

TM 9-2350-366-10-1

TECHNICAL MANUAL

OPERATOR MANUAL

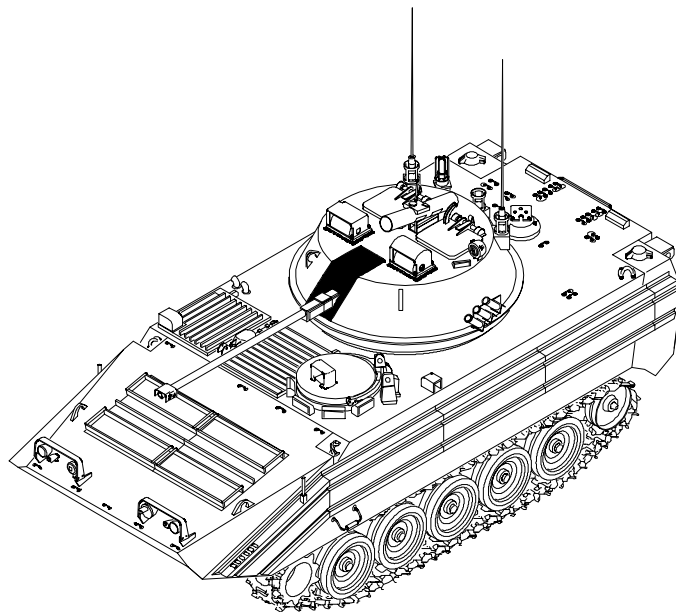
FOR

OPPOSING FORCES SURROGATE VEHICLE (OSV)

M113A3/BMP-2

2350-01-420-4716 (EIC AUK)

HULL



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HEADQUARTERS, DEPARTMENT OF THE ARMY

2 March 2003

WARNING SUMMARY

This section provides a summary of critical safety information in this TM. Warnings usually refer to a condition that, if it occurs, could cause death or serious injury to personnel and/or catastrophic damage to vehicle or equipment. It includes general WARNINGS not found in the Work Package (WP) procedures, hazardous materials WARNINGS, and a list of WARNINGS extracted from the WPs.

Prior to starting an operating or maintenance WP, the WARNINGS included in the text for that WP must be reviewed and understood.

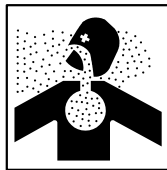
Materials listed in the INITIAL SETUP of the WP must also be reviewed for hazardous materials used during maintenance of the equipment or performance of the task. Then refer to the detailed WARNINGS for hazardous materials listed separately in this WARNING SUMMARY under the heading HAZARDOUS MATERIALS WARNINGS.

If possible, do a review of Material Safety Data Sheets (MSDS) for materials used in performance of tasks.

GENERAL WARNINGS NOT FOUND IN WP PROCEDURES

The following WARNINGS are general safety statements. They are not unique to any specific procedures and, therefore, do not appear elsewhere in this TM. Personnel operating or working near OSV must understand and continually observe the precautions in these WARNINGS.

WARNING



Vehicle engine and personnel heater exhaust fumes contain carbon monoxide and other materials that are toxic. Exposure to high levels can cause death or serious injury to personnel.

Symptoms of exhaust and carbon monoxide poisoning include dizziness, drowsiness, headache, and loss of muscle control. If anyone shows signs of exhaust poisoning, evacuate personnel from vehicle to an area with fresh air. Keep affected personnel warm, calm, and inactive. Obtain medical attention immediately. Perform artificial respiration if affected personnel stop breathing.

NBC mask will not filter out carbon monoxide and other toxic materials. Use of mask can hide presence of diesel exhaust and increase possibility of personnel exposure. NBC mask should only be worn when there is diesel smoke present. Diesel fuel particulates in smoke can make personnel nauseous. NBC mask will filter out smell of diesel smoke and may help to reduce nausea until getting clear of smoke.

To protect personnel from exhaust and carbon monoxide poisoning, the following rules must be obeyed:

Do not operate heater and/or engine indoors unless there is a good flow of fresh air.

Do not operate engine at idle for long periods unless there is a good flow of fresh air.

Do not operate engine and/or personnel heater if power plant access covers, plates, or doors are open. Perform maintenance that requires engine or heater operation with access covers, plates, or doors open or removed, in an area with a good flow of fresh air to remove exhaust gasses.

Crewmembers must always be alert for smell of exhaust fumes. When fumes are noticed inside OSV, vent fans must be turned on, hatch covers opened, and rear doors opened.

Remember: The best defense against exhaust gas poisoning is a good flow of fresh air.

WARNING SUMMARY (cont)

WARNING



Double hearing protection is required while OSV is operating. Noise from vehicle engine, tracks, and weapons operation can damage hearing of soldiers in or around vehicle. All personnel in vehicle MUST WEAR DOUBLE HEARING PROTECTION during weapons and/or OSV operations. Hearing protection devices consist of a CVC helmet or CAPS headset with foam earplugs and must be properly worn to provide effective protection.

If DOUBLE HEARING PROTECTION is not worn, safe level of noise exposure will be exceeded in a short time. Hearing loss occurs gradually. Each exposure that exceeds ear protection guidelines below will cause hearing loss, usually temporary. With repeated exposure, hearing loss becomes permanent. Make sure crew and riders have required hearing protection. Spare foam earplugs must be available.

Ear protection guidelines for all personnel:

Must wear CVC helmet or CAPS headset at all times.

Must wear CVC helmet or CAPS headset plus earplugs for operations exceeding 14 miles (23 km) in 24 hours or including weapons firing.

Driver and cargo hatches should be closed during weapons firing.

Hatches must be closed before firing missiles.

Use of radio with earplugs:

Wearing foam earplugs in addition to CVC helmet or CAPS headset improves ability to hear radio in a noisy environment. DO NOT remove earplugs while using radio.

Definitions:

CVC (DH-132) Helmet

“Tankers helmet”—must be in good condition, with liner and earcups fitted tightly, and chin strap worn at all times.

Earplugs

Standard issue earplugs must be used. All dismounted squad personnel must be trained in how to use them. Since they may be removed and lost, spares must be carried.

CAPS Headset

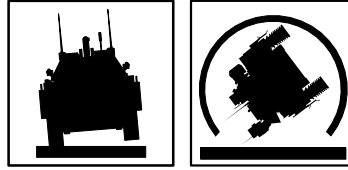
The “listen only” headset provided for dismounted squad while in vehicle.

LIST OF WARNINGS IN WP PROCEDURES

This list includes all WARNINGS in the manual. These WARNINGS must be studied carefully and obeyed. They can save your life and the lives of soldiers with whom you work. Failure to obey a warning could cause death or injury as well as destruction of, or damage to, the OSV and/or equipment.

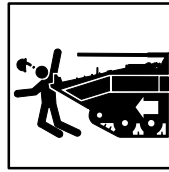
WARNING SUMMARY (cont)

WARNING



If you lose a track (break a track shoe or vehicle throws a track), exercise extreme caution in maintaining control of vehicle. Immediately release accelerator and allow vehicle to coast to a stop. Do not apply brakes (brake pedals, laterals, pivot) or any type of steering control. Application of braking and steering controls cause vehicle to pull to active or good track and could result in vehicle rollover. If absolutely necessary, apply brakes only if vehicle is approaching a ravine, cliff, or other situation where outcome would be catastrophic, probably resulting in fatalities, if vehicle does not immediately stop. When a rollover is imminent, crewmembers should immediately withdraw into vehicle, tighten seat belts, and hold onto a secure fixture until vehicle comes to a complete stop.

WARNING



Vehicle can move unexpectedly when working on tracks and cause death or serious injury to personnel.

Block front and rear of track that is not broken before working on track.

Do not disconnect both tracks simultaneously.

WARNING



Fire can break out at any time causing death or injury to personnel and/or damage to vehicle and equipment. Keep fire extinguisher ready for use prior to operating vehicle.

WARNING SUMMARY (cont)

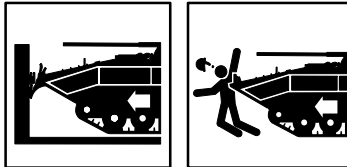
WARNING



Accidental discharge of fire extinguishers can seriously injure your eyes or skin.

Wear face shield, ear plugs, protective clothing, and gloves during fire bottle maintenance.

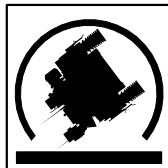
WARNING



Accelerator linkage failure can cause vehicle to crash and cause death or serious injury to personnel and/or damage vehicle and equipment.

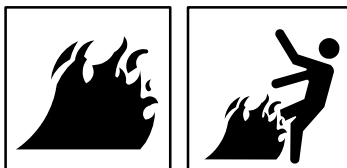
Do not operate OSV if accelerator pedal does not operate smoothly or if engine does not return to idle when accelerator pedal is released.

WARNING



Vehicle can roll over on hills or rough terrain causing death or injury to personnel and damage/destruction of OSV and/or equipment. Reduce speed and avoid bumps and sudden turns. Do not operate vehicle on side slopes steeper than 30% (16 degrees). Wear seat belts.

WARNING



When overheated, combustible materials can ignite or explode and cause death or injury to personnel and damage to vehicle and equipment. Do not operate heater until explosive materials are stored at least 30-inches from heater vents. Store combustibles a minimum of 12-inches from heater metal surfaces.

WARNING SUMMARY (cont)

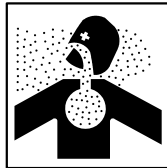
WARNING



Heater can flood and leak fuel. Diesel fuel can ignite and cause death or serious injury to personnel and damage to equipment.

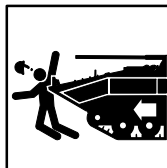
Do not start flooded heater using starting aids such as ether. If heater does not start after three attempts, your supervisor shall be notified.

WARNING



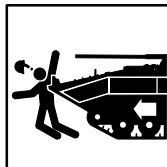
Exhaust from OSV personnel heater is poisonous and can cause death to personnel. Do not breathe exhaust gases. Keep exhaust unobstructed. Pull back exhaust grille cover.

WARNING



When OSV transmission controller is in SL position, engage steering lock pin or vehicle can pivot steer causing death or injury to personnel. If vehicle is not going to be driven, set transmission controller to SL, center steering yoke, engage steering lock pin in yoke, and STEERING LOCKED indicator on.

WARNING



If TRANS OIL LOW PRESS warning indicator stays on, vehicle could start to move erratically and cause death or injury to personnel and damage to OSV and equipment. Clear area around OSV of personnel and apply brakes before transmission is engaged.

WARNING SUMMARY (cont)

WARNING



After operation, engine, engine parts, gear box, and fluids are hot and can cause serious burns.

Allow engine, engine parts, gear box, and/or fluids to cool before working on or near them, inspecting for deterioration and damage or checking fluid levels. Wear heat protective gloves to work on hot parts.

WARNING



After operation, engine, transmission, final drive housing, and fluids are hot and can cause serious burns.

Allow engine and transmission to cool before working on or near them, or checking fluid levels. Wear heat protective gloves to work on hot parts.

After operation, final drive housing and fluids may be hot due to overheating. Notify your supervisor of hot drive housing.

WARNING



After operation, tracks and track components are hot and can cause serious burns. Allow tracks to cool before working on or near them. Wear heat protective gloves to work on hot parts.

WARNING SUMMARY (cont)

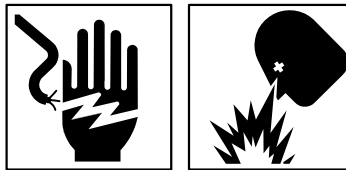
WARNING



After operation, shock absorbers can be hot and cause serious burns if touched.

Allow parts to cool before working on or near them. If necessary, wear heat protective gloves to work on shock absorbers.

WARNING



Battery posts and power cables can short circuit and cause death or serious burns to personnel.

Do not touch battery positive terminals with tools or other metal objects.

Do not touch both battery posts simultaneously with tools or other metal objects.

Do not wear jewelry when working with battery or electrical system.

Gas from batteries can explode and cause death or serious injury to personnel and/or damage to OSV and equipment.

WARNING

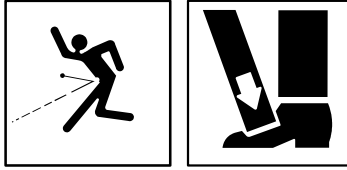


Do not attempt to slave start OSV that has frozen batteries.

An explosion can occur causing death or injury to personnel and damage to equipment.

WARNING SUMMARY (cont)

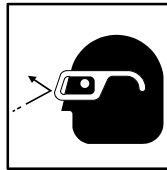
WARNING



Track can swing out and strike personnel and cause death or serious injury.

When working on OSV track, stand to side of track being broken, not in front.

WARNING



When striking metal with a hammer, steel fragments can be propelled by the blow. Fragments can impact eyes and cause serious injury or blindness.

Wear eye/face protection when using a hammer.

WARNING



Rear access doors are heavy and can swing rapidly and strike personnel, causing death or injury.

Do not stand behind doors. Keep rear of OSV clear of personnel before swinging doors open or closed.

Keep hands clear of path when doors are opened or closed. Keep hands clear of area between handle and door.

WARNING SUMMARY (cont)

WARNING



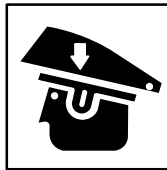
Turret can rotate and cause death or serious injury to personnel.

Do not reach through turret shield opening or enter/exit turret when turret power is on.

Keep turret shield door closed when turret drive power is on.

Engage turret travel lock before personnel enter turret or reach through turret shield opening.

WARNING



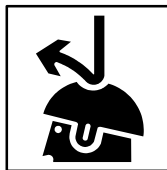
Falling hatch could seriously injure driver.

Keep head lower than closed hatch position when opening or closing hatch cover.

Fully engage latch pin or mechanism when hatch cover is in open position.

Support hatch cover with one hand before pushing hinge latch handle down. Keep hands clear of hatch rim when closing hatch cover.

WARNING



To avoid being struck by low-hanging obstacles, do not stand in open hatch while vehicle is moving.

Close hatch or put in pop-up position when operating in area with low-hanging obstacles.

WARNING SUMMARY (cont)

WARNING



Seat may move suddenly up or down when the control knob is released and cause injury to personnel.

Keep hands away from seat post. Lift body weight off seat before releasing control knob. Body weight is used to control movement of seat.

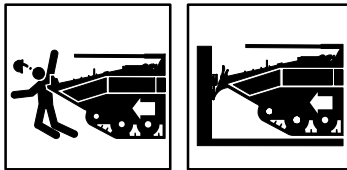
WARNING



Personnel can be injured using unsecured seats or seats with missing or inoperative seat belts during OSV operation.

Keep seat pins or latches and buckles in place and seat belts functional before personnel use the seat.

WARNING



Releasing parking brake could allow vehicle to move and cause injury or death to personnel and/or damage to vehicle and equipment. Press foot brake to prevent OSV movement when parking brake is released.

WARNING SUMMARY (cont)

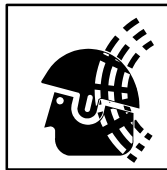
WARNING



Engine and personnel heater exhausts are poisonous. Close power unit access doors before starting engine to prevent exhaust gases from entering personnel areas.

NBC mask will not protect personnel from exhaust poisoning.

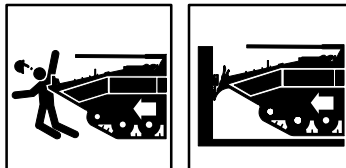
WARNING



Vehicle and power plant noise caused by OSV operation can cause permanent hearing damage to personnel.

Wear hearing protection when in or near an operating vehicle or power plant.

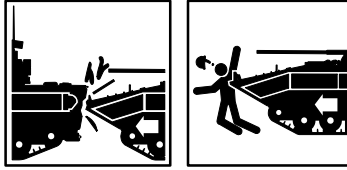
WARNING



Center steering yoke when starting engine. Clear area around OSV of personnel before starting engine. When transmission controller is set to SL and steering yoke is not centered to engage locking pin, OSV could pivot when started and cause death or injury to personnel and/or damage to vehicle and equipment.

WARNING SUMMARY (cont)

WARNING



Do not park source vehicle head-to-head with dead OSV.

Stay clear of area between vehicles during starting operations.

Either vehicle could jump forward, causing death or injury to personnel and/or damage to vehicles and equipment.

WARNING



Install slave cable properly at OSV and source vehicle. Improperly installed slave cable is an electrocution hazard. High voltage can kill or seriously injure personnel.

Correctly install slave cable at both ends before selecting import or export power on flat panel display (FPD).

WARNING



Disconnecting slave power cable from source vehicle or OSV can cause death or serious injury to personnel.

Turn import or export power OFF on OSV and external source vehicle before slave power cable is disconnected at either end.

WARNING SUMMARY (cont)

WARNING



During emergency situations when driver's hatch is blocked, exit through crawl space beside turret and out rear doors. Do not stow equipment in crawl space.

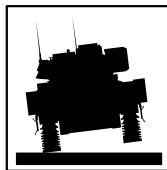
WARNING



Operating vehicle in hot weather increases risk of heat stress. Heat stress impairs performance and can lead to injury.

Drink lots of water. Work and rest in shade when possible. Follow instructions in FM 21-10.

WARNING



Driving more than 6 miles (9.6 km) per day over rough terrain can cause vibration-induced injuries to personnel in the OSV. On rough terrain, reduce speed to 10 mph maximum. Avoid bumps and sudden turns. Use tank trails when possible.

Do not drive vehicle on side slopes steeper than 30% (16 degrees).

Wear seat belts while vehicle is in motion.

WARNING SUMMARY (cont)

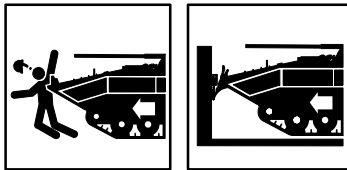
WARNING



Antennas contacting power lines can cause death or serious injury to personnel due to electrocution, damage to equipment due to overload, and possibly a vehicle fire.

Tie down or remove antennas before operating under or near power lines, in cantonment area, or around other obstructions lower than antennas. Do not touch an antenna that is touching a power line.

WARNING



Do not change forward or reverse movement of OSV by shifting gears until OSV comes to complete halt. OSV will not change direction when shifting from forward to reverse/reverse to forward while moving at a speed greater than 4 MPH.

Attempting to change direction of travel while vehicle is in motion can result in death or injury to personnel and/or damage or destruction of equipment.

WARNING



OSV brake pedal is very sensitive. Applying sudden hard pressure to brake pedal can cause OSV to come to abrupt halt and cause injury to personnel and/or damage to equipment.

Apply brake pressure lightly and with caution.

WARNING SUMMARY (cont)

WARNING



An out-of-control OSV can overturn. Personnel are safer staying in vehicle than getting out while vehicle is in motion. Personnel can be killed or seriously injured while attempting to evacuate a vehicle during a rollover. If vehicle starts to overturn, personnel must be fully inside OSV and braced. Personnel inside OSV may receive injuries from being thrown against metal parts but personnel outside the vehicle are in danger of being crushed by vehicle rollover.

Spilled fuel and oil can catch fire after a rollover. Shut off vehicle master power and engine fuel supply immediately. Evacuate vehicle as quickly as can be done safely after vehicle has come to rest.

WARNING



Driver cannot see to rear of OSV. Vehicle moving in reverse can cause death or injury to personnel and/or damage to equipment.

Stay clear of OSV rear while vehicle is backing up.

Post ground guides at front and rear of OSV before backing up.

WARNING



Sparks from static electricity could cause a fuel fire or explosion.

Metal nozzle must touch metal in fuel filler neck when fuel is running.

WARNING SUMMARY (cont)

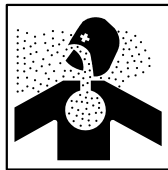
WARNING



Engine fan can blow away fire suppression agent. Agent being dispersed before fire is extinguished could result in death or burns to personnel and/or damage to equipment.

Stop engine before engine fire suppression system is activated.

WARNING

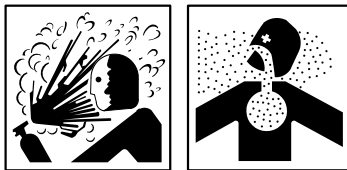


Personnel that breathe carbon dioxide discharged from fire extinguisher may have dizziness or nausea. Prolonged breathing of carbon dioxide could result in severe injury or death.

NBC mask will not protect personnel from carbon dioxide. If possible, evacuate vehicle or open hatch covers before discharging extinguisher within vehicle.

After discharging fire suppression system, open hatch covers and rear doors and turn vent fans on.

WARNING



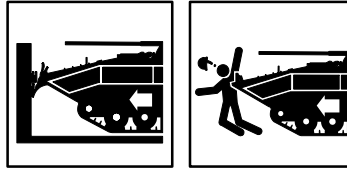
Carbon dioxide (CO²) from portable fire extinguisher discharge is poisonous and extremely cold. Breathing CO² can cause suffocation. Do not touch cone or spray when using portable fire extinguishers. Contact with skin and/or eyes can result in burns from extreme cold.

Handle fire extinguisher carefully to avoid banging or dropping cylinder.

Wear face shield, ear plugs, protective clothing, and gloves when doing fire bottle maintenance.

WARNING SUMMARY (cont)

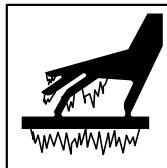
WARNING



OSV can move during maintenance or when parked on incline. Unguided movement of OSV can cause vehicle to strike personnel, objects, or other vehicles causing death or serious injury to personnel and/or damage to vehicle and equipment.

Block OSV treads when OSV is parked on hill, before personnel work under vehicle or near treads, or when doing maintenance that could result in accidental vehicle movement.

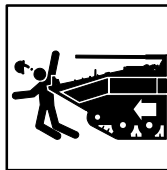
WARNING



Contact with cold metal and working outside in cold weather can cause frostbite. Wear gloves and cold weather clothing in cold conditions.

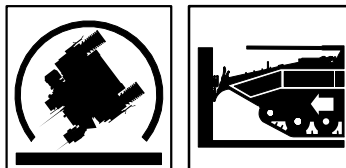
Do not touch cold metal with bare skin.

WARNING



Vehicle can move suddenly and unexpectedly if yoke is moved from center when moving gear selector lever to pivot (PV). Before shifting to PV, clear area around OSV of personnel. Do not move yoke from center. Push down brake pedal.

WARNING



Vehicle can roll over when entering a trench at an angle if the side of the trench is steeper than 30% (16 degrees). Wear seat belts.

Do not attempt to cross trenches that are more than 5 1/2-feet (1.67-m) in width. If the front of OSV hits side of trench, personnel could be killed or injured and OSV could be damaged. OSV could get stuck.

WARNING SUMMARY (cont)

WARNING



Vehicle can roll over if one track contacts obstacle and causes one side of OSV to tilt at an angle steeper than 30% (16 degrees). Wear seat belts.

WARNING



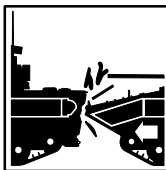
Vehicle can roll over while moving across slopes. Rollover can cause death or injury to personnel. Reduce speed on slopes and bumps and avoid sudden turns. Do not operate on side slopes steeper than 30% (16 degrees). Wear seat belts.

WARNING



Vehicle can slide and roll over while driving on snow, mud, or ice covered grades. Rollover can cause death or injury to personnel. If driving on a hazardous grade is required, reduce speed and operate the OSV straight up and straight down. Wear seat belts.

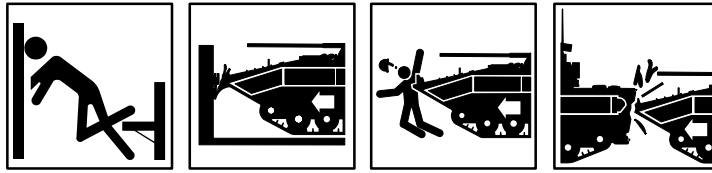
WARNING



OSV being towed without towbar can strike recovery vehicle, causing death or serious injury to personnel and/or damage to vehicles and equipment. Use a tow bar when towing downhill, tow starting a vehicle, and when tracks or propeller shaft have been removed. Personnel shall evacuate disabled OSV before towing operation begins.

WARNING SUMMARY (cont)

WARNING

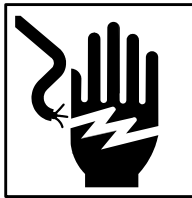


Steering and driving control are lost when final drive shafts are disconnected. Unexpected vehicle movement can throw personnel about and cause death or serious injury.

OSV with final drive shaft disconnected could move and strike personnel, objects, or other vehicles causing death or serious injury to personnel and/or damage to vehicles/equipment.

Block OSV tracks and connect tow bar between OSV and recovery vehicle before final drive shafts are disconnected.

WARNING



Touching OSV antenna during radio transmissions can cause shocks or burns to personnel.

Do not touch antenna when radios are in use. Turn radios off before working on or near antenna.

WARNING

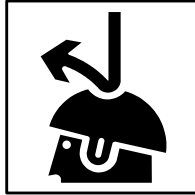


When VISMOD is in use, driver has limited field of view.

Vehicle movement can cause death or injury to personnel. Use caution around vehicle at all times and be alert for sudden vehicle movement while VISMOD is in use.

WARNING SUMMARY (cont)

WARNING



Wear CVC helmet to prevent head injuries.

Helmet must be in good condition with liner and earcups fitting tightly. Wear chin strap at all times.

Dismount troops in personnel area of OSV must wear Kevlar helmets. Personnel without helmets during vehicle operation can be killed or injured.

WARNING

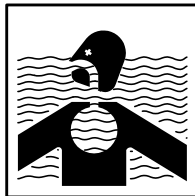


Diesel fuel can ignite and cause death or injury to personnel and damage or destroy OSV.

Wipe fuel spills immediately. Wear protective goggles. Do not permit smoking, welding, heater, open flame, or any other heat sources near fuel or when working on fuel system.

Fumes from diesel are poisonous and can cause nausea and vomiting. Park the OSV in well ventilated area or wear respiratory protection.

WARNING

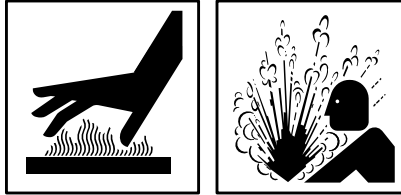


Do not ford water that is more than 40-inches deep because there is only one bilge pump.

Fording water deeper than 40-inches can cause death/drowning.

WARNING SUMMARY (cont)

WARNING



Hot coolant can cause burns. Do not remove radiator cap until TEMP gauge needle is in bottom quarter of green zone. Wear heat protective mittens and eye protection to remove radiator cap. Turn cap slowly to prevent sudden explosion due to pressure build-up.

WARNING



Benzene (benzol), paint thinner, gasoline, and diesel fuel oil and their fumes are flammable and explosive. Liquid or fumes can ignite and/or explode and cause death or injury to personnel and/or destruction/damage of equipment.

Fumes from thinners, and fuels are poisonous. Breathing fumes can cause dizziness and nausea. Prolonged breathing of fumes can cause serious injury to nasal passages, throat, and lungs.

Use approved paint thinners/fuels. Use in well ventilated area free of heat sources. Do not smoke within 50 feet.

Wear respiratory and eye/face protection, and gloves when working with thinners and fuels.

WARNING



Do not place transmission at steering lock (SL) position when speed is above 5 mph. Loss of control at speeds above 5 mph could cause vehicle to crash.

WARNING SUMMARY (cont)

WARNING



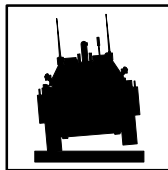
Contact with high voltage (16,000 volts or more) used to operate AN/VVS-2 can cause death or serious injury to personnel. To avoid contact with high voltage, observe following:

Connect power cable to DNV BEFORE turning MASTER SWITCH and DNV POWER switch to ON.

Do not touch end of cable with unprotected hands.

When shutting down, set DNV power switch to OFF and wait two minutes after image disappears from periscope screen before DNV power cable is disconnected.

WARNING

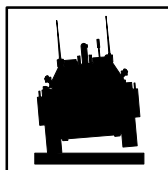


Improper number of track shoes may prevent track from being adjusted correctly creating a safety hazard.

For vehicles with new track (T150), ensure there are 63 track shoes on the left side of vehicle and 64 track shoes on the right side of vehicle.

For vehicles with old track (T130), ensure there are 62 track shoes on the left side of vehicle and 63 shoes on the right side of vehicle.

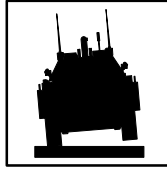
WARNING



Do not use crowbar on the track shoe pins to get leverage. Any scratches may cause the pin to break and cause the track assembly to fall off the vehicle while operating. This may kill soldiers and damage equipment. Use the crowbar as show in steps 2 through 5 to get leverage to install end connectors.

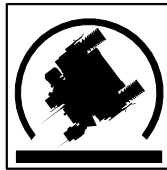
WARNING SUMMARY (cont)

WARNING



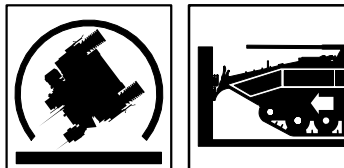
Not getting the bolt tight enough may result in death to personnel and damage to equipment if the end connectors fall off during movement of the vehicle.

WARNING



Vehicle can roll over when going up a grade at an angle and the grade is steeper than 30% (16 degrees). Wear seat belts.

WARNING



Vehicle can roll over when entering a trench at an angle if the side of the trench is steeper than 30% (16 degrees). Wear seat belts.

OSV should not attempt to cross trenches that are more than 5 1/2 feet (1.67-m) in width. If the front of OSV hits side of trench, personnel could be killed or injured and OSV could be damaged. OSV could get stuck.

FIRST AID

For first aid information, see FM 21-11.

END OF TASK

INSERT LATEST UPDATED PAGES/WORK PACKAGE. DESTROY SUPERSEDED DATA.

LIST OF EFFECTIVE PAGES/WORK PACKAGES.

NOTE: Updates to all portions of this TM are indicated by a vertical bar in the outer margin of the page.

Dates of issue for original and updated pages/work packages are:

Original 0 (2 March 2003)

TOTAL NUMBER OF PAGES FOR FRONT MATTER AND REAR MATTER IS 26 AND TOTAL NUMBER OF WORK PACKAGES IS 55 CONSISTING OF THE FOLLOWING:

| Page No. | *Change No. |
|------------------------------|-------------|
| Cover | 0 |
| a-w/x blank | 0 |
| A/B blank | 0 |
| i-viii | 0 |
| Chapter 1 Index | 0 |
| WP 0001 00- WP 0003 00 | 0 |
| Chapter 2 Index | 0 |
| WP 0004 00 – WP 0036 00 | 0 |
| Chapter 3 Index | 0 |
| WP 0037 00 – WP 0039 00 | 0 |
| Chapter 4 Index | 0 |
| WP 0040 00 – WP 0050 00 | 0 |
| Chapter 5 Index | 0 |
| WP 0051 00 – WP 0055 00 | 0 |
| Index 1 – Index 12 | 0 |
| Authentication Page | 0 |
| DA Form 2028-2/Back (Sample) | 0 |
| DA Form 2028-2/Back (3) | 0 |
| Metric Chart | 0 |
| Back Cover | 0 |

*Zero in this column indicates an original page.

A/B blank

**TECHNICAL MANUAL
OPERATOR'S MANUAL
OPPOSING FORCES SURROGATE VEHICLE (OSV) M113A3/BMP-2
NSN 2350-01-420-4716
(EIC: AUK)
HULL**

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028-2 (Recommended Changes to Equipment Publications), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is <http://aeps.ria.army.mil>. If you need a password, scroll down and click on "ACCESS REQUEST FORM". The DA Form 2028 is located in the ONLINE FORMS PROCESSING section of the AEPS. Fill out the form and click on SUBMIT. Using this form on the AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax, or email your letter, DA Form 2028, or DA Form 2028-2 directly to: Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-LC-CIP-WT (Tech Pubs Control Point), Rock Island, IL 61202-0048. The email address is TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

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

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HOW TO USE THIS MANUAL

This manual tells you how to use and maintain the hull on the OPPOSING FORCES SURROGATE VEHICLE (OSV) M113A3/BMP-2. This material is intended for use by the driver and squad members.

Before starting any task/procedure or before applying power to the hull, make sure you have read this HOW TO USE section and Controls and Indicators (WP 0004 00).

WHAT'S IN THE MANUAL — FRONT TO BACK

This TM is divided into chapters and front and rear matter. The chapters are further divided into Work Packages (WPs) for ease of use. The WARNING SUMMARY section, beginning on page “a”, provides safety and first aid information. This section includes general warnings not found in the TM text and a list of the most important detailed warnings extracted from the WPs. All of these warnings cover hazards that could kill or injure personnel.

The TABLE OF CONTENTS lists the WPs in each chapter.

CHAPTER 1 covers general introductory information with theory of operation. The Equipment Description (WP 0002 00) gives a brief description of major parts and features of the hull. The Theory of Operation (WP 0003 00) provides information that will help you understand how the hull components work.

CHAPTER 2 includes the Controls and Indicators (WP 0004 00) and all operation WPs.

CHAPTER 3 contains the troubleshooting WPs (WP 0037 00), which are used to find the cause of hull malfunctions.

CHAPTER 4 includes the Preventive Maintenance Checks and Services (PMCS) (WP 0040 00) and other maintenance WPs. These WPs contain maintenance procedures authorized for the driver and squad members.

CHAPTER 5 provides supporting information for the TM. It includes the following WPs:

- The REFERENCES (WP 0051 00) lists references to be used by personnel in operating and maintaining the hull. These references include technical manuals and other publications.
- The COEI/BII (WP 0052 00) lists components of end item and basic issue items. Components of end item are those items which are assembled and become a permanent part of the vehicle. Basic issue items are items needed to put the vehicle in operation, operate it, and do emergency repairs. This WP is a duplicate of the COEI/BII WP in TM 9-2350-366-10-2.
- The AAL (WP 0053 00) lists additional items required to support the vehicle during operation. This WP is duplicated in the AAL in TM 9-2350-366-10-2.
- The EXPENDABLE/DURABLE ITEMS (WP 0054 00) lists expendable supplies and materials that will be needed to operate and maintain the hull.
- The STOWAGE AND SIGN GUIDE (WP 0055 00) is a stowage guide for all removable equipment carried in and on the hull.

The INDEX is an alphabetical listing of all the major controls, procedures, indicators, systems, and subsystems covered in this manual. Each entry is cross-referenced to the WP number and page number.

DA FORM 2028-2 is used to report errors and to recommend improvements for procedures in this manual. Three blank DA Forms 2028-2 are in the back of this manual. A sample is provided to show you how to fill out the DA Form 2028-2.

The back cover includes a METRIC CONVERSION CHART that can be used to convert U.S. customary measurements to their metric equivalents. Measurements in this manual are given in U.S. customary units with metric units in parentheses.

This TM is published in two volumes as follows:

- Volume 1 contains introductory information WPs, maintenance WPs, operating procedure WPs, troubleshooting WPs, and supporting information WPs for the OSV hull.
- Volume 2 (TM 9-2350-366-10-2) contains introductory information WPs, maintenance WPs, operating procedure WPs, troubleshooting WPs, and supporting information WPs for the OSV turret.

Each volume includes a Table of Contents and an Index.

HOW TO USE THE WORK PACKAGES

How To Find The WP You Need.

Pick a key word from the hull part or system to be used. Look in the INDEX for this key word or the name of the action you will perform. Turn to the WP and page indicated.

The INDEX lists each WP under one or more headings. For example, the WP titled ADJUST DRIVER'S SEAT could be found under the four headings “Adjust”, “Driver's”, “Operation Under Usual Conditions”, and “Seat”.

HOW TO USE THIS MANUAL (cont)

How to read the WP.

WPs provide either descriptive/supporting information or detailed procedures for operating and maintaining the equipment. The WPs in Chapters 1 and 5 include descriptive/supporting information only. Chapter 2 includes descriptive information on controls and indicators, and operating procedures. Chapter 3 includes troubleshooting procedures. Chapter 4 includes maintenance procedures.

Pay attention to all **WARNINGS, CAUTIONS** and **NOTES**. These can appear in all types of procedures. Warnings and cautions help you avoid harm to yourself, other personnel, and equipment. Notes tell you things you should know about the procedure, task or step. Warnings, cautions, and notes appear before the applicable procedure, task, or step.

Before you start a procedure, get all the tools, supplies, and personnel you need to do the procedure. These items will be listed in the INITIAL SETUP of the WP.

Start with step 1 and do each step in the order given. Numbered primary steps tell you what to do. Alpha substeps have procedures that are done when a check has a negative result (such as “if pressure does not read within limits, proceed as follows:”) or when there is a necessity for a procedure that is only applicable to the numbered step (such as

“3. Check the pressure as follows:

- a.
- b.”

After completing the alpha substep procedure, unless there are instructions to do otherwise, go to the next numbered step.

Look at the illustrations. Locators show you where the equipment and parts are located on the hull. Closeup illustrations show the details you need to do the procedure.

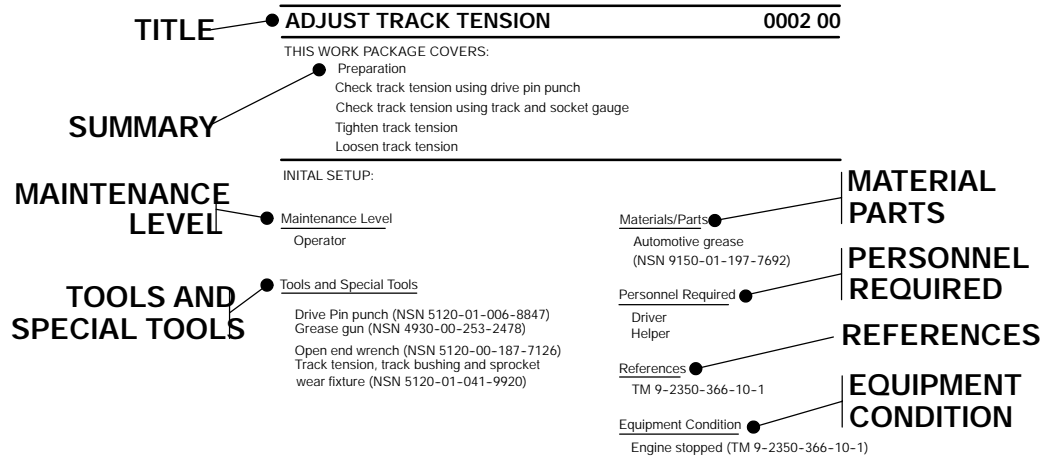
Operator and Maintenance instructions WPs.

Operator instructions WPs tell you how to operate the M113A3/BMP-2 hull and its components. Each WP provides the detailed steps to be performed to complete the procedure.

Maintenance instructions WPs help the crew keep the M113A3/BMP-2 hull in operating condition.

Both Operator and Maintenance instructions WPs use the same format. Look at the two samples given below.

The first sample below shows the THIS WORK PACKAGE COVERS and INITIAL SETUP sections on the first page of a WP. The legend defines each item of information.



HOW TO USE THIS MANUAL (cont)

LEGEND

| | |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| TITLE | The name of the procedure. |
| SUMMARY | A listing of the general actions to be performed, cross-referenced to the page where each action begins. |
| MAINTENANCE LEVEL | The level of personnel authorized to perform the procedures in the WP. |
| APPLICABLE CONFIGURATIONS | (Not shown above) When the WP does not apply to all vehicle configurations, the applicable models/serial numbers covered by the WP are listed here. |
| TOOLS AND SPECIAL TOOLS | The tools and equipment needed to do the procedures in the WP. |
| MATERIALS/PARTS | The supplies and parts needed to do the procedures in the WP. |
| PERSONNEL REQUIRED | The personnel needed to do the procedures in the WP. |
| REFERENCES | Other WPs, TMs, and publications you will need to do the procedures in the WP. |
| EQUIPMENT CONDITIONS | Any special equipment conditions required before the procedure can be started. |

Each WP is a different task and has different requirements. Because of this, each WP INITIAL SETUP section only shows the information for that task. Some WPs will include all of the above items. Other WPs will include only some of the above items.

Read the INITIAL SETUP section carefully before you start any procedure.

Get the tools and supplies listed and the personnel needed. Be sure the equipment is in the condition required.

The second sample below shows you things to watch for when performing the procedures in a WP. Read all steps, substeps, warnings, cautions, and notes before starting the WP procedure. The legend defines each item of information.

CHECK COOLANT LEVEL Continued 0026 00

WARNING



Hot coolant can burn you. Radiator cap must not be removed until coolant TEMP gauge reads in bottom one-quarter of green zone. Heat protective mittens and eye protection shall be worn to remove radiator cap. Cap shall be turned slowly to release pressure gradually.

CAUTION

CAUTION

Adding coolant to an overheated engine can cause damage to engine. Coolant must not be added to an overheated engine unless engine is running.

NOTE

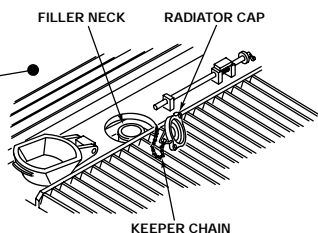
NOTE

Approved antifreeze coolant only may be added to radiator. In emergency conditions, water may be used if specified coolant is not available

STEP

REMOVE RADIATOR CAP AND CHECK COOLANT LEVEL.

LOCATOR

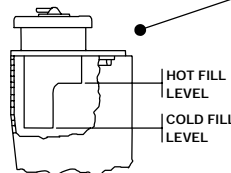


SUBSTEP

If coolant is hot, check that coolant reaches HOT FILL LEVEL in filler neck.

If coolant is cold, check that coolant reaches COLD FILL LEVEL in filler neck.

CLOSE-UP



HOW TO USE THIS MANUAL (cont)

LEGEND

- STEP** This tells you **WHAT** to do.
- SUBSTEP** This tells you **HOW** to do a complicated step or how to proceed if a check or inspection results in a negative condition.
- WARNING** This describes a condition that, if it occurs, could cause death or serious injury to yourself and/or other personnel or cause catastrophic failure (totaled) of equipment.
- CAUTION** This describes a condition that could cause injury to personnel and/or damage to equipment.
- NOTE** This gives additional information that is not part of the step but is required to perform the step.
- LOCATOR** An illustration that locates the equipment on or in the hull.
- CLOSEUP** A detailed illustration of the equipment.

Some WPs will include all of the above items. Some will not.

Read all of the WP before starting. Follow the steps in the order given.

The words **END OF OPERATING PROCEDURE** or **END OF TASK** will tell you when you have finished the procedure.

Preventive Maintenance Checks and Services (PMCS) WP

The PMCS procedures (WP 0040 00) are performed on a daily, weekly, and monthly basis to keep the vehicle operating properly.

There are four types of PMCS as follows:

- The **BEFORE (B)** PMCS must be done before you operate the hull.
- The **DURING (D)** PMCS must be done when you operate the hull. Monitor the hull systems as you perform your mission. Perform **DURING (D)** PMCS on a system only when the system is required to complete your mission.
- The **AFTER (A)** PMCS must be done after completing your mission.
- The **WEEKLY (W)** PMCS must be done weekly.

If anything seems wrong with the systems and you cannot fix it yourself, notify your supervisor. Common things to watch for are loose bolts or damaged welds. Watch for worn insulation, loose clamps, and loose connectors when checking wiring harnesses.

The following sample shows you what to look for when you read a PMCS procedure. For more information, see PMCS (WP 0040 00).

Table 2-1. Preventative Maintenance Checks and Services Model OSV

| MAN-HOUR | ITEM NO. | INTERVAL | MAN-HOUR | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|----------|----------|--------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------|
| | 8 | Before | | REAR ACCESS DOORS | DRIVER Check right rear access door for proper operation and seal. | Outside door handle will not secure and seal right door. |
| | 9 | Before | | HINGES | Make sure hinges work properly and that right door can be tightly secured. | Lock will not secure door. Hinge(s) damaged or missing. |

HOW TO USE THIS MANUAL (cont)

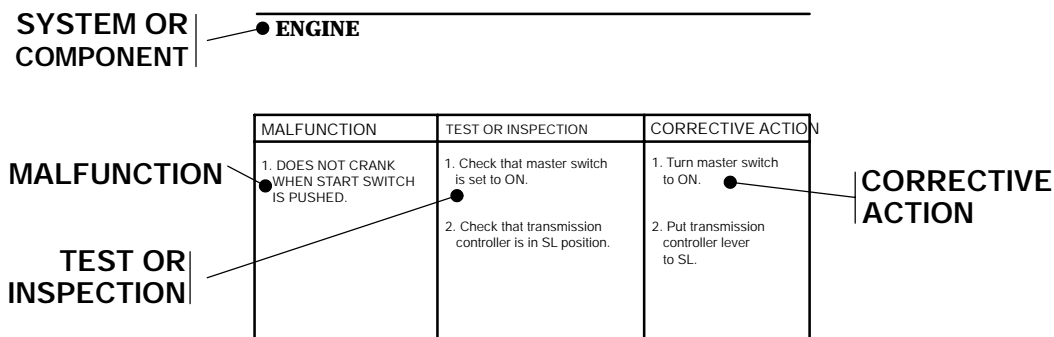
LEGEND

- ITEM NUMBER** This is the sequence for doing the PMCS.
- INTERVAL** This tells you when to perform the PMCS check.
- MAN-HOUR** When equipment must be lubricated, this tells you the man-hours that will be required for the lubrication procedure.
- ITEM TO BE CHECKED OR SERVICED** The name of the hull system or component being checked.
- CREWMEMBER** This tells you which crewmember must perform the check.
- PROCEDURE** This tells you what needs to be done.
- EQUIPMENT NOT READY/ AVAILABLE IF:** This tells you what conditions prevent the hull from being operational. These conditions will have to be corrected before you perform your mission.

Troubleshooting WPs.

Troubleshooting WPs help solve common problems and malfunctions. The Troubleshooting Symptom Index (WP 0038 00) lists the most common malfunctions that occur. This index directs you to the correct procedure in the Troubleshooting Table (WP 0039 00).

The following sample shows you what to look for when reading a troubleshooting procedure. The legend defines each item of information. For more information, see Troubleshooting introduction (WP 0037 00).



- SYSTEM OR COMPONENT** The hull system or component that malfunctioned.
- MALFUNCTION** The specific malfunction or symptom that describes the problem.
- TEST OR INSPECTION** The test or inspection you need to perform to find the cause of the problem.
- CORRECTIVE ACTION** What to do to fix the problem.
- LOCATOR** An illustration that locates the equipment on or in the hull.
- CLOSEUP** A detailed illustration of the equipment.

HOW TO USE THIS MANUAL (cont)

DEFINITION OF WP TERMS

Warnings, Cautions, And Notes.

Pay attention to all warnings and cautions within the WP. Ignoring a warning could cause death or injury to yourself or other personnel. Ignoring a caution could cause damage to equipment. Notes contain facts that are not required to complete the step but the operator must know. Warnings, cautions, and notes always appear just above the step to which they apply.

WARNINGS

Calls attention to conditions that could cause death or injury to personnel and/or loss of OSV or equipment. Warnings are also listed in the Warning Summary section.

CAUTIONS

Calls attention to actions or materials that could injure personnel and/or damage equipment.

NOTES

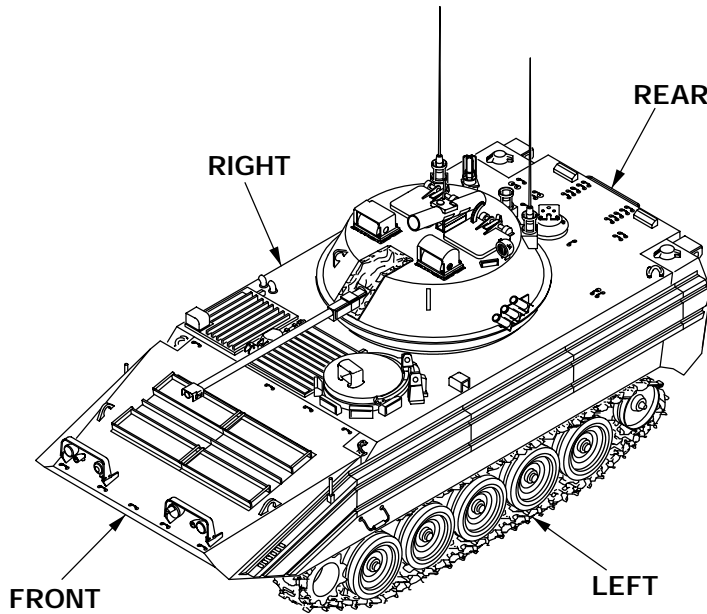
Contains information to make the step that follows easier or that the operator must know (such as “NOTE: IR lights have been removed and IR/BO switch only works in BO mode.”).

Helper.

Helpers are needed in procedures that require more than one person. Use a helper to help lift objects or act as an outside observer.

If a helper is needed to perform a procedure, the INITIAL SETUP will list Helper (H) under the PERSONNEL REQUIRED heading. If a helper assists with a step, the step will include: “Have helper assist”.

If a helper performs the action alone, the step will start with “(H):”.



Location Terms.

The terms “front”, “rear”, “left”, and “right” are used to indicate where items are located on the vehicle hull. Think of these locations as if you were standing at the rear of the OSV facing the inside of the vehicle.

CHAPTER 1
OPERATOR INTRODUCTORY INFORMATION WITH THEORY OF OPERATION

WORK PACKAGE INDEX

| <u>Title</u> | <u>Sequence No.</u> |
|--------------------------------------|---------------------|
| GENERAL INFORMATION | 0001 00 |
| EQUIPMENT DESCRIPTION AND DATA | 0002 00 |
| THEORY OF OPERATION | 0003 00 |

GENERAL INFORMATION

0001 00

SCOPE

Information in this manual tells you how to operate and maintain the M113A3/BMP-2 Opposing Forces Surrogate Vehicle (OSV) hull. It tells you what to do and what not to do and how to protect the safety of yourself and others.

Type of Manual: Operator

Equipment Name: M113A3/BMP-2 Opposing Forces Surrogate Vehicle (OSV) Hull

Purpose of Equipment: The M113A3/BMP-2 Opposing Forces Surrogate Vehicle (OSV) visually and tactically simulates the Russian-built Infantry Fighting Vehicle (IFV). The Opposing Forces use the OSV as a training device to simulate the capabilities of an armored fighting vehicle in maneuver exercises. The OSV is a modified version of the M113 Family of Vehicles (FOV) full tracked Armored Personnel Carrier (APC). Modifications include the addition of drive components and related visual modifications (VISMOS). The VISMOS provide key recognition signatures to the threat system being simulated.

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, The Army Maintenance Management System (TAMMS).

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your M113A3/BMP-2 OSV needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an (SF 368 Quality Deficiency Report). Mail it to us: Director, U.S. Army Armament Research, Development, and Engineering Center, ATTN: AMSTA-AR-QAW-A (R), Rock Island, IL 61299-7300. We will send you a reply.

CORROSION PREVENTION AND CONTROL (CPC)

Corrosion Prevention and Control (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.

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.

If a corrosion problem is identified, it can be reported using Standard Form 368 (Quality Deficiency Report). Use of key words such as "corrosion", "rust", "deterioration" or "cracking" will assure that the information is identified as a CPC problem. The form should be submitted to: Director, US Army Armament Research, Development, and Engineering Center, ATTN: AMSTA-AR-QAW-A (R), Rock Island, IL 61299-7300.

PREPARATION FOR STORAGE OR SHIPMENT

See AR 750-1 for information about administrative storage.

NOMENCLATURE CROSS-REFERENCE

This listing includes abbreviations and nomenclature cross references used in this manual.

| | |
|-----------------------------------|----------------------------|
| Cleaning solvent | Cleaning compound, solvent |
| Intercom | Full function crew station |
| Jack | Receptacle |
| Latch | Pin |
| Lower clutch override knob | Lower feed shaft stop |
| Plug | Connector |
| Rubber cap | Discharger cap |
| Sear release | Sear release link |
| Track and bolt assembly | Bolt and track assembly |
| Upper clutch override knob | Upper feed shaft stop |

LIST OF ABBREVIATIONS/ACRONYMS

Many abbreviations are used in this manual. The uncommon ones are listed below.

| | |
|----------------|----------------------------------|
| A | After |
| AAL | Additional Authorization List |
| B | Before |
| BATT | Battery |
| BII | Basic Issue Item |
| BO | Blackout |
| BRT | Brightness |
| COEIL | Components of End Item List |
| COMM | Communications |
| CPC | Corrosion Prevention and Control |
| D | During |
| DN | Down |
| DNV | Driver's Night Vision |
| ENG | Engine |
| GEN | Generator |
| HI TEMP | High Temperature |
| LO | Lubrication Order |
| LOF | Line-of-Fire |
| LRU | Line Replaceable Unit |
| MALF | Malfunction |

| | |
|---------------|--------------------------------------------|
| NBC | Nuclear, Biological, and Chemical |
| OVE | On Vehicle Equipment |
| OSV | Opposing Forces Surrogate Vehicle |
| PMCS | Preventive Maintenance Checks and Services |
| PRESS | Pressure |
| TEMP | Temperature |
| TTS | Tank Thermal Sight |
| VENT | Ventilation |
| VISMOD | Visual Modification |
| W | Weekly |
| WFOV | Wide Field of View |

SAFETY, CARE, AND HANDLING

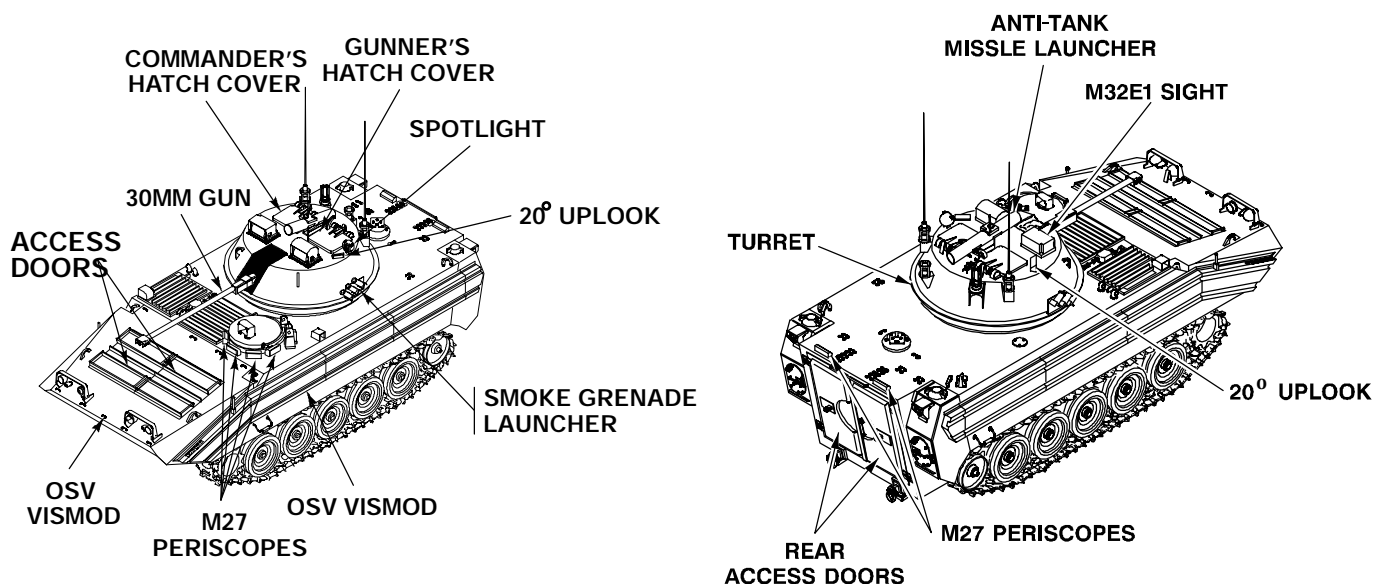
HEARING PROTECTION. You must use ear plugs and other approved hearing protectors while you are aboard the OSV. The CVC helmet does not have enough hearing protection. Make sure you know how to use the ear plugs and hearing protectors that are issued to you. Keep them clean and ready to use. Read warning in Warning Summary.

END OF TASK

EQUIPMENT DESCRIPTION AND DATA

0002 00

EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES



M113A3/BMP-2 Opposing Forces Surrogate Vehicle (OSV) visually and tactically simulates the Russian-built Infantry Fighting Vehicle (IFV). The opposing forces use OSV as a training device to simulate capabilities of an armored fighting vehicle in maneuver exercises. The OSV is a modified version of M113 Family of Vehicles (FOV) full tracked Armored Personnel Carrier (APC). Modifications include addition of drive components and related visual modifications (VISMOS). VISMOS provide key recognition signatures to threat system being simulated.

Capabilities/Characteristics

- at 25 mph, a minimum cruising range of 250 miles
- crew seat restraining system (seatbelts)
- visual devices for commander (M32E1) sight and gunner tank thermal sight (TTS) that permit 360 degrees vision by rotating turret
- fire control system with BMP-2 capabilities
- mobility similar to BMP-2
- physical characteristics and dimensions of BMP-2
- payload of five infantry soldiers and their equipment
- operating crew of three: Commander, Driver, Gunner
- built in lift points
- uses standard diesel fuel or automotive JP-8
- has stowage space for Basic Issue Items
- equipped with standard slaving receptacles
- double rear doors
- towed from rear instead of standard towing
- two man turret assembly with following features:
 - (1) ruggedized for crew safety
 - (2) meets visual and integration requirements of BMP-2
 - (3) traverse control to prevent 30mm main gun from hitting vehicle during turret movement
 - (4) two plane (azimuth and elevation) stabilization

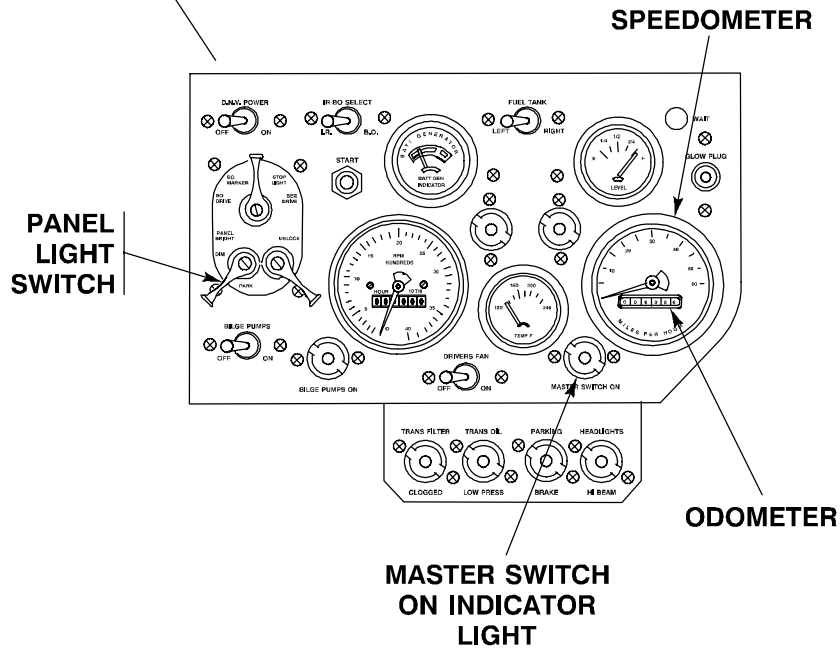
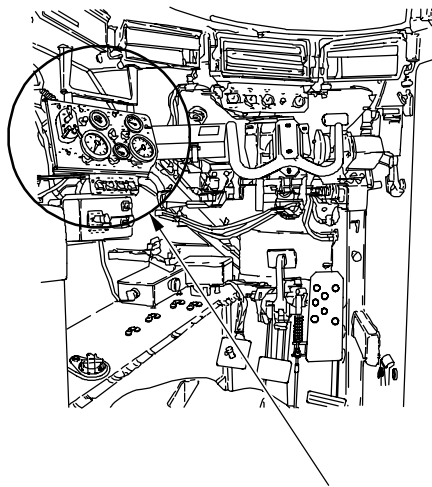
Features

- 30mm gun simulator
- 7.62 coaxial gun simulator
- top mounted anti-tank missile simulator
- two each smoke grenade launcher simulator

LOCATION AND DESCRIPTIONS OF MAJOR COMPONENTS

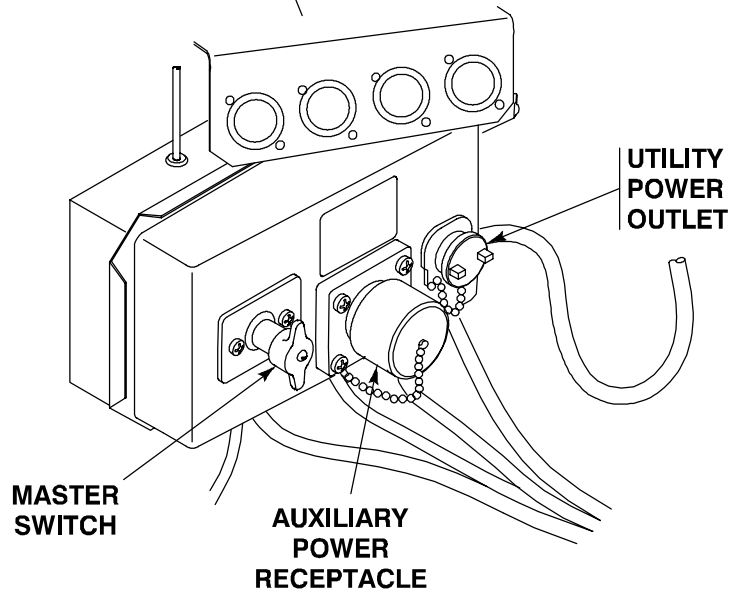
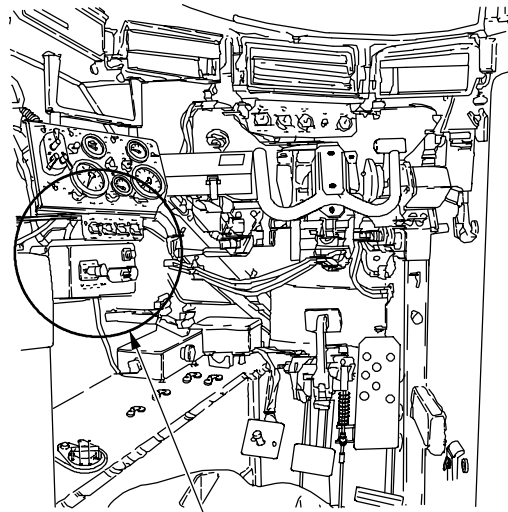
Hull major components are described in this section. Each illustration showing component location is followed by a component description.

Systems (such as exterior lighting) and component groups (such as power plant compartment) are described in this section as well as components accessed by removing a door/panel.



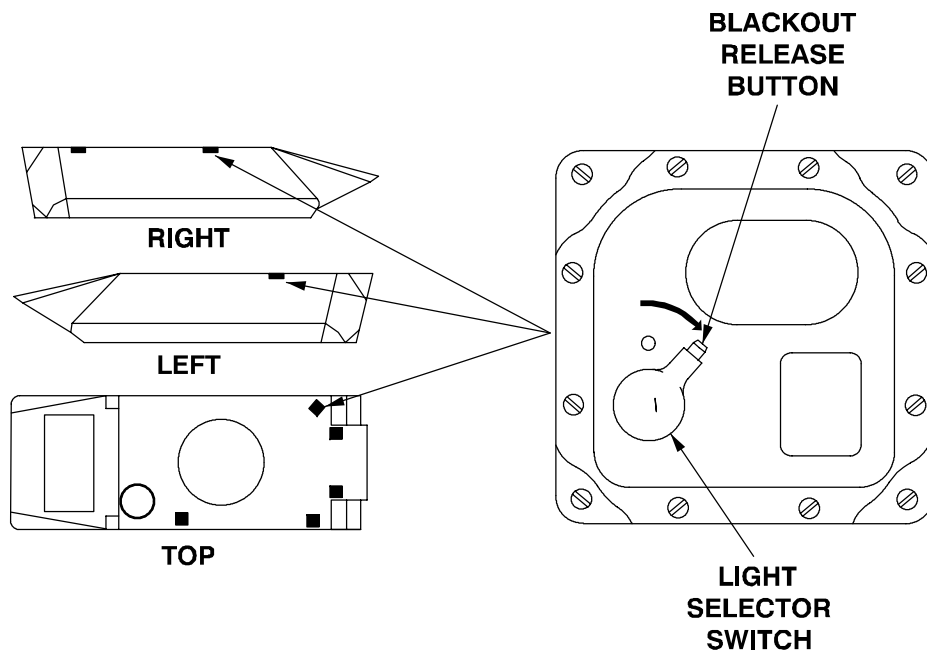
The Driver's Instrument Panel contains gauges and indicator lights that are required to operate OSV.

MASTER SWITCH PANEL (MSP)



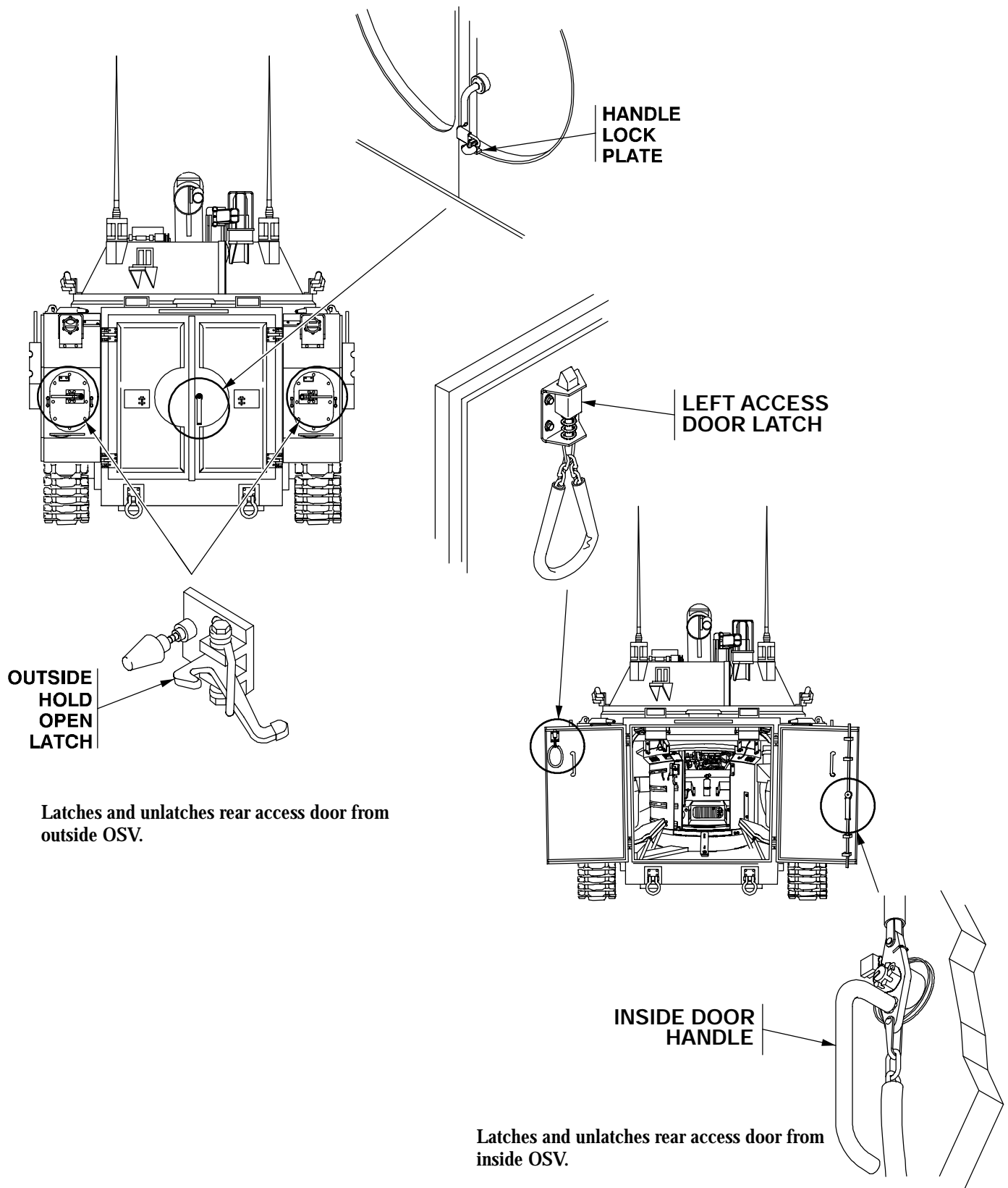
The MSP provides electrical power and slave start capability for hull operation.

DOME LIGHTS



Dome lights provide illumination for interior of hull. They select blackout (BO) or white light

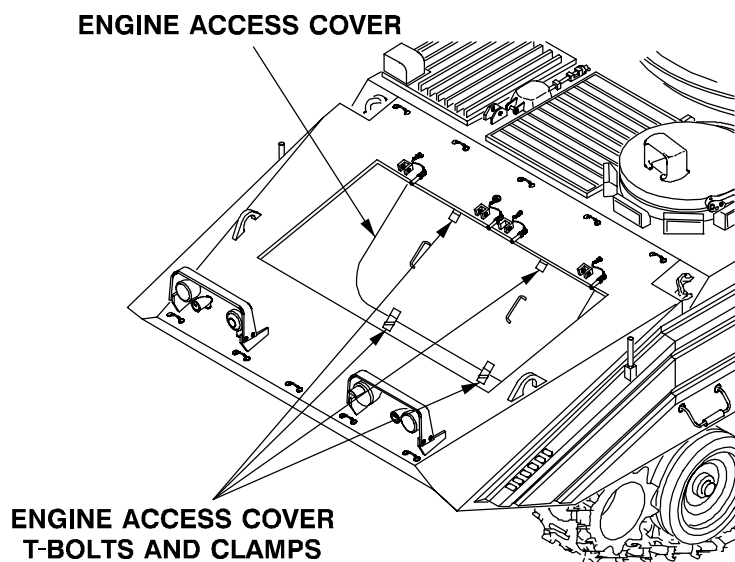
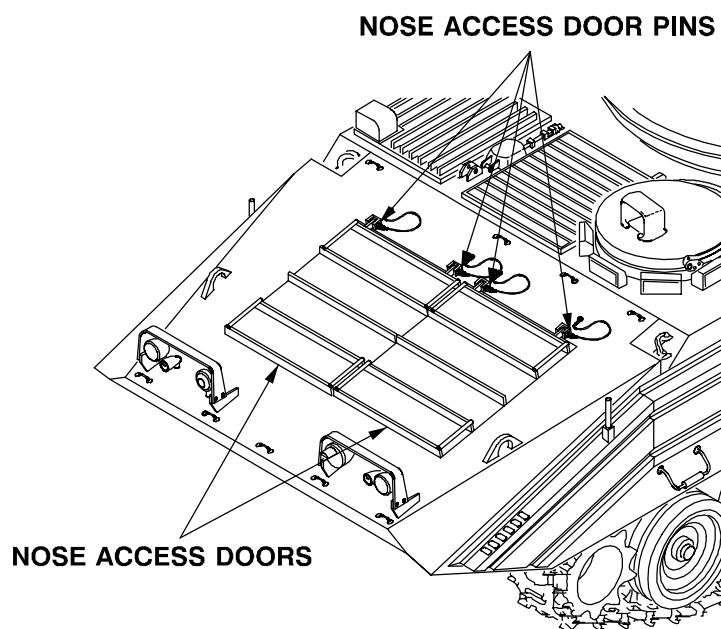
REAR ACCESS DOOR CONTROLS



Latches and unlatches rear access door from outside OSV.

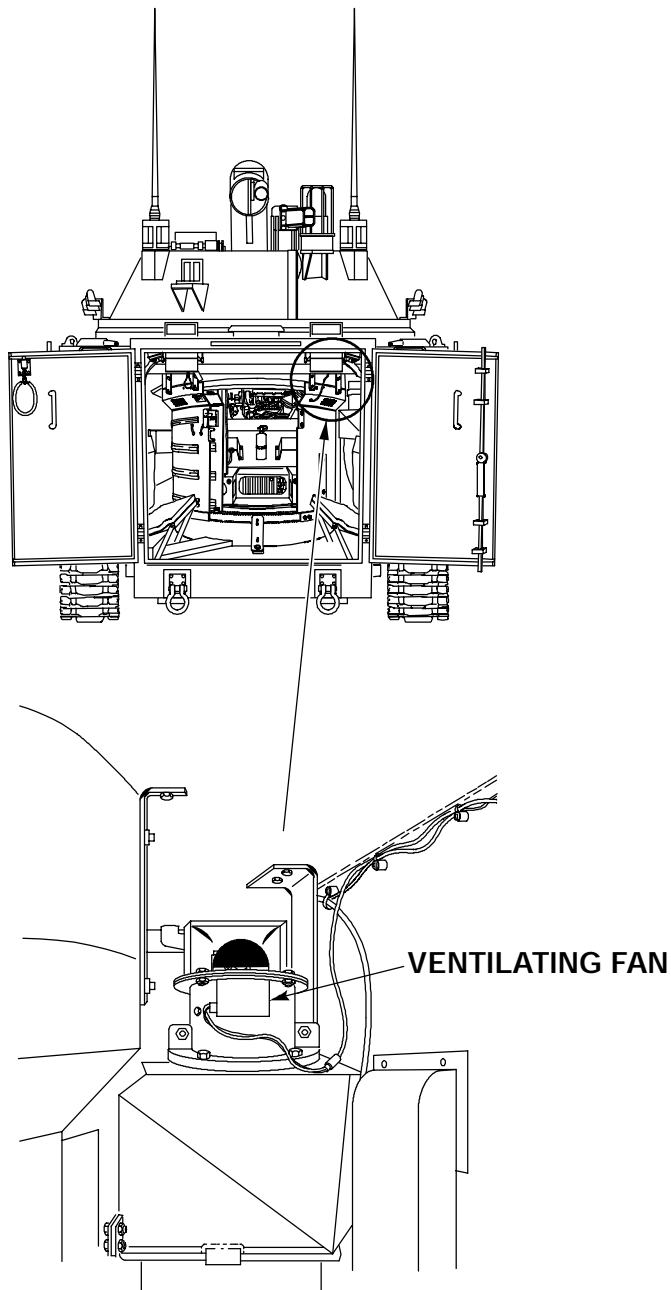
Latches and unlatches rear access door from inside OSV.

POWER PLANT ACCESS DOOR HARDWARE



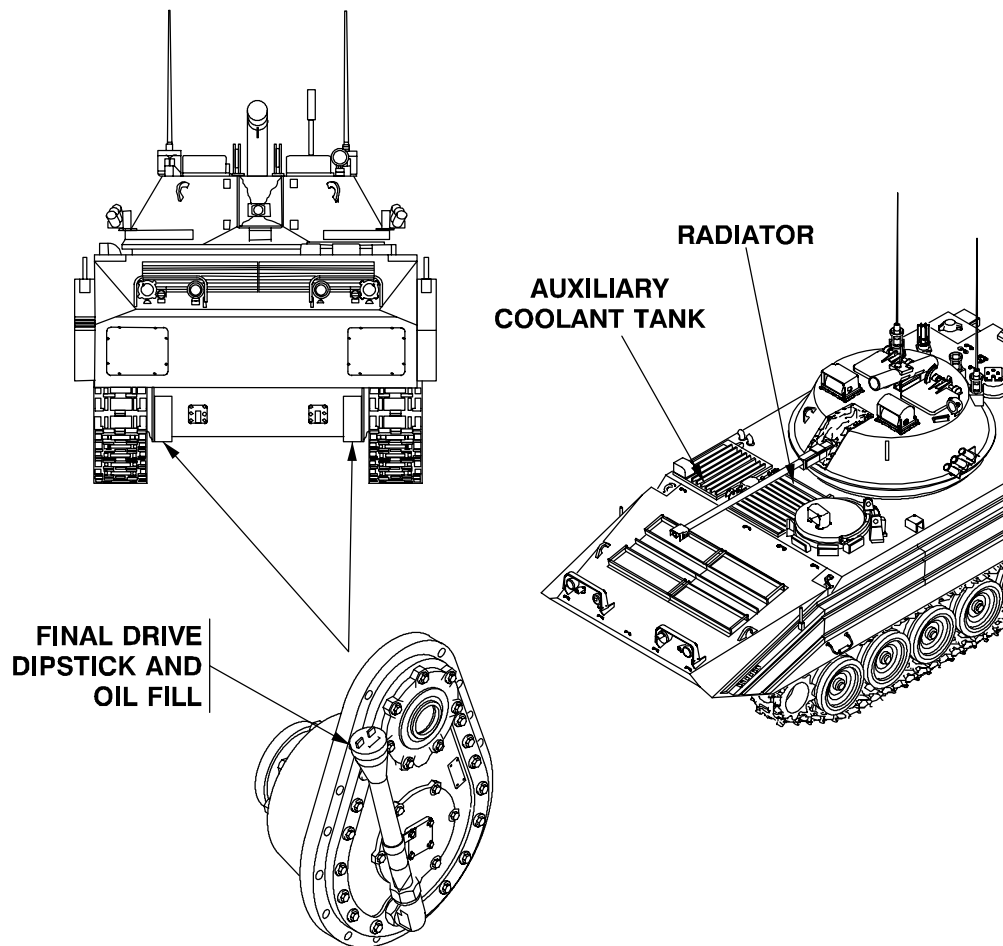
Door hardware consists of pins, t-bolts, and clamps that secure nose access doors and engine access cover and must be removed to access power plant.

VENTILATING FAN



Fan provides fresh air to passenger compartment.

POWER PLANT COMPARTMENT

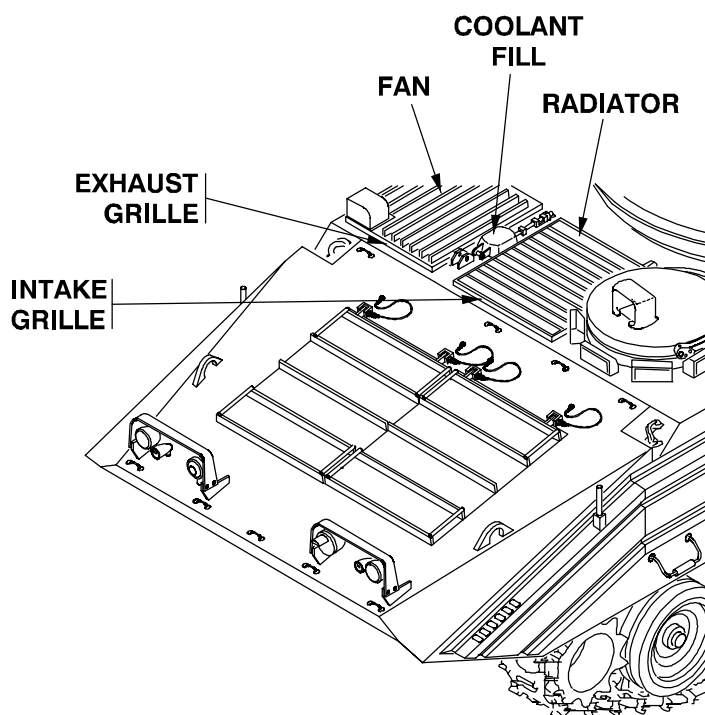


Power plant compartment is located in front right of vehicle.

Power plant compartment contains following:

- auxiliary coolant tank and fill
- radiator
- final drive dipstick and oil fill

ENGINE COOLING AND AIR INDUCTION

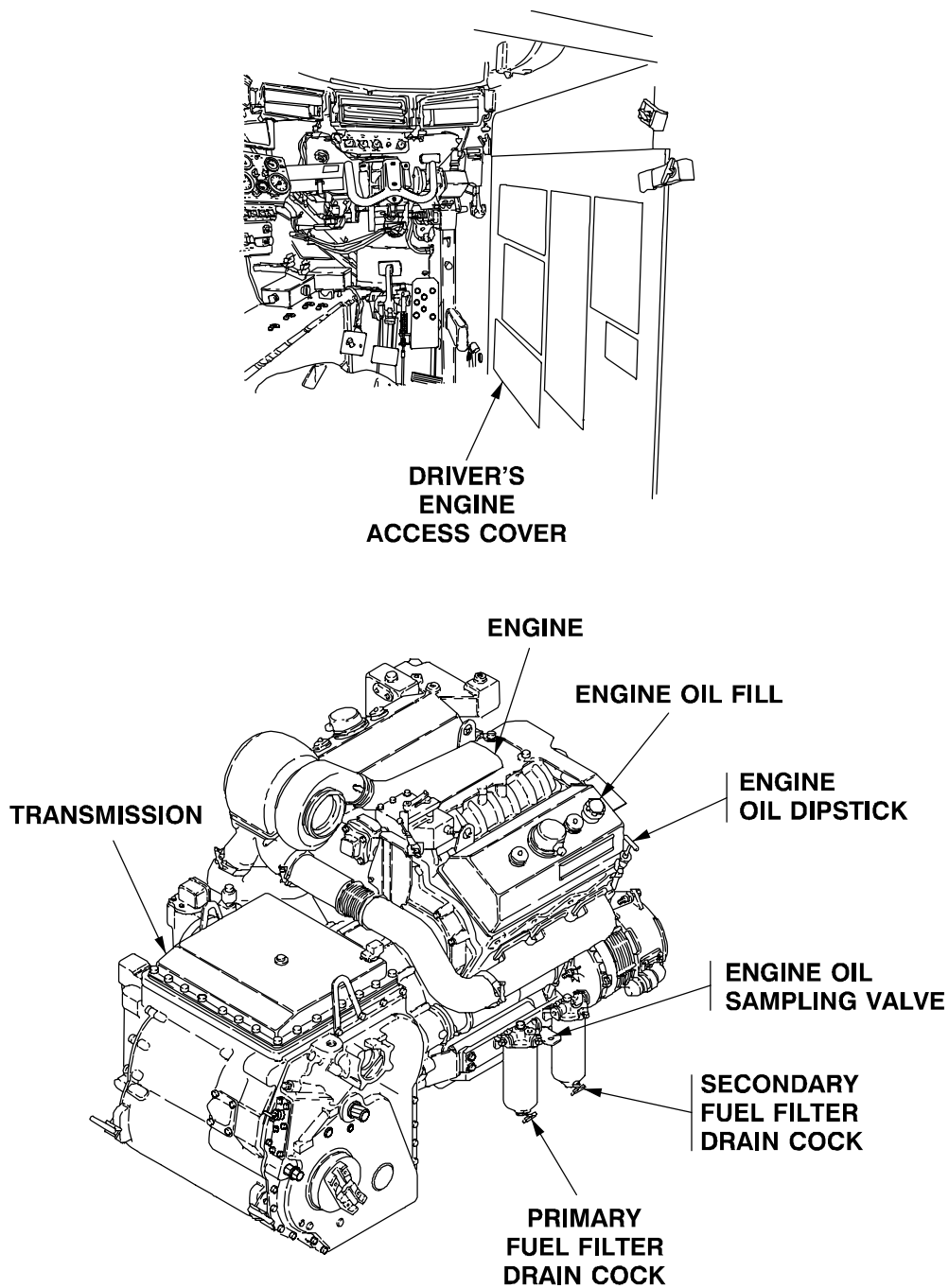


NOTE

Keep the intake grille and air cleaner clear of debris so that flow of fresh air to radiator is not restricted.

Air for fuel combustion and engine cooling is drawn through intake grill and radiator. Air moves down around power plant removing heat from engine. Heated air is exhausted through grille above fan. An air cleaner removes particles from intake air and supplies cleaned fresh air to engine. A restriction indicator notifies driver when element in air cleaner needs cleaning. The coolant fill is located between the fan and radiator.

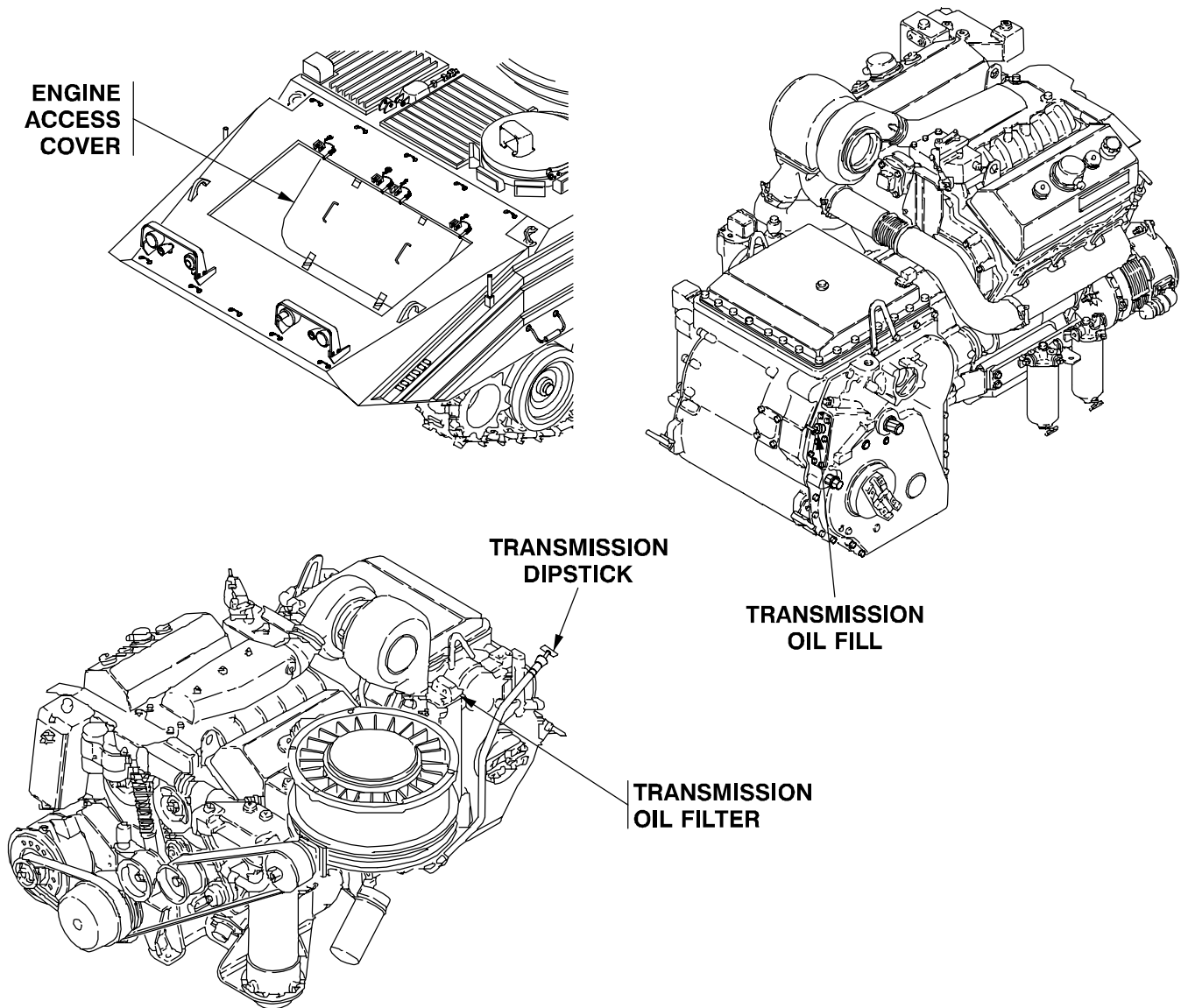
DRIVER'S ENGINE ACCESS COVER



Removing driver's engine access cover provides access to following:

- engine
- engine oil fill
- engine oil dipstick
- primary and secondary fuel filter drain cocks
- engine oil sampling valve
- transmission

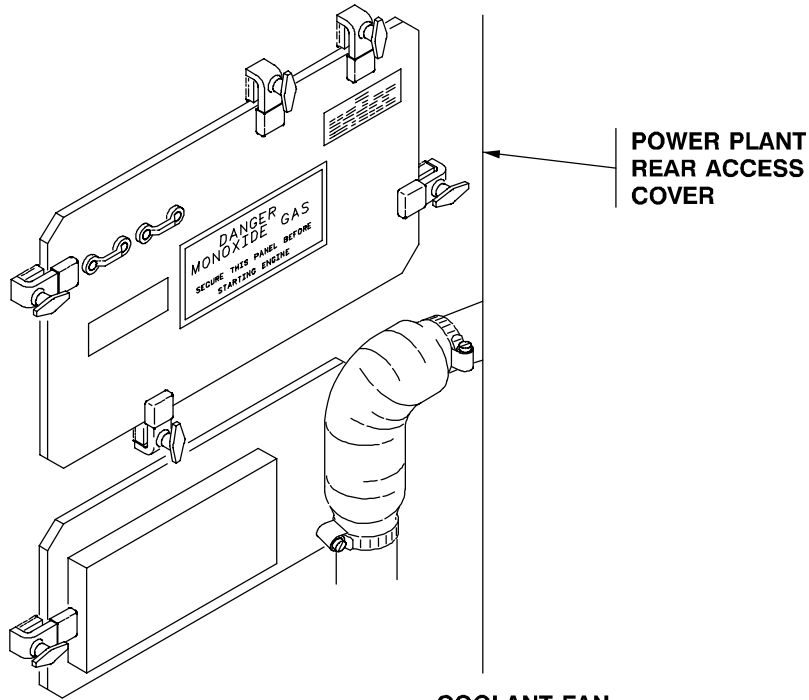
DRIVER'S FRONT ENGINE ACCESS COVER



Removing cover provides access to the following:

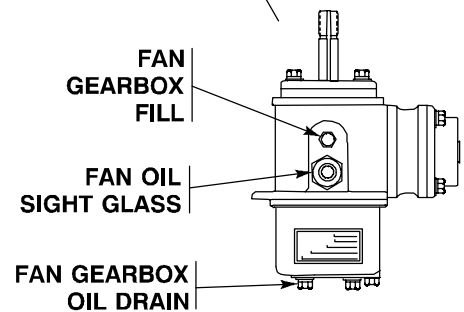
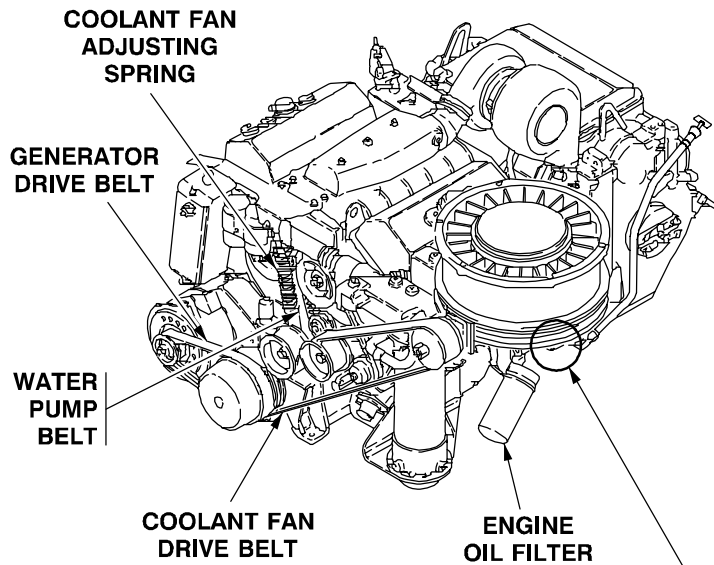
- transmission oil fill
- transmission dip stick
- oil filter

POWER PLANT REAR ACCESS COVER

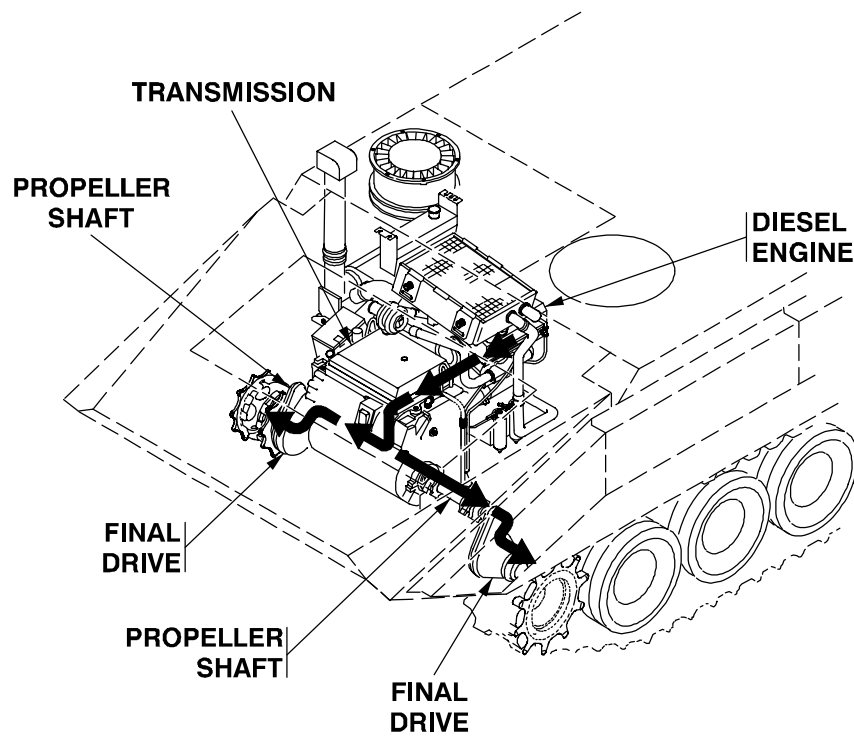


Removing rear access panel provides access to following:

- fan oil sight glass
- generator drive belt
- coolant fan drive belt
- engine oil filter
- fan gearbox oil drain
- water pump belt
- coolant fan adjusting spring
- fan gearbox fill



POWER TRAIN



The power train consists of following major connected components:

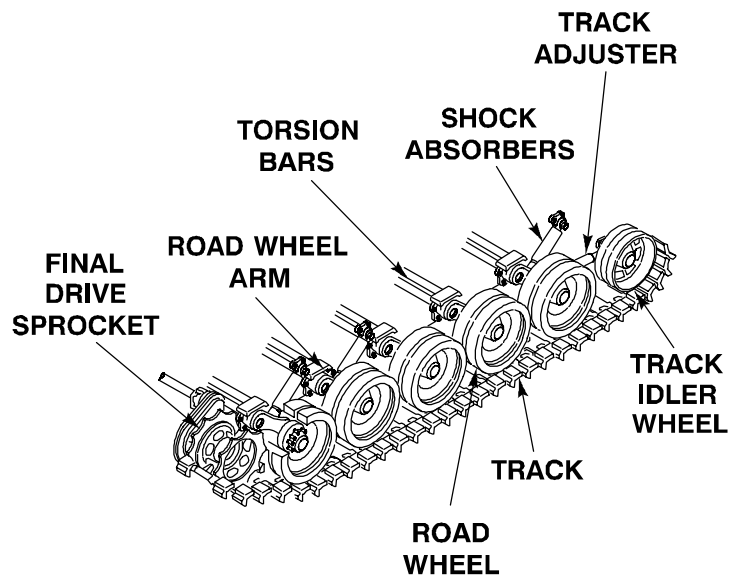
6V53T diesel engine

transmission — automatically selects gear range

propeller shafts — connect final drives to transmission

final drives — turn track drive sprockets

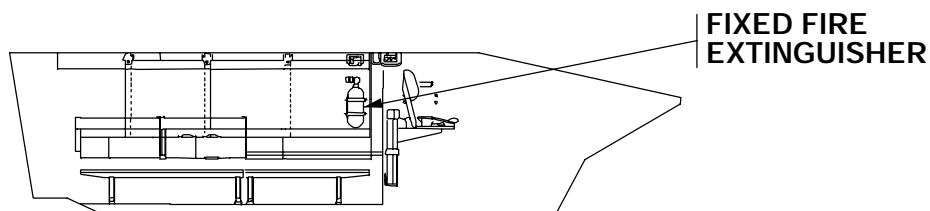
SUSPENSION SYSTEM



The suspension system, that moves vehicle, includes following:

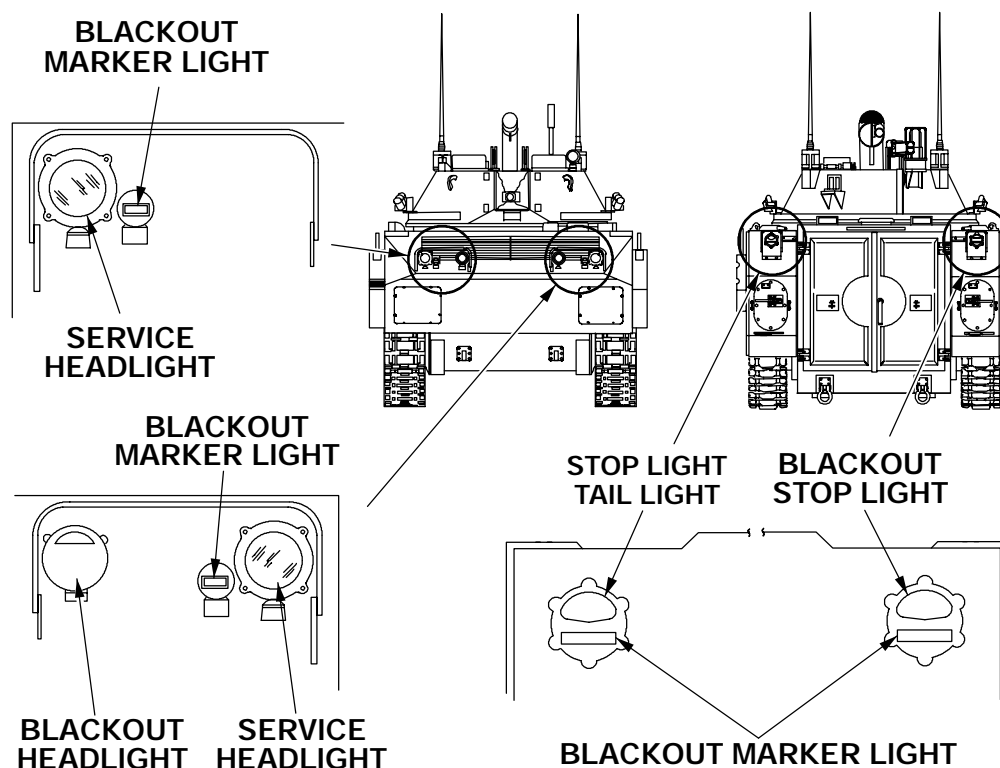
- road wheels — ten on each side of vehicle to support vehicle weight
- road wheel arms — five per side, each arm splined to individual torsion bars to suspend vehicle
- shock absorbers - three per side, cushions the movement of roadwheel arms
- torsion bars — five total, first three are M548 bars, other two are M113A3 bars
- tracks — one on each side, operated by final drive sprockets to move and stop vehicle. Both T130 and T150 track have 63 track shoes on the left side and 64 track shoes on the right side.
- track adjuster — maintain track tension
- track idler wheel — increases track tension when grease is pumped into track adjuster
- final drive sprocket — turn tracks to move vehicle

FIXED FIRE EXTINGUISHER



Fixed fire extinguisher releases CO² to put out a fire in power plant compartment. It can be manually activated by a control on extinguisher bottle or by a handle on vehicle left top deck.

EXTERIOR LIGHTING



Exterior lights include:

- service headlights
- blackout marker lights
- blackout headlights
- tail/stop lights

DIFFERENCES BETWEEN MODELS

Opposing Forces Surrogate Vehicle (OSV) and M113A3 FOV Common Components

OSV and M113A3 FOV components are common with following exceptions:

Table 1. OSV and M113A3 FOV Common Components

| | |
|------------------------|---------------------------------------------------------------------------------------------------------------------|
| Technical Data Package | Items listed in M113/BMP-2 OSV technical data package are peculiar to M113/BMP-2 OSV. |
| Torsion Bars | M548 torsion bars are installed in chassis positions 1 through 3. M548 torsion bars are common in U.S. Army supply. |
| VISMOS | M113/BMP-2 OSV has front and side visual mods to replicate a BMP. |
| Rear Doors | M113/BMP-2 OSV has two rear doors. |

EQUIPMENT DATA

Table 2. General

| | |
|------------|---|
| Crew | 3 |
| Passengers | 5 |

Table 3. Size

| | |
|------------------------|------------------------|
| Length | 248 in. (630 cm) |
| Width | 112 in. (284.48 cm) |
| Height | 121.13 in. (307.67 cm) |
| Clearance above ground | 15 in. (38.1 cm) |

Table 4. Weight

| | |
|-----------------|------------------------|
| Curb | 24500 lb (1113.13 kg) |
| Max operational | 27700 lb (12565.51 kg) |

Table 5. Performance

| | |
|---------------------------|------------------------------------------|
| Maximum forward speed | 40 mph (64.36 kmph) |
| Maximum grade | 60% |
| Maximum side slope | 30% |
| Vertical obstacle ability | 24 in. |
| Maximum trench | 66 in. |
| Fording depth | 40 in. |
| Range | 250 miles (402.3 k) at 25 mph (40.2 kph) |

Table 6. Center of Gravity

| | |
|-------------------------------------|-----|
| Above ground | TBD |
| Distance behind center of sprockets | TBD |

Table 7. Engine

| | |
|------------------------------------|--------------------------------------------------|
| Type | turbocharged, 2-cycle, 6-cylinder, V-type diesel |
| Horsepower | 275 hp at 2800 rpm |
| Idle speed | 650-700 rpm |
| Maximum governed speed: | |
| Full load | 2800 rpm |
| No load | 2950-3000 rpm |
| Normal operating temperature range | 190° to 230° F (87.8° to 110° C) |
| Cooling | liquid cooled w/radiator and fan |
| Lubrication | Forced feed |
| Fuel: | |
| DF-2 (VV-F-800) | only at temperatures above 32° F (0° C) |
| DF-1 (VV-F-800) | only at temperatures above -10° F (-23° C) |
| DF-A (VV-F-800) | any temperature |
| CITE (MIL-F-46005) | any temperature |

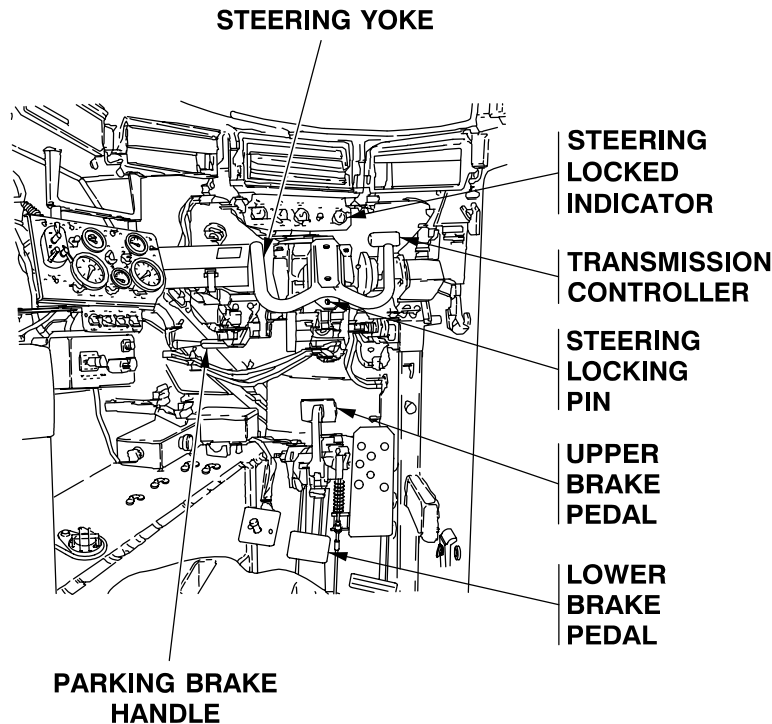
Table 8. Refill Capacities

| | |
|------------------------------|------------------------------|
| Coolant | 14.8 gal (56.02 liter) |
| Radiator cap pressure rating | 13-18 psi (89.63-124.11 kPa) |
| Oil: | |
| Engine | 22 qt (20.8 liter) |
| Transmission | 36 qt (34.1 liter) |
| Final drive (each) | 3-1/2 qt (3.3 liter) |
| Fan gearbox | 18 oz (0.53 liter) |
| Diesel fuel: | |
| Capacity | 95 gal (359.6 liter) |
| Maximum filling rate | 50 gpm (189.3 liter/m) |

Table 9. Tracks

| | |
|-------------------------------|----|
| T150: | |
| Track shoes, left (when new) | 63 |
| Track shoes, right (when new) | 64 |
| T130: | |
| Track shoes, left (when new) | 63 |
| Track shoes, right (when new) | 64 |

STEERING AND BRAKING SYSTEM



The steering and braking system are an integral part of the crossdrive transmission. The main controls are located in the driver's compartment.

- parking brake handle
- steering locked indicator
- steering yoke
- upper brake pedal
- lower brake pedal
- transmission controller
- steering locking pin

The steering yoke is centered and the transmission controller set to SL (steering lock) when the vehicle is being started, idled, or shut down. When the steering yoke is centered and locked, the STEERING LOCKED indicator will light. If the steering yoke is not centered and locked, the vehicle can pivot regardless of the position of the transmission controller. To pivot the vehicle, the transmission controller should be set to PV (pivot vehicle).

The service brakes operation is similar to the operation of brakes on an automobile. The lower brake pedal is used for normal operation. The upper brake pedal is used when the driver's seat is in the raised position.

To operate the parking brake, pressure is applied to the service brake and then the parking brake handle is pulled up

DRIVER'S CONTROLS

The engine, transmission, steering system, and braking system are driver controlled. Engine startup and shutdown are initiated by driver controls and accomplished by electrical signals and mechanical linkages connected to the accelerator pedal, the fuel shutoff cable, and the hand throttle cable.

Steering and braking are controlled through mechanical linkages connected to the transmission. The hand brake is manually operated.

ENGINE AND DRIVE TRAIN

The engine converts air and diesel fuel into power. The engine uses the power to operate the transmission, turn the driveshaft, and operate the variable speed alternator and fan drive.

The variable speed alternator and fan drive operate the alternator and cooling fan.

Air for fuel combustion flows through the air cleaner, turbocharger, and the engine.

Fuel flows from the fuel tanks to fuel injectors which inject the fuel into the combustion chamber. In the combustion chamber the fuel is mixed with air, and ignited by a spark. The ignited fuel is converted to power that is used to operate the drive train.

The drive train consists of the following:

- engine
- transmission
- drive lines
- final drive assemblies
- drive sprockets

The drive train transfers power from the engine to the vehicle tracks.

COOLING SYSTEM

The engine and transmission generate heat during operation. The cooling system uses two methods, airflow and coolant, to remove the heat and maintain a safe operating temperature. Fresh air is pulled into the engine compartment, circulated around the engine and transmission, and then the heated air is exhausted overboard.

The radiator holds a mix of coolant and water. The radiator capacity is 14.8 gallons.

HULL ELECTRICAL SYSTEM

The hull electrical system operates on four wet-cell batteries connected in series/parallel arrangement. Electrical power from the batteries goes to the distribution box, cables, subsystem assemblies, and to the hull. The hull grounds the electrical system.

END OF TASK

CHAPTER 2

OPERATOR INSTRUCTIONS

WORK PACKAGE INDEX

| <u>Title</u> | <u>Sequence No.</u> |
|----------------------------------------------------------------------|---------------------|
| DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS | 0004 00 |
| OPEN AND CLOSE REAR ACCESS DOORS | 0005 00 |
| OPEN/CLOSE TURRET SHIELD DOOR | 0006 00 |
| OPEN/CLOSE DRIVER'S HATCH | 0007 00 |
| OPEN/CLOSE NOSE ACCESS DOORS | 0008 00 |
| ADJUST DRIVER'S SEAT | 0009 00 |
| ADJUST DRIVER'S LAP SEAT BELT | 0010 00 |
| CONNECT DRIVER'S CVC HELMET TO INTERCOM CONTROL BOX | 0011 00 |
| SET/RELEASE PARKING BRAKE | 0012 00 |
| START ENGINE | 0013 00 |
| START ENGINE WITH OUTSIDE POWER SOURCE | 0014 00 |
| DRIVE OSV | 0015 00 |
| STOP ENGINE | 0016 00 |
| FUEL OSV | 0017 00 |
| OPERATE PERSONNEL HEATER | 0018 00 |
| OPERATE OSV LIGHTS | 0019 00 |
| ACTIVATE FIXED FIRE EXTINGUISHER SYSTEM | 0020 00 |
| ACTIVATE PORTABLE FIRE EXTINGUISHER | 0021 00 |
| REMOVE/INSTALL POWER PLANT REAR ACCESS COVERS | 0022 00 |
| REMOVE/INSTALL DRIVER'S ENGINE ACCESS COVER | 0023 00 |
| REMOVE/INSTALL BATTERY BOX COVERS | 0024 00 |
| OPERATE DRIVER'S FAN | 0025 00 |
| OPERATE FRESH AIR SYSTEM | 0026 00 |
| INSTALL/REMOVE M27 PERISCOPES | 0027 00 |
| OPERATE BILGE PUMP | 0028 00 |
| BLOCK/UNBLOCK VEHICLE TRACKS | 0029 00 |
| OPERATION IN EXTREME COLD BELOW -25° F (-31° C) | 0030 00 |
| OPERATE VEHICLE OVER ROUGH TERRAIN | 0031 00 |
| OPERATE VEHICLE IN EXTREME HEAT, HUMIDITY, OR SALTY CONDITIONS | 0032 00 |
| BYPASS DEFECTIVE TRANSMISSION CONTROLLER | 0033 00 |
| COVER/UNCOVER INTAKE AND EXHAUST GRILLES | 0034 00 |
| TOWING DISABLED VEHICLE | 0035 00 |
| IMMEDIATE ACTION TO STOP RUNAWAY ENGINE | 0036 00 |

DRIVER'S HATCH

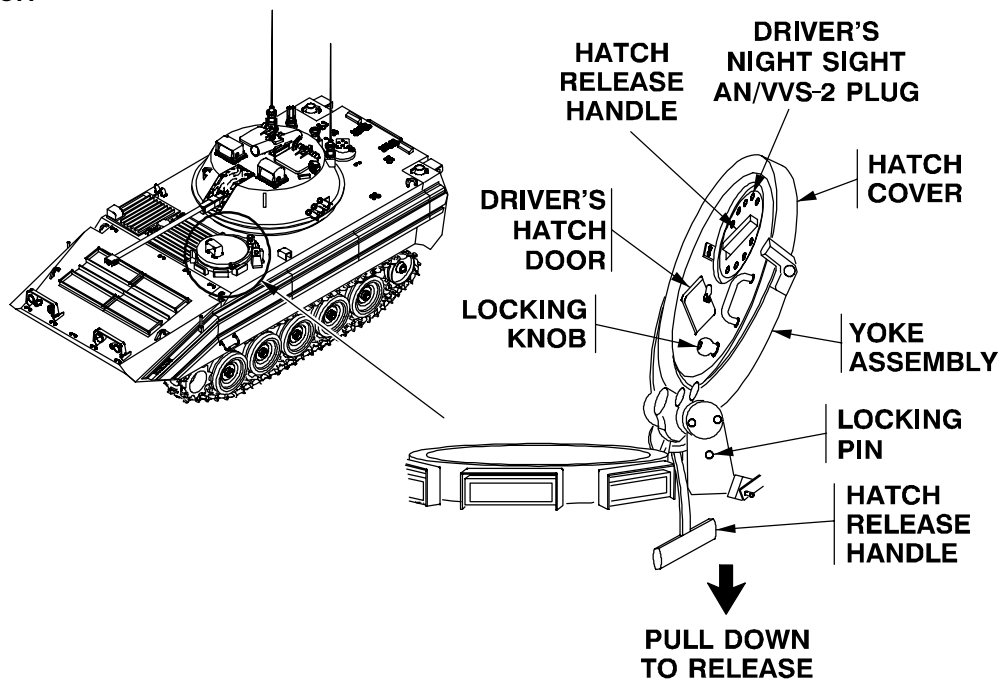


Table 1. DRIVER'S HATCH

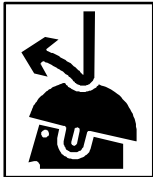
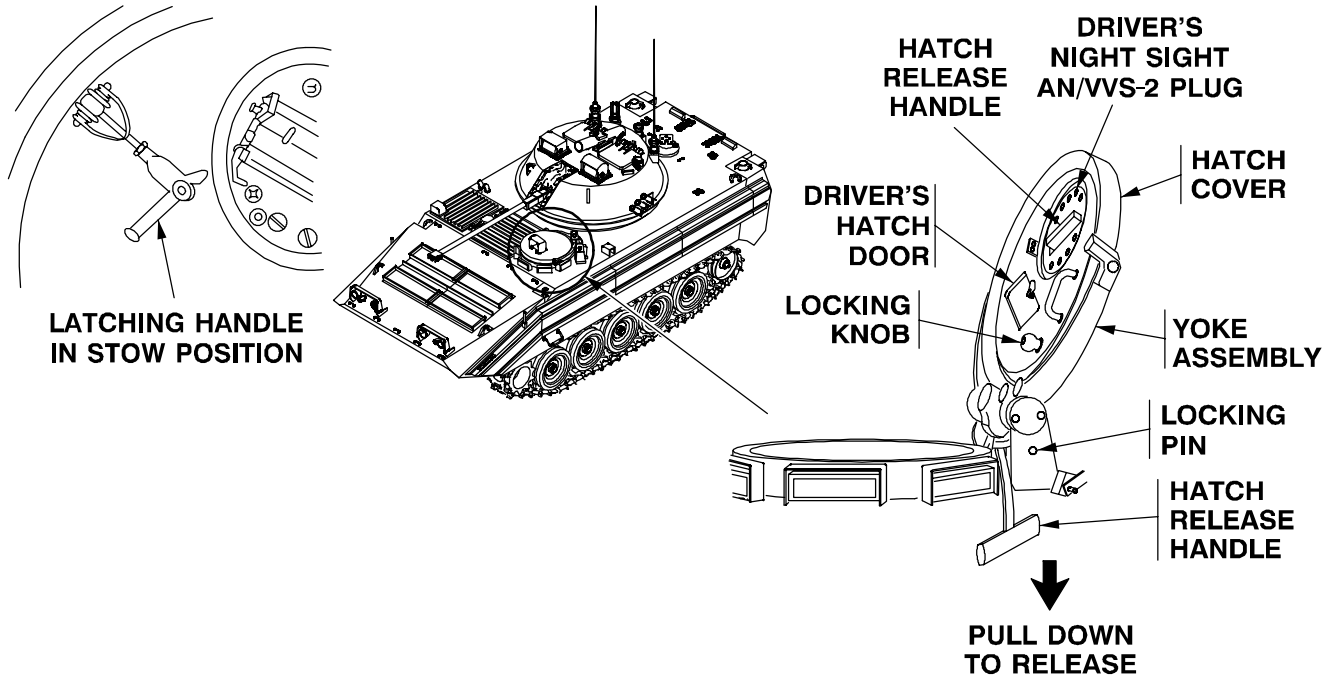
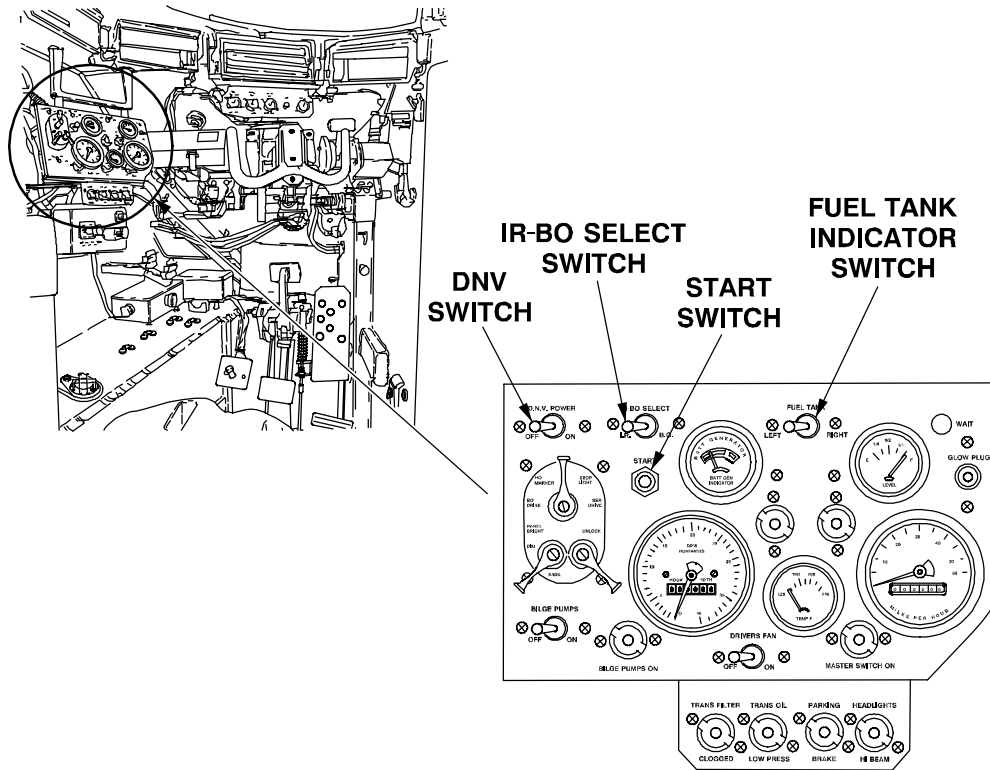
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>WARNING</p>  <p>To avoid being struck by low-hanging obstacles, do not stand in open hatch while vehicle is moving.</p> <p>Close hatch or put in pop-up position when operating in area with low-hanging obstacles.</p> <p>NOTE</p> <p>Lock driver's hatch in full open or pop-up (partially open) position.</p> <p>NOTE</p> <p>When closing hatch, support cover by hand before locking pin is moved.</p> |
| | DRIVER'S NIGHT SIGHT COVER | Mounting plate for the AN/VVS-2 |
| | DRIVER'S HATCH DOOR | Opens to allow driver to open hatch from outside of vehicle. When padlock is installed, vehicle is secured. |
| | YOKE ASSY | Allows hatch cover to swivel in popped-up position. |
| | HATCH COVER | Allows driver to enter or exit vehicle. Closes fully or opens in popped up or fully open positions. |
| | HATCH RELEASE HANDLE | Hand grip is pulled to release catch so hatch can be raised and lowered. |

Table 1. DRIVER'S HATCH - Continued



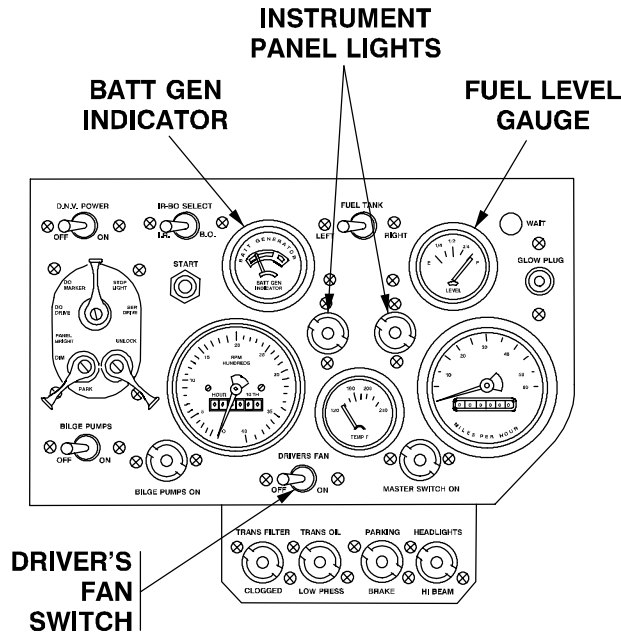
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|---------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>LOCKING KNOB</p> <p>LATCHING HANDLE</p> <p>LOCKING PIN</p> <p>DRIVER'S NIGHT SIGHT AN/VVS-2 PLUG</p> | <p style="text-align: center;"><u>CAUTION</u></p> <p>Do not move locking knob to center of hatch cover while hatch is to remain open. In the center position, the hatch cover could rotate and injure driver or damage equipment.</p> <p>Locks hatch cover to yoke assembly when hatch is open (full or pop-up) or releases hatch cover to close hatch.</p> <p>Locks hatch cover in closed position.</p> <p>Locks and unlocks hatch cover release mechanism.</p> <p>Covers opening for driver's night sight when night sight is not installed.</p> |

Table 2. Driver's Instrument Panel



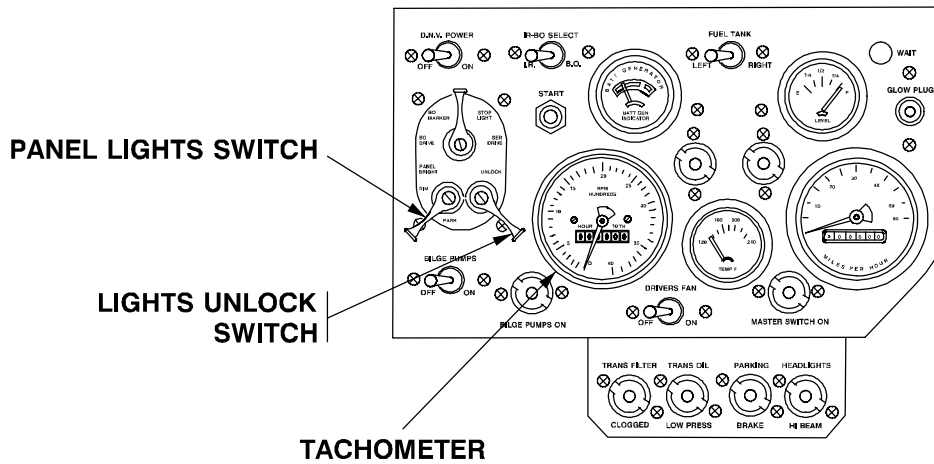
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>AN/VVS-2 DRIVER'S NIGHT VISION SWITCH (DNV Switch)</p> <p>IR-BO SELECT SWITCH</p> <p>START SWITCH</p> <p>FUEL TANK INDICATOR SWITCH</p> | <p>Two position switch controls power to the AN/VVS-2 driver's night viewer.</p> <p style="text-align: center;">NOTE</p> <p>IR lights have been removed from OSV. IR/BO switch works in blackout (BO) mode only.</p> <p>Two position (IR/BO) switch selects the lights in blackout (BO) mode of operation.</p> <p>Engages engine starter.</p> <p style="text-align: center;">NOTE</p> <p>Fuel is used equally from both tanks.</p> <p>Two position (LEFT/RIGHT) switch allows driver to read fuel level in external tanks.</p> |

Table 2. Driver's Instrument Panel - Continued



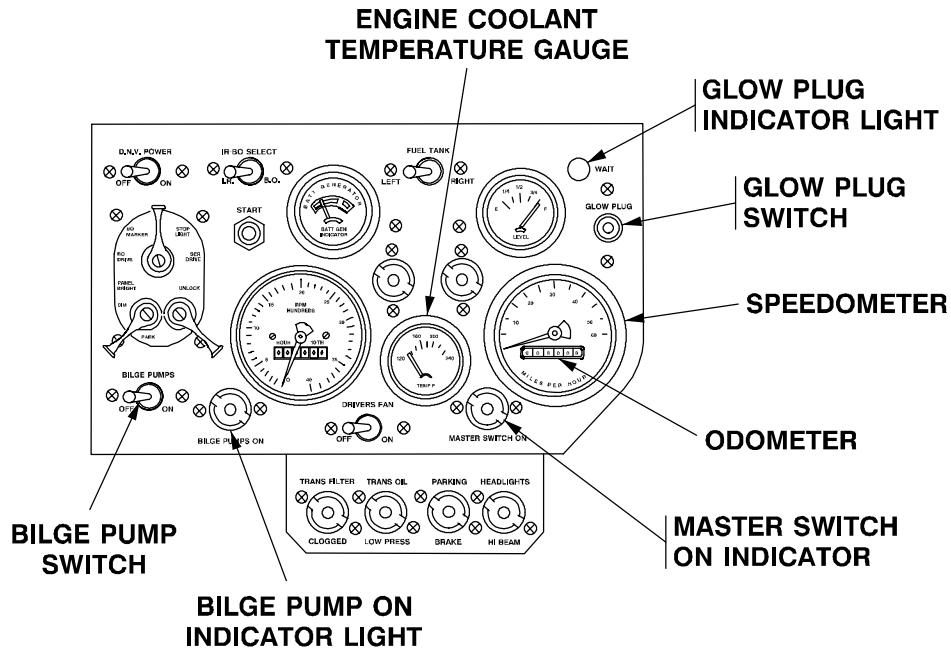
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|--------------------------------|-------------------------------------------------------------------------------------|
| | BATT GEN INDICATOR | Indicates battery and generator condition. |
| | INSTRUMENT PANEL LIGHTS | Illuminates instrument panel gauges and indicators when panel lights are turned on. |
| | FUEL LEVEL GAUGE | Indicates amount of fuel in tanks. |
| | DRIVER'S FAN SWITCH | Two position switch controls power to driver's fan. |

Table 2. Driver's Instrument Panel - Continued



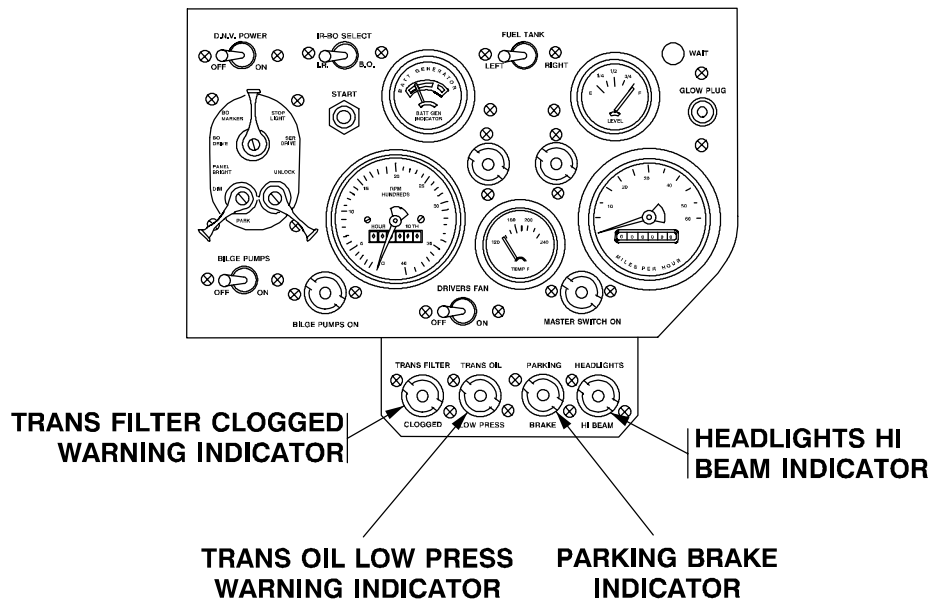
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | TACHOMETER | Gauge shows engine speed in rpm and accumulated hours of engine operation. |
| | LIGHTS UNLOCK SWITCH | Spring-loaded, two position lever releases driving light switch. Switch must be held in UNLOCK position when driving light is set to any position other than BO MARKER. |
| | PANEL LIGHTS SWITCH | Four position (PANEL BRIGHT/DIM/OFF/PARK) switch controls instrument panel lights. |

Table 2. Driver's Instrument Panel - Continued



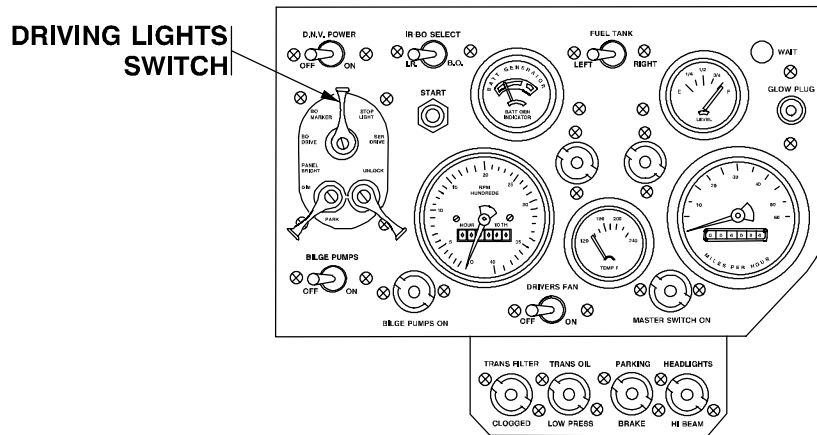
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| | SPEEDOMETER | Gauge shows vehicle speed in mph. |
| | ODOMETER | Digital readout shows total distance (in miles) vehicle has traveled. |
| | MASTER SWITCH ON | When the MASTER SWITCH is in the ON position indicator is lit. |
| | ENGINE COOLANT TEMPERATURE GAUGE | Graduated gauge shows engine temperature in degrees Fahrenheit. |
| | BILGE PUMP SWITCH | Turns front bilge pump on and off. |
| | GLOW PLUG INDICATOR LIGHT | Glow plug indicator (WAIT) is on when system is warning and goes off when system is ready to start. |
| | BILGE PUMP ON INDICATOR | Lighted indicator comes on when BILGE PUMP switch is set to ON. |
| | GLOW PLUG SWITCH | Used while starting engine during cold weather -25° F to +40° F (-31° C to +4° C). Switch is spring loaded to the off position. |

Table 2. Driver's Instrument Panel - Continued



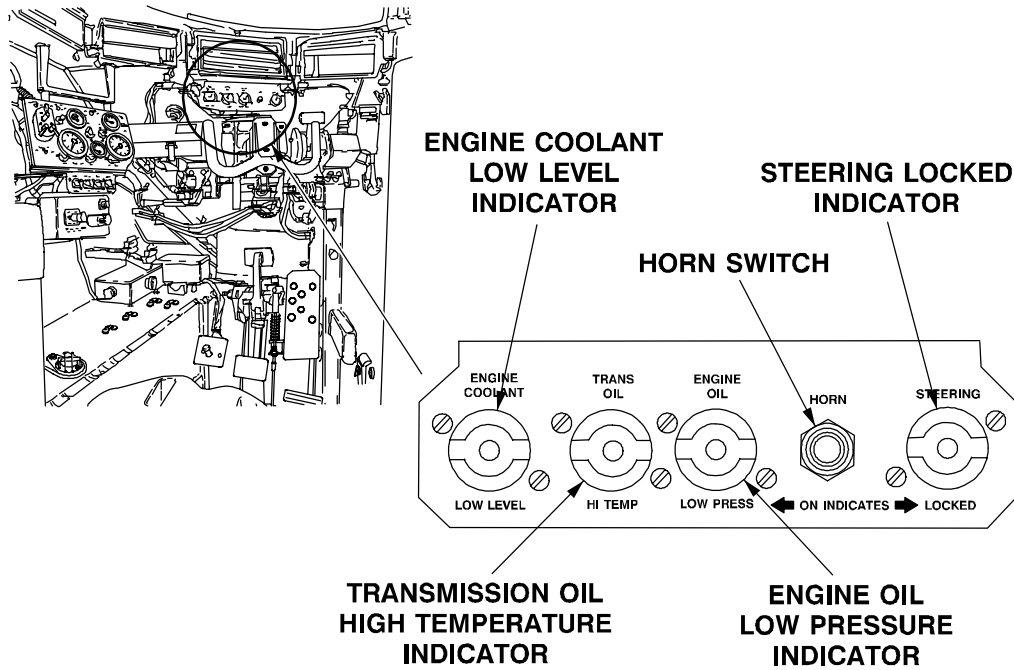
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|------------------------------|-----------------------------------------------------------------------------------|
| | TRANS FILTER CLOGGED WARNING | Indicator comes on when transmission filter is clogged and the engine is running. |
| | TRANS OIL LOW PRESS WARNING | Indicator comes on when transmission oil pressure is low. |
| | PARKING BRAKE INDICATOR | Light comes on when parking brake is set. |
| | HEADLIGHTS HI BEAM INDICATOR | Light comes on when headlight high beams are on. |

Table 2. Driver's Instrument Panel - Continued



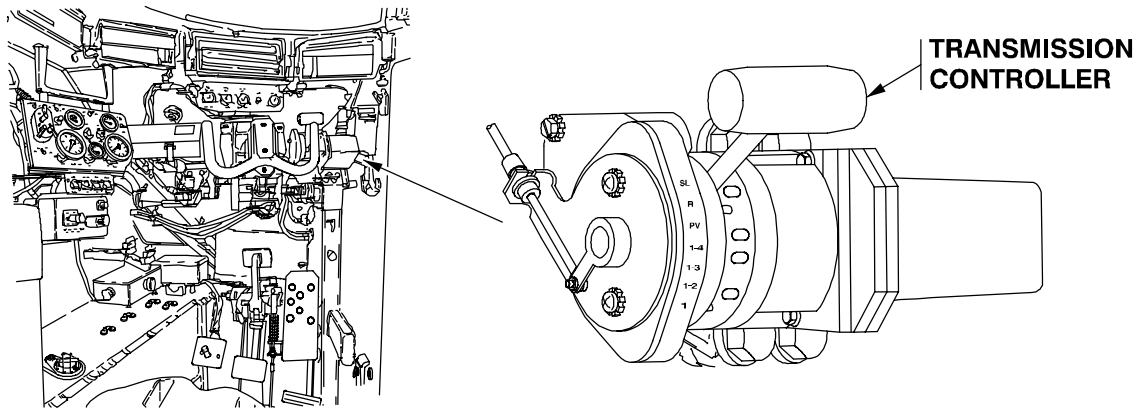
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>DRIVING LIGHTS SWITCH</p> | <p>Five position switch controls outside lights as follows:</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">IR lights have been removed from OSV. Switch does not function in IR position.</p> <p>With driving lights switch at BO DRIVE and IR-BO switch at BO, blackout (one) headlight and four blackout marker lights are on. When brakes are applied, blackout stoplight will come on.</p> <p>With switch at BO MARKER, four blackout marker lights are on and blackout stoplight is functional.</p> <p>Driving lights switch at OFF turns off all exterior lights.</p> <p>At STOP LIGHT position (daytime operation), stop lights function, taillights are on, and headlights are off.</p> <p>With driving lights switch at SER DRIVE, headlights and taillights are on and stop lights function.</p> |

Table 3. WARNING LIGHTS PANEL



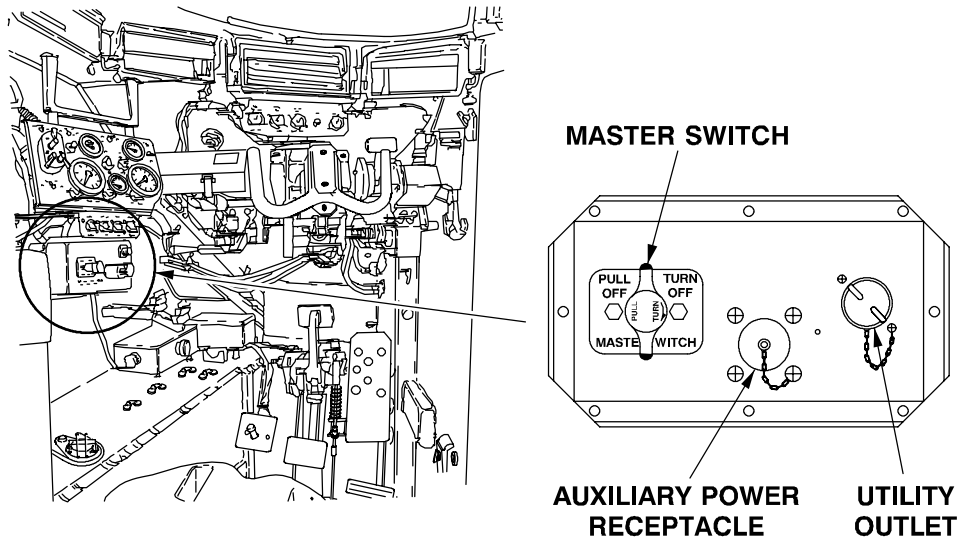
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|--------------------------|----------------------------------------------------------------------------|
| | ENGINE COOLANT LOW LEVEL | Warning indicator lights when coolant level is too low for safe operation. |
| | TRANS OIL HI TEMP | |
| | ENGINE OIL LOW PRESS | |
| | HORN SWITCH | Switch is pressed to activate vehicle horn. |
| | STEERING LOCKED | Indicator lights when steering yoke is locked in center position. |

Table 4. ELECTRICAL TRANSMISSION CONTROLLER



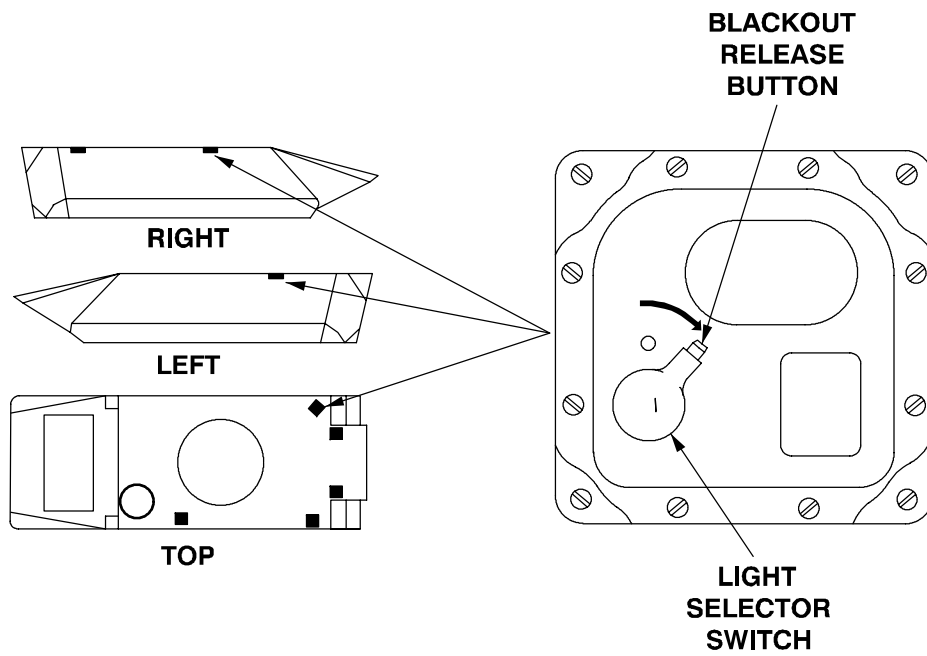
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | TRANSMISSION CONTROLLER | <p>Transmission controller handle selects the driving range of the transmission.</p> <p>Range 1 is low gear and gives maximum traction, low speed maneuvering, and engine braking. Range 1 is also used when climbing or descending steep grades and when entering or leaving water.</p> <p>Range 1-2 is used when climbing/descending medium grades, driving cross-country at high speeds, and while in water when fording.</p> <p>Range 1-3 is used when climbing/descending slight grades, driving cross-country at high speeds, and while driving on roads at moderate speed.</p> <p>Range 1-4 is used when driving in normal; forward operation.</p> <p>Pivot (PV) is used, while the vehicle is stopped, to turn the vehicle on it's own center.</p> <p>Reverse (R) is used when backing the vehicle. Reverse operates on land or in water.</p> <p>Steering lock (SL) is used to secure steering yoke in center position during engine start, idling, and engine shutdown.</p> |

Table 5. MASTER SWITCH PANEL



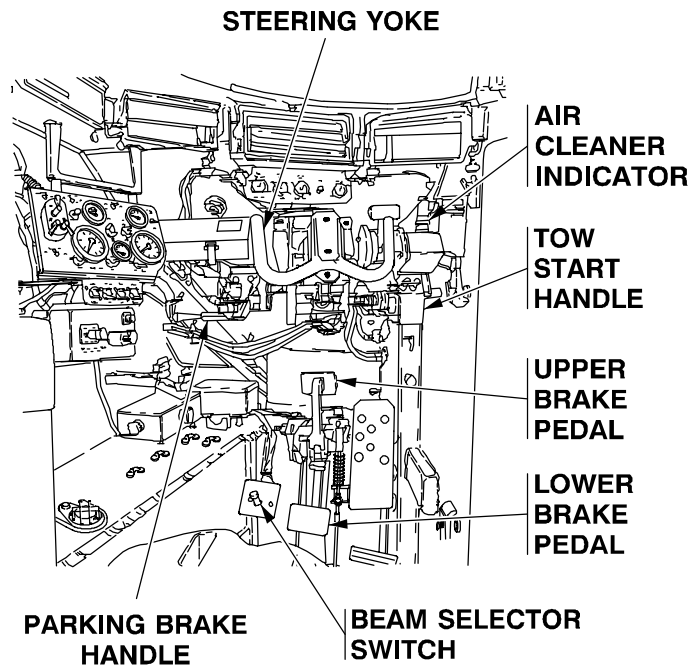
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|----------------------------|------------------------------------------------------------------------------------------------------------------------|
| | MASTER SWITCH | PULL/TURN switch turns vehicle electrical power on and off. |
| | AUXILIARY POWER RECEPTACLE | Connector used with a slave cable attached to an outside power source when external power is required to start engine. |
| | UTILITY OUTLET | Outlet provides 24 vdc power for accessories. |

Table 6. DOME LIGHTS



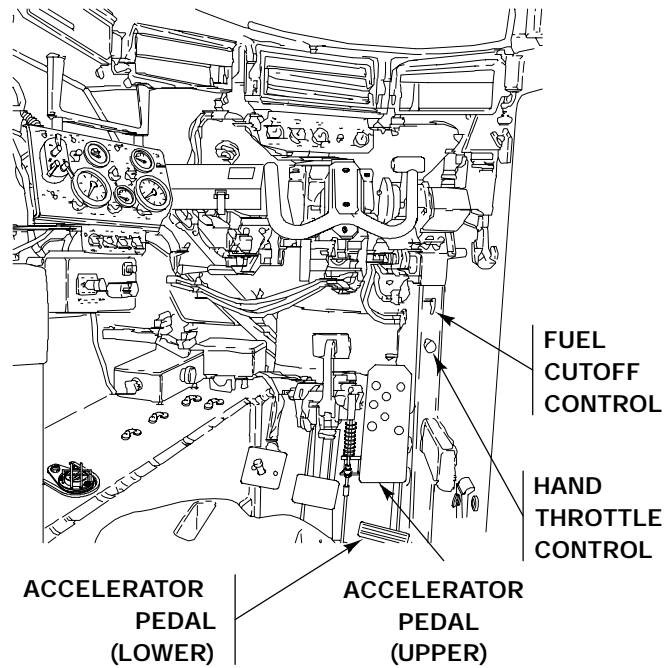
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|-------------------------|--------------------------------------------------------------------|
| | LIGHT SELECTOR SWITCH | Selects blackout or white light mode. |
| | BLACKOUT RELEASE BUTTON | Unlocks selector switch to change from BO to white light position. |

Table 7. DRIVER'S CONTROLS AND INDICATORS



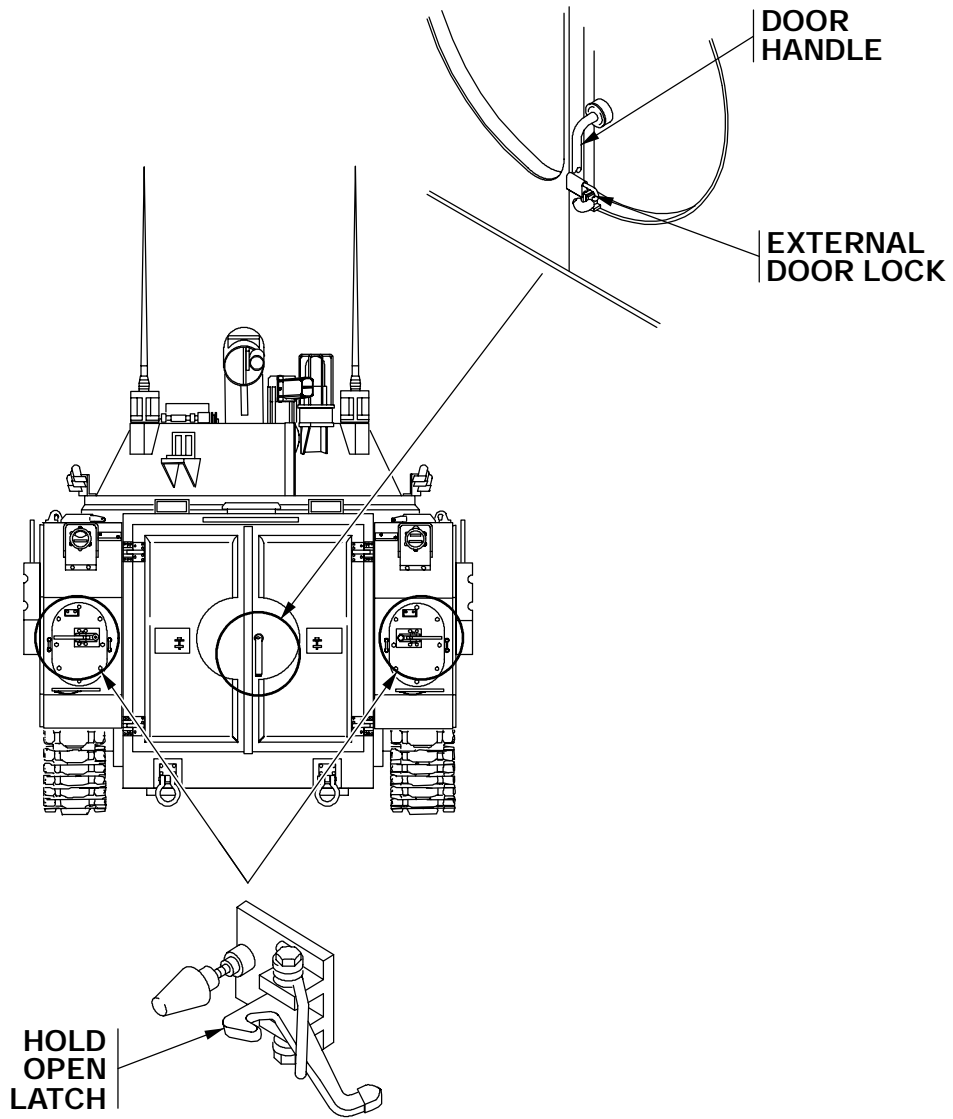
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|-----------------------|---------------------------------------------------------------------------------------------------------------------|
| | STEERING YOKE | Device used to steer vehicle. |
| | AIR CLEANER INDICATOR | Red/green gauge shows condition of the air cleaner element. When red only shows in window, maintenance is required. |
| | TOW START HANDLE | Used when it is necessary to start engine by towing vehicle. |
| | UPPER BRAKE PEDAL | Used to slow and/or stop vehicle when the driver's seat is in the raised position. |
| | LOWER BRAKE PEDAL | Used to slow and/or stop vehicle when the driver's seat is in the lowered position. |
| | BEAM SELECTOR SWITCH | Sets headlight beams at high or low. |
| | PARKING BRAKE HANDLE | Pull control used to engage/release parking brake. |

Table 8. FUEL AND THROTTLE CONTROLS



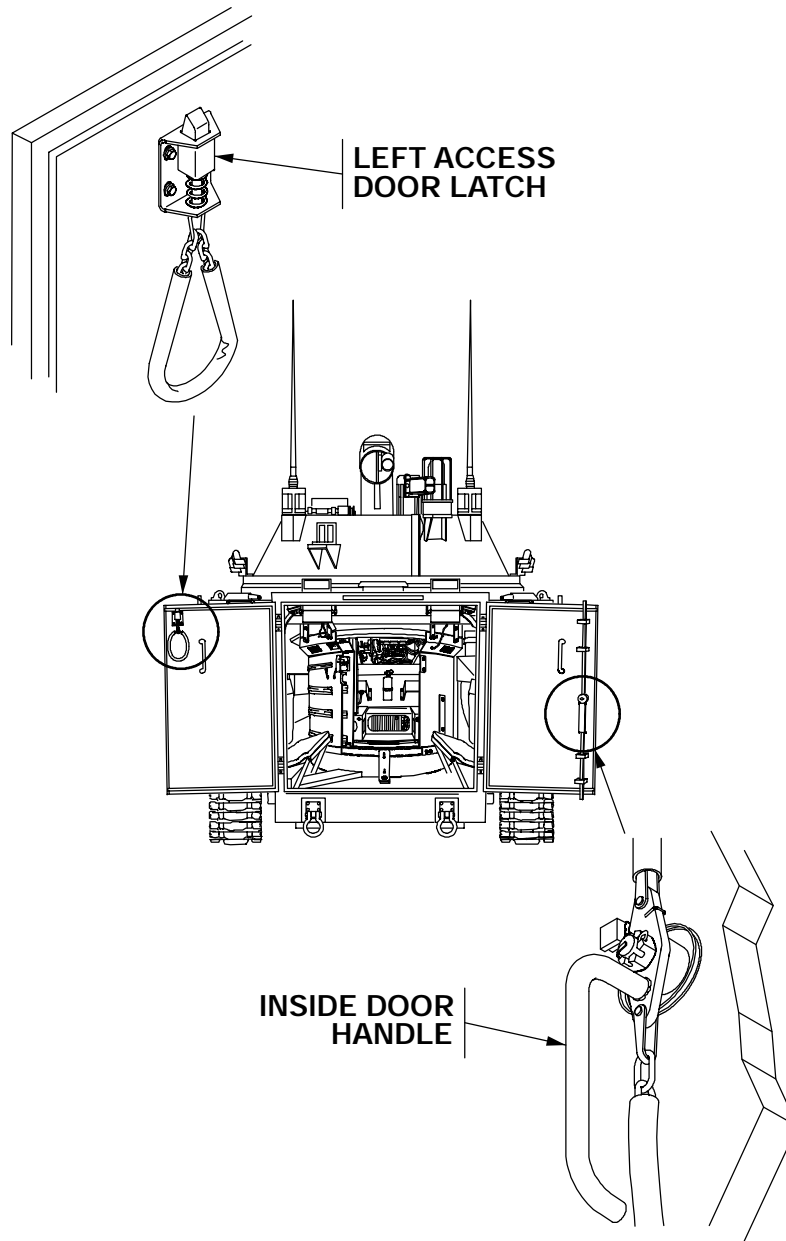
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|-------------------------|-------------------------------------------------------------------------------|
| | FUEL CUT-OFF CONTROL | Starts and stops fuel supply to engine. |
| | HAND THROTTLE CONTROL | Allows vehicle speed to be manually controlled. |
| | UPPER ACCELERATOR PEDAL | Used to control vehicle speed while driver's seat is in the raised position. |
| | LOWER ACCELERATOR PEDAL | Used to control vehicle speed while driver's seat is in the lowered position. |

Table 9. REAR ACCESS DOOR CONTROLS



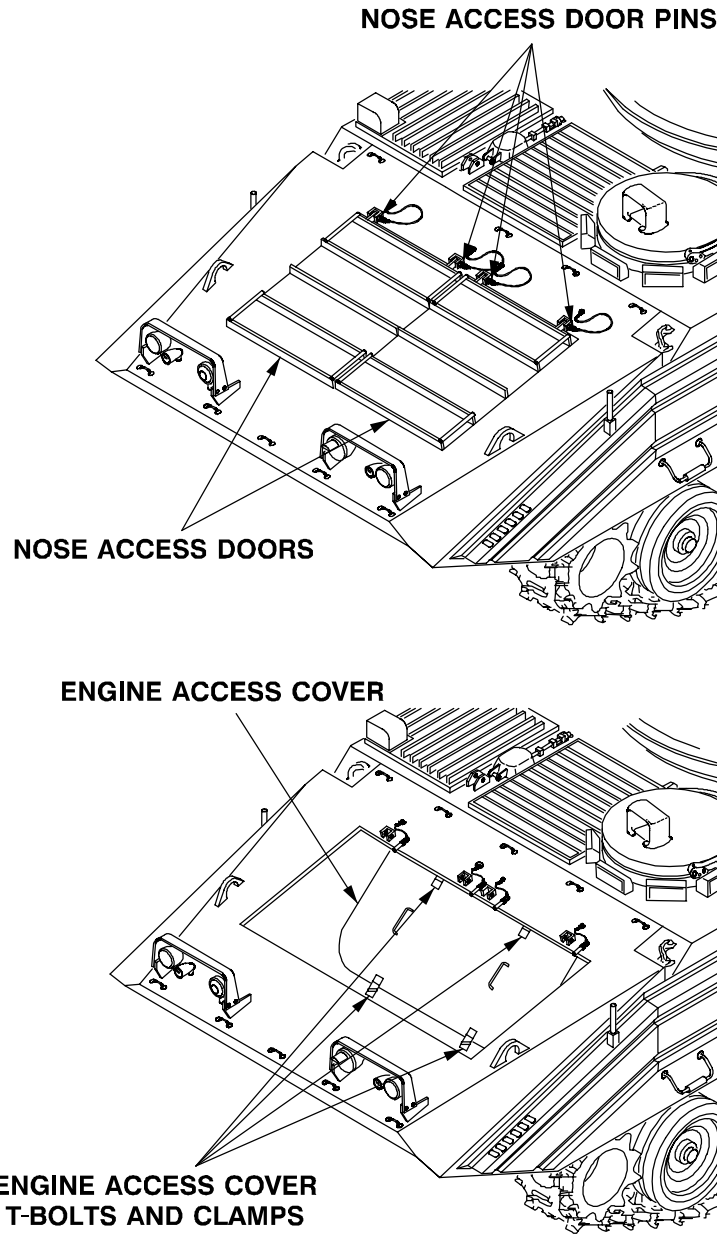
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|----------------------|--------------------------------------------------------------|
| | OUTSIDE DOOR HANDLE | Latches and unlatches rear access door from outside the OSV. |
| | HOLD OPEN LATCH | Fastens access door in the open position. |
| | EXTERNAL DOOR LOCK | Locks rear access door from outside the OSV. |

Table 9. REAR ACCESS DOOR CONTROLS - Continued



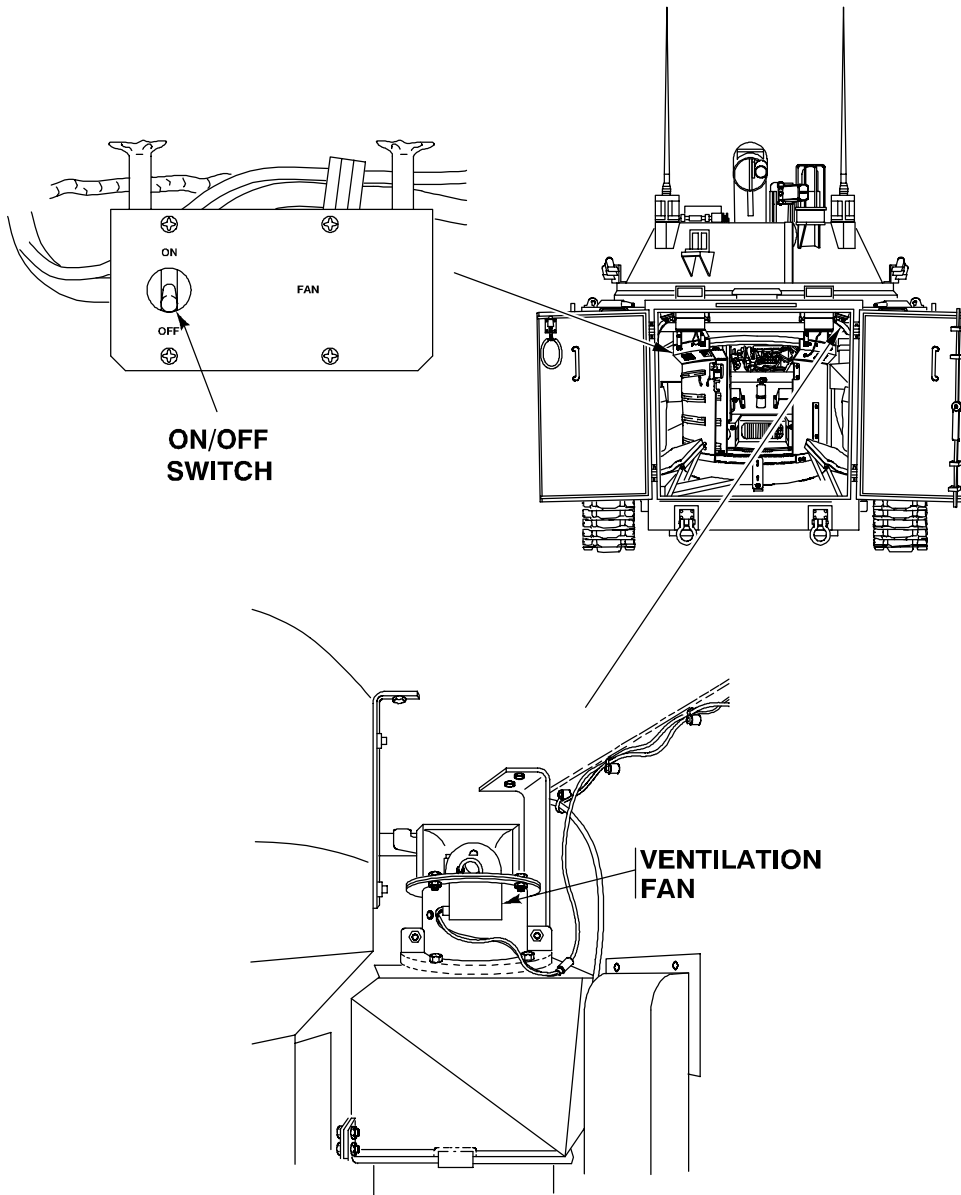
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|------------------------|-------------------------------------------------------------|
| | INSIDE DOOR HANDLE | Latches and unlatches rear access door from inside the OSV. |
| | LEFT ACCESS DOOR LATCH | Latches and unlatches left access door. |

Table 10. POWER PLANT ACCESS DOOR CONTROLS



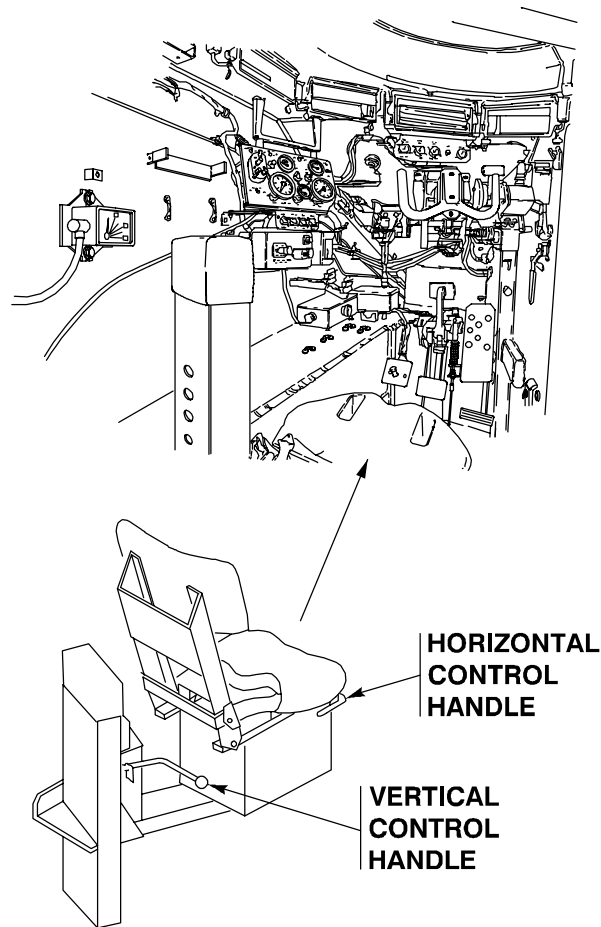
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|----------------------------------------|---------------------------------------------------------------------------------------|
| | NOSE ACCESS DOOR PINS | Four pins fasten the left and right outside power plant doors in the closed position. |
| | NOSE ACCESS DOORS | Left and right outer doors can be completely removed for maintenance. |
| | ENGINE ACCESS COVER T-BOLTS AND CLAMPS | Four T-bolts and four clamps fasten inner door in closed position. |
| | ENGINE ACCESS COVER | Provides access to engine compartment from front of vehicle. |

Table 11. VENTILATION FAN



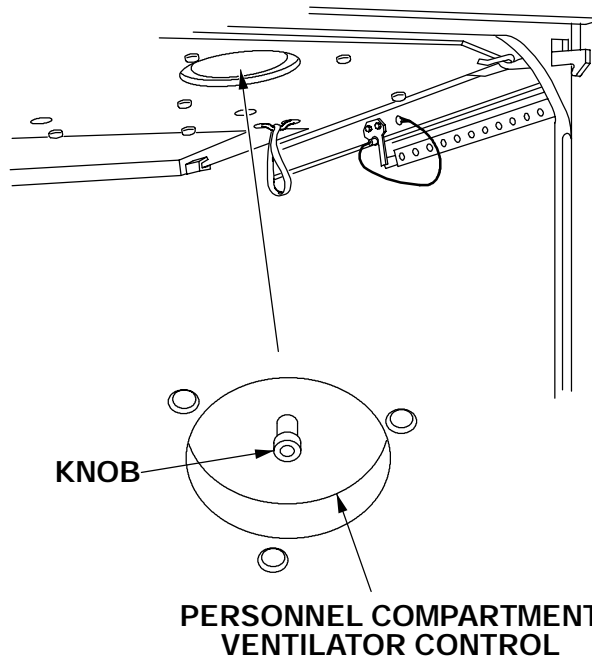
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|----------------------|--------------------------------------------------------------------------------------------------------|
| | FAN ON/OFF SWITCH | Two position switch turns ventilation fan on and off. |
| | VENTILATION FAN | Provides fresh air to driver and turret compartment by drawing outside air through front right VISMOD. |

Table 12. DRIVER'S SEAT CONTROLS



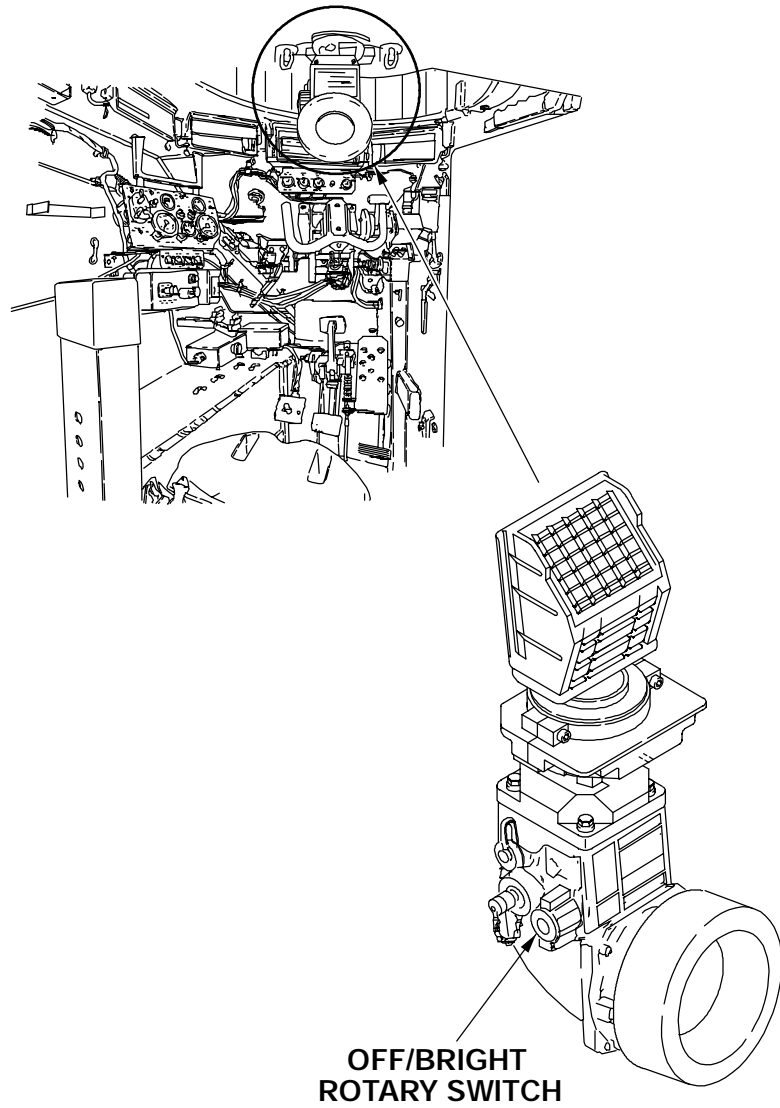
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|---------------------------|------------------------------------------------------------------------------------------------|
| | HORIZONTAL CONTROL HANDLE | Releases driver's seat so it can be moved forward or back and then locks the seat in position. |
| | VERTICAL CONTROL HANDLE | Releases driver's seat so it can be moved up or down and then locks the seat in position. |

Table 13. PERSONNEL COMPARTMENT VENTILATOR CONTROL



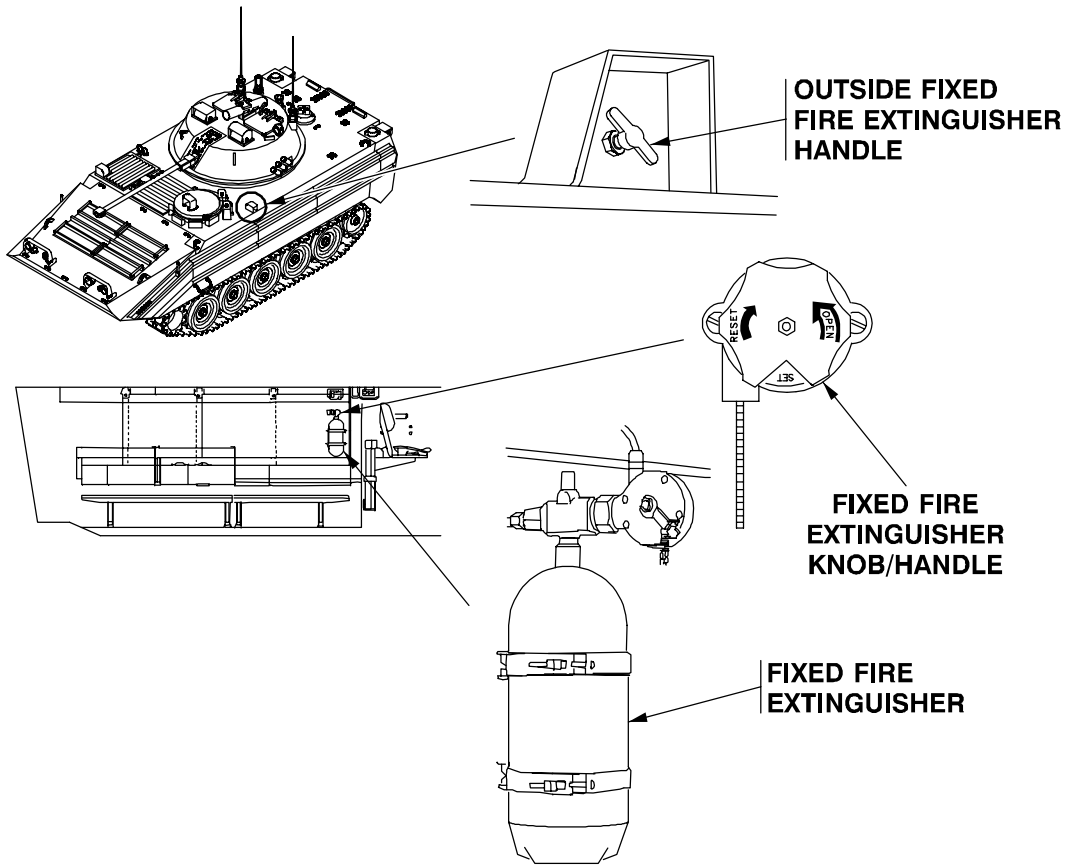
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>KNOB</p> <p>PERSONNEL COMPARTMENT VENTILATOR CONTROL</p> | <p>Knob is moved up to open ventilator valve and allow fresh air intake and moved down to close ventilator valve and shut off fresh airflow.</p> <p>Provides personnel compartment with fresh air by moving knob up to open ventilator or down to shut off fresh air flow.</p> |

Table 14. DRIVER'S NIGHT VIEWER (AN/VVS-2)



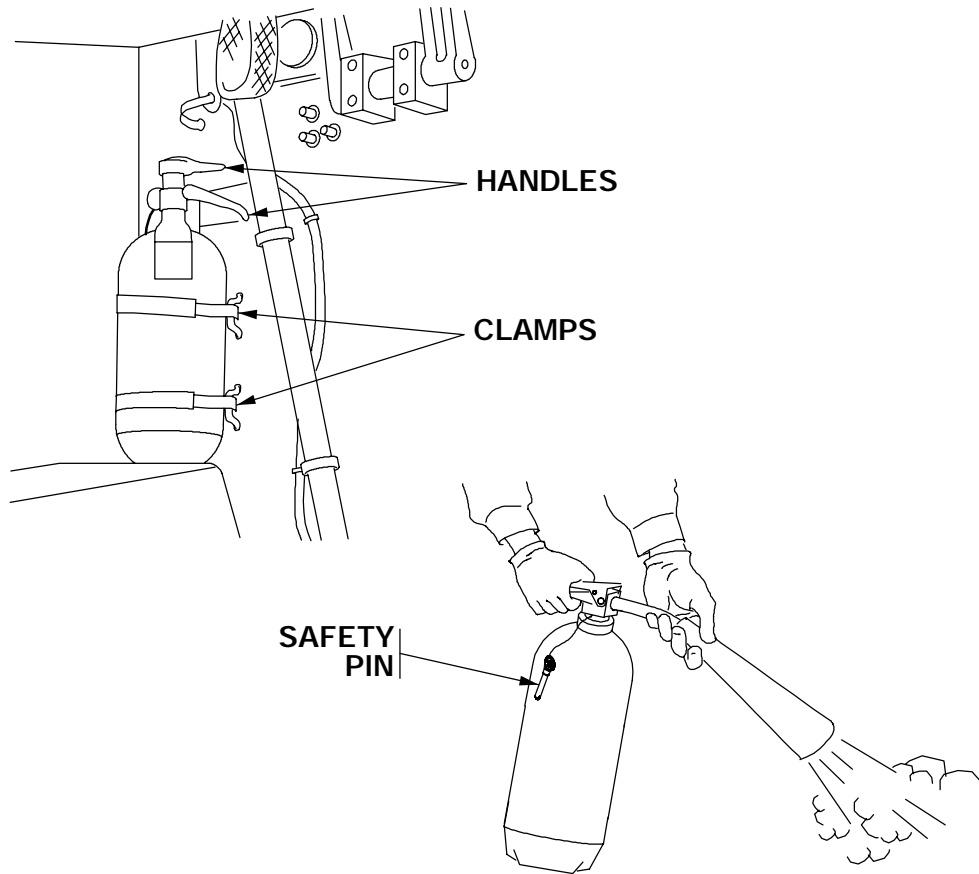
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|----------------------|--------------------------------------------------------------------------------|
| | OFF/BRIGHT | Rotary switch turns the night viewer on/off and adjust the brightness of view. |

Table 15. FIXED FIRE EXTINGUISHER SYSTEM



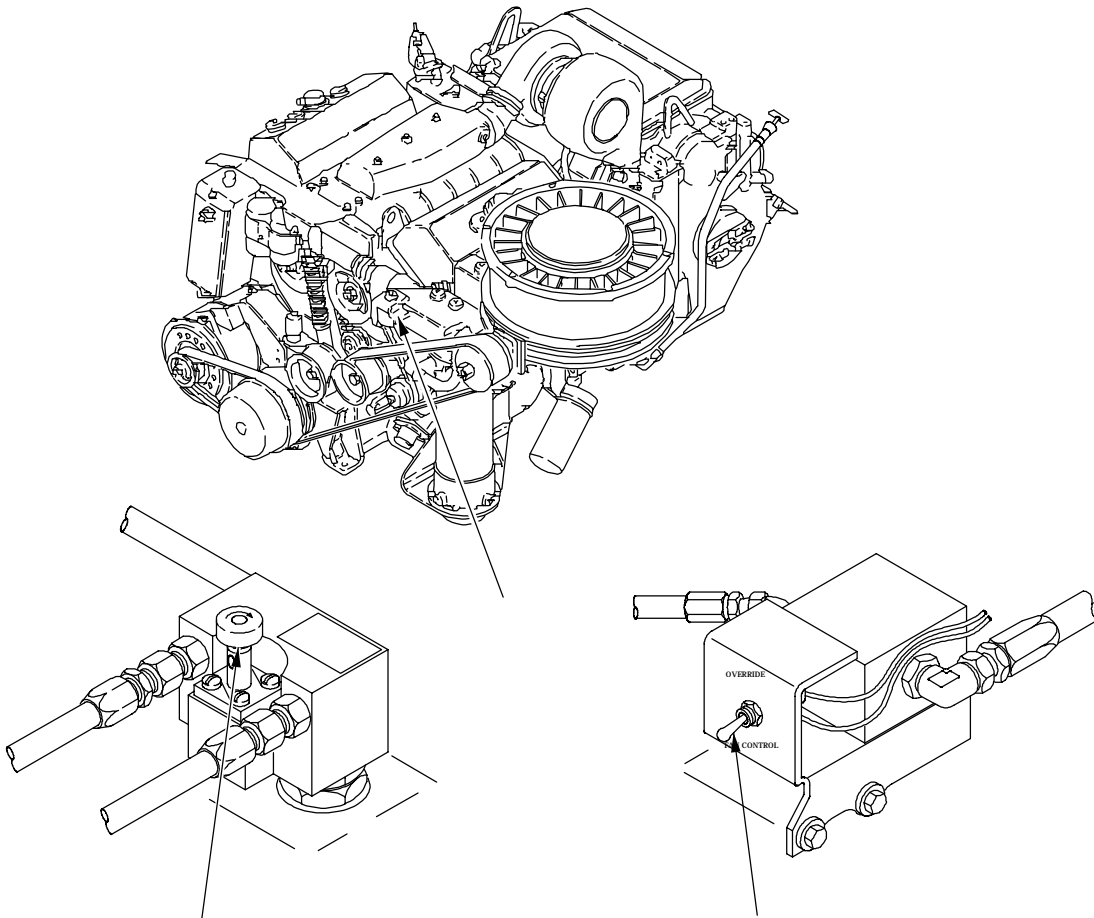
| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|-------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>OUTSIDE FIXED FIRE EXTINGUISHER HANDLE</p> <p>FIXED FIRE EXTINGUISHER KNOB/HANDLE</p> <p>FIXED FIRE EXTINGUISHER</p> | <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Fixed fire extinguisher located behind driver, discharges into engine compartment only.</p> <p>Allows personnel to do a manual fire extinguisher discharge from outside the vehicle.</p> <p>Allows personnel to do a manual fire extinguisher discharge from inside the vehicle.</p> <p>Allows personnel to do a manual fire extinguisher discharge from inside the vehicle.</p> |

Table 16. PORTABLE FIRE EXTINGUISHER



| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | CLAMPS | Two clamps in the personnel compartment secure portable fire extinguisher to bulkhead. |
| | SAFETY PIN | Safety pin goes through fire extinguisher handle to prevent accidental discharge of extinguisher. |
| | HANDLES | Handle has two parts, one part is fixed and the other moveable. Extinguisher is discharged when safety pin is removed and the moveable part of handle is squeezed toward fixed part of handle. |

Table 17. THERMOSTATIC FAN SPEED SWITCH BYPASS BUTTON

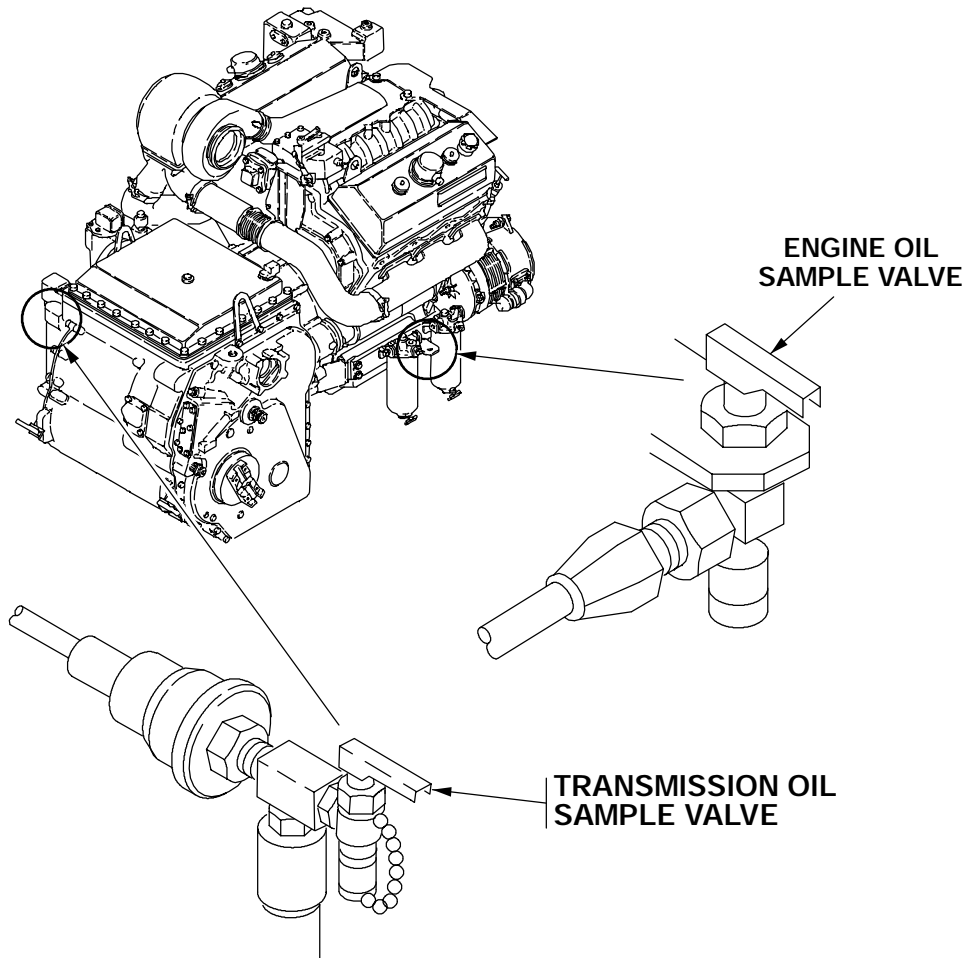


THERMOSTATIC FAN SPEED SWITCH BYPASS BUTTON (OLD CONFIGURATION)

MANUAL FAN SPEED OVERRIDE SWITCH (NEW CONFIGURATION)

| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| | THERMOSTATIC FAN SPEED SWITCH BYPASS BUTTON (OLD CONFIGURATION) | Pushed to bypass thermostatic fan speed switch and change engine coolant fan from variable drive to constant drive. |
| | MANUAL FAN SPEED OVERRIDE SWITCH (NEW CONFIGURATION) | Allows you to change the variable speed coolant fan drive to a constant speed fan drive by bypassing the variable speed fan drive controller. |

Table 18. ARMY OIL ANALYSIS PROGRAM (AOAP) SAMPLING VALVES



| KEY | CONTROL OR INDICATOR | FUNCTION |
|-----|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>TRANSMISSION AOAP SAMPLING VALVE</p> <p>ENGINE AOAP SAMPLING VALVE</p> | <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Do not take AOAP sample until second oil change on new or rebuilt engines.</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">AOAP requires engine and transmission oil be sampled and checked for contaminants and metal particle. Refer to lubrication instructions for procedure WP 0040 00 on taking transmission and engine AOAP samples.</p> <p>Used to take sample of transmission oil.</p> <p>Used to take sample of engine oil.</p> |

OPEN AND CLOSE REAR ACCESS DOORS

0005 00

THIS WORK PACKAGE COVERS:

- Open Rear Access Doors From Inside OSV (WP 0005 00-1).
 - Close Rear Access Doors From Inside OSV (WP 0005 00-2).
 - Open Rear Access Doors From Outside OSV (WP 0005 00-2).
 - Close Rear Access Doors From Outside OSV (WP 0005 00-4).
-

INITIAL SETUP:Maintenance Level

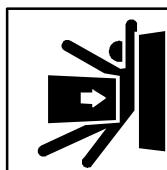
Operator

Equipment Conditions

Vehicle parked on level surface

Personnel Required

Crewmember

OPEN REAR ACCESS DOORS FROM INSIDE OSV**WARNING**

Rear access doors are heavy and can swing rapidly and strike personnel, causing death or injury.

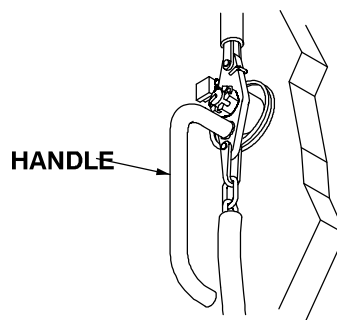
Do not stand behind doors. Keep rear of OSV clear of personnel before swinging doors open or closed.

Keep hands clear of path when doors are opened or closed. Keep hands clear of area between handle and door.

CAUTION

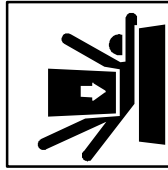
Commander must make sure that dismount troops are clear of vehicle and rear access doors are closed prior to vehicle movement.

1. Turn handle to unlatch right door.



2. Swing right door out until access door retainer engages in hold-open latch.
3. Pull down on left access door latch until left access door is released.
4. Swing left door out until access door retainer engages in hold-open latch.

CLOSE REAR ACCESS DOORS FROM INSIDE OSV

WARNING

Rear access doors are heavy and can swing rapidly and strike personnel, causing death or injury.

Do not stand behind doors. Keep rear of OSV clear of personnel before swinging doors open or closed.

Keep hands clear of path when doors are opened or closed. Keep hands clear of area between handle and door.

1. Pull rear access hold-open latch to release access doors.
2. Swing left access door closed.
3. Pull down on left access door latch until access door latch clears rear wall and door will close completely.
4. Release left access door latch to lock left door in place.
5. Swing right access door closed.
6. Lower inside door handle until it hits stop on handle.

OPEN REAR ACCESS DOORS FROM OUTSIDE OSV

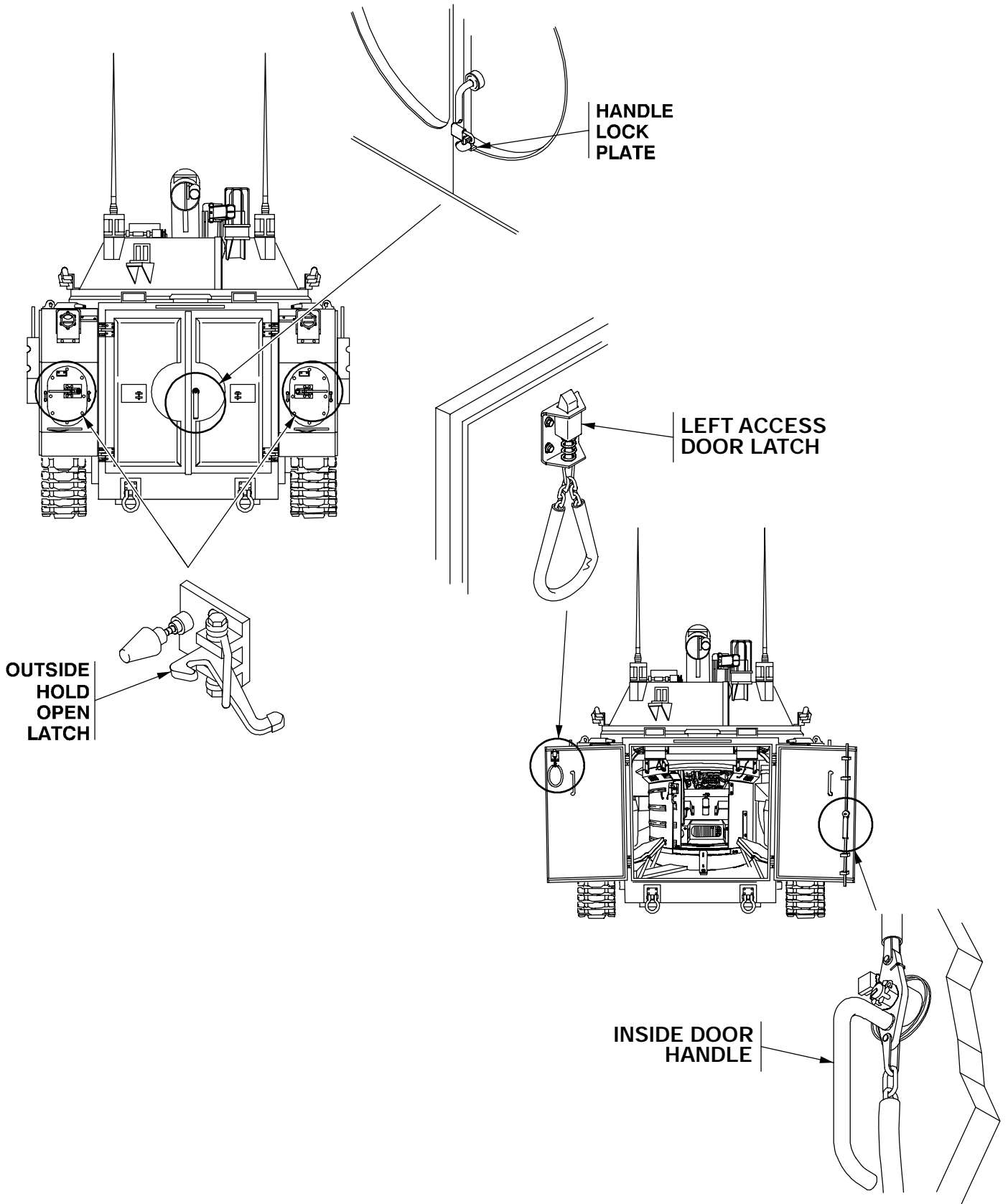
WARNING

Rear access doors are heavy and can swing rapidly and strike personnel, causing death or injury.

Do not stand behind doors. Keep rear of OSV clear of personnel before swinging doors open or closed.

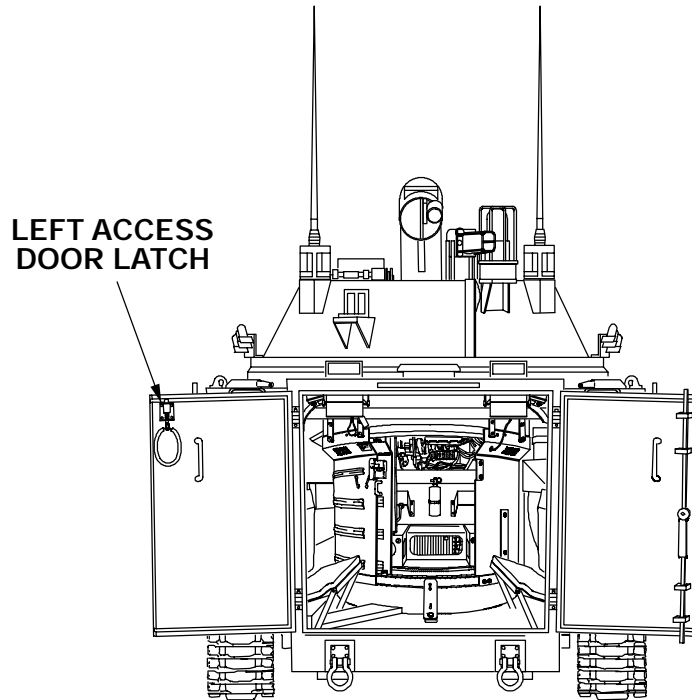
Keep hands clear of path when doors are opened or closed. Keep hands clear of area between handle and door.

1. Raise outside door handle until access door is released.
2. Swing access door out until door retainer engages hold-open latch.
3. Reach inside vehicle and pull down on left access door latch until access door releases.
4. Swing left access door out until door retainer engages hold-open latch.



CLOSE REAR ACCESS DOORS FROM OUTSIDE OSV

1. Pull rear access door hold open latch to release access doors.



2. Swing left access door closed.
3. Reach inside vehicle and pull down on left access door latch until access door latch clears rear wall and door will close completely.
4. Release left access door latch to lock left door in place.
5. Swing right access door closed.
6. Pull outside door handle down to secure door.
7. Close and latch all hatches, place padlock in outside door handle lock plate, and lock padlock.

END OF TASK

OPEN/CLOSE TURRET SHIELD DOOR

0006 00

THIS WORK PACKAGE COVERS:

- Open Turret Shield Door (WP 0006 00-1).
- Close Turret Shield Door (WP 0006 00-2).

INITIAL SETUP:

Maintenance Level

Operator

Personnel Required

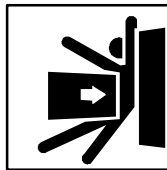
Crewmember

Equipment Conditions

- TURRET POWER switch set to OFF.
- Turret travel lock in LOCKED position.

OPEN TURRET SHIELD DOOR

WARNING



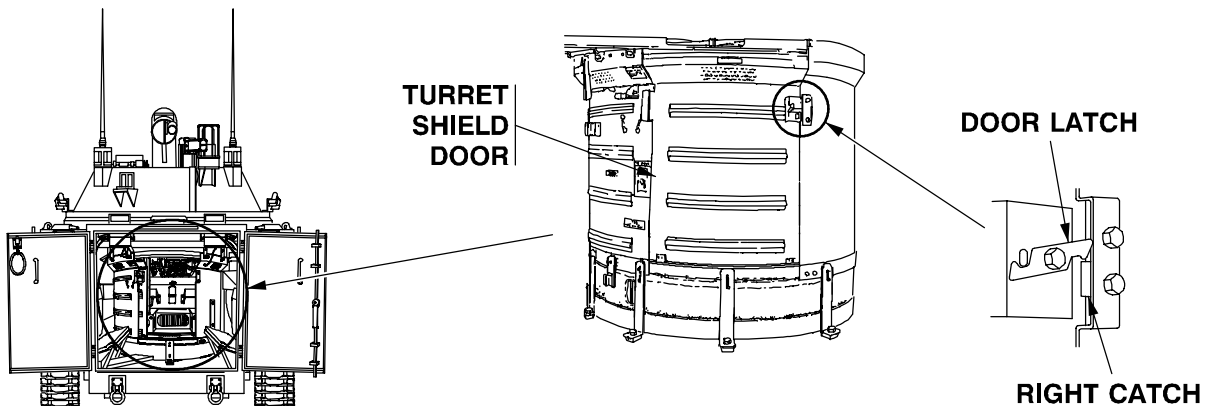
Turret can rotate and cause death or serious injury to personnel.

Do not reach through turret shield opening or enter/exit turret when turret power is on.

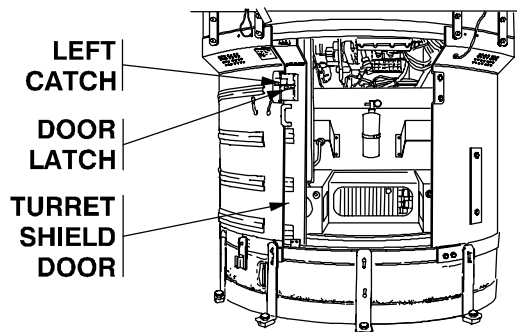
Keep turret shield door closed when turret drive power is on.

Engage turret travel lock before personnel enter turret or reach through turret shield opening.

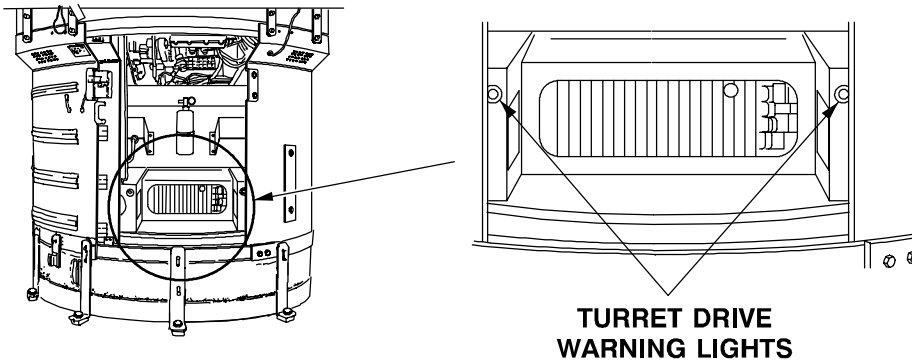
1. Push down on free end of door latch to release latch from right catch.



2. Slide turret shield door to left until door latch locks on left catch.

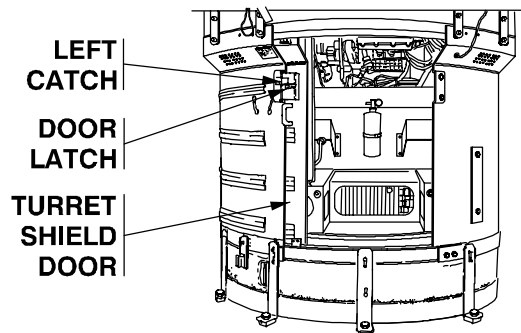


3. Check turret drive warning light. If light is on, do not enter turret.

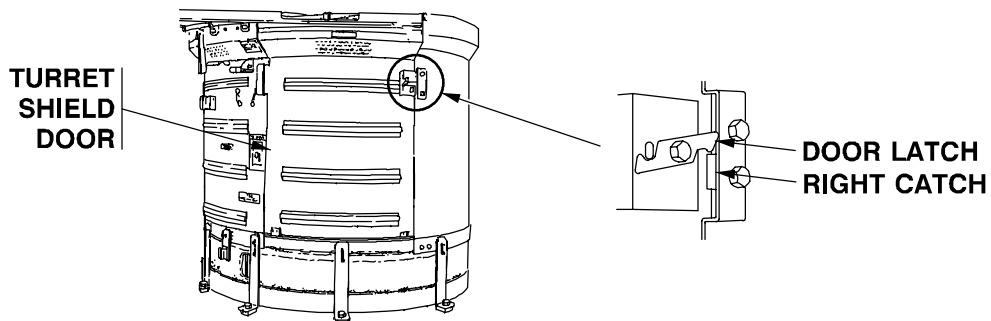


CLOSE TURRET SHIELD DOOR

1. Lift free end of door latch to release latch from left catch.



2. Slide turret shield door right until door latch locks on right catch.



END OF TASK

OPEN/CLOSE DRIVER'S HATCH

0007 00

THIS WORK PACKAGE COVERS:

- Open Driver's Hatch Cover (WP 0007 00-1).
 - Close Driver's Hatch Cover (WP 0007 00-4).
-

INITIAL SETUP:

Maintenance Level

Operator

Personnel Required

Driver

Equipment Conditions

Vehicle parked

Parking brake set (WP 0012 00)

OPEN DRIVER'S HATCH COVER

WARNING



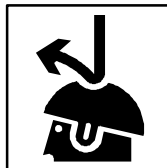
Falling hatch could seriously injure driver.

Keep head lower than closed hatch position when opening or closing hatch cover.

Fully engage latch pin or mechanism when hatch cover is in open position.

Support hatch cover with one hand before pushing hinge latch handle down. Keep hands clear of hatch rim when closing hatch cover.

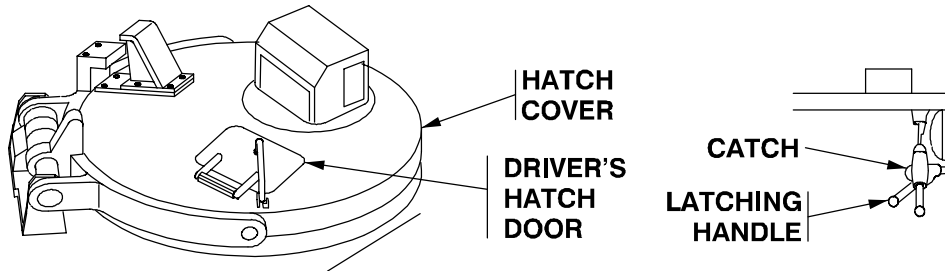
WARNING



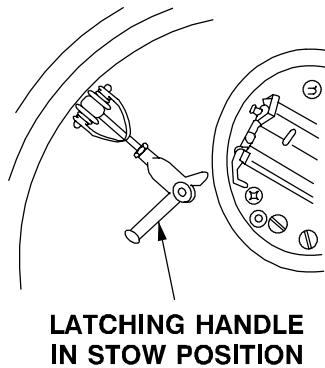
To avoid being struck by low-hanging obstacles, do not stand in open hatch while vehicle is moving.

Close hatch or put in pop-up position when operating in area with low-hanging obstacles.

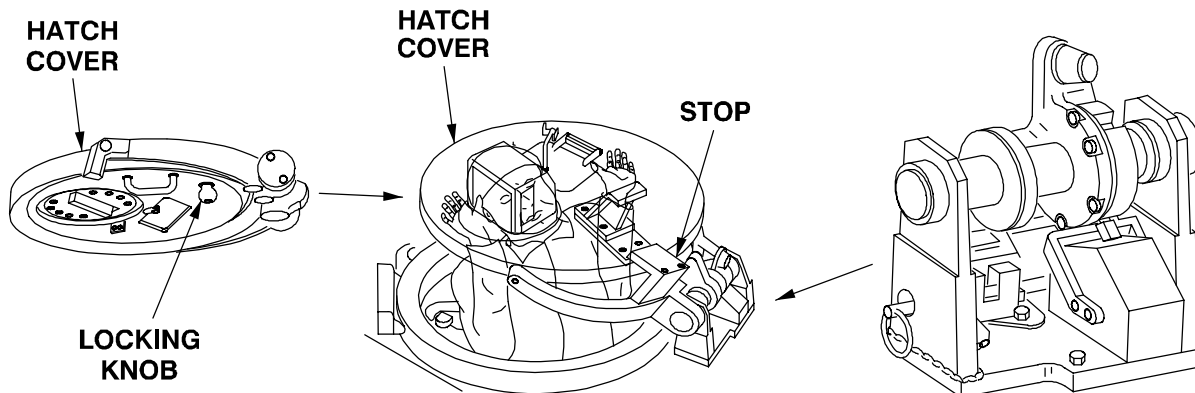
1. Remove padlock from driver's hatch door.
2. Rotate handle and open driver's hatch door.
3. Reach in through opening and pull latch handle until hatch cover unlocks.



4. Move latching handle to stowed position.



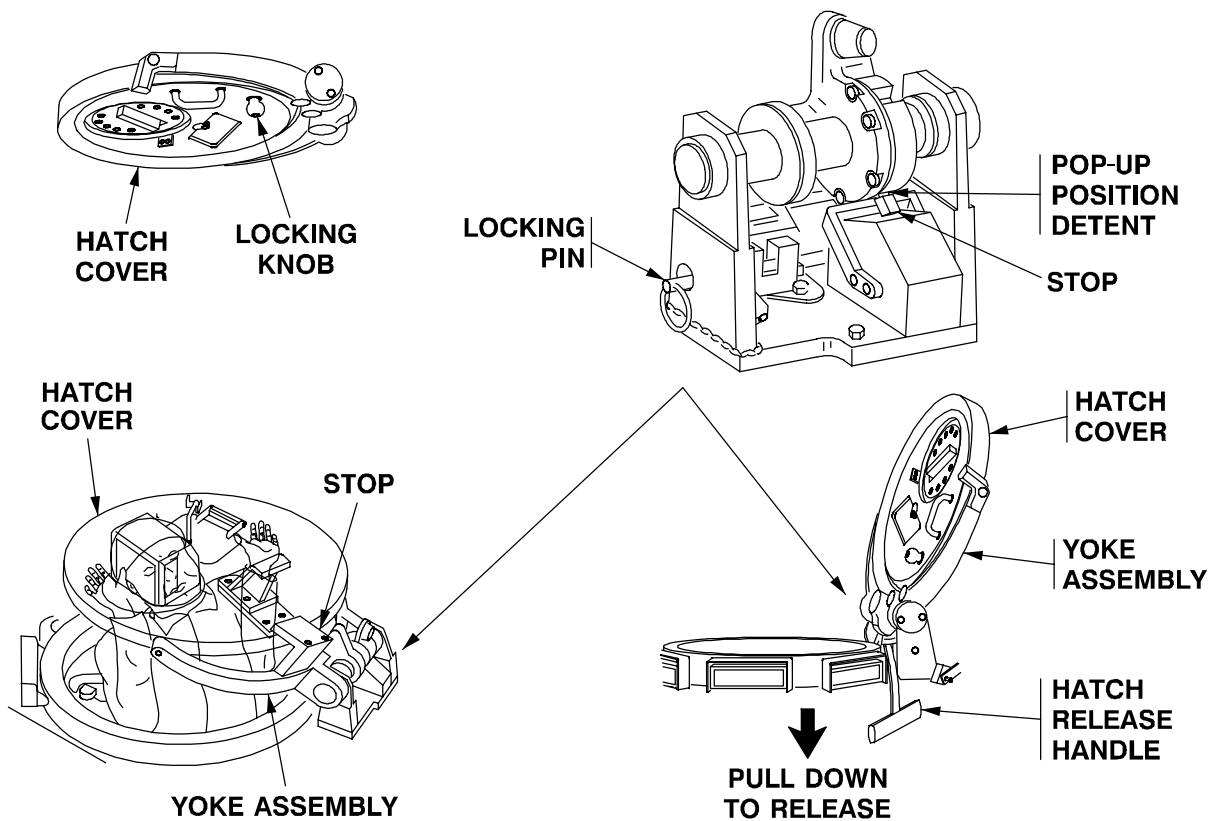
5. Pull locking knob toward center of hatch to release cover from hull.
6. Rotate back of hatch cover upward until cover contacts stop.
7. Pull down on locking knob and slide knob toward stop until slide bolt engages hole in stop. Release locking knob.
8. Support front and back of hatch cover and raise hatch cover and yoke assembly until stop engages pop-up detent in yoke assembly



9. Push locking pin in to secure hatch cover to yoke assembly.

10. To move hatch cover from pop-up to fully open, proceed as follows:

- a. Pull locking pin to retracted position.
- b. Push up on hatch cover and pull down on hatch release handle.
- c. When stop is clear of detent, release hatch release handle and push hatch cover and yoke assembly until stop engages full open detent.
- d. Push in locking pin to secure hatch cover to yoke assembly.



CLOSE DRIVER'S HATCH COVER

WARNING

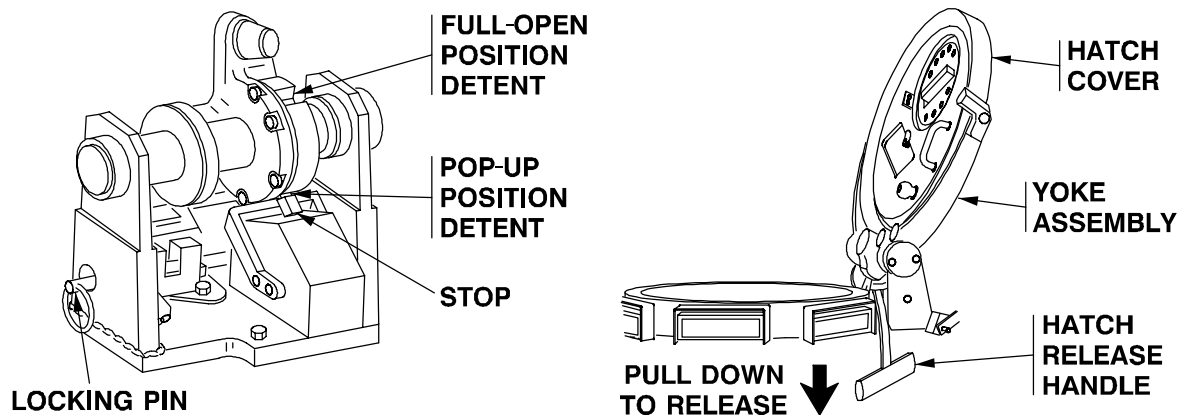
Falling hatch could seriously injure driver.

Keep head lower than closed hatch position when opening or closing hatch cover.

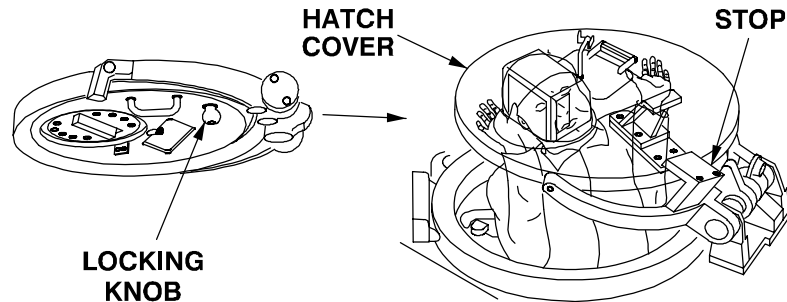
Fully engage latch pin or mechanism when hatch cover is in open position.

Support hatch cover with one hand before pushing hinge latch handle down. Keep hands clear of hatch rim when closing hatch cover.

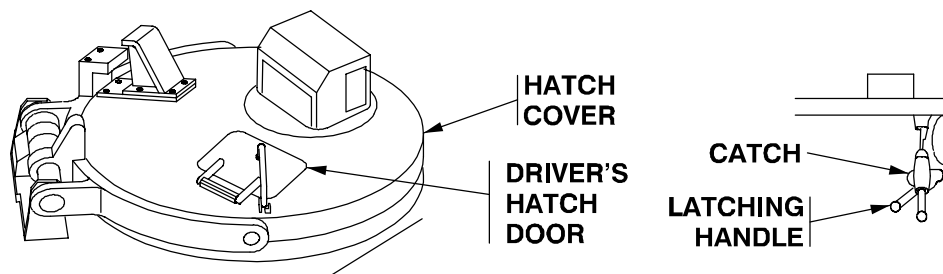
1. Pull locking pin to retracted position.
2. Pull down on hatch release handle.
3. If going from full open position to pop-up position, proceed as follows:
 - a. Release hatch release handle when stop is clear of full open position detent.
 - b. Lower hatch cover and yoke assembly until stop engages pop-up position detent.



4. When hatch cover is nearly closed, pull down on locking knob and slide knob away from stop.
5. Rotate front of hatch cover up and pull hatch cover closed.
6. Pull down on locking knob and slide knob away from center of hatch until cover is secured to hull.



7. Move latch handle into position under catch and push bottom of latch handle until latch engages catch.
8. Close driver's hatch release door.
9. Rotate handle to closed position and install padlock to secure vehicle.



END OF TASK

OPEN/CLOSE NOSE ACCESS DOORS

0008 00

THIS WORK PACKAGE COVERS:

- Open Nose Access Doors (WP 0008 00-1).
- Close Nose Access Doors (WP 0008 00-2).
- Open Engine Access Cover (WP 0008 00-2).
- Close Engine Access Cover (WP 0008 00-3).

INITIAL SETUP:**Maintenance Level**

Operator

Personnel Required

2 Crewmembers

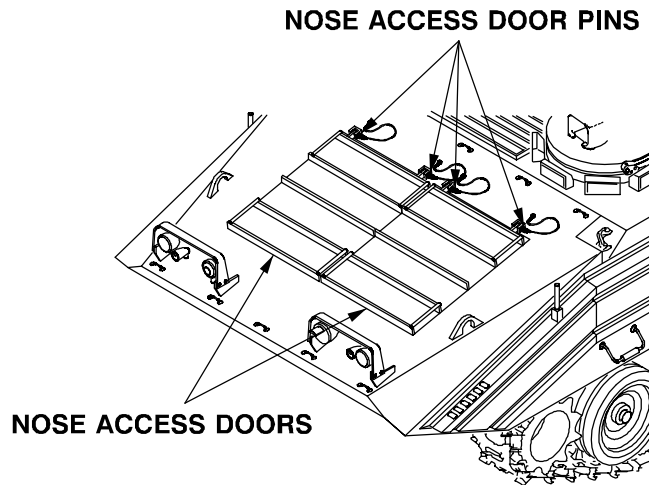
Equipment Conditions

- Engine stopped (WP 0016 00)
- Parking brake set (WP 0012 00)
- Vehicle blocked (WP 0029 00)

OPEN NOSE ACCESS DOORS**CAUTION**

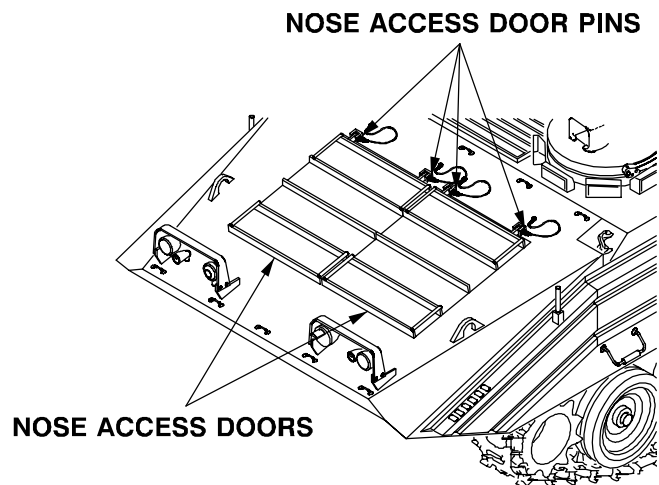
After removal, do not place doors over vehicle grill if engine is to be operated. Doors could cause an air restriction and engine overheating. High winds can blow access doors off vehicle.

1. Remove pins securing nose access doors.
2. Remove nose access doors from flange.



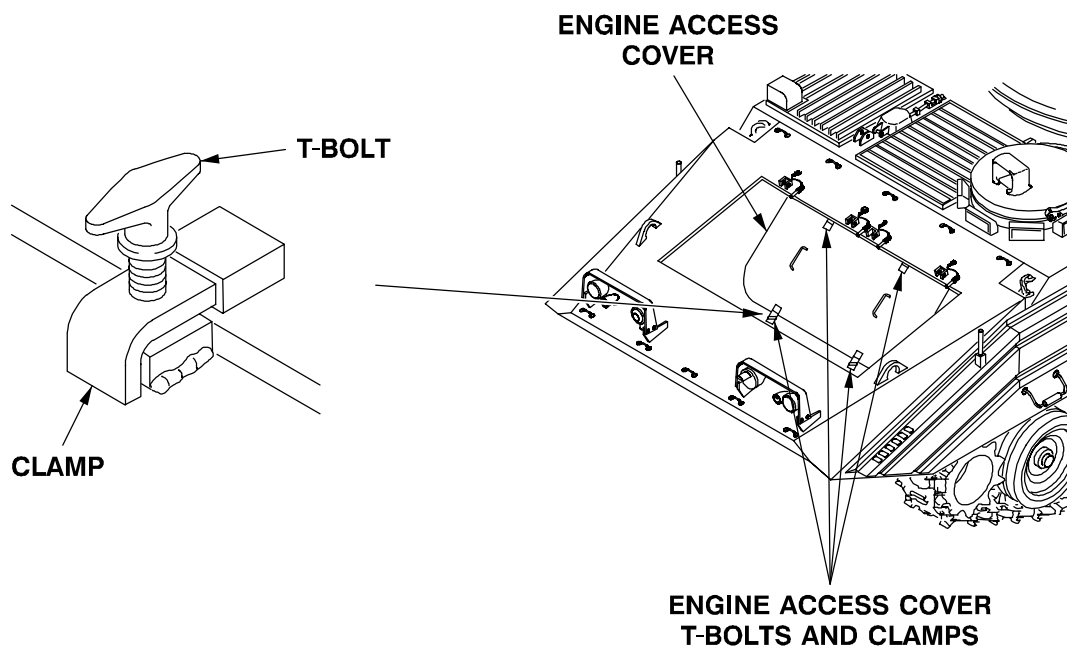
CLOSE NOSE ACCESS DOORS

1. Place nose access doors in flange.
2. Install pins securing nose access doors.



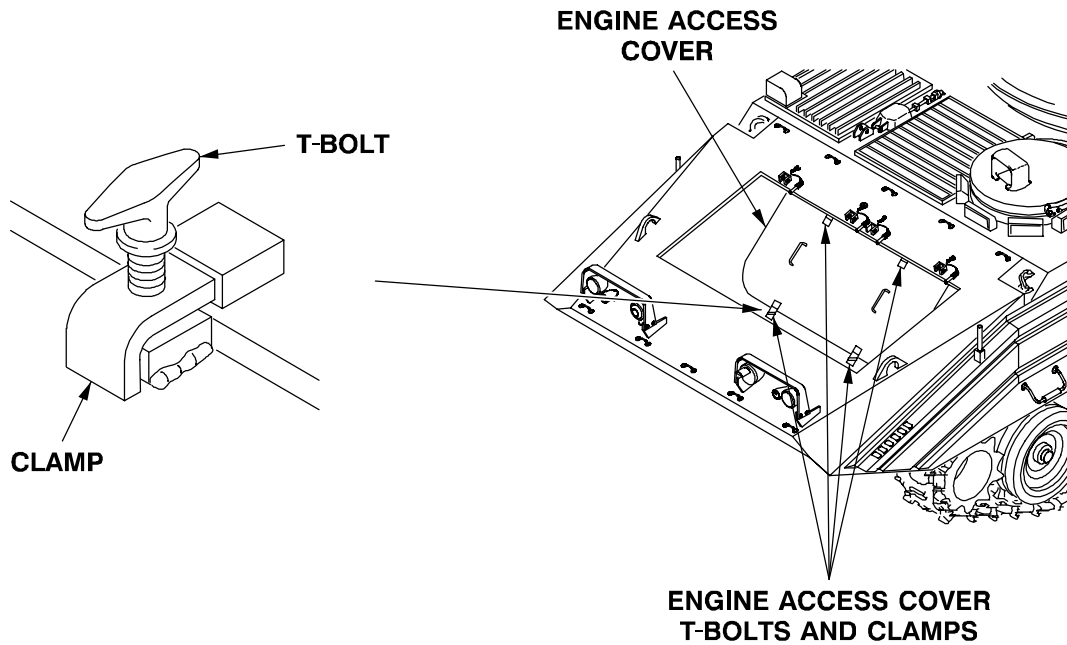
OPEN ENGINE ACCESS COVER

1. Loosen T-bolts and clamps securing engine access cover.
2. Remove engine access cover from flange.



CLOSE ENGINE ACCESS COVER

1. Place engine access cover in flange.
2. Position clamps over engine access cover and tighten T-bolts.

**END OF TASK**

ADJUST DRIVER'S SEAT

0009 00

THIS WORK PACKAGE COVERS:

- Raise or Lower Driver's Seat (WP 0009 00-1).
- Move Driver's Seat Forward/Back (WP 0009 00-2).

INITIAL SETUP:

Maintenance Level

Operator

Equipment Conditions

Engine stopped (WP 0016 00)

Personnel Required

Driver

RAISE OR LOWER DRIVER'S SEAT

WARNING



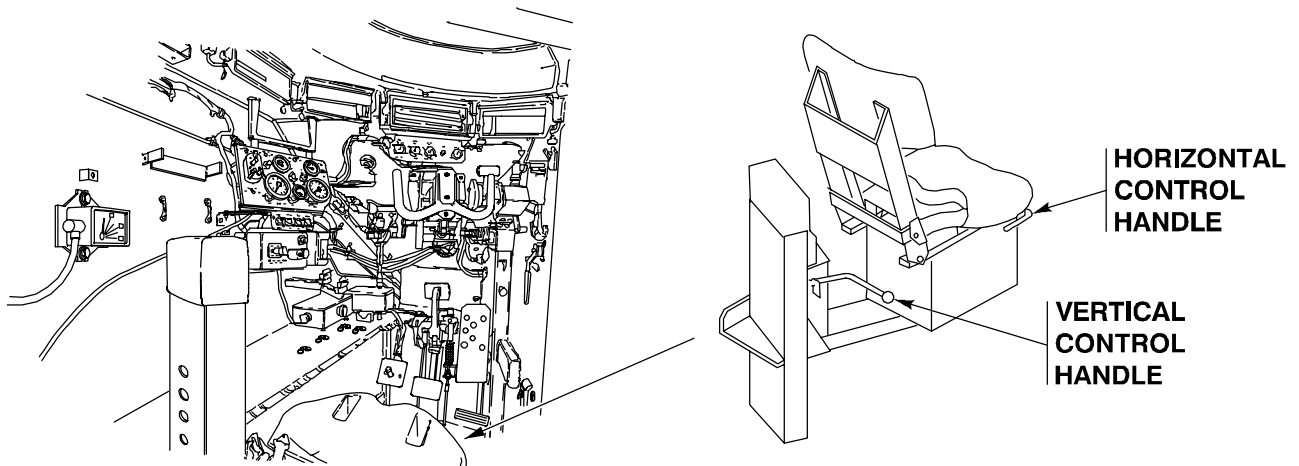
Seat may move suddenly up or down when the control knob is released and cause injury to personnel.

Keep hands away from seat post. Lift body weight off seat before releasing control knob. Body weight is used to control movement of seat.

CAUTION

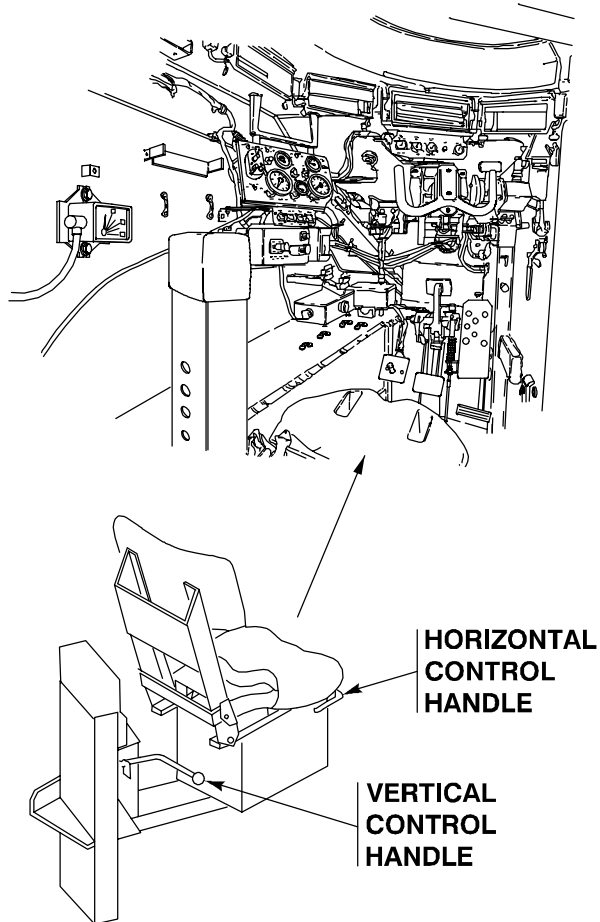
Do not step on seat back when entering or exiting vehicle. Damage to seat back will result.

1. Sit in driver's seat.
2. Lift weight slightly off seat and pull up on vertical control handle.
3. Using body weight, raise/lower seat to desired position.
4. Release vertical control handle.



MOVE DRIVER'S SEAT FORWARD/BACK

1. Pull up on horizontal control handle to release driver's seat.
2. Move driver's seat to front or rear.
3. Release horizontal control handle to lock driver's seat in place.

**END OF TASK**

ADJUST DRIVER'S LAP SEAT BELT

0010 00

THIS WORK PACKAGE COVERS:

Tighten or Loosen Driver's Lap Seat Belt (WP 0010 00-1).

INITIAL SETUP:

Maintenance Level

Operator

Equipment Conditions

Engine stopped (WP 0016 00)

Personnel Required

Driver

TIGHTEN OR LOOSEN DRIVER'S LAP SEAT BELT

WARNING



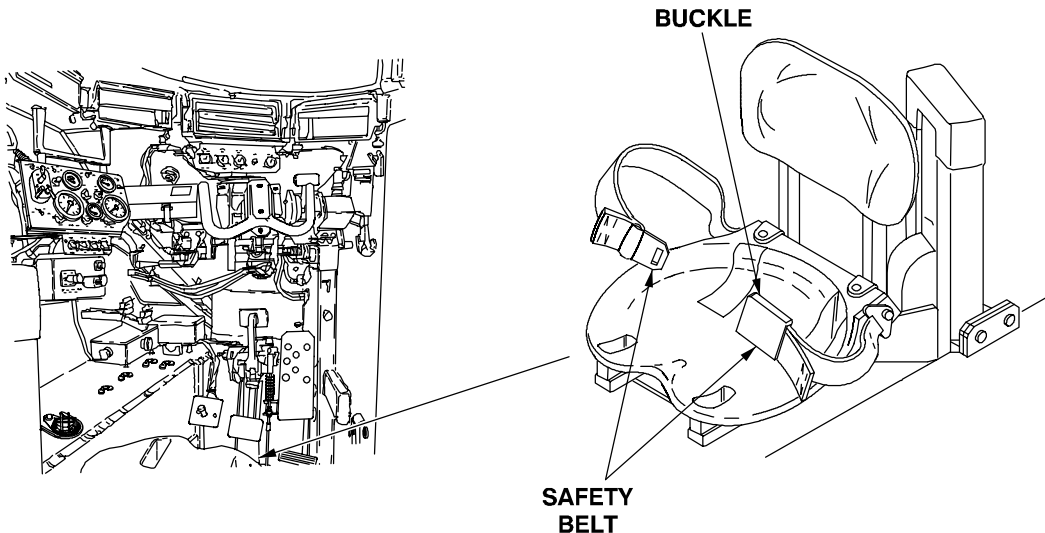
Personnel can be injured using unsecured seats or seats with missing or inoperative seat belts during OSV operation.

Keep seat pins or latches and buckles in place and seat belts functional before personnel use the seat.

CAUTION

Do not use the seat if seat pins and latches are not in place or are not functional.

1. Check seat belt pins and latches.
2. Sit in driver's seat.
3. Adjust lap seat belt so that buckle is centered on your lap.
4. Fasten lap seat belt.



END OF TASK

CONNECT DRIVER'S CVC HELMET TO INTERCOM CONTROL BOX

0011 00

THIS WORK PACKAGE COVERS:

Connect Driver's CVC Helmet to Intercom System (WP 0011 00-1).

INITIAL SETUP:

Maintenance Level

Operator

References

TM 11-5820-498-12

Personnel Required

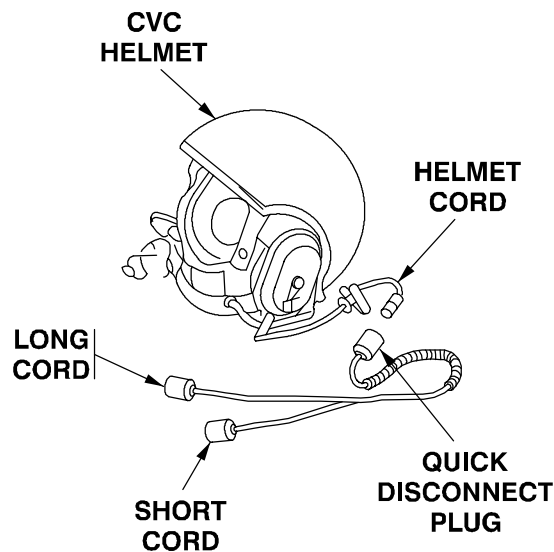
Driver

CONNECT DRIVER'S CVC HELMET TO INTERCOM SYSTEM

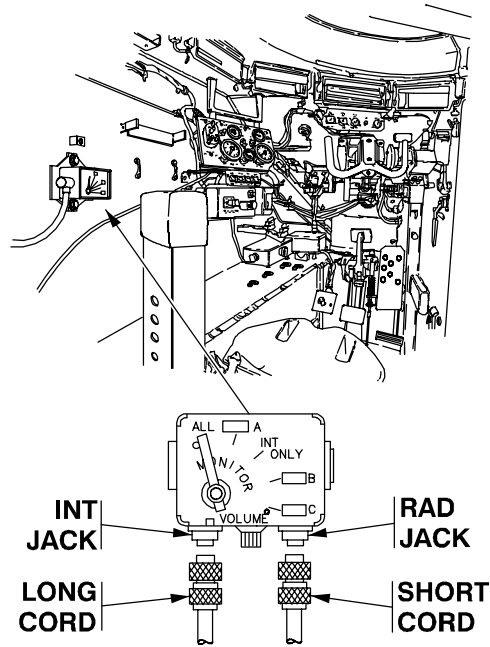
NOTE

For more information on radio equipment, refer to TM 11-5820-890-10-8.

1. Connect helmet cord to quick disconnect (QD) plug on intercom extension line.



2. Connect extension line long cord to INT jack on intercom control box.
3. Connect extension line short cord to RAD jack on intercom control box.



END OF TASK

SET/RELEASE PARKING BRAKE

0012 00

THIS WORK PACKAGE COVERS:

Set Parking Brake (WP 0012 00-1).

Release Parking Brake (WP 0012 00-2).

INITIAL SETUP:Maintenance Level

Operator

Equipment Conditions

Engine stopped (WP 0016 00)

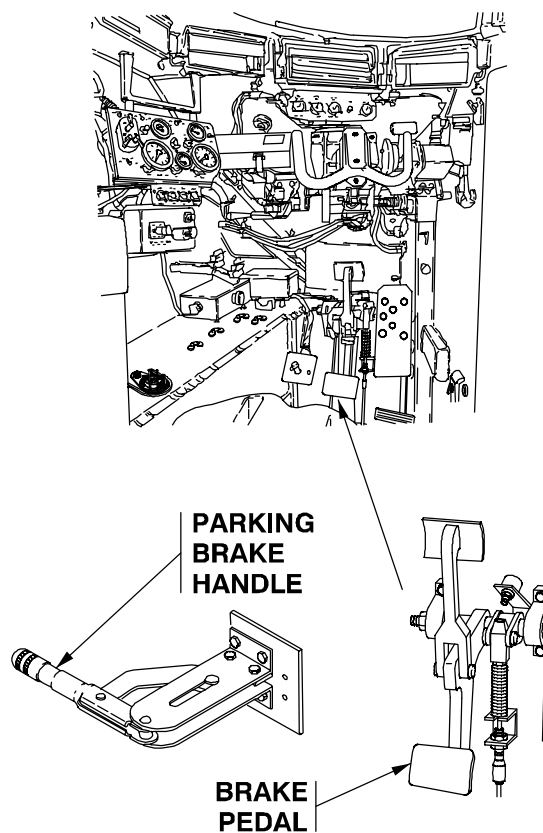
Personnel RequiredDriver

SET PARKING BRAKE

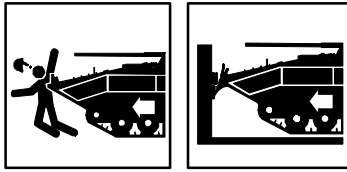
1. Press brake pedal.

NOTE**If both tracks are broken, parking brake will not hold.**

2. Set parking brake by pulling the brake handle.
3. Release brake pedal.

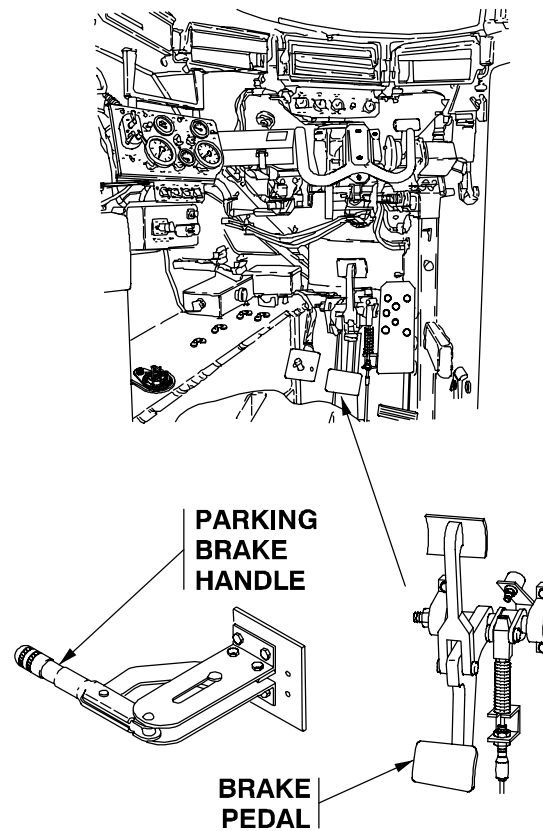


RELEASE PARKING BRAKE

WARNING

Releasing parking brake could allow vehicle to move and cause injury or death to personnel and/or damage to vehicle and equipment. Press foot brake to prevent OSV movement when parking brake is released.

1. Press down and hold brake pedal.
2. Release parking brake by pushing the brake handle.
3. Release brake pedal.



END OF TASK

START ENGINE

0013 00

THIS WORK PACKAGE COVERS:

Prepare to Start Engine (WP 0013 00-1).

Start Engine above +40° F (+4° C) (WP 0013 00-6).

Start Engine -25° F to +40° F (-32° C to +4° C) (WP 0013 00-8).

INITIAL SETUP:

Maintenance Level

Operator

Equipment Conditions

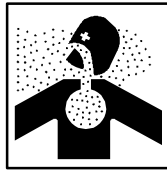
Engine stopped (WP 0016 00)

Personnel Required

Driver

PREPARE TO START ENGINE

WARNING



Engine and personnel heater exhausts are poisonous. Close power unit access doors before starting engine to prevent exhaust gases from entering personnel areas.

NBC mask will not protect personnel from exhaust poisoning.

CAUTION

Operate the engine with at least one fuel return line and one fuel supply line open. If both fuel return lines are closed, damage to engine can occur.

1. Check that fuel return line and fuel supply lines are open.
2. Check that driver's engine access cover is closed (WP 0023 00).

CAUTION

Install seat pins and latches and ensure seat belts are functional before using seat.

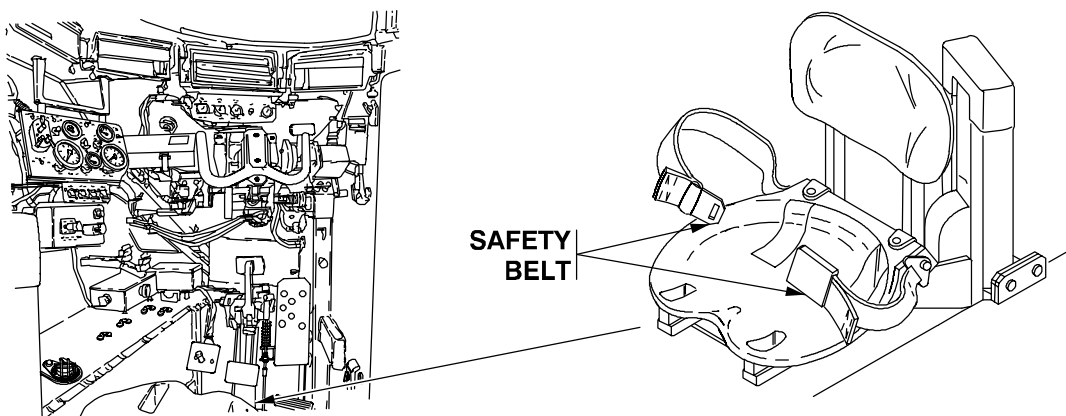
3. Check that seat belts and securing pins and latches are installed (WP 0010 00).

WARNING

Personnel can be injured using unsecured seats or seats with missing or inoperative seat belts during OSV operation.

Keep seat pins or latches and buckles in place and seat belts functional before personnel use the seat.

4. Fasten lap safety belt (WP 0010 00).



5. Check that parking brake is set (WP 0012 00)

CAUTION

Engine start can cause damage to radio components. Turn the radio power off before starting engine.

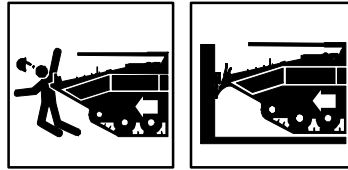
6. Check that RADIO POWER switch is set to OFF. See TM 11-5820-890-10-8.

WARNING

Vehicle and power plant noise caused by OSV operation can cause permanent hearing damage to personnel.

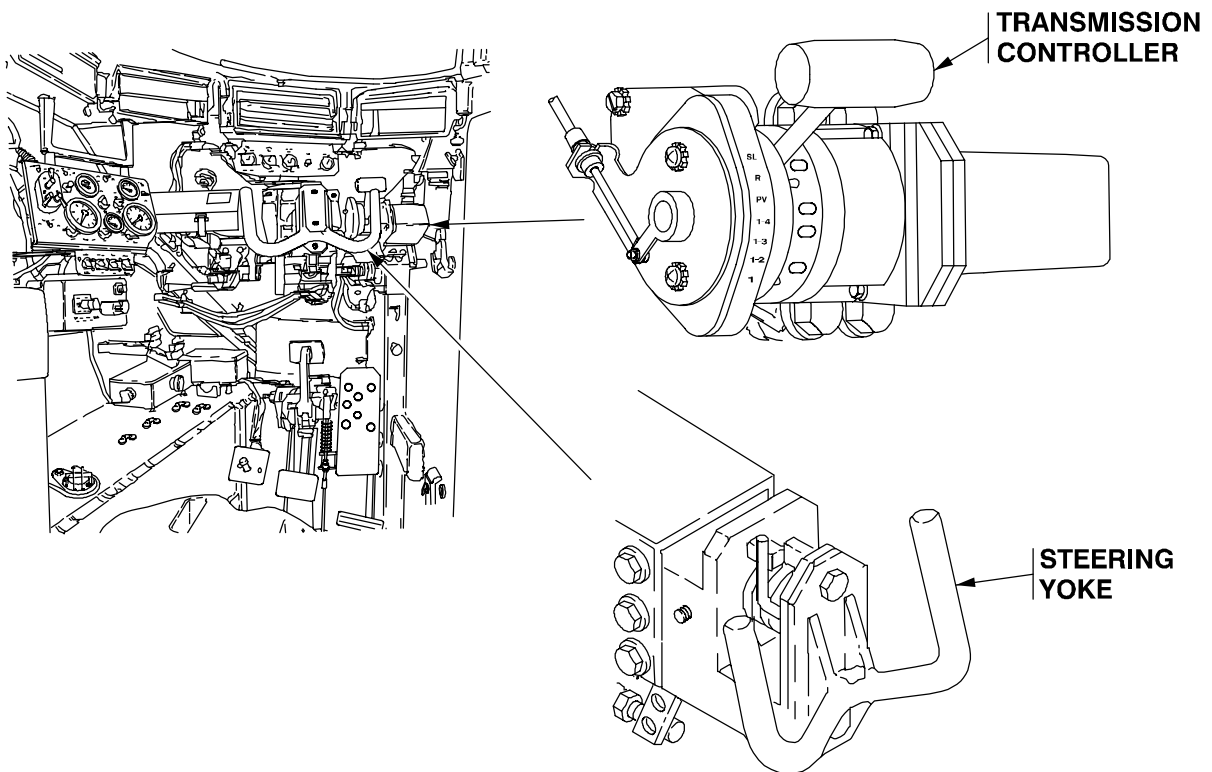
Wear hearing protection when in or near an operating vehicle or power plant.

7. Put on CVC helmet and connect helmet to intercom control box (WP 0011 00).

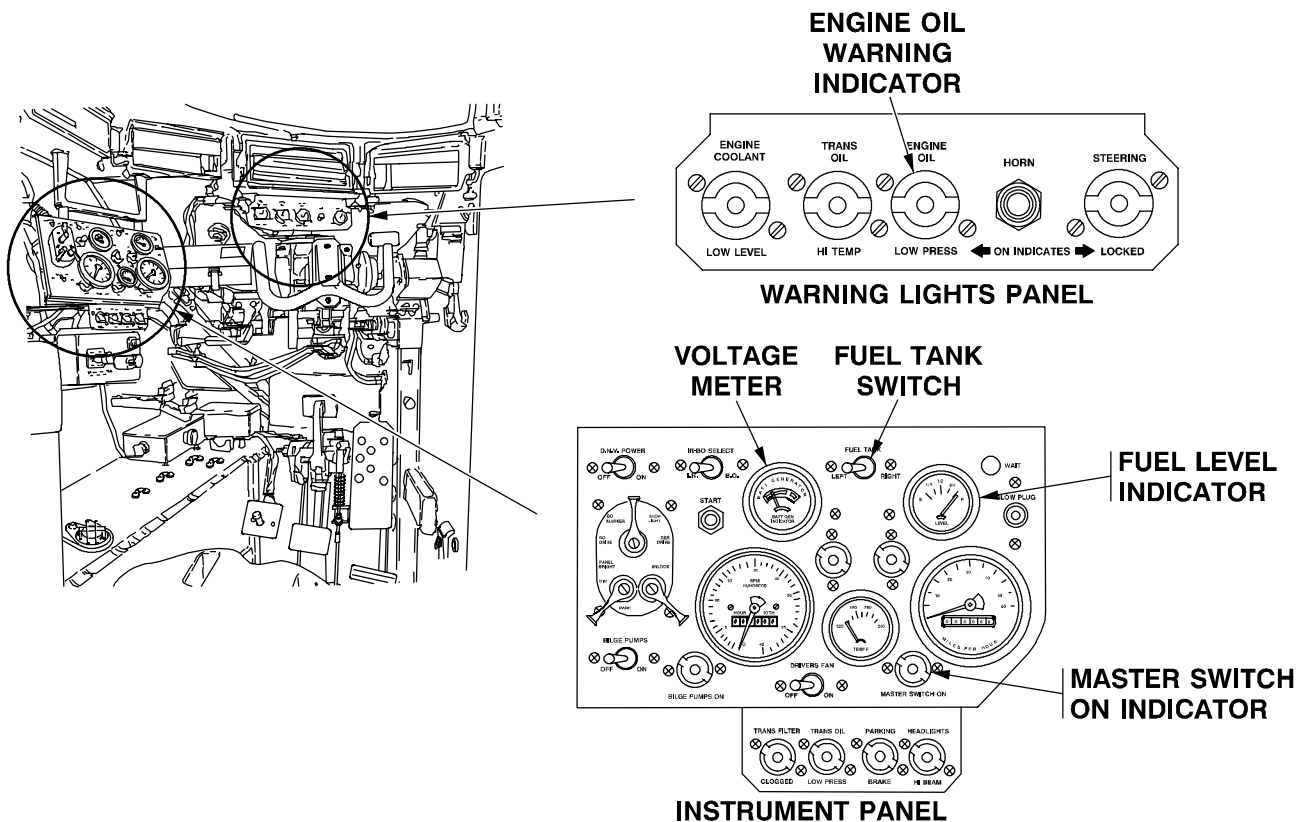
WARNING

Center steering yoke when starting engine. Clear area around OSV of personnel before starting engine. When transmission controller is set to SL and steering yoke is not centered to engage locking pin, OSV could pivot when started and cause death or injury to personnel and/or damage to vehicle and equipment.

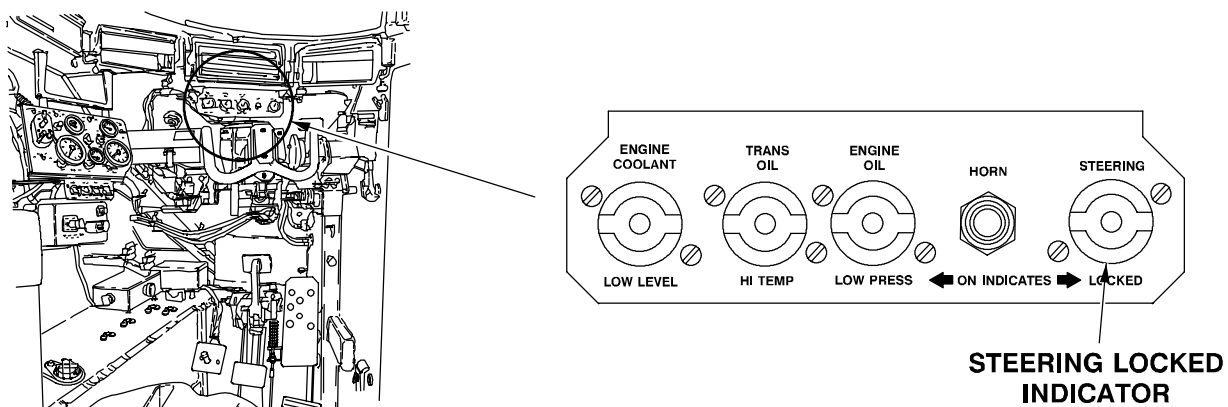
8. Make sure that steering yoke is centered and locked in place, and place transmission controller in SL position.



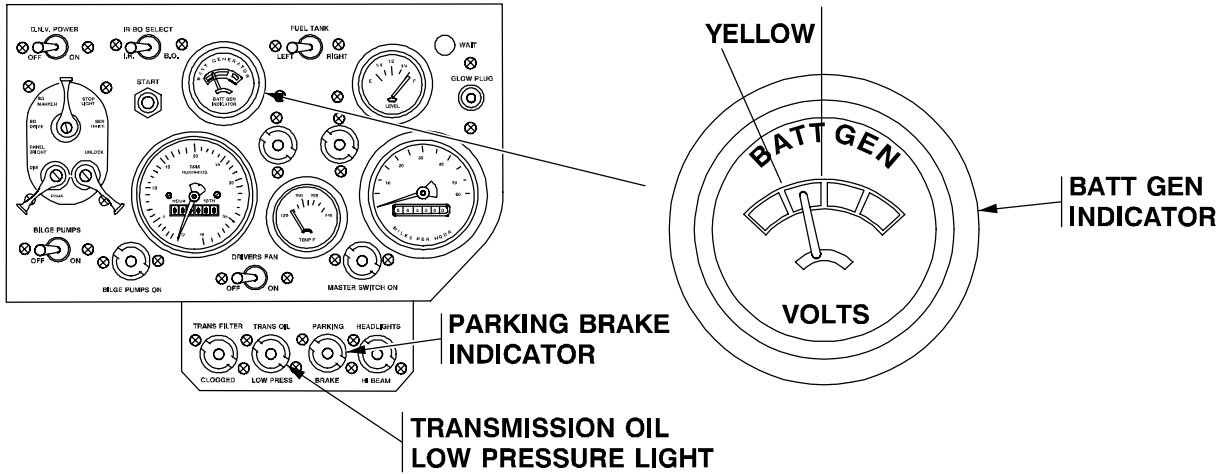
9. Set MASTER SWITCH to ON.
10. Check instrument panel and warning lights for unusual readings.
11. Check that instrument panel gauges and indicators show following:
 - a. MASTER SWITCH ON indicator is lit
 - b. ENGINE OIL LOW PRESS indicator is lit
 - c. BATT GEN INDICATOR needle in green or yellow zone
 - d. fuel LEVEL indicator shows amount of fuel in the selected tank
 - e. remaining indicators/gauges off



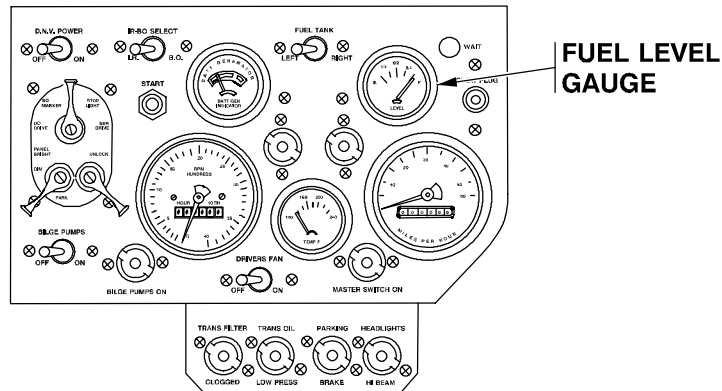
12. Check that STEERING LOCKED INDICATOR is on.



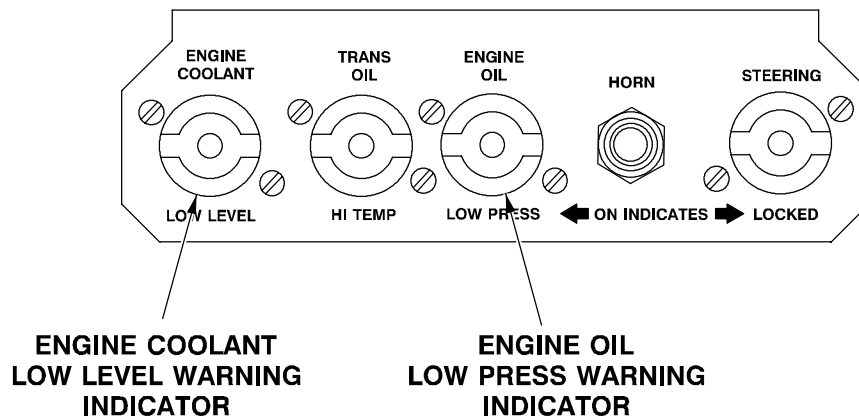
13. Check that PARKING BRAKE indicator is on.
14. Check that transmission oil low pressure light is on.
15. Check that BATT GEN needle is in yellow zone.



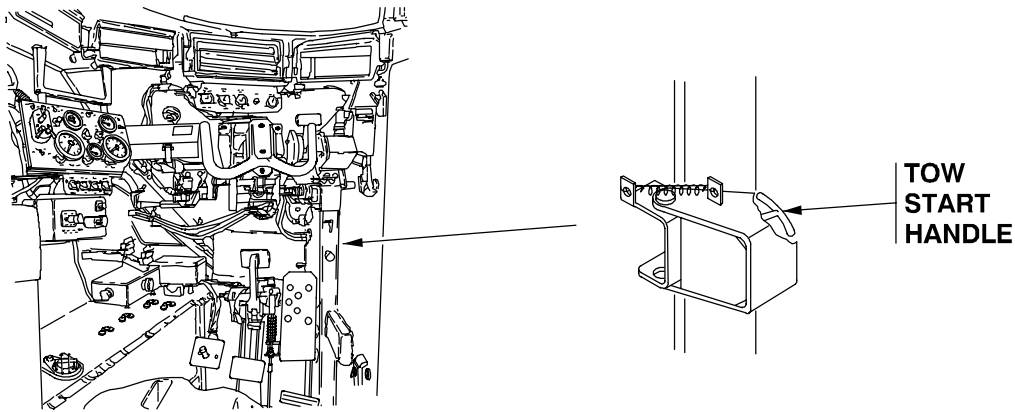
16. Check that LEVEL gauge shows amount of fuel in selected tank.



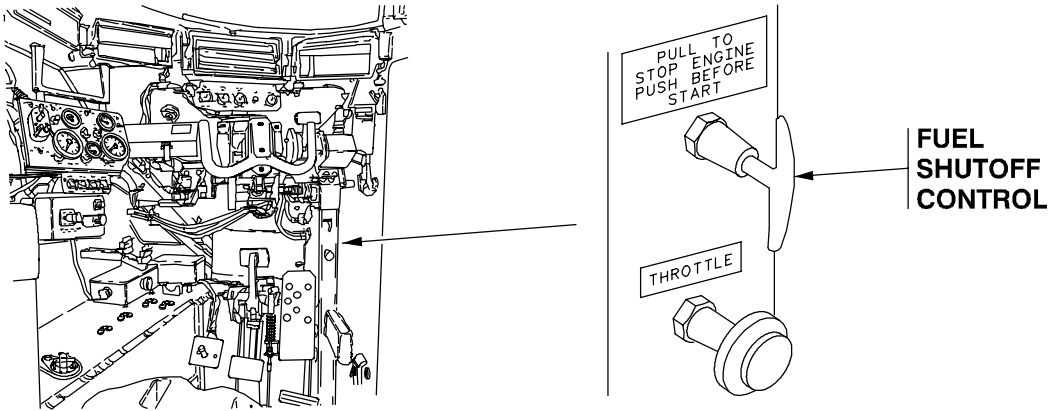
17. Check that ENGINE OIL LOW PRESS indicator is on.
18. Check that ENGINE COOLANT LOW LEVEL indicator is off.



19. Check that tow handle is pushed completely in.



20. Push FUEL CUTOFF control in.



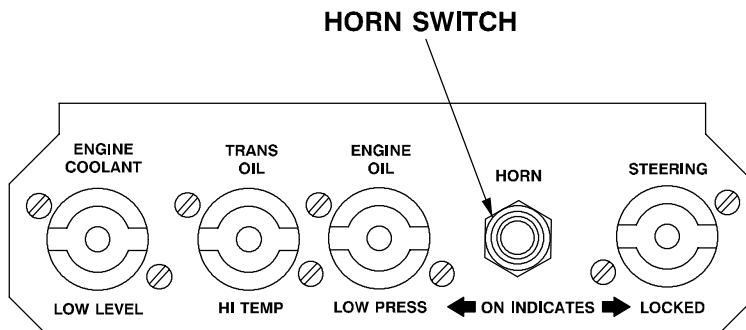
21. Check temperature. Do START ENGINE ABOVE +40° F (+4° C) (WP 0013 00) or START ENGINE -25° F to +40° F (-32° C to +4° C) (WP 0013 00) as applicable.

START ENGINE ABOVE +40° F (+4° C)

NOTE

If tactical situation permits, sound horn to warn personnel that engine is to be started.

1. If applicable, press HORN switch.



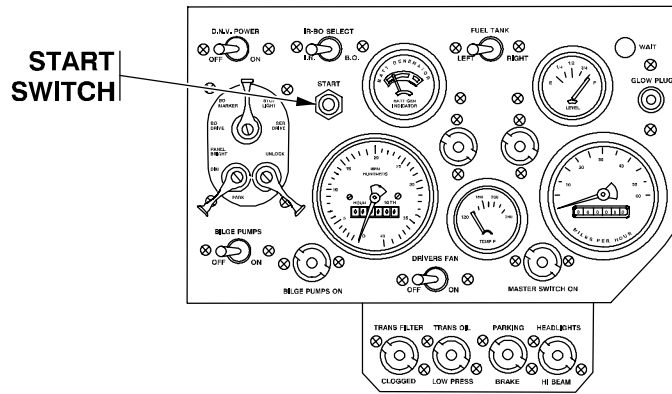
CAUTION

Do not hold START switch down for more than 15 seconds. Pushing START switch for more than 15 seconds when temperature is above +40° F (+4° C) can damage starter.

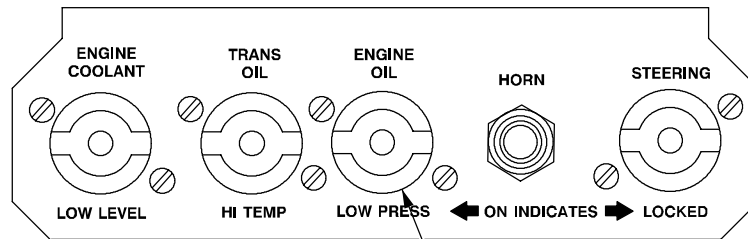
CAUTION

If engine does not start on first try, wait a minimum of 30 seconds before pushing START switch. Do not hold switch for more than 15 seconds.

2. Push and hold START switch until engine starts (maximum of 15 seconds). If engine does not start, proceed as follows:
 - a. Push START switch again.
 - b. If engine does not start, wait 30 seconds and push START switch for 15 seconds. If engine still does not start, notify your supervisor.

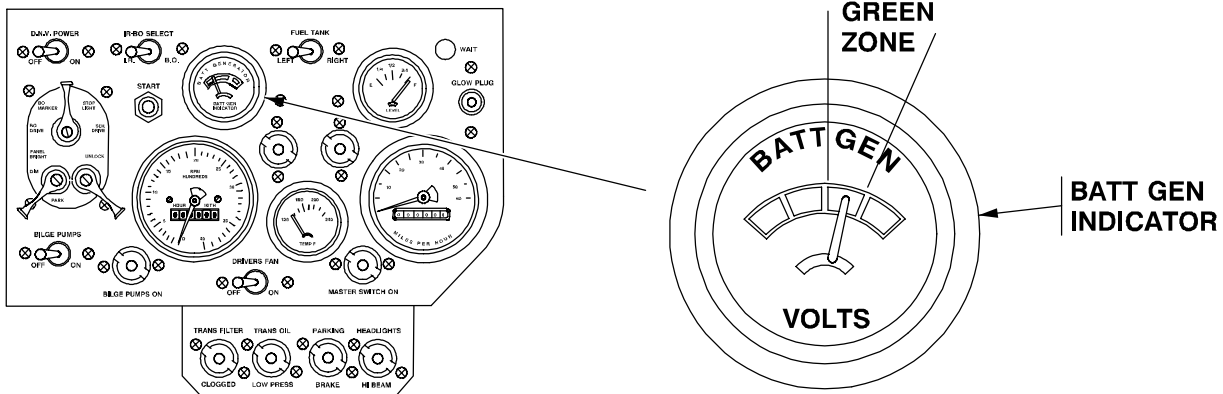


3. After engine has started for 10 seconds, check that ENGINE OIL LOW PRESS indicator goes out.

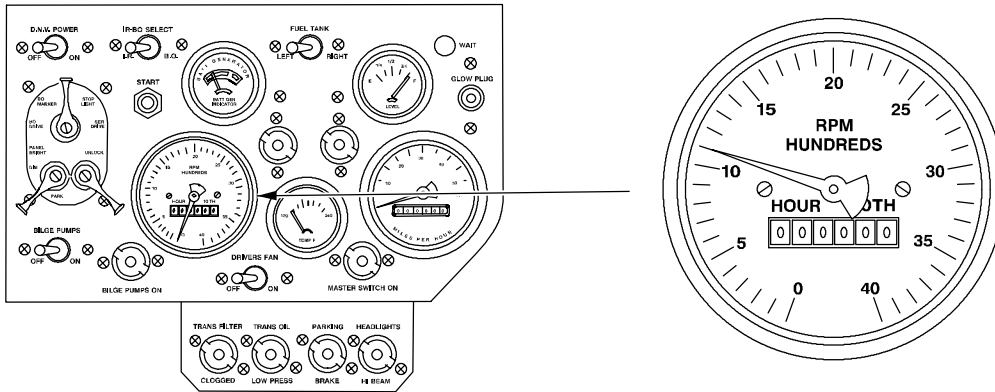


**ENGINE OIL
LOW PRESS WARNING
INDICATOR**

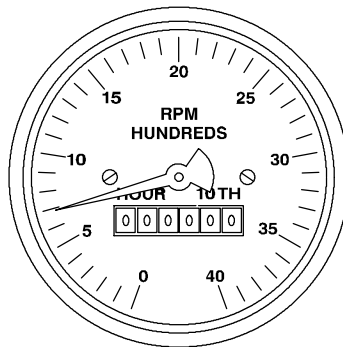
4. Check that BATT GEN indicator needle points to green zone.



5. Push accelerator until tachometer shows 1000 to 1200 rpm.



6. After 3 to 5 minutes, release accelerator. Tachometer should drop to 650 to 700 rpm (normal idle speed).

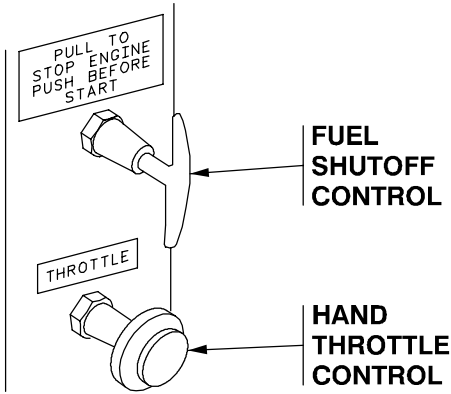


7. If vehicle is to be driven, proceed per DRIVE OSV (WP 0015 00).

START ENGINE -25° F TO +40° F (-32° C TO +4° C)

1. Make sure that MASTER SWITCH is set to ON and MASTER SWITCH indicator is lit.

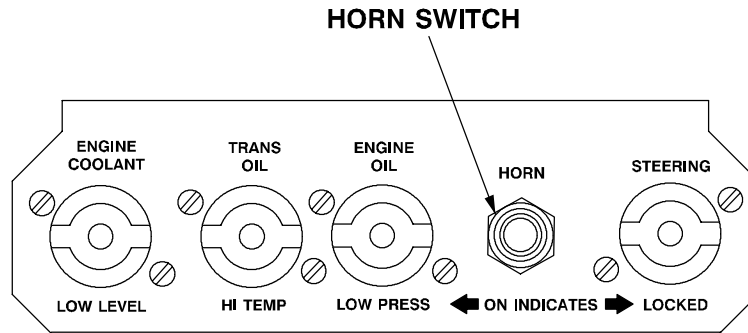
2. Push in FUEL SHUTOFF control.



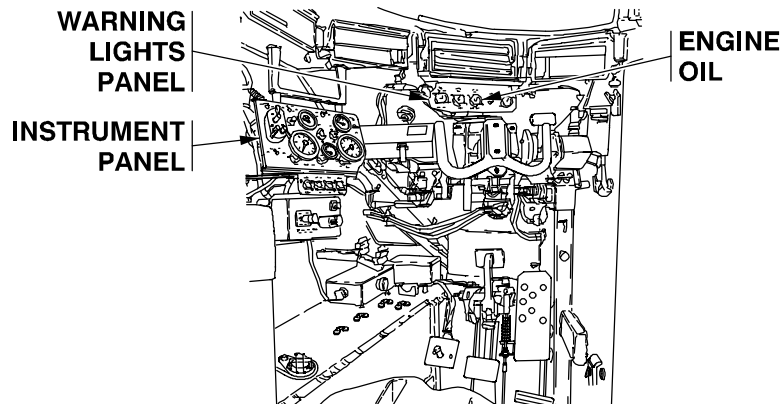
NOTE

If tactical situation permits, sound horn to warn personnel that engine is to be started.

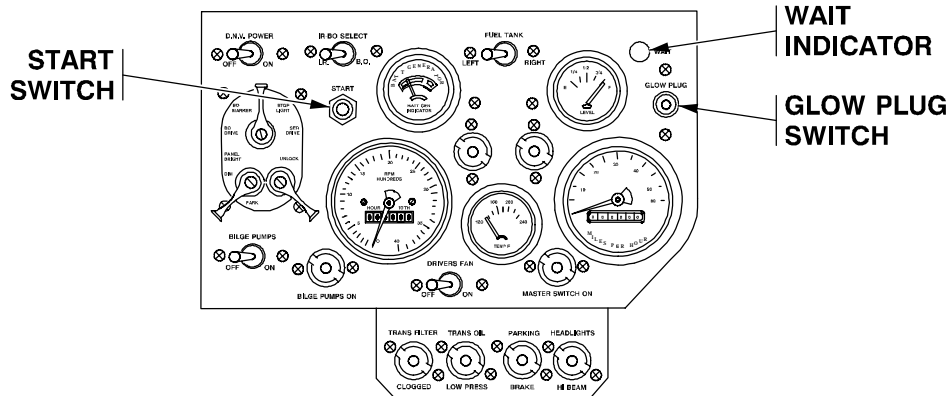
3. If applicable, press HORN switch.



4. Check instrument panel and warning lights for unusual readings.



7. Push GLOW PLUG switch up and release switch.



CAUTION

Do not hold START switch for more than 5 seconds and do not move engine THROTTLE.

NOTE

If START switch is not pushed within one minute after WAIT indicator starts to flash, WAIT indicator will go out.

8. When glow plug WAIT indicator starts to flash (approximately 35 seconds after GLOW PLUG switch is released), push START switch for maximum of 5 seconds. If engine does not start, proceed as follows:
 - a. After 10 seconds, push START switch for maximum of 5 seconds.
 - b. If engine does not start, wait 10 seconds and push START switch for a maximum of 5 seconds.

CAUTION

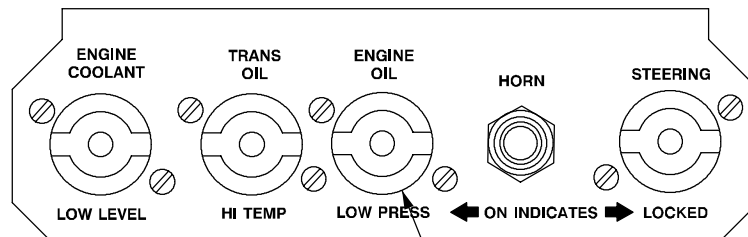
If engine does not start after four tries or glow plug WAIT indicator goes out, do not try to start engine.

- c. Wait 10 seconds and push START switch. If engine does not start notify your supervisor.

NOTE

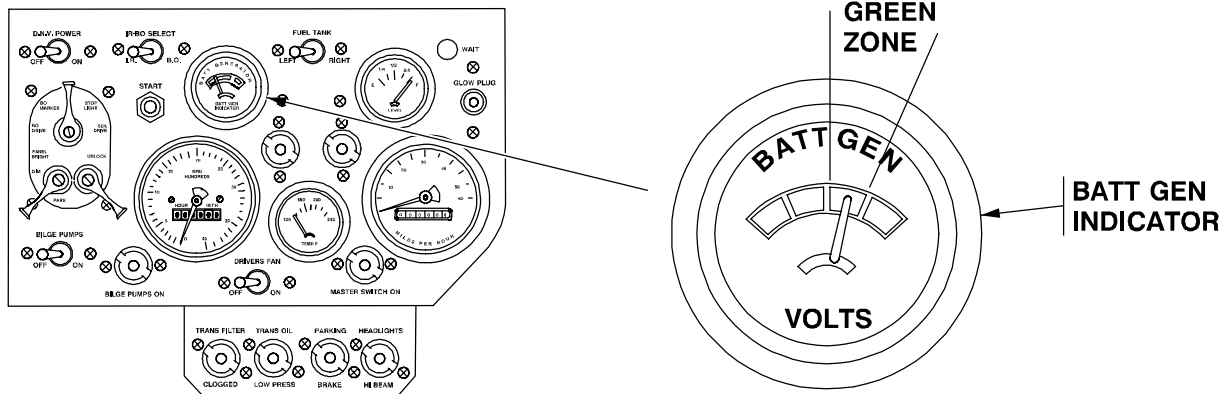
When engine starts, WAIT indicator will change from flashing light to continuous light for one minute after START switch released.

9. Check WAIT indicator. If it continues to flash after engine start or does not go out, notify your supervisor.
10. After 10 seconds, check that ENGINE OIL LOW PRESS indicator goes out.



**ENGINE OIL
LOW PRESS WARNING
INDICATOR**

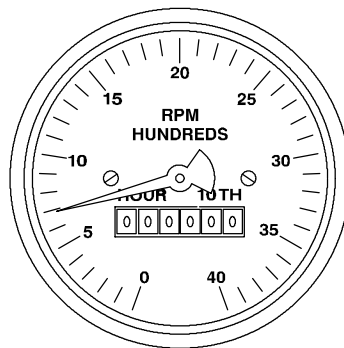
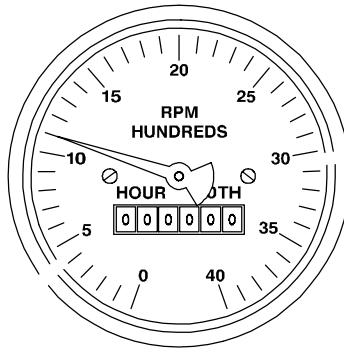
11. Check that BATT GEN indicator needle is in green zone. If not, notify unit maintenance.



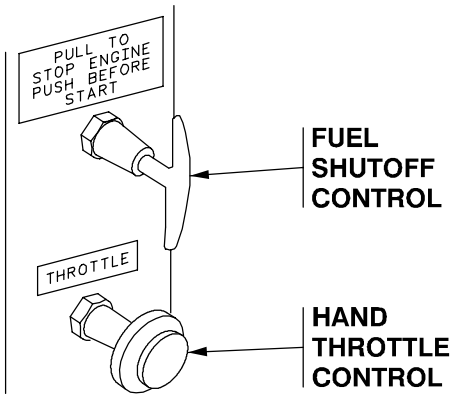
CAUTION

When increasing rpm rate, do not exceed 1800 rpm.

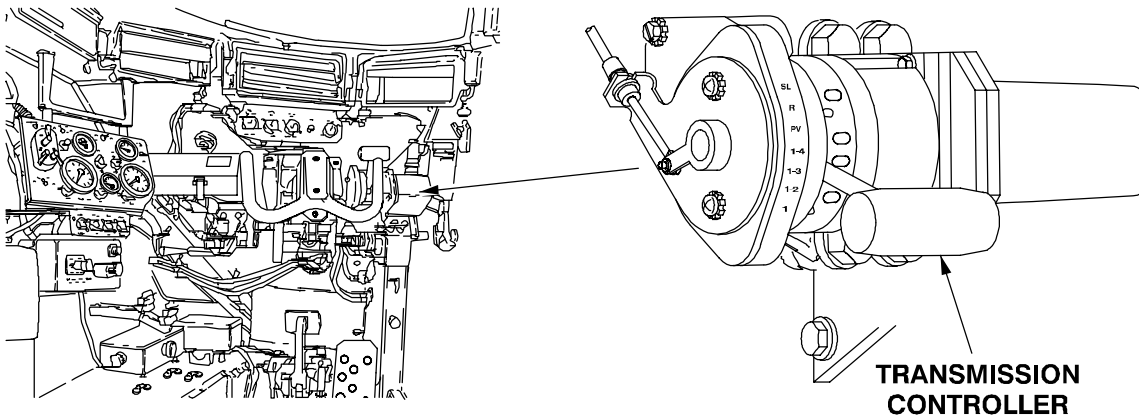
- 12. Slowly push accelerator until tachometer shows rpm of 1200 to 1800 rpm.
- 13. Slowly reduce engine rpm rate until tachometer shows 1000 to 1200 rpm. Keep rpm at this rate until engine temperature is 190° F to 230° F (operating temperature).
- 14. Reduce rpm rate to 650 to 700 rpm (normal operating rate).



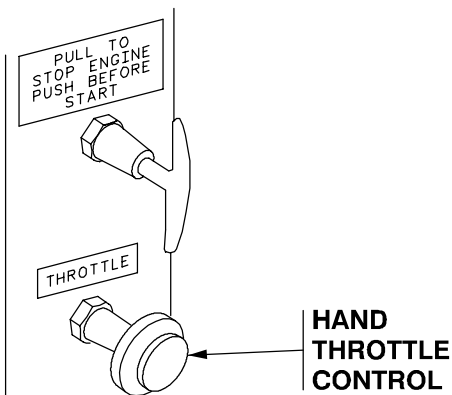
15. Adjust THROTTLE control until idle rate is 1200 to 1500 rpm.
16. Pull out FUEL SHUTOFF control to stop engine.



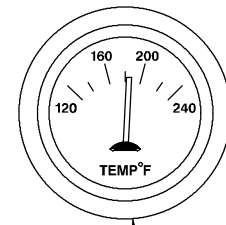
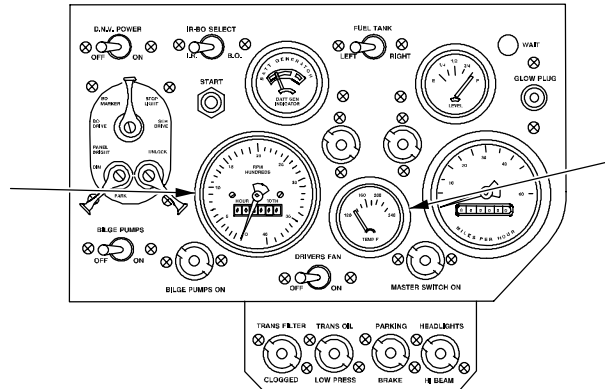
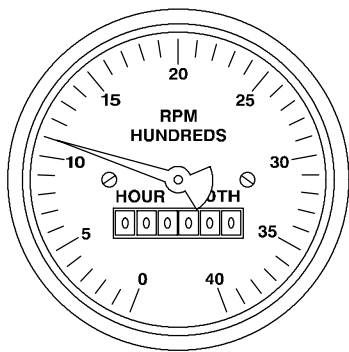
17. Do a mild temperature start (WP 0013 00).
18. At the transmission controller, place the shift lever at the 1-3 range.



19. Set the THROTTLE control until the tachometer shows 800 to 1000 rpm.

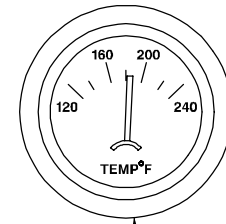
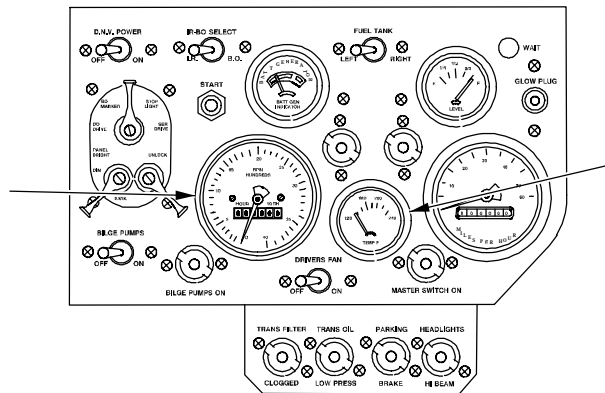
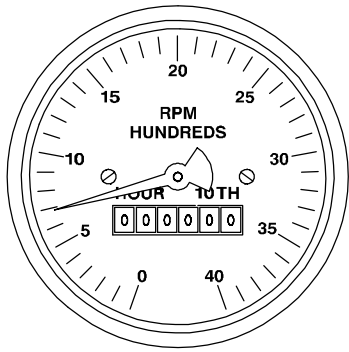


20. After 10 minutes to warm transmission, increase engine rpm to 1000 to 1200.



ENGINE COOLANT TEMPERATURE GAUGE

21. After 5 minutes or when TEMP gauge shows 185° F, decrease rpm rate to 650 to 700 rpm.



ENGINE COOLANT TEMPERATURE GAUGE

22. If vehicle is to be driven, proceed per DRIVE OSV (WP 0015 00).

END OF TASK

START ENGINE WITH OUTSIDE POWER SOURCE

0014 00**THIS WORK PACKAGE COVERS:**

Start Engine Using External Power (WP 0014 00-1).

INITIAL SETUP:Maintenance Level

Operator

Personnel Required

Driver

Helper

Tools and Special Tools

Slave cable

Source vehicle

Equipment Conditions

Vehicle unable to start under own power.

Source vehicle parked next to disabled vehicle.

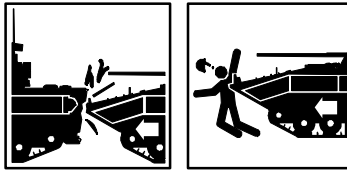
Source vehicle engine stopped (WP 0016 00).

START ENGINE USING EXTERNAL POWER

WARNING

Do not attempt to slave start OSV that has frozen batteries.

An explosion can occur causing death or injury to personnel and damage to equipment.

WARNING

Do not park source vehicle head-to-head with dead OSV.

Stay clear of area between vehicles during starting operations.

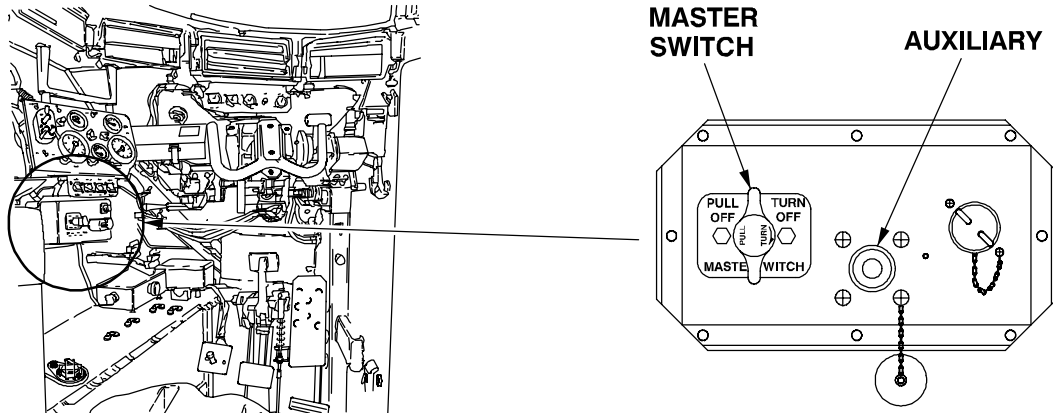
Either vehicle could jump forward, causing death or injury to personnel and/or damage to vehicles and equipment.

WARNING

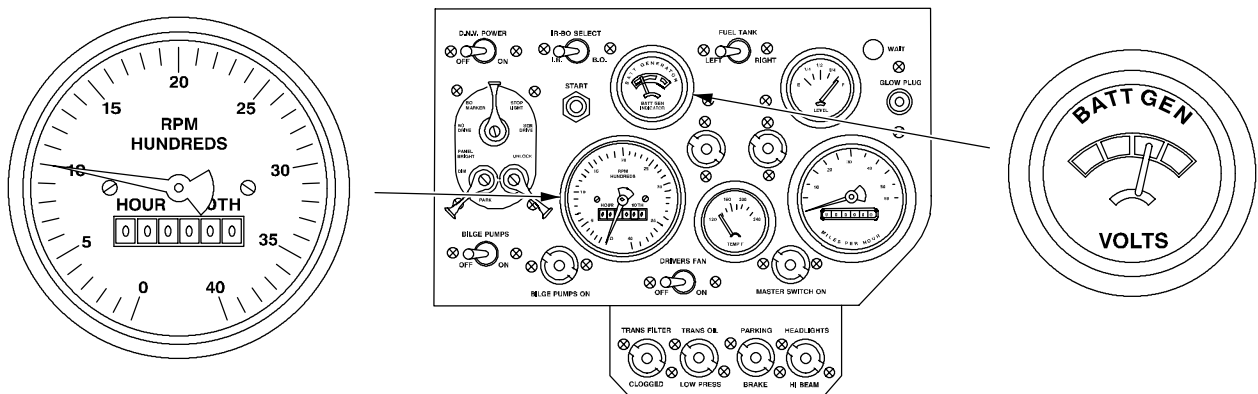
Install slave cable properly at OSV and source vehicle. Improperly installed slave cable is an electrocution hazard. High voltage can kill or seriously injure personnel.

Correctly install slave cable at both ends before selecting import or export power on flat panel display (FPD).

1. Check that MASTER SWITCH is set to OFF in OSV and source vehicle.
2. Remove cap from auxiliary power receptacle on OSV and source vehicle.
3. Connect slave cable to auxiliary power receptacle on disabled OSV.
4. Connect slave cable to auxiliary power receptacle on source vehicle.



5. Start source vehicle engine (WP 0013 00).
6. Operate source vehicle at fast idle (1000 rpm) 5 to 10 minutes to show charging on BATT GEN indicator.



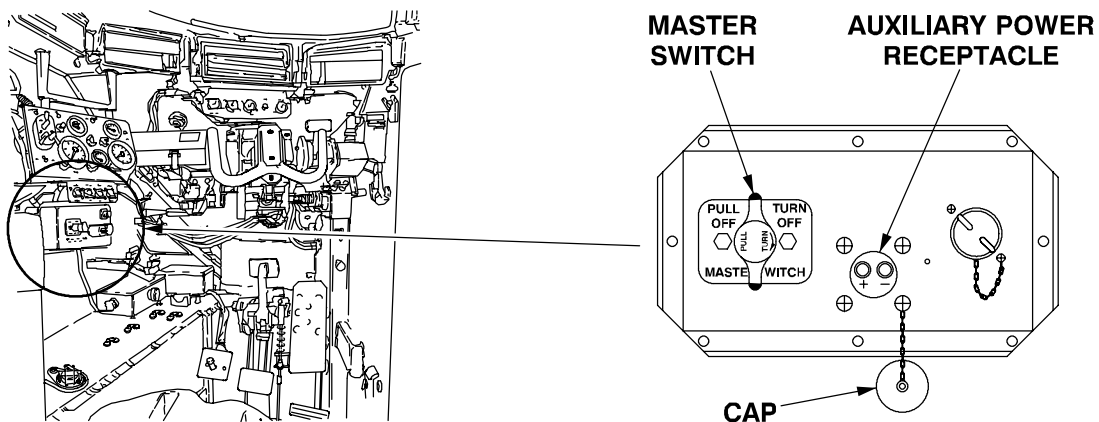
7. Start engine on disabled vehicle (WP 0013 00).

WARNING

Disconnecting slave power cable from source vehicle or OSV can cause death or serious injury to personnel.

Turn import or export power OFF on OSV and external source vehicle before slave power cable is disconnected at either end.

8. Disconnect slave cable from auxiliary power receptacles of both vehicles.
9. Install cap on auxiliary power receptacles of both vehicles.



END OF TASK

DRIVE OSV

0015 00

THIS WORK PACKAGE COVERS:

Driving Precautions (WP 0015 00-6).

Drive OSV (WP 0015 00-10).

INITIAL SETUP:Maintenance Level

Operator

Personnel Required

Driver

References

TM 9-2350-366-10-2

Equipment Conditions

Engine started (WP 0013 00)

Driver's hatch cover secured open or closed
(WP 0007 00)Commander and gunner hatch covers secured open or
closed (TM 9-2350-366-10-2)

WARNING



Personnel can be injured using unsecured seats or seats with missing or inoperative seat belts during vehicle operations.

Keep seat pins or latches and buckles in place and seat belts functional before personnel use the seat.

WARNING



Vehicle and power plant noise caused by OSV operation can cause permanent hearing damage to personnel.

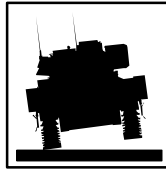
Wear hearing protection when in or near an operating vehicle or power plant.

WARNING



Operating vehicle in hot weather increases risk of heat stress. Heat stress impairs performance and can lead to injury.

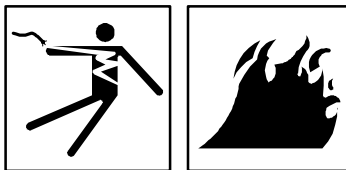
Drink lots of water. Work and rest in shade when possible. Follow instructions in FM 21-10.

WARNING

Driving more than 6 miles (9.6 km) per day over rough terrain can cause vibration-induced injuries to personnel in the OSV. On rough terrain, reduce speed to 10 mph maximum. Avoid bumps and sudden turns. Use tank trails when possible.

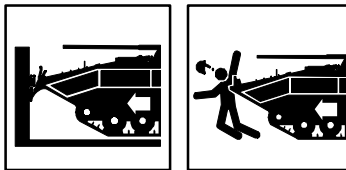
Do not drive vehicle on side slopes steeper than 30% (16 degrees).

Wear seat belts while vehicle is in motion.

WARNING

Antennas contacting power lines can cause death or serious injury to personnel due to electrocution, damage to equipment due to overload, and possibly a vehicle fire.

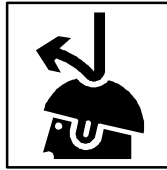
Tie down or remove antennas before operating under or near power lines, in cantonment area, or around other obstructions lower than antennas. Do not touch an antenna that is touching a power line.

WARNING

Accelerator linkage failure can cause vehicle to crash and cause death or serious injury to personnel and/or damage vehicle and equipment.

Do not operate OSV if accelerator pedal does not operate smoothly or if engine does not return to idle when accelerator pedal is released.

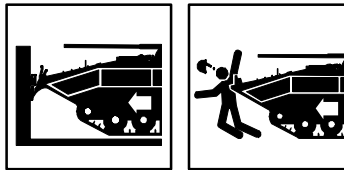
WARNING



To avoid being struck by low-hanging obstacles, do not stand in open hatch while vehicle is moving.

Close hatch or put in pop-up position when operating in area with low-hanging obstacles.

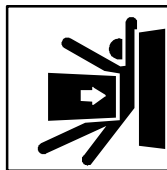
WARNING



Do not change forward or reverse movement of OSV by shifting gears until OSV comes to complete halt. OSV will not change direction when shifting from forward to reverse/reverse to forward while moving at a speed greater than 4 MPH.

Attempting to change direction of travel while vehicle is in motion can result in death or injury to personnel and/or damage or destruction of equipment.

WARNING



Rear access doors are heavy and can swing rapidly and strike personnel, causing death or injury.

Do not stand behind doors. Keep rear of OSV clear of personnel before swinging doors open or closed.

Keep hands clear of path when doors are opened or closed. Keep hands clear of area between handle and door.

WARNING



OSV brake pedal is very sensitive. Applying sudden hard pressure to brake pedal can cause OSV to come to abrupt halt and cause injury to personnel and/or damage to equipment.

Apply brake pressure lightly and with caution.

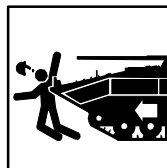
WARNING



Touching OSV antenna during radio transmissions can cause shocks or burns to personnel.

Do not touch antenna when radios are in use. Turn radios off before working on or near antenna.

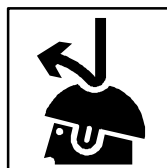
WARNING



When VISMOD is in use, driver has limited field of view.

Vehicle movement can cause death or injury to personnel. Use caution around vehicle at all times and be alert for sudden vehicle movement while VISMOD is in use.

WARNING



Wear CVC helmet to prevent head injuries.

Helmet must be in good condition with liner and earcups fitting tightly. Wear chin strap at all times.

Dismount troops in personnel area of OSV must wear Kevlar helmets. Personnel without helmets during vehicle operation can be killed or injured.

WARNING



Vehicle can roll over on hills or rough terrain causing death or injury to personnel and/or destruction or damage of OSV and equipment. Reduce speed and avoid bumps and sudden turns. Do not operate on side slopes steeper than 30% (16 degrees). Wear seat belts.

WARNING



An out-of-control OSV can overturn. Personnel are safer staying in vehicle than getting out while vehicle is in motion. Personnel can be killed or seriously injured while attempting to evacuate a vehicle during a rollover. If vehicle starts to overturn, personnel must be fully inside OSV and braced. Personnel inside OSV may receive injuries from being thrown against metal parts but personnel outside the vehicle are in danger of being crushed by vehicle rollover.

Spilled fuel and oil can catch fire after a rollover. Shut off vehicle master power and engine fuel supply immediately. Evacuate vehicle as quickly as can be done safely after vehicle has come to rest.

CAUTION

Avoid engine wear as much as possible. When engine will be idled for 5 minutes or more, set engine speed at 1000 to 1200 rpm.

CAUTION

TRANS OIL LOW PRESS warning indicator may come on when brakes are released. Indicator should go out when engine speed reaches 1200 rpm. If indicator does not go out, stop the vehicle and notify your supervisor.

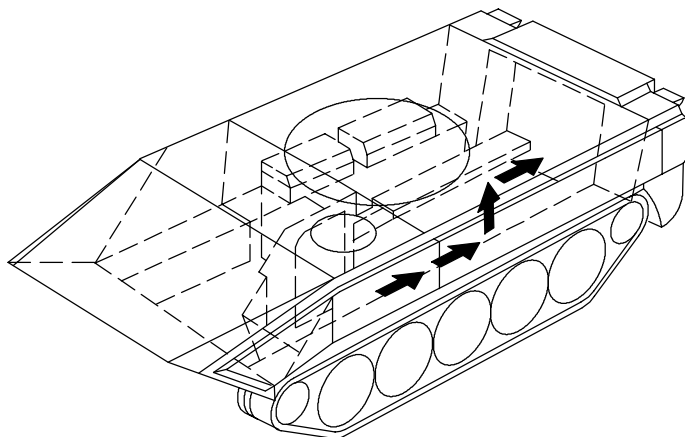
NOTE

Crossdrive transmission on OSV will not change vehicle direction of movement when vehicle is moving at speed above 4 mph. At forward speed above 4 mph, setting shift lever to reverse (R) will not cause the vehicle to go into reverse and change direction of travel. Also, at reverse speed above 4 mph, setting shift lever to a forward gear will not cause the vehicle to change direction of travel.

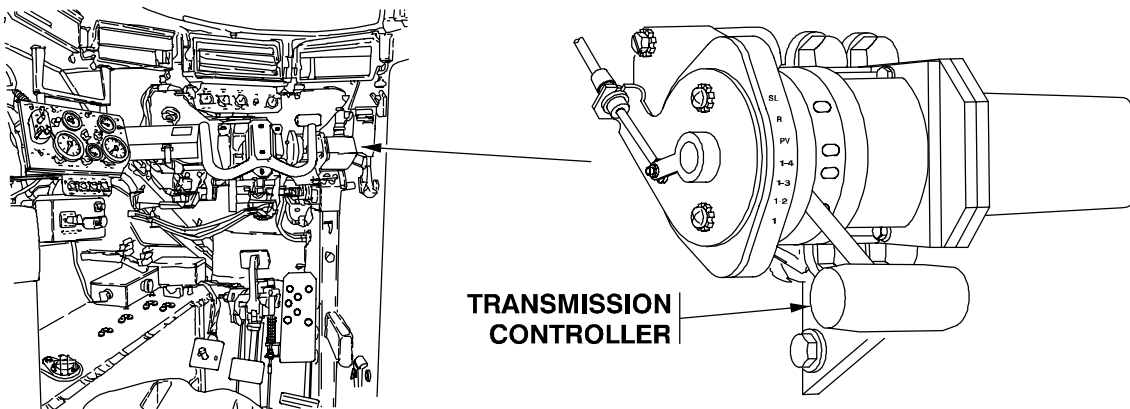
DRIVING PRECAUTIONS**WARNING**

During emergency situations when driver's hatch is blocked, exit through crawl space beside turret and out rear doors. Do not stow equipment in crawl space.

1. Before driving OSV, check emergency exit crawl space and remove equipment that could block or hinder personnel exit.



2. On transmission controller, use 1-2 range until familiar with vehicle.



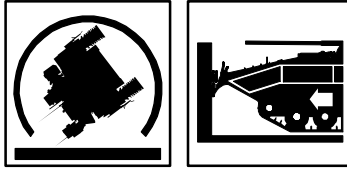
WARNING



An out-of-control OSV can overturn. Personnel are safer staying in vehicle than getting out while vehicle is in motion. Personnel can be killed or seriously injured while attempting to evacuate a vehicle during a rollover. If vehicle starts to overturn, personnel must be fully inside OSV and braced. Personnel inside OSV may receive injuries from being thrown against metal parts but personnel outside the vehicle are in danger of being crushed by vehicle rollover.

Spilled fuel and oil can catch fire after a rollover. Shut off vehicle master power and engine fuel supply immediately. Evacuate vehicle as quickly as can be done safely after vehicle has come to rest.

3. Do not oversteer vehicle or go too fast, especially on hard pavement. Oversteering and/or excessive speed can cause loss of control of vehicle.

WARNING

Vehicle can roll over when entering a trench at an angle if the side of the trench is steeper than 30% (16 degrees). Wear seat belts.

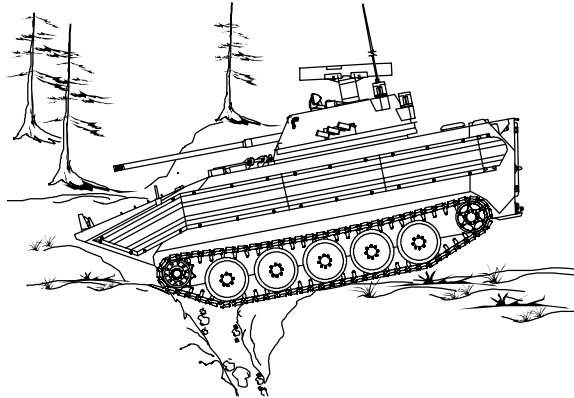
OSV should not attempt to cross trenches that are more than 5 1/2 feet (1.67-m) in width. If the front of OSV hits side of trench, personnel could be killed or injured and OSV could be damaged. OSV could get stuck.

4. Cross ditch or trench as follows:

NOTE

Maximum width of trench that may be crossed safely is 5 1/2 ft (1.6 m).

- a. Visually gauge width of trench/ditch and determine if it can be safely crossed.
- b. Decelerate when approaching edge of ditch/trench.
- c. Shift to gear range 1 or 1-2.
- d. When vehicle bottoms out, start to accelerate and use full power when vehicle starts to climb.



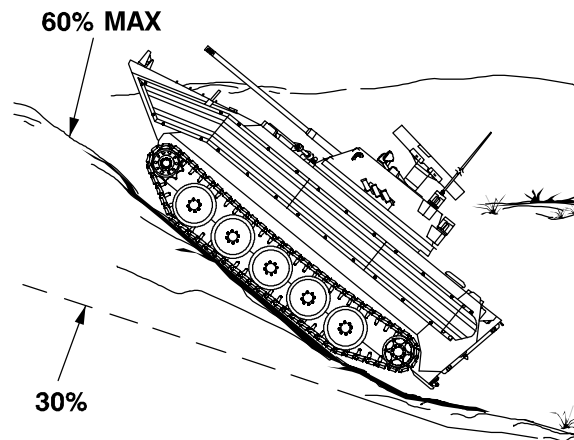
5. Climb hills/grades as follows:

- a. Visually gauge slope percent and determine if the hill can be safely climbed. Grade of 60% is maximum that can be safely climbed.

NOTE

Range 1 is used for grades to 30%. Range 1-2 is used for grades between 30% and 60% (maximum grade).

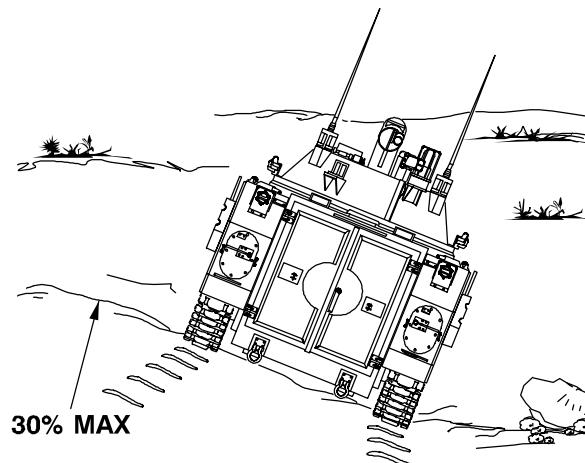
- b. Shift to a lower gear range.
- c. Decelerate at the top of the grade.



NOTE

Short sharp turns allows debris to feed out of tracks.

6. When traversing side slopes, shift to range 1 or 1-2 and steer in a series of short turns instead of long even turns.



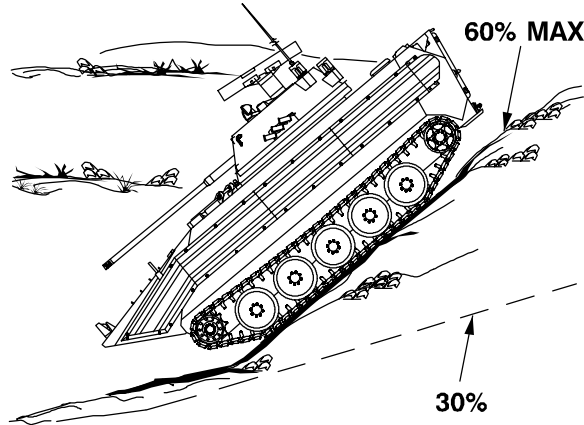
7. Descend hills/grades as follows:

- a. Visually gauge slope percent and determine if the grade can be safely descended. Grade of 60% is maximum that OSV can safely go down.

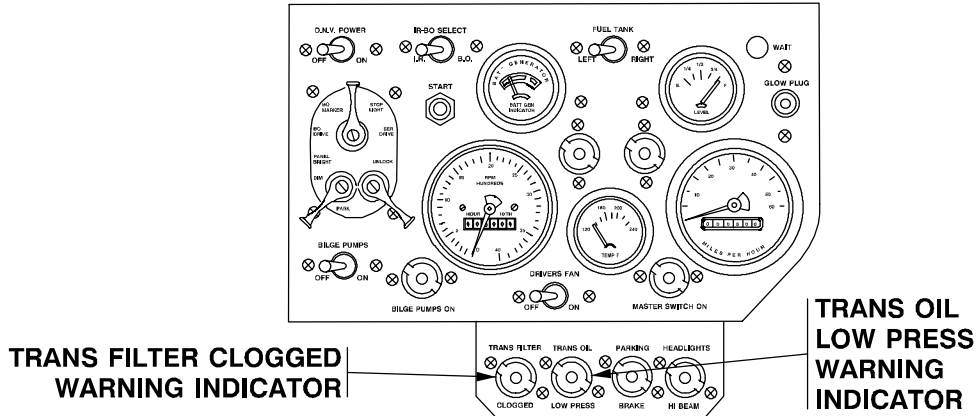
NOTE

Range 1 is used for grades of 30% to 60% (maximum grade). Range 1-2 is used for grades to 30%. Engine and transmission must not be used to hold vehicle on a slope.

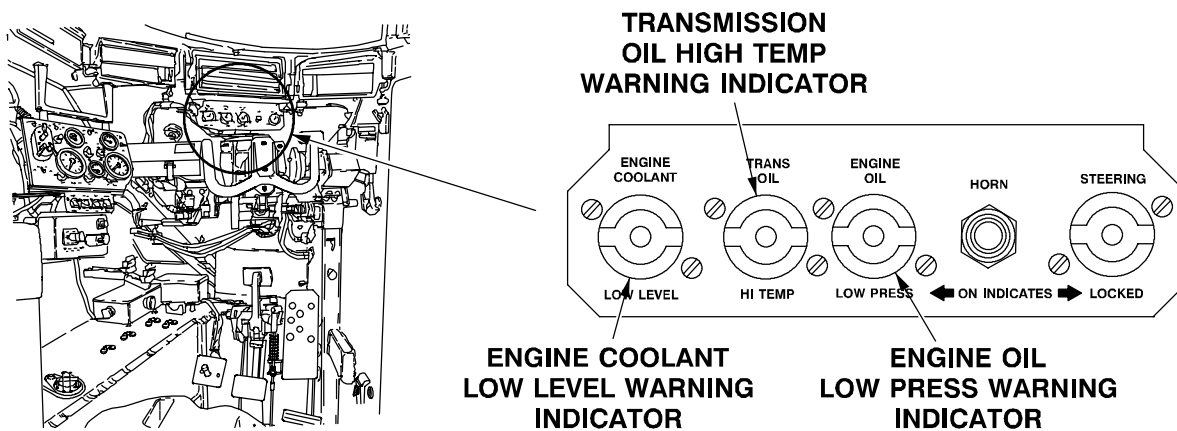
- b. Shift to a lower gear range.
- c. Slow down and use caution at bottom of slope to avoid digging.



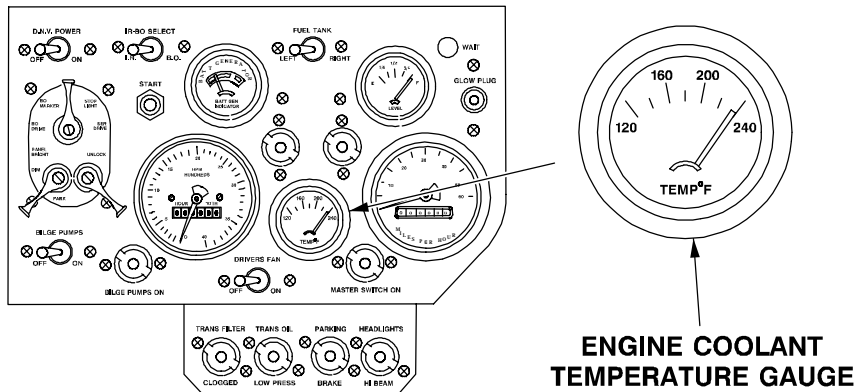
8. Check instrument panel gauges and warning indicators often while driving.



9. Check warning panel indicators often while driving.

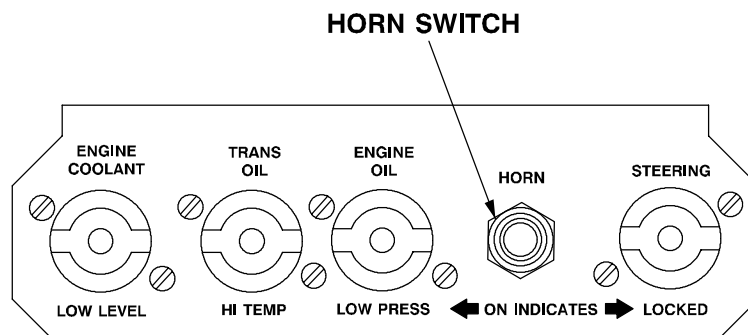


10. If a warning indicator on either panel comes on or a gauge shows an out-of-normal reading, do the following:
 - a. Stop engine (WP 0016 00).
 - b. Do troubleshooting index (WP 0038 00) to determine which troubleshooting procedure to use.
11. Check engine coolant TEMP gauge often while driving. If gauge goes above 230° F (110° C), stop engine (WP 0016 00). Notify your supervisor.

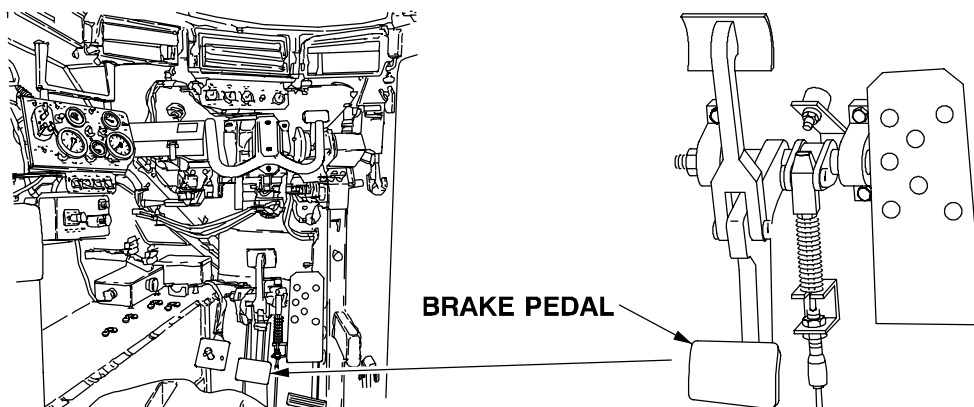


DRIVE VEHICLE

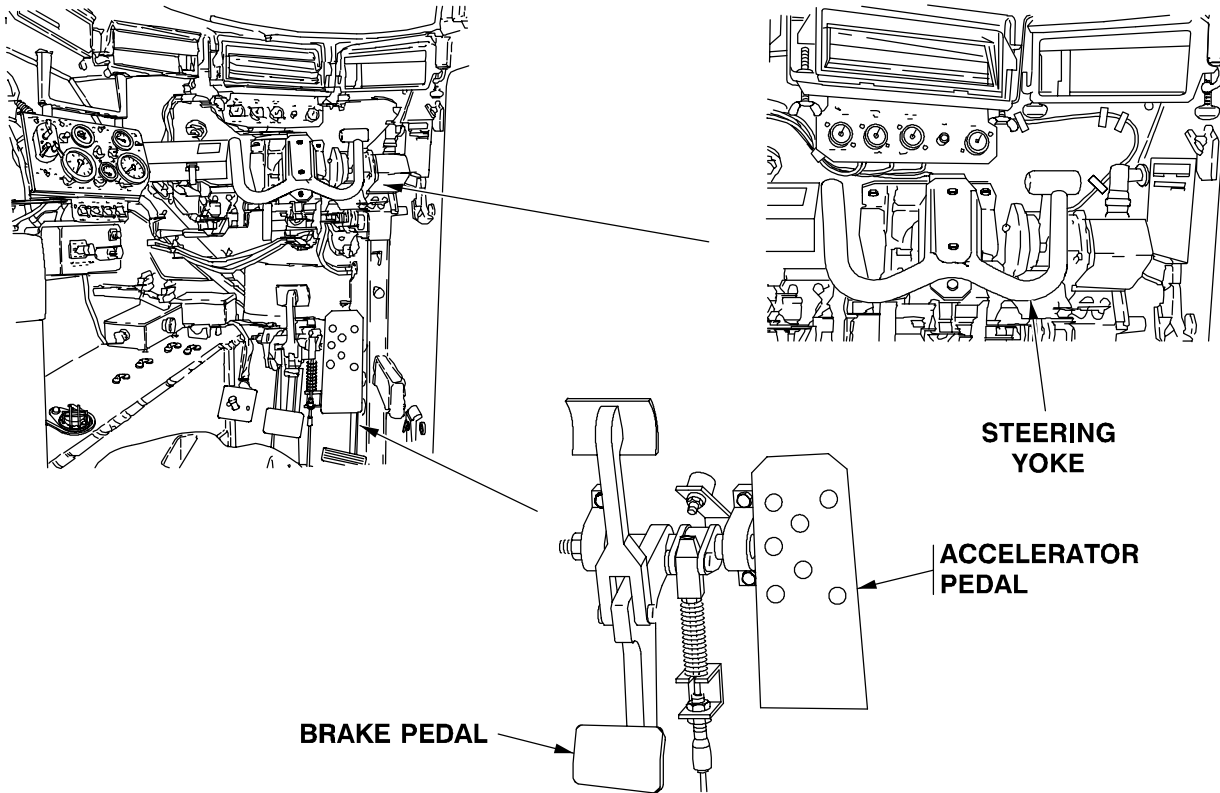
1. Release parking brake (WP 0012 00).
2. If tactical situation permits, press horn button to warn personnel that vehicle is about to move.



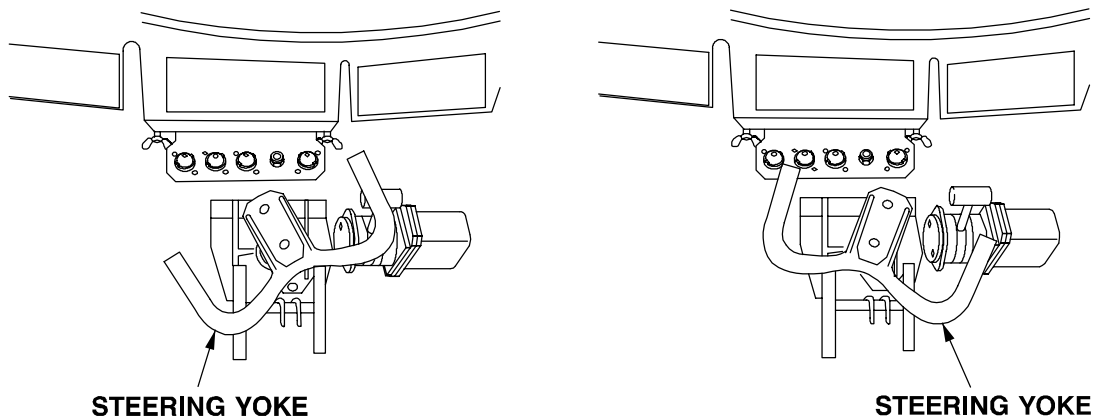
3. Press and hold brake pedal.

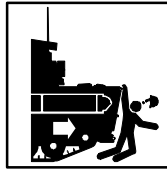


4. Put the transmission controller in the driving range to be used.
5. Center steering yoke.
6. Release brake pedal.
7. Slowly push accelerator until vehicle moves in the direction selected.



8. Turn steering yoke (turn yoke left to turn vehicle left/turn yoke right to turn vehicle right) as required to maneuver vehicle.



WARNING

Driver cannot see to rear of OSV. Vehicle moving in reverse can cause death or injury to personnel and/or damage to equipment.

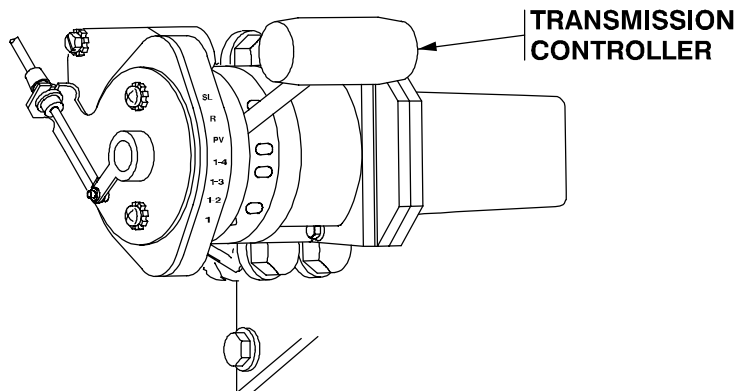
Stay clear of OSV rear while vehicle is backing up.

Post ground guides at front and rear of OSV before backing up.

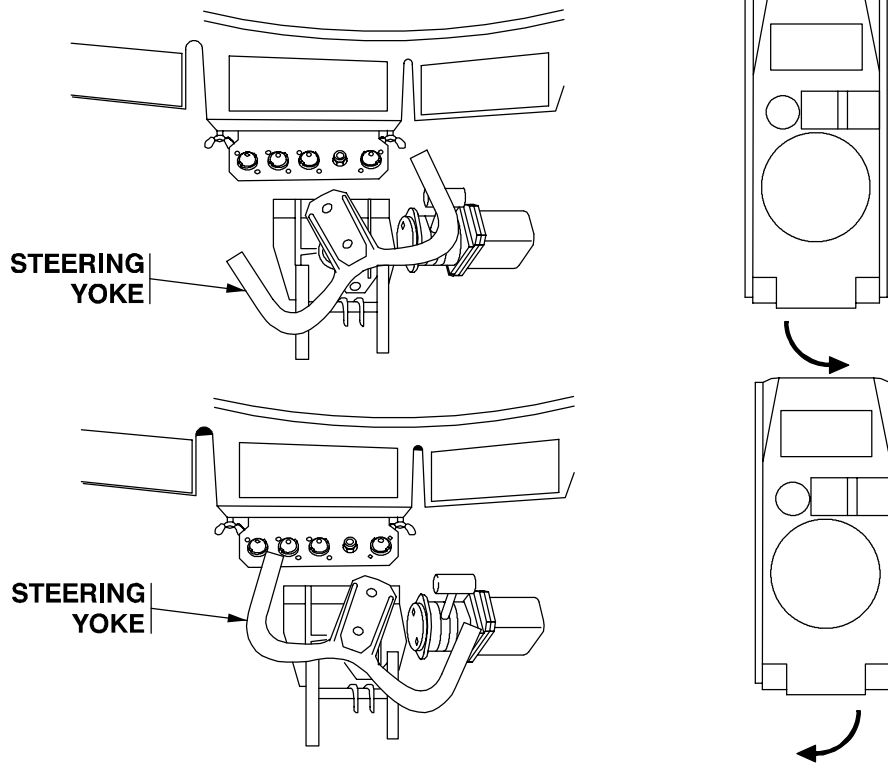
NOTE

When backing up, steering yoke is turned in opposite direction from forward moment. When turning left, yoke is turned right and when turning right, yoke is turned left.

9. Back vehicle up as follows:
 - a. Make sure that guides are posted and are within field of vision.
 - b. Place transmission controller in R.



- c. While backing, use the steering yoke as required to control vehicle movement.



CAUTION

Be careful when turning. Pivot steering on soft/loose soil or gravel can cause loss of a track.

CAUTION

Do not pivot steer while in motion. Pivot steering while vehicle is moving can damage power unit.

NOTE

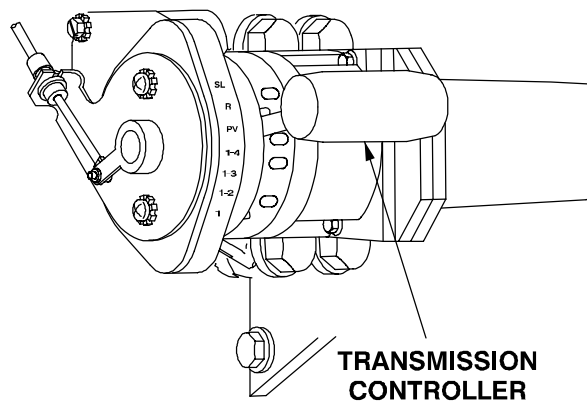
After a pivot turn is done, drive vehicle straight ahead for at least 1 vehicle length to clear track.

NOTE

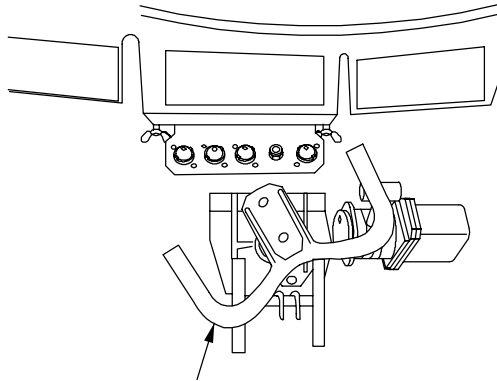
Make pivot turns only with vehicle stopped and only in close areas where normal turns are not possible.

10. Do pivot turns as follows:

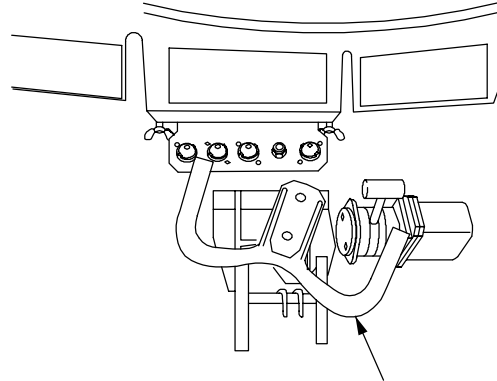
- a. Bring vehicle to full stop.
- b. Place transmission controller to PV.



c. Turn steering yoke in direction of turn.



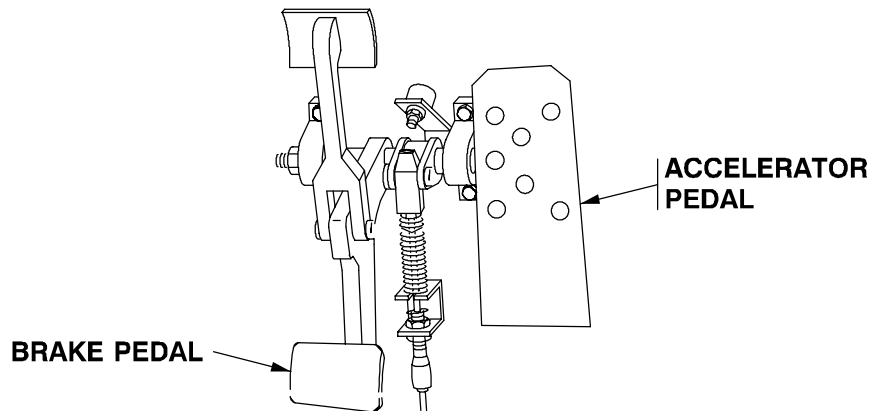
STEERING YOKE



STEERING YOKE

d. Push down on accelerator.

11. To stop OSV, apply smooth, gradual, pressure on brake pedal.



END OF TASK

STOP ENGINE

0016 00

THIS WORK PACKAGE COVERS:
Stop Engine (WP 0016 00-1).

INITIAL SETUP:

Maintenance Level

Operator

Equipment Conditions

Engine started (WP 0013 00)

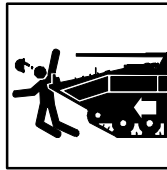
Personnel Required

Driver

STOP ENGINE

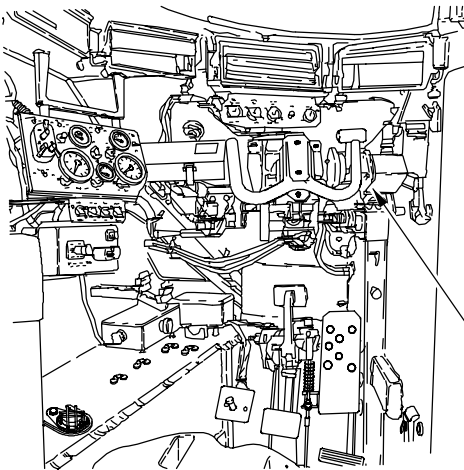
1. Bring vehicle to complete stop.

WARNING

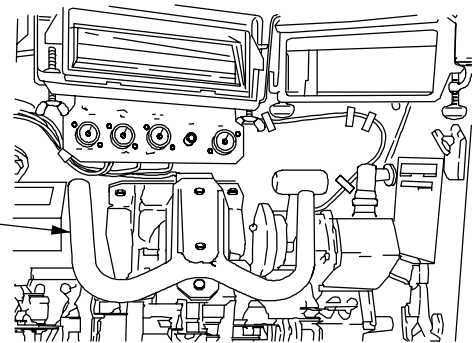


When OSV transmission controller is in SL position, engage steering lock pin or vehicle can pivot steer causing death or injury to personnel. If vehicle is not going to be driven, transmission controller must be set to SL, center steering yoke, engage steering lock pin in yoke, and **STEERING LOCKED indicator on.**

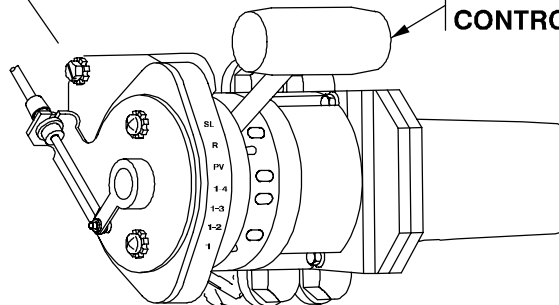
2. Turn steering yoke to center.
3. Place transmission controller lever at SL to lock steering yoke.



STEERING YOKE

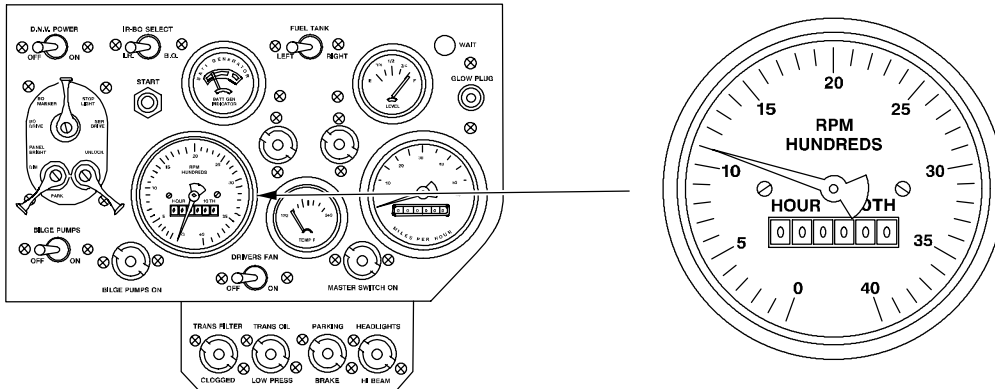


TRANSMISSION CONTROLLER

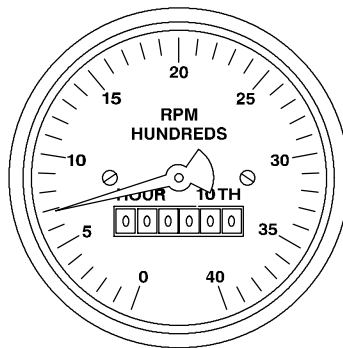


4. Set parking brake (WP 0012 00).

- Increase engine idle speed to 1000 to 1200 rpm.



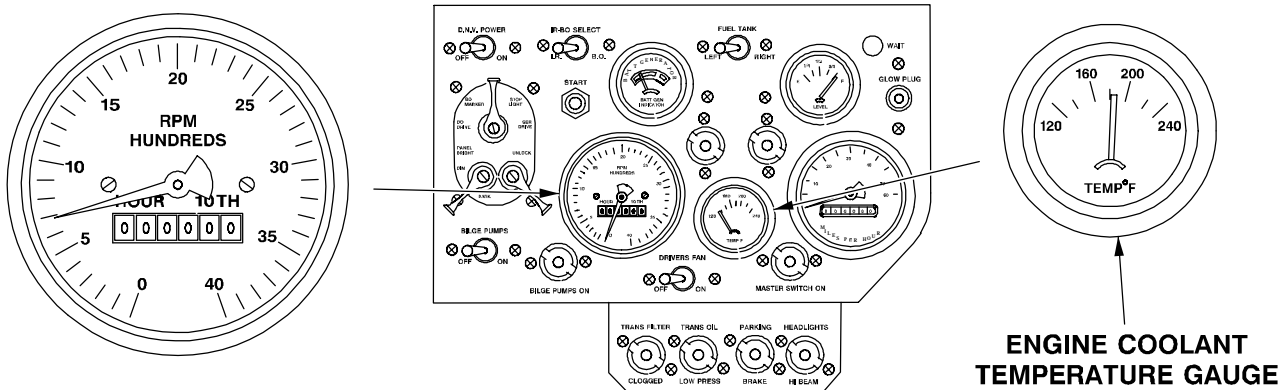
- After 3 to 5 minutes, decrease idle speed to 650 to 700 rpm.



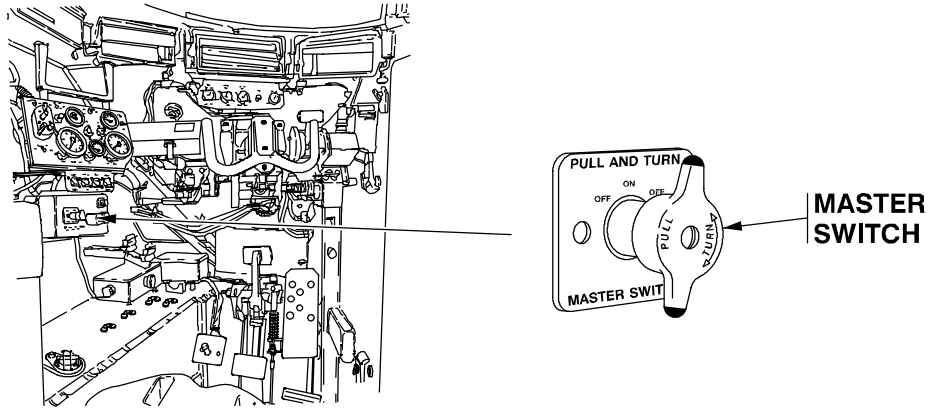
CAUTION

In cold weather, stopping engine without a cool down period can damage engine. Do not shut engine down until coolant temperature is 185° F (85° C) or below.

- Observe TEMP gauge. When engine has cooled, pull fuel cutoff control completely out.



8. Set MASTER SWITCH to OFF.



END OF TASK

FUEL OSV**0017 00****THIS WORK PACKAGE COVERS:**

Prepare for Fueling (WP 0017 00-1).

Fuel OSV (WP 0017 00-3).

INITIAL SETUP:**Maintenance Level**

Operator

Personnel Required

Driver

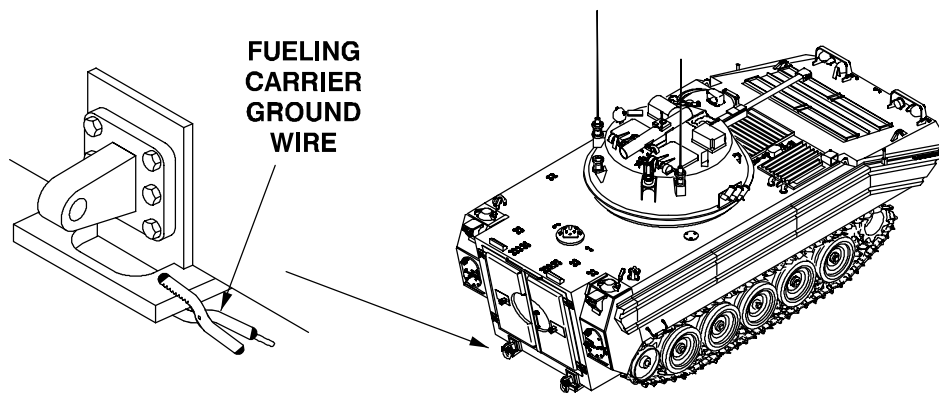
Equipment Conditions

Engine stopped (WP 0016 00)

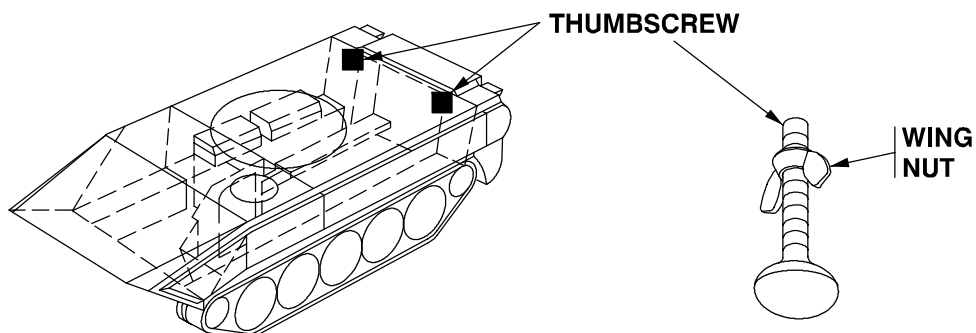
Parking brake set (WP 0012 00)

PREPARE TO FUEL**NOTE****Preparation for fueling is same for both tanks.**

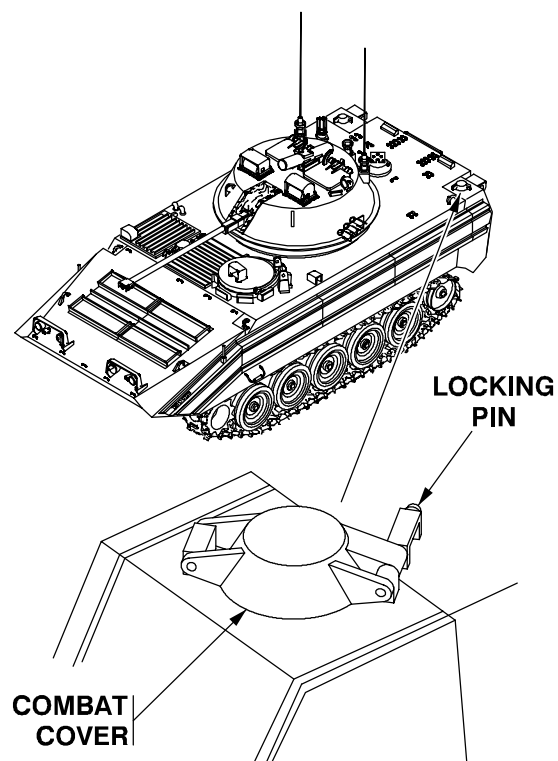
1. Install fueling vehicle ground wire to bare metal.



2. Loosen wing nut on combat cover lock.
3. Turn thumbscrew counterclockwise to release combat cover lock.



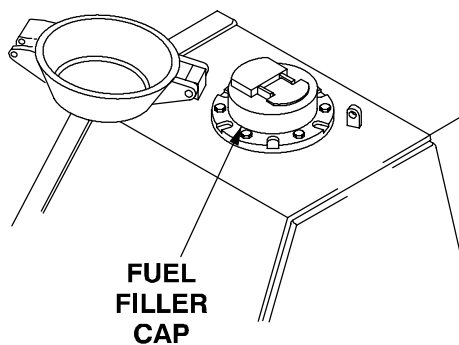
4. Pull locking pin and open combat cover.



CAUTION

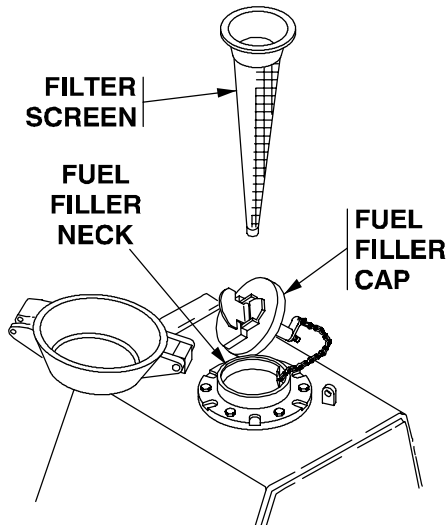
Contamination can cause damage to fuel system. Clean filler area to remove dirt, corrosion, and water before filler cap is opened.

5. Use a wiping rag and clean the area around filler cap.
6. Remove fuel filler cap.



7. Remove screen from fuel filler neck.

8. Check fuel filler screen for dirt and/or damage.
 - a. Clean screen if required.
 - b. Notify your supervisor of damage to screen.
9. Install screen in fuel filler neck.



FUEL OSV

WARNING



Diesel fuel can ignite and cause death or injury to personnel and damage or destroy OSV.

Wipe fuel spills immediately. Wear protective goggles. Do not permit smoking, welding, heater, open flame, or any other heat sources near fuel or when working on fuel system.

Fumes from diesel fuel are poisonous and can cause nausea and vomiting. Park the OSV in well ventilated area or wear respiratory protection.

NOTE

Fuel is used equally from both tanks.

WARNING

Sparks from static electricity could cause a fuel fire or explosion.

Metal nozzle must touch metal in fuel filler neck when fuel is running.

NOTE

Procedure to fuel left and right tanks is same. Fuel both tanks.

1. Insert nozzle in fuel filler neck.

CAUTION

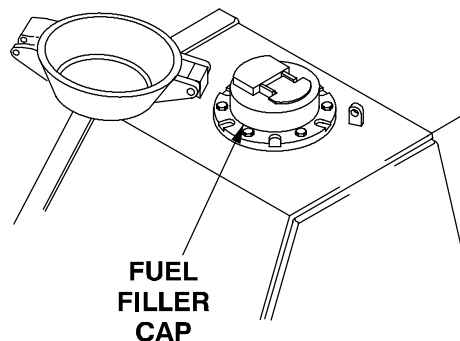
Do not overfill fuel tanks. When weather is hot, fuel will expand and leak out of vented fuel filler cap.

When vehicle is on a slope, fuel will travel to fuel tank on low side and drain out of vented fuel filler cap.

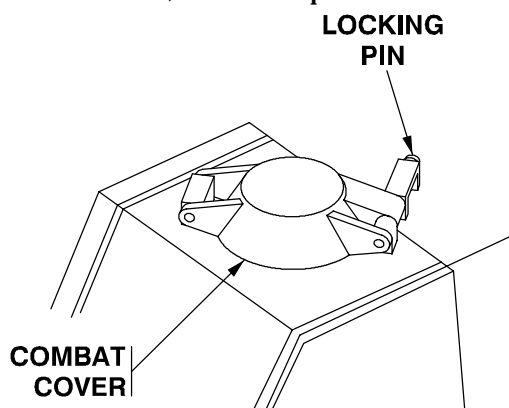
NOTE

Stop fueling when level is 5-inches below top of filler neck to allow for expansion.

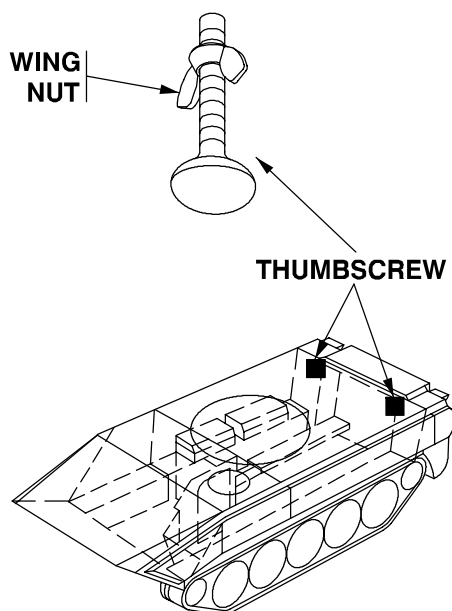
2. Press nozzle fuel lever.
3. When tank is full, release fuel lever and remove nozzle from filler neck.
4. Install fuel filler cap.



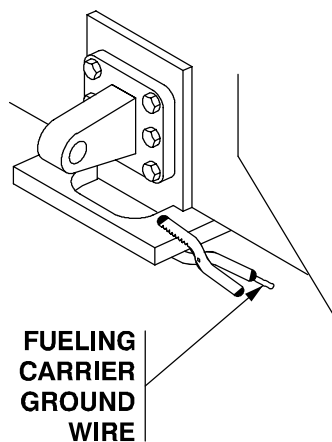
5. Pull combat cover locking pin, close combat cover, and release pin.



6. Turn combat cover lock thumbscrew clockwise.
7. Tighten wingnut.



8. Repeat procedure for second fuel tank.
9. Remove fueling vehicle ground wire.



END OF TASK

OPERATE PERSONNEL HEATER

0018 00

THIS WORK PACKAGE COVERS:

Turn Personnel Heater On (WP 0018 00-1).

Turn Personnel Heater Off (WP 0018 00-4).

INITIAL SETUP:Maintenance Level

Operator

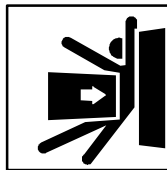
Personnel Required

Driver

WARNING

Engine and personnel heater exhausts are poisonous. Close power unit access doors before starting engine to prevent exhaust gases from entering personnel areas.

NBC mask will not protect personnel from exhaust poisoning.

WARNING

Turret can rotate and cause death or serious injury to personnel.

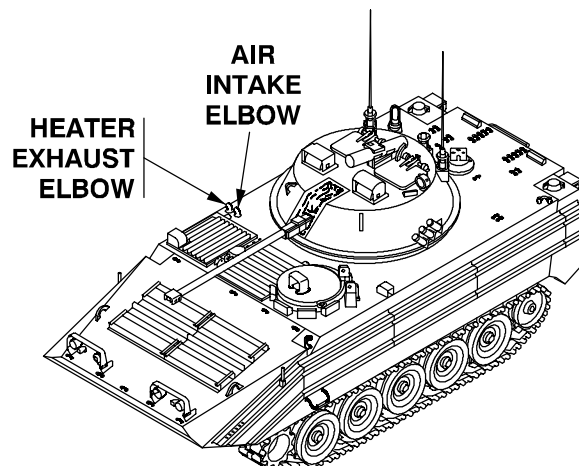
Do not reach through turret shield opening or enter/exit turret when turret power is on.

Keep turret shield door closed when turret drive power is on.

Engage turret travel lock before personnel enter turret or reach through turret shield opening.

TURN PERSONNEL HEATER ON

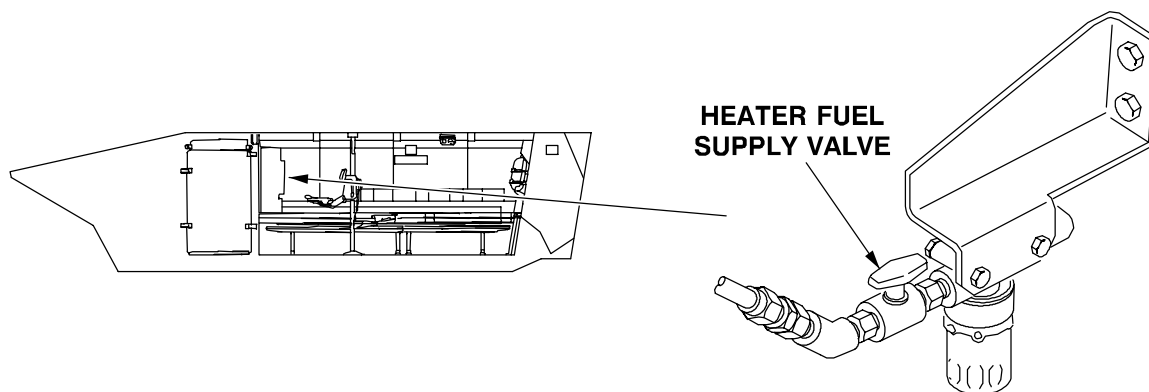
1. Check air intake elbow and heater exhaust elbow to make sure they are clear of debris.



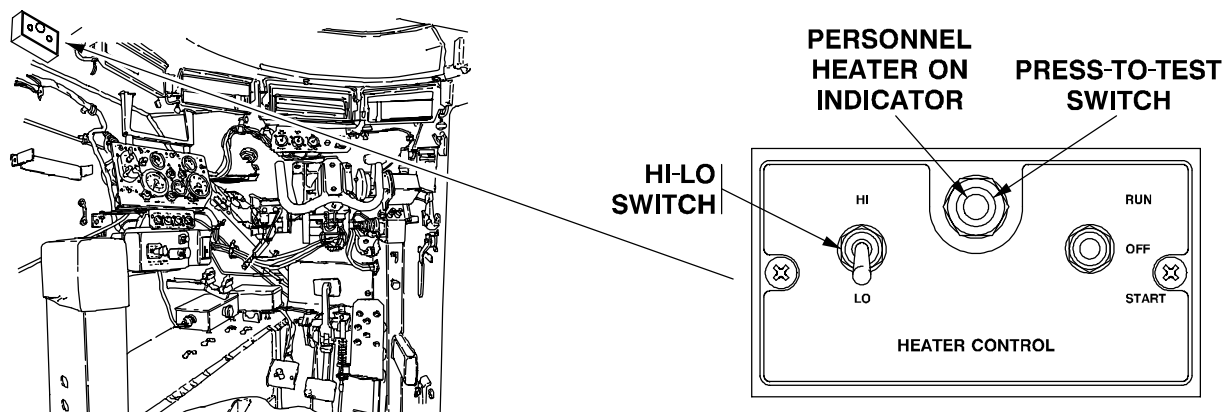
NOTE

Location of heater fuel supply valve varies between models.

2. Make sure that heater fuel supply valve is open.



3. Press PRESS-TO-TEST SWITCH. Check that HEATER light comes on.
 - a. If indicator does not light, discontinue and notify your supervisor.
4. Move HI-LO switch to LO.



NOTE

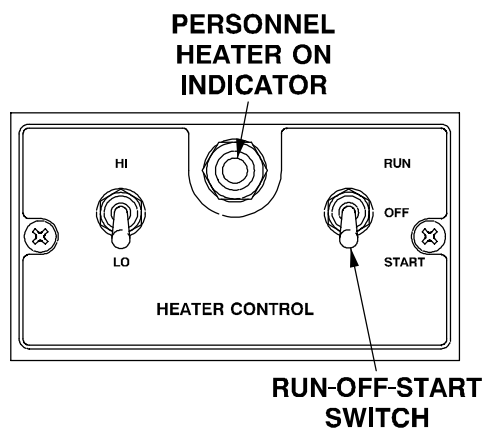
Heater startup varies with the type of heater installed in your vehicle.

For heater P/N 10560M24B1 (Stewart-Warner), see Step 5 and Step 6.

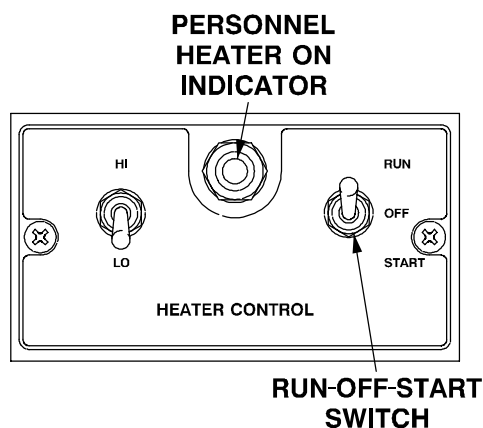
For heater P/N D55350-G1 (Hupp), see Step 7 and Step 8.

For heater P/N 5000-30178 (A20), see Step 9 and Step 10 and also TM 9-2540-207-14&P.

5. Move RUN-OFF-START switch to START for 2 minutes. If HEATER light does not come on, move RUN-OFF-START switch to OFF for 10 seconds. Move RUN-OFF-START switch to START for 1 minute. If HEATER light does not come on, move RUN-OFF-START switch to OFF for 10 seconds. Move RUN-OFF-START switch to START for 1 minute. If heater fails to start after third try, troubleshoot heater, see WP 0038 00.



6. Move RUN-OFF-START switch to RUN as soon as HEATER light comes on. Do not stop in OFF position.



NOTE

Step 7 and Step 8 apply to heater P/N D55350-G1 only.

7. Move RUN-OFF-START switch to START for 4 minutes. If HEATER light does not come on, move RUN-OFF-START switch to OFF. Wait at least 15 minutes. Move RUN-OFF-START switch to START for 4 minutes. If heater fails to start after second try, troubleshoot heater, see WP 0038 00.
8. Move RUN-OFF-START switch to RUN as soon as HEATER light comes on. Do not stop in OFF position.

NOTE

Personnel heater always starts at low heat. It changes to high heat if HI-LO switch is set at HI.

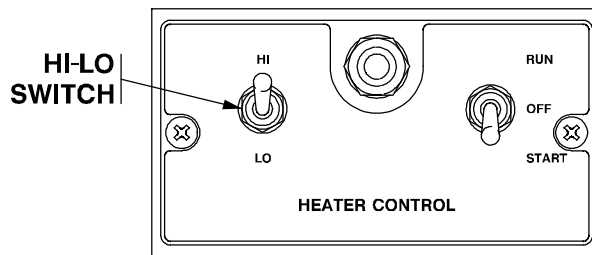
NOTE

If you operate heater for an extended time, start engine to keep batteries charged. See task: START ENGINE, WP 0013 00.

NOTE

Step 9 and Step 10 apply to heater P/N 5000-30178.

9. Move the RUN-OFF-START switch momentarily to START for at least four (4) seconds, and then move the switch to RUN. The heater will now run automatically and does not require any further actions by the operator.
10. CONTROL BOX WARNINGS INDICATOR LIGHT. If the control box lamp begins to flash, the heater is signaling that an abnormal condition is present. Read diagnostic display codes at the heater and take appropriate action. Move HI-LO switch to HI or LO.

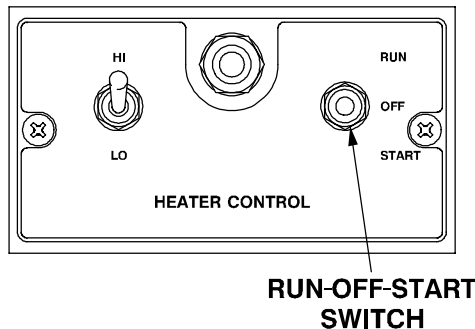


TURN PERSONNEL HEATER OFF

NOTE

When personnel heater is turned off, blower will run until personnel heater cools off. HEATER light will go off when personnel heater cools off. Driver should stay in vehicle until blower stops.

1. Move RUN-OFF-START switch to OFF.



2. Let personnel heater purge itself.

END OF TASK

OPERATE OSV LIGHTS

0019 00

THIS WORK PACKAGE COVERS:

- Operate Headlights (WP 0019 00-1).
- Operate Blackout Marker Lights (WP 0019 00-2).
- Operate Stop Lights (WP 0019 00-2).
- Operate Panel Lights (WP 0019 00-3).
- Operate White Dome Lights (WP 0019 00-3).
- Operate Blackout Dome Lights (WP 0019 00-4).

INITIAL SETUP:

Maintenance Level

Operator

Equipment Conditions

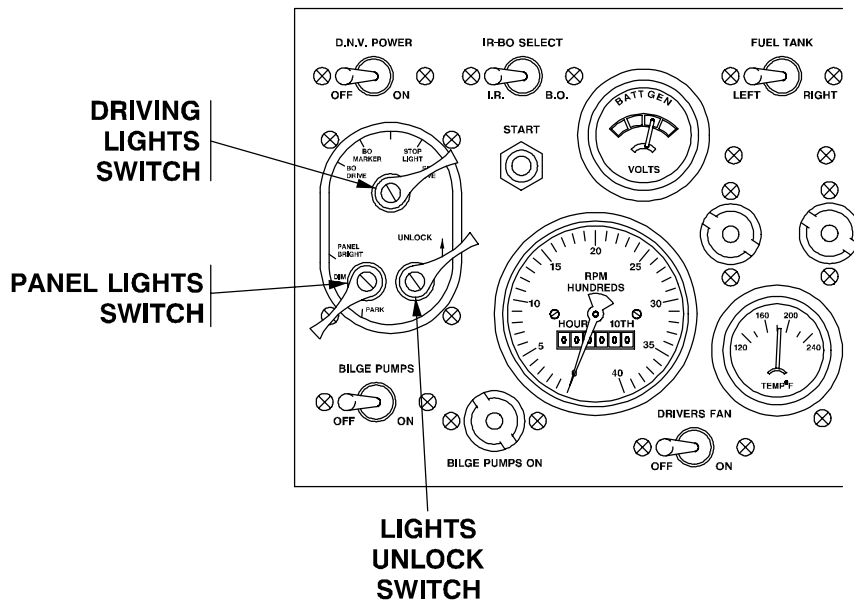
MASTER SWITCH set to ON

Personnel Required

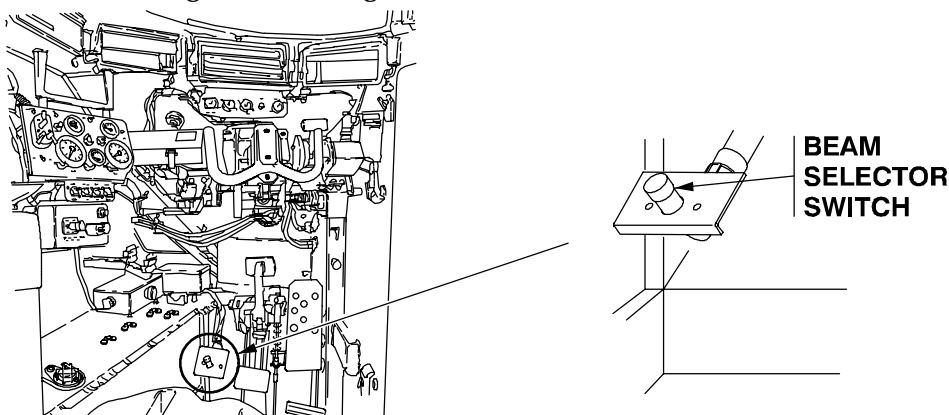
Driver

OPERATE HEADLIGHTS

1. Hold lights UNLOCK switch at UNLOCK position.
2. Set panel lights switch to OFF.
3. Set driving lights switch to SER DRIVE.



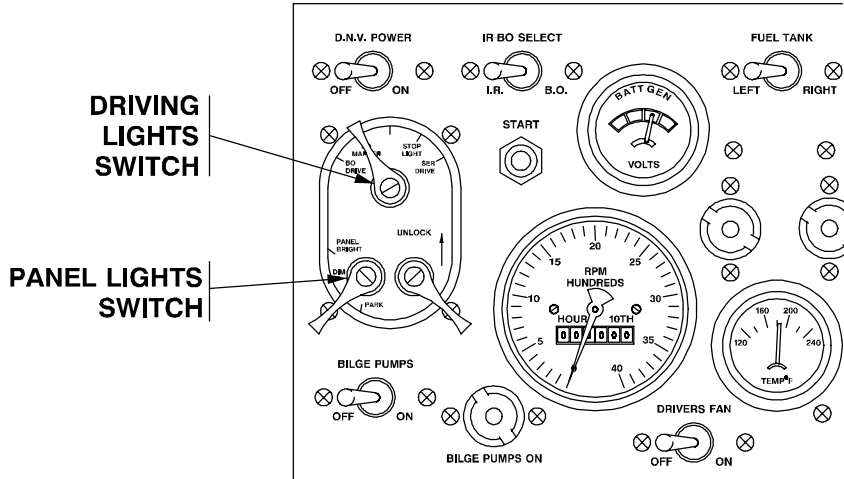
4. Press beam selector switch for high or low headlight beam.



5. Release UNLOCK switch.
6. Set driving lights switch to OFF.

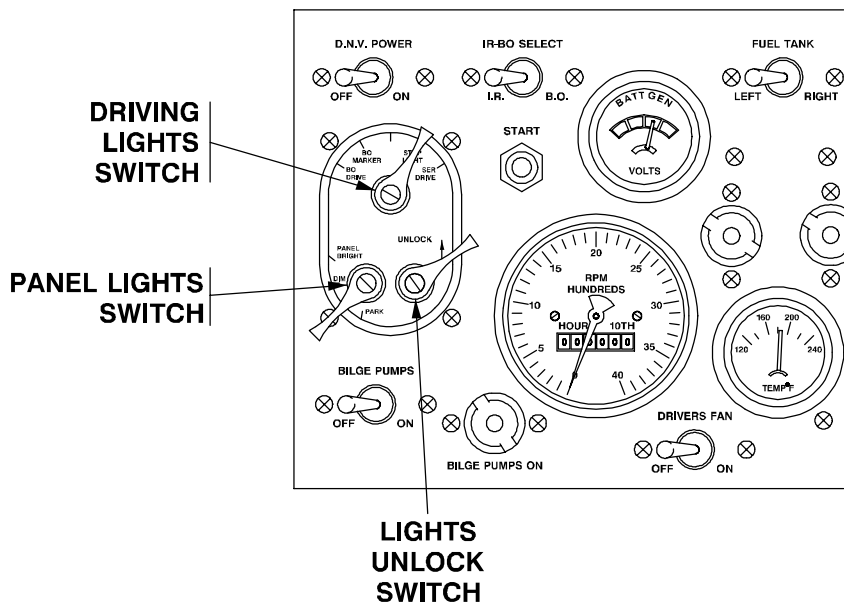
OPERATE BLACKOUT MARKER LIGHTS

1. Set driving lights switch to BO MARKER.
2. Set panel lights switch to OFF.
3. Set driving lights switch to OFF.



OPERATE STOP LIGHTS

1. Hold lights UNLOCK switch at UNLOCK position.
2. Set panel lights switch to OFF.
3. Set driving lights switch to STOP LIGHT.
4. Release UNLOCK switch.
5. Press/release brake pedal.
6. Set driving lights switch to OFF.

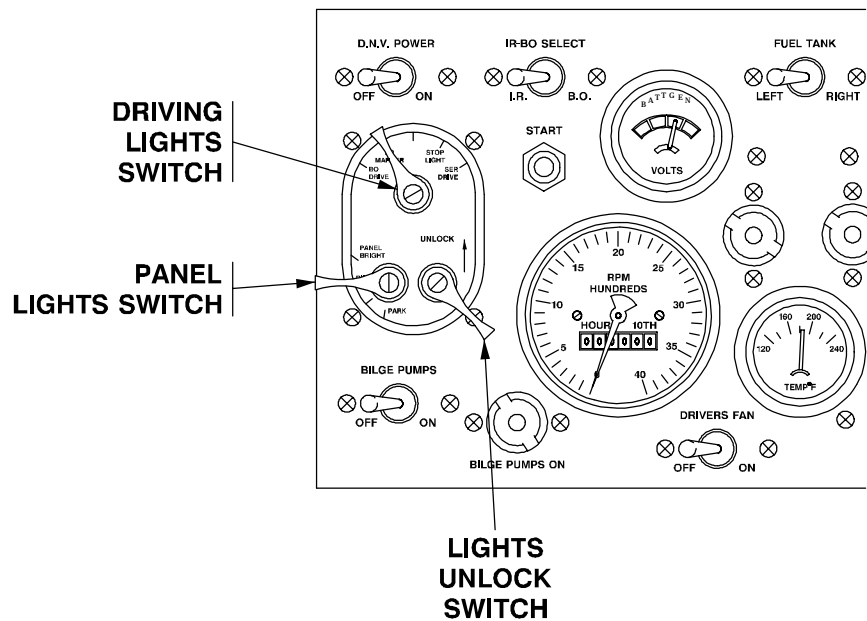


OPERATE PANEL LIGHTS

NOTE

When panel lights are to be operated, driving lights switch can be in any position but OFF.

1. Set panel lights switch to DIM or PANEL BRIGHT.
2. Set panel lights switch to OFF.
3. Set driving lights switch to OFF.

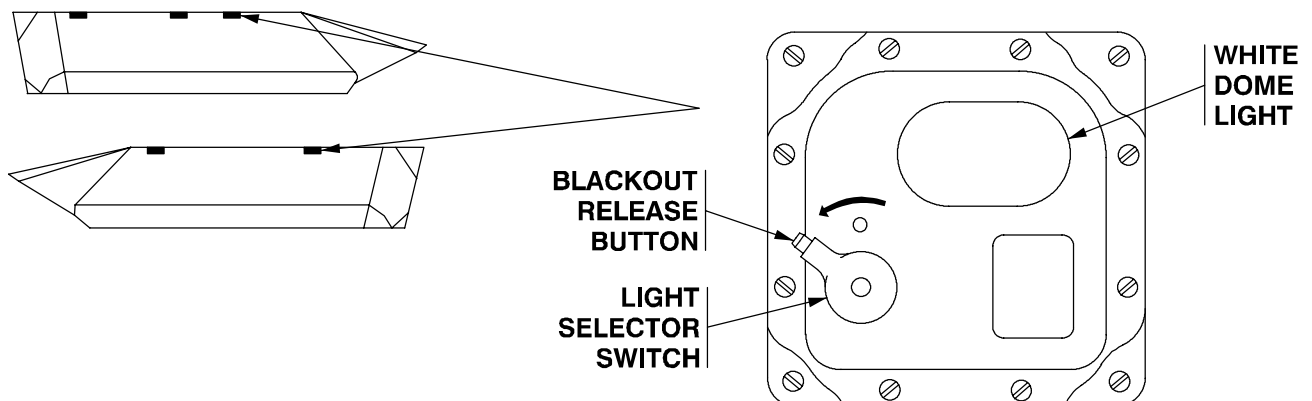


OPERATE WHITE DOME LIGHTS

NOTE

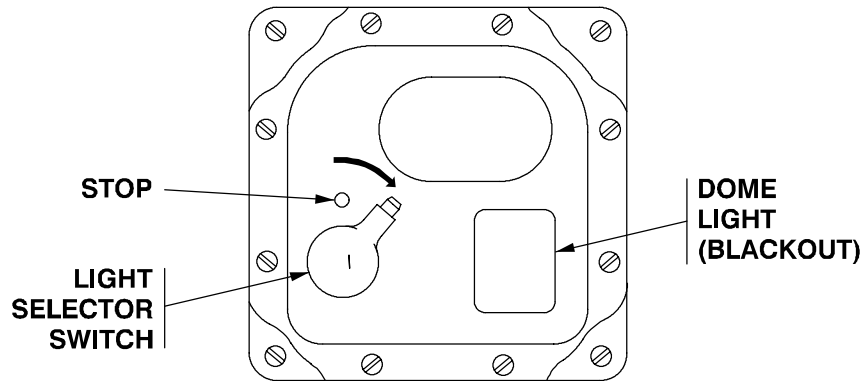
Dome light switch panel is located on right rear section adjacent to rear dome light. Switch at left rear access door operates dome light switch panel.

1. Press blackout release button on selector switch and turn selector switch toward edge of dome light.
2. Press blackout release button on selector switch and turn selector switch past stop to off position.



OPERATE BLACKOUT DOME LIGHTS

1. Turn selector switch toward center of dome light.
2. Turn selector switch to off position.



END OF TASK

ACTIVATE FIXED FIRE EXTINGUISHER SYSTEM

0020 00

THIS WORK PACKAGE COVERS:

- Activate Fixed Fire Extinguisher Using Outside Handle (WP 0020 00-1).
- Activate Fixed Fire Extinguisher Inside OSV Using Release Handle (WP 0020 00-2).
- Open Fixed Fire Extinguisher System, with Release Handle (WP 0020 00-2).
- Operate Inside Fixed Fire Extinguisher with Release Knob WP 0020 00-3).

INITIAL SETUP:

Maintenance Level

Operator

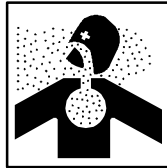
Equipment Conditions

Fire extinguisher installed and seal intact.

Personnel Required

Crewmember

WARNING



Personnel that breathe carbon dioxide discharged from fire extinguisher may have dizziness or nausea. Prolonged breathing of carbon dioxide could result in severe injury or death.

NBC mask will not protect personnel from carbon dioxide. If possible, evacuate vehicle or open hatch covers before discharging extinguisher within vehicle.

After discharging fire suppression system, open hatch covers and rear doors and turn vent fans on.

ACTIVATE FIXED FIRE EXTINGUISHER USING OUTSIDE HANDLE

WARNING

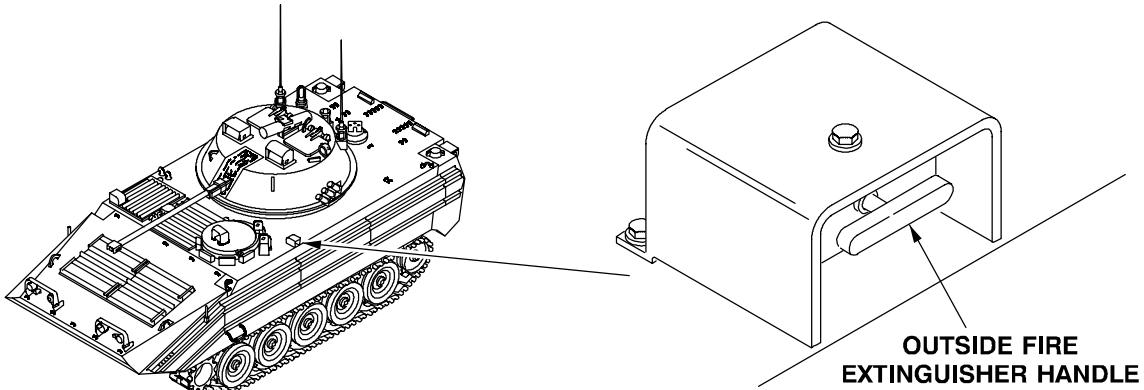


Engine fan can blow away fire suppression agent. Agent being dispersed before fire is extinguished could result in death or burns to personnel and/or damage to equipment.

Stop engine before engine fire suppression system is activated.

1. If possible, stop engine (WP 0016 00).

- At installation on hull, pull handle to activate fire extinguisher.



- As soon as possible, notify your supervisor of fire extinguisher activation.

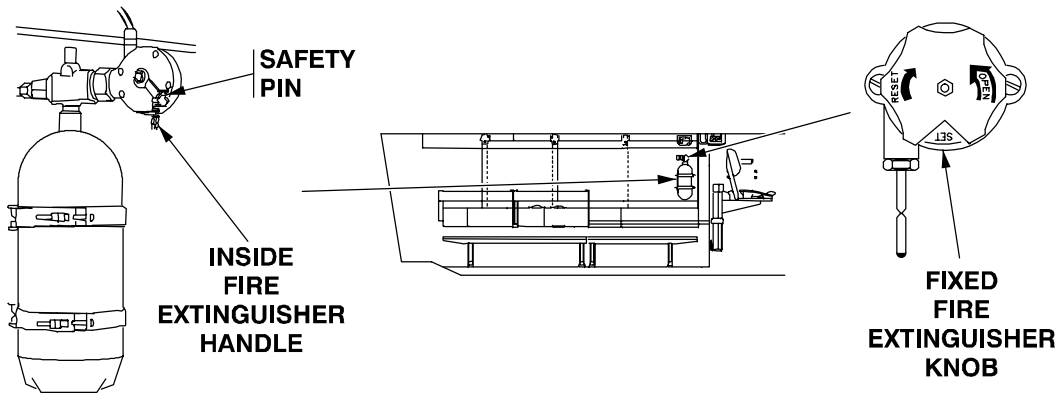
ACTIVATE FIXED FIRE EXTINGUISHER INSIDE OSV USING RELEASE HANDLE

- If possible, stop engine (WP 0016 00).

NOTE

Inside release is not same in all vehicles. Some systems are equipped with release handle and some are not.

- Remove safety pin from release handle.
- Rotate fire extinguisher handle up to activate fire extinguisher system.



WARNING



Personnel that breathe carbon dioxide discharged from fire extinguisher may have dizziness or nausea. Prolonged breathing of carbon dioxide could result in severe injury or death.

NBC mask will not protect personnel from carbon dioxide. If possible, evacuate vehicle or open hatch covers before discharging extinguisher within vehicle.

After discharging fill suppression system, open hatch covers and rear doors and turn vent fans on.

4. Open driver's hatch (WP 0007 00) and rear doors (WP 0005 00). If necessary, evacuate the vehicle.
5. Notify your supervisor of fire extinguisher activation as soon as possible.

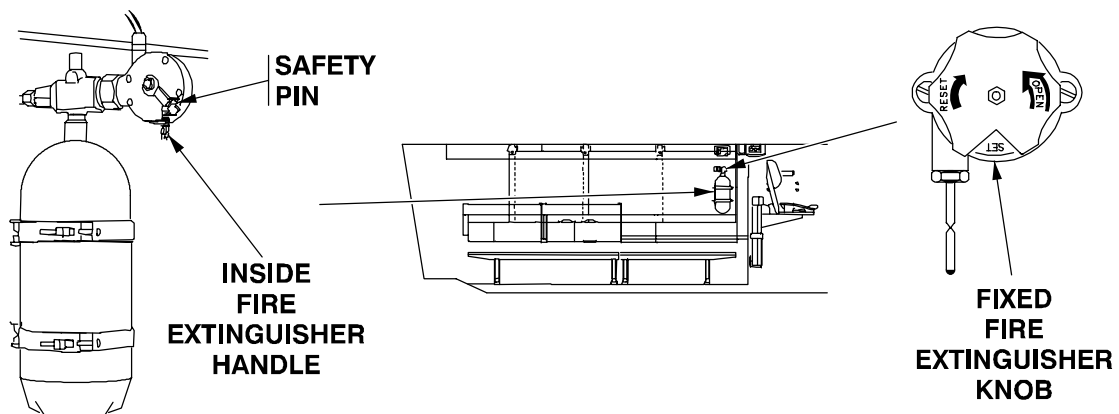
OPERATE INSIDE FIXED FIRE EXTINGUISHER WITH RELEASE KNOB

1. If possible, stop engine (WP 0016 00).

NOTE

Inside release is not same in all vehicles. Some systems are equipped with a release knob and some are not.

2. Turn fixed fire extinguisher release knob counterclockwise to activate fire extinguisher system.



WARNING



Personnel that breathe carbon dioxide discharged from fire extinguisher may have dizziness or nausea. Prolonged breathing of carbon dioxide could result in severe injury or death.

NBC mask will not protect personnel from carbon dioxide. If possible, evacuate vehicle or open hatch covers before discharging extinguisher within vehicle.

After discharging fill suppression system, open hatch covers and rear doors and turn vent fans on.

3. Open driver's hatch (WP 0007 00) and rear doors (WP 0005 00). If necessary, evacuate the vehicle.
4. Notify your supervisor of fire extinguisher activation as soon as possible.

END OF TASK

ACTIVATE PORTABLE FIRE EXTINGUISHER

0021 00

THIS WORK PACKAGE COVERS:

Operate Portable Fire Extinguisher (WP 0021 00-1).

INITIAL SETUP:

Maintenance Level

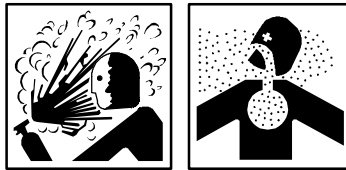
Operator

Personnel Required

Crewmember

OPERATE PORTABLE FIRE EXTINGUISHER

WARNING

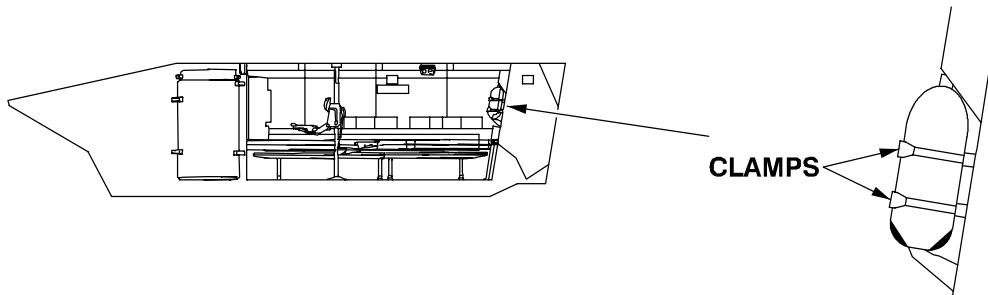


Carbon dioxide (CO²) from portable fire extinguisher discharge is poisonous and extremely cold. Breathing CO² can cause suffocation. Do not touch cone or spray when using portable fire extinguishers. Contact with skin and/or eyes can result in burns from extreme cold.

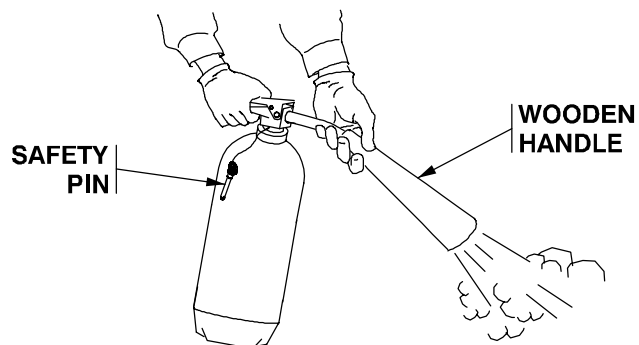
Handle fire extinguisher carefully to avoid banging or dropping cylinder.

Wear face shield, ear plugs, protective clothing, and gloves when doing fire bottle maintenance.

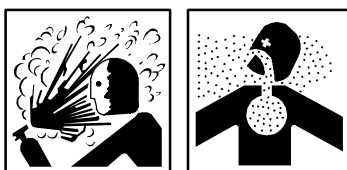
1. Open two clamps and remove fire extinguisher.



2. Break fire extinguisher seal.
3. Remove safety pin from handle.



WARNING



Carbon dioxide (CO²) from portable fire extinguisher discharge is poisonous and extremely cold. Breathing CO² can cause suffocation. Do not touch cone or spray when using portable fire extinguishers. Contact with skin and/or eyes can result in burns from extreme cold.

Handle fire extinguisher carefully to avoid banging or dropping cylinder.

Wear face shield, ear plugs, protective clothing, and gloves when doing fire bottle maintenance.

4. Hold cone by wood handle and point cone at base of fire.
5. Squeeze handle to activate fire extinguisher.

WARNING

Personnel that breathe carbon dioxide discharged from fire extinguisher may have dizziness or nausea. Prolonged breathing of carbon dioxide could result in severe injury or death.

NBC mask will not protect personnel from carbon dioxide. If possible, evacuate vehicle or open hatch covers before discharging extinguisher within vehicle.

After discharging fire suppression system, open hatch covers and rear doors and turn vent fans on.

6. Open driver's hatch (WP 0007 00) and rear doors (WP 0005 00). If necessary, evacuate the vehicle.
7. Return empty extinguisher to unit maintenance to be charged.
8. Install new or recharged extinguisher in personnel compartment and close two clamps.

END OF TASK

REMOVE/INSTALL POWER PLANT REAR ACCESS COVERS

0022 00

THIS WORK PACKAGE COVERS:

Remove Power Plant Rear Access Covers (WP 0022 00-1).

Install Power Plant Rear Access Covers (WP 0022 00-3).

INITIAL SETUP:

Maintenance Level

Operator

Personnel Required

Driver

References

TM 9-2350-366-10-2

Equipment Conditions

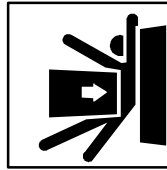
Engine stopped (WP 0016 00)

Turret traversed to 3300 mils (TM 9-2350-366-10-2)

TURRET POWER switch set to OFF

Turret lock installed

REMOVE POWER PLANT REAR ACCESS COVERS

WARNING

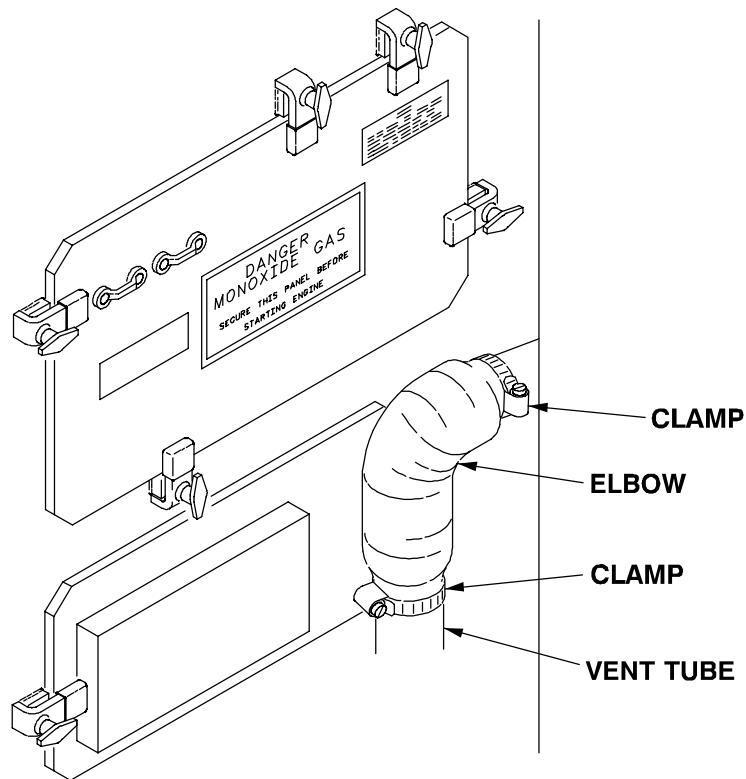
Turret can rotate and cause death or serious injury to personnel.

Do not reach through turret shield opening or enter/exit turret when turret power is on.

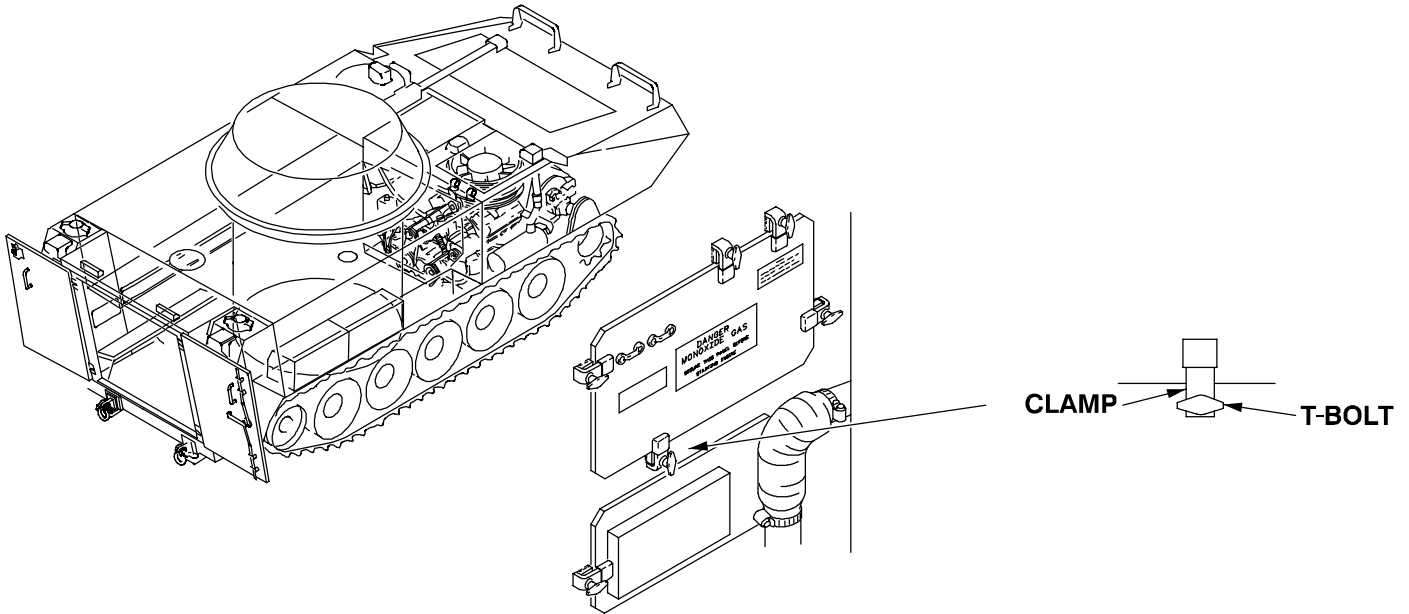
Keep turret shield door closed when turret drive power is on.

Engage turret travel lock before personnel enter turret or reach through turret shield opening.

1. Loosen clamps on personnel heater elbow vent tube.
2. Remove vent tube from heater duct.

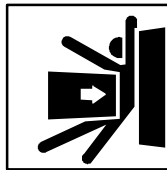


3. Loosen T-bolts and clamps that secure power plant access covers to bulkhead.
4. Remove power plant access covers from bulkhead supports.



INSTALL REAR POWER PLANT ACCESS PANELS

WARNING



Turret can rotate and cause death or serious injury to personnel.

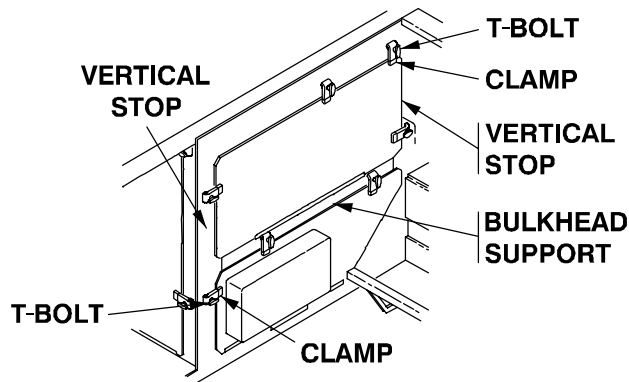
Do not reach through turret shield opening or enter/exit turret when turret power is on.

Keep turret shield door closed when turret drive power is on.

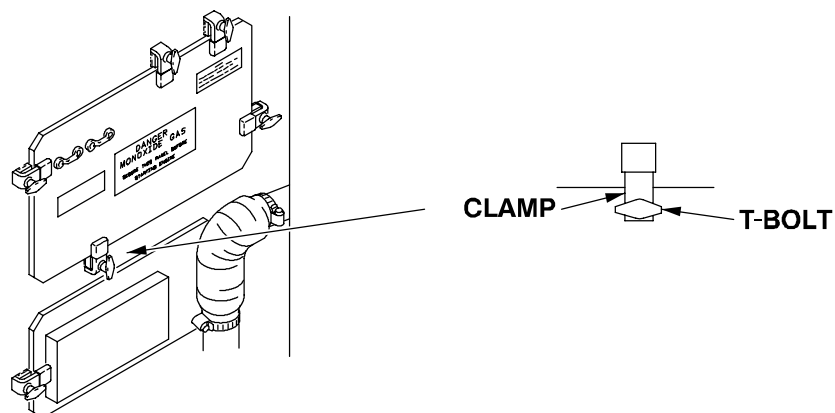
Engage turret travel lock before personnel enter turret or reach through turret shield opening.

1. Position power plant access covers in bulkhead supports.
2. Center covers between vertical stops.

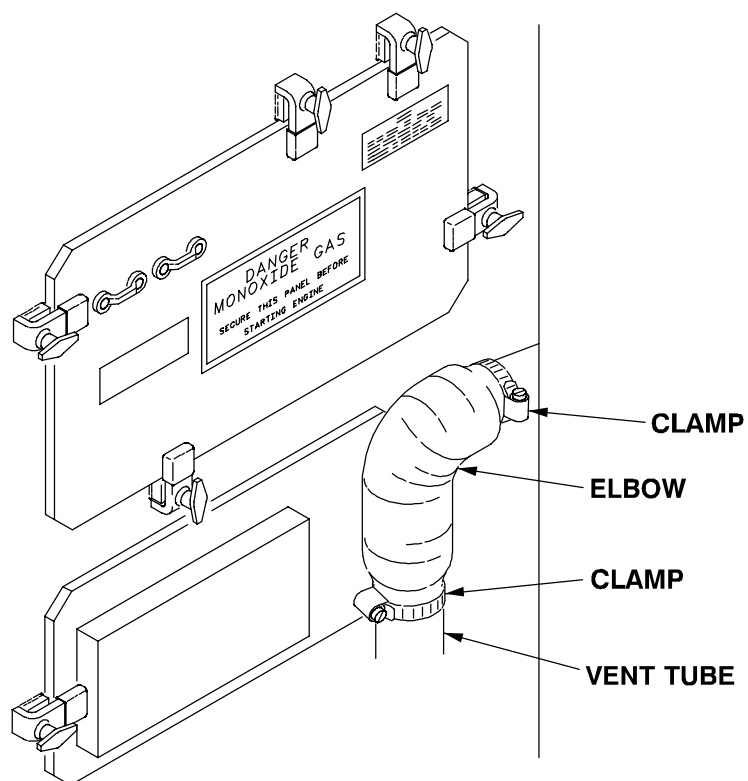
TURRET REMOVED FOR CLARITY



3. Position clamps on covers and tighten T-bolts that secure power plant access covers to bulkhead.



4. Position vent tube elbow on heater duct.
5. Tighten clamps on personnel heater elbow vent tube.



END OF TASK

REMOVE/INSTALL DRIVER'S ENGINE ACCESS COVER

0023 00

THIS WORK PACKAGE COVERS:

Remove Driver's Engine Access Cover (WP 0023 00-1).

Install Driver's Engine Access Cover (WP 0023 00-2).

INITIAL SETUP:**Maintenance Level**

Operator

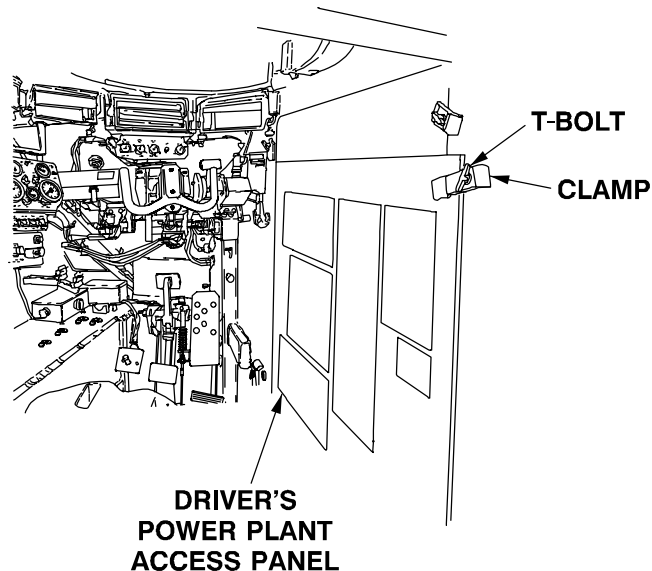
Equipment Conditions

Engine stopped (WP 0016 00)

Personnel RequiredDriver

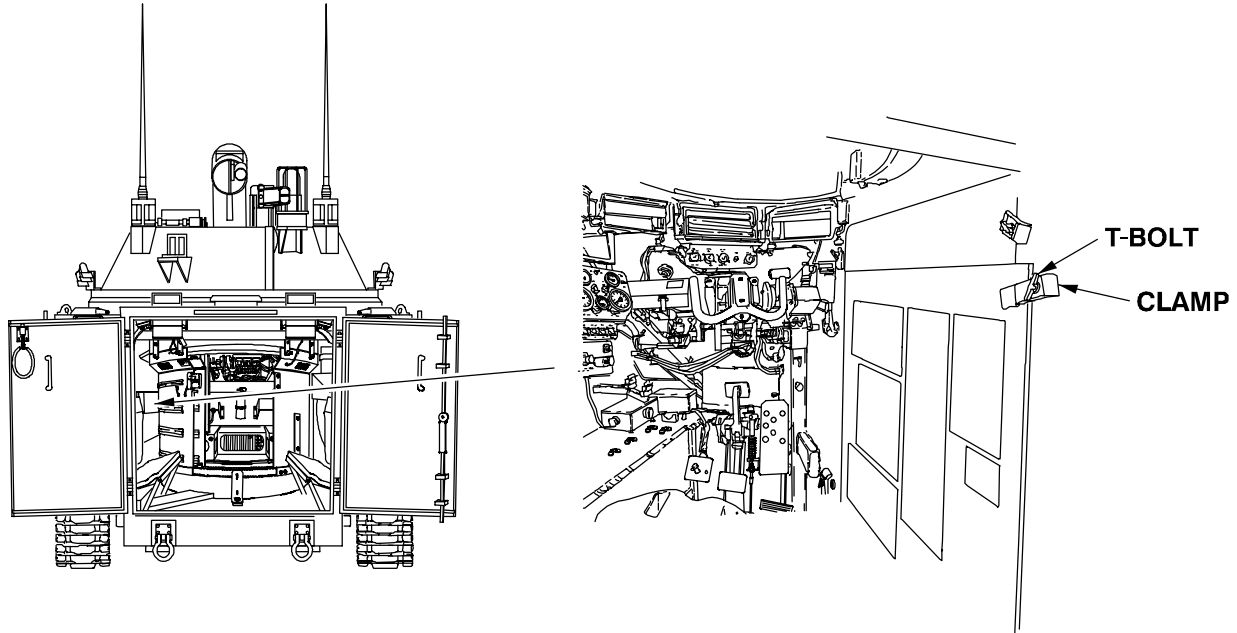
REMOVE DRIVER'S ENGINE ACCESS COVER

1. Loosen T-bolts and clamps that secure engine access cover to bulkhead.
2. Remove engine access cover from bulkhead.



INSTALL DRIVER'S ENGINE ACCESS COVER

1. Position engine access cover in bulkhead supports.
2. Center cover between vertical stops.
3. Position clamps on cover and tighten T-bolts.

**END OF TASK**

REMOVE/INSTALL BATTERY BOX COVERS

0024 00

THIS WORK PACKAGE COVERS:

Remove Battery Box Covers (WP 0024 00-1).

Install Battery Box Covers (WP 0024 00-2).

INITIAL SETUP:

Maintenance Level

Operator

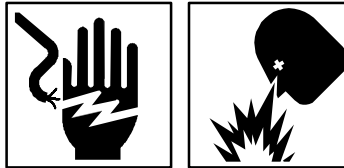
Equipment Conditions

Engine stopped (WP 0016 00)

Personnel Required

Driver

WARNING



Battery posts and power cables can short circuit and cause death or serious burns to personnel.

Do not touch battery positive terminals with tools or other metal objects.

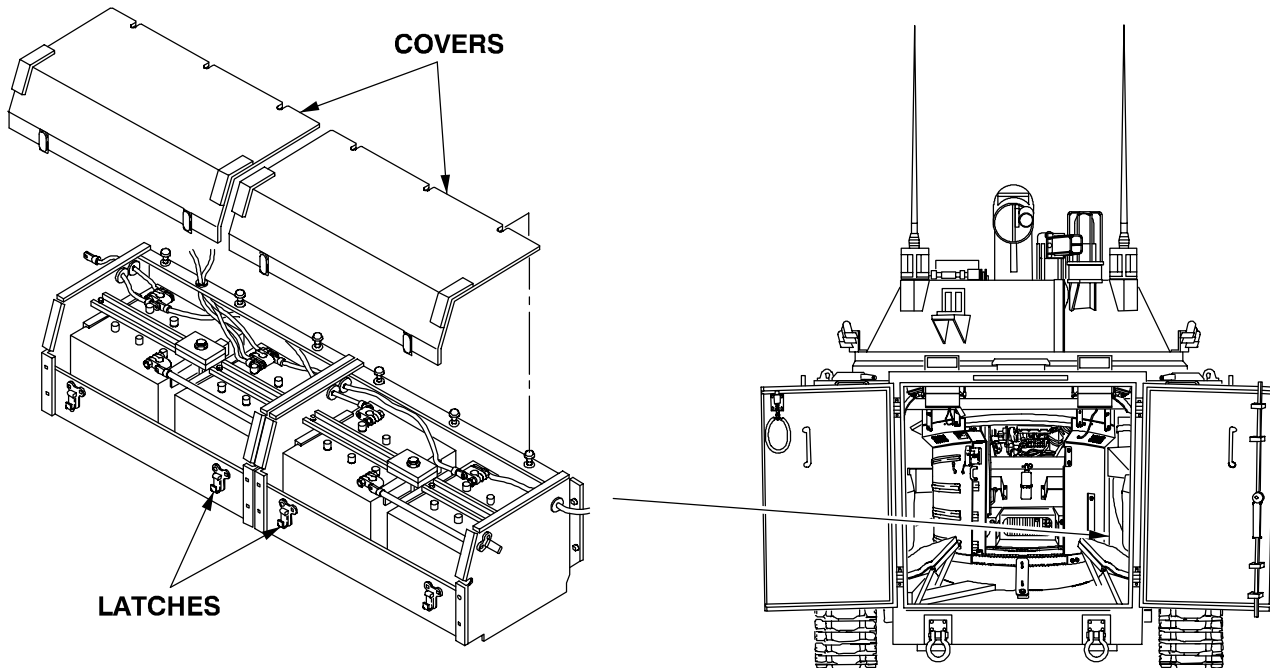
Do not touch both battery posts simultaneously with tools or other metal objects.

Do not wear jewelry when working with battery or electrical system.

Gas from batteries can explode and cause death or serious injury to personnel and/or damage to OSV and equipment.

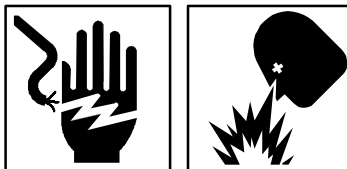
REMOVE BATTERY BOX COVERS

1. Unfasten six latches that secure covers to battery box.
2. Remove battery box covers.



INSTALL BATTERY BOX COVERS

WARNING



Battery posts and power cables can short circuit and cause death or serious burns to personnel.

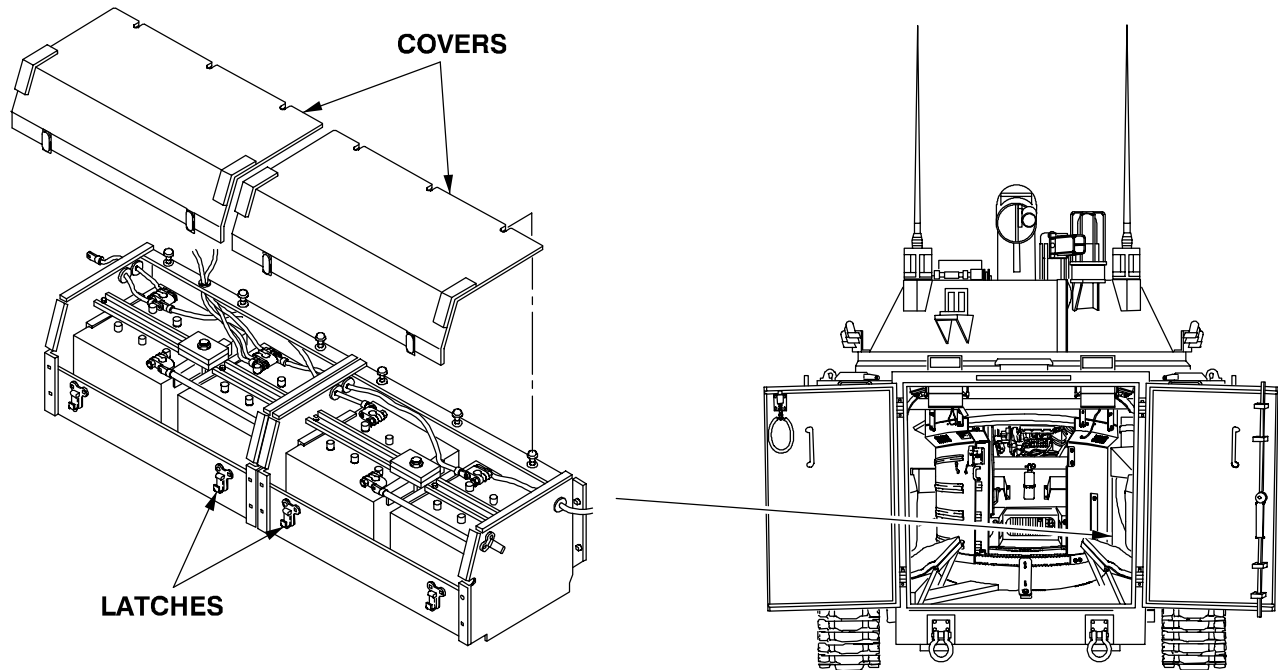
Do not touch battery positive terminals with tools or other metal objects.

Do not touch both battery posts simultaneously with tools or other metal objects.

Do not wear jewelry when working with battery or electrical system.

Gas from batteries can explode and cause death or serious injury to personnel and/or damage to OSV and equipment.

1. Place cover on battery box.
2. Fasten six latches to secure cover on battery box.



END OF TASK

OPERATE DRIVER'S FAN

0025 00

THIS WORK PACKAGE COVERS:

Operate Driver's Fan (WP 0025 00-1).

INITIAL SETUP:**Maintenance Level**

Operator

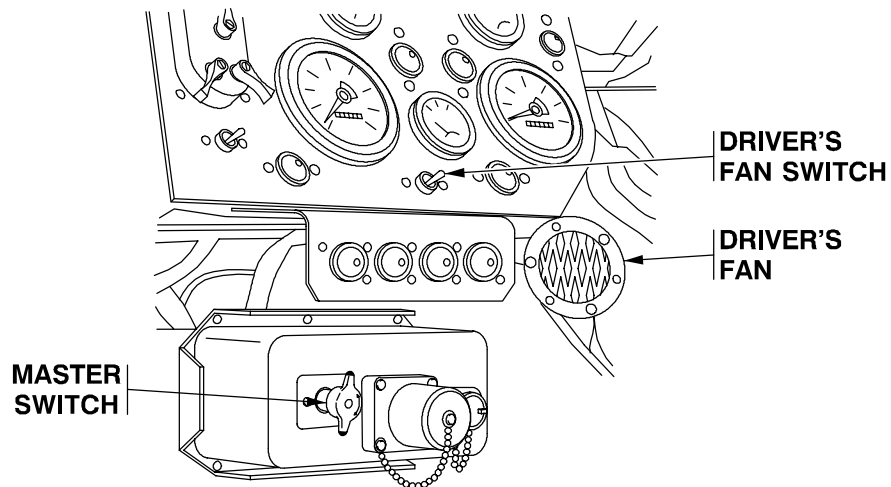
Equipment Conditions

MASTER SWITCH set to ON

Personnel RequiredDriver

OPERATE DRIVER'S FAN

1. Start driver's fan as follows:
 - a. On driver's instrument panel, set DRIVER'S FAN ON/OFF switch to ON.
2. Stop driver's fan as follows:
 - a. On driver's instrument panel, set DRIVER'S FAN ON/OFF switch to OFF.

**END OF TASK**

OPERATE FRESH AIR SYSTEM

0026 00

THIS WORK PACKAGE COVERS:

Operate Fresh Air System (WP 0026 00-2).

INITIAL SETUP:

Maintenance Level

Operator

Equipment Conditions

MASTER SWITCH set to ON

Personnel Required

Crewmember

OPERATE FRESH AIR SYSTEM

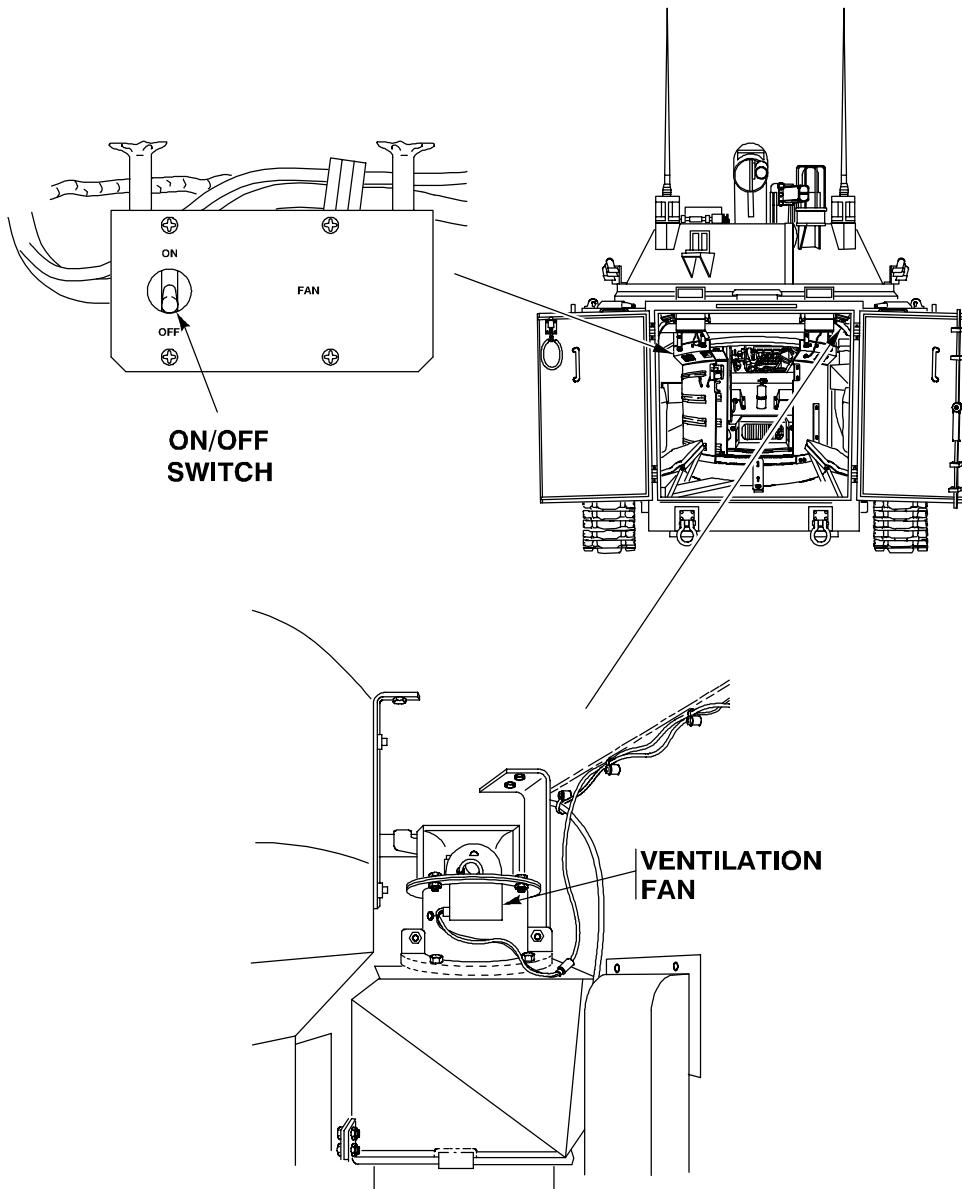
NOTE

Fresh air system is located on right side of vehicle near turret.

NOTE

Fresh air system switch is located to left of drivers station.

1. Start fresh air system as follows:
 - a. Set FAN ON/OFF switch to ON.
2. Stop fresh air system as follows:
 - a. Set FAN ON/OFF switch to OFF.



END OF TASK

INSTALL/REMOVE M27 PERISCOPES**0027 00****THIS WORK PACKAGE COVERS:**

Install Driver and Crew Compartment M27 Periscopes (WP 0027 00-1).

Install Warning Panel M27 Periscope (WP 0027 00-2).

Remove Driver and Crew Compartment M27 Periscopes (WP 0027 00-3).

Remove Warning Panel M27 Periscope (WP 0027 00-4).

INITIAL SETUP:Maintenance Level

Operator

Equipment Conditions

Engine stopped (WP 0016 00)

Personnel Required

Driver

NOTE

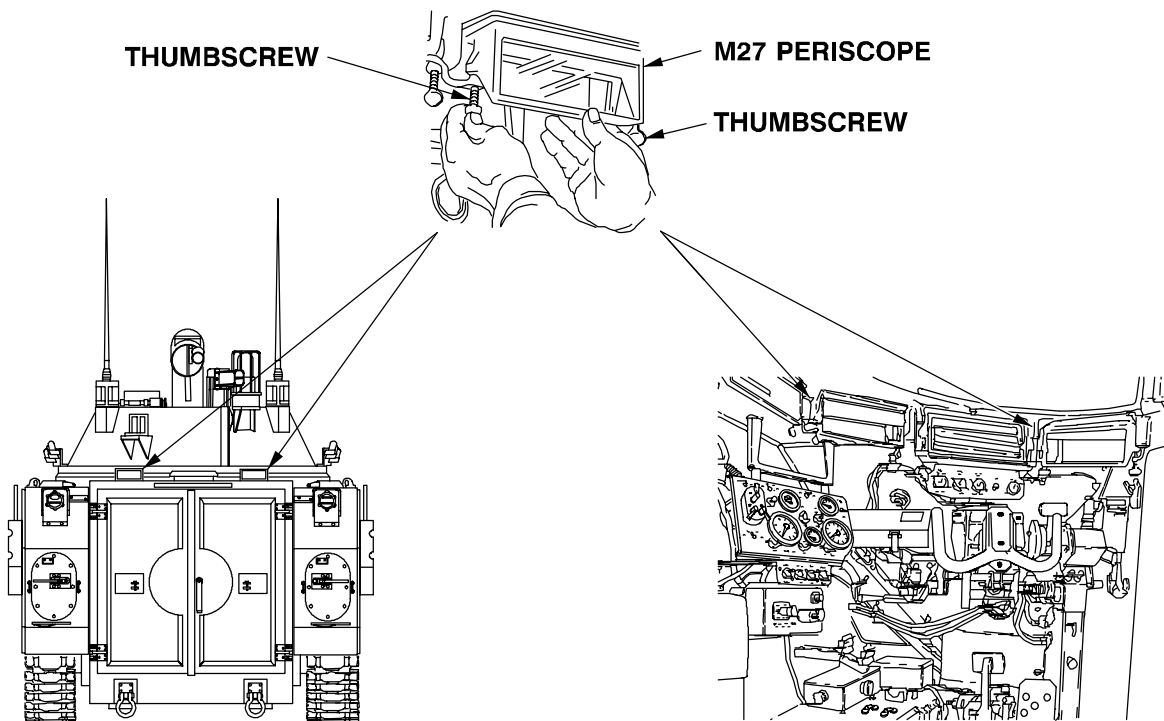
The procedures to install and remove driver and crew compartment periscopes are the same. The procedure to install and remove the warning panel periscope is different.

NOTE

Periscope at driver's 9 o'clock position has different spacer and bolts.

INSTALL DRIVER AND CREW COMPARTMENT M27 PERISCOPE

1. Align periscope with channel in driver's bulkhead or crew compartment.
2. Push periscope straight up into channel until periscope is in position.
3. Hold periscope in place and tighten two thumbscrews to lock periscope in position.



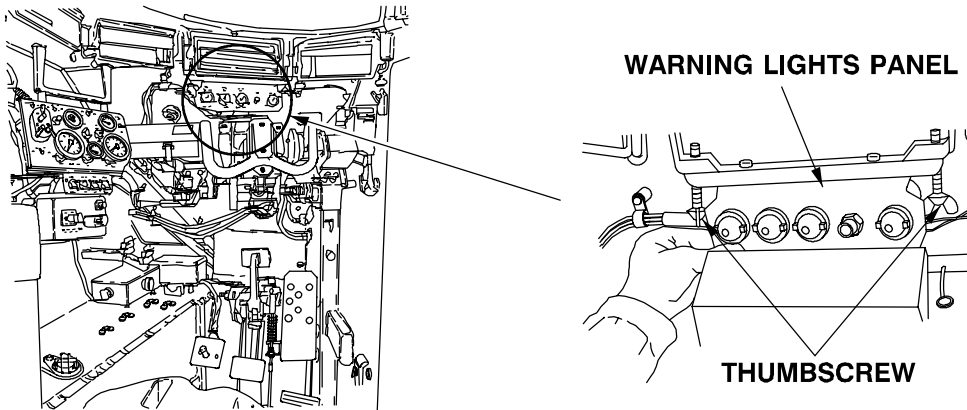
NOTE

During blackout operation, install a blackout cover (located behind each periscope) over periscope window.

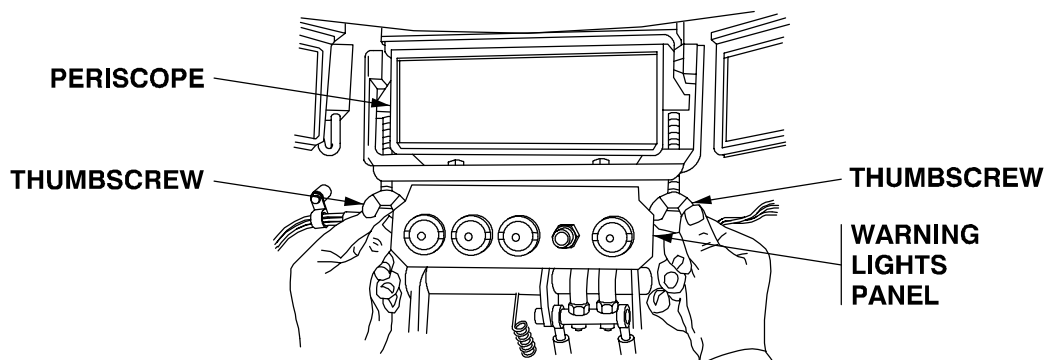
4. If necessary, install blackout cover over window.

INSTALL WARNING PANEL M27 PERISCOPE

1. Loosen two thumbscrews in warning panel.
2. Move warning panel away from periscope channel and hold panel to prevent movement.



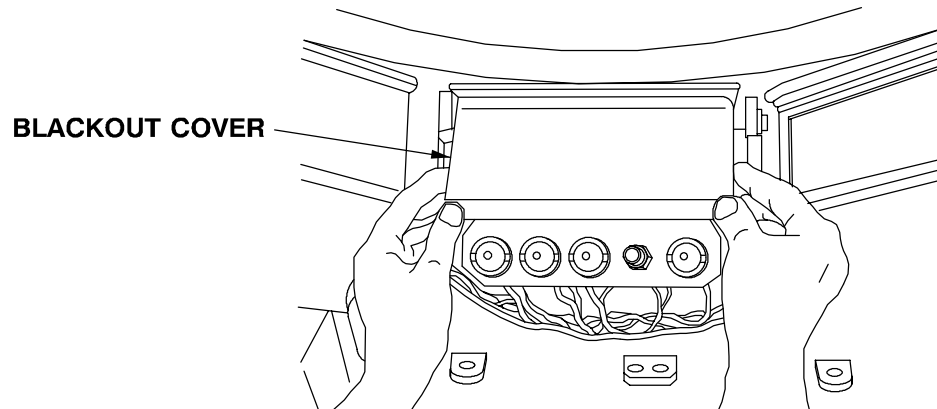
3. Align periscope with channel.
4. Push periscope into channel until periscope is in position.
5. Put the warning light panel into position.
6. Hold panel in place and tighten two thumbscrews to lock warning panel and periscope in position.



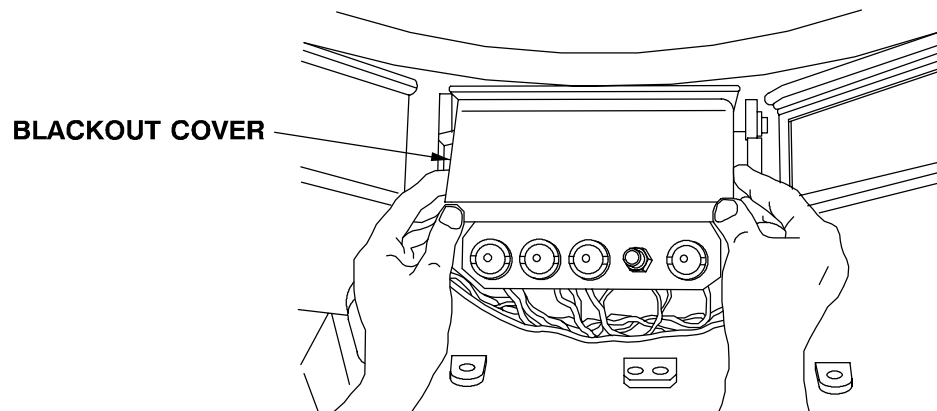
NOTE

During blackout operation, install a blackout cover (located behind periscope) over periscope window.

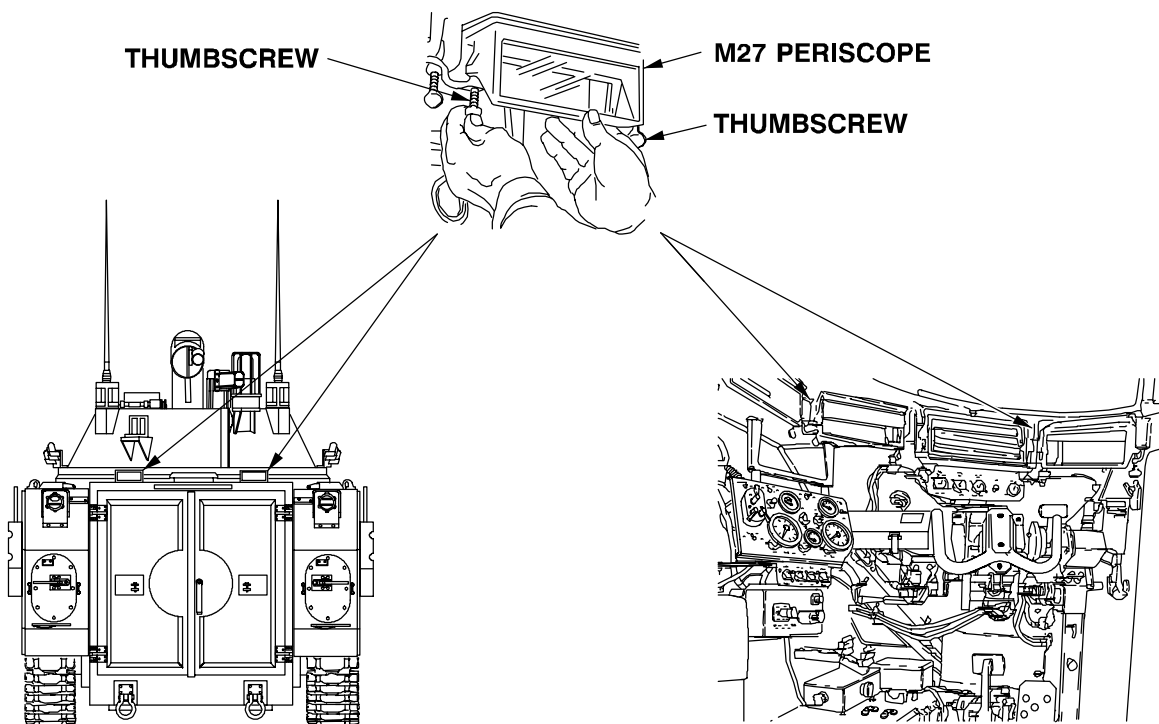
7. If necessary, install blackout cover over window.

**REMOVE DRIVER AND CREW COMPARTMENT M27 PERISCOPE**

1. If necessary, remove blackout cover and stow cover behind periscope.

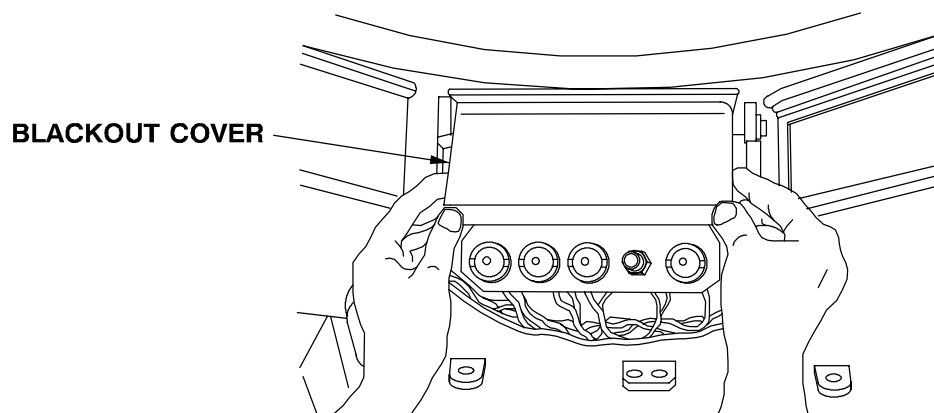


2. Loosen two thumbscrews.
3. Remove periscope.

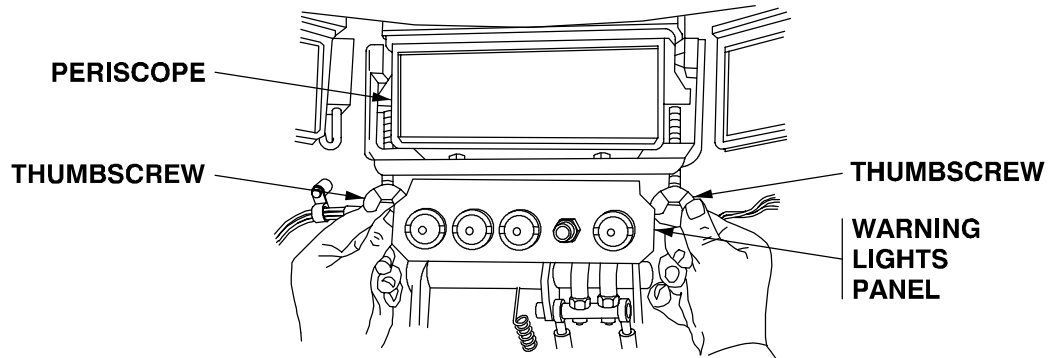


REMOVE WARNING PANEL M27 PERISCOPE

1. If necessary, remove blackout cover and stow cover behind periscope.



2. Loosen two thumbscrews in warning panel.
3. Move warning panel away from periscope channel and hold panel to prevent movement.
4. Remove periscope.
5. Put warning panel in position and tighten two thumbscrews



END OF TASK

OPERATE BILGE PUMP

0028 00

THIS WORK PACKAGE COVERS:
Operate Bilge Pump (WP 0028 00).

INITIAL SETUP:

Maintenance Level

Operator

Equipment Conditions

Engine stopped (WP 0016 00)

Personnel Required

Driver

Helper

WARNING

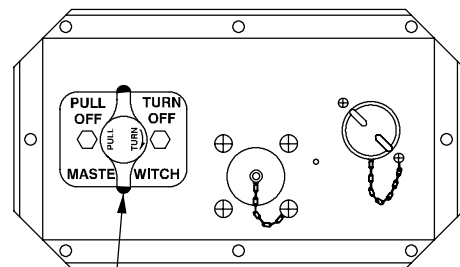
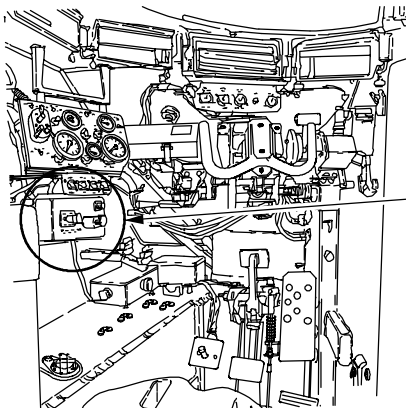


Do not ford water that is more than 40-inches deep because there is only one bilge pump.

Fording water deeper than 40-inches can cause death/drowning.

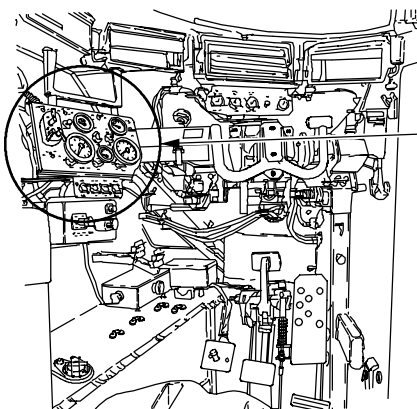
OPERATE BILGE PUMP

1. Set MASTER switch to ON.

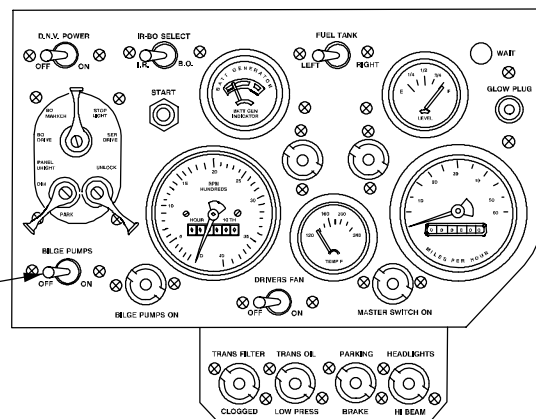


MASTER SWITCH

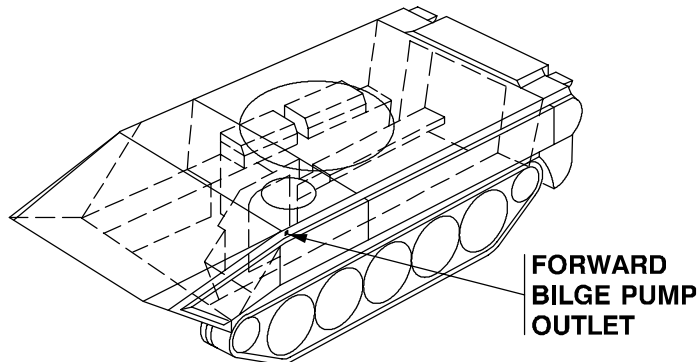
2. Set BILGE PUMP switch to ON.



BILGE PUMP SWITCH

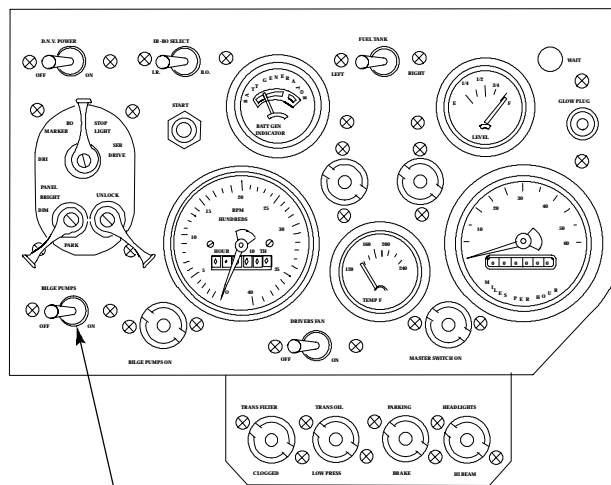


3. Have helper check for airflow (or water) at bilge pump outlet. If there is no flow, notify your supervisor.



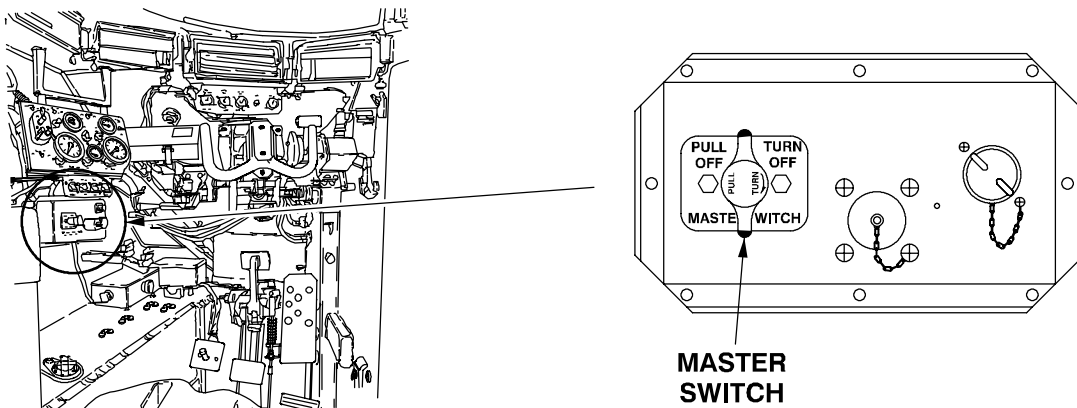
**FORWARD
BILGE PUMP
OUTLET**

4. When operation is finished, set BILGE PUMP switch to OFF.



BILGE PUMP SWITCH

5. Set MASTER switch to OFF.



**MASTER
SWITCH**

END OF TASK

BLOCK/UNBLOCK VEHICLE TRACKS

0029 00

THIS WORK PACKAGE COVERS:

Block Vehicle Tracks (WP 0029 00-1).

Unblock Vehicle Tracks (WP 0029 00-1).

INITIAL SETUP:

Maintenance Level

Operator

Equipment Conditions

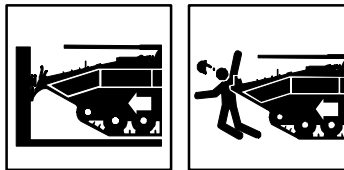
Vehicle parked

Personnel Required

Driver

BLOCK TRACKS

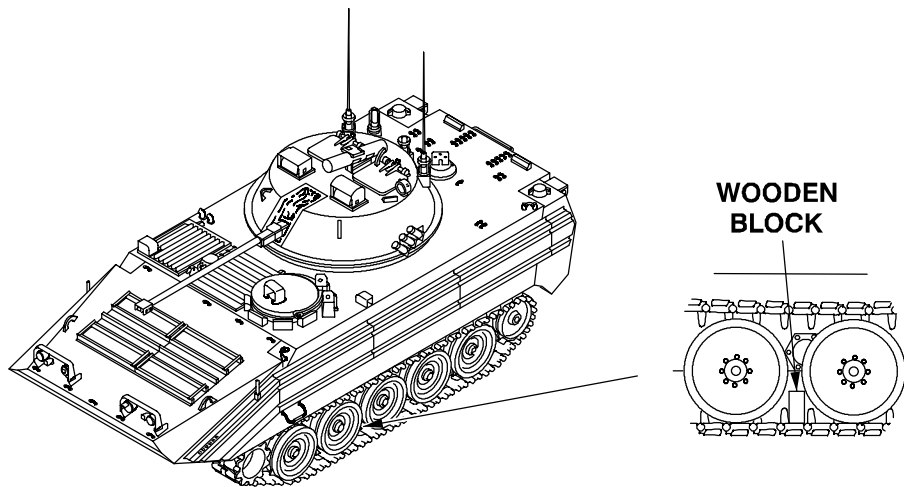
WARNING



OSV can move during maintenance or when parked on incline. Unguided movement of OSV can cause vehicle to strike personnel, objects, or other vehicles causing death or serious injury to personnel and/or damage to vehicle and equipment.

Block OSV treads when OSV is parked on hill, before personnel work under vehicle or near treads, or when doing maintenance that could result in accidental vehicle movement.

1. Place a block of wood or other suitable object between track guides and two sets of roadwheels.
2. Make sure block extends full width between road wheels.



UNBLOCK TRACKS

Remove block from between track guides and roadwheels.

END OF TASK

OPERATION IN EXTREME COLD BELOW -25° F (-31° C)

0030 00

THIS WORK PACKAGE COVERS:

- Prepare to Operate in Extreme Cold (WP 0030 00-1).
- Operate in Extreme Cold (WP 0030 00-2).
- Shutdown in Extreme Cold (WP 0030 00-5).
- Requirements for Extreme Cold Operation (WP 0030 00-6).

INITIAL SETUP:**Maintenance Level**

Operator

Personnel Required

Driver

Materials/Parts

Tarpaulin (WP 0053 00)

References

TM 9-2350-366-10-2

FM 21-306

PREPARE TO OPERATE IN EXTREME COLD**WARNING**

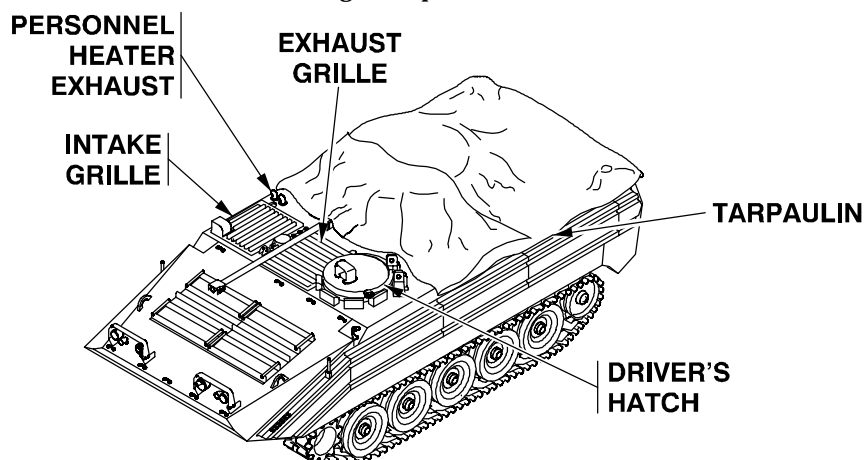
Contact with cold metal and working outside in cold weather can cause frostbite. Wear gloves and cold weather clothing in cold conditions.

Do not touch cold metal with bare skin.

NOTE

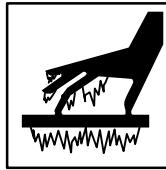
Do not operate personnel heater until heater exhaust has been uncovered.

1. Fold tarpaulin back to uncover exhaust and intake grilles, personnel heater exhaust, and driver's hatch.



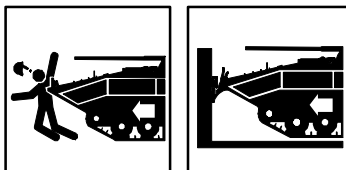
2. Make sure driver's hatch cover is closed (WP 0007 00).
3. Make sure gunner's and commander's hatch cover is closed TM 9-2350-366-10-2.
4. Remove cover from exhaust grille (WP 0034 00).
5. Open intake grille cover as required (WP 0034 00).

OPERATE IN EXTREME COLD

WARNING

Contact with cold metal and working outside in cold weather can cause frostbite. Wear gloves and cold weather clothing in cold conditions.

Do not touch cold metal with bare skin.

WARNING

Center steering yoke when starting engine. Clear area around OSV of personnel before starting engine. When transmission controller is set to SL and steering yoke is not centered to engage locking pin, OSV could pivot when started and cause death or injury to personnel and/or damage to vehicle and equipment.

NOTE

Extreme cold may require frequent engine startup to keep engine and crew compartment warm. Long term cold park may require vehicle to be towed to a heat source before startup.

NOTE

If possible, have second vehicle available for alternating operation and extra power if required.

NOTE

After cold start, allow engine to idle for 15 minute warm-up.

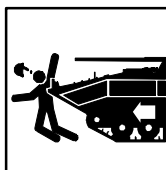
1. Start engine (WP 0013 00).
2. Increase idle speed to 1200 rpm.

WARNING

Engine and personnel heater exhausts are poisonous. Close power unit access doors before starting engine to prevent exhaust gas from entering personnel areas.

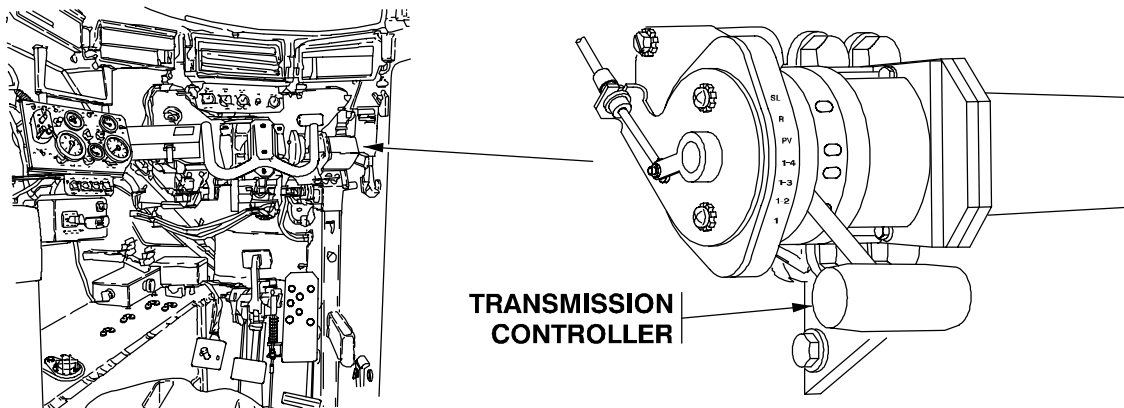
The NBC mask will not protect personnel from exhaust gas poisoning.

3. Start personnel heater (WP 0018 00) to warm batteries and inside of vehicle.
4. Release parking brake (WP 0012 00).
5. Push down and hold brake pedal.

WARNING

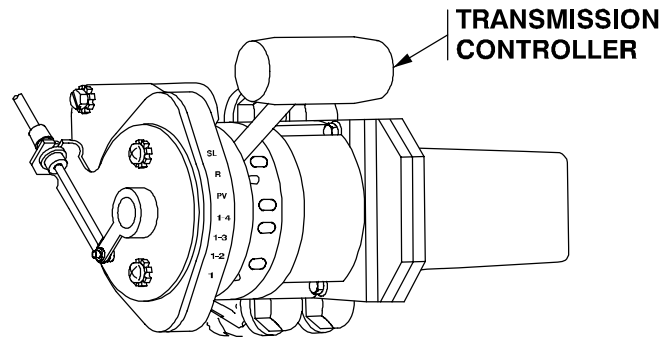
Vehicle can move suddenly and unexpectedly if yoke is moved from center when moving gear selector lever to pivot (PV). Before shifting to PV, clear area around OSV of personnel. Do not move yoke from center. Push down brake pedal.

6. Set transmission controller to 1-2.

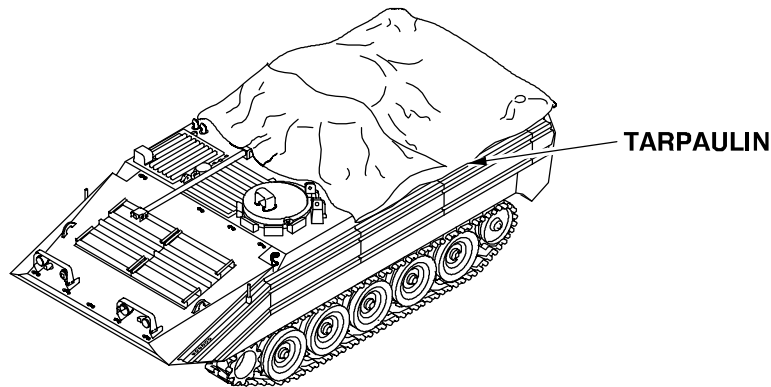


7. Slowly increase engine idle until engine runs smoothly (approximately 5 minutes).
8. Decrease engine idle to slow.

9. Set transmission controller to SL and release brake pedal.



10. Set parking brake (WP 0012 00).
 11. Uncover intake grille flaps as required (WP 0034 00).
 12. Remove tarpaulin from vehicle.

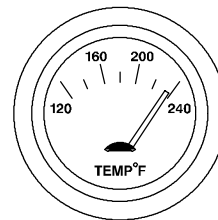
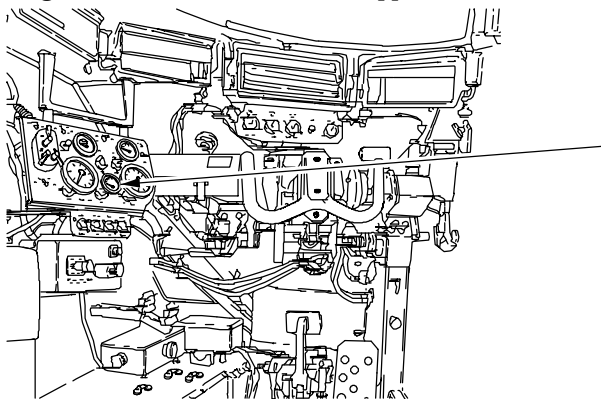


13. Repeat steps 4 through 8.

CAUTION

Operating engine at high speed after doing a cold start could cause damage to engine. Drive vehicle slowly for first kilometer.

14. Do mission as required.
 15. If engine coolant temperature goes above 230°F while operating vehicle, do following:
- Decrease engine idle to slow.
 - Set transmission controller to SL.
 - Set parking brake (WP 0012 00).
 - Remove intake grille cover (WP 0034 00) (if applicable).



**ENGINE COOLANT
TEMPERATURE GAUGE**

SHUTDOWN IN EXTREME COLD

WARNING

Contact with cold metal and working outside in cold weather can cause frostbite. Wear gloves and cold weather clothing in cold conditions.

Do not touch cold metal with bare skin.

1. Park vehicle (WP 0031 00).
2. Stop engine (WP 0016 00).
3. Remove driver's engine access cover (WP 0023 00).

CAUTION

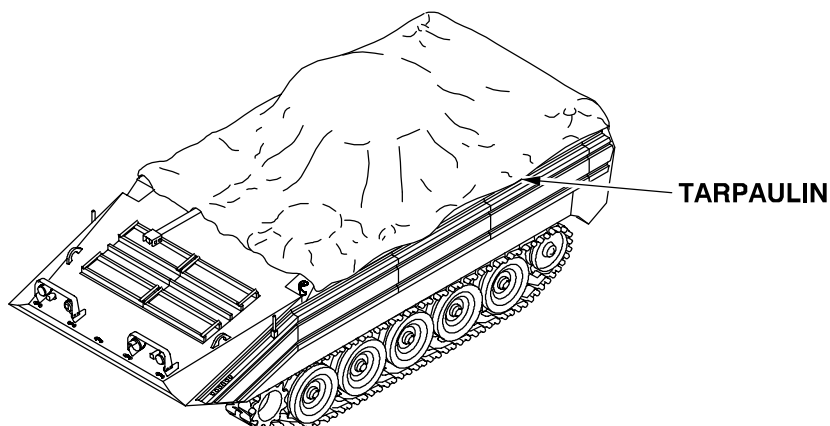
Condensation in fuel tanks and fuel lines can freeze and block fuel lines. Drain water and keep fuel tanks full.

4. Drain fuel filters (WP 0040 00).
5. Install driver's engine access cover (WP 0023 00).
6. Shut off personnel heater (WP 0018 00).
7. If intake grille was uncovered, install cover (WP 0034 00).
8. Cover exhaust grille (WP 0034 00).

NOTE

Keep fuel tanks full of fuel to prevent formation of condensation in tanks.

9. Fill fuel tanks (WP 0017 00).
10. Make sure driver's hatch is closed (WP 0007 00).
11. Make sure gunner's and commander's hatch covers are closed (TM 9-2350-366-10-2).
12. Put tarpaulin over vehicle.



REQUIREMENTS FOR OPERATION IN EXTREME COLD

WARNING

Contact with cold metal and working outside in cold weather can cause frostbite. Wear gloves and cold weather clothing in cold conditions.

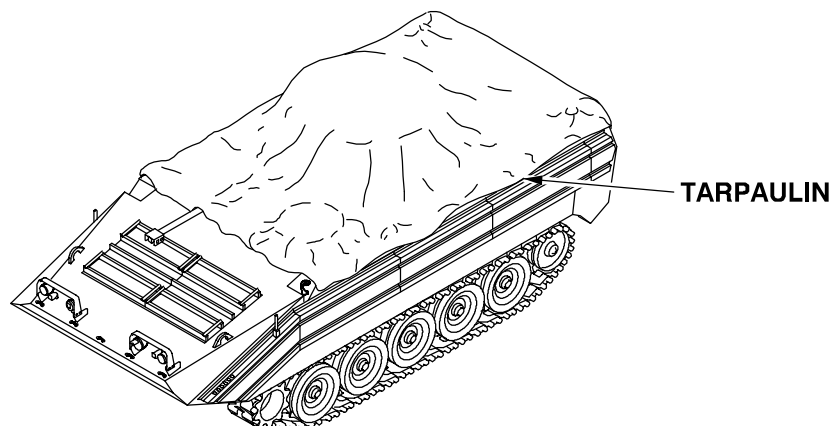
Do not touch cold metal with bare skin.

1. Observe vehicle for effects of cold weather.
2. Make sure inlet and exhaust grille covers are in place and are adjusted as required during operations.
3. Driver must read FM 21-306 to be familiar with methods and special hazards of operating vehicle on snow, ice, and unusual terrain.
4. Park vehicle in shelter when possible. If shelter is not available, observe following:
 - a. Park vehicle facing away from wind direction.
 - b. Footing of planks or brush must be placed under tracks so tracks won't get frozen in.
 - c. Snow, ice, and mud must be removed from vehicle.
5. Wear gloves when working outside vehicle.
6. Drain fuel filters as soon as possible (WP 0040 00).

NOTE

When vehicle cools, water from condensation collects in empty tanks and tanks that are not full. The water can freeze and block fuel flow. Water in fuel can also cause difficult starting and rough running.

7. Fill fuel tanks as soon as possible (WP 0017 00).
8. Cover vehicle with tarpaulins (or whatever is available) while not in use.



9. Remove drain plugs when water is observed in hull and drain water to prevent freezing.
10. When operations are finished, PMCS shall be done as soon as possible (WP 0040 00).
11. Turn off lights and electrical equipment while engine is off. When lights and/or electrical equipment are required on, keep duration as short as possible.
12. Do not allow ends of tarpaulin or other covering to contact ground long enough to freeze in place.
13. Do not touch external metal surfaces with bare hands or tongue. Extreme cold could cause them to freeze to metal surface.

END OF TASK

OPERATE VEHICLE OVER ROUGH TERRAIN

0031 00

THIS WORK PACKAGE COVERS:

- Drive Vehicle Over Trenches (WP 0031 00-3).
- Drive Vehicle Over Obstacles (WP 0031 00-4).
- Drive Vehicle on Grades (WP 0031 00-5).
- Drive Vehicle on Side Slopes (WP 0031 00-6).
- Drive Vehicle on Snow, Ice, or Mud (WP 0031 00-7).
- Park Vehicle on Snow, Ice, or Mud (WP 0031 00-8).

INITIAL SETUP:

Maintenance Level

Operator

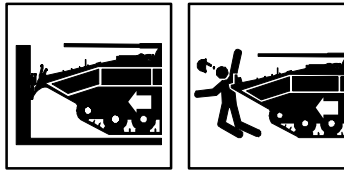
Equipment Conditions

Engine started (WP 0013 00)

Personnel Required

Driver

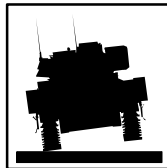
WARNING



Do not change forward or reverse movement of OSV by shifting gears until OSV comes to complete halt. OSV will not change direction when shifting from forward to reverse/reverse to forward while moving at a speed greater than 4 mph.

Attempting to change direction of travel while vehicle is in motion can result in death or injury to personnel and/or damage or destruction of equipment.

WARNING



Driving more than 6 miles (9.6 km) per day over rough terrain can cause vibration-induced injuries to personnel in the OSV. On rough terrain, reduce speed to 10 mph maximum. Avoid bumps and sudden turns. Use tank trails when possible.

Do not drive vehicle on side slopes steeper than 30% (16 degrees).

Wear seat belts while vehicle is in motion.

WARNING

Vehicle can roll over on hills or rough terrain causing death or injury to personnel and damage/destruction of OSV and/or equipment. Reduce speed and avoid bumps and sudden turns. Do not operate vehicle on side slopes steeper than 30% (16 degrees). Wear seat belts.

WARNING

OSV brake pedal is very sensitive. Applying sudden hard pressure to brake pedal can cause OSV to come to abrupt halt and cause injury to personnel and/or damage to equipment.

Apply brake pressure lightly and with caution.

WARNING

An out-of-control OSV can overturn. Personnel are safer staying in vehicle than getting out while vehicle is in motion. Personnel can be killed or seriously injured while attempting to evacuate a vehicle during a rollover. If vehicle starts to overturn, personnel must be fully inside OSV and braced. Personnel inside OSV may receive injuries from being thrown against metal parts but personnel outside the vehicle are in danger of being crushed by vehicle rollover.

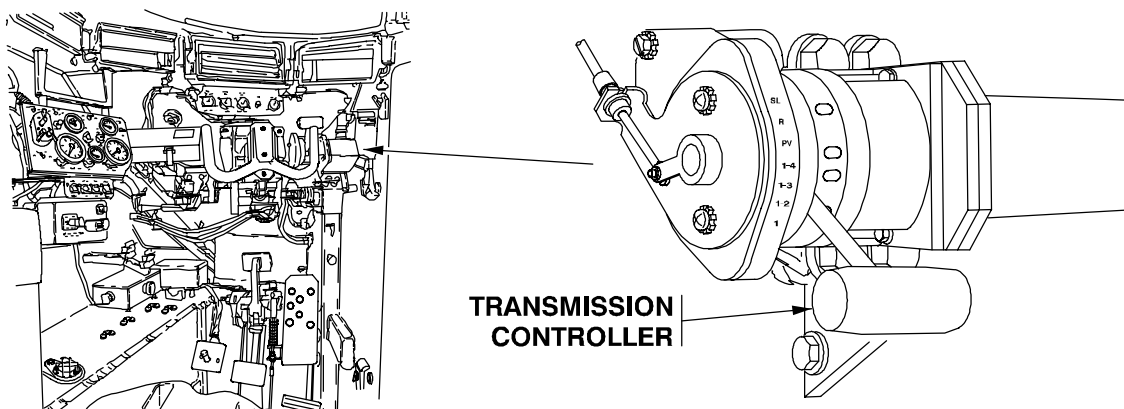
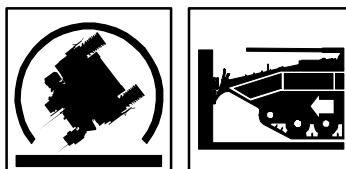
Spilled fuel and oil can catch fire after a rollover. Shut off vehicle master power and engine fuel supply immediately. Evacuate vehicle as quickly as can be done safely after vehicle has come to rest.

NOTE

Crossdrive transmission on OSV will not change vehicle direction of movement when vehicle is moving at speed above 4 mph. At forward speed above 4 mph, setting shift lever to reverse (R) will not cause the vehicle to go into reverse and change direction of travel. Also, at reverse speed above 4 mph, setting shift lever to a forward gear will not cause the vehicle to change direction of travel.

DRIVE VEHICLE OVER TRENCHES

1. Set transmission controller lever to 1 or 1-2.

**WARNING**

Vehicle can roll over when entering a trench at an angle if the side of the trench is steeper than 30% (16 degrees). Wear seat belts.

Do not attempt to cross trenches that are more than 5 1/2-feet (1.67-m) in width. If the front of OSV hits side of trench, personnel could be killed or injured and OSV could be damaged. OSV could get stuck.

2. Approach trench head on.

CAUTION

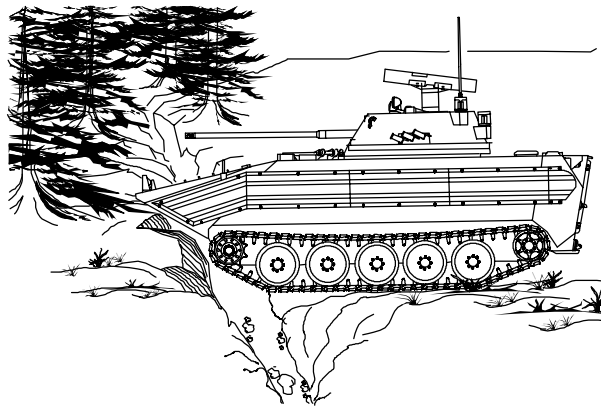
Front of OSV consists of light weight fabrication that gives OSV appearance of a BMP. Front is structurally weaker than the rest of the vehicle and could be damaged if weight of vehicle rests on nose or if OSV strikes trees or bottom/side of trench.

NOTE

Maximum width of trench that can be safely crossed is 5 1/2-feet (1.6-m).

3. Before starting to cross trench, visually check for obstacles and to make sure that trench can be safely crossed.

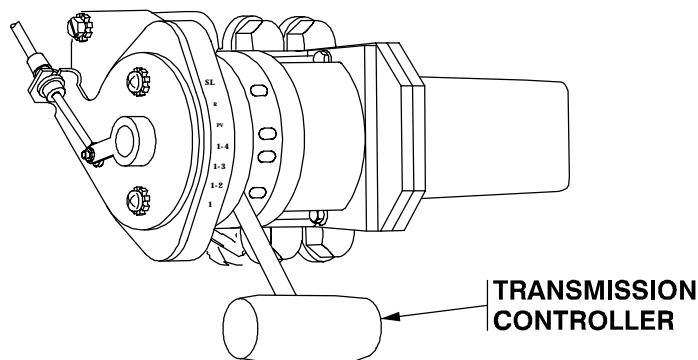
4. Slowly cross trench.



5. When tracks contact opposite side of trench, accelerate.

DRIVE VEHICLE OVER OBSTACLES

1. Set transmission controller lever to 1 or 1-2.



WARNING



Vehicle can roll over if one track contacts obstacle and causes one side of OSV to tilt at an angle steeper than 30% (16 degrees). Wear seat belts.

2. Approach obstacle head on.

CAUTION

Do not drive over obstacles higher than 24-inches. Front of OSV consists of light weight fabrication that gives OSV appearance of a BMP. Front is structurally weaker than the rest of the vehicle and could be damaged if OSV strikes obstacle. Bottom of OSV could also be damaged by obstacle higher than 24-inches.

3. Before starting to drive over obstacle, visually check to make sure that obstacle can be safely crossed.
4. Slowly drive over obstacle.

DRIVE VEHICLE ON GRADES

CAUTION

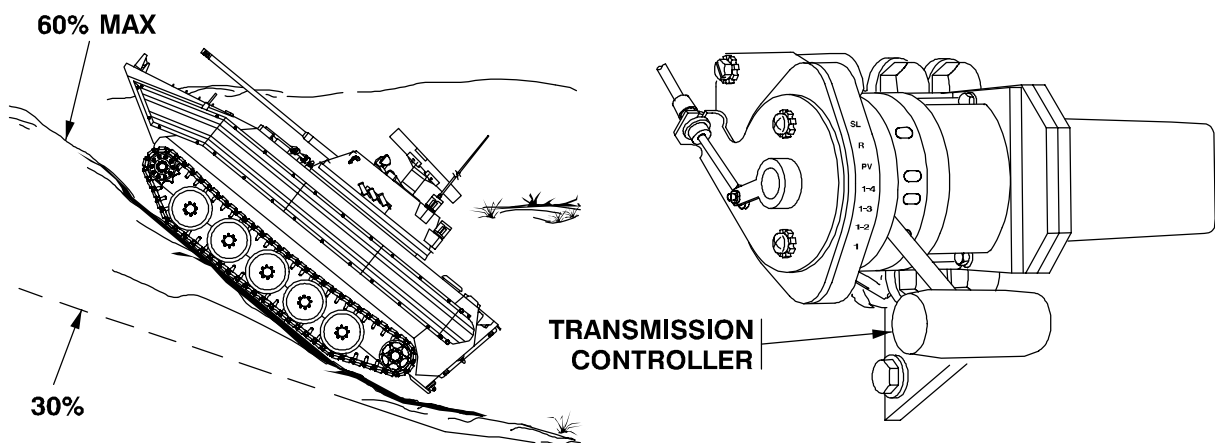
Do not climb grades that are steeper than 60%.

1. Visually check to make sure grade can be safely climbed and to determine required transmission range.

NOTE

Use transmission range 1-2 for grades to 30%. Use range 1 for grades of 30% to 60%.

2. Set transmission controller lever to 1 or to 1-2 as required.

**WARNING**

Vehicle can roll over when going up a grade at an angle and the grade is steeper than 30% (16 degrees). Wear seat belts.

3. Approach grade head on.
4. Accelerate when starting up grade.
5. Decelerate at top and during descent.

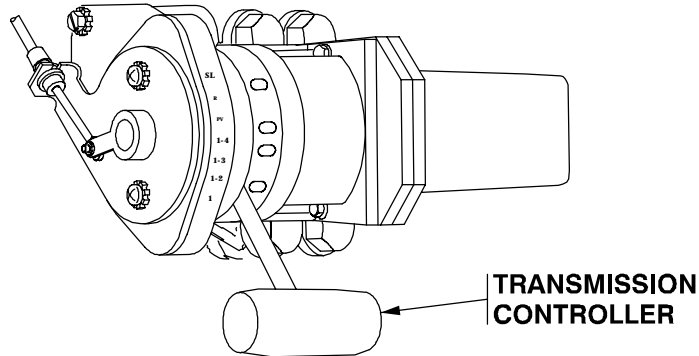
DRIVE VEHICLE ON SIDE SLOPES

WARNING



Vehicle can roll over while moving across slopes. Rollover can cause death or injury to personnel. Reduce speed on slopes and bumps and avoid sudden turns. Do not operate on side slopes steeper than 30% (16 degrees). Wear seat belts.

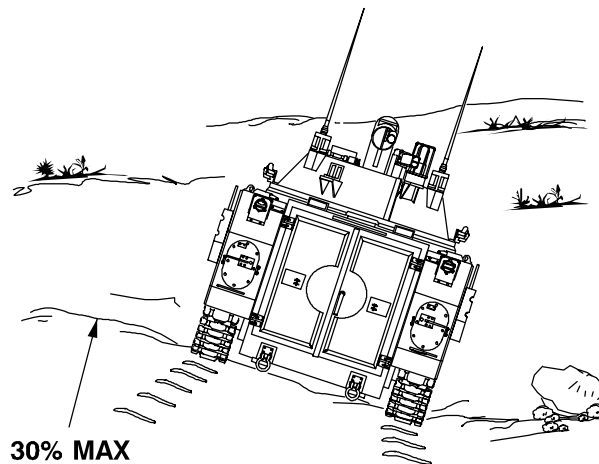
1. Visually check to make sure slope can be safely crossed and to determine required transmission range.
2. Set transmission controller lever to 1 or to 1-2 as required.



NOTE

Steer in a series of small wide turns instead of one sharp turn.

3. Slowly accelerate and drive across slope.



DRIVE VEHICLE ON SNOW, ICE, AND MUD

WARNING

Vehicle can slide and roll over while driving on snow, mud, or ice covered grades. Rollover can cause death or injury to personnel. If driving on a hazardous grade is required, reduce speed and operate the OSV straight up and straight down. Wear seat belts.

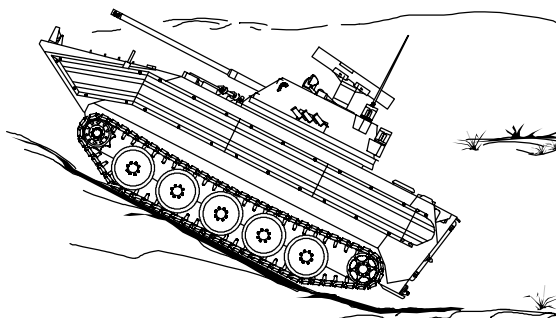
CAUTION

Steer on snow, mud, and ice in a series of small wide turns. Doing sharp turns could cause Vehicle to throw a track.

NOTE

For prolonged operations in areas of snow, mud, and ice, or heavy brush, unit maintenance should remove track shrouds.

1. Visually check to make sure condition permits OSV operation. When driving up a slope (or down), approach slope head on and go straight up.



2. Set transmission controller lever to range that permits vehicle to move smoothly and not dig in.

NOTE

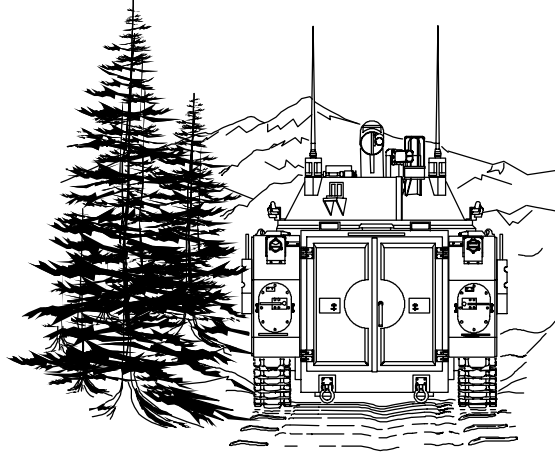
Steer in a series of small wide turns instead of one sharp turn. Slow OSV before starting each turn.

Drive OSV slowly to prevent skidding.

3. Slowly accelerate and drive OSV.
4. If vehicle breaks through crust into deep snow or soft soil, stop, reverse direction, and back straight out.

PARK VEHICLE ON SNOW, ICE, AND MUD

1. If possible, park vehicle on firm ground and in a sheltered area.



2. Turn vehicle so that front of vehicle faces away from wind.
3. If OSV is parked in a low area on mud and/or snow that could freeze, put branches or brush down and drive OSV so that tracks are on the material.
4. Stop engine (WP 0016 00).
5. Clean tracks and roadwheels to remove snow, ice, and mud.
6. If the temperature is in or near the extreme cold range, proceed per park instructions in OPERATE IN EXTREME COLD (WP 0030 00).

END OF TASK

OPERATE VEHICLE IN EXTREME HEAT, HUMIDITY, OR SALTY CONDITIONS

0032 00

THIS WORK PACKAGE COVERS:

Operate Vehicle in Extreme Heat, Humidity, or Salty Conditions (WP 0032 00-2).

Requirements to Maintain Vehicle in Extreme Heat, Humidity, or Salty Conditions (WP 0032 00-5).

INITIAL SETUP:

Maintenance Level

Operator

Personnel Required

Driver

References

WP 0022 00

WP 0016 00

FM 21-10

TM 9-2350-366-10-2

WARNING



Operating vehicle in hot weather increases risk of heat stress. Heat stress impairs performance and can lead to injury.

Drink lots of water. Work and rest in shade when possible. Follow instructions in FM 21-10.

WARNING



After operation, engine, engine parts, gear box, and fluids are hot and can cause serious burns.

Allow engine, engine parts, gear box, and/or fluids to cool before working on or near them, inspecting for deterioration and damage or checking fluid levels. Wear heat protective gloves to work on hot parts.

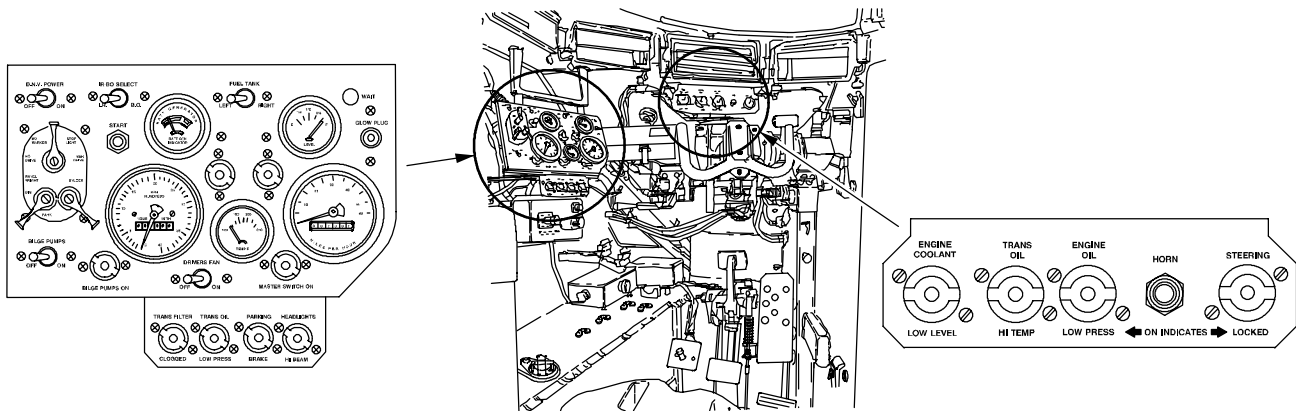
OPERATE VEHICLE IN EXTREME HEAT, HUMIDITY, OR SALTY CONDITIONS

1. Check gauges and warning indicators more often than when operating in less extreme conditions. If warning light comes on or gauge shows unusual readings, go to step 2. If normal conditions exist, go to step 8.
2. Traverse turret to 3200 mils (TM 9-2350-366-10-2).
3. Remove rear engine access cover (WP 0022 00).
4. Check coolant fan tower belts, and ensure they are turning.

NOTE

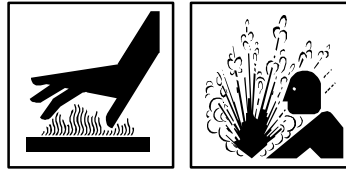
If belts are not turning, stop engine immediately.

5. Bypass thermostatic fan speed switch.
6. Proceed with engine shutdown procedures (WP 0016 00).



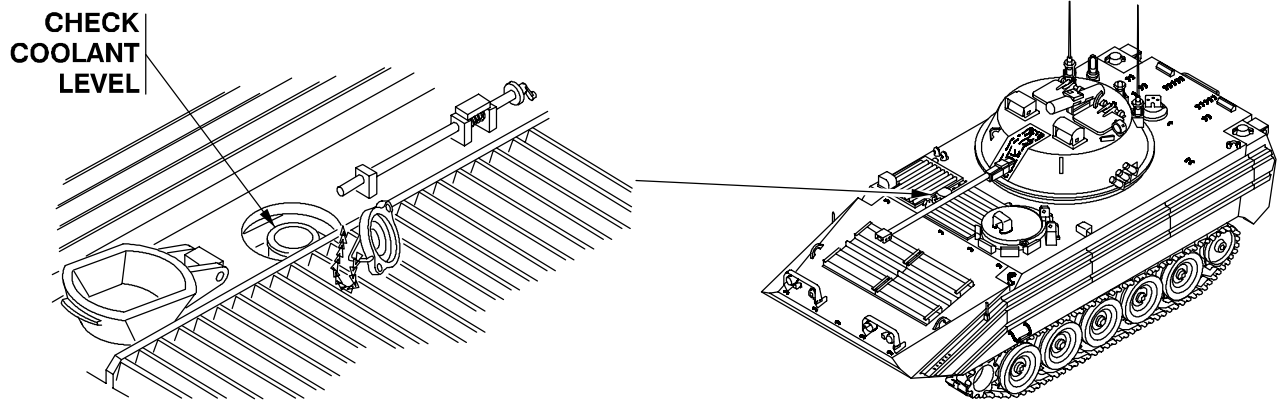
7. Do troubleshooting index to locate procedure to correct problem (WP 0038 00).

WARNING

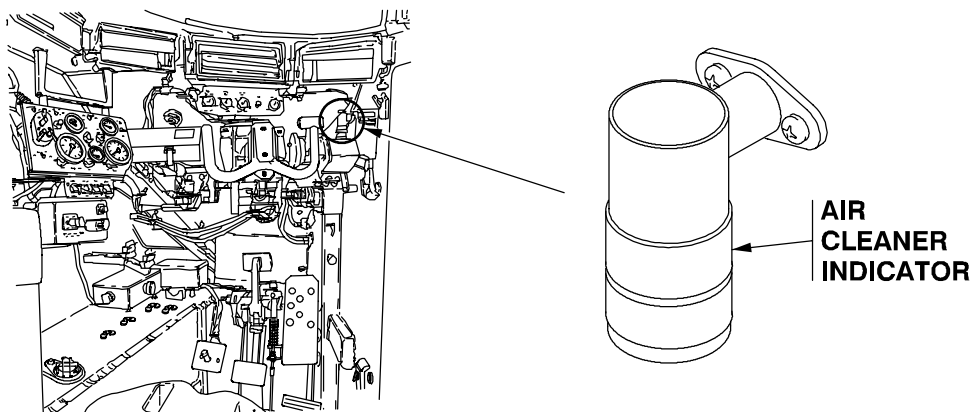


Hot coolant can cause burns. Do not remove radiator cap until TEMP gauge needle is in bottom quarter of green zone. Wear heat protective mittens and eye protection to remove radiator cap. Turn cap slowly to prevent sudden explosion due to pressure build-up.

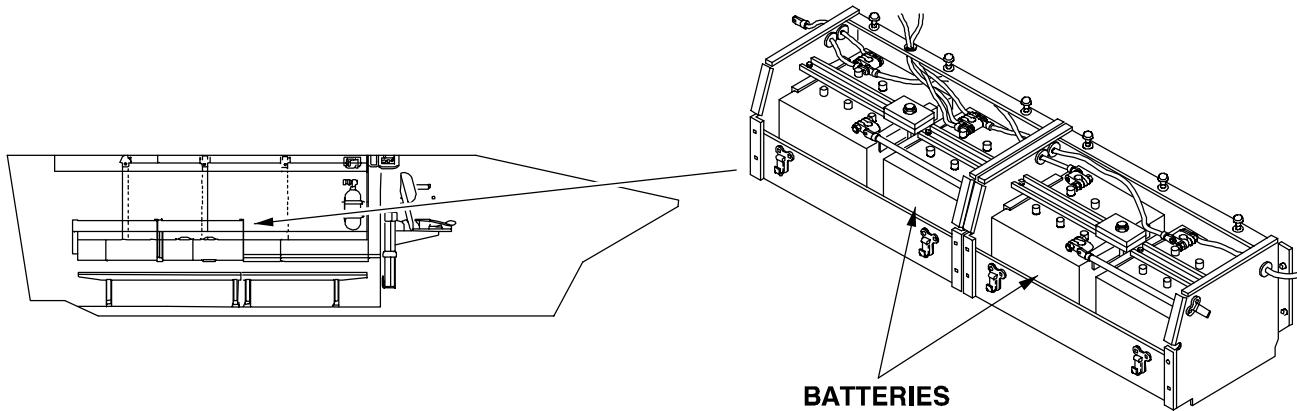
8. Check coolant level often (WP 0049 00).



9. Check air cleaner indicator often. If indicator window is red, notify your supervisor.



10. Check water level in batteries often (WP 0048 00).

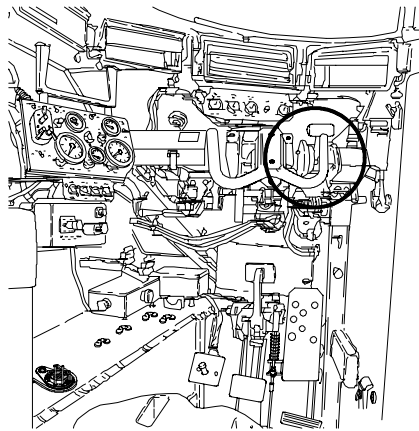


11. When operating in a hot, dry climate with blowing sand/dirt, replace transmission oil and engine oil more often than when operating in a moderate climate. Flush transmission to remove debris.

NOTE

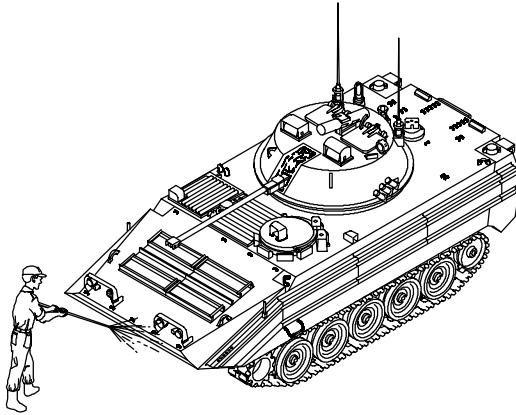
Keep transmission driving in 1-4 range as much as possible.

12. Put transmission controller lever in required position.

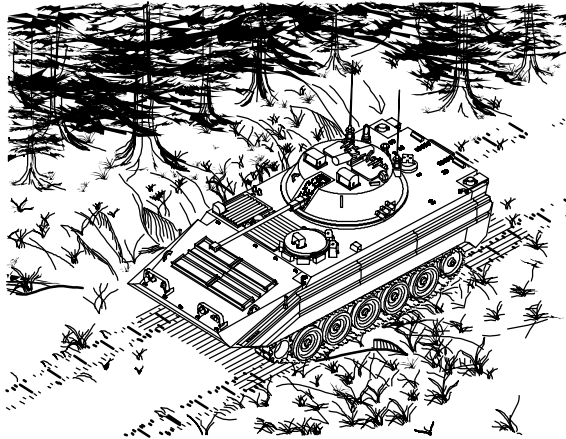


REQUIREMENTS TO MAINTAIN VEHICLE IN EXTREME HEAT, HUMIDITY, OR SALTY CONDITIONS

1. Dirt, sand, bugs, and other debris can build up in radiator fins. Clean fins as often as possible with water pressure.
2. Heat, sand, dust, humidity, and other factors have a negative affect on lubricants and moving parts. Lubricate vehicle often and check moving parts for wear.
3. When a malfunction occurs or there is an indication that one will soon occur, stop vehicle immediately, or as soon as tactical situation allows, and correct malfunction. Under extreme conditions, a minor problem can get worse very quickly.
4. Keep vehicle clean. Inspect and clean vehicle often. Fungus and mildew can grow quickly in conditions of high heat and humidity.



5. When parking vehicle, drive to a location where there is shelter or shade and cover vehicle with tarp.
 - a. If entire vehicle cannot be covered, cover intake and exhaust grilles (WP 0034 00).

**END OF TASK**

BYPASS DEFECTIVE TRANSMISSION CONTROLLER

0033 00

THIS WORK PACKAGE COVERS:

Bypass Transmission Controller (WP 0033 00-1).

INITIAL SETUP:

Maintenance Level

Operator

Equipment Conditions

Engine started (WP 0013 00)

Personnel Required

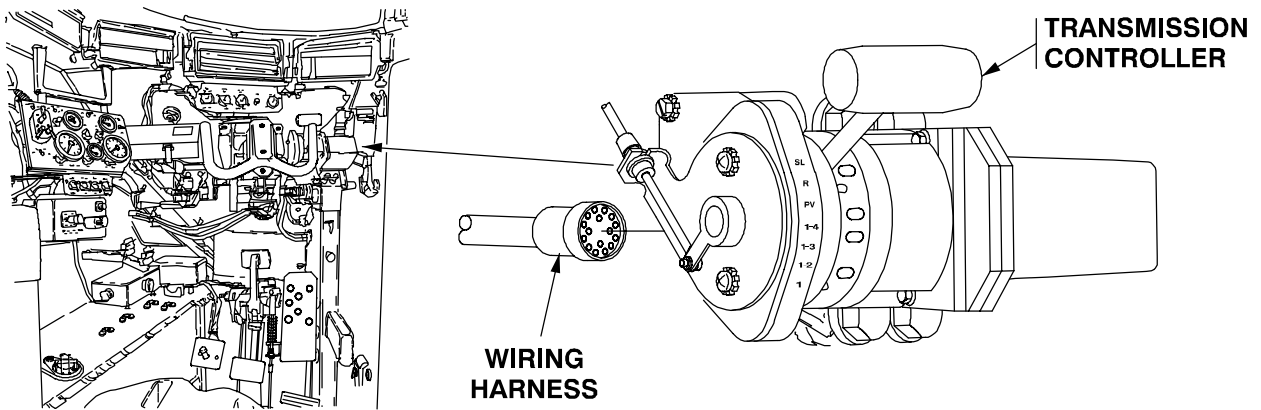
Driver

NOTE

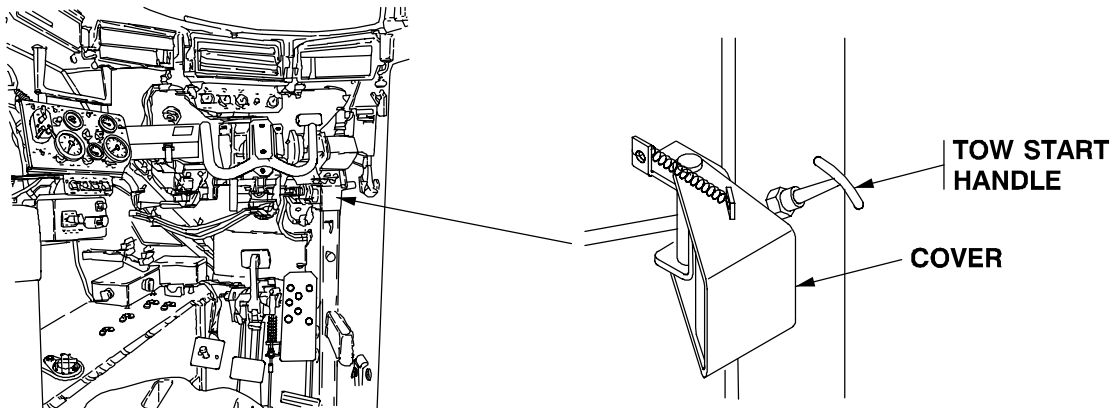
**If vehicle will not move at any shift lever position, transmission controller may be defective.
Bypass controller to permit vehicle to be driven to required destination or maintenance facility.**

BYPASS DEFECTIVE TRANSMISSION CONTROLLER

1. Disconnect transmission controller wire harness.



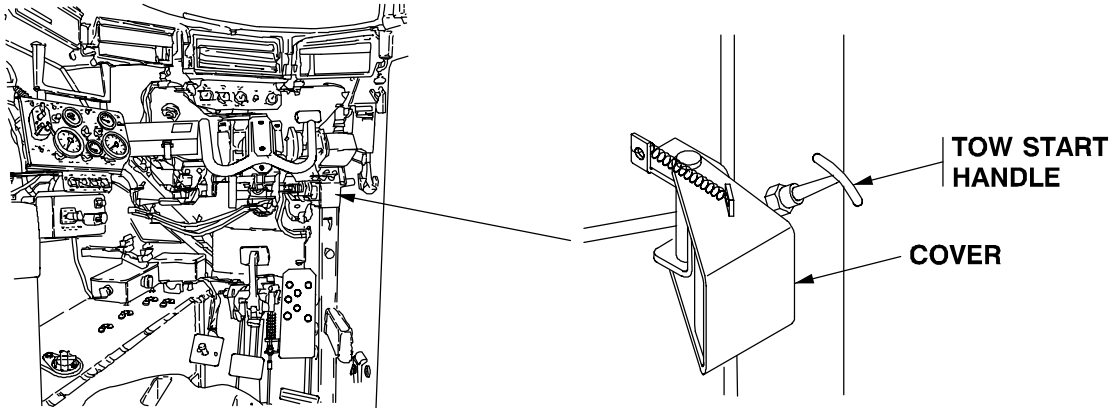
2. Open tow start handle cover.



NOTE

Pulling tow start handle will engage transmission in 1-4 range and permit vehicle to be driven. If vehicle will not drive, problem is with transmission and not controller.

3. Pull and release tow start handle.
4. If transmission will engage, close tow start handle cover.
 - a. If transmission will not engage, notify your supervisor that tow is required.



5. Drive vehicle to required destination.
6. Stop engine (WP 0016 00).

END OF TASK

COVER/UNCOVER INTAKE AND EXHAUST GRILLES

0034 00

THIS WORK PACKAGE COVERS:

- Cover Exhaust Grille (WP 0034 00-1).
- Cover Intake Grille (WP 0034 00-2).
- Uncover Exhaust Grille (WP 0034 00-3).
- Uncover Intake Grille (WP 0034 00-3).

INITIAL SETUP:

Maintenance Level

Operator

Equipment Conditions

Engine stopped (WP 0016 00)

Personnel Required

Driver

CAUTION

Extended operation of OSV with grilles covered can overheat engine and cause damage. Open exhaust grille and one or more flaps on intake grille before starting engine. Avoid extended operation with intake grille covered.

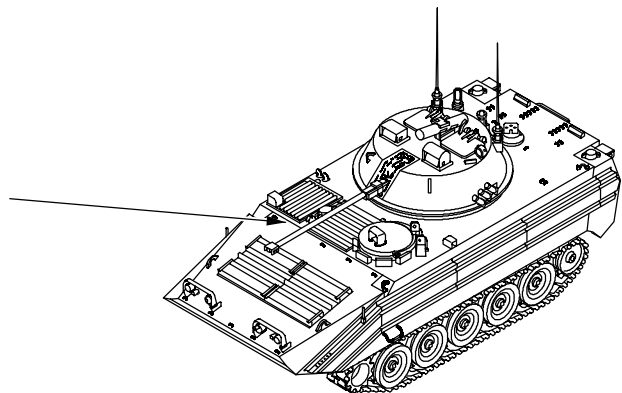
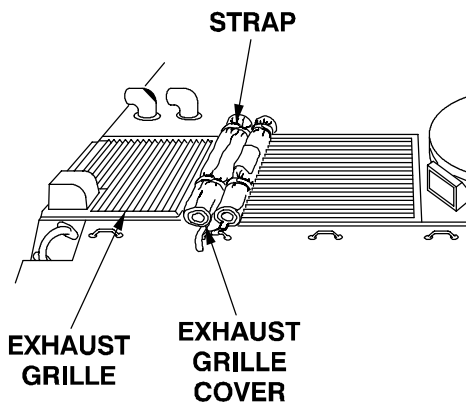
NOTE

Intake and exhaust grille covers prevent ice, snow, dirt, and other debris from entering power plant compartment and exhaust well when OSV is not in use.

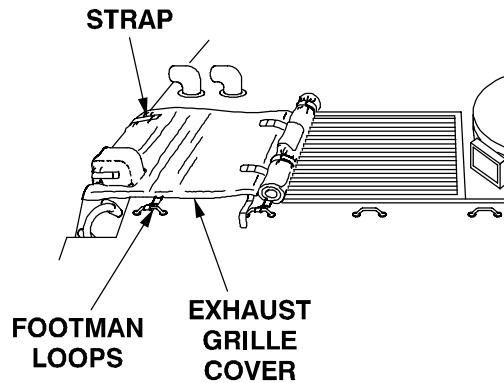
When not in use, roll up intake and exhaust grille covers and secure to area between intake and exhaust grilles.

COVER EXHAUST GRILLE

1. Unfasten two straps on exhaust grille cover.
2. Unroll exhaust grille cover over exhaust grille.

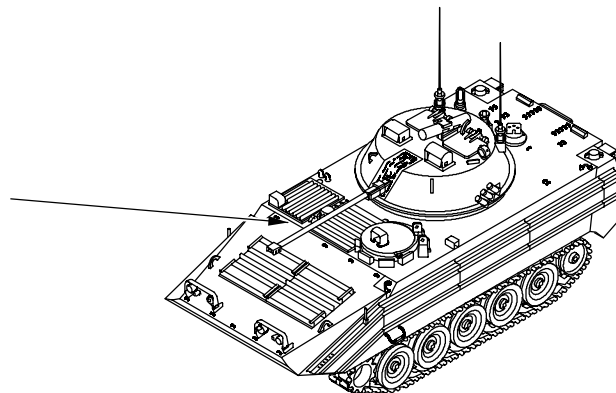
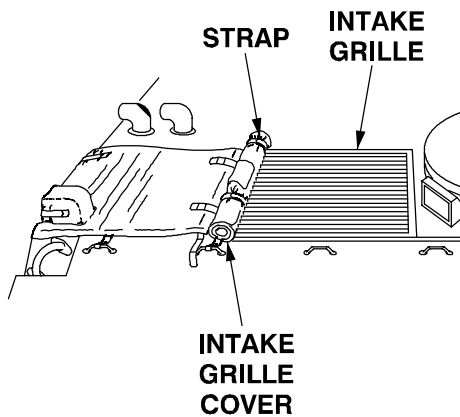


- Secure straps to footman loops on right side of exhaust grille.

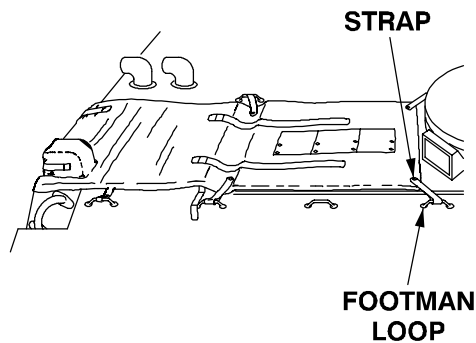


COVER INTAKE GRILLE

- Unfasten two straps on intake grille cover.
- Unroll intake grille cover over intake grille.

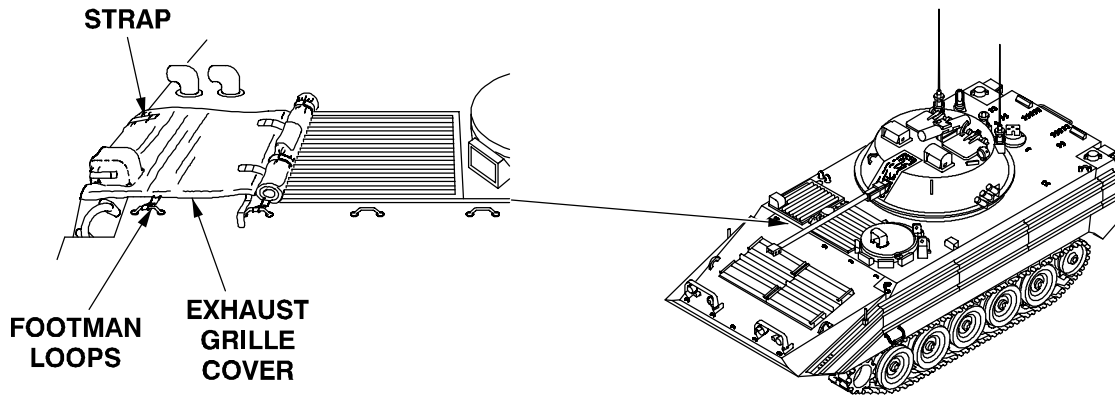


- Secure straps to footman loops on left side of intake grille.

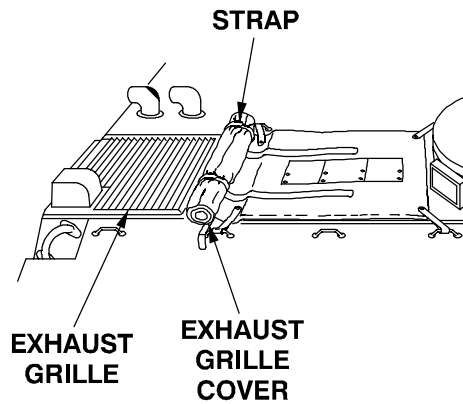


UNCOVER EXHAUST GRILLE

1. Release two straps from footman loops on right side of exhaust grille.



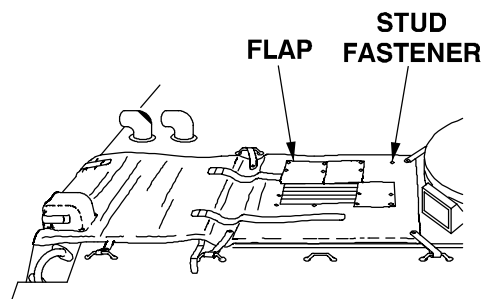
2. Roll exhaust grille cover toward area between intake and exhaust grilles.
3. Secure cover with two straps.



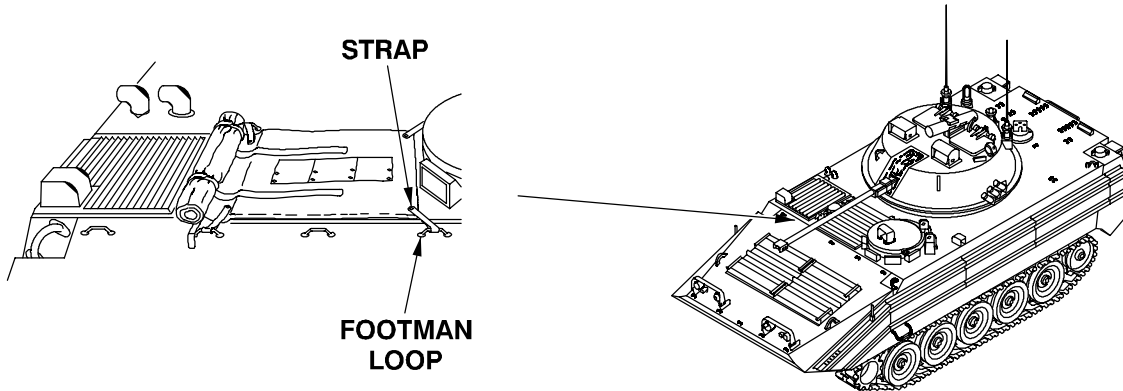
UNCOVER INTAKE GRILLE

1. To open one or more flaps on intake grille cover, do following:

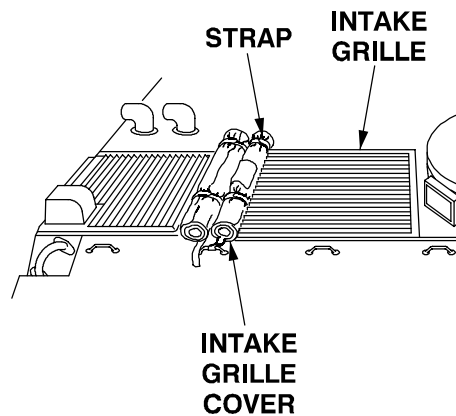
- a. Release stud fasteners as necessary.
- b. Fold flap open.
- c. Secure flap open with stud fasteners



2. To completely uncover grille, do following:
 - a. Make sure flaps are closed and fastened.
 - b. Release two straps from footman loops on left side of intake grille.



- c. Roll intake grille cover toward area between intake and exhaust grilles.
 - d. Secure cover with two straps.



END OF TASK

TOWING DISABLED VEHICLE

0035 00

THIS WORK PACKAGE COVERS:

- Connect Tow Bar Between Disabled OSV and Recovery Vehicle (WP 0035 00-2).
- Tow Disabled OSV (WP 0035 00-3).
- Remove Tow Bar From Disabled OSV and Recovery Vehicle (WP 0035 00-3).
- Self-Recovery (WP 0035 00-3).

INITIAL SETUP:

Maintenance Level

Operator

Personnel Required

Driver
Helpers (4)

Materials/Parts

Towbar (WP 0053 00)

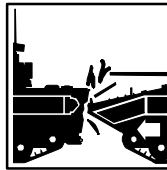
References

WP 0029 00
TM 9-2350-366-20
FM 9-43-2

Equipment Condition

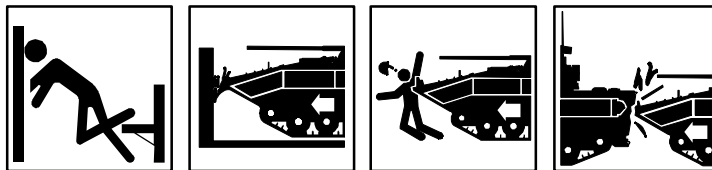
Vehicle blocked (WP 0029 00)
Final drives disengaged (TM 9-2350-366-20)

WARNING



OSV being towed without tow bar can strike recovery vehicle causing death or serious injury to personnel and/or damage to vehicles and equipment. Use a tow bar when towing downhill, tow starting a vehicle, and when tracks or propeller shaft have been removed. Personnel shall evacuate disabled OSV before towing operation begins.

WARNING



Steering and driving control are lost when final drive shafts are disconnected. Unexpected vehicle movement can throw personnel about and cause death or serious injury.

OSV with final drive shaft disconnected could move and strike personnel, objects, or other vehicles causing death or serious injury to personnel and/or damage to vehicles/equipment.

Block OSV tracks and connect tow bar between OSV and recovery vehicle before final drive shafts are disconnected.

CAUTION

If transmission is inoperable or final drive track assembly is missing, transmission oil pumps will not operate. Towing OSV with transmission oil pumps not operating will cause transmission damage. Do not tow vehicle with drive shafts connected. Unit maintenance must disconnect drive shafts before OSV is towed.

NOTE

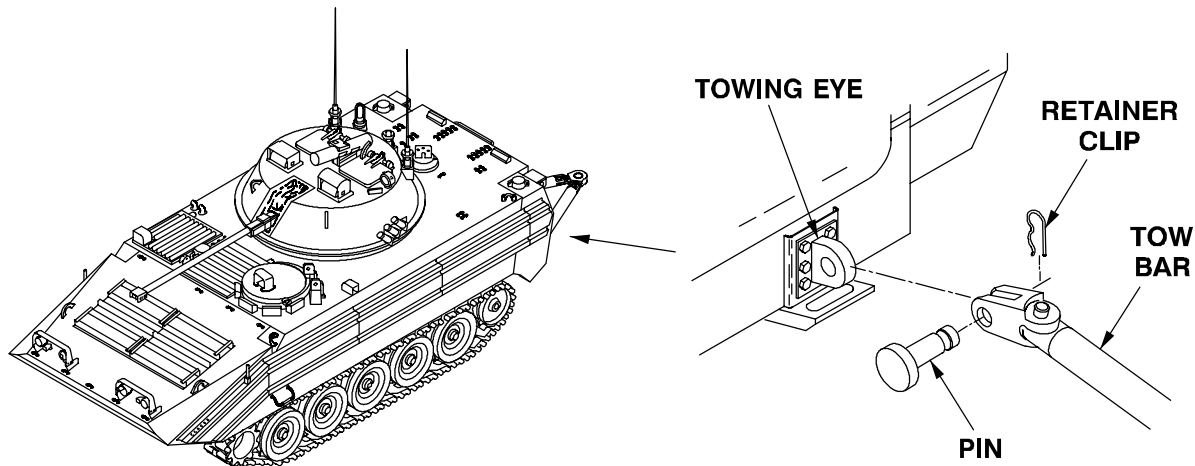
Recovery of OSV is responsibility of unit maintenance. Contact your supervisor when OSV is to be towed.

NOTE

Two helpers are required as road guides (one at left front and one at left rear of disabled OSV). Two additional helpers are required to install tow bar.

CONNECT TOW BAR BETWEEN DISABLED OSV AND RECOVERY VEHICLE

1. Maneuver as required to align rear of recovery vehicle with rear of disabled OSV.
2. Remove retainer clips and pins from each end of tow bar.



3. Put tow bar clevis on towing eye of a vehicle.
4. Secure tow bar with a pin and clip.
5. Repeat steps 3 and 4 to connect tow bar to second vehicle.

TOW DISABLED OSV

1. Unblock OSV tracks (WP 0029 00).
2. Start engine in recovery vehicle (WP 0013 00).

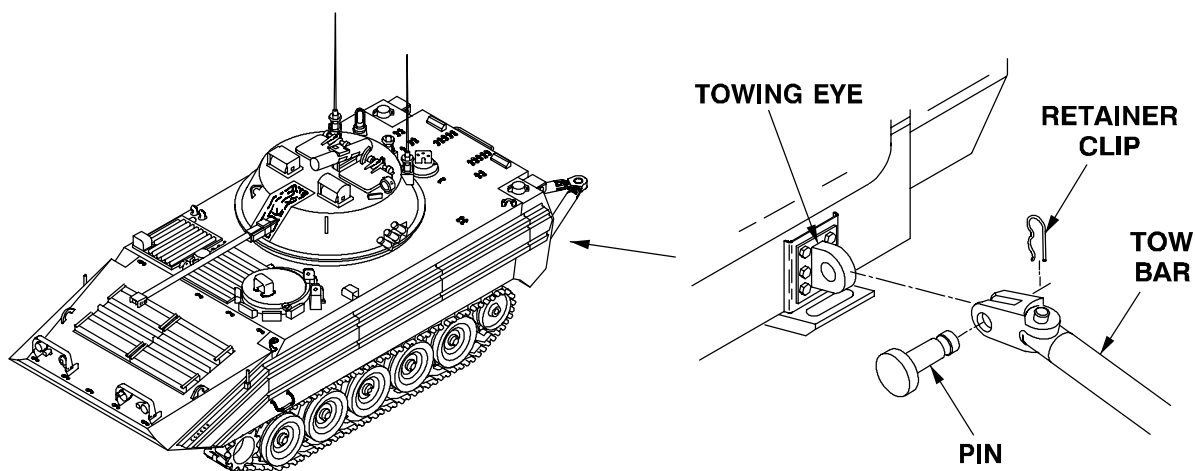
CAUTION

Vehicle may be towed backwards a maximum of 1/4-mile at 5 mph or less when final drive shafts are connected. Towing above 5 mph or farther than 1/4-mile will cause damage to transmission.

3. Tow disabled OSV.
4. At destination or when necessary, slowly bring both vehicles to stop by releasing accelerator pedal and lightly applying brakes.
5. Block OSV tracks (WP 0029 00).

REMOVE TOW BAR FROM DISABLED OSV AND RECOVERY VEHICLE

1. Stop engine in recovery vehicle.
2. Remove retainer clip and pin from one end of tow bar.



3. Lift tow bar clear of tow eye.
4. Replace pin in tow bar and secure with clip.
5. Repeat steps 2 through 4 with the other end of the tow bar.
6. Stow tow bar as required.

SELF-RECOVERY

To perform self-recovery of vehicle see FM 9-43-2.

END OF TASK

IMMEDIATE ACTION TO STOP RUNAWAY ENGINE

0036 00

THIS WORK PACKAGE COVERS:

Action to Stop Runaway Engine (WP 0036 00-1).

INITIAL SETUP:**Maintenance Level**

Operator

References

WP 0012 00

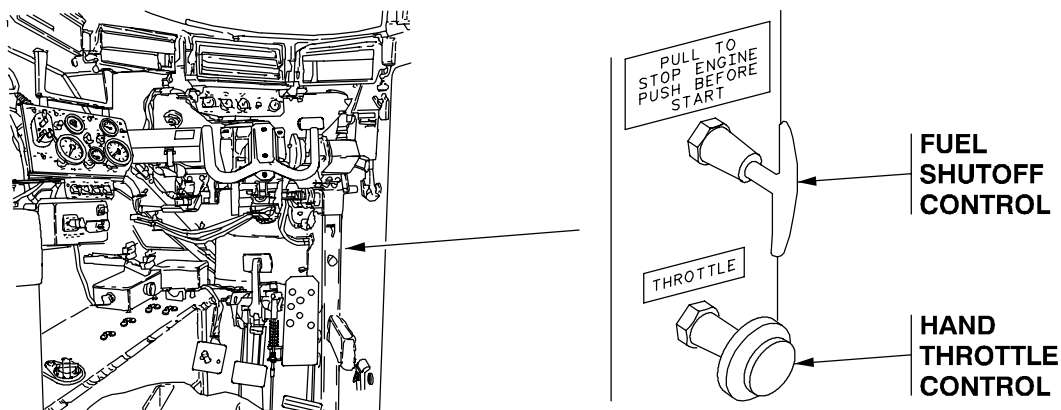
Personnel Required

Driver

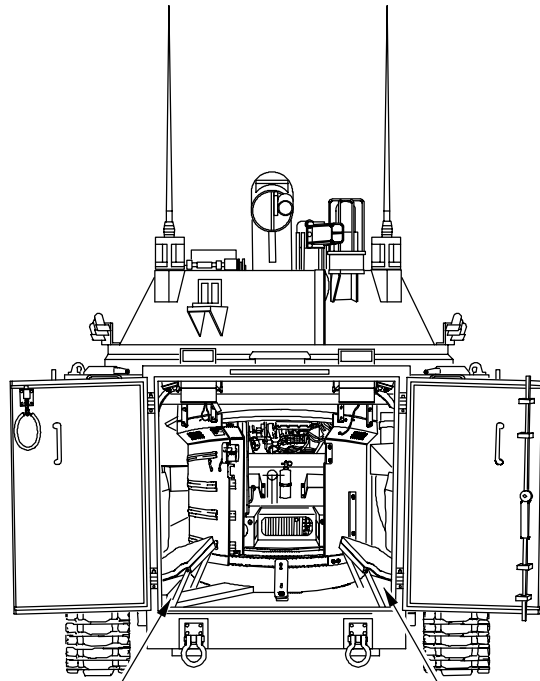
Equipment ConditionsEngine running away

ACTION TO STOP RUNAWAY ENGINE

1. If OSV is moving, push down hard on brake pedal and hold pedal down.
2. Pull fuel shutoff control.

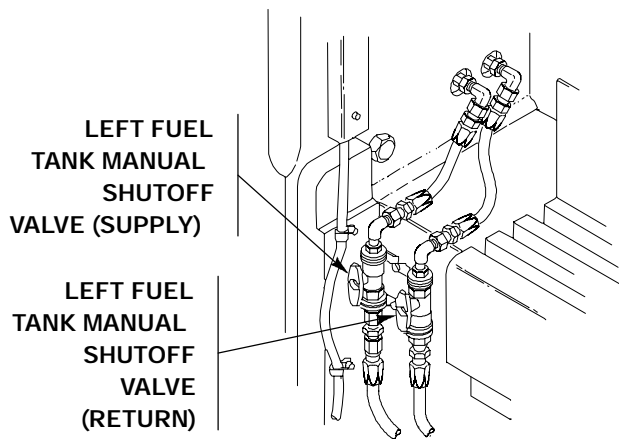


3. Close both fuel manual shutoff valves.



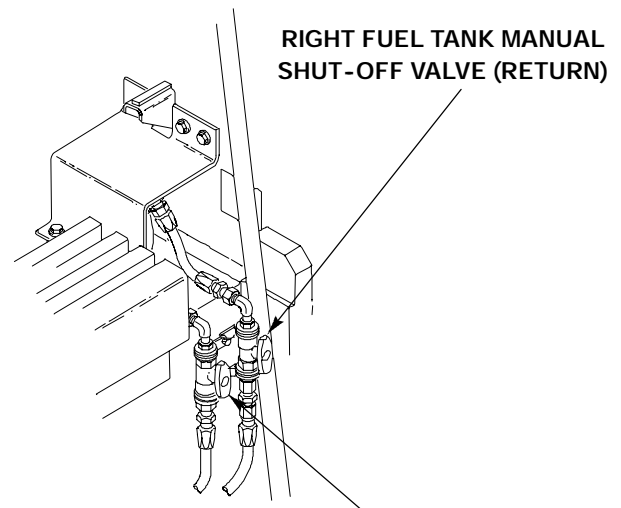
**LEFT FUEL TANK
MANUAL SHUTOFF
VALVE**

**RIGHT FUEL TANK
MANUAL SHUTOFF
VALVE**



**LEFT FUEL
TANK MANUAL
SHUTOFF
VALVE (SUPPLY)**

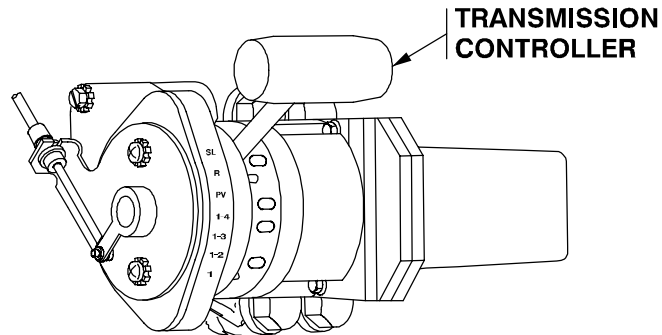
**LEFT FUEL
TANK MANUAL
SHUTOFF
VALVE
(RETURN)**



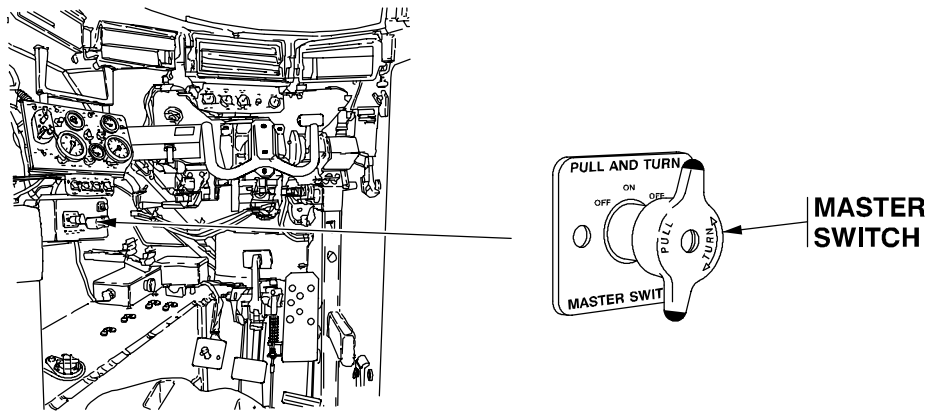
**RIGHT FUEL TANK MANUAL
SHUT-OFF VALVE (RETURN)**

**RIGHT FUEL TANK MANUAL
SHUT-OFF VALVE (SUPPLY)**

4. Turn steering yoke to center and set transmission controller lever to SL.



5. Set parking brake (WP 0012 00).
6. Set MASTER SWITCH to OFF.



END OF TASK

CHAPTER 3
OPERATOR TROUBLESHOOTING PROCEDURES

WORK PACKAGE INDEX

| <u>Title</u> | <u>Sequence No.</u> |
|---------------------------------------|---------------------|
| INTRODUCTION TO TROUBLESHOOTING | 0037 00 |
| TROUBLESHOOTING SYMPTOM INDEX | 0038 00 |
| TROUBLESHOOTING TABLES | 0039 00 |

INTRODUCTION TO TROUBLESHOOTING

0037 00**GENERAL**

Before starting troubleshooting on the tracks and suspension, transmission, or final drive, MASTER SWITCH must be at OFF, parking brake set, transmission set to SL and steering yoke centered.

TROUBLESHOOTING SYMPTOM INDEX

The Troubleshooting Symptom Index (WP 0038 00) lists common malfunctions that may occur during operation or crew servicing of the M113A3/BMP-2 Opposing Forces Surrogate Vehicle (OSV) and its components.

The Troubleshooting Symptom Index is divided into six sections: Engine, Transmission, Final Drive, Tracks and Suspension, Electrical System, and Personnel Heater.

Identify the malfunction that best describes your problem and turn to the appropriate Troubleshooting Table (WP 0039 00).

TROUBLESHOOTING TABLES

The troubleshooting work packages contain tables that list malfunctions, tests or inspections, and corrective actions required to return the vehicle or system to normal operation. Perform steps in the order they appear in the tables.

Each table is headed by an initial setup. This setup outlines what is needed as well as certain conditions which must be met before starting the task.

The Troubleshooting Tables have three columns — MALFUNCTION, TEST OR INSPECTION, and CORRECTIVE ACTION.

The MALFUNCTIONs (symptoms) are numbered in sequence through the Troubleshooting Table.

The TEST OR INSPECTION is a step you take to isolate the fault that causes the MALFUNCTION. Each TEST OR INSPECTION has a CORRECTIVE ACTION.

The CORRECTIVE ACTIONs are the “if” statements which tell you what to do to correct the fault.

If the fault cannot be identified or corrected, notify your supervisor by writing a DA Form 2404 describing the malfunction (symptom).

This operator’s manual cannot list all possible malfunctions or all the tests and inspections required for corrective actions. If a malfunction is not listed or is not corrected by the listed action, notify your supervisor.

END OF TASK

TROUBLESHOOTING SYMPTOM INDEX**0038 00****ENGINE**

| | |
|------------------------------------------------------------------|-----------|
| DOES NOT CRANK WHEN START SWITCH IS PUSHED | 0039 00-1 |
| CRANKS BUT DOES NOT START WHEN START SWITCH IS PUSHED | 0039 00-1 |
| CRANKS TOO SLOW TO START | 0039 00-1 |
| LABORS, RUNS ROUGH, STALLS, OR DOES NOT PUT OUT FULL POWER | 0039 00-1 |
| OVERHEATS | 0039 00-2 |
| ENGINE OIL LOW PRESS WARNING INDICATOR COMES ON | 0039 00-3 |
| ENGINE COOLANT LOW LEVEL WARNING INDICATOR COMES ON | 0039 00-3 |

TRANSMISSION

| | |
|-------------------------------------------------------|------------------------|
| VEHICLE WILL NOT DRIVE IN ANY RANGE | 0039 00-4 |
| TRANS OIL LOW PRESS WARNING INDICATOR ON | 0039 00-4 |
| TRANS OIL HI TEMP WARNING INDICATOR ON | 0039 00-5 |
| TRANS FILTER CLOGGED WARNING INDICATOR COMES ON | Notify your supervisor |

FINAL DRIVE

| | |
|----------------|-----------|
| RUNS HOT | 0039 00-5 |
|----------------|-----------|

TRACKS AND SUSPENSION

| | |
|---------------------------------|-----------|
| VEHICLE PULLS TO ONE SIDE | 0039 00-6 |
| VEHICLE THROWS TRACK | 0039 00-6 |
| TOO MUCH NOISE | 0039 00-6 |
| VEHICLE RIDES TOO HARD | 0039 00-7 |

ELECTRICAL SYSTEM

| | |
|---------------------------------------------------------------|-----------|
| BATTERIES DISCHARGED | 0039 00-8 |
| NO BATTERY CURRENT | 0039 00-8 |
| FUEL LEVEL GAUGE FAILS TO REGISTER | 0039 00-8 |
| MASTER SWITCH ON BUT MASTER SWITCH ON INDICATOR NOT LIT | 0039 00-8 |

BILGE PUMP

| | |
|------------------------|------------|
| DOES NOT OPERATE | 0039 00-10 |
|------------------------|------------|

PERSONNEL HEATER

| | |
|--------------------------------------------------------|------------|
| HEATER DOES NOT START, HEATER MOTOR RUNS | 0039 00-11 |
| HEATER DOES NOT START, HEATER MOTOR DOES NOT RUN | 0039 00-11 |
| HEATER OVERHEATS AND STOPS | 0039 00-11 |
| HEATER OVERHEATS BUT DOES NOT STOP | 0039 00-11 |
| HEATER DOES NOT PUT OUT ENOUGH HEAT | 0039 00-11 |

TROUBLESHOOTING TABLES

0039 00

INITIAL SETUP:



Maintenance Level

Operator



ENGINE

Pull on coolant fan drive belt. If coolant fan does not turn, notify your supervisor.

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. DOES NOT CRANK WHEN START SWITCH IS PUSHED | <ol style="list-style-type: none"> 1. Check that MASTER SWITCH is set to ON. 2. Check that transmission controller is in SL position. 3. Check battery condition (WP 0048 00). | <p>Set MASTER SWITCH to ON.</p> <p>Place transmission controller lever to SL.</p> <p>Troubleshoot electrical system (WP 0038 00).</p> |
| 2. CRANKS BUT DOES NOT START WHEN START SWITCH IS PUSHED | <ol style="list-style-type: none"> 1. Check if fuel shutoff control is pulled out. 2. Check fuel level. 3. Check if fuel tanks manual shutoff valves are closed. 4. Check for water in fuel. 5. Check if air cleaner restriction window shows only red (WP 0050 00). 6. Check if engine is getting sufficient air (WP 0040 00). | <p>Push fuel shutoff control in.</p> <p>Fuel OSV (WP 0017 00).</p> <p>Open manual shutoff valves.</p> <p>Drain primary and secondary fuel filters (WP 0040 00).</p> <p>Notify your supervisor.</p> <p>Clear intake grille. If engine still does not start, notify your supervisor.</p> |
| 3. CRANKS TOO SLOW TO START | <ol style="list-style-type: none"> 1. Check battery cable connections and battery water level (WP 0048 00). 2. Check battery charge level (WP 0048 00). 3. Check battery condition (WP 0048 00). | <p>Clean connections. Add water as required.</p> <p>Start using outside power source (WP 0014 00) or tow start.</p> <p>Notify your supervisor for troubleshooting of electrical system.</p> |
| 4. LABORS, RUNS ROUGH, STALLS, OR DOES NOT PUT OUT FULL POWER | <ol style="list-style-type: none"> 1. Check for water in fuel. 2. Check if air cleaner restriction window shows only red (WP 0050 00). 3. Check if engine is getting sufficient air (WP 0050 00). | <p>Drain primary and secondary fuel filters (WP 0040 00).</p> <p>Notify your supervisor.</p> <p>Clear intake grille.</p> |

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>5. OVERHEATS</p> | <p>4. High altitude operation.</p> <p style="text-align: center;">CAUTION</p> <p>Driving vehicle with overheated engine can cause damage to engine. When engine coolant TEMP gauge indicates that temperature is above 230° F (110° C), stop vehicle and idle engine at 1000 to 1200 rpm until temperature drops below 230° F (110° C).</p> <p>1. Check that nose access doors are in place and mounting clamps are tight.</p> <p>2. Hard running in hot weather.</p> <p style="text-align: center;">WARNING</p> <div style="display: flex; justify-content: center; gap: 10px;">   </div> <p>Hot coolant can cause burns. Do not remove radiator cap until TEMP gauge needle is in bottom quarter of green zone. Wear heat protective mittens and eye protection to remove radiator cap. Turn cap slowly to prevent sudden explosion due to pressure build-up.</p> <p>3. Put on heat protective mittens and check coolant level (WP 0049 00).</p> <p>4. If coolant is low, check that ENGINE COOLANT LOW LEVEL warning indicator is on.</p> <p>5. If coolant is low, check for leaks.</p> <p>6. Check that radiator cap seals radiator correctly.</p> <p>7. Check if sufficient air is moving through intake grille, air cleaner, and radiator (WP 0040 00).</p> <p>8. Check for loose, broken, worn, or otherwise damaged coolant fan belts.</p> <p>9. Check oil level.</p> | <p style="text-align: center;">NOTE</p> <p>Vehicle will normally operate at reduced power resulting in rough operation at high elevations such as mountain passes or high plateaus.</p> <p>Notify your supervisor.</p> <p>Install doors (WP 0008 00).</p> <p>Cool engine at idle speed of 1000 to 1200 rpm and continue operations per instructions for operating in extreme heat (WP 0032 00).</p> <p>Add coolant as required (WP 0049 00).</p> <p>Notify your supervisor.</p> <p>Notify your supervisor of leak.</p> <p>Straighten and tighten cap. If cap is damaged or seal is broken, notify your supervisor.</p> <p>Clear intake and exhaust grilles, air cleaner, and radiator fins.</p> <p>Notify your supervisor.</p> <p>Add oil as required.</p> |

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>6. ENGINE OIL LOW PRESS WARNING INDICATOR COMES ON</p> | <p>10. Check coolant fan drive system.</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Operating vehicle with ENGINE OIL LOW PRESS warning indicator on can cause damage to engine.</p> <ol style="list-style-type: none"> 1. Check engine oil level. 2. Check if engine is overheating. | <p>Stop engine (WP 0016 00). Remove power plant upper rear access cover (WP 0022 00).</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>If coolant fan does not turn, coolant fan drive system is broken. Do not operate vehicle until repair is completed.</p> <p>If coolant fan turns, push in thermostatic fan speed switch bypass button and turn button to left (WP 0004 00). Install power plant upper rear access cover (WP 0022 00). Start engine (WP 0013 00), notify your supervisor that thermostatic fan speed switch bypass button has been activated, and operate vehicle under conditions that caused overheat. If engine overheats, stop engine and notify your supervisor.</p> <p>Add oil as required. Do engine OVERHEAT troubleshooting.</p> |

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <p>7. ENGINE COOLANT LOW LEVEL WARNING INDICATOR COMES ON</p> | <p style="text-align: center;">WARNING</p> <div style="display: flex; justify-content: center; gap: 20px;">   </div> <p>Hot coolant can cause burns. Do not remove radiator cap until TEMP gauge needle is in bottom quarter of green zone. Wear heat protective mittens and eye protection to remove radiator cap. Turn cap slowly to prevent sudden explosion due to pressure build-up.</p> <ol style="list-style-type: none"> Put on heat protective mittens and check coolant level (WP 0049 00). | <p>Add coolant as required (WP 0049 00).</p> <p>Check for leaks. Notify your supervisor if leaks found.</p> |

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>3. TRANS OIL HI TEMP WARNING INDICATOR ON</p> | <p style="text-align: center;"><u>CAUTION</u></p> <p>Operating vehicle with TRANS OIL HI TEMP warning indicator on can cause damage to vehicle. Do not operate vehicle until cause of warning indicator has been located and corrected.</p> <p style="text-align: center;">NOTE</p> <p>Bad driving habits can be cause of transmission overheating. Move transmission controller lever out of range 1 as soon as possible. Sustained operation in range 1 can cause overheating.</p> <p>1. Check transmission oil level (WP 0040 00).</p> <p>2. Check coolant level (WP 0049 00).</p> | <p>Add transmission oil as required (WP 0040 00).</p> <p>Add coolant as required (WP 0049 00).</p> <p>Check for coolant leaks. Notify your supervisor if found.</p> |

INITIAL SETUP:

Maintenance Level

Operator

FINAL DRIVE

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|--------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <p>1. RUNS HOT</p> | <p>1. Check final drive oil level (WP 0040 00).</p> | <p>Add oil to final drive if required (WP 0040 00).</p> <p>Notify your supervisor if oil level is within limit.</p> |


INITIAL SETUP:

Maintenance Level

Operator

TRACKS AND SUSPENSION

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. VEHICLE PULLS TO ONE SIDE</p> | <p style="text-align: center;">NOTE</p> <p>When operating on a crowned road or on a slope, the vehicle will normally pull to one side.</p> <ol style="list-style-type: none"> 1. Check that track tension is equal on both sides 2. Check tracks for buildup of mud, dirt, or snow. | <p>Adjust track tension as required ((WP 0041 00), (WP 0042 00)).</p> <p>Clean track to remove debris.</p> |
| <p>2. VEHICLE THROWS TRACK</p> | <p style="text-align: center;">NOTE</p> <p>Bad driving habits can cause vehicle to throw a track. Do not use pivot steer while vehicle is moving. Avoid sharp turns at high speed or on soft ground.</p> <ol style="list-style-type: none"> 1. Check for loose tracks. 2. Check for worn track shoes (WP 0047 00). | <p>Adjust track tension if required ((WP 0041 00), (WP 0042 00)).</p> <p>Replace track shoes as required ((WP 0045 00), (WP 0046 00)).</p> |
| <p>3. TOO MUCH NOISE</p> | <p style="text-align: center;">NOTE</p> <p>Keep tracks clean. If vehicle is to be operated in mud and/or snow, contact your supervisor and remove track shrouds. On soft ground or heavy brush, make a series of short turns to remove debris from track.</p> <ol style="list-style-type: none"> 3. Check for buildup of snow, mud, or dirt in tracks. 4. Check for broken track. <ol style="list-style-type: none"> 1. Check tension on tracks. 2. Check for worn track shoes (WP 0047 00). 3. Check for loose, worn, or missing track pads. 4. Check for worn sprockets and cushions. | <p>Remove debris.</p> <p>Repair track as required ((WP 0043 00), (WP 0044 00)).</p> <p>Adjust track tension if required ((WP 0041 00), (WP 0042 00)).</p> <p>Replace track shoes as required ((WP 0045 00), (WP 0046 00)) or notify your supervisor.</p> <p>Tighten loose pads. Notify your supervisor of worn and/or missing pads.</p> <p>Notify your supervisor of worn sprockets and cushions.</p> |

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>4. VEHICLE RIDES TOO HARD</p> | <p style="text-align: center;">WARNING</p> <div style="text-align: center;">  </div> <p>After operation, shock absorbers can be hot and cause serious burns if touched.</p> <p>Allow parts to cool before working on or near them. If necessary, wear heat protective gloves to work on shock absorbers.</p> <p style="text-align: center;">NOTE</p> <p>Shock absorbers are checked by touching absorber after vehicle has been operating. If warmer than hull, shock absorber is good.</p> <ol style="list-style-type: none"> 1. Check that shock absorber is good. 2. Check shock absorber for leaks. 3. Check for broken torsion bars. | <p>If absorber is cool immediately after vehicle operation, notify your supervisor.</p> <p>Notify your supervisor of leaking shock absorbers.</p> <p>Notify your supervisor of broken torsion bars.</p> |

INITIAL SETUP:

Maintenance Level

Operator

ELECTRICAL SYSTEM

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. BATTERIES DISCHARGED | <p style="text-align: center;">NOTE</p> <p>Excessive use of electrical equipment when engine is not running will discharge batteries. When using vehicle electrical equipment, operate engine periodically to recharge batteries.</p> <ol style="list-style-type: none"> 1. Check battery electrolyte level (WP 0048 00). 2. Check that battery cable connectors are intact, tight, and clean (WP 0048 00). 3. Check generator drive belt. | <p>Add distilled water as required (WP 0054 00, Item 17).</p> <p>Notify your supervisor of corrosion and broken connectors.</p> <p>Notify your supervisor of broken, worn, or slipping belt.</p> |
| 2. NO BATTERY CURRENT | <ol style="list-style-type: none"> 1. Check battery electrolyte level (WP0048 00). 2. Check that battery cable connectors are intact, tight, and clean (WP 0048 00). | <p>Add distilled water as required (WP 0054 00, Item 17).</p> <p>Notify your supervisor of corrosion and broken connectors.</p> |
| 3. FUEL LEVEL GAUGE FAILS TO REGISTER | <ol style="list-style-type: none"> 1. Check fuel level in tanks. 2. Check that MASTER SWITCH is set to OFF. 3. Check for disconnected or faulty fuel quantity gauge lead. | <p>Add fuel as required (WP 0017 00).</p> <p>Set MASTER SWITCH to ON.</p> <p>Connect disconnected lead. Notify your supervisor of faulty lead.</p> |
| 4. MASTER SWITCH ON BUT MASTER SWITCH ON INDICATOR NOT LIT | <p style="text-align: center;">NOTE</p> <p>If BATT GEN gauge shows normal reading and other lights and electrical equipment are working, lamp is faulty and must be replaced. Vehicle can remain in operation with faulty indicator light but personnel must be sure to turn MASTER SWITCH to OFF when vehicle is shut down.</p> <ol style="list-style-type: none"> 1. Check for faulty indicator lamp. 2. Check for loose, disconnected, or faulty wires. | <p>Notify your supervisor of faulty lamp.</p> <p>Tighten/connect wire as applicable. Notify your supervisor of faulty wire.</p> |

TROUBLESHOOTING TABLES - Continued

0039 00

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| | <ol style="list-style-type: none"> 3. Check for discharged batteries. 4. Check that battery cable connectors are intact, tight, and clean (WP 0048 00). | <p>Do BATTERIES DISCHARGED troubleshooting.</p> <p>Tighten loose connections. Notify your supervisor of corrosion and broken connectors.</p> |

INITIAL SETUP:

Maintenance Level

Operator

BILGE PUMP

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. BILGE PUMP DOES NOT OPERATE | <ol style="list-style-type: none"> 1. Check that MASTER SWITCH is set to OFF. 2. Check for clogged strainer outlet. 3. Check for blocked bilge pump vent. 4. Check for dirty bilge pump. | <p>Set MASTER SWITCH to ON.</p> <p>Clean strainer outlet.</p> <p>Clean vent.</p> <p>Clean bilge pump if possible. If bilge pump cannot be accessed for cleaning, cycle BILGE PUMP between ON and OFF two or three times. If pump does not start after switch is cycled, notify your supervisor.</p> |

INITIAL SETUP:

Maintenance Level

Operator

PERSONNEL HEATER

NOTE

**For troubleshooting Model A20 personnel heater with P/N 5000-30178 see TM 9-2540-207-14&P.
For troubleshooting personnel heaters with Hupp heater P/N D55350-G1 and Stewart Warner
heater 10560M24B1 use table below.**

| MALFUNCTION | TEST OR INSPECTION | CORRECTIVE ACTION |
|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. HEATER DOES NOT START WITH THE RUN-OFF-START SWITCH HELD IN START POSITION. HEATER MOTOR RUNS. | <ol style="list-style-type: none"> 1. Check to see if fuel tanks manual shutoff valves are closed. 2. Check diagnostic display on heater for diagnostic fault code. Model A20 only. | <p>Open fuel tanks manual shutoff valves (WP 0040 00-57). Notify your supervisor.</p> |
| 2. HEATER DOES NOT START WITH THE RUN-OFF-START SWITCH HELD IN START POSITION. HEATER MOTOR DOES NOT RUN. | <ol style="list-style-type: none"> 1. Push PRESS-TO-TEST switch on personnel heater control box to test for electrical power. If light does not work, check for loose electrical connections at control box and heater. 2. Check to see if battery connections are intact, tight, and clean (WP 0048 00). 3. Check diagnostic display on heater for diagnostic fault code. Model A20 only. | <p>Tighten loose connections.</p> <p>Tighten loose connections. If corroded or broken, notify your supervisor. Notify your supervisor.</p> |
| 3. HEATER OVERHEATS AND STOPS | <ol style="list-style-type: none"> 1. Check to see if heater intake, elbow, exhaust elbow, or warm air outlet is blocked. 2. Check diagnostic display on heater for diagnostic fault code. Model A20 only. | <p>Clean as required to remove debris. Notify your supervisor.</p> |
| 4. HEATER OVERHEATS AND DOES NOT STOP | <ol style="list-style-type: none"> 1. Check to see if personnel heater fuel supply valve is OFF. 2. Allow heater to run for 2-3 minutes to burn off fuel in heater. 3. Check diagnostic display on heater for diagnostic fault code. Model A20 only. | <p>Turn personnel heater fuel supply valve OFF (WP 0018 00). Disconnect electrical connector from heater. Notify your supervisor.</p> |
| 5. HEATER DOES NOT PUT OUT ENOUGH HEAT | <ol style="list-style-type: none"> 1. Check for blockage of warm air outlet. 2. Check to see if HI-LO switch is in LO position. 3. Check diagnostic display on heater for diagnostic fault code. Model A20 only. | <p>Clean as required to remove debris. Move HI-LO switch to HI position (WP 0018 00). Notify your supervisor.</p> |

END OF TASK

CHAPTER 4
OPERATOR MAINTENANCE INSTRUCTIONS

WORK PACKAGE INDEX

| <u>Title</u> | <u>Sequence No.</u> |
|---------------------------------------------------------|---------------------|
| PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) | 0040 00 |
| ADJUST TRACK TENSION (T130) | 0041 00 |
| ADJUST TRACK TENSTION (T150) | 0042 00 |
| BREAK/JOIN TRACK (T130) | 0043 00 |
| BREAK/JOINT TRACK (T150) | 0044 00 |
| REMOVE/INSTALL TRACK SHOE (T130) | 0045 00 |
| REMOVE/INSTALL TRACK SHOE (T150) | 0046 00 |
| TRACK SHOE WEAR LIMITS | 0047 00 |
| CHECK VEHICLE BATTERIES | 0048 00 |
| CHECK AND FILL COOLING SYSTEM | 0049 00 |
| MAINTENANCE OF ENGINE AIR CLEANER | 0050 00 |

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

0040 00

THIS WORK PACKAGE COVERS:

Before (WP 0040 00-9)
 During (WP 0040 00-44)
 After (WP 0040 00-49)
 Weekly (WP 0040 00-68)

INITIAL SETUP:Maintenance Level

Operator

Personnel Required

Driver

Commander

Helper

Tools and Special Tools

Grease gun (WP 0052 00, Table 2, Item 16)

Grease gun adapter (WP 0052 00, Table 2, Item 9)

Crowbar (WP 0052 00, Table 2, Item 7)

Track gauge (WP 0052 00, Table 2, Item 15)

Track and sprocket gauge (WP 0052 00, Table 2, Item 13)

References

DA Form 2404

DA Form 2026

TB 43-0210

TM 11-5820-890-10-8

FM 9-207

FM 90-3

Materials/Parts

Cleaning compound, 134 Hi-Solv (WP 0054 00, Item 6)

Grease (GAA) (WP 0054 00, Item 12)

Wiping rag (WP 0054 00, Item 18)

SCOPE

PMCS tables have been provided to keep equipment in good operating condition and ready for its primary mission.

If you find something wrong when performing PMCS, fix it if you can using troubleshooting procedures and/or maintenance procedures. If unable to repair using troubleshooting procedures and/or maintenance procedures, inform your supervisor of problem.

MAINTENANCE FORMS AND RECORDS

Every mission begins and ends with paperwork. There isn't much of it, but you have to keep it up. The forms and records you fill out have many uses. They are a permanent record of services, repairs, and changes made to the OSV. They are reports to unit maintenance and to your track commander. They are checklists that tell you whether those faults have been repaired. For information on forms and records, see DA PAM 738-750.

WARNINGS AND CAUTIONS

Always observe the WARNINGS and CAUTIONS appearing in your PMCS tables BEFORE, DURING, and AFTER you operate the equipment. The WARNINGS and CAUTIONS appear before certain procedures. You must observe these WARNINGS and CAUTIONS to prevent serious injury to yourself and others or prevent damage to equipment.

EXPLANATION OF TABLE ENTRIES**Item Number Column**

Numbers in this column are for reference. When completing DA Form 2404 (Equipment Inspection and Maintenance Work Sheet), include the item number for the check/service indicating a fault. Item numbers also appear in the order that you must do the checks and services for the intervals listed.

Interval Column

This column tells you when you must do the procedure in the procedure column.

- Perform BEFORE procedures prior to the equipment leaving its containment area or performing its mission

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - Continued

0040 00

- Perform DURING checks per the PMCS tables to monitor and identify faults in equipment performance during the mission
- Perform AFTER procedures per the PMCS table at the conclusion of the mission to identify and correct faults which will preclude the next mission
- Do WEEKLY procedures each week. Perform WEEKLY and BEFORE PMCS procedures if:

You are assigned crewmember and have not operated the vehicle since the last WEEKLY.

You are operating the vehicle for first time.

When a check and service procedure is required for both WEEKLY and BEFORE intervals, it is not necessary to do the procedures twice.

Man-hour Column

Man-hours required to complete all prescribed lubrication are shown to the nearest tenth of an hour.

Item To Be Checked or Serviced Column

This column identifies the item to be checked or serviced.

Crewmember/Procedure Column

This column gives the procedure to check or service the item listed in the item to be checked or serviced column to know if the equipment is ready or available for its intended mission or for operation. Do the procedure at the time stated in the interval column. Carefully follow these instructions. If you do not have the tools, or if the procedure tells you to, have unit maintenance do the work.

Equipment Not Ready/Available If Column

Information in this column tells you what faults will keep your equipment from being capable of performing its primary mission. If you make check and service procedures that show faults listed in this column, do not operate the equipment. Follow standard operating procedures for maintaining the equipment or reporting equipment failure.

OTHER TABLE ENTRIES

Information other than WARNINGS, CAUTIONS, and NOTES appear in the PMCS table. Be sure to observe all special information appearing in the table.

PMCS GENERAL INSTRUCTIONS

Tools/Materials

When you do your PMCS, take along the tools you will need to make all the checks.

Cleaning

Keep the vehicle clean. Dirt, grease, oil, and debris only get in the way, and may cover up a serious problem. Clean the vehicle as you work and as needed. If you clean the vehicle, be sure to observe the following:

WARNING

Benzene (benzol), paint thinner, gasoline, and diesel fuel oil and their fumes are flammable and explosive. Liquid or fumes can ignite and/or explode and cause death or injury to personnel and/or destruction/damage of equipment.

Fumes from thinners, and fuels are poisonous. Breathing fumes can cause dizziness and nausea. Prolonged breathing of fumes can cause serious injury to nasal passages, throat, and lungs.

Use approved paint thinners/fuels. Use in well ventilated area free of heat sources. Do not smoke within 50 feet.

Wear respiratory, eye/face protection, and gloves when working with thinners, and fuels.

CAUTION

Petroleum products will damage rubber that is not resistant to petroleum. Do not get petroleum products on rubber parts.

Use cleaning solvent (WP 0054 00, Item 6) on metal surfaces. Use scrubbing soap and water when you clean rubber or plastic surfaces.

GENERAL INSPECTION**Hardware**

Check bolts, nuts, and screws for looseness and missing, bent, or broken parts.

Tighten loose bolts, nuts, and screws. If hardware can't be tightened (because of stripped threads or other damage), notify your supervisor.

Check for chipped paint, bare metal, or rust around bolt heads.

Notify your supervisor of chipped paint, bare metal, or rust around bolt heads.

Welds

Check for loose or chipped paint, rust, cracks, or gaps where parts are welded together.

Notify your supervisor of loose or chipped paint, rust, cracks, or a damaged/defective weld.

Electrical Wires and Connectors

NOTE

Hand tighten loose connectors.

Check for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connectors.

Check to make sure wires are in good shape.

Notify your supervisor of cracked or broken insulation, bare wires, or broken connectors.

Straps

Check for hold down straps that are cracked, broken, or hardened.

Check for webbing stowage straps that are frayed, worn or have missing metal ends.

Notify your supervisor of missing or damaged straps.

Hoses and Fluid Lines

NOTE

Drops of liquid, wet spots, or a stain around a fitting or connector are indications that there is a leak.

Check for wear, damage, and leaks. If a leak comes from a loose fitting or connector, tighten each fitting or connector.

Check that clamps, fittings, and attaching hardware are tight.

Notify your supervisor of missing parts, damage, or excessive wear.

HAZARDOUS WASTE

When servicing this vehicle, performing maintenance, or disposing of materials such as engine coolant, transmission fluid, lubricants, batteries, battery acid, or CARC paint, consult your Unit/local hazardous waste disposal center or safety office for local regulatory guidance. If further information is needed, please contact the Army environmental hotline at 1-800-872-3845. Improper disposal of this material may result in damage to environment or injury to personnel.

FLUID LEAKS

Fluid leaks can have a detrimental effect on the vehicle. Personnel must know how fluid leaks impact the vehicle.

NOTE

Equipment may be operated with minor leaks (class I or class II). How much fluid each item being checked or inspected can hold must be considered. When there is doubt, your supervisor must be informed of the condition. When operating equipment with class I or II leaks, fluid levels must be checked as required by the PMCS. Class III leaks make the vehicle NOT READY/AVAILABLE and must be reported to your supervisor immediately for corrective action.

Any fuel leak will make the vehicle NOT READY/AVAILABLE.

Definitions of types and classes of leaks are given below. Personnel must know types/classes of leaks to determine the condition of the vehicle. When there is DOUBT ABOUT THE LEAK, NOTIFY YOUR SUPERVISOR.

Leak Classification

CLASS I — Seepage of fluid that does not form drops but shows wetness or color change at or near the point of origin.

CLASS II — Leakage of fluid that forms drops but not sufficient loss to drip from the item being checked or inspected.

CLASS III — Leakage of fluid that forms drops that fall from the item being checked or inspected.

LUBRICATION

General

Your lubrication instruction has been provided so you keep your equipment in good operating condition and ready for its primary mission.

The lowest level of maintenance authorized to lubricate a point is indicated by (C) (crewmember) or (O) (unit maintenance) in the applicable illustration.

Intervals

Interval (hard time and on condition) is the time when you must do the procedure and related man-hours. Man-hours are based on normal operation and show the time needed to do the services required by a specified interval. Hard time intervals are specified and must be done as required. On condition intervals (OC) are variable and must be done when required by the condition. Intervals are indicated by a symbol as follows:

On condition intervals shall be applied unless changed by Army Oil Analysis Program (AOAP) laboratory. The hard time interval must be changed to a shorter period if lubricants are contaminated or OSV is being operated under adverse conditions, including longer-than-usual operating hours. Hard times may also be extended during periods of low activity if adequate preservation precautions are taken.

Hard time intervals shall apply to oil changes if AOAP laboratory support is not available.

Army Oil Analysis Program (AOAP)

AOAP is an effective maintenance diagnostic tool and not a maintenance substitute. The applicable manuals TB 43-0210 and TM 9-2300-422-23&P must not be interpreted to mean that AOAP minimizes, in any way, the need to employ good maintenance practices and strong maintenance disciplines.

Sampling Requirements

Samples may be taken without warming a component to operating temperature if equipment has been operated within last 30 days. If equipment has not been operated within last 30 days, the components must be brought to operating temperature. These requirements apply to routine sampling and special sampling. When an oil sampling valve is not available, use a vampire pump to take oil sample.

NOTE

Do not take AOAP sample until second oil change on new or rebuilt engines.

Frequency of AOAP Sample

Every 60 days, obtain a sample of engine oil and send it to the nearest AOAP Laboratory TB 43-0210 and TM 9-2300-422-23&P. Take samples as near the specified interval as possible. If sampling at the specified interval is not possible, a 10% variance before or after the scheduled interval is permissible. The need for an on-condition oil change will be determined by AOAP laboratory.

If AOAP laboratory support is not available, drain oil and change filter element/gasket at 1,500 mile intervals or semiannually. Engine and transmission filters must be changed at 150 hour/1500 mile intervals or semi-annually even when following AOAP procedures.

Hard time intervals may be shortened if equipment is operated under adverse conditions.

AOAP Sampling Procedure

NOTE

Do not take AOAP sample until second oil change on new or rebuilt engines.

NOTE

Do not add oil immediately before oil samples are taken. When operation checks and services indicate need to add oil, take sample before oil is added. New oil added immediately prior to taking samples or before prolonged operation of components will adversely affect oil analysis results.

1. Perform DAILY operation checks and services.
2. Obtain two sample bottles (TM 9-2300-422-23&P) and two DA Form 2026 from the unit AOAP monitor.
3. Start engine (WP 0013 00) if required by sampling requirements (WP 0040 00) and operate vehicle as follows to bring engine and transmission to normal operating temperatures.

NOTE

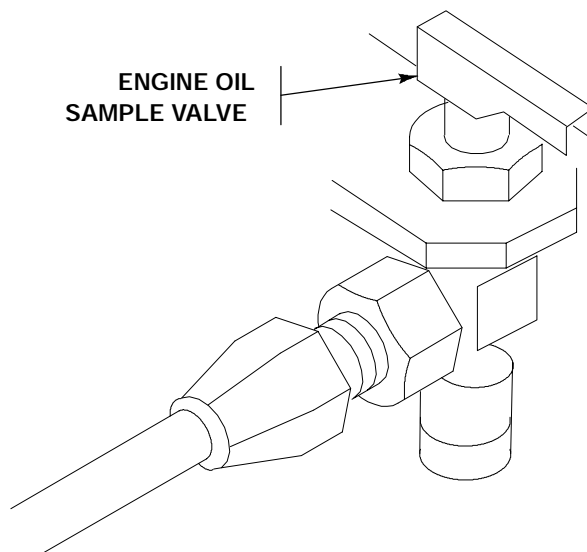
Perform the following steps with engine running if engine was started because of sampling requirements or with engine off if there was no requirement to start it. If started, engine must remain running until told to shut down.

4. Stop vehicle and set brakes (WP 0012 00).
5. Place range selector switch in steering locked (SL) position.
6. Remove driver's engine access cover (WP 0023 00).
7. Remove dust caps from engine and transmission oil sampling valves.

NOTE

Before taking a sample, drain a small amount of oil through valve to remove grit, dirt, and other contaminants.

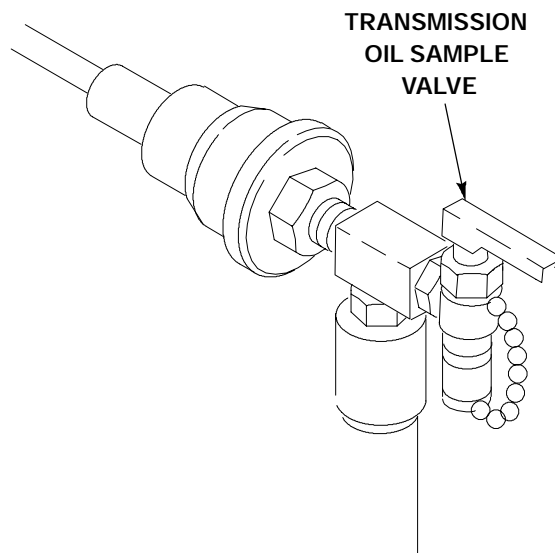
8. Place a small container under engine oil sampling valve and open valve. When a small amount of oil has drained into container, close sampling valve.



9. Place a sample bottle under sampling valve and open valve.
10. When sample bottle has filled to neck shoulder, close oil sampling valve.



11. Cap and seal bottle and attach a DA form 2026 to bottle.
12. Install dust cap on sampling valve.
13. Repeat steps 8 through 12 for transmission.
14. Stop engine (WP 0016 00) if started because of sampling requirements.



15. Install driver's engine access cover (WP 0023 00).
16. Properly dispose of engine and transmission oil that was drained to clear sampling valves.
17. Deliver filled sample bottles to unit AOAP monitor.

NOTE

Do not take AOAP sample until second oil change on new or rebuilt engines.

Preservation Oil

If engine/transmission have been filled with preservation oil, this oil must be left in the engine/transmission until first scheduled oil change. Maintain operating level by adding applicable grade (OE/HDO or OEA) of oil as required.

When first scheduled oil change is due, notify your supervisor. Unit maintenance will drain engine/transmission, replace filters, and fill engine/transmission with the applicable grade of oil.

LUBRICANT SYMBOLS

| SYMBOL | NOMENCLATURE | SPECIFICATION |
|--------|---------------------------------------------------------------|---------------|
| OE/HDO | Lubricating Oil, Internal Combustion Engine, Tactical Service | MIL-L-2104D |
| OEA | Lubricating Oil, Internal Combustion Engine, Arctic | MIL-L-46167 |
| PE | Preservation Oil | MIL-L-21260 |
| DF | Diesel Fuel | VV-F-800 |
| GAA | Grease, Automotive and Artillery | MIL-G-10924 |
| PL-M | Lubricating Oil, General Purpose (Medium) | MIL-L-3150 |
| PL-S | Lubricating Oil, General Purpose (Special) | VV-L-800 |

LUBRICANT USAGE

| COMPONENT | CAPACITY (APPROX) | LUBRICANTS TO USE AT EXPECTED TEMPERATURES | | | INTERVALS |
|--------------|--------------------------------------------------------------------------|--------------------------------------------|------------------------------------|----------------------------------|--------------------------------------------------------------|
| | | Above +32° F (Above 0° C) | +40° F to -10° F (-5° C to -23° C) | 0° F to -65° F (-5° C to -23° C) | |
| Engine | 18 qts | OE/HDO-15/40 | OE/HDO-15/40 | OEA | (D) — Check and fill (OC) - Drain, sample, replace |
| | | PE 30-1 | PE 30-1 | | Leave in engine until first scheduled oil change. |
| Fuel System | 100 gal | DF-2 | DF-1 | DF-A | (D) — Drain filters |
| Transmission | Initial Fill – 12 gal or 57 qts. Refill after oil change – approx 36 qts | OE/HDO-15/40 | OE/HDO-15/40 | OEA | (D) — Check and fill (OC) - Sample |
| | | PE 10-1 | PE 10-1 | | Leave in transmission until first scheduled oil change. |
| Final Drives | 3.5 qts or 7 pts Full (F) mark on gauge rod. | OE/HDO-15/40 | OE/HDO-15/40 | OEA | (W) — Check and fill. (S) — Drain and replace. |
| Fan Gearbox | Fill as required when low. Replace with 18 oz or 3/4 pt | OE/HDO-15/40 | OE/HDO-15/40 | OEA | (M) — Check and fill. (S or 1500 miles) — Drain and replace. |
| Tow Cable | As required | OE/HDO-15/40 | OE/HDO-15/40 | OEA | (S or 1500 miles) — Lubricate |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| 1 | Before | | VEHICLE EXTERIOR | <p>DRIVER</p> <p>Walk around vehicle, check for leaks, tampering, damage or missing parts.</p> | <p>Any Class III leak or fuel leak identified. Any damage that would prevent operation.</p> |
| 2 | Before | | TRACK TENSION (T130 AND T150) | <p>DRIVER</p> <p>NOTE</p> <p>Perform adjustment after vehicle is fully loaded.</p> <p>a. Check for missing or damaged track adjusters.</p> <p>CAUTION</p> <p>A track adjuster that is extended too far may buckle and be damaged during operation. Do not extend track adjusters more than 17-inches (maximum) between center of track adjuster and mounting screws.</p> <p>b. Adjust track tension as necessary ((WP 0041 00) (WP 0042 00)).</p> | <p>Track adjuster missing or unserviceable.</p> |

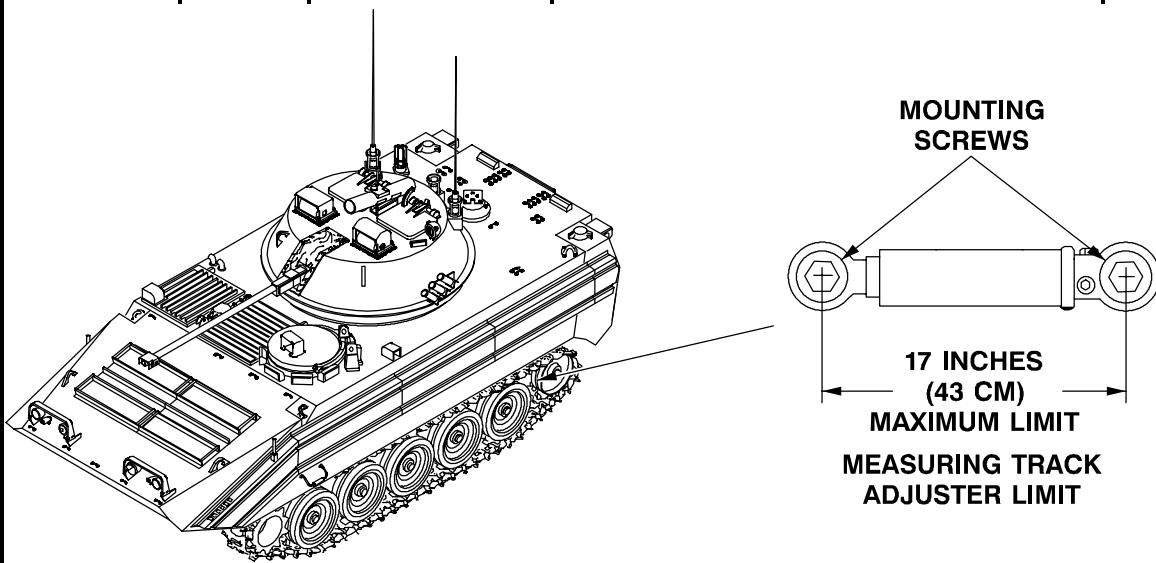


Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

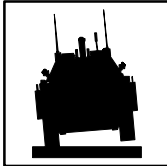

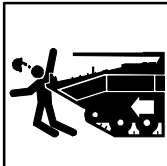
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| 3 | Before | | TRACK SHOES AND BUSHING (T150 TRACK) | <p style="text-align: center;">WARNING</p> <div style="display: flex; justify-content: center; gap: 20px;">   </div> <p>If you lose a track (break a track shoe or vehicle throws a track), exercise extreme caution in maintaining control of vehicle. Immediately release accelerator and allow vehicle to coast to a stop. Do not apply brakes (brake pedals, laterals, pivot) or any type of steering control. Application of braking and steering controls cause vehicle to pull to active or good track and could result in vehicle rollover. If absolutely necessary, apply brakes only if vehicle is approaching a ravine, cliff, or other situation where outcome would be catastrophic, probably resulting in fatalities, if vehicle does not immediately stop. When a rollover is imminent, crewmembers should immediately withdraw into vehicle, tighten seat belts, and hold onto a secure fixture until vehicle comes to a complete stop.</p> <p>DRIVER</p> <p style="text-align: center;">WARNING</p> <div style="text-align: center;">  </div> <p>Vehicle can move unexpectedly when working on tracks and cause death or serious injury to personnel.</p> <p>Block front and rear of track that is not broken before working on track.</p> <p>Do not disconnect both tracks simultaneously.</p> <p>a. Drive OSV forward while helper inspects entire length of track.</p> | |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | | <p>b. Check for any broken track shoes (cracked or broken shoe body) bent, broken, or missing center guides, chunked or missing road wheel path. If one or more track shoes or three or more center guides in a row are broken, notify your supervisor.</p> <p>c. Check center guide wear. Use track gauge (WP 0052 00, Table 2, Item 15). If three or more center guides in a row show excessive wear, notify your supervisor.</p> <p style="text-align: center;">NOTE</p> <p>Worn or missing track shoe pads will cause track shoe to wear out prematurely and mark road surface.</p> <p>d. Check track shoe for worn or missing track pads/pad nuts.</p> | <p>One or more broken track shoes. Three or more broken center guides in a row.</p> <p>Three or more center guides in a row show excessive wear.</p> |

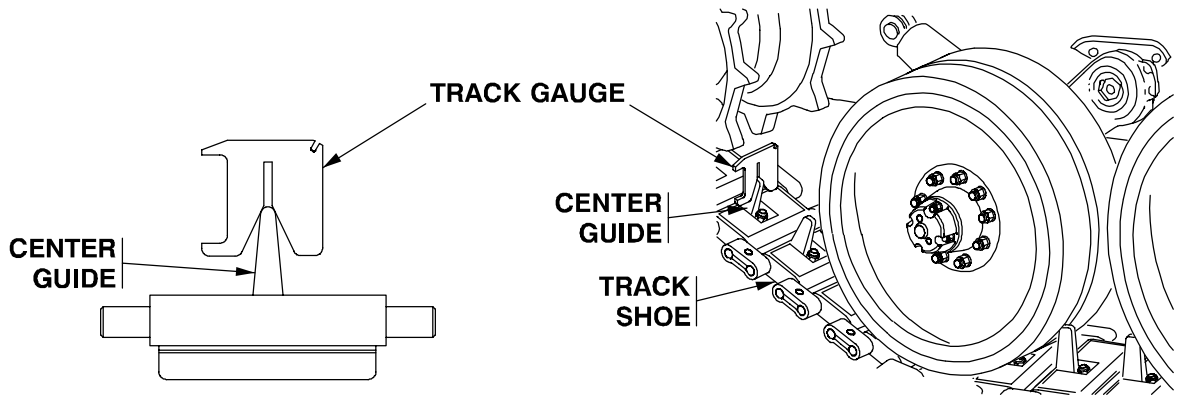


Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

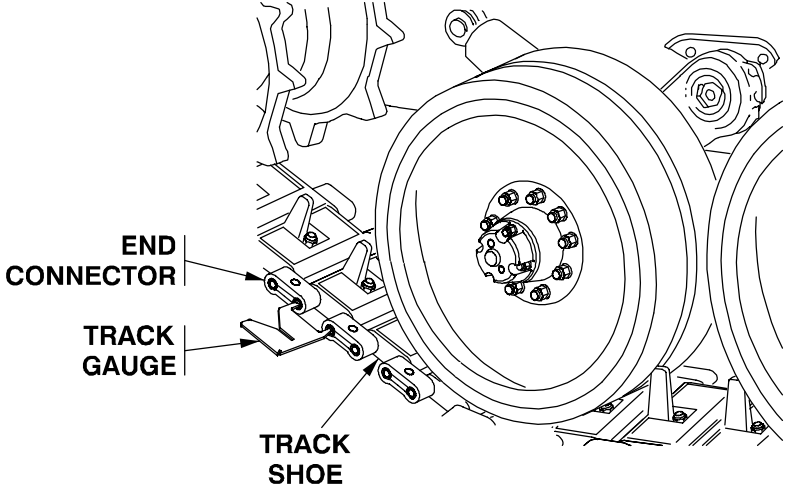
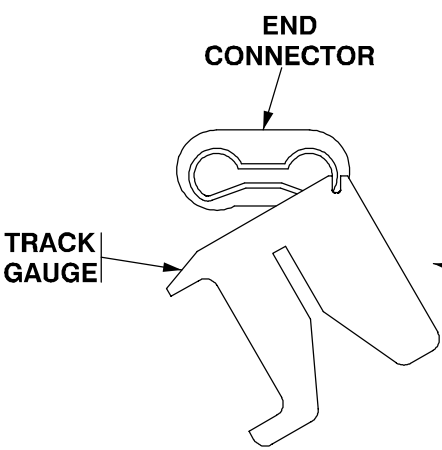
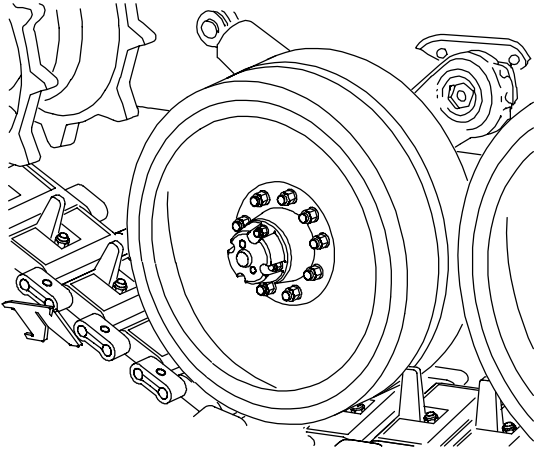
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | |  | <p>e. Check track shoe for missing or loose end connectors/bolts. Tighten loose end connectors. If one or more end connectors or bolts is missing, notify your supervisor.</p> <p>f. Check for track pin bushing wear. Use track gauge (WP 0052 00, Table 2, Item 15) when worn bushings are visible. If track gauge does not move freely inside track pin, notify your supervisor.</p> <p>g. Use track gauge and check for end connector wear. Remove end connector if wear is found. If end connector passes through gap of end connector gauge, notify your supervisor.</p> | <p>One or more end connectors/bolts missing.</p> <p>Track gauge does not move freely inside track pin.</p> <p>End connector gauge passes over end of end connector.</p> |
| | | |  |  | |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

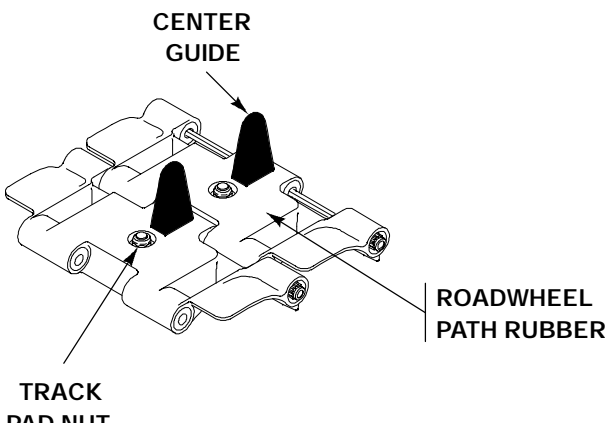
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | Before | | TRACK SHOES AND BUSHINGS (T130 TRACK) | <p>h. Check center guide for wear. Use track gauge. If gauge slot passes easily through center guide and base contacts track shoe, notify your supervisor.</p> <p>DRIVER</p> <p>a. Visually check for unusual or uneven gaps between two adjacent shoes. Check suspect bushing using track and sprocket gauge (WP 0052 00, Item 13). If a "NO/GO" reading is obtained inside or outside of block, replace unserviceable shoe/shoes.</p> <p>b. Check track shoes for damage (cracked or broken shoe body, bent, broken, or missing center guides, chunked or missing road-wheel path rubber).</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Worn or missing track pads will cause track shoe to mark road surface.</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Unusual or uneven gaps between two adjacent track shoes indicates worn bushings.</p> <p>c. Replace worn or missing track pads and track pad nuts (WP 0045 00).</p> <div style="text-align: center;">  <p>The diagram shows a perspective view of a track shoe assembly. A central vertical component is labeled 'CENTER GUIDE'. On either side, there are horizontal components labeled 'TRACK PAD NUT'. At the bottom edge of the shoe, there is a curved component labeled 'ROADWHEEL PATH RUBBER'.</p> </div> | <p>Gauge slot passes easily through center guide and base contacts track shoe.</p> <p>Unserviceable shoe.</p> <p>Track shoe body bent, cracked, or broken, track pin bent, broken, or missing.</p> <p>Shoe with worn bushing, protruding track pin, missing track pin nut, or pad height is less than 1/16-inch above grouser. A bushing deemed unserviceable.</p> |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

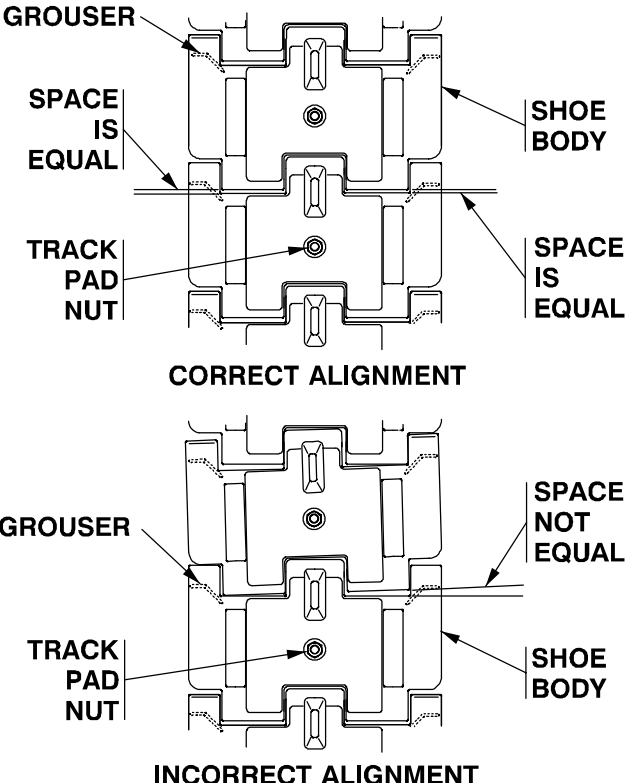
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | | <p>d. Check track shoe for damaged pins, missing pin nuts, and unusual or uneven gaps between two adjacent track shoes.</p>  | <p>Shoe with worn bushing, protruding track pin, missing track pin nut, or pad height is less than 1/16-inch above grouser. A bushing deemed unserviceable.</p> |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | | <p align="center">NOTE</p> <p>Worn bushings are very difficult to locate. Worn bushings may cause the track pin to appear off-center; it may have protruding track pin or track pin nut, unusual gaps between two adjacent shoes.</p> | <p>Shoe with worn bushing, protruding track pin, missing track pin nut, or pad height is less than 1/16-inch above grouser. A bushing deemed unserviceable.</p> |
| | | | <p>BUSHING PAD TRACK PIN TRACK PIN NUT</p> <p>BUSHING SHOE</p> <p>BUSHING GOOD BUSHING TRACK PIN NUT IS CENTERED</p> <p>WORN BUSHING WORN OUT BUSHING TRACK PIN NUT IS OFF-CENTER REPLACE</p> | | |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | | <p style="text-align: center;">NOTE</p> <p>Check tracks on left and right side of vehicle for damage to track shoes.</p> <p>e. Check for suspect bushings which should be tested with the track and sprocket gauge. Gauge pins must be fully inserted into bushing bore. A track shoe that fails track gauge inspection is unserviceable (WP 0045 00). Replace worn shoe bushing with shoe.</p> | <p>Track shoe with worn bushing, protruding track pin or missing track pin nut. Bushing deemed unserviceable. Pad height is less than 1/16" above grouser.</p> <p>One or more broken track shoes. Three or more broken center guides in a row.</p> |
| <div style="text-align: center;"> <p>The diagram illustrates the inspection process for track shoes. It shows a track shoe with a sprocket gauge being applied to it. Labels identify the GAUGE, BUSHING, TRACK PIN NUT, TRACK PIN, PAD, and BUSHING SHORE. Two circular cross-sections compare a 'GOOD BUSHING TRACK PIN NUT IS CENTERED' (where the nut is perfectly aligned in the center of the bushing) with a 'WORN BUSHING TRACK PIN NUT IS OFF-CENTER REPLACE' (where the nut is shifted to one side).</p> </div> | | | | | |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

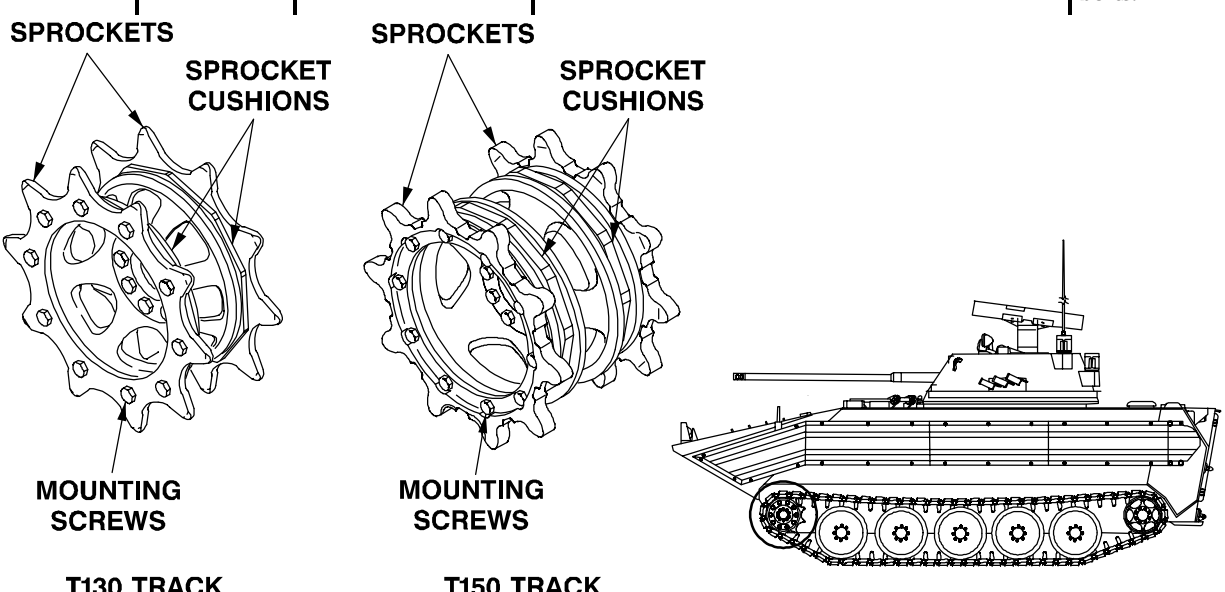
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|--|
| 5 | Before | | <p>SPROCKETS AND CUSHIONS (T130 AND T150)</p> | <p>DRIVER</p> <p style="text-align: center;">NOTE</p> <p>New style drive sprockets (T150) have a round circle for a wear indicator and do not require profile gauge to measure sprocket tooth wear. The old drive sprockets (T130) require the use of the profile gage to measure the sprocket teeth.</p> <p>a. Check sprocket carrier and sprocket for cracks, breaks, missing teeth, and loose/missing mounting bolts. If sprocket or sprocket carrier is cracked, broken, or has two or more missing mounting bolts, notify your supervisor.</p> | <p>Sprocket or sprocket carrier is cracked, broken, or has two or more missing mounting bolts.</p> | |
|  <p>The diagrams illustrate the components of the track system. On the left, a T130 track sprocket is shown with labels for 'SPROCKETS', 'SPROCKET CUSHIONS', and 'MOUNTING SCREWS'. In the middle, a T150 track sprocket is shown with similar labels. On the right, a side view of the vehicle's track system is shown, highlighting the sprockets and cushions. Below the diagrams, the labels 'T130 TRACK' and 'T150 TRACK' are positioned under their respective diagrams.</p> | | | | | | |
| | | | | <p>b. Tighten loose mounting bolts as needed. Mark bolts and notify your supervisor to torque.</p> | | |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

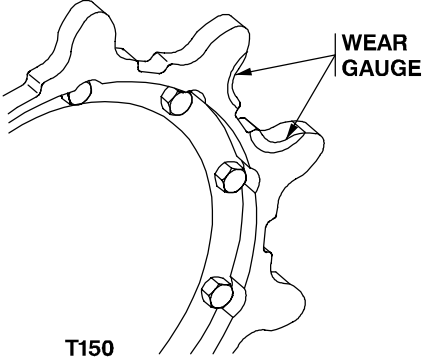
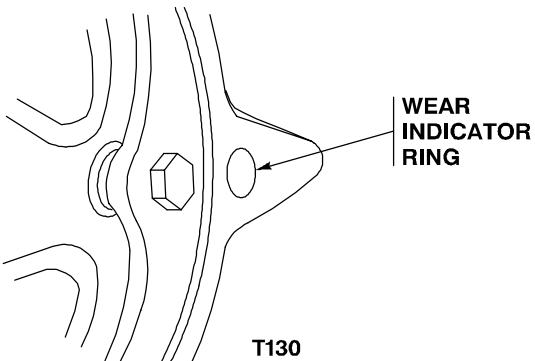
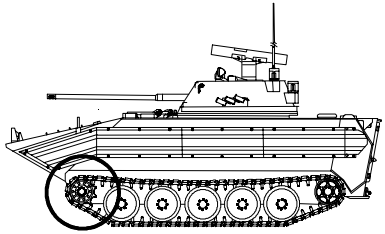
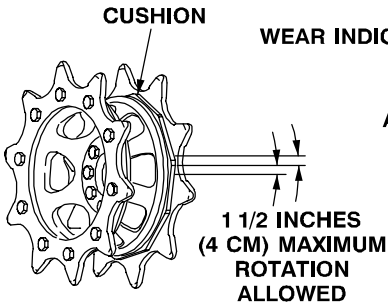
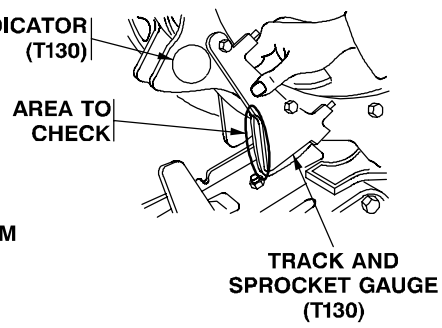
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|--------------------------------|----------------------|------------------------------------|
| NOTE | | | | | |
| <p>New style drive sprockets have a round circle for a wear indicator and do not require profile gauge to measure sprocket tooth wear. Old drive sprockets require profile gage to measure sprocket teeth.</p> | | | | | |
| <p>c. Check sprocket teeth for wear. Use profile gauge on old style drive sprockets (T130) to measure sprocket teeth. If any of the sprocket tooth does not extend beyond gauge or wear indicator (on newer sprockets), notify your supervisor. New style (T150) sprocket teeth have wear gauge as part of the sprocket. If only one side of sprocket shows wear notify your supervisor to reverse sprockets.</p> | | | | | |
| <div style="display: flex; justify-content: space-around;"> <div>  <p style="text-align: center;">T150</p> </div> <div>  <p style="text-align: center;">T130</p> </div> </div> | | | | | |
| <p>d. For both styles (T130, T150), check cushions for wear and damage. If cushions appear to be moving on sprocket hub, notify your supervisor. If track shoes are contacting sprocket hub flange, a thumping sound will be heard. Cushions should be replaced. Notify your supervisor.</p> | | | | | |
| <div style="display: flex; justify-content: space-between;"> <div>  </div> <div>  <p style="text-align: center;">1 1/2 INCHES (4 CM) MAXIMUM ROTATION ALLOWED</p> </div> <div>  <p style="text-align: center;">TRACK AND SPROCKET GAUGE (T130)</p> </div> </div> | | | | | |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| 6 | Before | | <p>FINAL DRIVE AND HULL PLUGS</p> | <p>DRIVER</p> <p>NOTE</p> <p>Final drive and hull plugs are located on vehicle exterior at ground level.</p> <p>a. Check beneath vehicle for loose or missing hull access cover, loose or missing drain plugs, and leaks.</p> | <p>Class III leak or fuel leak, one or more access cover, drain plug, or seal missing.</p> |
| | | | | | |
| | | | | <p>b. Tighten loose access covers and drain plugs.</p> | |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| 7 | Before | | FRONT VISMOD | <p>DRIVER</p> <p>a. Check VISMOD nose access doors for proper installation.</p> <div> </div> <p>b. Check that door pins are installed and secure.</p> | <p>VISMOD doors not properly installed.</p> <p>Door pins loose, not properly installed, or missing.</p> |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| 8 | Before | | VISMOD VENT | <p>DRIVER</p> <p>Check VISMOD vent for obstructions.</p> | <p>VISMOD vent obstructed.</p> |
| | | | | | |
| 9 | Before | | REAR ACCESS DOORS | <p>DRIVER</p> <p>a. Check that right door operates properly and is correctly seated.</p> | <p>Outside door handle will not latch and seal right access door.</p> |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| | | | | <p>b. Check that left door operates properly and is correctly seated.</p> <p>c. Check that left door can be tightly secured by left access door latch.</p> | <p>Left access door latch will not latch and/or seal left access door.</p> |

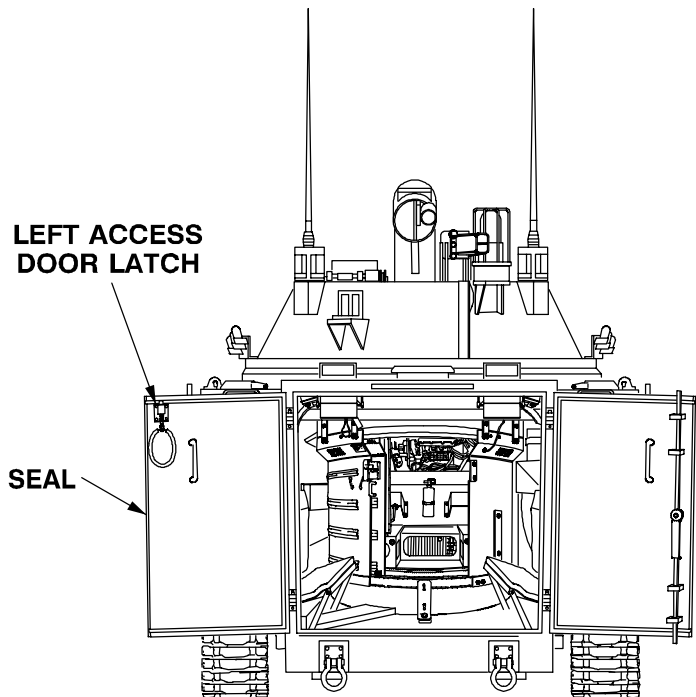


Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

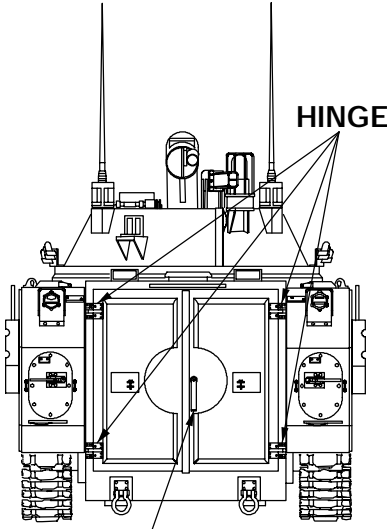
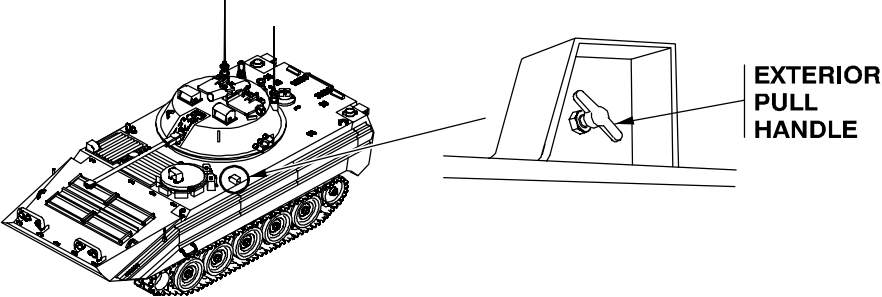
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| 10 | Before | | HINGES | <p>DRIVER</p> <p>a. Check that hinges are installed, intact, work properly, and doors can be tightly secured.</p>  <p style="text-align: center;">HINGE</p> <p style="text-align: center;">OUTSIDE DOOR HANDLE</p> | Lock will not secure door, hinges missing or damaged. |
| 11 | Before | | FIXED FIRE EXTINGUISHER EXTERIOR PULL HANDLE | <p>DRIVER</p> <p>a. Check for broken or missing seal on exterior pull handle.</p> <p>b. Check for broken or missing lockwire.</p> <p>c. Notify your supervisor of broken or missing seal and/or lockwire.</p>  <p style="text-align: right;">EXTERIOR PULL HANDLE</p> | Seal or lockwire missing or broken. |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

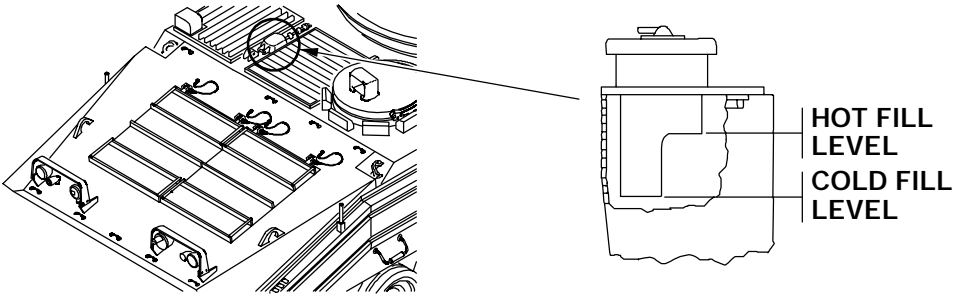
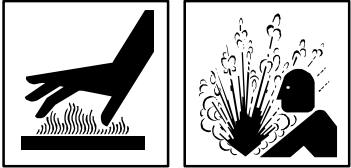
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| 12 | Before | | <p>RADIATOR (ON DECK) COOLANT LEVEL</p>  | <p>DRIVER</p> <p style="text-align: center;">WARNING</p>  <p>Hot coolant can cause burns. Do not remove radiator cap until TEMP gauge needle is in bottom quarter of green zone. Wear heat protective mittens and eye protection to remove radiator cap. Turn cap slowly to prevent sudden explosion due to pressure build-up.</p> <ol style="list-style-type: none"> Check that radiator cap is installed and not damaged. Fill radiator with coolant as required. Put on protective mittens and check coolant level (WP 0049 00). <p>d. Check for leaks.</p> | <p>Damaged or missing cap.</p> <p>Any class III leak.</p> |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued


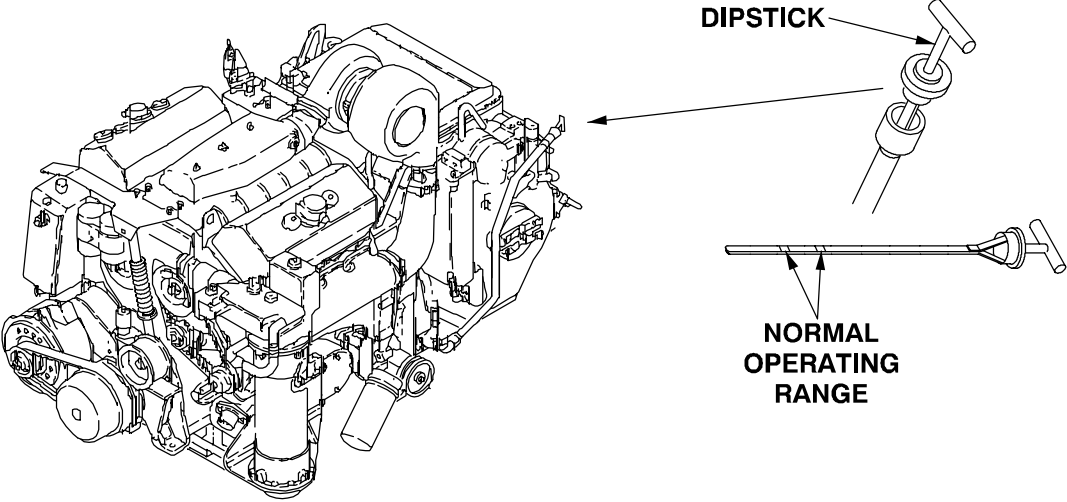
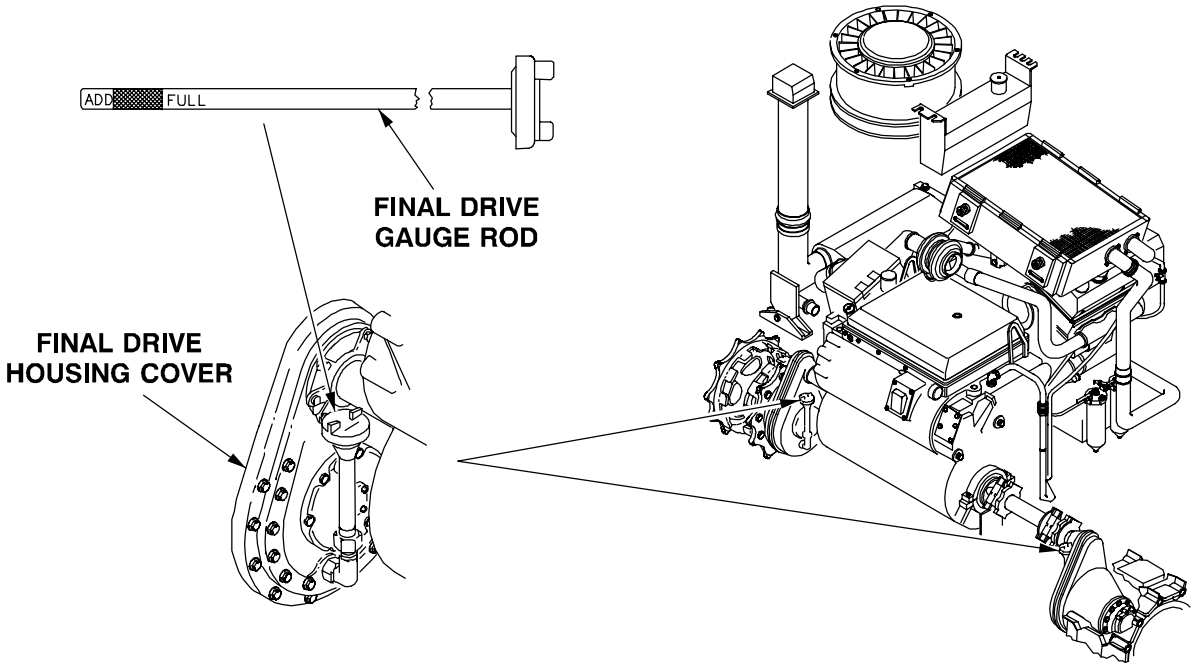
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|--------------------------------------------------------------------------------------|----------|-----------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| 13 | Before | | TRANSMISSION OIL LEVEL | <p>DRIVER</p> <p style="text-align: center;">WARNING</p>  <p>After operation, engine, transmission, housing, and fluids are hot and can cause serious burns.</p> <p>Allow engine and transmission to cool before working on or near them, or checking fluid levels. Wear heat protective gloves to work on hot parts.</p> <p>After operation, housing and fluids may be hot due to overheating. Notify your supervisor of hot drive housing.</p> <p style="text-align: center;">NOTE</p> <p>Vehicle must be on level ground when oil level is to be checked.</p> <ol style="list-style-type: none"> Check transmission and lines for leaks. Check that transmission oil level is at FULL mark on dipstick or between ADD and FULL marks. | Class III oil leak or any fuel leak. |
|  | | | | <ol style="list-style-type: none"> Add oil as required. Be careful not to over-fill transmission. | |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| 14 | Before | | FINAL DRIVE OIL LEVEL | <p>DRIVER</p> <p>NOTE</p> <p>Vehicle must be on level ground when oil level is to be checked.</p> <p>NOTE</p> <p>Four bolts in final drive housing are accessed through cover in the VISMOSDS.</p> <ol style="list-style-type: none"> Remove four bolts and final drive housing cover. Look for leaks around final drive and oil lines Check that oil level in left and right final drives is FULL or between FULL and ADD on the gauge rods. | Class III oil leak. |



d. Add oil as required. Be careful not to overfill the final drives.

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| 15 | Before | | AIR CLEANER | <p>DRIVER</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Do not operate vehicle with missing air cleaner, air cleaner with missing parts, or damaged air cleaner. Vehicle operation with missing/defective air cleaner can cause damage to engine.</p> <ol style="list-style-type: none"> a. Check that door is installed on housing, air cleaner door latch is not broken, bent, or missing, and gasket makes tight door seal. b. Release latch, swing door up, and remove door. c. Check door for missing gasket or gasket that has tears, breaks, or is loose. d. Check to ensure air filter is in place and not damaged. e. Check to ensure that J-hose (turbo hose) is in place, clamps tight, and hose has no holes or damage. | <p>Damaged or missing door latch or gasket does not seal door to housing.</p> <p>Gasket damaged or missing.</p> <p>Filter missing.</p> |

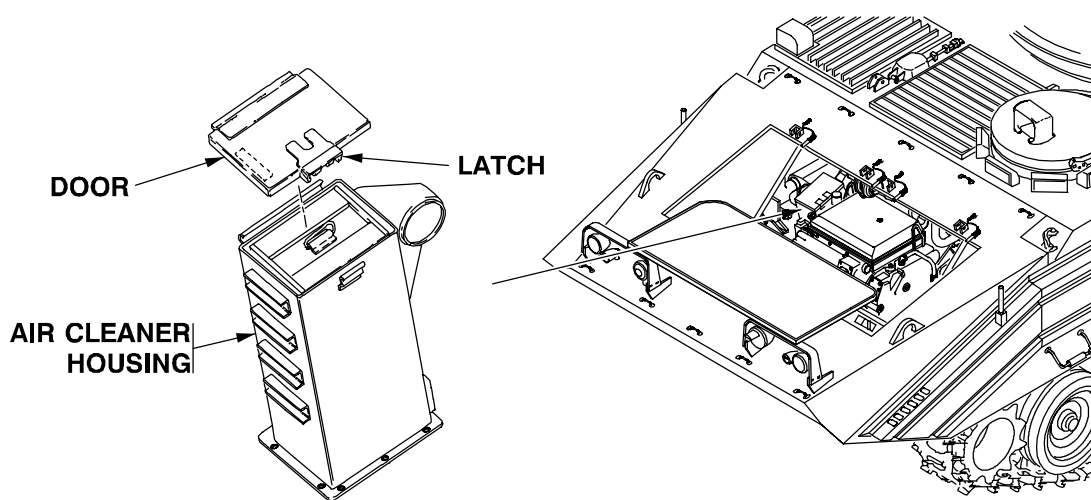




Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| 16 | Before | | <p>PROPELLER SHAFTS AND UNIVERSAL JOINTS</p> | <p>DRIVER</p> <p>a. Check propeller shafts, universal joints, mating couplings, and yokes for missing or loose hardware, corrosion, excessive wear, and damage.</p> <div> </div> <p>b. Clean as required to remove corrosion. Notify your supervisor of damaged and/or excessive wear.</p> <p>c. Close engine access and nose access doors (WP 0008 00).</p> | <p>Damaged, loose, or missing mounting hardware or parts. Bolts/washers loose, broken or missing.</p> |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| 17 | Before | | FIXED FIRE EXTINGUISHER | <p>DRIVER</p> <p style="text-align: center;">WARNING</p> <div style="text-align: center;">  </div> <p>Fire can break out at any time causing death or injury to personnel and/or damage to vehicle and equipment. Keep fire extinguisher ready for use prior to operating vehicle.</p> <p style="text-align: center;">WARNING</p> <div style="text-align: center;">  </div> <p>Accidental discharge of fire extinguishers can seriously injure your eyes or skin.</p> <p>Wear face shield, ear plugs, protective clothing, and gloves during fire bottle maintenance.</p> <p>a. Check that both fire extinguishers are installed and secure.</p> | Missing or loose fire extinguisher |

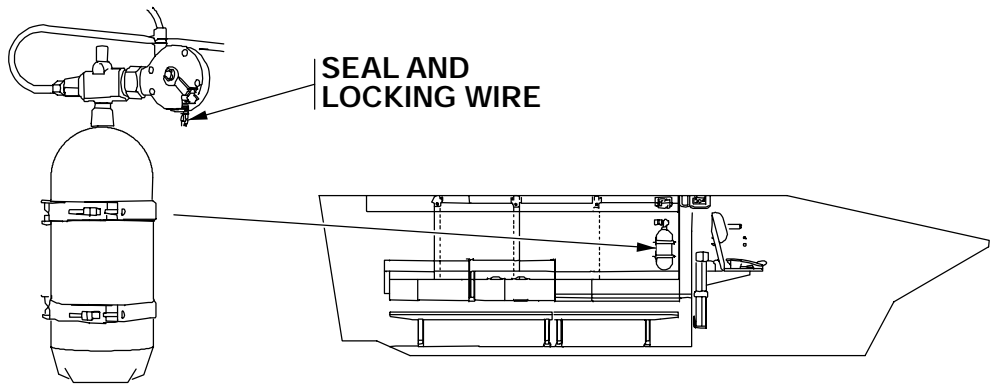


Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2
OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued


| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| 18 | Before | | PORTABLE FIRE EXTINGUISHERS | <p>b. Check that control seal and lockwire on fire extinguishers is installed and undamaged.</p> <p>c. Check that both extinguishers are fully charged.</p> <p>d. Notify your supervisor of broken or missing seals and/or lockwire or an extinguisher that is not charged.</p> <p>DRIVER</p> <p style="text-align: center;">WARNING</p> <div style="text-align: center;">  </div> <p>Fire can break out at any time causing death or injury to personnel and/or damage to vehicle and equipment. Keep fire extinguisher ready for use prior to operating vehicle.</p> | <p>Missing or damaged seal and/or lockwire.</p> <p>One or both extinguishers not fully charged.</p> |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued


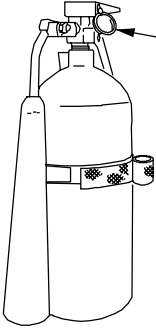
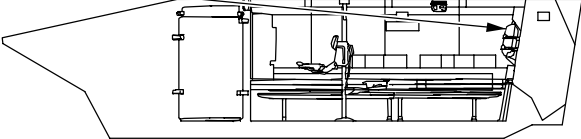
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| | | | | <p style="text-align: center;">WARNING</p>  <p>Accidental discharge of fire extinguishers can seriously injure your eyes or skin.</p> <p>Wear face shield, ear plugs, protective clothing, and gloves during fire bottle maintenance.</p> <p style="text-align: center;">NOTE</p> <p>Portable fire extinguisher is installed against curbside rear plate.</p> <ol style="list-style-type: none"> a. Check that fire extinguisher is installed and secure. b. Check that control seal and lockpin on fire extinguisher is installed and undamaged. | Missing or damaged seal and/or lockpin. |
| | | |  <p style="text-align: center;">SEAL AND LOCKING PIN</p> |  | |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2
OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| 19 | Before | | ENGINE OIL LEVEL | <p style="text-align: center;">NOTE</p> <p>Determine loss of charge by pressure gauge on extinguisher indicating discharge, seal broken, or extinguisher feels light.</p> <p>c. Check that extinguisher is fully charged. d. Notify your supervisor of broken or missing seals and/or lockwire or an extinguisher that is not charged.</p> <p>DRIVER</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Engine can be damaged if oil level is above F mark on dipstick. Do not add oil unless level is below L mark. Do not mix multi-grade lubricants (such as OE/HDO-15W40) with single grade lubricants.</p> <p style="text-align: center;">NOTE</p> <p>Ensure vehicle is on level ground when checking engine oil level.</p> <p>a. Remove driver's engine access cover (WP 0023 00). b. Check for leaks and leakage from coolant hoses, oil lines, and air intake ducts. Notify your supervisor of class I or II leaks after operations are concluded. Report Class III leaks and fuel leaks immediately.</p> <p style="text-align: center;">NOTE</p> <p>Oil level on dipstick should read between low (L) and full (F). If level on dipstick is below 3/4 full, add oil until the level is at F. Be careful not to overfill (level above F).</p> | <p>Extinguisher not fully charged.</p> <p>Any class III oil or coolant leak and/or any fuel leak.</p> |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

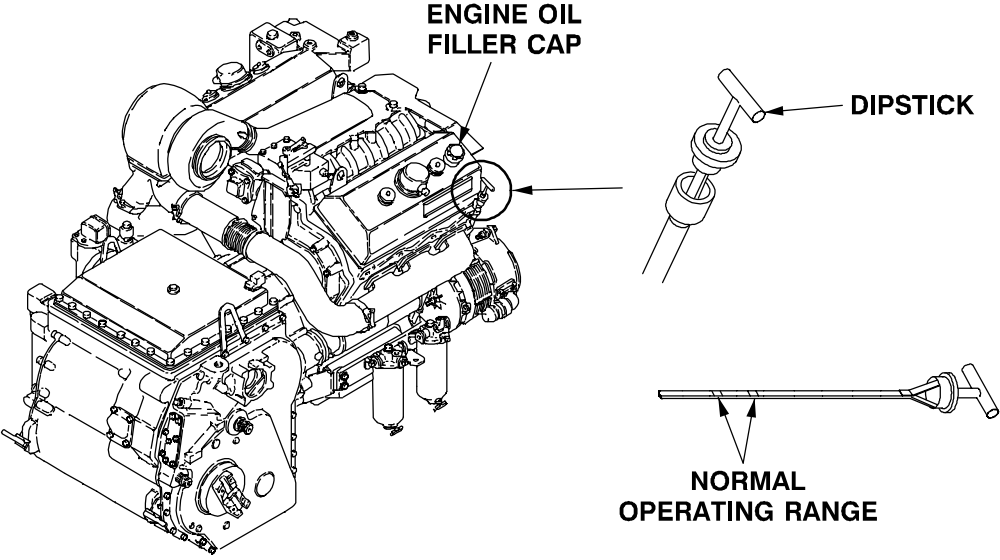
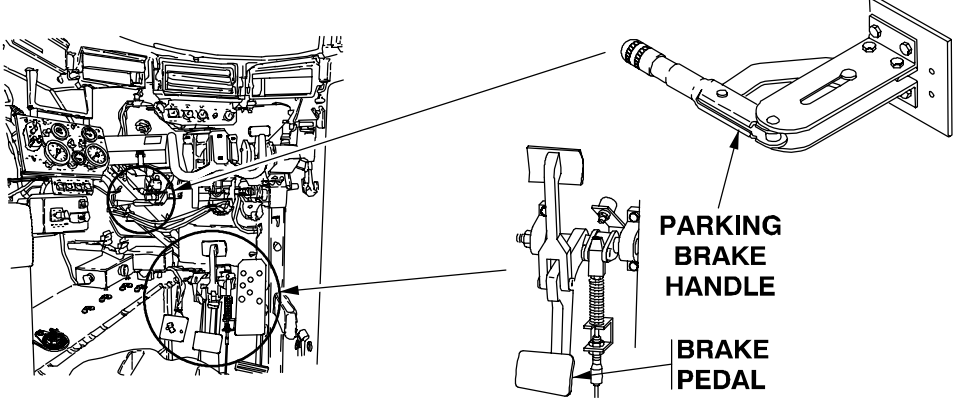
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| | | |  | <p>a. Check oil level on dipstick. If necessary add appropriate oil.</p> | |
| 20 | Before | | SEAT BELTS, COMMANDER | <p>b. Install driver's engine access cover (WP 0023 00). COMMANDER</p> <p>a. Check that belts are installed and in good condition.</p> <p>b. Check that buckle is in good condition and locks/unlocks strap.</p> | <p>Missing seat belt or worn, torn, or frayed belt.</p> <p>Buckle will not lock and/or unlock.</p> |
| 21 | Before | | SEAT BELTS, DRIVER | <p>DRIVER</p> <p>a. Check that belts are installed and in good condition.</p> <p>b. Check that buckle is in good condition and locks/unlocks strap.</p> | <p>Missing seat belt or worn, torn, or frayed belt.</p> <p>Buckle will not lock and/or unlock.</p> |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| 22 | Before | | SEAT, DRIVER | <p>DRIVER</p> <ul style="list-style-type: none"> a. Check seats for missing parts. b. Check that seat moves vertically, horizontally, and locks in place. | <p>Seat or back missing.</p> <p>Will not move in either horizontal or vertical directions or will not lock in place.</p> |
| 23 | Before | | BRAKING CONTROLS | <p>DRIVER</p> <ul style="list-style-type: none"> a. Push down on brake pedal. | <p>Brake pedal touches floor or does not return freely to off position when released.</p> |



The diagram illustrates the vehicle's interior from a driver's perspective. A circular callout highlights the brake pedal and parking brake handle area. A separate, enlarged view of the parking brake handle is shown to the right, with a label 'PARKING BRAKE HANDLE'. Below it, a label 'BRAKE PEDAL' points to the pedal in the callout area.

NOTE

Parking brake handle supplies sufficient force to lock service brake pedal but not enough force to actuate service brake.

NOTE

If brake pedal held firmly or moves downward slightly, parking brake adjustment is acceptable.

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 24 | Before | | DRIVER'S INSTRUMENT PANEL AND WARNING LIGHTS PANEL | <p>b. Push down on brake pedal and set parking brake (WP 0012 00).</p> <p>c. If brake pedal moves up or handle is easily moved, notify your supervisor.</p> <p>DRIVER</p> <p>a. Do the following steps when the ambient temperature is expected to be below 40° F.</p> <ol style="list-style-type: none"> 1) Set MASTER SWITCH to ON. 2) Check the glow plug WAIT indicator. | <p>Brake pedal moves up slightly after parking brake set or parking brake handle can be moved easily.</p> <p>WAIT indicator does not come on or, when engine temperature is below 50° F, flashes during first 35 seconds of test.</p> |

WAIT INDICATOR

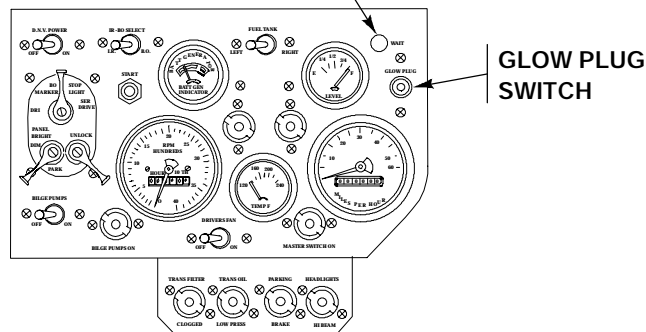


Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued



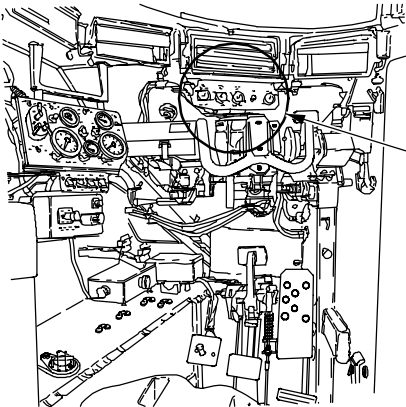
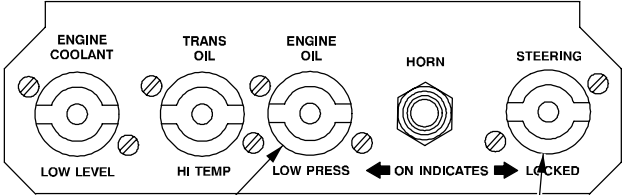
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|-------------------------------------------------------------------------------------|----------|-----------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| | | | | <p style="text-align: center;">WARNING</p> <div style="display: flex; justify-content: center; gap: 20px;">   </div> <p>Releasing parking brake could allow vehicle to move and cause injury or death to personnel and/or damage to vehicle and equipment. Press foot brake to prevent OSV movement when parking brake is released.</p> <p>b. Check that the following warning indicators are installed, intact, and on with parking brake released:</p> <ol style="list-style-type: none"> 1) Engine Oil Low Pressure 2) Steering Locked | <p>Indicator is not lit, missing, or broken.</p> |
|  | | | |  <p style="text-align: center;">ENGINE OIL LOW PRESSURE WARNING INDICATOR</p> <p style="text-align: center;">STEERING LOCKED INDICATOR</p> | |
| | | | | <p style="text-align: center;">NOTE</p> <p>Can only be used if tactical situation permits.</p> <p>c. Press HORN button and check that horn sounds. If not, notify your supervisor.</p> | |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

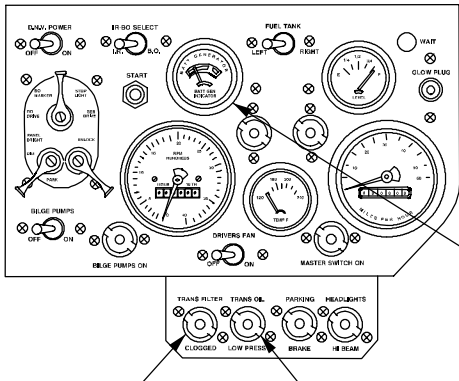
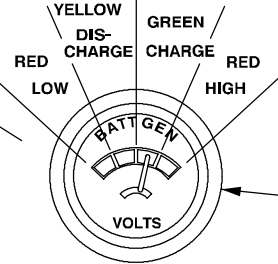
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | |  | <p style="text-align: center;">NOTE</p> <p>At engine temperature above 50° F, glow plug WAIT indicator comes on for one second and then goes out. At engine temperature below 50° F, glow plug WAIT indicator comes on steady for approximately 35 seconds, flashes for approximately 60 seconds, and then goes out.</p> <p>d. Start engine (WP 0013 00).</p> <p>e. Check that BATT GEN gauge is installed.</p>  <p style="text-align: right;">BATT GEN INDICATOR</p> <p>f. Check that TRANS FILTER CLOGGED warning indicator is installed, intact, and off.</p> <p>g. Check that TRANS OIL LOW PRESS warning indicator is installed, intact, and off. If lit, increase engine idle speed.</p> | <p>Engine will not start.</p> <p>BATT GEN indicator missing or broken, needle does not point to green zone, binding, chattering, or unusual noise.</p> <p>Indicator missing, broken, or lit.</p> <p>Indicator missing, broken, or lit and does not go off with engine at fast idle.</p> |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2
OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| | | | | <p style="text-align: center;"><u>CAUTION</u></p> <p>Do not operate OSV with TRANS OIL LOW PRESS indicator on. Operation of OSV with low transmission oil pressure could result in damage to transmission and/or unpredictable vehicle movements.</p> <p>h. Check tachometer as follows:</p> <ol style="list-style-type: none"> 1) Installed, intact, and needle moves as power is applied to engine. 2) Check that tachometer shows normal idle of 650 to 700 rpm. <p>i. Check that fuel gauge is operating properly.</p> | |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

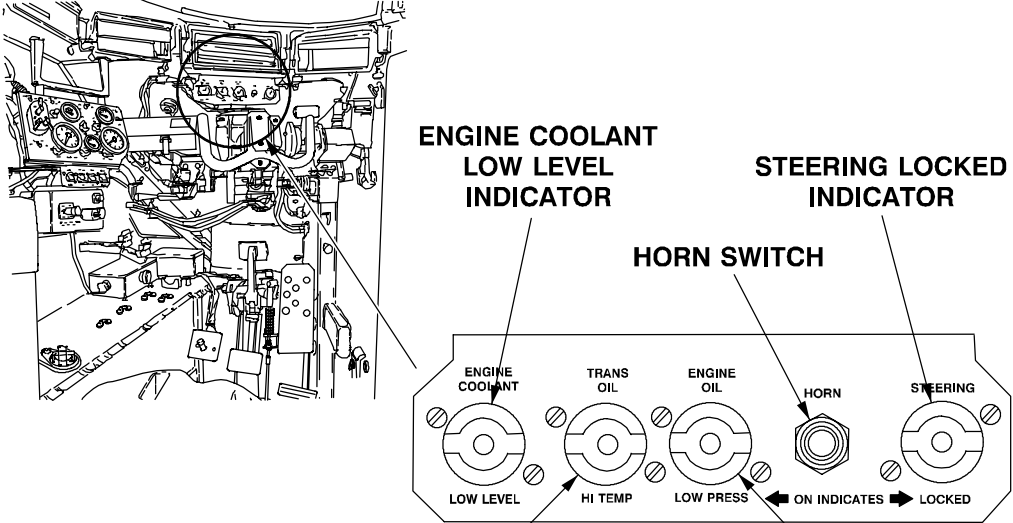
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | |  | <p>j. Check that ENG COOLANT LOW LEVEL warning indicator is installed, intact, and off.</p> <p>k. Check that ENGINE OIL LOW PRESS warning indicator is installed, intact, and off.</p> <p>l. Check that TRANS OIL HIGH TEMP warning indicator is installed, intact, and off.</p> <p>m. Check that STEERING LOCKED warning indicator is installed, intact, goes on when steering yoke is locked, and goes off when yoke is released.</p> | <p>Indicator missing, broken, or lit.</p> <p>Indicator missing, broken, or lit.</p> <p>Indicator missing, broken, off when yoke locked, or on when yoke released.</p> |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

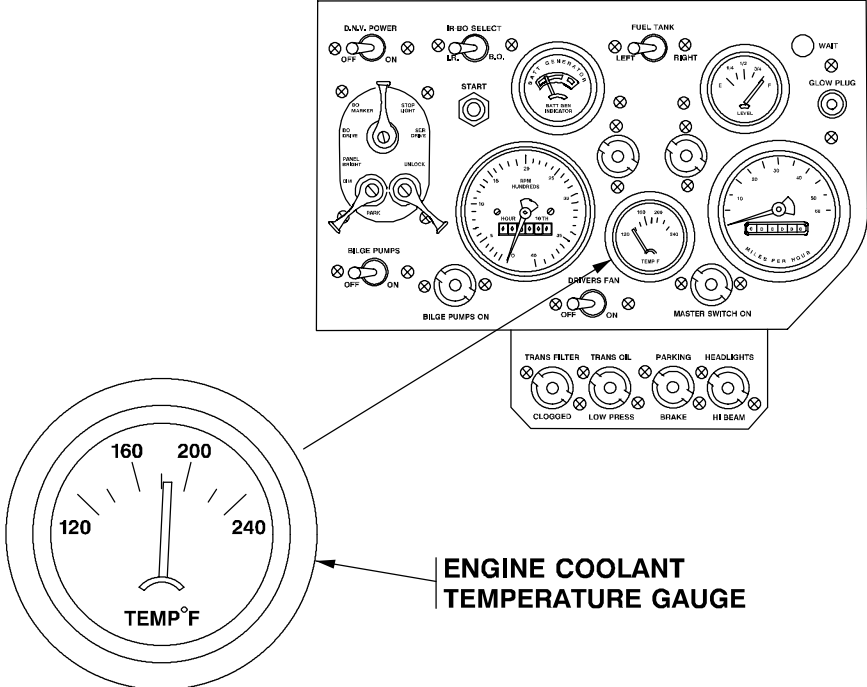

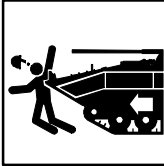
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | | <p style="text-align: center;">NOTE</p> <p>The normal low operating temperature of the engine is 160° F. The normal high operating temperature may vary from 200° F when ambient air temperature is lower than 85° F to 225° F when the ambient temperature is above 85° F.</p> <div style="text-align: center;">  <p>ENGINE COOLANT TEMPERATURE GAUGE</p> </div> | <p>Gauge missing, broken, or reading is outside of normal operating range (160°/200° F when air temp is lower than 85° F or 160°/225° F when air temp is higher than 85° F).</p> |
| n. | | | | <p>Check that engine coolant TEMP gauge is installed, intact, and in the correct operating range.</p> | |

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| 25 | Before | | ACCELERATOR AND THROTTLE CONTROLS | <p>DRIVER</p> <p style="text-align: center;">WARNING</p> <div style="display: flex; justify-content: space-around;">   </div> <p>Accelerator linkage failure can cause vehicle to crash and cause death or seriously injure personnel and/or damage vehicle and equipment.</p> <p>Do not operate OSV if accelerator pedal does not operate smoothly or if engine does not return to idle when accelerator pedal is released.</p> <p>a. Push down and then release accelerator pedal. Check that pedal moves freely and that tachometer increases rpm when pedal is pressed and rpm decreases when pedal is released.</p> | Pedal binds when pressed down or when released or engine does not return to idle when pedal is released. |

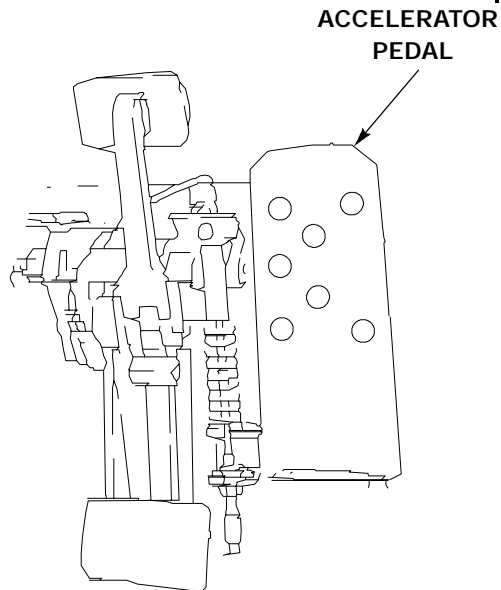
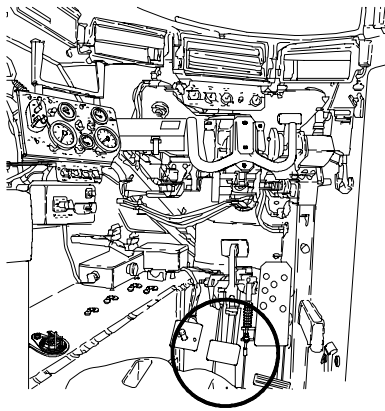
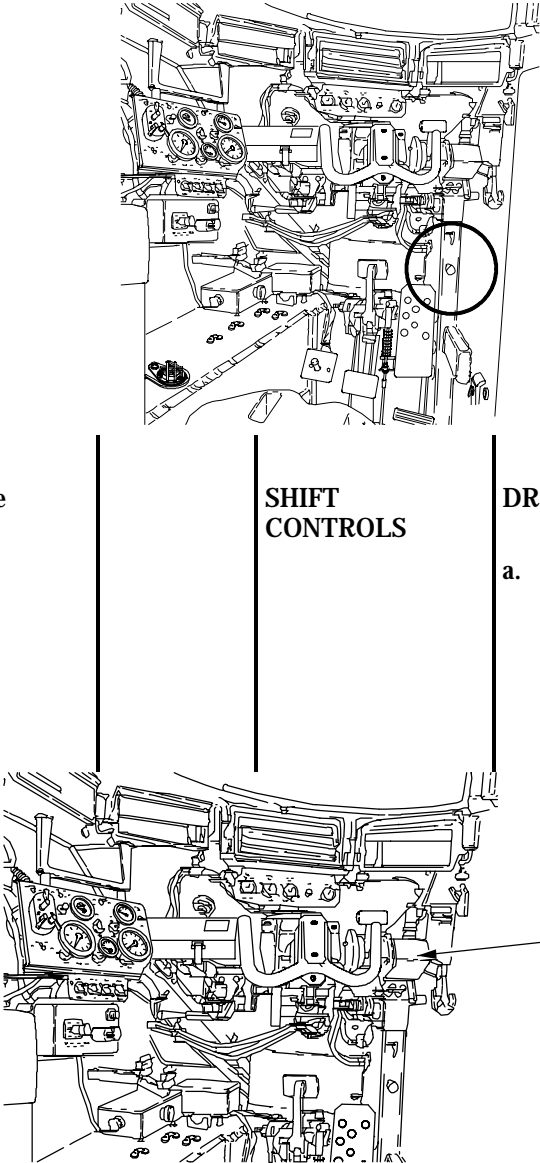
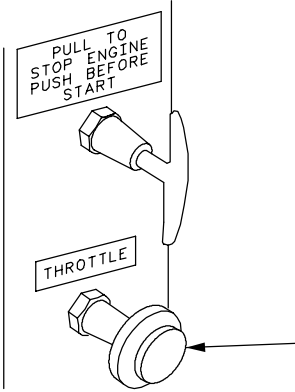
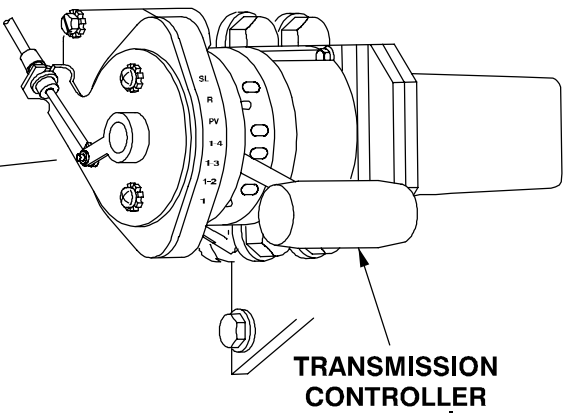


Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| 26 | Before | | <p>SHIFT CONTROLS</p>  | <p>DRIVER</p> <p>b. Pull hand throttle control out and then push it in. Check that control moves out and in and there is no sticking or binding and engine idle increases and decreases.</p> <p>c. Notify your supervisor of problems with accelerator pedal and/or hand throttle.</p>  | <p>Engine idle rate does not decrease when throttle control is pushed in.</p> |
| | | | | <p>a. Move transmission controller shift control lever through ranges. Check that shift control moves freely and that the transmission changes gears smoothly.</p>  | <p>Shift lever binds or sticks when moved or transmission does not engage or shift gears.</p> |
| | | | | <p>b. Shut engine off (WP 0016 00).</p> | |

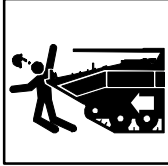
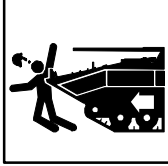
PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Continued

0040 00

Table 1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2
OPPOSING FORCES SURROGATE VEHICLE (OSV) — BEFORE - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|---------------------------------------|------------------------------------------------|------------------------------------|
| 27 | Before | | VEHICLE COMMUNICATION SYSTEM INTERCOM | DRIVER a. Operate intercom. | No communication with crewmembers. |
| 28 | Before | | ENGINE ACCESS COVER | DRIVER a. Check cover for damage and warps. | Damaged or missing cover. |

Table 2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — DURING

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| 29 | During | | STEERING CONTROLS | <p>DRIVER</p> <p style="text-align: center;">WARNING</p>  <p>When OSV transmission controller is in SL position, engage steering lock pin or vehicle can pivot steer causing death or injury to personnel. If vehicle is not going to be driven, set transmission controller to SL, center steering yoke, engage steering lock pin in yoke, and STEERING LOCKED indicator on.</p> <p>Check steering yoke operation.</p> | <p>Vehicle moves to right or left with steering yoke centered. Steering yoke does not return to center when released.</p> |
| 30 | During | | DRIVER CONTROLS AND INDICATORS | <p>DRIVER</p> <p style="text-align: center;">WARNING</p>  <p>If TRANS OIL LOW PRESS warning indicator stays on, vehicle could start to move erratically and cause death or injury to personnel and damage to OSV and equipment. Clear area around OSV of personnel and apply brakes before transmission is engaged.</p> | |

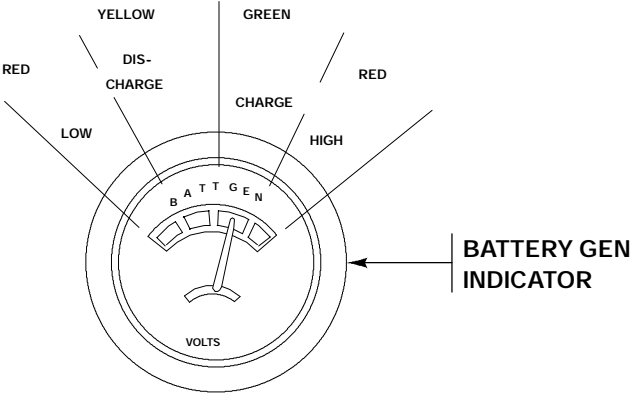
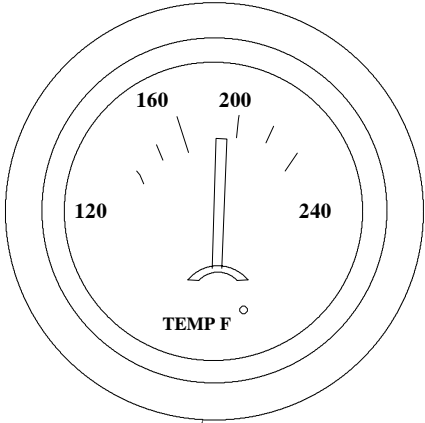
PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Continued

0040 00

Table 2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2
OPPOSING FORCES SURROGATE VEHICLE (OSV) — DURING - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| | | | | <p style="text-align: center;"><u>CAUTION</u></p> <p>Do not operate vehicle with TRANS OIL LOW PRESS warning indicator on. Operating vehicle with indicator lit can cause damage to transmission and unpredictable vehicle movement.</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>If TRANS OIL LOW PRESS warning indicator stays on or comes on during operations or if erratic vehicle movement occurs, cease operation and shut down vehicle as follows:</p> <ol style="list-style-type: none"> (1) Halt vehicle (2) Set transmission controller to SL (3) Set parking brake (4) Pull fuel cutoff control (5) Set MASTER switch to OFF (6) Secure vehicle <p>Check warning light panel periodically as follows:</p> <ol style="list-style-type: none"> a. Vehicle steering <p style="text-align: center;">NOTE</p> <p>TRANS LOW OIL PRESS indicator may come on when brakes are released but should go off when engine tachometer reaches 1200 to 1300 rpm.</p> <ol style="list-style-type: none"> b. Warning indicators. | <p>Erratic vehicle movement.</p> <p>TRANS OIL LOW PRESS indicator stays on. Other warning indicator on.</p> |

Table 2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — DURING - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| | | | | <p>c. BATT GEN gauge.</p>  <p>CAUTION Damage to engine could occur if temperature exceeds 230° F.</p> <p>d. Coolant temperature gauge within operating range.</p>  | <p>Needle not in green zone.</p> <p>Gauge above 200° F with air temp lower than 85° F or above 230° with air temp above 85° F.</p> |

PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Continued

0040 00

Table 2. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — DURING - Continued

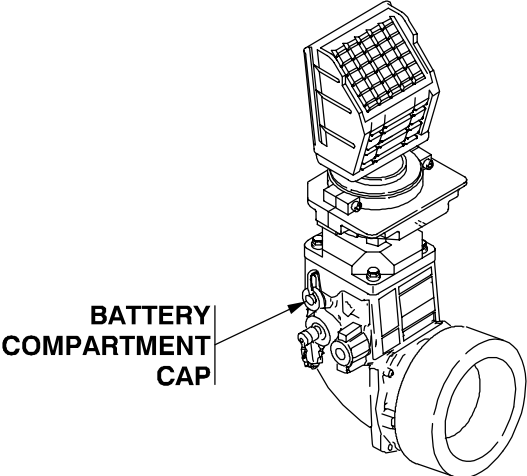
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| 33 | During | | DRIVER'S NIGHT VIEWER OFF/BRIGHT ROTARY SWITCH | <p>DRIVER</p> <p>a. Turn OFF/BRIGHT rotary switch and check that viewer comes on and brightness changes intensity as switch is turned.</p>  <p>b. Notify your supervisor if switch/viewer does not operate correctly.</p> | |

Table 3. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP—2
OPPOSING FORCES SURROGATE VEHICLE (OSV) — AFTER

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| 34 | After | | ENGINE SHUTDOWN | <p>DRIVER</p> <p>a. Stop engine (WP 0016 00).</p> | Engine will not shut down. |
| 35 | After | | DRIVER'S POWER PLANT COMPARTMENT | <p>DRIVER</p> <p style="text-align: center;">WARNING</p> <div style="text-align: center;"> </div> <p>After operation, engine, engine parts, gear box, and fluids are hot and can cause serious burns.</p> <p>Allow engine, engine parts, gear box, and/or fluids to cool before working on or near them, inspecting for deterioration and damage or checking fluid levels. Wear heat protective gloves to work on hot parts.</p> <p>a. Remove driver's engine access cover (WP 0023 00).</p> | |

ACCESS PANEL

Table 3. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — AFTER - Continued

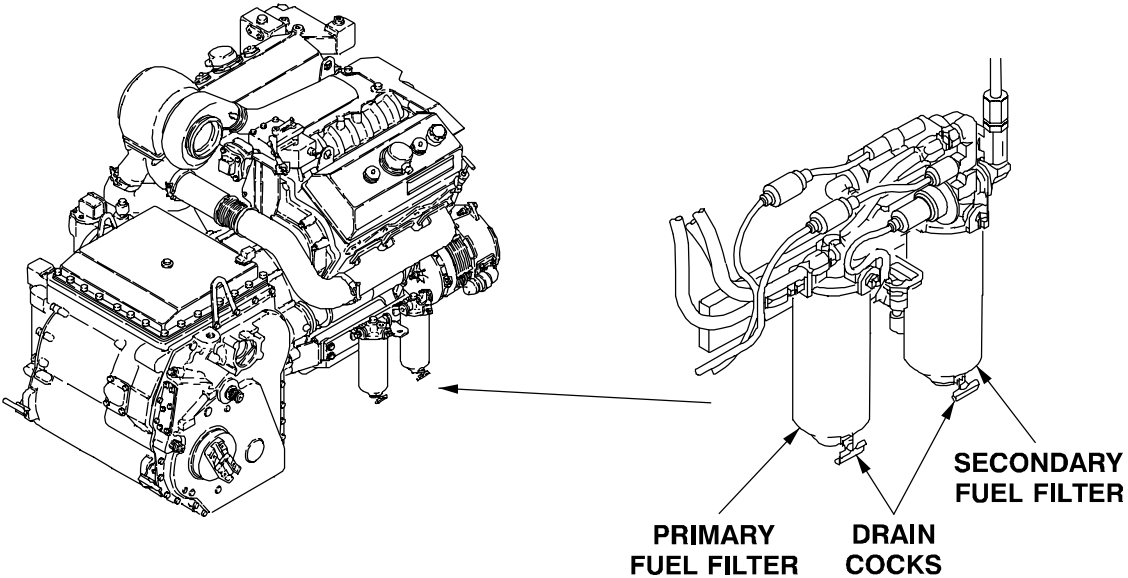

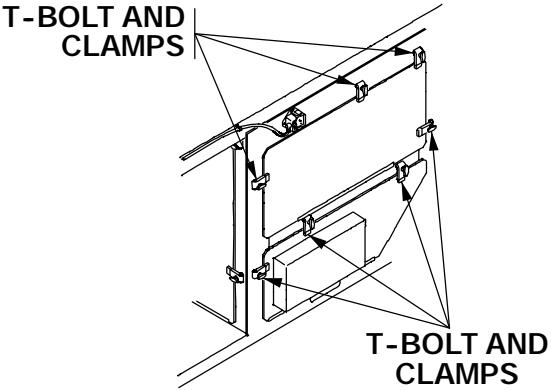
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|-------------------------------------------------------------------------------------|----------|-----------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| 36 | After | | FUEL FILTERS | <p>b. Check fuel lines, coolant hoses, oil lines, and air intake ducts.</p> <p>c. Notify your supervisor of leaks or damage to flex duct.</p> <p>DRIVER</p> <p>a. Check filters, lines, and connections for fuel leaks.</p> <p>b. Drain water and sediment from primary and secondary fuel filters as follows:</p> | <p>Class III oil or coolant leak or any fuel leak. Hole or tear in flexible air ducts.</p> <p>Fuel leak.</p> |
|  | | | | | |
| | | | | <ol style="list-style-type: none"> 1) Place a container under primary fuel filter and open drain cock. 2) When liquid starts to flow from the drain cock, check the flow for water and sediment. Close the drain cock when clean fuel is seen. 3) If sediment and/or water is found, notify your supervisor. | |

Table 3. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — AFTER - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| 37 | After | | POWER PLANT REAR ACCESS COVERS | <p>DRIVER</p> <p style="text-align: center;">WARNING</p>  <p>Turret can rotate and cause death or serious injury to personnel.</p> <p>Do not reach through turret shield opening or enter/exit turret when turret power is on.</p> <p>Keep turret shield door closed when turret drive power is on.</p> <p>Engage turret travel lock before personnel enter turret or reach through turret shield opening.</p> <p style="text-align: center;">CAUTION</p> <p>Put driver's hatch in the pop-up position prior to rotating turret.</p> <p style="text-align: center;">NOTE</p> <p>Rotate turret to 3200 mils for access to rear power plant access panels.</p> <ol style="list-style-type: none"> a. Traverse turret to 3200 mils (TM 9-2350-366-10-2). b. Open power plant rear access covers (WP 0022 00).  | |


PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Continued

0040 00

Table 3. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2
OPPOSING FORCES SURROGATE VEHICLE (OSV) — AFTER - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| | | | | <ul style="list-style-type: none"> c. Check fuel lines, coolant hoses, oil lines, and air intake ducts for leaks. Notify your supervisor of Class I, II, and III fluid leaks. d. Check that door latches are installed, tight, and free of damage. e. Tighten loose latches. Notify your supervisor of missing latches. f. Check that rubber seals are installed and free of damage (such as breaks tears, nicks, gouges, cracks, or poor seating). | <p>Class III oil or coolant leaks or any fuel leak.</p> <p>Missing latches or latches that won't tighten.</p> |

Table 3. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — AFTER - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 38 | After | | DRIVE BELTS | <p>DRIVER</p> <div style="text-align: center;"> <p>WARNING</p>  </div> <p>After operation, engine, engine parts, gear box, and fluids are hot and can cause serious burns.</p> <p>Allow engine, engine parts, gear box, and/or fluids to cool before working on or near them, inspecting for deterioration and damage or checking fluid levels. Wear heat protective gloves to work on hot parts.</p> <p>a. Check fan drive belts on generator, coolant pump, and coolant fan for looseness, excessive wear, and damage.</p> | <p>Missing drive belt, cracks in belt fiber, more than one crack that is 1/8-inch in depth or 50% of belt thickness, or tears more than 2-inches long.</p> |

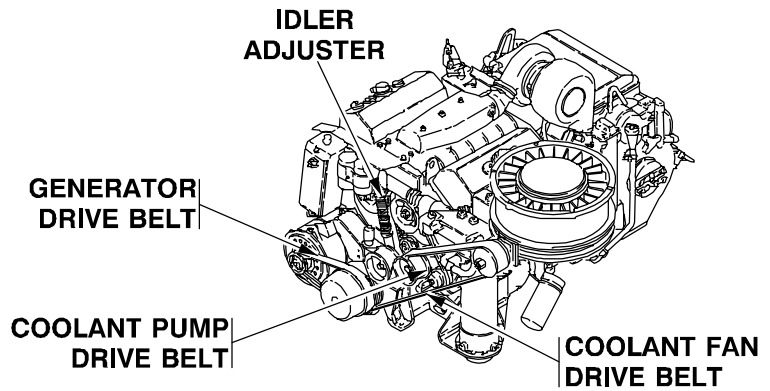


Table 3. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — AFTER - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| 39 | After | | FAN GEAR BOX | <p>b. Check coolant fan assembly.</p> <p>c. Check idler adjuster and hardware.</p> <p>d. Check idler adjuster for proper adjustment between operating range marks.</p> <div style="text-align: center;"> </div> <p>e. If idler is not in operating range and coolant fan drive belt has more than 1/2-inch deflection between pulleys, notify your supervisor.</p> <p>DRIVER</p> <div style="text-align: center;"> <p>WARNING</p> </div> <p>After operation, engine, engine parts, gear box, and fluids are hot and can cause serious burns.</p> <p>Allow engine, engine parts, gear box, and/or fluids to cool before working on or near them, inspecting for deterioration and damage or checking fluid levels. Wear heat protective gloves to work on hot parts.</p> <p>NOTE</p> <p>Oil level must be center of sight glass.</p> | <p>Coolant fan inoperative, makes grinding or squeaking noise.</p> <p>Loose or missing idler adjuster and/or hardware.</p> |

Table 3. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — AFTER - Continued

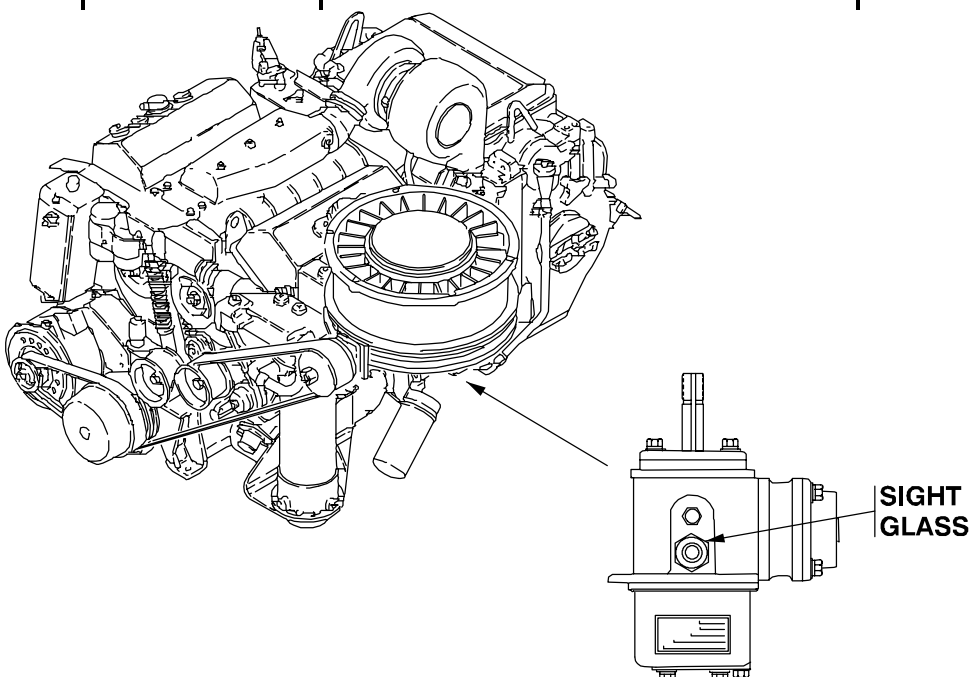
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| | | | | <p>a. Check lines for oil leaks, check oil level in fan gear box sight glass.</p>  <p>b. Notify your supervisor if oil is low or if oil is leaking.</p> | <p>Class III oil leak, no oil in sight glass, oil is contaminated.</p> |

Table 3. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — AFTER - Continued


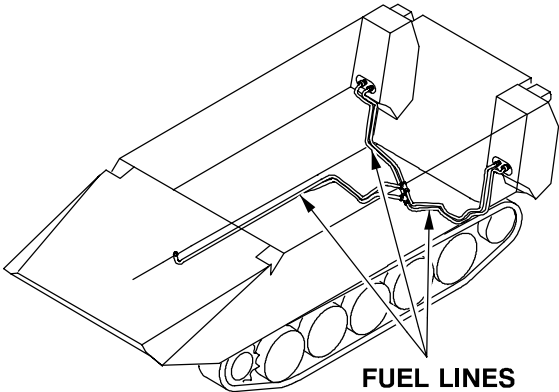
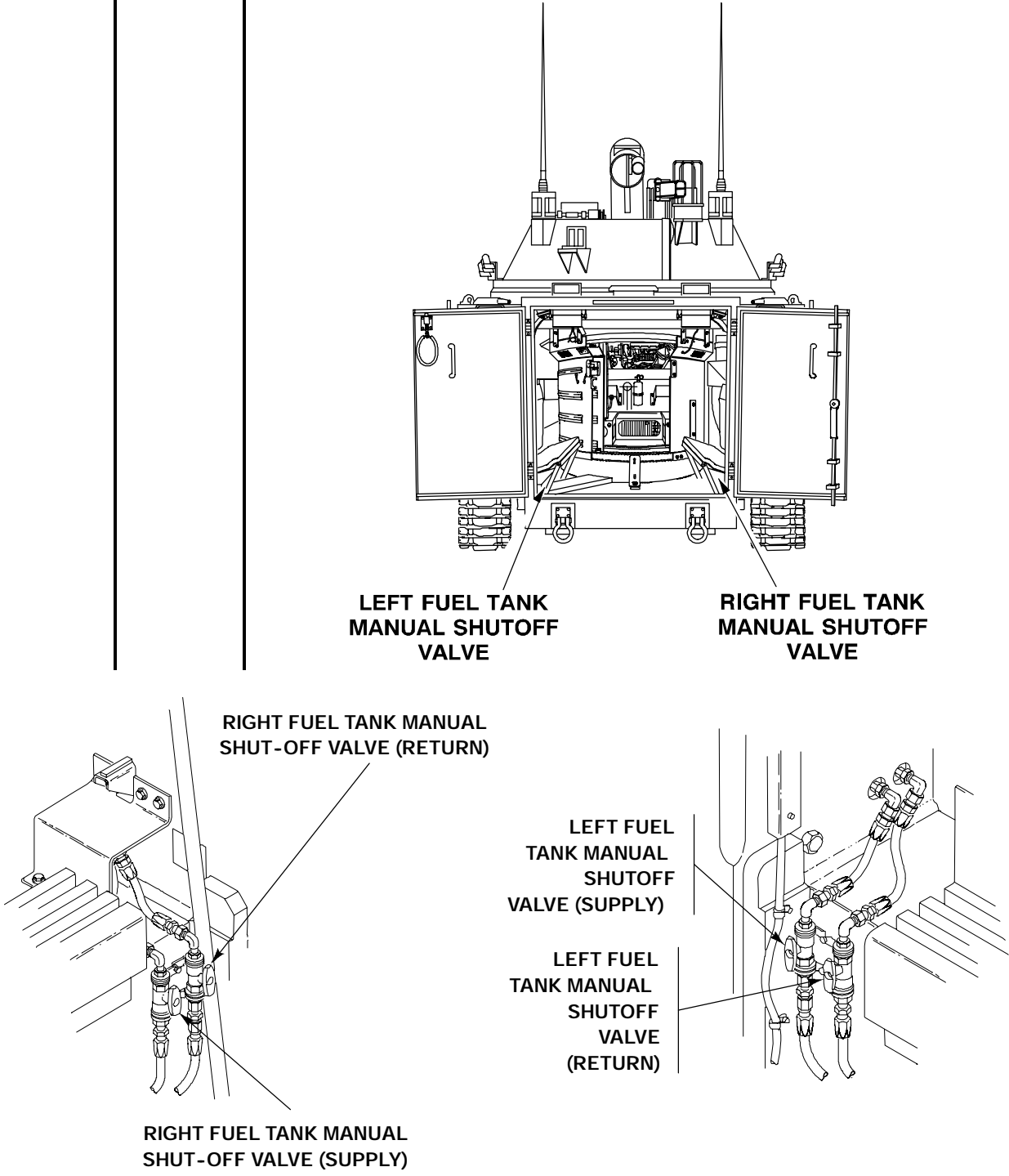
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| 40 | After | | FUEL LINES | <p>DRIVER</p> <p style="text-align: center;">WARNING</p>  <p>Diesel fuel can ignite and cause death or injury to personnel and damage or destroy OSV.</p> <p>Wipe fuel spills immediately. Wear protective goggles. Do not permit smoking, welding, heater, open flame, or any other heat sources near fuel or when working on fuel system.</p> <p>Fumes from diesel are poisonous and can cause nausea and vomiting. Park the OSV in well ventilated area or wear respiratory protection.</p> <p>a. Check fuel lines for leaks.</p>  | Any fuel leak. |

Table 3. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — AFTER - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| | | | | <p>b. Close shutoff valves and notify your supervisor of leaks.</p>  | |

PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Continued

0040 00

Table 3. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — AFTER - Continued


| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| 41 | After | | FUEL TANK AND FUEL FILLER CAP | <p>DRIVER</p> <p style="text-align: center;">WARNING</p>  <p>Diesel fuel can ignite and cause death or injury to personnel and damage or destroy OSV.</p> <p>Wipe fuel spills immediately. Wear protective goggles. Do not permit smoking, welding, heater, open flame, or any other heat sources near fuel or when working on fuel system.</p> <p>Fumes from diesel are poisonous and can cause nausea and vomiting. Park the OSV in well ventilated area or wear respiratory protection.</p> <p style="text-align: center;">NOTE</p> <p>Check fuel tanks, screens, and caps are the same on both fuel tanks.</p> | |

Table 3. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — AFTER - Continued

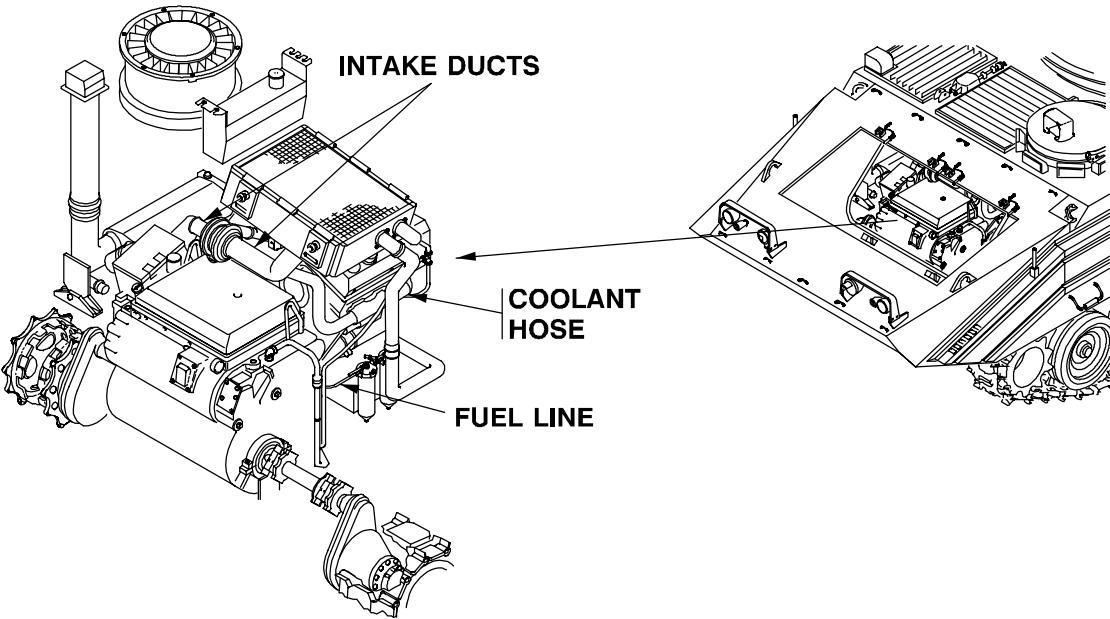
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| | | |  | <p>c. Check air intake flex ducting and fittings for tightness and damage.</p> <p>d. Tighten fittings. Notify your supervisor of damaged ducts.</p> <p>e. Check coolant hose and fuel lines for loose fittings and damage.</p> <p>f. Tighten loose fittings. Notify your supervisor of fuel lines with damage.</p> | <p>Hole or leak in flex air intake duct.</p> <p>Any leaking fuel line or class III leak in coolant hoses.</p> |

Table 3. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2
OPPOSING FORCES SURROGATE VEHICLE (OSV) — AFTER - Continued



| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| 43 | After | | FINAL DRIVES HOUSING | <p>DRIVER</p> <p style="text-align: center;">WARNING</p>  <p>After operation, engine, transmission, housing, and fluids are hot and can cause serious burns.</p> <p>Allow engine and transmission to cool before working on or near them, or checking fluid levels. Wear heat protective gloves to work on hot parts.</p> <p>After operation, housing and fluids may be hot due to overheating. Notify your supervisor of hot drive housing.</p> <ul style="list-style-type: none"> a. Move your hand near, but not touching final drive housing. If enough heat is radiated to indicate housing is too hot to touch, the housing is overheated. b. Check drain plugs. | <p>Overheated drive housing.</p> <p>Missing or leaking drain plug.</p> |

Table 3. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — AFTER - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| 44 | After | | ROADWHEELS AND IDLER WHEELS | <p>DRIVER</p> <ul style="list-style-type: none"> a. Hold hand near roadwheel and idler wheel hubs. b. Notify your supervisor of wheels that are warmer than others. <p style="text-align: center;">WARNING</p> <div style="text-align: center;">  </div> <p>After operation, tracks and track components are hot and can cause serious burns. Allow tracks to cool before working on or near them. Wear heat protective gloves to work on hot parts.</p> <ul style="list-style-type: none"> c. Check roadwheels for separation of rubber from metal and missing rubber (chunking). d. Check for missing, bent, or cracked roadwheels or idler wheels. | <p>Separation of 1/2 or more of rubber from wheel or chunking across 1/2 width of outer rubber surface.</p> <p>Damaged roadwheel or idler wheel.</p> |

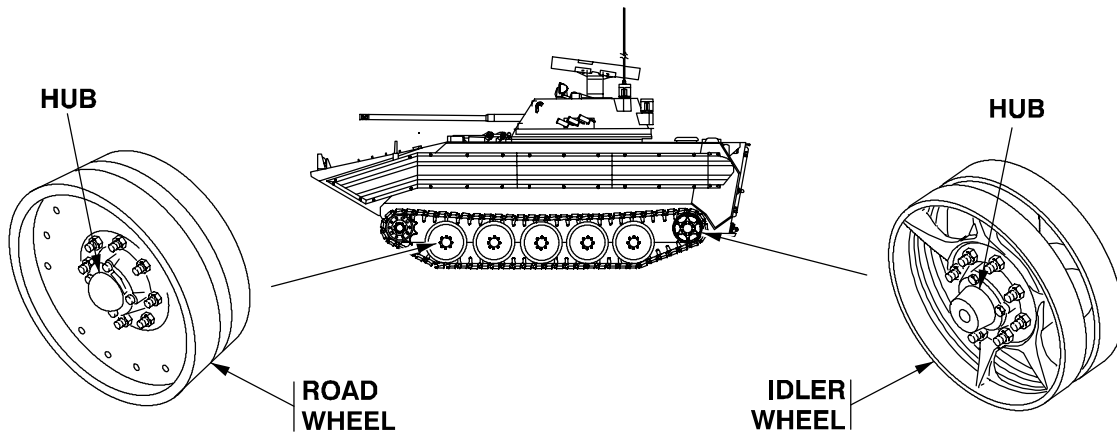


Table 3. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — AFTER - Continued

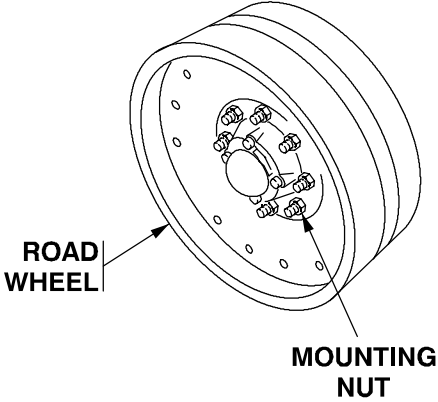
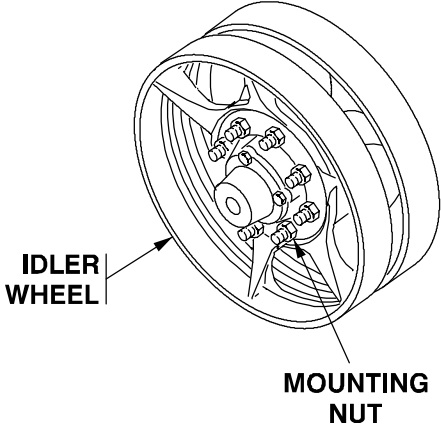

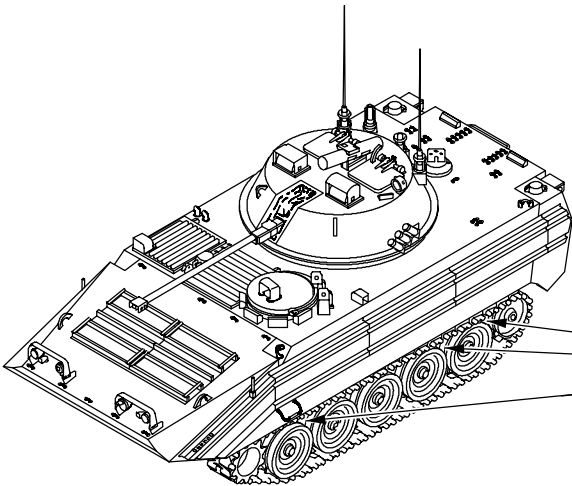
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| | | | | <p>e. Check for damaged or missing studs or nuts and elongated mounting holes.</p> <p style="text-align: center;">NOTE</p> <p>A worn mounting hole is indicated by shiny metal around mounting nut.</p> <p>f. Check for worn mounting holes.</p> | Damaged or missing studs/nuts or damaged holes. |
| | | |  <p>ROAD WHEEL</p> <p>MOUNTING NUT</p> |  <p>IDLER WHEEL</p> <p>MOUNTING NUT</p> | |
| | | | | <p>g. Check for lubricant leakage around outer hub cap and between rear of hub and support arm.</p> | |

Table 3. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — AFTER - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|-------------------------------------------------------------------------------------|----------|-----------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| 45 | After | | SHOCK ABSORBERS | <p>DRIVER</p> <p style="text-align: center;">WARNING</p>  <p>After operation, shock absorbers can be hot and cause serious burns if touched.</p> <p>Allow parts to cool before working on or near them. If necessary, wear heat protective gloves to work on shock absorbers.</p> <p style="text-align: center;">NOTE</p> <p>A shock absorber that is cold after operation or warmer than other shock absorbers is defective and should be replaced. Notify your supervisor.</p> <p>a. Check for hot or cold shock absorber.</p> | Shock absorber that is cold or too warm. |
|  | | | | <p>b. Check for missing shock absorbers.</p> | Missing shock absorber. |

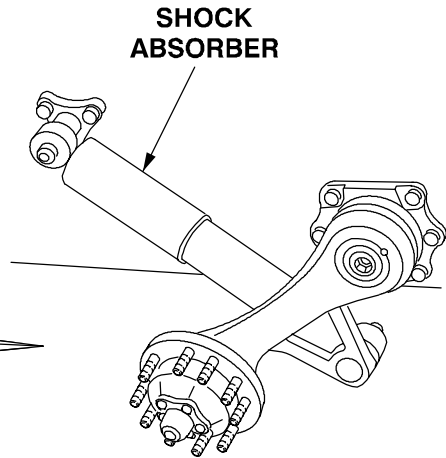


Table 3. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — AFTER - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|-------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 46 | After | | TORSION BARS, ROADWHEEL ARMS AND ROADWHEEL ARM BUSHINGS AND SEALS | <p style="text-align: center;">NOTE</p> <p>Small dents in a shock absorber will not affect shock absorber operation.</p> <p>c. Check shock absorbers for large dents, cracks, and holes.</p> <p>d. Check for leaks.</p> <p>e. Check shock absorbers and roadwheel arm mounting bolts.</p> <p>DRIVER</p> <p>a. Check for bent, broken, or missing roadwheel arms.</p> <p>b. Using a crowbar (WP 0052 00, Table 2, Item 7) lift each roadwheel and check for ease of lifting, excessive play, and looseness.</p> | <p>Cracks or holes. Large dents.</p> <p>Class III leak.</p> <p>Missing, loose, or damaged bolts.</p> <p>Roadwheel arm damaged.</p> <p>Missing or broken torsion bar or roadwheel arm, uneven gap between roadwheel arm and hull, excessive looseness.</p> |

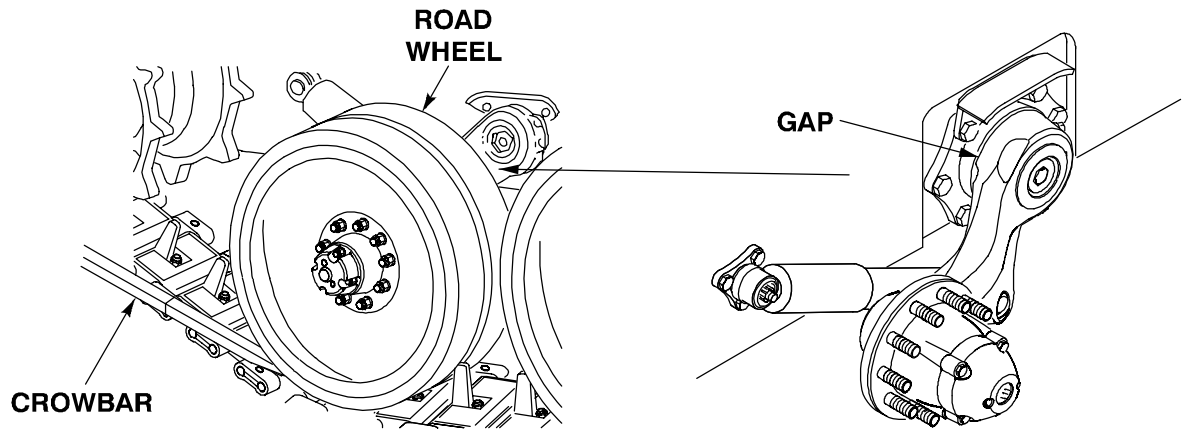


Table 3. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — AFTER - Continued

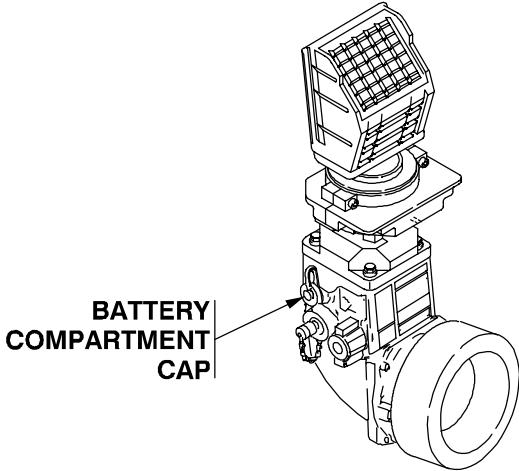
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| 47 | After | | DRIVER'S NIGHT VIEWER BATTERY | <p>If a roadwheel can be easily lifted, torsion bar is missing or broken.</p> <p>If excessive play or looseness is found, check gap where arm attaches to hull.</p> <p>Check for excessive grease leakage from roadwheel arm.</p> <p>c. Report missing, broken, or damaged torsion bar or roadwheel arm, excessive grease leakage, uneven gapping, or looseness in road arm assemblies to your supervisor.</p> <p>DRIVER</p> <p>a. Remove battery compartment cap.</p> | Missing or broken torsion bar or roadwheel arm, uneven gap between roadwheel arm and hull, excessive looseness. |
| 48 | After | | DRIVER'S NIGHT VIEWER |  <p>b. Remove battery.</p> <p>c. Replace battery compartment cap.</p> <p>d. Store battery as required.</p> <p>DRIVER</p> <p>a. Check exterior surface for dust, dirt, grease and fungus.</p> <p>b. Clean as required.</p> | |

Table 4. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — WEEKLY

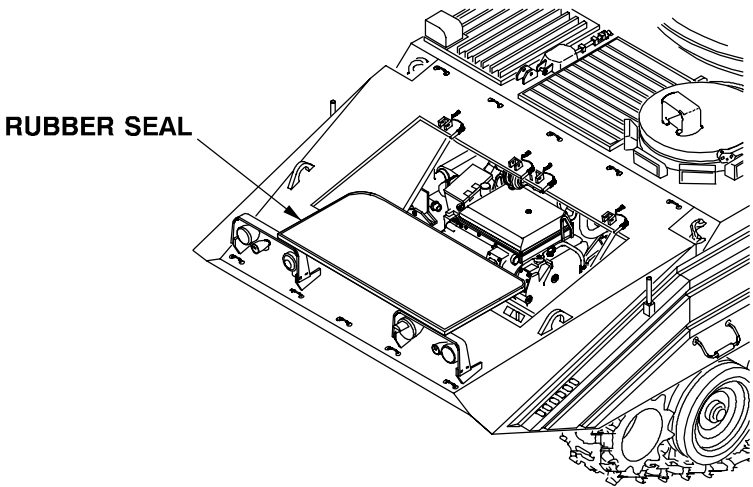

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49 | Weekly | | ENGINE ACCESS COVER | <p>DRIVER</p> <p>NOTE</p> <p>Perform weekly checks before OSV operation if vehicle is being operated for first time.</p> <p>NOTE</p> <p>Commander will direct, and assist with, weekly and monthly PMCS.</p> <ol style="list-style-type: none"> Open nose access cover (WP 0008 00). Check that access cover and seal are installed and in good condition.  <p>RUBBER SEAL</p> <ol style="list-style-type: none"> Check access cover locks. Report damage, missing door or seal, and other discrepancies to your supervisor. | <p>Access cover missing or damaged, rubber seal missing or has breaks, brittleness, cracks, and/or seat/seal is improper.</p> <p>Door will not close or lock.</p> |

Table 4. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — WEEKLY - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| 50 | Weekly | | ENGINE EXHAUST SYSTEM | <p>DRIVER</p> <p style="text-align: center;">WARNING</p>  <p>After operation, engine, engine parts, gear box, and fluids are hot and can cause serious burns.</p> <p>Allow engine, engine parts, gear box, and/or fluids to cool before working on or near them, inspecting for deterioration and damage or checking fluid levels. Wear heat protective gloves to work on hot parts.</p> <p style="text-align: center;">NOTE</p> <p>Do exhaust leak check after engine is at normal operating temperature (160° F to 200° F)(71.1° C to 93.3° C) because OSV leaks exhaust gas when engine is cold and carbon will be present at joints, and exhaust pipe connection clamps. Joints should expand and seal when engine exhaust pipe is hot.</p> <p>a. Start engine (WP 0013 00) and idle engine until normal operating temperature is reached.</p> | |

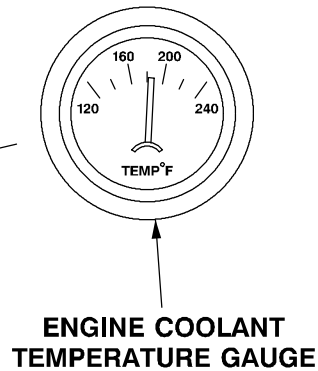
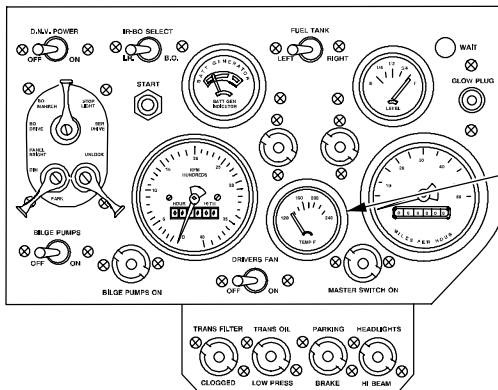


Table 4. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — WEEKLY - Continued

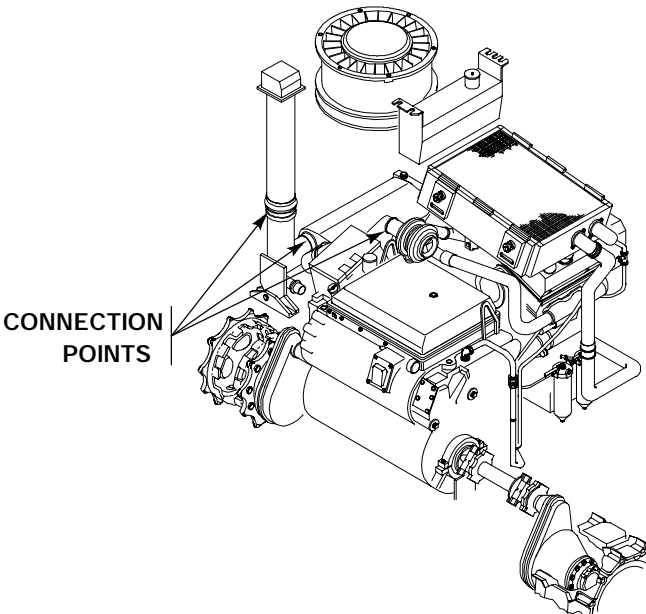
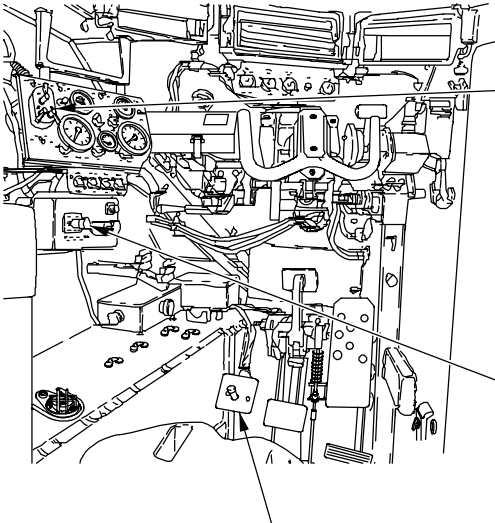
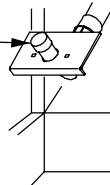
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| | | | | <p>b. Check for damage, deterioration, and exhaust leaks at connections.</p>  <p>c. Tighten loose connections.</p> <p>d. Check for weld failure and loose or missing hardware.</p> <p>e. Tighten loose hardware. Notify your supervisor of damage, deterioration, weld failure, and missing parts/hardware.</p> | <p>Damaged or deteriorated parts, exhaust leak due to damaged connections.</p> <p>Open welds and missing hardware.</p> |

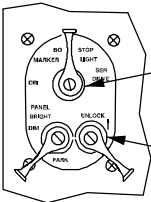
Table 4. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — WEEKLY - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| 51 | Weekly | | LIGHTS | <p>DRIVER</p> <p style="text-align: center;">NOTE</p> <p>Driver will operate light controls and crewmember (H) will check for proper operation of exterior lights.</p> <ol style="list-style-type: none"> a. Set MASTER SWITCH to ON. b. Lift light UNLOCK switch and set driving lights switch to SER DRIVE. c. Check that service headlights and stop/tail lights come on. d. Press the beam selector switch. e. Check that high beams come on. | |



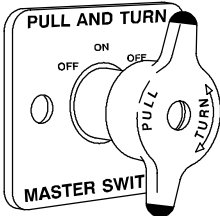
BEAM SELECTOR SWITCH



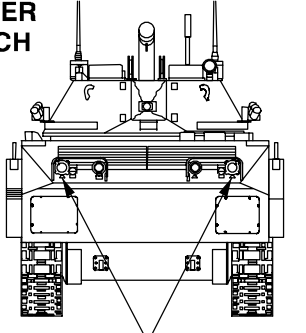


DRIVING LIGHTS SWITCH

UNLOCK SWITCH



MASTER SWITCH



SERVICE HEADLIGHTS

Table 4. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — WEEKLY - Continued

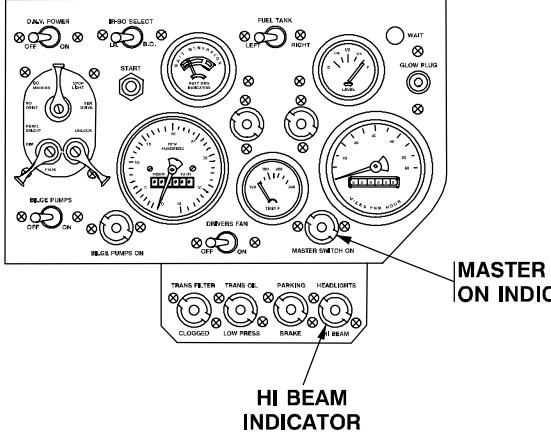
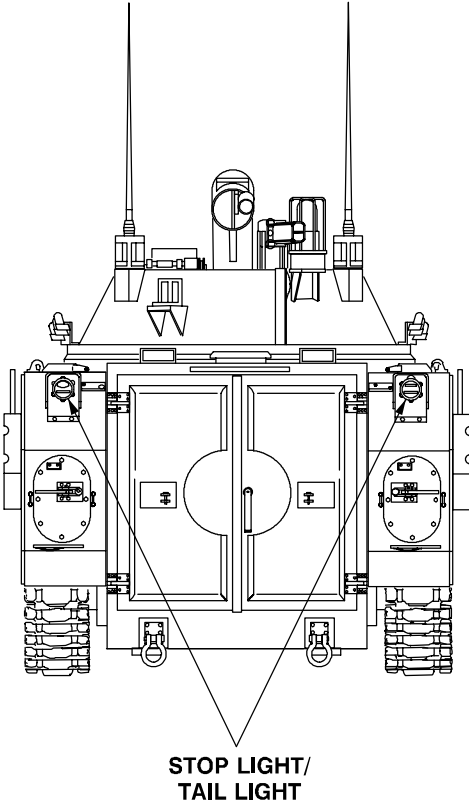
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| | | | | <p>f. Check that MASTER SWITCH ON and HEADLIGHTS HI BEAM indicators are on.</p>  <p>g. Press and release brake pedal.</p> <p>h. Check that tail lights brighten and dim.</p>  | |

Table 4. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — WEEKLY - Continued

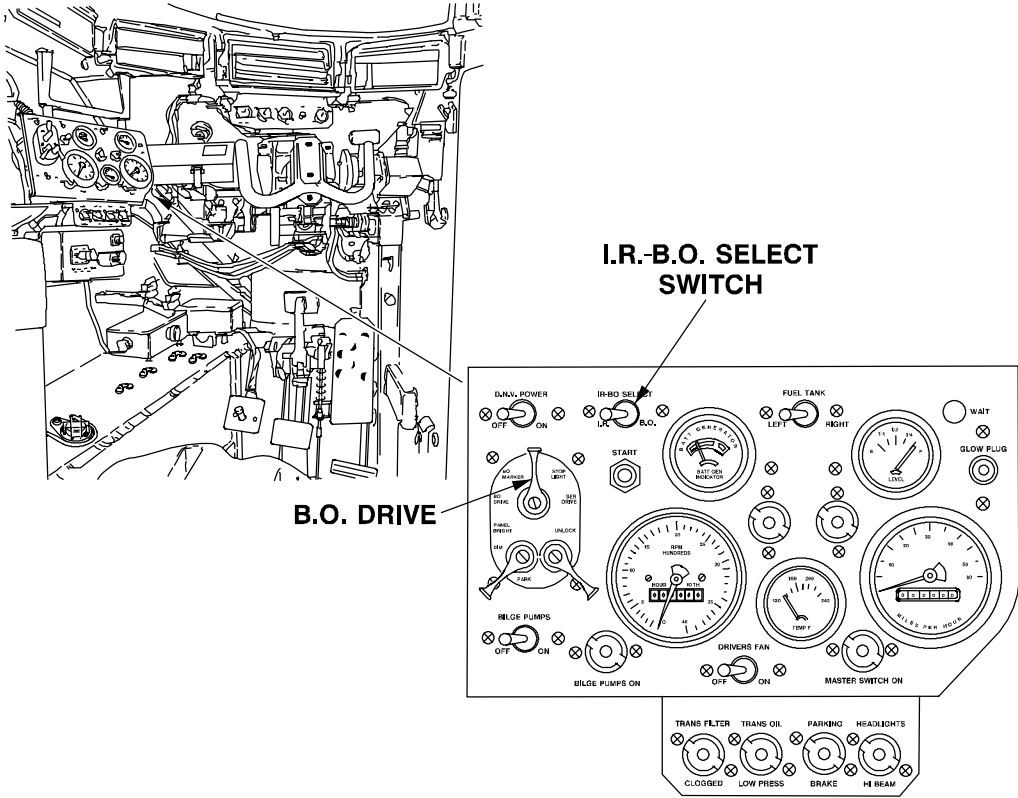
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| | | |  | <ul style="list-style-type: none"> i. Set light switch to BO DRIVE and IR-BO switch to BO. j. Check that blackout headlights and marker lights come on. k. Press and release brake pedal. l. Check that blackout stop lights come on and go off. | |

Table 4. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — WEEKLY - Continued

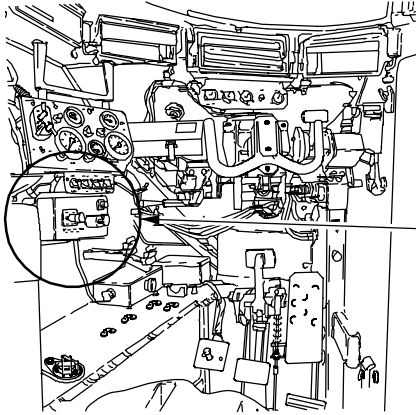
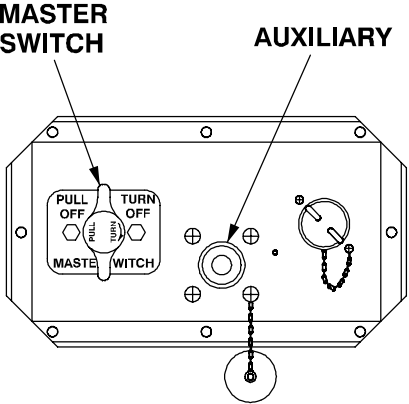
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| 52 | Weekly | | SLAVE CABLE AND RECEPTACLE | <p>DRIVER</p> <p>a. Check slave cable, receptacle, and cap for damage, burnt-out condition, and corrosion.</p> | |
| | | |  |  | |
| 53 | Weekly | | M27 PERISCOPE | <p>DRIVER</p> <p>b. Clean as required to remove corrosion, dirt, and debris. Notify your supervisor of burnt-out parts and other damage.</p> <p>a. Check periscope glass for dirt and damage.</p> <p style="text-align: center;">CAUTION</p> <p>Handle periscope carefully during removal to avoid damage to frame and glass.</p> | <p>More than 50% vision obstructed.</p> |

Table 4. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — WEEKLY - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| | | | | <p>b. Loosen 2 thumbscrews and remove periscope.</p> <p>c. Check between vehicle wall behind periscope and back of periscope for dirt and moisture.</p> | <p>More than 50% vision obstructed.</p> |

Table 4. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — WEEKLY - Continued


| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| 54 | Weekly | | AN/VVS-2 DRIVER'S NIGHT VISION (DNV) | <p>DRIVER</p> <p style="text-align: center;">WARNING</p> <div style="text-align: center;">  </div> <p>Contact with high voltage (16,000 volts or more) used to operate AN/VVS-2 can cause death or serious injury to personnel. To avoid contact with high voltage, observe following:</p> <p style="padding-left: 40px;">Connect power cable to DNV BEFORE turning MASTER SWITCH and DNV POWER switch to ON.</p> <p style="padding-left: 40px;">Do not touch end of cable with unprotected hands</p> <p style="padding-left: 40px;">When shutting down, set DNV power switch to OFF and wait two minutes after image disappears from periscope screen before DNV power cable is disconnected</p> <p style="text-align: center;">CAUTION</p> <p>Do not expose AN/VVS-2 drivers night vision viewer (DNV) to direct sunlight during inspection. Direct sunlight or large amounts of light will cause damage to viewer.</p> <ol style="list-style-type: none"> a. Check AN/VVS-2 night vision device for damage and proper operation. b. Make sure you can see through DNV. | <p>Inoperative and no other night sight available.</p> |

Table 4. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — WEEKLY - Continued

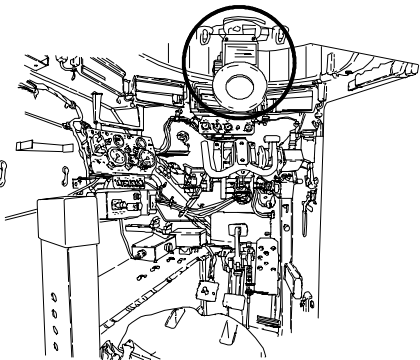
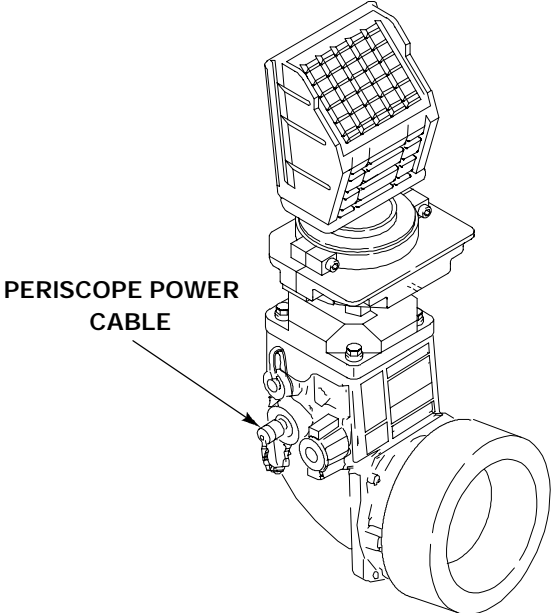
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| 55 | Weekly | |  <p>BILGE PUMP</p> | <p>c. Make sure power cable is properly connected and DNV POWER switch is at OFF.</p> <p>d. Notify your supervisor of a DNV that is damaged but still functional.</p>  <p>PERISCOPE POWER CABLE</p> <p>DRIVER</p> <p>NOTE</p> <p>Bilge pump is installed in left front corner of power plant compartment.</p> <p>a. Make sure that MASTER SWITCH is set to ON.</p> | |

Table 4. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — WEEKLY - Continued

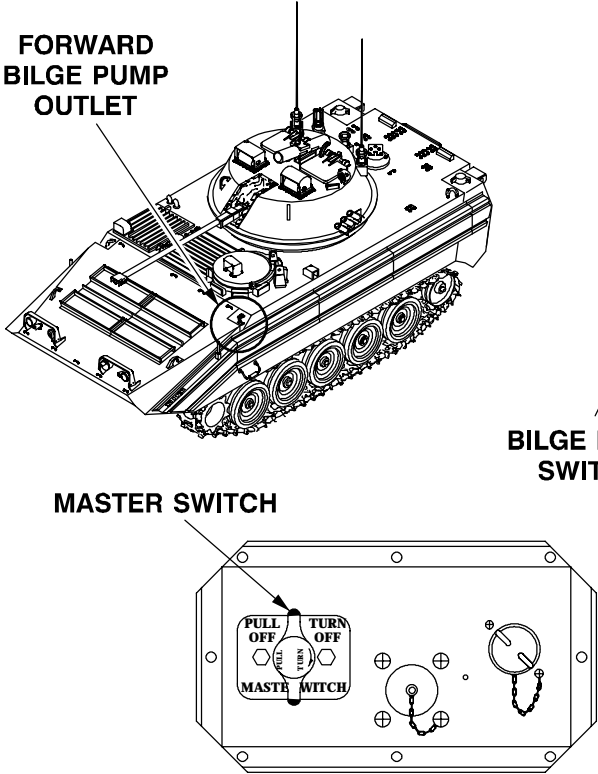
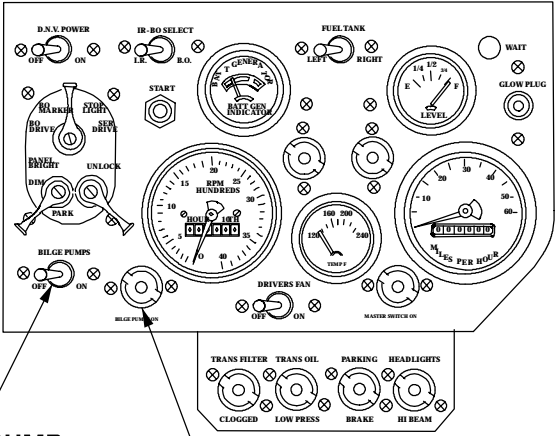
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| | | |  <p>FORWARD BILGE PUMP OUTLET</p> <p>MASTER SWITCH</p> | <p>b. Set BILGE PUMPS switch to ON.</p> <p>c. Check for water in the bottom of the compartment. If water is present, check the forward bilge pump outlet for a stream of water. If there is no water, feel the outlet for a stream of air.</p>  <p>BILGE PUMP SWITCH</p> <p>BILGE PUMP ON INDICATOR</p> | <p>Bilge pump does not operate.</p> |

Table 4. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — WEEKLY - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| | | | | <p>d. Check bilge pump intake screen and vent hole for clogging.</p> <p>e. Remove debris from screen.</p> <p>f. Use a stiff wire and clear the vent hole.</p> | |
| | | | | | |
| | | | | | |

Table 4. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — WEEKLY - Continued

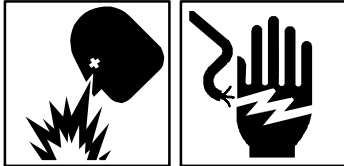

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| 56 | Weekly | | BATTERIES | <p>DRIVER</p> <p style="text-align: center;">WARNING</p> <div style="display: flex; justify-content: space-around;">  </div> <p>Battery posts and power cables can short circuit and cause death or serious burns to personnel.</p> <p>Do not touch battery positive terminals with tools or other metal objects.</p> <p>Do not touch both battery posts simultaneously with tools or other metal objects.</p> <p>Do not wear jewelry when working with battery or electrical system.</p> <p>Gas from batteries can explode and cause death or serious injury to personnel and/or damage to OSV and equipment.</p> <p style="text-align: center;">WARNING</p> <div style="display: flex; justify-content: center;">  </div> <p>Do not attempt to slave start OSV that has frozen batteries. An explosion can occur causing death or injury to personnel and damage to equipment.</p> <p style="text-align: center;">CAUTION</p> <p>In cold weather, unit maintenance must charge batteries immediately after adding water. Charge allows water to combine with electrolyte and prevent freezing.</p> | |

Table 4. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — WEEKLY - Continued

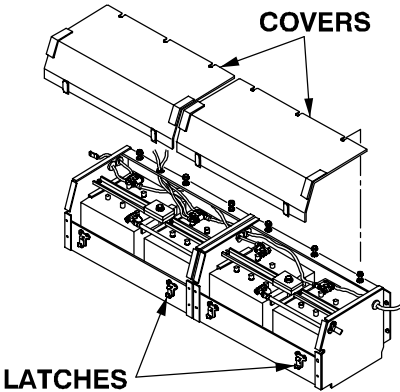
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | | <p>a. Unfasten latches, remove battery box covers (WP 0024 00), and visually check that batteries are installed.</p>  <p>The diagram shows a perspective view of a battery box. The top cover is shown partially open, with arrows pointing to it from the label 'COVERS'. The bottom part of the box is open, revealing internal components like cables and terminals. Arrows point to these components from the label 'LATCHES'.</p> <p>b. Do a visual inspection of batteries.</p> <p>c. Check electrolyte level in batteries (WP 0048 00).</p> <p>d. Check that vent hole in each cap is clear and install caps on batteries (WP 0048 00).</p> <p>e. Check that battery cables are undamaged, terminals are clean, and connections are tight (WP 0048 00).</p> <p>f. Check that hold down clamps and retainers are installed and undamaged (WP 0048 00).</p> <p>g. Check battery compartments for rubber grommets. Notify your supervisor if grommets are missing.</p> | <p>Missing batteries.</p> <p>Damaged caps or casings.</p> <p>Low electrolyte level.</p> <p>Damaged battery terminals or posts. Loose or broken cables or terminals.</p> <p>Missing or damaged battery retainers and/or clamps.</p> <p>Rubber grommets missing.</p> |

Table 4. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — WEEKLY - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| 57 | Weekly | | DRIVER'S HATCH | <p>DRIVER</p> <p>a. With hatch closed and latched, check yoke support assembly and block detents for mud, dirt, and debris that could interfere with assembly operation.</p> <div> <p>The diagram consists of two parts. The upper part shows a perspective view of the driver's hatch cover and door. Labels include 'DRIVER'S HATCH COVER', 'DRIVER'S HATCH DOOR', and 'LOCKING PIN'. The lower part shows a detailed view of the yoke support assembly. Labels include 'YOKE SUPPORT ASSEMBLY', 'BUMPER', and two 'BLOCK DETENTS'.</p> </div> <p>b. Clean yoke and detents as required.</p> <p>c. Open driver's hatch (WP 0007 00).</p> <p>d. Check that hatch locks in pop-up and full open positions.</p> <p>e. Check that bumper is present and secured in place.</p> <p>f. Clean hatch cover, hatch, latch mechanism, and yoke as required.</p> | <p>Hatch will not lock in either or both positions.</p> |

Table 4. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — WEEKLY - Continued

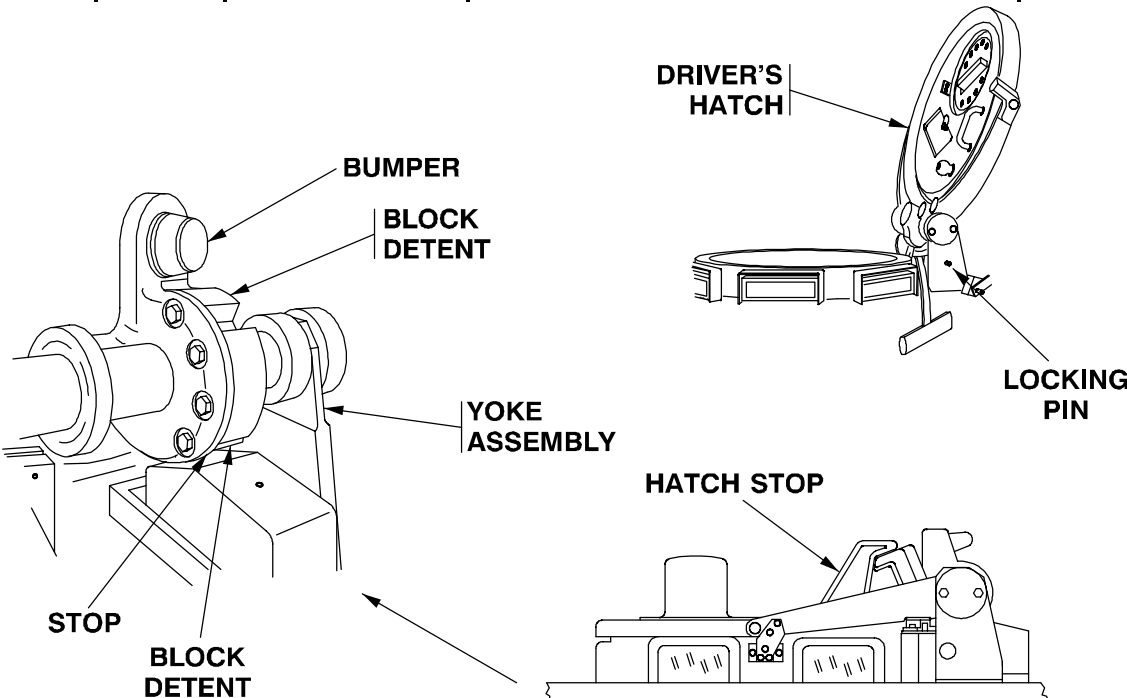
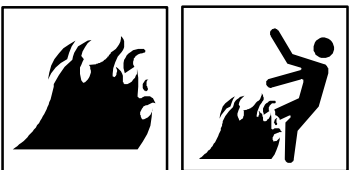
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| 58 | Weekly | | PERSONNEL HEATER | <p>g. Check that hatch stop is in place and secure.</p>  | |
| | | | | <p>DRIVER</p> <p>WARNING</p>  <p>When overheated, combustible materials can ignite or explode and cause death or injury to personnel and damage to vehicle and equipment. Do not operate heater until explosive materials are stored at least 30-inches from heater vents. Store combustibles a minimum of 12-inches from heater metal surfaces.</p> | |

Table 4. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2
OPPOSING FORCES SURROGATE VEHICLE (OSV) — WEEKLY - Continued



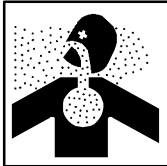
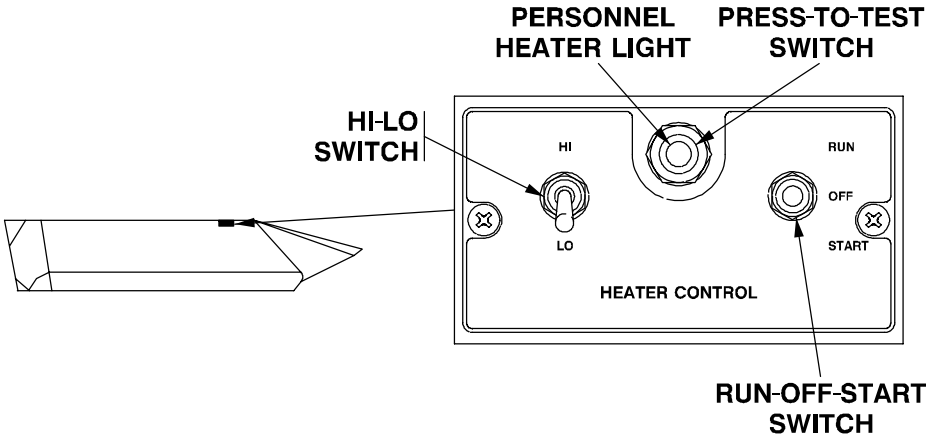
| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| | | | | <p style="text-align: center;">WARNING</p> <div style="text-align: center;">  </div> <p>Heater can flood and leak fuel. Diesel fuel can ignite and cause death or serious injury to personnel and damage to equipment.</p> <p>Do not start flooded heater using starting aids such as ether. If heater does not start after three attempts, your supervisor shall be notified.</p> <p style="text-align: center;">WARNING</p> <div style="text-align: center;">  </div> <p>Turret can rotate and cause death or serious injury to personnel.</p> <p>Do not reach through turret shield opening or enter/exit turret when turret power is on.</p> <p>Keep turret shield door closed when turret drive power is on.</p> <p>Engage turret travel lock before personnel enter turret or reach through turret shield opening.</p> | |

Table 4. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — WEEKLY - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| | | | | <p style="text-align: center;">NOTE</p> <p>When Stewart Warner heater is started, RUN/OFF/START switch must not be held at START for more than 3 minutes. When switch is released before heater ignites or heater does not start within 3 minutes, the heater must be allowed to stand for 3 to 5 minutes before doing start procedure again.</p> <p>When Global A-20 heater is started, START/OFF/RUN switch must be held at START for a minimum of 4 seconds and then set to RUN. Heater will operate automatically with no operator control.</p> <p style="text-align: center;">NOTE</p> <p>Rotate turret to 4100 mils for access to heater.</p> <p style="text-align: center;">NOTE</p> <p>Heater checks are not required when ambient temperature is above 40° F.</p> <p style="text-align: center;">NOTE</p> <p>When checking fuel lines, pay close attention to connections.</p> <ol style="list-style-type: none"> a. Traverse turret to 4100 mils. b. Check heater, fuel lines, and fuel line connections for leaks. c. Notify your supervisor if fuel leak found. | <p>Any fuel leak.</p> |
| <p>The diagram shows a top-down view of a heater assembly. It features a central vertical component labeled 'PERSONNEL HEATER'. To its left is an 'AIR INLET' and to its right is a 'FUEL LINE'. Below the heater is a 'HEATER EXHAUST' pipe. At the bottom, there is a 'HEATER DUCT' containing several circular elements. Two additional 'FUEL LINE' labels point to lines on the right side of the assembly.</p> | | | | | |

Table 4. PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR THE M113A3/BMP-2 OPPOSING FORCES SURROGATE VEHICLE (OSV) — WEEKLY - Continued

| ITEM NO. | INTERVAL | MAN-HOURS | ITEM TO BE CHECKED OR SERVICED | CREWMEMBER PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|----------|----------|-----------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| | | | | <p style="text-align: center;">WARNING</p>  <p>Exhaust from OSV personnel heater is poisonous and can cause death to personnel. Do not breathe exhaust gases. Keep exhaust unobstructed. Pull back exhaust grille cover.</p> <p>d. Check exhaust grille for obstructions. Clear grille as required.</p> <p>e. Check operation of personnel heater electrical circuits.</p> <p style="text-align: center;">NOTE</p> <p>Press the PRESS-TO-TEST indicator before the heater is started.</p> <p>f. Press and release the PRESS-TO-TEST indicator. Check that the indicator comes on when pressed and goes off when released.</p> | |
| | | | |  | |

END OF TASK

ADJUST TRACK TENSION (T130)

0041 00

THIS WORK PACKAGE COVERS:

- Preparation (WP 0041 00-1).
- Check Track Tension Using Drive Pin Punch (page 0041 00-2).
- Check Tension Using Track and Sprocket Gauge (page 0041 00-2).
- Tighten Track Tension (page 0041 00-3).
- Loosen Track Tension (page 0041 00-4).

INITIAL SETUP:

Maintenance Level

Operator

Materials/Parts

Grease, automotive (GAA) (WP 0054 00, Item 12)

Tools and Special Tools

- Drive pin punch (WP 0052 00, Table 2, Item 28)
- Grease gun (WP 0052 00, Table 2, Item 16)
- Open end wrench (WP 0052 00, Table 2, Item 37)
- Track tension, track bushing and sprocket wear fixture (WP 0052 00, Table 2, Item 13)

Personnel Required

- Driver
- Helper

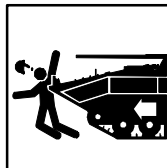
Equipment Conditions

Engine stopped (WP 0016 00)

PREPARATION

1. Start engine (WP 0013 00).
2. Drive vehicle (WP 0015 00) to level area.

WARNING

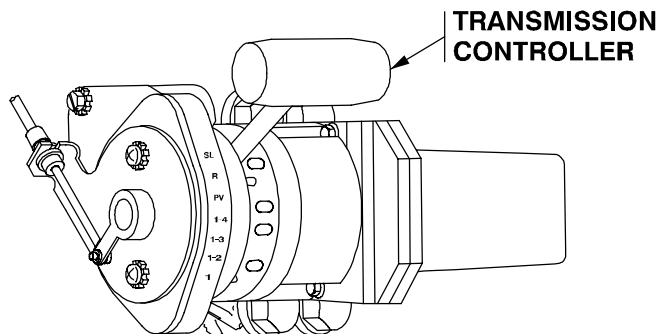


Do not place transmission at steering lock (SL) position when speed is above 5 mph. Loss of control at speeds above 5 mph could cause vehicle to crash.

CAUTION

Allow vehicle to coast to stop. Do not use steering wheel and/or brake pedal to stop vehicle.

3. At level area, release accelerator and when speed is below 5 mph, put transmission controller in SL position and coast vehicle to stop.



4. Stop engine (WP 0016 00).

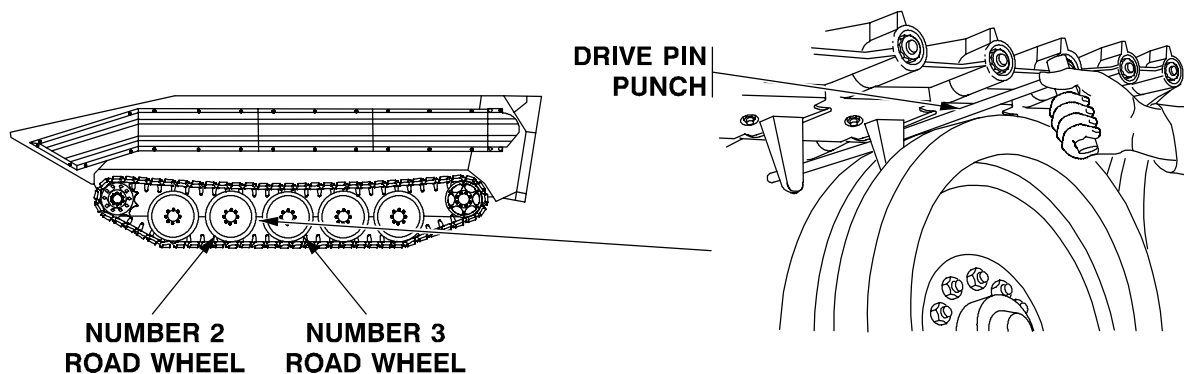
NOTE

There are two methods for checking track tension. Check tension using a drive pin punch or with a track and sprocket gauge.

5. Check track tension using drive pin punch or sprocket gauge.

CHECK TRACK TENSION USING DRIVE PIN PUNCH

1. Insert drive pin punch between top of number two roadwheel and bottom of track.
2. Tighten or loosen track tension if required.



NOTE

If drive pin punch is inserted freely and track touches top of number three roadwheel, track tension is correct.

If drive pin punch can be inserted freely but track does not touch top of number three roadwheel, track tension is too tight.

If drive pin punch cannot be inserted freely, track tension is too loose.

CHECK TRACK TENSION USING TRACK AND SPROCKET GAUGE

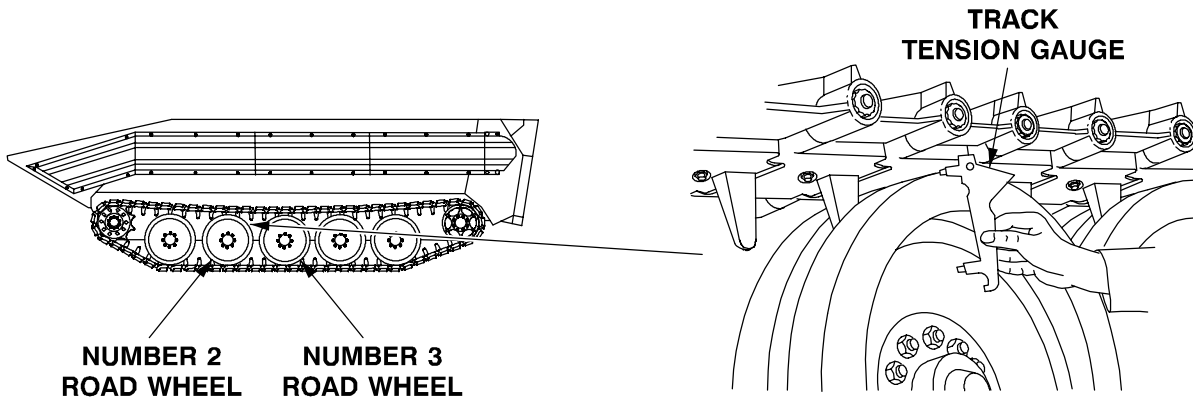
1. Position track and sprocket gauge against bottom of track at centerline of second roadwheel.

NOTE

If top of second roadwheel can be seen (3/8-in. to 5/8-in.) and track touches number three roadwheel, track tension is correct.

If top of second roadwheel cannot be seen or track does not touch third roadwheel, track requires adjustment.

2. Tighten or loosen track tension if required.



TIGHTEN TRACK TENSION

CAUTION

Dirt can damage fitting and cylinder. Clean fitting on track tension adjuster.

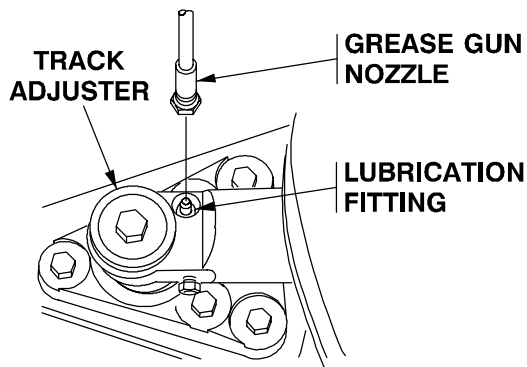
CAUTION

Servicing fitting can damage track adjuster, idler wheel, and final drive bearings. Track adjuster grease fitting is not an acceptable lubrication point. Do not service when lubricating the vehicle.

CAUTION

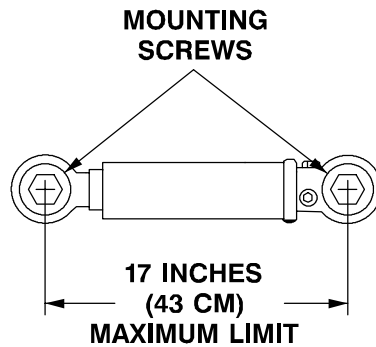
Track adjuster can be damaged by vehicle operations. Do not extend adjuster beyond 17-inches (maximum).

1. Connect grease gun to track adjuster fitting and add grease.



TIGHTENING TENSION

2. Watch the track adjuster. When the adjuster is tight or extended to 17 inches, remove the grease gun.

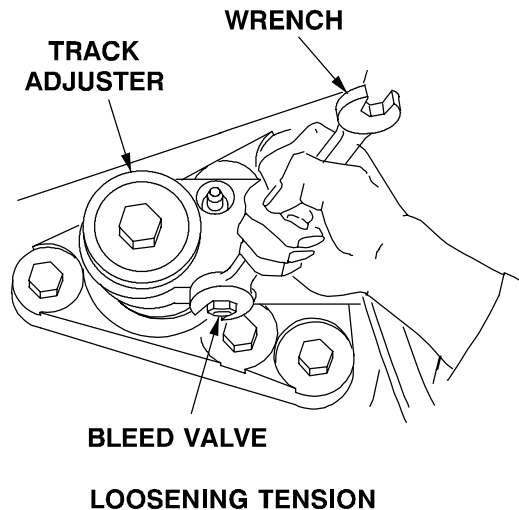


MEASURING TRACK ADJUSTER LIMIT

3. If the track adjuster is extended to the maximum and the track is too loose, remove a track shoe (WP 0045 00).
4. Do tension check again. Adjust track tension as required.

LOOSEN TRACK TENSION

1. Put a container under the track adjuster bleed valve.
2. Slowly open bleed valve on track adjuster.



3. If the track adjuster is fully retracted and the track is too tight, add a track shoe (WP 0045 00).
4. Do tension check again. Adjust track tension as required.

END OF TASK

ADJUST TRACK TENSION (T150)

0042 00

THIS WORK PACKAGE COVERS:

Adjust Track Tension (page 0042 00-1)

INITIAL SETUP:Maintenance Level

Operator

Materials/Parts

Grease, automotive (GAA) (WP 0054 00, Item 12)

Tools and Special Tools

Grease gun (WP 0052 00, Table 2, Item 16)

Open end wrench, 5/8 inch (WP 0052 00, Table 2, Item 37)

Track gauge (WP 0052 00, Table 2, Item 15)

Personnel Required

Driver

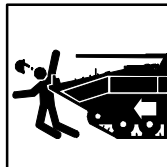
Helper

Equipment Conditions

Engine stopped (WP 0016 00)

ADJUST TRACK TENSION

1. Start engine (WP 0013 00).
2. Drive vehicle (WP 0015 00) to level area.

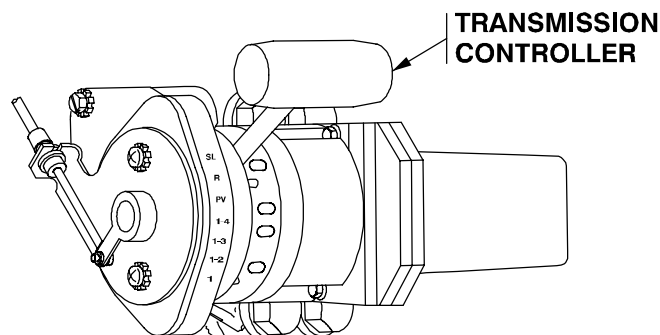
WARNING

Do not place transmission at steering lock (SL) position when speed is above 5 mph. Loss of control at speeds above 5 mph could cause vehicle to crash.

NOTE

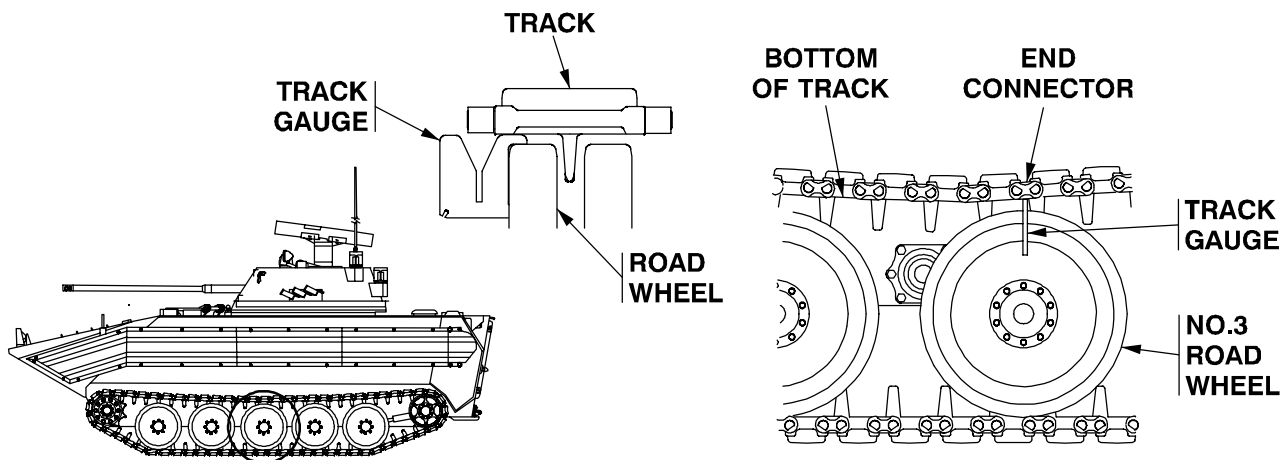
Do tension adjustment after mission when vehicle is completely unloaded of equipment and before mission after vehicle has been fully loaded.

3. At level area, release accelerator and when speed is below 5 mph, put transmission controller in SL position and coast vehicle to stop.



4. Stop engine (WP 0016 00).

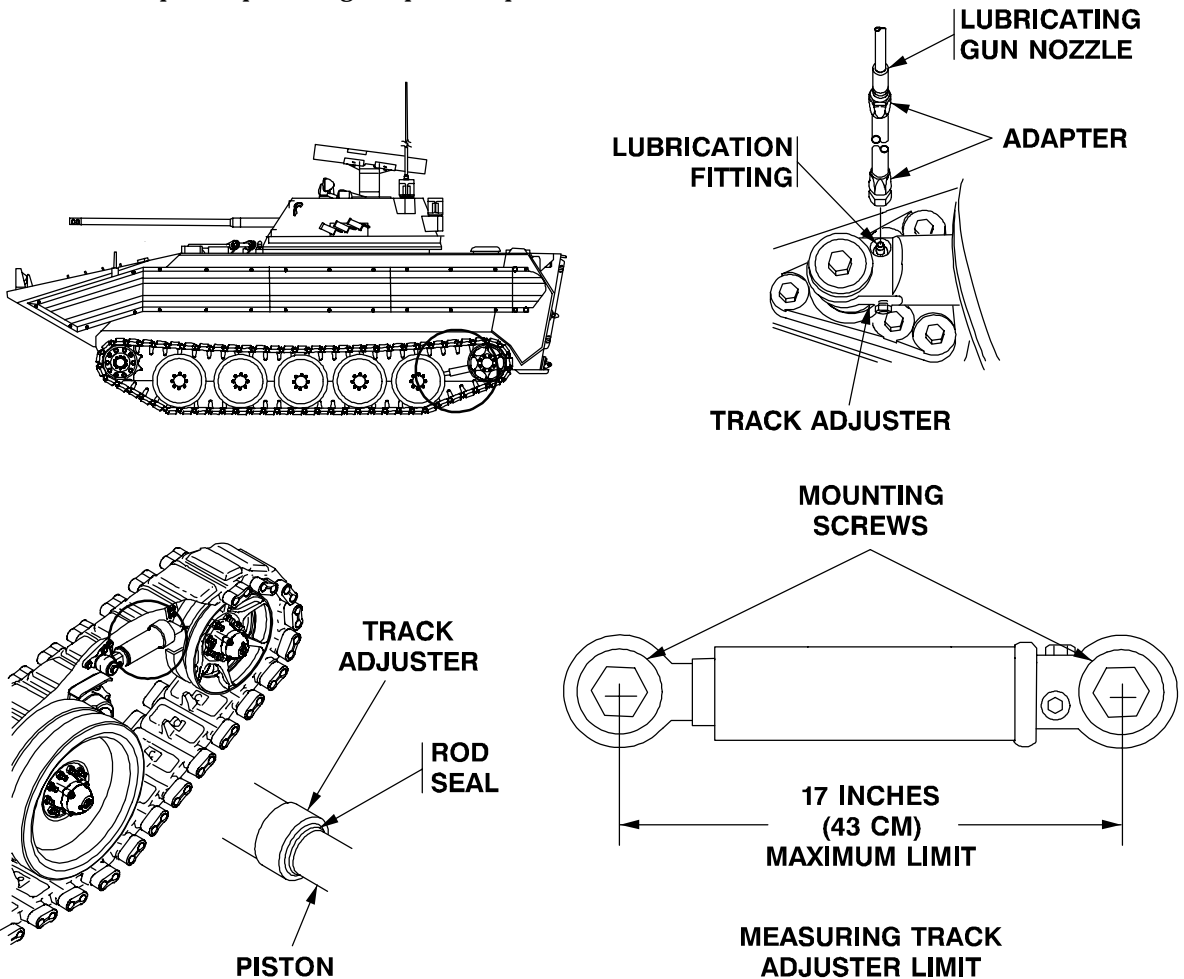
5. Block track (WP 0029 00).
6. To check track tension, position track gauge lightly between bottom of track and the third road wheel. Gauge should fit between bottom of track and top of road wheel.
7. If gauge does not fit between bottom of track and top of road wheel, track tension is too loose, if gauge fits between track and road wheel, but is not touching both at the same time, track tension is too tight. To tighten track tension do step 8. To loosen track tension, do step 9.



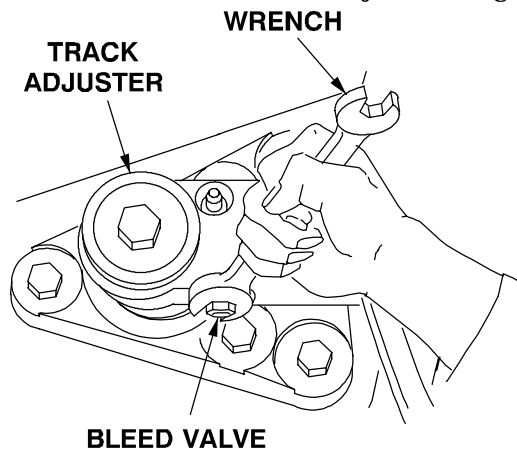
CAUTION

Dirt can damage fitting and cylinder. Clean track tension adjuster fittings. Servicing the fitting can damage track adjuster, idler wheel and final drive bearings. Track adjuster fitting is not a true lubrication point and is not serviced when lubricating OSV.

8. To tighten track tension, clean tension adjuster grease fitting and then add grease through fitting.
 - a. If track adjuster is extended to its maximum limit of 17 inches and the track is still loose, remove one track shoe (WP 0046 00) and repeat step 6 through step 8 or step 9.



9. To loosen track tension, slowly open bleed valve on track tension adjuster to let grease out. Wipe up excess grease.



LOOSENING TENSION

- a. If track adjuster is in as far as it will go, and track is still too tight, add one track shoe (WP 0046 00) and adjust track tension again, step 6 through step 8 or step 9.

END OF TASK

BREAK/JOIN TRACK (T130)

0043 00

THIS WORK PACKAGE COVERS:

- Preparation (page 0043 00-1).
- Break Track (page 0043 00-3).
- Join Track (page 0043 00-5).

INITIAL SETUP:**Maintenance Level**

Operator

Materials/Parts

Grease, automotive (GAA) (WP 0054 00, Item 12)

Tools and Special Tools

- Crowbar (WP 0052 00, Table 2, Item 7)
- Drive pin punch (WP 0052 00, Table 2, Item 28)
- Grease gun (WP 0052 00, Table 2, Item 16)
- Hammer, hand, ballpeen (WP 0053 00, Table 2, Item 17)
- Adjustable wrench, 1 5/16-in. (WP 0052 00, Table 2, Item 38)
- Socket handle, 1/2-in drive (WP 0052 00, Table 2, Item 20)
- Socket, 11/16-in (WP 0052 00, Table 2, Item 34)
- Track fixture (WP 0052 00, Table 2, Item 12)

Personnel Required

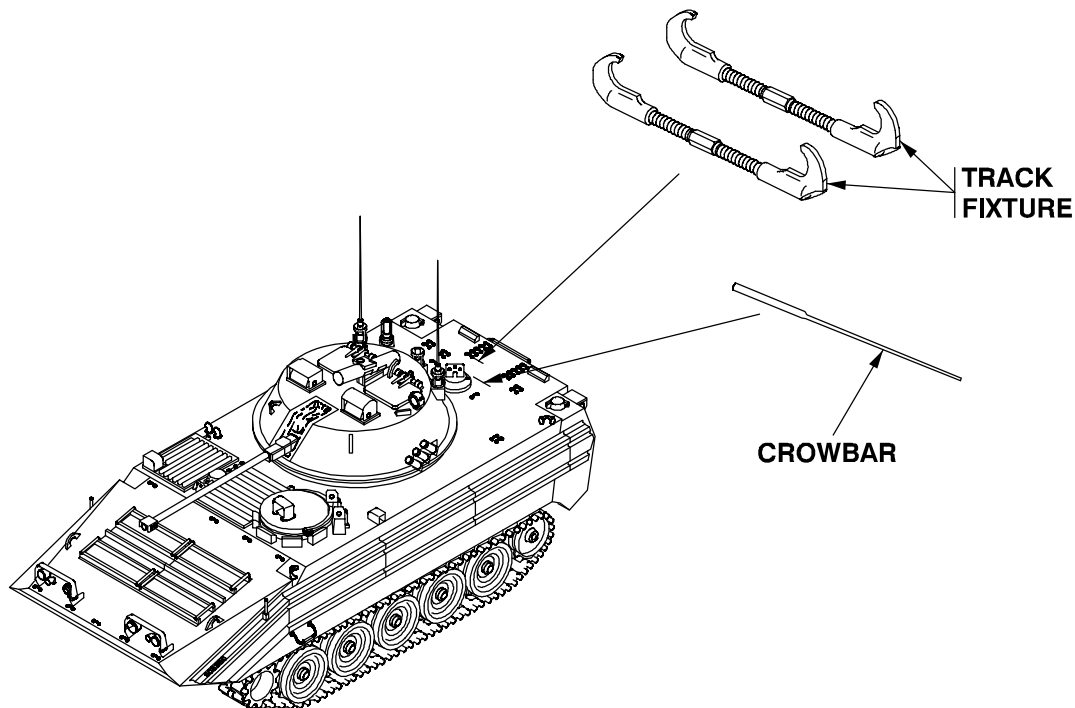
- Driver
- Helper

Equipment Condition

Engine stopped (WP 0016 00)

PREPARATION

1. Unstow crowbar and track fixtures from rear top deck.

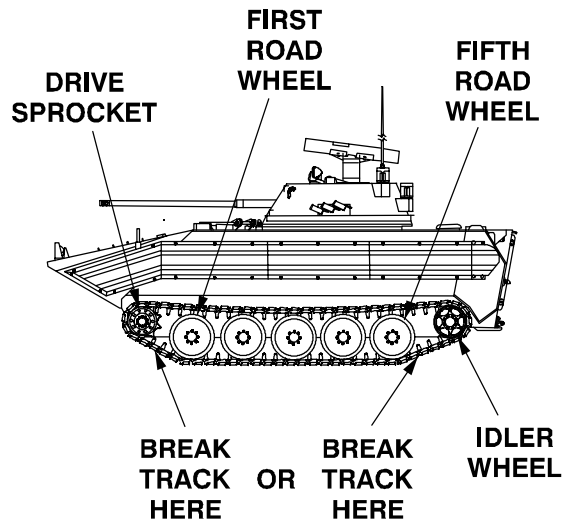
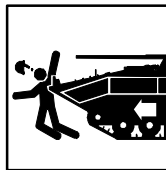


2. Remove hammer from tool bag.
3. Start engine (WP 0013 00).
4. Drive OSV (WP 0015 00) to firm, level ground.

CAUTION

Allow vehicle to coast to stop. Do not use steering wheel and/or brakes.

- When track pin to be removed is approximately halfway between first roadwheel and drive sprocket or halfway between idler wheel and fifth roadwheel, stop vehicle.

**WARNING**

Vehicle can move unexpectedly when working on tracks and cause death or serious injury to personnel.

Block front and rear of track that is not broken before working on track.

Do not disconnect both tracks simultaneously.

- Block track on side not being broken (WP 0029 00).
- Stop engine (WP 0016 00).

BREAK TRACK

1. Completely release track tension (WP 0041 00) on track to be broken.

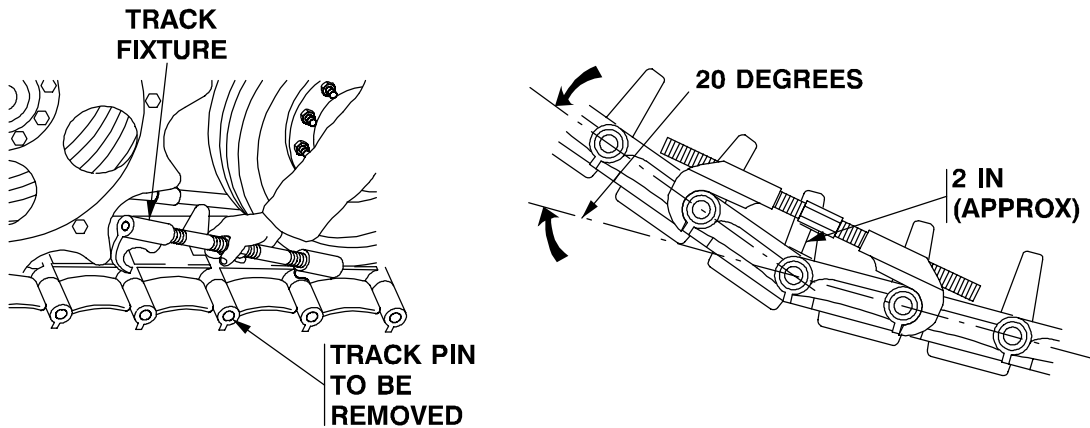
WARNING



Track can swing out and strike personnel and cause death or serious injury.

When working on OSV track, stand to side of track being broken, not in front.

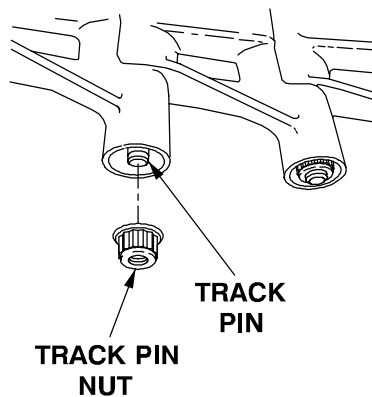
2. Install two track fixtures across pin to be removed.
3. Tighten track fixture to approximate 20 degree angle between shoes being disconnected.



NOTE

After fixture is tightened, there should be approximately 2-inches between fixture and track at pin.

4. Remove track pin nut from track pin being removed.



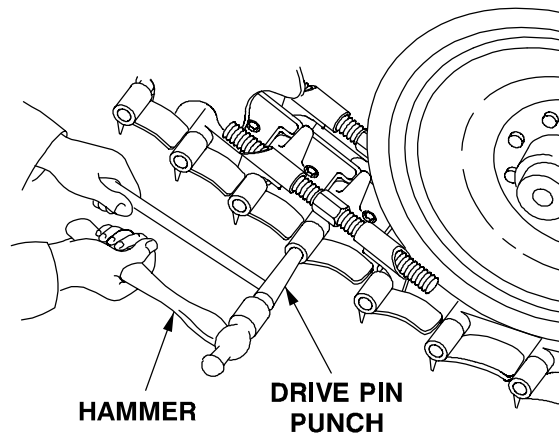
WARNING

Vehicle can move unexpectedly when working on tracks and cause death or serious injury to personnel.

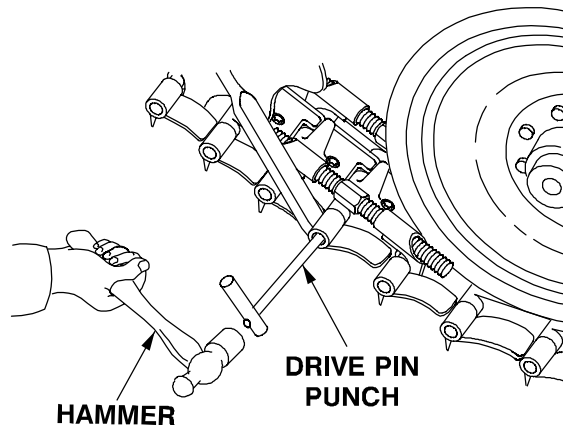
Block front and rear of track that is not broken before working on track.

Do not disconnect both tracks simultaneously.

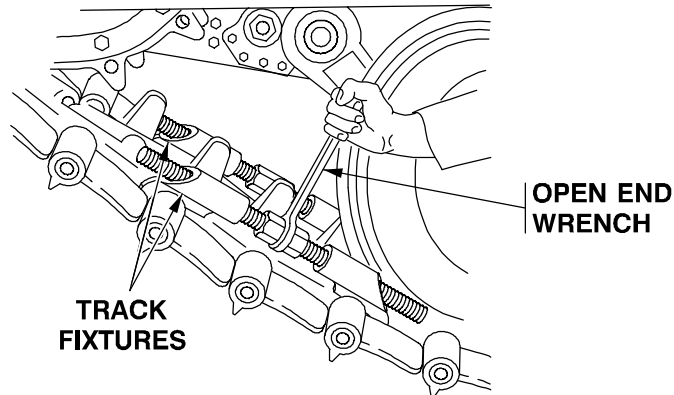
5. Use short end of drive pin punch and drive track pin part way out of track.



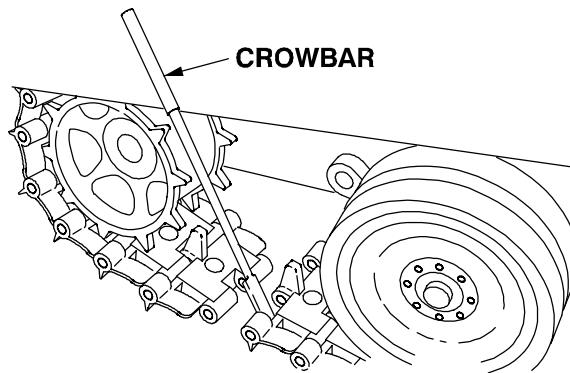
6. Use long end of drive pin punch and remove track pin.



7. If a track shoe is to be installed or removed, remove track fixtures.



8. Using crowbar, disconnect track.

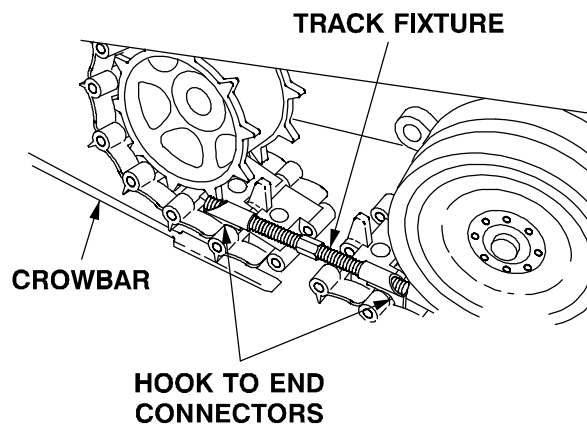


JOIN TRACK

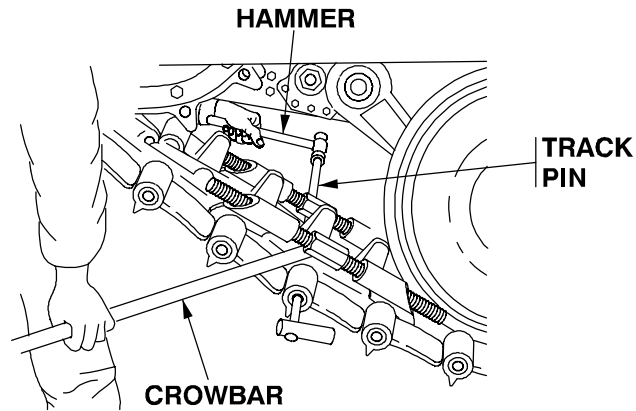
NOTE

Fixture is installed on outside of track first.

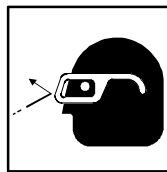
1. Extend both track fixtures, install track fixtures across open track.
2. Using crowbar, move ends of track together.
3. Use grease gun and coat track pin with oil or grease.



4. Install a track pin nut on track pin so that nut is flush with end of track pin.
5. Tighten track fixtures until track pin holes are aligned.



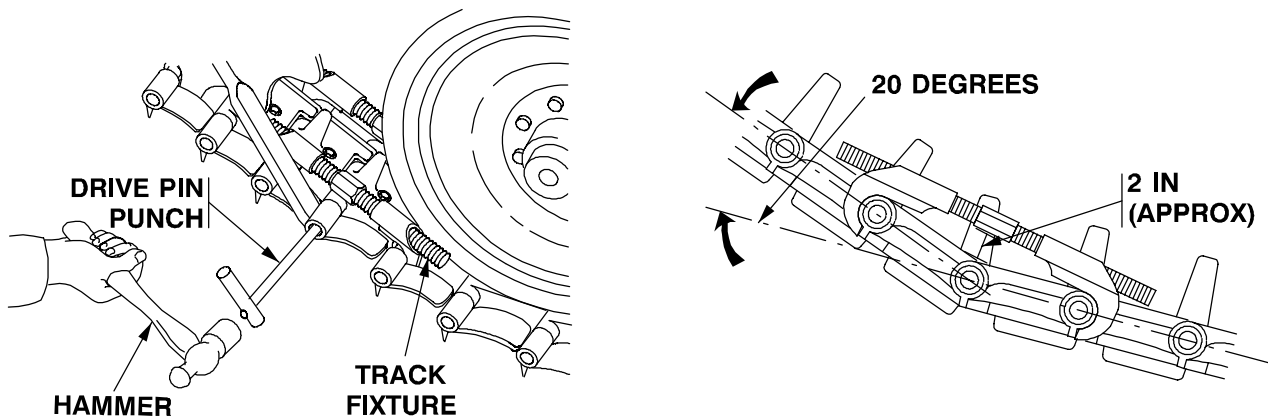
WARNING



When striking metal with a hammer, steel fragments can be propelled by the blow. Fragments can impact eyes and cause serious injury or blindness.

Wear eye/face protection when using a hammer.

6. Put drive pin punch in front track pin hole and tap punch through track pin holes.
7. Tighten track fixtures until there is 20 degree angle between shoes to be connected.



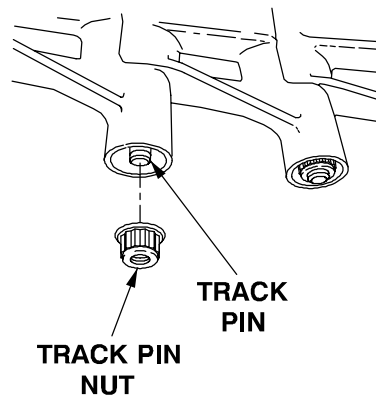
NOTE

Helper will use crowbar as necessary to align track pin holes and take pressure off of track pin so that the track pin will be easily installed.

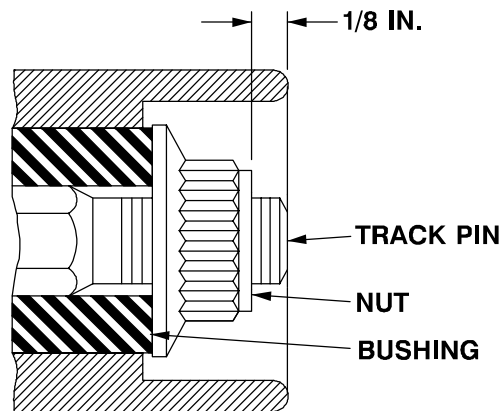
NOTE

As track pin is installed through the track, the drive pin will be pushed out.

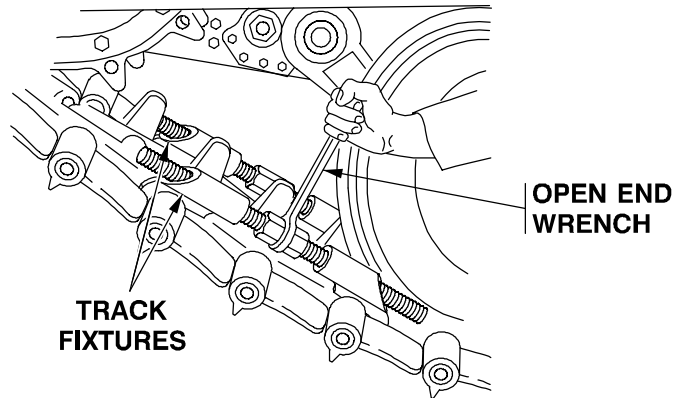
8. At inside of track, put track pin in track pin hole and lightly tap pin through track.
9. Install track pin nut on track pin.



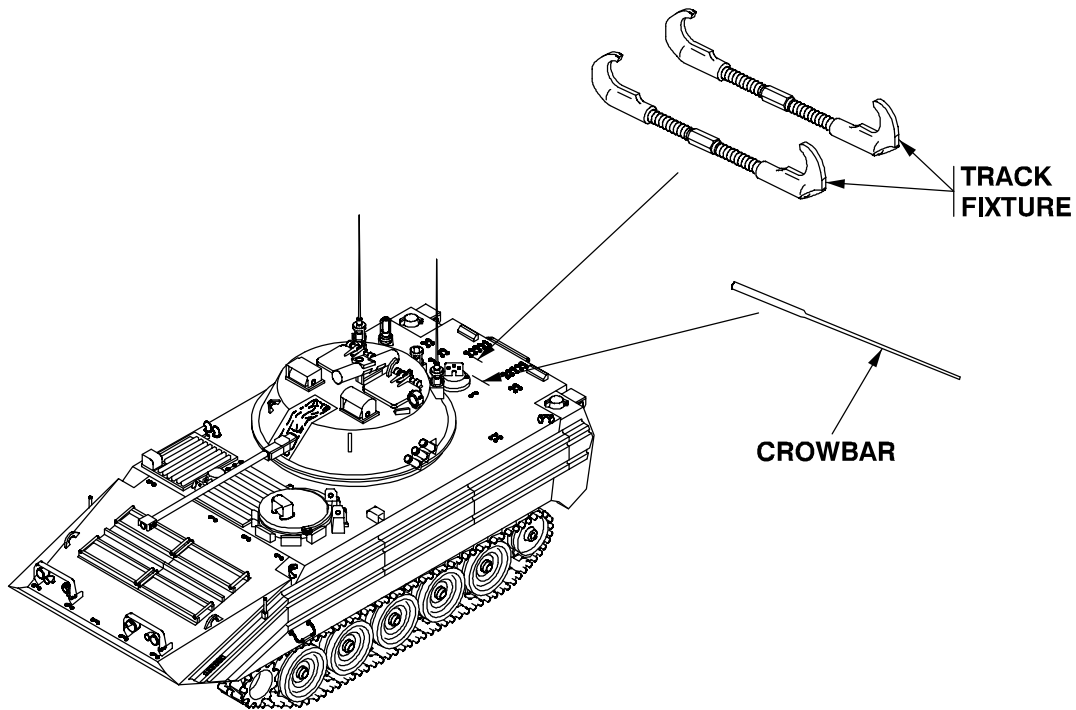
10. Tighten both track pin nuts until 2 or 3 threads (1/8-in.) show between top of nuts and end of track pin.



11. Mark nut for identification and torque by unit maintenance.
12. Remove track fixtures.



13. Adjust track tension (WP 0041 00).
14. Stow tools as required.



15. Unblock tracks (WP 0029 00).
16. Complete required form DA 2404 with request for unit maintenance to torque marked track pin nut.

END OF TASK

BREAK/JOIN TRACK (T150)

0044 00

THIS WORK PACKAGE COVERS:
 Break Track (page 0044 00-1)
 Join Track (page 0044 00-6)

INITIAL SETUP:Maintenance Level

Operator

Personnel Required

Driver

Crew

Tools and Special Tools

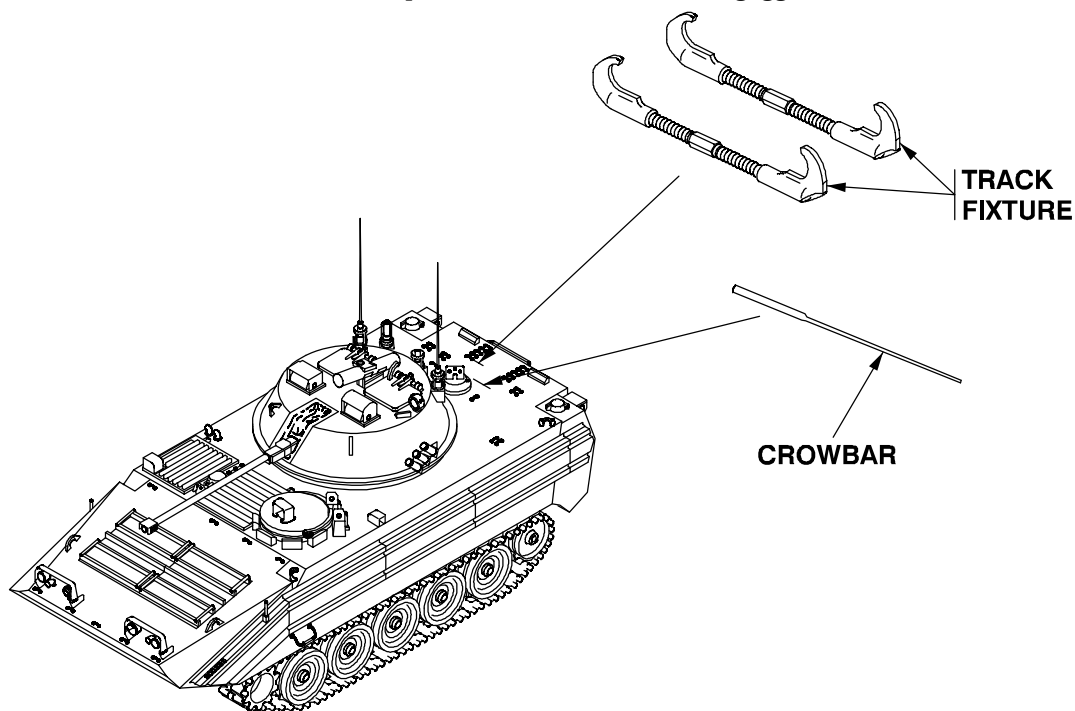
Crowbar (WP 0052 00, Table 2, Item 7)
 End connector remover (WP 0052 00, Table 2, Item 29)
 Grease gun (WP 0052 00, Table 2, Item 16)
 Hammer, 2 lb (WP 0052 00, Table 2, Item 17)
 Open end wrench, 1-5/16 inch (WP 0052 00, Table 2, Item 37)
 Handle, socket wrench, 3/4 inch drive (WP 0052 00, Table 2, Item 20)
 Handle, extension wrench (WP 0052 00, Table 2, Item 18)
 Socket, 1 1/8 inch, 3/4 inch drive (WP 0052 00, Table 2, Item 34)
 Track fixture (2) (WP 0052 00, Table 2, Item 12)
 Tool, track pin alignment (2) (WP 0052 00, Table 2, Item 36)

Equipment Conditions

Engine stopped (WP 0016 00)

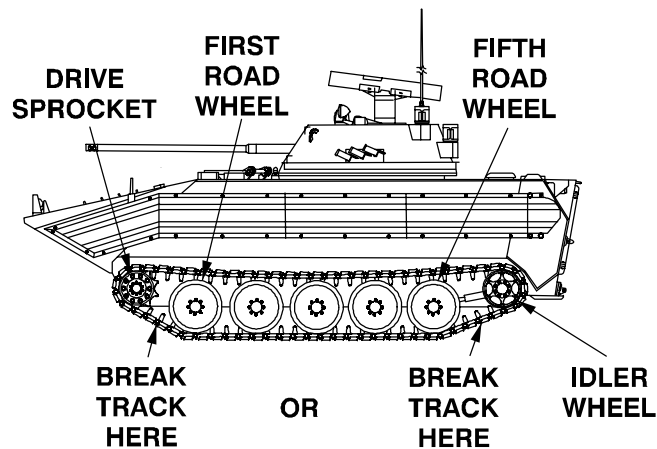
BREAK (T150) TRACK

1. Unstow crowbar and track fixtures from rear top of deck. Remove industrial goggles and hammer from tool bag.



2. Start engine (WP 0016 00).
3. Drive vehicle (WP 0015 00) to firm level ground.

4. Drive vehicle slowly so the track pin to be removed is about halfway between the first road wheel and the drive sprocket or halfway between the idler wheel and fifth road wheel. Do not use steering wheel or press brake pedal to stop vehicle.

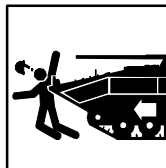


NOTE

Block track with suitable object.

5. Block track on side which is not being broken (WP 0029 00).
6. Stop engine (WP 0016 00).

WARNING

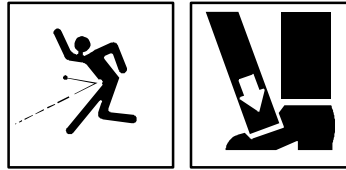


Vehicle can move unexpectedly when working on tracks and cause death or serious injury to personnel.

Block front and rear of track that is not broken before working on track.

Do not disconnect both tracks simultaneously.

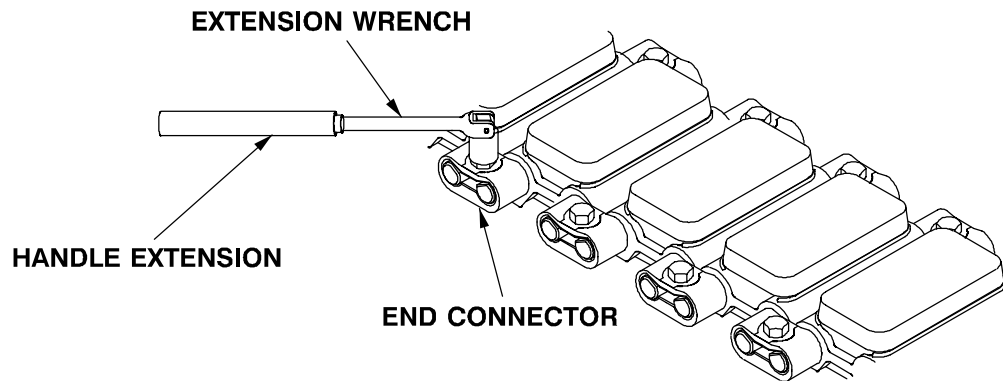
7. Release track tension all the way on track to be broken (WP 0042 00).

WARNING

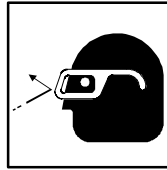
Track can swing out and strike personnel and cause death or serious injury.

When working on OSV track, stand to side of track being broken, not in front.

- Using 3/4-inch drive handle wrench, 1-1/8 inch socket, and wrench extension to get more leverage, remove the end connector bolts on the track shoes that need to be removed to break the track.



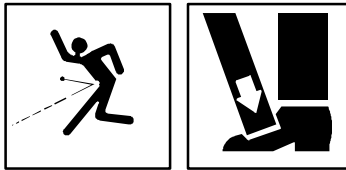
WARNING



When striking metal with a hammer, steel fragments can be propelled by the blow. Fragments can impact eyes and cause serious injury or blindness.

Wear eye/face protection when using a hammer.

WARNING



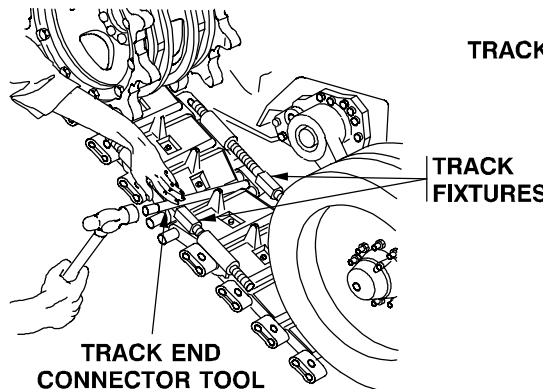
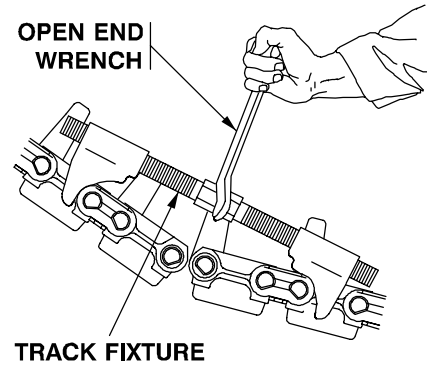
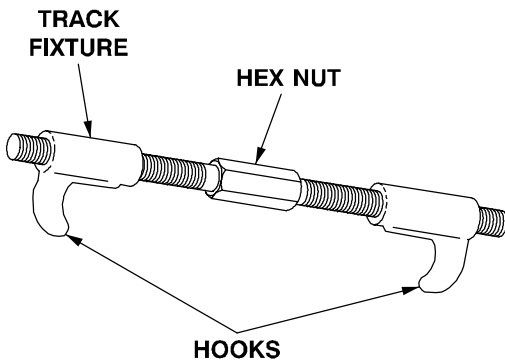
Track can swing out and strike personnel and cause death or serious injury.

When working on OSV track, stand to side of track being broken, not in front.

CAUTION

Keep personnel clear when removing the end connectors to avoid being hit when it is knocked free from the track shoe pins.

9. Install two track fixtures on both sides of the track and tighten to pull track shoes together. Use the track end connector tool and hammer to remove the end connector. Repeat using the track end connector tool to remove the opposite end connector.



WARNING



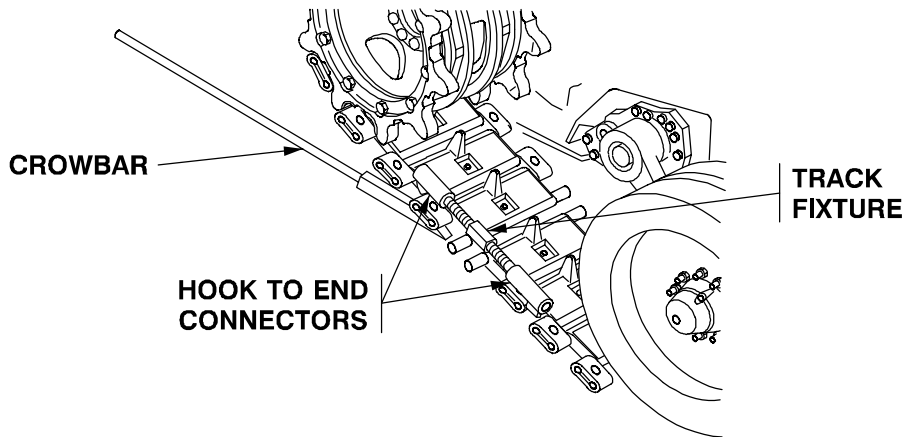
Track can swing out and strike personnel and cause death or serious injury.

When working on OSV track, stand to side of track being broken, not in front.

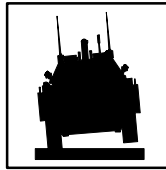
NOTE

Inside track fixture is removed first.

10. Support track. Use crowbar. Remove inside, then outside track fixtures.



JOIN (T150) TRACK

WARNING

Improper number of track shoes may prevent track from being adjusted correctly creating a safety hazard.

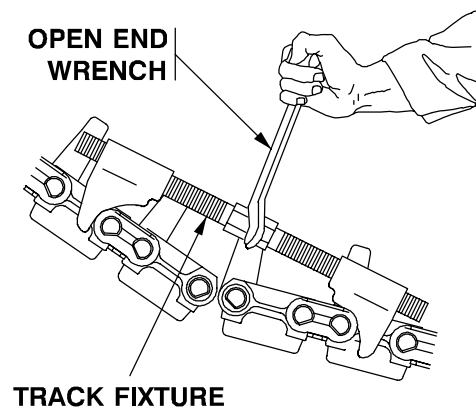
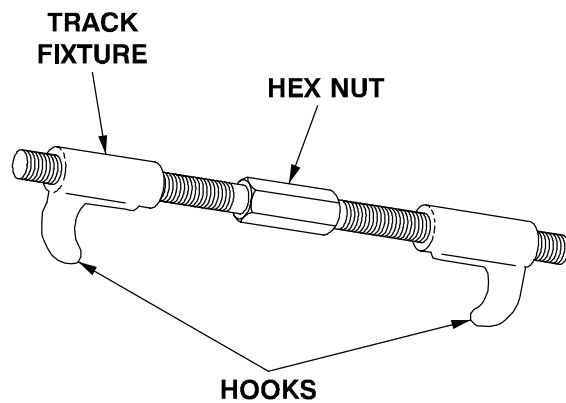
For vehicles with new track (T150), ensure there are 63 track shoes on the left side of vehicle and 64 track shoes on the right side of vehicle.

For vehicles with old track (T130), ensure there are 62 track shoes on the left side of vehicle and 63 shoes on the right side of vehicle.

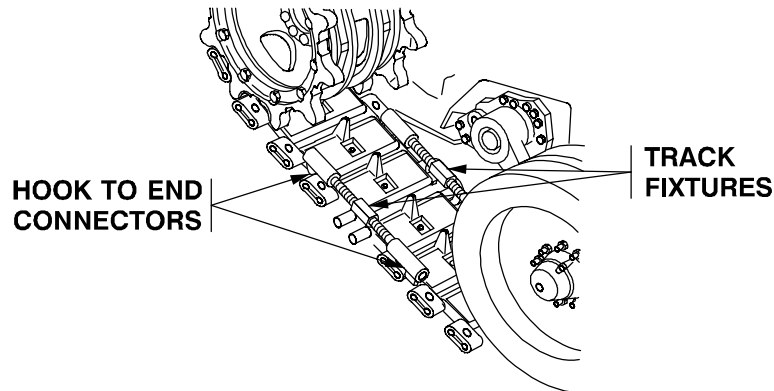
NOTE

Center hex nut between hooks on track fixture.

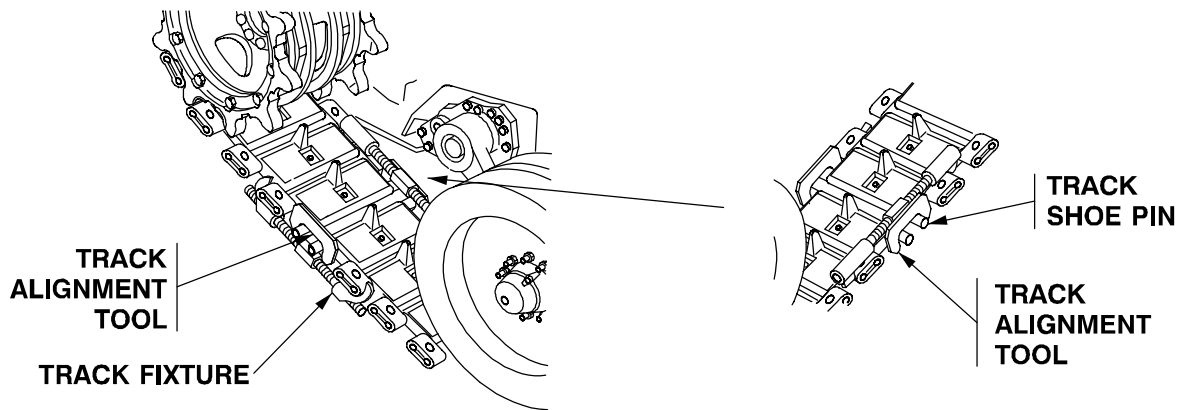
1. Hold track in position and install two track fixtures across place where track is to be connected. Install outside fixture first.



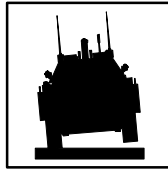
2. Tighten two track fixtures evenly until ends of track are close enough to install end connectors.



3. Place the track alignment tool over one pin on the outside shoe and rest it on the other pin. Tighten both track fixtures evenly to pull the track assembly together until the track alignment tool fits over and seats fully on both track shoe pins. Install the second track alignment tool on the inside track shoe pins. Leave the inside track fixture on.



4. Remove the outside track fixture. Both track alignment tools will hold the track together. Leave the track fixture on the inside of the track assembly.

WARNING

Do not use the crowbar on the track shoe pins to get leverage. Any scratches may cause the pin to break and cause the track assembly to fall off the vehicle while operating. This may kill soldiers and damage equipment.

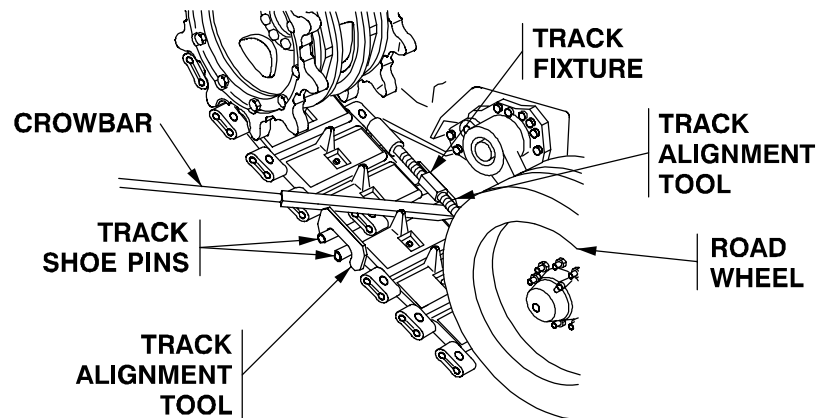
NOTE

Use the crowbar as shown in steps 2 through 5 to get leverage to install end connectors.

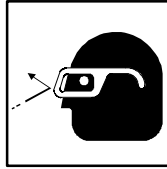
NOTE

Place end connector or similar size block on top of the two track shoes being joined. Use the crowbar under the track fixture connected to the inside track shoes and press down on the blocks to get the right angle to install the end connector.

5. Make sure the inside track fixture is tight enough to allow the helper to use the crowbar under it with enough pressure to get a slight degree of angle between the two shoes to allow installing the outside end connector.



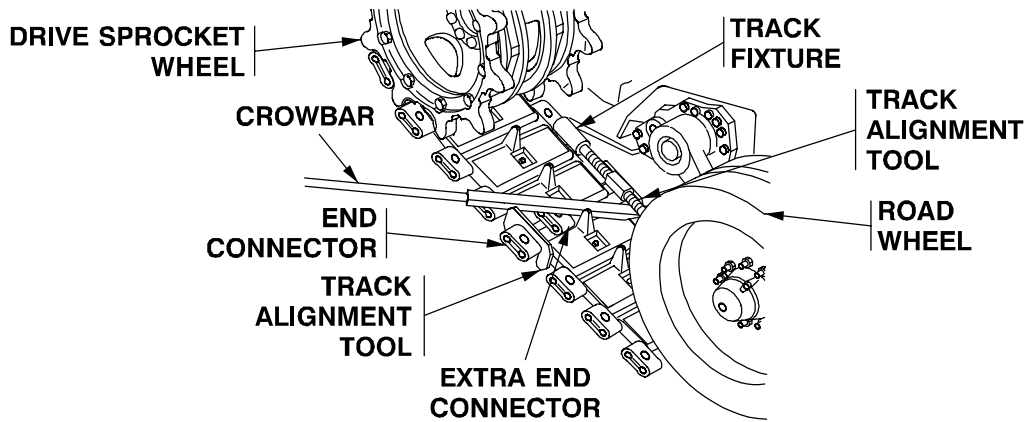
WARNING



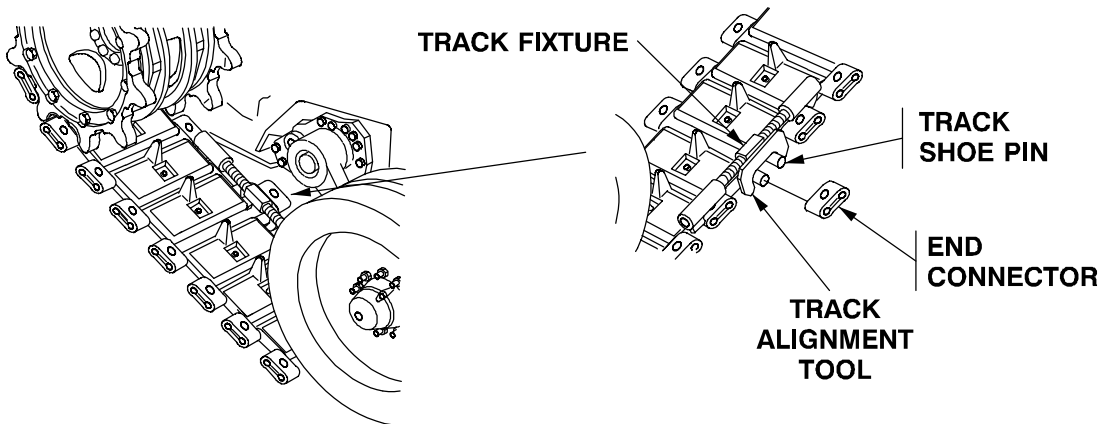
When striking metal with a hammer, steel fragments can be propelled by the blow. Fragments can impact eyes and cause serious injury or blindness.

Wear eye/face protection when using a hammer.

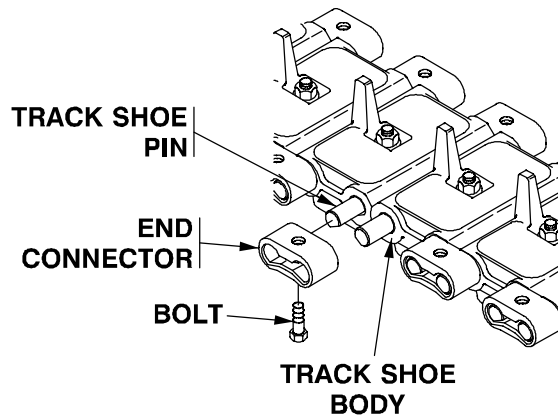
6. Install the end connector on the outside track shoe pins. Get the angle needed to allow the end connector to fit on the track shoe pins. Tap on the end connector close to the alignment tool. Remove the track alignment tool. Tap the end connector fully onto track shoe pins. Make sure it touches both track shoe bodies.



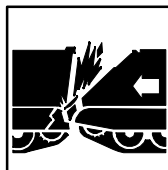
7. Install inside end connector. Only a slight amount or no leverage is needed to install the second connector if the outside end connector is already installed.



8. Once the end connector is installed half way on the inside of the track assembly, remove the track fixture and track alignment tool. Finish installing the end connector all the way on the track shoe pins until it touches the track shoe body.



WARNING

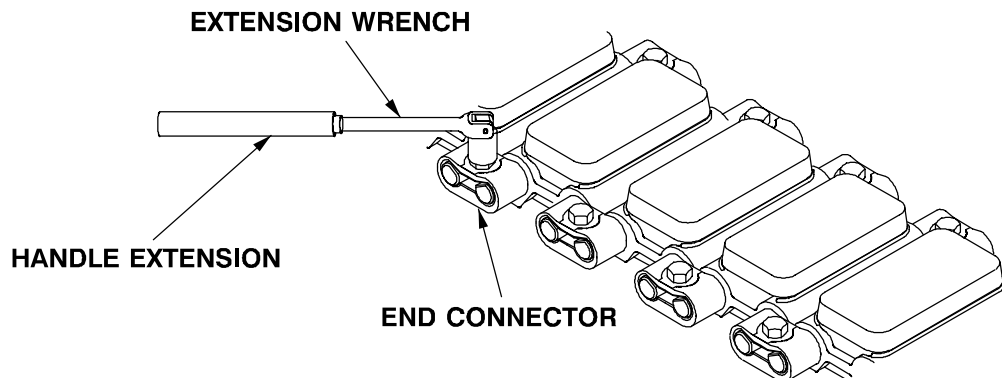


Not getting the bolt tight enough may result in death to personnel and damage to equipment if the end connectors fall off during movement of the vehicle. Use the wrench extension over the breaker bar to achieve more leverage when tightening the end connector bolt.

NOTE

Mark the location of the end connectors so unit maintenance can torque them properly. Take the vehicle to unit maintenance as soon as possible to have the end connector bolts torqued to the proper value.

9. Secure both end connector bolts using the breaker bar and extension wrench to get enough torque until you can get it to unit maintenance to torque it properly. Mark the end connectors you have loosened and retightened so unit maintenance can tighten to the right torque value. Fill out DA form 2404 to notify unit maintenance.



10. Adjust track tension for (T150) track (WP 0042 00).

END OF TASK

REMOVE/INSTALL TRACK SHOE (T130)

0045 00

THIS WORK PACKAGE COVERS:

Remove Track Shoe (page 0045 00-1).

Install Track Shoe (page 0045 00-3).

INITIAL SETUP:**Maintenance Level**

Operator

Materials/Parts

Grease, automotive (GAA) (WP 0054 00, Item 12)

Tools and Special Tools

Crowbar (WP 0052 00, Table 2, Item 7)

Drive pin punch (WP 0052 00, Table 2, Item 28)

Grease gun (WP 0052 00, Table 2, Item 16)

Hammer, hand, ballpeen (WP 0052 00, Table 2, Item 17)

Adjustable wrench, 1 5/16-in. (WP 0052 00, Table 2, Item 38)

Socket handle, 1/2-in. drive (WP 0052 00, Table 2, Item 20)

Socket, 11/16-in. (WP 0052 00, Table 2, Item 34)

Socket, 3/4-in. (WP 0052 00, Table 2, Item 34)

Track fixture (2) (WP 0052 00, Table 2, Item 12)

Personnel Required

Driver

Helper

Equipment Condition

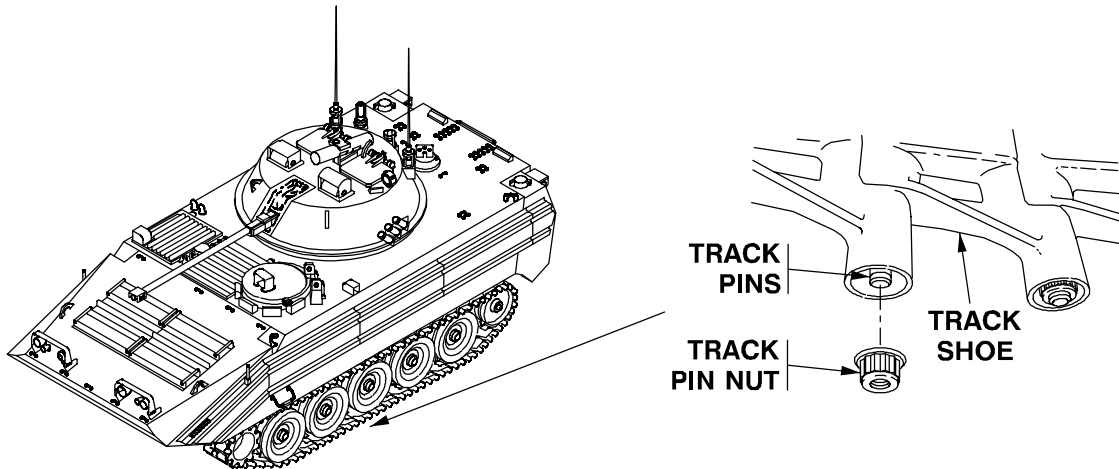
Vehicle on level surface

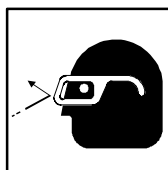
Engine shutdown (WP 0016 00)

Track broken (WP 0043 00)

REMOVAL

1. Remove track pin nut from track pin of shoe to be removed.

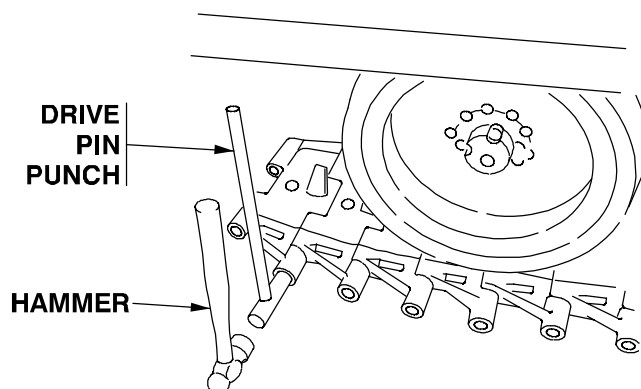


WARNING

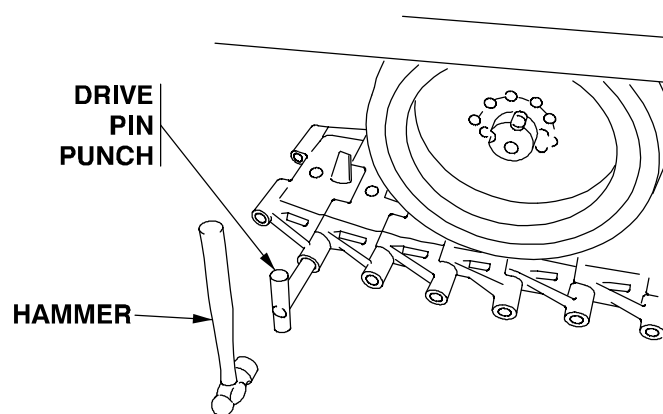
When striking metal with a hammer, steel fragments can be propelled by the blow. Fragments can impact eyes and cause serious injury or blindness.

Wear eye/face protection when using a hammer.

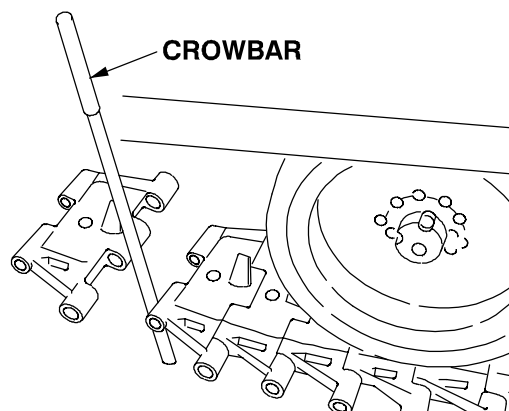
2. Use short side of punch and hammer and drive track pin part way out.



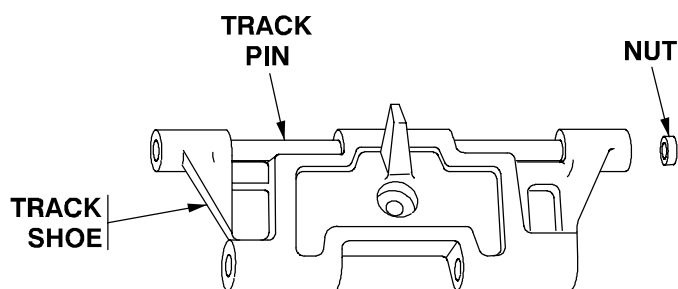
3. Reverse punch to long side and drive track pin out of track.



- Using crowbar, remove track shoe from track.



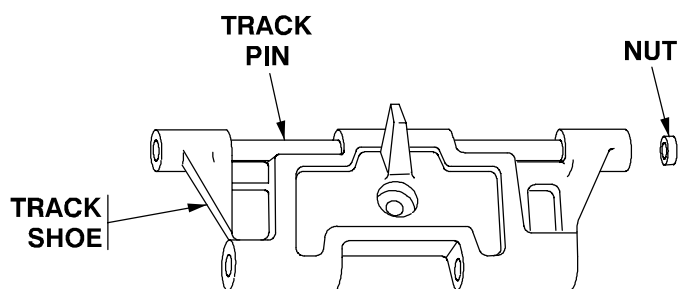
- Install track pin and nut in shoe if shoe is serviceable.

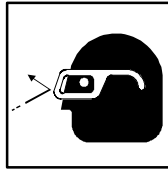


- Return removed shoe to unit maintenance.

INSTALLATION

- Remove track shoe from stowage.
- Remove track pin nut.

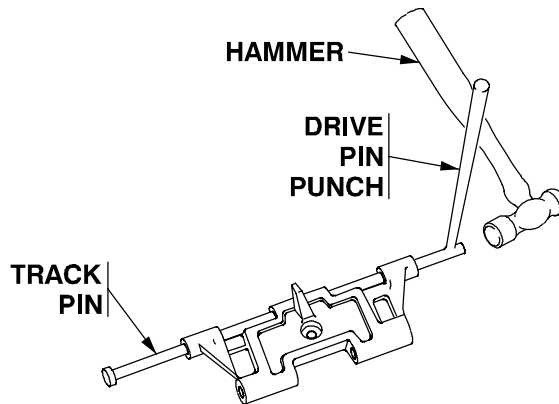


WARNING

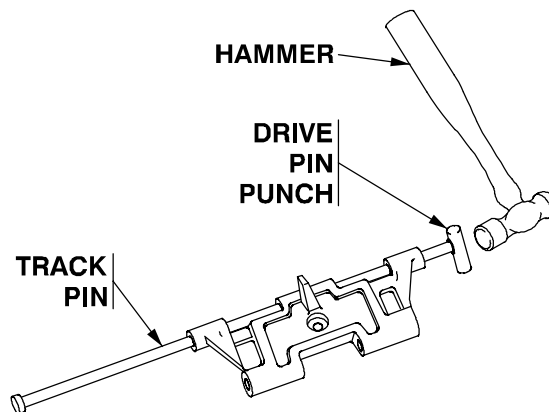
When striking metal with a hammer, steel fragments can be propelled by the blow. Fragments can impact eyes and cause serious injury or blindness.

Wear eye/face protection when using a hammer.

3. Use hammer and short end of drive pin punch and drive track pin part way out of track.

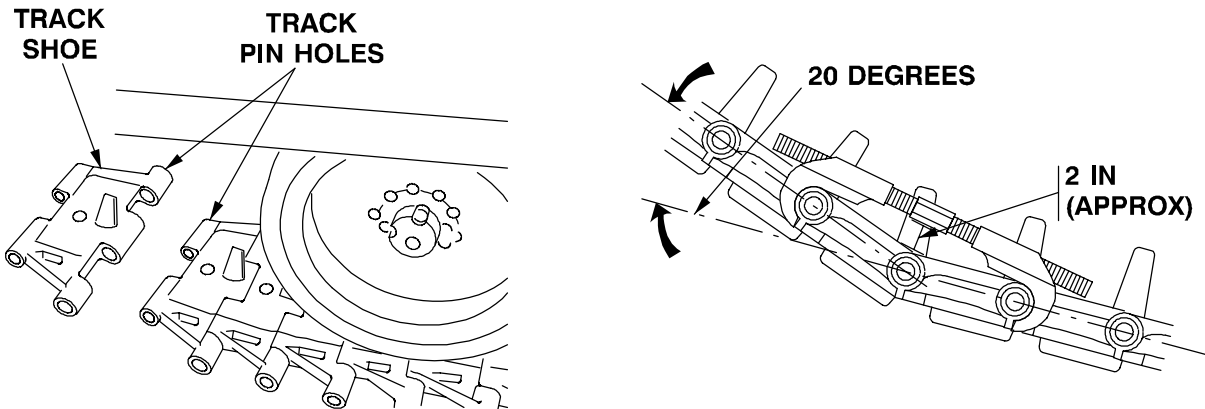


4. Use the other end of punch and remove track pin.



5. Coat track pin with oil or grease.
6. Install track pin nut on track pin with outside of nut flush with end of pin.

7. Put track shoe in lower part of track and adjust to 20° angle.
8. Align track pin holes.

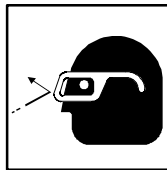


CAUTION

Angle between track shoes to be connected must be twenty degrees or damage to track will occur.

9. Adjust angle between track shoes to 20°.

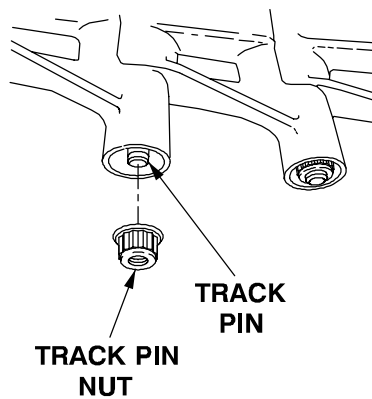
WARNING



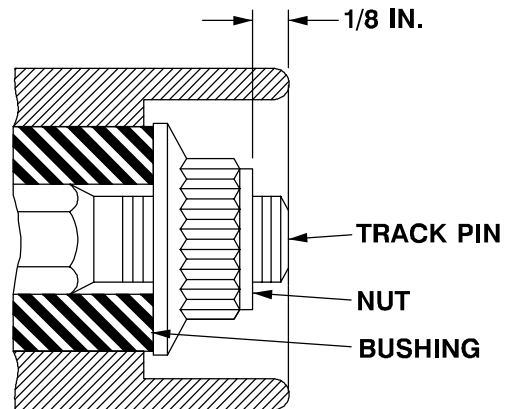
When striking metal with a hammer, steel fragments can be propelled by the blow. Fragments can impact eyes and cause serious injury or blindness.

Wear eye/face protection when using a hammer.

10. Using hammer, install track pin in track shoe.
11. Join track (WP 0043 00).
12. Install nut on track pin.



13. Tighten both track pin nuts until 2 or 3 threads (1/8-in.) show between top of nuts and end of track pin.



14. Adjust track tension (WP 0041 00).
15. Mark nuts for identification and torque by unit maintenance.
16. Complete required from DA Form 2404 to request unit maintenance to torque marked track pin nuts.

END OF TASK

REMOVE/INSTALL TRACK SHOE (T150)

0046 00

THIS WORK PACKAGE COVERS:

Remove Track Shoe (page 0046 00-1).

Install Track Shoe (page 0046 00-2).

INITIAL SETUP:**Maintenance Level**

Operator

Personnel Required

Driver

Helper

Tools and Special Tools

End connector remover (WP 0052 00, Table 2, Item 29)

Hammer, sledge hand, 6 lb. (WP 0053 00)

Socket, 3/4 inch drive, 1 1/8-inch opening, 6 pt.
(WP 0052 00, Table 2, Item 34)Handle, socket wrench, 3/4 inch drive (WP 0052 00, Table
2, Item 21)Tool, track pin alignment (2) (WP 0052 00, Table 2, Item
36)Handle, mattock pick (on top deck) (WP 0052 00,
Table 2, Item 19)**Equipment Condition**

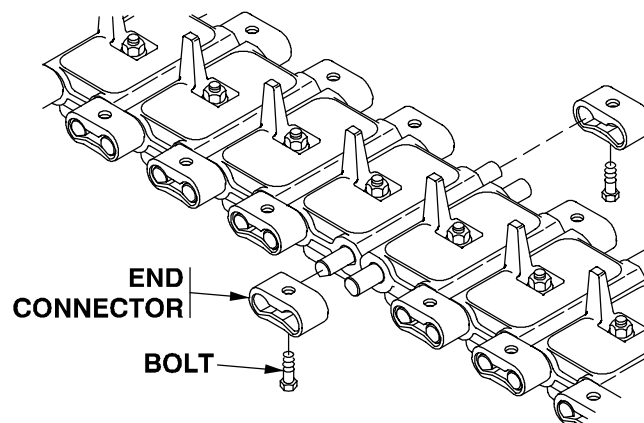
OSV on level surface

Engine stopped (WP 0016 00)

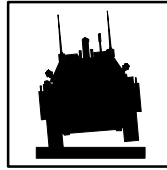
Track broken (WP 0044 00)

REMOVAL

1. Remove track shoe from track as follows:
 - a. Remove two bolts from inside and outside end connectors.
 - b. Remove two end connectors from track shoes.



INSTALLATION

WARNING

Not getting the bolt tight enough may result in death to personnel and damage to equipment if the end connectors fall off during movement of the vehicle.

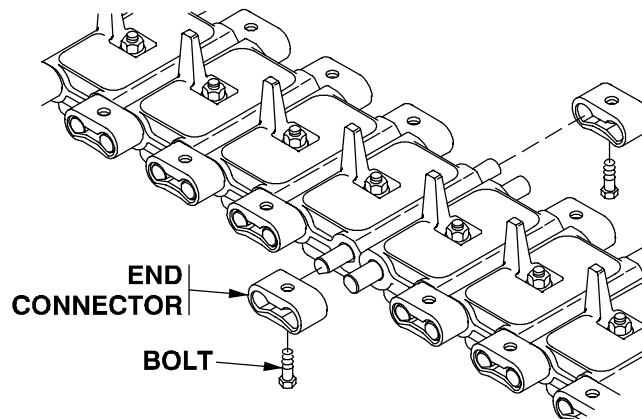
NOTE

Mark end connector bolts with identification for torque by unit maintenance.

NOTE

Position track shoes at slight angle to install end connectors on both shoe pins.

1. Install new track shoe on track.



- a. Install two track pin alignment tools over track shoe pins. Install two track end connectors on track shoes. Remove track pin alignment tools before driving end connectors flush with pin ends.

NOTE

Tighten end connector bolts correctly to prevent them from coming loose. Use the wrench extension over the socket wrench handle to achieve more leverage when tightening the end connector bolt. Unit maintenance must properly torque end connector bolts as soon as possible.

- b. Drive end connectors flush with pin ends and install bolts on each end connector.
2. Mark track that was replaced so bolts can be torqued later by unit maintenance.
3. Join track (WP 0044 00).
4. Stow spare track shoe.
5. Notify your supervisor that end connector bolts require torque.

END OF TASK

TRACK SHOE WEAR LIMITS

0047 00

THIS WORK PACKAGE COVERS:

Track Shoe Wear (page 0047 00-3)

INITIAL SETUP:

Maintenance Level

Operator

Personnel Required

Driver

Helper

Tools and Special Tools

Track and sprocket gauge (T130) (WP 0052 00, Table 2, Item 13)

Track gauge (T150) (WP 0052 00, Table 2, Item 15)

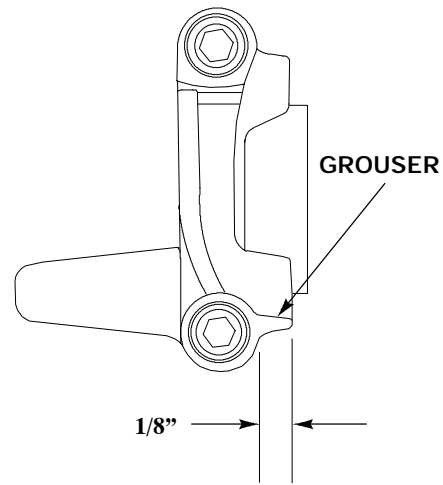
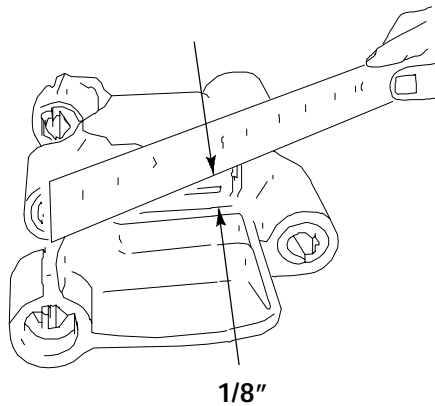
Equipment Condition

OSV parked on level ground

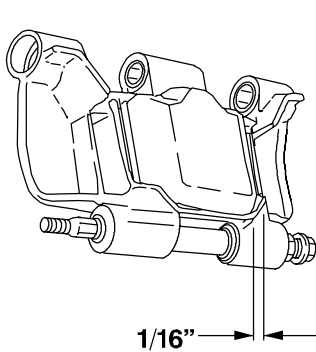
Engine stopped (WP 0016 00)

TRACK SHOE WEAR LIMITS

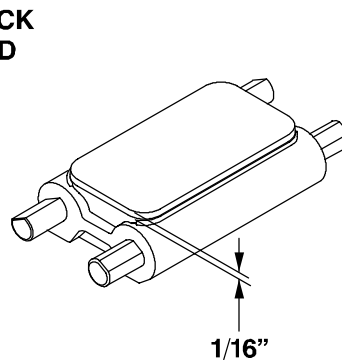
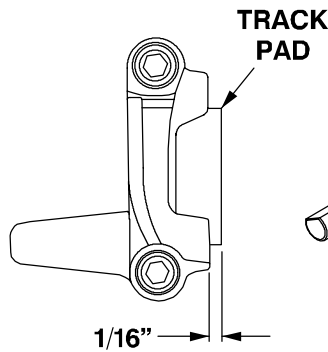
1. Grouser height (T130 only). Measure height of top edge of grouser above bushing housing. Replace shoe with less than 1/8-inch of grouser height left (WP 0045 00).



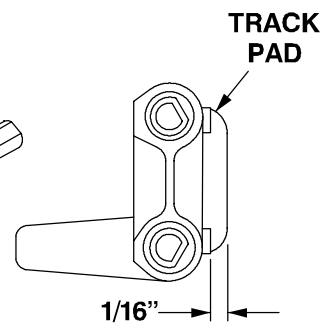
2. Track shoe pad (T130 and T150). Measure height of top of track shoe pad above top of grouser. If height is less than 1/16 inch, have unit maintenance replace pad.



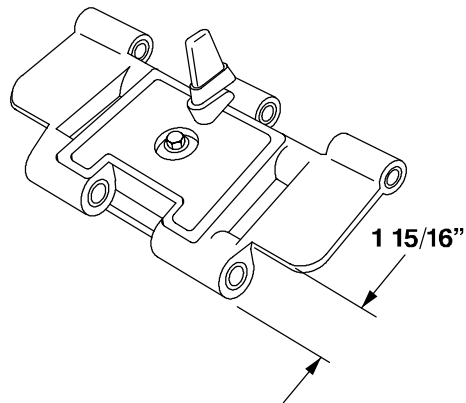
T130



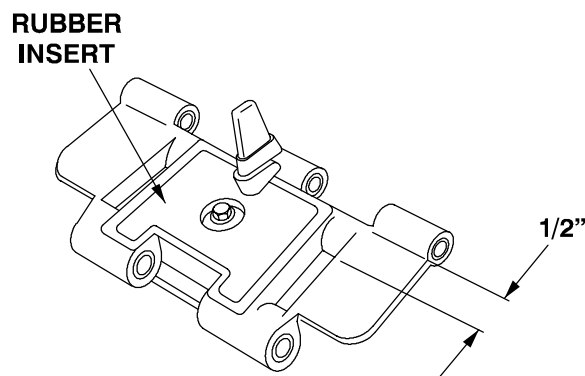
T150



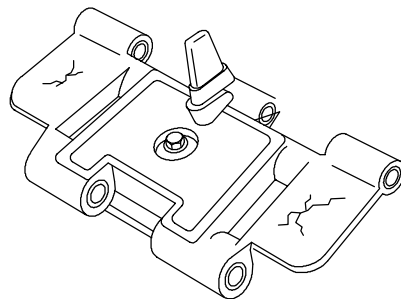
3. Drive sprocket flange (leading) (T130 only). On two bushing end of shoe, measure distance from edge of sprocket drive hole to outside of bushing housing. If distance is less than 1-15/16 inch, replace track shoe (WP 0045 00).



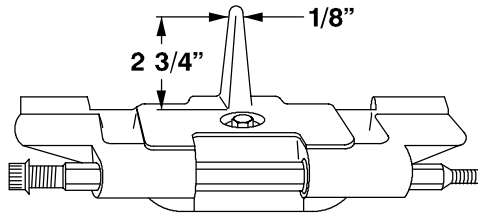
4. Drive sprocket flange (trailing) (T130 only). At three bushing ends of shoe, measure from edge of sprocket drive hole to nearest outside edge of shoe. If distance is less than 1/2-inch, replace track shoe (WP 0045 00).



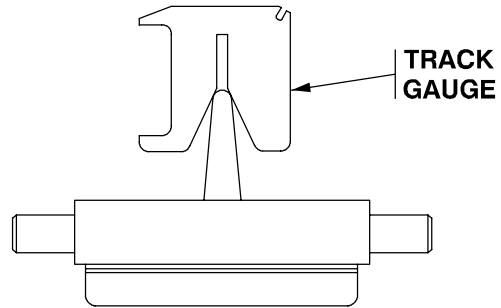
5. Track shoe forging (T130 only). Check for cracks in grousers, pad recess, ears (track web area outside the grousers and sprocket drive holes), and sides of sprocket drive holes. If cracks are less than 1-inch long in these plates, notify your supervisor that cracks require welding. If cracks are 1-inch or longer or in any other place, replace track shoes (WP 0045 00).



6. Center guide (T130 only). Center guide must be 1/8 inch thick or more, measured 2 3/4-inch from face of track. Center guide must be at least 2 3/4-inches long. (T150) If track shoe track gauge fits over center guide, center guide is worn. Report to your supervisor to replace the track shoe.

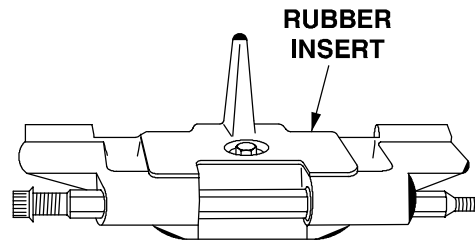


T130

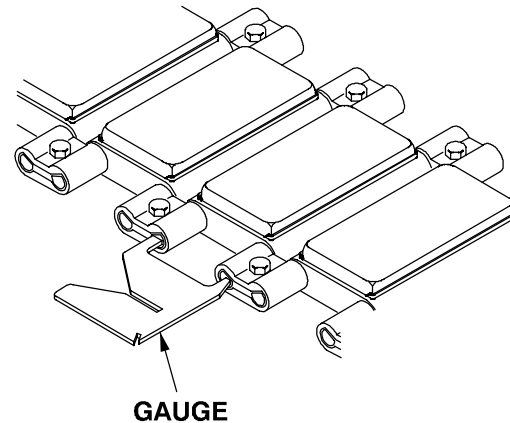
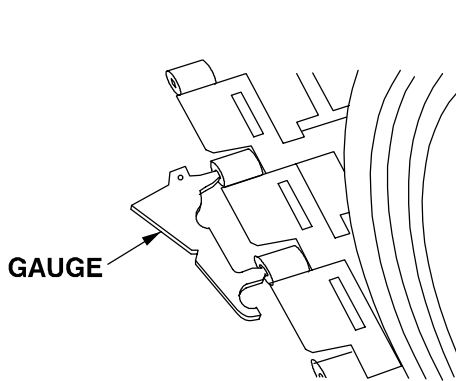


T150

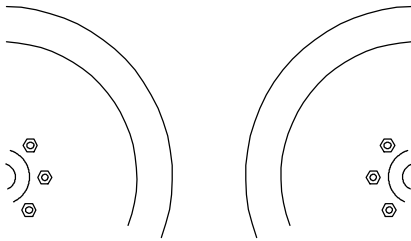
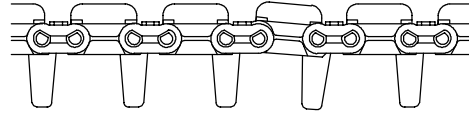
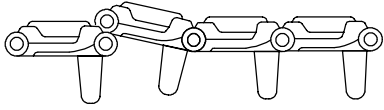
7. Rubber inserts (T130 only). Inspect rubber inserts that bear on road wheels. If there is 3/8-inch or more separation between rubber and metal completely around insert or insert shows chunking 1/2-inch or more deep on 10 percent or more of its surface, replace track shoe (WP 0045 00).



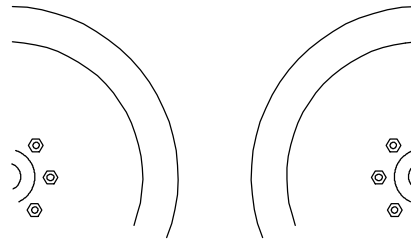
8. Bushing wear (T130 and T150). With track on OSV and under normal tension, insert pins of track and sprocket gauge into track shoes. (T130) If pins of track gauge enter both track shoes freely, track bushings are acceptable. If pins do not enter both track shoes freely, bushings are worn. Report worn bushings to your supervisor. (T150) If track gauge enters both end connector pins, bushings are worn. Notify your supervisor to replace track shoe.



9. Dead shoes (T130 and T150). Look for shoes with one end that sticks up above same side of next shoes on upper side of track. This is caused by rubber bushing rotating in shoe. Record fault on DA Form 2404 and report to your supervisor. If OSV has extra shoes stowed on front, replace dead shoes (WP 0045 00 or WP 0046 00).

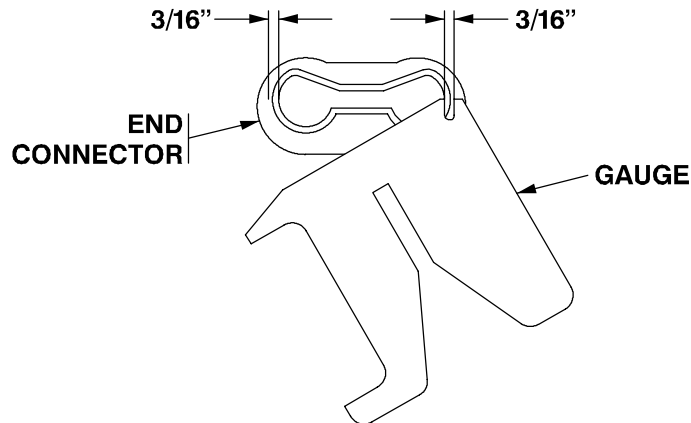


T130



T150

10. End Connectors (T150 only). Measure outside edge thickness of end connector. If track gauge fits over end connector edge, end connector is worn. Have unit maintenance replace end connector.



END OF TASK

CHECK VEHICLE BATTERIES

0048 00

THIS WORK PACKAGE COVERS:

Check Batteries (page 0048 00-1)

Clean Batteries (page 0048 00-4)

INITIAL SETUP:

Maintenance Level

Operator

Equipment Conditions

Engine shutdown (WP 0016 00)

Tools and Special Tools

Flashlight (WP 0052 00, Table 2, Item 14)

Grease gun (WP 0052 00, Table 2, Item 16)

References

TM 9-6140-200-14

Materials/Parts

Cleaning compound (WP 0054 00, Item 6)

Wiping rag (WP 0054 00, Item 18)

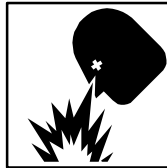
Grease, automotive (GAA) (WP 0054 00, Item 12)

Personnel Required

Driver

BATTERY CHECK

WARNING



Battery posts and power cables can short circuit and cause death or serious burns to personnel.

Do not touch battery positive terminals with tools or other metal objects.

Do not touch both battery posts simultaneously with tools or other metal objects.

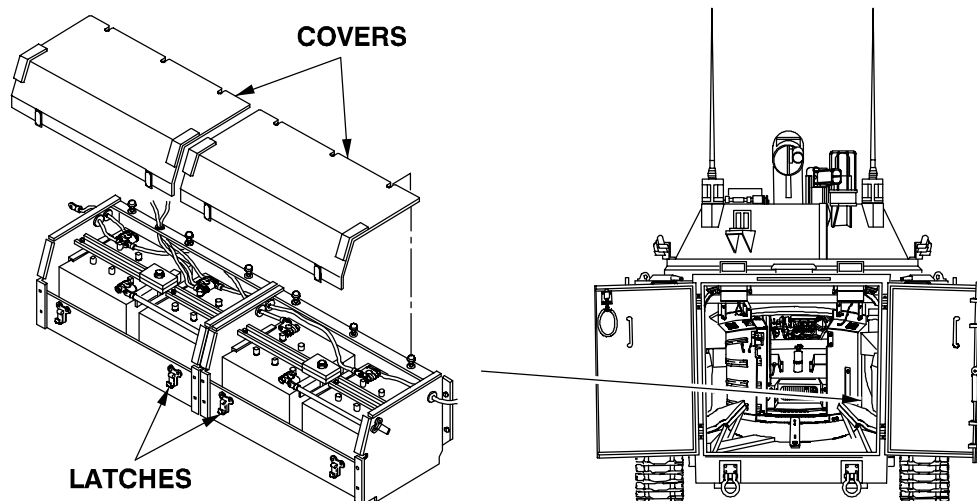
Do not wear jewelry when working with battery or electrical system.

Gas from batteries can explode and cause death or serious injury to personnel and/or damage to OSV and equipment.

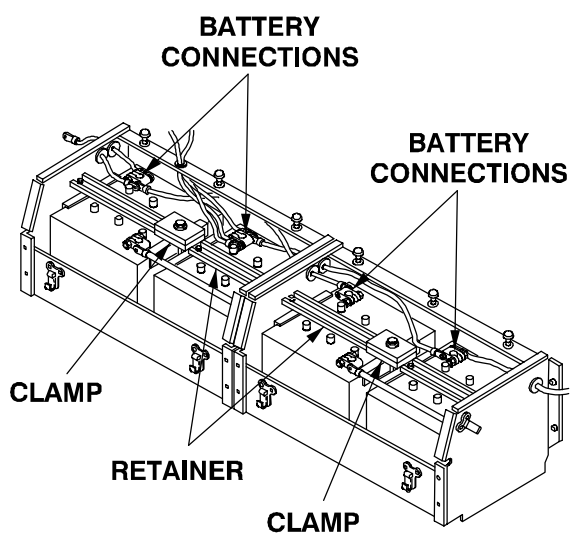
NOTE

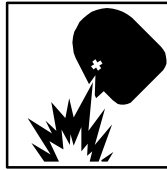
For additional information on batteries, refer to TM 9-6140-200-14.

1. Remove battery box covers (WP 0024 00).



2. Hold battery retainers and clamps with both hands and try to move them.
 - a. If batteries move or retainers/clamps are loose, notify your supervisor.
3. Check that battery connections are tight.
 - a. If connections are loose, notify your supervisor.
4. Hold clamp and try to twist.
 - a. If clamps are loose, notify your supervisor.
5. Check that cables are securely fastened to clamp.
 - a. If cables are loose, notify your supervisor.



WARNING

Battery posts and power cables can short circuit and cause death or serious burns to personnel.

Do not touch battery positive terminals with tools or other metal objects.

Do not touch both battery posts simultaneously with tools or other metal objects.

Do not wear jewelry when working with battery or electrical system.

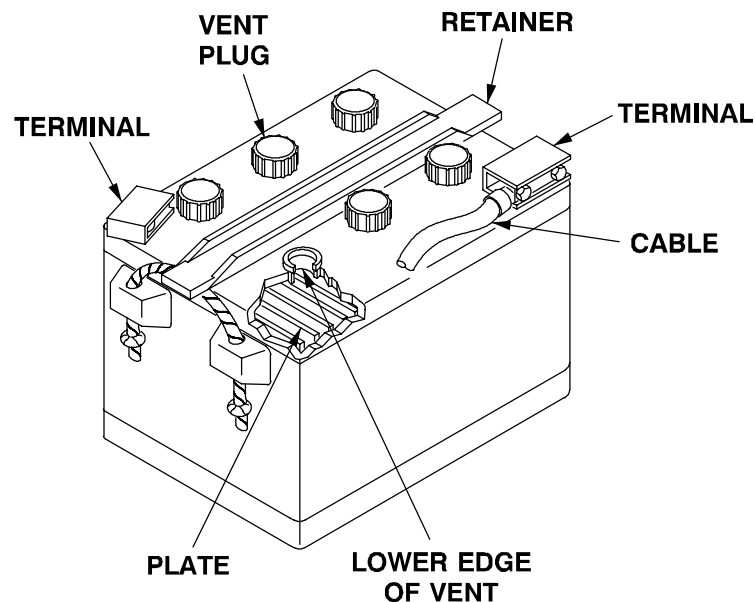
Gas from batteries can explode and cause death or serious injury to personnel and/or damage to OSV and equipment.

6. Remove vent plugs from batteries.

NOTE

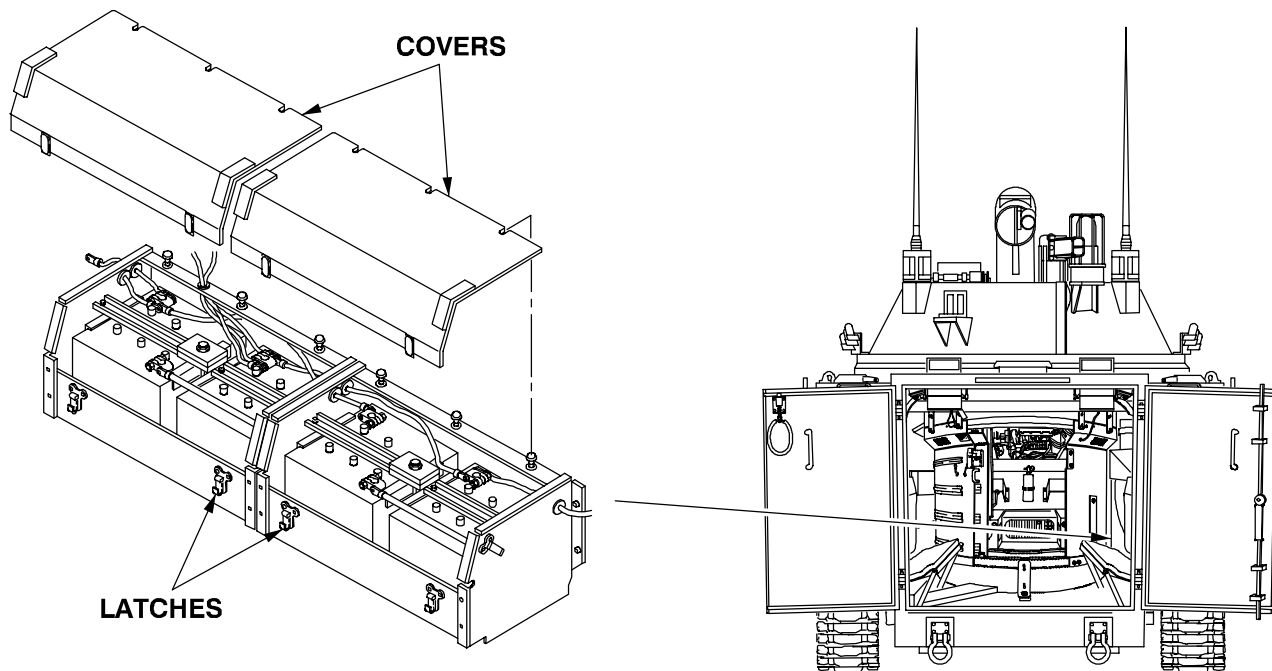
Electrolyte level should be checked often in hot weather. Electrolyte level should be to lower edge of vent.

7. Check electrolyte level in each cell.
 - a. If water is low, add distilled water as required to bring level to bottom of vent.
8. Check vent holes in plugs. Clear holes if necessary.
9. Install plugs in battery cells.



BATTERY CLEANING

1. Using a clean dry rag, wipe battery casings and surrounding metal.
2. Check terminals, clamps, cables, and retainers for dirt, debris, and corrosion.
 - a. Clean as required to remove dirt and/or corrosion.
3. Remove terminals from battery posts, clean posts and inside of terminals, install terminals.
4. Coat terminals with small amount of grease.
5. Install battery box covers (WP 0024 00).

**END OF TASK**

CHECK AND FILL COOLING SYSTEM

0049 00

THIS WORK PACKAGE COVERS:

Check Cooling System (WP 0049 00-1)

Fill Cooling System (WP 0049 00-3)

Close Radiator (WP 0049 00-4).

INITIAL SETUP:

Maintenance Level

Operator

Equipment Conditions

Engine shutdown (WP 0016 00)

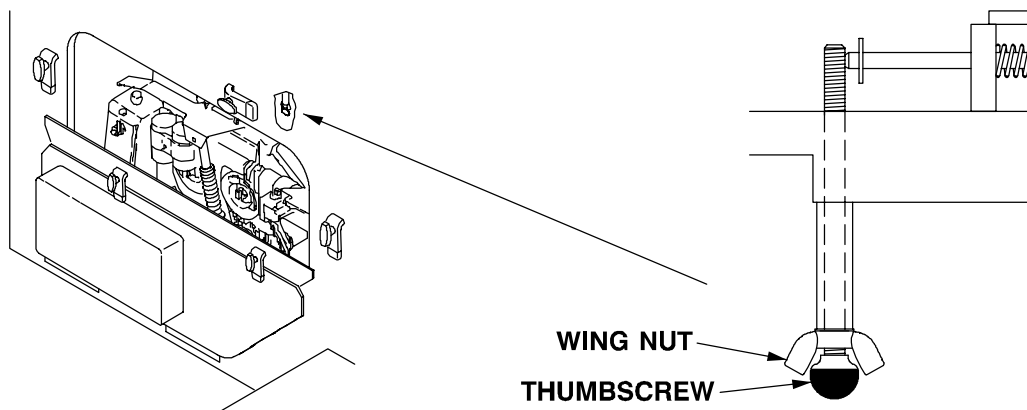
Personnel Required

Driver

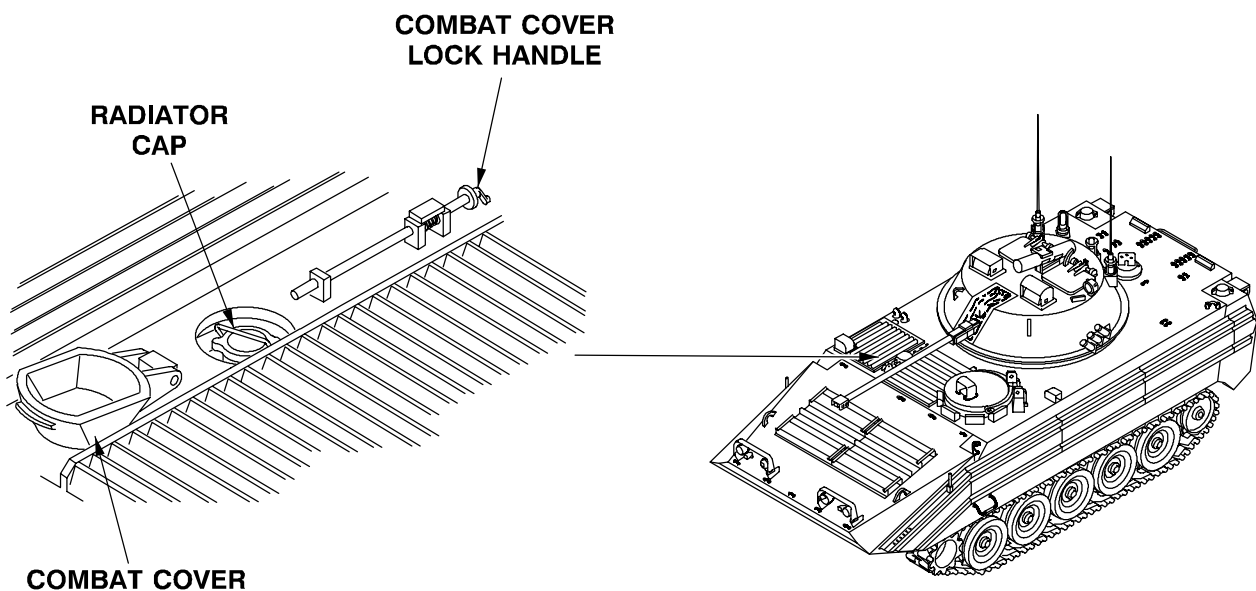
SERVICING

CHECK COOLING SYSTEM

1. Remove upper rear power plant access cover (WP 0022 00).
2. Reach into power plant compartment and loosen combat cover wing nut.

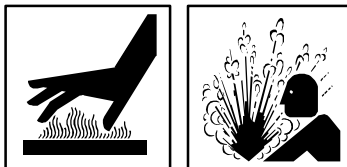


3. Turn thumbscrew counterclockwise to unlock radiator cap combat cover.
4. Pull combat cover lock handle up.



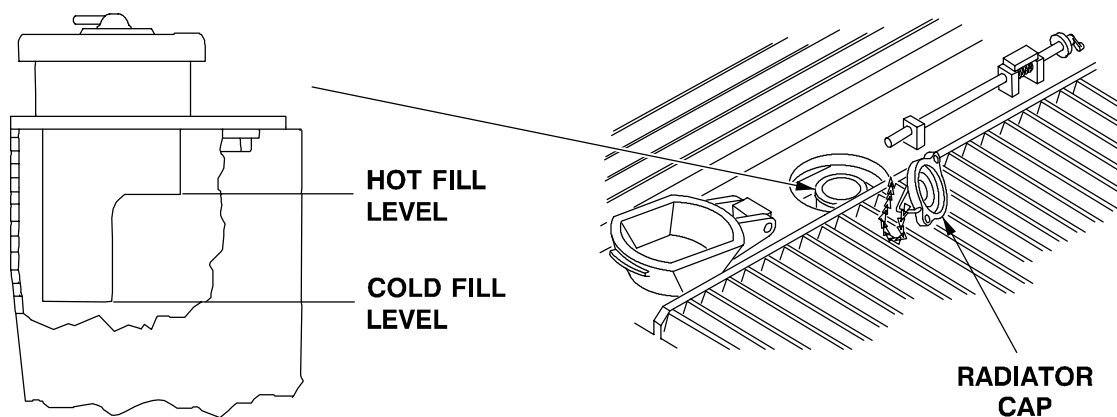
5. Open combat cover.

WARNING



Hot coolant can cause burns. Do not remove radiator cap until TEMP gauge needle is in bottom quarter of green zone. Wear heat protective mittens and eye protection to remove radiator cap. Turn cap slowly to prevent sudden explosion due to pressure build-up.

6. Carefully remove radiator cap and check level of coolant.
 - a. If coolant is not required, close radiator.



FILL COOLING SYSTEM

NOTE

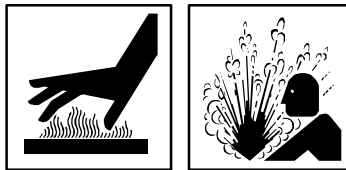
If coolant is hot, coolant must be at HOT FILL level. When cold, coolant must be at COLD FILL LEVEL.

NOTE

Only approved antifreeze/coolant may be added to radiator when available. Use water when approved antifreeze/coolant is not available.

1. If engine is cold and coolant is low, add coolant to COLD FILL mark.
2. If engine is hot and coolant is low, proceed as follows:

WARNING



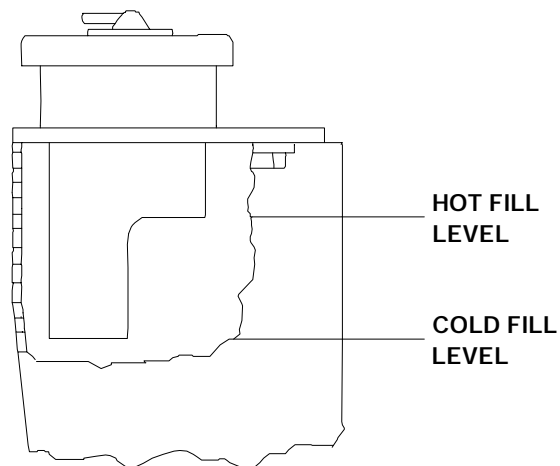
Adding coolant to an overheated radiator can cause discharge of hot coolant from radiator causing injury to personnel. Adding coolant to an overheated radiator can also cause damage to engine. When engine is overheated, run engine before coolant is added.

- a. Start engine (WP 0013 00).

NOTE

Add only approved antifreeze/coolant to radiator when available. Use water when approved antifreeze/coolant is not available.

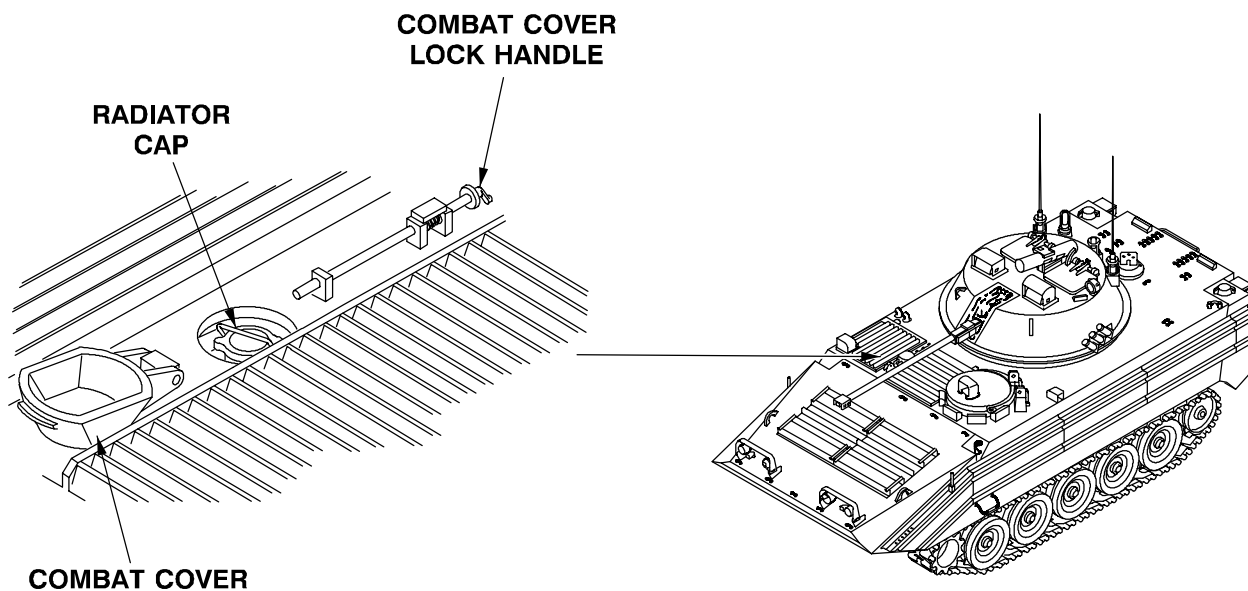
- b. Slowly add coolant until level is at HOT FILL mark.
- c. Stop engine (WP 0016 00).



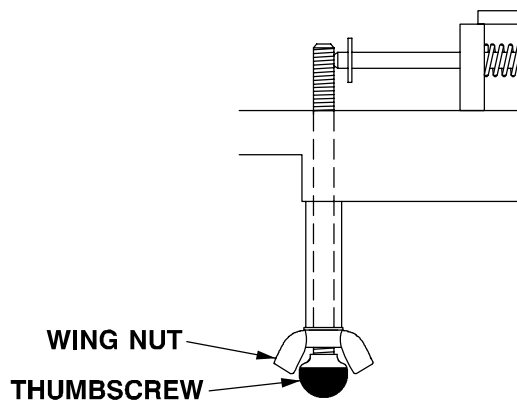
3. If water was added, contact your supervisor and request protection level check.

CLOSE RADIATOR

1. Install cap on radiator.
2. Close combat cover.
3. Secure combat cover with lock handle.



4. Turn thumbscrew clockwise until tight.
5. Turn wingnut to secure thumbscrew.



6. Install top rear power plant access panel (WP 0022 00).

END OF TASK

MAINTENANCE OF ENGINE AIR CLEANER

0050 00

THIS WORK PACKAGE COVERS:

Air Cleaner Maintenance (WP 0050 00-1).

INITIAL SETUP:Maintenance Level

Operator

Equipment Conditions

Engine shutdown (WP 0016 00)

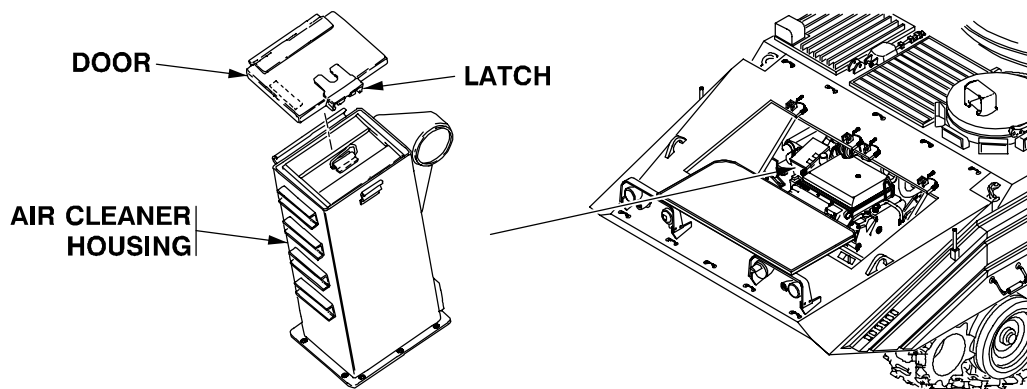
Personnel Required

Driver

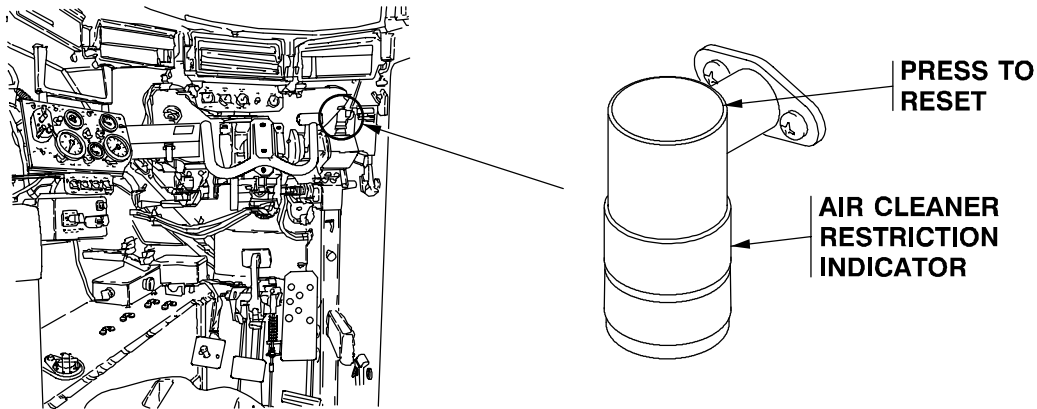
INSPECTION OF INSTALLED ITEMS**AIR CLEANER MAINTENANCE****CAUTION**

Operation with missing/damaged air cleaner can cause damage to engine. Do not operate vehicle if air cleaner element is missing or door or gasket is missing or damaged.

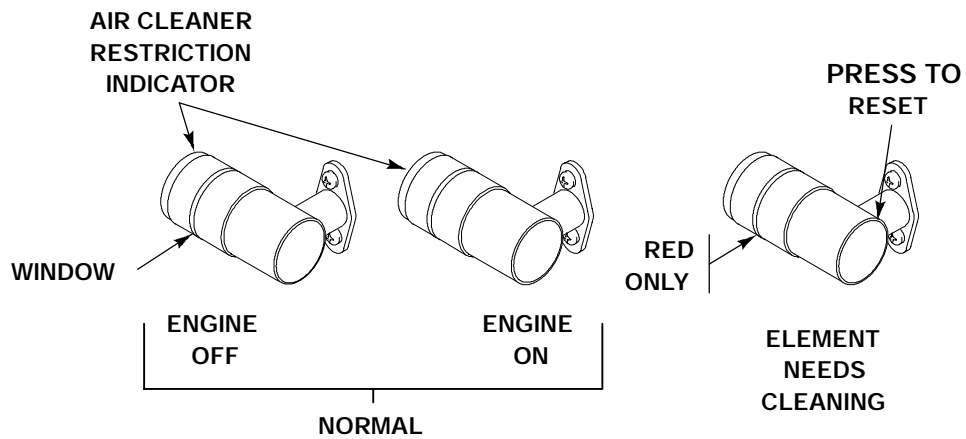
1. Open nose access doors and engine access cover (WP 0008 00).
2. Check that air cleaner door is free of dents and holes and seals the air cleaner housing.
3. Release latch at top of air cleaner housing.
4. Swing door up and remove door.
5. Check that latch operates properly.
6. Check that gasket is installed around door and gasket is clean and undamaged.
7. Check that air cleaner element is installed in housing.
 - a. If element is missing, obtain an element and install it in housing.
8. Remove air cleaner element from housing and check element condition.
 - a. If element is damaged or clogged, obtain an element and install it in housing.
9. Install door on air cleaner housing and fasten latch to secure door.



10. Check air cleaner restrictor indicator.



- a. If red flag shows in window, push RESET button.
- b. If red flag does not reset, notify your supervisor.



11. Close nose access doors and engine access cover (WP 0008 00).

12. Notify your supervisor of damage to air cleaner latch, door, gasket, and/or housing.

END OF TASK

CHAPTER 5
OPERATOR SUPPORTING INFORMATION

WORK PACKAGE INDEX

| <u>Title</u> | <u>Sequence No.</u> |
|-----------------------------------------------------|---------------------|
| REFERENCES | 0051 00 |
| COMPONENTS OF END ITEMS AND BASIC ISSUE ITEMS | 0052 00 |
| ADDITIONAL AUTHORIZATION LIST | 0053 00 |
| EXPENDABLE AND DURABLE ITEMS LIST | 0054 00 |
| STOWAGE AND DECAL/DATA PLATE GUIDE | 0055 00 |

REFERENCES

0051 00

SCOPE

This work package lists all forms, field manuals, technical manuals and miscellaneous publications referred to in this manual. Also listed are some manuals that will be helpful in the operation and maintenance of this vehicle.

FIELD MANUALS

| | |
|-------------------------------------------------------------------------------------------------|-------------------|
| Desert Operations (How to Fight) | FM 90-3 |
| Field Hygiene and Sanitation | FM 21-10 |
| First Aid for Soldiers | FM 21-11 |
| Manual for Tracked Combat Vehicle Driver | FM 21-306 |
| Operation and Maintenance of Ordnance Materiel in Cold Weather (0°F to -65°F) | FM 9-207 |
| Operator's Manual for Night Vision Goggles, AN/PVS-5 and AN/PVS-5A (NSN 5855-00-150-1820) | TM 11-5855-238-10 |
| Operator's Manual for Viewer, Driver's Night Vision AN/VVS-2(V)1 (NSN 5855-00-629-5278) | TM 11-5855-249-10 |
| Operator's, Organizational, DS and GS Maintenance Manual for Lead-Acid Storage Batteries | TM 9-6140-200-14 |
| Recovery and Battle Damage Assessment and Repair | FM 9-43-2 |
| Use and Care of Hand Tools and Measuring Tools | TM 9-243 |

FORMS

| | |
|-----------------------------------------------------------|--------------|
| Equipment Inspection and Maintenance Work Sheet | DA Form 2404 |
| Maintenance Request | DA Form 2407 |
| Quality Deficiency Report, Category 2 | SF 368 |
| Recommended Changes to Publications and Blank Forms | DA Form 2028 |
| Vehicle Accident Report | SF 91 |

TECHNICAL MANUALS

| | |
|-----------------------------------------------------------------------------------------------------------------|---------------------|
| M113A3/BMP-2 Opposing Forces Surrogate Vehicle (OSV) Turret | TM 9-2350-366-10-2 |
| Manual for the Tracked Combat Vehicle Operator | TM 21-36 |
| Organizational, Direct Support, and General Support Maintenance Manual for Heaters, Vehicular Compartment | TM 9-2540-205-24&P |
| Organizational, Direct Support, and General Support Maintenance Manual for Heaters, Vehicular Compartment | TM 9-2540-207-14&P |
| SINCGARS Radio, AN/VRC 87/89/92 | TM 11-5820-890-10-8 |

OTHER PUBLICATIONS

Army Materiel Maintenance Policy and Retail Maintenance Operations AR 750-1
 Army Oil Analysis Program (AOAP) TB 43-0211
 Equipment Improvement Report and Maintenance Digest: Tank Automotive Equipment TB 43-0001-39 Series
 Equipment Improvement Report and Maintenance Summary for TARCUM Equipment TB 43-0143
 Hand Portable Fire Extinguishers Approved for Army Users TB 5-4200-200-10
 Occupational and Environmental Health Preventive, Treatment, and Control of Heat Injury TB MED 507
 Occupational and Environmental Health: Food Service Sanitation TB MED 530
 Occupational and Environmental Health: Sanitary Control and Surveillance of Field Water Supplies TB MED 577
 Prevention Medicine AR 40-5
 Prevention of Motor Vehicle Accidents AR 385-55
 The Army Maintenance Management System (TAMMS) DA PAM 738-750
 Use of Antifreeze Solutions, Antifreeze Extender, Cleaning Compounds, and Test Kit
 in Engine Cooling Systems TB 750-651

END OF TASK

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS

0052 00

INTRODUCTION**Scope**

This work package lists components of end item (COEI) and basic issue items (BII) for the M113A3/BMP—2 Opposing Forces Surrogate Vehicle (OSV) to help inventory items required for safe and efficient operation of the equipment.

General

The COEI and BII are divided into the following lists:

- 1 **Components of End Item.** This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Items of COEI are removed and separately packaged for transportation or shipment when necessary. Illustrations are furnished to help you find and identify the items.
- 2 **Basic Issue Items.** These essential items are required to place the OSV in operation, to operate it, and to do emergency repairs. Although shipped and separately packaged, BII must be with the OSV during operation and whenever it is transferred between property accounts. Listing these items is your authority to request/requisition them for replacement based on authorization of the end item by the TOE/MTOE. Illustrations are furnished to help you find and identify the items.

Explanation of Columns in the COEI List and BII List

The following provides an explanation of columns found in the tabular listings:

- 1 Column (1) — Illus Number. Gives you the name of the item illustrated.
- 2 Column (2) — National Stock Number (NSN). Identifies the stock number of the item to be used for requisitioning purposes.
- 3 Column (3) — Description, CAGEC and Part Number. Identifies the Federal item name followed by a minimum description when needed. The stowage location of COIE and BII is also included in this column. The last line below the description is the CAGEC (Commercial and Government Entity Code) (in parentheses) and the part number.
- 4 Column (4) — Usable on Code. When applicable, gives you a code if the item you need is not the same as the different models of equipment. In this manual, all items are used on the M113A3/BMP-2 and no entries are required in this column.
- 5 Column (5) — Unit of Measure (U/M). Indicates the physical measurement or count of the item as issued per the National Stock Number shown in column (2). This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr).
- 6 Column (6) — Qty Rqr. Indicates the quantity required.

Table 1. Components of End Item List

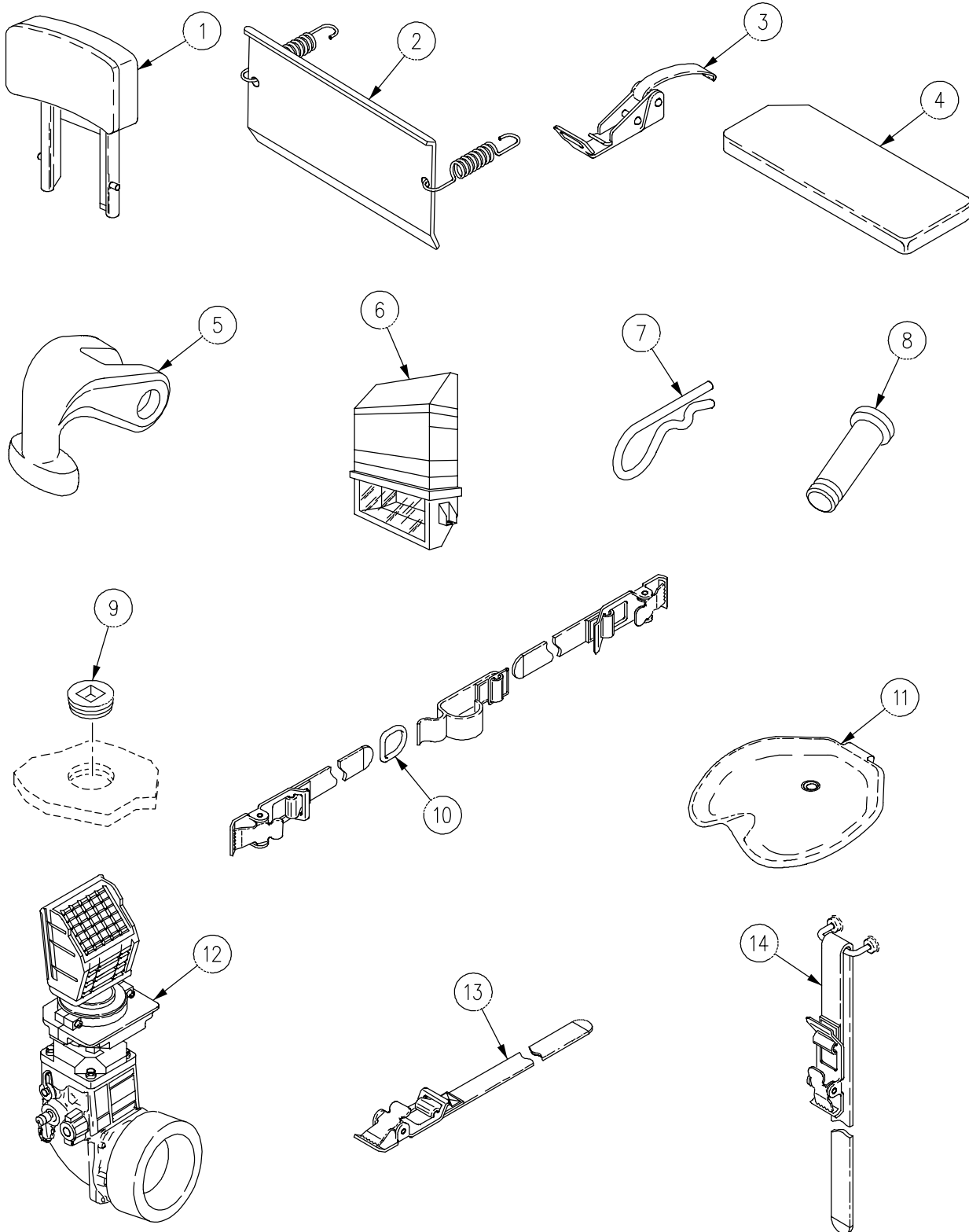
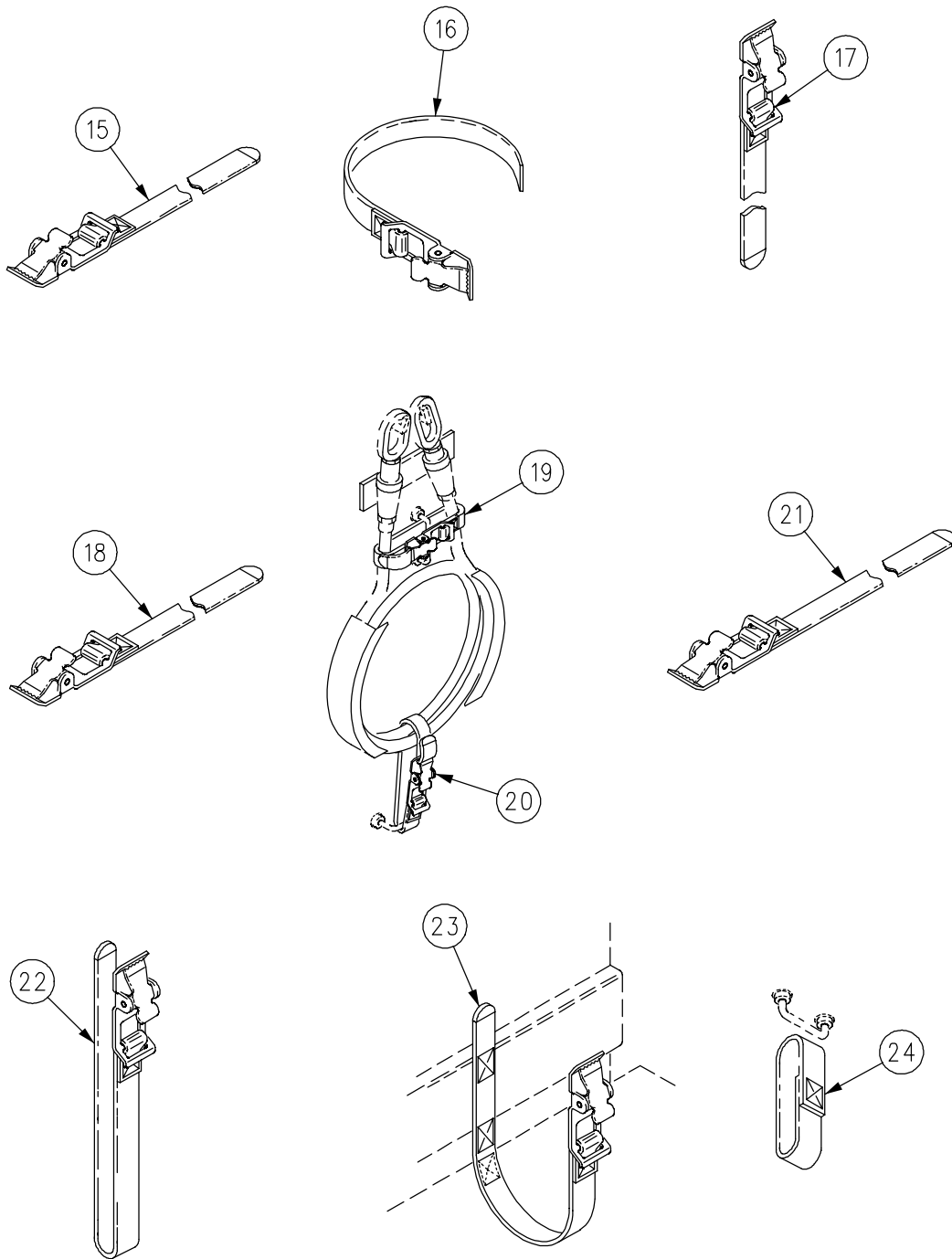


Table 1. Components of End Item List - Continued



COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS - Continued

0052 00

Table 1. Components of End Item List - Continued

| (1) ILLUS NUMBER | (2) NATIONAL STOCK NUMBER | (3) DESCRIPTION, CAGEC, AND PART NUMBER | (4) USABLE ON CODE | (5) U/M | (6) QTY RQR |
|------------------------|---------------------------------|----------------------------------------------------------------------------------------------------------|-----------------------------|------------|-------------------|
| 1 | 2540-00-840-9646 | Back Rest (19207) 10865882 | | EA | 1 |
| 2 | 2590-00-898-6771 | Cover, Periscope (M27 Periscope) (19207) 10866115 | | EA | 6 |
| 3 | 2510-00-701-3845 | Clamp, Fire Extinguisher (19207) 7013845 | | EA | 2 |
| 4 | 2540-00-831-6948 | Cushion, Seat (19207) 10866262 | | EA | 2 |
| 5 | 2540-00-679-8035 | Hook, Tow (Front And Rear Towing Eyes) (19207) 10861607 | | EA | 2 |
| 6 | 1240-01-319-8995 | Periscope, M27 (19200) 12357792 | | EA | 6 |
| 7 | 5315-00-598-5808 | Pin, Lock, Tow Hook (19207) 7752865 | | EA | 4 |
| 8 | 5315-00-862-2683 | Pin, Straight, Tow Hook (19207) 10890323 | | EA | 4 |
| 9 | 4730-00-187-1413 | Plug, Final Drive (81348) WWP471 | | EA | 2 |
| 10 | 5365-00-127-7449 | Ring, Dee (96906) MS51925-4 | | EA | 1 |
| 11 | 2540-00-831-6946 | Seat (20418) 10866352 | | EA | 1 |
| 12 | 5855-01-096-0871 | Viewer, Driver's Night Vision (On Wall Left Of Driver) (05234, 80063) AN/VVS-2(V)1A, SM-D-771480-1 | | EA | 1 |
| 13 | 5340-00-339-3768 | Web Strap (19207) 8690475 | | EA | 10 |
| 14 | 5340-00-543-3155 | Web Strap (19207) 8690476 | | EA | 2 |
| 15 | 5340-00-543-3188 | Web Strap (19207) 8690472 | | EA | 1 |
| 16 | 5340-00-543-3477 | Web Strap (19207) 8690468 | | EA | 7 |
| 17 | 5340-00-543-7110 | Web Strap (19207) 8690470 | | EA | 2 |
| 18 | 5340-00-753-3742 | Web Strap (19207) 8690471 | | EA | 8 |
| 19 | 5340-00-753-3743 | Web Strap (19207) 8690519 | | EA | 1 |
| 20 | 5340-00-753-3744 | Web Strap (19207) 8690473 | | EA | 4 |
| 21 | 5340-00-753-3745 | Web Strap (19207) 8690477 | | EA | 1 |
| 22 | 5340-00-827-8483 | Web Strap (19207) 8690513 | | EA | 1 |
| 23 | 5340-00-830-5021 | Web Strap (19207) 8690466 | | EA | 2 |
| 24 | 5340-00-831-6949 | Web Strap (19207) 8763238 | | EA | 7 |

Table 2. Basic Issue Items (BI) List

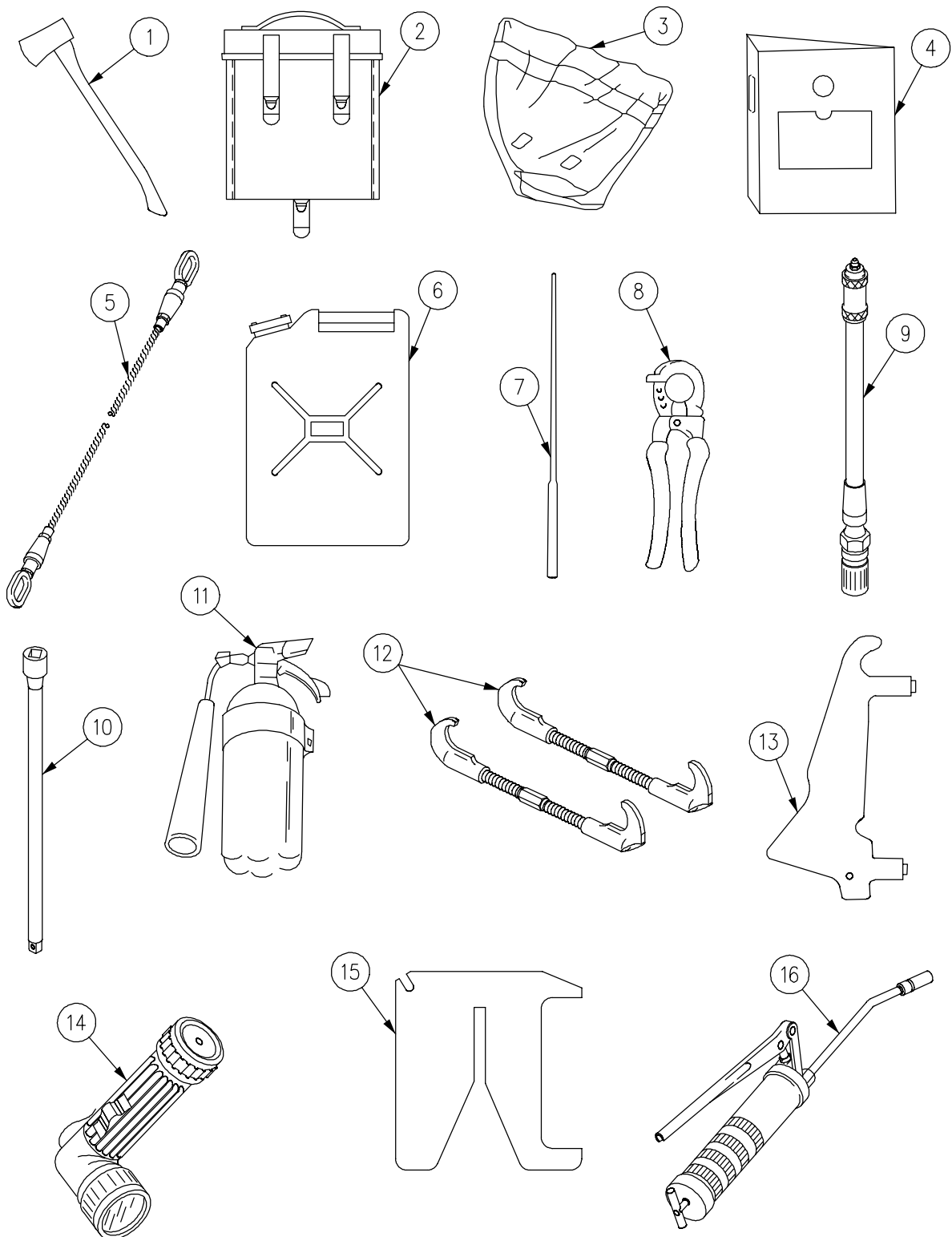


Table 2. Basic Issue Items (BI) List - Continued

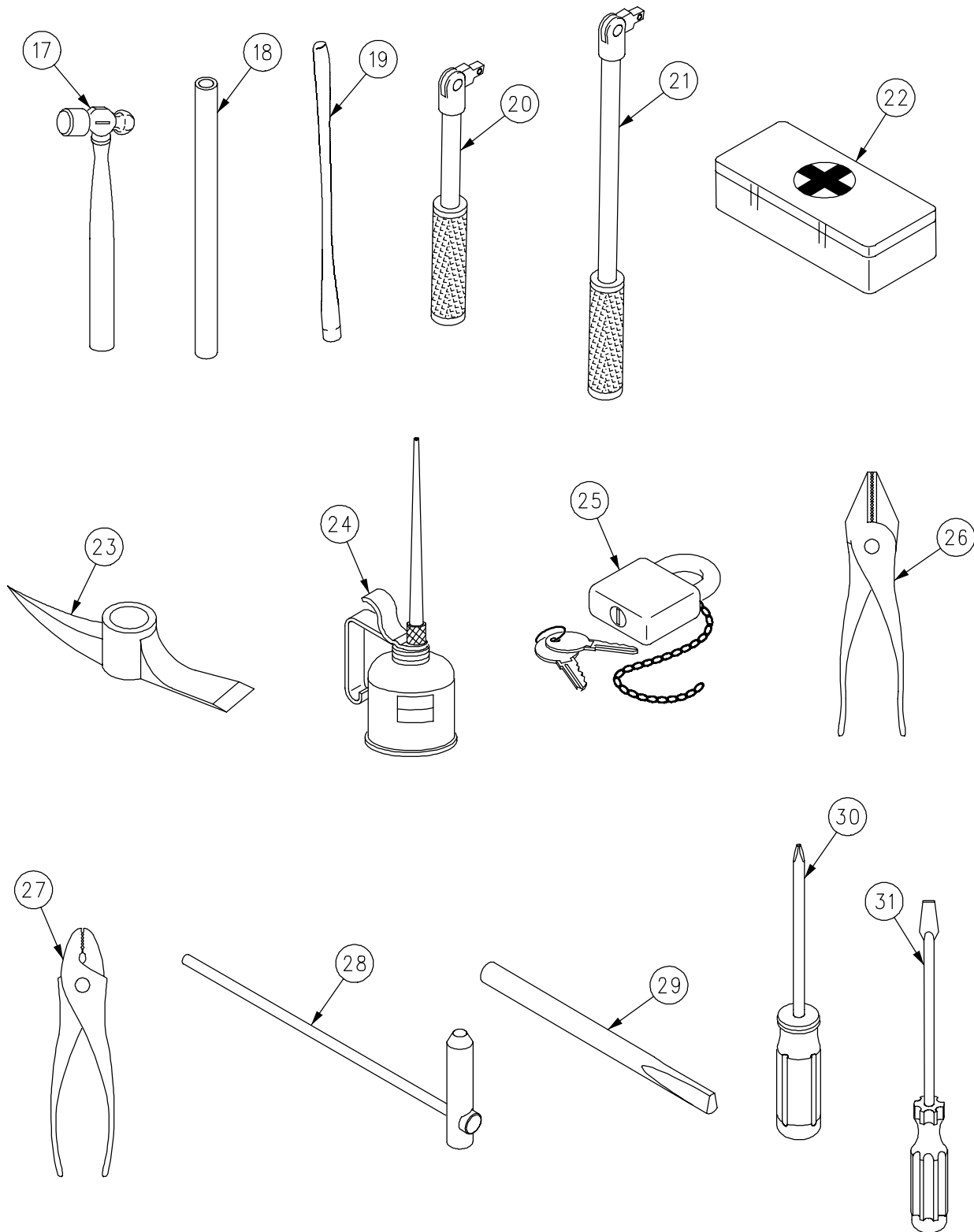


Table 2. Basic Issue Items (BII) List - Continued

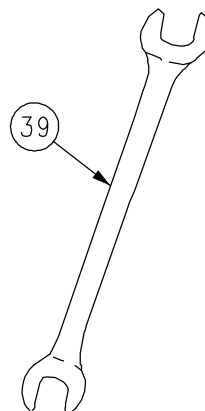
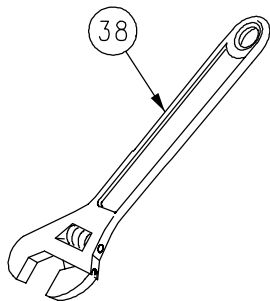
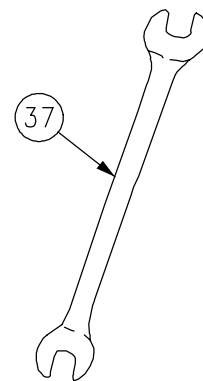
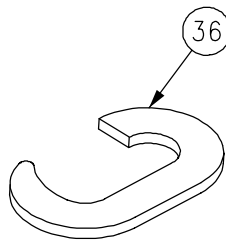
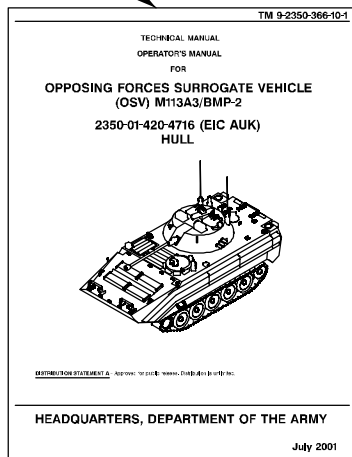
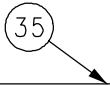
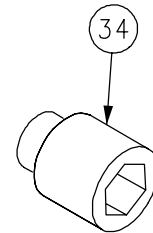
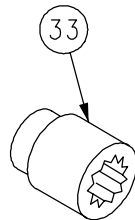
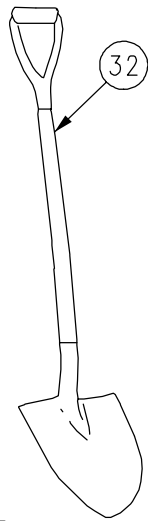


Table 2. Basic Issue Items (BI) List - Continued

| (1) ILLUS NUMBER | (2) NATIONAL STOCK NUMBER | (3) DESCRIPTION, CAGEC, AND PART NUMBER | (4) USABLE ON CODE | (5) UM | (6) QTY RQR |
|------------------------|---------------------------------|----------------------------------------------------------------------------------------------|-----------------------------|-----------|-------------------|
| 1 | 5110-00-293-2336 | Axe, Single Bit, 4 Lb (Top Rear Deck) (19207) 61509252 | | EA | 1 |
| 2 | 2540-00-670-2459 | Bag, Pamphlet (On Power Plant Rear Panel) (19207) 11676920 | | EA | 1 |
| 3 | 5140-00-473-6256 | Bag, Tool (On Right Sponson) (19207) 11655979 | | EA | 1 |
| 4 | 7510-00-889-3494 | Binder, Loose Leaf (In Pamphlet Bag) (19207) 11677003 | | EA | 1 |
| 5 | 4010-00-767-3149 | Cable, Tow (On Rear VISMODO Deck) (19207) 10861718 | | EA | 1 |
| 6 | 7240-00-242-3767 | Can, Water (Three Cans In Front VISMODO Only) (81349) MIL-C-13984 | | EA | 1 |
| 7 | 5120-00-240-6040 | Crowbar, Pinch (Top Rear Deck) (19207) 1677049 | | EA | 1 |
| 8 | 5110-00-595-8229 | Cutter, Wire, Hand (In Tool Bag) (19207) 11655981 | | EA | 1 |
| 9 | 4930-00-288-1511 | Extension, Adapter, Grease Gun (In Tool Bag) (19207) 6300333 | | EA | 1 |
| 10 | 5120-00-227-8074 | Extension, Bar 1/2-in X 10-in (In Tool Bag) (19207) 11655788-1 | | EA | 1 |
| 11 | 4210-00-253-2478 | Extinguisher, Fire, 5 Lb (Right Rear Bulk- head) (19207) 7714780 | | EA | 1 |
| 11 | 4210-00-555-8837 | Extinguisher, Fire, (Forward Center Turret Basket) (19207) 10916537 | | EA | 1 |
| 12 | 5120-01-041-4624 | Fixture, Track (On Top Deck) (19207) 12253183 | | EA | 2 |
| 13 | 5120-01-041-9920 | Fixture, Track Tension, Track Bushing And Sprocket Wear (In Tool Bag) (19207) 12253280 | | EA | 1 |
| 14 | 6230-00-264-8261 | Flashlight, 8-in. long (Interior Turret) (80063) MX991U | | EA | 1 |
| 15 | | Gauge, Track (In Tool Bag) (T150 Track) (19207) 12474849 | | EA | 1 |
| 16 | 4930-00-253-2478 | Grease Gun (In Tool Bag) (36251) 1142 | | EA | 1 |
| 17 | 5120-00-061-8546 | Hammer, Hand, Ballpeen (In Tool Bag) (19207) 11677028-3 | | EA | 1 |
| 18 | 5120-00-673-6320 | Handle Extension, Wrench (Under Tool Bag) (55719) 36A | | EA | 1 |
| 19 | 5120-00-288-6574 | Handle, Mattock Pick (On Top Deck) (19207) 11677021 | | EA | 1 |

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS - Continued

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Table 2. Basic Issue Items (BII) List - Continued

| (1) ILLUS NUMBER | (2) NATIONAL STOCK NUMBER | (3) DESCRIPTION, CAGEC, AND PART NUMBER | (4) USABLE ON CODE | (5) UM | (6) QTY RQR |
|------------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------|-------------------|
| 20 | 5120-00-236-7590 | Handle, Socket Wrench (In Tool Bag) (19207) 11657586-1 | | EA | 1 |
| 21 | 5120-00-221-7959 | Handle, Socket Wrench 3/4-in. Drive (45225) H377 | | EA | 1 |
| 22 | 6545-00-922-1200 | Kit, First Aid (In Driver's Compartment) (19207) 11677011 | | EA | 1 |
| 23 | 5120-00-243-2395 | Mattock Pick (Top Rear Deck) (19207) 11677022 | | EA | 1 |
| 24 | 4930-00-169-8275 | Oiler, Handpump Type (In Power Plant Compartment, Leftside) (19207) 6169931 | | EA | 1 |
| 25 | 5340-00-682-1645 | Padlock, Key (On Drivers Hatch) (96906) MS35647-6 | | EA | 2 |
| 26 | 5120-00-239-8251 | Pliers, Lineman (In Tool Bag) (72368) 1950 | | EA | 1 |
| 27 | 5120-00-223-7397 | Pliers, Slipjoint, Straight Nose, W/Cutter (In Tool Bag) (19207) 11655775-3 | | EA | 1 |
| 28 | 5120-01-006-8847 | Punch, Drive Pin (In Tool Bag) (19207) 11678718 | | EA | 1 |
| 29 | | Remover, Track End Connector (In Tool Bag) (T150 Track) (19207) 12474798 | | EA | 1 |
| 30 | 5120-00-234-8913 | Screwdriver, Cross Tip, No. 2 (In Tool Bag) (19207) 1655777-12 | | EA | 1 |
| 31 | 5120-00-278-1283 | Screwdriver, Flat Tip (In Tool Bag) (19207) 1655777-11 | | EA | 1 |
| 31 | 5120-00-764-8061 | Screwdriver, Flat Tip, 3/8-in. Wide Blade, 3/8-in. Drive Handle, 12-in. Long (Interior Turret) (81348) GGG-S-121 | | EA | 1 |
| 32 | 5120-00-293-3336 | Shovel, Hand (On Front Top Deck) (19207) 11655784 | | EA | 1 |
| 33 | 5120-00-189-7932 | Socket, Wrench, 1/2-in. X 9/16-in. (In Tool Bag) (19207) 11677025-1 | | EA | 1 |
| 33 | 5120-00-189-7946 | Socket, Wrench, 1/2-in. X 5/8-in. (In Tool Bag) (19207) 11677025-2 | | EA | 1 |
| 34 | 5130-00-227-6681 | Socket, Socket Wrench, 3/4 Inch Drive, 1 1/8-in. Opening, 6 Pt (55719) IM-362 | | EA | 1 |
| 34 | 5120-00-235-5870 | Socket, Wrench, 1/2-in. X 11/16-in. (In Tool Bag) (19207) 11677025-3 | | EA | 1 |
| 34 | 5120-00-189-7935 | Socket, Wrench, 1/2-in. X 15/16-in. (In Tool Bag) (19207) 11677025-6 | | EA | 1 |

Table 2. Basic Issue Items (BII) List - Continued

| (1) ILLUS NUMBER | (2) NATIONAL STOCK NUMBER | (3) DESCRIPTION, CAGEC, AND PART NUMBER | (4) USABLE ON CODE | (5) UM | (6) QTY RQR |
|------------------------|---------------------------------|-----------------------------------------------------------------------------------|-----------------------------|-----------|-------------------|
| 34 | 5120-00-189-7985 | Socket, Wrench, 1/2-in. X 3/4-in. (In Tool Bag) (19207) 11677025-4 | | EA | 1 |
| 34 | 5120-00-189-7934 | Socket, Wrench, 1/2-in. X 7/8-in. (In Tool Bag) (19207) 11677025-5 | | EA | 1 |
| 35 | TM 9-2350-366-10-1 | Technical Manual, (Hull) (In pamphlet Bag) | | EA | 1 |
| 35 | TM 9-2350-366-10-2 | Technical Manual, (Turret) (In Pamphlet Bag) | | EA | 1 |
| 36 | | Tool, Track Pin Alignment (In Tool Bag) (T150 Track) (19207) 12474881 | | EA | 2 |
| 37 | 5120-00-277-2342 | Wrench, Open End Fixed, 3/8-in. X 7/16-in. (In Tool Bag) (19207) 11655789-1 | | EA | 1 |
| 37 | 5120-00-187-7126 | Wrench, Open End Fixed, 9/16-in. X 5/8-in. (In Tool Bag) (19207) 11655789-2 | | EA | 1 |
| 38 | 5120-00-264-3796 | Wrench, Open End Adjustable, 1 5/16-in. X 12-in. (In Tool Bag) (19207) 11655778-5 | | EA | 1 |
| 39 | 5120-00-277-8300 | Wrench, Open End Fixed, 11/16-in. X 13/16-in. (In Tool Bag) (19207) 11655789-3 | | EA | 1 |

END OF TASK

ADDITIONAL AUTHORIZATION LIST**0053 00****INTRODUCTION****Scope**

This work package lists additional items that are authorized for support of the M113A3/BMP—2.

General

This list identifies items that do not have to accompany the vehicle and that do not have to be turned in with it. These items are all authorized by CTA, MTOE, TDA, or JTA.

Explanation of Columns in the AAL

Column (1) — National Stock Number (NSN). Identifies the stock number of the item to be used for requisitioning purposes.

Column (2) — Description, CAGEC, and Part Number. Identifies the Federal item name (in all capital letters) followed by a minimum description when needed. The last line below the description is the CAGEC (Commercial and Government Entity Code) (in parentheses) and the part number.

Column (3) — Usable On Code. Not applicable. All items are used on the M113A3/BMP-2.

Column (4) — Unit of Measure (U/M). Indicates the physical measurement or count of the item as issued per the National Stock Number shown in column (1).

Column (5) — Qty Recm. Indicates the quantity recommended.

Table 1. Additional Authorization List

| (1) NATIONAL STOCK NUMBER | (2) DESCRIPTION, CAGEC, AND PART NUMBER | (3) USABLE ON CODE | (4) U/M | (5) QTY RECM |
|---------------------------------|----------------------------------------------------------------------|--------------------------|------------|--------------------|
| 4930-00-204-2550 | Adapter, Grease Gun (81349) MIL-L-4387 | | EA | 1 |
| 5120-01-371-9268 | Brush, Cleaning, Battery (55719) BTC-3 | | EA | 1 |
| 5140-00-261-4994 | Vehicle, Wire Cutter (19207) 11655787 | | EA | 1 |
| 5120-00-265-7462 | Hammer, Hand Sledge, 6 lb (19207) 41S3722 | | EA | 1 |
| 6120-00-144-5207 | Adapter, Socket (19207) 11655788-3 | | EA | 1 |
| 7510-01-065-0166 | Folder, Equipment(81349) MIL-F-43986 | | EA | 1 |
| 2540-00-587-2532 | Tarpaulin, Cloth, Cotton 12-ft X 17-ft (19207) 10936264 | | EA | 1 |
| 2540-01-330-8062 | Tarpaulin, Cloth, Cotton, 12-ft X 17-ft (Tan) (19207) 10936264-IT | | EA | 1 |
| 7240-00-255-8113 | Swing Spout, Oil Can (N/A) | | EA | 1 |
| 2540-00-936-7801 | Towbar (19207) 11660660 | | EA | 1 |
| 5120-00-224-3154 | Wrench, Box, 1/2-in. x 9/16-in. (19207) 11655785-1 | | EA | 1 |
| 5120-00-224-3141 | Wrench, Box, 5/8-in. X 11/16-in. (19207) 11655785-2 | | EA | 1 |
| 5120-00-240-5609 | Wrench, Open End, Fixed, 3/4-in. X 7/8-in. (19207) 11655789-4 | | EA | 1 |

END OF TASK

EXPENDABLE AND DURABLE ITEMS LIST**0054 00****INTRODUCTION****Scope**

This work package lists expendable and durable items that you will need to operate and maintain the M113A3/BMP-2 OSV. This list is for information only and is not an authority to requisition the listed items. These items are authorized to you 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.

Explanation of Columns in the Expendable/Durable Items List

Column (1) — Item Number. This number is assigned to the entry in the list, and is referenced in the narrative instructions to identify the item (e.g. "Use cleaning solvent (WP 0054 00, Item 6).

Column (2) — Level. This column identifies the lowest level of maintenance that requires the listed item.

C = Operator/Crew

Column (3) — National Stock Number (NSN). This is the NSN assigned to the item which you can use to requisition it.

Column (4) — Item Name, Description, Commercial and Government Entity Code (CAGEC), and Part Number. This column provides the other information you need to identify the item.

Column (5) — Unit of Measure (U/M). This code shows the physical measurement or count of an item, such as gallon (GL), pound (LB), dozen (DZ), etc.

Table 1. Expendable and Durable Items List

| (1) ITEM NUMBER | (2) LEVEL | (3) NATIONAL STOCK NUMBER | (4) ITEM NAME, DESCRIPTION, CAGEC, AND PART NUMBER | (5) UM |
|-----------------------|--------------|---------------------------------|------------------------------------------------------------------------------------------|-----------|
| 1 | C | 6810-00-201-0906 | Alcohol, Denatured (81348) O-E-760, GRADE III | PT |
| 2 | C | 6810-00-983-8551 | Alcohol, Isopropyl (81348) TT-I-735A | PT |
| 3 | C | 6850-00-127-7193 | Antifogging Kit, M1 (81361) B5-16-1 | EA |
| 4 | C | 6135-00-120-1020 | Battery, Dry, 1.5 Volt (96906) MS75059 | EA |
| 5 | C | 8020-00-257-0382 | Brush, Artists (81562) 5038-2 | EA |
| 6 | C | 6850-01-277-0595 | Cleaning Compound (59557) 134 HI-SOLV | 5 GAL |
| 7 | C | 8305-00-267-3015 | Cloth, Cheesecloth, Cotton, Bleached and Un-bleached (81348) CCC-C-440, TYPE II, CLASS 2 | LB |
| 8 | C | 7920-00-044-9281 | Cloth, Lint-Free (51200) MIRACLEWIPE001 | LB |
| 9 | C | 7930-00-282-9699 | Detergent (81349) MIL-D-16791 | GAL |
| 10 | C | 9140-00-419-0450 | Fuel Oil, Diesel(58536) A-A-52557A (SUPER-SEDES VV-F-800E) | GAL |
| 11 | C | 9150-00-985-7244 | Grease, Aircraft and Instrument (GIA) (1 LB Can) (81349) MIL-PRF-23827C | LB |
| 12 | C | 9150-01-197-7692 | Grease, Automotive (GAA) (1 LB Can) (81349) MIL-PRF-10924G (SUPERSEDES MIL-G-10924) | LB |
| 13 | C | 9150-00-754-2595 | Grease, Molybdenum Disulfide (1 LB Can) (81349) MIL-G-21164 | EA |
| 14 | C | 9150-00-402-2372 | Lubricating Oil, Internal Combustion Engine, Arctic (OEA) (81349) MIL-L-46167C | QT |
| 15 | C | 9150-00-189-6727 | Lubricating Oil, Internal Combustion Engine (OE/HDO) (81349) MIL-L-2104D | QT |

Table 1. Expendable and Durable Items List - Continued

| (1) ITEM NUMBER | (2) LEVEL | (3) NATIONAL STOCK NUMBER | (4) ITEM NAME, DESCRIPTION, CAGEC, AND PART NUMBER | (5) UM |
|-----------------------|--------------|---------------------------------|----------------------------------------------------------|-----------|
| 16 | C | 7930-00-880-4454 | Solution, Lens Cleaning (81348) P-D-410 | GAL |
| 17 | C | 6810-00-356-4936 | Water, Distilled (81346) ASTM-D-1193 | BT |
| 18 | C | 7920-00-205-1711 | Wiping Rag(58536) A-A-2522 | LB |

END OF TASK

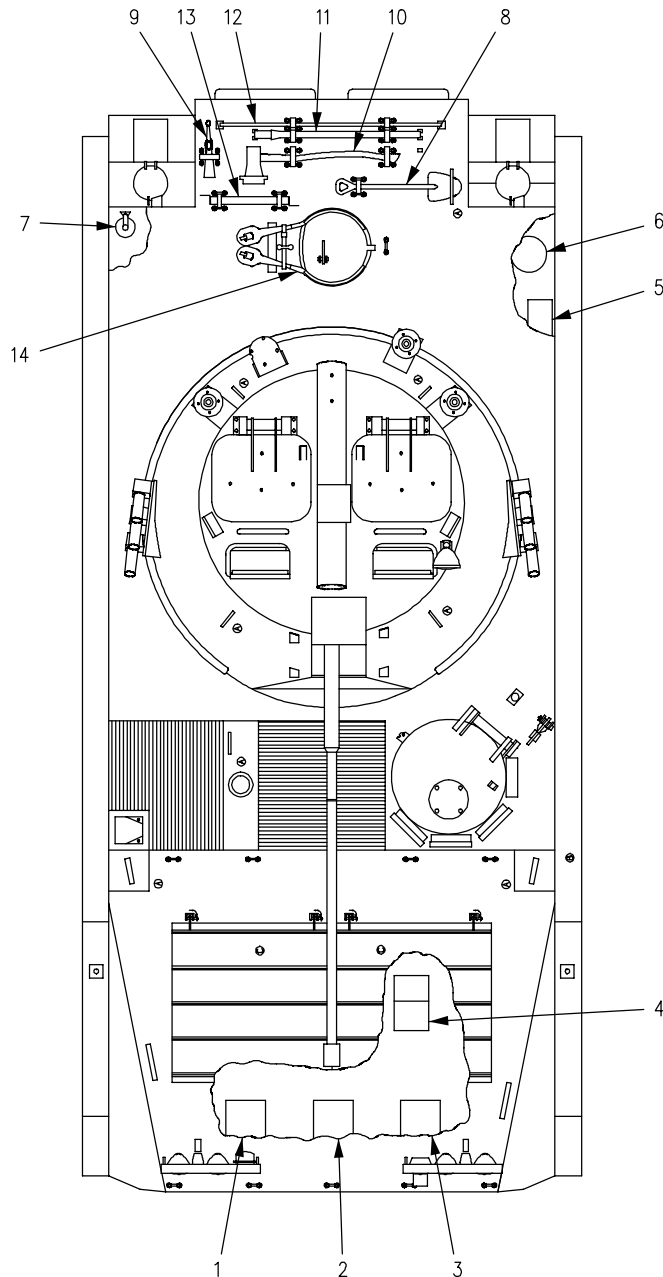
STOWAGE AND DECAL/DATA PLATE GUIDE

0055 00

STOWAGE

This work package shows you where to stow equipment in and on the M113A3/BMP-2 OSV hull. Equipment stowed in the turret is not covered. For other stowage, see (TM 9-2350-366-10-2).

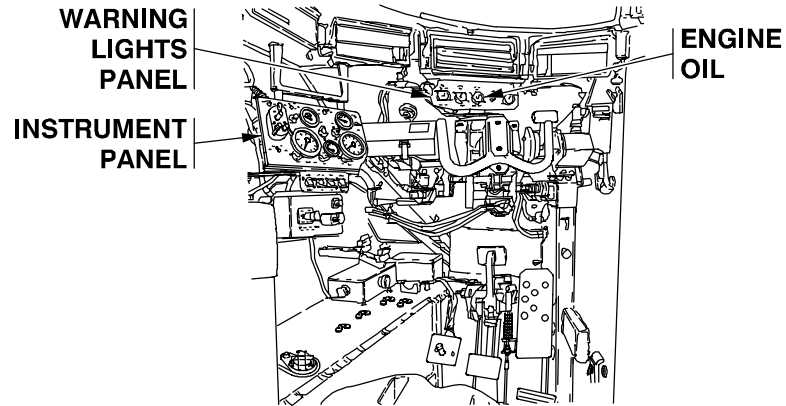
Items 1 through 7 are stowed inside the vehicle. Items 8 through 14 are stowed on the outside of the vehicle.

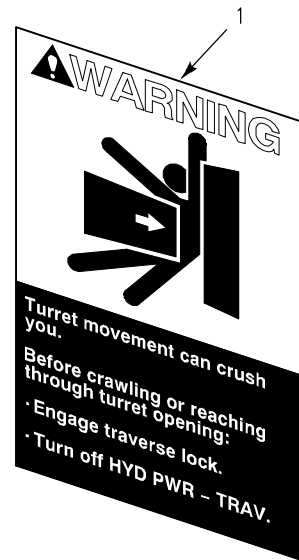
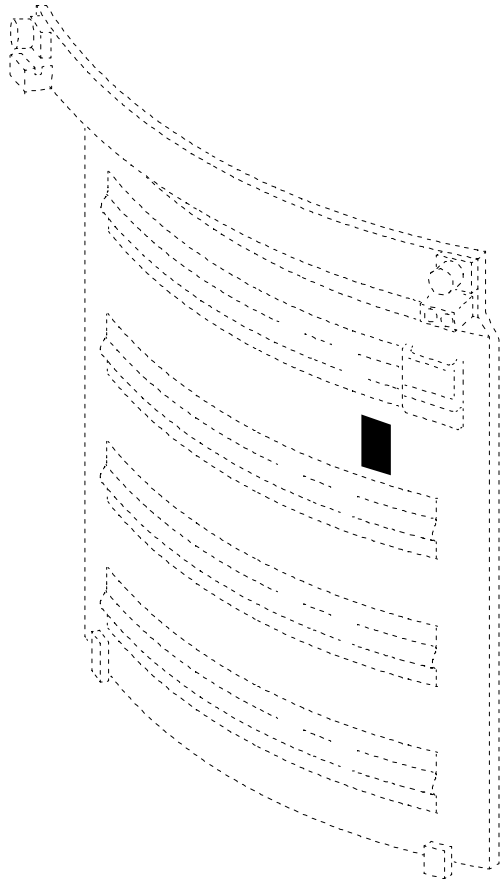


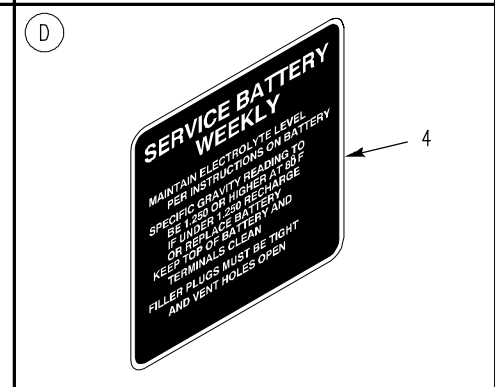
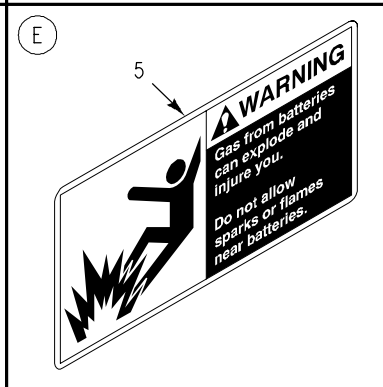
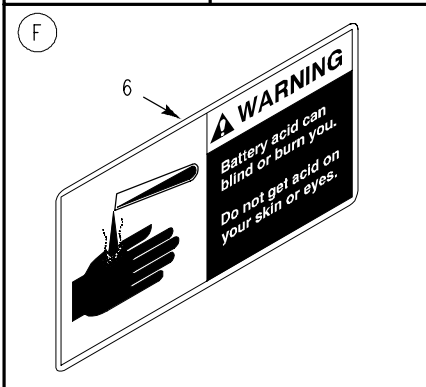
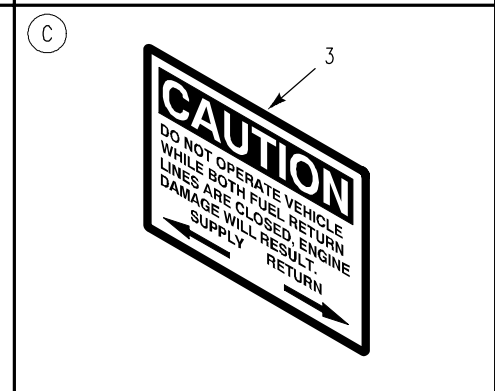
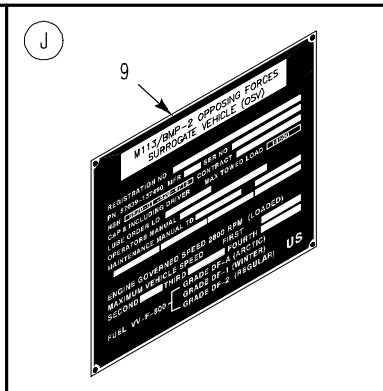
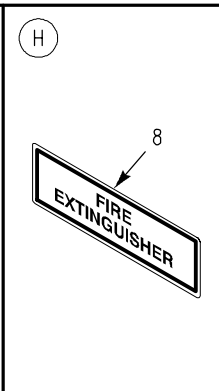
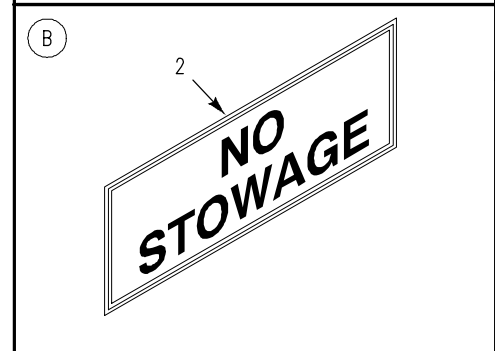
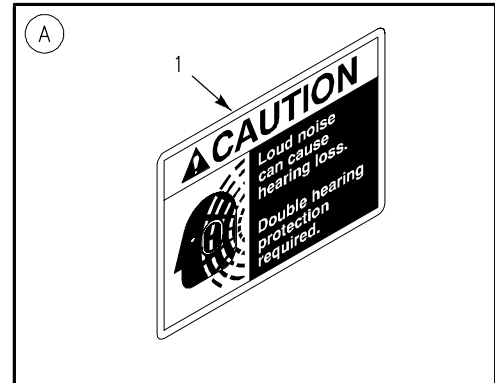
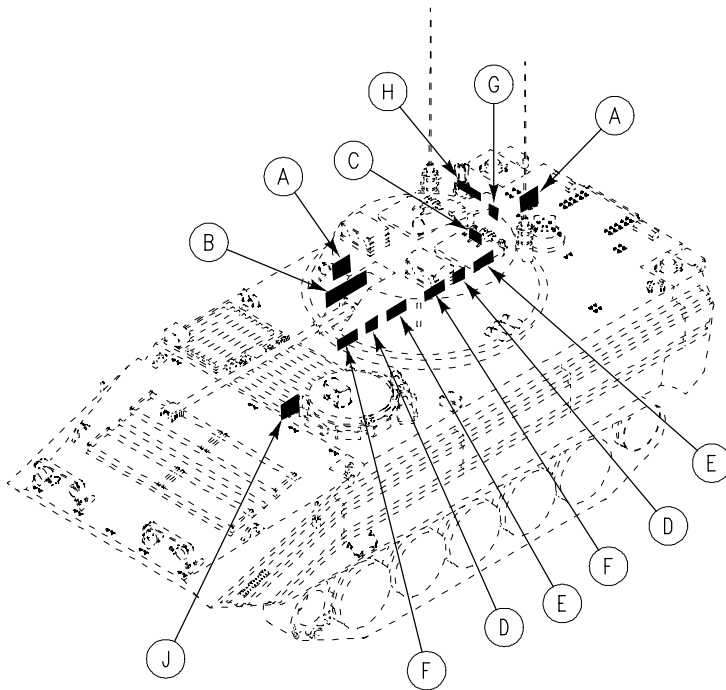
- 1. Can, Water
- 2. Can, Oil
- 3. Can, Anti Freeze
- 4. Shoes, Track
- 5. Bag, Tool
- 6. Cooler, Water
- 7. Fire Extinguisher
- 8. Shovel
- 9. Mattock Head
- 10. Axe
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- 12. Pry Bar
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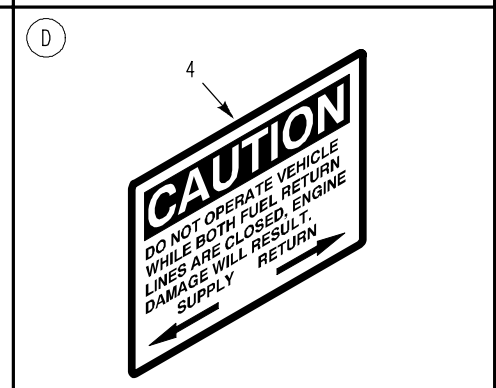
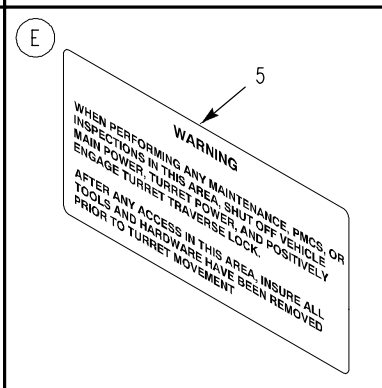
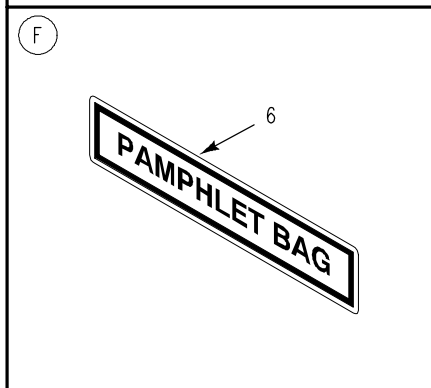
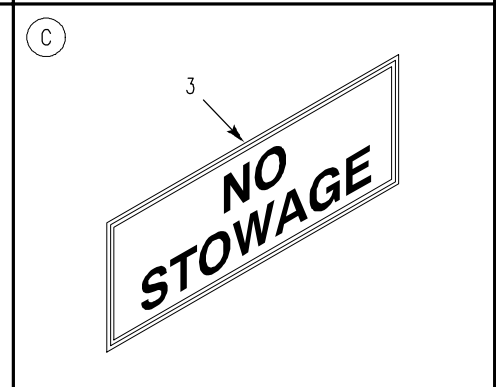
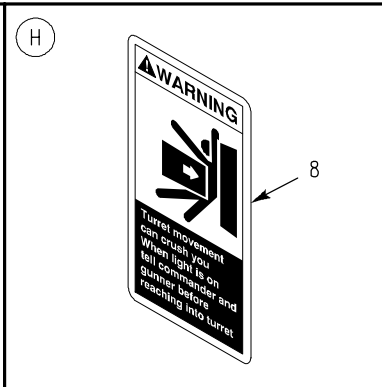
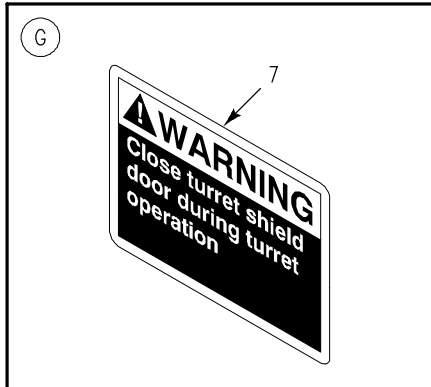
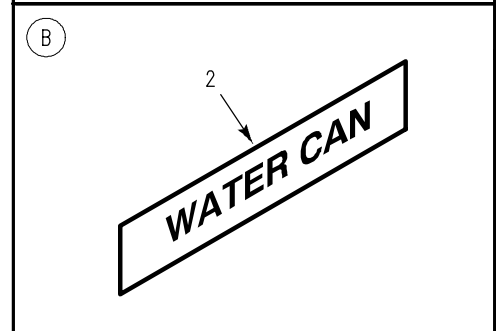
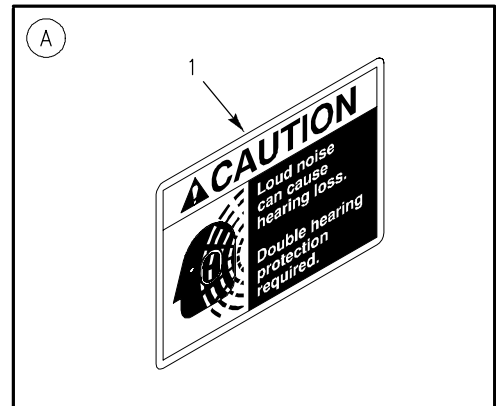
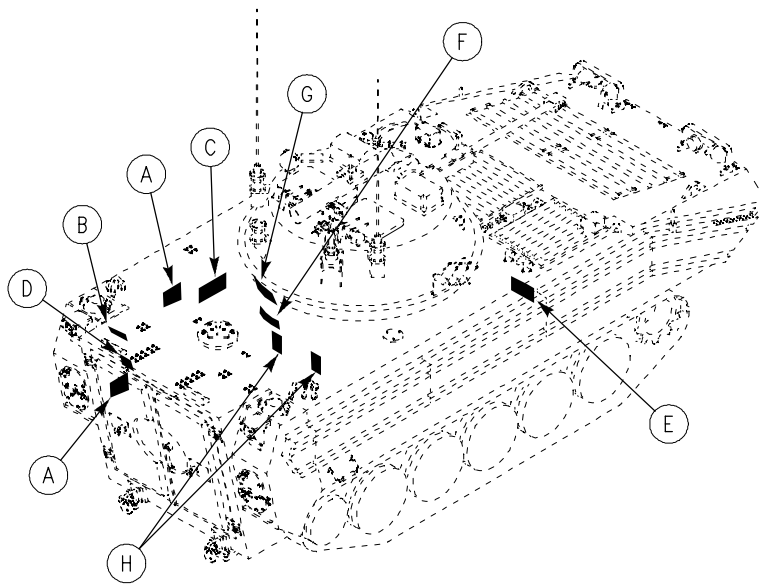
DECALS AND DATA PLATES

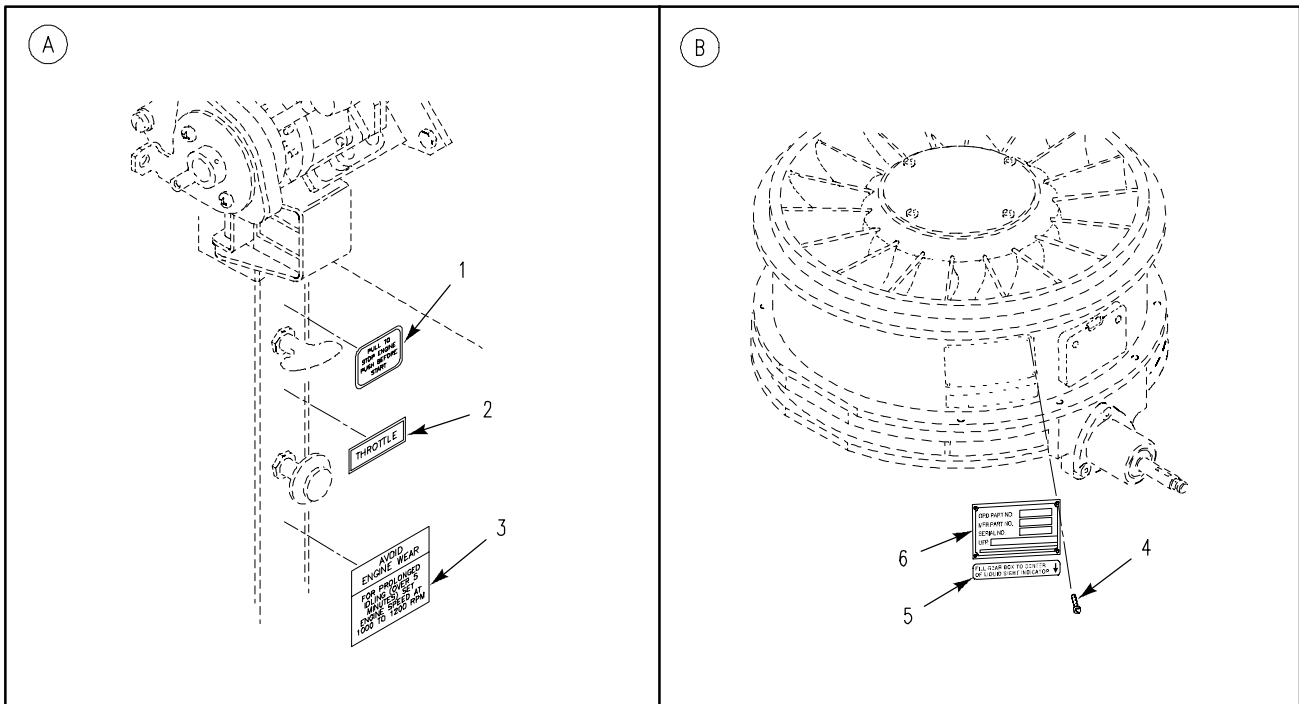
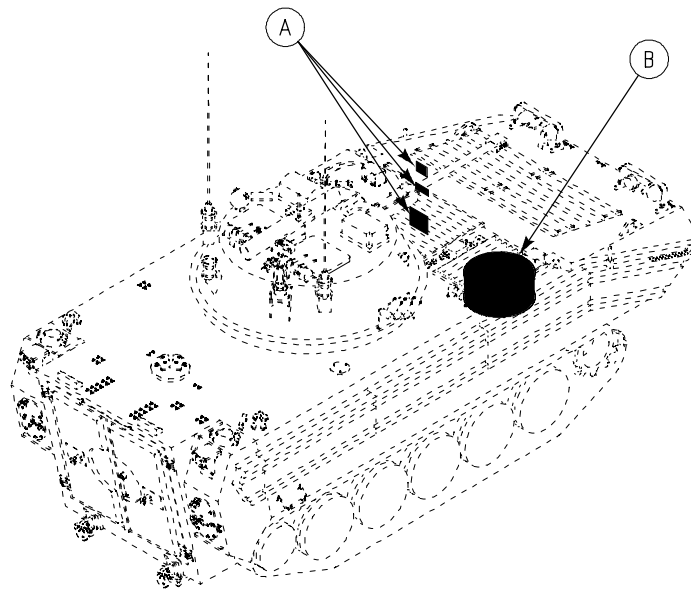
This work package also locates decals and data plates that are installed in the vehicle. Decals and plates are signs that identify an installed equipment item and/or contain instructions.











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| Adjust..... | 0041 00-1 |
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| Transmission Controller, Bypass Defective | 0033 00-1 |
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| Warning Lights Panel, Driver's Instrument Panel and, Check..... | 0040 00-35 |
| Warning Lights Panel Controls and Indicators..... | 0004 00-9 |
| Wear Limits, Track Shoe..... | 0047 00-1 |

By Order of the Secretary of the Army:

Official:

Handwritten signature of Joel B. Hudson in black ink.

*Administrative Assistant to the
Secretary of the Army*
0107105

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

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| PUBLICATION/FORM NUMBER TM 9-2360-366-10-1 | | | | DATE 2 March 2003 | | TITLE OPPOSING FORCES SURROGATE VEHICLE (OSV) M113A3/BMP-2 HULL | |
| ITEM | PAGE | PARA | LINE | FIGURE NO. | TABLE | RECOMMENDED CHANGES AND REASON | |
| 0052 00-4 | | | | | | Inspection Step 1 WP reference should be (WP 0003 00). | |
| SAMPLE | | | | | | | |
| *Reference to line numbers within the paragraph or subparagraph. | | | | | | | |
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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
 1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
 1 Kilogram = 1000 Grams = 2.2 Lb.
 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
 1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
 1 Sq. Kilometer = 1,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
 1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

TEMPERATURE

$5/9 (°F - 32) = °C$
 212° Fahrenheit is equivalent to 100° Celcius
 90° Fahrenheit is equivalent to 32.2° Celcius
 32° Fahrenheit is equivalent to 0° Celcius
 $(9/5 \times °C) + 32 = °F$

APPROXIMATE CONVERSION FACTORS

| TO CHANGE | TO | MULTIPLY BY |
|------------------------|----------------------|-------------|
| Inches | Centimeters | 2.540 |
| Feet | Meters | 0.305 |
| Yards | Meters | 0.914 |
| Miles | Kilometers | 1.609 |
| Square Inches | Square Centimeters | 6.451 |
| Square Feet | Square Meters | 0.093 |
| Square Yards | Square Meters | 0.836 |
| Square Miles | Square Kilometers | 2.590 |
| Acres | Square Hectometers | 0.405 |
| Cubic Feet | Cubic Meters | 0.028 |
| Cubic Yards | Cubic Meters | 0.765 |
| Fluid Ounces | Millimeters | 29.573 |
| Pints | Liters | 0.473 |
| Quarts | Liters | 0.946 |
| Gallons | Liters | 3.785 |
| Ounces | Grams | 28.349 |
| Pounds | Kilograms | 0.454 |
| Short Tons | Metric Tons | 0.907 |
| Pound-Feet | Newton-Meters | 1.356 |
| Pounds per Square Inch | Kilopascals | 6.895 |
| Miles per Gallon | Kilometers per Liter | 0.425 |
| Miles per Hour | Kilometers per Hour | 1.609 |

| TO CHANGE | TO | MULTIPLY BY |
|----------------------|------------------------|-------------|
| Centimeters | Inches | 0.394 |
| Meters | Feet | 3.280 |
| Meters | Yards | 1.094 |
| Kilometers | Miles | 0.621 |
| Square Centimeters | Square Inches | 0.155 |
| Square Meters | Square Feet | 10.764 |
| Square Meters | Square Yards | 1.196 |
| Square Kilometers | Square Miles | 0.386 |
| Square Hectometers | Acres | 2.471 |
| Cubic Meters | Cubic Feet | 35.315 |
| Cubic Meters | Cubic Yards | 1.308 |
| Milliliters | Fluid Ounces | 0.034 |
| Liters | Pints | 2.113 |
| Liters | Quarts | 1.057 |
| Liters | Gallons | 0.264 |
| Grams | Ounces | 0.035 |
| Kilograms | Pounds | 2.205 |
| Metric Tons | Short Tons | 1.102 |
| Newton-Meters | Pound-Feet | 0.738 |
| Kilopascals | Pounds per Square Inch | 0.145 |
| Kilometers per Liter | Miles per Gallon | 2.354 |
| Kilometers per Hour | Miles per Hour | 0.621 |

