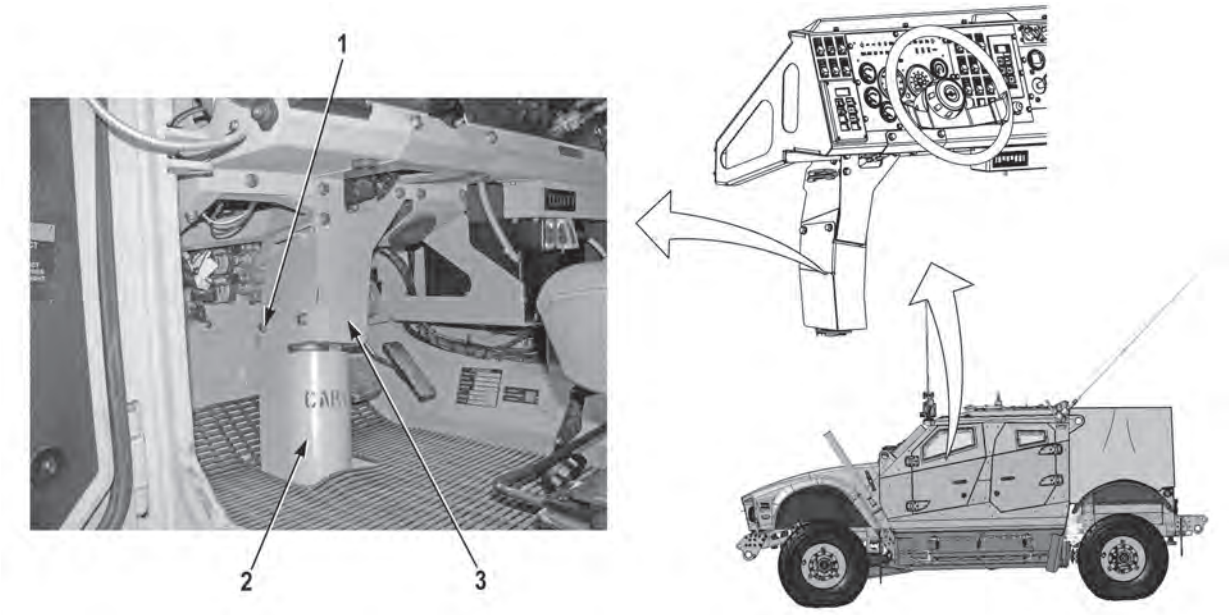
8. Install three washers (6), new lockwashers (5), and screws (4) on steering lock weldment (7).



WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water. Failure to comply may result in injury or death to personnel.

9. Apply sealing compound, Loctite 242, to threads of four screws (1) and install steering shaft bracket (2) on steering column mounting bracket (3) with four screws (1).

END OF TASK

END OF WORK PACKAGE

GENERAL MAINTENANCE

INTRODUCTION

This chapter includes Field Maintenance instructions for removing, repairing, installing, and adjusting components necessary to maintain the MRAP - All Terrain Vehicle (M-ATV).

GENERAL MAINTENANCE PROCEDURES

1. General Removal Instructions.

    a. **Work required.** Remove only those parts needing repair or replacement. Do not disassemble a component any further than needed.

    b. **Preparation.** Before removing any part of the electrical or air systems, make certain system is not energized or pressurized. Disconnect battery cables. Relieve all pressure from air system. Make sure brakes are applied and that all controls are in OFF position before starting any removal procedure.

    c. **Removal.** Make sure there is enough clearance to remove part. Disassemble MRAP - All Terrain Vehicle (M-ATV) or adjacent parts as needed to provide working clearance.

    d. **Lifting.** Always use chain hoist, jack, or other aid when lifting heavy parts. Make certain, load limit of lifting device exceeds weight being lifted. Position and rig lifting device before disconnecting part for removal.

    e. **Identification.** Tag or mark all similar parts, such as electrical leads, before disconnecting and removing. This will make proper assembly easier. Be sure to identify mating ends of electric connectors and air lines as they are disconnected.

    f. **Hoses.** Cap and plug all hoses and fittings upon removal.

2. General Disassembly Instructions.

    a. **Cleanliness.** Work area must be kept as clean as possible. This will prevent contamination of internal parts. This is especially true for valves, cylinders, or air system parts.

    b. **Expendable Parts.** All gaskets, packings, and seals removed during repair must be discarded and replaced with new parts. These items are usually damaged during removal. In the same way, all lockwire, lockwashers, locknuts, cotter pins, and like items must be replaced at time of assembly.

    c. **Removing Seals.** When removing gaskets, packings, or seals, do not use any metal tool that will scratch the surfaces that will mate with these items. Replace all seals upon removal.

    d. **Disassembly.** Before disassembly of any item, study illustration carefully. Note relationship of internal parts. Knowing details of a component will speed up disassembly and assembly, and will help avoid mistakes.

    e. **Parts Protection.** To prevent moisture and dirt from entering open housings, lines, or other openings, apply protective caps and plugs as soon as possible after disassembly.

3. General Cleaning Instructions.

WARNING

Clean up all fluid spills to prevent slip and fire hazards. Dispose of material in accordance with local hazardous waste disposal procedures. Failure to comply may result in injury to personnel and damage to the environment.

WARNING

Solvent cleaning compound MIL-PRF-680 Type II and III may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Use respirator as needed. Accidental ingestion can cause irritation of digestive tract and respiratory tract, may cause lung and central nervous system damage. Can be fatal if swallowed. Inhalation of high/massive concentrations can cause coma or be fatal. First aid for ingestion: do not induce vomiting. Seek immediate medical attention. First aid for skin contact: remove contaminated clothing. Wash skin thoroughly with soap and water. If symptoms persist, seek medical attention. First aid for eye contact: flush with water for 15 minutes or until irritation subsides. If symptoms persist, seek medical attention. First aid for inhalation: move to fresh air. If not breathing, provide artificial respiration. If symptoms persist, seek medical attention. Keep away from open flames and other flames and other sources of ignition. Failure to follow this warning may result in injury or death to personnel.

- **The flashpoint for Type II solvent cleaning compound is 141 to 198°F (61 to 92°C) and Type III is 200 to 241°F (93 to 116°C).**
- **Do not use improper cleaning methods or unauthorized cleaning solvents. Failure to comply may result in injury or death to personnel and damage to equipment.**
- **Fire extinguishers should be placed nearby when using solvent cleaning compound. Failure to comply may result in injury or death to personnel.**
- **Cloths or rags saturated with solvent cleaning compound must be disposed of IAW authorized facility's procedures. Failure to comply may result in injury to personnel.**
- **Eye shields must be worn when cleaning with a wire brush. Flying rust and metal particles may be present. Failure to comply may result in injury or death to personnel.**
- **Never use fuel to clean parts. Fuel is highly flammable. Fuel may ignite during cleaning. Failure to comply may result in injury or death to personnel.**
- **Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personnel protective equipment (goggles/shield, gloves, etc). Failure to comply may result in injury to personnel.**

CAUTION

Do not clean tires, rubber hoses, or electrical components with solvent mixture. Failure to comply may result in damage to equipment.

a. **Removing Deposits.** After soaking parts in a solvent, remove deposits by flushing or spraying. When necessary, brush with a soft-bristle brush moistened in solvent. Use compressed air to dry all parts, except bearings. Bearings must be allowed to air dry.

b. **Tools.** Do not use scrapers, wire brushes, abrasive wheels, or compounds when cleaning parts, unless called for in detailed instructions. These procedures may weaken a highly stressed part.

c. **Ball and Roller Bearings.** When cleaning ball or roller bearings, place them in a basket and suspend them in a container of solvent. If needed, use a brush to remove caked grease, chips, etc. Avoid rotating bearings before solid particles are removed to prevent damaging races and balls. When bearings have been cleaned, coat them lightly with lubrication oil to remove solvent.

d. **Rubber Parts.** Do not clean rubber parts in solvent. These parts should be wiped clean with a clean, dry, lint-free cloth.

WARNING

Steam cleaning creates hazardous noise levels and severe burn potential. Eye, skin, and ear protection are required. Failure to comply may result in injury to personnel.

e. **Exterior Parts.** Steam clean all exterior parts thoroughly before removing. This will make inspection and disassembly easier.

WARNING

Solvents used with a spray gun must be used in a spray booth with filter. Face shield must be used by personnel operating spray gun. Failure to comply may result in injury to personnel.

f. **Engine, Capsule Exterior, Body.** Use a high pressure washer for cleaning exterior of engine, capsule, and body. Rinse with hot water, if available. An ordinary garden hose with nozzle may be used if other equipment is not available. Rinse thoroughly.

WARNING

Adequate ventilation shall be provided while using solvents and cleaners. Prolonged breathing of vapors should be avoided. Do not use near heat or open flame. Avoid prolonged contact with skin. Use of rubber gloves conforming to FED SPEC ZZ-G-281, face shield conforming to L-F-36, and other protective equipment are required according to OSHA Standard. Failure to comply may result in injury or death to personnel.

CAUTION

- **When using a pressure washer to clean vehicle, do not allow water stream to contact dash, dash components, or other electrical components. Failure to comply may result in damage to equipment.**
- **When using a pressure washer to clean capsule interior, keep nozzle of pressure washer away from vehicle or components a distance of 5 ft. (1.5 m) or more. Failure to comply may result in damage to equipment.**
- **Do not spray cleaning solvent on the front of the dash panels or gauges. This can cause discoloration and clouding of dash panels and gauges. Failure to comply may result in damage to equipment.**

g. **Capsule Interior.** Using clean cloth, wipe loose dust and dirt from capsule interior. Clean seats and seat belts using a mild solution of warm water and soap solution. Never use solvents or abrasives. Using clean, dry cloth, wipe seats and seat belts dry.

h. **Degreasing Machine.** A degreasing machine may be used to remove heavy grease and oil accumulation from metal parts.

i. **Passages.** After removing parts from degreasing machine, and before coating with rust preventive, check all oil passages and cavities for dirt or blockage. A thin, flexible wire should be run through oil passages to make certain that they are not clogged. Individual passages that are dirty may be cleaned using a pressure spray gun and dry cleaning solvent.

WARNING

Ensure battery disconnect switch is in OFF position. Failure to comply may result in injury or death to personnel.

j. **Electrical Parts.** Electrical parts such as coils, junction blocks, switches, and igniters, which use insulation materials, should not be soaked or sprayed with cleaning solutions. Clean these parts with a clean, lint-free cloth moistened with solvent or contact cleaner. Cleaning solvent, contact cleaner, and wire terminals may be used to clean noninsulated, electrical contacts, switches, relays, and wire terminals.

k. **Ground Connectors.** It is required that ground wire, cable, and strap connections are made on a clean, bare metal surface, ensuring metal-to-metal contact. All paint, lacquer, oxides, corrosion, oils, and grease must be removed prior to attachment of wires, cables, or straps. Metal surfaces must be spot-faced to base metal to provide proper grounding.

CAUTION

Avoid excess removal of surface finish to adjacent area. Failure to comply may result in damage to equipment.

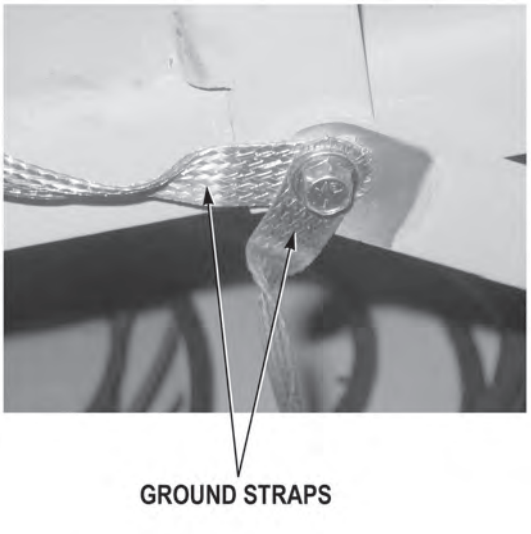
Paint removal is to be made in a uniform, circular diameter to allow full contact to base metal. Where surface preparation has been made and preserved, using adhesive-backed tapes or like items, it is necessary that the grounding surface be cleaned prior to final assembly. If metal surface has been exposed to elements where oxidation, corrosion, or contamination may have taken place, it is required that the surface be cleaned and prepared prior to final assembly.

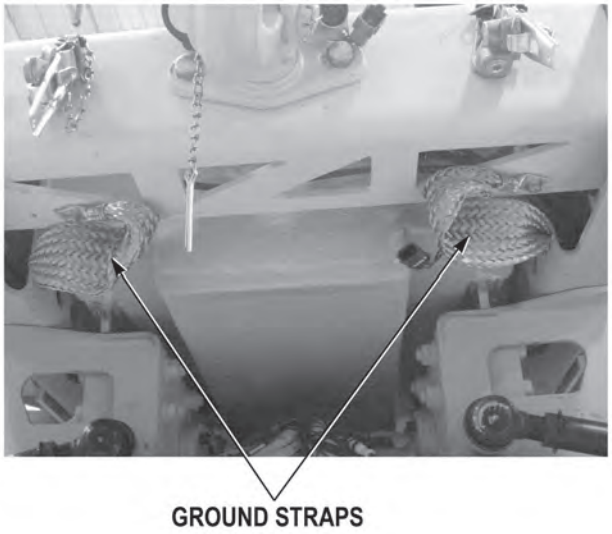
Once ground connections have been secured, RTV sealant must be applied to ends of ground wire, cable, or straps and any exposed bare metal surfaces to prevent oxidation, corrosion, or contamination.

Table 1. Recommended Spot-Face Diameters.

Wire Gauge	Nominal Fastener/Hole Size			
	#10	**1/4 in.**	**5/16 in.**	**3/8 or 1/2 in.**
18 - 14	1/2 in.	5/8 in.	3/4 in.	1 in.
12 - 10		5/8 in.	3/4 in.	1 in.
8		5/8 in.	3/4 in.	1 in.
6			3/4 in.	1 in.
4			3/4 in.	1 in.
2			3/4 in.	1 in.
1			3/4 in.	1 in.
1/0			3/4 in.	1 in.
2/0				1 in.
3/0				1 in.
4/0				1 in.

l. **Ground Straps.** This vehicle is equipped with extra grounding protection to ensure proper and safe operation of all electronic equipment in addition to normal ground wires and cables. There are several ground straps located throughout this vehicle. They can be identified by the flat, braided wire between the connection points of the strap as illustrated below.





CAUTION

Do not use soap or alkalies for cleaning tank interiors. Failure to comply may result in damage to equipment.

m. **Fuel Tanks.** Pay special attention to all warnings and cautions when working on vehicle's fuel tank. Fuel tanks should be flushed, using a spray gun and cleaning solvent.

n. **Battery.** Exterior surfaces of the electrical system and battery should be cleaned with a weak solution of baking soda and water. Apply solution with a bristle brush to remove any corrosion.

4. General Inspection Instructions.

a. **Sealing Surfaces.** Inspect all surfaces in contact with gaskets, packings, or seals. Make sure there are no nicks, burns, or scratches. If any defect is found, remove or repair part as required.

b. **Bearings.** Check bearings for rusted or pitted balls, races, or separators. Check balls and races for brinelling, abrasion, and serious discoloration. Following are causes for bearing rejection:

- Cuts or grooves parallel to ball or roller rotation.
- Fatigue pits (not minor machine marks or scratches).
- Cracks.

c. **Inspection.** Inspection consists of checking for defects such as distortion, wear, cracks, and pitting. Parts under heavy load or pressure must be inspected more thoroughly. Clean all parts before inspection.

d. **Drain Plugs.** When removing drain plugs from transmission, engine, or steering system components, inspect sediment adhering to plug. A build-up of grit and/or fine metal particles may indicate part failure. A few fine particles are normal. This inspection is effective in determining defective parts prior to internal inspection of parts.

e. **Gears.** Gear inspection cannot be described in detail here. There are too many differences in size and shape of gears. The following inspection can be used to make a general visual inspection of all gears. Follow all steps listed within repair inspection of parts.

- **Normal Wear.** Loss of metal from the surface of gear teeth. Wear must not prevent gears from meshing or performing properly.
- **Initial Pitting.** This may occur when a pair of gears is first started in service. It may continue until most high spots have been reduced. As long as contact surfaces are not affected, this pitting is not necessarily serious.
- **Destructive Pitting.** This type of pitting occurs after initial pitting, often at an increasing rate. This will destroy contact area and reduce gear's ability to carry a load. Rapid destruction will occur with use.
- **Abrasive Wear.** This damage is caused by fine particles carried in the lubricant or imbedded in the gear teeth. These particles may come from many sources; metal detached from gear teeth or bearings, abrasives not completely removed before assembly, sand or scale from castings, or other impurities in oil or air.
- **Scoring.** Burning or scoring is indicated by discoloration and loss of hardness due to excessive temperature. This is caused by too much friction resulting from overload, overspeed, lack of backlash, or faulty lubrication. If discoloring can be wiped off with clean cloth, such discoloring usually can be traced to oil burn-stains, which are not serious.
- **Rolling.** This damage occurs mainly on plastic gears. Rolling occurs when material is pushed out of shape without breaking off. This is caused by heavy, uneven loads, sliding, or overheating.
- **Brinelling.** This can be identified by tiny indentations or ridges on the shoulder or race of a bearing.

f. **Splines.** Inspect shaft splines for wear, pitting, rolling, peening, and fatigue cracks. In many cases, the same inspection procedure will apply to gears. However, the problem, if present, will often be much less pronounced. Have a magnetic particle inspection performed on splines if needed.

g. **Tubing and Hose.** Check all hose surfaces for broken or frayed fabric. Check for breaks caused by sharp kinks or rubbing against other parts of the vehicle. Inspect stainless steel lines for kinks. Inspect fitting threads for damage. All O-rings must be removed and new ones installed when any hose or tubing connection is disconnected. Replace any part found defective. Following assembly and during initial MRAP M-ATV operation, check for leaks.

h. **Electrical Parts.** Inspect all wiring harnesses for chafed or burned insulation. Inspect all terminal connectors for loose connections and broken parts.

i. **Metal Parts.** Visually inspect all castings and weldments for cracks. Parts that carry a great load should receive magnetic particle inspection. Critical nonferrous parts may be inspected with fluorescent penetrant.

5. General Repair Instructions.

WARNING

Drilling and grinding operations are hazardous to the eyes. Eye protection is required. Failure to comply may result in injury to personnel.

a. **Burrs.** Remove burrs from gear teeth with a fine-cut file or hand grinder.

b. **Exterior Parts.** Exterior painted parts may be resurfaced where paint is damaged, or where parts have been repaired, by using an abrasive disc.

c. **Bearings.** Remove residue and oil stain from bearing races with crocus cloth.

d. **Protective Parts.**

NOTE

This procedure is used with polished and machined steel parts not protected by cadmium, tin, or other plating or surface treatment. Bare metal surfaces must be free of moisture when protective coating is applied.

During repair operations, protect bare steel surfaces from rusting when not actually undergoing repair work. Dip parts in, or spray them with, corrosion-preventive compound. The same protective coating may be applied to other metals to prevent rust. Aluminum parts may require protection in atmospheres having a high salt content. Steel parts must always be protected.

e. **Threaded Inserts.**

CAUTION

When drilling out threaded insert, do not enlarge existing hole. The new threaded insert will not seat properly if hole is enlarged. Failure to comply may result in damage to equipment.

NOTE

- All threaded inserts are replaced the same way.
- When replacing threaded inserts, use Twist Drill table to determine which twist drill to use.

Table 2. Twist Drill.

PART NUMBER	TWIST DRILL SIZE (IN.)
ALS7-1024-130	1/4
ALS7-1024-130	1/4
ALS7-420-165	3/8
ALS7-1024-225	1/4
ALS7-616-150	1/2
ALS7-420-260	3/8
ALS7-518-150	13/32
ALS7-518-312	13/32

(1) Drill out damaged threaded insert.

CAUTION

Do not over tighten threaded insert. Failure to comply may result in damage to equipment.

NOTE

Use Tool Kit Blind Fastener from SATS to install threaded inserts.

(2) Using installation tool, insert new threaded insert into hole and install threaded insert until it is fully seated.

f. **Welding.**

WARNING

M-ATV is equipped with a capsule interior automatic fire suppression system. Before performing any welding, brazing, grinding, or using open flame in capsule, batteries must be disconnected. In addition, the maintenance circuit breaker located to the right of the main circuit breaker in the dash must be pulled out to prevent accidental activation of automatic fire suppression system in the capsule. System components must also be covered. Failure to comply may result in injury to personnel.

WARNING

M-ATV is equipped with an engine compartment fire suppression system. Before performing any welding, brazing, grinding operation, or using open flame in engine compartment, batteries must be disconnected. In addition, the automatic fire suppression system for the engine compartment must be disabled to prevent accidental activation of automatic fire suppression system. System components must also be covered. Failure to comply may result in injury to personnel.

WARNING

M-ATV is equipped with an undercarriage fire suppression system designed to extinguish fires in all wheel wells and in fuel tank area. Before preforming any welding, brazing, grinding operation, or using open flame in or around the wheel well/fuel tank areas, batteries must be disconnected. In addition, the automatic fire suppression system for the undercarriage must be disabled to prevent accidental activation of automatic fire suppression system. Care must be taken to prevent damage to any of the fire suppression sensor lines which, if damaged, may trigger automatic fire suppression system upon system being enabled. Undercarriage fire suppression system is triggered by loss of pressure in sensor lines. Failure to comply may result in injury to personnel.

WARNING

If welding, brazing, grinding, or open flame operations have been performed, any components subject to these operations must be allowed to cool before enabling automatic fire suppression system. Failure to comply may result in injury to personnel.

Welding and brazing may be used to repair cracks in external steel parts, such as brackets, panels, and light framework. These repairs should be made only when replacement parts are not available. Do not weld or braze castings, running parts, or parts under great stress except in emergencies.

g. **Stud Installation.** When installing studs in engine block and axle housings, use a driver designed for the stud to be installed. A worn stud driver may damage the end thread. This makes it necessary to use a chasing die before a nut can be screwed on. This procedure will remove cadmium plating and allow corrosion. This will make future disassembly difficult and may cause stud to be backed out with nut. Before driving a stud, inspect hole for chips and liquid. Blow out any foreign matter. Start stud by hand. If it will not start into hole, it is too large or has defective end thread. Before final insertion, coat thread with anti-seize compound. Turn stud in slowly to prevent overheating and galling of casting metal.

h. **Electrical Parts.** Replace all broken, worn, or burned electrical wiring. Wires with several broken strands must be replaced. Broken strands will increase the resistance of the wire and impair efficiency of electrical components, especially the ignition system. Ensure connectors are clean before reconnecting connectors. Apply a light coating of Nyogel 760G to all electrical connectors before connector is reconnected (a light coating is all that is required).

i. **Hoses.** Replace all broken, frayed, crimped, or soft flexible lines and hoses. Replace stripped or damaged fittings. Replace entire flexible hose if fittings are damaged. Make sure hose clamps do not crimp hoses. All O-rings must be removed and new ones installed when any hose or tubing connection is disconnected.

j. **Fasteners.** Replace any bolt, screw, nut, or fitting with damaged threads. Inspect tapped holes for thread damage. If cross-threading or galling is evident, retap the hole for the next oversize screw or stud. When retapping will weaken the part, or when the cost of the part makes retapping impractical, replace the damaged part. Chasing threads with the proper size tap or die may often be enough.

k. **Dents.** Straighten minor body dents by bumping with a soft-faced hammer while using a wooden block backing.

l. **Sheet Metal Repair.** Repair minor skin cracks by installing patches.

m. **Mounting Holes.** Reshape oval mounting hole to round. Drill to receive bushing with required inner diameter. Stake bushing in place with center punch.

6. General Assembly Instructions.

a. **Preparation.** Remove grease from new parts before installation.

b. **O-ring Installation.** Lubricate all O-rings with a thin coating of light mineral oil before installation. Slightly stretch packing and place into position. Rotate component on flat surface or uniformly press the packing into position.

c. **Gaskets.** To provide added sealing for gasket, coat both sides with sealant. Remove all traces of previous gasket and sealant before installing new gasket.

WARNING

On direct contact, uncured silicone sealant irritates eyes. In case of contact, flush eyes with water and seek medical attention. Avoid prolonged contact with skin. Failure to comply may result in injury or death to personnel.

d. **Silicone Sealant.** Silicone sealant is often used instead of a gasket to seal mating parts. The mating parts must be clean, dry, and free of oil or grease for proper adhesion. Silicon starts to set-up in 15 minutes and takes 24 hour to completely cure. Excess silicone sealant should be wiped off after disassembling the mating parts.

e. **Oil Seals.** Install oil seals with seal lip facing towards lubricant, applying an even force to outer edge of seal. Coat oil seals evenly with grease before installing. If oil seals will be installed over keyed or splined shafts, use a guide. This will prevent sharp edge of keyway of splines from cutting the leather or neoprene seal. Construct guides of very thin gage sheet metal and shape to required diameter. However, make certain guide edges are not sharp. Bend them slightly inward so they do not cut the seal.

f. **Seal Rings.** Coat seal rings with oil and carefully install into their bores. If seal rings must be installed over threaded parts, temporarily wrap the threads with tape to protect the seal ring, then remove the tape.

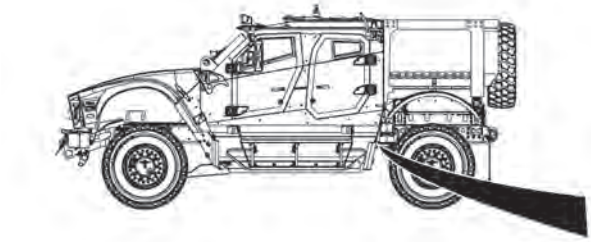
g. **Bearing and Shafts.** During assembly of shafts and bearings in housings, first mount bearing on shaft, then install the assembly by applying force to shaft. When mounting bearings on shafts, always apply force to the inner races of the bearing.

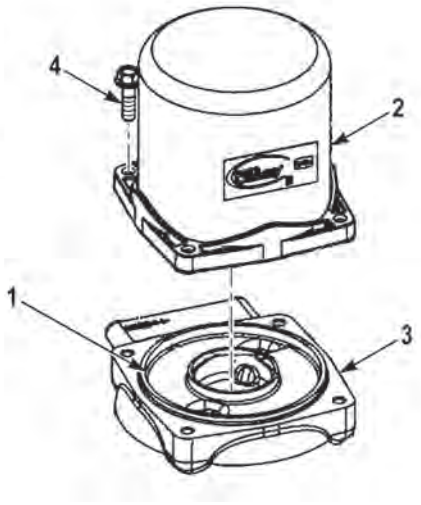
h. **Bearing Lubrication.** Lubricate bearings before reassembly with the type of lubricant normally used in the related housing or container. This will provide lubrication during the first run-in until lubricant from the system can reach the bearings.

i. **Fasteners.** When fastener tightening requirements are not given in the maintenance task, tighten screws and nuts in accordance with Torque Instructions (WP 0292). If a tightening sequence is required it will be given in the maintenance task.

END OF TASK

AIR SYSTEM LEAK TEST

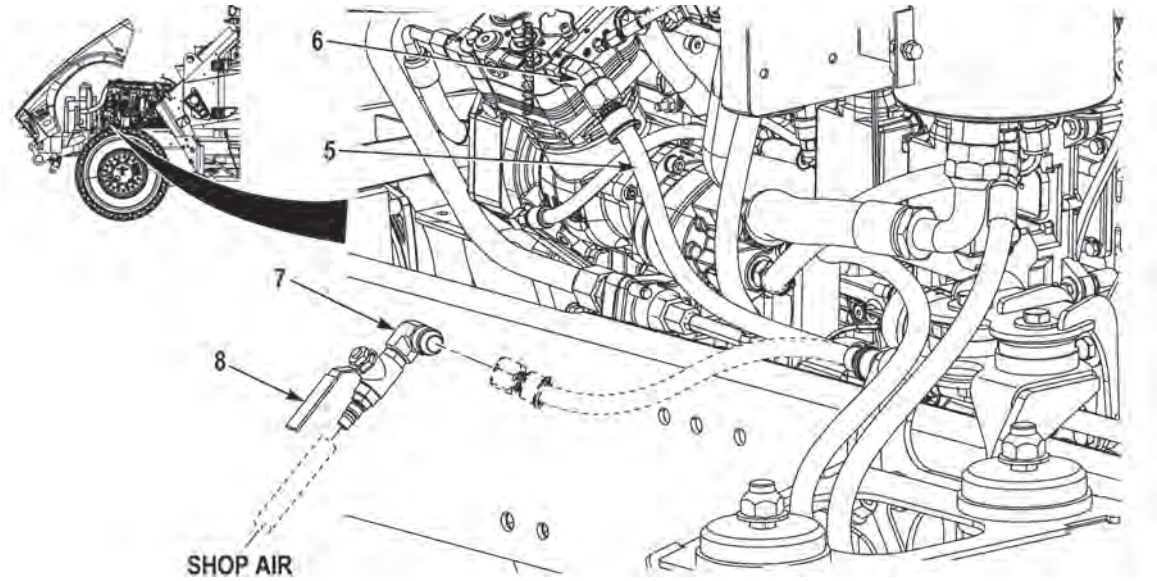




NOTE

- Perform Step (1) if air dryer is removed from vehicle.
- Reuse O-ring from air dryer removal for air system leak test only.
- Use ball valve (16B100) and 90º fitting (3953273) for air system leak test.

1. Install O-ring (1) and canister (2) on air dryer base (3) with four screws (4).



2. Remove hose assembly (5) from fitting (6).
3. Install fitting (7) on ball valve (8).
4. Install hose assembly (5) on fitting (7).

NOTE

Ensure ball valve is in the closed position prior to installation.

5. Connect shop air to ball valve (8).
6. Slowly open ball valve (8).
7. Once the air dryer has purged, close ball valve (8).
8. Listen and inspect all air lines for leaks. If air leak(s) are present, perform corrective maintenance as required.
9. Disconnect shop air from ball valve (8).
10. Remove hose assembly (5) from fitting (7).
11. Remove fitting (7) from ball valve (8).
12. Install hose assembly (5) on fitting (6).

WARNING

Air system must be drained prior to removing air system components. Failure to comply may result in injury or death to personnel.

13. Drain air system.

NOTE

Perform Steps (14) and (15) if air dryer was removed from vehicle.

14. Remove four screws (4), O-ring (1), and canister (2) from air dryer base (3). Discard O-ring.

15. Cover air dryer base (3) and canister (2) to prevent contamination.

END OF TASK

END OF WORK PACKAGE

TORQUE INSTRUCTIONS

TORQUE LIMITS FOR SCREWS

GENERAL

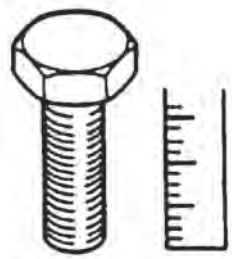
This section provides general torque limits for fasteners used on this vehicle. Special torque limits are indicated in the maintenance procedures for applicable components. The general torque limits given in this work package shall be used when specific torque limits are not indicated in the maintenance procedure. These general torque limits cannot be applied to screws that retain rubber components. The rubber components will be damaged before the correct torque limit is reached. If a special torque limit is not given in the maintenance instructions, tighten the screw or nut until it touches the metal bracket, then tighten it one more turn.

HOW TO USE TORQUE TABLE

Table 1 lists dry torque limits. Dry torque limits are used on screws that do not have lubricants applied to the threads. Table 2 lists wet torque limits. Wet torque limits are used on screws that have high-pressure lubricants applied to the threads. Table 3 lists torque limits for metric fasteners. Table 4 lists wet torque limits for Spiralock flange nuts (grade 8). All flange nuts used on this vehicle use Spiralock threads. Use the charts as follows:

1. Measure the diameter of the screw you are installing.

2. Count the number of threads per inch.
3. Under the heading SIZE, look down the left-hand column until you find the diameter of the screw you are installing (there will usually be two lines beginning with the same size).



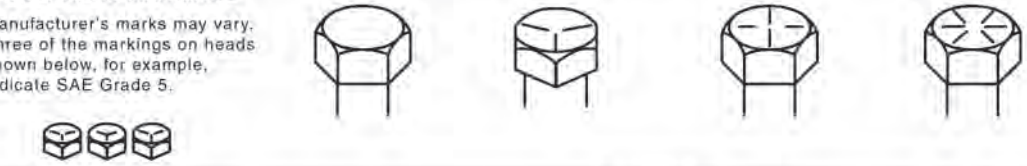
4. In the second column under SIZE, find the number of threads per inch that matches the number of threads you counted in Step (2).
5. To find the grade screw you are installing, match the markings on the head to the correct picture of CAPSCREW HEAD MARKINGS on the torque table.
6. Look down the column under the picture you found in Step (5) until you find the torque limit (in foot-pound or N•m) for the diameter and threads per inch of the screw you are installing.

TORQUE LIMITS FOR FASTENERS

Table 1. Torque Limits for Dry Fasteners.

BOLT HEAD MARKINGS

Manufacturer's marks may vary. Three of the markings on heads shown below, for example, indicate SAE Grade 5.



SIZE			TORQUE							
			SAE GRADE No. 1 or 2		SAE GRADE No. 5		SAE GRADE No. 6 or 7		SAE GRADE No. 8	
DIA INCHES	THREADS PER INCH	MILLIMETERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS
1/4	20	6.35	5.5	7.5	8	10.8	10	13.6	12	16.3
1/4	28	6.35	6.3	8.5	10	13.6	12	16.3	14	19.0
5/16	18	7.94	11	15	17	23.1	21	28.5	25	33.9
5/16	24	7.94	12	16.3	19	25.8	24	32.5	25	33.9
3/8	16	9.53	20	27.1	30	40.7	40	54.2	45	61.0
3/8	24	9.53	23	31.2	35	47.5	45	61.0	50	67.8
7/16	14	11.11	30	40.7	50	67.8	60	81.4	70	94.9
7/16	20		35	47.5	55	74.6	70	94.9	80	108.5
1/2	13	12.70	50	67.8	75	101.7	95	128.8	110	149.2
1/2	20		55	74.6	90	122.0	110	149.2	120	162.7
9/16	12	14.29	65	88.1	110	149.2	135	183.1	150	203.4
9/16	18		75	101.7	120	162.7	150	203.4	170	230.5
5/8	11	15.88	90	122.0	150	203.4	190	257.6	220	298.3
5/8	18		100	135.56	180	244.1	210	284.8	240	325.4
3/4	10	19.05	160	217.0	260	352.6	320	433.9	380	515.3
3/4	16		180	244.1	300	406.8	360	488.2	420	569.5
7/8	9	22.23	140	189.8	400	542.4	520	705.1	600	813.6
7/8	14		155	210.2	440	596.6	580	786.5	660	895.0
1	8	25.40	220	298.3	580	786.5	800	1084.8	900	1220.4
1	12		240	325.4	640	867.8	860	1166.2	1000	1356.0
1-1/8	7	25.58	300	406.8	800	1084.8	1120	1518.7	1280	1735.7
1-1/8	12		340	461.0	880	1193.3	1260	1708.6	1440	1952.6
1-1/4	7	31.75	420	569.5	1120	1518.7	1580	2142.5	1820	2467.9
1-1/4	12		460	623.8	1240	1681.4	1760	2386.6	2000	2712.0
1-3/8	6	34.93	560	759.4	1460	1979.8	2080	2820.5	2380	3227.3
1-3/8	12		640	867.8	1680	2278.1	2380	3227.3	2720	3688.3
1-1/2	6	38.10	740	1003.4	1940	2630.6	2780	3769.7	3160	4284.9
1-1/2	12		840	1139.0	2200	2983.2	3100	4203.6	3560	4827.4

Table 2. Torque Limits for Wet Fasteners.

BOLT HEAD MARKINGS

Manufacturer's marks may vary. Three of the markings on heads shown below, for example, indicate SAE Grade 5.

SIZE			TORQUE							
			SAE GRADE No. 1 or 2		SAE GRADE No. 5		SAE GRADE No. 6 or 7		SAE GRADE No. 8	
DIA INCHES	THREADS PER INCH	MILLIMETERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS
1/4	20	6.35	4	5.4	6.25	8.5	8	10.8	9	12.2
1/4	28	6.35	4.7	6.4	7	9.5	9	12.2	10	13.6
5/16	18	7.94	8	10.8	13	17.6	16	21.7	18	24.4
5/16	24	7.94	9	12.2	14	19.0	18	24.4	20	27.1
3/8	16	9.53	15	20.3	23	31.2	30	40.7	35	47.5
3/8	24	9.53	17	23.1	25	33.9	30	40.7	35	47.5
7/16	14	11.11	24	32.5	35	47.5	45	61.0	55	74.6
7/16	20		25	33.9	40	54.2	50	67.8	60	81.4
1/2	13	12.70	35	47.5	55	74.6	70	94.9	80	108.5
1/2	20		40	54.2	65	88.1	80	108.5	90	122.0
9/16	12	14.29	50	67.8	80	108.5	100	135.6	110	149.2
9/16	18		55	74.6	90	122.0	110	149.2	130	176.3
5/8	11	15.88	70	94.9	110	149.2	140	189.8	170	230.5
5/8	18		80	108.5	130	176.3	160	217.0	180	244.1
3/4	10	19.05	120	162.7	200	271.2	240	325.4	280	379.7
3/4	16		140	189.8	220	298.3	280	379.7	320	433.9
7/8	9	22.23	110	149.2	300	406.8	400	542.4	460	623.8
7/8	14		120	162.7	320	433.9	440	596.6	500	678.0
1	8	25.40	160	217.0	440	596.6	600	813.6	680	922.1
1	12		170	230.5	480	650.9	660	895.0	740	1003.4
1-1/8	7	25.58	220	298.3	600	813.6	840	1139.0	960	1301.8
1-1/8	12		260	352.6	660	895.0	940	1274.6	1080	1464.5
1-1/4	7	31.75	320	433.9	840	1139.0	1100	1491.6	1360	1844.2
1-1/4	12		360	488.2	920	1247.5	1320	1789.9	1500	2034.0
1-3/8	6	34.93	420	569.5	1100	1491.6	1560	2115.4	1780	2413.7
1-3/8	12		460	623.8	1260	1708.6	1780	2413.7	2040	2766.2
1-1/2	6	38.10	560	759.4	1460	1979.8	2080	2820.5	2360	3200.2
1-1/2	12		620	840.7	1640	2223.8	2320	3145.9	2660	3606.9

Table 3. Torque Limits for Metric Fasteners.

METRIC					OTC STD 8.8		OTC STD 10.9	
					PROPERTY CLASS 8.8		PROPERTY CLASS 10.9	
NOMINAL DIA -MM	PITCH -MM	NON STRESS AREA -MM	TENSILE STRENGTH (T) MIN PROOF LOAD (P) PSI		CLAMP LOAD LBS	ASSY TORQUE	CLAMP LOAD LBS	ASSY TORQUE
			8.8 T/P	10.9 T/P		LUB FT-LBS		LUB FT-LBS
6	1.00	20.1	113M/ 83M	142M/ 117M	1890	6	2660	8
7	1.00	28.9	"	"	2720	10	3830	15
8	1.25	36.6	"	"	3450	15	4850	20
10	1.50	58.0	"	"	5460	30	7680	40
12	1.75	84.3	"	"	7940	50	11170	70
14	2.00	115.0	"	"	10830	75	15230	110
16	2.00	157.0	"	"	14790	120	20800	170
20	2.50	245.0	"	"	23070	235	32460	330
24	3.00	383.0	"	"	33240	405	46760	570

Table 4. Wet Torque Limits for Grade 8 Spiralock Flange Nuts.

		TORQUE	
SIZE	**THREADS PER INCH**	**POUNDS FEET**	**NEWTON METERS**
1/4	20	15	20.3
5/16	18	25	33.9
3/8	16	44	59.7
1/2	13	107	145.1
5/8	11	212	287.5
3/4	10	375	508.5

TIGHTENING STANDARDS

SCOPE

This procedure is to set a standard for tightening fittings, tube/fittings, and hose assemblies. The torque values specified are from data compiled from tube, fitting, and equipment manufacturers and are recognized throughout the industry.

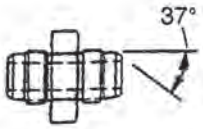
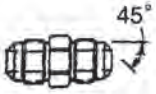
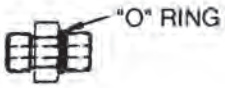
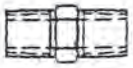
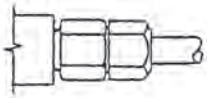
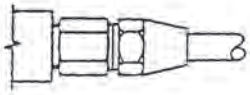
GENERAL

The purpose of this procedure is to inform assembly personnel on the proper methods to tighten fittings, tube/fittings, and hose assemblies to achieve proper torques.

PROCEDURE

This attached procedure was developed by Oshkosh Corporation Engineering Department and should be followed for all vehicles manufactured at OSK.

Table 5. Classification of Fittings.

TYPE	FIGURE	SECTION NUMBER
SAE 37° Flare		G-3.a.
SAE "O" Ring Face Seal (ORFS)		G-3.b.
45° SAE Flare		G-3.c.
SAE Straight Thread "O" Ring		G-3.d. G-3.e.
Pipe Thread (NPTF)		G-4.
BRASS COMPRESSION FITTINGS		
NTA - Air Brake		G-5.a.
AB - Air Brake		G-5.b.

ABBREVIATIONS

AB - Air Brake

NFPA - SAE 37° Flare Swivel Connections

NPSM - American Standard straight pipe threads for free fitting mechanical joints (ANSI-B1-20-1)

NPTFT - Dryseal American Standard taper pipe thread (ANSI-B1-20-3)

NTA - Registered trademark of Parker Haninfin for SAE J844 compatible air brake tube fitting with tube supports

ORFS - O-ring face seal - SAE J1453

GENERAL INSTRUCTIONS FOR ASSEMBLY OF TUBE TYPE FITTINGS

The successful operation of any system depends upon the care that is taken during its assembly.

- Take precautions to ensure that fittings and mating components are not damaged during storage, handling or assembly. Nicks and scratches in sealing surfaces can create a path for leaks which could lead to component contamination and or failure.
- When making a connection to tubing, compression or flare, inspect the tube in the area of fitting attachment to ensure that the tube has not been damaged. Damaged tubes, burrs, excessive paint can require excessive torque to tighten and can prevent a fitting from being properly tightened.

Always use two wrenches (when applicable) when installing or removing fittings, adapters, hoses, and air lines. Two wrenches are used to ensure the fitting being installed/removed does not affect the torque of the existing fitting/adapter. Always remove paint on fittings and adapters prior to removal. If paint is not removed, excess force must be exerted on adapters/fittings and may cause damage to component(s).

The assembly process is one of the leading causes for contamination in air and hydraulic systems. Contamination can prevent proper tightening of fittings and adapters from occurring.

- Avoid using dirty, oily rags when handling fittings.
- When it is required to disassemble fittings, the fittings should be cleaned and inspected for damage, and replaced, as necessary, before re-installing.
- Where specified, sealing compounds should be applied; however, caution should be taken not to introduce sealant into the system. Sealants can cause malfunction of components by blocking orifices and passages of valves.
- Avoid applying sealant to the area of the threads where the sealant will be forced into the system. (Generally, the first two threads of a fitting).
- Sealant should only be applied to the male threads.
- Straight fittings do not require sealants. O-rings or washers are provided for sealing.
- When replacing or installing O-rings, do not recklessly push the O-ring over the threads. O-rings could become nicked or torn. A damaged O-ring could lead to leakage problems. Use a thread protector when replacing O-rings on fittings.
- When installing O-rings, the O-rings should be lubricated to prevent scuffing or tearing from occurring.

Refer to the appropriate section of this standard for more specific instructions and procedures that should be followed.

SAE 37° FLARE SWIVEL CONNECTIONS

a. SAE 37° Flare Swivel Connections Consist of the Following:

- Machined adapters
- Hose fittings
- Flared tubes (sleeve and nut)
- Universal radius flared tubes

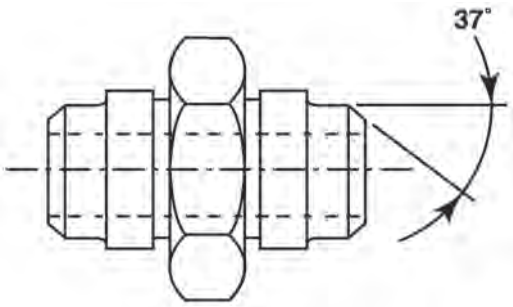


Table 6. Torque Values for 37° Port and Swivel Connections.

Tube Size	Thread Size	Torque Inch-Pounds	Torque Foot-Pounds
-4	7/16-20	135-145	11-12
-6	9/16-18	215-245	18-20
-8	3/4-16	430-470	36-39
-10	7/8-14	680-750	57-62
-12	1 1/16-12	950-1050	79-87
-14	1 1/16-12	1130-1240	93-103
-16	1 5/16-12	1300-1360	108-113
-20	1 5/8-12	1520-1600	127-133
-24	1 7/8-12	1900-2000	158-167
-32	2 1/2-12	2940-3100	245-258

b. ORS - O-ring Face Seal Connections

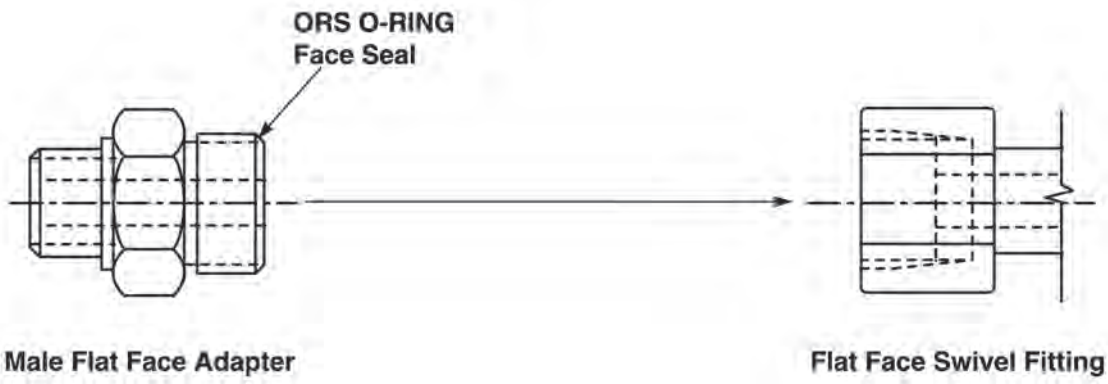


Table 7. Torque Values for O-ring Face Seal Fitting Connections.

Tube Size	Thread Size	Torque Inch-Pounds	Torque Foot-Pounds
-4	9/16-18	120-144	10-12
-6	11/16-16	216-240	18-20
-8	13/16-16	384-420	32-35
-10	1-14	552-600	46-50
-12	1 3/16-12	780-840	65-70
-16	1 7/16-12	1104-1200	92-100
-20	1 11/16-12	1500-1680	125-140
-24	2-12	1800-1980	150-165

c. 45° SAE Flare Connections

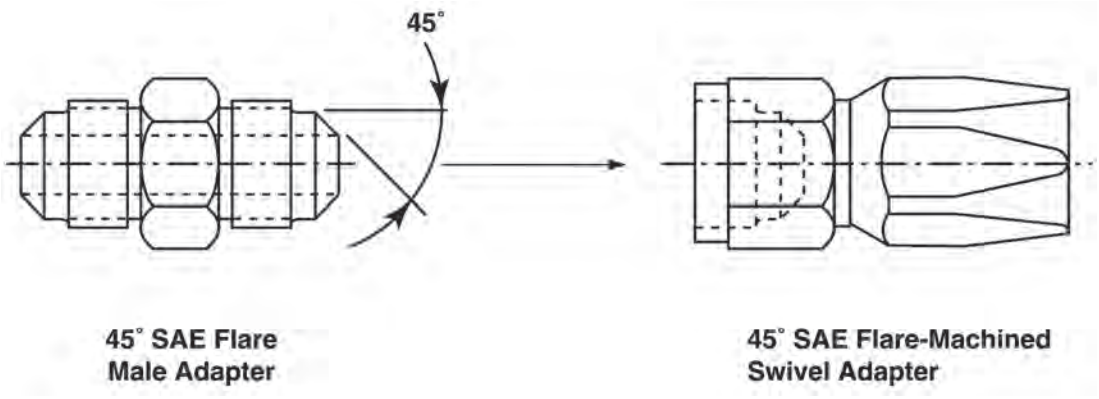


Table 8. Torque Values for 45° SAE Flare Connections.

Tube Size	Thread Size	Torque Inch-Pounds	Torque Foot-Pounds
-4	7/16-20	100-110	8-9
-6	5/8-18	215-235	18-20
-8	3/4-16	430-450	36-38
-10	7/8-14	620-650	52-54
-12	1 1/16-12	855-885	71-74

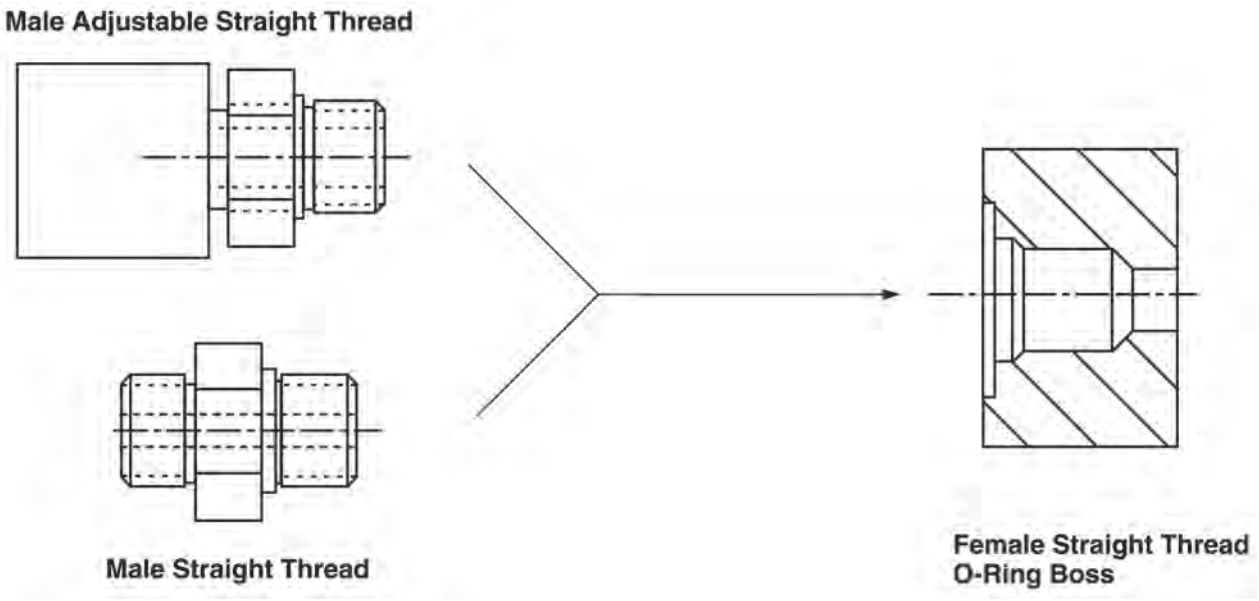
d. Straight Thread O-ring Boss Connections

Assembly instructions for Straight Thread O-ring Boss adjustable fittings. (As listed by SAE)

1. Lubricate the O-ring by coating with a light oil or petrolatum and install in the groove adjacent to the face of the metal back-up washer which should be assembled at the extreme end of the groove away from the port. The jamnut should be backed off also.

2. Install the fitting in the port until the metal back-up washer just contacts the face of the port. Do not tighten with a wrench.

3. The fitting may be positioned by turning the fitting out of the port (counterclockwise) up to one full turn. Using two wrenches, tighten the jamnut while holding the adapter body with the other wrench.



e. Torque Values for Straight Thread O-ring Boss

Table 9. Low-Pressure Series (SAE J514).

Tube Size	Thread Size	Torque Inch-Pounds	Torque Foot-Pounds
-4	7/16-20	100-110	8-9
-6	9/16-18	280-290	23-24
-8	3/4-16	480-510	40-42
-10	7/8-14	520-570	43-48
-12	1 1/16-12	820-900	68-75
-16	1 5/16-12	1340-1470	112-123
-20	1 5/8-12	1750-1930	146-161
-24	1 7/8-12	1850-2040	154-170
-32	2 1/2-12	2620-2880	218-240

Table 10. High-Pressure Series (SAE J1453).

Tube Size	Thread Size	Torque Inch-Pounds	Torque Foot-Pounds
-4	7/16-20	168-192	14-16
-6	9/16-18	288-312	24-26
-8	3/4-16	600-720	50-60
-10	7/8-14	864-960	72-80
-12	1 1/16-12	1500-1620	125-135
-16	1 5/16-12	2400-2640	200-220
-20	1 5/8-12	2520-3360	210-280
-24	1 7/8-12	3240-4320	270-360

PIPE THREAD CONNECTION

Because of the design of NPTF Dryseal pipe threads, assembly of the rotation method assures the best resultant connection. The plating does not affect the assembly procedure or the performance of the connection.

The assembly procedure should be performed as follows:

1. Assemble connection hand-tight.
2. Mark - male and female.
3. Rotate male approximately 2 1/2 (3 maximum) full turns past hand-tight position.

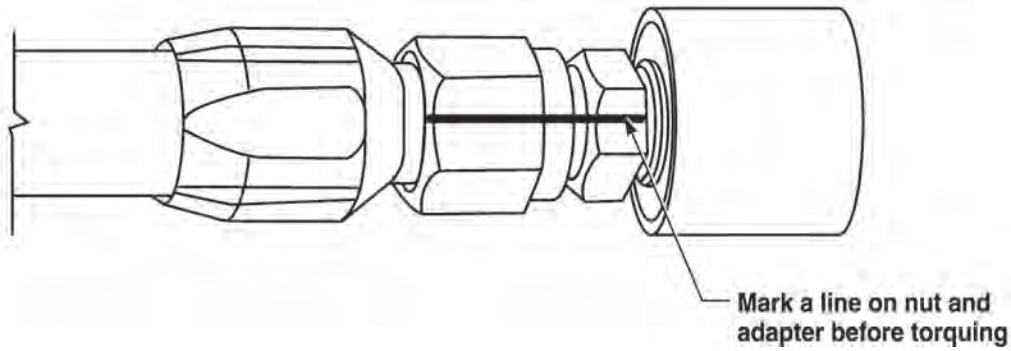
CAUTION

Overtightening will cause deformation of the pipe fitting and damage to the joining fitting, flange, or component. Failure to comply may result in damage to equipment.

ASSEMBLY BY THE FLATS METHODS

The assembly by the flats method may be used for 37° flared tube, 37° machined fitting seat, universal radius flare tube and 45° machined seat hose ends and adapters. The flats method is used when torque wrenches are not available or where the application does not permit their use. The following procedure should be used to ensure that the joints have been properly tightened.

1. Tighten nut “hand-tight” until it bottoms out the seat. It should be noted here that “hand-tight” is the point at which the swivel nut will no longer thread onto the adapter when a moderate amount of torque is applied with the hand and fingers. One must also move the fitting lightly side-to-side to eliminate any possible cocking or misalignment to ensure that the nut is completely threaded forward (hand-tight) and not bound-up.
2. To assist in identifying the number of flats tightened, mark a line lengthwise on the nut and extend it onto the adapter. Use an ink pen or marker.



3. Using a wrench, rotate the nut to tighten. Turn the nut the amount recommended for the particular fittings. The following chart provides the recommended number of flats rotation for the given connections.

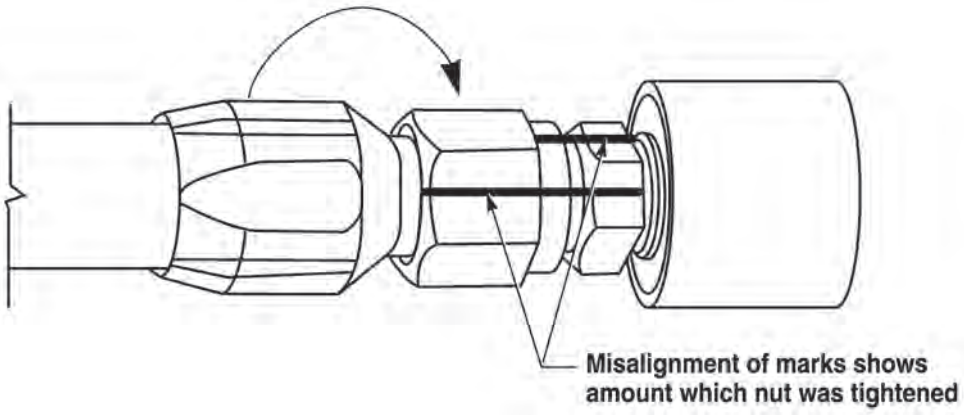


Table 11. Recommended Flats Rotation.

Tube Size	37° Flared Tube	45° Machined Fitting Seat	Universal Radius Flare Tube	45° SAE Machined Seat
-4	2 1/4-2 3/4	1 1/2-1 3/4	3-3 1/2	1-1 1/4
-5	3 1/4-3 3/4	1-1 1/2	3-3 1/2	1-1 1/4
-6	2 1/4-2 3/4	1-1 1/2	2 3/4-3	3/4-1
-8	2 1/4-2 3/4	1 1/4-1 3/4	3-3 1/2	1-1 1/4
-10	2-2 1/2	1 1/4-1 3/4	2 1/4-2 3/4	1-1 1/4
-12	2-2 1/2	1-1 1/2	1 1/2-2	1-1 1/4
-16	2 1/4-2 3/4	3/4-1		
-20	1 1/4-1 3/4	1/2-3/4		
-24	3/4-1 1/4	1/2-3/4		
-32	1-1 1/4	3/4		

It should be noted here that these data are guidelines only, and that part condition and application may affect performance.

NOTE

It is understandable that circumstances may occur where it is not feasible, due to limited space, to torque fittings. ORS type fittings require very little movement between hand-tightening to make contact with the flush face and additional rotation required for torque retention of the nut. Because of the limited movement required, the use of the flats method for tightening is not feasible. Therefore proper judgment must be used when tightening those fittings.

BRASS COMPRESSION FITTINGS

(Reference Parker Air Brakes - AB Fittings and NTA Fittings)

a. Air Brake Fitting (NTA Fitting)

Application: Use with SAE J844 A and B nylon tubing air brake systems in cab air controls.

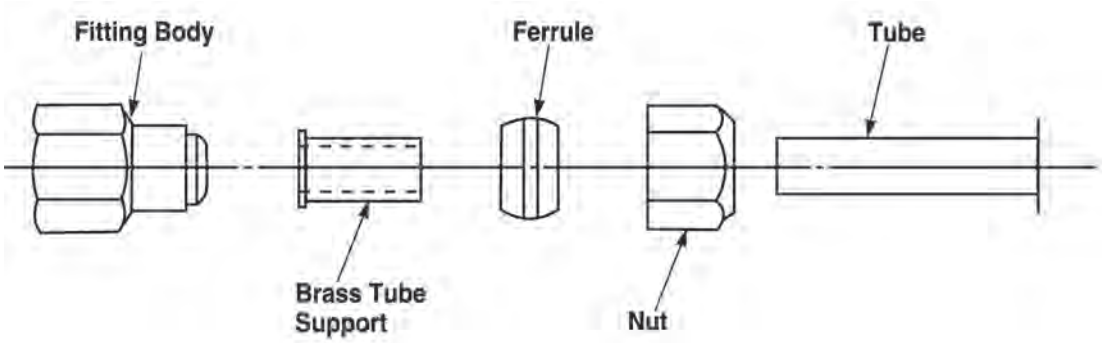
1. Assembly Instructions Method A:

   (a) Be sure tube end is square. Disassemble fitting, fitting body, brass tube support, ferrule, and nut.

   (b) Install nut and ferrule on tube, insert brass tube support.

   (c) Push tube assembly into fitting body until tube bottoms in fitting body, slide nut and ferrule assembly up to engage thread.

   (d) Tighten nut with wrench until one thread remains visible on the fitting body; or, the nut should be screwed down finger-tight, then wrench-tighten the number of additional turns from hand-tight. (Reference Table 12).



2. Assembly Instructions Method B:

   (a) Be sure tube end is square.

   (b) Loosen nut and insert tube through the nut and ferrule onto the brass tube support.

   (c) Push tube into fitting body until tube bottoms in fitting body.

   (d) Tighten nut with wrench until one thread remains visible on the fitting body; or, the nut should be screwed down finger-tight, then wrench-tighten the number of additional turns from hand-tight. (Reference Table 12).

Table 12. Air Brake Fitting (NTA Fitting).

Tube Size	Additional Number of Turns from Hand-Tight
1/4	3
3/8 and 1/2	4
5/8 and 3/4	3 1/2

b. Air Brake Fitting (AB Fitting)

Application: Use with copper tubing in air brake system. Bodies, with addition of NTA tube support, are interchangeable with NTA bodies that use SAE J844 nylon tubing. (Ferrules are not inter-changeable).

1. Assembly Instructions:

   (a) Cut tube squarely (or be sure nylon tube end is square). Disassemble fitting, fitting body, and nut.

   (b) Slide nut and ferrule onto tubing.

   (c) Insert tubing assembly into fitting body until tube bottoms on fitting body seat. The nut should be screwed down finger-tight, then wrench tighten the number of additional turns from hand-tight. (Reference Table 13).

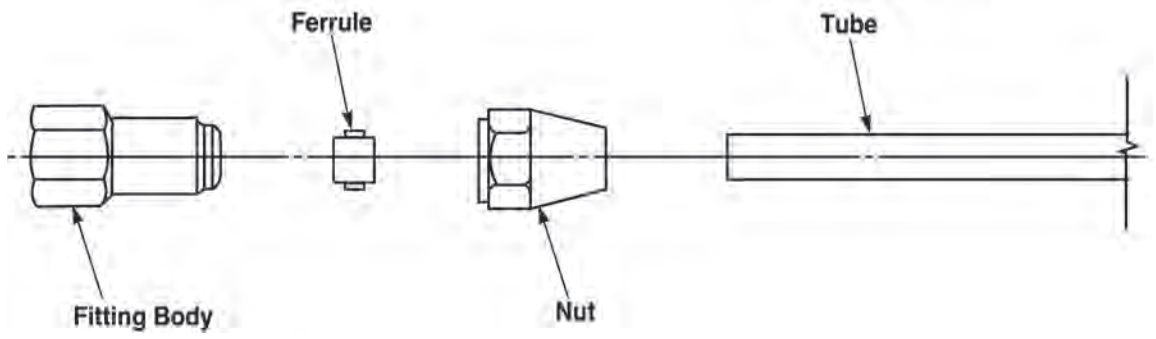


Table 13. Air Brake Fitting (AB Fitting).

Tube Size	Additional Number of Turns from Hand-Tight
1/4, 3/8, and 1/2	2
5/8 and 3/4	3

O-RING INSTALLATION

When replacing or installing O-rings, do not recklessly push the O-ring over the threads. O-rings could become nicked or torn. A damaged O-ring could lead to leakage problems.

When installing O-rings, the O-rings must be lubricated to prevent scuffing or tearing from occurring.

END OF WORK PACKAGE

CHAPTER 5

SUPPORTING INFORMATION FOR M1240, M1240A1, AND M1245

REFERENCES

SCOPE

This work package lists all pamphlets, field manuals, technical bulletins, and technical manuals referenced in this manual.

DEPARTMENT OF ARMY PAMPHLETS

DA PAM 750-8	The Army Maintenance Management System (TAMMS) Users Manual

FORMS

DA FORM 2028	Recommended Changes to Publications and Blank Forms
SF 368	Product Quality Deficiency Report

TECHNICAL BULLETINS

TB 43-0209	Color, Marking, and Camouflage Painting of Military Vehicles, Construction Equipment, and Material Handling Equipment
TB 750-651	Use of Antifreeze Solutions, Antifreeze Extender Cleaning Compounds and Test Kit in Engine Cooling Systems

TECHNICAL MANUALS

TM 9-2355-335-10	Operators Manual for Mine Resistant Ambush Protected All Terrain Vehicle (M-ATV)
TM 9-2355-335-24P	Repair Parts and Special Tools List (RPSTL) Manual Commercial-Off-The-Shelf (COTS) For Mine Resistant Ambush Protected (MRAP) All Terrain Vehicle (M-ATV)
TM 750-244-6	Procedures for Destruction of Tank Automotive Equipment to Prevent Enemy Use (U.S. Army Tank-Automotive Command)

END OF WORK PACKAGE

INTRODUCTION FOR STANDARD TWO-LEVEL MAINTENANCE ALLOCATION CHART (MAC)

THE ARMY MAINTENANCE SYSTEM MAC

This introduction provides a general explanation of all maintenance and repair functions authorized at the two maintenance levels under the Two-Level Maintenance System concept.

This MAC (immediately following the introduction) designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component shall be consistent with the capacities and capabilities of the designated maintenance levels, which are shown on the MAC in Column (4) as:

Field – includes two subcolumns, Crew (C) and Maintainer (F)

Sustainment – includes two subcolumns, Below Depot (H) and Depot (D)

Maintenance to be performed at field and sustainment levels is described as follows:

1. Crew maintenance. The responsibility of a using organization to perform maintenance on its assigned equipment. It normally consists of inspecting, servicing, lubricating, adjusting, and replacing parts, minor assemblies, and subassemblies. The replace function for this level of maintenance is indicated by the letter “C” in the third position of the SMR code. A “C” appearing in the fourth position of the SMR code indicates complete repair is possible at the crew maintenance level.

2. Maintainer maintenance. Maintenance accomplished on a component, accessory, assembly, subassembly, plug-in unit, or other portion either on the system or after it is removed. The replace function for this level of maintenance is indicated by the letter “F” appearing in the third position of the SMR code. An “F” appearing in the fourth position of the SMR code indicates complete repair is possible at the field maintenance level. Items are returned to the user after maintenance is performed at this level.

3. Below depot sustainment. Maintenance accomplished on a component, accessory, assembly, subassembly, plug-in unit, or other portion either on the system or after it is removed. The replace function for this level of maintenance is indicated by the letter “H” appearing in the third position of the SMR code. An “H” appearing in the fourth position of the SMR code indicates complete repair is possible at the below depot sustainment maintenance level. Items are returned to the supply system after maintenance is performed at this level.

4. Depot sustainment. Maintenance accomplished on a component, accessory, assembly, subassembly, plug-in unit, or other portion either on the system or after it is removed. The replace function for this level of maintenance is indicated by the letter “D” or “K” appearing in the third position of the SMR code. Depot sustainment maintenance can be performed by either depot personnel or contractor personnel. A “D” or “K” appearing in the fourth position of the SMR code indicates complete repair is possible at the depot sustainment maintenance level. Items are returned to the supply systems after maintenance is performed at this level.

   The tools and test equipment requirements table (immediately following the MAC) lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from the MAC.

   The remarks table (immediately following the tools and test equipment requirements) contains supplemental instructions and explanatory notes for a particular maintenance function.

MAINTENANCE FUNCTIONS

Maintenance functions are limited to and defined as follows:

1. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel). This includes scheduled inspection and gaugings and evaluation of cannon tubes.

2. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards on a scheduled basis, i.e., load testing of lift devices and hydrostatic testing of pressure hoses.

3. Service. Operations required periodically to keep an item in proper operating condition; e.g., to clean (includes decontamination, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases. This includes scheduled exercising and purging of recoil mechanisms. The following are examples of service functions:

    a. Unpack. To remove from packing box for service or when required for the performance of maintenance operations.

    b. Repack. To return item to packing box after service and other maintenance operations.

    c. Clean. To rid the item of contamination.

    d. Touch up. To spot paint scratched or blistered surfaces.

    e. Mark. To restore obliterated identification.

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

5. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

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

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

8. Paint (ammunition only). To prepare and spray color coats of paint so that the ammunition can be identified and protected. The color indicating primary use is applied, preferably, to the entire exterior surface as the background color of the item. Other markings are to be repainted as original so as to retain proper ammunition identification.

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

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

NOTE

The following definitions are applicable to the “repair” maintenance function:

- Services. Inspect, test, service, adjust, align, calibrate, and/or replace.
- Fault location/troubleshooting. The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or Unit Under Test (UUT).
- Disassembly/assembly. The step-by-step breakdown (taking apart) of a spare/functional group coded item to the level of its least component, that is assigned an SMR code for the level of maintenance under consideration (i.e., identified as maintenance significant).
- Actions. Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.

11. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

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

EXPLANATION OF COLUMNS IN THE MAC

Column (1) Group Number. Column (1) lists Functional Group Code (FGC) numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the Next Higher Assembly (NHA).

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

Column (3) Maintenance Function. Column (3) lists the functions to be performed on the item listed in column (2). (For a detailed explanation of these functions refer to “Maintenance Functions” outlined above).

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

The symbol designations for the various maintenance levels are as follows:

Field:

C Crew maintenance

F Maintainer Maintenance

Sustainment:

H Below depot maintenance

D Depot maintenance

NOTE

The “L” maintenance level is not included in column (4) of the MAC. Functions to this level of maintenance are identified by work time figure in the “H” column of column (4), and an associated reference code is used in the REMARKS column (6). This code is keyed to the remarks and the SRA complete repair application is explained there.

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

Column (6) Remarks Code. When applicable, this column contains a letter code, in alphabetical order, which is keyed to the remarks table entries.

EXPLANATION OF COLUMNS IN THE TOOLS AND TEST EQUIPMENT REQUIREMENTS

Column (1) - Tool or Test Equipment Reference Code. The tool or test equipment reference code correlates with a code used in column (5) of the MAC.

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

Column (3) - Nomenclature. Name or identification of the tool or test equipment.

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

Column (5) - Tool Number. The manufacturer’s part number.

EXPLANATION OF COLUMNS IN THE REMARKS

Column (1) - Remarks Code. The code recorded in column (6) of the MAC.

Column (2) - Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC.

END OF TASK

END OF WORK PACKAGE

MAINTENANCE ALLOCATION CHART (MAC)

Table 1. Maintenance Allocation Chart (MAC) for M-ATV.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT REFERENCE CODE	(6) REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
01	ENGINE							
0100	Engine Assembly	Service		4.0			19, 44, 53	
		Replace		40.0			8, 9, 19, 26, 33, 39,44, 46	
0102	Crankshaft Rear Oil Seal	Replace		42.0			6, 19, 25, 27, 44	
0103	Flexplate	Replace		42.0			44, 53	
0106	Engine Oil Filter	Replace		1.0			19, 44, 46	
03	Fuel System							
0302	Prime Fuel System	Service	0.5					
0304-01	Air Cleaner Assembly (M1240/M1245)	Replace		2.0			44	
0304-02	Air Cleaner Assembly (M1240A1)	Replace		2.5			44	
0304-03	Air Filter	Replace		.5			44	
0304-04	Air Intake Hoses (M1240/ M1245)	Replace		3.0			44, 46	
0305	Turbocharger Assembly	Replace		6.0			44	
0306-01	Fuel Lines	Replace		10.0			19, 44	
0306-02	Fuel Tank	Replace		12.0			20, 44	
0309-01	Fuel Filter	Replace		.5			44, 46	
0309-02	Fuel/Water Separator Base	Replace		.5			44	
0309-03	Fuel/Water Separator Filter	Replace		1.0			44, 46	
04	Exhaust System							
0401-01	Exhaust Pipe (M1240/M1245)	Replace		4.0			44	
0401-02	Exhaust Pipe (M1240A1)	Replace		4.0			44	

Table 1. Maintenance Allocation Chart (MAC) for M-ATV.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT REFERENCE CODE	(6) REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
0401-03	Muffler (M1240/M1245)	Replace		6.0			44	
0401-04	Muffler (M1240A1)	Replace		6.0			19, 44	
05	Cooling System							
0501-01	Charge Air Cooler	Replace		10			44	
0501-02	Coolant Reservoir	Replace		1.0			19, 44	
0501-03	Cooling System (Reservoir Equipped)	Service		2.0			19, 44	
0501-04	Cooling System (Surge Tank Equipped)	Service		2.0			19, 44	
0501-05	Cooling System Assembly and Supports	Replace		14.0			19, 44, 63	
0501-06	Radiator and Transmission Oil Cooler	Replace		8.0			19, 44	
0501-07	Surge Tank	Replace		2.0			19, 44	
0502-01	Cooling Shroud	Replace		6.0			19, 44	
0502-02	Radiator Baffle	Replace		4.0			19, 44, 46	
0503	Thermostat	Replace		3.0			44	
0504-01	Water Pump Belt	Adjust		6.0			21, 44	
		Replace		7.0			44	
0505-01	Fan and Fan Shroud	Replace		5.0			44, 53, 55	
0505-02	Fan Clutch	Replace		7.0			44	
06	Electrical System							
0601-01	Alternator Drive Belt	Replace		7.5			44	
0601-02	Alternator	Replace		7.0			44, 51	
0602	Voltage Regulator	Replace		1.0			44	
0603	Starter	Replace		10.0			19, 44	

Table 1. Maintenance Allocation Chart (MAC) for M-ATV.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT REFERENCE CODE	(6) REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
0605	Ignition Relay	Replace		2.0			44	
0606	Reset Circuit Breaker	Service	0.5					
0607-01	Circuit Breaker, Auxiliary	Replace		1.0			44	
0607-02	Circuit Breaker, Dash	Replace		1.0			44	
0607-03	Dash Control, HVAC	Replace		1.0			44	
0607-04	Deicer Circuit Breaker	Replace		1.5			44	
0608-01	Battery Disconnect Switch	Replace		2.0			44, 50	
0608-02	Engine Electronic Control Module (ECM)	Replace		6.0			44	
0608-03	NATO Slave Receptacle	Replace		2.0			44	
0608-04	Vehicle Interface Module (VIM)	Replace		4.0			44	
0609-01	Blackout Drivelight	Replace		1.0			44	
0609-02	Check-6 Rear Composite Light	Replace		1.0			44	
0609-03	Clearance Lights	Replace		1.0			44	
0609-04	Front Composite Light	Replace		1.0			44	
0609-05	Headlight	Replace		1.0			44	
0609-06	Infrared (IR) Light (M1245)	Replace		2.5			44	
0609-07	Rear Composite Light	Replace		1.0			44	
0609-08	Reverse Light	Replace		1.0			44	
0609-09	Spotlight	Replace		1.0			44	
0609-10	Spotlight Controller (Front)	Replace		2.0			44	

Table 1. Maintenance Allocation Chart (MAC) for M-ATV.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT REFERENCE CODE	(6) REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
0609-11	Spotlight Controller (Rear)	Replace		2.0			44	
0612-01	Battery (M1240/ M1240A1)	Replace		1.0			19, 44, 46, 55	
0612-02	Battery (M1245)	Replace		1.0			19, 44, 46, 55	
0612-03	Battery Cover	Replace	0.5	0.5			44	
0612-04	Battery Isolator	Replace		1.0			44, 55	
0612-05	Battery PDU Box (M1245)	Replace		3.0			44	
0612-06	PDU Deck Box (M1245)	Replace		2.0			44, 46	
0613-01	12-Volt Power Converter (Driver Side)	Replace		1.0			44	
0613-02	12-Volt Power Converter (Passenger Side)			1.0			44	
0613-03	Dimmer	Replace		1.0			44	
0613-04	Flasher	Replace		1.0			44	
0613-05	Transmission Control Module (TCM)	Replace		2.5			44	
0613-06	Wiring Harness	Repair		1.0			11, 12, 17, 19, 31, 44,59, 60, 61	
0615	EMI Filter	Replace		1.0			44	
07	Transmission							
0700-01	Transmission (M1240/M1245)	Service		8.0			19, 44, 53	
		Replace		40.0			8, 9, 19, 26, 33, 39, 44, 46	
0700-02	Transmission (M1240A1)	Service		16.0			19, 44, 53	
0700-03	Transmission Spring Support and Bracket (M1240/M1245)	Replace		6.0			44, 46	

Table 1. Maintenance Allocation Chart (MAC) for M-ATV.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT REFERENCE CODE	(6) REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
0700-04	Transmission Spring Support and Bracket (M1240A1)	Replace		12.0			44, 46	
0721-01	Transmission Breather (M1240/M1245)	Replace		5.0			44	
0721-02	Transmission Breather (M1240A1)	Replace		10.0			44	
0721-03	Transmission Cooler (M1240/M1245)	Replace		16.0			19, 44	
0721-04	Transmission Cooler (M1240A1)	Replace		20.0			19, 44	
0721-05	Transmission Filter (M1240/M1245)	Replace		9.0			19, 44	
0721-06	Transmission Filter (M1240A1)	Replace		18.0			19, 44	
08	Transfer and Final Drive							
0801-01	Transfer Case Assembly	Replace		25.0			42, 44, 46, 51	
		Service		0.7			19, 44, 49	
0801-02	Transfer Case Shift Stop Switch	Replace		13.0			19, 22, 44	
09	Propeller Shafts							
0900	Propeller Shafts	Replace		15.0			44, 51, 53, 64	
10	Front Axle							
1000-01	Axle Differential	Service		1.0			19, 44	
1000-02	Inner Shaft	Replace		5.0			19, 44, 51	
1002-01	Differential Housing and Differential	Replace		25.0			19, 44, 46	
1002-02	Differential Lock	Replace		2.0			44	
1002-03	Differential Yoke and Seal	Replace		5.0			1, 19, 44	

Table 1. Maintenance Allocation Chart (MAC) for M-ATV.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT REFERENCE CODE	(6) REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
1004-01	Control Arm Ball Joint	Replace		10.0			7, 10, 44, 52	
1004-02	Halfshaft and Seal	Replace		3.0			14, 19, 44, 46, 51, 53	
1004-03	Jounce Bumper	Replace		1.0			19, 44, 51	
1004-04	Knuckle	Replace		10.0			1, 44, 52	
1004-05	Rebound Bumper	Replace		1.5			19, 44, 51	
1004-06	Upper and Lower Control Arm	Replace		8.0			14, 19, 44	
11	Rear Axle							
1100-01	Axle Differential	Service		1.0			19, 44	
1100-02	Inner Shaft	Replace		5.0			19, 44, 51	
1102-01	Differential Housing and Differential	Replace		20.0			19, 44, 46	
1102-02	Differential Lock	Replace		2.0			44	
1102-03	Differential Yoke and Seal	Replace		2.0			1, 19, 44, 55, 56, 57, 58	
1104-01	Control Arm Ball Joint	Replace		10.0			7, 10, 44, 52	
1104-02	Halfshaft and Seal	Replace		3.0			14, 19, 44, 46, 51, 53	
1104-03	Jounce Bumper	Replace		1.0			19, 44, 51	
1104-04	Knuckle	Replace		10.0			1, 44, 52	
1104-05	Rebound Bumper	Replace		1.5			19, 44, 51	
1104-06	Upper and Lower Control Arm	Replace		8.0			14, 19, 44	
12	Brakes	Inspect		2.0			44, 63	
		Adjust		2.5			44, 63	
1202-01	Anti-Lock Brake System (ABS) Electronic Control Unit (ECU)	Replace		13.0			44	
1202-02	Brake Drum	Replace		2.0			44, 63	
1202-03	Brake Shoe	Replace		1.0			44, 47	

Table 1. Maintenance Allocation Chart (MAC) for M-ATV.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT REFERENCE CODE	(6) REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
1204-04	Spider/Spindle	Replace		8.0			14, 19, 44, 51	
1208-01	Air Dryer	Replace		14.0			44	
1208-02	Air Dryer Filter	Replace		1.0			44	
1208-03	Air Pressure Alarm	Replace		1.0			44	
1208-04	Air Reservoir Check Valve	Replace		8.0			44, 46	
1208-05	Air Reservoir (Primary) (Four Tank System)	Replace		8.0			19, 44	
1208-06	Air Reservoir (Secondary) (Four Tank System)	Replace		8.0			44	
1208-07	Air Reservoir (Secondary) (Two Tank System)	Replace		12.0			19, 44	
1208-08	Air Reservoir (Supply No. 1) (Four Tank System)	Replace		9.0			44	
1208-09	Air Reservoir (Supply No. 2) (Four Tank System)	Replace		10.0			44	
1208-10	Air Reservoir (Supply/ Primary) (Two Tank System)	Replace		18.0			19, 44	
1208-11	Air Solenoid Manifolds	Replace		2.0			44	
1208-12	Anti-Lock Brake System (ABS) Valve (Axle No. 1)	Replace		6.0			44	
1208-13	Anti-Lock Brake System (ABS) Valve (Axle No. 2)	Replace		4.0			44	

Table 1. Maintenance Allocation Chart (MAC) for M-ATV.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT REFERENCE CODE	(6) REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
1208-14	Automatic Traction Control (ATC) Valve Double Check Valve	Replace		.7			44	
1208-15	Automatic Traction Control (ATC) Valve	Replace		1.5			44	
1208-16	Brake Chamber (Axle No. 1)	Replace		2.0			44	
1208-17	Brake Chamber (Axle No. 2)	Replace		2.0			44	
1208-18	Parking Brake Stoplight Switch	Replace		1.0			44	
1208-19	Pressure Protection Valve (Emergency Supply)	Replace		16.0			44	
1208-20	Pressure Protection Valve (Secondary Air Reservoir)	Replace		16.0			44	
1208-21	Pressure Switch	Replace		1.0			44	
1208-22	Quick Release Valve (Axle No. 1)	Replace		18.0			44, 51	
1208-23	Quick Release Valve (Axle No. 2)	Replace		1.0			44	
1208-24	Rear Glad Hands Quick Release Valve	Replace		2.5			44	
1208-25	Safety (Relief) Valve	Replace		1.0			44	
1208-26	Service Brake Relay Double Check Valve	Replace		3.0			44	
1208-27	Service Brake Relay Valve	Replace		3.0			44	
1208-28	Spring Brake Double Check Valve	Replace		.7			44	

Table 1. Maintenance Allocation Chart (MAC) for M-ATV.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT REFERENCE CODE	(6) REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
1208-29	Spring Brake Relay Valve	Replace		3.0			44	
1208-30	Spring Brake Valve	Replace		11.0			44	
1208-31	Stoplight Switch	Replace		1.0			44	
1208-32	Tractor Protection Valve	Replace		2.0			44	
1208-33	Drain Air System	Service	0.5					
1208-34	Air System	Test		0.5			5, 44, 66	
1209-01	Air Compressor	Replace		9.0			44	
1209-02	Air Governor	Adjust		0.5			44	
		Replace		1.0			44	
13	Wheels and Tracks							
1311-01	Hub	Repair		18.0			15, 44	
		Replace		16.0			38, 44, 48, 51	
1311-02	Wheel End	Replace		5.0			19, 44, 49	
		Service		1.0			19, 44	
1311-03	Wheel/Tire Assembly	Replace		1.0				
		Service		4.0				
1311-04	Spare Tire Unstow/Stow (For 395/85R20 Spare Tire Carrier)			0.5			19, 44	
1311-05	Spare Tire Unstow/Stow (For Upgraded Spare Tire Carrier)			0.5			19, 44	
1311-06	Spare Tire Unstow/Stow (M1245)			0.5			19, 44	
1313-01	Tire Inflate/ Deflate	Service	0.5					
1313-02	Snow Chains	Replace	1.0					
14	Steering							
1401-01	Pitman Arm	Replace		2.0			19, 44, 52	

Table 1. Maintenance Allocation Chart (MAC) for M-ATV.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT REFERENCE CODE	(6) REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
1401-02	Steering Arm	Replace		10.0			19, 44, 52	
1401-03	Steering Column and Bracket	Replace		6.0			44	
1401-04	Steering Wheel	Replace		2.0			19, 44, 53	
1401-05	Tie Rod	Replace		12.0			19, 44, 51	
1401-06	Toe Control Link (Axle No. 1)	Replace		2.0			19, 44, 51	
1401-07	Toe Control Link (Axle No. 2)	Replace		2.0			19, 44, 51	
1401-08	Upper Steering Shaft	Replace		2.0			44, 49	
1404-01	Lower Steering Shaft	Replace		5.0			44	
1404-02	Middle Steering Shaft	Replace		16.0			44	
1407-01	Primary Steering Gear	Replace		30.0			19, 44	
1407-02	Secondary Steering Gear	Replace		30.0			19, 44	
1407-03	Steering Gear Mitre	Replace		6.0			44, 53	
1407-04	Steering Gear Relief	Adjust		2.0			44	
1407-05	Steering Gear Tray	Replace		26.0			19, 44	
1410	Power Steering Pump	Replace		4.0			19, 44	
1413-01	Power Steering Filter	Replace		2.0			44	
1413-02	Power Steering Reservoir and Bracket	Replace		7.0			19, 44	
		Service		11.0			19, 44	
15	Frame, Towing Attachments, and Drawbars							
1501-01	Front Bumper (Standard SPARK)	Replace		15.0			19, 44	

Table 1. Maintenance Allocation Chart (MAC) for M-ATV.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT REFERENCE CODE	(6) REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
1501-02	Front Bumper (Updated SPARK)	Replace		15.0			19, 44	
1501-03	Push Bumper (M1245)	Replace		2.0			19, 41, 44, 52	
1501-04	Rear Crossmember (M1240/ M1240A1)	Replace		13.0			44	
1501-05	Skid Plate	Replace		4.0			44, 46, 52	
1501-06	Spark Bar and Strut (Updated SPARK)	Replace		4.0			19, 44	
1504-01	Tire Carrier (M1245)	Replace		4.0			44	
1504-02	Tire Carrier (For 395/85R20 Spare Tire Carrier)	Replace		2.0			19, 44	
1504-03	Tire Carrier (For Upgraded Spare Tire Carrier)	Replace		3.0			19, 44	
16	Springs and Shock Absorbers							
1601	Coil Spring and Seat	Replace		4.0			13, 19, 44	
1604-01	Shock Absorber (M1240/M1245)	Replace		1.0			4, 19, 44, 51	
1604-02	Shock Absorber (M1240A1)	Replace		1.5			2, 3, 6, 7, 12, 23, 30, 44	
18	Body, Cab, Hood, and Hull							
1801-01	Antenna Platform (M1240/ M1240A1)	Replace		3.0			18, 44, 63	
1801-02	B-Pillar Handle	Replace		.5			44	
1801-03	Belly Deflector Crossmember Weldment	Replace		16.0			44	

Table 1. Maintenance Allocation Chart (MAC) for M-ATV.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT REFERENCE CODE	(6) REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
1801-04	Capsule Armor	Replace		4.5			44	
1801-05	Capsule Door	Replace		3.0			40, 44	
1801-06	Capsule Step (M1240/M1245)	Replace		1.0			44	
1801-07	Capsule Step (M1240A1)	Replace		2.0			18, 44, 46	
1801-08	Center Belly Deflector Panel (M1240/M1245)	Replace		4.0			44, 46	
1801-09	Coupler Box (M1240/ M1240A1)	Replace		.5			44	
1801-10	Crew Vehicle Receiver/ Jammer (CVRJ) Box (M1240/ M1240A1)	Replace		1.0			44	
1801-11	Dash Panel, Air System	Replace		1.0			44	
1801-12	Dash Panel, CTIS	Replace		1.0			44	
1801-13	Dash Panel, Instrument Panel	Replace		3.0			19, 44, 62	
1801-14	Dash Panel, Transmission	Replace		1.0			44	
1801-15	Dash	Replace		8.0			44	
1801-16	Driver Side Belly Deflector Panel (M1240/ M1245)	Replace		8.0			44, 46	
1801-17	Driver Side Splash Guard (AFES Nitrogen Detection)	Replace		2.0			44	
1801-18	Driver Side Splash Guard (AFES Linear Wire Detection)	Replace		2.5			44	
1801-19	Engine Belly Deflector Panel	Replace		10.0			44, 46	

Table 1. Maintenance Allocation Chart (MAC) for M-ATV.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT REFERENCE CODE	(6) REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
1801-20	Front Wheel Well Deflector Panel (M1240A1)	Replace		4.0			19, 44, 46	
1801-21	Hood (AFES Nitrogen Detection)	Replace		14.0			36, 41, 44, 46	
1801-22	Hood (AFES Linear Wire Detection)	Replace		16.0			44, 54, 63	
1801-23	Hood and Grill (M1245)	Replace		16.0			44, 46, 49	
1801-24	Hood Latch	Replace		1.0			44	
1801-25	Litter Door Dyneema Panel (M1245)	Replace		3.0			44	
1801-26	Passenger Side Belly Deflector Panel (M1240/ M1245)	Replace		8.0			44, 45	
1801-27	Passenger Side Engine Panel (M1240/M1245)	Replace		1.0			44	
1801-28	Passenger Side Splash Guard (AFES Nitrogen Detection)	Replace		2.0			44	
1801-29	Passenger Side Splash Guard (AFES Linear Wire Detector)	Replace		2.0			44	
1801-30	Rear Capsule Doors (M1245)	Replace		6.0			44	
1801-31	Rear Cargo Door Dyneema Panel (M1245)	Replace		3.0			44	
1801-32	Rear Wall Dyneema Panel (M1245)	Replace		3.0			44	

Table 1. Maintenance Allocation Chart (MAC) for M-ATV.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT REFERENCE CODE	(6) REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
1801-33	Rear Wheel Well Deflector Panel, Driver Side (M1240A1)	Replace		6.0			19, 44, 46	
1801-34	Rear Wheel Well Deflector Panel, Passenger Side (M1240A1)	Replace		8.0			19, 44, 46	
1801-35	Side Wall Dyneema Panel (M1245)	Replace		3.0			44	
1801-36	Spotlight Bracket	Replace		1.0			44	
1801-37	Underbody Improvement and Belly Deflector Armor Panels (M1240A1)	Replace		12.0			2, 19, 35, 44, 46, 52, 53, 65	
1801-38	Wheel Well Deflector Panel (M1240/M1245)	Replace		2.0			19, 44	
1802-01	Capsule Window	Replace		2.0			37, 44, 49	
1802-02	Capsule Windshield (M1240/ M1240A1)	Replace		10.0			18, 44	
1802-03	Front Mud Flap (Mud Protection)	Replace		1.0			44	
1802-04	Rear Fender Extension (Mud Protection)	Replace		1.0			44	
1806-01	5th Seat (M1245)	Replace		2.0			44	
1806-02	Floor Mat Replacement	Replace		.5			44	
1806-03	Gunner Platform	Adjust		.5			44	

Table 1. Maintenance Allocation Chart (MAC) for M-ATV.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT REFERENCE CODE	(6) REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
1806-04	Gunner Platform Mat (M1240A1)	Replace		1.0			44	
1806-05	Seat (M1240/M1245)	Replace		2.0			44	
1806-06	Seat, Front (M1240A1)	Replace		2.0			19, 44, 46, 51, 53	
1806-07	Seat, Rear (M1240A1)	Replace		8.0			19, 44, 46, 51, 53	
1806-08	Seatbelt, Driver (M1240/M1245)	Replace		2.0			44, 53	
1806-09	Seatbelt (M1240A1)	Replace		2.0			19, 44, 53	
1806-10	Seatbelt, Passenger (M1240/M1245)	Replace		1.5			44, 53	
1810-01	Cargo Deck Litter Door (M1245)	Replace		2.0			44	
1810-02	Cargo Deck Litter Door Frame (M1245)	Replace		4.0			44	
1810-03	Cargo Deck Rear Door (M1245)	Replace		3.0			44	
1810-04	Cargo Deck Rear Wall (M1245)	Replace		6.0			44	
1810-06	Cargo Deck (M1240/ M1240A1)	Replace		20.0			19, 44, 46, 55, 63	
1810-07	Cargo Deck (M1245)	Replace		18.0			38, 44, 49	
1810-08	Cargo Deck Side Wall (M1245)	Replace		9.0			44	
1810-09	GFE Cabinet (M1245)	Replace		3.0			44	
1810-10	Quick Lock Floor (M1245)	Replace		4.0			44	

Table 1. Maintenance Allocation Chart (MAC) for M-ATV.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT REFERENCE CODE	(6) REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
19	Turret						44	
1901	Gunner Harness Retractor	Replace		2.0			44	
1905	Mk-44 Receptacle (M1245)	Replace		1.0			44	
20	Winch							
2001-01	Winch Cable Guide and Guard	Replace		1.5			44	
2001-02	Winch Cable	Replace		1.0			44	
2001-03	Winch (Standard SPARK)	Replace		3.0			19, 44	
2001-04	Winch/Front Crossmember (Updated SPARK)	Replace		4.5			19,36, 44, 51, 63	
2001-05	Winch Cable (Updated SPARK)	Replace		1.0			5, 16, 19, 44, 46, 55	
22	Auxiliary Items							
2202-01	Auxiliary Mirror	Replace		1.0			19, 44, 55	
2202-02	Check-6 Control Boxes	Replace		1.0			44	
2202-03	Lower Plenum	Replace		1.0			44	
2202-04	Mirror	Replace		.5			44	
2202-05	Windshield Wiper Arm	Replace		.5			44	
2202-06	Windshield Wiper Motor	Replace		4.0			44	
43	Hydraulic, Fluid, Air and Vacuum System							
4317-01	CTIS Manifold	Replace		13.0			44	
4317-02	CTIS Quick Release Valve, Axle No. 1	Replace		14.0			44	

Table 1. Maintenance Allocation Chart (MAC) for M-ATV.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT REFERENCE CODE	(6) REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
4317-03	CTIS Quick Release Valve, Axle No. 2	Replace		2.0			44	
52	Air Conditioning Components	Service		3.0			29, 45	
5200-01	Air Conditioner Compressor (Original Compressor)	Replace		4.5			19, 44	
5200-02	Air Conditioner Compressor (Updated Compressor)	Replace		4.5			19, 44	
5200-03	Air Conditioner Drive Belt	Replace		1.0			44	
5200-04	Air Conditioner Leak Detection	Replace		3.0			24, 45	
5230	Air Conditioner Condenser	Replace		8.0			44	
5247-01	Air Conditioner Receiver/Dryer	Replace		4.0			19, 44	
5247-02	HVAC (Front)	Replace		15.0			45, 53, 54	
5247-03	HVAC (Rear) (M1240/ M1240A1)	Replace		8.0			45, 53, 55	
5247-05	HVAC (Rear) (M1245)	Replace		10.0			44	
76	Fire Fighting Equipment							
7639-01	Aerosol Generator (AFES Four Generator System)	Replace		1.0			44	
7639-02	Aerosol Generator (AFES Five Generator System)	Replace		1.0			44	

Table 1. Maintenance Allocation Chart (MAC) for M-ATV.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT REFERENCE CODE	(6) REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
7639-03	Fire Suppression System Capsule Cylinder (Platform Mount)	Replace		2.0			44	
7639-04	Fire Suppression System Capsule Cylinder (Wall Mount) (M1240/ M1240A1)	Replace		2.0			19, 44	
		Inspect		2.5			32	
7639-05	Fire Suppression System Chassis Switch	Replace		1.0			44	
7639-06	Fire Suppression System Control	Replace		1.0			44	
7639-07	Fire Suppression System Control Head Adapter	Replace		2.0			44	
7639-08	Fire Suppression System Front Optical Sensor	Replace		1.0			44	
7639-09	Fire Suppression System Power Supply	Replace		1.0			44	
7639-10	Fire Suppression System Rear Optical Sensor	Replace		1.0			44	

Table 1. Maintenance Allocation Chart (MAC) for M-ATV.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT REFERENCE CODE	(6) REMARKS CODE
			FIELD		SUSTAINMENT			
			CREW	MAINTAINER	BELOW DEPOT	DEPOT		
			C	F	H	D		
7639-11	Fire Suppression System Sensor Line (Front) (AFES Nitrogen Detection)	Replace		2.0			44	
7639-12	Fire Suppression System Sensor Line (Rear) (AFES Nitrogen Detection)	Replace		10.0			44	
7639-13	Fire Suppression System Tube and Diffuser (Wall Mount)	Replace		0.5			19, 44	
7639-14	Fire Suppression System Undercarriage (AFES Nitrogen Detection)	Service		1.0			28, 44	
7639-15	Fire Suppression System Undercarriage Cylinder (AFES Nitrogen Detection)	Replace		3.0			44	
7639-16	Fire Suppression System Undercarriage Cylinder (AFES Linear Wire Detection)	Replace		4.8			19, 44, 55, 62	
7639-17	Fire Suppression System Line Replacement Chart, Undercarriage (AFES Nitrogen Detection)	Replace		3.0			44	

Table 1. Maintenance Allocation Chart (MAC) for M-ATV.

(1)	(2)	(3)	(4) MAINTENANCE LEVEL				(5)	(6)
			FIELD		SUSTAINMENT			
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	CREW	MAINTAINER	BELOW DEPOT	DEPOT	TOOLS AND EQUIPMENT REFERENCE CODE	REMARKS CODE
			C	F	H	D		
7639-18	Fire Suppression System Line Replacement Chart, Undercarriage (AFES Linear Wire Detection)	Replace		3.0			44	
7639-19	Fire Suppression Systems	Test		3.0			43, 44	

Table 2. Tools and Test Equipment for M-ATV

Tool or Test Equipment	Maintenance Level	Nomenclature	National Stock Number	Tool Number
1	F	52 MM Socket		9SIA0PZ05V5602
2	F	Adapter Kit, Transmission Jack	4910-01-602-9693	95SK415
3	F	Adapter, Torque Wrench, 30 mm		GSRM430
4	F	Adapter, Torque Wrench, 5/8 in.	5120-01-367-3583	SRES20
5	F	Ball Valve, 3/8 in	4820-00-541-5198	16B100
6	F	Bolt, Crankshaft Seal Installer	5306-01-360-2004	1U-7596
7	F	Boot Driver	2520-01-481-0382	3369823
8	F	Bracket, Transmission Holding	2590-01-475-7886	J35926-A
9	F	Bracket, Transmission Lifting	5340-01-475-3497	J41445
10	F	Crimping Tool, Terminal Hand	5120-01-374-8836	J-38852
11	F	Driver, Bearing 2 In.	5120-01-480-2320	3061982
12	F	Driver, Bearing, 60 MM	5120-01-485-3173	3351597
13	F	Driver, Seal, CTIS	5330-01-480-2323	2209580
14	F	Elbow, Quick Disconnect	4730-01-572-5350	KV2L07-36S

Table 2. Tools and Test Equipment for M-ATV (Continued)

Tool or Test Equipment	Maintenance Level	Nomenclature	National Stock Number	Tool Number
15	F	Extractor, Electrical Connector Plug	5120-01-485-3155	2HB267
16	F	Eye Bolt	5306-01-529-6523	3100T11
17	F	Forward Repair System	4940-01-533-1621	SC4940-95-E42
18	F	Gauge, Belt Tension	6635-01-093-3710	BT-33-73F
19	F	Inflation Tool Kit	5220-01-609-4755	MS120011133
20	F	Kit, Leak Detection	4940-01-521-4469	TLK-100BZ/FB
21	F	Locator Assembly	4910-01-362-2331	1328772
22	F	Locknut	5310-01-479-0716	3266310
23	F	Nut Assembly	5310-01-038-8318	9S8858
24	F	Recharge Kit, Fire Extinguisher	4210-01-582-3743	600213
25	F	Reclaimer, Refrigerant	4250-01-411-7240	17800B
26		Regulator, Torpedo	1045-00-433-7957	3200300
27	F	Remover, Electrical Connector	5120-01-394-0296	305193
28	F	Scale, Weighing	6670-01-522-7835	TIF9010A
29	F	Screw	5305-01-305-6078	1536340
30	F	Seal Installer	5120-01-372-8799	1U-7594
31	F	Setscrew, Plain Cup, M24-3.0x50 mm Din 916	5305-01-599-0240	27KP516
32	F	Shackles	4030-01-586-0713	5340000467-00
33	F	Single Stud Ring	5306-01-529-6523	3100T11
34	F	Sling Assembly	3940-01-209-6008	
35	F	Socket, Turning Tool, Engine	4910-01-548-0012	178-8615
36	F	Spline Cover	5120-01-480-2322	3301788
37	F	Strap, 20 Ft	5340-01-586-0830	EEZ-903PMEX20
38	F	Strap, Ratchet	3990-01-542-1553	8834T48
39	F	Test Kit, AFES	4210-01-579-5981	19263-01
40	F	Tool Kit, General Mechanic's	5180-01-548-7634	PD484
41	F	Tool Kit, Refrigeration Equipment	5180-00-596-1474	SC 5180-90-CL-N18

Table 2. Tools and Test Equipment for M-ATV (Continued)

Tool or Test Equipment	Maintenance Level	Nomenclature	National Stock Number	Tool Number
42	F	Tool Set, SATS Base	4910-01-490-6453	SC4910-95-A81
43	F	Tool, Removal, Brake Return Spring	5120-01-480-2324	3350279
44	F	Wrench, Spindle Nut	5120-01-480-2328	3298841
45	F	Wrench, Torque, 20-100 Ft-Lb, 3/8" Drive	5120-01-400-0237	AS28431
46	F	Wrench, Torque, 40-200 In-Lb, 3/8" Drive	5120-01-400-0233	6064A
47	F	Wrench, Torque, Dial, 1/4" Drive, 30 In-Lb		KTC S0986
48	F	Wrench, Torque, Dial, 3/8" Drive, 300 In-Lb		KTC S0987
49	F	Yoke and Flange Holder	5120-01-166-0573	J-3456
50	F	Nut	5310-01-063-8970	95862
51	F	Screw	5305-01-352-2049	1754290
52	F	Remover Electrical Connector	5120-01-374-8969	J-36400-5
53	F	Remover Electrical Connector	5120-01-015-2154	91019-3
54	F	Remover Electrical Connector	5120-01-353-2534	J-33095-1
55	F	Cap and Plug Set	5340-00-450-5718	10935405
56	F	Strap, Nylon, 60 in.	5340-01-599-0238	3967774
57	F	Crow Foot Attachment, Socket Wrench, 9/16 in.	5120-01-335-1152	FC 018A
58	F	Elbow, Pipe to Tube	4730-01-599-0179	3953273
59	F	Maintenance Support Device (MSD)	6625-01-573-3383	DG-MRAP-CDK

Table 3. Remarks for M-ATV.

Remark Code	Remarks
-	No Remarks

END OF WORK PACKAGE

EXPENDABLE AND DURABLE ITEMS LIST

SCOPE

This work package lists expendable and durable items needed to operate and maintain the M-ATV.

EXPLANATION OF COLUMNS

a. Column (1) - Item Number. This number is assigned to the entry in the listing and may be referenced in Initial Setup area to identify the material.

b. Column (2) - National Stock Number. This is the National Stock Number assigned to the item; use it to request or requisition the item.

c. Column (3) - Description/Part Number (CAGEC). Indicates the Federal Item name, part number, and the Commercial and Government Entity (CAGE) Code.

d. Column (4) - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by two-character alphabetical abbreviations (e.g., EA, IN, PR). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Table 1. Expendable and Durable Items List.

(1) Item Number	(2) National Stock Number	(3) Description/Part Number (CAGEC)	(4) U/M
1	8040-00-148-7182	Adhesive 5 oz Tube	TU
2	8040-01-517-1610	Adhesive (Novagard) RTV200-257, (00CE9)	
3		Adhesive-Sealant, Loctite 515	
	5330-01-325-6993	515, (05972), 6-milliliter tube	EA
	8030-01-137-6964	51531, (05972), Ten 50-milliliter tubes	BX
	8030-01-262-3560	51574, (05972), 300-milliliter tube	TU
4	8040-00-843-0802	Adhesive-Sealant, Silicone, RTV (MIL-A-46106A) RTV108-2.8 oz, (01139), 2.8-ounce cartridge	KT
5	8040-01-566-0125	Adhesive, Sika #221 Gray 1490170, (45152)	
6	8040-01-250-3969	Adhesive, Thread Locking, Loctite 242 242, (05972), 50 ml Bottle	BT
7		Antifreeze, Ethylene Glycol (60%), Inhibited Type 1B	
	6850-01-464-9266	1 gal, A-A-52624 (58536)	GL
	6850-01-464-9263	5 gal, A-A-52624 (58536)	CO
	6850-01-464-9096	55 gal, A-A-52624 (58536)	DR

Table 1. Expendable and Durable Items List. (Continued)

(1) Item Number	(2) National Stock Number	(3) Description/Part Number (CAGEC)	(4) U/M
8	5975-01-273-8133	Cable Ties (Strap, Tiedown, Electrical Components) MS3367-3, (96906)	HD
9	5340-00-450-5718	Cap and Plug Set 10935405, (19207)	EA
10	5970-01-551-5155	Connector, Lubricant, Nyogel 760G 2200400 (45152)	EA
11	8010-01-523-1208	Coating, Primer TG-12	
12	8010-01-521-8653	Compound, Anti-Corrosion Spray 2233850, (45152), 11-oz spray can	
13	6850-01-515-2449	Compound, Anti-Corrosion VCI 325 3450736, (45152)	EA
14	8030-01-450-4009	Compound, Corrosion Preventative TG-1, (05SA2)	OZ
15	8030-01-166-0675	Compound, Sealing, Loctite 567 567 (05972)	TU
16	8030-01-218-0321	Compound, Sealing MS-PTS-50, (02570), 50 milliliter Tube	TU
17	8040-01-042-1422	Compound, Sealing, Flowable 1204 RTV Prime Coat (71984), 1 pint can	PT
18	8040-01-009-1562	Silicone, Sealant, Primer (Dow Coating 1204), (27963) Compound, Sealing, Flowable MIL-A-46146 (81349)	KT
19	8030-01-104-5392	Silicone, Sealant, Sealant (Dow Coating 3140), (81349) Compound, Sealing, Loctite 242, Type 2, Grade N 24221, (05981), Ten 10-Milliliter bottles	BX
	8030-01-025-1692	MIL-S-46163, (81349), 250-Milliliter centimeter bottle	BT
	8030-01-014-5869	MIL-S-46163, (81349), 50-Milliliter centimeter bottle	BT
20	8030-01-054-0740	Compound, Sealing, Loctite 592 (321410), Ten 50-Milliliter tubes	BX
21	8030-01-211-9576	Compound, Sealing, Torque F-1000, (01195)	OZ

Table 1. Expendable and Durable Items List. (Continued)

(1) Item Number	(2) National Stock Number	(3) Description/Part Number (CAGEC)	(4) U/M
22		Cleaning Compound, Solvent, Type II	
	6850-01-474-2319	MIL-PRF-680 (81349), 1-gallon can	GL
	6850-01-474-2317	MIL-PRF-680 (81349), 5-gallon can	CO
	6850-01-474-2316	MIL-PRF-680 (81349), 55-gallon drum	DR
23	5320-01-599-0178	Fastener Tape, Hook and Pile, 50 yards 3797012 (45152)	EA
24		Grease, Automotive and Artillery (GAA) (MIL-G-10924)	
	9150-01-197-7688	M-10924-A, (81349), 2-1/4-ounce tube	TU
	9150-01-197-7693	M-10924-B, (81349), 14-ounce cartridge	CA
	9150-01-197-7690	M-10924-C, (81349), 1-3/4-ounce can	CN
	9150-01-197-7689	M-10924-D, (81349), 6-1/2-pound can	CN
	9150-01-197-7692	M-10924-E, (81349), 35-pound can	CN
	9150-01-197-7691	M-10924-F, (81349), 120-pound drum	DR
25	9150-00-076-1587	Grease, Lubriplate LUBRIPLATE110, (73219), 8-ounce tube	TU
26	5970-01-342-1742	Heatshrink 603314-4, (00779)	EA
27	6810-01-075-5546	Isopropyl, Rubbing Alcohol 4 oz Bottle	BT
28	9505-00-191-3680	Lockwire (Wire, Nonelectrical) ASTM A853, (81349)	LB
29	9150-00-111-3199	Lubricating, Oil, Engine, Grade 10 M21260-3-10W, (81349), 5 GL	CN
30	9150-00-111-0208	Lubricating, Oil, Engine, Grade 10 MIL-PRF-21260, (81349), 55-gallon drum	DR
31	9150-00-111-0209	Lubricating, Oil, Engine, Grade 30 M21260-3-30W, (81349), 5-gallon can	CN
32	9150-00-111-0210	Lubricating, Oil, Engine, Grade 30 M21260-4-30W, (81349), 55-gallon drum	DR
33	7930-01-585-0017	Lubricant and Cleaning Compound 8T-2998, (11083)	EA
34	5970-01-551-5155	Lubricant, Connector 2200400, (45152)	EA
35		Oil, Lubricating, Gear GO 75 (MIL-L-2105)	
	9150-01-035-5390	M2105-1-75W, (81349), 1-quart can	QT
	9150-01-035-5391	MIL-PRF-2105, (81349), 5-gallon can	CN
36	9150-01-035-5393	Oil, Lubricating, Gear, GO 80W/90 (MIL-L-2105C) J2360, (81343), 5-gallon can	CN

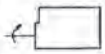
Table 1. Expendable and Durable Items List. (Continued)

(1) Item Number	(2) National Stock Number	(3) Description/Part Number (CAGEC)	(4) U/M
37		Oil, Lubricating, Gear GO 85W/140 (MIL-L-2105)	
	9150-01-035-5395	J2360, (81343), 5-gallon can	CN
	9150-01-035-5396	J2360, (81343), 55-gallon drum	DR
38		Oil, Lubricating, OE/HDO 40 (SAE 40) (MIL-L-2104)	
	9150-01-518-9477	MIL-PRF-2104, (81349), 1-quart can	QT
39	6640-01-128-9471	Paper, Lens	PG
40		Rag, Wiping Cotton	
	7920-00-205-1711	50 lbs Bale	BE
41	9150-01-546-5096	Refrigerant, Compressor Lubricating Oil	GL
42		Solution, Soap	
	7930-00-497-1582	MILW15000ClassC, (81349), 1-quart bottle	QT
43		Tags, Identification, White	
	8135-00-178-9200	8135-00-178-9200, (80244), 1000 per carton	BX
44		Tape, Insulation, Electrical	
	5970-00-644-3167	TL83, (80063), 3/4 inch wide, 1020 inch long	RO
45	6810-01-412-6362	Tetrafluoroethane, Technical, R-134A, 30 lbs	CY

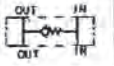
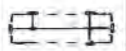
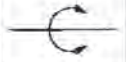
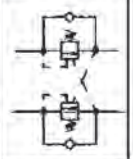
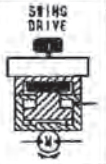
END OF WORK PACKAGE

SCHEMATICS SYMBOLS

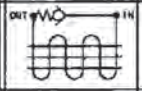
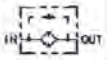
EXPLANATION OF OSHKOSH TRUCK CORPORATION
AIR SCHEMATIC SYMBOLS

OTC SYMBOL	DEFINITION	OTC SYMBOL	DEFINITION
	AIR REGUALTOR VALVE		SPRING BRAKE VALVE
	MANIFOLD		BULKHEAD FITTING
	AIR BAG		QUICK RELEASE VALVE
	PARKING BRAKE VALVE TRACTOR/TRAILER		DUAL TREADLE VALVE
	AIR GOVERNOR		AIR COMPRESSOR
	TRACTOR PROTECTION VALVE		COALESCING FILTER
	AFTERCOOLER		

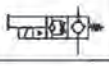
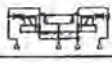
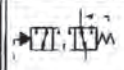
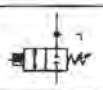
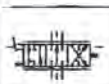
EXPLANATION OF OSHKOSH TRUCK CORPORATION
HYDRAULIC SCHEMATIC SYMBOLS

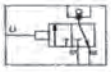
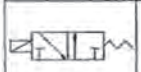
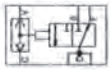
OTC SYMBOL	DEFINITION	OTC SYMBOL	DEFINITION
	SHUTTLE VALVE/DOUBLE CHECK		PILOT OPERATED CONTROL VALVE
	NEEDLE VALVE		
	ANTI-CAVITATION MANIFOLD		MANIFOLD
	ACCUMULATOR, GAS CHARGED		ROTATING SHAFT
	CYLINDER		DUAL COUNTERBALANCE/ HOLDING VALVE
	MOTOR AND DRUM		
	MOTOR DRIVEN SWING HOIST WITH BRAKE		SOLENOID DIRECTIONAL CONTROL VALVE 4-WAY 2 POSITION
			SOLENOID DIRECTIONAL CONTROL VALVE 4-WAY 3 POSITION SPOOL TYPE
	MOTOR DRIVEN HOIST DRIVE WITH BRAKE		PRESSURE SWITCH
			SOLENOID DIRECTIONAL CONTROL VALVE 2-WAY 2 POSITION

EXPLANATION OF OSHKOSH TRUCK CORPORATION
HYDRAULIC SCHEMATIC SYMBOLS

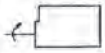
OTC SYMBOL	DEFINITION	OTC SYMBOL	DEFINITION
	STEEL TUBE		NORMALLY CLOSED PRESSURE SWITCH
	WORKING LINE, RETURN LINE AND FEED LINE		VARIABLE DISPLACEMENT, PRESSURE COMPENSATED, TANDEM PUMP
	PILOT CONTROL LINE		FAN MOTOR/FIXED DISPLACEMENT
	ENCLOSURE INDICATES EXTREMITY OF COMPONENT OR ASSEMBLY		HAND PUMP
	VALVE		VARIABLE DISPLACEMENT PUMP
	CHECK VALVE		RESERVOIR
	ORFICE		OIL COOLER WITH CHECK VALVE
	BULKHEAD ADAPTER/FITTING		RESERVOIR RETURN FILTER WITH BYPASS
	QUICK DISCONNECTS WITH CHECKS		FILTER WITH BYPASS
	TEST PORT		FILTER/STRAINER

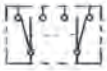
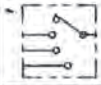
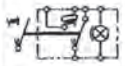
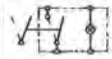
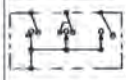
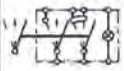
EXPLANATION OF OSHKOSH TRUCK CORPORATION
HYDRAULIC SCHEMATIC SYMBOLS

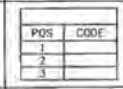
OTC SYMBOL	DEFINITION	OTC SYMBOL	DEFINITION
	SOLENOID DIRECTIONAL CONTROL VALVE 3-WAY 2-POSITION POPPET TYPE		DIRECTIONAL CONTROL SOLENOID VALVE, 2 WAY 2 POSTION, POPPET TYPE, NORMALLY CLOSED
	SOLENOID DIRECTIONAL CONTROL VALVE 2-WAY 2 POSITION		DIRECTIONAL CONTROL VALVE, 3 POSITION, 4 WAY, CLOSED CENTER SPOOL WITH CYLINDER PORTS OPEN TO TANK AT NEUTRAL
	DIFFERENTIAL PRESSURE SENSING VALVE		PILOT OPERATED VALVE, SPOOL TYPE 2 POSTION, 4 WAY
	DIFFERENTIAL PRESSURE SENSING VALVE, FLOW CONTROL, SPOOL TYPE, NORMALLY OPENED		PILOT OPERATED DIRECTIONAL CONTROL VALVE 3-WAY 2-POSITION
	SOLENOID VALVE 4-WAY 2-POSITION SPOOL TYPE		PRIORITY FLOW VALVE
	SOLENOID VALVE 2 WAY, 2 POSITION SPOOL TYPE, NORMALLY OPEN		SOLENOID DIRECTIONAL CONTROL VALVE 2-WAY 2-POSITION POPPET TYPE
	SOLENOID VALVE 2 WAY, 2 POSITION SPOOL TYPE, NORMALLY CLOSED		CHECK VALVE, DIRECT-ACTING WITH THERMAL EXPANSION RELIEF FUNCTION
	CLOSED CENTER SPOOL VALVE		SOLENOID DIRECTIONAL CONTROL VALVE 2-WAY 2-POSITION POPPET TYPE
	PRESSURE SEQUENCE VALVE		
	PRESSURE RELIEF VALVE		

EXPLANATION OF OSHKOSH TRUCK CORPORATION AIR SCHEMATIC SYMBOLS			
OTC SYMBOL	DEFINITION	OTC SYMBOL	DEFINITION
	PRESSURE SWITCH N.O.		BRAKE CHAMBER: SERVICE AND SPRING
	PRESSURE GAUGE		BRAKE CHAMBER: SERVICE
	HAND CONTROL VALVE		SERVICE BRAKE RELAY VALVE
	SOLENOID VAVLE: WITH RETURN SPRING		SPRING BRAKE RELAY VALVE
	HORN		AIR RESERVOIR
	DOUBLE CHECK VALVE		AIR DRYER
	CHECK VALVE: SPRING RETURN		GLAD HAND
	DRAIN VALVE		LOAD SENSING VALVE
	DRAIN VALVE: AUTOMATIC CLOSING		PRESSURE PROTECTION VALVE
	PRESSURE SWITCH N.C.		QUICK RELEASE VALVE

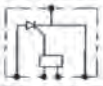
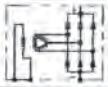
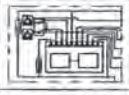
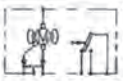
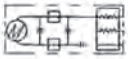
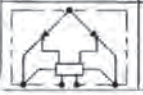
EXPLANATION OF OSHKOSH TRUCK CORPORATION
AIR SCHEMATIC SYMBOLS

OTC SYMBOL	DEFINITION	OTC SYMBOL	DEFINITION
	AIR REGULATOR VALVE		SPRING BRAKE VALVE
	MANIFOLD		BULKHEAD FITTING
	AIR BAG		QUICK RELEASE VALVE
	PARKING BRAKE VALVE TRACTOR/TRAILER		DUAL TREADLE VALVE
	AIR GOVERNOR		AIR COMPRESSOR
	TRACTOR PROTECTION VALVE		COALESCING FILTER
	AFTERCOOLER		

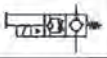
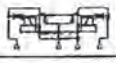
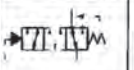
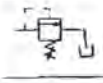
EXPLANATION OF OSHKOSH TRUCK CORPORATION ELECTRICAL SCHEMATIC SYMBOLS			
OTC SYMBOL	DEFINITION	OTC SYMBOL	DEFINITION
	RELAY DIODE SUPPRESSED		SWITCH, ON-OFF-ON DPDT
	RELAY RESISTOR SUPPRESSED		SWITCH, ON-ON SPDT
	RELAY		SWITCH, OFF-ON DPST
	SWITCH, ROTARY OFF-ON-ON-ON		SWITCH, ARCTIC PUMP ILLUMINATED
	SWITCH OFF-ON SPST		PRESSURE SWITCH N.O.
	SWITCH, IGNITION		PRESSURE SWITCH N.C.
	SWITCH, OFF-ON-ON ILLUMINATED		TEMPERATURE SWITCH N.O.
	SWITCH, OFF-ON DIMMER		TEMPERATURE SWITCH N.C.
	SWITCH, DPDT ILLUMINATED		PROXIMITY SENSING SWITCH
	SWITCH, OFF-ON-ON DPDT ILLUMINATED		SWITCH, N.O. SPST FOOT OPERATED

EXPLANATION OF OSHKOSH TRUCK CORPORATION ELECTRICAL SCHEMATIC SYMBOLS			
OTC SYMBOL	DEFINITION	OTC SYMBOL	DEFINITION
	ODOMETER		MULTIPLE CONNECTOR
	SPEEDOMETER, TACHOMETER		CIRCUIT BREAKER
	VERNIER CONTROL		LED - LIGHT EMITTING DIODE
	RESISTOR		TRANSORB DIODE
	DIODE		ZENIOR DIODE
	DIODE PACK		CAPACITOR
	ISOLATOR/DIODE		NAND GATE
	DIODE/RECTIFIER		FUSE
	BATTERY		TRANSISTOR
	INCANDESCENT LAMP (LIGHT BULB)		COIL/RELAY
	CONNECTOR		TIMER
	MOMENTARY SWITCH		SWITCH LOCK (Not Electrical Component)

EXPLANATION OF OSHKOSH TRUCK CORPORATION
ELECTRICAL SCHEMATIC SYMBOLS

OTC SYMBOL	DEFINITION	OTC SYMBOL	DEFINITION
	SWITCH, N.O. DRIVE LINE LOCK		REVERSE POLARITY PROTECTION 200 AMP
	COIL		ALTERNATOR, 145 AMP
	GAUGE		ALTERNATOR, 200 AMP
	HEATING ELEMENT		SENSOR
	SENDING UNIT, TEMPERATURE		SENSOR, ADJUSTABLE
Ⓖ	SPEEDOMETER GENERATOR		SENSOR, VARIABLE
Ⓜ	MOTOR		MAG SWITCH
	ALARM		TURN SIGNAL FLASHER
	MOTOR, WIPER		MOTOR, SUPPRESSED VARIABLE SPEED
	DUVAC CONTROLLER WITH REVERSE POLARITY PROTECTION 145 AMP		SOLENOID - VALVE

EXPLANATION OF OSHKOSH TRUCK CORPORATION
HYDRAULIC SCHEMATIC SYMBOLS

OTC SYMBOL	DEFINITION	OTC SYMBOL	DEFINITION
	SOLENOID DIRECTIONAL CONTROL VALVE 3-WAY 2-POSITION POPPET TYPE		DIRECTIONAL CONTROL SOLENOID VALVE, 2 WAY 2 POSITION, POPPET TYPE, NORMALLY CLOSED
	SOLENOID DIRECTIONAL CONTROL VALVE 2-WAY 2 POSITION		DIRECTIONAL CONTROL VALVE, 3 POSITION, 4 WAY, CLOSED CENTER SPOOL WITH CYLINDER PORTS OPEN TO TANK AT NEUTRAL
	DIFFERENTIAL PRESSURE SENSING VALVE		PILOT OPERATED VALVE, SPOOL TYPE 2 POSTION, 4 WAY
	DIFFERENTIAL PRESSURE SENSING VALVE, FLOW CONTROL, SPOOL TYPE, NORMALLY OPENED		PILOT OPERATED DIRECTIONAL CONTROL VALVE 3-WAY 2-POSITION
	SOLENOID VALVE 4-WAY 2-POSITION SPOOL TYPE		PRIORITY FLOW VALVE
	SOLENOID VALVE 2 WAY, 2 POSITION SPOOL TYPE, NORMALLY OPEN		SOLENOID DIRECTIONAL CONTROL VALVE 2-WAY 2-POSITION POPPET TYPE
	SOLENOID VALVE 2 WAY, 2 POSITION SPOOL TYPE, NORMALLY CLOSED		CHECK VALVE, DIRECT-ACTING WITH THERMAL EXPANSION RELIEF FUNCTION
	CLOSED CENTER SPOOL VALVE		SOLENOID DIRECTIONAL CONTROL VALVE 2-WAY 2-POSITION POPPET TYPE
	PRESSURE SEQUENCE VALVE		
	PRESSURE RELIEF VALVE		

END OF WORK PACKAGE

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS

For use of this form, see AR 25-30; the proponent agency is OAASA.

Use Part II *(reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).

DATE
Date you filled out this form.

TO *(Forward to proponent of publication or form) (Include ZIP Code)*
U.S. Army TACOM Life Cycle Management Command
ATTN: AMSTA-LCL-MPP/TECH PUBS, MS 727
6501 E. 11 Mile Road, Warren, MI 48397-5000

FROM *(Activity and location) (Include ZIP Code)*
Your mailing address

PART I – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM Number	*Date of the TM*	*Title of the TM*

ITEM	PAGE	PARA-GRAPH	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON (Exact wording of recommended change must be given)
	0007-3					*Figure 2, Item 9 should show a lockwasher. Currently shows a flat washer.*
	0018-2					*Cleaning and inspection, Step 6, reference to governor support pin (14) is wrong reference. Reference should be change to (12).*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
Your Name	*Your Phone Number*	*Your Signature*

TO *(Forward direct to addressee listed in publication)*	**FROM** *(Activity and location) (Include ZIP Code)*	**DATE**
U.S. Army TACOM Life Cycle Management Command ATTN: AMSTA-LCL-MPP/TECH PUBS, MS 727 6501 E. 11 Mile Road, Warren, MI 48397-5000	*Your Address*	*Date you filled out this form*

PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER	DATE	TITLE
TM Number	*Date of the TM*	*Title of the TM*

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III – REMARKS *(Any general remarks, or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
Your Name	*Your Phone Number*	*Your Signature*

APD V4.00

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PART I – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 9-2355-335-23-2	28 February 2013	MAINTENANCE MANUAL FOR MINE RESISTANT AMBUSH PROTECTED VEHICLE

	PAGE	PARA-GRAPH	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON

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TO *(Forward direct to addressee listed in publication)*	**FROM** *(Activity and location) (Include ZIP Code)*	**DATE**
U.S. Army TACOM Life Cycle Management Command ATTN: AMSTA-LCL-MPP/TECH PUBS, MS 727 6501 E. 11 Mile Road, Warren, MI 48397-5000		

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By Order of the Secretary of the Army:

RAYMOND T. ODIERNO
General, United States Army
Chief of Staff

Official:

JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army

1300303

By Order of the Secretary of the Air Force:

JANET C. WOLFENBARGER
General, United States Air Force
Commander, AFMC

MARK A. WELSH, III
General, United States Air Force
Chief of Staff

Distribution:

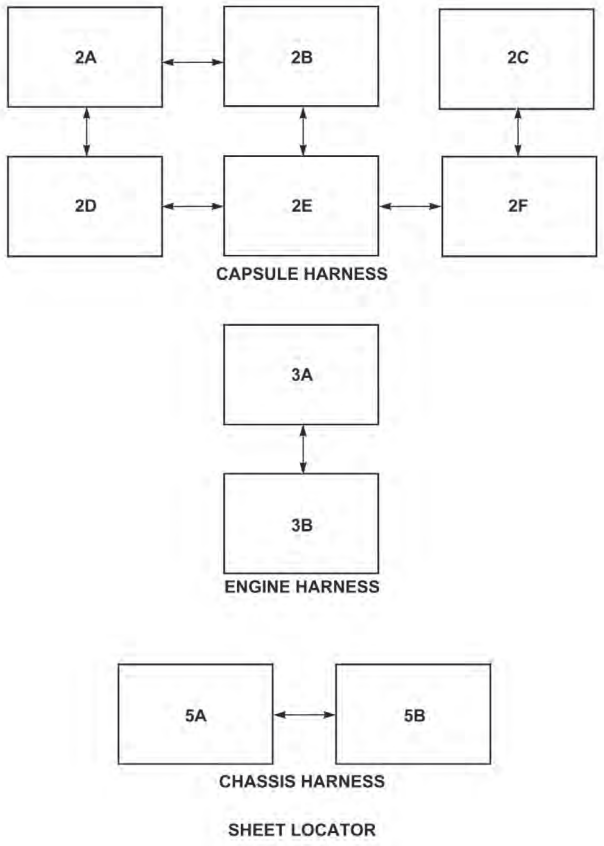
To be distributed in accordance with the initial distribution number (IDN) 381253 requirements for TM 9-2355-335-23-2.

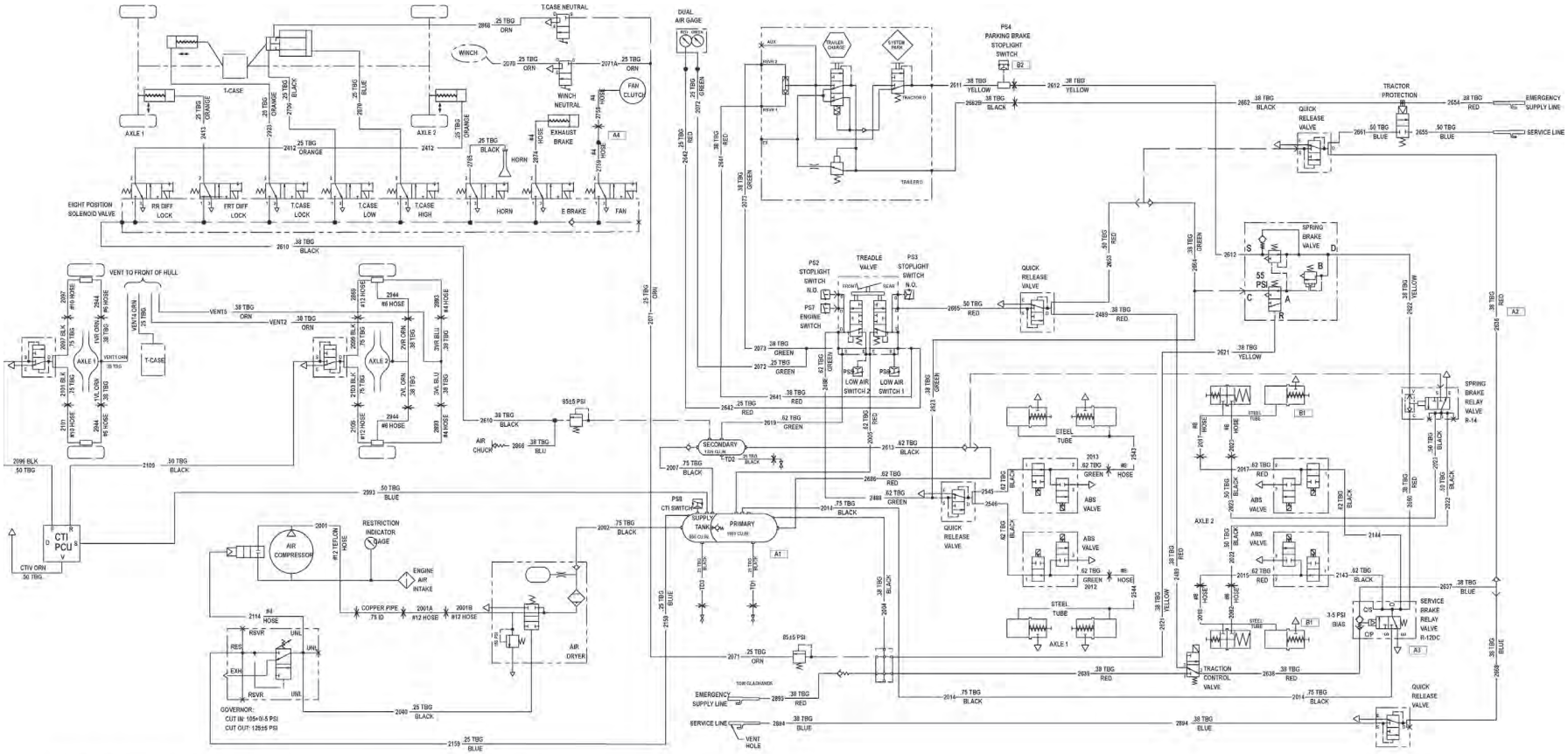
SCHEMATICS FOR M-ATV M1240/M1240A1

CAUTION

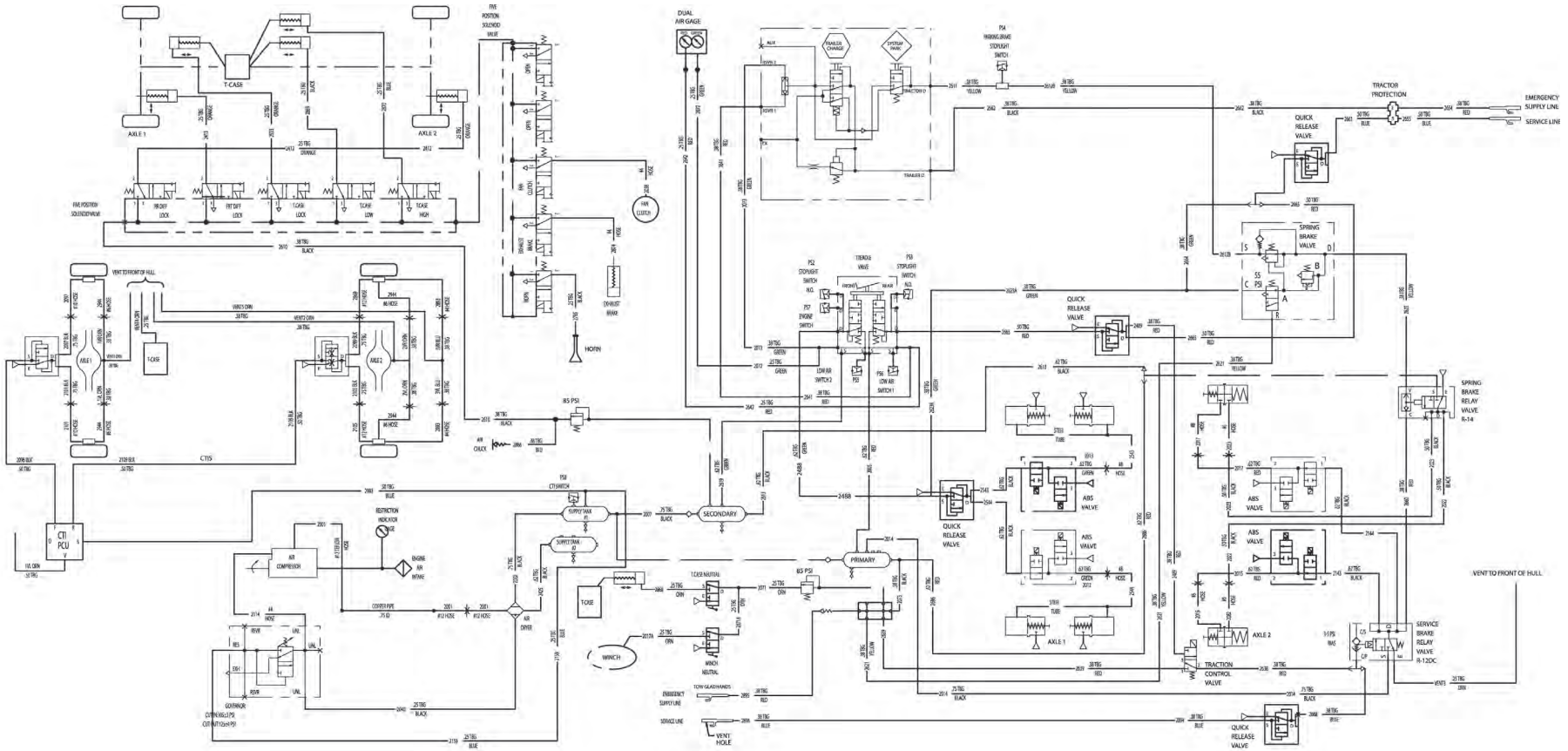
Schematics contained in this section are for M-ATV M1240/M1240A1. Do not use these schematics for any other model. Failure to comply may result in damage to equipment.

TABLE OF SCHEMATICS:



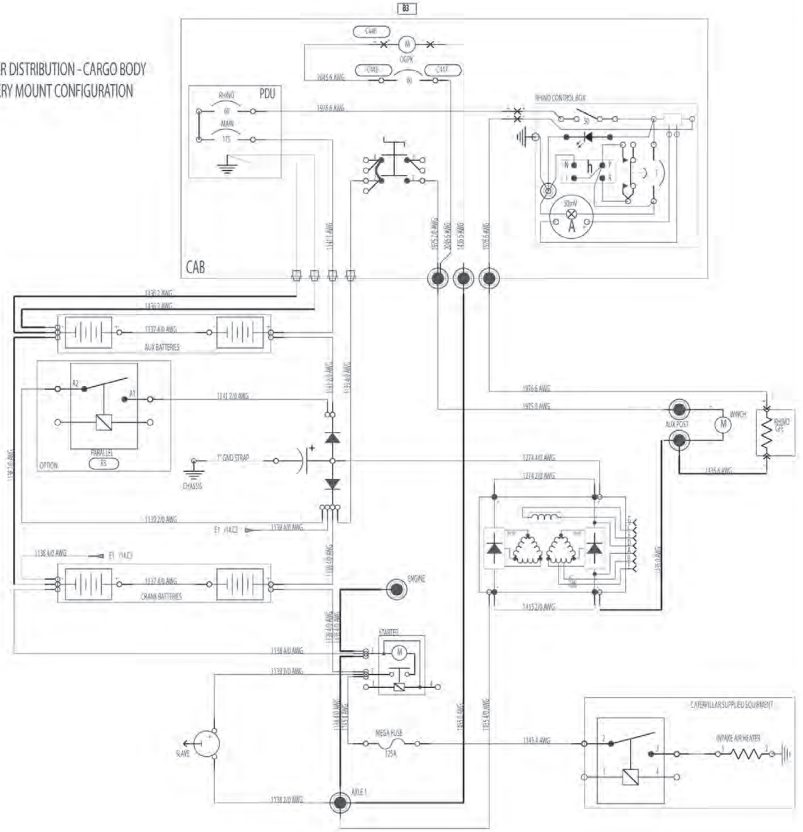


M-ATV AIR SCHEMATIC SHEET 1-A (TWO AIR TANK SYSTEM) (M1240/M1240A1)



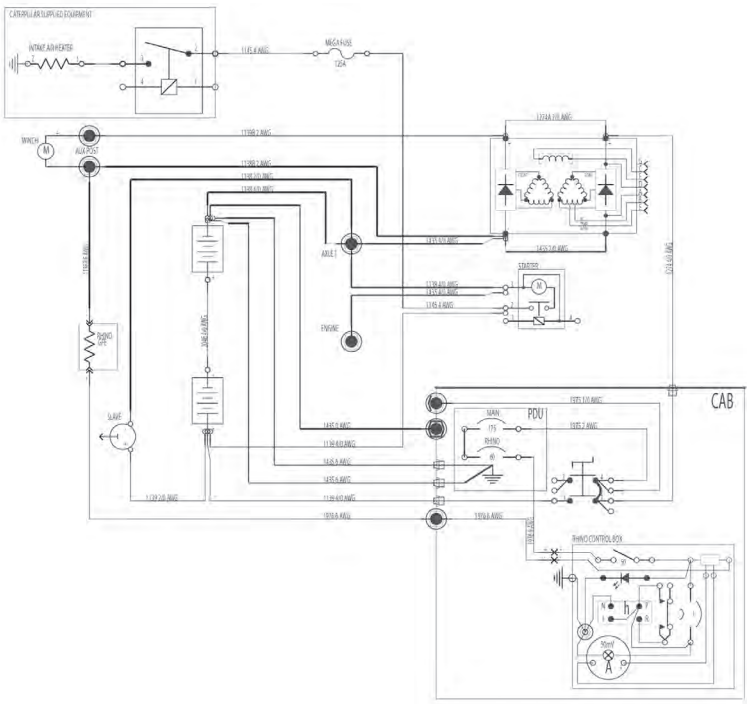
M-ATV SCHEMATIC SHEET 1-B (FOUR AIR TANK SYSTEM) (M1240/1240A1)

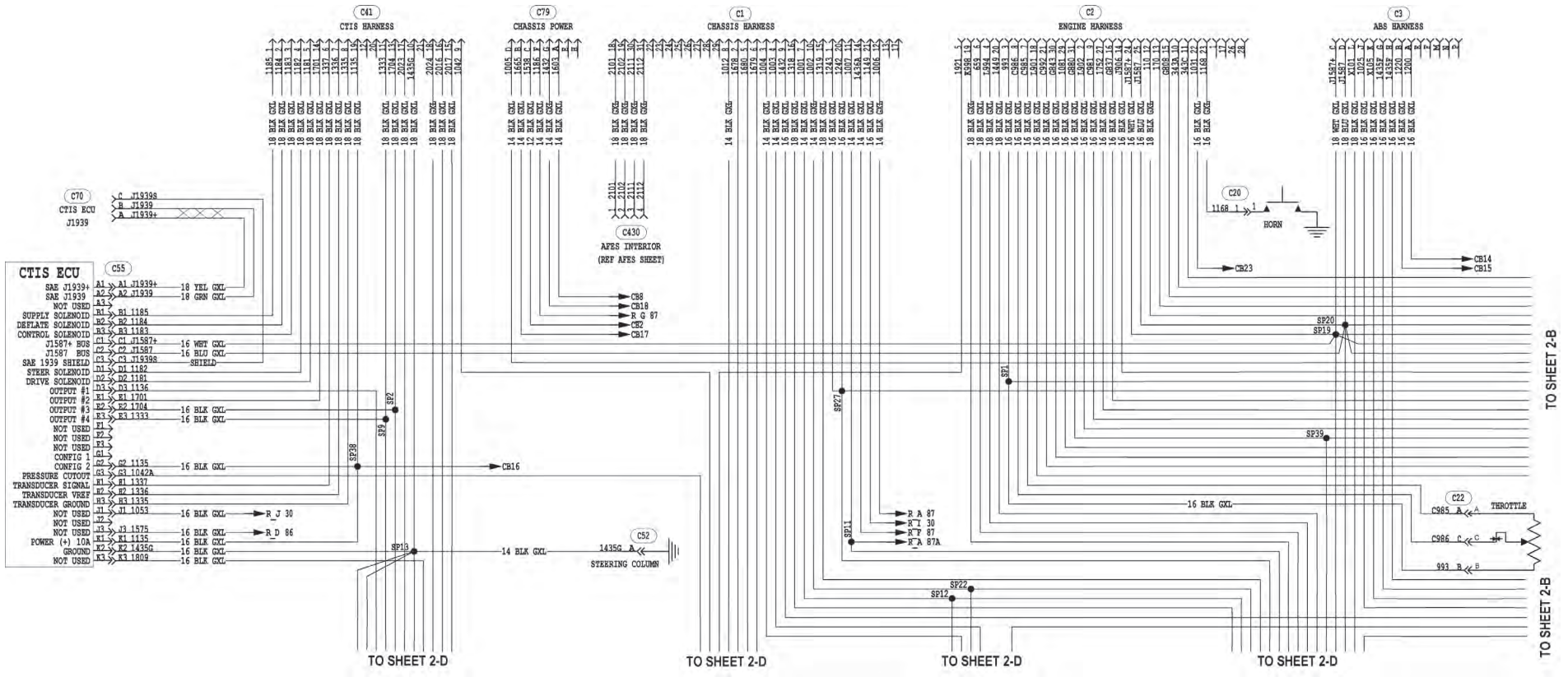
POWER DISTRIBUTION - CARGO BODY
BATTERY MOUNT CONFIGURATION



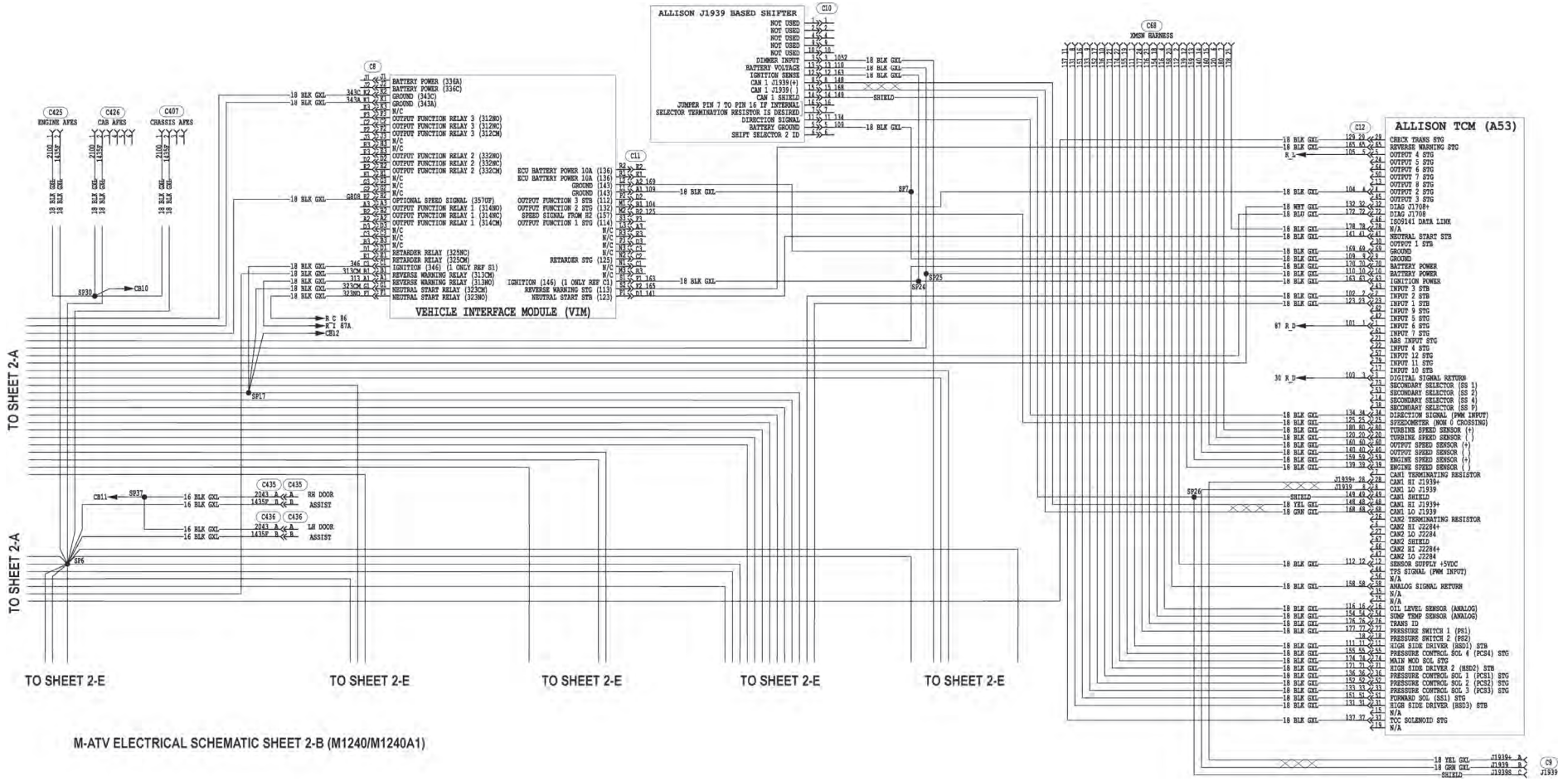
M-ATV ELECTRICAL SCHEMATIC SHEET 2 (M1240/M1240A1)

POWER DISTRIBUTION - FRONT BUMPER
BATTERY MOUNT CONFIGURATION





M-ATV ELECTRICAL SCHEMATIC SHEET 2-A (M1240/M1240A1)



M-ATV ELECTRICAL SCHEMATIC SHEET 2-B (M1240/M1240A1)