DEPARTMENT OF THE AIR FORCE
Headquarters US Air Force
Washington, D.C. 20330-1030

QTP 24-3-L287
31 August 2022

Joint Light Tactical Vehicle

Vehicle Management Codes: L285 (JLTV Heavy Guns Carrier), L286 (JLTV Utility), L287 (JLTV General Purpose), and L289 (JLTV Trailer)

QUALIFICATION TRAINING PACKAGE

CONTENTS

Section 1—OVERVIEW

1.1. Overview.

1.1.1. This publication implements Air Force standardized vehicle training in accordance with (IAW) AFI 24-301, Ground Transportation. This publication is applicable to all authorized users of Air Force Government Motor Vehicles (GMV) regardless of service affiliation to include Air National Guard (ANG) and Air Force Reserve, as well as Civil Air Patrol and non-appropriated fund activities.

1.1.2. This Qualification Training Package (QTP) will be used to train individuals on how to operate the JLTV and perform tasks with the equipment.

1.1.3. Send comments and suggested improvements on AF Form 847, *Recommendation for Change of Publication* through Air Force Installation and Mission Support Center (AFIMSC) functional managers via e-mail at AFIMSC.IZSL.GroundTrans@us.af.mil.

1.1.4. How to use this plan:

- Trainer:
  - Provide overview of training, **Section 2** and **Section 3**.
  - Trainer's lesson plan for trainee preparation, give classroom lecture, **Section 4**.
  - Trainer's lesson plan for knowledge training, **Section 5**.
  - Trainer's lesson plan for demonstration, **Section 6**.
  - Trainer's lesson plan for performance and evaluation, **Section 7**.
- Trainee:
  - Reads this entire lesson plan prior to starting lecture.
  - Follows along with lecture using this AFQTP and its attachments.
  - Uses Attachment 2 as a guide for vehicle inspection.
  - Takes knowledge test, Attachment 4.
  - Takes performance test.

Section 2—RESPONSIBILITIES

2.1. Responsibilities.

2.1.1. The trainee shall:

- Ensure the trainer explains the Air Force Qualification Training Plan (AFQTP) process and the responsibilities.
- Wear proper Personal Protective Equipment (PPE) IAW DAFMAN 91-203, *Air Force Occupational Safety, Fire and Health Standards*.
- Safety toed boots.
- Safety gloves, when required.
- Hearing protection, when required.
- Safety glasses, when required.
- Ask questions if they do not understand the objectives, lecture, or material for each section when training lecture or materials are unclear.
- Possess a valid vehicle operator's license IAW AFMAN 24-306, Chapter 3.
- Complete Section 1 and 2 of AF Form 171, *Request for Driver's Training and Addition to U.S. Government Drivers,* IAW AFMAN 24-306, Chapter 3.
- Review AFMAN 24-306*,* Chapters 4, 6, 7, 9, and 10.
- Read this AFQTP in its entirety.
- Read **Attachment 5 in its entirety.**
- Complete JLTV knowledge test, **Attachment 4** of this QTP.
- Review missed questions with the Trainer.
- Conduct performance demonstration until proficient.
- Complete JLTV performance test, **Attachment 3** of this QTP.

2.1.2. The Trainer shall:

- Understand trainer's role IAW DAFI 36-2670.
- Read **Attachment 5 in its entirety**.
- Wear and ensure trainee is wearing PPE IAW para 2.1.1.2 of this QTP.

- Validate trainee's vehicle operator's license IAW AFMAN 24-306, Chapter 3.
- Verify Section 1 and 2 of AF Form 171, IAW AFMAN 24-306, Chapter 3.
- Provide Lectures:
- AFMAN 24-306, Chapters 4, 6, 7, 9, and 10.
- This entire AFQTP.
- MOM.
- Conduct knowledge training with the trainee using the AFQTP.
- Conduct knowledge testing with the trainee using **Attachment 4**.
- Grade the review questions using the answer key in **Attachment 4**.
- Review missed questions with the trainee to ensure the required task knowledge has been gained to complete the task. A passing score for the knowledge test is 80%.
- Administer performance test, **Attachment 3** of this QTP.
- Review all No-Go items with the trainee, if applicable.
- Annotate training IAW DAFI 36-2670, and AFMAN 24-306

2.1.3. The Certifier shall:

- Not be the trainer.
- Evaluate the Airman's task performance without assistance.
- Ensure the trainee has zero No-Go's annotated on the performance test, using Attachment 3.
- Sign off the task

Section 3—INTRODUCTION

3 Introduction

3.1. Objectives

3.1.1. Trainees will be given lectures, demonstrations, a knowledge test, hands-on driving, and a performance test. Upon completion, the trainee should:

- Understand the manufacturer's compliance requirements in the Manufacturers Operator's Manual.
- Be proficient and qualified to inspect and operate the JLTV.
- Pass knowledge testing with a minimum score of 80%.
- Pass performance testing without assistance and zero No-Go's.

3.2. Desired Learning Outcomes.

3.2.1. Understand any safety precautions in the Manufacturers Operator's Manual and **Attachment 5.**

3.2.2. Understand the automotive systems and components of the JLTV

- Operation of the vehicle to include under emergency conditions
- Perform operator level maintenance tasks to ensure the vehicle is mission ready.

3.2.3. Know the proper operator maintenance procedures, IAW applicable Technical Orders (TO) and use of AF Form 1800, *Operator's Inspection Guide and Trouble Report*. Operators **must** read **Attachment 5,** in its entirety, to understand common issues and troubleshooting techniques.

3.2.4. Safely and proficiently operate the JLTV.

3.3. Lesson Duration.

3.3.1. Minimum instructional and hands-on training time will be 40 hours:

Figure 3.1. Minimum Training Time for Training Activities.

Training Activity	Training Time
Trainee's Preparation	.5 Hour
Trainee's Knowledge Evaluation	1 Hour
Trainer's Lecture and Demonstration	10.25 Hours

Trainee's Personal Experience (to build confidence and proficiency) ▪ Perform Operator Maintenance ▪ Operate the Vehicle	27.25 Hours
Trainee's Performance Evaluation	1 Hour
Total Hours	40 Hours

Note: This is the minimum training time; training time will most likely last longer.

3.4. Instructional References.

3.4.1. Risk Management (RM) and Safety Principles IAW Air Force Pamphlet (AFPAM) 90-803, *Risk Management (RM) Guidelines and Tools*.

3.4.2. Applicable TOs or MOM (see Vehicle Management for TO number for vehicle being used in training).

3.4.3. Air Force Manual (AFMAN) 24-306, *Operation of Air Force Government Motor Vehicles.*

3.4.4. AF Form 1800, Operator's Inspection Guide and Trouble Report

3.4.5. Special references based-off type of vehicle. Reference MOM.

3.5. Instructional Training Aids and Equipment.

3.5.1. JLTV AFQTP.

3.5.2. JLTV.

3.5.3. MOM.

3.5.4. AF Form 1800.

3.5.5. Suitable training area.

Section 4—TRAINEE PREPARATION

4.1. Licensing Requirements.

4.1.1. Trainee must have a valid state driver's license in their possession.

4.1.2. AF Form 171, *Request for Driver's Training and Addition to U.S. Government Driver's License* IAW Air Force Instruction (AFI) 24-301, *Ground Transportation*.

4.1.3. Applicable local licensing jurisdiction requirements.

4.2. Required Reading.

4.2.1. Read this entire AFQTP.

4.2.2. Read AFMAN 24-306.

4.2.3. Read MOM

Section 5—KNOWLEDGE, LECTURE, AND EVALUATION

5.1. Overview of Training and Requirements.

5.1.1. Training objectives:

- Trainees will be given lectures, demonstrations, a knowledge test, hands-on driving, and a performance test.

- This training will ensure the trainee becomes a qualified JLTV operator—an operator who has the knowledge and skills to operate a JLTV in a safe and professional manner.

5.1.2. The JLTV is capable of driving over various terrain. Due to its unique suspension system, it is necessary to know how to configure the vehicle for operation in normal driving conditions, on proved and improved roads, in emergency situations, in various climates, and over various terrain in order to complete the mission and avoid injury or death to personnel or damage to the vehicle. Refer to the MOM and **Attachment 5** for additional information on the specific JLTV being operated, and to the data plate for safe load capacity guidance. The JLTV normally can be identified by the following characteristics:

- Specifications. Refer to the MOM, **Attachment 5**, and the vehicle data plate to become familiar with the following specifications for the JLTV being operated.

    - Weight.

    - Chassis.

- Engine/drive train.

- Full time All-wheel drive with Axle Lockup in 4 different modes depending on terrain.

- Electrical system.

- Front and rear auxiliary heat and air conditioning (A/C).

    - Passenger capacity: Design for fire team and standard gear and additional capability, if applicable, for short periods.

    - Interior room.

- Maximum payload (with and without blast armor).

    - Fuel tank capacity/fuel type.

    - Armor rating and location.

- Blast resistant components, if applicable.
- Weapons configuration.

- Rollover prevention data. Angle of approach, angle of departure, maximum side slope on hard surfaces, maximum side slope on soft surfaces, and center of gravity location.
- Additional components.
  - CTIS (Central Tire Inflation System) is used in place of Run Flats and is controlled all through the DSDU (Driver Smart Display Unit).

Note: Tire pressure must be checked before each use located on DSDU.

- Doors.
  - Door hold open system (if applicable).
  - Door guards.
  - Turret.
  - Secure open/closed.
- Mounting weapons and turning.
  - Gunner stand.
  - Full side and rear running boards.
  - Rooftop access points.
  - Handholds.
  - Locking fuel door.
  - Instrument panels.
  - Hour meter.
- Other meters and gauges.
  - Center console.
  - Heated windshields.
  - Rear black-out feature.
  - Radio (mobile).

- Thermal imaging.
- Siren/public address (PA) system (if equipped).
- Power inverter. Allows the vehicle to be charged using shore plug on the exterior of the vehicle.

Note: The inverter switch must be in the off position to avoid drain on the batteries when not in use.

- Cabin interior.
- Lighting is tactical (red) or non-tactical (white).
- Rear heater control.
- Firing ports
- Fire Suppression System

5.2. Vehicle Inspection.

5.2.1. Pre-trip vehicle inspection test. Use **Attachment 2** as a walk around guide along with AF Form 1800.

5.2.2. Types of Vehicle Inspection. If discrepancies are found they must be reported to the Vehicle Control Official (VCO), the supervisor, and/or Vehicle Management: **Pre-trip inspection** – find items/problems that could cause accident or breakdown.

- Cleanliness/damage/missing items.
- Glass. --The strike side (known as the exterior) and the safe side is known as the interior.
- The strike side (exterior) should be cleaned with standard window cleaning products like windshield washer fluid or mild detergent.
- The safe side (known as the interior) should be cleaned with a 0% isopropyl alcohol solution and a lint free cloth. Do not use an ammonium-based cleaning products as this will damage the windshield.
- Only use approved vehicle washing soap and water to clean the vehicle. Note: Do NOT use chemicals to clean JLTV
- Do NOT wax.
- Secure cargo and equipment before operating the vehicle, as specified in the

MOM and Attachment 5.

- Leaks (fuel/oil/coolant/hydraulic/air).
- Check hoses and fluid lines for wear, damage, or leaks.
    - Make sure clamps and fittings are tight.
    - Wetness around seals, gaskets, fittings, or connections indicate leakage. Report all leaks to Vehicle Management.
- Fluid levels; ensure level is within limits IAW the MOM:
    - Opening hood.
    - Hood open assist device: yellow handle located on the passenger side of front grill, behind the bumper. After release, stand off-center, towards passenger side for ease of lifting ballistic hood.
    - Full engage the hood prop during all under-the-hood inspections.
- Engine oil.
- Coolant.
- Power steering fluid.
- Transmission fluid and hydraulic fluid
- Antifreeze.
- Battery: Security, fluid, damage, and corrosion.
    - Power inverter (if available).
    - Inverter vehicle battery charge feature (if available).
- Check all bolts, nuts, and screws. **Note:** If bent, broken, or missing, report conditions to the VCO or Vehicle Management.
- Look for loose or chipped paint, rust, or cracks at welds.
- If a cracked weld is found, report to Vehicle Management.
- All wheel rims: Check for any cracks, splits, or other visible damages.

Note: If any cracks, splits, or damage is found, report it to Vehicle Management.

- Check for loose or missing lug nuts. If lugs are loose, tighten them IAW with the MOM's specifications or report it to Vehicle Management.
- All tires.
    - During peacetime operations, only JLTV qualified maintenance personnel should perform tire changes. During contingency operations, the operator may perform a tire change and should only be performed with specialized preformed jack and equipment outlined in the MOM. Ensure Central Tire Inflation System (CTIS) is disabled and place suspension lock-out braces. The tires are extremely heavy and will require 2 or more individuals to remove the spare tire and to put the flat back in its place.
    - Ensure that the vehicle is on a level surface and that wheels are chocked prior to lifting the vehicle
    - Outer nuts hold wheel assembly together. Do not loosen or remove outer nuts on wheel. Tire is under pressure and loosening these nuts can cause tire to blow apart. Failure to comply may result in injury or death to personnel.
    - If pneumatic tools will be used, gloves, eye protection, and hearing protection are required.
    - Ensure proper inflation.
    - Check sidewalls and tread, to include depth and bulges.
    - Check for any cuts and abrasions.
    - Check transmission for any observable damage or leaks.
    - Check drive belts for tension, excessive looseness, and/or fraying.
- Ensure all hoses and wiring are secured and not damaged.
- Check differential, shocks, and brakes for leaks.
- Check suspension, springs, and shocks for damage.
- Ensure fuel door and fuel cap is intact and not broken or damaged.
- Check horn operation.
- Adjust the driver's seat to the desired position
- Check all gauges and the Driver Smart Display Unit (DSDU) for proper operation.

- Ensure that the heater/defroster is functioning correctly.
- Wiring/lights/reflectors (interior and exterior).
    - Look for bare wires and loose or broken connections.
    - Tactical (red) and non-tactical (white) lighting.
    - Ensure all signal lights (i.e., turn signals) are working correctly
    - Ensure all reflectors are not missing or damaged.
    - Ensure all mirrors are not damaged.
- Check windshield and windshield blades for cracks or damage.
- Check doors/door guards. Refrain with closing the door with the combat latch engaged. Will cause damage to door, and locking mechanism.
- Ensure the turret is operating correctly (i.e., swivel).
- Ensure weapon mounts are tightly in place and not damaged.
- Gunner stand (frayed/damaged turret seat mechanism), if applicable.
- Check firing ports, if applicable.
- Check full side and rear running boards, if applicable.
- Check rooftop access points, if applicable.
- Check hand holds for damage.
- Check locking fuel door.
- Check all windows for any cracks or damage.
- Check hood latches for proper operation and/or damage.
- Ensure all seatbelts work properly and are not damaged.
- Check fire extinguisher & Fire Suppression unit-sensor (center of driver's cab above DSDU). Make sure there aren't any obstructions

5.2.3. **During-operation**, check all:

- Instrument panel for proper operations.
- Warning lights.

- Gauges (oil pressure, fuel gauge, water temperature, voltage, etc.).
- Indicators.
- Heated windshields, if applicable.
- Blackout features.
- Radio or communications device, if applicable. 5.2.2.2.1.7. Thermal imaging system, if applicable.
- Siren/PA, if applicable.
- Driver's Smart Display Unit (DSDU).
- Listen for any unusual sounds, such as exhaust or air leaks.
- Stay alert for any unusual smells or odors.
- Stay alert for any abnormal vibrations or handling problems.

5.2.4. **After-trip inspection.** Ensure the JLTV is:

- Cleaned, both inside and outside to include all components.
- Organized by properly stowing equipment.
- Refueled.
- Parked with transmission in neutral (or P-Park for automatics) and emergency brake applied.

5.3 Vehicle Safety and Equipment.

5.3.1. Hazards and Human Factors:

5.3.2. Review MOM and Attachment 5 for overhead clearance.

5.3.3. Ensure loads do not extend beyond the vehicle's capacity IAW the data plate and the MOM.

5.3.4. Avoid jerky starts and stops.

5.3.5. Travel at an appropriate speed and distance between vehicles to allow for safe braking.

5.3.6. Suspension lock-out braces must be installed on driver and passenger side of axle prior to crawling under vehicle. Suspension may lower, crushing personnel. Failure to comply may result in injury or death to personnel.

5.3.7. Rollover risk warning. The potential for a vehicle to rollover increases for vehicles with a high

gross weight (20,000 lbs. or more) or a high center of gravity. Check the vehicle's data plate to determine if the vehicle is at higher risk for rollover.

5.3.8. Safety Clothing and Equipment:

- PPE must be worn IAW para 2.1.1.2 of this QTP.
- Inclement weather gear, if applicable.
- Reflective belt during hours of reduced visibility and on flightline (if applicable).
- Fire extinguisher.

5.4. Driving Safety and Precautions.

- Avoid jerky starts and stops. Use exhaust brake only during normal operating conditions. Using the exhaust brake is not recommended unless towing.
- When braking, allow a much greater distance to stop. The JLTV can take twice the distance of a normal High Mobility Multipurpose Wheeled Vehicle (HMMWV) to stop.
    - Traveling too fast and turning too sharply.
    - Due to the weight of the vehicle, the JLTV requires 2-10x the stopping distance of a regular vehicle. Inclement weather requires a much greater stopping distance.
    - Do not attempt to make sudden turns. The JLTV has an elevated rollover risk.

5.4.1. Rollover prevention. Be familiar with rollover prevention data for the JLTV: Know and understand the approach angle and departure angle. Also, refer to the MOM and Attachment 5 for information on the JLTVs center of gravity and maximum side slope for both hard and soft surfaces.

5.4.2. Backing

- Always use a spotter when backing.
- The operator must maintain visual contact with the spotter at all times.
- If visual contact is lost, the operator must immediately stop the vehicle. See AFMAN 24-306 for additional guidance on spotter safety and for standard hand signals.

5.5. Vehicle Operation.

5.5.1. Start the engine. Refer to the MOM for start-up procedures during cold-weather.

5.5.2. Glow plug preheat.

- Diesel engines are equipped with glow plugs instead of spark plugs. Glow plugs must be allowed to heat up prior to starting the vehicle.

- Turn the engine ignition switch to the "on" position and look for the "Wait to Start" indicator light on the left side of the instrument cluster. When the light goes out, it is safe to start the vehicle. Refer to Attachment 5 Figure 2.31 for an instrument panel visual. Note: If you do not allow the glow plugs to heat up, permanent damage can occur.

- Visibility. Know the weather conditions and visibility prior to operating the vehicle.

5.5.3. Axle Lock-up Operation.

- Only use 4WD when necessary. Operating the vehicle on the highway or in the city does not warrant 4WD utilization. Soft, wet (i.e., rain or snowy environment) conditions create uses for 4WD.

- Refer to the MOM for more 4WD information on the JLTV type.

5.5.4. Diesel Particulate Filter (DPF). (If equipped)

- If applicable, when the DPF is nearly full, a light or visual will be displayed in the instrument cluster or DSDU.

- When this occurs, the driver will need to drive the vehicle above 30 mph for about an hour until the light or visual goes out. If this is not done, the engine will go into reduced power mode until the filter is cleaned. Refer to the MOM for DPF information.

5.5.5. Headlight Operation

- Switch is a Multiplex (MUX) panel switch

- No longer traditional M-Series switch

5.5.6. Spot light (if applicable).

- The light is controlled by the 4-way joystick/power switch.

- Vehicle's main power must be in the "on" position to use the light.

5.5.7. Towing. Operators are able to flat tow or tow with a specific JLTV weighted tow bar.

- See MOM and Attachment 5 for specific vehicle operation guidance on JLTV operation. Operation procedures will vary based on vehicle manufacturer, model, and exterior/interior configuration and components.

5.6. Knowledge Evaluation

5.6.1. Once the trainee feels confident about the knowledge acquisition from this QTP, the MOM, and Attachment 5, they may be given the knowledge evaluation. The minimum passing score is 80%. Note: Trainers/test proctors must reach out to AFIMSC Ground Transportation for testing materials.

5.6.2. The knowledge test consists of 25 multiple-choice and fill-in-the-blank questions. Trainees must be afforded at least one hour to complete the test.

5.6.3. Trainees are not authorized to use notes or other study materials during the knowledge test.

5.6.4. Re-evaluation: If a trainee fails to meet the 80% passing threshold:

- The trainer/test proctor will review missed questions with the trainee.
- Once remediation has occurred, retesting can be conducted.
- The trainee must use Version B for the retest.

5.6.5. Second Re-evaluation: If a trainee fails to meet the 80% passing threshold for test Version A and B:

- The trainee must re-accomplish all knowledge requirements in this QTP (including the review of the MOM and Attachment 5).
- Once the trainer validates the re-accomplishment knowledge requirements, the trainee will be eligible to retest, starting with test Version A.

Section 6—EXPLANATION AND DEMONSTRATION

6.1. Trainer's Preparation.

6.1.1. Establish a training location.

6.1.2. Obtain appropriate MOM and Air Force JLTV QTP.

6.1.3. Schedule/reserve a vehicle.

6.1.4. Ensure trainee completes Section 1 and 2 of the AF Form 171.

6.2. Safety Procedures and Equipment.

6.2.1. The following safety items should be followed by both the trainer and trainee.

- Lock out Braces before crawling under the vehicle and long periods of time for the vehicle sitting.

6.2.2. Chock wheel (if required) when JLTV is parked.

6.2.3. Remove all jewelry and identification tags.

6.2.4. Wear PPE referenced in para 2.1.1.2 of this QTP.

- Wear inclement weather gear, if applicable.
- Wear reflective belt during hours of reduced visibility or on the flightline.

6.2.5. The trainer must conduct a thorough vehicle walk-around to familiarize the trainee with all warning labels and signs.

6.2.6. Ensure trainee wears seat belt.

6.2.7. Properly adjust driver's seat and all mirrors.

6.3. Inspection Demonstration.

6.3.1. With trainee, accomplish vehicle inspection using AF Form 1800. An inspection guide (**Attachment 2**) can be used to ensure all areas of the JLTV are covered in addition to the "Operation Demonstration" guidelines provided below.

6.4. Operation Demonstration.

6.4.1. Throughout demonstration, the trainer must:

- Allow for questions from the trainee and repeat demonstrations as needed or requested.

6.4.2. For all JLTVs, within the training area, demonstrate and explain the following. **Note:** Use information contained on the data plate, MOM, and **Attachment 5**:

- Specific JLTV characteristics and capabilities.
- JLTV instrument panel.
- Point out the items to be inspected prior to operation, refer to para 5.2.2.1. of this QTP.
- Point out the items to be inspected during operation, refer to para 5.2.2.2. of this QTP

6.4.3. Demonstrate the following JLTV operations on gravel road and on hard pavement:

- Basic forward driving.
- Backing. (Use a spotter. Trainer can be the spotter).
- Parking.
- Right turn/left turn.
- Various Terrain obstacles/conditions
- Demonstrate the after operations inspection, refer to para 5.2.2.3. of this QTP.
- Perform a walk-around inspection. Use Step 4 in Attachment 2.
- Annotate any discrepancies found on the AF Form 1800.

6.4.4. Conclude by allowing time for questions and any requested re-demonstrations.

Section 7—TRAINEE PERFORMANCE AND EVALUATION

7.1. Trainee Performance.

- Trainee must use **Attachment 2** as a guide while performing the following inspections (have trainee explain items being inspected):
    - Pre-inspection.
    - During-inspection.
    - After inspection.
- Ensure AF Form 1800 is properly documented.
- Have the trainee describe the following:
    - Specific JLTV characteristics and capabilities
    - JLTV instrument panel.
- Have the trainee point out the items to be inspected during operations, as referenced in para 5.2.2.2. in this QTP.
- Have the trainee demonstrate the following JLTV operations on gravel road AND on hard pavement, refer to para 6.4.3. in this QTP.
- Continue until trainee can show proficiency in all areas.
- Trainee will perform after-operation inspection, refer to para 5.2.2.3 in this QTP.
- Trainee will perform a walk-around inspection.
- Trainee will report any discrepancies found on AF Form 1800.

7.2. Performance Evaluation.

7.2.1. Once the trainee is ready for the performance evaluation, the certifier will utilize **Attachment 3**.

- Certifier and trainee will review Attachment 3.
- Certifier will answer trainee's questions prior to evaluation, if applicable.
- Trainee is not allowed any certifier assists to pass the performance evaluation.
- The trainee must have zero No-Go's annotated on the performance test, using

Attachment 3.

Note: If available, mark vehicle with magnetic sign indicating "Driver-in-Training" or "Trainee Operator".

7.2.2. Certifier will:

- Ensure safety at all times.
    - Ensure the trainee places wheel chocks (if required) when JLTV is parked.
    - Ensure no jewelry and identification tags are worn by the trainer or trainee.
- Ensure trainee wears all PPE IAW para 6.2.1.3. of this QTP
- Pay particular attention to the caution and warning indicators listed in the MOM.
- Ensure trainee wears seat belt.
- Ensures trainee properly adjust driver's seat and all mirrors.
- Ensure trainee is familiar with all JLTV safety items/procedures, outlined in the MOM and **Attachment 5**.

7.2.3. Evaluation will consist of:

- Trainee may use **Attachment 2** as a guide while performing the following inspections (have trainee explain items being inspected):
    - Pre-inspection.
    - During-inspection.
    - After inspection.

  NOTE: Ensure trainee properly documents the AF Form 1800.
- Trainee must describe the following:
    - Specific JLTV characteristics and capabilities.
    - JLTV instrument panel.
- Trainee demonstrating the following JLTV operations on gravel road AND on hard pavement, refer to para 6.4.3. in this QTP

7.2.4. Ensure the trainee is aware of the operating environment and road/weather conditions.

7.2.5. Conduct after-action reviews with the trainee.

7.2.6. Retraining: The Certifier will address all No-go's with the trainer and trainee after the performance evaluation.

- The trainer must re-demonstrate all No-Go items outlined in **Attachment 3** with the trainee until proficient.

- Once the trainee is ready for retesting, the trainer must coordinate with the Certifier on scheduling.

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References
AFI 24-301, *Ground Transportation,* 22 October 2019
AFMAN 24-306, *Operation of Air Force Government Motor Vehicles,* 30 July 2020
AFPAM 90-803, *Risk Management (RM) Guidelines and Tools*, 23 March 2022

Adopted Forms
AF Form 171, *Request for Driver's Training and Addition to U.S. Government Driver's License*, 25 October 2019
AF Form 847, *Recommendation for Change of Publication*, 15 April 2022
AF Form 1800, *Operator's Inspection Guide and Trouble Report*, 01 April 2010

Abbreviations and Acronyms
AF—Air Force
AFI—Air Force Instruction
AFIMSC—Air Force Installation Mission Support Center
AFMAN—Air Force Manual
AFQTP—Air Force Qualification Training Plan
DPF—Diesel Particulate Fuel
HMMWV—High Mobility Multipurpose Wheeled Vehicle
IAW—In Accordance With
MOM—Manufacturer's Operation Manual
MPH—Miles per Hour
PA—Public Address
TO—Technical Order
VCO—Vehicle Control Official
4WD—Four Wheel Drive

Attachment 2

JLTV INSPECTION GUIDE

GENERAL

STEP 1. VEHICLE OVERVIEW

☐ Paperwork
- AF Form 1800
- Discrepancy Correction Complete (VM Annotation)

☐ Vehicle Approach
- Cleanliness
- Damage
- Vehicle Leaning
- Fresh Leakage of Fluids
- Hazards Surrounding Vehicle

INTERNAL

STEP 2. ENGINE COMPARTMENT

☐ Leaks/hoses/Electrical Wiring Insulation
☐ Oil Level
☐ Coolant Level
☐ Power Steering Fluid
☐ Windshield Washer Fluid
☐ Battery Fluid Level, Connections & Tie-downs
☐ Power Inverter/Inverter Vehicle Battery Charge Feature
☐ Automatic Transmission Fluid Level
☐ Engine Compartment Belts

STEP 3. ENGINE START/CAB CHECK (LEFT/FRONT/RIGHT)

☐ Safe Start
☐ Gauges
- Oil Pressure Gauge
- Air Pressure Gauge
- Temperature Gauge (Coolant/Engine Oil)
- Ammeter/Voltmeter

☐ Warning Lights & Buzzers
☐ Blackout Features.
☐ Radio.
☐ Thermal Imaging System.
☐ Mirrors & Windshield
☐ Wipers/Washers

☐ Emergency & Safety Equipment
- Properly Charged & Rated Fire Extinguisher
- Optional (Chains/Tire Changing Equip, Emergency Phone List)

☐ **3B** – Lights/Reflectors/Reflector Tape Condition (Front/Sides/Rear)
(Dash Indicators for:)
- Left Turn Signal
- Right Turn Signal
- Four-Way Emergency Flashers
- High Beam Headlight
- Spotlight
- Clearance Lights

(Reflective Clean & Functional Light & Reflector Checks Include:)
- Headlights
- Taillights
- Backing Lights
- Turn Signals
- Four-Way Flashers
- Spotlight
- Brake Lights
- Red Reflectors & Amber Reflectors
- Reflective Tape Condition

☐ Horn
☐ Siren/PA
☐ Heater/Defroster
☐ Brakes
- Parking Brake Check
- Hydraulic Brake Check
- Operational Range Brake

☐ Check Safety Belt
(TURN-OFF ENGINE/TURN-ON HEADLIGHTS *LOW BEAM* AND FOUR-WAY FLASHERS)

STEP 4. WALK-AROUND INSPECTION

☐ **4A** – Steering
- Steering Box/Hoses
- Steering Linkages

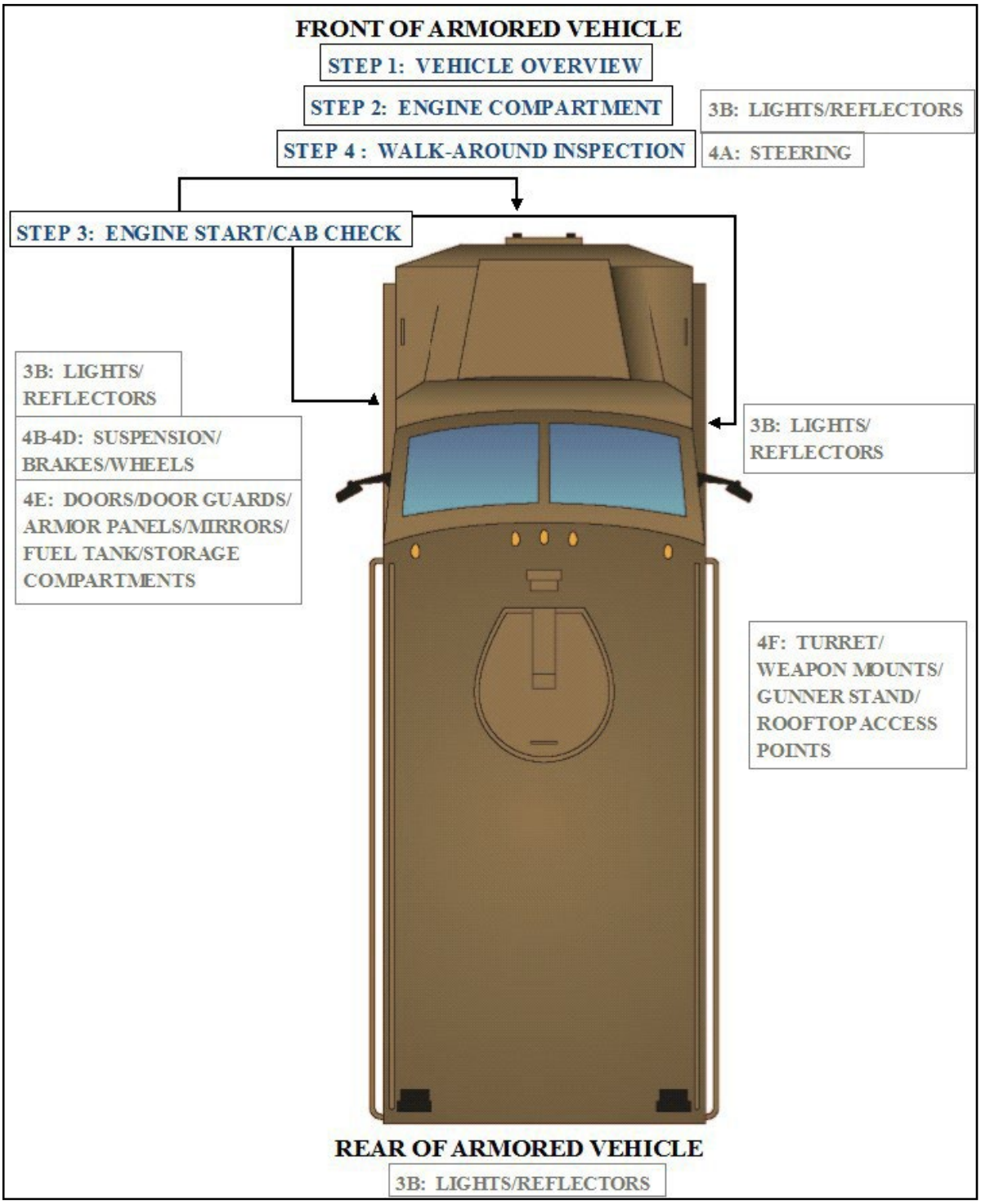
☐ **4B** – Suspension
- Springs/Air/Torque
- Mounts
- Shock Absorbers

☐ **4C** – Brakes
- Brake Chambers
- Brake Hoses/Lines
- Drum Brake
- Brake Linings

☐ **4D** – Wheels
- Rims
- Tires
- Hub Oil Seals/Axle Seals
- Lug Nuts
- Tire Pressure

SIDE OF VEHICLE
☐ **4E** – Doors
☐ **4E** – Door Guards
☐ **4E** – Armor Panels
☐ **4E** – Mirrors
☐ **4E** – Fuel Tank
☐ **4E** – Fuel Tank Door
☐ **4E** – Firing Ports
☐ **4E** – Storage Compartments
TOP OF VEHICLE
☐ **4F** – Turret
☐ **4F** – Weapon Mounts
☐ **4F** – Gunner Stand
☐ **4F** – Rooftop Access Points
REAR OF VEHICLE

Figure A2.1. JLTV Inspection Guide.



Attachment 3

PERFORMANCE TEST

A3.1. Desired Learning Outcome.

A3.1.1. Understand the safety precautions to be followed on the pre-, during-, and post-operation of the JLTV.

A3.1.2. Know the proper operator procedures of the JLTV, IAW applicable technical orders, the MOM, **Attachment 5**, and use of AF Form 1800.

A3.1.3. Safely and proficiently operate the JLTV.

A3.2. Instructions. Before beginning the performance test, the trainer will brief the trainee on the scenario that the trainee will need to accomplish. The trainee will be given additional directions and instructions as needed to proceed through the scenario.

A3.3. Scoring.

A3.3.1. The certifier will be scoring the trainee on JLTV operations and safe driving practices on the **A3.1** Test Checklist. The certifier will give instructions to the trainee to execute each driving task. The trainee will not be asked to drive in an unsafe manner.

A3.3.2. Graded tasks are found in **A3.1** on the following page. The trainee will be required to successfully complete all items with a "Go" in order to have a passing evaluation.

A3.3.3. The certifier will stop the test should any unsafe acts or safety concerns arise during the JLTV testing.

Figure A3.1. Performance Test Checklist:

PERFORMANCE TEST			
Trainees Name:		**Date:**	
Event	**Go**	**No Go**	**Notes**
1. PRE, DURING, AND POST- OPERATION INSPECTION			
1.1. Operator has required Personal Protective Equipment.			
1.2. Follows general pattern of pre-trip checklist.			
1.3. Performs brake component check			
1.4. Signs AF Form 1800 to signify accomplishment of complete inspection.			
1.5. Cleans windshield, windows, mirrors, lights and reflectors			
1.6. Continues during operations inspection checks.			
1.7. Knows use of jacks, tools, emergency devices, tire chains, fire extinguishers, etc.			
1.8. Engine.			
Uses proper starting procedures.			
Allows proper warm-up.			
Understands all gauges.			
Uses proper shutdown procedures.			
Basic knowledge of engines.			
1.9. Performs post trip inspection and reports malfunctions to Vehicle Management.			
Event	**Go**	**No Go**	**Notes**
2. ON-ROAD DRIVING TEST			
2.1. General - safety belt is used; obeys all traffic signs, signals, and laws; completes test without an accident or moving violation.			
2.2. Gravel Road.			
2.2.1. Basic Forward Driving			

2.2.2. Backing.			
Positions vehicle properly.			
Inspects vehicle before backing.			
Posts spotter/uses spotter correctly.			
Uses mirrors properly.			
Avoids blind side backing.			
Controls speed.			
2.2.3. Parking.			
Checks traffic position before parking.			
Secures truck properly.			
Parks legally and safely.			
Pulls completely off pavement when possible.			
Knows proper use of emergency warning devices.			
Uses emergency warning devices.			
2.2.4. Right turn/left turn.			
2.3. Hard Pavement.			
2.3.1. Rapid straight line stop from 30 mph.			
2.3.2. Backing.			
Positions vehicle properly.			
Inspects vehicle before backing.			
Posts spotter/uses spotter correctly.			
Uses mirrors properly.			
Avoids blind side backing.			
Controls speed to avoid rollovers			
2.3.3. Parking.			
Checks traffic position before parking.			
Secures vehicle properly.			
Parks legally and safely.			
Pulls completely off pavement when possible.			
Knows proper use of emergency warning devices.			
Uses emergency warning devices.			
2.3.4. Right turn/left turn.			

CERTIFIER COMMENTS:

Attachment 4--KNOWLEDGE TEST

For testing materials, contact AFIMSC Ground Transportation via email at: **AFIMSC.IZSL.GroundTrans@us.af.mil.**

Testing materials should NOT be distributed to anyone other than those testing or those administering the test.

Attachment 5

United States Air Force
Joint Light Tactical Vehicle (JLTV) Guide

LESSON 1

INTRODUCTION AND SAFETY

Warnings, Cautions, and Notes

- Read, understand, and adhere to Warnings, Cautions and Notes in the Manufacturer's Operator's Manual (MOM) prior to completing any task to prevent risk to personnel or damage to vehicle.
  - Warnings indicate possible danger to personnel.
  - Cautions indicate possible damage to equipment.
  - Notes provide clarification or additional information.
- Warning Summary, found at the front of the MOM, contains general safety and hazardous material warnings relevant to personnel operating and maintaining the JLTV.
- The MOM states specific warnings and cautions for each task.
  - Some warnings will be found at the beginning of the task.
  - Other warnings will be found throughout the task.

Label	Purpose
Battery Disconnect Caution Label 	• Vehicle damage hazard • Cautions operator to turn off ignition prior to switching battery disconnect

Noise Hazard Warning Label 	• Warns personnel to wear hearing protection to avoid possible hearing loss
Welding Damage Caution Label 	• Vehicle damage hazard • Cautions electronic components may be damaged by improper welding operations, and must be disconnected prior to welding

Figure 1.1 Decals and data plates chart

Decals and Data Plates (Figures 1.1)

- Decals and data plates are located on the vehicle, and state specific safety requirements and vehicle information.
- Adhere to information on plates or serious injury or death may result.

Check on Learning

Q: Where are Warnings, Cautions and Notes found?
A: In the Warning Summary at the front of the TO, at the beginning of a task or sometimes throughout the task.

Q. What on the vehicle states specific safety requirement?
A. Decals and data plates.

Identify Safety Factors

- Adhere to Warnings, Cautions and Notes in the TO.
- General workshop safety practices should always be adhered to in order to protect hearing, vision and prevent injury. Failure to adhere to can cause injury or death to personnel or damage to equipment.
- Chock tires when parked to prevent unintended movement.

- Maintain three points of contact to prevent slips and falls. Always use the grab points, DO NOT grab B-Pillar.

- To prevent bump hazards, be aware of your proximity to the vehicle. Keep body parts clear of labeled pinch points. Be aware of vehicle components that have the potential for movement and could cause additional pinch points.

- Suspension lock-out braces must be installed prior to crawling under vehicle. Suspension may lower, crushing personnel. Failure to comply may result in injury or death.
- Due to its weight, opening and closing the hood is a two-person operation.

- Personal Protective Equipment (PPE) is required when working around the JLTV. PPE is designed to protect operators from serious injuries resulting from workplace hazards.

    - Wear to protect hearing from various noise levels in the shop
    - Single point hearing protection shall be worn by all personnel within 10 feet of the JLTV when the vehicle is stationary at high idle.
    - Safety glasses. Wear safety glasses to protect eyes from work you or others may be doing. They should be worn when checking the battery.
    - Gloves
        - Use gloves to protect hands from abrasions, cuts, contact with chemicals, and high or low temperatures.
        - Be sure to wear the correct hand protection for the type of work performed.

Check on Learning

Q: Why should suspension lock-out braces be used when working under the JLTV?
A: To prevent the vehicle from falling on personnel, which could cause injury or death.

Q: What can you do to prevent slipping and falling in the shop?
A: Maintain three-point contact.

Q: Why is it important to adhere to the proper use of handholds when exiting/entering the vehicle?
A: Doors are heavy and pinching or injury to personnel can result.

LESSON 2

VEHICLE FAMILIARIZATION

Characteristics, Capabilities, Performance and Major Components

- Variants:
  - The JLTV is available in two or four door variants.

- The baseline vehicle is equipped with:
  - Central Tire Inflation System (CTIS)
  - Anti-lock Brake System (ABS)
  - Transaxle
  - Multi-operation setting High Pressure Gas (HPG) suspension system

- The two and four door variants are broken down into **three** base vehicles:
  - General Purpose (GP)
  - Close Combat Weapons Carrier (CCWC)
  - Utility
- There are **four** mission configurations of the JLTV. The mission configurations define the models.

Figure 2.1 General Purpose

- General Purpose (M1280A1) (Figure 2.1):
  - A base platform vehicle for general utility, movement of troops, or small supply items.
  - Can provide general purpose logistical support, including administrative movement.
  - Can be outfitted with multiple kits to support a variety of mission package configurations.
  - Four door configuration.

Figure 2.2 JLTV Heavy Guns Carrier Heavy Guns Carrier (M1278A1) (Figure 2.2)

- Accommodates mounting crew served weapons (machine gun and grenade machine guns).
- Four door configurations.

Figure 2.3 JLTV Close Combat Weapons Carrier

- Close Combat Weapon Carrier (M1281A1) (Figure 2.3).
    - Base platform vehicle that has a close combat weapons cargo bed.
    - Accommodates the Tube-launched, optically-tracked, wire commanded data link, guided missile Improve Target Acquisition system (TOW – ITAS) and direct fire kinetic weapons.
    - Four door configurations.

Figure 2.4 JLTV Utility

- Utility (M1279A1) (Figure 2.4).
    - Base platform vehicle that carries cargo on an open bed.
    - As a prime mover, this vehicle has the capability to tow existing combat loads. This includes, but not limited to 105mm, A1, A2 and other towed loads typically moved by light tactical vehicles.
    - Can be outfitted with existing standard shelters required for maintenance, communications, etc.
    - Two door configurations.

Figure 2.5 JLTV Models

- Operational dimensions. There are some differences in dimensions between the mission configurations of the JLTV. Reference the chart below.

Table 1. Operational Dimensions

Vehicle	Length	Width	Height	Clearance	Wheel Base
General Purpose GP M1280A1	211.3 in.	95.3 in.	128.5 in.	16.2 in.	130 in.
Heavy Gun Carrier HGC M1278A1	211.3 in.	95.3 in.	128.5 in.	16.2 in.	130 in.
Close Combat Weapons Carrier CCWC M1281A1	211.3 in.	95.3 in.	126.1 in.	16.2 in.	130 in.
Utility UTL M1279A1	217.7 in.	95.3 in.	121.8 in.	16.2 in.	145 in.

- Heights and clearances. There are some differences in height and clearance between JLTV A1 models. Reference the chart below to identify operational heights.

Table 2. Tie-Down Height

Vehicle	Height	Clearance
General Purpose	86.5 in.	14.2 in.
Heavy Gun Carrier	86.5 in.	14.2 in.
Close Combat Weapons Carrier	88.8 in.	14.2 in.
Utility	88.7 in.	14.2 in.

- Loading height. There are some differences in height and clearance between JLTV models. Reference the chart below to identify operational heights.

Table 3. Loading Height

Vehicle	Height	Clearance
General Purpose	75.8 in.	3.8 in.
Heavy Gun Carrier	75.8 in.	3.8 in.
Close Combat Weapons Carrier	75.8 in.	3.8 in.
Utility	75.8 in.	3.6 in.

- Curb weight. There are some differences in curb weight between the JLTV variants. Reference the chart below to identify weights.

Table 4. Curb Weight

Vehicle	Front Axle	Rear Axle	Total
General Purpose	7,189 lb.	6,241 lb.	13,430 lb.
Heavy Gun Carrier	7,189 lb.	6,241 lb.	13,430 lb.
Close Combat Weapons Carrier	7,181 lb.	6,649 lb.	13,830 lb.
Utility	7,510 lb.	5,930 lb.	13,440 lb.

- Gross Vehicle Weight Rating. Reference the chart below to identify Gross Vehicle Weight.

Table 5. Gross Vehicle Weight Rating

Vehicle	Front Axle	Rear Axle	Total
General Purpose	11,900 lb.	12,800 lb.	22,500 lb.
Heavy Gun Carrier	11,900 lb.	12,800 lb.	22,500 lb.
Close Combat Weapons Carrier	11,900 lb.	12,800 lb.	22,500 lb.
Utility	11,900 lb.	12,800 lb.	22,500 lb.

- Top speed. Top speed of the JLTV under normal conditions is 76 mph. The chart below lists the transmission/Trans axle gear ratio.

Table 6. Transmission Gear Ratios and Vehicle MPH

Gear	Ratio	MPH (km/h) with Transaxle in Low Range	MPH (km/h) with Transaxle in High Range
First	3.51:1	0.0 to 7.1 mph (0.0 to 11.4 km/h)	0.0 to 12.6 mph (0.0 to 20.3 km/h)
Second	1.90:1	7.1 to 15.7 mph (12.2 to 25.3 km/h)	12.6 to 28.0 mph (20.3 to 45.1 km/h)

Third	1.44:1	15.7 to 20.7 mph (25.3 to 33.3 km/h)	28.0 to 36.9 mph (45.1 to 59.4 km/h)
Fourth	1.00:1	20.7 to 29.8 mph (33.3 to 48.0 km/h)	36.9 to 53.1 mph (59.4 to 85.4 km/h)
Fifth	0.74:1	29.8 to 40.4 mph (48.0 to 65.0 km/h)	53.1 to 72.1 mph (85.4 to 116.0 km/h)
Sixth	0.64:1	40.4 to 47.4 mph (65.0 to 76.3 km/h)	72.1 to 76.0 mph (116.0 to 122.3 km/h)
Reverse	5.09:1	0.0 to 6.0 mph (0.0 to 9.7 km/h)	0.0 to 10.7 mph (0.0 to 17.2 km/h)

- Capabilities: Payload.
    - The payload of the General Purpose, Heavy Gun Carrier, and Close Combat Weapons Carrier is 3,500 lbs. and 3,000 lbs. with the Gunners Protection Kit (GPK) installed.
    - The payload of the Utility is 5,100 lbs. Acceleration.
- The JLTV can go from 0-30 mph in 7.4 seconds.
- It reaches 0-50 mph in 18.3 seconds.

Range.

- The maximum range of the JLTV is 300 miles at 35 mph at gross vehicle weight (GVW). 35.5-gallon tank.

Figure 2.6 JLTV side slope

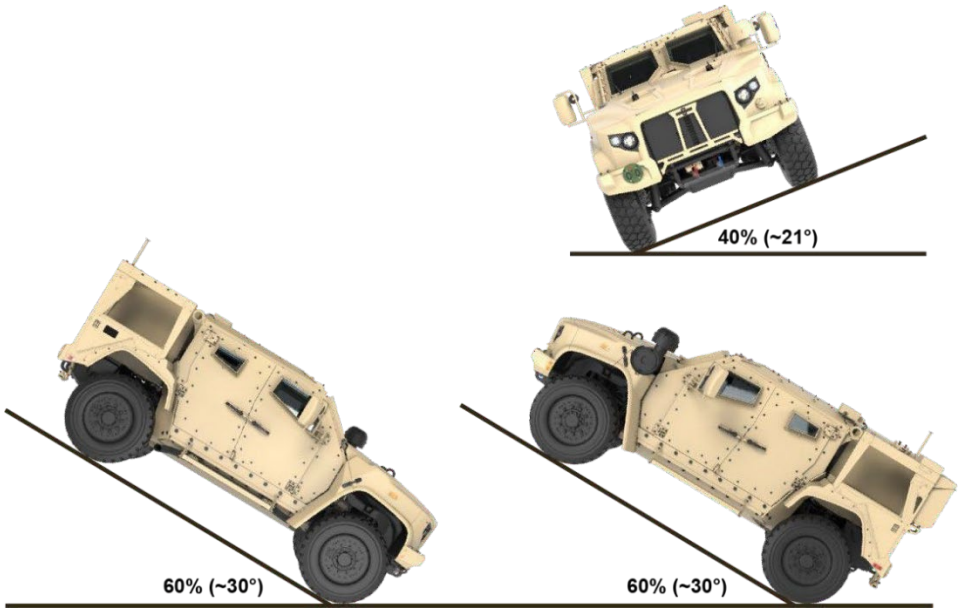


Figure 2.7 JLTV slopes

Figure 2.8 JLTV 60% slope

- Performance.
  - The JLTV is capable of performing lane changes at 53 mph.
  - The JLTV is capable of fording a depth of 30 in. without a fording kit, and 60 in. with a kit.
  - The JLTV can negotiate a 40% side slope. It is capable of negotiating a 40% grade

at 8 mph and a 60% grade at 6 mph. (Figures 2.6 - 2.8).

- Turning radius
  - The utility has a turning radius of 27 ft.
  - The turning radius for the GP, CCWC and the HGC is 25 ft.

Check on Learning

Q: What are the differences between the JLTV General Purpose and the JLTV Utility?
A: The General-Purpose variant is used for general utility, movement of troops, or small supply items; 4 door variant. The Utility variant is carries cargo on an open bed; 2 door variant.

Q: What is the maximum range of the JLTV at 35 mph at GVW?
A: 300 miles.

Q: What speed is the JLTV capable of negotiating a 40% slope?
A: Eight mph.

Q: What is the top speed for the JLTV when the transaxle is in high range?
A: 76 mph.

LESSON 3

IDENTIFY FAMILY OF VEHICLES

Front of JLTV

- Tow eyes. They are used for towing the vehicle and tie down points.
- Inter-vehicular connector.
  - The front of the vehicle is equipped with a 24 VDC inter-vehicular connector.
  - Supplies power to the truck if towed.
- NATO slave receptacle.
  - Used to jump-start the vehicle in the event of a dead battery.
  - It is a 24 VDC system so ensure the vehicle you are jumping is also a 24 VDC system.
- Glad hands.
  - The front glad hands supply air to the vehicle if towing and the air system is operational.
  - The red is for emergency and the blue is for service.
- Vehicle batteries.
  - The battery supplies power for the vehicle to start.
  - The access panel drops down the battery tray for servicing during its required intervals.
  - The two batteries are Optima sealed absorbed glass matte (AGM) supplying 25.6 VDC at 800 CCA when fully charged.

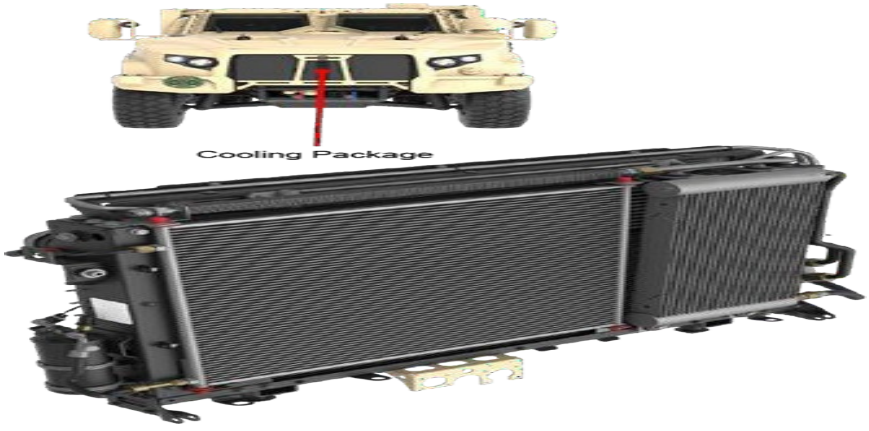


Figure 2.9 Cooling package

- Cooling package. Located at front of truck (Figure 2.9) consists of:
  - Transmission oil cooler (oil to air).
  - AC condenser.
  - Air system cooler.
  - Charge air cooler.
  - Engine radiator.
  - Transmission cooler (air-water).
  - Fuel cooler.
  - Hydraulic cooler.
- Hood.
  - Ultralight fiberglass hood with two rubber retaining straps for easy engine access.
  - Hood is equipped with a hood prop to ensure hood does not blow down on operator, if under the hood. Personnel should not stand on hood.
- Lighting.
  - Headlights.
  - Marker lights.
  - Composite lights.
  - Blackout lights.
- Bumper.
  - No bumper on standard JLTV.
  - If combat bumper is installed, it gives the vehicle the capability to push vehicles up to 6,000 lbs. out of the way.

Figure 2.10 Winch kit

- Winch (Figure 2.10).
  - Rated for 18,000 lbs. (8,165 kg).
  - Can be used with tow bar if kits are installed.
- Exterior components left.
  - Air cleaner. The air filter for the engine is located on the left side of the truck.
- Mirrors.
  - Electronically adjustable with control inside of the cab.
  - Found on both sides of vehicle.
- Doors.
  - The vehicle has carriage doors for front and rear protection.
  - The JLTV has tactical opening doors.
  - Dependent upon individual strength, increased force may be required to open door. Use whatever means necessary to use (i.e., legs or two-person buddy system) to aid operations.
  - Always ensure the doors are combat locked whenever operating the vehicle.
  - Do not close both doors at the same time.
- Ballistic windows. Windows are made of ballistic glass for crew protection.
- Deice elements. Deice elements are only found in the windshield (not at side windows).
- Step. There is a step to aid getting in/out of the vehicle safely.
- Tires. The vehicle is equipped with 365/80 R20 Michelin XZL tires.
- CTIS wheel valves.
  - These valves are a regulatory mechanism that manages inlet and outlet of air on all four tires.
  - CTIS functionality is automatic as well as upon command. The JLTV features a Command Zone controlled CTIS system controlling a Dana Spicer Mechatronic Control Unit (MCU). (CTIS and MCU details provided later in training).
- C4ISR vents.
  - These vents are found on the Utility variant.
  - They are used to ensure clean air is brought in to cool Command Control Computer Communication Intelligence Surveillance (C4ISR) power distribution.

- The vents should be covered when fording.
- There are five vents found on the Utility variant located on both sides of the truck.
- Fans shut off in fording mode.

- Stowage compartments
- The stowage compartments allow for securing:
  - Basic issue items (BII).
  - Components of end item (COEI).

Rear of JLTV.

- Cargo body.
- Tie-downs.
  - Used for holding down payload stored in cargo compartment.
  - Do not use chain binders to secure loads.
- Cargo cover.
- Tailgate.
  - Has two latches that must be opened to drop tailgate down.
  - Removable on the Utility variant.

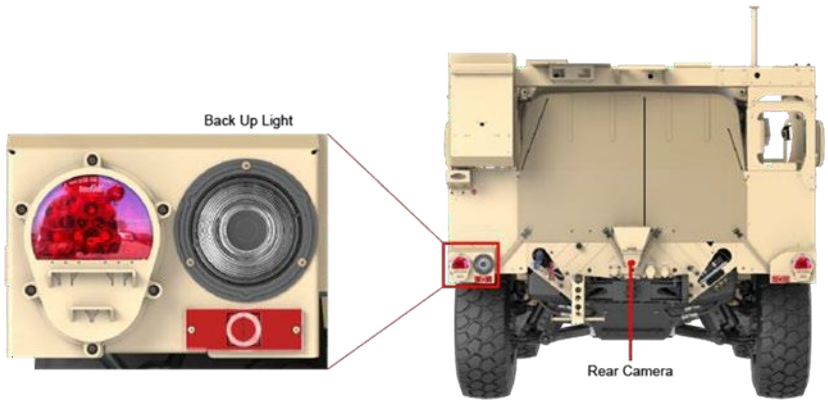


Figure 2.11 JLTV rear lighting and camera

- Rear lighting (Figure 2.11).
  - Tail light.

- Blackout light.
- Reverse light.

- Rear camera (Figure 2.11).
  - Assists with visibility behind the vehicle.
  - Displays on the DSDU monitor.

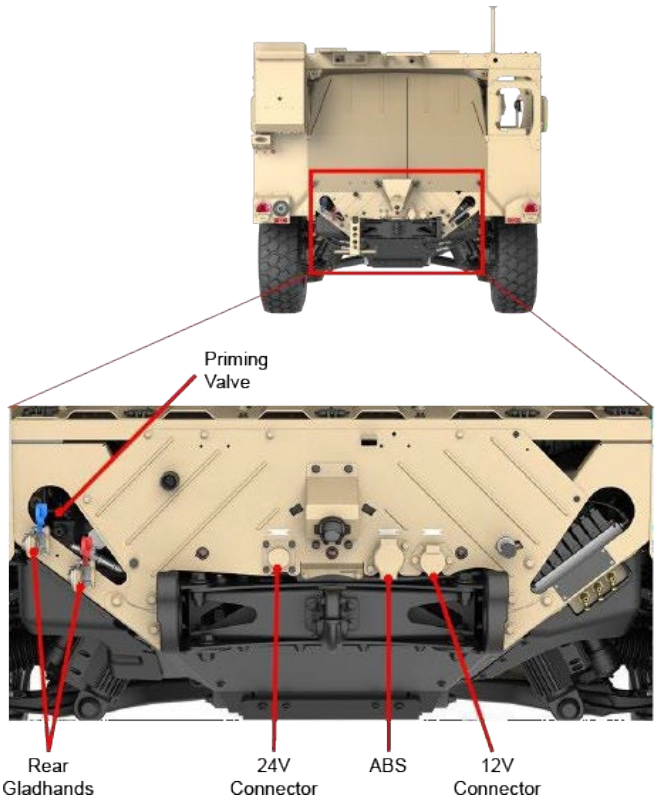


Figure 2.12 Rear components

- Priming valve. Used to prime fuel system if the JLTV runs out of fuel. (Figure 2.12)
- Rear glad hands (Figure 2.12).
  - The rear glad hands supply air to a towed JLTV or trailer if the air system is operational.
  - Blue is service.
  - Red is emergency.
- 24VDC inter-vehicular connector.
  - 24 volts is used for towing a trailer but requires ABS connector.

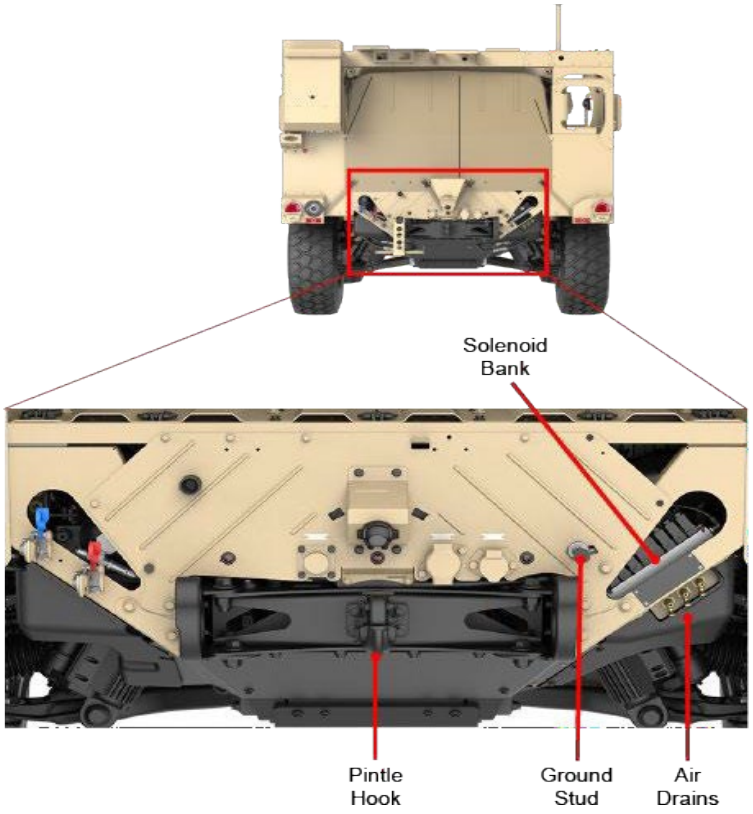


Figure 2.13 Rear components cont.

- Pintle hook. The pintle hook is used for towing a trailer or disabled vehicle. (Figure 2.13).
- ABS connector. Only when utilizing a 24v connector.
- 12VDC inter-vehicular connector.
    - 12 volts is used when connecting to the trailer.
    - ABS connector is not required for 12VDC connector.
- Grounding stud (Figure 2.13).
- Solenoid bank.
    - Used to manually override different parts of the driveline.
    - The only solenoids to be used for towing are the R1, T2 and T3.
- Air drain.
    - Located on right side of truck, underneath solenoid bank.
    - Used for draining air from air tanks once vehicle operations are complete.
- Exterior components.

- Fuel Tank quantity is 35.5 gallons.
- Stowage.
- Exhaust. Do not operate engine in enclosed area without proper ventilation.

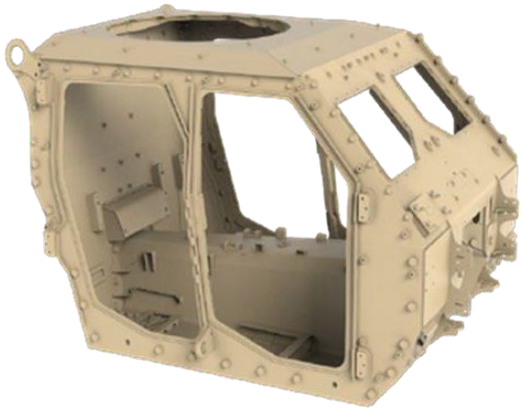


Figure 2.14 Monocoque capsule

- Capsule (Figure 2.14).
  - Monocoque (single shell) design for increased safety.
  - Welded nuts for armor plate mounting.
- Center channel.

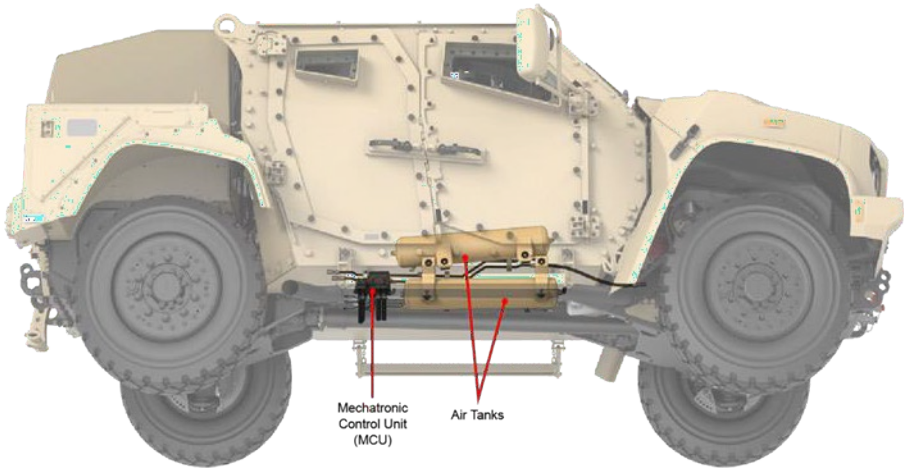


Figure 2.15 MCU and air tanks

- Air tanks (Figure 2.15).
- MCU (Figure 2.15).
    - Functions similar to Pneumatic Control Unit (PCU) on other tactical vehicles.
    - Activates inflation/deflation of tires.
    - JLTV is unique in that the MCU can inflate/deflate each tire separately, instead of only front or back tires activated by a PCU.
    - Safeties are built into system to help prevent damage by running under inflated tires at speeds too fast for those conditions.
- Major components.

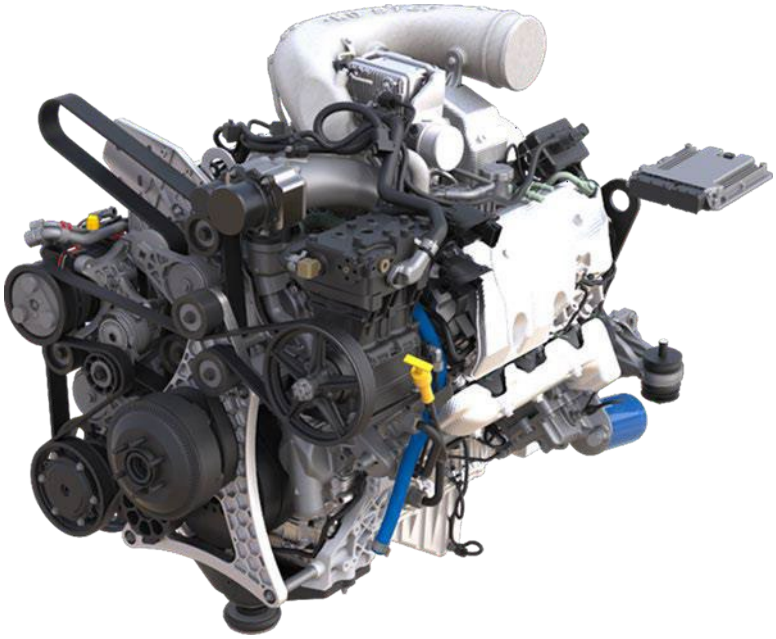


Figure 2.16 A1 engine

- A1 Engine (figure 2.16).
    - The engine in the JLTV is the Banks model 866T with turbo charged engine.
    - The engine is a 6.6 liter with 340 HP at 3200 RPM. It produces 660 ft-lb of torque at 1600 RPM.

Figure 2.17 Transmission

- Transmission (Figure 2.17).
  - The transmission used in the JLTV is an Allison 2500 Special Purpose (SP).
  - This model of transmission is a 6-speed automatic.
  - When the Central Tire Inflation System (CTIS) is not in HWY setting, the transmission is limited to fourth gear.

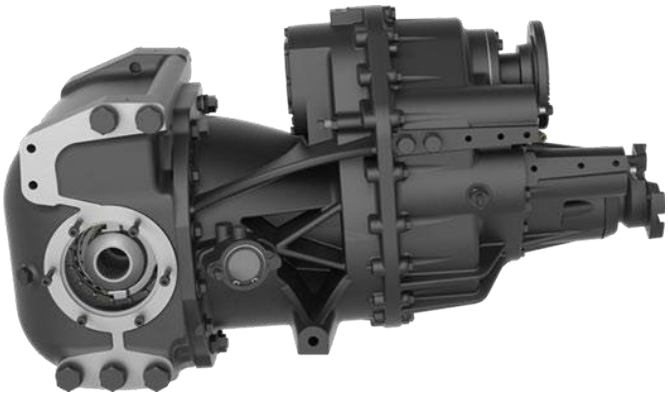


Figure 2.18 Transaxle

- Transaxle (Figure 2.18).
  - Transaxle. The transaxle receives power from the transmission and transfers it to the front and rear wheels. This provides all-wheel operation in both high and low

ranges. The transaxle used in the JLTV is an Oshkosh two-speed design.

- High Reduction – 1.65.
- Low Reduction – 2.95.
- Differential Gear Ratio – 2.2:1.
- Power Split. – 50/50 split to the front and rear of the truck.

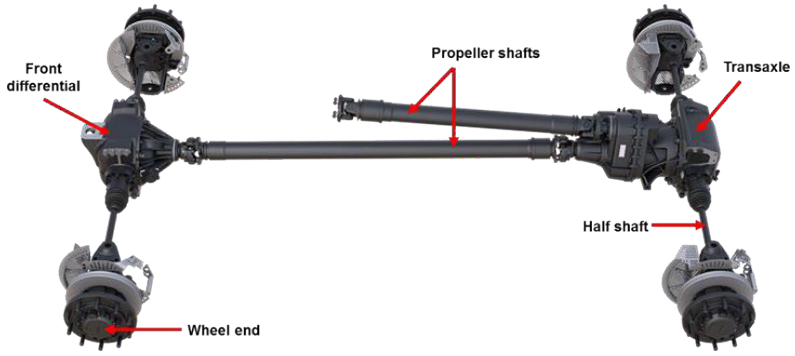


Figure 2.19 Propeller shafts and half shafts

- Propeller shafts. (Figure 2.19).
  - The JLTV has two propeller shafts. They are composite shafts with aluminum ends.
- Half shafts/axles.
  - From the differential and transaxle, the vehicle uses half-shafts with constant velocity joints, to account for angles produced by suspension movement.
- Wheel ends.
  - The wheel ends are planetary gear reduction.
- Suspension. The suspension used in the JLTV is an Oshkosh TAK-4i Intelligent Suspension.
  - The suspension is capable of 20 inches of total travel, 12 inches jounce and 8 inches rebound. Jounce is the compression stroke of a shock-absorber.
  - Rebound is the decompression of a shock-absorber.
  - The suspension system is designed to maximize traction, ride quality, and fuel efficiency.
  - It will adjust pressure in the suspension to correspond to the suspension system setting selected by the operator.

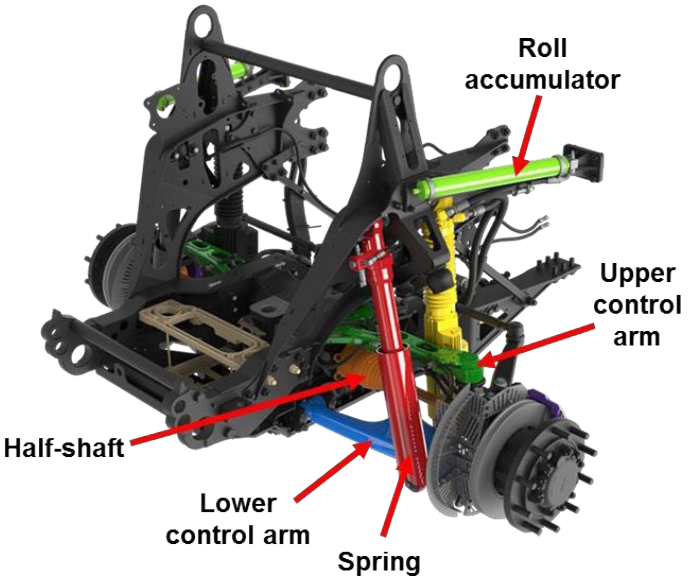


Figure 2.20 Front suspension

- Roll Accumulator (Figure 2.20).
- Half-shaft (Figure 2.20).
- Lower control arm (Figure 2.20).
- Spring (Figure 2.20).
- Upper control arm (Figure 2.20).

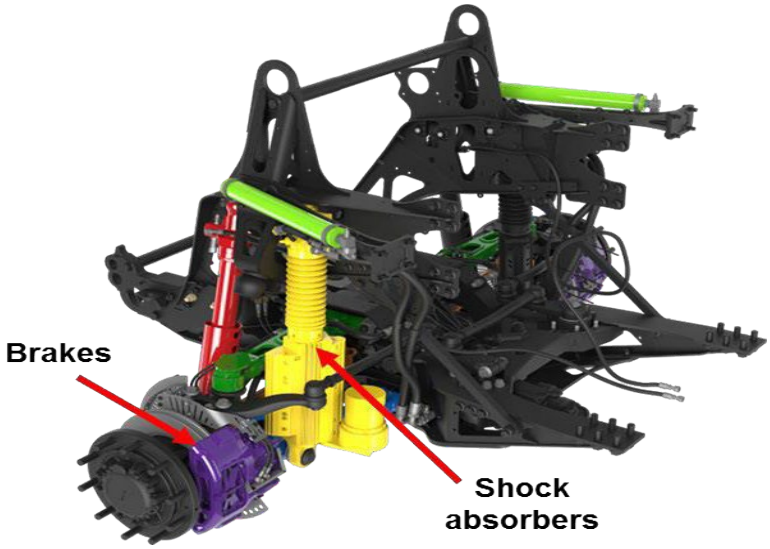


Figure 2.21 Rear view of front suspension shock assembly

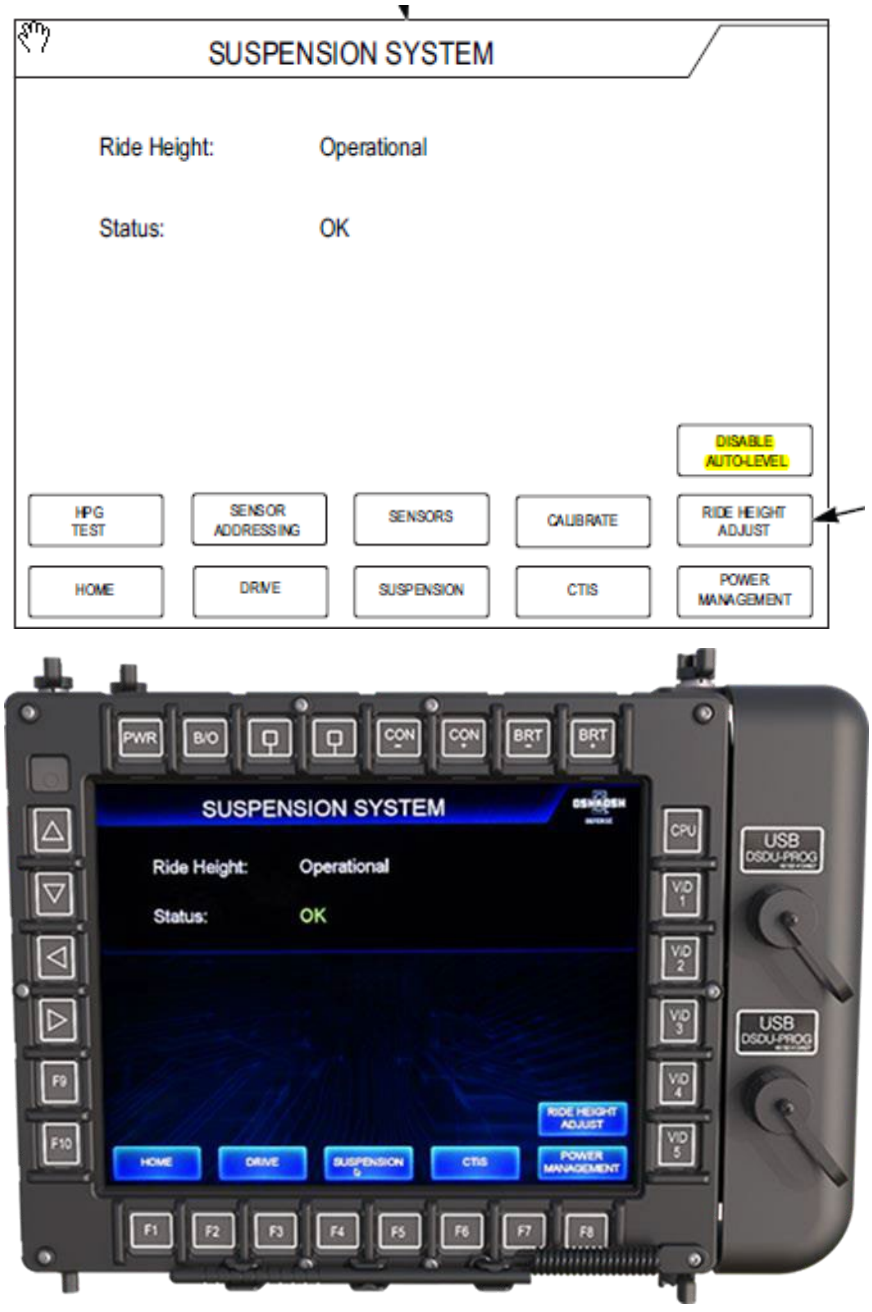


Figure 2.22 DSDU suspension system screen

- The suspension system (Figure 2.22) has five settings for operations. The Driver Smart Display Unit (DSDU) is discussed later in this lesson.
  - Fording Multiplexed (MUX) Switch panel.
  - Operational (DSDU).
  - Tie Down (DSDU).

- Loading (DSDU).
- Suspension Aided Egress System (SAES) (DSDU) when parking brake is engaged, and vehicle is neutral.
- High pressure gas suspension.

- These settings may take up to 5 minutes to adjust; typically, the suspension adjustment is completed in less than 1 minute.
- During an operator-initiated adjustment, the engine RPM increase will slowly ramp up to approximately 1550 RPM if the transmission is in neutral and the parking brake is applied. If either the transmission is shifted out of neutral or the service brake is applied during an adjustment, the engine speed will return to normal idle speed. When adjustment selection is aborted, by either the abort selection in the DSDU or by releasing the brake or putting it in gear, the vehicle will be limited to 10 mph.
  - If the High-Pressure Gas (HPG) pumps run continuously for 10 minutes, the SPNSN ERROR light will illuminate and the pumps will automatically stop running to prevent overheating. After 5 minutes, the pump time out error will automatically clear, the SPNSN ERROR light will turn off, and the system will allow ride height adjustments again.
  - The suspension system monitors the hydraulic oil temperature to prevent overheating. If the hydraulic oil temperature exceeds 212° F (100° C), the SPNSN ERROR light will illuminate and pumps will automatically stop running. When the hydraulic oil temperature drops back below 200° F (93° C), the SPNSN ERROR light will turn off, and the system will allow ride height adjustments again.
  - The vehicle is equipped with an automatic leveling feature which, if enabled, will attempt to maintain the vehicle at ideal ride height when in operational mode and moving over 5mph. If the automatic leveling feature is disabled or is unable to maintain the truck at the operational height, the suspension not level light may illuminate. If the automatic leveling system is enabled and a significant change to weight or payload occurs, several automatic leveling events may occur before the vehicle reaches ideal ride height. If the automatic leveling system is disabled, changes to weight, payload, and temperature could potentially lead to suspension not level light illuminating. If at any time the suspension not level light illuminates, the automatic leveling system becomes inactive until an operational adjustment is performed. The SPNSN NOT LEVEL light indicates suspension ride height or pressure is outside of expected limits for vehicle. If SPNSN NOT LEVEL light goes off after vehicle starts operating under normal conditions, no action is required. If SPNSN NOT LEVEL light remains illuminated, a suspension ride height adjust operation must be performed. If a significant change to weight or payload of vehicle has taken place, a ride height adjust operation may need to be performed 2 to 4 times to achieve optimal level operation. In a circumstance where the SPNSN NOT LEVEL light comes on after the vehicle has been off, the vehicle will be limited to

18 mph. This can be eliminated by simply selecting operational ride height from the suspension screen and allowing the system to adjust to operational ride height.

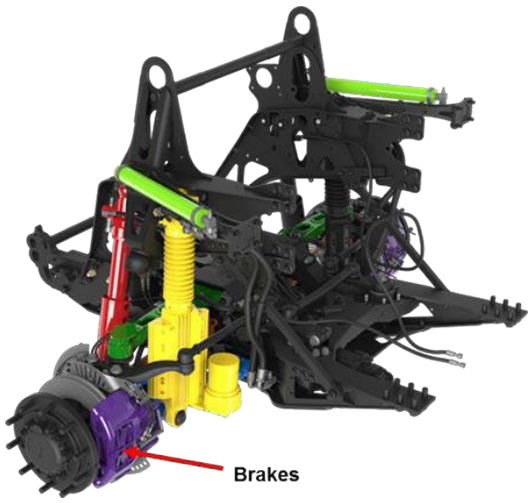


Figure 2.23 Brakes

- Brakes (Figure 2.23).
    - The vehicle is equipped with ABS (anti-lock braking system).
    - Air over hydraulic with four independent disc brakes.
    - Each brake has its own hydraulic reservoir.
    - The parking brake has its own reservoir and integrated heater.

Check on Learning

Q: What is the purpose of the glad hands?
A: The glad hands supply air to the vehicle if towing and the air system is operational.

Q: Where are the air drains located and when should the Operator drain the air tanks?
A: On the right side of truck, just underneath solenoid bank. Drain when operations are complete.

Q: What solenoids are used for towing?
A: R1, T2, and T3.

Q: The NATO slave receptacle is used to jump-start the vehicle in the event of a dead battery. What must you take into consideration when jump starting a vehicle?
A: It is a 24 VDC system so ensure the vehicle you are jumping is also a 24 VDC system.

LESSON 4

EXTERNAL COMPONENTS

Figure 2.24 Battery disconnect switch panel

- Battery Disconnect Panel (Figure 2.24).
  - Vehicle battery disconnect switch.
    - Located on bottom left side of the dash.
      - Two-position switch.
        - When in down position, batteries are disconnected from the vehicle.
        - When in up position battery power is supplied to the vehicle systems.
  - Green LED indicator.
    - Located on the battery disconnect switch.
    - Solid light: The indicator will illuminate when power is supplied to the vehicle.
    - Flashing light: If low voltage is detected on the JLTV, the green LED will flash for five minutes to indicate there is a low voltage condition.
- Auxiliary battery switch.
  - Two-position switch.
    - When in the DOWN position, the auxiliary batteries are disconnected from C4ISR assistance.

    - When in the UP-position power from the auxiliary batteries is supplied to C4ISR equipment.

- Combiner switch.
    - Three-position switch.
        - Up position links auxiliary batteries to vehicle batteries, for slave starting, when voltage is low.
        - Down position is used to immediately disconnect auxiliary batteries from 24V vehicle batteries.
        - Center position, its normal position, the combiner is in automatic mode which links auxiliary battery systems and vehicle battery systems together to charge when voltage is determined to be low on the auxiliary battery system.

Figure 2.25 Engine ignition switch and combat override switch

- Ignition switch panel.
    - Ignition switch (Figure 2.25).
    - Left switch on the panel.
        - Radial three-position switch:
            - Off is the far-left position.
            - Middle position requests power from electrical system.
            - Far-right position starts the vehicle.
    - Once the truck starts, the ignition switch will spring back to the ignition on position (middle position).

Figure 2.26 Combat override switch

- Combat override switch (Figure 2.26).
  - For emergency or combat situations **ONLY**.
  - This switch will:
    - Disable low-voltage disconnect.
    - Disable the neutral safety interlock.
    - Disable engine derates.
    - Disable the suspension related speed limitations.
    - Disable CTIS transmission gear limitations.
    - Disable all load shedding.
    - Overrides suspension hydraulic faults that inhibit operations.
    - Enables the low-pressure fuel pump at full pressure.
    - Provides an emergency bypass for adjusting CTIS and adjusting suspension ride height in the event of a DSDU failure.
    - Ties batteries together for more amperage.
  - LED red light indicator illuminates steady red when the combat override switch has been turned on.

Figure 2.27 Parking brake panel

- Parking brake panel (to the left of DSDU) (Figure 2.27).
    - Trailer air supply (red octagon) supplies air out to the emergency (red) glad hand for air supply to a towed vehicle or trailer.

Figure 2.28 Parking brake panel

- Parking brake switch (yellow square) (Figure 2.28).
    - Parking brake has a safety mechanism that must be released to push in the parking brake valve, for release of the parking brake. (ensure release is deliberate).

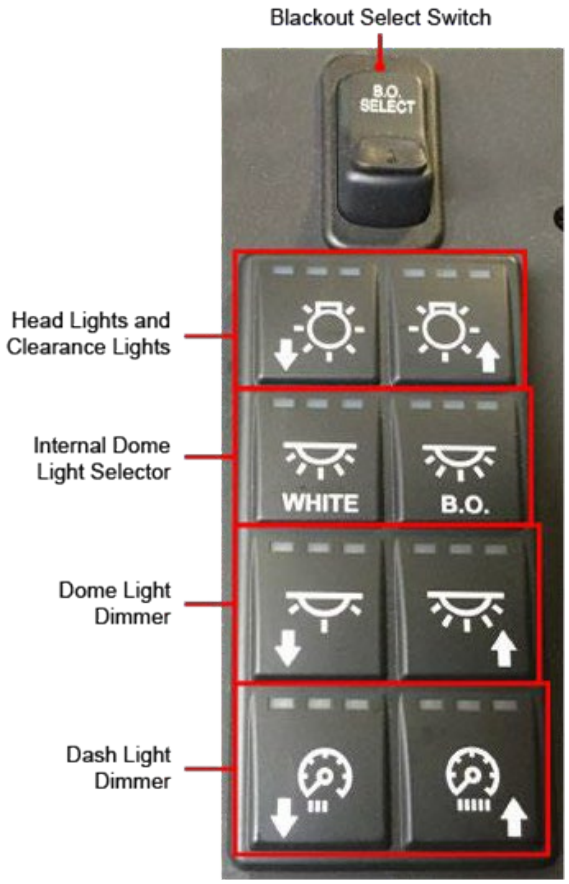


Figure 2.29 Lighting MUX panel

- Lighting multiplexed switch panel (MUX) (Figure 2.29).
  - Located just above the battery disconnect switch panel is the lighting MUX panel.
  - Panel is responsible for controlling all lighting on the truck.
  - MUST HOLD ONE SECOND to activate. To turn these MUX switches on or off, the operator must deliberately push the button for it to activate. If the button is tapped for less than one second, the selection may not register to the system (designed to avoid inadvertent bumps or taps changing the lighting settings).
  - Dash dimmer switches.
    - Left switch decreases dash backlighting intensity.
    - Right Switch increases the back lighting.
- Dome light dimmer.
  - Left switch decreases the brightness.
  - Right switch increases the brightness.

- Internal dome light selector.
    - The left switch is the white dome light on/off (when the black-out switch is off).
    - The right switch is the blackout dome light on/off.
- Headlights and clearance lights.
    - When the right switch is depressed once the clearance lights are turned on.
    - When the switch is depressed a second time the headlights turn on.
    - The left switch will turn the lights off, headlights for the first depression, then clearance lights with the second depression.
    - These same switches are used for blackout service and drive lights when the blackout switch is activated.
- Black out select switch.
    - Located at top of lighting panel (left side of the dash).
    - An analog switch that will turn off:
        - Internal: all warning icons, gauge backgrounds, and LCD illumination on the dash
        - External: all external lighting and sound.

Figure 2.30 Systems control multiplexed switch panel

Systems control multiplexed switch panel (Figure 2.30).

- Located on the right side off the dash; above the parking brake panel.
- Fording mode switch.
    - Located on the top left side of the MUX panel.
        - Depress two times to activate fording mode.

- Depress a second time when the light is flashing to activate or deactivate fording mode.
    - This button raises the truck to fording position which allows the truck to ford water up to 30 inches without the fording kit or 60 inches with the fording kit.
    - This brings the bottom of the truck differentials from approximately 16 inches from the ground to the bottom of the differential to about 22 inches from the ground.
    - When the vehicle reaches fording height, the following deactivate:
        - The AC compressor.
        - Engine fan.
        - CTIS.
        - 120v AC outlet.
  - Fording mode will limit maximum speed to 10 mph.
    - If the fording function is aborted for any reason, the truck will remain limited to 10 mph until it reaches operational height on its own.

- CTIS OFF switch.
  - Located next to the fording mode switch.
  - This switch will shut off the CTIS air system.
  - CTIS is off, but all of the speed interlocks will still be in place, all of the driveline locks will still be applied, the system will not adjust tire pressure.
  - Use in cold environments or when there is extensive tire damage and the operator desires to protect the air system from depletion.

- Transaxle HI/LO.
  - Located just to the right of the CTIS off selection is the transaxle (T- axle) high/low selection.
  - Selection changes the ratio of the output of the transaxle.
    - Transaxle high will be used for normal operation.
    - Transaxle low is used in any circumstance where additional torque is desired such as extreme muddy conditions, extreme up/down slopes or if the transmission defaults to too high of a gear.

- Axle locks: Lock up button/lock down button.
  - Located on the top and bottom half of the MUX panel on right hand side.
  - They are up and down arrows. The top button applies driveline locks; the bottom button removes the driveline locks.

- The first time the up-selector button is pushed, the front and rear drive axles from the transaxle will lock together (Lock Level 1).
- The second time the selector button is pushed the rear axles will lock side to side (Lock Level 2).
- The third time the button is selected the front axles will lock side to side; this is considered full lock up (Lock Level 3 or Full Lock up).

- High idle.
  - Located just to the right of the exhaust brake switch.
  - High idle increases engine speed up to 1800 RPM.
  - This should be used whenever idling for more than 5 minutes or when operating in extreme cold conditions.
- Exhaust brake.
  - Located next to the deicer switch.
  - When selected, the exhaust brake will provide additional stopping power to assist in braking when necessary.
- Deicer.
  - Located on the bottom left side of the MUX panel.
  - The deice selection should only be used when there is physical ice on the windows.
  - Only works on the windshield.
  - Times out after 15 minutes of use.

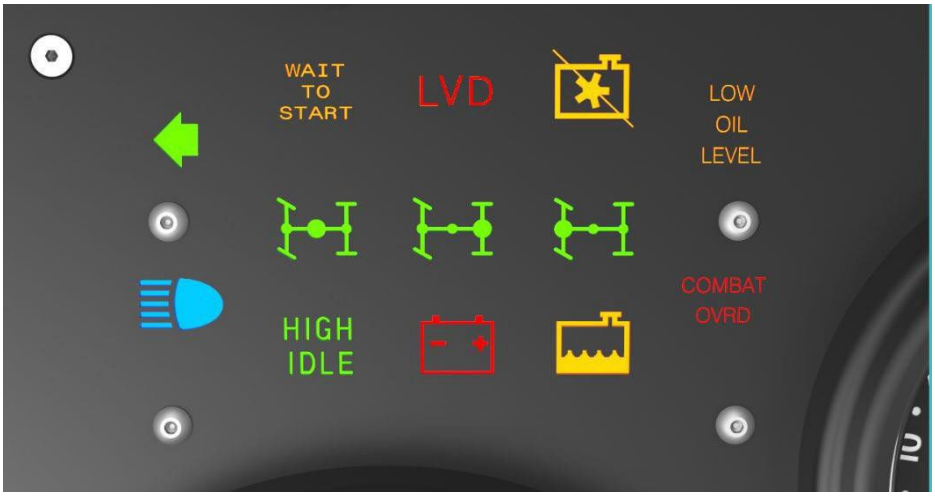


Figure 2.31 Indicators on left side of dash

- Indicators - Left side of dash (Figure 2.31).
  - Left turn indicator. Blinks green when left turn is selected with the stalk. It also blinks with the right turn signal when the hazards are selected.
  - Wait to Start. Illuminates steady red while glow plugs are cycling.
  - LVD (Low voltage detection). Illuminates steady amber when vehicle voltage drops below 24.2 VDC.
  - Engine fan disable Indicator. Illuminates steady amber when engine fans are disabled.
  - Low oil level. Audible alarm will sound, and steady amber indicator illuminates when oil is low.
  - High beam indicator. Illuminates steady blue when high beams are selected.
  - Driveline locks. Indicators illuminate steady green when driveline locks are applied. From left to right the lights are lock level 1 (inter-axle lockup), axle lock 2 (adds rear intra-axle lockup), axle lock 3 (adds front intra-axle lockup).
  - High idle. Illuminates steady green when high idle is selected.
  - Charging system indicator. Illuminates steady red when there is a charging system fault.
  - Low coolant indicator. Illuminates amber when coolant is below safe operating level.
  - Combat override indicator: Illuminates steady red when the switch has been engaged.

Figure 2.32 Indicators on right side of dash

- Indicators - Right side of dash (Figure 2.32).
  - Parking brake indictor. Illuminates steady red when parking brake is applied.
  - Range inhibit. Illuminates steady amber when range inhibiting is active.
  - Trailer ABS. Illuminates steady amber when there is trailer ABS fault or is inoperable.
  - Tractor ABS. Illuminates steady amber when there is an ABS fault, or a loss of communication from the ABS controller. Will blink steady when in off road mode (CTIS settings other than highway).
  - Right turn indicator. Blinks green when right turns are selected on the stalk. This indicator will also flash green with the left turn indicator, when hazards are selected.
  - CTIS over speed. Illuminates steady amber when the vehicle exceeds speeds programed in the CTIS controller.
  - CTIS fault. Illuminates steady amber when the CTIS has a fault.
  - SPNSN (Suspension) Error. Illuminates steady amber when there is a suspension error.
  - Brake failure indicator. Not used on this vehicle (looks like red exclamation point in a red

circle.

- Electronic Stability Control (ESC) Off. (Figure 2.33). (Looks like swerving car).
  - Electronic Stability Control (ESC) Off: ESC Off indicator will illuminate steady amber when the ESC is disabled or when there is a system fault.
  - ESC Active (looks like swerving car): ESC Active indicator will flash amber when it is actively controlling the vehicle and will illuminate steady amber when the ESC is disabled or when there is a system fault.

Figure 2.33 ESC

- ESC prime mover. (looks like swerving car).
- Suspension active. Flashes amber when auto-leveling is imminent. Illuminates steady amber when the suspension is actively adjusting.
- SPNSN (Suspension) not level.
  - Illuminates when the suspension in not level (outside its expected range).
  - Select operational ride height from the ride height adjust screen on the DSDU to remedy this.
  - This is not a fault as changing conditions may cause this light to illuminate.

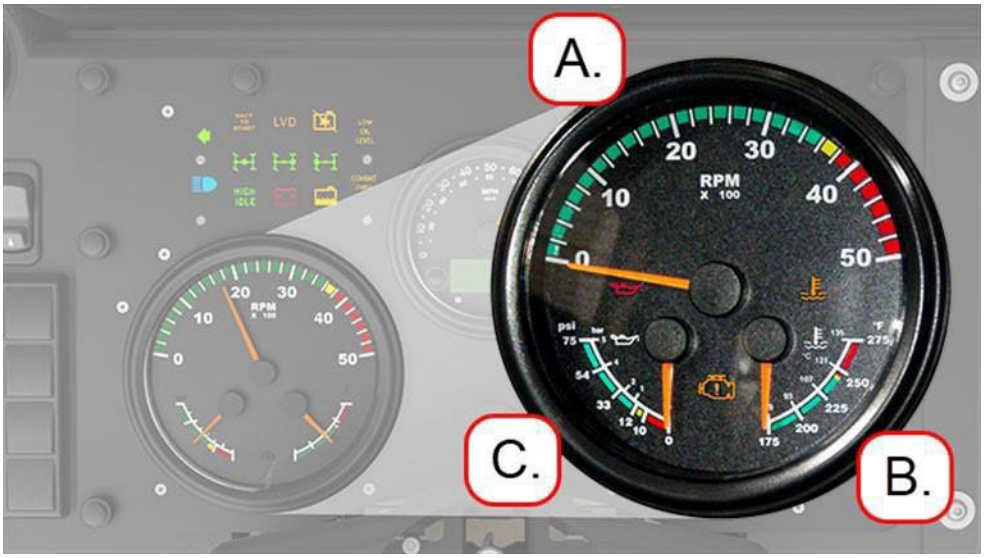


Figure 2.34 Left gauge cluster of dash

- Left gauge cluster for engine performance (Figure 2.34).
  - Tachometer for engine RPM (Section A of Figure 2.34).
  - Coolant temperature indicator. Illuminates amber when coolant is above critical range (approximately 240 °F). An audible alarm will also sound to alert the operator.
  - Coolant temperature gauge (Section B of Figure 2.34).
  - Check engine indicator. Amber indicator illuminates when an engine fault occurs.
  - Oil pressure gauge. Measures oil pressure and psi.
  - Low oil pressure indicator. Red indicator illuminates when oil pressure is below 10 psi for 5 seconds at engine RPM above 400 (Section C of Figure 2.34).

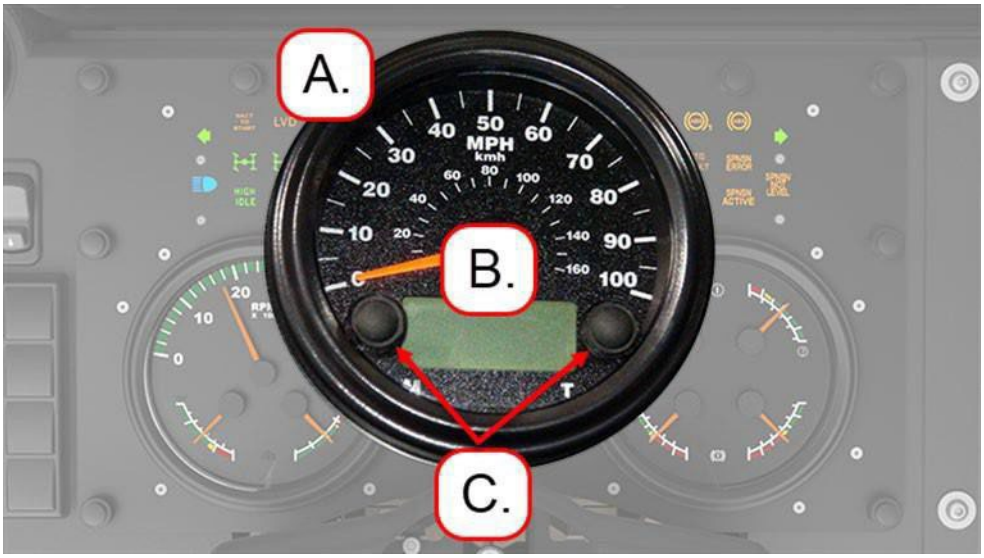


Figure 2.35 Center gauge of dash cluster

Center gauge cluster (Figure 2.35).

- Speedometer.
  - Located: Center gauge of three radial gauges in dash (Section A of Figure 2.35).
- LCD screen (Section B of Figure 2.35).
- LCD navigation buttons (Section C of Figure 2.35).
  - M button on left of display.
  - T button on right of display.

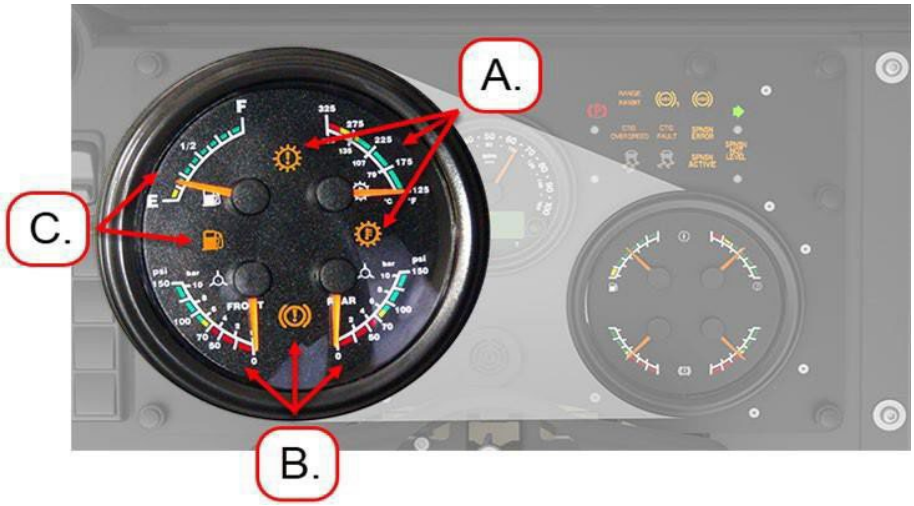


Figure 2.36 Right gauge cluster of dash

- Right gauge cluster (Figure 2.36).

- Transmission indicator.
    - Check transmission indicator. Illuminates amber when transmission monitoring system indicates a fault.
    - Icon is a dial (See Section A of Figure 2.36).

- Transmission temperature gauge. Measures transmission temperature in degrees Fahrenheit.
- Transmission temperature indicator. Illuminates amber when transmission temperature is above 325 °F (See Section A of Figure 2.36).
- Rear air pressure gauge /front air pressure gauge (See Section B of Figure 2.36).
- Low air warning indicator. Illuminates amber when air is below 70 psi (See Section B of Figure 2.36).
- Low fuel indicator. Illuminates amber when fuel is at 1/8 tank (Section C of Figure 2.36).
- Fuel level gauge (Section C of Figure 2.36).

Figure 2.37 Steering wheel and stalk

Steering components (Figure 2.37).

- Steering wheel.
- Horn.
- Stalk – (high beams/turn signals/windshield wash).
    - Pull back on the stalk to activate the bright lights. Pull back again to turn the bright lights off.
    - The stalk is also used to activate the left and right turn signals by pushing the stalk

up or down. The hazards are turned on by pulling out the silver tab, and then canceled by activating the turn signal.

- The windshield washer spray is activated by pushing in on the end of the stalk.
- Turn to activate the windshield wipers.

Figure 2.38 Mirror adjustment controls

Mirror adjustment controls (Figure 2.38).

- Joystick electronically controls the mirrors.
- The center position of the joystick is to prevent unintentional adjustments of the mirror.
- Turn the joystick to the side mirror you want to adjust (left or right) and then move the joystick up, down, left, right as needed for adjustment.

Figure 2.39 Transmission shift lever

Transmission shift lever (Figure 2.39).

- The transmission shift lever is a stalk-style lever with a release button on the front of it.
- It provides the operator with reverse, neutral, drive, 3rd, 2nd, and 1st. There is no diagnostic capability on the transmission shift lever.
- Operator should always place vehicle in Neutral, use parking brake and follow local SOP (i.e., chock blocks).

Figure 2.40 HVAC controls

HVAC Controls (Figure 2.40).

- The heating, ventilation, and air conditioning (HVAC) control panel is located just below the Driver Smart Display Unit.
- The controller has images for each function available.
- On the left of the display is the fan speed control.
  - The up arrow increases blower fan speed, the down lowers it.
- To the right of the fan speed control is the auto fan selection. With this the operator can set the systems to the desired temperature.
- Below the fan speed control is the power button, which turns the HVAC on and off.
- In the middle of the display is the LED indicator. This reads temperature and selections as they are being completed by the operator.
- Below the display is vent selection and the defog option.
- To the right of the LED display is the AC on button.
- Just below that is the recirculation button.
- To the far right of the unit are the temperature control buttons: the red up arrow increases cab temperature and the downward blue arrow decreases it.

Figure 2.41 Receptacles

- Found in the middle of the cab, are a series of plugs or receptacles. There are 12-volt, 24 volts, and 120-volt connectors available to the operator. (Figure 2.41).
  - The connector with the grey cover is used for maintenance diagnostics.

Figure 2.42 DSDU (Showing default logon screen)

Driver Smart Display Unit (DSDU) (Figure 2.42).

- The DSDU is a touch screen display unit that gives the operator capabilities to control CTIS, the suspension system, manage power distribution, monitor drive data, and check fluid and filter life among many other things.
  - USB Ports (for keyboard only – will not charge electronics).
- Found in the middle of the cab, are a series of plugs or receptacles. There are 12-volt,

24 volts, and 120-volt connectors available to the operator.

- The connector with the grey cover is used for maintenance diagnostics.
- Also found near the screens in the truck are locations to plug in the keyboard.
- Treat USB ports like a government computer, do not plug personal devices into them.

Figure 2.43 Map lights

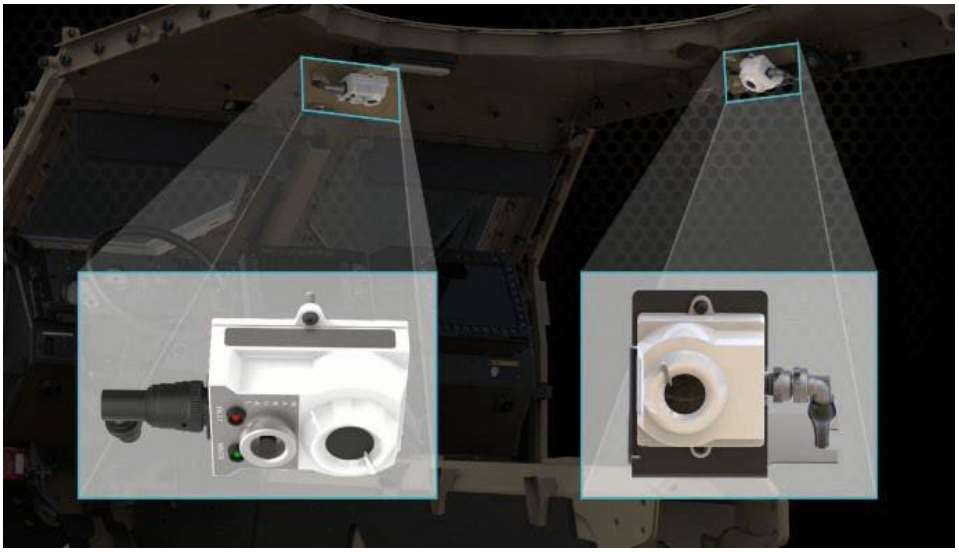


Figure 2.44 Automatic Fire Extinguishing System (AFES)

Automatic Fire Extinguishing System (AFES) (Figure 2.44).

- AFES has two optical sensors that monitor infrared (IR) and ultraviolet (UV) signatures within the capsule to determine fire suppression discharge.
- LED indicators: Monitor faults.
- Notify Field Maintenance if the AFES has been discharged.

Figure 2.45 Commander's Smart Display Unit

Commanders Smart Display Unit (Figure 2.45).

Five-point harness/seatbelt (Figure 2.46).

- The seats in the vehicle adjust forward, backward, and for height.
  - Seats are equipped with five-point harnesses that adjust for height and length.
- The seatbelt harness restraint is designed with quick release capability. The release is a rotational device that releases all of the retaining straps at once.

LESSON 5

OPERATE THE INTERCOM SYSTEM CONTROLS

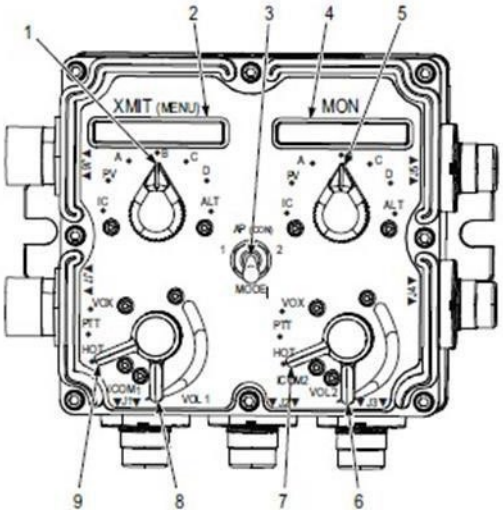


Figure 2.47 Dual Control Crew Station (CS) controls and Indicators

Table 2.6 Dual Control Crew Station (CS) controls and Indicators

Key	Control/Indicator	Function
1	XMIT (MENU) Switch	Selects assets IC, PV, A, B, C, D, or ALT to transmit
2	XMIT (Menu) Display	Displays an alphanumeric indication of selected asset.
3	AP (CON) Switch	Selects between CREW 1, WAP, or CREW 2 modes to control transmission and monitoring.
4	MON Display	Displays an alphanumeric indication of selected asset.
5	MON Switch	Selects assets IC, PV, A, B, C, D, or ALT to monitor.
6	VOL 2 Switch	Controls CREW 2's master volume setting for all assets.
7	ICOM 2 Switch	Selects between HOT, Push-To-Talk (PTT), or Voice Operated Switch (VOX) mode of microphone operation for CREW 2.
8	VOL 1 Switch	Controls CREW 1's master volume setting for all assets.
9	ICOM 1 Switch	Controls CREW 1's master volume setting for all assets.

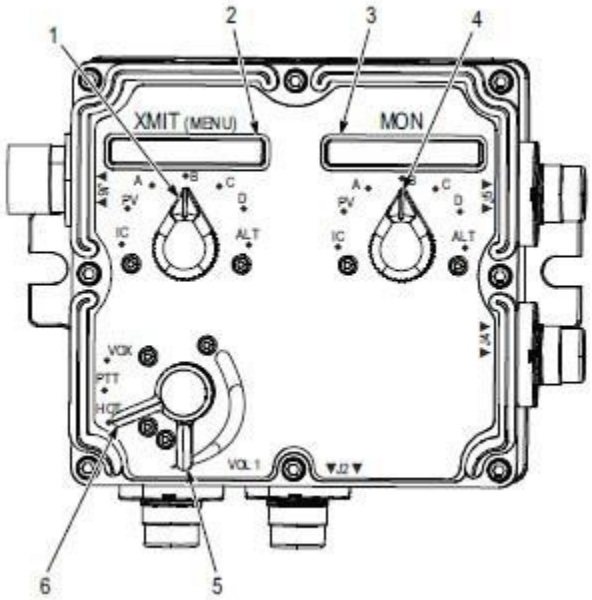


Figure 2.48 Single Control Crew Station (CS) Controls and Indicators.

Table 2.7 Single Control Crew Station (CS) Controls and Indicators

Key	Control/Indicator	Function
1	XMIT (MENU)	Selects assets IC, PV, A, B, C, D, or ALT to transmit.
2	XMIT (MENU) Display	Displays an alphanumeric indication of selected asset.
3	MON Display	Displays an alphanumeric indication of selected asset.
4	MON Switch	Selects assets IC, PV, A, B, C, D, or ALT to monitor.
5	VOL 1 Switch	Controls operator master volume setting for all assets.
6	ICOM Switch	Selects between HOT, Push-To-Talk (PTT), or Voice Operated Switch (VOX) mode of microphone operation for operator.

Check on Learning

Q: Where is the battery disconnect switch located, for powering the vehicle?
A: On the dash, at the driver's left knee.

Q: Where are the controls for most vehicle lighting functions?
A: The lighting MUX panel

Q: What is the function of the blackout switch?
A: It disables normal exterior lighting and enables blackout lighting.

Q: What is the function of the combat override switch?
A: It disables some vehicle safety limitations and interlocks and provides emergency operation of CTIS and suspension.

Q: Where is the high idle switch, and what is the indicator it has been activated?
A: The high idle button is just to the right of the exhaust brake, and an indicator illuminates steady green when high idle is selected.

LESSON 6

OPERATE THE DSDU

Driver Smart Display Unit (DSDU)

- There are four main screens we will be using throughout training on the DSDU:

Figure 2.49 DSDU Home screen

Home screen (Figure 2.49).

- The home screen contains buttons used to check vehicle systems, access vehicle information (fluid levels, pressures, and temperatures), service screen (active codes), and powertrain selection (for monitoring the engine, transmission, and transaxle).

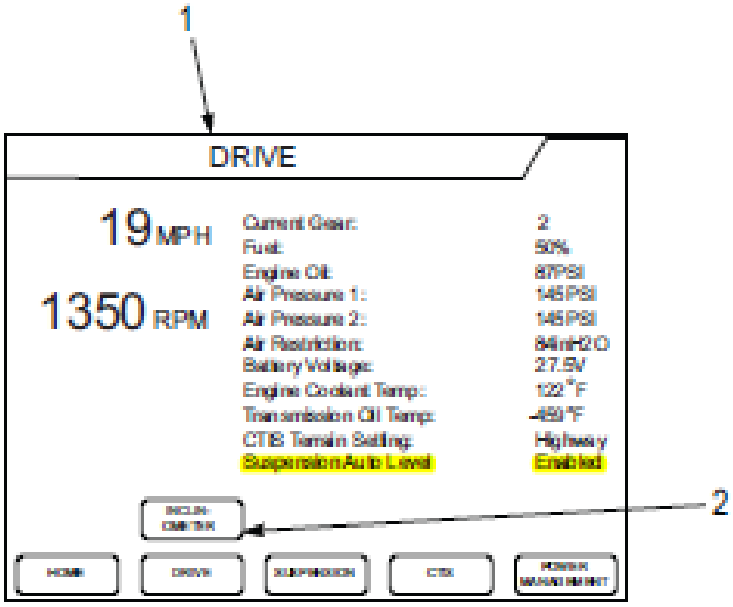


Figure 2.50 DSDU Drive screen

Drive screen (Figure 2.50).

- The drive screen allows the operator to monitor vehicle drive information during operation.
- It will also communicate to the driver when speed limiting is active or if there are any conditional faults.

Figure 2.51 DSDU CTIS screen

CTIS screen (Figure 2.51).

- These selections will adjust pressures based on pre- programed criteria based on the

load selection and the terrain selection.

- When cross country is selected, the system will apply lock level 1 as well as lower tire pressure. The ABS light will begin flashing. This is normal as it is putting the ABS controller in deep cycle mode, which pulses the brakes at a slower rate.
- When mud, sand, and snow is selected, the driveline lock #2 will be added to the first lockup. This is the last driveline lock that the CTIS controller will automatically provide.
- If it is necessary to add another driveline lock, it must be manually applied using the MUX panel discussed earlier. Refer to the Operator Manual for conditions of use and cautions associated with sling driveline locks.
    - Curb Weight (CW).
    - Curb Weight plus B-Kit (CW+B kit).
    - Gross Vehicle Weight (GVW).
    - Gross Vehicle Weight Rating (GVWR).
- The terrain selections available on the DSDU are:
    - Highway.
    - Cross country.
    - Mud, sand and snow.
    - Emergency
- There are two primary speed interlocks on the vehicle. The first interlock is when the system is aborted in the middle of an adjustment. If this occurs, the vehicle will not allow the vehicle to exceed 10 MPH. If the system is aborted twice at one selection, the truck will be limited to 10 MPH.
- If the vehicle sits overnight and temperatures change, the Suspension Not Level light may come on when you start it. If you operate the truck in this mode, the truck will be limited to 18 MPH. IT IS GOOD PRACTICE FOR STUDENTS TO ENTER OPERATIONAL MODE AS SOON AS THEY START THE TRUCK.
- When the vehicle management system does not see the DSDU on the network for 5 seconds, there is still full activation of the CTIS system and limited use of the suspension system. If the combat override switch is on, and fording mode is selected on the MUX panel, the truck will initially go to operational ride height. It will also still have use of fording mode, but the operator will not be able to access tie-down or loading mode using this method. If the operator must control the CTIS system with a failed DSDU, the operator can switch the combat override switch and apply driveline locks. When the operator applies driveline locks, the DSDU is not seen on the network, and the combat override is on, the CTIS will switch from highway (with no locks), to cross country (with the first lock), to mud sand and snow (with the second driveline lock), and

emergency (with the third driveline lock). Note that there is a slight difference between normal CTIS function and combat override CTIS function. When using the combat override, all three driveline locks will be in emergency mode. When operating in normal CTIS mode on the DSDU, the operator is limited to only the front to rear lockup and rear axle lockups.

Figure 2.52 DSDU Suspension screen

Suspension screen (Figure 2.52).

- The suspension is controlled by the DSDU suspension screen. When the suspension screen is initially entered, the selection made (operational, tie down, loading), and the system status will be displayed. Ensure the suspension auto-level feature is active.
- This selection will bring the operator to a screen that allows for suspension adjustment. Available selections for this screen are:
    - Operational.
        - Normal ride height for the vehicle.
        - It gives the appropriate clearance for the vehicle and full operational speed.
        - Interlocks are not applied in this suspension selection.
        - The auto level feature will adjust for changes in weight/payload when traveling over 5 mph.
        - The auto-level system becomes inactive if the suspension not level light is

illuminated solid. A manual adjustment should be performed. If this does not shut the light off, it is not advised to drive the vehicle.

- Tie-down.
  - Tie-down is used when the truck is transported on a flatbed or by rail.
  - This lowers the suspension and limits the speed of the truck to 8-10 mph.
    - Loading.
      - Loading is used for ship transport. When this suspension selection is made, the truck will be limited to 8-10 mph.
      - When the loading mode is selected, a request is asked if you have removed jounce bumpers and would like to enter loading mode. Once this occurs another screen opens with four selections. These buttons give the operator control of:
        - Raising front suspension.
        - Lowering front suspension.
        - Raising rear suspension.
        - Lowering rear suspension.
      - The vehicle operator will need to follow the specific loading instructions. Use these controls to adjust ride height, which will clear overhead and underneath obstructions during loading operations.

- All screens can be found in the DSDU Quick Reference Guide.

Check on Learning

Q: Name the four main screens used in the DSDU?

A: Home, Drive, CTIS, and Suspension screens.

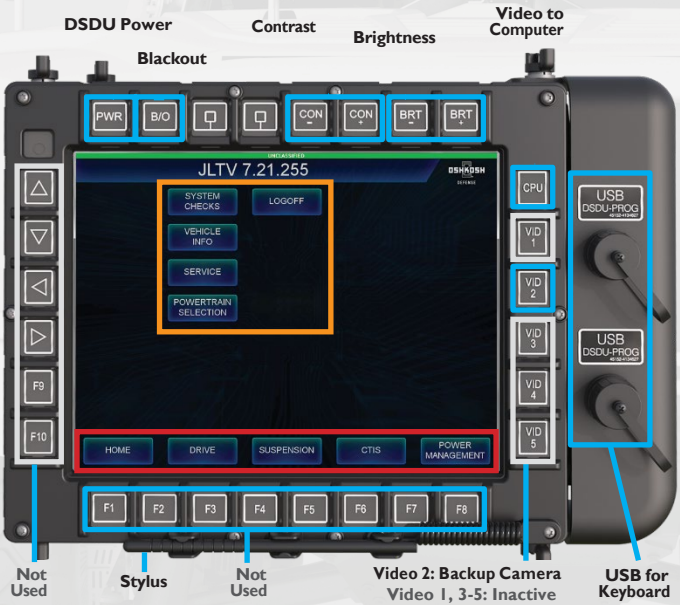
Q: What is the tie-down suspension setting used for?

A: When transporting the truck by rail or on a flatbed.

Q: An operator is driving the JLTV and needs to monitor vehicle drive information, i.e., when speed limiting is active and fuel and oil levels. Where can the operator find this information?

A: The drive screen.

The Driver Smart Display Unit (DSDU)



The DSDU is a touch screen device that automatically activates when the vehicle is powered up.

- The ***outer housing*** provides display controls and USB ports.
- The ***center buttons*** on the home screen are used for checking critical systems, changing settings, and conducting PMCS.
- The ***home buttons*** along the bottom, appear on every screen, providing access to key operational menus and settings.

DRIVE SCREEN

The Drive Screen displays the status of all critical systems.

Left Side:

- **MPH**
- **RPM**
- **Warning/Fault Indicator**

Right Side:

- **Current transmission gear**
- **Fuel Level %**
- **Engine Oil Pressure**
- **Air System Pressure**
- **Air Intake Restriction**
- **Battery System Voltage**
- **Engine Coolant Temperature**
- **Transmission Oil Temperature**
- **CTIS setting**

This is real-time data and will match the gauge cluster display.

INCLINOMETER

This function displays real-time vehicle pitch and roll.

Used to:

- **Determine Suspension Aided Egress System (SAES) use**
- **Monitor terrain to ensure vehicle does not exceed maximum ratings.**

NOTE: The values displayed on this screen are in degrees, not percent grade

Common Grading Values:

60% = 30°
40% = 21°
30% = 16°

SUSPENSION SYSTEM

The Suspension System screen displays the current ***Ride Height*** configuration and ***Status***.

Ride Height configurations:

- **Fording**
- **Operational**
- **Tie-Down**
- **Loading**
- **Custom**

Status Message:

- **OK**
- **Adjusting**
- **NO COMM**
- **Error**
- **Vehicle Speed Limiting Is Active**
- **Weight Calculation In Progress**
- **Not Level**

Ride Height configurations can be entered from the DSDU or MUX.

RIDE HEIGHT ADJUSTMENT

Allows selection of Ride Height configuration

Operational: Normal driving.

- No speed interlocks are applied.
- Clearance is ~16.2 inches.

Tie-Down: Transport JLTV by rail or flat bed.

- A 10 MPH interlock is applied.
- Clearance is 14.2 inches with suspension lockout braces.

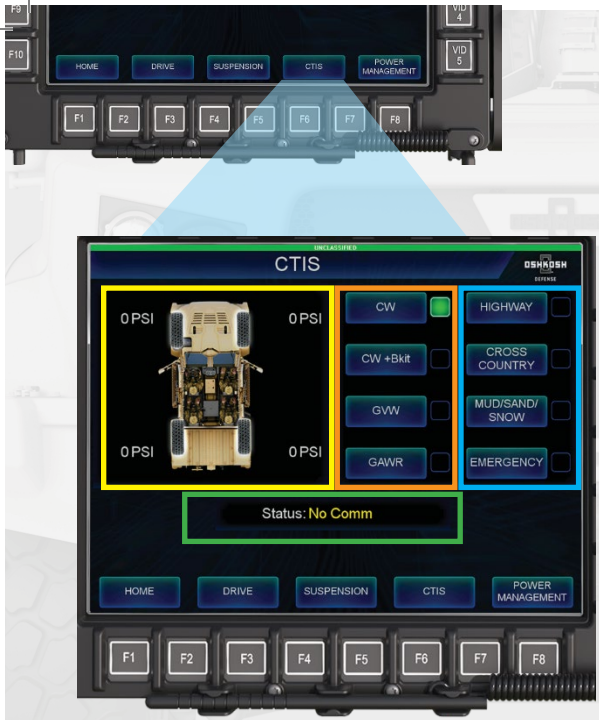
Loading: Loading on ships and air transport.

- A 10 MPH interlock is applied.
- Clearance is 3.8 inches.

NOTE: Jounce bumpers must be removed, allowing for manual control of suspension.

Suspension Aided Egress System (SAES): Initiates self-leveling of the vehicle, adjusting to the limitations of the suspension.

- A 10 MPH interlock is applied.
- Parking brake must be set.
- Transmission must be in neutral.



CTIS

Displays tire pressures and allows for system configuration.

Tire pressures - current readings

Vehicle Weight Rating setting accordingly

- **CW**: Curb Weight (Akit vehicle)
- **CW + Bkit**: Akit plus armor (Bkit)
- **GVW**: Gross Vehicle Weight (loaded)
- **GAWR**: Gross Axle Weight Rating (full payload)

Terrain setting adjustments

- adjusts tire pressure and axle lockout

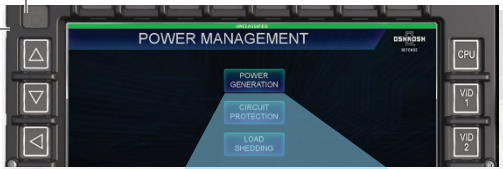
System Status:

- **Active**: The system is adjusting tire pressure.
- **Confirmed**: Once programmed tire pressure is reached.
- **Disabled**: CTIS system is disabled.
- **No Comm**: No Communication.

POWER MANAGEMENT

Allows access to:

- **Power Generation**
  View current data about alternator, battery, and vehicle power status
- **Circuit Protection**
  View current data about circuit breaker status
- **Load Shedding**
  Create Load Shedding configurations for multiple mission profiles



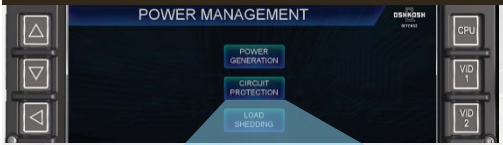
POWER GENERATION

Displays live data from the electrical system.

Displayed on this screen:

- **Alternator Status:** OK
- **Alternator Speed:** RPM
- **Alternator Output:** Percent %
- **Battery Management System (BMS) Status:** OK
- **Battery State of Charge:** Percent %
- **Battery Voltage:** Volts
- **Battery Current:** Amps
- **Battery Temperature:** Fahrenheit
- **Battery Time until Low Voltage:** Minutes
- **Vehicle Power:** Watts

NOTE: Alternator and BMS Status may appear as: OK, Faulted, or Warning. Contact Field Maintenance if Faulted or Warning.



CIRCUIT PROTECTION

Displays live data about circuit breakers in the 12/24VDC mVEC and 24VDC mVEC.

- Can virtually check CBs as part of troubleshooting tasks

Circuit breakers will be identified as:

- **OK:** CBs are functioning
- **Faulted:** CBs tripped, missing, not connected
- **Unknown:** Not addressed or used

24 VDC mVEC is located behind the DSDU.

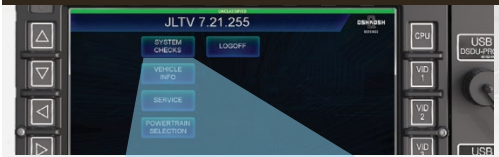
12/24 VDC mVEC is located in the engine compartment on the firewall below the passenger window.

LOAD SHEDDING

Allows the configuration of up to 4 Mission profiles by selecting the order that non-critical systems shut off when the battery voltage drops to a predetermined level during a critical situation.

1. Select a **Set Mission** button to edit the order that systems shut down.

2. Follow on-screen instructions to re-order the systems.



SYSTEM CHECKS

Provides a color-coded status of critical vehicle systems.

The status colors indicate:

- **Green:** System functioning properly

- **Yellow/amber:** System faulted or low level

- **Red:** Degraded mode or extremely low level, refer to manual

- **Black:** No or invalid communication

VEHICLE INFO

Provides access to:

- **Fluid Levels**
  View current levels for major systems
- **Fluid Pressures**
  View current pressures for major systems
- **Fluid Temperatures**
  View current temperatures for major systems
- **Preventative Maintenance**
  View filter status for major systems
- **Weight Diagram**
  View vehicle weight (corner, axle, and total vehicle) and indicates when weight limits have been exceeded

FLUID LEVELS

Displays current fluid level status for:

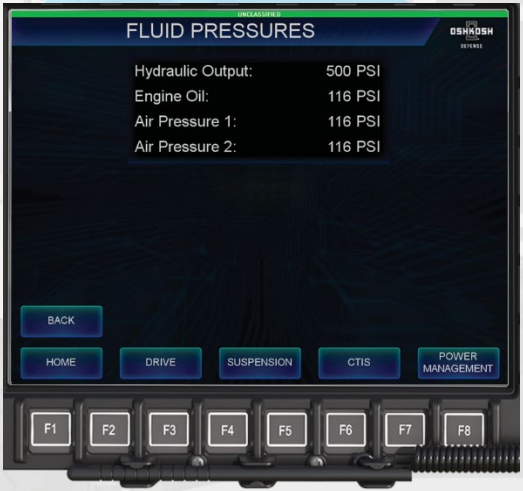
- Hydraulic fluid
- Engine oil
- Coolant
- Fuel
- Front axles
- Rear axles

These will be displayed as:

- **OK** when fluids are in the appropriate range. Fuel is displayed as percentage.
- **LOW:** Refer to manual for corrective action
- **Unknown:** No communication or invalid communication

NOTE: Unknown values may be fine. Stop vehicle on level ground and restart system.

This screen is used to conduct Before PMCS checks, providing current fluid level status.

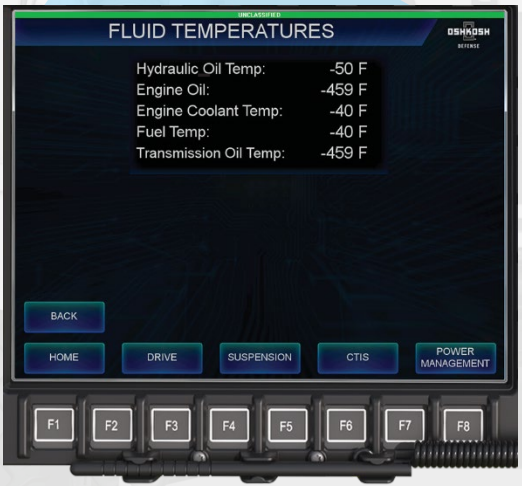


FLUID PRESSURES

Displays:

- **Hydraulic output pressure**
- **Engine oil pressure**
- **Air pressure**
  (for both air tanks)

Engine oil and air pressures are also displayed on the Drive screen.



FLUID TEMPERATURES

Monitors a live data feed and provides current temperatures for:

- **Hydraulic fluid**
- **Engine oil**
- **Engine coolant**

  Fuel
- **Transmission Oil**

Temperatures are displayed in Fahrenheit.

Typically used during missions operating in arctic conditions, hot environments, or during maintenance procedures.

PREVENTATIVE MAINTENANCE

Displays:

- **Air Restriction:** Higher numbers indicate a more restricted air filter

Filter life as a countdown percentage for:

- **Air Dryer**
- **Fuel Filter**
- **Engine Oil Filter**
- **Hydraulic Oil Filter**

WEIGHT DIAGRAM

Displays calculated vehicle weight for corners, axles, and total vehicle.

- **White text:** weight is within limits
- **Yellow text:** weight is approaching maximum limits
- **Red text:** weight has exceeded limits

The calculated weights will pre-populate the CTIS data input screen to ensure the CTIS is set to the correct vehicle weight.

Driving the vehicle is required to calculate the weight.

SERVICE SELECTION

Provides access to:

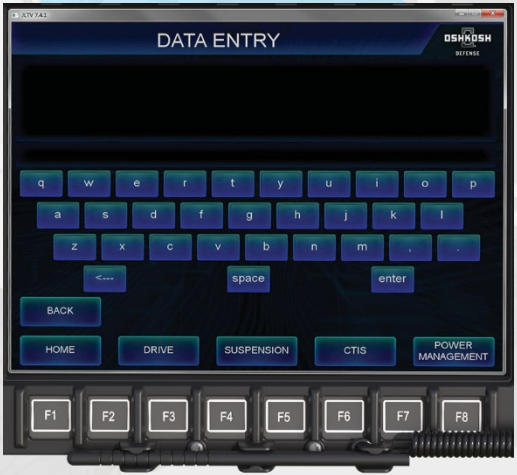
- **Active Service Codes**
  Identify current system fault code
- **Data Entry**
  Document existing conditions related to fault event
- **ABCD export**
  (Maintenance Only)
- **Unit Selection**
  Select units of measurement used by system displays

ACTIVE SERVICE CODES

Touching the active fault codes on this screen will bring up the Operator Manual.

There are 4 columns to the Active Service Code screens.

- **System:** Identifies the system the fault occurred in.
- **No:** Indicates the numerical code for the system the fault occurred in.
- **Severity:** A letter designated code describing the overall severity of the fault.
  - **W - Warning** (system is moving into failure mode; must be addressed as soon as possible)
  - **C - Caution** (a problem requires prompt attention to prevent escalation into a Warning)
- **Description:** A brief narrative of the active fault.



DATA ENTRY

The Data Entry Screen is used to record data when a fault is discovered on the JLTV.

When a fault occurs, the fault and related conditions can be documented during the event. This data cannot be erased.

ABCD EXPORT

Provides access to the ABCD Export function.

- **The operator or maintainer can begin an export by pressing the START EXPORT button.**

This is primarily used by maintainers to export maintenance and operational performance data.

UNIT SELECTION

Allows selection of units used to display data on system.

Quick Selection allows the selection of either English (Standard) Units or Metric Units for all options.

Optionally, these units can be selected individually:

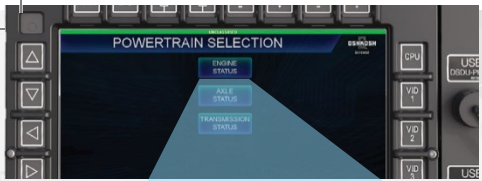
- **Speed** (KPH/MPH)
- **Pressure** (kPa/PSI)
- **Temperature** (Celsius/Fahrenheit)
- **Length** (Centimeter/Inch)

POWERTRAIN SELECTION

Provides access to:

- **Engine Status**
  displays current engine performance and maintenance data
- **Axle Status**
  displays current axle fluid level status and driveline lockup conditions
- **Transmission Status**
  displays current system data and status

Primarily used by Maintainers.

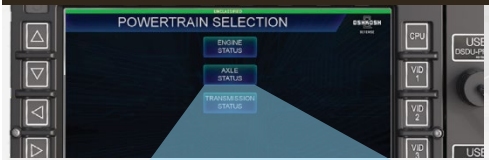


ENGINE STATUS

Provides a central location for data feeds from multiple engine systems:

- **basic engine component status**
- **maintenance data**
- **performance data**

Primarily used by Maintainers.



AXLE STATUS

Displays current data related to axle lockup conditions and fluid level status:

- **Front Axle Oil Level**
- **Rear Axle Oil Level**
- **Gearbox Position**
- **Front Differential Lockup**
- **Interaxle Lockup**
- **Rear Differential Lockup**

Primarily used by Maintainers.

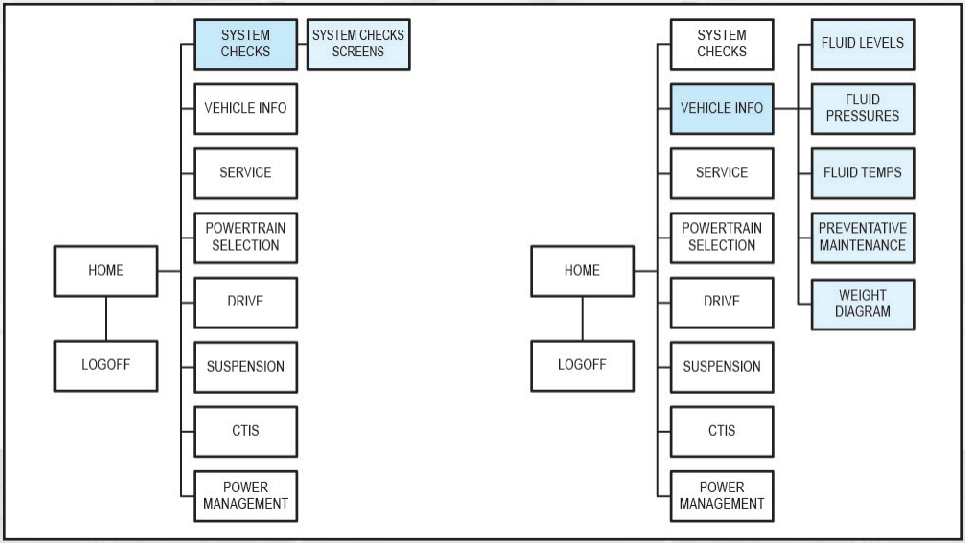
TRANSMISSION STATUS

Displays current data related to the transmission status:

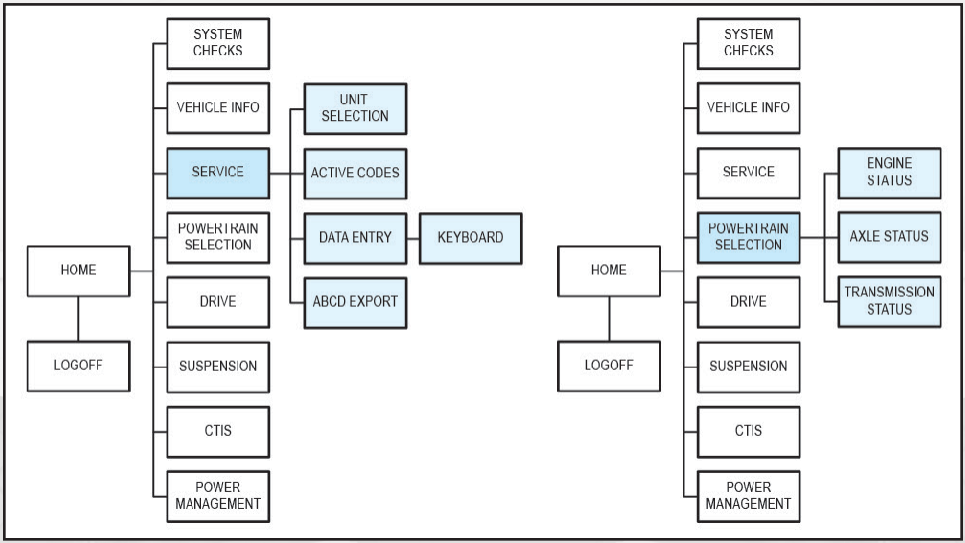
- **Transmission Status:**
  - **OK**: Fully mission capable
  - **Unknown**: Loss of communication
  - **Faulted**: Active code
- **Current Gear**
- **Input Shaft Speed**
- **Output Shaft Speed**
- **Transmission Oil Temp**

Primarily used by Maintainers.

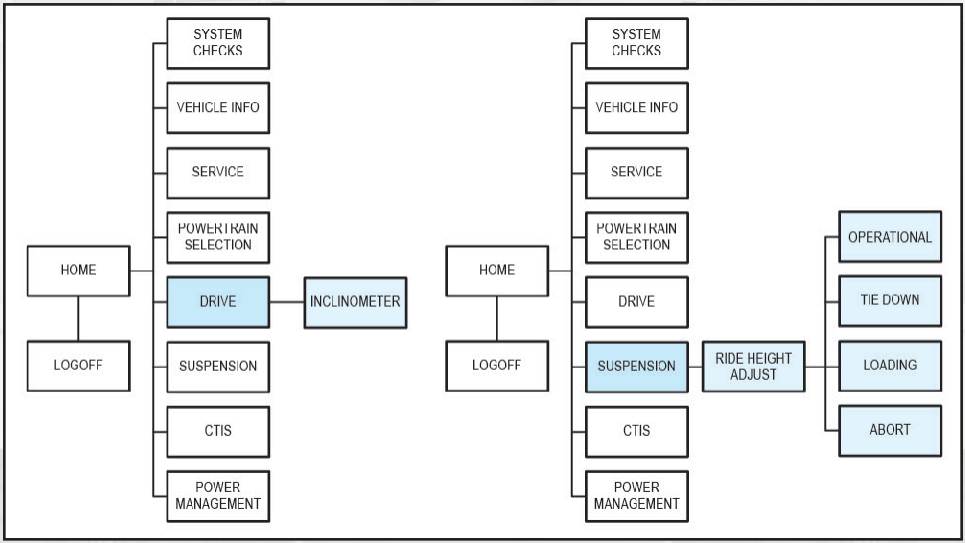
DSDU Application Paths



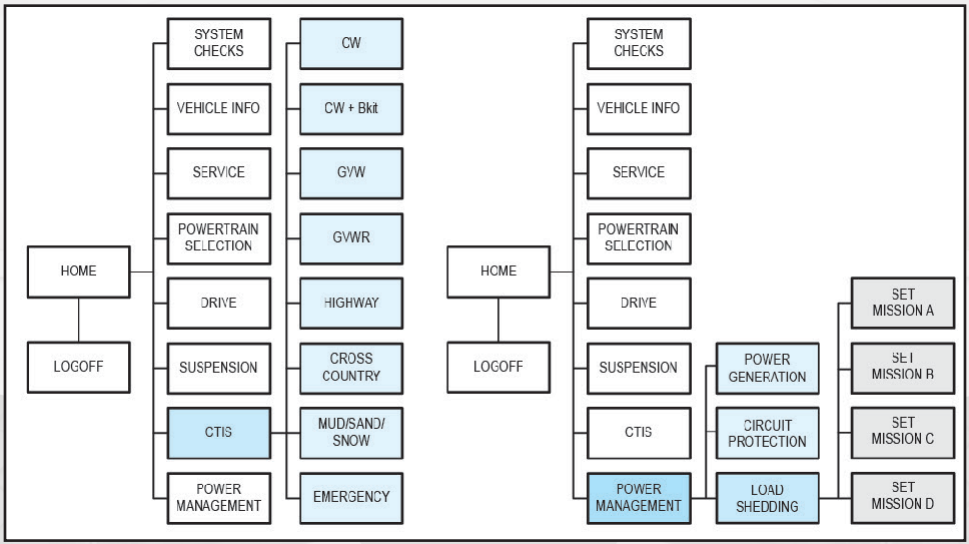
DSDU Application Paths



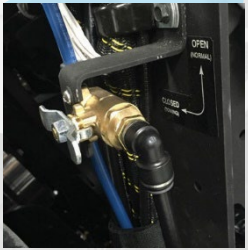
DSDU Application Paths



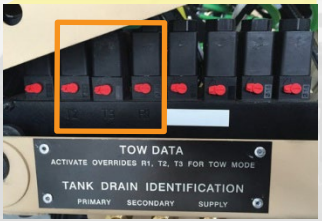
DSDU Application Paths



JLTVA1



JLTVA0



TOWING

The vehicle must be configured properly to prevent critical damage when towing. Always reference the appropriate work package for towing procedures.

1. **Locate** the ball valve found in the engine compartment and **rotate** to the closed position. (Ball valve is mounted to frame rail on JLTVA0, and mounted next to surge tank on JLTVA1.)

Note: When towing operations are complete, return ball valve to open position in accordance with work package.

2. **Push and Rotate 90°** (red solenoid override switches R1, T2, T3) found at rear of truck.
   - Clockwise overrides the solenoid control
   - Counter-clockwise returns the truck to normal operating state
3. **Return override to normal** when towing procedure is complete

LESSON 7

OPERATE THE JLTV

- Suspension lock-out braces must be installed on driver and passenger side of axle prior to crawling under vehicle. Suspension may lower, crushing personnel. Failure to comply may result in injury or death to personnel. Inspect area between belly armor and propeller shaft to verify it is clear of debris.

- Open flame inside cab will activate fire suppression system. Cab interior fire suppression system uses optical fire detectors. Do not smoke or have open flame inside cab. Failure to comply may result in injury or death to personnel.

- Injury or death can occur if you ignore a warning light or buzzer. These signals tell you something is wrong with vehicle. An amber light will indicate a system needs to be checked when convenient. A red light means a system failure and needs to be checked immediately. Failure to comply may result in injury or death to personnel.

- To avoid hitting personnel, check that all areas under, around, and on vehicle are clear of unauthorized personnel prior to operating vehicle. Failure to comply may result in injury or death to personnel.

- Driver has limited vision to rear of vehicle. Ground guide is required when driving vehicle in reverse. Failure to comply may result in injury or death to personnel.

- Severing, smashing, and crushing of body parts can occur if caught between door and cab.

- When vehicle is parked on an uneven surface, potential of cab hinge detents not holding doors open to aid in egress is elevated. Whenever possible, park vehicle on an even surface. Failure to comply may result in injury or death to personnel.

- Always use seat belts when vehicle is in operation. Failure to comply may result in injury or death to personnel.

- Without proper mirror adjustment, operator may not see personnel or obstacles behind vehicle. Ensure side view mirrors are adjusted to allow for full range of view prior to operating vehicle. Failure to comply may result in injury or death to personnel.

- Do not exit vehicle when suspension is being adjusted. Severing, smashing, and crushing of body parts can occur if caught between door and cab. Remain in vehicle until suspension operation has concluded. Failure to comply may result in injury or death to personnel.

- Do not level, raise, or lower vehicle on sloped terrain to prevent overturning of vehicle. When possible, park on level ground. Failure to comply may result in injury or death to personnel.

- Stay clear of areas between wheel and bed, axle and frame, and jounce bumper while engine is running or while the suspension is being raised or lowered. Severing, smashing, and crushing of body parts can occur if caught between these areas. Failure to comply may result in injury or death to personnel.

- Use of exhaust brake on slick or loose surfaces can cause vehicle to skid. Use exhaust brake only when vehicle tires have good traction. Failure to comply may result in injury or death to personnel.

- Speed limits posted on curves reflect speeds that are considered safe for automobiles. Heavy vehicles with a high center of gravity can roll over at these speed limits. Reduce your speed below posted limit prior to entering a curve. Failure to comply may result in injury or death to personnel.

- Ice accumulation between door and door frame may obstruct doors, causing them to prevent proper entry and exit. Monitor and remove ice as needed to ensure proper functionality. Failure to comply may result in injury or death to personnel.

- If required to remain inside vehicle during extreme cold, occupants should wear proper clothing/boots, minimize exposure time, and follow cold stress preventive medicine measures contained in TC 4-02.3 Field Hygiene and Sanitation (WP 0171).

- When driving on sand dunes, always drive straight up or down the dune face. Do not drive vehicle at an angle or across sand dune, as this may cause unwanted sliding. Failure to comply may result in injury or death to personnel.

- If required to remain inside vehicle during extreme heat, occupants should follow the water intake, work/rest cycle times, and other heat/stress preventive medicine measures contained in TC 4-02.3 Field Hygiene and Sanitation (WP 0171).

- When in slippery or low-traction conditions, if not enough distance is allowed, vehicle may not be able to stop in time to prevent accidents. Allow a considerable distance for stopping. Failure to comply may result in injury or death to personnel.

- Vehicle may roll over if side slope capabilities are exceeded. Vehicle has a high center of gravity. Slow down for turns and other maneuvers. Approach slopes head-on and avoid side slopes when possible. Failure to comply may result in injury or death to personnel and/or damage to equipment.

- Slippery or rough roads can cause loss of vehicle control. Keep vehicle speeds within limits of road condition. Failure to comply may result in injury or death to personnel.

- Use of exhaust brake on slick or loose surfaces can cause vehicle to skid. Use engine brake only when vehicle tires have good traction. Failure to comply may result in injury or death to personnel.

- Use extreme caution when driving with degraded brake system. If three or more of

your service brakes are not operational, do not drive your vehicle unless absolutely necessary. Failure to comply may result in injury or death to personnel.

- Vehicle may roll forward or backward if park brakes are inoperable or park brakes are caged. Ensure vehicle is stopped on flat/level ground to reduce possibility of vehicle roll. Failure to comply may result in injury or death to personnel.

- When driving with degraded brake system, stopping distance will be greatly increased. Allow a considerable distance for stopping. Failure to comply may result in injury or death to personnel.

- Brake system components may be hot if they have been recently operated. Allow sufficient time for brake system components to cool before caging park brakes. Failure to comply may result in injury or death to personnel.

- Tow bar weighs over 75 lbs. (34 kg). Do not attempt to lift or move tow bar without the aid of an assistant. Failure to comply may result in injury to personnel.

- Personnel could become pinched or crushed between vehicles when connecting disabled vehicle. Do not allow personnel to get between vehicles. Failure to comply may result in injury or death to personnel.

- Be aware when towing a disabled vehicle off road. Steep grades or side slopes can cause loss of control of vehicle. Failure to comply may result in injury or death to personnel.

- Disabled vehicle can roll once unhooked from tow vehicle. Ensure to pull out parking brake control of the disabled vehicle. Failure to do so may cause injury or death to personnel.

- Personnel must stand twice the length of the deployed winch rope away during winch operations. Winch rope may violently snap. Failure to comply may result in injury or death to personnel. Avoid quick, jerking winch operation. Jerking places unnecessary strain on components. Failure to comply may result in injury or death to personnel.

- Do not disengage winch clutch under load. Be certain there is no tension on winch rope when disengaging clutch prior to handling winch rope. Failure to comply may result in injury or death to personnel.

- Always wear heavy leather gloves when handling winching components. Failure to comply may cause injury to personnel.

- Never guide or let winch rope run through hands onto drum. Severed or pinched fingers can occur. Failure to comply may cause injury to personnel.

LESSON 8

PREPARE FOR OPERATIONS

Before Operations Preventive Maintenance Checks and Services (PMCS).

- Observe the Warnings, Cautions and Notes appearing in the PMCS table in the MOM.
- Ensure JLTV is on level ground.
- Ensure door combat locks function properly.
- Do not ignore a warning light or buzzer. This could indicate a failure in an important system and could lead to injury to personnel or damage to the equipment.
- Perform PMCS in prescribed order. Checks and services are numbered in a logical order for moving around the equipment. (Figure 3.1).

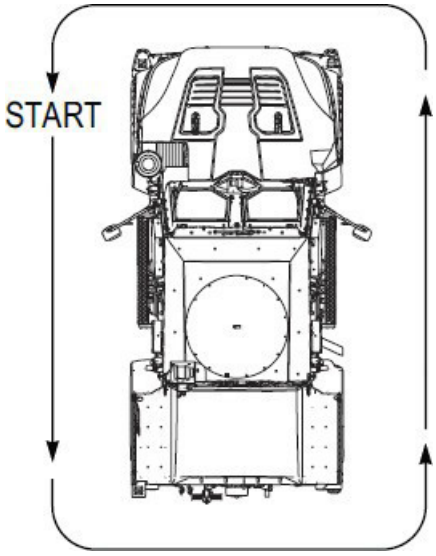


Figure 3.1 Vehicle walk around

- Have necessary tools and rags on hand to perform all checks.
    - General maintenance procedure.
        - Cleanliness.
            - Clean prior to performing PMCS.

    - Dirt, oil, and debris may cover deficiencies.

- Lubrication. Lubricate vehicle after washing according to lubrication instructions.

- Nuts and screws.

    - Check for looseness, missing, bent or broken nuts and screws.

    - Look for chipped paint, bare metal or rust around screw heads.

        - Welds. Look for loose or chipped paint, rust or gaps where parts are welded together.

- Electric wires and connectors. Look for cracked or broken insulation, bare wires, and loose or broken connectors.

- Fluid lines and fittings.

    - Look for wear, damage and leaks.

    - Ensure clamps are tight.

    - Fluids and stains on or around fittings and connectors can be signs of leaks.

- Check for fluid leakage.

    - Leakage categories:

        - Class 1. Seepage of fluid not great enough to form drops.

        - Class 2. Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked/inspected.

        - Class 3. Leakage of fluid great enough to form drops that fall from item being checked/inspected.

    - It is important to know how fluid leakage affects the status of the JLTV.

    - Any fuel leak shall render the JLTV not mission capable.

- Corrosion prevention and control (CPC).

    - While performing PMCS, look for and always be aware of rust, peeling or blistering paint, and any damage that can cause corrosion.

    - Inspect entire vehicle.

- Appearance and color of corrosion is dependent on the metal/components involved.

Table 3.0 Corrosion

METAL/COMPONENT	CORROSION APPEARANCE
Steel	Powdery Reddish Brown
Aluminum	Powdery White
Brass	Green
Electrical Connectors	Green

Starting the vehicle.

Figure 3.2 Battery disconnect switch

- Turn battery disconnect switch to on position. (Figure 3.2).

Figure 3.3 Ignition switch panel

- Turn ignition switch to ON position. (Figure 3.3).
- Disable CTIS. CTIS seals can be damaged if temperature is below 32 °F and air pressure is applied to the seal.
- Apply service brake.

- Wait for voltage reading to show on LCD.
- When WAIT TO START light goes out, turn ignition switch to START position. Once engine has started, release ignition switch.
- Release service brake.

Normal Driving Procedures.

- Adjust seat, side view mirrors, adjust and fasten seatbelt and adjust steering wheel.
- Lock combat lock.
- Turn on HVAC and lights as required.

Figure 3.4 CTIS screen

1. Set CTIS controller. CTIS setting adjustments are dependent of weight/load on vehicle. (Figure 3.4).

Table 3.1 CTIS Settings

CTIS SETTING	TERRAIN CONDITIONS
Highway	For operation on improved, paved roads
Cross Country	For operation on nonpaved, secondary roads and hardback trails
Mud/Sand/Snow	For operation on soft-surface trails and other unimproved surfaces
Emergency	To travel a short distance over an extreme terrain when other CTIS settings will not be sufficient.

CTIS LOAD SETTINGS	VEHICLE LOAD CONDITIONS
Curb Weight (CW)	Not loaded without kits installed
CW + B Kit	Not loaded with kits installed
Gross Vehicle Weight (GVW)	Partially loaded with or without kits installed
Gross Axle Weight Rating (GAWR)	Loaded to near capacity

Load Setting	Terrain Setting	Front Pressure PSI	Rear Pressure PSI
CW	Emergency	16 PSI (110 kPa)	16 PSI (110 kPa)
	Mud/Sand/Snow	19 PSI (131 kPa)	19 PSI (131 kPa)
	Cross Country	28 PSI (193 kPa)	28 PSI (193 kPa)
	Highway	37 PSI (255 kPa)	37 PSI (255 kPa)
CW + B kit	Emergency	16 PSI (110 kPa)	16 PSI (110 kPa)
	Mud/Sand/Snow	19 PSI (131 kPa)	19 PSI (131 kPa)
	Cross Country	35 PSI (241 kPa)	33 PSI (228 kPa)
	Highway	46 PSI (317 kPa)	44 PSI (303 kPa)
GVW	Emergency	16 PSI (110 kPa)	16 PSI (110 kPa)
	Mud/Sand/Snow	23 PSI (159 kPa)	27 PSI (186 kPa)
	Cross Country	40 PSI (276 kPa)	54 PSI (372 kPa)
	Highway	56 PSI (386 kPa)	69 PSI (476 kPa)
	Emergency	21 PSI (145 kPa)	24 PSI (165 kPa)

GAWR	Mud/Sand/Snow	25 PSI (172 kPa)	27 PSI (186 kPa)
	Cross Country	49 PSI (338 kPa)	54 PSI (372 kPa)
	Highway	63 PSI (434 kPa)	69 PSI (476 kPa)

TERRAIN SETTING	MAXIMUM ALLOWABLE SPEED	DRIVELINE LOCK CONFIGURATION
HWY	76 MPH (122 km/h)	No Driveline Lock
CC	45 MPH (72 km/h)	Interaxle Lock
MSS	20 MPH (32 km/h)	Interaxle and Rear Axle Side to Side Lock
EMER	10 MPH (16 km/h)	Interaxle and Front and Rear Axle Side to Side Lock

- Select the applicable transaxle setting.
- Apply service brake.
- Lift parking brake safety lever and push PARKING BRAKE control in to release parking brakes.
- Position transmission range selector to desired range.
- Release service brake and slowly press down on accelerator pedal.
- Accelerate, brake, and steer as required.

Figure 3.5 Drive screen

- The drive screen is the primary screen for operating conditions (Figure 3.5).

- The vehicle is rated up to 76 MPH.
- Perform during PMCS throughout normal driving procedures.
- Park vehicle after mission is completed.
- Perform After PMCS.
- During PMCS is performed on the following systems throughout driving procedures.
    - Air system.
        - Monitor and ensure both air pressure gauges indicate a reading between 110 and 130 psi for normal operation.
        - While operating, listen for audible air leaks.
- Check gauges.
    - Amber light indicates a system needs to be checked when convenient.
    - Red light indicates system failure and needs to be checked immediately.
    - While operating, monitor and ensure oil pressure gauge indicates pressure at idle and increases with engine speed.
    - While operating, monitor and ensure tachometer gauge indicates 750 to 950 RPM when engine is idling and increases with engine speed while driving.
    - While operating, monitor and ensure cooling fan engages when water temperature gauge is at or over 220 °F (104 °C).
    - While operating, monitor and ensure water temperature gauge reads between 175 and 240 °F (80 to 116 °C).
    - While operating, monitor and ensure transmission fluid temperature gauge reads below 240 °F (116 °C) and transmission temperature warning indicator is not illuminated.
    - While operating, monitor and ensure fuel gauge functions.
    - While operating, monitor main instrument panel LCD to ensure voltage reads between 24 and 30 volts.
    - While operating, monitor and ensure speedometer indicates speed while driving.
    - While operating, monitor and ensure low oil level indicator does not illuminate.
    - While operating, navigate DSDU to DRIVE screen in VEHICLE INFO tab to

monitor air restriction level.

- While operating, monitor and ensure air restriction indicator reads below 30 in/H20 (7kPa) restriction while vehicle is running.
- Monitor DSDU for faults.

- Engine.
  - Monitor engine for excessive smoke, rough running, excessive vibration, unusual noises, or misfiring.
  - Pay attention at all times during vehicle operation for unusual noises from engine compartment and excessive exhaust odors in cab. Presence of exhaust odors may be an indication of an exhaust leak.
- Transmission.
  - While operating, monitor and ensure transmission shifts smoothly through gears and does not slip while accelerating or pulling.
- Brakes.
  - While operating, monitor brakes for pulling, binding, or grabbing.
  - While operating, engage exhaust brake to ensure proper operation.
- Steering.
  - While operating, monitor steering for difficulty turning, excessive free play, binding, and shimmying.
- Accelerator Pedal.
  - While operating, monitor for sticking, constant throttle control, or binding pedal.
- Powertrain.
  - While operating, monitor engine, transmission, differentials, propeller shafts, half- shafts, transaxles, and wheels for unusual noise or vibration.
- HVAC System.
  - Check heater for proper operation if ambient temperature is below 65 °F (18 °C).
  - Check air conditioning (A/C) for proper operation if ambient temperature above 65 °F (18 °C).
  - While operating, inspect HVAC controls for proper operation in all settings.

- Inspect rear fan control for proper operation in all settings.
- Perform rear fan control inspection on M1278A1, M1280A1, and M1281A1 models only.

Check on Learning
Q: What could occur if suspension lock-out braces are not installed before an operator crawls under the truck?
A: Vehicle may become unstable and crush personnel.

Q: What should the suspension be set to for normal operating conditions?
A: Operational

Q: What must be engaged whenever the truck is in operation?
A: Combat locks

Perform Before PMCS:

- Ensure vehicle is on level ground.
- Ensure combat locks function properly.
- Perform PMCS in prescribed order.
- Clean vehicle prior to performing PMCS.
- Lubricate vehicle after washing.
- Check nuts and screws for looseness and damage.
- Check welds for damage or looseness.
- Check electric wires and connectors for cracks, looseness and damage.
- Check fluid lines and fittings for wear, damage, looseness and leaks.
- Check for fluid leakage.
- Perform PMCS.

Start Engine and Driving:

- Turn battery disconnect switch to on position.
- Turn ignition switch to ON position.
- Apply service brake.
- Adjust seat, side view mirrors, adjust and fasten seatbelt and adjust steering wheel.

- Lock combat lock.
- Turn on HVAC.
- Set CTIS controller
- Select the applicable transaxle setting.
- Apply service brake.
- Lift parking brake safety lever and push PARKING BRAKE control in to release parking brakes.
- Position transmission range selector to desired range.
- Release service brake and slowly press down on accelerator pedal.
- Accelerate, brake, and steer as required.
- Drive the vehicle on proved and improved roads.

Configure Vehicle for Normal Operations:

- Turn on vehicle.
- Vehicle battery on.
- Ignition switch on.
- Start vehicle.
- Adjust suspension to operational mode.
- Check or adjust CTIS to highway.
- Operate vehicle on range.

Perform During PMCS:

- Monitor the Air System.
- Monitor Gauges.
- Monitor Engine.
- Monitor Transmission.
- Monitor Brakes.
- Monitor Steering.

- Monitor Accelerator Pedal.
- Monitor Powertrain.
- Monitor HVAC system.

Perform after PMCS:

- Clean vehicle.
- Park vehicle on level surface. Install suspension lock-out braces.
- Turn on engine.
- Raise and secure hood.

Active Faults:

- Check SERVICE SELECTION screen on DSDU for active codes and report active codes to Field Maintenance.
- Check FLUID LEVELS screen on DSDU for low hydraulic fluid, engine oil, coolant, front and rear axle oil, and fuel. If LOW, add appropriate fluid until level reads OK on screen or notify Field Maintenance as necessary.

- Check for illuminated fault indicators on main instrument panel Windshield Wiper/Washer controls:
  - Check windshield washer control and windshield wiper control for proper operation.
  - Shut off engine.

Driver and Passenger Side, Mirrors, Doors, and Ballistic Glass:

- Check mirrors for improper operation and damage.
- Check front and rear doors, door latches, weldments, combat locks, and hinges for improper operation, binding, and damage.
- Check central region of front and rear door ballistic glass for delamination of inner layers, broken exterior glass exposing inner glass, excessive scratches which completely impair visibility, or large deep through thickness cracks.
- Only the M1279A1 has front door overlaps. Inspect for obvious damage and loose hardware.

Under Vehicle Checks:

- Inspect under vehicle for obvious damage and evidence of leaks.

- Inspect air lines, tubes and fittings for leaks.
- Inspect propeller shaft for damage.

Driver and Passenger Side Vehicle Checks:

- Inspect steps, step linkage, and fenders are present, intact, free of cracks and obvious damage, and all hardware is in place.
- Inspect steering components for obvious damage, looseness, and leaks.
- Inspect service and park brake hose protectors for excessive abrasion.
- Inspect whip collar for dislodgement or broken at the crimp.
- Inspect half shaft boots and ball joint boots for leaks, rips, tears, and obvious damage.

Install Suspension Lock-out Braces:

- Visually inspect four jounce bumpers to ensure jounce bumpers are not missing, cracked, or damaged.
- Set suspension to fording mode.
- Set fording mode to off position when suspension is high enough to install suspension lock-out braces.
- Install suspension lock-out brace on upper control arm with screw and wing nut.
- Repeat Step 4 for remaining suspension lock-out braces.
- Set suspension to tie down mode.
- Visually verify all four-suspension lock-out braces are seated against jounce bumpers.

Springs and Shocks:

- Inspect springs for leaks and obvious damage.
- Inspect shocks for leaks and obvious damage.
- Inspect shock absorber cap for cracks, tears, or if missing.
- Inspect spring cap for cracks, tears, or if missing.

Jounce Bumpers:

- Inspect jounce bumpers for gouges, cracks, or if missing.

Wheels/Tires:

- Inspect tires to ensure they are not low, flat, or have audible leaks.
- Inspect tires for cuts, gouges, cracks, bulging, leaks, or other damage.
- Inspect wheels for broken, cracked, or bent surfaces.
- Inspect wheel lug nuts and studs for looseness and obvious damage.
- Inspect wheel nuts and studs for looseness and obvious damage.
- Inspect Central Tire Inflation System (CTIS) valve for leaks.

Rear of Vehicle:

- Check fuel cap for looseness, cracks, and obvious damage.
- Check rear glad-hand couplers for leaks, damage, or missing glad-hand covers.

Drain Air:

- Drain Air System.

Cargo Cover.

- Perform inspection on M1278A1, M1279A1, and M1280A1 models only. Inspect cargo cover for tears, missing straps, and obvious damage.

Transaxle.

- Inspect transaxle for leaks and obvious damage.

Passenger Side Rear Brake Reservoirs.

- Inspect three brake reservoirs for obvious damage and leaks and park brake reservoir to ensure brake fluid between FILL and LOW lines. If brake fluid is below LOW line, add brake fluid as necessary.

Passenger Side Front Brake Reservoir.

- Inspect brake reservoir for obvious damage, leaks, and to ensure brake fluid is between FILL and LOW lines. If brake fluid is below LOW line, add brake fluid as necessary.

Front of Vehicle.

- Inspect central region of driver and passenger windshield ballistic glass for delamination of inner layers, broken exterior glass exposing inner glass, excessive scratches which completely impair visibility, or large deep through thickness cracks.
- Inspect windshield wiper arms and blades for damage, cracks, tears, or if missing.
- Inspect front glad-hand couplers for leaks, damage, or missing glad- hand plugs.

Hood.

- Inspect hood for cracks and obvious damage.
- Check hood latches for improper operation and obvious damage.

Cooling System.

- Inspect radiator transmission oil cooler clamps, tubes, and hoses for leaks, cuts, loose hose clamps, debris, build up, and other obvious damage.

Engine Compartment.

- Inspect accessory drive belts for obvious damage.
- Inspect engine compartment for obvious damage.
- Inspect air compressor for leaks and obvious damage.
- Inspect fuel filter, fuel lines, and fuel hoses for leaks, looseness, and obvious damage.

Engine Oil.

- Remove dipstick from dipstick tube and check for milky colored oil and if oil has a fuel smell.
- Check oil level is between ADD and FULL marks. If level is below ADD, add oil to bring level between ADD and FULL marks.

Driver Side Brake Reservoir.

- Inspect brake reservoir for obvious damage, leaks, and to ensure brake fluid between FILL and LOW lines. If brake fluid is below LOW line, add brake fluid as necessary.

Windshield Washer Reservoir.

- Inspect windshield washer reservoir for missing components, fluid level, leaks, and obvious damage.

Hydraulic Reservoir.

- Inspect hydraulic reservoir hoses, lines, and fittings for cracks, leaks, and obvious damage.
- Inspect hydraulic fill port for cracks, leaks, missing cap and obvious damage.

Front Differential.

- Inspect front differential or leaks and obvious damage.
- Close hood.
- Remove suspension lock-out braces.

Mandatory Replacement Parts.

- No Mandatory replacement parts required for PMCS procedures.

Note: If B-Kit armor and/or rocket Propelled Grenade (RPG) Netting are installed, see WP in the MOM for PMCS procedures.

LESSON 9

OPERATING THE JLTV IN VARIOUS CLIMATES

Figure 3.6 Operating in cold climates

Operating in cold climates 32 °F to -25 °F. (Figure 3.6).

- Adhere to Warnings, Cautions and Notes in the MOM.
- Battery power on.
- Disable CTIS.
- Start engine.
- If engine fails to start, wait 2 minutes prior to next start attempt to allow starter to cool.
- Re-engaging starter prior to 2-minute wait time may cause starter to overheat. Failure to comply may result in damage to equipment.
- Run engine at low idle for 15 minutes or until engine runs smooth, then engage high idle button for another 10 minutes or until water temperature gauge reads 150 °F (66 °C).
- Press deicer for one second and release to turn on deicer button.
- Press deicer for one second and release to turn off deicer button.
- Clean or remove pre-cleaner screen if air restriction level reads below 33 in/H2O or if unable to keep screen clear of ice or snow.
- Push transmission range selector release on transmission range selector and set transmission range to D (drive). Release PARKING BRAKE control and slowly (under 27 mph) drive vehicle 3 to 5 miles (5 to 8 km) to warm up driveline components and tires.
- Press CTIS disable button for one second and release to turn CTIS on after vehicle

has been driven 3 to 5 miles to warm hubs up.

- Park vehicle.
    - Park vehicle on high dry ground if possible. If high, dry ground is not available, spread-out planks or brush to make raised and dry area so tires will not freeze in snow, water, ice, or mud.
    - Shelter or cover truck to provide adequate protection from cold. If no shelter or cover is available, park so vehicle does not face wind.

Additional Concerns.

- When working in a cold environment, it is important to observe the location of ice build-up. Clear snow or ice from components critical to vehicle operation (i.e., intake, lights, engine, etc.).
- If parking the vehicles, consider parking them under cover and in close proximity to each other. This will assist in protecting the vehicles from the elements.
- Transmission Considerations. Ensure the vehicles transmission remains between 125 and 325 °F (51 to 162 °C) for all operations.
- When shutting down, idle the engine for 10 minutes at 1500-1800 RPM. This will allow the system to stabilize and the turbocharger to cool down appropriately.

Figure 3.7 Operating in extreme cold conditions

Operating in extreme cold conditions (-25 to -40 °F) (Figure 3.7).

- Adhere to Warnings, Cautions and Notes in the MOM.
- The JLTV has a separate kit available which can assist in cold weather starting. The Arctic kit, when installed, will provide extra battery power, enabling the vehicle to start within 2 minutes in temperatures down to -40 °F (-40 °C).

- If vehicle has been parked for an extended time period at temperatures below -40 °F (-40 °C), notify Field Maintenance to inspect suspension nitrogen system for confirmation of mission capable pressures.

- Ensure vehicle has proper fluids for extreme cold environment.

- Battery power on.

- Disable CTIS.

- Start. Follow normal starting procedures. Wait for gauges to sweep and for the Wait to Start Light to go out.

- Press AUX BAT switch to up position to turn on if vehicle is equipped with an arctic kit or silent watch.

- If engine fails to start, wait 2 minutes prior to next start attempt to allow starter to cool. Re-engaging starter prior to 2-minute wait time may cause starter to overheat. Failure to comply may result in damage to equipment.

- Press COMBINER switch to up position to turn on.

- Start. Follow normal starting procedures. Wait for gauges to sweep and for the Wait to Start Light to go out.

- Press COMBINER switch to center position to turn to AUTO.

- Enable CTIS after driving three-five miles.

- Park vehicle.

    - Set suspension to tie down mode.

Figure 3.8 Operating under extreme heat conditions

Operating under extreme heat conditions – Temperatures above 100 °F (Figure 3.8).

- When operating vehicle in temperatures above 100 °F (38 °C), extra care must be taken to prevent engine and transmission from overheating.

- Each of the lubricating systems assists each other in transferring heat. If one of the systems fails, there is a good chance that more will follow.

    - Engine. Continuously monitor engine coolant temperature. If the engine is overheating, stop the truck and allow the engine to idle. This will cool all of the systems to include the engine. The operator could use a lower gear range as necessary as this reduces load on the engine.

    - Transmission. Just like the engine, the operator should continuously monitor the temperature of the transmission fluid and keeping it between 125° and 325° F (51 to 162° C) for all operations.

    - If it appears to be overheating, the operator can:

        - Slow vehicle. Set transmission range selector to next lower gear range.

- Continue operation.

- Continue normal operation when transmission temperature gauge reads 125 to 325 °F (51 to 162 °C).

Figure 3.9 Silent Watch kit

Operating under Silent Watch (Figure 3.5).

- The JLTV has a Silent Watch kit which gives the operator the capability to operate Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) equipment without operating the truck for 2 hours.

    - The batteries must be at 95% capacity, the temperature must be above 32F, and the batteries must be above 24.2 VDC. If any of these conditions do not exist, the vehicle will not allow the Silent Watch system to work.

    - Normal driving conditions. Silent Watch is a stationary function. To use the Silent Watch kit during normal operation, the operator must park the vehicle, press the combiner and auxiliary power switches, and momentarily shut down the vehicle. Then the operator must turn the ignition switch back to the on position. The operator should then monitor battery life using the DSDU.

    - Restarting the vehicle. Once Silent Watch operations have completed, you can shut off the combiner switch, start the vehicle, and drive away.

LESSON 10

SLAVE START THE JLTV

Slave Start.

- Adhere to Warnings, Cautions and Notes in the MOM.
- Slave starting the vehicle.
    - Slave starting is useful in cold weather, when the JLTV has trouble starting.
    - There are two ways to slave start the JLTV:

Figure 3.10 Slave start with auxiliary batteries

- Slave starting with auxiliary batteries (Figure 3.10).
    - Push AUX BAT (auxiliary battery) switch up to on position.
    - Push COMBINER switch up to on position.
    - Follow normal starting procedures.

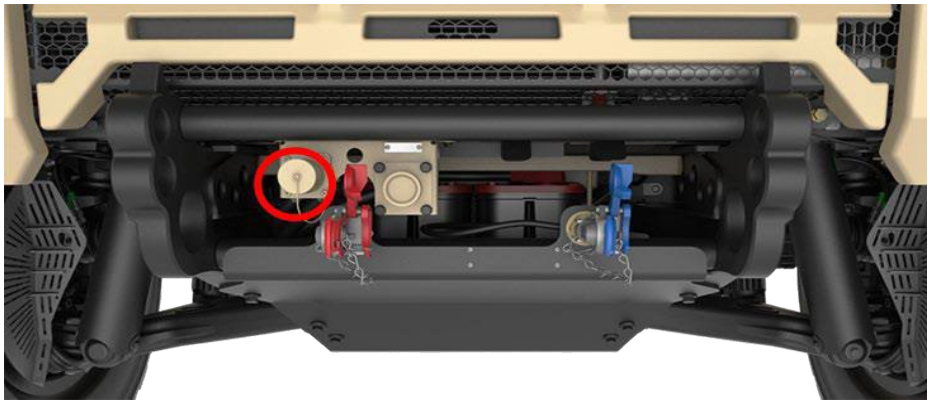


Figure 3.11 Slave start with assisting vehicle Slave starting with assisting vehicle

Figure 3.11 12 must be above 24.2 VDC.

LESSON 11

OPERATE IN COLD/EXTREME COLD ENVIRONMENTS

Operate in Cold Environment

- Start engine.
- Run engine at low idle for 15 minutes or until engine runs smooth, then engage high idle button for another 10 minutes or until water temperature gauge reads 150 °F (66 °C).
- Press deicer for one second and release to turn on deicer button.
- Press deicer for one second and release to turn off deicer button.
- Clean or remove pre-cleaner screen if air restriction level reads below 33 in/H2O or if unable to keep screen clear of ice or snow.
- Push transmission range selector release on transmission range selector and set transmission range to D (drive). Release PARKING BRAKE control and slowly drive vehicle 3 to 5 miles (5 to 8 km) to warm up driveline components and tires.
- Press CTIS disable button for one second and release to turn CTIS on.
- Park vehicle.
- Shut Down Vehicle. Idle the engine for 10 minutes at 1500-1800 RPM.

Operate in Extreme Cold Environment.

- If storage has been below -40 °F (-40 °C), notify Field Maintenance to inspect suspension nitrogen system for confirmation of mission capable pressures.
- AUX BAT switch to up position to turn on (only if vehicle is equipped with Silent Watch kit).
- Press COMBINER switch to up position to turn on.
- Start vehicle.
- Press COMBINER switch to center position to turn to AUTO.
- Park vehicle.
- Set suspension to tie down mode.

Lesson 12

OPERATIONS OVER VARIOUS TERRAIN OBSTACLES

Operations over various terrain obstacles.

- Adhere to Warnings, Cautions and Notes in the MOM.
- Operating under mud, sand and snow conditions.
    - Braking. Braking is reduced in mud, sand, and snow conditions. Ensure appropriate following distances are adhered to and safe driving practices are adhered to.
    - CTIS. CTIS is a tool the operator can use for mud, sand, and snow conditions. The operator should consider the CTIS settings before they enter conditions requiring lower tire pressures and axle locks. It takes time to adjust tire pressure. The MOM has general guidance for different exercises for CTIS settings available on the JLTV.
        - Bump delays are built into system to help prevent damage by running under inflated tires at speeds too fast for those conditions.
            - Bump delays should not be used by an operator as a means to adjust tire pressure as it will log fault codes showing that the tire pressure was not adjusted correctly.
            - The following three scenarios are the conditions and times required to make an automatic adjustment to occur:
                - If in cross country setting and Operator exceeds 45 mph for 120 seconds, CTIS will automatically adjust to highway.
                - If in Mud, Sand, Snow setting and Operator exceeds 20 mph for 60 seconds, CTIS will automatically adjust to cross country.
                - If in Emergency setting and Operator exceeds 10 mph for 30 seconds, CTIS will automatically adjust to Mud, Sand, and Snow.
                - The CTIS system takes about two minutes between each setting (i.e., highway to cross country, cross country to mud sand and snow, mud sand and snow to emergency). The total time it takes a JLTV to go from highway to emergency is approximately seven minutes; from emergency to highway takes about nine minutes.

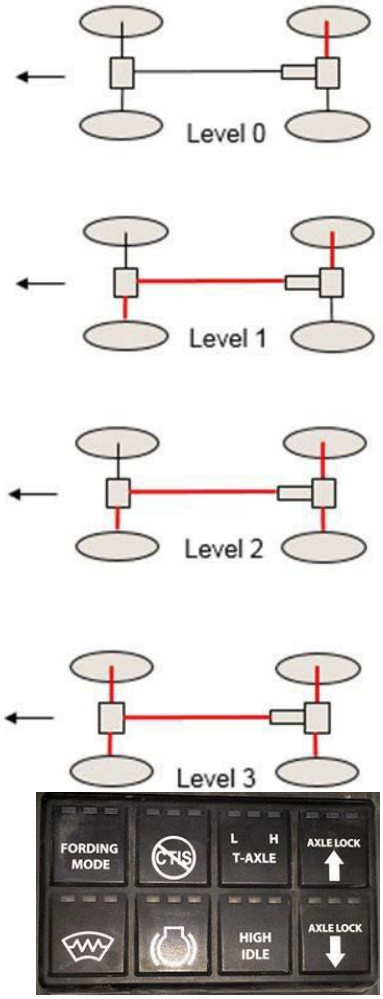


Figure 3.12 Axle lockups

Axle lockups (Figure 3.12).

- The axle lockup on the JLTV is activated in one of two ways:
    - CTIS Controller. The CTIS controller supplies driveline lock level 1 in cross country and driveline lock level 2 in mud, sand, and snow settings. If you need more lockups, the last lockup must be added manually.
    - Manually. If you choose to maintain a higher tire pressure and still want to add driveline locks (which may be desirable for sharp rocks with a steep incline or decline) you can simply add driveline locks by pressing the axle lock button on the MUX panel. Pushing the axle lock up once will supply driveline lock level 1 (inter-axle lockup), pressing it again will give axle lock level 2 (adding rear intra- axle lockup), and pressing it a third time supplying axle lock 3 (front intra-axle lockup).
- Lock Level 0 Provides “Full Time All-Wheel Drive”. The primary drive wheel will be the right rear, and the secondary will be the driver side front. Power transfer between

the two will be 68% Rear and 32% Front.

- Lock Level 1 Provides a 50/50 division of power between the front and rear axle. There will be two primary drive wheels, and they will be the passenger side rear, and the driver side front.

- Lock Level 2 provides the same as lock level one, and applies a third drive wheel, which is the driver side rear. The driver side rear will be powered at the same rate as the passenger side rear, and the driver side front.

- Lock Level 3 provides the same as lock level two, and applies the only other available drive wheel, which is the passenger side front. At this point, all wheels are being powered equally, and will rotate at the same rate.

Figure 3.13 Operating under mud, sand and Snow conditions

- Operating in extreme Soft Conditions or where the potential of a stuck vehicle is high. Maximum Tractive effort (Figure 3.13) Use emergency mode in extreme muddy conditions. Add lock level 3 as necessary. Remember not to over speed the truck for too long as this will kick the CTIS to the next highest setting. If additional torque is required, select transaxle low to increase output torque.

Operating under desert conditions

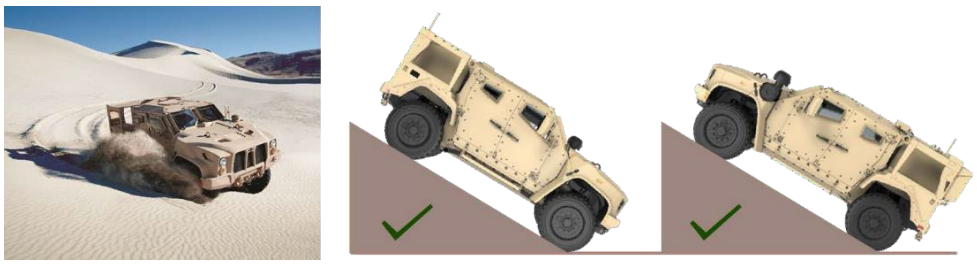


Figure 3.14 Dune face driving

Dune Face Driving. (Figure 3.14).

- Drive only on dune faces straight up or straight down. To drive across a dune or at an angle can cause the sand to collapse from below and unwanted sliding can occur.
- If driving across a dune is required and slipping occurs, it is ideal to direct the vehicle in a down slope direction.

- Temperature Variation. Expansion and contraction due to constant temperature changes can cause the vehicle to leak fluids unexpectedly. It is recommended that operators check and top off fluids regularly.

- Additional operating considerations
  - When operating in sand, quick acceleration and braking can cause the vehicle to dig into the sand causing the truck to bury itself. It is wise to accelerate and decelerate slowly as this will prevent the truck from digging in the sand. Use high pressure air to clean cooling pack.
  - When parking, it is advised that the truck is parked on hard ground. If hard ground is not available, park the truck on planks. If planks are not available, the operator should drive back and forth 3 feet or so to pack the sand, creating a solid area on which to park.
  - Use high pressure air to clean cooling pack.

Figure 3.15 Operating under dusty conditions

Operating under dusty conditions (Figure 3.15).

- Cleaning. The armored windows are cleaned with specific cleaners to remove dust and debris. There are two sides to transparent armor (windows) and they require different cleaning products.

    - The strike side (known as the exterior), the safe side is known as the interior. The strike side (exterior) should be cleaned with standard window cleaning products like windshield washer fluid or mild detergent.

    - The safe side (known as the interior) should be cleaned with a 90% isopropyl alcohol solution and a lint free cloth. Do not use an ammonium-based cleaning product as this will damage the windshield.

- Servicing. Monitor the air restriction gauge to ensure the engine air filter is not being restricted. The air filter should be cleaned weekly at a minimum in these conditions.

- Whenever the vehicle is not in use, ensure that the glass is covered. Sand blowing on the glass can damage it. Park vehicles close together.

- Additional Maintenance Concerns. The operator should physically check the cabin air filter and the recirculation filter daily to ensure there is no restriction from a build- up of dust/debris.

Figure 3.16 Operating over forest and rocky terrain conditions

Operating over forest and rocky terrain (Figure 3.16).

- Correct CTIS settings. Forest or rocky terrain can change quickly which may cause you to adjust CTIS settings often. The operator must be aware of sharp objects when operating though forests or sharp rocks. The tire side walls can get damaged easily.

- Vehicle speed considerations. Drive to the terrain, lower speeds may be required to navigate though, over, around obstacles. Lower inflation in tires could result in puncturing of the sidewalls.

- Maneuvering considerations. The operator should be considerate of maneuvering through low overhangs, narrow paths, over debris, approach and departure slopes, and throttle control. Do not throttle hard over rough terrain as this could damage equipment. Operator may need to slow vehicle to maneuver through these scenarios.

- Transmission range selection. Adjust transmission range based on terrain. If going down a steep slope, place the transmission in first gear and gradually increase the speed of the JLTV. Avoid slopes greater than 40 percent to prevent getting mired in soft forest floors.

Figure 3.17 Fording heights

Operating under fording conditions (Figure 3.17).

- Suspension rises to fording height when fording mode is selected.

- Truck will be limited to 10 mph.

- Cooling fans, A/C compressor, CTIS, and 120 VAC outlets shut off once fording mode is achieved. The operator must take the vehicle out of fording mode to re-engage these components. Failure to do so may cause the engine to overheat.

- If suspension adjustment has been aborted, the truck will still be limited in speed until it reaches Operational height.

- Maximum fording height without fording kit is 30 inches (Figure 3.17).

    - The 30-inch line on the vehicle falls to a point at the base of the cab.

- Maximum fording height with kit is 60 inches.

    - The 60-inch line on the vehicle falls to a point at the door levers, and the base of

the air filter on the driver's side.

- Operators must ensure that they take the vehicle out of fording mode immediately when not needed.

- Operators must clean vehicle with clean, fresh water after fording through salt water.

Check on Learning

Q: What is the maximum fording height without a fording kit?
A: 30 inches.

Q: Forest or rocky terrain conditions can change quickly, what are some conditions the operator should be aware of?
A: Over hangs, debris and sharp objects, the tire side walls can be damaged easily.

Q: What speed is the vehicle limited to when the suspension is adjusted to fording mode?
A: 10 mph

Q: Why would an engine overheat when operating in fording mode?
A: Because the engine fan shuts off.

Q: What should an operator do when driving across a dune and slippage occurs?
A: Direct the vehicle in a down slope direction.

LESSON 13

SELF-RECOVERY

Self –Recovery.

- Adhere to Warnings, Cautions and Notes in the MOM.
- Not all vehicles are configured with a winch kit. If your vehicle has a winch kit you should have extra tools stored on the truck to include:
    - Recovery Chain.
    - Shackle.
    - Snatch Block.
    - Winch Remote.
- Vehicle self-recovery safety considerations. Depending on the level of mire the winch may or may not be able to recover the vehicle by itself. For instance, the standard curb weight with B Kit added, of an M1280A1 (GP) JLTV is a total of 17,900 lbs.
- Winch Kit: Winch is rated for 18,000 lbs. (8 165 kg).
- Pulling capacity without snatch block (Table 3.2):

Table 3.2 Maximum Capacity for Winching

Winch Cable Layer	Max Capacity for Winching
1	18,500 lbs. (8165 kg)
2	14,341 lbs. (6505 kg)
3	11,918 lbs. (5406 kg)
4	10,196 lbs. (4625 kg)
5	8, 908 lbs. (4041 kg)

    - With 8 wraps on first layer.
    - The above rated capacities will be degraded anytime the winch is not pulling straight ahead.
    - Prolonged or continuous use will overheat the winch. Do not continue to run a “stalled” winch. Failure to comply may result in damage to equipment.
- A snatch block doubles the pulling capacity of the winch per each layer on the winch drum.
- Ensure all personnel are at least two times the length of the rope away from winching operations.

- Never disengage the winch under a heavy load.
- Use the winch intermittently.

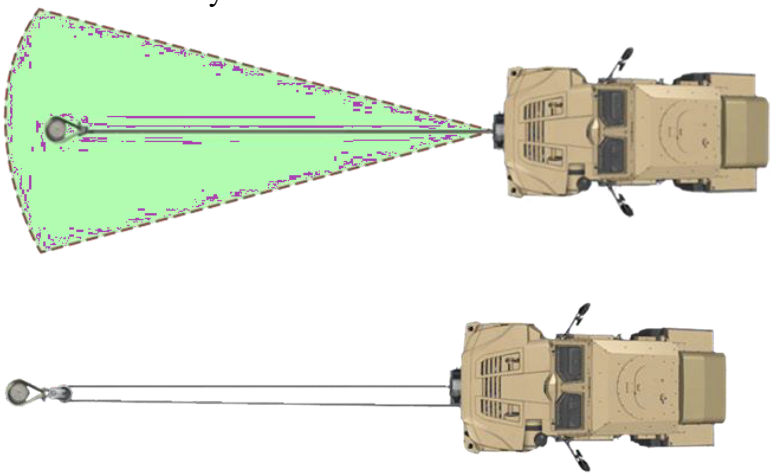


Figure 3.18 Vehicle self-recovery

- Set up truck to pull only in a 30o envelope. (Figure 3.18).
- Procedure.
    - Position chain around a stationary object within the 30-degree envelope.
    - Attach a snatch block if necessary.
    - Ensure drum load capacities are not exceeded.

Figure 3.19 Winch control and NATO slave receptacle

- Attach the winch control to the winch assembly, and ensure the winch is plugged into the NATO slave receptacle for power. (Figure 3.19).

- Release winch cable.
- Assistant holds cable with moderate tension.
- Release winch brake and allow assistant to walk out cable.
- Connect winch hook to rigging.
- Always follow MOM for additional information.

Configure the vehicle for self-recovery.

- Purpose. The purpose of this demonstration is to show students how to configure the vehicle for self-recovery.
- Student role. Observe the demonstration. All students should position themselves for a clear view of the vehicle.
- Instructor role. Refer to the MOM. Demonstrate how to configure vehicle for self- recovery.
- Safety brief. Primary instructor will brief the students on safety procedures while working around the vehicle and in the bay. All students will be checked for proper equipment i.e., closed toe shoes, safety glasses, and ear protection.
- Supervision and guidance. The instructor(s) will lead the demonstration by showing the students how to configure the vehicle for self-recovery.

Configure vehicle for self-recovery.

- Locate and follow MOM (Operator Manual) work packages for Winch Operation and Self- Recovery.
- Position second vehicle within 30° pull zone; this will act as the stationary object.
- Position recovery chain around stationary object. Remove pin from shackle and route shackle through ends of recovery chain then reinstall pin.
- Pay out winch using remote until winch hook is able to connect to recovery chain.
- Connect winch hook to anchor point.
- Apply service brake.
- Lift parking brake safety and push PARKING BRAKE control in to release parking brakes and Set transmission range selector to D (drive).

- Release service brake and slowly press down on the accelerator pedal to operate winch.
- Park vehicle once it is no longer stuck.
- Disconnect winch hook from anchor point.
- With the aid of an assistant, press and hold winch in/out switch to pay in position until winch is stowed.

LESSON 14

CONFIGURING THE VEHICLE FOR TERRAIN OBSTACLES

Configure Vehicle for Fording Mode.

- Adhere to Warnings, Cautions and Notes in the MOM.
- Disconnect shelter power from 120 VAC/28 VAC outlets.
- For Utility variant only- Install electronic box filter covers.
- If equipped with fording kit, remove mats from cab, install 2 plugs on cab, and turn plug handle clockwise to tighten.
- For Utility variant only- Install washer and plug on electronics box (if equipped with fording kit).
- Stop vehicle at edge of water obstacle.
- Set transmission range selector to N (neutral) and engage parking brake.
- Select CTIS button to MUD/SAND/SNOW.
- Press FORDING MODE button two times within three seconds to enable fording mode.
- Turn off HVAC unit.
- Release parking brake after suspension has reached fording height.
- Drive vehicle slowly into water.
- If engine stops once the water obstacle has been entered, immediately try to restart vehicle. If engine will not start, tow vehicle.
- Drive vehicle through water.
- If vehicle enters water deeper than 30 in. (76 cm) without fording kit or 60 in. (152 cm) with fording kit, slowly back out of water.
- After leaving water, lightly press service brake pedal and hold while driving slowly to dry out brake components.

- When clear of fording area, stop vehicle, set transmission range selector to N (neutral) and engage parking brake.

- Apply and release parking brake control several times to remove water from brake components.

- Set CTIS to appropriate setting for terrain.

- HVAC system can be turned back on once all standing water has been drained from the HVAC unit.

- If equipped with fording kit, remove plugs from cab. Allow water to drain from cab, if needed. Install floor mats.

- For Utility variant only- Remove plug and washer from electronics box (if equipped with fording kit). Allow water to drain, if needed.

- Press FORDING MODE button two times within three seconds to disable fording mode.

- Inspect service cabin filter and recirculation filter.

- Remove water and clean deposits from all vehicle parts.

- Service all lubrication points below fording depth.

- For Utility variant only- Remove electronics box filter covers and inspect filters.

Configuring the Vehicle for Various Terrains.

- Purpose. The purpose of this demonstration is to show the students how to configure the vehicle for various terrain obstacles.

- Student role. Observe the demonstration. All students should position themselves for a clear view of the vehicle.

- Instructor role. Refer to MOM. Demonstrate how to configure vehicle for various conditions.

- Safety brief. Primary Instructor will brief the students on safety procedures while working around the vehicle and in the bay. All students will be checked for proper equipment i.e., closed toe shoes, safety glasses, gloves and ear protection.

- Supervision and guidance. The instructor(s) will lead the demonstration by showing the students how to configure the vehicle for various terrain obstacles.

Configure vehicle for Steep Slopes.

- Set CTIS to appropriate setting for slope and terrain.
- Set transaxle to appropriate setting. Operate transaxle in low range as necessary for extremely steep grades, moderate grades with trailer, or situations of reduced traction.
- Unless uphill grade is steep, begin with transmission range selector in gear range D (drive). If there is enough power for safe and satisfactory road speed, remain in D range and allow transmission to shift automatically.
- Do not use exhaust brake on slippery surfaces.

Configure Vehicle for Rocky Terrain

- Adjust side mirrors so area to rear of vehicle is visible but mirrors will not be damaged by rocks, trees, and other obstructions.
- Set CTIS to appropriate setting for terrain.
- Operate vehicle at speed appropriate to terrain conditions.
- Traverse lowest terrain grade possible.

Configure Vehicle for Extreme Soft Conditions.

- Set CTIS to emergency.
- Shift transaxle to low range.
- Manually lock front differential.
- Select desired transmission range.
- Gradually apply accelerator pedal and release service brake pedal as traction allows.

LESSON 15

OPERATE THE VEHICLE UNDER LIMP HOME CONDITIONS

Limp Home Conditions.

- Limp Home is a condition when the vehicle may be having some technical difficulties, such as degraded brakes, but allows the operator to continue with the mission before notifying Field Maintenance. The operator should only drive the vehicle if necessary. The operator should allow for additional stopping distance.

- Transmission is locked into a specific gear range and will not up shift or down shift.

    - Monitor transmission and water temperature gauge to ensure the vehicle does not overheat.

    - Once mission is complete, notify Field Maintenance.

    - The engine must not be turned off until the mission is complete.

    - Once the engine is turned off, the vehicle may not be operable until the problem is corrected.

    - If the transmission is locked into gear, the operator will not be able to leave the cab until the engine is shut off and vehicle is parked.

    - Depending on the gear the transmission is locked into, the vehicle may not be able to drive up steep grades.

    - The brakes may need to be applied slightly earlier than normal when stopping the vehicle.

    - Depending on the gear the transmission is locked into and the terrain the vehicle is operating in, the engine or transmission may overheat.

    - Do not shift transmission into neutral. Transmission may become locked in neutral.

Figure 3.20 Combat override

Combat override (Figure 3.20).

- Combat override is used to override system failures when an operator needs to get out of an area in a combat situation and the vehicle is limiting itself. Combat override disables neutral start, bypasses some interlocks (listed below), and connects silent watch or arctic kit batteries.

- Combat override can also be used in combat situations when:

    - Vehicle battery power is too low.

    - Batteries are damaged and electrical power is needed.

    - Alternator fails in a combat.

- Listed below are some scenarios when combat override can be used and how combat override works in that situation.

    - If the vehicle cannot get up to speed in a combat situation, combat override will:

        - Disable engine derate due to engine oil, fuel, or coolant temperature.

        - Disable suspension related speed limitations.

        - Disable CTIS related transmission gear limitation.

        - Enable low pressure fuel pump at full pressure.

    - If suspension will not adjust in a combat situation, combat override will:

        - Override suspension hydraulic faults that inhibit operation.

        - Override high hydraulic oil temp during pumping.

        - Override 10-minute pumping time-out.

        - Override low hydraulic oil level combined with low hydraulic oil pressure (both must occur for suspension to error out).

    - If the vehicle will not start in a combat situation, combat override will disable Neutral Safety interlock for starting.

    - If the mission relies on GFE and you need to prevent the vehicle from powering down in a combat situation, combat override will:

        - Disable low voltage disconnect.

        - Disable all load shedding (re-enables all shed loads).

- If the DSDU is inoperable and you need to adjust the CTIS or suspension to prevent damage to the equipment, combat override will:
  - Adjust CTIS settings when DSDU is not operational.
  - Adjust suspension ride height when DSDU is not operational (to Operational only).

- Combat override logs a code indicating when and for how long the over-ride was active.

LESSON 16

OPERATE THE VEHICLE WITH DEGRADED BRAKES

Degraded Service or Park Brakes.

- Adhere to Warnings, Cautions and Notes in the MOM.

- Use extreme caution when driving with degraded brake system. If three or more of your service brakes are not operational, do not drive your vehicle unless absolutely necessary. Failure to comply may result in injury or death to personnel.

- When driving with degraded brake system, stopping distance will be greatly increased. Allow a considerable distance for stopping. Failure to comply may result in injury or death to personnel.

- Perform if one of four service brake systems are not operational.

    - Vehicle is still mission capable at a degraded performance level. Speed of vehicle should not exceed 35 mph (56 km/h) on improved surfaces (primary and secondary roads) during mission operations over Operational Mode Summary/Mission Profile (OMS/MP) or 20 mph (32 km/h) on unimproved surfaces (trails and cross country) during mission operations over OMS/MP.

- Perform if two of four service brake systems are not operational, two of four reservoirs are empty, or if vehicle pulls to one side while braking but still has stopping capability.

    - Vehicle is still mission capable at a degraded performance level. Speed of vehicle should not exceed 25 mph (40 km/h) on improved surfaces (primary and secondary roads) during mission operations over OMS/MP or 15 mph (24 km/h) on unimproved surfaces (trails and cross country) during mission operations over OMS/MP.

- If three or more service brake systems are not operational or three or more reservoirs are empty, notify Field Maintenance.

- When park brake system inadvertently engages during a mission, drive vehicle to a “safe” location (flat/level ground). Monitor engine, transmission oil, and ensure coolant temperatures do not exceed maximum normal operating ranges. Vehicle can be driven at intervals up to 100 ft. (31 m), with a maximum engine speed of 2,000 RPM and vehicle speed of 4 mph (6 km/h).

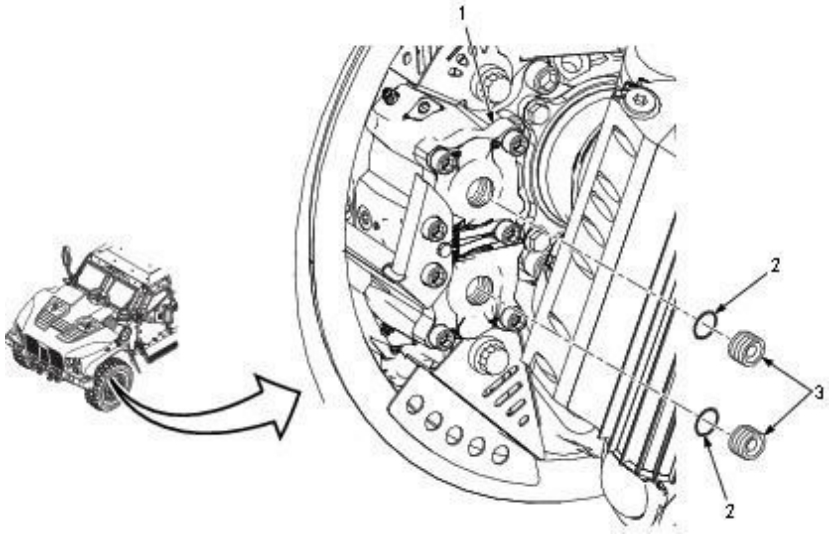


Figure 3.21 Caging Brakes

Caging Brakes (Figure 3.21).

- Remove two plugs (Figure 3.21, Item 3) and O-rings (Figure 3.21, Item 2) from brake caliper (Figure 3.21, Item 1). Discard O-rings.

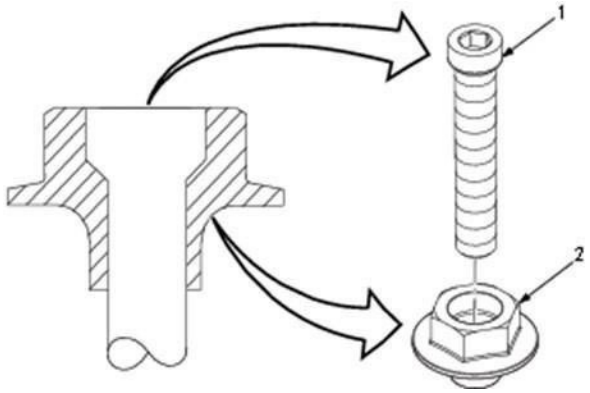


Figure 3.22 Cage brakes

- Install two caging nuts (Figure 3.22, Item 2) on caging screws (Figure 3.22, Item 1).

Caging Brakes.

- Install suspension lock-out braces.
- Chock wheels.
- Remove two plugs and O-rings from brake caliper. Discard O-rings.

- Install two caging nuts on caging screws.
- Install two washers and caging nuts on caliper with two caging screws. Do not tighten screws.
- Without rotating two caging screws tighten caging nuts (1/4 rotation at a time.
- Tighten two caging nuts alternating between each one, until 3/4 rotation of both caging nuts is achieved.
- Verify wheel spins freely.

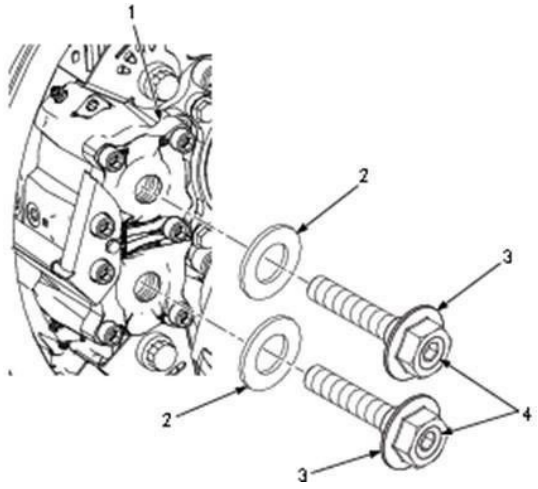


Figure 3.23 Cage brakes

- Install two washers (Figure 3.23, Item 2) and caging nuts (Figure 3.23, Item 3) on caliper (Figure 3.23, Item 1) with two caging screws (Figure 23, Item 4), turn caging screws 1/4 turn at a time. Do not tighten screws.
    - Without rotating two caging screws (Figure 3.23, Item 4), tighten caging nuts (Figure 3.23, Item 3) 3/4 rotation clockwise.
    - Tighten two caging nuts (Figure 3.23, Item 3), alternating between each one, until 3/4 rotation of both caging nuts is achieved.
    - Raise vehicle and verify that the wheel rotates freely.
    - Remove suspension lock out braces before continuing with mission if vehicle is to be moved/towed.

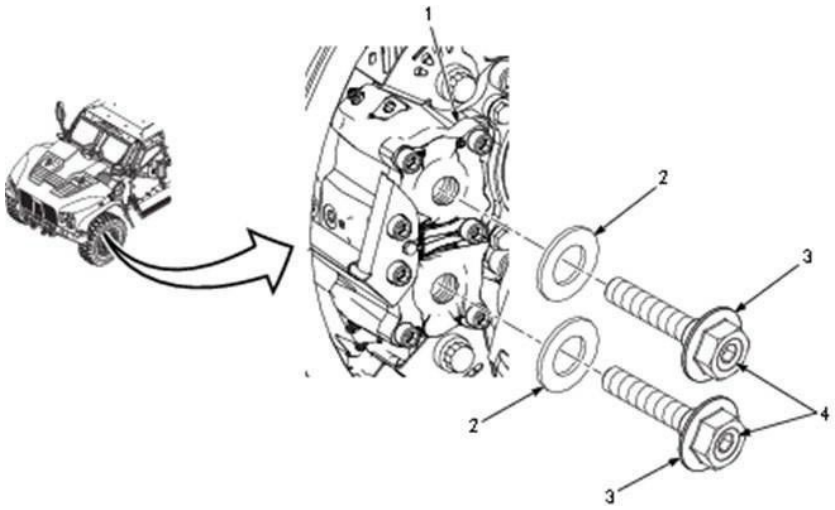


Figure 3.24 Uncage brakes

Uncage Brakes.

- The brakes require new O-rings to be installed so field level maintenance must complete this task.
- If the vehicle is left or disconnected form towing vehicle, the wheels must be chocked to prevent unwanted movement of vehicle.

LESSON 17

EMERGENCY PROCEDURES

Figure 3.27 Emergency ingress

Emergency Ingress.

- Emergency ingress is used if an operator is trapped within the JLTV. (Figure 3.27).
  - Use the ingress tool located on the down truck.
  - Insert ingress tool on combat lock shaft and rotate.
  - Open the door.
  - Egress is through doors and hatch equipped with turret. Be aware of the way out.

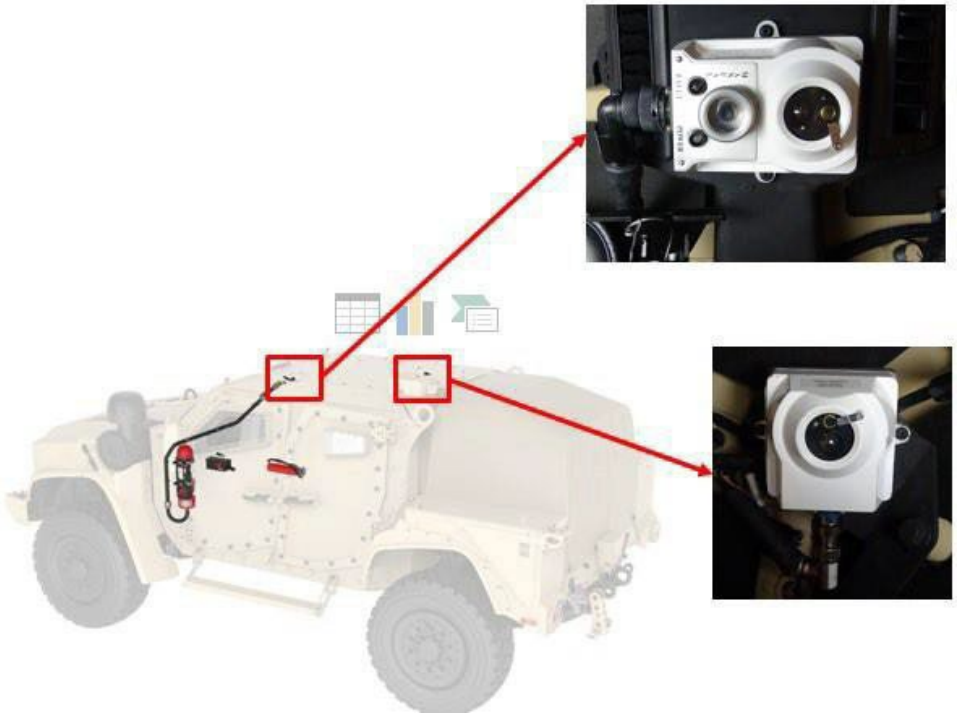


Figure 3.28 AFES

Initiating the fire suppression system (Figure 3.28).

- The Automatic Fire Extinguishing System (AFES) uses optical sensors to put out fires in the event of a capsule fire. In an emergency, push through the thin film screen to initiate the fire suppression system.

- If the fire extinguisher does not discharge or fire suppression is needed, the operator can press the manual override button located on the fire suppression system controller. This will discharge agent inside the cab to put out the fire.

- An impulse noise hazard is present during AFES operations. Hearing protection is recommended.

Emergency procedures from air loss.

- If the low air warning buzzer sounds, the low air light illuminates, or both occur, check air pressure on the dash gauge.

- If the air pressure is below 100psi, increase following distance, slow the vehicle using service brakes.

- Park the vehicle using chock blocks.

LESSON 18

JLTV OPERATOR MAINTENANCE

JLTV Operator Maintenance.

- Suspension lock-out braces must be installed on driver and passenger side of axle prior to crawling under vehicle. Suspension may lower, crushing personnel. Failure to comply may result in injury or death to personnel.

- If engine has been recently operated, then cooling system is hot and pressurized. Allow system to cool prior to cleaning. Failure to comply may result in injury or death to personnel. Severe burns may result from engine components that become hot during normal operation. Do not touch hot engine components with bare hands or allow body to contact hot engine components. Failure to comply may result in injury to personnel.

- Rotating parts in engine compartment can cause injury to personnel. Keep hands and clothing clear of moving parts in engine compartment. Ensure that all guards are in place and do not wear loose clothing when conducting maintenance. Always check to ensure that area is clear of personnel and obstructions before starting engine. Failure to comply may result in injury or death to personnel.

- If engine has been recently operated, cooling system will be hot and pressurized. Do not remove surge tank cap while engine is hot; steam and hot coolant can escape and burn personnel. Allow system to cool and remove cap slowly to relieve pressure. Failure to comply may result in injury or death to personnel.

- A direct short may result and cause severe burns or electrical shock if jewelry or tools contact positive electrical circuits. Remove all jewelry such as rings, ID tags, bracelets, etc., prior to working on or around positive electrical circuits. Failure to comply may result in injury or death to personnel.

- Prior to performing parking brake test, ensure area 30 ft. (9 m) in front of vehicle is clear of objects and personnel. Failure to comply may result in injury or death to personnel. If vehicle moves during parking brake test, release accelerator pedal immediately and apply service brake. Failure to comply may result in injury or death to personnel.

- Dust particles may irritate eyes, breathing, and skin. Personnel must wear goggles and work in a well-ventilated area. If injury occurs, remove personnel from area and seek medical attention immediately. Failure to comply may result in injury to personnel.

- Ensure vehicle is parked in a safe area, out of traffic, where there is no danger to personnel changing wheel/tire assembly. Failure to comply may result in injury or death to personnel.

- Uneven or soft surface could result in vehicle sliding off jack. Park vehicle on a hard, level surface where jack will have a stable surface beneath it. Do not perform this task until jack is stable and in proper position. Failure to comply may result in injury or death to personnel.

- Wheel/tire assembly, without run flat, weighs 229 lb. (103 kg). Wheel/tire assembly, with run flat, weighs 312 lb. (141 kg). Do not attempt to lift or catch wheel/tire assembly without the aid of an assistant and a lifting device. Failure to comply may result in injury or death to personnel.

- Suspension system works to keep vehicle level. Vehicle can become unstable while raising a single corner of vehicle. Suspension lock-out braces must be installed to keep vehicle stable. Failure to comply may result in injury or death to personnel.

- Injury can result if hydraulic jack fails or vehicle falls off jack. Ensure set screw on jack adapter is secured to top of jack pad before operating jack. Do not get under vehicle after vehicle is raised unless it is properly supported with blocks or jack stands. Hydraulic jacks are intended only for lifting the vehicle and not for supporting the vehicle while performing maintenance. Failure to comply may result in injury or death to personnel.

- Outer nuts hold wheel assembly together. Do not loosen or remove outer nuts on wheel. Tire is under pressure and loosening these nuts can cause tire to blow apart. Failure to comply may result in injury or death to personnel.

- When changing a tire, injury can result if hydraulic jack fails or vehicle falls off jack. Do not get under vehicle after vehicle is raised unless it is properly supported with blocks or jack stands. Hydraulic jacks are intended only for lifting the vehicle and not for supporting the vehicle while performing maintenance. Failure to comply may result in injury or death to personnel.

- High pressure air and blowing debris may irritate face and eyes. Personnel must wear safety goggles and stand clear of draining air stream. If injury occurs, remove personnel from area and seek medical attention immediately. Open air system drain valves slowly to prevent sudden blast of air. Failure to comply may result in injury to personnel.

- High-pressure water at central vehicle wash facilities has a recommended design pressure of 75 to 100 psi (517 to 690 kPa). The water pressure is measured at the nozzle. Do not directly spray personnel. Failure to comply may result in injury to personnel.

- Severing or pinching of hands and fingers can result if caught between cabin filter cover and cab. Keep hands and fingers clear of cabin filter cover and cab area when removing cabin filter cover. Failure to comply may result in injury to personnel.

- Air filter may be coated with dust. Dust particles may irritate eyes, breathing, and skin. Personnel must wear goggles, air respirator, and gloves, and work in a well-ventilated area. If injury occurs, remove personnel from area and seek medical attention immediately. Failure to comply may result in injury to personnel.

Perform Monthly Preventative Maintenance Checks and Service (PMCS).

Figure 4.1 Perform PMCS

- Monthly PMCS (Figure 4.1).
  - Monthly PMCS is supported by regular Before, During and After PMCS.
  - The DSDU screens that support Monthly PMCS are the Preventative Maintenance and System Checks screens.
  - Monthly PMCS is a contrast to Before, During and After checks as monthly checks focus on components that are important, but not necessarily mission critical.

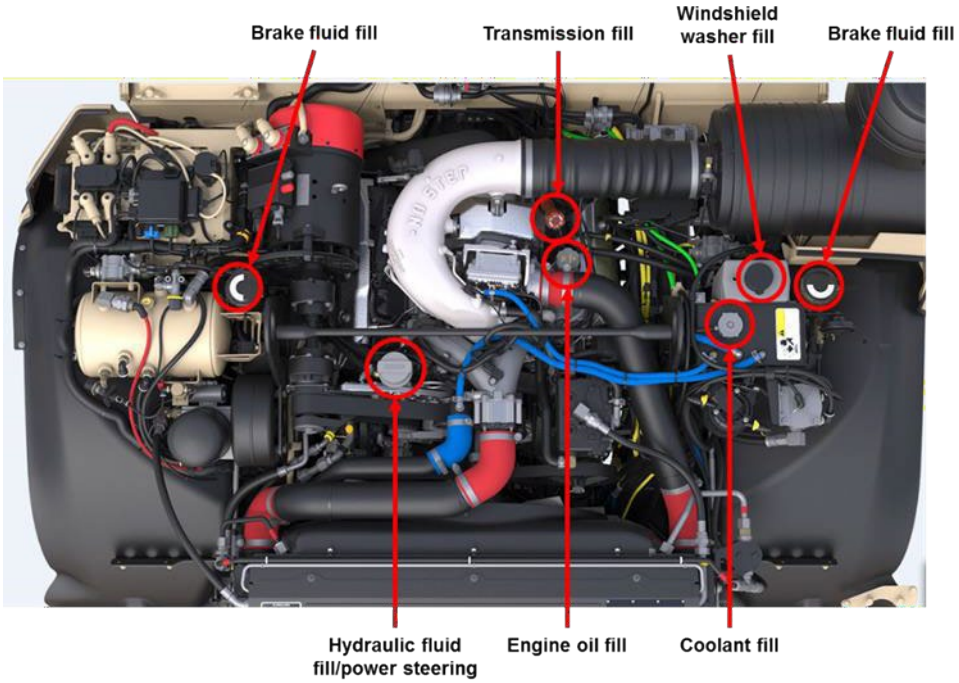


Figure 4.2 A1 Engine fill locations

- Engine Fill Locations (Figure 4.2).
  - A1 engine fill locations used during PMCS. Note that the engine oil fill is positioned in front of the transmission fill location. (Figure 5.1).

- Rear brake fluid (Figure 4.3).

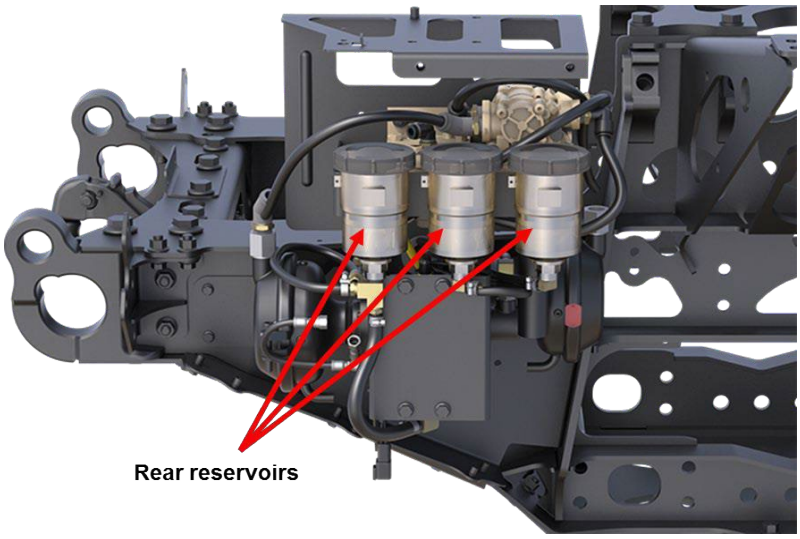


Figure 4.3 Rear brake reservoirs

Check on Learning

Q: What do monthly PMCS checks focus on?
A: Monthly checks focus on components that are important, but not necessarily mission critical.

Q: What checks support the monthly PMCS?
A: Before, During and After PMCS

Filter Maintenance.

Figure 4.4 Air filters

- Air Filter (Figure 4.4).
    - Service life is two years. Service life is one year in a dust environment.
    - Inspection should be conducted on the DSDU drive screen every time you operate the vehicle. It is also recommended that the filter be removed and inspected monthly, especially in dusty environments.
    - Replace as needed.
    - The pre-cleaner is the hood screen covering the intake. This should be inspected for serviceability and security regularly.
    - Opening must face rear of vehicle to prevent water from entering the air filter.

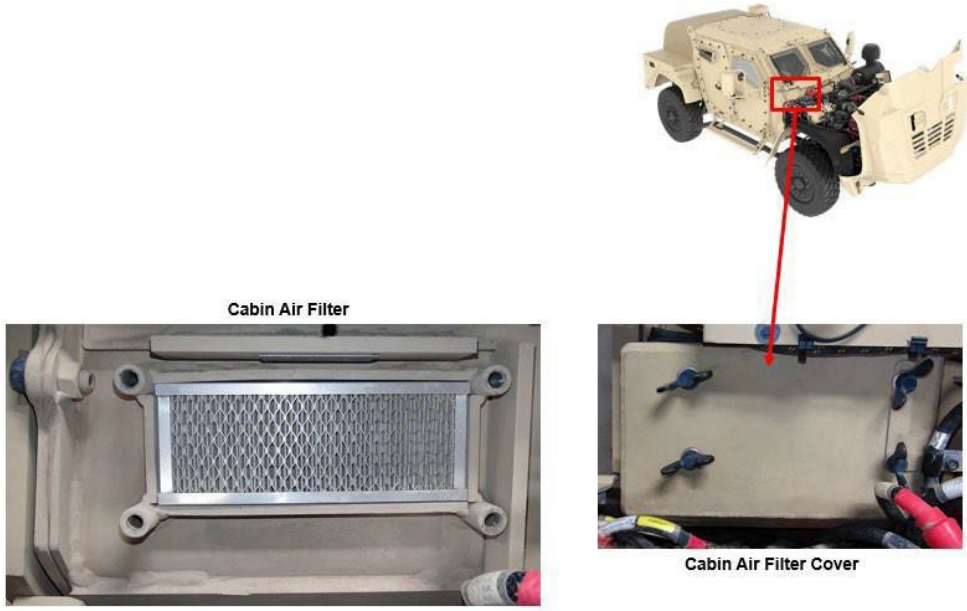


Figure 4.5 Cabin filter

- Cabin Filter (Figure 4.5).
  - Refer to MOM WP Service Cabin Filter for any warnings, cautions, and notes associated with this task.
  - The cabin filter is located under a cover on the right of the engine compartment.
  - To inspect the cabin filter.
    - Remove the wing nuts holding the armored plate in place.
    - Remove cabin filter.
    - Inspect and clean as necessary.
  - Replace: Replacement of the cabin filter follows the same procedure as inspection. The only difference is that it is replaced with a filter of the same rating as the original, this is typically accomplished by replacing the filter with one that is of the same national stock number (NSN) or part number.

Figure 4.6 Air recirculation filter

- Air recirculation filter (Figure 4.6).
- Refer to the MOM WP Service Cabin Filter for any warnings, cautions, and notes associated with this task.
- The air recirculation filter is found in the passenger's side seating area.
- This filter is a screen that filters large particles from the air when air recirculation is selected.
- Inspect: Visually inspect the condition of the filter. If the filter appears to be dirty, it should be removed and cleaned.
- Replace: Removal of the filter is done by removing the thumb screws from the retaining bracket. Remove the bracket and remove the filter.
- Cleaning is the first course of maintenance with the filter.
    - The filter can be gently tapped against a hard surface to remove particles trapped in the filter.
    - If necessary, clean water and a mild detergent can be used to clean the filter.
    - If it is damaged, replace with a new filter with the same NSN.

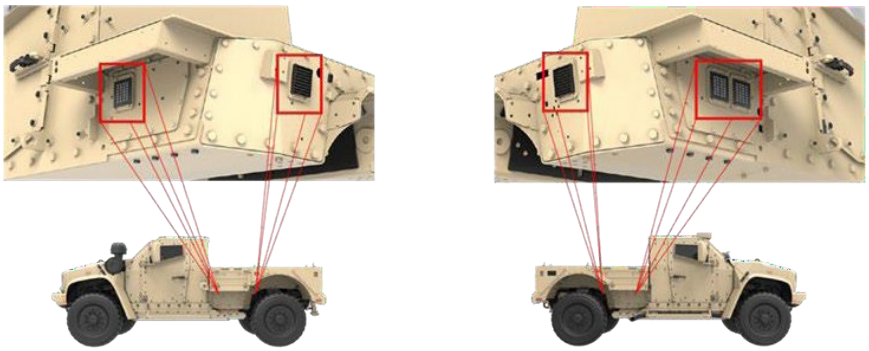


Figure 4.7 Electronics box filter

- Electronic box filter (Figure 4.7).
    - Refer to MOM and Work Package, “Electronics Box Filter Covers Installation/Removal” for any warnings, cautions, and notes associated with this task.
    - The electronics box filter is found on the utility variant and must be cleaned regularly. After cleaning the filter, put the filter back in place, and then put the cover back on.
    - The filter must also be replaced with the fording covers when fording water.

Check on Learning

Q: **What filters must be checked when performing filter maintenance on the JLTV?**

A: Air filter, cabin filter, air recirculation filter and the electronics box filter/

Q: What is the recommended frequency for removing and inspecting the air filter?
A: Monthly

Q: When fording, what must the electronics box filter be replaced with?
A: Fording covers

Q: Where is the air recirculation filter found and what is its purpose?
A: It is found in the passenger’s side seating area. It removes large particles from the air.

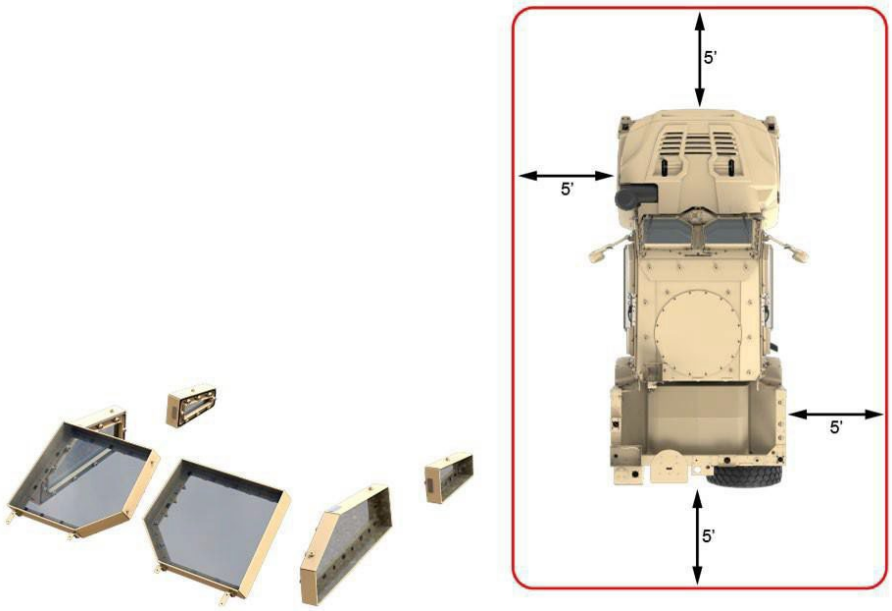


Figure 4.8 Cleaning distance

Vehicle Cleaning.

- Exterior (Figure 4.8).
    - Stay about 5 feet away from the vehicle when using high pressure water to clean the vehicle.
    - No additional chemicals should be used in cleaning the JLTV. Do not clean the cooling pack with high pressure water.
- Glass cleaning.
    - The outside of the glass can be cleaned with a mild detergent or windshield washer fluid.
    - The inside of the glass should be cleaned with a 90% isopropyl alcohol solution.

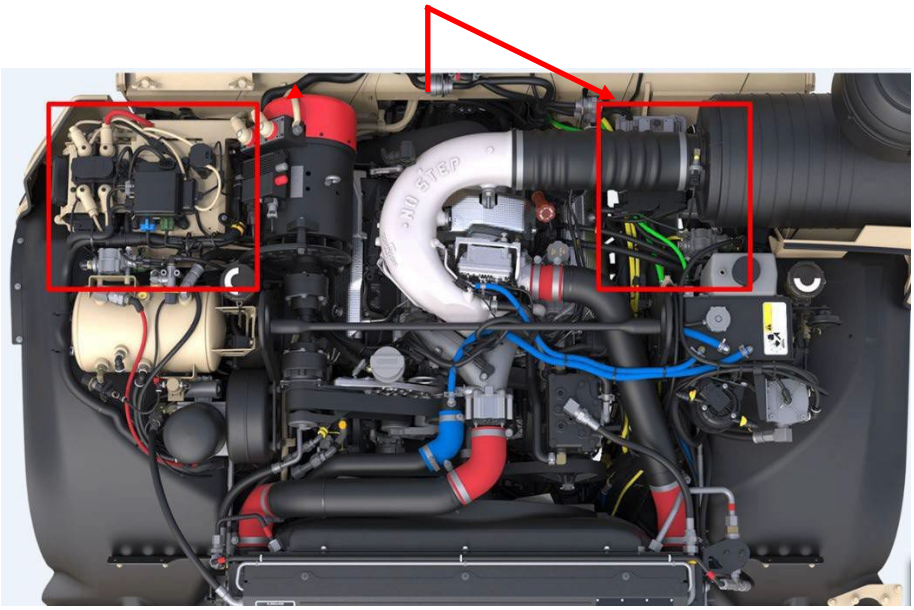


Figure 4.9 A1 Engine

- Engine (Figure 4.9).
    - Stay about 3-5 feet away from the engine compartment when washing the engine compartment.
    - Consider using a compressed air to clean sensitive locations such as the Electronic Control Unit (ECU), electrical connectors, or the cooling pack.
    - If more than 30% of the cooling pack is caked with mud, use low pressure warm water to clean it.

Check on Learning

Q: How far away should the end of the pressure wash nozzle be from the vehicle when cleaning the exterior with high pressure water?
A: About 5 feet

Q: **What is used to clean the outside and inside of the glass on the JLTV?**
A: The outside of the glass can be cleaned with a mild detergent or windshield washer fluid. The inside of the glass should be cleaned with a 90% isopropyl alcohol solution.

Q: **What should you use to clean sensitive locations?**

A: **Compressed air**

Q: **What should you clean the cooling pack with if more than 30% of it is caked with mud?**
A: Low pressure warm water

Figure 4.10 Gunner platform

- Gunner Platform (Figure 4.10).
    - The gunner's platform is used for the gunner to access the turret on the vehicles with the turret installed.
    - An adjustment of the gunner's platform is done by removing the bolts and adjusting it to the appropriate location for the height of the individual identified as the gunner, then tighten the bolts.

Check on Learning

Q: **What component allows the gunner to access the turret on vehicles that have it installed?**
A: Gunner's platform

Q: **What is the procedure for adjusting the gunner's platform?**
A: Remove the bolts and adjust to the appropriate location for the height of the gunner, then tighten the bolts.

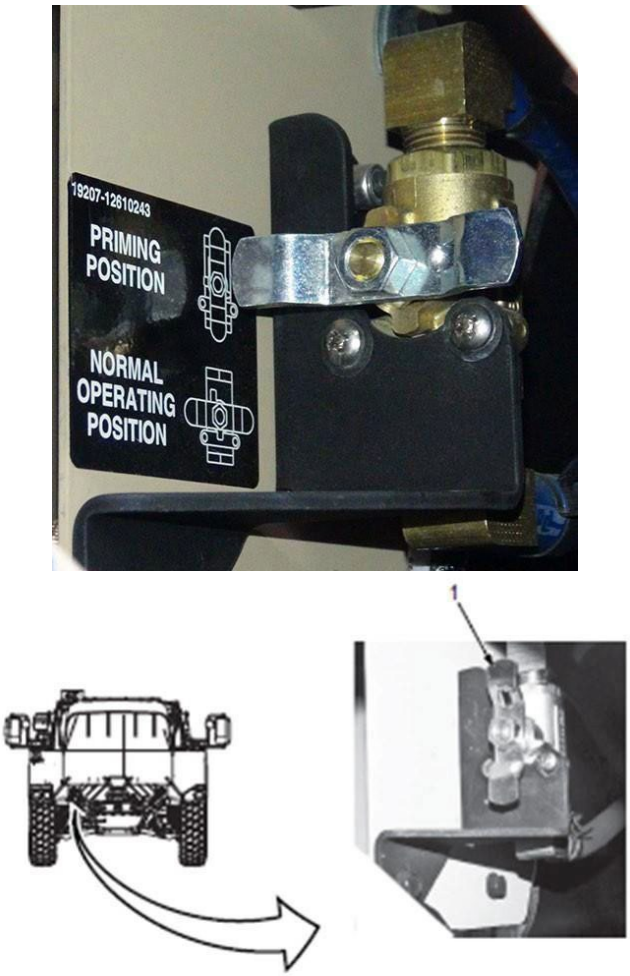


Figure 4.11 Fuel system priming

Fuel System Priming.

- With the vehicle parked on level ground, make sure DSDU or dash gauges show minimum fuel level of 25%.
- Move to rear driver's side of vehicle and turn prier handle counter clockwise to open (handle vertical).
- Go to cab and turn battery disconnect and ignition on.
- Start timer and tune combat override on.
- Wait five minutes and turn combat override off.
- Move to rear driver's side of vehicle and turn primer valve handle clockwise to close (handle horizontal).

- Turn ignition on.

Check on Learning

Q: **An operator runs out of fuel, what must be done to deliver fuel to the engine?**
A: Prime the fuel system.

Q: Describe the procedure for priming the fuel system on the JLTV.
A: 1) Fill the fuel tank with JP-8 or DF-2 as defined by AR70-12. 2) Turn ignition switch on.3) Allow fuel pump to run until no air is present (may take up to 5 minutes).

Storage and Transportation.

- Long term storage.
    - Occasionally long-term storage of the JLTV will be necessary. When required, there are a few things to consider.
    - Store the vehicles close together.
    - Tires must be clean and free of grease or oil. They also should be kept from direct sunlight.
    - Inspect the JLTV regularly; address any rust within standards of local rust prevention program guidelines.
    - Lower to tie-down mode.
    - Drain the air system.

Figure 4.12 Modes of transport

Transportation (Figure 4.12).

- Refer to Operator Manual work package “Preparation for Storage or Shipment” for any warnings, cautions, and notes associated with these tasks.

- The JLTV can be transported by sea, air or rail.

- The suspension control system allows for different modes of transportation to be used to ship the JLTV.

- Tie down mode is used for most movement exercises such as rail and over the road transport.

    - Tie-down height refers to the vehicle in a reduced height state where the suspension lock-out braces have been installed on the upper control arms of the suspension to prevent vehicle settling and keep vehicle tie downs at proper vertical dimensions.

    - Transport the JLTV using tie down mode with suspension lock-out braces installed.

    - When transporting by rail in tie-down mode, the JLTV can be transported by all railways in the United States and NATO countries.
- Loading mode is used to drive the JLTV on and off a marine vessel. In this state, the JLTV is at its lowest point and requires the jounce bumpers to be removed. Contact field maintenance to remove jounce bumpers. Configuring vehicle for shipment will depend on height of vessel compartment being used. The operator uses manual control of the front and rear suspension to navigate the beams and floor surface of the vessel.

Check on Learning

Q: **What are some things to consider when storing the JLTV long term?**
A: Store vehicle close together, Tires must be clean and free of grease or oil. They also should be kept from direct sunlight, Inspect the JLTV regularly; address any rust within standards of local rust prevention program guidelines, install suspension lock-out braces, and drain the air system.

Q: What suspension setting is used for rail and over the road transport?
A: Tie-down mode

Q: **What is loading mode used for?**
A: Transporting the JLTV on or off marine vessels. In this state, the JLTV is at its lowest state and requires the jounce bumpers to be removed. This should only be used when required.

Q: **What means of transport are suitable for transporting the JLTV?**
A: Sea, air or rail

Tow Bar Installation.

- The tow bar is used to tow disabled vehicles.
- The process can be different depending on the kits used on the mission configuration of the vehicle.
- Ensure vehicle operators use a ground guide to align the pintle.
- Operators must also make sure the Inter-Vehicular Cable (IVC), chains, and appropriate air hoses are used, and the vehicle brakes are caged.

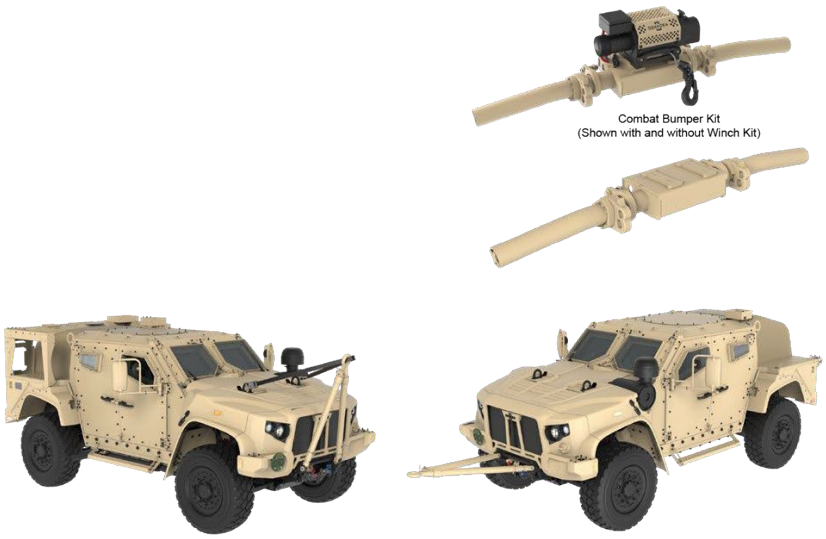


Figure 4.13 Combat bumper

Combat Bumper.

- Combat bumper (Figure 4.13). Combat bumper has integrated tow eyes for easy tow bar installation.
- Regular bumper. With the regular bumper, the operator can simply attach the tow bar to the truck and raise it to the transport position.

Prepare Vehicle for Towing.

Figure 4.14 Ball valve

- Turn ball valve (Figure 4.14) to the CLOSED (TOWING) position.

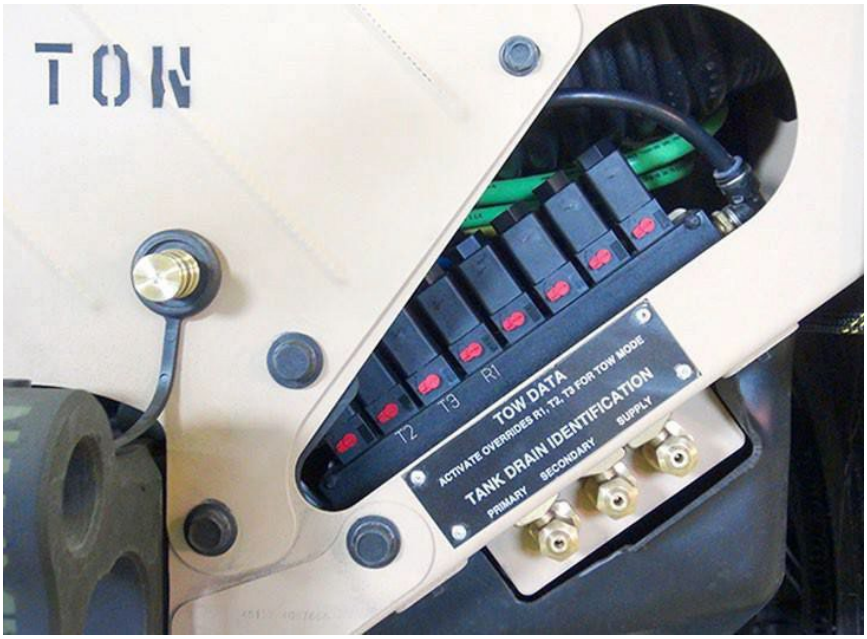


Figure 4.15 T2, T3, and R1 solenoid screws

- In the rear of the vehicle, turn T2, T3, and R1 solenoid screw (Figure 4.15) ¼ turn clockwise to disengage transaxle and front differential.

- Remove rear step, if vehicle is being towed from the rear

Check on Learning (
Q: **Why can the towing process be different between vehicles?**
A: Depending on kits and mission configuration of the JLTV.

Q: **What is the purpose of the integrated tow eyes on the combat bumper?**
A: They are for easy tow bar installation.

Q: **How far must you turn the T2, T3, and R1 solenoid screws to disengage the trans axle and the front differential?**
A: ¼ turn clockwise

Connecting to a disabled vehicle.

- Lower tow to the ground.
- Open pintle hook.
- Back towing vehicle to towed vehicle.
- Install tow bar into towing vehicle pintle.
- Park vehicle.
- Route safety chains through two tie down eyes.
- Attach hooks to safety chains.
- If there is a combat bumper, route the chains around the combat bumper mounts and secure the chain.
- Attach shackles to rear tow eyes.
- Attach chains to shackles.
- Attach service and emergency glad hands.
- Attach 24 IVC to 24 VDC connector.
- Rotate air solenoid valves T2, T3 and R1 at the rear air solenoid bank.
- Rotate ball valve to seal service glad hand air system.
- Release parking brake.
- If the air system does not function correctly, cage brakes.

- If air system works properly, push in trailer air supply control.
- Remove wheel chocks.
- Release the parking brake.
- Remove all components in reverse order of attachment.

Change the Tire.

Figure 4.17 Spare tire stowage

- Soft Cover (Figure 4.16).
    - The soft cover is used to conceal and protect items in the back of truck.
    - Soft cover must be unzipped to remove the spare tire. The procedure differs between the two and four door vehicles.
        - Procedure for accessing spare tire on the four-door vehicle:

        - Unzip soft cover to expose spare tire davit mount.
    - Procedure for accessing spare tire on the two-door vehicle:
        - Unzip cover.
        - Remove frame.
- Removal/Replacement.
    - Remove/replace rubber tie-downs.
    - Remove/replace support tubing and associated hardware.
    - Refer to Soft Cover work package for additional details.
- Stowing the Spare Tire (Figure 4.17).
    - GP and HGC the spare tire is mounted on the back of the truck.
    - In the utility the spare tire is located in the bed of the truck. The spare tire davit is also located in the bed of the utility variant.

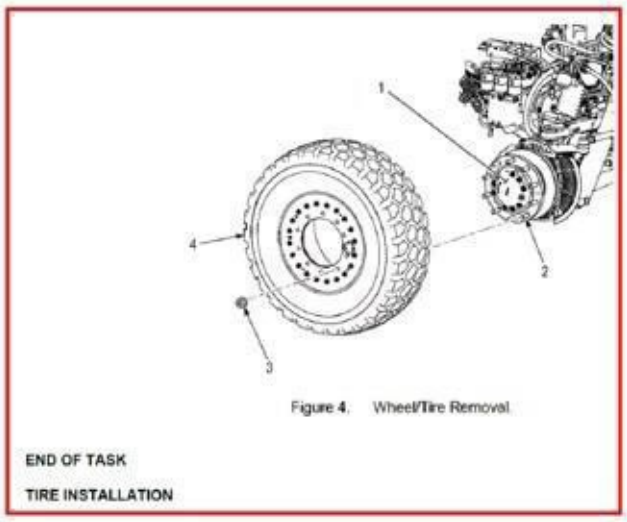


Figure 4.18 Changing the tire

Changing the Tire (Figure 4.18).

- Replace.
- Ensure CTIS is disabled.
- Install suspension lock-out braces.

Change the Tire.

- Remove the Soft Cover.

- Refer to MOM Work Package “Soft Cover Removal” for any warnings, cautions, and notes associated with this task.
- Remove rubber tie downs.
- Remove supporting tubing and associated hardware.
- Refer to Soft Cover work package for additional details.

- Removing the Spare Tire.

  Instructor Note: Do not remove nuts until cable has been secured around the tire because there is a possibility that the tire could fall off.

  - Remove top nuts from spare tire mounting bracket.
  - Loosen bottom nits from spare tire mounting bracket.
  - Remove spare tire removal davit from rear of truck.
  - Remove handle and install davit to spare tire mounting hole on top of the spare tire mount.
  - Install handle onto winch gear.
  - Lower the hook and install the choker strap to the hook, tighten cable so cable does not wind.
  - Remove bottom two nuts from the spare tire mounting bracket.
  - Lower spare tire.

- Changing the Tire.
  - Set the suspension to tie down mode.
  - Break torque on wheel nuts.
  - Drive vehicle onto wooden blocks. Wooden block should be 3 inches to the outside of the tire.
  - Insert wheel chocks.
  - Position suspension lock-out braces plate.
  - Position suspension lock-out braces.

    - Operate brace until tire can be removed.
    - Remove lug nuts and tire.
    - Remove sticker from deal for CTIS.
    - Inspect CTIS seal condition.
    - Line up CTIS valve.
    - Mount tire.
    - Tighten lug nuts.
- Raising the Spare Tire.
    - Have choker strap wrapped around tire.
    - Attach winch hook from davit onto choker strap.
    - Lift spare tire.
    - Install four nuts.
    - Remove cable.
    - Tighten four nuts.
- Replace the Soft Cover.
    - Replace supporting tubing and associated hardware.
    - Replace rubber tie downs.
    - Refer to Soft Cover work package for additional details.

LESSON 19

TROUBLESHOOTING

- Contact with energized electrical components can result in a direct short, severe burns, or electrical shock. Ensure electrical power is off prior to working on all electrical components. Failure to comply may result in injury or death to personnel.

- Suspension lock-out braces must be installed prior to crawling under vehicle Suspension may lower, crushing personnel. Failure to comply may result in injury or death to personnel.

- Adhere to warnings, cautions and notes in the MOM.

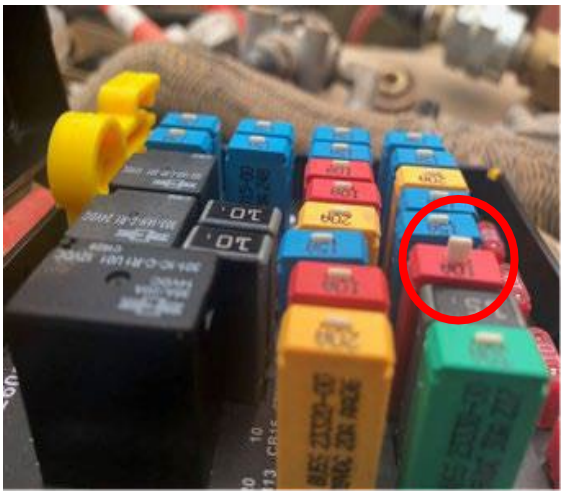


Figure 5.1 Active service codes

Troubleshooting Introduction.

- Many faults within a system can be diagnosed by using the fault codes. These can be found within the DSDU and the MOM.

- The troubleshooting procedures included in the MOM provide the information needed to isolate, diagnose, and correct symptoms that may occur during the operations of the vehicle.

- Action to take in the event track doesn't correct the fault.

Before Troubleshooting.

- Ensure Operator preventive maintenance checks and services (PMCS) was performed prior to, during, and after the mission.

- Obtain as much information as possible about the malfunction.

- Turn the vehicle off and then back on to confirm active diagnostic troubleshooting codes. Any codes that are not currently active will no longer be an active code to troubleshoot.

- Verify codes are still active prior to troubleshooting.

- Use all of your senses to observe and locate problems.

- Whenever possible, isolate the system first and then the component causing the malfunction.

Troubleshooting Procedures.

- Troubleshooting procedures are arranged by a series of questions and corrective actions.

- The title of a work package indicates which symptom has occurred for a specific system or equipment.

- The question asked will identify the possible malfunction that may have caused the indicated symptom.

- Any corrective steps will be listed in the DECISION, which states the procedure(s) required to isolate and correct the cause of the malfunction.

Figure 5.2 mVEC with faulted breakers

Troubleshooting Rules.

- Read and follow all safety instructions found in the Warning Summary at the front of the manual.
- Observe all warnings, cautions, and notes listed in the procedure.
- Perform each step of the procedure in the order listed until the malfunction is corrected. DO NOT perform any task unless the troubleshooting procedure tells you to do so.
- When checking for tripped circuit breakers, ensure that fuses, circuit breakers, and relays in the mVEC align with the locations identified on the mVEC cover.

- Reference the applicable publication to address proper operation, maintenance, and/or troubleshooting requirements of C4ISR equipment.

Troubleshooting Tracks.

- Operator troubleshooting is critical to the troubleshooting process.

- It is important that the operator follow all steps required to assist field maintenance in getting the truck back into service.

- Six parts to troubleshooting tracks.

    - Initial setup. This section discusses the required tasks that need to be done and where to find information about how to complete the tasks.

    - Troubleshooting procedure. This describes the fault as it is presented on the truck.

    - Step. Steps are actions that the operator must do to troubleshoot the system.

    - Condition/indication. The condition/indication is a question guiding the operator to a decision that needs to be made about the condition.

    - Decision. Decisions are typically yes or no answers to the Condition/Indication troubleshooting tree.

    - End of work package. This indicates the end of the troubleshooting track. If the problem still exists after this, notify your supervisor who will then verify that the tracks were followed correctly and contact field maintenance as necessary.

Check on Learning

Q: **Why is it important for an operator to follow all steps of the troubleshooting tracks?**
A: Assists field maintenance in getting the truck back into service.

Q: **Name the six parts of the Troubleshooting Tracks found in the MOM.**
A: Initial setup, troubleshooting procedure, step, condition/indication, decision, end of work package

Q: **How does the condition/indication step in the troubleshooting track assist an operator?**
A: It provides a question guiding the operator to a decision that needs to be made about the condition.

Q: What should be done if the troubleshooting tracks do not fix the problem?
A: **Notify supervisor.**

Figure 5.3 DSDU active service codes

Fault Code Index.

- The fault code index provides the operator with information related to the codes found on the DSDU. (Figure 5.3) This can greatly assist operators with troubleshooting in the field. It can also give field maintenance personnel information related to how to troubleshoot a problem if it occurs. The MOM can be referenced in the event the DSDU fails.

- Nomenclature in the description may note Left which is Driver Side or Right which is Passenger Side. Always ensure to check the correct side of the vehicle when diagnosing faults.

- If unsure of the fault code listed, check the troubleshooting index to see if there is a symptom which may match the fault indicated.

- Not all fault codes will have operator level corrective actions. If a malfunction is not listed and you are not able to proceed, or it is not corrected by the listed corrective actions, notify your supervisor or Field Maintenance. An example of DSDU fault code

is listed below:

Table 5.0 DSDU Fault Code

Sys. ENG	**No.** 1-222	**Severity** W	**Description** Coolant Temp Warning

- There are four parts to the fault code index work package:
  - Initial setup. Related conditions or work packages related to the task.
  - Fault code index. A description of the fault code index limitations and use.
  - Fault severity describes the faults.
    - W = Warning; serious, take immediate action.
    - C = Caution; mission will dictate operator actions.
  - Fault Index Table lists the following:
    - Fault Number.
    - Fault description.
    - Corrective action.
    - Example of a Fault Code Index for Silent Watch Battery Management:

Table 5.1 Fault Code Index

Fault No.	Fault Description	Corrective Action
07-1	Vehicle Battery State of Charge Below 20%	Reduce battery load. Start Vehicle.

Check on Learning

Q: **What are the two fault severity codes and what do they mean?**
A: W = Warning; serious, take immediate action. C = Caution; mission will dictate operator actions.

Q: **What is the purpose of the fault code index?**
A: It provides the operator with information related to the codes found on the DSDU.

Q: **Name the four parts to the fault code index work package.**
A: Initial setup, fault code index, fault severity and fault index tables

Remove the DSDU/Circuit Breakers.

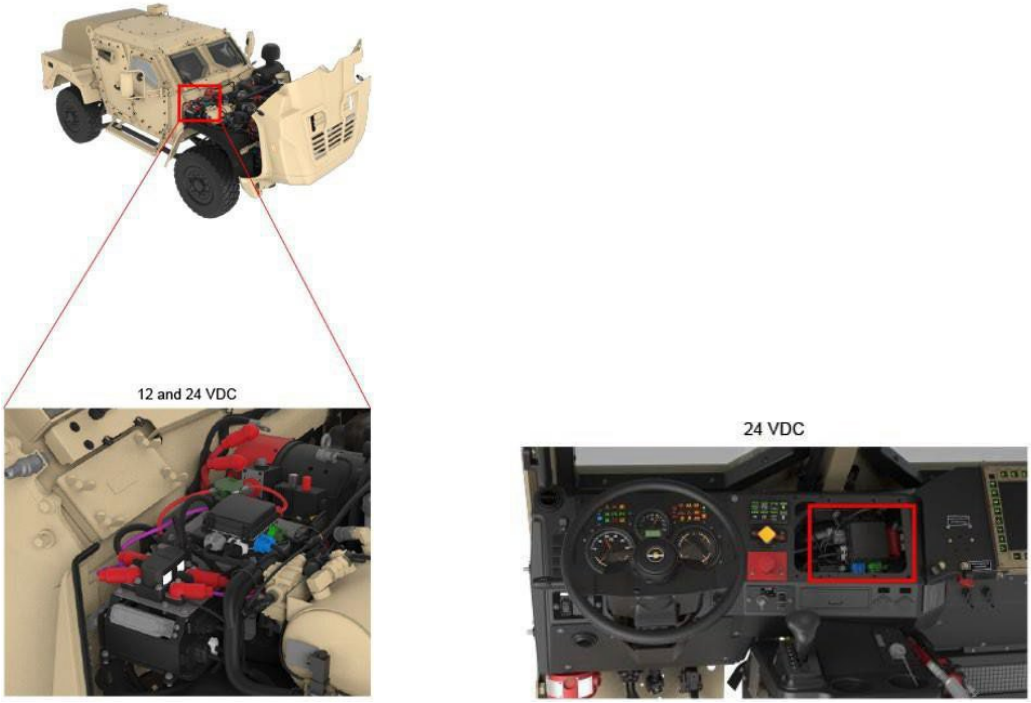


Figure 5.4 12/24v mVEC locations

- Circuit Breakers.
    - Circuit breakers are found on the JLTV in two primary locations, behind the DSDU and on the upper right side of the engine compartment. (Figure 5.4).

- The 24 VDC circuit breakers are found behind the DSDU and the 12/24 VDC circuit breakers are found in the engine compartment.

- To identify a faulted circuit breaker, go to the power management screen of the DSDU and identify where the faulted circuit breaker is. They will be identified by either “OK” if it is serviceable and “Faulted” if there is a fault. If a fault is identified, the operator should record the location and the circuit breaker number. The operator then can identify the location of the failed circuit breaker by the numbers found in the mVEC.

- Inspect Circuit Breakers.

  - Inspect the circuit breakers identified on the DSDU before removal to determine where the faulted circuit breaker is and record the location for your reference. The 12/24v mVEC is located in the right side of the engine compartment. The 24v mVEC is located behind the DSDU.

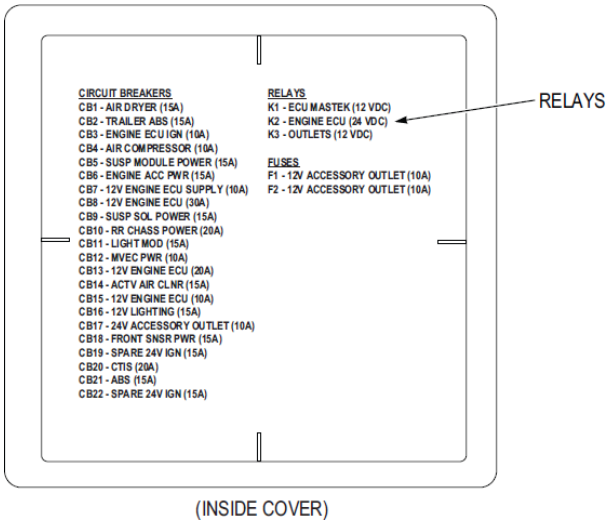


Figure 5.5 Inside cover of 12v mVEC

  - If in the engine bay mVEC, remove mVEC cover and inspect for circuit breakers that appear tripped.

  - Circuit breakers have numbers in the mVEC that identify the location. (Figure 5.5).

  - If the mVEC is behind the DSDU, removal of DSDU is required prior to visual inspection of circuit breaker.

- Remove DSDU.
    - Remove thumb screws.
    - Remove electrical connection covers.
- Replace circuit breaker/fuse.
    - Replace failed fuses or circuit breakers as necessary.
    - Remove fuse by pulling it out of its cavity.

Figure 5.6 Circuit breakers

    - Replace fuse cavity with spare fuse in mVEC by pushing it into its appropriate cavity (Figure 5.6). If the fuse blows again the vehicle needs to be sent to maintenance.
    - Always ensure correctly rated fuses are used when replacing them

Check on Learning

Q: **Where are the circuit breakers found on the JLTV?**
A: Behind the DSDU and on the upper right side of the engine compartment.

Q: **How does an operator find a faulted circuit breaker?**
A: Go to the power management screen of the DSDU and identify the location of the faulted circuit breaker.

Q: **What must be removed to inspect for tripped circuit breakers in the 24vm VEC?**
A: DSDU

Inspect/remove circuit breakers.

- 12/24 VDC Circuit Breakers.
    - Opens engine compartment hood.
    - Access mVEC (multiplex vehicle electrical center) on the right side if the truck.
    - Remove cover from the mVEC to access circuit breakers.
    - Ensure none are missing or popped.
    - Close mVEC cover.
    - Close engine compartment hood.

- 24 VDC Circuit Breakers.
    - Remove DSDU.
    - Access mVEC behind dash.
    - Remove cover of mVEC.
    - Inspect for missing or popped circuit breakers.
    - Close mVEC cover.
    - Reinstall any dash components removed during process.
    - Install DSDU.