINE 1 OUT indicator is not lighted, replace lamp (TM 1-1520-238-23). If still does not light, go to paragraph 9-341.</p> <p>If ENGINE CHOP indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-342.</p> <p>If ENGINE 2 OUT indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-343.</p> <p>If HIGH RPM ROTOR indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-344.</p> <p>If BUCS FAIL indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-345.</p>
<p>e. On pilot caution/warning panel (fig. 9-215), check that all indicators are lighted or flashing.</p>	<p>If all caution/warning indicators are not lighted or flashing, go to paragraph 9-337.</p> <p>If some indicators are not lighted or flashing, replace appropriate lamp(s) (TM 1-1520-238-23).</p> <p>If lamps still do not light, go to paragraph 9-331 to troubleshoot pilot caution/warning indicators.</p>
<p>f. On pilot APU fire test panel (fig. 9-216), check that PRI DISCH, and RES DISCH indicators are lighted.</p>	<p>If PRI DISCH indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-346.</p> <p>If RES DISCH indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-347.</p>



M69-306

Figure 9-215. Pilot Caution/Warning Panel



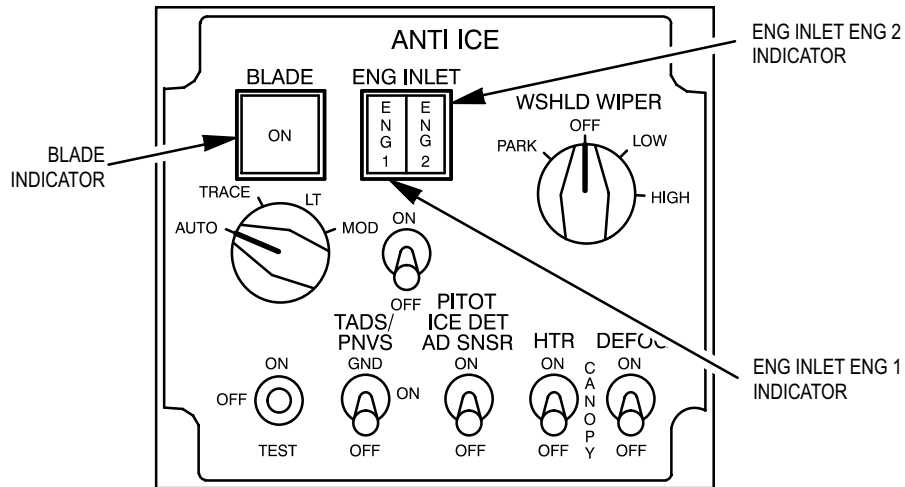
M69-307

Figure 9-216. Pilot APU Fire Test Panel

Task	Result
g. On pilot ANTI ICE panel (fig. 9-217), check that ENG INLET ENG 1 , ENG INLET ENG 2 , and BLADE indicators are lighted.	<p>If ENG INLET ENG 1 indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-348.</p> <p>If ENG INLET ENG 2 indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-349.</p> <p>If BLADE indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-350.</p>
h. On pilot power quadrant (fig. 9-218), check that ENG START ENG 1 and ENG START ENG 2 indicators are lighted.	<p>If ENG START ENG 1 indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-351.</p> <p>If ENG START ENG 2 indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-352.</p>

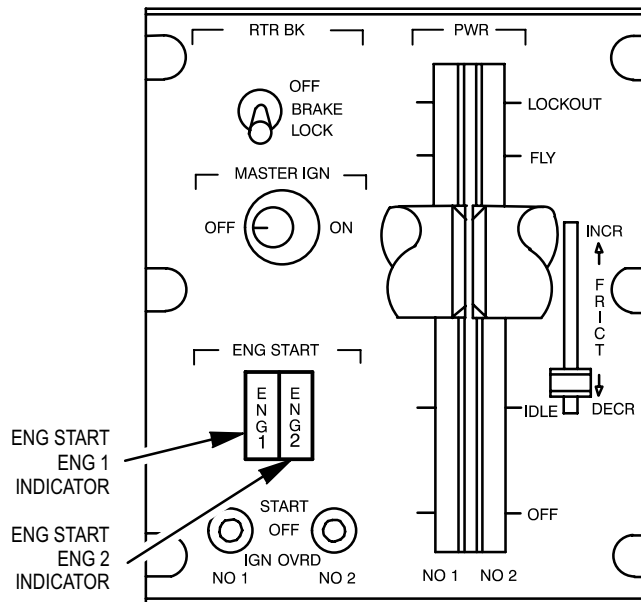
9-333. PILOT CAUTION AND WARNING SYSTEM – MAINTENANCE OPERATIONAL CHECK (cont)

9-333



M69-308

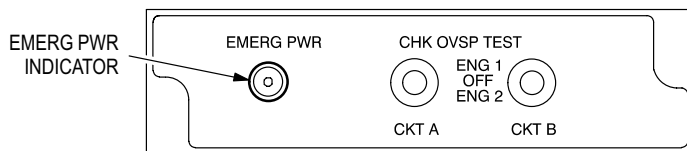
Figure 9-217. Pilot ANTI ICE Panel



M69-309

Figure 9-218. Pilot Power Quadrant

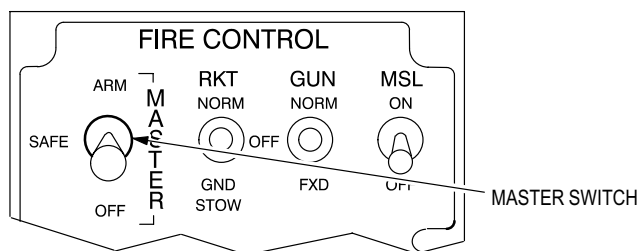
Task	Result
<p>i. On pilot EMERG PWR CHK OVSP TEST panel (fig. 9-219), check that EMERG PWR indicator is lighted.</p>	<p>If EMERG PWR indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-353.</p>



M69-310

Figure 9-219. Pilot EMERG PWR CHK OVSP TEST Panel

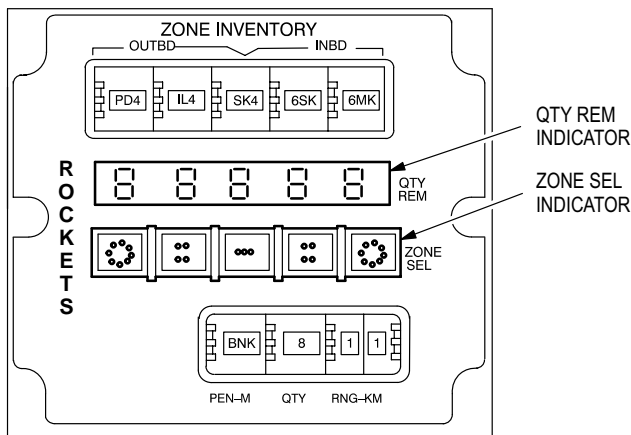
Task	Result
j. On APU fire test panel (fig. 9-216), check that the APU FIRE PULL indicator is lighted.	If APU FIRE PULL indicator does not light, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-354.
k. On CPG FIRE CONTROL panel (fig. 9-234), set PLT/GND ORIDE to ORIDE and CPG ARM/SAFE switch to SAFE . On pilot FIRE CONTROL panel, (fig. 9-220), set MASTER switch to SAFE .	



M69-376

Figure 9-220. Pilot FIRE CONTROL Panel

l. On pilot ROCKETS control panel (fig. 9-221), check that QTY REM and ZONE SEL indicators are lighted.	If QTY REM and ZONE SEL indicators are not lighted, replace lamps (TM 1-1520-238-23). If lamps still do not light, go to paragraph 9-355.
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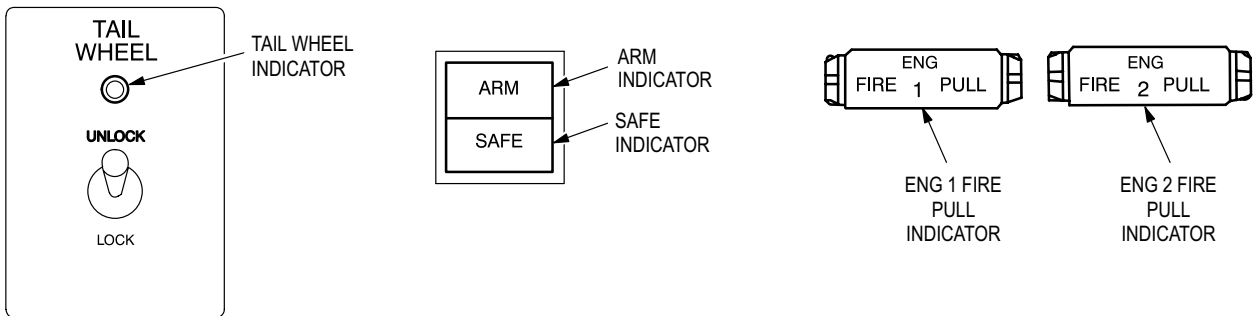
M69-311

Figure 9-221. Pilot ROCKETS Control Panel

9-333. PILOT CAUTION AND WARNING SYSTEM – MAINTENANCE OPERATIONAL CHECK (cont)

9-333

Task	Result
<p>m. On CPG FIRE CONTROL panel (fig. 9-234), set CPG ARM/SAFE switch to OFF and PLT/GND ORIDE to OFF. On pilot FIRE CONTROL panel (fig. 9-220), place MASTER switch to OFF.</p>	
<p>n. On pilot TAIL WHEEL panel (fig. 9-222), check that TAILWHEEL indicator is lighted.</p>	<p>If TAIL WHEEL indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-356.</p>
<p>o. On pilot instrument panel, check that ARM/SAFE, ENG 1 FIRE PULL and ENG 2 FIRE PULL indicators (fig. 9-222) are lighted.</p>	<p>If ARM/SAFE indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-357.</p> <p>If ENG 1 FIRE PULL indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-358.</p> <p>If ENG 2 FIRE PULL indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-359.</p>

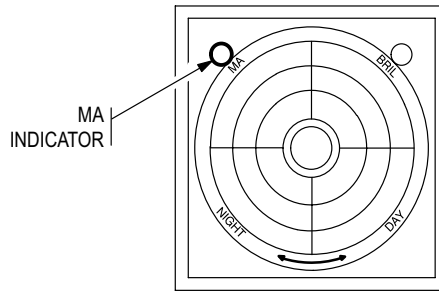


M69-312A

Figure 9-222. Pilot TAIL WHEEL Panel, ARM/SAFE and ENG 1 and 2 FIRE PULL Indicators

- p. On pilot radar warning display (fig. 9-223), check that **MA** indicator is lighted.
- q. Deleted

If **MA** indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-360.

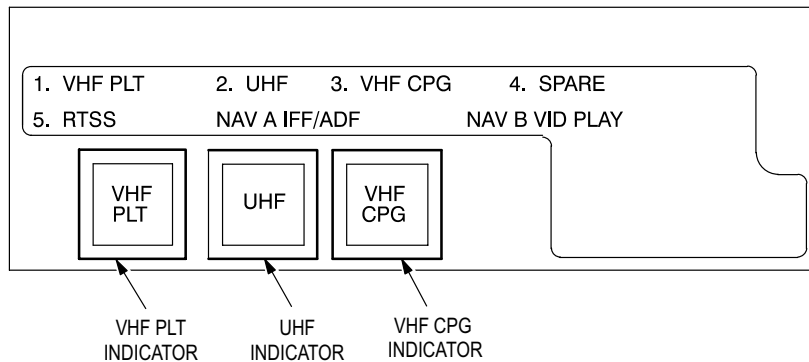


M69-315

Figure 9-223. Pilot Radar Warning Display

Figure 9-224. Deleted

Task	Result
r. (AAN) On remote transmitter selector indicator panel (fig. 9-225), check that VHF PLT , UHF , and VHF CPG indicators are lighted.	(AAN) If VHF PLT , UHF , and VHF CPG indicators are not lighted, replace lamps (TM 1-1520-238-23). If lamps still do not light, go to paragraph 9-362.
(ACD) On remote indicator panel (fig. 9-225), check that VHF-1 , UHF , and VHF-2 indicators are lighted.	(ACD) If VHF-1 , UHF , VHF-2 indicators are not lighted, replace lamps (TM 1-1520-238-23). If lamps still do not light, go to paragraph 9-362.



M69-317B

Figure 9-225. Pilot Remote Transmitter Selector Indicator and Remote Indicator Panels

9-333. PILOT CAUTION AND WARNING SYSTEM – MAINTENANCE OPERATIONAL CHECK (cont)

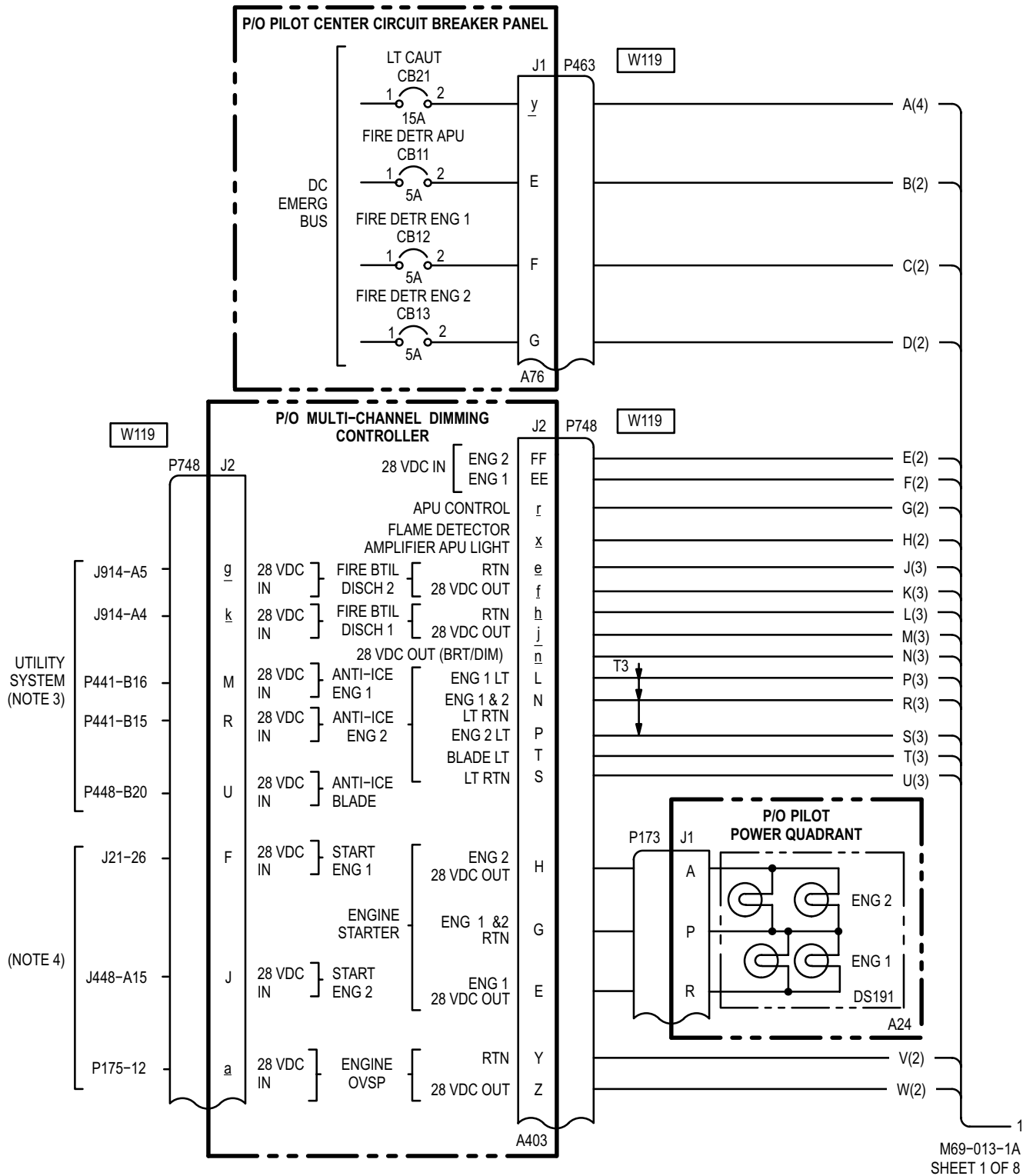
9-333

- | | |
|--|---|
| s. Open pilot canopy. On pilot master caution/warning panel (fig. 9-214), check that MASTER CAUTION indicator is lighted and flashing. | If MASTER CAUTION indicator is not lighted and flashing, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-337. |
| t. On pilot caution/warning panel (fig. 9-215), check that CANOPY indicator is lighted and flashing. | If CANOPY indicator is not lighted and flashing, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-363. |
| u. On pilot master caution/warning panel (fig. 9-214), press MASTER CAUTION indicator, check that MASTER CAUTION indicator is not lighted. | If MASTER CAUTION indicator is lighted, go to paragraph 9-363. |
| v. On pilot EXT LT/INTR LT panel (fig. 9-213), set INST control to OFF . | If pilot caution/warning indicators do not increase in brightness, go to paragraph 9-336B. |

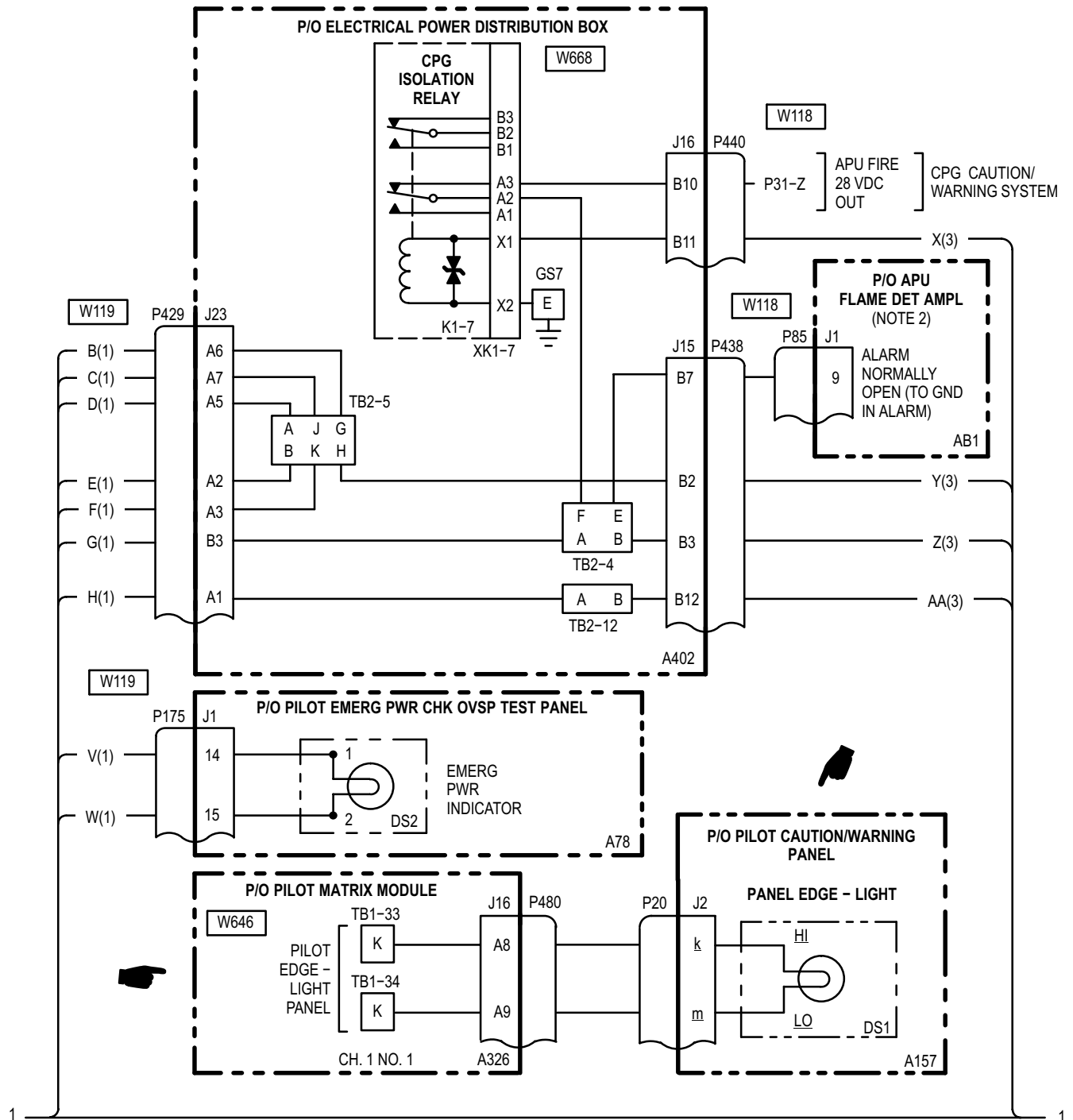
-
2. Perform EXTERNAL POWER – POWER DOWN (para 9-46).

END OF TASK

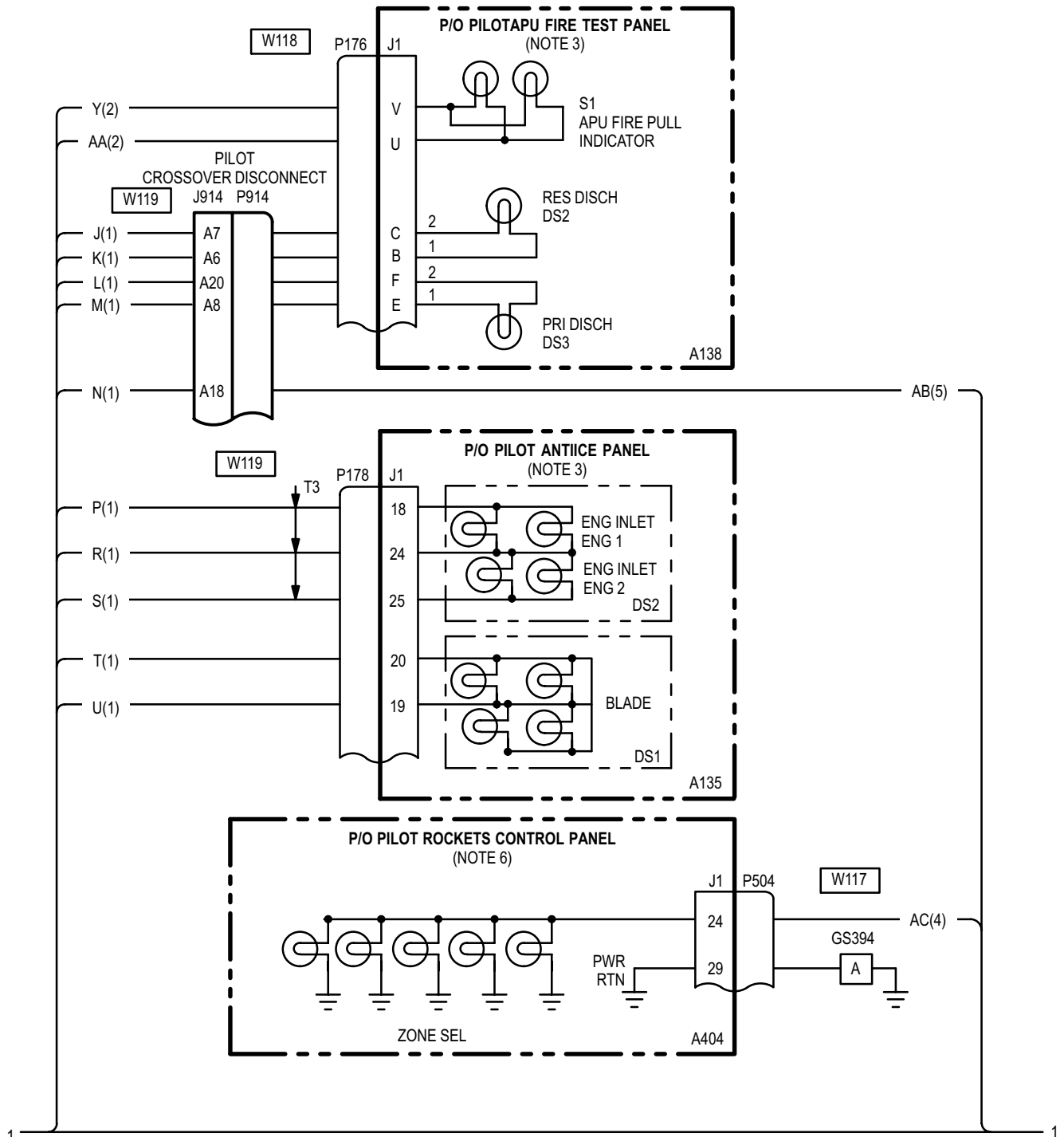
9-334. PILOT CAUTION AND WARNING SYSTEM – WIRING INTERCONNECT DIAGRAM



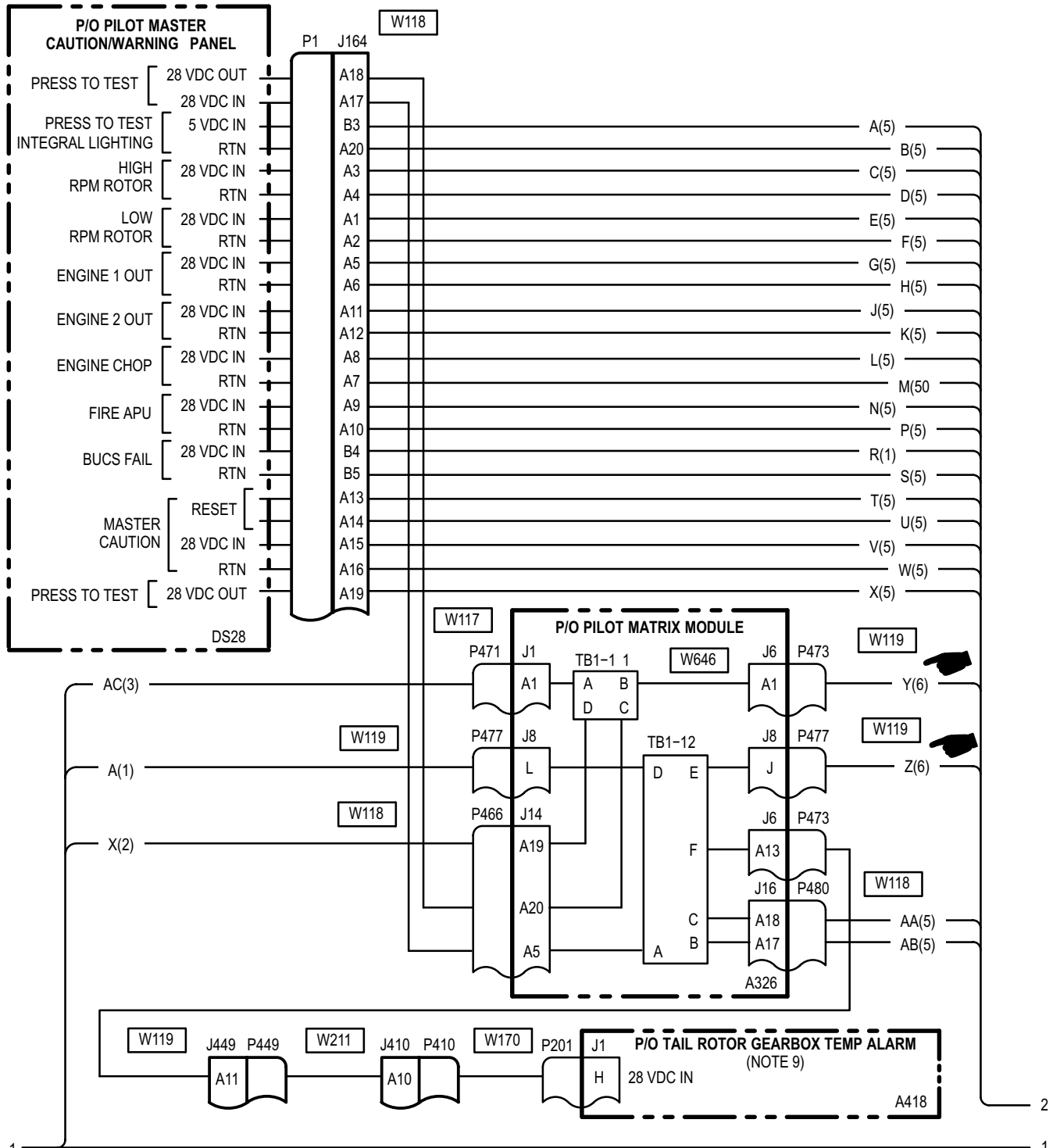
9-334. PILOT CAUTION AND WARNING SYSTEM – WIRING INTERCONNECT DIAGRAM (cont)



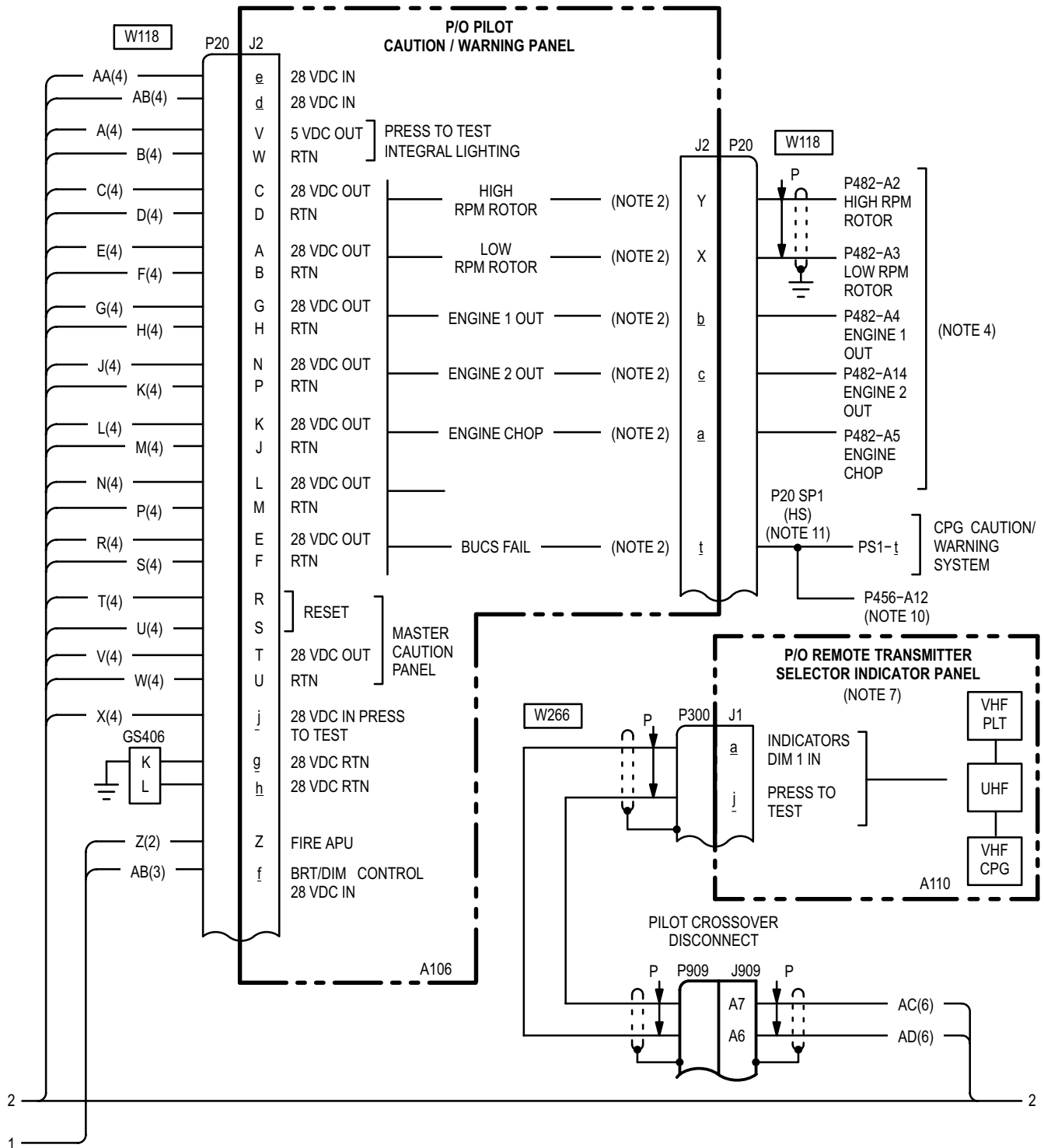
9-334. PILOT CAUTION AND WARNING SYSTEM – WIRING INTERCONNECT
 DIAGRAM (cont)



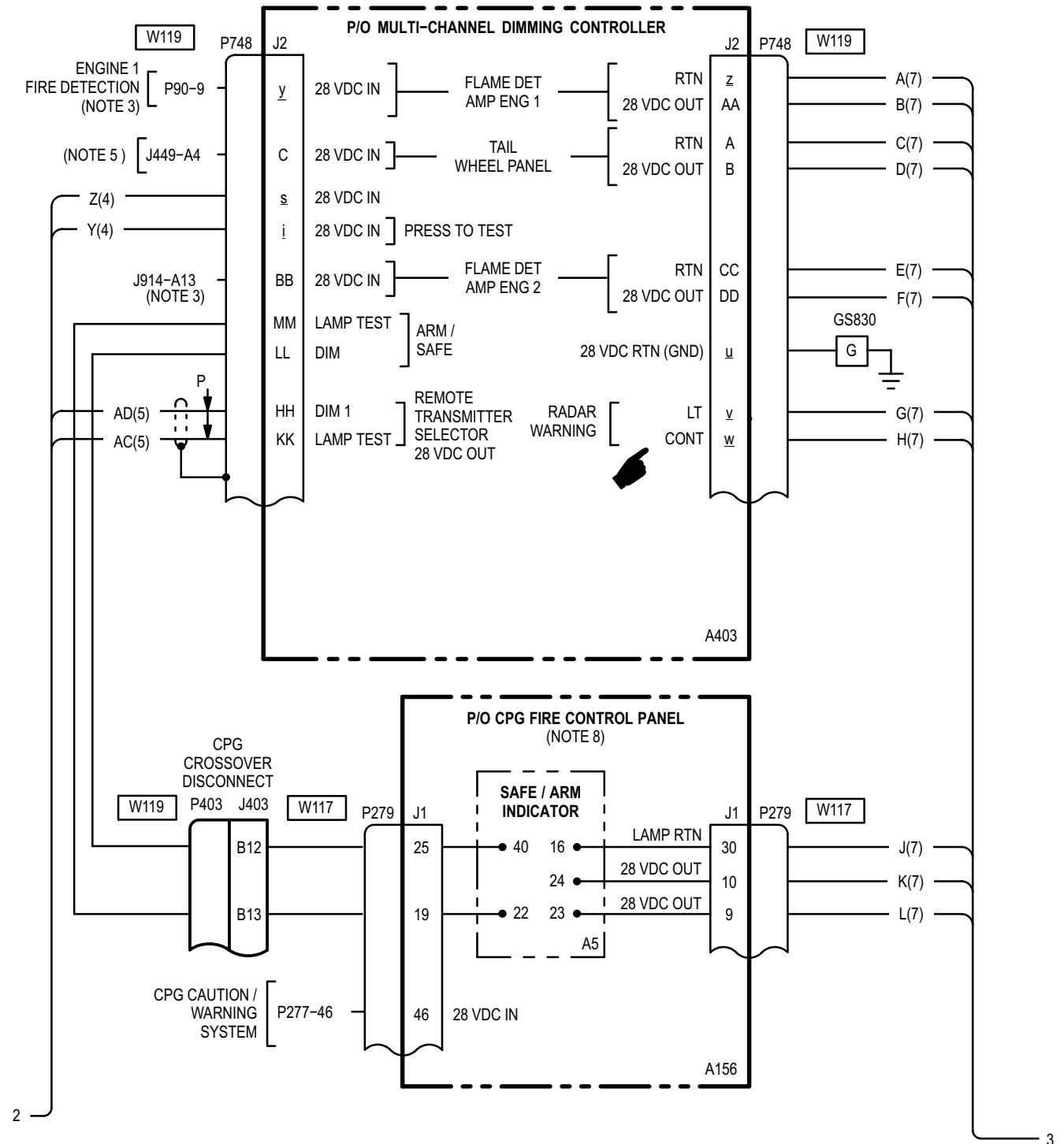
9-334. PILOT CAUTION AND WARNING SYSTEM – WIRING INTERCONNECT DIAGRAM (cont)



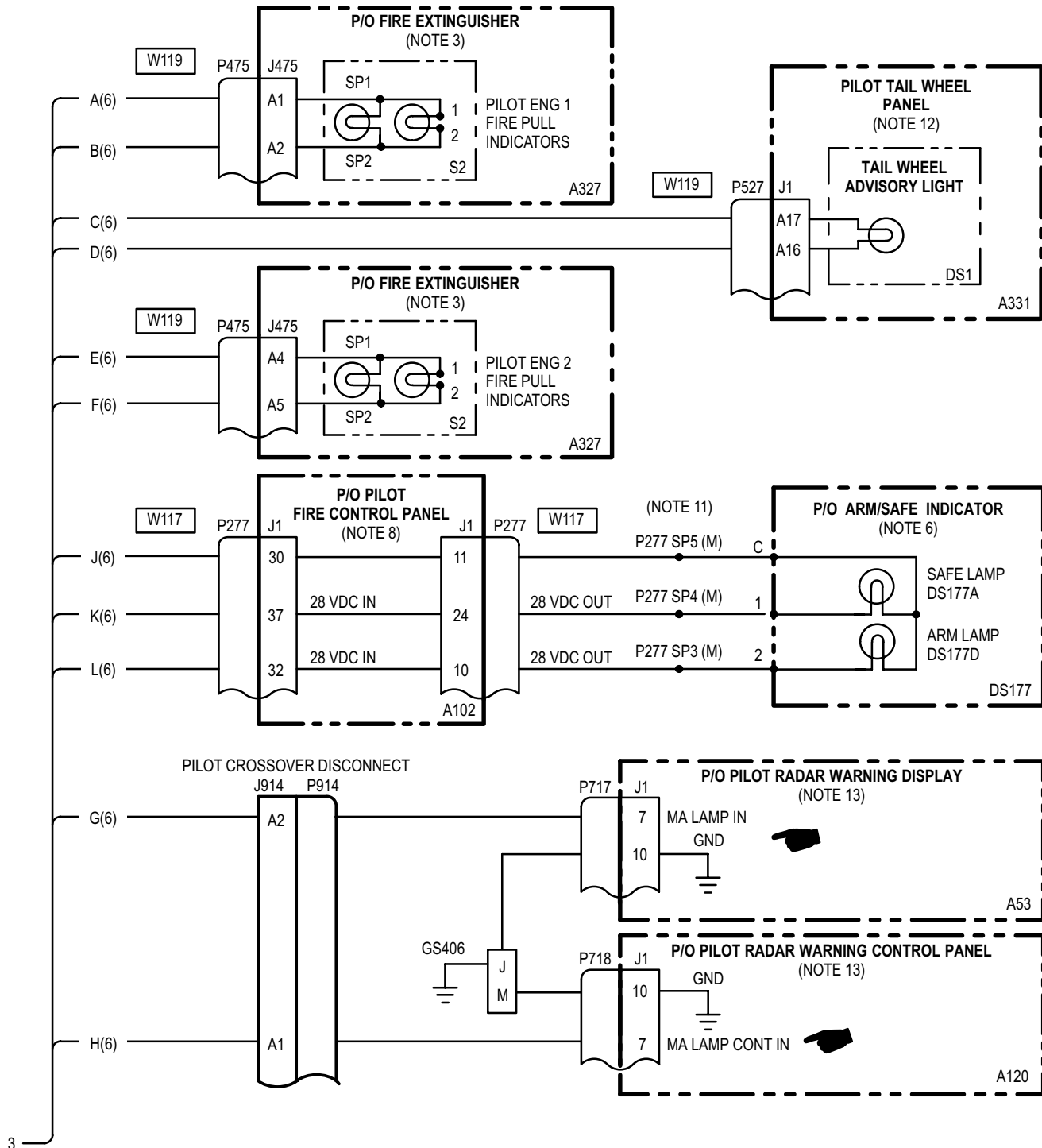
9-334. PILOT CAUTION AND WARNING SYSTEM – WIRING INTERCONNECT
 DIAGRAM (cont)



9-334. PILOT CAUTION AND WARNING SYSTEM – WIRING INTERCONNECT DIAGRAM (cont)



9-334. PILOT CAUTION AND WARNING SYSTEM – WIRING INTERCONNECT DIAGRAM (cont)



**9-334. PILOT CAUTION AND WARNING SYSTEM – WIRING INTERCONNECT
DIAGRAM (cont)**

9-334

NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

1. GROUND AT FAULT INPUT.
2. AUXILIARY POWER UNIT (TM 1-1520-238-T-8).
3. UTILITY SYSTEM (TM 1-1520-238-T-8).
4. POWER PLANTS (TM 1-1520-238-T-4).
5. HYDRAULIC SYSTEM (TM 1-1520-238-T-5).
6. AREA WEAPON AND ROCKETS (TM 9-1090-238-23-2).
7. AVIONICS CONFIGURATION – INTERCOMMUNICATION SYSTEM (TM 11-1520-238-23-2).
8. FIRE CONTROL SYSTEM (TM 9-1230-476-20-2).
9. DRIVE SYSTEM (TM 1-1520-238-T-4).
10. FLIGHT CONTROL SYSTEM (TM 1-1520-238-T-7).
11. HS DESIGNATES A HARD SPLICE WHICH CANNOT BE DISCONNECTED.
M DESIGNATES A SOFT SPLICE WHICH MAY BE DISCONNECTED FOR A WIRING CHECK.
12. LANDING GEAR SYSTEM (TM 1-1520-238-T-4).
13. AVIONICS CONFIGURATION – RADAR WARNING SYSTEM (TM 11-1520-238-23-2).

9-335. LT CAUT CIRCUIT BREAKER (CB21) – DOES NOT STAY CLOSED

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-149	Pilot circuit breaker panel accessing – completed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot center circuit breaker panel, open **LT CAUT** circuit breaker (CB21). Check for short between (A76)J1-y and ground.
Does short exist?

YES	Go to paragraph 9-263 to troubleshoot dc emergency bus – pilot station.
NO	Go to step 2.
- With wire ends (A326): TB1-12-A and TB1-12-D detached, check for short between (A326): TB1-12-A and ground, TB1-12-D and ground.
Does short exist?

YES	Go to step 3.
NO	Go to step 4.

- With wire ends (A326): TB1-12-A and TB1-12-D detached, check for short between J164-A17 and ground.
Does short exist?

YES	Repair shorted wire. Go to paragraph 9-333.
NO	Replace pilot master caution/warning panel (TM 1-1520-238-23).
- With wire ends (A326): TB1-12-B and TB1-12-C detached, check for short between (A326): TB1-12-B and ground, TB1-12-C and ground.
Does short exist?

YES	Go to step 8.
NO	Go to step 5.
- With wire end (A326)TB1-12-E detached, check for short between (A326)TB1-12-E and ground.
Does short exist?

YES	Go to step 7.
NO	Go to step 6.
- With wire end (A326)TB1-12-F detached, check for short between P20-H and ground.
Does short exist?

YES	Repair shorted wire. Go to paragraph 9-333.
NO	Replace tail rotor gearbox temperature alarm (TM 1-1520-238-23).
- With wire end (A326)TB1-12-E detached, check for short between P748-s and ground.
Does short exist?

YES	Repair shorted wire. Go to paragraph 9-333.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

9-335. LT CAUT CIRCUIT BREAKER (CB21) – DOES NOT STAY CLOSED (cont)

9-335

8. With wires ends (A326)TB1-12-B and (A326)TB1-12-C detached, check for short between:

P20-d and ground,

P20-e and ground.

Does short exist?

- | | |
|-----|---|
| YES | Repair shorted wire.
Go to paragraph 9-333. |
| NO | Replace pilot caution/warning panel (TM 1-1520-238-23). |

END OF TASK

9-336. PRESS TO TEST INDICATOR – IS NOT LIGHTED

9-336

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **EXT/INTR LT** panel, place **INST** control to **BRT**. Check for 5 VDC at J164-A20.

Is voltage present?

- YES Go to step 2.
- NO Go to step 3.

2. Check for open between:
P20-W and J164-A20,
P20-V and J164-B3.

Does open exist?

- YES Repair open wire.
 Go to paragraph 9-333.
- NO Go to step 3.

3. On pilot caution/warning panel, check for 28 VDC at P20-e and P20-d.

Is voltage present?

- YES Go to step 4.
- NO Go to step 5.

4. Check for open between:
P20-g and ground,
P20-h and ground.

Does open exist?

- YES Repair open wire.
 Go to paragraph 9-333.
- NO Replace pilot master
 caution/warning panel
 (TM 1-1520-238-23).

5. On pilot circuit breaker panel, check for 28 VDC at (A76)J1-y.

Is voltage present?

- YES Check for open between:
 (A326)TB1-12-B and P20-d,
 (A326)TB1-12-C and P20-e,
 (A326)TB1-12-D and P463-y.
 Repair open wire.
 Go to paragraph 9-333.
- NO Go to paragraph 9-263 to
 troubleshoot circuit protection
 system (dc emergency bus –
 pilot station).

END OF TASK

9-336A.PILOT CAUTION/WARNING EDGE-LIGHT PANEL – IS NOT LIGHTED

9-336A

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non transparent barrier removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot **EXT LT/INTR LT** panel, set **INST** control to **BRT**. On pilot matrix module, check for 5 VDC between (A326):
J16-A8 and J16-A9.
Is voltage present?

YES	Go to step 3.
NO	Go to step 2.

- Check for 5 VDC between (A326):
TB1-33-K and TB1-34-K.
Is voltage present?

YES	Repair open wire between (A326): TB1-33-K and J16-A8, TB1-34-K and J16-A9, Go to paragraph 9-333.
NO	Go to paragraph 9-113 to troubleshoot pilot edge-lights.
- Check for open between:
P480-A8 and P20-k,
P480-A9 and P20-m.
Does open exist?

YES	Repair open wire between: P480-A8 and P20-k, P480-A9 and P20-m, Go to paragraph 9-333.
NO	Replace pilot caution/warning panel (TM 1-1520-238-23).

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot **EXT LT/INTR LT** panel, set **INST** control from **OFF** to **BRT** while checking for 0 to 28 VDC at P20-f.

Does voltage change?

- | | |
|-----|---|
| YES | Replace pilot caution/warning panel (TM 1-1520-238-23). |
| NO | Go to step 2. |

2. Check for open between P748-n and P20-f.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire between: P748-n and P20-f. Go to paragraph 9-333. |
| NO | Replace multi-channel dimming controller (TM 1-1520-238-23). |

3. Check for open between A403J2-p and A403J2-n.

Does open exist?

- | | |
|-----|---|
| YES | Replace multi-channel dimming controller (TM 1-1520-238-23) |
| NO | Go to step 4. |

4. Detach P100 from A133J1. Check for open between P100-B3 and P478-p.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire between: P100-B3 and P478-p. Go to paragraph 9-333. |
| NO | Replace pilot EXT LT/INTR LT panel (A133) (TM 1-1520-238-23) |

END OF TASK

9-337. MASTER CAUTION/WARNING AND CAUTION/WARNING PANELS – ARE NOT LIGHTED WITH PRESS TO TEST INDICATOR PRESSED 9-337

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-149	Pilot circuit breaker panel accessing – completed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot circuit breaker panel. Check for 28 VDC at (A76)J1-y.

Is voltage present?

YES	Go to step 2.
NO	Go to paragraph 9-263 to troubleshoot circuit protection system (dc emergency bus – pilot station).

2. On pilot master caution/warning panel, check for 28 VDC at J164-A17.

Is voltage present?

YES	Go to step 3.
NO	Go to step 6.

3. On pilot caution/warning panel, check for 28 VDC at P20-e and P20-d.

Is voltage present?

YES	Go to step 4.
NO	Check for open between: P20-e and (A326)TB1-12-C, P20-d and (A326)TB1-12-C. Repair open wire. Go to paragraph 9-333.

4. Check for open between: P20-g and ground, P20-h and ground, P20-j and J164-A19.

Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Go to step 5.

5. Press and hold **PRESS TO TEST** indicator and check for open between (DS28): P1-A17 and P1-A19.

Does open exist?

YES	Replace pilot master caution/warning panel (TM 1-1520-238-23).
NO	Replace pilot caution/warning panel (TM 1-1520-238-23).

6. Check for open between: J164-A17 and P466-A5, (A326)J16-A18 and (A326)TB1-12-C, (A326)J8-L and (A326)TB1-12-D.

Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Replace (A326)TB1-12 (TM 1-1520-238-23).

END OF TASK

**9-338. MASTER CAUTION INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR
PRESSED****Tools:**

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between:

P20-T and J164-A15,
P20-U and J164-A16.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire.
Go to paragraph 9-333. |
| NO | Go to step 2. |

2. Check for short between P20-T and P20-U.

Does short exist?

- | | |
|-----|--|
| YES | Repair shorted wire.
Go to paragraph 9-333. |
| NO | Replace pilot master
caution/warning panel
(TM 1-1520-238-23). If problem
still exists, replace pilot
caution/warning panel
(TM 1-1520-238-23). |

END OF TASK

**9-339. LOW RPM ROTOR INDICATOR – IS NOT LIGHTED AND FLASHING WITH
PRESS TO TEST INDICATOR PRESSED**

9-339

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between:

P20-A and J164-A1,
P20-B and J164-A2.

Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Go to step 2.

2. Check for short between P20-A and P20-B.

Does short exist?

YES	Repair shorted wire. Go to paragraph 9-333.
NO	Replace pilot master caution/warning panel (TM 1-1520-238-23). If problem still exists, replace pilot caution/warning panel (TM 1-1520-238-23).

END OF TASK

**9-340. FIRE APU INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR
PRESSED****Tools:**

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between:

P20-L and J164-A9,
P20-M and J164-A10.

Does open exist?

- | | |
|-----|---|
| YES | Go to step 2. |
| NO | Repair open wire.
Go to paragraph 9-333. |

2. Check for short between P20-L and P20-M.

Does short exist?

- | | |
|-----|--|
| YES | Repair shorted wire.
Go to paragraph 9-333. |
| NO | Replace pilot master
caution/warning panel
(TM 1-1520-238-23). If problem
still exists, replace pilot
caution/warning panel
(TM 1-1520-238-23). |

END OF TASK

9-341. ENGINE 1 OUT INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR PRESSED

9-341

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between:

P20-G and J164-A5,
P20-H and J164-A6.

Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Go to step 2.

2. Check for short between P20-G and P20-H.

Does short exist?

YES	Repair shorted wire. Go to paragraph 9-333.
NO	Replace pilot master caution/warning panel (TM 1-1520-238-23). If problem still exists, replace pilot caution/warning panel (TM 1-1520-238-23).

END OF TASK

**9-342. ENGINE CHOP INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR
PRESSED****Tools:**

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between:

P20-K and J164-A8,
P20-J and J164-A7.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire.
Go to paragraph 9-333. |
| NO | Go to step 2. |

2. Check for short between P20-K and P20-J.

Does short exist?

- | | |
|-----|--|
| YES | Repair shorted wire.
Go to paragraph 9-333. |
| NO | Replace pilot master
caution/warning panel
(TM 1-1520-238-23). If problem
still exists, replace pilot
caution/warning panel
(TM 1-1520-238-23). |

END OF TASK

9-343. ENGINE 2 OUT INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR PRESSED

9-343

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- Check for 28 VDC at (A106)J2-N.
Is voltage present?

YES	Go to step 2.
NO	Replace pilot caution/warning panel (TM 1-1520-238-23).
- Check for open between:
P20-N and J164-A11,
P20-P and J164-A12.
Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Replace pilot master caution/warning panel (TM 1-1520-238-23). If problem still exists, replace pilot caution/warning panel (TM 1-1520-238-23).

END OF TASK

**9-344. HIGH RPM ROTOR INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR
PRESSED**

9-344

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between:

P20-C and J164-A3,
P20-D and J164-A4.

Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Go to step 2.

2. Check for short between

P20-C and P20-D.

Does short exist?

YES	Repair shorted wire. Go to paragraph 9-333.
NO	Replace pilot master caution/warning panel (TM 1-1520-238-23). If problem still exists, replace pilot caution/warning panel (TM 1-1520-238-23).

END OF TASK

**9-345. BUCS FAIL INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR
PRESSED**

9-345

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between:
P20-E and J164-B4,
P20-F and J164-B5.

Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Go to step 2.

2. Check for short between P20-E and P20-F.

Does short exist?

YES	Repair shorted wire. Go to paragraph 9-333.
NO	Replace pilot master caution/warning panel. (TM 1-1520-238-23). If problem still exists, replace pilot caution/warning panel (TM 1-1520-238-23).

END OF TASK

**9-346. PRI DISCH INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR
PRESSED**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- Press and hold **PRESS TO TEST** indicator and check for 28 VDC at P176-E.
Is voltage present?

YES	Replace pilot APU fire test panel (TM 1-1520-238-23).
NO	Go to step 2.
- Check for open between:
(A326)TB1-11-C and J164-A18,
(A326)TB1-11-B and P748-i.
Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Go to step 3.
- Check for open between:
P748-j and P176-E,
P748-h and P176-F.
Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

**9-347. RES DISCH INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR
PRESSED**

9-347

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- Press and hold **PRESS TO TEST** indicator and check for 28 VDC at P176-B.
Is voltage present?

YES	Replace pilot APU fire test panel (TM 1-1520-238-23).
NO	Go to step 2.
- Check for open between:
P748-f and P176-B,
P748-e and J176-C
Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-348. ENG INLET ENG 1 INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR PRESSED

9-348

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provision – L90 door opened

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Press and hold **PRESS TO TEST** indicator and check for 28 VDC at P178-18.

Is voltage present?

YES	Go to step 2.
NO	Replace pilot ANTI ICE panel (TM 1-1520-238-23).

2. Check for open between:

P748-L and P178-18,
P748-N and P178-24.

Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-349. ENG INLET ENG 2 INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR PRESSED

9-349

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provision – L90 door opened

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC at (A403)J2-P.

Is voltage present?

YES	Go to step 2.
NO	Replace multi-channel dimmer controller (TM 1-1520-238-23).

2. Check for open between:

P748-P and P178-25,
P748-N and P178-24.

Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Replace pilot ANTI ICE panel (TM 1-1520-238-23).

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Press and hold **PRESS TO TEST** indicator and check for 28 VDC at P178-20.

Is voltage present?

YES	Replace pilot ANTI ICE panel (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:

P748-T and P178-20,
P748-S and P178-19.

Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Replace multi-channel dimmer controller (TM 1-1520-238-23).

END OF TASK

9-351. ENG START ENG 1 INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR PRESSED

9-351

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- Press and hold **PRESS TO TEST** indicator and check for 28 VDC at (A403)J2-E.
Is voltage present?

YES	Go to step 2.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).
- Check for open between:
P748-E and P173-R,
P748-H and P173-A.
Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Replace pilot power quadrant (TM 1-1520-238-23).

END OF TASK

**9-352. ENG START ENG 2 INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR
PRESSED**

9-352

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Press and hold **PRESS TO TEST** indicator and check for 28 VDC at P173-A.

Is voltage present?

YES	Replace pilot power quadrant (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:
P748-G and P173-P,
P748-H and P173-A.

Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-353. EMERG PWR INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR PRESSED

9-353

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution box cover removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Press and hold **PRESS TO TEST** indicator and check for 28 VDC at (A402)J2-Z.
Is voltage present?

YES	Go to step 2.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

2. Check for open between:
P748-Z and P175-15,
P748-Y and P175-14.
Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Replace pilot EMERG PWR CHK OVSP TEST panel (TM 1-1520-238-23).

END OF TASK

9-354. APU FIRE PULL INDICATOR – DOES NOT LIGHT WITH PRESS TO TEST INDICATOR PRESSED

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

3. Press and hold **PRESS TO TEST** switch, check for open between P176-U and ground.

Does open exist?

YES	Go to step 4.
NO	Replace APU FIRE PULL indicator (TM 1-1520-238-23).

4. Check for open wire between P176-U and P748-x.

Does open exist?

YES	Repair open wire between: P176-U and P438-B12, P429-A1 and P748-x. (A326)J15-B12 and (A326)TB2-12-B, (A326)TB2-12-A and (A326)J23-A1. Go to paragraph 9-333.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

1. Check for 28 VDC at P176-V.

Does open exist?

YES	Go to step 3.
NO	Go to step 2.

2. Check for 28 VDC at (A76)J1-E.

Does open exist?

YES	Repair open wire between: P463-E and P429-A6, P438-B2 and P176-V, (A326)J23-A6 and (A326)TB2-5-G, (A326)TB2-5-H and (A326)J15-B2. Go to paragraph 9-333.
NO	Go to paragraph 9-263 to troubleshoot dc emergency bus – pilot station.

END OF TASK

9-355. QTY REM AND ZONE SEL INDICATORS – ARE NOT LIGHTED WITH PRESS TO TEST INDICATOR PRESSED

9-355

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 9-1090-208-23-1

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Check for open between:
(A326)TB1-11-A and P504-24,
P504-29 and ground.

Does open exist?

- | | |
|-----|--|
| YES | Repair open wire.
Go to paragraph 9-333. |
| NO | Replace pilot ROCKETS control panel (TM 9-1090-208-23-1). |

END OF TASK

**9-356. TAIL WHEEL INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR
PRESSED**

9-356

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed Access provisions – L90 door opened

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Press and hold **PRESS TO TEST** indicator and check for 28 VDC at P527-A16.

Is voltage present?

YES	Replace pilot TAIL WHEEL panel (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:

P748-B and P527-A16,
P748-A and P527-A17.

Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-357. ARM/SAFE INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR PRESSED

9-357

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – L40 cover removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Press and hold **PRESS TO TEST** indicator and check for 28 VDC at P279-19.

Does open exist?

- YES Go to step 2.
- NO Go to step 5.

2. Press and hold **PRESS TO TEST** indicator and check for 28 VDC at:
P277-37,
P277-32.

Does open exist?

- YES Go to step 3.
- NO Replace CPG **FIRE CONTROL** panel (TM 1-1520-238-23).

3. Check for open between (A102):
J1-30 and J1-11.

Does open exist?

- YES Replace pilot **FIRE CONTROL** panel (TM 1-1520-238-23).
- NO Go to step 4.

4. Check for open between:
P279-30 and P277-30,
P277-11 and P277 SP5.

Does open exist?

- YES Repair open wire.
Go to paragraph 9-333.
- NO Replace **ARM/SAFE** indicator (TM 1-1520-238-23).

5. Check for open between P279-19 and P748-MM.

Does open exist?

- YES Repair open wire between:
P748-MM and P403-B13,
P279-19 and J403-B13.
Go to paragraph 9-333.
- NO Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

**9-358. ENG 1 FIRE PULL INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR
PRESSED**

9-358

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – L90 door opened

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between:

P748-AA and P475-A2,
P748-z and P475-A1.

Does open exist?

YES	Go to step 2.
NO	Repair open wire. Go to paragraph 9-333.

2. Press and hold **PRESS TO TEST** indicator and check for 28 VDC at P475-A2.

Is voltage present?

YES	Replace multi-channel dimming controller (TM 1-1520-238-23).
NO	Replace ENG 1 FIRE PULL indicator (TM 1-1520-238-23).

END OF TASK

9-359. ENG 2 FIRE PULL INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR PRESSED

9-359

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – L90 door opened

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC at (A403)J2-DD.

Is voltage present?

YES	Go to step 2.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

2. Check for open between:

P748-DD and P475-A5,
P748-CC and P475-A4.

Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Replace ENG 2 FIRE PULL indicator (TM 1-1520-238-23).

END OF TASK

9-360. MA INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST BUTTON PRESSED

9-360

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-1

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – L90 door opened

3. Check for open between P748-V and P717-7.
Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Go to step 4.

4. Check for short between:
P748-V and ground
P717-7 and ground
Does short exist?

YES	Repair shorted wire. Go to paragraph 9-333.
NO	Replace multi-channel dimmer controller (TM 11-1520-238-23-1).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between P717-10 and ground.

Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Go to step 2.

2. Press and hold press to test button and check for 28 VDC.

Is voltage present?

YES	Replace radar warning display (TM 11-1520-238-23-1).
NO	Go to step 3.

END OF TASK

Paragraph 9-361 and all data on page 9-689 deleted

9-362. REMOTE TRANSMITTER SELECTOR INDICATOR PANEL OR REMOTE INDICATOR PANEL INDICATOR(S) – ARE NOT LIGHTED WITH PRESS TO TEST INDICATOR PRESSED

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-1

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – L90 door opened

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC at (A403)J2-KK.

Is voltage present?

YES	Replace multi-channel dimming controller (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:

P748-HH and P300-a,
P748-KK and P300-j.

Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Replace remote transmitter selector indicator panel (TM 11-1520-238-23-1).

END OF TASK

9-363. MASTER CAUTION INDICATOR – DOES NOT RESET CAUTION INDICATORS**9-363****Tools:**

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between:

J164-A13 and P20-R,

J164-A14 and P20-S.

Does open exist?

YES	Repair open wire. Go to paragraph 9-333.
NO	Go to step 2.

2. Press **MASTER CAUTION** indicator and check for open between (DS28):

P1-A13 and P1-A14.

Does open exist?

YES	Replace pilot master caution/warning panel (TM 1-1520-238-23).
NO	Replace pilot caution/warning panel (TM 1-1520-238-23).

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
Paragraph 9-132	CPG EDGE-LIGHT MAINTENANCE OPERATIONAL CHECK completed
Paragraph 9-45	EXTERNAL POWER – POWER UP completed

References:

TM 1-1520-238-23
 TM 9-1230-476-20-2

Personnel Required:

68X Armament/Electrical Systems Repairer
 One person to assist

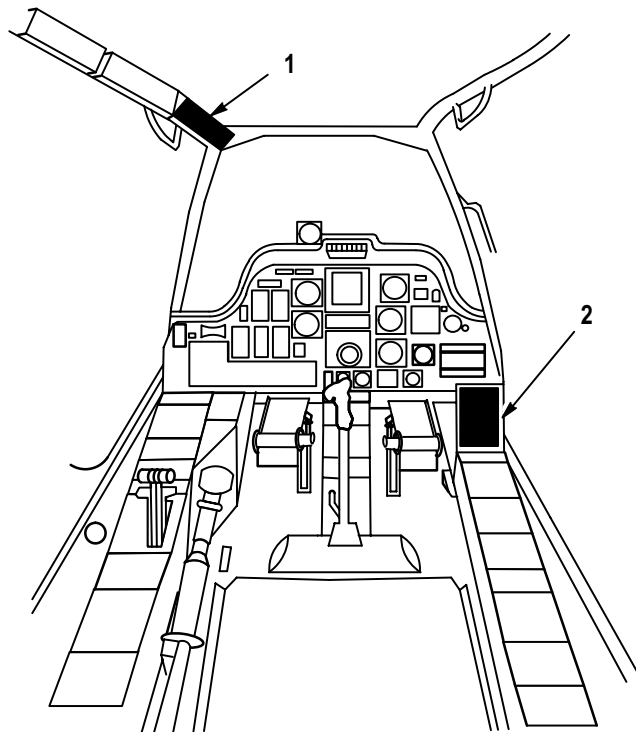
WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

NOTE

- Refer to pilot station (fig. 9-226) and CPG station (fig. 9-227) for cockpit configuration and equipment.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.

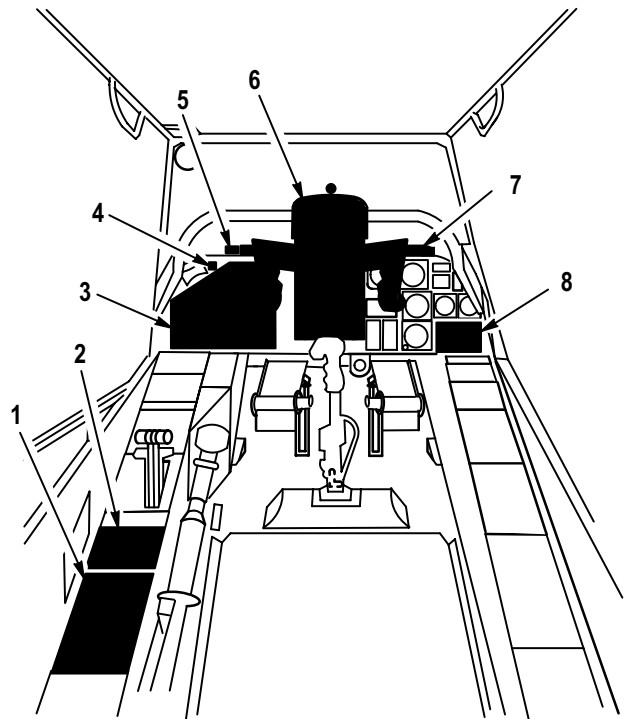
9-364. CPG CAUTION AND WARNING SYSTEM – MAINTENANCE OPERATIONAL CHECK (cont) 9-364



1. PILOT FORWARD CIRCUIT BREAKER PANEL
2. PILOT CAUTION / WARNING PANEL

M69-325

Figure 9-226. Pilot Station



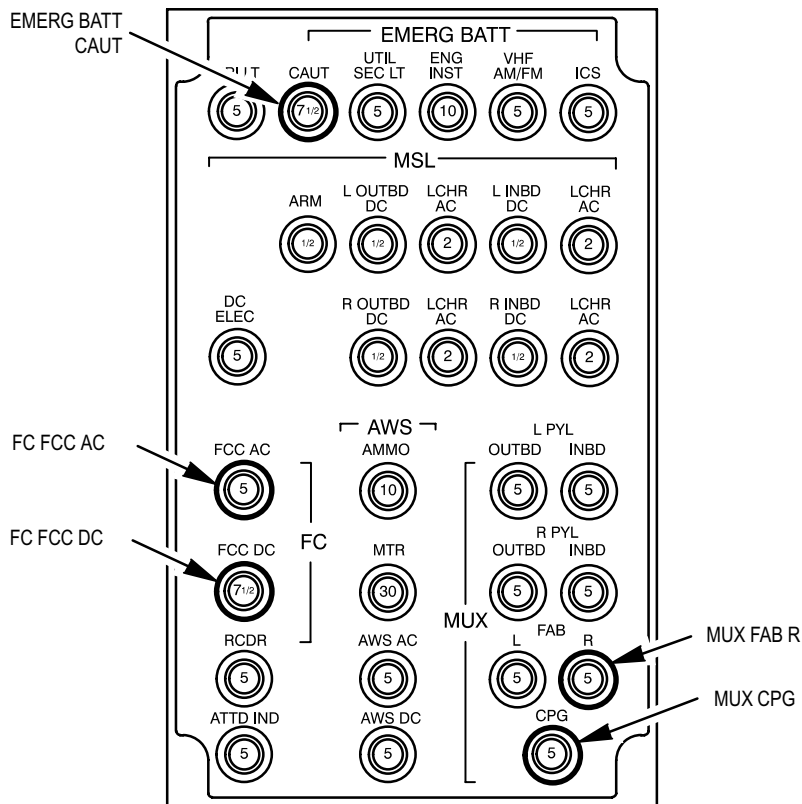
1. CPG CIRCUIT BREAKER PANEL 1
2. CPG INTR LT PANEL
3. CPG FIRE CONTROL PANEL
4. CPG ARM / SAFE INDICATOR
5. CPG ENG 1 / ENG 2 FIRE PULL INDICATORS
6. CPG ORT
7. CPG MASTER CAUTION / WARNING PANEL
8. CPG CAUTION / WARNING PANEL

M69-326

Figure 9-227. CPG Station

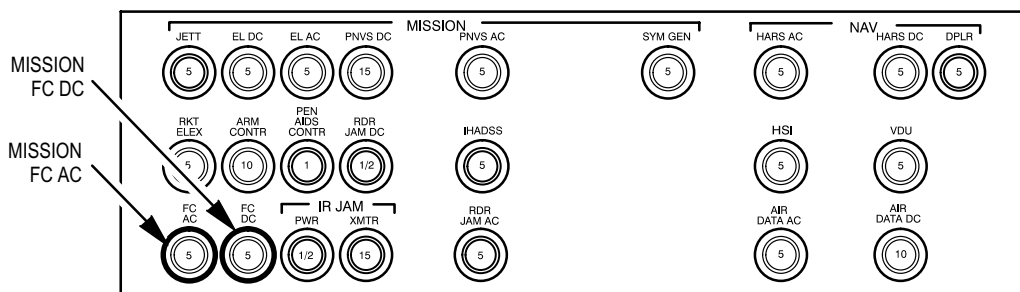
1. Perform the maintenance operational check as follows:

Task	Result
<p>a. On CPG circuit breaker panel 1 (fig. 9-228), check that EMERG BATT CAUT (CB29), FC FCC AC (CB16), FC FCC DC (CB4), MUX FAB R (CB9) and MUX CPG (CB15) circuit breaker are closed.</p>	<p>If EMERG BATT CAUT circuit breaker (CB29) does not stay closed, go to paragraph 9-366.</p>
<p>b. On pilot forward circuit breaker panel (fig. 9-229), check that MISSION FC AC (CB51) and MISSION FC DC (CB50) circuit breakers are closed.</p>	<p>If FC FCC AC (CB16), FC FCC DC (CB4), MUX FAB R (CB9) and MUX CPG (CB15) circuit breakers do not stay closed, refer to TM 9-1230-476-20-2 to troubleshoot fire control system.</p>
	<p>If MISSION FC AC (CB51) and MISSION FC DC (CB50) circuit breakers do not stay closed, refer to TM 9-1230-476-20-2 to troubleshoot fire control system.</p>



M69-327

Figure 9-228. CPG Circuit Breaker Panel 1

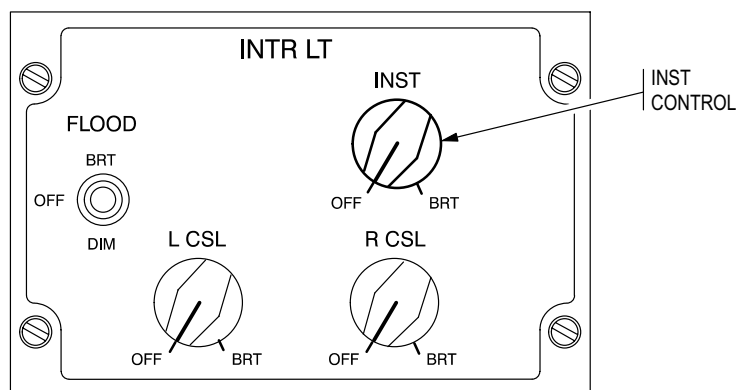


M69-328

Figure 9-229. Pilot Forward Circuit Breaker Panel

Task	Result
c. On CPG INTR LT panel (fig. 9-230), set INST control to BRT .	If CPG caution/warning edge-lighted panel is not lighted, go to paragraph 9-367.
d. Set INST control to OFF .	If CPG caution/warning indicators do not increase in brightness, go to paragraph 9-368.

9-364. CPG CAUTION AND WARNING SYSTEM – MAINTENANCE OPERATIONAL CHECK (cont) 9-364

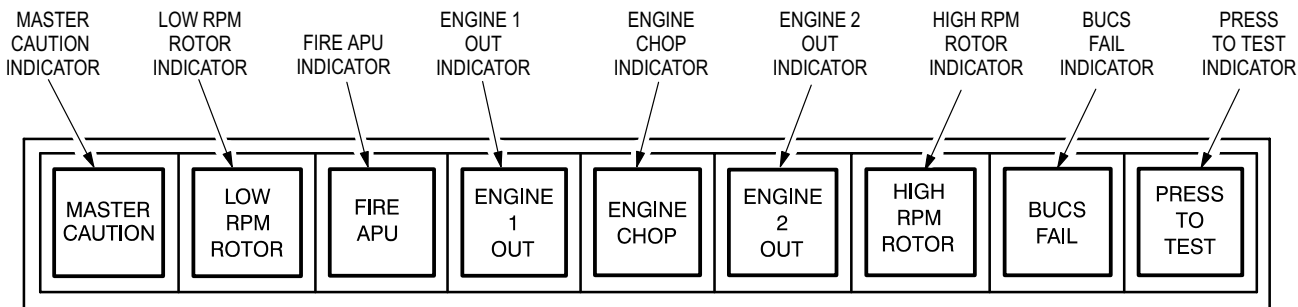


M69-329

Figure 9-230. CPG INTR LT Panel

Task	Result
e. On CPG master caution/warning panel (fig. 9-231), press and hold PRESS TO TEST indicator.	<p>If all CPG master caution/warning indicators are not lighted, go to paragraph 9-369.</p> <p>If PRESS TO TEST indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-370.</p> <p>If MASTER CAUTION indicator is not lighted and flashing, go to paragraph 9-371.</p> <p>If LOW RPM ROTOR indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-372.</p> <p>If FIRE APU indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-373.</p> <p>If ENGINE 1 OUT indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-374.</p> <p>If ENGINE CHOP indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-375.</p> <p>If ENGINE 2 OUT indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-376.</p> <p>If HIGH RPM ROTOR indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-377.</p> <p>If BUCS FAIL indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-378.</p>

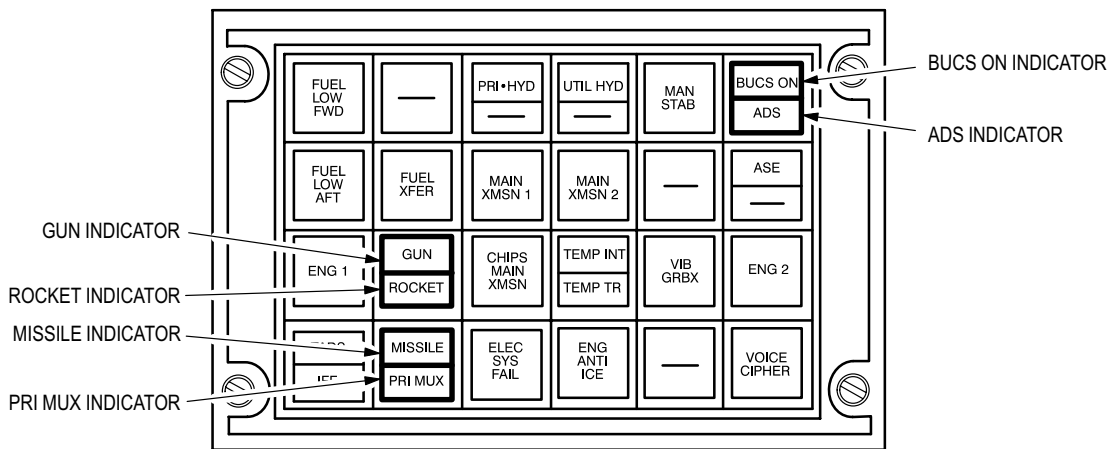
9-364. CPG CAUTION AND WARNING SYSTEM – MAINTENANCE OPERATIONAL CHECK (cont) 9-364



M69-330

Figure 9-231. CPG Master Caution/Warning Panel

Task	Result
<p>f. On CPG caution/warning panel (fig. 9-232), check that all indicators are lighted or flashing.</p>	<p>If all caution/warning indicators are not lighted or flashing, go to paragraph 9-369.</p> <p>If some caution/warning indicators are not lighted or flashing, replace appropriate lamp(s) (TM 1-1520-238-23).</p> <p>If lamp(s) still do not light, go to paragraph 9-331 to troubleshoot CPG caution/warning indicators.</p>

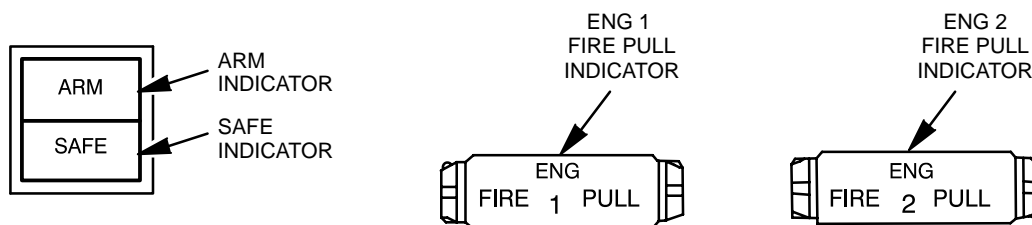


M69-331

Figure 9-232. CPG Caution/Warning Panel

9-364. CPG CAUTION AND WARNING SYSTEM – MAINTENANCE OPERATIONAL CHECK (cont) 9-364

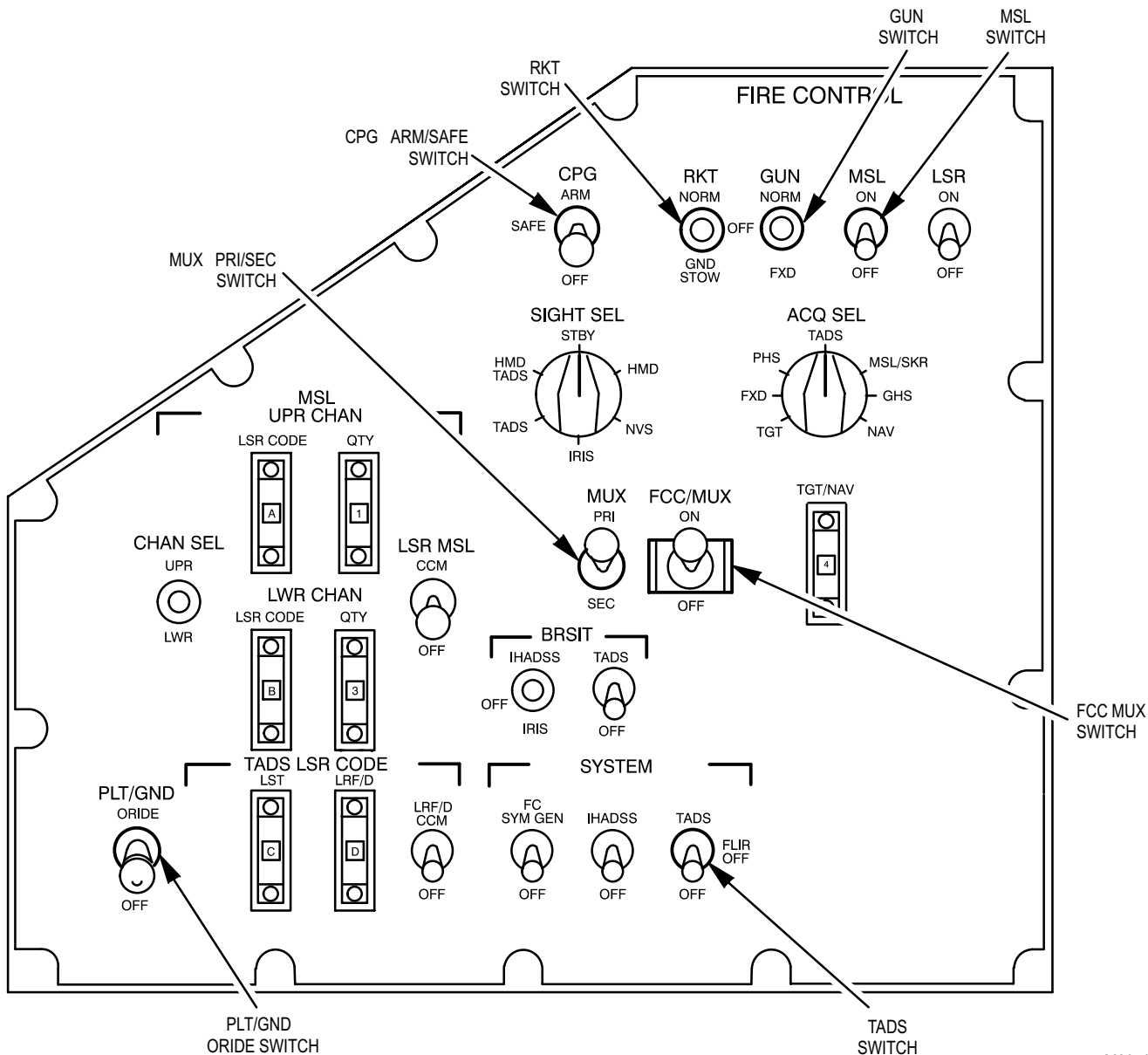
Task	Result
<p>g. On CPG instrument panel, check that ARM/SAFE indicator, ENG 1 FIRE PULL and ENG 2 FIRE PULL indicators (fig. 9-233) are lighted.</p>	<p>If all three indicators are not lighted, go to paragraph 9-379.</p> <p>If ARM/SAFE indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-380.</p> <p>If ENG 1 FIRE PULL indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-381.</p> <p>If ENG 2 FIRE PULL indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-382.</p>



M69-333

Figure 9-233. CPG ARM/SAFE and ENG 1 and 2 FIRE PULL Indicators

- | | |
|---|--|
| <p>h. On CPG FIRE CONTROL panel (fig. 9-234), set PLT/GND ORIDE switch to ORIDE, CPG ARM/SAFE switch to ARM, and FCC/MUX switch to ON.</p> | |
| <p>i. On pilot caution/warning panel (fig. 9-235) and CPG caution/warning panel (fig. 9-232), check that ADS indicators are lighted.</p> | <p>If both ADS indicators are not lighted, replace lamps (TM 1-1520-238-23). If lamps still do no light, go to paragraph 9-383.</p> |
| <p>j. On pilot and CPG caution/warning panels, check that PRI MUX indicators are not lighted.</p> | <p>If PRI MUX indicators are lighted, refer to TM 9-1230-476-20-2 to troubleshoot MRTU.</p> |
| <p>k. On CPG FIRE CONTROL panel, set TADS switch to TADS. On CPG caution/warning panel, check that TADS indicator is lighted.</p> | <p>If TADS indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-384.</p> |
| <p>l. On pilot caution/warning panel, check that TADS indicator is lighted. Set TADS switch to OFF.</p> | <p>If TADS indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-385.</p> |

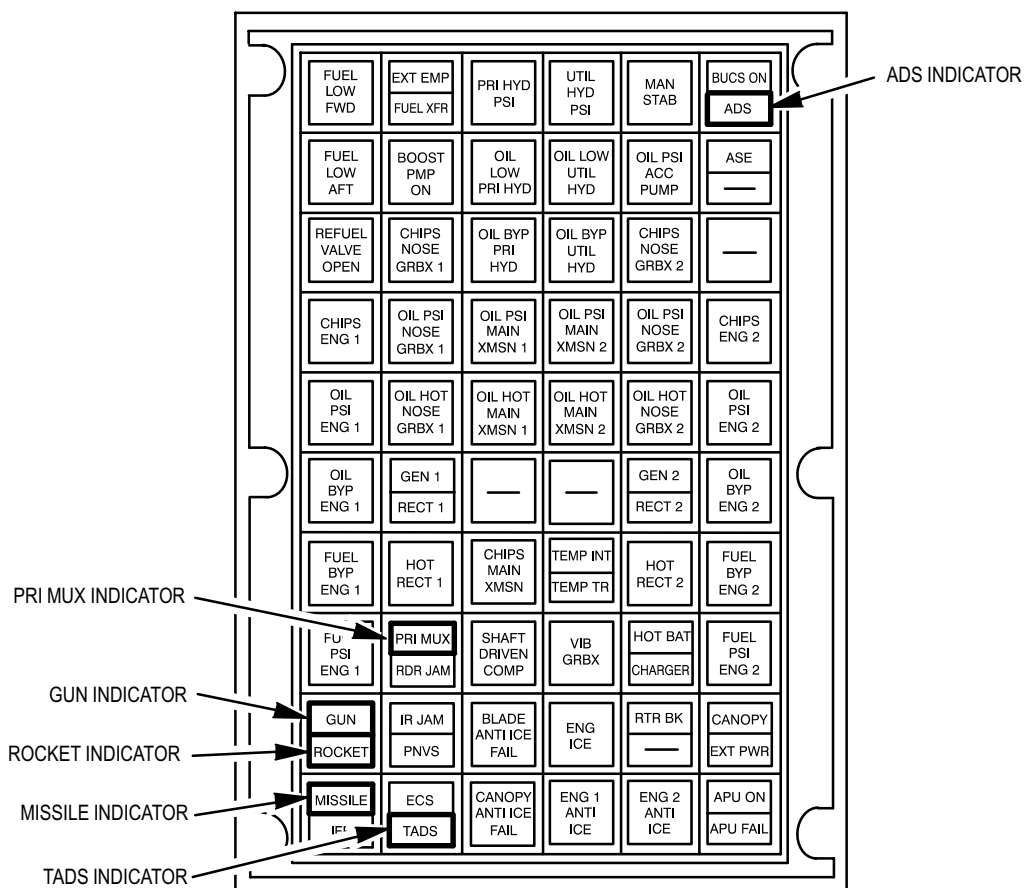


M69-334

Figure 9-234. CPG FIRE CONTROL Panel

Task	Result
<p>m. On CPG FIRE CONTROL panel (fig. 9-234), place RKT switch to NORM. On CPG ORT (fig. 9-236), hold weapon action switch (WAS) to RKT. On CPG caution/warning panel (fig. 9-232), check that ROCKET indicator is lighted.</p>	<p>If CPG ROCKET indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-386.</p>

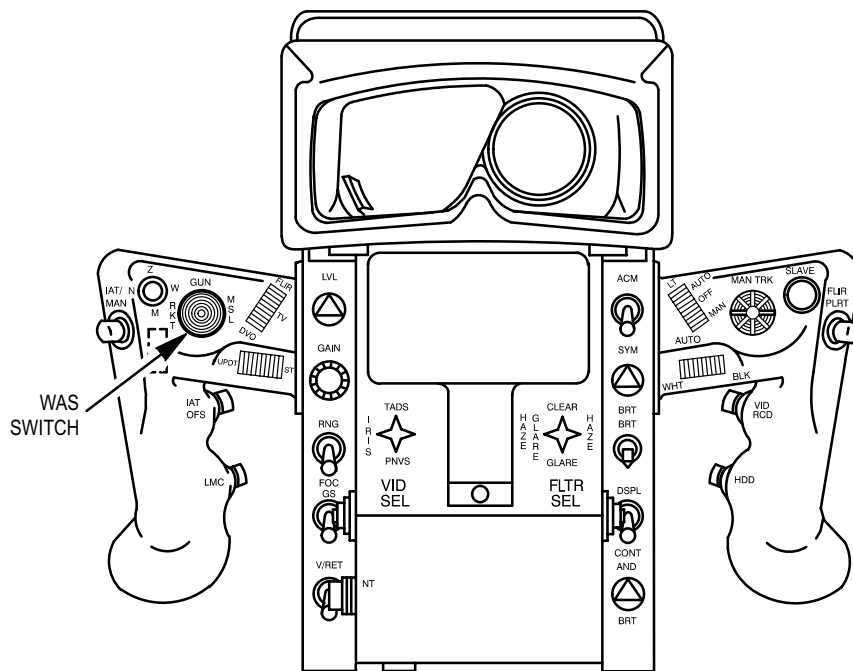
9-364. CPG CAUTION AND WARNING SYSTEM – MAINTENANCE OPERATIONAL CHECK (cont) 9-364



M69-335

Figure 9-235. Pilot Caution/Warning Panel

Task	Result
n. On pilot caution/warning panel (fig. 9-235), check that ROCKET indicator is lighted. On CPG FIRE CONTROL panel (fig. 9-234), set RKT switch to GND STOW .	If pilot ROCKET indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-387.
o. On CPG FIRE CONTROL panel, set GUN switch to NORM . On ORT, set WAS to GUN position. On CPG caution/warning panel (fig. 9-232), check that GUN indicator is lighted.	If CPG GUN indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-388.
p. On pilot caution/warning panel, check that GUN indicator is lighted. On CPG FIRE CONTROL panel, set GUN switch to FXD .	If pilot GUN indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-389.



M69-336

Figure 9-236. CPG ORT

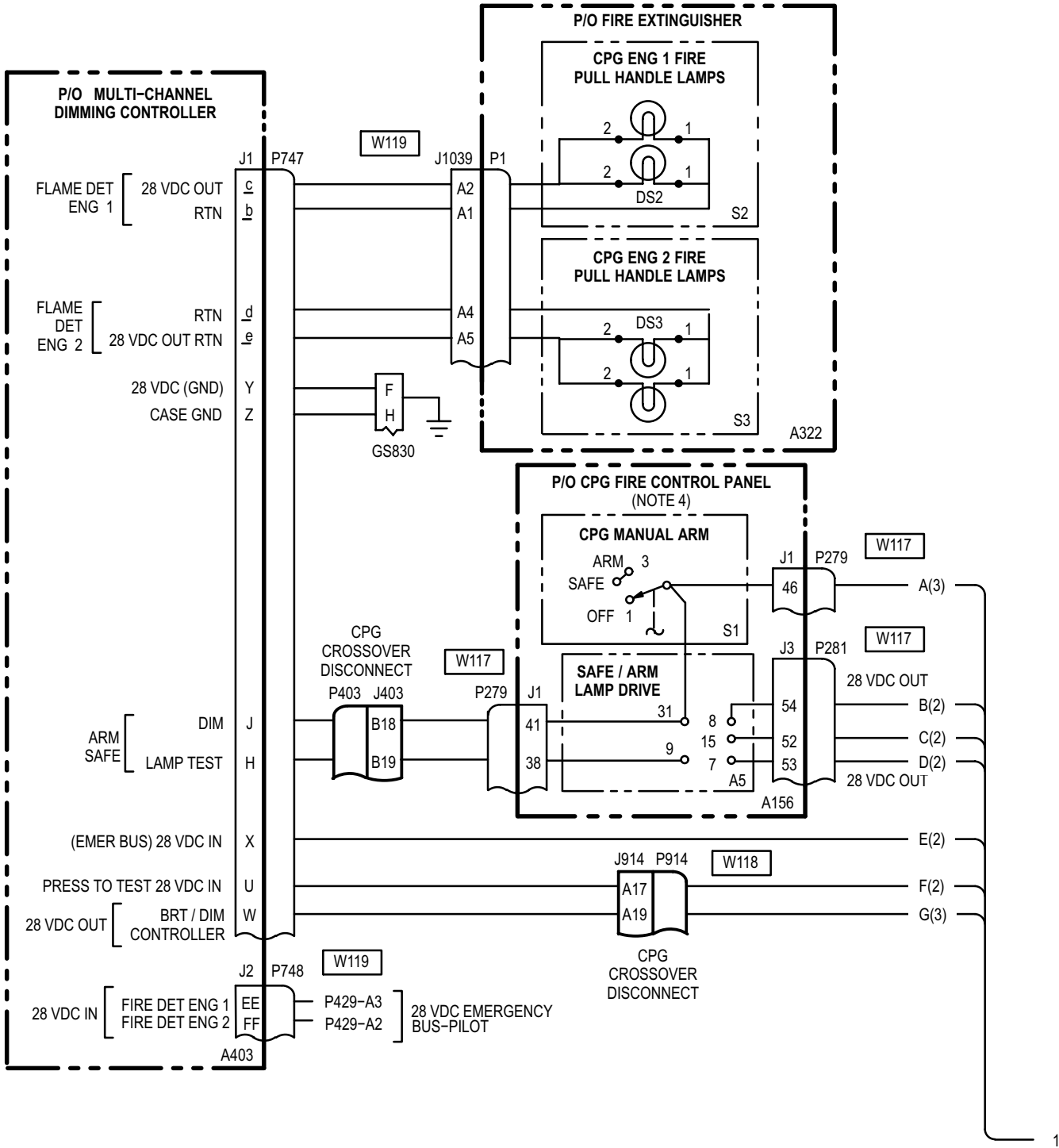
Task	Result
q. On CPG FIRE CONTROL panel (fig. 9-234), set MSL switch to ON . Set WAS to MSL . On CPG caution/warning panel (fig. 9-232), check that MISSILE indicator is lighted.	If CPG MISSILE indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-390.
r. On pilot caution/warning panel (fig. 9-235), check that MISSILE indicator is lighted. On CPG FIRE CONTROL panel, set MSL switch to OFF .	If pilot MISSILE indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-391.
s. On CPG FIRE CONTROL panel, set FCC/MUX switch to OFF , CPG ARM switch to OFF , and PLT/GND ORIDE switch to OFF .	
t. On CPG circuit breaker panel 1 (fig. 9-228), open FC FCC DC circuit breaker (CB4). On CPG FIRE CONTROL panel (fig. 9-234), set MUX switch to SEC . On CPG caution/warning panel, check that PRI MUX indicator is lighted and flashing.	If PRI MUX indicator is not lighted and flashing, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-392.
u. On CPG master caution/warning panel (fig. 9-231), press MASTER CAUTION indicator. Check that MASTER CAUTION indicator is not lighted.	If MASTER CAUTION is lighted, go to paragraph 9-393.

9-364. CPG CAUTION AND WARNING SYSTEM – MAINTENANCE OPERATIONAL CHECK (cont) 9-364

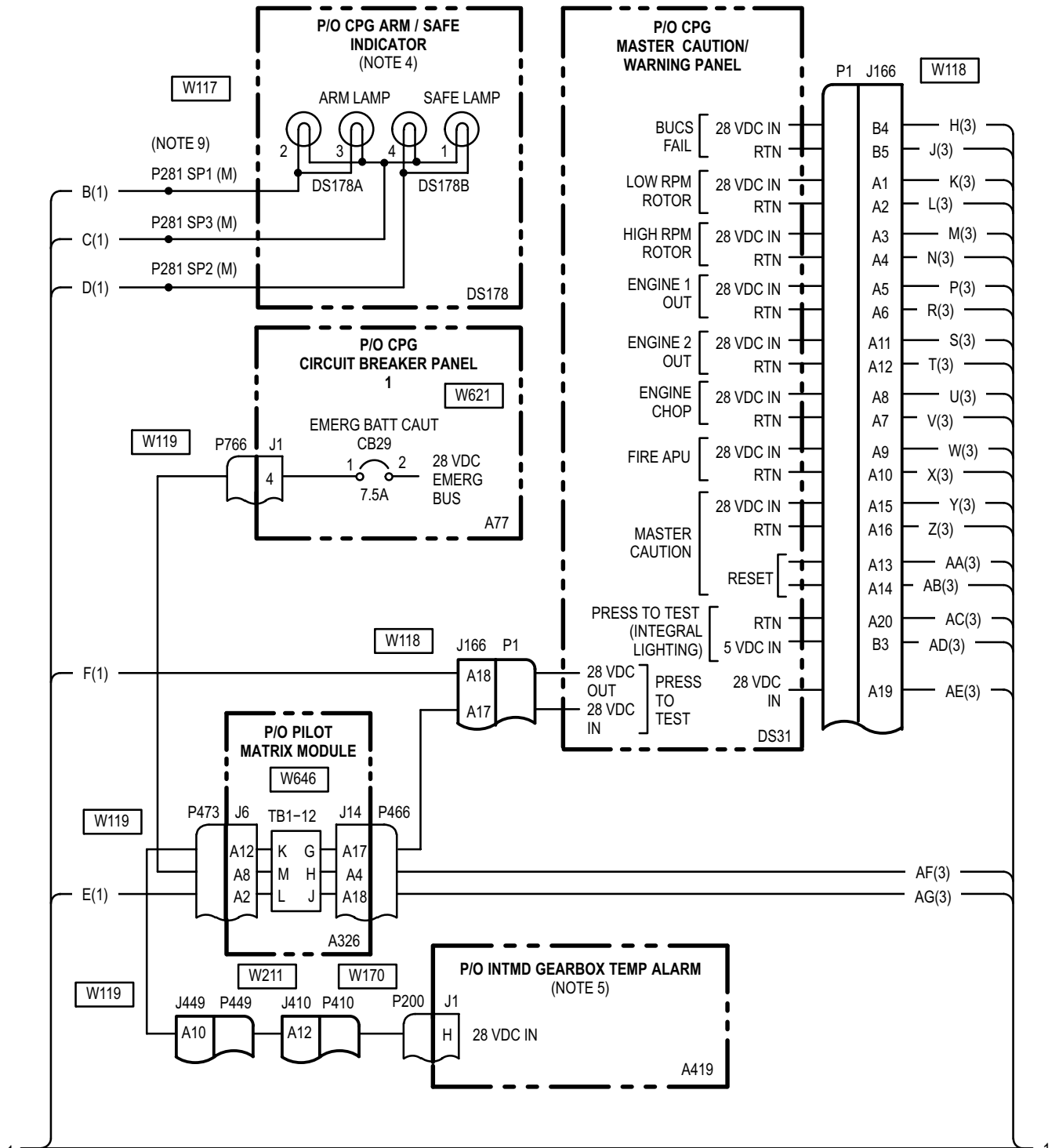
Task	Result
v. On CPG caution/warning panel (fig. 9-232), check that PRI MUX indicator is lighted and not flashing.	If PRI MUX indicator is flashing, go to paragraph 9-393.
w. On pilot caution/warning panel (fig. 9-235), check that PRI MUX indicator is lighted and not flashing.	If PRI MUX indicator is not lighted and flashing, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-394.

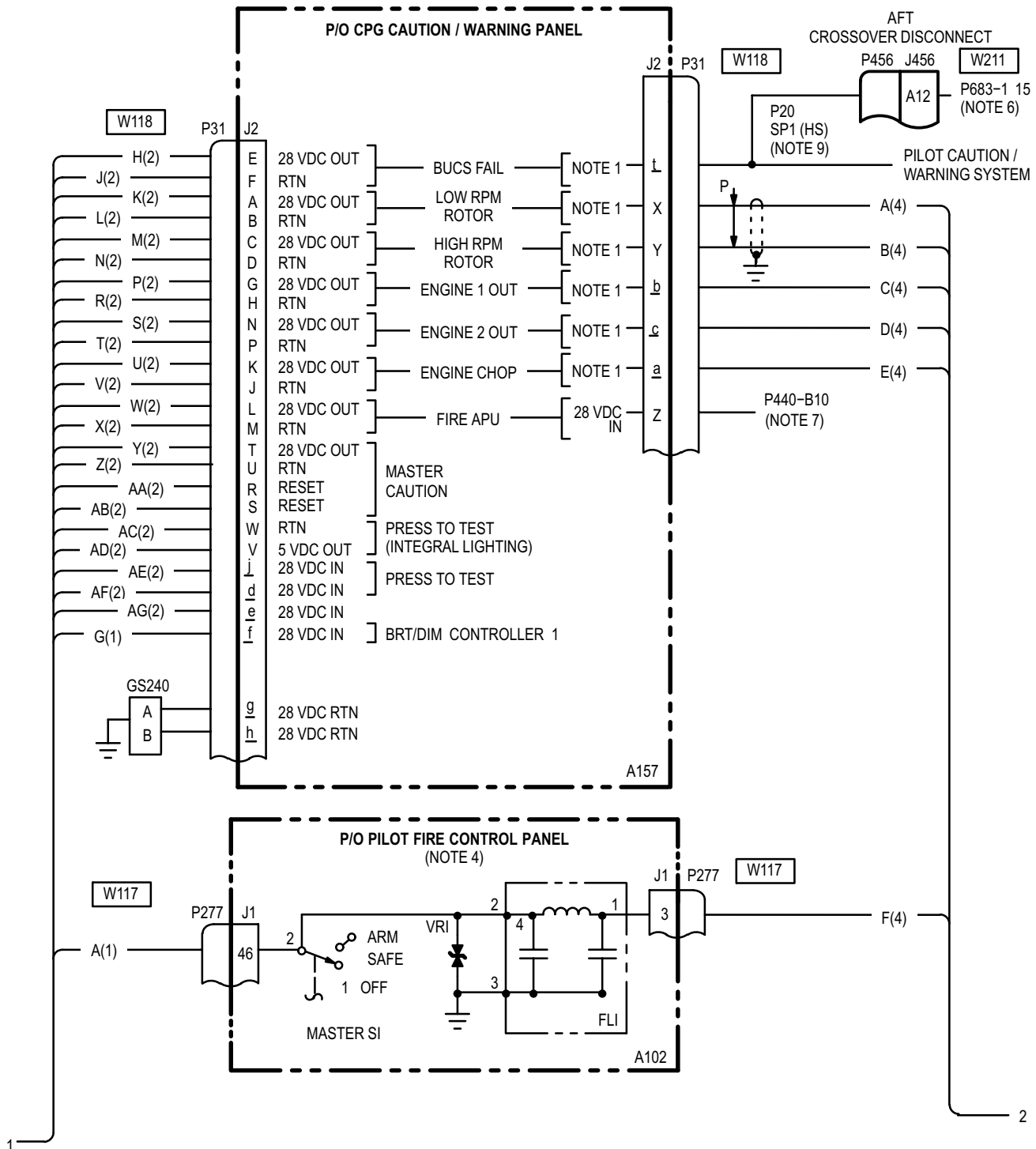
2. Perform EXTERNAL POWER – POWER DOWN (para 9-46).

END OF TASK



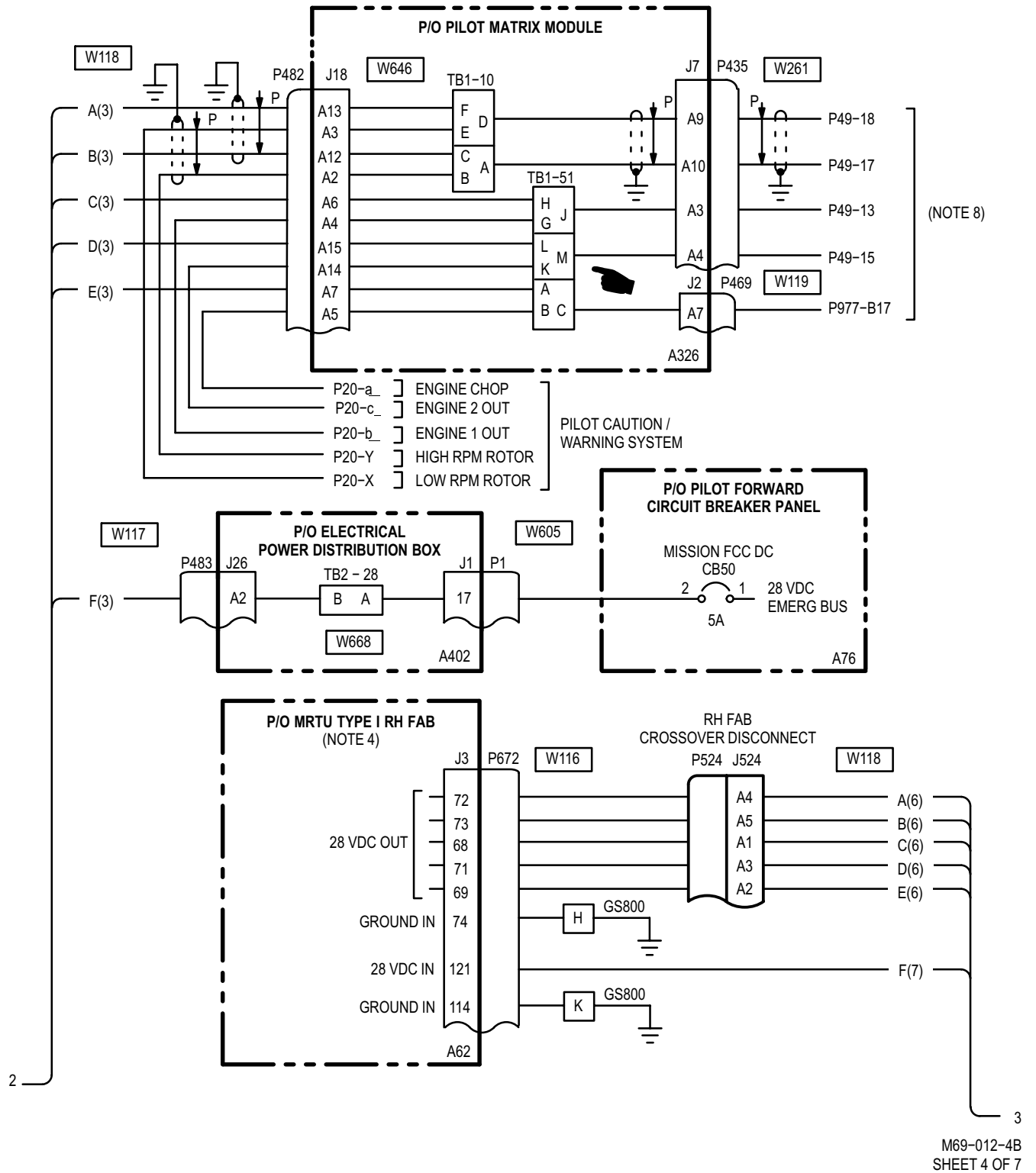
9-365. CPG CAUTION AND WARNING SYSTEM – WIRING INTERCONNECT DIAGRAM (cont)

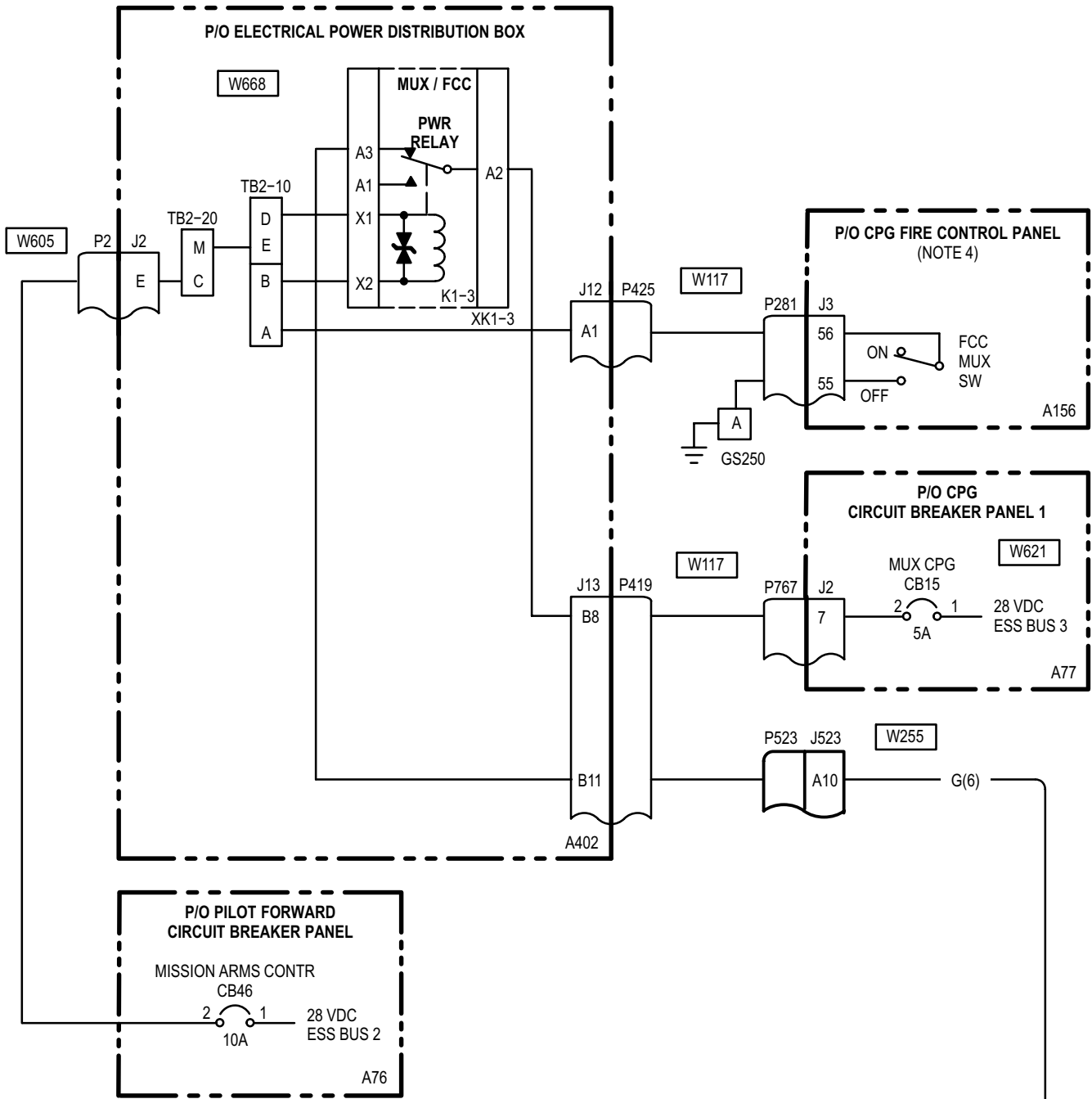




9-365. CPG CAUTION AND WARNING SYSTEM – WIRING INTERCONNECT DIAGRAM (cont)

9-365

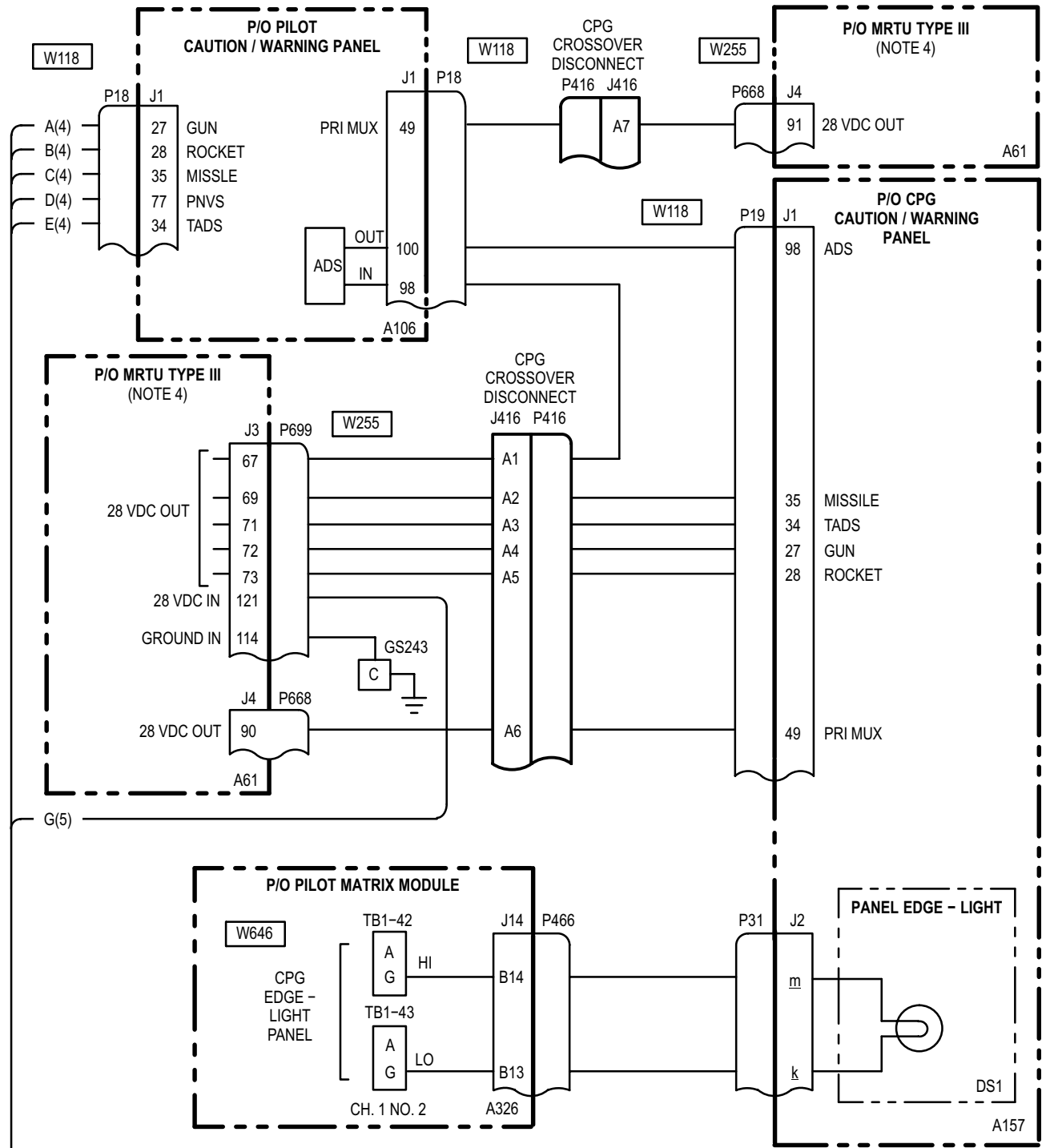




3 _____ 3

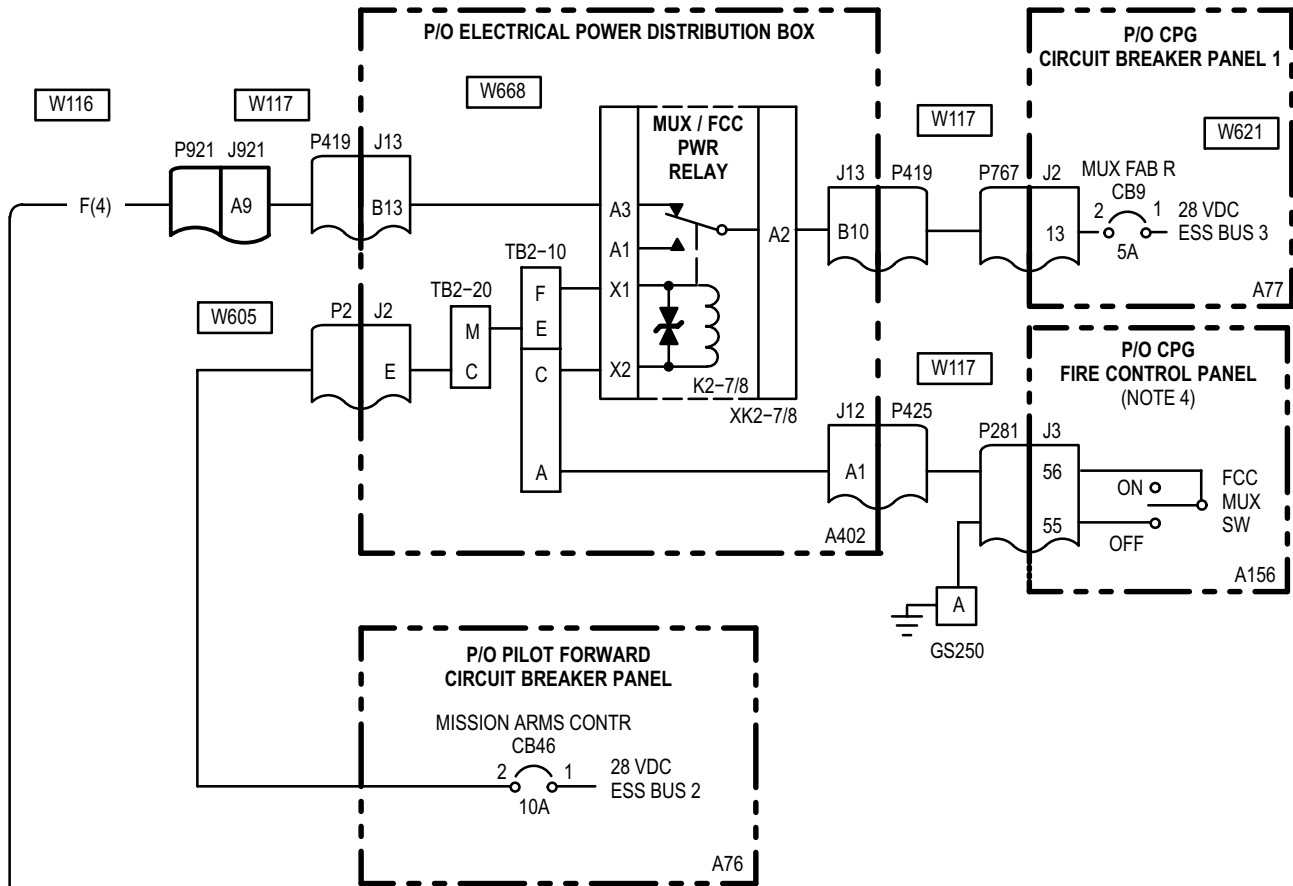
9-365. CPG CAUTION AND WARNING SYSTEM - WIRING INTERCONNECT DIAGRAM (cont)

9-365



3

3



3

NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. GROUND AT FAULT INPUT. 2. GROUND FAULT INPUT FROM ENGINE 1 AND ENGINE 2 START MODE RELAY PANEL. 3. GROUND FAULT INPUT FROM ENGINE OUT WARNING UNIT. 4. FIRE CONTROL SYSTEM (TM 9-1230-476-20-2). 5. DRIVE SYSTEM (TM 1-1520-238-T-4). | <ol style="list-style-type: none"> 6. FLIGHT CONTROL SYSTEM (TM 1-1520-238-T-7). 7. AUXILIARY POWER UNIT (TM 1-1520-238-T-8). 8. POWER PLANTS (TM 1-1520-238-T-4). 9. HS DESIGNATES A HARD SPLICE WHICH CANNOT BE DISCONNECTED. M DESIGNATES A SOFT SPLICE WHICH MAY BE DISCONNECTED FOR A WIRING CHECK. |
|--|--|

9-366. EMERG BATT CAUT CIRCUIT BREAKER (CB29) – DOES NOT STAY CLOSED

9-366

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	CPG circuit breaker panel 1 removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

NOTE

On CPG circuit breaker panel 1 connectors P767, P768, P769 remain attached.

1. On CPG circuit breaker panel 1, close **EMERG BATT CAUT** circuit breaker (CB29). Detach P766 and check for short between (A77)J1-4 and ground.
Does short exist?

YES	Go to paragraph 9-304 to troubleshoot dc emergency bus – CPG station.
NO	Go to step 2.

2. Detach P473. Check for short between P473-A8 and ground.
Does short exist?

YES	Repair short between P473-A8 and P766-4. Go to paragraph 9-364.
NO	Go to step 3.
3. Check for short between P473-A2 and ground.
Does short exist?

YES	Go to step 16.
NO	Go to step 4.
4. Check for short between (A326)J6-A8 and ground.
Does short exist?

YES	Go to step 5.
NO	Go to paragraph 9-364.
5. Detach P466. Check for short between (A326)J6-A8 and ground.
Does short exist?

YES	Go to step 6.
NO	Go to step 10.
6. Check for short between P466-A17 and ground.
Does short exist?

YES	Go to step 9.
NO	Go to step 7.
7. Check for short between ground and P466-A4 and P466-A18.
Does short exist?

YES	Go to step 8.
NO	Go to paragraph 9-364.

9-366. EMERG BATT CAUT CIRCUIT BREAKER (CB29) – DOES NOT STAY CLOSED (cont)

9-366

- | | |
|---|--|
| <p>8. Detach P31 and check for short between: P466-A4 and ground, P466-A18 and ground.
Does short exist?</p> <p>YES Repair short between: P466-A4 and P31-d, P466-A18 and P31-e. Go to paragraph 9-364.</p> <p>NO Replace CPG caution/warning panel (TM 1-1520-238-23).</p> <p>9. Detach J166 and check for short between P466-A17 and ground.
Does short exist?</p> <p>YES Repair short between P466-A17 and J166-A17. Go to paragraph 9-364.</p> <p>NO Replace CPG master caution/warning panel (TM 1-1520-238-23).</p> <p>10. Detach P200. Check for short between (A326)J6-A8 and ground.
Does short exist?</p> <p>YES Go to step 11.</p> <p>NO Replace intermediate gearbox temp alarm (TM 1-1520-238-23).</p> <p>11. Detach wire from (A326)TB1-12-K and check for short to ground.
Does short exist?</p> <p>YES Repair short between (A326)TB1-12-K and P200-4. Go to paragraph 9-364.</p> <p>NO Go to step 12.</p> <p>12. Detach wire from (A326)TB1-12-L and check for short to ground.
Does short exist?</p> <p>YES Repair short between (A326): TB1-12-L and J6-A2. Go to paragraph 9-364.</p> <p>NO Go to step 13.</p> | <p>13. Detach wire from (A326)TB1-12-M and check for short to ground.
Does short exist?</p> <p>YES Repair short between (A326): TB1-12-M and J6-A8. Go to paragraph 9-364.</p> <p>NO Go to step 14.</p> <p>14. Detach wire from (A326)TB1-12-H and check for short to ground.
Does short exist?</p> <p>YES Repair short between (A326): TB1-12-H and J14-A4. Go to paragraph 9-364.</p> <p>NO Go to step 15.</p> <p>15. Detach wire from (A326)TB1-12-G and check for short to ground.
Does short exist?</p> <p>YES Repair short between (A326): TB1-12-G and J14-A17. Go to paragraph 9-364.</p> <p>NO Go to step 16.</p> <p>16. Detach P747. Check for short between P473-A2 and ground.
Does short exist?</p> <p>YES Repair short between P473-A2 and P747-X. Go to paragraph 9-364.</p> <p>NO Replace multi-channel dimming controller (TM 1-1520-238-23).</p> |
|---|--|

END OF TASK

9-367. CPG CAUTION/WARNING EDGE-LIGHT PANEL – IS NOT LIGHTED

9-367

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed

3. Check for open between:
P466-B14 and P31-m,
P466-B13 and P31-k.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire.
Go to paragraph 9-364. |
| NO | Replace CPG caution/warning panel (TM 1-1520-238-23). |



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On CPG **INTR LT** panel, set **INST** control to **BRT**. On pilot matrix module, check for 5 VDC between (A326):
J14-B14 and J14-B13.

Is voltage present?

- | | |
|-----|---------------|
| YES | Go to step 3. |
| NO | Go to step 2. |

2. Check for 5 VDC between (A326):
TB1-42-G and TB1-43-G.

Is voltage present?

- | | |
|-----|--|
| YES | Repair open wire between (A326):
TB1-43-G and J14-B13,
TB1-42-G and J14-B14.
Go to paragraph 9-364. |
| NO | Go to paragraph 9-132 to troubleshoot CPG edge-lights. |

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
 One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On CPG **INTR LT** panel, set **INST** control from **OFF** to **BRT** and check for 0 to 28 VDC at P31-f.
Does voltage change?

YES	Replace CPG caution/warning panel (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between P747-W and P31-f.
Does open exist?

YES	Repair open wire between P747-W and P31-f. Go to paragraph 9-364.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-369. ALL CPG CAUTION/WARNING AND MASTER CAUTION/WARNING INDICATORS – DO NOT LIGHT WITH PRESS TO TEST INDICATOR PRESSED **9-369**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC at (A326)TB1-12-M.
Is voltage present?
 - YES Go to step 3.
 - NO Go to step 2.

2. Check for 28 VDC at (A77)J1-4.
Is voltage present?
 - YES Repair open wire between (A326)TB1-12-M and P766-4. Go to paragraph 9-364.
 - NO Go to paragraph 9-304 to troubleshoot dc emergency bus – CPG station.

3. Check for 28 VDC at J166-A17.
Is voltage present?
 - YES Go to step 4.
 - NO Repair open wire between (A326)TB1-12-G and J166-A17. Go to paragraph 9-364.

4. Check for 28 VDC at P31-d and P31-e.
Is voltage present?
 - YES Go to step 5.
 - NO Repair open wire between: (A326)TB1-12-H and P31-d, (A326)TB1-12-J and P31-e. Go to paragraph 9-364.

5. Check for open between: P31-g and ground, P31-h and ground, P31-j and J166-A19.
Does open exist?
 - YES Repair open wire. Go to paragraph 9-364.
 - NO Go to step 6.

6. Press and hold **PRESS TO TEST** indicator and check for open between (DS31): P1-A17 and P1-A19.
Does open exist?
 - YES Replace CPG master caution/warning panel (TM 1-1520-238-23).
 - NO Replace CPG caution/warning panel (TM 1-1520-238-23).

END OF TASK

9-370. PRESS TO TEST INDICATOR – IS NOT LIGHTED

9-370

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On CPG **INTR LT** panel, set **INST** control to **BRT**. Check for 5 VDC at J166-B3.

Is voltage present?

YES	Replace CPG master caution/warning panel (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for 28 VDC at P31-d and P31-e.

Is voltage present?

YES	Repair open between: P31-W and J166-A20, P31-V and J166-B3. Go to paragraph 9-364.
NO	Go to step 4.

3. Check for 5 VDC at (A157)J2-V.

Is voltage present?

YES	Go to step 5.
NO	Go to step 6.

4. Check for open between: P31-g and ground, P31-h and ground.

Does open exist?

YES	Repair open wire. Go to paragraph 9-364.
NO	Replace CPG caution/warning panel (TM 1-1520-238-23).

5. Check for 28 VDC at (A77)J1-4.

Is voltage present?

YES	Repair open wire between wire end: (A326)TB1-12-H and P31-d, (A326)TB1-12-J and P31-e, (A326)TB1-12-M and P766-4. Go to paragraph 9-364.
NO	Go to paragraph 9-304 to troubleshoot dc emergency bus – CPG station.

END OF TASK

**9-371. MASTER CAUTION INDICATOR – IS NOT LIGHTED AND FLASHING WITH
PRESS TO TEST INDICATOR PRESSED**

9-371

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Press and hold **PRESS TO TEST** indicator and check for 28 VDC at J166-A15.

Is voltage present?

YES	Replace CPG master caution/warning panel (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:
P31-T and J166-A15,
P31-U and J166-A16.

Does open exist?

YES	Repair open wire. Go to paragraph 9-364.
NO	Replace CPG caution/warning panel (TM 1-1520-238-23).

END OF TASK

**9-372. LOW RPM ROTOR INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR
PRESSED**

9-372

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Press and hold **PRESS TO TEST** indicator and check for 28 VDC at J166-A1.

Is voltage present?

YES	Replace CPG master caution/warning panel (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:

P31-A and J166-A1,
P31-B and J166-A2.

Does open exist?

YES	Repair open wire. Go to paragraph 9-364.
NO	Replace CPG caution/warning panel (TM 1-1520-238-23).

END OF TASK

**9-373. FIRE APU INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR
PRESSED**

9-373

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Press and hold **PRESS TO TEST** indicator and check for 28 VDC at (A157)J2-L.

Is voltage present?

YES	Replace CPG caution/warning panel (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:
P31-L and J166-A9,
P31-M and J166-A10.

Does open exist?

YES	Repair open wire. Go to paragraph 9-364.
NO	Replace CPG master caution/warning panel (TM 1-1520-238-23).

END OF TASK

**9-374. ENGINE 1 OUT INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR
PRESSED**

9-374

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- Press and hold **PRESS TO TEST** indicator, check for 28 VDC at (A157)J2-G.
Is voltage present?

YES	Replace CPG caution/warning panel (TM 1-1520-238-23).
NO	Go to step 2.
- Check for open between:
P31-G and J166-A5,
P31-H and J166-A6.
Does open exist?

YES	Repair open wire. Go to paragraph 9-364.
NO	Replace CPG master caution/warning panel (TM 1-1520-238-23).

END OF TASK

9-375. ENGINE CHOP INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR PRESSED

9-375

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- Press and hold **PRESS TO TEST** indicator, check for 28 VDC at (A157)J2-K.
Is voltage present?

YES	Replace CPG caution/warning panel (TM 1-1520-238-23).
NO	Go to step 2.
- Check for open between:
P31-K and J166-A8,
P31-J and J166-A7.
Does open exist?

YES	Repair open wire. Go to paragraph 9-364.
NO	Replace CPG master caution/warning panel (TM 1-1520-238-23).

END OF TASK

9-376. ENGINE 2 OUT INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR PRESSED

9-376

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- Press and hold **PRESS TO TEST** indicator check for 28 VDC at (A157)J2-N.
Is voltage present?

YES	Replace CPG caution/warning panel (TM 1-1520-238-23).
NO	Go to step 2.
- Check for open between:
P31-N and J166-A11,
P31-P and J166-A12.
Does open exist?

YES	Repair open wire. Go to paragraph 9-364.
NO	Replace CPG master caution/warning panel (TM 1-1520-238-23).

END OF TASK

9-377. HIGH RPM ROTOR INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR PRESSED

9-377

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- Press and hold **PRESS TO TEST** indicator, check for 28 VDC at (A157)J2-C.
Is voltage present?

YES	Replace CPG caution/warning panel (TM 1-1520-238-23).
NO	Go to step 2.
- Check for open between:
P31-C and J166-A3,
P31-D and J166-A4.
Does open exist?

YES	Repair open wire. Go to paragraph 9-364.
NO	Replace CPG master caution/warning panel (TM 1-1520-238-23).

END OF TASK

**9-378. BUCS FAIL INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR
PRESSED**

9-378

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- Press and hold **PRESS TO TEST** indicator, check for 28 VDC at (A157)J2-E.
Is voltage present?

YES	Replace CPG caution/warning panel (TM 1-1520-238-23).
NO	Go to step 2.
- Check for open between:
P31-E and J166-B4,
P31-F and J166-B5.
Does open exist?

YES	Repair open wire. Go to paragraph 9-364.
NO	Replace CPG master caution/warning panel (TM 1-1520-238-23).

END OF TASK

**9-379. CPG ARM/SAFE, ENG 1 AND ENG 2 FIRE PULL INDICATORS – ARE NOT LIGHTED
WITH PRESS TO TEST INDICATOR PRESSED**

9-379

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- Press and hold **PRESS TO TEST** indicator and check for 28 VDC at P747-U.
Is voltage present?

YES	Replace multi-channel dimming controller (TM 1-1520-238-23).
NO	Go to step 2.
- Press and hold **PRESS TO TEST** switch and check for open between (DS31): P1-A17 and P1-A18.
Does open exist?

YES	Replace CPG master caution/warning panel.
NO	Repair open wire between P747-U and J166-A18. Go to paragraph 9-364.

END OF TASK

9-380. ARM/SAFE INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR PRESSED

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-1

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – L40 cover removed

3. Attach P279 on CPG **FIRE CONTROL** panel. Check for 28 VDC at (A156): J3-53 and J3-54.

Is voltage present?

YES	Replace ARM/SAFE indicator (TM 9-1230-476-20-1).
NO	Replace CPG FIRE CONTROL panel (TM 1-1520-238-23).

4. Check for open between: P747-J and P279-41, P747-H and P279-38.

Does open exist?

YES	Repair open wire. Go to paragraph 9-364.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Press and hold **PRESS TO TEST** indicator. **Does ARM/SAFE indicator light?**

YES	Go to paragraph 9-364.
NO	Go to step 2.

2. Check for 28 VDC at P279-38. **Is voltage present?**

YES	Go to step 3.
NO	Go to step 4.

END OF TASK

9-381. ENG 1 FIRE PULL INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR PRESSED

9-381

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Press and hold **PRESS TO TEST** indicator, check for 28 VDC at J1039-A2.

Is voltage present?

YES	Replace ENG 1 FIRE PULL indicator (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between:
P747-c and J1039-A2,
P747-b and J1039-A1.

Does open exist?

YES	Repair open wire. Go to paragraph 9-364.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

**9-382. ENG 2 FIRE PULL INDICATOR – IS NOT LIGHTED WITH PRESS TO TEST INDICATOR
PRESSED**

9-382

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- Press and hold **PRESS TO TEST** indicator, check for 28 VDC at J1039-A5.
Is voltage present?

YES	Replace ENG 2 FIRE PULL indicator (TM 1-1520-238-23).
NO	Go to step 2.
- Check for open between:
P747-e and J1039-A5,
P747-d and J1039-A4.
Does open exist?

YES	Repair open wire. Go to paragraph 9-364.
NO	Replace multi-channel dimming controller (TM 1-1520-238-23).

END OF TASK

9-383. PILOT AND CPG ADS INDICATORS – ARE NOT LIGHTED WITH CPG FCC/MUX SWITCH SET TO ON

9-383

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
 One person to assist

References:

TM 1-1520-238-23
 TM 9-1230-476-20-2

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC at P18-98.

Is voltage present?

YES	If either indicator is not lighted, replace pilot caution/warning panel (TM 1-1520-238-23). If CPG indicator is not lighted, replace CPG caution/warning panel (TM 1-1520-238-23).
-----	--

NO	Go to step 2.
----	---------------

2. Check for open between:
 (AAZ) P699-67 and P18-98,
 P18-100 and P19-98.
 (AAC) P699-67 and P19-98.

Does open exist?

YES	Repair open wire. Go to paragraph 9-364.
NO	Refer to TM 9-1230-476-20-2 to troubleshoot MRTU.

END OF TASK

9-384. CPG TADS INDICATOR – IS NOT LIGHTED WITH TADS SWITCH IN TADS POSITION

9-384

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – L40 cover removed



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot forward circuit breaker panel, check that **MISSION ARMS CONTR** circuit breaker (CB46) is open. Check for 28 VDC between P699-121 and P699-114.

Is voltage present?

YES Go to step 2.
NO Go to step 4.

- Check for 28 VDC between P19-34 and ground.
Is voltage present?

YES Go to paragraph 9-331 to troubleshoot CPG caution/warning indicators.
NO Go to step 3.

- Check for open between P699-71 and P19-34.
Does open exist?

YES Repair open wire between: P699-71 and J416-A3, P416-A3 and P19-34. Go to paragraph 9-364.

NO Refer to TM 9-1230-476-20-2 to troubleshoot MRTU.

- On CPG circuit breaker panel 1, open **MUX CPG** circuit breaker (CB15). On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF**. Check for open between P699-114 and ground.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Go to step 6.

- Check for 28 VDC (A77)J2-7.
Is voltage present?

YES Go to step 5.

NO Go to paragraph 9-249 to troubleshoot circuit protection system (dc essential bus 3 – CPG station).

- Check for open between P419-B11 and P699-121.

Does open exist?

YES Repair open wire between P699-121 and J523-A10, P523-A10 and P419-B11. Go to paragraph 9-364.

NO Go to step 7.

- Check for open between (A402)J13-B11 and (A402)XK1-3-A3.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Go to step 8.

9-384. CPG TADS INDICATOR – IS NOT LIGHTED WITH TADS SWITCH IN TADS POSITION (cont) 9-384

8. Check for open between (A402)XK1-3-A2 and (A402)J13-B8.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Go to step 9.

9. Check for open between P419-B8 and P767-7.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Replace relay K1-3 (TM 1-1520-238-23).

END OF TASK

9-385. PILOT TADS INDICATOR – IS NOT LIGHTED WITH TADS SWITCH IN TADS POSITION

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – R90 door opened



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot forward circuit breaker panel, check that **MISSION ARMS CONTR** circuit breaker (CB46) is open. Check for 28 VDC between P672-121 and P672-114.

Is voltage present?

YES Go to step 2.
NO Go to step 4.

- Check for 28 VDC between P18-34 and ground.
- Is voltage present?**

YES Go to paragraph 9-331 to troubleshoot pilot caution/warning indicators.
NO Go to step 3.

- Check for open between P672-71 and P18-34.
- Does open exist?**

YES Repair open wire between: P672-71 and P524-A2, J524-A2 and P18-34. Go to paragraph 9-364.

NO Refer to TM 9-1230-476-20-2 to troubleshoot MRTU.

- On CPG circuit breaker panel 1, open **MUX FAB R** circuit breaker (CB9). On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF**. Check for open between P672-114 and ground.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Go to step 6.

- Check for 28 VDC (A77)J2-13.

Is voltage present?

YES Go to step 5.

NO Go to paragraph 9-249 to troubleshoot circuit protection system (dc essential bus 3 – CPG station).

- Check for open between P419-B13 and P672-121.

Does open exist?

YES Repair open wire between P672-121 and P921-A9, J921-A9 and P419-B13. Go to paragraph 9-364.

NO Go to step 7.

- Check for open between (A402)J13-B13 and (A402)XK2-7/8-A3.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Go to step 8.

9-385. PILOT TADS INDICATOR – IS NOT LIGHTED WITH TADS SWITCH IN TADS POSITION (cont) 9-385

8. Check for open between (A402)XK2-7/8-A2 and (A402)J13-B10.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Go to step 9.

9. Check for open between P419-B10 and P767-13.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Replace relay (A402)K2-7/8 (TM 1-1520-238-23).

END OF TASK

9-386. CPG ROCKET INDICATOR – IS NOT LIGHTED WITH RKT SWITCH IN NORM POSITION

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – L40 cover removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot forward circuit breaker panel, check that **MISSION ARMS CONTR** circuit breaker (CB46) is open. Check for 28 VDC between P699-121 and P699-114.

Is voltage present?

YES Go to step 2.
NO Go to step 4.

- Check for 28 VDC between P19-28 and ground.
- Is voltage present?**

YES Go to paragraph 9-331 to troubleshoot CPG caution/warning indicators.
NO Go to step 3.

- Check for open between P699-73 and P19-28.
- Does open exist?**

YES Repair open wire between: P699-73 and J416-A5, P416-A5 and P19-28. Go to paragraph 9-364.
NO Refer to TM 9-1230-476-20-2 to troubleshoot MRTU.

- On CPG circuit breaker panel 1, open **MUX CPG** circuit breaker (CB15). On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF**. Check for open between P699-114 and ground.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.
NO Go to step 6.

- Check for 28 VDC (A77)J2-7.

Is voltage present?

YES Go to step 5.
NO Go to paragraph 9-249 to troubleshoot circuit protection system (dc essential bus 3 – CPG station).

- Check for open between P419-B11 and P699-121.

Does open exist?

YES Repair open wire between P699-121 and J523-A10, P523-A10 and P419-B11. Go to paragraph 9-364.
NO Go to step 7.

- Check for open between (A402)J13-B11 and (A402)XK1-3-A3.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.
NO Go to step 8.

9-386. CPG ROCKET INDICATOR – IS NOT LIGHTED WITH RKT SWITCH IN NORM POSITION (cont)

9-386

8. Check for open between (A402)XK1-3-A2 and (A402)J13-B8.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Go to step 9.

9. Check for open between P419-B8 and P767-7.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Replace relay (A402)K1-3 (TM 1-1520-238-23).

END OF TASK

9-387. PILOT ROCKET INDICATOR – IS NOT LIGHTED WITH RKT SWITCH IN NORM POSITION

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – R90 door opened

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot forward circuit breaker panel, check that **MISSION ARMS CONTR** circuit breaker (CB46) is open. Check for 28 VDC between P672-121 and P672-114.

Is voltage present?

YES Go to step 2.
NO Go to step 4.

- Check for 28 VDC between P18-28 and ground.
- Is voltage present?**

YES Go to paragraph 9-331 to troubleshoot pilot caution/warning indicators.
NO Go to step 3.

- Check for open between P672-73 and P18-28.
- Does open exist?**

YES Repair open wire between: P672-73 and P524-A5, J524-A5 and P18-28. Go to paragraph 9-364.

NO Refer to TM 9-1230-476-20-2 to troubleshoot MRTU.

- On CPG circuit breaker panel 1, open **MUX FAB R** circuit breaker (CB9). On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF**. Check for open between P672-114 and ground.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Go to step 6.

- Check for 28 VDC (A77)J2-13.

Is voltage present?

YES Go to step 5.

NO Go to paragraph 9-249 to troubleshoot circuit protection system (dc essential bus 3 – CPG station).

- Check for open between P419-B13 and P672-121.

Does open exist?

YES Repair open wire between P672-121 and P921-A9, J921-A9 and P419-B13. Go to paragraph 9-364.

NO Go to step 7.

- Check for open between (A402)J13-B13 and (A402)XK2-7/8-A3.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Go to step 8.

9-387. PILOT ROCKET INDICATOR – IS NOT LIGHTED WITH RKT SWITCH IN NORM POSITION (cont)

9-387

8. Check for open between (A402)XK2-7/8-A2 and (A402)J13-B10.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Go to step 9.

9. Check for open between P419-B10 and P767-13.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Replace relay (A402)K2-7/8 (TM 1-1520-238-23).

END OF TASK

9-735

9-388. CPG GUN INDICATOR – IS NOT LIGHTED WITH GUN SWITCH IN NORM POSITION

9-388

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – R90 door opened



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot forward circuit breaker panel, check that **MISSION ARMS CONTR** circuit breaker (CB46) is open. Check for 28 VDC between P699-121 and P699-114.

Is voltage present?

YES Go to step 2.
NO Go to step 4.

- Check for 28 VDC between P19-27 and ground.
- Is voltage present?**

YES Go to paragraph 9-331 to troubleshoot CPG caution/warning indicators.
NO Go to step 3.

- Check for open between P699-72 and P19-27.
- Does open exist?**

YES Repair open wire between: P699-72 and J416-A4, P416-A4 and P19-27. Go to paragraph 9-364.
NO Refer to TM 9-1230-476-20-2 to troubleshoot MRTU.

- On CPG circuit breaker panel 1, open **MUX CPG** circuit breaker (CB15). On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF**. Check for open between P699-114 and ground.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.
NO Go to step 6.

- Check for 28 VDC (A77)J2-7.
- Is voltage present?**

YES Go to step 5.
NO Go to paragraph 9-249 to troubleshoot circuit protection system (dc essential bus 3 – CPG station).

- Check for open between P419-B11 and P699-121.

Does open exist?

YES Repair open wire between P699-121 and J523-A10, P523-A10 and P419-B11. Go to paragraph 9-364.
NO Go to step 7.

- Check for open between (A402)J13-B11 and (A402)XK1-3-A3.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.
NO Go to step 8.

9-388. CPG GUN INDICATOR – IS NOT LIGHTED WITH GUN SWITCH IN NORM POSITION (cont) 9-388

8. Check for open between (A402)XK1-3-A2 and (A402)J13-B8.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Go to step 9.

9. Check for open between P419-B8 and P767-7.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Replace relay (A402)K1-3 (TM 1-1520-238-23).

END OF TASK

9-389. PILOT GUN INDICATOR – IS NOT LIGHTED WITH GUN SWITCH IN NORM POSITION

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – R90 door opened

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC between P18-27 and ground.

Is voltage present?

YES	Refer to paragraph 9-333, to troubleshoot pilot caution/warning system.
NO	Go to step 2.

2. Check for 28 VDC between (A62)J3-72 and ground.

Is voltage present?

YES	Repair open wire between: P672-72 and P524-A4, J524-A4 and P18-27. Go to paragraph 9-364.
NO	Go to step 3.

3. Check for 28 VDC between P672-121 and ground.

Is voltage present?

YES	Refer to TM 9-1230-476-20-2 to troubleshoot MRTU.
NO	Go to step 4.

4. Check for 28 VDC between (A77)J2-13 and ground.

Is voltage present?

YES	Go to step 5.
NO	Refer to paragraph 9-249 to troubleshoot circuit protection system DC essential bus 3 – CPG station.

9-389. PILOT GUN INDICATOR – IS NOT LIGHTED WITH GUN SWITCH IN NORM POSITION (cont)

9-389

5. Remove relay (A402) K2-78. Check for open between relay contact A2 and A3.

Does open exist?

- | | |
|-----|---|
| YES | Replace Relay (A402)XK2-7/8 (TM 1-1520-238-23). |
| NO | Repair open wire between; P672-121 and P921-A9, J921-A9 and P419-B13, (A402)J13-B13 and (A402)K2-7/8-A3, (A402)J13-B10 and (A402)K2-7/8-A2, P419-B10 and P767-13. Go to paragraph 9-364.. |

END OF TASK

9-390. CPG MISSILE INDICATOR – IS NOT LIGHTED WITH MSL SWITCH IN ON POSITION

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – R90 door opened

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot forward circuit breaker panel, check that **MISSION ARMS CONTR** circuit breaker (CB46) is open. Check for 28 VDC between P699-121 and P699-114.

Is voltage present?

YES Go to step 2.
NO Go to step 4.

- Check for 28 VDC between P19-35 and ground.
- Is voltage present?**

YES Go to paragraph 9-331 to troubleshoot CPG caution/warning indicators.
NO Go to step 3.

- Check for open between P699-69 and P19-35.
- Does open exist?**

YES Repair open wire between: P699-69 and J416-A2, P416-A2 and P19-35. Go to paragraph 9-364.

NO Refer to TM 9-1230-476-20-2 to troubleshoot MRTU.

- On CPG circuit breaker panel 1, open **MUX CPG** circuit breaker (CB15). On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF**. Check for open between P699-114 and ground.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Go to step 6.

- Check for 28 VDC (A77)J2-7.

Is voltage present?

YES Go to step 5.

NO Go to paragraph 9-249 to troubleshoot circuit protection system (dc essential bus 3 – CPG station).

- Check for open between P419-B11 and P699-121.

Does open exist?

YES Repair open wire between P699-121 and J523-A10, P523-A10 and P419-B11. Go to paragraph 9-364.

NO Go to step 7.

- Check for open between (A402)J13-B11 and (A402)XK1-3-A3.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Go to step 8.

9-390. CPG MISSILE INDICATOR – IS NOT LIGHTED WITH MSL SWITCH IN ON POSITION (CONT)

9-390

8. Check for open between (A402)XK1-3-A2 and (A402)J13-B8.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Go to step 9.

9. Check for open between P419-B8 and P767-7.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Replace relay (A402)K1-3 (TM 1-1520-238-23).

END OF TASK

9-391. PILOT MISSILE INDICATOR – IS NOT LIGHTED WITH MSL SWITCH IN ON POSITION

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – R90 door opened



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot forward circuit breaker panel, check that **MISSION ARMS CONTR** circuit breaker (CB46) is open. Check for 28 VDC between P672-121 and P672-114.

Is voltage present?

YES Go to step 2.
NO Go to step 4.

- Check for 28 VDC between P18-35 and ground.
- Is voltage present?**

YES Go to paragraph 9-331 to troubleshoot pilot caution/warning indicators.
NO Go to step 3.

- Check for open between P672-71 and P18-35.
- Does open exist?**

YES Repair open wire between: P672-71 and P524-A1, J524-A1 and P18-35. Go to paragraph 9-364.

NO Refer to TM 9-1230-476-20-2 to troubleshoot MRTU.

- On CPG circuit breaker panel 1, open **MUX FAB R** circuit breaker (CB9). On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF**. Check for open between P672-114 and ground.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Go to step 6.

- Check for 28 VDC (A77)J2-13.

Is voltage present?

YES Go to step 5.

NO Go to paragraph 9-249 to troubleshoot circuit protection system (dc essential bus 3 – CPG station).

- Check for open between P419-B13 and P672-121.

Does open exist?

YES Repair open wire between P672-121 and P921-A9, J921-A9 and P419-B13. Go to paragraph 9-364.

NO Go to step 7.

- Check for open between (A402)J13-B13 and (A402)XK2-7/8-A3.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Go to step 8.

9-391. PILOT MISSILE INDICATOR – IS NOT LIGHTED WITH MSL SWITCH IN ON POSITION (cont)

9-391

8. Check for open between (A402)XK2-7/8-A2 and (A402)J13-B10.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Go to step 9.

9. Check for open between P419-B10 and P767-13.

Does open exist?

YES Repair open wire. Go to paragraph 9-364.

NO Replace relay (A402)K2-7/8 (TM 1-1520-238-23).

END OF TASK

9-743

9-392. CPG PRI MUX INDICATOR – IS NOT LIGHTED AND FLASHING WITH MUX SWITCH IN SEC POSITION

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – R90 door opened

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC at P19-49.

Is voltage present?

YES	Replace CPG caution/warning panel (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between P668-90 and P19-49.

Does open exist?

YES	Repair open wire. Go to paragraph 9-364.
NO	Refer to TM 9-1230-476-20-2 to troubleshoot MRTU.

END OF TASK

9-393. CPG MASTER CAUTION RESET – DOES NOT FUNCTION

9-393**Tools:**

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between:

J166-A13 and P31-R,
J166-A14 and P31-S.

Does open exist?

YES	Repair open wire. Go to paragraph 9-364.
NO	Go to step 2.

2. Press master caution indicator and check for open between (DS31):

P1-A13 and P1-A14.

Does open exist?

YES	Replace CPG master caution/warning panel (TM 1-1520-238-23).
NO	Replace CPG caution/warning panel (TM 1-1520-238-23).

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 9-1230-476-20-2

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – R90 door opened

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC at (A61)J4-91.

Is voltage present?

YES	Go to step 2.
NO	Refer to TM 9-1230-476-20-2 to troubleshoot MRTU.

2. Check for open between P668-91 and P18-49.

Does open exist?

YES	Repair open wire. Go to paragraph 9-364.
NO	Go to paragraph 9-331 to troubleshoot CPG caution/warning panel indicators.

END OF TASK

9-395. AUDIO WARNING SYSTEM – MAINTENANCE OPERATIONAL CHECK

9-395

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45
Headset (2)	MIL-H-26312

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 11-1520-238-23-2	ICS OPERATIONAL CHECK completed
Paragraph 9-333	PILOT CAUTION/WARNING SYSTEM – MAINTENANCE OPERATIONAL CHECK completed
Paragraph 9-366	CPG CAUTION/WARNING SYSTEM – MAINTENANCE OPERATIONAL CHECK completed

Personnel Required:

68X Armament/Electrical Systems Repairer
 One person to assist
 152FG Pilot

References:

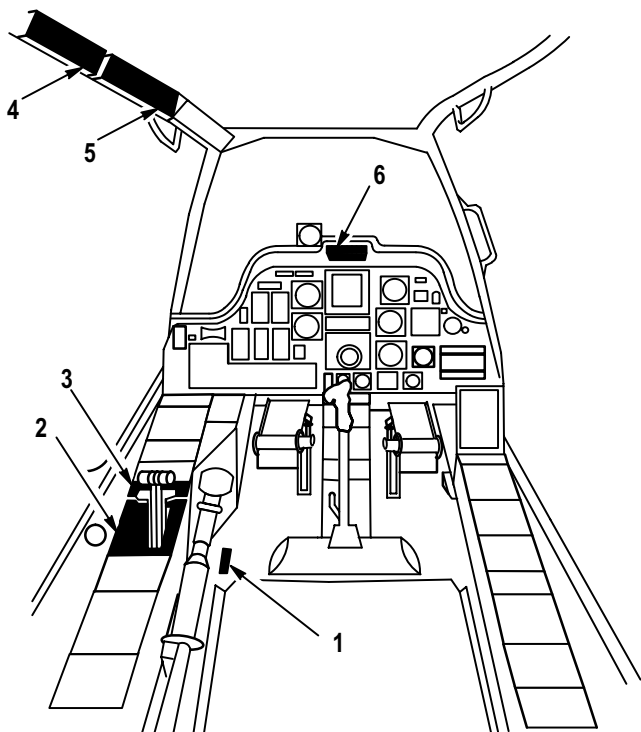
TM 1-1520-238-23
 TM 1-1520-238-CL
 TM 1-1520-238-T-7
 TM 11-1520-238-23-2

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

NOTE

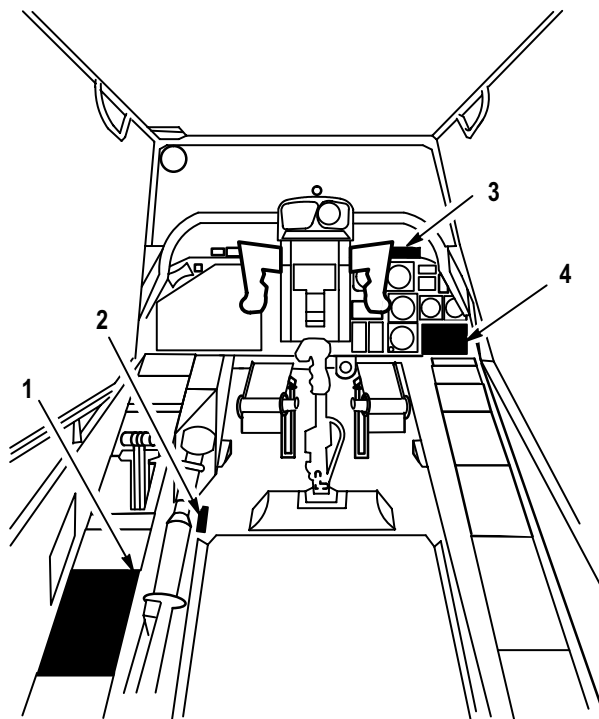
- If a false engine out warning occurs for an operating engine during an inflight single engine maneuver requiring high power settings, resulting in the engine N_p (power turbine speed) dropping below 89%, go to paragraph 9-410.
- Refer to pilot station (fig. 9-237) and CPG station (fig. 9-238) for cockpit configuration and equipment.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.



1. PILOT STABILATOR MANUAL CONTROL PANEL
2. PILOT POWER QUADRANT
3. PILOT ELEC PWR PANEL
4. PILOT AFT CIRCUIT BREAKER PANEL
5. PILOT CENTER CIRCUIT BREAKER PANEL
6. PILOT MASTER CAUTION / WARNING PANEL

M69-337

Figure 9-237. Pilot Station



1. CPG CIRCUIT BREAKER PANEL 1
2. CPG STABILATOR MANUAL CONTROL PANEL
3. CPG MASTER CAUTION/WARNING PANEL
4. CPG CAUTION / WARNING PANEL

M69-338

Figure 9-238. CPG Station

1. Perform the maintenance operational check as follows:

Task	Result
<p>a. On pilot circuit breaker panel (fig. 9-239), check that ENG WARN (CB52), COMM ICS (CB27), STAB AUTO AC (CB2), STAB AUTO DC (CB3), STAB MAN DC (CB6), and STAB MAN AC (CB7) circuit breakers are closed.</p>	<p>If ENG WARN circuit breaker (CB52) does not stay closed, go to paragraph 9-397.</p> <p>If COMM ICS circuit breaker (CB27) does not stay closed, refer to TM 11-1520-238-23-2 to troubleshoot intercommunication system.</p> <p>If STAB AUTO AC (CB2), STAB AUTO DC (CB3), STAB MAN DC (CB6), and STAB MAN AC (CB7) circuit breakers do not stay closed, refer to TM 1-1520-238-T-7 to troubleshoot stabilator.</p>

9-395. AUDIO WARNING SYSTEM – MAINTENANCE OPERATIONAL CHECK (cont)

9-395

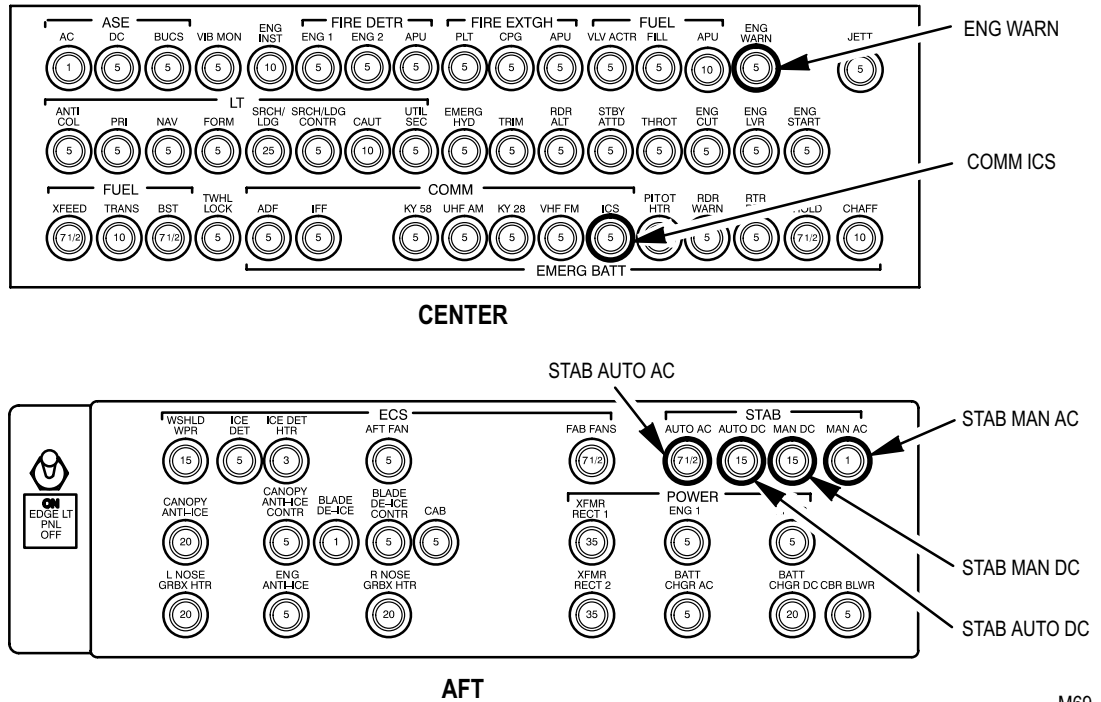


Figure 9-239. Pilot Circuit Breaker Panels

Task	Result
b. On CPG circuit breaker panel 1 (fig. 9-240), check that EMERG BATT ICS circuit breaker (CB13) is closed.	If EMERG BATT ICS circuit breaker (CB13) does not stay closed, refer to TM 11-1520-238-23-2 to troubleshoot intercommunication system.

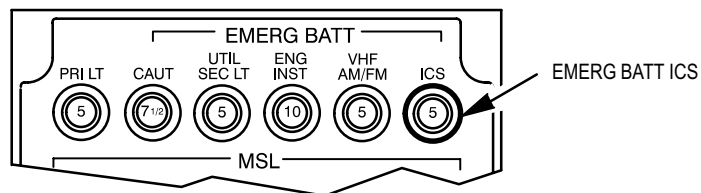
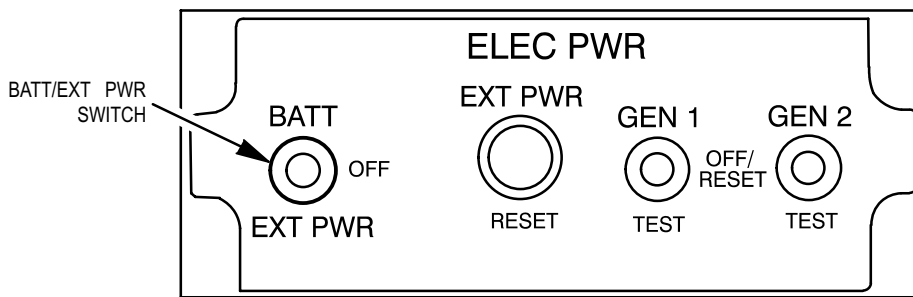


Figure 9-240. CPG Circuit Breaker Panel 1

c. On pilot ELEC PWR panel (fig. 9-241), set BATT/EXT PWR switch to OFF and back to EXT PWR . Check that audio warning is heard in pilot and CPG headsets.	If audio warning is not heard in both headsets, go to paragraph 9-398. If audio warning is heard in one but not the other headset, refer to TM 11-1520-238-23-2 to troubleshoot integrated audio warning system.
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M69-339

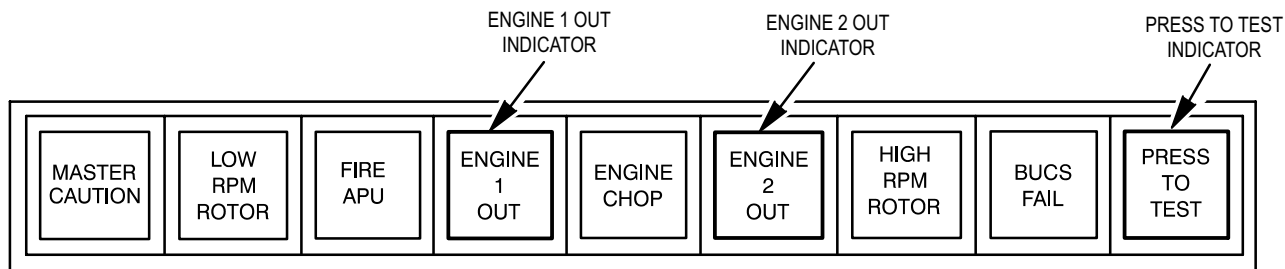
M69-340



M69-341

Figure 9-241. Pilot ELEC PWR Panel

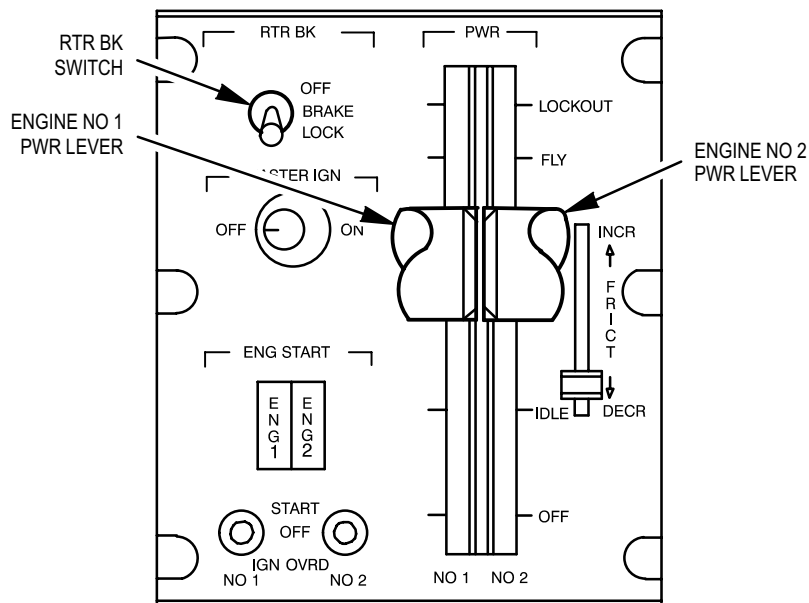
Task	Result
d. On pilot master caution/warning panel (fig. 9-242), press ENGINE 1 OUT indicator. Check that audio warning is silenced.	If audio warning is still heard, go to paragraph 9-399.



M69-342

Figure 9-242. Master Caution/Warning Panel

- | | |
|---|---|
| e. On pilot power quadrant (fig. 9-243), set RTR BK switch to OFF . | |
| 2. Start No. 1 and No. 2 engines (TM 1-1520-238-CL). | |
| a. On pilot power quadrant, set engine NO 1 PWR lever to FLY . Check that audio warning is heard in pilot and CPG headsets. | If audio warning is not heard in both pilot and CPG headsets, replace engine out warning unit (TM 1-1520-238-23). |
| | If audio warning is heard in only one headset, refer to TM 11-1520-238-23-2 to troubleshoot integrated audio warning system. |
| b. On pilot master caution/warning panel, check that ENGINE 1 OUT indicator is lighted and flashing. | If ENGINE 1 OUT indicator is not lighted and flashing, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-400. |

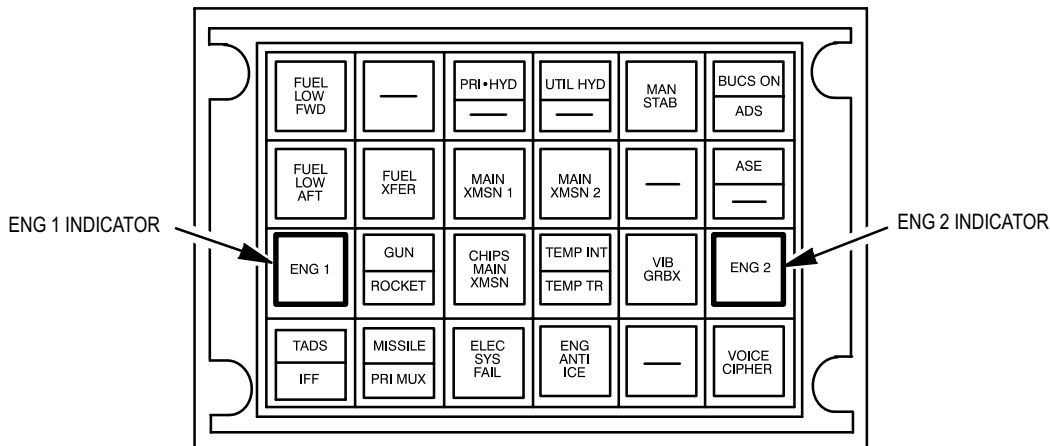


M69-343

Figure 9-243. Pilot Power Quadrant

Task	Result
c. On pilot power quadrant, place engine NO 1 PWR lever to OFF and back to FLY .	
d. On CPG caution/warning panel (fig. 9-244), check that ENG 1 indicator is lighted and flashing.	If ENG 1 indicator is not lighted and flashing, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-401.
e. On CPG master caution/warning panel (fig. 9-242), press ENGINE 1 OUT indicator. Check that audio warning is silenced.	If audio warning is still heard, go to paragraph 9-402.
f. On pilot quadrant (fig. 9-243), set engine NO 1 PWR lever to OFF . Set engine NO 2 PWR lever to FLY . Check that audio warning is heard in pilot and CPG headsets.	If audio warning is not heard in both pilot and CPG headsets, replace engine out warning unit (TM 1-1520-238-23).
	If audio warning is heard in only one headset, refer to TM 11-1520-238-23-2 to troubleshoot integrated audio warning system.
g. On pilot master caution warning panel, check that ENGINE 2 OUT indicator is lighted and flashing.	If ENGINE 2 OUT indicator is not lighted and flashing, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-403.
h. On pilot master caution warning panel, press ENGINE 2 OUT indicator, check that audio warning is silenced.	If audio warning is still heard, go to paragraph 9-404.

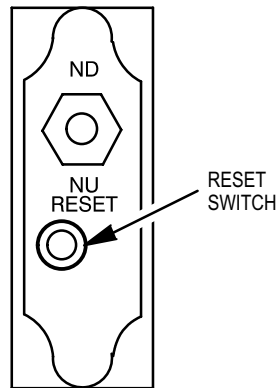
Task	Result
i. On pilot power quadrant (fig. 9-243), set engine NO 2 PWR lever to OFF and back to FLY .	
j. On CPG caution/warning panel (fig. 9-244), check that ENG 2 indicator is lighted and flashing.	If ENG 2 indicator is not lighted and flashing, replace lamp (TM 1-1520-238-23.). If lamp still does not light, go to paragraph 9-405.



M69-344

Figure 9-244. CPG Caution/Warning Panel

- | | |
|--|---|
| k. On CPG master caution/warning panel (fig. 9-242), press ENGINE 2 OUT indicator. Check that audio warning is silenced. | If audio warning is still heard, go to paragraph 9-406. |
| l. On pilot power quadrant, set engine NO 2 PWR lever to OFF position, and RTR BK switch to LOCK position. | |
| m. On pilot aft circuit breaker panel (fig. 9-239), open STAB AUTO AC circuit breaker (CB2). Check that audio warning is heard in pilot and CPG headsets. | If audio warning is not heard in either headset, go to paragraph 9-407. |
| | If audio warning is heard in one but not the other headset, refer to TM 11-1520-238-23-2 to troubleshoot integrated audio warning system. |
| n. On pilot stabilator manual control panel (fig. 9-245), press RESET switch. Check that audio warning is silenced. | If audio warning is still heard, go to paragraph 9-408. |
| o. On pilot aft circuit breaker panel, close then open STAB AUTO AC circuit breaker (CB2). | |



M69-345

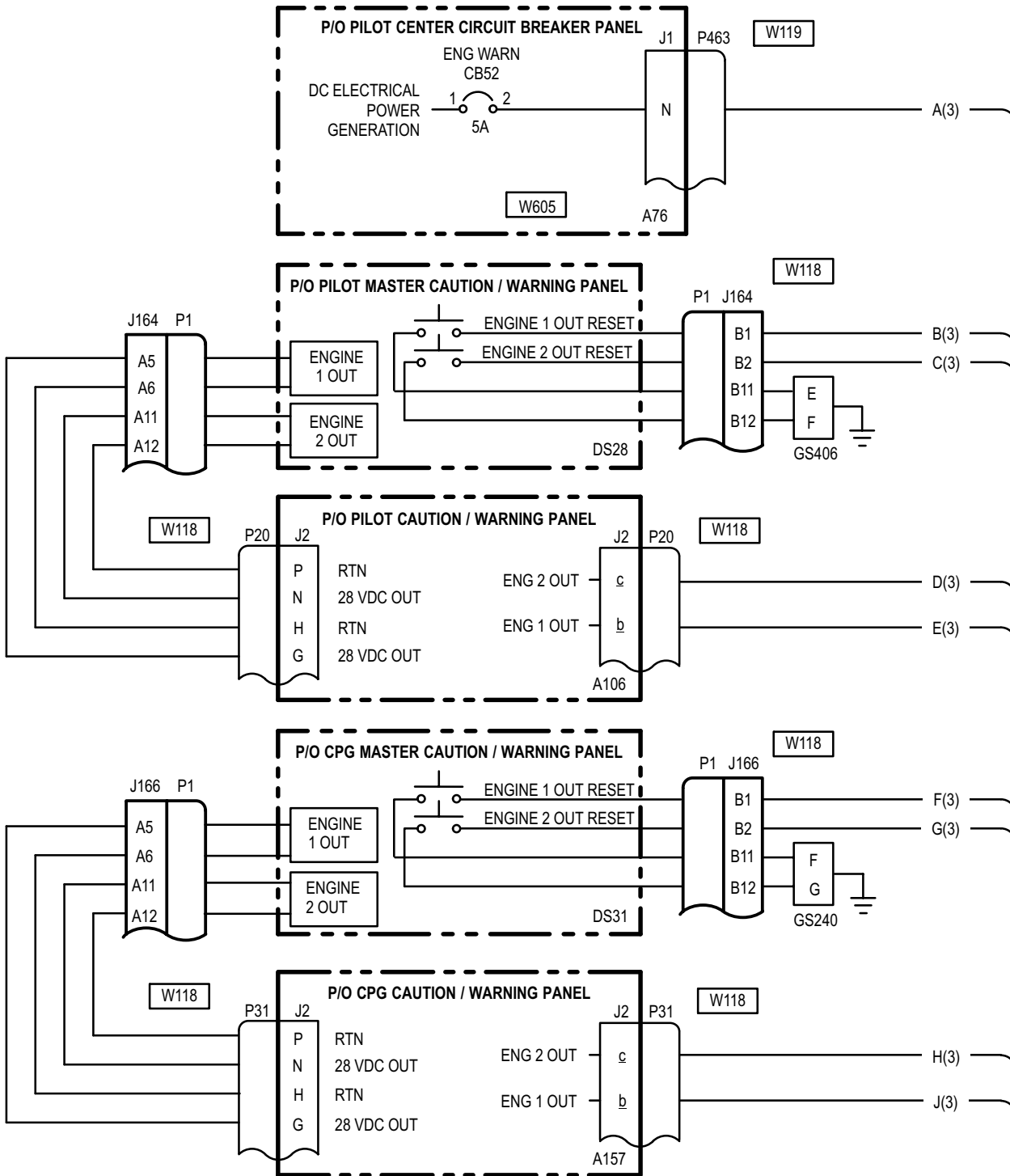
Figure 9-245. Stabilator Manual Control Panel

Task	Result
<p>p. On CPG stabilator manual control panel (fig. 9-245), press RESET switch. Check that audio warning is silenced.</p>	<p>If audio warning is still heard, go to paragraph 9-409.</p>
<p>q. On pilot aft circuit breaker panel (fig. 9-239), close STAB AUTO AC circuit breaker (CB2).</p>	

3. Shutdown No. 1 and No. 2 engines (TM 1-1520-238-CL).
4. Perform EXTERNAL POWER – POWER DOWN (para 9-46).

END OF TASK

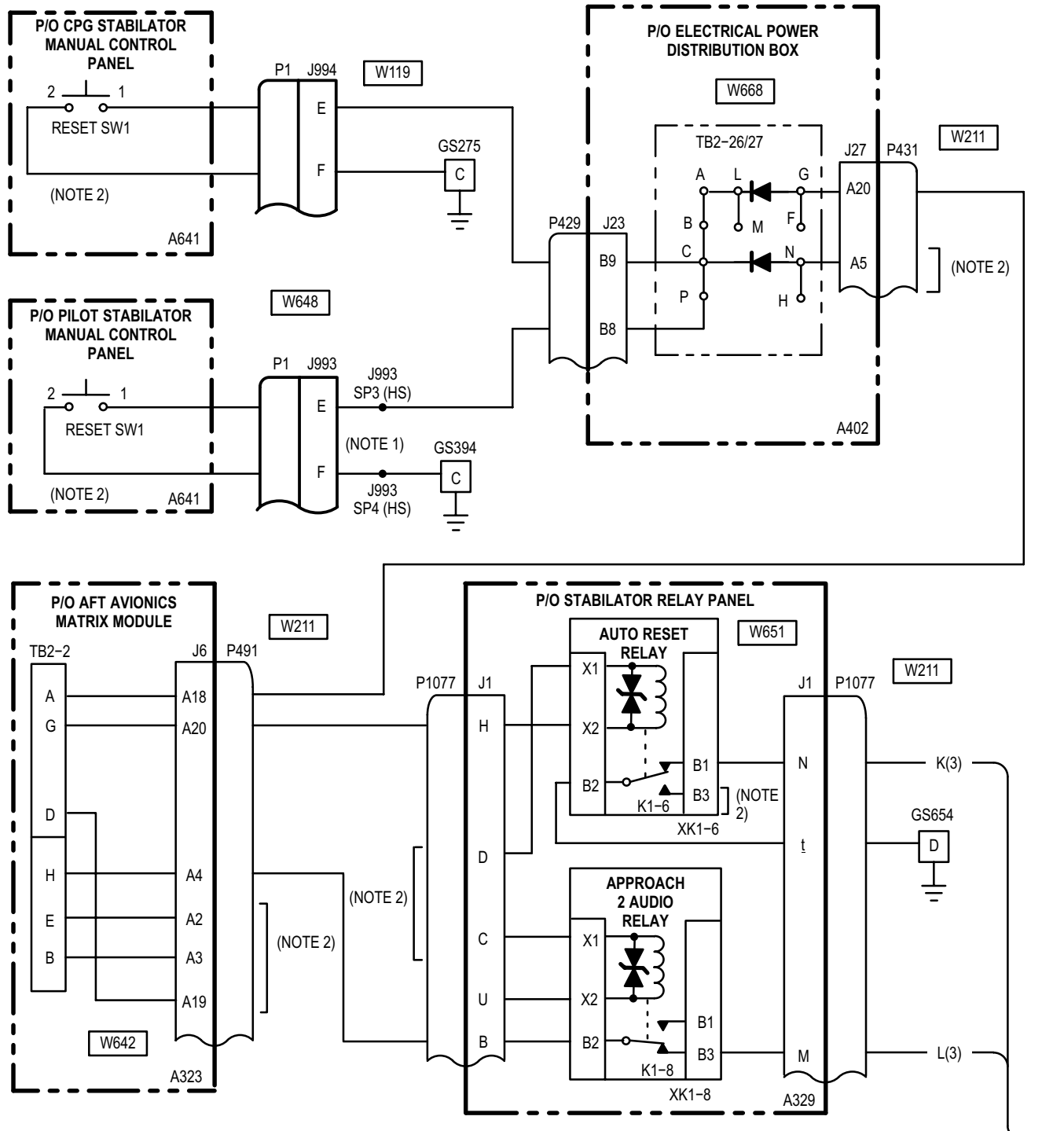
9-396. AUDIO WARNING SYSTEM – WIRING INTERCONNECT DIAGRAM



1

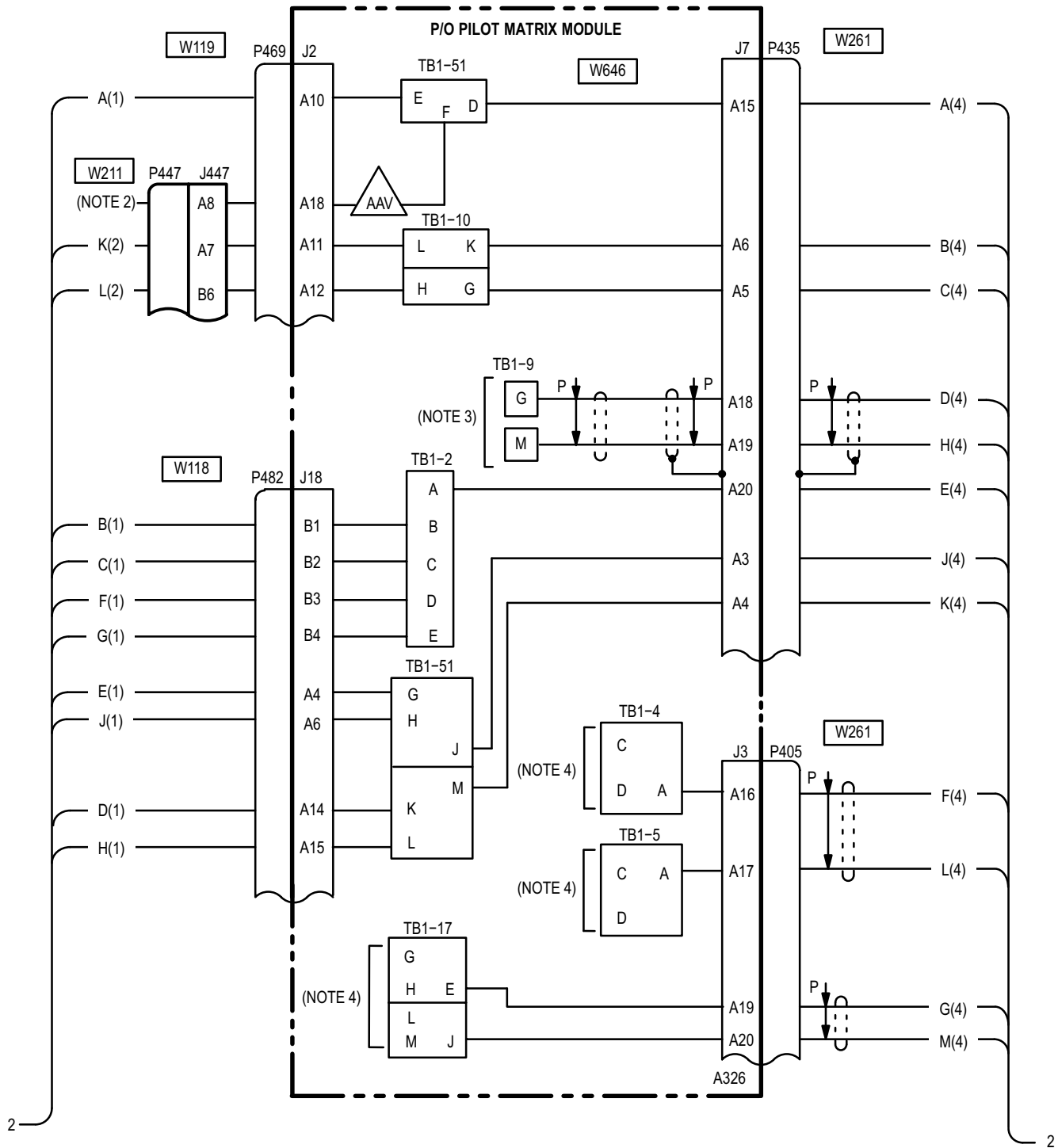
9-396. AUDIO WARNING SYSTEM – WIRING INTERCONNECT DIAGRAM (cont)

9-396



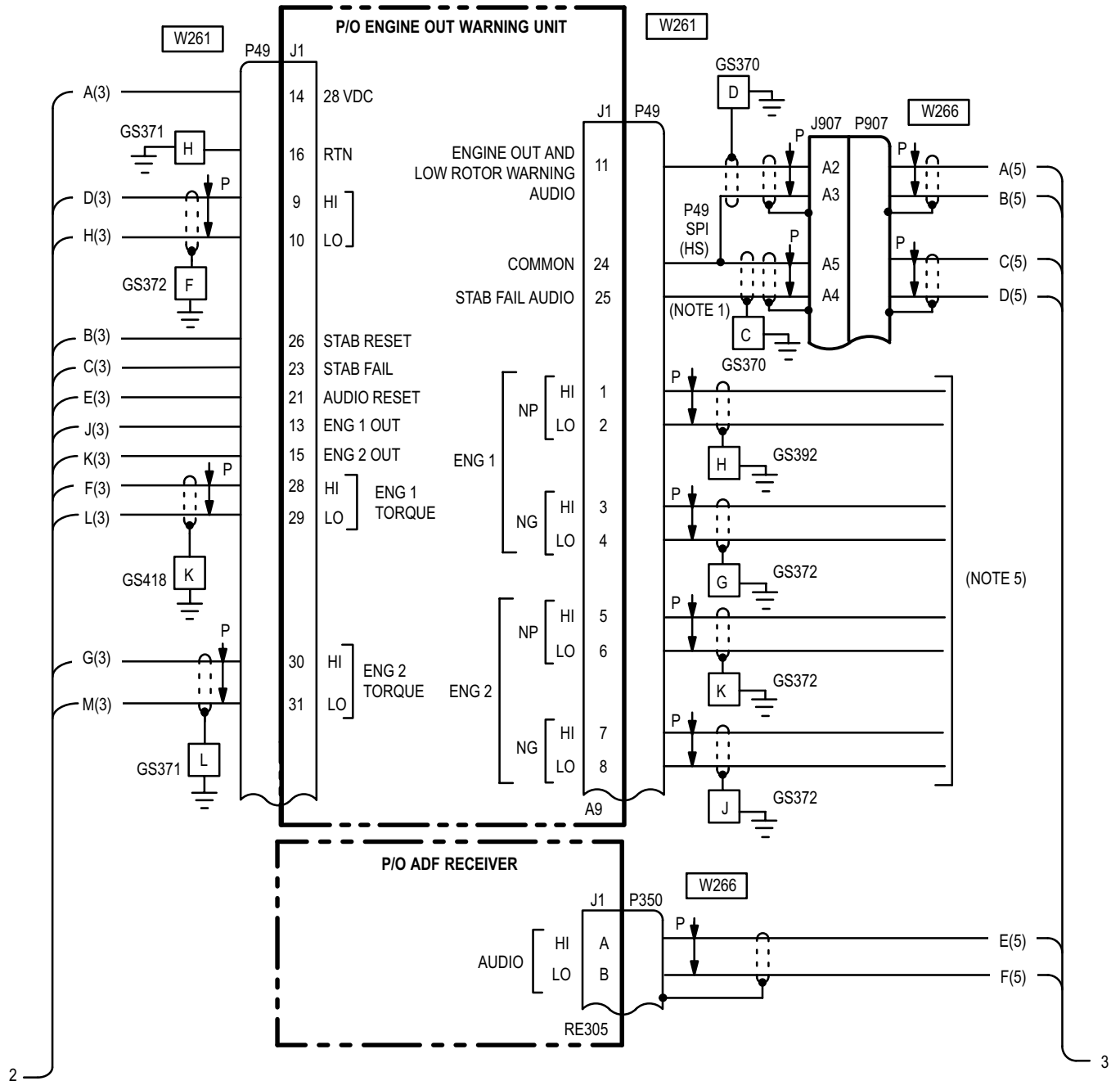
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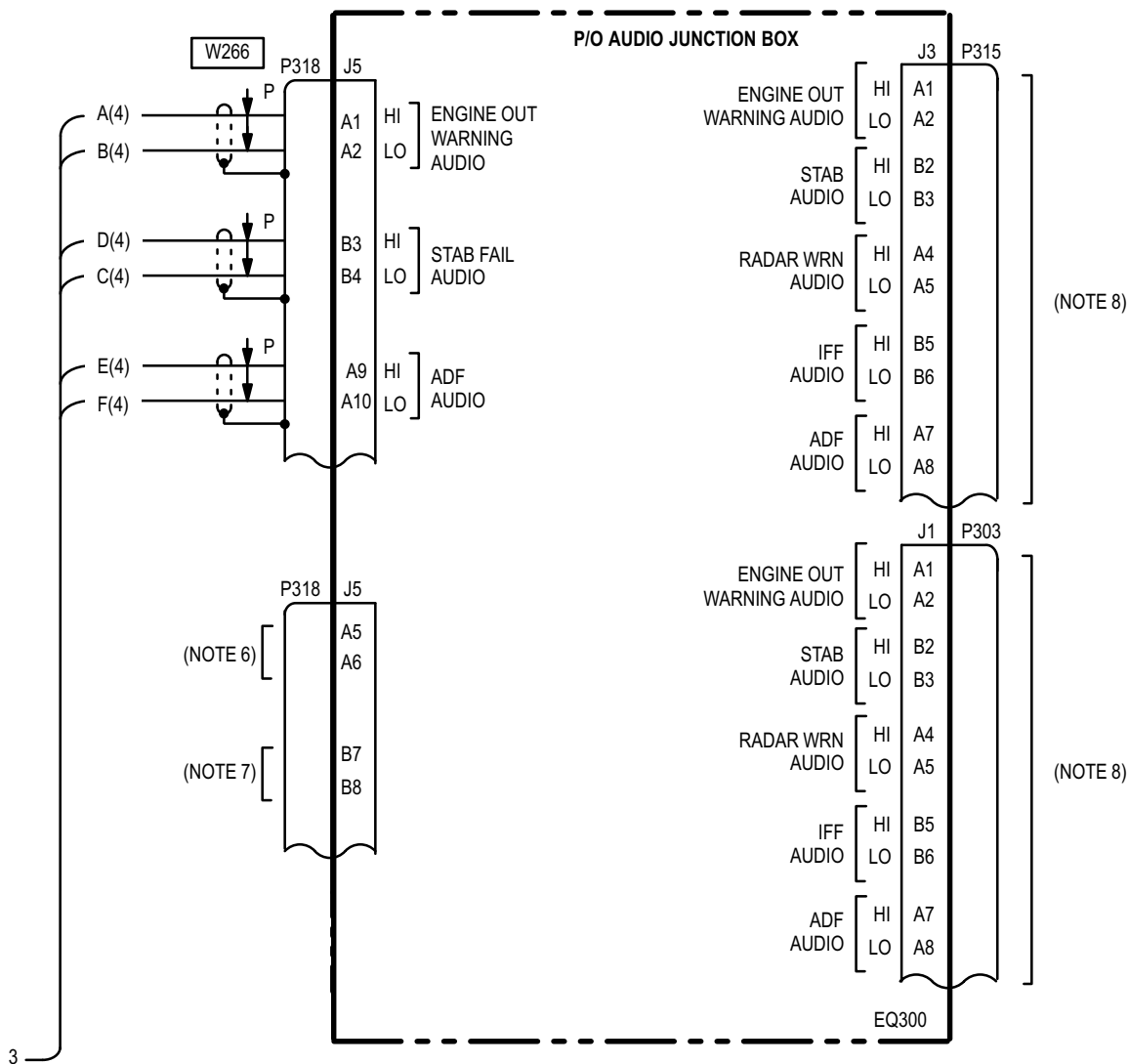
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9-396. AUDIO WARNING SYSTEM – WIRING INTERCONNECT DIAGRAM (cont)

9-396





NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

1. HS DESIGNATES A HARD SPLICE WHICH CANNOT BE DISCONNECTED, M DESEGNATES A SOFT SPLICE WHICH MAY BE DISCONNECTED FOR A WIRING CHECK.
2. FLIGHT CONTROL SYSTEM (TM 1-1520-238-T-7).
3. DRIVE SYSTEM (TM 1-1520-238-T-4).
4. INSTRUMENTS (TM 1-1520-238-T-5).
5. POWER PLANTS (TM 1-1520-238-T-4).
6. AVIONICS CONFIGURATION - RADAR WARNING SYSTEM (TM 11-1520-238-23-2).
7. AVIONICS CONFIGURATION - IFF (TM 11-1520-238-23-2).
8. AVIONICS CONFIGURATION - INTERCOMMUNICATION SYSTEM (TM 11-1520-238-23-2).

9-397. ENG WARN CIRCUIT BREAKER (CB52) – DOES NOT STAY CLOSED

9-397

Tools:

Nomenclature	Part Number
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Detach P463. On pilot center circuit breaker panel, check that **ENG WARN** circuit breaker (CB52) is closed.

Does circuit breaker stay closed?

- YES Go to step 2.
- NO Go to paragraph 9-263 to troubleshoot dc emergency bus – pilot station.

2. Detach P49. Check for short between P463-N and ground.

Does short exist?

- YES **(AAT)** Go to step 3.
(AAV) Go to step 4.
- NO Replace engine out warning unit (TM 1-1520-238-23).

3. **(AAT)** Detach wire ends at (A326): TB1-51-D and TB1-51-E. Check for short between:
P463-N and ground,
P49-14 and ground,
(A326)J2-A10 and ground,
(A326)J7-A15 and ground.

Does short exist?

- YES Repair shorted wire between:
P463-N and P469-A10,
P49-14 and P435-A15.
(A326):
J2-A10 and TB1-51-E,
J7-A15 and TB1-51-D.
Go to paragraph 9-395.
- NO Replace relay (A326)TB1-15 (TM 1-1520-238-23).

4. **(AAV)** Detach P469. Detach wire ends at (A326):
TB1-51-D, TB1-51-E and TB1-51-F. Check for short between:
P463-N and ground,
P49-14 and ground,
(A326)J2-A10 and ground,
(A326)J7-A15 and ground,
(A326)J2-A18 and ground.

Does short exist?

- YES Repair shorted wire between:
P463-N and P469-A10,
P49-14 and P435-A15,
(A326)J2-A10 and
(A326)TB1-51-E,
(A326)J7-A15 and
(A326)TB1-51-D,
(A326)J2-A18 and
(A326)TB1-51-F.
Go to paragraph 9-395.
- NO Replace relay (A326)TB1-51 (TM 1-1520-238-23).

END OF TASK

9-398. LOW RPM ROTOR AUDIO WARNING – IS NOT HEARD IN BOTH HEADSETS

9-398

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-4



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC at (A76)J1-N.

Is voltage present?

YES	Go to step 2.
NO	Go to paragraph 9-263 to troubleshoot circuit protection system (dc emergency bus – pilot station).

2. Check for open between:

P463-N and P49-14,
P49-16 and ground.

Does open exist?

YES	Repair open wire. Go to paragraph 9-395.
NO	Go to step 3.

3. Check for 0.6 to 0.8 VAC between P49-9 and P49-10.

Is voltage present?

YES	Go to step 4.
NO	Go to step 5.

4. Check for open between:

P49-11 and P318-A1,
P49-24 and P318-A2.

Does open exist?

YES	Repair open wire. Go to paragraph 9-395.
NO	Replace engine out warning unit (TM 1-1520-238-23).

5. Check for open between:

P49-9 and (A326)TB1-9-G,
P49-10 and (A326)TB1-9-M.

Does open exist?

YES	Repair open wire. Go to paragraph 9-395.
NO	Refer to TM 1-1520-238-T-4 to troubleshoot drive system.

END OF TASK

9-399. PILOT ENGINE 1 OUT INDICATOR – DOES NOT RESET AUDIO WARNING

9-399

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

- Detach wire from (A326):
TB1-2-B and TB1-2-A. Check for open between:
J164-B1 and P482-B1,
P435-A20 and P49-21.
Wire end at (A326):
TB1-2-B and J18-B1,
TB1-2-A and J7-A20.

Does open exist?

YES	Repair open wire. Go to paragraph 9-395.
NO	Replace terminal board (A326)TB1-2 (TM 1-1520-238-23).



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

- On pilot master caution/warning panel, press **ENGINE 1 OUT** indicator and check for open between (DS28):
P1-B1 and P1-B11.
Does open exist?

YES	Replace pilot master caution/warning panel (TM 1-1520-238-23).
NO	Go to step 2.
- Check for open between J164-B11 and ground.
Does open exist?

YES	Repair open wire. Go to paragraph 9-395.
NO	Go to step 3.
- Check for open between J164-B1 and P49-21.
Does open exist?

YES	Go to step 4.
NO	Replace engine out warning unit (TM 1-1520-238-23).

END OF TASK

9-400. PILOT ENGINE 1 OUT INDICATOR – IS NOT LIGHTED WITH ENGINE 1 NOT RUNNING 9-400

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC between J164-A5 and J164-A6.

Is voltage present?

YES	Replace pilot master caution/warning panel (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between: J164-A5 and P20-G, J164-A6 and P20-H.

Does open exist?

YES	Repair open wire. Go to paragraph 9-395.
NO	Go to step 3.

3. Check for 28 VDC at P20-b.

Is voltage present?

YES	Replace pilot caution/warning panel (TM 1-1520-238-23).
NO	Go to step 4.

4. Check for open between P20-b and P49-13.

Does open exist?

YES	Go to step 5.
NO	Replace engine out warning unit (TM 1-1520-238-23).

5. Detach wire from (A326)TB1-51-G

Check for open between:

P20-b and P482-A4,
P435-A3 and P49-13.

Wire at end (A326):
TB1-51-G and J18-A4.

Does open exist?

YES	Repair open wire. Go to paragraph 9-395.
NO	Replace terminal board (A326)TB1-51 (TM 1-1520-238-23).

END OF TASK

9-401. CPG ENGINE 1 OUT INDICATOR – IS NOT LIGHTED WITH ENGINE 1 NOT RUNNING

9-401

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC between J166-A5 and J166-A6.

Is voltage present?

YES	Replace CPG master caution/warning panel (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between: J166-A5 and P31-G, J166-A6 and P31-H.

Does open exist?

YES	Repair open wire. Go to paragraph 9-395.
NO	Go to step 3.

3. Check for 28 VDC at P31-b.

Is voltage present?

YES	Replace CPG caution/warning panel (TM 1-1520-238-23).
NO	Go to step 4.

4. Check for open between P31-b and P49-13.

Does open exist?

YES	Go to step 5.
NO	Replace engine out warning unit (TM 1-1520-238-23).

5. Detach wires from (A326):

TB1-51-H and TB1-51-J.
Check for open between:

P31-b and P482-A6,
P435-A3 and P49-13.

Wire end at (A326):

TB1-51-H and J18-A6,

TB1-51-J and J7-A3.

Does open exist?

YES	Repair open wire. Go to paragraph 9-395.
NO	Replace terminal board (A326)TB1-51 (TM 1-1520-238-23).

END OF TASK

9-402. CPG ENGINE 1 OUT INDICATOR – DOES NOT RESET AUDIO WARNING

9-402

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – L175 fairing removed

3. Check for open between J166-B1 and P49-21.

Does open exist?

YES	Go to step 4.
NO	Replace engine out warning unit (TM 1-1520-238-23).

4. Detach wire from (A326)TB1-2-D. Check for open between:

J166-B1 and P482-B3,
P435-A20 and P49-21.

Wire end at (A326):
TB1-2-D and J18-B3.

Does open exist?

YES	Repair open wire. Go to paragraph 9-395.
NO	Replace terminal board (A326)TB1-2 (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On CPG master caution/warning panel, press **ENGINE 1 OUT** indicator and check for open between (DS31):
P1-B1 and P1-B11.

Does open exist?

YES	Replace CPG master caution/warning panel (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between J166-B11 and ground.

Does open exist?

YES	Repair open wire. Go to paragraph 9-395.
NO	Go to step 3.

END OF TASK

9-403. PILOT ENGINE 2 OUT INDICATOR – IS NOT LIGHTED WITH ENGINE 2 NOT RUNNING

9-403

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC between J164-A11 and J164-A12.

Is voltage present?

YES	Replace pilot master caution/warning panel (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between: J164-A11 and P20-N, J164-A12 and P20-P.

Does open exist?

YES	Repair open wire. Go to paragraph 9-395.
NO	Go to step 3.

3. Check for 28 VDC at P20-c.

Is voltage present?

YES	Replace pilot caution/warning panel (TM 1-1520-238-23).
NO	Go to step 4.

4. Check for open between P20-c and P49-15.

Does open exist?

YES	Go to step 5.
NO	Replace engine out warning unit (TM 1-1520-238-23).

5. Detach wires from (A326):

TB1-51-K and TB1-51-M.

Check for open between:

P20-c and P482-A14,

P435-A4 and P49-15.

Wire end at (A326):

TB1-51-K and J18-A14,

TB1-51-M and J7-A4.

Does open exist?

YES	Repair open wire. Go to paragraph 9-395.
NO	Replace terminal board (A326)TB1-51 (TM 1-1520-238-23).

END OF TASK

9-404. PILOT ENGINE 2 OUT INDICATOR – DOES NOT RESET AUDIO WARNING

9-404

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

4. Detach wire from (A326)TB1-2-C.

Check for open between:

J164-B2 and P482-B2,
P435-A20 and P49-21.

Wire end at (A326):
TB1-2-C and J18-B2.

Does open exist?

YES	Repair open wire. Go to paragraph 9-395.
NO	Replace terminal board (A326)TB1-2 (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On pilot master caution/warning panel, press **ENGINE 2 OUT** indicator and check for open between (DS28):

P1-B12 and P1-B2.

Does open exist?

YES Replace pilot master caution/warning panel (TM 1-1520-238-23).

NO Go to step 2.

2. Check for open between J164-B12 and GS406-F.

Does open exist?

YES Repair open wire.
Go to paragraph 9-395.

NO Go to step 3.

3. Check for open between J164-B2 and P49-21.

Does open exist?

YES Go to step 4.

NO Replace engine out warning unit (TM 1-1520-238-23).

END OF TASK

9-405. CPG ENGINE 2 INDICATOR – IS NOT LIGHTED WITH ENGINE 2 NOT RUNNING

9-405

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC between J166-A11 and J166-A12.

Is voltage present?

YES	Replace CPG master caution/warning panel (TM 1-1520-238-23).
NO	Go to step 2.

2. Check for open between: J166-A11 and P31-N, J166-A12 and P31-P.

Does open exist?

YES	Repair open wire. Go to paragraph 9-395.
NO	Go to step 3.

3. Check for 28 VDC at P31-c.

Is voltage present?

YES	Replace CPG caution/warning panel (TM 1-1520-238-23).
NO	Go to step 4.

4. Check for open between P31-c and P49-15.

Does open exist?

YES	Go to step 5.
NO	Replace engine out warning unit (TM 1-1520-238-23).

5. Detach wire from (A326)TB1-51-L.

Check for open between:

P31-c and P482-A15,
P435-A4 and P49-15.

Wire end at (A326):

TB1-51-L and J18-A15.

Does open exist?

YES	Repair open wire. Go to paragraph 9-395.
NO	Replace terminal board (A326)TB1-51 (TM 1-1520-238-23).

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

4. Detach wire from (A326)TB1-2-E.

Check for open between:

J166-B2 and P482-B4,
P435-A20 and P49-21.

Wire end at (A326):
TB1-2-E and J18-B4.

Does open exist?

YES	Repair open wire. Go to paragraph 9-395.
NO	Replace terminal board (A326)TB1-2 (TM 1-1520-238-23).



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. On CPG master caution/warning panel, press **ENGINE 2 OUT** indicator and check for open between (DS31):

P1-B2 and P1-B12.

Does open exist?

YES Replace CPG master caution/warning panel (TM 1-1520-238-23).

NO Go to step 2.

2. Check for open between J166-B12 and ground.

Does open exist?

YES Repair open wire.
Go to paragraph 9-395.

NO Go to step 3.

3. Check for open between J166-B2 and P49-21.

Does open exist?

YES Go to step 4.

NO Replace engine out warning unit (TM 1-1520-238-23).

END OF TASK

9-407. STABILATOR AUDIO WARNING – IS NOT HEARD IN EITHER HEADSET

9-407

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-7

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Non-transparent barrier removed

3. Check for open between: P447-B6 and P1077-M, P1077-B and P491-A4, (A323)J6-A4 and (A323)J6-A3.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire.
Go to paragraph 9-395. |
| NO | Go to step 4. |

4. On stabilator relay panel, check for open between (A329): J1-B and J1-M.

Does open exist?

- | | |
|-----|--|
| YES | Replace relay (A329)K1-8 (TM 1-1520-238-23). |
| NO | Refer to TM 1-1520-238-T-7 to troubleshoot stabilator. |



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for open between P447-B6 and ground.

Does open exist?

- | | |
|-----|---------------|
| YES | Go to step 3. |
| NO | Go to step 2. |

2. Check for open between J447-B6 and P49-23.

Does open exist?

- | | |
|-----|---|
| YES | Repair open wire.
Go to paragraph 9-395. |
| NO | Replace engine out warning unit (TM 1-1520-238-23). |

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 1-1520-238-T-7

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – L200 panel removed; L325, T290R and T290L doors opened



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28 VDC at P1077-D.
Is voltage present?

- YES Go to step 2.
- NO Refer to TM 1-1520-238-T-7 to troubleshoot stabilator.

2. Check for open between:
J993-F and ground,
J993-E and P429-B8,
P431-A20 and P1077-H,
P1077-t and ground,
(A402)J23-B8 and (A402)TB2-26/27-P,
(A402)TB2-26/27-B and (A402)TB2-26/27-A,
(A402)TB2-26/27-G and (A402)J27-A20,
(A329)J1-H and (A329)XK1-6-X2,
(A329)J1-N and (A329)XK1-6-B1.

Does open exist?

- YES Repair open wire.
Go to paragraph 9-395.
- NO Go to step 3.

3. Check for open between (A329):
XK1-6-X2 and XK1-6-X1.

Does open exist?

- YES Replace relay (A329)K1-6 (TM 1-1520-238-23).
- NO Go to step 4.

4. With positive meter lead at (A402):
TB2-26/27-G, check for open between
TB2-26/27-G and TB2-26/27-L.

Does open exist?

- YES Replace terminal board (A402)TB2-26/27 (TM 1-1520-238-23).
- NO Go to step 5.

5. With pilot stabilator reset button pressed, check for open between (A641):
P1-E and P1-F.

Does open exist?

- YES Replace pilot stabilator manual control panel reset switch (TM 1-1520-238-23).
- NO Go to step 6.

9-408. PILOT RESET SWITCH – DOES NOT RESET STABILATOR AUDIO WARNING (cont)

9-408

6. Check for open between P1077-N and P49-26.

Does open exist?

YES Repair open wire.
 Go to paragraph 9-395.

NO Go to step 7.

7. On pilot stabilator manual control panel, press reset switch and check for open between P447-A7 and ground.

Does open exist?

YES Replace relay (A329)K1-6
 (TM 1-1520-238-23).

NO Replace engine out warning unit
 (TM 1-1520-238-23).

END OF TASK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Access provisions – L200 panel removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Check for open between:

J994-F and ground,
J994-E and P429-B9,
(A402)J23-B9 and (A402)TB2-26/27-C.

Does open exist?

YES	Repair open wire. Go to paragraph 9-395.
NO	Replace CPG stabilator manual control panel reset switch (TM 1-1520-238-23).

END OF TASK

9-410. FALSE ENGINE OUT WARNING – OCCURS INFLIGHT (SINGLE ENGINE MANEUVER AT HIGH POWER SETTING AND Np LESS THAN 89%)

9-410

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Aircraft Mechanic's	SC518099CLA01
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

- 67R Attack Helicopter Repairer
- 68X Armament/Electrical Systems Repairer
- 100KG Pilot

References:

- TM 1-1520-238-23
- TM 1-1520-238-T-8
- TM 1-1520-238-CL

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-CL	Engines 1 and 2 running

2. Shutdown engines 1 and 2. Check for open between:
P49-28 and P405-A16,
P49-29 and P405-A17,
P49-30 and P405-A19,
P49-31 and P405-A20.

Does open exist?

YES Repair open wire.
Go to paragraph 9-395.

NO Go to step 3.

3. Check for open between (A326):
J3-A16 and TB1-4-A,
J3-A17 and TB1-5-A,
J3-A19 and TB1-17-E,
J3-A20 and TB1-17-J.

Does open exist?

YES Repair open wire.
Go to paragraph 9-395.

NO Replace engine out warning unit (TM 1-1520-238-23).



Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check pilot **TORQUE** indicator.
Does TORQUE indicator 1 and vertical scale and digital readouts indicate zero percent?

YES Refer to TM 1-1520-238-T-8 to troubleshoot engine instruments.

NO Go to step 2.

END OF TASK

9-411. SQUAT SWITCH SYSTEM – MAINTENANCE OPERATIONAL CHECK

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45
Fixture, Squat Switch	7-3621MF002
	Make item

References:

- TM 1-1520-238-23
- TM 1-1520-238-T-4
- TM 1-1520-238-T-8
- TM 9-1090-208-23-2
- TM 9-1230-476-20-2
- TM 11-1520-238-23-2

Equipment Conditions:

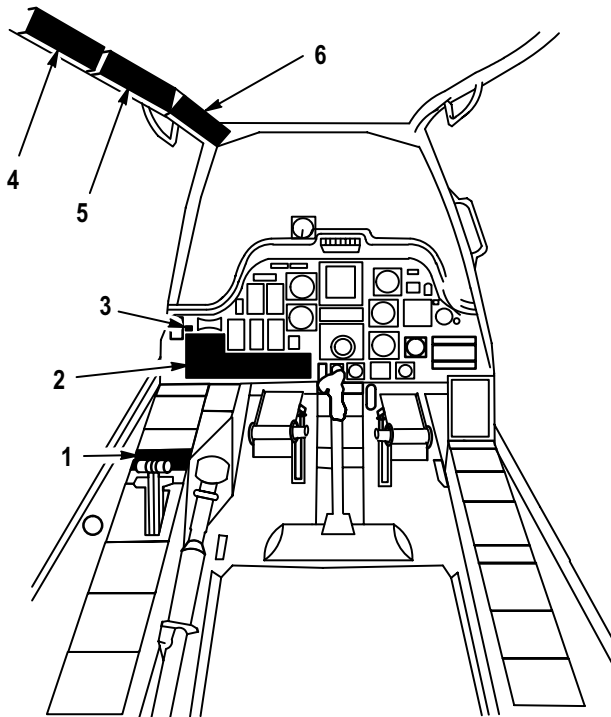
<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23 Paragraph 9-45	Battery installed EXTERNAL POWER – POWER UP completed
Paragraph 9-10	AC ELECTRICAL POWER GENERATION – POWER UP completed

Personnel Required:

- 68X Armament/Electrical Systems Repairer
- One person to assist

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.



1. PILOT ELEC PWR PANEL
2. PILOT FIRE CONTROL PANEL
3. PILOT ARM/SAFE INDICATOR
4. PILOT AFT CIRCUIT BREAKER PANEL
5. PILOT CENTER CIRCUIT BREAKER PANEL
6. PILOT FORWARD CIRCUIT BREAKER PANEL

M69-415

Figure 9-246. Pilot Station

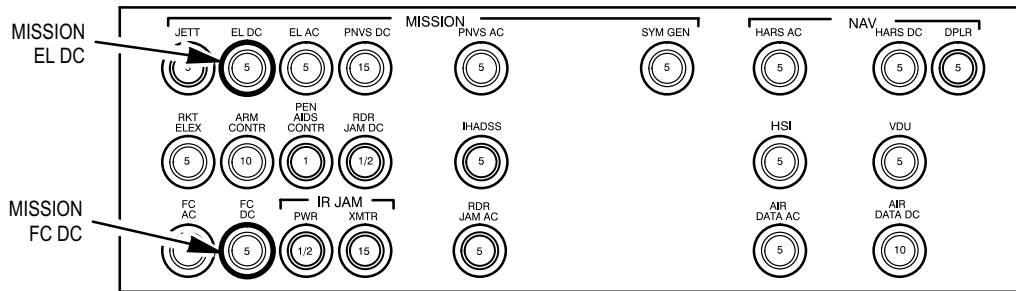
NOTE

- Refer to pilot station (fig. 9-246) for configuration and component locations.
- If referenced out of one paragraph or volume into another for additional troubleshooting, upon completion of the task, return to the maintenance operational check for the original paragraph or volume.

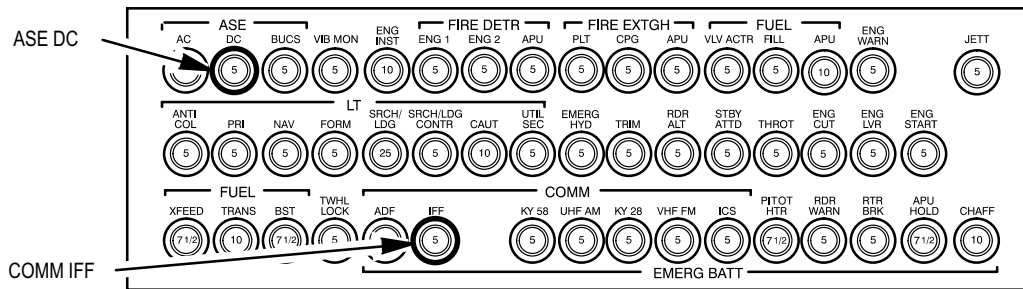
1. Perform maintenance operational checks as follows:

Task	Result
<p>a. On pilots circuit breaker panel (fig. 9-247), check that the following circuit breakers stay closed: MISSION EL DC (CB93), MISSION FC DC (CB50), ASE DC (CB28), COMM IFF (CB29), ECS CANOPY ANTI-ICE (CB70).</p>	<p>If MISSION EL DC circuit breaker (CB93) does not stay closed, refer to TM 9-1090-208-23-2 to troubleshoot external stores control system.</p> <p>If MISSION FC DC circuit breaker (CB50) does not stay closed, refer to TM 9-1230-476-20-2 to troubleshoot fire control system.</p> <p>If ASE DC circuit breaker (CB28) does not stay closed, refer to TM 1-1520-238-T-7 to troubleshoot DASE.</p> <p>If COMM IFF circuit breaker (CB29) does not stay closed, refer to TM 11-1520-238-23-2 to troubleshoot IFF.</p> <p>If ECS CANOPY ANTI-ICE CONTR circuit breaker (CB70) refer to TM 1-1520-238-T-8 to troubleshoot canopy anti-ice system.</p>
<p>b. On pilot master caution/warning panel (fig. 9-248), press and hold PRESS TO TEST switch.</p>	<p>If ARM/SAFE indicator is not lighted, replace lamp (TM 1-1520-238-23). If lamp still does not light, go to paragraph 9-333 to troubleshoot pilot caution/warning system.</p>
<p>c. Check audio at right wing ICS. On pilot FIRE CONTROL panel (fig. 9-249), set MASTER switch to SAFE.</p>	<p>If audio is not present and SAFE light on pilot ARM/SAFE indicator is lighted, go to paragraph 9-413.</p>
<p>d. Install squat switch fixture (fig. 9-250) (TM 1-1520-238-23).</p>	

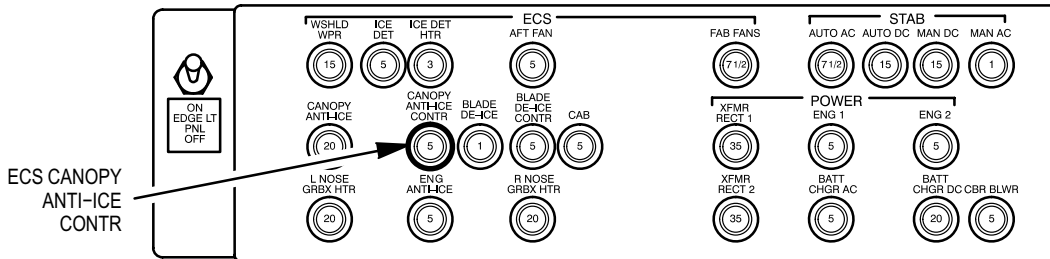
9-411. SQUAT SWITCH SYSTEM – MAINTENANCE OPERATIONAL CHECK (cont)



FORWARD



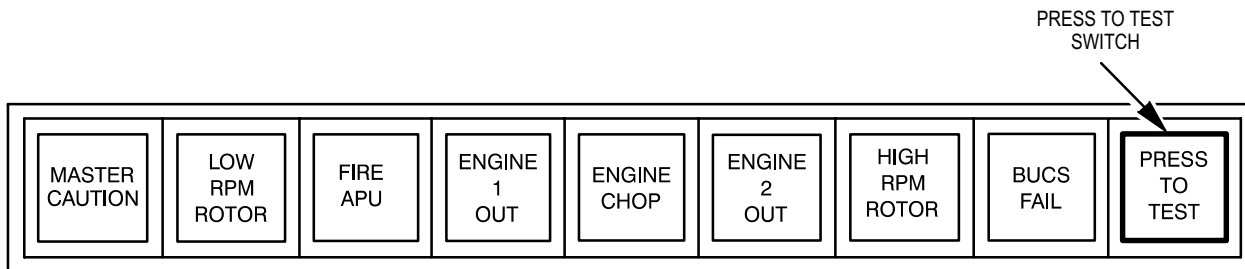
CENTER



AFT

M69-416

Figure 9-247. Pilot Circuit Breaker Panels



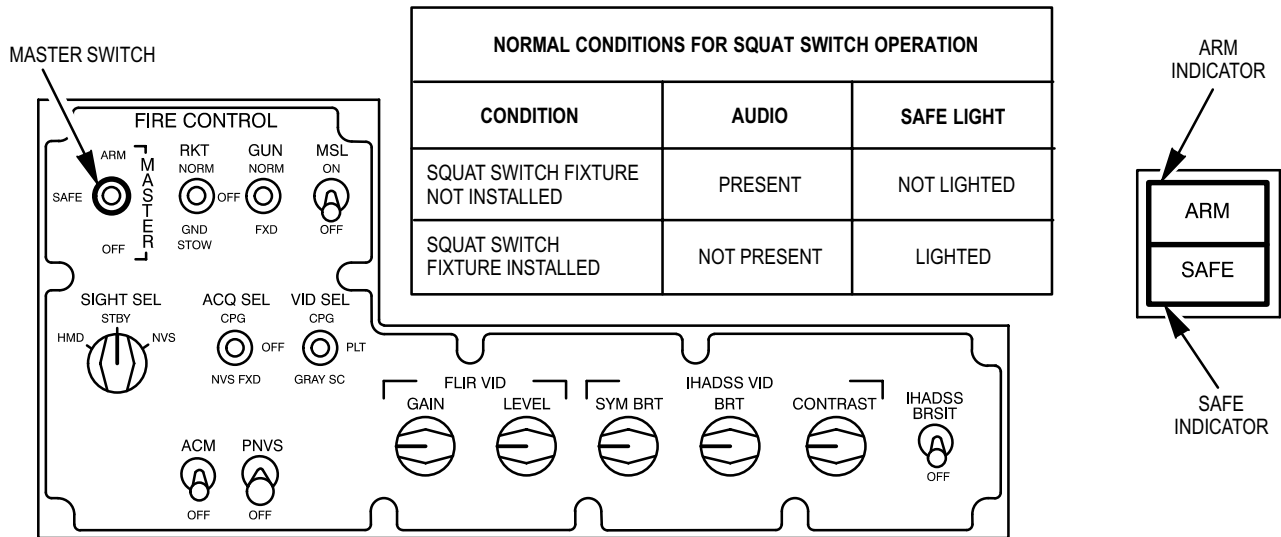
M69-434

Figure 9-248. Master Caution/Warning Panel

9-411. SQUAT SWITCH SYSTEM – MAINTENANCE OPERATIONAL CHECK (cont)

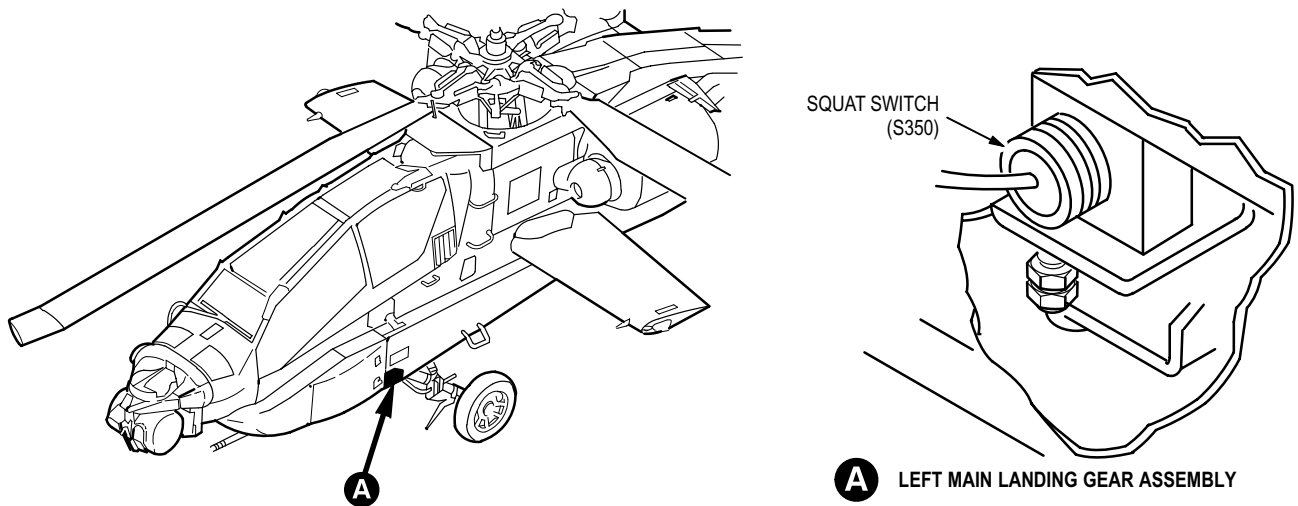
9-411

Task	Result
e. Check audio at right wing ICS. Check pilot ARM/SAFE indicator (fig. 9-249).	<p>If audio is present and SAFE light on pilot ARM/SAFE indicator is lighted, go to paragraph 9-414.</p> <p>If audio is not present and SAFE light on pilot ARM/SAFE indicator is not lighted, go to paragraph 9-415.</p> <p>If audio is present and SAFE light on pilot ARM/SAFE indicator is not lighted, go to paragraph 9-416.</p>



M69-417

Figure 9-249. Pilot FIRE CONTROL Panel and ARM/SAFE Indicator



M69-418

Figure 9-250. Squat Switch Location

9-411. SQUAT SWITCH SYSTEM – MAINTENANCE OPERATIONAL CHECK (cont)

9-411

Task

Result

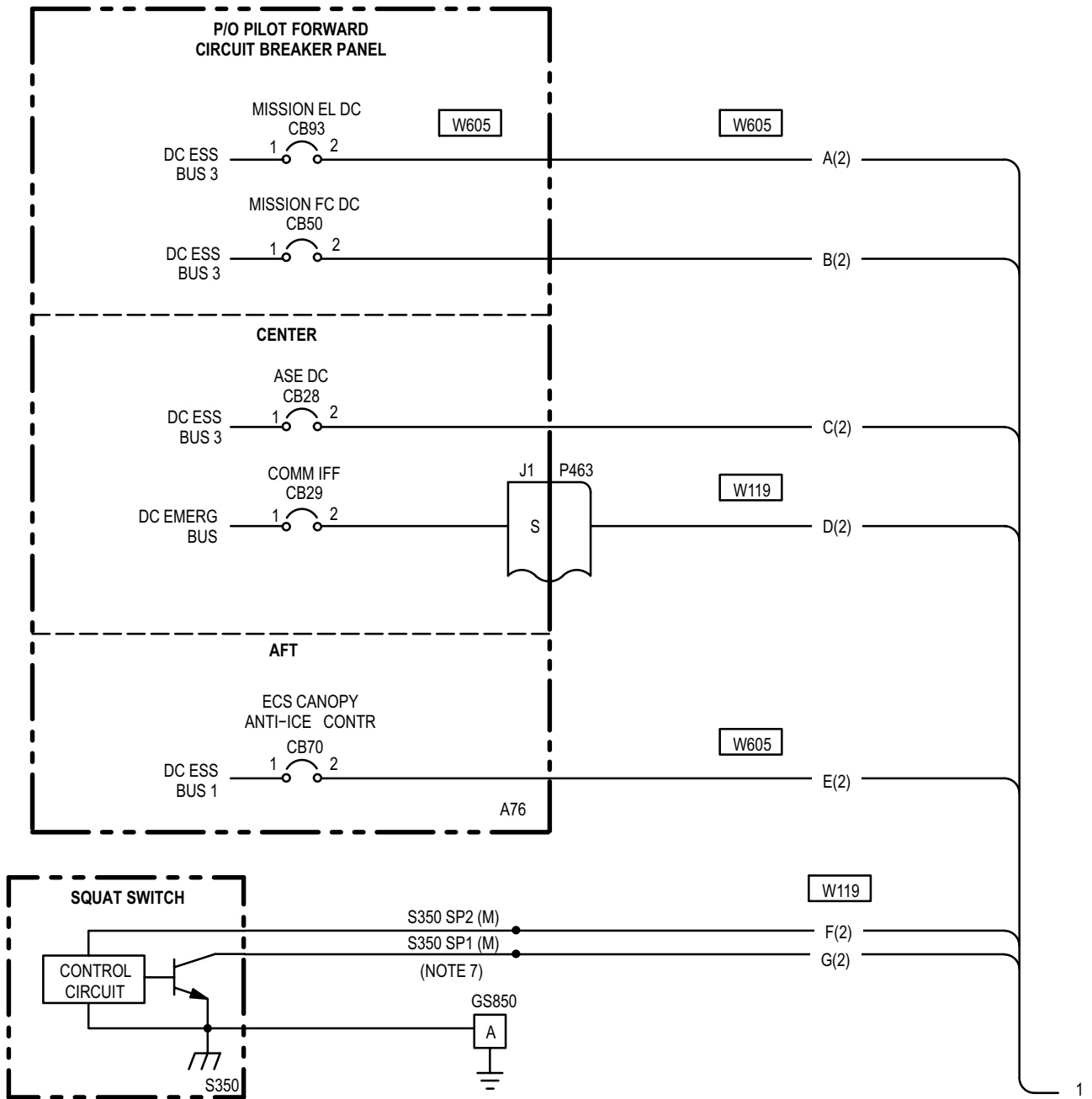
- f. On pilot **FIRE CONTROL** panel (fig. 9-249), set **MASTER** switch to **OFF**.
-

2. Perform EXTERNAL POWER – POWER DOWN (para 9-11).
3. Disconnect maintenance headset (TM 1-1520-238-T-4).
4. Remove squat switch (TM 1-1520-238-23).

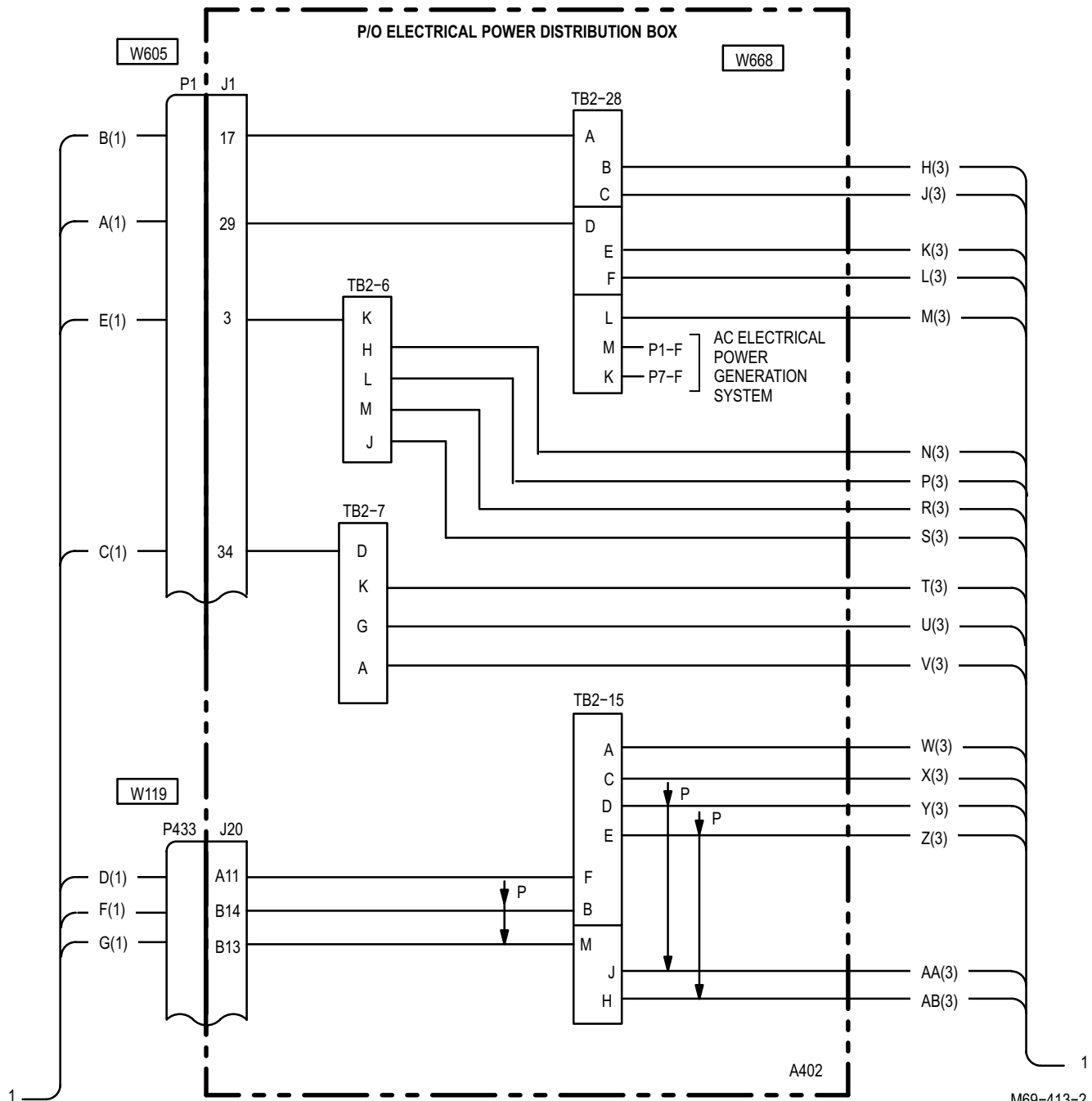
END OF TASK

9-412. SQUAT SWITCH SYSTEM – WIRING INTERCONNECT DIAGRAM

9-412

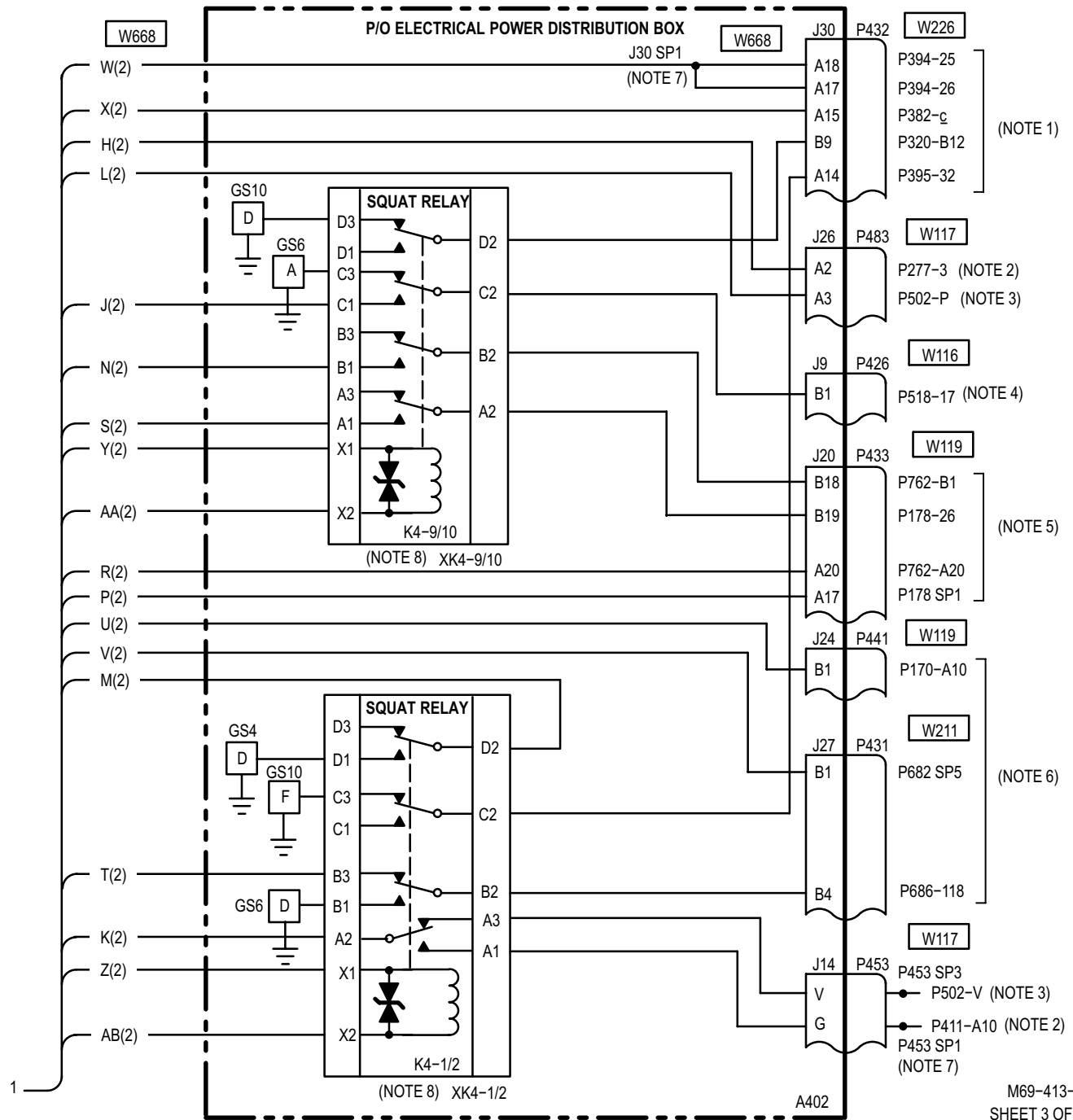


M69-413-1
SHEET 1 OF 4



9-412. SQUAT SWITCH SYSTEM - WIRING INTERCONNECT DIAGRAM (cont)

9-412



M69-413-3
SHEET 3 OF 4

NOTES:

HIGHWAY USE: THE ALPHA CHARACTER IDENTIFIES A SPECIFIC LINE, AND THE NUMBER IN PARENTHESIS IDENTIFIES THE SHEET NUMBER WHERE THE SIGNAL TERMINATES.

1. AVIONICS CONFIGURATION – IFF (TM 11-1520-238-23).
2. FIRE CONTROL SYSTEM (TM 9-1230-476-20-2)
3. MISSION EQUIPMENT (TM 1-1520-238-T-8).
4. ARMAMENT – AREA WEAPON SYSTEM (TM 9-1090-208-23-2).
5. UTILITY SYSTEM – CANOPY DEFOG AND ANTI-ICE (TM 1-1520-238-T-8)
6. FLIGHT CONTROL SYSTEM (TM 1-1520-238-T-7).
7. (HS) DESIGNATES A HARD SPLICE WHICH CANNOT BE DISCONNECTED.
(M) DESIGNATES A SOFT SPLICE WHICH MAY BE DISCONNECTED FOR A WIRING CHECK.
8. RELAY SHOWN IN DE-ENERGIZED STATE (WEIGHT ON WHEELS).

9-413. AUDIO AT RIGHT WING ICS – IS NOT PRESENT AND SAFE LIGHT ON PILOT ARM/SAFE INDICATOR IS LIGHTED WITH SQUAT SWITCH FIXTURE NOT INSTALLED

9-413

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution box aft fan and relay cover removed Relays (A402): K4-1/2 and K4-9/10 removed Access provisions – door L90 opened

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Detach wire at S350 SP1. Check for short between wire end of S350 SP1 and ground.

Does short exist?

- YES Repair shorted wire between: S350 SP1 and P433-B13, (A402)J20-B13 and (A402)TB2-15-M, (A402)TB2-15-J and (A402)XK4-9/10-X2, (A402)TB2-15-H and (A402)XK4-1/2-X2. Go to paragraph 9-411.

- NO Replace squat switch (S350) (TM 1-1520-238-23).

END OF TASK

**9-414. AUDIO AT RIGHT WING ICS – IS PRESENT AND SAFE LIGHT ON PILOT
ARM/SAFE INDICATOR IS LIGHTED WITH SQUAT SWITCH FIXTURE INSTALLED**

9-414

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution box aft fan and relay cover removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Check for open between (A402):
TB2-15-D and XK4-9/10-X1.

Does open exist?

YES	Repair open wire. Go to paragraph 9-411.
NO	Repair open wire between (A402): TB2-15-J and XK4-9/10-X2. Go to paragraph 9-411.

END OF TASK

**9-415. AUDIO AT RIGHT WING ICS – IS NOT PRESENT AND SAFE LIGHT ON PILOT
ARM/SAFE INDICATOR IS NOT LIGHTED WITH SQUAT SWITCH FIXTURE INSTALLED**

9-415

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer

References:

TM 1-1520-238-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution box aft fan and relay cover removed

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

Check for open between (A402):
TB2-15-E and XK4-1/2-X1.

Does open exist?

- YES Repair open wire.
 Go to paragraph 9-411.

- NO Repair open wire between
 (A402):
 TB2-15-H and XK4-1/2-X2.
 Go to paragraph 9-411.

END OF TASK

9-416. AUDIO AT RIGHT WING ICS – IS NOT PRESENT AND SAFE LIGHT ON PILOT ARM/SAFE INDICATOR IS NOT LIGHTED WITH SQUAT SWITCH FIXTURE INSTALLED **9-416**

Tools:

<u>Nomenclature</u>	<u>Part Number</u>
Tool Kit, Electrical Repairer's	SC518099CLA06
Multimeter, Digital	AN/PSM-45

Personnel Required:

68X Armament/Electrical Systems Repairer
One person to assist

References:

TM 1-1520-238-23
TM 11-1520-238-23-2

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
TM 1-1520-238-23	Electrical power distribution box aft fan and relay cover removed

3. Identify and detach wires at S350 SP1 and S350 SP2. Check for open between wire end at S350 SP2 and (A402)TB2-15-B.

Does open exist?

YES	Repair open wire. Go to paragraph 9-411.
NO	Go to step 4.

4. Check for open between wire end S350 SP1 and (A402)TB-2-15-M.

Does open exist?

YES	Repair open wire. Go to paragraph 9-411.
NO	Replace squat switch (S350) (TM 1-1520-238-23).

WARNING

Turn off power before detaching or attaching wires and connectors. High current 28 VDC or 115 VAC is present. Failure to do so could result in death or serious injury.

1. Check for 28VDC at (A402)TB2-15-F.

Does voltage exist?

YES	Go to step 3.
NO	Go to step 2.

2. Check for 28VDC at (A67)J1-S.

Does voltage exist?

YES	Repair open wire between P463-S and (A402)TB2-15-F. Go to paragraph 9-411.
NO	Refer to TM 11-1520-238-23-2 to troubleshoot IFF system.

END OF TASK

By Order of the Secretary of the Army:

Official:



MILTON H. HAMILTON
*Administrative Assistant to the
Secretary of the Army*

02128

GORDON R. SULLIVAN
*General, United States Army
Chief of Staff*

DISTRIBUTION:

To be distributed in accordance with DA Form 12-31-E, block no. 3124, AVUM and AVIM maintenance requirements for TM 1-1520-238-T-6.

These are the instructions for sending an electronic 2028

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however, only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever" whomever@avma27.army.mil
To: 2028@redstone.army.mil
Subject DA Form 2028

1. **From:** Joe Smith
2. **Unit:** home
3. **Address:** 4300 Park
4. **City:** Hometown
5. **St:** MO
6. **Zip:** 77777
7. **Date Sent:** 19-OCT-93
8. **Pub no:** 55-2840-229-23
9. **Pub Title:** TM
10. **Publication Date:** 04-JUL-85
11. **Change Number:** 7
12. **Submitter Rank:** MSG
13. **Submitter FName:** Joe
14. **Submitter MName:** T
15. **Submitter LName:** Smith
16. **Submitter Phone:** 123-123-1234
17. **Problem:** 1
18. **Page:** 2
19. **Paragraph:** 3
20. **Line:** 4
21. **NSN:** 5
22. **Reference:** 6
23. **Figure:** 7
24. **Table:** 8
25. **Item:** 9
26. **Total:** 123
27. **Text:**

This is the text for the problem below line 27.



SOMETHING WRONG WITH THIS PUBLICATION?

THEN ... JOT DOWN THE DOPE ABOUT IT ON THIS FORM, CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

PFC John DOE
CO 4 3rd Engineer Bn
Ft. Leonardwood, MD 63108

DATE SENT

10 January 1999

PUBLICATION NUMBER

TM 1-1520-238-T-5

PUBLICATION DATE

30 December 1998

PUBLICATION TITLE

Operator's manual MH60L Helicopter

BE EXACT PIN-POINT WHERE IT IS

IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
6	2-1 a		
B1		4-3	

In line 6 of paragraph 2-1a the manual states the engine has 6 cylinders. The engine on my set only has 4 cylinders. Change the manual to show 4 cylinders.

Callout 16 in figure 4-3 is pointed at a bolt. In key to figure 4-3, item 16 is called a shim. Please correct one or the other

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

JOHN DOE, PFC (268) 317-7111

SIGN HERE

JOHN DOE *John Doe*

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.
DRSTS-M verprint2, 1 Nov 80

P.S. - IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION, MAKE A CARBON COPY OF THIS AND GIVE TO YOUR HEADQUARTERS.



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PUBLICATION NUMBER

PUBLICATION DATE

PUBLICATION TITLE

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IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PAGE NO

PARA-GRAPH

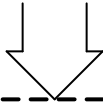
FIGURE NO

TABLE NO

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

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TEAR ALONG PERFORATED LINE



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PAGE NO

PARA-GRAPH

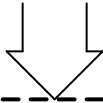
FIGURE NO

TABLE NO

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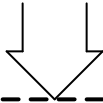
IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO

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TEAR ALONG PERFORATED LINE

The Metric System and Equivalents

Linear Measure

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

Weights

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

Liquid Measure

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

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
 1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

<i>To change</i>	<i>To</i>	<i>Multiply by</i>	<i>To change</i>	<i>To</i>	<i>Multiply by</i>
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

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

PIN: 070214-010