

TECHNICAL MANUAL

DIRECT SUPPORT
AND GENERAL SUPPORT
MAINTENANCE MANUAL

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PART 1
MAINTENANCE

TURRET
FOR
COMBAT ENGINEER VEHICLE,
M728
(2350-00-795-1797)

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

WARNING**BE CAREFUL: CARBON MONOXIDE IS A GAS THAT CAN KILL YOU**

Carbon monoxide always comes when something gets hot or burns - such as heaters, engines, etc. To keep carbon monoxide from making anyone sick or drowsy, there must be plenty of fresh air in the place where the heating or burning takes place. This gas has no color and no smell, but it is deadly poisonous. It can damage your brain, or kill you, if you do not have enough fresh air coming in to push the carbon monoxide out.

Follow these rules to keep from getting poisoned:

1. Do not operate engine or heater inside a building unless there is plenty of fresh air coming in.
2. Do not idle an engine unless you are sure there is plenty of fresh air in personnel compartments.
3. Do not drive a vehicle which has inspection plates, cover plates, or engine compartment doors taken off. except for very short maintenance times when necessary.
4. When operating vehicle, always be on the lookout for personnel who seem to be getting sick or drowsy. If you notice this happening, immediately get fresh air into personnel compartments. If this does not help, remove sick or drowsy personnel vehicle and do following:
 - a. Put him into fresh air.
 - b. Keep him covered warm.
 - c. Keep him still. Do not let him exercise (Exercise will make him worse.)
 - d. Give him artificial respiration, if necessary.
 - e. Get medical help.

CHANGE
NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C. 20 June 1985

**DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE
COMBAT ENGINEER VEHICLE, FULL-TRACKED, M728
NSN 2350-00-795-1797
(TURRET)**

TM 9-2350-222-34-2-1, 10 October 1980, is changed as follows:

1. Remove old pages and insert new pages as indicated below.
2. New or changed material is indicated by a vertical bar in the margin of the page.

Remove Pages	Insert Pages
A and B 1-21 and 1-22 4-1 and 4-2 8-1 and 8-2 8-19 and 8-20 8-25 and 8-26 8-35 and 8-36 8-39 thru 8-42 8-45 thru 8-56 8-59 thru 8-89/(8-90 blank)	None 1-21 and 1-22 4-1 and 4-2 8-1 and 8-2 8-19 and 8-20 8-25 and 8-26 8-35 and 8-36 8-39 thru 8-42 13-45 thru 8-56 8-59 thru 8-95/(8-96 blank)

3. File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

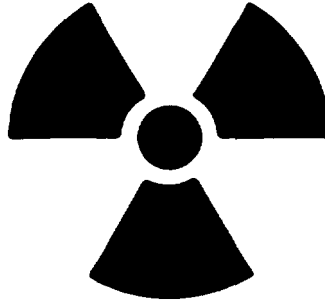
Official:

DONALD J. DELANDRO
Brigadier General, United States Army
The Adjutant General

Distribution: To be distributed in accordance with DA Form 12-37, Direct and General Support Maintenance requirements for Vehicle, Combat, Engineer, Full-Track, M728.

WARNING

WARNING
RADIATION HAZARD



Azimuth dial pointers in indicator may be tipped with radioactive material. This becomes dangerous when dial window is broken or removed. When this happens, make repairs as soon as possible.

If dial window is broken or removed, all maintenance must be done at depot level only, except replacement of lamps or replacement of whole indicator unit.

Protecting, handling, storing, and getting rid of radioactive material must be done in accordance with TB MED-232 and TB 750-237.

WARNING

When placing the turret (elev/trav) power switch in the ON position, ensure that the gunner's power control handles are not displaced. If handles are displaced, rapid movements of the turret traverse in azimuth may result in fatal injury.

WARNING

When turret is in the power mode the gun will elevate and depress without depressing the magnetic brake switch on the gunner's control handles.

WARNING

Assure crew are in safe positions and driver has lowered his seat and has head down before operating in power or manual traversing or elevating modes.

WARNING

Do not release magnetic brake switch or override in magnetic brake actuator while traversing until gunner's or commander's power control is returned to neutral position. This will reduce unnecessary wear and/or damage to magnetic brake.

WARNING

Be careful when working around pressurized parts. Hydraulic fluid under pressure can hurt you.

WARNING

Before charging main accumulator, hydraulic system pressure must be lowered to 0 psi. Hydraulic fluid under pressure can hurt you.

WARNING

Before draining hydraulic system, pressure must be lowered to 0 psi. Hydraulic fluid under pressure can hurt you.

WARNING

Before removing hydraulic tubes, hydraulic system pressure must be lowered to 0 psi. Hydraulic fluid under pressure can hurt you.

WARNING

Before traversing turret, make sure gun will not hit anything if turret is traversed. If necessary, move vehicle.

WARNING

Nitrogen under pressure can hurt you. Keep fingers and hands clear of valve while letting out nitrogen. Let nitrogen out slowly.

Technical Manual
No. 9-2350-222-34-2-1

HEADQUARTERS.
DEPARTMENT OF THE ARMY
Washington, D.C. 10 October 1980

Technical Manual
Direct Support and General Support Maintenance

TURRET
FOR
COMBAT, ENGINEER VEHICLE,
M728
(2350-00-795-1797)

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 Armament Materiel Readiness Command
ATTN: DRSAR-MAS
Rock Island, IL 61299

A reply will be furnished to you.

*This manual in conjunction with TM 9-2350-222-34-2-2, TM 9-2350-222-34-2-3, TM 9-2350-222-34-2-4, and TM 9-2350-222-34-2-5 supersedes so much of the DS/GS portion of TM 9-2300-378-35/2, January 1968, as pertains to the M728 CEV, so much of the DS/GS Portion of TM 9-2350-222-35/2, October 1965, as pertains to the M728 CEV, and so much of the DS/GS portion of TM 9-2300-378-35/1, January 1968, as pertains to the Slipping Assembly, Turret and Miscellaneous Components for the M728 CEV, including all changes.

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INTRODUCTION

SCOPE

This manual is one of a series of manuals for your use in performing direct support, general support maintenance of the turret and turret components of the M728 combat engineer vehicle.

Descriptions of components and maintenance procedures for these components as allocated by the Maintenance Allocation Chart (MAC) are included.

MANUAL ORGANIZATION

This manual is arranged in 5 parts with each part divided into chapters as follows:

- Chapter 1 - contains system and component functional descriptions
- Chapter 2 and subsequent chapters - contains maintenance procedures for equipment items in the turret. Each equipment item is covered in a separate chapter.

HOW TO USE THIS MANUAL

- 1 Go to Table of Contents in front of manual or Index in back of manual to find equipment item that you are looking for.
- 2 Go to chapter or section listed in Table of Contents or Index.
- 3 Use maintenance procedures index to find maintenance task paragraph reference.
- 4 Go to paragraph references in maintenance procedures index.
- 5 Each maintenance procedure has a listing of resources (tools, personnel, etc) required to do the task. The resource listing items are explained as follows:

- Tools: Hand tools or special tools required to do task
- Supplies: Expendable material or parts required to do task
- Personnel: Minimum number of soldiers required to do task
- References: Lists other technical manuals where related procedures can be found
- Equipment Location Information: Refers to foldout illustrations at end of each part that show where equipment item is located in turret
- Equipment Condition: Condition of tank or equipment item necessary to start task
- Preliminary Procedures: Lists procedures that must be done before starting task
- General Instructions: Provides instructions that you should be made aware of when performing entire procedure

NOTE

If any resource is not applicable to the procedure, the resource will not be listed.

HOW TO USE THIS MANUAL (CONT)

6 Obtain resources

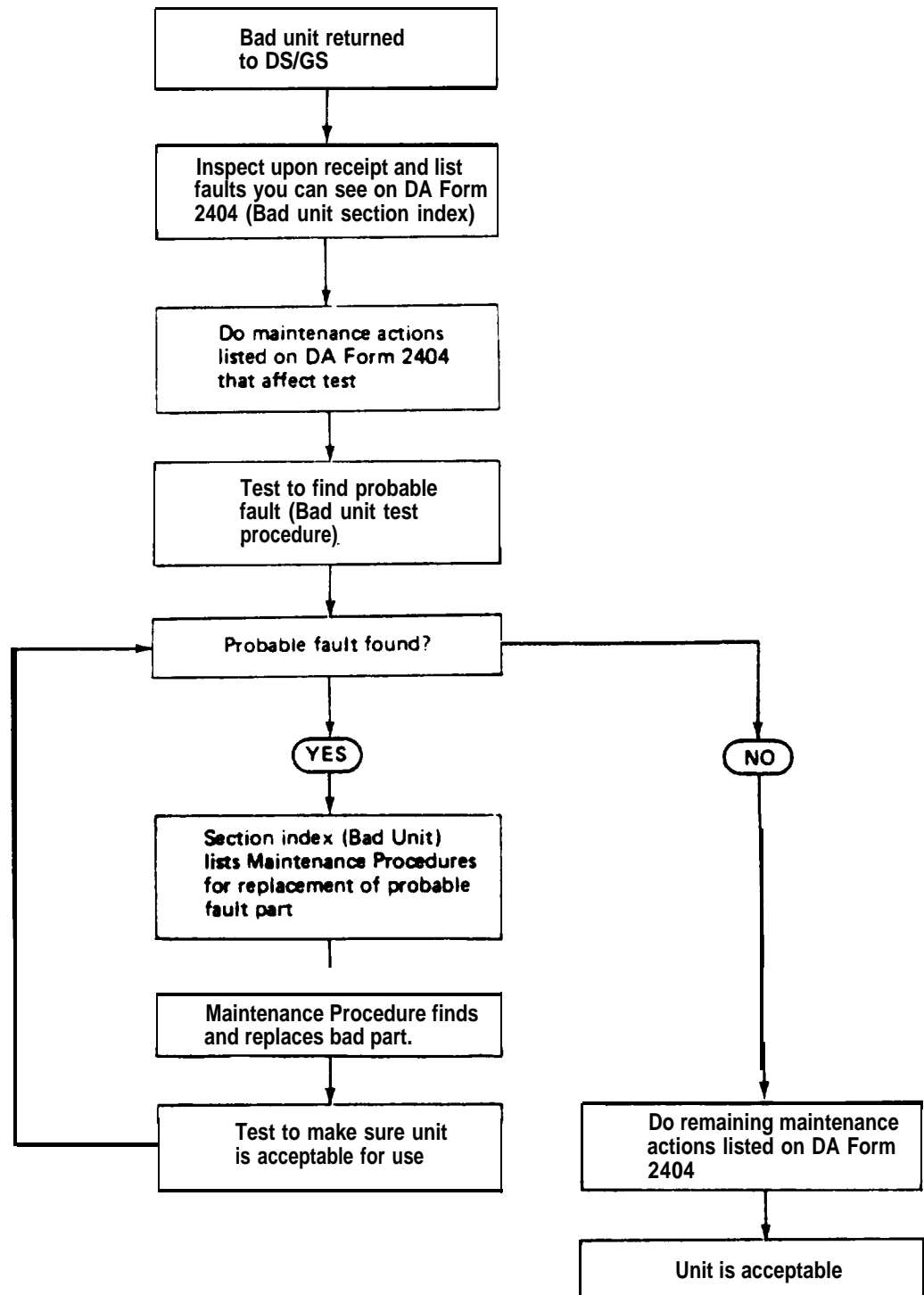
7 Continue with procedure:

- Procedures are arranged in frames beginning with Frame 1.
- Each frame provides instructions in a series of steps.
- Parts named in each step are followed by a number in parentheses ().
- Illustrations support each frame and are either on same page or on facing page.
- Number callouts on each illustration match number in procedure step.
- Following last step on each frame are instructions to either go to next frame or end task.
- Some tasks will require other procedures be done before task is completed. This will be denoted as: Follow-on Maintenance Action Required.

NOTE

In parts of this manual component/assembly nomenclature may differ. Refer to TM 9-2350-222-20-2-1, Appendix C for component/assembly name used on Maintenance Allocation Chart and associated common name used in maintenance procedures.

HOW TO REPAIR BAD UNIT



CHAPTER 1

GENERAL MAINTENANCE INFORMATION

Section 1. SCOPE

1-1. This technical manual contains instructions for direct support and general support of turret and turret components of the full-tracked combat engineer vehicle M728. The vehicle is designed to provide maximum ballistic protection for the crew and is heavily armed, being a basic M60A1 tank modified to provide a mobile and maneuverable weapon for combat support of ground troops and vehicles. It is equipped with a hydraulically operated bulldozer mounted to the front of the hull. A winch and boom are mounted to the turret for lifting, carrying, and winching. Erecting and stowing the boom are accomplished hydraulically. The M728 vehicle is used for breaching, obstacle removal, transportation of demolition teams, and pioneering operations. The crew consists of a commander, gunner, loader and driver.

1-2. The turret, which fits into the hull opening, is a one-piece homogeneous armor steel casting. A platform (turret basket) attached to the turret permits the commander, gunner, and loader to traverse with the turret. Openings provided in the turret accommodate the 165-mm combination gun mount commander's cupola, ventilating blower, antennas, boom and winch hydraulic lines, sighting and fire control components and loader's hatch. The turret contains electrical and hydraulic controls, communications equipment, sighting, and firing controls. Externally the turret has racks for stowing miscellaneous items such as a 5-gallon water can, cargo and combat packs, towing cables, water fording equipment and the Xenon searchlight. Internal racks are provided for stowage of items such as periscopes, binoculars, flashlights, canteens, rations, a portable carbon dioxide (CO₂) fire extinguisher, ammunition and various hand tools. A winch-boom assembly is mounted to the turret for lifting, carrying, and winching operations.

1-3. TABULATED DATA

a. Vehicle

Armor (hull and turret)	cast homogeneous armor steel
Capacities (fuel and oil):	
Fuel tanks (total)	375 gal
Engine crankcase (fill, approximate)	18 gal
Engine crankcase, (refill, approximate)	13 gal
Transmission (fill, approximate)	23 gal
Transmission (refill, approximate)	17 gal
Hydraulic reservoir (boom, winch, and bulldozer) (fill, approximate)	50 gal
Hydraulic reservoir (boom, winch, and bulldozer) (refill, approximate)	48 gal
Crew	4 (commander, driver, gunner and loader)
Controls:	
Brakes:	
Operation	hydraulically-linked foot pedal
Type	multiple disc wet plate
Steering:	
Type	mechanical, steering control
Turning radius	pivot to infinity
Transmission shift lever positions:	
"N" (Neutral)	pivot steer
"P" (Park)	lock vehicle brakes to park, start position
"L" (Low)	ascending and descending steep grades and soft or very rough terrain - forward at 10 mph maximum
	descending steep grades for maximum engine braking power - rearward at 5 mph maximum
"H" (High)	normal driving conditions - forward at 30 mph maximum
"R" (Reverse)	normal driving conditions and ascending steep grades for maximum engine power - rearward at 5 mph maximum
	descending steep grades for maximum braking power - forward at 5 mph maximum
Dimensions:	
Length (with boom and bulldozer, in travel position)	350.80 in.
Length (with boom in erected position)	366.30 in.

Height (lowest operable).....	128.23 in.
Length of hull with bulldozer installed,	314.80 in.
Width with bulldozer installed	146 in.
Ground clearance	15 in.
Traverse radius (with boom in travel position)	197.50 in.
Traverse radius (with boom in erected position)	205.50 in.
Electrical:	
Electrical system	24-volt DC
Generated	28-volt DC, 300 amp
Number of batteries	6 (12-volt)
Power plant and final drive:	
Make and type	Continental 12-cylinder, air cooled, 90 degree "V" -type, compression-ignition
Model	AVDS-1790-2A
Displacement	1,790 cu in.
Weight, dry (with accessories)	4,527 lb
Speed:	
Governed, full load	2,400 rpm
Governed, no load	2,550 rpm
Idle	750 rpm
Horsepower, gross	750 bhp at 2,400 rpm
Horsepower, net	642 bhp at 2,400 rpm
Fuel oil, diesel	40 cetane, regular grade DF-2, VV-F-800, 20° to 115°F
Fuel oil, diesel	40 cetane, regular grade DF-1, VV-F-800, -25° to 20°F
Fuel oil, diesel	40 cetane, regular grade DF-A, VV-F-800, -65° to -25°F
Oil pressure:	
At 750 rpm (idle)	20 psi with OE 30 at 180°F
At 2,400 rpm (full load)	40 to 70 psi with OE 30 at 180°F
Oil temperature:	
Normal	180°F at 60°F ambient
Maximum	245°F

Cooling system.....	thermostatically-controlled engine-driven fan for cylinders, transmission and engine oil coolers
Induction system.....	supercharged by two Schwitzer exhaust-driven turbosuperchargers.
Transmission:	
Type.....	Allison CD-850-6A, cross-drive
Performance:	
Vehicle speed (maximum).....	30 mph
Allowable speed (maximum):	
Low.....	10 mph
High.....	30 mph
Reverse.....	5 mph
Cruising range (approximate).....	280 miles at 20 mph on hard surface roads
Vertical obstacle vehicle will climb forward.....	30 in.
Width of ditch vehicle will cross (maximum).....	99 in.
Fording depth (without vehicle fording kit).....	48 in.
Grade ascending ability (maximum).....	60 percent
Grade descending ability (maximum).....	60 percent
Fuel consumption (approximate).....	1.13 gpm
Traverse of turret.....	360 deg
Weight:	
Gross (combat-loaded).....	115,000 lb
Net (less crew, stowage and fuel).....	109,000 lb
Ground pressure.....	12.2 psi
Bridge load classification:	
Empty.....	54
Cross country (combat loaded).....	57

1-4. GUN ELEVATING AND TURRET TRAVERSING SYSTEM

a. General. The gun elevating and turret traversing system consists of mechanical, electrical, and hydraulic components so arranged as to permit either the gunner or commander to traverse the turret 360 degrees in either direction or to depress and elevate the 165-mm gun. The 165-mm gun can be elevated or depressed while the turret is being traversed. The gun elevating and traversing system consists of the following: an electrical-hydraulic controlled elevating and traversing system, and in case of power or other failure, a manually operated hydraulic elevating system and a manually operated mechanical traversing system,

b. Tabulated Data

Gun elevating system:

Depression of gun:

Power control	10 deg minimum each side of vehicle front centerline to 90 deg of vehicle rear centerline 0 deg minimum each side from 90 deg of vehicle rear centerline to rear centerline
---------------------	--

Manual control	(with power "ON") 10 deg minimum each side of vehicle front centerline to 90 deg of vehicle rear centerline and 0 deg minimum each side from 90 deg of rear centerline (with power "OFF") 10 deg minimum each side of front centerline to 90 deg of vehicle rear centerline and 5 deg from 90 deg to 20 deg from rear centerline and 0 deg from 20 deg to rear centerline
----------------------	---

Elevation of gun (power and manual control)	20 deg maximum for 360 deg of turret traverse
--	---

Type of elevation mechanism.....	20 deg maximum for 360 deg of turret traverse
----------------------------------	---

Type of elevation mechanism	hydraulic
-----------------------------------	-----------

Rate of power elevation of gun (maximum)	4 deg per sec
--	---------------

Turret traversing system:

Time required to power traverse turret 360 deg	37.5 sec minimum
--	------------------

1-5. TURRET ARMAMENT

a. General. The armament components include: a 165-mm gun XM135, mounted in a combination gun mount XM150, a coaxially mounted 7.62-mm machine gun M73, mounted in the combination gun mount, a gun elevating and turret traversing system, and a cal .50 machine gun M85, mounted in the commander's cupola M19. Other armament located in the turret consists of a cal .45 submachine gun.

b. Tabulated Data

Ammunition:

M 13 link 7.62. mm	3,600 rounds
(for 7.62-mm machine gun)	
M15 A2 link cal .50	728 rounds
(for cal .50 machine gun)	
Cal .45	360 rounds
165-mm (for 165-mm gun XM135)	30 rounds
Grenades	12

Primary armament:

165-mm gun XM135:

Type:

165-mm gun	tank gun, rifled bore, fixed cartridge ammunition
Caliber	165 millimeters (6.496 in.)
Breech	vertical sliding wedge, manual opening, spring closing
Firing mechanism	electric firing
Gun support	integral cylindrical bearing on tube
Tube	cold worked monoblock buttress thread attachment to breech ring

Length:

Gun	105 in.
Bore (in calibers)	14
Rifling	90 in.

Characteristics:

Muzzle velocity	850 fps
Rated max. pressure	5,100 psi
Chamber volume	750 cu in.
Rifling twist	1 turn in 15 calibers
Projectile travel	91 in.

Combination gun mount XM150:	
Type of recoil mechanism	concentric hydro-spring constant recoil distance
Length of recoil (normal)	12 in.
Length of recoil (maximum)	13.5 in.
Hydraulic oil capacity of recoil mechanism (including replenisher)	22 qts
Operation of firing mechanism:	
Vehicle power	gunner: one trigger on each of the gunner's power control handles and one trigger on manual elevating handle commander one trigger on commander's power control handle
Emergency firing device	hand-operated handle (rotation actuated)
Commander's cupola M 19:	
Ammunition capacity (cal. .50 machine gun) (approximate)	188 rounds
Cupola azimuth movement	360 degrees
Elevation (machine gun)	+60 degrees
Depression (machine gun)	-15 degrees
Operation	manual
Power required	24 volts dc
Communications	radio and interphone
Vision	eight vision blocks
Gun firing	electrical and manual
Secondary armament	
Machine gun M85	cal .50
Ammunition	cal .50, M33 ball and M17 tracer in M 15 series links
Weight of gun	65.00 lb
Weight of barrel with flash suppressor	16.25 lb
Overall:	
Length of gun	54.50 in.
Length of barrel (w/flash suppressor)	40.00 in.
Width of gun	5.25 in.
Height of gun	5.90 in.
Rifling:	
Length	32.60 in.

Number of grooves	8
Twist (right-hand - one turn-in)	15.00 in.
Operation	recoil
Feed	metallic disintegrating link belt
Belt pull	20 lb
Cooling	air
Rate of fire (cyclic):	
High	800 to 950 rd per min
Low	400 to 500 rd per min
Muzzle velocity	2,840 to 3,450 fps
Range (maximum)	6,700 meters or 7,275 yds
Chamber pressure	53,000 psi
Method of target engagement:	
Ground targets	10-20 round burst, low rate of fire
Air targets	a continuous burst, high rate of fire
7.62-mm machine gun M73:	
Ammunition	AP M61, ball M80 and tracer M62 in M13 series links
Weight of gun	29.31 lb
Weight of barrel	5.25 lb
Length	38.00 in.
Length of barrel	22.00 in.
Length of rifling (approx)	20.00 in.
Number of grooves	4
Twist, right-hand	one turn in 12 in.
Height (cover closed)	5.30 in.
Height (cover open)	6.60 in.
Width	4.40 in.
Feed	disintegrating metallic link belt
Operation	recoil with gas assist
cooling	air
Muzzle velocity (approx)	2,800 fps
Rate of fire (cyclic)	450-500 rd per min

Maximum range (approx 3,700 meters or 4,050 yards)	see appropriate Firing Table
Maximum effective range	900 meters (tracer burnout point)
Method of target engagement.....	20-25 round bursts
Trigger push.....	15 lb

1-6. SIGHTING AND FIRE CONTROL EQUIPMENT

a. General. The sighting and fire control components of the M728 vehicle include both daylight (conventional) and infrared (IR) units. Five independent sighting and fire control systems are utilized in the M728 vehicle; namely: a primary direct sighting and fire control system, a secondary direct sighting and fire control system, an auxiliary sighting and fire control system, a 7.62-mm machine gun sighting and fire control system, and a cal .50 machine gun sighting and fire control system.

b. Primary Direct Sighting and Fire Control System. The primary direct sighting and fire control system consists of a telescope M105 F, telescope hanger, telescope mount M114, a light source control 8619165-1, instrument light M50, a filter box, and filters. Components contained in this system are used to view the target during daylight and during periods of artificial illumination.

c. Secondary Direct Sighting and Fire Control System. The secondary direct sighting and fire control system consists of a ballistic drive XM15, periscope M32C, periscope mount M118, and infinity sight 8635466. The XM15 ballistic drive is a direct periscope drive consisting of a temperature compensating link and a parallelogram linkage with solid cross shaft between the 165-mm gun trunnion and gunner's periscope M32C. The periscope M32C provides the gunner with three optical sighting systems: a unity power system for wide, close-in vision of the terrain, an eight-power daylight system for sighting of distant targets, and an eight-power infrared system used for night sighting of targets.

d. Auxiliary Sighting and Fire Control System. The auxiliary sighting and fire control system consists of a fire control (elevation) quadrant M13A3 with light source control 8620860, and azimuth indicator M28E2. These components are used during periods of limited visibility and darkness. The necessary data, range, quadrant elevation, and deflection from a reference point, are determined by the vehicle crew during hours of good visibility to each designated target and are recorded on a range card for ready use when required. Scales of the azimuth indicator and the fire control (elevation) quadrant are illuminated by light control sources. Controls on the sources of light allow the gunner to vary the brilliance of the illumination.

e. 7.62-mm Machine Gun Sighting and Fire Control System. The 7.62-mm machine gun sighting and fire control system consists of the infinity sight 8635466, which transfers electrical power to the infrared power supply and projects a circular reticle on the unity power window of the M32C periscope.

f. Cal .50 Machine Gun Sighting and Fire Control System. The cal .50 machine gun sighting and fire control system consists of periscope mount M119, light source control 8619159, and periscope M36.

g. Tabulated Data	
Ballistic drive	XM15
Periscope M32C (gunner's):	
Optical characteristics - visible light body assembly	
Magnification	8X
Field-of-view	8 deg 0 min
Optical characteristics - infrared body assembly	
Magnification	8X
Field-of-view	8 deg 0 min
Line of sight (travel):	
Elevation	22 deg 0 min
Depression	18 deg 0 min
Temperature range:	
Operable	+ 150°F to -40°F
Storage	+ 160°F to -80°F
Optical characteristics - unity power system:	
Horizontal field-of-view	30 deg 32 min
Vertical field-of-view	5 deg 48 min
Infinity Sight 8635466	
Illuminated Circle	20 mils
Lamp Operation	24 volt d.c.
Telescope M 105F (gunner's):	
Magnification	8X
Field-of-view	7 deg 30 min
Diopter scale	-4 to +4 diopters
Reticle	HEP-M123E1 mil scale
	The horizontal line intersecting the vertical line on top of reticle (HEP-M123E1) form the boresight cross. The horizontal lines on each side of vertical lines equal 5 mils with exception of horizontal lines extending from the boresight cross on the mil scale which is 2.5 mils.
	HEP-M123E1 meter scale

The vertical line below the horizontal line forming the boresight cross equals 100 meters of range. The space from bottom of this line to top of next vertical line equals 100 meters of range. The rest of the vertical lines and spaces equal 100 meters of range with the exception of the vertical line intersected by the horizontal line at the 600 meter point. This vertical line equals 200 meters; 100 meters above and 100 meters below the horizontal line. The reticle (HEP-M123E1) is numbered in increments of 200 meters starting at the range of 200 meters and continuing to the range of 800 meters.

Filters

neutral density, red, and yellow filters

Telescope mount M114 (gunner's):

Boresight knob scales (gun laying, reticle)

-graduated in 0.1 mil increments, numbered every mil

Scale:

Elevation

0.5 to 5.5 mils

Deflection

0.5 to 5.5 mils

Fire control (elevation) quadrant M13A3:

Scale graduations:

Elevation scale

200 mils depression to 600 mils elevation, graduated in 100-mil increments, numbered every 200 mils

Micrometer scale

0 to 100 mils elevation or depression graduated in 1-mil increments, numbered every 10 mils

Azimuth indicator M28E2:

Scale graduations:

Azimuth scale

0 to 3,200 mils. graduated in 100-mil increments, numbered every 200-mils counterclockwise in two consecutive semicircles

Micrometer scale	0 to 100 mils, graduated in 1-red increments, numbered counterclockwise every 5 mils
Gunner's aid (dial).....	0 to 50 mils left and right, in 1-mil increments, numbered every 5 mils
Pointer:	
Azimuth pointer	inner 100-mil scale
Micrometer pointer.....	used in conjunction with micrometer scale and outer 100-mil scale
Directional pointer	moves in relation to longitudinal axis of the vehicle
Gunner's quadrant M1A1:	
Scale graduations:	
Elevation scale	0 to 800 mils, 800 to 1,600 mils, graduated in 10-mil increments, numbered every 50 mils
Micrometer scale	0 to 10 mils in both directions, graduated in 0.2-mil increments, numbered every mil
Periscope M36 (commander's):	
Optical characteristics - unity power system:	
Horizontal field-of-view	60 deg
Vertical field of view	28 deg
(at zero elevation)	
Optical characteristics - visible light (left) channel:	
Magnification	7X
Field-of-view	10 deg
Optical characteristics - infrared (right) channel:	
Magnification	8X
Field-of-view	8 deg
Line of sight (travel):	
Elevation	60 deg
Depression	20 deg
Temperature range:	
Operable	+ 150°F to -40°F

Storage	+ 160°F to -80°F
Periscope M27 (driver's):	
Magnification	1X
Field-of-view	150 deg horizontal, 50 deg vertical
Periscope M24 (driver's infrared):	
Magnification	1X
Field-of-view	26.8 deg and can be pivoted to right and left 32 deg and 15 deg in elevation
Operating voltage	16,000 volts dc
Periscope M37 (loader's):	
Magnification	1X
Field-of-view	26 deg vertical and 72 deg horizontal
Periscope mount M118:	
Height, including headrest	21.87 in.
Width	16.25 in.
Depth, including headrest	11.75 in.
Weight	83 lb
Periscope mount M119:	
Height, including headrest	19.46 in.
Width	15.68 in.
Depth, including headrest	9.15 in.
Weight	64 lb
Instruction plate (range card) 8724207	luminous markings

1-7. WINCH AND BOOM ASSEMBLY

a. General. The boom assembly is a tubular constructed “A” frame used for hoisting operations. The boom is mounted to a trunnion on each side of the turret, at the gun-end. It is moved to erect or stowed positions by a hydraulic cylinder and winch. In the stowed position, two manual locks secure the boom to the turret. In the erect position, the boom weight and hoisting load is supported by staylines extending from each side of the turret, from the rear of the turret, to an equalizer bar at the boom end. The equalizer bar divides the load equally between the staylines. A pulley is mounted at the end of the boom to guide and support the winch cable. A retaining eye, located below the pulley, provides a support for the winch cable hook when a two-part line operation is required. A second retaining eye is located on the left side of the boom near the trunnion. This eye is used to support the winch cable hook when erecting or stowing the boom. U-shaped rods on the left side of the boom provide steps for the crew when climbing the erected boom. J-shaped rods, one located on the turret and two on the boom, are supports for the staylines when the boom is in the stowed position. A reversible, hydraulically driven winch is located at the rear of the turret, The winch has three gear positions; high-speed (HI), low-speed (LO), and neutral (N). One end of the winch cable is attached to the winch drum. The cable extends upward onto the pulley located between the guides at the top of the boom. A lifting hook is secured at the free end of the cable. The winch “payout” or “reel-in” is controlled by a directional control valve located in the commander’s compartment. High or low winching speed is controlled by a lever located on top of the turret and to the rear of the commander’s cupola.

b. Tabulated Data.

Controls	hydraulic
Hoisting capacity	17,500 lb in all positions, single line, 4th layer
Winching capacity (direct pull)	25,000 lb single line, 1st layer
Boom	tubular “A” frame
Traverse	360 degrees
Winch	planetary gear, two-speed
Speed at 1,800 rpm engine speed. 4th layer, low gear	30 fpm
Cable	3/4-in. dia, approximately 200 ft

1-8. COMMANDER'S CUPOLA

The commander's cupola is a self-contained unit mounted and secured in the top of the turret. The cupola contains the cal .50 M85 machine gun and the necessary instruments and controls to lay the machine gun in azimuth (deflection) and elevation and fire the machine gun. The cupola has vision blocks to provide the vehicle commander with 360 degrees overlapping external vision. The commander is protected from direct or overhead bursts by the cupola which also enables the machine gun to be serviced and operated under cover. An electrical slipring provides an uninterrupted source of power for the cal .50 machine gun, sighting unit, and communication system.

1-9. COMMUNICATIONS

The turret contains the major components of the vehicle communications equipment. This equipment, consisting of Radio Set AN/VRC-53, AN/GRC-125, or AN/VRC-46 and Intercommunication Set AN/VIC-1, provides ground-to-ground communications between vehicles and intercommunication for the crew.

1-10. VENTILATING BLOWER

The vehicle is ventilated by an electrically controlled blower, located on the upper right hand corner of the turret ceiling, that draws outside air into the turret. When the gun is being fired, the blower helps purge the driver's compartment and the turret of spent powder gases.

Section 2. REFERENCE DOCUMENTS

1-11. GENERAL MAINTENANCE

The following list contains applicable publications for general maintenance and repair.

AR 75-1	Malfunctions Involving Ammunition and Explosives
AR 310-20	Allied Communications Publications (ACP's) and Joint Army-Navy-Air Force Publications (JANAPS)
AR 385-40	Accident Reporting and Records
AR 385-55	Prevention of Motor Vehicle Accidents
AR 385-63	Regulation for Firing Ammunition for Training, Target Practice, and Combat
AR 385-65	Identification of Inert Ammunition and Ammunition Components
AR 725-50	Requisitioning, Receipt, and Issue System
DA Form 253	Fire Extinguisher Record Tag (For Use on Carbon Dioxide Extinguishers)
DA Form 348	Equipment - Operator's Qualification Record (Except Aircraft)
DA Form 829	Rejection Memorandum
DA Form 2028	Recommended Changes to DA Technical Manual, Parts List, or Supply Manual 7, 8, or 9
DA Form 2404	Equipment, Inspection, and Maintenance Worksheet
DA Form 2407	Maintenance Requests
DA Pam 310-2	Index of Blank Forms
DA Form 2765	Request for Issue or Turn-In
DD Form 6	Reports of Packaging and Handling Deficiencies
DD Form 1397	Processing and Reprocessing Record for Shipment, Storage and Issue of Vehicles, and Spare Engines
FM 5-20	Camouflage, Basic Principles and Field Camouflage
FM 5-25	Explosives and Demolitions
FM 17-12	Tank Gunnery
FM 20-22	Vehicle Recovery
FM 21-5	Military Training
FM 21-6	Techniques of Military Instruction
FM 21-30	Military Symbols
FM 21-40	Chemical, Biological, Radiological, and Nuclear Defense
FM 31-70	Basic Cold Weather Manual

FM 31-71	Northern Operations
FM 31-72	Mountain Operations
ETM 643-091-9400R/JPG	Skill Performance Procedures for MOS 45N Tank Turrets M60, M60A1, M728
ETM 643-091 -9000 R/JPG	Skill Performance Procedures for MOS 45K M551, M551A1, M60, M60A1, M60A2 and M728
LO 9-2350-222-12	Lubrication Order for Vehicle, Combat Engineer, Full Tracked: M728
SF Form 46	United States Government Motor Vehicle Operator's Identification Card
SF Form 91	Operator's Report of Motor-Vehicle Accident
TB 746-93-1	Color and Marking of Military Vehicles, Construction Equipment, and Materials Handling Equipment
TB ORD 426	Hydropneumatic Recoil Mechanisms for Towed and Self Propelled Field Artillery: Instructions for Inspection and for Checking and Correcting Nitrogen Pressure
TB ORD 548	Failure of Azimuth Indicators, Sighting and Fire Control Instruments
TB 9-2300-278-20	Vehicle Protective Closures: Use and Disposition
TB 9-2300-286-50	Depot Reconditioning of Final Drive Hub (2530-736-4134)
TB 9-2300-386-50	General Paint Standards for Overhaul of Military Vehicles
TB 9-2300-387-50	General Overhaul Standards for Combat and Tactical Vehicle Non-Mechanical Components
TB 9-2300-388-50	Acceptance Testing of Reconditioned Combat and Tactical Vehicles
TB 9-2300-389-50	Maintenance of Supplies and Equipment Depot Maintenance Overhaul/Rebuild of Combat and Tactical Vehicles
TM 3-220	Chemical, Biological, and Radiological (CBR) Decontamination
TM 9-207	Operation and Maintenance of Army Materiel in Extreme Cold Weather 0° to -65°
TM 9-208-1	Cleaning of Ordnance Materiel
TM 9-238	Deep Water Fording of Ordnance Materiel
TM 9-243	Use and Care of Hand Tools and Measuring Tools
TM 9-254	General Maintenance Procedures for Fire Control Materiel
TM 9-500	Ordnance Corps Equipment Data Sheets

TM 9-1005-231-25	Machine Gun Caliber .50 M85, Organizational, Direct Support, General Support, and Depot Maintenance Manual including Repair Pans and Special Tools List
TM 9-1005-231-34	Direct and General Support Maintenance Manual with Repair Parts and Special Tool Lists for Machine Gun, Caliber .50, M85
TM 9-1005-233-24	Machine Gun 7.62 -MM-, Organizational, Direct Support, and General Support, Maintenance Manual including Repair Parts and Special Tools List
TM 9-1300-206	Care, Handling, Preservation, and Destruction of Ammunition
TM 9-1305-200	Small Arms Ammunition
TM 9-2350-222 ESC	Equipment Serviceability Criteria
TM 9-2350-222-10	Operator's Manual: Combat Engineer Vehicle, M728
TM 9-2350-222-20P-1	Organizational Maintenance Repair Pans and Special Tools List for Hull, Combat Engineer Vehicle, M728
TM 9-2350-222-20P-2	Organizational Maintenance Repair Parts and Special Tools List for Turret, Combat Engineer Vehicle, M728
TM 9-2350-222 -20-2-1	Preventive Maintenance: Combat Engineer Vehicle, M728
TM 9-2350 -222-20-2-2	Organizational Troubleshooting Combat Engineer Vehicle, M728
TM 9-2350-222 -20-2-3-1	Organizational Maintenance: Combat Engineer Vehicle, M728
TM 9-2350-222 -20-2-3-2	Organizational Maintenance: Combat Engineer Vehicle, M728
TM 9-2350-222 -20-2-3-3	Organizational Maintenance: Combat Engineer Vehicle, M728
TM 9-2350-222-34P-1	Direct Support and General Support Repair Parts and Special Tools List for Hull, Combat Engineer Vehicle, M728
TM 9-2350-222-34P-2	Direct Support and General Support Repair Parts and Special Tools List for Turret, Combat Engineer Vehicle, M728
TM 9-247	Materials Used for Cleaning, Preserving, Abrading, and Cemeting Ordnance Material, and Related Materials

- TM 9-2815-200-35 Direct Support, General Support and Depot Maintenance Manual Including Repair Parts and Special Tools Lists for Engine, with Container Turbosupercharged Diesel, Fuel Injection, 90-Degree “V” type, air cooled, 12-cylinder, Assembly Models AVDS-1790-2M (2815-856-4996), AVDS-1790-2A and AVDS-1790-2AM (28 15-856-9005), October 1970,
- TM 9-2910-212-34 Field Maintenance Manual for Pump, Metering. Fuel Injection, Assembly 2910-473-8203 and 2910-064-6265, November 1962.
- TM 9-2910-213-34 Field Maintenance Manual (Including Field and Depot Maintenance Repair Parts List): Pump, Fuel Engine Assembly
- TM 9-2920-224-35 Field and Depot Maintenance Manual for Generator (Jack and Heintz Mode G22-6 Series)
- TM 9-2990-200-34 Field Maintenance Manual (Including Field and Depot Maintenance Repair Parts and Special Tools List): for Turbosupercharger Engine Assembly
- TM 9-6140-200-14 Operation and Organizational, Field and Depot Maintenance: Storage Batteries, Lead-Acid Type
- TM 11-5820-498-12 Operator’s and Organizational Maintenance Manual Including Repair and Special Tools List for Radio Sets AN/VRC-53, AN/VRC-64 and AN/GRC-125, AN/GRC-160, and Amplifier-Power Supply Group OA-3633/GRC and OA-3633A/GRC
- TM 11-5820-401-12 Operator’s and Organizational Maintenance Manual, Radio Sets AN/VRC-12 and AN/VRC-43, -44, -45, -46, -47, -48, -49, -54, and -55
- TM 11-6230-219-12 Operator, Organizational Maintenance Manual for Searchlight D.C. 28 Volt, 100 Amp Xenon Type Infrared and Visible
- TM 11-6230-219-35 Direct Support, General Support, and Depot Maintenance including Repair Parts Manual for Searchlight D.C. 28 Volt, 100 Amp Xenon Type Infrared and Visible
- TM 21-301 Driver’s Selection, Training, and Supervision, Full Track Vehicles
- TM 21-306 Manual for the Tracked Vehicle Driver
- TM 38-760 The Army Maintenance Management System (TAMMS)

1-12. CLEANING

General cleaning procedures are located in ETM 643-091-9000R/JPG.

1-13. PAINTING

General painting procedures are located in TM 43-0139.

Section 3. SAFETY AND EMERGENCY PROCEDURES

1-14. Any safety or emergency procedures associated with the direct support and general support maintenance procedures contained in this manual will be found with the procedures they apply to.

Section 4. SPECIAL TOOLS

1-15. A list of special tools and a description of their use can be found in the MAINTENANCE ALLOCATION CHART in TM 9-2350-222-202-1. Instructions for use of multi-use special tools is either contained in the applicable maintenance Procedure or the Job Performance Guide as referenced in the applicable maintenance procedure.

Section 5. SPECIAL TEST EQUIPMENT

1-16. A list of special test equipment can be found in the MAINTENANCE ALLOCATION CHART contained in TM 9-2350-222-20-2-1.

Section 6. INSPECTION UPON RECEIPT**1-17. INSPECTION UPON RECEIPT**

SUPPLIES: DA Form 2404
Pencil

PERSONNEL: One

REFERENCES: JPG for procedure to:
Remove corrosion
Repair threads
Repair electrical connectors

EQUIPMENT CONDITION: Equipment item removed from vehicle

GENERAL INSTRUCTIONS:

NOTE

This procedure gives instructions to check electrical or mechanical equipment items for faults that you can see when received in DS/GS Shop. Procedures for repair are listed in the maintenance procedures index for the equipment item you are inspecting. A complete inspection of the equipment item should be made and all faults listed in DA Form 2404 before doing any maintenance to correct the fault.

1-17. INSPECTION UPON RECEIPT PROCEDURE (CONT)

a. Mechanical Items

FRAME 1		
Step	Procedure	Maintenance Action
1.	Check to make sure identification or data plates are in place and can be read,	Identify item. Replace.
2.	Check outside of equipment item for cracks, dents, or damaged parts. (See maintenance procedure index for equipment item being inspected.)	Replace bad parts.
3.	Check to make sure that screws and nuts that hold covers and other attached parts are tight.	Tighten loose pans. Replace, if necessary.
4.	Check to make sure hydraulic fitting ports are protected with plugs.	Install protective plugs.
5.	Check bearings to make sure they do not bind and are not damaged.	Replace bad parts.
6.	Check operating handles and arms for smooth movement.	Replace bad parts.
7.	Check piston shafts for scratches, burrs, or other damage,	Repair or replace bad parts.
8.	Check mounting surfaces for damage. Check for proper protective covering.	Install protective covering.
9.	Check parts for damaged threads.	Repair (JPG). Replace as needed
10.	Check for corrosion.	Clean (JPG).
	GO TO FRAME 2	

1-17. INSPECTION UPON RECEIPT PROCEDURE (CONT)**b. Electrical Items**

FRAME 2		
Step	Procedure	Maintenance Action
1.	Check to make sure identification or data plates are in place and can be read.	Identify item. Replace bad or missing plates.
2.	Check outside of equipment item for cracks, dents, or damaged parts. (See maintenance procedure index for equipment item being inspected.)	Replace bad parts.
3.	Check to make sure that screws and nuts that hold covers and other attached parts are tight.	Tighten loose pans. Replace, if necessary.
4.	Check to make sure electrical connectors are protected with caps or plugs.	Install protective caps or plugs as needed.
5.	Check electrical connectors for dirt, corrosion, and bent or broken pins.	Clean or repair as needed (JPG). Replace, if necessary.
6.	Check electrical connectors and other parts "for damaged threads.	Repair threads (JPG). Replace as needed.
7.	Check electrical wires and terminals for damage.	Replace as needed.
8.	Check light lenses for scratches and cracks.	Replace as needed.
9.	Check electrical switches for proper operation.	Replace as needed.
10.	Check to be sure electrical dials and meters are readable. Check for broken or cracked glass covers.	Replace bad parts.
11.	Check electrical controls knobs.	Replace bad or missing parts.
12.	Check for corrosion.	Clean (JPG).
	GO TO FRAME 3	

1-17. INSPECTION UPON RECEIPT PROCEDURE (CONT)

FRAME 3	
Step	Procedure
	<p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required:</p> <p style="text-align: center;">Correct faults found during Inspection Upon Receipt that affect test procedure. (See maintenance procedure index for inspected item.)</p> <p style="text-align: center;">Do test procedure. (See maintenance procedure index for inspected item.)</p> <p>END OF TASK</p>

CHAPTER 2

TURRET

Section 1. SCOPE

2-1. LIST OF EQUIPMENT ITEMS CONTAINED IN THIS CHAPTER

Section	Equipment Item	Paragraph
2	Turret Platform	2-2
3	Turret Structure	2-5

SECTION 2. TURRET PLATFORM

2-2. MAINTENANCE PROCEDURES INDEX

Equipment Item	Removal	Tasks	Installation
Turret Platform	2-3		2-4

2-3. TURRET PLATFORM REMOVAL PROCEDURE

TOOLS: Four-wheeled dolly
Hydraulic jacks (three)
9/16" open end wrench
9/16" socket (3/8" drive)
3/8" drive ratchet
20 ounce ball peen hammer

PERSONNEL: Three

REFERENCES: TM 9-2350-222-20-2-3 for procedures to:

- Remove power relay box
- Remove 7.62-mm ammunition boxes
- Remove caliber .50 ammunition boxes
- Remove battery access door
- Remove gunner's footrest plate
- Remove fire extinguisher mounting bracket
- Remove IR periscope spare head stowage box
- Remove periscope stowage box
- Remove commander's seat support tube
- Remove gunner's seat pedestal
- Remove power pack motor mounting plate
- Remove power pack motor mounting bracket
- Remove gunner's, commander's, and loader's electric air filter heater elbows
- Remove equilibrator accumulator and support
- Remove equilibrator manifold
- Remove equilibrator system tubes
- Remove gunner's foot guard
- Remove winch and boom hydraulic tubes

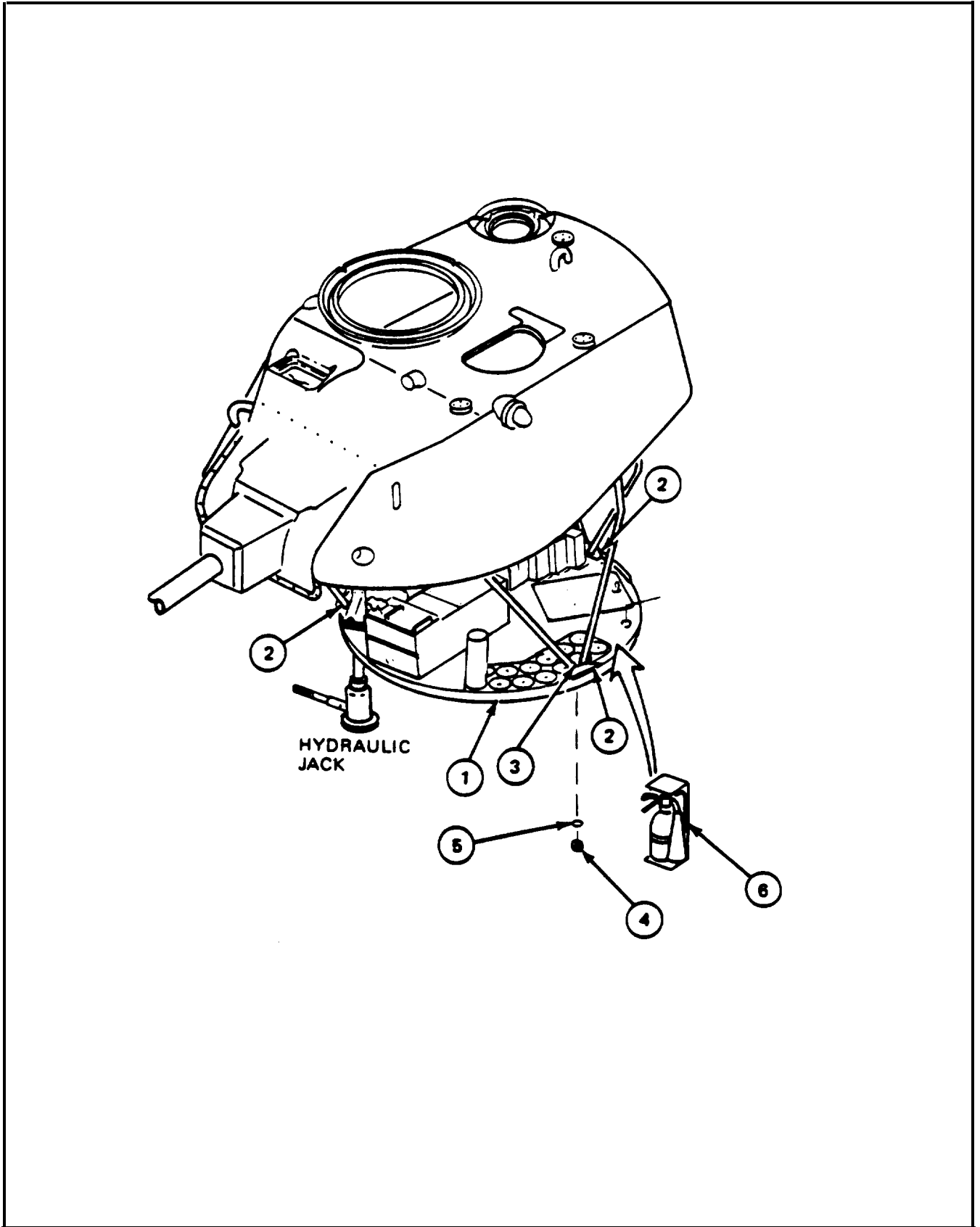
JPG for procedures to:

- Remove adhesive
- Remove sealant

PRELIMINARY PROCEDURES: Remove turret structure (para 2-6)

2-3. TURRET PLATFORM REMOVAL PROCEDURE (CONT)

FRAME 1	
Step	Procedure
1.	Remove equilibrator system tubes (TM-20-2-3).
2.	Remove gunner's foot guard (TM-20-2-3).
3.	Remove three winch and boom hydraulic tubes (11637508, 11637509, and 11637510) (TM-20-2-3).
4.	Soldiers A, B, and C: Place hydraulic jacks under turret platform (1) eight inches to left of hanger (2) positions, and operate jacks to fit snug to turret platform (1),
5.	Soldier A: Put dolly under center of turret platform (1).
6.	Soldier B: Use open end wrench to hold each of fifteen bolts (3).
7.	Soldier C: Using socket wrench, remove fifteen self-locking nuts (4), and fifteen flat washers (5). Throw away self-locking nuts (4).
8.	Soldier B: Remove fifteen bolts (3) from hangers (2).
9.	Soldiers A, B, and C: Operate hydraulic jacks and lower platform (1) about 1/4 inch.
NOTE	
Platform (1) is bonded to hanger (2) base. Break bond with hammer.	
10.	Using hammer, break bond on platform (1). Remove sealant (JPG).
11.	Soldiers A, B, and C: Operate hydraulic jacks to lower platform (1) to dolly. Remove jacks.
12.	Soldier A: Pull dolly while soldiers B and C guide platform (1) from under turret stand.
13.	Remove fire extinguisher mounting bracket (6) (TM-20-2-3).
GO TO FRAME 2	

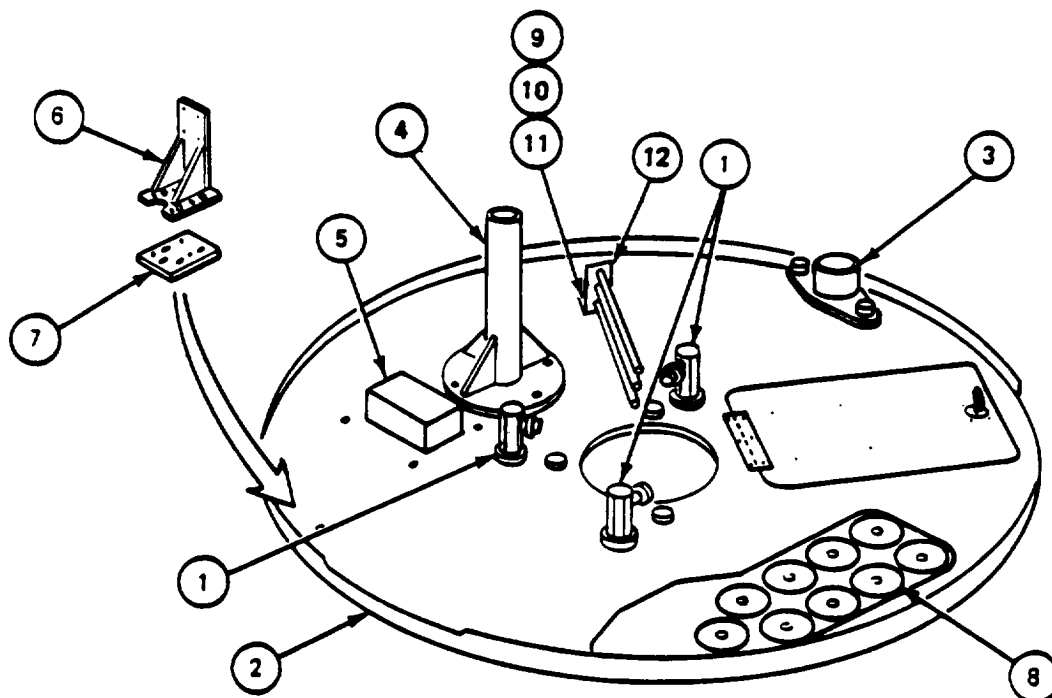


2-3. TURRET PLATFORM REMOVAL PROCEDURE (CONT)

FRAME 2	
Step	Procedure
<ol style="list-style-type: none"> 1. Remove two 7.62-mm ammunition boxes (1) (TM-20-2-3). 2. Remove two caliber .50 ammunition boxes (2) (TM-20-2-3). 3. Remove equilibrator manifold (3) (TM-20-2-3). 4. Remove battery access door (4) (TM-20-2-3). 5. Remove IR periscope spare head stowage box (5) (TM-20-2-3). 6. Remove periscope stowage box (6) (TM-20-2-3). 7. Remove gunner's footrest plate (7) (TM-20-2-3). 8. Remove equilibrator accumulator and support (8) (TM-20-2-3). <p>GO TO FRAME 3</p>	

2-3. TURRET PLATFORM REMOVAL PROCEDURE (CONT)

FRAME 3	
Step	Procedure
1.	Remove three electric air filter heater elbows (1) from turret platform (2) (TM-20-2-3).
2.	Remove commander's seat support tube (3) (TM-20-2-3).
3.	Remove gunner's seat pedestal (4) (TM-20-2-3).
4.	Remove power relay box (5) from under side of platform (2) (TM-20-2-3).
5.	Remove power pack motor mounting bracket (6) from mounting plate (7) (TM-20-2-3).
6.	Remove power pack motor mounting plate (7) from platform (2) (TM-20-2-3).
7.	Remove nine ammo ready-rack rubber pads (8) in platform (2) holes. Throw away rubber pads.
8.	Remove adhesive from nine platform (2) holes (JPG).
9.	Using open end wrench, remove two screws (9), two lockwashers (10), and two flat washers (11) that attach winch hydraulic tube bracket with winch tubes (12) to platform (2).
10.	Soldiers A, B, and C: Remove platform (2) from dolly. END OF TASK



2-4. TURRET PLATFORM INSTALLATION PROCEDURE

TOOLS: Four-wheeled doily
3/8" drive torque wrench (0-50 foot-pounds)
9/16" open end wrench
9/16" socket (3/8" drive)
Hydraulic jacks (three)
3/8" drive ratchet

SUPPLIES: Sealer, (item 26, App. A)
Adhesive, (item 4, App. A)
Rubber pads 11637515 (thirteen)
Self-locking nuts MS 51922-21 (fifteen)

PERSONNEL: Three

REFERENCES: TM 9-2350 -222-20-2-3 for procedures to:
Install power relay box
Install 7.62-mm ammunition boxes
Install caliber .50 ammunition boxes
Install battery access door
Install gunner's footrest plate
Install fire extinguisher mounting bracket
Install IR periscope spare head stowage box
Install periscope stowage box
Install commander's seat support tube
Install gunner's seat pedestal
Install turret platform guard
Install power pack motor mounting plate
Install power pack motor mounting bracket
Install gunner's, commander's, and loader's electric air filter heater elbows
Install equilibrator accumulator and support
Install equilibrator manifold
Install equilibrator system tubes
Install gunner's foot guard
Install winch and boom hydraulic tubes
JPG for procedures to:
Apply adhesive
Apply sealant

EQUIPMENT CONDITION: New platform on dolly
Turret and hangers on turret stand

2-4. TURRET PLATFORM INSTALLATION PROCEDURE (CONT)

FRAME 1	
Step	Procedure
1.	Apply adhesive on nine rubber pads (1) (JPG).
2.	Put nine pads (1) in nine platform (2) holes.
3.	Install power pack motor mounting plate (3) on platform (2) (TM-20-2-3).
4.	Install power pack mounting bracket (4) on mounting plate (3) (TM-20-2-3).
5.	Install power relay box (5) on platform (2) (TM-20-2-3).
6.	Install gunner's seat pedestal (6) on platform (2) (TM-20-2-3).
7.	Install commander's seat support tube (7) on platform (2) (TM-20-2-3).
8.	Install three electric air filter heater elbows (8) on platform (2) (TM-20-2-3).
9.	Using open end wrench, attach hydraulic tube bracket with winch tubes (9) to platform (2) with two screws (10), two lockwashers (11), and two flat washers (12).
GO TO FRAME 2	

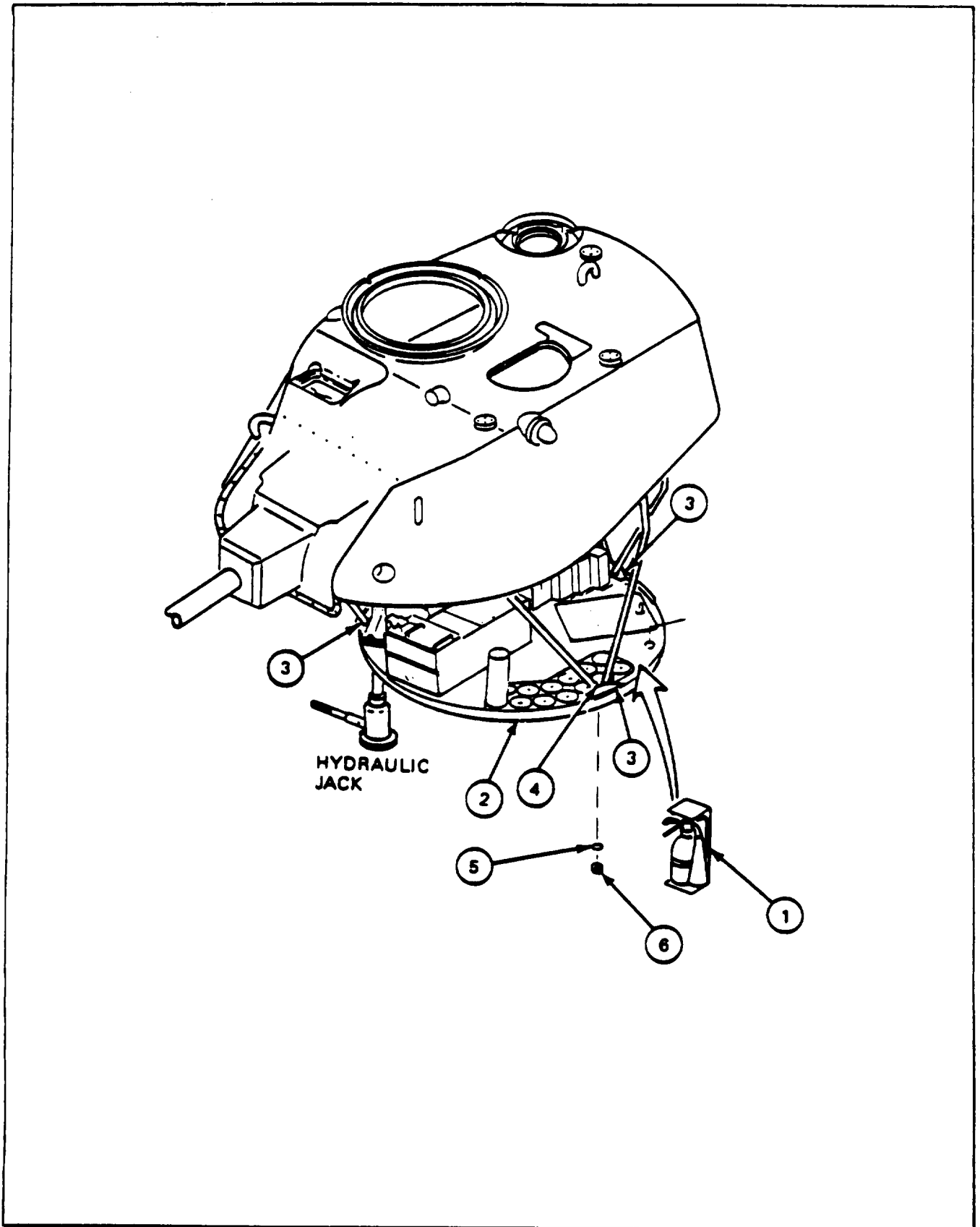
The diagram shows an exploded view of the turret platform assembly. The main platform is labeled (2) and features a grid of nine circular holes. Component (1) consists of nine small circular rubber pads. Component (3) is a rectangular power pack motor mounting plate. Component (4) is a power pack mounting bracket. Component (5) is a power relay box. Component (6) is a gunner's seat pedestal. Component (7) is a commander's seat support tube. Component (8) represents three electric air filter heater elbows. Component (9) is a hydraulic tube bracket with winch tubes. Components (10), (11), and (12) are screws, lockwashers, and flat washers, respectively, used for securing the hydraulic tube bracket.

2-4. TURRET PLATFORM INSTALLATION PROCEDURE (CONT)

FRAME 2	
Step	Procedure
<ol style="list-style-type: none"> 1. Install gunner's footrest plate (1) on platform (2) (TM-20-2-3). 2. Install periscope stowage box (3) on platform (2) (TM-20-2-3). 3. Install IR periscope spare head stowage box (4) on platform (2) (TM-20-2-3). 4. Install battery access door (5) on platform (2) (TM-20-2-3). 5. Install equilibrator manifold (6) on platform (2) (TM-20-2-3). 6. Install two caliber .50 ammunition boxes (7) on platform (2) (TM-20-2-3). 7. Install two 7.62-mm ammunition boxes (8) on platform (2) (TM-20-2-3). 8. Install equilibrator accumulator and support (9) on platform (2) (TM-20-2-3). <p>GO TO FRAME 3</p>	

2-4. TURRET PLATFORM INSTALLATION PROCEDURE (CONT)

FRAME 3	
Step	Procedure
1.	Install fire extinguisher mounting bracket (1) on platform (2) (TM-20-2-3).
2.	Soldier A: Pull dolly while soldiers B and C guide platform (2) under turret stand.
3.	Place platform (2) holes in line with hanger (3) mounting holes.
4.	Put sealer at three hanger (3) mating surfaces on platform (2) (JPG).
5.	Soldiers A, B and C: Place hydraulic jacks under turret platform (2) eight inches left of three hanger (3) positions, operate jacks to fit snug to turret platform (2).
NOTE	
Three mounting bolts (4) are longer. Put longer bolts into holes on raised part of hanger (3) mounting.	
6.	Put fifteen bolts (4) through holes in hanger (3) mounting.
7.	Put fifteen washers (5) and fifteen new nuts (6) on bolts (4).
8.	Soldier A: Using open end wrench, hold fifteen bolts (4). Soldier B: Using socket wrench, tighten fifteen nuts (6).
9.	Soldier B: Using torque wrench, torque fifteen nuts (6) to between 35 and 39 foot-pounds (JPG).
10.	Remove dolly from under platform (2).
11.	Soldiers A, B, and C: Lower jacks from under platform (2), remove jacks.
12.	Install three winch and boom hydraulic tubes (11637508, 11637509, and 11637510) (TM-20-2-3).
13.	Install gunner's foot guard (TM-20-2-3).
14.	Install equilibrators tubes (TM-20-2-3).
END OF TASK	



Section 3. TURRET STRUCTURE

2-5. MAINTENANCE PROCEDURES INDEX

Equipment Item	Removal	Tasks	Installation
Turret Structure	2-6		2-7

2-6. TURRET STRUCTURE REMOVAL PROCEDURE

TOOLS: Hoist, capable of lifting 20 tons or more and capable of raising hook at least 20 feet above ground
 Turret lifting sling (NSN 4933-00-938-3008)
 Turret stand (fabricated tool. item 5, App. B)
 1-1/8" socket (3/4" drive)
 6" extension (3/4" drive)
 3/4" drive ratchet
 3/4" hinged handle

PERSONNEL: Five

REFERENCES: TM 9-2350-222-10 for procedures to:
 Traverse and operate turret
 Set turret traverse lock to UNLOCKED
 TM 9-2350-222 -20-2-3 for procedure to remove turret electrical sliping

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
 Turret electrical sliping removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Remove boom (para 29-2)

GENERAL INSTRUCTIONS:

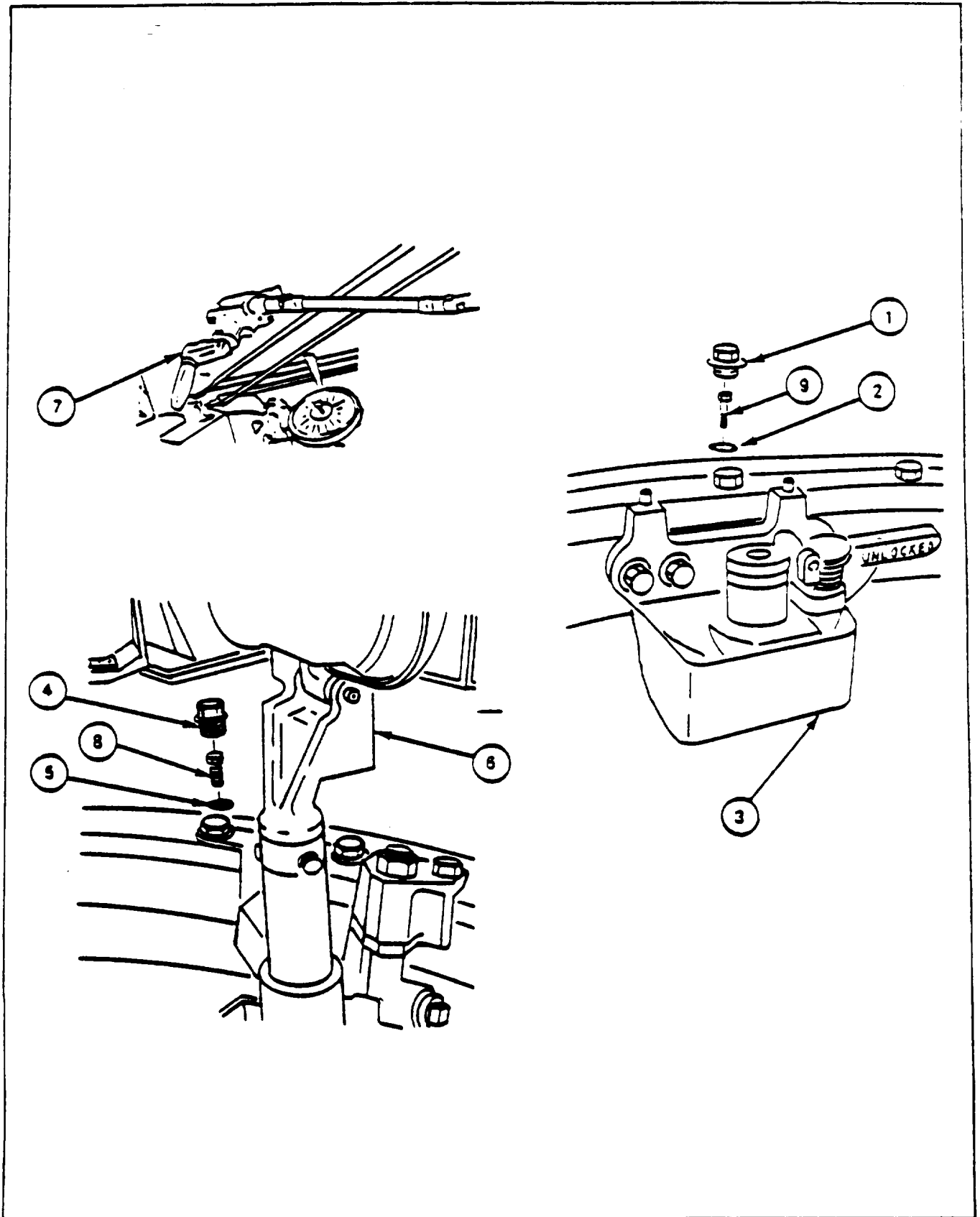
NOTE

Keep bolts for installation.

This procedure is for removal of platform, flotation seal, and replacement of turret with race rings. Race ring will be removed as unit with turret. Turret stand should be on smooth, level ground or pavement near vehicle.

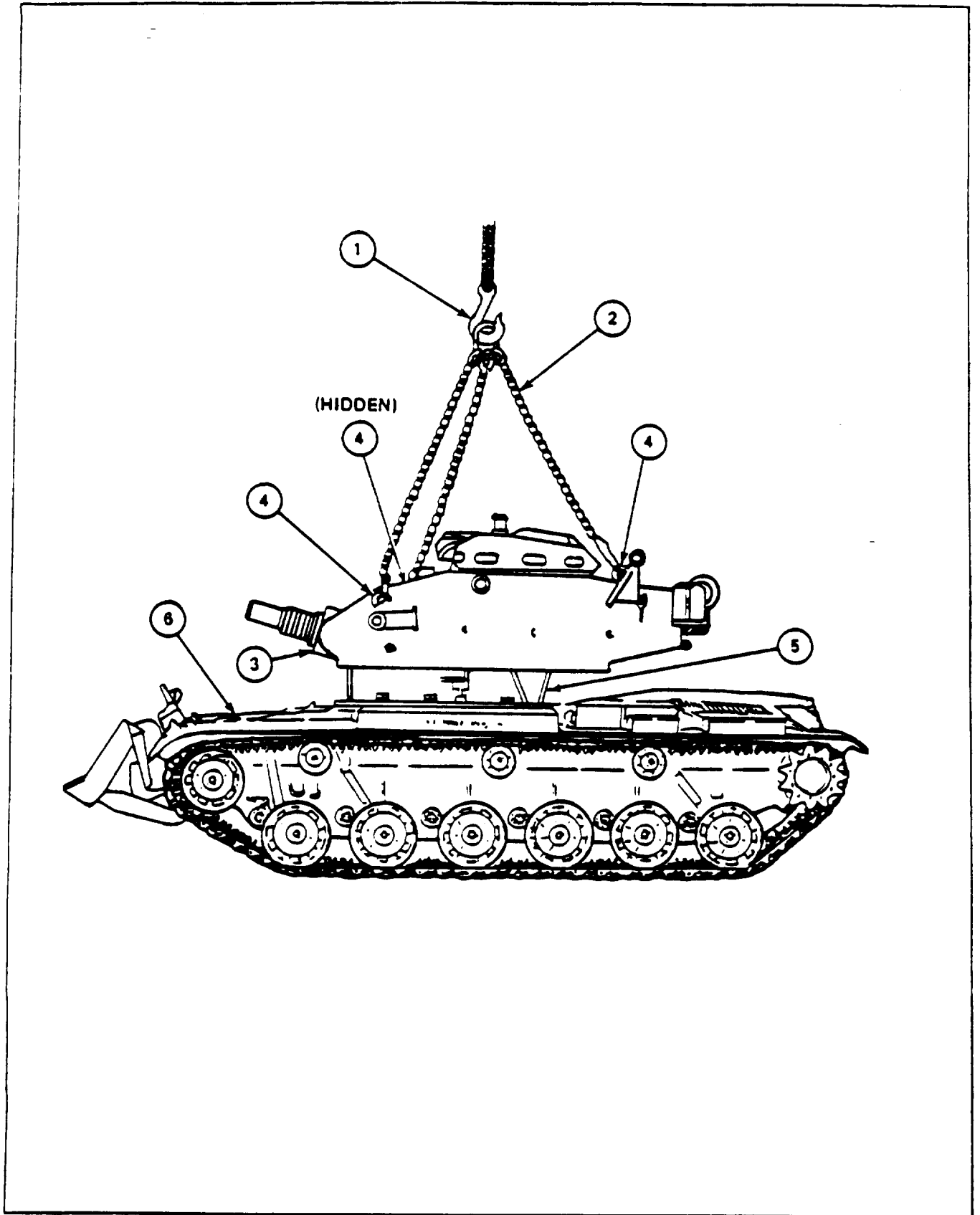
2-6. TURRET STRUCTURE REMOVAL PROCEDURE (CONT)

FRAME 1	
Step	Procedure
	<p>NOTE</p> <p>This procedure is for removal of platform, flotation seal, and replacement of turret with race ring.</p>
1.	Set turret traverse lock to UNLOCKED (TM-10).
2.	Using socket wrench. take plug (1) from race bolt access hole (2) near turret traverse lock (3).
3.	Using socket wrench, take plug (4) from race bolt access hole (5) near commander's seat (6).
4.	Using hand traversing drive (7), traverse turret clockwise so that bolt heads (8) and (9) are under each of bolt access holes (2) and (5).
	<p>NOTE</p> <p>It may be necessary to use wire with a hook or loop on end to lift bolts (8) and (9) out of access holes (2) and (5).</p>
5.	Using socket wrench. remove bolts (8) and (9) and lift out of access holes (2) and (5).
6.	Repeat steps 4 and 5 until all 48 bolts have been removed.
	GO TO FRAME 2



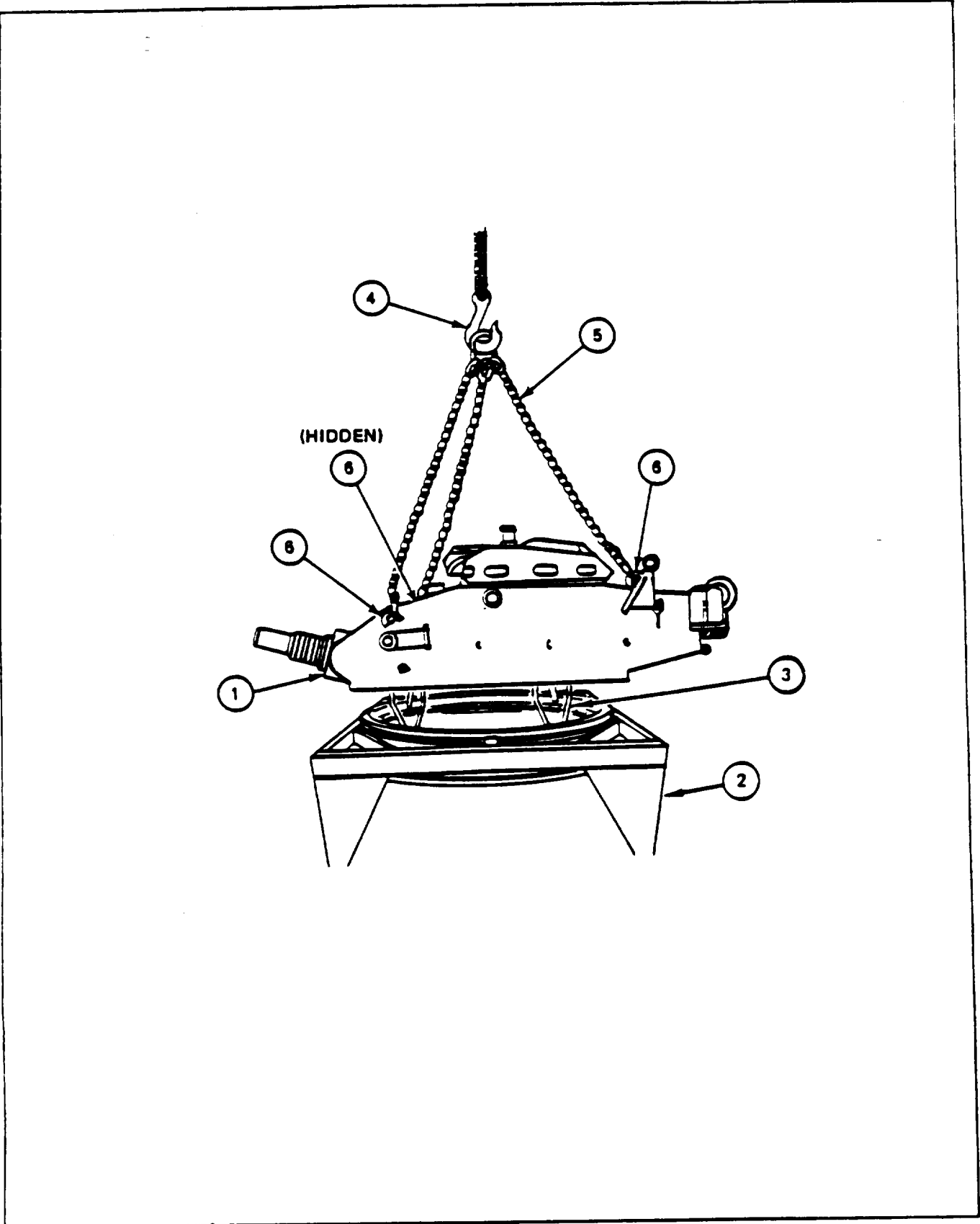
2-6. TURRET STRUCTURE REMOVAL PROCEDURE (CONT)

FRAME 2	
Step	Procedure
	<p>NOTE</p> <p>Turret sling (2) is heavy and awkward to handle. Hoist hook (1) should be used to lift sling.</p>
<ol style="list-style-type: none"> 1. 2. 3. 4. 	<ol style="list-style-type: none"> Using hoist, lower hoist hook (1) to sling (2) on floor. Put sling (2) on hoist hook (1). Raise hoist hook (1) with sling (2) and position hoist hook over center of turret (3). Put three hooks of ding (2) through three turret lifting eyes (4).
	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">WARNING</div> <p>Turret weighs nearly 20 tons. Do not get under turret (3) while it is on hoist. Turret could fall and hurt or kill you.</p>
	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">CAUTION</div> <p>When lifting turret (3) from hull (6), do not let turret platform (5) bump against hull. Parts could be damaged. Turret must be lifted level and straight up.</p>
	<p>NOTE</p> <p>Soldier A will operate hoist. Soldiers B and C will be on each side of turret (3) to guide and check turret as it is lifted out of hull. Soldiers D and E will help where needed.</p>
<ol style="list-style-type: none"> 5. 	<ol style="list-style-type: none"> Using hoist, carefully lift turret (3) straight up and turret platform (5) is clear of hull (6). <p>GO TO FRAME 3</p>



2-6. TURRET STRUCTURE REMOVAL PROCEDURE (CONT)

FRAME 3	
Step	Procedure
1.	<p>Using hoist move turret (1) and position over turret stand (2).</p> <div style="text-align: center; border: 1px solid black; padding: 2px; width: fit-content; margin: 10px auto;">CAUTION</div> <p style="text-align: center;">When putting turret (1) on turret stand (2). do not let turret platform (3) bump against turret stand. Parts could be damaged.</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Soldiers B and C will be on each side of turret (1) to guide turret on turret stand (2).</p>
2.	Lower turret platform (3) into turret stand (2) until turret (1) is on turret stand.
3.	Lower hoist hook (4) until three hooks of sling (5) can be removed from three turret lifting eyes (6).
4.	Using hoist. move hoist hook (4) with sling (5) over clear area on floor. and lower sling to ground.
5.	Remove sling (5) from hoist hook (4).
6.	Move hoist to clear area.
	END OF TASK



2-7. TURRET STRUCTURE INSTALLATION PROCEDURE

TOOLS: Hoist, capable of lifting 20 tons or more and capable of raising hook at least 20 feet above ground
Turret lifting sling (NSN 4933-00-938-3008)
1-1/8" socket (3/4" drive)
6" extension (3/4" drive)
3/4" drive torque wrench (0-420 foot-pounds)
3/4" drive ratchet

SUPPLIES: Grease (item 12, App. A)
1/4" rope (30 feet long)

PERSONNEL: Five

REFERENCES: TM 9-2350-222-10 for procedures to:
Traverse and operate turret
Set turret traverse lock to LOCKED and UNLOCKED
JPG for procedure to use torque wrench
TM 9-2350 -222-20-2-3 for procedure to install turret electrical slipring

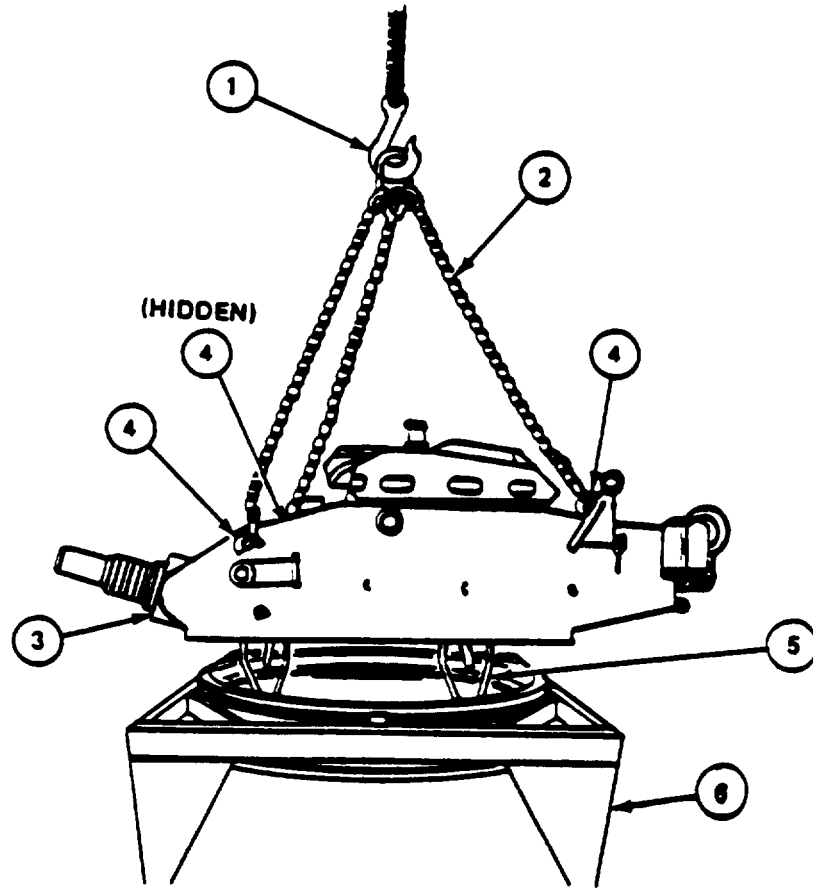
GENERAL INSTRUCTIONS:

NOTE

A light coat of grease should be applied to all bolt threads that attach turret to race ring.

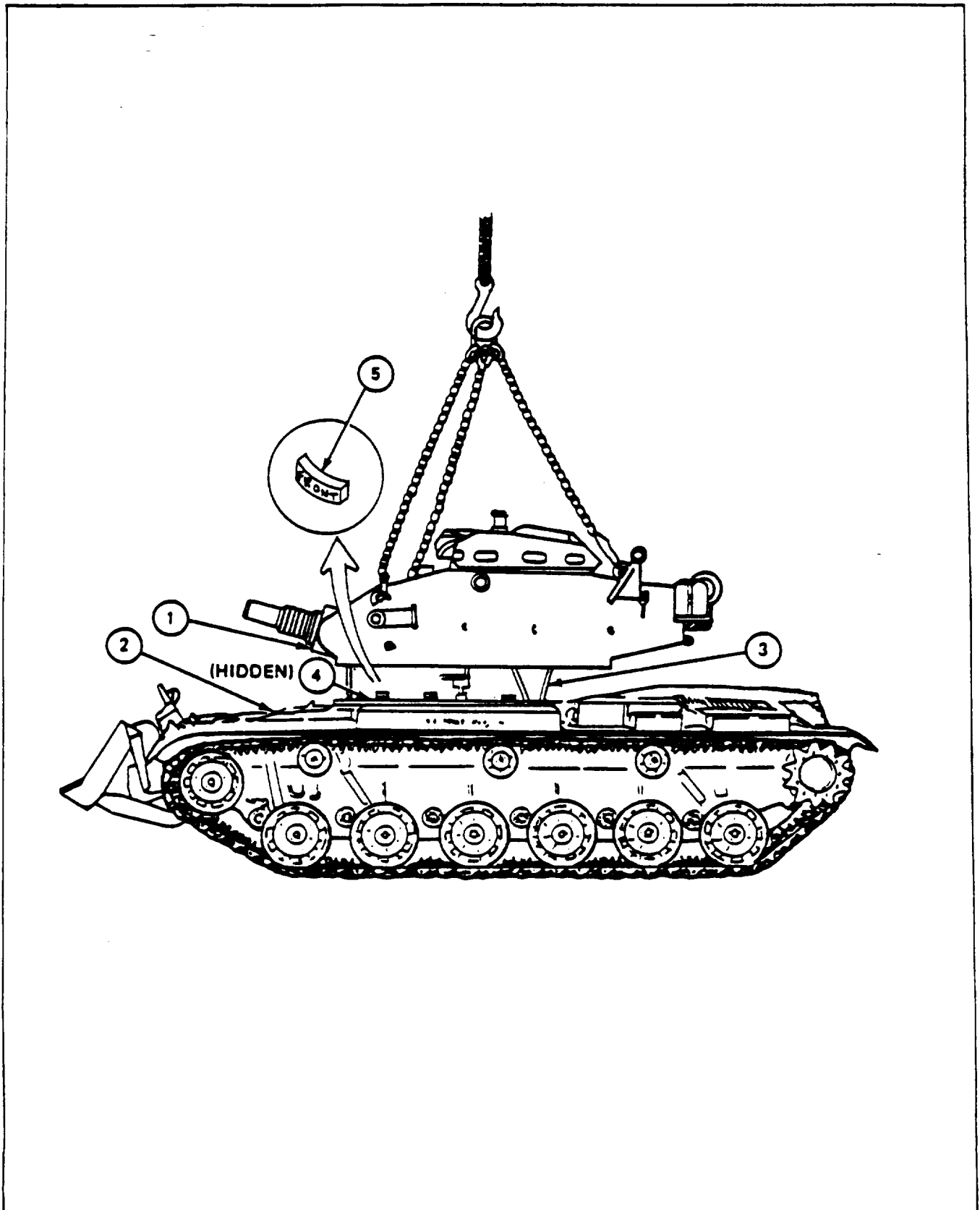
2-7. TURRET STRUCTURE INSTALLATION PROCEDURE (CONT)

FRAME 1	
Step	Procedure
	<p>NOTE</p> <p>Turret sling (2) is heavy and awkward to handle. Hoist hook (1) should be used to lift sling.</p> <ol style="list-style-type: none"> 1. Using hoist, lower hoist hook (1) to sling (2) on floor. 2. Put sling (2) on hoist hook (1). 3. Raise hoist hook (1) with sling (2) and position hoist hook over center of turret (3) 4. Put three hooks of sling (2) through three turret lifting eyes (4).
	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">WARNING</div> <p>Turret weighs nearly 20 tons. Do not get under turret (3) while it is on hoist. Turret could fall and hurt or kill you.</p>
	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">CAUTION</div> <p>When lifting turret (3) from turret stand (6), do not let turret platform (5) bump against turret stand. Parts could be damaged. Turret must be lifted level and</p>
	<p>NOTE</p> <p>Soldier A will operate hoist. Soldiers B and C will be on each side of turret (3) to guide and check turret as it is lifted out of hull. Soldiers D and E will help where needed.</p>
5.	Using hoist, carefully lift turret (3) straight up until turret platform (5) is clear of turret stand (6).
	GO TO FRAME 3



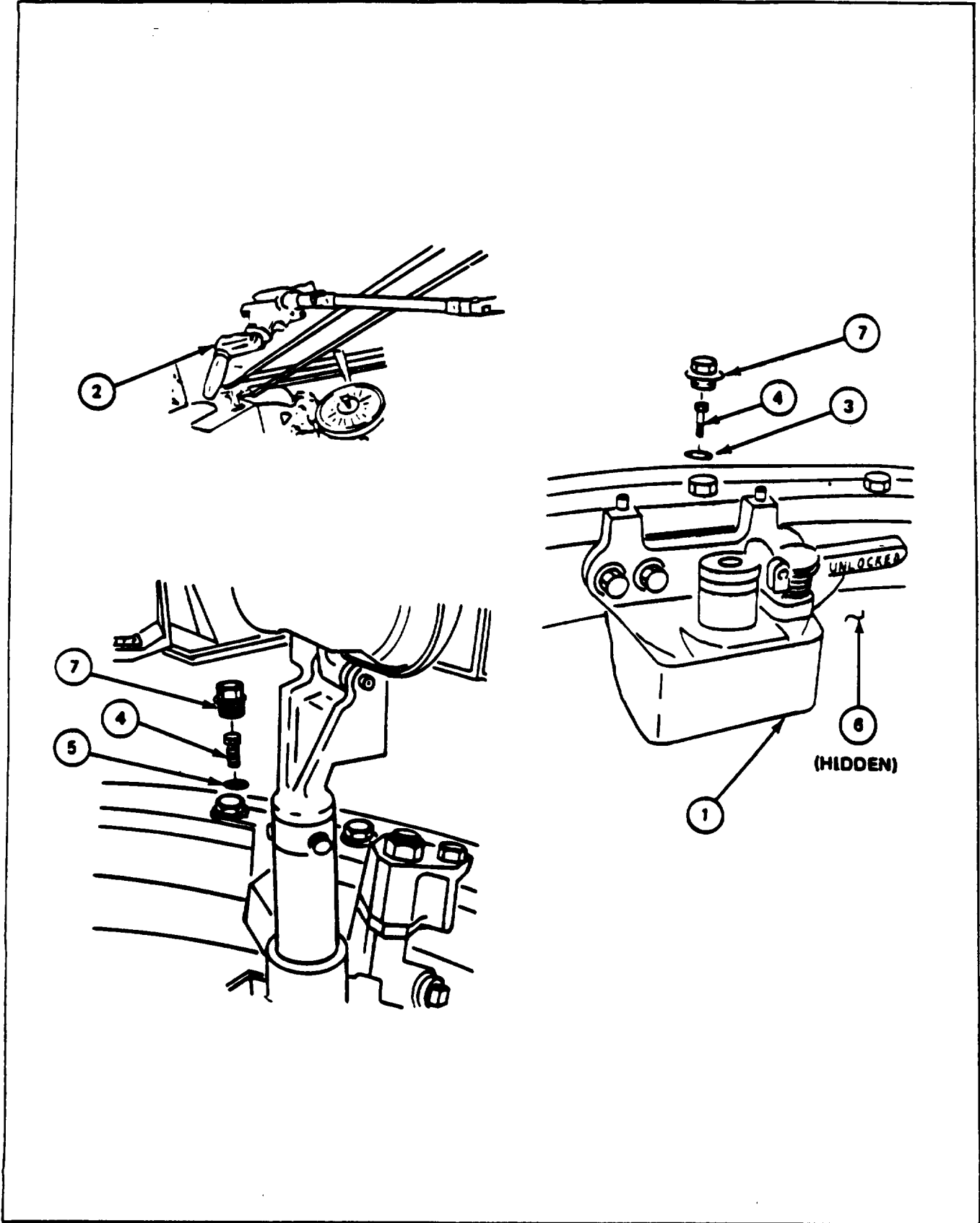
2-7. TURRET STRUCTURE INSTALLATION PROCEDURE (CONT)

FRAME 2	
Step	Procedure
1.	<p>Using hoist. move turret (1) and position over hull (2).</p> <p style="text-align: center;">CAUTION</p> <p style="text-align: center;">When putting turret (1) on hull (2), do not let turret platform (3) bump against hull. Parts could be damaged.</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Soldiers B and C will be on each side of turret (1) to guide turret on hull (2).</p>
2.	<p>Using hoist. lower turret platform (3) into hull (2) until turret (1) is about 1" above hull.</p> <p style="text-align: center;">CAUTION</p> <p style="text-align: center;">Turret (1) is positioned on three dowel pins (4) in hull (2) and must e lowered evenly to prevent damage.</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Outer race (5) is marked "FRONT" and must be positioned toward front of hull (2).</p>
3.	<p>Using hoist. carefully lower turret (1) on three dowel pins (4) in hull (2).</p> <p>GO TO FRAME 3</p>



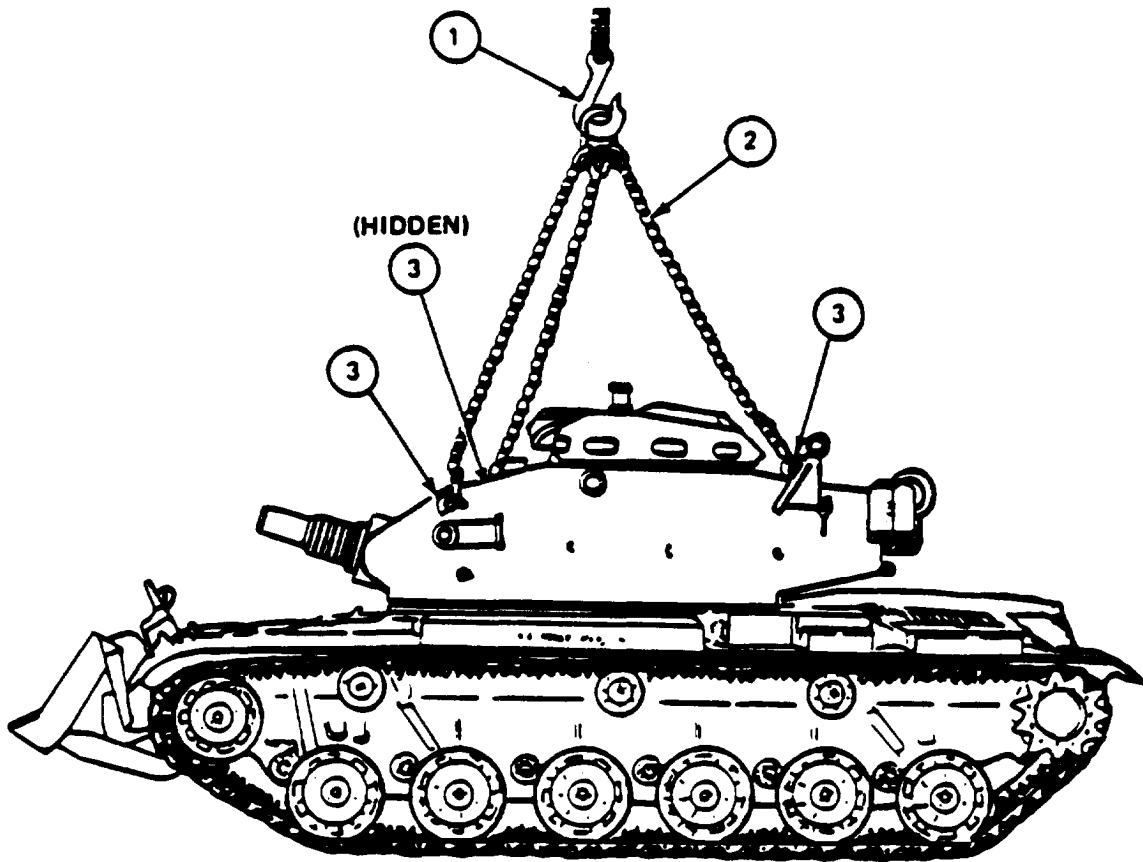
2-7. TURRET STRUCTURE INSTALLATION PROCEDURE (CONT)

FRAME 3	
Step	Procedure
1.	<p>Set turret traverse lock (1) to UNLOCKED (TM-10).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Soldier B should rotate turret, while Soldier C looks for bolt hole through access hole (3) and puts in bolts.</p>
2.	<p>Using hand traversing handle (2), traverse turret clockwise just enough to see bolt hole in access hole (3) (TM-10).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">When bolt hole can be seen in access hole (3), a second bolt hole will be seen in access hole (5).</p>
3.	Using socket wrench, put one bolt (4) in access hole (3) and access hole (5), and tighten them into hull (6).
4.	Repeat step 2 and 3 until 48 bolts (4) are tightened.
5.	Using torque wrench, torque one bolt (4) in access hole (3) and access hole (5) to between 300 and 350 foot-pounds (JPG).
6.	Repeat steps 2 and 5 until 48 bolts are torqued.
7.	Using socket wrench, put one plug (7) in access hole (3) and access hole (5).
8.	Set turret traverse lock (1) to LOCKED (TM-10).
	GO TO FRAME 4



2-7. TURRET STRUCTURE INSTALLATION PROCEDURE (CONT)

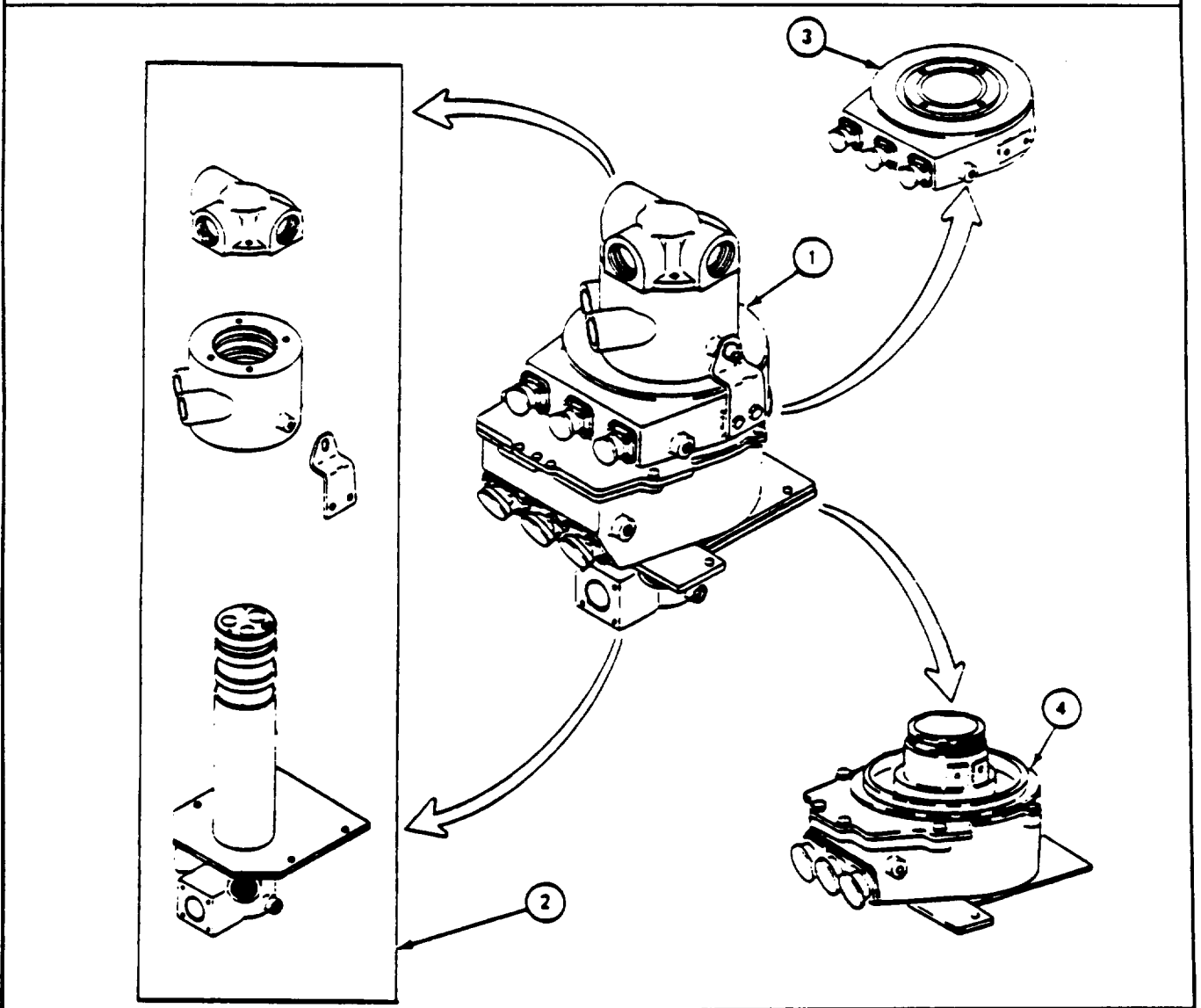
FRAME 4	
Step	Procedure
<ol style="list-style-type: none"> 1. 2. 3. 4. 5. 	<p>Using hoist. lower hoist hook (1) until three hooks of sling (2) can be removed from three turret lifting eyes (3).</p> <p>Using hoist. move hoist hook (1) with sling (2) over clear area on floor.</p> <p>Using hoist, lower hoist hook (1) until sling (2) is on floor.</p> <p>Remove sling (2) from hoist hook (1).</p> <p>Move hoist to clear area.</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required:</p> <p style="text-align: center;">Install boom (para 29-3) Install turret electrical slipring (TM-20-2-3). Operate turret in manual and power modes to make sure it works properly (TM-10).</p> <p>END OF TASK</p>



CHAPTER 3
TURRET ELECTRICAL SLIPRING

3-1. MAINTENANCE PROCEDURES INDEX

Equipment Item	Inspection	Test	Tasks			
			Removal	Installation	Disassembly	Assembly
1. Turret Electrical Slipping	...	3-2	...	...	3-3	3-4
2. Hydraulic Attachments	3-5	...	3-6	3-7	...	...
3. Upper Housing	3-8	...	...	...	3-9	3-10
4. Lower Housing	3-11	...	...	...	3-12	3-13



Para 3-1

3-2

3-2. TURRET ELECTRICAL SLIPRING TEST PROCEDURE

- a. Electrical Test

TEST EQUIPMENT Multimeter

PERSONNEL: One

REFERENCES: JPG for procedure to use multimeter
TM 9-2350-222 -20-2-3 for procedure to remove turret electrical slipring

EQUIPMENT CONDITION: Turret electrical slipring removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Install hydraulic attachments (para 3-7)

3-2. TURRET ELECTRICAL SLIPRING TEST PROCEDURE (CONT)

a. Electrical Test (Cont)

FRAME 1

Procedure	Normal indication
-----------	-------------------

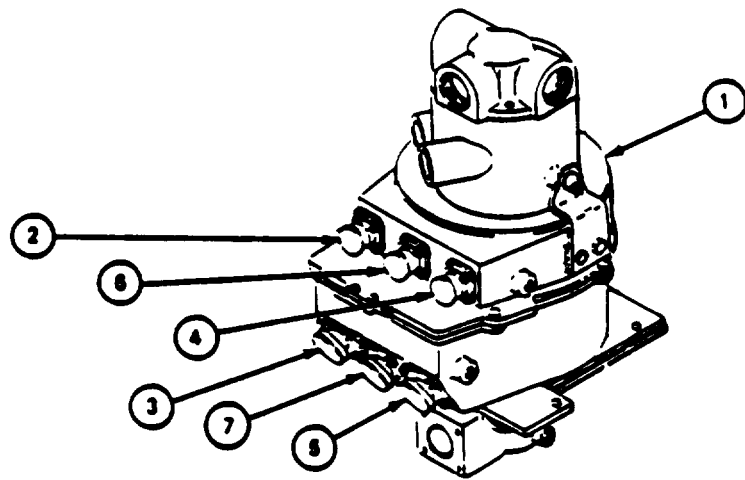
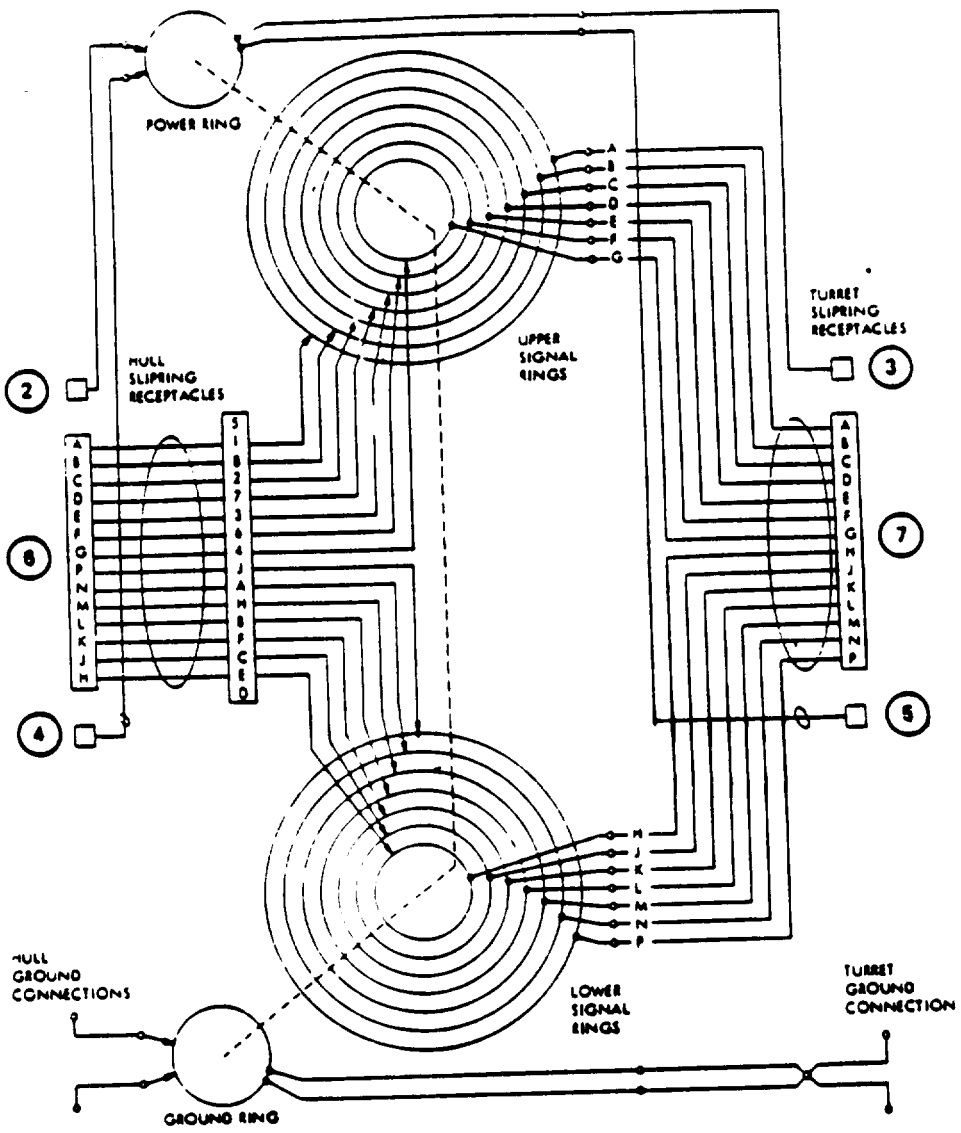
NOTE

If normal indication is not obtained, there is probably an opening in the circuit being tested. Disassemble slipring (para 3-3). Repair or replace bad parts.

1. Using multimeter, check continuity between the following connectors on slipring (1) (JPG):

FROM	TO	
(2)	(3)	Less than 2 ohms
(4)	(5)	Less than 2 ohms
(6)	(7)	Less than 2 ohms
pin A	pin A	
pin B	pin B	
pin C	pin C	
pin D	pin D	
pin E	pin E	
pin F	pin F	
pin G	pin G	
pin H	pin H	
pin J	pin J	
pin K	pin K	
pin L	pin L	
pin M	pin M	
pin N	pin N	
pin P	pin P	

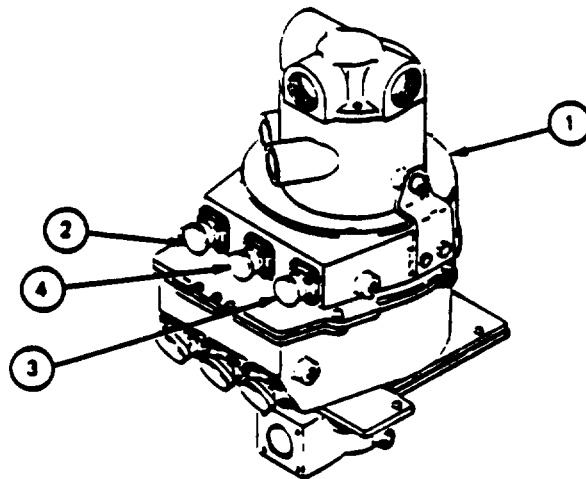
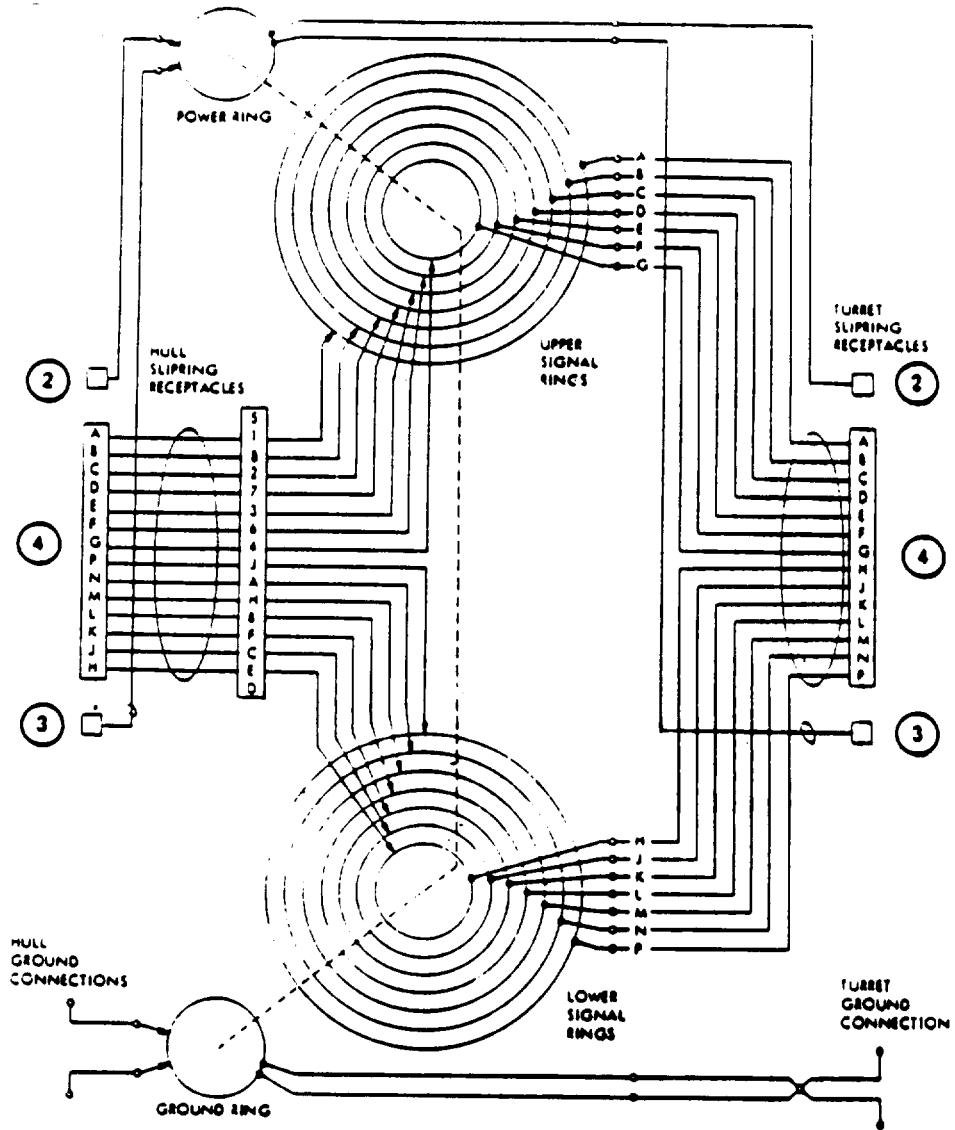
GO TO FRAME 2



3-2. TURRET ELECTRICAL SLIPRING TEST PROCEDURE (CONT)

a. Electrical Test (Cont)

FRAME 2		
Step	Procedure	Normal Indication
1.	<p style="text-align: center;">NOTE</p> <p>If normal indication is not obtained, there is probably a short in the circuit being tested. Disassemble slipring (para 3-3). Repair or replace bad parts.</p> <p>Using multimeter, check continuity between slipring (1) and the following connectors (JPG):</p> <p style="text-align: center;">(2)</p> <p style="text-align: center;">(3)</p> <p style="text-align: center;">(4)</p> <p style="text-align: center;">Pin A pin B pin c pin D pin E pin F pin G pin H pin J pin K pin L pin M pin N pin P</p>	<p style="text-align: center;">More than 10 million ohms</p> <p style="text-align: center;">More than 10 million ohms</p> <p style="text-align: center;">More than 10 million ohms</p>
	END OF TASK	



3-2. TURRET ELECTRICAL SLIPRING TEST PROCEDURE (CONT)**b Air Pressure Test**

TEST EQUIPMENT: Watch or timer

- Air compressor (0 to 50 psi)
- Air pressure regulator (0 to 10 psi)
- Air flow control valve (0 to 50 psi)
- Air pressure gauge (0 to 10 psi)
- Air relief valve (10 psi)
- Air bleed valve (0 to 50 psi)

TOOLS: 12" adjustable wrench
7/16" combination wrench

SUPPLIES: Pipe plug (three) (MS 20913-8D)

PERSONNEL: One

REFERENCES: JPG for procedures to:
Use air compressor
Connect air lines and fittings
Inspect air lines and fittings
Read air gauges

PRELIMINARY PROCEDURES: Install hydraulic attachments (para 3-7)

GENERAL INSTRUCTIONS:

NOTE

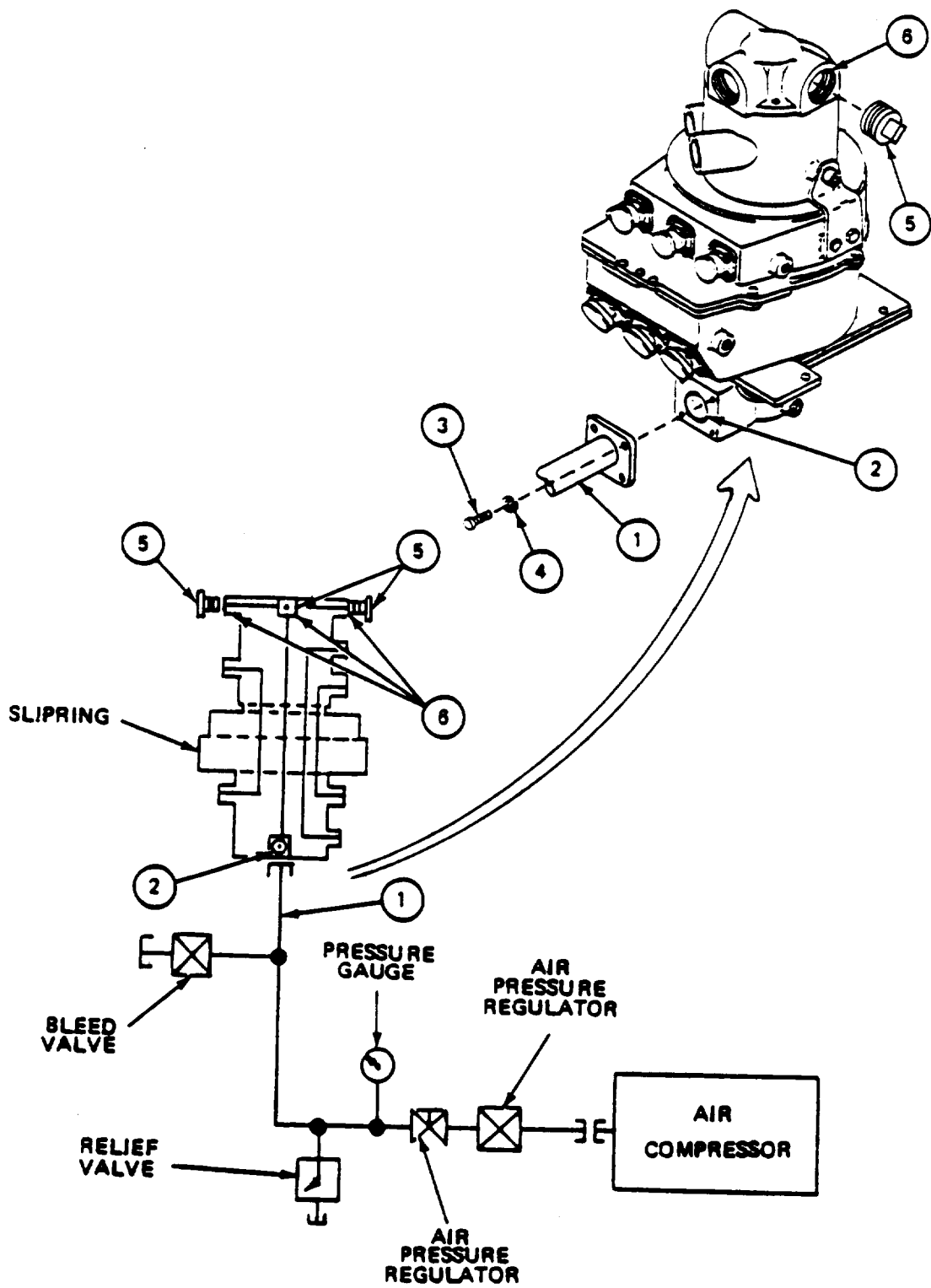
Suitable tools and supplies should be used as needed to connect test equipment to slipring.

If normal indication is not obtained, remove hydraulic attachments (para 3-6). Repair or replace bad parts.

3-2. TURRET ELECTRICAL SLIPRING TEST PROCEDURE (CONT)

b. Air Pressure Test (Cont)

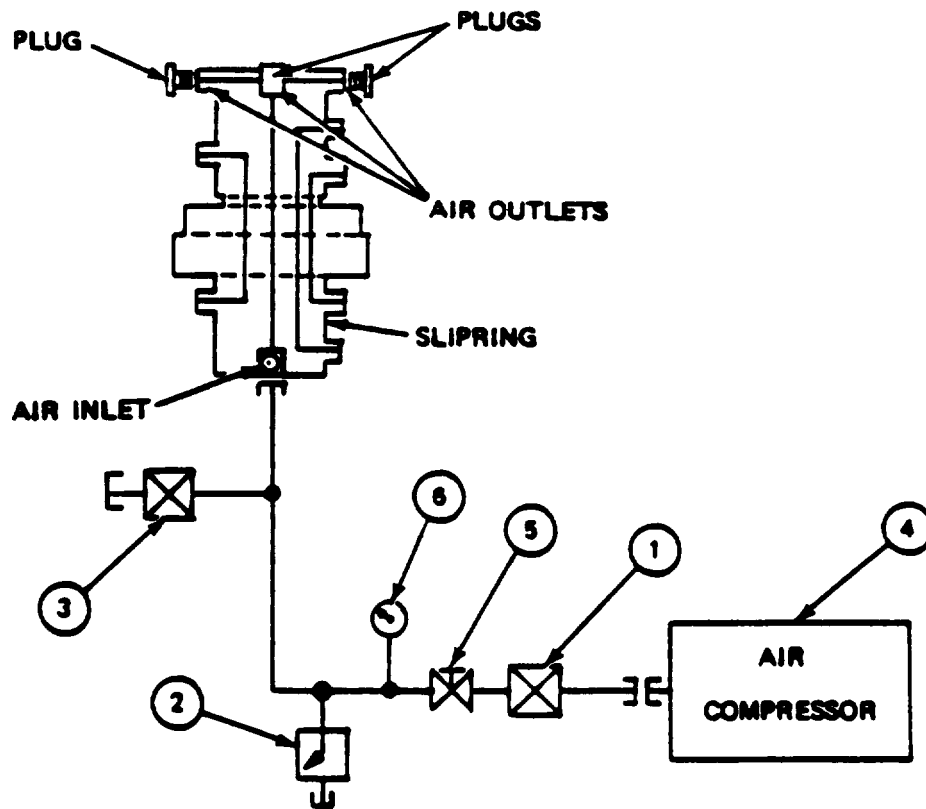
FRAME 1	
Step	Procedure
1.	Using combination wrench, connect tube assembly (1) to slipring air inlet (2) with four screws (3) and four lockwashers (4).
2.	Using adjustable wrench, install three pipe plugs (5) in three slipring air outlets (6).
3.	Using suitable tools and supplies, connect air pressure test equipment to slipring (JPG). GO TO FRAME 2



3-2. TURRET ELECTRICAL SLIPRING TEST PROCEDURE (CONT)

b. Air Pressure Test (Cont)

FRAME 2		
Step	Procedure	Normal Indication
1.	Set control valve (1), relief valve (2), and bleed valve (3) to closed position.	...
2.	Start air compressor (4) (JPG).	...
3.	Set control valve (1) to open position.	...
4.	Adjust pressure regulator (5) until pressure gauge (6) reads between 1.8 and 2.2 psi (JPG).	...
5.	Set control valve (1) to closed position.	...
6.	Stop air compressor (4) (JPG).	...
7.	Using watch or timer, read pressure gauge (6) for two minutes (JPG).	No drop in air pressure
8.	Set relief valve (2) to open position.	...
END OF TASK		



3-2. TURRET ELECTRICAL SLIPRING TEST PROCEDURE (CONT)

c. Hydraulic Test

TEST EQUIPMENT: M3 oil pump
 Accumulator
 Relief valve (0 to 3000 psi)
 Relief valve (0 to 55 psi)
 Control valve
 Pressure gauge (0 to 100 psi)
 Pressure gauge (0 to 3000 psi)
 Watch or timer

TOOLS: 12" adjustable wrench

SUPPLIES: Pipe plug (two) (MS 20913-8S)
 Pipe plug (MS 20913-3S)

PERSONNEL: One

REFERENCES: JPG for procedures to:
 Use M3 oil pump
 Connect hydraulic lines, fittings, and parts
 Inspect hydraulic lines, fittings, and parts
 Read hydraulic gauges
 Use hydraulic test equipment

PRELIMINARY PROCEDURES: Install hydraulic attachments (para 3-7)

GENERAL INSTRUCTIONS:

NOTE

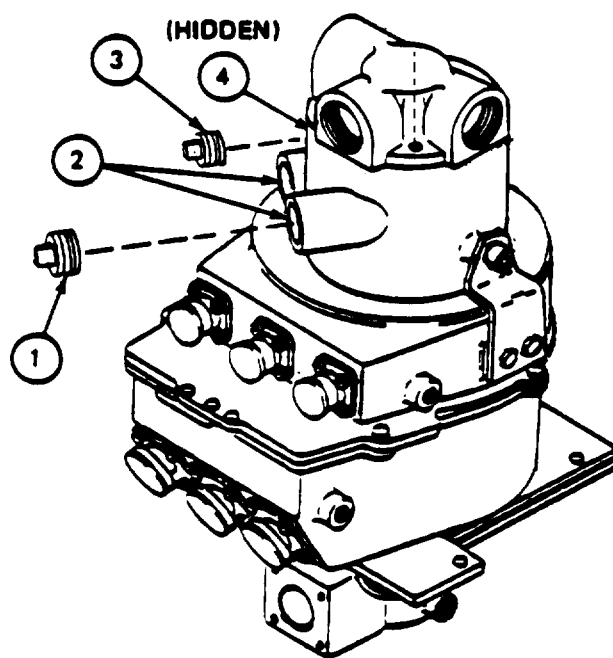
Suitable tools and supplies should be used as needed to connect test equipment to slipring.

If normal indication is not obtained, remove hydraulic attachments (para 3-6). Repair or replace bad parts.

3-2. TURRET ELECTRICAL SLIPRING TEST PROCEDURE (CONT)

c. Hydraulic Test (Cont)

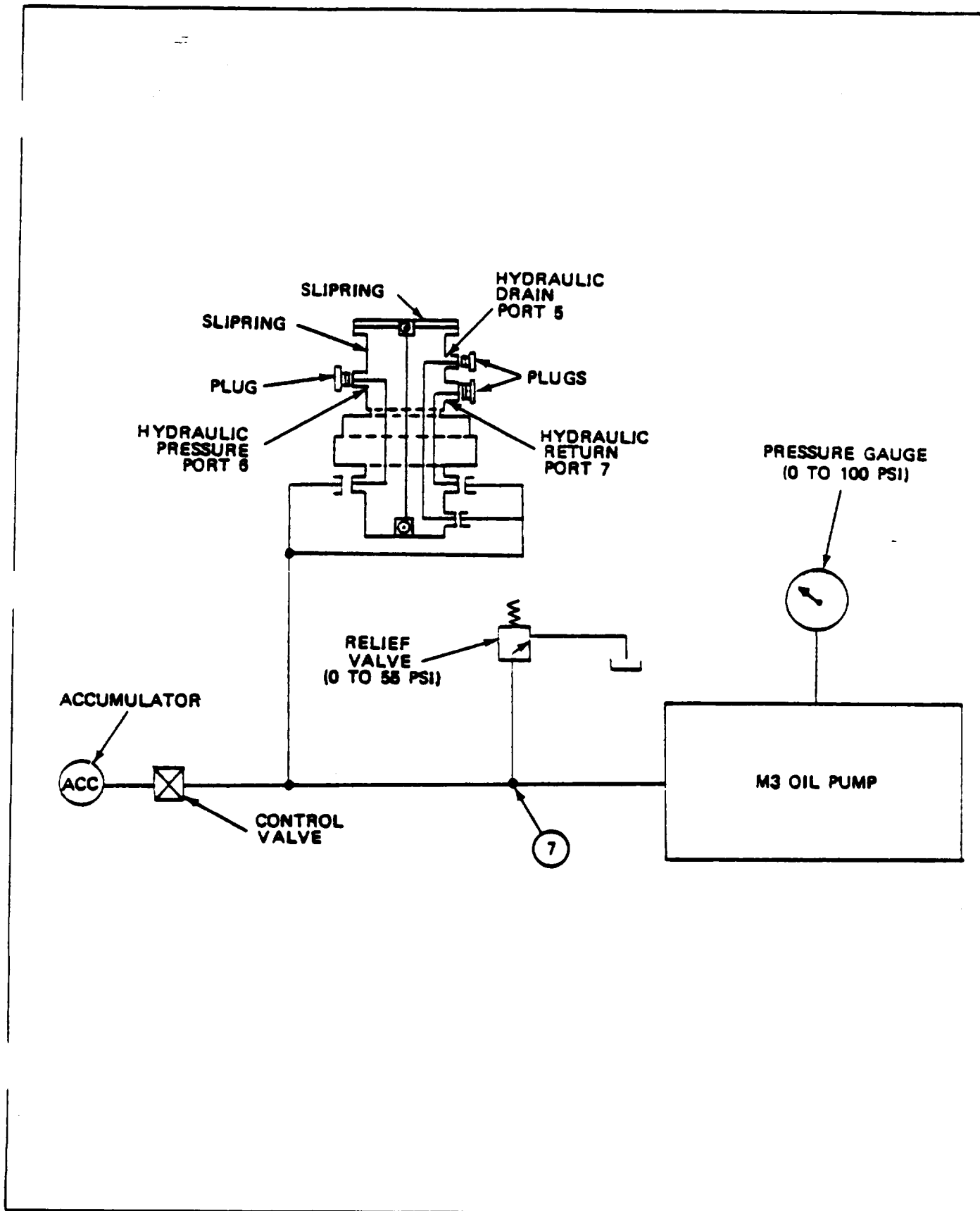
FRAME 1	
Step	Procedure
1.	Using wrench, install two pipe plugs (1) in two ports (2).
2.	Using wrench, install pipe plug (3) in port (4). GO TO FRAME 2



3-2. TURRET ELECTRICAL SLIPRING TEST PROCEDURE (CONT)

c. Hydraulic Test (Cont)

FRAME 2	
Step	Procedure
	NOTE
	Pressure gauge that comes with M3 oil pump is not used for this test. other pressure gauges are needed.
1.	Assemble M3 oil pump except for pressure gauge (JPG).
2.	Using suitable tools and supplies, connect test equipment to slipring.
3.	Close control valve.
4.	Set relief valve for 55 psi (JPG).
5.	Precharge accumulator to between 40 and 50 psi (JPG).
	GO TO FRAME 3



3-2. TURRET ELECTRICAL SLIPRING TEST PROCEDURE (CONT)

c. Hydraulic Test (Cont)

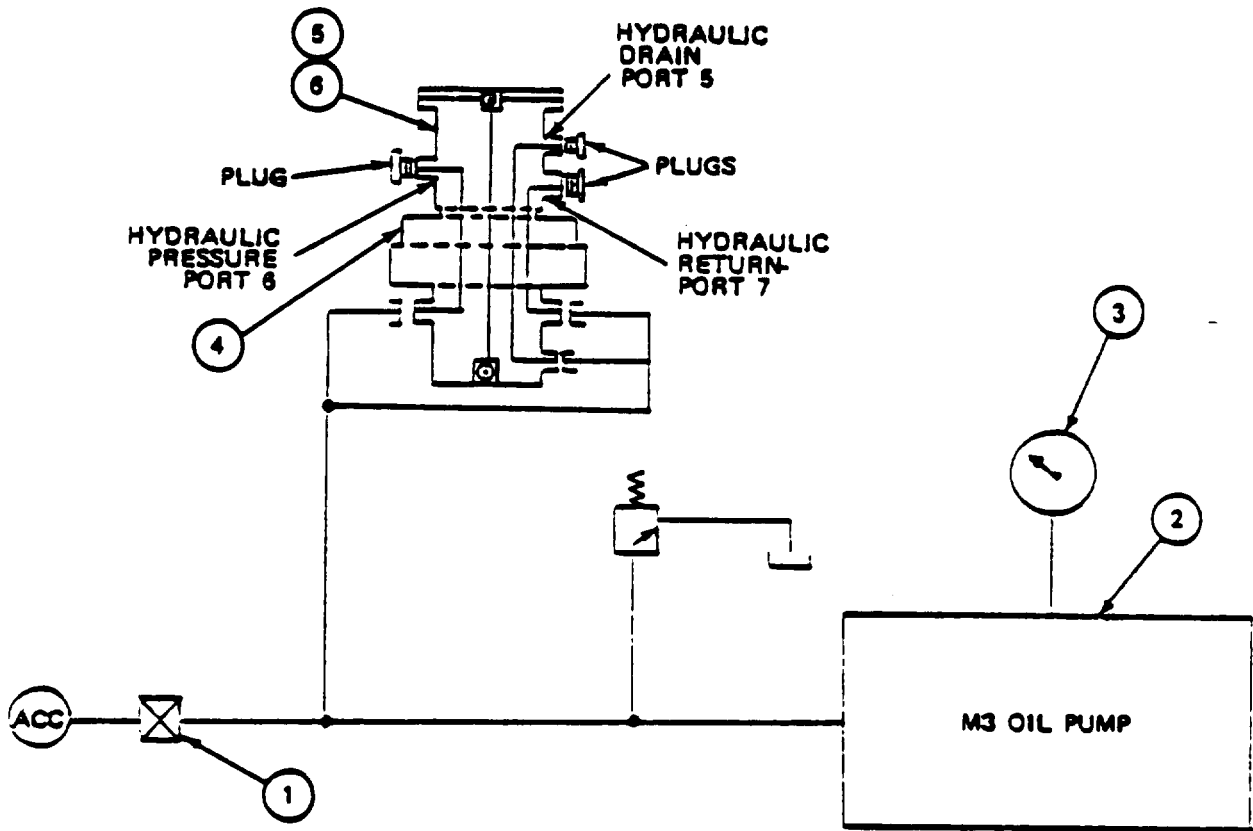
FRAME 3		
Step	Procedure	Normal Indication
1.	Open control valve (1).	...
2.	Operate M3 oil pump (2) until pressure gauge (3) reads between 45 and 55 psi (JPG).	...
3.	Using hands, slowly turn top of slipring (4) ten full turns.	Pressure gauge (3) reads between 45 and 55 psi (JPG).
4.	Close control valve (1).	...
5.	Using hands, slowly turn top of slipring (4) ten full turns. GO TO FRAME 4	Slipring turn smoothly and easily.

The diagram illustrates the hydraulic test setup. On the left, a control valve (1) is connected to a line that leads to the M3 oil pump (2). A pressure gauge (3) is connected to the pump's output line. The pump is connected to a slipring assembly (4). The slipring assembly has several ports: a hydraulic drain port (5) at the top, a hydraulic pressure port (6) on the left, and a hydraulic return port (7) on the right. There are also two plugs shown on the assembly. The entire system is connected to a common return line that goes back to the pump's inlet.

3-2. TURRET ELECTRICAL SLIPRING TEST PROCEDURE (CONT)

c. Hydraulic Test (Cont)

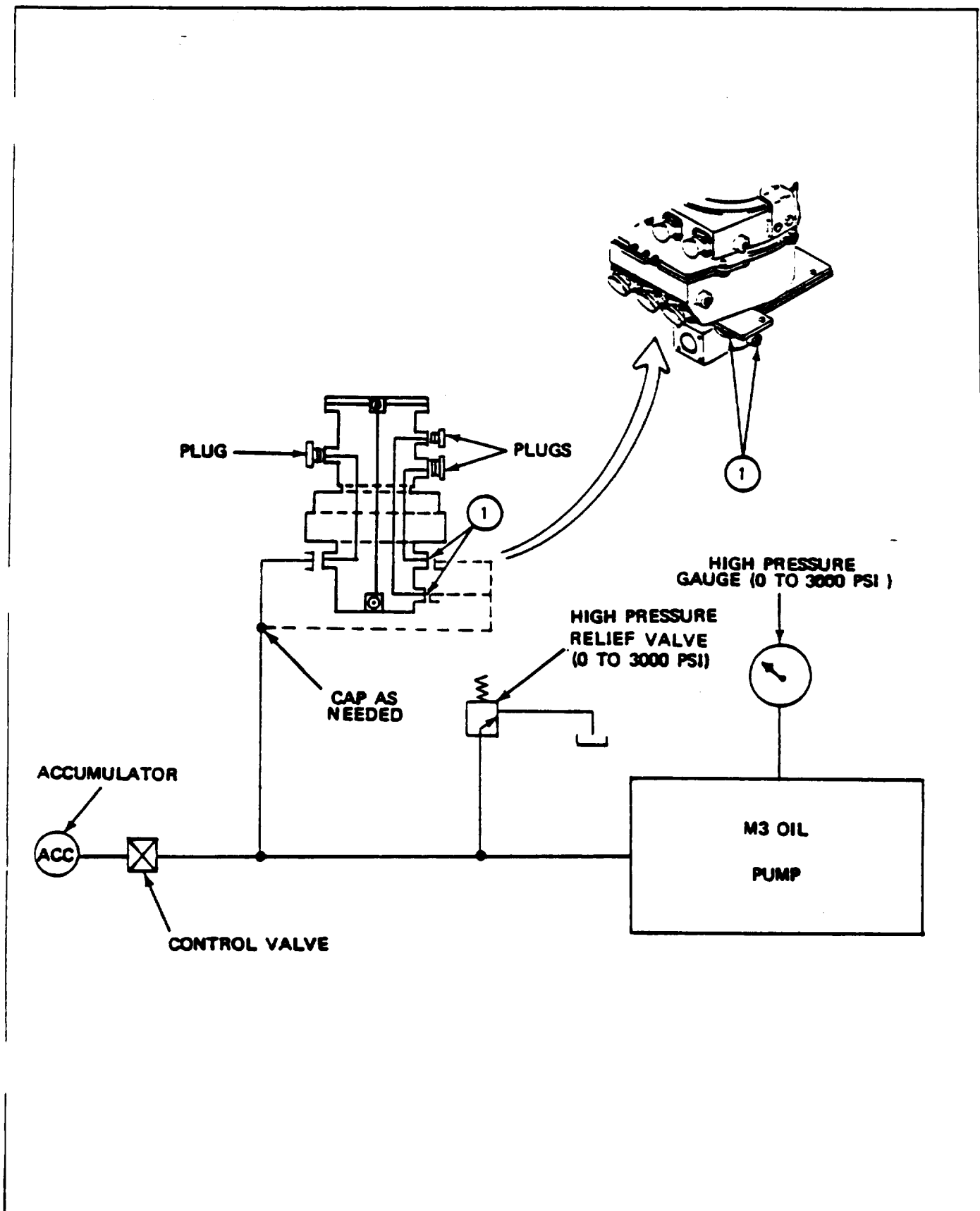
FRAME 4		
Step	Procedure	Normal Indication
1.	Open control valve (1).	. . .
2.	Operate M3 oil pump (2) until pressure gauge (3) reads between 45 and 55 psi (JPG).	. . .
3.	Using hands and watch or timer, turn top of slipring (4) at a rate of about one turn per minute for ten full turns.	Pressure gauge (3) reads between 45 and 55 psi (JPG). Leaks between housing (5) and post (6) not more than slight wetting of surface.
4.	Stop turning slipring (4).	. . .
5.	Using watch or timer, keep slipring (4) under pressure for five minutes.	Pressure gauge (3) reads between 45 and 55 psi (JPG). No leaks between housing (5) and post (6).
6.	Close control valve (1). GO TO FRAME 5	



3-2. TURRET ELECTRICAL SLIPRING TEST PROCEDURE (CONT)

c. Hydraulic Test (Cont)

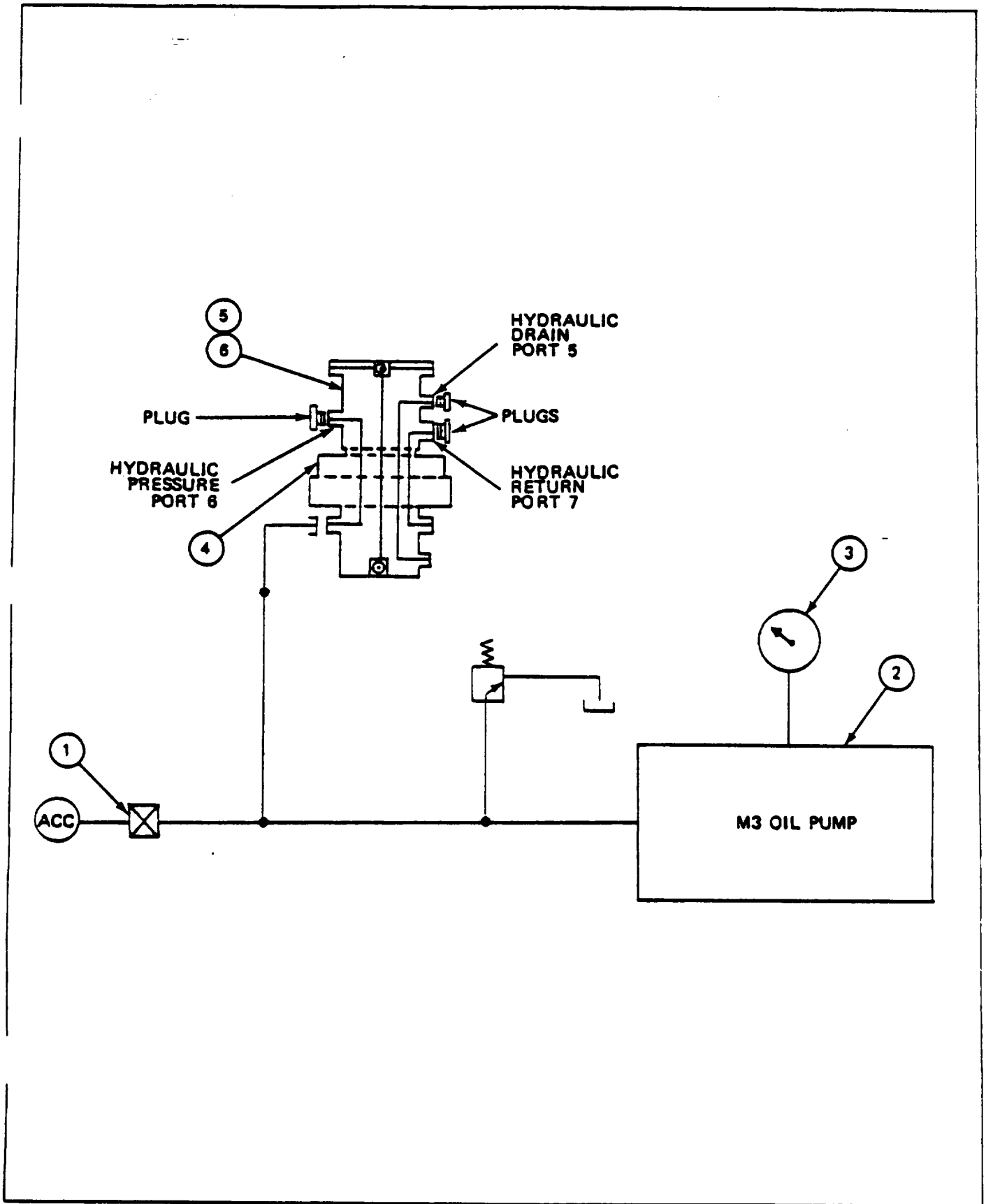
FRAME 5	
Step	Procedure
	<div style="border: 1px solid black; padding: 5px; text-align: center; margin: 0 auto;"> <p>WARNING</p> </div> <p style="text-align: center;">Be sure hydraulic pressure is 0 psi before disconnecting hydraulic lines or parts. Oil under pressure can hurt you.</p> <ol style="list-style-type: none"> 1. Operate M3 oil pump to lower pressure to 0 psi (JPG). 2. Using suitable tools, remove low pressure relief valve (0 to 55 psi) and install high pressure relief valve (0 to 3000 psi) (JPG). 3. Using suitable tools, remove low pressure gauge (0 to 100 psi) and install high pressure gauge (0 to 3000 psi) (JPG). 4. Using suitable tools and supplies, disconnect test equipment from two parts (1) and cap hydraulic lines as needed (JPG). 5. Set high pressure relief valve for 2200 psi (JPG). 6. Precharge accumulator to between 800 and 1200 psi (JPG). <p>GO TO FRAME 6</p>



3-2. TURRET ELECTRICAL SLIPRING TEST PROCEDURE (CONT)

c. Hydraulic Test (Cont)

FRAME 6		
Step	Procedure	Normal Indication
1.	Open control valve (1).	.
2.	Operate M3 oil pump (2) until pressure gauge (3) reads between 1900 and 2100 psi (JPG).	...
3.	Using hands and watch or timer, turn top of slipring (4) at a rate of about one turn per minute for ten full turns.	Pressure gauge (3) reads between 1900 and 2100 psi (JPG). Leaks from Port 5 or Port 7 not more than three drops per minute. Leaks between housing (5) and post (6) not more than slight wetting of surface.
4.	Stop turning top of slipring (4).	...
5.	Using watch or timer, keep slipring (4) under pressure for five minutes.	Pressure gauge (3) reads between 1900 and 2100 psi (JPG). No leaks from Port 5 or Port 7. No leaks between housing (5) and post (6).
<div style="border: 1px solid black; width: fit-content; margin: 0 auto; padding: 5px;">WARNING</div> <p style="text-align: center; margin-top: 10px;">Be sure hydraulic pressure is 0 psi before disconnecting hydraulic lines or parts. Oil under pressure can hurt you.</p>		
6.	Operate M3 oil pump (2) to lower pressure to 0 psi (JPG).	
<p style="text-align: center; margin-top: 10px;">NOTE</p> <p style="text-align: center;">If normal indication is obtained in electrical test, air pressure test, and hydraulic test, turret electrical slipring is good. If slipring is good, disassembly is not required.</p> <p style="text-align: center; margin-top: 10px;">END OF TASK</p>		



3-3. TURRET ELECTRICAL SLIPRING DISASSEMBLY PROCEDURE

PERSONNEL: One

REFERENCES: TM 9-2350-222-20-2-3 for procedure to remove turret electrical slipring

EQUIPMENT CONDITION: Turret electrical slipring removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Test turret electrical slipring (para 3-2)

FRAME 1	
Step	Procedure
1.	Remove hydraulic attachments (para 3-6).
2.	Disassemble upper housing (para 3-9).
3.	Disassemble lower housing (para 3-12).
	<p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required:</p> <p style="text-align: center;">Inspect hydraulic attachments (para 3-5). Inspect upper housing (para 3-8). Inspect lower housing (para 3-11).</p> <p>END OF TASK</p>

3-4. TURRET ELECTRICAL SLIPRING ASSEMBLY P R O D U C E

PERSONNEL: One

PRELIMINARY PROCEDURES: Inspect hydraulic attachments (para 3-5)
 Inspect upper housing (para 3-8)
 Inspect lower housing (pars 3-11)

FRAME 1	
Step	Procedure
1.	Assemble lower housing (para 3-13).
2.	Assemble upper housing (para 3-10).
3.	Install hydraulic attachments (para 3-7).
	NOTE
	Follow-on Maintenance Action Required: Test turret electrical slipring (para 3-2).
	END OF TASK

3-5. HYDRAULIC ATTACHMENTS INSPECTION PROCEDURE

PERSONNEL: One

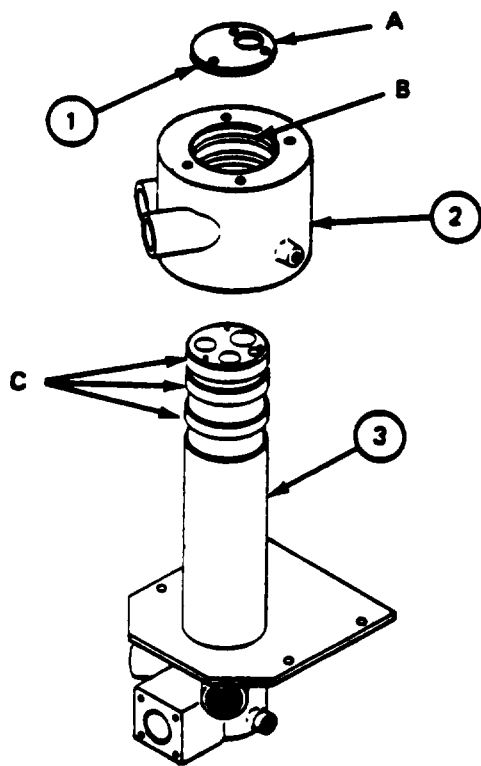
PRELIMINARY PROCEDURES: Remove hydraulic attachment (para 3-6)

GENERAL INSTRUCTIONS:

NOTE

If part is bad, repair part or order next higher assembly as required.

FRAME 1			
Step	Procedure		
	SUPPORT SHOP WORK		
1.	If necessary, take gasket (1), housing (2), and post (3) to shop where inspection equipment is available.		
2.	Make the following dimensional checks.		
	Reference Letter	Point of Measurement	Measurement
	A	Thickness of gasket	0.182 to 0.187
	B	ID of housing	2.875 to 2.877
	C	OD of post (for minimum distance of 4.5" from end)	2.871 to 2.873
	NOTE		
	Tag all parts that are out of tolerance.		
3.	After support shop work, return parts to turret shop.		
	END OF TASK		



3-6. HYDRAULIC ATTACHMENTS REMOVAL PROCEDURE

TOOLS: 3/16" socket head screw key (Allen wrench)
 3/8" flat tip screwdriver
 1/2" socket (3/8" drive)
 3/8" drive ratchet
 O-ring extractor kit
 1/4" socket head screw key (Allen wrench)
 Scriber, machinists
 Scraper
 Stiff bristled brush
 Fine stone

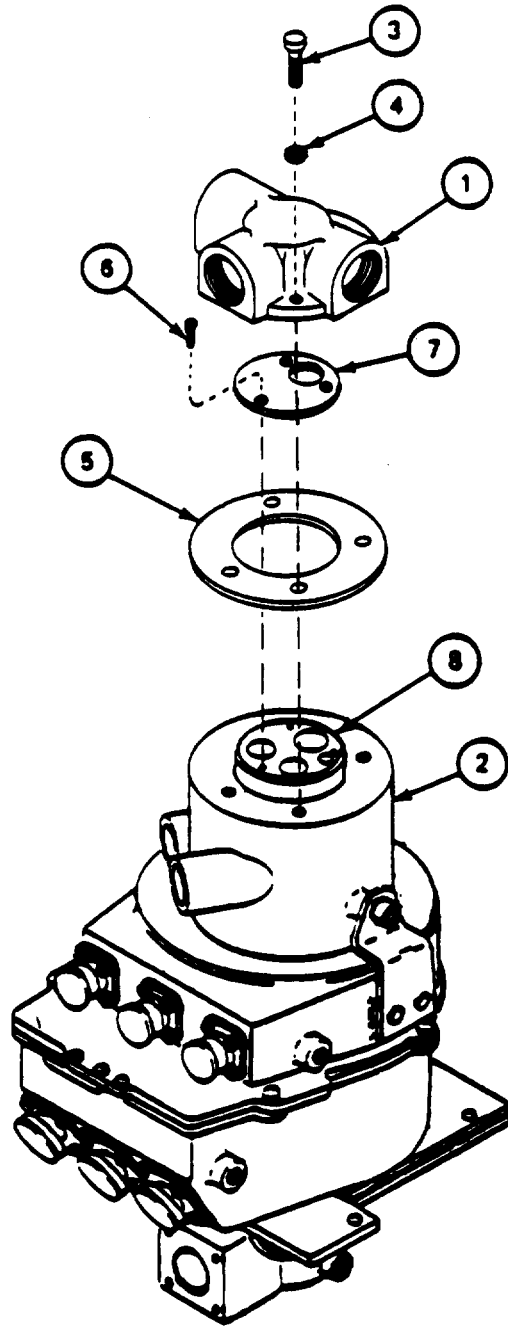
SUPPLIES: Dry cleaning solvent (item 33, App. A)
 Crocus cloth (item 7, App. A)

PERSONNEL: One

REFERENCES: JPG for procedures to:
 Inspect and repair parts
 Clean parts
 Use O-ring extractor kit
 Use machinists scriber

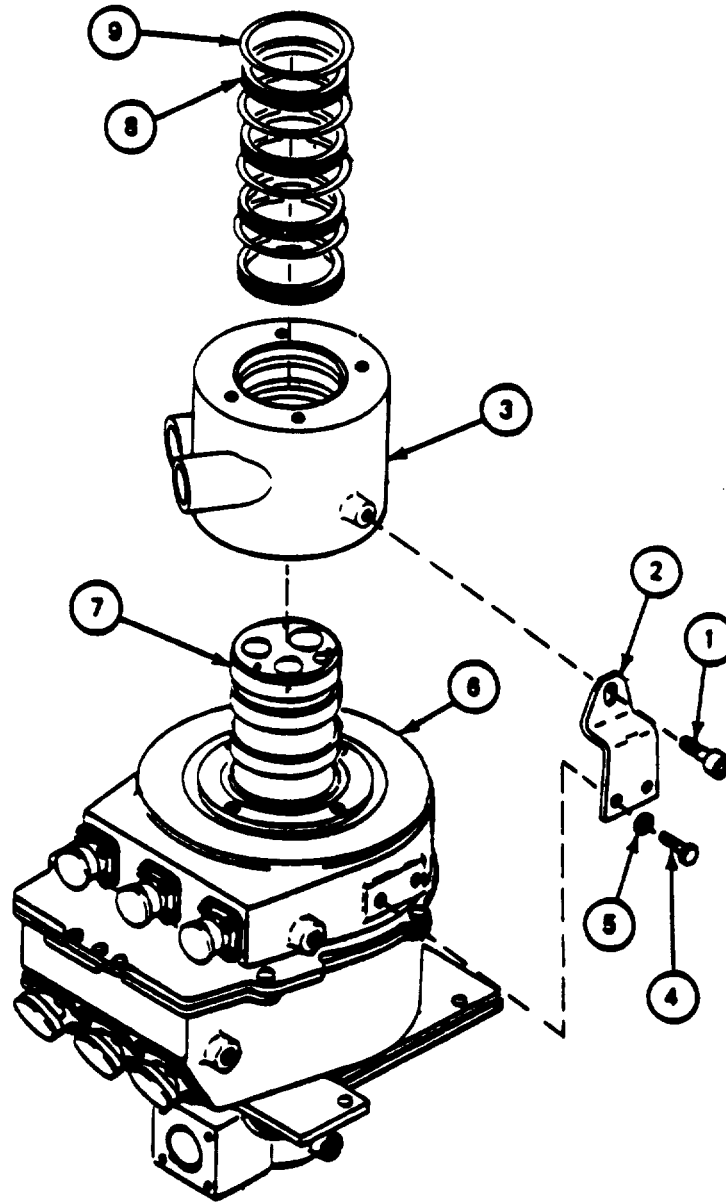
PRELIMINARY PROCEDURES: Test slipring (para 3-2)

FRAME 1	
Step	Procedure
	NOTE
	Parts should be marked during removal so that cap (1) can be properly installed.
1.	Using scriber, make matching marks on cap (1) and housing (2) (JPG).
2.	Using 3/16" Allen wrench, remove four screws (3), four lockwashers (4), cap (1), and washer (5) from housing (2).
3.	Using screwdriver, remove three screws (6) and gasket (7) from post (8).
	GO TO FRAME 2



3-6. HYDRAULIC ATTACHMENTS REMOVAL PROCEDURE (CONT)

FRAME 2	
Step	Procedure
1.	Using 1/4" Allen wrench, remove screw (1) from bracket (2) and housing (3).
2.	Using socket wrench, remove two screws (4), two lockwashers (5), and bracket (2) from slipring (6).
3.	Slide housing (3) off post (7).
<p>NOTE</p> <p>Do not do step 4 unless seal rings (8) or packings (9) are bad and need to be replaced.</p>	
4.	Using O-ring extractor kit, remove four seal rings (8) and four packings (9) from housing (3). Throw away packings and seal rings.
GO TO FRAME 3	



3-6. HYDRAULIC ATTACHMENTS REMOVAL PROCEDURE (CONT)

FRAME 3	
Step	Procedure
<ol style="list-style-type: none"> 1. 2. 	<p>Using socket wrench, remove two screws (1) and two lockwashers (2) from post (3) and slipring (4).</p> <p>Slide post (3) out of slipring (4).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required:</p> <p style="text-align: center;">Clean all parts (JPG). Inspect and repair all parts (JPG). Do detail inspection of parts (para 3-5).</p> <p>END OF TASK</p>

3-7. HYDRAULIC ATTACHMENTS INSTALLATION PROCEDURE

TOOLS: 1/2" socket (3/8" drive)
3/8" drive ratchet
3/8" flat tip screwdriver
3/16 socket head screw key (Allen wrench)
O-ring extractor kit
1/4" socket head screw key (Allen wrench)

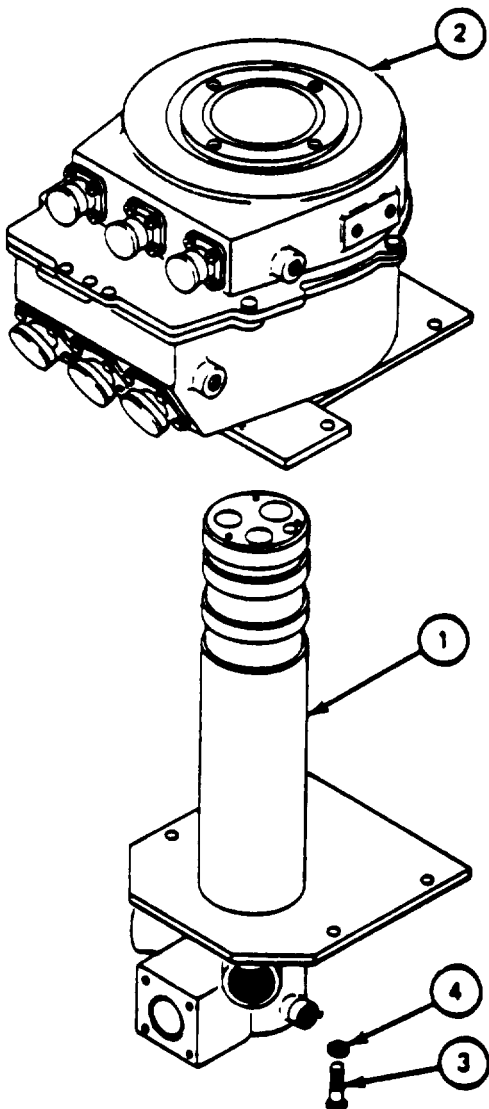
SUPPLIES: Parts kit (5704200) including
Seal ring (four) (10946947)
Preformed packing (four) (MS 28775-234)
Hydraulic fluid (item 10, App. A)

PERSONNEL: One

REFERENCES: .JPG for procedures to:
Install preformed packing
Use O-ring extractor kit

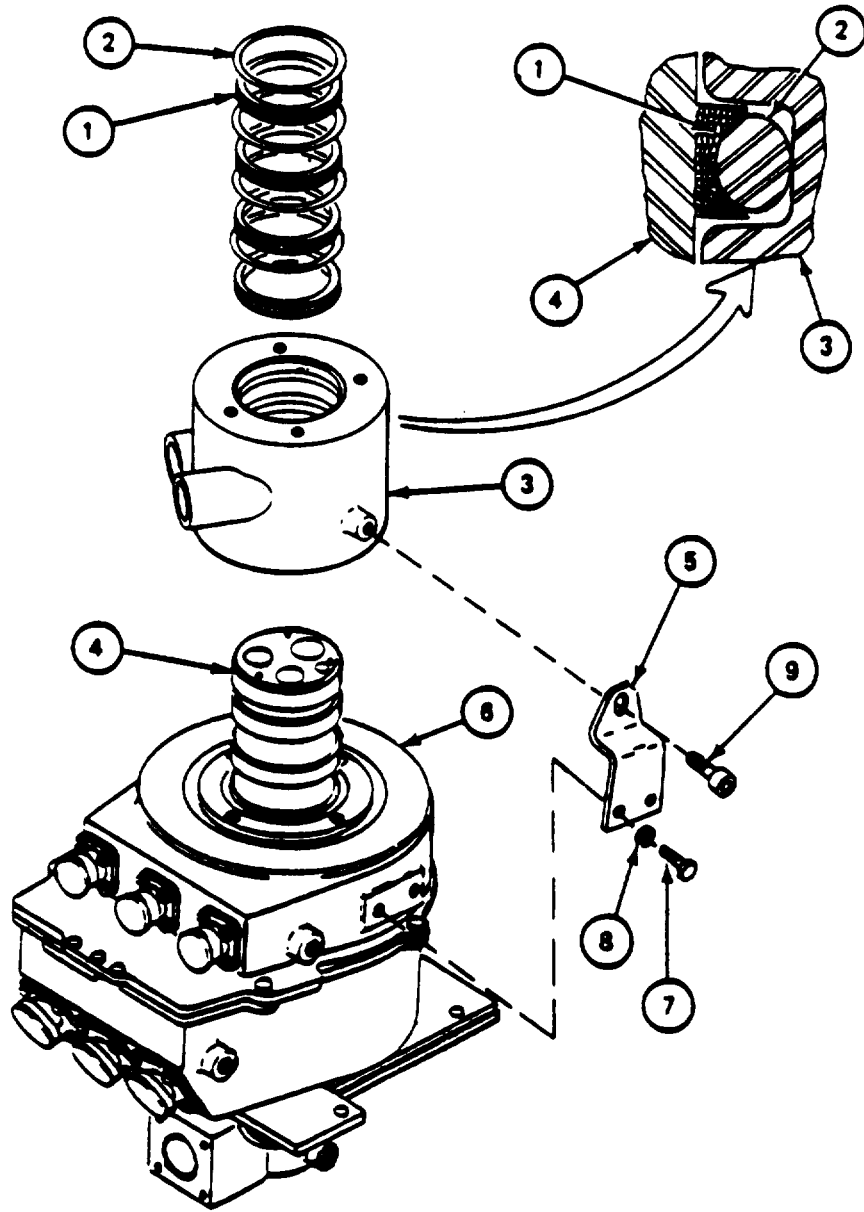
PRELIMINARY PROCEDURES: Assemble lower housing (para 3-13)
Inspect hydraulic attachments (para 3-5)

3-7. HYDRAULIC ATTACHMENTS INSTALLATION PROCEDURE (CONT)

FRAME 1	
Step	Procedure
<ol style="list-style-type: none"> 1. Slide post (1) up through center of slipring (2). 2. Using socket wrench, attach post (1) to slipring (2) with two screws (3) and two lockwashers (4). <p>GO TO FRAME 2</p>	
 <p>The diagram illustrates the installation of a hydraulic attachment. It consists of two main parts: a slipring (2) and a post (1). The slipring (2) is a cylindrical component with a central hole and a flange. The post (1) is a vertical cylindrical component with a threaded top section. The post (1) is shown being inserted into the center of the slipring (2). The assembly is shown being secured with two screws (3) and two lockwashers (4).</p>	

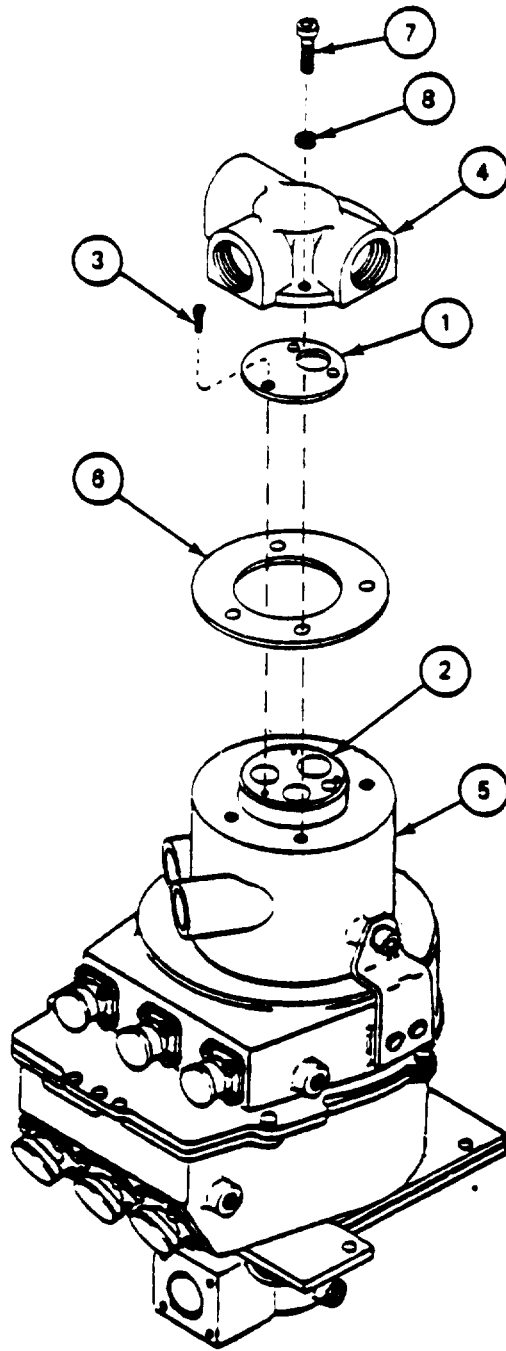
3-7. HYDRAULIC ATTACHMENTS INSTALLATION PROCEDURE (CONT)

FRAME 2	
Step	Procedure
1.	Lightly coat four new seal rings (1) and four new packings (2) with hydraulic oil. NOTE Packings (2) go over outside of seal ring (1).
2.	Using O-ring extractor kit, install four packings (2) in housing (3) (JPG).
3.	Using O-ring extractor kit, install four seal rings (1) over four packings (2) in housing (3) (JPG).
4.	Slide housing (3) on post (4).
5.	Using socket wrench, attach bracket (5) to slipring (6) with two screws (7) and two lockwasher (8).
6.	Using Allen wrench, attach bracket (5) to housing (3) with screw (9). GO TO FRAME 3



3-7. HYDRAULIC ATTACHMENTS INSTALLATION PROCEDURE (CONT)

FRAME 3	
Step	Procedure
1.	<p>Using screwdriver, attach gasket (1) to post (2) with three screws (3).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Cap (4) and housing (5) were scribe marked during removal.</p>
2.	<p>Line up marks on cap (4) and housing (5). Position cap (4) and washer (6) on housing (5).</p>
3.	<p>Using 3/16" Allen wrench, attach cap (4) and washer (6) to housing (5) with four screws (7) and four lockwashers (8).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required:</p> <p style="text-align: center;">Test slipping (para 3-2).</p> <p>END OF TASK</p>



3-8. UPPER HOUSING INSPECTION PROCEDURE

PERSONNEL: One

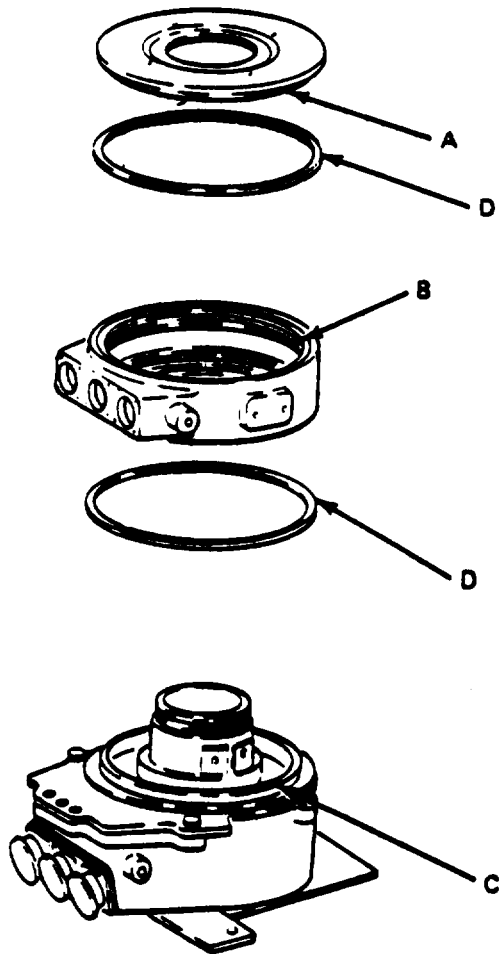
PRELIMINARY PROCEDURES: Disassemble upper housing (para 3-9)

GENERAL INSTRUCTIONS:

NOTE

If part is bad, order repair part or next higher assembly as required.

FRAME 1			
Step	Procedure		
	SUPPORT SHOP WORK		
1.	If necessary take slipping parts to shop where inspection equipment is available.		
2.	Make the following dimensional checks.		
	Reference Letter	Point of Measurement	Measurement
	A	OD of cover	7.248 to 7.252
	B	ID of housing	7.295 to 7.305
	C	OD of lower cover	7.248 to 7.250
	D	Thickness of washer	0.061 to 0.062
	NOTE		
	Tag all parts that are out of tolerance.		
3.	After support shop work, return parts to turret shop.		
	END OF TASK		



3-9. UPPER HOUSING DISASSEMBLY PROCEDURE

TOOLS: O-ring extractor kit
 Spanner wrench (5120-907-9000)
 9/16" socket (3/8" drive)
 3/8" drive ratchet
 12" socket extension (3/8" drive)
 No. 1 cross tip screwdriver (Phillips)
 1/8" flat tip screwdriver
 7/16" open end wrench
 9/16" box end wrench
 1/4" flat tip screwdriver
 Long round nose pliers
 Scraper
 Stiff bristled brush
 Fine stone

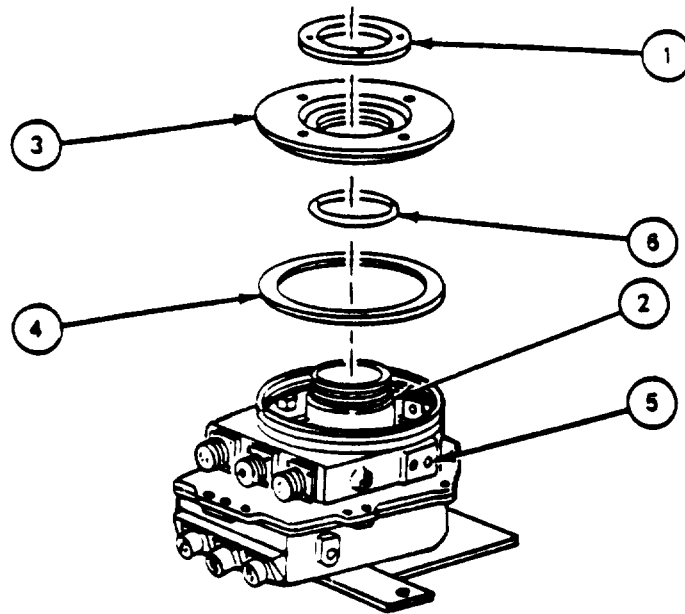
SUPPLIES: Masking tape (item 36, App. A)
 Marking pen
 Dry cleaning solvent (item 33, App. A)
 Crocus cloth (item 7, App. A)

PERSONNEL: One

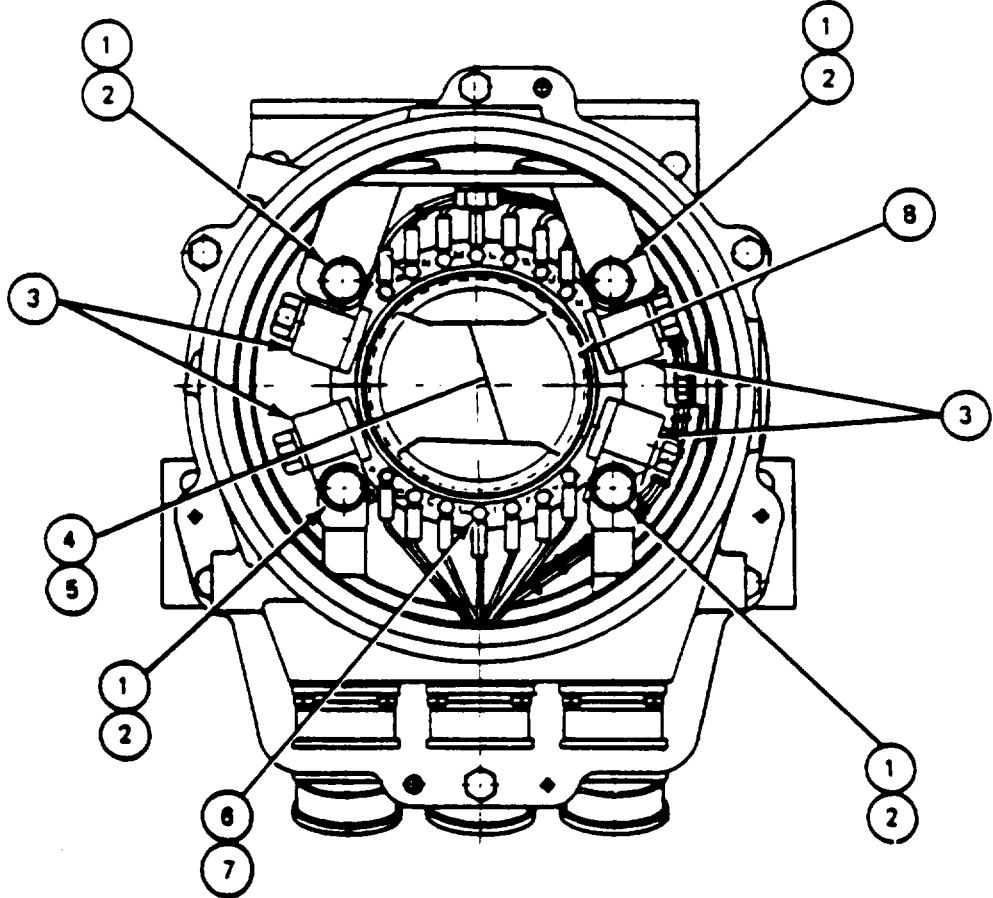
REFERENCES: JPG for procedures to:
 Clean parts
 Inspect and repair parts
 Use spanner wrench
 Tag parts
 Use O-ring extractor tool

PRELIMINARY PROCEDURES: Test turret electrical slipping (para 3-2)
 Remove hydraulic attachments (para 3-6)

FRAME 1	
Step	Procedure
1.	Using spanner wrench, remove round nut (1) from lower housing (2) (JPG).
2.	Using spanner wrench, remove cover (3) from lower housing (2) (JPG).
3.	Remove washer (4) from upper housing (5).
4.	Using extractor kit, remove packing (6) from lower housing (2) (JPG).
GO TO FRAME 2	



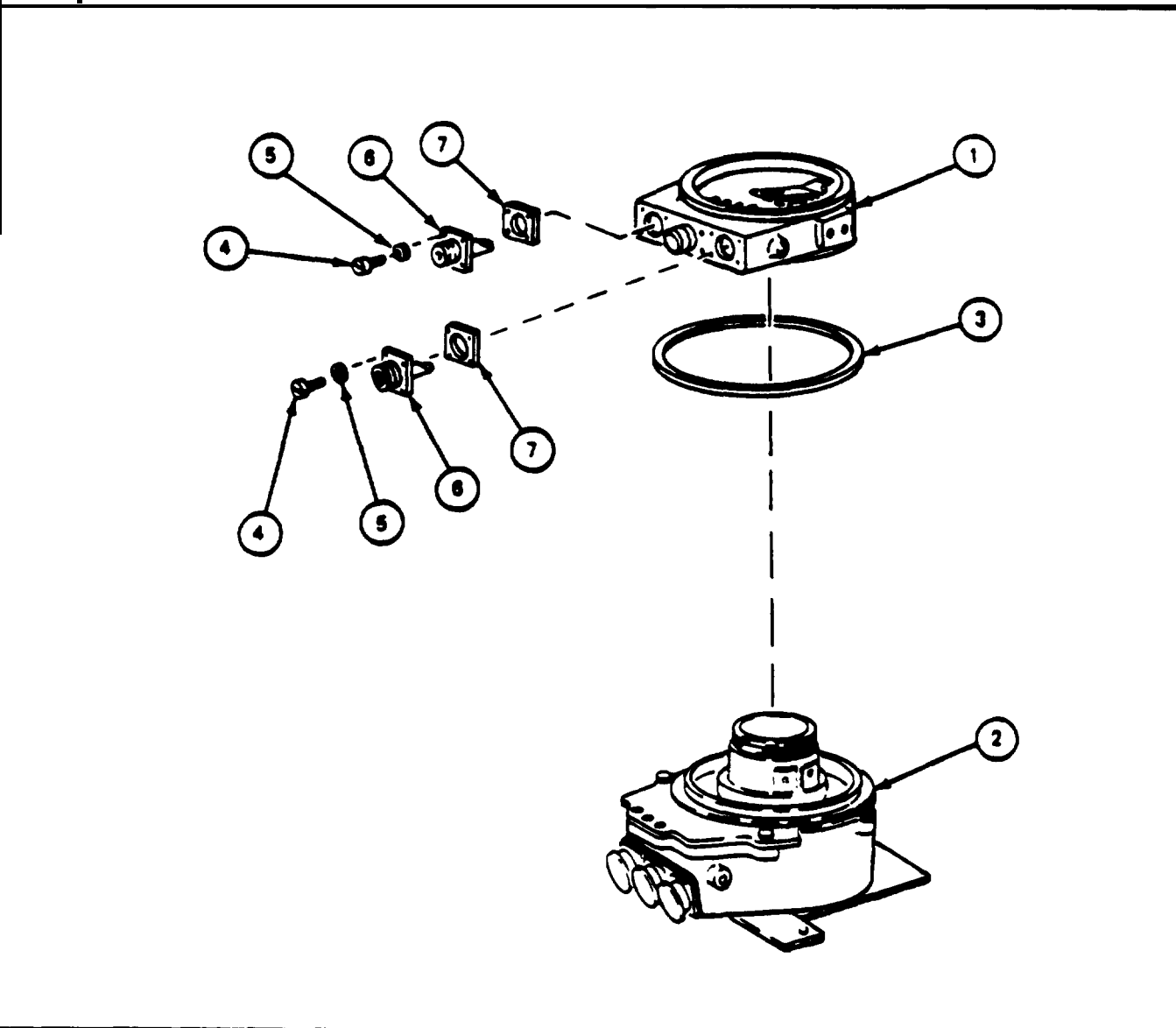
3-9. UPPER HOUSING DISASSEMBLY PROCEDURE (CONT)

FRAME 2	
Step	Procedure
<ol style="list-style-type: none"> 1. Using 9/16" socket wrench with extension, remove four screws (1) and four lockwashers (2) from bus bars (3). 2. Using masking tape and pen, tag 14 wires (4) and 14 terminals (5) (JPG). 3. Using screwdriver and pliers, remove 14 screws (6), 14 lockwashers (7), and 14 wires (4) from ring assembly (8). <p>GO TO FRAME 3</p>	
	

3-9. UPPER HOUSING DISASSEMBLY PROCEDURE (CONT)

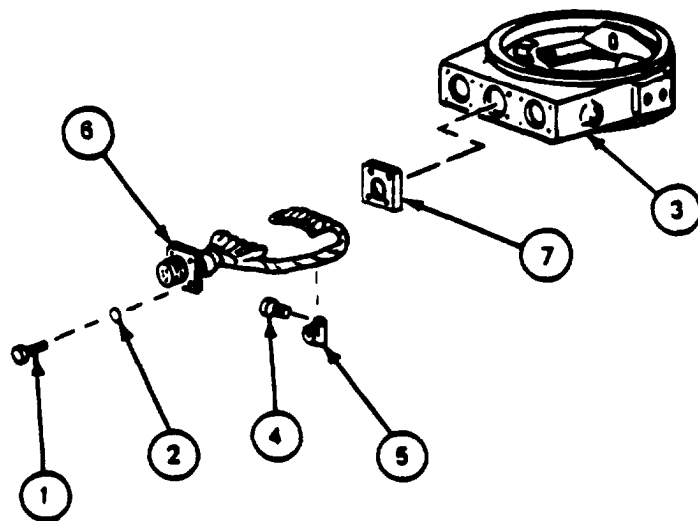
FRAME 3

Step	Procedure
1.	Lift upper housing (1) off lower housing (2).
2.	Remove washer (3) from upper housing (1).
3.	Using 1/4" flat tip screwdriver, remove eight screws (4) and eight lockwashers (5) from upper housing (1).
4.	Remove two connectors (6) and two gaskets (7) from upper housing (1). GO TO FRAME 4



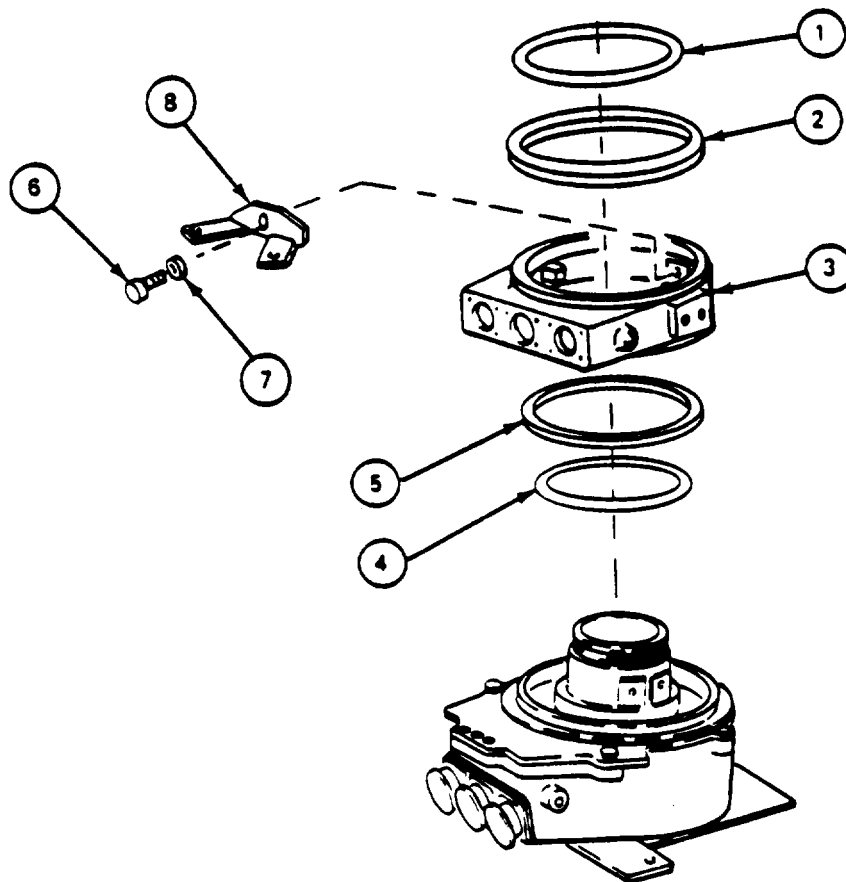
3-9. UPPER HOUSING DISASSEMBLY PROCEDURE (CONT)

FRAME 4	
Step	Procedure
1.	Using 1/4" flat tip screwdriver, remove four screws (1) and four lockwashers (2) from upper housing (3).
2.	Using 7/16" wrench, remove lockwasher screw (4) and clamp (5) from upper housing (3).
3.	Remove connector wiring harness (6) and gasket (7) from upper housing (3).
	GO TO FRAME 5



3-9. UPPER HOUSING DISASSEMBLY PROCEDURE (CONT)

FRAME 5	
Step	Procedure
	<p>NOTE</p> <p>Remove rings and packings only if they are bad and need to be replaced.</p>
1.	Using O-ring extractor tool, remove ring (1) and packing (2) from upper end of upper housing (3) (JPG).
2.	Using O-ring extractor tool, remove ring (4) and packing (5) from lower end of upper housing (3).
3.	Using 9/16" box end wrench, remove screw (6), lockwasher (7) and bus bar (8) from upper housing (3).
	<p>NOTE</p> <p>Follow-on Maintenance Action Required:</p> <p>Clean all parts (JPG). Inspect all parts (JPG). Do detail inspection of parts (para 3-8).</p>
	END OF TASK



3-10. UPPER HOUSING ASSEMBLY PROCEDURE

TOOLS: Long round nose pliers
1/4" flat tip screwdriver
7/16" socket (3/8" drive)
9/16" socket (3/8" drive)
1/8" flat tip screwdriver (3/8" female square drive in handle)
No. 1 cross tip bit socket (3/8" drive)
Torque wrench (3/8" drive, 0 to 30 inch-pounds)
Torque wrench (3/8" drive, 0 to 250 inch-pounds)
Torque wrench (3/8" drive, 0 to 100 foot-pounds)
Spanner wrenches (two) (5 120-907-9000)
0.000" to 1.000" depth micrometer
5" extension (3/8" drive)
3/8" drive ratchet

SUPPLIES: Silicone compound (item 9, App. A)

PERSONNEL: Two

REFERENCES: JPG for procedures to:
Apply insulating compound
Use torque wrench
Use depth micrometer

PRELIMINARY PROCEDURES: Assemble lower housing (para 3-13)
Inspect upper housing (para 3-8)

3-10. UPPER HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 1	
Step	Procedure
<ol style="list-style-type: none"> 1. 2. 3. 4. 5. 	<p>Using 9/16" socket wrench, attach bus bar (1) to upper housing (2) with lockwasher (3) and screw (4).</p> <p>Using torque wrench, tighten screw (4) to between 108 and 132 inch-pounds (JPG).</p> <p>Put thin coat of insulating compound on packing (5) and packing (6) (JPG).</p> <p>Install packing (5) and seal ring (7) at bottom of upper housing (2).</p> <p>Install packing (6) and seal ring (8) at top of upper housing (2).</p> <p>GO TO FRAME 2</p>

3-10. UPPER HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 2	
Step	Procedure
1.	Put wire harness (1) of connector (2) through gasket (3) and hole (4) in upper housing (5).
2.	Using 1/4" screwdriver, attach connector (2) to upper housing (5) with four lockwashers (6) and four screws (7).
3.	Using torque wrench, tighten four screws (7) to between 16 and 18 inch-pounds (JPG).
4.	Using 7/16" socket, attach wire harness (1) to upper housing (5) with clamp (8) and screw (9).
5.	Using torque wrench, tighten screw (9) to between 36 and 60 inch-pounds (JPG).
GO TO FRAME 3	

3-10. UPPER HOUSING ASSEMBLY PROCEDURE (CONT)

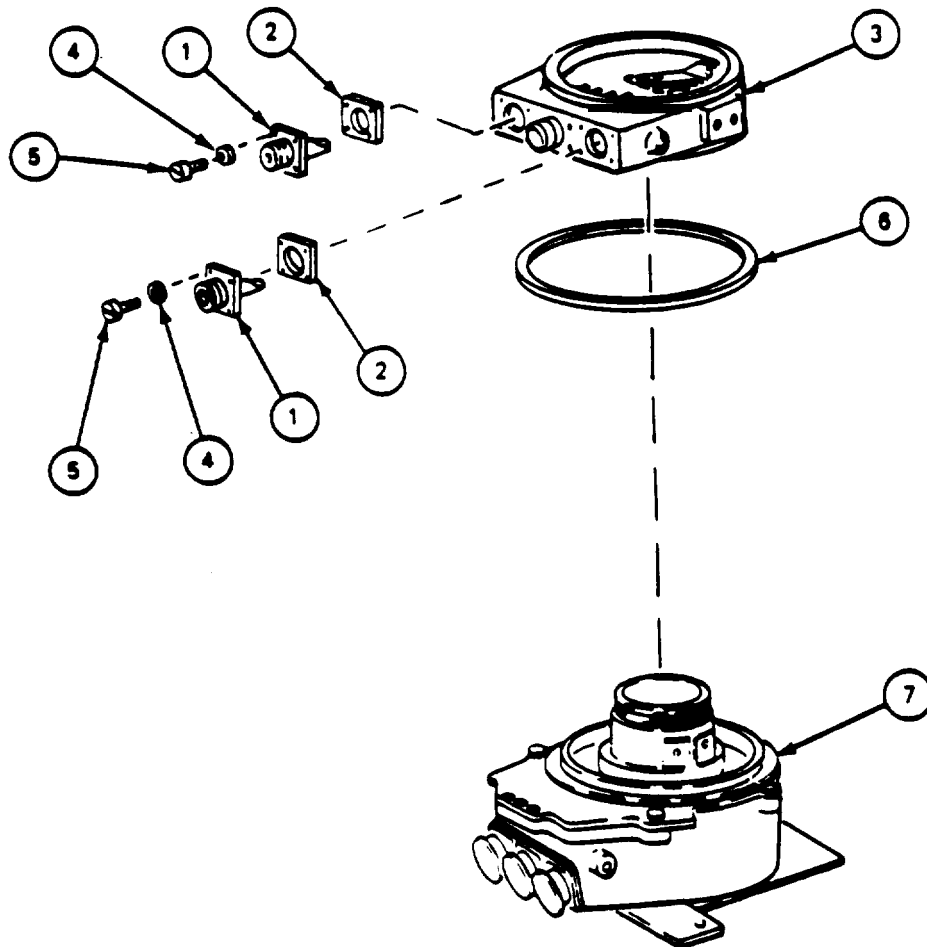
FRAME 3

Step

Procedure

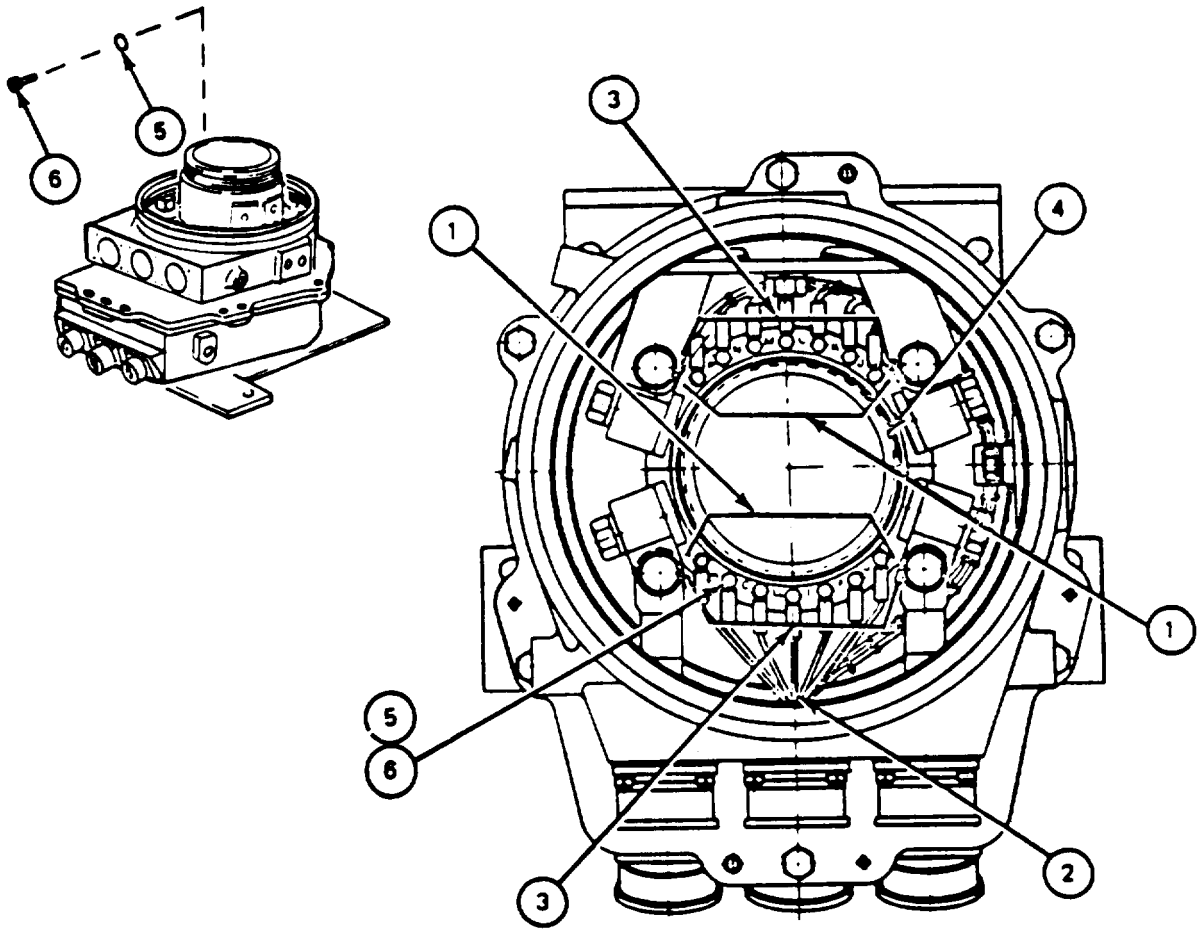
1. Using 1/4" screwdriver wrench, attach two connectors J1 and J3 (1) and two gaskets (2) to upper housing (3) with eight lockwashers (4) and eight screws (5).
2. Using torque wrench, tighten eight screws (5) to between 8 and 10 inch-pounds (JPG).
3. Put washer (6) on upper housing (3).
4. Put upper housing (3) on lower housing (7).

GO TO FRAME 4



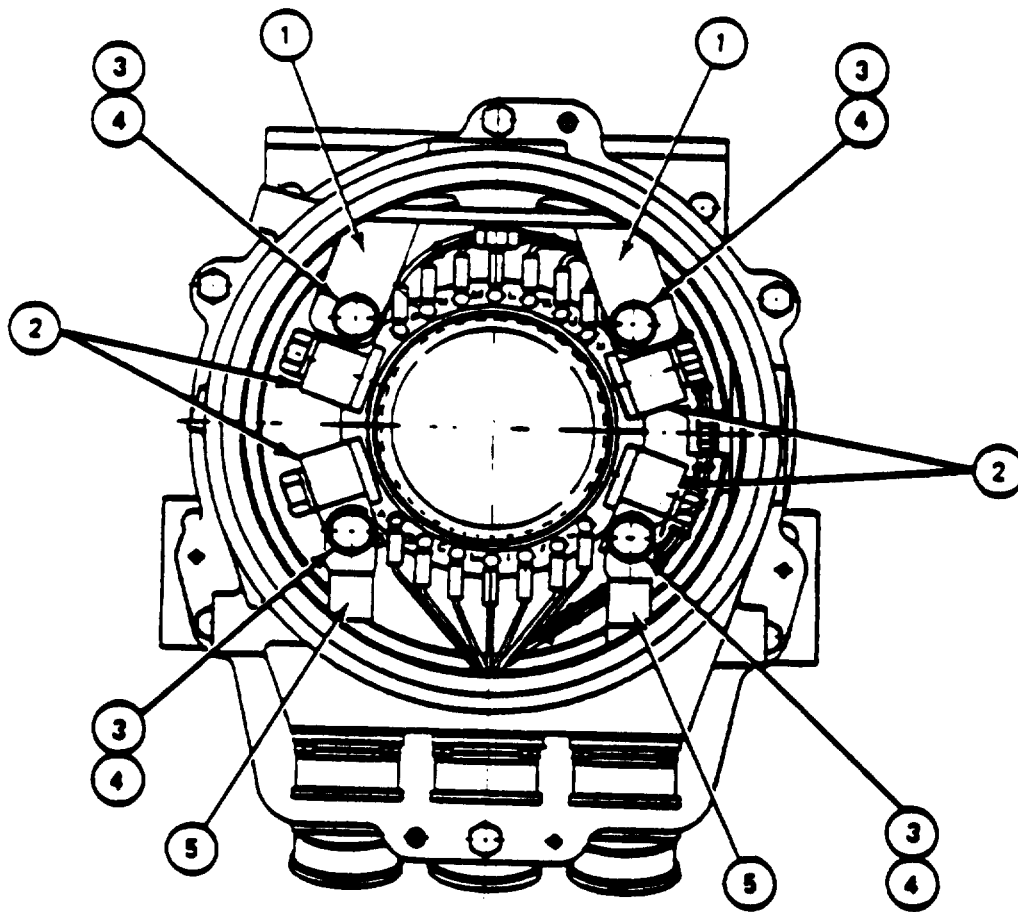
3-10. UPPER HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 4	
Step	Procedure
1.	<p style="text-align: center;">CAUTION</p> <p>Terminals (1) on wire harness (2) and connection points (3) on contact ring (4) are marked with letters (A, B, C, D, E, F, G, H, J, K, L, M, N, and P). Letters on terminals (1) must match letters on connection points (3) when terminals are connected.</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Long nose pliers may be helpful during step 1.</p> <p>Using 1/8" screwdriver, connect 14 terminals (1) of wiring harness (2) to 14 connection points (3) on contact ring (4), with 14 lockwashers (5) and 14 screws (6) (JPG).</p> <p>GO TO FRAME 5</p>



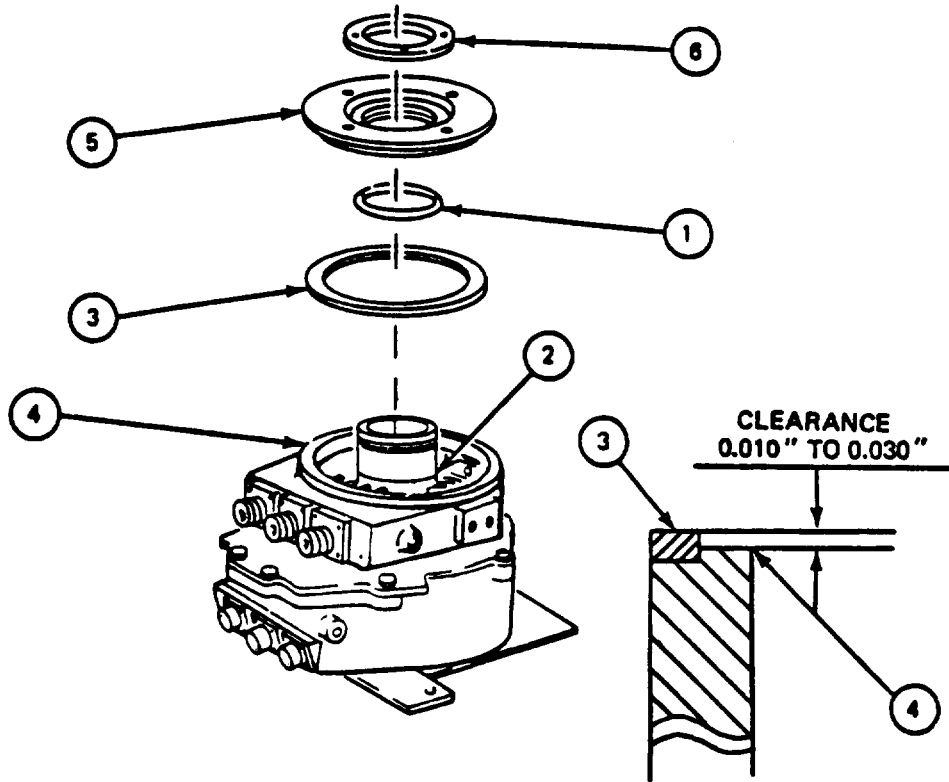
3-10. UPPER HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 5	
Step	Procedure
1.	Using 9/16" socket, attach bus bar (1) to two bus bars (2) with two lockwashers (3) and two screws (4).
2.	Using torque wrench, tighten two screws (4) to between 108 and 132 inch-pounds (JPG).
3.	Using 9/16" socket, attach two connector terminals (5) to two bus bars (2) with two lockwashers (3) and two screws (4).
4.	Using torque wrench, tighten two screws (4) to between 108 and 132 inch-pounds (JPG).
5.	Do turret electrical slipring test (para 3-2a).
	GO TO FRAME 6



3-10. UPPER HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 6	
Step	Procedure
1.	Soldier A: Put thin coat of insulating compound on packing (1) (JPG).
2.	Put packing (1) in lower housing (2).
3.	Put washer (3) in upper housing (4). Clearance between upper housing (4) and cover (5) must be between 0.010" and 0.030"". Clearance can be changed by changing thickness of washer (3).
4.	Hold down washer (3). Using micrometer, measure distance from top of housing (4) to top of washer (3).
5.	Change washer (3) as needed to get measurement between 0.010" and 0.030" in step 4.
6.	Using spanner wrench, install cover (5) on upper housing (4) (JPG).
7.	Using spanner wrench, hold cover (5) in place (JPG).
8.	Soldier B: Using spanner wrench, install nut (6) in cover (5) (JPG).
9.	Using torque wrench, tighten nut (6) to between 68 and 82 foot-pounds (JPG).
	GO TO FRAME 7



3-10. UPPER HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 7	
Step	Procedure
	<div style="text-align: center; border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto 10px auto;"> CAUTION </div> <p>If upper housing (1) does not turn easily on lower housing (2), slipping is not assembled right. Slipping should be disassembled (para 3-3), and assembled again (para 3-4) as needed to fix problem.</p> <p>1. Using hands, turn upper housing (1) at least five full turns in each direction. Make sure upper housing turns smoothly and easily without binding. Make sure lower housing (2) does not turn.</p> <div style="text-align: center; margin: 10px 0;"> <p>NOTE</p> <p>Follow-on Maintenance Action Required:</p> <p>Install hydraulic attachments (para 3-7).</p> </div> <p>END OF TASK</p>

3-11. LOWER HOUSING INSPECTION PROCEDURE

PERSONNEL: One

PRELIMINARY PROCEDURES: Disassemble lower housing (para 3-12)

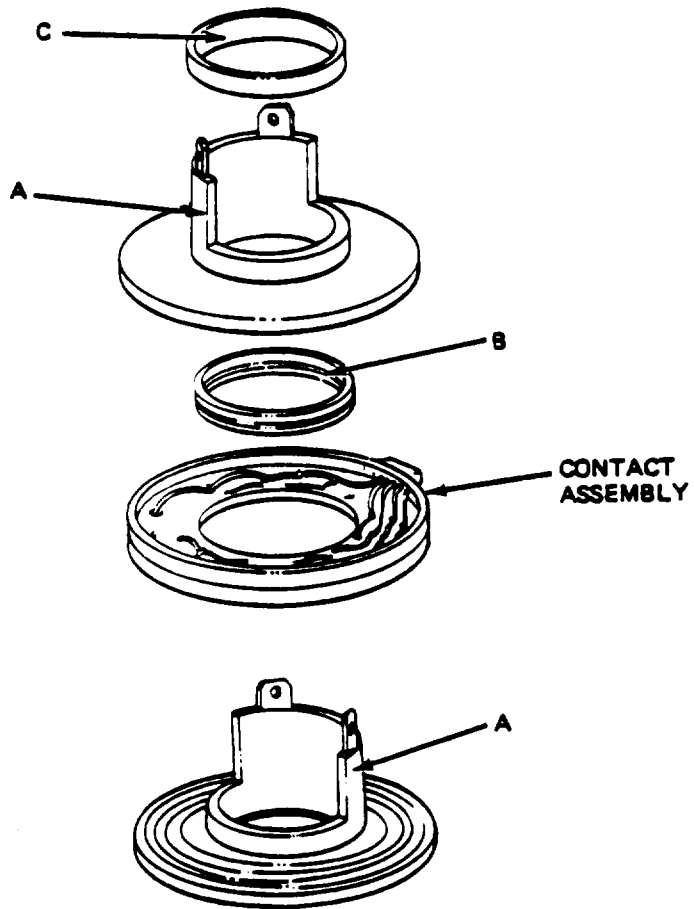
GENERAL INSTRUCTIONS:

NOTE

If part is bad, order repair part or next higher assembly as required.

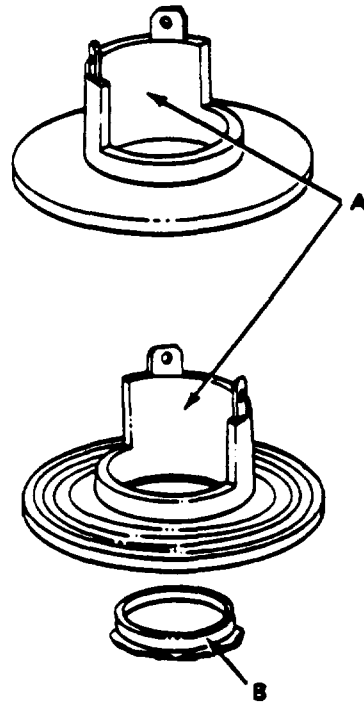
3-11 LOWER HOUSING INSPECTION PROCEDURE (CONT)

FRAME 1			
Step	Procedure		
	SUPPORT SHOP WORK		
1.	If necessary, take lower housing parts to shop where inspection equipment is available.		
2.	Make the following dimensional checks.		
	Reference Letter	Point of Measurement	Measurement
	A	OD of upper and lower rings (assembled)	4.373 to 4.375
	B	ID of spacer ring (slotted) assembled with contact assembly	4.373 to 4.379
	c	ID of spacer ring	4.374 to 4.379
	NOTE		
	Tag all parts that are out of tolerance.		
3.	After support shop work, return parts to turret shop.		
	GO TO FRAME 2		



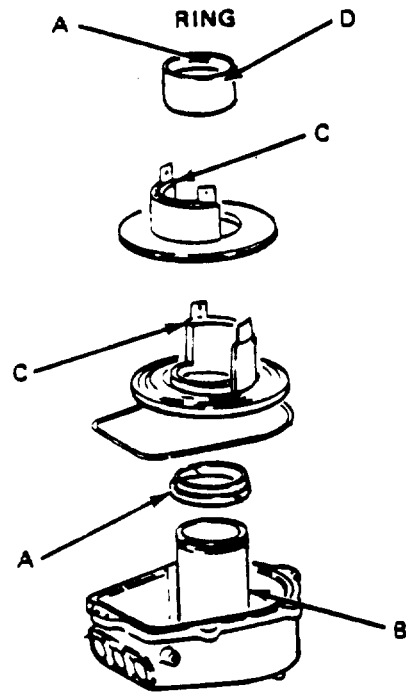
3-11. LOWER HOUSING INSPECTION PROCEDURE (CONT)

FRAME 2										
Step	Procedure									
	SUPPORT SHOP WORK									
1.	If necessary, take lower housing parts to shop where inspection equipment is available.									
2.	Make the following dimensional checks.									
	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 20%;">Reference Letter</th> <th style="text-align: left; width: 60%;">Point of Measurement</th> <th style="text-align: left; width: 20%;">Measurement</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">A</td> <td>ID of upper and lower rings (assembled)</td> <td>3.510 to 3.515</td> </tr> <tr> <td style="text-align: center;">B</td> <td>OD of spacer (minor diameter)</td> <td>3.507 to 3.509</td> </tr> </tbody> </table>	Reference Letter	Point of Measurement	Measurement	A	ID of upper and lower rings (assembled)	3.510 to 3.515	B	OD of spacer (minor diameter)	3.507 to 3.509
Reference Letter	Point of Measurement	Measurement								
A	ID of upper and lower rings (assembled)	3.510 to 3.515								
B	OD of spacer (minor diameter)	3.507 to 3.509								
	NOTE									
	Tag all parts that are out of tolerance.									
3.	After support shop work, return parts to turret shop.									
	GO TO FRAME 3									



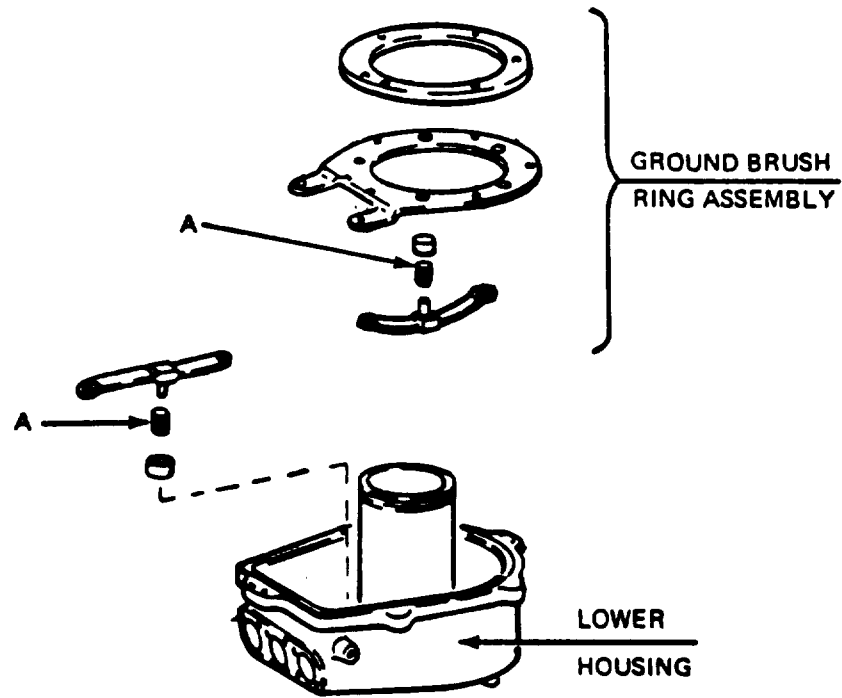
3-11. LOWER HOUSING INSPECTION PROCEDURE (CONT)

FRAME 3																
Step	Procedure															
	SUPPORT SHOP WORK															
1.	If necessary, take lower housing parts to shop where inspection equipment is available.															
2.	Make the following dimensional checks.															
	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Reference Letter</th> <th style="text-align: center;">Point of Measurement</th> <th style="text-align: center;">Measurement</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">A</td> <td>ID of spacer</td> <td style="text-align: center;">3.369 to 3.379</td> </tr> <tr> <td style="text-align: center;">B</td> <td>OD of post</td> <td style="text-align: center;">3.373 to 3.375</td> </tr> <tr> <td style="text-align: center;">C</td> <td>ID of contact rings (assembled, minor diameter)</td> <td style="text-align: center;">3.600 to 3.605</td> </tr> <tr> <td style="text-align: center;">D</td> <td>OD of spacer</td> <td style="text-align: center;">3.596 to 3.599</td> </tr> </tbody> </table>	Reference Letter	Point of Measurement	Measurement	A	ID of spacer	3.369 to 3.379	B	OD of post	3.373 to 3.375	C	ID of contact rings (assembled, minor diameter)	3.600 to 3.605	D	OD of spacer	3.596 to 3.599
Reference Letter	Point of Measurement	Measurement														
A	ID of spacer	3.369 to 3.379														
B	OD of post	3.373 to 3.375														
C	ID of contact rings (assembled, minor diameter)	3.600 to 3.605														
D	OD of spacer	3.596 to 3.599														
	NOTE															
	Tag all parts that are out of tolerance.															
3.	After support shop work, return parts to turret shop.															
	GO TO FRAME 4															



3-11. LOWER HOUSING INSPECTION PROCEDURE (CONT)

FRAME 4																
Step	Procedure															
	SUPPORT SHOP WORK															
1.	If necessary, take lower housing parts to shop where inspection equipment is available.															
2.	Make the following dimensional checks.															
	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Reference Letter</th> <th style="text-align: center;">Point of Measurement</th> <th style="text-align: center;">Measurement</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">A</td> <td>Brush spring</td> <td></td> </tr> <tr> <td></td> <td style="padding-left: 20px;">Approximate free length</td> <td style="text-align: center;">0.661"</td> </tr> <tr> <td></td> <td style="padding-left: 20px;">Load at compressed length of 0.375"</td> <td style="text-align: center;">5.06 to 6.18 lb</td> </tr> <tr> <td></td> <td style="padding-left: 20px;">Load at compressed length of 0.312"</td> <td style="text-align: center;">6.17 to 7.53 lb</td> </tr> </tbody> </table>	Reference Letter	Point of Measurement	Measurement	A	Brush spring			Approximate free length	0.661"		Load at compressed length of 0.375"	5.06 to 6.18 lb		Load at compressed length of 0.312"	6.17 to 7.53 lb
Reference Letter	Point of Measurement	Measurement														
A	Brush spring															
	Approximate free length	0.661"														
	Load at compressed length of 0.375"	5.06 to 6.18 lb														
	Load at compressed length of 0.312"	6.17 to 7.53 lb														
	NOTE															
	Tag all parts that are out of tolerance.															
3.	After support shop work, return parts to turret shop.															
	END OF TASK															



3-12. LOWER HOUSING DISASSEMBLY PROCEDURE

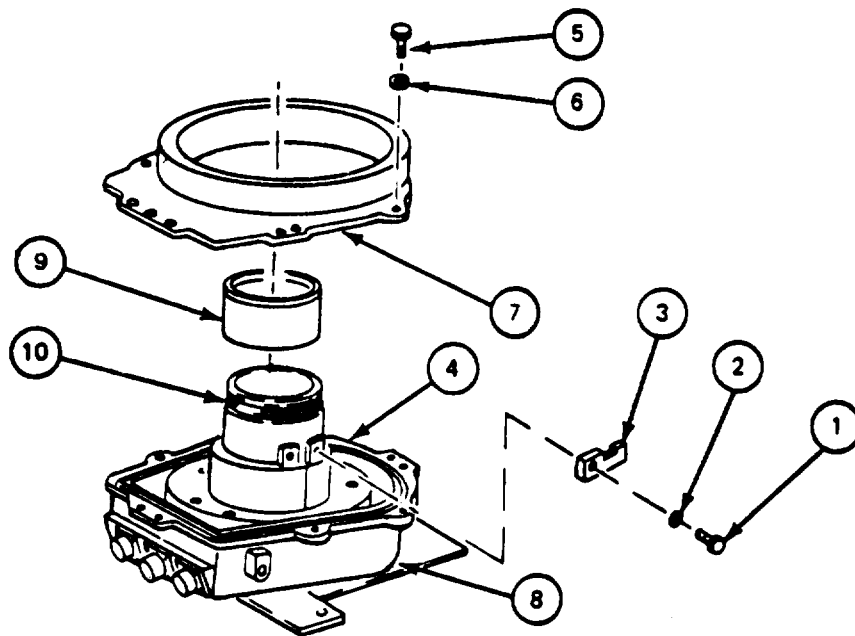
- TOOLS:** 9/16" box end wrench
 7/16 box end wrench
 9/16" socket (3/8" drive)
 12" extension (3/8" drive)
 3/8" drive ratchet
 No. 2 cross tip screwdriver (Phillips)
 1/4" flat tip screwdriver
 Long round nose pliers
 3/16" socket head screw key (Allen wrench)
 Scraper
 Stiff bristled brush
 Fine stone

PERSONNEL: One

REFERENCES: JPG for procedures to:
 Clean parts
 Inspect and repair pans

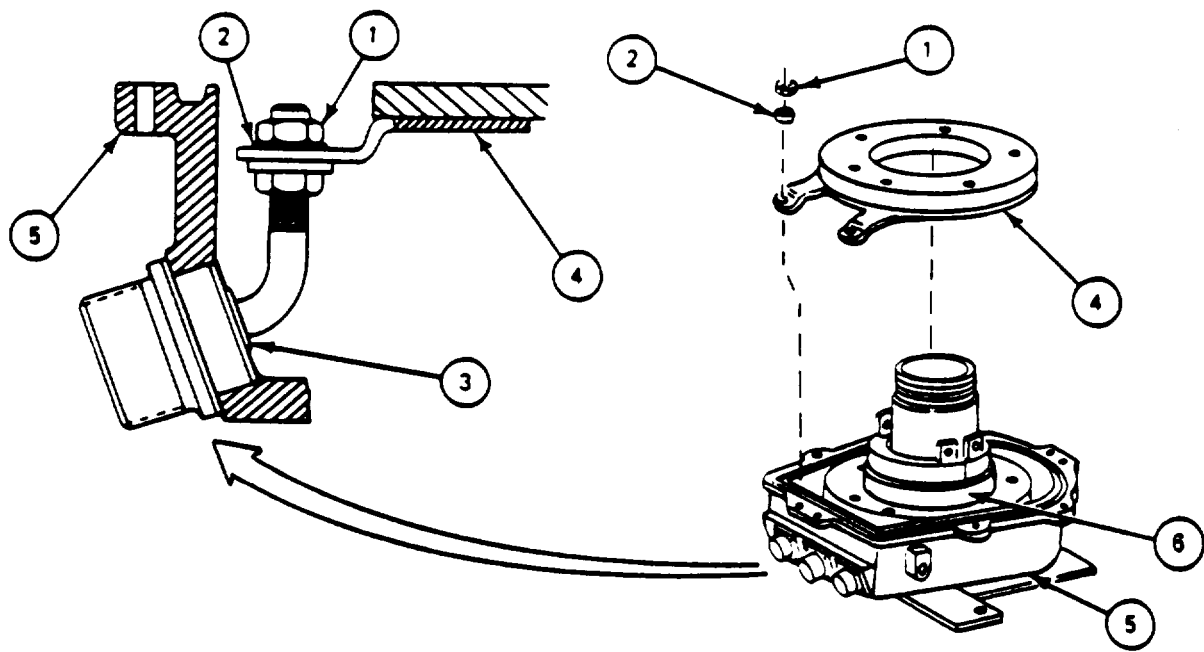
PRELIMINARY PROCEDURES: Test turret electrical slipping (para 3-2)
 Disassemble upper housing (para 3-9)

FRAME 1	
Step	Procedure
1.	Using 9/16" box end wrench, remove four screws (1), four lockwashers (2), and four bus bars (3) from upper and lower ring assemblies (4).
2.	Using 7/16" box end wrench, remove six screws (5), six lockwashers (6), and cover (7) from housing (8).
3.	Remove spacer (9) from housing center post (10).
GO TO FRAME 2	



3-12. LOWER HOUSING DISASSEMBLY PROCEDURE (CONT)

FRAME 2	
Step	Procedure
1.	Using 9/16" socket wrench with extension, remove two nuts (1) and two lockwashers (2) from two connectors (3) leads.
2.	Lift ground brush ring (4) out of housing (5).
3.	Remove spacer (6).
GO TO FRAME 3	



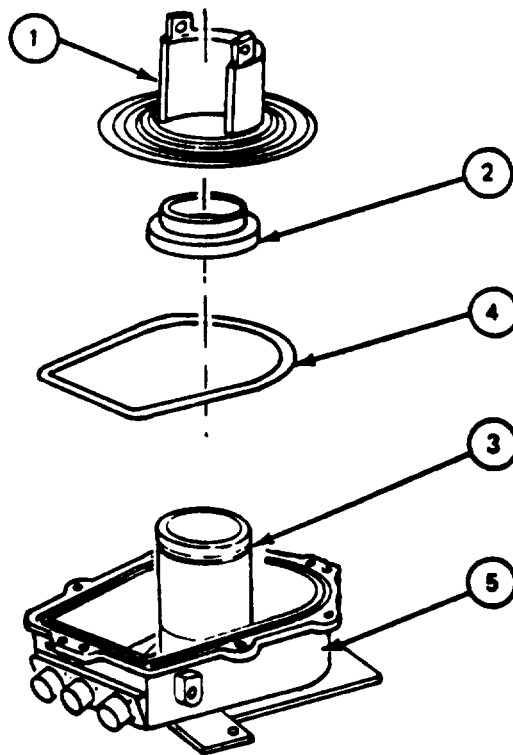
3-12. LOWER HOUSING DISASSEMBLY PROCEDURE (CONT)

FRAME 3	
Step	Procedure
<ol style="list-style-type: none"> 1. Remove upper ring (1) from housing (2), 2. Using flat tip screwdriver, push down two retaining rings (3) off two pins (4). 3. Unplug connector (5) from contact assembly (6). 4. Using flat tip screwdriver, push down two more retaining rings (3) off two pins (4). 5. Remove two pins (4) from bracket (7). 6. Remove contact assembly (6) and slotted ring (8) from housing (2). <p>GO TO FRAME 4</p>	

3-12. LOWER HOUSING DISASSEMBLY PROCEDURE (CONT)

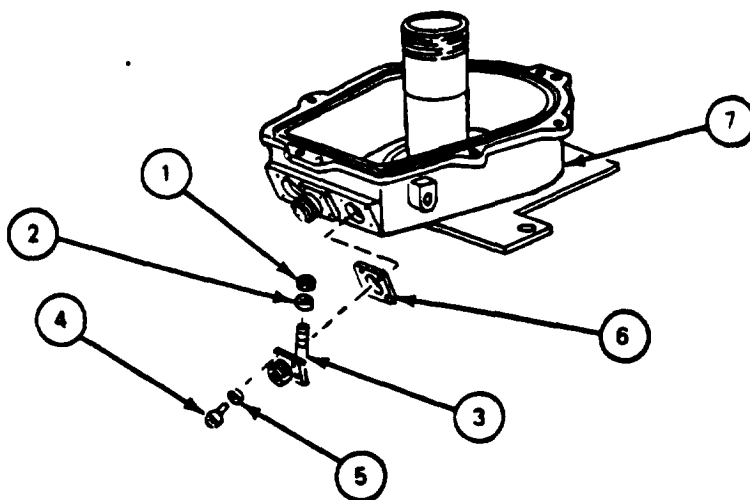
FRAME 4

Step	Procedure
	<p style="text-align: center;">NOTE</p> <p style="text-align: center;">It may be necessary to turn housing (3) upside down to remove spacer (2). If spacer (2) will not come out tap lightly on housing (3).</p> <ol style="list-style-type: none"> 1. Remove lower ring (1) and spacer (2) from housing center post (3). 2. Remove gasket (4) from housing (5). <p>GO TO FRAME 5</p>



3-12. LOWER HOUSING DISASSEMBLY PROCEDURE (CONT)

FRAME 5	
Step	Procedure
<ol style="list-style-type: none"> 1. Remove two flat washers (1) and two nuts (2) from two connector (3) leads. 2. Using flat tip screwdriver, remove eight screws (4), eight lockwashers (5), two connectors (3), and two gaskets (6) from housing (7). <p>GO TO FRAME 6</p>	

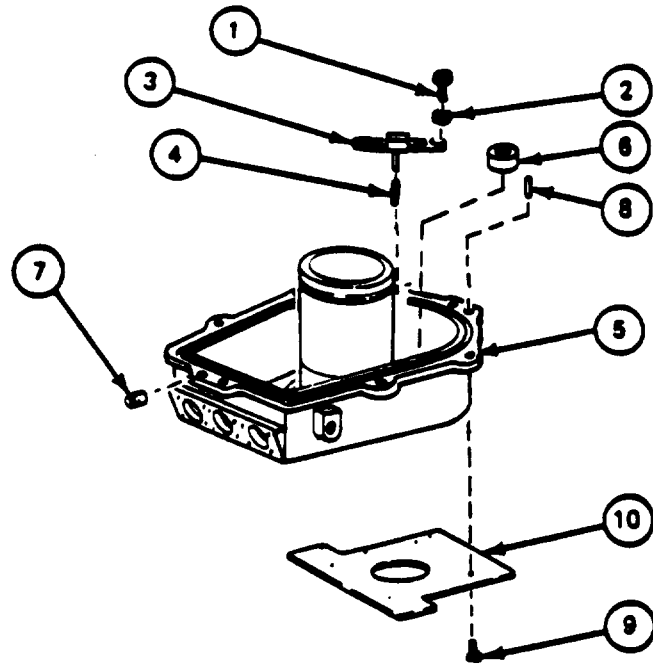


3-12. LOWER HOUSING DISASSEMBLY PROCEDURE (CONT)

FRAME 6	
Step	Procedure
1.	Using flat tip screwdriver, remove four screws (1), four lockwashers (2), connectors (3) with wiring harness and gasket (4) from housing (5).
2.	Using flat tip screwdriver, remove two screws (6), two lockwashers (7), and bracket (8) from housing (5). GO TO FRAME 7

3-12. LOWER HOUSING DISASSEMBLY PROCEDURE (CONT)

FRAME 7	
Step	Procedure
1.	<p>Using flat tip screwdriver, remove five screws (1), five lockwashers (2), five brushes (3) and five springs (4) from lower housing (5).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Contact guards (6) are pressed in lower housing (5) and should not be removed unless they are bad and need to be replaced. It may be necessary to notify support shop to remove contact guards (6).</p>
2.	Remove five contact guards (6) from lower housing (5).
3.	<p>Using 3/16" Allen wrench, remove plug (7) from lower housing(5).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">It may be necessary to notify support shop to remove dowel pins (8). Dowel pins (8) should not be removed unless they are bad and need to be replaced.</p>
4.	Using pliers, remove two dowel pins (8) from lower housing (5).
5.	<p>Using No. 2 Phillips screwdriver, remove four screws (9) and bracket (10) from lower housing (5).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required:</p> <p style="text-align: center;">Clean all parts (JPG). Inspect all parts (JPG). Do-detail inspection of parts (para 3-11).</p> <p>END OF TASK</p>



3-13. LOWER HOUSING ASSEMBLY PROCEDURE

TOOLS: 0.0" to 1.000" depth micrometer
Long round nose pliers
8 ounce ball peen hammer
1/4" flat tip screwdriver (3/8" female square drive in handle)
3/8" drive ratchet
No. 2 cross tip bit socket (3/8" drive)
7/16" socket (3/8" drive)
9/16" socket (3/8" drive)
5/32" hex head socket (3/8" drive)
Torque wrench (3/8" drive, 0 to 30 inch-pounds)
Torque wrench (3/8" drive, 0 to 250 inch-pounds)
9/16" open end wrench
3/16" hex head socket
4" extension

SUPPLIES: Sealing compound (item 25, App. A)
Sealing compound (item 27, App. A)

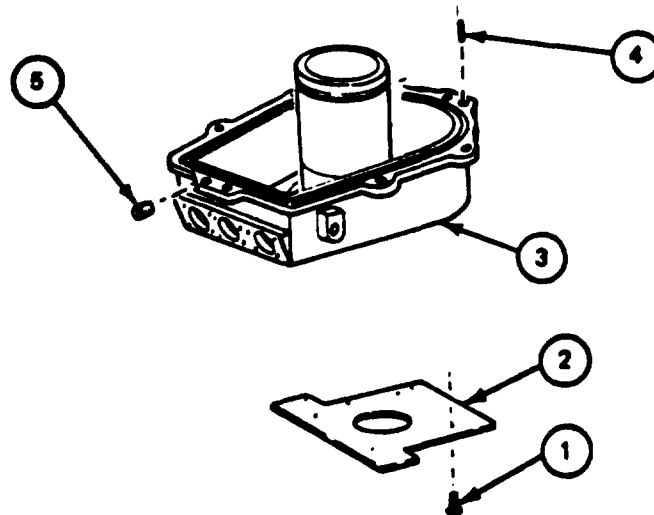
PERSONNEL: One

REFERENCES: JPG for procedures to:
Apply sealing compound
Use torque wrench
Use depth micrometer
Install snap rings

PRELIMINARY PROCEDURES: Inspect lower housing (para 3-11)

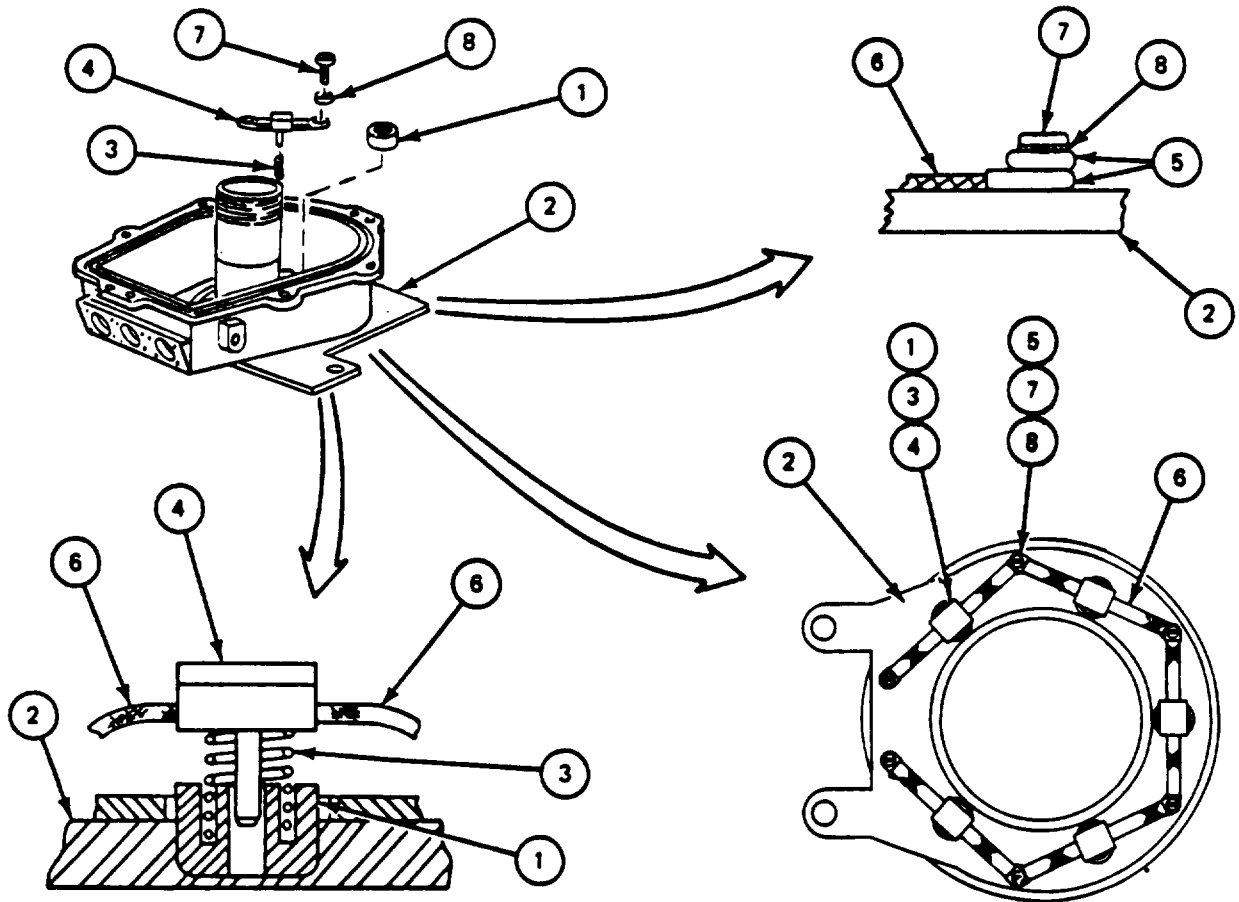
3-13. LOWER HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 1	
Step	Procedure
1.	Put sealing compound (item 27) on four screws (1) (JPG).
2.	Using 5/32" hex head socket, attach bracket (2) to housing (3) with four screws (1).
3.	Using torque wrench, tighten four screws (1) to between 15 and 19 inch-pounds (JPG).
4.	Using pliers, hold two dowel pins (4) in place in holes in housing (3).
5.	Using hammer, lightly tap two pins (4) into place in housing (3).
6.	Put sealing compound (item 25) on plug (5) (JPG).
7.	Using 3/16" hex head socket, install plug (5) in housing (3).
GO TO FRAME 2	



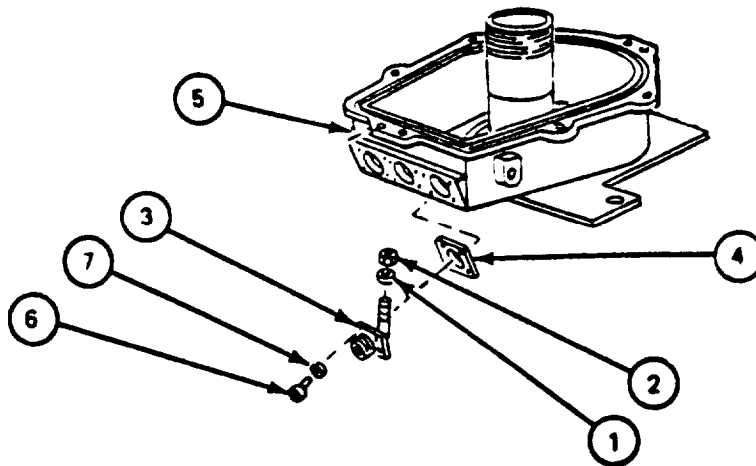
3-13. LOWER HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 2	
Step	Procedure
	<p>NOTE</p> <p>Do step 1 if guides were removed. Support shop may be needed.</p>
1.	Press five guides (1) into bottom of housing (2).
2.	Put five springs (3) in five guides (1).
3.	Slide five brushes (4) into five springs (3) and five guides (1).
	<p>CAUTION</p> <p>Brushes (4) must be installed with one terminal (5) touching housing (2). Brushes must be installed with braid (6) flat and straight.</p>
4.	Using cross tip bit socket, attach five brushes (4) and terminals with braid (6) to housing (2) with five screws (7) and five lockwashers (8).
5.	Using torque wrench, tighten five screws (7) to between 16 and 78 inch-pounds (JPG).
	GO TO FRAME 3



3-13. LOWER HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 3	
Step	Procedure
1.	Using fingers, put two nuts (1) and two flat washers (2) on two connectors (3) leads.
2.	Put two gaskets (4) and two connectors (3) on housing (5),
3.	Using flat tip screwdriver, attach two connectors (3) and two gaskets (4) to housing (5) with eight screws (6) and eight lockwashers (7).
4.	Using torque wrench, tighten eight screws (6) to between 5 and 7 inch-pounds (JPG).
GO TO FRAME 4	



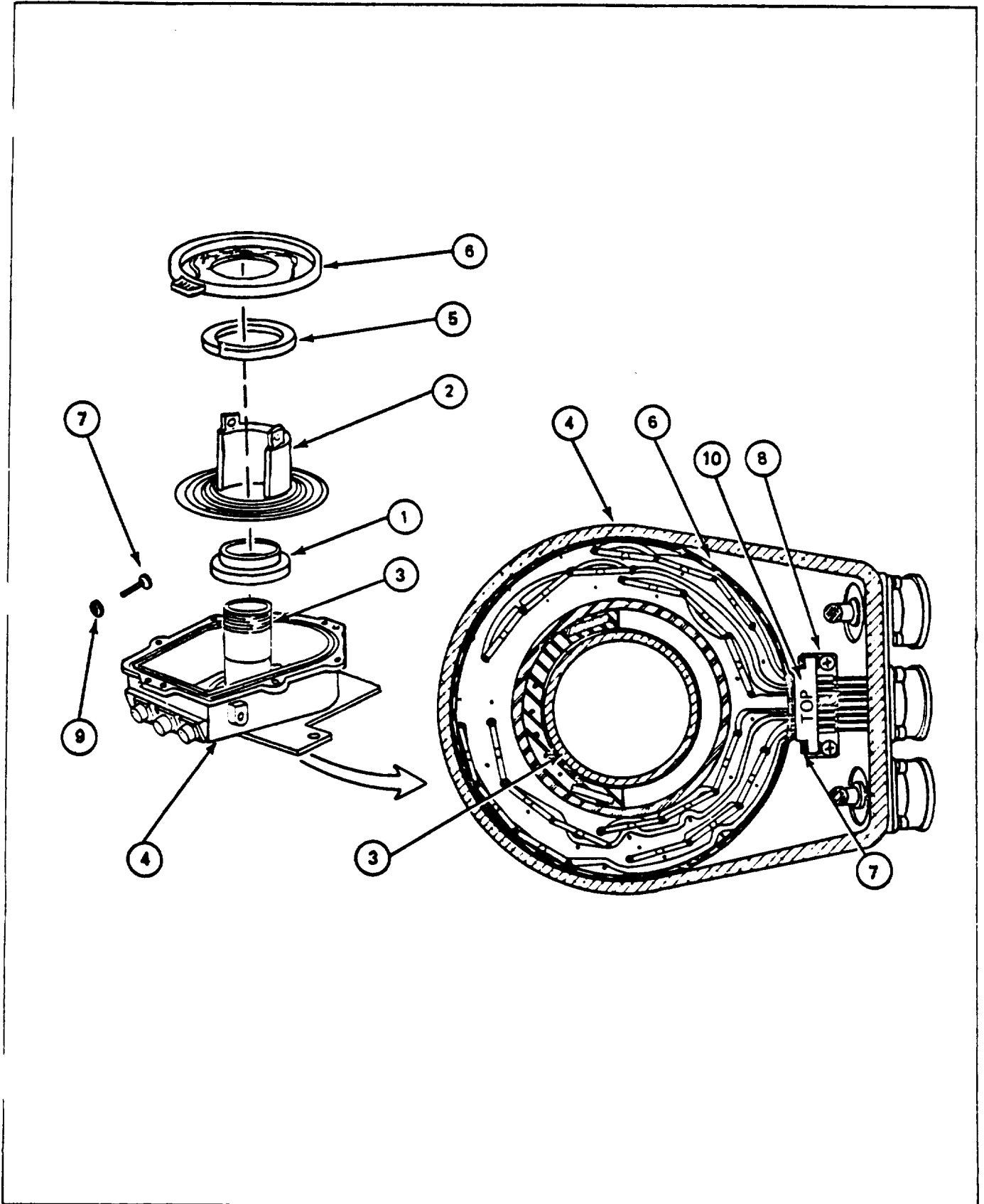
3-13. LOWER HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 4	
Step	Procedure
1.	Put connector (1) with wiring harness through gasket (2) and into housing (3).
2.	Using flat tip screwdriver, attach connector (1) with wiring harness to housing (3) with four screws (4) and four lockwashers (5).
3.	Using torque wrench, tighten four screws (4) to between 16 and 18 inch-pounds (JPG).
4.	Using flat tip screwdriver, attach bracket (6) to housing (3) with two screws (7) and two lockwashers (8).
5.	Using torque wrench, tighten two screws (7) to between 16 and 18 inch-pounds (JPG).
GO TO FRAME 5	

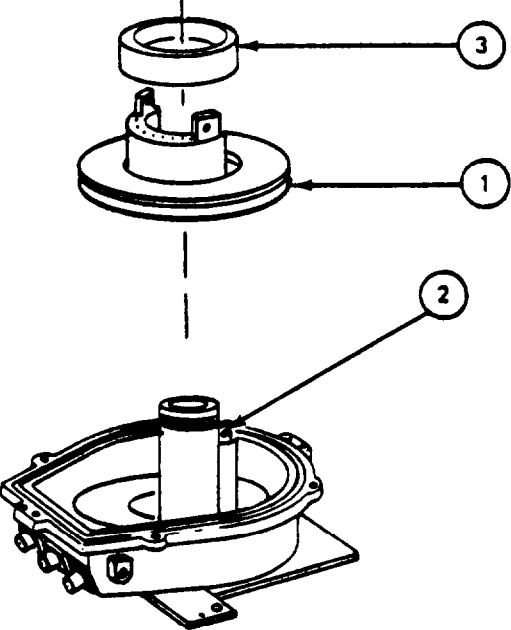
The diagram is an exploded view of the lower housing assembly. It features a central rectangular housing (3) with a cylindrical component on top. A gasket (2) is positioned between the top of the housing and the connector (1). The connector (1) is a complex assembly with a wiring harness. Four screws (4) and lockwashers (5) are shown being inserted into the housing to secure the connector. A bracket (6) is shown being attached to the side of the housing with two screws (7) and lockwashers (8). Arrows point from numbered circles (1-8) to the corresponding parts in the assembly.

3-13. LOWER HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 5	
Step	Procedure
1.	Slide spacer (1) and lower ring (2) over hollow center post (3) of housing (4).
2.	Put slotted ring (5) in place (center) on contact assembly (6).
3.	Slide two pins (7) through bracket (8).
4.	Using pliers, put two retaining rings (9) on two pins (7) (JPG).
5.	Slide contact assembly (6) over hollow center post (3) of housing (4).
6.	Push connector plug (10) over two pins (7) and contact assembly (6) connection.
7.	Put connector plug (10) in bracket (8).
8.	Using pliers, put two more retaining rings (9) on two pins (7) (JPG).
	GO TO FRAME 6



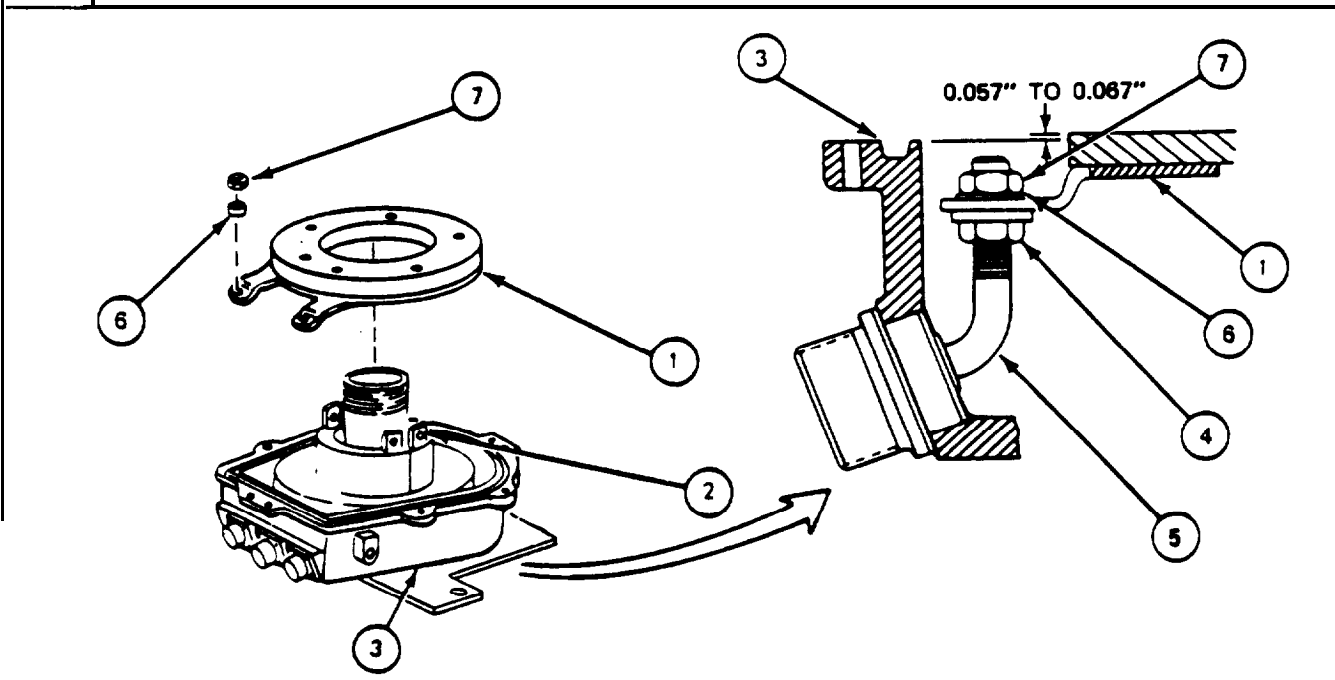
3-13. LOWER HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 6	
Step	Procedure
1. 2.	Slide upper ring (1) over lower ring (2). Slide spacer (3) over upper ring (1) and lower ring (2). GO TO FRAME 7
	

3-13. LOWER HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 7

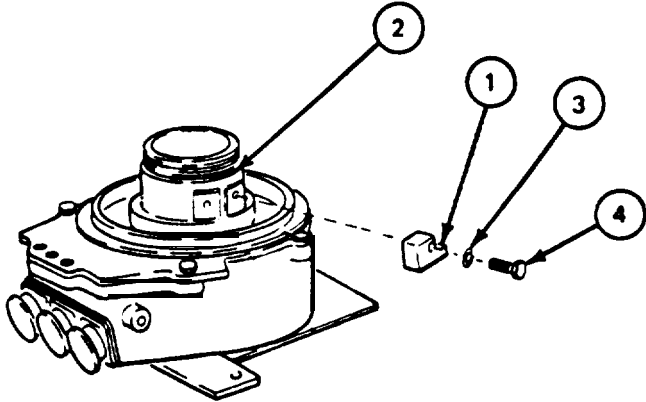
Step	Procedure
1.	<p>Slide ground brush ring (1) over upper and lower rings (2) in housing (3).</p> <div style="text-align: center; border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>CAUTION</p> </div> <p style="text-align: center;">Ground brush ring (1) must be installed between 0.057" and 0.067" above housing (3).</p>
2.	Using fingers, adjust two nuts (4) on connector terminals (5) evenly to put ground brush ring (1) top from 0.057" to 0.067" above housing (3).
3.	Position ground brush ring (1) on terminals (5) and install two lockwashers (6) and two nuts (7) to hold ground brush ring (1) in place.
4.	Using micrometer, push down and hold ground brush ring (1) in place, measure how far ground brush ring (1) is above housing (3) (JPG).
5.	Adjust nuts (4) and (7) on connector terminals (5) as needed to put ground brush ring (1) from 0.057" to 0.067" above housing (3).
6.	Using 9/16" open end wrench to hold nuts (4) and 9/16" socket wrench to turn nuts (7), attach guard brush ring (1) to two connector terminals (5) with two nuts (7) and two lockwashers (6).
7.	Using torque wrench, tighten two nuts (7) to between 108 and 132 inch-pounds (JPG).
<p>GO TO FRAME 8</p>	



3-13. LOWER HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 8	
Step	Procedure
<ol style="list-style-type: none"> 1. Slide spacer (1) over housing center post (2). 2. Put gasket (3) and cover (4) on housing (5). 3. Using 7/16" socket wrench, attach cover (4) to housing (5) with six lockwashers (6) and six screws (7). 4. Using socket wrench, tighten six screws (7) to between 84 and 108 inch-pounds (JPG). <p>GO TO FRAME 9</p>	

3-13. LOWER HOUSING ASSEMBLY PROCEDURE (CONT)

FRAME 9	
Step	Procedure
<ol style="list-style-type: none"> 1. 2. 	<p>Using 9/16" socket and torque wrench, attach four bus bars (1) to rings (2) with four lockwashers (3) and four screws (4).</p> <p>Using torque wrench, tighten four screws (4) to between 36 and 60 inch-pounds (JPG).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required:</p> <p style="text-align: center;">Assemble upper housing (para 3-10). Install hydraulic attachments (para 3-7).</p> <p>END OF TASK</p>
	

CHAPTER 4

TURRET ELECTRICAL SYSTEM WIRING HARNESES AND ELECTRICAL LEADS

4-1. This section contains information on the removal and installation of electrical system wiring harnesses. Following the information in this section will show you how to remove an old wiring harness and install a new one in the same operation. This will get your equipment operational in the shortest amount of time.

NOTE

If you have to replace any wiring harness, go to para 4-3 and read the procedure completely before you begin removing and replacing the harness. All harnesses are removed and installed by doing para 4-3.

4-2. MAINTENANCE PROCEDURES INDEX

Harness or Lead Part Number	Equipment Item	Removal/ Installation	Foldout
10951575	Slipring to Turret Power Relay Box	4-3	FO-6
10911297	Turret Power Relay Box to Searchlight Receptacle	4-3	FO-7
10911298	Slipring to Interphone Slave Receptacle	4-3	FO-8
10924270	Control Box to Ventilating Blower	4-3	FO-9
10924271	Turret Power Relay Box to Blower Control Box	4-3	FO-10
10951615	Turret Control (Early Model)	4-3	FO-11
10933473	Gun Firing	4-3	FO-12

4-3. TURRET ELECTRICAL SYSTEM WIRING HARNESSES AND ELECTRICAL LEADS-REMOVAL AND INSTALLATION PROCEDURE

NOTE

This procedure will provide general information for removal and installation of any wiring harness.

TOOLS: (See applicable foldout)

PERSONNEL: One

REFERENCES: JPG for procedures to:
 Disconnect and connect electrical connectors
 Disconnect and connect harness ground leads
 Disconnect and connect harness clamps and straps
TM 9-2350-222-10 for TM-10 procedures
TM 9-2350-222-20 for TM 20 procedures
LO 9-2350-222-12 for procedure to fill hydraulic system

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Turret Traverse Lock	FO-3	7
Main Accumulator	FO-1	16

EQUIPMENT CONDITION: (See applicable foldout)

PRELIMINARY PROCEDURES: (See applicable foldout)

GENERAL INSTRUCTIONS:

NOTE

Wiring harness connectors are labeled with metal tags or shrink tubing near each connector. Be sure that new harness connectors are labeled the same as old harness connectors when installing.

4-3. TURRET ELECTRICAL SYSTEM WIRING HARNESS AND ELECTRICAL LEADS REMOVAL AND INSTALLATION PROCEDURE (CONT)

FRAME 1	
Step	Procedure
1.	Using maintenance procedures index (para 4-2), look up harness part number to find foldout number of wiring harness to be replaced. (For example, part number 10911298 shows FO-8.) Carefully pull the foldout out so that it will face this page.
2.	Do equipment conditions and preliminary procedures listed on foldout.
3.	Find callout 1 on foldout. This is where you will begin removing the old harness and installing the new harness. Equipment location foldout is referenced near callout 1 to help you find starting point.
<p>NOTE</p> <p>Many equipment units have several connectors. The foldout shows exactly which connector on the equipment must be removed.</p>	
4.	Using tools listed on wiring harness foldout, as necessary, disconnect first harness connector on old wiring harness (JPG).
GO TO FRAME 2	

4-3. TURRET ELECTRICAL SYSTEM WIRING HARNESS AND ELECTRICAL LEADS REMOVAL AND INSTALLATION PROCEDURE (CONT)

FRAME 2	
Step	Procedure
1.	<p>Pull old wiring harness away from equipment until next place where harness is fastened.</p> <p style="text-align: center;">CAUTION</p> <p>Make sure new harness connector is same as old connector.</p>
2.	If old harness is fastened with cable clamp, strap or ground lead, use tools listed on foldout, as necessary, to remove old harness and install new harness (JPG).
3.	Repeat steps 1 and 2 until all connectors, cable clamps, straps, and ground leads on old harness are replaced on new harness.
4.	Remove old harness from vehicle.
5.	Do follow-on maintenance procedures listed on foldout.
	END OF TASK

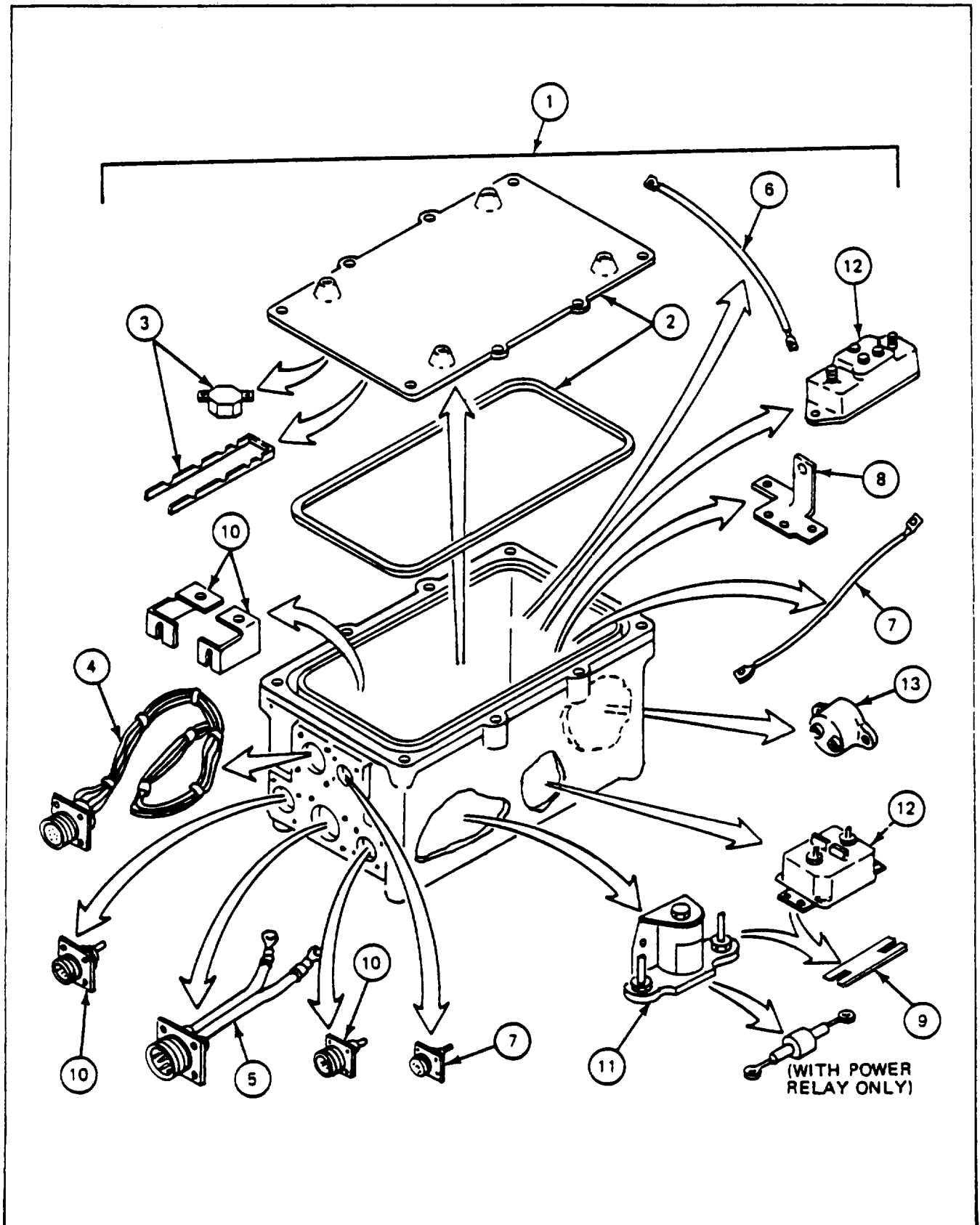
CHAPTER 5
TURRET POWER AND SEARCHLIGHT RELAY BOX
(10905722 OR 11654980)

5-2. MAINTENANCE PROCEDURES INDEX

NOTE

Turret power and searchlight relay box will be referred to as relay box in all paragraphs of this section.

Equipment Item	Inspection	Test	Tasks			
			Removal	Installation	Disassembly	Assembly
1. Relay Box (Assembly)	5-3	5-4			5-5	5-6
2. Cover and Gasket			5-7	5-8		
3. Cover Circuit Breakers and Bus Bar			5-9	5-10		
4. Harness and Connector			5-11	5-12		
5. Power Input Connector			5-13	5-14		
6. Cover Circuit Breakers Power Cable			5-15	5-16		
7. Blower Circuit Breaker Lead and Connector			5-17	5-18		
8. Power Input Bus Bar			5-19	5-20		
9. Power and Searchlight Relays to Circuit Breakers Bus Bars			5-21	5-22		
10. Power and Searchlight Relay Bus Bars and Connectors			5-23	5-24		
11. Power and Searchlight Relays and Semiconductor Device			5-25	5-26		
12. Power and Searchlight Circuit Breakers			5-27	5-28		
13. Blower Circuit Breaker			5-29	5-30		



5-3. RELAY BOX INSPECTION PROCEDURE

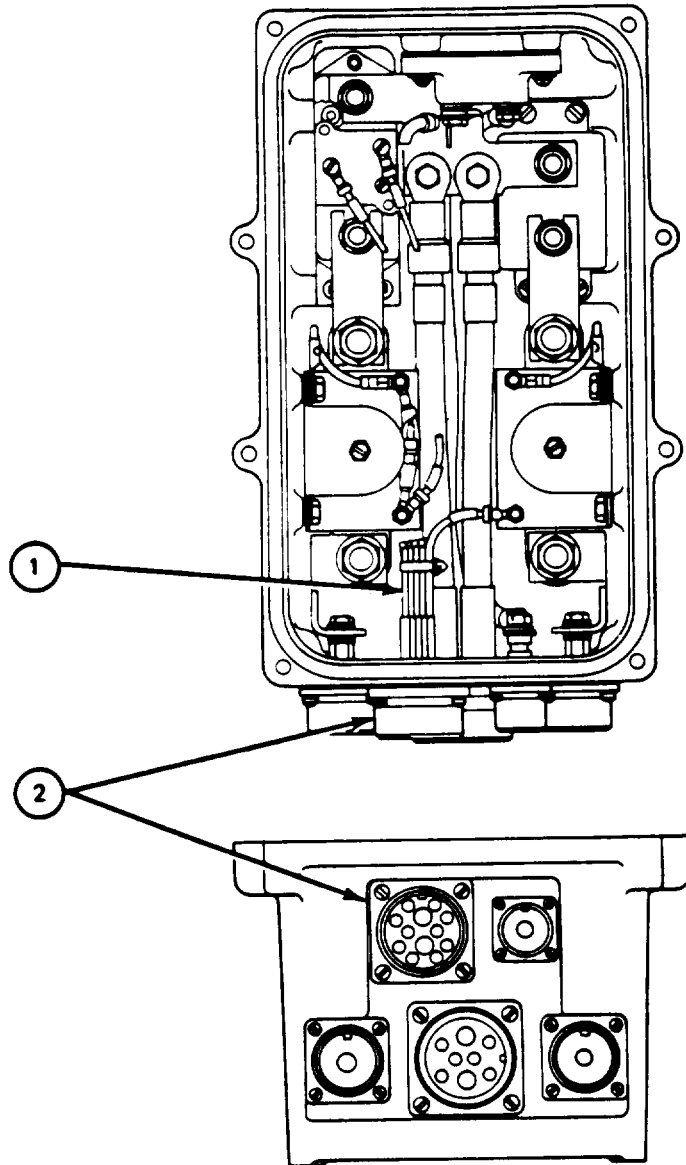
a. Harness and Connector Inspection

APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

PERSONNEL: One

PRELIMINARY PROCEDURES: Test relay box (para 5-4)
Remove relay box cover (para 5-7)

FRAME 1	
Step	Procedure
1.	Check wires in harness assembly (1) for cuts and damaged insulation.
2.	Check connector (2) for loose, bent or missing pins, corrosion on pins, or damaged connector threads.
3.	If wires or connector are damaged. remove harness and connector (para 5-11).
4.	Install new wire harness and connector (para 5-12).
	GO TO FRAME 2

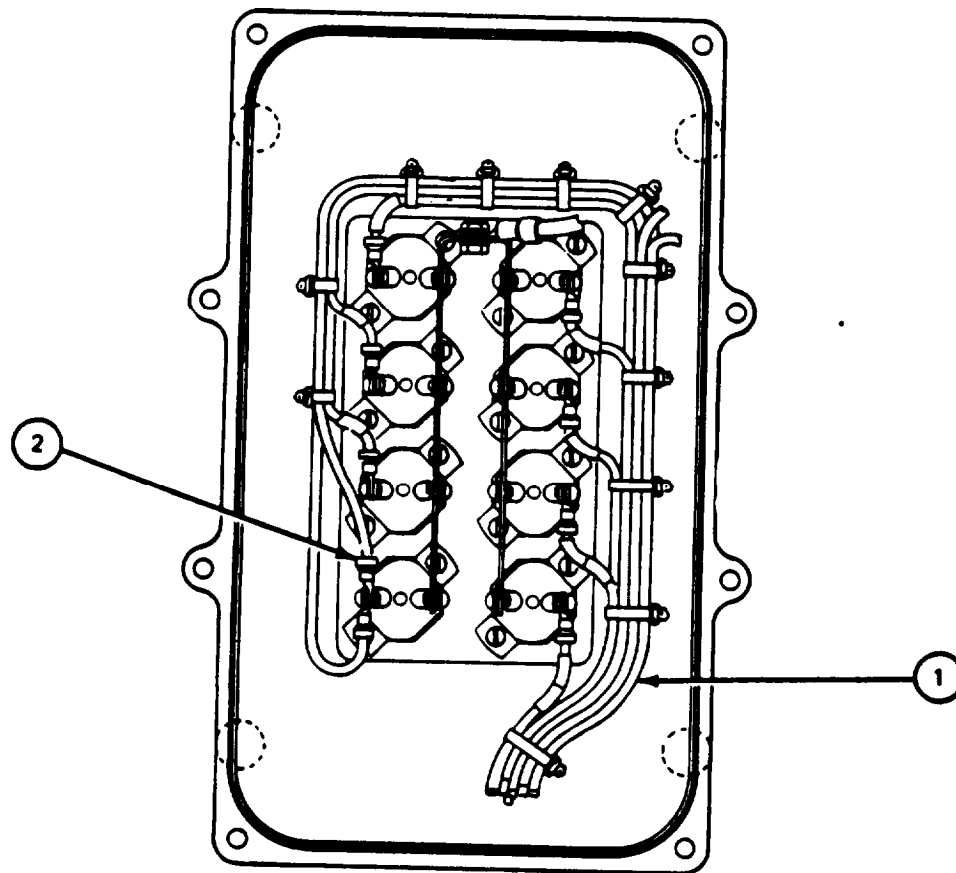


5-3. RELAY BOX INSPECTION PROCEDURE (CONT)

a. Harness and Connector Inspection (Cont)

FRAME 2

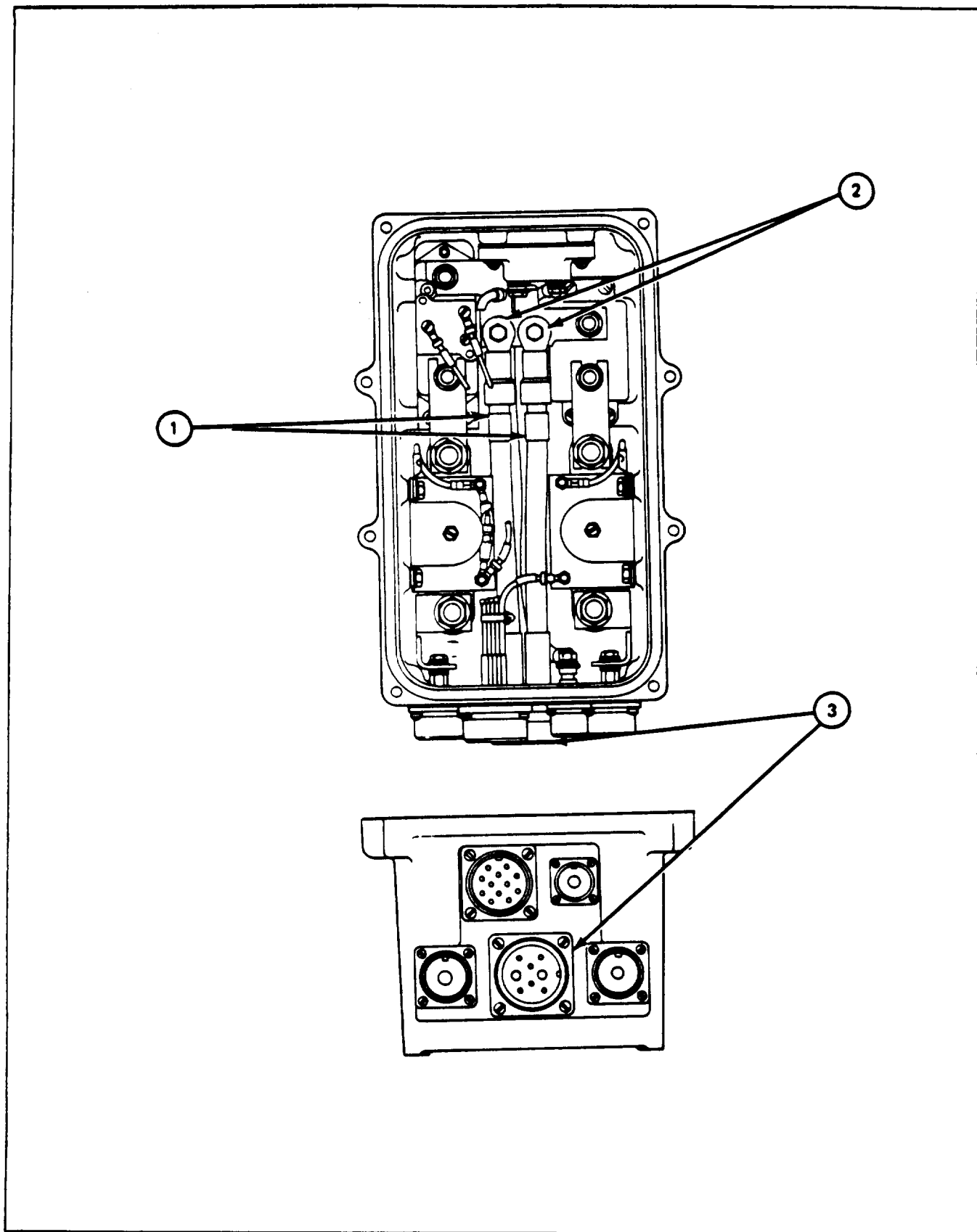
Step	Procedure
1.	Check wires in harness assembly (1) for cuts, damaged insulation, or damaged wire terminals (2),
2.	If wires (1) or terminals (2) are damaged, remove harness and connector (para 5-11).
3.	Install new wire harness and connector (para 5-12). GO TO FRAME 3



5-3. RELAY BOX INSPECTION PROCEDURE (CONT)

b. Power Input Connector Inspection

FRAME 3	
Step	Procedure
1.	Check wires (1) in lead assembly for cuts and damaged insulation.
2.	Check wire terminals (2) for corrosion or damage.
3.	Check connector (3) for loose fitting pins, corrosion on pins, and damage to connector threads.
4.	If wires (1), terminals (2) or connector (3) are damaged, remove power input connector (para 5-13).
5.	Install new power input connector (para 5-14).
	GO TO FRAME 4

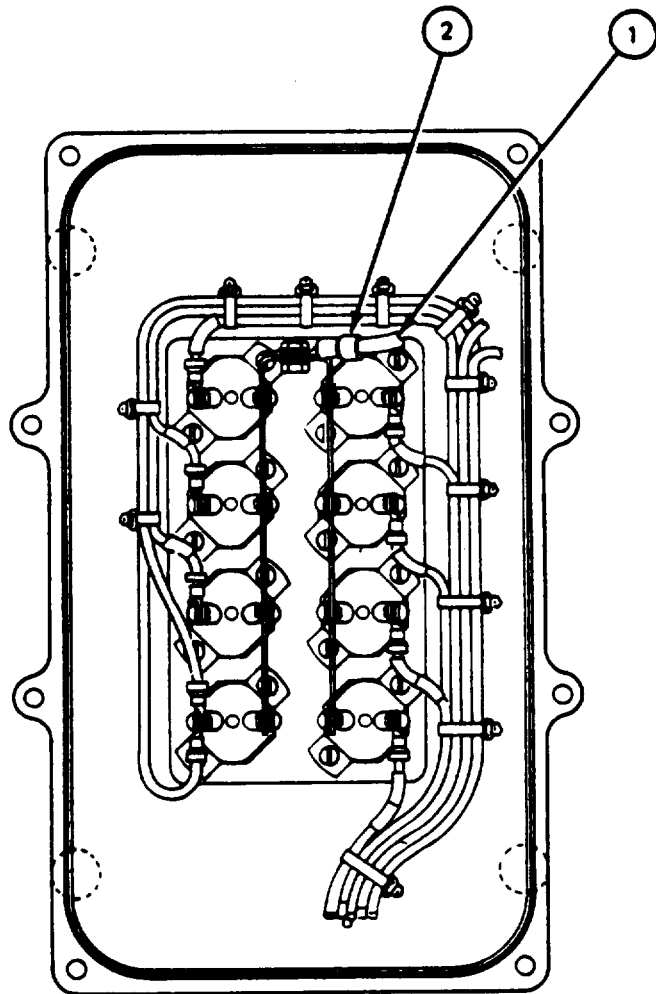


5-3. RELAY BOX INSPECTION PROCEDURE (CONT)

Cover Circuit Breakers Power Cable Inspection

FRAME 4

Step	Procedure
1.	Check wire (1) of lead assembly for cuts and damaged insulation.
2.	Check wire terminal (2) for corrosion or damage.
3.	If wire (1) or terminal (2) is damaged, remove cover circuit breakers power cable (para 5-15).
4.	Install new cover circuit breakers power cable (para 5-16). GO TO FRAME 5



5-3. RELAY BOX INSPECTION PROCEDURE (CONT)

c. Cover Circuit Breakers Power Cable Inspection (Cont)

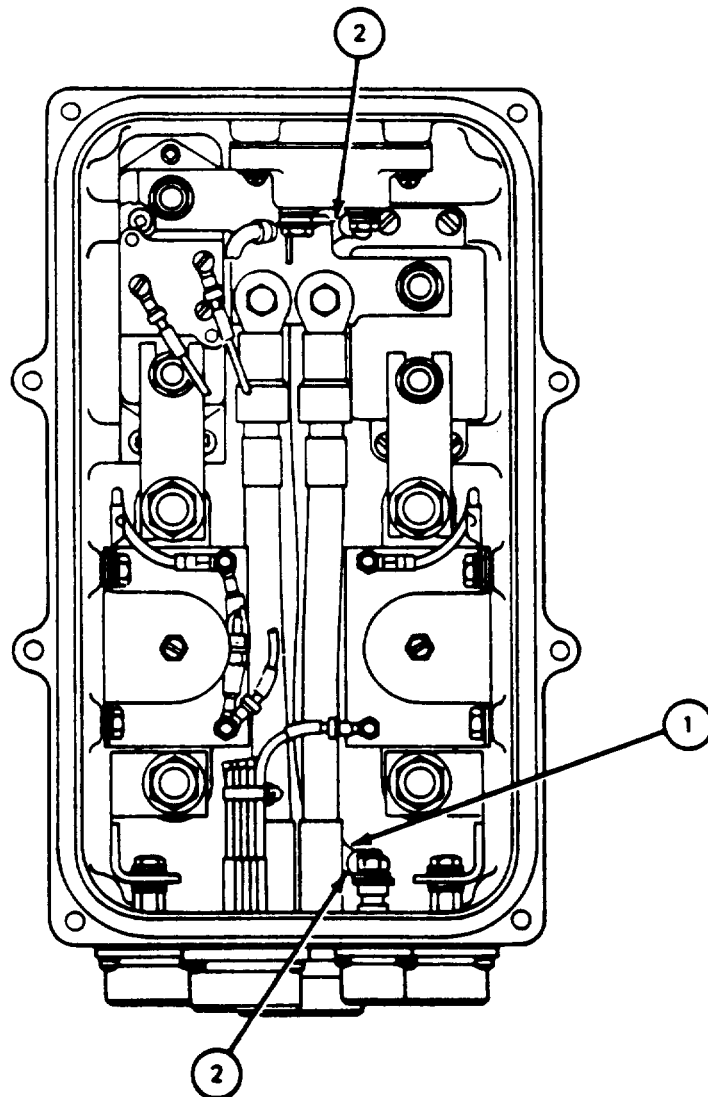
FRAME 5	
Step	Procedure
<ol style="list-style-type: none"> 1. Check wire (1) of lead assembly for cuts and damaged insulation. 2. Check wire terminal (2) for corrosion or damage. 3. If wire (1) or terminal (2) is damaged, remove cover circuit breakers power cable (para 5-15). 4. Install new rover circuit breakers power cable (para 5-16). 	<p>GO TO FRAME 6</p>

5-3. RELAY BOX INSPECTION PROCEDURE (CONT)

Blower Circuit Breaker Cable and Connector Inspection

FRAME 6

Step	Procedure
1.	Check wire (1) of lead assembly for cuts and damaged insulation.
2.	Check two wire terminals (2) of wire (1) for corrosion or damage.
3.	If wire (1) or terminals (2) are damaged, remove blower circuit breaker lead and connector (para 5-17).
4.	Install new blower circuit breaker lead and connector (para 5-18). GO TO FRAME 7

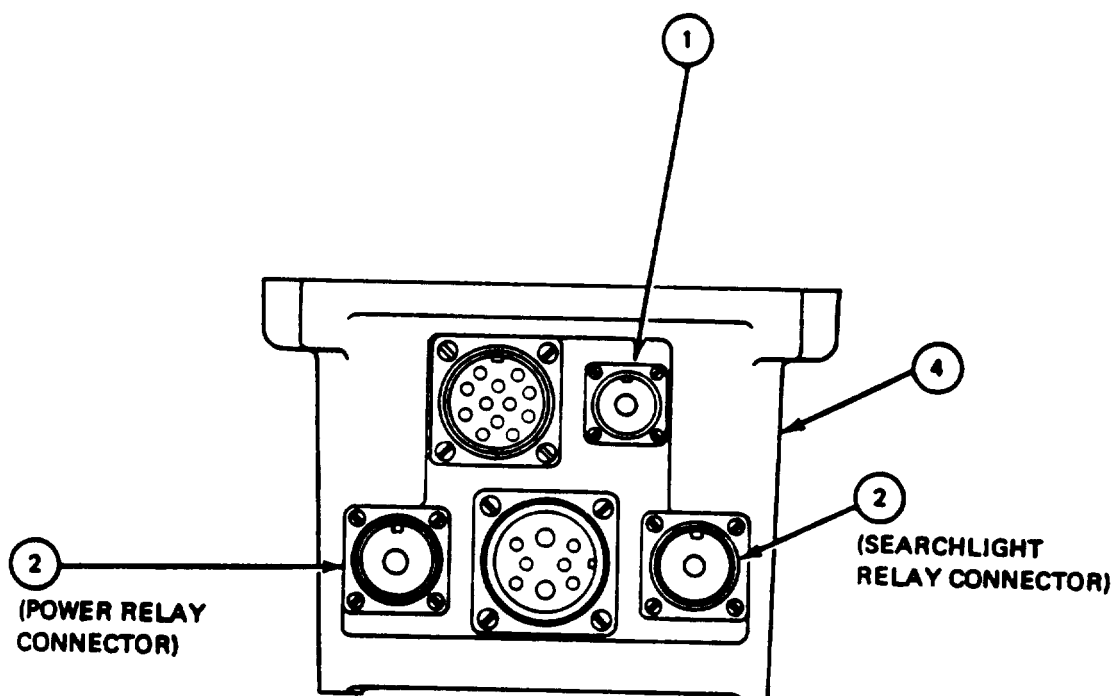


5-3. RELAY BOX INSPECTION PROCEDURE (CONT)

e. Connector Inspection

FRAME 7

Step	Procedure
1.	Check connectors (1), (2) and (3) on relay box (4) for loose fitting connector pins and corrosion on pin.
2.	Check threads of connectors (1), (2) and (3) for scarred and stripped threads.
3.	If receptacle (1) is damaged, remove lower circuit breaker lead and receptacle (1) (para 5-17).
4.	Install new blower circuit breaker lead and connector (1) (para 5-18).
5.	If power or searchlight connector (2) is damaged, remove connector (2) (para 5-23).
6.	Install new power or searchlight connector (2) (para 5-24).
END OF TASK	



5-4. RELAY BOX TEST PROCEDURE

APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

TEST EQUIPMENT 0-36 VDC power supply
Multimeter

PERSONNEL: One

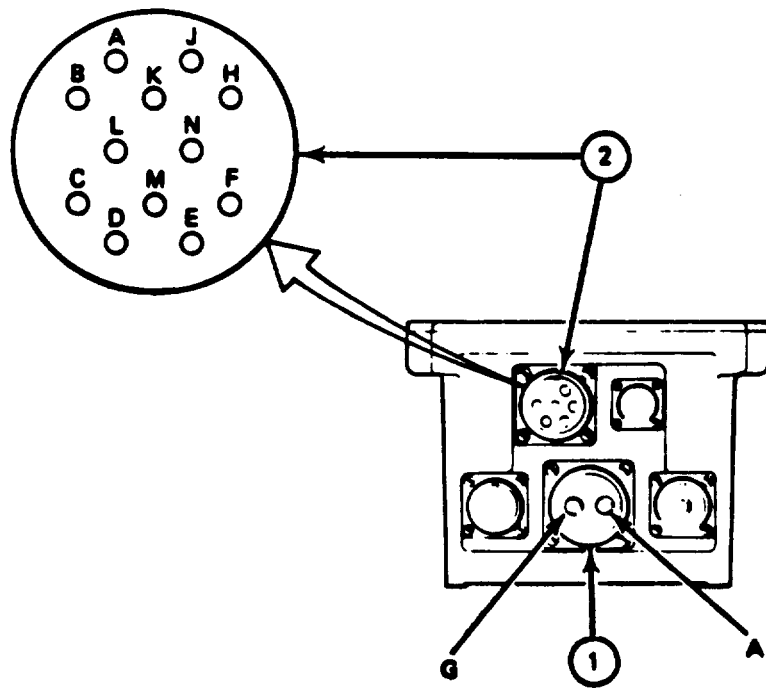
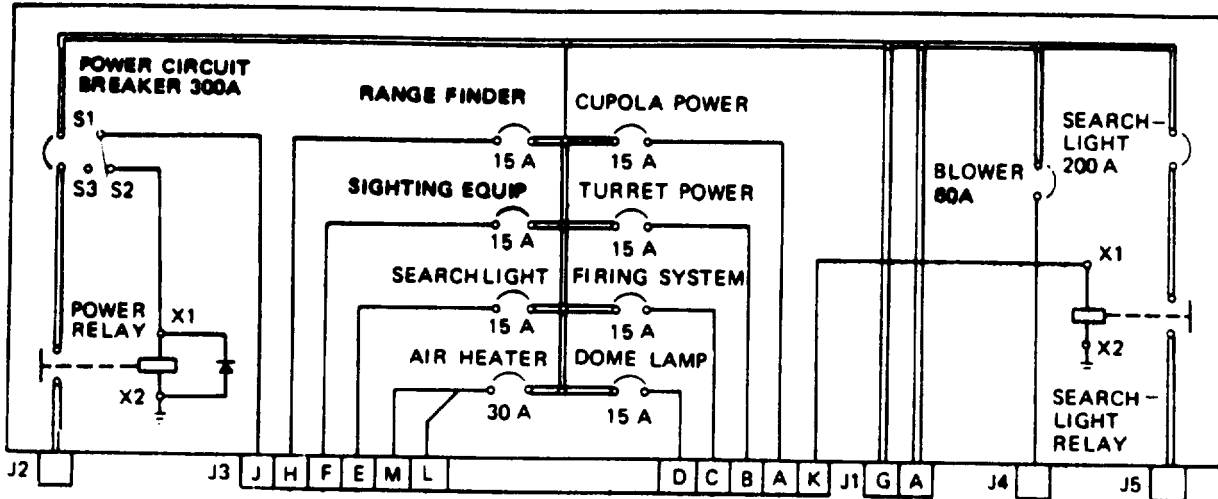
REFERENCES: JPG for procedures to:
Use multimeter
Use power supply
TM 9-2350-222-20-2-3 for procedure to remove relay box

EQUIPMENT CONDITION: Relay box removed (TM-20-2-3)

GENERAL INSTRUCTIONS: If normal indication is not obtained, remove cover (para 5-7) and do continuity check on items listed in Probable Fault column (JPG). Refer to section index (para 5-1) for replacement of bad parts.

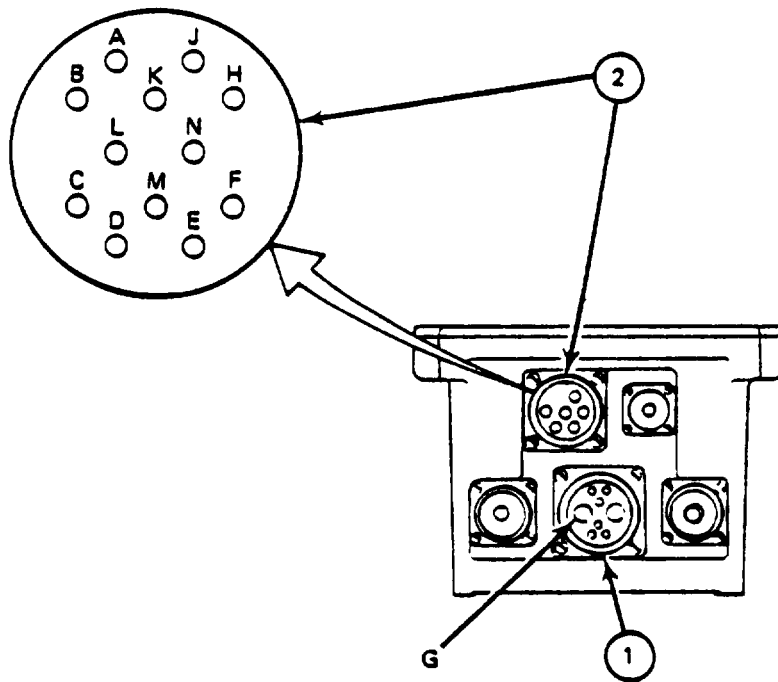
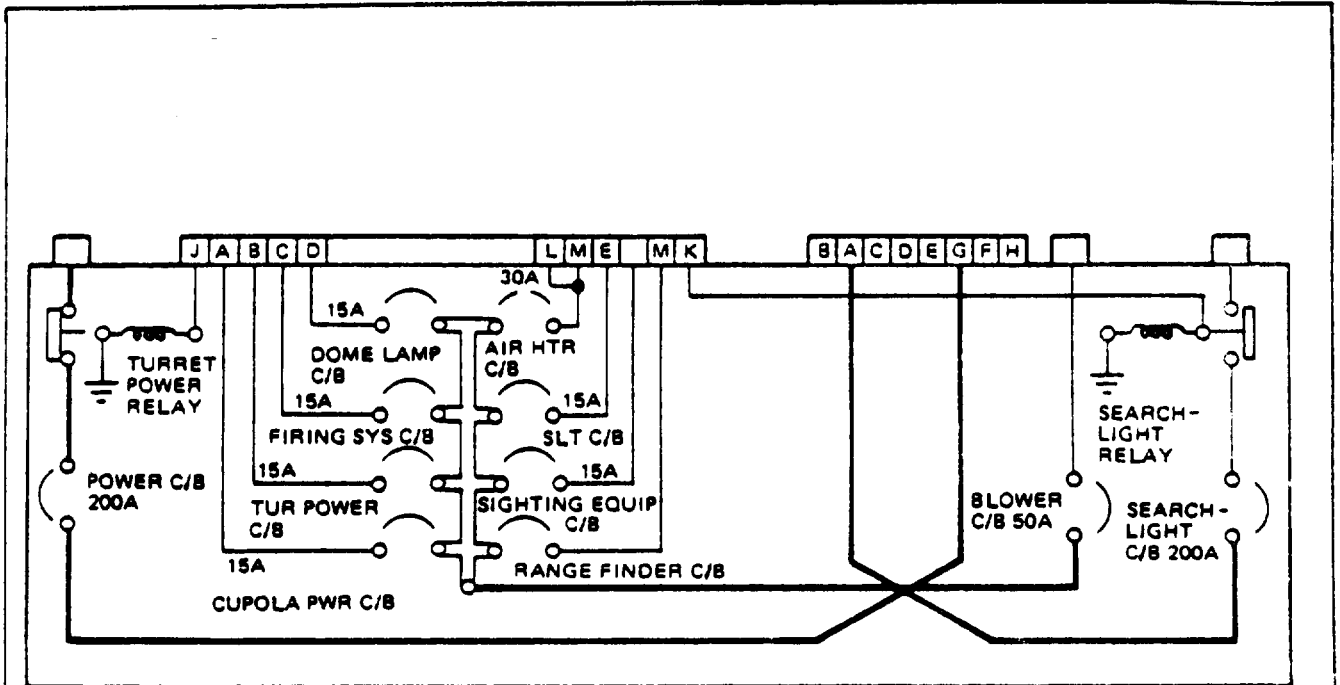
5-4. RELAY BOX TEST PROCEDURE (CONT)

FRAME 1			
Step	Procedure	Normal Indication	Probable Fault
1.	Using multimeter, check continuity between connector (1) pins G and A.	Less than 2 ohms	Power input connector or leads.
2.	Using multimeter, check continuity between connector (1) pin G and the following connector (2) pins:		
	A	Less than 2 Ohms	Connector or harness, cupola power circuit breaker, cover circuit breakers power cable.
	B	Less than 2 ohms	Connector or harness, turret power circuit breaker
	c	Less than 2 ohms	Connector or harness, firing system circuit breaker
	D	Less than 2 ohms	Connector or harness, dome lamp circuit breaker
	GO TO FRAME 2		



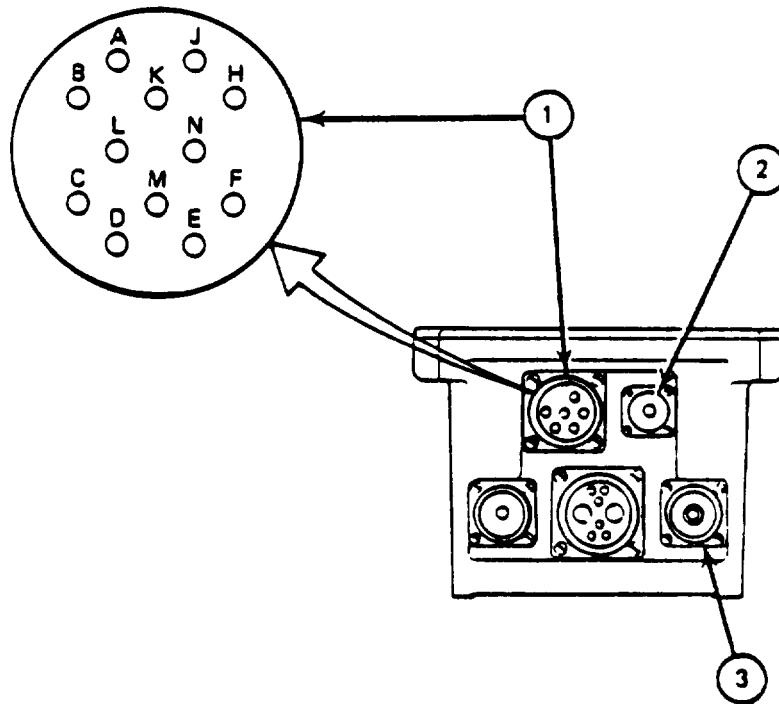
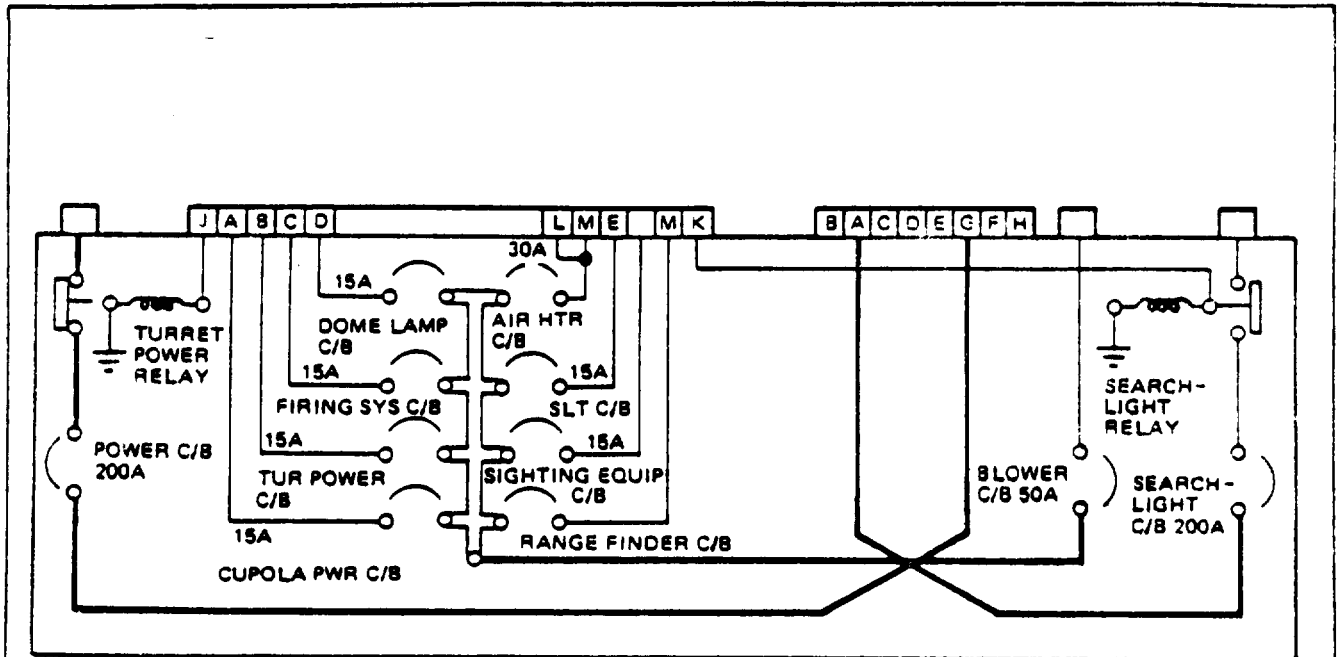
5-4. RELAY BOX TEST PROCEDURE (CONT)

FRAME 2			
Step	Procedure	Normal Indication	Probable Fault
1.	Using multimeter, check continuity between connector (1) pin G and the following connector (2) pins:		
	E	Less than 2 ohms	Connector or harness, searchlight circuit breaker
	F	Less than 2 ohms	Connector or harness, sighting equipment circuit breaker
	H	Less than 2 ohms	Connector or harness, range finder circuit breaker
	L	Less than 2 ohms	Connector or harness, air heater circuit breaker
	M	Less than 2 ohms	Connector or harness
	GO TO FRAME 3		



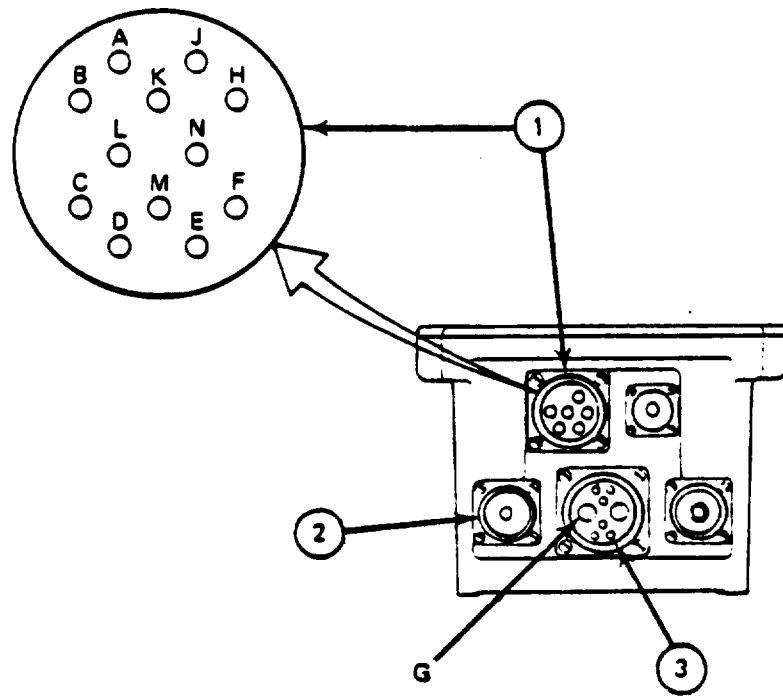
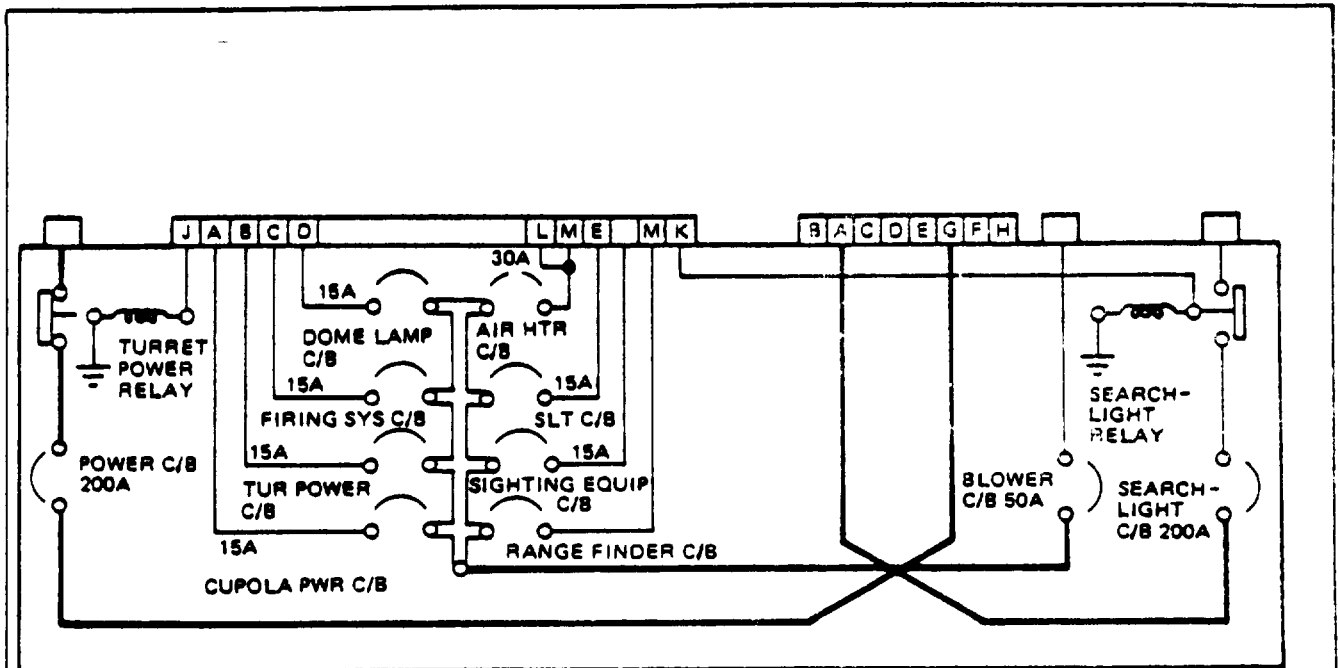
5-4. RELAY BOX TEST PROCEDURE (CONT)

FRAME 3			
Step	Procedure	Normal indication	Probable Fault
1.	Connect positive lead of power supply to connector (1) pin K. Connect negative lead to relay box (ground).		
2.	Turn on power supply. Adjust voltage to 24 vdc (JPG).		
3.	Using multimeter check continuity between connector (2) and connector (3).	Less than 2 ohms	Searchlight relay, connector or harness, blower circuit breaker lead or connector, blower circuit breaker, searchlight relay connector, searchlight circuit breaker
4.	Adjust voltage to 0 vdc. Turn off power supply (JPG). GO TO FRAME 4		



5-4. RELAY BOX TEST PROCEDURE (CONT)

FRAME 4			
Step	Procedure	Normal Indication	Probable Fault
1.	Connect positive lead of power supply to connector (1) pin J. Connect negative lead to relay box (ground).		
2.	Turn on power supply. Adjust voltage to 24 vdc (JPG).		
3.	Using multimeter, check continuity between connector (2) and connector (3), pin G.	Less than 2 ohms	Power relay, connector or harness, power relay connector power circuit breaker
4.	Adjust voltage to 0 vdc Turn off power supply (JPG). END OF TASK		



5-5. RELAY BOX DISASSEMBLY PROCEDURE

APPLICABLE CONFIGURATIONS: 10905722 or I 1654980 relay box

PERSONNEL: One

PRELIMINARY PROCEDURES: Remove relay box cover (para 5-7)

FRAME 1																									
Step	Procedure																								
1.	Remove: <table style="width: 100%; border: none;"> <thead> <tr> <th style="text-align: center; width: 60%;">Item</th> <th style="text-align: center; width: 40%;">Refer to Paragraph</th> </tr> </thead> <tbody> <tr> <td>Cover circuit breakers and bus bar</td> <td style="text-align: center;">5-9</td> </tr> <tr> <td>Harness and connector</td> <td style="text-align: center;">5-11</td> </tr> <tr> <td>Power input connector</td> <td style="text-align: center;">5-13</td> </tr> <tr> <td>Cover circuit breakers power cable</td> <td style="text-align: center;">5-15</td> </tr> <tr> <td>Blower circuit breaker lead and connector</td> <td style="text-align: center;">5-17</td> </tr> <tr> <td>Power input bus bar</td> <td style="text-align: center;">5-19</td> </tr> <tr> <td>Power and searchlight relays to circuit breakers bus bars</td> <td style="text-align: center;">5-21</td> </tr> <tr> <td>Power and searchlight relay bus bars and connectors</td> <td style="text-align: center;">5-23</td> </tr> <tr> <td>Power and searchlight relays and semiconductor device</td> <td style="text-align: center;">5-25</td> </tr> <tr> <td>Power and searchlight circuit breakers</td> <td style="text-align: center;">5-27</td> </tr> <tr> <td>Blower circuit breaker</td> <td style="text-align: center;">5-29</td> </tr> </tbody> </table>	Item	Refer to Paragraph	Cover circuit breakers and bus bar	5-9	Harness and connector	5-11	Power input connector	5-13	Cover circuit breakers power cable	5-15	Blower circuit breaker lead and connector	5-17	Power input bus bar	5-19	Power and searchlight relays to circuit breakers bus bars	5-21	Power and searchlight relay bus bars and connectors	5-23	Power and searchlight relays and semiconductor device	5-25	Power and searchlight circuit breakers	5-27	Blower circuit breaker	5-29
Item	Refer to Paragraph																								
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Power and searchlight relays and semiconductor device	5-25																								
Power and searchlight circuit breakers	5-27																								
Blower circuit breaker	5-29																								
	END OF TASK																								

5-6. RELAY BOX ASSEMBLY PROCEDURE

APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

PERSONNEL: One

FRAME 1																											
Step	Procedure																										
1.	<p>Install:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; width: 60%;">Item</th> <th style="text-align: center; width: 40%;">Refer to Paragraph</th> </tr> </thead> <tbody> <tr> <td>Blower circuit breaker</td> <td style="text-align: center;">5-30</td> </tr> <tr> <td>Power and searchlight circuit breakers</td> <td style="text-align: center;">5-28</td> </tr> <tr> <td>Power and searchlight relays and semiconductor device</td> <td style="text-align: center;">5-26</td> </tr> <tr> <td>Power and searchlight relay bus bars and connectors</td> <td style="text-align: center;">5-24</td> </tr> <tr> <td>Power and searchlight relays to circuit breakers bus bars</td> <td style="text-align: center;">5-22</td> </tr> <tr> <td>Power input bus bar</td> <td style="text-align: center;">5-20</td> </tr> <tr> <td>Blower and circuit breaker lead and connector</td> <td style="text-align: center;">5-18</td> </tr> <tr> <td>Cover circuit breakers and bus bar</td> <td style="text-align: center;">5-10</td> </tr> <tr> <td>Cover circuit breakers power cable</td> <td style="text-align: center;">5-16</td> </tr> <tr> <td>Power input connector</td> <td style="text-align: center;">5-14</td> </tr> <tr> <td>Harness and connector</td> <td style="text-align: center;">5-12</td> </tr> <tr> <td>Cover and gasket</td> <td style="text-align: center;">5-8</td> </tr> </tbody> </table> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required: Test relay box (para 5-4).</p> <p>END OF TASK</p>	Item	Refer to Paragraph	Blower circuit breaker	5-30	Power and searchlight circuit breakers	5-28	Power and searchlight relays and semiconductor device	5-26	Power and searchlight relay bus bars and connectors	5-24	Power and searchlight relays to circuit breakers bus bars	5-22	Power input bus bar	5-20	Blower and circuit breaker lead and connector	5-18	Cover circuit breakers and bus bar	5-10	Cover circuit breakers power cable	5-16	Power input connector	5-14	Harness and connector	5-12	Cover and gasket	5-8
Item	Refer to Paragraph																										
Blower circuit breaker	5-30																										
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Power and searchlight relay bus bars and connectors	5-24																										
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Power input connector	5-14																										
Harness and connector	5-12																										
Cover and gasket	5-8																										

5-7. COVER AND GASKET REMOVAL PROCEDURE

APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

TOOLS: 7/16" socket (3/8" drive)
3/8" drive ratchet

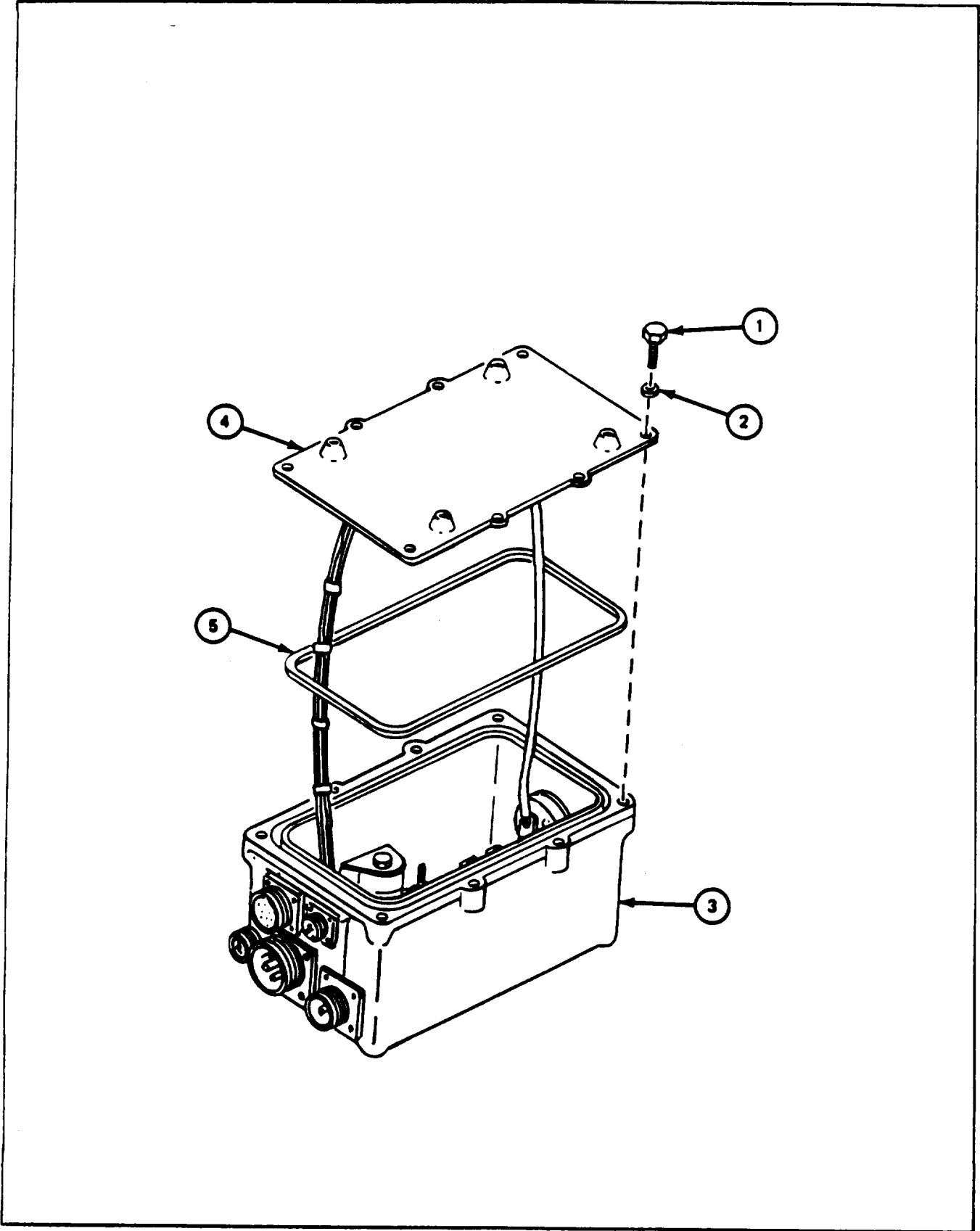
PERSONNEL: One

REFERENCES: TM 9-2350-222-20-2-3 for procedure to remove turret power and searchlight relay box

EQUIPMENT CONDITION: Relay box removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Test relay box (para 5-4)

FRAME 1	
Step	Procedure
1.	<p>Using socket wrench, remove eight screws (1) and eight lockwashers (2) from relay box (3).</p> <div style="text-align: center; border: 1px solid black; padding: 2px; width: fit-content; margin: 10px auto;">CAUTION</div> <p style="text-align: center;">Circuit breakers are attached to underside of cover (4). A wire harness in relay box is connected to these circuit breakers. Use care to avoid damage to wire harness.</p>
2.	Lift cover (4) off relay box (3).
3.	Position cover (4) so that circuit breakers are facing up.
4.	Remove gasket (5) from groove in top of relay box.
5.	Lift gasket (5) over cover (4) and remove gasket.
	<p>NOTE</p> <p>Follow-on Maintenance Action Required:</p> <p>Do inspection procedure (para 5-3).</p>
	END OF TASK



5-8. COVER AND GASKET INSTALLATION PROCEDURE

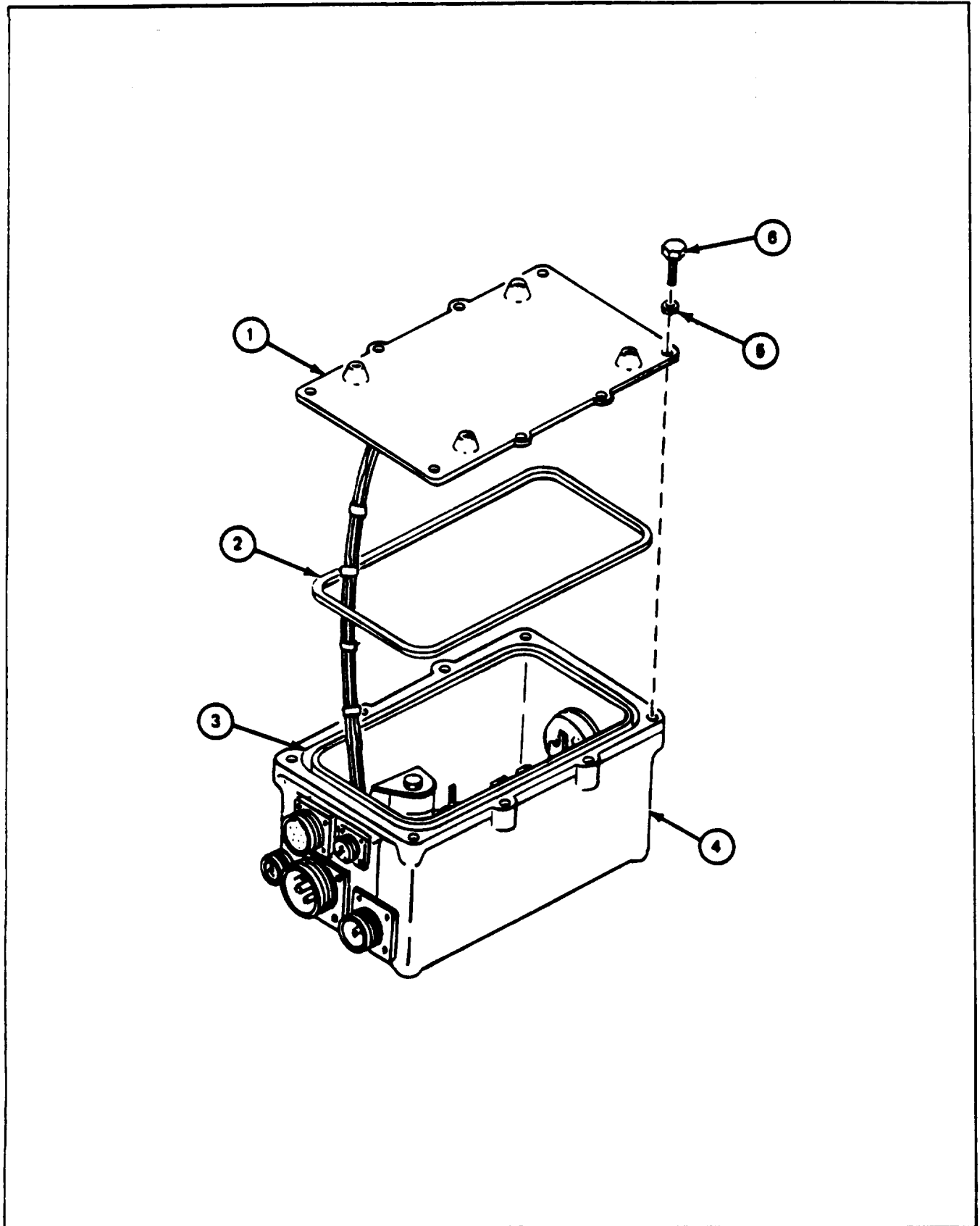
APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

TOOLS: 7/16" socket (3/8" drive)
3/8" drive torque wrench (0-50 foot-pounds)
3/8" drive ratchet

SUPPLIES: Gasket, 11599739

PERSONNEL: One

FRAME 1	
Step	Procedure
1. 2.	Put cover (1) through new gasket (2). Install gasket (2) in groove (3) of relay box (4). <div style="text-align: center;">CAUTION</div> <p style="text-align: center;">To avoid damage to wire harness, make sure wire harness will not be pinched between cover and parts in relay box (4).</p> 3. Put cover (1) on relay box (4). 4. Using socket wrench, attach cover (1) to relay box (4) with eight lockwashers (5) and eight screws (6). 5. Using torque wrench, tighten eight screws (6) to 2 to 3 foot-pounds. END OF TASK



5-9. COVER CIRCUIT BREAKERS AND BUS BAR REMOVAL PROCEDURE

APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

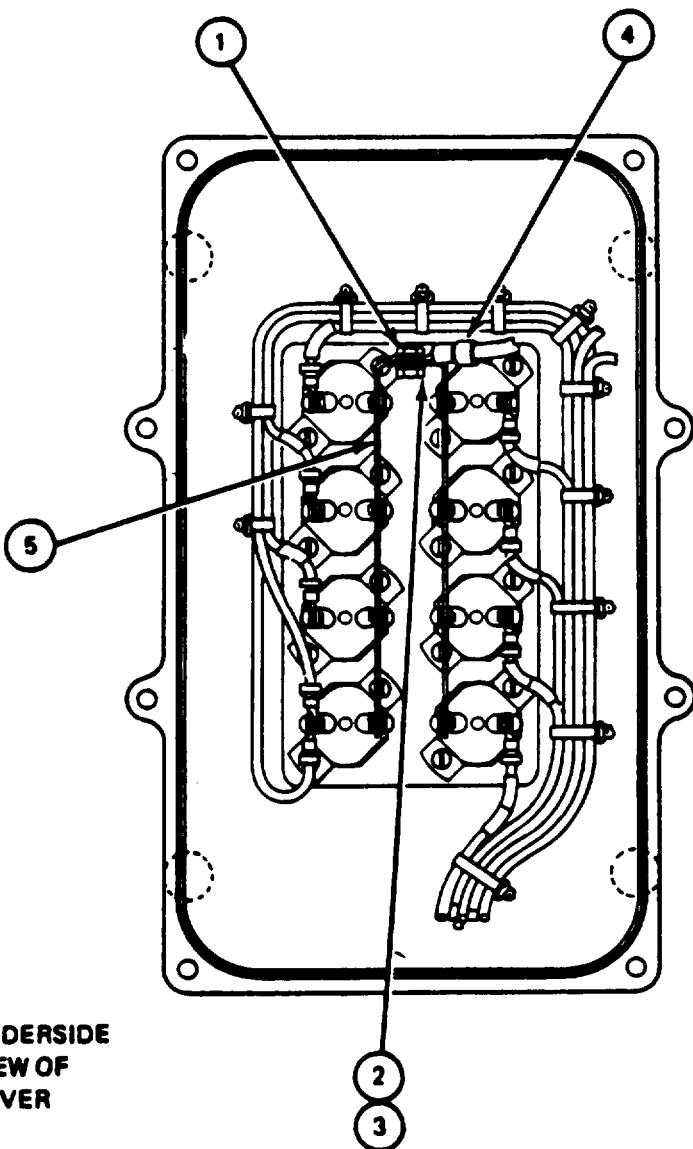
TOOLS: 1/4" flat tip screwdriver
11/32" open end wrench
1/4" open end wrench

PERSONNEL: One

PRELIMINARY PROCEDURES: Test relay box (para 5-4)
Remove relay box cover (para 5-7)
Inspect relay box (para 5-3)

5-9. COVER CIRCUIT BREAKERS AND BUS BAR REMOVAL PROCEDURE (CONT)

FRAME 1	
Step	Procedure
1.	Using 1/4" wrench on lockwasher screw (1) and, 11/32" wrench on nut (2), remove nut (2) and lockwasher (3).
2.	Remove cover circuit breakers power cable (4) from bus bar (5), GO TO FRAME 2

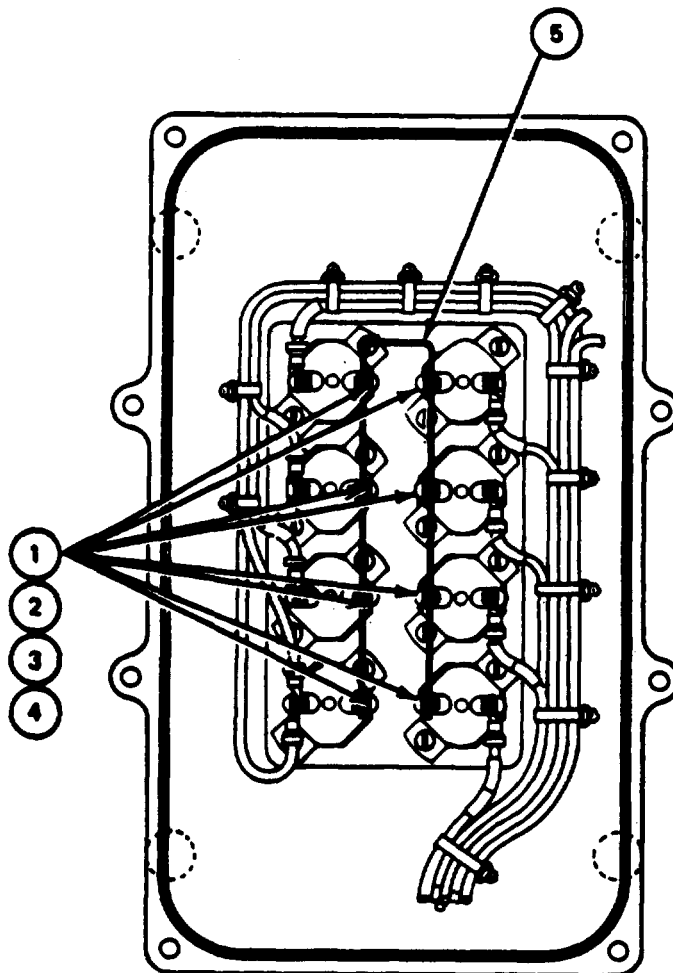


**UNDERSIDE
VIEW OF
COVER**

5-9. COVER CIRCUIT BREAKERS AND BUS BAR REMOVAL PROCEDURE (CONT)

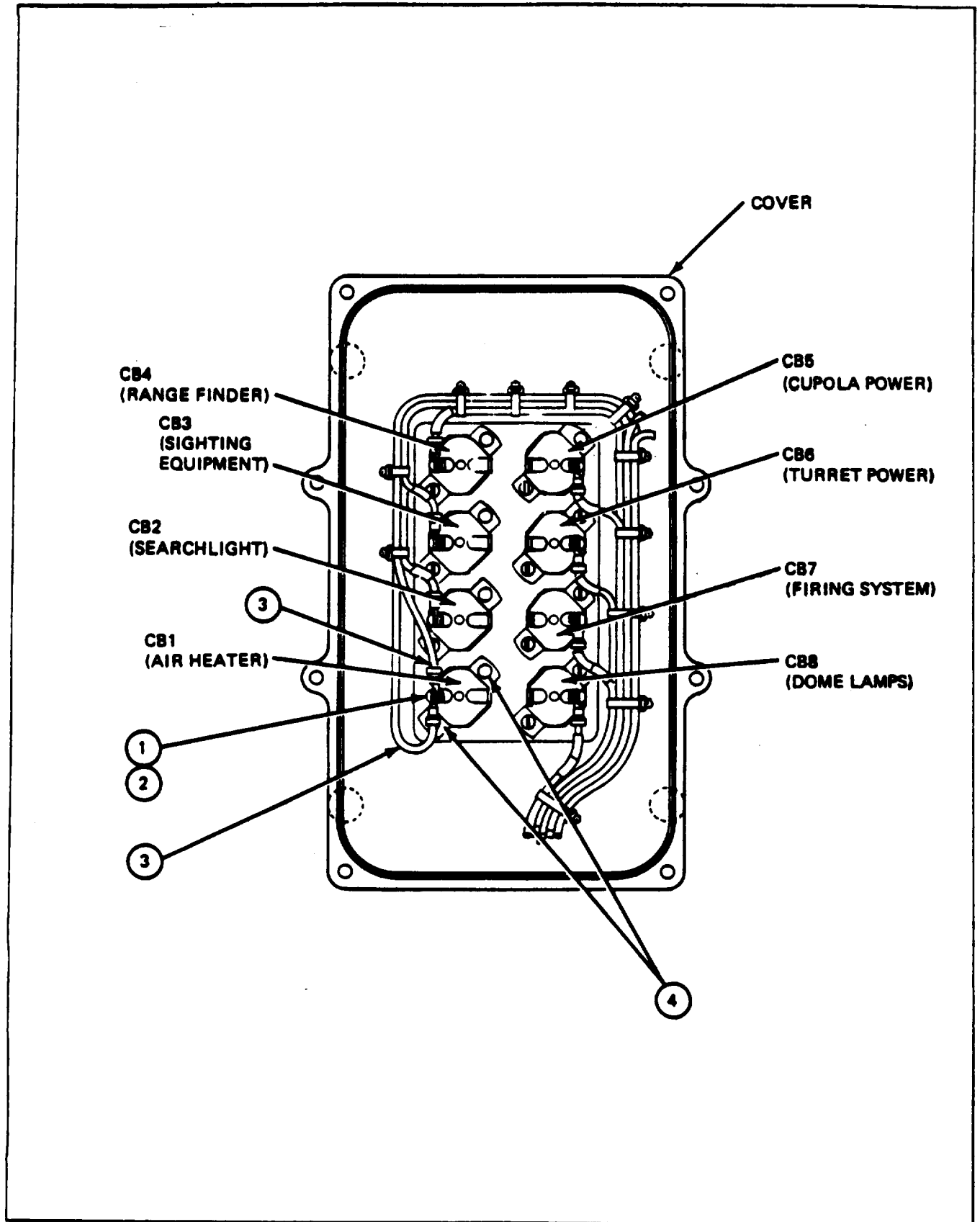
FRAME 2

Step	Procedure
1.	Using screwdriver, remove eight screws (1), eight lockwashers (2), and eight flat washers (3) from circuit breaker terminals (4).
2.	Remove bus bar (5) from circuit breaker terminals (4). GO TO FRAME 3



**5-9. COVER CIRCUIT BREAKERS AND BUS BAR REMOVAL PROCEDURE
(CONT)**

FRAME 3	
Step	Procedure
	<p style="text-align: center;">NOTE</p> <p style="text-align: center;">Remove bad circuit breakers only.</p> <p style="text-align: center;">The relay box cover has eight circuit breakers. The removal procedure for any one circuit breaker is the same except CB 1 (30 amp) has two wires while CB2 through CB8 (15 amp) has only one wire.</p> <ol style="list-style-type: none"> 1. Using flat tip screwdriver, remove screw (1), lockwasher (2), and two wire terminals (3) from terminal of circuit breaker CB 1. 2. Using flat tip screwdriver, remove two lockwasher screws (4) from cover. 3. Remove circuit breaker CB1 from cover. 4. Do steps 1 thru 3 for circuit breaker CB2 thru CB8 as required. <p>END OF TASK</p>



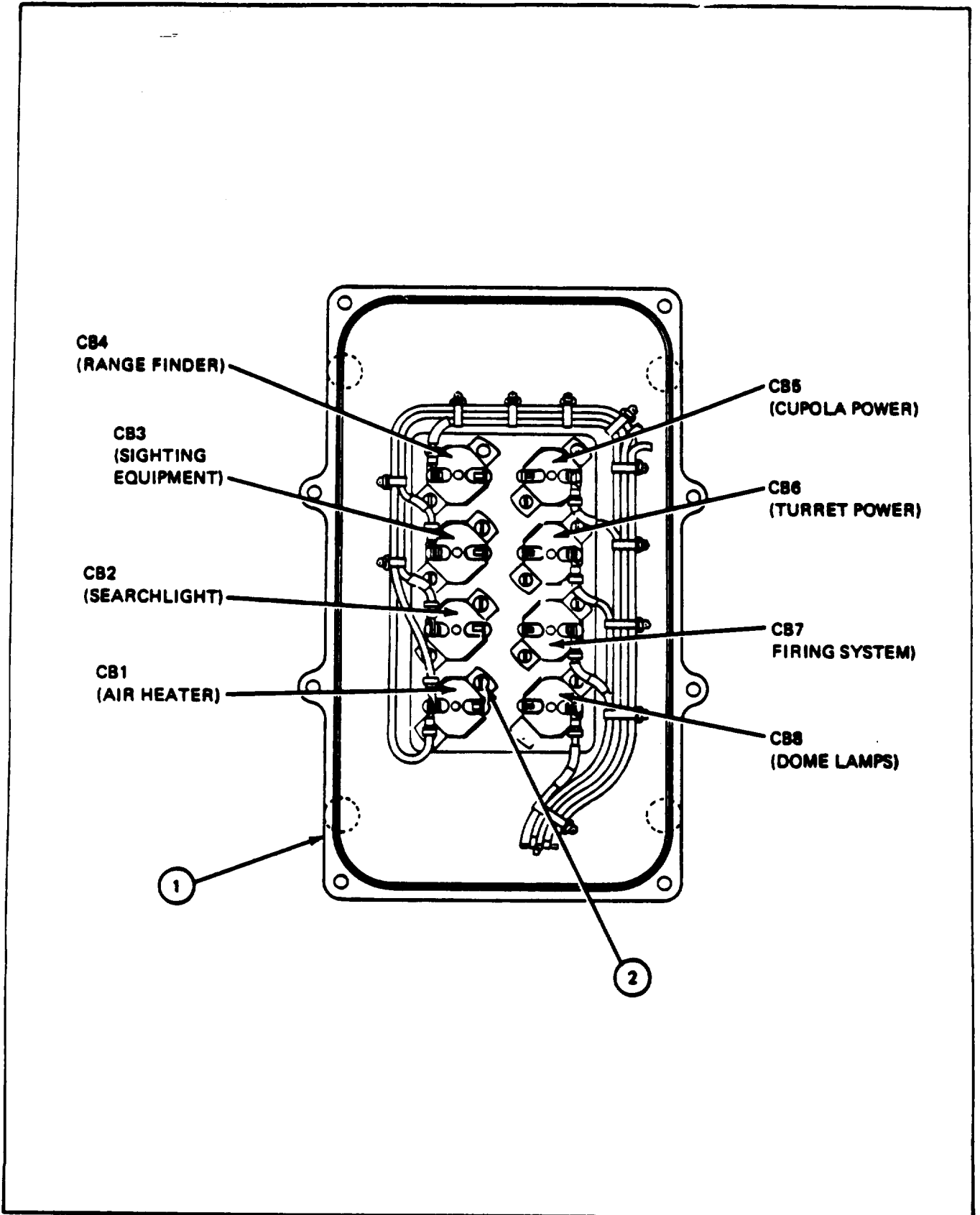
5-10. COVER CIRCUIT BREAKERS AND BUS BAR INSTALLATION PROCEDURE

APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

TOOLS: 1/4" flat tip screwdriver
1/4" open end wrench
11/32" open end wrench

PERSONNEL: One

FRAME 1	
Step	Procedure
	<p style="text-align: center;">NOTE</p> <p style="text-align: center;">Relay box cover (1) has eight circuit breakers. Installation for any circuit breaker is same except CB1 (30 amp) has two wires while CB2 through CB8 (15 amp) has only one wire.</p> <ol style="list-style-type: none">1. Put circuit breaker CB 1 in mounting place on cover (1).2. Using flat tip screwdriver, attach circuit breaker CB 1 to cover (1) with two lockwasher screws (2).3. Do steps 1 and 2 for each circuit breaker CB2 thru CB8. <p>GO TO FRAME 2</p>



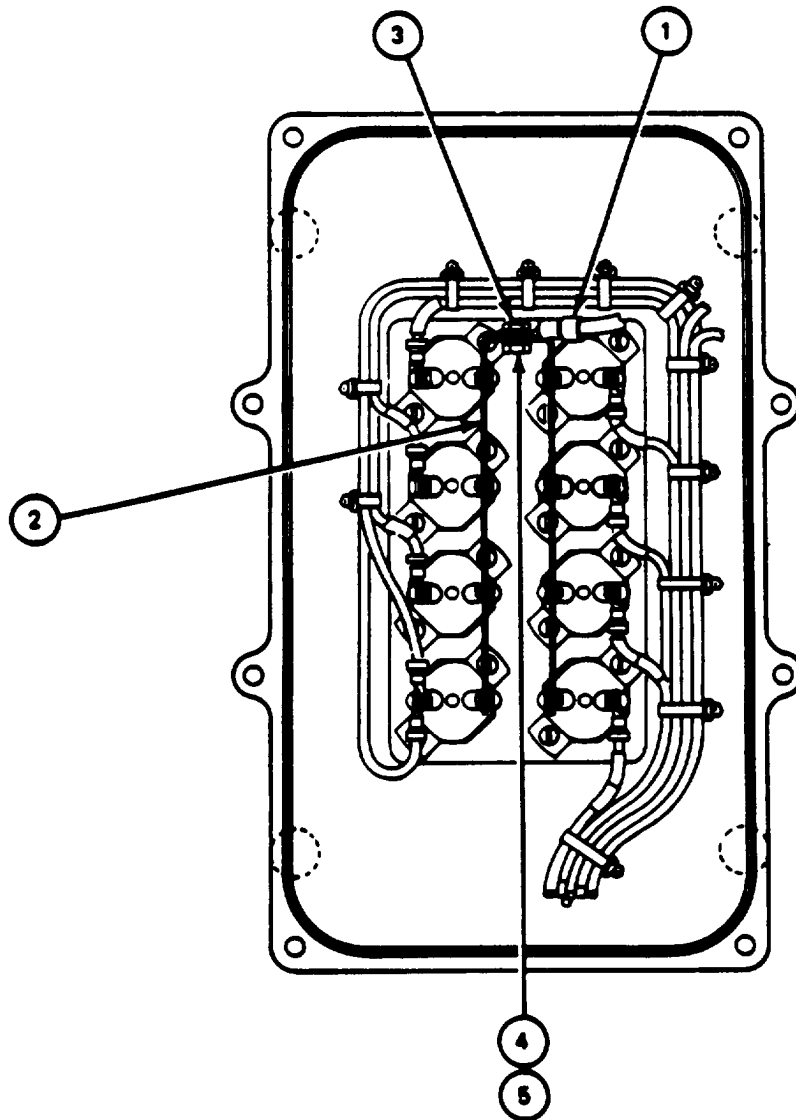
5-10. COVER CIRCUIT BREAKERS AND BUS BAR INSTALLATION PROCEDURE
(CONT)

FRAME 2	
Step	Procedure
<ol style="list-style-type: none"> 1. 2. 	<p>Put on bus bar (1) so that bus bar screw holes are in line with screw holes of circuit breaker terminals (2).</p> <p>Using screwdriver, put eight flat washers (3), eight lockwashers (4), and eight screws (5) through bus bar (1) into eight circuit breaker terminals (2).</p> <p>GO TO FRAME 3</p>
<p>The diagram illustrates the installation of a bus bar (1) onto a circuit breaker assembly. The bus bar is positioned at the top of the assembly. Eight terminals (2) are visible on the left side. The diagram shows the bus bar being secured to the terminals using flat washers (3), lockwashers (4), and screws (5). The bus bar (1) is shown as a horizontal bar with eight screw holes. The terminals (2) are shown as vertical bars with eight screw holes. The flat washers (3), lockwashers (4), and screws (5) are shown being inserted through the bus bar (1) into the terminals (2).</p>	

5-10. COVER CIRCUIT BREAKERS AND BUS BAR INSTALLATION PROCEDURE (CONT)

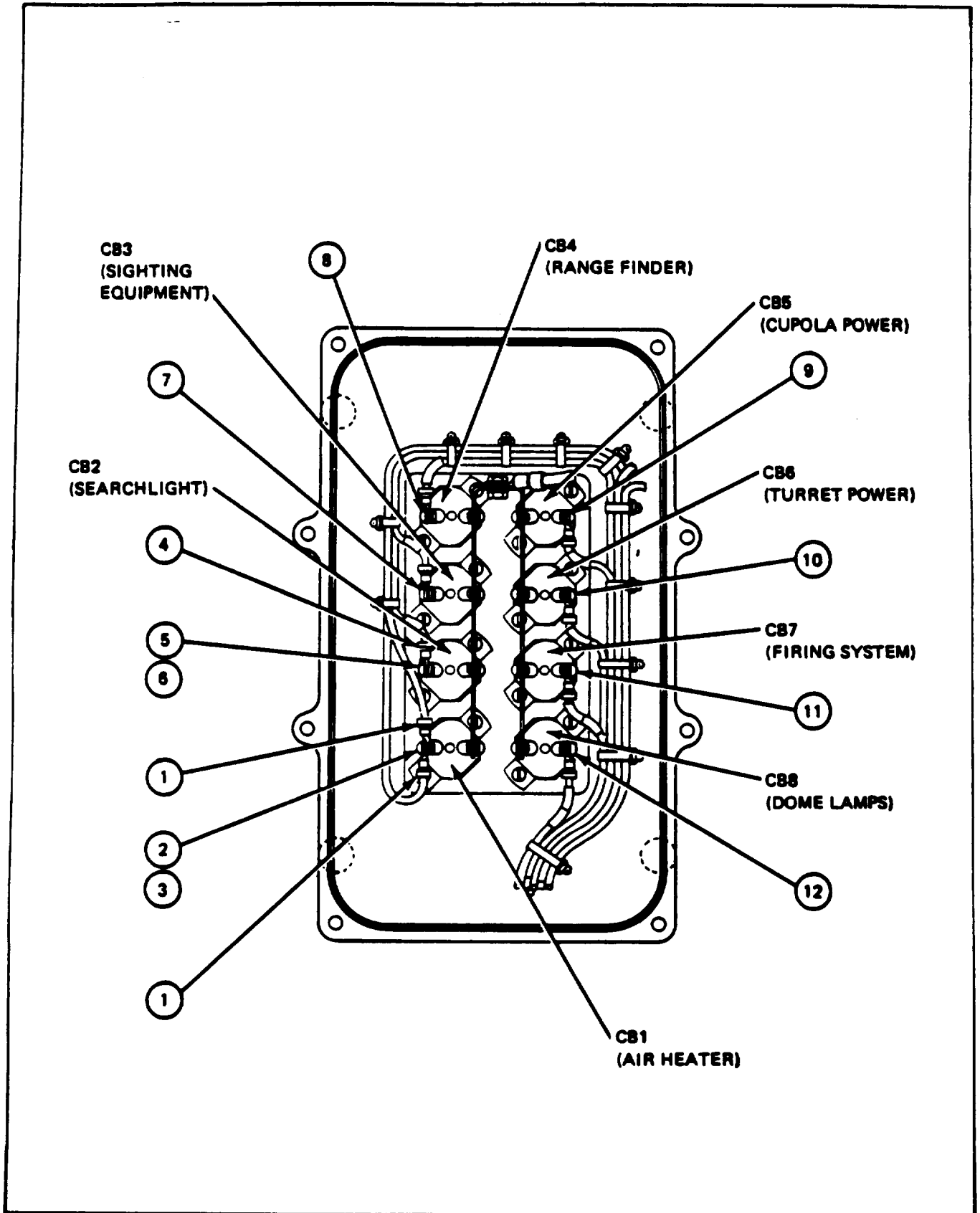
FRAME 3

Step	Procedure
1.	Put lead terminal (1) in mounting position on bus bar (2).
2.	Put lockwasher screw (3) through lead terminal (1) and bus bar (2).
3.	Put 1/4" wrench on lockwasher screw (3).
4.	Using 11/32" wrench, put lockwasher (4) and nut (5) on lockwasher screw (3). GO TO FRAME 4



5-10. COVER CIRCUIT BREAKERS AND BUS BAR INSTALLATION PROCEDURE (CONT)

FRAME 4	
Step	Procedure
1.	Using flat tip screwdriver, attach two wire terminals (1) (without circuit numbers) to circuit breaker CBI terminal with lockwasher (2) and screw (3).
2.	Using flat tip screwdriver, attach wire terminal (4) (circuit 518G) to circuit breaker CB2 terminal with lockwasher (5) and screw (6).
NOTE	
Procedure for installing harness wires to circuit breakers CB3 thru CB8 are same as procedure in step 2.	
3.	Do step 2 for: Wire terminal (7) (circuit 147) and CB3 Wire terminal (8) (circuit 147-465) and CB4 Wire terminal (9) (circuit 111) and CB5 Wire terminal (10) (circuit 625) and CB6 Wire terminal (11) (circuit 115-117) and CB7 Wire terminal (12) (circuit 138-810) and CB8.
NOTE	
Follow-on Maintenance Action Required: Install relay box cover (para 5-8). Test relay box (para 5-4).	
END OF TASK	



5-11. HARNESS AND CONNECTOR REMOVAL PROCEDURE

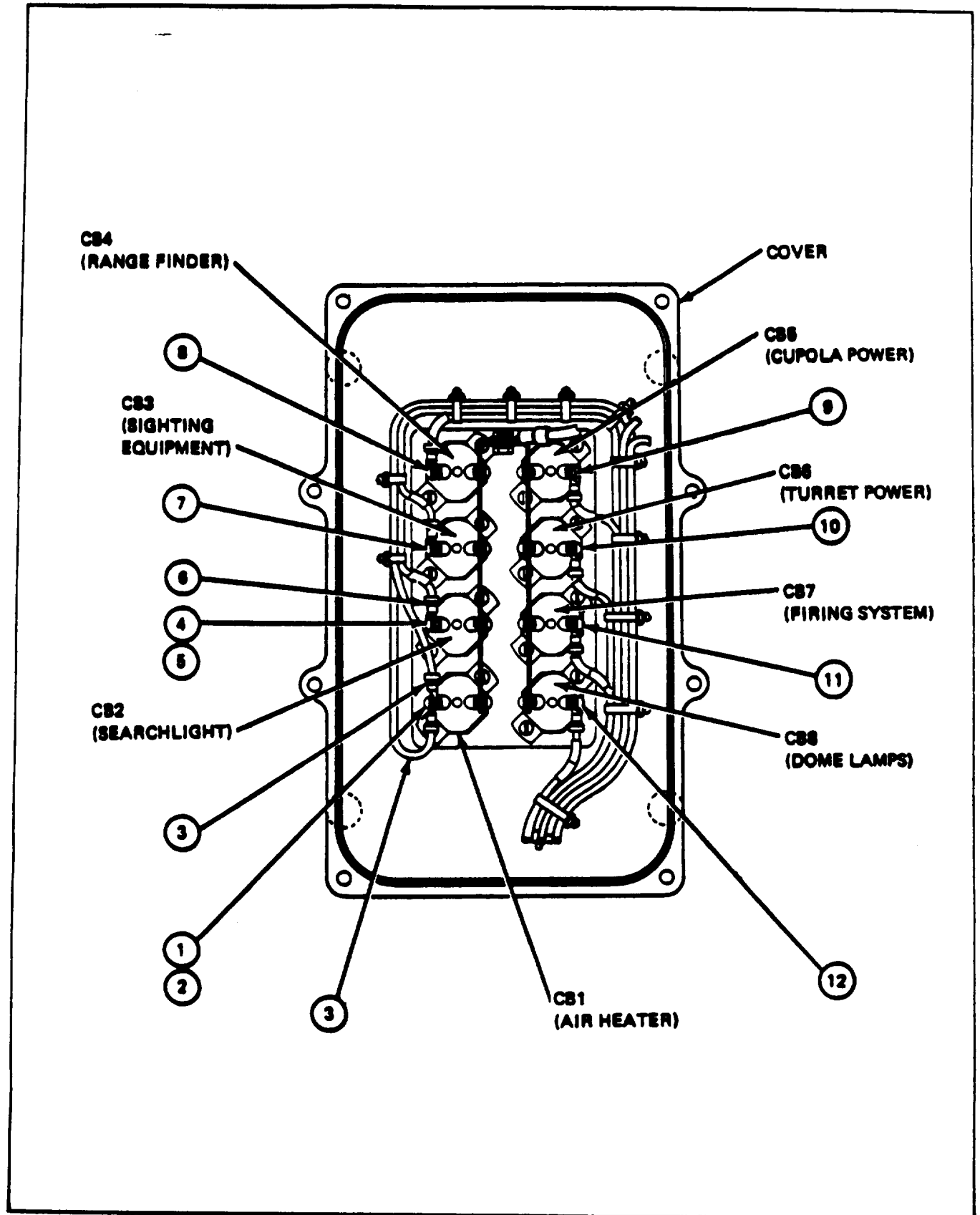
APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

TOOLS: 1/4" flat tip screwdriver
 5/16" socket, single socket spinner type

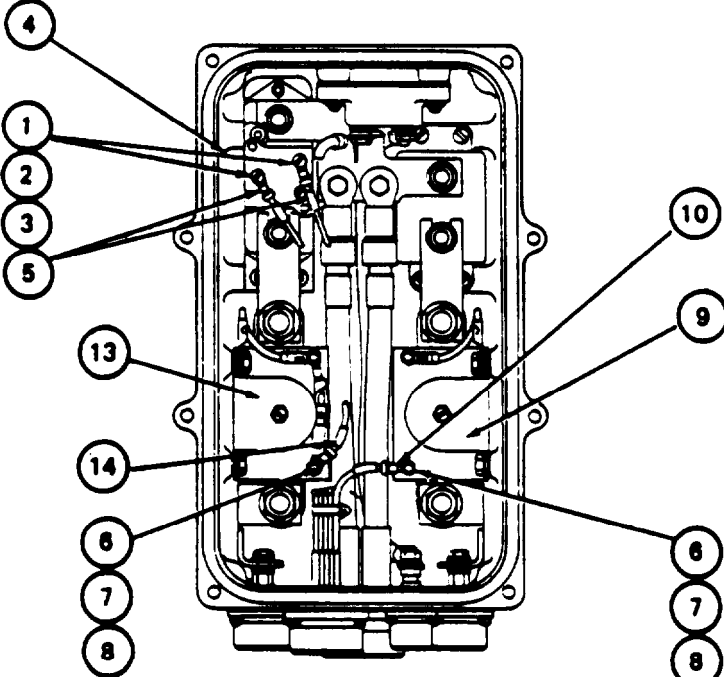
PERSONNEL: One

PRELIMINARY PROCEDURES: Test relay box (para 5-4)
 Remove relay box cover (para 5-7)
 Inspect relay box (para 5-3)

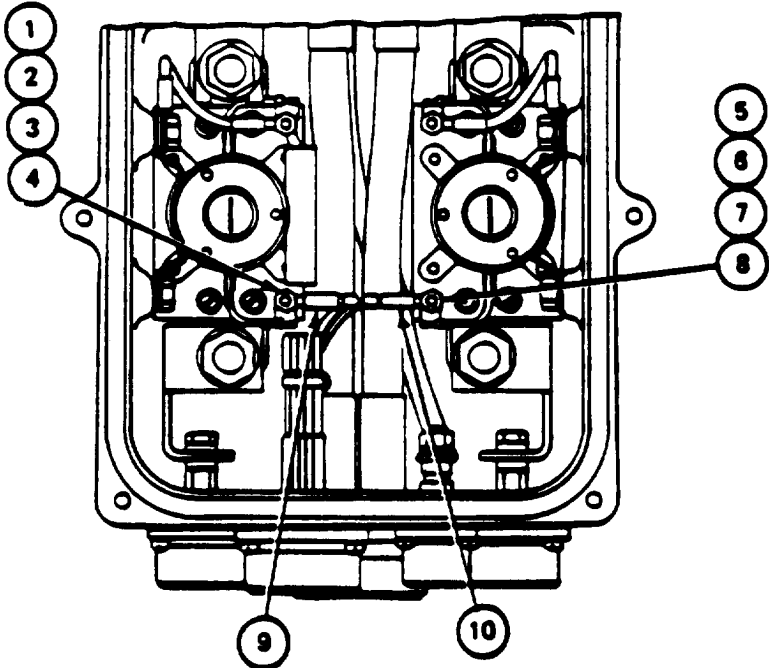
FRAME 1	
Step	Procedure
	<p>NOTE</p> <p>CB1 has two wires attached to terminal. CB2 thru CB8 have only one wire attached to terminal.</p>
1.	Using screwdriver, remove screw (1) and lockwasher (2) from terminal of circuit breaker CB1.
2.	Remove terminals of two wires (3) from terminal of circuit breaker CB1.
3.	Using screwdriver, remove screw (4) and lockwasher (5) from terminal of circuit breaker CB2.
4.	Remove wire terminal (6) from terminal of circuit breaker CB2.
	<p>NOTE</p> <p>Procedure for removing harness wires from remaining circuit breakers are similar to procedures in steps 3 and 4.</p>
5.	Do steps 3 and 4 to remove: Wire terminal (7) from CB3 Wire terminal (8) from CB4 wire terminal (9) from CBS Wire terminal (10) from CB6 Wire terminal (11) from CB7 Wire terminal (12) from CB8. GO TO FRAME 2



5-11. HARNESS AND CONNECTOR REMOVAL PROCEDURE (CONT)

FRAME 2	
Step	Procedure
	<p style="text-align: center;">NOTE</p> <p style="text-align: center;">This frame is for relay box 11654980 which contains a power control device (3). If harness and receptacle is being removed from relay box 10905722, go to Frame 3.</p> <ol style="list-style-type: none"> 1. Using screwdriver, remove two screws (1), two lockwashers (2), and two flat washers (3) from terminals S1 and S2 of power circuit breaker (4). 2. Remove wire terminals (5) from power circuit breaker (4). 3. Using socket wrench, remove nut (6), lockwasher (7), and flat washer (8) from terminal X2 of searchlight relay (9). 4. Remove wire terminal (10) from searchlight relay (9). 5. Remove second flat washer (8) from terminal X2 of searchlight relay (9). 6. Using socket wrench, remove nut (6), lockwasher (7) and flat washer (8) from terminal XI of power relay (11). 7. Remove wire terminal (12) from power relay (11). <p style="text-align: center;">GO TO FRAME 3</p>
	 <p>The diagram shows a top-down view of a rectangular relay box. It contains two main relay units. Various screws, washers, nuts, and terminals are labeled with circled numbers 1 through 14. Callout 1 points to screws on the top left. Callouts 2 and 3 point to lockwashers and flat washers on the top left. Callout 4 points to a power circuit breaker at the top. Callouts 5 and 10 point to wire terminals on the left and right sides. Callouts 6, 7, and 8 point to nuts, lockwashers, and flat washers on terminals X2 and XI. Callouts 11, 12, 13, and 14 point to other internal components and terminals.</p>

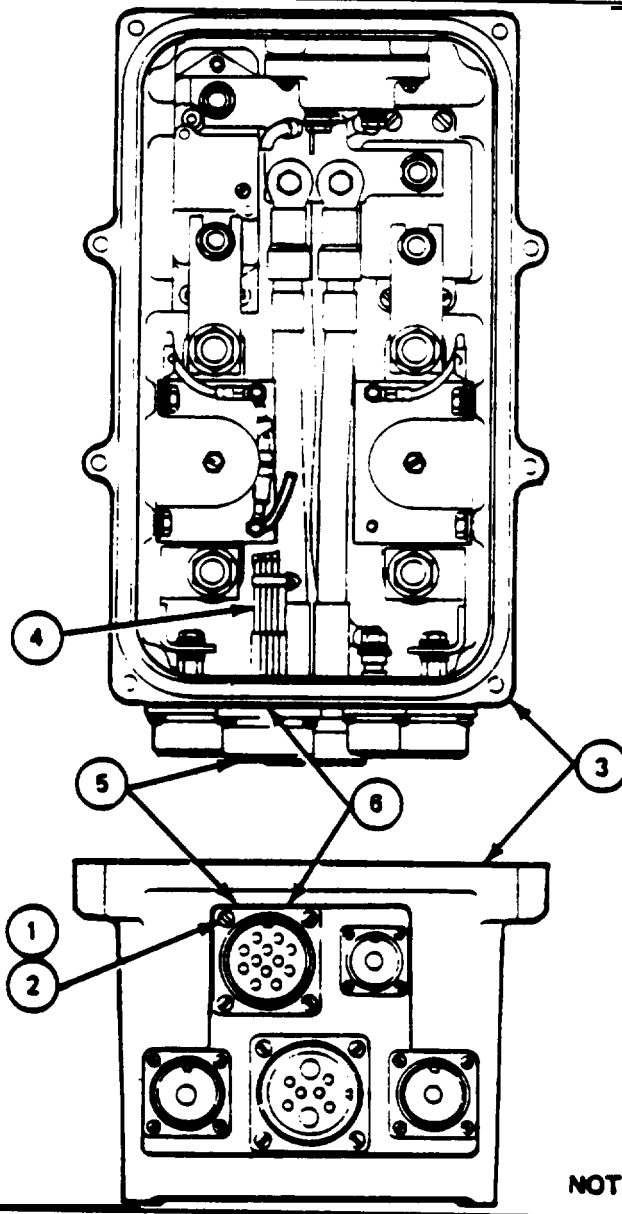
5-11. HARNESS AND CONNECTOR REMOVAL PROCEDURE (CONT)

FRAME 3	
Step	Procedure
	<p style="text-align: center;">NOTE</p> <p style="text-align: center;">This rame is for relay box 10905722 which contains a power circuit breaker in place of a power control device.</p> <ol style="list-style-type: none"> 1. Using socket wrench, remove nut (1), lockwasher (2) and flat washer (3) from power relay terminal (4). 2. Using socket wrench, remove nut (5), lockwasher (6) and flat washer (7) from searchlight relay terminal (8). 3. Using hand, pull wire connector (9) from power relay terminal (4). 4. Using hand, pull wire connector (10) from searchlight relay terminal (8). 5. Remove second flat washer (7) from searchlight relay terminal (8). <p>GO TO FRAME 4</p>
	<div style="text-align: center;">  <p style="text-align: center;">NOTE: RELAY BOX 10905722 SHOWN</p> </div>

5-11. HARNESS AND CONNECTOR REMOVAL PROCEDURE (CONT)

FRAME 4

Step	Procedure
1.	Using screwdriver, remove four screws (1) and four lockwashers (2) from relay box (3).
2.	Using hands, pull lead assembly (harness) (4) with connector (5) and gasket (6) from relay box (3).
3.	Remove gasket (6) from connector (5).
END OF TASK	



NOTE: RELAY BOX 11654980 SHOWN

5-12. HARNESS AND CONNECTOR INSTALLATION PROCEDURE

APPLICABLE CONFIGURATIONS: 11654980 or 10905722 relay box

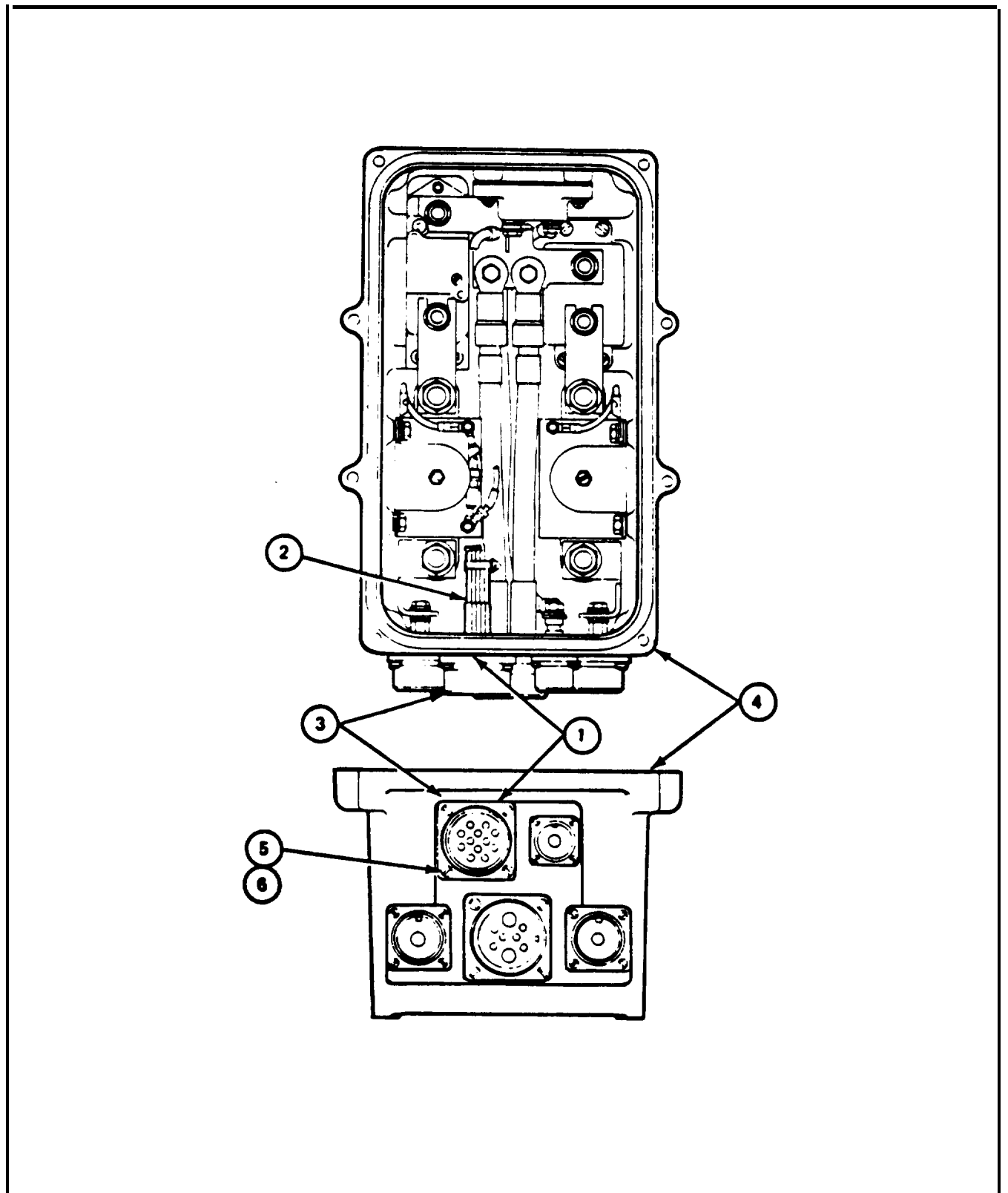
TOOLS: 1/4" flat tip screwdriver
5/16" socket wrench, single socket spinner type

SUPPLIES: Gasket, MS 52000-10

PERSONNEL One

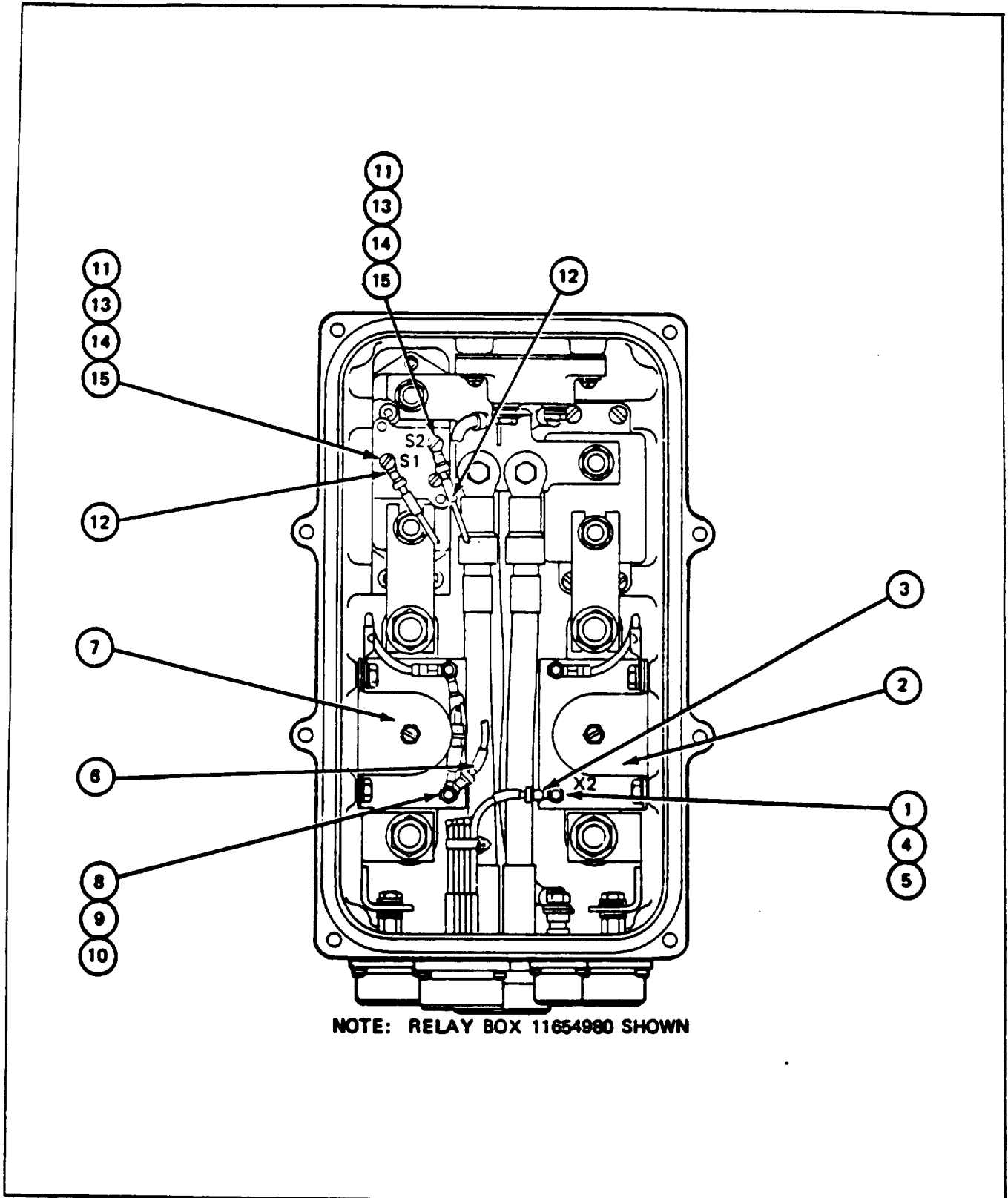
5-12. HARNESS AND CONNECTOR INSTALLATION PROCEDURE (CONT)

FRAME 1	
Step	Procedure
1.	Put gasket (1) over harness (2) and slide down until it is near connector (3).
2.	Pull harness (2) through hole in end of box (4).
NOTE	
Connector (3) keyway must be up (12 o'clock).	
3.	Align mounting holes with connector (3) and gasket (1).
4.	Using screwdriver, put four screws (5) and four lockwashers (6) in box (4).
GO TO FRAME 2	



5-12. HARNESS AND CONNECTOR INSTALLATION PROCEDURE (CONT)

FRAME 2	
Step	Procedure
1.	put flat washer (1) on terminal X2 of searchlight relay (2).
2.	Put wire terminal (3) (wire harness circuit 518B) on terminal X2 of searchlight relay (2).
3.	Using socket wrench, put second flat washer (1), lockwasher (4), and nut (5) on terminal X2 of searchlight relay (2).
4.	Put wire terminal (6) (wire harness circuit 645A) on terminal X1 of power relay (7).
5.	Using socket wrench, put flat washer (8), lockwasher (9) and nut (10) on terminal X1 of power relay (7).
6.	Using screwdriver, put wire terminals (11) (circuit 645A) on terminal S2 and (circuit 645) on terminal S1 of power control device (12) with flat washer (13), lockwasher (14), and screw (15).
	GO TO FRAME 3

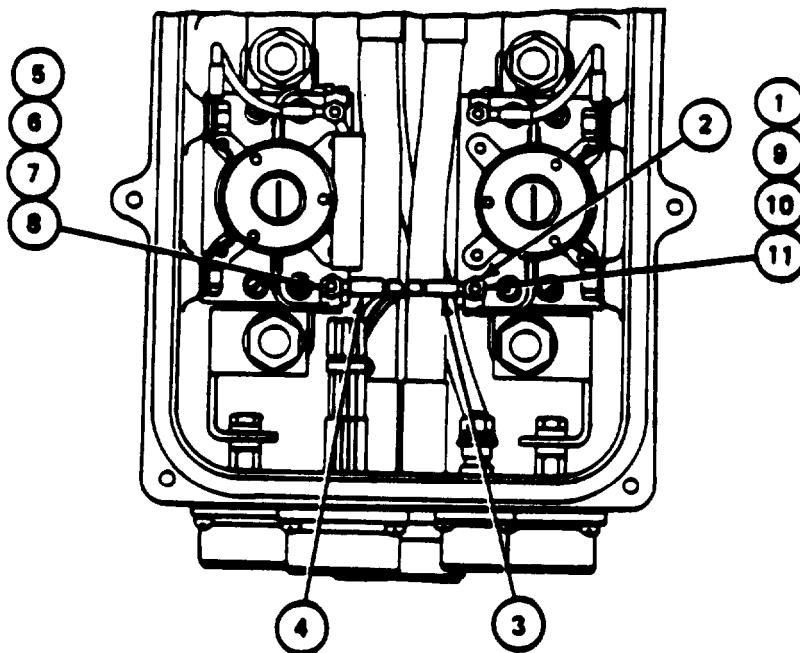


NOTE: RELAY BOX 11654980 SHOWN

5-12. HARNESS AND CONNECTOR INSTALLATION PROCEDURE (CONT)

FRAME 3

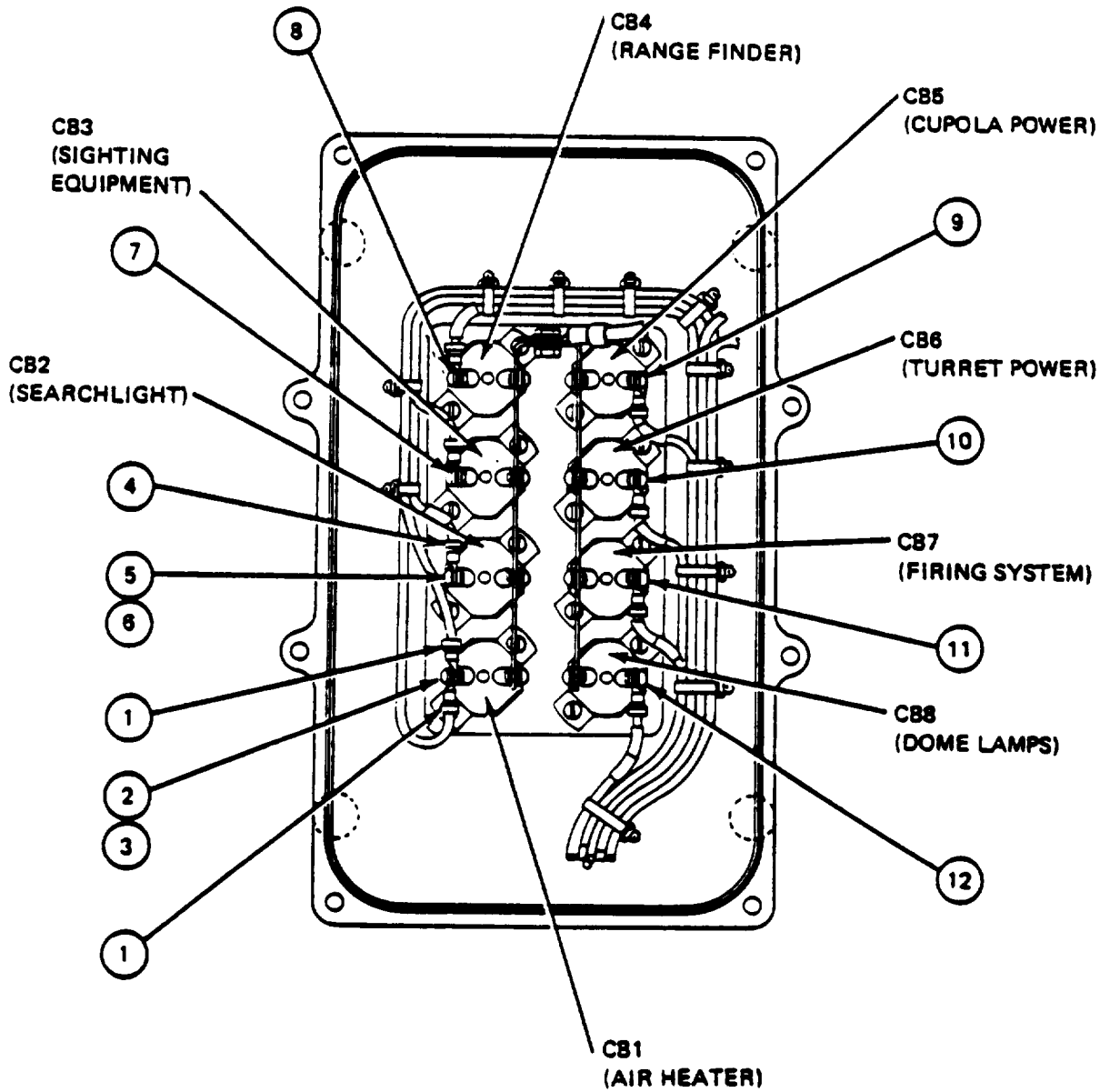
Step	Procedure
	<p style="text-align: center;">NOTE</p> <p style="text-align: center;">This frame is for relay box 10905722 which contains a power circuit braker in place of a power control device.</p> <ol style="list-style-type: none"> 1. Put flat washer (1) on searchlight relay terminal (2). 2. Place wire (518B) connector (3) on searchlight relay terminal X2 (2). 3. Place wire (645) connector (4) on power relay terminal (5), 4. Using socket wrench, put flat washer (6), lockwasher (7) and nut (8) on power relay terminal (5), 5. Using socket wrench, put flat washer (9), lockwasher (10) and nut (11) on searchlight relay terminal (2). <p>GO TO FRAME 4</p>



NOTE: RELAY BOX 10905722 SHOWN

5-12. HARNESS AND CONNECTOR INSTALLATION PROCEDURE (CONT)

FRAME 4	
Step	Procedure
1.	Using screwdriver, attach two wire terminals (1) (without circuit numbers) to circuit breaker CB 1 terminal with lockwasher (2) and screw (3).
2.	Using screwdriver, attach wire terminal (4) (circuit 518G) to circuit breaker CB2 terminal with lockwasher (5) and screw (6).
NOTE	
Procedures for installing harness wires to circuit breakers CB3 thru CB8 are same as procedure in step 2.	
3.	<p>Do step 2 for:</p> <ul style="list-style-type: none"> Wire terminal (7) (circuit 147) and CB3 Wire terminal (8) (circuit 147-465) and CB4 Wire terminal (9) (circuit 111) and CB5 Wire terminal (10) (circuit 625) and CB6 Wire terminal (11) (circuit 115-117) and CB7 Wire terminal (12) (circuit 138-810) and CB8.
NOTE	
Follow-on Maintenance Action Required:	
Install relay box cover (para 5-8).	
Test relaybox (para 5-4).	
END OF TASK	



5-13. POWER INPUT CONNECTOR REMOVAL PROCEDURE

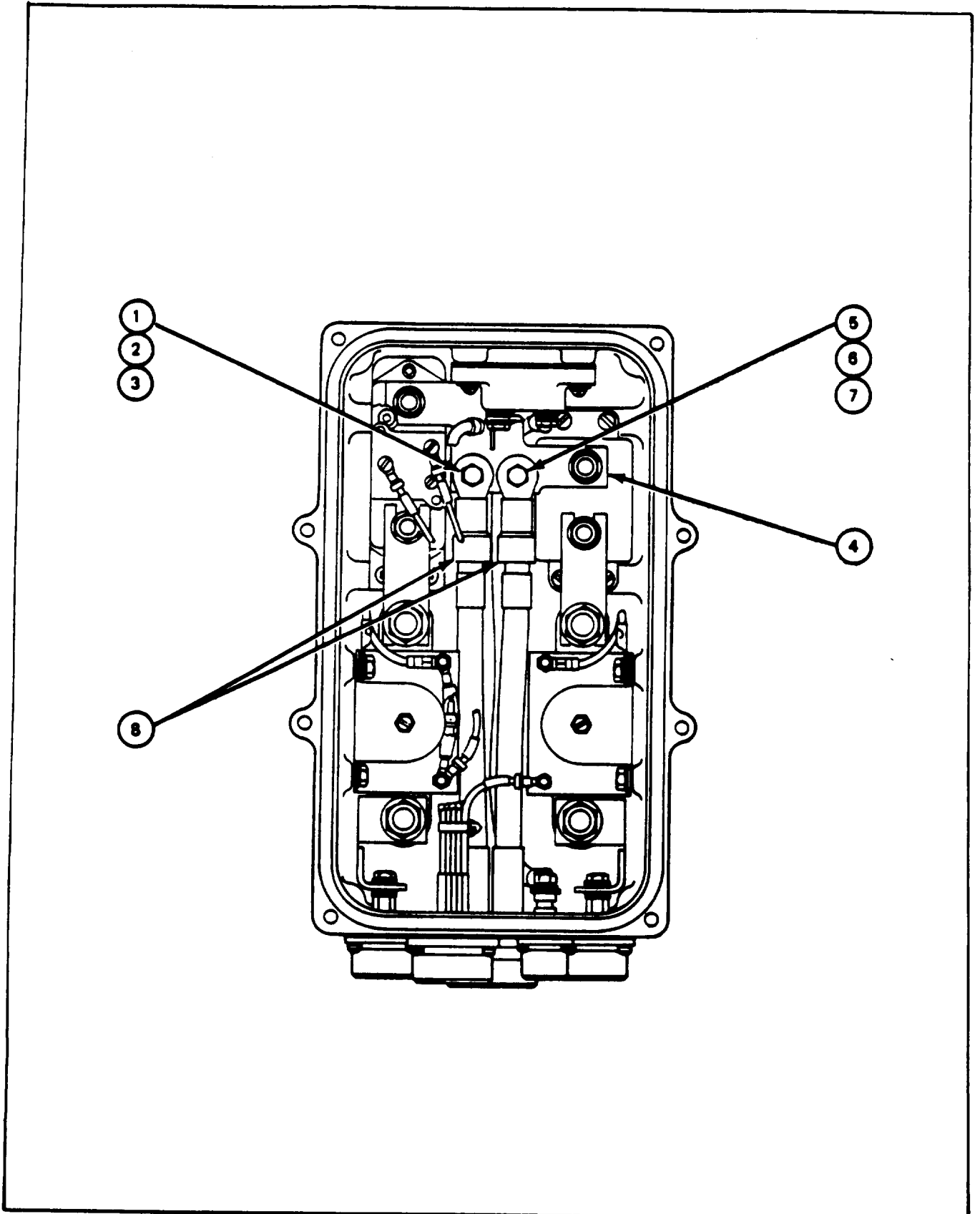
APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

TOOLS: 7/16" combination wrench
 1/4" flat tip screwdriver
 7/16" socket (3/8" drive)
 6" extension (3/8" drive)
 3/8" drive ratchet

PERSONNEL: One

PRELIMINARY PROCEDURES: Teat relay box (para 5-4)
 Remove relay 6X cover (para 5-7)
 Remove power input bus bar (para 5-19)

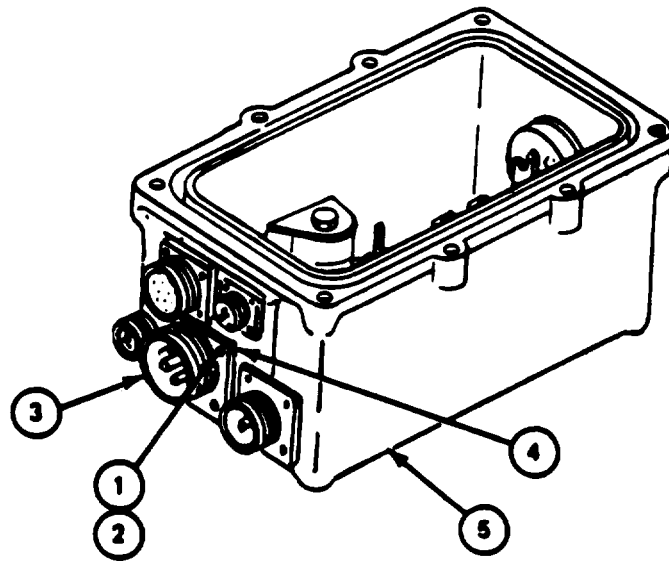
FRAME 1	
Step	Procedure
1.	Using socket wrench on screw (1) and combination wrench on nut (2), remove screw (1), nut (2) and two lockwashers (3) from bus bar (4).
2.	Using socket wrench on screw (5), and combination wrench on nut (6), remove screw (5), nut (6), and two lockwashers (7) from bus bar (4).
3.	Remove terminals of two wires (8) from bus bar (4).
	GO TO FRAME 2



5-13. POWER INPUT CONNECTOR REMOVAL PROCEDURE (CONT)

FRAME 2

Step	Procedure
1.	Using screwdriver, remove four screws (1) and four lockwashers (2) from connector (3).
2.	Pull connector (3) with attached wires, and gasket (4) from relay box (5).
3.	Remove gasket (4) from connector (3). END OF TASK



5-14. POWER INPUT CONNECTOR INSTALLATION PROCEDURE

APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

TOOLS: 1/4" flat Up screwdriver
5" extension (3/8" drive)
7/16" combination wrench
7/16" socket (3/8" drive)
3/8" drive ratchet

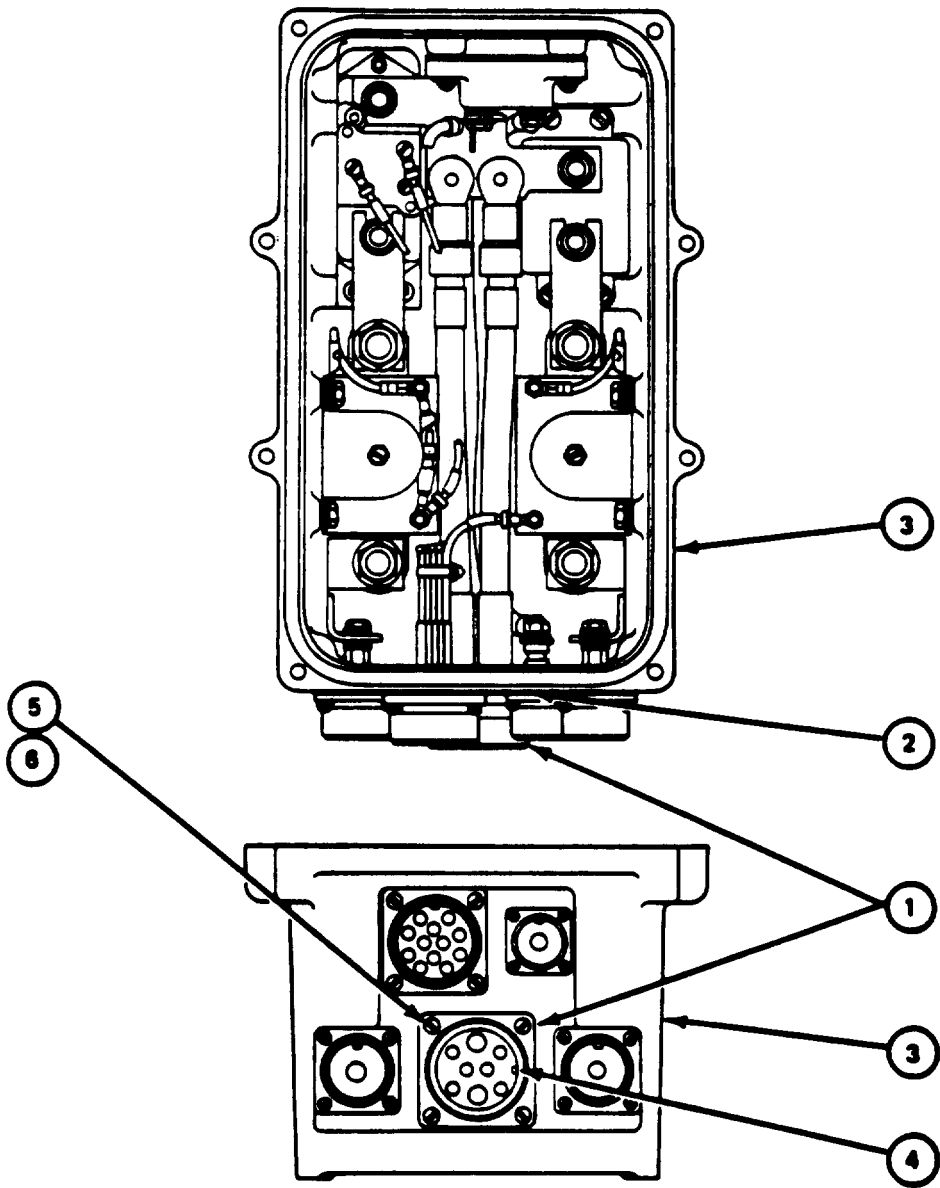
SUPPLIES: Gasket MS52000- 12

PERSONNEL One

5-14. POWER INPUT CONNECTOR INSTALLATION PROCEDURE (CONT)

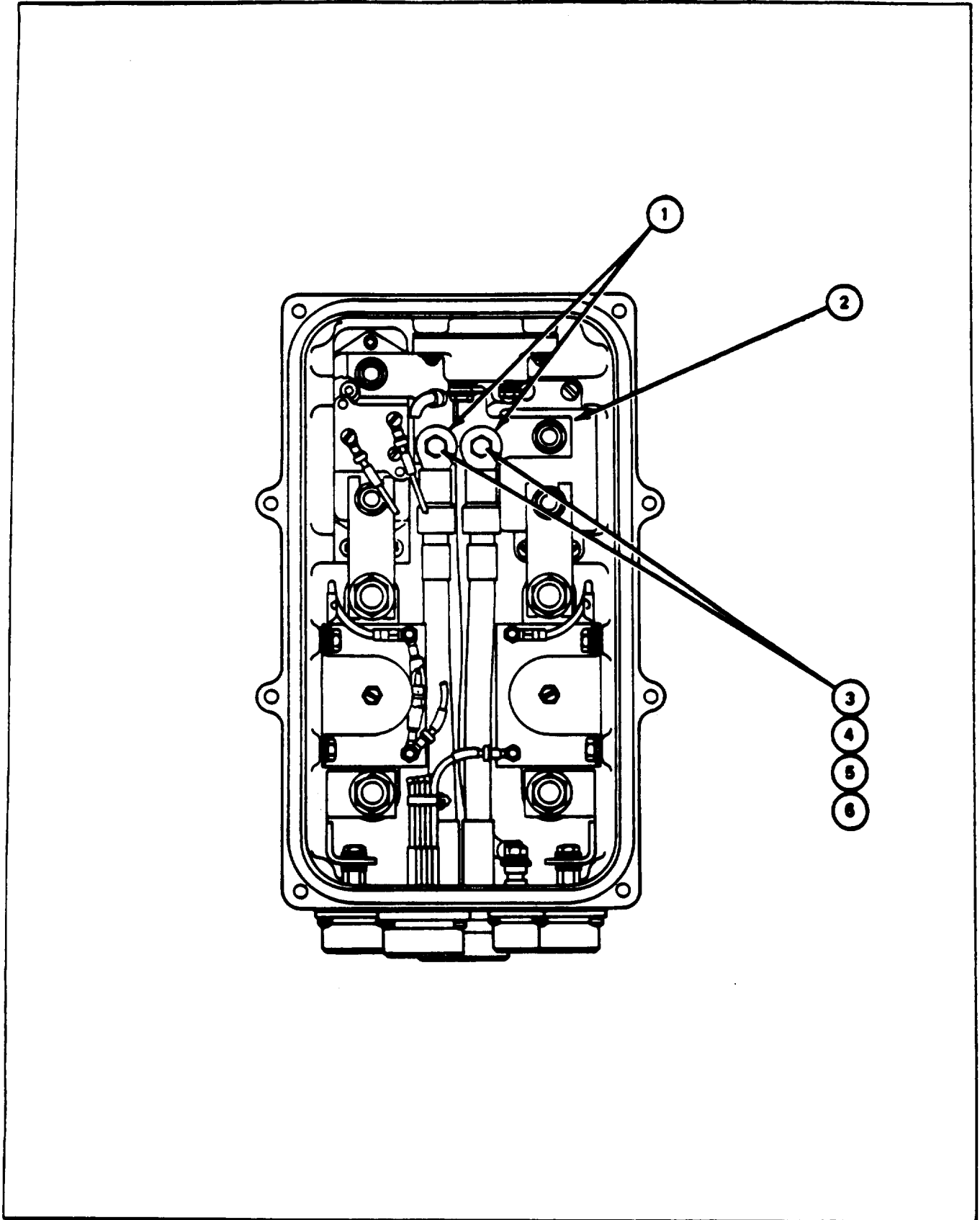
FRAME 1

Step	Procedure
1.	Put lead assembly connector (1) and new gasket (2) on relay box (3) so that connector key (4) is on the tight side of connector (1).
2.	Using screwdriver, put in four screws (5) and four lockwashers (6), GO TO FRAME 2



5-14. POWER INPUT CONNECTOR INSTALLATION PROCEDURE (CONT)

FRAME 2	
Step	Procedure
1.	Put two lead terminals (1) in mounting place on top of bus bar (2).
2.	Put two screws (3) with two lockwashers (4) through two lead terminals (1), and two screw holes in bus bar (2).
	NOTE
	In next step, two lockwashers (6) and two nuts (5) are put on two screws at underside of bus bar.
3.	Using socket wrench on screws (3) and combination wrench on nuts (5), put two lockwashers (6) and two nuts (5) on two screws (3).
	NOTE
	Follow-on Maintenance Action Required: Install power input bus bar (para 5-20). Install relay box cover (para 5-8). Test relay box (para 5-4).
	END OF TASK



5-15. COVER CIRCUIT BREAKERS POWER CABLE REMOVAL PROCEDURE

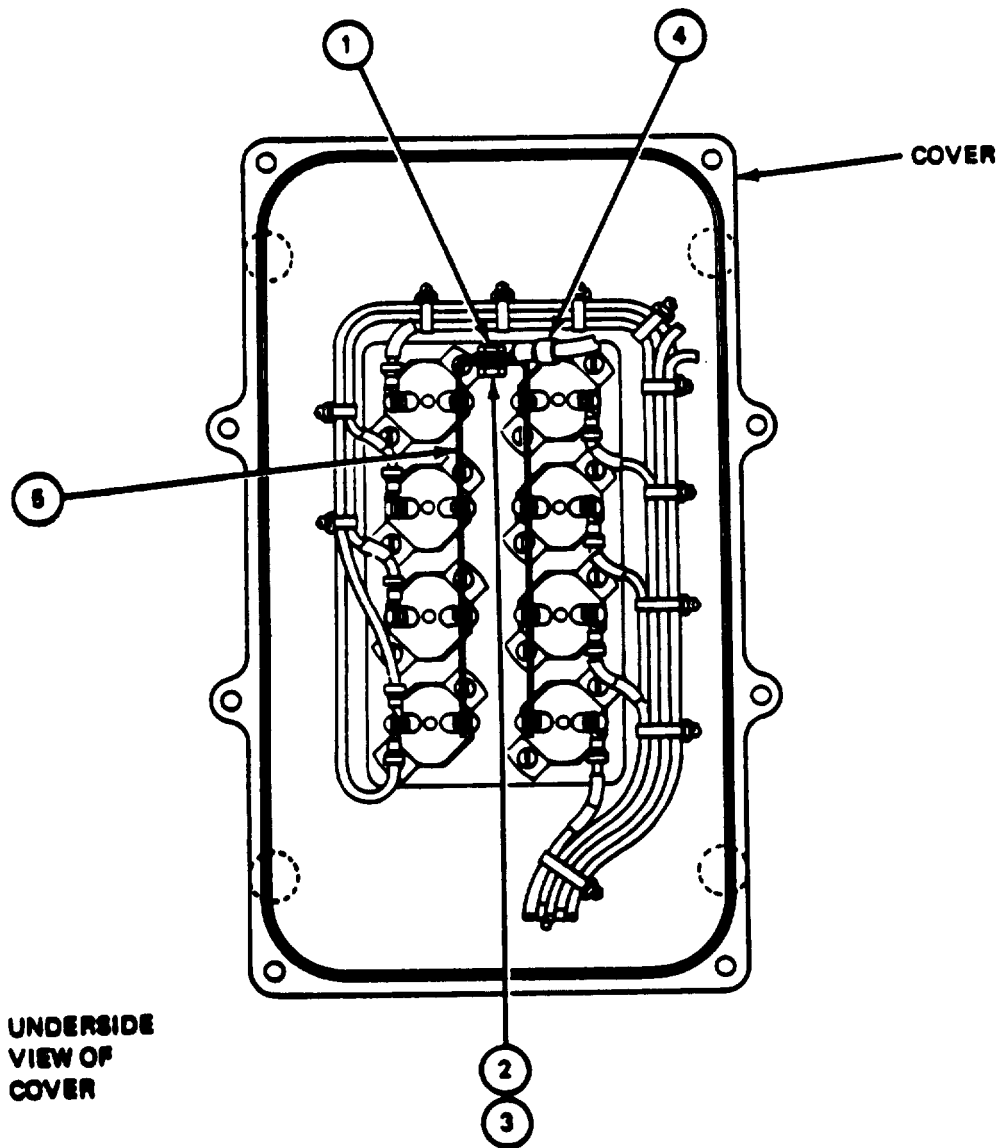
APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

TOOLS: 11/32" open end wrench
1/4" open end wrench

PERSONNEL: ONE

PRELIMINARY PROCEDURES: Test relay box (para 5-4)
Remove relay box cover (para 5-7)
Inspect relay box (para 5-3)

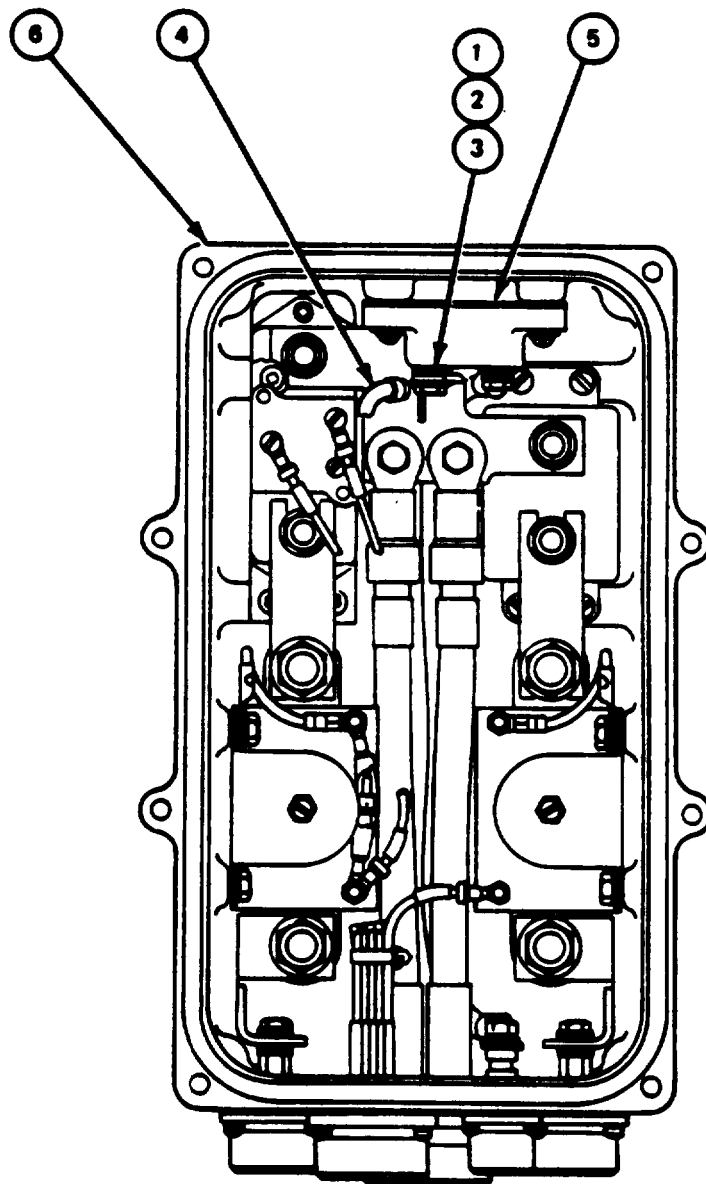
FRAME 1	
Step	Procedure
1.	Using 1/4" wrench on lockwasher screw (1) and, 11/32" wrench on nut (2), remove nut (2) and lockwasher (3),
2.	Remove power cable terminal (4) from bus bar (5).



5-15. COVER CIRCUIT BREAKERS POWER CABLE REMOVAL PROCEDURE (CONT)

FRAME 2

Step	Procedure
1.	Using 1/4" wrench on lockwasher screw (1) and 11/32" wrench on nut (2), remove lockwasher screw (1), nut (2) and lockwasher (3) that attaches power cable (4) to bus bar (5).
2.	Remove power cable (4) from relay box (6). END OF TASK



5-16. COVER CIRCUIT BREAKERS POWER CABLE INSTALLATION PROCEDURE

APPLICABLE CONFIGURATIONS 10905722 or 11654980 relay box

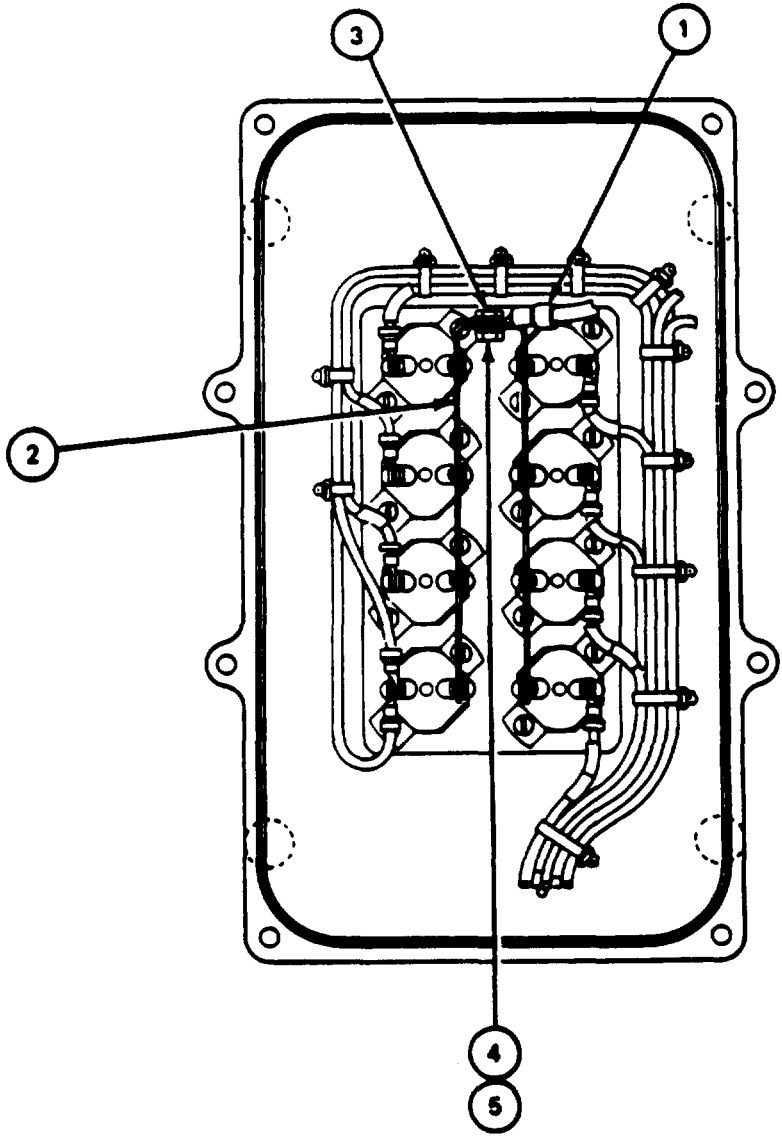
TOOLS: 1/4" open end wrench
1 1/32" open end wrench

PERSONNEL: One

5-16. COVER CIRCUIT BREAKERS POWER CABLE INSTALLATION PROCEDURE (CONT)

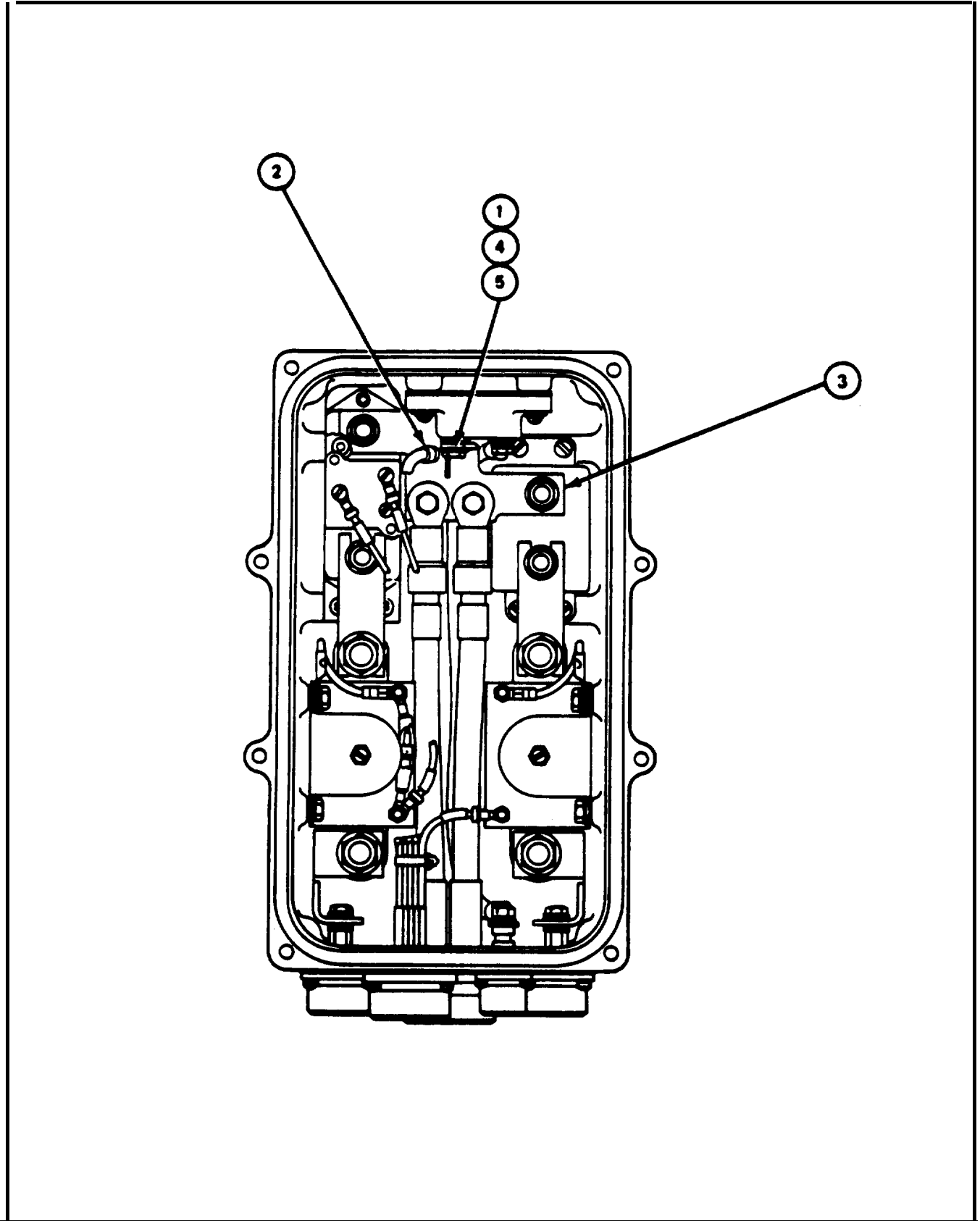
FRAME 1

Step	Procedure
1.	Put power cable terminal (1) in mounting position on bus bar (2).
2.	Put lockwasher screw (3) through power cable terminal (1) and bus bar (2).
3.	Put 1/4" wrench on lockwasher screw (3).
4.	Using 11/32" wrench, put lockwasher (4) and nut (5) on lockwasher screw (3). GO TO FRAME 2



5-16. COVER CIRCUIT BREAKERS POWER CABLE INSTALLATION PROCEDURE (CONT)

FRAME 2	
Step	Procedure
1.	Put lockwasher screw (1) through power cable terminal (2) and bus bar (3).
2.	Put lockwasher (4) and nut (5) on lockwasher screw (1).
3.	Using 1/4" wrench and 11/32" wrench, tighten nut (5).
	<p>NOTE</p> <p>Follow-on Maintenance Action Required:</p> <p>Install relay box cover (pint 5-8).</p> <p>Test relay box (para 5-4).</p>
	END OF TASK



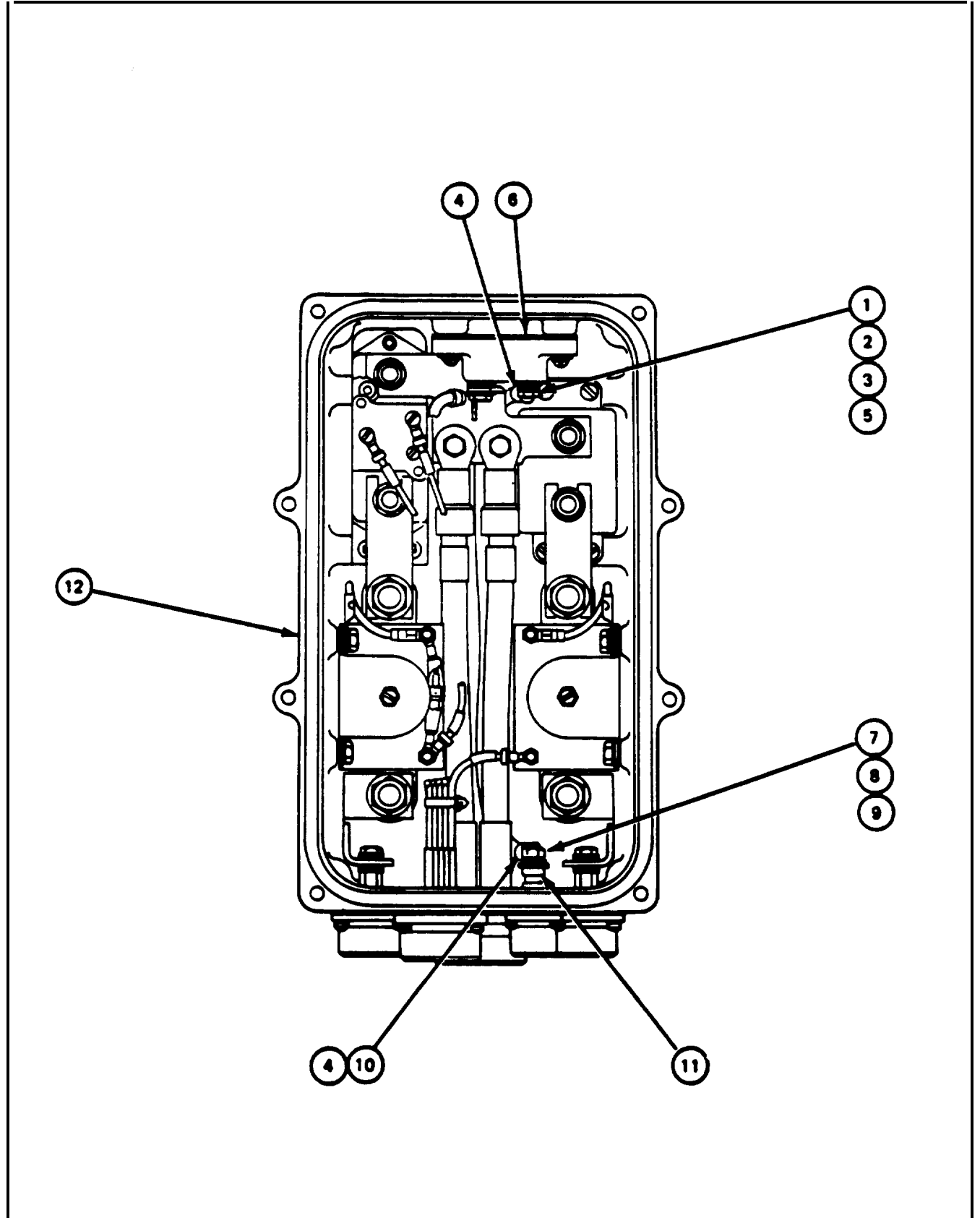
**5-17. BLOWER CIRCUIT BREAKER LEAD AND CONNECTOR REMOVAL
PROCEDURE**

APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

TOOLS: 7/16" combination wrench
Slip joint pliers
1/4" flat tip screwdriver

PRELIMINARY PROCEDURES: Test relay box (para 5-4)
Remove relay box cover-(para 5-7)
Inspect relay box (para 5-3)

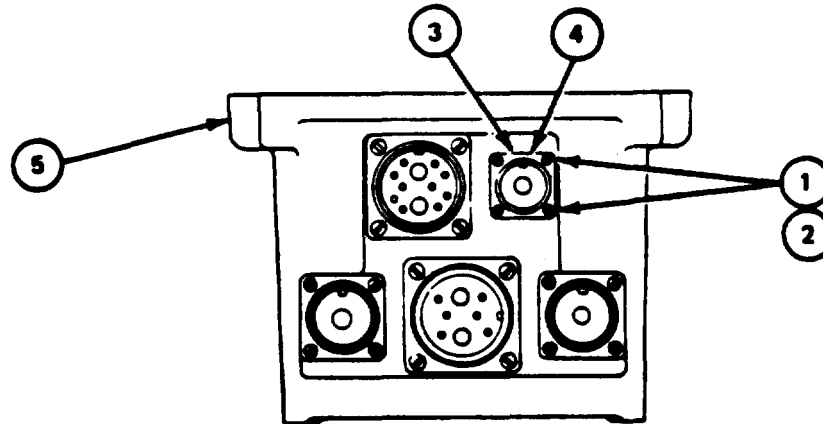
FRAME 1	
Step	Procedure
1.	Using wrench, remove screw (1), lockwasher (2), terminal (3) of lead (4) and lockwasher (5) from circuit breaker (6). NOTE In following step, put wrench on nut (7) and slip joint pliers on connector terminal (11).
2.	Using wrench and slip joint pliers, remove nut (7), lockwasher (8), flat washer (9) and terminal (10) of lead (4) from connector terminal (11).
3.	Remove lead (4) from relay box (12). GO TO FRAME 2



5-17. BLOWER CIRCUIT BREAKER LEAD AND CONNECTOR REMOVAL
 PROCEDURE CONT)

FRAME 2

Step	Procedure
1.	Using screwdriver, remove four screws (1) and four lockwashers (2) from connector (3).
2.	Remove connector (3) and gasket (4) from relay box (5).
3.	Remove gasket (4) from connector (3). END OF TASK



5-18. BLOWER CIRCUIT BREAKER LEAD AND CONNECTOR INSTALLATION PROCEDURE

APPLICABLE CONFIGURATIONS 10905722 or 11654980 relay box

TOOLS: 7/16" combination wrench
 Slip joint pliers
 1/4" flat tip screwdriver

SUPPLIES: Gasket, MS52000-5

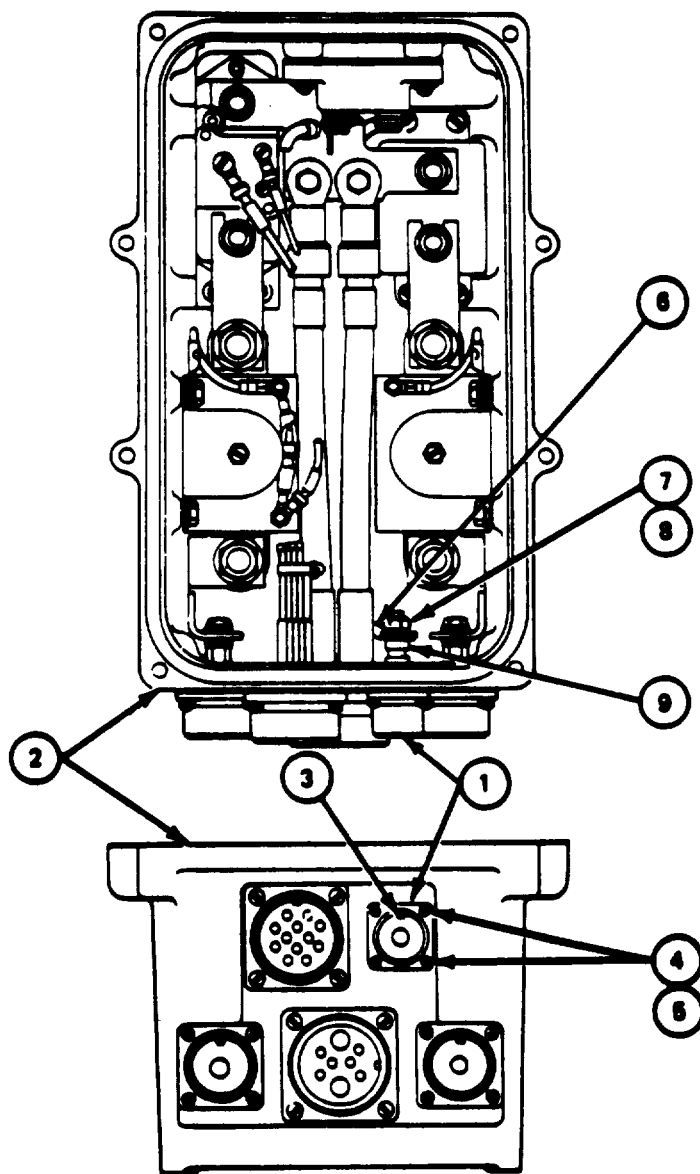
PERSONNEL: One

FRAME 1	
Step	Procedure
1.	Put new gasket (1) on blower circuit breaker connector (2).
2.	Put flat washer (3) on blower circuit breaker connector (2).
GO TO FRAME 2	

The diagram shows a cross-section of a blower circuit breaker connector. It consists of a cylindrical base with a threaded top section. Callout 1 points to a gasket being placed on the base. Callout 2 points to the base of the connector. Callout 3 points to a flat washer being placed on the threaded top section.

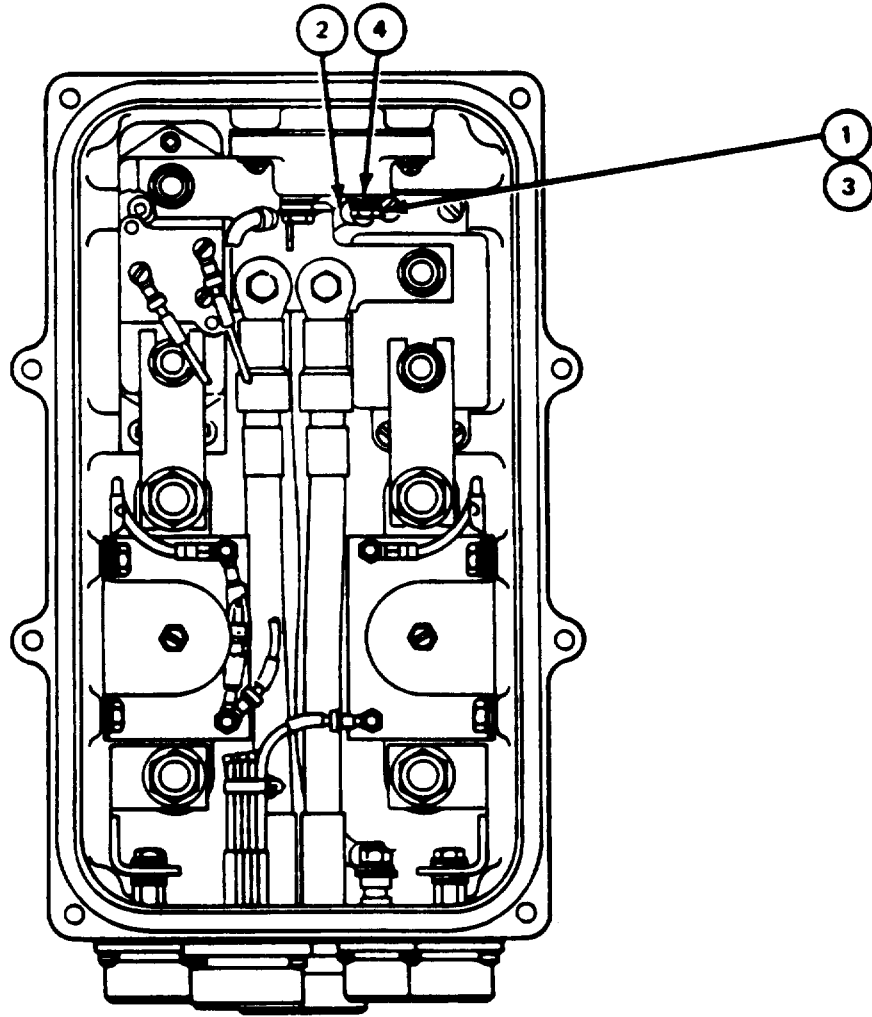
**5-18. BLOWER CIRCUIT BREAKER LEAD AND CONNECTOR INSTALLATION
PROCEDURE (CONT)**

FRAME 2	
Step	Procedure
1.	Put blower circuit breaker connector (1) on relay box (2) with connector key (3) at top of connector. <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Make sure screw holes in gasket are in line with screw holes in connector.</p>
2.	Using screwdriver, attach connector (1) to relay box (2) with four screws (4) and four lockwashers (5).
3.	Put terminal of lead (6), lockwasher (7) and nut (8) on connector terminal (9).
4.	Using wrench on nut (8) and pliers on connector terminal (9), tighten nut (8). GO TO FRAME 3



**5-18. BLOWER CIRCUIT BREAKER LEAD AND CONNECTOR INSTALLATION
PROCEDURE (CONT)**

FRAME 3	
Step	Procedure
1.	Put lockwasher (1), connector terminal (2) and second lockwasher (1) on screw (3).
2.	Using wrench, put screw (3) on circuit breaker terminal (4).
<p>NOTE</p> <p>Follow-on Maintenance Action Required:</p> <p>Install relay box cover (para 5-8).</p> <p>Test relay box (para 5-4).</p>	
END OF TASK	



5-19. POWER INPUT BUS BAR REMOVAL PROCEDURE

APPLICABLE CONFIGURATIONS: 11654980 or 10905722 relay box

TOOLS: 7/16" combination wrench
7/16" socket (3/8" drive)
6" extension (3/8" drive)
3/8" drive ratchet
5/8" socket (3/8" drive)
9/16" socket (3/8" drive)
1/4" open end wrench
11/32" open end wrench

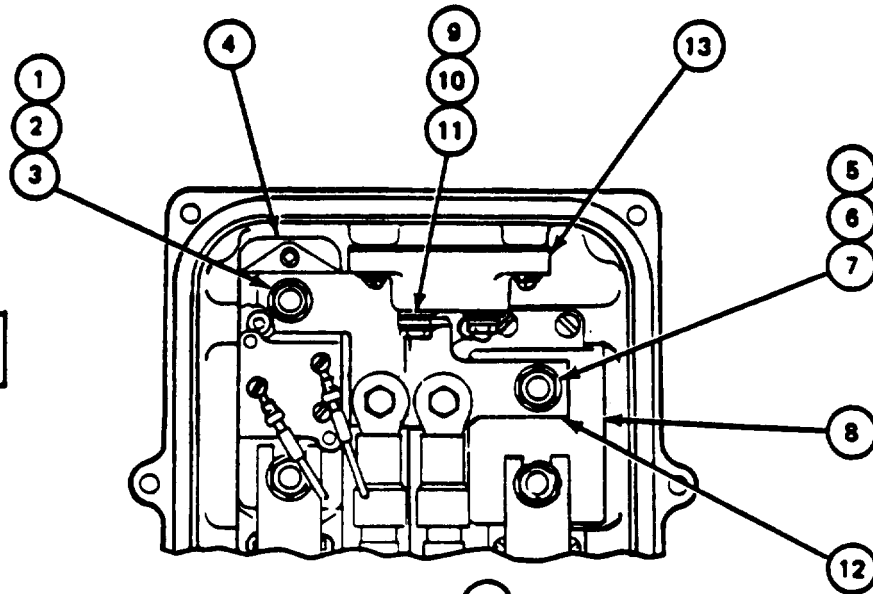
PERSONNEL: One

PRELIMINARY PROCEDURES: Test relay box (para 5-4)
Remove relay box cover (para 5-7)
Inspect relay box (para 5-3)
Remove cover circuit breakers power cable (para 5-15)

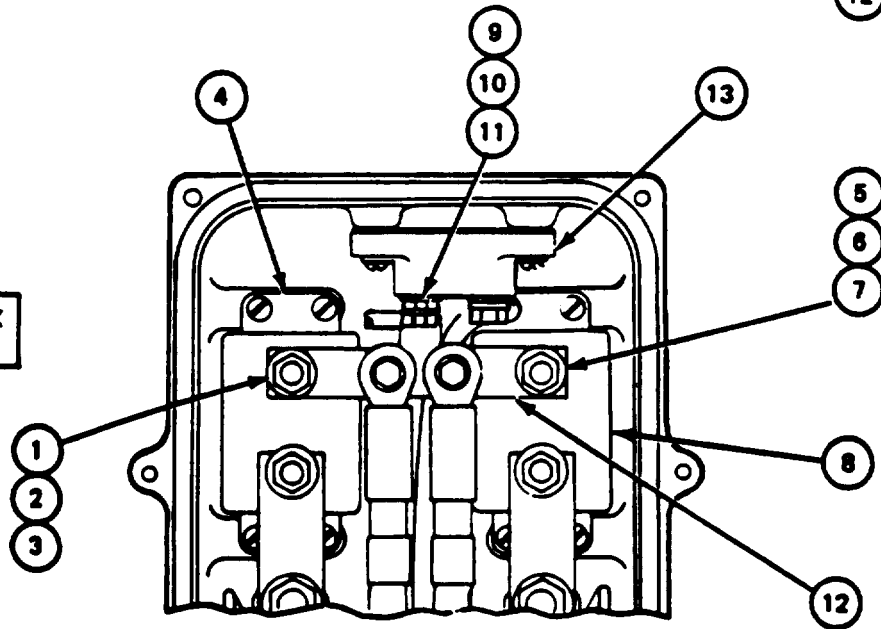
5-19. POWER INPUT BUS BAR REMOVAL PROCEDURE (CONT)

FRAME 1	
Step	Procedure
1.	Using 5/8" socket wrench, remove nut (1), lockwasher (2), and flat washer (3) from terminal of circuit breaker (4). <p style="text-align: center;">NOTE</p> <p style="text-align: center;">For relay box 10905722, use 5/8" socket wrench.</p>
2.	Using 9/16" socket wrench, remove nut (5), lockwasher (6), and flat washer (7) from terminal of circuit breaker (8).
3.	Using 7/16" combination wrench, remove screw (9), lockwasher (10), and flat washer (11) that attach bus bar (12) to circuit breaker (13). GO TO FRAME 2

RELAY BOX
11654980

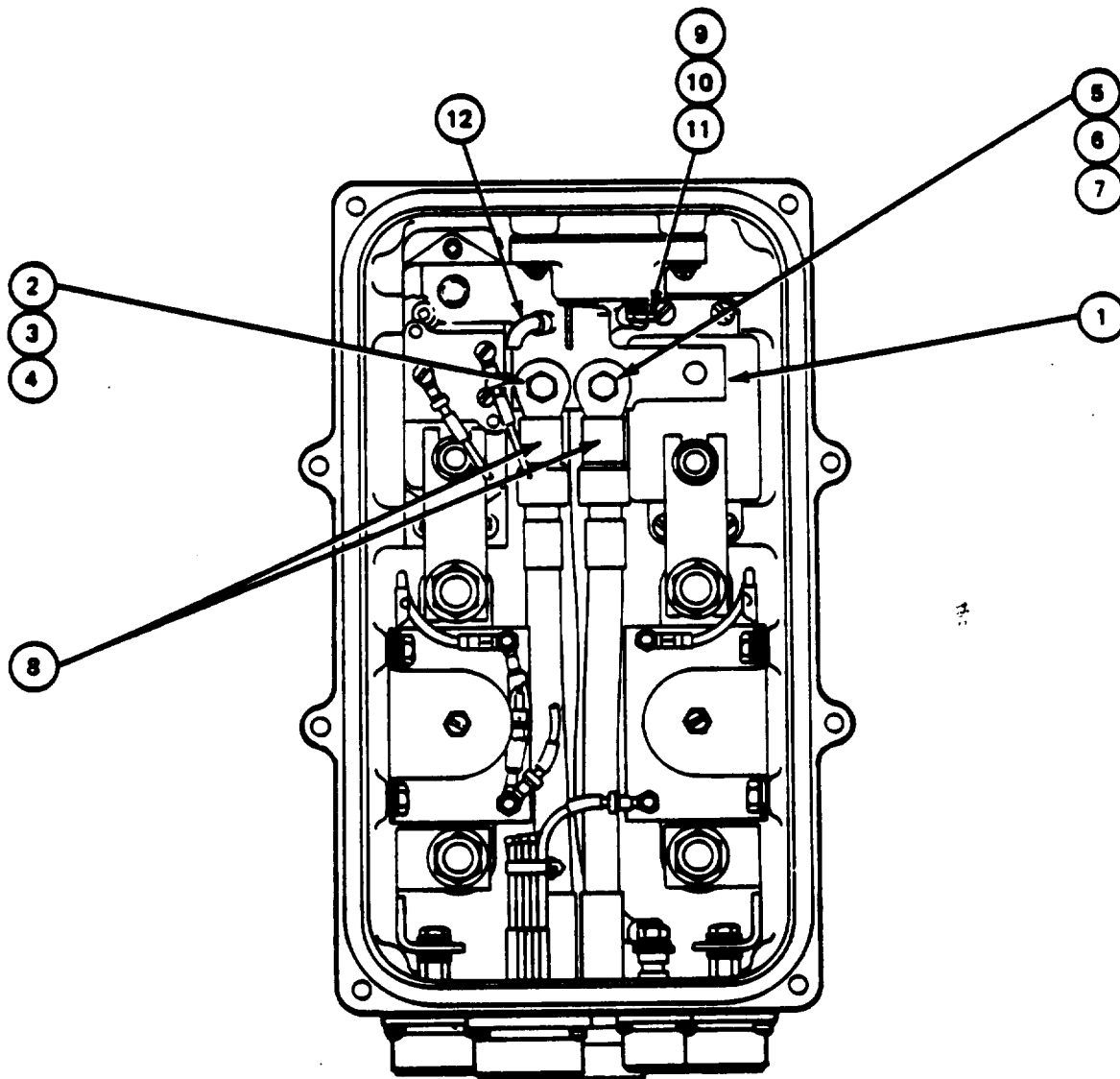


RELAY BOX
10906722



5-19. POWER INPUT BUS BAR REMOVAL PROCEDURE (CONT)

FRAME 2	
Step	Procedure
	NOTE
	Nut (2) is on bottom side of bus bar.
1.	Lift bus bar (1) up enough to put wrench on nut (2).
2.	Using 7/ 16" socket wrench on screw (3) and combination wrench on nut (2), remove screw (3), nut (2), and two lockwashers (4) from bus bar (1).
3.	Using 7/16" socket wrench on screw (5) and combination wrench on nut (6), remove screw (5), nut (6), and two lockwashers (7) from bus bar (1).
4.	Lift bus bar (1) from terminals (8).
5.	Using 1/4" wrench on lockwasher screw (9) and 11/32" wrench on nut (10), remove nut (10), lockwasher (11), and lockwasher screw (9) that attach cable (12) to bus bar (1).
6.	Remove bus bar (1).
	END OF TASK



NOTE: RELAY BOX 11664880 SHOWN

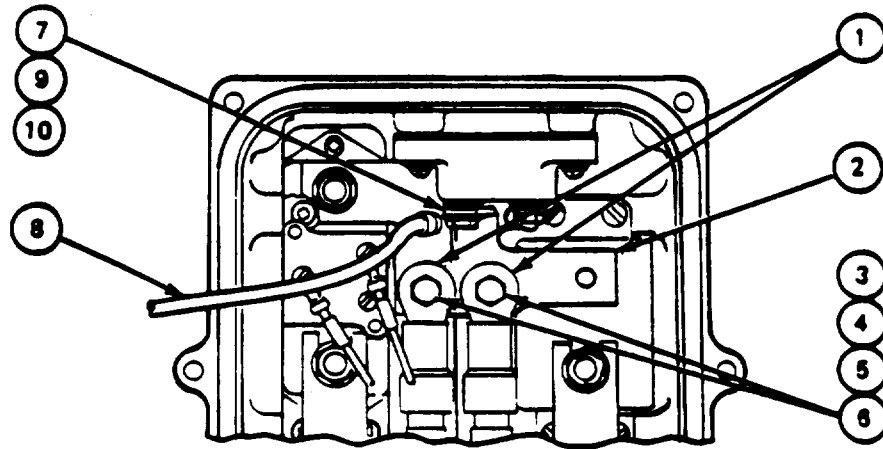
5-20. POWER INPUT BUS BAR INSTALLATION PROCEDURE

APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

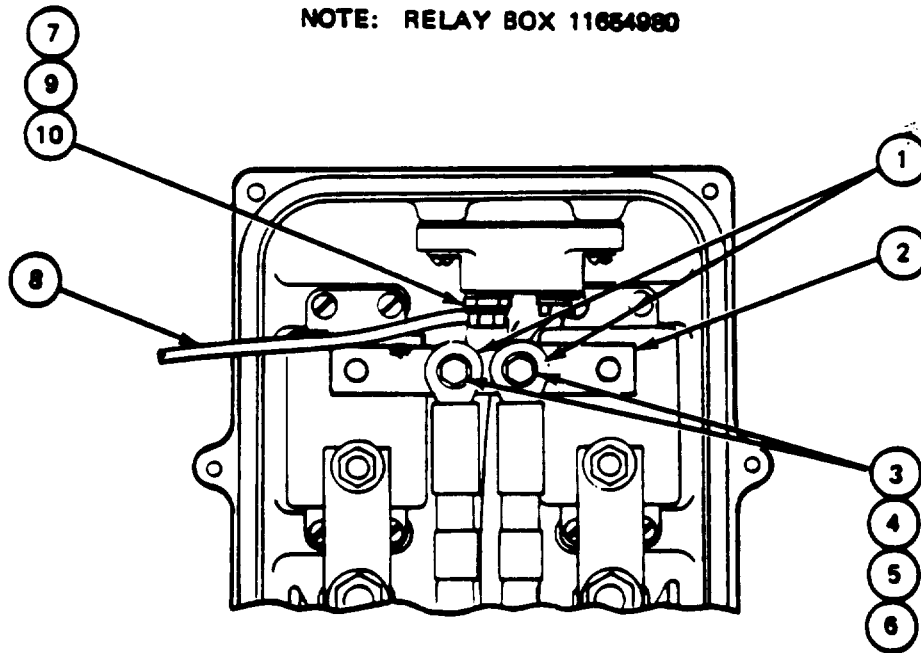
- TOOLS: 7/16" combination wrench
 7/16" socket (3/8" drive)
 5/8" socket (3/8" drive)
 3/8" drive ratchet
 6" extension (3/8" drive)
 9/16" socket (3/8" drive)
 1/4" open end wrench
 11/32" open end wrench

PERSONNEL: One

FRAME 1	
Step	Procedure
1.	Put two wire terminals (1) in mounting place on top of bus bar (2).
2.	Put two screws (3), with two lockwashers (4) through two wire terminals (1) and two screw holes in bus bar (2).
	NOTE
	Two screws (3) should be held to top of bus bar (2) with one hand while doing next step with other hand.
3.	Put two lockwashers (5) and two nuts (6) on two screws (3) at underside of bus bar (2).
	NOTE
	In next step, use 7/16" combination wrench on nuts (6) while using socket wrench on screws (3) on top side of bus bar (2).
4.	Using 7/16" combination wrench, and 7/16" socket wrench, tighten two screws (3).
5.	Put lockwasher screw (7) through power cable (8) terminal bus bar (2).
6.	Put lockwasher (9) and nut (10) on lockwasher screw (7).
7.	Using 1/4" wrench on lockwasher screw (7) and 11/32" wrench on nut (10), attach power cable (8) terminal to bus bar (2).
	GO TO FRAME 2



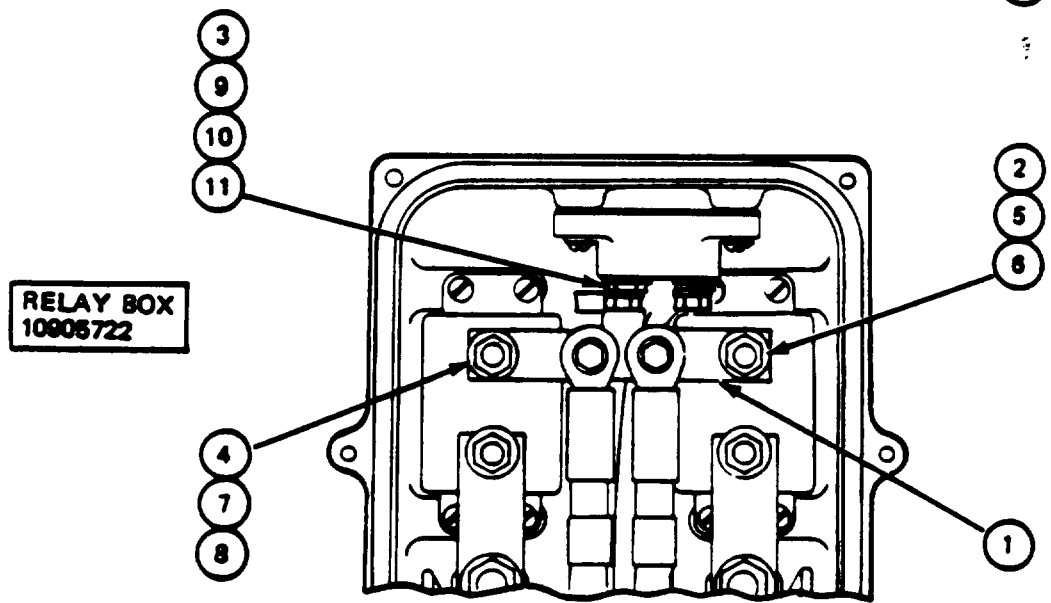
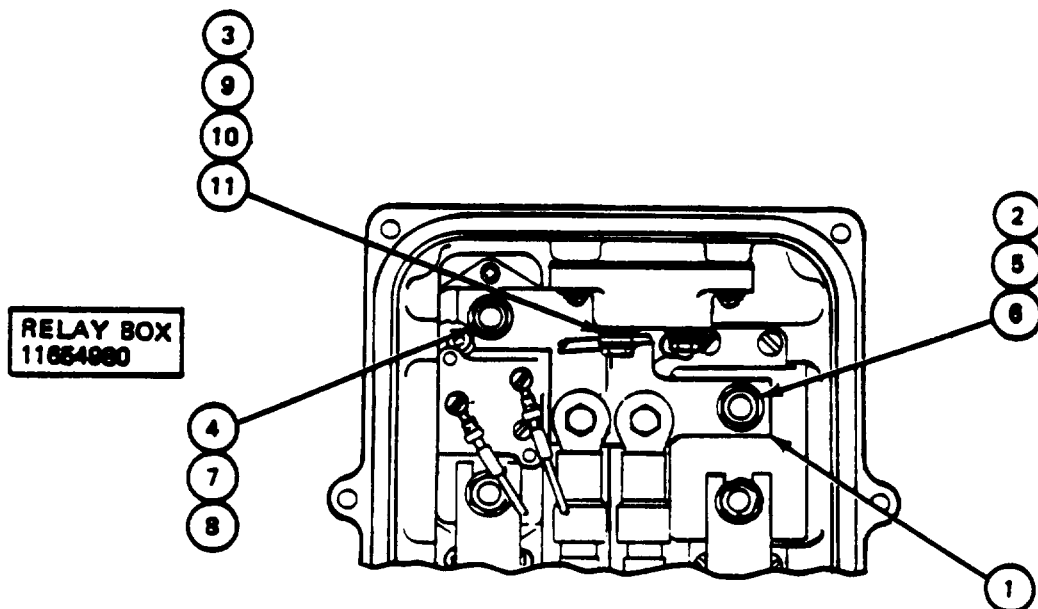
NOTE: RELAY BOX 11654980



NOTE: RELAY BOX 10905722 SHOWN

5-20. POWER INPUT BUS BAR INSTALLATION PROCEDURE (CONT)

FRAME 2	
Step	Procedure
1.	<p>Put bus bar (1) on circuit breaker terminals (2), (3), and (4).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">For relay box 10905722, use 5/8" socket wrench.</p>
2.	<p>Using 9/16" socket wrench, put lockwasher (5) and nut (6) on circuit breaker terminal (2).</p>
3.	<p>Using 5/8" socket wrench, put lockwasher (7) and nut (8) on circuit breaker terminal (4).</p>
4.	<p>Using 7/16" combination wrench, put flat washer (9), lockwasher (10), and screw (11) on circuit breaker terminal (4).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required:</p> <p style="text-align: center;">Install cover circuit breakers power cable (para 5-16). Install relay box cover and gasket (para 5-8). Test relay box (para 5-8).</p> <p>END OF TASK</p>



**5-21. POWER AND SEARCHLIGHT RELAYS TO CIRCUIT BREAKERS BUS BARS
REMOVAL PROCEDURE**

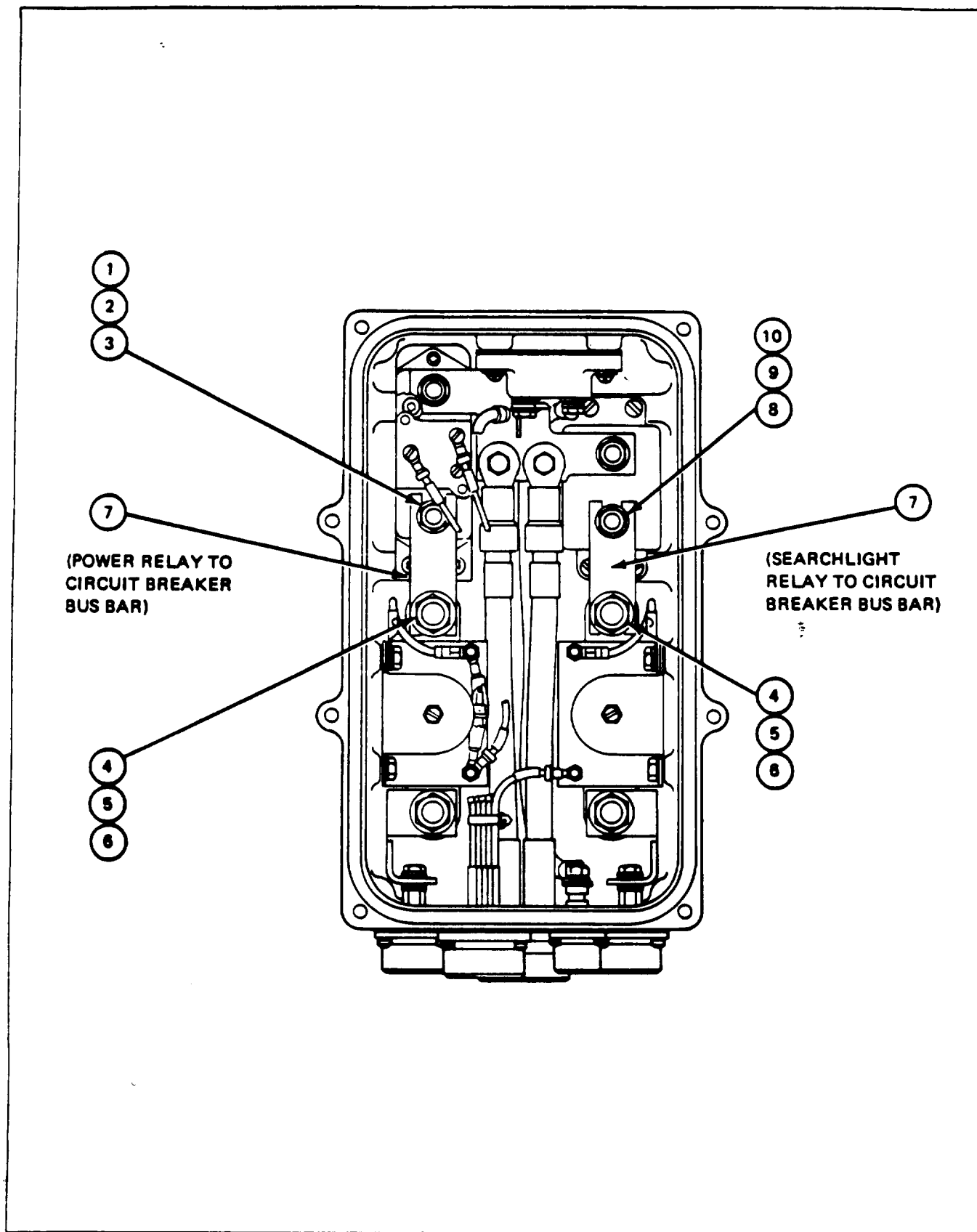
APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

TOOLS: 9/16" socket (1/2" drive)
 5/8" socket (1/2" drive)
 13/16" socket (1/2" drive)
 6" extension (1/2" drive)
 1/2" drive ratchet

PERSONNEL: One

PRELIMINARY PROCEDURES: Test relay box (para 5-4).
 Remove relay box cover (para 5-7).
 Inspect relay box (para 5-3).

FRAME 1	
Step	Procedure
	<p>NOTE</p> <p>Do steps 1 through 4 for power relay (7) to circuit breaker bus bar.</p> <p>Do steps 5 and 6 for searchlight relay (7) to circuit breaker bus bar.</p>
1.	<p>Using 5/8" socket wrench, remove nut (1), lockwasher (2), and flat washer (3).</p>
	<p>NOTE</p> <p>For relay box 10905722, use 5/8" socket wrench.</p>
2.	Using 13/16" socket wrench, remove nut (4), lockwasher (5), and flat washer (6).
3.	Lift out bus bar (7) from circuit breaker and relay terminals.
4.	Remove second flat washer (6) from relay terminal.
5.	Using 9/16" socket wrench, remove nut (8), lockwasher (9), and flat washer (10).
6.	Repeat steps 2 through 4 for searchlight relay (7) to circuit breaker bus bar.
	<p>END OF TASK</p>



5-22. POWER AND SEARCHLIGHT RELAYS TO CIRCUIT BREAKERS BUS BARS INSTALLATION PROCEDURE

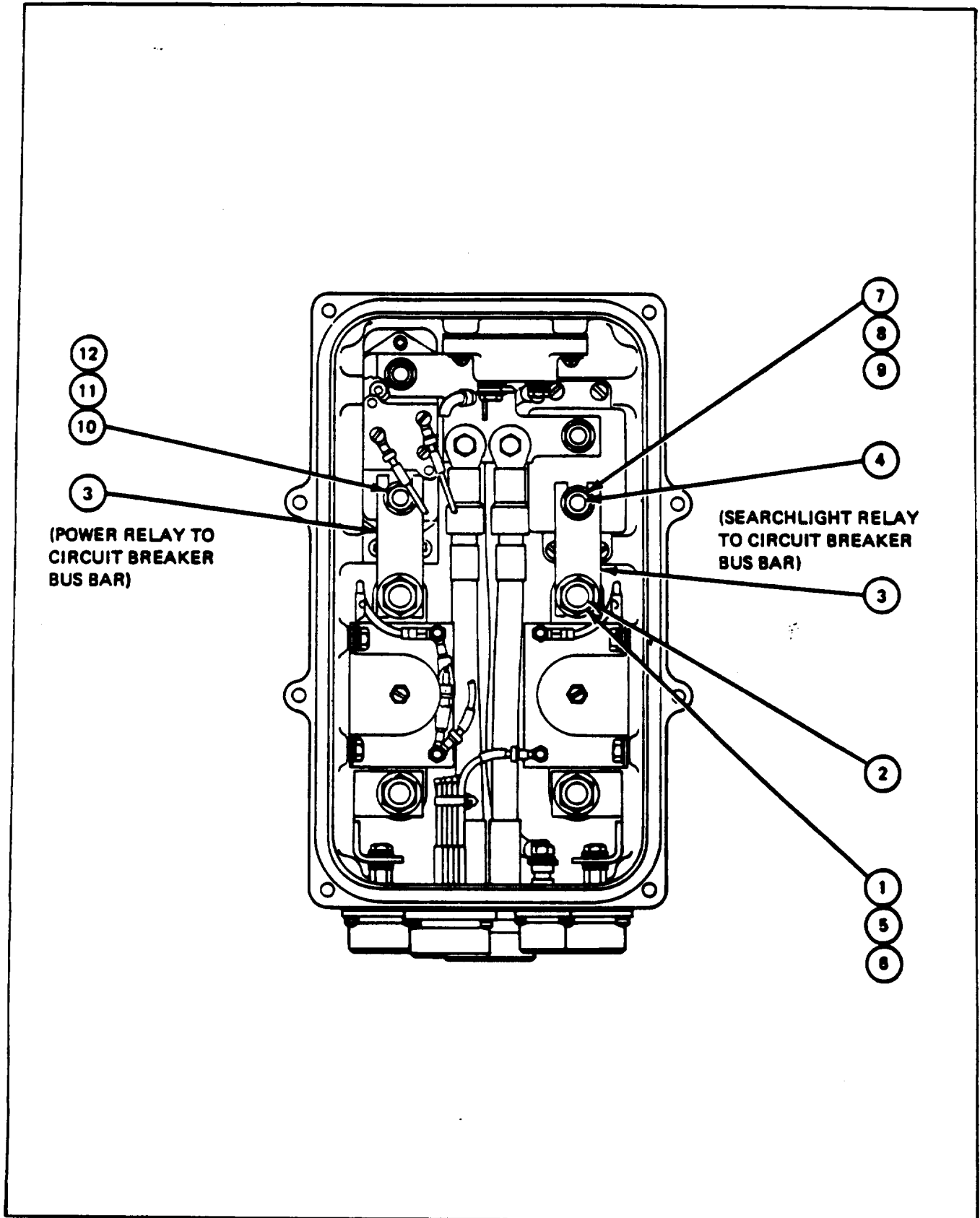
APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

TOOLS: 9/16" socket (1/2" drive)
5/8" socket (1/2" drive)
13/16" socket (1/2" drive)
6" extension (1/2" drive)
1/2" drive ratchet

PERSONNEL: One

**5-22. POWER AND SEARCHLIGHT RELAYS TO CIRCUIT BREAKERS BUS BARS
INSTALLATION PROCEDURE (CONT)**

FRAME 1	
Step	Procedure
	NOTE
	Do steps 1 through 5 for searchlight relay (3) to circuit breaker bus bar.
	Do steps 6 and 7 for power relay (3) to circuit breaker bus bar.
1.	Put flat washer (1) on relay terminal (2),
	NOTE
	Searchlight relay (3) to circuit breaker bus bar is straight and flat.
2.	Put bus bar (3) on relay terminal (2) and circuit breaker terminal (4).
3.	Put second flat washer (1), lockwasher (5) and nut (6) on relay terminal (2).
4.	Using 13/16" socket wrench, tighten nut (6).
5.	Using 9/16" socket wrench, put flat washer (7), lockwasher (8), and nut (9) on circuit breaker terminal (4).
	NOTE
	For relay box 10905722, use 5/8" socket wrench.
6.	Repeat steps 1 through 4 for power relay (3) to circuit breaker bus bar.
7.	Using 5/8" socket wrench, put flat washer (10), lockwasher (11), and nut (12) on circuit breaker terminal (4).
	NOTE
	Follow-on Maintenance Action Required:
	Install relay box cover (para 5-8).
	Test relay box (para 5-4).
	END OF TASK



**5-23. POWER AND SEARCHLIGHT RELAY BUS BARS AND CONNECTORS
REMOVAL PROCEDURE**

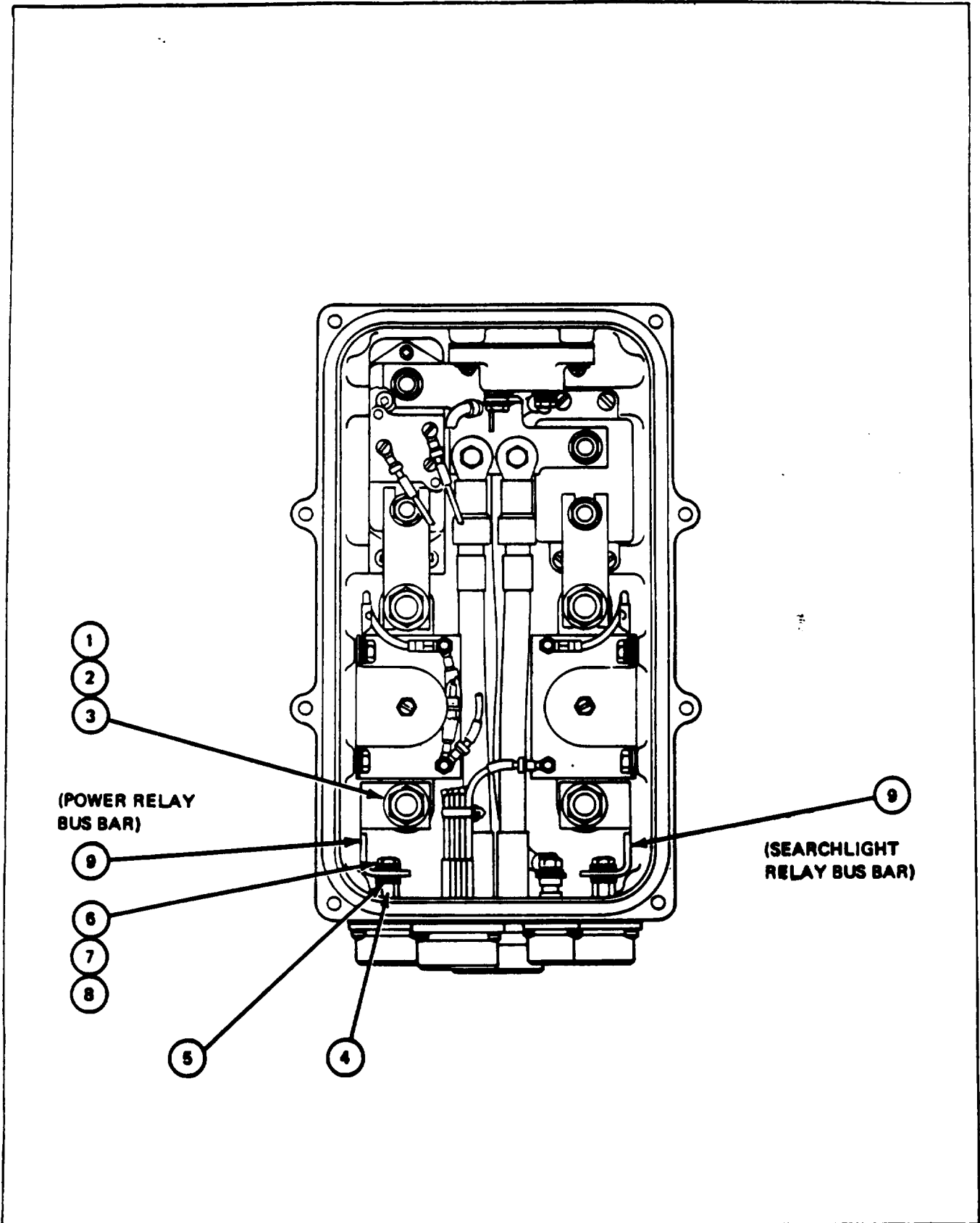
APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

TOOLS: 1/4" flat tip screwdriver
 9/16" combination wrench
 13/16" socket (1/2" drive)
 1/2" drive ratchet
 6" extension (1/2" drive)
 1/8" drive pin punch

PERSONNEL: One

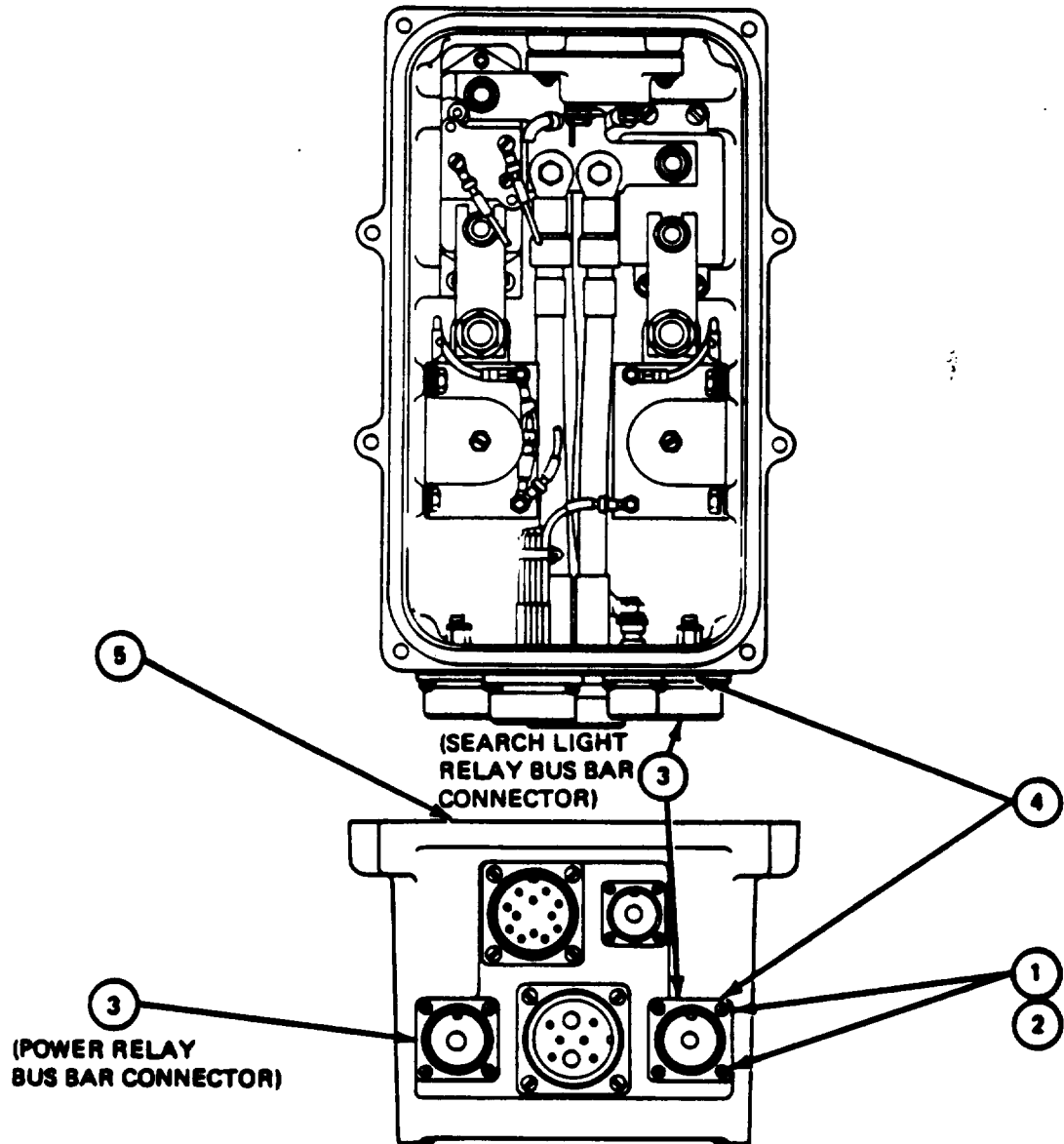
PRELIMINARY PROCEDURES: Test relay box (para 5-4).
 Remove relay box cover (para 5-7).
 Inspect relay box (para 5-3).

FRAME 1	
Step	Procedure
	NOTE
	Power bus bar and connector removal procedure is identical to the searchlight bus bar and connector removal procedure.
1.	Using socket wrench, remove nut (1), lockwasher (2) and flat washer (3).
2.	Put punch in hole (4) of connector (5) to keep connector from moving in step 3.
3.	Using combination wrench, remove nut (6), lockwasher (7), and flat washer (8).
4.	Lift power relay bus bar (9) from relay and connector terminals and remove.
5.	Remove second flat washer (8) from power connector terminal
6.	Remove second flat washer (3) from relay terminal.
	GO TO FRAME 2



5-23. POWER AND SEARCHLIGHT RELAY BUS BARS AND CONNECTORS
REMOVAL PROCEDURE (CONT)

FRAME 2	
Step	Procedure
1.	Using screwdriver, remove four screws (1) and four lockwashers (2) from connector (3).
2.	Remove connector (3) and gasket (4) from relay box (5).
3.	Remove gasket (4) from connector (3).
	END OF TASK



**5-24 POWER AND SEARCHLIGHT RELAY BUS BARS AND CONNECTORS
INSTALLATION PROCEDURE**

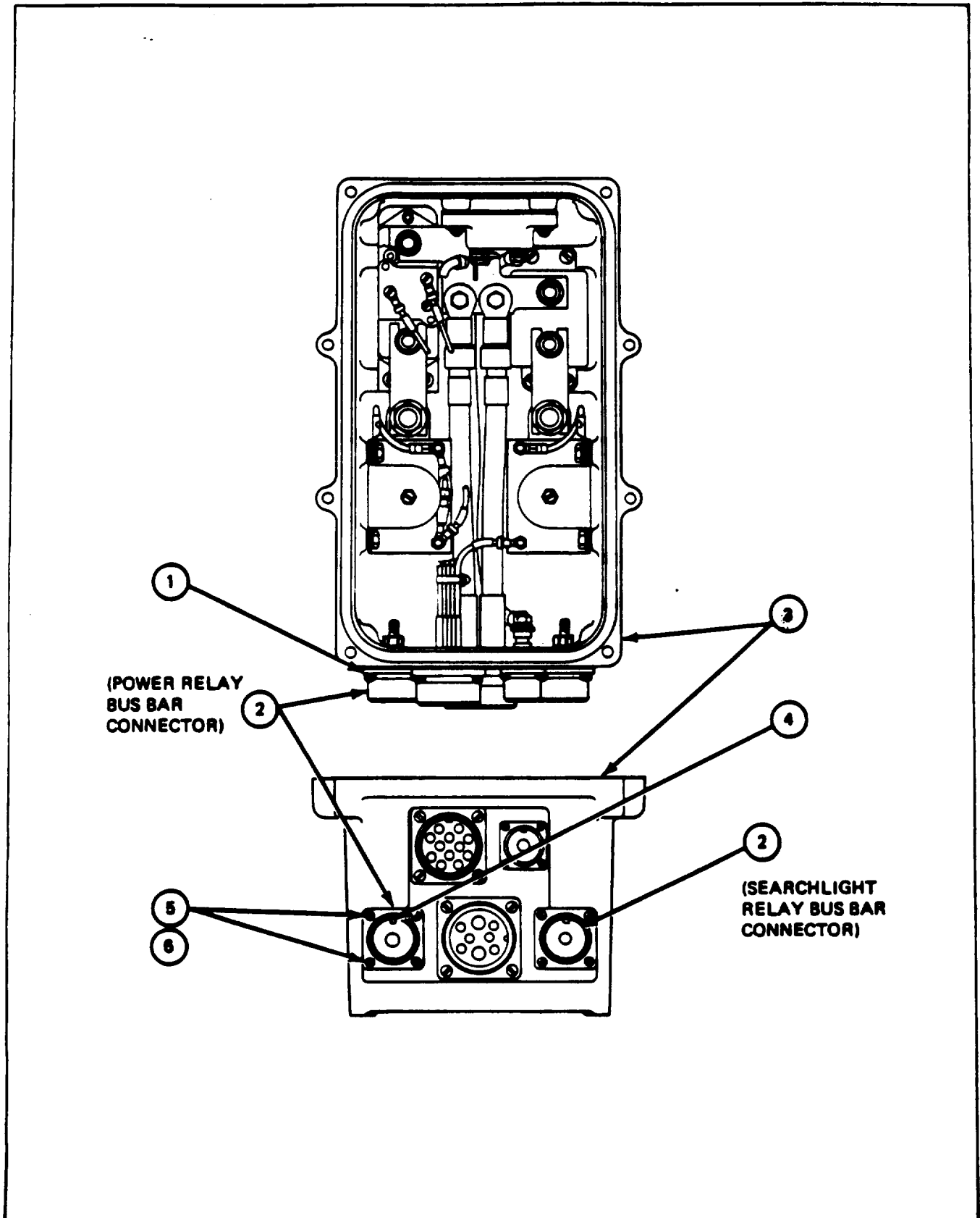
APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

TOOLS: 13/16" socket (1/2" drive)
 6" extension (1/2" drive)
 1/2" drive ratchet
 9/16" combination wrench
 1/4" flat tip screwdriver
 1/8" drive pin punch

SUPPLIES: Gasket, MS52000-8

PERSONNEL: One

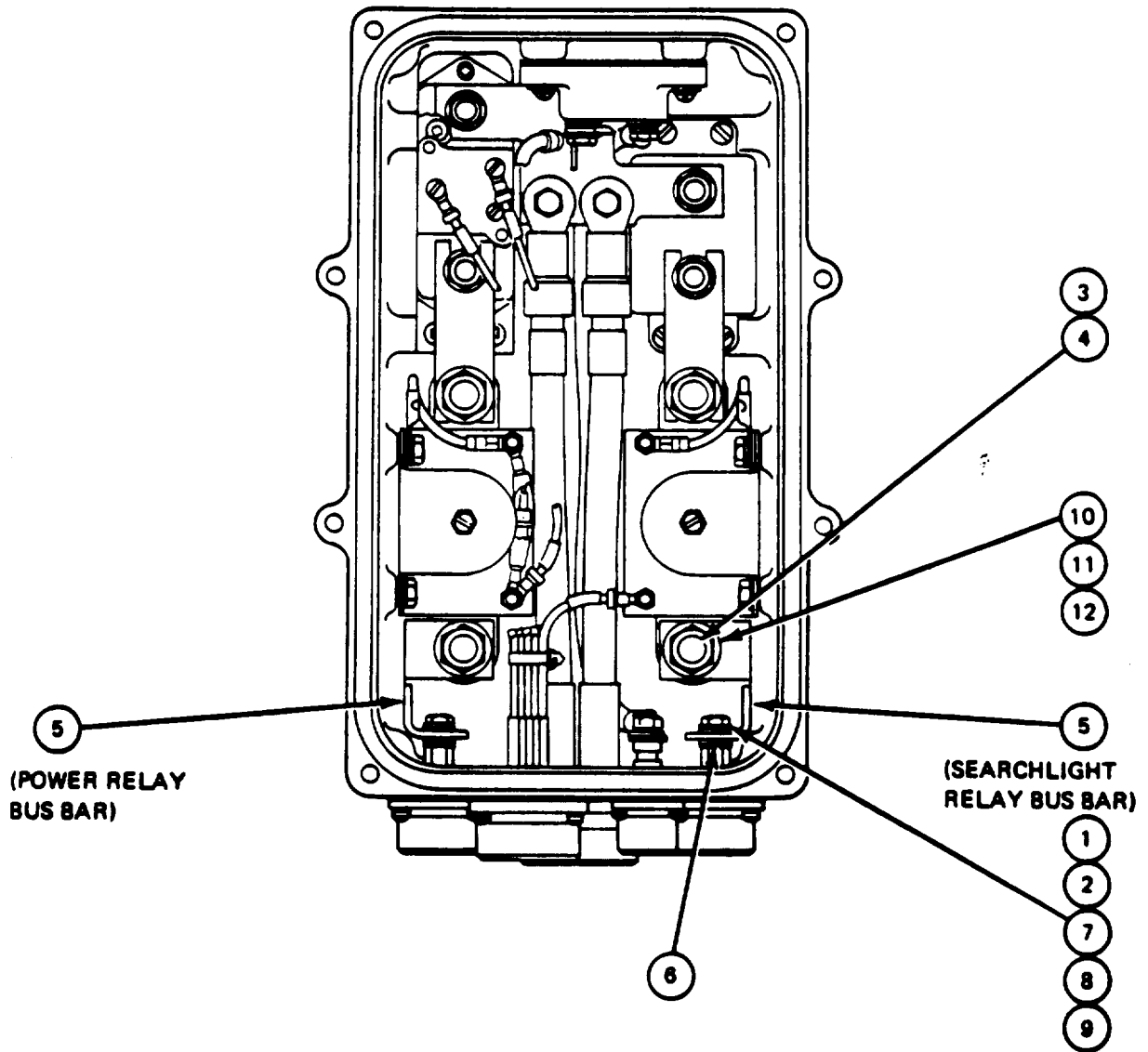
FRAME 1	
Step	Procedure
	<p>NOTE</p> <p>Installation of power relay bus bar and connector is identical to installation of searchlight relay bus bar and connector.</p>
1.	Put new gasket (1) on connector (2).
2.	Put connector (2) on relay box (3) so that connector key (4) is at top side of connector (2).
	<p>NOTE</p> <p>Make sure screw holes in gasket are in line with screw holes in connector.</p>
3.	Using screwdriver, attach connector (2) to relay box (3) with four screws (5) and four lockwashers (6).
	GO TO FRAME 2



**5-24. POWER AND SEARCHLIGHT RELAY BUS BARS AND CONNECTORS
INSTALLATION PROCEDURE (CONT)**

FRAME 2

Step	Procedure
1.	Put flat washer (1) on connector terminal (2).
2.	Put flat washer (3) on relay terminal (4).
3.	Put bus bar (5) on connector terminal (2) and relay terminal (4).
4.	Put punch in hole (6) on connector terminal (2) to keep connector from moving in step 5.
5.	Using 9/16" combination wrench, put nut (7), lockwasher (8) and flat washer (9) on connector terminal (2).
6.	Using 13/16" socket wrench, put nut (10), lockwasher (11), and flat washer (12) on relay terminal (4).
NOTE	
Follow-on Maintenance Action Required:	
Install relay box cover (para 5-8).	
Test relay box (para 5-4).	
END OF TASK	



5-25. POWER AND SEARCHLIGHT RELAYS AND SEMICONDUCTOR DEVICE REMOVAL PROCEDURE

APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

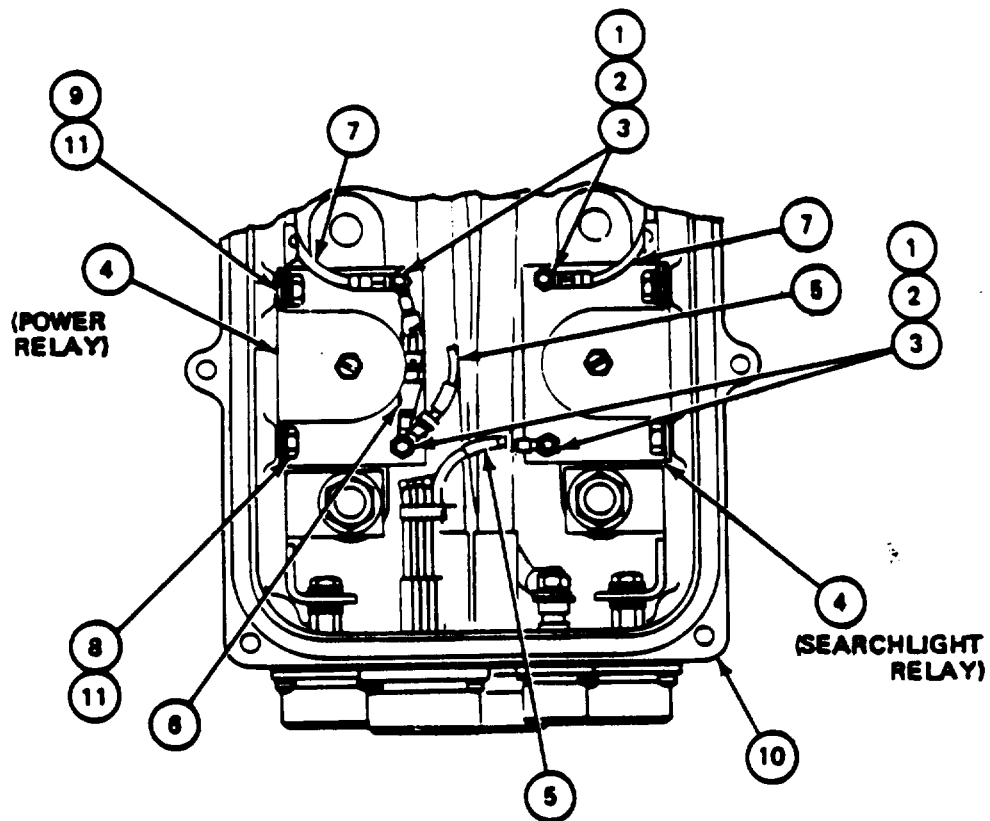
TOOLS: 7/16" combination wrench
5/16" socket wrench, single socket spinner type

PERSONNEL: One

PRELIMINARY PROCEDURES: Test relay box (para 5-4)
Remove relay box cover (para 5-7)
Inspect relay box (para 5-3)
Remove power and searchlight relays to circuit breakers bus bars
(para 5-21)
Remove power and searchlight relay bus bars and connector (para
5-23)

**5-25. POWER AND SEARCHLIGHT RELAYS AND SEMICONDUCTOR DEVICE
REMOVAL PROCEDURE (CONT)**

FRAME 1	
Step	Procedure
	NOTE
	Do this frame for relay box 11654980. Go to frame 2 for relay box 10905722. Removal of power relay and searchlight is as noted.
1.	Using socket wrench, remove two nuts (1), two lockwashers (2), and two flat washers (3) from relay (4) terminals.
2.	Remove wire (5) from relay (4) terminal.
	NOTE
	Semiconductor device is on power relay only.
3.	Remove semiconductor device (6) from relay (4).
4.	Remove wire (7) from relay (4) terminal.
5.	Remove two second flat washer (3) from two relay (4) terminals.
6.	Using combination wrench, remove lockwasher screws (8) and (9) that attach relay (4) to relay box (10).
7.	Remove wire (7) and lockwasher (11) from lockwasher screw (9).
	NOTE
	Second lockwasher (11) is between relay (4) and relay box (10).
8.	Remove relay (4) and two lockwashers (11) from relay box (10).
	GO TO FRAME 2



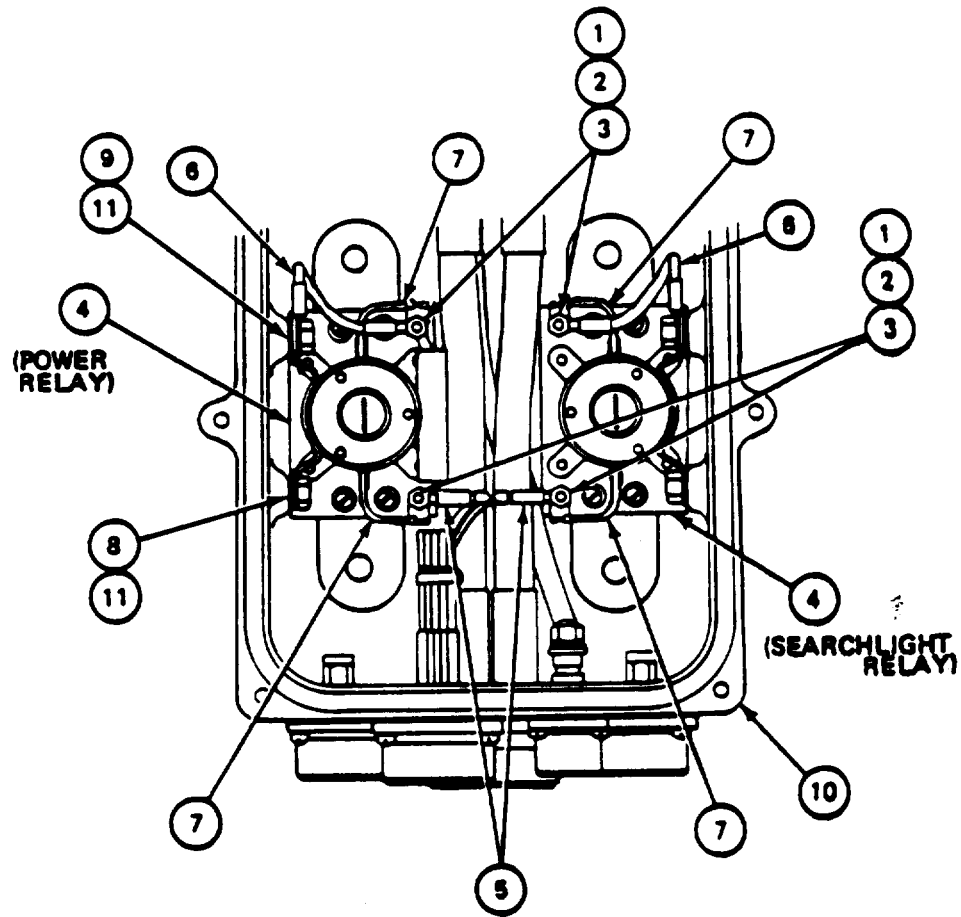
(POWER RELAY)

(SEARCHLIGHT RELAY)

RELAY BOX 11664980

5-25. POWER AND SEARCHLIGHT RELAYS AND SEMICONDUCTOR DEVICE REMOVAL PROCEDURE (CONT)

FRAME 2	
Step	Procedure
	NOTE
	Do this frame for relay box 10905722. Removal of power relay and searchlight relay is the same.
1.	Using socket wrench, remove two nuts (1), two lockwashers (2), and two flat washers (3) from relay (4) terminals.
2.	Remove wire (5) from relay (4) terminal.
3.	Remove wire (6) from relay (4) terminal.
4.	Remove two wires (7) from relay (4) terminal.
5.	Remove two second flat washers from two relay (4) terminals.
6.	Using combination wrench, remove lockwasher screws (8) and (9) that attach relay (4) to relay box (10).
7.	Remove wire (6) and lockwasher (11) from lockwasher screws (9).
	NOTE
	Second lockwasher (11) is between relay (4) and relay box (10).
8.	Remove relay (4) and two lockwashers (11) from relay box (10).
	END OF TASK



RELAY BOX 10905722

**5-26. POWER AND SEARCHLIGHT RELAYS AND SEMICONDUCTOR DEVICE
INSTALLATION PROCEDURE**

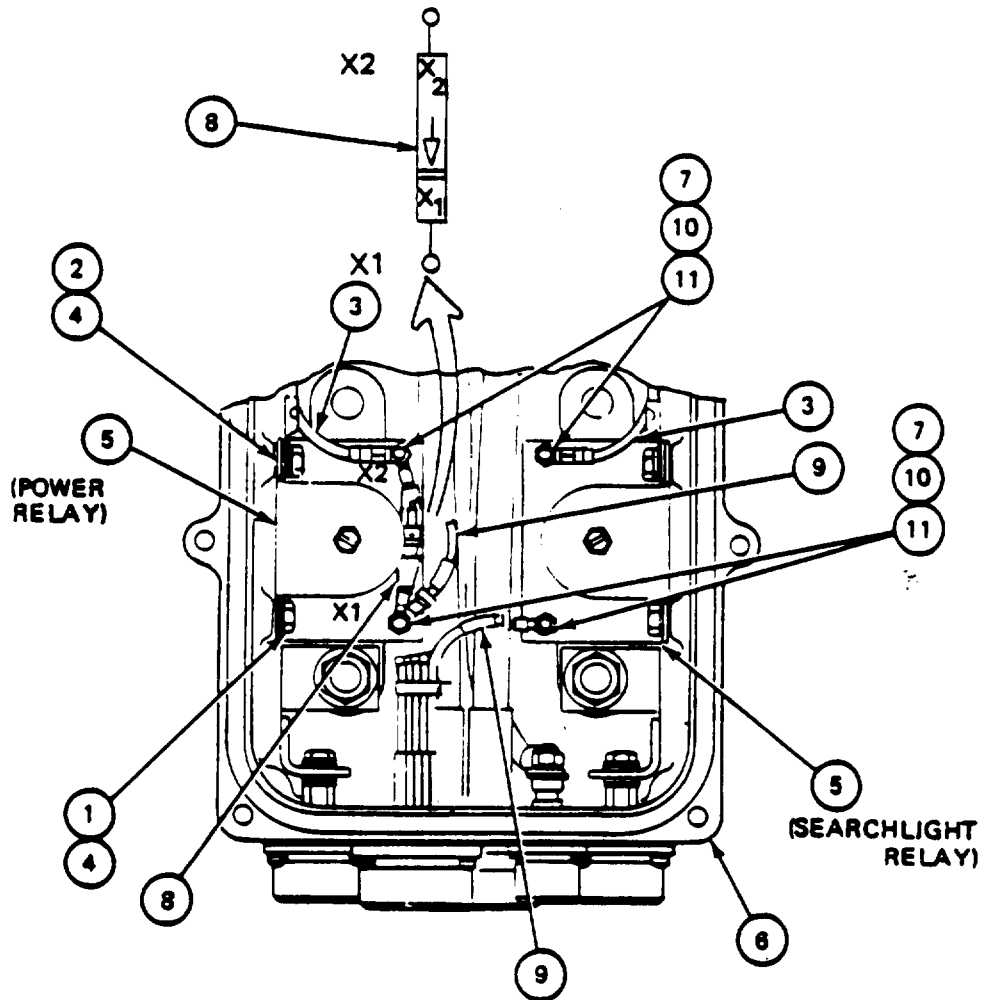
APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

TOOLS: 7/16" combination wrench
5/16" socket (3/8" drive)
5" extension (3/8" drive)
3/8" drive ratchet
7/16" socket (3/8" drive)
3/8" drive torque wrench

PERSONNEL: One

**5-26. POWER AND SEARCHLIGHT RELAYS AND SEMICONDUCTOR DEVICE
INSTALLATION PROCEDURE (CONT)**

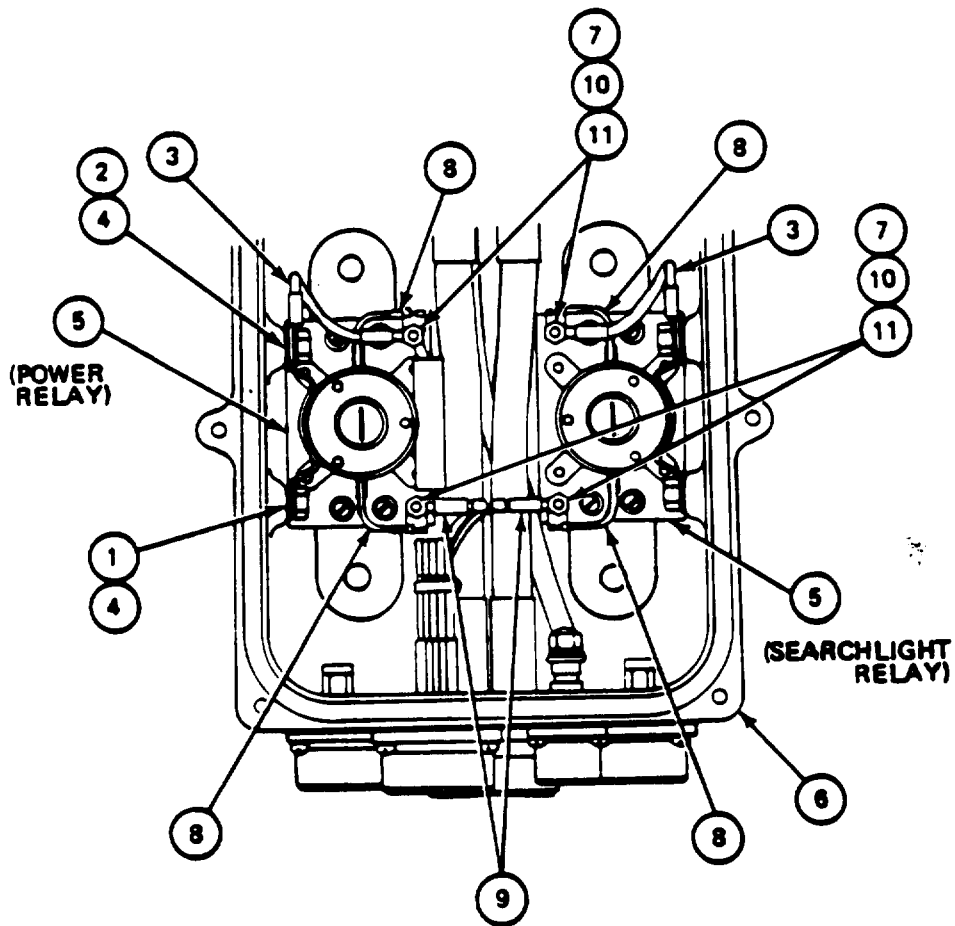
FRAME 1	
Step	Procedure
	NOTE
	Do this frame for relay box 11654980. Go to frame 2 for relay box 10905722. Installation of power relay and searchlight are as noted.
1.	Put lockwasher screw (1) and lockwasher screw (2) with wire (3) terminal and lockwasher (4) in relay (5).
	NOTE
	Second lockwasher (4) will be between relay (5) and relay box (6).
2.	Put lockwasher (4) on lockwasher screw (1) and lockwasher (4) on lockwasher screw (2).
3.	Put relay (5) in relay box (6) and start lockwasher screw (1) and (2).
4.	Using combination wrench, attach relay (5) to relay box (6) with lockwasher screws (1) and (2).
5.	Put two flat washers (7) on two relay (5) terminals.
6.	Put wire (3) terminal on relay (5) terminal.
	NOTE
	Semiconductor device (8) is on power relay (5) only. Semiconductor device terminal marked X1 must be put on relay (5) terminal marked X1.
7.	Put semiconductor device (8) on two relay (5) terminals.
	NOTE
	Wire (9) terminal (circuit 645A) is for power relay (5). Wire (9) terminal (circuit 518B) is for searchlight relay (5).
8.	Put wire (9) terminal on relay (5) terminal.
9.	Put second two flat washers (7), two lockwashers (10) and two nuts (11) on two relay (5) terminals.
10.	Using socket wrench, tighten two nuts (11).
	GO TO FRAME 2



RELAY BOX 11664980

5-26. POWER AND SEARCHLIGHT RELAYS AND SEMICONDUCTOR DEVICE INSTALLATION PROCEDURE (CONT)

FRAME 2	
Step	Procedure
	NOTE Do this frame for relay box 10905722. Installation of power relay and searchlight is the same.
1.	Put lockwasher screw (1) and lockwasher screw (2) with wire (3) terminal and lockwasher (4) in relay (5).
	NOTE Second lockwasher (4) will be between relay (5) and relay box (6).
2.	Put lockwasher (4) on lockwasher screw (1) and lockwasher (4) on lockwasher screw (2).
3.	Put relay (5) in relay box (6) and start lockwasher screws (1) and (2).
4.	Using combination wrench, attach relay (5) to relay box (6) with lockwasher screws (1) and (2).
5.	Put two flat washers (7) on two relay (5) terminals.
6.	Put two wire (8) terminals on two relay (5) terminals.
7.	Put wire (3) terminals on relay (5) terminal.
	NOTE Wire (9) terminal (circuit 645) is for power relay (5). Wire (9) terminal (circuit 5 18B) is for power relay (5).
8.	Put wire (9) terminal on relay (5) terminal.
9.	Put second two flat washers (7), two lockwashers (10), and two nuts (11) on two relay (5) terminals.
10.	Using socket wrench, tighten two nuts (11).
	NOTE Follow-on Maintenance Action Required: Install power and searchlight relay to circuit breaker bus bars (para 5-22). Install power and searchlight relay bus bars and connector (para 5-24). Install relay box cover and gasket (para 5-8). Test relay box (para 5-4).
	END OF TASK



RELAY BOX 10905722

5-27. POWER AND SEARCHLIGHT CIRCUIT BREAKERS REMOVAL PROCEDURES

APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

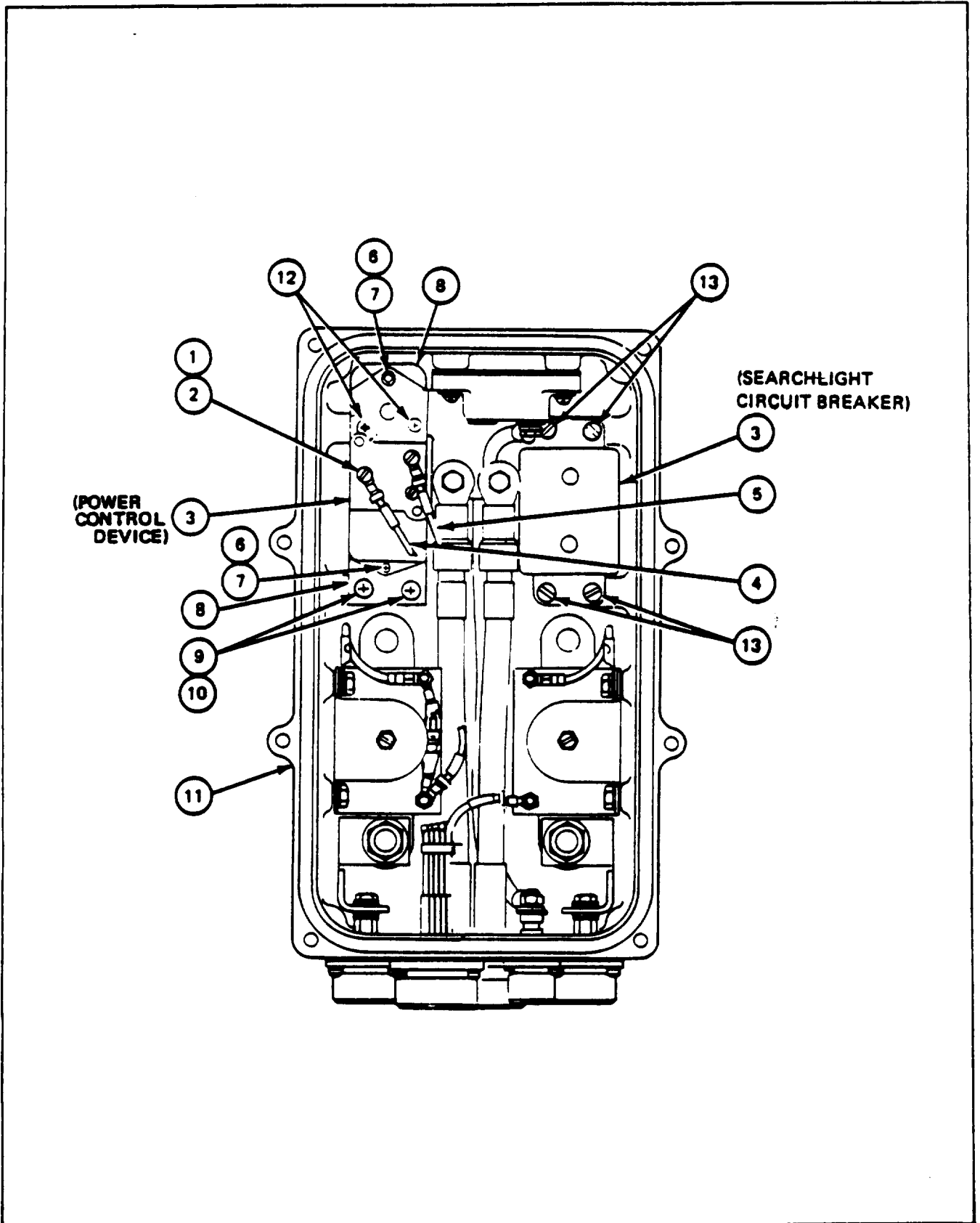
TOOLS: 1/4" flat tip screwdriver
No. 2 cross tip screwdriver (Phillips)

PERSONNEL: one

PRELIMINARY PROCEDURES: Test relay box (para 5-4)
Remove relay box cover (para 5-7)
Inspect relay box (para 5-3)
Remove power input bus bar (para 5-19)
Remove power and searchlight relay to circuit breakers bus bars (para 5-21)

5-27. POWER AND SEARCHLIGHT CIRCUIT BREAKERS REMOVAL PROCEDURE (CONT)

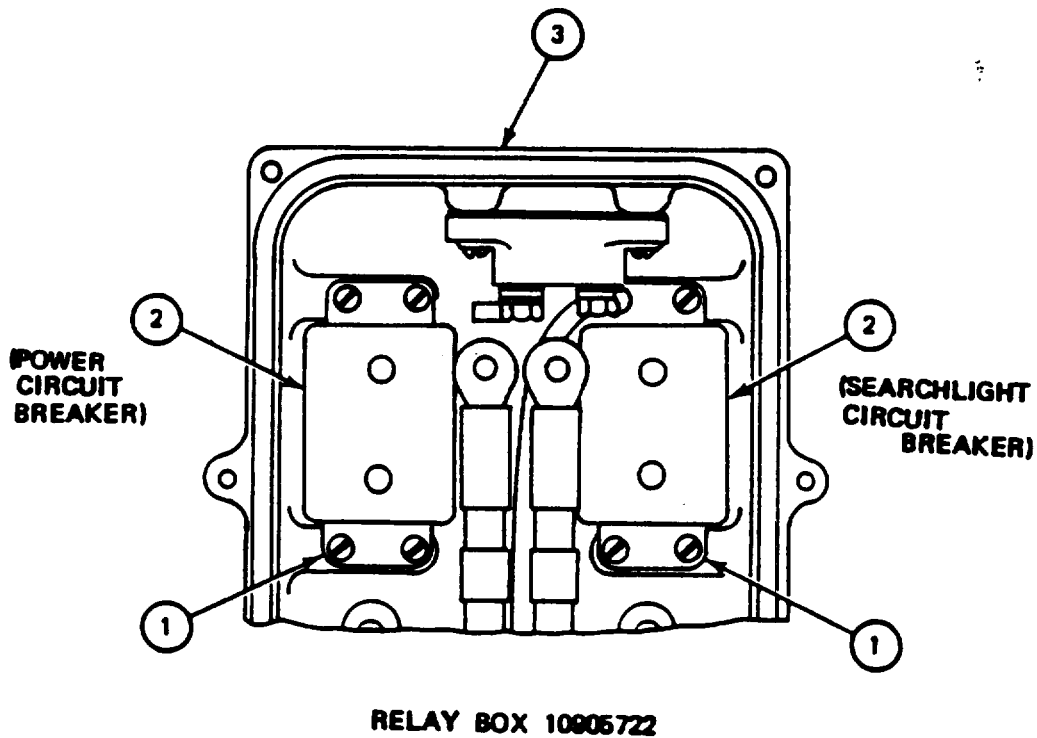
FRAME 1	<p style="text-align: center;">NOTE</p> <p style="text-align: center;">Do this frame for relay box 11654980. Go to Frame 2 for relay box 10905722. Do steps 1 through 4 for removal of power control device and steps 8 and 9 for searchlight circuit breaker.</p> <ol style="list-style-type: none"> 1. Using flat tip screwdriver, remove two screws (1) and two lockwashers (2) from power control device (3) terminals. 2. Remove two wires (4) and (5) from power control device (3) terminals. 3. Using cross tip screwdriver, remove two screws (6) and two lockwashers (7) that attach power control device (3) to plate (8). 4. Remove power control device (3). <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Do steps 5 through 7 if plate (8) is to be replaced.</p> <ol style="list-style-type: none"> 5. Using cross tip screwdriver, remove two screws (9) and lockwashers (10) that attach plate (8) to relay box (11). 6. Using cross tip screwdriver, remove two screws (12) that attach plate (8) to relay box (11). 7. Remove plate (8) from relay box (11). <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Do steps 8 ad 9 to remove searchlight circuit breaker.</p> <ol style="list-style-type: none"> 8. Using flat tip screwdriver, remove four lockwashers screws (13) that attach searchlight circuit breaker (3) to relay box (11). 9. Remove searchlight circuit breaker (3). <p>GO TO FRAME 2</p>
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5-27. POWER AND SEARCHLIGHT CIRCUIT BREAKERS REMOVAL PROCEDURE (CONT)

FRAME 2

Step	Procedure
	<p style="text-align: center;">NOTE</p> <p style="text-align: center;">This frame is for relay box 10905722. Power circuit breaker and searchlight circuit breaker removal are the same.</p> <ol style="list-style-type: none"> 1. Using flat tip screwdriver, remove four lockwasher screws (1) that attach circuit breaker (2) to relay box (3). 2. Remove circuit breaker (2). <p>END OF TASK</p>



5-28. POWER AND SEARCHLIGHT CIRCUIT BREAKERS INSTALLATION PROCEDURE

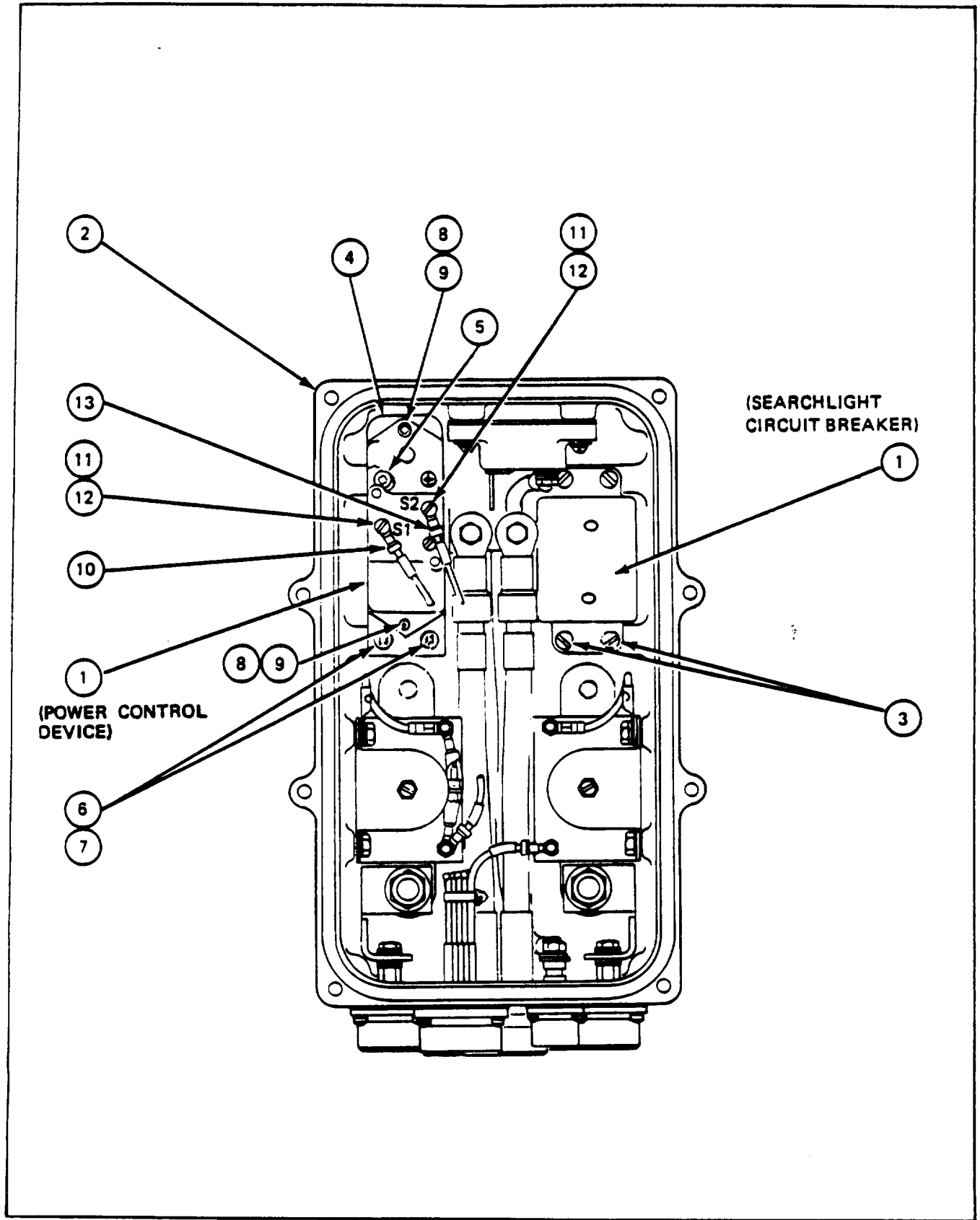
APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

TOOLS: 1/4" flat tip screwdriver
No. 2 cross tip screwdriver (Phillips)

PERSONNEL: One

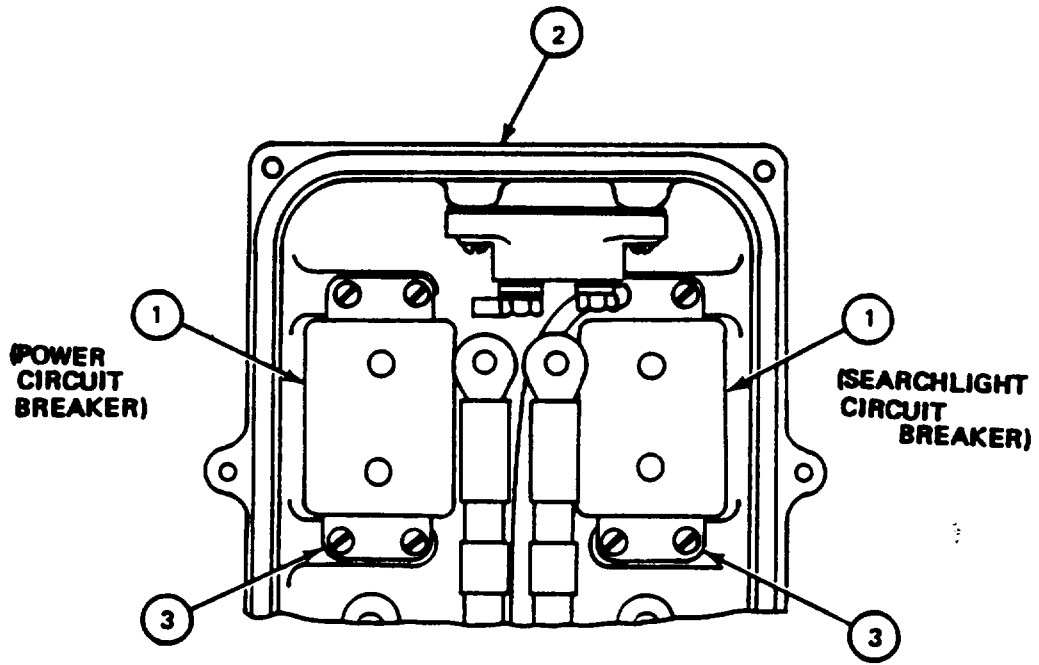
5-28. POWER AND SEARCHLIGHT CIRCUIT BREAKERS INSTALLATION PROCEDURE (CONT)

FRAME 1	
Step	Procedure
	<p>NOTE</p> <p>Do this frame for relay box 11654980. Go to frame 2 for relay box 10905722. Do steps 1 and 2 for installation of searchlight circuit breaker and steps 3 through 9 for power control device.</p>
1.	Put searchlight circuit breaker (1) in relay box (2).
2.	Using flat tip screwdriver, attach searchlight circuit breaker (1) to relay box (2) with four lockwasher screws (3).
	<p>NOTE</p> <p>Do steps 3 through 5 if plate 4 was removed.</p>
3.	Put plate (4) in relay box (2).
4.	Using cross tip' screwdriver, attach plate (4) to relay box (2) with two screws (5).
5.	Using cross tip screwdriver, attach plate (4) to relay box (2) with two screws (6) and two lockwashers (7).
6.	Put power control device (1) on plate (4).
7.	Using cross tip screwdriver, attach power control device (1) to plate (4) with two screws (8) and two lockwashers (9).
8.	Using flat tip screwdriver, attach wire (10) terminal (circuit 645) to power circuit breaker (1) terminal S1 with screw (11) and lockwasher (12).
9.	Using flat tip screwdriver, attach wire (13) terminal (circuit 645A) to power control device (1) terminal S2 with screw (11) and lockwasher (12).
	GO TO FRAME 2



5-28. POWER AND SEARCHLIGHT CIRCUIT BREAKERS INSTALLATION PROCEDURE (CONT)

FRAME 2	
Step	Procedure
	<p style="text-align: center;">NOTE</p> <p style="text-align: center;">Do this frame for relay box 10905722. Power circuit breaker and searchlight circuit breaker are the same.</p> <ol style="list-style-type: none"> 1. Put circuit breaker (1) in relay box (2). 2. Using flat tip screwdriver, attach circuit breaker (1) to relay box (2) with four lockwasher screws (3). <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required:</p> <p style="text-align: center;">Install power and searchlight relays to circuit breaker bus bars (para 5-22). Install power input bus bars (para 5-20). Install relay box cover and gasket (para 5-8). Test relay box (para 5-4).</p> <p>END OF TASK</p>



RELAY BOX 10805722

5-29. BLOWER CIRCUIT BREAKER REMOVAL PROCEDURE

APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

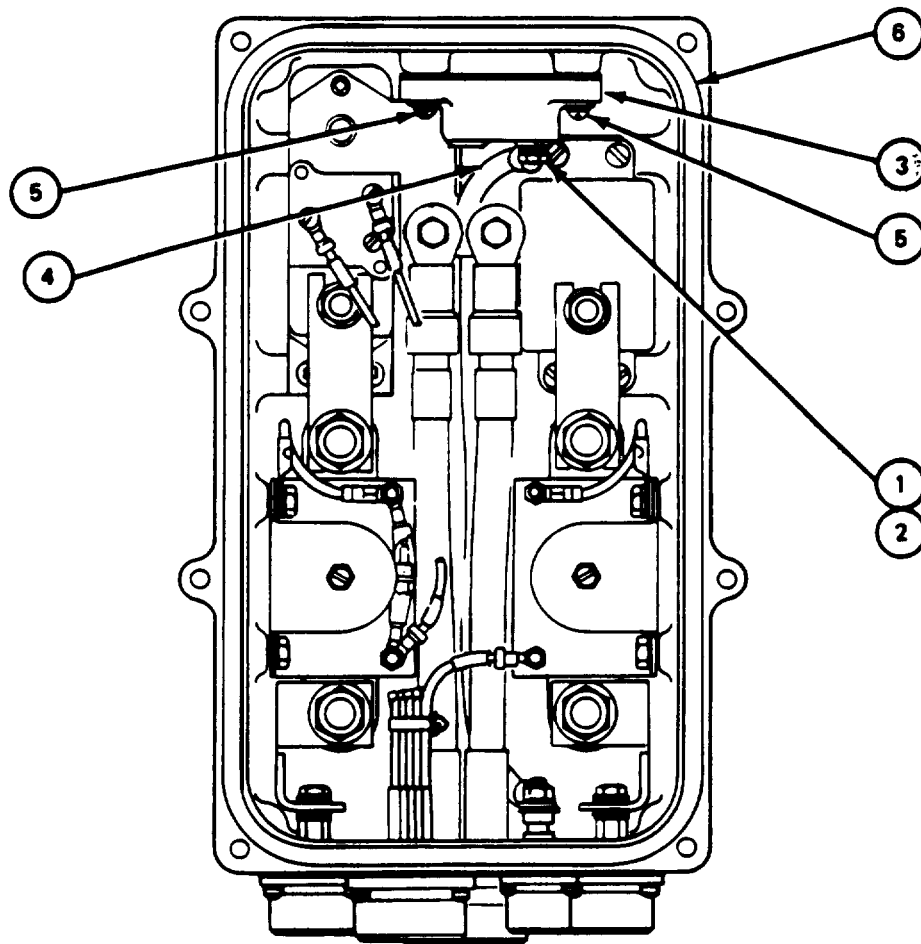
TOOLS: 1/4" flat tip screwdriver
7/16" combination wrench

PERSONNEL: One

PRELIMINARY PROCEDURES: Test relay box (para 5-4)
Remove relay box cover (para 5-7)
Inspect relay box (5-3)
Remove cover circuit breakers power cable (para 5-15)
Remove power input bus bar (para 5-19)

5-29. BLOWER CIRCUIT BREAKER REMOVAL PROCEDURE (CONT)

FRAME 1	
Step	Procedure
<ol style="list-style-type: none"> 1. 2. 3. 4. 	<p>Using wrench, remove screw (1) and lockwasher (2) from terminal of circuit breaker (3).</p> <p>Remove terminal blower circuit breaker lead (4) and second lockwasher (2) from terminal of circuit breaker (3).</p> <p>Using screwdriver, remove two lockwasher screws (5) from circuit breaker (3).</p> <p>Remove circuit breaker (3) from relay box (6).</p> <p>END OF TASK</p>



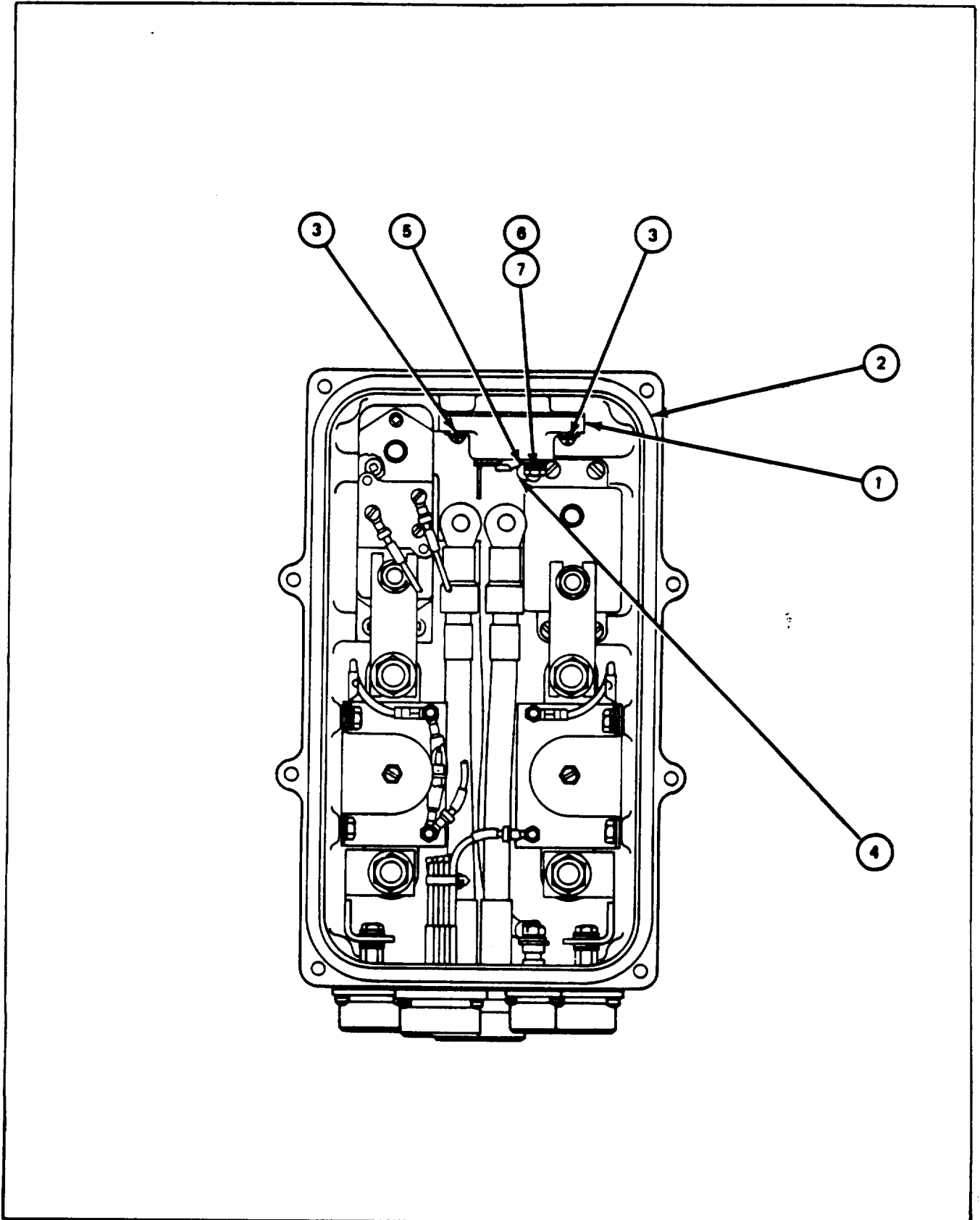
5-30. BLOWER CIRCUIT BREAKER INSTALLATION PROCEDURE

APPLICABLE CONFIGURATIONS: 10905722 or 11654980 relay box

TOOLS: 1/4" flat tip screwdriver
 7/16" combination wrench

PERSONNEL: One

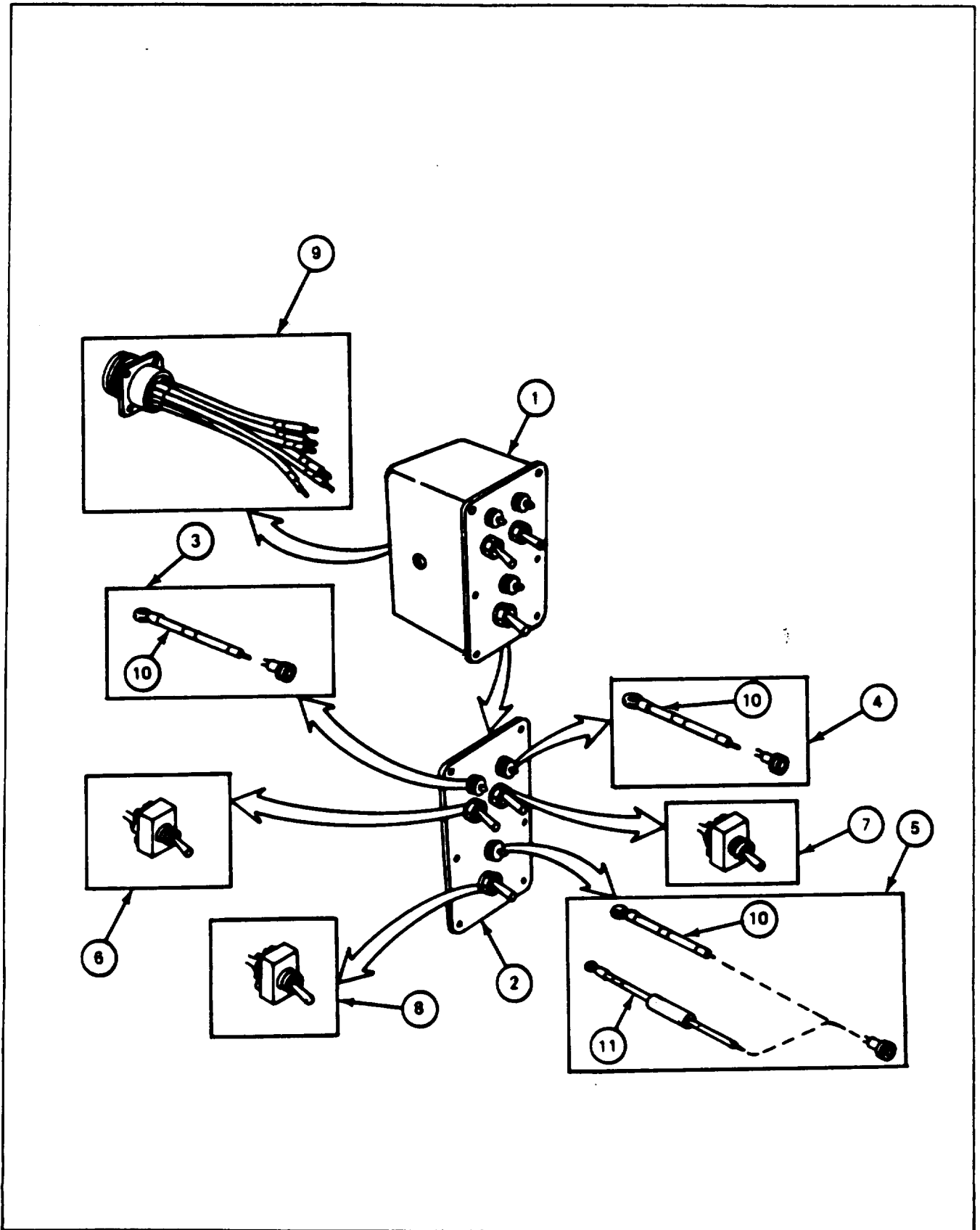
FRAME 1	
Step	Procedure
1.	Put circuit breaker (1) in mounting position in relay box (2).
2.	Using screwdriver, put two lockwasher screws (3) through mounting holes in circuit breaker (1) into relay box (2).
3.	Put terminal of blower circuit breaker lead (4) (circuit 137-159) on circuit breaker terminal (5).
4.	Using wrench, put screw (6) with lockwasher (7) on circuit breaker terminal (5).
	NOTE
	Follow-on Maintenance Action Required:
	Install power input bus bar (para 5-20), Install cover circuit breakers power cable (para 5-16). Install relay box cover (para 5-8). Test relay box (para 5-4).
	END OF TASK



CHAPTER 6
GUNNER'S CONTROL BOX

6-1. MAINTENANCE PROCEDURES INDEX

Equipment Item	Inspection	Test	Tasks			
			Removal	Installation	Dis-assembly	Assembly
1. Gunner's Control Box	6-2	6-3			6-4	6-5
2. Cover			6-6	6-7		
3. MAIN GUN Light			6-8	6-9		
4. MACHINE GUN Light			6-10	6-11		
5. ELEV/TRAV POWER Light			6-12	6-13		
6. MAIN GUN Switch			6-14	6-15		
7. MACHINE GUN switch			6-16	6-17		
8. ELEV/TRAV POWER Switch			6-18	6-19		
9. Wiring Harness			6-20	6-21		
10. Ground Wires			6-22	6-23		
11. Diode Lead			6-24	6-25		



6-2. GUNNER'S CONTROL BOX INSPECTION PROCEDURE

PERSONNEL: One

PRELIMINARY PROCEDURES: Remove cover (para 6-6)

GENERAL INSTRUCTIONS:

NOTE

If any part is bad, order repair part or next higher assembly. Refer to section index (para 6-1) for replacement of parts.

FRAME 1	
Step	Procedure
1.	Check electrical connector for bent or broken pins. Check soldered connections for tightness.
2.	Check electrical connections at switches, lamps, and diode.
3.	Check for loose, bent, or damaged parts.
4.	Check wires for breaks, and burned or worn insulation
5.	Check case and cover for dents and cracks.
<p>NOTE</p> <p>Follow-on Maintenance Action Required:</p> <p>Install cover (para 6-7).</p>	
END OF TASK	

6-3. GUNNER'S CONTROL BOX TEST PROCEDURE

TEST EQUIPMENT: Multimeter

PERSONNEL One

REFERENCES: JPG for procedures to:
Use multimeter
Remove and install lamps
TM 9-2350-222-20-2-3 for procedure to remove gunner's control box

EQUIPMENT CONDITION: Gunner's control box removed (TM-20-2-3)

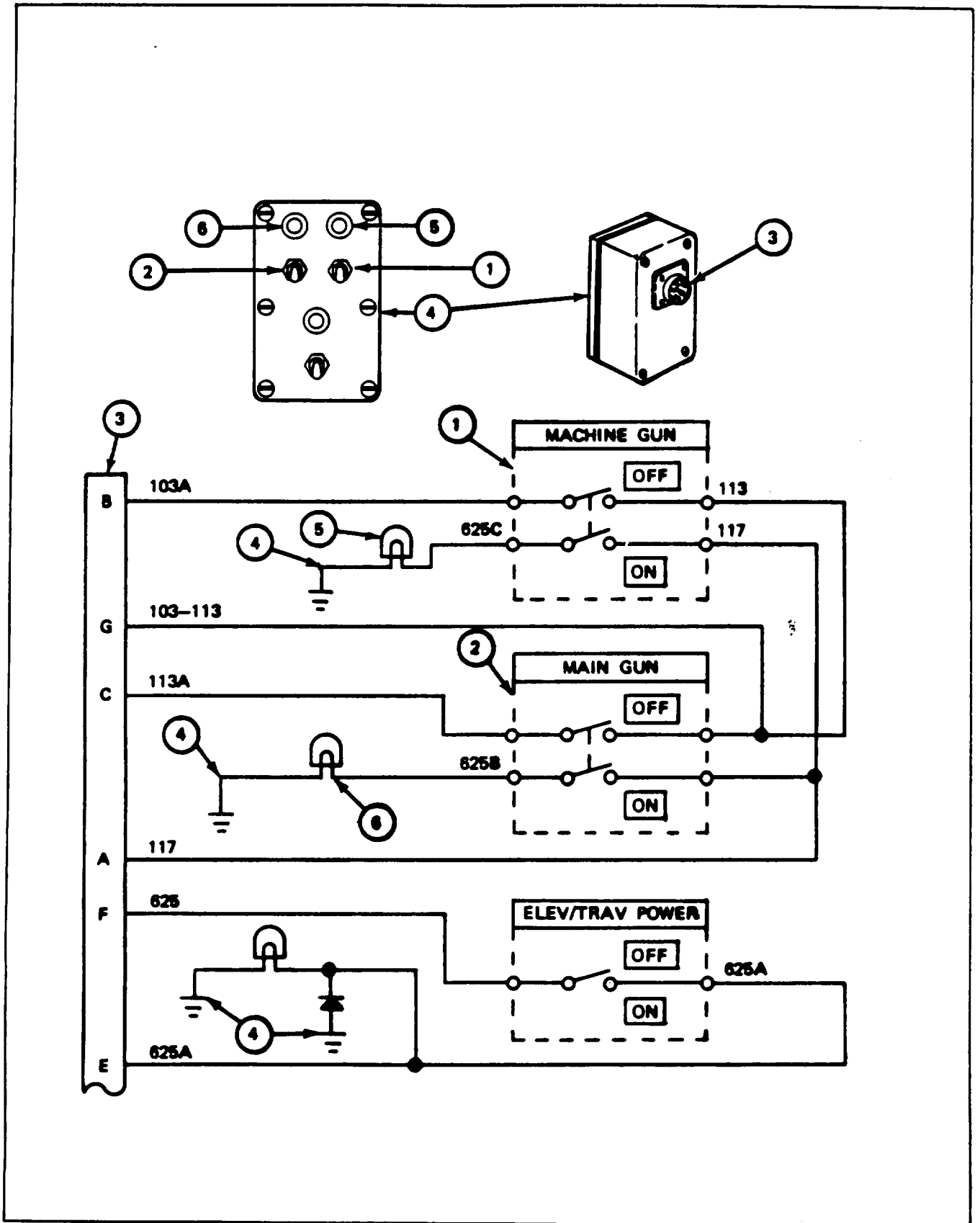
GENERAL INSTRUCTIONS:

NOTE

If normal indication is not obtained, remove cover (para 6-6) and do inspection (para 6-2) and continuity check (JPG) on items listed in Probable Fault column. Refer to section index (para 6-1) for replacement of parts.

6-3. GUNNER'S CONTROL BOX TEST PROCEDURE (CONT)

FRAME 1			
Step	Procedure	Normal Indication	Probable Fault
1.	Set MACHINE GUN switch (1) to ON. Set MAIN GUN switch (2) to OFF.		
2.	Using multimeter, check for continuity between pins B and G of connector (3) (JPG).	Less than 2 ohms	Bad MACHINE GUN switch (1) or wiring.
3.	Using multimeter, check for continuity between control box (4) (ground) and pin A of connector (3) (JPG).	Less than 200 ohms	Bad MACHINE GUN lamp (5), switch (1), or wiring.
4.	Set MACHINE GUN switch (1) to OFF.		
5.	Using multimeter, check for continuity between pins B and G of connector (3) (JPG).	Greater than 10M ohms	Bad MACHINE GUN switch (1) or wiring.
6.	Set MAIN GUN switch (2) to ON.		
7.	Using multimeter, check for continuity between pins C and G of connector (3) (JPG).	Less than 2 ohms	Bad MAIN GUN switch (2) or wiring.
8.	Using multimeter, check for continuity between control box (4) (ground) and pin A of connector (3) (JPG).	Less than 200 ohms	Bad MAIN GUN switch (2), lamp (6), or wiring.
9.	Set MAIN GUN switch (2) to OFF.		
10.	Using multimeter, check for continuity between pins C and G of connector (3) (JPG). GO TO FRAME 2	Greater than 10M ohms	Bad MAIN GUN switch (2) or wiring.



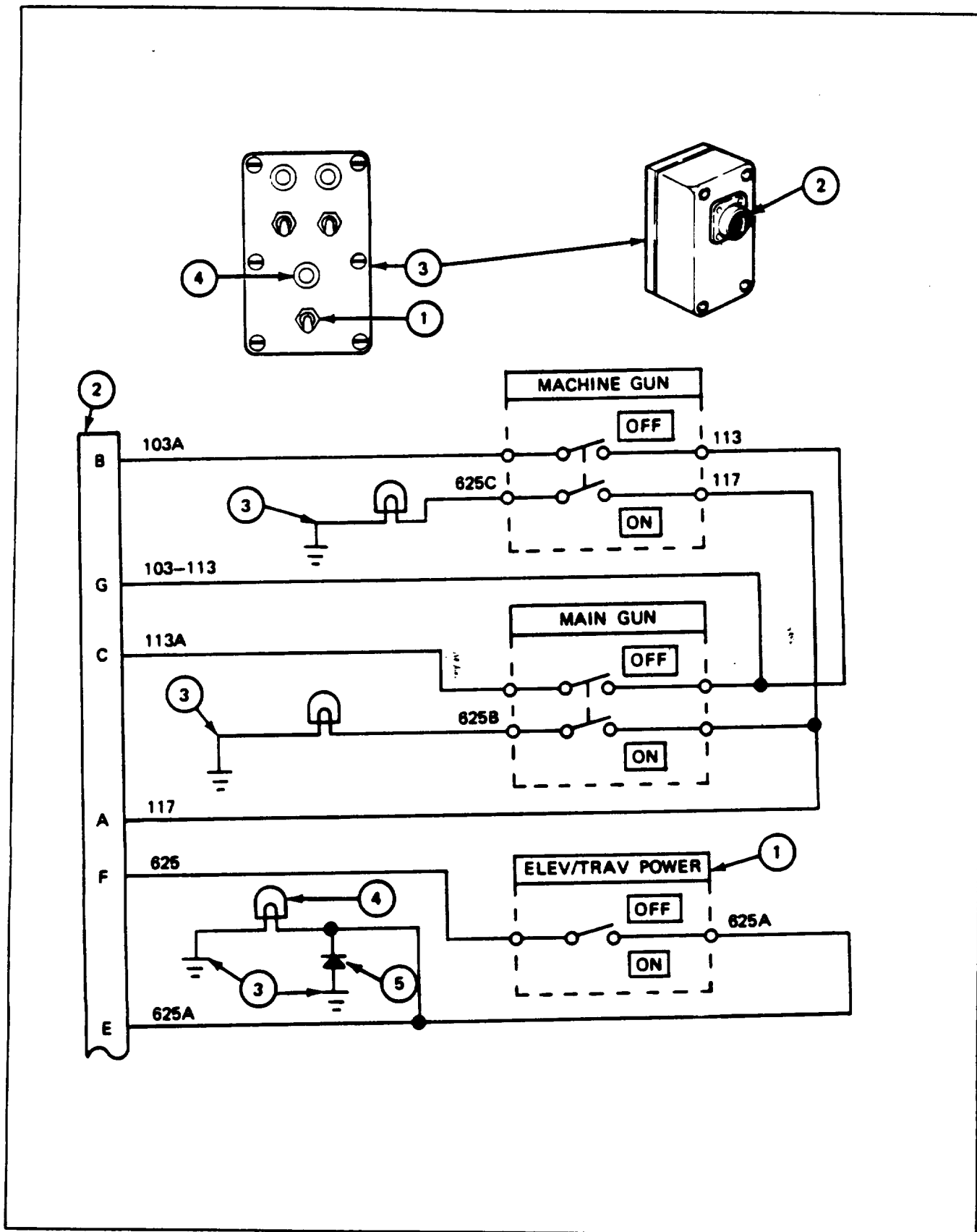
6-3. GUNNER'S CONTROL BOX TEST PROCEDURE (CONT)

FRAME 2			
Step	Procedure	Normal Indication	Probable Fault
1.	Set ELEV/TRAV POWER switch (1) to ON.		
2.	Using multimeter, check for continuity between pins E and F of connector (2) (JPG).	Less than 2 ohms	Bad ELEV/TRAV POWER switch (1) or wiring.
3.	Using multimeter, check for continuity between control box (3) (ground) and pin E of connector (2) (JPG).	Less than 200 ohms	Bad ELEV/TRAV POWER lamp (4) or wiring.
4.	Set ELEV/TRAV POWER switch (1) to OFF.		
5.	Using multimeter, check for continuity between pins E and F of connector (2) (JPG).	Greater than 10M ohms	Bad ELEV/TRAV POWER switch (1) or wiring
6.	Remove POWER lamp (4) (JPG).		
7.	Using multimeter measure resistance between pin E of connector (2) and control box (3) (ground) (JPG). Reverse multimeter leads and measure again.	One measurement should be at least 100 times larger than the other.	Bad diode (5) or wiring
8.	Install POWER lamp (4) (JPG).		

NOTE

If normal indication was obtained in frames 1 and 2, gunner's control box is good.

END OF TASK



6-4. GUNNER'S CONTROL BOX DISASSEMBLY PROCEDURE

PERSONNEL: One

REFERENCES: TM 9-2350-222 -20-2-3 for procedure to remove gunner's control box

EQUIPMENT CONDITION: Gunner's control box removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Test gunner's control box (para 6-3)

FRAME 1	
Step	Procedure
1.	Remove cover (para 6-6).
2.	Remove MAIN GUN light (para 6-8).
3.	Remove MACHINE GUN light (para 6-10).
4.	Remove ELEV/TRAV POWER light (para 6-12).
5.	Remove REMOVE MAIN GUN switch (para 6-14).
6.	Remove MACHINE GUN switch (para 6-16).
7.	Remove ELEV/TRAV POWER switch (para 6-18).
9.	Remove wiring harness (para 6-20).
9.	Remove ground wires (para 6-22).
10.	Remove diode lead (para 6-24).
	END OF TASK

6-5. GUNNER'S CONTROL BOX ASSEMBLY PROCEDURE

PERSONNEL: One

FRAME 1	
Step	Procedure
1.	Install diode lead (para 6-25).
2.	Install three ground wires (para 6-23).
3.	Install wiring harness (para 6-2 1).
4.	Install ELEV/TRAV POWER switch (para 6-19).
5.	Install MACHINE GUN switch (para 6-17).
6.	Install MAIN GUN switch (para 6-15).
7.	Install ELEV/TRAV POWER light (para 6-13).
8.	Install MACHINE GUN light (para 6-11).
9.	Install MAIN GUN light (para 6-9).
10.	Install cover (para 6-7).
	NOTE
	Follow-on Maintenance Action Required: Test gunner's control box (para 6-3).
	END OF TASK

6-6. COVER REMOVAL PROCEDURE

TOOLS: 5/ 16" flat tip screwdriver

PERSONNEL: One

REFERENCES: TM 9-2350-222-20-2-3 for procedure to remove gunner's control box

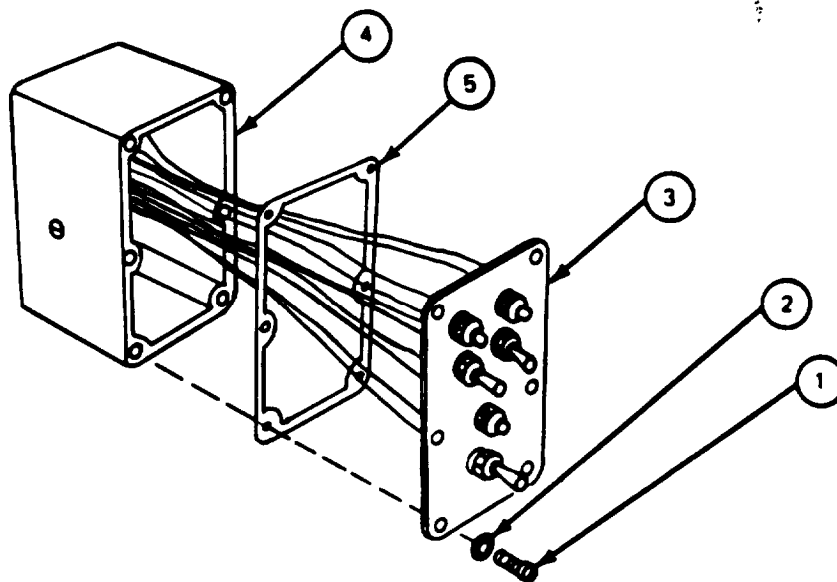
EQUIPMENT CONDITION: Gunner's control box removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Test gunner's control box (para 6-3)

6-6. COVER REMOVAL PROCEDURE (CONT)

FRAME 1

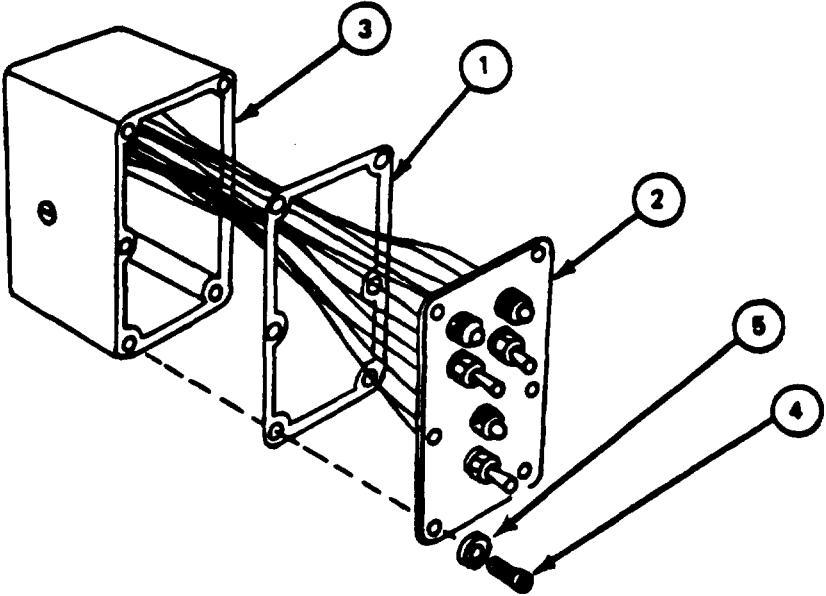
Step	Procedure
1.	<p>Using screwdriver, remove six screws (1) and six lockwashers (2) holding cover (3) to case (4).</p> <p style="text-align: center;">CAUTION</p> <p style="text-align: center;">Use care when removing cover (3) from case (4), to prevent breaking or damaging attached wires.</p>
2.	Pull cover (3) with gasket (5) away from case (4).
3.	Pull gasket (5) over cover (3).
END OF TASK	



6-7. COVER INSTALLATION PROCEDURE

TOOLS: 5/16" flat tip screwdriver

PERSONNEL: One

FRAME 1	
Step	Procedure
	<div style="text-align: center; border: 1px solid black; padding: 2px;">CAUTION</div> <p>Fold wires attached to cover (2) into case (3). Make sure that wires are not pinched by cover so they cannot be damaged.</p> <ol style="list-style-type: none"> <li>1. Put gasket (1) over cover (2) and line up holes. <li>2. Using screwdriver, attach cover (2) and gasket (1) to case (3) using six screws (4) and six lockwashers (5). <p>END OF TASK</p>
	

6-8. MAIN GUN LIGHT REMOVAL PROCEDURE

TOOLS: Soldering iron
9/16" open end wrench

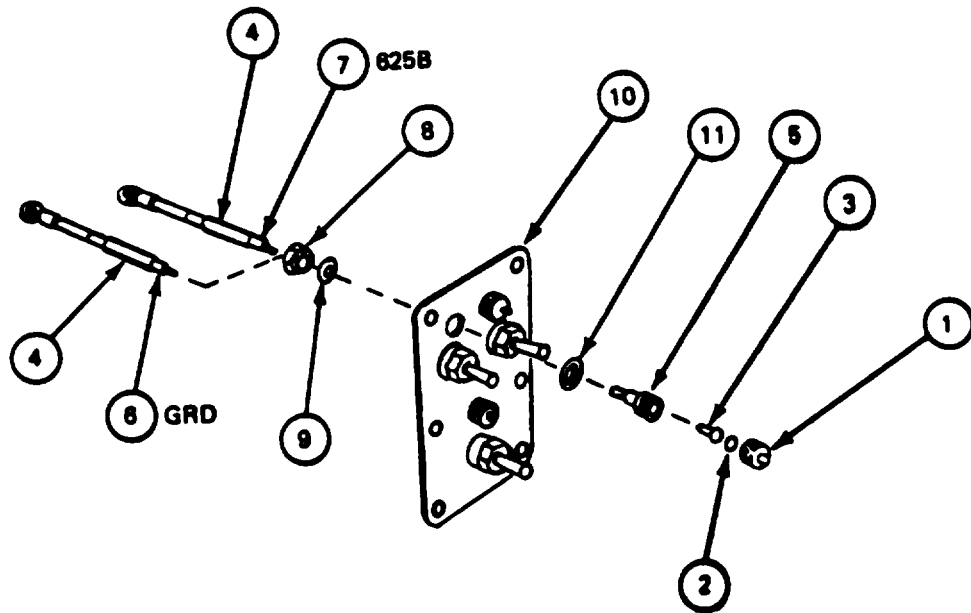
PERSONNEL: One

REFERENCES: JPG for procedures to:
Remove lamps
Use soldering iron
Tag wires

PRELIMINARY PROCEDURES: Test gunner's control box (para 6-3)
Remove cover (para 6-6)

6-8. MAIN GUN LIGHT REMOVAL PROCEDURE (CONT)

FRAME 1	
Step	Procedure
1.	Remove lens cap (1), gasket (2), and lamp (3) (JPG).
2.	Slide sleeving (4) off two terminals on light (5).
3.	Tag each wire connected to light (5) terminals (JPG).
4.	Using soldering iron, unsolder GRD wire (6) from light (5) terminal (JPG).
5.	Using soldering iron, unsolder 625B wire (7) from light (5) terminal (JPG).
6.	Using wrench, remove nut (8) and lockwasher (9) holding light (5) to cover (10).
7.	Remove light (5) from cover (10).
8.	Remove preformed packing (11) from light (5).
9.	Slide sleeving (4) off wires (6) and (7).
10.	Throw away sleeving (4).
	END OF TASK



6-9. MAIN GUN LIGHT INSTALLATION PROCEDURE

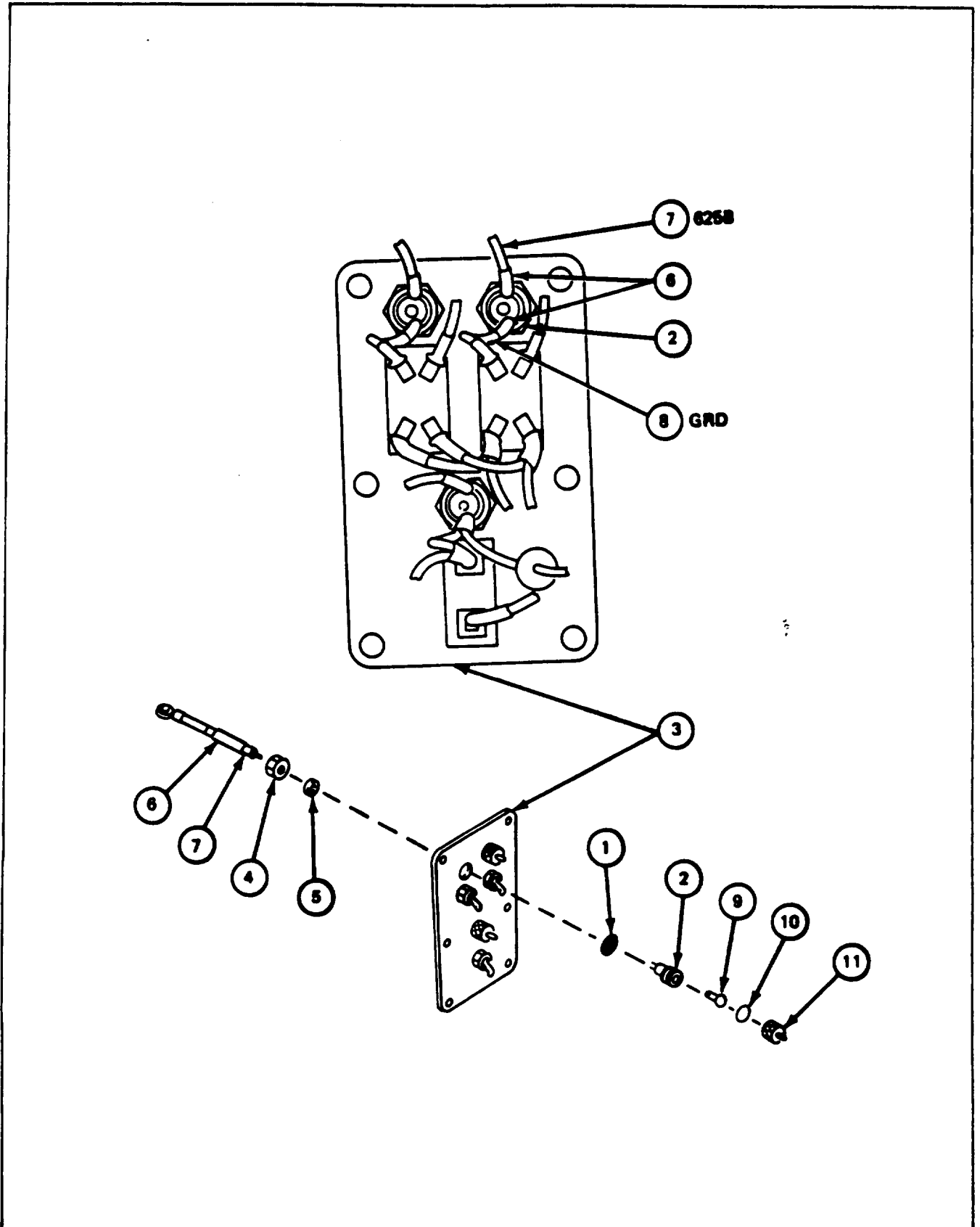
TOOLS: Soldering iron
 Heat gun (NSN 4940-00-561- 1002)
 9/16" open end wrench

SUPPLIES: Insulation sleeving
 Solder (item 31, App. A)

PERSONNEL One

REFERENCES: JPG for procedures to
 Install lamps
 Use soldering iron
 Use heat gun

FRAME 1	
Step	Procedure
<ol style="list-style-type: none"> 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 	<p>Put preformed packing (1) on light (2).</p> <p>Put light (2) -in cover (3).</p> <p>Using wrench attach light (2) to cover (3) with nut (4) and lockwasher (5).</p> <p>Slide 1" long insulation sleeving (6) on 625B wire (7) and GRD wire (8).</p> <p>Using soldering iron, solder 625B wire (7) to light (2) terminal (JPG).</p> <p>Using soldering iron, solder GRD wire (8) to light (2) terminal (JPG).</p> <p>Slide 1" long insulation sleeving (6) on light (2) terminals.</p> <p>Put in lamp (9), gasket (10), and lens cap (11) (JPG).</p> <p>Remove all tags from wires.</p> <p>Using heat gun, heat insulation sleeving until sleeving begins to shrink (JPG).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Do following only if this completes maintenance of control box. If more maintenance must be done, omit following</p> <p style="text-align: center;">Follow-on Maintenance Action Required</p> <p style="text-align: center;">Install cover on control box (para 6-7). Test gunner's control box (para 6-3).</p> <p>END OF TASK</p>



6-10. MACHINE GUN LIGHT REMOVAL PROCEDURE

TOOLS: Soldering iron
9/16" open end wrench

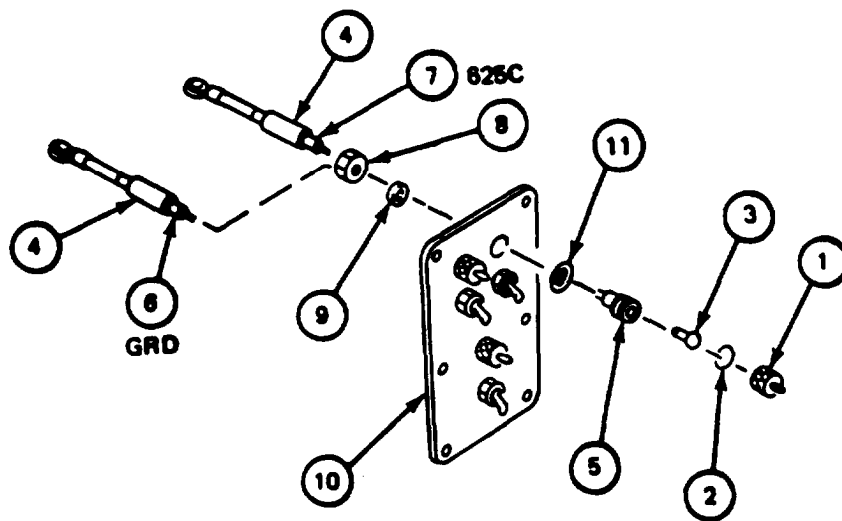
PERSONNEL: One

REFERENCES: JPG for procedures to:
Remove lamps
Use soldering iron
Tag wires

PRELIMINARY PROCEDURES: Test gunner's control box (para 6-3)
Remove cover (para 6-6)

6-10. MACHINE GUN LIGHT REMOVAL PROCEDURE (CONT)

FRAME 1	
Step	Procedure
1.	Remove lens cap (1), gasket (2), and lamp (3) (JPG).
2.	Slide sleeving (4) off two terminals on light (5).
3.	Tag each wire connected to light (5) terminals (JPG).
4.	Using soldering iron, unsolder GRD wire (6) from light (5) terminal (JPG).
5.	Using soldering iron, unsolder 625C wire (7) from light (5) terminal (JPG).
6.	Using wrench, remove nut (8) and lockwasher (9) holding light (5) to cover (10).
7.	Remove light (5) from cover (10).
8.	Remove preformed packing (11) from light (5).
9.	Slide sleeving (4) off wires (6) and (7).
10.	Throw away sleeving (4).
END OF TASK	



6-11. MACHINE GUN LIGHT INSTALLATION PROCEDURE

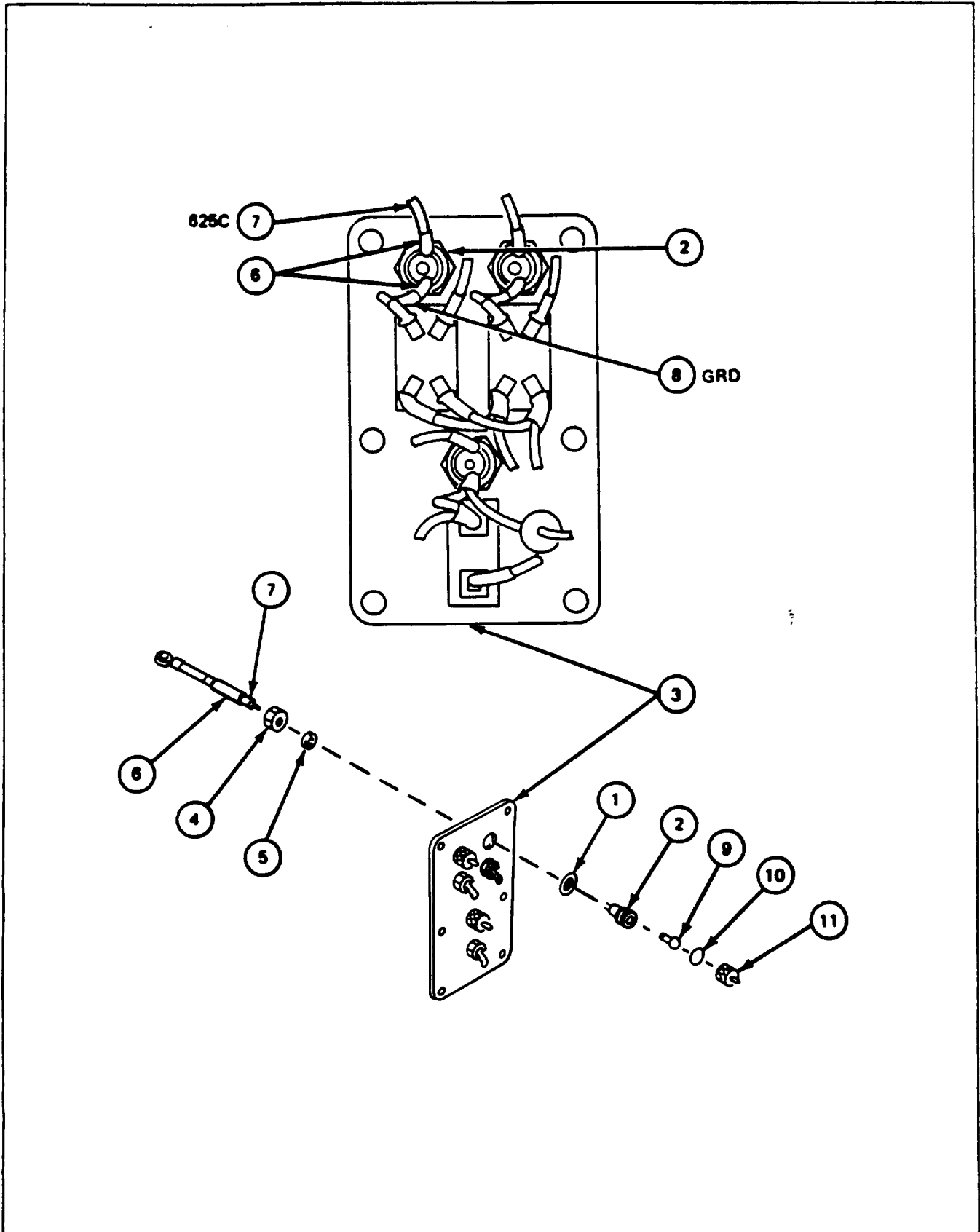
TOOLS: Soldering iron
 Heat gun (NSN 4940-00-561-1002)
 9/16" open end wrench

SUPPLIES: Insulation sleeving
 Solder (item 31, App. A)

PERSONNEL: One

REFERENCES: JPG for procedures to:
 Install lamps
 Use soldering iron
 Use heat gun

FRAME 1	
Step	Procedure
1.	Put preformed packing (1) on light (2).
2.	Put light (2) in cover (3).
3.	Using wrench, attach light (2) to cover (3) with nut (4) and lockwasher (5).
4.	Slide 1" long insulation sleeving (6) on 625C wire (7) and GRD wire (8).
5.	Using soldering iron, solder 625C wire (7) to light (2) terminal (JPG).
6.	Using soldering iron solder GRD wire (8) to light (2) terminal (JPG).
7.	Slide 1" long insulation sleeving (6) on tight (2) terminals.
8.	Put in lamp (9), gasket (10), and lens cap (11) (JPG).
9.	Remove all tags from wires.
10.	Using heat gun, heat insulation sleeving until sleeving begins to shrink (JPG).
	NOTE
	Do following only if this completes maintenance of control box. If more maintenance must be done, omit following.
	Follow-on Maintenance Action Required:
	install cover (para 6-7). Test gunner's control box (para 6-3).
	END OF TASK



6-12. ELEV/TRAV POWER LIGHT REMOVAL PROCEDURE

TOOLS: Soldering iron
9/16" combination wrench

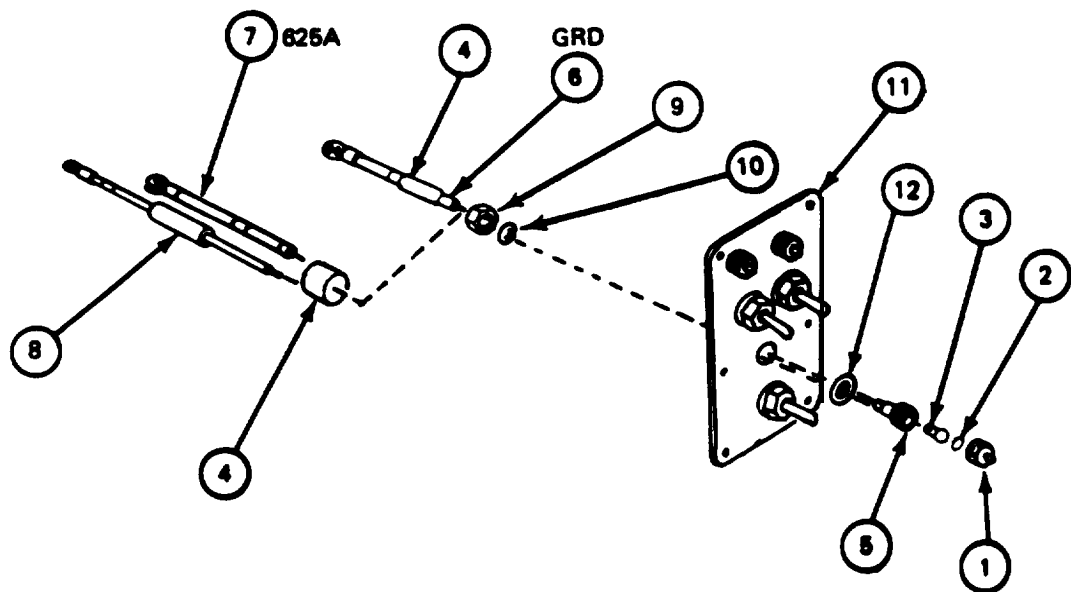
PERSONNEL: One

REFERENCES: JPG for procedures to:
Remove lamps
Use soldering iron
Tag wires

PRELIMINARY PROCEDURES: Test gunner's control box (para 6-3)
Remove cover (para 6-6)

6-12. ELEV/TRAV POWER LIGHT REMOVAL PROCEDURE (CONT)

FRAME 1	
Step	Procedure
1.	Remove lens cap (1), gasket (2), and lamp (3) (JPG).
2.	Slide sleeving (4) off two terminals on light (5).
3.	Tag each wire connected to light (5) terminals (JPG).
4.	Using soldering iron, unsolder GRD wire (6) from light (5) terminal (JPG).
5.	Using soldering iron, unsolder 625A wire (7) and diode lead assembly (8) from light (5) terminal (JPG).
6.	Using wrench, remove nut (9) and lockwasher (10), holding light (5) to cover (11).
7.	Remove light (5) from cover (11).
8.	Remove preformed packing (12) from light (5).
9.	Slide sleeving (4) off wires (6), (7), and (8).
10.	Throw away sleeving (4).
	END OF TASK



6-13. ELEV/TRAV POWER LIGHT INSTALLATION PROCEDURE

TOOLS: Soldering iron
Heat gun (NSN 4940-00-561-1002)
9/16" combination wrench

SUPPLIES: Insulation sleeving
Solder (item 31, App. A)

PERSONNEL: One

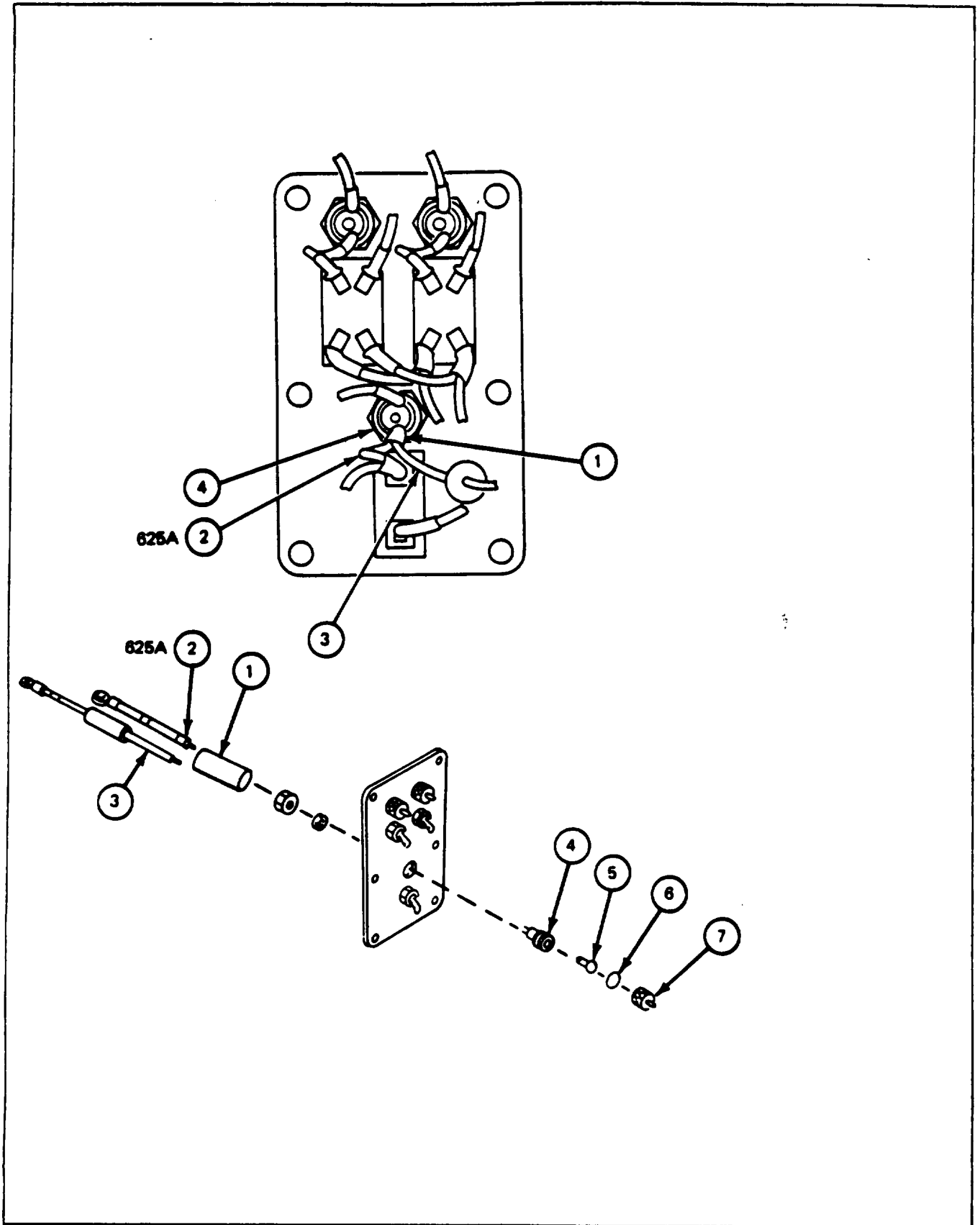
REFERENCES: JPG for procedures to:
Install lamps
Use soldering iron
Use heat gun

6-13. ELEV/TRAV POWER LIGHT INSTALLATION PROCEDURE (CONT)

FRAME 1	
Step	Procedure
<ol style="list-style-type: none"> 1. Put preformed packing (1) on light (2). 2. Put light (2) in cover (3). 3. Using wrench, attach light (2) to cover (3) with nut (4) and lockwasher (5). 4. Slide 1" long insulation sleeving (6) on GRD wire (7). 5. Using soldering iron, solder GRD wire (7) to light (2) terminal (JPG). 6. Slide 1" long insulation sleeving (6) on light (2) terminal. <p>GO TO FRAME 2</p>	

6-13. ELEV/TRAV POWER LIGHT INSTALLATION PROCEDURE (CONT)

FRAME 2	
Step	Procedure
<ol style="list-style-type: none"> 1. 2. 3. 4. 5. 6. 	<p>Slide 1" long insulation sleeving (1) on both 625A wire (2) and diode lead wire (3).</p> <p>Using soldering iron, solder 625A wire (2) and diode lead wire (3) to light (4) terminal (JPG).</p> <p>Slide 1" long insulation sleeving (1) on light (4) terminal.</p> <p>Put in lamp (5), gasket (6) and lens cap (7) (JPG).</p> <p>Remove tags from wires.</p> <p>Using heat gun, heat insulation sleeving until sleeving begins to shrink (JPG).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Do following only if this completes maintenance of control box. If more maintenance must be done, omit following.</p> <p style="text-align: center;">Follow-on Maintenance Action Required:</p> <p style="text-align: center;">Install cover (para 6-7). Test gunner's control box (para 6-3).</p> <p>END OF TASK</p>



6-14. MAIN GUN SWITCH REMOVAL PROCEDURE

TOOLS: 9/16" open end wrench
Soldering iron

PERSONNEL: One

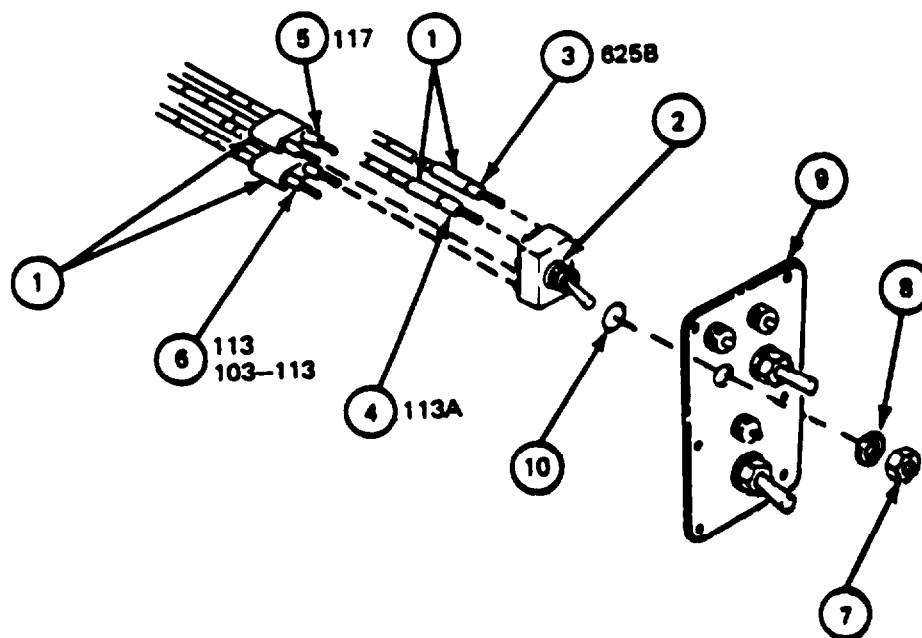
REFERENCES: JPG for procedures to
Use soldering iron
Tag wires

PRELIMINARY PROCEDURES: Test gunner's control box (para 6-3)
Remove cover (para 6-6)

6-14. MAIN GUN SWITCH REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Slide sleeving (1) off four terminals on switch (2).
2.	Tag each wire connected to switch (2) terminals (JPG).
3.	Using soldering iron, unsolder 625B wire (3) from switch (2) terminal (JPG).
4.	Using soldering iron, unsolder 113A wire (4) from switch (2) terminal (JPG).
5.	Using soldering iron, unsolder two 117 wires (5) from switch (2) terminal (JPG).
6.	Using soldering iron, unsolder both 113 and 103-113 wires (6) from switch (2) terminal (JPG)
7.	Slide sleeving (1) off wires (3), (4), (5), and (6), and throw sleeving (1) away.
8.	Using wrench, remove nut (7) and lockwasher (8) holding switch (2) to cover (9).
9.	Remove switch (2) and seal (10).
10.	Throw seal (10) away.
END OF TASK	



6-15. MAIN GUN SWITCH INSTALLATION PROCEDURE

TOOLS: 9/16" open end wrench
Heat gun (NSN 4940-00-561-1002)
Soldering iron

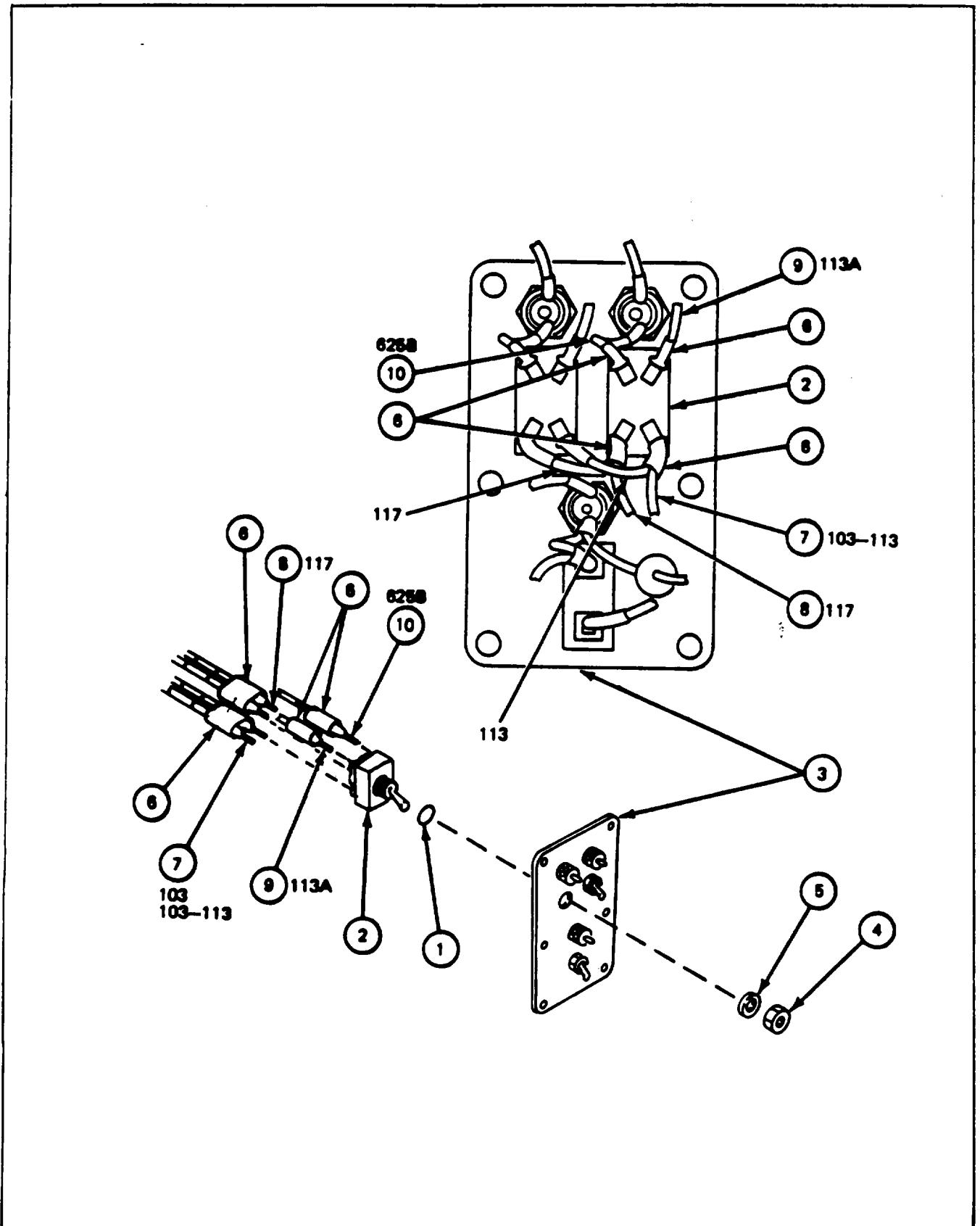
SUPPLIES: Seal (MS25196-1)
Insulation sleeving
Solder (item 31, App. A)

PERSONNEL: One

REFERENCES: JPG for procedures to
Use soldering iron
Use heat gun

6-15. MAIN GUN SWITCH INSTALLATION PROCEDURE (CONT)

FRAME 1	
Step	Procedure
1.	Put seal (1) on switch (2).
2.	Set switch (2) to OFF position (keyway side).
3.	Put switch (2) in cover (3) with OFF down.
4.	Using wrench, attach switch (2) and seal (1) to cover (3) with nut (4) and lockwasher (5).
5.	Slide 1" long insulation sleeve (6) on both 103 and 103-113 wires (7).
6.	Using soldering iron, solder both 103 and 103-113 wires (7) to switch (2) terminal (JPG).
7.	Slide 1" long insulation sleeve (6) on two 117 wires (8).
8.	Using soldering iron, solder two 117 wires (8) to switch (2) terminal (JPG).
9.	Slide 1" long insulation sleeve (6) on 113A wire (9).
10.	Using soldering iron, solder 113A wire (9) to switch (2) terminal (JPG).
11.	Slide 1" long insulation sleeve (6) on 625B wire (10).
12.	Using soldering iron, solder 625B wire (10) to switch (2) terminal (JPG).
13.	Slide insulation sleeving (6) on four terminals on switch (2).
14.	Remove all tags from wires.
15.	Using heat gun, heat insulation sleeving until sleeving begins to shrink (JPG).
 NOTE 	
Do following only if this completes maintenance of control box. If more maintenance must be done, omit following	
Follow-on Maintenance Action Required	
Install rover (para 6-7). Test gunner's control box (para 6-3).	
END OF TASK	



6-16. MACHINE GUN SWITCH REMOVAL PROCEDURE

TOOLS: 9/16" open end wrench
Soldering iron

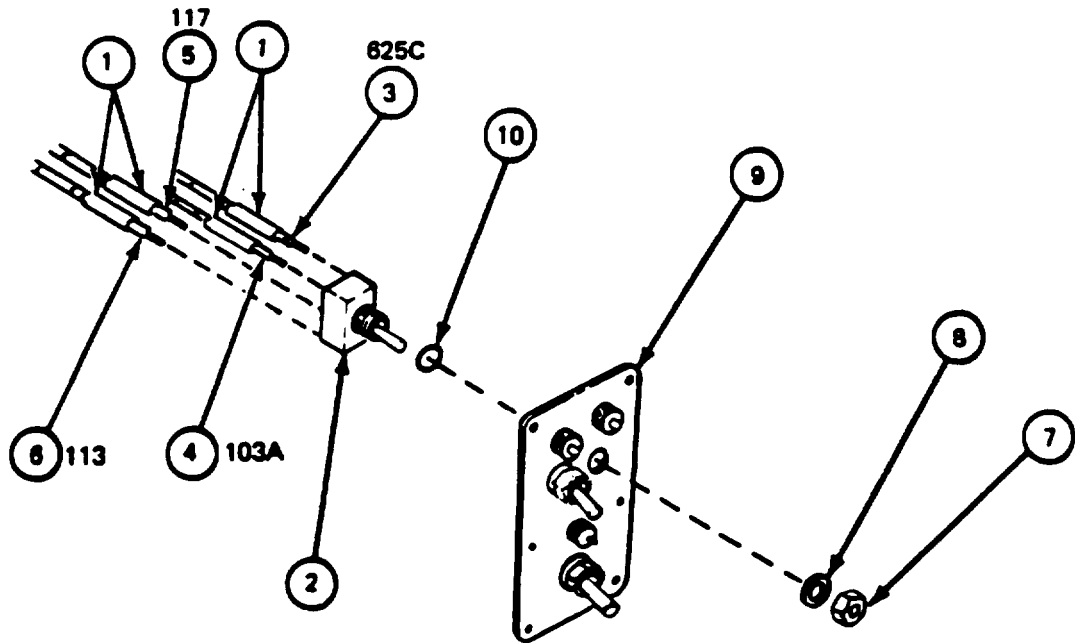
PERSONNEL: One

REFERENCES: JPG for procedures to:
Use soldering iron
Tag wires

PRELIMINARY PROCEDURES Test gunner's control box (para 6-3)
Remove cover (para 6-6)

6-16. MACHINE GUN SWITCH REMOVAL PROCEDURE (CONT)

FRAME 1	
Step	Procedure
1.	Slide sleeving (1) off four terminals on switch (2).
2.	Tag each wire connected to switch (2) terminals (JPG).
3.	Using soldering iron, unsolder 625C wire (3) from switch (2) terminal (JPG).
4.	Using soldering iron, unsolder 103A wire (4) from switch (2) terminal (JPG).
5.	Using soldering iron, unsolder 117 wire (5) from switch (2) terminal (JPG).
6.	Using soldering iron, unsolder 113 wire (6) from switch (2) terminal (JPG).
7.	Slide sleeving (1) off four wires and throw sleeving away.
8.	Using wrench, remove nut (7) and lockwasher (8) holding switch (2) to cover (9).
9.	Remove switch (2) and seal (10).
10.	Throw seal (10) away.
	END OF TASK



6-17. MACHINE GUN SWITCH INSTALLATION PROCEDURE

TOOLS: 9/16" open end wrench
Heat gun (NSN 4940-00-561-1002)
Soldering iron

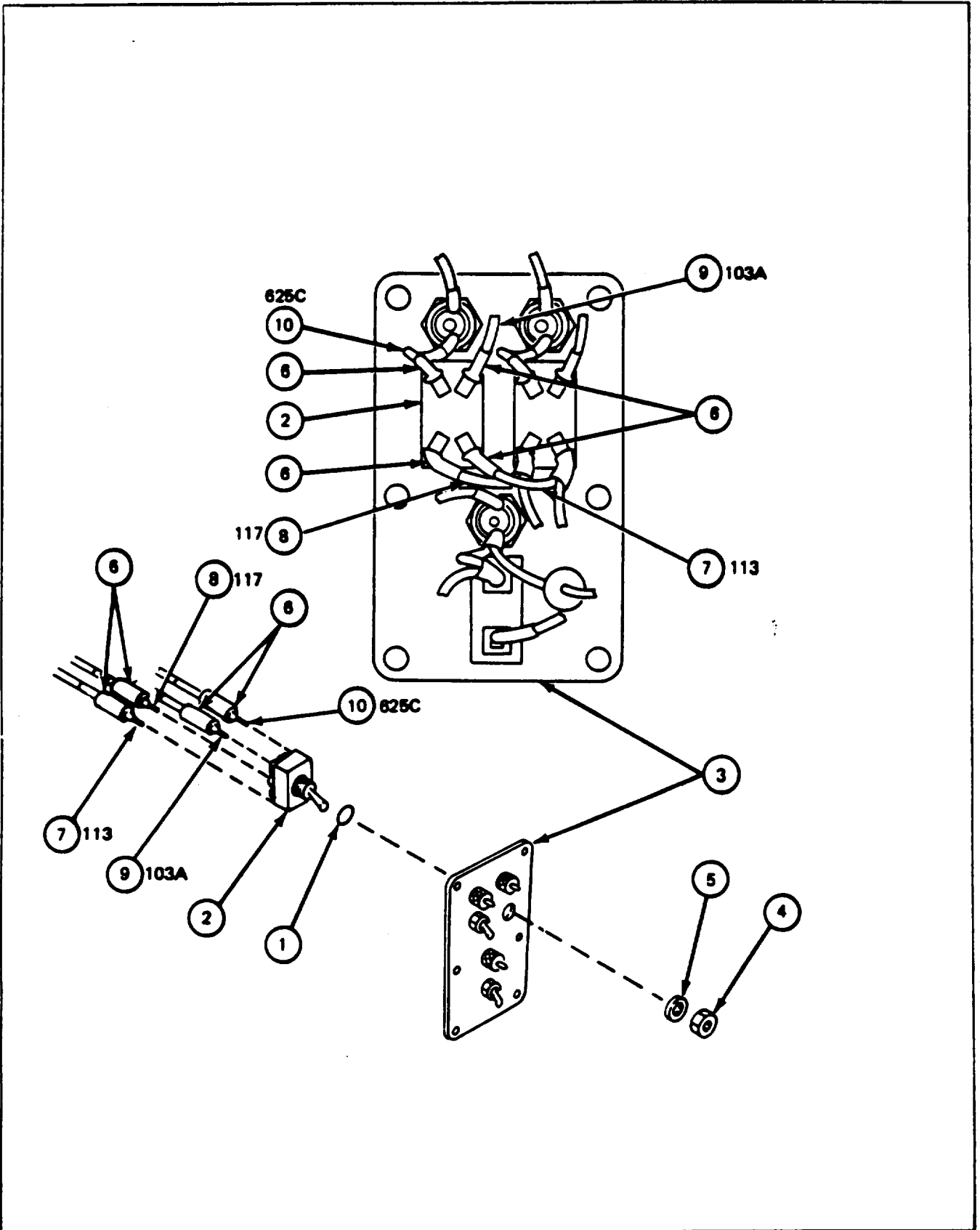
SUPPLIES: Seal (MS25 196-1)
Insulation sleeving
Solder (item 31, App. A)

PERSONNEL: One

REFERENCES: JPG for procedures to:
Use soldering iron
Use heat gun

6-17. MACHINE GUN SWITCH INSTALLATION PROCEDURE (CONT)

FRAME 1	
Step	Procedure
<ol style="list-style-type: none"> 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 	<p>Put seal (1) on switch (2).</p> <p>Set switch (2) to OFF position (keyway side).</p> <p>Put switch (2) in cover (3) with OFF down.</p> <p>Using wrench, attach switch (2) and seal (1) to cover (3) with nut (4) and lockwasher (5).</p> <p>Slide 1“ long insulation sleeve (6) on 113 wire (7).</p> <p>Using soldering iron, solder 113 wire (7) to switch (2) terminal (JPG).</p> <p>Slide 1“ long insulation sleeve (6) on 117 wire (8).</p> <p>Using soldering iron, solder 117 wire (8) to switch (2) terminal (JPG).</p> <p>Slide 1" long insulation sleeve (6) on 103A wire (9).</p> <p>Using soldering iron, solder 103A wire (9) to switch (2) terminal (JPG).</p> <p>Slide 1" long insulation sleeve (6) on 625C wire (10).</p> <p>Using soldering iron, solder 625C wire (10) to switch (2) terminal (JPG).</p> <p>Slide 1“ long insulation sleeving (6) on four terminals on switch (2).</p> <p>Remove tags from wires.</p> <p>Using heat gun, heat insulation sleeving until sleeving begins to shrink (JPG).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Do following only if this completes maintenance of control box. If more maintenance must be done, omit following.</p> <p style="text-align: center;">Follow-on Maintenance Action Required</p> <p style="text-align: center;">Install cover (para 6-7). Test gunner's control box (para 6-3).</p> <p>END OF TASK</p>



6-18. ELEV/TRAV POWER SWITCH REMOVAL PROCEDURE

TOOLS: 9/16" open end wrench
Soldering iron

PERSONNEL One

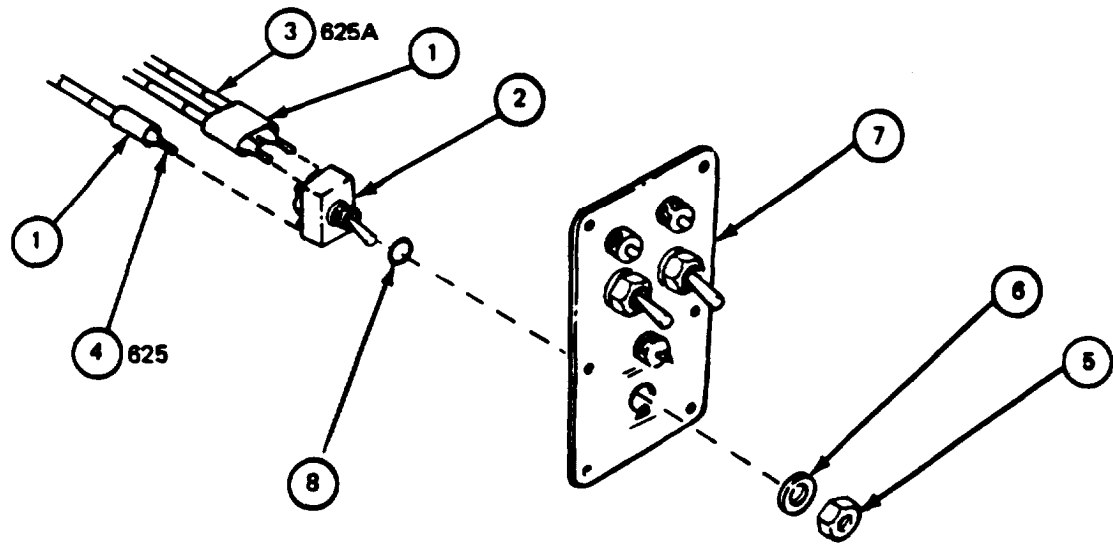
REFERENCES: JPG for procedures to:
Use soldering iron
Tag wires

PRELIMINARY PROCEDURES: Test gunner's control box (para 6-3)
Remove cover (para 6-6)

6-18. ELEV/TRAV POWER SWITCH REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
1.	Slide sleeving (1) off two terminals on switch (2).
2.	Tag each wire connected to switch (2) terminals (JPG).
3.	Using soldering iron, unsolder two 625A wires (3) from switch (2) terminal (JFG).
4.	Using soldering iron, unsolder 625 wire (4) from switch (2) terminal (JPG).
5.	Slide sleeving (1) off two wires and throw sleeving away.
6.	Using wrench, remove nut (5) and lockwasher (6) holding switch (2) to cover (7).
7.	Remove switch (2) and seal (8).
8.	Throw seal (8) away.
END OF TASK	



6-19. ELEV/TRAV POWER SWITCH INSTALLATION

TOOLS: 9/16" open end wrench
 Heat gun (NSN 4940-00-561-1002)
 Soldering iron

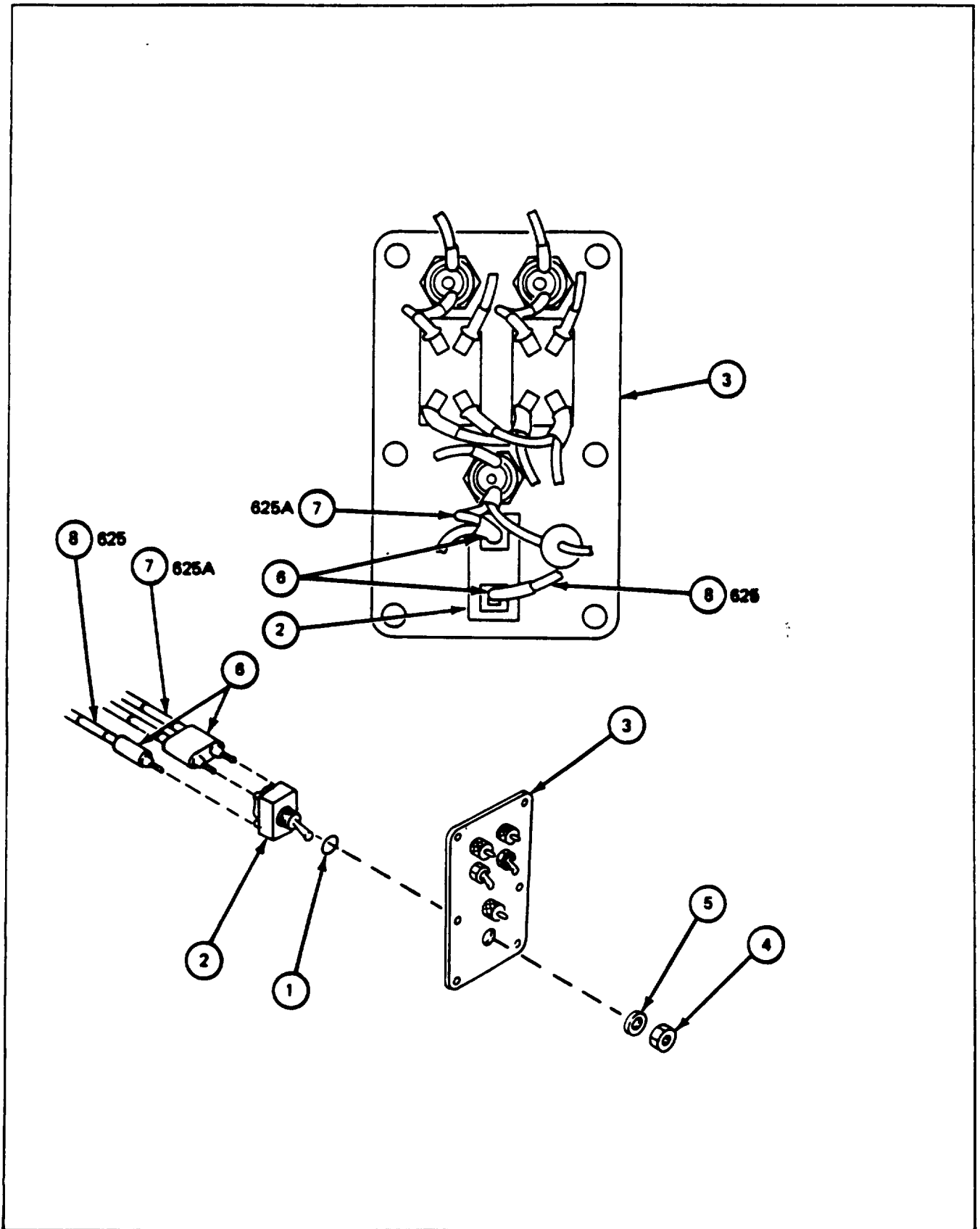
SUPPLIES: Seal (MS2S196-1)
 Insulation sleeving
 Solder (item 31, App. A)

PERSONNEL: One

REFERENCES: JPG for Procedures to:
 Use soldering iron
 Use heat gun

IFRAME 1

Step	Procedure
1.	Put seal (1) on switch (2).
2.	Set switch (2) to OFF position (keyway side).
3.	Put switch (2) in cover (3) with OFF down.
4.	Using wrench attach switch (2) and seal (1) to cover (3) with nut (4) and lockwasher (5).
5.	Hide 1" long insulation sleeve (6) on two 625A wires (7).
6.	Using soldering iron, solder two 625A wires (7) to switch (2) terminal (JPG).
7.	Slide 1" long insulation sleeve (6) on 625 wire (8).
8.	Using soldering iron, solder 625 wire (8) to switch (2) terminal (JPG).
9.	Remove tags from wires.
10.	Slide 1" long insulation sleeves (6) on two terminals on switch (2).
11.	Using heat gun, heat insulation sleeving until sleeving begins to shrink (JPG).
<p>NOTE</p> <p>Do following only if this completes maintenance of control box If more maintenance must be done, omit following.</p> <p>Follow-on Maintenance Action Required</p> <p>Install cover (para 6-7). Test gunner's control box (para 6-3).</p> <p>END OF TASK</p>	



6-20. WIRING HARNESS REMOVAL PROCEDURE

TOOLS: Soldering iron
1/4" flat tip screwdriver

PERSONNEL: One

REFERENCES: JPG for procedures to:
Use soldering iron
Tag wires

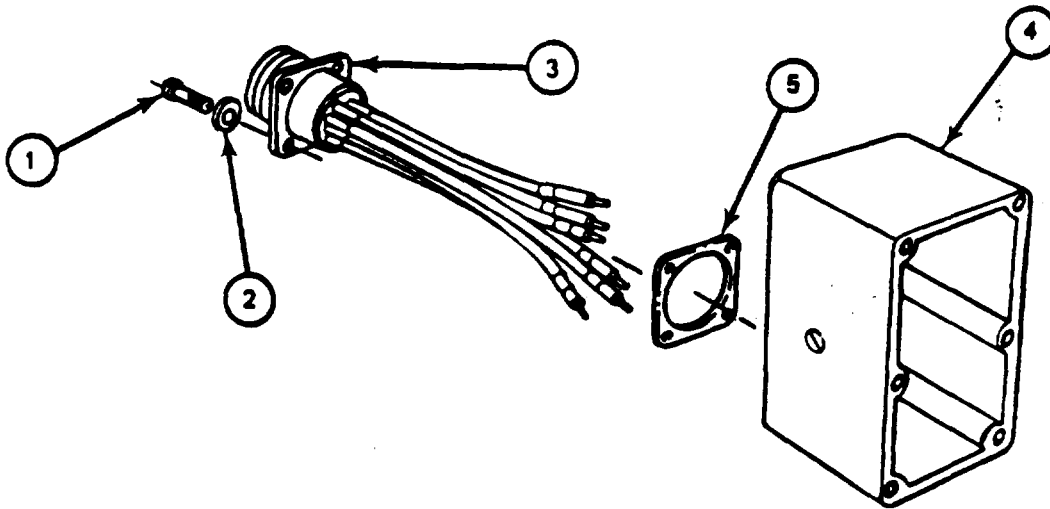
PRELIMINARY PROCEDURES: Test gunner's control box (para 6-3)
Remove cover (para 6-6)

6-20. WIRING HARNESS REMOVAL PROCEDURE (CONT)

FRAME 1	
Step	Procedure
1.	Slide sleeving (1) off six switch terminals (2).
2.	Tag each wire connected to six switch terminals (2) (JPG).
3.	Using soldering iron, unsolder following wires from six switch terminals (2) (JPG): 625 wire (3) 625A wire (4) 103A wire (5) 113A wire (6) 103-113 wire (7) 117 wire (8)
4.	Slide sleeving (1) off wires and throw sleeving away.
5.	Using soldering iron, if necessary, remove 103-113 wire (7) from 113 jumper wire (9) (JPG).
6.	Using soldering iron, if necessary, remove 117 wire (8) from 117 jumper wire (10) (JPG).
	GO TO FRAME 2
<p>The diagram shows a terminal block with six terminals at the top. Wires are connected to these terminals and to other terminals below. Callouts 1 and 2 point to the terminals. Callouts 3, 4, 5, 6, 7, and 8 point to specific wires. Callouts 9 and 10 point to jumper wires.</p>	

6-20. WIRING HARNESS REMOVAL PROCEDURE (CONT)

FRAME 2	
Step	Procedure
1.	Using screwdriver, remove four screws (1) and four lockwashers (2) holding wiring harness (3) to control box (4).
2.	Remove wiring harness (3) and gasket (5) from control box (4). END OF TASK



6-21. WIRING HARNESS INSTALLATION PROCEDURE

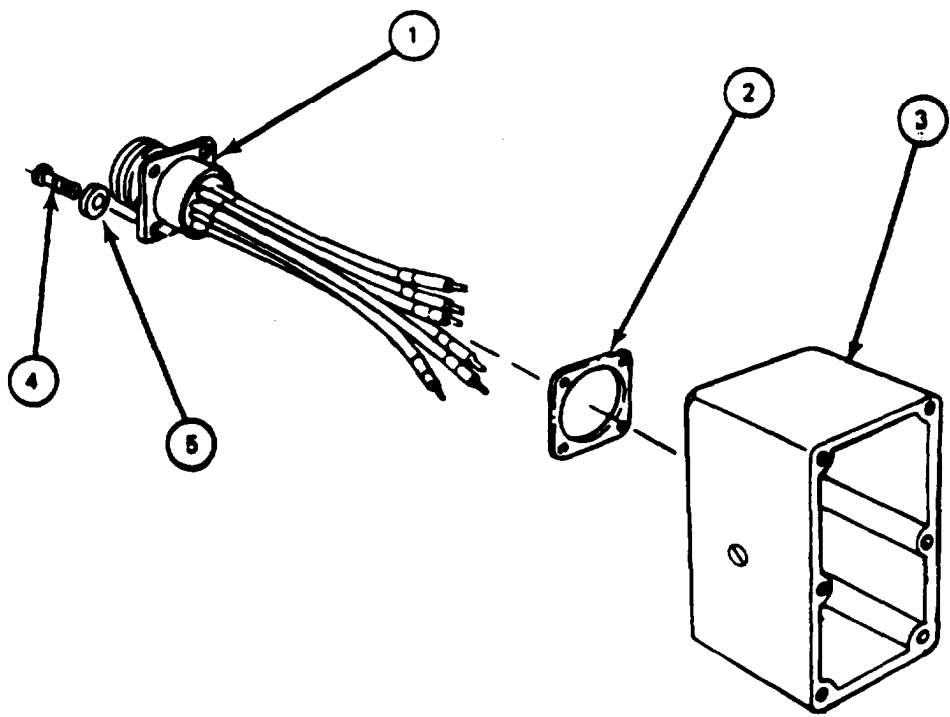
TOOLS: soldering iron
Heat gun (NSN 4940-00-561-1002)
1/4" flat tip screwdriver

SUPPLIES: Insulation sleeving
Solder (item 31, App. A)

PERSONNEL: One

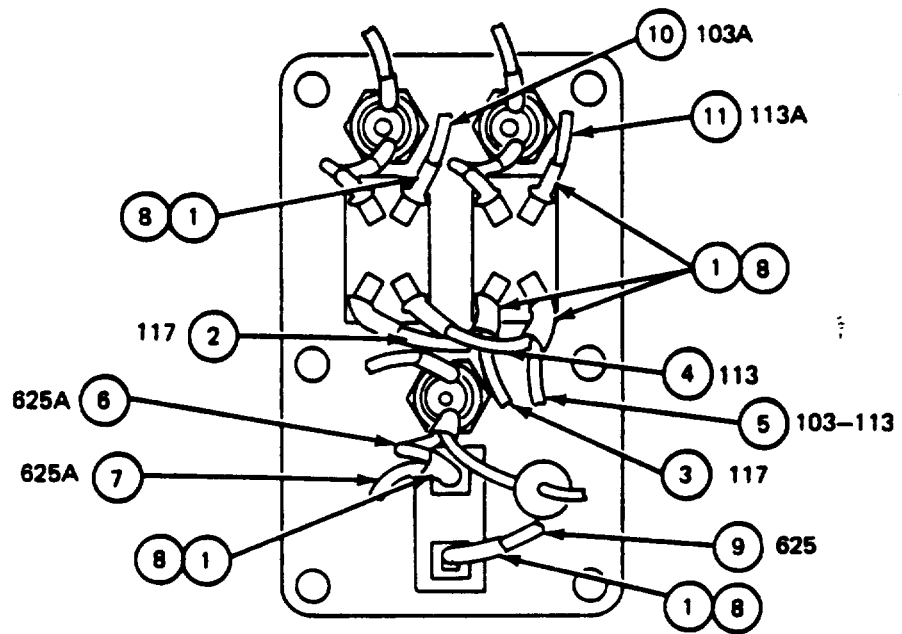
REFERENCES: JPG for procedures to:
Use soldering iron
Use heat gun

6-21. WIRING HARNESS INSTALLATION PROCEDURE (CONT)

FRAME 1	
Step	Procedure
<ol style="list-style-type: none"> 1. 2. 	<p>Put six wires of wiring harness (1) through gasket (2) and into control box (3).</p> <p>Using screwdriver, attach wiring harness (1) and gasket (2) to control box (3) with four screws (4) and four lockwashers (5).</p> <p>GO TO FRAME 2</p>
 <p>The diagram illustrates the assembly process. On the left, a wiring harness (1) with six wires is shown. A square gasket (2) is positioned over the harness. On the right, a control box (3) is shown. Four screws (4) and four lockwashers (5) are used to secure the harness and gasket to the control box.</p>	

6-21. WIRING HARNESS INSTALLATION PROCEDURE (CONT)

FRAME 2	
Step	Procedure
1.	Slide 1" long insulation sleeves (I) on six wires of wiring harness.
2.	Slide 117 jumper wire (2) into 117 wire (3) insulation sleeve (1).
3.	Slide 113 jumper wire (4) into 103-113 wire (5) insulation sleeve (1).
4.	Slide 625A jumper wire (6) into 625A wire (7) insulation sleeve (1).
5.	Using soldering iron, solder following wires to six switch terminals (8) (JPG): Two 117 wires (2) (3) 113 and 103-113 wires (4) (5) Two 625A wires (6) (7) 103A wire (10) 113A wire (11)
6.	Slide insulation sleeves (1) on six switch terminals (8).
7.	Remove tags from wires.
8.	Using heat gun, heat insulation sleeving until sleeving begins to shrink (JPG).
NOTE	
Do following only if this completes maintenance of control box. If more maintenance must be done, omit following.	
Follow-on Maintenance Action Required:	
Install cover (para 6-7). Test gunner's control box (para 6-3).	
END OF TASK	



6-22. GROUND WIRES REMOVAL PROCEDURE

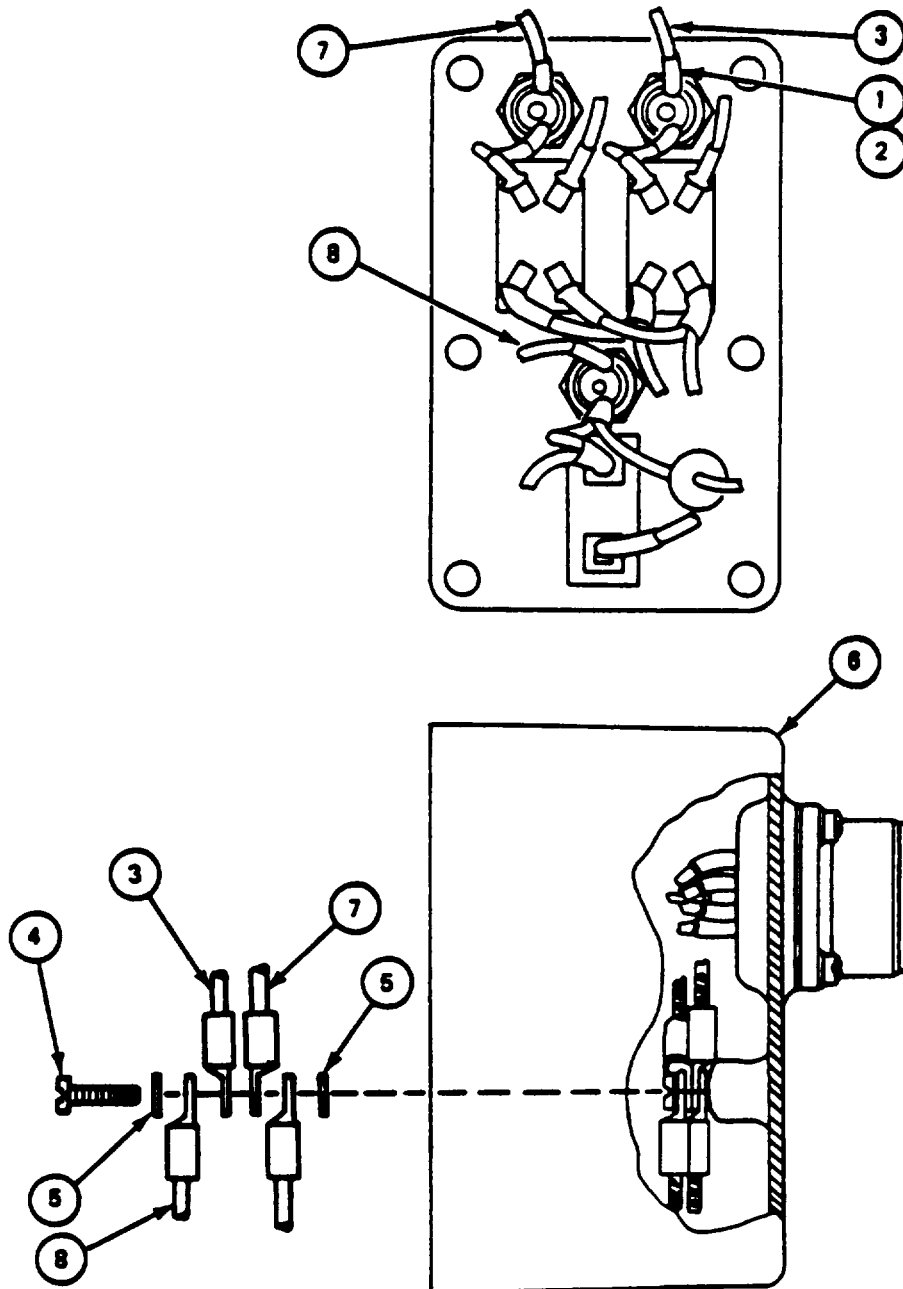
TOOLS: 1/4" flat tip screwdriver
Soldering iron

PERSONNEL: One

REFERENCES: JPG for procedures to:
Use soldering iron
Tag wires

PRELIMINARY PROCEDURES Test gunner's control box (para 6-3)
Remove cover (para 6-6)

FRAME 1	
Step	Procedure
	MAIN GUN Light Ground Wire
1.	Slide insulation sleeving (1) off MAIN GUN light terminal (2).
2.	Tag ground wire at each end (JPG).
3.	Using soldering iron, unsolder MAIN GUN GRD wire (3) from light terminal (2) (JPG).
4.	Slide sleeving (1) off GRD wire (3) and throw sleeving away.
5.	Using screwdriver, remove screw (4) and two lockwashers (5) holding GRD wire (3) to control box (6).
6.	Remove GRD wire (3) from control box (6).
7.	Using screwdriver, attach three other ground wires to control box (6) with screw (4) and two lockwashers (5).
	MACHINE GUN Light Ground Wire
8.	Do steps 1 through 7 for MACHINE GUN light ground wire (7).
	ELEV/TRAV POWER Light Ground Wire
9.	Do steps 1 through 7 for ELEV/TRAV POWER light ground wire (8).
	END OF TASK



6-23. GROUND WIRES INSTALLATION PROCEDURE

TOOLS: 1/4" flat tip screwdriver
Heat gun (NSN 4940-00-561-1002)
Soldering iron

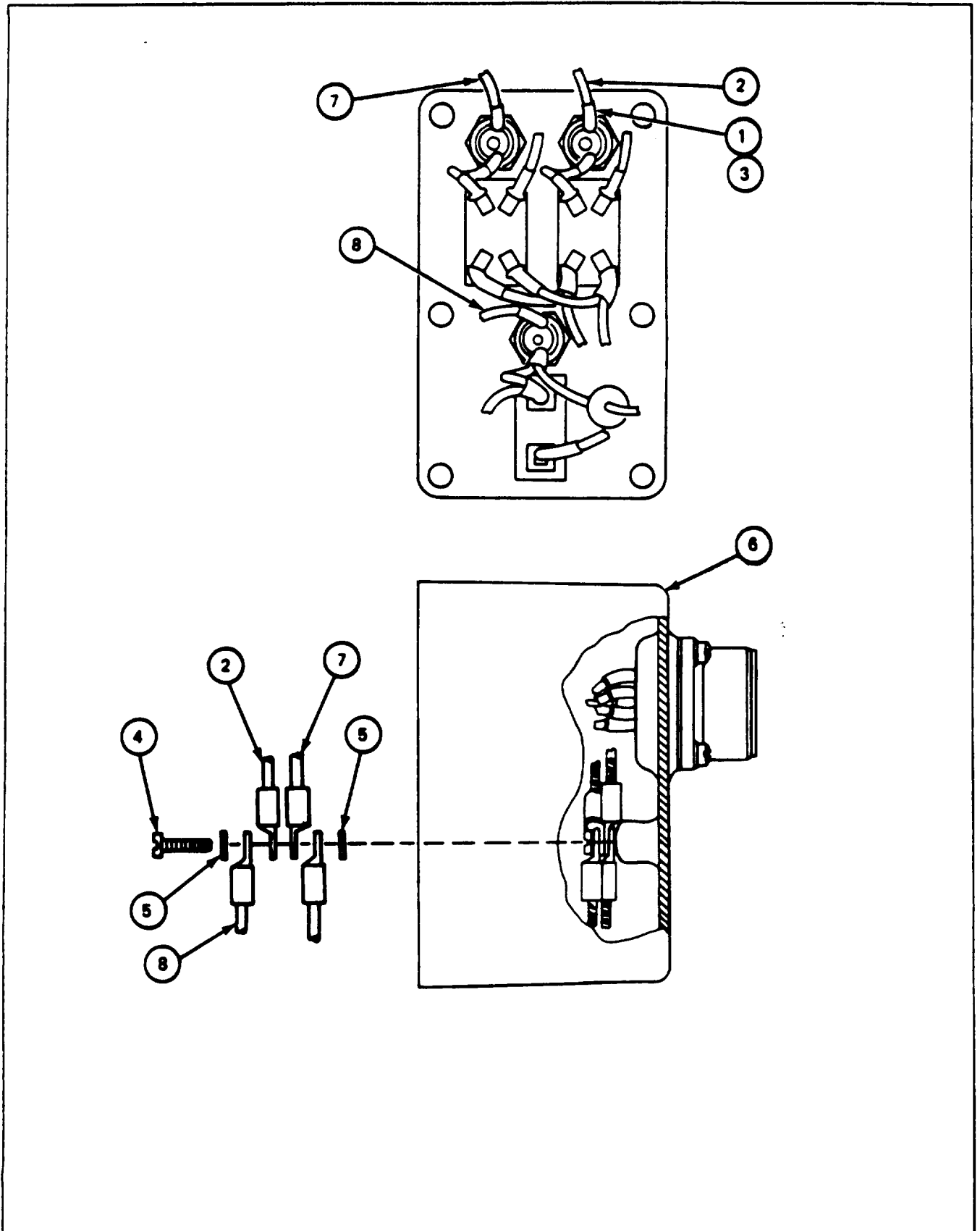
SUPPLIES Insulation sleeving
 Solder (item 31, App. A)

PERSONNEL: One

REFERENCES: JPG for procedures to:
 Use soldering iron
 Use heat gun

6-23. GROUND WIRES INSTALLATION PROCEDURE (CONT)

FRAME 1	
Step	Procedure
	MAIN GUN Light Ground Wire
1.	Slide 1“ long insulation sleeving (1) on MAIN GUN light GRD wire (2).
2.	Using soldering iron, solder MAIN GUN light GRD wire (2) to MAIN GUN light terminal (3) (JPG).
3.	Slide 1“ insulation sleeving (1) on MAIN GUN light terminal (3).
4.	Using screwdriver, remove screw (4) and two lockwashers (5) holding three ground wires to control box (6).
5.	Using screwdriver, attach MAIN GUN light GRD wire (2) and other three ground wires to control box (6) with screw (4) and two lockwashers (5).
6.	Remove tags from wires.
7.	Using heat gun, heat insulation sleeving until sleeving begins to shrink (JPG).
	MACHINE GUN Light Ground Wire
8.	Do steps 1 through 7 for MACHINE GUN light ground wire (7).
	ELEV/TRAV POWER Light Ground Wire
9.	Do steps 1 through 7 for ELEV/TRAV POWER light ground wire (8).
	NOTE
	Do following only if this completes maintenance of control box. If more maintenance must be done, omit following.
	Follow-on Maintenance Action Required
	Install cover (para 6-7).
	Test gunner’s control box (para 6-3).
	END OF TASK



6-24. DIODE LEAD REMOVAL PROCEDURE

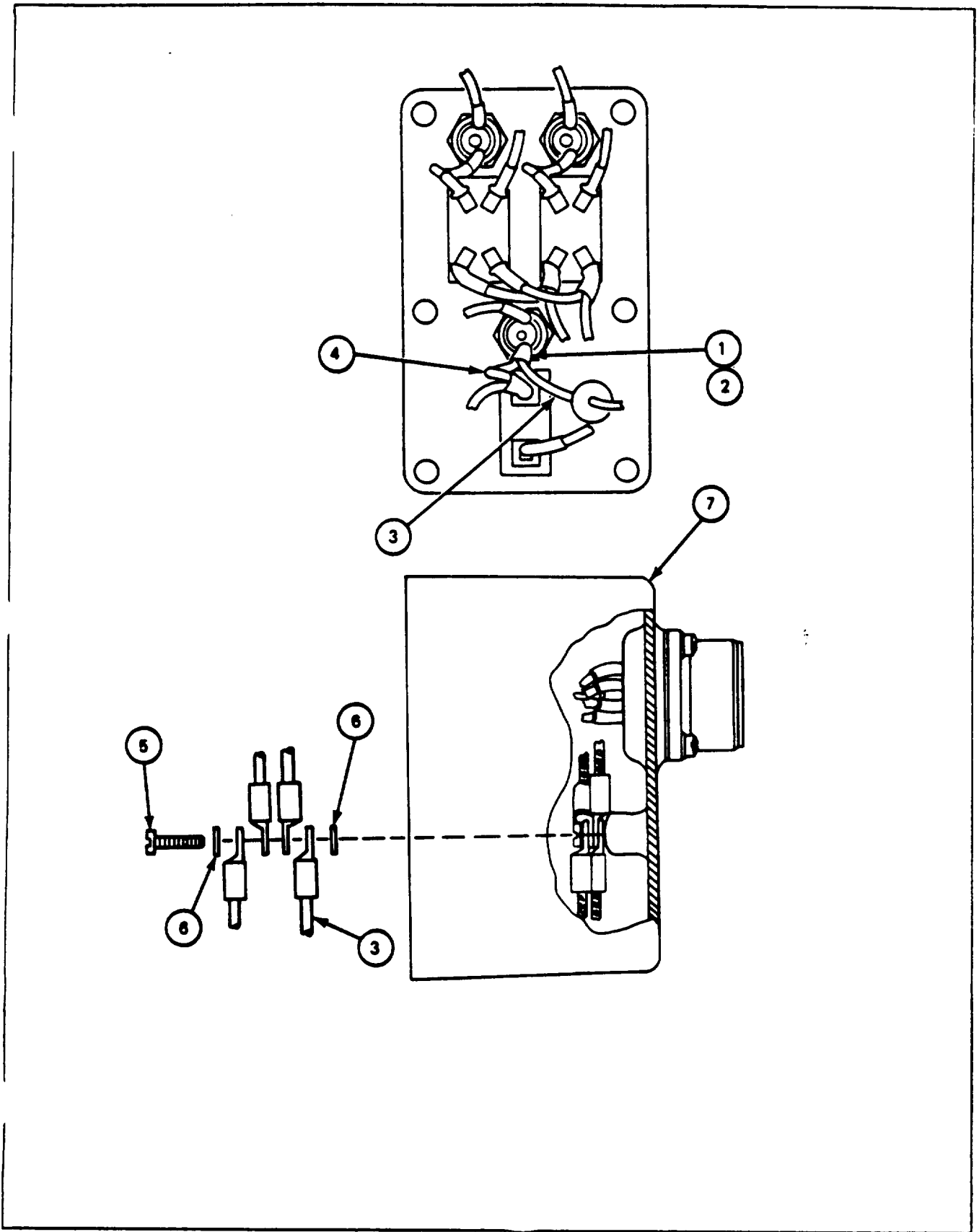
TOOLS: 1/4" flat tip screwdriver
Soldering iron

PERSONNEL: One

REFERENCES: JPG for procedures to:
Use soldering iron
Tag wires

PRELIMINARY PROCEDURES: Test gunner's control box (para 6-3)
Remove cover (para 6-6)

FRAME 1	
Step	Procedure
1.	Slide insulation sleeving (1) off ELEV/TRAV POWER light terminal (2).
2.	Tag each wire connected to ELEV/TRAV POWER light terminal (2) and ground (JPG).
3.	Using soldering iron, unsolder diode lead wire (3) and 625A jumper wire (4) from ELEV/TRAV POWER light terminal (2) (JPG).
4.	Slide sleeving (1) off diode lead wire (3) and 625A jumper wire (4) and throw sleeving away.
5.	Using soldering iron, if necessary, separate diode lead wire (3) and 625A jumper wire (4) (JPG).
6.	Using screwdriver, remove screw (5) and two lockwashers (6) holding diode lead wire (3) to control box (7).
7.	Remove diode lead wire (3) from control box (7).
8.	Using screwdriver, attach three ground wires to control box (7) with screw (5) and two lockwashers (6).
	END OF TASK



6-25. DIODE LEAD INSTALLATION PROCEDURE

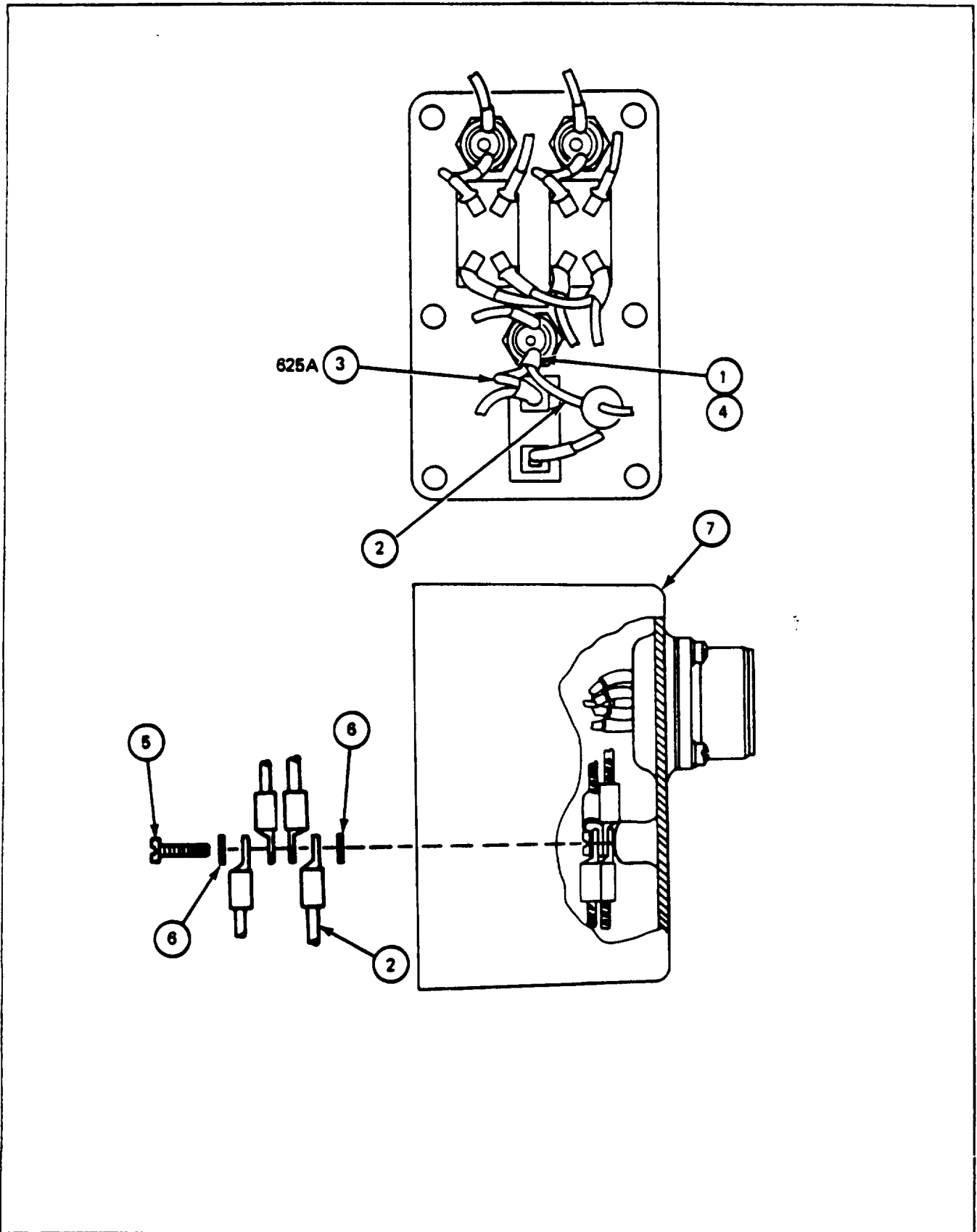
TOOLS: 1/4" flat tip screwdriver
 Heat gun (NSN 4940-00-561-1002)
 Soldering iron

SUPPLIES: Insulation sleeving
 Solder (item 31, App. A)

PERSONNEL: One

REFERENCES: JPG for procedures to
 Use soldering iron
 Use heat gun

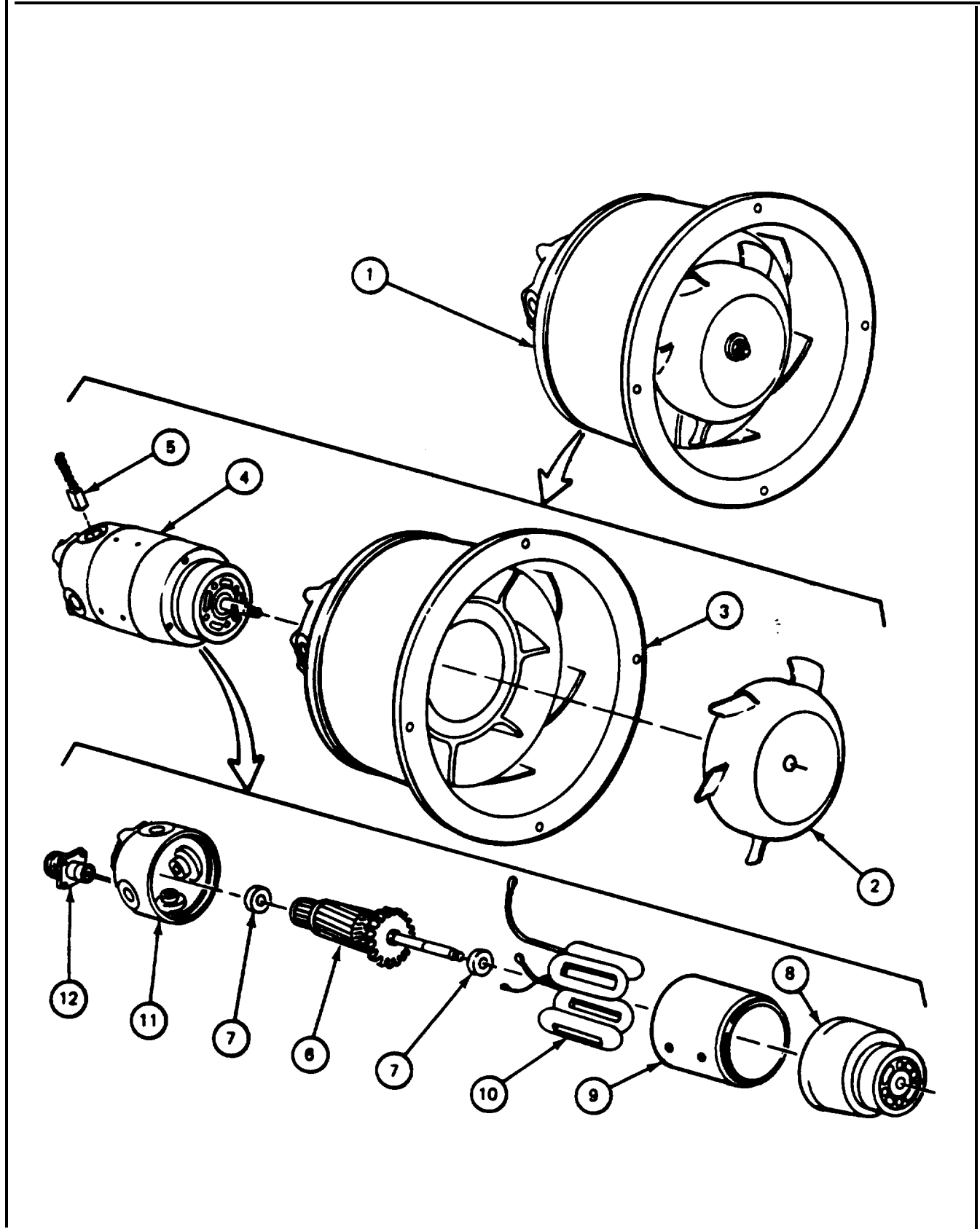
FRAME 1	
Step	Procedure
1.	Slide 1" long insulation sleeving (1) on diode lead wire (2) and 625A jumper wire (3).
2.	Using soldering iron, solder diode lead wire (2) and 625A jumper wire (3) to ELEV/TRAV POWER light terminal (4) (JPG).
3.	Slide 1" long insulation sleeving (1) on ELEV/TRAV POWER light terminal (4).
4.	Using screwdriver, remove screw (5) and two lockwashers (6) holding three ground wires to control box (7).
5.	Using screwdriver, attach diode lead wire (2) and three ground wires to control box (7) with screw (5) and two lockwashers (6).
6.	Remove tags from wires.
7.	Using heat gun, heat insulation sleeving until sleeving begins to shrink (JPG).
NOTE	
Do following only if this completes maintenance of control box. If more maintenance must be done, omit following.	
Follow-on Maintenance Action Required:	
Install cover (para 6-7).	
Test gunner's control box (para 6-3).	
END OF TASK	



CHAPTER 7
TURRET VENTILATING BLOWER

7-1* MAINTENANCE PROCEDURES INDEX

Equipment Item	Inspection	Cleaning	Test	Tasks				
				Removal	Installation	Disassembly	Assembly	Repair
1. Turret Ventilating Blower	7-2	...	7-3	...	...	7-4	7-5	...
2. Impeller	...	...	...	7-6	7-7	...	...	...
3. Shroud	...	...	...	7-8	7-9	...	...	...
4. Motor	...	...	...	7-8	7-9	7-10	7-11	
5. Brushes	7-12	...	...	7-13	7-14	...	...
6. Armature	7-15	7-16	7-17	7-18	7-19	...	...	7-20
7. Bearings	...	...	...	7-18	7-19	...	...	...
8. Fan End	...	...	...	7-18	7-19	7-21	7-22	...
9. Frame	...	...	...	7-23	7-24	...	...	...
10. Field Coils	7-25	7-26	7-27	7-28	7-29	...	...	...
11. Commutator End	...	7-30	...	7-23	7-24	...	...	...
12. Connector	7-25	7-30	7-27	7-31	7-32	...	...	...



7-2. TURRET VENTILATING BLOWER INSPECTION PROCEDURE

PERSONNEL: One

REFERENCES: JPG for procedure to inspect and repair parts

PRELIMINARY PROCEDURES: Disassemble turret ventilating blower (para 7-4)

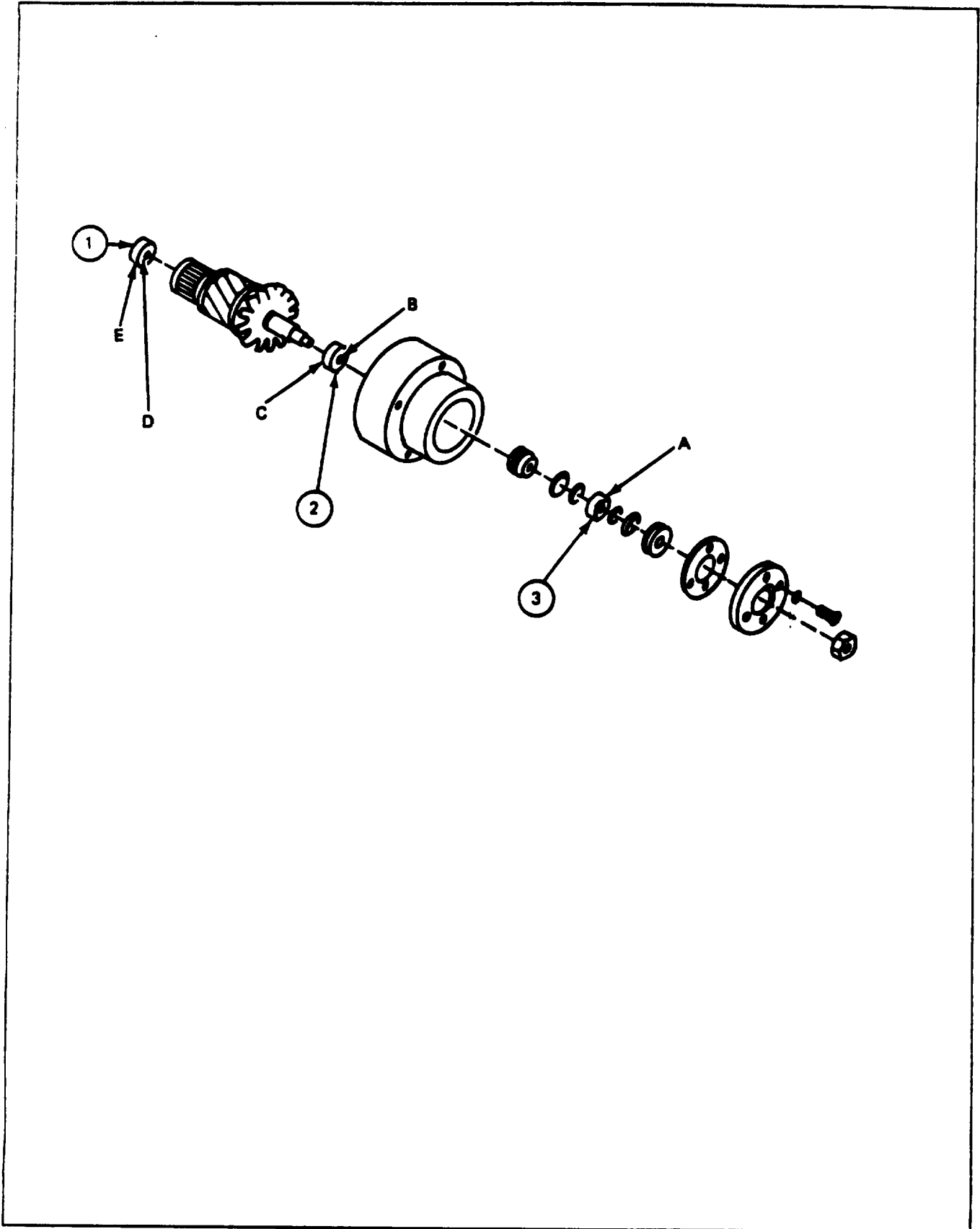
GENERAL INSTRUCTIONS:

NOTE

If part is bad, order repair part or next higher assembly as required. Brushes, armature, and field coils are inspected using different procedures. Refer to section index (para 7- 1) for inspection procedures.

7-2. TURRET VENTILATING BLOWER INSPECTION PROCEDURE (CONT)

FRAME 1																			
Step	Procedure																		
	SUPPORT SHOP WORK																		
1.	Take commutator end bearing (1), fan end bearing (2), and spacer (3) to shop where inspection equipment is available.																		
2.	Make dimensional check.																		
	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Reference Letter</th> <th style="text-align: left;">Point of Measurement</th> <th style="text-align: left;">Measurement</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">A</td> <td>I.D. of spacer (3)</td> <td>0.6280 to 0.6360 inch</td> </tr> <tr> <td style="text-align: center;">B</td> <td>I.D. of bearing (2)</td> <td>0.6690 to 0.6693 inch</td> </tr> <tr> <td style="text-align: center;">C</td> <td>O.D. of bearing (2)</td> <td>1.5743 to 1.5748 inch</td> </tr> <tr> <td style="text-align: center;">D</td> <td>I.D. of bearing (1)</td> <td>0.4721 to 0.4724 inch</td> </tr> <tr> <td style="text-align: center;">E</td> <td>O.D. of bearing (1)</td> <td>1.2594 to 1.2598 inch</td> </tr> </tbody> </table>	Reference Letter	Point of Measurement	Measurement	A	I.D. of spacer (3)	0.6280 to 0.6360 inch	B	I.D. of bearing (2)	0.6690 to 0.6693 inch	C	O.D. of bearing (2)	1.5743 to 1.5748 inch	D	I.D. of bearing (1)	0.4721 to 0.4724 inch	E	O.D. of bearing (1)	1.2594 to 1.2598 inch
Reference Letter	Point of Measurement	Measurement																	
A	I.D. of spacer (3)	0.6280 to 0.6360 inch																	
B	I.D. of bearing (2)	0.6690 to 0.6693 inch																	
C	O.D. of bearing (2)	1.5743 to 1.5748 inch																	
D	I.D. of bearing (1)	0.4721 to 0.4724 inch																	
E	O.D. of bearing (1)	1.2594 to 1.2598 inch																	
	NOTE																		
	Tag parts that are out of tolerance.																		
3.	After support shop work, return bearings (1) and (2) and spacer (3) to turret shop.																		
	NOTE																		
	For all parts tagged out of tolerance, order replacement parts or next higher assembly as required.																		
	END OF TASK																		



7-3. TURRET VENTILATING BLOWER TEST PROCEDURE

PERSONNEL: One

REFERENCES: TM 9-2350-222-20-2-3 for procedure to remove turret ventilating blower

EQUIPMENT CONDITION: Turret ventilating blower removed (TM-20-2-3)

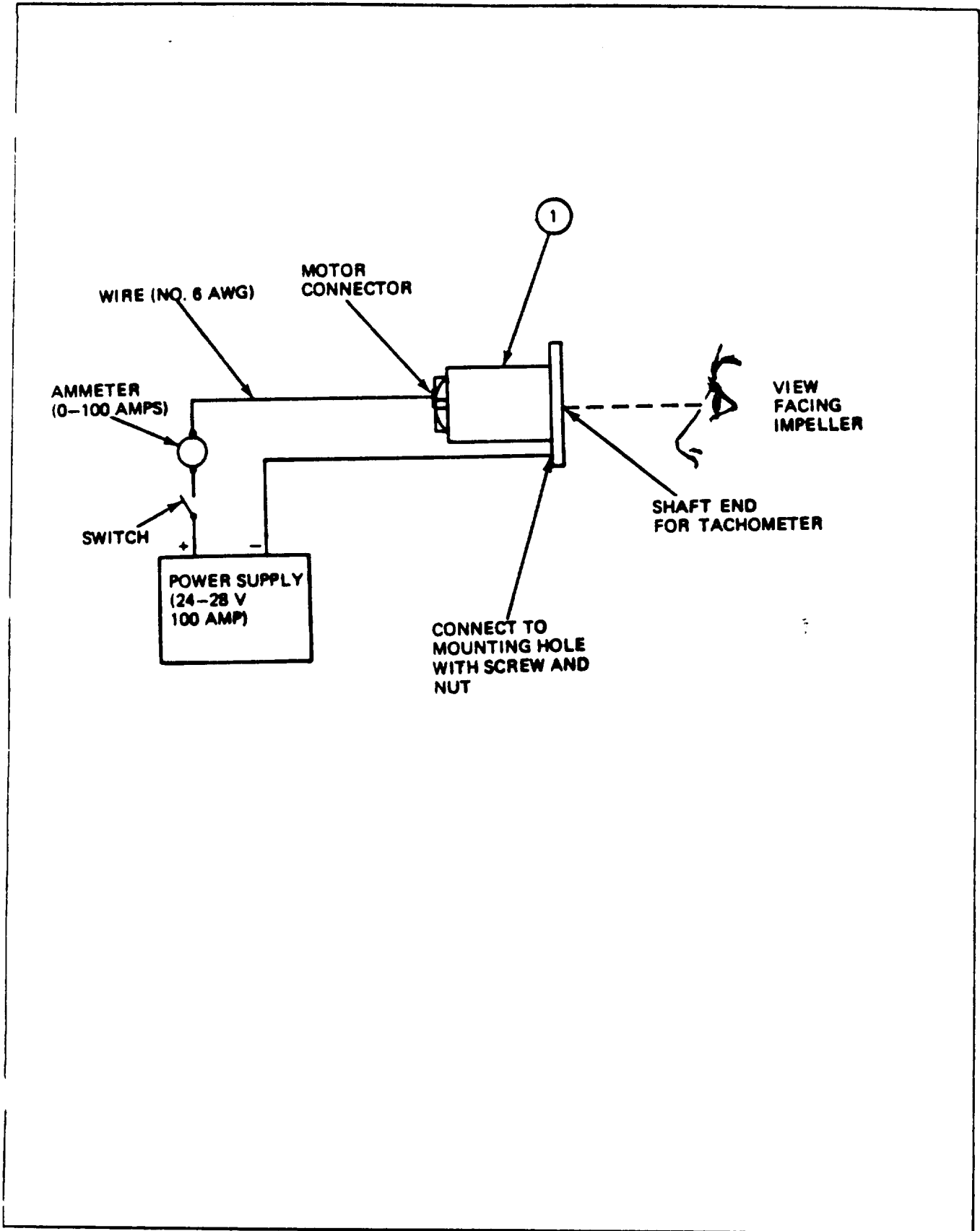
PRELIMINARY PROCEDURES: Assemble turret ventilating blower (para 7-5)

GENERAL INSTRUCTIONS:

NOTE

If normal indication is not obtained, blower is bad. Refer to section index (para 7-1) for replacement of bad part.

FRAME 1			
Step	Procedure	Normal Indication	Probable Fault
SUPPORT SHOP WORK			
1.	Take turret ventilating blower (1) to support shop where test equipment is available. Make the following performance check:	. . .	. . .
2.	Attach blower (1) firmly to test bench.	. . .	. . .
NOTE			
Blower should turn clockwise when viewed from impeller end.			
3.	Operate blower (1).	Turns clockwise between 5750 and 5850 rpm. Current not more than 60 amps.	Bent shaft Tight bearings
NOTE			
Tag blower if out of tolerance.			
4.	After support shop work, return blower (1) to turret shop. END OF TASK		



7-4. TURRET VENTILATING BLOWER DISASSEMBLY PROCEDURE

PERSONNEL: One

REFERENCES: TM 9-2350-222-20-2-3 for procedure to remove turret ventilating blower

EQUIPMENT CONDITION: Turret ventilating blower removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Test turret ventilating blower (para 7-3)

FRAME 1

Step	Procedure
1.	Remove impeller (para 7-6).
2.	Remove motor (para 7-8).
	END OF TASK

7-5. TURRET VENTILATING BLOWER ASSEMBLY PROCEDURE

PERSONNEL: One

FRAME 1	
Step	Procedure
<ol style="list-style-type: none"> 1. 2. 	<p>Install motor (para 7-9).</p> <p>Install impeller (para 7-7).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required: Test turret ventilating blower (para 7-3).</p> <p>END OF TASK</p>

7-6. IMPELLER REMOVAL PROCEDURE

TOOLS: 3/4” socket (1/2” drive)
1/2” drive ratchet
3/4” brass drift pin
20 ounce ball peen hammer
Scraper
Fine stone
Stiff bristled brush

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL One

REFERENCES: TM 9-2350-222-20-2-3 for procedure to remove turret ventilating blower
JPG for procedures to:
Clean parts
Inspect and repair parts

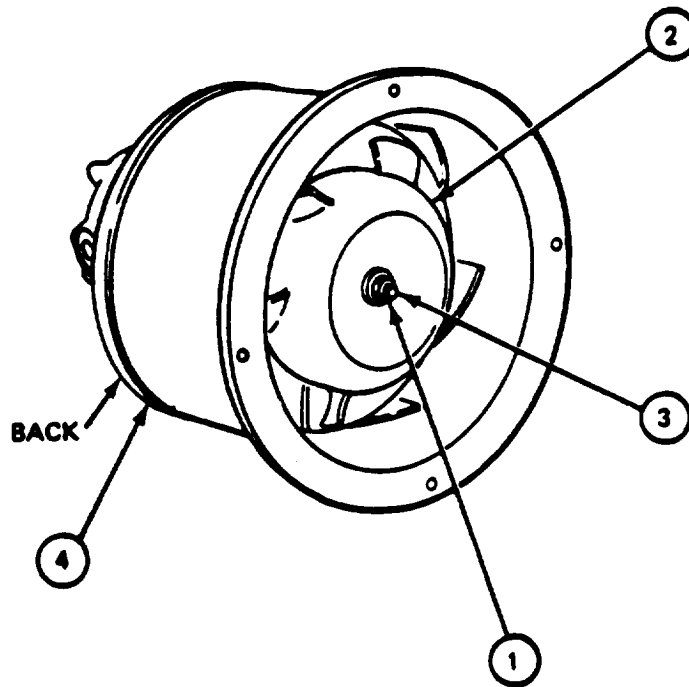
EQUIPMENT CONDITION: Turret ventilating blower removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Test turret ventilating blower (para 7-3)

7-6. IMPELLER REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
<ol style="list-style-type: none"> 1. 2. 3. 	<p>Using socket wrench, remove nut (1), that attaches impeller (2) to motor shaft (3).</p> <p>Using hammer and drift pin, gently tap impeller (2) with drift pin placed through back of turret ventilating blower (4)</p> <p>Remove impeller (2).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required:</p> <p style="text-align: center;">Clean all parts (JPG). Inspect and repair all parts (JPG).</p> <p>END OF TASK</p>

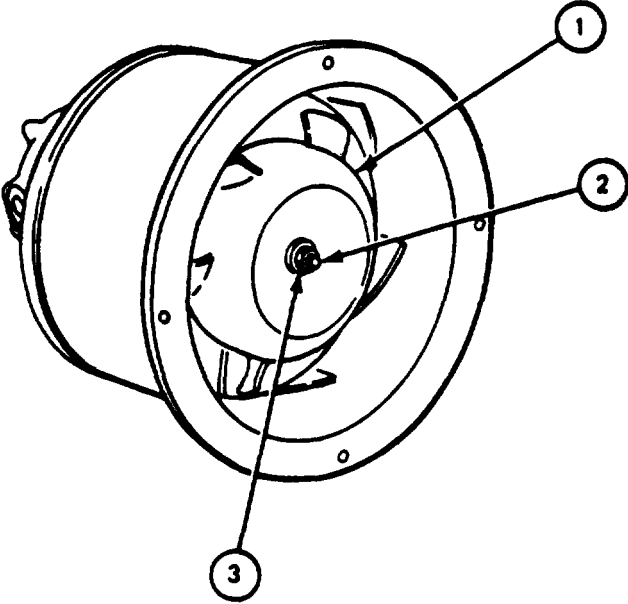


7-7. IMPELLER INSTALLATION P R O D U C E

TOOLS: 3/4" socket (1/2" drive)
1/2" drive ratchet

PERSONNEL: One

PRELIMINARY PROCEDURES: Install motor (para 7-9)

FRAME 1	
Step	Procedure
1.	Align key slot in impeller (1) with woodruff key in shaft (2) and put on impeller.
2.	Using socket wrench, attach impeller (1) to motor shaft (2) with nut (3).
<p>NOTE</p> <p>Follow-on Maintenance Action Required: Test ventilating blower (para 7-3).</p>	
<p>END OF TASK</p>	
	

7-8. MOTOR AND SHROUD REMOVAL PROCEDURE

TOOLS: 7/16" socket (3/8" drive) (thin wall)
 3/8" drive ratchet
 6" extension (3/8" drive)
 20 ounce ball peen hammer
 1/4" brass drift pin
 Scraper
 Fine stone
 Stiff bristled brush

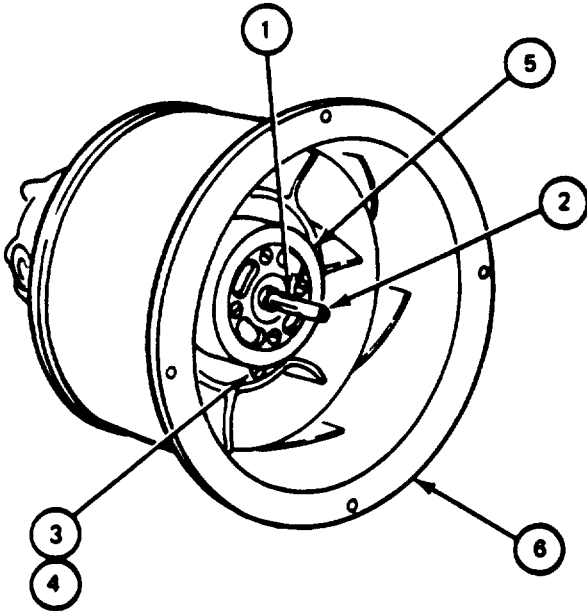
SUPPLIES: Dry cleaning solvent (item 33, App. A)
 Crocus cloth (item 7, App. A)

PERSONNEL: One

REFERENCES: JPG for procedures to:
 Clean parts
 Inspect and repair parts

PRELIMINARY PROCEDURES: Test ventilating blower (para 7-3)
 Remove impeller (para 7-6)

FRAME 1	
Step	Procedure
1.	Using hammer and drift pin, tap end of woodruff key (1) and drive key out of motor shaft (2). Remove key.
2.	Using socket wrench, remove four screws (3) and four lockwashers (4) that attach motor (5) to shroud (6). Remove motor from shroud.
	<p>NOTE</p> <p>Follow-on Maintenance Action Required</p> <p>Clean all parts (JPG).</p> <p>Inspect and repair all parts (JPG).</p>
	END OF TASK



7-9. MOTOR AND SHROUD INSTALLATION PRODUCE

TOOLS: 7/16" socket (3/8" drive) (thin wall)
 3/8" drive ratchet
 6" extension (3/8" drive)
 20 ounce ball peen hammer

PERSONNEL: One

FRAME 1	
Step	Procedure
<ol style="list-style-type: none"> 1. 2. 	<p>Using socket wrench, attach motor (1) to shroud (2) with four screws (3) and four lockwashers (4).</p> <p>Using hammer, put woodruff key (5) into slot in motor shaft (6).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required</p> <p style="text-align: center;">Install impeller (para 7-7).</p> <p>END OF TASK</p>

7-10. MOTOR DISASSEMBLY PROCEDURE

PERSONNEL: One

PRELIMINARY PROCEDURES: Remove motor (para 7-8)

FRAME 1

Step	Procedure
1.	Remove brushes (para 7-13).
2.	Remove armature (para 7-18).
3.	Disassemble fan end (para 7-21).
4.	Remove frame (para 7-23),
5.	Remove field coils (para 7-28).
6.	Remove connector (para 7-31).
	END OF TASK

7-11. MOTOR ASSEMBLY PROCEDURE

PERSONNEL: One

FRAME 1	
Step	Procedure
<ol style="list-style-type: none"> 1. 2. 3. 4. 5. 6. 	<p>Install connector (para 7-32).</p> <p>Install field coils (para 7-29).</p> <p>Install frame (para 7-24).</p> <p>Assemble fan end (para 7-22).</p> <p>Install armature (para 7-19).</p> <p>Install brushes (para 7-14).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required: Assemble turret ventilating blower (para 7-5).</p> <p>END OF TASK</p>

7-12. BRUSHES INSPECTION PROCEDURE

TOOLS: 6" scale

PERSONNEL: One

PRELIMINARY PROCEDURES: Remove brushes from motor (para 7-13)

GENERAL INSTRUCTIONS:

NOTE

If part is bad, order repair part or next higher assembly as required.

FRAME 1	
Step	Procedure
1.	Check brush for any damage to spring,
2.	Using 6" scale, check that brush is more than 5/8" long.
3.	Check brush for chipped or burned carbon.
4.	Check brush for even wear over at least 85% of the possible contact area
5.	Check brush leads for broken strands.
	GO TO FRAME 2

7-12. BRUSHES INSPECTION PROCEDURE (CONT)

FRAME 2							
Step	Procedure						
	SUPPORT SHOP WORK						
1.	Take brushes to shop where spring compression measurement equipment is available.						
2.	Make measurement check.						
	<table border="0" style="width: 100%;"> <tr> <td style="text-align: center; width: 60%;">Brush Spring Compressed to:</td> <td style="text-align: center; width: 40%;">Pressure Required</td> </tr> <tr> <td style="text-align: center;">3/4 inch</td> <td style="text-align: center;">25 to 29 ounces</td> </tr> <tr> <td style="text-align: center;">1-1/4 inch</td> <td style="text-align: center;">16 ounces minimum</td> </tr> </table>	Brush Spring Compressed to:	Pressure Required	3/4 inch	25 to 29 ounces	1-1/4 inch	16 ounces minimum
Brush Spring Compressed to:	Pressure Required						
3/4 inch	25 to 29 ounces						
1-1/4 inch	16 ounces minimum						
	<p>NOTE</p> <p>Tag brushes that are out of tolerance.</p>						
3.	After support shop work, return brushes to turret shop.						
	END OF TASK						

7-13. BRUSHES REMOVAL PROCEDURE

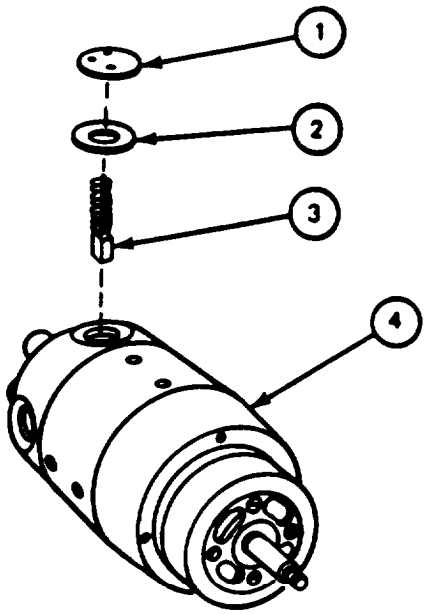
TOOLS: Adjustable face spanner wrench with 3/16" pin diameter

PERSONNEL: One

REFERENCES: TM 9-2350-222-20-2-3 for procedure to remove turret ventilating blower

EQUIPMENT CONDITION: Turret ventilating blower removed (TM-20-2-3)

PRELIMINARY PROCEDURES: Test ventilating blower (para 7-3)
 Remove impeller (para 7-6)
 Remove motor (para 7-8)

FRAME 1	
Step	Procedure
1.	Using wrench, remove brush cap (1) and gasket (2) that hold brush (3) in motor (4). Remove brush.
2.	Repeat step 1 for remaining three brushes (3).
<p>NOTE</p> <p>Follow-on Maintenance Action Required:</p> <p>Do detail inspection of brushes (para 7-12).</p>	
END OF TASK	
	

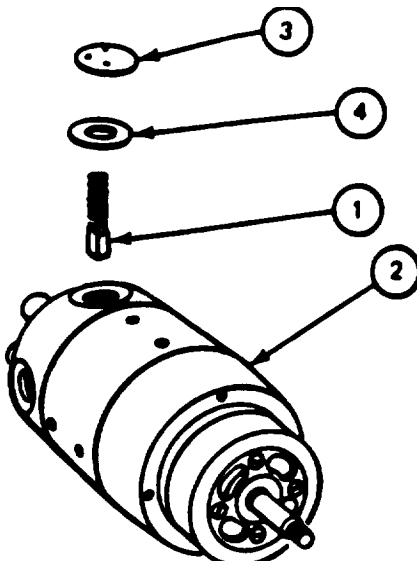
7-14. BRUSHES INSTALLATION PROCEDURE

TOOLS: Adjustable face spanner wrench with 3/ 16” pin diameter

SUPPLIES: Brushes (7729568) (four)

PERSONNEL: One

PRELIMINARY PROCEDURES: Install armature in motor (para 7-19)

FRAME 1	
Step	Procedure
	<p>NOTE</p> <p>If armature was repaired or replaced, install new brushes.</p>
1.	Put brushes (1) in motor (2).
2.	Using wrench, attach brush cap (3) and gasket (4) to motor (2).
3.	Repeat steps 1 and 2 for remaining three brushes.
	<p>NOTE</p> <p>Follow-on Maintenance Action Required: Install motor (para 7-9).</p>
	END OF TASK
 <p>The diagram illustrates the brush installation process. It shows a motor (2) with a brush (1) being inserted into the brush holder. Above the motor, the brush cap (3) and gasket (4) are shown being attached to the motor housing.</p>	

7-15. ARMATURE INSPECTION PROCEDURE

PERSONNEL: One

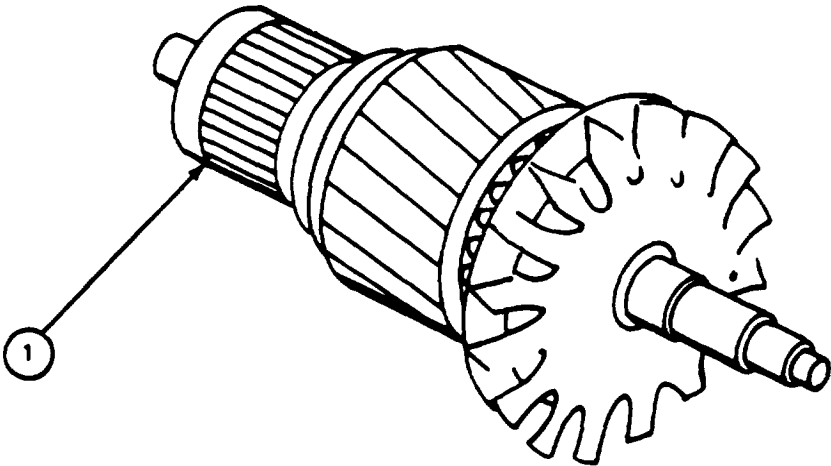
PRELIMINARY PROCEDURES: Remove armature (para 7-18)

GENERAL INSTRUCTIONS:

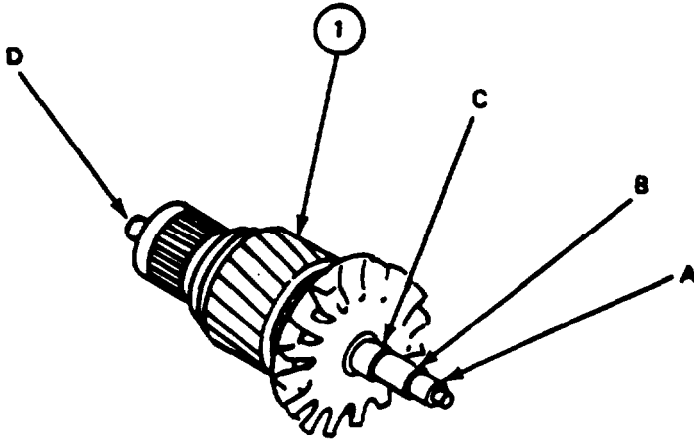
NOTE

If armature is bad, repair or replace armature or next higher assembly as required.

7-15. ARMATURE INSPECTION PROCEDURE (CONT)

FRAME 1	
Step	Procedure
1.	<p>Check armature for damage.</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Brush contact surfaces of commutator (1), that are shiny dark copper color, are good.</p>
2.	<p>Check brush contact surfaces of commutator (1) for rough, pitted, scored, burned in places, or places coated with hardened varnish or carbon. Bad armature must be repaired (para 7-20).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Armature coil that has a short or open circuit is probable cause of burned commutator bars.</p>
3.	<p>Check brush contact surfaces of commutator (1) for bars next to each other that are burned or very dark in color. Bad armature must be tested (para 7-17).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">An out-of-round commutator or grease spots on brush and commutator is probable cause of burned commutator bars.</p>
4.	<p>Check brush contact surfaces of commutator (1) for a series of bars next to each other that are burned. Bad armature must be repaired (para 7-20).</p> <p>GO TO FRAME 2</p>
	

7-15. ARMATURE INSPECTION PROCEDURE (CONT)

FRAME 2																
Step	Procedure															
	SUPPORT SHOP WORK															
1.	Take armature to shop where inspection equipment is available.															
2.	Make dimensional check.															
	<table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Reference Letter</th> <th style="text-align: left;">Point of Measurement</th> <th style="text-align: left;">Measurement</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">A</td> <td>O.D. of shaft at impeller location</td> <td>0.5620 to 0.5630 inch</td> </tr> <tr> <td style="text-align: center;">B</td> <td>O.D. of shaft at spacer location</td> <td>0.6250 to 0.6280 inch</td> </tr> <tr> <td style="text-align: center;">C</td> <td>O.D. of shaft at bearing location</td> <td>0.6690 to 0.6694 inch</td> </tr> <tr> <td style="text-align: center;">D</td> <td>O.D. of shaft at bearing location</td> <td>0.4720 to 0.4725 inch</td> </tr> </tbody> </table>	Reference Letter	Point of Measurement	Measurement	A	O.D. of shaft at impeller location	0.5620 to 0.5630 inch	B	O.D. of shaft at spacer location	0.6250 to 0.6280 inch	C	O.D. of shaft at bearing location	0.6690 to 0.6694 inch	D	O.D. of shaft at bearing location	0.4720 to 0.4725 inch
Reference Letter	Point of Measurement	Measurement														
A	O.D. of shaft at impeller location	0.5620 to 0.5630 inch														
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C	O.D. of shaft at bearing location	0.6690 to 0.6694 inch														
D	O.D. of shaft at bearing location	0.4720 to 0.4725 inch														
	<p>NOTE</p> <p>Tag parts that are out of tolerance.</p>															
3.	After support shop work, return armature (1) to turret shop.															
	END OF TASK															
																

7-16. ARMATURE CLEANING PROCEDURE

TOOLS: Air compressor with filter
Air nozzle attachment
Goggles

SUPPLIES: Lint-free cloth (item 21, App. A)
Dry cleaning solvent (item 33, App. A)
Number 4/0 sandpaper (item 23, App. A)

PERSONNEL One

REFERENCES: JPG for procedures to:
Clean parts
To use air compressor

PRELIMINARY PROCEDURES: Remove armature (para 7-18)
Inspect armature (para 7-15)

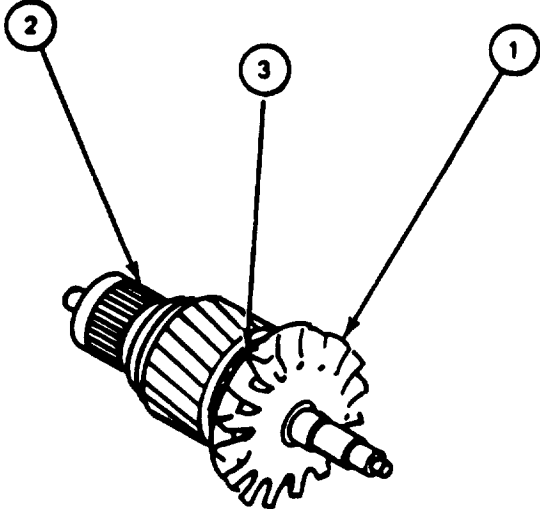
GENERAL INSTRUCTIONS:

NOTE

Do not clean armature before inspection (para 7-15)
because evidence of why the part may be bad will be
removed.

7-16. ARMATURE CLEANING PROCEDURE (CONT)

FRAME 1	
Step	Procedure
1.	Using air compressor with air nozzle, and wearing goggles, blow air on armature (1) and remove all loose pieces of dirt (JPG). Shut off air. <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Do not wipe windings (3) with cloth because dry cleaning solvent may damage windings.</p>
2.	Using cloth dampened with solvent, wipe outer sides of armature (1) (JPG).
3.	Using sandpaper, lightly clean commutator (2) of armature (1).
4.	Using air compressor with air nozzle, and wearing goggles, blow air on armature (1) and remove all sanding dust (JPG). Shut off air.
5.	Cover armature with clean lint-free cloth until armature is ready to be assembled. END OF TASK



The diagram shows a perspective view of an armature. Callout 1 points to the entire armature assembly. Callout 2 points to the commutator at the front of the armature. Callout 3 points to the windings on the armature core.

7-17. ARMATURE TEST PROCEDURE

PERSONNEL: One

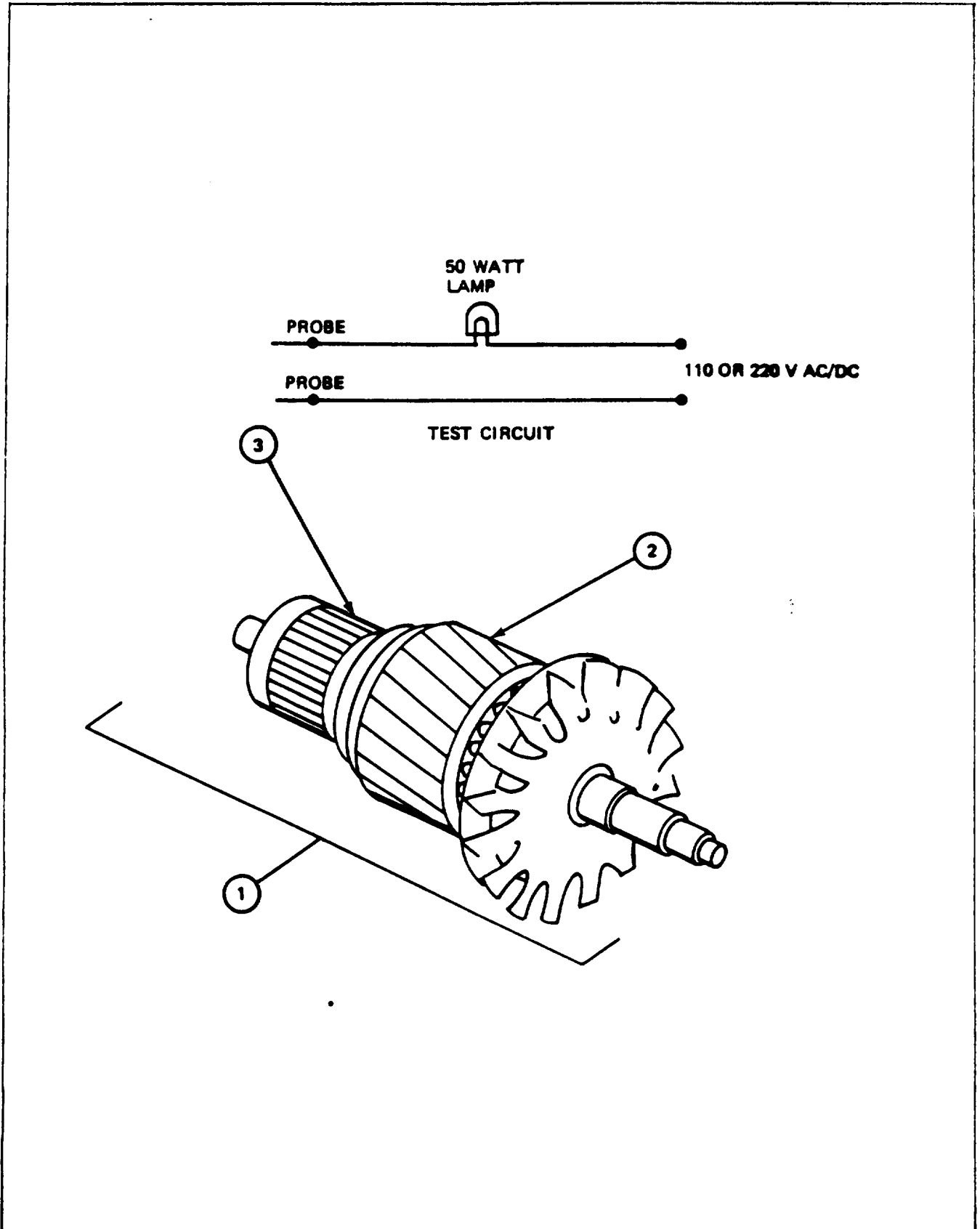
PRELIMINARY PROCEDURES: Remove armature from motor (para 7-18)

GENERAL INSTRUCTIONS:

NOTE

If normal indication is not obtained, replace armature (para 7-19).

FRAME 1			
Step	Procedure	Normal Indication	Probable Fault
SUPPORT SHOP WORK			
1.	Take armature (1) to support shop where test equipment is available. Make the following checks:	. . . .	. . . .
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">WARNING</div> <p style="text-align: center;">High voltage can kill you. Be very careful when using 110-volt or 220-volt test circuit.</p>			
2.	Using test circuit, check for grounded armature between core (2) and commutator bars (3). Check all bars.	Lamp does not light	Armature grounded
3.	Using growler and hacksaw blade, check armature (1) for short circuits.	Hacksaw blade does not vibrate (shake)	Armature short circuit
NOTE			
Tag armature if test does not give normal indication.			
4.	After test, return armature to turret shop.		
END OF TASK			



7-18. ARMATURE, BEARINGS, AND FAN END REMOVAL PROCEDURE

TOOLS: Bearing puller
3/8" flat tip screwdriver
Metal scribe
Fine stone
Stiff bristled brush
Scraper
Plastic face hammer
O-ring extractor kit
Slotted screw bit socket (3/8" drive)
3/8" drive ratchet

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

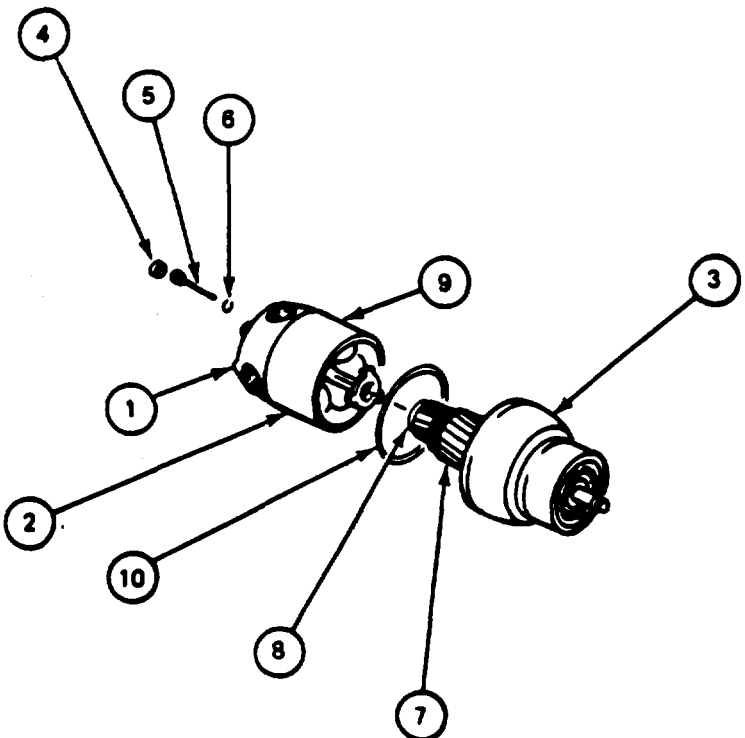
PERSONNEL: One

REFERENCES: JPG for procedures to:
Use bearing puller
Clean parts
Inspect and repair parts

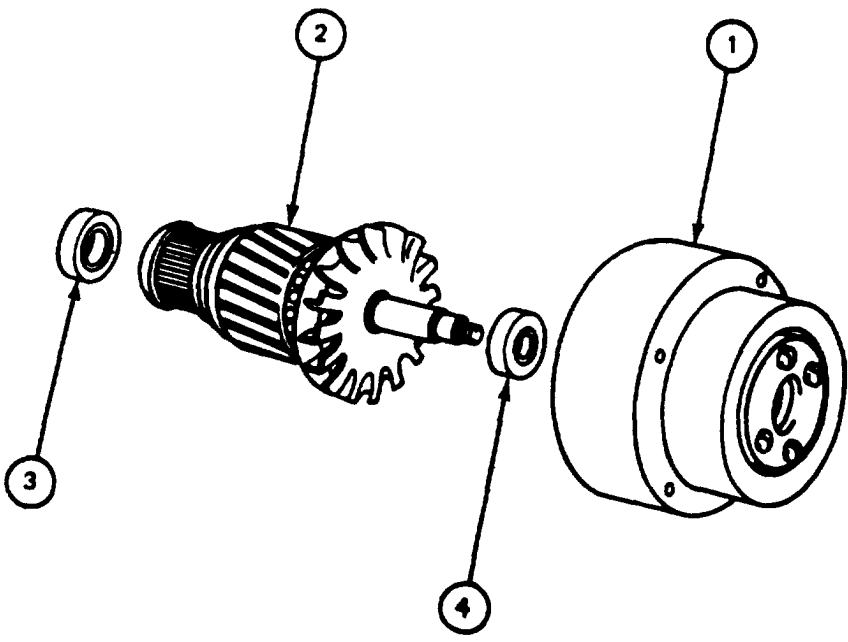
PRELIMINARY PROCEDURES Test ventilating blower (para 7-3)
Remove impeller (para 7-6)
Remove motor (Para 7-8)
Remove brushes (para 7-13)

7-18. ARMATURE, BEARINGS, AND FAN END REMOVAL PROCEDURE (CONT)

FRAME 1

Step	Procedure
	<p style="text-align: center;">NOTE</p> <p style="text-align: center;">Position of commutator end (1), frame (2), and fan end (3) must be marked to help put them back in place.</p> <ol style="list-style-type: none"> 1. Using scribe, make one line across commutator end (1) to frame (2) joint, and two lines across fan end (3) to frame (2) joint. 2. Using socket wrench, remove four plugs (4) from commutator end (1). 3. Using screwdriver, remove four bolts (5) and four flat washers (6) that attach commutator end (1) and fan end (3) to frame (2). 4. Using one hand, hold frame (2). Using hammer, tap fan end (3) and separate from frame (2). 5. Remove fan end (3) with armature (7) and bearing (8). 6. Remove spring washer (9) from commutator end (1). 7. Using O-ring extractor tool, remove gasket (10) from frame (2). <p>GO TO FRAME 2</p>
	

7-18. ARMATURE, BEARINGS, AND FAN END REMOVAL PROCEDURE (CONT)

FRAME 2	
Step	Procedure
<ol style="list-style-type: none"> 1. 2. 	<p>Using one hand, hold fan end (1). With other hand, remove armature (2) from an end.</p> <p>Using bearing puller, remove two bearings (3) and (4) from armature (2).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required:</p> <p style="text-align: center;">Test armature (para 7-17). Do detail inspection of armature (para 7-15). Clean armature (para 7-16). Clean all parts (JPG). Inspect all parts (JPG). Do detail inspection of parts (para 7-2).</p> <p>END OF TASK</p>
	

7-19. ARMATURE, BEARING AND FAN END INSTALLATION PROCEDURE

TOOLS: Slotted screw bit socket (3/8" drive)
3/8" flat tip screwdriver
3/8" drive ratchet

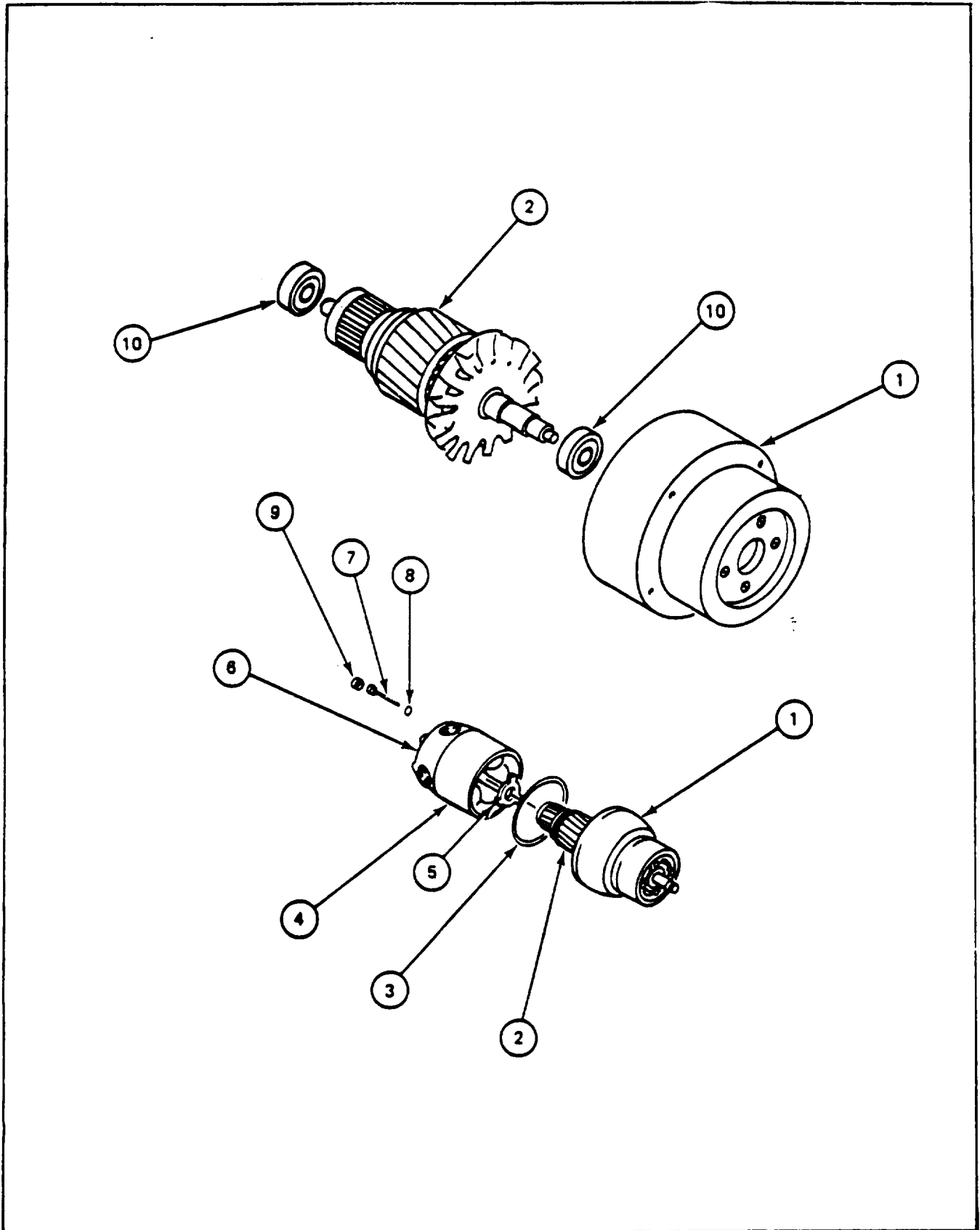
SUPPLIES: Gasket (7729565)

PERSONNEL One

PRELIMINARY PROCEDURES: Assemble fan end (para 7-22)
Install commutator end (para 7-24)

7-19. ARMATURE, BEARING AND FAN END INSTALLATION PROCEDURE (CONT)-

FRAME 1	
Step	Procedure
	<p>SUPPORT SHOP WORK</p> <p>NOTE</p> <p>Take armature (2) and two bearings (10) to shop where press is available and have bearings pressed on armature.</p>
1.	Using one hand, hold fan end (1). With other hand, turn armature (2) and put it in fan end.
2.	Put new gasket (3) on frame (4).
3.	Put spring washer (5) in commutator end (6).
	<p>NOTE</p> <p>Fan end (1) and frame (4) were marked during removal (para 7-18) to help put them back in place.</p>
4.	Using one hand, hold commutator end (6). With other hand, put armature (2) with fan end (1) in frame (4), and commutator end (6). Line up scribe marks.
5.	Support fan end (1) and frame (4) in upright position.
6.	Using screwdriver, attach fan end (1) and commutator end (6) to frame (4) with four bolts (7) and four flat washers (8).
7.	Using socket wrench, put four plugs (9) in commutator end (6).
	<p>NOTE</p> <p>Follow-on Maintenance Action Required</p> <p>Install brushes (para 7-14).</p>
	END OF TASK



7-20. ARMATURE REPAIR PROCEDURE

PERSONNEL: One

PRELIMINARY PROCEDURES: Remove armature from motor (para 7-18)
Inspect armature (para 7-15)

GENERAL INSTRUCTIONS:

NOTE

Procedure is used to resurface armature commutator and undercut mica grooves to correct depth if necessary. If armature is bad, order repair part or next higher assembly as required.

7-20. ARMATURE REPAIR PROCEDURE (CONT)

FRAME 1																
Step	Procedure															
	SUPPORT SHOP WORK															
1.	<p>Take armature (1) to shop where inspection, metal cutting lathe, and mica grooving equipment is available.</p> <p>a. Resurface commutator (2) only enough to remove all pits and scores, and for eccentricity requirements if necessary.</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Armature (1) is bad if commutator (2) diameter is out of tolerance. Commutator (2) must be undercut if out of tolerance.</p> <p>b. Make dimensional check of commutator.</p> <table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Reference Letter</th> <th style="text-align: left;">Point of Measurement</th> <th style="text-align: left;">Measurement</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">A</td> <td>Commutator Diameter</td> <td>1.976 inches minimum</td> </tr> <tr> <td style="text-align: center;">B</td> <td>Bar-to-bar eccentricity</td> <td>0.0002 inch maximum</td> </tr> <tr> <td style="text-align: center;">A</td> <td>Total eccentricity</td> <td>0.001 inch maximum</td> </tr> <tr> <td style="text-align: center;">C</td> <td>Undercut of commutator</td> <td>1/32 inch minimum</td> </tr> </tbody> </table> <p>c. If armature (1) is bad, replace armature (para 7-19). If not, continue with step d.</p> <p>d. Undercut commutator mica to 3/64" deep and 0.022 inch wide.</p>	Reference Letter	Point of Measurement	Measurement	A	Commutator Diameter	1.976 inches minimum	B	Bar-to-bar eccentricity	0.0002 inch maximum	A	Total eccentricity	0.001 inch maximum	C	Undercut of commutator	1/32 inch minimum
Reference Letter	Point of Measurement	Measurement														
A	Commutator Diameter	1.976 inches minimum														
B	Bar-to-bar eccentricity	0.0002 inch maximum														
A	Total eccentricity	0.001 inch maximum														
C	Undercut of commutator	1/32 inch minimum														
2.	<p>After support shop work return armature to turret shop.</p> <p>END OF TASK</p>															

7-21. FAN END DISASSEMBLY PROCEDURE

TOOLS: 3/8' flat tip screwdriver
O-ring extractor kit
Scraper
Stiff bristled brush
1/8" drive pin punch
Fine stone

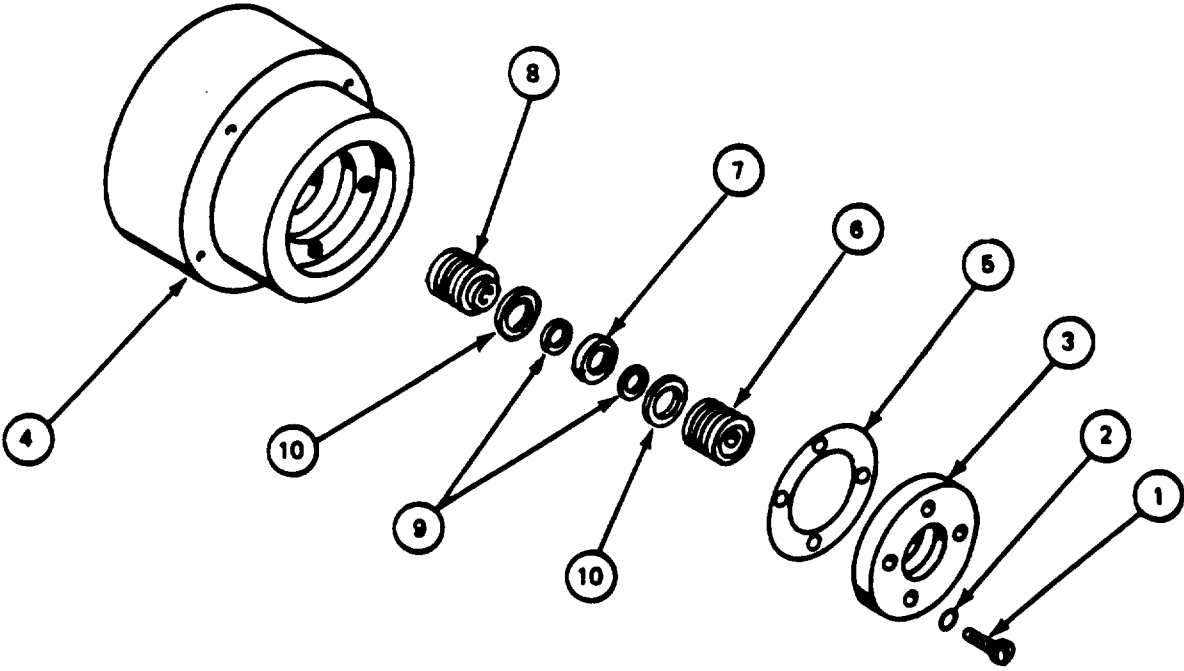
SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts

PRELIMINARY PROCEDURES: Remove fan end (para 7-18)

7-21. FAN END DISASSEMBLY PROCEDURE (CONT)

FRAME 1	
Step	Procedure
<ol style="list-style-type: none"> 1. 2. 3. 4. 5. 	<p>Using screwdriver, remove four screws (1) and four washers (2) that attach cap (3) to fan end (4). Remove cap (3) and gasket (5).</p> <p>Using punch, push seal (6) from cap (3).</p> <p>Using punch, push spacer (7) and seal (8) from fan end (4).</p> <p>Using O-ring extractor tool, remove two gaskets (9) from inside of spacer (7).</p> <p>Using O-ring extractor tool, remove two gaskets (10) from two seals (6) and (8).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required:</p> <p style="text-align: center;">Clean all parts (JPG).</p> <p style="text-align: center;">Inspect and repair all parts (JPG).</p> <p>END OF TASK</p>
	

7-22. FAN END ASSEMBLY PROCEDURE

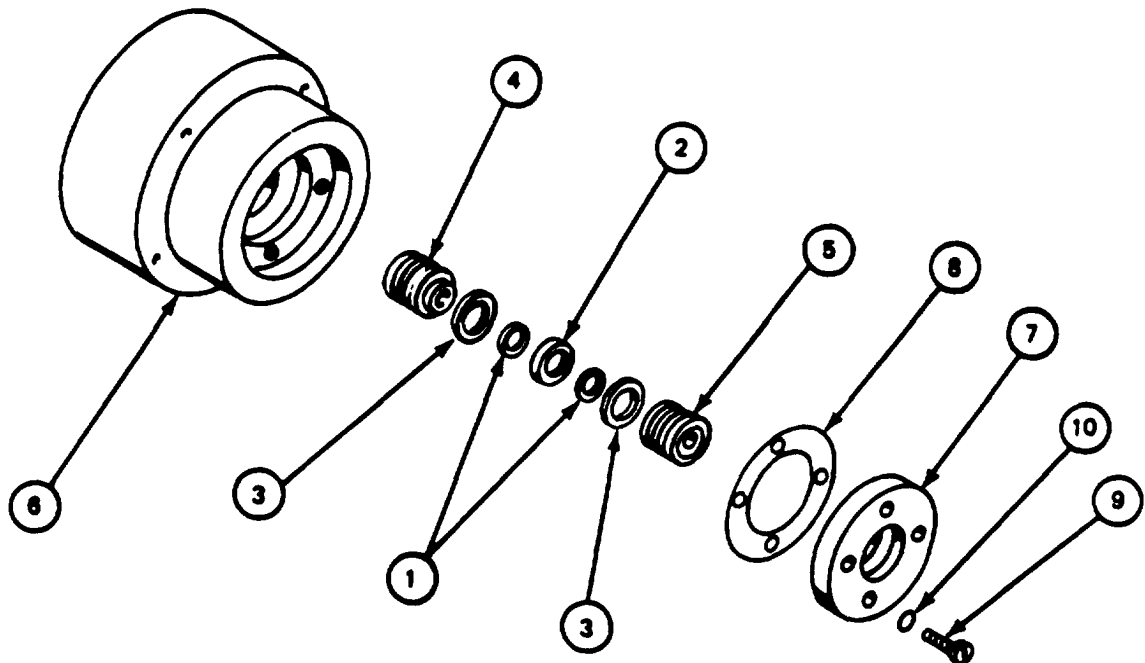
TOOLS: 3/8" flat tip screwdriver

SUPPLIES: Gasket (71724-CPH-1820-21) (two)
Instrument oil (item 19, App, A)
Gasket (71724-CPH-1820- 12) (two)

PERSONNEL: One

7-22. FAN END ASSEMBLY PROCEDURE (CONT)

FRAME 1	
Step	Procedure
1.	Using hands, put two new gaskets (1) in spacer (2) and two new gaskets (3) in proper grooves of seal (4) and (5).
2.	Using hands, put seal (4) and spacer (2) in fan end (6).
3.	Using hands, put seal (5) in cap (7).
4.	Fill well in seal (5) with instrument oil.
5.	Using screwdriver, attach cap (7) and new gasket (8) to fan end (6), with four screws (9) and four washers (10).
<p>NOTE</p> <p>Follow-on Maintenance Action Required:</p> <p>Install fan end (para 7- 19).</p>	
<p>END OF TASK</p>	



7-23. COMMUTATOR END AND FRAME REMOVAL PROCEDURE

TOOLS: 1/4" flat tip screwdriver
Diagonal cutting pliers
Scraper
Stiff bristled brush
Fine stone
Plastic face hammer
O-ring extractor kit

SUPPLIES: Masking tape (item 36, App. A)
Pencil
Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

REFERENCES: JPG for procedures to:
Clean all parts
Inspect and repair all parts

PRELIMINARY PROCEDURES: Test ventilating blower (para 7-3)
Remove impeller (para 7-6)
Remove motor (para 7-8)
Remove brushes (para 7-13)
Remove armature (para 7-18)

7-23. COMMUTATOR END AND FRAME REMOVAL PROCEDURE (CONT)

FRAME 1	
Step	Procedure
1.	Using hammer, tap commutator end (1) and separate from frame (2) as far as wires will allow.
2.	Using masking tape, tag each lead connected to commutator end (1) (JPG).
3.	Using screwdriver, remove two screws (3) and two lockwashers (4) that attach two coil short leads (5) of frame (2) to commutator end (1).
4.	Using pliers, cut lead (6) that attaches capacitor (7) and coils (8).
5.	Using hands, remove frame (2) from commutator end (1).
6.	Using O-ring extractor tool, remove gasket (9) from frame (2).
7.	Using screwdriver, remove two screws (10) and two lockwashers (11) that attach lead (12) to commutator end (1).
<p>NOTE</p> <p>Follow-on Maintenance Action Required:</p> <p>Clean commutator end (para 7-30). Clean all parts (JPG). Inspect and repair all parts (JPG). Test field coils and connector (para 7-27).</p>	
END OF TASK	

7-24. COMMUTATOR END AND FRAME INSTALLATION **PROCEDURE**

TOOLS: 1 /4" flat tip screwdriver
Heat gun (NSN 4940-00-561-1002)
Wire crimping tool

SUPPLIES: Gasket (7729565)
Tubing insulation (item 39, App. A)
Wire connector (splice)

PERSONNEL: One

REFERENCES: JPG for procedures to:
Use heat gun
Use wire crimping tool

PRELIMINARY PROCEDURES: Install connector (para 7-32)
Install field coils (para 7-29)

7-24. COMMUTATOR END AND FRAME INSTALLATION PROCEDURE (CONT)

FRAME 1	
Step	Procedure
<ol style="list-style-type: none"> 1. 2. 3. 4. 5. 6. 7. 	<p>Put new gasket (1) on commutator end of frame (2).</p> <p>Using screwdriver, attach lead (3) to commutator end (4) with two screws (5) and two lockwashers (6).</p> <p>Put 2“ long piece of tubing insulation (7) on lead (8).</p> <p>Using crimping tool, connect two wires (8) with wire connector (JPG).</p> <p>Using heat gun, slide tubing insulation (7) over wire connector and shrink tubing insulation (JPG).</p> <p>Using screwdriver, attach two tagged leads (9) to proper place on commutator end (4) with two screws (10) and two lockwashers (11).</p> <p>Remove masking tape tags from leads,</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Commutator end (4) and frame (2) were marked during armature removal (para 7-18) to help put them back.</p>
<ol style="list-style-type: none"> 8. 	<p>Put commutator end (4) on frame (2) and line up scribe mark.</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required: Install armature (para 7-19).</p> <p>END OF TASK</p>

7-25. FIELD COILS AND CONNECTOR INSPECTION PROCEDURE

PERSONNEL: One

PRELIMINARY PROCEDURES: Remove field coils (para 7-28)
Remove connector (para 7-31)

GENERAL INSTRUCTIONS:

NOTE

If field coils or connector are bad, order repair part or next higher assembly as required.

FRAME 1	
Step	Procedure
1.	Check field coils for burned or charred insulation,
2.	Check connector and field coil leads for damage to insulation or ends.
	END OF TASK

7-26. FIELD COILS CLEANING PROCEDURE

TOOLS: Air compressor with filter
 Air nozzle attachment
 Goggles

SUPPLIES: Lint-free cloth (item 21, App. A)
 Dry cleaning solvent (item 33, App. A)

PERSONNEL: One

REFERENCES: JPG for procedures to:
 Clean parts
 Use air compressor

PRELIMINARY PROCEDURES: Remove field coils (para 7-28)

FRAME 1

Step	Procedure
	<p style="text-align: center;">NOTE</p> <p style="text-align: center;">Use care not to damage insulation coating on field coil . windings or break field coil leads.</p> <ol style="list-style-type: none"> 1. Using cloth dampened with dry cleaning solvent, wipe outer surfaces of field coils and leads (JPG). 2. Using air compressor with air nozzle, and wearing goggles, blow air on field coils to dry them (JPG). Shut off air. 3. Cover field coils with clean lint-free cloth until field coils are ready to be inspected or assembled. <p>END OF TASK</p>

7-27. FIELD COILS AND CONNECTOR TEST PROCEDURE

TEST EQUIPMENT: Multimeter

PERSONNEL: One

REFERENCES: JPG for procedure to use multimeter

PRELIMINARY PROCEDURES: Remove field coils from frame (para 7-28)
Remove connector from commutator end (para 7-31)

GENERAL INSTRUCTIONS:

NOTE

If normal indication is not obtained, parts are bad. Refer to section index (para 7-1) for replacement of bad parts.

FRAME 1			
Step	Procedure	Normal Indication	Probable Fault
1.	Using multimeter, check continuity between two large wire leads (1) (JPG).	Less than 2 ohms	Open circuit
2.	Using multimeter, check continuity between connector pin (2) and wire lead (3) (JPG).	Less than 2 ohms	Open circuit
3.	Using multimeter, check continuity between wire lead (3) and commutator end (4) (JPG).	More than 10 million ohms	Short circuit
4.	Using multimeter, check continuity between wire leads (1) and frame (5) (JPG). END OF TASK		

7-28. FIELD COILS REMOVAL PROCEDURE

TOOLS: 5/16" flat tip screwdriver
Metal scribe
Scraper
Stiff bristled brush
Fine stone

SUPPLIES: Dry cleaning solvent (item 33, App. A)
Crocus cloth (item 7, App. A)

PERSONNEL: One

REFERENCES: JPG for procedures to:
Clean parts
Inspect and repair parts

PRELIMINARY PROCEDURES: Test ventilating blower (para 7-3)
Remove impeller (para 7-6)
Remove motor (para 7-8)
Remove brushes (para 7-13)
Remove armature (para 7- 18)
Remove commutator end (para 7-23)
Test field coils and connector (para 7-27)

7-28. FIELD COILS REMOVAL PROCEDURE (CONT)

FRAME 1	
Step	Procedure
	<p style="text-align: center;">NOTE</p> <p style="text-align: center;">Location of field coils (6) must be marked to help put them back in place.</p> <ol style="list-style-type: none"> 1. Using scribe, mark location of coils leads (1) on inside of frame (2). 2. Using screwdriver, remove eight screws (3), eight washers (4), and four pole shoes (5) that attach field coils (6) to frame (2). Remove field coils. <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required</p> <p style="text-align: center;">Clean field coils (para 7-26). Clean all parts (JPG). Inspect and repair all parts (JPG). Inspect field coils (para 7-25).</p> <p>END OF TASK</p>

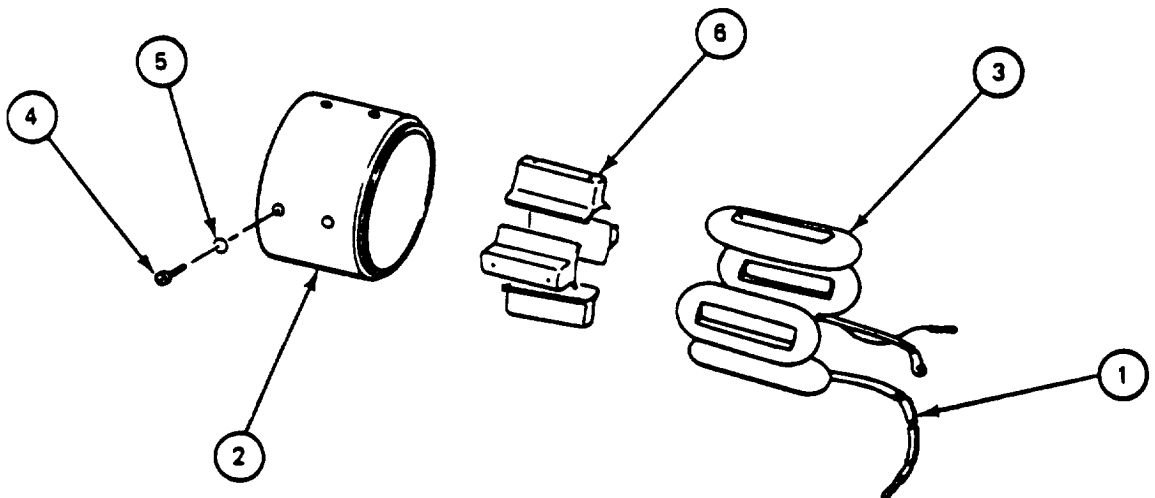
7-29. FIELD COILS INSTALLATION PROCEDURE

TOOLS: 5/16" flat tip screwdriver

PERSONNEL: One

FRAME 1

Step	Procedure
	<p style="text-align: center;">NOTE</p> <p style="text-align: center;">Frame (2) was marked with coil lead (3) location during removal (para 7-28) to help put them back in place.</p> <ol style="list-style-type: none"> 1. Put field coils (1) in frame (2) and line up coil leads (3) with scribe marks. 2. Using screwdriver, attach field coils (1) to frame (2), with eight screws (4), eight washers (.5), and four pole shoes (6). <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required: Install commutator end (para 7-24).</p> <p>END OF TASK</p>



7-30. COMMUTATOR END AND CONNECTOR CLEANING PROCEDURE

TOOLS: Air compressor with filter
 Air nozzle attachment
 Goggles
 Bristle brush

SUPPLIES: Lint-free cloth (item 21, App. A)
 Dry cleaning solvent (item 33, App. A)

PESONNEL: One

REFERENCES: JPG for procedures to
 Clean parts
 Use air compressor

PRELIMINARY PROCEDURES: Remove connector (para 7-31)
 Remove commutator end (para 7-23)

FRAME 1	
Step	Procedure
1.	Using air compressor with air nozzle, and wearing goggles, blow air on commutator end and connector while using brush to remove loose dirt (JPG).
2.	Using cloth dampened with dry cleaning solvent, wipe outer surfaces of commutator end and connector to remove all dirt (JPG).
3.	Cover commutator end and connector with clean lint-free cloth until parts are ready to be inspected or assembled.
	END OF TASK

7-31. CONNECTOR REMOVAL PROCEDURE

TOOLS: 1/4" flat tip screwdriver

PERSONNEL: One

PRELIMINARY PROCEDURES: Test ventilating blower (para 7-3)
 Remove impeller (para 7-6)
 Remove motor (para 7-8)
 Remove brushes (para 7-13)
 Remove armature (para 7- 18)
 Remove commutator end (para 7-23)
 Test field coils and connector (para 7-27)

FRAME 1	
Step	Procedure
<ol style="list-style-type: none"> 1. 2. 	<p>Using screwdriver, remove four screws (1) and four lockwashers (2) that attach connector (3) to commutator end (4).</p> <p>Remove connector (3) with wiring (5) and gasket (6) from commutator end (4).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required:</p> <p style="text-align: center;">Clean connector (para 7-30). Inspect connector (para 7-25).</p> <p>END OF TASK</p>

7-32. CONNECTOR INSTALLATION PROCEDURE

TOOLS: 1/4" flat up screwdriver

SUPPLIES: Gasket (MS5200-5)

PERSONNEL: One

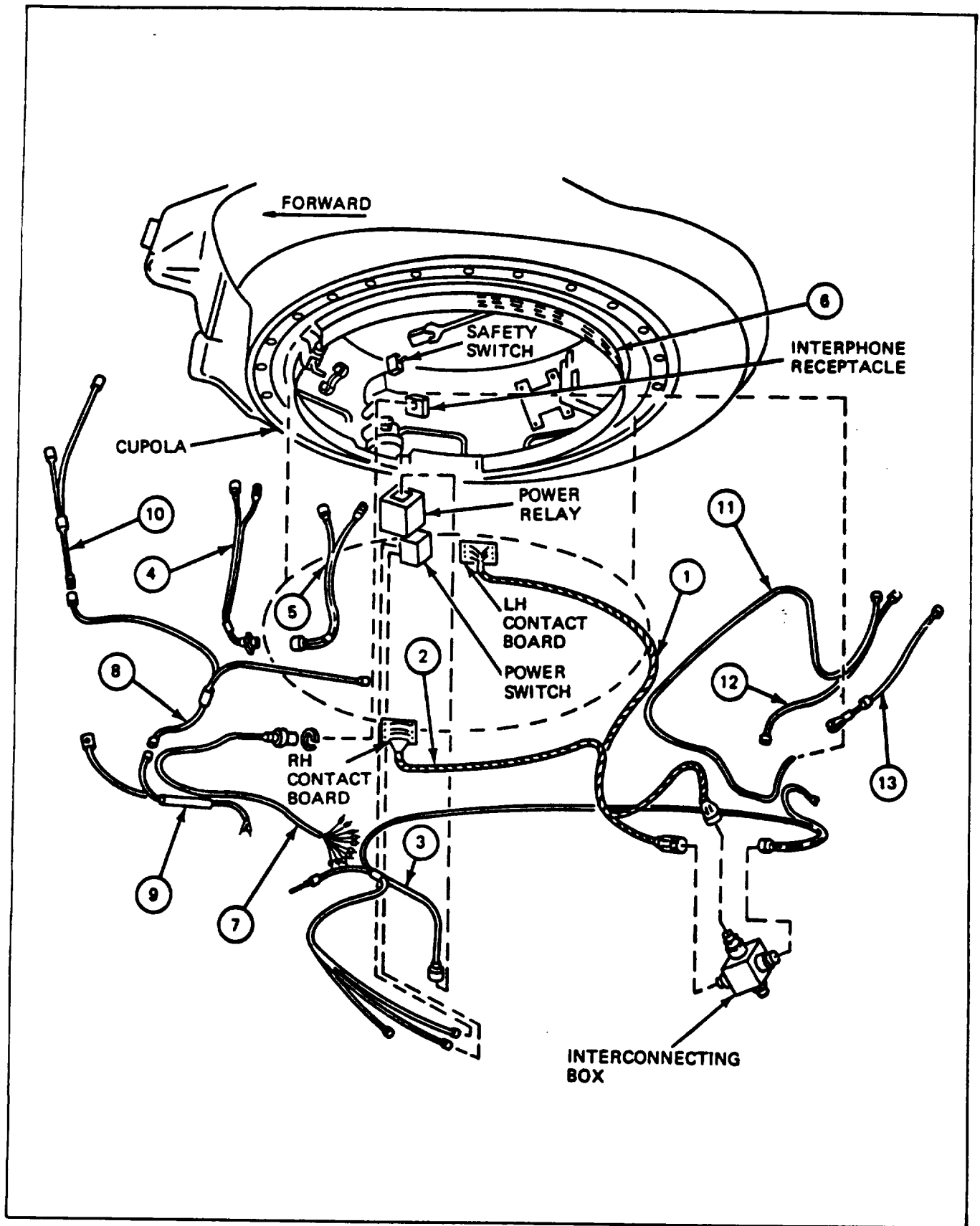
FRAME 1

Step	Procedure
1.	Put new gasket (1) on commutator end (2).
2.	Put wiring (3) of connector (4) through gasket (1) and hole in commutator end (2).
3.	Using screwdriver, attach connector (4) to commutator end (2) with four screws (5) and four lockwashers (6).
NOTE	
Follow-on Maintenance Action Required: Install commutator end (para 7-24).	
END OF TASK	

CHAPTER 8
CUPOLA ELECTRICAL SYSTEM

8-1. MAINTENANCE PROCEDURES INDEX

Equipment Item	Removal	Tasks	Installation
1. Wiring Harness, Left Hand Contact Board (109112363)	8-2		8-3
2. Wiring Harness, Right Hand Contact Board (10911236-1)	8-4		8-5
3. Branched Wiring Harness (10905869/10951614)	8-6		8-7
4. Lead Assembly (11599179)	8-8		8-9
5. Lead Assembly, Periscope Power Unit (1159917\$)	8-10		8-11
6. Terminal Board Assembly (10873472)	8-12		8-13
7. Wiring Harness (10873607) (Early Model)	8-14		8-15
8. Branched Wiring Harness (10911240) (Early Model)	8-16		8-17
9. Wiring Harness (10873581) (Early Model)	8-18		8-19
10. Wiring Harness (10915973) (Early Model)	8-20		8-21
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12. Electrical Lead (10924501) (Early Model)	8-24		8-25
13. Electrical Lead (10887499)	8-26		8-27
14. Branched Wiring Harness (11673938) (Late Model)	8-28		8-29



**8-2. WIRING HARNESS, LEFT HAND CONTACT BOARD (10911236-3)
REMOVAL PROCEDURE**

TOOLS: 1/4" flat tip screwdriver
Adjustable hook type spanner wrench
7/16" combination wrench

SUPPLIES: Masking tape (1"wide) (item 36, App. A)
Pen

PERSONNEL: One

REFERENCES: JPG for procedure to disconnect electrical connectors
TM 9-2350-222-10 for procedure to traverse cupola

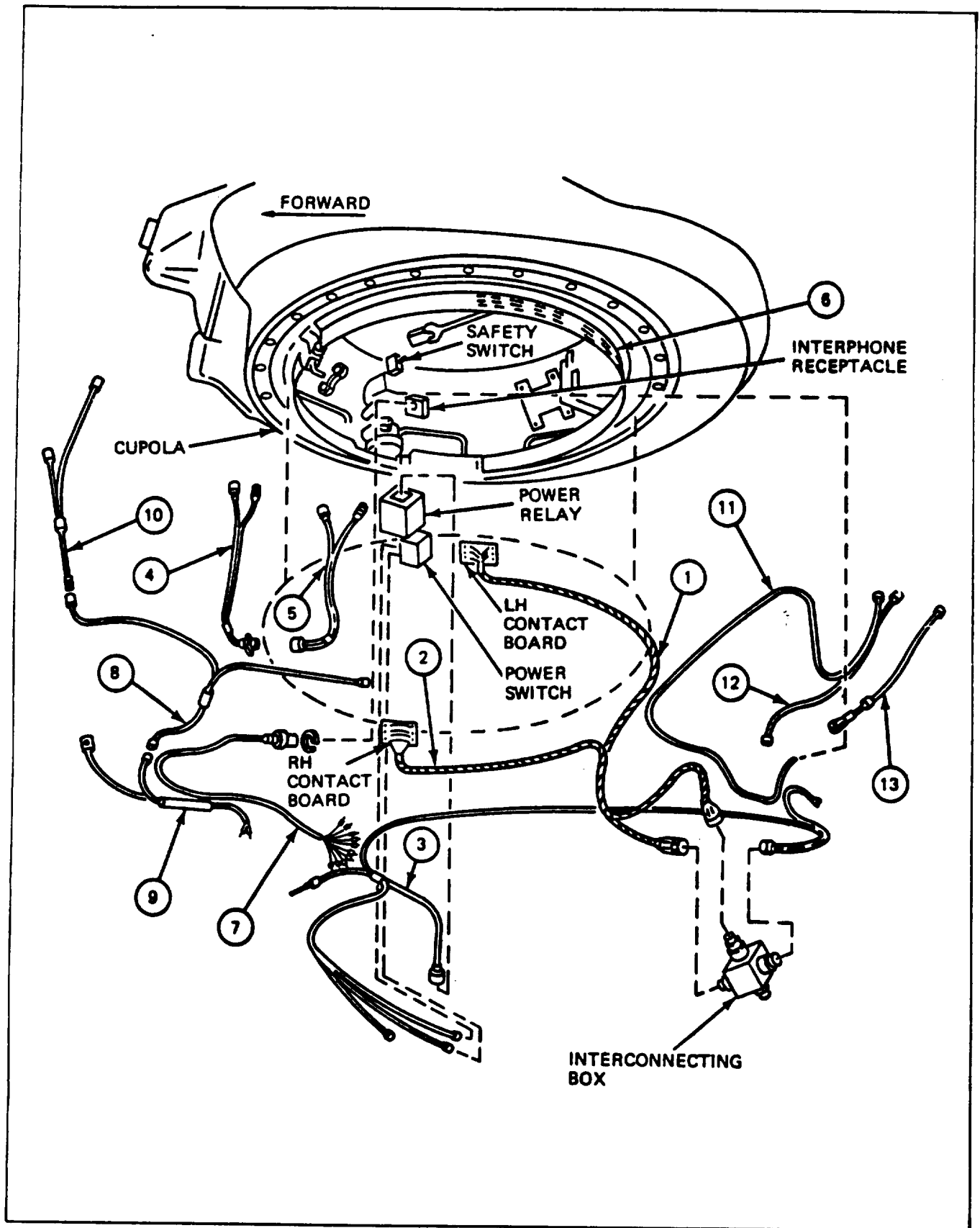
EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Interconnecting Box	FO-2	6

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF

PRELIMINARY PROCEDURES: Remove cupola guard (para 9-2)

FRAME 1	
Step	Procedure
1.	Traverse cupola until left-hand contact board can be seen (TM-10).
2.	Using spanner wrench, disconnect electrical connector (1) from interconnecting box (2) (JPG).
<p>NOTE</p> <p>Some cable clamps and straps hold more than one wiring harness. Remove only contact board wiring harness from these clamps and straps.</p>	
3.	Using combination wrench, remove eight screws (3), eight lockwashers (4), and eight flat washers (5) holding eight cable straps (6) to turret.
4.	Separate wiring harness (7) from eight cable straps (6).
5.	Using hand, put back eight screws (3), eight lockwashers (4), and eight flat washers (5) holding eight cable straps (6) to turret. Tag each cable strap (6) with a piece of masking tape as it is put back.
GO TO FRAME 2	



**8-2. WIRING HARNESS, LEFT HAND CONTACT BOARD (10911236-3)
REMOVAL PROCEDURE**

TOOLS: 1/4” flat tip screwdriver
Adjustable hook type spanner wrench
7/16” combination wrench

SUPPLIES: Masking tape (1" wide) (item 36, App. A)
Pen

PERSONNEL: One

REFERENCES: JPG for procedure to disconnect electrical connectors
TM 9-2350-222-10 for procedure to traverse cupola

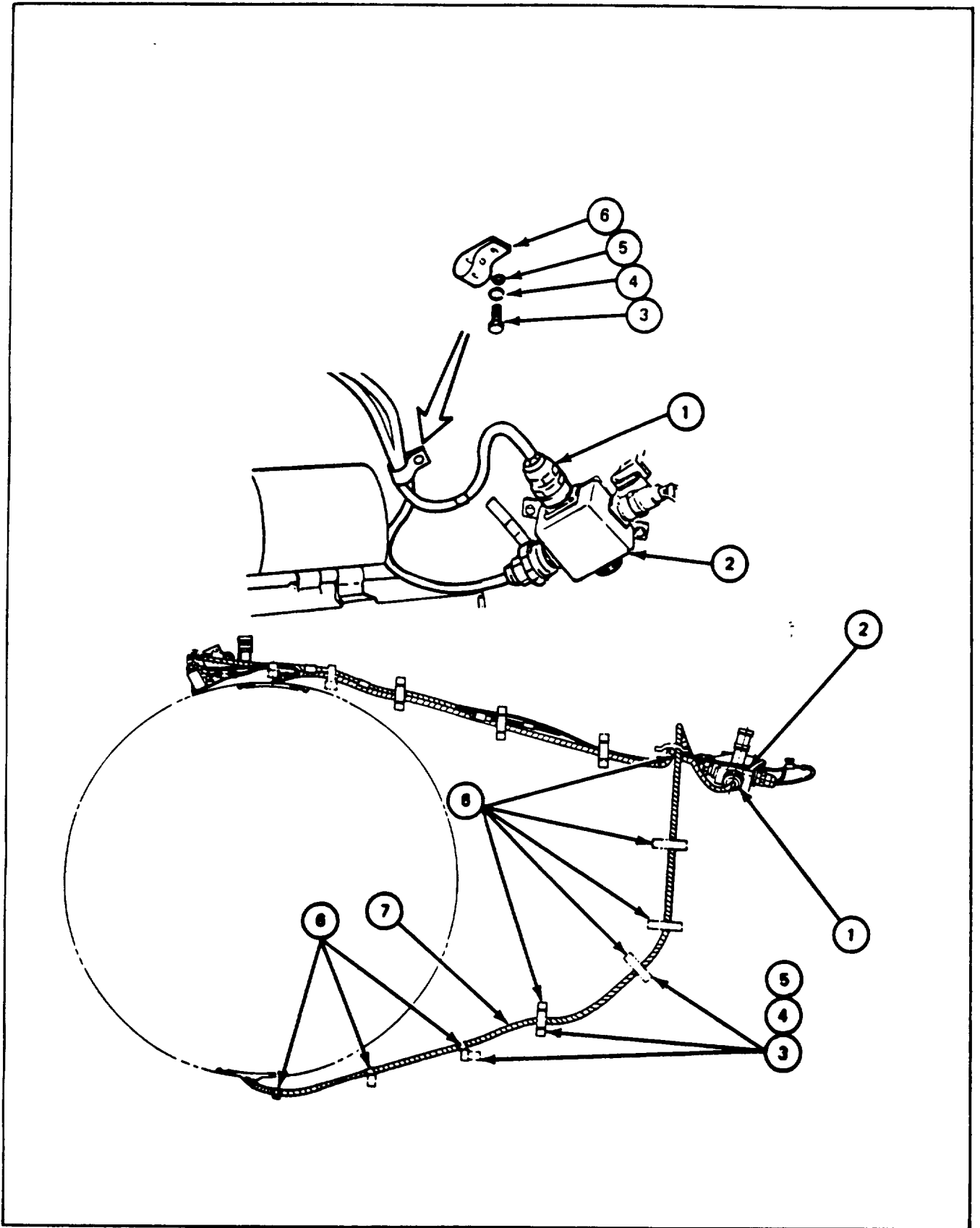
EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver’s Master Control Panel	FO-3	11
Interconnecting Box	FO-2	6

EQUIPMENT CONDITION: Driver’s master control panel MASTER BATTERY switch set to OFF

PRELIMINARY PROCEDURES: Remove cupola guard (para 9-2)

FRAME 1	
Step	Procedure
1.	Traverse cupola until left-hand contact board can be seen (TM-10).
2.	Using spanner wrench, disconnect electrical connector (1) from interconnecting box (2) JPG).
	NOTE
	Some cable clamps and straps hold more than one wiring harness, Remove only contact board wiring harness from these clamps and straps.
3.	Using combination wrench, remove eight screws (3), eight lockwashers (4), and eight flat washers (5) holding eight cable straps (6) to turret.
4.	Separate wiring harness (7) from eight cable straps (6).
5.	Using hand, put back eight screws (3), eight lockwashers (4), and eight flat washers (5) holding eight cable straps (6) to turret. Tag each cable strap (6) with a piece of masking tape as it is put back.
	GO TO FRAME 2

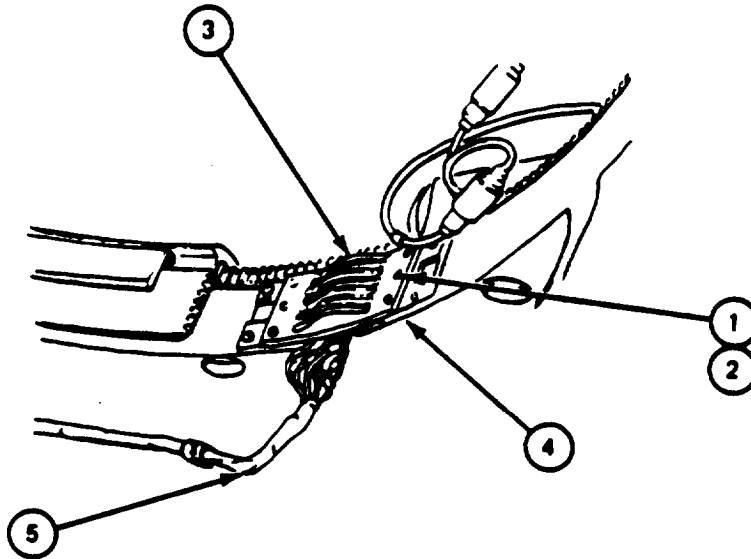


Para 8-2 Cont
8-5/(8-6 blank)

8-2. WIRING HARNESS, LEFT HAND CONTACT BOARD (10911236-3)
REMOVAL PROCEDURE (CONT)

FRAME 2

Step	Procedure
1.	Using screwdriver, remove six screws (1) and six lockwashers (2) holding contact board (3) to two turret mounting brackets (4).
2.	Separate contact board (3) from two turret mounting brackets (4).
3.	Using hand, put back six screws (1) and six lockwashers (2) in two mounting brackets (4).
4.	Remove wiring harness (5) from vehicle.
END OF TASK	



**8-3. WIRING HARNESS, LEFT HAND CONTACT BOARD (10911236-3)
INSTALLATION PROCEDURE**

TOOLS: 1/4" flat tip screwdriver
7/16" combination wrench
Adjustable hook type spanner wrench

PERSONNEL: One

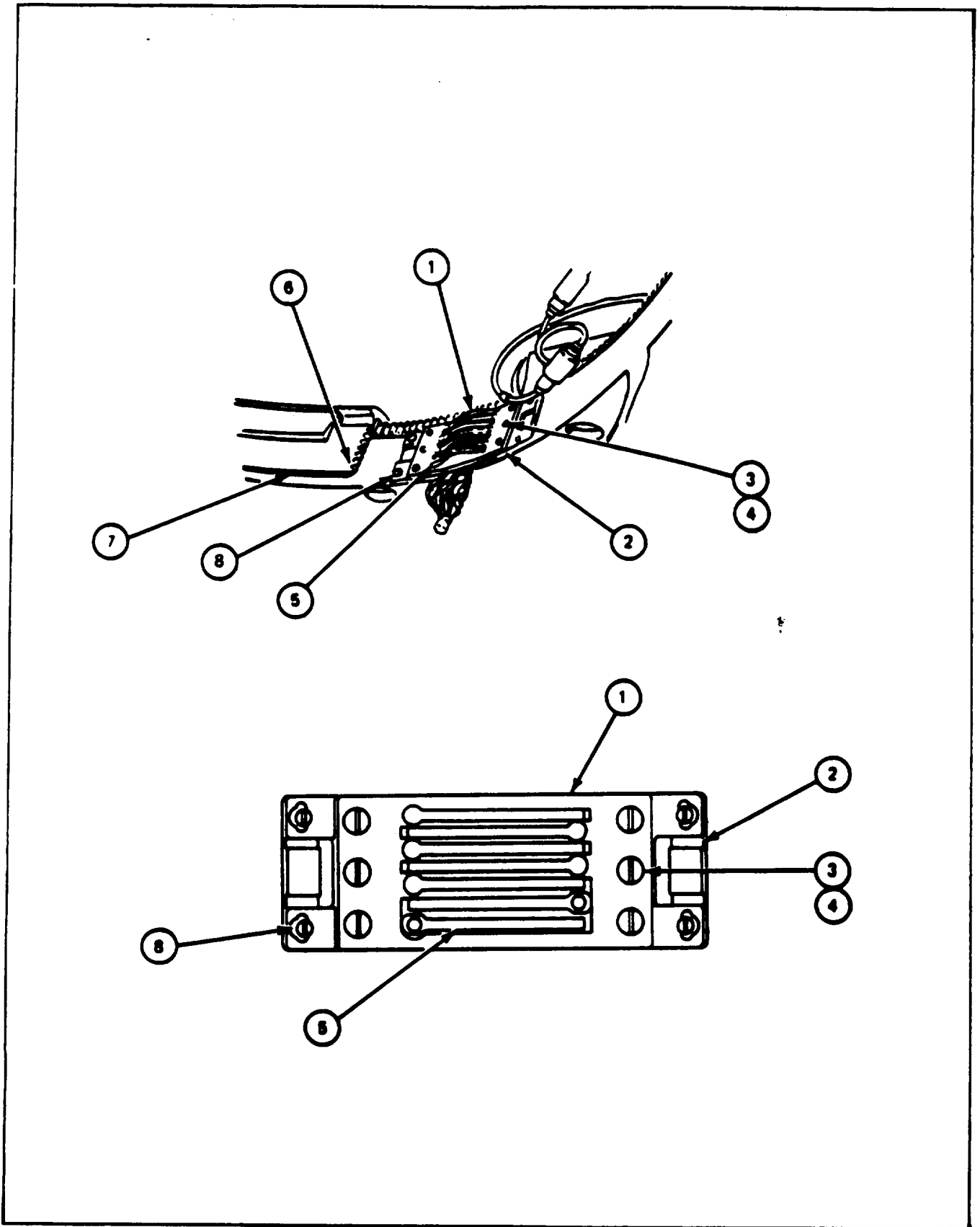
REFERENCES: JPG for procedure to connect electrical connectors
TM 9-2350-22-10 for procedure to traverse cupola

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Interconnecting Box	FO-2	6

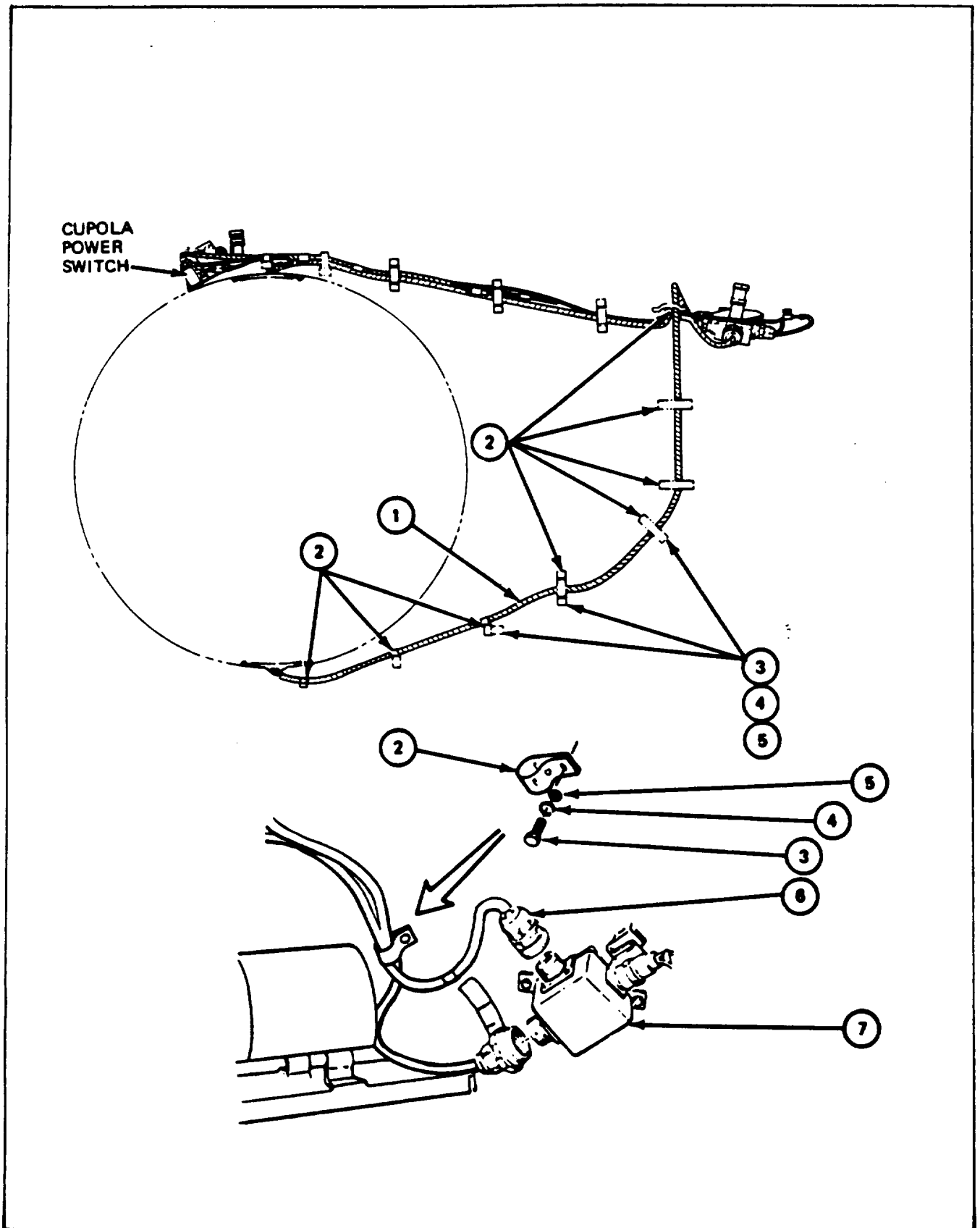
EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF

FRAME 1	
Step	Procedure
1.	Traverse cupola by hand until left hand contact board can be seen (TM-10).
2.	Using screwdriver, attach contact board (1) to two turret mounting brackets (2) with six screws (3) and six lockwashers (4).
	NOTE
	Bottom edge of spring contact (5) must be aligned with bottom edge of terminal strip (6).
3.	Check that bottom edge of spring contact (5) on contact board (1) is even with bottom edge of terminal strip (6) on terminal board assembly (7). If not lined up, do steps 4 thru 9. If lined up, GO TO FRAME 2.
4.	Using screwdriver, loosen four screws (8).
5.	Traverse cupola by hand, until spring contact (5) on contact board (1) is under terminal strip (6) (TM-10).
6.	Using hands, move contact board (1) up or down until spring contact (5) is even with terminal strip (6) on terminal board assembly (7).
7.	Using screwdriver, tighten two of four screws (8).
8.	Traverse cupola by hand, until terminal strip (6) is off contact board (1) (TM-10).
9.	Using screwdriver, tighten other two of four screws (8).
	GO TO FRAME 2



8-3. WIRING HARNESS, LEFT HAND CONTACT BOARD (10911236-3)
 INSTALLATION PROCEDURE (CONT)

FRAME 2	
Step	Procedure
	<div style="border: 1px dashed black; padding: 2px; display: inline-block;">CAUTION</div> <p>Make sure cables are not pinched under clamps or straps. Make sure cables are not kinked at cable bends. Pinching or kinking will damage cable.</p> <p style="text-align: center;">NOTE</p> <p>Some cable straps and clamps hold more than one wiring harness. Put contact board wiring harness in all cable straps or clamps.</p> <p>Use masking tape tags to find straps and clamps which hold contact board harness to equipment. Remove masking tape as each cable strap or clamp is attached.</p>
2.	Using hands, put wiring harness (1) in eight cable clamps (2).
3.	Using combination wrench, attach eight cable clamps (2) to equipment using eight screws (3) eight lockwashers (4) and eight flat washers (5).
4.	Using spanner wrench, connect electrical connector (6) to interconnection box (7) (JPG).
	<p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required:</p> <p style="text-align: center;">Install cupola guard assembly (para 9-3).</p>
	END OF TASK



**8-4. WIRING HARNESS, RIGHT HAND CONTACT BOARD (10911236-1)
REMOVAL PROCEDURE**

TOOLS: 1/4" flat tip screwdriver
Adjustable hook type spanner wrench
7/16" combination wrench

SUPPLIES: Masking tape (1" wide) (item 36, App. A)
Pen

PERSONNEL: One

REFERENCES: JPG for procedure to disconnect electrical connectors
TM 9-2350-222-10 for procedure to traverse cupola

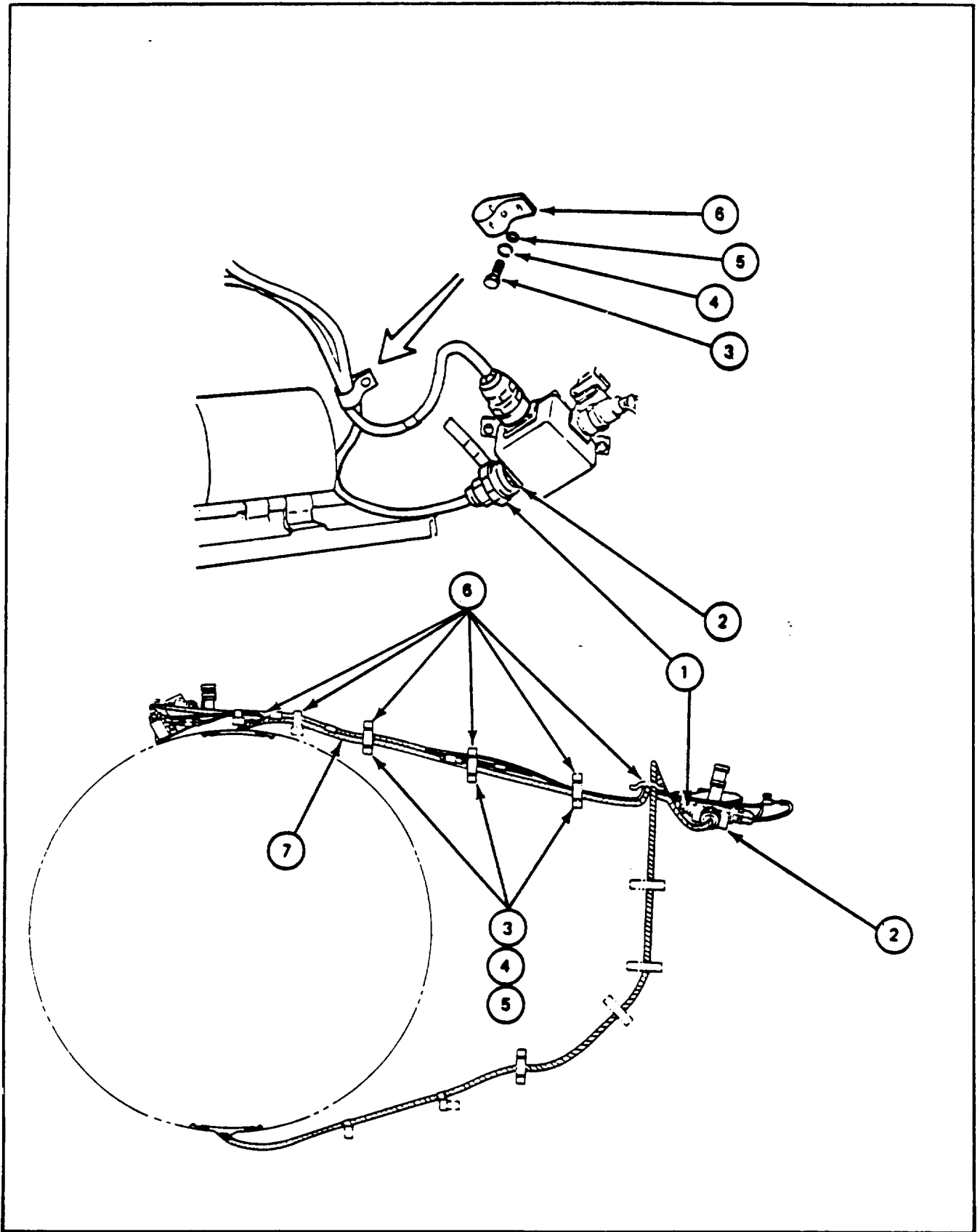
EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Interconnecting Box	FO-2	6

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF

PRELIMINARY PROCEDURES: Remove cupola guard (para 9-4)

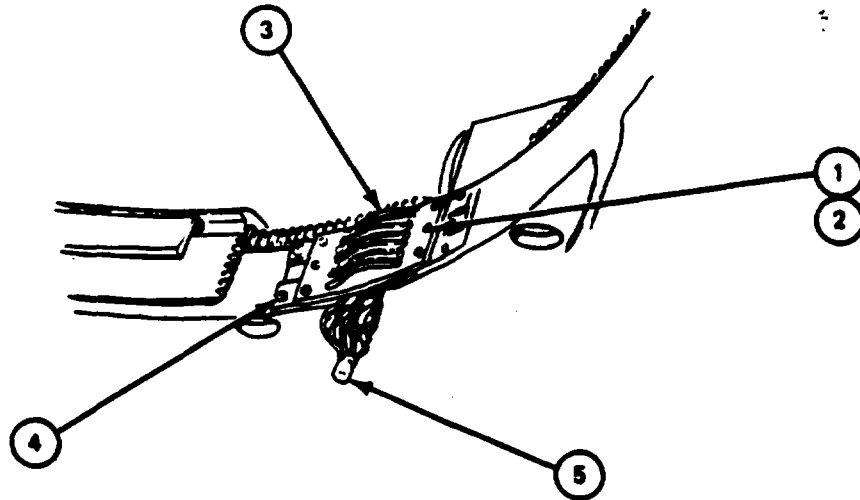
FRAME 1	
Step	Procedure
1.	Traverse cupola until right-hand contact board can be seen (TM-10).
2.	Using spanner wrench, disconnect electrical connector (1) from interconnecting box (2) (JPG).
NOTE	
Some cable clamps and straps hold more than one wiring harness. Remove only contact board wiring harness from these clamps and straps.	
3.	Using combination wrench, remove six screws (3), six lockwashers (4), and six flat washers (5) holding six cable straps (6) to equipment.
4.	Remove wiring harness (7) from five cable straps (6).
5.	Using hand, put back six screws (3), six lockwashers (4), six flat washers (5), and six cable straps (6). Tag each cable strap (6) with a piece of masking tape as it is put back.
GO TO FRAME 2	



8-4. WIRING HARNESS, RIGHT HAND CONTACT BOARD (10911236-1) REMOVAL PROCEDURE (CONT)

FRAME 2

Step	Procedure
1.	Using screwdriver, remove six screws (1) and six lockwashers (2) holding contact board (3) to two turret mounting brackets (4).
2.	Separate contact board (3) from two turret mounting brackets (4).
3.	Using hand, put back six screws (1) and six lockwashers (2) in two mounting brackets (4).
4.	Remove wiring harness (5) from vehicle. END OF TASK



**8-5.) WIRING HARNESS, RIGHT HAND CONTACT BOARD (10911236-1)
INSTALLATION PROCEDURE**

TOOLS: 1/4" flat tip screwdriver
 7/16" combination wrench
 Adjustable hook type spanner wrench

PERSONNEL: One

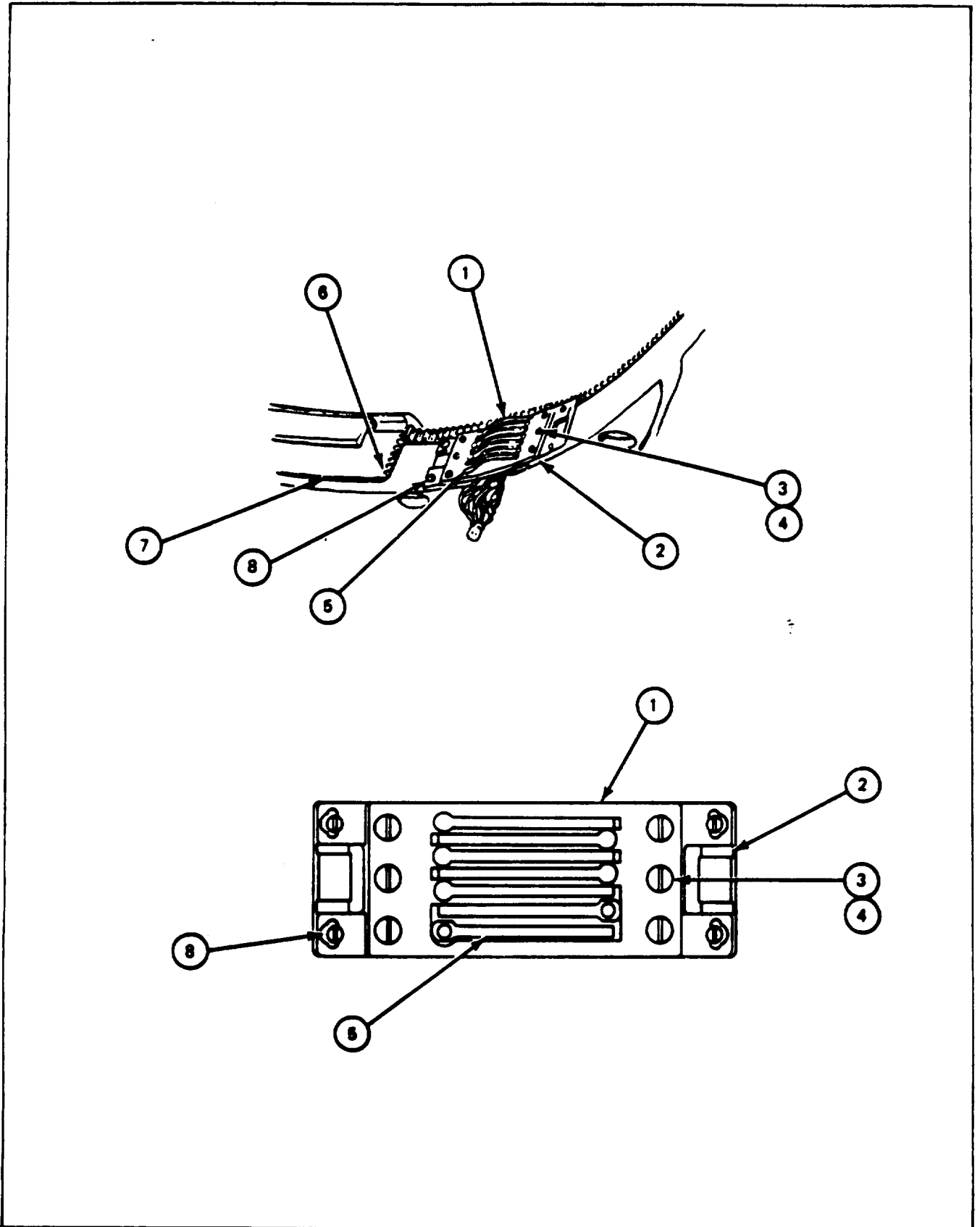
REFERENCES: JPG for procedure to connect electrical connectors
 TM 9-2350-222-10 for procedure to traverse cupola

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Interconnecting Box	FO-2	6

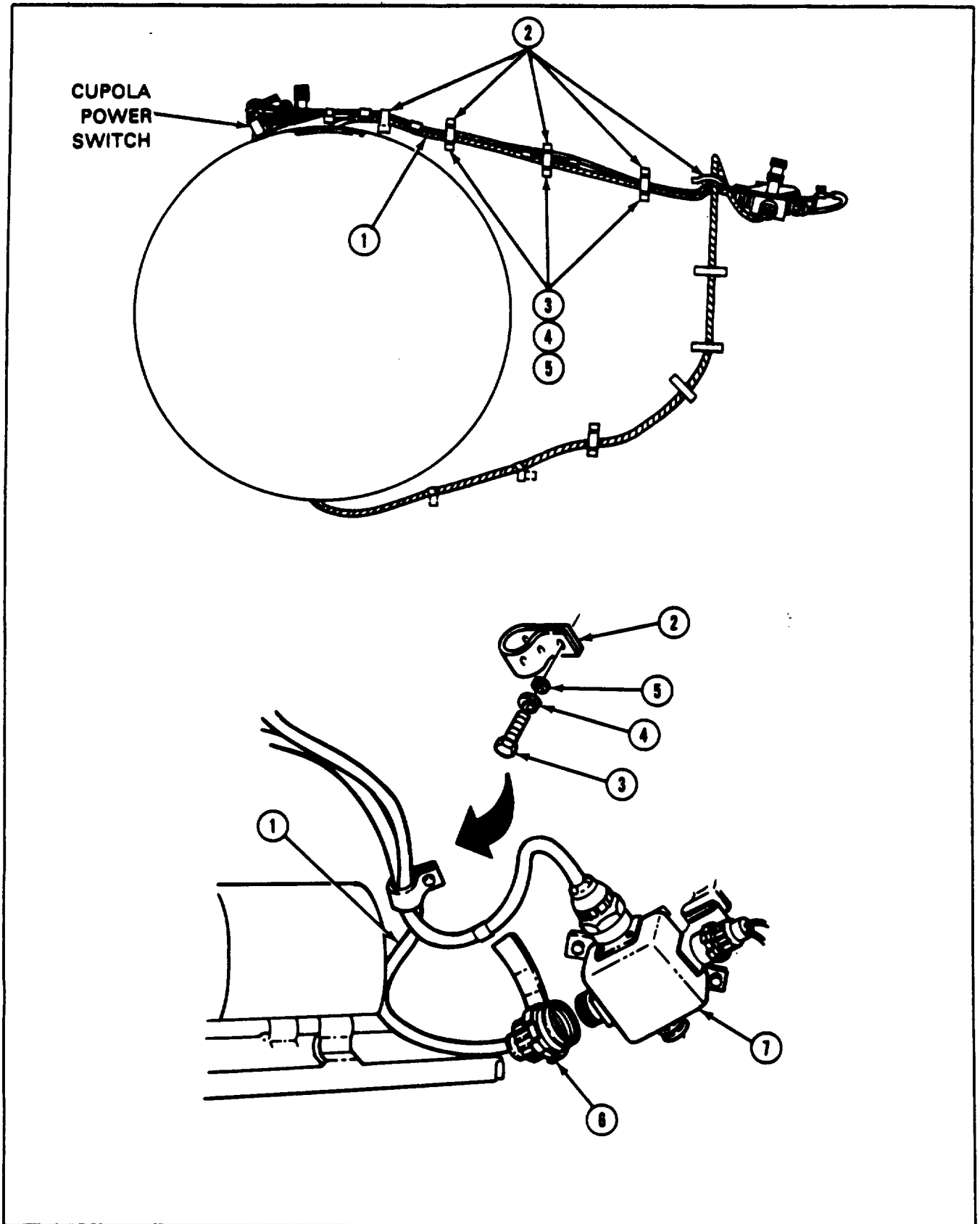
EQUIPMENT CONDITION: Drivers master control panel MASTER BATTERY switch set to OFF

FRAME 1	
Step	Procedure
1.	Traverse cupola by hand until right hand contact board can be seen (TM-10).
2.	Using screwdriver, attach contact board (1) to two turret mounting brackets (2) with six screws (3) and six lockwashers (4).
	NOTE
	Bottom edge of spring contact (5) must be aligned with bottom edge of terminal strip (6).
3.	Check that bottom edge of spring contact (5) on contact board (1) is even, with bottom edge of terminal strip (6) on terminal board assembly (7). If not lined up, do steps 4 thru 9. If lined up, GO TO FRAME 2.
4.	Using screwdriver, loosen four screws (8).
5.	Traverse cupola by hand, until spring contact (5) on contact board (1) is under terminal strip (6) (TM-10).
6.	Using hands, move contact board (1) up or down until spring contact (5) is even with terminal strip (6) on terminal board assembly (7).
7.	Using screwdriver, tighten two of four screws (8).
8.	Traverse cupola by hand, until terminal strip (6) is off contact board (1) (TM-10).
9.	Using screwdriver, tighten other two of four screws (8).
	GO TO FRAME 2



8-5. WIRING HARNESS, RIGHT CONTACT BOARD (10911236-1)
 INSTALLATION PROCEDURE (CONT)

FRAME 2	
Step	Procedure
	<p>CAUTION</p> <p>Make sure cables are not pinched under clamps or straps. Make sure cables are not kinked at cable bends. Pinching or kinking will damage cable.</p> <p>NOTE</p> <p>Some cable straps and clamps hold more than one wiring harness. Put contact board wiring harness in all cable straps or clamps.</p> <p>Use masking tape tags to find straps and clamps which hold contact board harness to equipment. Remove masking tape as each cable strap or clamp is attached.</p> <p>2 Using hands, put wiring harness (1) in five cable clamps (2).</p> <p>3 Using combination wrench, attach five cable clamps (2) to equipment using five screws (3), five lockwashers (4), and five flat washers (5).</p> <p>4 Using spanner wrench, connect electrical connector (6) to interconnecting box (7) (JPG),</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required: Install cupola guard assembly (para 9-5).</p> <p>END OF TASK</p>



8-6. BRANCHED WIRING HARNESS (10906869) REMOVAL PROCEDURE

TOOLS: 12 in.- adjustable wrench
7/16 in. combination wrench

SUPPLIES: Masking tape (1 in. wide) (item 36, App. A)
Pen

PERSONNEL: One

REFERENCES: JPG for procedures to
Tag parts
Disconnect electrical connector

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Interconnecting Box	FO-2	6

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF

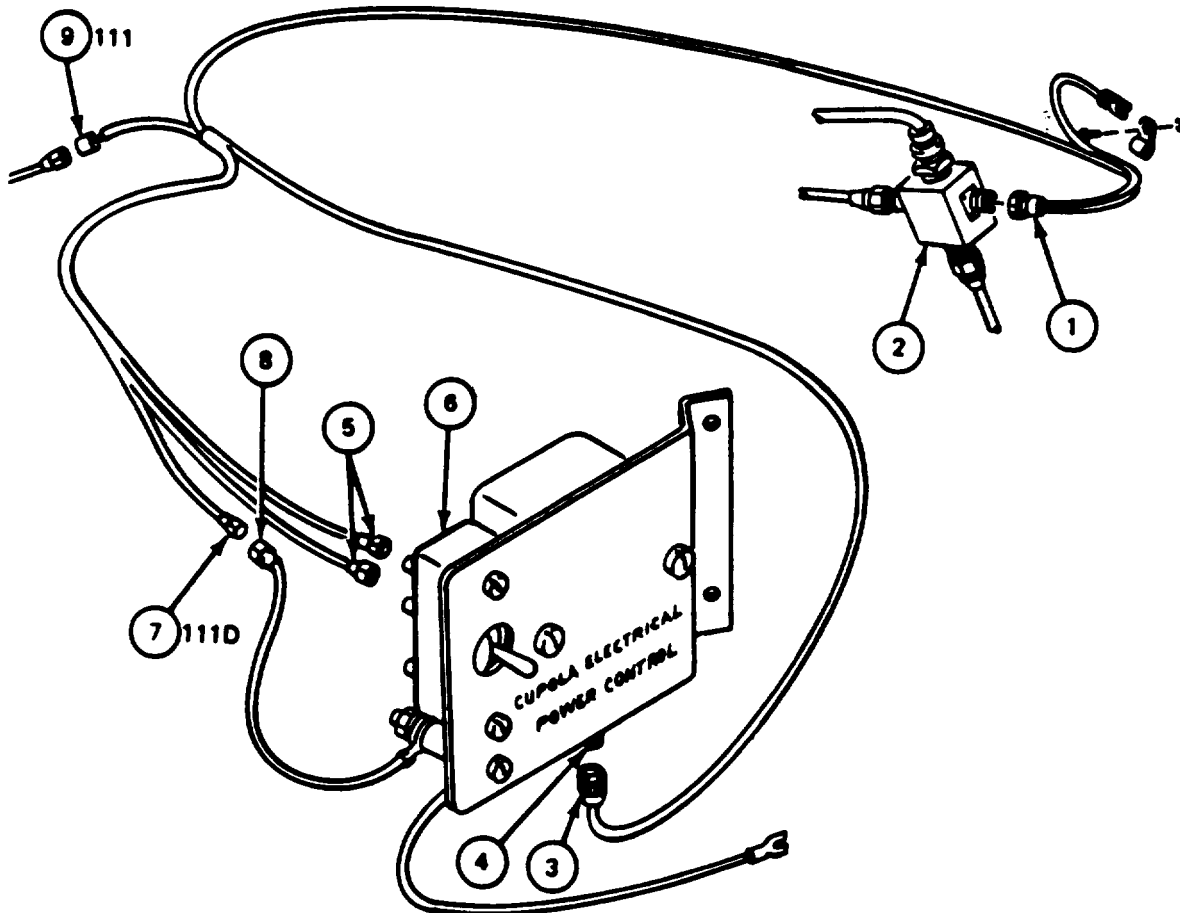
NOTE

These procedures are to be used for the removal of the branched wiring harness (10951614) which is used on the late model vehicle

8-6. BRANCHED WIRING HARNESS (10905869) REMOVAL PROCEDURE (CONT)

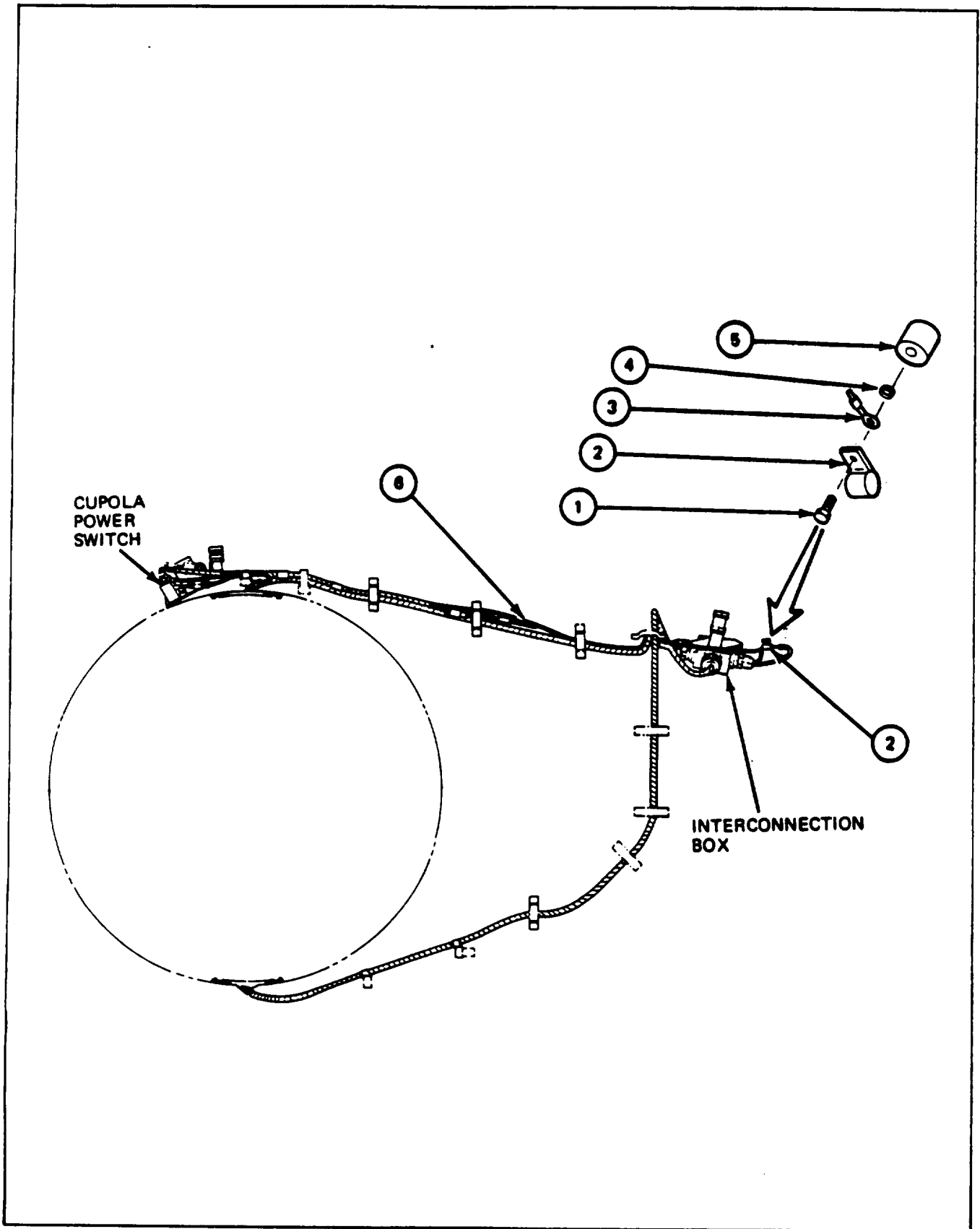
FRAME 1

Step	Procedure
1.	Using adjustable wrench, disconnect electrical connector (1) from interconnecting box (2) (JPG).
2.	Using adjustable wrench, disconnect electrical connector (3) from cupola power relay (4) (JPG).
3.	Disconnect two electrical connectors (5) from cupola power switch (6) terminals 2 and 3 (JPG).
4.	Disconnect (circuit number 111D) electrical connector (7) from resistor connector (8) (JPG).
5.	Disconnect (circuit number 111) electrical connector (9) from turret control harness connector (JPG). GO TO FRAME 2



8-6. BRANCHED WIRING HARNESS (10905869) REMOVAL PROCEDURE (CONT)

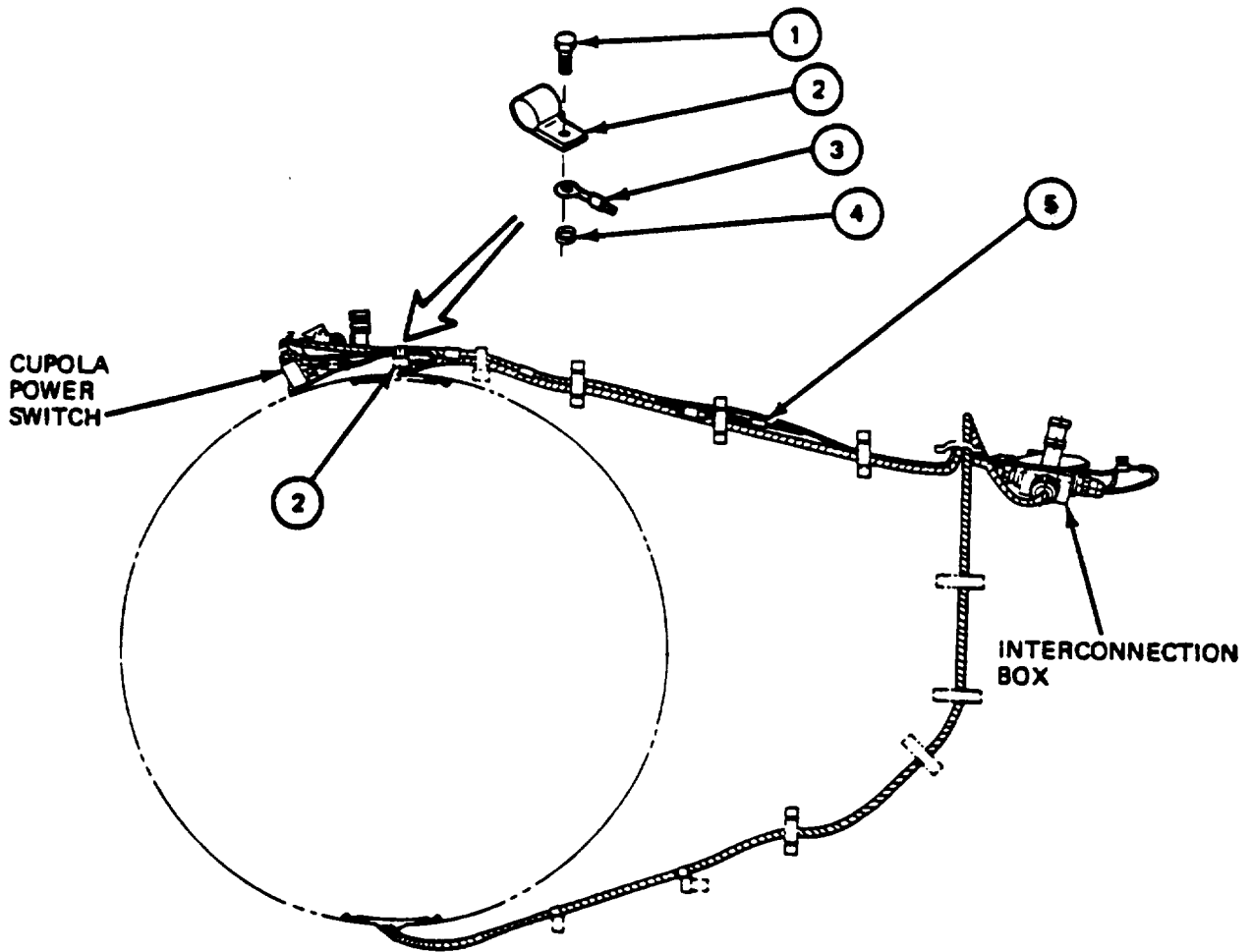
FRAME 2	
Step	Procedure
	<p style="text-align: center;">NOTE</p> <p>Some cable straps are held with two screws. Remove only one screw. Remove wiring harness. Using hand, put back screw.</p> <p>After cable is removed from one cable strap, put back and tag cable strap before removing next cable strap.</p> <ol style="list-style-type: none"> 1. Using combination wrench remove screw (1) holding cable clamp (2), ground terminal (3), and lockwasher (4) to equipment pad (5). 2. Separate ground terminal (3) from equipment pad (5). 3. Remove harness (6) from cable clamp (2). 4. Using hands, put back screw (1), cable clamp (2), and lockwasher (4). 5. Using masking tape and pen, tag cable clamp (2) (JPG). <p>GO TO FRAME 3</p>



8-6. BRANCHED WIRING HARNESS (10905869) REMOVAL PROCEDURE (CONT)

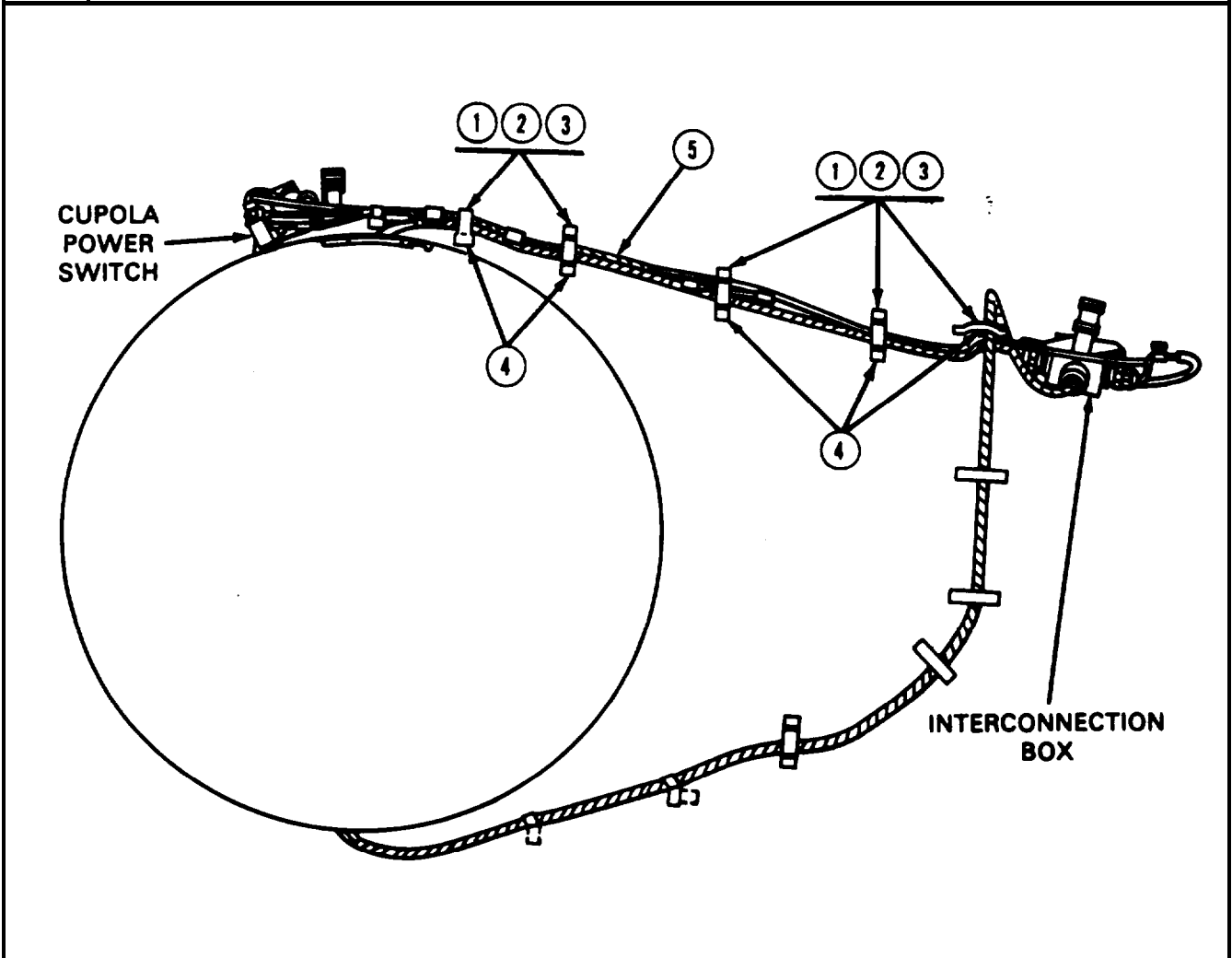
FRAME 3

Step	Procedure
1.	Using combination wrench, remove screw (1), holding cable clamp (2), resistor ground terminal (3), and lockwasher (4) to equipment.
2.	Remove wiring harness (5) from cable clamp (2).
3.	Using hands, put back screw (1), cable clamp (2), ground terminal (3), and lockwasher (4).
4.	Using masking tape and pen, tag cable clamp (2) (JPC). GO TO FRAME 4



8-6. BRANCHED WIRING **HARNESS (10905869) REMOVAL** PROCEDURE (CONT)

FRAME 4	
STEP	PROCEDURE
1.	Using combination wrench, remove five screws (1), five lockwashers (2), and five flat washers (3) holding five cable straps (4) to equipment.
2.	Separate harness (5) from five cable straps (4).
3.	Using hands, put back five cable straps (4), five screws (1), five lockwashers (2), and five flat washers (3).
4.	Using making tape and pen, tag five cable straps (4) (JPG).
6.	Remove wiring harness (5) from vehicle.
	END OF TASK



8-7. BRANCHED WIRING HARNESS (10906869) INSTALLATION PROCEDURE

TOOLS: 12 in. adjustable wrench
7/16 in. combination wrench

NOTE
These procedures are to be used for the **installation** of branched wiring harness (10961614) which is used on the late model tank.

PERSONNEL: One

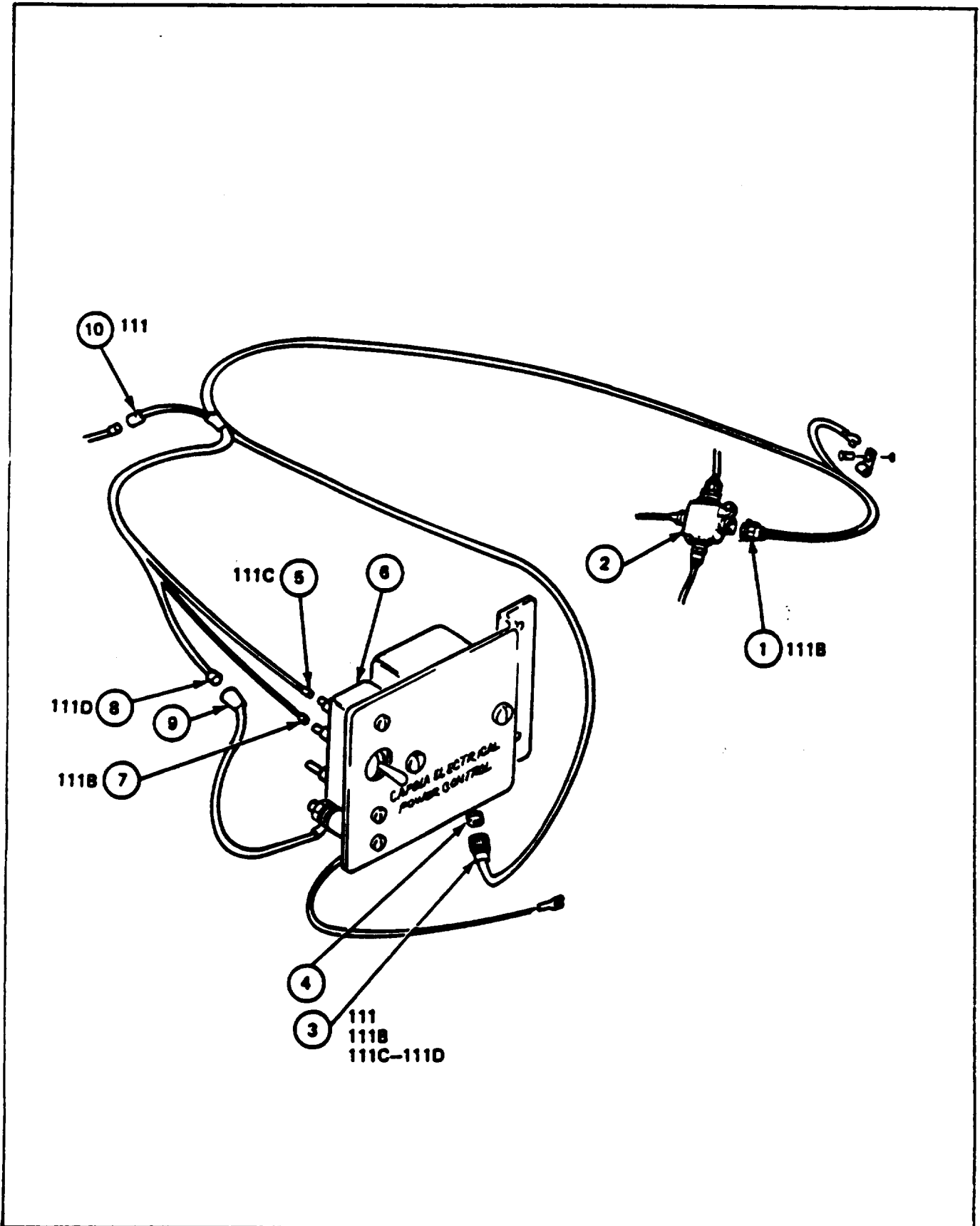
REFERENCES: JPG for procedure to connect electrical connectors

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Interconnecting Box	FO-2	6

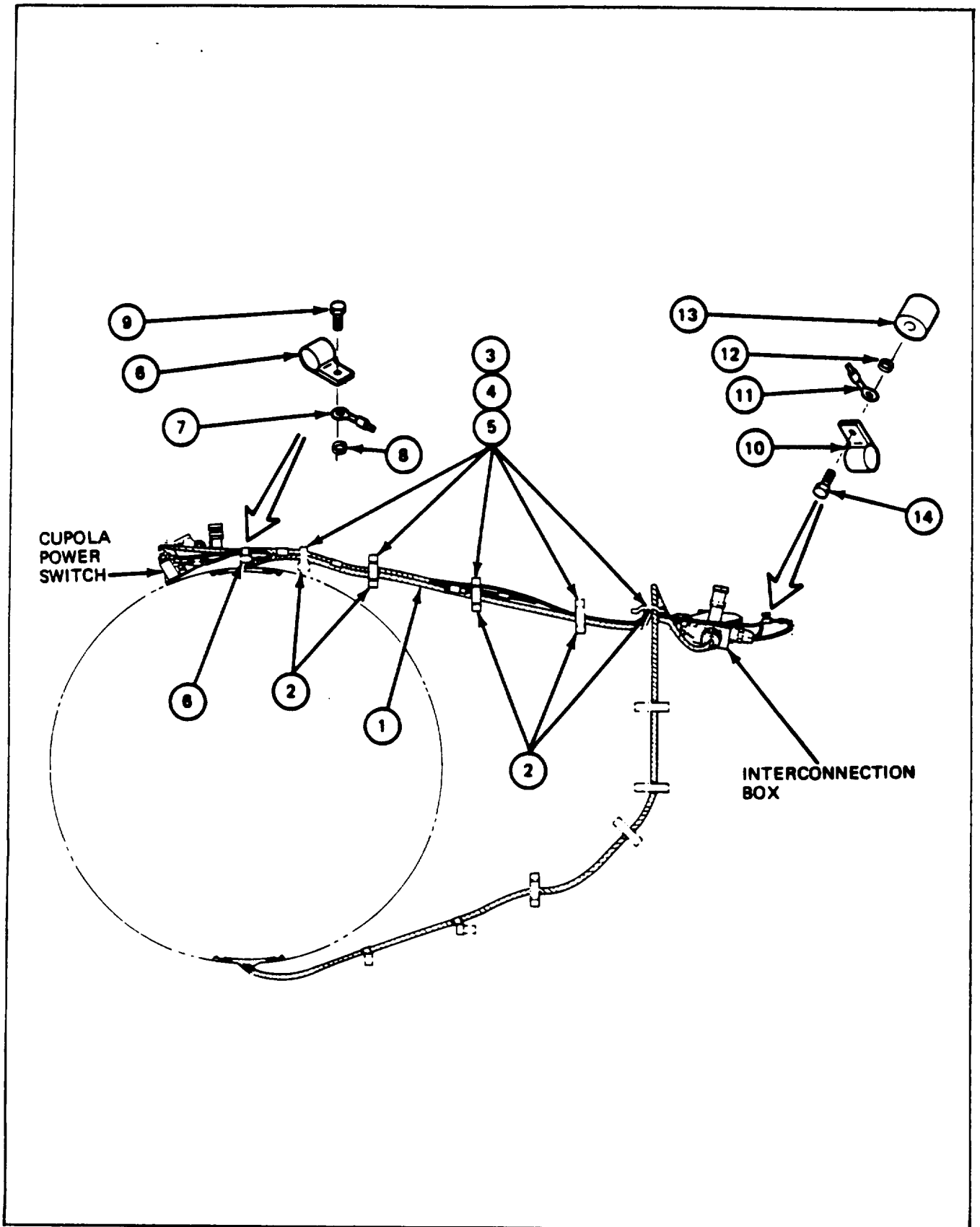
EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF

FRAME 1	
STEP	PROCEDURE
	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">CAUTION</div> <p>Cable connectors must be connected to receptacles which match circuit numbers on metal tabs attached to wires near connectors. Wrong connections will damage equipment.</p>
1.	Check that connector (1) wires are tagged with numbers 111B and GRD.
2.	Using adjustable wrench, connect electrical connector (1) to interconnecting box (2) (JPG).
3.	Check that connector (3) wires are tagged with numbers 111, 111B, and 111C-111D.
4.	Using adjustable wrench, connect electrical connector (3) to cupola power relay (4) (JPG).
5.	Check that connector (5) wire is tagged with number 111C.
6.	Connect electrical connector (5) to terminal number 2 on cupola power switch (6) (JPG).
7.	Check that connector (7) wire is tagged with number 111B.
8.	Connect electrical connector (7) to terminal number 3 on cupola power switch (6) (JPG).
9.	Check that connector (8) wire is tagged with number 111D.
10.	Connect electrical connector (8) to resistor connector (9) (JPG).
11.	Check that connector (10) wire is tagged with number 111.
12.	Connect electrical connector (10) to turret control harness connector (JPG).
	GO TO FRAME 2



8-7. BRANCHED WIRING HARNESS (10905869) INSTALLATION PROCEDURE (CONT)

FRAME 2	
Step	Procedure
	<p style="text-align: center;">CAUTION</p> <p>Make sure cables are not pinched under straps. Make sure cables are not kinked at cable bends. Pinching or kinking will damage cable.</p> <p style="text-align: center;">NOTE</p> <p>Use masking tape tags to find straps which hold wiring harness to equipment. Remove masking tape as each cable strap is attached.</p> <ol style="list-style-type: none"> 1. Put harness (1) in five cable clamps (2). 2. Using combination wrench, attach five cable clamps (2) to equipment using five screws (3), five lockwashers (4), and five flat washers (5). 3. Put harness (1) in cable clamp (6). 4. Using combination wrench, attach cable clamps (6), resistor ground terminal (7), and lockwasher (8) to equipment using screw (9). 5. Put harness (1) in cable clamp (10). 6. Using combination wrench, attach cable clamp (10), interconnection box ground terminal (11), and lockwasher (12) to equipment pad (13) with screw (14). <p>END OF TASK</p>



8-8. LEAD ASSEMBLY (11599179) REMOVAL PROCEDURE

TOOLS: No. 1 cross tip screwdriver (Phillips)
Needle nose pliers

PERSONNEL.: One

REFERENCES: JPG for procedure to disconnect electrical connectors

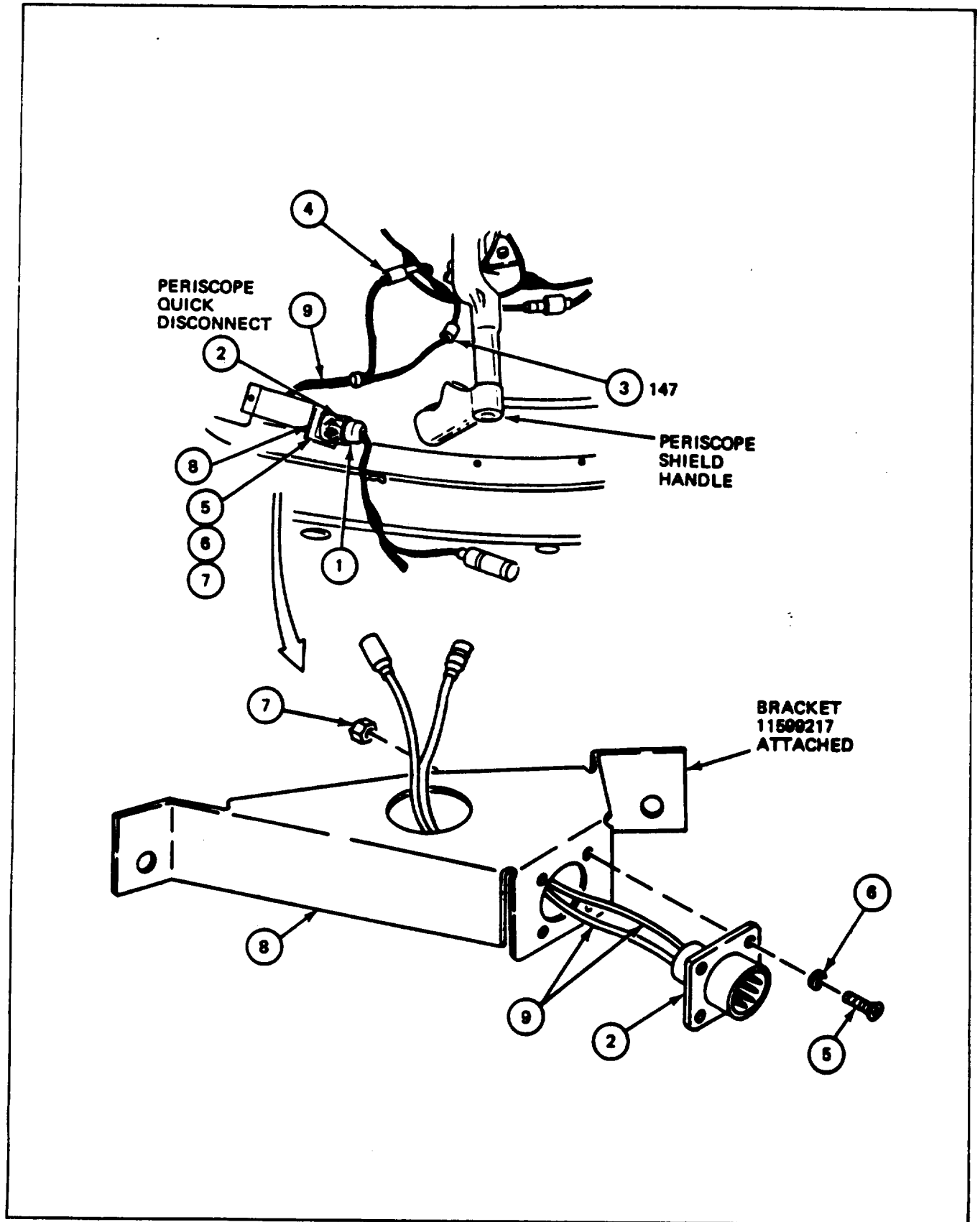
EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Commander's Periscope	FO-2	16

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF

PRELIMINARY PROCEDURES: Remove support bracket (para 9-4)

FRAME 1	
Step	Procedure
1.	Disconnect electrical connector (1) from periscope quick-disconnect bracket connector (2) (JPG).
2.	Disconnect electrical connector (3) from wiring harness (10915973) (circuit number 147) connector (JPG).
3.	Disconnect electrical connector (4) from periscope control light source connector (JPG).
4.	Using pliers and screwdriver, remove four screws (5), four lockwashers (6), and four nuts (7) holding connector (2) to bracket (8).
5.	Pull lead assembly (9) out of two holes in bracket (8).
6.	Using hands, put back four screws (5), four lockwashers (6) and four nuts (7) in bracket (8).
	END OF TASK



8-9. LEAD ASSEMBLY (11599179) INSTALLATION PROCEDURE

TOOLS: No. 1 cross tip screwdriver (Phillips)
Needle nose pliers

PERSONNEL: One

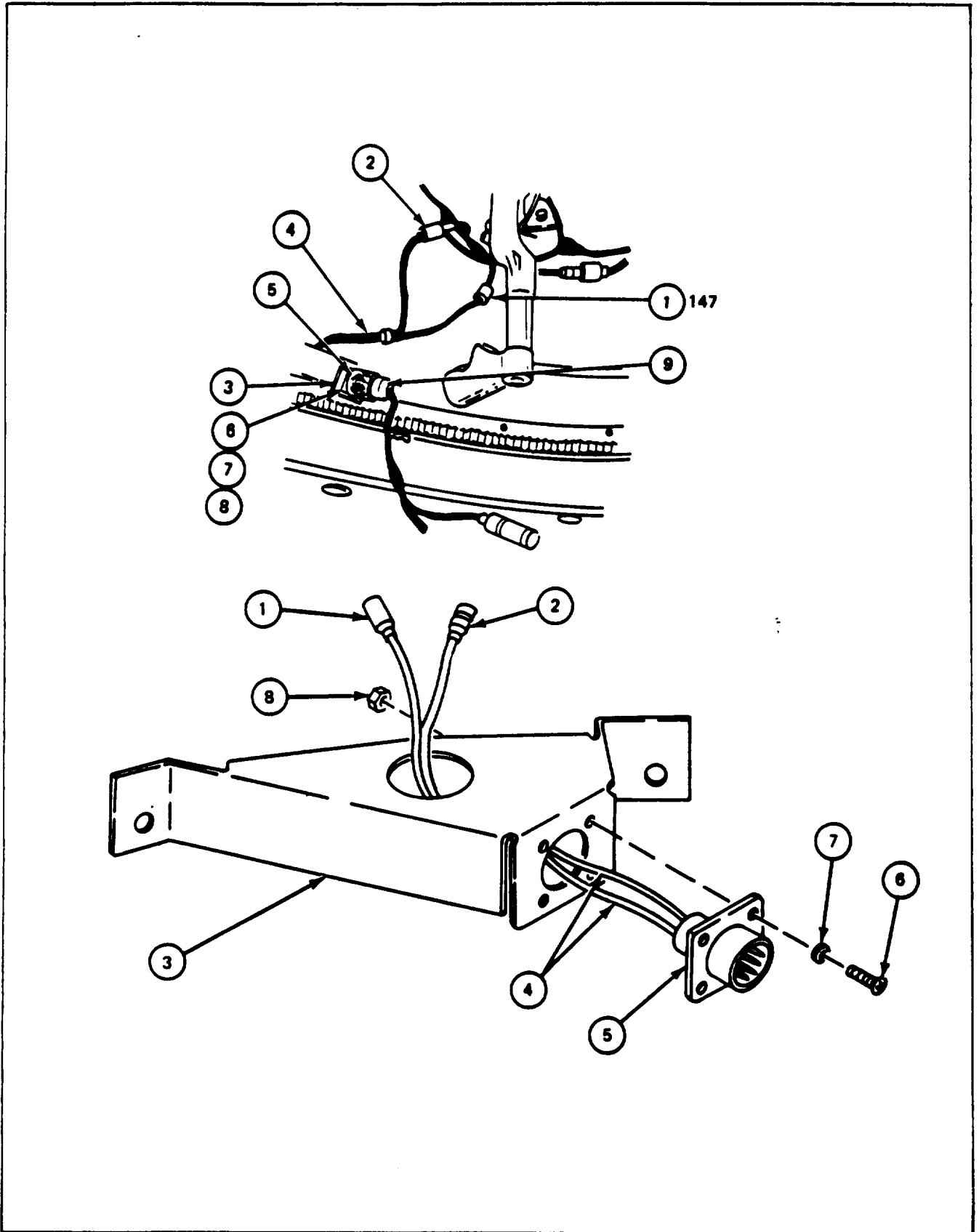
REFERENCES: JPG for procedure to connect electrical connectors

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Commander's Periscope	FO-2	16

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF

FRAME 1	
Step	Procedure
	<div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">CAUTION</div> <p>Cable connectors must be connected to receptacles which match circuit numbers on metal tabs attached to wires near connectors. Wrong connections will damage equipment.</p>
1.	Put connectors (1) and (2) through two holes in bracket (3).
2.	Pull lead assembly (4) through two holes in bracket (3) until connector (5) is in place.
3.	Using screwdriver and pliers, attach connector (5) to bracket (3) with four screws (6), four lockwashers (7), and four nuts (8).
4.	Connect electrical connector (circuit number 147) (1) to wiring harness (10915973) (JPG).
5.	Connect electrical connector (2) to periscope control light source connector (JPG).
6.	Connect electrical connector (9) to connector (5) in bracket (3) (JPG).
	<p>NOTE</p> <p>Follow-on Maintenance Action Required:</p> <p>Install support bracket (para 9-5).</p>
	END OF TASK



8-10. LEAD ASSEMBLY, PERISCOPE POWER UNIT (11599178) REMOVAL PROCEDURE

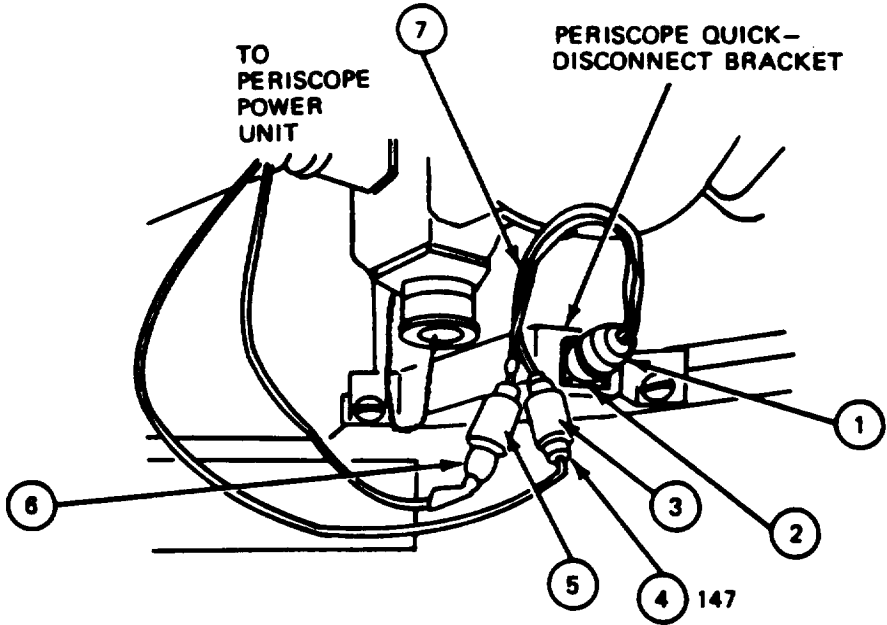
PERSONNEL: One

REFERENCES: JPG for procedure to disconnect electrical connectors

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Commander's Periscope	FO-2	16

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF

FRAME 1	
Step	Procedure
<ol style="list-style-type: none"> 1. Disconnect electrical connector (1) from quick-disconnect bracket connector (2) (JPG). 2. Disconnect electrical connector (3) from periscope power unit connector (4) (JPG). 3. Disconnect electrical connector (5) from periscope power unit return connector (6) (JPG). 4. Remove lead assembly (7) from vehicle. <p>END OF TASK</p>	

8-11. LEAD ASSEMBLY, PERISCOPE POWER UNIT (11599178) INSTALLATION PROCEDURE

PERSONNEL One

REFERENCES: JPG for procedure to connect electrical connectors

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Commander's Periscope	FO-2	16

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF

FRAME 1	
STEP	PROCEDURE
1.	Connect electrical connector (1) to quick-disconnect bracket connector (2) (JPG).
2.	Connect electrical connector (3) to periscope power unit (circuit number 147) connector (4) (JPG).
3.	Connect electrical connector (5) to periscope power unit return connector (6) (JPG).
	END OF TASK

8-12. TERMINAL BOARD ASSEMBLY (10873472) REMOVAL PROCEDURE

TOOLS: No. 2 cross-tip screwdriver (phillips)

PERSONNEL One

REFERENCES TM 9-2350-222-202-3 for procedure to remove cupola backrest pad

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT
Driver's Master Control Panel

FOLDOUT
FO-3

CALLOUT
11

EQUIPMENT CONDITION Driver's master control panel MASTER BATTERY switch set to OFF
Cupola backrest pad removed (TM 20-2-3)

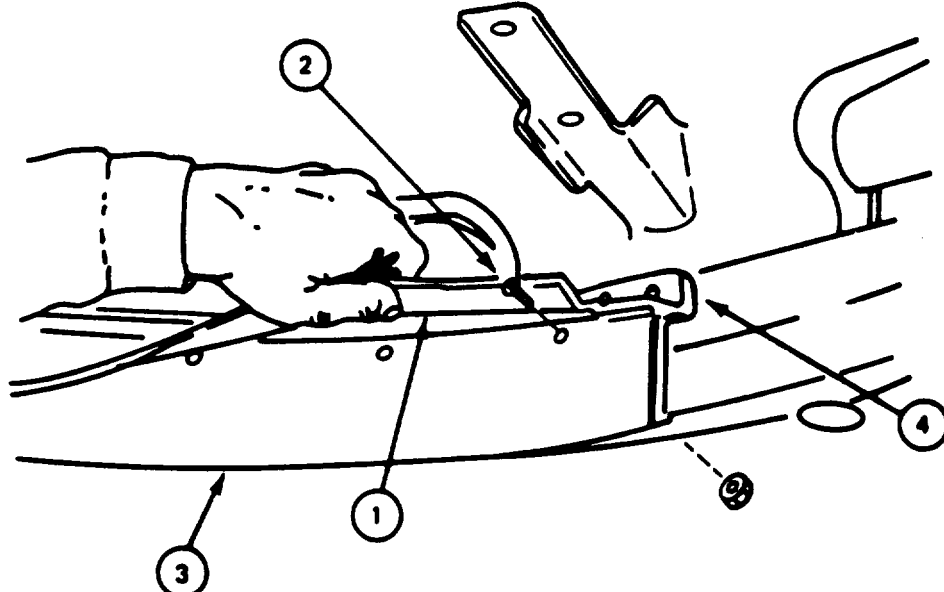
PRELIMINARY PROCEDURES: Remove wiring harness (10873607) (para 8- 14) (Early Model)
Remove wiring harness (10873581) (para 8-18) (Early Model)
Unsolder wiring hamess (11673938) (para 8-28) (Late Model)

GENERAL INSTRUCTIONS

NOTE

If terminal board is being removed for inspection or to remove cupola, do not unsolder two wiring harnesses from torminal board.

8-12. TERMINAL BOARD ASSEMBLY (10873472) REMOVAL PROCEDURE
(CONT)

FRAME 1	
Step	Procedure
	<p style="text-align: center;">NOTE</p> <p style="text-align: center;">Terminal board is attached to support with thirteen flat head screws (2) under rubber strip (1). Rubber strip must be lifted to remove screws.</p> <ol style="list-style-type: none"> 1. Using hand, lift up rubber strip (1) until screws (2) can be seen. 2. Using screwdriver, remove thirteen screws (2) holding terminal board (3) to support (4). 3. Remove terminal board (3) from vehicle. <p>END OF TASK</p>
	

8-13. TERMINAL BOARD ASSEMBLY (10873472) INSTALLATION PROCEDURE

TOOLS: No. 2 cross tip screwdriver (Phillips)

PERSONNEL: Two

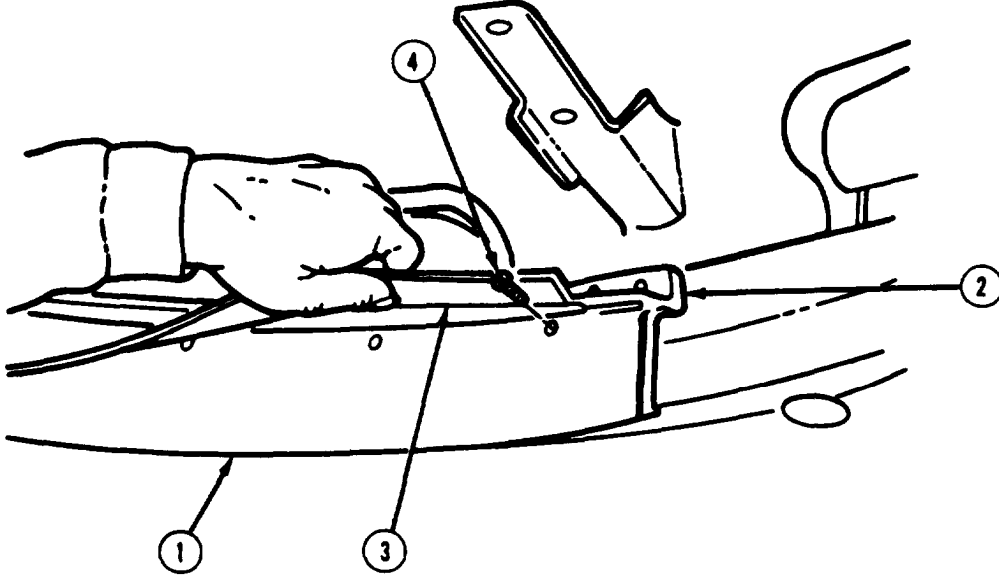
REFERENCES: TM 9-2350-222-20-2-3 for procedure to install cupola backrest pad

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11

EQUIPMENT CONDITION: Driver's master control panel **MASTER BATTERY** switch set to **OFF**

8-13, TERMINAL BOARD ASSEMBLY (10873472) INSTALLATION PROCEDURE (CONT)

FRAME 1	
STEP	PROCEDURE
<ol style="list-style-type: none"> 1. 2. 3. 	<p>Soldier A: Line up holes in terminal board (1) with holes in support (2) and hold in place,</p> <p>Soldier B: Lift up rubber strip (3) in middle of terminal board (1) and put in 13 screws (4) by hand, starting at middle of terminal board and each side of middle in turn until all screws are in.</p> <p>Soldier B: Using screwdriver, tighten 13 screws (4) attaching terminal board (1) to support (2).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Follow-on Maintenance Action Required:</p> <p style="text-align: center;">Install wiring harness (10873007) (para 3-15) (Early Model). Install wiring harness (10873581) (para 8-19) (Early Model). Install wiring harness (11673938) (Para 8-29) (Late Model). Install cupola backrest pad (TM 20-2-3).</p> <p>END OF TASK</p>
	

8-14. WIRING HARNESS (10873607) REMOVAL PROCEDURE (EARLY MODEL)

TOOLS: Soldering iron
 1/4 in. flat-tip screwdriver
 7/16 in. combination wrench
 3/8 in. flat-tip screwdriver

PERSONNEL: One

REFERENCES: JPG for procedures to:
 Disconnect electrical connectors
 Use soldering iron
 TM 9-2350-222-20-2-3 for procedure to remove cupola backrest pad

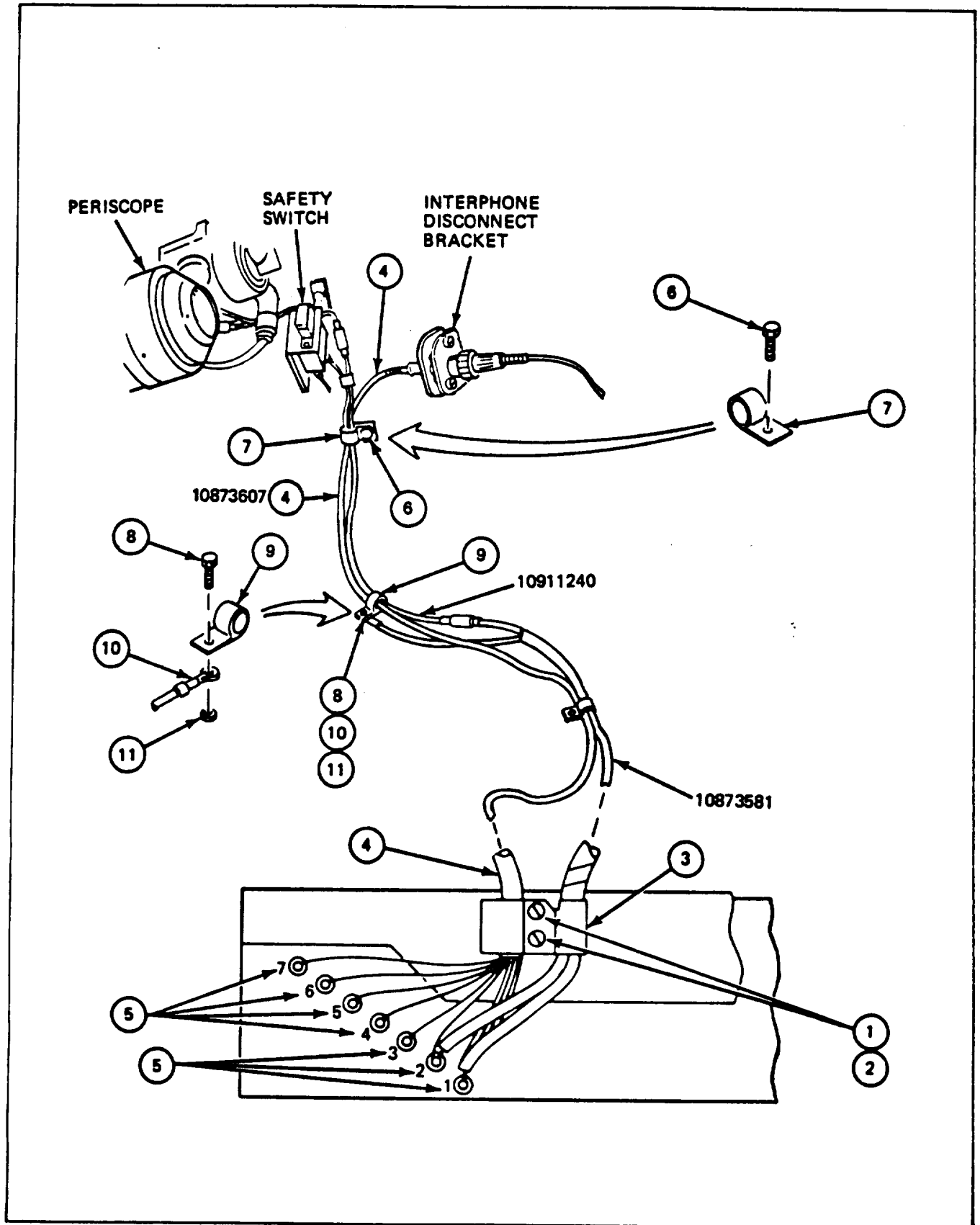
EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Commander's Periscope	FO-2	16

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
 Cupola backrest pad removed (TM 202-3)

PRELIMINARY PROCEDURES: Remove cupola guard (para 9-6)

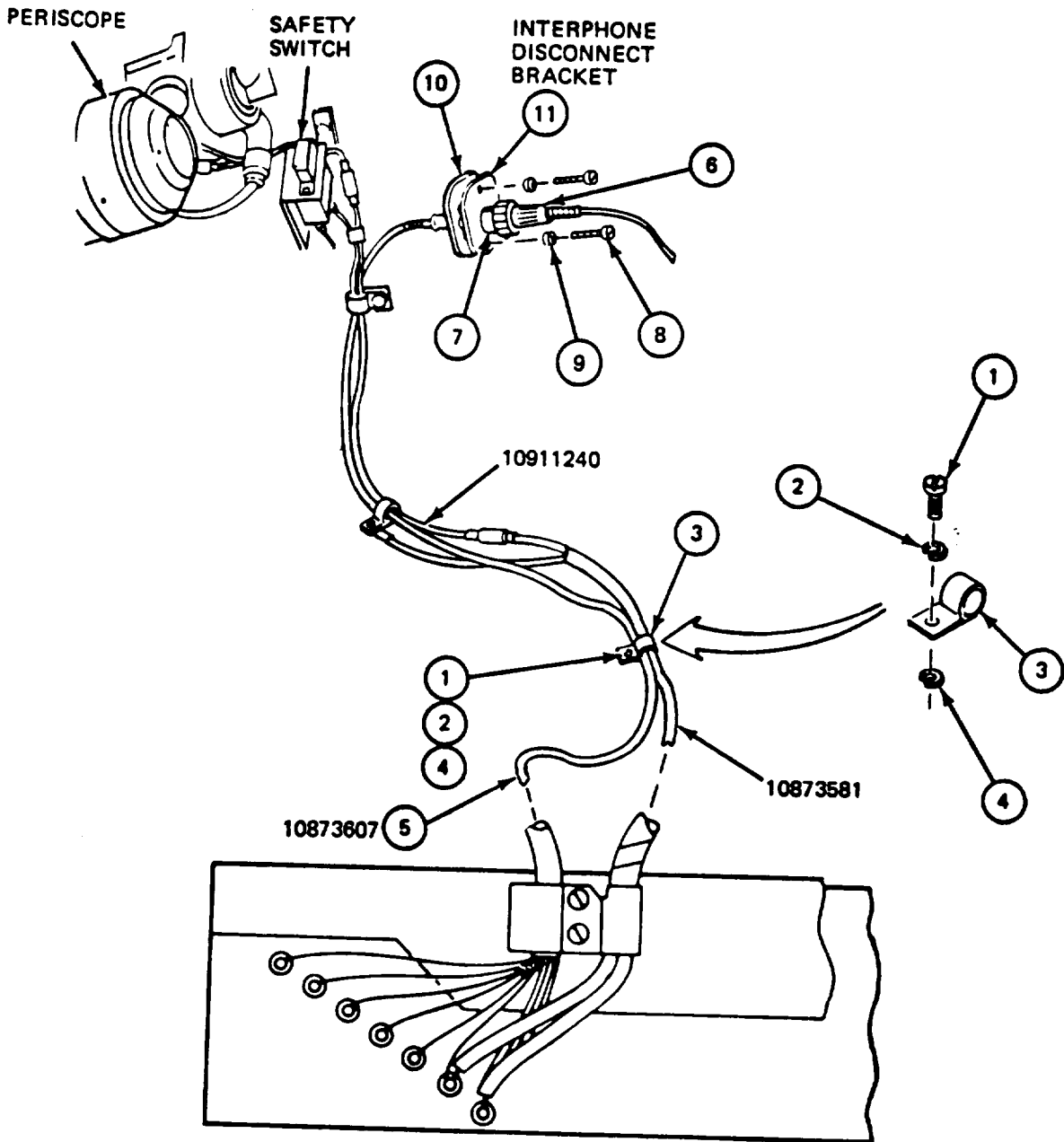
FRAME 1	
STEP	PROCEDURE
1.	Using 1/4 inch screwdriver, remove two screws (1) and two lockwashers (2) holding clamp (3) to terminal board.
2.	Remove harness (4).
3.	Using hands, put back two screws (1), lockwashers (2), and clamp (3).
4.	Using soldering iron, unsolder ten leads (5) in harness (4) from seven terminals (JPG).
5.	Using wrench, remove screw (6) that attaches clamp (7) to equipment.
6.	Remove (10873607) harness (4) from clamp (7).
7.	Using hands, put back screw (6) and clamp (7).
8.	Using wrench, remove screw (8) that attaches clamp (9), ground terminal (10), and lockwasher (11) to equipment.
9.	Remove (10873607) harness (4) from clamp (9).
10.	Using hands, put back screw (8), clamp (9), ground terminal (10), and lockwasher (11).
	GO TO FRAME 2



8-14. WIRING HARNESS (10873607) REMOVAL PROCEDURE (CONT)

FRAME 2

Step	Procedure
1.	Using 3/8" screwdriver, remove screw (1) and lockwasher (2) that attach clamp (3) and lockwasher (4) to equipment.
2.	Remove (10873607) harness (5) from clamp (3).
3.	Using hands, put back screw (1), lockwasher (2), clamp (3), and lockwasher (4).
4.	Disconnect communications cable connector (6) from interphone disconnect bracket connector (7) (JPG).
5.	Using 1/4" screwdriver, remove two screws (8) and two lockwashers (9) that attach plate (10) to interphone disconnect bracket (11).
6.	Pull connector (7) out of hole in interphone disconnect bracket (11).
7.	Remove plate (10) from interphone disconnect wiring harness (5).
8.	Using hands, attach plate (10) to interphone disconnect bracket (11) With two screws (8) and two lockwashers (9).
9.	Remove harness (5) from vehicle.
	END OF TASK



8-15. WIRING HARNESS (10873607) INSTALLATION PROCEDURE (EARLY MODEL)

TOOLS Soldering iron
 1/4 in. flat-tip screwdriver
 7/16 in, combination wrench

SUPPLIES: Solder (item 31, App. A)

PERSONNEL: One

REFERENCES: JPG for procedural to:
 Use soldering iron
 Connect electrical connectors
 TM 9-2350-222-20-2-3 for procedure to install cupola backrest pad

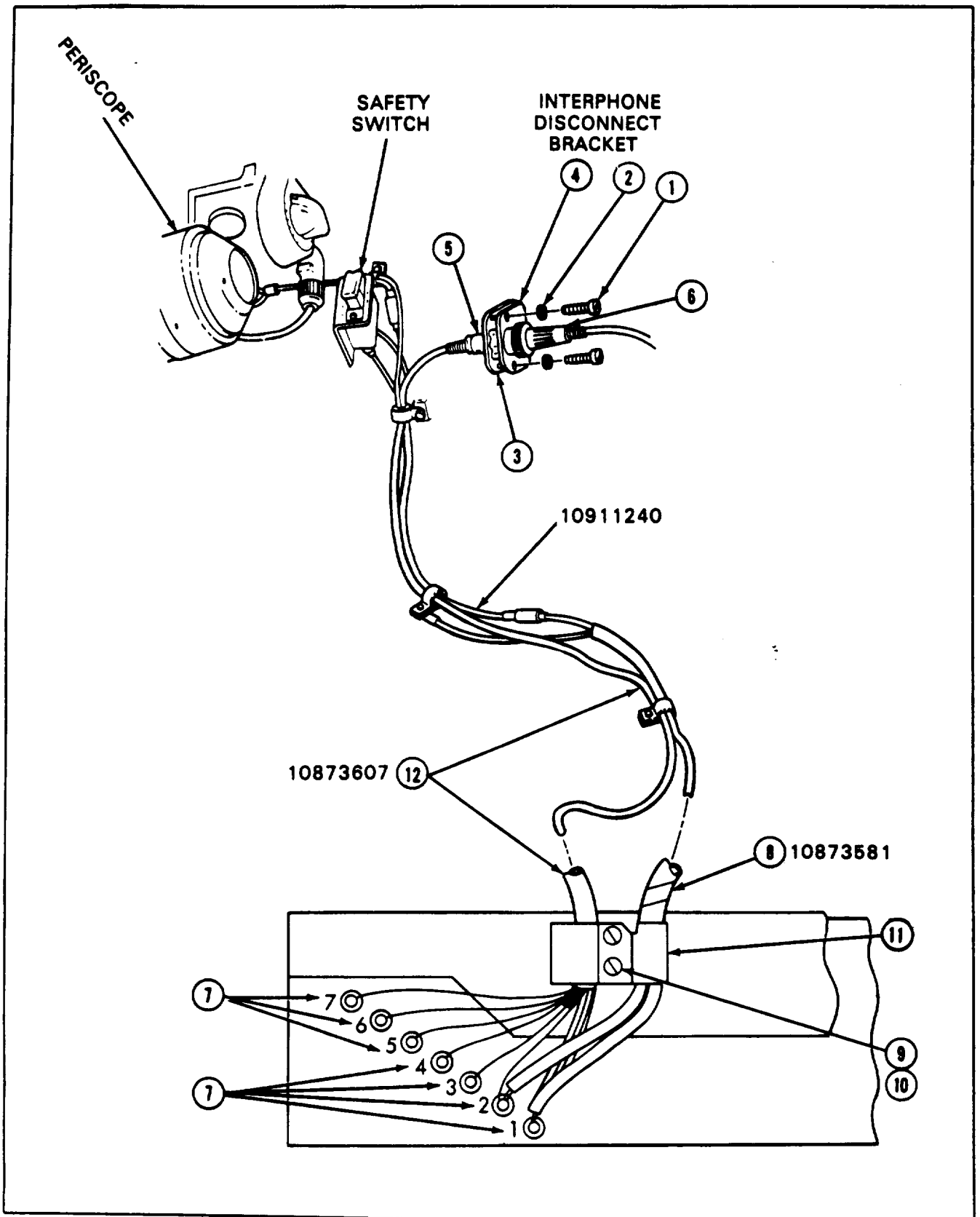
EQUIPMENT LOCATION INFORMATION

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Commander's Periscope	FO-2	16

EQUIPMENT CONDITION: Driver's master control panel **MASTER BATTERY** switch set to OFF

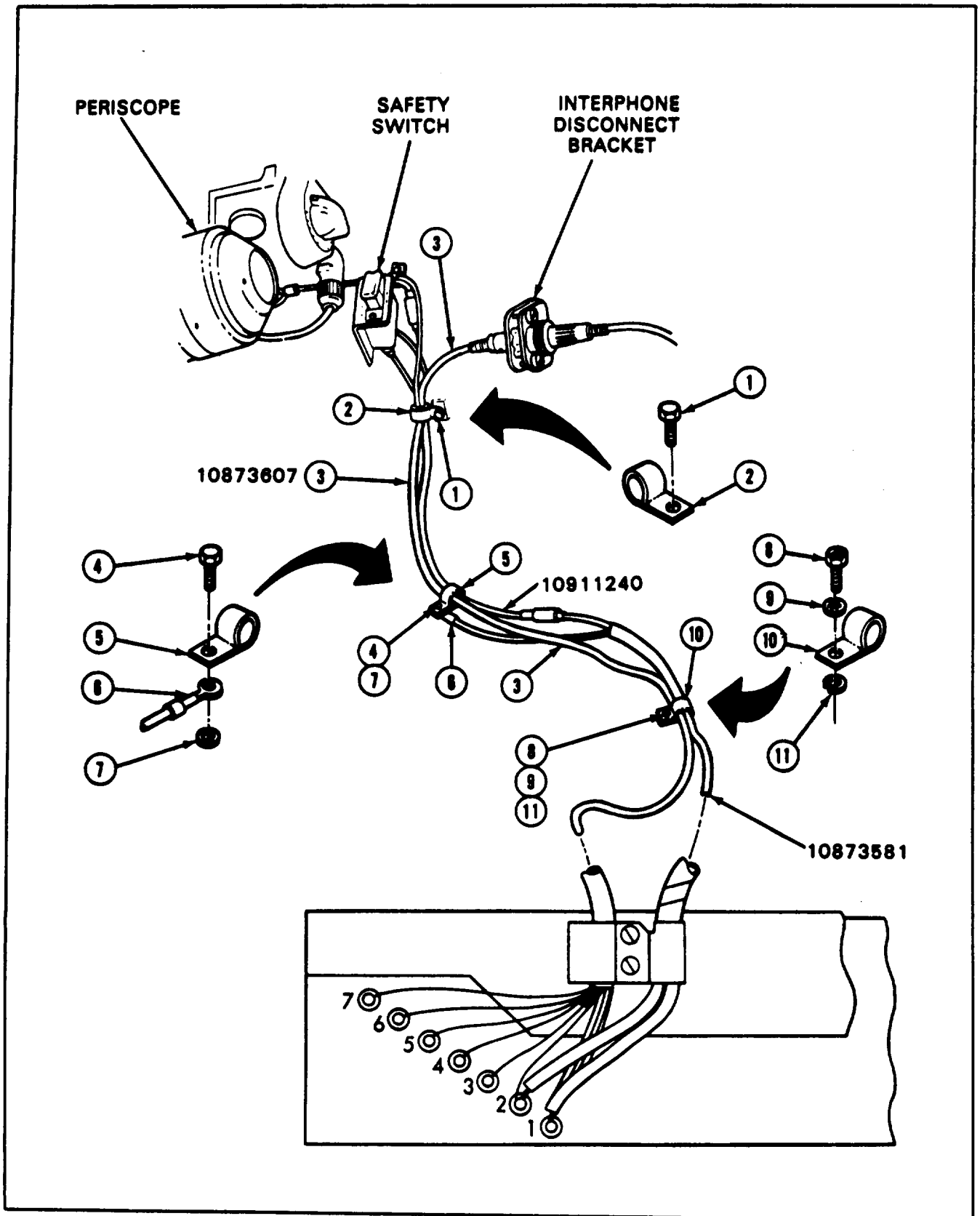
8-15. WIRING HARNESS (10873607) INSTALLATION PROCEDURE (EARLY MODEL) (CONT)

FRAME 1	
STEP	PROCEDURE
1.	Using handS, remove two screws (1) and two lockwasher (2) that attach plate (3) to interphone disconnect bracket (4).
2.	Put harness connector (5) in hole in interphone disconnect bracket (4).
3.	Put plate (3) over harness connector (5).
4.	Using screwdriver, attach plate (3) to interphone disconnect bracket (4) with two screws (1) and two lockwasher (2).
5.	Connect communication cable connector (6) to harness connector (5) (JPG).
<div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">CAUTION</div> <p>Cable connectors must be connected to terminals which match circuit numbers on metal tabs attached to wires near connectors. Wrong connections will damage equipment.</p>	
6.	Match tabs on ten wires (7) with seven terminal numbers.
7.	Using soldering iron, colder ten wires (7) and two wires from power harness (8) to seven terminals (JPG).
8.	Using acrowdriver, remove two screws (9) and two lockwashers (10) that attach clamp (11) to terminal board.
9.	Put harness (12) under clamp (11).
10.	Using screwdriver, attach clamp (11) to terminal board with two screws (9) and two lockwashers (10).
GO TO FRAME 2	



8-16. WIRING HARNESS (10873607) INSTALLATION PROCEDURE (EARLY MODEL) (CONT)

FRAME 2	
STEP	PROCEDURE
	<div style="border: 1px solid black; padding: 2px; display: inline-block;">CAUTION</div> <p>Make sure cables are not pinched under clamps or straps. Make sure cables are not kinked at cable bends. Pinching or kinking will damage cable.</p>
1.	Using hands, remove screw (1) and clamp (2).
2.	Put harness (3) in clamp (2).
3.	Using wrench, attach clamp (2) to equipment with screw (1).
4.	Using hands, remove screw (4), clamp (5), ground terminal (6), and lockwasher (7).
5.	Put harness (3) in clamp (5).
6.	Using wrench, attach clamp (5), ground terminal (6), and lockwasher (7) to equipment with screw (4).
7.	Using hands, remove screw (8), lockwasher (9), clamp (10), and lockwasher (11).
8.	Put harness (3) in clamp (10).
9.	Using screwdriver, attach clamp (10) and lockwasher (11) to equipment with screw (8) and lockwasher (9).
	<p>NOTE</p> <p>Follow-on Maintenance Action Required:</p> <p>install cupola backrest pad (TM 20-2-3).</p>
	END OF TASK



8-16. BRANCHED WIRING HARNESS (10911240) REMOVAL PROCEDURE (EARLY MODEL)

TOOLS: 7/16 in. combination wrench

PERSONNEL: One

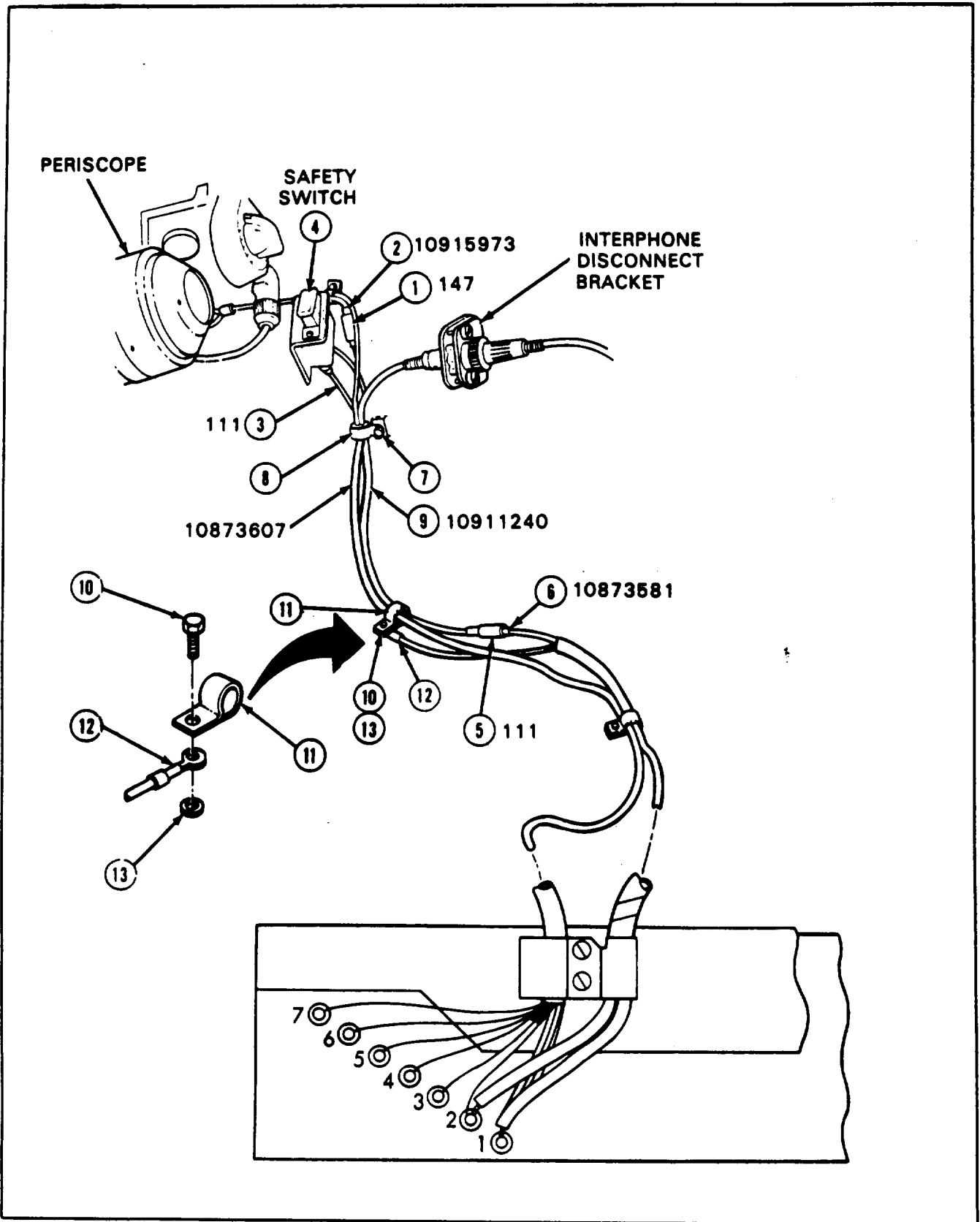
REFERENCES: JPG for procedure to disconnect electrical connectors

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Commander's Periscope	FO-2	16

EQUIPMENT CONDITION: Driver's master control panel **MASTER BATTERY** switch set to **OFF**

FRAME 1	
STEP	PROCEDURE
1.	Disconnect electrical connector (circuit number 147) (1) from harness (0915973) connector (2) (JPG).
2.	Disconnect electrical connector (circuit number 111) (3) from safety switch (4) (JPG).
3.	Disconnect electrical connector (circuit number 111) (5) from harness (10873581) connector (6) (JPG)
4.	Using wrench, remove screw (7) that attaches clamp (8) to equipment.
5.	Remove (10911240) harness (9) from clamp (8).
6.	Using hands, put back screw (7) and clamp (8).
7.	Using wrench, remove screw (10) that attaches clamp (11), ground terminal (12), and lockwasher (13) to equipment.
8.	Remove (10911240) harness (9) from clamp (11).
9.	Using hands, put back screw (10), clamp (11), ground terminal (12), and lockwasher (13).
10.	Remove (10911240) harness (9) from vehicle.
	END OF TASK



8-17. BRANCHED WIRING HARNESS (10911240) INSTALLATION PROCEDURE (EARLY MODEL)

TOOLS: 7/16 in. combination wrench

PERSONNEL One

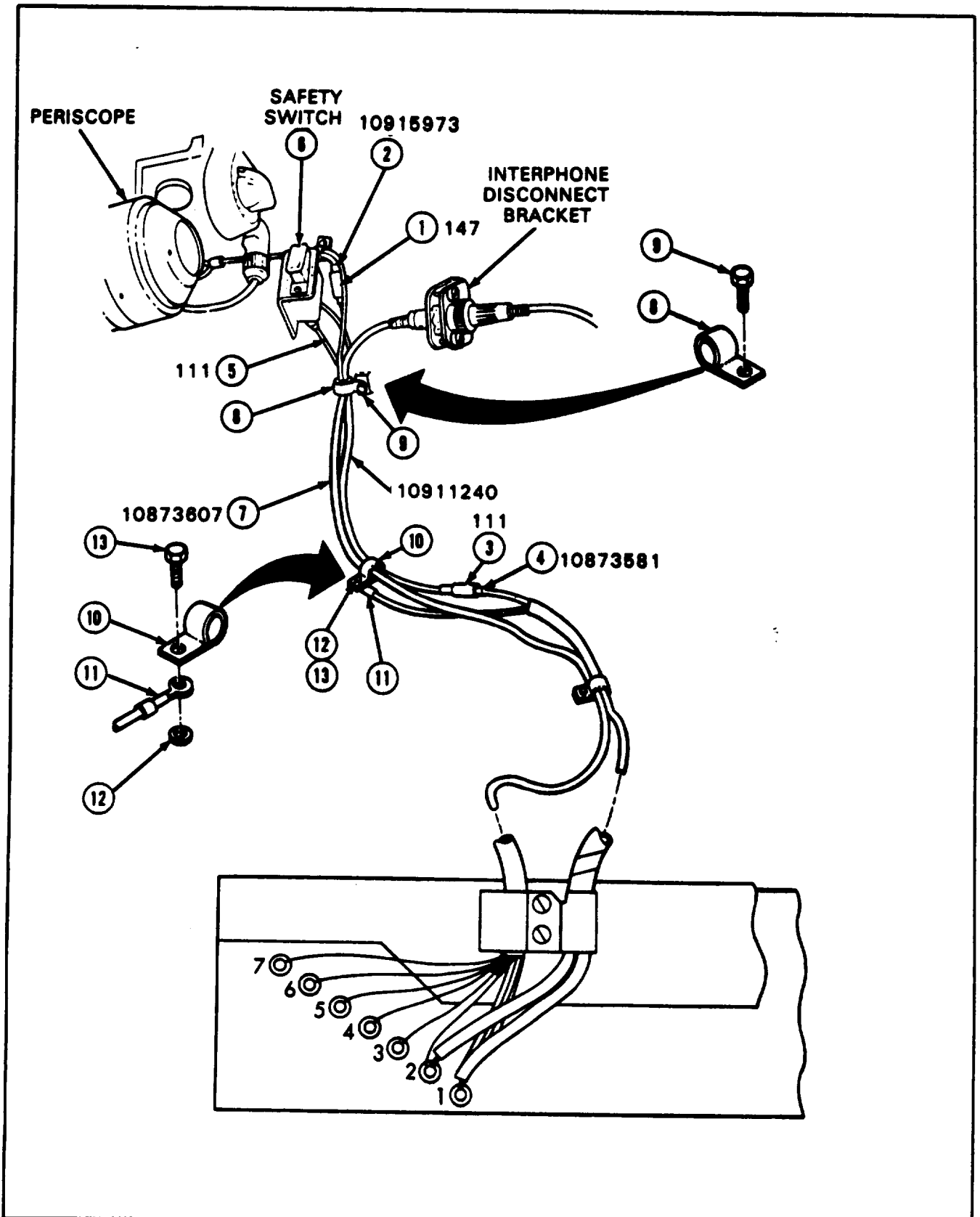
REFERENCES: JPG for procedure to connect electrical connectors

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Commander's Periscope	FO-2	16

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF

FRAME 1	
STEP	PROCEDURE
	<div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">CAUTION</div> <p>Cable connectors must be connected to receptacles which match circuit numbers on metal tabs attached to wires near connectors. Wrong connections will damage equipment.</p>
1.	Connect electrical connector (circuit number 147) (1) to harness (10915973) connector (2) (JPG).
2.	Connect electrical connector (circuit number 111) (3) to harness (10873581) connector (4) (JPG).
3.	Connect electrical connector (circuit number 111) (5) to safety switch (6) (JPG).
	<div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">CAUTION</div> <p>Make sure cables are not pinched under clamps or straps. Make sure cables are not kinked at cable bends. Pinching or kinking will damage cable.</p>
4.	Put wiring harness (7) in clamp (8).
5.	Using wrench, attach clamp (8) to equipment with screw (9).
6.	Put wiring harness (7) in clamp (10).
7.	Using wrench, attach clamp (10), ground terminal (11), and lockwasher (12) to equipment with screw (13).
	END OF TASK



8-18. WIRING HARNESS (10873581) REMOVAL PROCEDURE (EARLY MODEL)

TOOLS: Soldering iron
 7/16 in. combination wrench
 1/4 in. flat-tip screwdriver

PERSONNEL: One

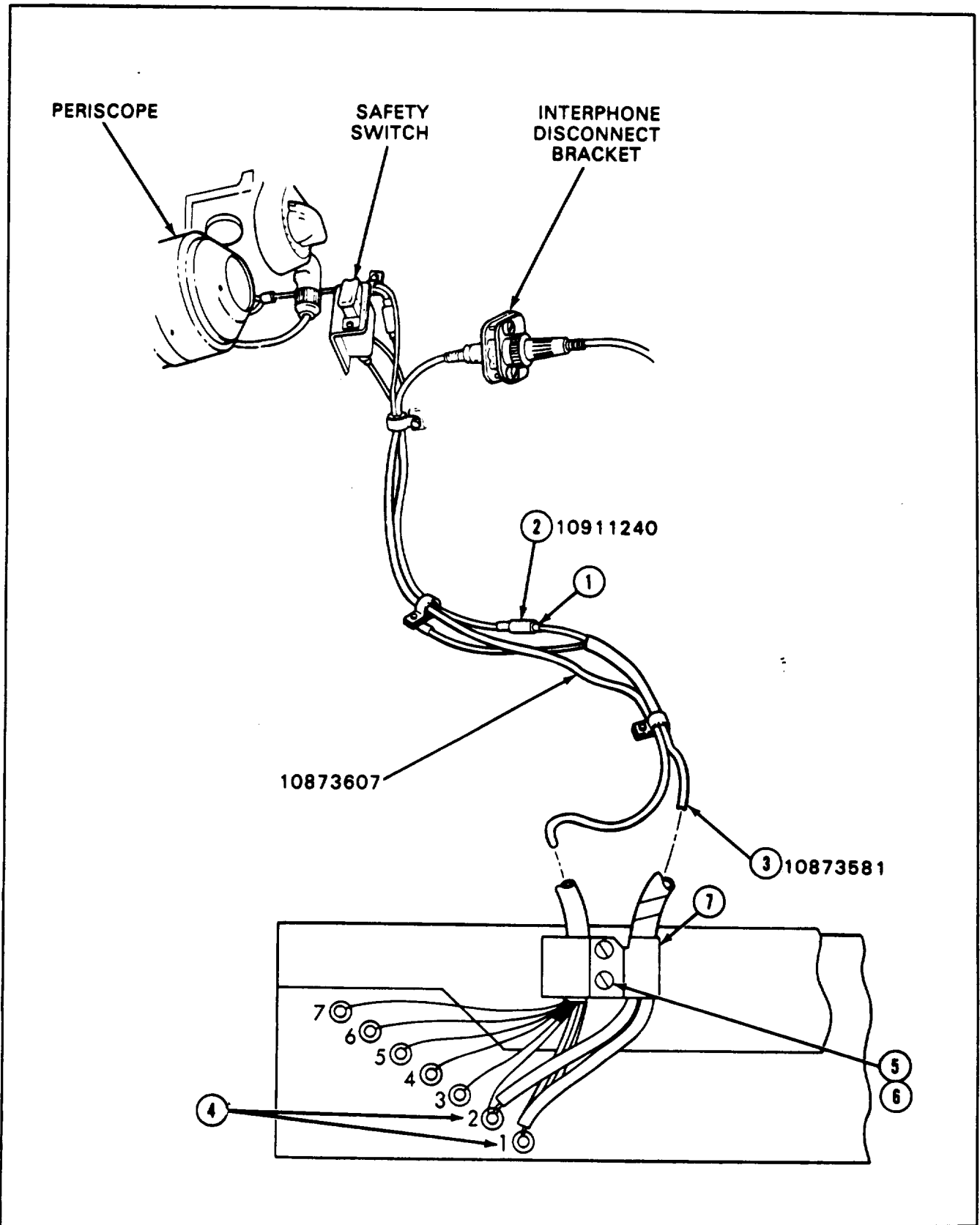
REFERENCES: JPG for procedures to:
 Use soldering iron
 Disconnect electrical connectors
 TM 9-2350-222-20-2-3 for procedure to remove cupola backrest pad

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Commander's Periscope	FO-2	16

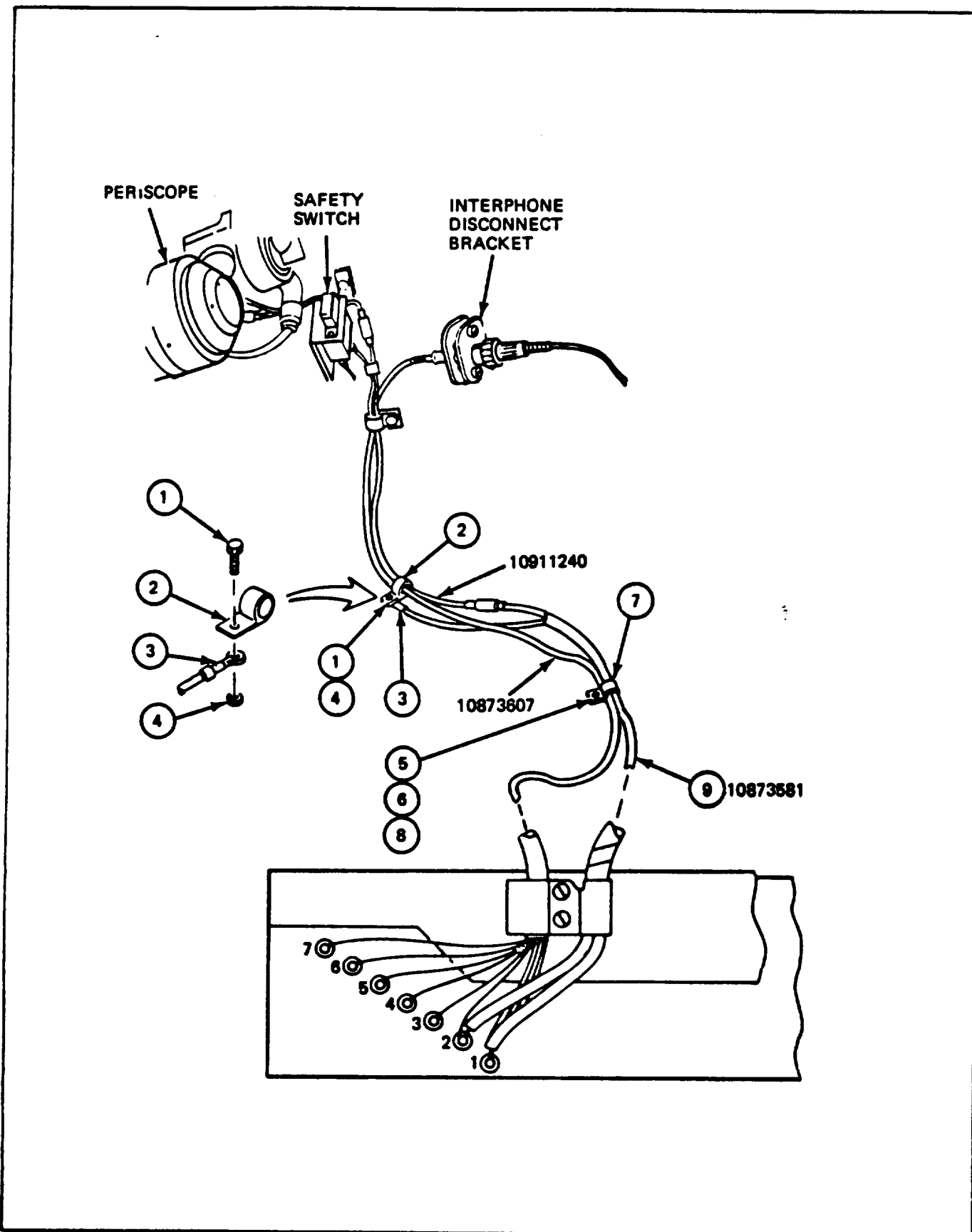
EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
 Cupola backrest pad removed (TM 20-2-3)

FRAME 1	
STEP	PROCEDURE
1.	Disconnect connector (circuit number 111) (1) from harness (10911240) connector (2) (JPG)
2.	Using soldering iron, unsolder two leads in harness (3) from terminals numbers 1 and 2 (4) on terminal board (JPG).
3.	Using screwdriver, remove two screws (5) and two lockwashers (6) that attach clamp (7) to terminal board.
4.	Remove harness (3) from under clamp (7).
5.	Using hands, put back two screws (5), two lockwashers (6), and clamp (7).
GO TO FRAME 2	



8-18. WIRING HARNESS (10873581) REMOVAL PROCEDURE (EARLY MODEL) (CONT)

FRAME 2	
STEP	PROCEDURE
1.	Using wrench, remove screw (1) that attaches clamp (2), ground terminal (3), and lockwasher (4) to equipment.
2.	Separate cupola power ground terminal (3) from equipment.
3.	Using hands, put back screw (1), clamp (2), and lockwasher (4).
4.	Using screwdriver, remove screw (5) and lockwasher (6) that attach clamp (7) and lockwasher (8) to equipment.
5.	Remove harness (9) from clamp (7).
6.	Using hands, put back screw (5), lockwasher (6), clamp (7), and lockwasher (8).
7.	Remove harness (9) from vehicle.
	END OF TASK



8-19. WIRING HARNESS (10873681) INSTALLATION PROCEDURE (EARLY MODEL)

TOOL: Soldering iron
 7/16 in. combination wrench
 1/4 in. flat-tip screwdriver

SUPPLIES: Solder (item 31, App. A)

PERSONNEL One

REFERENCES JPG for procedure to:
 Use soldering iron
 Connect electrical connectors
 TM 9-2350-222-20-2-3 for procedure to install cupola backrest pad

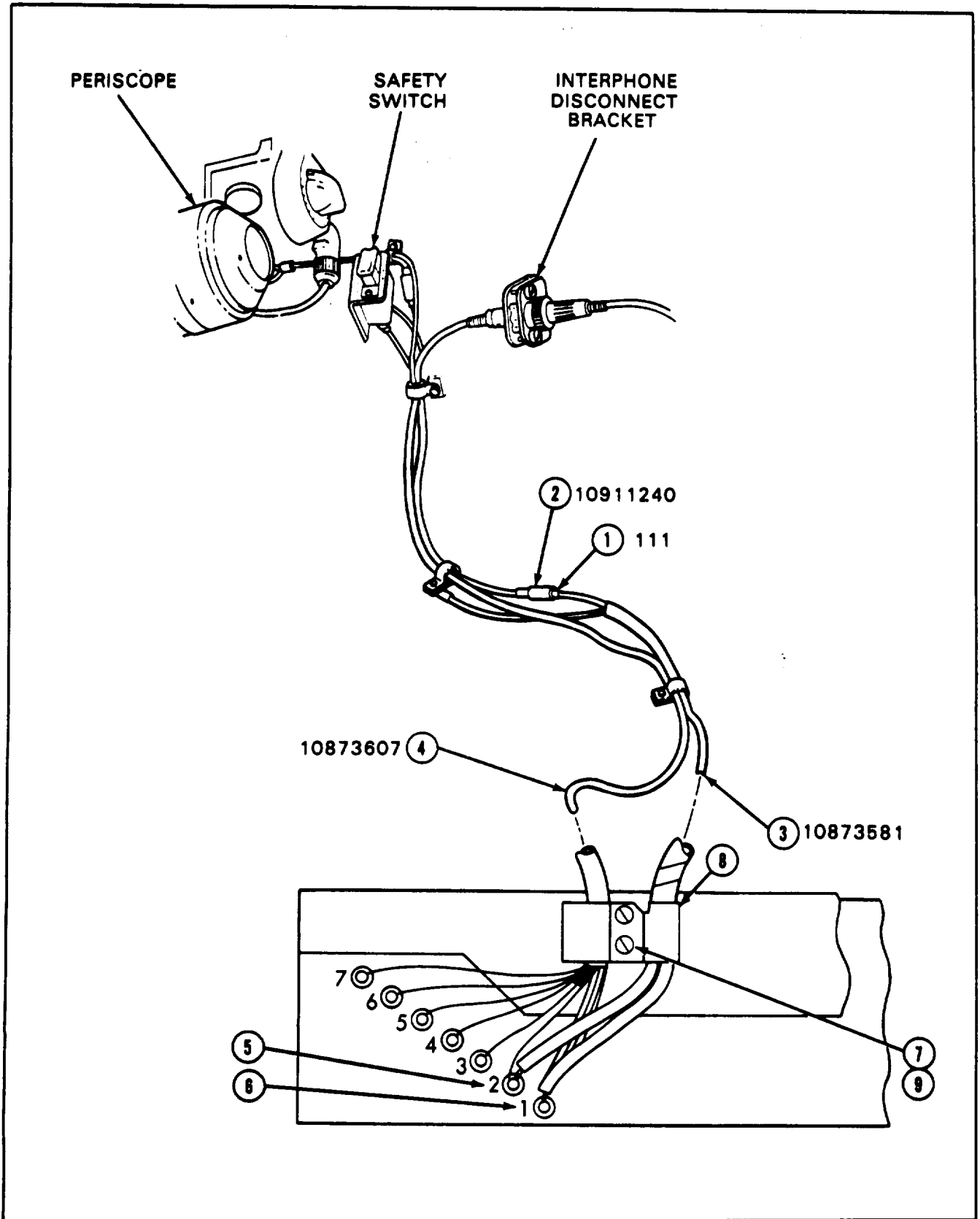
EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Commander's Periscope	FO-2	16

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF

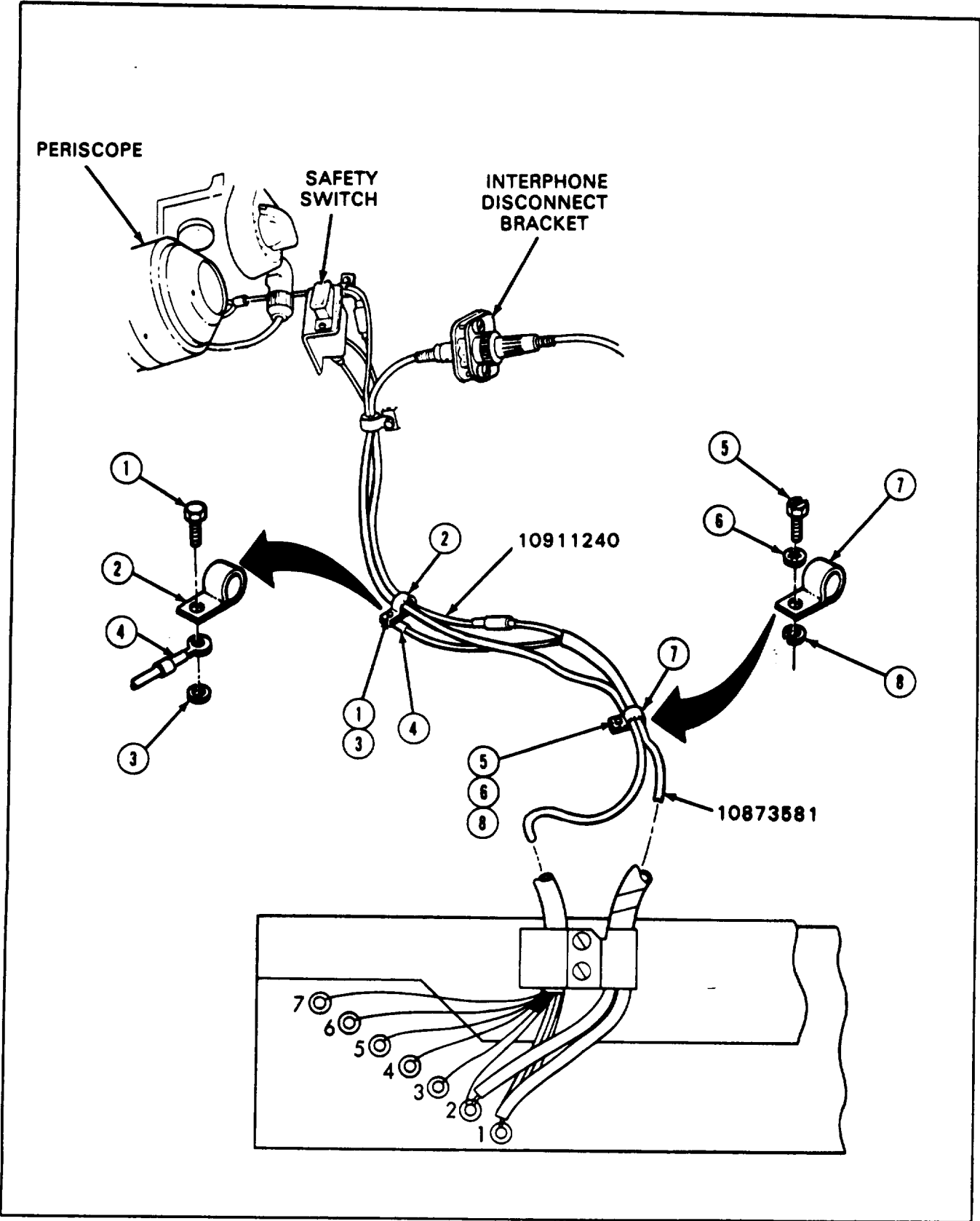
8-19. WIRING HARNESS (10873681) INSTALLATION PROCEDURE (EARLY MODEL) (CONT)

FRAME 1	
STEP	PROCEDURE
	<div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">CAUTION</div> <p style="text-align: center;">Cable connectors must be connected to receptacles which match circuit numbers on metal tabs attached to wires near connectors. Wrong connections will damage equipment.</p>
1.	Connect connector (circuit number 111) (1) to harness 10911240) connector (2) (JPG).
2.	Using soldering iron, solder wire (number 2) in harness (3) and wire (number 2) in harness (4) t.o terminal (number 2) (5) on terminal board (JPG).
3.	Using soldering iron, solder wire (number 1) in harness (3) and four wires (number 1) in harness (4) to terminal (number 1) (6) on terminal board (JPG).
	<div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">CAUTION</div> <p style="text-align: center;">Make sure cables are not pinched under clamps or straps. Make sure cables are not kinked at cable bends. Pinching or kinking will damage cable.</p>
4.	Using hands, remove two screws (7), clamp (8), and two lockwashers (9) from terminal board.
5.	Put harness (3) under clamp (8).
6.	Using screwdriver, attach clamp (8) to terminal board with two screws (7) and two lockwashers (9).
	GO TO FRAME 2



8-19. WIRING HARNESS (10873681] INSTALLATION PROCEDURE **(EARLY MODEL) (CONT)**

FRAME 2	
STEP	PROCEDURE
1.	Using hands, remove screw (1), clamp (2), and lockwasher (3).
2.	Using wrench, attach clamp (2), ground terminal (4), and lockwasher (3) to equipment with screw (1).
3.	Using hands, remove screw (5), lockwasher (6), clamp (7), and lockwasher (8).
4.	Put harness (9) in clamp (7).
5.	Using screwdriver, attach clamp (7) and lockwasher (8) to equipment with screw (5) and lockwasher (6).
	NOTE
	Follow-on Maintenance Action Required:
	Install cupola backrest pad (TM 20-2-3).
	END OF TASK



8-20. WIRING HARNESS (10915973) REMOVAL PROCEDURE (EARLY MODEL)

TOOLS: 7/16 in, combination wrench

PERSONNEL: One

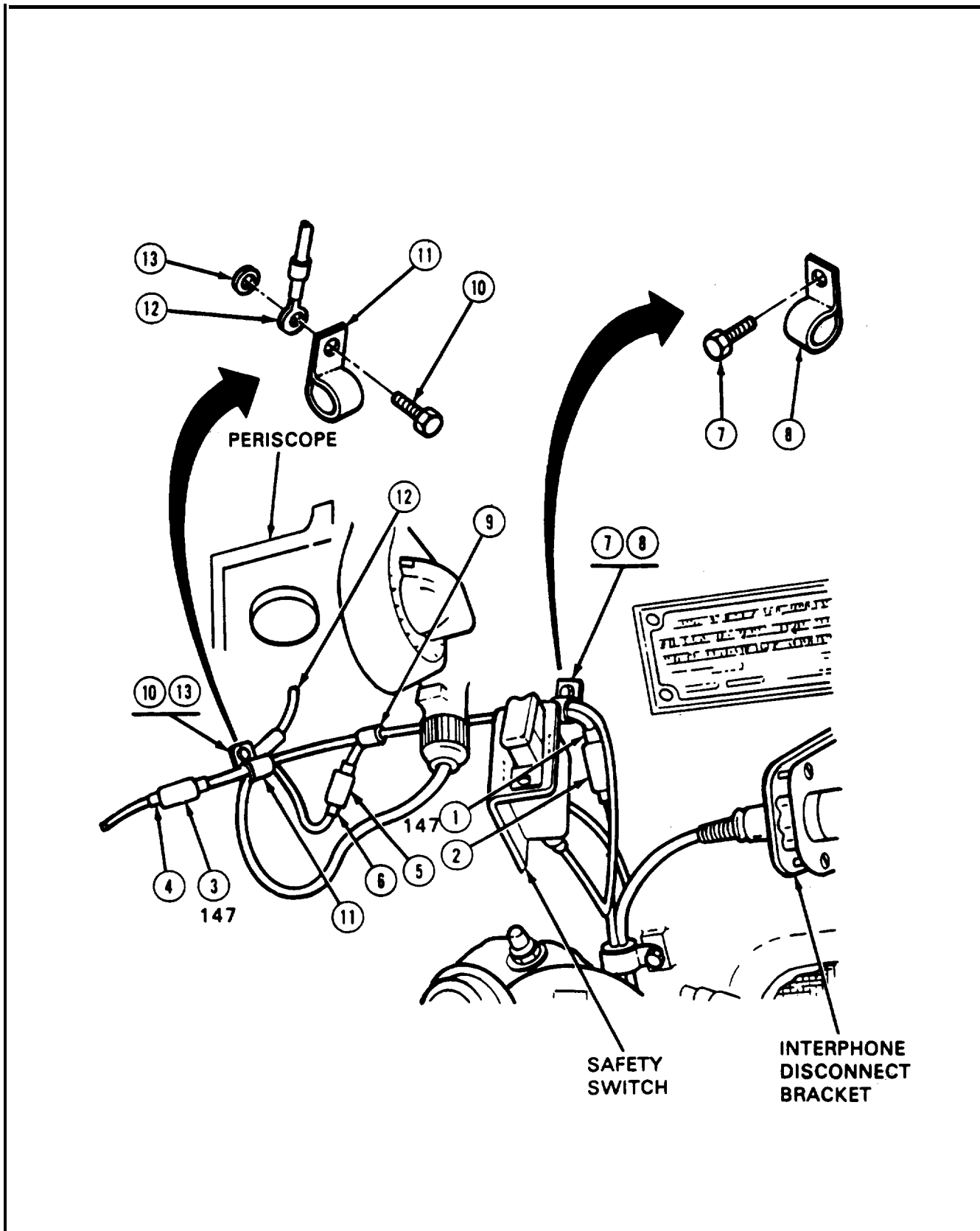
REFERENCES: JPG for procedure to disconnect electrical connectors

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Commander's Periscope	FO-2	16

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF

FRAME 1	
STEP	PROCEDURE
1.	Disconnect electrical connector (circuit number 147) (1) from harness (10811240) connector (2) (JPG).
2.	Disconnect electrical connector (circuit number 147) (3) from lead assembly (11599179) connector (4) (JPG).
3.	Disconnect electrical connector (5) from periscope control light source connector (6) (JPG).
4.	Using wrench, remove screw (7) that attaches clamp (8) to equipment.
5.	Remove wiring harness (9) from clamp (8).
6.	Using hands, put back screw (7) and clamp (8).
7.	Using wrench, remove screw (10) that attaches clamp (11), periscope ground terminal (12), and lockwasher (13) to equipment.
8.	Remove wiring harness (9) from clamp (11).
9.	Using hands, put back screw (10), clamp (11), periscope ground terminal (12), and lockwasher (13).
10.	Remove wiring harness (9) from equipment.
	END OF TASK



8-21. WIRING HARNESS (10916973) INSTALLATION PROCEDURE (EARLY MODEL)

TOOLS: 7/16 in. combination wrench

PERSONNEL: One

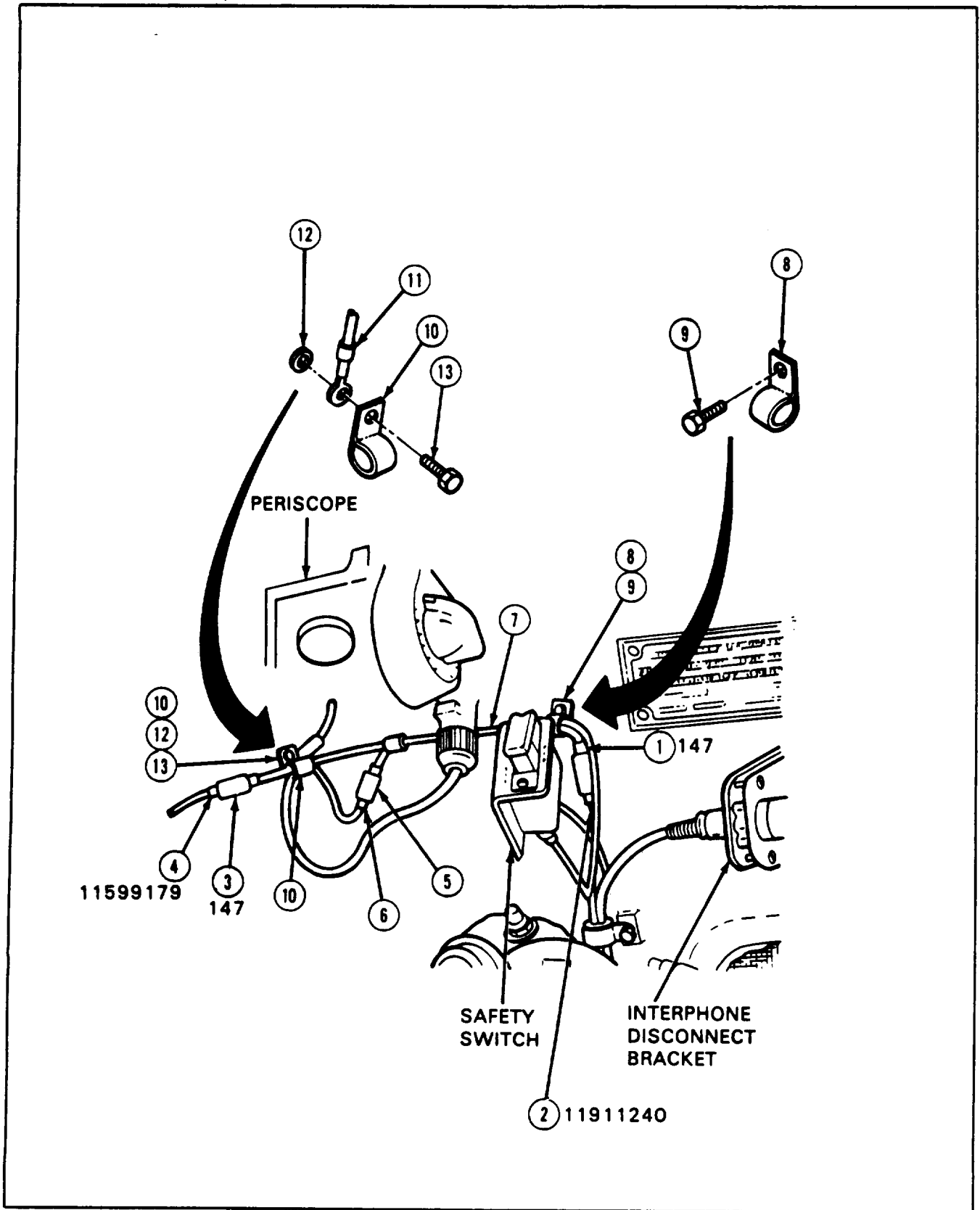
REFERENCES: JPG for procedure to connect electrical connectors

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Commander's Periscope	FO-2	16

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF

FRAME 1	
STEP	PROCEDURE
	<div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">CAUTION</div> <p>Cable connectors must be connected to receptacles which match circuit numbers on metal tabs attached to wires near connectors. Wrong connections will damage equipment.</p>
1.	Connect electrical connector (circuit number 147) (1) to harness (10911240) connector (2) (JPG).
2.	Connect electrical connector (circuit number 147) (3) to lead assembly (11599179) connector (4) (JPG).
3.	Connect electrical connector (5) to periscope control light source connector (6) (JPG).
	<div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">CAUTION</div> <p>Make sure cables are not pinched under clamps or straps. Make sure cables are not kinked at cable bands. Pinching or kinking will damage cable.</p>
4.	Put wiring harness (7) in clamp (8).
5.	Using wrench, attach clamp (8) to equipment with screw (9).
6.	Put wiring harness (7) in clamp (10).
7.	Using wrench, attach clamp (10), periscope ground terminal (11), and lockwasher (12) to equipment with screw (13).
	END OF TASK



8-22. ELECTRICAL LEAD (10884158) REMOVAL PROCEDURE (EARLY MODEL)

TOOLS: 7/16 in. combination wrench

SUPPLIES: Masking tape (1 in. wide) (item 36, App, A)
Pen

PERSONNEL: One

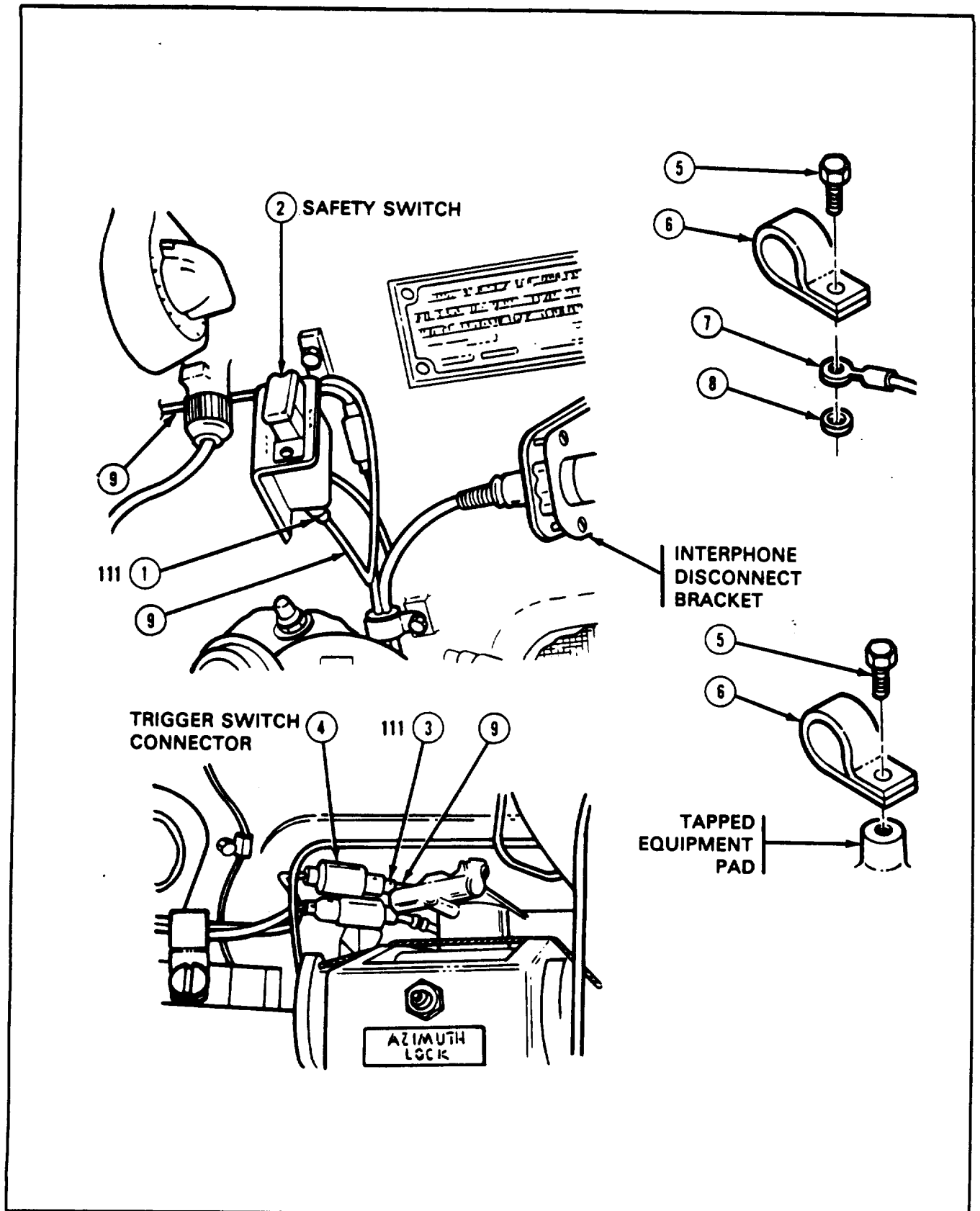
REFERENCES: JPG for procedures to:
Disconnect electrical connectors
Tag parts
TM 9-2350-222-10 for procedure to remove commander's periscope

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Cupola Gun Safety Switch and Guard	FO-2	15
Cupola Azimuth Lock	FO-2	19

EQUIPMENT CONDITION: Driver's master control panel **MASTER BATTERY** switch set to **OFF**
Commander's periscope removed (TM -10)

FRAME 1	
STEP	PROCEDURE
1.	Disconnect connector (circuit number 111) (1) from safety switch (2) (JPG).
2.	Disconnect connector (circuit number 111) (3) from trigger switch connector (4) (JPG).
	NOTE
	Find ten cable clamps by following route of electrical load.
	One cable clamp has periscope ground wire terminal and lockwasher under it. Periscope ground wire terminal and lockwasher must be put back when this cable clamp is removed.
3.	Using wrench, remove ten screws (5) that attach ten cable clamps (6), one ground terminal (7), and one lockwasher (8) to equipment.
4.	Remove electrical lead (9) from ten cable clamps (6).
5.	Using hands, put back ten cable clamps (6), one ground terminal (7), one lockwasher (8), and ten screws (5).
6.	Using masking tape and pen, tag ten cable clamps (6) (JPG).
7.	Remove electrical lead (9) from vehicle.
	END OF TASK



8-23. ELECTRICAL LEAD (10884158) INSTALLATION PROCEDURE (EARLY MODEL)

TOOLS: 7/16 in. combination wrench

PERSONNEL: One

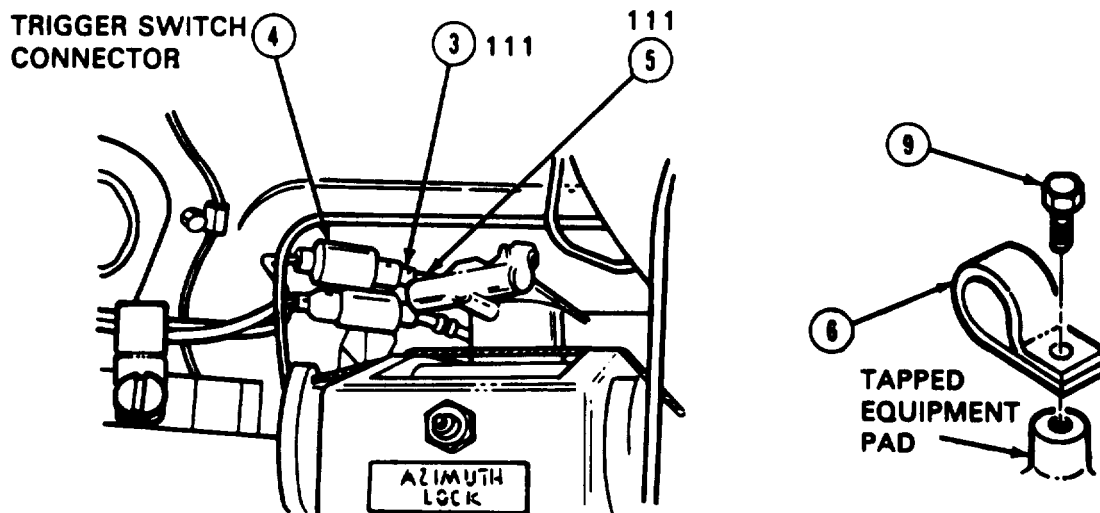
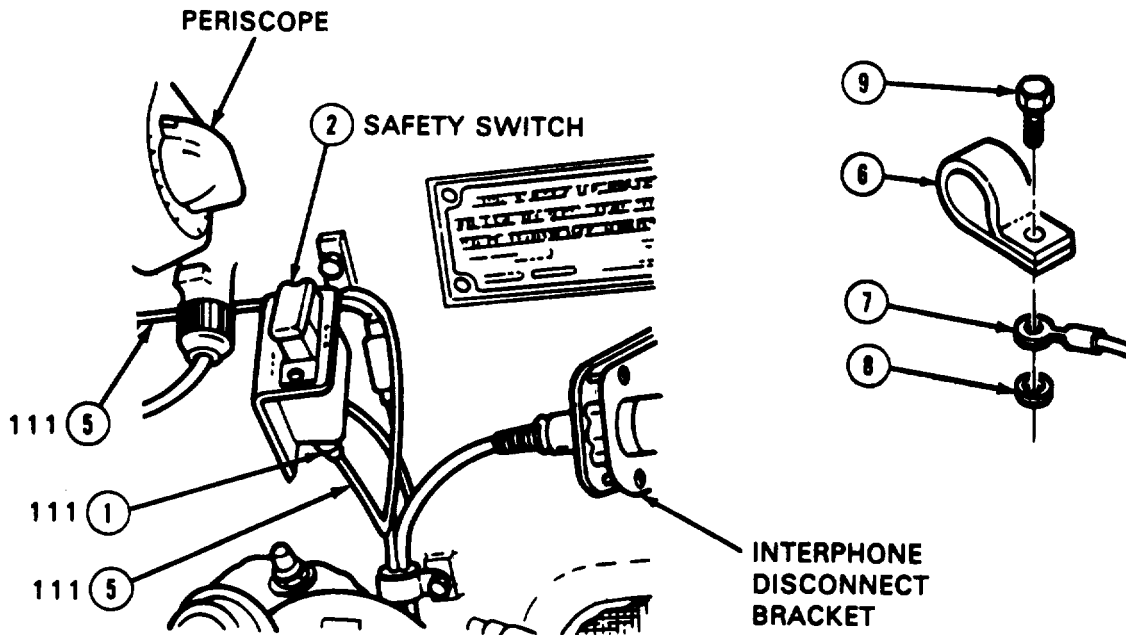
REFERENCES: JPG for procedure to connect electrical connectors

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Cupola Gun Safety Switch and Guard	PO-2	15
Cupola Azimuth Lock	FO-2	19

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF

FRAME 1	
STEP	PROCEDURE
	<p>CAUTION</p> <p>Cable connectors must be connected to receptacles which match circuit numbers on metal tabs attached to wire near connectors, Wrong connections will damage equipment.</p>
1.	Connect connector (circuit number 111) (1) to safety switch (2) (JPG).
2.	Connect connector (circuit number 111) (3) to trigger switch connector (4) (JPG).
	<p>CAUTION</p> <p>Make sure cables are not pinched under clamps or straps. Make sure cables are not kinked at cable bends. Pinching or kinking will damage cable.</p>
	<p>NOTE</p> <p>Use masking tape tags to find clamps which hold electrical lead to equipment Remove masking tape as each cable clamp is attached to equipment.</p> <p>One cable clamp has periscope ground wire terminal and lockwasher under it. Pariscope ground wire terminal and lockwasher must be put back when this cable clamp is attached.</p>
3.	Using hands, put electrical lead (5) in ten cable clamps (6).
4.	Using wrench, attach ten cable clamps (6), periscope ground terminal (7), and one lockwasher (8) to equipment with ten screws (9).
	END OF TASK



8-24. ELECTRICAL LEAD (10924501) REMOVAL PROCEDURE (EARLY MODEL)

TOOLS: 7/16 in. combination wrench

SUPPLIES: Masking tape (1 in. wide) (item 36, App. A)
Pen

PERSONNEL: One

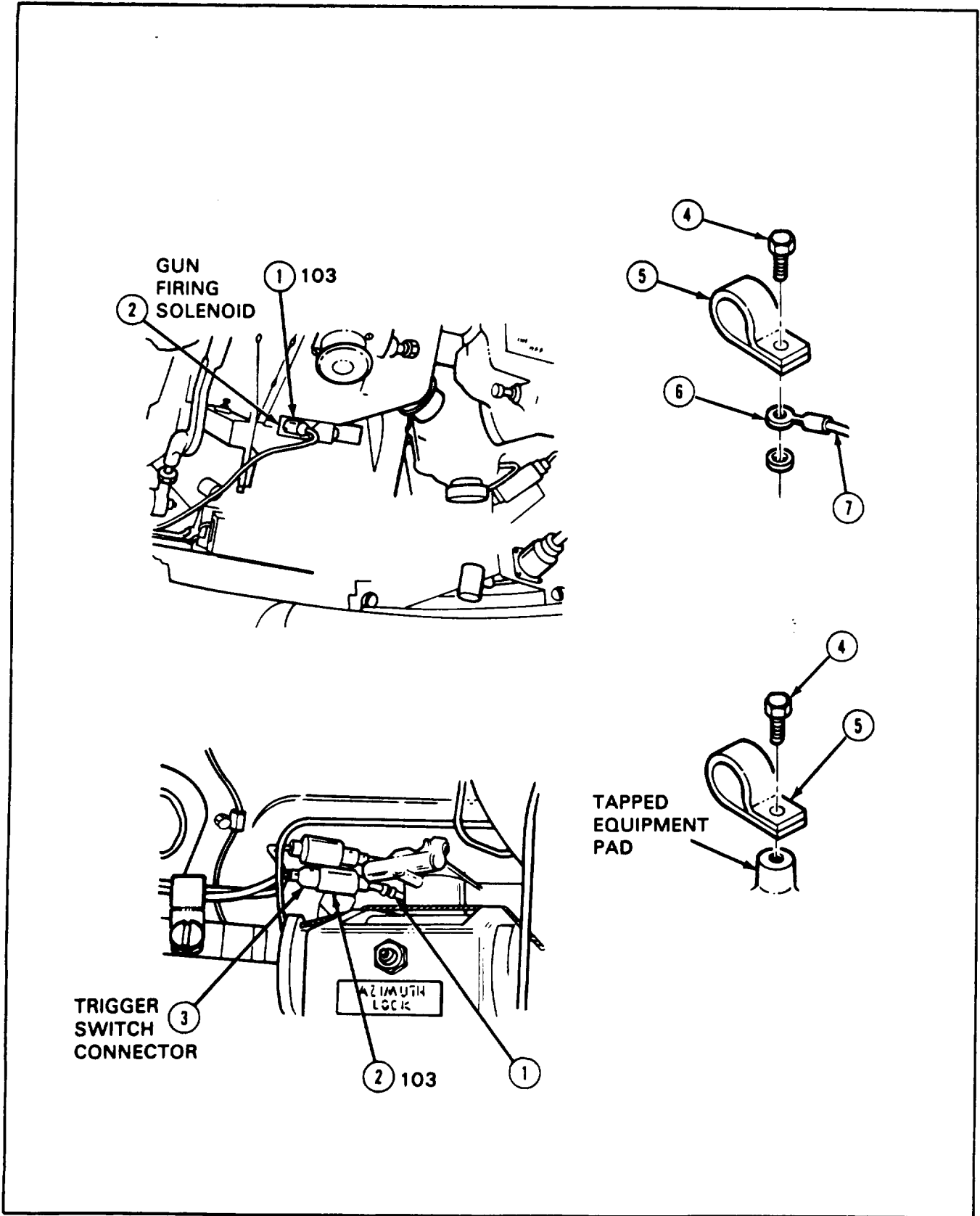
REFERENCES: JPG for procedures to:
Disconnect electrical connectors
Tag parts

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Cupola Azimuth Lock	FO-2	19

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF

FRAME 1	
STEP	PROCEDURE
1.	Locate electrical lead (circuit number 103) (1) for gun firing solenoid in machine gun cradle.
2.	Disconnect electrical connector (circuit number 103) (2) from trigger switch connector (3) (JPO).
	NOTE
	Two cable clamps each have a ground wire terminal and lockwasher under them. These two terminal connect ground strap between machine gun cradle and cupola (electrical load, para 8-26), Ground wire terminals and lockwashars must be put back with cable clamps when these two cable clamps ara removed.
	Find four cable clamps by following route of elactrical lead (1 0924601).
3.	Using wrench, remove four screws (4) that attach four cable clamps (5), two ground terminals (6), and two lockwashers (7) to equipment.
4.	Remove electrical lead (1) from four cable clamps (5).
5.	Using hands, put back four cable clamps (5), two ground terminals (6), and two lockwashers (7) with four screws (4).
6.	Using masking tape and pen, tag four cable clamps (5) (JPG).
7.	Remove electrical lead (1) from vehicle.
	END OF TASK



8-25. ELECTRICAL LEAD (10924501) INSTALLATION PROCEDURE (EARLY MODEL)

TOOLS: 7/16 in. combination wrench

PERSONNEL: One

REFERENCES JPG for procedure to connect electrical connectors

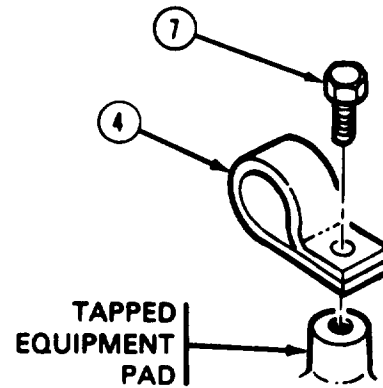
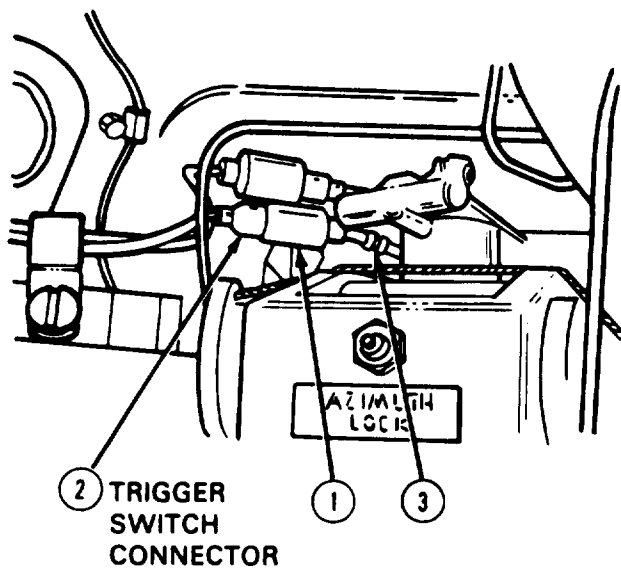
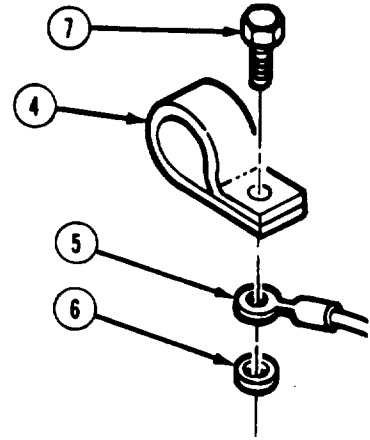
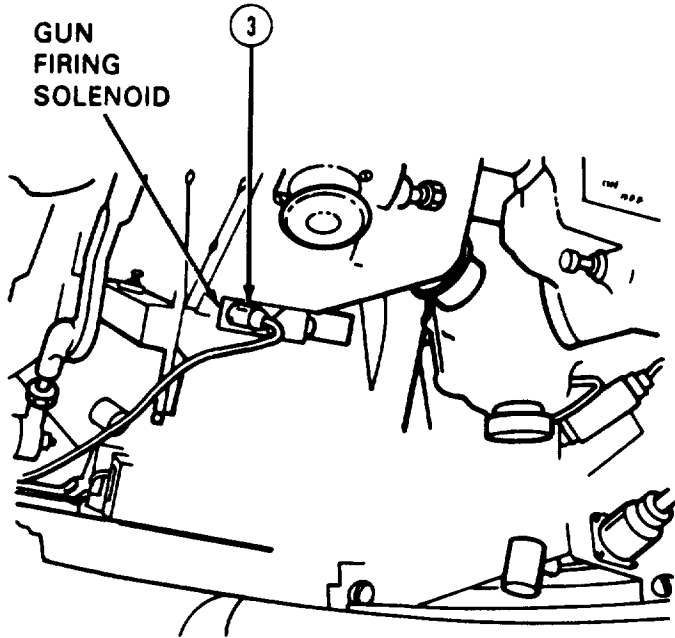
EQUIPMENT LOCATION INFORMATION:

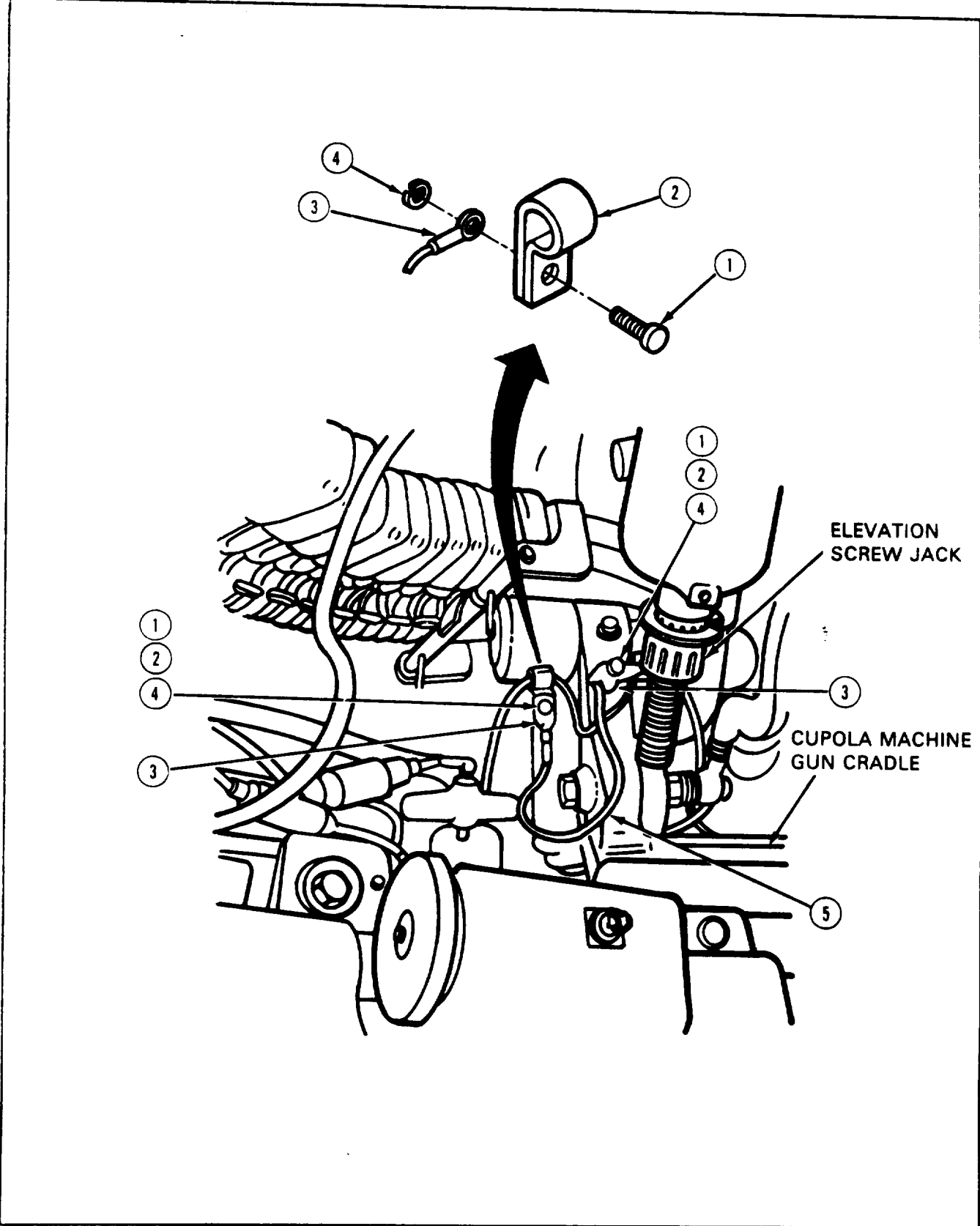
EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	PO-3	11
Cupola Azimuth Lock	PO-2	19

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF

8-25. ELECTRICAL LEAD (10924501) INSTALLATION PROCEDURE (EARLY MODEL) (CONT)

FRAME 1	
STEP	PROCEDURE
1.	<p style="text-align: center;">CAUTION</p> <p>Cable connectors must be connected to receptacles which match circuit numbers on metal tabs attached to wires near connectors. Wrong connections will damage equipment.</p> <p>Connect connector (circuit number 103) (1) to trigger switch connector (2) (JPG).</p> <p style="text-align: center;">CAUTION</p> <p>Make sure cables are not pinched under clamps or straps. Make sure cables are not kinked at cable bends. Pinching or kinking will damage cable.</p> <p style="text-align: center;">NOTE</p> <p>Use masking tape tags to find clamps which hold electrical load to equipment. Remove masking tape as each cable clamp is attached.</p> <p>Two cable clamps each have a ground wire terminal and lockwasher under thorn. These two terminals connect ground strap between machine gun cradle and cupola electrical load, para 8-27). Ground wire terminals and lockwasher must be put back with cable clamps when these two cable clamps are attached.</p>
2.	Using hands, put electrical lead (3) in four cable clamps (4).
3.	Using wrench, attach four cable clamps (4), two ground terminals (5), and two lockwashers (6) to equipment with four screws (7).
	END OF TASK





8-26. ELECTRICAL LEAD (10887499) REMOVAL PROCEDURE

TOOLS: 7/16 in. combination wrench

PERSONNEL: One

EQUIPMENT LOCATION INFORMATION

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Elevation Screw Jack	FO-2	21

EQUIPMENT CONDITION: Driver's master control panel **MASTER BATTERY** switch set to **OFF**

FRAME 1	
STEP	PROCEDURE
1.	Using wrench, remove two screws (1) that attach two clamps (2), two ground terminals (3), end two lockwashers (4) to equipment.
2.	Using hands, remove two lockwashers (4) end two ground terminals (3) from two screws (1).
3.	Put back two lockwashers (4) on two screws (1).
4.	Using hands, put back two screws (1), two clamps (2), and two lockwashers (4).
5.	Remove electrical lend (5) from vehicle.
	END OF TASK

8-27. ELECTRICAL LEAD (10887499) INSTALLATION PROCEDURE

TOOLS: 7/16 in. combination wrench

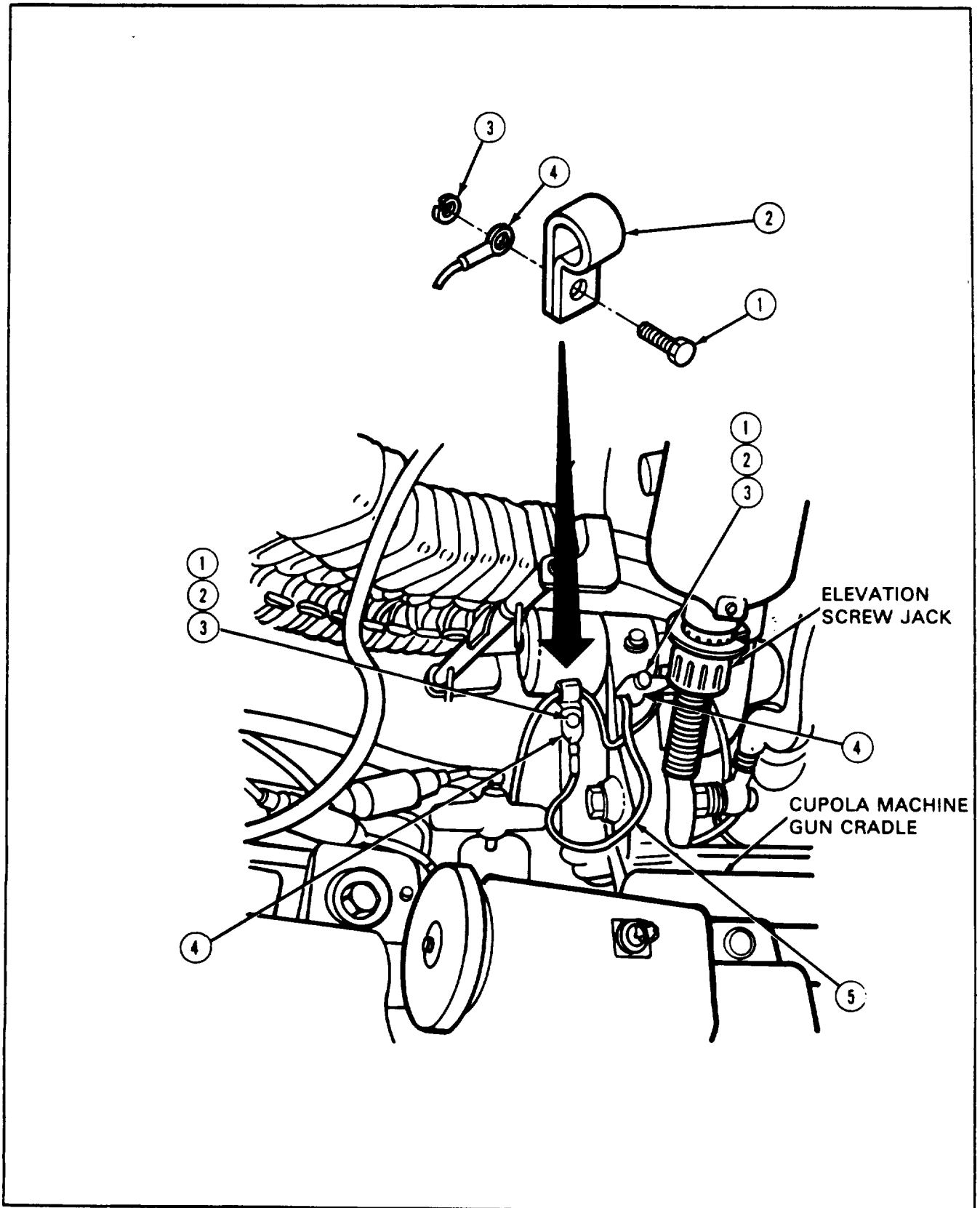
PERSONNEL: One

EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Elevation Screw Jack	FO-2	21

EQUIPMENT CONDITION: Driver's master control panel **MASTER BATTERY** switch set to **OFF**

FRAME 1	
STEP	PROCEDURE
1.	Using hands, remove two screws (1), two clamps (2), and two lockwashers (3) from equipment.
2.	Using hands, remove two lockwashers (3) from two screws (1).
3.	Using hands, put two ground terminals (4) and two lockwashers (3) on two screws (1).
4.	Using wrench, attach electrical lead (5), two clamps (2), two ground terminals (4), and two lockwashers (3) to equipment with two screws (1).
	END OF TASK



8-28. BRANCHED WIRING HARNESS (11673938) REMOVAL PROCEDURE

TOOLS: No.1 cross-tip screwdriver
 No. 3 cross-tip screwdriver
 7/16 in. socket with 1/2in. sq. drive
 6 in. extension with 1/2in. sq. drive
 Ratchet with 1/2 in, sq. drive
 Soldering iron

PERSONNEL One

REFERENCES **JPG** for procedures to:
 Disconnect electrical connectors
 Use soldering iron

EQUIPMENT LOCATION INFORMATION:

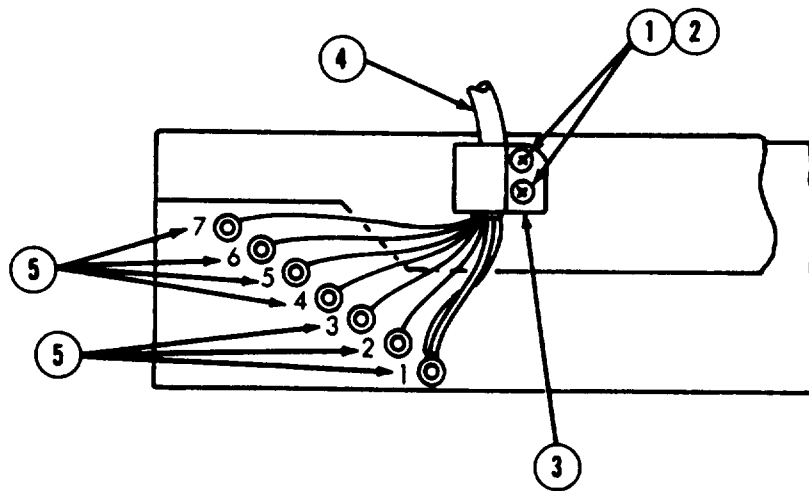
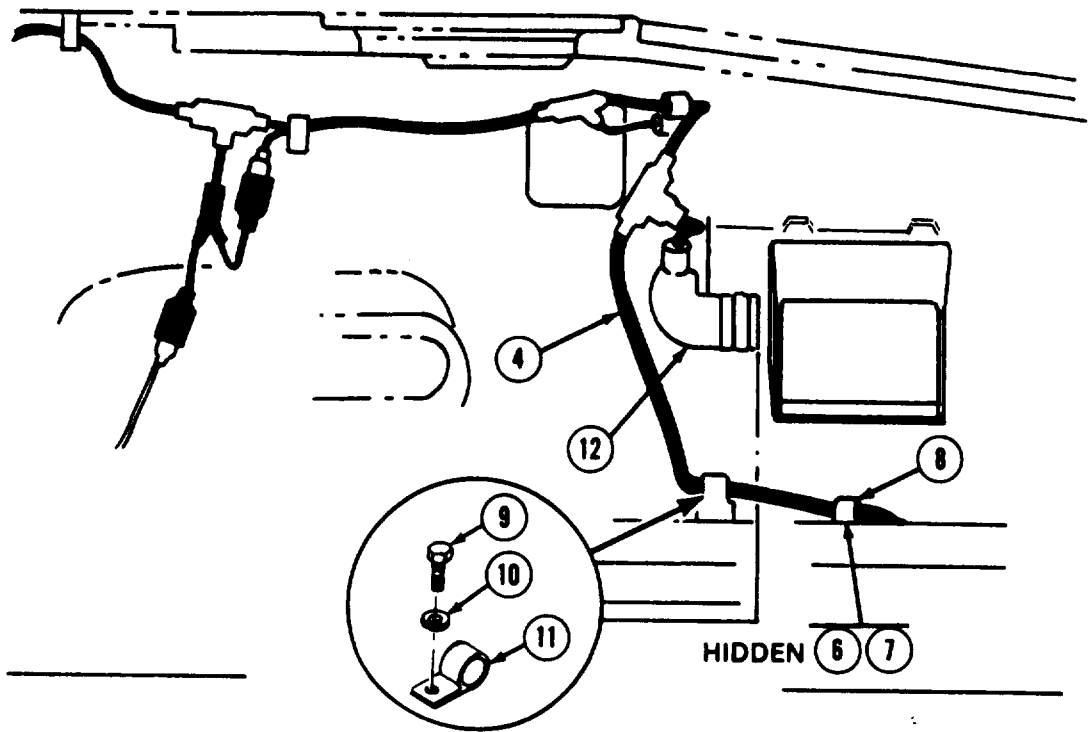
EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Commander's Control Panel		

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
 Cupola backrest pad removed (TM 20-2-3-2)

PRELIMINARY PROCEDURES Remove cupola guard (para 9-6)
 Remove M96/M36E1 periscope (T'M-10)

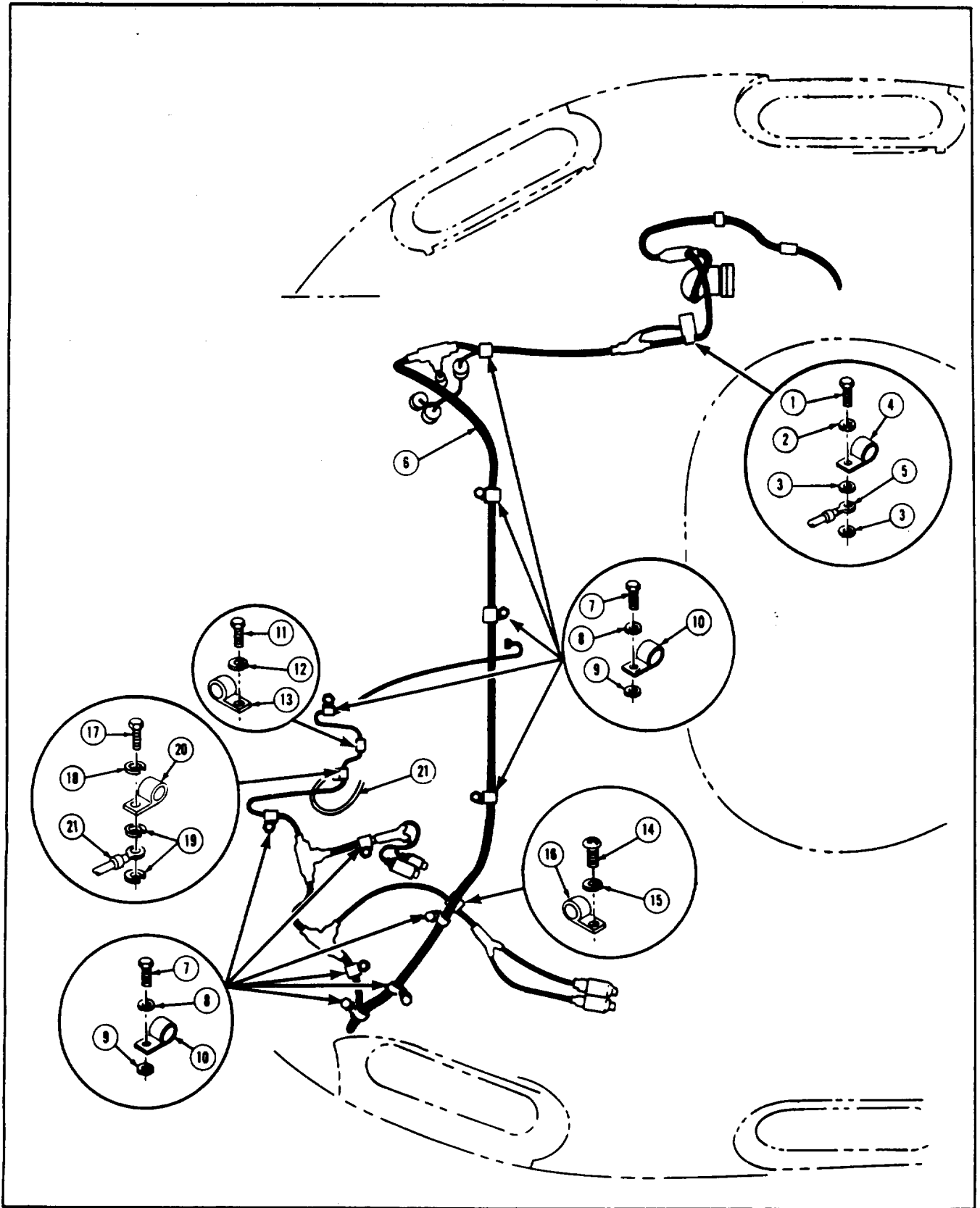
8-28. BRANCHED WIRING HARNESS (11673938) REMOVAL PROCEDURE (CONT)

FRAME 1	
STEP	PROCEDURE
1.	Using screwdriver, remove two screws (1) and two lockwashers (2) holding clamp (3) to terminal board.
2.	Remove clamp (3) harness (4).
3.	Using hands, put back two screws (1), lockwashers (2), and clamp (3).
4.	Using soldering iron, unsolder seven leads (5) in harness (4) from seven terminals (JPG).
5.	Using screwdriver, remove screw (6) and lockwasher (7) securing clamp (8).
6.	Remove clamp (8) from harness (4) and, using hands, put back screw (6), lockwasher (7), and clamp (8).
7.	Using 7/16 inch socket, remove screw (9) and lockwasher (10) securing clamp (11).
8.	Remove clamp (11) from harness (4) and, using hands, put back screw (9), lockwasher (10), and clamp (11).
9.	Disconnect harness connector (12) from control box (JPG).
	GO TO FRAME 2



8-28. BRANCHED WIRING HARNESS (11673938) REMOVAL PROCEDURE (CONT)

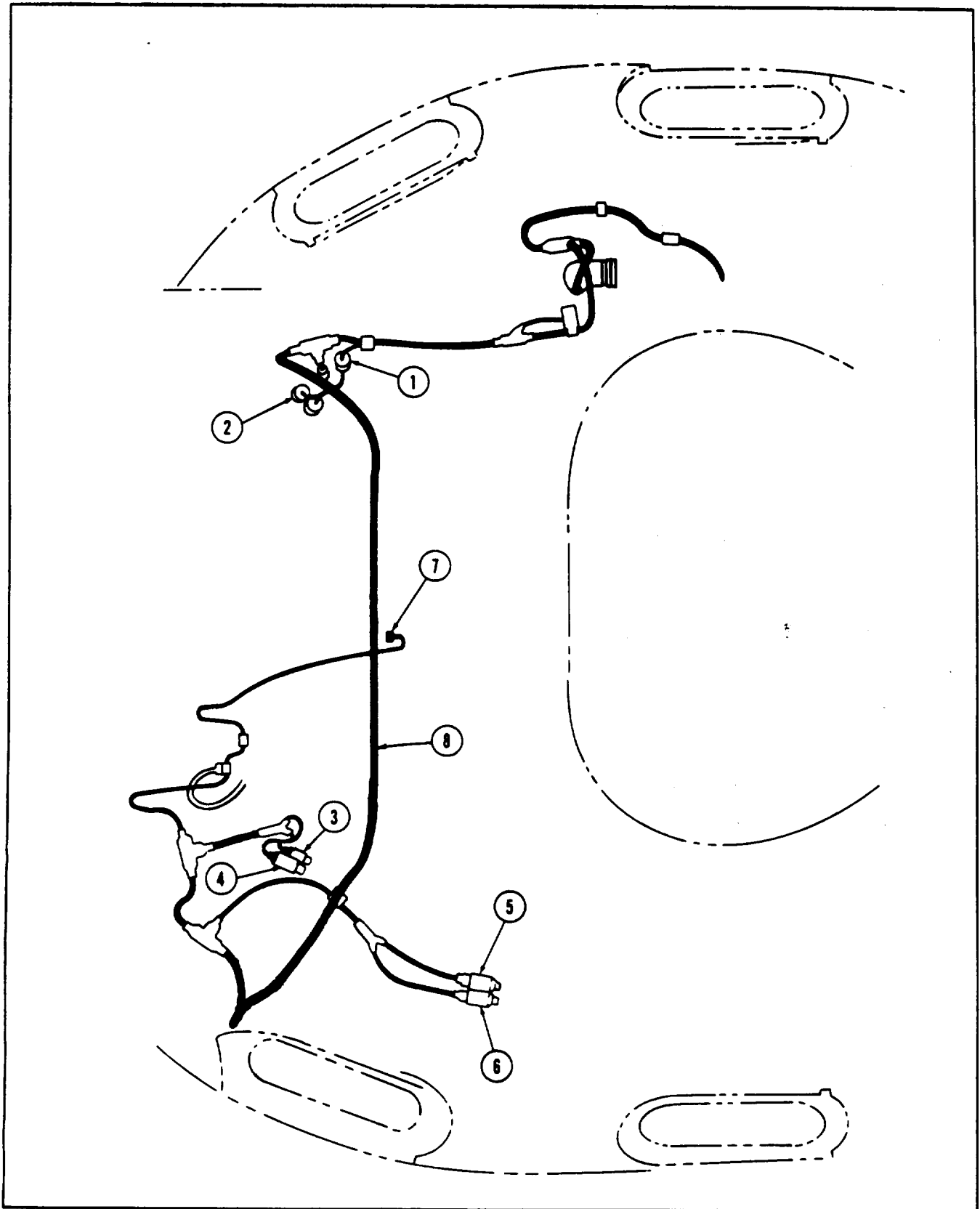
FRAME 2	
STEP	PROCEDURE
1.	Using 7/16 inch socket, extension, and ratchet, remove screw (1) and lockwashers (2 and 3) securing lamp (4) and ground lead (5).
2.	Using hands, remove clamps (4) from harness (6) and put back screw (1) and clamp (4).
3.	Using 7/16 inch socket, extension, and ratchet, remove screws (7) and lockwashers (8 and 9) securing clamps (10) (11 places).
4.	Using hands, remove clamps (10) from harness (6) and put back screws (7) and clamps (10).
5.	Using 7/16 inch socket, extension, and ratchet, remove screw (11) and lockwasher (12) securing clamp (13).
6.	Using hands, remove clamp (13) from harness (6) and put back screw (11) and clamp (13).
7.	Using socket, remove screw (14) and lockwasher (15) securing clamp (16).
8.	Using hands, remove clamp (16) from harness (6) and put back screw (14) and clamp (16).
9.	Using 7/16 inch socket, extension, and ratchet, remove screw (17) and lockwashers (18 and 19) securing clamp (20) and ground lead (21).
10.	Using hands, remove clamp (20) from harness (6). Put ground lead (21) screw (17) and clamp (20) back on cupola.
	GO TO FRAME 3



8-28. BRANCHED WIRING HARNESS (11673938) REMOVAL PROCEDURE (CONT)

FRAME 3

STEP	PROCEDURE
1.	Disconnect harness connection (1 thru 6) (JPG).
2.	Disconnect harness connector (7) from machine gun (JPG).
3.	Remove wiring harness (8) from vehicle.
END OF TASK	



8-29. BRANCHED WIRING HARNESS (11673938) INSTALLATION PROCEDURE

TOOLS: No. 1 cross-tip screwdriver
 No. 3 cross-tip screwdriver
 7/16 in. socket with 1/2 in. sq. drive
 6 in. extension with 1/2 in. sq. drive
 Ratchet with 1/2 in. sq. drive
 Soldering iron

SUPPLIES: Solder (item 31, App, A)
 Lockwashers (MS 35336-44) (14 Required)

PERSONNEL: One

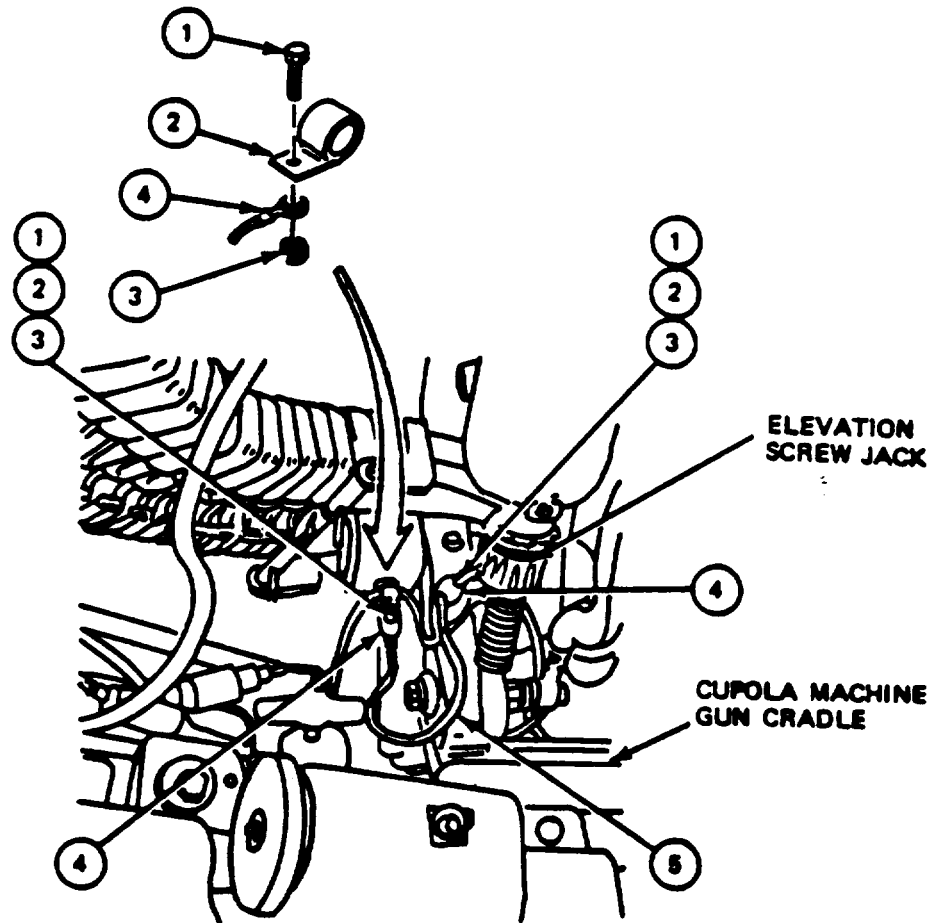
REFERENCES: JPG for procedure to:
 Connect electrical connectors
 Use soldering iron
 TM 9-2360222-202-3 for procedure to install cupola backrest pad

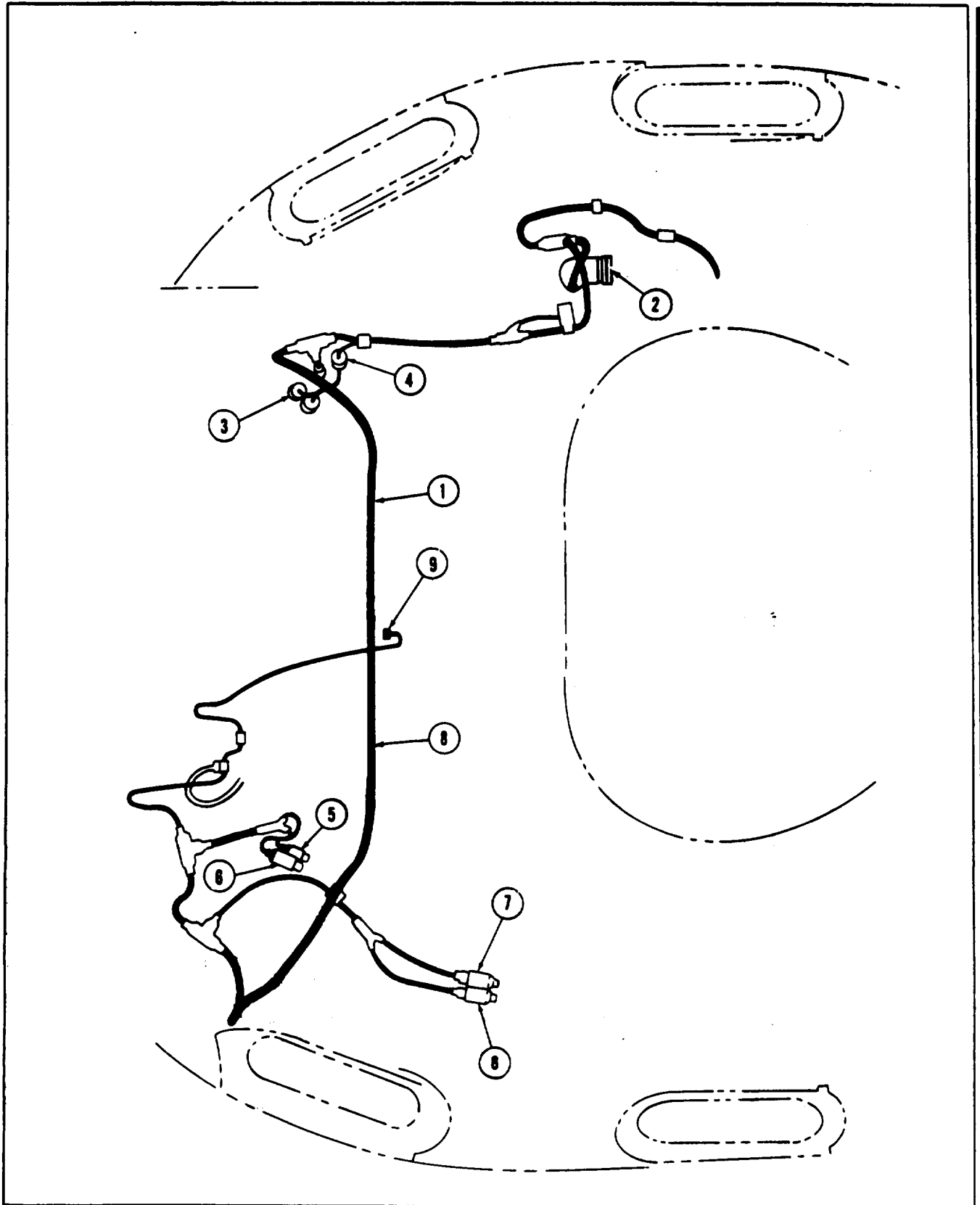
EQUIPMENT LOCATION INFORMATION:

EQUIPMENT	FOLDOUT	CALLOUT
Driver's Master Control Panel	FO-3	11
Commander's Control Panel	FO-2	15

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF

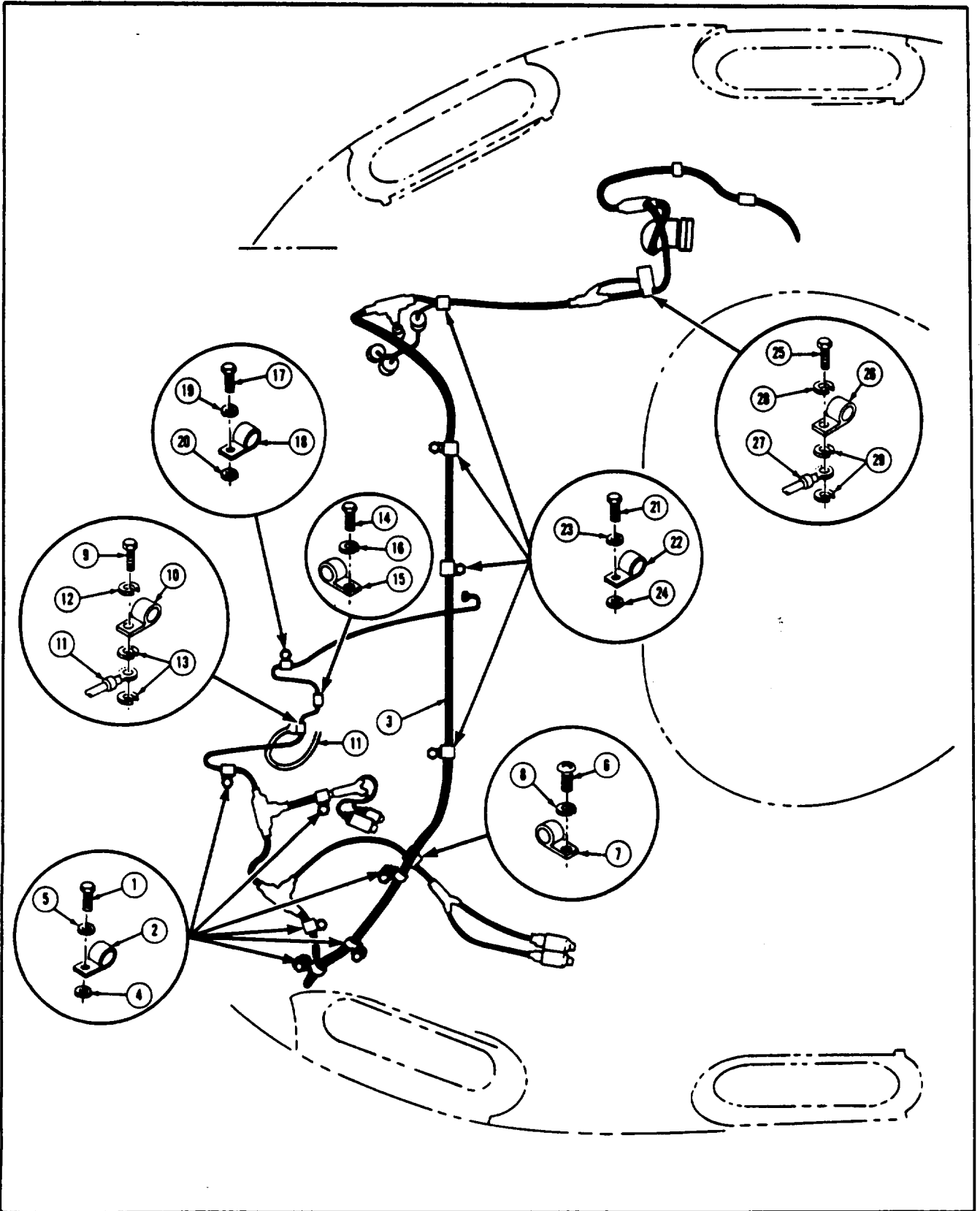
FRAME 1	
STEP	PROCEDURE
1.	Position branched wiring harness (1) in cupola.
2.	Connect harness connector (2) to commander's control box (JPG).
3.	Connect harness connector (3 thru 8) (JPG).
4.	Connect harness connector (9) to machine gun.
GO TO FRAME 2	





8-29. BRANCHED WIRING HARNESS (11673938) INSTALLATION PROCEDURE (CONT)

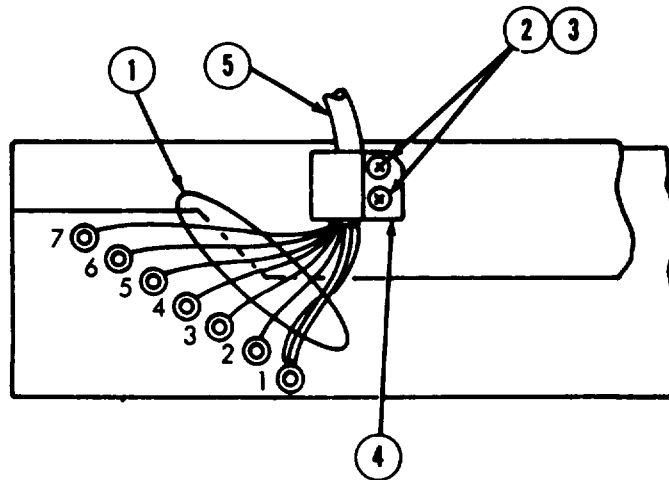
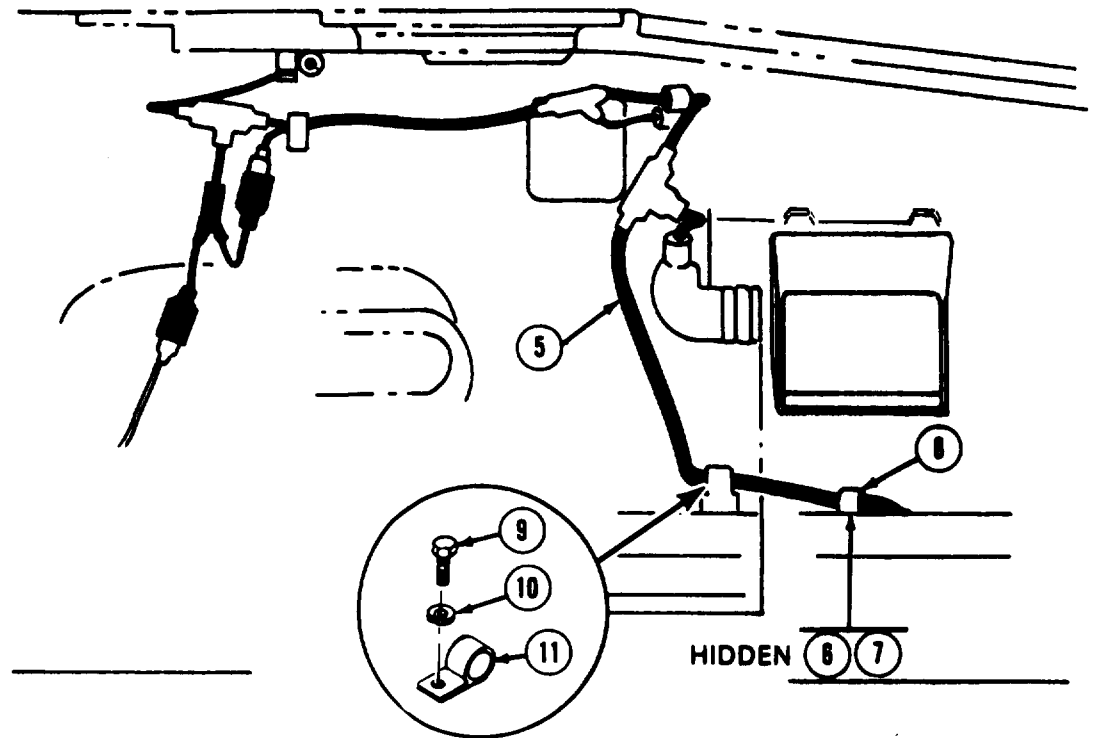
FRAME 2	
STEP	PROCEDURE
1.	Using hands, remove screws (1) and clamps (2) from cupola (6 places).
2.	Using hands, install clamps (2) onto harness (3).
3.	Using hands, position new lockwasher (4) under clamps (2) and secure clamps (2) to cupola with new lockwashers (5) and screws (1).
4.	Using hands, remove screw (6) and clamp (7) from cupola,
5.	Using hands, install clamp (6) onto harness (3) and secure clamp (7) to cupola with screw (6) and new lockwasher (8).
6.	Using hands, remove screw (9), clamp (10), and ground lead (11) from cupola.
7.	Using hands, install clamp (10) onto harness (3) and secure clamp (10) and ground lead (11) to cupola with screw (9), new lockwashers (12), and two new lockwashers (13).
8.	Using hands, remove screw (14) and clamp (15) from cupola.
9.	Using hands, install clamp (15) onto harness (3) and secure clamp (15) to cupola with screw (14) and new lockwasher (16).
10.	Using hands, remove screw (17) and clamp (18) from cupola.
11.	Using hands, install clamp (18) onto harness (3) and secure clamp (18) to cupola with screw (17), new lockwasher (19), and new lockwasher (20).
12.	Using hands, remove screws (21) and clamps (22) from cupola (4 places).
13.	Using hands, install clamps (22) onto harness (3) and secure clamps (22) to cupola with screws (21), new lockwaahers (23), and new lockwashers (24).
14.	Using hands, remove screw (25), clamp (26), and ground lead (27) from cupola,
15.	Using hands, install clamp (26) onto harness (3) and secure clamp (26) and ground lead (27) to cupola with screw (25), new lockwasher (28), and new lockwashers (28).
16.	Reposition wiring harness (3) in clamps so no section is under tension, and using screwdriver or 7/16 inch socket, extension, and ratchet, tighten all screws securing clamps.
GO TO FRAME 3	



8-29. BRANCHED WIRING HARNESS (11673938) INSTALLATION PROCEDURE (CONT)

FRAME 3

STEP	PROCEDURE
	<div style="border: 1px solid black; padding: 2px; display: inline-block;">CAUTION</div> <p>Cable connectors must be connected to terminate which match circuit numbers on metal tabs attached to wires near connectors. Wrong connections will damage equipment.</p>
1.	Match tabs on ten wires (1) with seven terminal numbers.
2.	Using soldering iron, solder ten wires (1) to seven terminals (JPG).
3.	Using hands, remove two screws (2) and two lockwashers (3) that attach clamp (4) to terminal board.
4.	Put harness (5) under clamp (4).
5.	Using screwdriver, attach clamp (4) to terminal board with two screws (2) and two lockwashers (3).
6.	Using hands, remove screw (6), lockwasher (7), and clamp (8) from cupola.
7.	Using hands, install clamp (8) onto harness (5).
8.	Using screwdriver, install and tighten screw (6) and lockwasher (7) to secure clamp (8) to cupola.
9.	Using hands, remove screw (9), lockwasher (10), and clamp (11) from cupola.
10.	Using hands, install clamp (11) onto harness (5).
11.	Using 7/16 inch socket, extension, and ratchet, install and tighten screw (9) and lockwasher (10) to secure clamp (11) to cupola.
	<p>NOTE</p> <p>Follow-on Maintenance Action Required:</p> <p> Install cupola guard (para 9-7) Install cupola backrest pad (TM 20-2-3) Install periscope M36/M36E1 (TM-10) </p>
	END OF TASK



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General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Major General, United States Army
The Adjutant General

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TM 9-XXXX-XXX-XX

DATE

Date of TM

TITLE

Title of TM

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.
3		2	
109		51	
2-8			2-1
12	1-6a		

Item 10. Change illustration. Reason: Tube end shown assembled on wrong side of lever cam.

Item 3. The NSN and P/N are not listed on the AMDF nor the MCRL. Request correct NSN and P/N be furnished.

2-1 Preventive Maintenance Checks and Services. Item 7 under "Items to be inspected" should be changed to read as follows: Firing linkage and firing mechanism pawl.

Since there are both 20- and 30- round magazines for this rifle, data on both should be listed.

SAMPLE

TYPED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

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PUBLICATION NUMBER

TM 9-2350-222-34-2-1

DATE

10 OCT 1980

TITLE
COMBAT ENGINEERING
TURRET, PART

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.
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TEA

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DATE

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TITLE

COMBAT ENGINEER VEHICLE, M728,
TURRET, PART 1, MA

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.
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COMBAT ENGINEER VEHICLE, M728,
TURRET, PART 1, MA

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.

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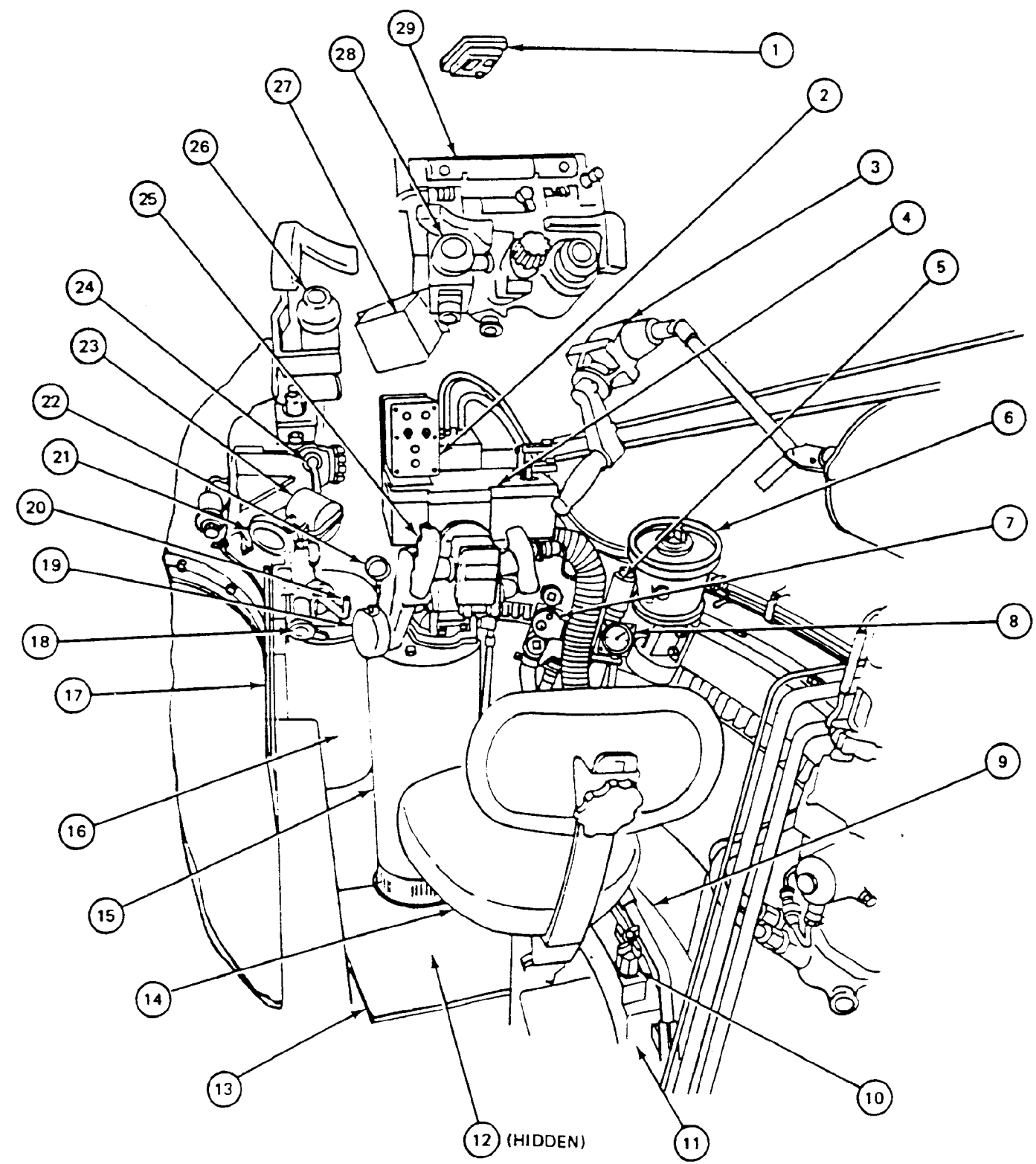
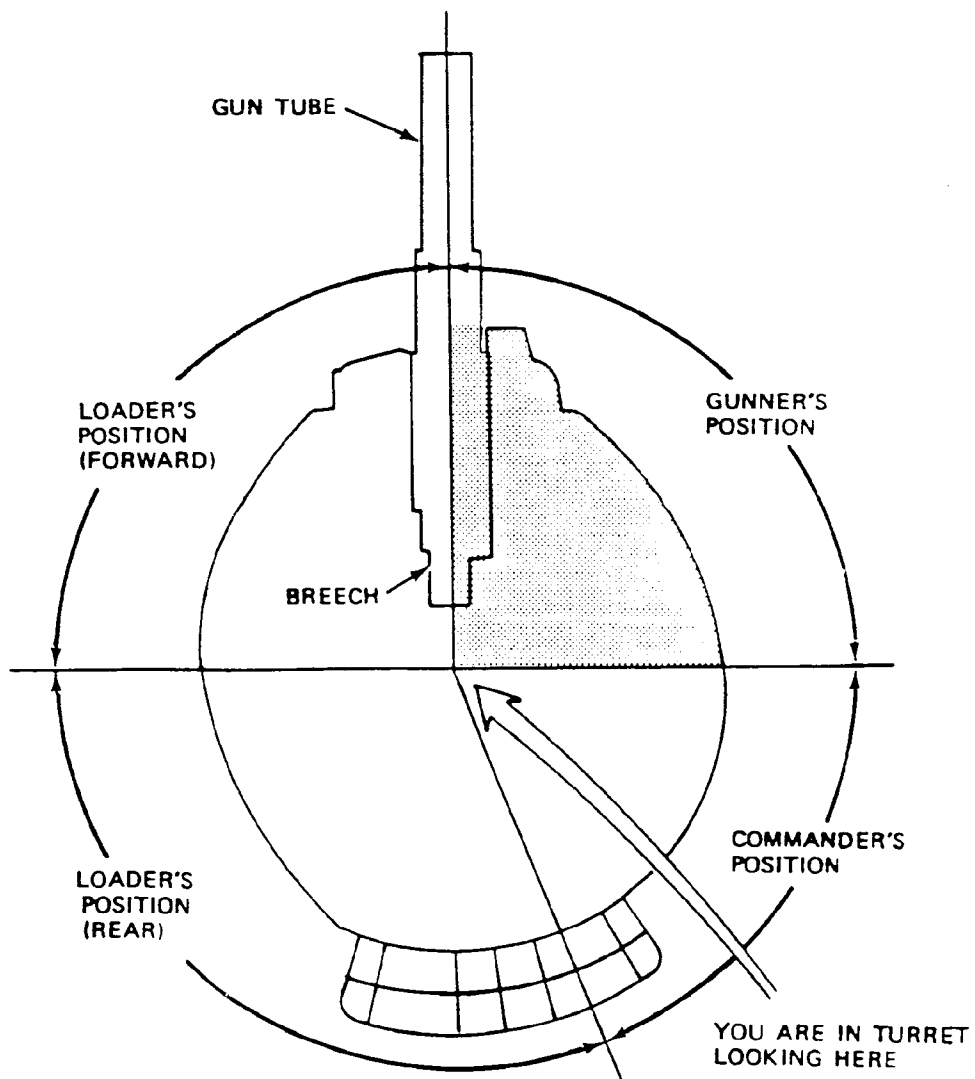
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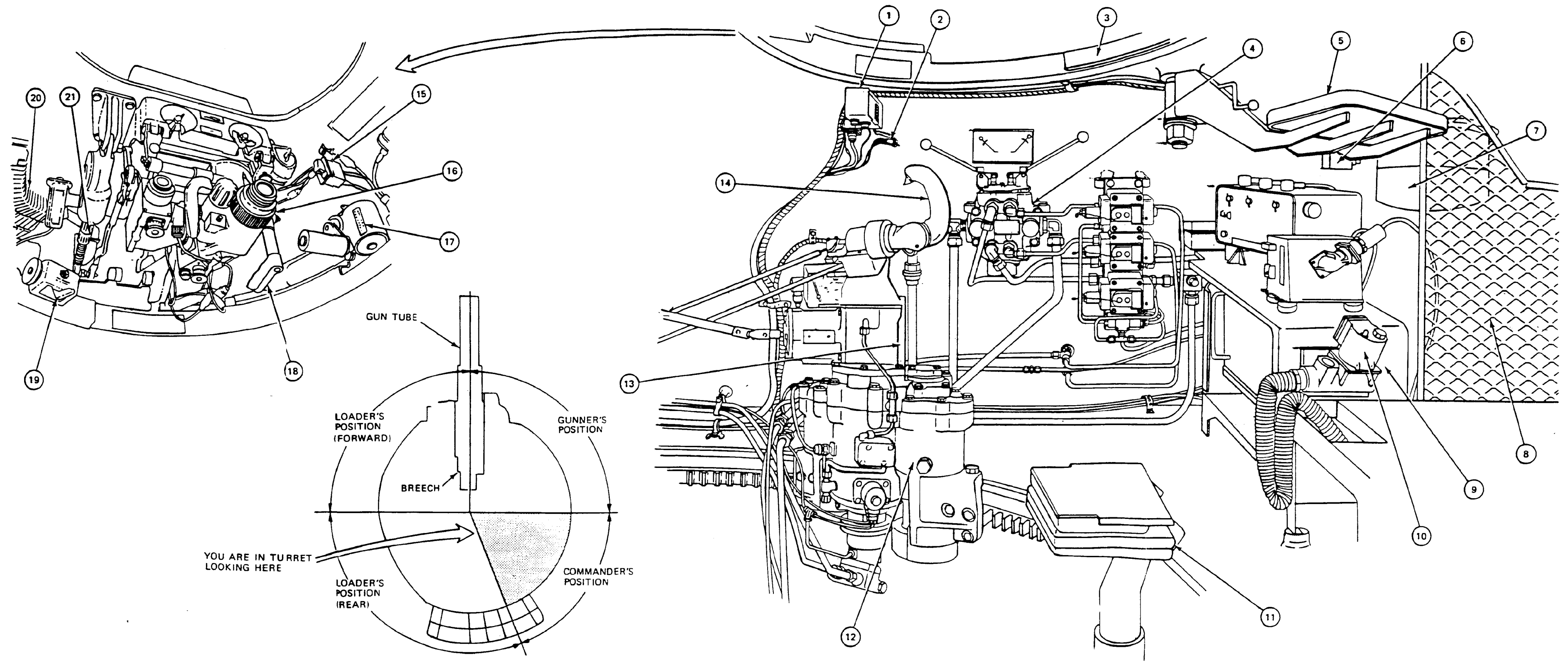
FOLD BACK

- LEGEND:**
1. GUNNER'S DOMELIGHT
 2. GUNNER'S CONTROL BOX
 3. HAND TRAVERSING DRIVE
 4. GUNNER'S CONTROL
 5. RIGHT HANGER
 6. AZIMUTH INDICATOR
 7. GUNNER'S ELECTRIC AIR FILTER HEATER
 8. EQUILIBRATOR PRESSURE GAUGE
 9. GUNNER'S FOOTGUARD
 10. EQUILIBRATOR CHARGING MANIFOLD
 11. 7.62-MM AMMUNITION BOXES
 12. TURRET POWER AND SEARCHLIGHT RELAY BOX
 13. GUNNER'S FOOTREST PLATE
 14. GUNNER'S SEAT
 15. POWER PACK
 16. MAIN ACCUMULATOR
 17. GUNNER'S GUARD
 18. ELEVATION QUADRANT
 19. MANUAL ELEVATING HANDLE
 20. BLASTING MACHINE
 21. TELESCOPE LIGHT SOURCE CONTROL
 22. PRESSURE GAUGE
 23. FILTER BOX
 24. M114 TELESCOPE MOUNT
 25. GUNNER'S CONTROL HANDLES
 26. ARTICULATED TELESCOPE M105F
 27. TURRET GUN FIRING RELAY BOX
 28. GUNNER'S PERISCOPE M32
 29. GUNNER'S PERISCOPE MOUNT M118

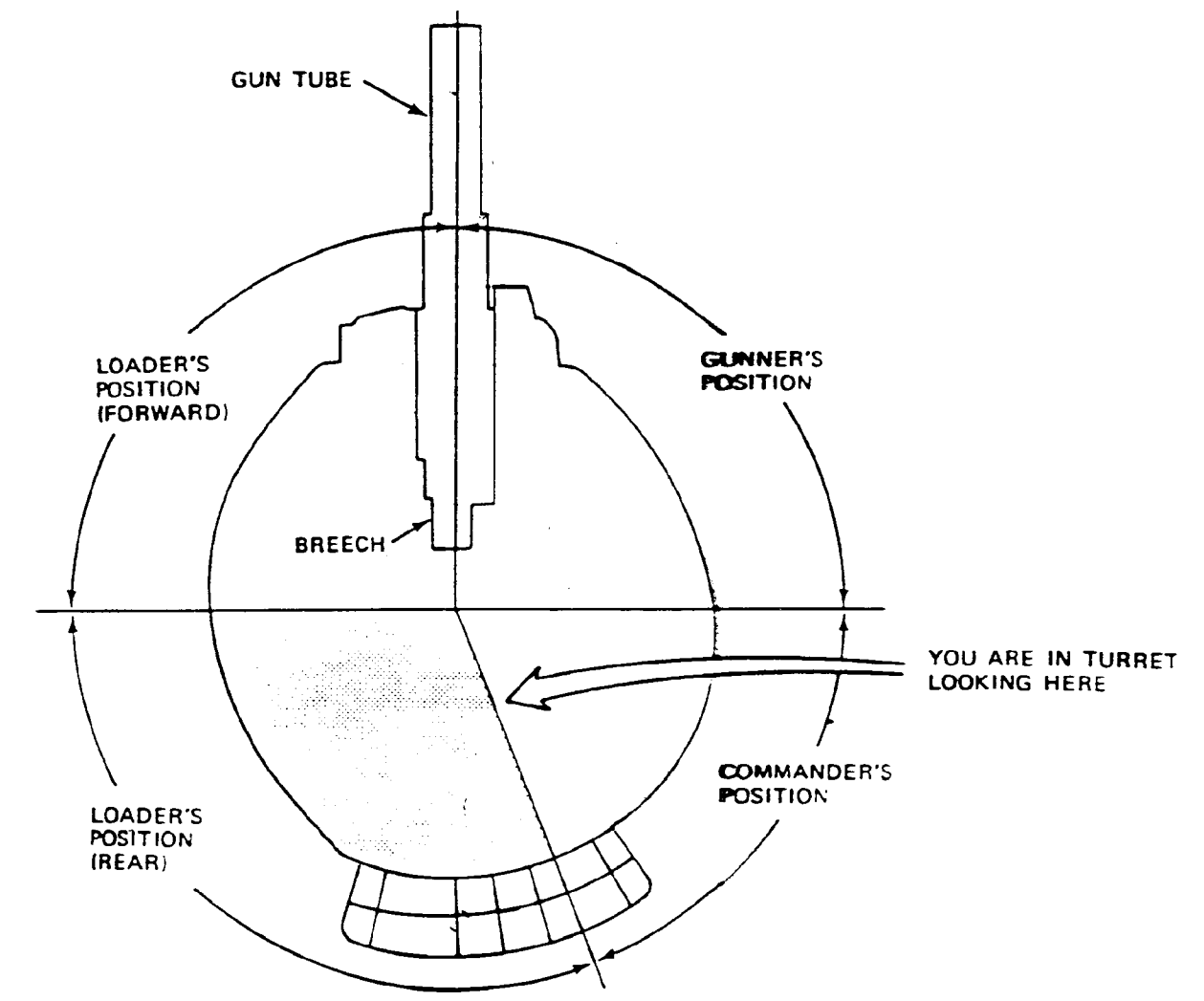


F0-1. EQUIPMENT LOCATION INFORMATION - GUNNER'S POSITION

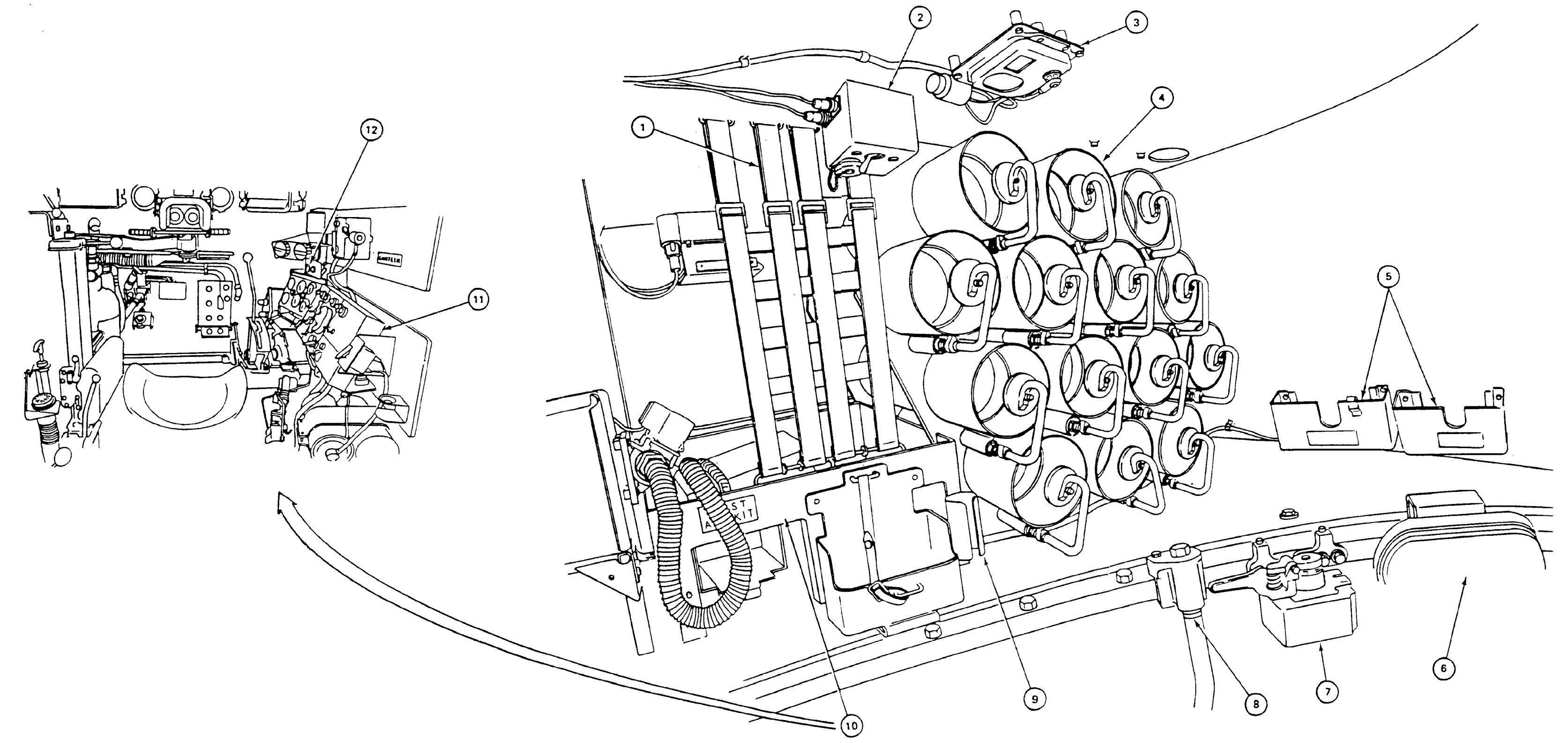
- LEGEND:**
1. INTERPHONE AND CONTROL BOX
 2. CUPOLA ELECTRICAL POWER CONTROL PANEL
 3. BACKREST PAD
 4. WINCH BOOM CONTROL VALVES
 5. COMMANDER'S SWING SEAT
 6. INTERCONNECTING BOX
 7. TURRET VENTILATING BLOWER
 8. ODDMENT TRAY RIGHT SCREEN
 9. TURRET RADIO SUPPORTS
 10. COMMANDER'S ELECTRIC AIR FILTER HEATER
 11. COMMANDER'S SEAT
 12. TURRET TRAVERSING MECHANISM
 13. ANTI BACKLASH MECHANISM
 14. COMMANDER'S CONTROL HANDLE
 15. CUPOLA GUN SAFETY SWITCH AND GUARD
 16. COMMANDER'S PERISCOPE
 17. CUPOLA AZIMUTH GEAR BOX
 18. SHIELD OPERATING HANDLE
 19. CUPOLA AZIMUTH LOCK
 20. FLEXIBLE CHUTE ASSEMBLY
 21. ELEVATION SCREW JACK



F0-2. EQUIPMENT LOCATION INFORMATION - COMMANDER'S POSITION

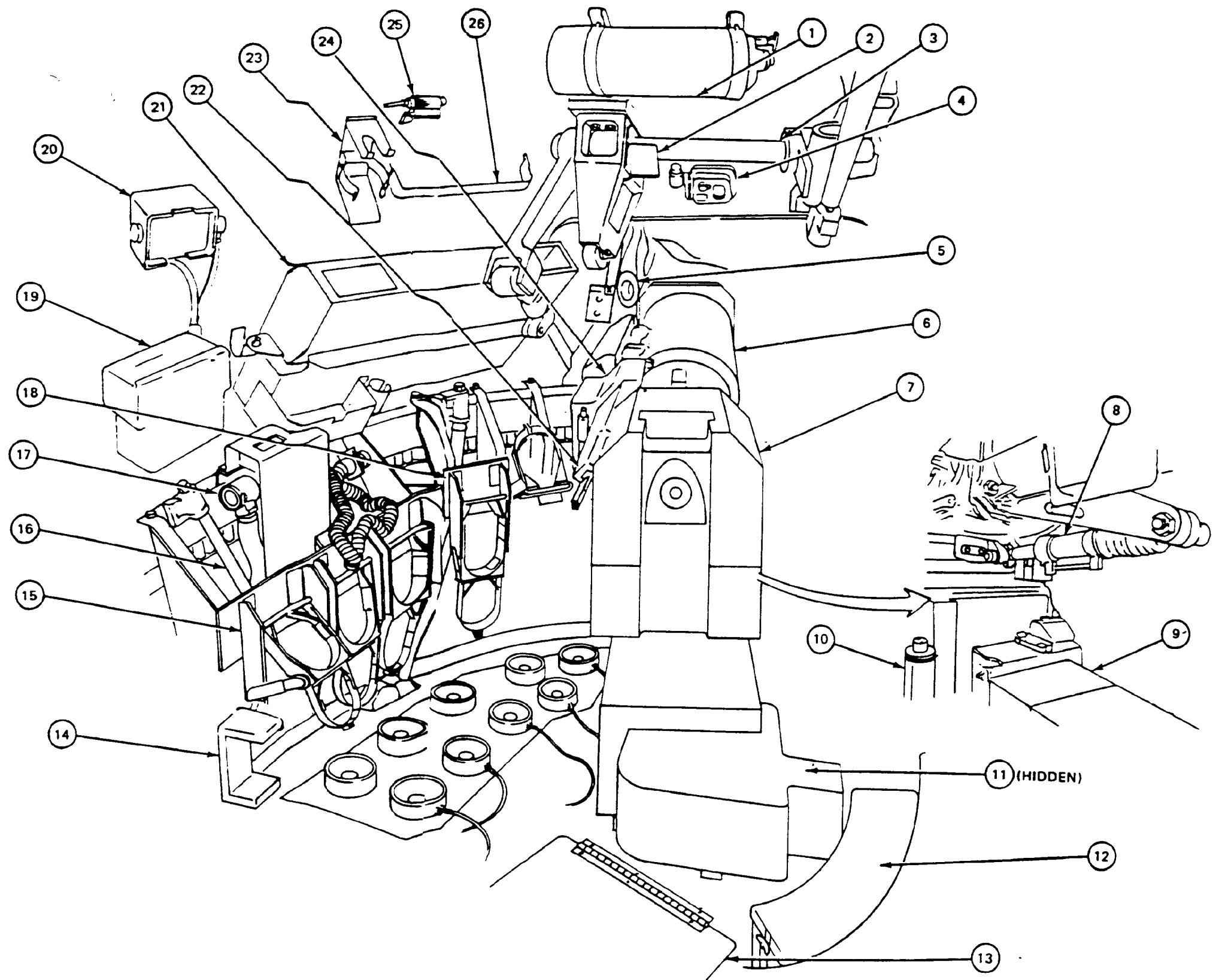
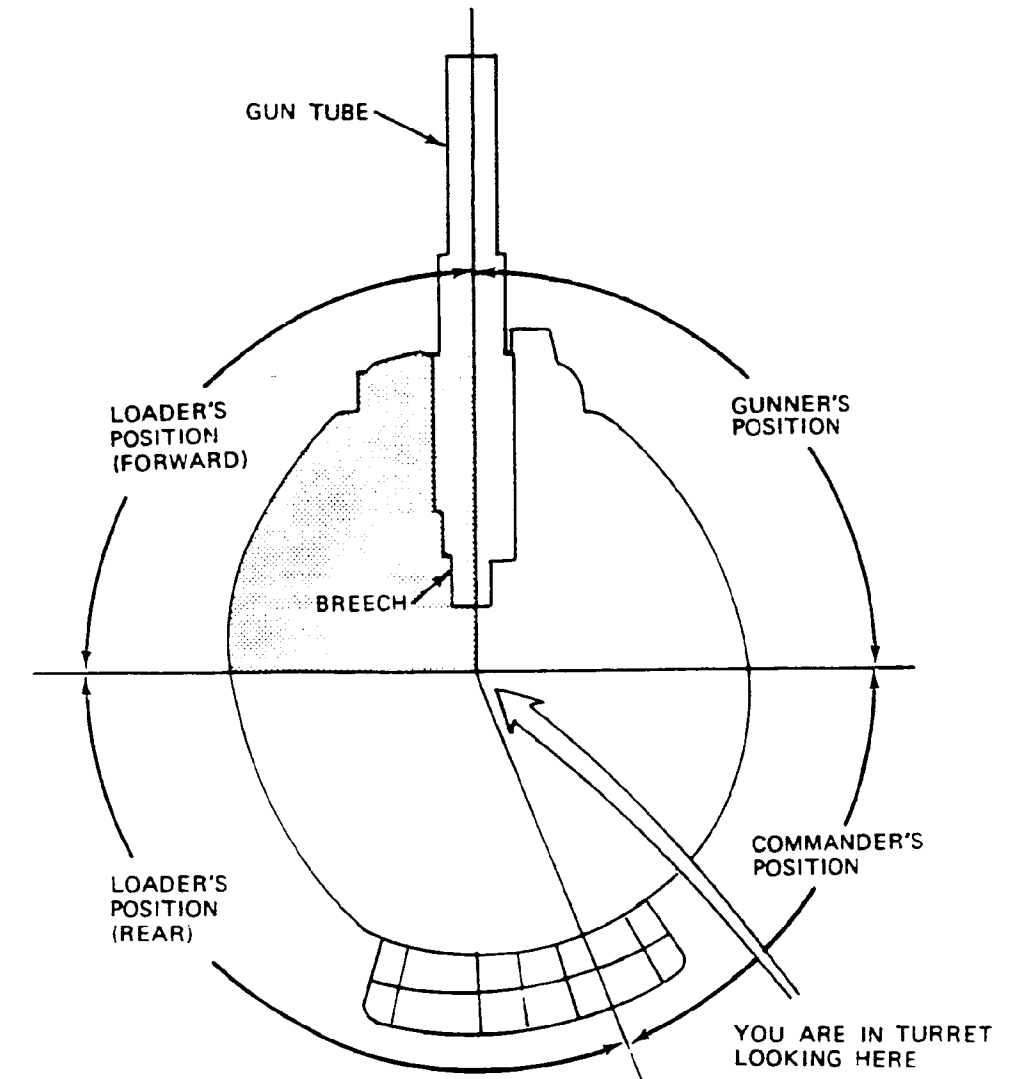


- LEGEND:
1. RADIO GUARD SCREEN
 2. TURRET VENTILATING CONTROL BOX
 3. COMMANDER'S DOME LIGHT
 4. FOURTEEN ROUND AMMUNITION STOWAGE RACK
 5. HAND GRENADE STOWAGE BRACKET
 6. LOADER'S SEAT
 7. TURRET TRAVERSE LOCK
 8. CENTER HANGER
 9. FLASHLIGHT TUBE
 10. ODDMENT TRAY
 11. DRIVER'S MASTER CONTROL PANEL
 12. HYDRAULIC PUMP PANEL



FO-3. EQUIPMENT LOCATION INFORMATION - LOADER'S POSITION REAR

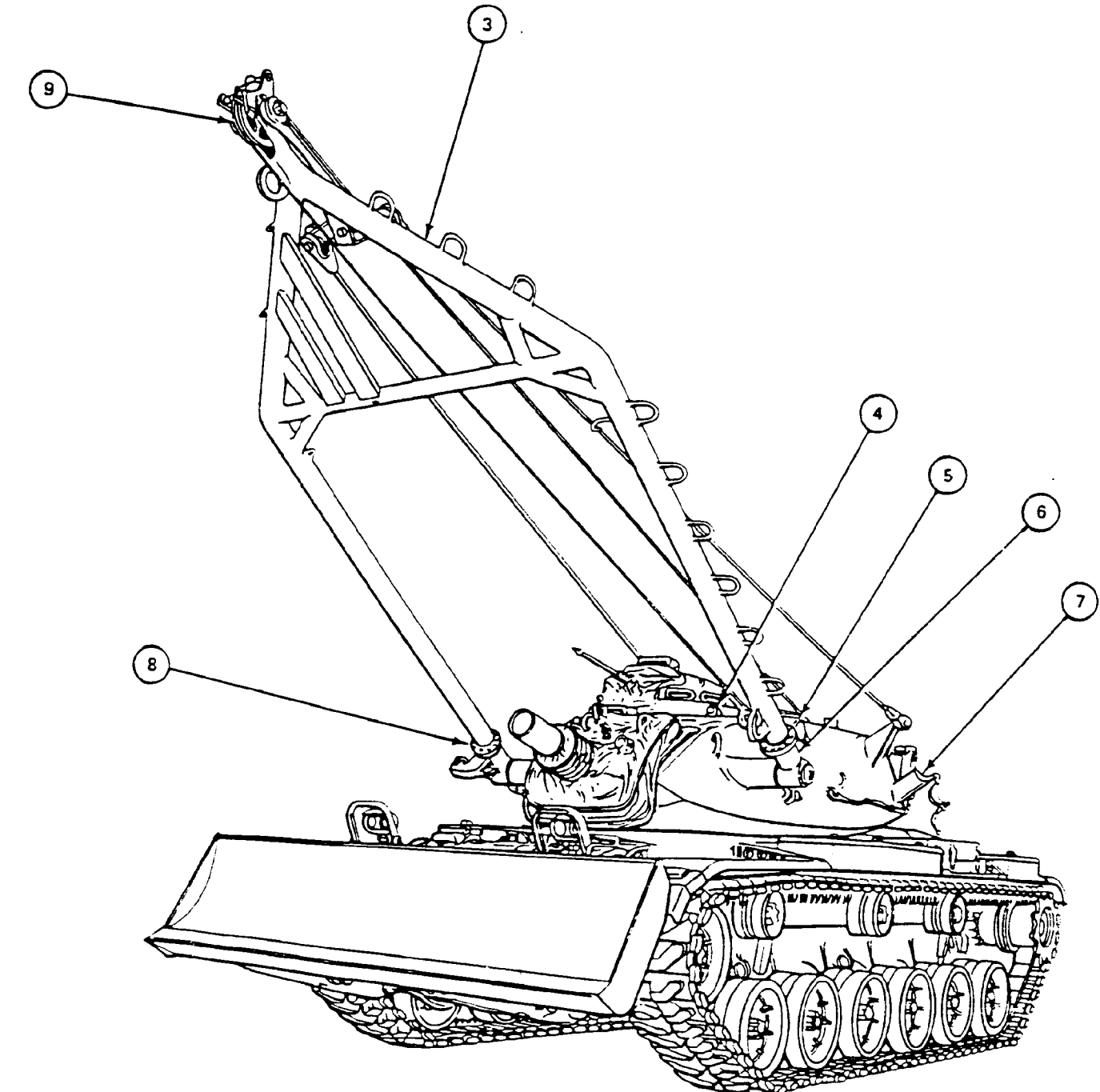
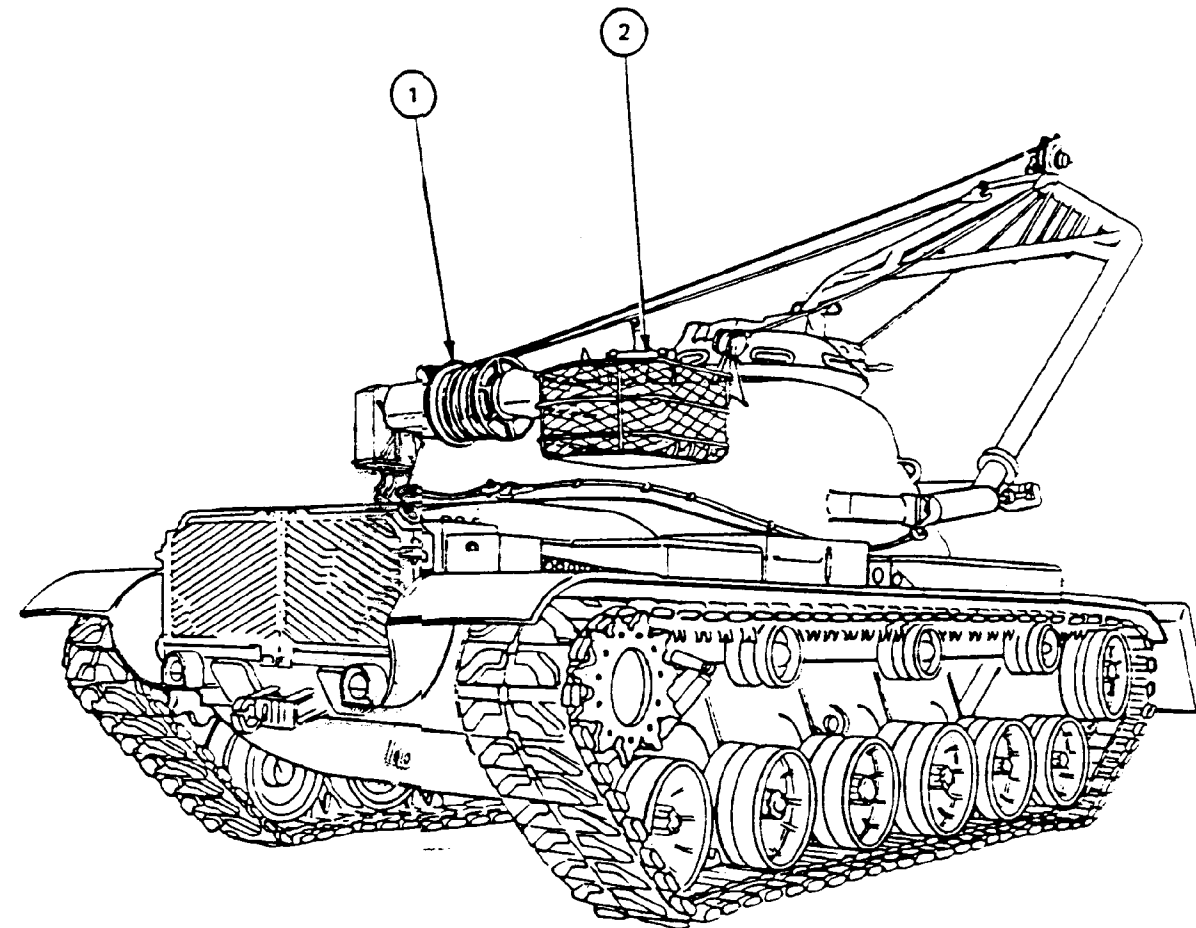
- LEGEND:**
1. REPLENISHER
 2. GUN ELEVATION INTERFERENCE SWITCH
 3. BALLISTIC DRIVE
 4. LOADER'S DOMELIGHT
 5. MACHINE GUN MOUNT
 6. 165-MM GUN
 7. BREECH
 8. ELEVATING MECHANISM
 9. PERISCOPE STOWAGE BOX
 10. EQUILIBRATOR ACCUMULATOR
 11. ELECTRICAL SLIPRING
 12. CALIBER .50 AMMUNITION BOXES
 13. BATTERY ACCESS DOOR
 14. FIRE EXTINGUISHER MOUNTING BRACKET
 15. 165-MM SIX ROUND AMMUNITION RACK
 16. LEFT HANGER
 17. LOADER'S ELECTRIC AIR FILTER HEATER
 18. 165-MM THREE ROUND AMMUNITION RACK
 19. LOADER'S PERISCOPE BOX
 20. LOADER'S INTERPHONE CONTROL BOX
 21. 7.62 READY ROUND AMMO BOX AND COVER
 22. LOADER'S GUARD
 23. OILCAN MOUNTING BRACKET
 24. LOADER'S SAFETY SWITCH
 25. RADIATION DETECTOR
 26. CANTEEN MOUNTING BRACKET



FO-4. EQUIPMENT LOCATION INFORMATION - LOADER'S POSITION FORWARD

LEGEND:

- 1. WINCH
- 2. SEARCHLIGHT STOWAGE BOX
- 3. A-FRAME
- 4. SEARCHLIGHT CONNECTOR
- 5. LOADER'S ESCAPE HATCH
- 6. A-FRAME LEFT TRUNNION
- 7. BOOM TRAVEL LOCK
- 8. A-FRAME RIGHT TRUNNION
- 9. A-FRAME PULLEY



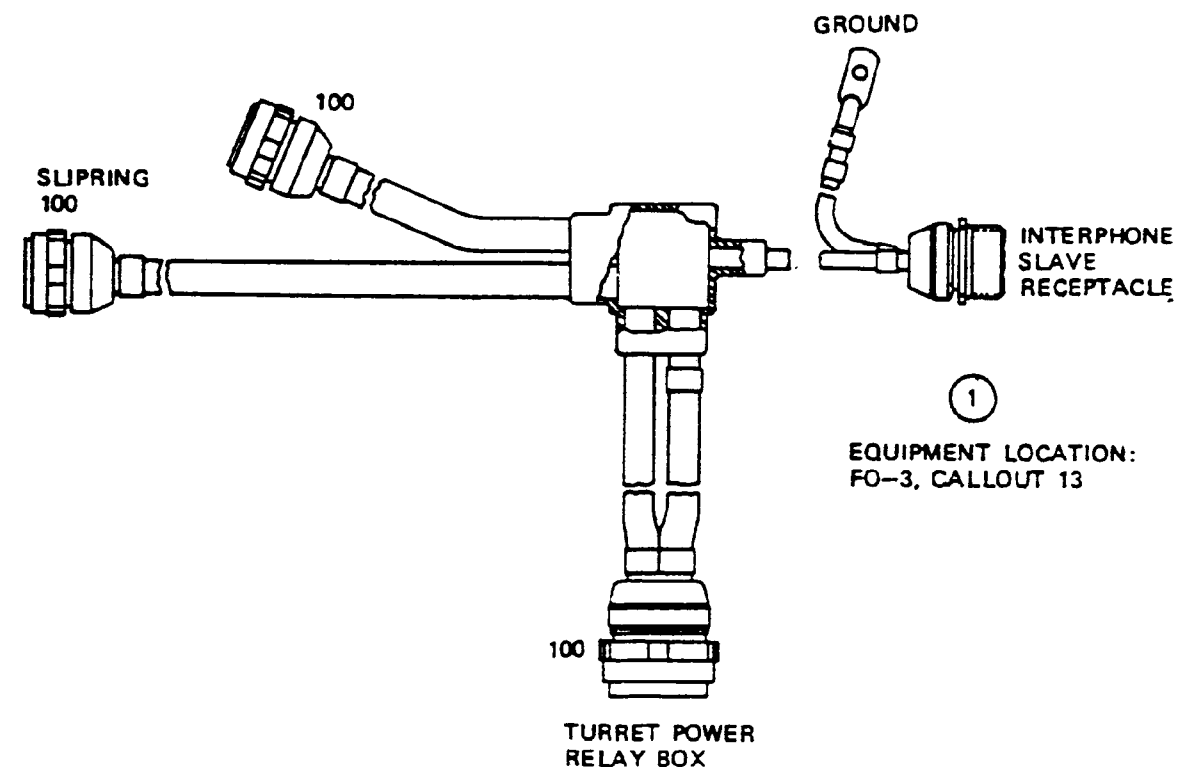
FO-5. EQUIPMENT LOCATION INFORMATION - OUTSIDE TANK

TOOLS: 3/8" drive ratchet
 7/16" socket (3/8" drive)
 7/16" combination wrench
 Spanner wrench (hook type)
 1/4" flat tip screwdriver
 10" extension

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
 Turret traversed so main accumulator is behind driver's compartment (TM-10)
 Turret traverse lock set to LOCKED
 Slipping shield removed (TM-20-2-3)

NOTE

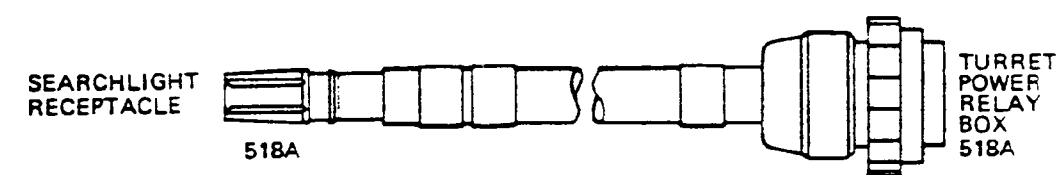
Follow-on Maintenance Action Required:
 Install slipping shield (TM-20-2-3)



FO-6. SLIPRING TO POWER RELAY, WIRING HARNESS (10951575)

TOOLS: 7/16" socket (3/8" drive)
 7/16" combination wrench
 3/8" drive ratchet
 1/4" flat tip screwdriver
 6" extension (3/8" drive)
 Pry bar
 Spanner wrench (adjustable lock type)

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
 Turret traversed so main accumulator is behind driver's compartment (TM-10)
 Turret traverse lock set to LOCKED



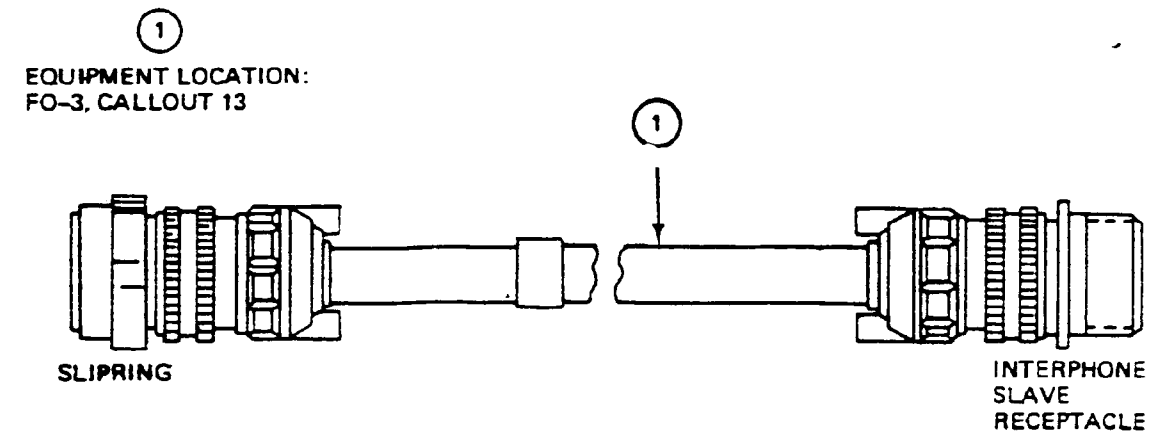
① EQUIPMENT LOCATION:
 FO-1, CALLOUT 14

FO-7. TURRET POWER RELAY BOX TO SEARCHLIGHT RECEPTACLE ELECTRICAL LEAD (10911297)

TOOLS: 7/16" socket (3/8" drive)
 3/8" drive ratchet
 10" extension (3/8" drive)
 Spanner wrench (Adjustable hook type)
 7/16" combination wrench
 Slip-joint plier.

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
 Turret traversed so main accumulator is behind driver's compartment (TM-10)
 Turret traverse lock set to LOCKED
 Controller unit removed (TM-20-2-3)
 Slipring cover removed (TM-20-2-3)
 Receiver transmitter (RT246A/VRC) removed (TM-10)

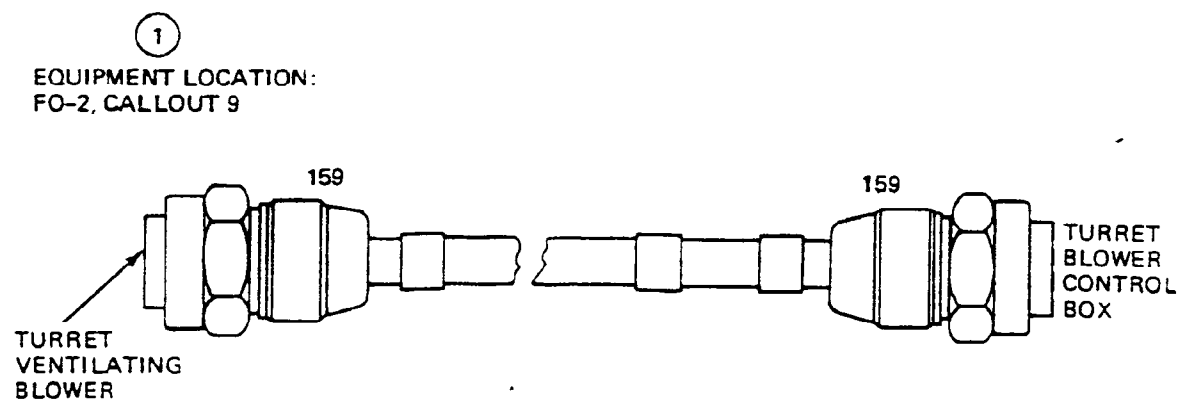
FOLLOW-ON MAINTENANCE ACTION REQUIRED:
 Install slipring cover (TM-20-2-3)
 Install controller unit (TM-20-2-3)
 Install receiver transmitter (RT 246A/VRC) (TM-10)



F0-8. SLIPRING TO INTERPHONE SLAVE RECEPTACLE,
 WIRING HARNESS (1091T298)

TOOLS: 7/16" socket (3/8" drive)
3/8" drive ratchet
1 1/8" open end wrench

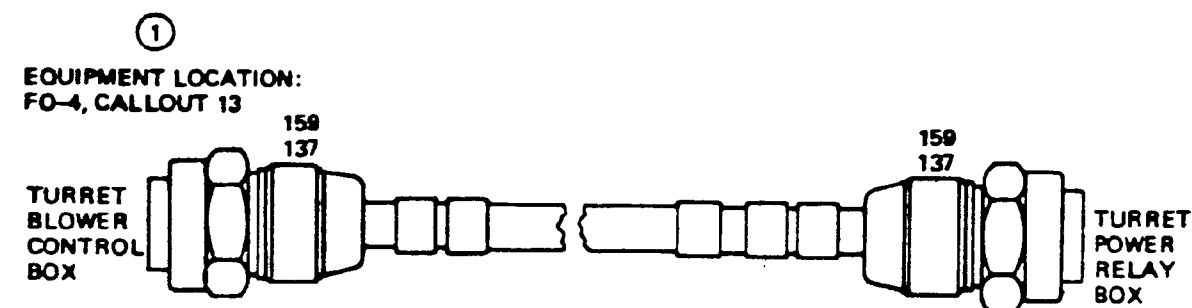
EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
Turret traversed so main accumulator is behind driver's compartment (TM-10)
Turret traverse lock set to LOCKED



FO-9. TURRET BLOWER CONTROL BOX TO TURRET VENTILATING BLOWER, ELECTRICAL LEAD (10924270)

TOOLS: 7/16" socket (3/8" drive)
3/8" drive ratchet
7/16" combination wrench
10" extension (3/8" drive)
1 1/8" open end wrench

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
Turret traversed so main accumulator is behind driver's compartment (TM-10)
Turret traverse lock set to LOCKED



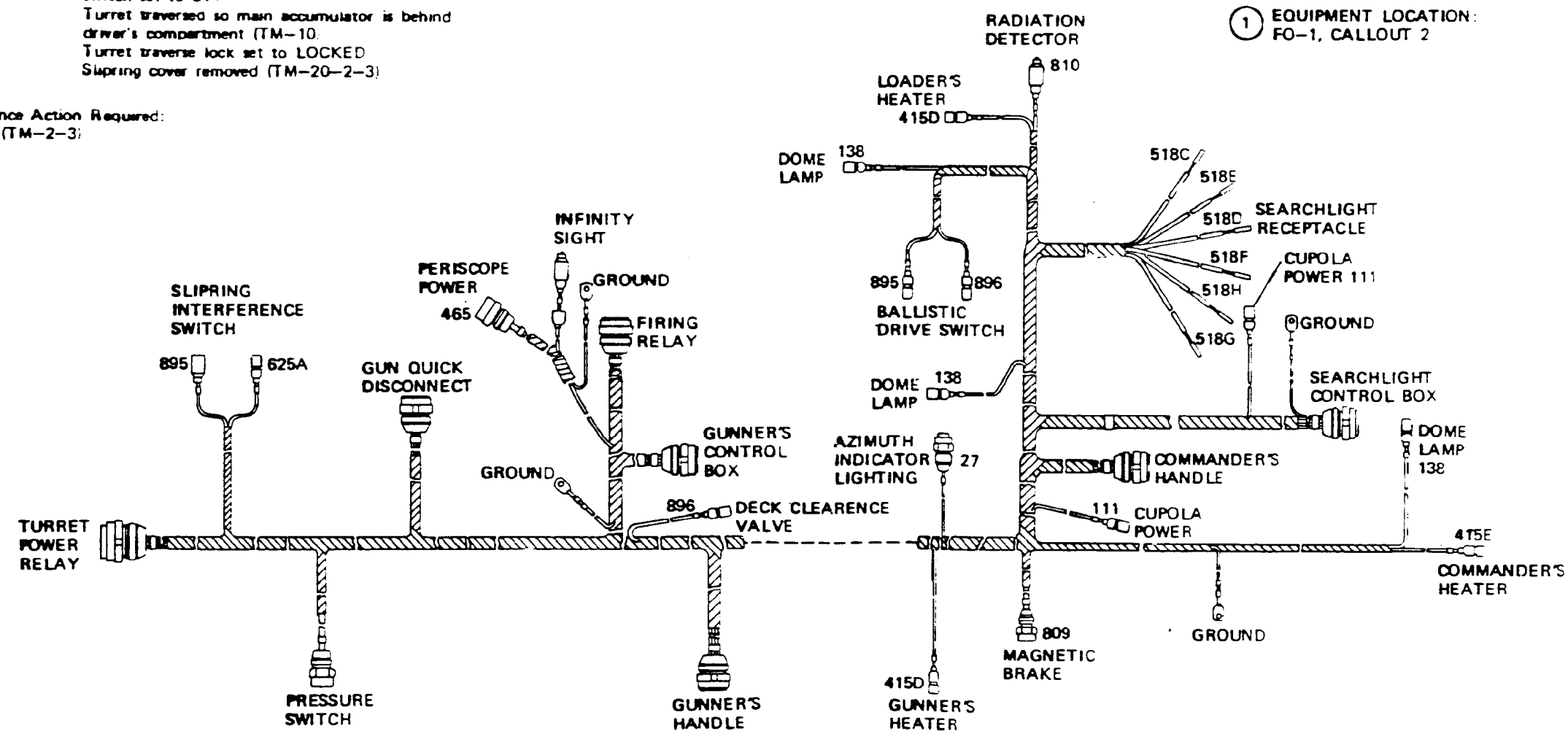
FO-10. TURRET POWER RELAY BOX TO BLOWER CONTROL BOX,
ELECTRICAL LEAD (10924271)

TOOLS: Spanner wrench (hook type)
 1" open end wrench
 1 1/8" open end wrench
 7/16" socket (3/8" drive)
 3/8" drive ratchet
 7/16" combination wrench
 1/4" flat tip screwdriver
 7/8" combination wrench

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
 Turret traversed so main accumulator is behind driver's compartment (TM-10)
 Turret traverse lock set to LOCKED
 Slipping cover removed (TM-20-2-3)

Follow-on Maintenance Action Required:
 Install slipping cover (TM-2-3)

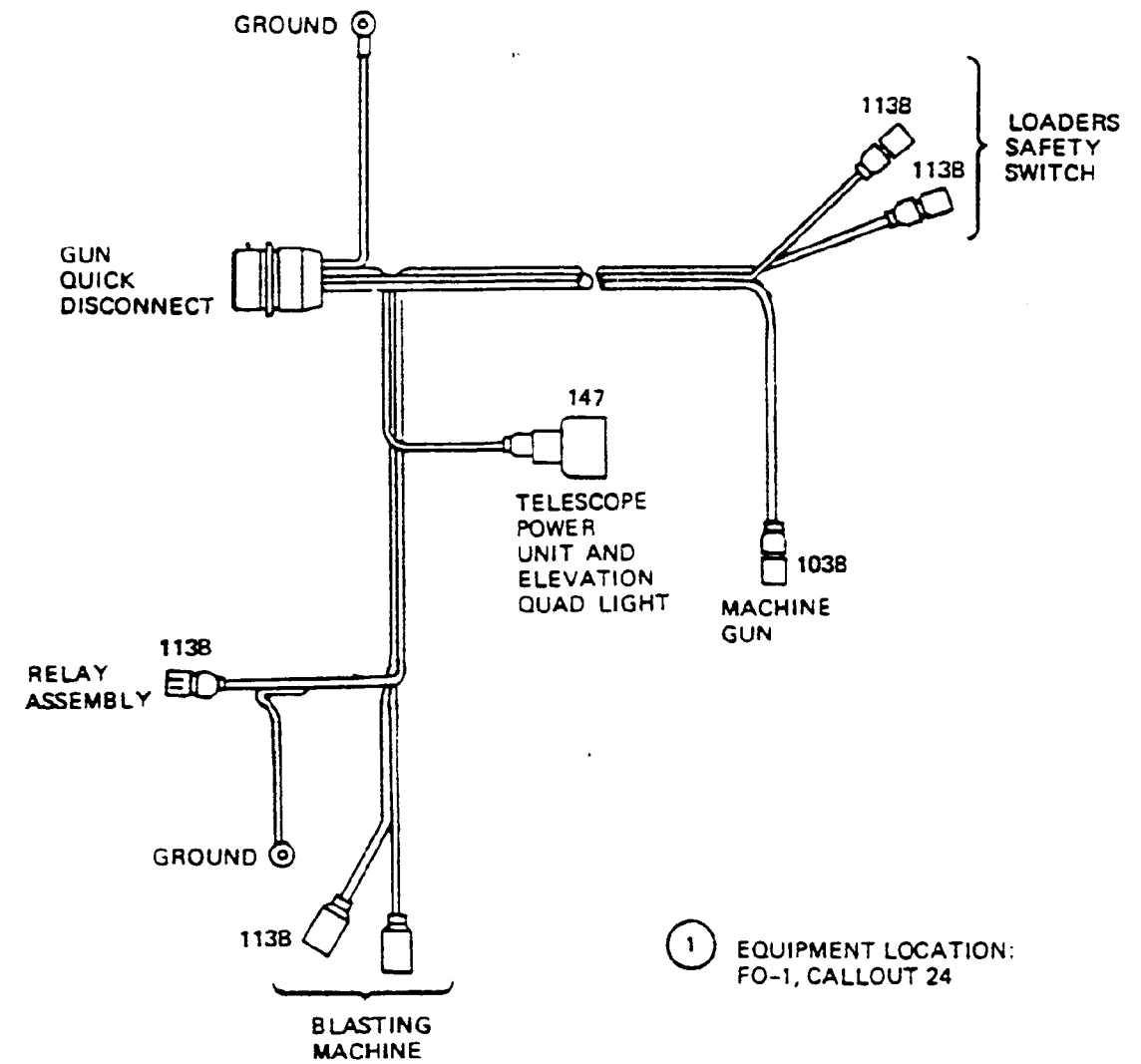
① **EQUIPMENT LOCATION:**
 FO-1, CALLOUT 2



FO-11. TURRET CONTROL, WIRING HARNESS (10951615)

TOOLS: 1/2" combination wrench
 7/16" combination wrench
 No. 2 cross tip screwdriver (Phillips)
 Spanner wrench (Hook type)

EQUIPMENT CONDITION: Driver's master control panel MASTER BATTERY switch set to OFF
 Turret traversed so main accumulator is behind driver's compartment (TM-10)
 Turret traverse lock set to LOCKED



FO-12. GUN FIRING WIRING HARNESS (10933473)

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
 1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
 1 Kilogram = 1000 Grams = 2.2 Lb
 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
 1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
 1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
 1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

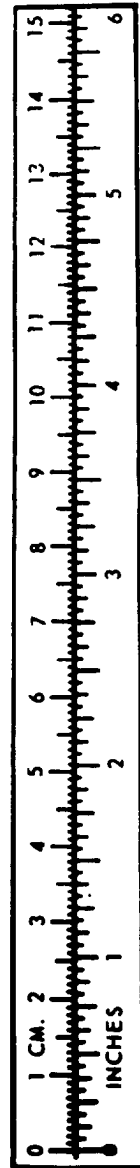
TEMPERATURE

$5/9 (^{\circ}\text{F} - 32) = ^{\circ}\text{C}$
 212^o Fahrenheit is equivalent to 100^o Celsius
 90^o Fahrenheit is equivalent to 32.2^o Celsius
 32^o Fahrenheit is equivalent to 0^o Celsius
 $9/5 \text{ C}^{\circ} + 32 = \text{F}^{\circ}$

APPROXIMATE CONVERSION FACTORS

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621



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**TURRET FOR COMBAT ENGINEER
VEHICLE, M728 (2350-00-795-1797),
PART 1, MAINTENANCE**

1980