TECHNICAL MANUAL

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST (INCLUDING DEPOT MAINTENANCE REPAIR PARTS)

VOLUME I - TROUBLESHOOTING

VOLUME II - MAINTENANCE

BALLISTIC DRIVE: M15 (1220-00-071-5330)

VOLUME I TROUBLESHOOTING

VOLUME II MAINTENANCE

HEADQUARTERS, DEPARTMENT OF THE ARMY

NOVEMBER 1983

WARNING

Be careful when removing ballistics drive, it is heavy and hard to handle. Do not drop as it may hurt someone or damage equipment.

TECHNICAL MANUAL
No.9-1220-231-34P

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *25 November 1983*

Direct Support And General Support Maintenance Manual Including Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts)

BALLISTICS DRIVE: M15 (1220-00-071-5330)

Current as of 25 May 1983 for APPENDIX D.

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, US Army Arament Materiel Readiness Command, ATTN: DRSAR-MAS, Rock Island, IL 61299.
A reply will be furnished direct to you.

*This manual supersedes TM 9–1220– 1–35, 27 September 1965 and TM 9–1220–231–34P, 11 April 1972.

LIST OF EFFECTIVE PAGES

INSERT LATEST CHANGED PAGES. DESTROY SUPERSEDED PAGES.

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

Dates of issue for original and changed pages are:

Original . . . 0 . . .

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 94 **CONSISTING OF THE FOLLOWING:**

*Zero in this column indicates an original page.

HOW TO USE THIS MANUAL

This manual has two volumes of maintenance information you will need to repair and service the M15 Ballistics Drive.

- Volume I - Troubleshooting
- Volume II - Maintenance

The organization paragraph in each volume tells you what information you can find in each chapter and appendix.

There are four ways to find any maintenance information you need:

- Index on the front cover which tells what information is contained in each chapter
- Table of contents located at the front of the manual which has a complete listing by paragraph number and page number
- Performance test (Vol I, Chap 2)
- Maintenance task index (Vol II, App. B) which lists major assemblies, subassemblies and paragraph numbers of all maintenance procedures

Before doing any maintenance, you should read and understand HOW TO TROUBLESHOOT on page 1-2. If you do not know the equipment well, you should read the section on description and data (Vol II, Chap 1).

Throughout the manual reference is made to a Job Performance Guide 113-091-9000R (JPG 41C) which helps you to develop skills in doing the maintenance tasks.

TECHNICAL MANUAL

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST (INCLUDING DEPOT MAINTENANCE REPAIR PARTS)

VOLUME I - TROUBLESHOOTING

BALLISTICS DRIVE: M15

CHAPTER 1

INTRODUCTION

1-1. SCOPE

This volume contains troubleshooting requirements for direct support and general support maintenance of the M15 Ballistics Drive.

1-2. ORGANIZATION

All troubleshooting requirements for checking out the ballistics drive and finding fault symptoms are given in Chapter 2. See paragraph 1-3 for how to do troubleshooting.

1-3. HOW TO TROUBLESHOOT

The following steps tell you how to troubleshoot. A diagram of these steps is on page 1-3.

(A) Do a visual check and list any faults on DA Form 2404 before making repairs. See Vol II, Chap 3 for what to check for.

(B) If you see any faults that may affect the checkout procedure, fix them now. This does not mean small things like painting scratches.

(C) Do the performance test in Vol I, Chap 2 from the beginning until you find a fault symptom.

(D) When a fault symptom is found, do the maintenance action required to correct the fault symptom (Vol II, Chap 4),

(E) After the fault symptom has been corrected, do the performance test in Chapter 2 again. This is to make sure all fault symptoms have been corrected.

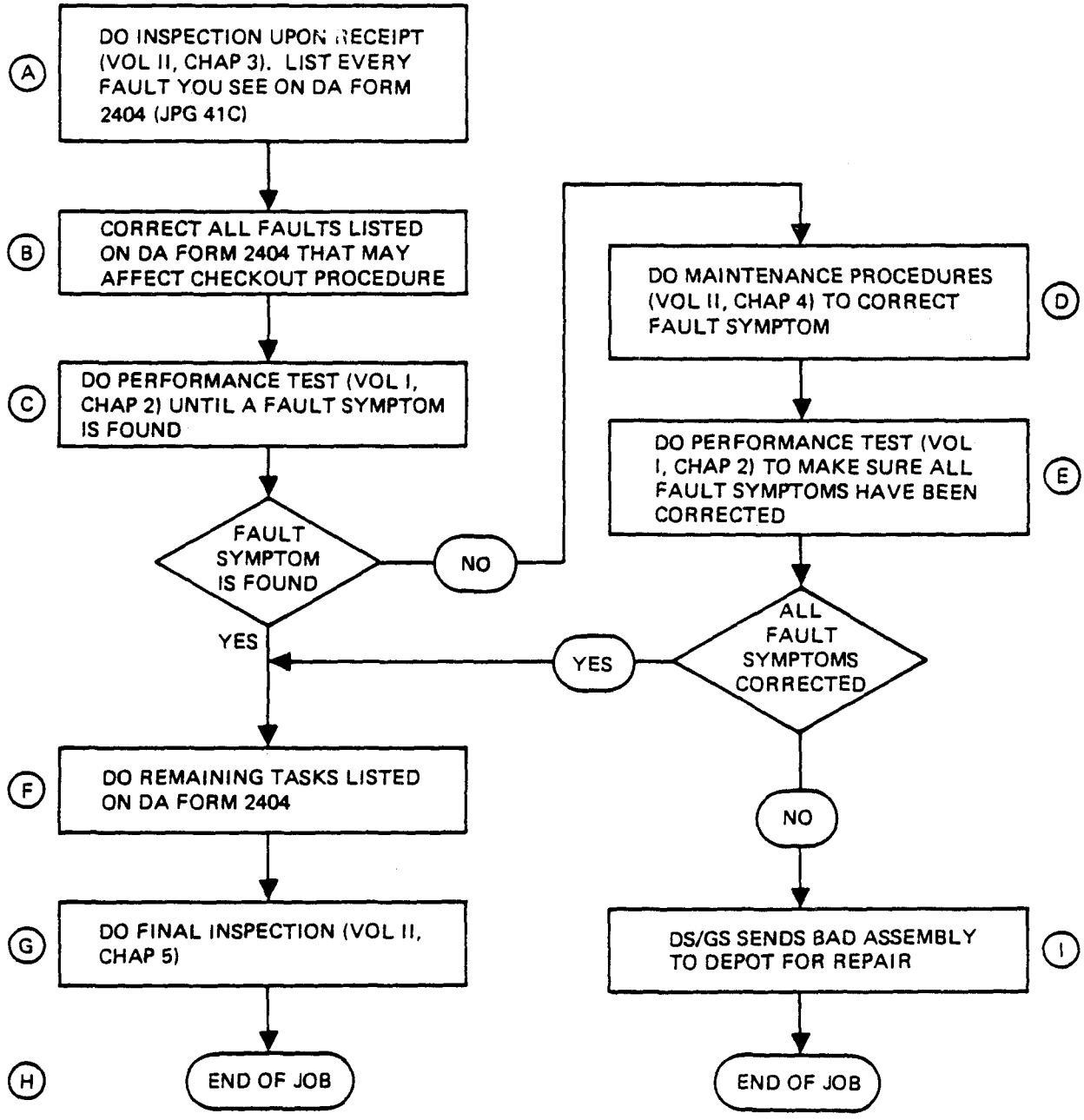
(F) If all the fault symptoms are now corrected, do the remaining maintenance tasks on DA Form 2404.

(G) Do the final inspection given in Vol II, Chap 5.

(H) The job is over and the good assembly is sent back to service.

(I) If all fault symptoms were not corrected after step E, the bad assembly is sent back to the depot for repair.

1-3. HOW TO TROUBLESHOOT (CONT)



CHAPTER 2

TROUBLESHOOTING

2-1. SCOPE

Troubleshooting of the M 15 Ballistics Drive is done by using the following performance test. If you find any symptom, look in the maintenance action column to correct it.

2-2. PERFORMANCE TEST

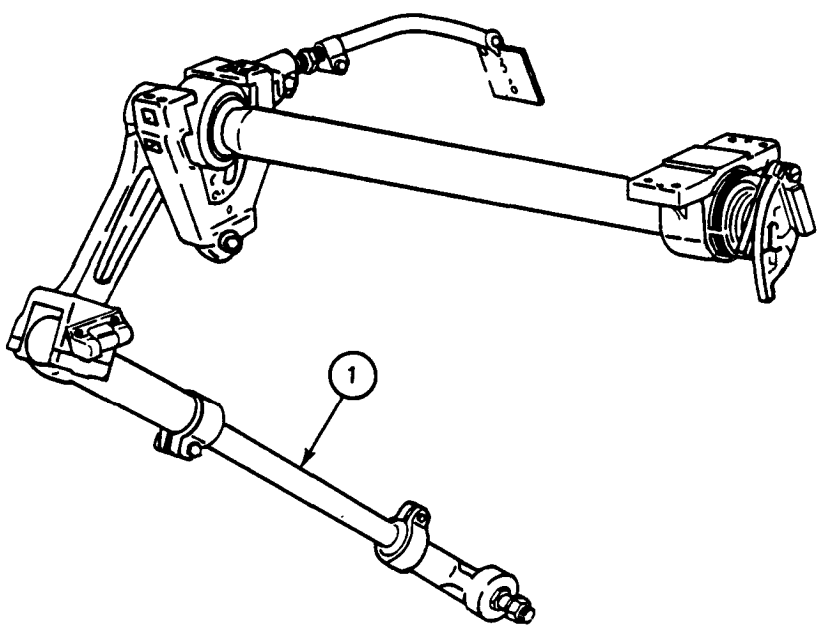
PERSONNEL: One

REFERENCE: TM 9-2350-222-20-2-1 for synchronization check

EQUIPMENT CONDITION: Ballistics drive mounted in vehicle

FRAME 1

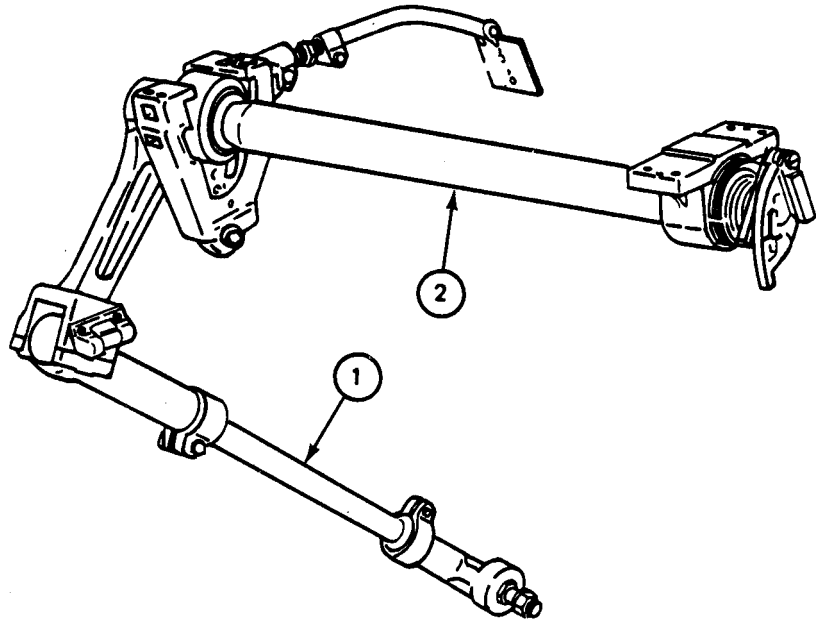
Step	Procedure	Symptom	Maintenance Action
1.	Do synchronization check (PM-20-2-1). Check ballistics drive (1) is in synchronization. GO TO FRAME 2	Ballistics drive out of alignment.	Send unit to depot for repair.



2-2. PERFORMANCE TEST (CONT)

FRAME 2

Step	Procedure	Symptom	Maintenance Action
1.	Disconnect trunnion link (1) (Vol II, para 4-4, frame 2, steps 1 thru 3).	. . .	
2.	Turn cross shaft (2) all the way in both directions. Check shaft (2) turns smoothly without binding. NOTE Correct remaining faults listed on DA Form 2404. Do final inspection (Vol II, para 5-2). END OF TASK	Cross shaft does not turn smoothly.	Send unit to depot for repair.



TECHNICAL MANUAL

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST (INCLUDING DEPOT MAINTENANCE REPAIR PARTS)

VOLUME II - MAINTENANCE

BALLISTICS DRIVE: M15

CHAPTER 1

INTRODUCTION

Section 1. GENERAL

1-1. SCOPE

This volume contains maintenance requirements for direct support and general support maintenance of the M15 Ballistics Drive. See Volume 1 for troubleshooting information.

1-2. ORGANIZATION

a. Chapter 2. General Maintenance Information lists maintenance items and references general procedures that are necessary to do the maintenance procedures in this volume.

b. Chapter 3. Inspecton Upon Receipt gives the faults to look for when the unit is returned to DS/ GS. A complete inspection should be made and faults listed on DA Form 2404 before any repairs are made.

c. Chapter 4. Maintenance Procedures give step-by-step procedures to repair faults found during inspection or troubleshooting.

d. Chapter 5. Final Inspection gives procedures to be done after repair to make sure that the ballistics drive works and ready for packaging or installation.

e. Chapter 6. Packaging gives procedures for packaging the ballistics drive for storage or shipment.

f. Appendix A. Expendable Supplies and Materials List gives supplies and materials, with specification or NSN, needed to repair the ballistics drive.

g. Appendix B. Maintenance Task Index helps you find maintenance tasks for the ballistics drive.

h. Appendix C. Fabricated Tools contains information that you will need to have these tools made.

i. Appendix D. Repair Parts and Special Tools List, gives a listing of repair parts, special tools, and support equipment required for the performance of direct support and general support maintenance of the periscope.

Section 2. DESCRIPTION AND DATA

1-3. DESCRIPTION

The M15 ballistics drive is part of the primary direct sighting and fire control system of the 165-mm gun, full tracked, combat engineer vehicle M728.

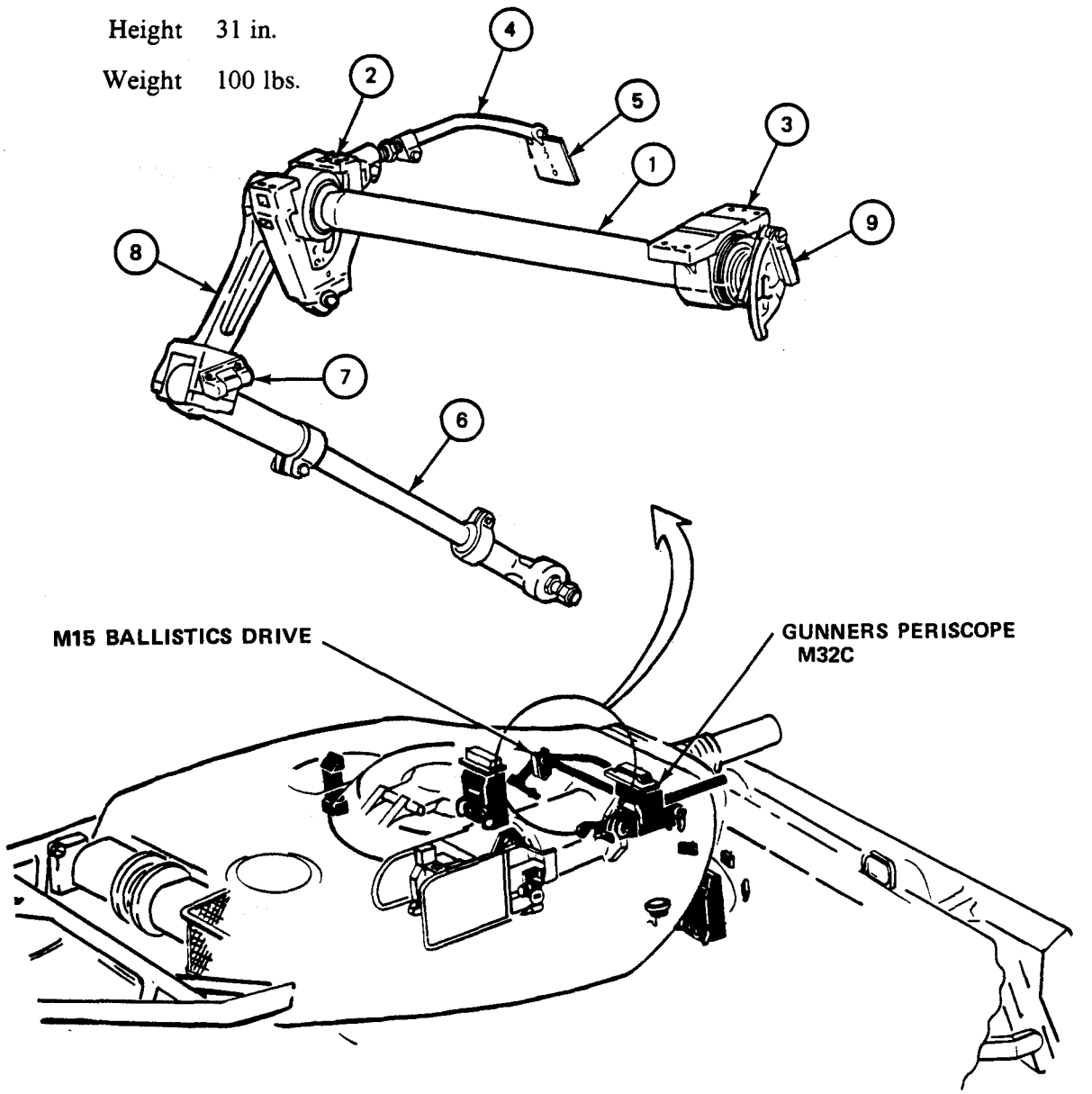
The ballistics drive causes a corresponding movement of the line of sight of the M32C periscope when the gun is elevated or depressed.

1-3. DESCRIPTION (CONT)

The ballistics drive has a cross shaft assembly (1) with support assemblies (2) and (3) which are fastened to mounting pads on the turret roof. A temperature compensating rod (4) with rod mounting bracket (5) is fastened to a pad inside the turret wall. A trunnion link (6) is connected to the gun trunnion. A fire control level (7) is mounted on the connecting arm (8). A coupling assembly (9) connects the ballistics drive to the elevation arm wedge of the M32C periscope.

1-4. TABULATED DATA

Length	36 in.
Width	45 in.
Height	31 in.
Weight	100 lbs.



CHAPTER 2

GENERAL MAINTENANCE INFORMATION

Section 1. GENERAL

2-1. SCOPE

This chapter tells you where to find general information and what special tools and test equipment are needed to do the maintenance procedures in this volume.

Section 2. REFERENCE DOCUMENTS

2-2. GENERAL MAINTENANCE

General maintenance procedures for fire control materiel are in TM 9-254 and Job Performance Guide 113-091-9000R (JPG 41C).

2-3. CLEANING

General cleaning procedures are in JPG 4lC.

2-4. PAINTING

General painting procedures are in TM 43-0139.

2-5. SEALING

General instructions for using sealing compounds are in JPG 4lC.

2-6. LUBRICATION

General instructions on how to use lubricants are in JPG 41C.

Section 3. SAFETY PROCEDURES

2-7. GENERAL PROCEDURE

General safety procedures are found in AR 385-40 Safety: Accident Reporting and Records.

Section 4. SPECIAL TOOLS AND TEST EQUIPMENT

2-8. TOOLS AND TEST EQUIPMENT

Item	National Stock Number	Part Number (FSCM)	Use
Gage, Spacer	4931-00-065-0538	. . .	Setting distance between ballistics drive and M32C periscope.
Modified screw key 5/1 socket head.	Fabricated tool	. . .	Removing screws in support assembly.

CHAPTER 3

INSPECTION UPON RECEIPT

3-1. SCOPE

This chapter gives procedures to check the ballistics drive for faults you can see when received in DS/GS shop. Maintenance procedures are referenced for repair of the assembly. A complete inspection should be made and all faults listed on DA Form 2404 before taking any maintenance actions.

3-2. INSPECTION UPON RECEIPT

TOOLS: 5/16" modified socket head screw key (fabricated Allen wrench, see App. C)
1/2", 9/16", 3/4'", 15/16" box end wrench

PERSONNEL: One

REFERENCES: TM 43-0139 for painting
TM 9-254 for general maintenance
JPG 4lC for Completing DA Form 2404
Installing lead seals

EQUIPMENT CONDITION: Ballistics drive mounted in vehicle.

NOTE

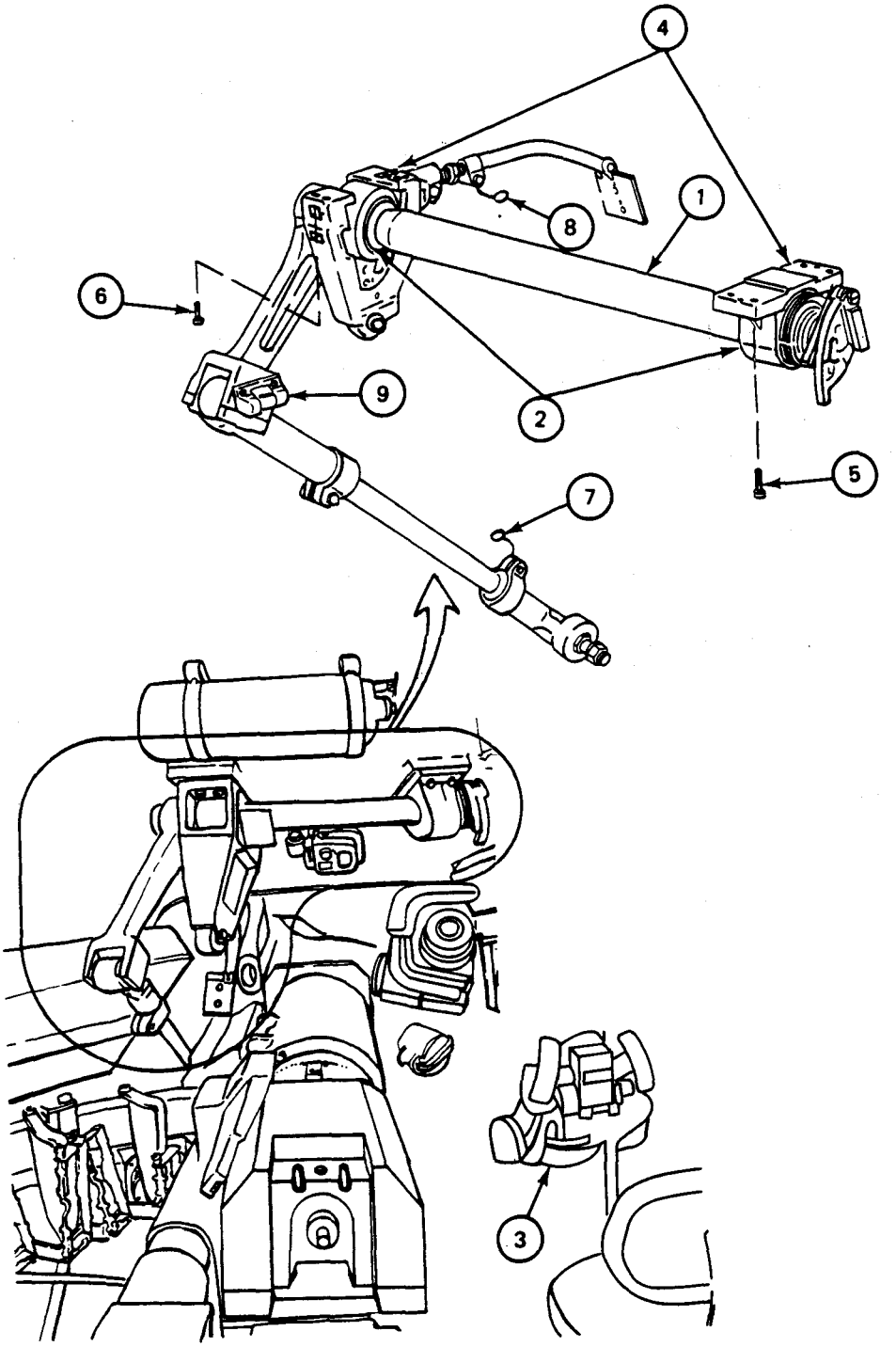
Once the ballistic drive is removed from vehicle DS/GS does not have the tools to accurately set the fire control level if the level is tampered with. If the fire control level needs to be repaired, repair before removing ballistic drive from vehicle.

3-2. INSPECTION UPON RECEIPT (CONT)

FRAME 1

Step	Procedure	Maintenance Action	Reference
1.	Clean exterior of ballistic drive and check for cracks or dents.	If cracks or dents are found, tell your supervisor.	. . .
2.	Check ballistics drive for dirt and corrosion.	Clean	TM 9-254
3.	Check ballistic drive for free movement of cross shaft assembly (1) in left and right support assemblies (2) while operating manual elevation hand pump (3).	Send ballistics drive to depot for repair.	. . .
4.	Check surface (4) of left and right mounting supports (2) for damage.	Send ballistics drive to depot.	. . .
5.	Using fabricated Allen wrench, check four screws (5) are tight.	Tighten. Replace if missing.	. . .
6.	Using fabricated Allen wrench, check four screws (6) are tight.	Tighten. Replace if missing.	. . .
7.	Check two lead seals (7 and 8) are installed.	Install lead seals.	JPG 41C
8.	Check fire control level (9) is not damaged. GO TO FRAME 2	Repair level	Para 4-12

3-2. INSPECTION UPON RECEIPT (CONT)

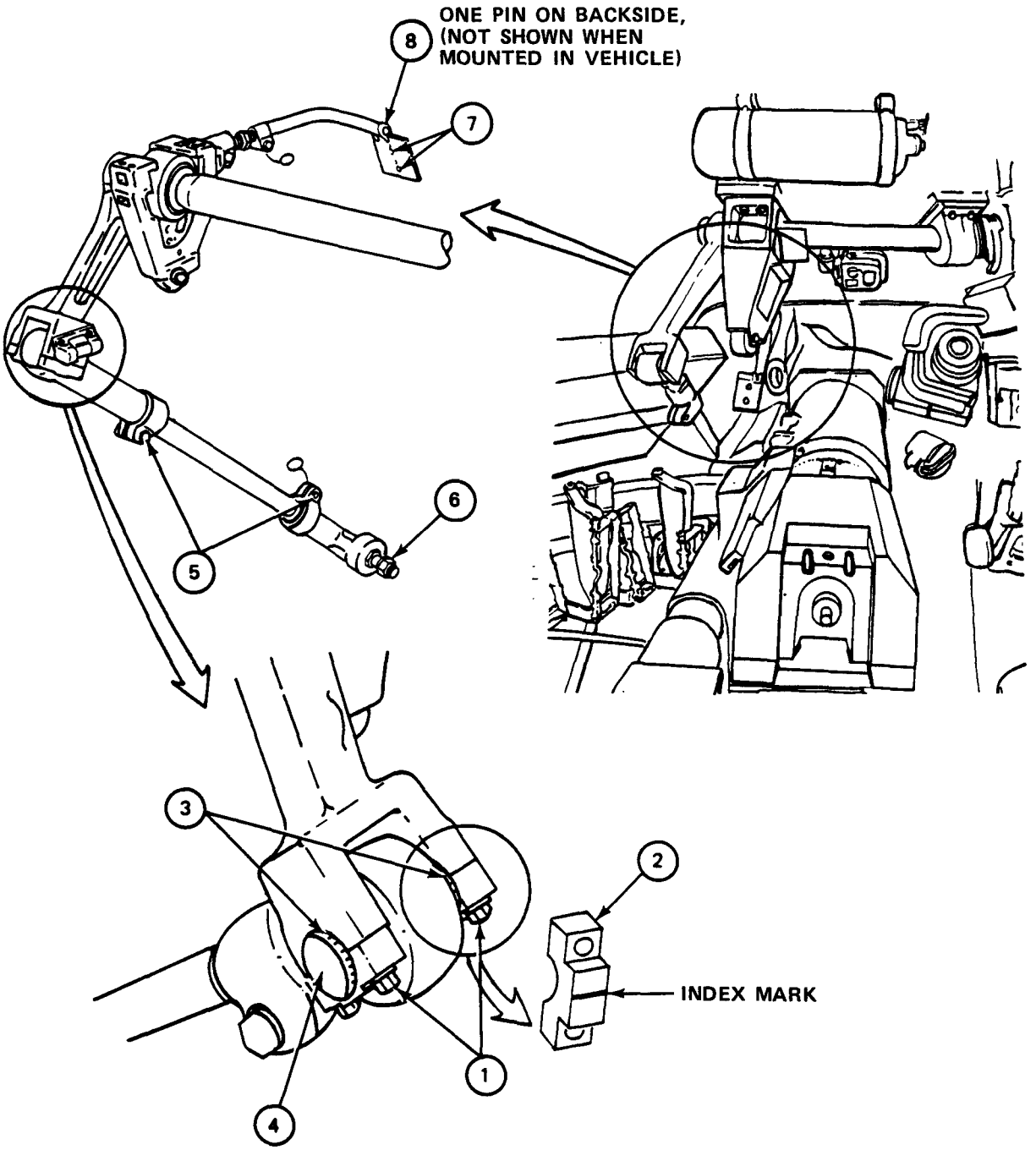


3-2. INSPECTION UPON RECEIPT (CONT)

FRAME 2

Step	Procedure	Maintenance Action	Reference
1.	Using 1/2" wrench, check four screws (1) are tight.	Tighten. Replace if missing.	. . .
2.	Check index mark on two eccentric caps (2) is clear.	a. Do maintenance procedures. b. Replace caps if damaged.	a. TM 9-254 b. Para 4-4, Frame 2 c. Para 4-5, Frame 5
3.	Check two scales (3) on eccentric (4) can be read.	Do maintenance procedures, if still not able to read, tell your supervisor.	TM 9-254
4.	Using 15/ 16" wrench, check two screws (5) are tight.	Tighten. Replace if missing.	. . .
5.	Using 15/ 16" wrench, check nut (6) is tight.	Tighten. Replace if missing.	. . .
6.	Using 9/16" wrench, check two screws (7) are tight.	Tighten. Replace if missing.	. . .
7.	Check two pins (8) are installed. GO TO FRAME 3	Install pins	Para 4-10

3-2. INSPECTION UPON RECEIPT (CONT)

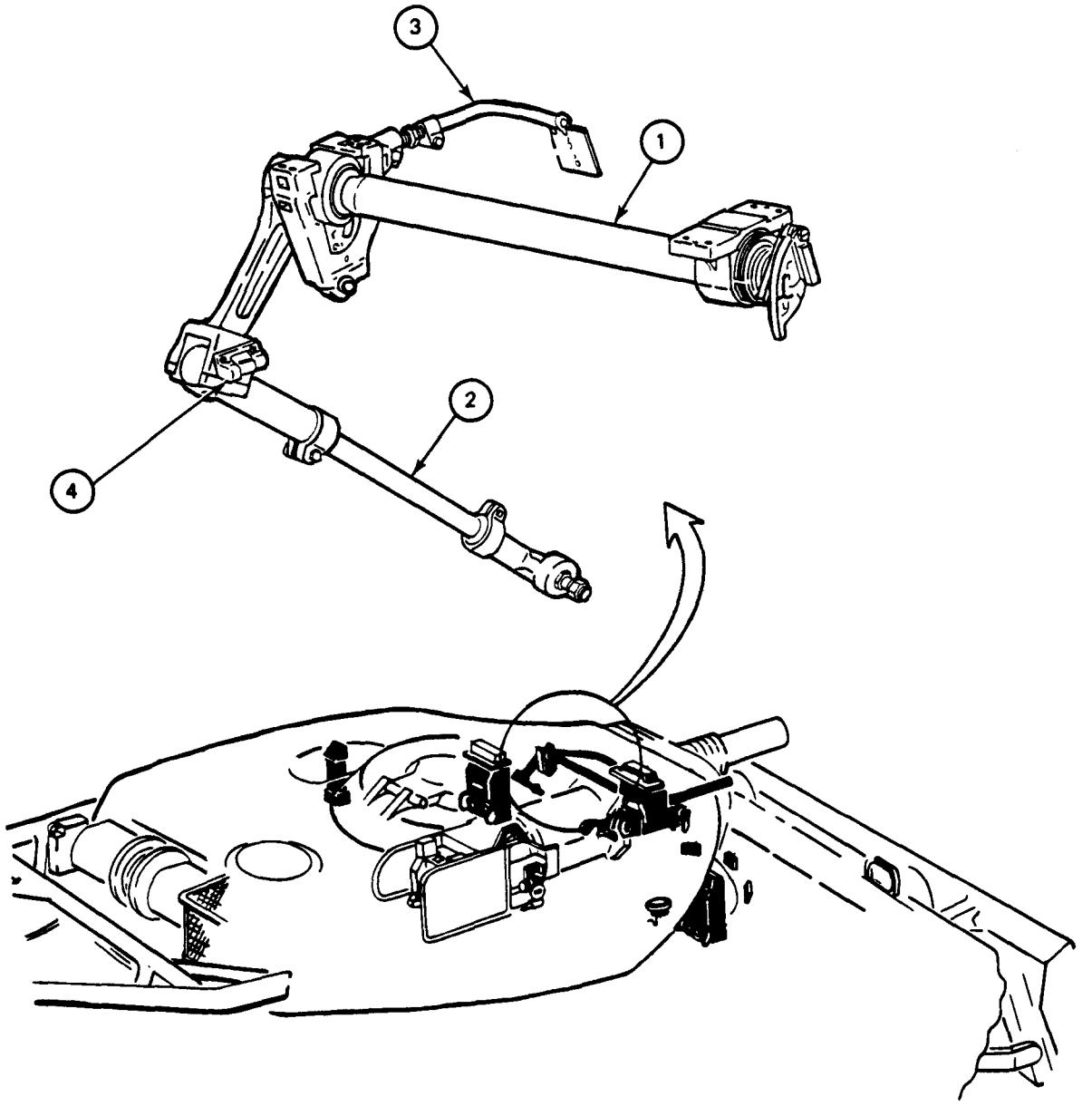


3-2. INSPECTION UPON RECEIPT (CONT)

FRAME 3

Step	Procedure	Maintenance Action	Reference
1.	Using 3/4" wrench, check two screws (1) are tight.	Tighten. Replace if	. . .
2.	Check nut (2) and cotter pin are not missing.	Tell your supervisor.	. . .
3.	Check threads on adjuster (3) are not damaged.	Replace adjuster.	Para 4-9
4.	Check washer (4) and cotter pin (5) are not missing on link pin (6).	Tell your supervisor.	. . .
5.	Check rubber boot (7) for damage, and two wires (8) are not missing.	Tell your supervisor.	. . .
6.	Check ballistic drive for chipped or scratched paint.	Paint chipped or scratched area.	TM 43-0139
	NOTE		
	FOLLOW-ON MAINTENANCE		
	Correct faults listed on DA Form 2404 that may affect performance test. Do Performance Test (Vol I, para 2-2).		
	END OF TASK		

3-2. INSPECTION UPON RECEIPT (CONT)


3
1
2
4

CHAPTER 4

MAINTENANCE PROCEDURES

Section 1. GENERAL

4-1. SCOPE

This chapter gives maintenance procedures for the M15 Ballistics Drive.

4-2. LIST OF BALLISTICS DRIVE ITEMS CONTAINED IN THIS CHAPTER

Item	Figure Index No.	Reference (para)
Ballistics Drive	1	4-3
Trunnion Link	2	4-6
Temperature Compensating Rod	3	4-9
Fire Control Level	4	4-12

Section 2. BALLISTICS DRIVE

4-3. BALLISTICS DRIVE MAINTENANCE PROCEDURES INDEX

Task	Reference (para)
Removal	4-4
Installation	4-5

4-4. BALLISTICS DRIVE REMOVAL

TOOLS: 7/16", 15/16", 1/2", 9/16", 3/4" box end wrenches
5/16" modified socket head screw key (fabricated Allen wrench, see App. C)
1-1 / 16" open end wrench
Wire cutters
Pry bar
#2 cross tip screwdriver (Phillips type)
1/4" flat tip screwdriver

PERSONNEL: Two
Repairman A: Holds ballistics drive
Repairman B: Removes hardware

REFERENCES: TM 9-2350-222-10 for removing M32C periscope

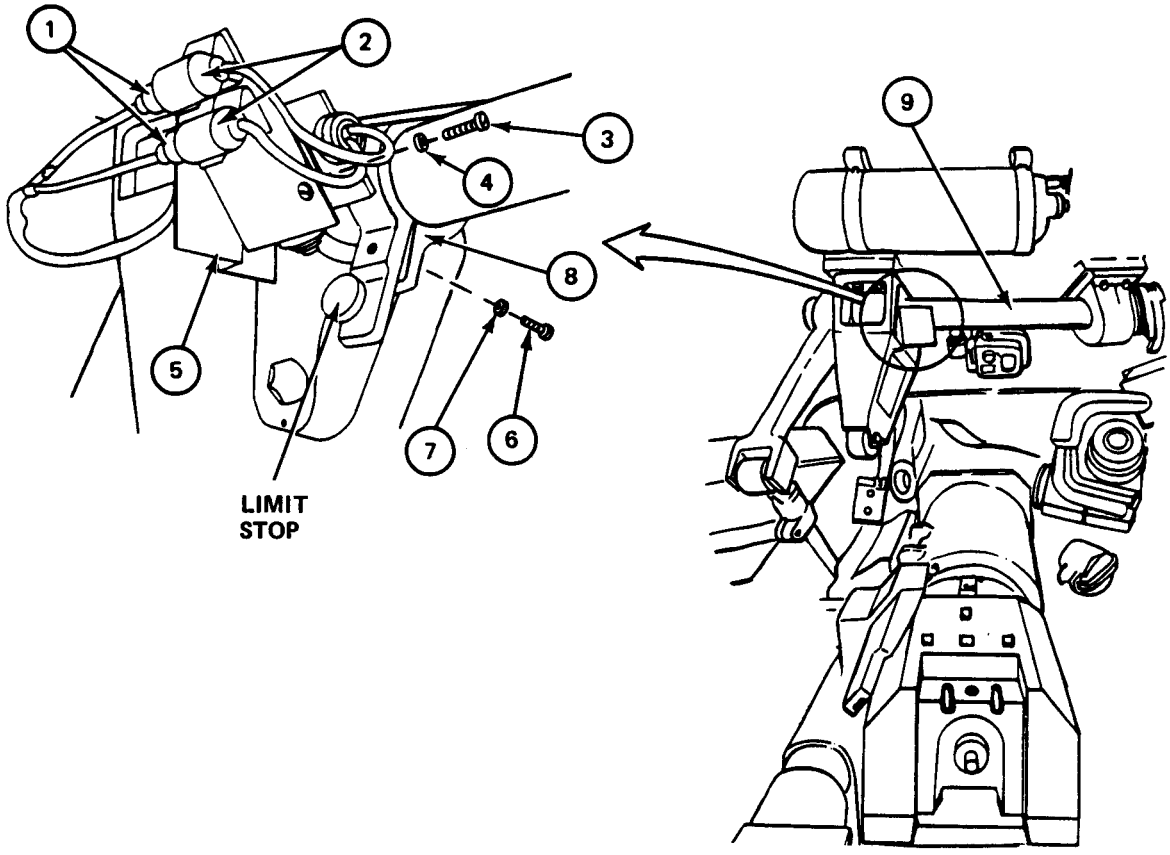
EQUIPMENT CONDITION: Ballistics drive mounted in vehicle

PRELIMINARY PROCEDURES: Remove gunner's periscope M32C (TM 9-2350-222-10)

4-4. BALLISTICS DRIVE REMOVAL (CONT)

FRAME 1

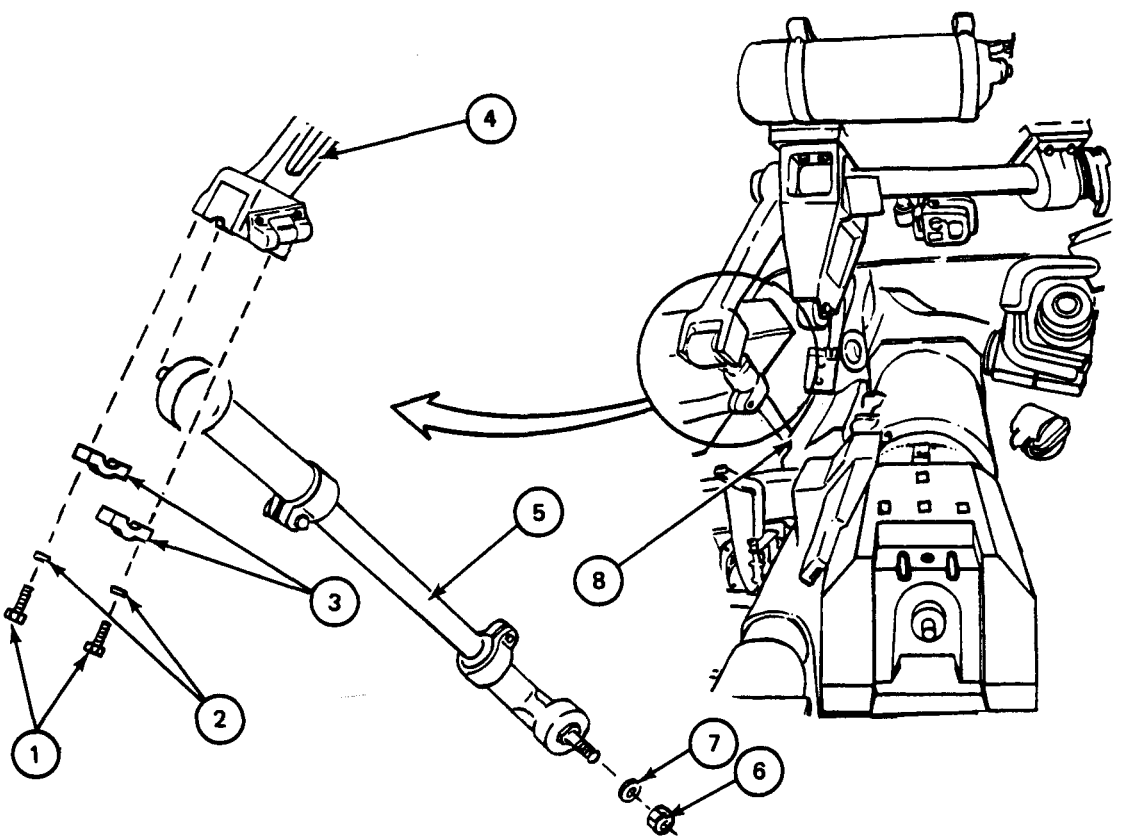
Step	Procedure
1.	Disconnect electrical plugs (1) from electrical connectors (2).
2.	Using Phillips screwdriver, remove two screws (3) and two lockwashers (4) holding bracket (5) to ballistics drive.
3.	Remove bracket (5) and attached switch.
4.	Using 7/16” wrench, remove one screw (6) and one lockwasher (7), holding clamp assembly (8) to cross shaft assembly (9).
	NOTE Clamp assembly (8) should remain in vehicle. Clamp assembly is not part of ballistics drive.
5.	Remove clamp assembly (8) with limit stop attached.
	GO TO FRAME 2



4-4. BALLISTICS DRIVE REMOVAL (CONT)

FRAME 2

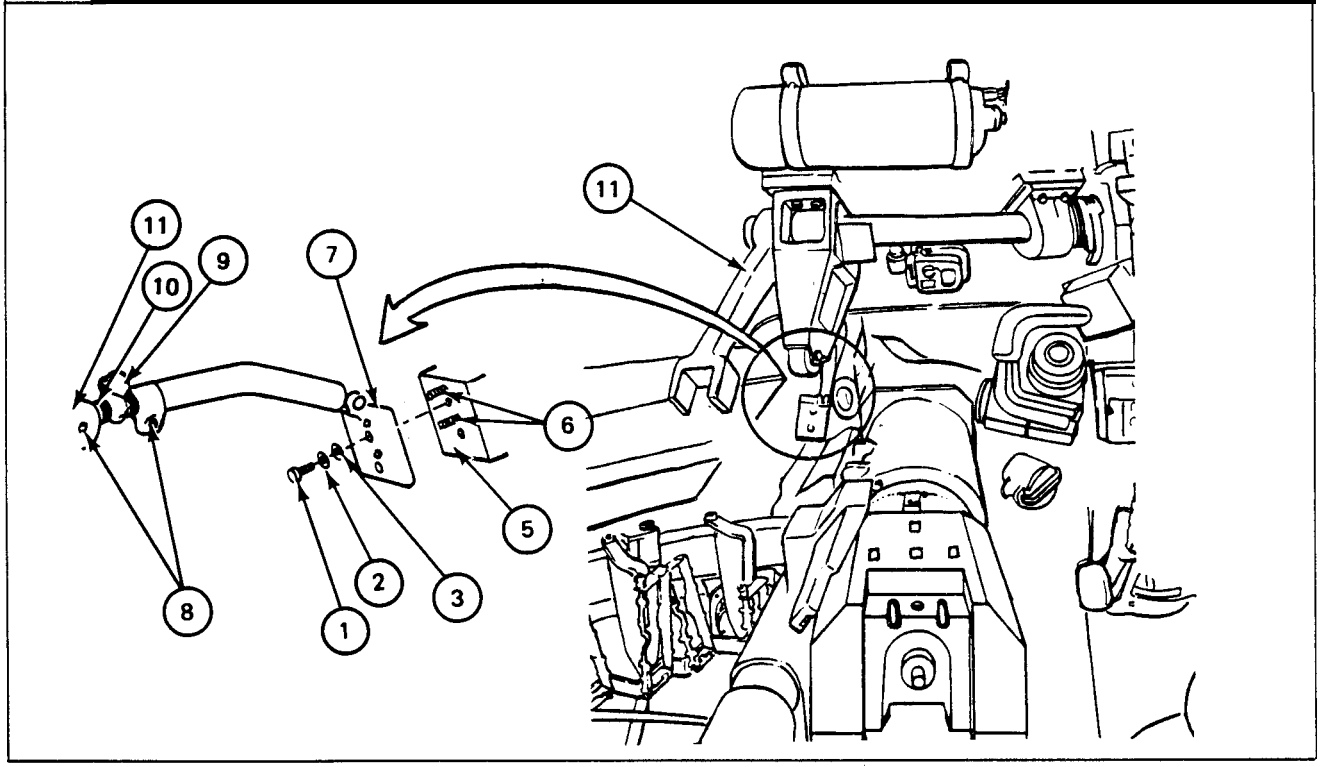
Step	Procedure
1.	Using 1/2" wrench, remove four screws (1), four washers (2) and two caps (3) from connecting arm (4).
2.	Lower trunnion link (5) from connecting arm (4).
3.	Loosely put four screws (1), four washers (2) and two caps (3) on connecting arm (4) to prevent loss.
4.	Using 15/16" wrench, remove nut (6) and washer (7).
5.	Remove trunnion link (5) from gun trunnion (8).
6.	Loosely put washer (7) and nut (6) on trunnion link (5) to prevent loss.
	GO TO FRAME 3



4-4. BALLISTICS DRIVE REMOVAL (CONT)

FRAME 3

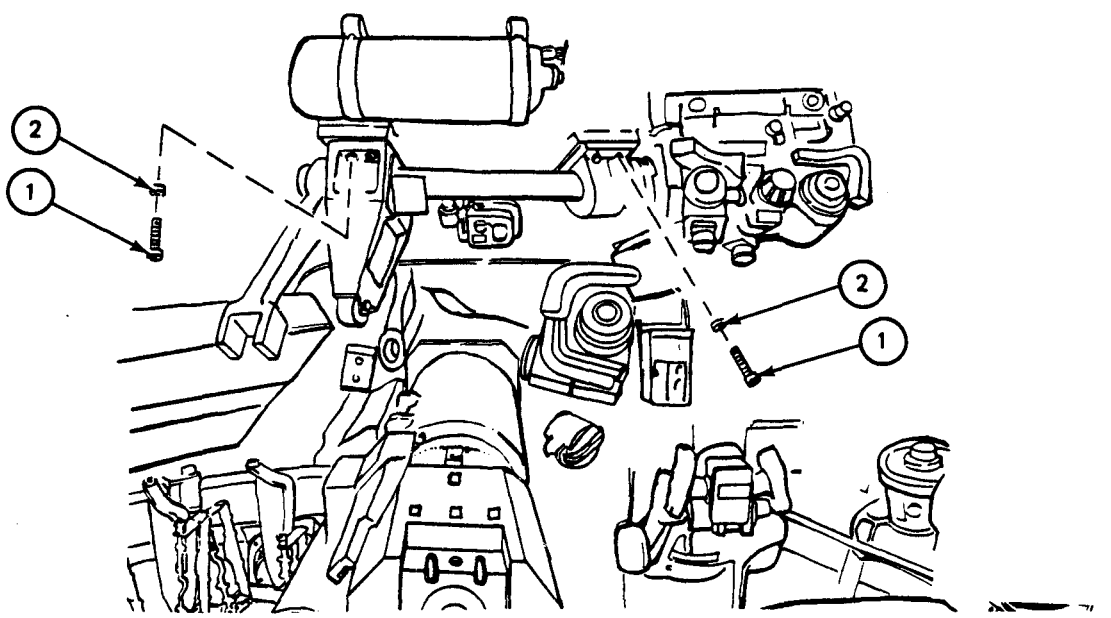
Step	Procedure
1.	Using 9/16" box end wrench, remove two screws (1), two lockwashers (2), and two flat washers (3) holding temperature compensating rod and bracket (4) to turret pad (5).
	CAUTION Be careful when using pry bar. Damage to two pins (6) may result.
2.	Using pry bar, remove bracket (7) from turret pad (5).
	NOTE Do steps 3 and 4 only if temperature compensating rod (4) is being removed for repair.
3.	Using 3/4" open end wrench, loosen two screws (8). Using wire cutter, remove wire seal (9) from adjuster (10).
4.	Using 1-1/16" wrench, remove adjuster (10) from ballistics drive (11).
	GO TO FRAME 4



4-4. BALLISTICS DRIVE REMOVAL (CONT)

FRAME 4

Step	Procedure
	WARNING Be careful when removing ballistics drive, it is heavy and hard to handle. Do not drop as it may hurt someone or damage equipment.
1.	Repairman B, using fabricated Allen wrench, loosen, but do not remove eight screws (1).
2.	Repairman A holds ballistics drive, Repairman B removes eight screws (1) and eight lockwashers (2).
3.	Repairmen A and B, using pry bar, carefully pry and lower ballistics drive from turret roof.
4.	Repairman A, inside vehicle, carefully hand ballistics drive through loader's hatch to Repairman B outside vehicle.
5.	Using flat tip screwdriver, check that three screws (3) are tight and not missing. If loose, tighten and tell your supervisor. If missing send ballistic drive to depot for repair.
	END OF TASK



4-5. BALLISTICS DRIVE INSTALLATION

TOOLS: 5/16“ modified socket head screw key (fabricated Allen wrench, see App. C)
Spacer gage
Electric drill
1/4” pin drive punch
15/64” drill bit
1/4” reamer
8 oz ball peen hammer
9/16”, 7/16”, and 3/4” box end wrench
1-1/16” and 15/16” open end wrench
#2 cross tip screwdriver (Phillips type)

SUPPLIES: Rags, clean (item 1, App. A)
Alcohol (item 2, App. A)

PERSONNEL: Two
Repairman A: Holds ballistic drive
Repairman B: Installs hardware

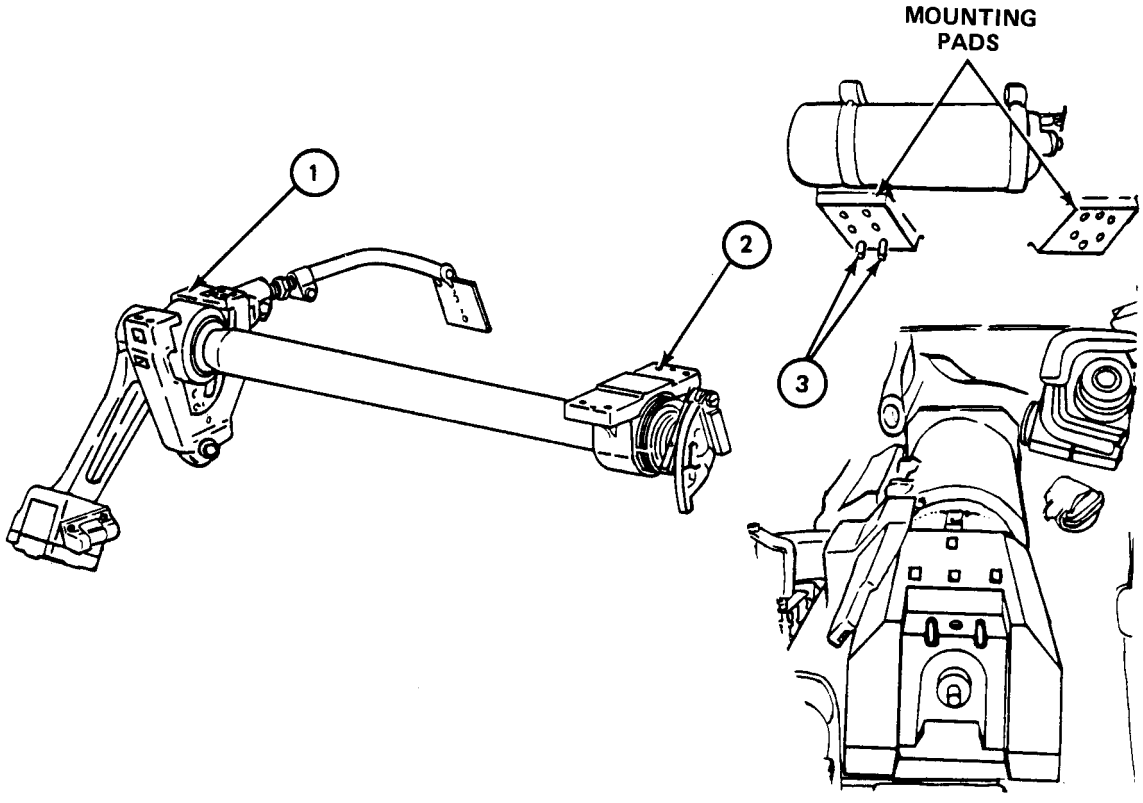
REFERENCES: JPG 41C for cleaning with alcohol

EQUIPMENT CONDITION: Ballistic drive in clean area next to parked vehicle

4-5. BALLISTICS DRIVE INSTALLATION (CONT)

FRAME 1

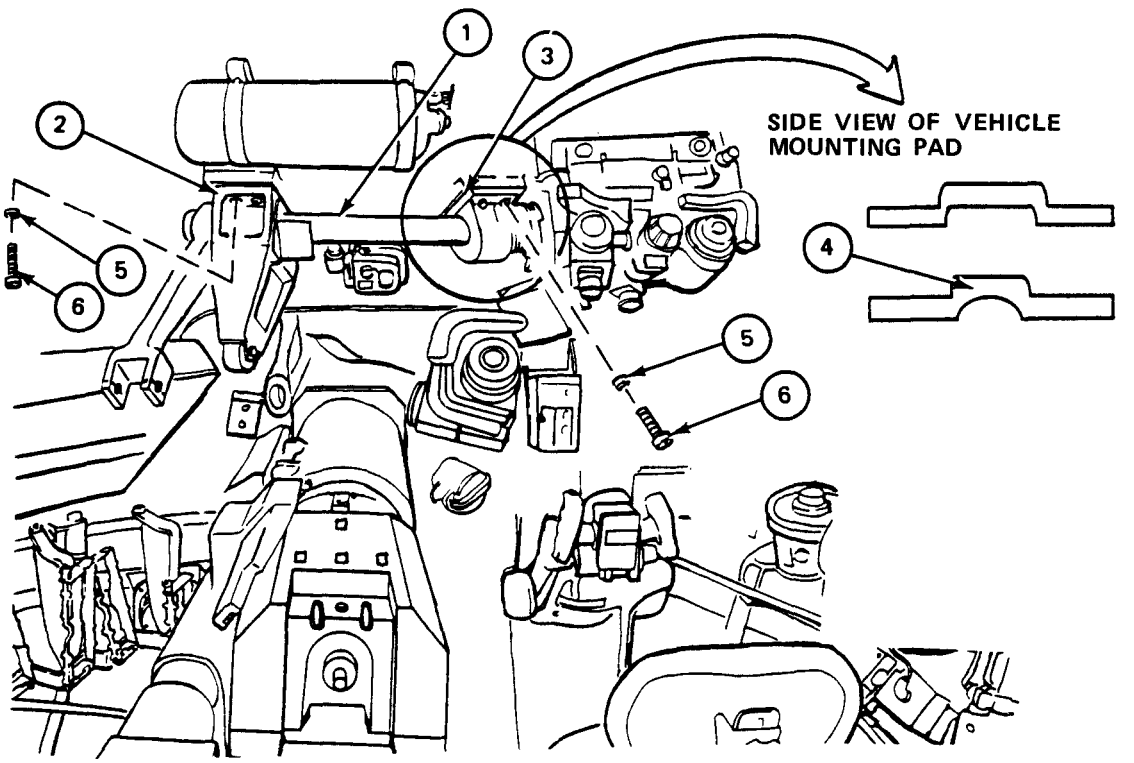
Step	Procedure
1.	Using rags and alcohol, clean mounting pads on turret roof for right and left support assemblies (1) and (2) (JPG).
2.	Check two pins (3) in left mounting pad are not damaged. If damaged, replace with good pin(s).
3.	Repairman B, outside turret, carefully hand ballistics drive through loader's hatch to repairman A inside vehicle. GO TO FRAME 2



4-5. BALLISTICS DRIVE INSTALLATION (CONT)

FRAME 2

Step	Procedure
1.	Repairman A, lift ballistics drive (1) to put left support assembly (2) and right support assembly (3) on turret mounting pads. NOTE Make sure locating key (4) in right support assembly (3) is in line with keyway in turret mounting pad.
2.	Repairman B, loosely install eight washers (5) and eight screws (6) in left and right support assemblies (2) and (3) to hold support assemblies on turret mounting pads. NOTE Do not tighten screws (6) if installing a replacement ballistics drive. GO TO FRAME 3

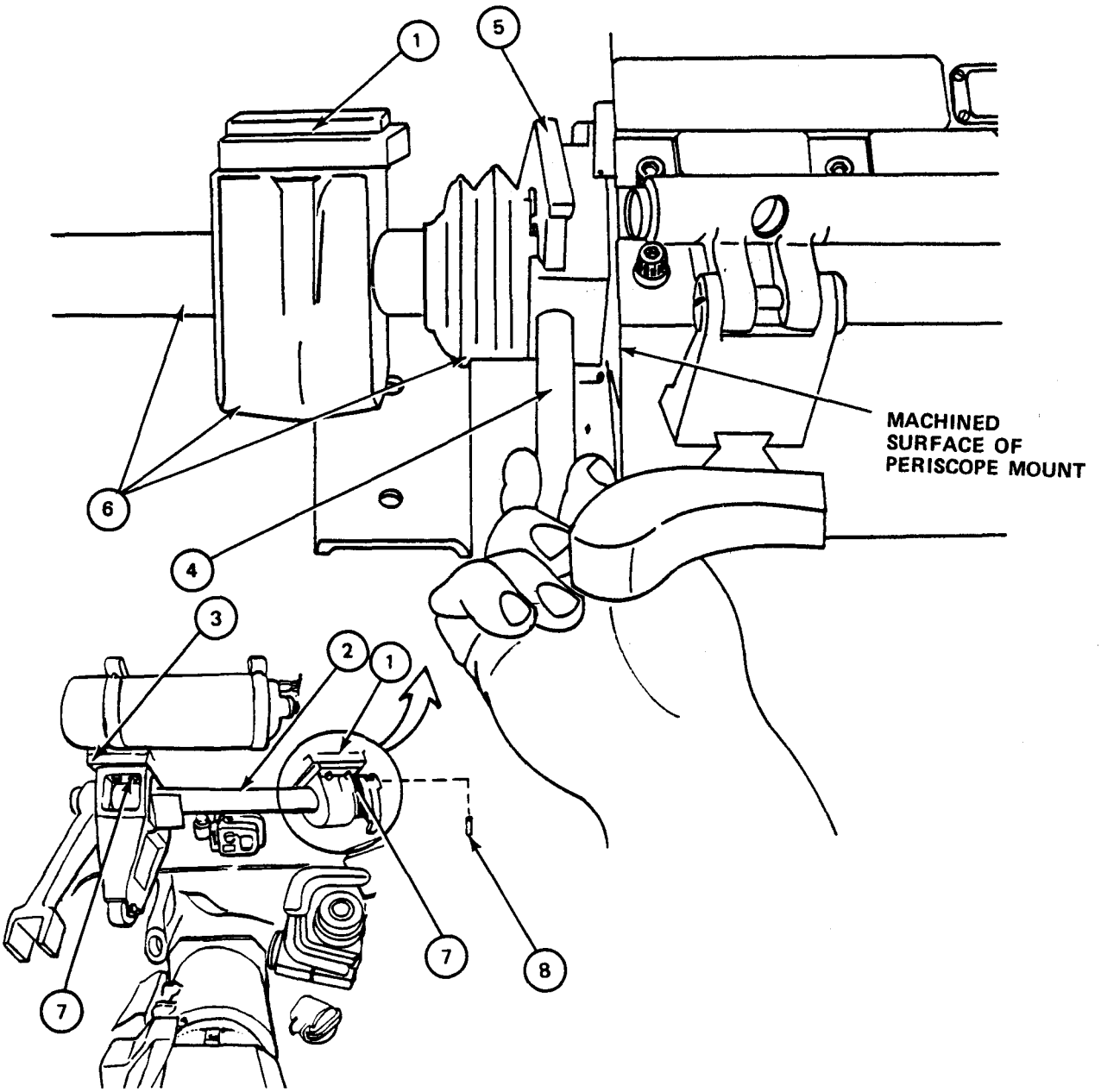


4-5. BALLISTICS DRIVE INSTALLATION (CONT)

FRAME 3

Step	Procedure
	NOTE The oversize screw holes in right support assembly (1) lets right support assembly move back and forth from right to left to set the correct distance from M32C periscope. While moving right support assembly back and forth, cross shaft (2) slides inside bearing of left support assembly (3).
1.	Using spacer gage (4), set correct distance between V-shaped output coupling (5) and left outer machined surface of periscope mount by sliding cross shaft assembly (6) left or right.
	NOTE While tightening screws (7) keep checking distance with spacer gage (4) to make sure distance stays the same.
2.	Using fabricated Allen wrench, alternately tighten eight screws (7) in right and left support assemblies (1) and (3).
	NOTE Do step 3 only if new pins (8) are to be installed.
3.	Use holes in left or right support assemblies as guide and using drill and bit, drill new holes in turret pads.
4.	Using punch and hammer, install pins (8). GO TO FRAME 4

4-5. BALLISTICS DRIVE INSTALLATION (CONT)

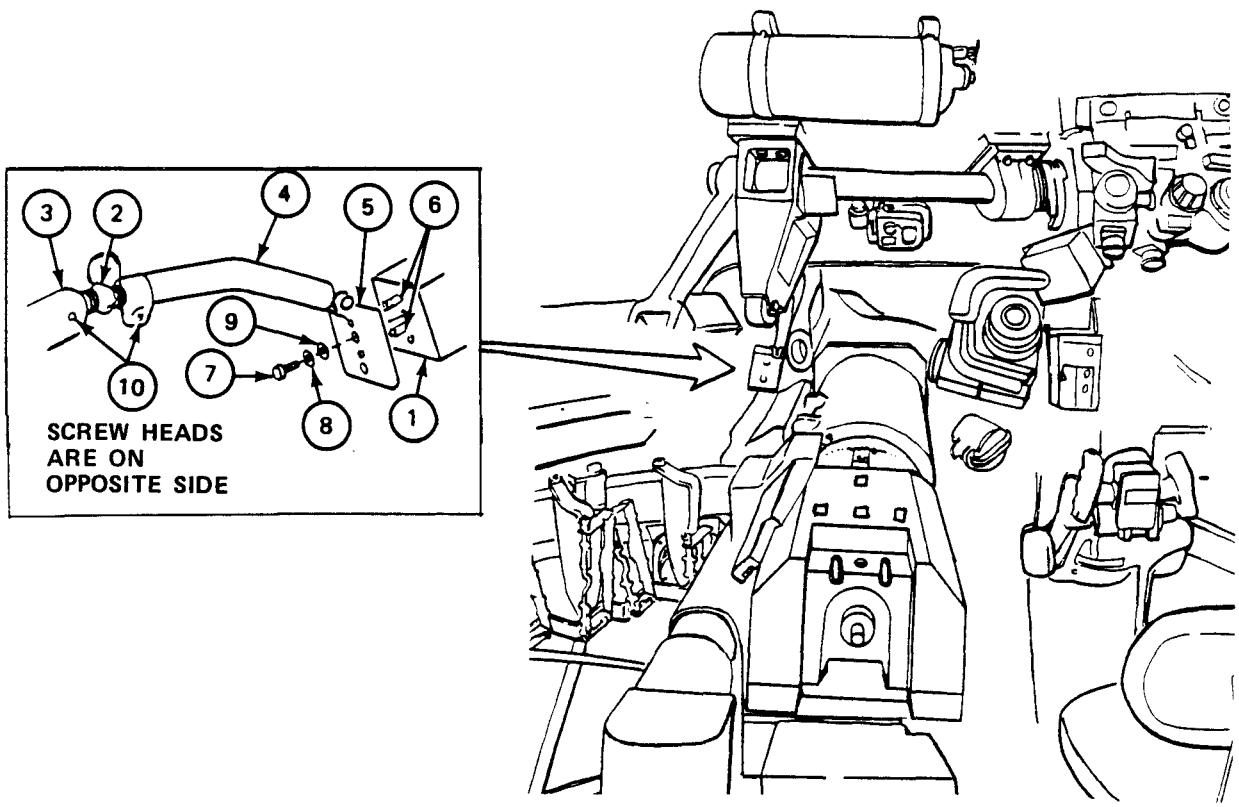


4-5. BALLISTICS DRIVE INSTALLATION (CONT)

FRAME 4

Step	Procedure
1.	Using rag and alcohol, clean turret mounting pad (1) (JPG).
	CAUTION Place gun tube at maximum elevation to prevent injury and to provide easier access to component.
2.	Repairman A, position adjuster (2) into support arm (3). Turn adjuster (2) by hand to mesh threads.
3.	Repairman A, using 1-1/16“ wrench, screw adjuster (2) into support arm (3) and rod (4) until clearance is enough to mount bracket (5) onto turret mounting pad (1). Make sure pin holes in bracket (5) are lined up with pins (6).
4.	Repairman A, guide bracket (5) onto turret mounting pad pins (6) while repairman B turns adjuster (2) clockwise to lengthen rod (4).
5.	Repairman B, using 9/16“ wrench, install two screws (7), two lockwashers (3), and two flat washers (9) into mounting bracket (5) and mounting pad (1).
6.	Repairman A, using 3/4” wrench, tighten two screws (10) to support arm (3) and rod (4).
	GO TO FRAME 5

4-5. BALLISTICS DRIVE INSTALLATION (CONT)

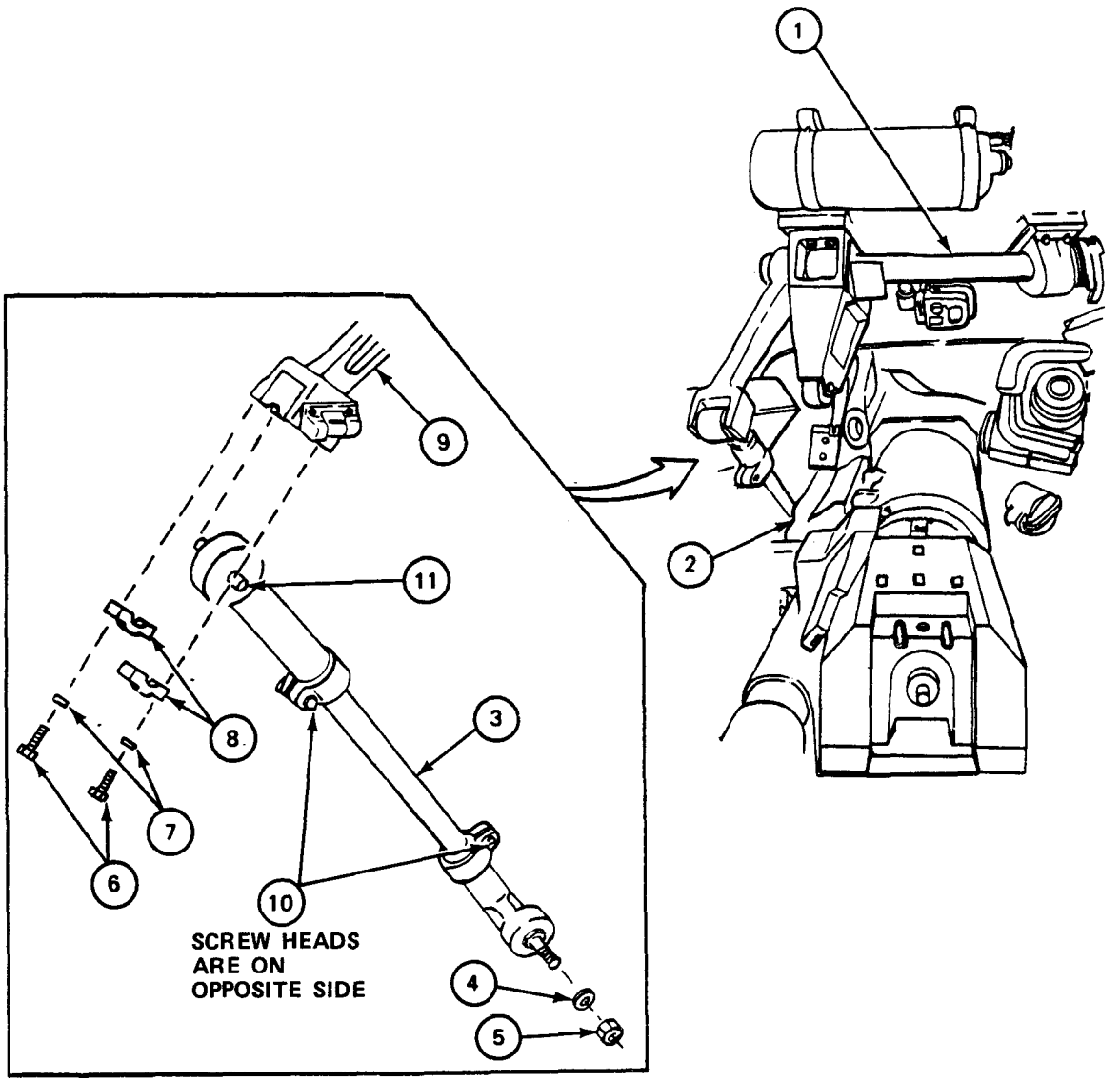


4-5. BALLISTICS DRIVE INSTALLATION (CONT)

FRAME 5

Step	Procedure
1.	Using hands, turn cross shaft (1) in both directions. Be sure cross shaft (1) turns freely.
2.	Using rag and alcohol, clean mounting hole on gun trunnion (2) for installing end of trunnion link (3) (JPG).
3.	Install stud end of trunnion link (3) in gun trunnion (2) and using 15/16“ wrench, install washer (4) and nut (5).
4.	Remove four screws (6), four washers (7), and two caps (8) from connecting arm (9).
5.	Using 15/16” wrench, loosen two screws (10) on trunnion link (3).
6.	Raise free end of trunnion link (3) and put spindle (11) in bearing slot of connecting arm (9). Turn link tube (3) to lengthen or shorten the trunnion link (3) to make spindle (11) fit easily in the bearing slot of connecting arm (9) if necessary.
7.	Put two caps (8) on end of connecting arm (9) to hold end of trunnion link (3).
8.	Using 1/2” wrench, install four washers (7) and four screws (6) to hold two caps (8).
	GO TO FRAME 6

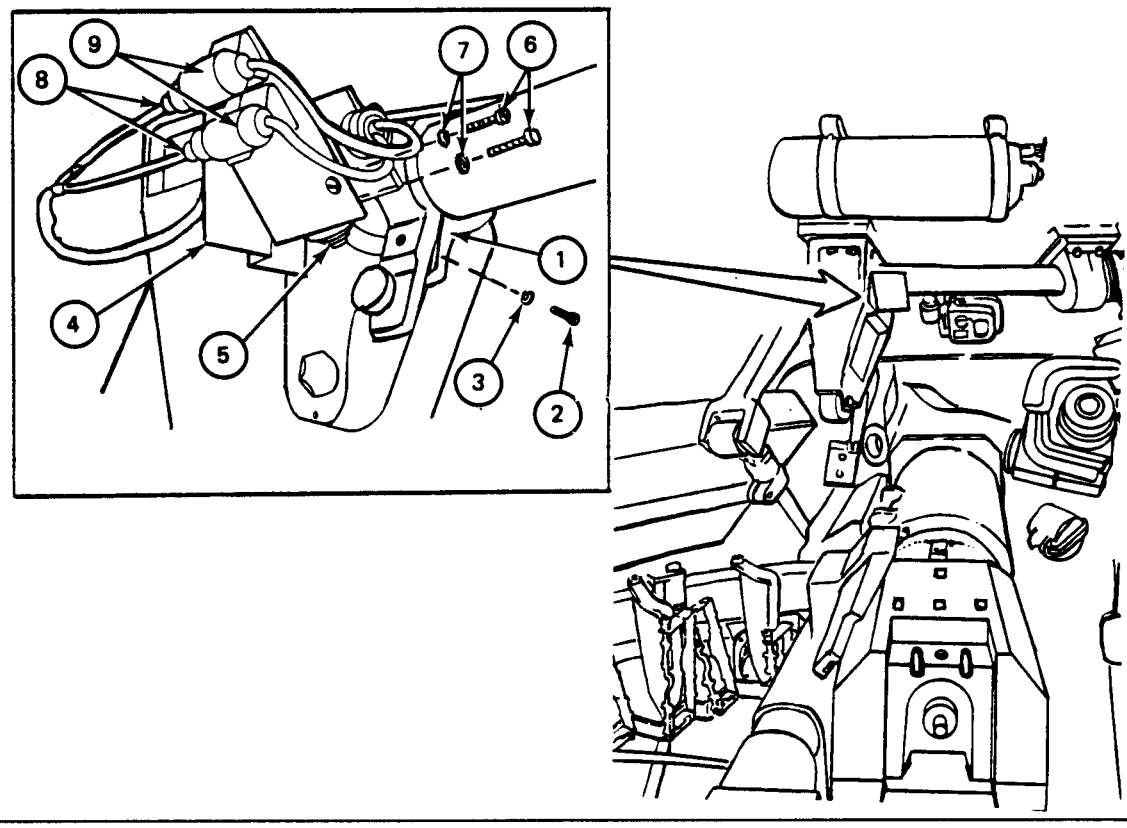
4-5. BALLISTICS DRIVE INSTALLATION (CONT)



4-5. BALLISTICS DRIVE INSTALLATION (CONT)

FRAME 6

Step	Procedure
1.	Using 7/16” wrench, install clamp assembly (1) (limit stop attached), using one screw (2) and one lockwasher (3).
2.	Using screwdriver, install bracket (4), switch (5) (attached) using two screws (6) and two lockwashers (7).
3.	Connect electrical plugs (8) to electrical connectors (9).
	NOTE FOLLOW-ON MAINTENANCE Do performance test (Vol I, para 2-2).
	END OF TASK



Section 3. TRUNNION LINK

4-6. TRUNNION LINK MAINTENANCE PROCEDURES INDEX

Task	Reference (para)
Removal	4-4, Frame 2
Disassembly	4-7
Assembly	4-8
Installation	4-5, Frame 5

4-7. TRUNNION LINK DISASSEMBLY

TOOLS: 15/16" box end wrench
Wire cutters
Vise

PERSONNEL: One

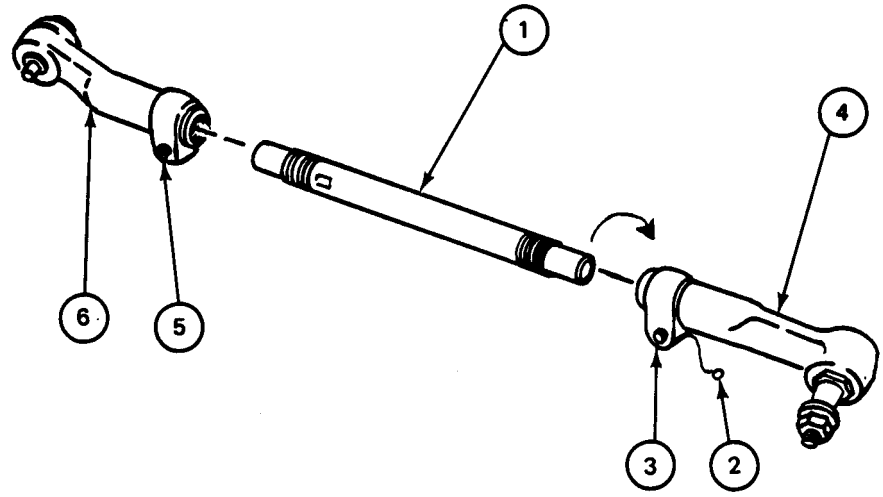
EQUIPMENT CONDITION: Trunnion link on work bench

PRELIMINARY PROCEDURES: Remove trunnion link (para 4-4, Frame 2)

4-7. TRUNNION LINK DISASSEMBLY (CONT)

FRAME 1

Step	Procedure
1.	Clamp tube (1) in vise.
2.	Using wire cutter, cut and remove seal (2).
3.	Using wrench, loosen screw (3).
4.	Turn drive connector (4) clockwise until it comes off of tube (1).
5.	Using wrench, loosen screw (5).
6.	Turn link connector assembly (6) until it comes off of tube (1).
	END OF TASK



4-8. TRUNNION LINK ASSEMBLY

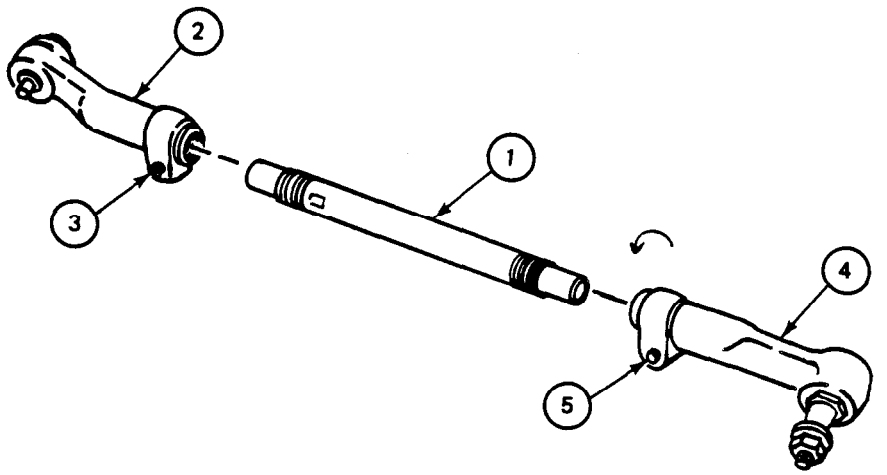
TOOLS: 15/16“ box end wrench
Vise

PERSONNEL: One

EQUIPMENT CONDITION: Trunnion link on work bench

FRAME 1

Step	Procedure
1.	Clamp tube (1) in vise.
2.	Screw link connector assembly (2) on tube (1).
3.	Using wrench, lightly tighten screw (3).
4.	Screw drive connector assembly (4) counterclockwise on tube (1).
5.	Using wrench, lightly tighten screw (5).
	NOTE FOLLOW-ON MAINTENANCE Install trunnion link (para 4-5, Frame 5). Do performance test (Vol I, para 2-2).
	END OF TASK



Section 4. TEMPERATURE COMPENSATING ROD

4-9. TEMPERATURE COMPENSATING ROD MAINTENANCE PROCEDURES INDEX

Task	Reference (para)
Removal	4-10
Installation	4-11

4-10. TEMPERATURE COMPENSATING ROD REMOVAL

TOOLS: 8 oz ball peen hammer
1/8" punch
1/2" brass drift pin
3/4" box end wrench
1-1/16" open end wrench

PERSONNEL: One

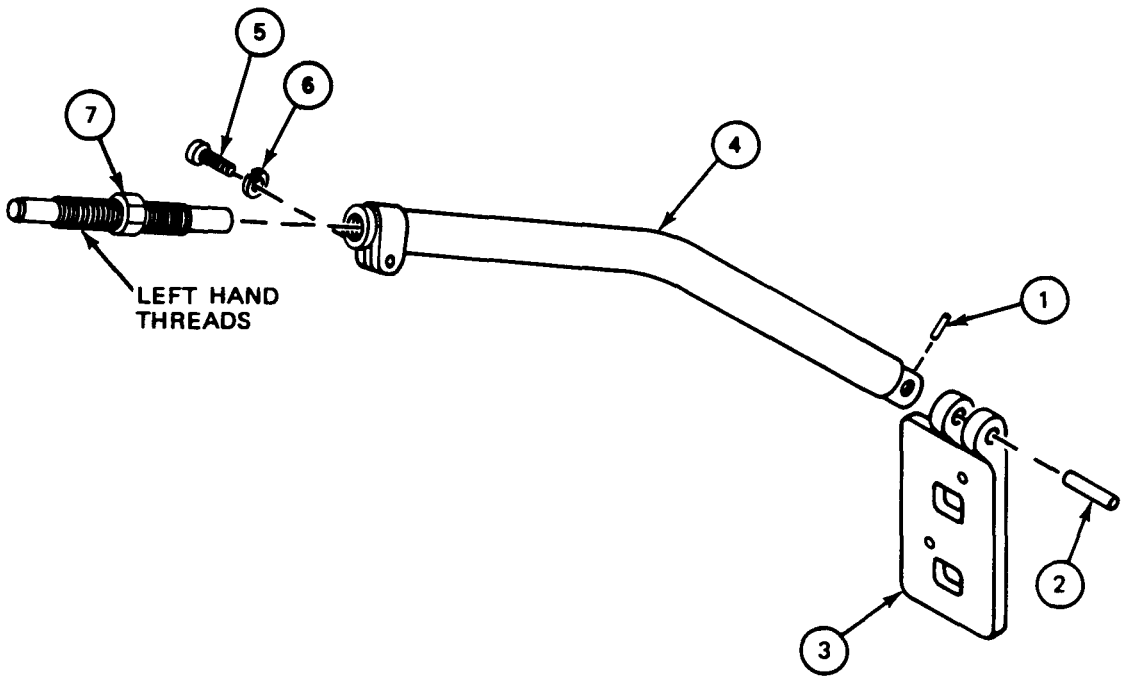
EQUIPMENT CONDITION: Temperature compensating rod and related parts on work bench

PRELIMINARY PROCEDURES: Remove temperature compensating rod and related parts (para 4-4, Frame 3)

4-10. TEMPERATURE COMPENSATING ROD REMOVAL (CONT)

FRAME 1

Step	Procedure
1.	Using punch and hammer, drive out tapered pin (1) from smaller diameter end of tapered pin (1).
2.	Using brass drift pin and hammer, drive out straight pin (2) and remove bracket (3) from rod (4).
3.	Using wrench, remove screw (5) and lockwasher (6).
4.	Using 1-1/16” wrench, remove adjuster (7) from rod (4).
	END OF TASK



4-11. TEMPERATURE COMPENSATING ROD INSTALLATION

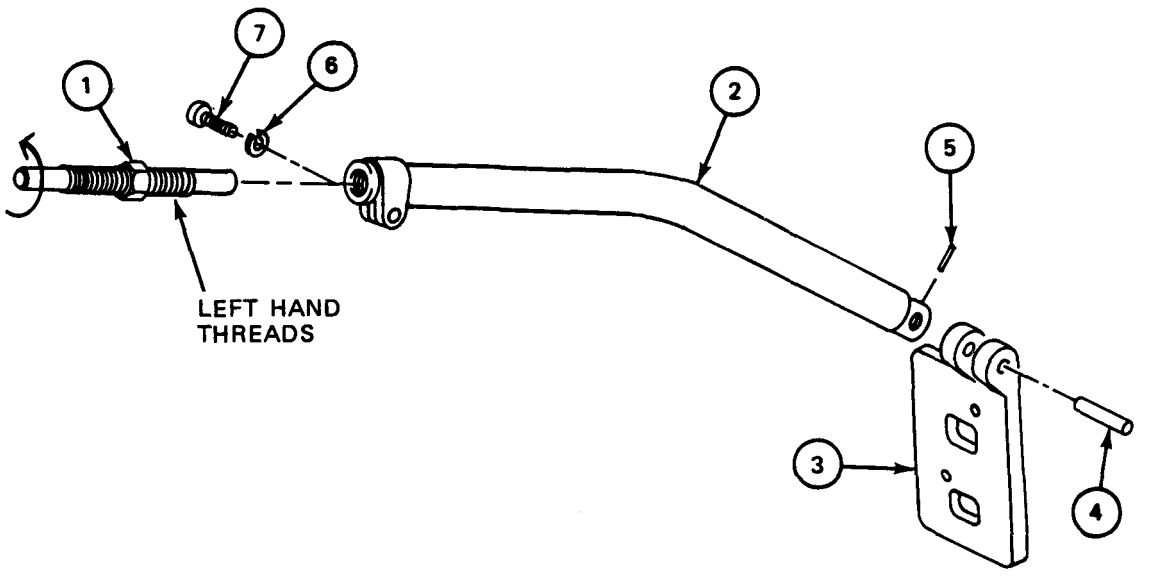
TOOLS: 3/4" box end wrench
8 oz ball peen hammer

PERSONNEL: One

EQUIPMENT CONDITION: Temperature compensating rod and related parts on work bench

FRAME 1

Step	Procedure
1.	Screw left hand thread end of adjuster (1) four turns counterclockwise into rod (2).
2.	Line up holes in mounting bracket (3) with hole in rod (2).
3.	Install pin (4) into bracket (3) and rod (2).
4.	Using hammer, install tapered pin (5).
5.	Using wrench, install, do not tighten, washer (6) and screw (7).
	NOTE FOLLOW-ON MAINTENANCE: Install temperature compensating rod and related parts (para 4-5, Frame 4). Do performance test (Vol I, para 2-2).
	END OF TASK



Section 5. FIRE CONTROL LEVEL

4-12. FIRE CONTROL LEVEL MAINTENANCE PROCEDURES INDEX

Task	Reference (para)
Removal	4-13
Disassembly	4-14
Assembly	4-15
Installation	4-16

4-13. FIRE CONTROL LEVEL REMOVAL

TOOLS: 1/4" flat tip screwdriver, offset
Soft face hammer

PERSONNEL: One

EQUIPMENT CONDITION: Ballistic drive mounted in vehicle

NOTE

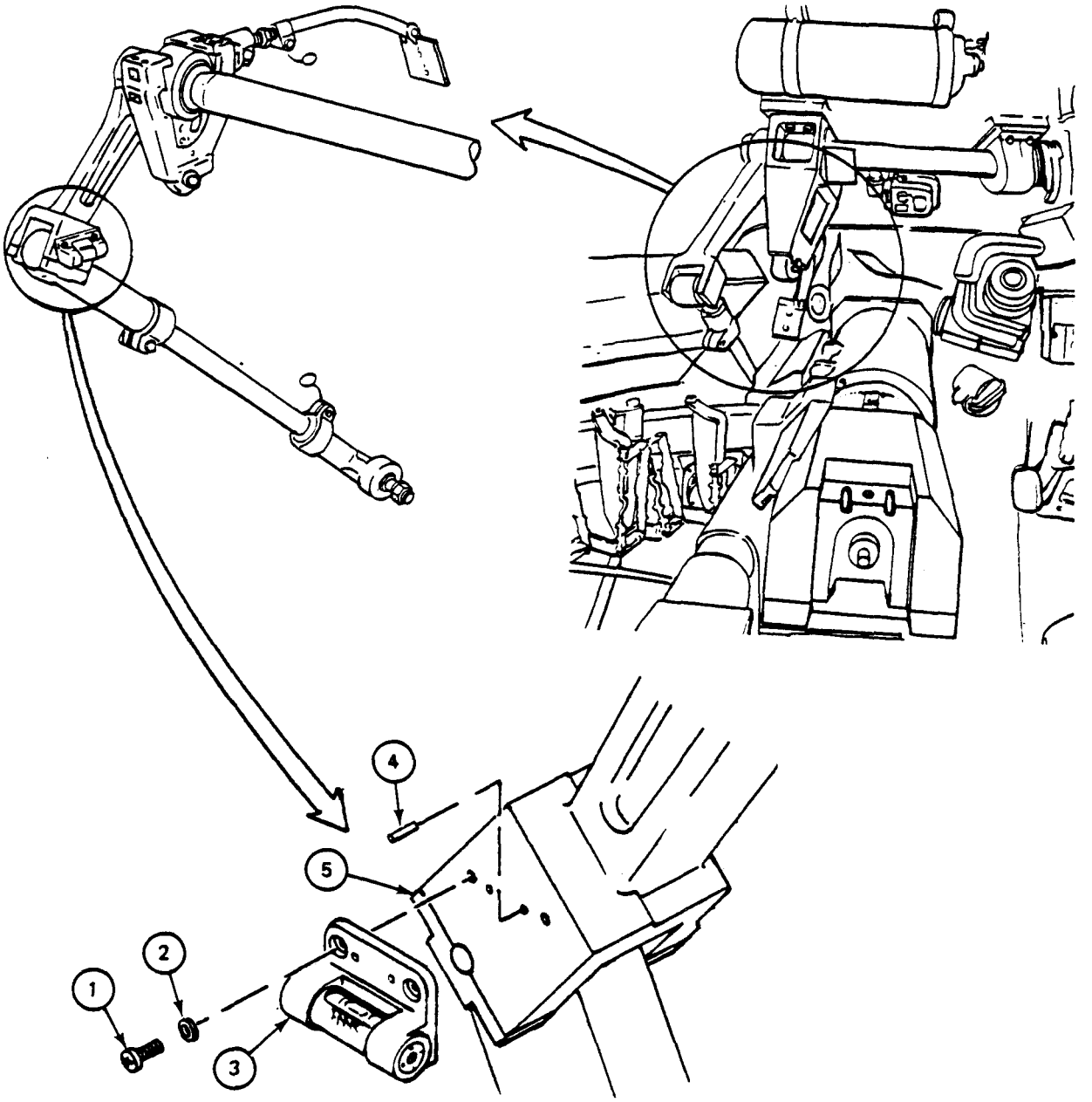
Once the ballistic drive is removed from the vehicle DS/GS does not have the tools to accurately set the fire control level if removed from drive. If the fire control level needs to be repaired, repair before removing ballistic drive from vehicle.

4-13. FIRE CONTROL LEVEL REMOVAL (CONT)

FRAME 1

Step	Procedure
1.	Using screwdriver, remove two screws (1) and two lockwashers (2).
	NOTE Fire control level is mounted on two pins. It may require prying to remove it from ballistic drive. Pins should not be removed in normal removal or assembly.
2.	Using hammer, tap lightly on edge of fire control level (3) while pulling straight off.
3.	Remove tire control level (3) from pins (4) and ballistic drive (5).
	END OF TASK

4-13. FIRE CONTROL LEVEL REMOVAL (CONT)



4-14. FIRE CONTROL LEVEL DISASSEMBLY

TOOLS: 0.055 to 0.060 adjustable face spanner wrench
4 oz ball peen hammer
1/16“ drive pin punch
Machinist’s scriber
0.055 jeweler’s screwdriver
1/4” flat tip screwdriver

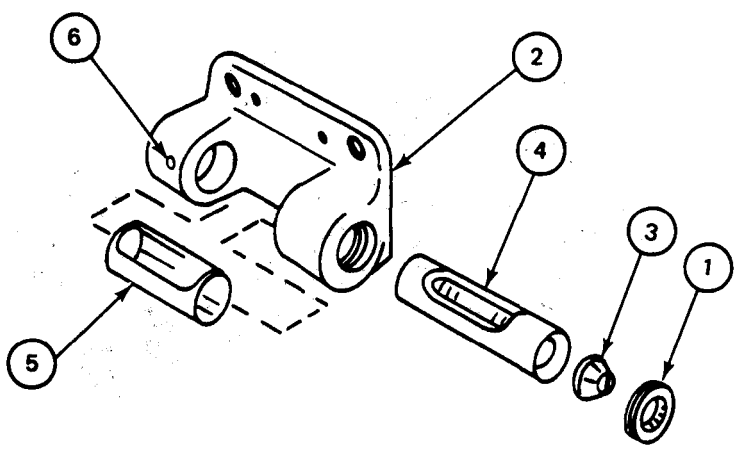
PERSONNEL: One

EQUIPMENT CONDITION: Fire control level on work bench

PRELIMINARY PROCEDURES: Remove fire control level from ballistic drive (para 4-13)

FRAME 1

Step	Procedure
1.	Using spanner wrench, remove threaded ring (1) from housing (2).
2.	Remove eccentric (3) from end of housing (2).
3.	Slide level vial tube (4) through cover (5) and housing (2).
4.	Remove cover (5) from housing (2).
	NOTE Do step 5 only if pin (6) is damaged.
5.	Using hammer and punch, drive pin (6) from housing (2).
	END OF TASK



4-15. FIRE CONTROL LEVEL ASSEMBLY

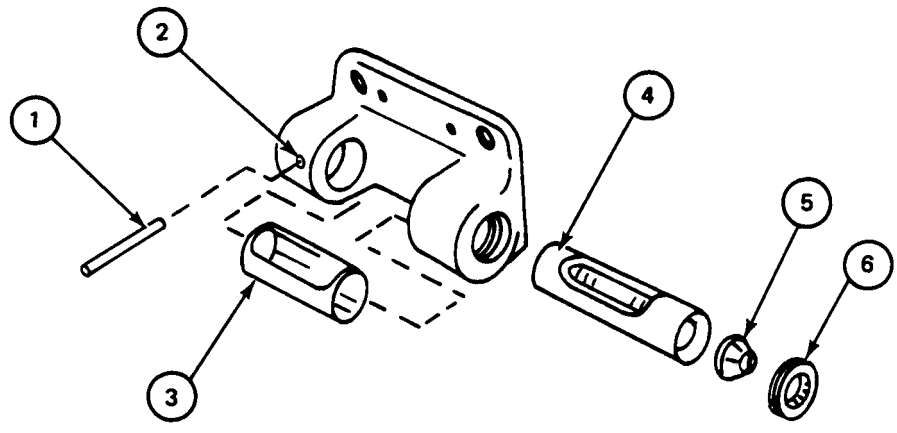
TOOLS: 0.055 to 0.060 adjustable face spanner wrench
4 oz. ballpeen hammer
1/16“ drive pin punch
0.055 jeweler’s screwdriver
1/4” flat tip screwdriver

PERSONNEL: One

EQUIPMENT CONDITION: Fire control level on work bench

FRAME 1

Step	Procedure
	NOTE Do step 1 only if pin (1) was removed.
1.	Using hammer and punch, install pin (1) in housing (2).
2.	Position cover (3) on housing (2) and hold in place while installing level vial tube (4). Make sure level vial tube (4) is lined up with pin (1) in housing (2).
3.	Place eccentric (5) into threaded ring (6).
4.	Using spanner wrench, install threaded ring (6) with eccentric (5). Do not tighten.
5.	Install and adjust fire control level (para 4-16).
	END OF TASK



4-16. FIRE CONTROL LEVEL INSTALLATION

TOOLS: 1/4" flat tip screwdriver, offset
Soft face hammer
M1A1 gunner's quadrant

PERSONNEL: One

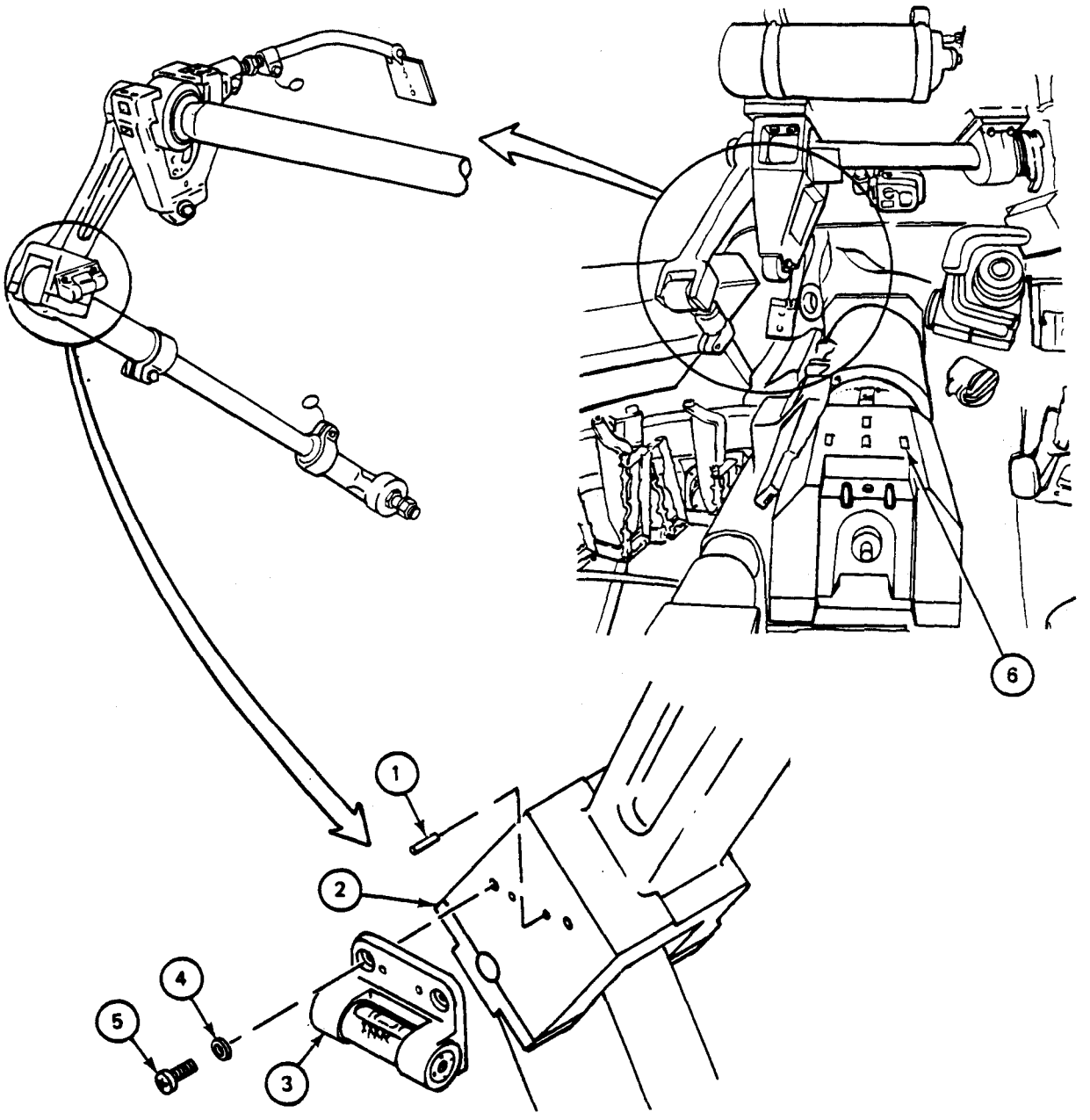
REFERENCES: TM 9-2350-222-10 for Elevating and depressing gun
Using M1A1 gunner's quadrant

EQUIPMENT CONDITION: Ballistic drive mounted in vehicle; vehicle on level ground

FRAME 1

Step	Procedure
	NOTE If pins were removed or are being replaced, start with step 1. If not, go to step 3.
1.	Place two pins (1) in holes in ballistic drive (2).
2.	Using hammer, tap pins (1) gently until they are in place.
3.	Position fire control level (3) on pins (1) evenly.
4.	Using hammer, tap fire control level (3) gently to install on pins (1).
5.	Using 1/4" offset screwdriver, install two washers (4) and two screws (5).
6.	Place gunner's quadrant on breech (6) leveling pads (TM-10).
7.	Elevate or depress gun until level bubble in gunner's quadrant is centered (TM-10).
	GO TO FRAME 2

4-16. FIRE CONTROL LEVEL INSTALLATION (CONT)

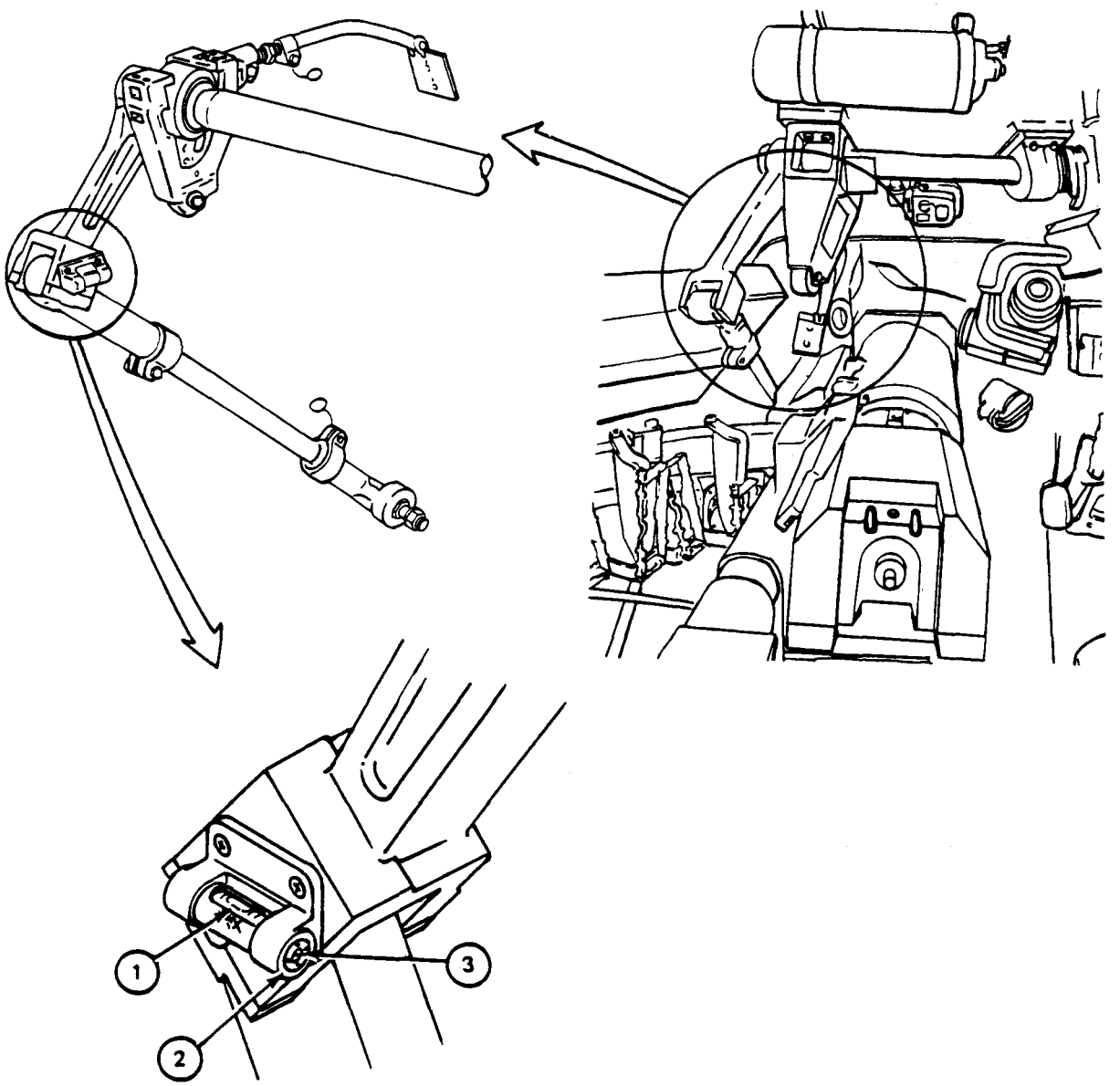


4-16. FIRE CONTROL LEVEL INSTALLATION (CONT)

FRAME 2

Step	Procedure
1.	Check ballistic drive fire control level bubble (1) is centered.
	NOTE
	If bubble is centered, go to step 4; if not, continue with step 2.
2.	Using spanner wrench, loosen ring (2) slightly.
3.	Using 3/16" screwdriver, turn eccentric (3) left or right until level vial assembly bubble (1) is centered.
	NOTE
	Eccentric (2) may have to be held in position with 3/16" screwdriver to prevent it from turning when doing next step.
4.	Using spanner wrench, tighten ring (2).
5.	Check level vial assembly bubble (1) remains centered. If not, repeat steps 2 through 5.
6.	Remove gunner's quadrant.
	NOTE
	FOLLOW-ON MAINTENANCE
	Do performance test (Vol I, Chap 2)
	END OF TASK

4-16. FIRE CONTROL LEVEL INSTALLATION (CONT)



CHAPTER 5

FINAL INSPECTION

5-1. SCOPE

This chapter gives final inspection procedures to be done after repairing the ballistics drive.

5-2. FINAL INSPECTION

PERSONNEL: One

REFERENCES: JPG 41C for cleaning
TM 9-2350-222-10 for elevating and depressing gun.

EQUIPMENT CONDITION: Ballistics drive installed in vehicle

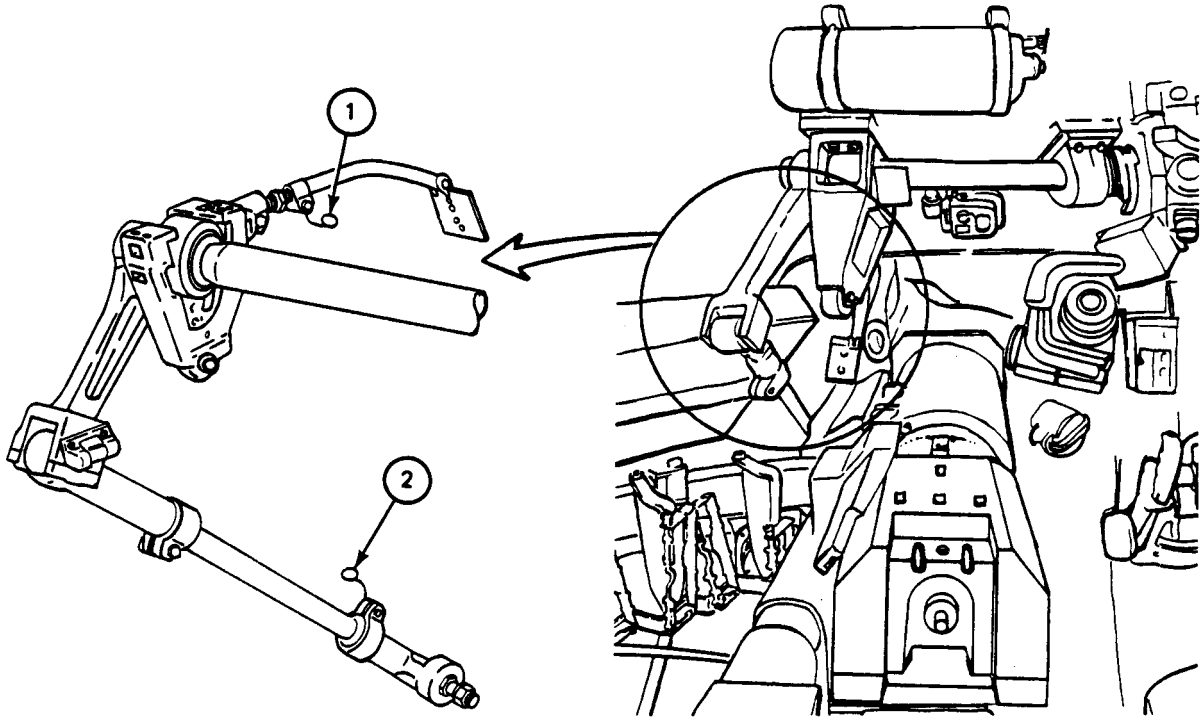
NOTE

If you find a fault, tell your supervisor. If you do not find a fault, send the good ballistics drive back to service.

5-2. FINAL INSPECTION (CONT)

FRAME 1

Step	Procedure
1.	Check ballistics drive for loose or missing parts.
2.	Check ballistics drive is free of dirt and corrosion. If ballistic drive has dirt or corrosion, clear (JPG).
3.	Elevate and depress gun (TM-10). Check movement of ballistics drive is smooth with no binding (TM-10).
4.	Check two seals (1 and 2) are installed.
	END OF TASK



CHAPTER 6

PACKAGING

6-1. SCOPE

This chapter provides information on packaging of the ballistics drive for storage or shipment.

6-2. PACKAGING OF ASSEMBLIES

Package and pack the ballistics drive in accordance with MIL-P-1lG, AR 700-15, TM 9-200, and MIL-P-14232/P10516375.

APPENDIX A

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section 1. INTRODUCTION

A-1. SCOPE

This appendix lists expendable supplies and materials you will need to repair the ballistics drive. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

A-2. EXPLANATION OF COLUMNS

a. Column 1 - Item number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material, e.g., cotton flannel cloth (item 1, App. A).

b. Column 2- Level. This column identifies the lowest level of maintenance that requires the listed items.

F - Direct Support Maintenance

H - General Support Maintenance

c. Column 3 - National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column 4 - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

e. Column 5 - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest of issue that will satisfy your requirements.

Section 2. EXPENDABLE SUPPLIES AND MATERIALS

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
1	F	7920-00-205-1711	Rags, Clean 50 lbs	LB
2	F	6810-00-264-5906	Alcohol, Ethyl 0-C-265 16 oz bottle	BT

APPENDIX B

MAINTENANCE TASK INDEX

B-1. SCOPE

This appendix helps you find maintenance tasks for the ballistics drive by giving you references to the procedures.

B-2. MAINTENANCE TASK INDEX (CONT)

BALLISTICS DRIVE: M15 (1220-00-071-5330) NOMENCLATURE	MAINTENANCE TASKS								
	INSPECTION UPON RECEIPT (VOL II)	FINAL INSPECTION (VOL II)	PERFORMANCE TEST (VOL I)	ADJUST, ALIGN, CALIBRATE (VOL II)	TROUBLESHOOT (VOL I)	REMOVAL/INSTALLATION (VOL II)	DISASSEMBLY/ASSEMBLY (VOL II)	TOOLS AND TEST EQUIPMENT (VOL I/VOL II)	NOTES
BALLISTICS DRIVE	Para 3-2	Para 5-2	Para 2-2	Para 4-5	Para 2-1	Para 4-4/ 4-5		Para 2-8	
FIRE CONTROL LEVEL						Para 4-13/ 4-16	Para 4-14/ 4-15		
TEMPERATURE COMPENSATING ROD						Para 4-10/ 4-11			
TRUNNION LINK						Para 4-4/ 4-5	Para 4-7/ 4-8		

APPENDIX C
FABRICATED TOOL

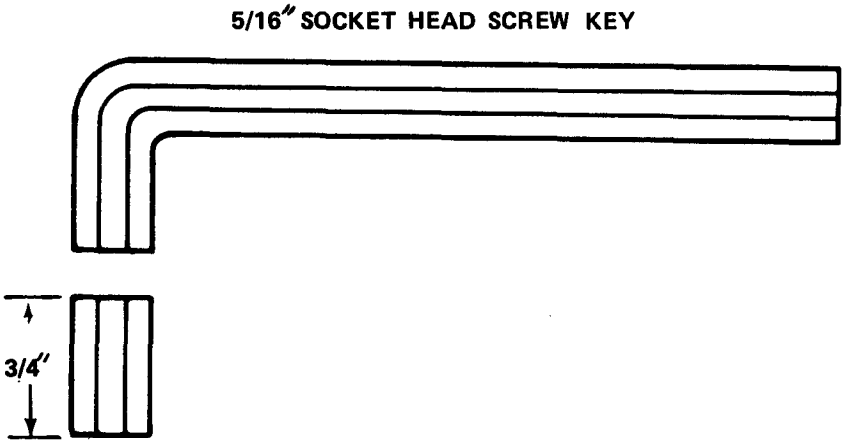
C-1. SCOPE

This section gives the procedure to modify the 5/16“ socket head screw key (Allen wrench or equivalent) for use on the M15 ballistics drive.

C-2. PROCEDURE

a. Get a standard 5/16’” socket head screw key.

b. Cut 3/4” off short end of wrench.



APPENDIX D
DIRECT SUPPORT AND
GENERAL SUPPORT MAINTENANCE
REPAIR PARTS AND SPECIAL TOOLS LIST
(INCLUDING DEPOT MAINTENANCE REPAIR PARTS
AND SPECIAL TOOLS)

Section I. INTRODUCTION

D-1. SCOPE

This appendix lists spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE), and other special support equipment required for performance of direct support, and general support and depot maintenance of the Ballistic Drive M15.
It authorizes the requisitioning and issue of spares and repair parts as indicated by the source and maintenance codes.

D-2. GENERAL

This Repair Parts and Special Tools List is divided into the following sections:

a. Section II. Repair Parts List. A list of spares and repair parts authorized for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in numeric sequence, with the parts in each group listed in figure and item number sequence.

b. Section III. Special Tools List. A list of special-tools, special TMDE, and other special support equipment authorized for the performance of maintenance.

c. Section IV. National Stock Number and Part Number Index. A list in National item identification number (NIIN) sequence, of all National stock numbers (NSN) appearing in the listings, followed by a list in alphameric sequence of all part numbers appearing in the listings. National stock numbers and part numbers are cross-referenced to each illustration figure and item number appearance.

D-3. EXPLANATION OF COLUMNS

a. Illustration. This column is divided as follows:

(1) Figure Number. Indicates the figure number of the illustration on which the item is shown.

(2) Item Number. The number used to identify item called out in the illustration.

b. Source, Maintenance, and Recoverability (SMR) Codes.

(1) Source Code. Source codes indicate the manner of acquiring

support items for maintenance, repair, or overhaul of end items. Source codes are entered in the first and second positions of the Uniform SMR Code format as follows:

Code	Definition
PA	-Item procured and stocked for anticipated or known usage.
PB	-Item procured and stocked for insurance purpose because essentiality dictates that a minimum quantity be available in the supply system.
PC	-Item procured and stocked and which otherwise would be coded PA except that it is deteriorative in nature.
PD	-Support item, excluding support equipment, procured for initial issue or outfitting and stocked only for subsequent or additional initial issues or outfittings. Not subject to automatic replenishment.
PE	-Support equipment procured and stocked for initial issue or outfitting to specified maintenance repair activities.
PF	-Support equipment which will not be stocked but which will be centrally procured on demand.
PG	-Item procured and stocked to provide for sustained support for the life of the equipment. It is applied to an item peculiar to the equipment which, because of probable discontinuance or shutdown of production facilities, would prove uneconomical to reproduce at a later time.
KD	-An item of a depot overhaul/ repair kit and not purchased separately. Depot kit defined as a kit that provides items required at the time of overhaul or repair.
KF	-An item of a maintenance kit and not purchased separately. Maintenance kit defined as a kit that provides an item that can be replaced at organizational or intermediate levels of maintenance.
KB	-Item included in both a depot overhaul/repair kit and a maintenance kit.
MO	-Item to be manufactured or fabricated at organizational level.
MF	-Item to be manufactured or fabricated at the direct support maintenance level.
MH	-Item to be manufactured or fabricated at the general support maintenance level.
MD	-Item to be manufactured or fabricated at the depot maintenance level.
AO	-Item to be assembled at organizational level.
AF	-Item to be assembled at direct support maintenance level.
AH	-Item to be assembled at general support maintenance level.

AD -Item to be assembled at depot maintenance level.

XA -Item is not procured or stocked because the requirements for the item will result in the replacement of the next higher assembly.

XB -Item is not procured or stocked. If not available through salvage, requisition.

XC -Installation drawing, diagram, instruction sheet, field service drawing, that is identified by manufacturer's part number.

XD -A support item that is not stocked. When required, item will be procured through normal supply channels.

NOTE : Cannibalization or salvage may be used as a source of supply for any items coded above except those coded XA and aircraft support items as restricted by AR 700-42.

(2) Maintenance Code. Maintenance codes are assigned to indicate the levels of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the Uniform SMR Code format as follows:

(a) The maintenance code entered in the third position will indicate the lowest maintenance level authorized to remove, replace, and use the support item. The maintenance code entered in the third position will indicate one of the following levels of maintenance:

Code	Application/Explanation
C	-Crew or operator maintenance performed within organizational maintenance.
O	-Support item is removed, replaced, used at the organizational level.
F	-Support item is removed, replaced, used at the direct support level.
H	-Support item is removed, replaced, used at the general support level.
D	-Support items that are removed, replaced, used at depot, mobile depot, or specialized repair activity only.

(b) The maintenance code entered in the fourth position indicates whether the item is to be repaired and identifies the lowest maintenance level with the capability to perform complete repair (i.e., all authorized maintenance functions). This position will contain one of the following maintenance codes.

Code	Application/Explanation
O	-The lowest maintenance level capable of complete repair of the support item is the organizational level.
F	-The lowest maintenance level capable of complete repair of the support item is the direct support level.
H	-The lowest maintenance level capable of complete repair of the support item is the general support level.

D -The lowest maintenance level capable of complete repair of the support item is the depot level.

L -Repair restricted to Specialized Repair Activity. (Not Applicable).

Z -Nonreparable. No repair is authorized.

B -No repair is authorized. The item may be reconditioned by adjusting, lubricating, etc., at the user level. No parts or special tools are procured for the maintenance of this item.

(3) Recoverability Code. Recoverability codes are assigned to support items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the Uniform SMR Code format as follows:

Recoverability Codes	Definition
Z	-Nonreparable item. When unserviceable, condemn and dispose at the level indicated in position 3.
O	-Reparable item. When uneconomically reparable, condemn and dispose at organizational level.
F	-Reparable item. When uneconomically reparable, condemn and dispose at the direct support level.
H	Reparable item. When uneconomically reparable, condemn and dispose at the general support level.
D	-Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal not authorized below depot level.
L	-Reparable item. Repair, condemnation, and disposal not authorized below depot/ specialized repair activity level.
A	-Item requires special handling or condemnation procedures because of specific reasons (i.e., precious metal content, high dollar value, critical material or hazardous material). Refer to appropriate manuals/directives for specific instructions.

c. National Stock Number. Indicates the National stock number assigned to the item and which will be used for requisitioning.

d. Federal Supply Code for Manufacturer (FSCM). The FSCM is a 5-digit numeric code listed in SB 708-42 which is used to identify the manufacturer, distributor, or Government agency, etc.

e. Part Number. Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

NOTE: When a stock numbered item is requisitioned, the item received may have a different part number than the part being replaced.

f. Description. Indicates the Federal item name and, if required, a minimum description to identify the item. In the Special Tools List, the initial basis of issue (BOI) appears as the last line in the entry for each special tool, special TMDE, and other special support equipment. When density of equipments supported exceeds density spread indicated in the basis of issue, the total authorization is increased accordingly.

g. Unit of Measure (U/M). Indicates the standard of the basic quantity of the listed item as used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr, etc). When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required units of measure will be requisitioned.

h. Quantity Incorporated in Unit. Indicates the quantity of the item used in the breakout shown on the illustration figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column in lieu of a quantity indicates that no specific quantity is applicable, (e.g., shims, spacers, etc).

D-4. SPECIAL INFORMATION

(Not Applicable)

D-5. HOW TO LOCATE REPAIR PARTS

a. When National Stock Number or Part Number is Unknown:

(1) First. Using the table of contents, determine the functional group within which the item belongs. This is necessary since illustrations are prepared for functional groups, and listings are divided into the same groups.

(2) Second. Find the illustration covering the functional group to which the item belongs.

(3) Third. Identify the item on the illustration and note the illustration figure and item number of the item.

(4) Fourth. Using the Repair Parts Listing, find the figure and item number noted on the illustration.

b. When National Stock Number or Part Number is Known:

(1) First. Using the Index of National Stock Numbers and Part Numbers, find the pertinent National stock number or part number. This index is in NIIN sequence followed by a list of part numbers in alphameric sequence, cross-referenced to the illustration figure number and item number.

(2) Second. After finding the figure and item number, locate the figure and item number in the repair parts list.

D-6. ABBREVIATIONS

(Not Applicable)

Section II

REPAIR PARTS LIST

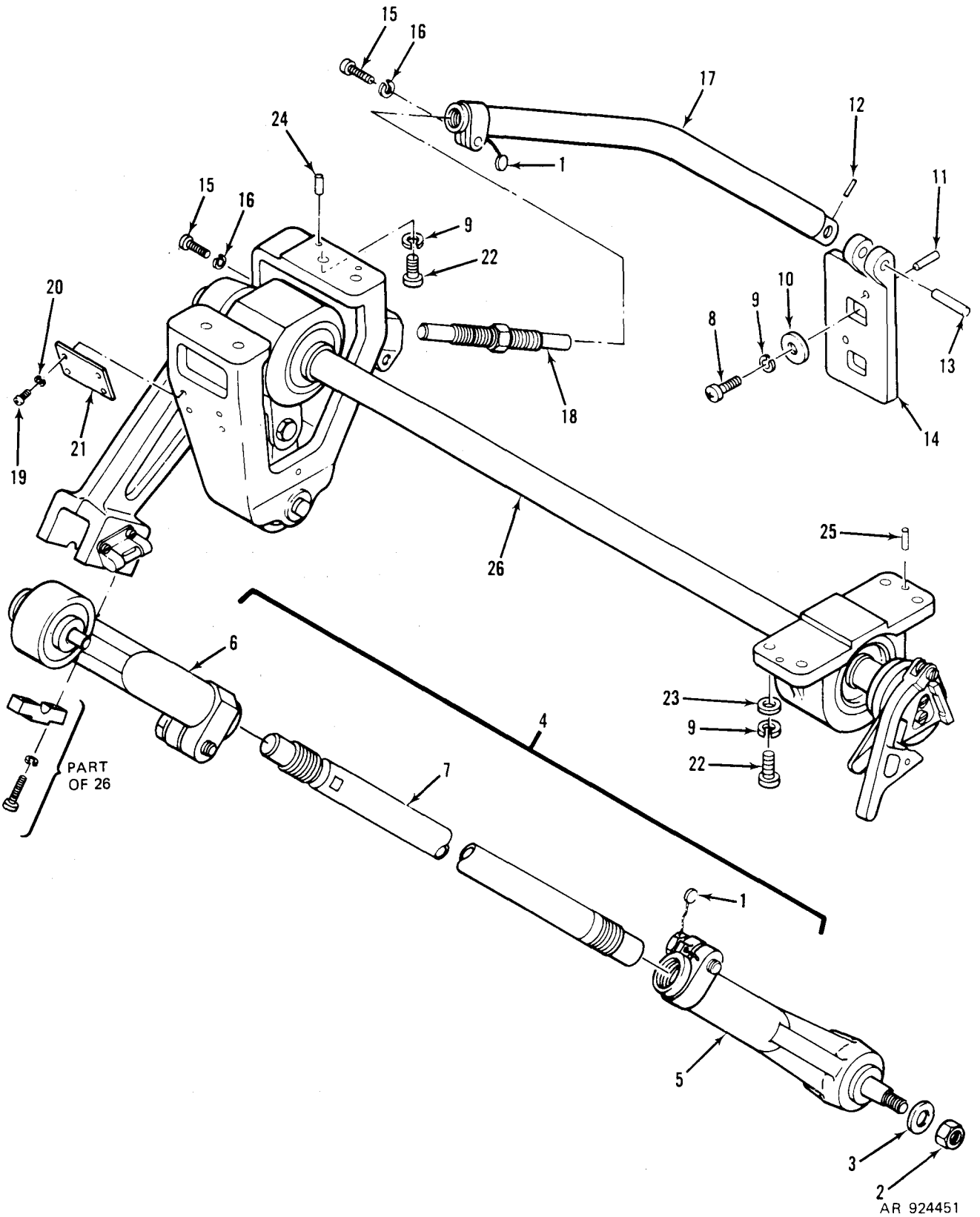


Figure D-1. Ballistic drive M15 10516375 including Link assembly 8620208

(1) ILLUSTRATION (a) FIG NO	(b) ITEM NO	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP OO BALLISTIC DRIVE M15 10516375		
						INCLUDING		
						GROUP 0001 LINK ASSEMBLY 8620208		
D-1	1	PAFZZ	5340-00-491-7632	96906	MS51938-5	SEAL,ANTIPILFERAGE	EA	2
D-1	2	PAFZZ	5310-00-169-9779	19200	10516551	NUT,PLAIN,SLOTTED	EA	1
D-1	3	PAFZZ	3120-00-661-3201	19200	8201215	BEARING,WASHER	EA	1
D-1	4	AFFFF		19200	8620208	LINK ASSEMBLY	EA	1
D-1	5	PAFZZ	1220-00-144-5490	19200	10516116	.CONNECTOR,DRIVE	EA	1
D-1	6	PAFZZ	1220-00-432-1358	19200	8620092	.LINK,CONNECTOR	EA	1
D-1	7	PAFZZ	1220-00-432-1356	19200	8620209	.TUBE DRIVE	EA	1
D-1	8	PAFZZ	5305-00-995-6311	96906	MS35207-271	SCREW,MACHINE	EA	2
D-1	9	PAFZZ	5310-00-926-5877	96906	MS35338-160	WASHER,LOCK	EA	10
D-1	10	PAFZZ	5310-00-990-0700	19200	8620134	WASHER,FLAT	EA	2
D-1	11	PAFZZ	5315-00-901-2190	96906	MS16556-648	PIN,STRAIGHT	EA	2
D-1	12	PAFZZ	5315-00-083-0432	96906	MS35672-31	PIN,GROOVED	EA	1
D-1	13	PAFZZ	5315-00-046-6292	19200	10516092	PIN,STRAIGHT	EA	1
D-1	14	XDFZZ		19200	10516093	BRACKET	EA	1
D-1	15	PAFZZ	5305-00-702-4524	96906	MS35308-413	SCREW,CAP,HEXAGON HEAD	EA	2
D-1	16	PAFZZ	5310-00-933-8778	96906	MS35338-143	WASHER,LOCK	EA	2
D-1	17	PAFZZ	1220-01-091-3591	19200	8620212	ROD,BALLISTIC DRIVE	EA	1
D-1	18	PAFZZ	1220-00-477-9910	19200	8620110	ADJUSTER,DRIVE	EA	1
D-1	19	PADZZ	5305-00-051-4078	96906	MS90727-36	SCREW,CAP,HEXAGON HEAD	EA	4
D-1	20	PADZZ	5310-00-974-6623	96906	MS35338-140	WASHER,LOCK	EA	4
D-1	21	PADZZ	9905-00-432-1357	19200	10516380	PLATE, IDENTIFICATION	EA	1
D-1	22	PAFZZ	5305-00-978-9395	96906	MS16997-100	SCREW,CAP	EA	8
D-1	23	PAFZZ	5310-00-903-2612	96906	MS9321-12	WASHER,FLAT	EA	4
D-1	24	PAFZZ	1220-00-712-8397	19200	8620113	PIN	EA	2
D-1	25	PAFZZ	5315-00-663-1284	96906	MS35675-40	PIN,GROOVED	EA	1
D-1	26	XDDDD		19200	10516381	SHAFT ASSEMBLY	EA	1

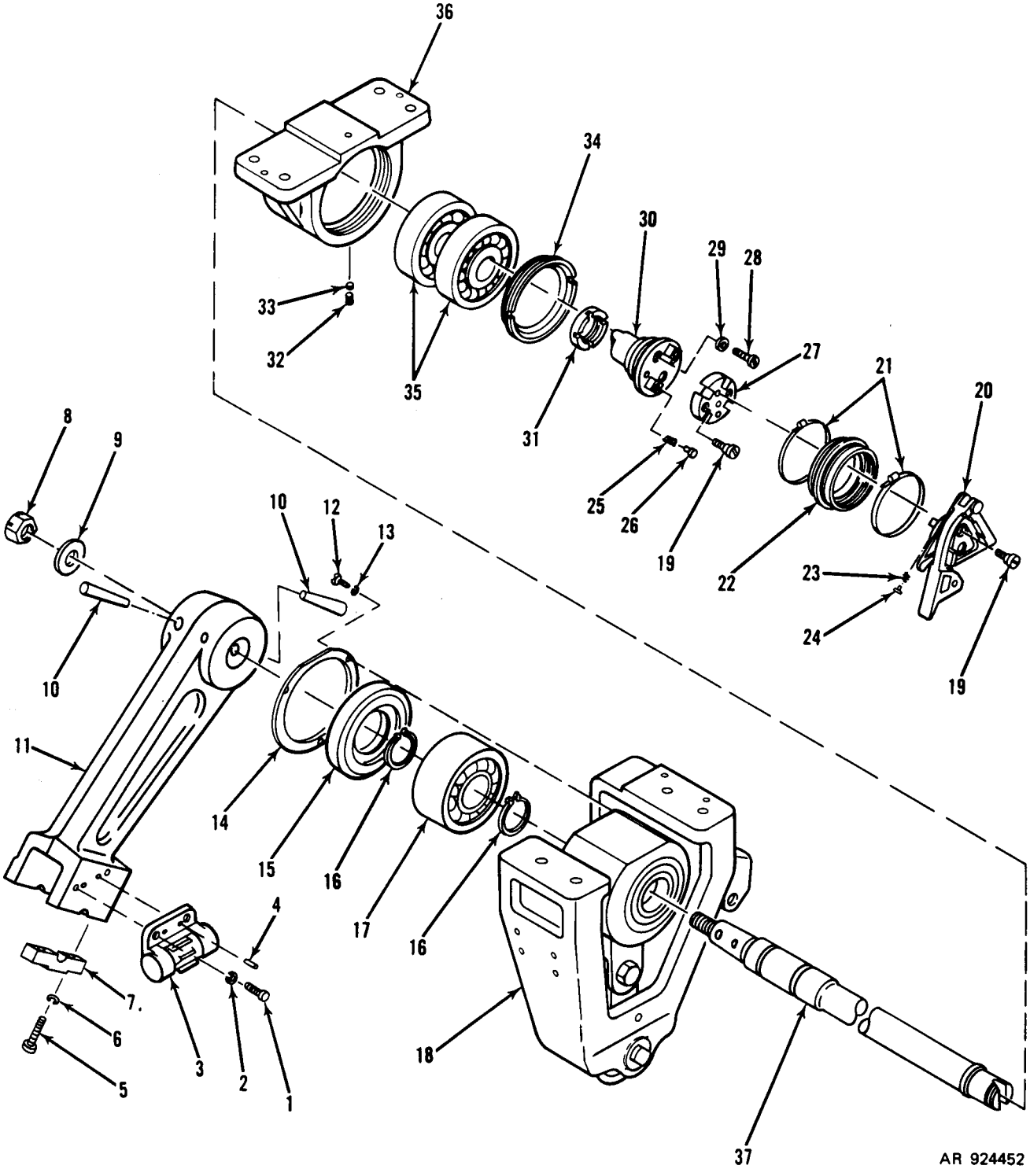


Figure D-2. Shaft assembly 10516381

(1) ILLUSTRATION (a) FIG NO	(b) ITEM NO	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0002 SHAFT ASSEMBLY 10516381		
D-2	1	PAFZZ	5305-00-912-4818	96906	MS35276-261	SCREW,MACHINE	EA	2
D-2	2	PAFZZ	5310-00-933-8119	96906	MS35338-137	WASHER,LOCK	EA	2
D-2	3	PAFFF	1290-00-432-1355	19200	8585560	LEVEL,FIRE CONTROL	EA	1
D-2	4	PAFZZ	5315-00-905-8431	96906	MS16556-626	PIN,STRAIGHT	EA	2
D-2	5	PAFZZ	5305-00-051-4078	96906	MS90727-36	SCREW,CAP HEXAGON HEAD	EA	4
D-2	6	PAFZZ	5310-00-974-6623	96906	MS35338-140	WASHER,LOCK	EA	4
D-2	7	PAFZZ	1220-00-676-2185	19200	8620112	CAP,DRIVE	EA	2
D-2	8	PADZZ	5310-00-108-9654	19200	10516552	NUT,PLAIN,SLOTTED	EA	1
D-2	9	PADZZ	5310-00-595-5818	19200	8201146	WASHER,FLAT	EA	1
D-2	10	PADZZ	5315-00-144-8218	96906	MS24692-375	PIN,TAPERED,PLAIN	EA	2
D-2	11	XDDZZ		19200	10516274	ARM	EA	1
D-2	12	PADZZ	5305-00-054-6668	96906	MS51957-43	SCREW,MACHINE	EA	3
D-2	13	PADZZ	5310-00-933-8119	96906	MS35338-137	WASHER,LOCK	EA	3
D-2	14	PADZZ	5365-01-091-3683	19200	8201244	SPACER,RING	EA	1
D-2	15	XDDZZ		19204	8201231	SEAL RETAINER ASSY	EA	1
D-2	16	PADZZ	5365-00-419-0750	96906	MS16626-4156	RING,RETAINING	EA	2
D-2	17	PADZZ	3110-00-277-0313	19200	8201542	BEARING,BALL	EA	1
D-2	18	XDDZZ		19200	10516383	SUPPORT ASSEMBLY	EA	1
D-2	19	PADZZ	5305-00-582-8184	19200	8605989	SCREW,SELF-LOCKING	EA	4
D-2	20	ADDDD		19200	8620124	COUPLING ASSEMBLY	EA	1
D-2	21	PADZZ	1220-00-357-6124	19200	11727429	CLAMP,REUSUABLE	EA	2
D-2	22	PADZZ	1220-00-357-6136	19200	11727433	BOOT,DUST AND MOISTURE SEAL	EA	1
D-2	23	PADZZ	5360-00-584-0168	19200	8229116	SPRING,HELICAL	EA	1
D-2	24	PADZZ	1220-00-612-1434	19200	8229115	PLUNGER,DETENT	EA	2
D-2	25	PADZZ	5360-00-584-0166	19200	8298370	SPRING,HELICAL	EA	4
D-2	26	PADZZ	1220-00-612-1437	19200	8298369	PLUNGER,DETENT	EA	4
D-2	27	PADZZ	1240-00-933-9627	19200	8298358	SLIDER	EA	1
D-2	28	PADZZ	5305-00-225-7774	96906	MS16996-24	SCREW,CAP,SOCKET HEAD	EA	2
D-2	29	PADZZ	5310-00-143-6272	96906	MS51848-10	WASHER,LOCK	EA	2
D-2	30	XDDZZ		19200	8621087	ADAPTER	EA	1
D-2	31	PADZZ	5310-00-950-2666	19200	8620153	NUT,PLAIN,ROUND	EA	1
D-2	32	PADZZ	5305-00-281-3118	96906	MS51021-32	SETSCREW	EA	1
D-2	33	PADZZ	5340-00-685-0831	19200	8620013	DISK,SOLID,PLAIN	EA	1
D-2	34	XDDZZ		19200	8620146	RING,EXTERNALLY	EA	1
D-2	35	PADZZ	3110-00-142-7049	19200	8620150	BEARING,BALL	EA	1
D-2	36	XDDZZ		19200	8620148	SUPPORT	EA	1
D-2	37	XDDZZ		19200	10516370	SHAFT 4	EA	1

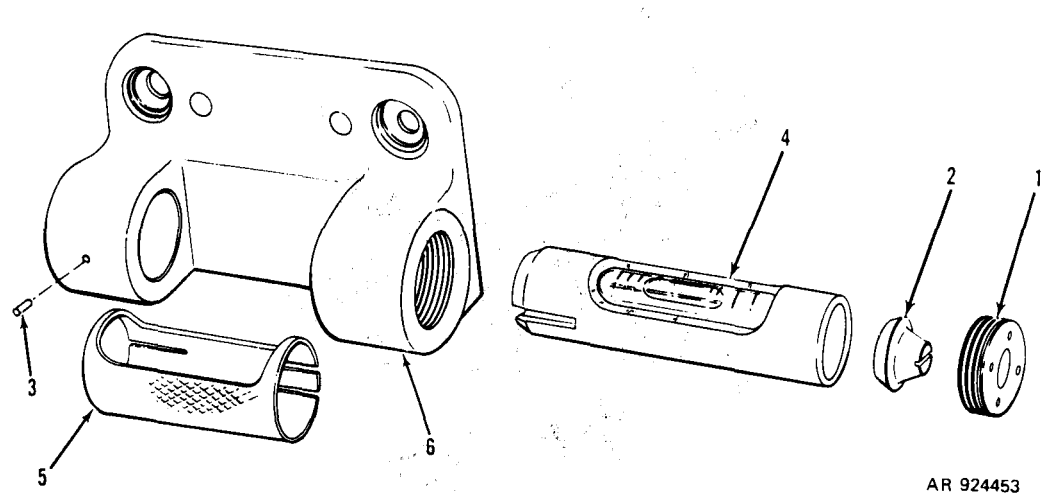


Figure D-3. Fire control level 8585560

(1) ILLUSTRATION		(2)	(3)	(4)	(5)	(6) DESCRIPTION	(7)	(8)
(a) FIG NO	(b) ITEM NO	SMR CODE	NATIONAL STOCK NUMBER	FSCM	PART NUMBER	USABLE ON CODE	M	QTY INC IN UNIT
					GROUP 000201 FIRE CONTROL LEVEL 8585560.			
D-3	1	PAFZZ	5365-00-692-149	19200	8202181	RING, EXTERNALLY	A	1
D-3	2	PAFZZ	1290-00-896-225	19200	8202177	ECCENTRIC	A	
D-3	3	PAFZZ	5315-00-817-088	96906	MS16555-601	PIN, STRAIGHT	A	
D-3	4	PAFZZ	1290-00-692-149	19200	8202183	LEVEL, FIRE CONTROL	A	
D-3	5	PAFZZ	1290-00-896-223	19200	8215635	COVER, LEVEL VIAL	A	
D-3	6	XDFZZ		19200	8585561	HOUSING, LEVEL VIAL	A	

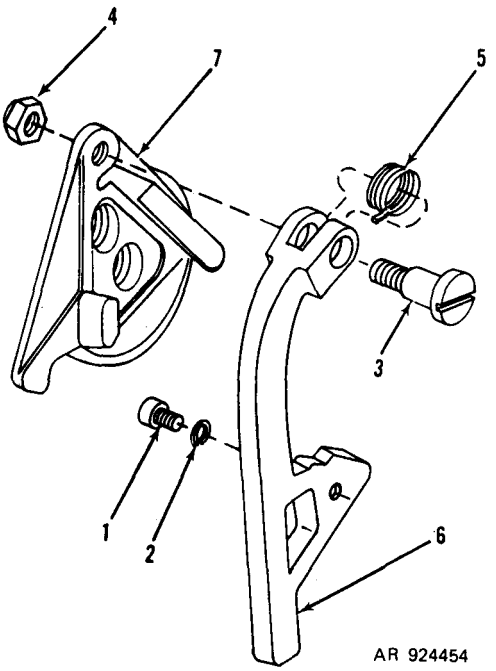


Figure D-4. Coupling assembly 8620124

(1) ILLUSTRATION (a) FIG NO.	(b) ITEM NO	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION / USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 000202 COUPLING ASSEMBLY 8620124		
D-4	1	PADZZ	5305-00-954-8424	96906	MS 16998-1 8	SCREW, CAP	EA	1
D-4	2	PADZZ	531 0-00-933-8 11	96906	MS35338-137	WASHER, LOCK	EA	1
D-4	3	PADZZ	530 5-00-753 -4441	19200	8620147	SCREW, SHOULDER	EA	1
D-4	4	PADZZ	531 0-00-660-3381	96906	MS21 083N5	NUT, SELF-LOCKING	EA	1
D-4	5	PADZZ	53 60-00-753-3985	19200	8620125	SPRING, HELICAL	EA	1
D-4	6	PADZZ	1240-00-933-9271	19200	8620151	LEVER	EA	1
D-4	7	PADZZ	1240-00-933-9272	19200	86201 52	COUPLING	EA	1

Section III

SPECIAL TOOLS LIST

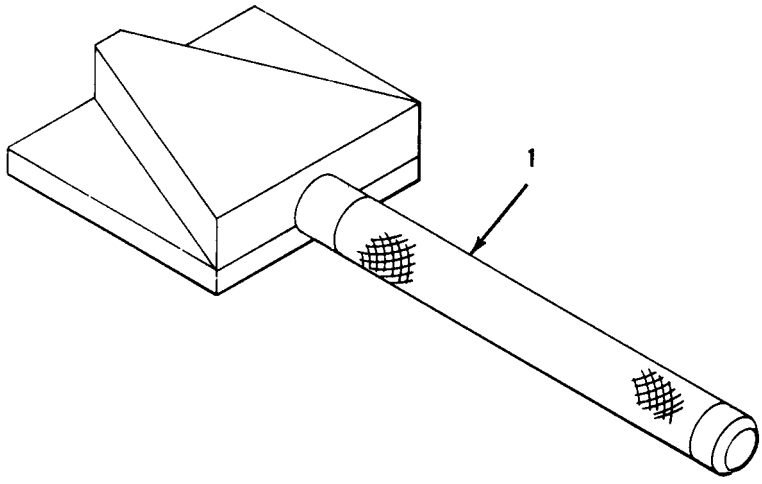


Figure D-5. Special Tools

(1) ILLUSTRATION FIG NO	ITEM NO	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION / USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 95 SPECIAL TOOLS		
D-5		PEFZZ	4931-00-065-0538	19207	8566947	GAGE,SPACER..... BOI 1 AUTH PER BN HQ WHEN BN HAS A SVC COMPANY	EA	

Section IV

NATIONAL STOCK NUMBER AND PART NUMBER INDEX

NATIONAL STOCK NUMBER AND PART NUMBER INDEX

STOCK NUMBER	FIGURE NO.	ITEM NO.	STOCK NUMBER	FIGURE NO.	ITEM NO.
5315-00-046-6292	D-1	13	5315-00-663-1284	D-1	25
5305-00-051-4078	D-1	19	1220-00-676-2185	D-2	7
5305-00-051-4078	D-2	5	5340-00-685-0831	D-2	33
5305-00-054-6668	D-2	12	5365-00-692-1492	D-3	1
4931-00-065-0538	D-5	1	1290-00-692-1493	D-3	4
5315-00-083-0432	D-1	12	5305-00-702-4524	D-1	15
5310-00-108-9654	D-2	8	1220-00-712-8397	D-1	24
3110-00-142-7049	D-2	35	5360-00-753-3985	D-4	5
5310-00-143-6272	D-2	29	5305-00-753-4444	D-4	3
1220-00-144-5490	D-1	5	5315-00-817-0889	D-3	3
5315-00-144-8218	D-2	10	1290-00-896-2239	D-3	5
5310-00-169-9779	D-1	2	1290-00-896-2251	D-3	2
5305-00-225-7774	D-2	28	5315-00-901-2190	D-1	11
3110-00-277-0313	D-2	17	5310-00-903-2612	D-1	23
5305-00-281-3118	D-2	32	5315-00-905-8431	D-2	4
1220-00-357-6124	D-2	21	5305-00-912-4818	D-2	1
1220-00-357-6136	D-2	22	5310-00-926-5877	D-1	9
5365-00-419-0750	D-2	16	5310-00-933-8119	D-2	2
1290-00-432-1355	D-2	3	5310-00-933-8119	D-2	13
1220-00-432-1356	D-1	7	5310-00-933-8119	D-4	2
9905-00-432-1357	D-1	21	5310-00-933-8778	D-1	16
1220-00-432-1358	D-1	6	1240-00-933-9271	D-4	6
1220-00-477-9910	D-1	18	1240-00-933-9272	D-4	7
5340-00-491-7632	D-1	1	1240-00-933-9627	D-2	27
5305-00-582-8184	D-2	19	5310-00-950-2666	D-2	31
5360-00-584-0166	D-2	25	5305-00-954-8424	D-4	1
5360-00-584-0168	D-2	23	5310-00-974-6623	D-1	20
5310-00-595-5818	D-2	9	5310-00-974-6623	D-2	6
1220-00-612-1434	D-2	24	5305-00-978-9395	D-1	22
1220-00-612-1437	D-2	26	5310-00-990-0700	D-1	10
5310-00-660-3381	D-4	4	5305-00-995-6311	D-1	8
3120-00-661-3201	D-1	3	1220-01-091-3591	D-1	17
			5365-01-091-3683	D-2	14

FSCM	PART NUMBER	FIGURE NO.	ITEM NO.	FSCM	PART NUMBER	FIGURE NO.	ITEM NO.
96906	MS16555-601	D-3	3	19200	11727433	D-2	22
96906	MS16556-626	D-2	4	19200	8201146	D-2	9
96906	MS16556-648	D-1	11	19200	8201215	D-1	3
96906	MS16626-4156	D-2	16	19204	8201231	D-2	15
96906	MS16996-24	D-2	28	19200	8201244	D-2	14
96906	MS16997-100	D-1	22	19200	8201542	D-2	17
96906	MS16998-18	D-4	1	19200	8202177	D-3	2
96906	MS21083N5	D-4	4	19200	8202181	D-3	1
96906	MS24692-375	D-2	10	19200	8202183	D-3	4
96906	MS35207-271	D-1	8	19200	8215835	D-3	5
96906	MS35276-261	D-2	1	19200	8229115	D-2	24
96906	MS35308-413	D-1	15	19200	8229116	D-2	23
96906	MS35338-137	D-2	2	19200	8298358	D-2	27
96906	MS35338-137	D-2	13	19200	8298369	D-2	26
96906	MS35338-137	D-4	2	19200	8298370	D-2	25
96906	MS35338-140	D-1	20	19200	8566947	D-5	1
96906	MS35338-140	D-2	6	19200	8585560	D-2	3
96906	MS35338-143	D-1	16	19200	8585561	D-3	6
96906	MS35338-160	D-1	9	19200	8605989	D-2	19
96906	MS35672-31	D-1	12	19200	8620013	D-2	33
96906	MS35675-40	D-1	25	19200	8620092	D-1	6
96906	MS51021-32	D-2	32	19200	8620110	D-1	18
96906	MS51848-10	D-2	29	19200	8620112	D-2	7
96906	MS51938-5	D-1	1	19200	8620113	D-1	24
96906	MS51957-43	D-2	12	19200	8620124	D-2	20
96906	MS90727-36	D-1	19	19200	8620125	D-4	5
96906	MS90727-36	D-2	5	19200	8620134	D-1	10
96906	MS9321-12	D-1	23	19200	8620146	D-2	34
19200	10516092	D-1	13	19200	8620147	D-4	3
19200	10516093	D-1	14	19200	8620148	D-2	36
19200	10516116	D-1	5	19200	8620150	D-2	35
19200	10516274	D-2	11	19200	8620151	D-4	6
19200	10516370	D-2	37	19200	8620152	D-4	7
19200	10516380	D-1	21	19200	8620153	D-2	31
19200	10516381	D-1	26	19200	8620203	D-1	4
19200	10516383	D-2	18	19200	8620209	D-1	7
19200	10516551	D-1	2	19200	8620212	D-1	17
19200	10516552	D-2	8	19200	8621087	D-2	30
19200	11727429	D-2	21				

By Order of the Secretary of the Army:

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Date you send in form

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 9-1220-231-34&P	25 Nov 83	Ballistic Drive: M15

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
3		2		Item 10. Change illustration. Reason: Tube end shown assembled on wrong side of lever cam.
109		51		Item 3. The NSN and P/N are not listed on the AMDF nor the MCRL. Request correct NSN and P/N furnished.
2-8			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.
12	1-6a			Since there are both 20- and 30- round magazines for this rifle, data on both should be listed.

SAMPLE

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER
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SIGN HERE:
John Smith

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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

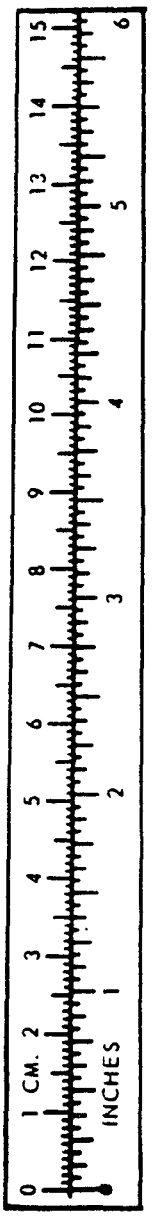
TEMPERATURE

$5/9\,(^0F - 32) = {}^0C$
212^0 Fahrenheit is equivalent to 100^0 Celsius
90^0 Fahrenheit is equivalent to 32.2^0 Celsius
32^0 Fahrenheit is equivalent to 0^0 Celsius
$9/5\,C^0 + 32 = F^0$

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
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

TO CHANGE	TO	MULTIPLY BY
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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