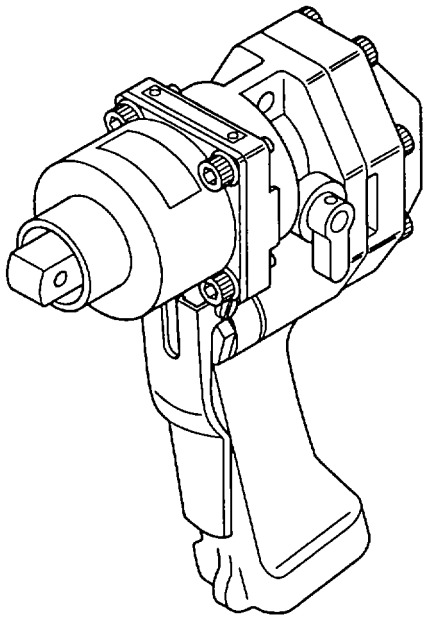
# TECHNICAL MANUAL
# OPERATOR'S AND UNIT
# MAINTENANCE MANUAL
# (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)
# FOR
# WRENCH, IMPACT, HYDRAULIC
# MODEL IW-12-140T
# (PN 12322630)
# (NSN 5130-00-790-2284)







**HEADQUARTERS, DEPARTMENT OF THE ARMY**

**1 DECEMBER 1997**

**WARNING**
**DRY-CLEANING SOLVENT HAZARD**

***Dry-cleaning solvent (PD-680) is toxic and flammable. Wear protective goggles and gloves; use in a well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I dry-cleaning solvent is 100 degrees Fahrenheit (°F) (37.8 degrees Celsius [°C]) and for type II is 138°F (58.9°C). Failure to do so may result in injury or death to personnel.***

***If personnel become dizzy while using dry-cleaning solvent, immediately get fresh air and medical help. If dry-cleaning solvent contacts skin or clothes flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical help.***

**WARNING**
**SPRING TENSION HAZARD**

***Many items are under spring tension. Injury to personnel could occur if spring tension is released quickly.***

**WARNING**
**OPERATIONAL HAZARDS**

- ***To prevent injury to personnel, do not operate hydraulic impact wrench with trigger removed.***
- ***To prevent injury to personnel, operate hydraulic impact wrench beginning at lowest torque setting.***

TECHNICAL MANUAL
NO. 9-5130-338-12&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., *1 December 1997*

# OPERATOR'S AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR WRENCH, IMPACT, HYDRAULIC Model IW-12-140T (NSN 5130-00-790-2284)

**REPORTING OF ERRORS**

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 direct to: Director, Armament and Chemical Acquisition and Logistics Activity, ATTN: AMSTA-AC-NML, Rock Island, IL 61299-7630. A reply will be furnished to you.



*This manual supersedes TM 9-5130-338-15P dated 20 November 1961.

## HOW TO USE THIS MANUAL

### General

This manual provides you with the information needed to operate and maintain the hydraulic impact wrench.

The information contained in this manual is presented in four chapters and seven appendices. Pages are numbered after the chapter number or appendix letter. For example, 1-14 means Chapter 1, page 14, and A-2 means Appendix A, page 2.

**a. Front Matter.**

1. The front cover has an index for the major divisions in this manual. The first page of the associated major division has a black edge that lines up with the applicable cover boxed-in area.
2. There are general warnings that are on the first right-hand page immediately after the cover that should be read before performing any maintenance on the hydraulic impact wrench.
3. The table of contents has the page where each chapter, appendix, section, and paragraph starts.

**b. Chapters.**

1. Chapter 1-Introduction. Provides general information about the hydraulic impact wrench, contains a list of abbreviations, describes and identifies major components, and provides principles of operation.

2. Chapter 2-Operating Instructions. Identifies and describes the operating controls and explains how to use them. This chapter also covers operator Preventive Maintenance Checks and Services (PMCS) and operation under usual conditions.

3. Chapter 3-Operator Maintenance Instructions. Provides the lubrication instructions and the maintenance instructions to be done by the operator.

4. Chapter 4-Unit Maintenance Instructions. Provides the maintenance procedures, including PMCS and troubleshooting, for unit maintenance.

**c. Warnings, Cautions, and Notes.** Warnings, cautions, and notes are provided throughout this manual:

1. A warning is provided where injury may occur to personnel.

2. A caution is provided where equipment may be damaged, but no injuries to personnel should result.

3. A note provides information, but no personnel injury or equipment damage should result.

**d. Initial Setups**. Before starting a task, you must obtain all the tools and supplies listed in the initial setup. Be sure to read the task before performing the maintenance. If any other tasks are referenced, you must go to the initial setup page for each of those tasks to find out what tools and supplies will be needed.

**e. Referencing.**

1. In this manual, internal referencing is done by chapter, appendix, paragraph, section, or task. For example, (see para. 2-15) refers you to Chapter 2, paragraph 15.

2. Referencing outside this manual is done by the military publication number. For example, (refer to TM 9-2350-256-10) refers you to that manual.

**f. Appendixes.**

1. Appendix A-References. Provides the titles of documents references in this manual.

2. Appendix B-Maintenance Allocation Chart (MAC). Provides the MAC and a special tools identification list.

3. Appendix C-Expendable and Durable Items List. Provides a list of the expendable and durable items needed to operate and maintain the hydraulic impact wrench.

4. Appendix D-Operator's and Unit Maintenance Repair Parts and Special Tools List (RPSTL). Provides an illustration and a list of all the parts of the hydraulic impact wrench.

5. Appendix E-Torque Values for Threaded Fasteners. Provides the torque limits for different types of fasteners.

6. Appendix F-Mandatory Replacement Parts. Provides a list of all the mandatory replacement parts needed to perform the maintenance procedures.

7. Appendix G-Lubrication Instructions. Provides the lubrication instructions for the hydraulic impact wrench.

**g. Locating Information**. This manual provides four ways to locate information quickly:

1. The cover index lists most frequently used major divisions by name and starting page number.

2. The table of contents.

3. The chapter and appendix indexes list data and information covered within those chapters.

4. The alphabetical index provides an alphabetical listing of information contained in this manual.

**NOTE**

- **You must read and understand this manual before operating or performing maintenance on the hydraulic impact wrench.**

- **This manual includes instructions to notify unit maintenance for specific repairs. Follow these instructions carefully.**

# CHAPTER 1
# INTRODUCTION

## CHAPTER OVERVIEW

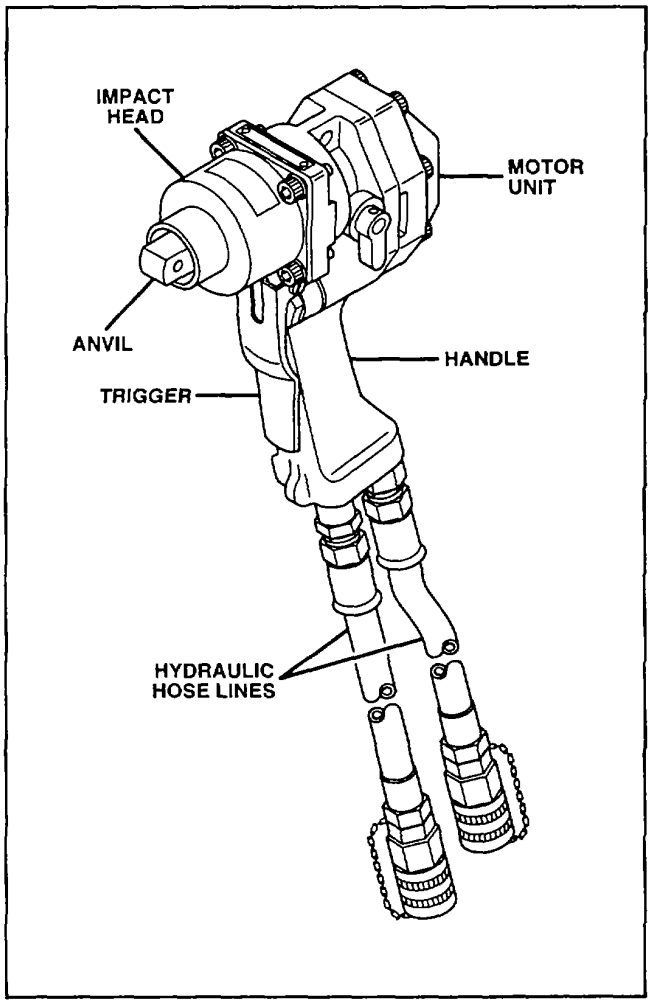
This chapter introduces the operator and unit maintenance personnel to the hydraulic impact wrench model IW-12-140T (PN 12322630). This chapter is divided into three major sections:



## Section I. GENERAL INFORMATION

### 1-1. SCOPE.

This manual contains instructions for the operator and unit maintenance personnel for the hydraulic impact wrench model IW-12-140T (PN 12322630). It contains descriptions of and procedures for removal, inspection, repair, test, and lubrication, as well as a Maintenance Allocation Chart (MAC) and repair parts list.




### 1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS.

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750 as contained in the Maintenance Management update. No forms other than those approved for the Department of the Army will be used. The reports necessary to comply with the Army safety program are listed in AR 385-40. These reports are required whenever accidents involving personnel or damage to materiel occur.

### 1-3. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE.

For information and conditions under which destruction of the hydraulic impact wrench should be undertaken to prevent enemy use, and for methods of destruction, refer to TM 750-244-6.

## 1-4. CORROSION PREVENTION AND CONTROL (CPC).

**a.** CPC of Army materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in future items.

**b.** While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials, such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem.

**c.** If a corrosion problem is identified, it can be reported using an SF 368, Product Quality Deficiency Report. Use of key words such as "corrosion", "rust," "deterioration," or "cracking" will ensure that the information is identified as a CPC problem.

## 1-5. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs).

**NOTE**

**Report only repeated or recurrent failures or malfunctions which indicate unsatisfactory design or material However, reports will always be made when exceptionally costly equipment is involved.**

**a.** If your hydraulic impact wrench needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you do not like about your equipment. Let us know why you do not like the design or performance. Put it on an SF 368. Mail it to us at: Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-MC, Warren, MI 48397-5000. A reply will be furnished to you.

**b.** Any suggestions pertinent to the improvement, safety, or correction of unsatisfactory performance of equipment and materials are to be reported on DA Form 2407 in accordance with instructions contained in DA PAM 738-750.

## 1-6. PREPARATION FOR STORAGE OR SHIPMENT.

Instructions for storage and shipment of the hydraulic impact wrench are found in Chapter 4, Section VI.

## 1-7. LIST OF ABBREVIATIONS.

AMDF ..... Army Master Data File
BOI ..... Basis Of Issue
BT ..... bottle
C ..... operator/crew maintenance
CAGEC ..... Commercial And Government Entity Code
CN ..... can
CPC ..... Corrosion Prevention and Control
CC ..... degree Celsius
OF ..... degree Farenheit
DMWR ..... Depot Maintenance Work Requirement
DR ..... drum
EA ..... each
EIR ..... Equipment Improvement Recommendation
Fig. ..... figure
GL ..... gallon
gpm ..... gallon per minute

in ..... inch
kg ..... kilogram
kPa. ..... kilopascal
lb ..... pound
lb-ft . ..... pound-foot
lb-in ..... pound-inch
lpm . ..... liter per minute
MAC ..... Maintenance Allocation Chart
MTOE ..... Modified Table of Organization and Equipment
NIIN ..... National Item Identification Number
No ..... number
NSN ..... National Stock Number
N•m ..... Newton-meter
Oz ..... ounce
PG ..... package
PMCS ..... Preventive Maintenance Checks and Services
PN . ..... Part Number
psi ..... pound per square inch
PT ..... pint
QT ..... quart
QTY ..... quantity
RL ..... roll
rpm ..... revolution per minute
SAE. ..... Society of Automotive Engineers
SMR ..... Source, Maintenance, and Reliability
SRA. ..... Specialized Repair Activity
TAMMS ..... The Army Maintenance Management System
TM ..... Technical Manual
TMDE ..... Test Measurement and Diagnostic Equipment
U or O ..... unit maintenance
U/I ..... unit of issue
U/M ..... unit of measure
UOC ..... Usable On Code
UUT ..... Unit Under Test

## Section II. EQUIPMENT DESCRIPTION

### 1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

The hydraulically actuated impact wrench is a field support tool supplying high torque when needed for repair operations. It requires low power for operation and provides maximum torque for heavy repairs. The hydraulic impact wrench's features include:

- Lightweight, compact construction
- Low maintenance
- High torque output
- Low power requirements
- Portability

## 1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

The hydraulic impact wrench is designed primarily for heavy-duty disassembly and assembly tasks where torque requirements are maximum and available power resources are minimal. The impact wrench consists of two major assemblies: the impact head and the motor unit. The impact head is located in a die-cast housing constructed of an aluminum alloy or press-formed steel. The motor unit contains connections for two hydraulic hose lines, handle, and trigger. It provides a 3/4-in.-square drive for the attachment of heavy-duty sockets.

## 1-10. EQUIPMENT DATA.

Manufacturer ..... Stanley Hydraulic Tools

Operating pressure .....2000 pounds per square inch (psi)
(maximum permissible) ..... (13,790 kilopascals [kPa])

Fluid flow (minimum) .....2.0 gallons per minute (gpm) @ 1400 psi
.....(7.6 liters per minute (lpm) @ 9653 kPa)

Fluid flow (maximum) .....5.0 gpm © 1400 psi (18.9 lpm @ 9653 kPa)

Wrench speed (maximum permissible) .....2000 revolutions per minute (rpm)

Minimum torque output ..... 50 pound-feet (lb-ft) (67.8 Newton-meters [Nom] )

Ambient operating temperature .....25 degrees Fahrenheit (OF) (-31.7 degrees
(with proper oil viscosity) ..... Celsius [$^{o}$C] ) to 115$^{o}$F (46.1 $^{o}$C)

Ambient storage (with proper oil viscosity) .....-65$^{o}$F (-53.9$^{o}$C) to 155$^{o}$F (68.4$^{o}$C)

Operating oil .....OE/HD-10, PE 10-1,
OHA, and OES

Weight with hoses and preservative oil ..... 30 pounds (lb) (13.6 kilograms [kg])

## Section III. PRINCIPLES OF OPERATION

## 1-11. MOTOR UNIT.

**a**. Pressure on the on/off trigger (1) permits the flow of fluid from the high-pressure inlet line (2) through the motor unit (3). The fluid pressure forces the gears (4 and 5) to rotate, providing clockwise or counterclockwise operation of the hydraulic impact wrench, as controlled with the selector switch (6).

**b.** As gear rotation continues, a quantity of fluid is displaced and carried to the opposite side of the motor unit (3), where it is exhausted to the outlet return line (7). The rotation of gears (4 and 5) causes rotation of the assembly shaft (8), which engages the upper end of the hammer (9), which in turn drives the anvil (10).

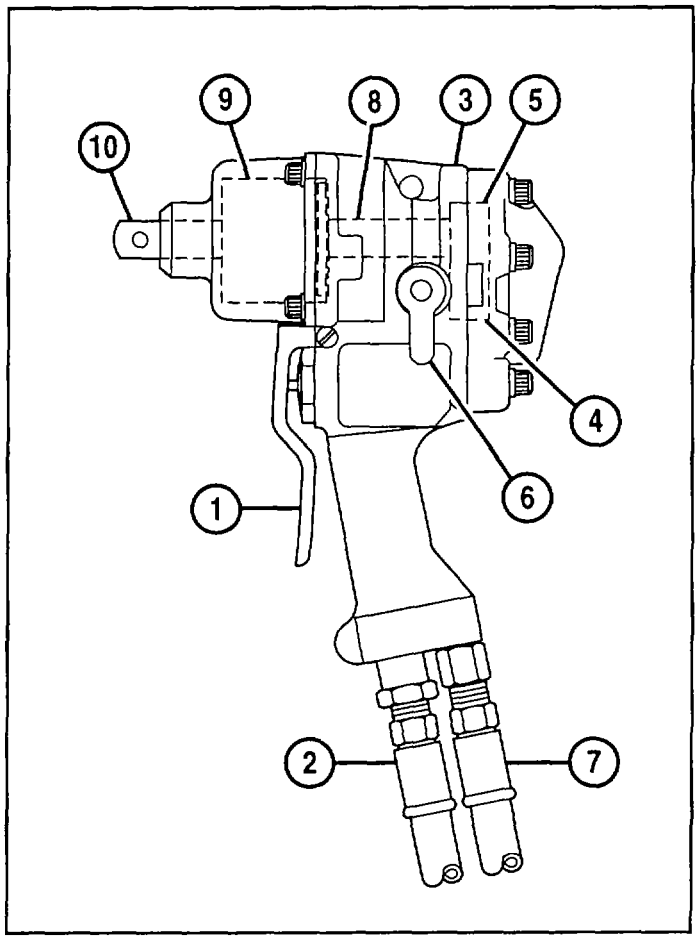
## 1-12. IMPACTING UNIT.

**a**. At this point, the restrictive force of the object being tightened or loosened triggers the hydraulic impact function of the wrench. The anvil (10) engages the hammer assembly (9) and the energy stored in the hammer assembly is transmitted to the anvil, delivering an impact force to the object being turned.

**NOTE**

**Unless resistive force of object being turned is greater than 50 lb-ft (67.8 N•m), hydraulic impact wrench will not function and wrench will rotate at continuous speed.**

**b.** The resistive force of the object being turned acts to momentarily break the contact between the slot of the anvil (10) and the tang of the hammer assembly (9). A buildup of kinetic energy in the hammer assembly during the break alternates with the transfer of stored energy to the object being turned during the period of contact.



# CHAPTER 2
# OPERATING INSTRUCTIONS

## CHAPTER OVERVIEW

This chapter provides instructions for the operation and maintenance of the hydraulic impact wrench. This chapter is divided into three major sections:



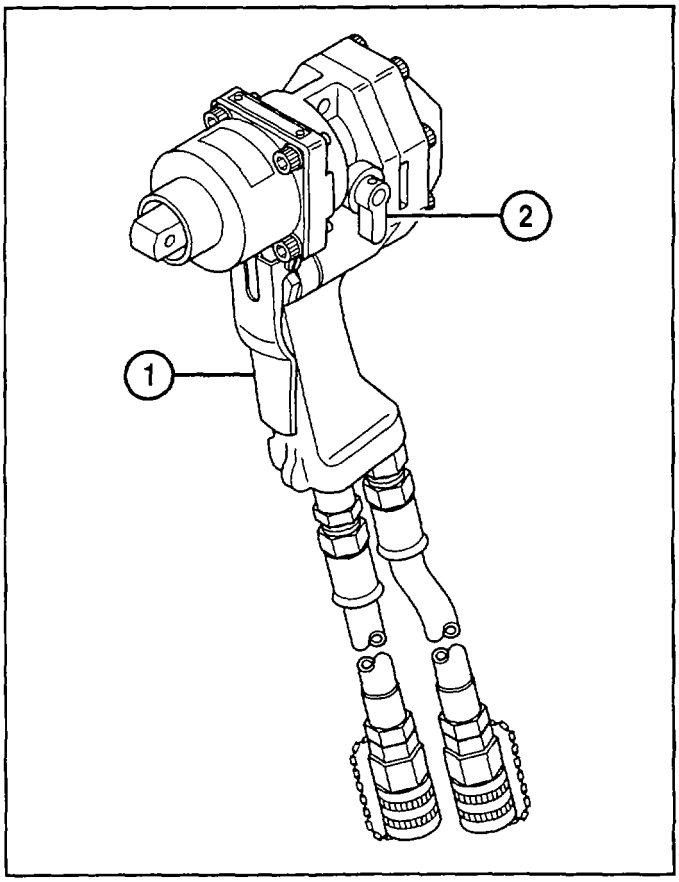
## Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS

### 2-1. ON/OFF TRIGGER.

The on/off trigger (1) actuates the variable flow of fluid through the hydraulic impact wrench to provide the torque needed for the required maintenance.

### 2-2. DIRECTIONAL CONTROL HANDLE LEVER

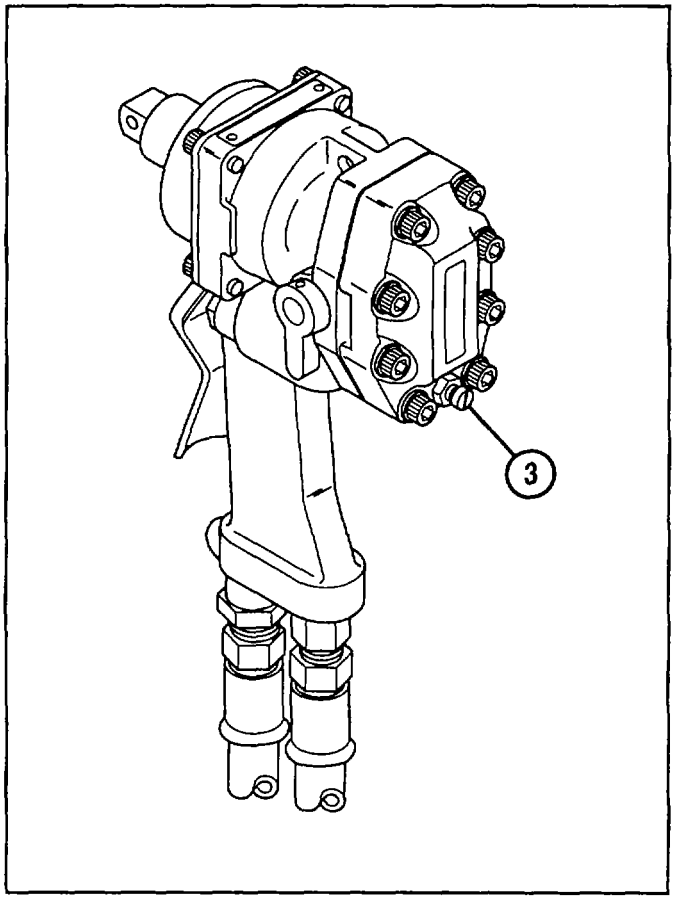
The directional control handle lever (2) controls the clockwise/counterclockwise rotation of the motor unit which loosens or tightens fasteners.



**2-3. RELIEF ADJUSTMENT SCREW.**

**CAUTION**

**Relief adjustment screw (3) is preset and sealed by the manufacturer. No attempt should be made to adjust screw, or damage to equipment could occur.**




## Section II. OPERATOR PMCS

**2-4. INTRODUCTION TO PMCS TABLE.**

**a. General.** The PMCS table lists the inspections and care of the hydraulic impact wrench required to keep it in good operating condition.

**b. PMCS Procedures.**

1. Item No. Column. Use the numbers in the Item No. column of the PMCS and Material Condition Status Reporting Criteria tables for the TM Item No. column of DA Form 2404 (Equipment Inspection and Maintenance Worksheet) when you have found a deficiency.

2. Interval Column. The Interval column of your PMCS table tells you when to do a certain check or service.

(a) Do your Before preventive maintenance just before you operate the hydraulic impact wrench. Pay attention to the warnings and cautions.

(b) Do your During preventive maintenance during operation. (During operation means to monitor the hydraulic impact wrench and its related components while they are being operated.) Pay attention to the warnings and cautions.

(c) Do your After preventive maintenance right after operating the hydraulic impact wrench. Pay attention to the warnings and cautions.

3. Location. Item to Check/Service Column. This column provides the location and the item to be checked or serviced.

4. Procedure Column. The Procedure column of your PMCS table tells how to do the required checks and services. Carefully follow these instructions. If your hydraulic impact wrench does not perform as required, notify unit maintenance. Report any malfunctions or failures on the proper DA Form 2404.

5. Not Fully Mission Capable if: Column. Entries in this column will be keyed specifically to checks listed in the Procedure column for the purpose of identifying the criteria that will cause the equipment to be classified as not fully mission capable because of inability to perform its primary mission. Entries in this column will:

(a) Identify conditions that make the equipment not ready/available for use.

(b) Deny use of equipment until corrective action has been performed. Always keep warnings and cautions in mind as you do PMCS. Take along all tools needed and a clean cloth (Appx. C, item 5) or two to make checks.

**c. To Maximize Effectiveness of PMCS, Always Watch for Following Conditions:**

1. Dirt and Grease. Keep your wrench clean. Dirt, grease, oil and other debris may hide a serious problem and will shorten the life of your equipment. Clean as you work.

**WARNING**

**Dry-cleaning solvent (PD-680) is toxic and flammable. Wear protective goggles and gloves; use in a well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I dry-cleaning solvent is 100 degrees Fahrenheit ($^{o}$F) (37.8 degrees Celsius [$^{o}$C]) and for type II is 138$^{o}$F (58.9$^{o}$C). Failure to do so may result in injury or death to personnel.**

**If personnel become dizzy while using dry-cleaning solvent, immediately get fresh air and medical help. If drycleaning solvent contacts skin or clothes flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical help.**

Use dry-cleaning solvent (Appx. C, item 16) on all metal surfaces. Use detergent (Appx. C, item 11) and water when you clean rubber or plastic materials.

**2-4. INTRODUCTION TO PMCS TABLE-Continued.**

2. Loose. Damaged, or Missing Bolts, Nuts, and Screws. Check for obvious looseness or damaged condition. Without using a wrench, it may be difficult to spot loose hardware. However, you can often identify loose bolts by chipped or missing paint around the bolt head and bare metal at the base of the bolt head. If you find a loose bolt, tighten it. If a bolt is missing, or a damaged bolt, nut, or screw is discovered, report it to unit maintenance.

3. Fluid Leaks. Look for wear, damage, and leaks under fluid hoses, lines, and fittings. Ensure fittings and clamps are tight. Wet spots indicate leaks but stains around a fitting can mean a leak too. If a leak comes from a loose fitting or connector, tighten the connection. If a hose, fitting, or connector is broken or worn out, report it to unit maintenance.

   It is necessary for you to know how fluid leakage affects your equipment. The following classification system defines the three types of leaks you may encounter while doing PMCS. Become familiar with the system so that you can determine the readiness/availability of your hydraulic impact wrench.

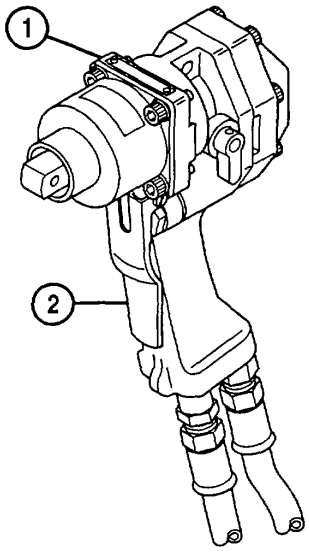
- Class I leak-Seepage of fluid (indicated by wetness or discoloration) not great enough to form drops.
- Class II leak-Leakage of fluid great enough to form drops, but not enough to cause drops to drip from the item being checked/inspected.
- Class IIII leak-Leakage of fluid great enough to form drops that fall from the item being checked/inspected.

**CAUTION**

- **Equipment operation is allowable with minor leakage (class I or class II). Of course, consideration must be given to fluid capacity in item/system being checked/inspected. When in doubt, notify your supervisor. When operating with class I or class II leaks, continue to check fluid levels as required in your PMCS to prevent damage to equipment.**
- **Class Ill leaks should be reported to your supervisor or unit maintenance.**

**Table 2-1. OPERATOR PMCS.**

| ITEM NO. | INTERVAL | LOCATION ITEM TO CHECK / SERVICE | PROCEDURE | NOT FULLY MISSION CAPABLE IF: |
|---|---|---|---|---|
| 1 | Before | Hydraulic impact wrench | Inspect hydraulic impact wrench (1) for cracks or breaks in casting. | Cracks or broken casting or winch body. |
| | During | | Inspect hydraulic impact wrench (1) for evidence of leakage. | Any class Ill leak. |
| 2 | Before | On/off trigger | Check for smooth, unrestricted operation of on/off trigger (2). | Trigger will not function. |

| ITEM NO. | INTERVAL | LOCATION ITEM TO CHECK/ SERVICE | PROCEDURE | NOT FULLY MISSION CAPABLE IF: |
|---|---|---|---|---|
| | | |  | |

## Section III. OPERATION UNDER USUAL CONDITIONS

### 2-5. OPERATING PROCEDURES

**CAUTION**

- **Damage to object being tightened could occur if flow rate is not adjusted properly prior to operation.**
- **Do not operate hydraulic impact wrench with flow higher than 5.0 gallons per minute (gpm) (18.9 liters per minute [gpm] ). Excessive speeds may damage hydraulic impact wrench internally.**
- **To prevent contaminants from entering hydraulic impact wrench and causing equipment damage, quick disconnect plugs must be installed when hydraulic impact wrench is not in use.**

**NOTE**

- **For specific system operation, refer to applicable vehicle operator's manual.**
- **Hydraulic impact wrench must be set for proper flow and impacting time. As pump speed increases, amount of fluid delivered to hydraulic impact wrench increases, causing motor to turn faster and deliver higher impact loads to object being turned. Adjust flow to generate an impact force to turn object to, but not beyond, its required torque limit.**

**2-5. OPERATING PROCEDURES-Continued.**

**a.** Check hydraulic lines from power source to hydraulic impact wrench.

**b.** Check vehicle hydraulic reservoir. Fill if necessary in accordance with applicable vehicle Technical Manual/Lubrication Order.

**c.** Start power supply to pump and allow power unit to warm up.

**CAUTION**

**Ensure directional control is set to clockwise or counterclockwise limit. Failure to do so will restrict oil flow and cause unnecessary strain on hydraulic supply equipment.**

**d.** Set directional control handle (1) for either clockwise or counterclockwise position.

**WARNING**

**To prevent injury to personnel, do not operate hydraulic impact wrench with trigger removed.**

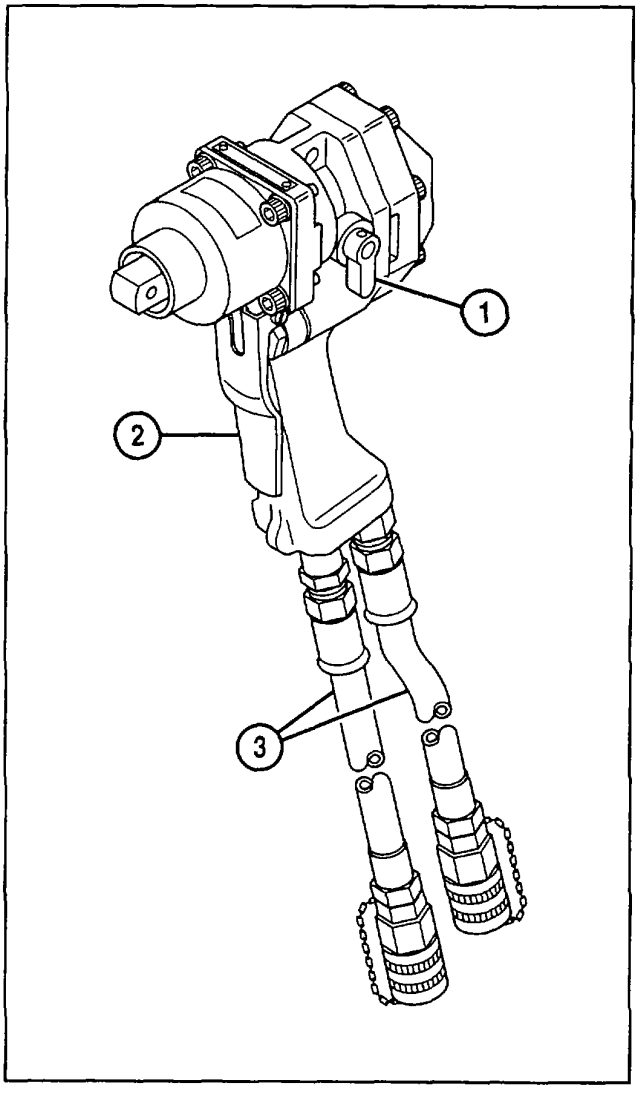
**NOTE**

**Unless resistive force of object being turned is greater than 50 pound-feet (lb-ft) (67.8 Newton-meters [Nom]), impact feature of wrench will not function and hydraulic impact wrench will rotate at continuous speed.**

**e**. Press and hold trigger (2) for operation.

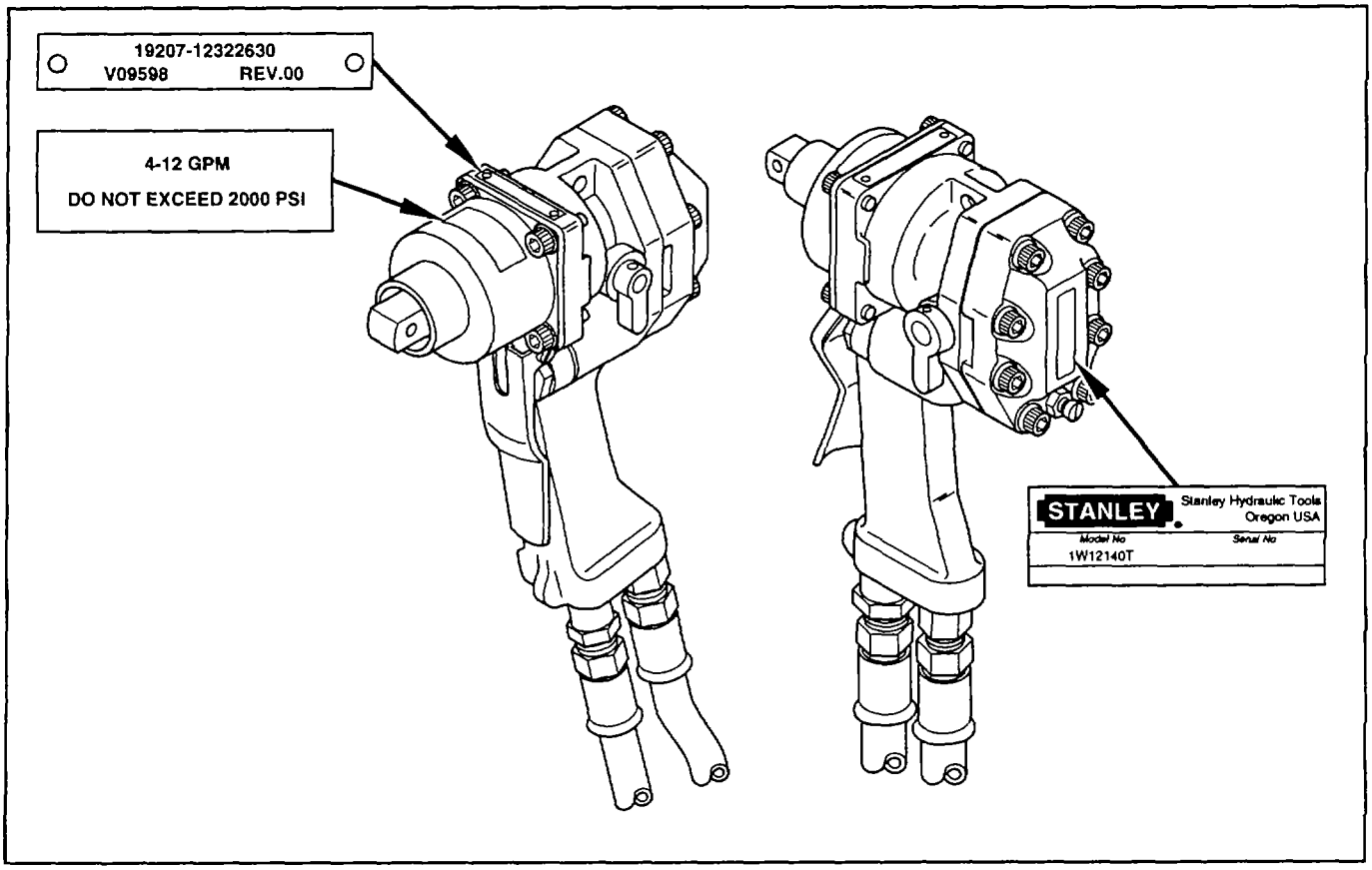
**f.** Release trigger (2) to stop operation.

**g.** Bleed small amount of fluid from hoses (3) prior to storing to prevent pressure build up in hoses.



## 2-6. DECALS AND IDENTIFICATION PLATE.

The decals and identification plate are located on the exterior of the hydraulic impact wrench as shown.



# CHAPTER 3
# OPERATOR MAINTENANCE INSTRUCTIONS

## CHAPTER OVERVIEW

This chapter provides maintenance procedures which the operator is authorized and required to perform. This chapter is divided into two major sections:



## Section I. LUBRICATION INSTRUCTIONS

Lubrication instructions are in Appendix G of this manual. All lubrication instructions are mandatory.

## Section II. OPERATOR MAINTENANCE PROCEDURES

There is no operator maintenance authorized except for cleaning of exterior surface.

# CHAPTER 4
# UNIT MAINTENANCE INSTRUCTIONS

## CHAPTER OVERVIEW

This chapter provides maintenance instructions which unit maintenance is authorized and required to perform. This chapter is divided into six major sections:



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

### 4-1. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

### 4-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT.

Special tools, TMDE, and support equipment are not required to maintain the hydraulic impact wrench.

### 4-3. REPAIR PARTS.

Repair parts are listed and illustrated in Appendix D. Mandatory replacement parts are listed in Appendix F.

## Section II. SERVICE UPON RECEIPT

### 4-4. CHECKING UNPACKED EQUIPMENT.

**a**. Inspect equipment for damage incurred during shipment. If equipment has been damaged, report damage on SF Form 368, Product Quality Deficiency Report.

**b.** Check equipment against packing slip to see if shipment is complete. Report all discrepancies in accordance with DA PAM 738-750.

### 4-5. PROCESSING UNPACKED EQUIPMENT.

**a.** Clean hydraulic impact wrench.

**4-5. PROCESSING UNPACKED EQUIPMENT-Continued.**

**b.** Examine hydraulic impact wrench for evidence of damage during shipment and for external rust or corrosion. If external corrosion or rust is found, examine impact head internally for additional rust or corrosion. Instructions for servicing hydraulic impact wrench components are found in Section III of this chapter.

**4-6. PRELIMINARY SERVICING AND ADJUSTMENT OF EQUIPMENT.**

**a.** General. Equipment faults disclosed during preliminary inspection and servicing or during break-in period will be corrected by unit maintenance.

**b.** Assembly and Preparation for Use.

1. Remove hydraulic impact wrench from packing.
2. Clean exterior of hydraulic impact wrench with cloth (Appx. C, item 5).
3. Apply sealing compound (Appx. C, item 10) or antiseize tape (Appx. C, item 17) to threads of hydraulic lines.
4. Attach hydraulic hoses to hydraulic impact wrench. Ensure inlet and outlet hoses are properly connected.
5. Stow hydraulic impact wrench at proper location.

**c. Initial Adjustments, Checks, and Self-Test.**

1. Select several fastenings of size and type that are to be used in a particular operation.
2. Assemble fastenings, finger tight, on a test block or other support that will not be damaged in event of nut or capscrew failure.

**CAUTION**

**Do not operate hydraulic impact wrench with flow higher than 5.0 gallons per minute (18.9 liters per minute). Excessive speeds may damage impact wrench internally.**

3. Operate hydraulic impact wrench in accordance with paragraph 2-6.
4. Using a torque-indicating wrench, measure amount of torque required to turn each fastener. Indicated readings should be substantially similar to recommended torque value. If indicated torque values are not rational, refer to Section IV of this chapter. Otherwise, power supply equipment and hydraulic impact wrench may be considered to be in satisfactory operating condition and actual torque operations may be started.
5. Operate hydraulic impact wrench in accordance with paragraph 2-6.

## Section III. UNIT MAINTENANCE PMCS

**4-7. INTRODUCTION TO PMCS TABLE.**

**a. General**. The PMCS table lists the inspections and care of the hydraulic impact wrench required to keep it in good operating condition.

**b. PMCS Procedures.**

1. Item No. Column. Use the numbers in the Item No. column of PMCS and Material Condition Status Reporting Criteria tables for the TM Item No. column of DA Form 2404, Equipment Inspection and Maintenance Worksheet, when a deficiency has been found.

2. Interval Column. The Interval column of the PMCS table tells when to do a certain check or service.

3. Location. Item to Check/Service Column. This column provides the location and the item to be checked or serviced.

4. Procedure Column. The Procedure column of the PMCS table tells how to do the required checks and services. Carefully follow these instructions. Report any malfunctions or failures on DA Form 2404.

5. Not Fully Mission Capable if: Column. Entries in this column will be keyed specifically to checks listed in the Procedure column for the purpose of identifying criteria that will cause equipment to be classified as not fully mission capable because of inability to perform its primary mission. Entries in this column will:

   (a) Identify conditions that make the equipment not ready or available for use.

   (b) Deny use of equipment until corrective action has been performed. Always keep warnings and cautions in mind as you do PMCS. Take along all tools needed and a clean cloth (Appx. C, item 5) or two to make checks.

**c. To Maximize Effectiveness of PMCS, Always Watch for Following Conditions:**

1. Dirt and Grease. Keep hydraulic impact wrench clean. Dirt, grease, oil, and other debris may hide a serious problem and will shorten the life of equipment. Clean as you work.

**WARNING**

**Dry-cleaning solvent (P-D-680) is toxic and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I dry-cleaning solvent is 100 degrees Fahrenheit ($^{o}$F) (37.8 degrees Celsius [$^{o}$C] ) and for type II is 138$^{o}$F (58.9$^{o}$C). Failure to do so may result in injury or death to personnel.**

**If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.**

Use dry-cleaning solvent (Appx. C, item 16) on all metal surfaces. Use detergent (Appx. C, item 11) and water to clean rubber or plastic materials.

2. Loose, Damaged, or Missing Bolts, Nuts. and Screws. Check for obvious looseness or damaged condition. Without using a wrench, it may be difficult to spot loose hardware. However, you can often identify loose bolts by chipped or missing paint around bolt head and bare metal at base of bolt head. If you find a loose bolt, tighten it. If a bolt is missing or a damaged bolt, nut, or screw is discovered, it must be replaced.

3. Fluid Leaks. Look for wear, damage, and leaks under fluid hoses, lines, and fittings. Ensure fittings and clamps are tight. Wet spots indicate leaks, but stains around a fitting can also mean a leak. If a leak comes from a loose fitting or connector, tighten the connection. If a hose, fitting, or connector is broken or worn out, it must be replaced.

**4-7. INTRODUCTION TO PMCS TABLE-Continued.**

It is necessary for you to know how fluid leakage affects your equipment. The following classification system defines three types of leaks you may encounter while doing PMCS. Become familiar with the system so that you can determine readiness status of your hydraulic impact wrench.

- Class I leak-Seepage of fluid (indicated by wetness or discoloration) not great enough to form drops.
- Class II leak-Leakage of fluid great enough to form drops, but not enough to cause drops to drip from item being checked or inspected.
- Class Ill leak-Leakage of fluid great enough to form drops that fall from item being checked or inspected.

**CAUTION**

- **Equipment operation is allowable with minor leakage (class I or class II). Of course, consideration must be given to fluid capacity in item or system being checked or inspected. When in doubt, notify your supervisor. When operating with class I or class II leaks, continue to check fluid levels as required in your PMCS to prevent damage to equipment.**
- **Class III leaks should be reported to your supervisor.**

**Table 4-1. UNIT MAINTENANCE PMCS.**

| ITEM NO. | INTERVAL | LOCATION ITEM TO CHECK / SERVICE | PROCEDURE | NOT FULLY MISSION CAPABLE IF: |
|---|---|---|---|---|
| 1 | Semiannual | Hydraulic impact wrench | Perform operator PMCS listed in table 2-1 of this manual. | |
| 2 | Semiannual | Impact head | Service impact head in accordance with paragraph 4-11. | |

## Section IV. UNIT MAINTENANCE TROUBLESHOOTING PROCEDURES

**4-8. INTRODUCTION FOR UNIT MAINTENANCE TROUBLESHOOTING.**

The following table lists common malfunctions which you may find during the operation or maintenance of the hydraulic impact wrench or its components. Perform tests/inspections and corrective actions in the order listed.

This manual cannot list all malfunctions that may occur, nor all tests, inspections, and corrective actions. If a malfunction is not listed, or is not corrected by listed corrective actions, notify your supervisor.

**NOTE**

**Before you use this troubleshooting table, ensure you have performed all applicable operating checks in Chapter 2.**

**Table 4-2. UNIT MAINTENANCE TROUBLESHOOTING.**

**MALFUNCTION**
**TEST OR INSPECTION**
**CORRECTIVE ACTION**

**1. Hydraulic Impact Wrench Fails to Operate.**

**Step 1-**Refer to applicable vehicle manual and ensure that vehicle is properly set up for hydraulic impact wrench operation.

**Step 2**-Inspect wrench hydraulic hose couplings to ensure they are properly connected and free of restrictions.

Remove all restrictions from hose couplings. If restriction cannot be removed, replace hose couplings (refer to applicable vehicle manual). Ensure hose couplings are properly connected.

**Step 3**-Inspect hydraulic hoses for restriction or damage that would stop oil flow.

Repair or replace restricted or damaged hydraulic hoses (refer to applicable vehicle manual).

**Step 4**-Check that rotation direction selector control is properly set for desired rotation.

Set selector control fully in desired rotation direction.

**Step 5**-With all of above checks performed, attempt to operate hydraulic impact wrench.

If hydraulic impact wrench fails to operate, repair hydraulic impact wrench (see para. 4-17).

**2. Hydraulic Impact Wrench Fails to Develop Full Power.**

**Step 1-**Refer to applicable vehicle manual and ensure controls are set to deliver sufficient oil for desired torque requirement.

Set vehicle controls to provide sufficient oil flow for torque requirement.

**Step 2**-Check that rotation direction selector control is set fully in position for desired rotation.

Set rotation direction selector control fully in position for desired rotation.

**Step 3**-Inspect hose for oblivious kinks, flat spots, or obstructions. Remove obstructions or replace hoses as required (refer to applicable vehicle manual).

**Step 4**-Check for torque requirements in excess of wrench capacity. Do not attempt to turn any fastener requiring torque in excess of 850 pound-feet (lb-ft) (1152 Newton-meters [N•m] ).

**Step 5**-Inspect impact head for worn, loose, or damaged parts. Also check for proper lubricant (see para. 4-11).

Replace worn, damaged, or broken parts. Properly lubricate head (see para. 4-11).

**Step 6**-Test hydraulic impact wrench to ensure full power is developed. If hydraulic impact wrench fails to develop full power, repair hydraulic impact wrench (see para. 4-17).

**3. Hydraulic Impact Wrench Operation Is Sluggish or Erratic (Motor Fails to Respond).**

**Step 1**-Refer to applicable vehicle manual and ensure that vehicle is supplying sufficient oil for proper hydraulic impact wrench operation.

Set vehicle control for proper hydraulic impact wrench operation.

**Table 4-2. UNIT MAINTENANCE TROUBLESHOOTING-Continued.**

| MALFUNCTION<br>TEST OR INSPECTION<br>CORRECTIVE ACTION |
|---|

**Step 2**-Check vehicle hydraulic system for proper oil level. Bring vehicle hydraulic oil to proper oil level.

**Step 3**-Check applicable vehicle manual and ensure hydraulic oil is of proper grade for hydraulic impact wrench operation.

If grade of oil for vehicle does not meet requirements for hydraulic impact wrench operation, discontinue hydraulic impact wrench operation with vehicle.

**Step 4**-Inspect hydraulic impact wrench for damaged, worn, or broken parts (see para. 4-19).

Repair hydraulic impact wrench as required (see para. 4-17).

**4. Hydraulic Impact Wrench Breaks Fasteners.**

**Step 1**-Refer to flow output and approximate torque output setting as shown in applicable vehicle manual. Check impacting setting for fastener being torqued.

Adjust impacting setting as shown in applicable vehicle manual.

**Step 2**-Refer to applicable vehicle manual and ensure proper amount of oil is being supplied for torque required.

Set vehicle controls for required torque.

**5. Hydraulic Impact Wrench Leaks Oil.**

Inspect hydraulic impact wrench for worn or damaged parts and seals (see para. 4-19).
Replace worn or damaged parts and seals as required (see para. 4-17).

**6. Trigger and/or Needle Roller Will Not Disengage When Trigger Is Released.**

**Step 1**-Check freedom of movement of trigger.

Adjust locknut for free trigger movement.

**Step 2**-Depress trigger and check for smooth engagement of trigger and needle roller.

If needle roller fails to disengage, check relief adjustment screw for proper setting (see para. 4-16).

**Step 3**-Inspect needle roller and relief valve for wear, distortion, obstructions, or broken parts.

If unserviceable conditions are found, repair hydraulic impact wrench as required (see para. 4-15 or 4-17).

## Section V. UNIT MAINTENANCE PROCEDURES

**4-9. CLEANING.**

Cleaning instructions are as follows.

**WARNING**

**Dry-cleaning solvent (P-D-680) is toxic and flammable. Wear protective goggles and gloves; use only in well ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I dry-cleaning solvent is 100°F (37.8°C) and for type II is 138°F (58.9°C). Failure to do so may result in injury or death to personnel.**

**If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.**

**a.** Use cleaning compound (Appx. C, item 7) or dry-cleaning solvent (Appx. C, item 16) to wash lubricant from all unpainted metal parts of hydraulic impact wrench.

**b.** To clean painted metal parts, use cleaning compound (Appx. C, item 8).

**c**. Use detergent (Appx. C, item 11) and hot water to clean all plastic and rubber parts.

**d**. Dry all parts with a clean cloth (Appx. C, item 5).

**e**. After rubber and plastic parts are clean, dry thoroughly.

**f.** Before installing new parts, remove any rust-preventive compound, protective lubricants, etc., and lubricate those parts requiring lubrication.

**g.** Apply a light film of lubricating oil (Appx. C, item 14) to all unpainted metal parts to prevent tarnishing.

## 4-10. RUST REMOVAL.

Remove rust or corrosion from all parts of material. To remove rust or corrosion from unfinished surfaces, use steel wire cleaning brushes, abrasive cloths, or corrosion-removing compound (Appx. C, item 9). On finished surfaces, remove rust or corrosion by buffing surface with a fine, rotary-wheel, wire brush.

On highly polished surfaces, remove rust or corrosion by buffing surface with buffing compound (Appx. C, item 6). Apply very light buffing pressure. To remove rust or corrosion by hand, use crocus cloth (Appx. C, item 4).

## 4-11. IMPACT HEAD SERVICING AND REPAIR.

This task covers: a. Servicing b. Removal c. Disassembly d. Inspection e. Assembly f. Installation

**INITIAL SETUP**

Tools
Tool kit, general mechanic's (SC 5180-90-CL-N26)
Bushing driver (5180-00-121-3866)
Socket wrench attachment, socket head screw, 1/4-inch (in.), 3/8-in.-drive (5120-00-596-8508)
Wrench, torque, 0-600 pound-inches (lb-in.), 3/8-in.-square drive (5120-00-542-5681)

Materials/Parts
Cloth, cleaning (Appx. C, item 5)
Gasket (Appx. F, item 1)

Materials/Parts-Continued
Grease, automotive (Appx. C, item 12)
Lockwasher (4) (Appx. F, item 4)
Solvent, dry-cleaning (Appx. C, item 16)

Equipment Conditions
Hydraulic impact wrench disconnected from power source.
Hydraulic impact wrench secured in vise with soft-jaw caps; impact head assembly facing upward.

**4-11. IMPACT HEAD SERVICING AND REPAIR-Continued.**

**a. Servicing**. When performing semiannual servicing, perform all steps in this paragraph.

**b. Removal.**

**NOTE**
**Trigger (1) must be depressed to remove hammer case (2).**

1. Remove four capscrews (3) and four lockwashers (4) securing hammer case (2) to main housing (5). Discard lockwashers.

2. Remove and discard hammer case gasket (6).

**NOTE**
**Remove hammer case bushing (7) only if damaged. Refer to paragraph 4-19 for inspection.**

3. Remove hammer case bushing (7) from hammer case (2).

**NOTE**
**Inertia insert (8) may adhere to main housing (5) or hammer frame assembly (9).**

4. Remove hammer frame assembly (9) from main housing (5).

**NOTE**
**Pilot ring (10) may adhere to either hammer case (2) or main housing (5).**

5. Remove pilot ring (10) from hammer case (2).

**c. Disassembly.**

**NOTE**
- **To aid in proper installation, note position of hammer (11) before disassembly.**
- **If inertia insert (8) remains with hammer frame assembly (9), remove prior to performing following step.**

1. Remove anvil (12), two hammer pins (13), and hammer (11) from hammer frame (14).

2. Remove inertia insert (8), thrust race (15), thrust bearing (16), and thrust race (17).

**d. Inspection.** Inspect impact head assembly (18) in accordance with paragraph 4-19.

**e. Assembly.**

1. Lubricate all parts of hammer frame assembly (9) with grease.

2. Install thrust race (17), thrust bearing (16), and thrust race (15) in main housing (5).

3. Install inertia insert (8) in main housing (5).

4. Install and secure hammer (11) in hammer frame (14) with two hammer pins (13).

5. Install anvil (12) in hammer frame assembly (9).

**f. Installation.**

1. Aline hammer pins (13) with inertia insert (8).

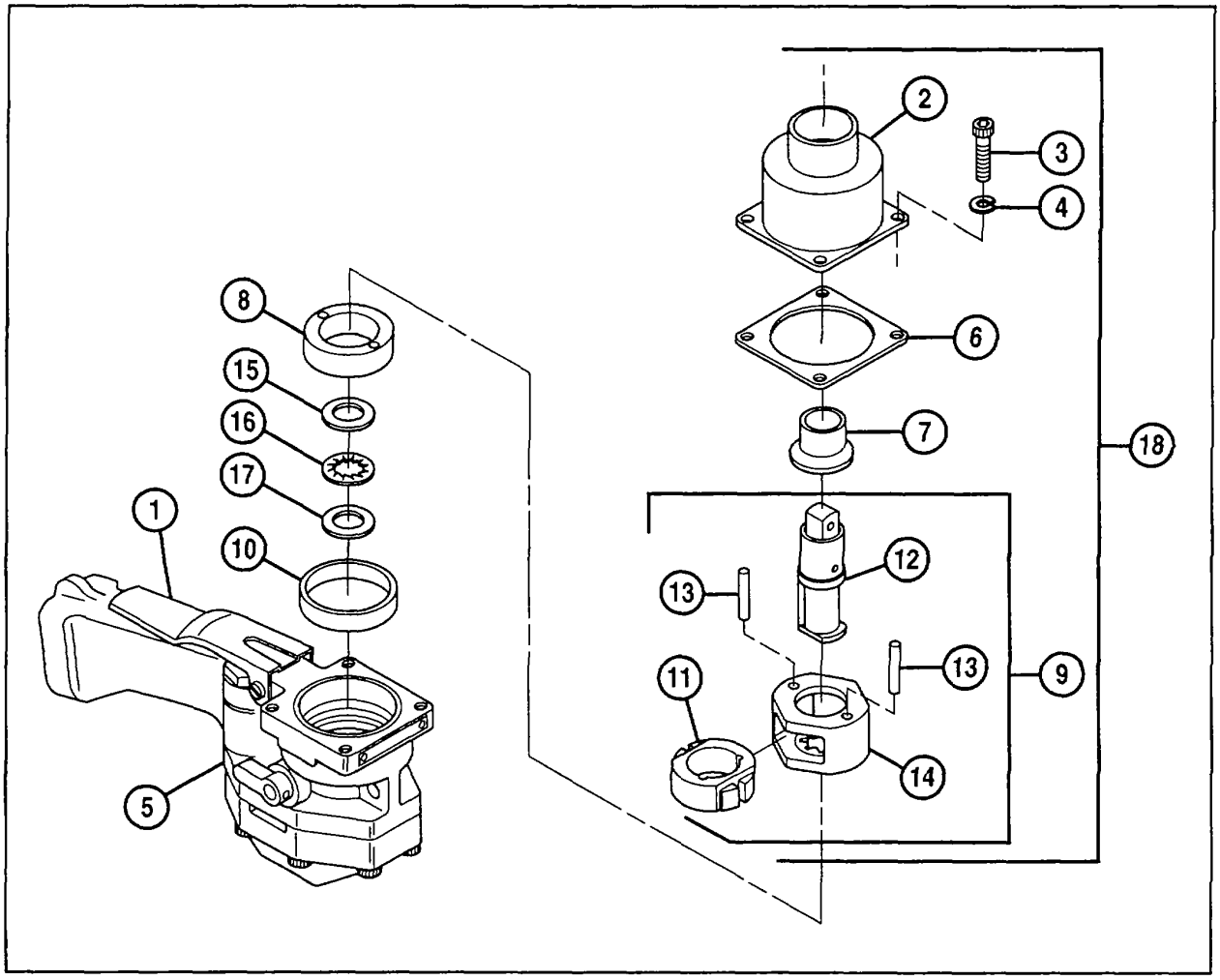
2. Install hammer frame assembly (9) in main housing (5).

3. Install hammer case bushing (7), if removed, and pilot ring (10) in hammer case (2).

4. Position new hammer case gasket (6) on main housing (5).

5. Install hammer case (2) onto main housing (5) while depressing trigger (1).

6. Secure hammer case (2) to main housing (5) with four capscrews (3) and four new lockwashers (4). Torque capscrews to 180 lb-in. (20.3 N•m).



## 4-12. LEVER REPLACEMENT.

This task covers: a. Removal b. Installation

**INITIAL SETUP**

Tools
Tool kit, general mechanic's (SC 5180-90-CL-N26)

Equipment Conditions
Hydraulic impact wrench disconnected from power source.

**a. Removal.**

1. Remove setscrew (1) securing lever (2) to reversing spool (3).

**CAUTION**

**To prevent damage to reversing spool or packings when lever is removed, hold opposite end of reversing spool securely.**

2. Remove lever (2) from reversing spool (3).

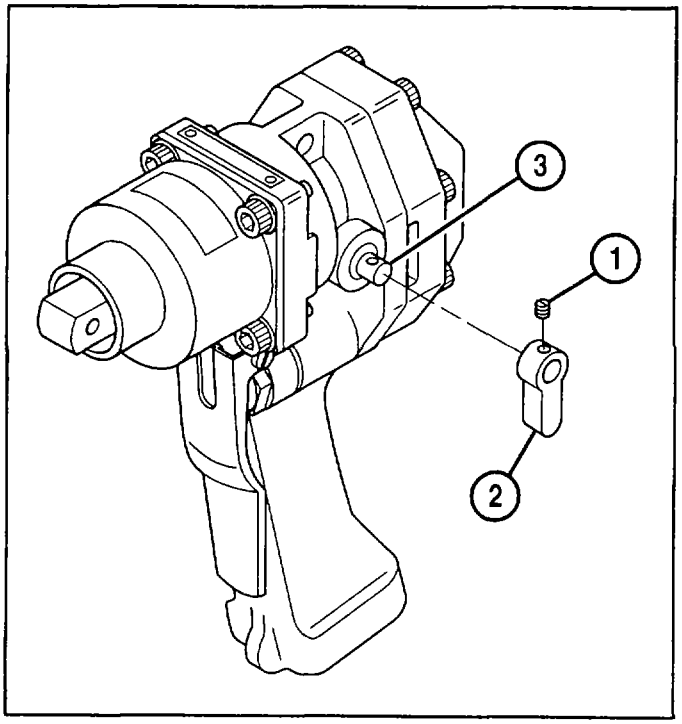
**b. Installation.**

**CAUTION**

**Reversing spool could be damaged if screw holes are not alined properly when installing lever.**

1. Aline and install lever (2) on reversing spool (3).

2. Secure lever (2) to reversing spool (3) with setscrew (1).



## 4-13. REVERSING SPOOL AND PREFORMED PACKING REPLACEMENT.

This task covers: a. Removal b. Inspection c. Installation

**INITIAL SETUP**

Tools
Tool kit, general mechanic's (SC 5180-90-CL-N26)
Pliers, snapring (5120-00-789-0492)
Solvent, dry-cleaning (Appx. C, item 16)

Materials/Parts
Cloth, cleaning (Appx. C, item 5)
Oil, lubricating (Appx. C, item 13)
Packing, preformed (2) (Appx. F, item 7)

Materials Parts-Continued
Ring, backup (2) (Appx. F, item 12)
Snapring (Appx. F, item 14)

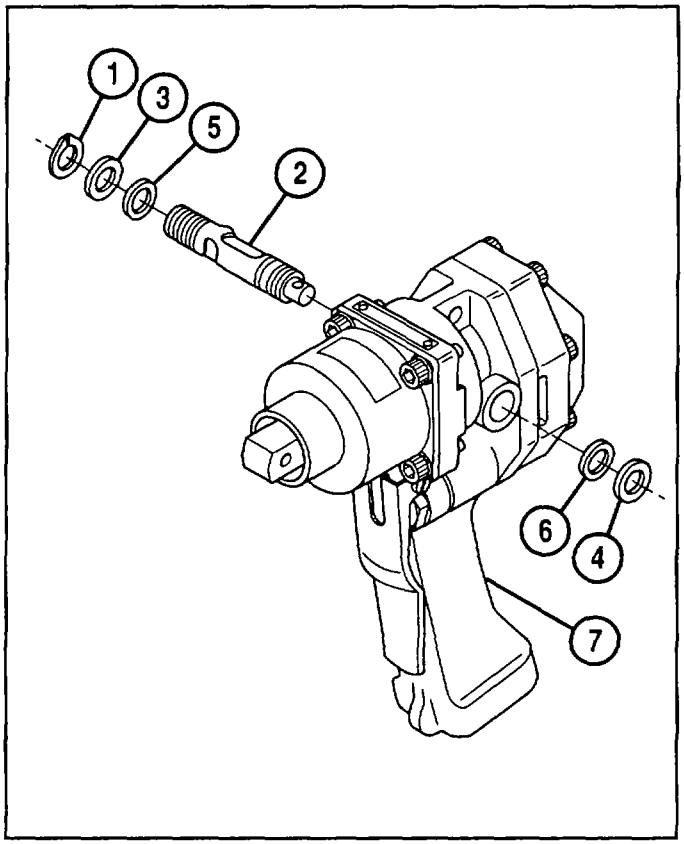
Equipment Conditions
Lever removed (see para. 4-12).

**a. Removal.**

1. Remove snapring (1) from reversing spool (2). Discard snapring.

2. Remove reversing spool (2), two backup rings (3 and 4), and two preformed packings (5 and 6) from right side of main housing (7). Discard preformed packings and backup rings.

**b. Inspection**. Inspect reversing spool (2) in accordance with paragraph 4-19.



**4-13. REVERSING SPOOL AND PREFORMED PACKING REPLACEMENT-Continued.**

**c. Installation.**

**CAUTION**

**Sliding reversing spool (2) through main housing (7) after installation of preformed packings (5 and 6) will cause damage to preformed packings.**

1. Apply a small amount of lubricating oil to two new preformed packings (5 and 6).

**NOTE**

**Ensure backup ring (3) is to side toward end of reversing spool.**

2. Install new preformed packing (5) and new backup ring (3) on snapring end of reversing spool (2).

3. Slide reversing spool (2) from right side just far enough to allow installation of preformed packing (5) and backup ring (3) in groove.

4. Install reversing spool (2) into right side of main housing (7) until lever end of reversing spool extends through main housing.

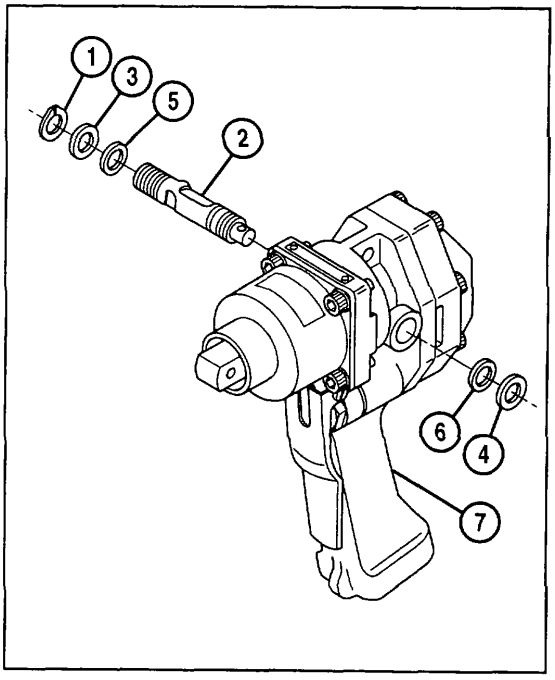
5. Install new preformed packing (6) and new backup ring (4) on lever end of reversing spool (2).

6. Slide reversing spool (2) from left side until left end of revering spool extends from right side of main housing (7).

7. Install new snapring (1) on reversing spool (2).

**NOTE**

**Follow-on maintenance: Install lever on reversing spool (see para. 4-12).**



## 4-14. TRIGGER ASSEMBLY REPLACEMENT.

This task covers: a. Removal b. Installation

**INITIAL SETUP**

Tools
Tool kit, general mechanic's (SC 5180-90-CL-N26)

Materials/Parts
Locknut (Appx. F, item 2)

Equipment Conditions
Hydraulic impact wrench disconnected from power source.

**a. Removal.**

**NOTE**
**Needle roller (1) may fall out when trigger (2) is removed.**

1. Remove locknut (3) and capscrew (4) securing trigger (2) to hydraulic impact wrench. Discard locknut.
2. Remove trigger (2).

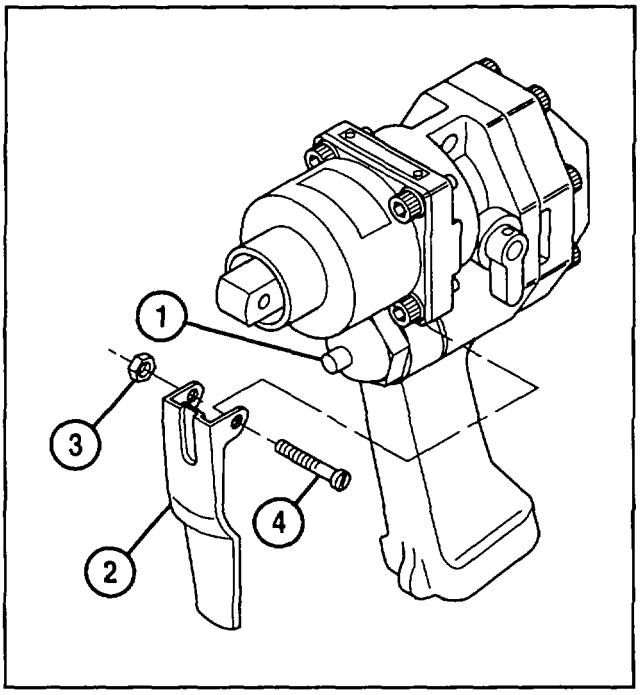
**b. Installation.**

**NOTE**
**Do not overtighten locknut (3).**

1. Install and secure new trigger (2) to hydraulic impact wrench with capscrew (4) and new locknut (3).

**CAUTION**
**Equipment could be damaged if needle roller (1) does not disengage when trigger (2) is released.**

2. Check trigger (2) for free play. If trigger does not operate freely, refer back to Section IV of this chapter.
3. Check that needle roller (1) disengages when trigger (2) is released. If needle roller does not operate properly, refer back to Section IV of this chapter.



## 4-15. RELIEF VALVE ASSEMBLY REPLACEMENT.

This task covers: a. Removal b. Inspection c. Installation

**INITIAL SETUP**

Tools
Tool kit, general mechanic's (SC 5180-90-CL-N26)
Wrench, 1-1/2-in.-comb (5120-00-227-8834)

Materials/Parts
Cloth, cleaning (Appx. C, item 5)
Oil, lubricating (Appx. C, item 13)
Packing, preformed (Appx. F, item 5)
Packing, preformed (Appx. F, item 8)
Solvent, dry-cleaning (Appx. C, item 16)

Equipment Conditions
Hydraulic impact wrench disconnected from power source.
Hydraulic impact wrench secured in vise with soft-jaw caps; impact head assembly facing upward.
Trigger assembly removed (see para. 4-14).

**a. Removal.**

**WARNING**

**Exercise extreme care when removing spool cap (1) due to spring force. Injury to personnel could occur if spring force is released quickly.**

1. Remove needle roller (2), spool cap (1), and two preformed packings (3 and 4). Discard preformed packings.

**NOTE**
**Do not attempt to remove valve sleeve (5).**

2. Remove valve spool (6), relief seat (7), relief poppet (8), two springs (9 and 10), and spring rest (11) from main housing (12).

**b. Inspection**. Inspect valve spool components in accordance with paragraph 4-19.

**c. Installation.**

**CAUTION**
**Damage to equipment could occur if valve spool components are not alined properly during Installation.**

1. Insert relief seat (7) into valve spool (6) until notches in relief seat engage strut of valve spool.

2. Install spring (10), spring rest (11), spring (9), relief poppet (8), and valve spool (6) with relief seat (7) in main housing (12).

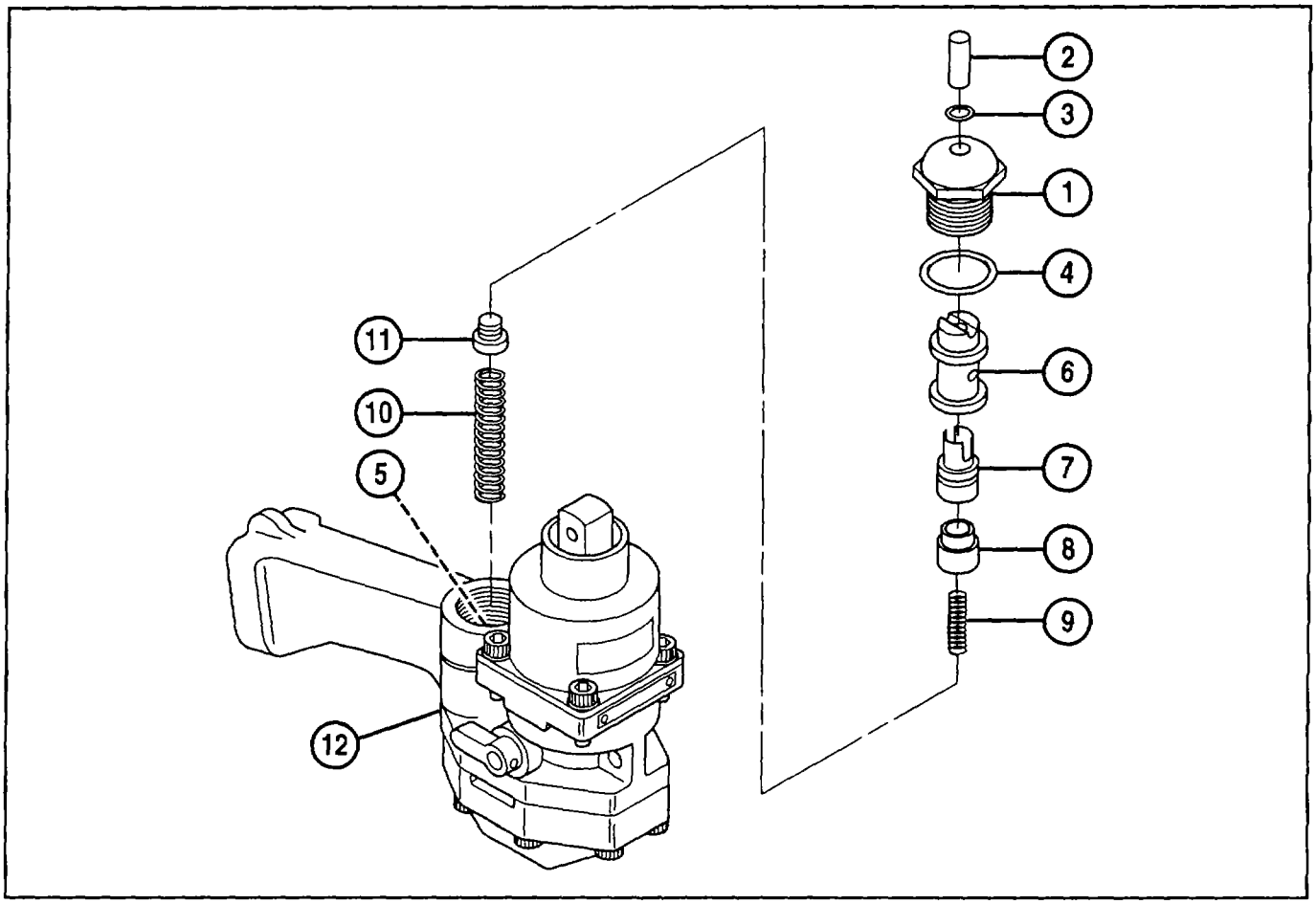
3. Lubricate two new preformed packings (3 and 4) with clean lubricating oil and install preformed packings.

**WARNING**

**Exercise extreme care when installing spool cap (1) due to spring force. Injury to personnel could occur if spring force is released quickly.**

4. Secure valve spool (6) in main housing (12) by installing spool cap (1) with preformed packing (4).

5. Install needle roller (2) with preformed packing (3) in spool cap (1).




**NOTE**

**Follow-on maintenance: Install trigger (see para. 4-14).**

## 4-16. RELIEF ADJUSTMENT SCREW REPLACEMENT.

This task covers: a. Removal b. Installation c. Installation

**INITIAL SETUP**

**Tools**

Tool kit, general mechanic's (SC 5180-90-CL-N26)

**Materials/Parts**

Cloth, cleaning (Appx. C, item 5)

**Equipment Conditions**

Hydraulic impact wrench disconnected from power source.

**4-16. RELIEF ADJUSTMENT SCREW REPLACEMENT-Continued.**

**a. Removal.**

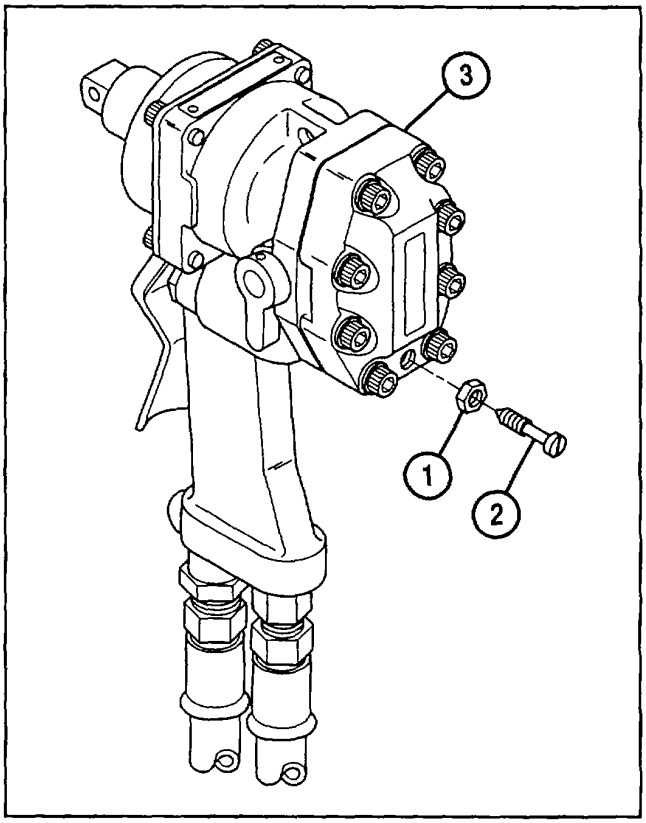
1. Loosen nut (1).
2. Remove screw (2) and nut (1) from motor cap (3).
3. Remove nut (1) from screw (2).

**b. Installation.**

1. Install nut (1) on screw (2).
2. Install screw (2) in motor cap (3).

**c. Adjustment.**

1. Turn screw (2) clockwise, until it bottoms, then turn counterclockwise 1-1/2 full turns.
2. Secure screw (2) in position with nut (1).




**4-17. HYDRAULIC IMPACT WRENCH REPAIR.**

This task covers: a. Disassembly b. Inspection c. Assembly d. Testing

**INITIAL SETUP**

**Tools**

Tool kit, common No. 1 (SC 4910-95-CL-A74)
Socket wrench attachment, socket head screw, 5/16-in., 3/8-in.-drive (5120-00-683-8602)
Wrench, torque, 0-600 lb-in., 3/8-in.-square drive (5120-00-542-5681)

**Materials/Parts**

Cloth, cleaning (Appx. C, item 5)
Lockwasher (8) (Appx. F, item 3)
Oil, lubricating (Appx. C, item 13)
Packing, preformed (Appx. F, item 6)
Packing, preformed (Appx. F, item 9)

**Materials/Parts - Continued**

Packing, flat preformed (Appx. F, item 10)
Packing, round preformed (Appx. F, item 11)
Snapring (Appx. F, item 13)
Solvent, dry-cleaning (Appx. C, item 16)

**Equipment Conditions**

Impact head assembly removed (see para. 4-11).
Reversing spool and two packings removed (see para. 4-13).
Relief valve removed (see para. 4-15).
Relief adjustment screw removed (see para. 4-16).

**a. Disassembly.**

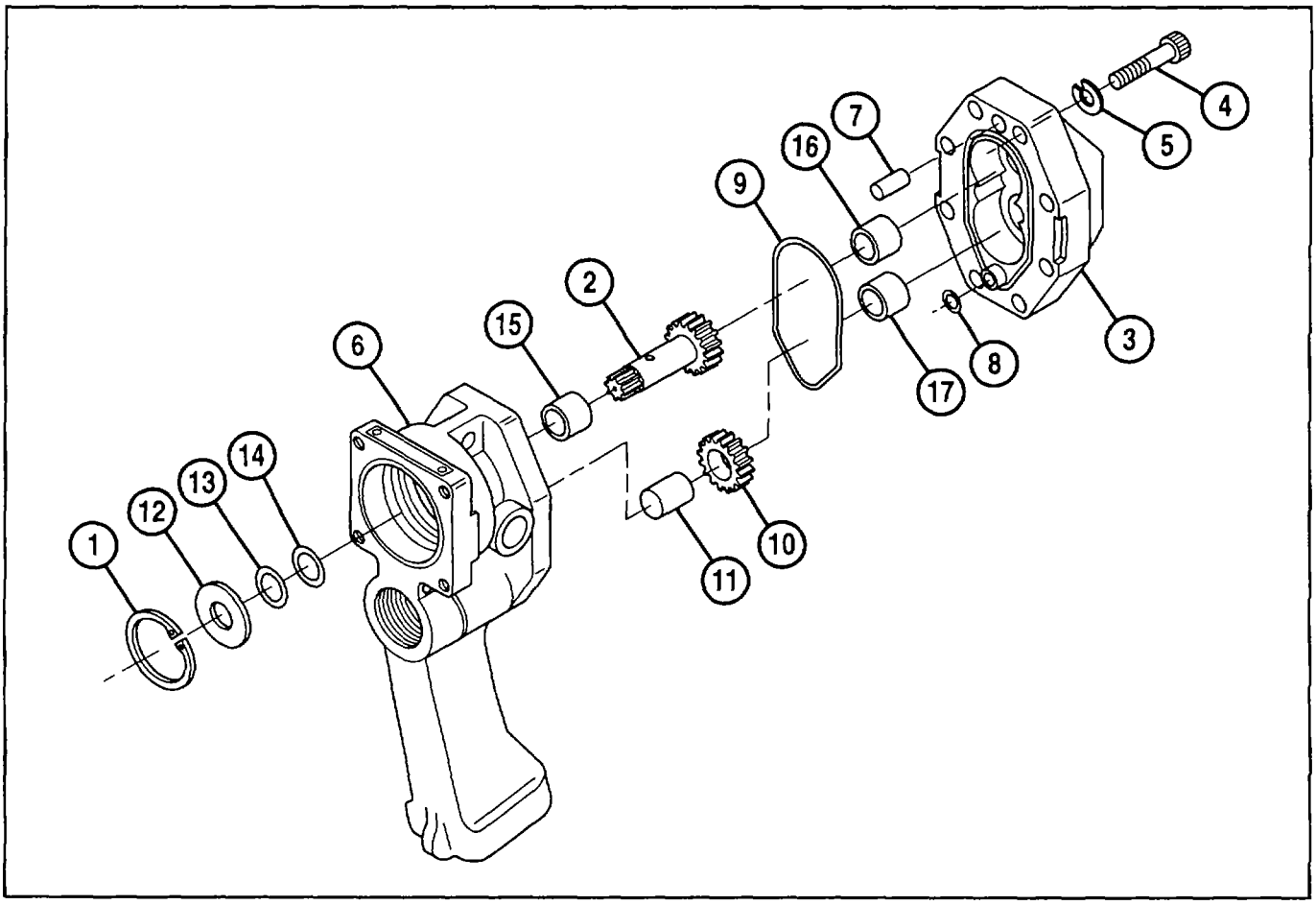
1. Remove snapring (1) from main shaft (2). Discard snapring.
2. Position hydraulic impact wrench so that motor cap (3) is facing upward.
3. Remove eight capscrews (4), eight lockwashers (5), and motor cap (3) from main housing (6). Discard lockwashers.

**NOTE**
**Dowel pin (7) may adhere to either main housing (6) or motor cap (3).**

4. Remove two preformed packings (8 and 9) and dowel pin (7) from motor cap (3). Discard preformed packings.
5. Remove main shaft (2), idler gear (10), and idler shaft (11) from main housing (6).
6. Remove backup washer (12), flat preformed packing (13), and round preformed packing (14) from main housing (6). Discard preformed packings.
7. Remove bushing (15) from main housing (6). Remove two bushings (16 and 17) from motor cap (3).

**b. Inspection.**

Inspect motor assembly in accordance with paragraph 4-19.

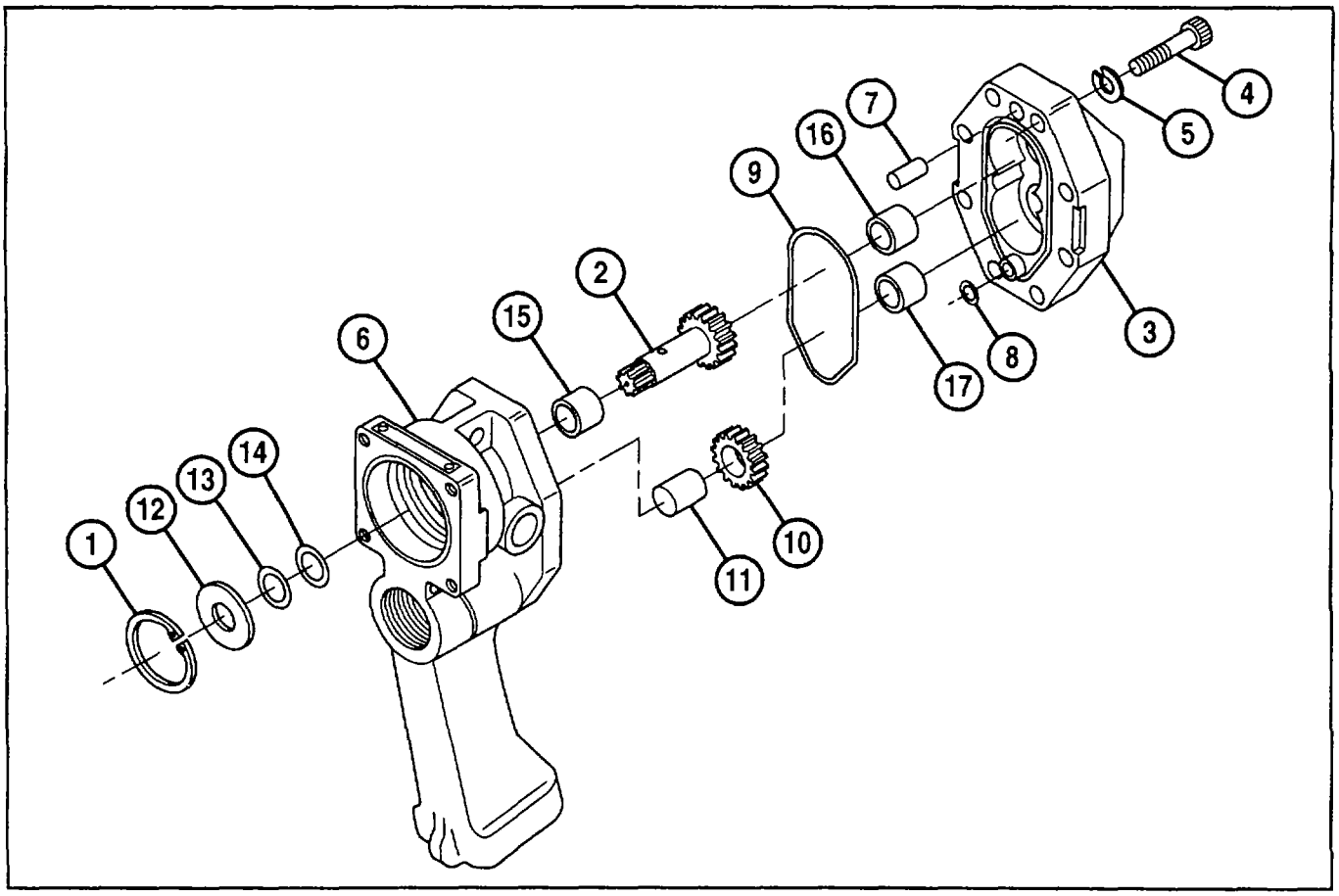


**4-17. HYDRAULIC IMPACT WRENCH REPAIR-Continued.**

**c. Assembly.**

1. Position main housing (6) in vise with soft-jaw caps, motor side facing up.
2. Install bushing (15) in main housing (6) and two bushings (16 and 17) in motor cap (3).
3. Lubricate and install two new preformed packings (8 and 9) with clean lubricating oil.
4. Install dowel pin (7) in motor cap (3).
5. Install idler shaft (11), idler gear (10), and main shaft (2) in main housing (6).
6. Install and secure motor cap (3) to main housing (6) with eight capscrews (4) and eight new lockwashers (5). Torque capscrews to 384 lb-in. (43.4 N•m).
7. Position main housing (6) facing upward.
8. Lubricate new round preformed packing (14) and new flat preformed packing (13) with clean lubricating oil.
9. Install new round preformed packing (14), new flat preformed packing (13), backup washer (12), and new snapring (1) on main shaft (2).

**d. Testing**. Perform motor test procedure (see para. 4-21) after completing all follow-on maintenance.



**NOTE**

**Follow-on maintenance:**
**-Install relief adjustment screw (see para. 4-16),**
**-Install relief valve (see para. 4-15),**
**-Install reversing spool and packings (see para. 4-13), and**
**-Install impact head assembly (see para. 4-11).**

## 4-18. INSPECTION OF INSTALLED ITEMS.

These procedures shall indicate if parts of the hydraulic impact wrench can be rebuilt within the limits prescribed in AR 710-2. Follow typical cleaning procedures as shown in paragraph 4-9. Clean dirt, lubricants, and rust scale from all parts that can be inspected without disassembling. Inspect for following:

- **a.** Any missing parts
- **b.** Breaks, cracks, corrosion, and damaged threads in housing
- **c.** Rust, corrosion, or binding in stem and internal mechanisms

## 4-19. INSPECTION-ACCEPTANCE/REJECTION CRITERIA.

- **a. General.** These inspection procedures list general criteria indicating if a part shall be repaired. To conserve supply of available parts, care must be exercised to ensure that parts are not discarded because of poor appearance or minor discrepancies. Every effort will be made to reclaim and repair such parts. For antifriction type bearings, use TM 9-214 as a guide to determine serviceability.
- **b. Castings.** Visually inspect all castings. When any of following conditions exist, casting is unserviceable.
  1. Broken
  2. Cracked
  3. Distorted
  4. Damaged threads
  5. Worn to extent that mating parts do not fit correctly
- **c. Common Hardware.** Visually inspect all common hardware. When not comparable to new, common hardware is unserviceable.
- **d. Springs**. Visually inspect all springs. When any of following conditions exist, spring is unserviceable.
  1. Loss of force
  2. Broken coils
  3. Distorted coils
  4. Rusted or corroded
  5. Nicks in coils
- **e. Threaded Parts Other Than Common Hardware.** Visually inspect threaded portion of all parts. When any of following conditions exist, part is unserviceable.
  1. Stripped threads
  2. Crossed threads

**4-19. INSPECTION-ACCEPTANCE/REJECTION CRITERIA-Continued.**

3. Pulled or distorted threads
4. Rusted or corroded

**f. Special.** Clean all parts of hydraulic impact wrench in accordance with paragraph 4-9. Dry with cloth (Appx. C, item 5). Inspect parts for evidence of excessive wear or damage. Carefully examine surfaces of parts that are subject to wear caused by mating with, or rubbing against, adjacent surfaces. If a severe wear condition is found on a part, its mating part should be closely examined. If any abnormal condition is noted in mating part, both parts should be replaced during assembly. If damage is evident on any part, cause of damage should be determined and corrected. Special inspection procedures are as follows:

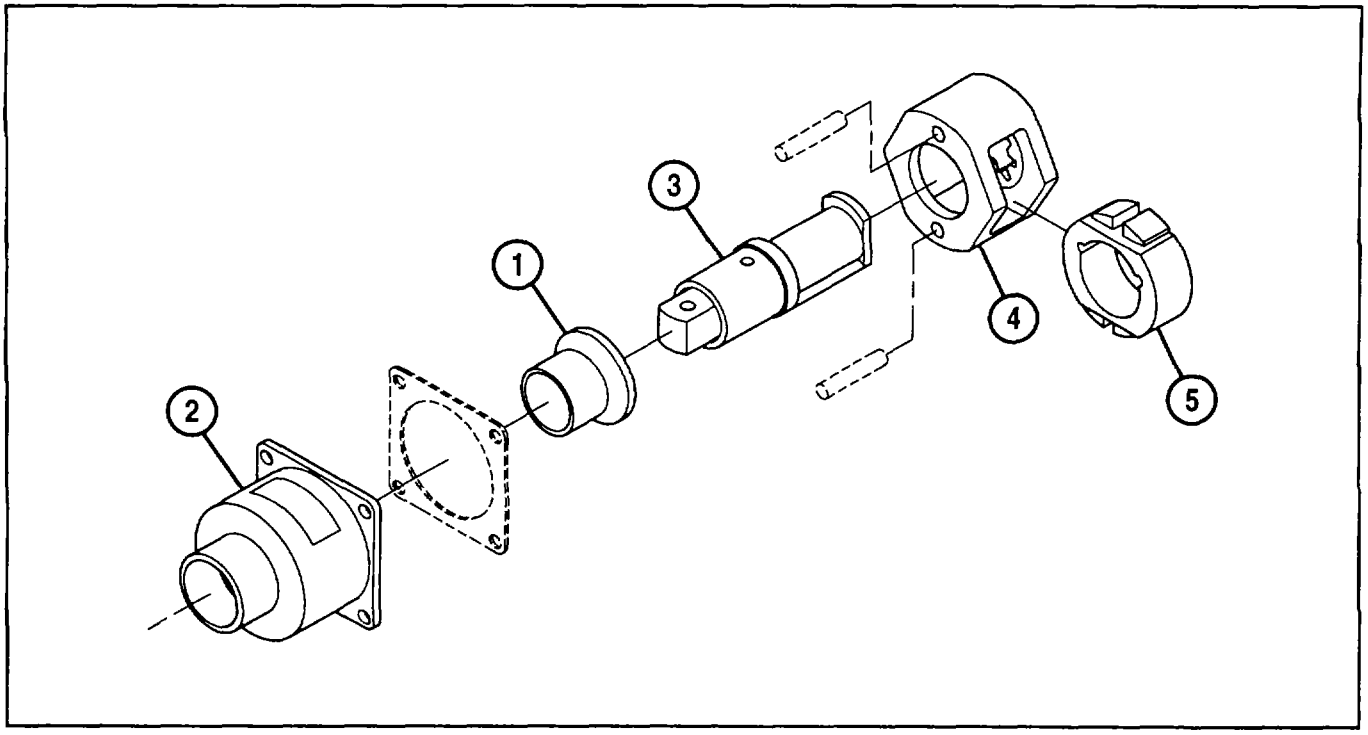
1. Impact Head Assembly Components.

(a) Bushing (1). Visually inspect for following:

(1) Foreign material imbedded in bearing face
(2) Scoring
(3) Flaking

If any of above conditions exist, bushing must be replaced.

(b) Inspect hammer case assembly (2), anvil (3), hammer frame assembly (4), and hammer (5) as described in f above.



2. Motor Assembly.

(a) Three bushings (1). Visually inspect for following:
(1) Foreign material imbedded in bushing face
(2) Scoring
(3) Flaking

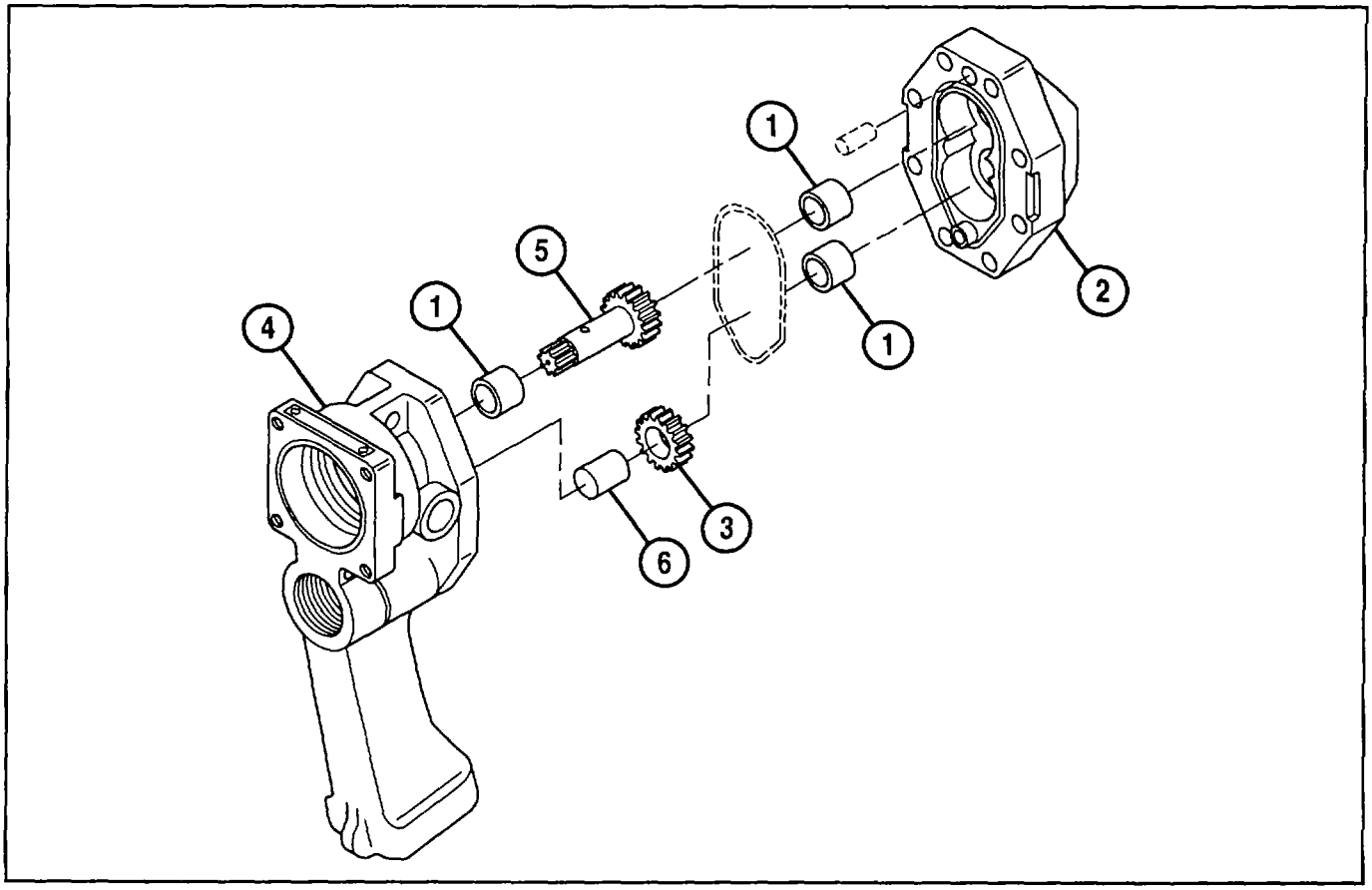
If any of above conditions exist, replace applicable motor cap (2), gear (3), or main housing (4). Also, if any shafts (5 and 6) are to be replaced, replace motor cap and main housing.

(b) Motor shafts (5 and 6). Check both shafts as described in beginning of this section. Also, check for discoloration, pitted, cracked, abnormal wear, or broken shafts. If any of these are evident, replace shaft.

(c) Gears (3).

**NOTE**
**Gears are used in matched pairs only. If one gear is defective, both must be replaced.**

(1) Inspect gear shaft (6) and gear (3) for nicks, burrs, and scratches, and broken or missing teeth. Also, remove any sharp corners and rough areas on surface.



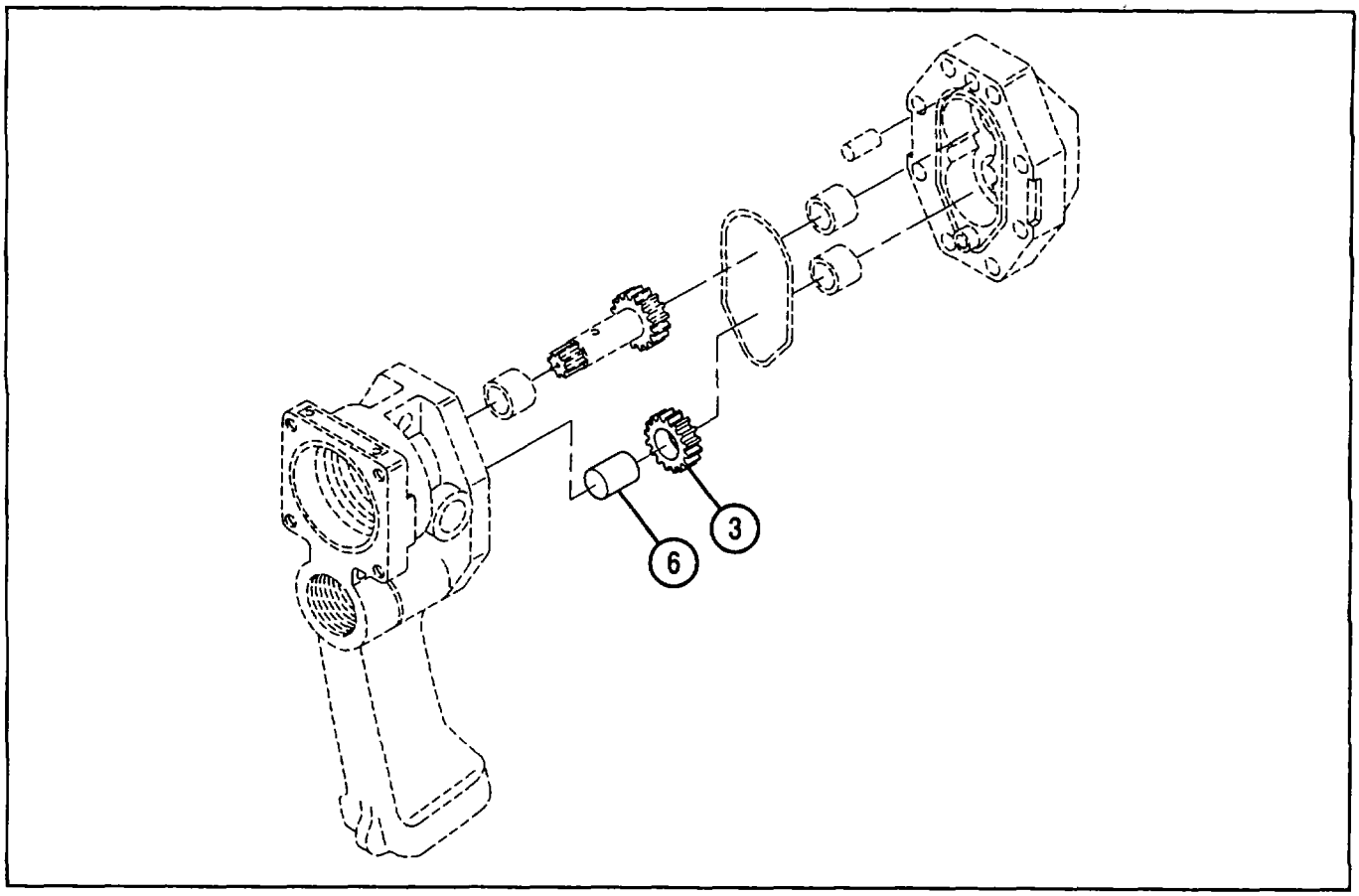
**4-19. INSPECTION-ACCEPTANCE/REJECTION CRITERIA-Continued.**

**WARNING**

**Dry-cleaning solvent (P-D-680) is toxic and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I dry-cleaning solvent is 100°F (37.8°C) and for type II is 138°F (58.9°C). Failure to do so may result in injury or death to personnel.**

**If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.**

(2) Thoroughly clean gear shaft (6) and gear (3) with dry-cleaning solvent (Appx. C, item 16) to remove any particles of dirt, sand, grit, etc., prior to installation. Dry with cloth (Appx. C, item 5).




(d) Component parts. Inspect remaining parts of motor unit as described in beginning of this section.

### 4-20. FINAL INSPECTION.

Final inspection is performed after all repairs have been completed and hydraulic impact wrench has been assembled. Inspection includes a general visual examination of hydraulic impact wrench and a functional check to ensure hydraulic impact wrench is operating properly.

**a**. Function and appearance of hydraulic impact wrench should approximate that of a new hydraulic impact wrench.
**b**. Inspect hydraulic impact wrench to ensure all components are properly assembled and secure. Inspect nameplate for legibility.

### 4-21. MOTOR TEST PROCEDURE.

**a.** Test hydraulic impact wrench with applicable equipment that is ordinarily used to power it. Refer to applicable vehicle operating manual for flow output and torque settings.

**WARNING**

**To prevent injury to personnel, operate hydraulic impact wrench beginning at lowest torque setting.**

**b.** Operate hydraulic impact wrench in accordance with paragraph 2-6 and applicable vehicle manual.
**c.** Check for leaks and proper operations.

## Section VI. PREPARATION FOR STORAGE OR SHIPMENT

### 4-22. GENERAL.

If hydraulic impact wrench is to be stored for a period of less than 30 days, no special care or preservation measures are necessary, except that it should be stored in a dry place and the hydraulic fluid openings plugged to prevent access of any foreign objects. However, if hydraulic impact wrench is to be stored for a period exceeding 30 days, carry out the following procedure.

**a.** Remove hydraulic fluid hoses from hydraulic impact wrench and drain as much fluid as possible from motor section of hydraulic impact wrench.
**b.** Disassemble impact head from motor section and carefully clean all lubricant from parts in impact head. Do not disassemble motor section.
**c.** Immerse parts of impact head and motor assembly in lubricating oil (Appx. C, item 15) for 10 minutes.
**d.** Assemble hydraulic impact wrench and remove all traces of lubricating oil from exterior painted surface of hydraulic impact wrench.
**e.** Pour lubricating oil (Appx. C, item 15) in both hydraulic connection ports and seal them with pipe plugs.
**f.** Attach a tag reading "PREPARED FOR STORAGE ON (date), DRAIN AND LUBRICATE BEFORE USE" on hydraulic impact wrench and seal hydraulic impact wrench in suitable waterproof container.

**4-22. GENERAL-Continued.**

**g.** If hydraulic impact wrench is not returned to service within 8 months, repeat entire preservation procedure.

**h.** Deterioration of hydraulic fluid hoses can be prevented by immersing hoses in clean lubricating oil (Appx. C, item 13) and then allowing them to drain thoroughly. Remove any excess oil from exterior of hoses with a clean cloth (Appx. C, item 5) and seal hose ends to prevent contaminates from entering hoses. Store in a cool, dry place.

**4-23. SPECIAL PRESERVATION.**

Apply grade 4 preservatives to exterior metal surfaces as specified in MIL-C-16173. Preservation of interior surfaces is not required since preservative-type lubricants were applied to all interior surfaces.

**4-24. PACKAGING.**

Military packaging for levels A, B, and C shall be as follows:

**a. Level A-Military Package.**

1. Publications. Package publications per method IC-3 of MIL-P-116. Use a heat sealed interior packaging bag conforming to MIL-B-117.
2. Hydraulic Impact Wrench. Package hydraulic impact wrench per method IA-14 of MIL-P-116. Seal ports and lubricating fitting, if required, with pressure-sensitive adhesive tape (Appx. C, item 18). Wrap hydraulic impact wrench in greaseproof barrier material listed in MIL-B-121. Secure with pressure-sensitive adhesive tape (Appx. C, item 18).
3. Place hydraulic impact wrench and package publications in a snug-fitting corrugated fiberboard box (Appx. C, item 2). Secure carton with pressure-sensitive adhesive tape (Appx. C, item 18). Place carton into barrier bag (Appx. C, item 1). Place barrier-covered bag into carton (Appx. C, item 3). Secure carton with pressure-sensitive adhesive tape (Appx. C, item 18).

**b. Level B-Limited Military Package.** Package all items as specified for level A military package in paragraph 4-24a.

**c. Level C-Minimum Military Package.** Package hydraulic impact wrench and publications sufficiently for protection against deterioration and damage during shipment and the subsequent interval prior to use.

**4-25. PACKING.**

Pack the packaged hydraulic impact wrench in accordance with PPP-P-40.

**4-26. MARKING.**

Prepare and attach packing lists and mark unit packages and exterior containers in accordance with MIL-STD-129. Nomenclature is "HYDRAULIC IMPACT WRENCH." Additional markings also required are as follows.

**a.** Conspicuously mark exterior containers with item name and model number, contract number, and contractor's name and address.

**b.** Mark exterior containers with shipment digit markings in accordance with MIL-STD-129, when required.

# APPENDIX A

# REFERENCES

## A-1. SCOPE.

This appendix lists all of the documents referenced in this manual. These documents, combined with the procedures contained in this manual, cover all of the procedures needed for the hydraulic impact wrench.

## A-2. ARMY REGULATIONS.

| | |
|---|---|
| AR 385-40 | Accident Reporting and Records |
| AR 700-42 | Classification, Reclassification, Maintenance, Issuance and Report of Maintenance Training Aircraft |
| AR 710-2 | Supply Policy Below the Wholesale Level |

## A-3. BLANK FORMS.

| | |
|---|---|
| DA Form 2028 | Recommended Changes to Publications and Blank Forms |
| DA Form 2028-2 | Recommended Changes to Equipment Technical Publications |
| DA Form 2404 | Equipment Inspection and Maintenance Worksheet |
| DA Form 2407 | Maintenance Request |
| SF Form 368 | Product Quality Deficiency Report |

## A-4. COMMON TABLES OF ALLOWANCES.

| | |
|---|---|
| CTA 8-100 | Army Medical Department Expendable/Durable Items |
| CTA 50-970 | Expendable/Durable Items (Except Medical, Class V, Repair Parts and Heraldic Items) |

## A-5. DEPARTMENT OF ARMY PAMPHLET.

| | |
|---|---|
| DA PAM 738-750 | The Army Maintenance Management System (TAMMS) as Contained in Maintenance Management Update |

## A-6. FEDERAL SPECIFICATION.

| | |
|---|---|
| PPP-P-40 | Preservation and Packaging of Hand Tools, Tools, and Tool Accessories for Power Driven, Metal, and Woodworking Machinery |

## A-7. MILITARY SPECIFICATIONS.

| | |
|---|---|
| MIL-B-1 17 | Bags, Sleeves and Tubing-interior Packaging |
| MIL-B-121 | Barrier Material, Greaseproofed, Flexible (Waterproofed) |

**A-7. MILITARY SPECIFICATIONS Continued.**

MIL-C-16173.....Corrosion Preventive Compound, Solvent Cutback, Cold Application

MIL-P-1 16.....Preservation, Methods of

**A-8. MILITARY STANDARD.**

MIL-STD-129.....Marking for Shipment and Storage

**A-9. TECHNICAL MANUALS.**

FM 9-207.....Operation and Maintenance of Ordnance Material in Cold Weather (0°F to -65°F)

TM 9-214.....Inspection, Care and Maintenance of Antifriction Bearings

TM 750-244-6.....Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use

# APPENDIX B

# MAINTENANCE ALLOCATION CHART

## Section I. INTRODUCTION

### B-1. General.

**a.** This introduction (Section I) provides a general explanation of all maintenance and repair functions authorized at various maintenance levels under the standard Army Maintenance System concept.

**b.** The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and the capabilities of the designated maintenance levels, which are shown on the MAC in column 4 as:

Unit-Includes two subcolumns, C (operator/crew) and O (unit) maintenance
Direct support-Includes an F subcolumn
General support-Includes an H subcolumn
Depot-Includes a D subcolumn

**c.** Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II.

**d.** Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

### B-2. MAINTENANCE FUNCTIONS.

Maintenance functions are limited to and defined as follows.

**a. Inspect.** To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., sight, sound, touch).

**b. Test.** To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

**c. Service.** Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

**d. Adjust.** To maintain or regulate within prescribed limits, by bringing into proper position, or by setting the operating characteristics to specified parameters.

**e. Aline.** To adjust specified variable elements of an item to bring about optimum or desired performance.

**f. Calibrate**. To determine and cause to be made or to be adjusted on instruments or test, measuring, and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

**B-2. MAINTENANCE FUNCTIONS-Continued.**

**g. Remove/install.** To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

**h. Replace.** To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and assigned maintenance level is shown as the third position of the Source, Maintenance, and Reliability (SMR) code.

**i. Repair.** The application of maintenance services[1] including fault location/troubleshooting,[2] removal installation, disassembly/assembly[3] procedures, and maintenance actions[4] to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

**j. Overhaul.** That maintenance effort (service/action) prescribed to restore an item to a completely serviceability/operational condition as required by maintenance standards in the appropriate technical publications (i.e., Depot Maintenance Work Requirement [DMWR] ). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

**k. Rebuild.** Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes returning to zero those age measurements (e.g., hours/miles) considered in classifying Army equipment/components.

**B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II.**

**a. Column (1), Group No.** Column 1 lists functional group code numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

**b. Column (2), Component/Assembly**. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

**c. Column (3), Maintenance Functions**. Column 3 lists the functions to be performed on the item listed in column 2 (for detailed explanation of these functions see para. B-2).

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[1]Inspect, test, service, adjust, aline, calibrate, and/or replace.

[2]The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or Unit Under Test (UUT).

[3]The step-by-step breakdown (taking apart) of a spare functional group coded item to the level of its least component that is assigned an SMR code for the level of maintenance under consideration (i.e., identified as maintenance significant).

[4]Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.

**d. Column (4), Maintenance Level.** Column 4 specifies each level of maintenance authorized to perform each function listed in column 3, by indicating work-time required (expressed as man-hours in whole hours or decimal) in the appropriate subcolumn. This work-time figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate work-time figures are to be shown for each level. The work-time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time and quality assurance in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the MAC. The symbol designation for the various maintenance levels are as follows:

C - Operator or crew
O - Unit maintenance
F - Direct support maintenance
L - Specialized Repair Activity (SRA)[5]
H - General support maintenance
D - Depot maintenance

**e. Column (5), Tools and Test Equipment Reference Code.** Column 5 specifies by code those common tools sets (not individual tools), common Test Measurement and Diagnostic Equipment (TMDE), and special tools, special TMDE, and special support equipment required to perform the designated function. Codes are keyed to tools and test equipment in Section III.

**f. Column (6), Remarks.** When applicable this column contains a letter code, in alphabetical order.

## B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III.

**a. Column (1), Reference Code.** The tool and test equipment reference code correlates with a code used in the MAC, Section II, column 5.

**b. Column (2), Maintenance Level.** The lowest level of maintenance authorized to use the tool or test equipment.

**c. Column (3), Nomenclature.** Name or identification of the tool or test equipment.

**d. Column (4), National Stock Number (NSN).** The NSN of the tool or test equipment.

**e. Column (5), Tool number.** The manufacturer's part number, model number, or type number.

## B-5. EXPLANATION OF COLUMNS IN REMARKS, SECTION IV.

**a. Column (1), Remarks Code.** This code is recorded in column 6, Section II.

**b. Column (2), Remarks.** This column lists the information pertinent to the function being performed as indicated in the MAC, Section II.

---

[5]This maintenance level is not included in Section II, column 4 of the MAC. Functions to this level of maintenance are identified by a work-time figure in the "H" column of Section II, column 4 and an associated referenced code is used in the "Remarks" column, column 6.

## Section II. MAINTENANCE ALLOCATION CHART.

| (1) Group Number | (2) Component/Assembly | (3) Maintenance Function | (4) Maintenance Category | | | | | (5) Tools And Equipment Ref. Code | (6) Remarks Code |
|---|---|---|---|---|---|---|---|---|---|
| | | | Unit | | DS | GS | Depot | | |
| | | | C | O | F | H | D | | |
| 3172 | Wrench, impact, hydraulic | Inspect | .08 | .50 | | | | | |
| | | Test | | .17 | | | | | |
| | | Service | | .20 | | | | 1,3,5,6,7 | |
| | | Adjust | | .15 | | | | 1 | |
| | | Replace | | .15 | | | | 1,3 | |
| | | Repair | | 2.15 | | | | 1 thru 9 | |

## Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

| (1) Tool Or Test Equipment Ref Code | (2) Maintenance Level | (3) Item Name | (4) N.S.N. | (5) Reference Number |
|---|---|---|---|---|
| 1 | U | Tool kit, general mechanics | 5180-00-177-7033 | SC-5180-90-CL-N26 |
| 2 | U | Wr., comb. 1-3/16-in. | 5120-00-555-9367 | CTA 50-970 |
| 3 | U | Shop equip, common 1 | 4910-00-754-0654 | SC-4910-95-CL-A73 |
| 4 | U | Shop equip, common 2 | 4910-00-754-0650 | SC-4910-95-CL-A72 |
| 5 | U | Shop equip, supply 2 | 4910-00-754-0743 | SC-4910-95-CL-A74 |
| 6 | U | Driver, bushing | 5180-00-121-3866 | CTA 50-970 |
| 7 | U | Socket, hex head, 1/4-in., 3/8-in. drive | 5120-00-596-8508 | CTA 50-970 |
| 8 | U | Socket, hex head, 5/16-in., 3/8-in. drive | 5120-00-683-8602 | CTA 50-970 |
| 9 | U | Socket, hex head, 3/8-in., 3/8-in. drive | 5120-00-596-1199 | CTA 50-970 |

# APPENDIX C

# EXPENDABLE AND DURABLE ITEMS LIST

## Section I. INTRODUCTION

### C-1. SCOPE.

This appendix lists expendable and durable items needed to operate and maintain the hydraulic impact wrench. This appendix is for informational purposes only and is not authority to requisition listed items. These items are authorized by CTA 50-970, Expendable/Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

### C-2. EXPLANATION OF COLUMNS.

- **a. Column (1), Item Number**. This number is assigned to entry in listing and is referenced in narrative instructions to identify material (e.g., "Use dry-cleaning solvent (Appx. C, item 16).").
- **b. Column (2), Level**. This column identifies the lowest level of maintenance that requires the listed item:
  C-Operator/Crew
  U-Unit Maintenance
- **c. Column (3), National Stock Number (NSN).** This is the NSN assigned to an item; use it to request or requisition the item.
- **d. Column (4), Description.** This indicates federal item name and, if required, a description to identify the item. The last line for each item indicates the Commercial And Government Entity Code (CAGEC) in parentheses followed by the part number.
- **e. Column (5), Unit of Measure (U/M) Unit of Issue (U/I).** This measure is expressed by a two character alphabetical abbreviation (e.g., EA, PG, LB). If the unit of measure differs from the unit of issue as shown in the Army Master Data File (AMDF), requisition lowest unit of issue that will satisfy your requirements.

## Section II. EXPENDABLE AND DURABLE ITEMS LIST

| (1) ITEM NUMBER | (2) LEVEL | (3) NATIONAL STOCK NUMBER | (4) DESCRIPTION | (5) (U/M)/(U/I) |
|---|---|---|---|---|
| 1 | U | 8105-01-236-1395 | Bag, barrier-covered, MIL-B-117, type 1, class E, 34 inches (in.) x 39 in. (864 millimeters [mm] x 991 mm) | EA |
| 2 | U | - | Box, corrugated fiberboard, PPP-B-636, type CF, grade 200, class (DOM), 25 in. x 21 in. x 11.5 in. (635 mm x 533 mm x 292 mm) | EA |

**Section II. EXPENDABLE AND DURABLE ITEMS LIST-Continued.**

| (1) ITEM NUMBER | (2) LEVEL | (3) NATIONAL STOCK NUMBER | (4) DESCRIPTION | (5) (U/M)/(U/I) |
|---|---|---|---|---|
| 3 | U | - | Box, corrugated fiberboard, PPP-B-636, grade W5C, class WR, 25.5 in. x 21.5 in. x 12.25 in. (648 mm x 546 mm x 311 mm) | EA |
| 4 | U | 5350-00-221-0872 | Cloth, abrasive crocus, 50 sheets, (81348), P-C-458 | PG |
| 5 | C | 7920-00-044-9281 | Cloth, cleaning, (81349), MIL-C-85043 | LB |
| 6 | U | 5350-00-193-7225 | Compound, buffing, (81349), MIL-B-16909, grade B | LB |
| 7 | U | 6850-00-224-6665 | Compound, cleaning, (81349), MIL-C-11090 | CN |
| 8 | U | 6950-00-664-7530 | Compound, cleaning, (81348), PD-436 | DR |
| 9 | U | 6850-00-656-1292 | Compound, corrosion removing, (81349), MIL-C-10578 | GL |
| 10 | U | 8030-00-133-3164 | Compound, sealing, (80244), MIL-L-22473, grade HVV | BT |
| 11 | C | 7930-00-282-9699 | Detergent, water soluble, (83421) | GL |
| 12 | U | 9150-00-935-1017 | Grease, automotive and artillery, 14-ounce (397-gram) can, (81349), MIL-G-10924 | Oz |
| 13 | U | 9150-00-186-6681 | Oil, lubricating, (81349), MIL-L-2104 | QT |
| 14 | C | 9150-00-231-6689 | Oil, lubricating, PL-special, (81348), VV-L-800 | QT |
| 15 | U | 9150-00-111-0201 | Oil, lubricating, (81349), MIL-L-21260 | PT |
| 16 | C | 6850-00-281-1985 | Solvent, dry-cleaning, (81348), P-D-680 | GL |
| 17 | U | 8030-00-889-3534 | Tape, antiseize, (81349), MIL-T-27730 | EA |
| 18 | U | 7510-00-501-6373 | Tape, pressure-sensitive adhesive, (81348), PPP-T-60, type I, type II, or type Ill, class I | RL |

# APPENDIX D

# OPERATOR'S AND UNIT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL)

## Section I. INTRODUCTION

### D-1. SCOPE.

This RPSTL lists and authorizes spare and repair parts; special tools; special Test, Measurement, and Diagnostic Equipment (TMDE); and other special support equipment required for performance of unit, direct support, and general support maintenance of the hydraulic impact wrench. It authorizes the requisitioning, issue, and disposition of spares, repair parts, and special tools as indicated by the Source, Maintenance, and Recoverability (SMR) codes.

### D-2. GENERAL.

In addition to Section I, Introduction, this RPSTL is divided into the following sections:

**a. Section II-Repair Parts List.** A list of spare and repair parts authorized by this RPSTL 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 ascending alphanumeric sequence, with the parts in each group listed in ascending figure and item number sequence. Bulk materials are listed in item name sequence. Repair parts kits are listed separately in their own functional group within Section II.

**b. Section III-Special Tools List.** Not applicable.

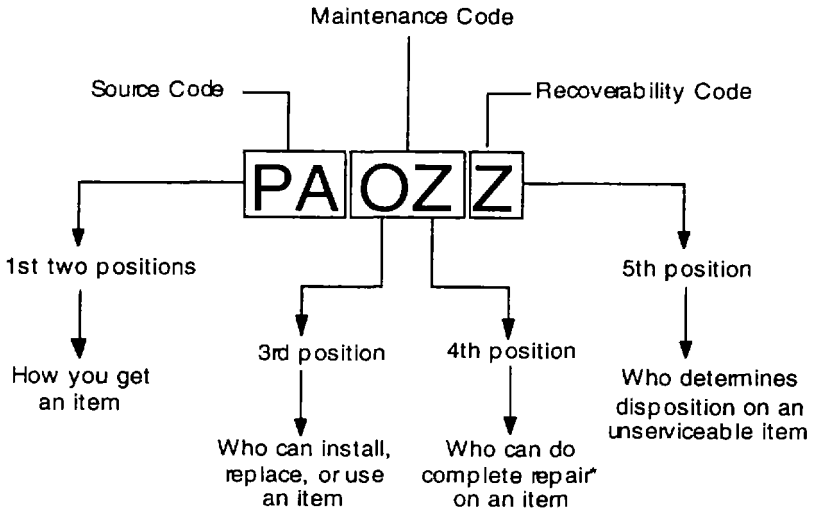
**c. Section IV-Cross-Reference Indexes.** A list, in National Item Identification Number (NIIN) sequence, of all national stock numbered items appearing in the listing, followed by a list in alphanumeric sequence of all part numbers appearing in the listing. National Stock Numbers (NSNs) and part numbers are cross-referenced to the figure and each item number appearance.

### D-3. EXPLANATION OF COLUMNS (SECTION II AND SECTION III).

**a. ITEM NO. [Column (1)].** Indicates the number used to identify items called out in the figure.

**b. SMR CODE [Column (2)].** The SMR code is a 5-position code containing supply/requisitioning information, maintenance category authorization criteria, and disposition instruction, as shown in the following breakout:

**D-3. EXPLANATION OF COLUMNS (SECTION II AND SECTION III)Continued.**




* Complete Repair: Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of the "Repair" function in a use/user environment in order to restore serviceability to a failed item.

1. Source Code. The source code tells you how to get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanation of source codes follows:

| CODE | APPLICATION/EXPLANATION |
|---|---|
| PA<br>PB<br>PC**<br>PD<br>PE<br>PF<br>PG | Stocked items: use the applicable NSN to request/requisition items with these source codes. They are authorized to the category indicated by the code entered in the 3rd position of the SMR code.<br><br>**Items coded PC are subject to deterioration. |
| KD<br>KF<br>KB | Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance category indicated in the 3rd position of the SMR code. The complete kit must be requisitioned and applied. |
| MO-(Made at ORG/ AVUM Level)<br>MF-(Made at DS/ AVUM Level)<br>MH-(Made at GS Level)<br>MD-(Made at Depot) | Items with these codes are not to be requested/requisitioned individually. They must be made from bulk material which is identified by the part number in the DESCRIPTION AND USABLE ON CODES (UOC) column and listed in the bulk material group of the Repair Parts List in this RPSTL. If the item is authorized to you by the 3rd position of the SMR code, but the source code indicates it is made at a higher level, order the item from the higher level of maintenance. |
| AO-(Assembled by ORG/AVUM Level)<br>AF-(Assembled by DS/AVUM Level)<br>AH-(Assembled by GS Level)<br>AD-(Assembled by Depot) | Items with these codes are not to be requested/requisitioned individually. The parts that make up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indicated by the source code. If the 3rd position of the SMR code authorizes you to replace the item, but the source code indicates the item is assembled at a higher level, order the item from the higher level of maintenance. |

**NOTE**

**Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes, except for those source coded "XA."**

XA ..... Do not requisition an XA coded item. Order its next higher assembly.

XB ..... If an XB item is not available from salvage, order it using the Commercial and Government Entity Code (CAGEC) and part number given.

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

XD ..... Item is not stocked. Order an XD coded item through normal supply channels using the CAGEC and part number given, if no NSN is available.

2. Maintenance Code. Maintenance codes tell you the level(s) of maintenance authorized to use and repair support items. The maintenance codes are entered in the 3rd and 4th positions of the SMR code as follows:

   (a) The maintenance code entered in the 3rd position tells you the lowest maintenance level authorized to remove, replace, and use an item. The maintenance code entered in the 3rd position will indicate authorization to one of the following levels of maintenance.

| CODE | APPLICATION/EXPLANATION |
|---|---|
| C | Crew or operator maintenance done within unit maintenance or aviation unit maintenance. |
| O | Unit maintenance or aviation unit can remove, replace, and use the item. |
| F | Direct support or aviation intermediate level can remove, replace, and use the item. |
| H | General support level can remove, replace, and use the item. |
| L | .Specialized Repair Activity (SRA) can remove, replace, and use the item. |
| D | Depot level can remove, replace, and use the item. |

**NOTE**

**If authorized by the Maintenance Allocation Chart and SMR codes, some limited repair may be done on an item at a lower level of maintenance.**

   (b) The maintenance code entered in the 4th position tells whether the item is to be repaired and identifies the lowest maintenance level with the capability to do complete repair (i.e., perform all authorized repair functions). This position will contain one of the following maintenance codes.

| CODE | APPLICATION/EXPLANATION |
|---|---|
| O | Unit maintenance or aviation unit is the lowest level that can do a complete repair of the item. |

**D-3. EXPLANATION OF COLUMNS (SECTION II AND SECTION III) - Continued.**

| CODE | APPLICATION/EXPLANATION |
|---|---|
| F | Direct support or aviation intermediate is the lowest level that can do a complete repair of the item. |
| H | General support is the lowest level that can do a complete repair of the item. |
| L | SRA is the lowest level that can do a complete repair of the item. |
| D | Depot is the lowest level that can do a complete repair of the item. |
| Z | Nonrepairable. No repair is authorized. |
| B | No repair is authorized. (No parts or special tools are authorized for the maintenance of a B coded item.) However, the item may be reconditioned by adjusting, lubricating, etc., at the user level. |

3. Recoverability Code. Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is entered in the 5th position of the SMR code as follows:

| CODE | APPLICATION/EXPLANATION |
|---|---|
| Z | Nonrepairable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in the 3rd position of the SMR code. |
| O | Repairable item. When uneconomically repairable, condemn and dispose of the item at unit maintenance or aviation unit level. |
| F | Repairable item. When uneconomically repairable, condemn and dispose of the item at the direct support or aviation intermediate level. |
| H | Repairable item. When uneconomically repairable, condemn and dispose of the item at the general support level. |
| D | Repairable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item not authorized below depot level. |
| L | Repairable item. Condemnation and disposal of item not authorized below SRA. |
| A | Item requires special handling or condemnation procedures for specific reasons (e.g., precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions. |

**c. NSN [Column (3)].** The NSN for the item is listed in this column.

**d. CAGEC [Column (4)].** The CAGEC is a 5-digit alphanumeric code which is used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

**NOTE**

**When you use an NSN to requisition an item, the item you receive may have a different part number from the part ordered.**

**e. PART NUMBER [Column (5)].** 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.

**f. DESCRIPTION AND UOC [Column (6)].** This column includes the following information:

1. The Federal item name and, when required, a minimum description to identify the item.
2. Physical security classification of the item is indicated by the parenthetical entry.
3. Items that are included in kits and sets are listed below the name of the kit or set on Figure KIT.
4. Spare/repair parts that make up an assembled item are listed immediately following the assembled item line entry.
5. Part numbers for bulk materials are referenced in this column in the line item entry for the item to be manufactured/fabricated.
6. When the item is not used with all serial numbers of the same model, the effective serial numbers are shown on the last line(s) of the description (before UOC).
7. The UOC, when applicable (see paragraph D-5, Special Information).
8. In the Special Tools List section, the Basis of Issue (BOI) appears as the last line(s) in the entry for each special tool, special TMDE, and other special support equipment. When density of equipment supported exceeds density spread indicated in the BOI, the total authorization is increased proportionately.
9. The statement "END OF FIGURE" appears just below the last item description in Column 5 for a given figure in both Section II and Section III.

**g. OTY [Column (7)].** The QTY (quantity per figure) column indicates the quantity of the item used in the breakout shown on the 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 the quantity may vary from application to application.

## D-4. EXPLANATION OF COLUMNS (SECTION IV).

**a. NSN Index.**

1. STOCK NUMBER column. This column lists the NSN by NIIN sequence. The NIIN consists of the last nine digits of the NSN.

| NSN |
|---|
| 5305-01-674-1467 |
| NIIN |

When using this column to locate an item, ignore the first 4 digits of the NSN. However, the complete NSN should be used when ordering items by stock number.

2. FIG. column. This column lists the number of the figure where the item is identified/located. The figures are in numerical order in Section II and Section Ill.
3. ITEM column. The item number identifies the item associated with the figure listed in the adjacent FIG. column. This item is also identified by the NSN listed on the same line.

**D-4. EXPLANATION OF COLUMNS (SECTION IV)-Continued.**

**b. PART NUMBER INDEX**. Part numbers in this index are listed by part number in ascending alphanumeric sequence (i.e., vertical arrangement of letter and number combination which places the first letter or digit of each group in order A through Z, followed by the numbers 0 through 9 and each following letter or digit in like order).

1. CAGEC column. The CAGEC is a 5-digit alphanumeric code used to identify the manufacturer, distributor, Government agency, etc., that supplies the item.
2. PART NUMBER column. Indicates the primary number used by the manufacturer (individual, 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.
3. STOCK NUMBER column. This column lists the NSN for the associated part number and manufacturer identified in the PART NUMBER and CAGEC columns to the left.
4. FIG. column. This column lists the number of the figure where the item is identified/located in Section II and Ill.
5. ITEM column. The item number is that number assigned to the item as it appears in the figure referenced in the adjacent FIG. column.

**D-5. SPECIAL INFORMATION.**

Not applicable.

**D-6. HOW TO LOCATE REPAIR PARTS.**

**a. When NSN or Part Number Is Not Known.**

1. First. Identify the item on Figure D-1 and note the item number.
2. Second. Refer to the Repair Parts List to find the line item entry for the item number noted on the figure.

**b. When NSN or Part Number Is Known:**

1. First. Using the NSN and Part Number Indexes, find the pertinent NSN or part number. The NSN index is in NIIN sequence. The part numbers in the Part Number Index are listed in ascending alphanumeric sequence. Both indexes cross-reference to the item number.
2. Second. To verify the item, locate the item number on Figure D-1 and in the Repair Parts List.

**D-7. ABBREVIATIONS.**

BOI.....Basis of Issue
CAGEC .....Commercial and Government Entity Code
FIG.....Figure
NN.....National Item Identification Number
NSN .....National Stock Number

QTY .....Quantity
RPSTL .....Repair Parts and Special Tools List
SMR.....Source, Maintenance, and Recoverability
SRA .....Specialized Repair Activity
TMDE.....Test, Measurement, and Diagnostic Equipment
UOC.....Usable on Codes

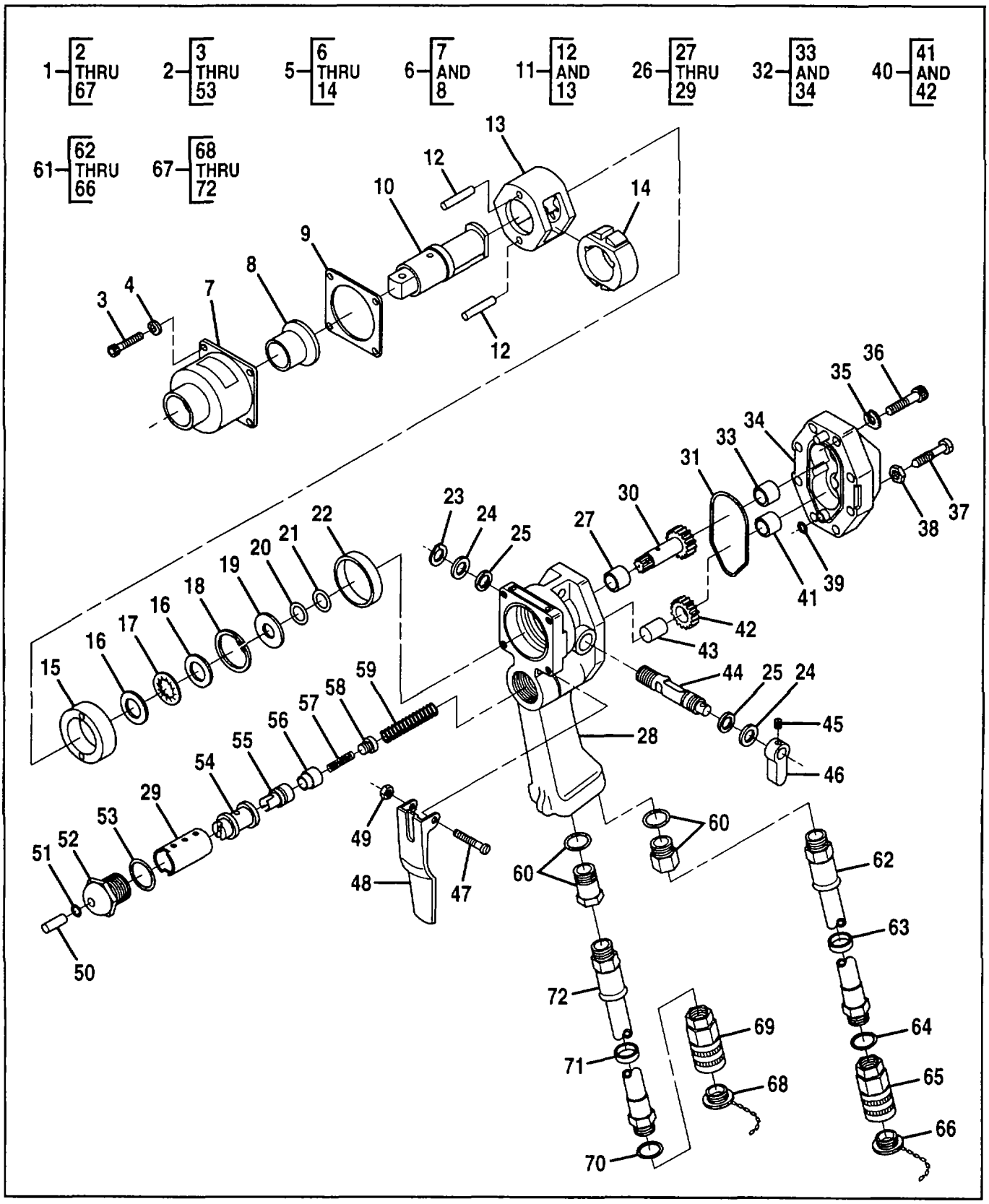



FIGURE D-1. HYDRAULIC IMPACT WRENCH.

| (1) ITEM NO. | (2) SMR CODE | (3) NSN | (4) CAGEC | (5) PART NUMBER | (6) DESCRIPTION AND USABLE ON CODE | (7) QTY |
|---|---|---|---|---|---|---|
| | | | | | GROUP: 7005<br>FIGURE D-1. HYDRAULIC IMPACT WRENCH ASSEMBLY | |
| 1 | PAOOO | 5130007902284 | 06085 | BMY-20124 | WRENCH,IMPACT,HYDRA | 1 |
| 2 | PAOOO | | 54252 | IW-12-140T | .WRENCH,IMPACT,PNEUM | 1 |
| 3 | PAOZZ | | 96906 | MS35455-49 | ..SCREW, CAP | 4 |
| 4 | PAOZZ | 5310011577595 | 54252 | 00145 | ..WASHER,LOCK | 4 |
| 5 | AOOOO | | 54252 | 08021 | ..IMPACT MECHANISM | 1 |
| 6 | PAOZZ | 3895013020931 | 54252 | 08071 | ...HAMMER, CASE | 1 |
| 7 | XAOZZ | | 19207 | NPN | ....CASE,HAMMER | 1 |
| 8 | PAOZZ | 3120013017802 | 54252 | 08072 | ....BUSHING, SLEEVE | 1 |
| 9 | KFOZZ | 5330013044469 | 54252 | 08022 | ...GASKET PART OF KIT P/N 08073 | 1 |
| 10 | PAOZZ | 5220013159337 | 54252 | 08070 | ...GAGE,SNAP,PLAIN ADJ | 1 |
| 11 | PAOOO | | 54252 | 08068 | ...FRAME,HAMMER | 1 |
| 12 | PAOZZ | 5315013016021 | 54252 | 08069 | ....PIN,STRAIGHT,HEADLE | 2 |
| 13 | XAOZZ | | 19207 | NPN | ....FRAME,HAMMER | 1 |
| 14 | PAOZZ | 3895013018100 | 54252 | 08067 | ...HAMMER,PILE DRIVER | 1 |
| 15 | PAOZZ | 4820013009055 | 54252 | 07990 | ..SEAT,VALVE | 1 |
| 16 | PAOZZ | 3110013246978 | 54252 | 08019 | ..BEARING,ROLLER,NEED | 2 |
| 17 | PAOZZ | 3110007793506 | 60380 | NTA1423 | ..RETAINER AND ROLLER | 1 |
| 18 | PAOZZ | 5325012066856 | 54252 | 00166 | ..RING, RETAINING | 1 |
| 19 | PAOZZ | 5310013017865 | 54252 | 07987 | ..WASHER,SHOULDERED | 1 |
| 20 | PAOZZ | | 96906 | MS28775-118 | ..PACKING,PREFORED | 1 |
| 21 | PAOZZ | | 81349 | M83428/1-118 | ..PACKING,PREFORMED PART OF KIT P/N 08073 | 1 |
| 22 | PAOZZ | 5325013006996 | 54252 | 07980 | ..RING,RETAINING | 1 |
| 23 | PAOZZ | 5325013017796 | 54252 | 08016 | ..RING,RETAINING | 1 |
| 24 | PAOZZ | 5365013014000 | 54252 | 08015 | ..SPACER,RING PART OF KIT P/N 08073. | 2 |
| 25 | PAOZZ | | 81349 | M83248/1-016 | ..PACKING,PREFORMED PART OF KIT P/N 08073. | 2 |
| 26 | PAOOO | 3040013012990 | 54252 | 07999 | ..HOUSING,MECHANICAL | 1 |
| 27 | PAOZZ | | 26124 | 14DU04 | ...BUSHING,SLEEVE | 1 |
| 28 | XAOZZ | | 19207 | NPN | ...HOUSING | 1 |
| 29 | PAOZZ | 4820013004297 | 54252 | 07994 | ...SLIDE,DIRECTIONAL C | 1 |
| 30 | PAOZZ | 3040013018064 | 54252 | 08001 | ..GEARSHAFT,SPUR | 1 |
| 31 | PAOZZ | 5330013013919 | 54252 | 08023 | ..O-RING PART OF KIT P/N 08073 | 1 |
| 32 | PAOOO | 4320013012977 | 54252 | 07997 | ..COVER,HYDRAULIC,PUM | 1 |
| 33 | PAOZZ | | 26124 | 14DU04 | ...BUSHING,SLEEVE | 1 |
| 34 | XAOZZ | | 19207 | NPN | ...CAP, MOTOR | 1 |
| 35 | PAOZZ | | 96906 | MS35338-47 | ..WASHER,LOCK | 8 |
| 36 | PAOZZ | 5305012443986 | 54252 | 00682 | ..SCREW,CAP,SOCKET HE | 8 |
| 37 | PAOZZ | 4820013004251 | 54252 | 07984 | ..STEM,FLUID VALVE | 1 |
| 38 | PAOZZ | 5310012475838 | 54252 | 00429 | ..NUT,PLAIN,HEXAGON | 1 |
| 39 | PAOZZ | | 81349 | M83428/1-010 | ..PACKING,PREFORMED PART OF KIT P/N 08073 | 1 |
| 40 | PAOOO | 3020013024990 | 54252 | 07989 | ..GEAR,SPUR | 1 |
| 41 | PAOZZ | 3120013029499 | 54252 | 07978 | ...BUSHING,SLEEVE | 1 |
| 42 | XAOZZ | | 19207 | NPN | ...GEAR,IDLER | 1 |
| 43 | PAOZZ | 3040013012946 | 54252 | 07991 | ..SHAFT, STRAIGHT | 1 |
| 44 | PAOZZ | 4820013005283 | 54252 | 08002 | ..SLIDE,DIRECTIONAL C | 1 |
| 45 | PAOZZ | 5305012536477 | 54252 | 01607 | ..SETSCREW | 1 |

| (1) ITEM NO. | (2) SMR CODE | (3) NSN | (4) CAGEC | (5) PART NUMBER | (6) DESCRIPTION AND USABLE ON CODE | (7) QTY |
|---|---|---|---|---|---|---|
| 46 | PAOZZ | 4910012443671 | 54252 | 04939 | ..LEVER,REMOTE CONTRO | 1 |
| 47 | PAOZZ | 5305013212372 | 54252 | 00025 | ..SCREW,CAP,SOCKET HD | 1 |
| 48 | PAOZZ | 5130013090285 | 54252 | 07996 | ..TRIGGER,IMPACT WREN | 1 |
| 49 | PAOZZ | | 88044 | AN635-1024A | ..NUT,SELF-LOCKING | 1 |
| 50 | PAOZZ | 3110013020795 | 54252 | 06634 | ..ROLLER,BEARING | 1 |
| 51 | PAOZZ | | 81349 | M83248/1-008 | ..PACKING,PREFORMED PART OF KIT P/N 08073 | 1 |
| 52 | PAOZZ | 4730013005320 | 54252 | 08000 | ..RESTRICTOR,FLUID FL | 1 |
| 53 | PAOZZ | 5330010419661 | 81349 | M25988/3-916 | ..O-RING PART OF KIT P/N 08073 | 1 |
| 54 | PAOZZ | 4820013018077 | 54252 | 07998 | ..SLEEVE,DIRECTIONAL | 1 |
| 55 | PAOZZ | 4820013009054 | 54252 | 07986 | ..SEAT,VALVE | 1 |
| 56 | PAOZZ | | 54252 | 07993 | ..DISK,VALVE | 1 |
| 57 | PAOZZ | 5360013026597 | 54252 | 07985 | ..SPRING,HELICAL,COHP | 1 |
| 58 | PAOZZ | 5340013022430 | 54252 | 07982 | ..SEAT,HELICAL COHPRE | 1 |
| 59 | PAOZZ | 5360013020915 | 54252 | 07988 | ..SPRING,HELICAL,COMP | 1 |
| 60 | PAOZZ | 4730012082041 | 54252 | 00936 | ..ADAPTER,STRAIGHT,PI | 2 |
| 61 | PAOOO | 4720008560483 | 19207 | 10894463 | .HOSE ASSEMBLY, NONME | 1 |
| 62 | XAOZZ | 4720007069109 | 19207 | 10867335 | ..HOSE ASSEMBLY,NONME | 1 |
| 63 | PAOZZ | | 19207 | 10867455 | ..BAND MARKER | 1 |
| 64 | PAOZZ | 5325012732378 | 81349 | M27426-1112D | ..RING,RETAINING | 1 |
| 65 | PAOZZ | | 81361 | E150-1-12-4-1-A | ..COUPLING,HALF | 1 |
| 66 | XBOZZ | | 81361 | D150-1-15-5 | ..PLUG | 1 |
| 67 | PAOOO | 4720008560484 | 19207 | 10894462 | .HOSE ASSEMBLY,NONME | 1 |
| 68 | PAOZZ | 4730010918057 | 81361 | D150-1-15-8 | ..PLUG,QUICK DISCONNE | 1 |
| 69 | PAOZZ | 4730011032469 | 81361 | E150-1-12-6-1-A | ..COUPLING HALF,QUICK | 1 |
| 70 | PAOZZ | | 81349 | M27426-1116D | ..RING,RETAINING | 1 |
| 71 | PAOZZ | | 19207 | 10867455 | ..BAND MARKER | 1 |
| 72 | XAOZZ | 4720007069128 | 19207 | 10867353 | ..HOSE ASSEMBLY,NONME | 1 |

END OF FIGURE

| (1) ITEM NO. | (2) SMR CODE | (3) NSN | (4) CAGEC | (5) PART NUMBER | (6) DESCRIPTION AND USABLE ON CODE | (7) QTY |
|---|---|---|---|---|---|---|
| | | | | | GROUP: 9401<br>KITS | |
| | XDOZZ | | 54252 | 08073 | SEAL ASSEMBLY ..... | 1 |
| | | | | | GASKET ( 1) D1-9 | |
| | | | | | O-RING ( 1) D1-53 | |
| | | | | | O-RING ( 1) D1-31 | |
| | | | | | PACKING,PREFORMED ( 1) D1-21 | |
| | | | | | PACKING,PREFORMED ( 1) D1-39 | |
| | | | | | PACKING,PREFORMED ( 2) D1-25 | |
| | | | | | PACKING,PREFORMED ( 1) D1-51 | |
| | | | | | SPACER,RING ( 2) D1-24 | |
| | | | | | END OF FIGURE | |

## CROSS-REFERENCE INDEXES

## NATIONAL STOCK NUMBER INDEX

| STOCK NUMBER | FIGURE NO. | ITEM NO. |
|---|---|---|
| 5330-00-166-0967 | D1 | 51 |
| 5330-00-166-0992 | D1 | 25 |
| 5310-00-209-0965 | D1 | 35 |
| 5305-00-273-5250 | D1 | 3 |
| 5330-00-542-1586 | D1 | 20 |
| 3110-00-779-3506 | D1 | 17 |
| 5130-00-790-2284 | D1 | 1 |
| 4720-00-856-0483 | D1 | 61 |
| 4720-00-856-0484 | D1 | 67 |
| 5330-01-041-9661 | D1 | 53 |
| 4730-01-091-8057 | D1 | 68 |
| 4730-01-103-2469 | D1 | 69 |
| 5310-01-157-7595 | D1 | 4 |
| 5325-01-206-6856 | D1 | 18 |
| 4730-01-208-2041 | D1 | 60 |
| 4910-01-244-3671 | D1 | 46 |
| 5305-01-244-3986 | D1 | 36 |
| 5310-01-247-5838 | D1 | 38 |
| 5305-01-253-6477 | D1 | 45 |
| 5325-01-273-2378 | D1 | 64 |
| 4820-01-300-4251 | D1 | 37 |
| 4820-01-300-4297 | D1 | 29 |
| 4820-01-300-5283 | D1 | 44 |
| 4730-01-300-5320 | D1 | 52 |
| 5325-01-300-6996 | D1 | 22 |
| 4820-01-300-9054 | D1 | 55 |
| 4820-01-300-9055 | D1 | 15 |
| 3040-01-301-2946 | D1 | 43 |
| 4320-01-301-2977 | D1 | 32 |
| 3040-01-301-2990 | D1 | 26 |
| 5330-01-301-3919 | D1 | 31 |
| 5365-01-301-4000 | D1 | 24 |
| 5315-01-301-6021 | D1 | 12 |
| 5325-01-301-7796 | D1 | 23 |
| 3120-01-301-7802 | D1 | 8 |
| 5310-01-301-7865 | D1 | 19 |
| 3040-01-301-8064 | D1 | 30 |
| 4820-01-301-8077 | D1 | 54 |
| 3895-01-301-8100 | D1 | 14 |
| 4820-01-301-8116 | D1 | 56 |
| 3110-01-302-0795 | D1 | 50 |
| 5360-01-302-0915 | D1 | 59 |
| 3895-01-302-0931 | D1 | 6 |
| 5340-01-302-2430 | D1 | 58 |
| 3120-01-302-3584 | D1 | 27 |
| | D1 | 33 |
| 3020-01-302-4990 | D1 | 40 |
| 5360-01-302-6597 | D1 | 57 |
| 3120-01-302-9499 | D1 | 41 |
| 4320-01-305-5827 | D1 | 11 |
| 5130-01-309-0285 | D1 | 48 |
| 5220-01-315-9337 | D1 | 10 |
| 5305-01-321-2372 | D1 | 47 |
| 3110-01-324-6978 | D1 | 16 |
| 5130-01-355-6271 | D1 | 2 |

## CROSS-REFERENCE INDEXES

### PART NUMBER INDEX

| CAGEC | PART NUMBER | STOCK NUMBER | FIG. | ITEM |
|---|---|---|---|---|
| 88044 | AN635-1024A | | D1 | 49 |
| 06085 | BMY-20124 | 5130-00-790-2284 | D1 | 1 |
| 81361 | D150-1-15-5 | | D1 | 66 |
| 81361 | D150-1-15-8 | 4730-01-091-8057 | D1 | 68 |
| 81361 | E150-1-12-4-1-A | | D1 | 65 |
| 81361 | E150-1-12-6-1-A | 4730-01-103-2469 | D1 | 69 |
| 54252 | IW-12-140T | 5130-01-355-6271 | D1 | 2 |
| 96906 | MS28775-118 | 5330-00-542-1586 | D1 | 20 |
| 96906 | MS35338-47 | 5310-00-209-0965 | D1 | 35 |
| 96906 | MS35455-49 | 5305-00-273-5250 | D1 | 3 |
| 81349 | M25988/3-916 | 5330-01-041-9661 | D1 | 53 |
| 81349 | M27426-1112D | 5325-01-273-2378 | D1 | 64 |
| 81349 | M27426-1116D | | D1 | 70 |
| 81349 | M83248/1-008 | 5330-00-166-0967 | D1 | 51 |
| 81349 | M83248/1-016 | 5330-00-166-0992 | D1 | 25 |
| 81349 | M83428/1-010 | | D1 | 39 |
| 81349 | M83428/1-118 | | D1 | 21 |
| 19207 | NPN | | D1 | 7 |
| | | | D1 | 13 |
| | | | D1 | 28 |
| | | | D1 | 34 |
| | | | D1 | 42 |
| 60380 | NTA1423 | 3110-00-779-3506 | D1 | 17 |
| 54252 | 00025 | 5305-01-321-2372 | D1 | 47 |
| 54252 | 00145 | 5310-01-157-7595 | D1 | 4 |
| 54252 | 00166 | 5325-01-206-6856 | D1 | 18 |
| 54252 | 00429 | 5310-01-247-5838 | D1 | 38 |
| 54252 | 00682 | 5305-01-244-3986 | D1 | 36 |
| 54252 | 00936 | 4730-01-208-2041 | D1 | 60 |
| 54252 | 01607 | 5305-01-253-6477 | D1 | 45 |
| 54252 | 04939 | 4910-01-244-3671 | D1 | 46 |
| 54252 | 06634 | 3110-01-302-0795 | D1 | 50 |
| 54252 | 07978 | 3120-01-302-9499 | D1 | 41 |
| 54252 | 07980 | 5325-01-300-6996 | D1 | 22 |
| 54252 | 07982 | 5340-01-302-2430 | D1 | 58 |
| 54252 | 07984 | 4820-01-300-4251 | D1 | 37 |
| 54252 | 07985 | 5360-01-302-6597 | D1 | 57 |
| 54252 | 07986 | 4820-01-300-9054 | D1 | 55 |
| 54252 | 07987 | 5310-01-301-7865 | D1 | 19 |
| 54252 | 07988 | 5360-01-302-0915 | D1 | 59 |
| 54252 | 07989 | 3020-01-302-4990 | D1 | 40 |
| 54252 | 07990 | 4820-01-300-9055 | D1 | 15 |
| 54252 | 07991 | 3040-01-301-2946 | D1 | 43 |
| 54252 | 07993 | 4820-01-301-8116 | D1 | 56 |
| 54252 | 07994 | 4820-01-300-4297 | D1 | 29 |
| 54252 | 07996 | 5130-01-309-0285 | D1 | 48 |
| 54252 | 07997 | 4320-01-301-2977 | D1 | 32 |
| 54252 | 07998 | 4820-01-301-8077 | D1 | 54 |
| 54252 | 07999 | 3040-01-301-2990 | D1 | 26 |
| 54252 | 08000 | 4730-01-300-5320 | D1 | 52 |
| 54252 | 08001 | 3040-01-301-8064 | D1 | 30 |

## CROSS-REFERENCE INDEXES

### PART NUMBER INDEX

| CAGEC | PART NUMBER | STOCK NUMBER | FIG. | ITEM |
|---|---|---|---|---|
| 54252 | 08002 | 4820-01-300-5283 | D1 | 44 |
| 54252 | 08015 | 5365-01-301-4000 | D1 | 24 |
| 54252 | 08016 | 5325-01-301-7796 | D1 | 23 |
| 54252 | 08019 | 3110-01-324-6978 | D1 | 16 |
| 54252 | 08021 | | D1 | 5 |
| 54252 | 08022 | | D1 | 9 |
| 54252 | 08023 | 5330-01-301-3919 | D1 | 31 |
| 54252 | 08067 | 3895-01-301-8100 | D1 | 14 |
| 54252 | 08068 | 4320-01-305-5827 | D1 | 11 |
| 54252 | 08069 | 5315-01-301-6021 | D1 | 12 |
| 54252 | 08070 | 5220-01-315-9337 | D1 | 10 |
| 54252 | 08071 | 3895-01-302-0931 | D1 | 6 |
| 54252 | 08072 | 3120-01-301-7802 | D1 | 8 |
| 54252 | 08073 | | KIT | |
| 19207 | 10867335 | | D1 | 62 |
| 19207 | 10867353 | | D1 | 72 |
| 19207 | 10867455 | | D1 | 63 |
| | | | D1 | 71 |
| 19207 | 10894462 | 4720-00-856-0484 | D1 | 67 |
| 19207 | 10894463 | 4720-00-856-0483 | D1 | 61 |
| 26124 | 14DU04 | 3120-01-302-3584 | D1 | 27 |
| | | | D1 | 33 |

## APPENDIX E

## TORQUE VALUES FOR THREADED FASTENERS

This appendix lists the torque values for threaded fasteners. Follow the torque values as specified in the procedures throughout this manual. When no torque value is given, use the following guides. The guides are based on using clean, dry threads.

**NOTE**

- **Reduce torque by 10 percent (%) when lubricating oil is used on threads (wet torque).**
- **Reduce torque by 20% when installing new threaded fasteners.**
- **Reduce torque by 30% when threading screw into aluminum, unless inserts are used.**

**Table E-1. STANDARD TORQUE VALUE GUIDE.**

| Screw Diameter | Torque A- No Dashes (SAE* Grade No. 2) | | Torque B- 3 Dashes (SAE Grade No. 5) | | Torque C 6 Dashes (SAE Grade No. 8) | | Socket Size |
|---|---|---|---|---|---|---|---|
| | lb-ft** | N•m*** | lb-ft | N•m | lb-ft | N•m | |
| 1/4-20 UNC | 3-5 | 4.1-6.8 | 6-8 | 8.1-10.8 | 10-12 | 13.6-16.3 | 7/16 |
| 1/4-28 UNF | 4-6 | 5.4-8.1 | 8-10 | 10.8-13.6 | 9-14 | 12.2-19.0 | 7/16 |
| 5/16-18 UNC | 7-11 | 9.5-14.9 | 13-17 | 17.6-23.0 | 19-24 | 25.8-32.5 | 1/2 |
| 5/16-24 UNF | 7-11 | 9.5-14.9 | 14-19 | 19.0-25.8 | 23-28 | 31.2-38.0 | 1/2 |
| 3/8-16 UNC | 14-18 | 19.0-24.4 | 26-31 | 35.3-42.0 | 39-44 | 52.9-59.7 | 9/16 |
| 3/8-24 UNF | 15-19 | 20.3-25.8 | 30-35 | 40.7-47.5 | 46-51 | 62.4-69.1 | 9/16 |
| 7/16-14 UNC | 23-28 | 31.2-38.0 | 44-49 | 59.7-66.4 | 65-70 | 88.1-94.9 | 5/8 |
| 7/16-20 UNF | 23-28 | 31.2-38.0 | 44-54 | 59.7-73.2 | 69-79 | 93.6-107.1 | 5/8 |
| 1/2-13 UNC | 32-37 | 43.4-50.2 | 65-75 | 88.1-101.7 | 95-105 | 128.8-142.4 | 3/4 |
| 1/2-20UNF | 34-41 | 46.1-55.6 | 73-83 | 99.0-112.5 | 113-123 | 153.2-166.8 | 3/4 |
| 9/16-12 UNC | 46-55 | 62.4-74.6 | 100-110 | 135.6-149.1 | 145-155 | 196.6-210.1 | 13/16 |
| 9/16-19 UNF | 47-57 | 63.7-77.3 | 107-117 | 145.1-158.6 | 165-175 | 223.7-237.3 | 13/16 |
| 5/8-11 UNC | 62-72 | 84.1-97.6 | 140-150 | 189.8-203.4 | 200-210 | 271.2-284.7 | 15/16 |
| 5/8-18 UNF | 67-77 | 90.8-104.4 | 153-163 | 207.4-221.0 | 235-245 | 318.6-332.2 | 15/16 |
| 3/4-10 UNC | 106-116 | 143.7-157.3 | 260-270 | 352.5-366.1 | 365-375 | 494.9-508.4 | 1-1/4 |

**Table E-1. STANDARD TORQUE VALUE GUIDE-Continued.**

| Screw Diameter | Torque A- No Dashes (SAE* Grade No. 2) | | Torque B- 3 Dashes (SAE Grade No. 5) | | Torque C 6 Dashes (SAE Grade No. 8) | | Socket Size |
|---|---|---|---|---|---|---|---|
| | lb-ft** | N•m*** | lb-ft | N•m | lb-ft | N•m | |
| 3/4-16 UNF | 115-125 | 155.9-169.5 | 268-278 | 363.4-376.9 | 417-427 | 565.4-578.9 | 1-1/4 |
| 7/8-9 UNC | 165-175 | 223.7-237.3 | 385-395 | 522.0-535.5 | 595-605 | 806.7-820.3 | 1-5/16 |
| 7/8-14 UNF | 178-188 | 241.3-254.9 | 424-434 | 574.9-588.4 | 663-673 | 898.9-912.5 | 1-5/16 |
| 1-8UNC | 251-261 | 340.3-353.9 | 580-590 | 786.4-799.9 | 900-910 | 1220-1233 | 1-1/2 |
| 1-14UNF | 255-265 | 345.7-359.3 | 585-634 | 793.1-859.6 | 943-993 | 1278-1346 | 1-1/2 |
| 1-1/4-7UNC | 451-461 | 611.5-625.0 | 1070-1120 | 1450-1518 | 1767-1817 | 2395-2463 | 1-7/8 |
| 1-1/4-12UNF | 488-498 | 661.6-675.2 | 1211-1261 | 1641-1709 | 1963-2013 | 2661-2729 | 1-7/8 |
| 1-1/2-6UNC | 727-737 | 985.7-999.2 | 1899-1949 | 2574-2642 | 3111-3161 | 4217-4285 | 2-1/4 |
| 1-1/2-12 UNF | 816-826 | 1106-1119 | 2144-2194 | 2906-2974 | 3506-3556 | 4753-4821 | 2-1/4 |

*Specification of Society of Automotive Engineers **pound-feet ***Newton-meters

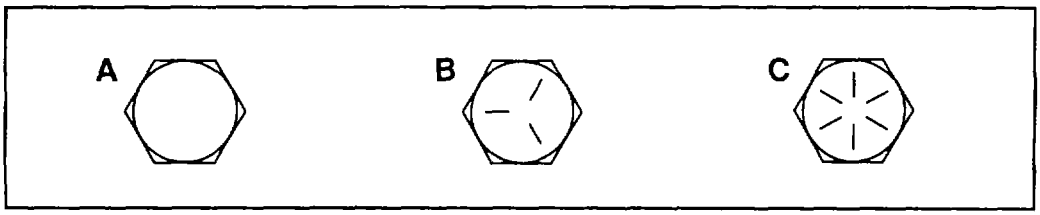



**Table E-2. SELF-LOCKING NUT BREAKAWAY TORQUE VALUES.**

| Thread Size | Minimum Breakaway Torque | | Thread Size | Minimum Breakaway Torque | | Thread Size | Minimum Breakaway Torque | |
|---|---|---|---|---|---|---|---|---|
| | lb-in.* | N•m | | lb-in. | N•m | | lb-in. | N•m |
| 10-32 | 2.0 | 0.23 | 7/16-20 | 14.0 | 1.58 | 3/4-16 | 50.0 | 5.65 |
| 1/4-28 | 3.5 | 0.40 | 1/2-20 | 18.0 | 2.03 | 7/8-14 | 70.0 | 7.91 |
| 5/16-24 | 6.5 | 0.73 | 9/16-18 | 24.0 | 2.71 | 1-12 | 90.0 | 10.17 |
| 3/8-24 | 9.5 | 1.07 | 5/8-18 | 32.0 | 3.62 | 1-1/8-12 | 117.0 | 13.22 |
| | | | | | | 1-1/4-12 | 143.0 | 16.16 |

*pound-inches

**NOTE**

**To determine breakaway torque, thread nut onto screw or bolt until at least two threads stick out. Nut shall not make contact with a mating part. Stop nut Torque necessary to begin turning nut again is breakaway torque. Do not reuse self-locking nuts that do no meet minimum breakaway torque.**

## APPENDIX F

## MANDATORY REPLACEMENT PARTS

This appendix lists the mandatory replacement parts and their corresponding part numbers. The item number appears in the Initial Setup under the Materials/Parts listing of maintenance procedures.

**Table F-1. MANDATORY REPLACEMENT PARTS.**

| Item No. | Nomenclature | Part No. |
|---|---|---|
| 1 | Gasket | 08022 |
| 2 | Locknut | AN635-1024A |
| 3 | Lockwasher | MS35338-47 |
| 4 | Lockwasher | 00145 |
| 5 | Packing, preformed | M83248/1-008 |
| 6 | Packing, preformed | M83428/1-010 |
| 7 | Packing, preformed | M83248/1-016 |
| 8 | Packing, preformed | M25988/3-916 |
| 9 | Packing, preformed | 08023 |
| 10 | Packing, preformed (flat) | MS28775-118 |
| 11 | Packing, preformed (round) | M83428/1-118 |
| 12 | Ring, backup | 08015 |
| 13 | Snapring | 00166 |
| 14 | Snapring | 08016 |

# APPENDIX G

# OPERATOR LUBRICATION INSTRUCTIONS

## G-1. EXPOSURE TO MOISTURE.

Wipe anvil, lever, and other machined surfaces with preservative lubricant (Appx. C, item 14).

## G-2. USE IN SAND OR DUST.

After operation, wipe dirt and grit from all exposed surfaces, paying particular attention to anvil and lever. When cleaning exposed surfaces, be careful not to force dirt into hydraulic impact wrench. Apply a light coat of preservative lubricant (Appx. C, item 14) to outside of hydraulic impact wrench. Wipe off all excess lubricant from outside of hydraulic impact wrench. Wrap in clean cloth (Appx. C, item 5).

## G-3. LUBRICATION-ALL TEMPERATURES.

The following table applies to lubrication and servicing (see para. 4-11) of impact head/mechanism.

**Table G-1. GREASE, AUTOMOTIVE AND ARTILLERY (GAA) SPECIFICATIONS FOR HYDRAULIC IMPACT WRENCH.**

| Lubricant | Capacity Temperatures | Operating Conditions | Expected | Interval |
|---|---|---|---|---|
| MIL-G-10924 GAA | As required | Normal | +155 to -65 degrees Fahrenheit (+68 to -54 degrees Celsius) | Semiannually-As defined in Preventive Maintenance Checks and Services (PMCS) |
| | | Arctic | Refer to FM 9-207 | |

# INDEX

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# The Metric System and Equivalents

### *Linear Measure*

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

### *Weights*

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

### *Liquid Measure*

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

### *Square Measure*

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

### *Cubic Measure*

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

## Approximate Conversion Factors

| *To change* | *To* | *Multiply by* | *To change* | *To* | *Multiply by* |
|---|---|---|---|---|---|
| inches | centimeters | 2.540 | ounce-inches | Newton-meters | .007062 |
| feet | meters | .305 | centimeters | inches | .394 |
| yards | meters | .914 | meters | feet | 3.280 |
| miles | kilometers | 1.609 | meters | yards | 1.094 |
| square inches | square centimeters | 6.451 | kilometers | miles | .621 |
| square feet | square meters | .093 | square centimeters | square inches | .155 |
| square yards | square meters | .836 | square meters | square feet | 10.764 |
| square miles | square kilometers | 2.590 | square meters | square yards | 1.196 |
| acres | square hectometers | .405 | square kilometers | square miles | .386 |
| cubic feet | cubic meters | .028 | square hectometers | acres | 2.471 |
| cubic yards | cubic meters | .765 | cubic meters | cubic feet | 35.315 |
| fluid ounces | milliliters | 29,573 | cubic meters | cubic yards | 1.308 |
| pints | liters | .473 | milliliters | fluid ounces | .034 |
| quarts | liters | .946 | liters | pints | 2.113 |
| gallons | liters | 3.785 | liters | quarts | 1.057 |
| ounces | grams | 28.349 | liters | gallons | .264 |
| pounds | kilograms | .454 | grams | ounces | .035 |
| short tons | metric tons | .907 | kilograms | pounds | 2.205 |
| pound-feet | Newton-meters | 1.356 | metric tons | short tons | 1.102 |
| pound-inches | Newton-meters | .11296 | | | |

## Temperature (Exact)

| | | | | |
|---|---|---|---|---|
| °F | Fahrenheit temperature | 5/9 (after subtracting 32) | Celsius temperature | °C |

**PIN: 075945-000**