

TECHNICAL MANUAL DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE

CARRIER, PERSONNEL,
FULL TRACKED, ARMORED, M113A2
2350-01-068-4077

CARRIER, COMMAND POST,
LIGHT TRACKED, M577A2
2350-01-068-4089

CARRIER, MORTAR, 107-MM, M30;
SELF-PROPELLED, M106A2
2350-01-069-6931

CARRIER, MORTAR, 81-MM, M29A1;
SELF-PROPELLED, M125A2
2350-01-068-4087

CARRIER, MORTAR, 120-MM;
SELF-PROPELLED, M1064
2350-01-338-3116

CARRIER, SMOKE GENERATOR,
FULL TRACKED, M1059
2350-01-203-0188

COMBAT VEHICLE, ANTI-TANK,
IMPROVED TOW VEHICLE, M901A1
2350-01-103-5641

CARRIER, STANDARDIZED INTEGRATED
COMMAND POST SYSTEM, M1068
2350-01-354-5657

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This manual supersedes TM 9-2350-261-34 dated July 1985, including all changes.

DISTRIBUTION STATEMENT A:

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CARRIER, STANDARDIZED INTEGRATED COMMAND POST SYSTEM, M106S
2350-01-354-5657

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know 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 Tank-automotive and Armaments Command, ATTN: AMSTA-AC-NML, Rock Island, IL61201-9948. A reply will be furnished to you.

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	METRIC CONVERSION CHART	Inside Rear Cover

HOW TO USE THIS MANUAL

This manual tells you how to perform direct and general support maintenance for the M113A2, M577A2, M106A2, M1064, M125A2, M741A1, M1068, M1059, and M901A1 carriers.

Before starting a task or procedure, read HOW TO USE THIS MANUAL and CHAPTER 2, GENERAL MAINTENANCE PROCEDURES.

WHAT'S IN THE MANUAL - FRONT TO BACK

FRONT COVER INDEX lists the information you need most often.

WARNINGS in front of the manual are a summary of the warnings in this manual. The warnings cover hazards that could hurt or kill personnel. Shorter versions of the warnings may appear in the task.

TABLE OF CONTENTS tells you where each chapter, section, and appendix starts. Information located in blocks on the Front Cover Index corresponds with the Table of Contents.

USING YOUR MANUAL ON THE JOB

The best way to learn about this manual is to practice using it. Knowing how to use this manual will save both time and energy.

MAINTENANCE TASKS

How do you find the correct task?

Pick a keyword from the carrier part or system to be used during the task. Look in the ALPHABETICAL INDEX for this keyword or the name of the action you will perform. Turn to the page indicated.

The ALPHABETICAL INDEX lists each task under one or more headings. The task, INSTALL ENGINE COOLANT HEATER KIT, could be found:

Under "C"

Coolant Heater
Kit, engine, install 14-2

Under "E"

Engine:
Coolant heater kit, install, 14-2

Under "H"

Heater kit:
Engine coolant, install, 14-2

Under "K"

Kit:
Heater, engine coolant, install, 14-2

HOW DO YOU READ MAINTENANCE TASKS?

Be sure to read all warnings, cautions, and notes. These are in all types of tasks. They help you avoid harm to yourself, other personnel and equipment. They also tell you things you should know about the task.

Before starting, get all tools, supplies, and personnel listed on the setup page needed to do the task. Be sure to read the task before performing the maintenance. If any other tasks are referenced, you must go to the setup page for each of those tasks to find out what tools, parts, and materials will be needed.

Start with step 1 and do each step in given order.

Look at the drawings. These show you what to look for when reading a maintenance task.

MAINTENANCE TASKS

Doing maintenance tasks will keep the carrier operating properly. Maintenance tasks are used to present maintenance instructions. Each maintenance task details steps which you need to perform. If the carrier and parts need maintenance that is not included in any task in the manual, report this to your supervisor.

SAMPLE OF SETUP ITEMS

The sample on the next page shows the DESCRIPTION and INITIAL SETUP sections on the first page of a task. Items to watch for are listed in the legend. Match them with the sample.

	REPLACE SERRATED LOCKRING SCREW THREAD INSERTS
	DESCRIPTION This task covers: Remove (page 8-29). Install Non-sealed Inserts (page 8-31). Install Sealed Inserts (M981 Carrier, External Fuel Tanks Only) (page 8-31).
	INITIAL SETUP Tools: General Mechanics Tool Kit (Item 35, App B) Extractor Screw Set (Item 32, App B) Portable Electric Drill (Item 24, App B) Twist Drill Set (Item 98, App B) Materials/Parts: Grease (Item 9, App C) Sealing compound (Item 68, App C) Sealing compound primer (Item 72 App C)
	Personnel Required: Track Vehicle Repairer 63H10 References: See your -10 Equipment Conditions: Engine stopped/shutdown (see your -10) Carrier blocked (see your -10)

Legend to Sample

- | | | |
|---|--------------------|--|
| ① | TITLE | This is the name of the task. |
| ② | DESCRIPTION | This describes the overall actions you will perform. Also, it tells you the page where each action begins. |

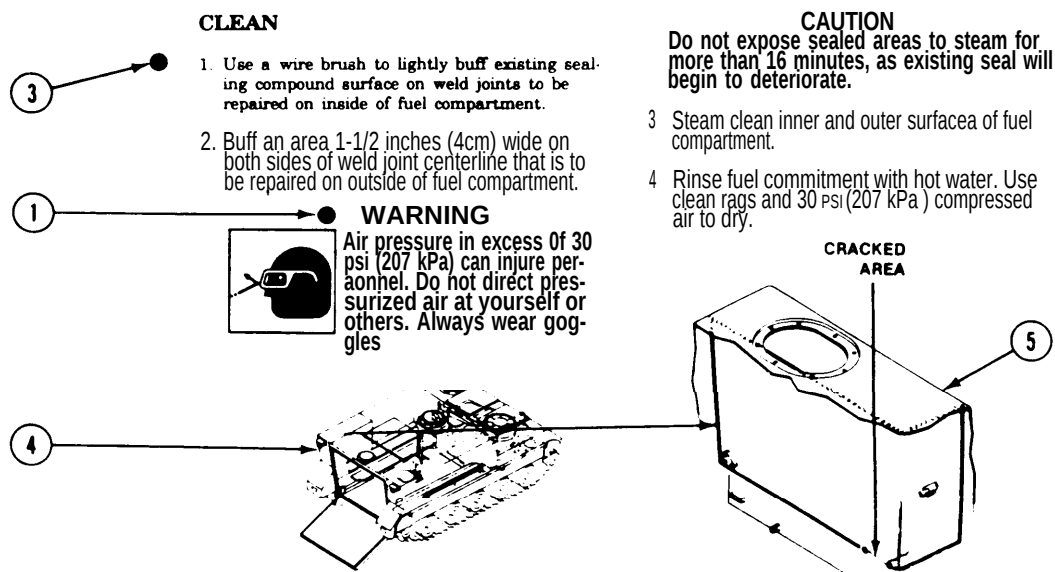
- | | |
|---|---|
| <p>③ TOOLS</p> <p>④ MATERIALS/
PARTS</p> <p>⑤ PERSONNEL
REQUIRED</p> <p>⑥ REFERENCES</p> <p>⑦ EQUIPMENT
CONDITIONS</p> | <p>These are the tools and equipment you will need to do the task.</p> <p>These are supplies you will need to do the task. If more than one part is needed, the quantity will be in parenthesis following the name of the part. The only parts listed are those you must replace every time the task is performed. Use the Repair Parts and Special Tools List (RPSTL), TM 9-2350-261-24P, to order parts you need for the task.</p> <p>These are the personnel needed to do the task.</p> <p>These are the other technical publications you will need to do the task.</p> <p>These are the conditions the equipment must be in before you start the task. You will be referred to the task or technical publication needed to meet each equipment condition. This reference will be given in parenthesis after each equipment condition.</p> |
|---|---|

Some tasks will include all of the items above. Others will only include some of the above items.

Read the INITIAL SETUP section carefully before you start each task. Get the tools and supplies listed and the personnel needed. Be sure the equipment is in the condition required.

SAMPLE OF TASK STEPS

The sample below shows you some of the signs to watch for when you are performing a task. Read all the steps, warnings, cautions and notes before starting each task. Some items to watch for are listed in the legend. Match them with the sample.



Legend to Sample Above

- | | |
|--|---|
| <p>① WARNING</p> <p>② CAUTION</p> <p>③ STEP</p> <p>④ LOCATOR</p> <p>⑤ CLOSEUP</p> | <p>This describes possible injury to personnel.</p> <p>This describes possible damage to equipment.</p> <p>This tells you what to do and how to do it.</p> <p>This helps you locate equipment on the carrier or major components. An arrow will lead you from the locator to the closeup. If the arrow is dotted, it means that the item is located behind something.</p> <p>This shows you a closeup of the equipment.</p> |
|--|---|

WARNINGS, CAUTIONS, AND NOTES

Be sure to read all warnings and cautions in the task. Ignoring a warning could cause death or injury to yourself or other personnel. Ignoring a caution could cause damage to equipment. Notes contain facts to make the task easier. Warnings, cautions, and notes always appear just above the task step to which they apply.

WARNINGS: Call attention to the things that could injure personnel.



WARNING

Engine support could fall and injure you. Make sure to secure engine support to the main frame before towing, lifting or transporting engine stand.

CAUTIONS: Call attention to the actions or materials that could damage equipment.

CAUTION

Engine stand jack screw could be damaged if the two screws and nuts attaching jack screw to main frame are not removed. Remove screws and nuts before towing, lifting or transporting an empty engine stand.

NOTES: Contain information you should know.

NOTE

Both front and rear trim vane pods are repaired the same way.

HELPER

Helpers are needed in tasks that require more than one person such as to help lift heavy objects. A helper may also be needed to act as an outside observer, drive the carrier, or do similar tasks.

If a helper is needed to perform a task, the INITIAL SETUP will tell you:

Example: Personnel required:

Track Vehicle Repairer 63H10

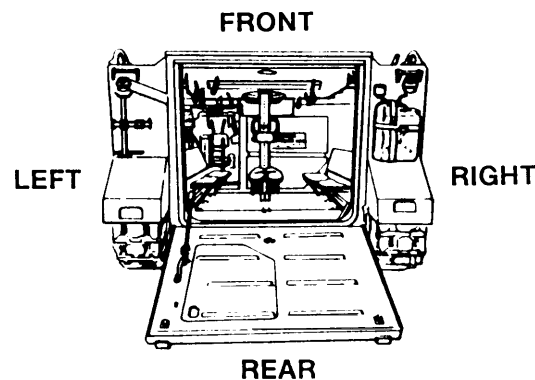
Helper (H)

LOCATIONAL TERMS

The terms FRONT, REAR, LEFT and RIGHT are used to describe where items are located. THE POINT OF REFERENCE FOR THESE TERMS IS DIFFERENT FOR CARRIER ITEMS AND POWER UNIT ITEMS. (Carrier items are items which are not on the power unit. Power unit items are items on the engine or transmission.)

If you are working with carrier items, use this point of reference. Think of the location as if you were sitting in the driver's seat looking out the hatch.

If you are working with power unit items, use this point of reference. Think of the locations as if you were standing at the transmission end of the power unit and facing the flywheel. This rule applies whether the power unit is IN OR OUT of the carrier.



REFERENCES

References within a task refer to a different manual or to another task in the same manual. A step in one task may be a complete task someplace else. Below is an example of a reference step from the task: INSTALL ENGINE COOLANT HEATER KIT.

**Example: Lower power plant grille assembly
(see your -20).**

The tools needed to do the task will be listed in that task.

MATERIAL/PARTS

For all tasks, the following comments apply:

Parts which are listed on the setup page will be referred to as “new” in the task steps when installed.

Examples are:

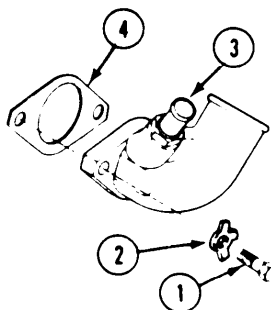
locknuts
lockwashers
cotter pins
some gaskets

These and other new parts are listed under MATERIALS/PARTS in the initial setup.

GENERAL MAINTENANCE

Cleaning, inspecting, checking for leaks, and similar procedures which apply to most tasks are found in CHAPTER 2, GENERAL MAINTENANCE PROCEDURES. Use these steps to clean and inspect any part being removed, repaired or installed. Special cleaning will be covered in the task step. Below is a step that would require general cleaning.

23. Remove two screws (1), key washers (2), oil cooler elbow (3) and gasket (4) from engine.
Discard gasket and key washers.



After doing this step, you would clean the mating surface with cleaning solvent and a wiping rag according to the general cleaning procedures. In other tasks, hoses or rubber hatch seals will need to be checked for leaks. Refer to CHAPTER 2 for general procedures.

HOW TO USE THE REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL) WITH THIS MANUAL

The RPSTL (TM 9-2350-261-24P) gives the National Stock Number (NSN) required to order parts used in the maintenance tasks. To use the RPSTL to identify and order a part, do the following:

1. In this manual, turn to the first page of the task to be performed.
2. Find Materials/Parts under INITIAL SETUP, and read the part(s) that need replacement. If required, find the illustrated part in the task steps.
3. Go to the RPSTL and find the same illustrated part. That part will have an item number assigned to it. Look this item number up in the listing for that figure. The NSN can be found in the National Stock Number and Part Number Index in the back of the RPSTL.
4. If you inspect an item and find that it is damaged, go to the RPSTL and find the SMR code for the item. If the SMR code does not authorize you to repair the item, reassemble it and send it to the authorized level of maintenance.

CHAPTER 1 INTRODUCTION

Section I. GENERAL INFORMATION

SCOPE

Type of Manual: Direct and General Support Maintenance.

Model Number and Equipment Name:

M113A2 - Carrier, Personnel, Full Tracked, Armored
 M577A2 - Carrier, Command Post, Light Tracked
 M106A2 - Carrier, Mortar, 107-mm M30; Self-Propelled
 M125A2 - Carrier, Mortar, 81-mm, M29A1; Self-Propelled
 M741A1 - Chassis, Gun, Anti-Aircraft Artillery
 M1059 - Carrier, Smoke Generator, Full Tracked
 M901A1 - Combat Vehicle, Anti-Tank, Improved Tow Vehicle
 M1064 - Carrier, Mortar, 120-mm, Self-Propelled
 M1068 - Carrier, Standardized Integrated Command Post System

MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pamphlet 738-750, The Army Maintenance Management System (TAMMS).

DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

See the following technical manuals for information on destruction of Army materiel:

TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use.
TM 750-244-2-5-1	Procedures for Destruction of Conventional Ammunition and Improved Conventional Munitions to Prevent Enemy Use.
TM 750-244-6	Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use.
TM 750-244-7	Procedures for Destruction of Equipment in Federal Supply Classifications 1000, 1005, 1010, 1520, 2530, 5590, 5595 to Prevent Enemy Use.

PREPARATION FOR STORAGE OR SHIPMENT

For information about administrative storage or shipment, see the following documents:

<u>Specification</u>	<u>Applicable Carriers</u>
MIL-C-45360G(AT)	M113A2, M106A2, M125A2, M1064, & M1059
MIL-C-46746DC(AT)	M577A2 & M1068
MIL-C-62074C(AT)	M741A1
MIL-C-62327A(AT)	M901A1 TOW Vehicle (Less TOW Weapon)

NOMENCLATURE CROSS REFERENCE LIST

This listing includes nomenclature cross references used in this manual.

<u>COMMON NAME</u>	<u>OFFICIAL NOMENCLATURE</u>
Locknut	Self-locking nut
Lock screw	self-locking bolt
Lockwasher	Lockwasher
Pressnut	Splined self-locking nut
Heat exchanger	Battery plate

REPORTING OF EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your carrier need6 improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at: Commander, US Army Tank-automotive and Armament Command, Attn: AMSTA-TR-QCL, Warren MI. 48397-5000. A reply will be sent to you.

For warranty information on the M577A2, see TB 9-2350-265-38-1.

Section II. EQUIPMENT DATA AND DESCRIPTION

For equipment characteristics, capabilities, features, and description of major components, see your -10.

Section III. PRINCIPLES OF OPERATION

For a brief description of principles of operation and equipment, see your -10.

CHAPTER 2

GENERAL MAINTENANCE PROCEDURES

Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

COMMON TOOLS AND EQUIPMENT

For authorized common tools and equipment, see the Modified Table of Organization and Equipment (MTOE) for your unit.

SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

Special tools you need are listed in Repair Parts and Special Tools List (RPSTL), TM 9-2350-261-24P. Test Measurement and Diagnostic Equipment (TMDE) and special tools are listed in TM 9-2350-261-20. More than one model of multimeter is available to you in the system, and you may use any model available.

FABRICATED TOOLS

These tools enable direct support and general support personnel to fabricate the tools locally. The tools are of particular value to organizations engaged in repairing a number of identical components. Fabricated tools are not available for issue. An accompanying list of materials required for fabrication of the tools is given on page 24, Fig 1, 2 and 3.

REPAIR PARTS

Repair parts are listed and illustrated in the Repair Parts and Special Tools List (TM 9-2350-261-24P) covering direct and general support maintenance for this equipment. Maintenance and supply personnel can order them.

Section II. SERVICE UPON RECEIPT

The following procedures tell you how to check and service the M113A2, M577A2, M106A2, M1064, M1068, M125A2, M741A1, M1059, and M901A1. These procedures will allow you to drive the carrier to the motor pool. Procedures are given for level B and level A reprocessing. Level B reprocessing is performed when the carrier has been in storage for less than ninety (90) days. Level A deprocessing is performed in addition to Level B reprocessing when the carrier has been in storage for more than ninety days (90) days.

SERVICE UPON RECEIPT — M113A2			
LOCATION	ITEM	ACTION	REMARKS
LEVEL B			
Hull	Driver's hatch	Remove welded nut/bolt from driver's hatch to gain vehicle entry.	
Engine	Engine air intake	a. Remove air restrictor plug from air duct at air filter. b. Connect filter hose to air filter. c. Remove warning tag.	
Engine	Fuel lines	a. Connect fuel lines at quick disconnect. b. Connect fuel supply tubing.	
Engine	Crankcase	Remove shipping tape from breather crankcase breather.	
Engine	Oil level gage	Remove shipping tape from oil level gage rod opening.	
Engine	Oil filter cap	Remove shipping tape from oil filter cap.	
Engine	Caps and plugs	Remove caps and plugs from all openings to engine that vent to outside.	
Hull	Power plant access panels	Install power plant access panels.	
Hull	Carrier batteries	a. Remove shipping tape from filler caps. b. Add electrolyte and charge batteries. See TM 9-6140-200-14.	
Hull	Battery cables	Install cables on battery. See TM 9-2350-261-20.	
Hull	Personnel heater/feed line	a. Remove shipping tape from heater external exhaust and intake elbows. b. Remove shipping tape from end of disconnected fuel feed line. c. Connect feed line to heater.	

SERVICE UPON RECEIPT - M113A2			
LOCATION	ITEM	ACTION	REMARKS
Hull	Fuel system	Fill fuel tank	
Hull	Squad seats and back-rests	Remove shipping paper and tape.	
Hull	Commander's seat and post	Install commander's seat and post on carrier. See TM 9-2350-261-20.	
Hull	Periscopes	a.Remove plugs from periscope openings. b.Remove periscopes from packages and install. See TM 9-2350-261-20.	
Hull	Fire Extinguishers	Check for intact seals on handles.	
Hull	Drain plugs	Close hull drain plugs.	
Hull	Closure kit	Remove and store closure kit.	
Hull	Engine air inlet grill	Remove shipping tape and intake and exhaust grill cover from exhaust and intake grill.	
Hull	Armor mounting inserts and screw holes	Check for loose or missing plugs in inserts and setscrews in hull screw holes.	
LEVEL A			
For level A deprocessing, perform the following procedures in addition to all the procedures for level B deprocessing			
Power Plant Compartment	Engine	Change engine oil. See engine crank-case tag on filler neck and LO 9-2350-261-12.	
Power Plant Compartment	Transmission	Service transmission with operational lubricant. See transmission tag on filler necks and LO 9-2350-261-12.	
Hull	Final drives	Service final drives with operational lubricant. see Lo 9-2350-261-12.	

CHECKING EQUIPMENT

Perform all operator and organizational PMCS. See TM 9-2350-261-10 and TM 9-2350-261-20.

Inspect the equipment for damage incurred during shipment. If the equipment has been damaged damage on form SF 368, Quality Deficiency Report.

Section III. GENERAL MAINTENANCE INSTRUCTIONS

SCOPE

This section contains safety warnings, guidelines and general maintenance instructions. They should be followed when doing maintenance procedures.

PREPARATION FOR MAINTENANCE

- a. PERSONNEL SAFETY. Practice all shop safety procedures and read all warnings in this manual.
- b. PROPER EQUIPMENT. Get equipment before starting a maintenance task. See page 2-1, the RPSTL, TM 9-2350-261-24P, and the maintenance tasks for tools, equipment, parts, and materials.
- c. WHAT To DISCARD. Parts to discard, such as lock washers, locknuts, and gaskets are listed in the maintenance task. If the step does not say to discard a part, the part should be saved. It may be used later or be repaired.
- d. HANDLING TECHNIQUES.
 - (1) Avoid damage to parts during disassembly, cleaning, inspection, repair, and reassembly procedures. Nick, scratches, and dents caused by carelees handling could result in equipment failure.
 - (2) Dirt can damage parts and cause malfunctions. Make sure all air and fluid openings, lines, and hoses are capped or plugged during maintenance procedures.
- e. IDENTIFICATION.
 - (1) During disassembly, tag parts to ensure proper assembly.
 - (2) During disassembly, tag leads on electrical parts to ensure proper assembly. Tag each lead, as it is removed, with numbers from wiring diagrams and terminals.
- f. FABRICATED TOOLS. These steps enable direct support. and general support personnel to fabricate the tools locally. Accompanying illustrations below show materials required for fabrication of the tools.

■ (1) Lock Ring Tool for Stud Insert

- (a) Make from round steel stock (1020 or 1040) or locally procure steel pipe.
- (b) Remove all burrs.
- (c) Do not break sharp edges.
- (d) All dimensions are in inches.

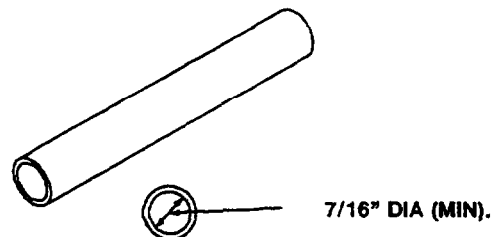
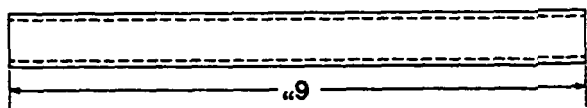


Figure 1. Lock Ring Tool for Stud Insert

f(1). SPECIAL PURPOSE CABLE FOR POWER CONTROL ENCLOSURE

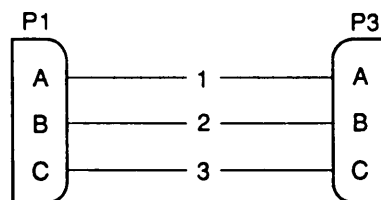
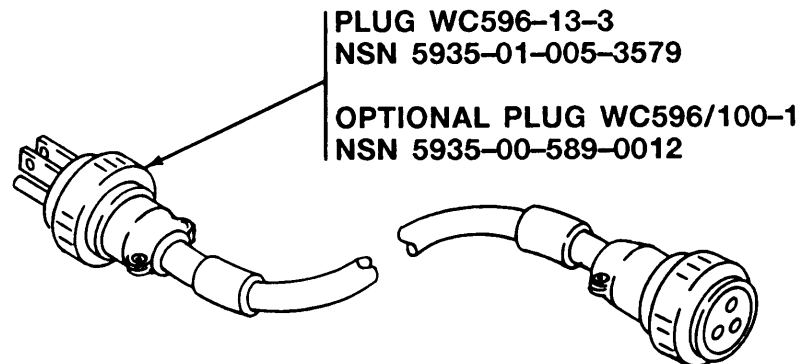
Make a special electrical cable to plug in from a shop wall socket to the Power Control Enclosure for powering up the Power Control Enclosure while on a shop table, the purpose is to preform troubleshooting or testing after repairs have been made. Use a W3 harness (To be modified) Part Number 12383899, See TM 9-2350-261-24P.

CAUTION

When installing wires into the plug, ensure polarity is correct, incorrect polarity can cause damage to equipment and harm personnel when electrical power is applied to the Power Control Enclosure.

MODIFYING W3 HARNESS FOR USING WITH POWER CONTROL ENCLOSURE

Remove connector labeled W3P1 (A3J1) from W3 harness and replace with new plug Part Number WC596-13-3(81348) NSN 5935-01-005-3579. (USE WIRING DIAGRAM) The length of the special purpose cable is dependent upon the distance of the wall socket and the work bench the Power Control Enclosure will be on. A W3 cable is between 115 and 125 inches long.



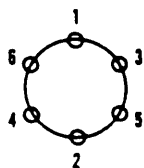
WIRING DIAGRAM

1 = HOT
2 = NEUTRAL
3 = GROUND

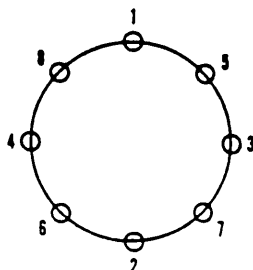
W3 CABLE - PART NUMBER 12383899

Figure f(1)a. Special Purpose Cable

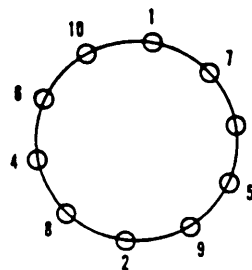
g. TORQUING. Where needed, torque values are listed in the maintenance task. When torquing, use one of the star pattern sequences below unless otherwise stated in the maintenance task.



6-HOLE PATTERN

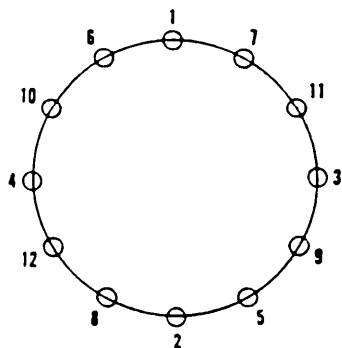


8-HOLE PATTERN

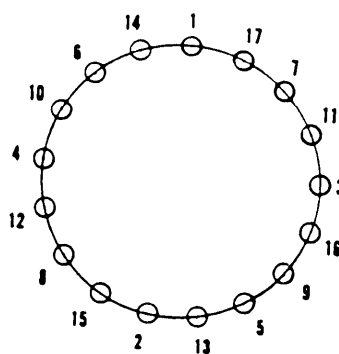


10-HOLE PATTERN

12-HOLE PATTERN



17-HOLE PATTERN



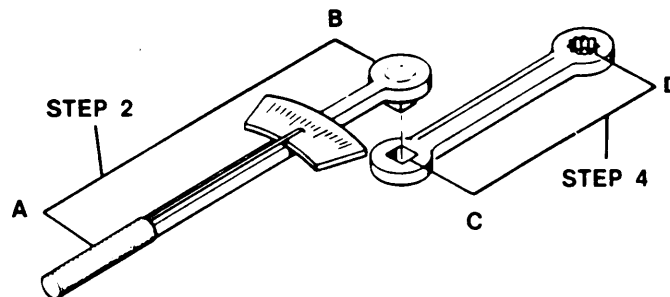
h. TORQUE WRENCH ADAPTERS AND CONVERSION FORMULA.

(1) Torque wrench adapters (extensions) are used to tighten screws and nuts to specific values that cannot be reached with a regular socket on the end of a torque wrench. This makes the dial or scale reading less than the actual torque applied to the screw or nut. When using an adapter, determine the dial or scale reading as follows:

- Step 1. Check your manual for specific torque value to which the screw or nut should be tightened.
- Step 2. Measure the length of your torque wrench from the center of the handle (point A) to the center of the socket (point B). Record this measurement.
- Step 3. Multiply the above measurement by the desired torque. Record this product.
- Step 4. Measure length of adapter from socket end (point C) to screw or nut end (point D). Record this measurement.
- Step 5. Add length of adapter (step 4) to the length of torque wrench (step 2). Record this sum.
- Step 6. Divide the product recorded in step 3 by the sum found in step 5.
- Step 7. The value found in step 6 is your torque wrench setting. Set your dial.

NOTE

Setting the torque wrench dial at the reading found in step 7 will deliver the required torque at the end of your adapter.



Example: Metric equivalents deleted for clarity.

- step 1. 40 lb-ft required.
- step 2. 12 inches.
- step 3. $12 \times 40 = 480$ lb-ft.
- step 4. 4 inches.
- step 5. $12 + 4 = 16$ inches.
- Step 6. $\frac{480}{16} = 30$ lb-ft.
- Step 7. Torque wrench dial setting = 30.