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**ORGANIZATIONAL AND DIRECT SUPPORT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LISTS)**

FOR

**ARMY OIL ANALYSIS SAMPLING VALVES,
ARMY OIL ANALYSIS PROGRAM,
NONAERONAUTICAL EQUIPMENT
(COMBAT, TACTICAL, AND SPECIAL PURPOSE VEHICLES)**

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Technical Manual
NO.9-2300-422-23&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 13 February 1985

ORGANIZATIONAL AND DIRECT SUPPORT MAINTENANCE MANUAL
FOR
ARMY OIL ANALYSIS SAMPLING VALVES
ARMY OIL ANALYSIS PROGRAM
NONAERONAUTICAL EQUIPMENT
(COMBAT, TACTICAL, AND SPECIAL PURPOSE VEHICLES)

Current as of November 1984

REPORTING OF ERRORS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander, US Army Tank-Automotive Command, ATTN: AMSTA-MB, Warren, Michigan 48090. A reply will be furnished to you.

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CHAPTER 1

INTRODUCTION

Section I. GENERAL INFORMATION

1-1. Purpose

These instructions are published for use by organizational and direct support maintenance units. These instructions are published in support of the Army Oil Analysis Program (AOAP) for Tank-Automotive equipment only (non-aeronautical). This TM is not intended to be inclusive of AOAP instructions for equipment other than Tank-Automotive combat, tactical and/or special purpose vehicles. Policies, objectives, and responsibilities described herein are in accordance with AR 750-22, **MAINTENANCE OF SUPPLIES AND EQUIPMENT, Army Oil Analysis Program**. These instructions are applicable to all commands, units, installations, and activities which operate or provide maintenance support for equipment under proponentcy of the US Army Tank-Automotive Command (TACOM).

1-2. Scope

This manual provides instructions for installation and maintenance of Army Oil Analysis Program sampling valves. Instructions provided are for specific vehicles or Family of Vehicles (FOV). The scope of this manual also includes information on the oil analysis program itself as well as the status of all tank-automotive equipment and their components with regard to AOAP. Repair parts for all available sampling valves and valve kits used on combat, tactical, and special purpose vehicles are provided as Appendix B. To assist soldiers in locating installation and maintenance for specific vehicles, a

model reference index is published at the beginning of each of the three vehicle sections. The model reference index for combat vehicles is found on page 2-3. The model reference index for tactical vehicles is on page 2-27. The model reference index for special purpose vehicles is on page 2-61.

1-3. Maintenance Forms and Records

General maintenance forms as well as procedures for their use are contained in DA PAM 738-750, **The Army Maintenance Management System (TAMMS)**. Sample forms and records applicable to the Army Oil Analysis Program are provided in this TM as Appendix C. Instructions for use of these forms and records are contained in Technical Bulletin, TB 43-0210, **Nonaeronautical Equipment, Army Oil Analysis Program (AOAP)** and in DA PAM 738-750.

1-4. Reporting Equipment Improvement Recommendations (EIR)

EIR's can be submitted by anyone who is aware of an unsatisfactory condition with sampling valve kits, their design or use. It is not necessary to show a new design or to list a better way to perform a procedure. Simply tell why the current design is unfavorable or why a procedure is difficult. EIR's can be submitted on DA Form SF368 (Quality Deficiency Report). Mail this form directly to: Commander, US Army Tank-Automotive Command (TACOM), ATTN: AMSTA-M, Warren, Michigan 48090. A reply will be furnished to you.

Section II. DESCRIPTION AND DATA

1-5. General

Unit participation in the Army Oil Analysis Program is mandatory. This is because AOAP reduces Army vehicle maintenance costs. AOAP also reduces equipment down-time, increases unit readiness, and saves oil resources. Safety of personnel is also an important benefit of this program, which can prevent failure of major vehicle components such as a vehicle engine or transmission. AOAP prevents component failure by early detection of potential damage and by providing units with information as to the possible cause of this damage.

This section is presented for the general information of users. It is intended to describe the Army Oil Analysis Program, how it works, and why AOAP is important to the continued readiness of their unit. AOAP sampling methods, procedures for processing samples, lab reports, and unit responses to the lab reports are all critical elements of this program. Definitions and abbreviations often associated with this program are presented. The list of vehicles and their components affected by AOAP are published in this section in table format as easy references for use by maintenance personnel.

1-6. Army Oil Analysis Program (AOAP)

AOAP is a program of "preventive maintenance" whereby potentially costly damage to major vehicle components is discovered before such damage occurs. This is done by Army lab technicians who analyze oil samples sent to them by maintenance units. These technicians then compare results of their tests with comparable data available to them.

Oil analysis lab findings are returned to the maintenance unit along with the lab's recommendations. Findings, for example, may indicate unusually high levels of dust or dirt in the oil. In such cases, the lab will inform the maintenance unit that dust levels in the oil is abnormal. The lab will also note that the most likely cause of this condition is a faulty air induction system. The maintenance unit can then act on this information. It can locate and repair the problem before the problem causes major damage to the component. It is in this way that AOAP is considered "preventive maintenance".

Lab reports can also inform maintenance units that the oil sample submitted is "fine" and that wearmetals suspended in the oil sample are perfectly normal. In such cases the recommendation would be to **leave the oil as is**. This continued use of good lubricants in a well-operating component saves maintenance units time, money, and resources. This differs from the old **hard-time service interval policy** wherein oil is changed regardless of its condition after so many miles, hours of operation, or calendar months.

1-7. Exclusions/Warranty Provisions

Not all tank-automotive vehicles are affected by AOAP. Vehicles with gasoline engines, for example, are not included in the oil analysis program for several reasons:

- Gasoline vehicles are now being converted to multifuel or diesel engine vehicles.
- The number of gasoline vehicles is decreasing.
- Uneven effects of lead in gasoline on engine oil makes oil comparisons difficult.

The combination of the above reasons makes it impractical to include gasoline vehicles in the oil analysis program. However, when gas-powered vehicles are converted to multifuel or diesel, the converted vehicles are in AOAP.

A second major category of vehicles not included in the oil analysis program are vehicles under a manufacturer's warranty which specifically prohibits attachment of sampling valves or the use of a hose and pump on the component under warranty. In addition, a typical warranty will require specific oil service intervals, including scheduled oil changes. In order to honor such provisions, these vehicles are excluded from AOAP until the warranty expires.

If a vehicle warranty does not prohibit taking of oil samples, such samples can be taken and units can act upon the preventive maintenance recommendations of the analysis lab. In such cases, hard time oil service intervals are still honored under the terms of the warranty.

It is the responsibility of using units to know what vehicles are excluded or limited with regard to AOAP because of warranty provisions. Using units must also know when a vehicle warranty expires. These units are required to initiate AOAP as soon after expiration of the warranty as is practical.

1-8. AOAP Sampling Procedures

There are two methods for maintenance units to obtain oil samples. The best method is through a sampling valve installed on the vehicle. Use of a sampling valve takes less time. It is also easier for soldiers to use, and it provides a truer sample of a component's oil for the lab to analyze. Sampling valves for most vehicles are available in kit form. Refer to table 1-1 through table 1-3 for information on AOAP sampling valve kits now available for combat, tactical, and special purpose vehicles.

If a vehicle is not equipped with a sampling valve, the next best method of taking oil samples is by using the oil sampling pump, NSN 4930-01-119-4030. Every organizational and direct support maintenance unit should take steps to install sampling valve kits on their unit's vehicles whenever possible. When such kits are not available and the unit has vehicles without valves, maintenance units should have the oil sampling pump available and know how to use it.

a. Using the Oil Sampling Pump

CAUTION

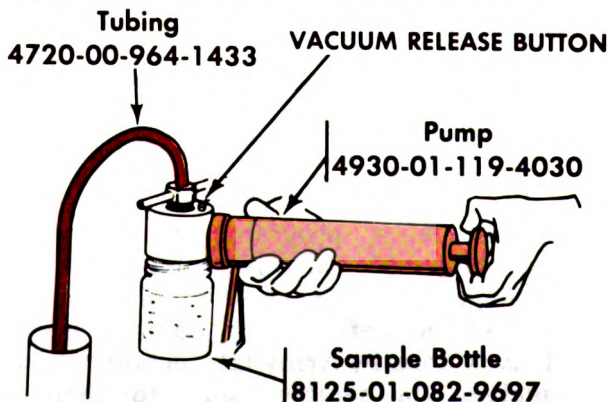
AOAP depends upon good oil samples. Extra care must be taken when using the oil sampling pump so as not to contaminate the sample with sludge or carbon deposits.

NOTE

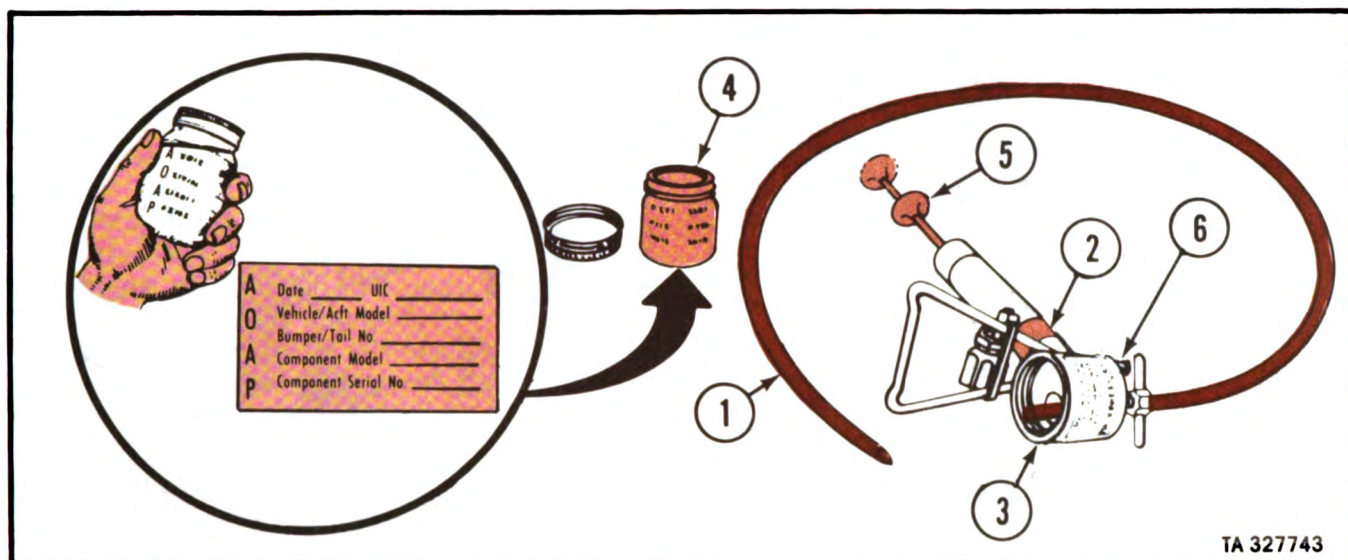
Use of syringe, NSN 6515-00-727-008, is no longer an acceptable AOAP procedure. The syringe method is officially superseded by the sampling pump method described below.

NOTE

This procedure requires the sampling pump as well as an oil sample bottle (NSN 8125-01-082-9697) and a length of 1/4-in OD plastic tubing (NSN 4720-00-964-1433).



Typical Procedure using Oil Sampling Pump
TA 327742



TA 327743

(1) Obtain a length of plastic tubing (1) at least ten inches longer than the dipstick of the vehicle being sampled. Cut one end of the tube straight across. Cut the opposite end at an angle. This angle-cut will help prevent unwanted contamination of the sample.

(2) Install the straight-cut end of the plastic tube (1) into the "T" handle part of the sampling pump (2). The tube (1) should be inserted until it protrudes through the opposite end and about flush with the rim (3) of the pump. When hose is in position, tighten "T" handle to secure the hose in place during sampling.

(3) Install sampling bottle (4) to the rim (3) of the sampling pump.

(4) Push in the plunger handle (5) of the sampling pump (2).

(5) Start vehicle engine before taking a sample if the vehicle has not been operated within the last seven days or if the temperature around the vehicle is below 35°F (1.7°C). Shut off vehicle engine after normal operating temperature is reached.

(6) Remove filler cap or dipstick from the component being sampled. Refer to the vehicle LO for service location.

(7) Very carefully insert the angle-cut end of the plastic tubing into the filler neck or dipstick tube. Be especially careful not to touch bottom. If available, ask an assistant to hold the tube in place until the sample is taken.

(8) Pull out plunger handle (5) in one even motion. This action will draw oil from the component and into the sampling bottle. If necessary, slowly push plunger handle back and repeat the motion. Continue this step until sampling bottle is filled to about 1/2-inch from the top.

CAUTION

Do not overfill sampling bottle. Overfilling will contaminate the sampling pump. Keep sample level until bottle is capped.

(9) After sample is taken, push in sampling pump vacuum release button (6). This will allow oil still in the tube (1) to return to the component.

(10) Keeping the sample level, carefully remove and cap bottle (4).

(11) Slowly remove length of plastic tube (1) from the component.

(12) Loosen "T" handle and remove plastic tubing (1) from sampling pump (2). Discard tubing.

b. Using a Sampling Valve:

NOTE

It is not necessary to start engine if the vehicle has been operated in the past thirty days and/or if the temperature is above 35°F (1.7°C).

(1) If necessary, start engine of vehicle being sampled. Refer to the vehicle's Operator's Manual for start-up instructions, **WARNINGS**, and **Cautions**.

(2) Use a clean, available container (7) to drain about 1-pint of oil from the vehicle component sampling valve (8). This is to assure that the actual sample taken will be fresh from the component and not left over from the last time the oil was sampled. After draining, close valve (8) and set the container (7) aside.

(3) Place an AOAP sampling bottle (9) under drain part and open valve (8). Drain oil until sampling bottle is filled to about 1/2-inch from the top. Close valve (8) and cap sampling bottle (9).

(4) If on, shut off vehicle engine after oil sample has been taken. Return the pint of drained oil (7) to the component's reservoir. Refer to the vehicle LO for specific fill location.

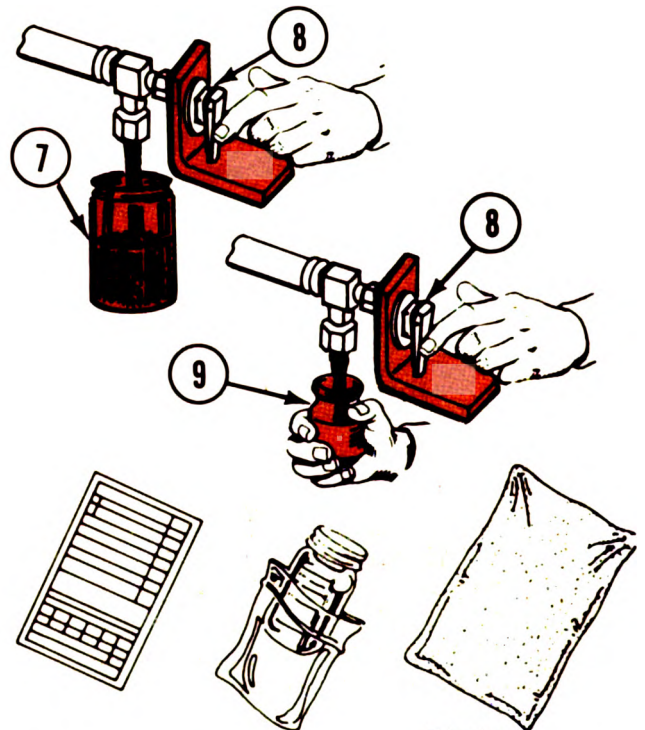
1-9. Processing Samples

A unit's success with AOAP depends upon two factors ---- good oil samples and good feedback. **Good oil samples** means the oil is truly representative of the oil inside the vehicle's component, and it is uncontaminated by external sludge, dirt, or carbon caking. **Good feedback** means records. In the Army Oil Analysis Program at the unit level, AOAP records consists of the following forms:

(1) **DD Form 314 - Preventive Maintenance Schedule and Record** (Appendix C, Figure C-1).

(2) **DD Form 2026 - Oil Analysis Request** (Appendix C, Figure C-2).

(3) **DA Form 2408-20 - Oil Analysis Log** (Appendix C, Figure C-3).



DD Form 2026
TA 327744

Plastic Bag
8105-00-837-7754

Shipping
Sack
8105-00-290-0340

(4) **DA Form 3254-R - Oil Analysis Recommendation and Feedback** (Appendix C, Figure C-4).

Instructions for filling out all of the above forms can be found in DA PAM 738-750, **The Army Maintenance Management System (TAMMS)**.

Processing samples begins with scheduling. Each maintenance unit is required to establish an AOAP schedule and record, DD Form 314, for each of the unit's vehicles in the Oil Analysis Program.

After a sample is taken, an Oil Analysis Request, DD Form 2026, must be filled out by the maintenance unit. Basic information is also required on the sample bottle itself to prevent any possibility of a mix-up with other bottles.

Each sample bottle is inserted in a plastic bag, NSN 8105-00-837-7754. The plastic bag with sample bottle is then inserted in a special shipping sack, NSN 8105-00-290-0340, along with the Oil Analysis Request, DD Form 2026. This

package is then mailed to the Army Oil Analysis Laboratory servicing your unit. TB 43-0210 provides a list and the locations of all current AOAP laboratories.

While the sample is being processed to an AOAP laboratory, the maintenance unit should establish an Oil Analysis Log. DA Form 2408-20, for every component being sampled in the unit. This form becomes the component record of samples taken and lab results. This form stays with the component throughout its service life.

1-10. Laboratory Reports

CAUTION

AOAP depends on **GOOD** oil samples and **GOOD** feedback. Every effort must be made to make certain the sample taken truly represents the oil in the component. Avoid external dirt and internal sludge or caking. Also, units must act on lab recommendations. They must also let the lab know what is found. Future recommendations depend on such feedback!

If the sample submitted is normal and no potential trouble is found, the unit's Oil Analysis Request, DD Form 2026, will be returned stamped **NORMAL**. If trouble is identified, the AOAP lab will explain its findings and make specific recommendations to the unit. The lab does this on DA Form 3254-R, **Oil Analysis Recommendation and Feedback**.

Block #9 of DA Form 3254-R will contain the AOAP lab recommendations. These comments are very important to the unit because the form would not have been sent unless lab tests revealed something wrong with the oil. The AOAP lab will make specific recommendations. These recommendations are based on data the lab has on specific components and vehicles. It is also based on past feedback from units with like samples and vehicles.

DA Form 3254-R requires a unit to act

on AOAP recommendations. It also requires a unit to provide the feedback the lab needs for future evaluations of like conditions. It is very important to the success of the Army Oil Analysis Program for units to fill out block #14 ("FEEDBACK") and return this form to the lab.

1-11. Vehicles/Components Affected

Tables 1-1 through 1-3 provide a complete list of tank-automotive combat, tactical, and special purpose vehicles in alpha-numeric sequence. These tables indicate if a vehicle is in the Army Oil Analysis Program as well as what components of a vehicle are/are not affected by AOAP.

(1) Table 1-1 provides the AOAP status of all combat vehicles.

(2) Table 1-2 provides the AOAP status of all tactical vehicles.

(3) Table 1-3 provides the AOAP status of all special purpose vehicles. Special purpose vehicles include all materiel handling, construction, special utility vehicles and yard equipment.

Refer to tables 1-1 through 1-3 to determine the status of your unit's vehicles with regard to AOAP. These tables will indicate whether sampling valve kits are available and will provide page references in this TM for valve installation and repair parts.

1-12. Vehicles/Components Not Affected

It is the purpose of tables 1-1 through 1-3 to indicate the AOAP status of all tank-automotive vehicles. Vehicles listed in these tables which are followed by a "NO" in the AOAP column are those vehicles with components **not affected** by oil analysis.

The reasons for a vehicle or a major component of a vehicle not being included in AOAP are as follows:

- a. Vehicle engine is gasoline.
- b. Vehicle transmission is standard.

c. Vehicle is electrically powered (as in some material handling equipment).

d. Component oil volume is low/mortality is low.

e. Vehicle density and/or usage is limited to a degree wherein AOAP is impractical. Vehicle warranty provisions affect usage of AOAP at this time (date

of TM).

f. Vehicle being converted to diesel or multifuel to receive upgraded model designator after conversion.

g. Vehicle type classified but still in development at time of this publication (HMMWV/LAV). AOAP data/specifics not available.

**TABLE 1-1. Combat Vehicles/Vehicle Components
Army Oil Analysis Program (AOAP)**

VEHICLE MODEL	VEHICLE DESCRIPTION	A O A P	ENGINE		TRANS		OTHER		TM REFERENCE
			VALVE KIT	W/ PUMP	VALVE KIT	W/ PUMP	VALVE KIT	W/ PUMP	
LAV M1	Light Armored Vehicle Tank	Yes Yes	X —	— X	X —	— X	— —	— F/DR Hyd	Para 1-12g Para 1-8a
M1E1	Tank	Yes	—	X	—	X	—	F/DR Hyd	Para 1-8a
M2	Infantry Fighting Vehicle	Yes	—	—	—	—	—	—	Para 1-12g
M3	Cavalry Fighting Vehicle	Yes	—	—	—	—	—	—	Para 1-12g
M42A1	Self-Propelled Gun	No	—	—	—	—	—	—	Para 1-12e
M48A2	AVLB Bridge Launcher	Yes	X	—	X	—	—	—	Para 2-5/Fig B-1
M48A3	Tank	Yes	X	—	X	—	—	—	Para 2-5/Fig B-1
M48A5	Tank	Yes	X	—	X	—	—	—	Para 2-5/Fig B-1
M48A5	AVLB Bridge Launcher	Yes	X	—	X	—	—	—	Para 2-5/Fig B-1
M60	Tank	Yes	X	—	X	—	—	—	Para 2-5/Fig B-1
M60A1	Tank	Yes	X	—	X	—	—	—	Para 2-5/Fig B-1
M60A1	(RISE) Tank	Yes	X	—	X	—	—	—	Para 2-5/Fig B-1
M60A1	(RISE Passive) Tank	Yes	X	—	X	—	—	—	Para 2-5/Fig B-1
M60A1	(AOS) Tank	Yes	X	—	X	—	—	—	Para 2-5/Fig B-1
M60A3	Tank	Yes	X	—	X	—	—	—	Para 2-5/Fig B-1
M88A1	Recovery, Tracked	Yes	X	—	X	—	—	—	Para 2-9/Fig B-5
M106A1	Mortar Carrier	Yes	X	—	X	—	—	—	Para 2-6/Fig B-2
M106A2	Mortar Carrier	Yes	X	—	X	—	—	—	Para 2-6/Fig B-2
M107	Self Propelled Gun	Yes	X	—	X	—	—	—	Para 2-8/Fig B-4
M108	Self Propelled Howitzer	Yes	X	—	X	—	—	—	Para 2-8/Fig B-4
M109	Self Propelled Howitzer	Yes	X	—	X	—	—	—	Para 2-8/Fig B-4
M109A1	Self Propelled Howitzer	Yes	X	—	X	—	—	—	Para 2-8/Fig B-4
M109A2	Self Propelled Howitzer	Yes	X	—	X	—	—	—	Para 2-8/Fig B-4
M113A1	Personnel Carrier	Yes	X	—	X	—	—	—	Para 2-6/Fig B-2
M113A2	Personnel Carrier	Yes	X	—	X	—	—	—	Para 2-6/Fig B-2
M125A1	Mortar Carrier	Yes	X	—	X	—	—	—	Para 2-6/Fig B-2
M125A2	Mortar Carrier	Yes	X	—	X	—	—	—	Para 2-6/Fig B-2
M132A1	Flame Thrower	Yes	X	—	X	—	—	—	Para 2-6/Fig B-2
M163A1	Vulcan Air Defense	Yes	X	—	X	—	—	—	Para 2-6/Fig B-2
M247	(DIVAD) Gun, Tracked	Yes	X	—	X	—	—	—	Para 2-5/Fig B-1
M50IE3	Hawk Loader	No	—	—	—	—	—	—	Para 1-12a
M548	Tracked Cargo Carrier	Yes	X	—	X	—	—	—	Para 2-7/Fig B-3
M548A1	Tracked Cargo Carrier	Yes	X	—	X	—	—	—	Para 2-7/Fig B-3
M551	Armored Reconnaissance	Yes	—	X	—	X	—	—	Para 1-8a
M551A1	Armored Reconnaissance	Yes	—	X	—	X	—	—	Para 1-8a
M577A1	Command Post Carrier	Yes	X	—	X	—	—	—	Para 2-6/Fig B-2
M577A2	Command Post Carrier	Yes	X	—	X	—	—	—	Para 2-6/Fig B-2
M578	Recovery Vehicle	Yes	X	—	X	—	—	—	Para 2-8/Fig B-4
M667	Lance Missile Carrier	Yes	—	X	—	X	—	—	Para 1-8a

TABLE 1-1. Combat Vehicles/Vehicle Components
Army Oil Analysis Program (AOAP)
 (continued)

VEHICLE MODEL	VEHICLE DESCRIPTION	A O A P	ENGINE		TRANS		OTHER		TM REFERENCE
			VALVE KIT	W/ PUMP	VALVE KIT	W/ PUMP	VALVE KIT	W/ PUMP	
M728	Combat Engineering Vehicle	Yes	X	—	X	—	—	—	Para 2-5/Fig B-1
M730	Chaparral Missile Carrier	Yes	X	—	X	—	—	—	Para 2-7/Fig B-3
M730A1	Chaparral Missile Carrier	Yes	X	—	X	—	—	—	Para 2-7/Fig B-3
M741	Chassis/M163A1 Vulcan	Yes	X	—	X	—	—	—	Para 2-6/Fig B-2
M741A1	Chassis/M163A1 Vulcan	Yes	X	—	X	—	—	—	Para 2-6/Fig B-2
M901	Improved TOW	Yes	X	—	X	—	—	—	Para 2-6/Fig B-2
M901A1	TOW 2	Yes	X	—	X	—	—	—	Para 2-6/Fig B-2
M973	(SUS-V) All Terrain	Yes	—	X	—	—	—	—	Para 1-8a
M981	(FIST-V) Fire Support	Yes	X	—	X	—	—	—	Para 2-6/Fig B-2
M992	(FAAS-V) Arty Support	Yes	X	—	X	—	—	—	Para 2-8/Fig B-4
M993	(MLRS) Rocket Station	Yes	—	—	—	—	—	—	Para 1-12g
M1015	EW Carrier	Yes	X	—	X	—	—	—	Para 2-7/Fig B-3
M1015A1	EW Carrier	Yes	X	—	X	—	—	—	Para 2-7/Fig B-3

TABLE 1-2. Tactical Vehicles/Vehicle Components
Army Oil Analysis Program (AOAP)

VEHICLE MODEL	VEHICLE DESCRIPTION	A O A P	ENGINE		TRANS		OTHER		TM REFERENCE
			VALVE KIT	W/ PUMP	VALVE KIT	W/ PUMP	VALVE KIT	W/ PUMP	
M34A2	M44 Series (2 1/2-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M35A1	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M35A2	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M35A2C	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M36A2	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M36C	M44 Series (2 1/2-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M39A1	M39 Series (5-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M39A2	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M40	M39 Series (5-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M40A1	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-11/Fig B-7
M40A1C	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-11/Fig B-7
M40A2C	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M44A1	M44 Series (2 1/2-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M44A2	M44 Series (2 1/2-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M44C	M44 Series (2 1/2-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M45A1	M44 Series (2 1/2-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M45A2	M44 Series (2 1/2-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M46A1	M44 Series (2 1/2-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M46A2	M44 Series (2 1/2-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M46A1C	M44 Series (2 1/2-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M46A2C	M44 Series (2 1/2-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M49A1C	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M49A2C	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M49C	M44 Series (2 1/2-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M50	M44 Series (2 1/2-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M50A1	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M50A2	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M50A3	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M51	M39 Series (5-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M51A1	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-11/Fig B-7
M51A2	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M52	M39 Series (5-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M52A1	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-11/Fig B-7

TABLE 1-2. Tactical Vehicles/Vehicle Components
Army Oil Analysis Program (AOAP)
(continued)

VEHICLE MODEL	VEHICLE DESCRIPTION	A O A P	ENGINE		TRANS		OTHER		TM REFERENCE
			VALVE KIT	W/ PUMP	VALVE KIT	W/ PUMP	VALVE KIT	W/ PUMP	
M52A2	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M54	M39 Series (5-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M54A1	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-11/Fig B-7
M54A1C	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-11/Fig B-7
M54A2	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M54A2C	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M55	M39 Series (5-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M55A1	M39 Series (5-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M55A2	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M61	M39 Series (5-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M61A1	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-11/Fig B-7
M61A2	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M63	M39 Series (5-Ton)	No	X	—	—	—	—	—	Para 1-12a/b
M63A1	M39 Series (5-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M63A2	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M63A2C	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M63C	M39 Series (5-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M109A1	M44 Series (2 1/2-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M109A2	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M109A3	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M123	M123 Series (10-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M123A1C	M123 Series (10-Ton)	Yes	X	—	—	—	—	—	Para 2-13/Fig B-9
M123C	M123 Series (10-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M123E2	M123 Series (10-Ton)	Yes	X	—	—	—	—	—	Para 2-13/Fig B-9
M125	M123 Series (10-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M139	M39 Series (5-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M139A1	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-11/Fig B-7
M139F	M39 Series (5-Ton)	No	—	—	—	—	—	—	Para 1-12e
M139A1F	M39 Series (5-Ton)	No	—	—	—	—	—	—	Para 1-12e
M139A2F	M39 Series (5-Ton)	No	—	—	—	—	—	—	Para 1-12e
M151	M151 Series (1 1/4-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M151A1	M151 Series (1 1/4-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M151A1C	M151 Series (1 1/4-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M151A2	M151 Series (1 1/4-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M185A2	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M185A3	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M246	M39 Series (5-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M246A1	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-11/Fig B-7
M246A2	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M275A1	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M275A2	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M291A1	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-11/Fig B-7
M291A1C	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-11/Fig B-7
M291A1D	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-11/Fig B-7
M291A2	M39 Series (5-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M292A1	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M292A2	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M292A3	M44 Series (2 1/2-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M292A4	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M292A5	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M328A1	M39 Series (5-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M342A2	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M520	M520 Series (8-Ton)	Yes	X	—	X	—	—	—	Para 2-14/Fig B-10
M543	M39 Series (5-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M543A1	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-11/Fig B-7
M543A2	M39 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M553	M520 Series (8-Ton)	Yes	X	—	X	—	—	—	Para 2-14/Fig B-10
M559	M520 Series (8-Ton)	Yes	X	—	X	—	—	—	Para 2-14/Fig B-10

TABLE 1-2. Tactical Vehicles/Vehicle Components
Army Oil Analysis Program (AOAP)
 (continued)

VEHICLE MODEL	VEHICLE DESCRIPTION	A O A P	ENGINE		TRANS		OTHER		TM REFERENCE
			VALVE KIT	W/ PUMP	VALVE KIT	W/ PUMP	VALVE KIT	W/ PUMP	
M561	Gamma Goat	Yes	X	—	—	—	—	—	Para 2-15/Fig B-11
M656	M656 Series (5-Ton)	Yes	—	X	—	X	—	—	Para 1-8a
M718	M151 Series (1/4-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M718A1	M151 Series (1/4-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M746	M746 HET (22 1/2-Ton)	Yes	X	—	X	—	—	—	Para 2-16/Fig B-12
M748	M39 Series (5-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M748A1	M39 Series (5-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M751	M44 Series (2 1/2-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M751A1	M44 Series (2 1/2-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M751A2	M44 Series (2 1/2-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M756A2	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M757	M656 Series (5-Ton)	Yes	—	X	—	X	—	—	Para 1-8a
M764	M44 Series (2 1/2-Ton)	Yes	X	—	—	—	—	—	Para 2-12/Fig B-8
M791	M656 Series (5-Ton)	Yes	—	X	—	X	—	—	Para 1-8a
M792	Gamma Goat	Yes	X	—	—	—	—	—	Para 2-15/Fig B-11
M809	M809 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-19/Fig B-15
M809A1	M809 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-19/Fig B-15
M810	M809 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-19/Fig B-15
M811	M809 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-19/Fig B-15
M811A1	M809 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-19/Fig B-15
M811A2	M809 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-19/Fig B-15
M812	M809 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-19/Fig B-15
M812A1	M809 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-19/Fig B-15
M813	M809 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-19/Fig B-15
M813A1	M809 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-19/Fig B-15
M814	M809 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-19/Fig B-15
M815	M809 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-19/Fig B-15
M816	M809 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-19/Fig B-15
M817	M809 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-19/Fig B-15
M818	M809 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-19/Fig B-15
M819	M809 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-19/Fig B-15
M820	M809 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-19/Fig B-15
M820A1	M809 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-19/Fig B-15
M820A2	M809 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-19/Fig B-15
M821	M809 Series (5-Ton)	Yes	X	—	—	—	—	—	Para 2-19/Fig B-15
M825	M151 Series (1/4-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M876	Telephone Truck	Yes	X	—	X	—	—	—	Para 2-21/Fig B-6
M877	M520 Series (8-Ton)	Yes	X	—	X	—	—	—	Para 2-14/Fig B-10
M880	M880 Series (1 1/4-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M881	M880 Series (1 1/4-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M882	M880 Series (1 1/4-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M883	M880 Series (1 1/4-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M884	M880 Series (1 1/4-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M885	M880 Series (1 1/4-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M886	M880 Series (1 1/4-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M888	M880 Series (1 1/4-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M890	M880 Series (1 1/4-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M891	M880 Series (1 1/4-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M892	M880 Series (1 1/4-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M893	M880 Series (1 1/4-Ton)	No	—	—	—	—	—	—	Para 1-12a/b
M911	M911 Series/HET (22 1/2-Ton)	Yes	X	—	X	—	—	—	Para 2-17/Fig B-13
M915	M915 Series/HET	Yes	X	—	X	—	—	—	Para 2-18/Fig B-14
M915A1	M915A1 HET Tractor	Yes	X	—	X	—	—	—	Para 1-12g
M916	M915 Series/HET	Yes	X	—	X	—	—	—	Para 2-18/Fig B-14
M917	M915 Series/HET	Yes	X	—	X	—	—	—	Para 2-18/Fig B-14
M918	M915 Series/HET	Yes	X	—	X	—	—	—	Para 2-18/Fig B-14
M919	M915 Series/HET	Yes	X	—	X	—	—	—	Para 2-18/Fig B-14
M920	M915 Series/HET	Yes	X	—	X	—	—	—	Para 2-18/Fig B-14

TABLE 1-2. Tactical Vehicles/Vehicle Components
Army Oil Analysis Program (AOAP)
 (continued)

VEHICLE MODEL	VEHICLE DESCRIPTION	A O A P	ENGINE		TRANS		OTHER		TM REFERENCE
			VALVE KIT	W/ PUMP	VALVE KIT	W/ PUMP	VALVE KIT	W/ PUMP	
M923	M939 Series (5-Ton)	Yes	X	—	X	—	—	—	Para 2-20/Figs B-15, B-16
M924	M939 Series (5-Ton)	Yes	X	—	X	—	—	—	Para 2-20/figs B-15, B-16
M925	M939 Series (5-Ton)	Yes	X	—	X	—	—	—	Para 2-20/Figs B-15, B-16
M926	M939 Series (5-Ton)	Yes	X	—	X	—	—	—	Para 2-20/Figs B-15, B-16
M927	M939 Series (5-Ton)	Yes	X	—	X	—	—	—	Para 2-20/Figs B-15, B-16
M928	M939 Series (5-Ton)	Yes	X	—	X	—	—	—	Para 2-20/Figs B-15, B-16
M929	M939 Series (5-Ton)	Yes	X	—	X	—	—	—	Para 2-20/Figs B-15, B-16
M930	M939 Series (5-Ton)	Yes	X	—	X	—	—	—	Para 2-20/Figs B-15, B-16
M931	M939 Series (5-Ton)	Yes	X	—	X	—	—	—	Para 2-20/Figs B-15, B-16
M932	M939 Series (5-Ton)	Yes	X	—	X	—	—	—	Para 2-20/Figs B-15, B-16
M934	M939 Series (5-Ton)	Yes	X	—	X	—	—	—	Para 2-20/Figs B-15, B-16
M935	M939 Series (5-Ton)	Yes	X	—	X	—	—	—	Para 2-20/Figs B-15, B-16
M936	M939 Series (5-Ton)	Yes	X	—	X	—	—	—	Para 2-20/Figs B-15, B-16
M939	M939 Series (5-Ton)	Yes	X	—	X	—	—	—	Para 2-20/Figs B-15, B-16
M940	M939 Series (5-Ton)	Yes	X	—	X	—	—	—	Para 2-20/Figs B-15, B-16
M941	M939 Series (5-Ton)	Yes	X	—	X	—	—	—	Para 2-20/Figs B-15, B-16
M942	M939 Series (5-Ton)	Yes	X	—	X	—	—	—	Para 2-20/Figs B-15, B-16
M943	M939 Series (5-Ton)	Yes	X	—	X	—	—	—	Para 2-20/Figs B-15, B-16
M944	M939 Series (5-Ton)	Yes	X	—	X	—	—	—	Para 2-20/Figs B-15, B-16
M945	M939 Series (5-Ton)	Yes	X	—	X	—	—	—	Para 2-20/Figs B-15, B-16
M966	M966 Series (HMMWV)	Yes	X	—	X	—	—	—	Para 1-12g
M977	M977 Series (HEMTT)	Yes	X	—	X	—	—	—	Para 1-12g
M978	M977 Series (HEMTT)	Yes	X	—	X	—	—	—	Para 1-12a
M983	M977 Series (HEMTT)	Yes	X	—	X	—	—	—	Para 1-12g
M984	M977 Series (HEMTT)	Yes	X	—	X	—	—	—	Para 1-12g
M985	M977 Series (HEMTT)	Yes	X	—	X	—	—	—	Para 1-12g
M996	M966 Series (HMMWV)	Yes	X	—	X	—	—	—	Para 1-12g
M997	M966 Series (HMMWV)	Yes	X	—	X	—	—	—	Para 1-12g
M998	M966 Series (HMMWV)	Yes	X	—	X	—	—	—	Para 1-12g
M1001	MAN Series	Yes	X	—	X	—	—	—	Para 1-12g
M1002	MAN Series	Yes	X	—	X	—	—	—	Para 1-12g
M1008	CUC-V Series	No	—	—	—	—	—	—	Para 1-12e
M1008A1	CUC-V Series	No	—	—	—	—	—	—	Para 1-12e
M1009	CUC-V Series	No	—	—	—	—	—	—	Para 1-12e
M1010	CUC-V Series	No	—	—	—	—	—	—	Para 1-12e
M1013	MAN Series	Yes	X	—	X	—	—	—	Para 1-12g
M1014	MAN Series	Yes	X	—	X	—	—	—	Para 1-12g
M1025	M966 Series (HMMW-V)	Yes	X	—	X	—	—	—	Para 1-12g
M1026	M966 Series (HMMW-V)	Yes	X	—	X	—	—	—	Para 1-12g
M1028	CUC-V Series	No	—	—	—	—	—	—	Para 1-12e
M1031	CUC-V Series	No	—	—	—	—	—	—	Para 1-12e
M1035	M966 Series (HMMW-V)	Yes	X	—	X	—	—	—	Para 1-12g
M1036	M966 Series (HMMW-V)	Yes	X	—	X	—	—	—	Para 1-12g
M1037	M966 Series (HMMW-V)	Yes	X	—	X	—	—	—	Para 1-12g
M1038	M966 Series (HMMW-V)	Yes	X	—	X	—	—	—	Para 1-12g
M1045	M966 Series (HMMW-V)	Yes	X	—	X	—	—	—	Para 1-12g
M1046	M966 Series (HMMW-V)	Yes	X	—	X	—	—	—	Para 1-12g

**TABLE 1-3. Special Purpose Vehicles/Vehicle Components
Army Oil Analysis Program (AOAP)**

VEHICLE MODEL	VEHICLE DESCRIPTION	A O A P	ENGINE		TRANS		OTHER		TM REFERENCE
			VALVE KIT	W/ PUMP	VALVE KIT	W/ PUMP	VALVE KIT	W/ PUMP	
ACE 40	Forklift, MHE 227	No	—	—	—	—	—	—	Para 1-12a/b
ACP-60-PS		No	—	—	—	—	—	—	Para 1-12a/b
ACC-10-PS-10		No	—	—	—	—	—	—	Para 1-12a/b
ACC-40-PS-100	Forklift, MHE 231	No	—	—	—	—	—	—	Para 1-12a/b
ACT 40	Tractor, MHE 168	No	—	—	—	—	—	—	Para 1-12a/b
ARFT-6	Forklift, MHE 222	Yes	X	—	X	—	—	—	Para 2-35/ Fig B-27
BSF400	Paver	Yes	—	X	—	—	—	—	Para 1-8a
B21171	Mixer, Rotary	Yes	—	X	—	—	—	—	Para 1-8a
CAT D5	Tractor	Yes	—	X	—	X	—	—	Para 1-8a
CAT D7E	Tractor	Yes	X	—	—	X	—	—	Para 2-24/ Fig B-18
CAT D7F	Tractor	Yes	X	—	—	X	—	—	Para 2-23/ Fig B-17
CAT 12	Road Grader	Yes	—	X	—	—	—	—	Para 1-8a
CAT 120	Road Grader	Yes	X	—	—	—	—	—	Para 2-25/ Fig B-19
CM150	Drill, Boom-Type	No	—	—	—	—	—	—	Para 1-12a/b
CTA 40	Tractor, Wheeled	No	—	—	—	—	—	—	Para 1-12a/b
CTA40-RS	Tractor, MHE 180	No	—	—	—	—	—	—	Para 1-12a/b
CY150	Forklift	No	—	—	—	—	—	—	Para 1-12a/b
C20B-1615158	Forklift	No	—	—	—	—	—	—	Para 1-12a/b
C350B	Roller, Tandem	Yes	X	—	—	—	—	—	Para 2-45/ Fig B-36
C350B-D	Roller, Tandem	Yes	X	—	—	—	—	—	Para 2-45/ Fig B-36
C530A	Roller, Pneumatic	Yes	X	—	—	—	—	—	Para 2-28/ Fig B-21
DV43	RTCH, MHE 240	Yes	—	X	—	X	—	—	Para 1-8a
D30	Distributor, Bitimous	No	—	—	—	—	—	—	Para 1-12a/b
D32	Distributor, Bitimous	No	—	—	—	—	—	—	Para 1-12a/b
D40	Distributor, Bitimous	No	—	—	—	—	—	—	Para 1-12a/b
D5A	Tractor, Crawler	No	—	—	—	—	—	—	Para 1-12a/b
D52	Distributor, Bitimous	No	—	—	—	—	—	—	Para 1-12a/b
D6B	Tractor	Yes	—	X	—	—	—	—	Para 1-8a
D60	Distributor, Bitimous	Yes	—	X	—	—	—	—	Para 1-8a
D63	Distributor, Bitimous	Yes	—	X	—	X	—	—	Para 1-8a
D8K	Tractor	Yes	X	—	—	X	—	—	Para 2-40/Fig B-32
EJF-060	Forklift, MHE 193	No	—	—	—	—	—	—	Para 1-12a/b
EJF-060	Forklift, MHE 210	No	—	—	—	—	—	—	Para 1-12a/b
E1012M	Roller, Motorized	No	—	—	—	—	—	—	Para 1-12a/b
E1012MR	Roller, Motorized	No	—	—	—	—	—	—	Para 1-12a/b
FE-20-24	Forklift, MHE 219	No	—	—	—	—	—	—	Para 1-12a/b
FJF-040	Forklift, MHE 221	No	—	—	—	—	—	—	Para 1-12a/b
FJF-040	Forklift, MHE 188	No	—	—	—	—	—	—	Para 1-12a/b
FT750	Fire Truck, Pumping	Yes	—	X	—	—	—	—	Para 1-8a
FTD-020	Forklift, MHE 204	No	—	—	—	—	—	—	Para 1-12c
FTD-020-FE	Forklift, MHE 197	No	—	—	—	—	—	—	Para 1-12c
FTD-020-FESS	Forklift, MHE 198	No	—	—	—	—	—	—	Para 1-12c
FTD-040	Forklift, MHE 186	No	—	—	—	—	—	—	Para 1-12c
FTD-040-FE	Forklift, MHE 196	No	—	—	—	—	—	—	Para 1-12c
FTD-060-FE	Forklift, MHE 108	No	—	—	—	—	—	—	Para 1-12c
FT20-24PS-100	Forklift, MHE 182	No	—	—	—	—	—	—	Para 1-12a
FT20-24PS-127	Forklift, MHE 182A	No	—	—	—	—	—	—	Para 1-12a
FT60-24PS	Forklift, MHE 183	No	—	—	—	—	—	—	Para 1-12a
FWD-349-V	Snow Removal	No	—	—	—	—	—	—	Para 1-12a
F1386	Trailer	No	—	—	—	—	—	—	NA

TABLE 1-3. Special Purpose Vehicles/Vehicle Components
Army Oil Analysis Program (AOAP)
 (continued)

VEHICLE MODEL	VEHICLE DESCRIPTION	A O A P	ENGINE		TRANS		OTHER		TM REFERENCE
			VALVE KIT	W/ PUMP	VALVE KIT	W/ PUMP	VALVE KIT	W/ PUMP	
F1500M F3M	Grader Kettle, Bitimous, Wheeled	Yes	X	—	—	X	—	—	Para 2-37/Fig B-29
F40-24PS	Forklift, MHE 209	No	—	—	—	—	—	—	Para 1-12a
F40-24PS-100	Forklift, MHE 224	No	—	—	—	—	—	—	Para 1-12a
F5070	Truck, Dump (20-Ton)	Yes	X	—	—	X	—	—	Para 2-31/ Fig B-22
F60-24PS-100	Forklift, MHE-205	No	—	—	—	—	—	—	Para 1-12a
F60-24PS-128	Forklift, MHE-205A	No	—	—	—	—	—	—	Para 1-12a
F60-24PS-168	Forklift, MHE-205B	No	—	—	—	—	—	—	Para 1-12a
GR-TD24	Bulldozer	No	—	—	—	—	—	—	Para 1-12d/e
G40	Tractor, Warehouse, MHE 189	No	—	—	—	—	—	—	Para 1-12a
G40A	Tractor, MHE 189A	No	—	—	—	—	—	—	Para 1-12a
G40B	Tractor, MHE 189B	No	—	—	—	—	—	—	Para 1-12a
G40C	Tractor, MHE 217	No	—	—	—	—	—	—	Para 1-12a
HC-238A	Crane, MHE 248 (140-Ton)	Yes	—	X	—	X	—	ENG	Para 1-8a
HD-16M	Tractor	Yes	—	X	—	X	—	—	Para 1-8a
HD-6M	Tractor	Yes	—	X	—	X	—	—	Para 1-8a
HDTM	Mixer	No	—	—	—	—	—	—	Para 1-12d
HTD-A-67	Mixer	No	—	—	—	—	—	—	Para 1-12d
H-100C	Loader, Scoop	Yes	X	—	—	X	—	—	Para 2-43/ Fig B-36
H-150C	Forklift, MHE 178	No	—	—	—	—	—	—	Para 1-12a
H-150F	Forklift, MHE 223	No	—	—	—	—	—	—	Para 1-12a
H-446	Crane (5-Ton)	Yes	—	X	—	X	—	—	Para 1-8a
H-446A	Crane w/HLG (5-Ton)	Yes	—	X	—	X	—	—	Para 1-8a
H-60M	Loader, Scoop	No	—	—	—	—	—	—	Para 1-12d
H-90M	Loader, Scoop	Yes	—	X	—	X	—	—	Para 1-8a
H-90CM	Loader, Scoop	Yes	—	X	—	X	—	—	Para 1-8a
JD410	Tractor	Yes	X	—	—	—	—	—	Para 2-30/ Fig B-23
JG40	Tractor, Warehouse	No	—	—	—	—	—	—	Para 1-12a
KA-60	Mixer, Bitimous	Yes	—	X	—	—	—	—	Para 1-8a
KX-25E-A66	Roller, Motorized	No	—	—	—	—	—	—	Para 1-12a
K300	Compactor	Yes	X	—	—	X	—	—	Para 2-26/ Fig B-18
L36M	Crane (12 1/2-Ton)	Yes	—	X	—	—	—	—	Para 1-8a
MIL-D-40	Distributor, Bitimous	No	—	—	—	—	—	—	Para 1-12a
MLT-6	Forklift, MHE 200	Yes	X	—	X	—	—	—	Para 2-35/ Fig B-27
MLT-6-CH	Forklift, MHE 202	Yes	X	—	X	—	—	—	Para 2-35/ Fig B-27
MLT-6-2	Forklift, MHE 220	Yes	X	—	X	—	—	—	Para 2-35/ Fig B-27
MP38-W	Sweeper	No	—	—	—	—	—	—	Para 1-12a
MP38-67	Sweeper	No	—	—	—	—	—	—	Para 1-12a
MT250	Crane (25 Ton)	Yes	X	—	—	—	—	—	Para 2-36/ Fig B-28
MT250W	Crane (25 Ton)	Yes	X	—	—	—	—	—	Para 2-36/ Fig B-28
MT40	Tractor, Warehouse	No	—	—	—	—	—	—	Para 1-12a
MT40MARS	Tractor, Warehouse	No	—	—	—	—	—	—	Para 1-12a
MW24	Loader, Scoop	Yes	—	X	—	X	—	—	Para 1-8a
MW24B	Loader, Scoop	Yes	—	X	—	X	—	—	Para 1-8a
M10A	Forklift, MHE236	Yes	X	—	—	X	—	—	Para 2-39/ Fig B-31

TABLE 1-3. Special Purpose Vehicles/Vehicle Components
Army Oil Analysis Program (AOAP)
 (continued)

VEHICLE MODEL	VEHICLE DESCRIPTION	A O A P	ENGINE		TRANS		OTHER		TM REFERENCE
			VALVE KIT	W/ PUMP	VALVE KIT	W/ PUMP	VALVE KIT	W/ PUMP	
M20A	Crane, Truck Mounted	No	—	—	—	—	—	—	Para 1-12a
M20B	Crane, Truck Mounted	No	—	—	—	—	—	—	Para 1-12a
M200	Crane, Truck Mounted	No	—	—	—	—	—	—	Para 1-12a
M200W	Crane, Truck Mounted	No	—	—	—	—	—	—	Para 1-12a
M22	Crane, Truck Mounted	No	—	—	—	—	—	—	Para 1-12a
M320RT	Crane, Carrier	Yes	X	—	—	X	ENG	—	Para 2-47/ Fig B-36
M4K	Forklift, MHE 248	Yes	X	—	—	X	—	—	Para 2-34/ Fig B-26
M450	Tractor	Yes	—	X	—	X	—	—	Para 1-8a
M450-L	Tractor	Yes	—	X	—	X	—	—	Para 1-8a
M480CK	Loader, Front End	No	—	—	—	—	—	—	Para 1-12a
M878	Yard Tractor	No	—	—	—	—	—	—	Para 1-12a
M878A1	Yard Tractor	Yes	X	—	X	—	—	—	Para 2-41/ Fig B-33
M918	Roller, Motorized	No	—	—	—	—	—	—	Para 1-12a
M919	Roller, Motorized	No	—	—	—	—	—	—	Para 1-12a
PG70	Conveyer	No	—	—	—	—	—	—	Para 1-12c
PM-415-MIL	Mixer	No	—	—	—	—	—	—	Para 1-12a
PSM-50M	Heater, Bitimous	No	—	—	—	—	—	—	Para 1-12a
RE22940	Distributor, Bitimous	No	—	—	—	—	—	—	Para 1-12a
ROLL-O-MATC	Roller	No	—	—	—	—	—	—	Para 1-12a
RTL-10	Forklift, MHE 199	Yes	X	—	—	X	—	—	Para 2-38/ Fig B-30
RTL-10-1	Forklift, MHE 215	Yes	X	—	—	X	—	—	Para 2-38/ Fig B-30
R1424	(See CAT 120)	Yes	X	—	—	—	—	—	Para 2-25/ Fig B-19
R528	Roller, Vibratory	Yes	X	—	—	—	—	—	Para 2-32/Fig B-24
S40CP	Forklift, MHE 203	No	—	—	—	—	—	—	Para 1-12a
SA-45	Paver, Bitimous	No	—	—	—	—	—	—	Para 1-12a
SP848	Roller, Vibratory	Yes	—	X	—	—	—	—	Para 1-8a
TD-18	Tractor	No	—	—	—	—	—	—	Para 1-12e
TD-18-182	Tractor	No	—	—	—	—	—	—	Para 1-12e
TD-20	Tractor	No	—	—	—	—	—	—	Para 1-12e
TD-20-200	Tractor	No	—	—	—	—	—	—	Para 1-12e
TD-24	Tractor	No	—	—	—	—	—	—	Para 1-12e
TL-645	Loader, Scoop	Yes	—	X	—	X	—	—	Para 1-8a
TMS-300-5	Crane (25 Ton)	Yes	X	—	—	—	—	—	Para 2-33/ Fig B-25
T-5G	Roller	No	—	—	—	—	—	—	Para 1-12a
T500	Road Grader	Yes	—	X	—	—	—	—	Para 1-8a
VSH-10	Crane, MHE 194	No	—	—	—	—	—	—	Para 1-12a
W-IMS	Distributor	No	—	—	—	—	—	—	1-12a
W15A (Gas)	Distributor	No	—	—	—	—	—	—	1-12a
W15A(Multifuel)	Distributor	Yes	—	X	—	—	—	—	1-8a
W15B	Distributor	Yes	—	X	—	—	—	—	1-8a
10F	Crane, MHE 195	No	—	—	—	—	—	—	1-12a
10FM	Crane, MHE 216	No	—	—	—	—	—	—	1-12a
112	Road Grader	No	—	—	—	—	—	—	1-12e
112F	Road Grader	No	—	—	—	—	—	—	1-12e
1125	Crane (60-Ton)	Yes	—	X	—	X	—	—	1-8a
1503	Roller	No	—	—	—	—	—	—	1-12a
1602	Distributor	No	—	—	—	—	—	—	1-12a
1615159	Forklift, MHE 184	No	—	—	—	—	—	—	1-12a
175B	Loader	Yes	—	X	—	X	—	—	1-8a
175B	Loader	Yes	—	X	—	X	—	—	1-8a
1756420	Forklift, MHE 207	No	—	—	—	—	—	—	1-12a

TABLE 1-3. Special Purpose Vehicles/Vehicle Components
Army Oil Analysis Program (AOAP)
 (continued)

VEHICLE MODEL	VEHICLE DESCRIPTION	A O A P	ENGINE		TRANS		OTHER		TM REFERENCE
			VALVE KIT	W/ PUMP	VALVE KIT	W/ PUMP	VALVE KIT	W/ PUMP	
22BM	Crane (12 1/2-Ton)	Yes	—	X	—	—	—	—	1-8a
2360	Crane (20-Ton)	No	—	—	—	—	—	—	1-12a
2380	Crane (20-Ton)	Yes	—	X	—	X	—	ENG	1-8a
2385	Crane (20-Ton)	Yes	—	X	—	X	—	ENG	1-8a
290M	Tractor	Yes	X	—	—	X	—	—	Para 2-29/Fig B-18
3000M	Loader, Scoop	Yes	—	X	—	X	—	—	1-8a
3T-9-6	Roller	No	—	—	—	—	—	—	1-12a
337450	Forklift, MHE 185	No	—	—	—	—	—	—	1-12c
3414	Loader, Tractor	No	—	—	—	—	—	—	1-12c
4D	Loader, Scoop	Yes	—	X	—	—	—	—	1-8a
440HA	Grader, Road	Yes	X	—	—	—	—	—	Para 2-44, Fig B-36
502PG-144	Forklift, MHE 220	No	—	—	—	—	—	—	1-12a
502PG-154	Forklift, MHE 190	No	—	—	—	—	—	—	1-12a
462SG-100	Forklift, MHE 191	No	—	—	—	—	—	—	1-12a
462SG-144	Forklift, MHE 191A	No	—	—	—	—	—	—	1-12a
5157B	Crusher, Jaw	Yes	—	X	—	—	—	—	1-8a
5230B	Crusher, Jaw	Yes	—	X	—	—	—	—	1-8a
530B	Truck, Fire	Yes	—	X	—	—	—	—	1-8a
530BAM	Truck, Fire	Yes	—	X	—	—	—	—	1-8a
585HG	Loader, Scoop	No	—	—	—	—	—	—	1-12d
624VL	Ditcher	Yes	—	X	—	X	—	—	1-8a
6250TC	Crane, MHE 247	Yes	X	—	—	—	ENG	—	Para 2-42/Fig B-34
645M	Loader, Scoop	Yes	—	X	—	X	—	—	1-8a
830MB	Tractor	Yes	X	—	—	X	—	—	Para 1-8a/Para 2-27 Fig B-20
855BG	Crane (40T)	Yes	—	X	—	—	—	—	1-8a
855BG2	Crane (40T)	Yes	—	X	—	—	—	—	1-8a
855BG3	Crane (40T)	Yes	—	X	—	—	—	—	1-8a
9125TC	Crane, Truck	Yes	X	—	—	—	ENG	—	Para 2-46/Fig B-35
988B	Forklift	Yes	—	X	—	—	—	—	1-8a

1-13. Definitions

Some of the important words or terms used in this TM are explained below. This is not considered to be a complete list of words associated with the Army Oil Analysis Program (AOAP). Such terms, including technical definitions, can be found in TM 38-301-1, Joint Oil Analysis Program Laboratory Manual for Nonaeronautical Equipment and TB 43-0210, Nonaeronautical Equipment, Army Oil Analysis Program.

a. Army Oil Analysis Program AOAP. A program of preventive maintenance whereby potentially costly damage to major components is discovered before such damage occurs. The program consists of scheduled sampling and laboratory analysis of oil

being used in major components. This is followed up by AOAP lab recommendations to units and feedback from the maintenance unit to the lab.

b. Components. The term "major components" is used throughout this TM in reference to a vehicle's engine and/or transmission. A component is a part of a larger mechanical (or electrical) system. That system being addressed in this manual is a vehicle's power train. An engine and transmission are the major components of a vehicle power train. Other components of some vehicles are also in AOAP. These components are listed in tables 1-1 through 1-3 under OTHER.

c. Family of Vehicles. Several different end item vehicles belong to the

same family of vehicles because their power train is the same and because the power train is basically mounted and serviced from the same location. The M901 TOW carrier for example, belongs to the M113 family of vehicles because it uses the same basic chassis as the M113 armored personnel carrier.

d. Feedback. AOAP feedback is the findings of a maintenance unit after it has acted upon an oil analysis recommendation. Feedback is important to help labs in making future recommendations on like components in like conditions.

e. Hard-Time Service Interval. Oil service interval based on miles, hours of operation and/or calendar months. Hard-time service intervals call for changing of oil regardless of the condition of the oil. This interval is based on the average service life of oil. Vehicle components under AOAP are not subject to hard-time service intervals. Rather, AOAP components are serviced "On-Condition." (See 1-13k, below).

f. Laboratory (AOAP). Army labs are located throughout CONUS, USAREUR, and Korea. These are locations where technicians test the oil samples sent by maintenance units. These labs also maintain records of all components and their test results. These records are continuously updated through user feedback (1-13d, above). Oil sample tests results, and user feedback become the basis for the lab's recommendations to maintenance units. TB 43-0210 lists all current AOAP laboratories and their locations.

g. Laboratory Tests. The tests performed on oil samples provide technicians with a complete chemical breakdown of all materials found in the oil. It is from such tests that technicians can determine the condition of the component and potential trouble areas. High levels of iron found in a 6V53 engine oil sample, for example, might indicate to the lab that the engine's cylinder lining is wearing too fast because it is the cylinder lining that

contains iron. The lab would then pass this information on to a unit.

h. Left-justified Digits (Alpha-numeric) Sequence. Appendix B, Section IV, Part Number cross reference index is organized in a left-justified digit sequence. The sequence within each digit is alpha-numeric. This means that the part number is organized by the first letter or number, followed by the second letter or number, followed by the third letter or number, etc. In such a sequence, the number "40" would follow the number "100" because the first digit "1" in "100" comes before the first digit "4" in "40". Such a sequence becomes necessary because of the mix of letters and numbers found in item part numbers.

i. NIIN Sequence. National Stock Numbers in Appendix B, Section IV are listed numerically by National Item Identification Number (NIIN) sequence. This consists of the last nine numbers of the NSN.

j. Oil Analysis. Test to analyze the chemical composition of oil.

k. On-Condition. This term refers to the oil service interval (drain and fill) of components under AOAP. Such component's oil is sampled and analyzed at regular intervals. The oil is not changed, however, unless oil analysis indicates it needs to be changed.

l. Preventive Maintenance (PM). This is an Army policy of inspecting, checking, or servicing an item in order to prevent damage or more costly maintenance. This policy recognizes the potential for major equipment damage. PM is the action taken to inspect, service, and prevent major damage from occurring.

m. Series (Vehicle Model). A vehicle model series (such as the M44 series trucks) consists of different end items with a common power train. A vehicle model series is the same as a family of vehicles. (See 1-13c, above).

n. Syringe Method. A method of taking oil samples by use of an outsized syringe. This method is obsolete. It is replaced by using oil sampling valves or the vampire pump. (See para 1-8.)

o. Vampire Pump. A special purpose tool used to take an oil sample from a vehicle not equipped with a sampling valve. (See para 1-8.)

p. Warranty. A manufacturer's or a seller's guarantee or written promise that goods specified in a purchase contract will perform to certain standards or will be replaced or repaired by the seller at little or no cost to the buyer.

1-14. Abbreviations

The following abbreviations appear in the narrative portions of this manual. Additional abbreviations used in Appendix B, Repair Parts and Special Tools List, are listed in paragraph B-6 of the appendix.

AOAP	Army Oil Analysis Program
AOS	Add On Stabilization
AVLB	Armored Vehicle Launcher, Bridge
CONUS	Continental United States
CUC-V	Commercial Utility Cargo Vehicle
DIVAD	Division Air Defense Gun
EIR	Equipment Improvement Recommendation
ENG	Engine
EW	Electronics Warfare
FAAS-V	Field Artillery Ammunition Support Vehicle
F/DR	Final Drive
FIST-V	Fire Support Team Vehicle

FOV	Family of Vehicles
HEMTT	Heavy Expanded Mobility Tactical Trucks
HET	Heavy Equipment Transporter
HMMW-V	High Mobility Multiple Purpose Wheeled Vehicle
HYD	Hydraulics
LAV	Light-Armored Vehicle
LO	Lubrication Order
MAN	Machinenfabric Augsburg-Nuernberg
MLRS	Missile Launching Rocket Station
NIIN	National Item Identification Number
NSN	National Stock Number
OC	On Condition
OD	Outside diameter
P/N	Part Number
QDR	Quality Deficiency Report
RISE	Reliability Improved Selected Equipment
RPSTL	Repair Parts and Special Tools List
SUS-V	Small Unit Support Vehicle
TAMMS	The Army Maintenance Management System
TACOM	Tank-Automotive Command
TM	Technical Manual
TOW	Tube-Launched, Optically Tracked, Wire Guided
TRANS	Transmission

CHAPTER 2

INSTALLATION AND MAINTENANCE INSTRUCTIONS

Section I. PARTS, TOOLS, AND EQUIPMENT

2-1. Tools and Equipment.

The majority of initial installation and maintenance instructions presented in this TM can be accomplished by organizational maintenance units. The tools required to accomplish these tasks are in the general mechanic's tool kit, automotive, NSN 5180-00-177-7033. Exceptions to the above are indicated at the beginning of each maintenance procedure by the INITIAL SETUP. The level of maintenance authorized to perform initial installation will be as indicated by the TM references of the INITIAL SETUP. Follow-on maintenance is performed by the level of maintenance indicated by specific item SMR Codes found in Appendix B of this TM. The most common level of maintenance for initial installation and follow-on replace/repair of AOAP sampling valves is organizational maintenance.

a. **Tools.** Both common tools and special tools required to perform each specific installation are listed in the INITIAL SETUP preceding each vehicle's installation instructions. Tables 2-2, 2-3, and 2-4 provide alpha-numeric lists of vehicles affected with page references to the specific procedure for each vehicle.

b. **Materials/Parts.** All sampling valve/valve kit materials/parts required for installation of the valve to a specific vehicle are also listed in the INITIAL SETUP.

c. **Kit Installation Policy/Practices.** It is mandatory to check for leaks immediately after installation of any/all AOAP sampling valve kits. After installation, start the vehicle engine and check for leakage. Tighten all loose fittings. This policy is viewed as a good maintenance practice absolutely necessary to assure proper kit installation.

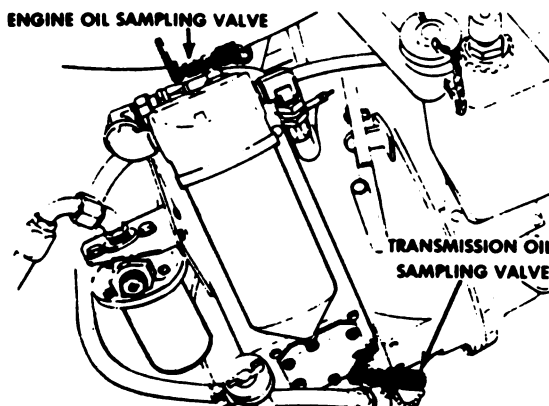
2-2. Fabrication.

Some oil analysis sampling valve kits include brackets for remote mounting of valves. All such kits using brackets come with the brackets pre-made and ready for installation. Therefore, no fabrication of bracketry is necessary.

"Make from" items also appear in specific procedures calling for fabricated hoses. Dimensions given in these sections are in specific lengths. Some minor variances in lengths can occur with individual vehicles. In such cases, a reasonable adjustment to specific vehicles must be accomplished by the maintenance unit.

Kits in this manual requiring special drilling and tapping must be installed initially at direct support maintenance. This applies only to initial installation. The kits themselves have been largely source coded for removal and replacement at organizational maintenance. The recommended level of maintenance authorized for initial installation of each kit is provided in each applicable vehicle paragraph.

Once again this applies only to initial installation of the kits. Follow-on maintenance of the kits are not source coded for removal/replacement at this level. The repair parts and special tools list (Appendix B of this TM) provides the codes of kits after initial installation.



TA 327745/

2-3. Repair Parts.

Repair parts for each valve kit are provided in this TM as Appendix B. Existing vehicle hardware removed and reinstalled during the installation procedure can be found in the vehicle's TM. Such parts may be called out in the narrative maintenance sections of this manual, but they are not parts of the vehicle AOAP kits. For this reason,

these parts are not listed in the Appendix B tables.

Table 2-1, below, lists all Army Oil Analysis Program sampling valve kits now available through the Army supply system. The TM reference indicates the paragraph for installation of these kits and the Appendix B figure where all repair parts for each kit are listed.

Table 2-1. Sampling Valve Kits/Repair Parts

Kit/Parts Code	Kit Part Number	Kit National Stock Number	Used On	TM Reference (Para/Fig)
D	12268199	2990-01-176-9372	M109/M110FOV	2-8/B-4
A	12275816	2815-01-146-8970	M48/M60 Tanks	2-5/B-1
FF	53516332		M878A1 Tractor (Trans)	2-41/B-33
FF	53516333		M878A1 Tractor (ENG)	2-41/B-33
L	5705365	2815-01-167-8049	M746 Truck Tractor	2-16/B-12
M	5705366	2815-01-154-9934	M911 Truck Tractor	2-17/B-13
J	5705368	2815-01-174-0329	M520 Series Trucks	2-14/B-10
N	5705369	2815-01-154-9933	M915 Series Trucks	2-18/B-14
K	5705370	2815-01-179-7512	M561/M792 Trucks	2-15/B-11
F	5705372	2815-01-174-0328	M876 Telephone Truck	2-21/B-6
Q	5705373	2815-01-189-0463	D7F Crawler	2-23/B-17
R	5705377	2815-01-184-4828	290M	2-29/B-18
R	5705377	2815-01-184-4828	K300	2-26/B-18
R	5705377	2815-01-184-4828	D7E Tractor	2-24/B-18
W	5705379		JD410 Tractor	2-30/B-23
V	5705380	2815-01-191-0977	F5070 Dump Truck	2-31/B-22
U	5705381	2805-01-151-6189	C530A Roller	2-28/B-21
X	5705382	2815-01-184-6356	RS28 Roller	2-32/B-24
Y	5705384	2815-01-180-9849	TMS 300-5 Crane	2-33/B-25
S	5705385		MT250 Crane	2-36/B-28
S	5705385		Model 120 Grader	2-25/B-19
AA	5705386	2815-01-180-9850	Forklifts (various)	2-35/B-27
Z	5705387	2815-01-182-7424	M4K Forklift	2-34/B-26
CC	5705388	2815-01-191-5915	F1500M Grader	2-37/B-29
DD	5705389		RTL-10/-1 Forklifts	2-38/B-30
T	5705390	2815-01-187-9456	830MB Tractor	2-27/B-20
T	5705390	2815-01-187-9456	M10A Forklift	2-39/B-31
B	5705394	2815-01-154-3891	M113 Carriers	2-6/B-2
C	5705395	2815-01-152-8807	M548/M730 Carriers	2-7/B-3
E	5705396		M88A1 Recovery	2-9/B-5

*Letter designators correspond with Usable On Codes of Appendix B.

Section II. INSTALLATION AND MAINTENANCE INSTRUCTIONS FOR COMBAT VEHICLES

2-4. Model Reference Index

This section presents oil analysis sampling valve kit installation and maintenance instructions for tank-automotive combat vehicles only. Table 2-2, below, lists the models and the page reference where instructions for each model can be located in this TM. Combat vehicles not listed in table 2-2 do not have sampling valve kits available at time of this publication. However,

major components of such vehicles may still come under Army Oil Analysis Program directives. Table 1-1 lists tank-automotive combat vehicles and provides a vehicle-by-vehicle status with regard to sampling valve kits, use of the sampling pump, and/or why a particular vehicle is not in the oil analysis program. Refer to Table 1-1 if your vehicle is not listed below.

TABLE 2-2. Model Reference Index for Combat Vehicles

Vehicle Model #	Description	Page Number
M48A2AVLB	Bridge Launcher	2-4
M48A3	Tank	2-4
M48A5	Tank	2-4
M60	Tank	2-4
M60A1	Tank	2-4
M60A1 RISE	Tank	2-4
M60A1 RISE Passive	Tank	2-4
M60A1 (AOS)	Tank	2-4
M60A3	Tank	2-4
M88A1	Recovery Vehicle	2-23
M106A1	107-MM Mortar Carrier	2-9
M106A2	107-MM Mortar Carrier	2-9
M107	Self-Propelled Gun	2-19
M108	Self-Propelled Howitzer	2-19
M109	Self-Propelled Howitzer	2-19
M109A1	Self-Propelled Howitzer	2-19
M109A2	Self-Propelled Howitzer	2-19
M113A1	Personnel Carrier	2-9
M113A2	Personnel Carrier	2-9
M125A1	81-MM Mortar Carrier	2-9
M125A2	81-MM Mortar Carrier	2-9

Vehicle Model #	Description	Page Number
M132A1	Flame Thrower	2-9
M163A1	Vulcan Air Defense Artillery (DIVAD) Gun, Tracked	2-9
M247	Tracked Cargo Carrier	2-4
M548	Tracked Cargo Carrier	2-13
M548A1	Tracked Cargo Carrier	2-13
M577A1	Command Post Carrier	2-9
M577A2	Command Post Carrier	2-9
M578	Recovery Vehicle	2-19
M728	Combat Engineering Vehicle	2-4
M730	Chaparral Missile Carrier	2-13
M730A1	Chaparral Missile Carrier	2-13
M741	Chassis, Carrier (M163A1 Vulcan)	2-9
M741A1	Chassis, Carrier (M163A1 Vulcan)	2-9
M901	Improved TOW	2-9
M901A1	TOW 2	2-9
M981	(FIST-V) Fire Support	2-9
M992	(FAAS-V) Arty Support	2-19
M1015	Electronics Warfare Carrier	2-13
M1015A1	Electronics Warfare Carrier	2-13

2-5. M48/M60 Tanks

Engine and transmission oil sampling valve kit, NSN 2815-01-146-8970, is replacing the previous AOAP valve installation for M48/M60 tanks. This kit will be installed during depot overhaul. These kits may also be installed by organizational maintenance units if the transmission oil cooler, NSN 2520-00-410-1166, is being replaced by the new transmission oil cooler, NSN 2520-01-162-7035. The difference between the two transmission oil coolers is the addition of a welded boss fitting at the rear end of the oil cooler. The tank's transmission AOAP sampling hose is connected to this boss fitting. The procedure below is for use by organizational maintenance units after replacement of the old transmission oil

cooler.

M48/M60 Family of Tanks consists of the following: The M48A2, M48A5, and M60A1 bridge launchers; the M48A5, M60, M60A1, and M60A3 tanks; the M60A1 RISE tank, the M60A1 RISE Passive tank, and the M60A1 AOS tank; the M247 DIVAD tracked gun system, and the M728 combat engineering vehicle.

Illustrations and instructions presented are of a "typical" M48/M60 tank. Variations to these instructions may occur within models or from model to model. Such variations, however, will be minor. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT #1
4910-00-754-0654
GENERAL MECH TOOL KIT #2
4910-00-754-0650
GENERAL MECH TOOL KIT #2(SUPPLEMENTAL)
4940-00-754-0743

MATERIALS/PARTS:

*VALVE (2)-4820-01-163-7156
*BRACKET (1)-5340-01-157-8846
*PLUG (1)-5365-00-684-6901
*CLAMP (4)-5340-00-738-5174
*HOSE (1)-4720-01-163-3219
*HOSE (1)-4720-01-163-1093
*HOSE (2)-4720-01-167-0742
*ADAPTER (1)-4730-00-959-5930
*O-RING (2)-5330-00-882-9172
*WASHER (2)-5310-00-514-6674
*TEE (1)-4730-00-116-6686
*BOLT (2)-5306-00-050-1238
SEALING COMPOUND (B)-8030-00-656-1426

*PART OF KIT, NSN 2815-01-146-8970

TM REFERENCES:

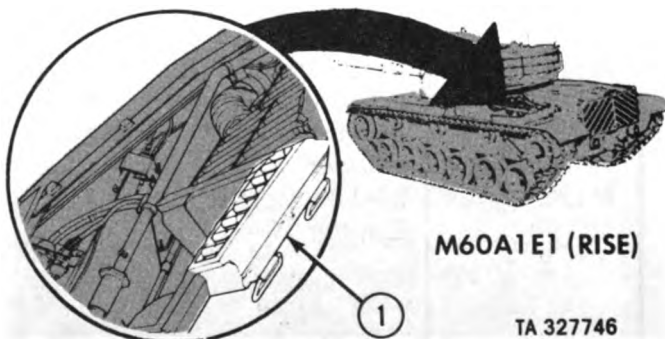
TM 9-2350-215-10-1	TM 9-2350-260-10-1-1
LO 9-2350-215-12	LO 9-2350-260-12
TM 9-2350-215-20-1-1	TM 9-2350-260-20-1-2
TM 9-2350-222-10-1	TM 9-2350-253-10-1
LO 9-2350-222-12	LO 9-2350-253-12
TM 9-2350-222-20-1-1	TM 9-2350-253-20-1
TM 9-2350-258-10-1	TM 9-2350-257-10-1
LO 9-2350-258-12	LO 9-2350-257-12
TM 9-2350-258-20-1	TM 9-2350-257-20-1-1
	TM 9-2815-220-34

EQUIPMENT CONDITION:

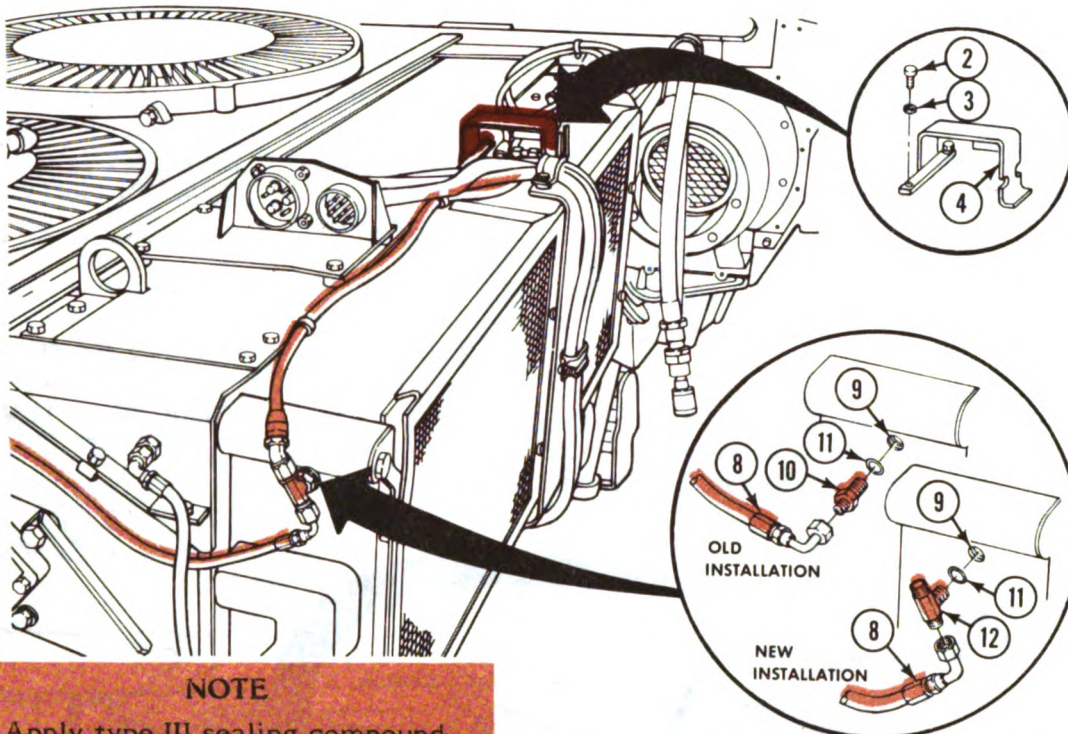
VEHICLE ON LEVEL SURFACE
MASTER SWITCH OFF
POWER PACK REMOVED
MAIN GUN TRAVERSED
TO RT/LFT
TRANSMISSION OIL COOLER
(NSN 2520-01-162-7035)
INSTALLED.

LOCATION

M48/M60 AOAP sampling valve kit is installed on the engine left side. Ready access to the valves is obtained through the left access grille (1) on the tank deck.



ENGINE OIL SAMPLING VALVE INSTALLATION



NOTE

Apply type III sealing compound, NSN 8030-00-656-1426 (or equal) to threaded ends of all male fittings before installing each fitting.

1. Remove two capscrews (2) and washers (3) from transmission oil cooler frame. Discard capscrews and washers. Position valve mounting bracket (4) NSN 5340-01-157-8846 and secure in place with new capscrews (2), NSN 5306-00-050-1238 and new washers (3) NSN 5310-00-514-6674. Tighten capscrews (2).

2. Remove drain valve (5) from engine oil filter housing (6). Install plug (7), NSN 5365-00-684-6901, in engine oil filter housing port hole. Valve (5) should be returned to supply if serviceable.

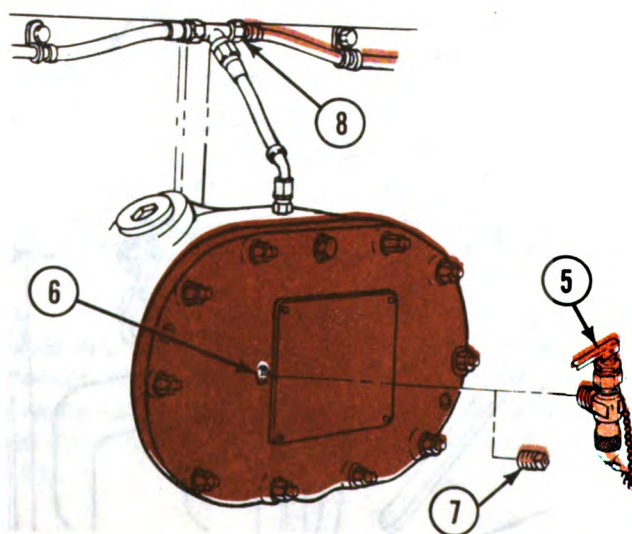
3. Remove hose (8) from engine oil cooler housing (9). Remove adapter (10) and O-ring (11) from oil cooler housing (9). Retain adapter (10) for later use on the transmission oil sampling valve procedure. Discard O-ring (11).

4. Install new O-ring (11), NSN 5330-00-166-0980, and adapter tee (12), NSN 4730-00-116-6686, into engine oil cooler housing (9). Tighten tee (12).

NOTE

Loosen opposite end of hose (8) located above the oil filter cover. Swivel hose, as necessary, to allow for reinstallation of the hose into adapter tee (step 5). Tighten end of hose after step 5 is completed.

5. Reinstall hose (8) to adapter tee (12). Tighten hose (8).



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6. Connect hose (13), NSN 4720-01-163-1093, to opposite end of adapter tee (12). Tighten hose end-fitting (14). Route opposite end of hose (13) toward installed bracket (4). Connect opposite end of hose (13) to center port of sampling valve (15), NSN 4820-01-163-7156. Tighten hose end-fitting.

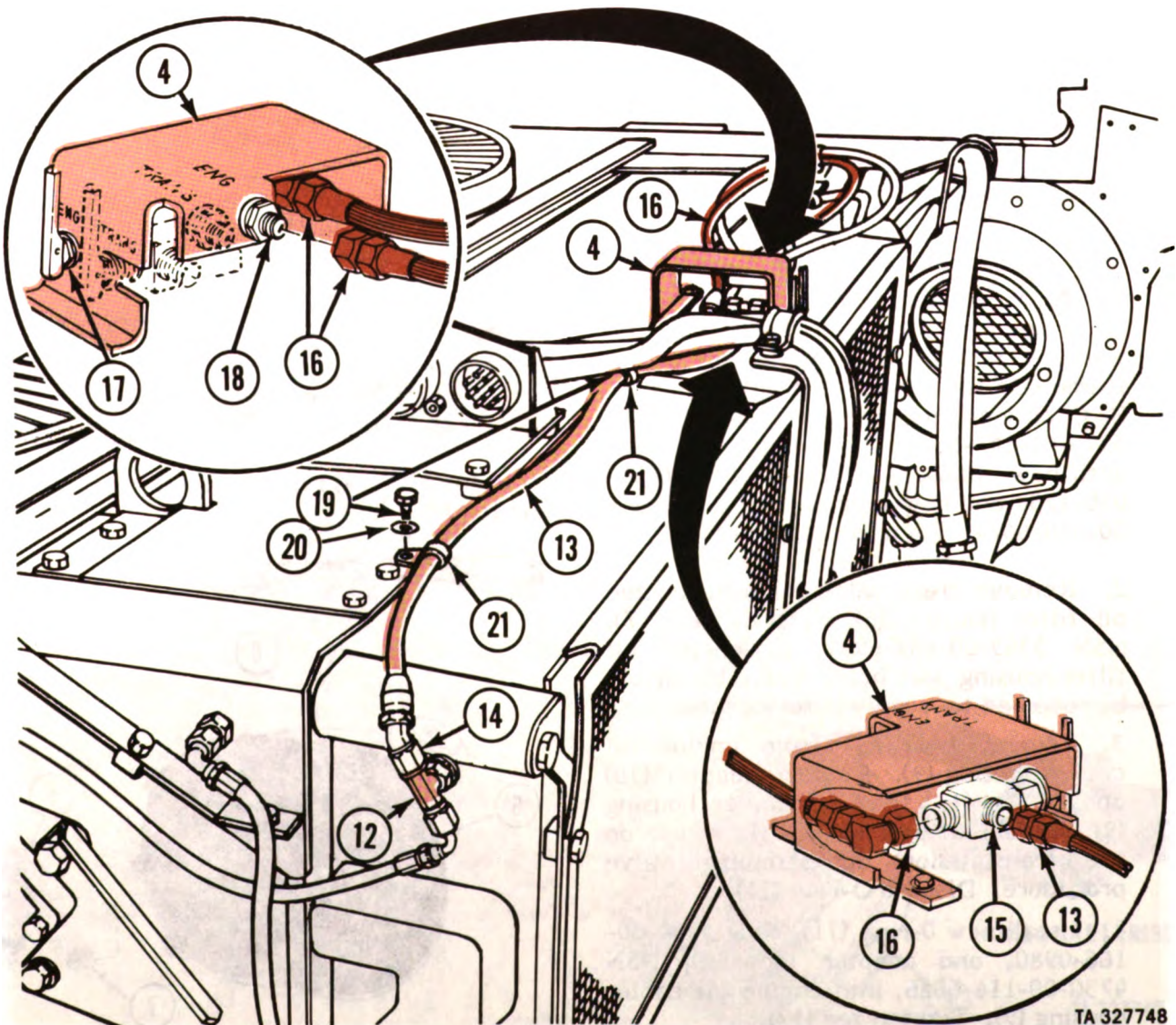
7. Install 90° elbow end fitting of hose (16), NSN 4720-01-167-0742, to rear port of sampling valve (15). Tighten end fitting.

8. Install engine oil sampling valve (15) on bracket (4). Slide valve neck into bracket slot marked ENGINE. Secure

valve in position by tightening valve locking nut (17).

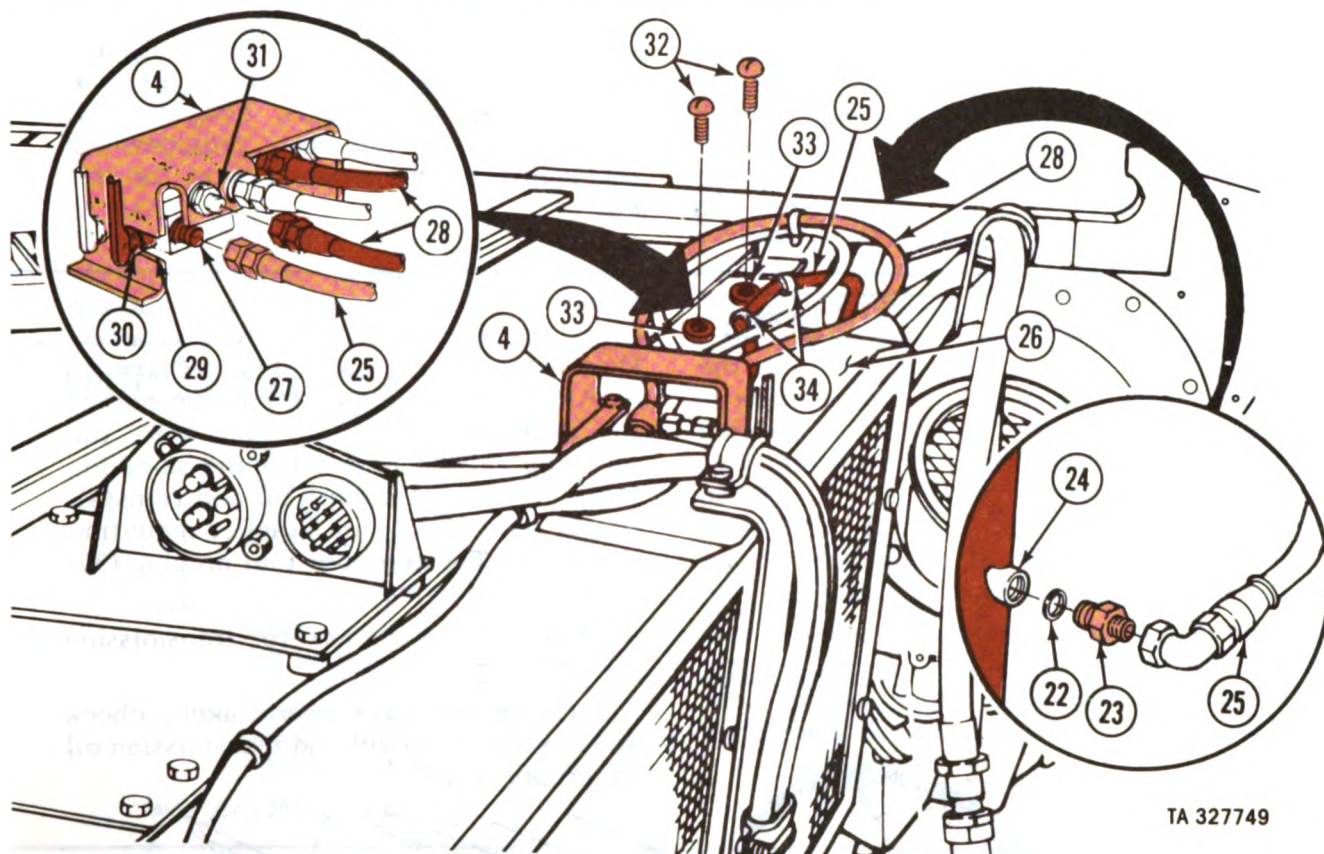
9. Route hose (16) in a loop along the surface length of the transmission oil cooler. Secure hose (16) for travel by installing loose end of hose (16) to the threaded mounting plug (18) marked ENG on bracket (4).

10. Remove two capscrews (19) and washers (20) from engine oil cooler frame. Secure hose (13) to the engine oil cooler frame using two clamps (21), NSN 5340-00-738-5174, capscrews (19) and washers (20).



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TRANSMISSION OIL SAMPLING VALVE INSTALLATION



TA 327749

NOTE

Transmission oil sampling valve installation requires use of the new transmission oil cooler, NSN 2520-01-162-7035

11. Install O-ring (22), NSN 5330-00-882-9172, and adapter (23), NSN 4730-00-959-5930, into transmission oil cooler boss (24).

12. Install 90° elbow end of hose (25), NSN 4720-01-163-3219, to adapter (23). Tighten end fitting.

13. Route opposite end of hose (25) along the transmission oil cooler frame (26) and toward installed bracket (4). Connect end of hose (25) to the center port of sampling valve (27), NSN 4820-01-163-7156. Tighten hose end-fitting.

14. Install 90° elbow end of hose (28), NSN 4720-01-167-0742, to rear port of sampling valve (27). Tighten end-fitting.

15. Install transmission oil sampling valve (27) on bracket (4). Slide valve neck into bracket slot (29) marked TRANSMISSION. Secure valve in position by tightening valve locking nut (30).

16. Route hose (28) in a loop along the surface length of the transmission oil cooler. Secure hose (28) for travel by installing loose end of hose to the threaded mounting plug (31) marked TRANS on bracket (4).

17. Remove two capscrews (32) and washers (33) from the transmission oil cooler frame. Secure hose (25) to the frame using two clamps (34), NSN 5340-00-738-5174, capscrews (32) and washers (33).

MAINTENANCE

Prior to installing powerpack in vehicle, bring engine and transmission oil to operating levels. (See specific vehicle LO.) Ground hop engine. Inspect AOAP oil lines and fittings for leaks. Tighten loose fittings. Shut off engine and perform follow-on tasks listed below.

SPECIAL SAMPLING INSTRUCTIONS

If the tank has not been operated in the past seven days or if the temperature is below 35°F (1-7°C), start tank engine and allow it to run until the engine is at normal operating temperature. When the engine is at normal operating temperature, shut off engine and obtain an oil sample.

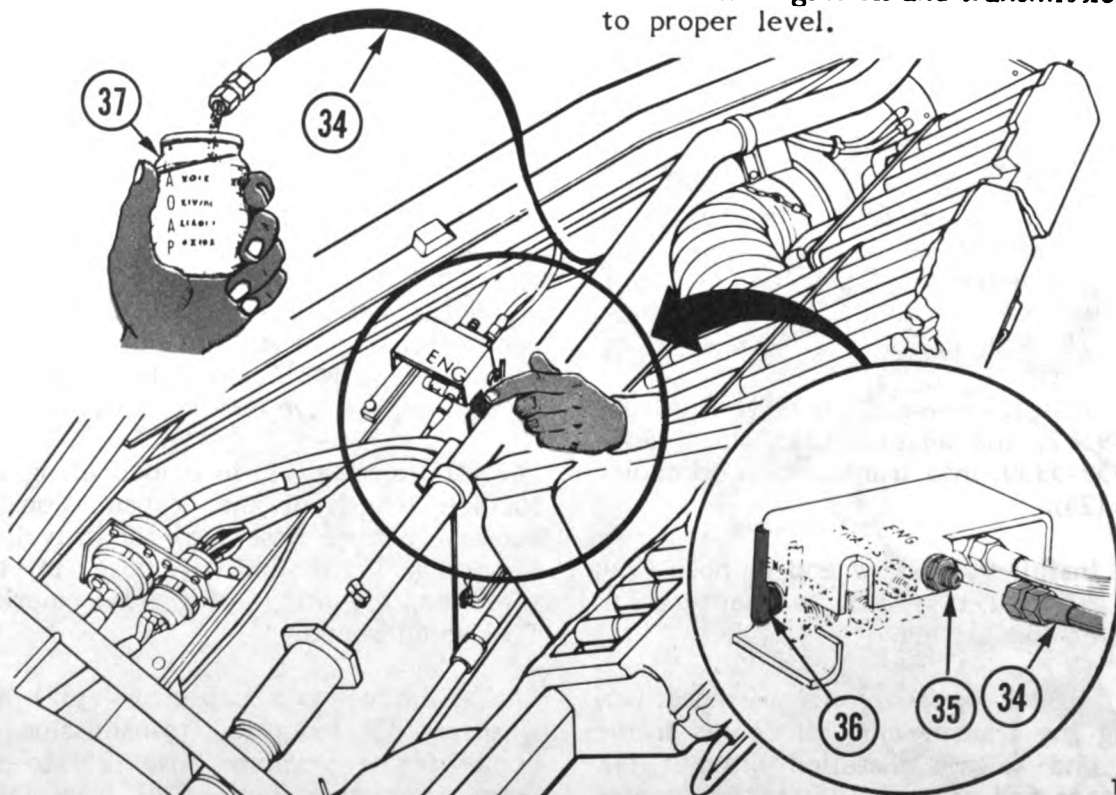
For engine oil sampling, unscrew and remove end of hose (34) from its bracket mounting plug (35). Place end of hose (34) into a clean container. Then open

Individual components of the M48/M60 oil analysis sampling valve kit are available as spare parts. Figure B-1, Appendix B of this TM, provides the replacement item ordering data for this kit.

sampling valve (36) and allow about one quart of oil to drain into the container. Shut off sampling valve (36). Place an AOAP sampling bottle (37) at the end of the hose (34). Once again open the sampling valve (36) and fill the sampling bottle. Shut off valve (36) and reinstall end of hose (34) to its bracket mounting plug (35). Tighten hose (34) on plug (35) to secure it for travel.

Repeat above procedure for transmission oil sampling.

After samples have been taken, check and fill the engine oil and transmission oil to proper level.



TA 327750

FOLLOW ON TASKS

Install power pack (-20 TM's).

Main gun traversed and secured for travel.

2-6. M113 Family Carriers

This paragraph contains installation and maintenance instructions for oil sampling valve kit, NSN 2815-01-154-3891, used on the engine and transmission of the following M113 Family of Vehicles: M113A1, M113A2, M106A1, M106A2, M125A1, M125A2, M132A1, M163A1, M577A1, M577A2, M741, M741A1, M901, M901A1, and M981.

Illustrations and instructions presented are of a "typical" carrier. Variations may occur within models or from model to model. However, such variations are minor. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

Lowest level of maintenance capable of initial installation of this kit is direct support maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT #1
4910-00-754-0654
GENERAL MECH TOOL KIT #2
4910-00-754-0650
DRILL SET - 5133-00-596-8080

MATERIALS/PARTS

*DRAIN VALVES (2)-2910-01-073-0080
*PIPE BUSHING (1)-4730-00-196-0837
*PIPE BUSHING (1)-4730-00-196-0889
*ELBOW (1)-4730-01-129-0481
SEALING COMPOUND-8030-00-656-1426
PREFORMED PACKING (1)-5330-00-263-8033

*PARTS OF KIT 2815-01-154-3891

TM REFERENCES:

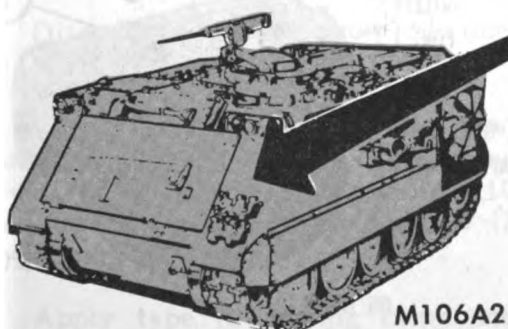
TM 9-2300-257-10(M113A1/A2 FOV)
TM 9-2350-261-10(M113A2 FOV)
LO 9-2300-257-12(M113A1/A2 FOV)
LO 9-2350-261-12(M113A2 FOV)
TM 9-2300-257-20(M113A1/A2 FOV)
TM 9-2350-261-20 (M113A2 FOV)

EQUIPMENT CONDITION

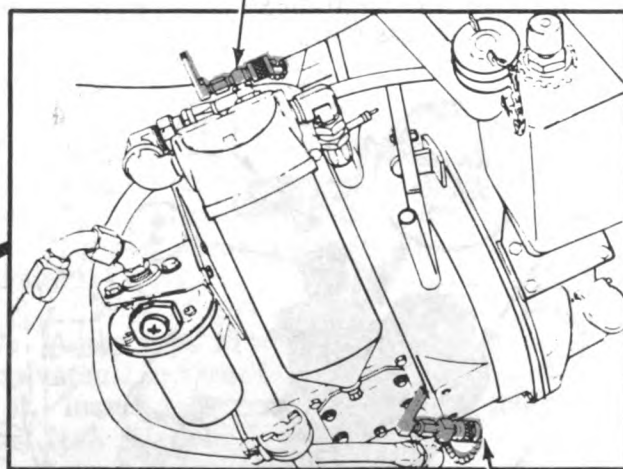
CARRIER ON LEVEL SURFACE
HAND BRAKE SET
MASTER SWITCH OFF
DRIVER'S ENGINE ACCESS PANEL REMOVED
TRANSMISSION OIL DRAINED

LOCATION

Engine and transmission oil sampling valves for M113 FOV are installed through the driver's engine access panel.



ENGINE OIL
SAMPLING
VALVE



TRANSMISSION OIL
SAMPLING VALVE

TA 327751

ENGINE OIL SAMPLING VALVE INSTALLATION**NOTE**

The engine oil sampling valve is installed on the engine oil filter housing cap (1) near the inlet port. Two kinds of caps (1) can be found in M113 FOV - caps with pipe plugs/caps without pipe plugs.

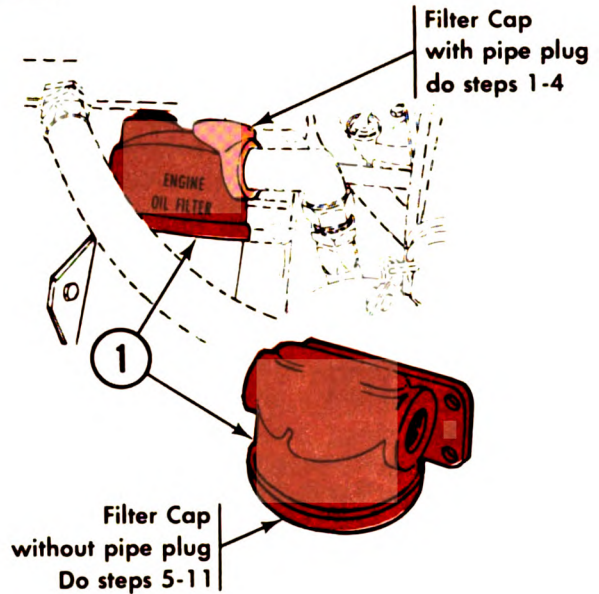
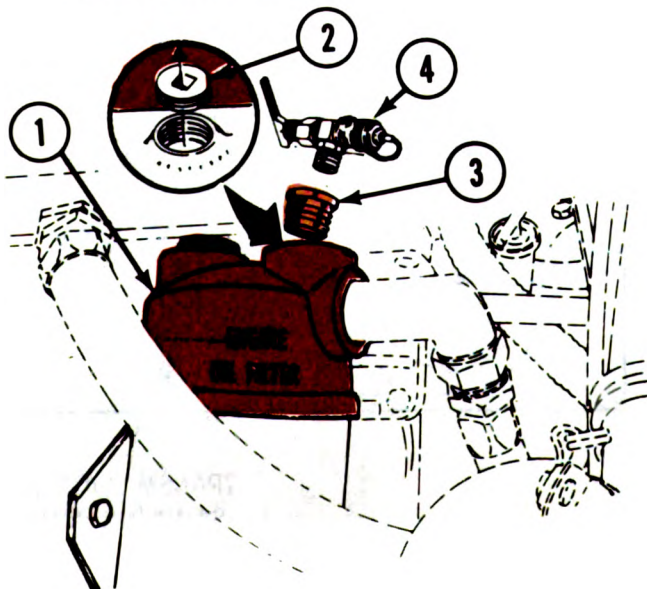
- Perform steps 1 through 4, below, if your carrier's engine oil filter housing cap has pipe plugs.
- Perform steps 5 through 11 if the engine oil filter cap in your carrier does not have pipe plugs.

1. Remove pipe plug (2) from the inlet port side of the oil filter housing cap (1).

2. Apply type III sealing compound, NSN 8030-00-656-1426 (or equivalent) to threads of bushing (3), NSN 4730-00-196-0889.

3. Install bushing (3) to oil filter housing cap (1). Tighten bushing.

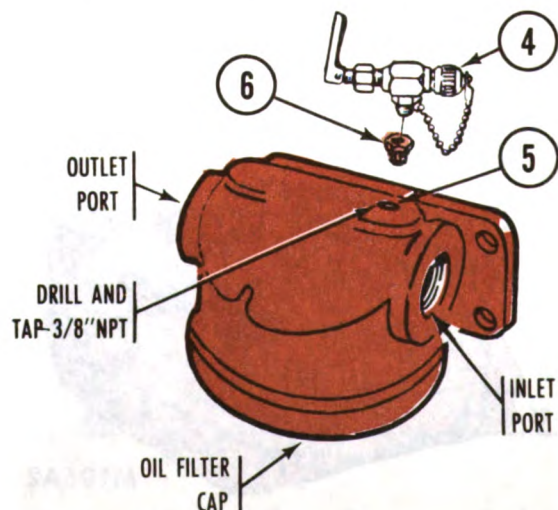
4. Apply type III sealing compound (or equivalent) to threads of sampling valve (4), NSN 2910-01-073-0080, and install valve (4) on bushing (3). Valve (4) should be installed so that valve drain point is readily accessible.



5. On carriers with oil filter caps without pipe plugs, remove the engine oil filter housing. (see TM 9-2300-257-20/ TM 9-2350-261-20.)

6. Locate, mark, and drill a $\frac{37}{64}$ inch diameter hole (5) through the oil filter cap. Hole (5) should be made through the top of the filter cap (1) near the inlet port to the space between the cap's outside shell and the inner web.

7. Tap hole (5) with a $\frac{3}{8}$ inch national pipe tap. Remove all chips and burrs from tapped housing. Clean cap (1).



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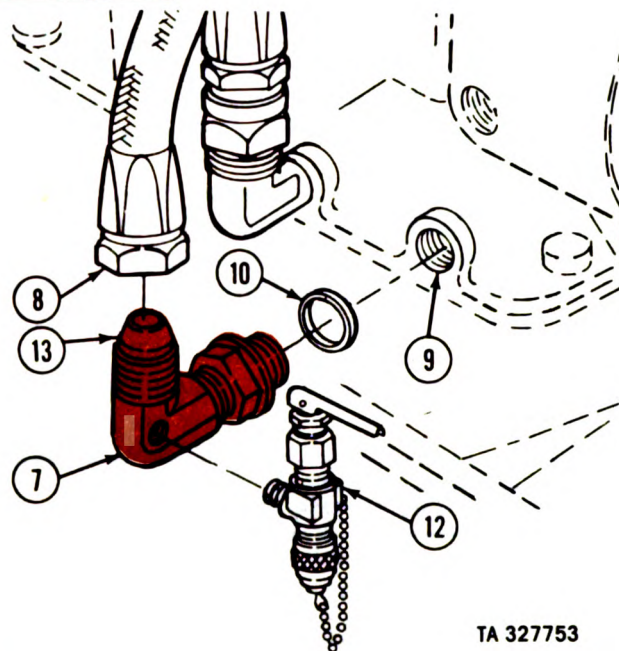
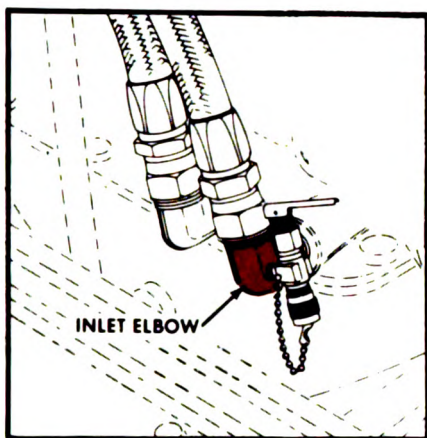
8. Apply type III sealing compound, NSN 8030-00-656-1426 (or equivalent), to threads of bushing (6), NSN 4730-00-196-0837.

9. Install bushing (6) to tapped hole (5). Tighten bushing.

10. Apply type III sealing compound (or equivalent) to threads of sampling valve (4), NSN 2910-01-073-0080, and install valve (4) on bushing (6).

11. Install engine oil filter housing. (See TM 9-2300-257-20/TM 9-2350-261-20).

TRANSMISSION OIL SAMPLING VALVE INSTALLATION



TA 327753

NOTE

The transmission oil sampling valve is installed on the transmission oil inlet elbow (7). Installation of the sampling valve requires draining of transmission oil in order to prevent undue oil spillage.

12. Drain transmission oil. See LO 9-2300-257-12 (M113A1 FOV) or LO 9-2350-261-12 (M113A2 FOV).

13. Disconnect transmission oil inlet hose (8) from elbow (7).

14. Disconnect elbow (7) from transmission oil inlet port (9). Remove elbow (7) and preformed packing (10) from inlet port (9). Discard elbow (7) and packing (10).

15. Apply type III sealing compound, NSN 8030-00-656-1426 (or equivalent) to

threads of oil sampling valve (12). Install sampling valve (12) on new elbow (7), NSN 4730-01-129-0481. Install so that drain part of valve (12) is downward.

16. Install new packing (10), NSN 5330-00-263-8033, on new elbow (7). Install new elbow (7) to transmission inlet port (9). Tighten elbow so that elbow inlet port (13) is upward.

17. Apply type III sealing compound (or equivalent) to threads of elbow inlet port (13). Install inlet hose (8) to elbow inlet port (13). Tighten hose (8).

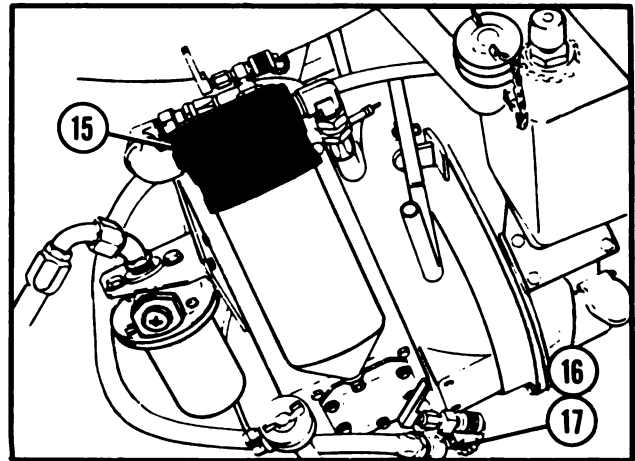
18. Fill transmission. See LO 9-2300-257-12 (M113A1 FOV) or LO 9-2350-261-12 (M113A2 FOV).

M113 FOV SAMPLING VALVE MAINTENANCE

All oil sampling valve kit hardware is available as individual repair parts. These items can be removed and replaced at organizational maintenance. Figure B-2, Appendix B of this TM, provides the repair parts for M113 FOV engine and transmission sampling valves.

Some vehicle items affected by installation of the oil sampling kit are the engine oil filter housing cap without pipe plugs (15), the transmission oil inlet elbow (16) and preformed packing (17).

a. The engine oil filter housing cap without pipe plugs (15) must be drilled and tapped in accordance with instructions in this TM each time the item must be replaced. This item is not currently available in the supply system with a threaded AOAP sampling valve port.



TA 327754

b. The transmission oil inlet elbow preformed packing (17) must be replaced whenever the elbow (16) is removed during maintenance.

FOLLOW ON TASKS

Fill transmission oil per vehicle LO instructions. Check level until correct.

Reinstall driver engine access panel per operator's manual instructions.

2-7. M548/M730 Family Carriers.

This paragraph contains installation and maintenance instructions for oil sampling valve kit, NSN 2815-01-152-8807. This kit is used on the engine, transmission, and differential of the following M548/M730 Family of Vehicles: M548/M548A1 tracked cargo carriers, M730/M730A1 guided missile carriers (Chaparral), and M1015/M1015A1 Electronics Warfare (EW) carriers.

Illustrations and instructions presented are of a "typical" carrier. Variations may occur within models or from model to model. Such variations, however, are minor. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

Lowest level of maintenance capable of initial installation of this kit is direct support maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT #1
4910-00-754-0654
GENERAL MECH TOOL KIT #2
4910-00-754-0650
DRILL SET - 5133-00-596-8088

SEALING COMPOUND-8030-00-656-1426
SCREW (2)-5305-00-269-3214
WASHER (2)-5310-00-080-6004
LOCKNUTS (2)-5310-00-087-4652

MATERIALS/PARTS

*DRAIN VALVES (2)-2910-01-073-0080
*BUSHING (1)-4730-00-196-0889
*BUSHING (1)-4730-00-196-0837
*COUPLING (1)-4730-00-947-7498
*ADAPTER (1)-4730-00-187-0861
*CLAMP (2)-4730-00-871-6729
*CLAMP (1)-5340-00-290-0783
*CLAMP (3)-5340-00-061-2296
*ADAPTER (1)-4730-00-231-5590
*SCREW (2)-5305-00-989-7435
*NUT (2)-5310-00-877-5797
*ELBOW (1)-4730-01-129-0481
*PACKING (1)-5330-00-263-8033
HOSE (3/4")-4720-00-913-5910
*BRACKET (1)-2540-01-130-3367

TM REFERENCES:

TM 9-2350-247-10 (M548/M1015)
TM 9-1450-585-10 (M730)
LO 9-2350-247-12 (M548/M1015)
LO 9-1450-585-12 (M730)
TM 9-2350-247-20 (M548/M1015)
TM 9-1450-585-20 (M730)
TM 9-1425-585-14 (M48 Fire Station)

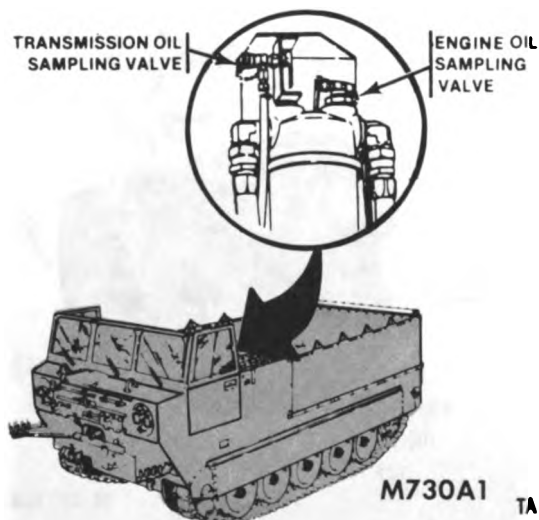
EQUIPMENT CONDITION

CARRIER ON LEVEL SURFACE (ALL)
HAND BRAKE SET (ALL)
MASTER SWITCH OFF (ALL)
BLAST SHIELD REMOVED (M730)
LAUNCH STATION DEMATED (M730)
SHELTER BACK (M1015)
REAR POWER PLANT COMPARTMENT
DOOR OPEN (ALL)
TRANSMISSION OIL DRAINED (ALL)

*PART OF KIT 2815-01-152-8807

LOCATION

M548/M730 FOV engine and transmission oil sampling valves are installed through the center engine access grilles behind the vehicle cab. Installation of the transmission oil sampling valve hose line is also accomplished through the rear power plant door on the carrier's deck.



ENGINE OIL SAMPLING VALVE INSTALLATION**NOTE**

The engine oil sampling valve is installed on the engine oil filter housing cap (1) near the inlet port. Two kinds of caps (1) can be found on M548/M730 FOV—caps **with** pipe plugs/caps **without** pipe plugs.

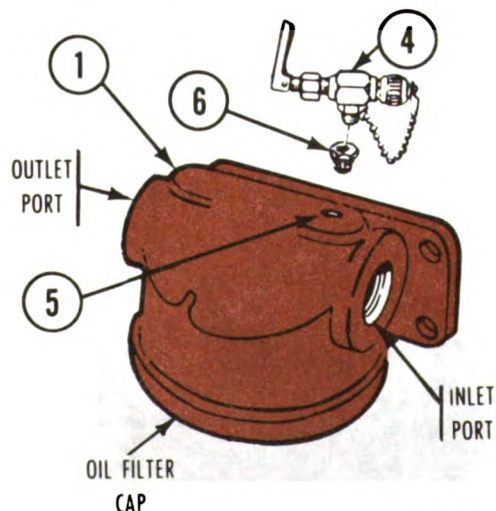
- Perform steps 1 through 4, below, if your carrier's engine oil filter housing cap has pipe plugs.
- Perform steps 5 through 11 if the engine oil filter cap in your carrier does not have pipe plugs.

1. Remove pipe plug (2) from the inlet port side of the oil filter housing cap (1).

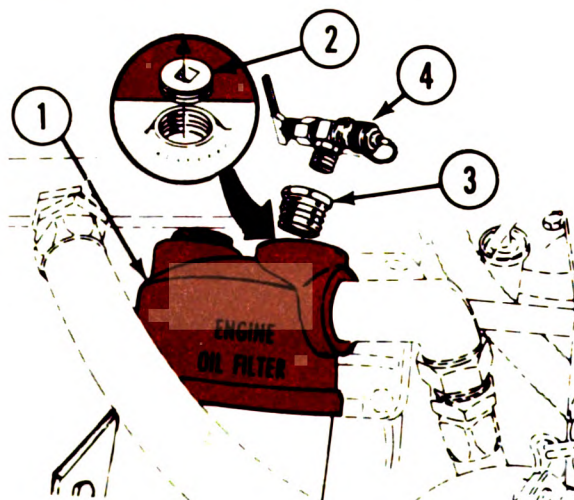
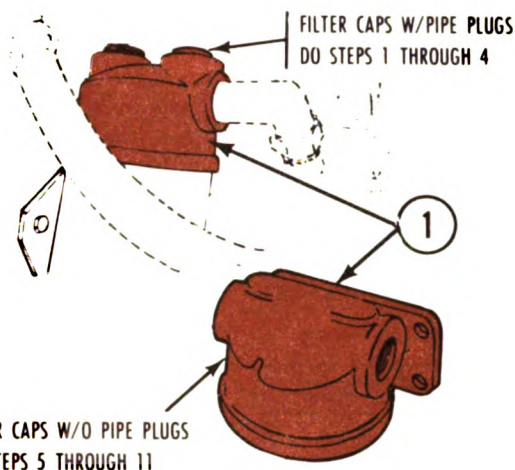
2. Apply type III sealing compound, NSN 8030-00-656-1426 (or equivalent) to threads of bushing (3), NSN 4730-00-196-0889.

3. Install bushing (3) to oil filter housing cap (1). Tighten bushing.

4. Apply type III sealing compound (or equivalent) to threads of sampling valve (4), NSN 2910-01-073-0080, and install valve (4) on bushing (3) - valve (4) should be installed so that valve drain point is readily accessible.



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5. On carriers with oil filter caps without pipe plugs, remove the engine oil filter housing. (See TM 9-2350-247-20 or TM 9-1450-585-20).

6. Locate, mark, and drill a $\frac{37}{64}$ inch diameter hole (5) through the oil filter cap. Hole (5) should be made through the top of the filter cap (1) near the inlet port to the space between the cap's outside shell and inner web.

7. Tap hole (5) with a $\frac{3}{8}$ inch national pipe tap. Remove all chips and burrs from tapped housing. Clean cap (1).

8. Apply type III sealing compound, NSN 8030-00-656-1426 (or equivalent), to outside threads of bushing (6), NSN 4730-00-196-0837.

9. Install bushing (6) to tapped hole (5). Tighten bushing.

10. Apply type III sealing compound (or equivalent) to threads of sampling valve (4), NSN 2910-01-073-0080, and install

valve (4) on bushing (6). Valve (4) should be installed so that valve drain point is readily accessible.

11. Install engine oil filter housing. (See TM 9-2350-247-20 or TM 9-1450-585-20.)

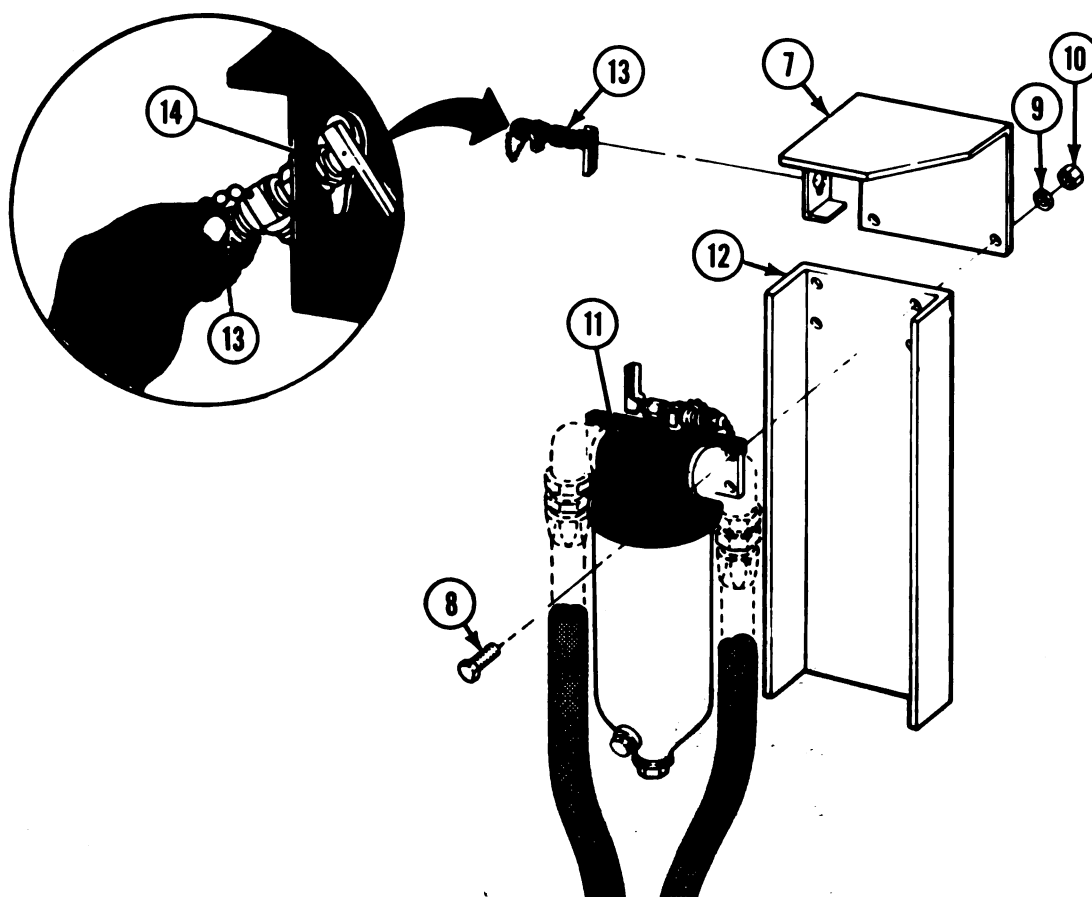
TRANSMISSION OIL SAMPLING VALVE INSTALLATION

12. Remove upper two screws (8), washers (9), and locknuts (10) mounting the engine oil filter (11) to the vehicle's platform bracket (12).

13. Install bracket (7), NSN 2540-01-130-3367, behind vehicle platform bracket (12). Secure engine oil filter (11), the platform bracket (12) and the AOAP valve mounting bracket (7) in

place using kit screws (8), NSN 5305-00-269-3214, washers (9), NSN 5310-00-080-6004, and locknuts (10), NSN 5310-00-087-4652.

14. Install transmission oil sampling valve (13), NSN 2910-01-073-0080, to bracket (7). Slide valve neck into the narrow end of the mounting bracket hole and secure in place by tightening valve hex-head nut (14).



TA 327757

15. Drain transmission oil. (See LO 9-2350-247-12 or LO 9-1450-585-12.)

16. Disconnect transmission oil inlet hose (15) from elbow (16).

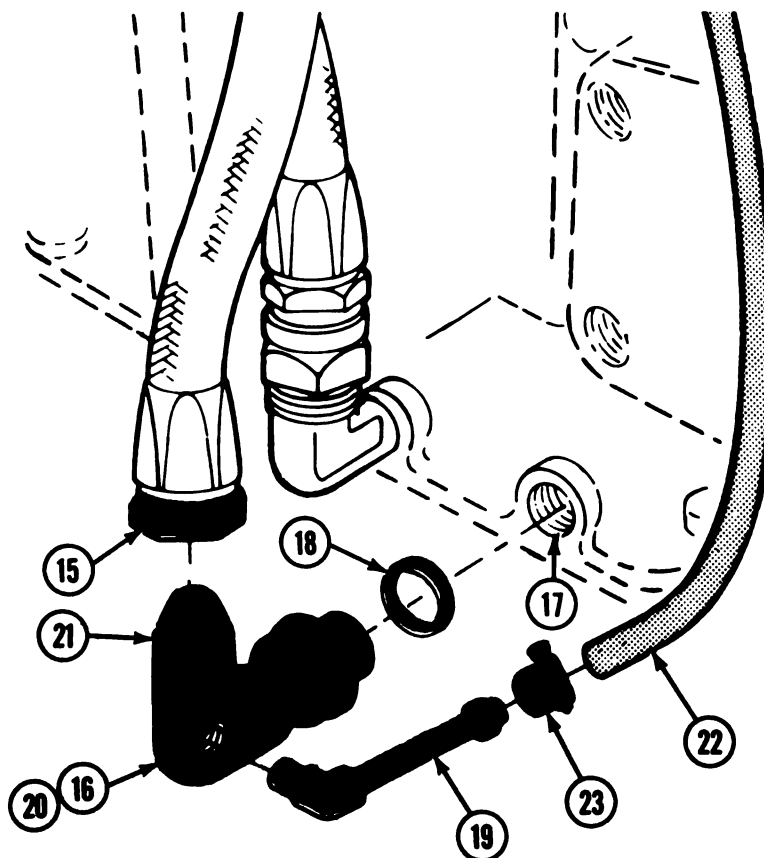
17. Disconnect elbow (16) from transmission oil inlet port (17). Remove elbow (16) and preformed packing (18) from inlet port (17). Discard elbow (16) and packing (18).

18. Apply type III sealing compound, NSN 8030-00-656-1426 (or equivalent) to external threads of elbow adapter (19), NSN 4730-00-231-5590. Install elbow adapter (19) on kit elbow (20), NSN 4730-01-129-0481.

19. Install new packing (18), NSN 5330-00-263-8033, on elbow (20). Install elbow to transmission inlet port (17). Tighten elbow so that open end of elbow adapter (19) points upward toward the engine oil filter II.

20. Apply type III sealing compound (or equivalent) to threads of elbow inlet port (21). Install hose (15) to elbow inlet port (21). Tighten hose (15).

21. Obtain a 34 inch length of hose (22), NSN 4720-00-913-5910. Install one end of hose (22) to elbow adapter (19). Secure in place with clamp (23), NSN 4730-00-871-6729. Install opposite end of hose to adapter (24), NSN 4730-00-187-0861. Secure in place with second kit clamp (23).



TA 327758

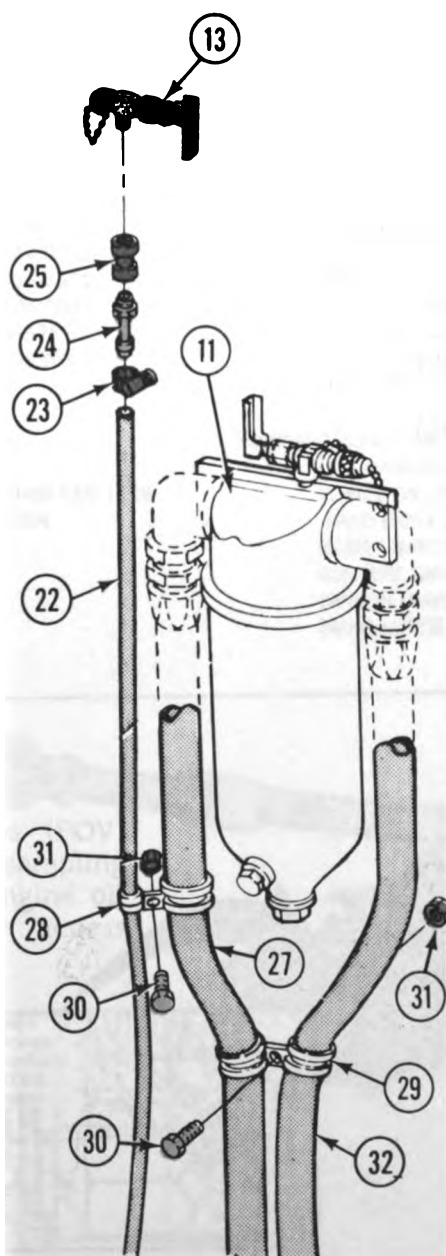
22. Apply type III sealing compound to external threads of adapter (24). Install coupling (25), NSN 4730-00-947-7498, to adapter (24). Remove sampling valve (13) from bracket (7). Install valve (13) into coupling (25). Reinstall valve unto bracket (7) as in step 14.

23. Secure hose (22) to engine oil outlet hose (27) using clamp (28), NSN 5340-00-290-0783, and clamp (29), NSN 5340-00-597-2296. Secure both clamps together

with screw (30), NSN 5305-00-989-7435, and nut (31) NSN 5310-00-877-5797.

24. Secure engine oil outlet hose (27) to engine oil inlet hose (32) with two clamps (29), NSN 5340-00-061-2296. Secure both clamps together with screw (30) and nut (31).

25. Fill transmission. (See LO 9-2350-247-12 or LO 9-1450-585-12.)



TA 327759

M548/M730 FOV SAMPLING VALVE MAINTENANCE

Individual components of the sampling valve kit are available as repair parts. Figure B-3, Appendix B of this TM, provides the list of replacement items used on the M548/M730 FOV sampling valves.

Vehicle items modified or replaced during installation of the sampling valve kit are the following:

- a. Engine oil filter housing cap w/o pipe plugs.
- b. Engine oil filter mounting screw, washers, and locknuts (steps 12 and 13, above)

FOLLOW ON TASKS

Fill transmission oil per vehicle LO instructions. Check level until correct.

Close rear power plant compartment door.

Install center engine access grilles.

EW shelter forward (M1015)

Blast shields installed (M730)

Launch station mated (M730)

2-8. M109/M110 Family Vehicles

This paragraph contains installation and maintenance instructions for oil sampling valve kit, P/N 12268199. This kit is installed on the engine and transmission of the following vehicles: M107, M108, M109, M109A1, M109A2, M109A3, M110, M110A1, and or M110A2 self propelled artillery. This kit is also installed on the M578 recovery vehicle and the M992 artillery support vehicle.

Illustrations and instructions presented are of a "typical" self-propelled artillery vehicle. Variations may occur within models or from model to model. Such variations are minor. Maintenance personnel are asked to adjust to all such variations when performing any of the procedures.

The lowest level of maintenance capable of initial installation of this kit is organizational maintenance.

INITIAL SETUP

TOOLS: GENERAL MECHANICS TOOL KIT #1
4910-00-754-0654
GENERAL MECHANICS TOOL KIT #2
4910-00-754-0650

MATERIALS/PARTS

*VALVE (2)-2910-01-073-0080
*ADAPTER (1)-4730-00-289-0383
*ADAPTER (1)-4730-00-800-7570
*BUSHING (1)-4730-00-196-0930
*CLAMP (1)-5340-00-964-5267
*ELBOW (1)-4730-00-877-8997
*ELBOW (1)-MS51506A4
*TUBE (1)-12268191
*BRACKET (1)-12268190
*DECAL (1)-12268192
SEALING COMPOUND 8030-00-656-1426
HOSE (1)-4720-00-182-8854

TM REFERENCES

TM 92350-202-10
LO 9-2350-20212
TM 9-2300-216-10
LO 02300-216-12

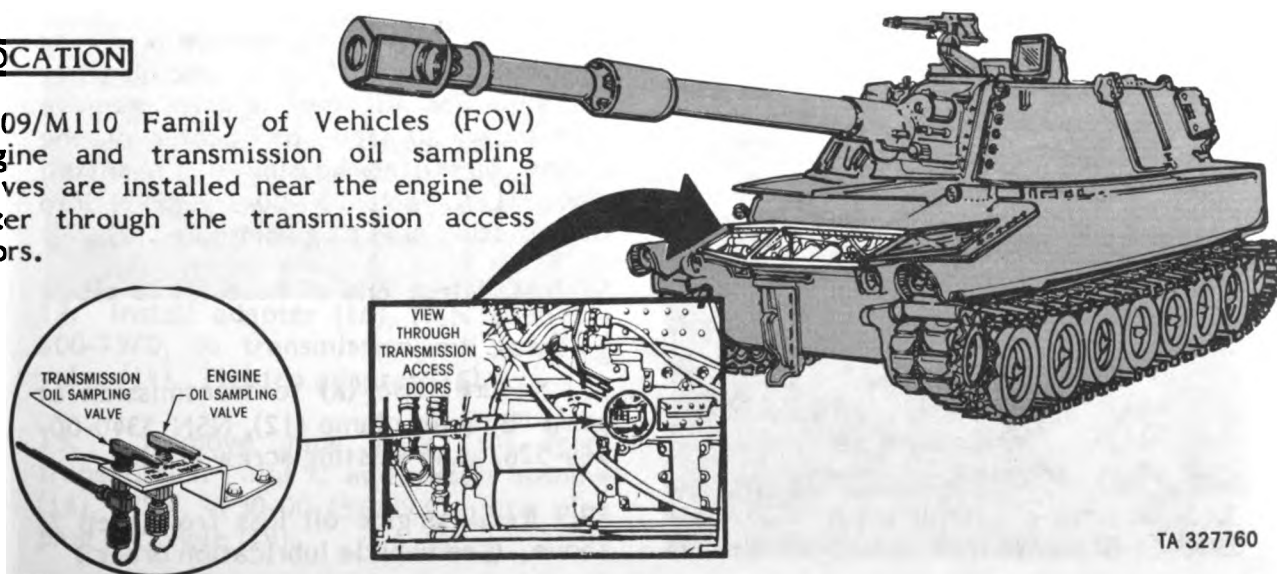
TM 9-2350-217-10
LO 9-2350-217-12
TM 9-2350-217-10N
LO 9-2350-217-12N
TM 9-2350-303-10
LO 9-2350-303-12
TM 9-2350-304-10
TM 9-2350-304-12
TM 9-2350-238-10
LO 9-2350-238-12
TM 9-2350-267-10
LO 9-2350-267-12

EQUIPMENT CONDITION

(SEE OPERATOR'S MANUAL)
VEHICLE ON LEVEL GROUND
HAND BRAKE SET
MASTER SWITCH OFF
GUN TUBE TRAVEL LOCK FORWARD
CANNON TRAVERSED TO RT/LT
TRANS ACCESS DOOR OPEN

LOCATION

M109/M110 Family of Vehicles (FOV) engine and transmission oil sampling valves are installed near the engine oil filter through the transmission access doors.



TA 327760

ENGINE OIL SAMPLING VALVE INSTALLATION

NOTE

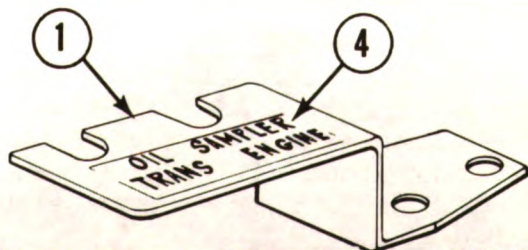
Kit bracket (1) P/N 12268190, is installed on the vehicle using existing screws (2). Upon first removal of screws (2), inspect and replace screws only if unserviceable. Existing vehicle screws used with this oil sampling valve kit are P/N MS35295-70, NSN 5305-00-017-9851 (FSCM: 96906).

1. Remove two screws (2) from transmission housing (3). Align bracket (1) to housing (3) and reinstall screws (2) to secure bracket in place.

CAUTION

Install "OIL SAMPLER TRANS ENGINE" decal (4) on mounting bracket as shown below. When installed on vehicle in accordance with these instructions, the word "TRANS" will be aligned with the transmission oil sampling valve. An improperly installed decal may result in confusion and mislabeling of the oil sample itself.

2. Attach decal (4) to the forward bed of mounting bracket (1).



NOTE

TA327761

Apply type III sealing compound, NSN 8030-00-656-1426 (or equivalent) to external threads of all fittings listed in steps 4 through 10 below. Tighten all fittings after each step.

3. Slide neck of sampling valve (5), NSN 2910-01-073-0080 into slot of bracket (1)

near decal marking "ENGINE". Secure valve (5) in place by tightening valve locknut (6).

4. Install elbow (7), NSN 4730-00-877-8997, on valve (5).

5. Install hose (8), NSN 4720-00-182-8854, on elbow (7).

6. Route hose (8) in a semi-circle from valve (5) to transmission housing (point "B") to engine oil filter assembly (9). Route so that hose (8) is beneath vehicle electrical wiring harness.

CAUTION

Obtain a clean container and be prepared to catch oil from the engine oil filter assembly (9) when performing the next step. Oil loss should be less than 1 pint.

NOTE

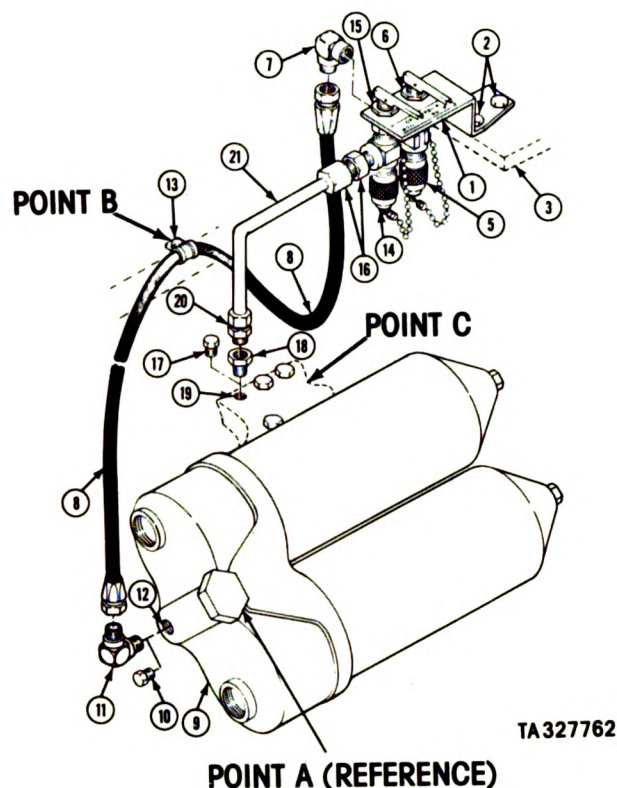
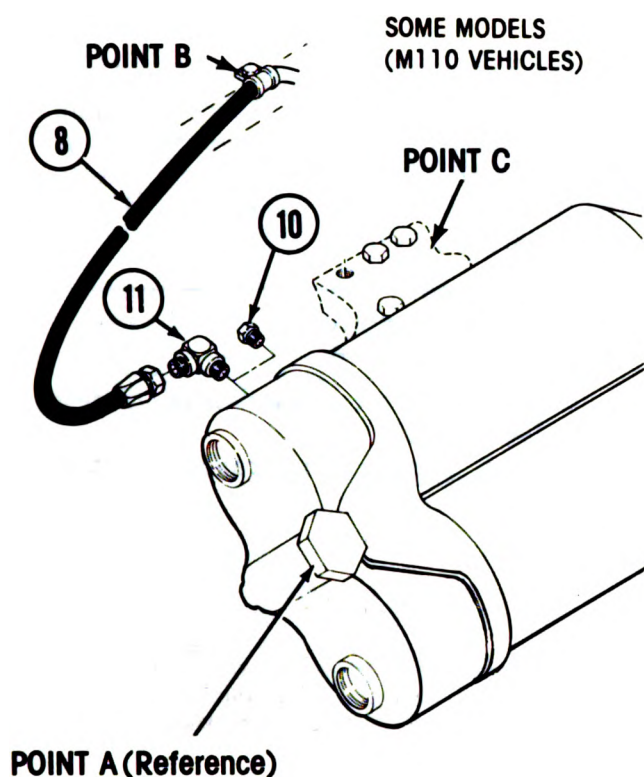
Some models (M110 vehicles) install hose (8) at a different location. On such models, the pipe plug removed is located at the side of the oil filter housing. Kit parts used remain the same for all installations.

7. For M110 vehicles, remove pipe plug (10) from the side of the engine oil filter housing. For all other vehicles, remove pipe plug (10) from the center of the engine oil filter housing cap. Install elbow (11), NSN 4730-00-877-8997, into the resulting pipe plug port hole (12).

8. Install free end of hose (8) to elbow (11).

9. Secure hose (8) to transmission at point "B" with clamp (12), NSN 5340-00-964-5267, and existing screw (13).

10. Refill engine oil loss from step 7, above. (See vehicle lubrication order.)



TRANSMISSION OIL SAMPLING VALVE INSTALLATION

11. Slide neck of sampling valve (14), NSN 2910-01-073-0080, into slot of bracket (1) near decal marking-TRANS (right side of vehicle). Secure valve (14) tightly in place with valve locknut (15). Installed valve should be secured with oil port fitting facing transmission point C.

NOTE

Apply type III sealing compound NSN 8030-00-656-1426 (or equivalent) to external threads of all fittings listed in steps 12 through 16 below. Tighten fittings as directed within each step to avoid alignment difficulty.

12. Install adapter (16), NSN 4730-00-800-7570, to transmission oil sampling valve (14). Tighten adapter (16).

13. Remove pipe plug (17) from transmission Point C and install bushing (18), NSN 4730-00-196-0930, into pipe plug port hole (19).

14. Install adapter (20), NSN 4730-00-289-0383, on bushing (18). Tighten adapter (20).

15. Shape piping of tube assembly (21), P/N 12268191, so that tube end fittings extend from the sampling valve (14) to transmission point C.

16. Install one end of shaped tube assembly (21) to valve adapter (16). Install opposite end to adapter (20) at transmission point C. Tighten end fittings after both fittings have been installed.

NOTE

Some vehicle kit installations may require loosening of the sampling valve from the mounting bracket in order to help align the tube assembly. Retighten valve to mounting after alignment is obtained.

MAINTENANCE

Individual components of the oil sampling valve kit are available as repair parts. Figure B-4, Appendix B of this TM, provides the repairable/replacement items for M109/M110 FOV engine and transmission sampling valves.

Vehicle items affected by installation of the kit are the engine oil filter cap pipe plug (step 7, item 10) and the transmission pipe plug (step 13, item 17). The engine oil filter pipe plug is not available as an individual replacement item. For this reason, pipe plugs

removed during installation of the kit should be saved for possible reinstallation. In the event it is necessary to remove the kit and restore the transmission, use pipe plug, 1/4-in NPT, NSN 4730-00-287-3279.

FOLLOW ON TASKS

Close and lock transmission access doors (vehicle-10).

Secure cannon in travel position (vehicle-10).

2-9. M88A1 Recovery Vehicle.

This paragraph contains installation and maintenance instructions for oil sampling valve kit, Part Number 570-5396. This kit is installed on the engine and transmission of the M88 Medium Recovery Vehicle.

Some M88A1 oil filter covers may already have plugs at location of the

engine oil sampling valve. Other vehicles may require drilling of the covers. The lowest level of maintenance authorized to install this kit on vehicles with pre-threaded covers is organizational maintenance. If drilling and tapping of the cover is required, initial installation of this kit must be accomplished at direct support maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECHANICS TOOL KIT #1
4910-00-754-0654

MATERIALS/PARTS:

*VALVE (2)-2910-01-073-0080
*COUPLING (1)-4730-00-415-3172
*GASKET (1)-11684047
*SCREW, OIL VENT (1)-5305-00-269-2806
*WASHER, SEAL (1)-5310-00-184-8974
*PACKING (1)-5330-00-954-6684
SEALING COMPOUND-(BULK)-8030-00-656-1426

*PART OF KIT P/N 5705396

TM REFERENCES:

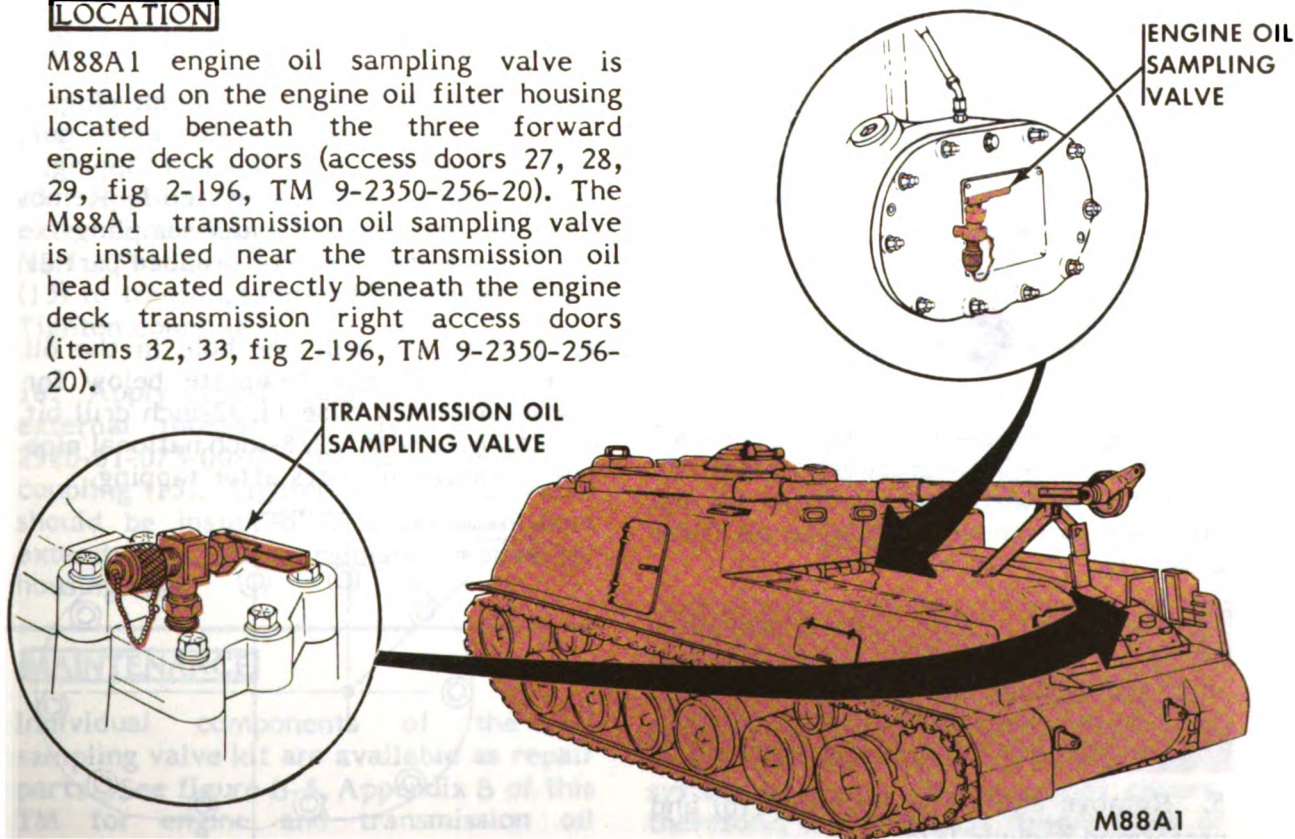
TM 9-2350-256-10
LO 9-2350-256-12
TM 9-2350-256-20

EQUIPMENT CONDITION:

VEHICLE ON LEVEL GROUND
FUEL SHUTOFF HANDLE OUT
MASTER SWITCH OFF
FORWARD ENGINE DECK DOORS
REMOVED (All)
ENGINE DECK TRANSMISSION
RIGHT FRONT AND RIGHT
REAR ACCESS DOORS
OPEN

LOCATION

M88A1 engine oil sampling valve is installed on the engine oil filter housing located beneath the three forward engine deck doors (access doors 27, 28, 29, fig 2-196, TM 9-2350-256-20). The M88A1 transmission oil sampling valve is installed near the transmission oil head located directly beneath the engine deck transmission right access doors (items 32, 33, fig 2-196, TM 9-2350-256-20).



M88A1

TA327763

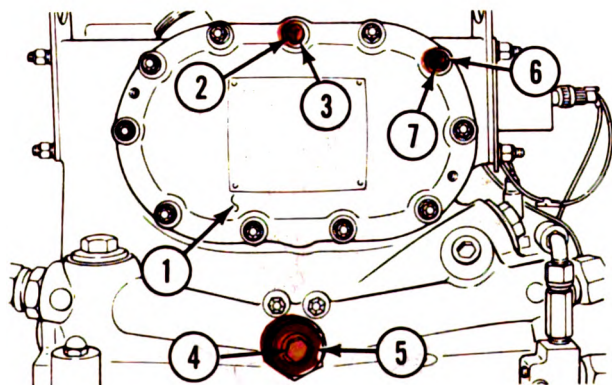
ENGINE OIL SAMPLING VALVE INSTALLATION**NOTE**

It is not necessary to completely drain the engine of oil before removal of the engine oil filter cover (1). However, drain at least 2 gallons from the main engine crankcase. This will minimize the oil loss during installation procedure. (See LO 9-2350-256-12.)

1. Remove oil vent capscrew (2) and seal washer (3) from engine oil filter cover (1). Discard vent capscrew (2) and washer (3).

2. Loosen oil drain valve plug bolt (4) six complete turns. Do not loosen oil drain valve adapter (5).

3. Remove ten self-locking nuts (6) and flatwashers (7) from engine oil filter cover (1).

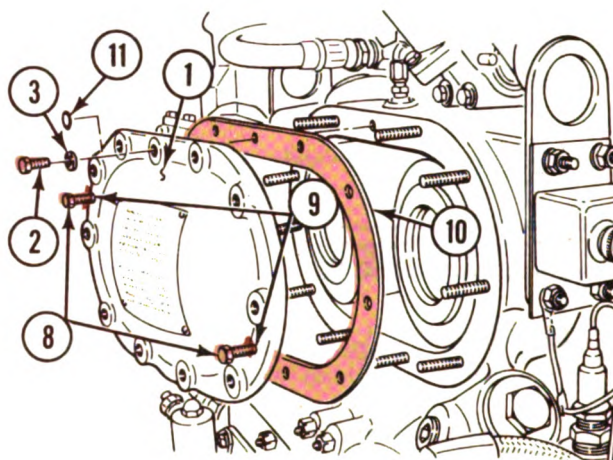


4. Install two capscrews (8), 3/8-24 UNF x 1-1/2, into oil filter cover bosses (9). Grip the two installed capscrews (8) and pull back to remove the engine oil filter cover (1).

NOTE

Be prepared for some oil loss during removal of the engine oil filter cover (1).

5. Remove and discard gasket (10) and preformed packing (11).

**WARNING**

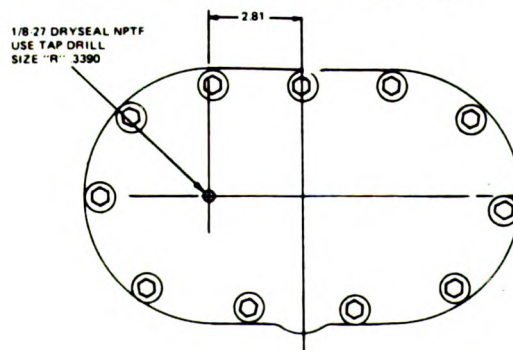
Dry cleaning solvent is flammable. Keep it away from heat or open flame. Use in well ventilated area. Do not let it get on your skin.

6. Clean engine oil filter cover (1) in preparation for rework. Use dry cleaning solvent, type II, P-D-680.

NOTE

M88A1 vehicles with pipe plugs on the engine oil filter cover do not require drilling and tapping. In such cases, skip step 7. Remove pipe plug and install sampling valve in the pre-threaded part as directed by step 8.

7. Locate and drill one hole in the oil filter cover. See template below for rework location. Use 11/32-inch drill bit and tap hole with a 1/8-inch national pipe tap. Remove all burrs after tapping.



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8. Apply type III sealing compound, NSN 8030-00-656-1426 (or equivalent) to external threads of sampling valve (12), NSN 2910-01-073-0080. Install valve (12) on reworked cover (1). Tighten valve (12). Valve should be installed so that drain port will be downward.

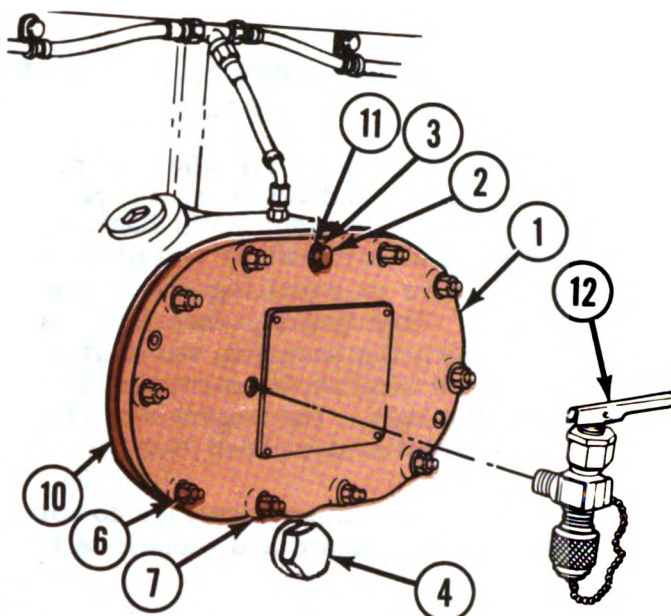
9. Install kit gasket (10), P/N 11684047, and oil filter cover (1). Secure installation in place with ten flatwashers (7) and self-locking nuts (6), NSN 5310-00-982-4908. Tighten locknuts.

10. Tighten oil drain valve plug bolt (4) until bolt bottoms.

CAUTION

Make certain bolt (4) has been bottomed. Failure to tighten bolt until it is bottomed will result in loss of engine oil pressure.

11. Install kit preformed packing (11), NSN 5330-00-954-6684, seal washer (3),



NSN 5310-00-184-8974, and oil vent capscrew, NSN 5305-00-269-2806.

12. Remove capscrews (8) from oil filter cover bosses (9).

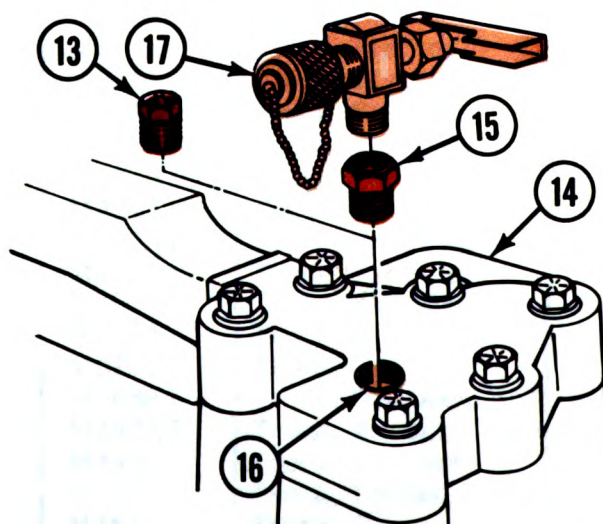
13. Refill engine oil level. (See LO 9-2350-256-12).

TRANSMISSION OIL SAMPLING VALVE INSTALLATION

14. Remove converter in-pressure pipe plug (13) on transmission (14).

15. Apply type III sealing compound to external threads of pipe coupling (15), NSN 4730-00-415-3172. Install coupling (15) to transmission in-pressure port (16). Tighten coupling (15).

16. Apply type III sealing compound to external threads of valve (17), NSN 2910-01-073-0080. Install valve (17) on coupling (15). Tighten valve (17). Valve should be installed so that drain port extends over the transmission converter housing (14).



Vehicle items affected by installation of this kit are the engine oil filter cover (1) and transmission converter housing pipe plug. The filter housing cover is no longer available in the Army supply system untapped. Replacement covers, therefore, do not require rework (such as in step 7, above). The replacement

MAINTENANCE

Individual components of the oil sampling valve kit are available as repair parts. See figure B-5, Appendix B of this TM for engine and transmission oil sampling valve replacement parts.

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cover stock number is NSN 2940-01-070-5969. This item is coded PAOZZ.

Kit gasket (10), P/N 11684047, is not available as an individual spare part. This is because the item is not likely to be needed unless a unit is installing a sampling valve or replacing the engine oil filter. This gasket, therefore, is available with the sampling valve kit or the engine oil filter replacement kit, NSN 2940-00-397-3404. The engine oil filter replacement kit is also coded PAOZZ.

M88A1 vehicle maintenance TM's do not advise users to discard and replace self-

locking nuts (6). Replacement of such locknuts when possible is good maintenance practice. For this reason, the replacement NSN for the self-locking nuts is given in step 9, above.

FOLLOW ON TASKS

Close engine deck transmission access doors.

Install forward engine deck doors.

Section III. INSTALLATION AND MAINTENANCE INSTRUCTIONS FOR TACTICAL VEHICLES

2-10. Model Reference Index.

This section presents oil analysis sampling valve and valve kit installation and maintenance instructions for tactical, wheeled vehicles only.

Table 2-3, below, lists the models and the page reference where instructions for each model can be located in this TM. Tactical vehicles not listed in table 2-3 do not have sampling valves or valve kits available at time of this publication. However, major components of such vehicles may still come under Army Oil

Analysis Program directives. Table 1-2 lists all tank-automotive tactical vehicles and provides a vehicle-by-vehicle status with regard to sampling valves, use of the sampling pump, and/or why a particular tactical vehicle is not in the oil analysis program. Refer to table 1-2 if your vehicle is not listed below.

Vehicles are listed in table 2-3, below, by model number in alpha-meric sequence.

TABLE 2-3. Model Reference Index for Tactical Vehicles

Vehicle Model #	Description	Page Number
M35A1	Truck, Cargo	2-32
M35A2	Truck, Cargo	2-32
M35A2C	Truck, Cargo	2-32
M36A2	Truck, Cargo	2-32
M39A2	Truck, Chassis	2-32
M40A1	Truck, Chassis	2-29
M40A1C	Truck, Chassis	2-29
M40A2C	Truck, Chassis	2-32
M49A1C	Truck, Tank, Fuel	2-32
M49A2C	Truck, Tank, Fuel	2-32
M50A1	Truck, Tank, Water	2-32
M50A2	Truck, Tank, Water	2-32
M50A3	Truck, Tank, Water	2-32
M51A1	Truck, Dump	2-29
M51A2	Truck, Dump	2-32
M52A1	Truck, Tractor	2-29
M52A2	Truck, Tractor	2-32
M54A1	Truck, Cargo	2-29
M54A1C	Truck, Cargo	2-29
M54A2	Truck, Cargo	2-32
M54A2C	Truck, Cargo	2-32
M55A2	Truck, Cargo	2-32
M61A1	Truck, Chassis	2-29
M61A2	Truck, Chassis	2-32
M63A2	Truck, Chassis	2-32
M63A2C	Truck, Chassis	2-32
M109A2	Truck, Van, Shop	2-32
M109A3	Truck, Van, Shop	2-32
M123A1C	Truck, Tractor	2-34
M123E2	Truck, Tractor	2-34

Vehicle Model #	Description	Page Number
M139A1	Truck, Chassis	2-29
M185A2	Truck, Repair Shop	2-32
M185A3	Truck, Repair Shop	2-32
M246A1	Truck, Tractor Wrecker	2-29
M246A2	Truck, Tractor Wrecker	2-32
M275A1	Truck, Tractor	2-32
M275A2	Truck, Tractor	2-32
M291A1	Truck, Van, Exp	2-29
M291A1C	Truck, Van, Exp	2-29
M291A1D	Truck, Van, Exp	2-29
M292A1	Truck, Van, Exp	2-32
M292A2	Truck, Van, Exp	2-32
M292A4	Truck, Van, Exp	2-32
M292A5	Truck, Van, Exp	2-32
M342A2	Truck, Dump	2-32
M520	Truck, Cargo	2-36
M543A1	Truck, Wrecker, Med	2-29
M543A2	Truck, Wrecker, Med	2-32
M553	Truck, Wrecker	2-36
M559	Truck, Tanker, Fuel	2-36
M561	Truck, Cargo	2-39
M746	Truck, Tractor	2-42
M756A2	Truck, Pipeline	2-32
M764	Truck, Polesetting	2-32
M792	Truck, Ambulance	2-39
M809	Truck, Chassis	2-51
M809A1	Truck, Chassis	2-51
M810	Truck, Chassis	2-51

TABLE 2-3. Model Reference Index for Tactical Vehicles (continued)

Vehicle Model #	Description	Page Number	Vehicle Model #	Description	Page Number
M811	Truck, Chassis	2-51	M919	Truck Chassis, Concrete Mixer	2-49
M811A1	Truck, Chassis	2-51	M920	Truck, Tractor	2-49
M811A2	Truck, Chassis	2-51	M923	Truck, Cargo	2-53
M812	Truck, Chassis	2-51	M924	Truck, Cargo	2-53
M812A1	Truck, Chassis, Rocket Launch	2-51	M925	Truck, Cargo,	2-53
M813	Truck, Cargo	2-51	M926	Truck, Cargo	2-53
M813A1	Truck, Cargo	2-51	M927	Truck, Cargo, LWB	2-53
M814	Truck, Cargo	2-51	M928	Truck, Cargo, LWB	2-53
M815	Truck, Bolster	2-51	M929	Truck, Dump	2-53
M816	Truck, Wrecker, Med	2-51	M930	Truck, Dump	2-53
M817	Truck, Dump	2-51	M931	Truck, Tractor	2-53
M818	Truck, Tractor	2-51	M932	Truck, Tractor	2-53
M819	Truck, Tractor, Wrecker	2-51	M934	Truck, Van, Exp	2-53
M820	Truck, Van, Exp	2-51	M935	Truck, Van, Exp w/Lift Gate	2-53
M820A1	Truck, Van, Exp	2-51	M936	Truck, Wrecker, Med	2-53
M820A2	Truck, Van, Exp	2-51	M939	Truck, Chassis	2-53
M821	Truck, Stake, Bridge	2-51	M940	Truck, Chassis	2-53
M876	Truck, Telephone Maintenance	2-57	M941	Truck, Chassis	2-53
M877	Truck, Cargo	2-36	M942	Truck, Chassis	2-53
M911	Truck, Heavy Equip Transporter (HET)	2-46	M943	Truck, Chassis	2-53
M915	Truck, Tractor HET	2-49	M944	Truck, Chassis	2-53
M916	Truck, Tractor LET	2-49	M945	Truck, Chassis	2-53
M917	Truck Chassis, Dump	2-49			
M918	Truck Chassis, Bituminous Distributor	2-49			

2-11. M39 Series Trucks W/Diesel Engines

This paragraph contains installation and maintenance instructions for the oil sampling valve and associated hardware installed on the MACK ENDT673 diesel engine used in various M39 series 5-ton trucks. M39 series trucks affected by these instructions are M40A1, M40A1C, M61A1, and M139A1 chassis, the M51A1 dump truck, M52A1 tractor truck, the M54A1 and M54A1C cargo trucks, the M246A1 tractor-wrecker, the M543A1 medium wrecker, and the M291A1, M291A1C and M291A1D expansible vans.

Illustrations and instructions presented are for a "typical" M39 series truck with the MACK ENDT673 engine. Variations may occur within models. Such variations, however, are minor. Maintenance personnel are asked to adjust to all such variations when performing the procedure.

The lowest level of maintenance capable of initial installation of this kit is organizational maintenance

INITIAL SETUP

TOOLS: GENERAL MECHANICS TOOL KIT #1
4910-00-754-0654

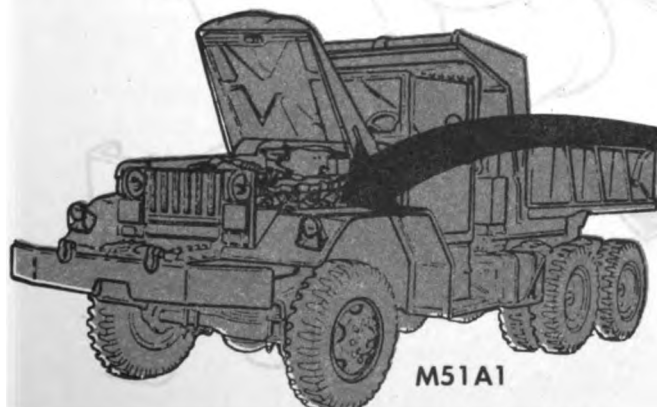
MATERIALS/PARTS:
VALVE (1)-4820-00-845-1096
TEE (1)-4730-00-249-2029
NIPPLE (1)-4730-00-196-1485
SEALING COMPOUND-8030-00-656-1426

TM REFERENCES:
TM 9-2320-211-10
LO 9-2320-211-12

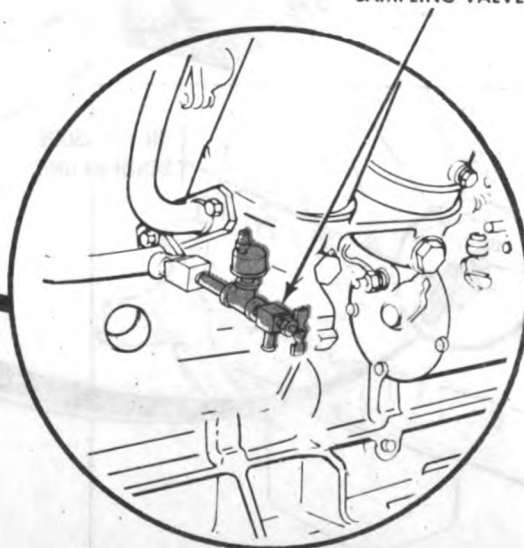
EQUIPMENT CONDITION
(SEE OPERATOR'S TM)
VEHICLE ON LEVEL GROUND
ENGINE OFF
HAND BRAKE SET
BATTERY SWITCH OFF
HOOD RAISED/SECURED
ENGINE OIL DRAINED (LO)
BATTERY GROUND CABLE
DISCONNECTED
OIL PRESSURE SENDING UNIT
ELECTRICAL LEAD DISCONNECTED

LOCATION

The oil sampling valve for M39 series vehicles with MACK ENDT673 engines is installed on the cooler oil outlet line elbow on the engine's right side.



ENGINE OIL
SAMPLING VALVE



TA327766

ENGINE OIL SAMPLING VALVE INSTALLATION

1. Unscrew and remove the engine oil pressure sending unit (1) from the cooler oil outlet line elbow (2).

NOTE

Apply type III sealing compound, NSN 8030-00-656-1426, (or equal) to external threads of all fittings before installation of each fitting.

2. Install pipe nipple (3), NSN 4730-00-196-1485, to the cooler oil outlet line elbow (2). Tighten nipple (3).

3. Install pipe tee (4), NSN 4730-00-249-2029, to pipe nipple (3). Tighten tee (4). Tee should be installed with the center port upward.

4. Install vehicle oil pressure sending unit (1) to center port of tee (4).

Tighten sending unit (1).

NOTE

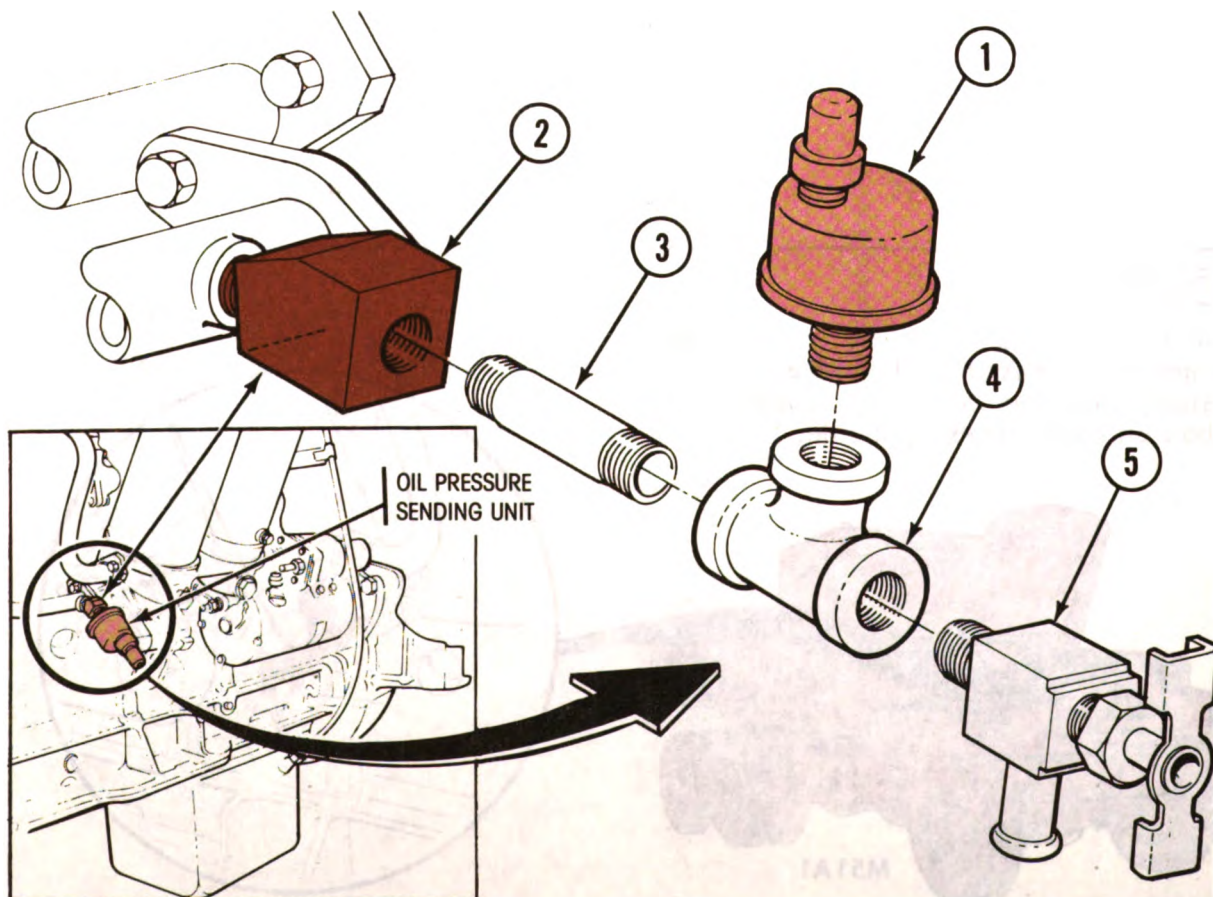
Reconnect oil pressure sending unit electrical leads after installation.

5. Install sampling valve (5), NSN 4820-00-845-1096, to pipe tee (4). Tighten valve (5). Valve should be installed with the drain port downward.

CAUTION

Check to make sure valve (5) is closed during engine oil refill.

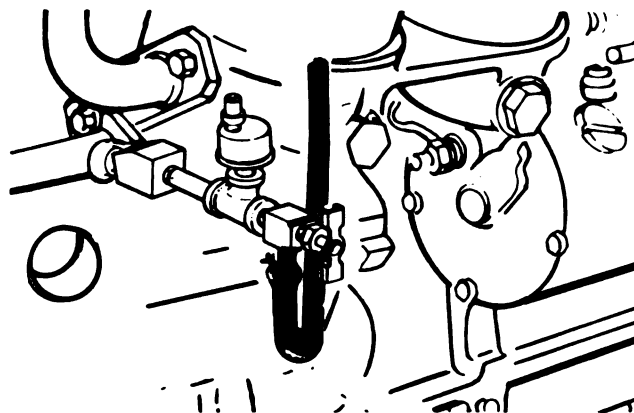
6. Refill engine oil level. See engine level/fill, LO 9-2320-211-12.



TA327767

SPECIAL SAMPLING INSTRUCTIONS

It is recommended that maintenance personnel connect a suitable length of hose to the valve drain port when taking oil samples. This will make the task easier, cleaner, and safer. Hose used must be clean. Do not reuse hose for AOAP sampling. Install hose before starting the engine. See paragraph 1-8b, page 1-5 of this TM for general sampling instructions. Remove hose after sample has been taken and engine has cooled.

**MAINTENANCE**

Replacement part ordering data for M39 series diesel engines is provided in figure B-7, Appendix B of this TM.

FOLLOW ON TASKS

Connect electrical lead to oil pressure sending unit (TM 9-2320-211-20).

Connect battery ground cable (TM 9-2320-211-20).

Lower and secure hood (TM 9-2320-211-10).

TA327768

2-12. M39/M44 Series Trucks W/Multifuel Engines

This paragraph contains installation and maintenance instructions for the oil sampling valve and associated hardware as installed on LD 400 series multifuel engines. LD 400 series multifuel engines are used in various M39 series 5-ton trucks and in all M44 series 2-1/2-ton trucks.

M39 series trucks affected by these instructions are the M40A2C, M61A2, M63A2, and M63A2C chassis, the M54A2, M54A2C, and M55A2 cargo trucks. The M51A2 dump truck, the M52A2 tractor truck, the M246A2 tractor wrecker, and the M543A2 medium wrecker.

M44 series trucks affected by these instructions are the M35A1, M35A2, M35A2C, and M36A2 cargo trucks, the M49A1C and M49A2C fuel tankers, the

M50A1, M50A2, and M50A3 water tankers, the M109A2 and M109A3 shop vans, the M185A2 and M185A3 repair shop trucks, the M275A1 and M275A2 tractor trucks, the M292A1, M292A2, M292A4, and M292A5 expansible vans, the M342A2 dump truck, the M756A2 pipeline truck, and the M764 polesetting truck.

Illustrations and instructions presented are for a "typical" installation. Access and equipment conditions may vary from model to model. Such variations, however, are minor. Maintenance personnel are asked to adjust to all such variations when performing the procedure.

The lowest level of maintenance authorized to install this sampling valve is organizational maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECHANICS TOOL KIT #1
4910-00-754-0654

MATERIALS/PARTS:

VALVE (1)-4820-00-845-1096
BUSHING (1)-4730-00-196-0935
SEALING COMPOUND-8030-00-656-1426

TM REFERENCES:

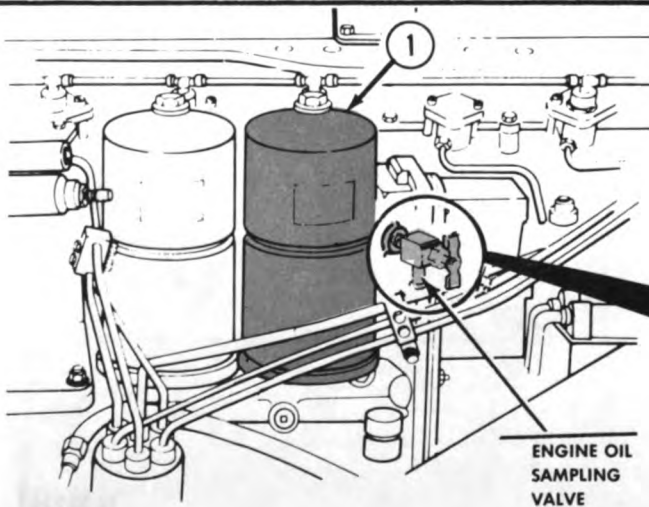
TM 9-2320-211-10-1
LO 9-2320-211-12-1
TM 9-2320-209-10
LO 9-2320-209-12

EQUIPMENT CONDITION:

VEHICLE ON LEVEL GROUND
ENGINE OFF
HAND BRAKE SET
BATTERY SWITCH OFF
HOOD RAISED/SECURED
ENGINE OIL DRAINED

LOCATION

The oil sampling valve for LD 400 series multifuel engines is installed directly on the engine block near the engine oil bypass filter (1).



TA327760

ENGINE OIL SAMPLING VALVE INSTALLATION

1. Remove pipe plug (2) from engine block near the oil bypass filter (1).

2. Apply type III sealing compound, NSN 8030-00-656-1426 (or equal) to external threads of bushing (3), NSN 4730-00-196-0935. Install bushing (3) into pipe plug port (4). Tighten bushing (3).

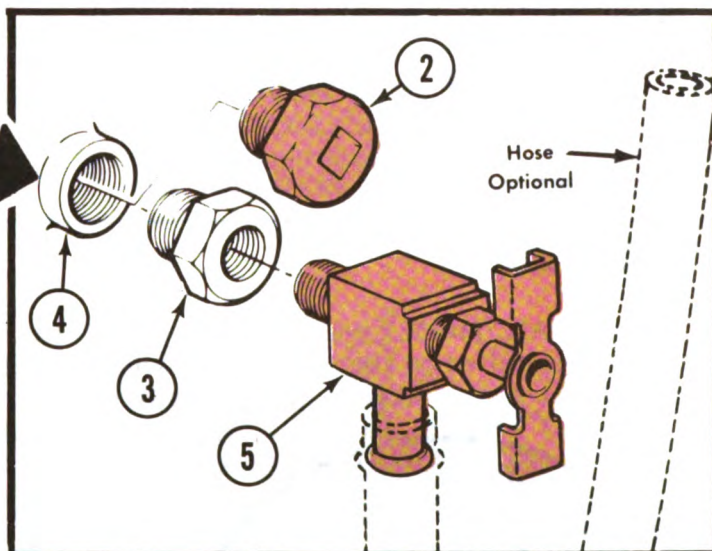
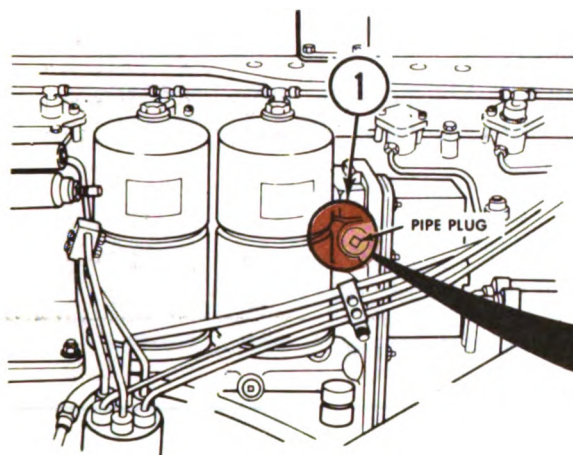
3. Apply type III sealing compound (or equal) to external threads of sampling valve (5), NSN 4820-00-845-1096. Install

valve (5) to bushing (3). Tighten valve (5). Valve should be installed with the drain port downward.

CAUTION

Make sure sampling valve (5) is closed during engine oil refill.

4. Refill engine oil level. See LO 9-2320-211-12-1 (M39 series) or LO 9-2320-209-12 (M44 series).



SPECIAL SAMPLING INSTRUCTIONS

It is recommended that maintenance personnel connect a suitable length of hose to the valve drain port when taking oil samples. This will make the task easier, cleaner, and safer. Hose used must be clean. Do not reuse hose for AOAP sampling. Install hose before starting the engine. See paragraph I-8b, page I-5 of this TM for general sampling instructions. Remove hose after sample has been taken and engine has cooled.

MAINTENANCE

Replacement part ordering data for M39/M44 series trucks with multifuel engines is provided in figure B-8, Appendix B of this TM.

FOLLOW ON TASKS

Lower and secure hood. Refer to TM 9-2320-211-10-1 (M39 series) or TM 9-2320-209-10 (M44 series).

TA327770

2-13. M123A1C and M123E2 Truck Tractor

This paragraph contains installation and maintenance instructions for the engine oil sampling valve and associated hardware used on M123A1C and M123E2 10-Ton, 6x6, Truck Tractors.

Illustrations and instructions presented are of a "typical" installation. Variations may occur within models or from model to model - especially with regard to M123 type vehicles' oil inlet

hose routing. Such variations, however, are minor. Maintenance technicians are asked to keep in mind that the sampling valve is installed in the location of the oil pressure sending unit.

Lowest level of maintenance authorized to perform initial installation of the M123A1C/M123E2 oil sampling valve is organizational maintenance.

INITIAL SETUP

TOOLS:

AUTOMOTIVE MECH TOOL KIT
5180-00-754-0641

MATERIALS/PARTS

VALVE (1)-4820-00-845-1096
TEE (1)-4730-00-014-6763*
SEALING COMPOUND (B)-8030-00-656-1426

TM REFERENCES:

TM 9-2320-206-10
LO 9-2320-206-12
TM 9-2320-206-20

EQUIPMENT CONDITION

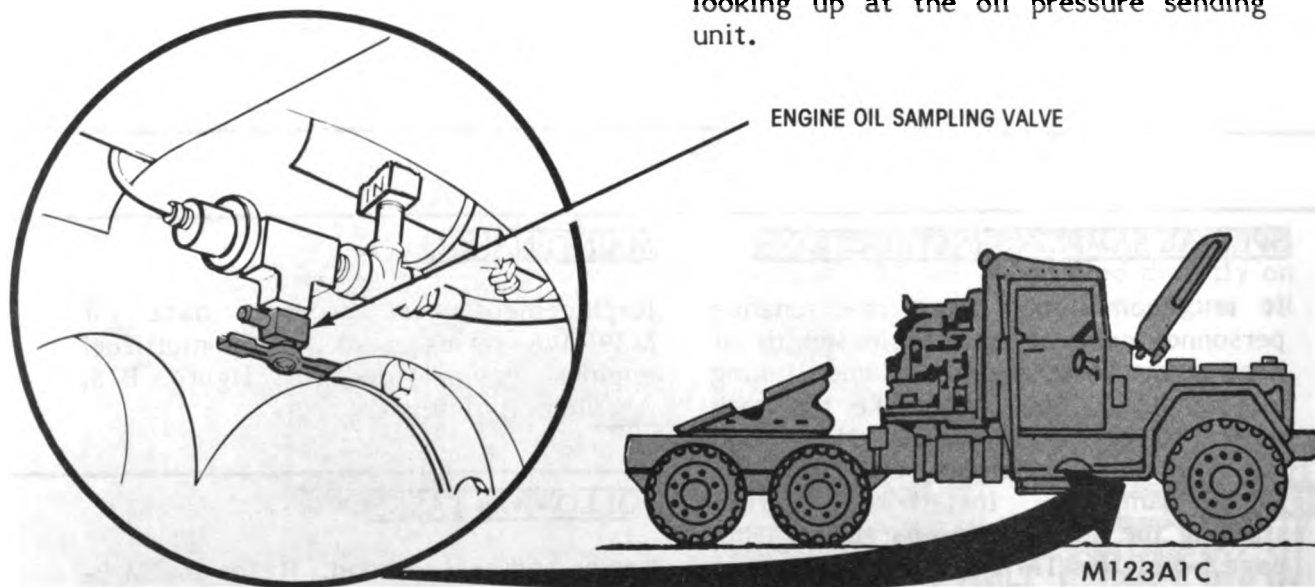
VEHICLE ON LEVEL SURFACE
WHEELS CHOCKED
HAND BRAKE SET
MASTER SWITCH OFF
BATTERY GROUND CABLE
DISCONNECTED
ENGINE OIL DRAINED
(SEE LO)

*WHEN SUPPLY IS EXHAUSTED, USE 4730-00-277-9615

LOCATION

The M123A1C/M123E2 engine oil sampling valve is installed on the engine oil cooler inlet port tee. Access to the service

location is from beneath the vehicle, left-rear of the vehicle engine. View provided is from beneath the vehicle looking up at the oil pressure sending unit.



TA327771

ENGINE OIL SAMPLING VALVE INSTALLATION

1. Disconnect electrical lead (1) from the oil pressure sending unit (2).
2. Unscrew and remove the oil pressure sending unit (2) from the bushing (3) connecting the sending unit to the inlet tee (4).

NOTE

Bushing (3) should remain with the inlet tee (4). If access makes it hard to remove the sending unit (2) separate from the bushing (3), remove both as a unit. Clean and reinstall the bushing (3) before proceeding with these instructions.

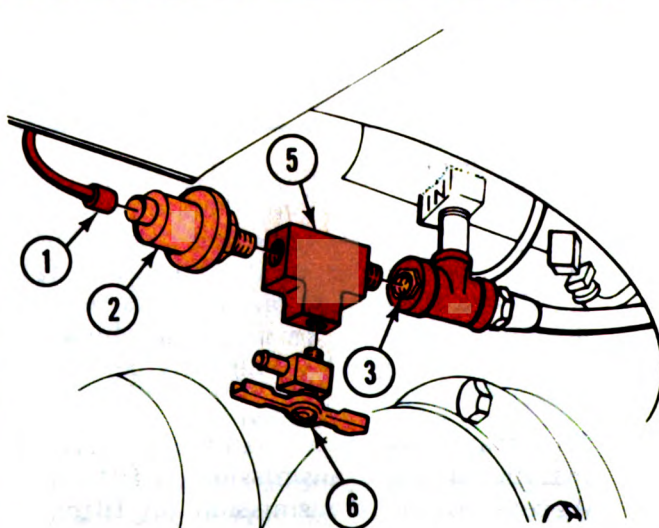
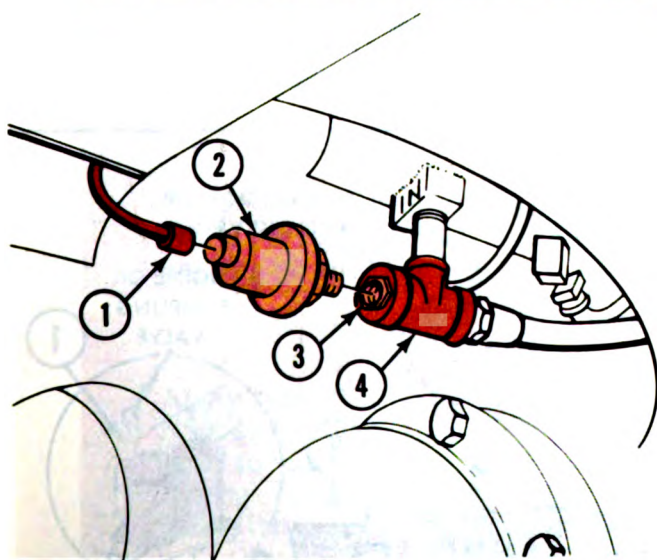
NOTE

Apply type III sealing compound, NSN 8030-00-656-1426 (or equal), to external threads of all fittings before connecting each fitting.

3. Install the male end of street tee (5), NSN 4730-00-014-6763, to bushing (3). Tighten street tee (5). Street tee should be installed with the center port facing downward.
4. Install oil sampling valve (6), NSN 4820-00-845-1096, to the center port of the street tee (5). Tighten valve (6). Valve should be installed with the valve drain port (7) facing rear of vehicle.
5. Reinstall the oil pressure sending unit (2) to the female end port of street tee (5). Tighten sending unit (2).
6. Reconnect electrical lead (1) to the sending unit (2).

NOTE

Refill engine oil to service level. See LO 9-2320-206-12 for check and fill instructions.

**MAINTENANCE**

Repair/replacement parts for the oil sampling valve and associated hardware are presented in figure B-9, Appendix B of this TM.

FOLLOW ON TASKS

Check engine oil level. (See LO 9-2320-206-12.)

Connect battery ground lead. (See TM 9-2320-206-20.)

2-14. M520 Series, "GOER" Trucks.

This paragraph contains installation and maintenance instructions for oil sampling valve kit, P/N 5705368. This kit is installed on the engine and transmission of the M520 series trucks.

M520 "GOER" series trucks consist of the M520 and M877 cargo trucks (8-ton), the M553 wrecker (10-ton), and the M559 fuel servicing tanker truck.

Illustrations and instructions presented

are of a "typical" M520 series truck. Variations may occur within models or from model to model. Such variations, however, are minor. Maintenance personnel are asked to adjust to all such variations when performing the procedures.

Lowest level of maintenance authorized to install this kit is direct support maintenance

INITIAL SETUP

TOOLS:

GENERAL MECHANICS TOOL KIT #1
4910-00-754-0654
GENERAL MECHANICS TOOL KIT #2
4910-00-754-0650

MATERIALS/PARTS:

*VALVE (1)-4820-00-275-2224
*TEE (1)-4730-00-595-1887
*NIPPLE (1)-4730-00-196-1464
*COMPRESSION CONNECT (1)-4730-00-278-4357
*COMPRESSION SLEEVE (1)-4730-00-278-8763
*NUT (1)-4730-00-013-7397
*TUBING (1)-4710-00-277-7581
*VALVE (1)-4820-01-120-4532
*ADAPTER (1)-4730-01-131-7679
SEALING COMPOUND-8030-00-656-1426

*PARTS OF KIT P/N 5705368

TM REFERENCES:

TM 9-2320-233-10
LO 9-2320-233-12
TM 9-2320-233-34

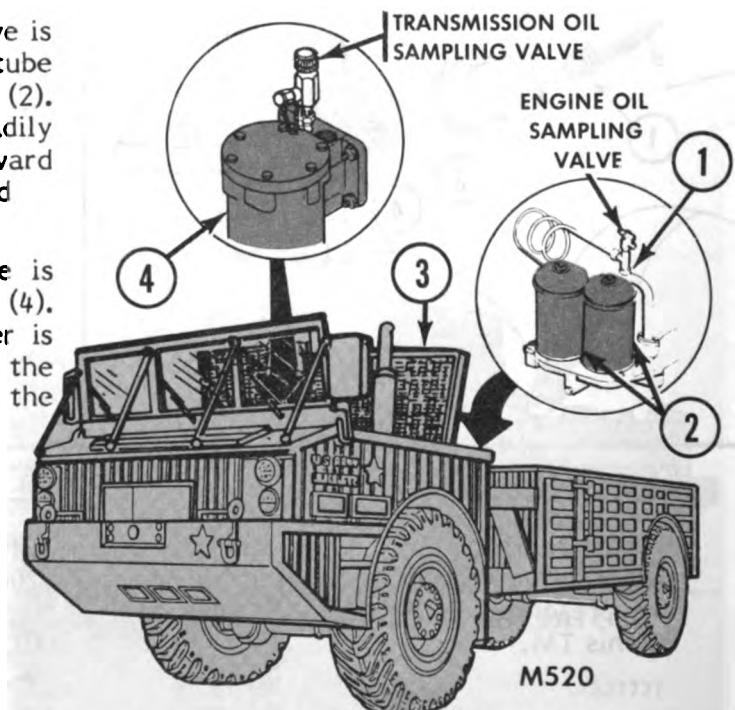
EQUIPMENT CONDITION:

VEHICLE ON LEVEL SURFACE
MASTER SWITCH OFF
PARKING BRAKE SET
FORWARD ENGINE ACCESS GRILLE
RAISED
TRANSMISSION ACCESS COVER
OFF

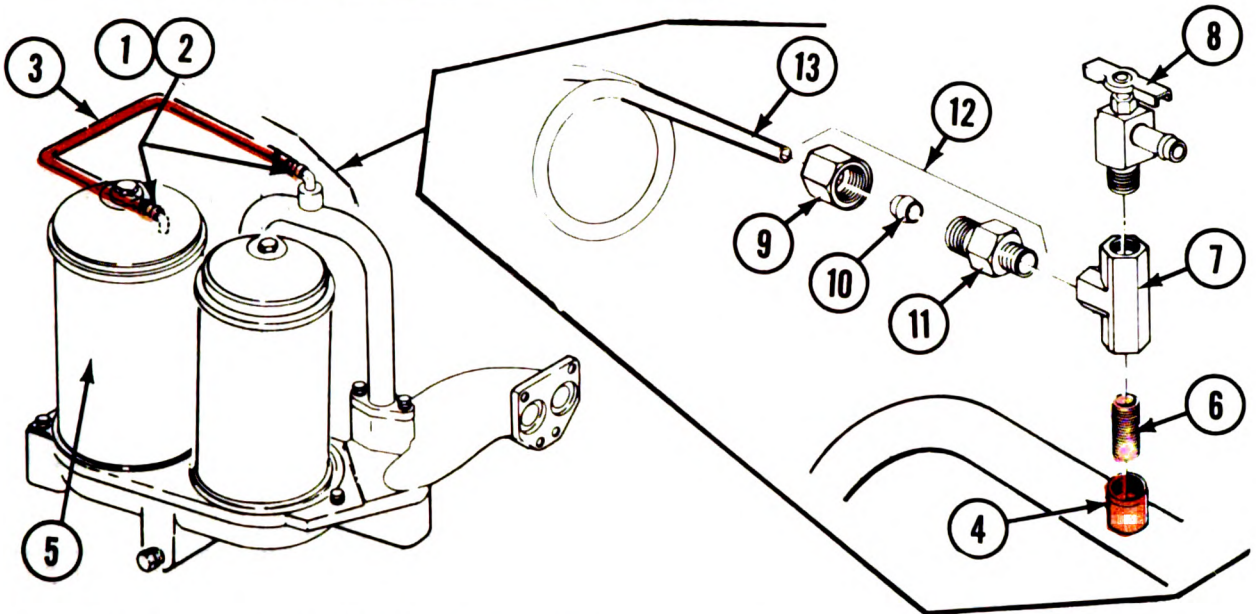
LOCATION

The "GOER" engine oil sampling valve is installed on the engine oil filter tube boss (1) behind the engine oil filters (2). Access to the engine oil filters is readily accomplished by raising the forward engine access grille (3) directly behind the vehicle cab.

The transmission oil sampling valve is installed on the transmission oil filter (4). Access to the transmission oil filter is accomplished by removing the transmission access cover next to the crew seat in the vehicle cab.



TA327773

ENGINE OIL SAMPLING VALVE INSTALLATION

1. Loosen hex nut (1) of compression fitting elbow (2). Repeat loosening procedure at opposite end of tubing (3). Pull tubing (3) free of compression fitting elbows (2). Discard tubing (3).

2. Unscrew and remove compression fitting elbow (2) from engine oil filter tube boss (4). Discard elbow (2).

NOTE

The remaining compression fitting elbow (2) stays on the oil filter housing (5) for later use.

NOTE

Apply type III sealing compound, NSN 8030-00-656-1426 (or equivalent) to external threads of all fittings before installation of each fitting.

3. Install nipple (6), NSN 4730-00-196-1464 into engine oil filter tube boss (4). Tighten nipple (6).

4. Install tee (7), NSN 4730-00-595-1887, on nipple (6). Tighten tee (7). Tee should be installed with the center part toward the rear of the vehicle (as shown).

5. Install valve (8), NSN 4820-00-275-2224, onto top of tee (7). Tighten valve (8). Valve should be installed with the drain part toward the front of the vehicle (as shown).

6. Unscrew and remove the compression connector locknut (9) and sleeve (10) from the compression connector adapter nut (11).

NOTE

Items 9, 10, and 11 make up the kit compression connector (12), NSN 4730-00-278-4357.

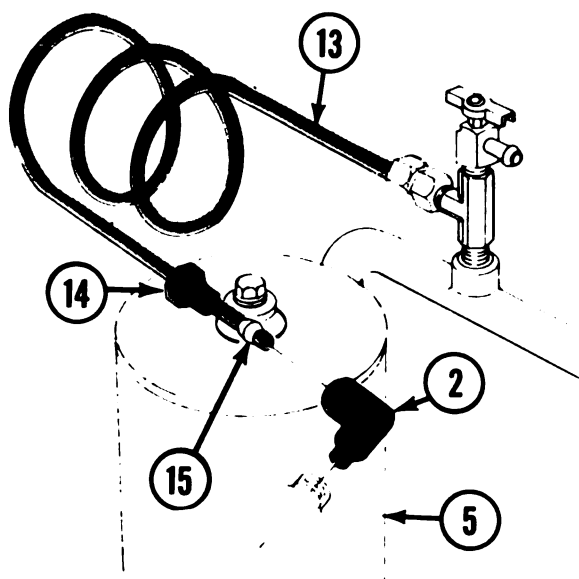
7. Install adapter nut (11) to center port of tee (7). Tighten adapter nut (11).

8. Slide compression connector locknut (9) and sleeve (10) on one end of coiled tubing (13), NSN 4710-00-277-7581. Install this assembly to adapter nut (11) and tighten assembly's compression connector locknut (11).

NOTE

Coiled tubing (13) may require slight bending in order to adjust to the installation position.

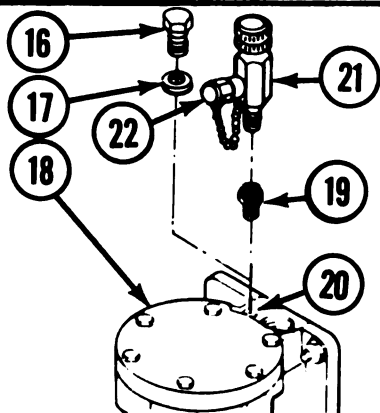
TA 327774



9. Slide inverted nut (14), NSN 4730-00-013-7397, on opposite end of coiled tubing (13). Slide compression sleeve (15) on tubing (13).

10. Install end of coiled tubing (13) to existing compression elbow (2) located at the side of the oil filter housing (5).

TRANSMISSION OIL SAMPLING VALVE INSTALLATION



11. Remove pipe plug (16) and O-ring (17) from transmission oil filter (18). Discard pipe plug (16) and O-ring (17).

12. Install adapter with O-ring (19), NSN 4730-01-131-7679, into transmission oil filter pipe plug port hole (20). Tighten adapter (19).

13. Install valve (21), NSN 4820-01-120-4532, into adapter (19). Tighten valve (21). Valve should be installed with valve drain port (22) facing outward.

MAINTENANCE

Individual replacement parts of the engine and transmission oil sampling valve kit are available. These items are listed in figure B-10, Appendix B of this TM.

Some sampling valve maintenance is restricted to direct support by associated hardware. The engine valve itself, for example, can be removed at organizational maintenance. However, the valve tee (item 7) and adapter (item 12) cannot be maintained lower than direct support because they are linked to removal of the tubing (item 13) coded PAFZZ.

FOLLOW ON TASKS

Transmission access cover installed.
Forward engine access grille lowered/secured.

TA 327775

2-15. M561 and M792 1-1/4 - Ton Trucks (Gamma Goat)

This paragraph contains installation and maintenance instructions for the engine oil sampling kit, P/N 5705370, used on the M561 1-1/4-Ton, 6x6, Cargo Truck and on the M792 1-1/4-Ton, 6x6, Ambulance Truck.

Illustrations and instructions presented are of a "typical" Gamma Goat. Variations may occur within models or

between the two models. However, such variations are minor. Maintenance technicians are asked to adjust to all such variations when performing the procedure.

Lowest level of maintenance authorized for installation of this kit is direct support maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECHANICS TOOL KIT #1
4910-00-754-0654

MATERIALS/PARTS

*VALVE (1)-2910-00-999-9452
*ADAPTER (1)-4730-00-889-2474
*ADAPTER (1)-4730-00-054-7650
*CAP (1)-4730-00-640-0632
*HOSE (B)-4720-00-857-1732
*CLAMP (1)-5340-00-057-3037
*BUSHING (1)-4730-00-248-6728
*ELBOW (1)-4730-00-231-4009
*BRACKET (1)-P/N 12343162
SEALING COMPOUND-8030-00-656-1426

*PART OF KIT 2815-01-179-7512

TM REFERENCES:

TM 9-2320-242-10-1
TM 9-2320-242-10-4
LO 9-2320-242-12
TM 9-2320-242-34-2-1
TM 9-2320-242-34P

EQUIPMENT CONDITION:

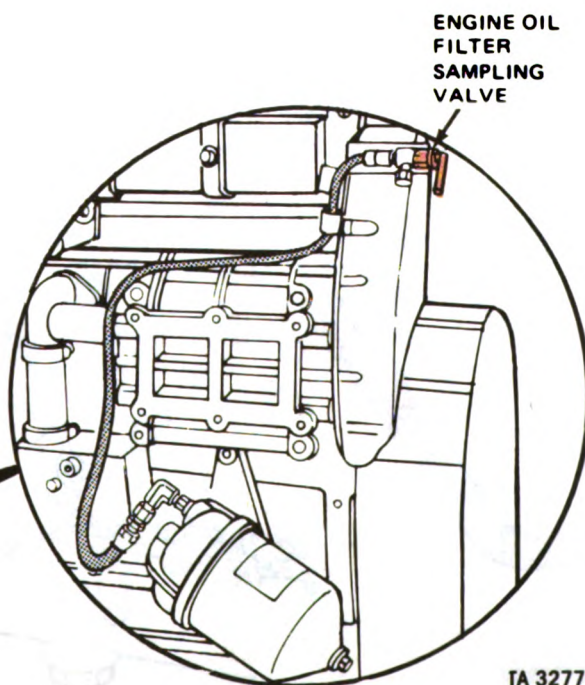
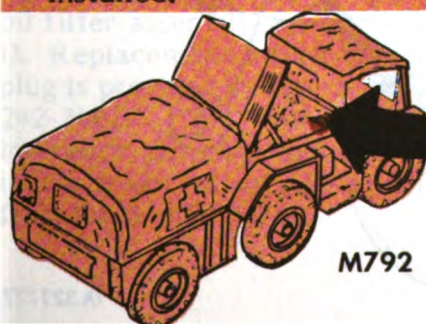
VEHICLE ON LEVEL SURFACE
ENGINE OFF AND COOL
HAND BRAKE SET
MASTER SWITCH OFF
(See TM 9-2320-242-10-1)
ENGINE COVER RAISED/BRACED
(See TM 9-2320-242-10-4)
AIR CLEANER CASE/ELEMENT/BASE
REMOVED (See TM 9-2320-242-34-2-1)

LOCATION

The engine oil sampling valve kit is installed on the engine oil filter with the valve remotely mounted to the truck's flywheel housing, right side of vehicle.

NOTE

Apply type III sealing compound, NSN 8030-00-656-1426, to male threads of all fittings being installed.



TA 327776

ENGINE OIL SAMPLING VALVE INSTALLATION

1. Remove pipe plug (1) from engine oil filter (2).

2. Install bushing (3), NSN 4730-00-248-6728, into the oil filter pipe plug port (4). Tighten bushing (3).

3. Install elbow (5), NSN 4730-00-231-4009, on bushing (3). Tighten elbow (5).

4. Remove screw (6), lockwasher (7), and flatwasher (8) from flywheel housing (9). Position bracket (10), P/N 12343162, on flywheel housing (9) and secure in place with screw (6), lockwasher (7), and flatwasher (8). Tighten screw (6).

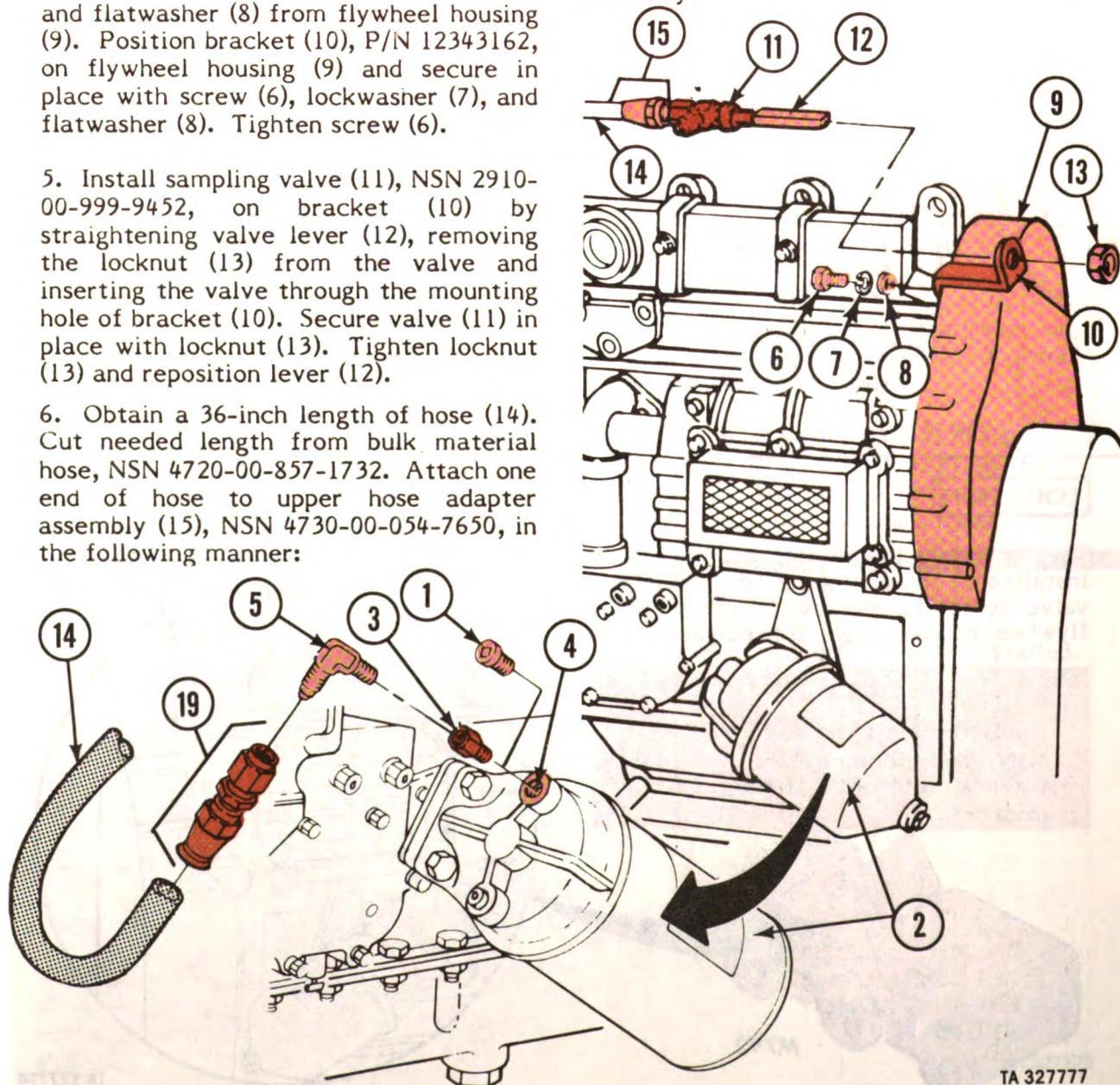
5. Install sampling valve (11), NSN 2910-00-999-9452, on bracket (10) by straightening valve lever (12), removing the locknut (13) from the valve and inserting the valve through the mounting hole of bracket (10). Secure valve (11) in place with locknut (13). Tighten locknut (13) and reposition lever (12).

6. Obtain a 36-inch length of hose (14). Cut needed length from bulk material hose, NSN 4720-00-857-1732. Attach one end of hose to upper hose adapter assembly (15), NSN 4730-00-054-7650, in the following manner:

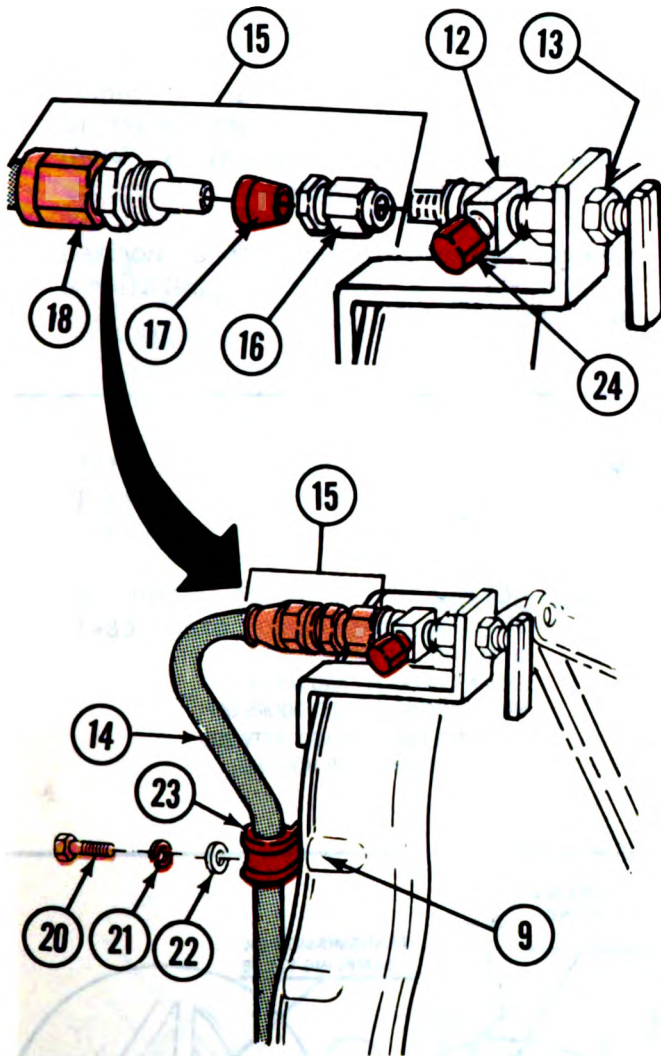
a. Remove socket fitting (16) and sleeve (17) from the nipple sub-assembly (18).

b. Slide socket fitting (16) on end of hose (14) and install sleeve (17) into end of hose (14).

c. Install end of hose (14) with sleeve (17) onto nipple sub-assembly (18). Slide socket fitting (16) back to end of hose and reinstall socket fitting (16) to the nipple sub-assembly (18). Tighten assembly.



TA 327777



7. Install the upper hose adapter assembly (15) with attached hose (14) on the sampling valve (11). Tighten assembly.

8. Attach opposite end of hose (14) to the lower hose adapter assembly (19), NSN 4730-00-889-2474.

NOTE

Lower hose adapter assembly (19) is installed on hose (14) in the same way as the upper hose adapter assembly (15), steps 6a through 6c, above.

9. Install the lower hose adapter assembly (19) with attached hose (14) on elbow (5). Tighten assembly.

10. Remove screw (20), lockwasher (21), and flatwasher (22) from flywheel housing (9). Attach clamp (23), NSN 5430-00-057-3037, to hose (14) and secure to flywheel housing with screw (20), lockwasher (21), and flatwasher (22). Hose (14) should be routed as illustrated.

11. Install sampling valve cap (24), NSN 4730-00-640-0632, to sampling valve (11).

MAINTENANCE

All oil sampling valve kit hardware are available as individual repair parts. Figure B-11, Appendix B of this TM, provides the repair parts for the M561 and M792 engine oil sampling valve.

The single vehicle item affected by installation of the oil sampling kit is the oil filter assembly pipe plug (item 1, step 1). Replacement information on the pipe plug is provided by figure 22, TM 9-2320-242-34P. This item is stocked for insurance purposes and can be replaced in the event of salvage of an AOAP kit from an M561 or M792.

FOLLOW ON TASKS

Install air cleaner base element and case (See TM 9-2320-242-34-2-1).

Check level and fill of engine oil. (See LO 9-2320-242-12.)

Engine cover lowered/secured. (See TM 9-2320-242-10-4.)

2-16. M746 22-1/2-Ton Truck Tractor

This paragraph contains installation and maintenance instructions for oil sampling valve kit, P/N 5705365 used on the engine and transmission of the M746 22-1/2-Ton, 8x8, Truck Tractor.

Illustrations and instructions presented are of a "typical" M746. Some variations may occur within models. Such

variations, however, are minor. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

Lowest level of maintenance authorized to install this kit is organizational maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECHANICS TOOL KIT #1
4910-00-754-0654

MATERIALS/PARTS

*VALVE (2)-4820-00-845-1096
*COUPLING (2)-4730-00-187-7610
*NIPPLE (2)-4730-00-196-1485
*ELBOW (1)-4730-00-277-5553
SEALING COMPOUND-8030-00-656-1426

*PART OF KIT 5705365

TM REFERENCES:

TM 9-2320-258-10
LO 9-2320-258-12
TM 9-2320-258-20

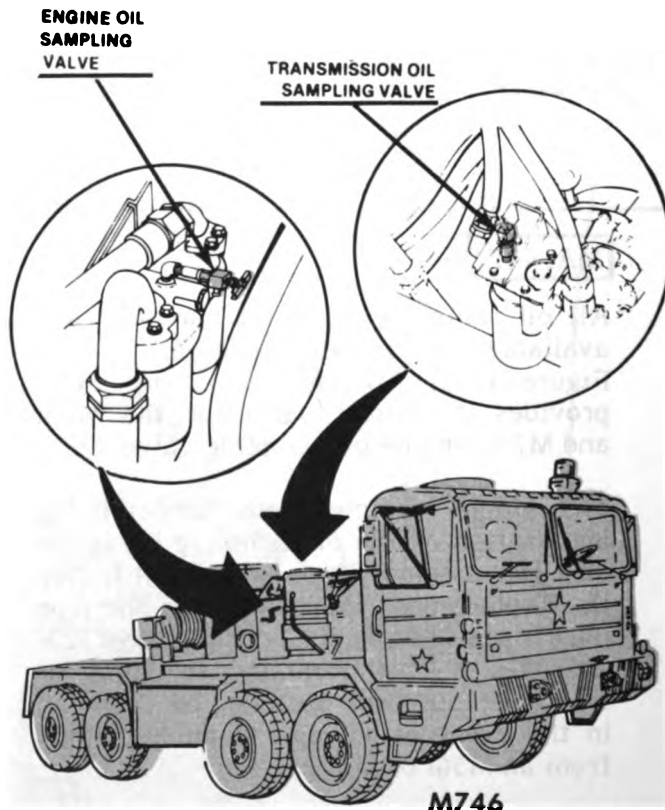
EQUIPMENT CONDITION:

VEHICLE ON LEVEL SURFACE
ENGINE OFF AND COOL
PARKING BRAKE SET AND LOCKED
ENGINE ACCESS SHROUD DOORS OFF
AIR FILTER TUBE REMOVED (BETWEEN
ENGINE & AIR FILTER HOUSING)

LOCATION

The engine oil sampling valve is installed on the engine oil filter assembly. Access to the engine oil filter is through the engine access cover door on vehicle right side. Engine oil filter assembly is remotely mounted to the engine access cover shroud near the engine oil cooler.

The transmission oil sampling valve is installed on the transmission oil filter. Access to the transmission oil filter is through the engine access cover door on the vehicle left side.



TA 327779

ENGINE OIL SAMPLING VALVE INSTALLATION

1. Remove pipe plug (1) from engine oil filter casting (2). Discard pipe plug (1).

NOTE

Apply type III sealing compound, NSN 8030-00-656-1426 (or equal) to external threads of all fittings prior to installation.

2. Install pipe elbow (3), NSN 4730-00-277-5553 (3) into pipe plug port (4). Tighten elbow. Elbow should be installed with the open port outward.

3. Install nipple (5), NSN 4730-00-196-1485, into open port of elbow (3).

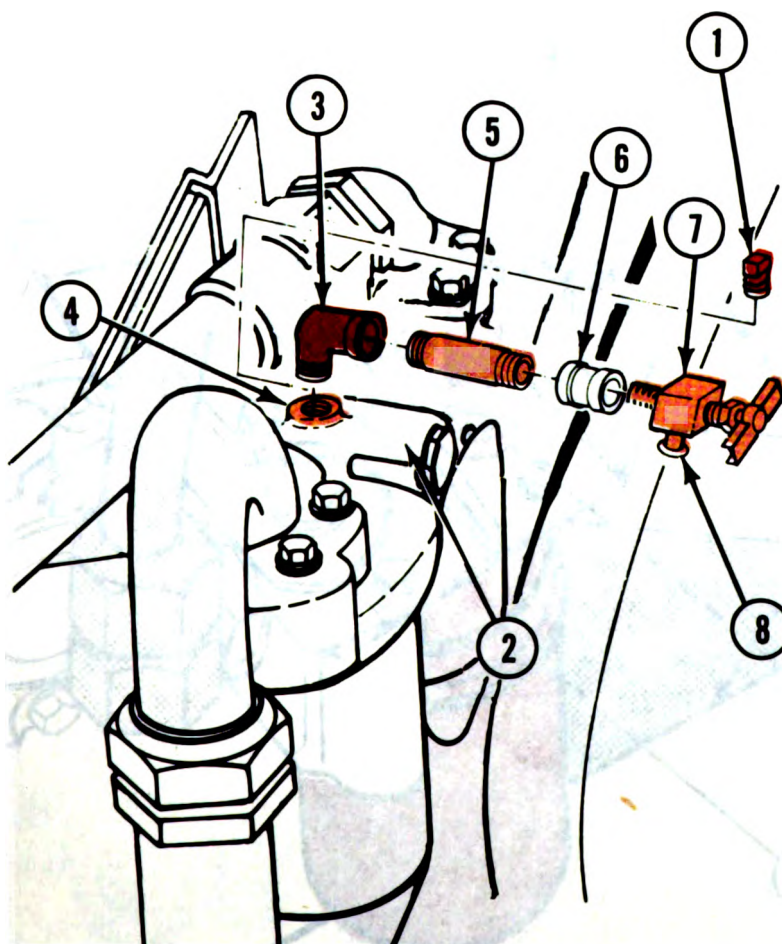
Tighten nipple.

4. Install coupling (6), NSN 4730-00-187-7610, onto nipple (5). Tighten coupling (6).

5. Install sampling valve (7), NSN 4820-00-845-1096, to coupling (6). Tighten valve (7). Valve should be installed with the valve drain port (8) downward.

NOTE

Reinstall air filter tube between engine and air filter. (See TM 9-2320-258-20 .



TA 327780

TRANSMISSION OIL SAMPLING VALVE INSTALLATION

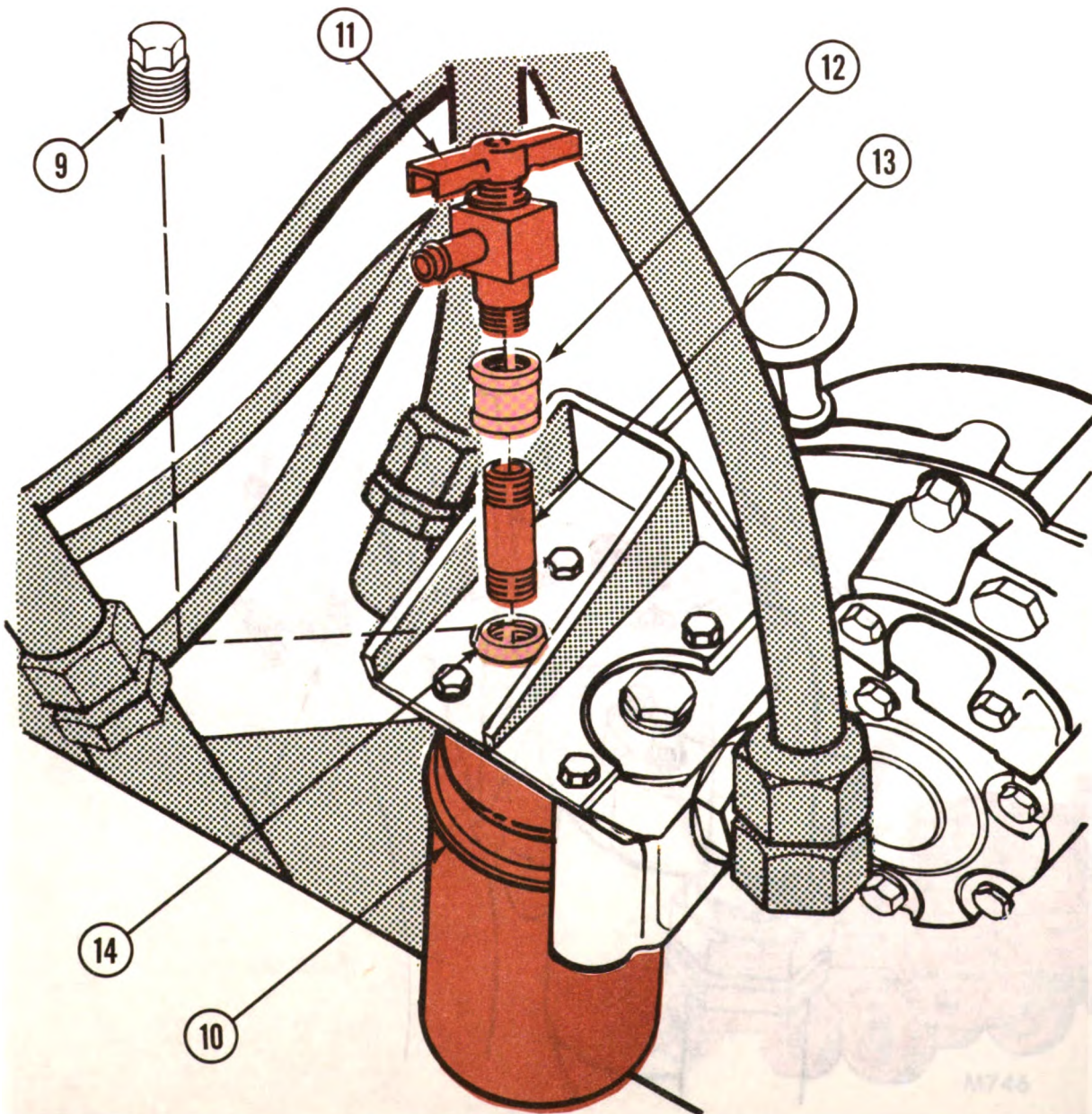
6. Remove 9/16" hex plug (9) located on the outlet side of transmission oil filter casting (10). Discard hex plug (9).

NOTE

Apply type III sealing compound to external threads of all fittings prior to installation.

7. Preassemble drain valve (11), NSN 4820-00-845-1096, into coupling (12), NSN 4730-00-187-7610. Install coupling (12) onto nipple (13), NSN 4730-00-196-1485. Tighten each assembled part.

8. Install assembled valve (11), coupling (12), and nipple (13) into hex plug port (14). Tighten assembly. Installed valve's drain port should be outward for ease of sampling.



TA 327781

MAINTENANCE

Oil sampling valve kit repair parts for the M746 truck are available in the supply system. Figure B-12, Appendix B of this TM, provides a list of the individual parts and ordering data.

FOLLOW ON TASKS

Install engine air filter tube. See TM 9-2320-258-20.)

Install engine access covers. (See TM 9-2320-258-10.)

2-17. M911 Truck Tractor (22-1/2-Ton)

This paragraph contains installation and maintenance instructions for the engine and transmission oil sampling valve kit, NSN 2540-01-154-9934, used on the M911 Truck Tractor, Commercial Heavy Equipment Transporter (C-HET), 8x6, 85,000 Gross Vehicle Weight Rated (GVWR).

Illustrations and instructions presented are of a "typical" M911 installation.

Variations may occur from vehicle to vehicle. Such variations, however, are minor. Maintenance technicians are asked to adjust to minor variations when performing the procedure.

Lowest level of maintenance authorized for initial installation of the M911 engine and transmission oil sampling valve kit is organizational maintenance.

INITIAL SETUP**TOOLS:**

AUTOMOTIVE MECH TOOL KIT
5180-00-754-0641

MATERIALS/PARTS

*VALVE (1)-4820-00-720-4488
*NIPPLE (1)-4730-00-196-1487
*ELBOW(1)-4730-00-817-1843
*VALVE (1)-4820-00-684-0880
*ELBOW (1)-4730-00-287-1649

*PARTS OF KIT, NSN 2540-01-154-9934

TM REFERENCES

TM 9-2320-270-10
LO 9-2320-270-12

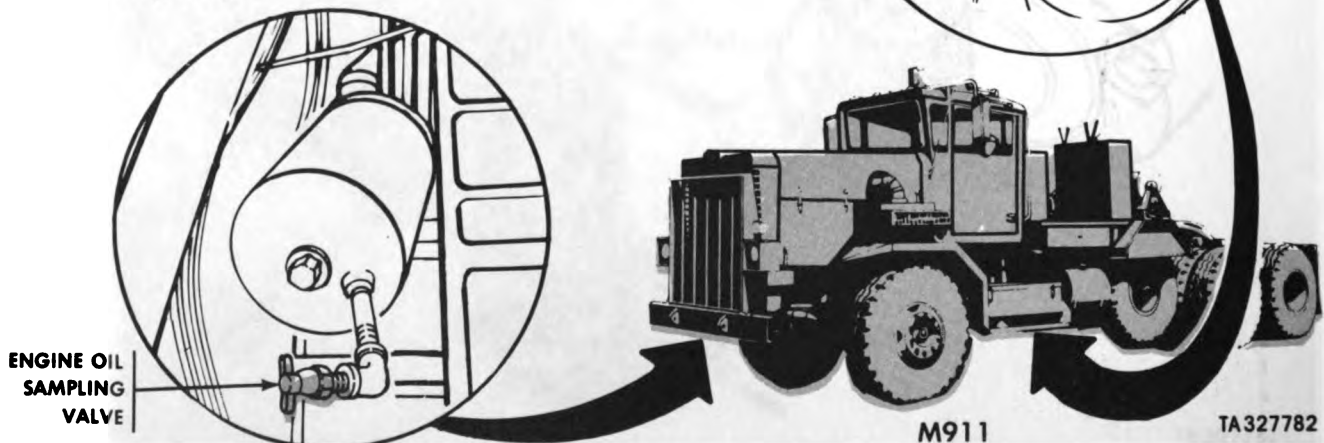
EQUIPMENT CONDITION

VEHICLE ON LEVEL SURFACE
ENGINE OFF AND COOL
PARKING BRAKE CONTROL PULLED OUT
HOOD RAISED (FOR LIGHT)
WHEELS CHOCKED

LOCATION

The M911 engine oil sampling valve is installed on the engine oil filter. Best service location is from beneath the vehicle, forward right front side of the engine.

The M911 transmission oil sampling valve is installed on the transmission oil filter. Best service location is from beneath the vehicle, left rear side of engine (near battery box).



ENGINE OIL SAMPLING VALVE INSTALLATION

1. Obtain an available, clean container to drain approximately two quarts of oil. Remove engine oil filter drain plug (1) and allow oil from the engine oil filter (2) to drain into the container. Discard drain plug (1).

NOTE

Apply type III sealing compound, NSN 8030-00-656-1426 (or equal), to external threads of all fittings before connecting each fitting.

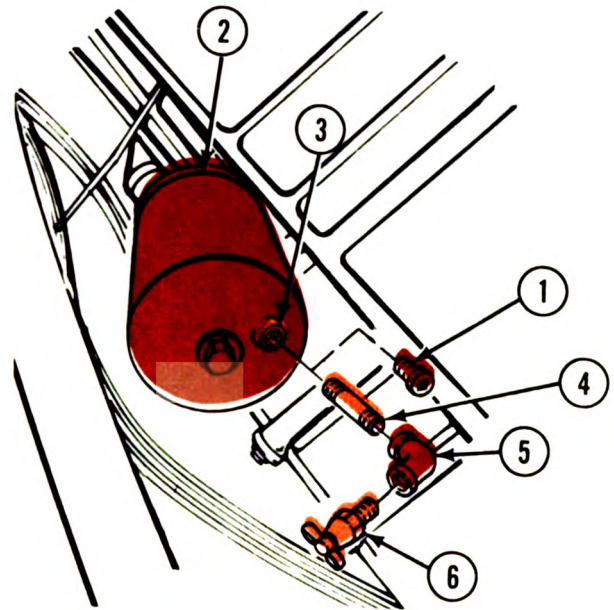
NOTE

Use a clean rag to wipe and clean excess oil from the oil filter drain port (3) before installing the nipple (4).

2. Install pipe nipple (4), NSN 4730-00-196-1487, to the oil filter drain port (3). Tighten nipple (4).

3. Install elbow (5), NSN 4730-00-817-1843, onto pipe nipple (4). Tighten elbow (5). Elbow should be installed with its open port facing downward.

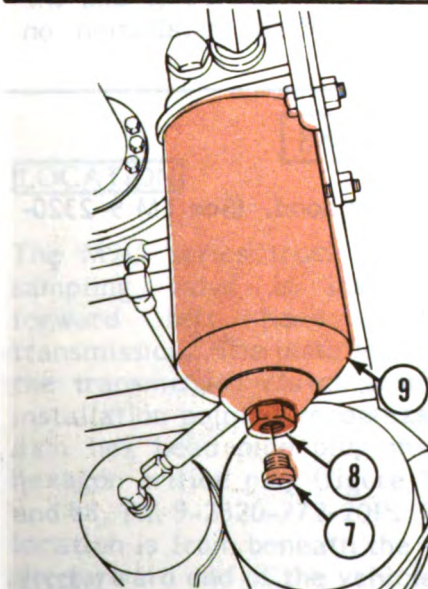
4. Install sampling valve (6), NSN 4820-00-720-4488, into elbow (5). Tighten valve (6). Valve should be installed with the drain port outward.



5. Replace the oil drained during step 1, above. See LO 9-2320-270-12 for lubrication instructions.

6. Start vehicle engine and check for leaks. See TM 9-2320-270-10 for operating instructions. If leaks are found, tighten all fittings.

TRANSMISSION OIL SAMPLING VALVE INSTALLATION



CAUTION

Maintenance technicians are cautioned to clean the "available container" before reusing the container to drain the transmission oil filter. M911 engine oil residue should not be mixed with the transmission fluid.

6. Obtain an available, clean container to drain approximately two quarts of oil. Remove transmission oil filter drain plug (7) located in the bottom center of the transmission oil filter stud bolt (8). Allow oil from the transmission oil filter (9) to drain into the container. Discard drain plug (7).

TA327783

NOTE

Use a clean rag to wipe and clean excess oil from the oil filter drain point.

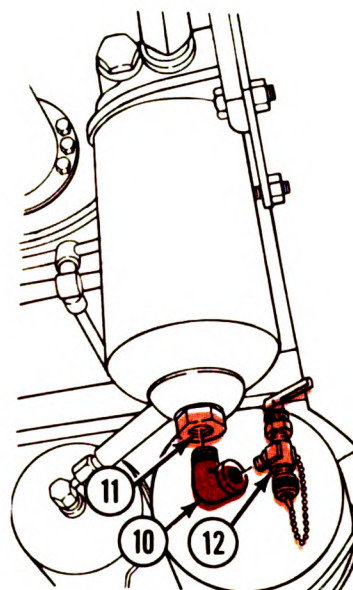
NOTE

Apply type III sealing compound (or equal) to external threads of all fittings before connecting each fitting.

7. Install street elbow (10), NSN 4730-00-287-1649, to the oil filter drain port (11). Tighten elbow (10).

8. Install oil sampling valve (12), NSN 4820-00-684-0880, into elbow (10). Tighten valve (12). Valve should be installed with the drain port downward.

9. Refill transmission oil to correct level. See LO 9-2320-270-12.



MAINTENANCE

Individual components of M911 oil sampling valve kit, NSN 2540-01-154-9934, are available in the Army supply system as replacement parts. Ordering data for each of these parts is provided in figure B-13, Appendix B of this TM.

Vehicle parts affected by installation of the engine and transmission sampling valves are the drain plugs (items 1 and 7).

Both items are eliminated. Future drain of the engine oil filter and transmission oil filter is through the sampling valves.

Replacement engine and transmission oil filter assemblies are not currently available in the supply system with sampling valves. Replacement oil filter assemblies must be modified to add the sampling valves before installation on vehicle.

FOLLOW ON TASKS

Lower and secure hood. (See TM 9-2320-270-10)

TA327784

2-18. M915 Series Trucks

This paragraph contains installation and maintenance instructions for the transmission oil sampling valve and associated hardware used on M915 series trucks. Engine oil sampling on M915 series trucks is accomplished by use of the drain valve on the bottom of the bypass oil filter. No additional specialized valve is needed for the M915 series truck engine.

M915 series vehicles are the truck tractors M915, M916, and M920 and truck chassis for the 20-ton dump truck, M917,

for the bituminous distributor truck, M918, and for the concrete mobile mixer truck, M919.

Illustrations and instructions presented are of a "typical" carrier. Variations may occur within models or from model to model. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

Lowest level of maintenance authorized for initial installation of the M915 series truck transmission sampling valve is organizational maintenance.

INITIAL SETUP

TOOLS: AUTOMOTIVE MECH TOOL KIT
5180-00-754-0641

MATERIALS/PARTS:

*VALVE (1)-4820-00-720-4488
*NIPPLE (1)-4730-00-640-6330
*COUPLING (1)-4730-00-223-9255
SEALING COMPOUND (B)-8030-01-055-6126

*PART OF KIT, NSN 2815-01-154-9933

TM REFERENCES:

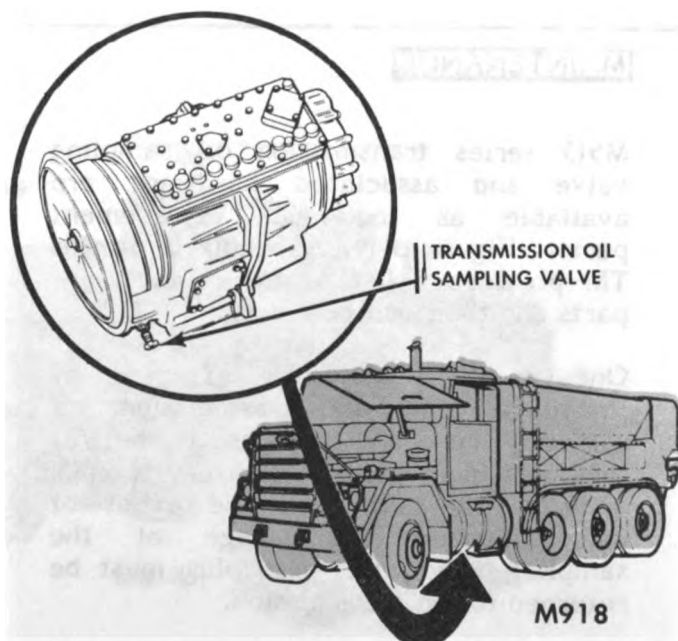
TM 9-2320-273-10
LO 9-2320-273-12
TM 9-2320-273-20
TM 9-2320-273-20P

EQUIPMENT CONDITION

VEHICLE ON LEVEL SURFACE
ENGINE OFF AND COOL
WHEELS CHOCKED
PARKING BRAKE CONTROL
BUTTON PULLED OUT
RAISE VEHICLE HOOD
LEFT SIDE (FOR LIGHT)
TRANSMISSION OIL DRAINED
(SEE LO)

LOCATION

The M915 series truck transmission oil sampling valve is installed on the forward left hand side of the transmission. The installation point is on the transmission clutch assembly. This installation point is recognizable as a 1/8 inch hex head pipe plug installed on a hexagon orifice plug (figure 34, items 47 and 48, TM 9-2320-272-20P. Best service location is from beneath the vehicle near the forward end of the vehicle fuel tank.



TA327785

TRANSMISSION OIL SAMPLING VALVE INSTALLATION

1. With transmission oil drained, remove and discard the 1/8-inch hex-head pipe plug (1) on the left side of transmission clutch assembly (2).

NOTE

Do not remove the hexagon orifice plug (3).

NOTE

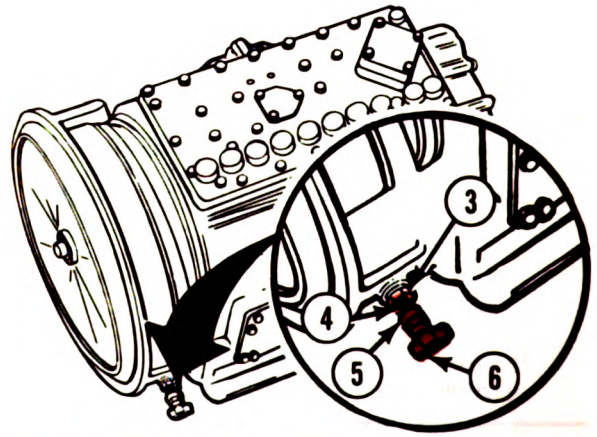
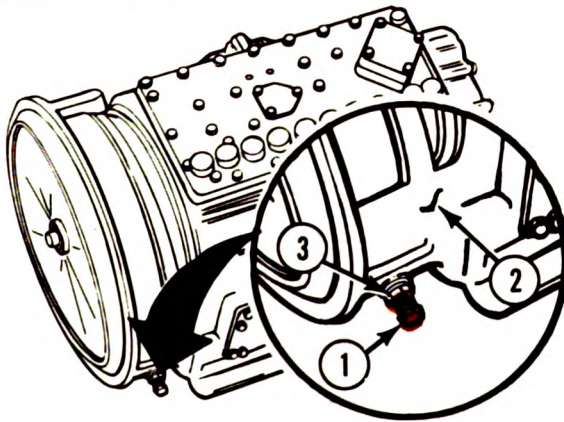
Apply pipe thread sealing compound, NSN 8030-01-055-6126 (or equal), to external threads of fittings before installation of each fitting.

2. Install nipple (4), NSN 4730-00-640-6330, into hexagon orifice plug (3). Tighten nipple (4).

3. Install coupling (5), NSN 4730-00-223-9255, on nipple (4). Tighten coupling (5).

4. Install sampling valve (6), NSN 4820-00-720-4488, on coupling (5). Tighten valve (6). Valve should be installed with the valve drain port downward.

5. Fill transmission oil. See LO 9-2320-273-12.

**MAINTENANCE**

M915 series transmission oil sampling valve and associated hardware are available as individual replacement parts. Figure B-14, Appendix B of this TM provides a list of the replacement parts and their ordering data.

One vehicle component affected by installation of the transmission oil sampling valve and hardware is the 1/8-inch hex-head pipe plug (item 1, NSN 4730-00-924-7886). In the event of cannibalization or salvage of the sampling valve, the pipe plug must be returned to the transmission.

Maintenance on M915 series trucks'

transmission oil sampling valve will require draining of the transmission oil prior to service and refill after service is completed.

Maintenance and repair of the M915 series oil bypass filter used for engine oil sampling is provided in TM 9-2320-273-20.

FOLLOW ON TASKS

Check and fill transmission oil. (See LO 9-2320-273-12.)

Lower and secure vehicle hood. (See TM 9-2320-273-10.)

TA327786

2-19. M809 Series Trucks (5-Ton)

This paragraph contains installation and maintenance instructions for the engine oil sampling valve used on M809 series trucks.

M809 series vehicles affected by these instructions are the trucks, chassis, 5-ton, 6x6, M809, M809A1, M810, M811, M811A1, M811A2, M812, and M812A1, the M813, M813A1, and M814 cargo trucks, the M815 bolster logging truck, the M816 medium wrecker, the M817 dump truck, the M818 tractor truck, the M819 tractor wrecker, the M820, M820A1, and M820A2

expansible vans, and the M821 bridge stake truck.

Illustrations and instructions presented are of a "typical" M809 series truck installation. Minor variations may occur within models or from model to model. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

Lowest level of maintenance authorized for initial installation of the engine oil sampling valve used on M809 series trucks is organizational maintenance.

INITIAL SETUP

TOOLS: GENERAL MECH TOOL KIT #1
4910-00-754-0654

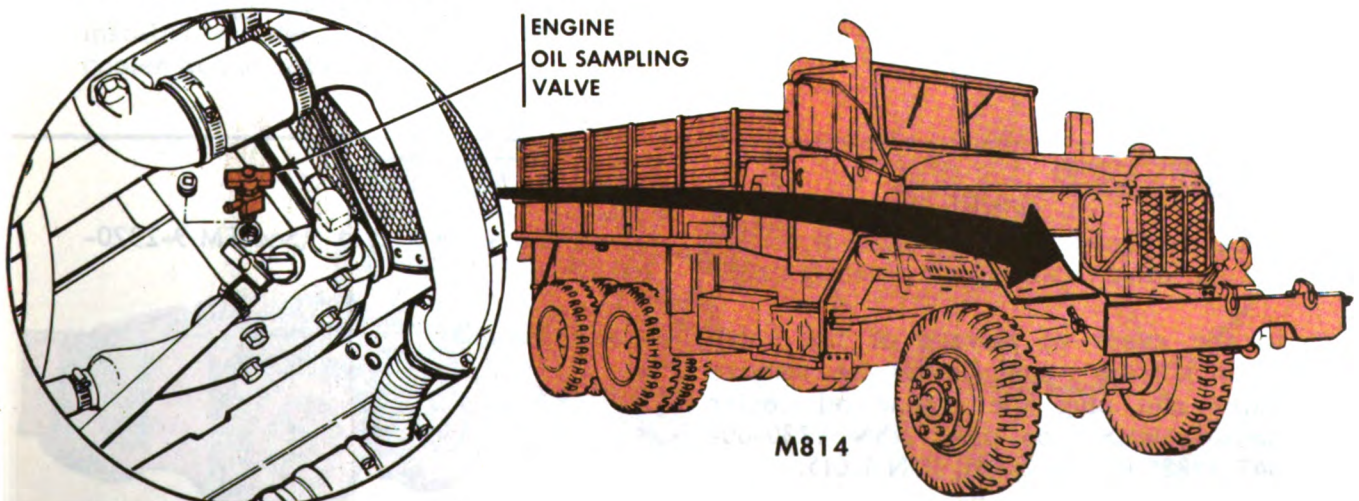
TM REFERENCES:
TM 9-2320-260-10-1

MATERIALS/PARTS:
VALVE (1)-4820-00-845-1096
SEALING COMPOUND (B)-8030-00-656-1426

EQUIPMENT CONDITION:
VEHICLE ON LEVEL SURFACE
ENGINE OFF AND COOL
BATTERY SWITCH OFF
HAND BRAKE SET
HOOD RAISED AND SECURED

LOCATION

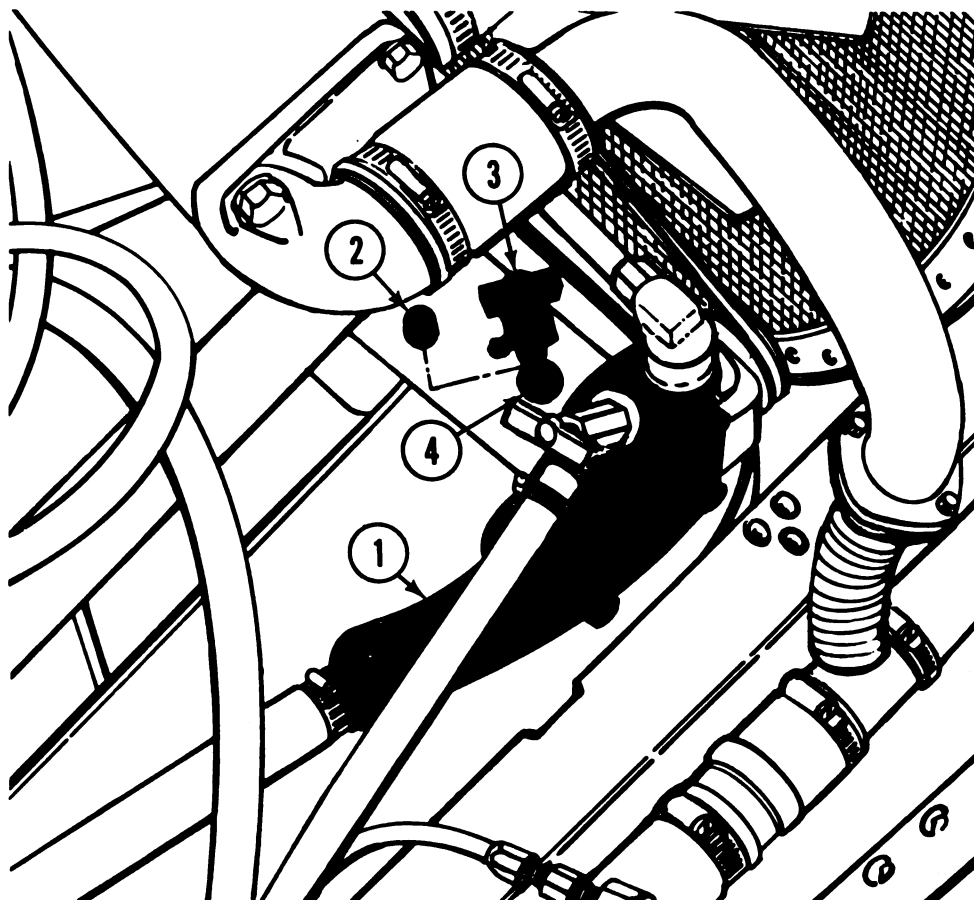
M809 series engine oil sampling valve is installed on the engine oil cooler housing located at the forward right side of the vehicle engine. Best service location is from the vehicle right fender.



TA327787

ENGINE OIL SAMPLING VALVE INSTALLATION

1. Remove socket head pipe plug (2) from the engine oil cooler housing (1).
2. Apply type III sealing compound, NSN 8030-00-656-1426 (or equal), to male threads of oil sampling valve (3), NSN 4820-00-845-1096. Install valve (3) into the open port (4) on the engine oil cooler housing (1). Tighten valve (3). Valve should be installed with the sample drain port facing rear of vehicle.



MAINTENANCE

Refer to figure B-15, Appendix B of this TM for valve replacement ordering data.

In the event of salvage of the valve (item 3) from a specific vehicle, remove valve and plug the engine oil cooler housing with pipe plug, NSN 4730-00-042-8988, FSCM 24491, P/N 10015.

FOLLOW ON TASKS

Lower and secure hood. (See TM 9-2320-260-10-1.)

TA327788

2-20. M939 Series Trucks (5-Ton)

This paragraph contains installation and maintenance instructions for the engine and transmission oil sampling valves used on M939 series trucks.

M939 series vehicles are 5-ton, 6x6, cargo, dump, tractor, wrecker, and van trucks with automatic transmissions. Vehicles affected by these instructions are the M923, M924, M925, M926, M927, and M928 cargo trucks, the M929 and M930 dump trucks, the M931 and M932 truck tractors, the M934 and M935 expansible vans, and the M936 medium wrecker. Also affected are the truck

chassis M939, M940, M941, M942, M943, M944, and M945.

Illustrations and instructions presented are of a "typical" M939 series truck installation. Minor variations may occur within models or from model to model. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

Lowest level of maintenance authorized for installation of the M939 series truck engine and transmission oil sampling valves is organizational maintenance.

INITIAL SETUP

TOOLS: GENERAL MECH TOOL KIT #1
4910-00-754-0654

MATERIALS/PARTS

VALVE (2)-4820-00-845-1096
ELBOW (1)-4730-01-155-5449
O-RING(1)-5330-00-599-2721
SEALING COMPOUND (B)-8030-00-656-1426

TM REFERENCES

TM 9-2320-272-10
LO 9-2320-272-12
TM 9-2320-272-20

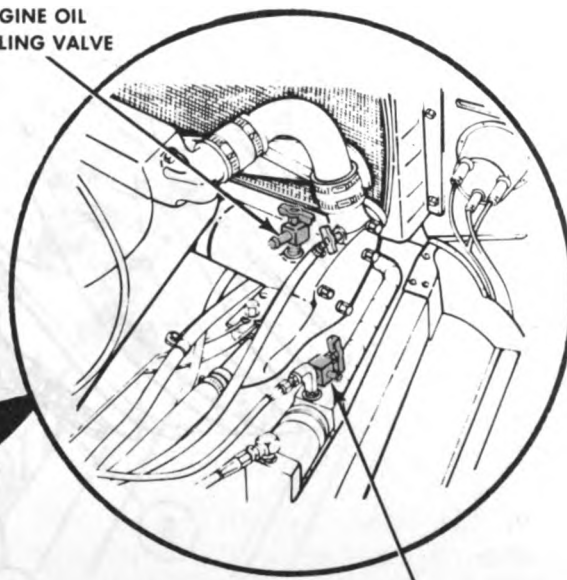
EQUIPMENT CONDITION:

VEHICLE ON LEVEL SURFACE
ENGINE OFF AND COOL
BATTERY SWITCH OFF
HAND BRAKE SET
HOOD RAISED AND SECURED
RIGHT WHEEL SHROUD REMOVED

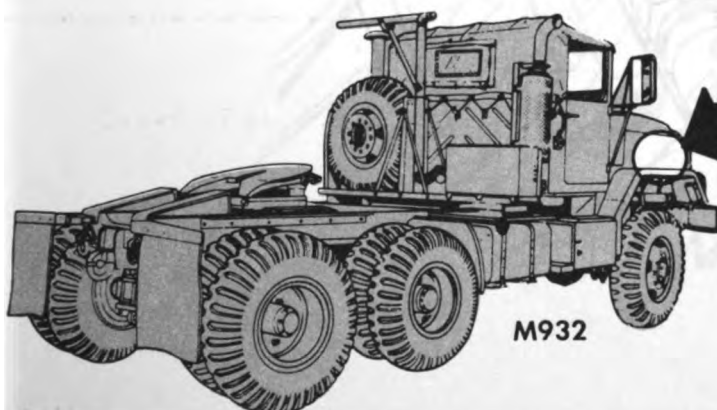
LOCATION

The M939 series truck engine oil sampling valve is installed on the engine oil cooler housing located at the forward right side of the vehicle engine. The transmission oil sampling valve is installed on the nearby transmission oil cooler at the outlet elbow.

ENGINE OIL
SAMPLING VALVE



TRANSMISSION OIL
SAMPLING VALVE



M932

TA327789

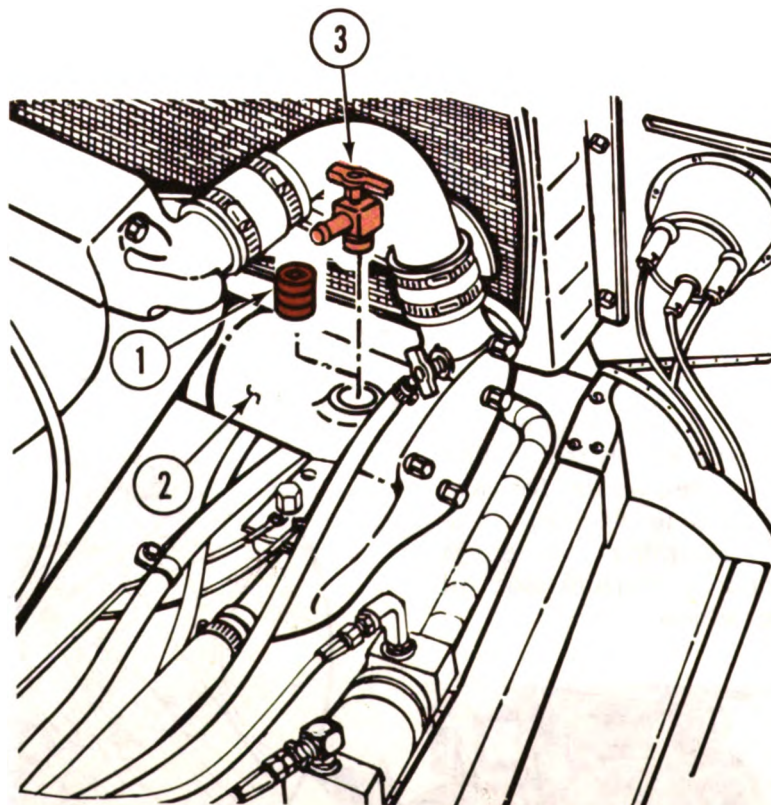
ENGINE OIL SAMPLING VALVE INSTALLATION

1. Remove socket head pipe plug (1) from the engine oil cooler housing (2).

NOTE

Apply type III sealing compound, NSN 8030-00-656-1426 (or equal), to external threads of fittings before installing each fitting.

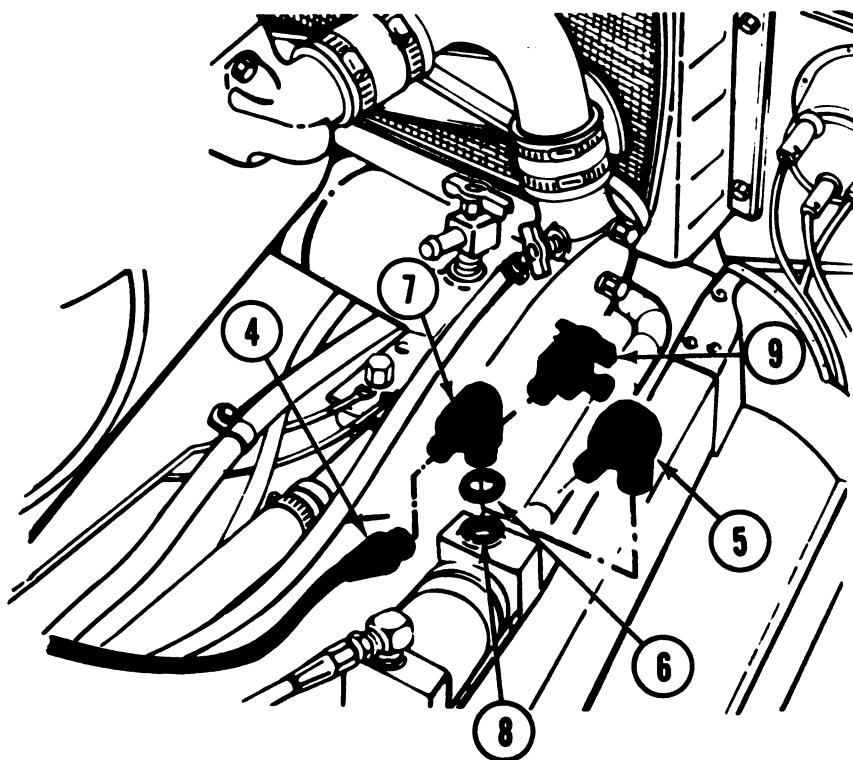
2. Install oil sampling valve (3), NSN 4820-00-845-1096, into the open port on the engine oil cooler housing (2). Tighten valve (3). Valve should be installed with the sample drain port facing the rear of the vehicle.



TA327790

TRANSMISSION OIL SAMPLING VALVE INSTALLATION

3. Disconnect oil supply hose (4) from the transmission oil cooler outlet elbow (5). Allow any transmission oil from the supply hose (4) to drain into a suitable container.
4. Remove outlet elbow (5) from the transmission oil cooler. Discard elbow (5).
5. Position O-ring (6), NSN 5330-00-599-2721, on elbow (7), NSN 4730-01-155-5449, install elbow (7) into the oil outlet port (8) of the transmission oil cooler. Tighten elbow (7). Elbow should be installed with the elbow's outlet port facing rear of the vehicle.
6. Reinstall the transmission oil supply hose (4) into new elbow (7). Tighten the hose fitting.
7. Install oil sampling valve (9), NSN 4820-00-845-1096, into the tapped housing port of elbow (7). Tighten valve.
8. Refill transmission oil captured during step 3. See LO 9-2320-272-12 for transmission oil level and fill instructions.



MAINTENANCE

Refer to figures B-15 and B-16, Appendix B of this TM, for M939 series truck engine and transmission oil sampling valve replacement ordering data.

In the event of salvage of the two oil sample valves (items 3 and 9), replace adapter elbow (item 7) with original elbow, NSN 4730-01-110-4059. Also, plug engine oil cooler housing (item 2) with pipe plug, NSN 4730-00-042-8988.

FOLLOW ON TASKS

Check transmission oil level and fill. (See LO 9-2320-272-12.)

Reinstall right wheel shroud. (See TM 9-2320-272-20.)

Lower and secure hood. (See TM 9-2320-272-10.)

2-21. M876 Telephone Maintenance Truck

This paragraph contains installation and maintenance instructions for the engine and transmission oil sampling valve kit, P/N 5705372, used on the M876 Telephone Maintenance Truck, 6x4, 36,000 GVW.

Illustrations and instructions presented are of a "typical" installation. Variations

may occur from vehicle to vehicle. Such variations, however, are minor. Maintenance technicians are asked to adjust to minor variations when performing the procedure.

Lowest level of maintenance authorized to install this kit is organizational maintenance.

INITIAL SETUP

TOOLS: AUTOMOTIVE MECH TOOL KIT
5180-00-754-0641

MATERIALS/PARTS

*VALVE (2)-4820-00-720-4488
*NIPPLE (1)-4730-00-278-0002
*ELBOW (1)-4730-00-249-3915
*NIPPLE (1)-4730-00-188-1846
*BUSHING (2)-4730-00-277-9386
*TEE (1)-4730-00-249-2029
SEALING COMPOUND (B)-8030-00-656-1426

*PART OF KIT, P/N 5705372

TM REFERENCES:

TM 9-2320-269-10
LO 9-2320-269-12
TM 9-2320-269-34P

EQUIPMENT CONDITION

VEHICLE ON LEVEL SURFACE
ENGINE OFF AND COOL
PARKING BRAKE SET
KEY SWITCH OFF
HOOD RAISED/SECURED
WHEELS CHOCKED

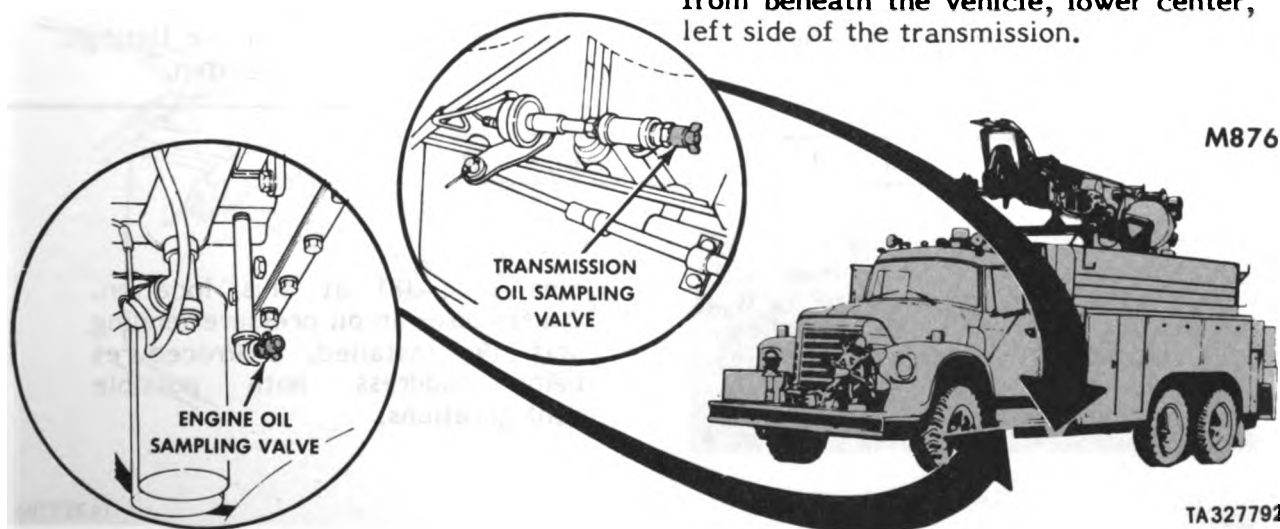
LOCATION

The M876 telephone maintenance truck's engine oil sampling valve is installed on the bottom of the vehicle's engine oil cooler near the oil filter housing on the left side of the engine.

The transmission oil sampling valve is installed into the vehicle's transmission main pressure tap near the modulator valve, left side of transmission. At this location, some M876's have a

transmission oil pressure sending unit installed. Other M876 trucks have a 1/8" pipe plug as shown in figure 51, item 13, TM 9-2320-269-34P. Both possibilities are addressed in these instructions.

Service locations for installation of the engine oil sampling valve is from beneath the vehicle, engine forward left side. Best location for installation of the transmission oil sampling valve is from beneath the vehicle, lower center, left side of the transmission.



ENGINE OIL SAMPLING VALVE INSTALLATION

1. Obtain a clean, available container to drain approximately 1 gallon of oil. Locate container beneath the 1/4" hexhead pipe plug (1) on the underside of the oil cooler housing (2). Remove pipe plug (1) and allow oil to drain from the engine oil cooler. Discard pipe plug (1).

NOTE

Use a clean rag to wipe excess oil from the oil cooler drain port (3).

NOTE

Apply type III sealing compound, NSN 8030-00-656-1426 (or equal), to the external threads of all fittings before installing each fitting.

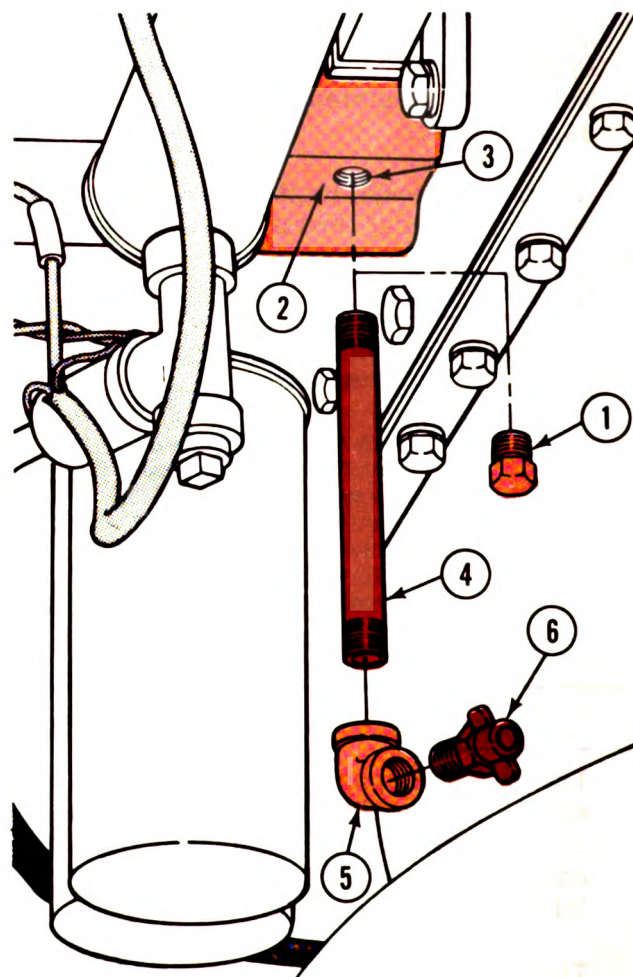
2. Install 1/4" x 5" pipe nipple (4), NSN 4730-00-278-0002, into the oil cooler drain port (3). Tighten nipple (4).

3. Install 90° elbow (5), NSN 4730-00-249-3915, onto pipe nipple (4). Tighten elbow with open end facing the rear of the vehicle.

4. Install oil sampling valve (6), NSN 4820-00-720-4488, into open end of elbow (5). Tighten valve.

CAUTION

Make certain valve is closed before refilling engine crankcase.



5. Refill engine with oil collected during step 1. See LO 9-2320-269-12. After refill, start engine and observe installed fittings and valve to make certain there are no leaks. Tighten any loose fittings. Shutdown engine after inspection.

TRANSMISSION OIL SAMPLING VALVE INSTALLATION

NOTE

The transmission oil sampling valve and associated parts are installed in the M876 transmission's main pressure tap (7). Some M876 trucks are equipped with a 1/4"

pipe plug (8) at this location. Others have an oil pressure sending unit (9) installed. Procedures below address both possible configurations.

TA327793

NOTE

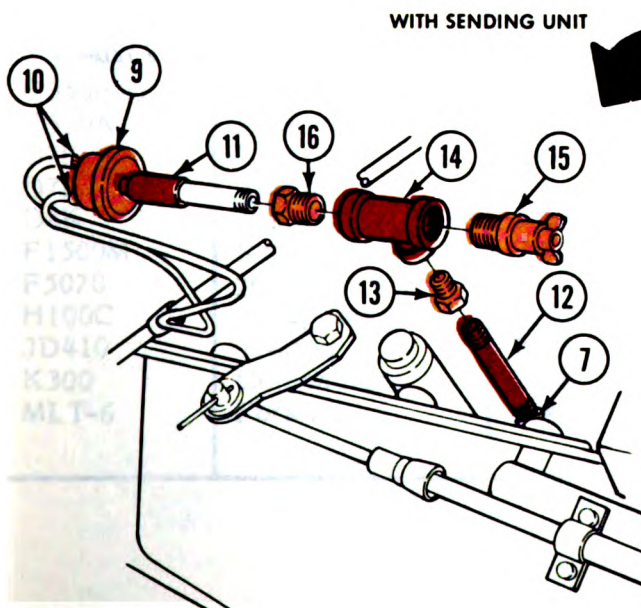
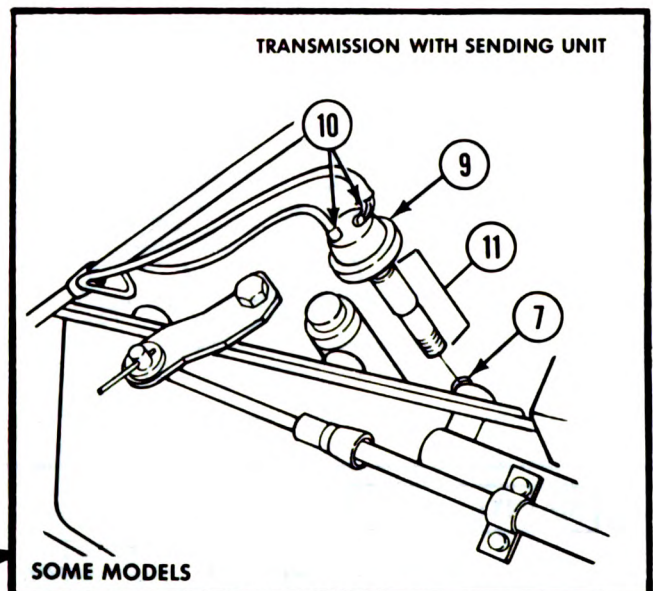
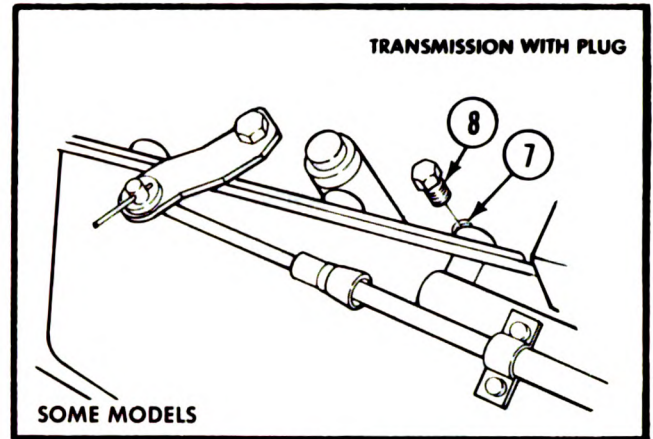
Obtain a clean, available container and be prepared to catch oil spillage from the transmission when removing the pipe plug (8) or oil pressure sending unit (9). Use a clean rag to wipe area of the main pressure tap after draining stops.

6. If your vehicle is equipped with the sending unit (9), disconnect electrical leads (10). Unscrew and remove sending unit (9) with the attached sending unit adapter (11).

7. If your vehicle's transmission main pressure tap has a pipe plug (8), remove plug.

8. Install 1/4" x 4" pipe nipple (12), NSN 4730-00-188-1846, into main pressure tap (7). Tighten pipe nipple (12).

9. Install bushing (13), NSN 4730-00-277-9386, onto pipe nipple (12). Tighten bushing (13).



10. Install center port of tee (14), NSN 4730-00-249-2029, onto bushing (13). Tighten tee (14). Tee should be installed as illustrated.

11. Install sampling valve (15), NSN 4820-00-720-4488, in the vehicle rear port of tee (14). Tighten sampling valve (15).

12. Install second bushing (16), NSN 4730-00-277-9386, into forward end of tee (14). Tighten bushing (16).

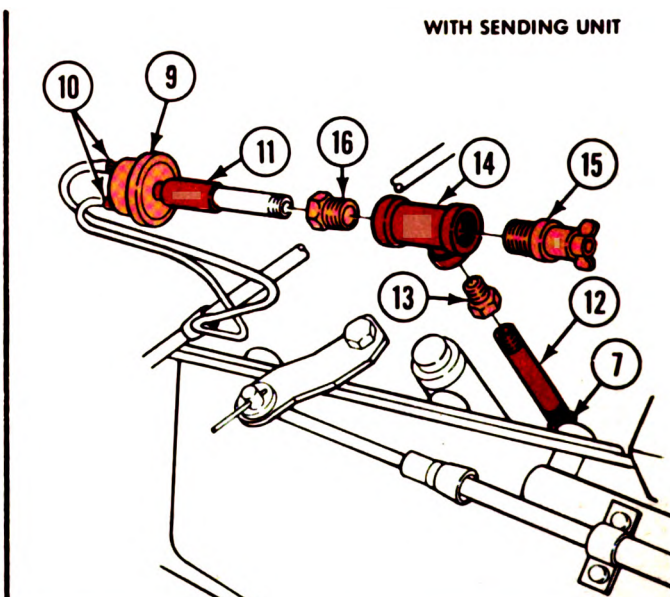
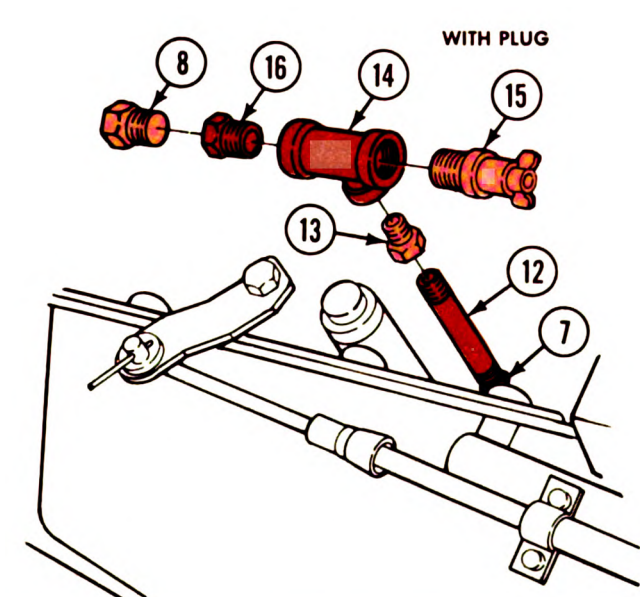
13. If your vehicle is equipped with the sending unit (9), install unit with its transmission main pressure tap adapter (11) into bushing (16). Reconnect electrical leads (10) to sending unit (9).

14. If your vehicle is equipped with a transmission main pressure tap pipe plug (8), install plug (8) into bushing (16). Tighten plug (8).

CAUTION

Visually check and make certain valve (15) is closed before refill of transmission.

15. Fill transmission. See LO 9-2320-269-12 for transmission check and fill locations and instructions.



MAINTENANCE

Individual components of the M876 telephone maintenance truck oil sampling valve kit are available in the Army Supply System. Figure B-6, Appendix B of this TM, provides replacement ordering data for sampling valve kit, P/N 5705372.

FOLLOW ON TASKS

Lower and secure hood. (See TM 9-2320-269-10.)

Section IV. INSTALLATION AND MAINTENANCE INSTRUCTIONS FOR SPECIAL PURPOSE VEHICLES**2-22. Model Reference Index**

This section provides oil analysis sampling valve and valve kit installation and maintenance instructions for special purpose vehicles only. Special purpose vehicles may be track or wheel vehicles. Special purpose vehicles include all material handling, dock-yard, construction, fire and special utility vehicles.

Table 2-4, below, lists the models and the page reference where instructions for each model can be located in this TM. The models are listed in alphanumeric sequence by left-justified digits. Paragraph 1-13h, page 1-16 of this TM provides an explanation of this type of sequencing. This kind of sequencing becomes necessary with special purpose

vehicles because of the mix of letters and numbers that are used to identify these types of vehicles.

Special purpose vehicles not listed in table 2-4 do not have sampling valves or valve kits available at time of this publication. However, major components of such vehicles may still come under Army Oil Analysis Program directives.

Table 1-3 lists all tank-automotive special purpose vehicles and provides a vehicle-by-vehicle status with regard to sampling valves, use of the sampling pump, and/or why a particular vehicle is not in the oil analysis program. Refer to table 1-3 if your vehicle is not listed in table 2-4 below.

TABLE 2-4. Model Reference Index for Special Purpose Vehicles

Vehicle Model #	Description	Page Number
ARTFT-6	Forklift MHE 222	2-86
CAT D7E	Tractor	2-64
CAT D7F	Tractor	2-62
CAT 120	Road Grader	2-66
C350B	Tandem Roller	2-108
C350B-D	Tandem Roller	2-108
C530A	Pneumatic Roller	2-72
D7E	Tractor	2-64
D7F	Tractor	2-62
D8K	Tractor	2-97
F1500M	Road Grader	2-91
F5070	20-Ton Dump	2-79
H100C	Scoop Loader	2-106
JD410	Tractor	2-77
K300	Compactor	2-68
MLT-6	Forklift	2-86

Vehicle Model #	Description	Page Number
MLT-6-CH	Forklift	2-86
MLT-6-2	Forklift	2-86
MT250	Crane (25-Ton)	2-89
MT250W	Crane (25-Ton)	2-89
M10A	Forklift	2-95
M320RT	Crane Carrier	2-113
M4K	Forklift	2-84
M878A1	Yard Tractor	2-99
RS28	Vibratory Roller	2-81
RTL-10	Forklift	2-93
RTL-10-1	Forklift	2-93
TM S-300-5	Crane (25-Ton)	2-82
290M	Wheeled Tractor	2-74
440HA	Road Grader	2-107
6250TC	Crane	2-103
830MB	Tractor	2-70
9125TC	Truck Crane	2-110

2-23. D7F Tractor, Crawler

This paragraph contains installation and maintenance instructions for the engine oil sampling valve kit, Part Number 5705373. This kit is used on the engine of the D7F tractor crawler. Illustrations and instructions presented are of a "typical" tractor. Variations may occur from vehicle to vehicle. Such variations,

however, are minor. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

The lowest level of maintenance capable of initial installation of this kit is organizational maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT #1
4910-00-754-0654
GENERAL MECH TOOL KIT #2
4910-00-754-0650

MATERIALS/PARTS:

*REDUCER (1)-4730-00-811-6205
*NIPPLE (1)-4730-00-196-1465
*TEE (1)-4730-00-257-2117
*VALVE (1)-4620-01-120-4532
*BUSHING (1)-4730-00-248-6728
SEALING COMPOUND 8030-00-656-1426
TAPE, ANTISEIZE 8030-00-889-3535

*PART OF KIT P/N 5705373

TM REFERENCES:

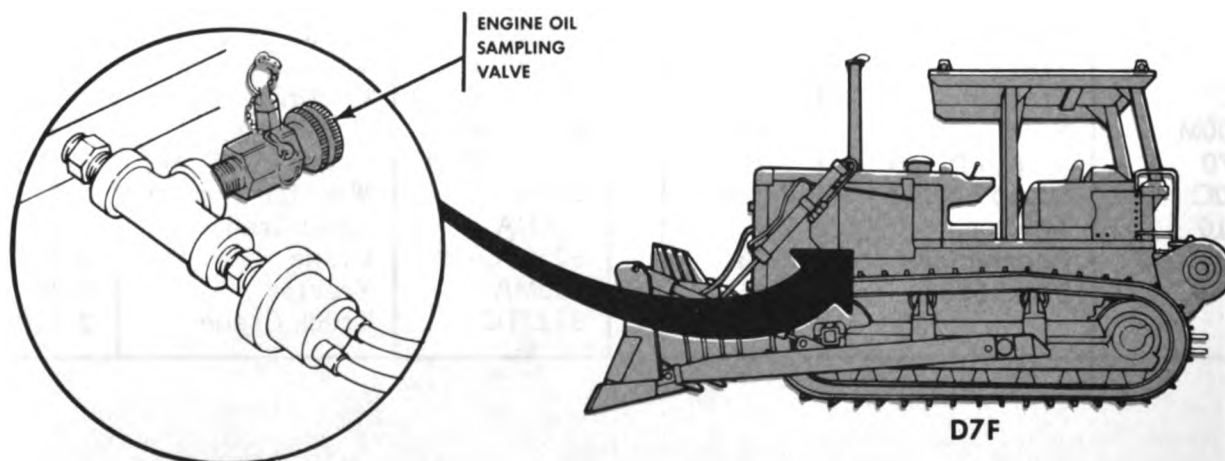
TM 5-2410-233-10
TM 5-2410-233-20
TM 5-2410-233-20P

EQUIPMENT CONDITION:

VEHICLE ON LEVEL SURFACE
BLADE/RIPPER LOWERED
BRAKE-LOCK LEVER LOCKED
HEAT-START SWITCH "OFF"
DISCONNECT SWITCH "OFF"
LIGHT SWITCHES "OFF"
LEFT ENGINE ACCESS COVER
REMOVED
ENGINE OIL DRAINED

LOCATION

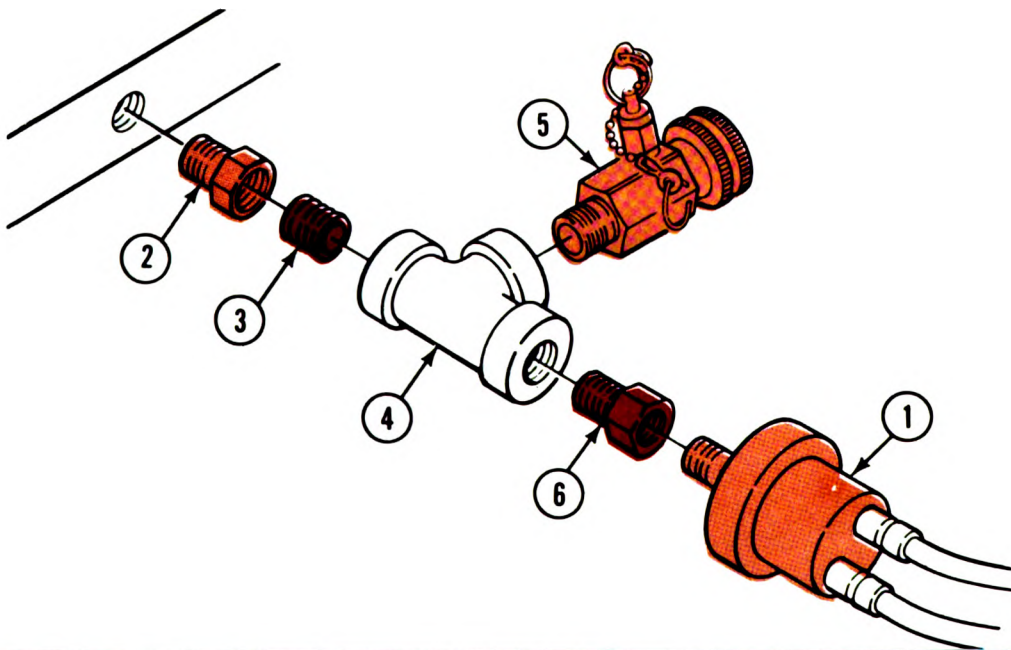
The D7F engine oil sampling valve kit is installed between the engine oil sending unit and the engine block, near the lower right corner of the engine compartment on the vehicle left side.



TA 327796

ENGINE OIL SAMPLING VALVE INSTALLATION

1. Disconnect the engine oil sending unit (1) from side of engine block.
2. Apply sealing compound, NSN 8030-00-656-1426 (or equivalent), or antiseize tape, NSN 8030-00-889-3535 around external threads of reducer (2), NSN 4730-00-811-6205. Install reducer (2) into port of engine block remaining from sending unit (1). Tighten reducer (2).
3. Apply sealing compound or antiseize tape around threads of nipple (3), NSN 4730-00-196-1465. Install nipple (3) into reducer (2). Tighten nipple.
4. Install one end of tee (4), NSN 4730-00-257-2117, onto nipple (3). Tighten tee (4) with center port facing toward front of vehicle.
5. Apply sealing compound or antiseize tape to threads of oil sampling valve (5), NSN 4820-01-120-4532. Install valve (5) into center port of tee (4) with drain port of valve pointing downward.
6. Apply sealing compound or antiseize tape to threads of bushing (6), NSN 4730-00-248-6728. Install bushing (6) into remaining port of the tee (4). Tighten bushing.
7. Apply sealing compound or antiseize tape to threads of oil sending unit (1). Install sending unit (1) into bushing (6) and tighten.

**MAINTENANCE**

All oil sampling valve kit hardware is available as individual repair parts. These items can be removed and replaced at the organizational maintenance level. See figure B-17, Appendix B of this TM for engine oil sampling valve replacement parts.

FOLLOW ON TASKS

Refill engine oil level in accordance with vehicle LO instructions. Check level until correct.

Start engine per operator's manual instructions, and check oil sampling valve kit installation area for leaks. Repair any leaks as necessary.

Replace engine access cover.

TA 327797

2-24. D7E Tractor, Crawler

This paragraph contains installation and maintenance instructions for the engine oil sampling valve kit, Part Number 5705377. This kit is used on the engine of the D7E Tractor Crawler. Illustrations and instructions presented are of a "typical" tractor. Variations,

however, are minor. maintenance technicians are asked to adjust to all such variations when performing the procedures.

The lowest level of maintenance capable of initial installation of this kit is organizational maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT #1
4910-00-754-0654
GENERAL MECH TOOL KIT #2
4910-00-754-0650

MATERIALS/PARTS:

*TEE (1)-4730-00-257-2117
*VALVE (1)-4820-01-120-4532
*NIPPLE (1)-4730-00-196-1465
SEALING COMPOUND 8030-00-656-1426
TAPE, ANTISEIZE 8030-00-889-3535

*PART OF KIT P/N 5705377

TM REFERENCE:

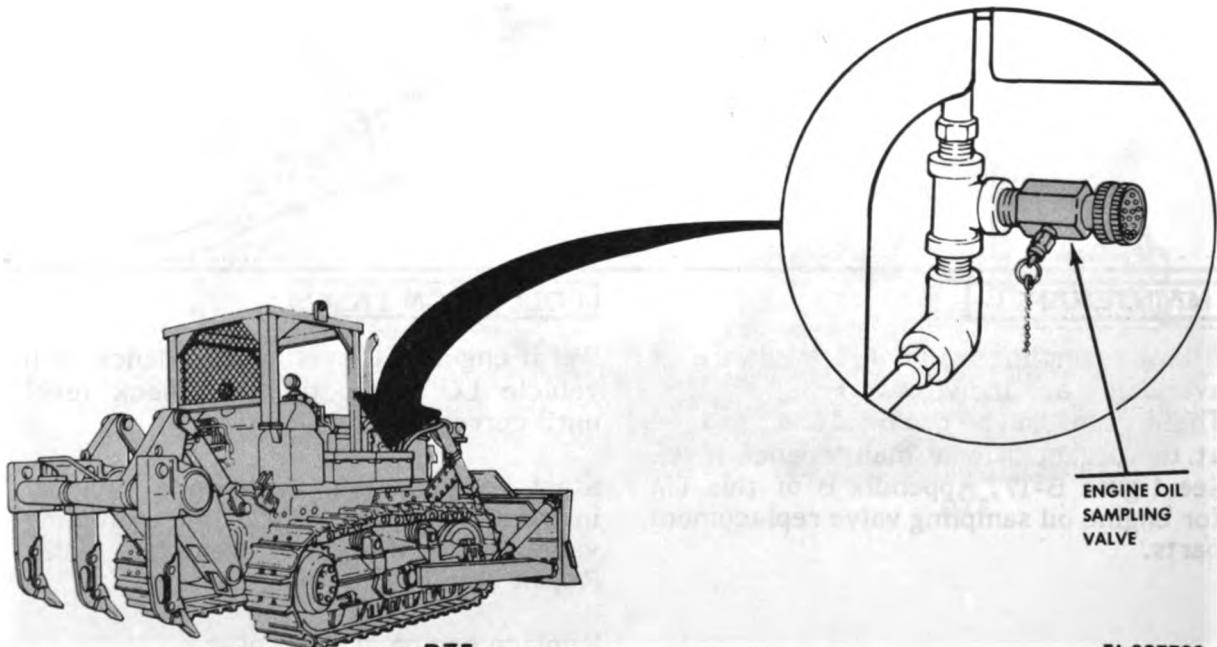
LO 5-2410-214-12
TM 5-2410-242-12
TM 5-2410-242-20P

EQUIPMENT CONDITION:

TRACTOR ON LEVEL SURFACE
BLADE/RIPPER LOWERED
LIGHT SWITCHES "OFF"
HEAT-START SWITCH "OFF"
SAFETY LOCK LEVER "ON"
BRAKE LOCK CONTROL ENGAGED
ENGINE ACCESS COVER REMOVED
ENGINE OIL DRAINED

LOCATION

The D7E engine oil sampling valve is installed near the upper left corner of the engine compartment on vehicle right side.

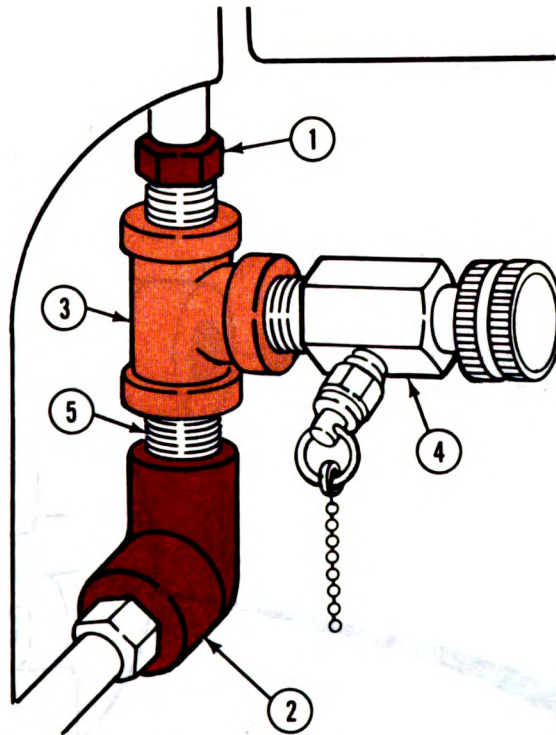


D7E

TA 327796

ENGINE OIL SAMPLING VALVE INSTALLATION

1. Locate the 1/4-inch pipe coupling in the line to the engine oil pressure gage, where the tubing connects to the hose. Remove the coupling between the tube fitting (1) and the hose connection (2).
2. Apply sealing compound, NSN 8030-00-656-1426 (or equivalent), or wrap antiseize tape, NSN 8030-00-889-3535 around external threads of tube fitting (1). Install one end of tee (3), NSN 4730-00-257-2117, onto tube fitting. Tighten tee (3) with center port facing toward front of vehicle.
3. Apply sealing compound or antiseize tape to threads of oil sampling valve (4), NSN 4820-01-120-4532. Install sampling valve (4) into center port of tee (3) with drain port of valve pointing downward.
4. Apply sealing compound or antiseize tape to threads of nipple (5), NSN 4730-00-196-1465, install nipple (5) into remaining open port of tee (3). Tighten nipple.
5. Install coupling of hose connection (2) onto nipple (5) and tighten.



MAINTENANCE

All oil sampling valve kit hardware is available as individual repair parts. These items can be removed and replaced at the organizational maintenance level. See figure B-18, Appendix B of this TM for engine oil sampling valve replacement parts.

FOLLOW ON TASKS

Refill engine oil level in accordance with vehicle LO instructions. Check level until correct.

Start engine per operator's manual instructions, and check oil sampling valve kit installation area for leakage. Repair any leaks as necessary.

Replace engine access cover.

TA 327799

2-25. M120 and M120 ROPS Motor Grader

This paragraph contains installation and maintenance instructions for the oil sampling valve kit, Part Number 5705385, used on the engine of the M120 and M120 ROPS motor graders. Illustrations and instructions presented are of a "typical" grader. Variations may occur from vehicle to vehicle. Such variations,

however, are minor. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

The lowest level of maintenance capable of initial installation of this kit is organizational maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT #1
4910-00-754-0654

TM REFERENCES:

TM 5-3805-249-12
TM 5-3805-249-20P

MATERIALS/PARTS:

*BUSHING (1)-4730-00-194-0216
*VALVE (1)-4820-01-120-4532
SEALING COMPOUND-8030-00-656-1426

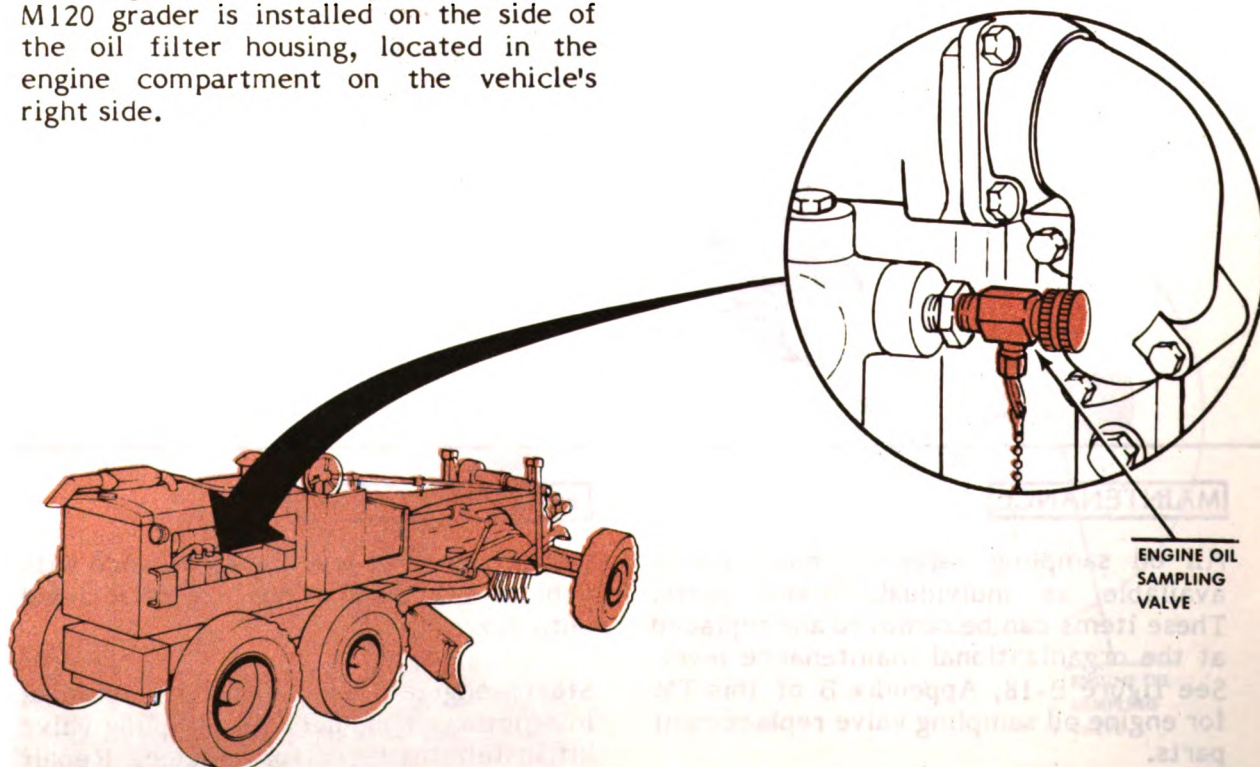
EQUIPMENT CONDITION:

VEHICLE ON LEVEL SURFACE
SCARIFIER LOWERED
BLADE LOWERED
PARKING BRAKE LEVER LOCKED
MASTER SWITCHES OFF
HEAT/START SWITCH OFF
ENGINE OIL DRAINED

*PART OF KIT 5705385

LOCATION

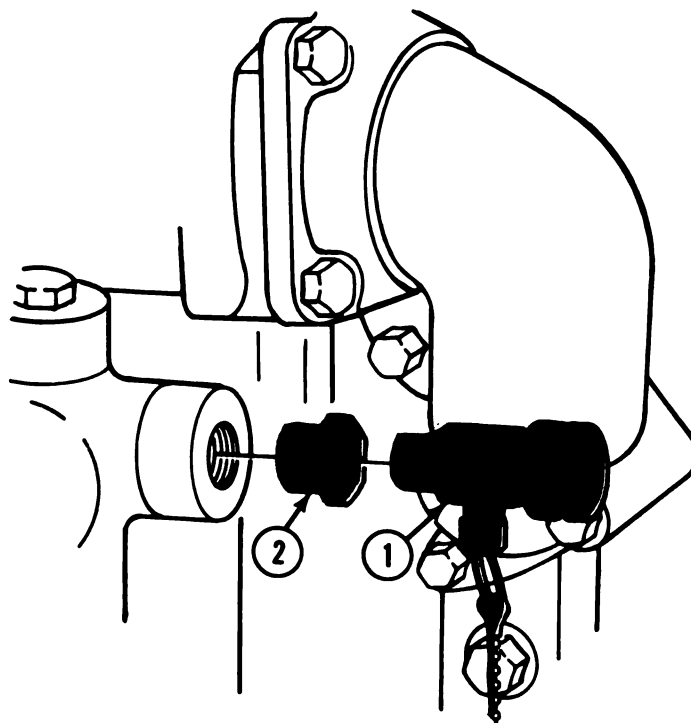
The engine oil sampling valve for the M120 grader is installed on the side of the oil filter housing, located in the engine compartment on the vehicle's right side.



M120 and M120 ROPS

ENGINE OIL SAMPLING VALVE INSTALLATION

1. Locate and remove the pipe plug from side of oil filter housing, opposite from the inlet and discharge hoses. Discard pipe plug.
2. Apply type III sealing compound, NSN 8030-00-656-1426 (or equivalent), to threads of bushing (2), NSN 4730-00-194-0216. Install bushing (2) into port remaining from removal of pipe plug. Tighten bushing.
3. Apply sealing compound to threads of oil sampling valve (1), NSN 4820-01-120-4532. Install valve (1) into bushing (2) with drain port of valve pointing downward.

**MAINTENANCE**

Individual components of the oil sampling valve kit are available as repair parts. See figure B-19, Appendix B of this TM for engine oil sampling valve replacement parts.

FOLLOW ON TASKS

Refill engine oil in accordance with vehicle LO instructions. Check level until correct.

Start engine per operator's manual instructions, and check oil sampling valve kit installation area for leakage. Repair any leaks as necessary.

2-26. K300 Self Propelled Compactor

This paragraph contains installation and maintenance instructions for the oil sampling valve kit, Part Number 5705377, used on the engine of the K300 Compactor. Illustrations and instructions presented are of a "typical" compactor. Variations may occur from vehicle to vehicle. Such variations,

however, are minor. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

The lowest level of maintenance capable of initial installation of this kit is organizational maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT #1
4910-00-754-0654
GENERAL MECH TOOL KIT #2
4910-00-754-0650

MATERIALS/PARTS:

*NIPPLE (1)-4730-00-196-1465
*TEE (1)-4730-00-257-2117
*VALVE (1)-4820-01-120-4532
TAPE, ANTISEIZE 8030-00-889-3535
SEALING COMPOUND 8030-00-656-1426

TM REFERENCE:

TM 5-3895-349-14&P

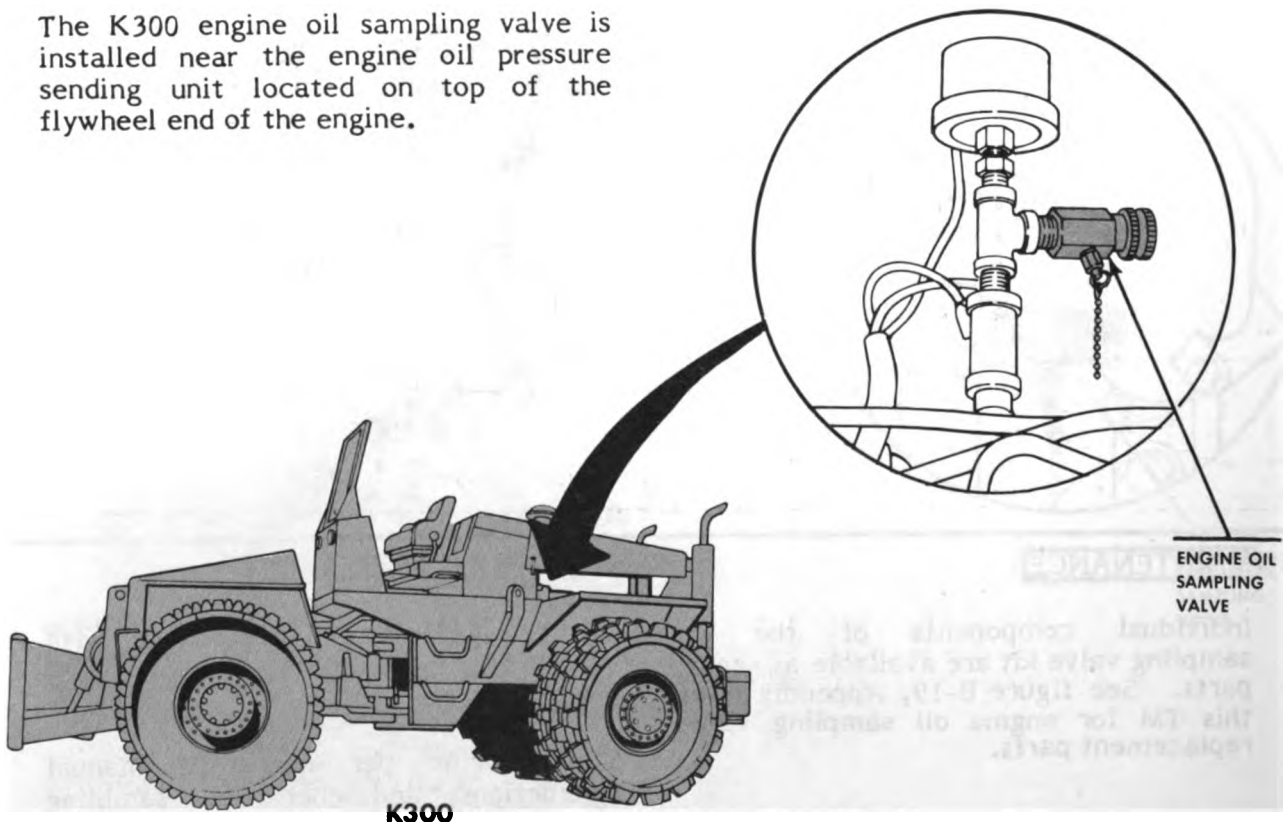
EQUIPMENT CONDITION:

VEHICLE ON LEVEL SURFACE
PARKING BRAKE SET
BLADE LOWERED
MASTER SWITCH OFF
ENGINE OIL DRAINED

*PART OF KIT P/N 5705377

LOCATION

The K300 engine oil sampling valve is installed near the engine oil pressure sending unit located on top of the flywheel end of the engine.



TA 327802

ENGINE OIL SAMPLING VALVE INSTALLATION**CAUTION**

Mark and disconnect wires from oil pressure sending unit.

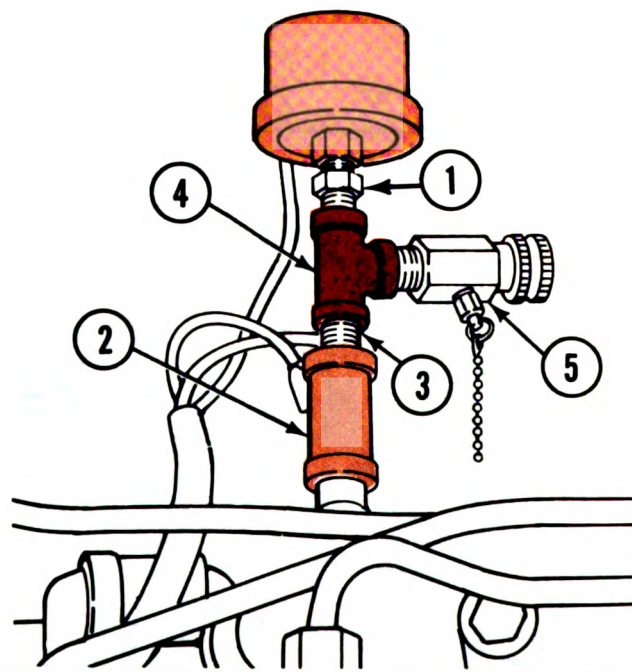
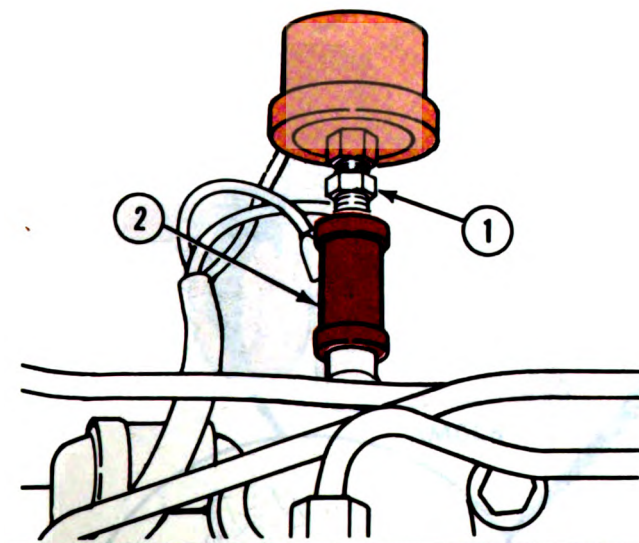
1. Remove the engine oil pressure sending unit with reducer (1) from existing tee (2). Set sending unit with reducer (1) aside for later installation.

2. Apply Type III sealing compound, NSN 8030-00-656-1426 (or equivalent), or wrap antiseize tape, NSN 8030-00-889-3535 around threads of nipple (3), NSN 4730-00-196-1465. Install nipple (3) into the open port of existing tee (2). Tighten nipple.

3. Install one end of tee (4), NSN 4730-00-257-2117, on nipple (3). Tighten tee (4).

4. Apply sealing compound or antiseize tape around threads of oil sampling valve (5), NSN 4820-01-120-4532. Install valve (5) into center port of tee (4) with drain port of valve pointing downward.

5. Apply sealing compound or antiseize tape around threads of sending unit with reducer (1). Install sending unit with reducer (1) into remaining end port of tee (4), and tighten. Reconnect marked wires to oil pressure sending unit.

**MAINTENANCE**

Individual components of the oil sampling valve kit are available as repair parts. See figure B-18, Appendix B of this TM for engine oil sampling valve replacement parts.

FOLLOW ON TASKS

Refill engine oil in accordance with vehicle LO instructions. Check level until correct.

Start engine per operator's manual instructions, and check oil sampling valve kit installation area for leakage. Repair any leaks as necessary.

TA 327803

2-27. 830 MB Wheeled Tractor

This paragraph contains installation and maintenance instructions for the engine oil sampling valve kit, Part Number 5705390. This kit is used on the engine of the 830MB wheeled tractor. Illustrations and instructions presented are of a "typical" tractor. Variations may occur from vehicle to vehicle. Such variations,

however, are minor. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

The lowest level of maintenance capable of initial installation of this kit is organizational maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT #1
4910-00-754-0654

MATERIALS/PARTS:

*NIPPLE (1)-4730-00-921-3624
*TEE (1)-4730-00-595-1887
*REDUCER (1)-4730-00-811-6205
*VALVE (1)-4820-01-120-4532
SEALING COMPOUND-8030-00-656-1426
TAPE, ANTISEIZE-8030-00-889-3535

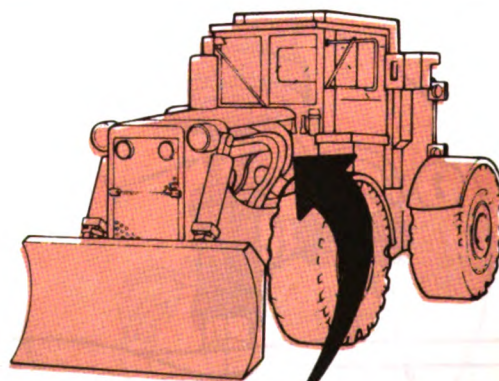
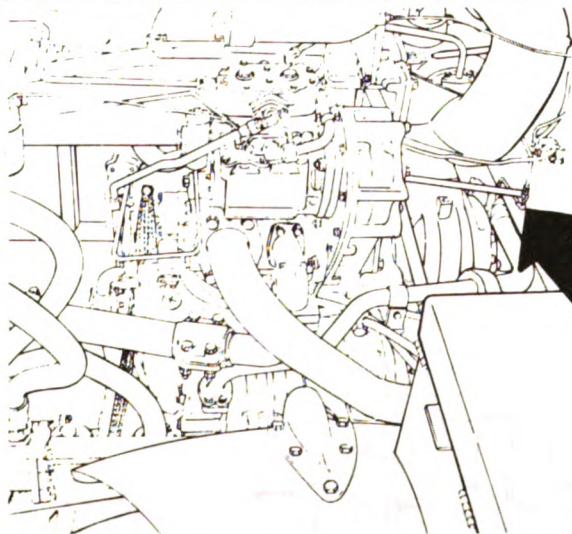
TM REFERENCES:

TM 5-2420-213-12
LO 5-2420-213-12-3
TM 5-2420-213-20P

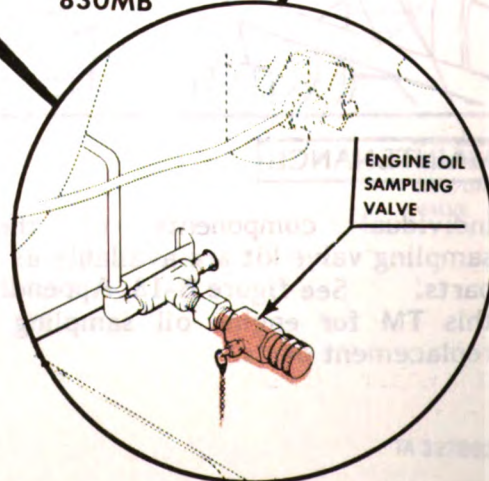
EQUIPMENT CONDITION:

VEHICLE ON LEVEL SURFACE
BLADE FULLY LOWERED
SCRAPER FULLY LOWERED
PARKING BRAKE LEVER LOCKED
SAFETY LOCK LEVER LOCKED
HEAT-START SWITCH OFF
ENGINE HOOD RAISED
ENGINE OIL DRAINED

*PART OF KIT



830MB



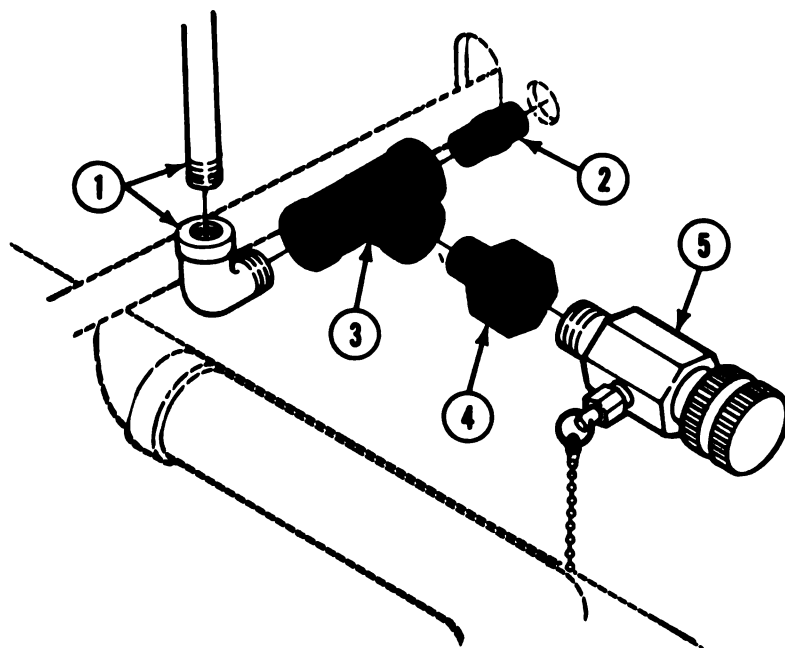
LOCATION

The 830MB engine oil sampling valve is installed through the engine access panel on the vehicle's left side, in the line to the oil pressure gauge outside the firewall.

TA 327804

ENGINE OIL SAMPLING VALVE INSTALLATION

1. Disconnect existing 90° elbow and line (1) to the oil pressure gauge from outside the firewall.
2. Apply Type III sealing compound, NSN 8030-00-656-1426 (or equivalent), or wrap antiseize tape, NSN 8030-00-889-3535 around threads of nipple (2), NSN 4730-00-921-3624. Install nipple (2) into port remaining from elbow and line (1). Tighten nipple.
3. Install one end of tee (3), NSN 4730-00-595-1887, onto nipple (2), with center port of tee facing toward the outside of vehicle.
4. Apply sealing compound or antiseize tape around external threads of reducer (4), NSN 4730-00-811-6205. Install reducer (4) into center port of tee (3). Tighten reducer.
5. Apply sealing compound or antiseize tape around threads of oil sampling valve (5), NSN 4820-01-120-4532. Install valve (5) into reducer (4) with drain port of valve pointing downward.
6. Install existing elbow and line (1), into remaining port of tee (3), and tighten.

**MAINTENANCE**

All oil sampling valve kit hardware is available as individual repair parts. These items can be removed and replaced at the organizational maintenance level. See figure B-20, Appendix B of this TM for engine oil sampling valve replacement parts.

FOLLOW ON TASKS

Refill engine oil level in accordance with vehicle LO instructions. Check level until correct.

Start engine per operator's manual instructions, and check oil sampling valve kit installation area for leakage. Repair any leakage as necessary.

TA 327805

2-28. C530A Pneumatic Tired Roller

This paragraph contains installation and maintenance instructions for the engine oil sampling valve kit, P/N 5705381. This kit is used on the engine of the C530A pneumatic tired roller. Illustrations and instructions presented are of a "typical" roller. Variations may occur from vehicle to vehicle. Such

variations, however, are minor. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

The lowest level of maintenance capable of initial installation of this kit is organizational maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT #1
4910-00-754-0654

TM REFERENCE:

TM 5-3895-347-14 & P

MATERIALS/PARTS:

*ELBOW (1)-4730-00-253-4412
*VALVE (1)-4820-00-120-4532
SEALING COMPOUND-8030-00-656-1426
TAPE, ANTISEIZE-8030-00-889-3535

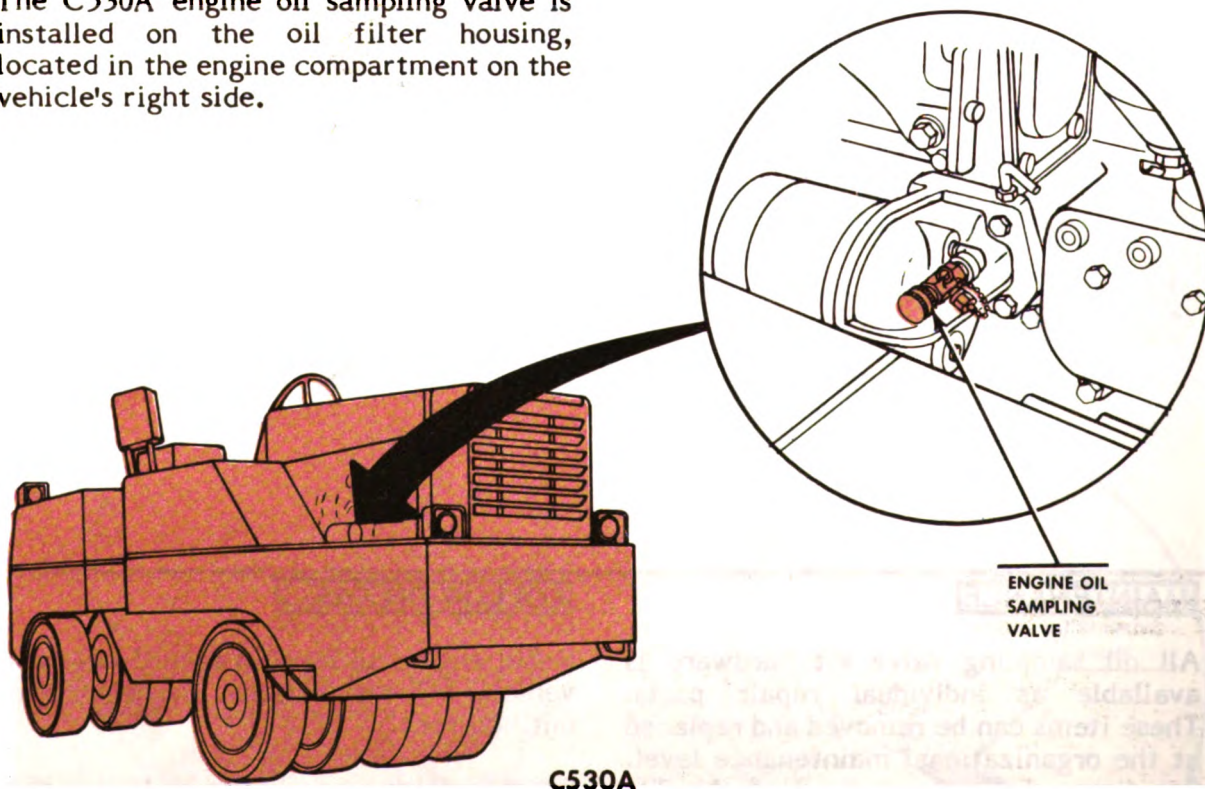
EQUIPMENT CONDITION:

ROLLER ON LEVEL SURFACE
GOVERNOR-DIRECTION CONTROL
KNOB IN NEUTRAL
PARKING BRAKE SET
START SWITCH "OFF"
ENGINE OIL DRAINED

*PART OF KIT P/N 5705381

LOCATION

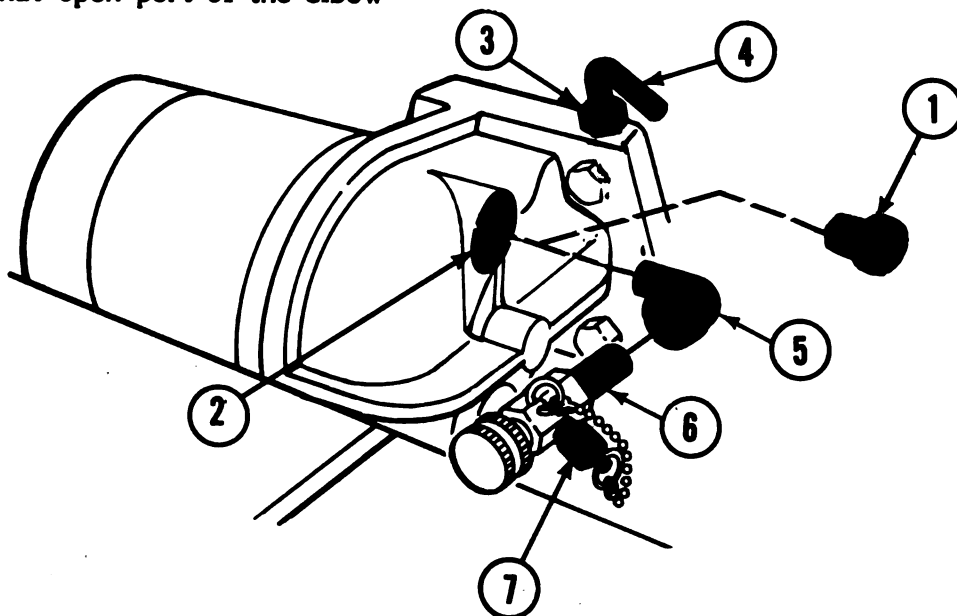
The C530A engine oil sampling valve is installed on the oil filter housing, located in the engine compartment on the vehicle's right side.



TA 327806

ENGINE OIL SAMPLING VALVE INSTALLATION

1. Locate and remove pipe plug (1) from oil filter housing (2). Discard plug (1).
2. Loosen dipstick tube locknut (3) and swing dipstick handle (4) to the right and out of the way during installation of elbow (5) and sampling valve (6).
3. Apply type III sealing compound, NSN 8030-00-656-1426 (or equivalent) around threads of elbow (5), NSN 4730-00-253-4412. Install elbow (5) into port remaining from removal of the pipe plug. Tighten elbow (5). Elbow should be installed so that open port of the elbow (5) faces toward the outside of the vehicle.
4. Apply type III sealing compound (or equivalent) to external threads of oil sampling valve (6), NSN 4820-01-120-4532. Install valve (6) into elbow (5). Tighten valve (6). Valve should be installed with the valve drain port (7) facing downward.
5. Swing dipstick handle (4) back into position and secure dipstick tube in place by tightening locknut (3).

**MAINTENANCE**

All oil sampling valve kit hardware is available as individual repair parts. These items can be removed and replaced at the organizational maintenance level. See figure B-21, Appendix B of this TM for engine oil sampling valve replacement parts.

FOLLOW ON TASKS

Refill engine oil level in accordance with vehicle LO instructions. Check level until correct.

Start engine per operator's manual instructions, and check oil sampling valve kit installation area for leakage. Repair any leaks as necessary.

TA 327807

2-29. 290M Wheeled Tractor

This paragraph contains installation and maintenance instructions for the oil sampling kit, Part Number 5705377. One kit is used on the engine and one kit is used on the transmission of the 290M Wheeled Tractor. Illustrations and instructions presented are of a "typical" tractor. Variations may occur from vehicle to vehicle. Such variations,

however, are minor. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

The lowest level of maintenance capable of initial installation of this kit is organizational maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECHANICS TOOL KIT #1
4910-00-754-0654
GENERAL MECHANICS TOOL KIT #2
4910-00-754-0650

TM REFERENCES:

TM 5-2420-206-12
TM 5-2420-206-20P

MATERIALS/PARTS:

*NIPPLE-(1)-4730-00-196-1465
*TEE-(1)-4730-00-275-2117
*VALVE-(1)-4820-01-120-4532

TAPE, ANTISEIZE-8030-00-889-3535
SEALING COMPOUND-8030-00-656-1426

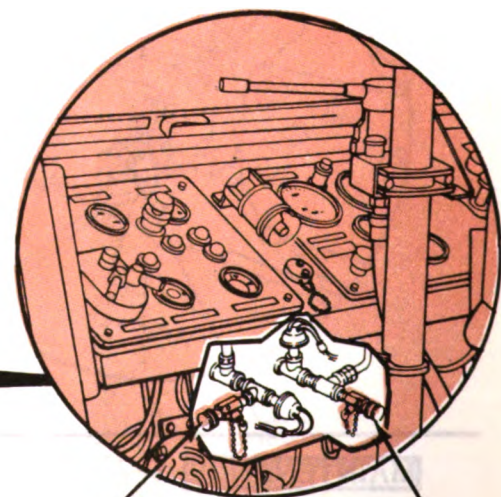
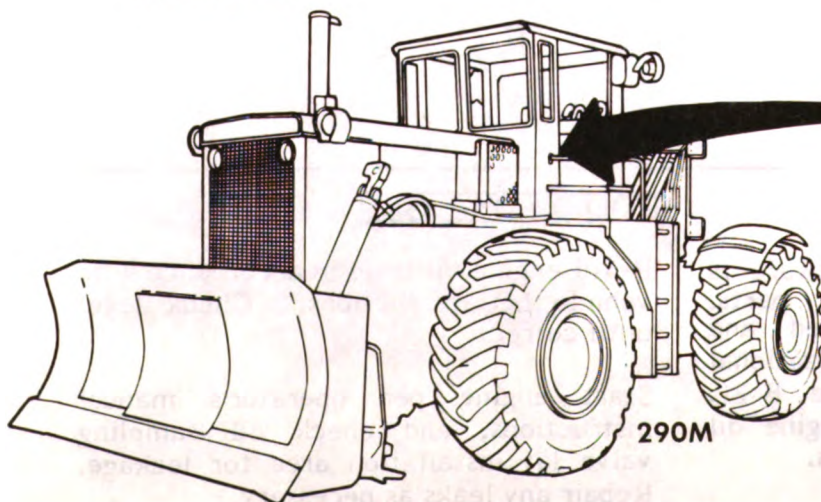
*PART OF KIT P/N 5705377

EQUIPMENT CONDITION:

VEHICLE ON LEVEL SURFACE
BLADE LOWERED
PARKING BRAKE LEVER IN
"APPLIED" POSITION
MAIN SWITCH LEVER "OFF"
MASTER SWITCH "OFF"
ENGINE OIL DRAINED
TRANSMISSION OIL DRAINED

LOCATION

The 290M engine oil sampling valve kit is installed in the cab area, behind the steering column, in a position perpendicular to the firewall. The 290M transmission oil sampling valve kit is also installed in the cab area, behind the steering column, in a position parallel to the firewall.



TRANSMISSION
OIL SAMPLING
VALVE

ENGINE OIL
SAMPLING
VALVE

TA 327808

ENGINE OIL SAMPLING VALVE INSTALLATION

1. On the firewall, locate the pipe tee (1) that provides the port to connect the copper tubing (2) to the engine pressure gauge.

NOTE

Use care when moving copper tubing in order to prevent kinking or bending

Loosen tubing nut (3) at pipe tee (1) and move copper tubing (2) aside.

2. Remove pipe-to-tube fitting (4) and set aside for later installation.

3. Apply type III sealing compound, NSN 8030-00-656-1426 (or equivalent), or wrap antiseize tape, NSN 8030-00-889-3535, around threads of nipple (5), NSN 4730-00-196-1465. Install nipple (5) into

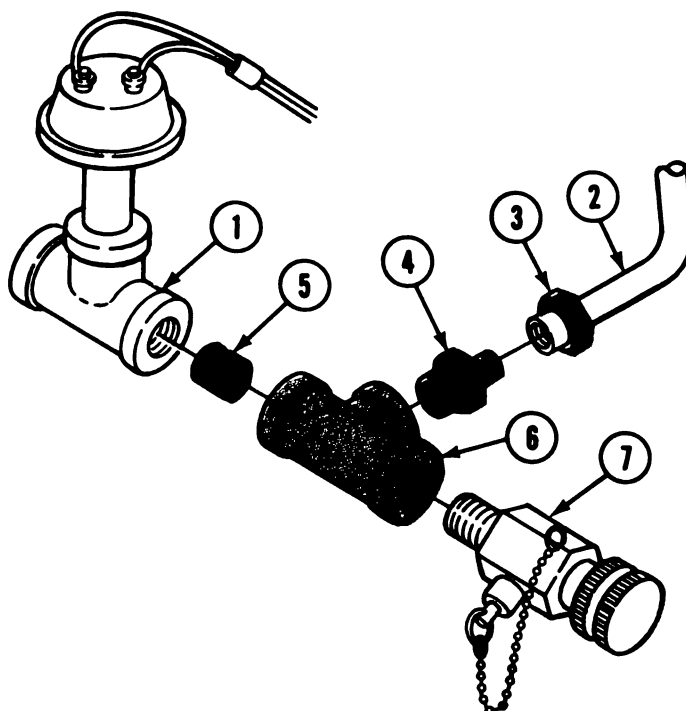
the open port of existing tee (1). Tighten nipple.

4. Install one end of tee (6), NSN 4730-00-275-2117, onto nipple (5). Tighten tee (6) with center port of tee facing at an upward angle toward the top right corner of cab.

5. Apply sealing compound or antiseize tape to threads of oil sampling valve (7), NSN 4820-01-120-4532. Install sampling valve (7) into end of tee (6) with drain port of valve (7) pointing downward.

6. Apply sealing compound or antiseize tape to external threads of pipe-to-tube fitting (4). Install fitting (4) into center port of tee (6). Tighten fitting.

7. Install copper tubing (2) onto pipe-to-tube fitting (4) and tighten tubing nut (3).



TA 327809

TRANSMISSION OIL SAMPLING VALVE INSTALLATION

8. On the firewall, locate the pipe tee (8) that provides the port to connect the copper tubing (9) to the transmission pressure gauge.

CAUTION

Mark and disconnect wiring to transmission pressure gage sending unit.

9. Remove sending unit (10) from pipe tee (8). Set sending unit (10) aside for later installation.

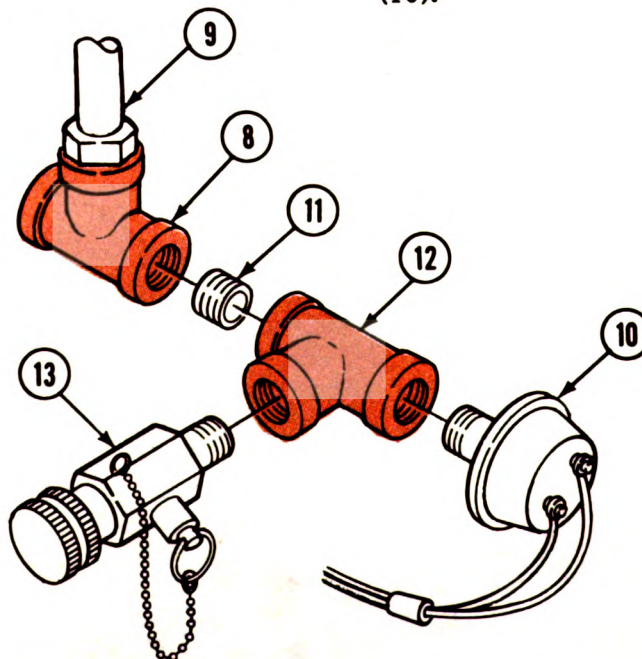
10. Apply type III sealing compound, NSN 8030-00-656-1426 (or equivalent), or wrap antiseize tape, NSN 8030-00-889-3535 around threads of nipple (11), NSN

4730-00-196-1465. Install nipple (11) into the open port of existing tee (8). Tighten nipple.

11. Install one end of tee (12), NSN 4730-00-275-2117, onto nipple (11). Tighten tee (12) with center port of tee facing toward the outside of cab.

12. Apply sealing compound or antiseize tape to threads of oil sampling valve (13), NSN 4820-01-120-4532. Install sampling valve (13) into center port of tee (12) with drain port of valve pointing downward.

13. Install sending unit (10) into remaining open port of tee (12). Reconnect marked wires to sending unit (10).



MAINTENANCE

Individual components of the oil sampling valve kit are available as repair parts. See figure B-18, Appendix B of this TM for engine and transmission oil sampling valve replacement parts.

FOLLOW ON TASKS

Refill engine and transmission oil in accordance with vehicle LO instructions. Check levels until correct.

Start engine per operator's manual instructions, and check oil sampling valve kit installation areas for leakage. Repair any leaks as necessary.

TA 327810

2-30. JD 410 Wheeled Tractor

This paragraph contains installation and maintenance instructions for the engine oil sampling valve kit, Part Number 5705379. This kit is used on the engine of the JD410 Wheeled Tractor. Illustrations and instructions presented are of a "typical" tractor. Variations may occur from vehicle to vehicle. Such

variations, however, are minor. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

The lowest level of maintenance capable of initial installation of this kit is organizational maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT #1
4910-00-754-0654

TM REFERENCES:

TM 5-2420-222-14&P-1
TM 5-2420-222-14&P-2

MATERIALS/PARTS:

*BUSHING (1)-4730-00-196-0837
*REDUCER (1)-4730-00-811-6205
*VALVE (1)-4820-01-120-4532
SEALING COMPOUND-8030-00-656-1426
TAPE, ANTISEIZE-8030-00-889-3535

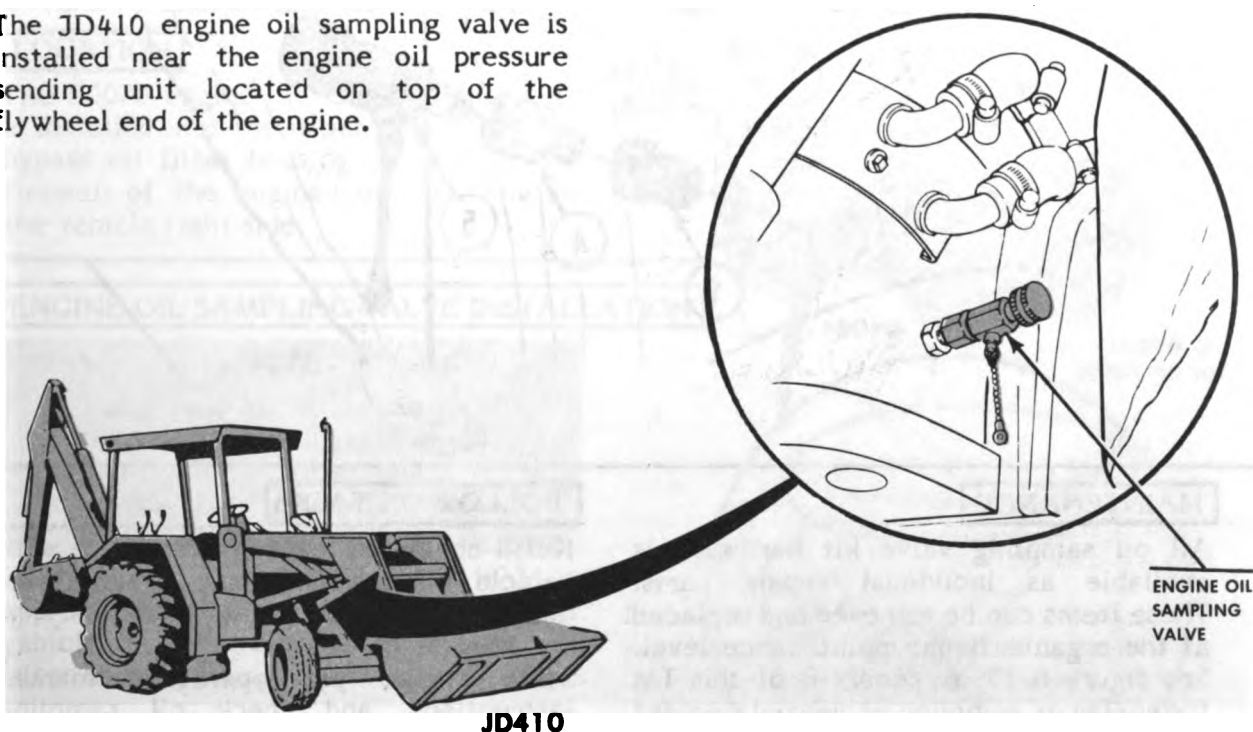
EQUIPMENT CONDITION:

VEHICLE ON LEVEL SURFACE
FRONT BUCKET LOWERED
START SWITCH OFF
ENGINE OIL DRAINED

*PART OF KIT P/N 5705379

LOCATION

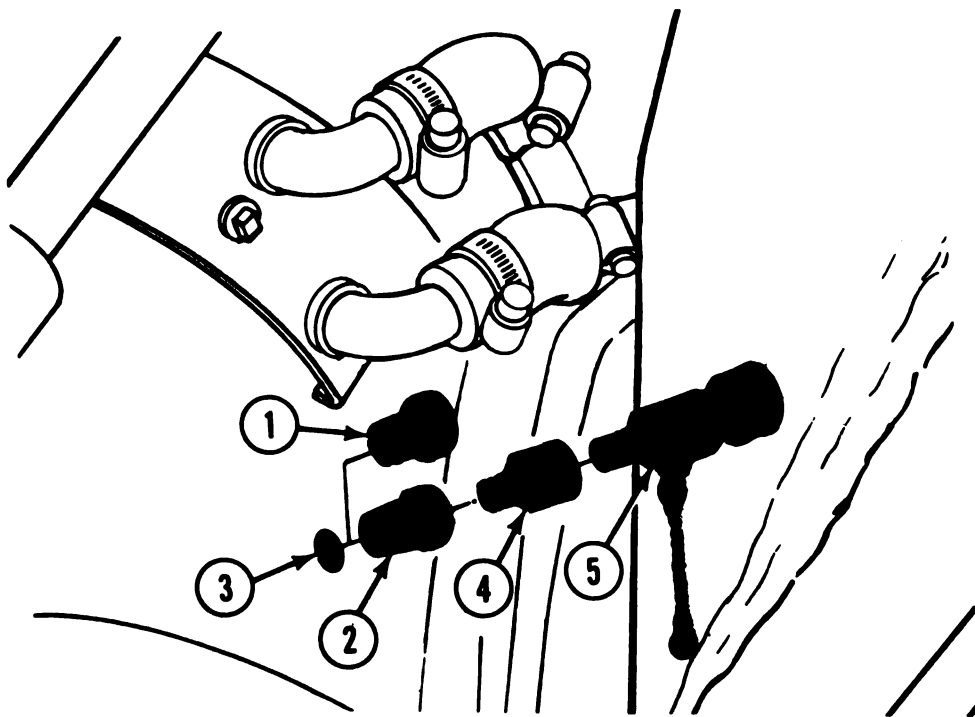
The JD410 engine oil sampling valve is installed near the engine oil pressure sending unit located on top of the flywheel end of the engine.



TA 327811

ENGINE OIL SAMPLING VALVE INSTALLATION

1. Remove uppermost pipe plug (1) located at right side of engine block, forward of oil filter. Discard plug.
2. Apply Type III sealing compound, NSN 8030-00-656-1426 (or equivalent), or antiseize tape, NSN 8030-00-889-3535, around external threads of bushing (2), NSN 4730-00-196-0837. Install bushing (2) into port (3) remaining from plug (1). Tighten bushing.
3. Apply sealing compound or antiseize tape around external threads of reducer (4), NSN 4730-00-811-6205. Install reducer (4) into bushing (2). Tighten reducer.
4. Apply sealing compound or antiseize tape around threads of oil sampling valve (5), NSN 4820-01-120-4532. Install valve (5) into reducer (4). Tighten valve with drain port facing downward.



MAINTENANCE

All oil sampling valve kit hardware is available as individual repair parts. These items can be removed and replaced at the organizational maintenance level. See figure B-23, Appendix B of this TM for engine oil sampling valve replacement parts.

FOLLOW ON TASKS

Refill engine oil level in accordance with vehicle LO instructions. Check level until correct.

Start engine per operator's manual instructions, and check oil sampling valve kit installation area for leaks. Repair any leakage as necessary.

2-31. F5070 20 Ton Dump Truck

This paragraph contains installation and maintenance instructions for the oil sampling valve kit, Part Number 5705380, used on the engine of the F5070 Dump Truck. Illustrations and instructions presented are of a "typical" truck. Variations may occur from vehicle to vehicle. However, such variations are

minor. Maintenance technicians are asked to adjust to all such variations when performing the procedures

The lowest level of maintenance capable of initial installation of this kit is organizational maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT #1
4910-00-754-0654
GENERAL MECH TOOL KIT #2
4910-00-754-0650

MATERIALS/PARTS:

*BUSHING (1)-4730-00-196-0837
*ELBOW (1)-4730-00-287-1649
*NIPPLE (1)-4730-00-196-1464
*REDUCER (1)-4730-00-231-5642
*VALVE (1)-4820-01-120-4532
SEALING COMPOUND-8030-00-656-1426
TAPE, ANTISEIZE-8030-00-889-3535

TM REFERENCES:

TM 5-3805-254-14&P-1
TM 5-3805-254-14&P-2

EQUIPMENT CONDITION:

VEHICLE ON LEVEL SURFACE
PARKING BRAKE SET
START SWITCH IN "OFF" POSITION
VEHICLE RIGHT ENGINE ACCESS HOOD
RAISED AND SECURED
ENGINE OIL DRAINED

*PART OF KIT PART NUMBER 5705380

LOCATION

The F5070 engine oil sampling valve kit is installed into the upper portion of the bypass oil filter housing located on the firewall of the engine compartment on the vehicle right side.

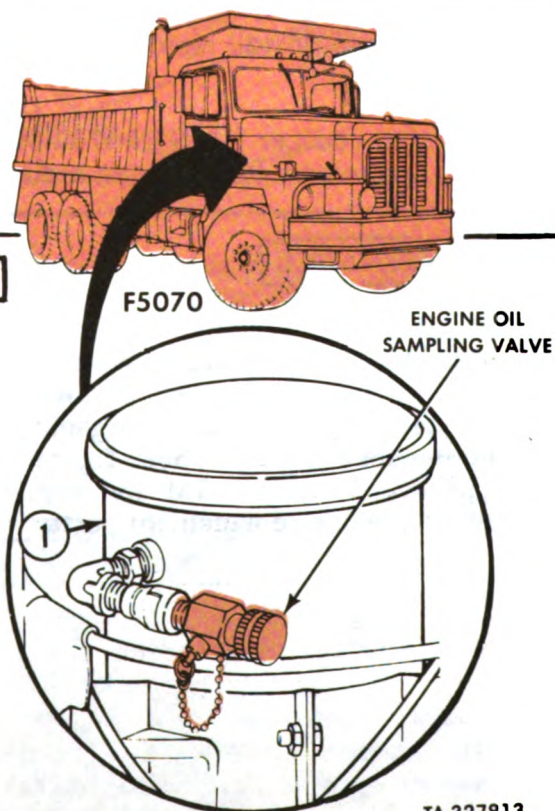
ENGINE OIL SAMPLING VALVE INSTALLATION

NOTE

The bypass oil filter housing must be turned slightly to aid installation of oil sampling valve. Use care when loosening cable clamp.

1. Loosen cable clamp located approximately 6 to 9 inches toward vehicle driver's side from bypass oil filter housing (1).

2. Loosen, but do not remove, the bypass oil filter housing bracket nuts enough to enable the housing cannister (1) to be turned. Do not allow cannister to drop downward.



TA 327813

3. Turn cannister approximately 30° to expose pipe plug (2) for installation of oil sampling valve kit.

NOTE

Obtain container to catch oil drippage while removing pipe plug.

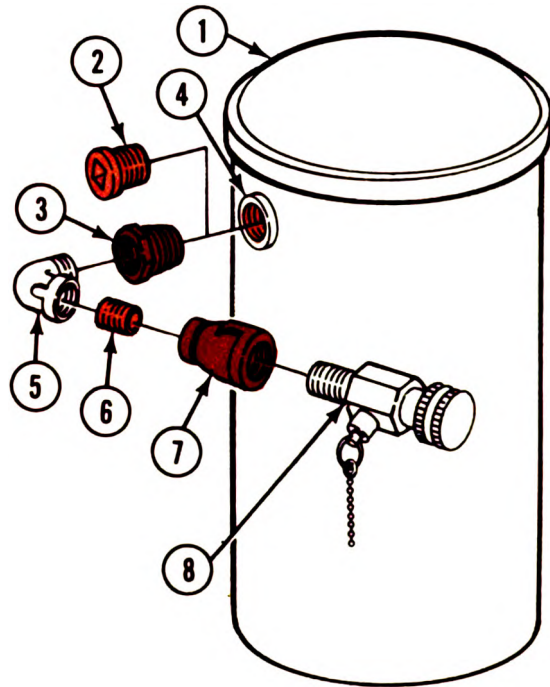
4. Remove pipe plug (2) from bypass oil filter housing (1). Discard pipe plug.

5. Apply Type III sealing compound, NSN 8030-00-656-1426 (or equivalent), or wrap antiseize tape, NSN 8030-00-889-3535, around external threads of bushing (3), NSN 4730-00-196-0837. Install bushing (3) into open port (4) remaining from pipe plug. Tighten bushing.

6. Apply sealing compound or antiseize tape to external threads of elbow (5), NSN 4730-00-287-1649. Install elbow (5) into bushing (3) and tighten until open port of elbow faces toward the outside of vehicle.

7. Apply sealing compound or antiseize tape to threads of nipple (6), NSN 4730-00-196-1464. Install nipple (6) into elbow (5).

8. Install reducer (7), NSN 4730-00-231-5642, onto nipple (6). Tighten reducer.



9. Apply sealing compound or antiseize tape to external threads of oil sampling valve (8), NSN 4820-01-120-4532. Install valve (8) into reducer (7) and tighten until drain port of valve points downward.

10. Tighten bypass oil filter housing bracket nuts. Tighten cable clamp.

MAINTENANCE

All oil sampling valve kit hardware is available as individual repair parts. These items can be removed and replaced at the organizational maintenance level. See figure B-22, Appendix B of this TM for engine oil sampling valve replacement parts.

FOLLOW ON TASKS

Refill engine oil level in accordance with vehicle LO instructions. Check level until correct.

Start engine per operator's manual instructions, and check oil sampling valve kit installation area for leakage. Repair any leaks as necessary.

Lower engine access hood per operator's manual instructions.

2-32. RS28 Vibratory Roller

This paragraph contains installation and maintenance instructions for the oil sampling valve kit, Part Number 5705382, used on the engine of the RS28 Vibratory Roller. Illustrations and instructions presented are of a "typical" roller. Variations may occur from

vehicle to vehicle. Such variations, however, are minor. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

The lowest level of maintenance capable of initial installation of this kit is organizational maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT #1
4910-00-754-0654

MATERIALS/PARTS:

*ELBOW (1)-4730-00-278-4290
*VALVE (1)-4820-01-120-4532
SEALING COMPOUND 8030-00-656-1426
*PART OF KIT P/N 5705382

TM REFERENCE:

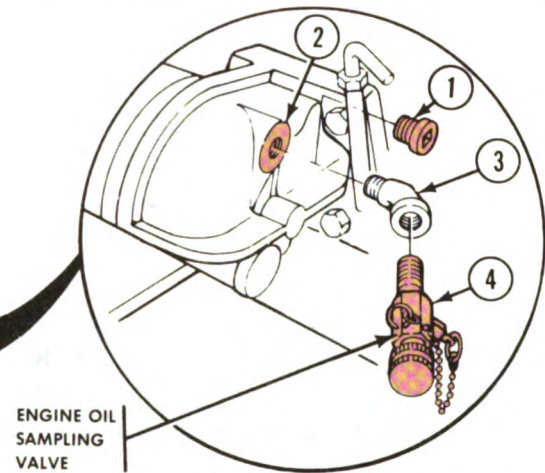
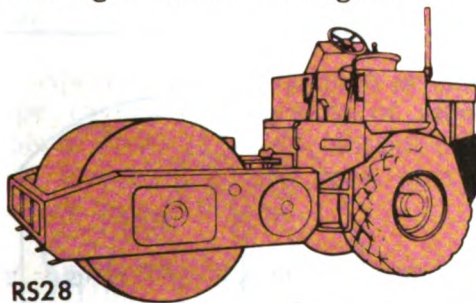
TM 5-3895-346-14&P

EQUIPMENT CONDITION:

VEHICLE ON LEVEL SURFACE
MASTER SWITCH "OFF"
START SWITCH "OFF"
PARKING BRAKE SET
ENGINE OIL DRAINED

LOCATION

The engine oil sampling valve for the RS28 vibratory roller is installed on the horizontally mounted oil filter located on the right side of the engine.



ENGINE OIL SAMPLING VALVE INSTALLATION

1. Locate two pipe plugs in base of the oil filter. Remove the top plug (1) from the oil filter base (2). Discard plug (1).

2. Apply type III sealing compound, NSN 8030-00-656-1426 (or equivalent), to external threads of elbow (3), NSN 4730-00-278-4290. Install elbow (3) into port

of oil filter (2) remaining from removal of pipe plug (1). Tighten elbow (3).

3. Apply sealing compound to threads of oil sampling valve (4), NSN 4820-01-120-4532. Install valve (4) into elbow (3) with drain port of valve pointing downward.

MAINTENANCE

Individual components of the oil sampling valve kit are available as repair parts. See figure B-24, Appendix B of this TM for engine oil sampling valve replacement parts.

FOLLOW ON TASKS

Refill engine oil in accordance with vehicle LO instructions. Check level until correct.

Start engine per operator's manual instructions, and check oil sampling valve kit installation area for leakage. Repair any leaks as necessary.

TA 327815

2-33. TMS 300-5 Truck Mounted Hydraulic Crane

This paragraph contains installation and maintenance instructions for the oil sampling valve kit, Part Number 5705384, used on the engine of the TMS 300-5 truck mounted hydraulic crane. Illustrations and instructions presented are of a "typical" truck. Variations may occur from vehicle to vehicle. However,

such variations are minor. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

The lowest level of maintenance capable of initial installation of this kit is organizational maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT #1
4910-00-754-0654
GENERAL MECH TOOL KIT #2
4910-00-754-0650

MATERIALS/PARTS:

*BUSHING (1)-4730-00-196-0889
*ELBOW (1)-4730-00-287-1649
*REDUCER (1)-4730-00-811-6205
*VALVE (1)-4820-01-120-4532
SEALING COMPOUND 8030-00-656-1426
TAPE, ANTISEIZE 8030-00-889-3535

TM REFERENCES:

TM 5-3810-300-10
TM 5-3810-300-24&P

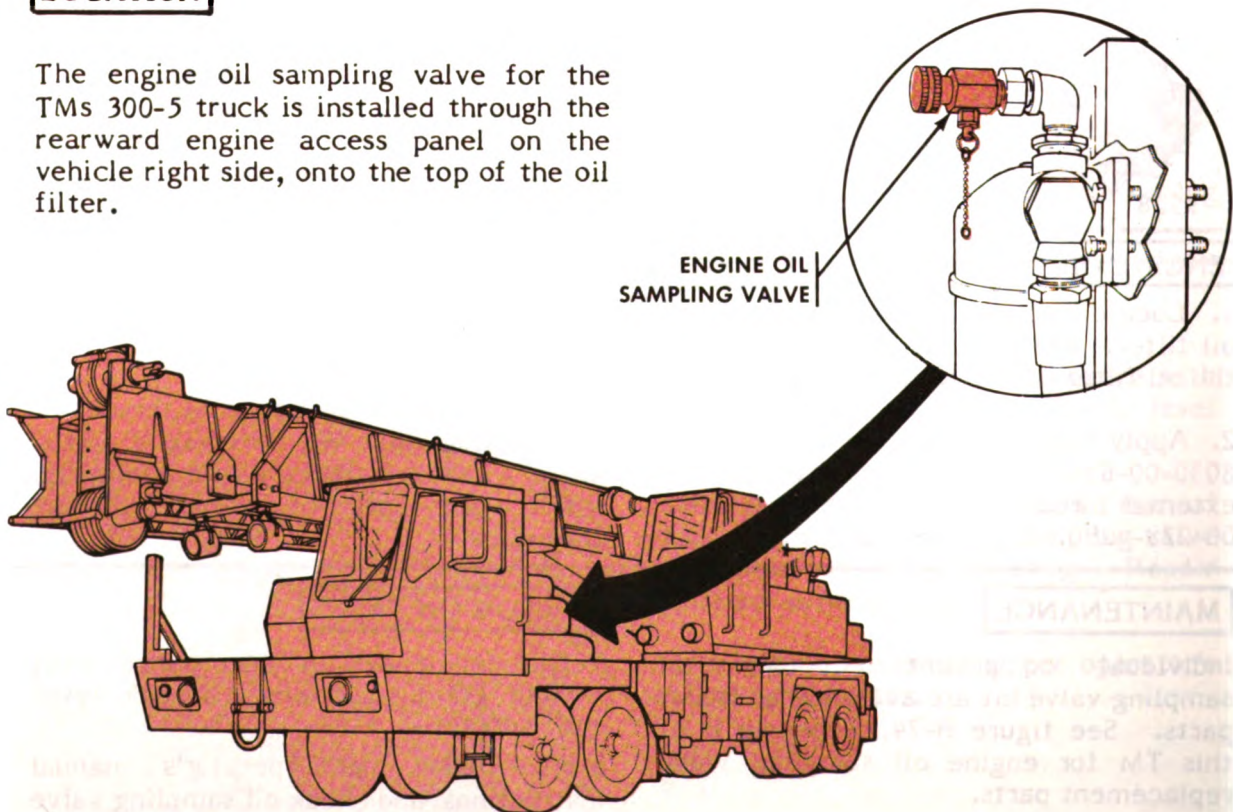
EQUIPMENT CONDITION:

VEHICLE ON LEVEL SURFACE
PUSH-PULL PARKING BRAKE
CONTROL PULLED "OUT"
IGNITION SWITCH "OFF"
ENGINE ACCESS COVER REMOVED
ENGINE OIL DRAINED

*PART OF KIT #5705384

LOCATION

The engine oil sampling valve for the TMS 300-5 truck is installed through the rearward engine access panel on the vehicle right side, onto the top of the oil filter.



TMS 300-5

TA 327816

ENGINE OIL SAMPLING VALVE INSTALLATION

NOTE

Oil filter housing bracket nuts (1) do not need to be removed. Do not allow oil filter housing to come free of its mounting.

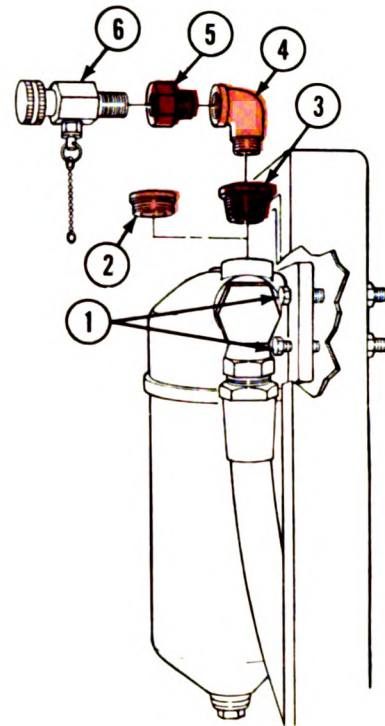
1. Loosen four mounting bracket nuts (1). Pull oil filter housing slightly away from wall of engine compartment.

2. Locate two plugs at the top of the oil filter housing. Remove the one plug (2) located toward the outside of the vehicle. Discard plug (2).

3. Apply type III sealing compound, NSN 8030-00-656-1426 (or equivalent), or wrap antiseize tape, NSN 8030-00-889-3535, around the external threads of bushing (3), NSN 4730-00-196-0889. Install bushing (3) into port remaining from pipe plug (2). Tighten bushing.

4. Apply sealing compound or antiseize tape to external threads of elbow (4), NSN 4730-00-287-1649. Install elbow (4) into bushing (3) with open port facing toward rear of vehicle.

5. Apply sealing compound or antiseize tape to external threads of reducer (5), NSN 4730-00-811-6205. Install reducer (5) into elbow (4). Tighten elbow.



6. Apply sealing compound or antiseize tape to external threads of oil sampling valve (6), NSN 4820-01-120-4532. Install valve (6) into reducer (5) with drain port of valve pointing downward.

7. Push oil filter housing back toward wall of engine compartment. Retighten four mounting bracket nuts (1).

MAINTENANCE

All oil sampling valve kit hardware is available as individual repair parts. These items can be removed and replaced at the organizational maintenance level. See figure B-25, Appendix B of this TM for engine oil sampling valve kit replacement parts.

FOLLOW ON TASKS

Refill engine oil level in accordance with vehicle LO instructions. Check level until correct.

Start engine per operator's manual instructions, and check oil sampling valve kit installation area for leakage. Repair any leaks as necessary.

Replace engine access cover.

2-34. M4K (MHE 248) Rough Terrain Forklift

This paragraph contains installation and maintenance instructions for the oil sampling valve kit, P/N 5705387, used on the engine of the M4K rough terrain forklift.

Illustrations and instructions presented are for a typical installations. Minor production variations may occur from

vehicle to vehicle. Maintenance technicians are asked to adjust to such variations when performing the installation.

Lowest level of maintenance capable of initial installation of this kit is organizational maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT #1
4910-00-754-0654

MATERIALS/PARTS

*REDUCER (1)-4730-01-134-6559
*TEE (1)-4730-00-257-2117
*BUSHING (1)-4730-00-248-6728
*VALVE (1)-4820-01-120-4532
SEALING COMPOUND -8030-00-656-1426

TM REFERENCES:

LO 10-3930-638-12
TM 10-3930-638-24&P

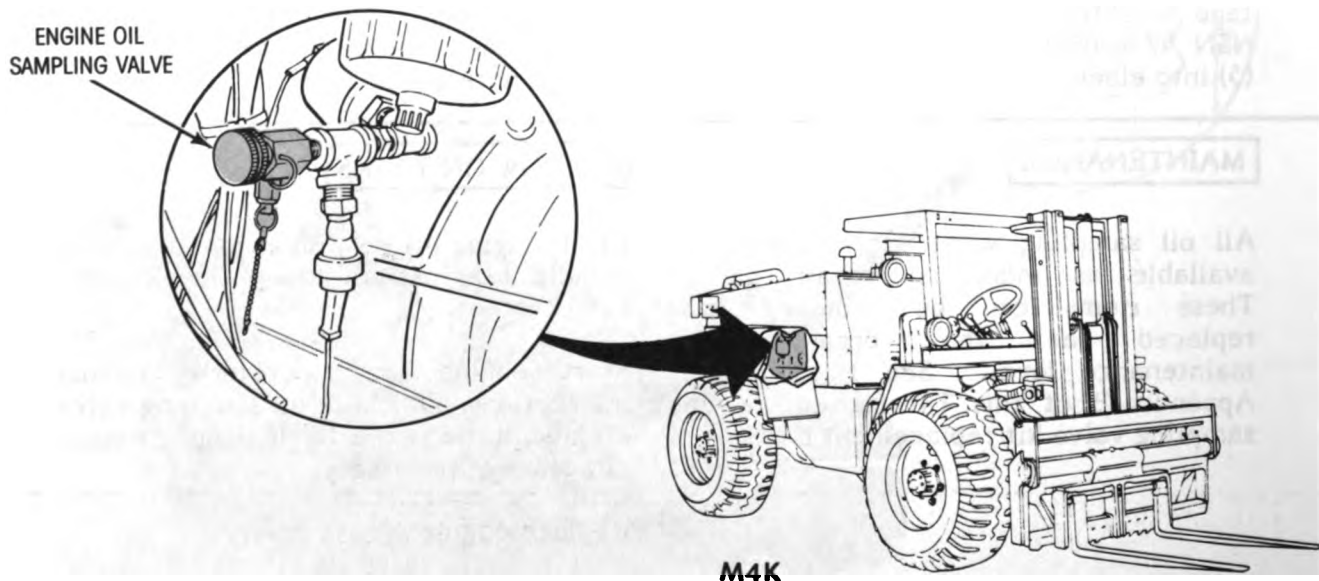
EQUIPMENT CONDITION:

VEHICLE ON LEVEL SURFACE
ENGINE OFF AND COOL
FORKS DOWN
RIGHT-REAR WHEEL WELL ACCESS DOOR REMOVED

*PART OF KIT 5705387

LOCATION

The sampling valve used on the M4K forklift is installed in the location of the oil pressure sending unit beneath the lower fuel filter and adjacent to the engine dipstick on the vehicle right side.



TA 327818

ENGINE OIL SAMPLING VALVE INSTALLATION**NOTE**

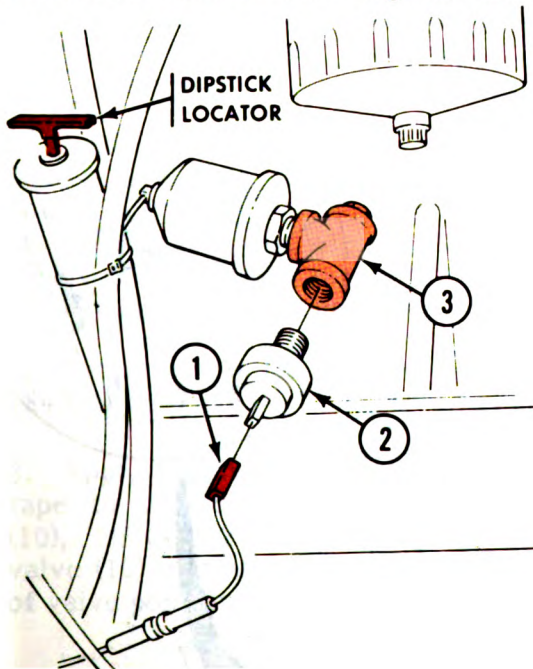
Use available container to catch oil loss during removal of oil pressure switch.

1. Carefully pull to disconnect electrical lead (1) from the vehicle's oil pressure switch (2). Then unscrew and remove the oil pressure switch (2) from the oil pressure sending unit tee (3).

NOTE

Apply type III sealing compound, NSN 8030-00-656-1426 (or equal), to external threads of all male fittings before installing each fitting.

2. Install reducer (4), NSN 4730-01-134-6559, into the oil pressure sending unit tee (3). Tighten reducer (4).
3. Install kit tee (5), NSN 4730-00-257-2117, onto reducer (4). Tighten tee (5).



Tee should be installed with the center port downward.

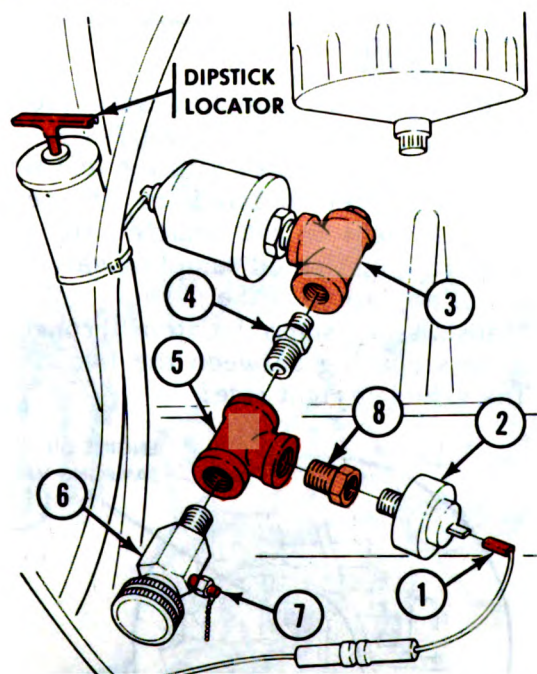
4. Install sampling valve (6), NSN 4820-01-120-4532, into tee (5). Tighten valve (6). Sampling valve should be installed with the drain port (7) facing downward.

5. Install bushing (8), NSN 4730-00-248-6728, into center port of tee (5). Tighten bushing (8).

6. Reinstall oil pressure switch (2) into bushing (8). Tighten switch.

7. Reconnect electrical lead (1) to the vehicle's oil pressure switch.

8. Refill engine oil to correct level. See LO 10-3930-638-12. Start engine and check installation for leaks. Tighten loose fittings.

**MAINTENANCE**

Individual components of the M4K rough terrain forklift engine oil sampling valve kit are available in the Army supply system as replacement parts. Refer to figure B-26, Appendix B of the TM.

FOLLOW ON TASKS

Install right-rear wheel well access panel. (See TM 10-3930-638-24&P).

TA 327819

2-35. MLT-6 (MHE200), MLT-6-CH (MHE202), MLT-6-2 (MHE220), ARTFT-6 (MHE222) Rough Terrain Forklifts

This paragraph contains installation and maintenance instructions for the oil sampling valve kit, Part Number 5705386, used on the engine and transmission of the following Family of Vehicles: MLT-6, MLT-6-CH, MLT-6-2, and ARTFT-6 Forklifts. Illustrations and instructions presented are of a "typical" forklift. Variations may occur within models or

from model to model. Such variations, however, are minor. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

The lowest level of maintenance capable of initial installation of this kit is organizational maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT #1
4910-00-754-0654
GENERAL MECH TOOL KIT #2
4910-00-754-0650

MATERIALS/PARTS:

*NIPPLE (1)-4730-00-278-0002
*ELBOW(1)-4730-00-817-1843
*VALVE (1)-4820-01-120-4532
SEALING COMPOUND-8030-00-656-1426
TAPE, ANTISEIZE-8030-00-889-3535

*PART OF KIT P/N 5705386

TM REFERENCES:

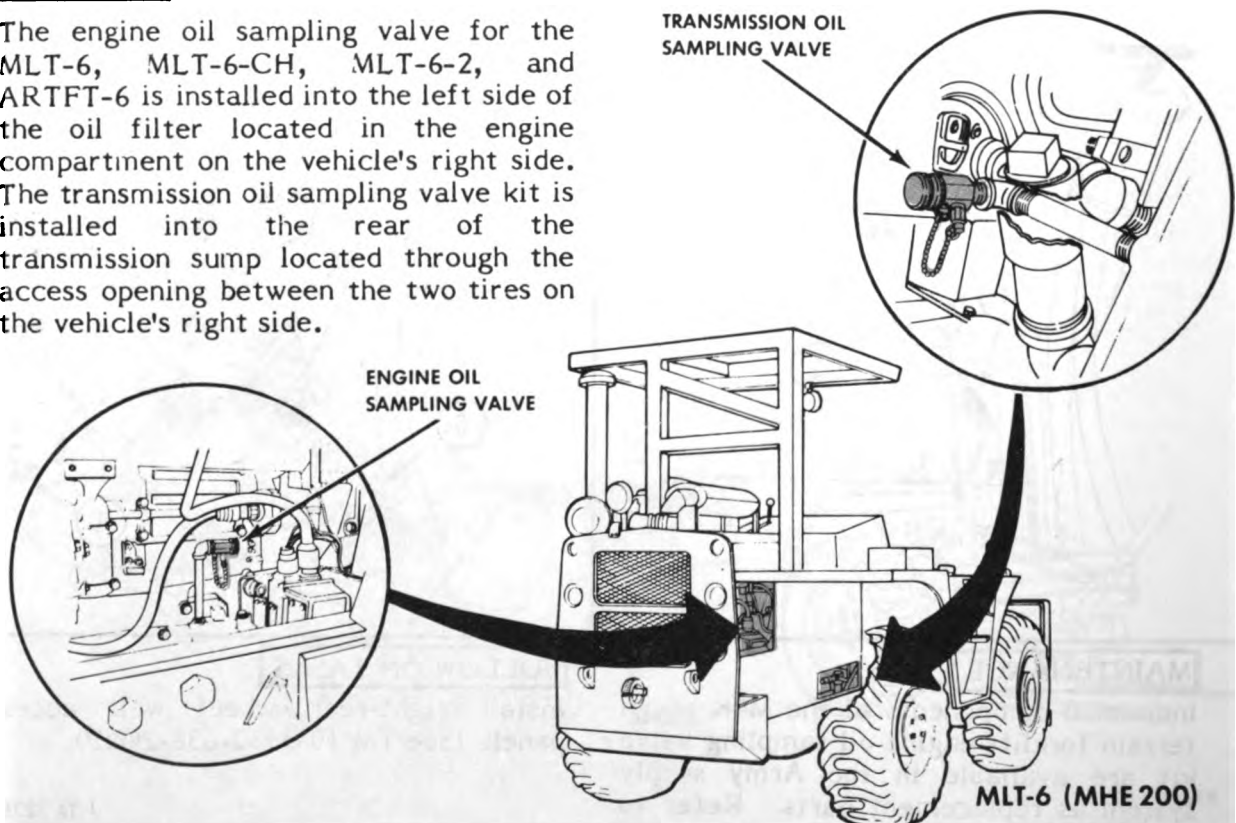
TM 10-3930-634-12
TM 10-3930-634-20P
TM 10-3930-242-12
TM 10-3930-242-20P/1
TM 10-3930-242-20P/2

EQUIPMENT CONDITION:

FORKLIFT ON LEVEL SURFACE
FORKS COMPLETELY LOWERED
F-N-R CONTROL LEVER IN "NEUTRAL"
NEUTRAL LOCK KNOB ENGAGED
IGNITION SWITCH "OFF"
PARKING BRAKE ENGAGED
ENGINE ACCESS PANEL REMOVED
ENGINE OIL DRAINED
TRANSMISSION OIL DRAINED

LOCATION

The engine oil sampling valve for the MLT-6, MLT-6-CH, MLT-6-2, and ARTFT-6 is installed into the left side of the oil filter located in the engine compartment on the vehicle's right side. The transmission oil sampling valve kit is installed into the rear of the transmission sump located through the access opening between the two tires on the vehicle's right side.



TA 327620

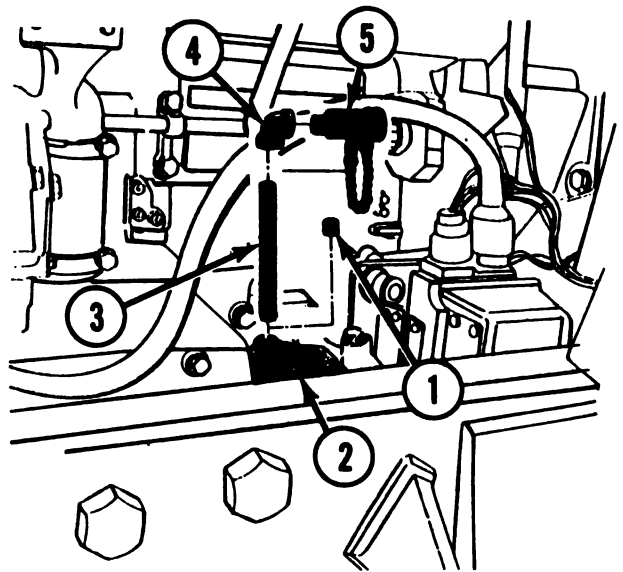
ENGINE OIL SAMPLING VALVE INSTALLATION

1. Remove pipe plug (1) from left side of oil filter (2). Discard plug (1).

2. Apply Type III sealing compound, NSN 8030-00-656-1426 (or equivalent), or wrap antiseize tape, NSN 8030-00-889-3535, around threads of nipple (3), NSN 4730-00-278-0002. Install nipple (3) into port remaining from pipe plug (1).

3. Install elbow (4), NSN 4730-00-817-1843, onto nipple (3), with open end of elbow (4) facing toward front of vehicle.

4. Apply sealing compound or antiseize tape to threads of oil sampling valve (5), NSN 4820-01-120-4532. Install valve (5) into elbow (4) with drain port of valve pointing downward.

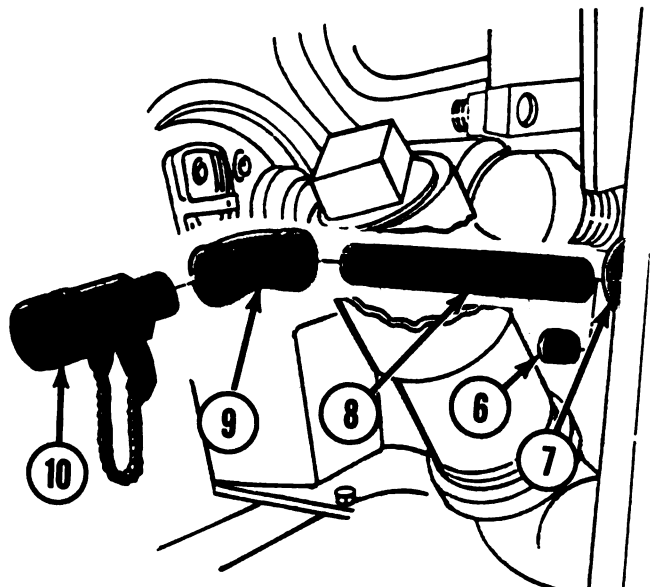
**TRANSMISSION OIL SAMPLING VALVE INSTALLATION**

5. Remove pipe plug (6) from rear of transmission sump (7) located just above, and to the (vehicle) left of the transmission fill tube. Discard pipe plug (6).

6. Apply Type III sealing compound, NSN 8030-00-656-1426 (or equivalent), or wrap antiseize tape, NSN 8030-00-889-3535, around threads of nipple (8), NSN 4730-00-278-0002. Install nipple (8) into port remaining from pipe plug (6).

7. Install elbow (9), NSN 4730-00-817-1843, onto nipple (8). Tighten elbow.

8. Apply sealing compound or antiseize tape to threads of oil sampling valve (10), NSN 4820-01-120-4532. Install valve (10) into elbow (9) with drain port of valve pointing downward.



TA 327821

MAINTENANCE

Individual components of the oil sampling valve kit are available as repair parts. See figure B-27, Appendix B of this TM for engine and transmission oil sampling valve replacement parts.

FOLLOW ON TASKS

Refill engine and transmission oil in accordance with vehicle LO instructions. Check levels until correct.

Start engine per operator's manual instructions, and check oil sampling valve kit installation areas for leakage. Repair any leaks as necessary.

Replace engine access cover.

2-36. MT250/MT250W Truck, Mounted, Crane

This paragraph contains installation and maintenance instructions for the engine oil sampling valve kit, Part Number 5705385. This kit is used on the engines of the MT250 and MT250W trucks, mounted, cranes. Illustrations and instructions presented are of a "typical" truck. Variations may occur within models or from model to model. Such

variations, however, are minor. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

The lowest level of maintenance capable of initial installation of this kit is organizational maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT #1
4910-00-754-0654

MATERIALS/PARTS:

*BUSHING (1)-4730-00-194-0216
*VALVE (1)-4820-01-120-4532
TAPE, ANTISEIZE 8030-00-889-3535
SEALING COMPOUND 8030-00-656-1426

*PART OF KIT P/N 5705385

TM REFERENCES:

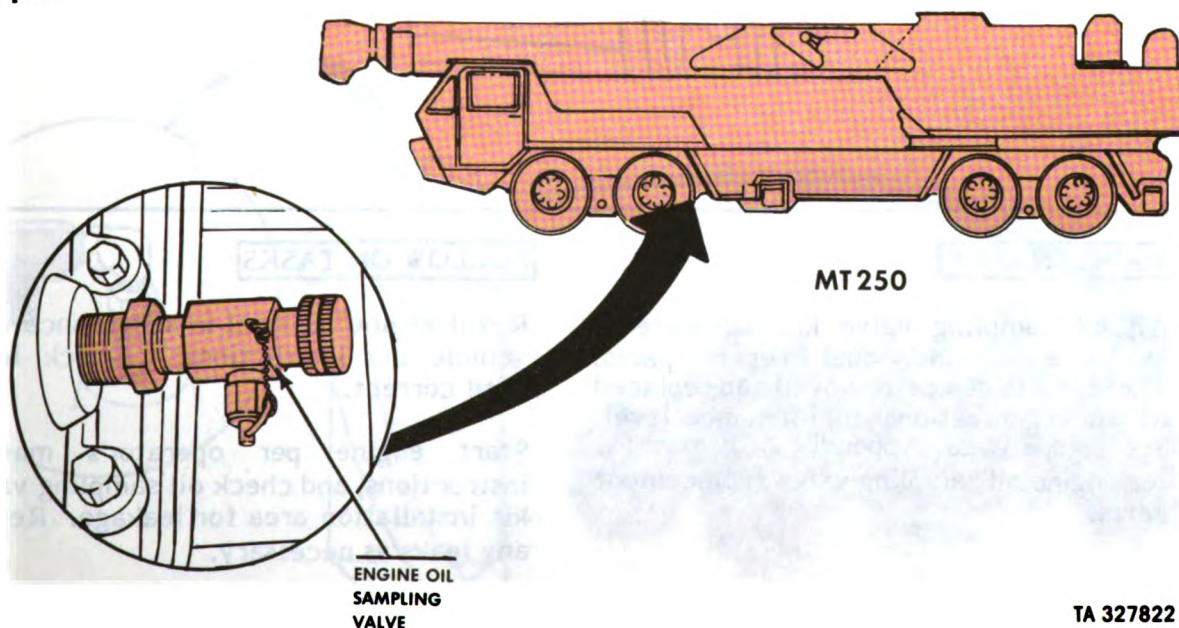
TM 5-3810-293-14&P-1
TM 5-3810-293-14&P-2
TM 5-3810-293-14&P-3

EQUIPMENT CONDITION:

TRUCK ON LEVEL SURFACE
ALL CONTROLS IN "NEUTRAL"
POSITION
SWING BRAKE LOCKED
BOOM LOWERED OR IN
HORIZONTAL POSITION
ENGINE STOPPED
IGNITION KEY IN "OFF" POSITION
MASTER SWITCH "OFF"
PARKING BRAKE SET
ENGINE OIL DRAINED

LOCATION

The MT250 engine oil sampling valve is installed from underneath the vehicle, behind the two left front tires, into the oil pan.



TA 327822

ENGINE OIL SAMPLING VALVE INSTALLATION**NOTE**

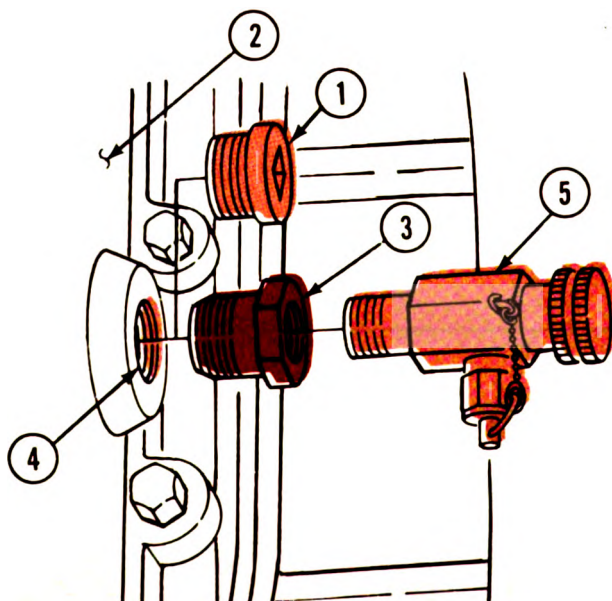
Use 3/8-inch allen wrench to remove the pipe plug from the oil pan.

1. Remove 3/8-inch hex plug (1) from oil pan (2). Discard plug (1).

2. Apply Type III sealing compound, NSN 8030-00-656-1426 (or equivalent), or

wrap antiseize tape, NSN 8030-00-889-3535, around external threads of bushing (3), NSN 4730-00-194-0216. Install bushing (3) into port (4) remaining from pipe plug (1). Tighten bushing.

3. Apply sealing compound or antiseize tape to threads of oil sampling valve (5), NSN 4820-01-120-4532. Install sampling valve (5) into bushing (3) with drain port of valve pointing downward.

**MAINTENANCE**

All oil sampling valve kit hardware is available as individual repair parts. These items can be removed and replaced at the organizational maintenance level. See figure B-28, Appendix B of this TM for engine oil sampling valve replacement parts.

FOLLOW ON TASKS

Refill engine oil level in accordance with vehicle LO instructions. Check level until correct.

Start engine per operator's manual instructions, and check oil sampling valve kit installation area for leakage. Repair any leaks as necessary.

2-37. F1500M Motor Grader

This paragraph contains installation and maintenance instructions for the engine oil sampling valve kit, Part Number 5705388. This kit is used on the engine of the F1500M Motor Grader. Illustrations and instructions presented are of a "typical" grader. Variations may occur from vehicle to vehicle. Such

variations, however, are minor. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

The lowest level of maintenance capable of initial installation of this kit is organizational maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT *1
4910-00-754-0854

TM REFERENCES:

TM 5-3805-253-12
TM 5-3805-253-20P

MATERIALS/PARTS:

*BUSHING (1)-4730-00-196-0889
*REDUCER (1)-4730-00-811-8205
*ELBOW (1)-4730-00-246-9215
*VALVE (1)-4820-01-120-4532
SEALING COMPOUND-8030-00-656-1426
TAPE ANTISEIZE-8030-00-889-3535

EQUIPMENT CONDITION:

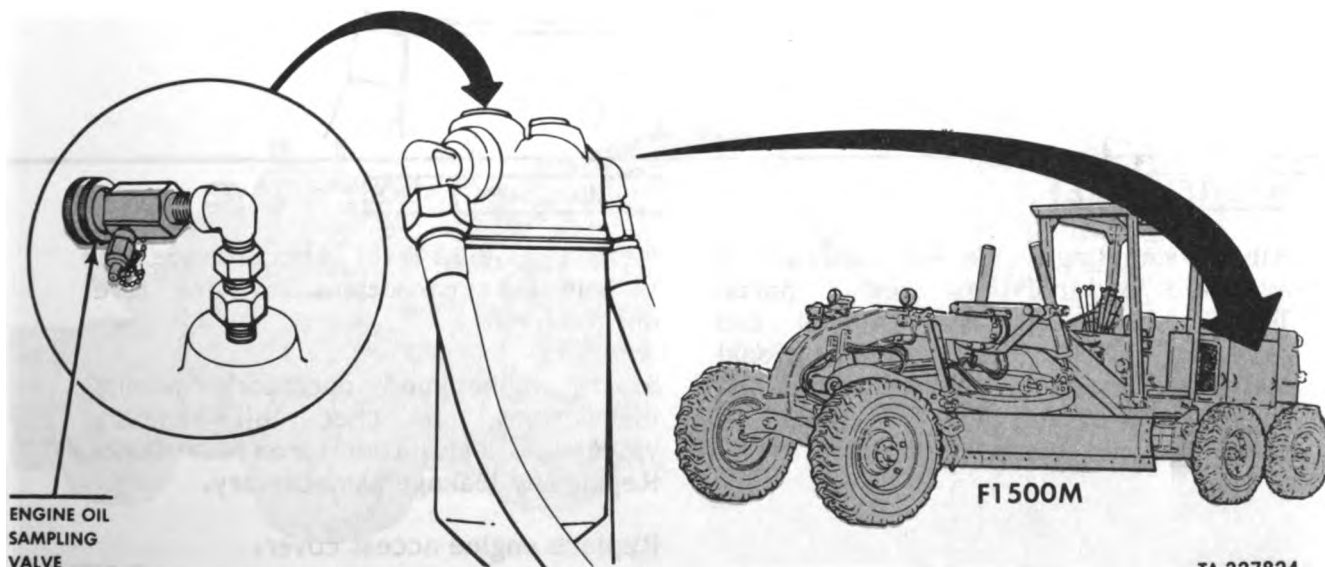
VEHICLE ON LEVEL SURFACE
BLADE/SCARIFIER LOWERED
ELECTRICAL SWITCHES "OFF"
MASTER SWITCH "OFF"
START SWITCH "OFF"
PARKING BRAKE ENGAGED
ENGINE ACCESS COVER REMOVED-
LEFT SIDE

*PART OF KIT P/N 5705388

ENGINE OIL DRAINED

LOCATION

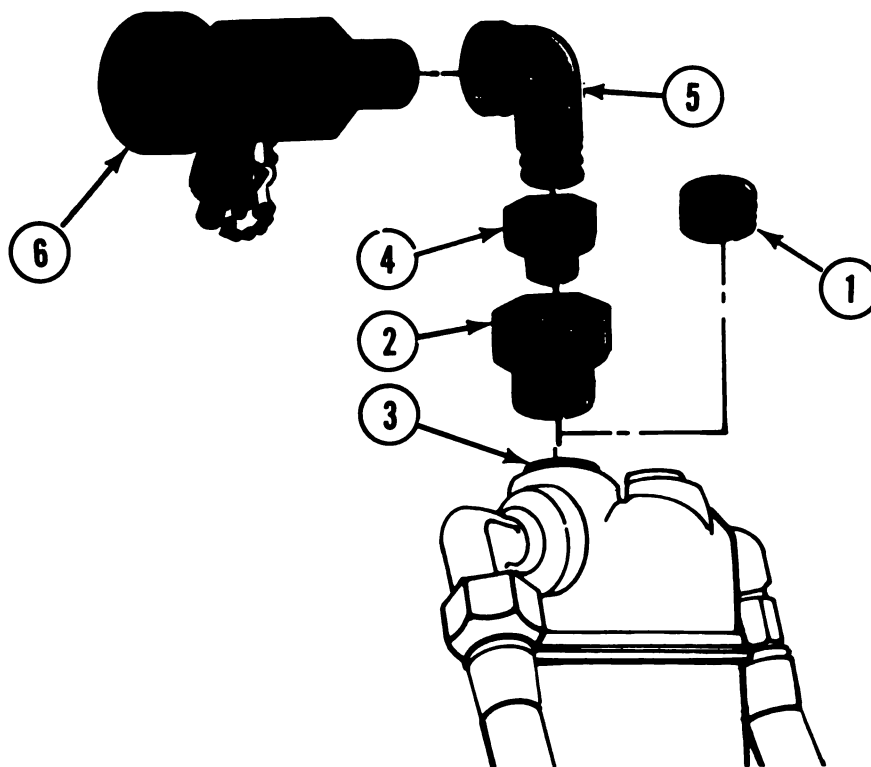
The F1500M engine oil sampling valve is installed on the top of the oil filter housing located in the engine compartment on the vehicle's left side.



TA 327824

ENGINE OIL SAMPLING VALVE INSTALLATION

1. Locate two plugs on the top of the oil filter housing. Remove outlet side plug (1) from the housing. Discard plug.
2. Apply type III sealing compound, NSN 8030-00-656-1426 (or equivalent), or antiseize tape, NSN 8030-00-889-3535, around external threads of bushing (2), around external threads of bushing (2), NSN 4730-00-196-0889. Install bushing (2) into port (3) remaining from plug (1). Tighten bushing.
3. Apply sealing compound or antiseize tape to external threads of reducer (4), NSN 4730-00-811-6205. Install reducer (4) into bushing (2). Tighten reducer.
4. Apply sealing compound or antiseize tape to external threads of elbow (5), NSN 4730-00-246-9215. Install elbow (5) into reducer (4), with open port of elbow facing toward rear of vehicle.
5. Apply sealing compound or antiseize tape to threads of oil sampling valve (6), NSN 4820-01-120-4532. Install valve (6) into elbow (5). Tighten valve with drain port facing downward.



MAINTENANCE

All oil sampling valve kit hardware is available as individual repair parts. These items can be removed and replaced at the organizational maintenance level. See figure B-29, Appendix B of this TM for engine oil sampling valve replacement parts.

FOLLOW ON TASKS

Refill engine oil level in accordance with vehicle LO instructions. Check level until correct.

Start engine per operator's manual instructions, and check oil sampling valve kit installation area for leaks. Repair any leakage as necessary.

Replace engine access cover.

TA 327825

2-38. RTL-10 (MHE 199) and RTL-10-1 (MHE 215) Rough Terrain Forklift

This paragraph contains installation and maintenance instructions for the oil sampling valve kit, Part Number 5705389, used on the engine of the RTL-10 forklifts. Illustrations and instructions presented are of a "typical" forklift. Variations may occur from

vehicle to vehicle. Such variations, however, are minor. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

The lowest level of maintenance capable of initial installation of this kit is organizational maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT #1
4910-00-754-0654

MATERIALS/PARTS:

*NIPPLE (1)-4730-00-196-1464
*WASHER (2)-5310-00-087-7493
*REDUCER (2)-4730-00-186-3024
*ELBOW (1)-4730-00-278-4290
*TEE (1)-4730-00-257-2117
*VALVE (1)-4820-01-120-4532
*WASHER (1)-5310-00-068-5285
*BRACKET(1)-P/N 12343161
SEALING COMPOUND-8030-00-656-1426

*PART OF KIT P/N 5705389

TM REFERENCES:

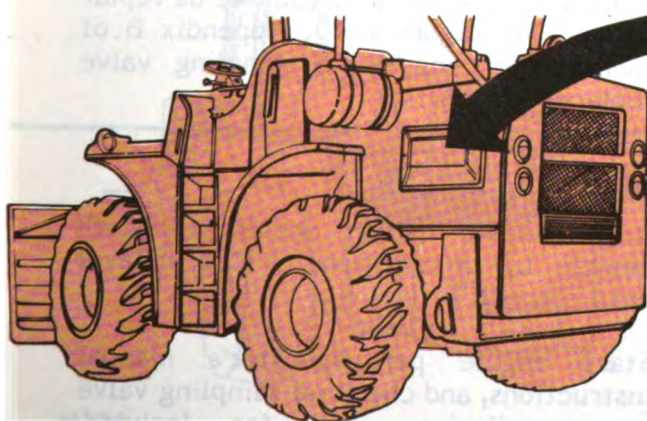
LO 10-3930-243-12
TM 10-3930-243-12
TM 10-3930-243-20P

EQUIPMENT CONDITION:

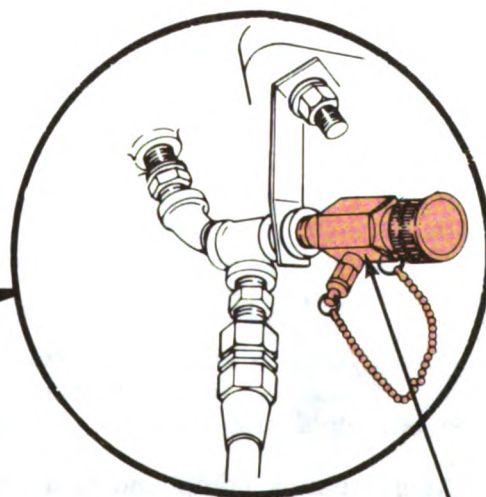
VEHICLE ON LEVEL SURFACE
FORKS COMPLETELY LOWERED
MASTER SWITCH OFF
PARKING BRAKE SET
ENGINE OIL DRAINED

LOCATION

The engine oil sampling valve for the RTL-10 and RTL-10-1 is installed into the oil pressure gallery port located in the engine compartment on the vehicle's left side.



RTL-10 (MHE 199)



ENGINE OIL
SAMPLING
VALVE

TA 327826

1. Locate the oil pressure gallery port (1) and disconnect the 1/4-inch copper tube (2). Set aside for later installation.

2. Remove the pipe adapter (3) from the copper tube. Set adapter aside for later installation.

3. Remove 1/8-inch elbow (4), and discard.

4. Apply type III sealing compound, NSN 8030-00-656-1426 (or equivalent) to threads of nipple (5), NSN 4730-00-196-1464. Install nipple (5) into oil pressure gallery port (1), and tighten.

5. Place flat washer (6), NSN 5310-00-087-7493, on nipple (5) as required to shim and reinforce installation.

6. Apply sealing compound to external threads of reducer (7), NSN 4730-00-186-3024. Install reducer (7) over washer (6) onto nipple (5). Tighten reducer (7).

7. Apply sealing compound to external threads of elbow (8), NSN 4730-00-278-4290. Install elbow (8) onto reducer (7), and tighten.

8. Install one end port of tee (9), NSN 4730-00-257-2117, onto elbow (8) and align tee for later reattachment of copper tube.

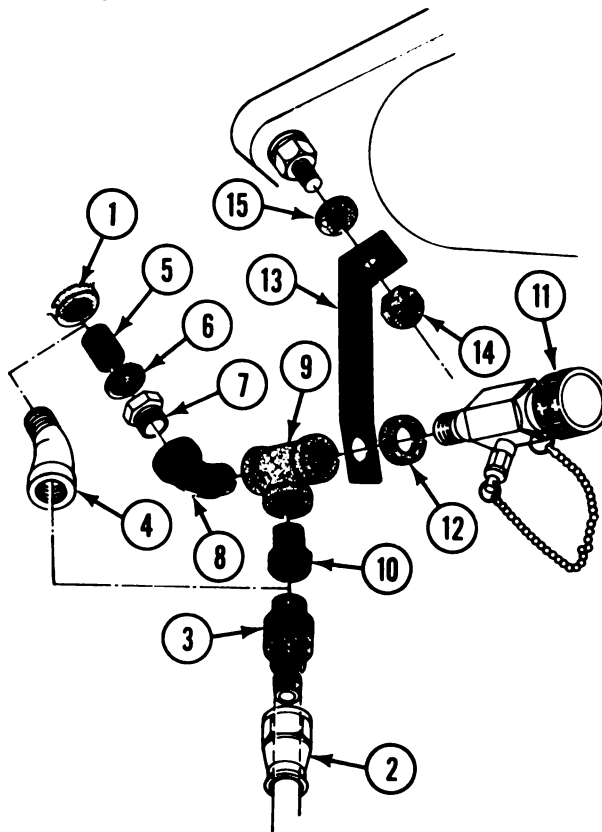
9. Apply sealing compound to threads of reducer (10), NSN 4730-00-186-3024. Install reducer (10) into center port of tee (9). Tighten reducer.

10. Install flare to adapter (3), retained in step 3 above, into reducer (10). Reconnect copper tube (2).

11. Apply sealing compound to threads of oil sampling valve (11), NSN 4820-01-120-4532. Install sampling valve (11) stem through washer (12), NSN 5310-00-068-5285, through the larger hole of bracket, P/N 12343161, and install valve (11) into remaining port of tee (9).

12. Remove and retain the 1/2-inch nut

(14) from the exhaust manifold stud. Place flatwasher (15), NSN 5310-00-087-7493, and the remaining end of bracket (13) on exhaust manifold stud (16). Secure in place with the 1/2-inch nut (14). Tighten and torque nut (14) to 57-63 foot pounds.



MAINTENANCE

Individual components of the oil sampling valve kit are available as repair parts. See figure B-30, Appendix B of this TM for engine oil sampling valve replacement parts.

FOLLOW ON TASKS

Refill engine oil in accordance with vehicle LO instructions. Check level until correct.

Start engine per operator's manual instructions, and check oil sampling valve kit installation area for leakage. Tighten any loose fittings, as needed.

TA 327827

2-39. M10A (MHE 236) Rough Terrain Forklift

This paragraph contains installation and maintenance instructions for the oil sampling valve kit, Part Number 5705390, used on the engine of the M10A (MHE 236) forklift. Illustrations and instructions presented are of a "typical" forklift. Variations may occur from vehicle to vehicle. Such variations,

however, are minor. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

The lowest level of maintenance capable of initial installation of this kit is organizational maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT #1
4910-00-754-0654
GENERAL MECH TOOL KIT #2
4910-00-754-0650

MATERIALS/PARTS:

*VALVE (1)-4820-01-120-4532
*TEE (1)-4730-00-595-1887
*REDUCER (1)-4730-00-811-8205
*NIPPLE (1)-4730-00-921-3624

SEALING COMPOUND 8030-00-656-1426

*PART OF KIT P/N 5705390

TM REFERENCES:

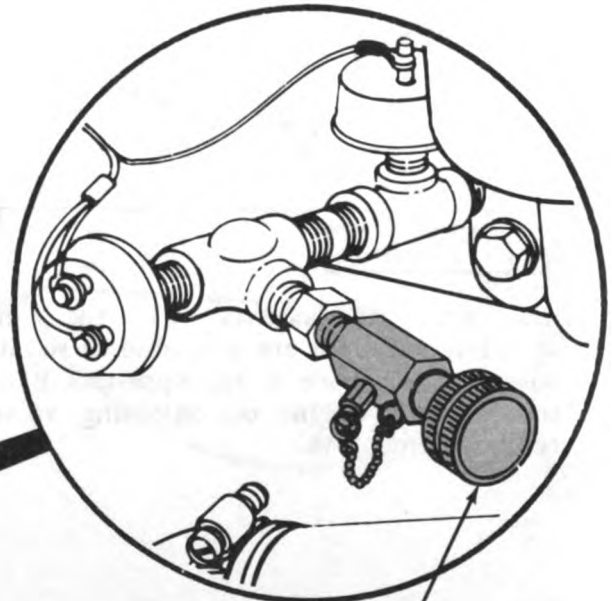
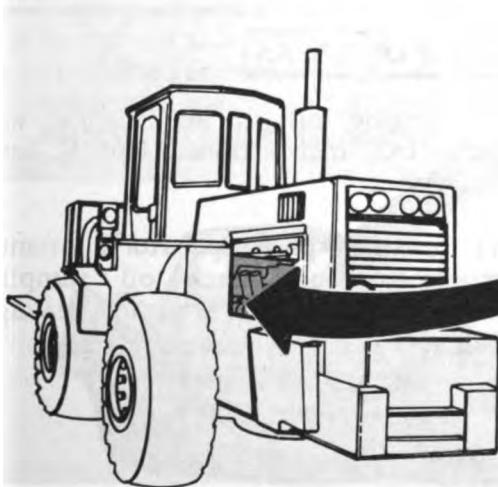
TM 9-3930-643-14&P

EQUIPMENT CONDITION:

FORKLIFT ON LEVEL SURFACE
COMPLETELY LOWERED FORKS
HAND BRAKE SET
STARTING SWITCH OFF
BATTERY GROUND WIRES DISCONNECTED
LEFT ENGINE ACCESS PANEL REMOVED
ENGINE OIL DRAINED

LOCATION

The engine oil sampling valve for the M10A forklift is installed under the oil pressure sending unit, located through the engine access panel on the vehicle's left side.



ENGINE OIL
SAMPLING VALVE

M10A

TA 327828

ENGINE OIL SAMPLING VALVE INSTALLATION**CAUTION**

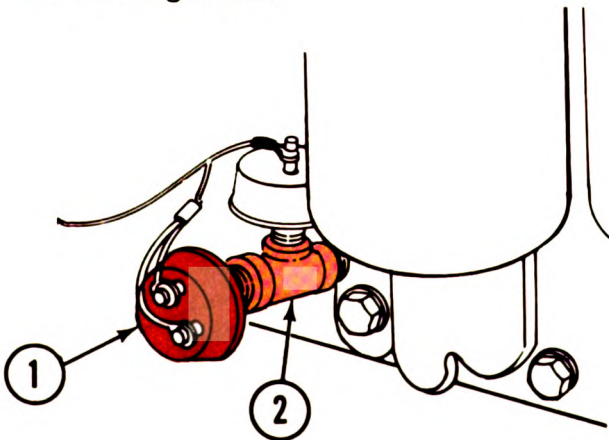
Mark and disconnect wiring to engine oil pressure switch.

NOTE

Apply type III sealing compound, NSN 8030-00-656-1426, to external threads of all male fittings before installing each fitting.

1. Locate and disconnect the oil pressure switch (1) from the existing tee (2) beneath the oil pressure sending unit. Set pressure switch (1) aside for later installation.

2. Apply type III sealing compound, to threads of nipple (3), NSN 4730-00-921-3624. Install nipple (3) into open port of existing tee (2).

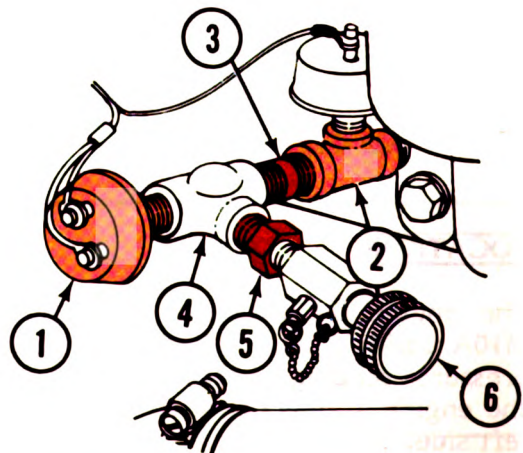


3. Apply sealing compound to external threads on the opposite end of nipple (3). Install tee (4), NSN 4730-00-595-1887, on nipple. Tee (4) should be installed with the center port facing rearward.

4. Install reducer (5), NSN 4730-00-811-6205, into center port of tee (4). Tighten reducer.

5. Install sampling valve (6), NSN 4820-01-120-4532, into reducer (5). Tighten sampling valve. Valve should be installed with the drain port downward.

6. Install oil pressure switch (1) into remaining port of tee (4). Tighten switch (1) and reconnect wiring.

**MAINTENANCE**

Individual components of the oil sampling valve kit are available as repair parts. See figure B-31, Appendix B of this TM for engine oil sampling valve replacement parts.

FOLLOW ON TASKS

Refill engine oil in accordance with vehicle LO instructions. Check level until correct.

Start engine per operator's manual instructions, and check oil sampling valve kit installation area for leakage. Repair any leaks as necessary.

2-40. D8K Tractor Crawler

This paragraph contains installation and maintenance instructions for the oil sampling valve, NSN 2910-01-073-0080, used on the engines of the D8K Tractor Crawlers. Illustrations and instructions presented are of a "typical" tractor. Variations may occur from vehicle to vehicle. Such variations, however, are

minor. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

The lowest level of maintenance capable of initial installation of this kit is organizational maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECHANICS TOOL KIT #1
4910-00-754-0654

MATERIALS/PARTS:

VALVE (1)-2910-01-073-0080
SEALING COMPOUND-8030-00-656-1426
TAPE, ANTISEIZE-8030-00-889-3535

TM REFERENCES:

TM 5-2410-234-14&P-1
TM 5-2410-234-14&P-2

EQUIPMENT CONDITION:

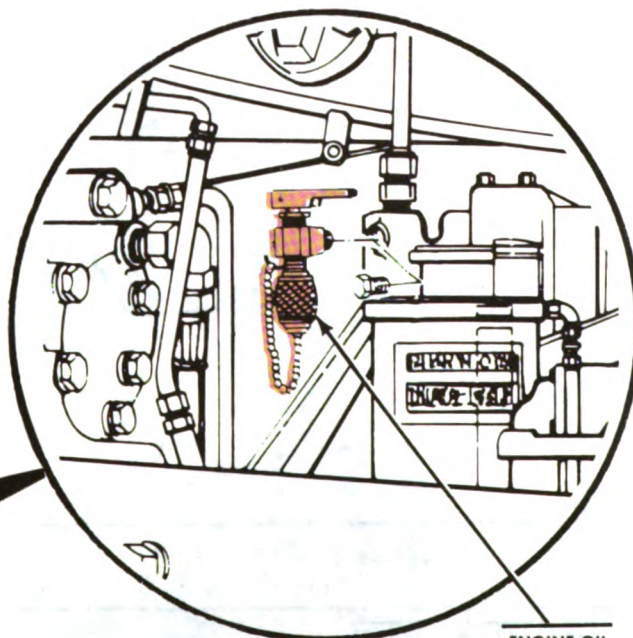
VEHICLE ON LEVEL SURFACE
BLADE LOWERED
RIPPER LOWERED
PARKING BRAKE ENGAGED
HEAT-START SWITCH "OFF"
DISCONNECT SWITCH "OFF"
ENGINE OIL DRAINED

LOCATION

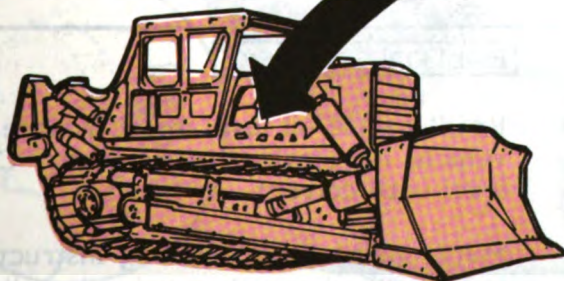
The engine oil sampling valve for the D8K Tractor Crawler is installed into the oil filter housing located in the engine access compartment on the vehicle's right side.

NOTE

D8K tractor crawlers without port plugs on the oil filter housing do not use this kit. No kit is available for such models. Do not install valves on D8K tractors without port plugs on housing.



ENGINE OIL
SAMPLING
VALVE



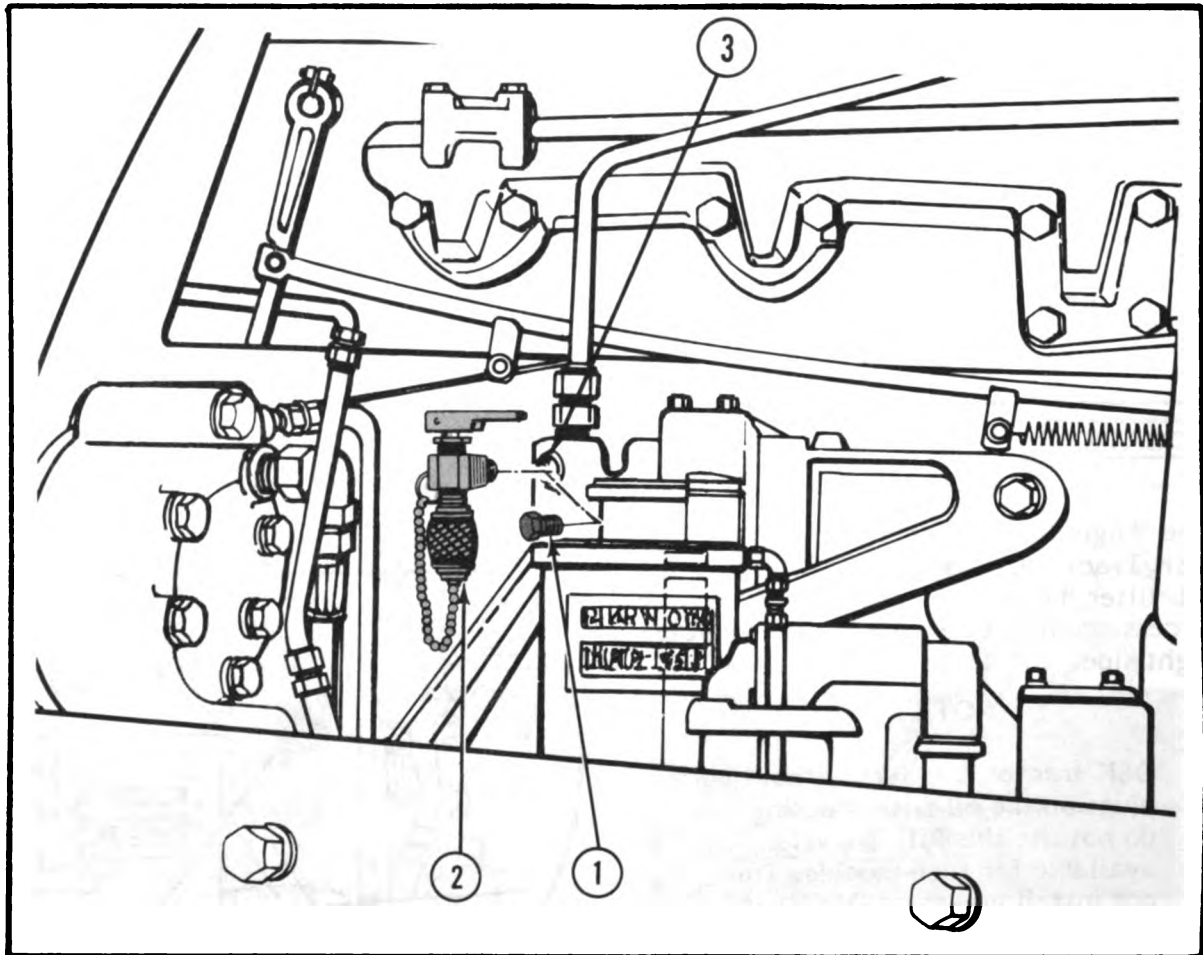
D8K

TA 327830

ENGINE OIL SAMPLING VALVE INSTALLATION

1. Locate and remove the 1/4 inch test port plug (1) from the oil filter housing. Discard plug (1).
2. Apply type III sealing compound, NSN 8030-00-656-1426 (or equivalent), or wrap antiseize tape, NSN 8030-00-889-

3535, around external threads of oil sampling valve (2), NSN 2910-01-073-0080. Install valve (2) into port (3) remaining from plug (1). Tighten valve (2) with drain port of valve pointing downward.



MAINTENANCE

The engine oil sampling valve is available as a repair part. See Figure B-32, Appendix B of this TM.

FOLLOW ON TASKS

Refill engine oil level in accordance with vehicle lubrication instructions. Check level until correct.

Start engine per operating instructions, and check oil sampling valve installation area for leakage. Repair any leaks as necessary.

TA 327831

2-41. M878A1 Truck Tractor

This paragraph provides installation and maintenance instructions for the M878A1 yard tractor engine oil sampling valve kit, P/N 53516333, and transmission oil sampling valve kit, P/N 53516332.

Illustrations and instructions presented are of a "typical" installation. Variations can occur between models.

Such variations, however, are minor. Maintenance technicians are asked to adjust to all such variations when performing these procedures.

Lowest level of maintenance authorized for initial installation of the M878A1 engine and transmission sampling valve kits is organizational maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT #1
4910-00-754-0654

TM REFERENCES:

M878A1 COMMERCIAL TM
(OTTAWA TRUCK DIVISION)

EQUIPMENT CONDITION:

VEHICLE ON LEVEL SURFACE
BRAKES SET
ENGINE OFF AND COOL
TRANSMISSION OIL DRAINED

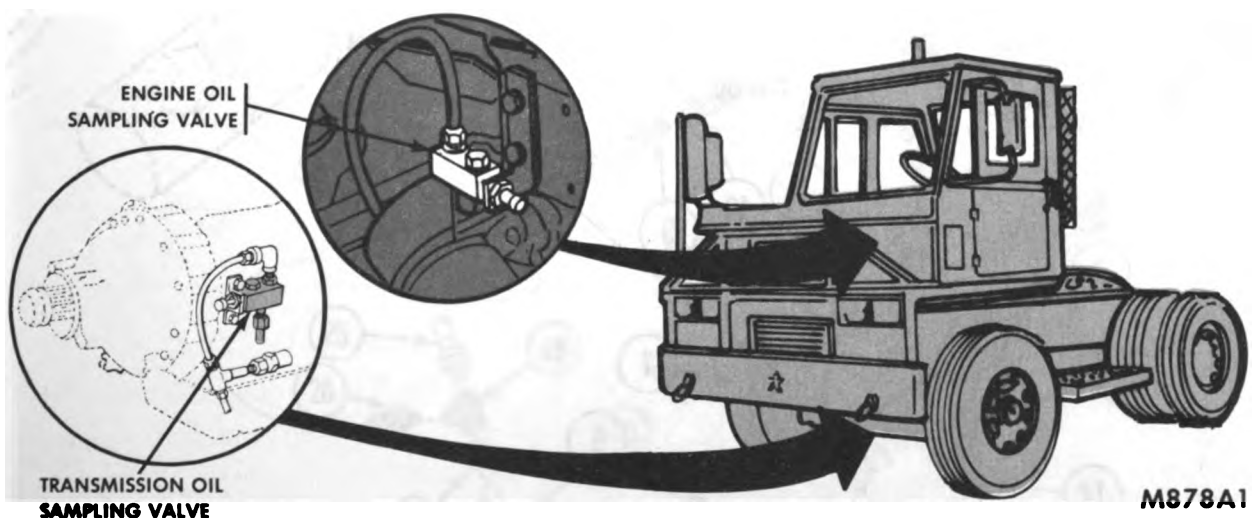
MATERIALS/PARTS

VALVE (2)-53103585
ADAPTER (1)-90210020
SWIVEL (2)-53109225
HOSE (2)-99802352
HOSE END (4)-53451937
PLUG (2)-95670105
BRACKET (1)-53516328
WASHER (2)-98415050
CAPSCREW (2)-90804238
ELBOW (1)-96082214
BUSHING (1)-90709340
CAPSCREW (2)-90804226
WASHER (2)-98415045
BRACKET (1)-53516329
SWIVEL (1)-53450543
TEE (1)-97415015
NIPPLE (1)-90003582
SEALING COMPOUND-8030-00-656-1426

LOCATION

The engine oil sampling valve is remotely mounted to the engine left side just above the engine oil filter. The installed valve is connected to the engine oil filter housing cap.

The transmission oil sampling valve is installed on the right side of the transmission. The valve is remotely mounted to the transmission housing and connected to the oil pressure tap.



M878A1

TA 327832

ENGINE OIL SAMPLING VALVE INSTALLATION

1. Position bracket (1) against adapter plate (2) and secure in place with two lock washers (3), P/N 98415050, and capscrews (4), P/N 90804238.

2. Remove locknut (5) from sampling valve (6), P/N 53103585. Position valve (6) on bracket (1) and secure in position with locknut (5). Valve should be installed with valve plug upward.

3. Remove pipe plug (7) from engine oil filter cap (8). Discard pipe plug.

4. Install adapter (9), P/N 90210020, into engine oil filter cap (8). Tighten adapter (9).

5. Install the 90° swivel hose fitting (10), P/N 53109225, to adapter (9). Tighten fitting so that open port is upward (towards the sampling valve).

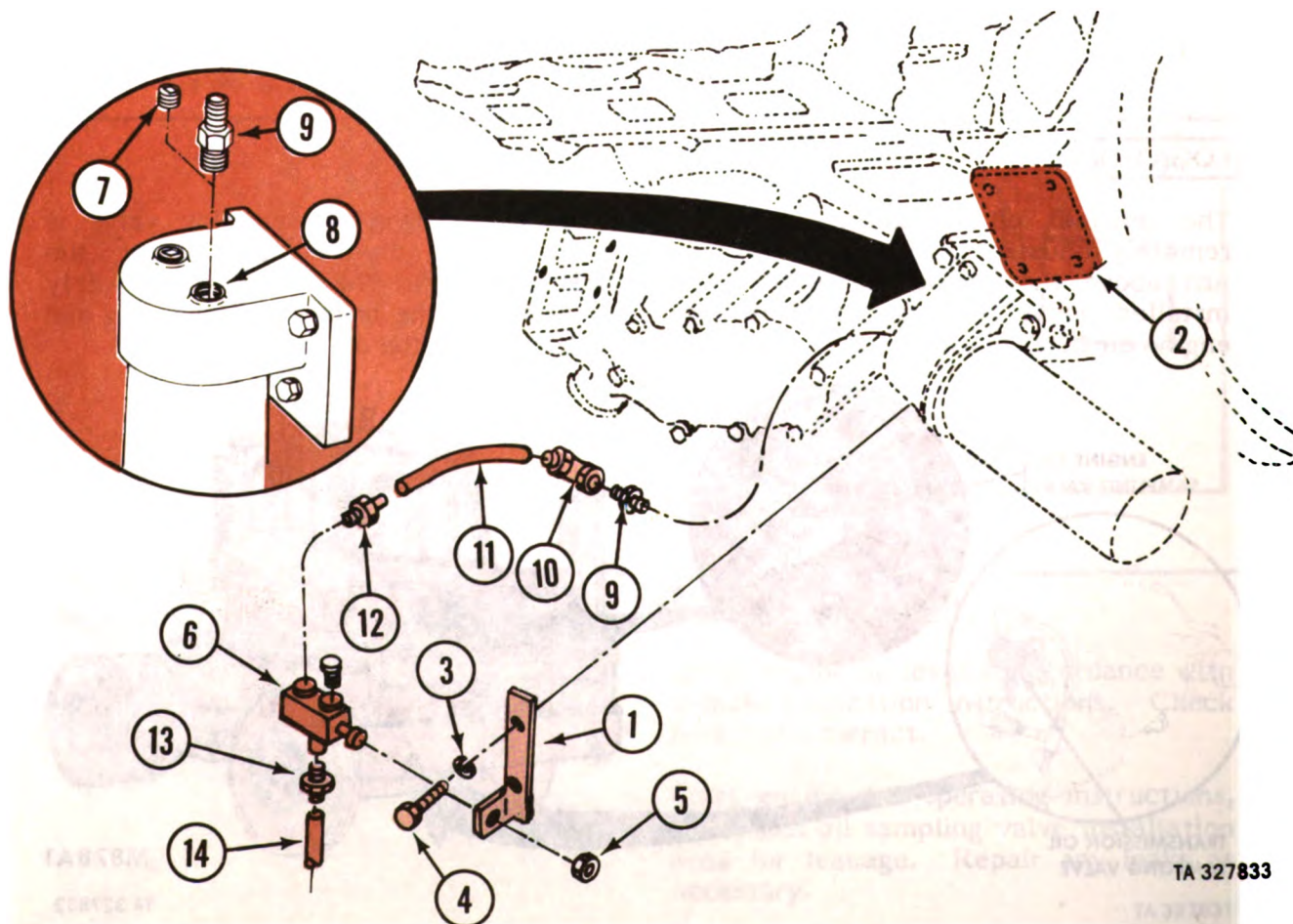
6. Insert one end of hose (11), P/N 99802352, into open port of swivel hose fitting (10) and tighten fitting's locknut.

7. Install external thread end of adapter (12) P/N 53451937 into the top port of valve (6). Tighten adapter (12).

8. Cut hose (11) to required length and connect free end of hose (11) to adapter (12). Tighten adapter locknut to secure hose in place.

9. Install adapter (13), P/N 53451937, to bottom port of valve.

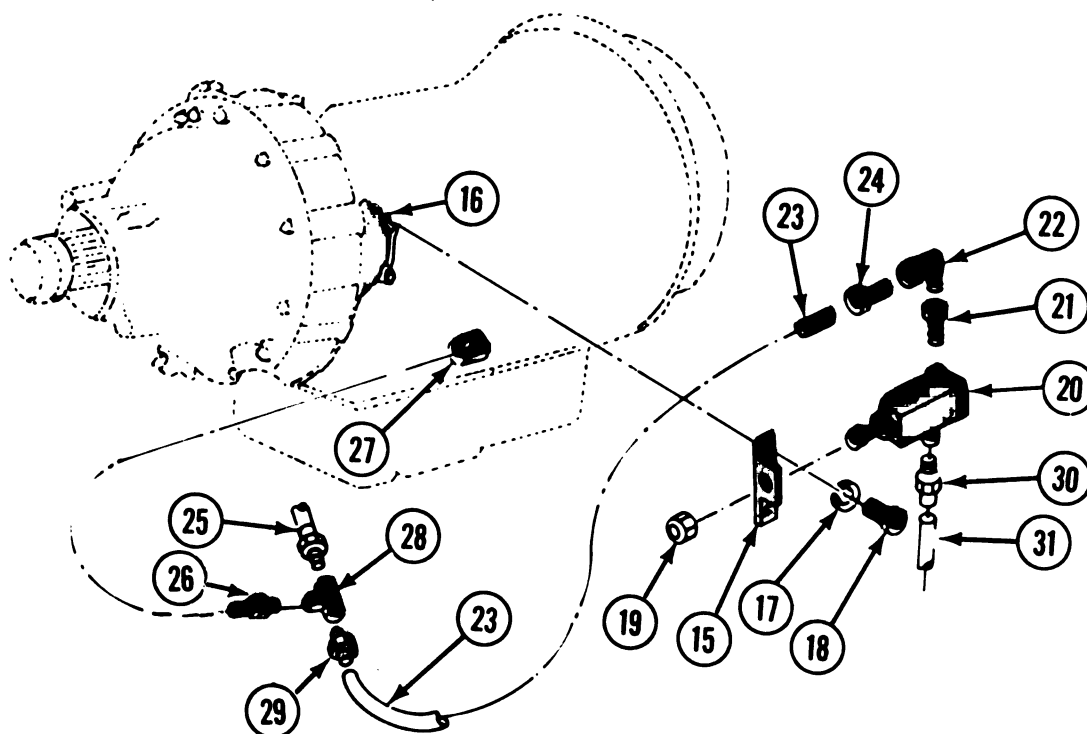
10. Store remaining length of hose (14), P/N 99802352, in vehicle cab for use when taking oil samples. See SPECIAL SAMPLING INSTRUCTIONS below for specific steps when using the M878A1 engine oil sampling valve.



TA 327833

TRANSMISSION OIL SAMPLING VALVE INSTALLATION

11. Position bracket (15), P/N 53516329, against transmission housing bosses (16) and secure in place with two lockwashers (17), P/N 98415045, and capscrews (18), P/N 90804226.
12. Remove locknut (19) from sampling valve (20), P/N 53103585. Position valve (20) on bracket (15) and secure in place with locknut (19). Valve should be installed with valve plug upward.
13. Install bushing (21), P/N 90709340, to open top port of valve (20). Tighten bushing (21).
14. Install 90° elbow (22), P/N 96082214, into bushing (21). Tighten elbow (22). Elbow should be installed with open port facing the rear of the vehicle.
15. Attach end of hose (23), P/N 99802352, to swivel hose end (24), P/N 53450543. Install this assembly into the 90° elbow (22). Tighten all fittings.
16. Disconnect PTO fitting (25) from the transmission. Install nipple (26), P/N 90003582, into PTO pressure tap port (27). Tighten nipple (26).
17. Install center port of tee (28), P/N 97415015, on nipple (26). Tighten tee (28).
18. Install PTO fitting (25) to tee (28). Tighten PTO fitting (25).
19. Install adapter (29), P/N 53451937, to opposite end of tee (28). Tighten adapter.
20. Route hose (23) to adapter (29). Cut any excess length. Install hose end on adapter (29).
21. Install adapter (30), P/N 53451937, to bottom port of sampling valve (20).
22. Store remaining length of hose (31), P/N 99802352, in vehicle cab for use when taking oil samples. See SPECIAL SAMPLING INSTRUCTIONS below for specific steps when using the M878A1 transmission oil sampling valve.
23. Refill transmission oil to operating level.



TA 327834

SPECIAL SAMPLING INSTRUCTIONS

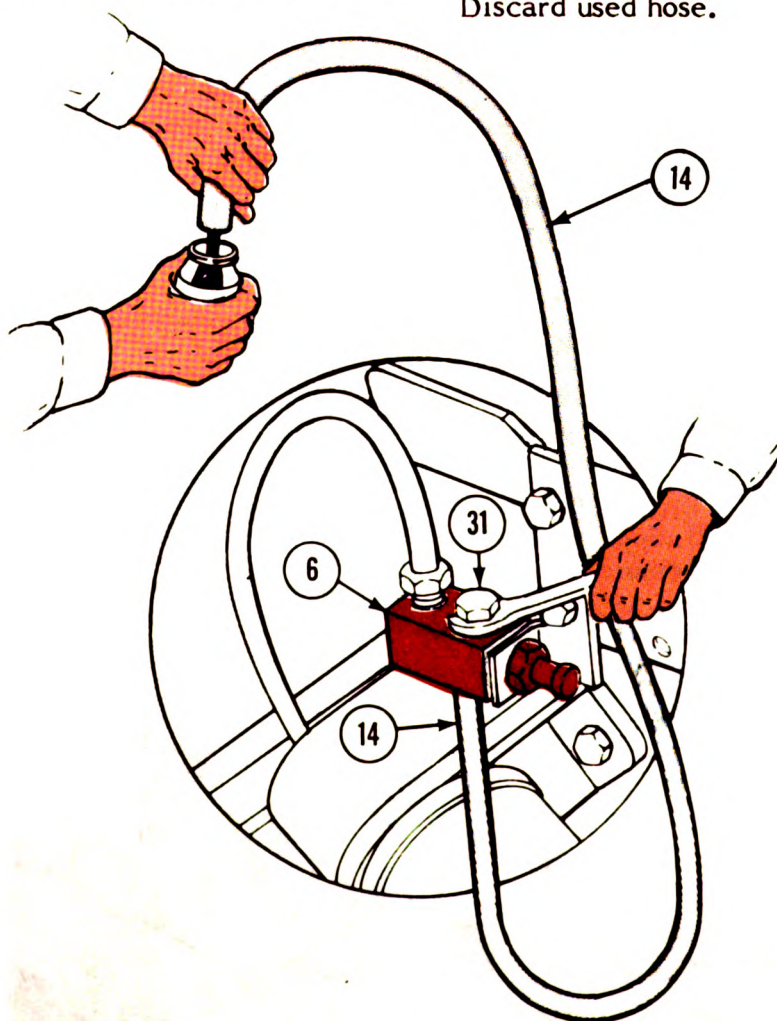
Start engine and allow it to run until it is at normal operating temperature. When engine and transmission are warmed up, shut off engine.

For engine oil sampling, attach stored length of hose (14) to bottom port of sampling valve (6). Place end of hose in a clean container. Open sampling valve by unscrewing valve plug (31). Allow about

1 pint of oil to drain from the engine and into the container. Shut off sampling valve by tightening valve plug (31). Place AOAP sampling bottle at end of hose (14). Repeat procedure above until sample is taken.

Procedures for sampling the transmission oil is the same as the engine procedure.

Discard used hose.

**MAINTENANCE**

Refer to figure B-33, Appendix B of this TM, for individual repair parts ordering data.

FOLLOW ON TASKS

Check and fill engine and transmission oil to operating levels.

2-42. Model 6250 Truck Crane (MHE 247)

This paragraph contains installation and maintenance instructions for oil sampling valves used on the Harnischfeger model 6250, 250-ton capacity truck crane. These procedures include installation of an oil sampling valve on the crane carrier engine and on the superstructure engine.

Illustrations and instructions presented are of a "typical" installation. Some

variations may occur between production models of the crane. Such variations, however, are minor. Maintenance technicians are asked to adjust to all such variations when performing the procedures.

Lowest level of maintenance authorized for initial installation of the sampling valves is direct support maintenance.

INITIAL SETUP

TOOLS:

AUTOMOTIVE MECH TOOL KIT
5180-00-754-0641

TM REFERENCES:

TM 10-3950-264-14&P-1
TM 10-3950-264-14&P-2

MATERIALS/PARTS:

VALVE (2)-4820-01-120-4532
TEE (1)-4730-01-055-7646
NIPPLE (2)-4730-00-921-3624
REDUCER (1)-4730-00-231-5642

EQUIPMENT CONDITION:

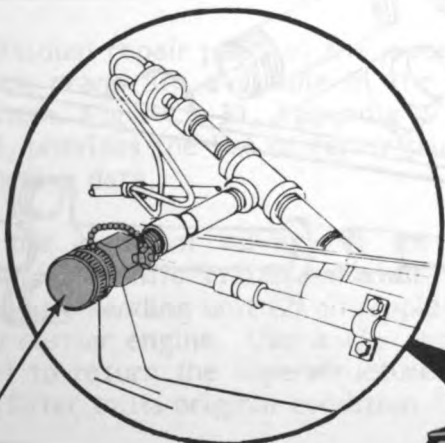
ENGINE ACCESS PLATES REMOVED
ENGINE OFF AND COOL
CARRIER ENGINE OIL DRAINED

LOCATION

The 6250 truck crane carrier engine oil sampling valve is installed at the right side of the engine block at the location of the oil sending unit.

The crane superstructure engine oil sampling valve is installed on the engine's full flow filter head (See page 5-23, TM 10-3950-264-14&P-1.

ENGINE OIL
SAMPLING
VALVE



ENGINE OIL
SAMPLING
VALVE



6250TC

TA 327836

CARRIER ENGINE OIL SAMPLING VALVE INSTALLATION

NOTE

Apply type III sealing compound, NSN 8030-00-656-1426 (or equal) to exterior threads of all male fittings before installing each fitting.

1. Disconnect electrical leads (1) from oil pressure sending unit (2).
2. Disconnect oil pressure sending unit (2) from nipple (3).
3. Install tee (4), NSN 4730-01-055-7646, on nipple (3). Tighten tee (4).
4. Install nipple (5), NSN 4730-00-921-3624, into opposite port of tee (4). Tighten nipple (5).
5. Install oil pressure sending unit (2) on nipple (5). Tighten sending unit (2) and

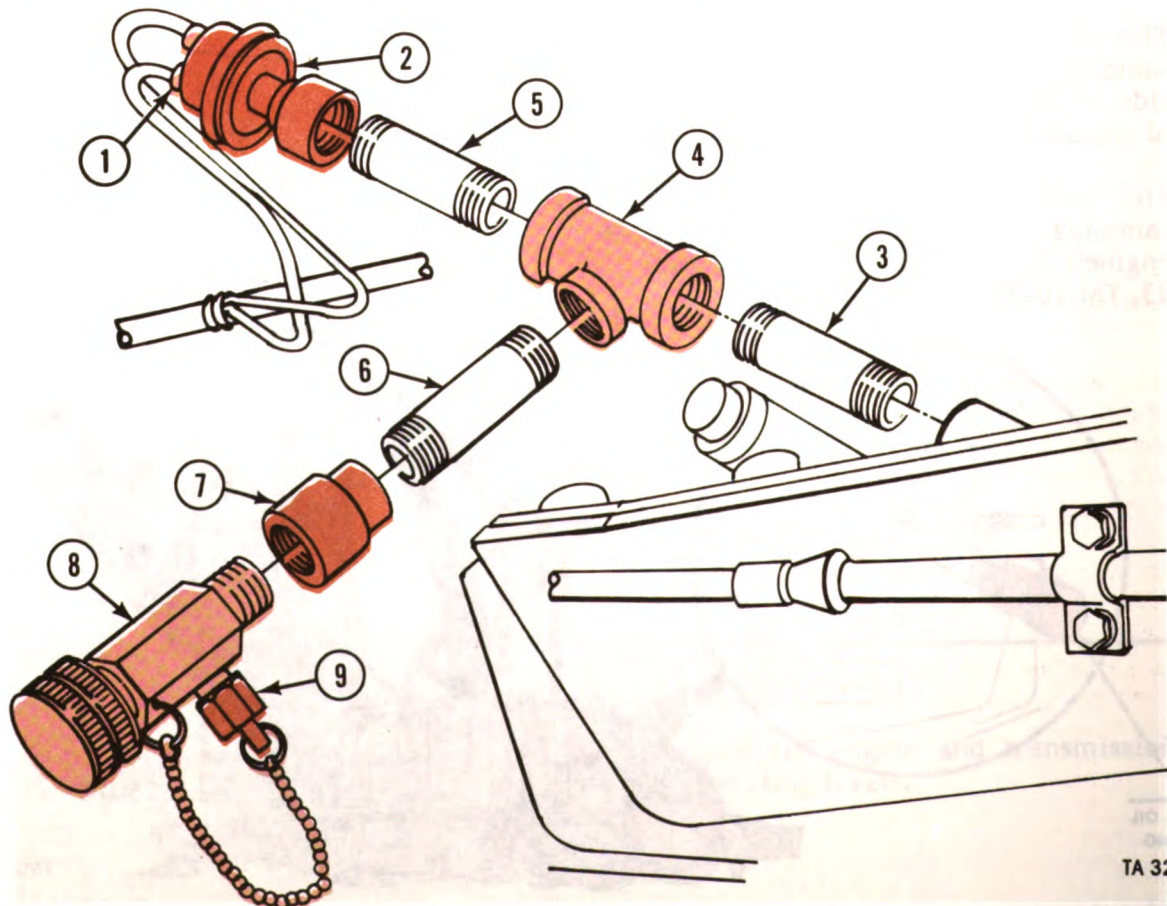
reconnect electrical leads (1).

6. Install nipple (6), NSN 4730-00-921-3624, into center port of tee (4). Tighten nipple (6).
7. Install reducer (7), NSN 4730-00-231-5642, on nipple (6). Tighten reducer (7).
8. Install sampling valve (8), NSN 4820-01-120-4532, into reducer (7). Tighten valve (8).

CAUTION

Make certain valve cap (9) is installed tightly on valve (8) before refilling engine oil.

9. Refill engine oil in accordance with lubrication instructions, Chapter 3, TM 10-3950-264-14&P-1.



TA 327837

SUPERSTRUCTURE ENGINE OIL SAMPLING VALVE INSTALLATION

10. Locate engine full flow oil filters (10) on left rear of engine. Remove plug (11) from the housing cap of the forward filter. Discard plug (11).

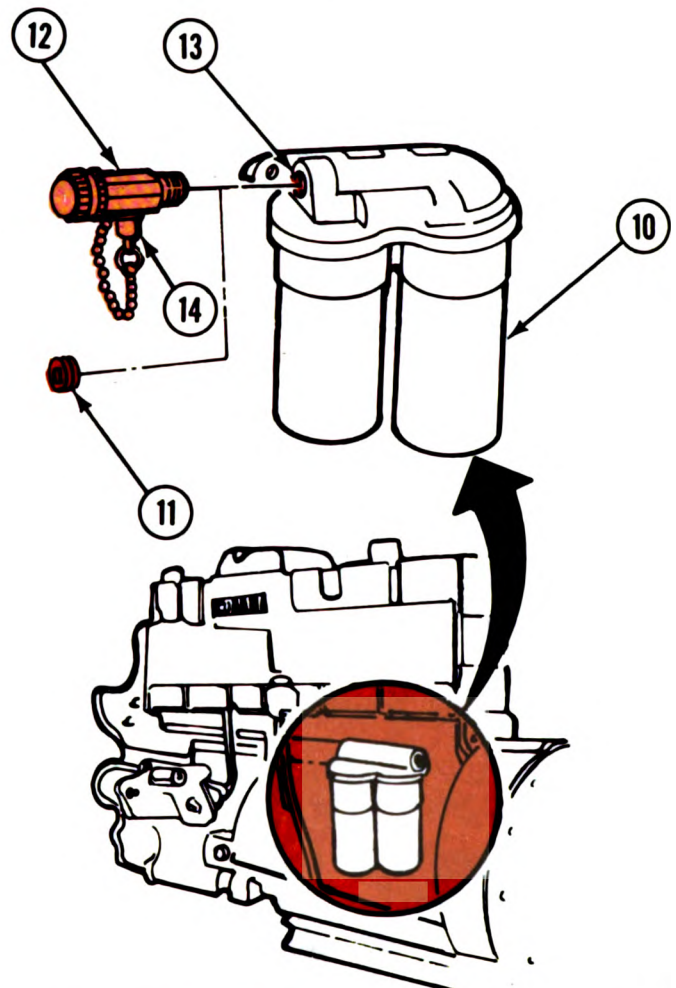
CAUTION

Pipe plug (11) is shown as item #2, page 161-3, TM 10-3950-264-14&P-2. Make certain the similar plug on the opposite end of the filter cap is not removed in error. This plug, item #8, page 161-3, TM 10-3950-264-14&P-2, looks exactly the same as plug (11) but it is the expansion plug for the bypass valve plunger and spring.

11. Install sampling valve (12), NSN 4820-01-120-4532, into oil filter housing cap (13). Tighten valve (12).

CAUTION

Make certain valve cap (14) is installed tightly on valve (12).



MAINTENANCE

Individual repair parts of the model 6250 truck crane are available in the supply system. Figure B-34, Appendix B of this TM, provides the list of repair parts and ordering data.

In the event of salvage of the valves from a specific crane, reinstall the oil pressure sending unit (2) on nipple (3) for the carrier engine. Use a 1/4 inch plug (11) to return the superstructure engine oil filter to its original condition.

FOLLOW ON TASKS

Check and fill both engines to operating levels.

Reinstall carrier and superstructure engine access plates.

TA 327838

2-43. H100C Front-End Loader

This paragraph contains engine oil sampling valve installation and maintenance instructions for the IHC Model H100C scoop type loader.

Illustrations and instructions presented are for a "typical" installation. Variations may occur between differing production generations of the H100C

Model. Such variations, however, will be minor. Maintenance technicians are asked to adjust to such variations.

Installation of the H100C engine oil sampling valve should be accomplished by organizational maintenance units after the engine oil has been drained for regularly scheduled service.

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT
4910-00-754-0654

MATERIALS/PARTS

VALVE (1)-4820-01-120-4532
SEALING COMPOUND-8030-00-656-1426

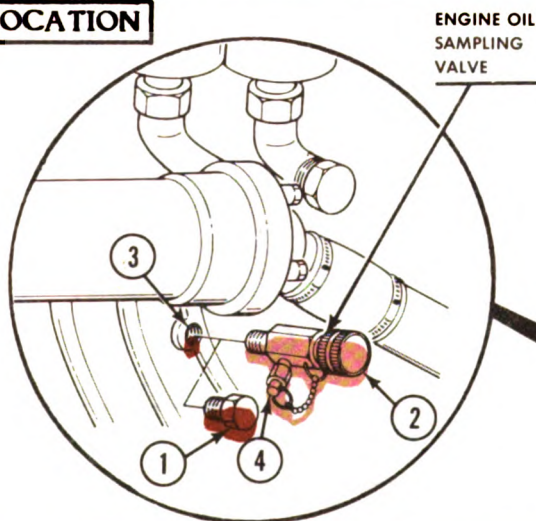
TM REFERENCES:

TM 5-3805-255-14&P

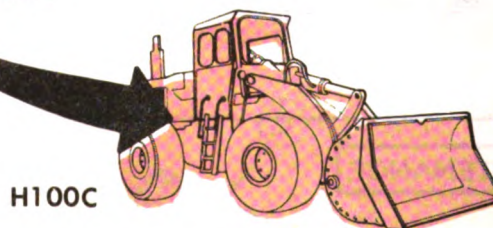
EQUIPMENT CONDITION:

LOADER ON LEVEL SURFACE
PARKING BRAKE SET
ENGINE OFF AND COOL
ENGINE OIL DRAINED

LOCATION



The H100C front-end loader engine oil sampling valve is installed on the left side of the engine block just below the engine oil cooler. Because the DT 817 Series C International Engine is reverse-mounted to the vehicle, installation is accomplished from the vehicle's right side.



ENGINE OIL SAMPLING VALVE INSTALLATION

1. Locate 1/4-inch pipe plug (1) on the engine block just below the engine oil cooler. Remove and discard pipe plug (1).
2. Apply type III sealing compound (or equal) to external threads of sampling valve (2), NSN 4820-01-120-4532. Install

valve (2) into engine block pressure port (3). Tighten valve (2).

CAUTION

Make certain valve cap (4) is installed tightly on valve (2) before refill of engine oil to operating level.

MAINTENANCE

Oil sampling valve replacement ordering data is presented in figure B-36, Appendix B of this TM.

FOLLOW ON TASKS

Refill engine oil to operating level (See TM 5-3805-255-14&P).

TA 327839

2-44. Model 440HA and 440HA "ROPS" Road Grader.

This paragraph contains installation and maintenance instructions for the engine oil sampling valve used on model 440HA road grader.

Illustrations and instructions presented are for a "typical" model 440HA. Minor variations may occur between differing production models. Maintenance

technicians are asked to adjust to such variations.

The model 440HA road grader engine oil sampling valve should be installed by organizational maintenance during scheduled hard time service after (100 hrs of operation).

INITIAL SETUP

TOOLS:

GENERAL MECH TOOL KIT
4910-00-754-0654

TM REFERENCES:

TM 5-3805-237-12

MATERIALS/PARTS:

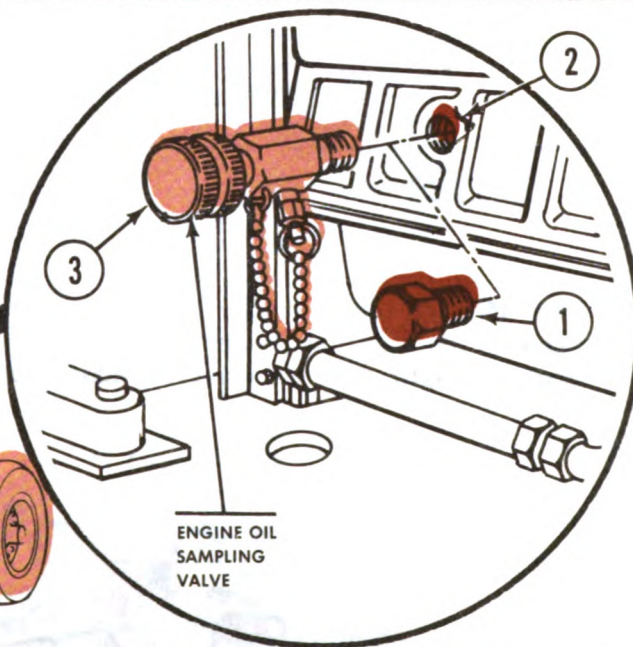
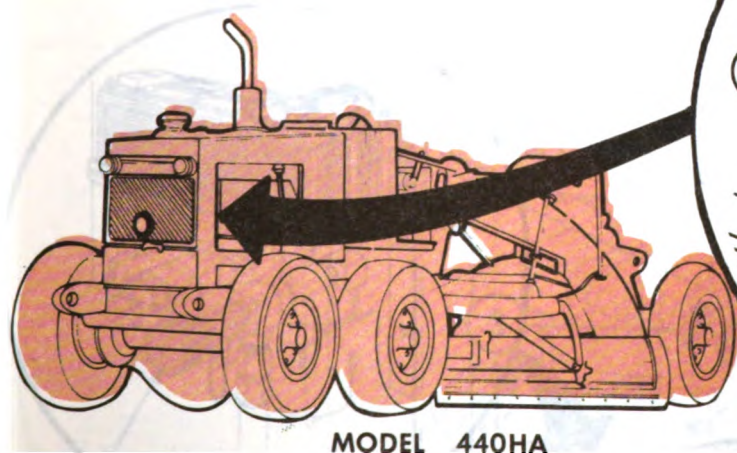
VALVE (1)-4820-01-120-4532
SEALING COMPOUND-8030-00-656-1426

EQUIPMENT CONDITION

VEHICLE ON LEVEL SURFACE
ENGINE RIGHT ACCESS HOOD OFF
ENGINE OIL DRAINED

LOCATION

The 440HA road grader engine oil sampling valve is installed at the lower right rear of the engine block.



ENGINE OIL SAMPLING VALVE INSTALLATION

1. Locate 1/4 inch pressure tap plug (1) at the lower right rear of the engine block (2). Remove and discard plug (1).
2. Apply type III sealing compound (or

equal) to threads of sampling valve (3). NSN 4820-01-120-4532. Install valve (3) into pressure port of the engine block (2). Tighten valve.

MAINTENANCE

Oil sampling valve replacement ordering data is presented in figure B-36, Appendix B of this TM.

FOLLOW ON TASKS

Refill engine oil (TM 5-3805-237-12). Install engine compartment access hood.

2-45. Model 350B-D Steel Wheel Roller

This paragraph contains engine oil sampling valve installation and maintenance instructions for the Hyster Model 350B-D motorized steel wheel tandem roller.

Illustrations and instructions presented are for a "typical" installation. Variations can occur between differing

production models of the roller. Such variations, however, are minor. Maintenance technicians are asked to adjust to all such variations when performing the procedure.

Lowest level of maintenance authorized for initial installation of this kit is direct support maintenance.

INITIAL SETUP

TOOLS:

GEN MECH TOOL KIT #1
4910-00-754-0654
GEN MECH TOOL KIT #2
4910-00-754-0650
DRILL SET-5133-00-596-8088

MATERIALS/PARTS

VALVE (1)-4820-01-120-4532
SEALING COMPOUND-8030-00-656-1426

TM REFERENCES:

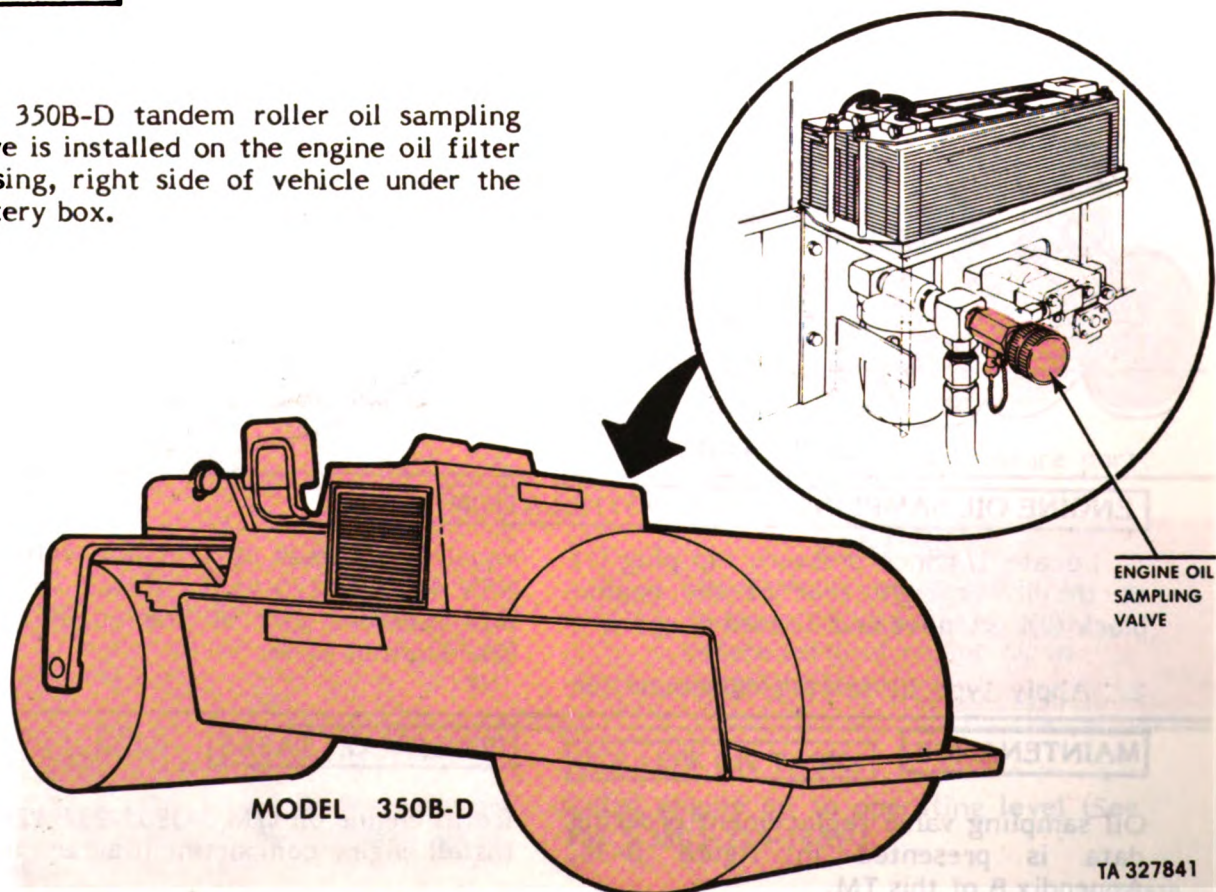
TM 5-3895-348-14&P-1

EQUIPMENT CONDITION:

VEHICLE ON LEVEL SURFACE
ENGINE OFF AND COOL
ENGINE ACCESS PLATES OFF
ENGINE OIL DRAINED

LOCATION

The 350B-D tandem roller oil sampling valve is installed on the engine oil filter housing, right side of vehicle under the battery box.



ENGINE OIL SAMPLING VALVE INSTALLATION**NOTE**

Apply type III sealing compound (or equal) to external threads of all male fittings before installing each fitting.

1. Disconnect oil return line (1) from engine oil filter housing cap elbow (2).
2. Disconnect elbow (2) from engine oil filter housing cap (3).
3. Drill 7/16-inch hole on the side of elbow (2). Tap drilled hole with 1/4-18 NPT. Remove all chips and burrs from tapped elbow (2). Clean elbow.

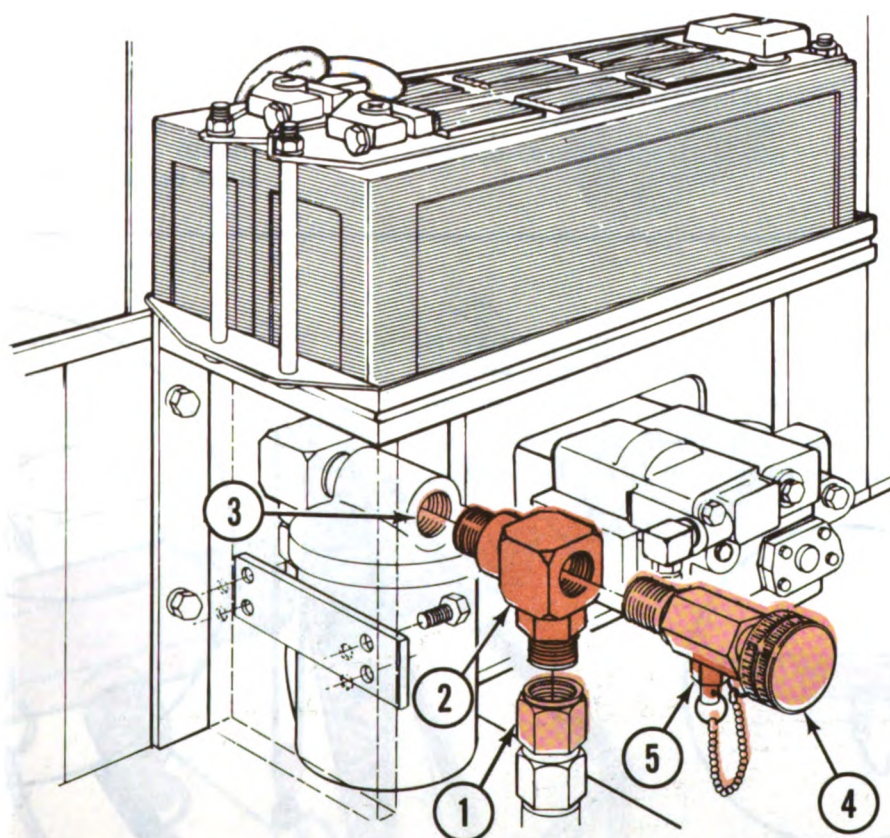
4. Reinstall elbow (2) in engine oil filter housing cap (3). Tighten elbow (2).

5. Reinstall oil return line (1) on elbow (2). Tighten oil return line (1).

6. Install sampling valve (4) into tapped port of elbow (2). Tighten valve (4).

CAUTION

Make certain valve cap (5) is installed tightly on valve before refill of engine oil to operating level.

**MAINTENANCE**

Oil sampling valve replacement ordering data is presented in figure B-36, Appendix B of this TM.

FOLLOW ON TASKS

Refill engine oil. (See TM 5-3895-348-14&P-1.)

Close engine access door.

TA 327842

2-46 Model 9125 TC Truck Crane

This paragraph contains installation and maintenance instructions for oil sampling valves used on the Harnischfeger Model 9125 TC 140-Ton truck crane. These procedures include installation of an oil sampling valve on the NTF365 crane carrier engine and on the V903 crane superstructure engine.

Illustrations and instructions presented

are of a "typical" installation. Variations may occur between individual models. Such variations, however, are minor. Maintenance technicians are asked to adjust to all such variations when performing the procedure.

Lowest level of maintenance authorized for initial installation of this kit is direct support maintenance.

TOOLS:

AUTOMOTIVE MECH TOOL KIT
5180-00-754-0641

MATERIALS/PARTS:

VALVE (2)-4820-01-120-4532
NIPPLE (1)-4730-00-921-3624
REDUCER (1)-4730-00-231-5642
NIPPLE (1)-4730-00-196-1485
TEE (1)-4730-00-257-2117
SEALING COMPOUND-8030-00-656-1426

TM REFERENCES:

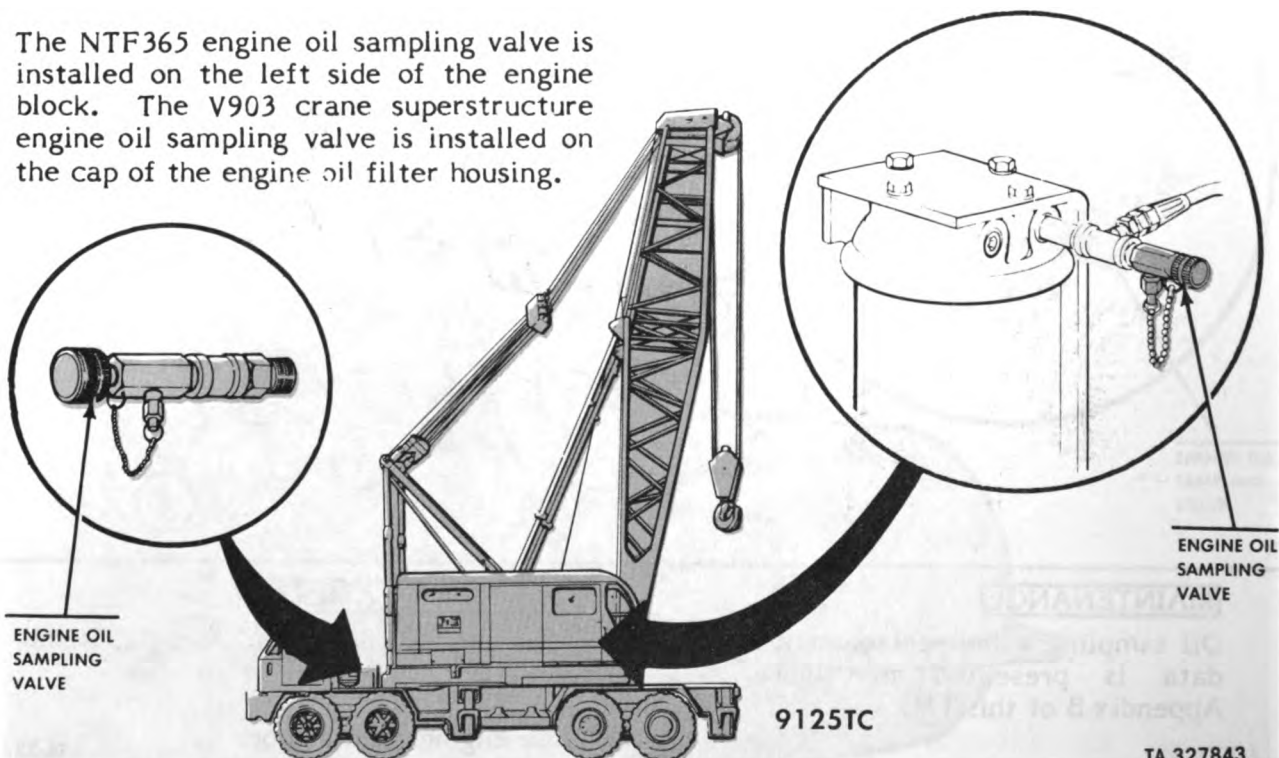
P&H BULLETIN 9125A-1-QM
CUMMINS OP & MAINT MANUALS
(NTF365/V903 ENGINES)

EQUIPMENT CONDITIONS:

VEHICLE ON LEVEL SURFACE
ENGINES OFF AND COOL
VEHICLE ENGINE LEFT ACCESS
DOOR OPEN
SUPERSTRUCTURE ENGINE ACCESS PLATE
REMOVED
NTF365 ENGINE OIL DRAINED

LOCATION

The NTF365 engine oil sampling valve is installed on the left side of the engine block. The V903 crane superstructure engine oil sampling valve is installed on the cap of the engine oil filter housing.



CARRIER ENGINE OIL SAMPLING VALVE INSTALLATION**NOTE**

Apply type III sealing compound, NSN 8030-00-656-1426 (or equal) to exterior threads of all male fittings before installing each fitting.

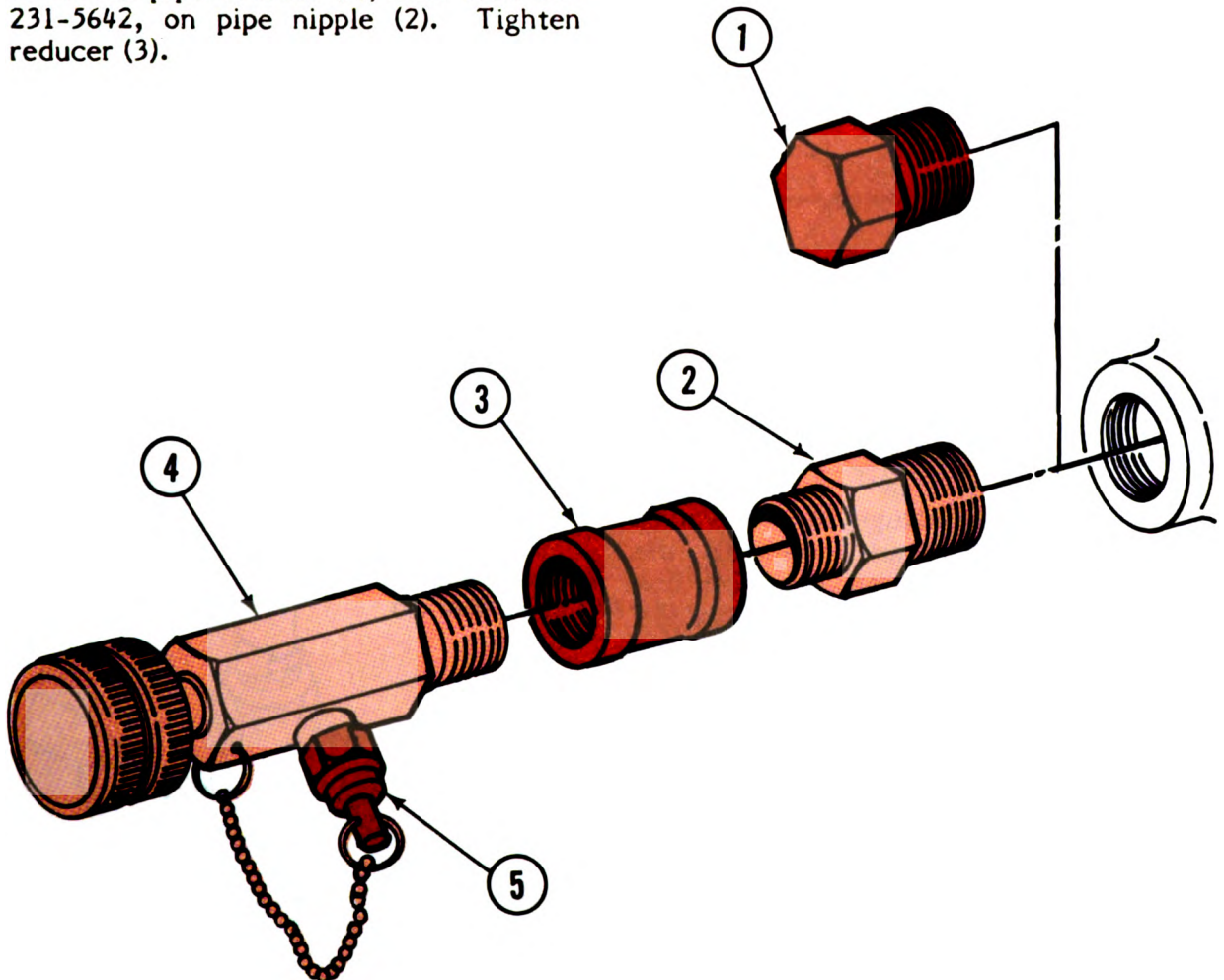
1. Locate 1/8" pipe plug (1) on left side of carrier engine. Remove and discard plug.
2. Install pipe nipple (2), NSN 4730-00-921-3624, into pipe plug port hole on the engine block. Tighten nipple (2).
3. Install pipe reducer (3), NSN 4730-00-231-5642, on pipe nipple (2). Tighten reducer (3).

4. Install oil sampling valve (4), NSN 4820-01-120-4532, into reducer (3). Tighten valve (4).

CAUTION

Make certain valve cap (5) is installed on valve and is hand tight before engine oil refill.

5. Refill engine oil in accordance with lubrication instructions found in the vehicle's commercial manual (P&H Bulletin Number 9125A-1-OM).



TA 327844

SUPERSTRUCTURE ENGINE OIL SAMPLING VALVE INSTALLATION

6. Disconnect oil line (6) from adapter end fitting (7) from engine oil filter housing cap (8).

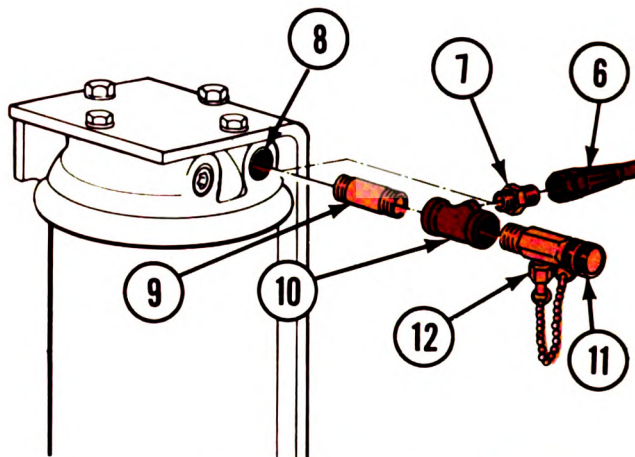
7. Install pipe nipple (9), NSN 4730-00-196-1485, into oil filter housing cap (8).

8. Install pipe tee (10), NSN 4730-00-257-2117, on pipe nipple (9). Tighten tee (10). Tee (10) should be installed with the center port facing the engine block.

9. Connect adapter end fitting (7) into center port of tee (10). Tighten end fitting (7).

10. Connect oil line (6) to adapter end fitting (7).

11. Install oil sampling valve (11), NSN 4820-01-120-4532, to remaining port of tee (10). Tighten valve.

**CAUTION**

Make certain valve cap (12) is installed on valve and is hand tight.

MAINTENANCE

Individual repair parts of the Model 9125 TC truck crane are available in the supply system. Figure B-35 Appendix B of this TM, provides the list of repair parts and ordering data.

In the event of salvage of the valves from a specific crane, reinstall the superstructure engine oil filter oil line (6) and adapter (7) to the filter cap (8). Use a 1/8" pipe plug (1) from available stock to plug engine block when salvaging the carrier engine oil sampling valve.

FOLLOW ON TASKS

Check engine oil levels and refill.

Start engines individually and check for leaks. Tighten loose fittings.

Install superstructure engine access plate.

Close and secure vehicle engine access door.

2-47. M320RT Wheel Mounted Crane (20-Ton).

This paragraph contains installation and maintenance instructions for oil sampling valves used on the carrier and superstructure engines of the Harnischfeger Model M320RT crane. Illustrations and instructions presented are of a typical installation. However, minor variations may occur between

various production generations of the M320RT. Maintenance technicians are asked to adjust to all such variations when performing the procedure.

The lowest level of maintenance authorized for initial installation of this kit is direct support maintenance.

INITIAL SETUP

TOOLS:

GENERAL MECHANICS TOOL KIT #1
4910-00-754-0654

DRILL SET-5133-00-596-8088

TM REFERENCES:

TM 5-3810-295-12
LO 5-3810-295-12-1
LO 5-3810-295-12-2
TM 5-3810-295-20

MATERIALS/PARTS

VALVE (2)-4820-01-120-4532

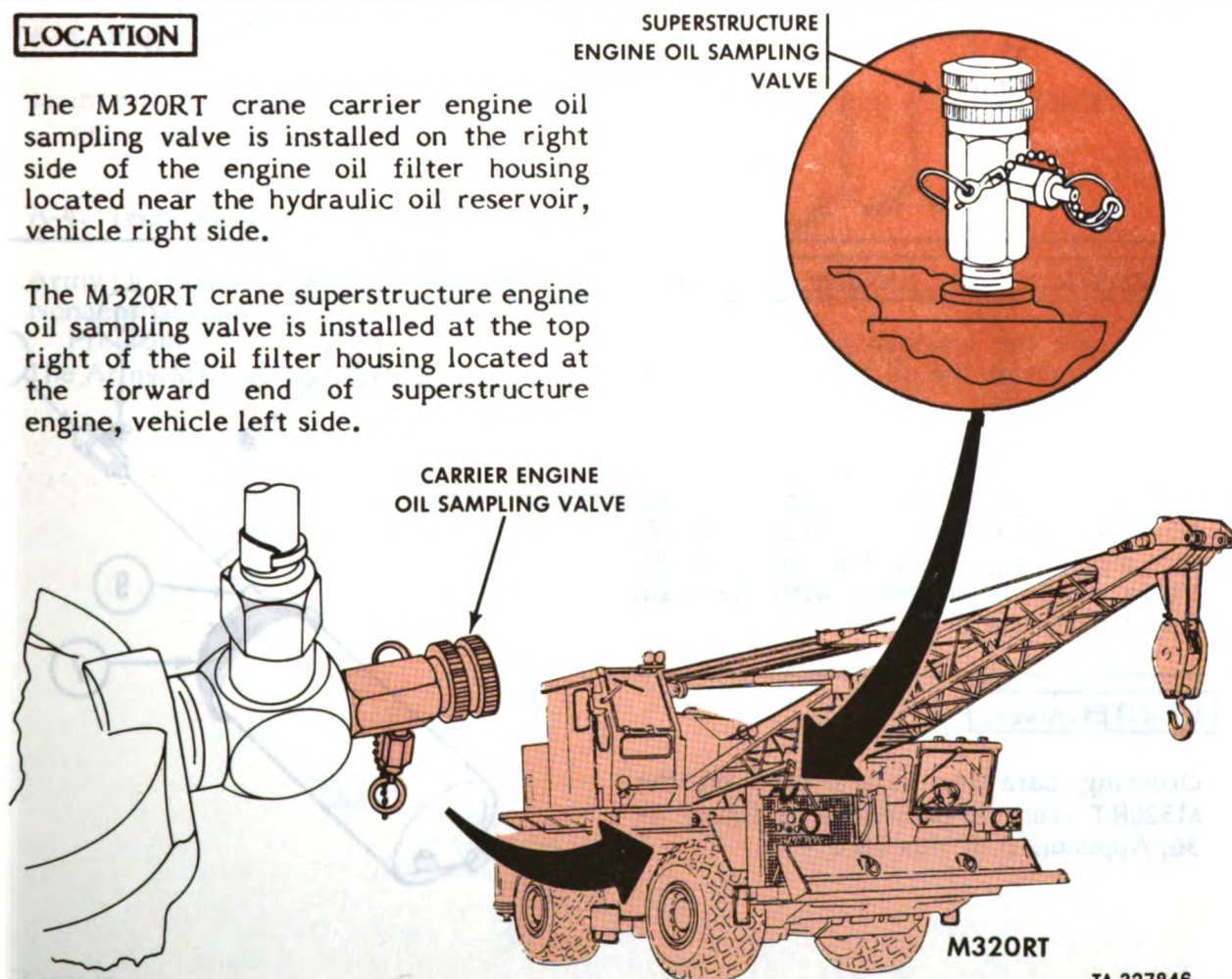
EQUIPMENT CONDITION:

VEHICLE ON LEVEL SURFACE
ENGINE OFF AND COOL

LOCATION

The M320RT crane carrier engine oil sampling valve is installed on the right side of the engine oil filter housing located near the hydraulic oil reservoir, vehicle right side.

The M320RT crane superstructure engine oil sampling valve is installed at the top right of the oil filter housing located at the forward end of superstructure engine, vehicle left side.



TA 327846

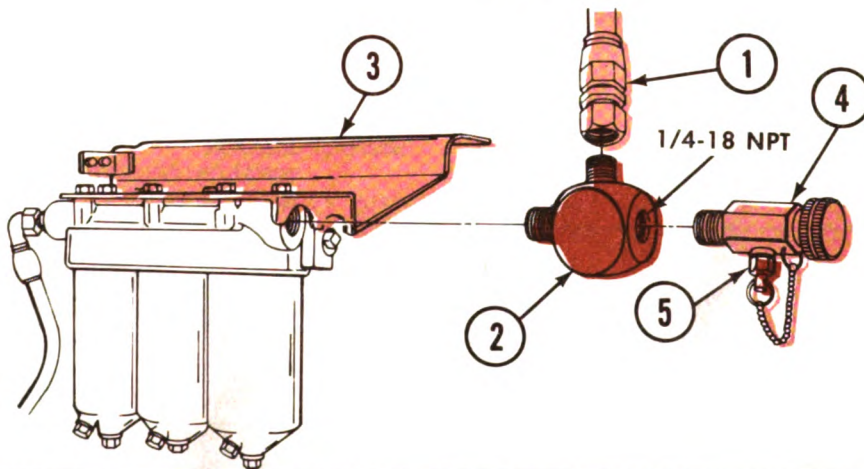
CARRIER ENGINE OIL SAMPLING VALVE INSTALLATION

1. Disconnect the oil line (1) from oil filter coupling (2) on the right side of oil filter housing (3).
2. Remove coupling elbow (2). Drill a 7/16 dia. thru hole and tap 1/4-18 NPT. Clean coupling elbow (2) with SDII drycleaning solvent.
3. Apply type III sealing compound (or

equal) to external threads of coupling (2) and reinstall on oil filter housing (3).

4. Reconnect oil line (1) to coupling (2).

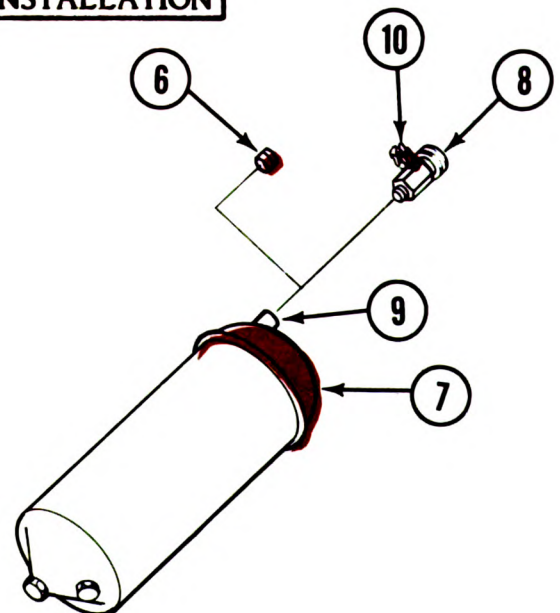
5. Apply type III sealing compound (or equal) to external threads of sampling valve (4), NSN 4820-01-120-4532. Install valve (4) into tapped coupling (2). Tighten valve (4). Valve should be installed with the valve drain port (5) downward.



SUPERSTRUCTURE ENGINE SAMPLING VALVE INSTALLATION

6. Locate the 1/4-inch pipe plug (6) at the top right of the oil filter housing (7). Remove plug (6).

7. Apply type III sealing compound (or equal) to external threads of valve (8), NSN 4820-01-120-4532. Install valve (8) into pipe plug port (9). Tighten valve (8). Valve should be installed with the drain port (10) outward.



MAINTENANCE

Ordering data for valves used on the M320RT crane is presented as figure B-36, Appendix B of this TM.

APPENDIX A REFERENCES

A-1. Scope.

This Appendix lists only Army Oil Analysis Program (AOAP) forms, regulations, and technical publications referenced in this manual. Specific vehicle manuals referenced in the maintenance procedures are provided in the initial setup (tools/materials/equipment condition) for each vehicle.

A-2. Forms.

Recommended Changes to Publications.....	DA Form 2028
Oil Analysis Recommendation and Feedback.....	DA Form 3254-R
Quality Deficiency Report (EIR's)	DA Form SF368
Oil Analysis Request	DD Form 2026
Oil Analysis Record	DD Form 2027
Oil Analysis Log	DA Form 2408-20

A-3. Regulations.

Maintenance of Supplies and Equipment, Army	AR750-22
Oil Analysis Program (AOAP)	

A-4. Technical Publications.

Army Oil Analysis Program, Guide for Leaders.....	DA Pam 750-5
Nonaeronautical Equipment, Army Oil Analysis	TB 43-0210
Program	
The Army Maintenance Management System.....	DA Pam 738-750

APPENDIX B

REPAIR PARTS AND SPECIAL TOOLS LIST

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Section I. INTRODUCTION

B-1. Scope.

This appendix lists repair parts and special tools required for performance of organizational maintenance and direct support maintenance of Army Oil Analysis Program (AOAP) sampling valves and associated hardware as used on tank-automotive combat, tactical, and special purpose vehicles. This appendix authorizes ordering and the issue of repair parts in accordance with Source, Maintenance, and Recoverability (SMR) Codes.

B-2. General.

This appendix is divided into the following sections:

a. **Section II. Repair Parts List.** This section lists available kits and repair parts authorized for use in the performance of maintenance. The lists also include parts which must be removed for the replacement of authorized parts. Available kits contain parts within multiple functional group codes. For this reason, the organization of the lists is by vehicle applications in the following sequence:

- (1) Combat Vehicles - Figures B-1 through B-5.
- (2) Tactical Vehicles - Figures B-6 through B-16.
- (3) Special Purpose Vehicles - Figures B-17 through B-36.

A bulk items list is provided as the last table of this section. These materials are listed numerically by National Item Identification Number (NIIN) sequence. This consists of the last nine numbers of the materials National Stock Number (NSN).

b. **Section III. Special Tools List.** A list of special tools authorized for use by organizational maintenance and direct support maintenance is provided in this section.

c. **Section IV. National Stock Number and Part Number Index.** This section provides a list of all NSN's and part numbers that appear in Section II of this appendix.

(1) NSN's are listed numerically in "NIIN" sequence. This means NSN's are listed numerically by the last nine numbers of the NSN.

Example:
$$\begin{array}{r} \text{NSN} \\ 4730-00-257-2117 \\ \text{NIIN} \end{array}$$

is followed by...

Example:
$$\begin{array}{r} \text{NSN} \\ 2910-01-120-4532 \\ \text{NIIN} \end{array}$$

(2) Part numbers are listed by alpha numeric **left justified digits**. This means that the first listing is by the letter or number of the far left or **first** digit. Second consideration is the second digit, followed by the third, fourth, fifth, etc. Within each digit, the sequencing is first alphabetical and then numerical. In such a system, part number BT8 follows part number A17004-2 because the first digit letter "B" comes after the letter "A" in the alphabet.

Example: 1 3 2 1 8 9 0 0
is followed by: 1 4 4 0 8 3

Both the NSN listing and the part number listing will reference to the figure and item in this appendix where they can be located.

B-3. Explanation of Columns.

The following provides an explanation of columns found in the tabular listings of Section II:

a. Illustrations/Column (1). This column is divided into subcolumn (a) for the figure number of the illustration in which the item is shown and subcolumn (b) for the item's callout number in the illustration.

b. Source, Maintenance, and Recoverability Code/Column (2).

Source, Maintenance, and Recoverability (SMR) codes are listed in column (2) in five positions as follows:

(1) Source Codes (First and Second Letters) - This code indicates the lowest level of maintenance assigned to support the item. Source codes are explained as listed below:

Source Code	Explanation
PA	Item procured and stocked for anticipated or known usage.
PB	Item procured and stocked for insurance purpose because essentiality dictates that a minimum quantity be available in the supply systems.
PC	Item procured and stocked and which otherwise would be coded PA except that it is deteriorative in nature.
PD	Support item, excluding support equipment, procured for initial issue or outfitting and stocked only for subsequent or additional initial issues or outfittings. Not subject to automatic replenishment.
PE	Support equipment procured and stocked for initial issue or outfitting to specified maintenance repair activities.
PF	Support equipment which will not be stocked but which will be centrally procured on demand.
PG	Item procured and stocked to provide for sustained support for the life of the equipment. It is applied to an item peculiar to the equipment which, because of probable discontinuance or shutdown of production facilities, would prove uneconomical to reproduce at a later time.
KD	An item of a depot overhaul/repair kit and not purchased separately. Depot kit defined as a kit that provides items required at the time of overhaul or repair.
KF	An item of a maintenance kit and not purchased separately. Maintenance kit defined as a kit that provides an item that can be replaced at organizational or intermediate levels of maintenance.
KB	Item included in both a depot overhaul/repair kit and a maintenance kit.
MO	Item to be manufactured or fabricated at organizational level.
MF	Item to be manufactured or fabricated at the direct support maintenance level.
MH	Item to be manufactured or fabricated at the general support maintenance level.
MD	Item to be manufactured or fabricated at the depot maintenance level.
AO	Item to be assembled at organizational level.

Source Code

Explanation

AF	Item to be assembled at direct general support maintenance level.
AH	Item to be assembled at the general support maintenance level.
AD	Item to be assembled at depot maintenance level.
XA	Item is not procured or stocked because the requirements for the item will result in the replacement of the next higher assembly.
XB	Item is not procured or stocked. If not available through salvage, requisition.
XD	A support item that is not stocked. When required, item will be procured through normal supply channels.

NOTE

Cannibalization or salvage may be used as a source of supply for any item listed in this appendix.

(2) Maintenance Codes (Third, and Fourth Letters. Maintenance codes indicate the lowest level of maintenance authorized to remove, replace, use, and repair a support item.

(a) Third Letter - The Third Letter of the SMR code indicates the lowest level authorized to remove, replace, and use a support item. This is indicated by one of the codes defined below:

C	Crew or operator maintenance performed within organizational maintenance.
O	Support item is removed, replaced, used at the organizational level.
I	Support item is removed, replaced, used by the direct support element of integrated direct support maintenance.
F	Support item is removed, replaced, used at the direct support level.
H	Support item is removed, replaced, used at the general support level.
D	Support items that are removed, replaced, used at depot, mobile depot, specialized repair activity only.

(b) Fourth Letter - The Fourth Letter of the SMR code indicates the lowest level of maintenance authorized to repair a support item. This is indicated by one of the codes defined on the following page:

Code	Explanation
------	-------------

- | | |
|---|---|
| O | The lowest maintenance level capable of complete repair of the support item is the organizational level. |
| F | The lowest maintenance level capable of complete repair of the support item is the direct support level. |
| H | The lowest maintenance level capable of complete repair of the support item is the General support level. |
| D | The lowest maintenance level capable of complete repair of the support item is the depot level, performed by depot, mobile depot, or specialized repair activity. |
| L | Repair restricted to designated specialized repair activity. |
| Z | Nonreparable. No repair is authorized. |
| B | No repair is authorized. The item may be reconditioned by adjusting, lubricating, etc., at the user level. No parts or special tools are procured for the maintenance of this item. |

(3) Recoverability Code (Fifth Letter)

This code is assigned to a support item to indicate the lowest level of maintenance authorized to decide if an item should be repaired or if it is not economical to repair. This is indicated by one of the codes defined below:

Code	Explanation
Z Nonreparable item.	When unserviceable, condemn and dispose at level indicated in position 3.
O Repairable item.	When uneconomically repairable, condemn and dispose at organizational level.
F Repairable items.	When uneconomically repairable, condemn and dispose at the direct support level.
H Repairable item.	When uneconomically repairable, condemn and dispose at the general support level.
D Repairable item.	When beyond lower lever repair capability, return to depot. Condemnation and disposal not authorized below depot level.
L Repairable item.	Repair, condemnation, and disposal not authorized below depot/specialized repair activity level.
A Item requires special handling or condemnation procedures because of specific reasons (i.e., precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.	

c. **National Stock Number/Column (3).** This column indicates the NSN assigned to the item and to be used for requisitioning purposes.

d. **Part Number/Column (4).** This column indicates the primary number used by the manufacturer (individual company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specification standards, and inspection requirements, to identify an item or range of items.

NOTE

When a stock number is requisitioned, the repair part received may have a different part number than the part being replaced.

e. **Federal Supply Code for Manufacturer (FSCM)/Column (5).** This is the 5-digit numeric code listed in SB 708-42 which is used to identify the manufacturer, the distributor, or the Government agency controlling the item.

f. **Description/Column (6).** This column indicates the item name. It also provides a minimum description required to identify the item. Items that are part of a kit or set are indented beneath the kit or set description. Material required for fabrication is identified in this column with reference to the required bulk materials.

g. **Unit of Measure (U/M)/Column (7).** This column indicates the standard or basic quantity by which the listed item is used in performing the specific vehicle maintenance function. This measure is expressed by a two-character alphabetical abbreviation; e.g., EA (each), IN (inch), etc. This is the basis

used to indicate quantities and allowances in subsequent columns. When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the unit of measure will be requisitioned.

h. **Quantity Incorporated In Unit/Column 8.** This column normally indicates the quantity of the item used in the functional group. Since this appendix (as a supplemental RPSTL) lists kits with parts of multiple quantities in multiple functional groups, the column's quantity indicates the total number of like items in the kit.

B-4. Usable On Codes.

Usable on codes are provided in the description column of the repair parts tables. Identification of these codes to vehicles/vehicle systems is as follows:

Code	Used On
------	---------

A	M48/M60 Family Tanks (M48A2, M48A3, M48A5, M48a5AVLB, M60, M60A1, M60A1 RISE, M60A1 RISE Passive, M60A1AOS, M60A3, M247(DIVAD), and M728).
----------	--

B	M113 Family Carriers (M106A1, M106A2, M113A1, M113A2, M125A1, M125A2, M132A1, M163A1, M577A1, M577A2, M741, M741A1, M901, M901A1, M981).
----------	--

C	M548/M730 Family Carriers (M548, M598A1, M730, M730A1, M1015, M1015A1)
----------	--

Code	Used On
------	---------

D	M109/M110 Family Vehicles (M42A1, M107, M108, M109, M109A1, M109A2, M109A3, M110, M110A1, M110A2, M578, M992).
----------	--

E	M88 Recovery Vehicle
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F	M876 Telephone Maintenance
----------	-----------------------------------

G	M39 Series Trucks w/Diesel Engine (M40A1, M40A1C, M51A1, M52A1, M54A1, M54A1C, M61A1, M139A1, M246A1, M291A1, M291A1C, M291A1D, M543A1).
----------	--

H	M39 Series/M44 Series Trucks W/Multifuel Engines. (M35A1, M35A2, M35A2C, M36A2, M40A2C, M49A1C, M49A2C, M50A1, M50A2, M50A3, M51A2, M52A2, M54A2, M54A2C, M55A2, M61A2, M63A2, M63A2C, M109A2, M109A3, M185A2, M185A3, M246A2, M275A1, M275A2, M292A1, M292A2, M292A4, M292A5, M342A2, M543A2, M756A2, M764).
----------	---

I	M123A1C and M123E2 Trucks (10-Ton)
----------	---

J	M520 Series Trucks (M520, M553, M559, M877).
----------	---

K	M561 and M792 (Gamma Goat) 1 1/4-Ton Trucks
----------	--

L	M746 Tractor Truck (22 1/2-Ton)
----------	--

Code	Used On	Code	Used On
M	M911 Tractor Trucks (22 1/2-Ton)	Y	TMS - 300-5 Truck Crane
N	M915 Series Trucks (M915, M916, M917, M918, M919, M920).	Z	M4K Forklift (MHE248)
O	M809 Series Trucks (5-Ton) (M809, M809A1, M810, M811, M811A1, M811A2, M812, M812A1, M813, M813A1, M814, M815, M816, M817, M818, M819, M820, M820A1, M20A2, M821).	AA	Rough Terrain Forklifts (MLT-6/MHE200, MLT-6-CH/MHE202, MLT-6-2/MHE220)
P	M939 Series Trucks (5-Ton) (M923, M924, M925, M926, M927, M928, M929, M930, M931, M932, M934, M935, M936, M939, M940, M941, M942, M943, M944, M945).	BB	MT250 Truck Crane (25-Ton)
Q	CAT D7F Crawler	CC	F1500M Road Grader
R	Cat D7E Crawler, K300 Compactor, 290M Tractor	DD	RTL-10 Forklifts (RTL-10/MHE199, RTL-10-1/MHE215)
S	Model 120 Grader, MT250 Truck Crane	EE	Cat D8K Crawler Tractor
T	830MB Tractor, MHE236 Forklift	FF	M878A1 Yard Tractor
U	C530A Pneumatic Roller	GG	M320RT Crane, C350B-D Roller, 440HA Road Grader, H100C Loader
V	F5070 Dump Truck (20-Ton)	HH	6250TC Truck Crane (MHE247)
W	JD410 Tractor	II	9125 Truck Crane
X	R528 Vibratory Roller	XX	Multiple/Frequent Usability Code for the P59-500 sampling valve used on multiple/varied applications: M520 Series trucks, D7E and D7F Crawlers, MHE199, 200, 202, 215, 220, 236, and 248 Forklifts, the C530A, C350B-D, and R528 Rollers, TMS-300-5, MT250, M320RT, 6250TC, and 9125 Cranes, F1500M and 440HA Graders, and the H100C Loader.

B-5. How to Locate Repair Parts

a. When NSN and/or P/N are known:

(1) Refer to Section IV of this Appendix to find the national stock number or part number. NSN's in this section are in numeric sequence by the last seven numbers of the NSN. Part numbers are in alpha-numeric sequence.

(2) Locate the known NSN and/or part number and turn to the figure and item numbers indicated in this section.

(3) To locate an NSN or part number as it applies to a specific vehicle application, refer to tables 1-1 through 1-3, then look up the vehicle model number, and turn to the "Appendix B" figure number referenced in these tables. The NSN or part number will be found in the referenced Appendix B tabular listing located beneath this figure.

b. When NSN and/or P/N are not known:

(1) Refer to tables 1-1 through 1-3 and locate the vehicle on which the NSN is applied. The vehicle model number will

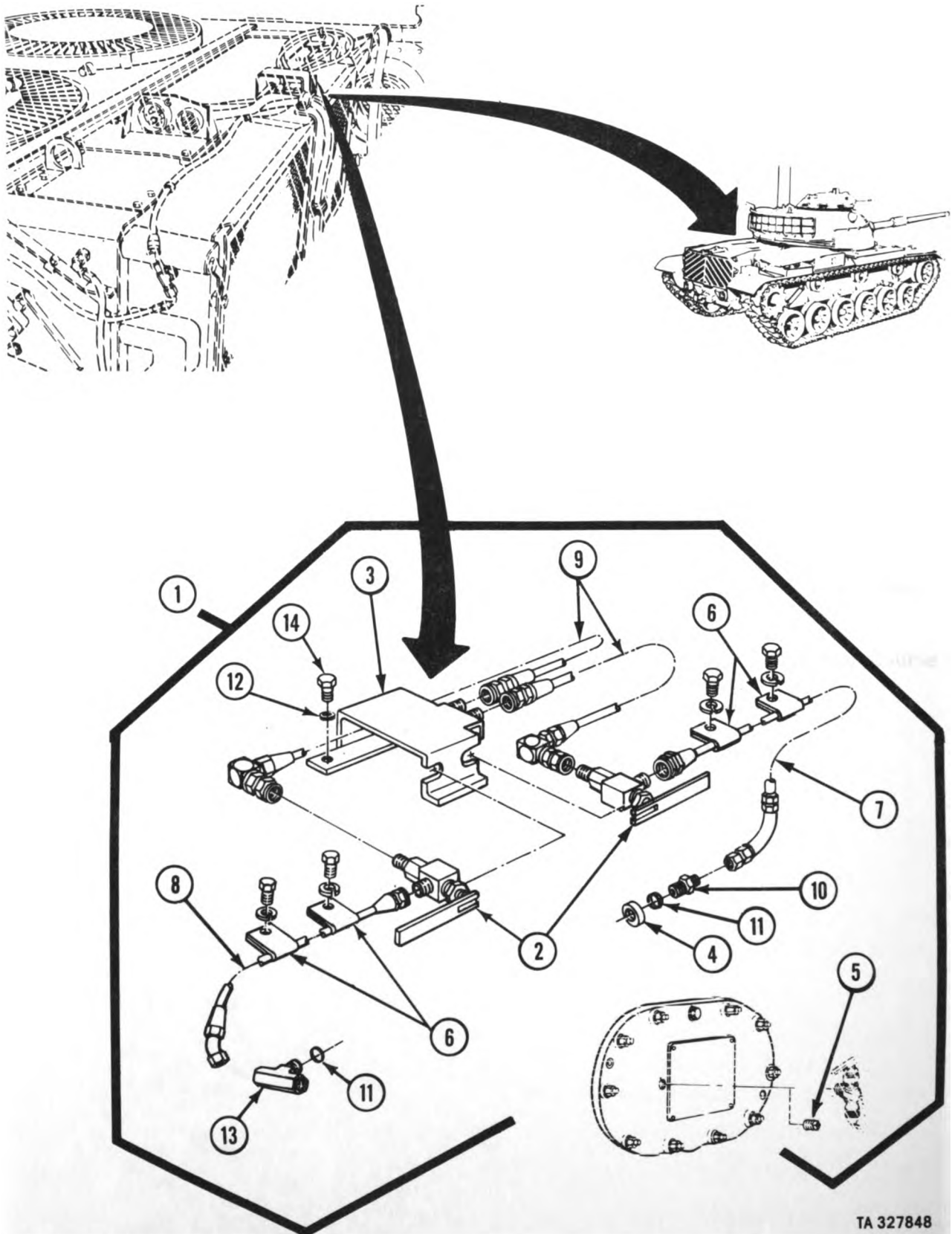
provide the reference in Appendix B where the vehicle's sampling valve kit parts are listed.

(2) Turn to the referenced Appendix B figure. Locate the item needed in the description column of the tabular data. The item NSN and P/N will be provided with the item description.

B-6. Abbreviations

dia = diameter
 EA = each
 FT = foot/feet
 Hex = Hexagon Head
 ID = Inside Diameter
 IN = Inches
 lg = long
 mm = millimeter
 NPT = National Pipe Tap
 NSN = National Stock Number
 OD = Outside Diameter
 P/N = Part Number
 UNC = Unified National Course
 u/o = used on
 u/w = used with
 w = wide/width
 w/ = with/(item)

Section II. REPAIR PARTS LIST



TA 327848

Figure B-1. AOAP Sampling Valve Kit/M48 and M60 Family Tanks

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) PSCM	(6) DESCRIPTION USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.							
B-1	1	PFOZZ	2815-01-146-8970	12275816	19207	3307. Special Purpose Kits Kit, Modification, Engine and Trans- mission Oil Sampling Composed of:	A EA	1
B-1	2	PAOZZ	4820-01-163-7156	11669771	19207	Valve Sampling	A EA	2
B-1	3	PAOZZ	5340-01-157-8846	12314626	19207	Bracket	A EA	1
B-1	4	KDDZZ		12314628	19207	Boss	A EA	1
B-1	5	PAOZZ	5365-00-684-6901	7538990	19207	Plug	A EA	1
B-1	6	PAOZZ	5340-00-738-5174	7385174	19207	Clamp	A EA	4
B-1	7	PAOZZ	4720-01-163-3219	MS8005- E-270B	96906	Hose	A EA	1
B-1	8	PAOZZ	4720-01-163-1093	MS8005- E-300B	96906	Hose	A EA	1
B-1	9	PAOZZ	4720-01-167-0742	MS8005- E-310C	96906	Hose	A EA	2
B-1	10	PAOZZ	4730-00-959-5930	MS9193- 04	96906	Adapter	A EA	1
B-1	11	PAOZZ	5330-00-166-0980	MS9388- 012	96906	O-Ring	A EA	2
B-1	12	PAOZZ	5310-00-514-6674	MS35335- 34	96906	Washer	A EA	2
B-1	13	PAOZZ	4730-00-116-6686	MS51529- A4	96906	Tee	A EA	1
B-1	14	PAOZZ	5306-00-050-1238	MS90726- 32	96906	Bolt	A EA	2

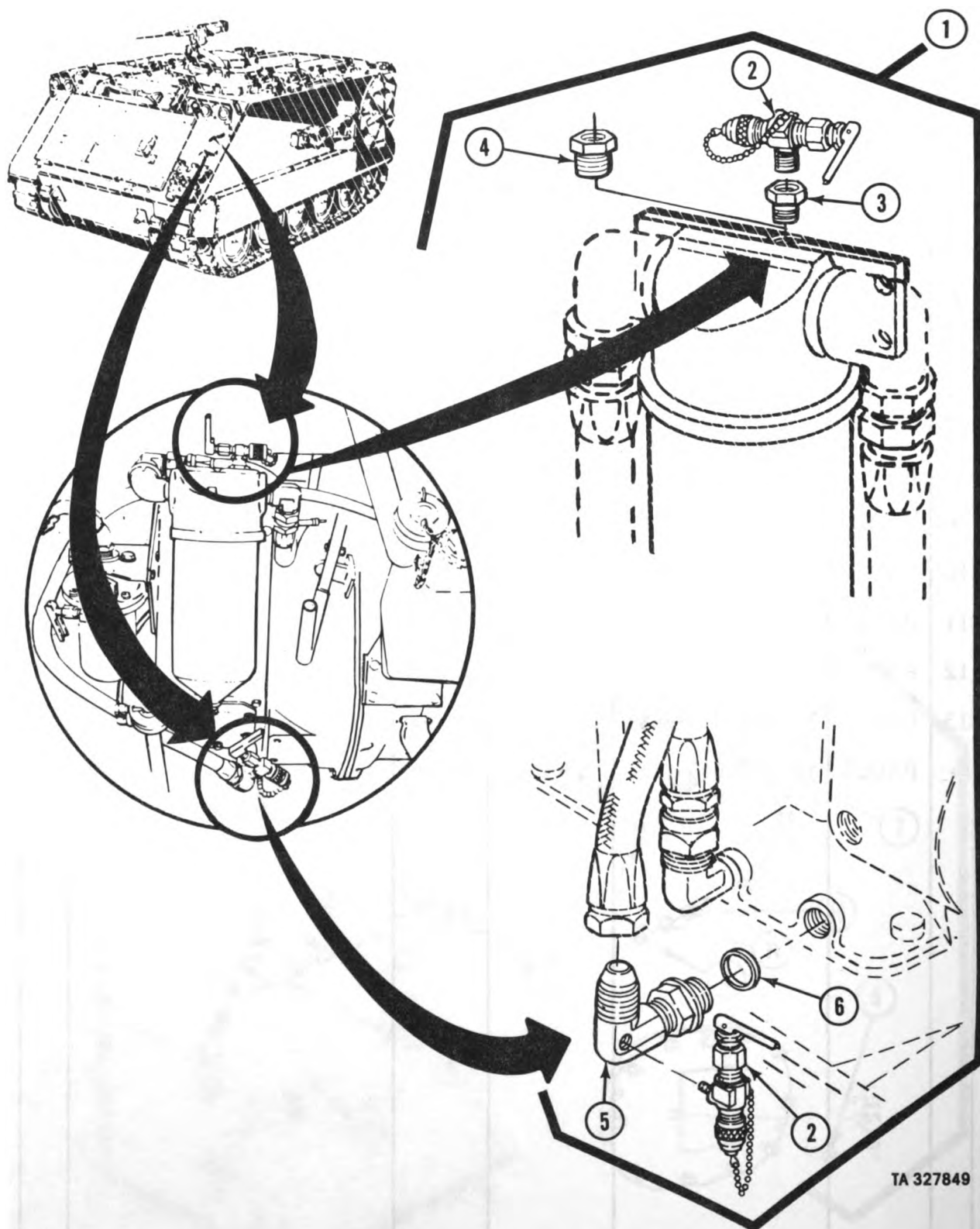
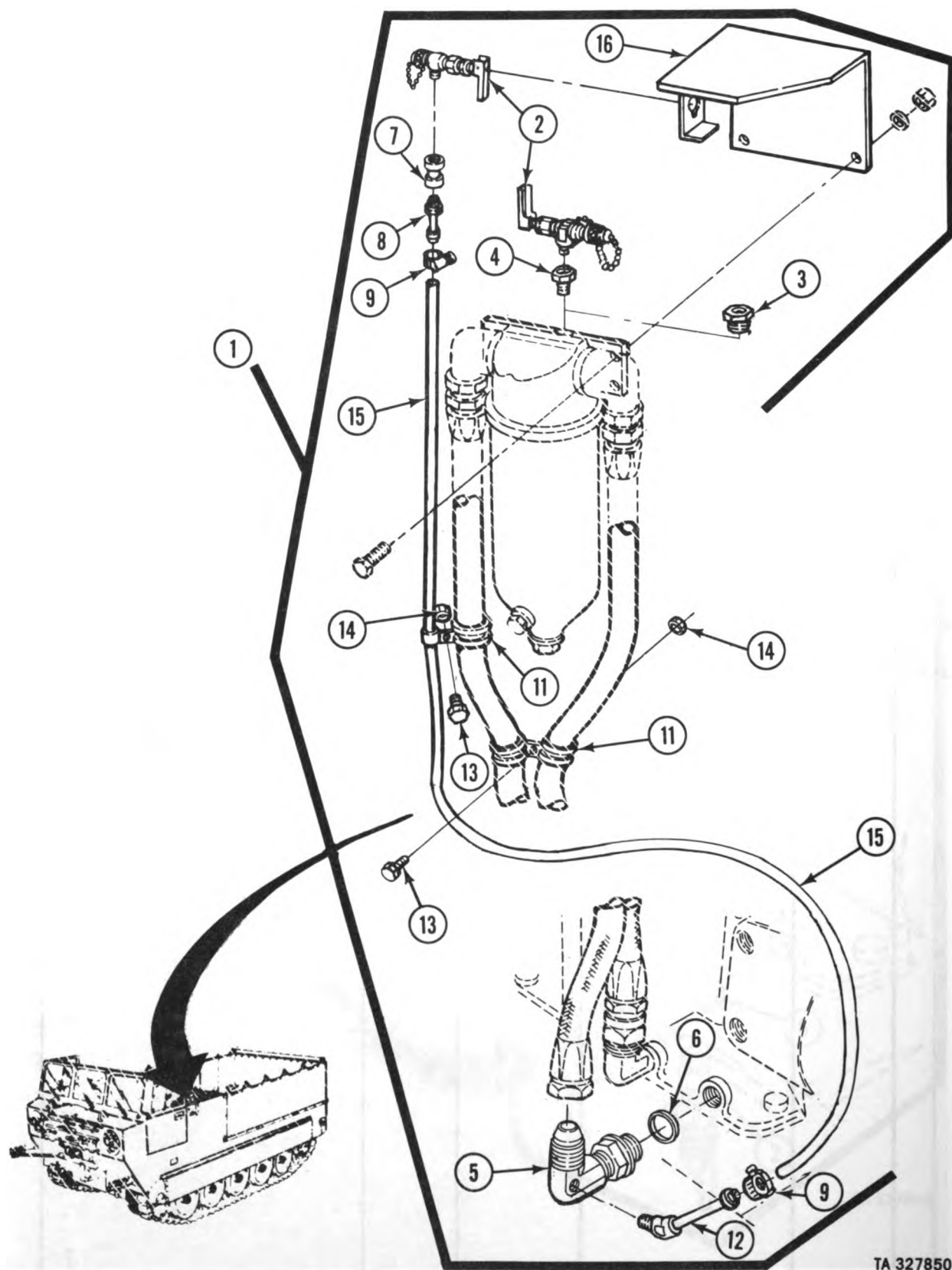


Figure B-2. AOAP Sampling Valve Kit/M113 Family Vehicles (Engine and Transmission)

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) PSCM	(6) DESCRIPTION USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.							
B-2	1	PFOZZ	2815-01-154-3891	5705394	19207	3307. Special Purpose Kits Kit, AOAP Sampling Valve	B	EA 1
B-2	2	PAOZZ	2910-01-073-0080	11669424	19207	Consisting of: Valve, Toggle	B,C,D,E,E	EA 2
B-2	3	PAOZZ	4730-00-196-0837	MS51887-5	96906	Bushing, Pipe 3/8" x 1/8" Used on engine oil filter caps w/o pipe plugs (early model carriers).	B,C,V,W	EA 1
B-2	4	PAOZZ	4730-00-196-0889	MS51887-29Z	96906	Bushing, Pipe, 1" x 1/8" Used on engine oil filter caps w/pipe plugs (later model carriers).	B,C,Y,CC	EA 1
B-2	5	PAOZZ	4730-01-129-0481	12313096	19207	Elbow	B,C	EA 1
B-2	6	PAOZZ	5330-00-263-8033	MS29512-12	96906	Packing	B,C	EA 1



TA 327850

Figure B-3. AOAP Sampling Valve Kit/M548 and M730 Family Vehicles

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.							
B-3	1	PFFZZ	2815-01-152-8807	5705395	19207	3307. Special Purpose Kits Kit, AOAP Sampling Valve, Engine and Transmission Composed of: Valve, Toggle Bushing, Pipe, 1" x 1/8" Used on engine oil filter caps w/pipe plugs (later model carriers). B.C,D,EEE	c EA	1
B-3	2	PAOZZ	2910-01-073-0080	11669424	19207	Valve, Toggle	EA	2
B-3	3	PAOZZ	4730-00-196-0889	MS51887-29	96906	Bushing, Pipe, 1" x 1/8" Used on engine oil filter caps w/pipe plugs (later model carriers). B.C,V,W	EA	1
B-3	4	PAOZZ	4730-00-196-0837	MS51887-5	96906	Bushing, Pipe, 3/8" x 1/8" Used on engine oil filter caps w/o pipe plugs (early model carriers). B,C	EA	1
B-3	5	PAOZZ	4730-01-129-0481	12313096	19207	Elbow, Drilled	EA	1
B-3	6	PAOZZ	5330-00-263-8033	MS29512-12	96906	Packing, Preformed	EA	1
B-3	7	PAOZZ	4730-00-947-7498	MS392331-1	96906	Coupling	EA	1
B-3	8	PAOZZ	4730-00-187-0861	AN840-4D	88044	Adapter, Straight	EA	1
B-3	9	PAOZZ	4730-00-871-6729	GS4	76599	Clamp, Hose	EA	2
B-3	10	PAOZZ	5340-00-290-0783	MS21919-DF8	96906	Clamp, Loop	EA	1
B-3	11	PAOZZ	5340-01-061-2296	MS21919-WDG19	96906	Clamp, Loop	EA	3
B-3	12	PAOZZ	4730-00-231-5590	AN844-4	88044	Adapter, Pipe-to-Hose	EA	1
B-3	13	PAOZZ	5305-00-989-7435	MS35207-264	96906	Screws, Machine	EA	2
B-3	14	PAOZZ	5310-00-877-5797	MS21044 N3	96906	Nut, Self-Locking	EA	2
B-3	15	MOOZZ		10949692-1	19207	Hose, Non-metallic, 34" make from NSN 4720-00-913-5910	IN	V
B-3	16	PAOZZ	2540-01-130-3367	12313097	19207	Bracket	EA	1

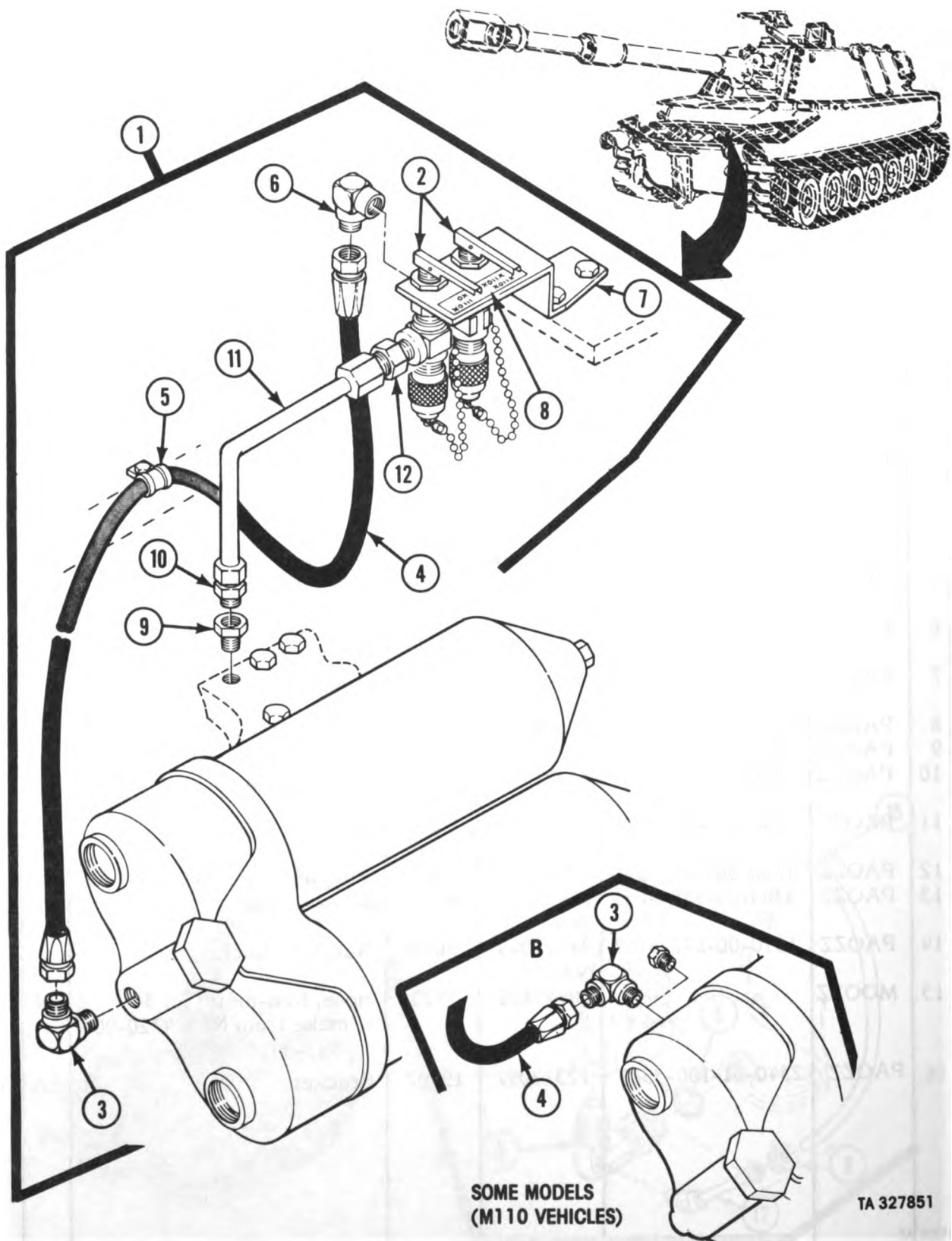
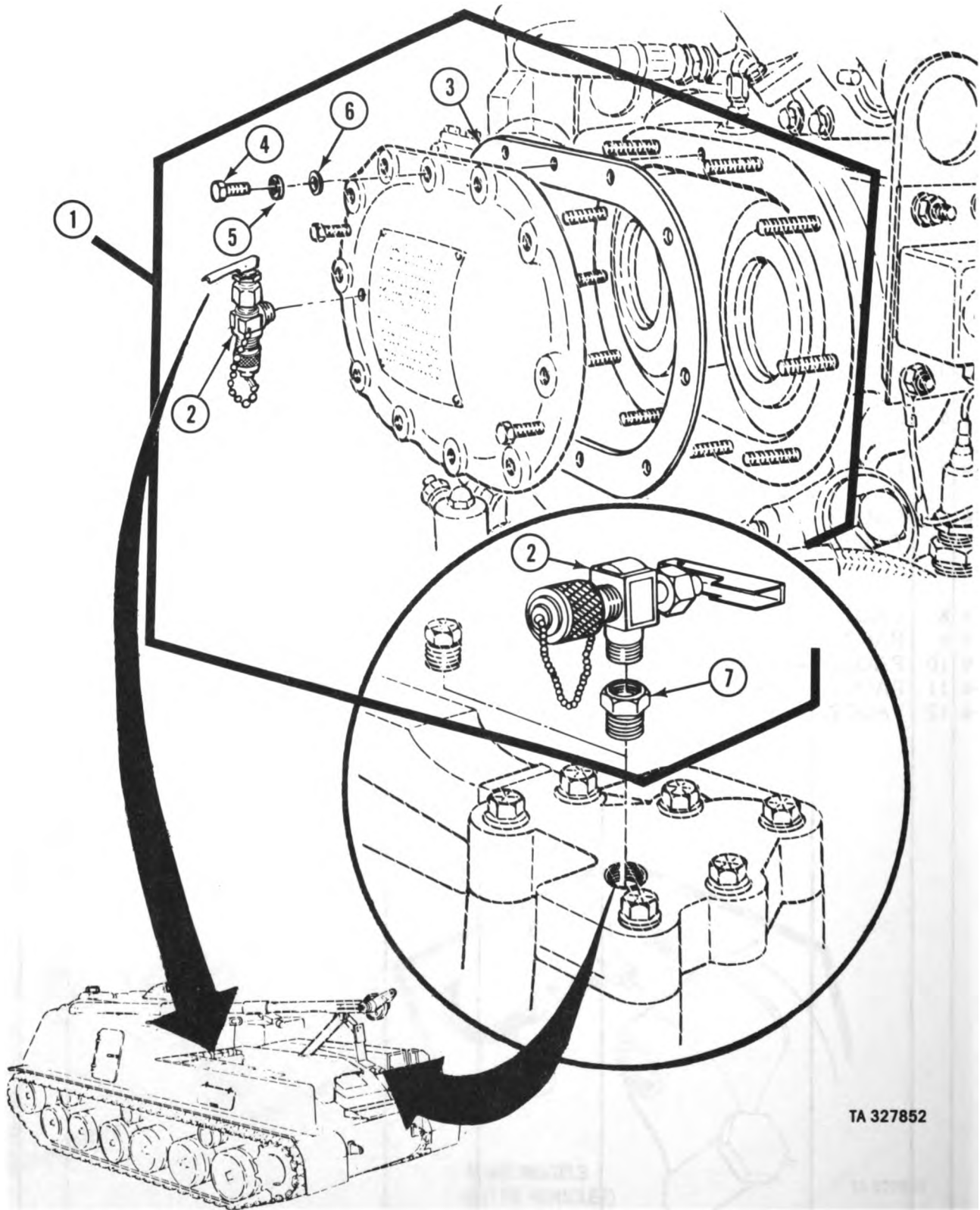


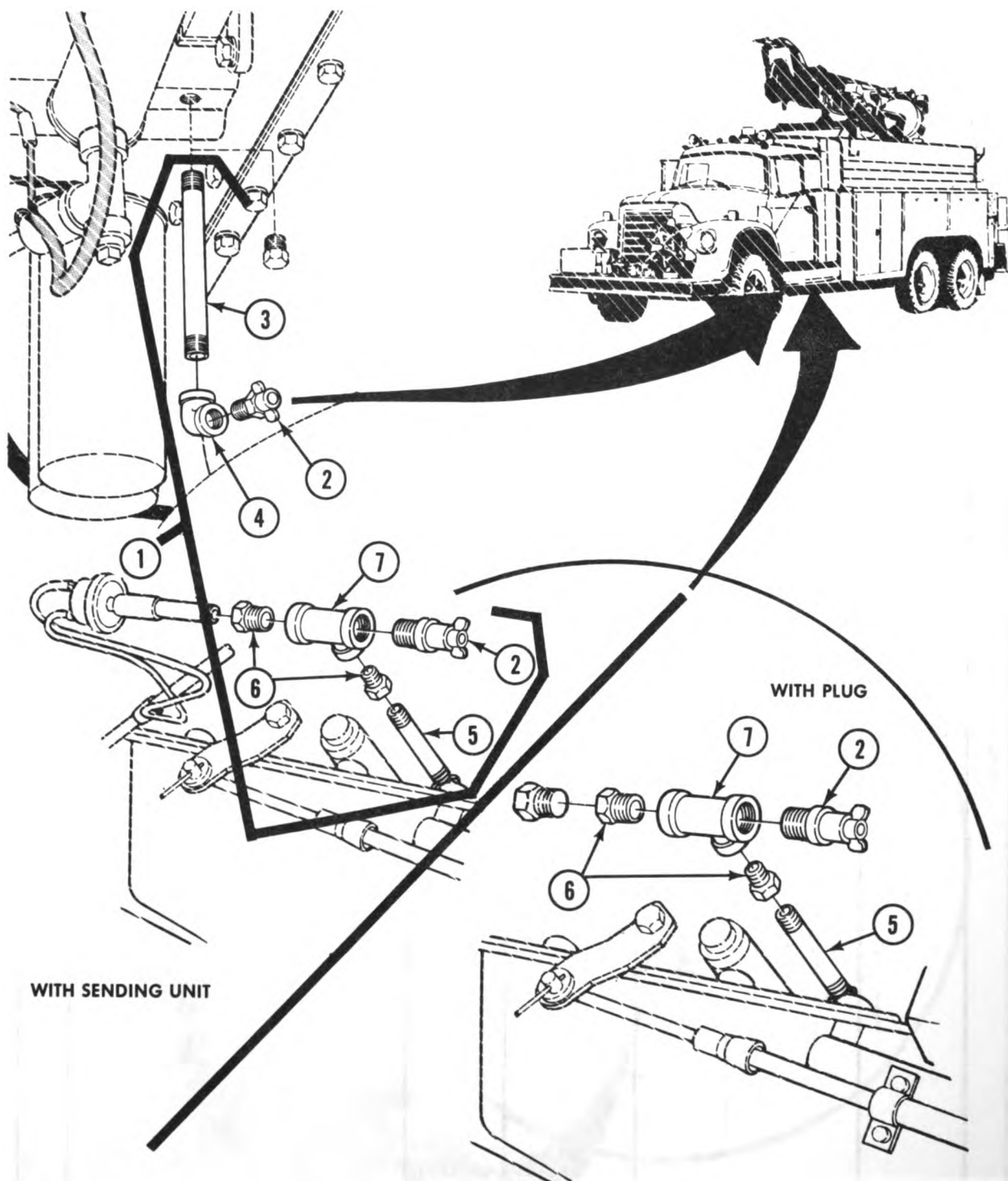
Figure B-4. AOAP Oil Sampling Valve Kit - M109/M110 FOV (Engine and Transmission)

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) PSCM	(6) DESCRIPTION USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.							
						3307. Special Purpose Kits		
B-4	1	PFOZZ	2990-01-176-9372	12268199	19207	Kit, Oil Sampling Parts, Engine/Trans, M109/M110FOV Consisting of Valve, Oil Sampling Elbow	D EA	1
B-4	2	PAOZZ	2910-01-073-0080	11669424	19207		B,C,D,E,E EA	2
B-4	3	PAOZZ	4730-00-877-8997	MS51504A4 -4	96906		D EA	1
B-4	4	PAOZZ	4720-00-182-8854	MS8000E- 320A	96906	Hose Assembly	D EA	1
B-4	5	PAOZZ	5340-00-964-5267	MS21333- 120	96906	Clamp	D EA	1
B-4	6	PAOZZ	4730-00-100-2994	MS51506A4	96906	Elbow	D EA	1
B-4	7	PAOZZ	5340-01-176-9427	12268190	19207	Bracket	D EA	V
B-4	8	PAOZZ	7690-01-176-9436	12268192	19207	Decal	D EA	1
B-4	9	PAOZZ	4730-00-196-0930	MS51847-1	96906	Bushing	D EA	1
B-4	10	PAOZZ	4730-00-289-0383	MS51506A4	96906	Adapter	D EA	1
B-4	11	PAOZZ	4710-01-176-9429	12268191	19207	Tube Assembly	D EA	1
B-4	12	PAOZZ	4730-00-800-7570	MS51503B4	96906	Adapter	D EA	1



**Figure B-5. AOAP Oil Sampling Valves Kit/M88A1 Recovery Vehicle
(Engine and Transmission)**

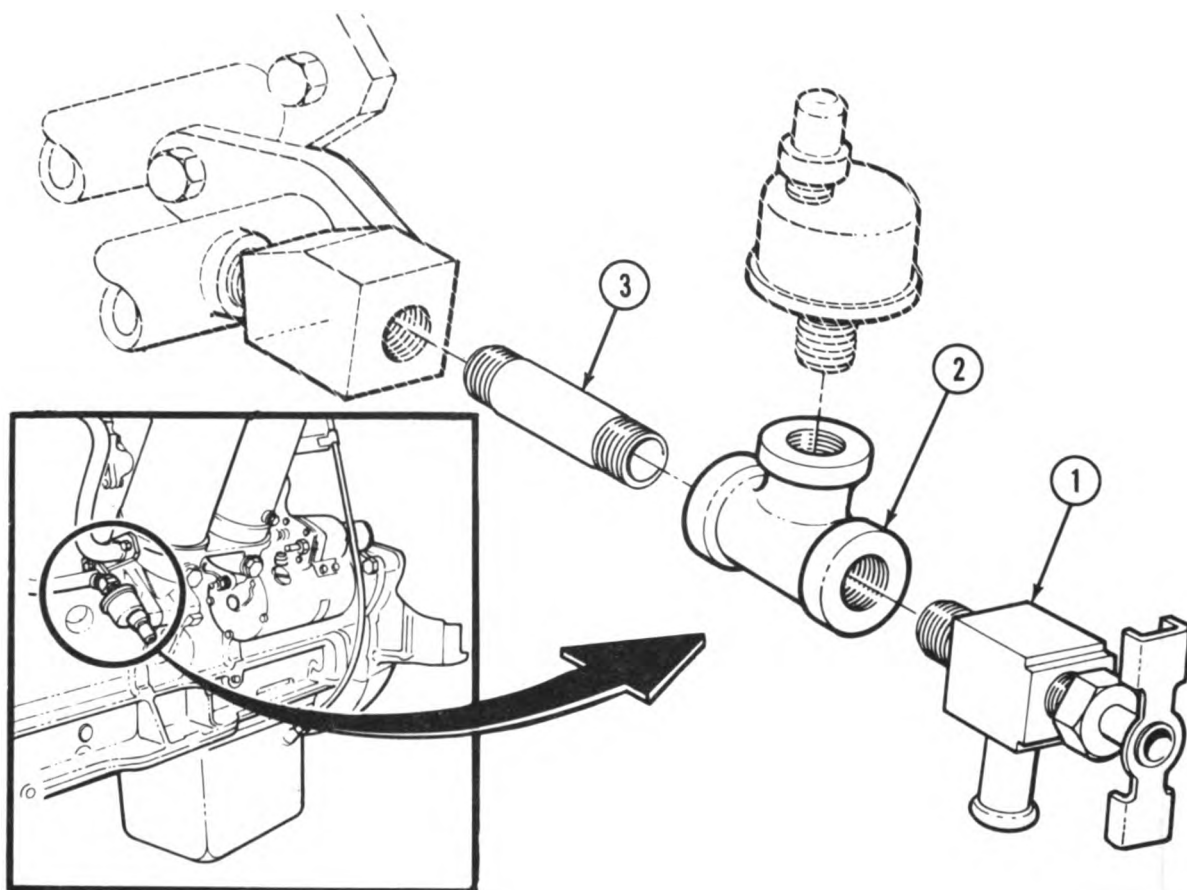
(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.							
B-5	1	PFOZZ		5705396	19207	3307. Special Purpose Kits Kit, Modification, Engine, and Trans- mission Oil Sampling Valves: Consisting of: 0106. Engine Lubrication System	E	EA 1
B-5	2	PAOZZ	2910-01-073-0080	11669424	19207	Valve, Drain	B,C,D,E,E	EA 2
B-5	3	KFOZZ		11684047	19207	Gasket (Part of Parts Kit, Fluid, NSN 2940-00-397-3404, P/N 5704486)	E	EA 1
B-5	4	PAOZZ	5305-00-269-2806	MS90726- 63	96906	Screw	E	EA 1
B-5	5	PAOZZ	5310-00-184-8974	MS9320- 12	96906	Washer, Flat	E	EA 1
B-5	6	PAOZZ	5330-00-954-6684	NAS1598- 6Y	80205	Packing w/Retainer 0721. Transmission Lubrication System	E	EA 1
B-5	2	PAOZZ	2910-01-073-0080	11669424	19207	Valve, Drain	AC,D,E,E	EA 2
B-5	7	PAOZZ	4730-00-415-3172	443998	21450	Coupling, Pipe	E	EA 1



TA 327853

**Figure B-6. AOAP Sampling Valve Kit/M876 Telephone Maintenance Truck
(Engine and Transmission)**

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) PSCM	(6) DESCRIPTION USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT	
(a) FIG. NO.	(b) ITEM NO.								
B-6	1	PFOZZ	2815-01-174-0328	5705372	19207	3307. Special Purpose Kits Kit, Modification, Engine, and Trans- mission Oil Sampling Valves: Consisting of: Valve, Oil Sampling Nipple, Pipe, 1/4" x 5" Elbow, Nipple, Pipe 1/8" x 4" Bushing, 1/4" x 1/8" Tee, Pipe, 1/4"	F	EA	1
B-6	2	PAOZZ	4820-00-720-4488	MS35782-2	96906		F,M,N	EA	2
B-6	3	PAOZZ	4730-00-278-0002	MS51953- 38B	96906		F,M	EA	1
B-6	4	PAOZZ	4730-00-817-1843	DX533AC	56442		F,M,M	EA	1
B-6	5	PAOZZ	4730-00-188-1846	RF904	66289		F	EA	1
B-6	6	PAOZZ	4730-00-277-9386	895-8D	80049		F	EA	2
B-6	7	PAOZZ	4730-00-249-2029	D9484- 5528	91340		F,G	EA	1



TA 327854

Figure B-7. Engine Oil Sampling Valve, Mack ENDT 673 Engine, M39 Series Vehicles (Various)

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) PSCM	(6) DESCRIPTION		(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.						USABLE ON CODE		
B-7	1	PAOZZ	4820-00-845-1096	MS35783-2	96906	0106. Engine Lubrication System Valve, Drain	G,H,I,L,O,P	EA	1
B-7	2	PAOZZ	4730-00-249-2029	D9484- 5528	91340	Tee, Pipe	F,G	EA	1
B-7	3	PAOZZ	4730-00-196-1485	MS51953- 32	96906	Nipple, Pipe, 1/4" x 2"	G,L,H	EA	1

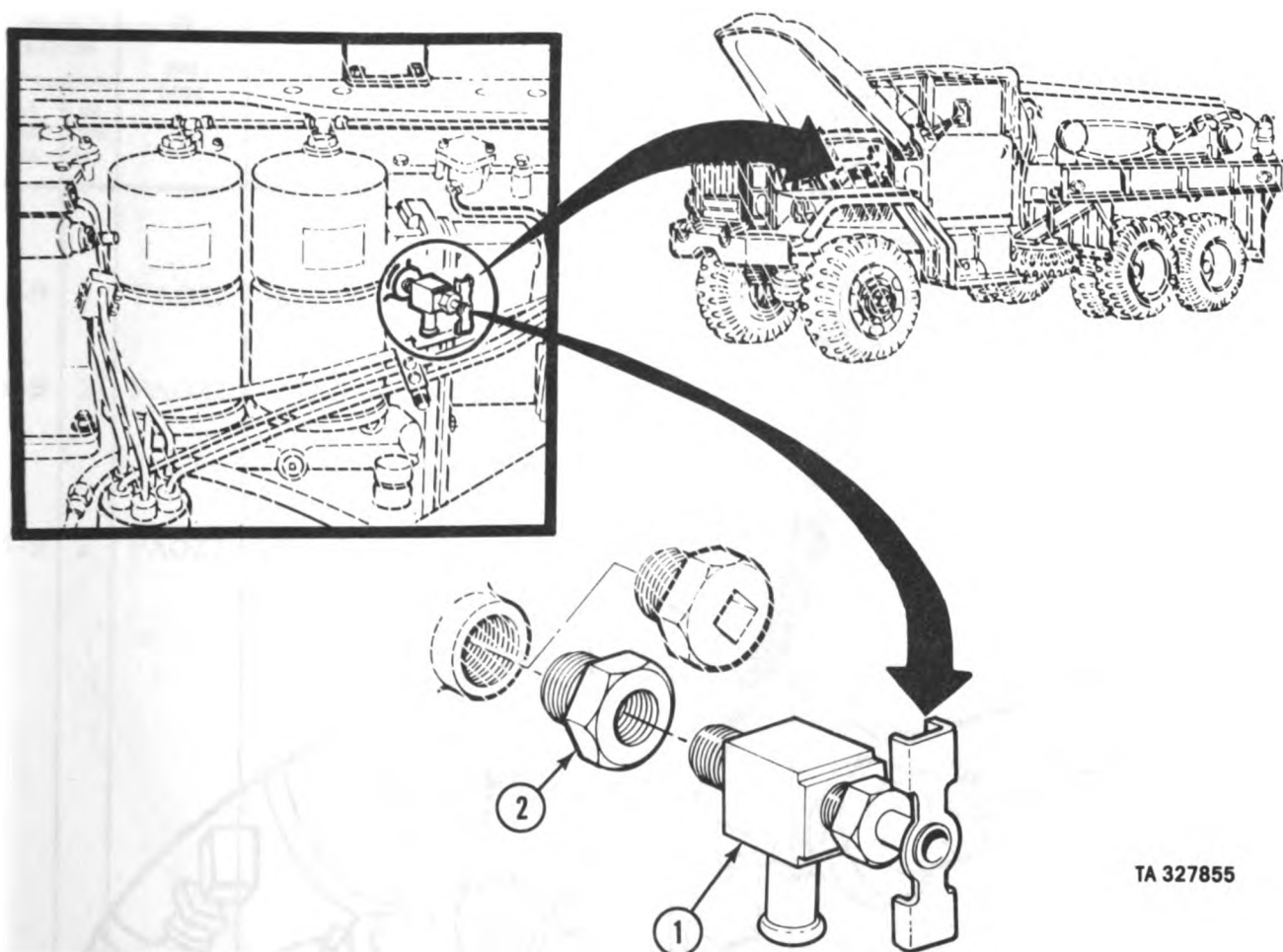
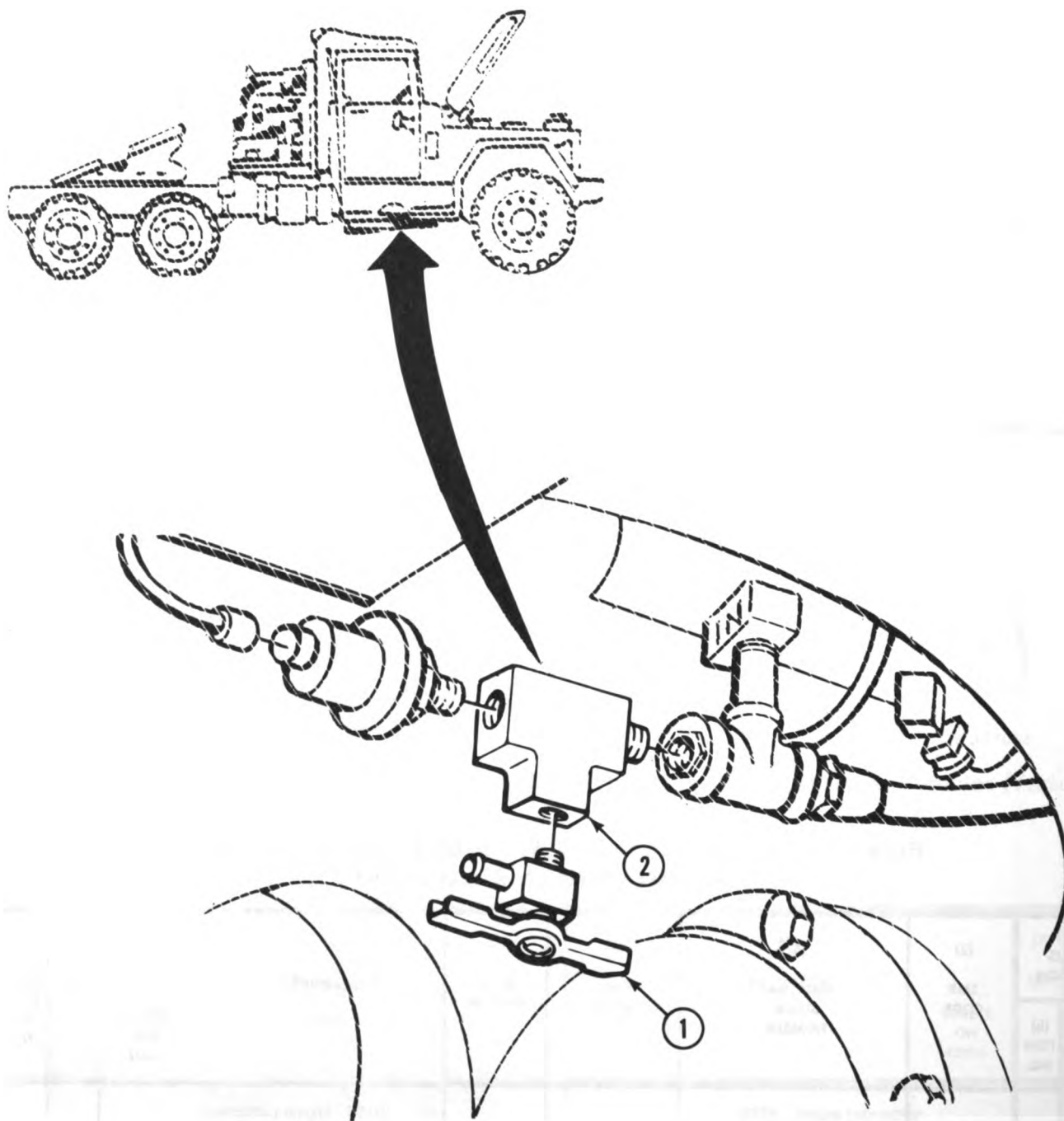


Figure B-8. Engine Oil Sampling Valve, LD Engine Models Multifuel, M39/M44 Series trucks (Various)

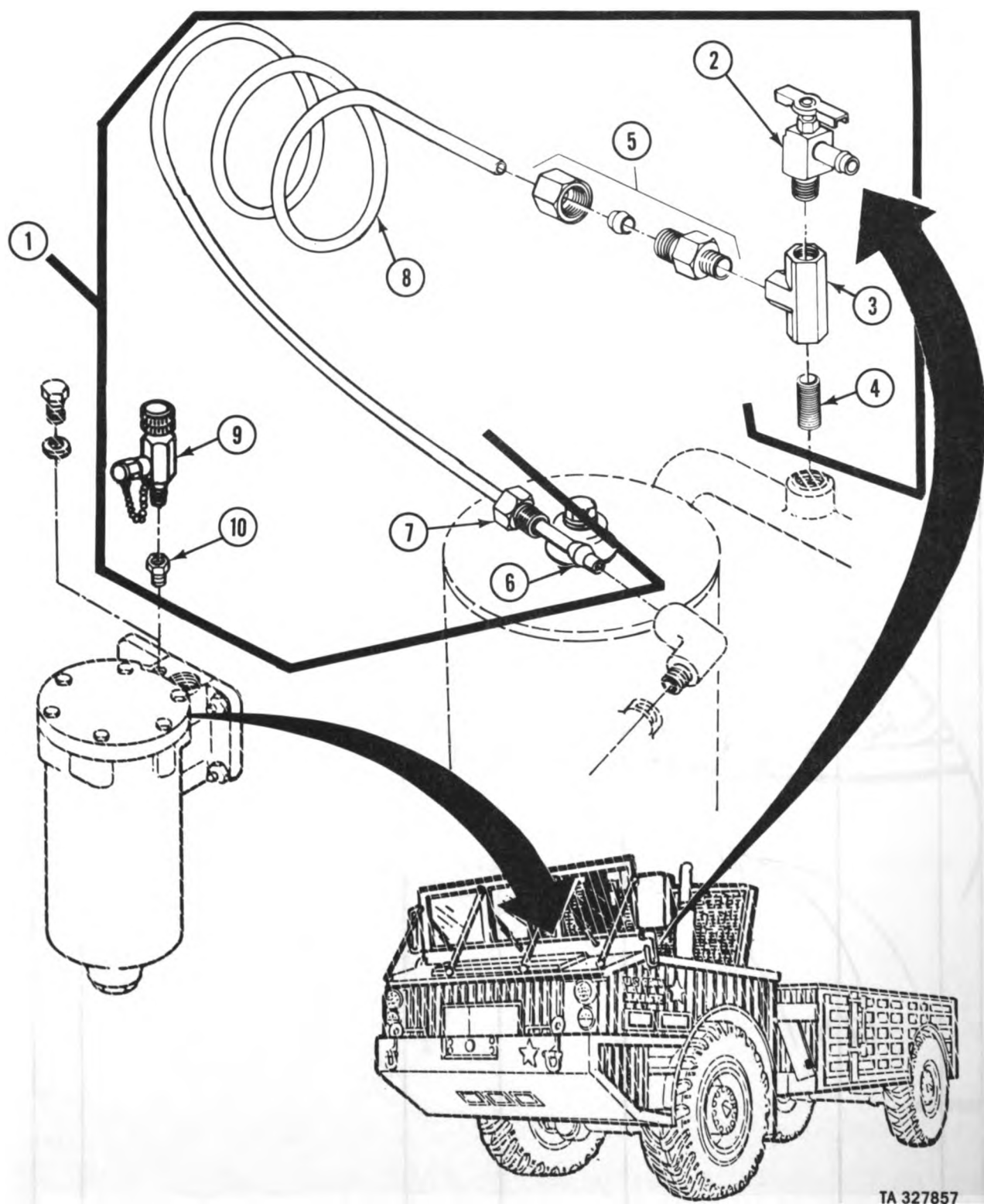
(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) PSCM	(6) DESCRIPTION	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.							
B-8	1	PAOZZ	4820-00-845-1096	MS35783-2	96906	0106. Engine Lubrication System Valve, Sampling	EA	1
B-8	2	PAOZZ	4730-00-196-0935	MS51847-9	96906	Bushing, Reducing	EA	1



TA 327856

**Figure B-9. Engine Oil Sampling Valve Kit/M123 Series Vehicles
(M123A1C and M123E2)**

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) PSCM	(6) DESCRIPTION USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.							
B-9	1	PAOZZ	4820-00-845-1096	MS35783-2	96906	0106. Engine Lubrication System Valve, Drain G,H,I,L,O,P	EA	1
B-9	2	PAOZZ	4730-00-014-6763	116-2500	19207	Tee, Pipe, Street (use until exhausted. When exhausted use NSN 4730-00-277-9615)	EA	1
B-9	2	PAOZZ	4730-00-277-9615	A17004-2	08441	Tee, Pipe, Street	EA	1



TA 327857

**Figure B-10. AOAP Sampling Valve Kit/M520 Series Trucks,
(Engine and Transmission)**

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.							
B-10	1	PFFZZ	2815-01-174-0329	5705368	19207	3307. Special Purpose Kits Kit, AOAP Sampling Valve, Engine/Trans for M520 Series Trucks Consisting of: 0106. Engine Lubrication System	J EA	1
B-10	2	PAOZZ	4820-00-275-2224	MS35783-1	96906	Valve, Drain, AOAP	J EA	1
B-10	3	PAFZZ	4730-00-595-1887	1-8MM0S	30780	Tee, Pipe	J,T EA	1
B-10	4	PAFZZ	4730-00-196-1464	501991	21450	Nipple, Pipe	J,V,DD EA	1
B-10	5	PAFZZ	4730-00-278-4357	2R0645	11083	Compression Connector, Male	J EA	1
B-10	6	PAFZZ	4730-00-278-8763	MS39177-3	96906	Compression Sleeve	J EA	1
B-10	7	PAFZZ	4730-00-013-7397	S-1022-A	15434	Nut, Inverted	J EA	1
B-10	8	PAFZZ	4710-00-277-7581	ASTM B280	81346	Copper, Tubing, 1/8" (20" lg.)	J EA	1
						0721. Transmission Lubrication System		
B-10	9	PAOZZ	4820-01-120-4532	P59-500	91816	Valve, Drain AOAP	J,XX EA	1
B-10	10	PAOZZ	4730-01-131-7679	6-1/4 F50G-S	30780	Adapter W/O-Ring	J EA	1

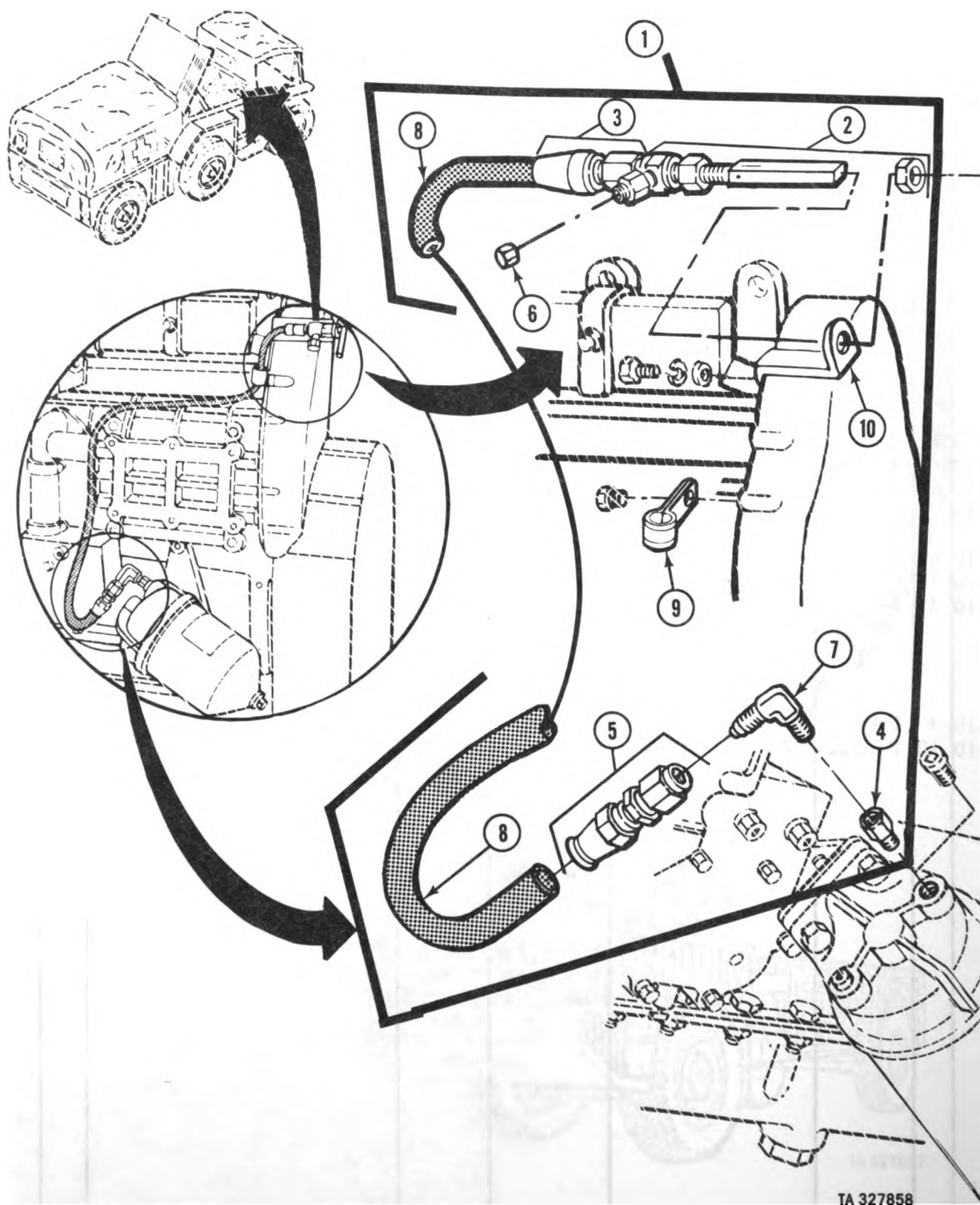
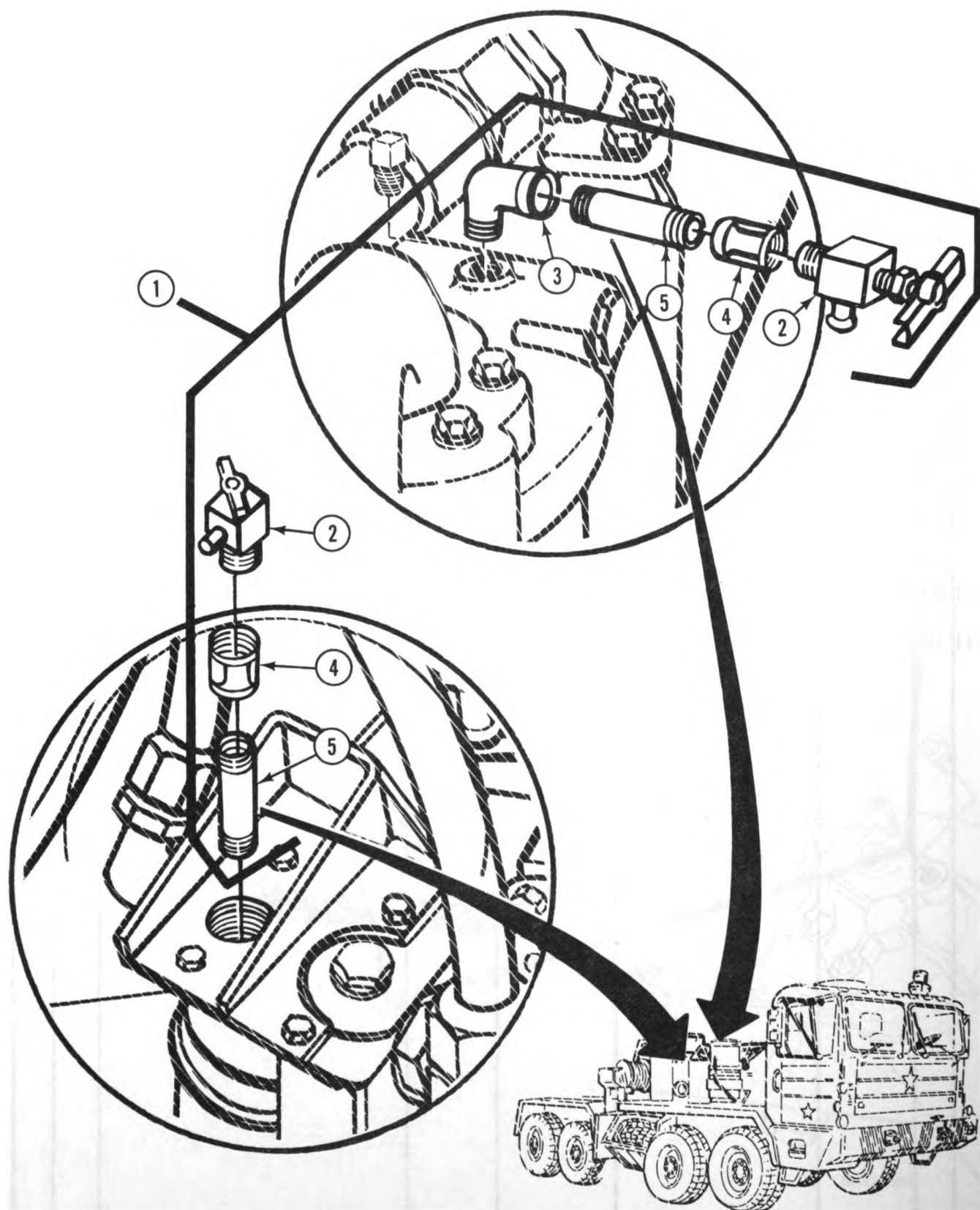


Figure B-11. Engine Oil Analysis Sampling Valve Kit/M561 and M792

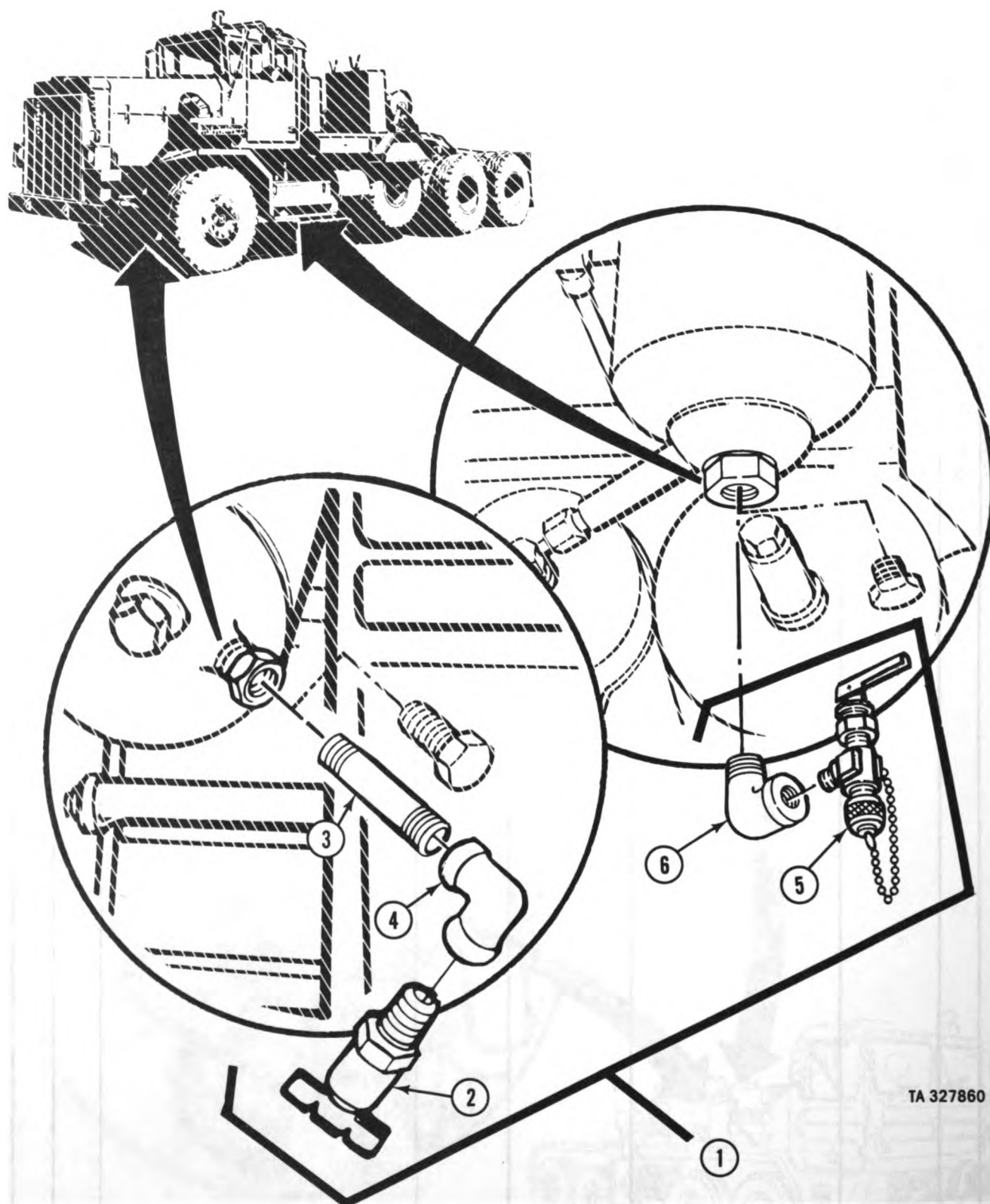
(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) PSCM	(6) DESCRIPTION	USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.								
B-11	1	PFOZZ	2815-01-179-7512	5705370	19207	3307. Special Purpose Kits Kit, Modification, Sampling Valve Consisting of:	K	EA	1
B-11	2	PAOZZ	2910-00-999-9452	10947970	19207	Valve, Drain	K	EA	1
B-11	3	PAOZZ	4730-00-054-7650	MS27381-4 C	96906	Adapter, Upper	K	EA	1
B-11	4	PAOZZ	4730-00-248-6728	C3109-4-2	79470	Bushing	KQZ	EA	1
B-11	5	PAOZZ	4730-00-889-2474	MS27053 -4C	96906	Adapter, Lower	K	EA	1
B-11	6	PAOZZ	4730-00-640-0632	MS21914-4	96906	Cap, Assy	K	EA	1
B-11	7	PAOZZ	4730-00-231-4009	MS20822-4	96906	Elbow	K	EA	1
B-11	8	MOOZZ		MIL-H- 27267-4	81349	Hose, Non- metallic, 36" (make from NSN 4720-00-857- 1732)	K	FT	V
B-11	9	PAOZZ	5340-00-057-3037	MS21333- 111	96906	Clamp	K	EA	2
B-11	10	PAOZZ		12343162	19207	Bracket, Support, 1/8" x 1" w x 6" lg	K	IN	V



**Figure B-12. AOAP Sampling Valve Kit, M746 (HET) Tractor,
(Engine and Transmission)**

TA 327859

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION	USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.								
B-12	1	PFOZZ	2815-01-167-8049	5705365	19207	3307. Special Purpose Kits Kit, Modification, AOAP Sampling Valves, Engine and Trans- mission Consisting of:	L	EA	1
B-12	2	PAOZZ	4820-00-845-1096	MS35783-2	96906	Valve, Drain	G,H,I,L,O,P	EA	2
B-12	3	PAOZZ	4730-00-277-5553	MS51952-2	96906	Elbow, 90°	L	EA	1
B-12	4	PAOZZ	4730-00-187-7610	MS39233-2	19207	Coupling	L	EA	2
B-12	5	PAOZZ	4730-00-196-1485	MS51953- 32	96906	Nipple	G,L,H	EA	2



**Figure B-13. AOAP Sampling Valve Kit/M911 HET Tractor,
(Engine and Transmission)**

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.							
B-13	1	PFOZZ	2815-01-154-9934	5705366	19207	3307. Special Purpose Kits Kit, Modification, AOAP Sampling Valves for Engine, DD 8V92T-90, and Transmission, DDA CLBT750, Consisting of: 0106. Engine Lubrication System	M EA	1
B-13	2	PAOZZ	4820-00-720-4488	MS35782-2	96906	Valve, Drain	F,M,N EA	1
B-13	3	PAOZZ	4730-00-196-1487	MS51953-34	96906	Nipple, Pipe,	F,M,AA EA	1
B-13	4	PAOZZ	4730-00-817-1843	DX533AC	56442	Elbow, Pipe,	EA	1
						0721. Transmission Lubrication System	EA	1
B-13	5	PAOZZ	4820-00-684-0880	MS35782-1	30327	Valve, Drain	M EA	1
B-13	6	PAOZZ	4730-00-287-1649	MS39230-1	03958	Elbow, Street, 1/8 NPT	M,V,Y EA	1

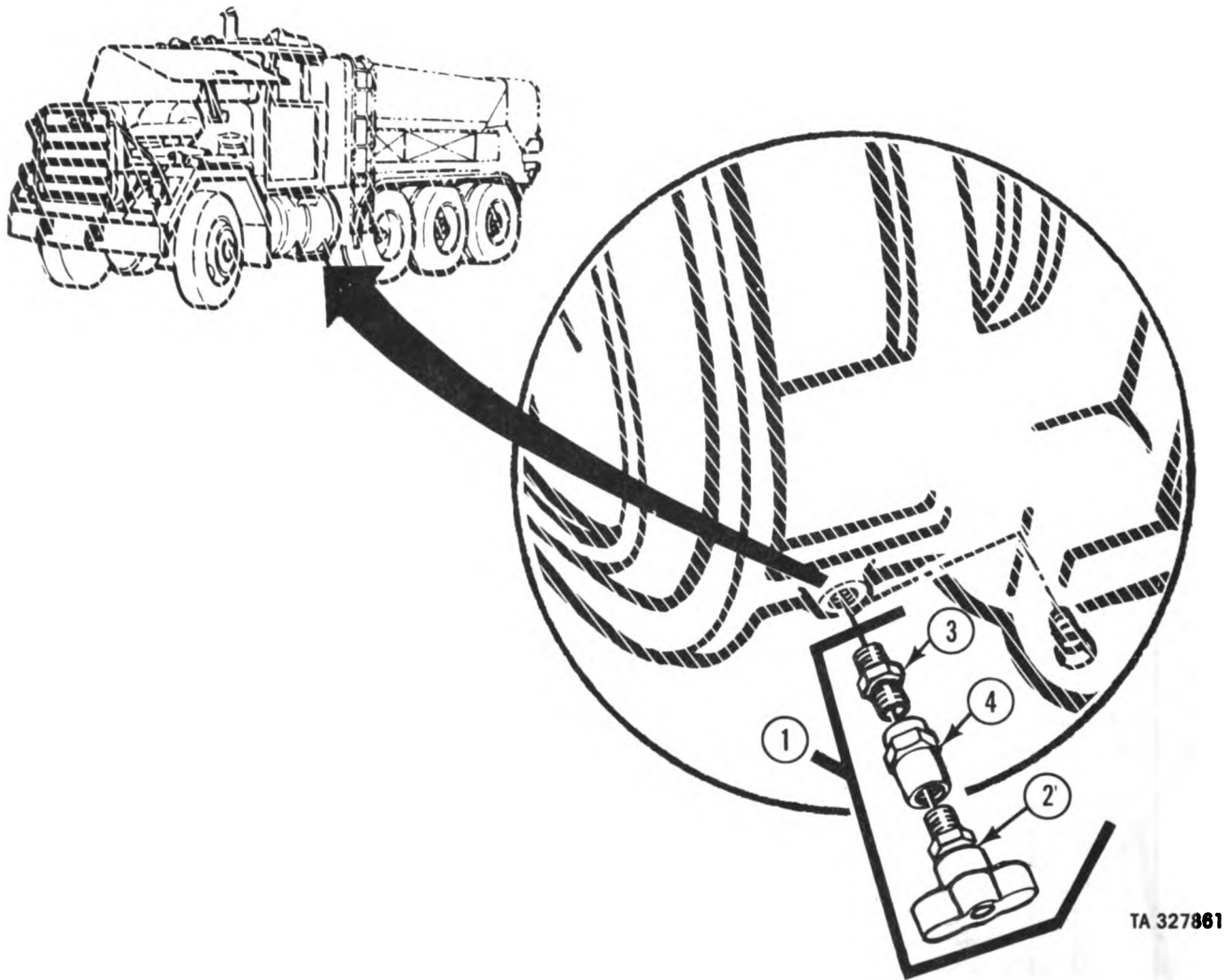
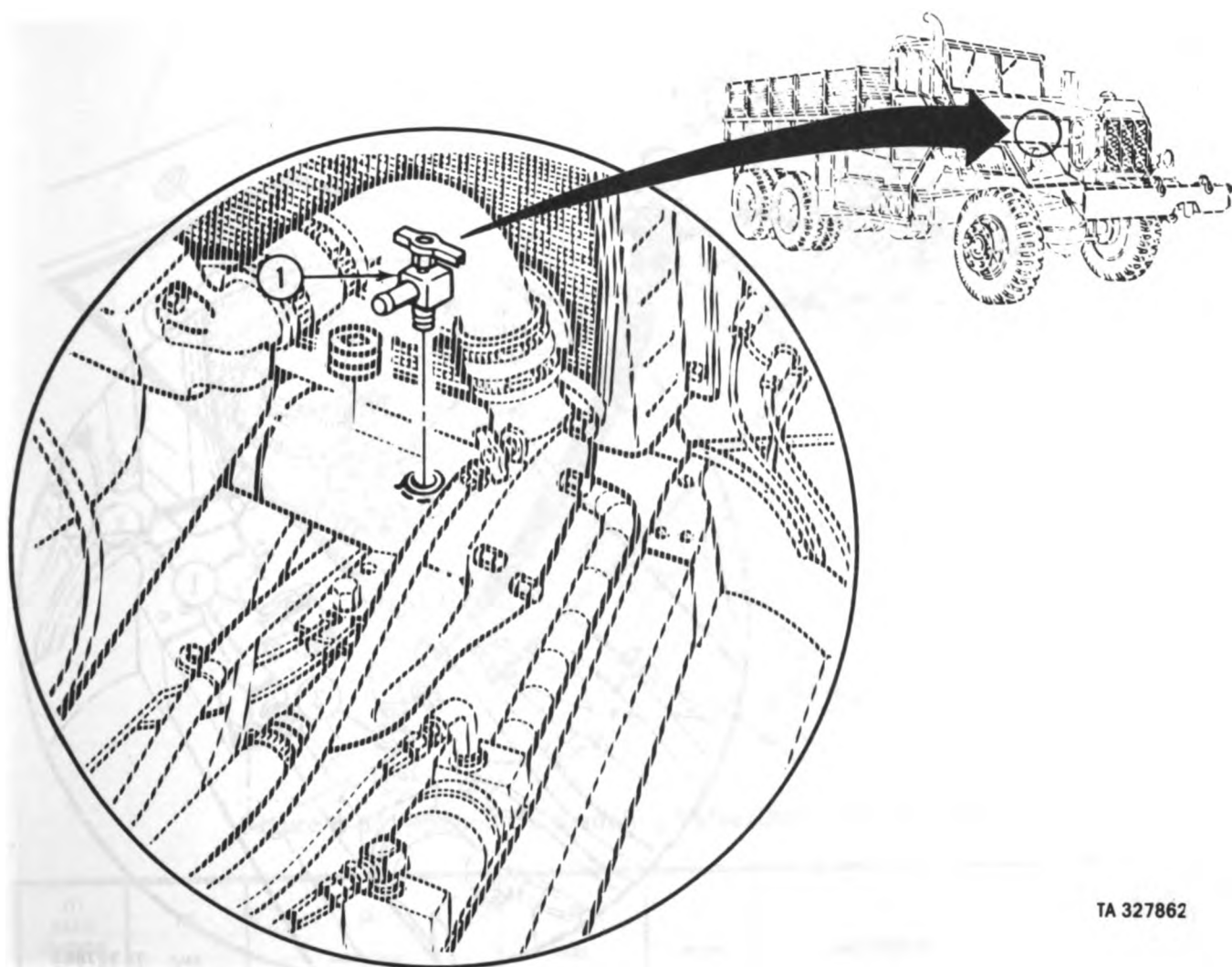


Figure B-14. Transmission Oil Sampling Kit/M915 Series Trucks

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT	
(a) FIG. NO.	(b) ITEM NO.								
B-14	1	PFOZZ	2815-01-154-9933	5705369	19207	0721. Transmission Lubrication System Kit, Oil Sampling Valve Consisting of: Valve, Sampling, Center Drain Nipple, Brass, Coupling, Brass, 1/4"	N	EA	1
B-14	2	PAOZZ	4820-00-720-4488	MS35782-2	96906		F,M,N	EA	1
B-14	3	PAOZZ	4730-00-640-6330	925010-1	92392		N	EA	1
B-14	4	PAOZZ	4730-00-223-9255	45C3482	10001		N	EA	1



TA 327862

**Figure B-15. Engine Oil Sampling Valve/M809, M939 Series Trucks
(NHC 250 Cummins Engine)**

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.							
B-15	1	PAOZZ	4820-00-845-1096	MS35783-2	96906	0106. Engine Lubrication System Valve, Sampling	EA	1

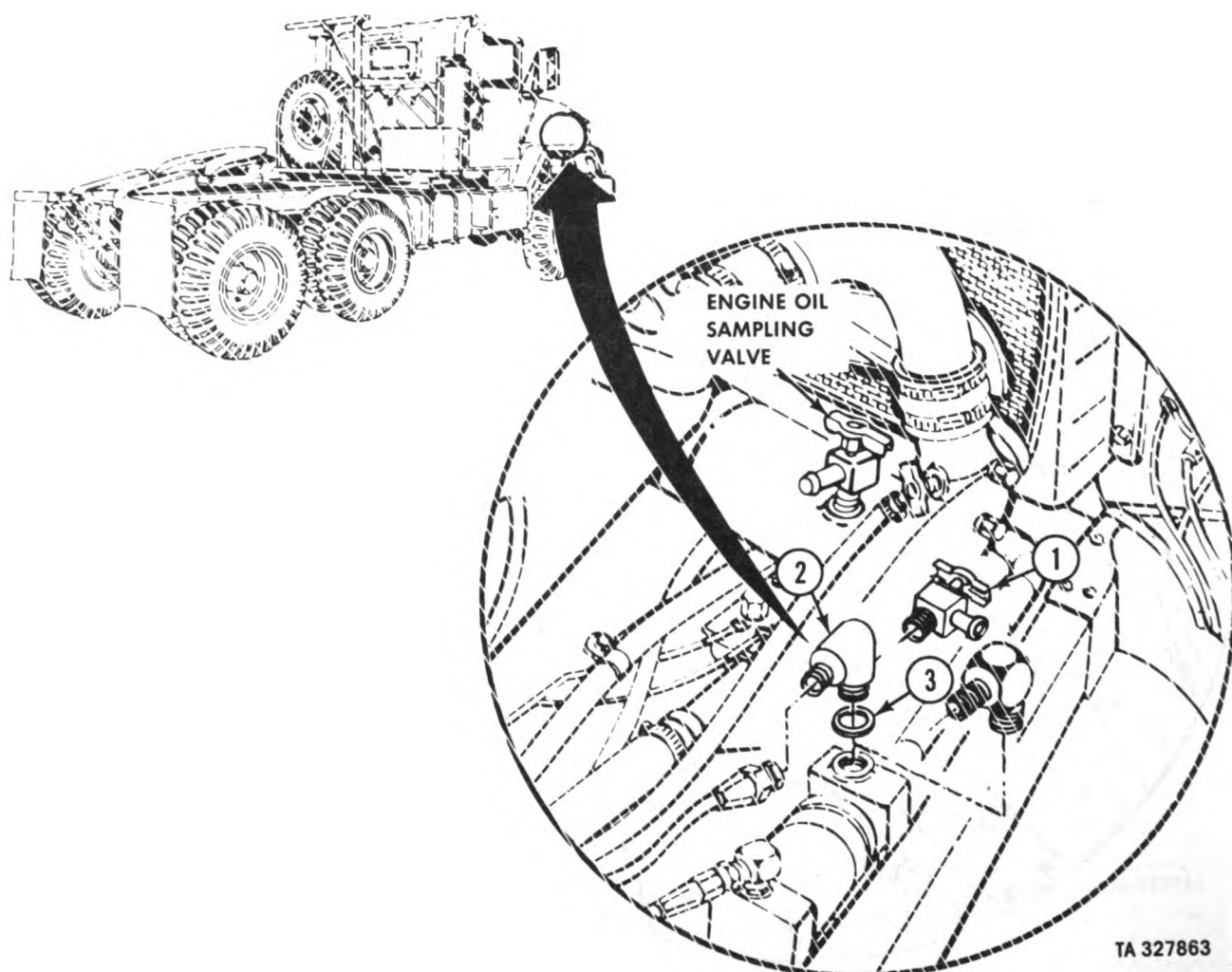
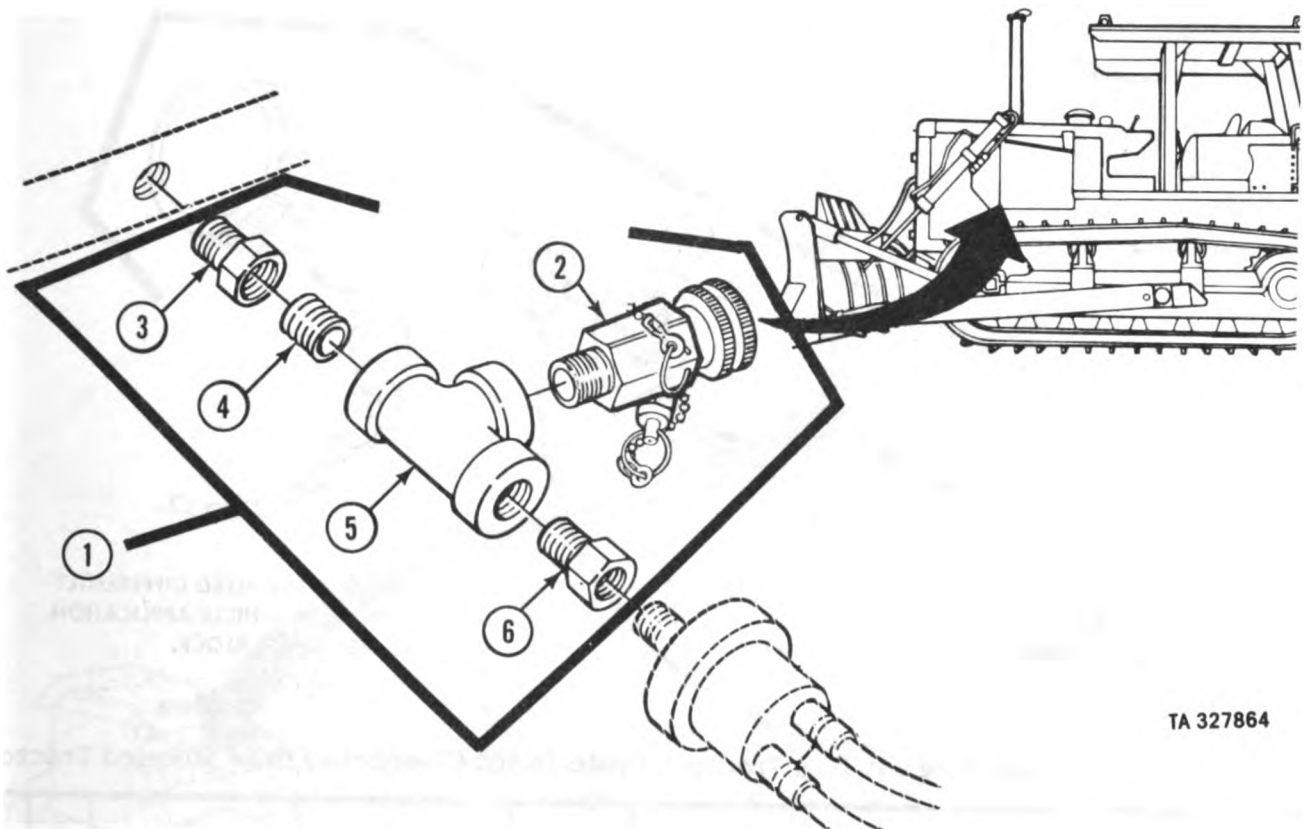


Figure B-16. Transmission Oil Sampling Valve Kit/M939 Series Trucks

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.							
B-16	1	PAOZZ	4820-00-845-1096	MS35783-2	96906	0721. Transmission Lubrication System		1
B-16	2	PAOZZ	4720-01-089-3071	12256456-5	19207	Valve, Sampling	G,H,I,L,O,P	1
B-16	3	PAOZZ	5330-00-599-2721	MS28778-10	96906	Elbow, Pipe, O-Ring	P	1

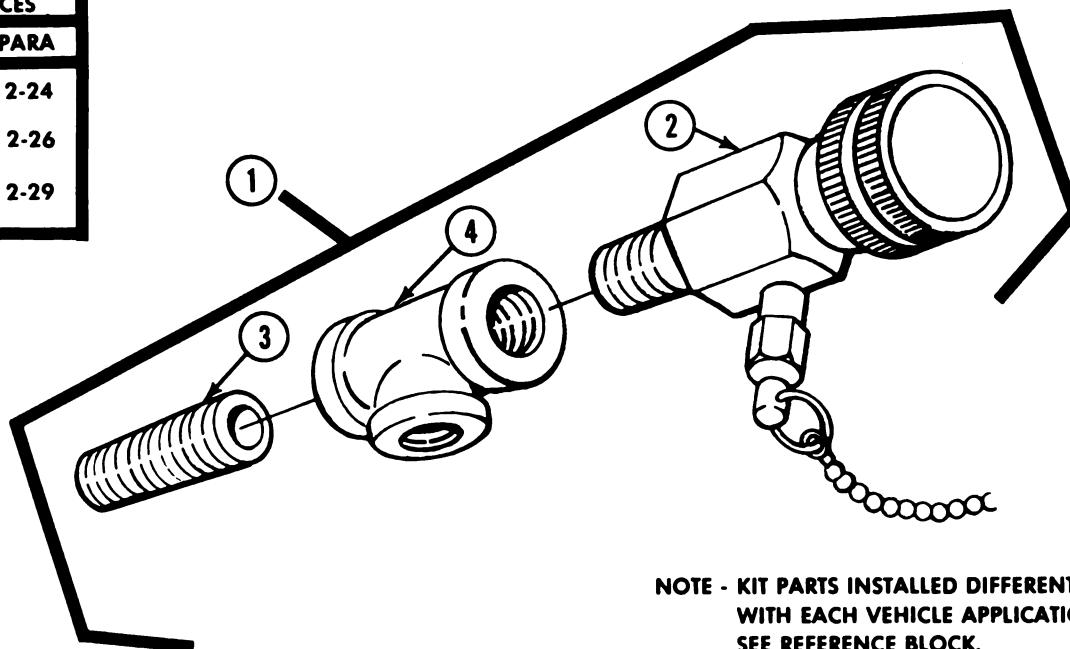


TA 327864

Figure B-17. Engine Oil Sampling Valve/D7F Crawler Tractor

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.					USABLE ON CODE		
B-17	1	PFOZZ	2815-01-189-0463	5705373	19207	0106. Engine Lubrication System Kit, Modification, AOAP Sampling Valve for Engine, CAT D333CT or Engine, CAT D33306 Consisting of:	Q	
B-17	2	PAOZZ	4820-01-120-4532	P59-500	91816	Valve, Oil Sampling	Q,XX	EA 1
B-17	3	PAOZZ	4730-00-811-6205	2-4PRC	97576	Reducer	Q,T,W,Y,CC	EA 1
B-17	4	PAOZZ	4730-00-196-1465	MS51873- 25	96906	Nipple, Close, 1/4"	Q,R	EA 1
B-17	5	PAOZZ	4730-00-257-2117	WW-P-521	81348	Tee, 1/4"	Q,R,ZDD,II	EA 1
B-17	6	PAOZZ	4730-00-248-6728	C3109-4-2	79470	Bushing	K,Q,Z	EA 1

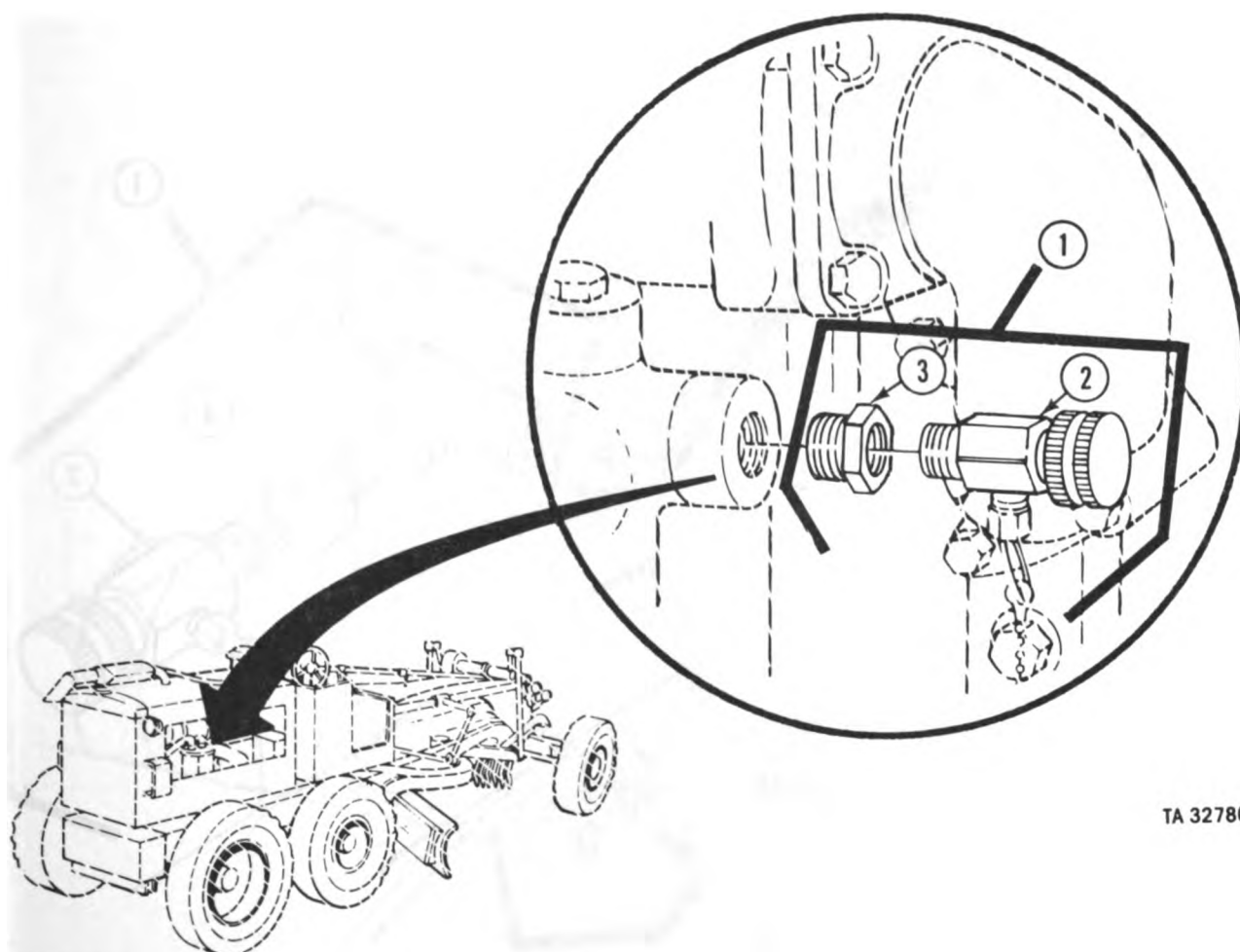
REFERENCES	
MODEL	PARA
D73	2-24
K300	2-26
290M	2-29



TA 327865

Figure B-18. Oil Sampling Kit/D7E Tractor Crawler/K300 Compactor/290M Wheeled Tractor

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT	
(a) FIG. NO.	(b) ITEM NO.								
B-18	1	PFOZZ	2815-01-184-4828	5705377	19207	3307. Special Purpose Kits Kit, Modification, Oil Sampling Valve for Engines , CAT 339T for D7E, CAT 3208 for K300, and Cummins NT380 for 290M; Transmission , Clark 8420-1 as used on 290M.* Consisting of: Valve, Oil Sampling Nipple, Close, 1/4" Tee, Pipe, 1/4" *Duplicate of Engine Valve Kit Parts.	R QRZDD,II	EA EA	1 1
B-18	2	PAOZZ	4820-01-120-4532	P59-500	91816	Valve, Oil Sampling	RXX	EA	1
B-18	3	PAOZZ	4730-00-196-1465	MS51873- 25	96906	Nipple, Close, 1/4"	QR	EA	1
B-18	4	PAOZZ	4730-00-257-2117	WW-P-521	81348	Tee, Pipe, 1/4"	QRZDD,II	EA	1



TA 327866

Figure B-19. Engine Oil Sampling Valve Kit/Model 120 Grader

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.							
B-19	1	PFOZZ		5705385	19207	0106. Engine Lubrication System Kit, Modification, AOAP Sampling Valve for Engine, CAT D333, Consisting of: Valve, Oil Sampling Bushing S,BB	EA	1
B-19	2	PAOZZ	4820-01-120-4532	P59-500	91816	S,BB,XX	EA	1
B-19	3	PAOZZ	4730-00-194-0216	AN912-5	88044	S,BB	EA	1

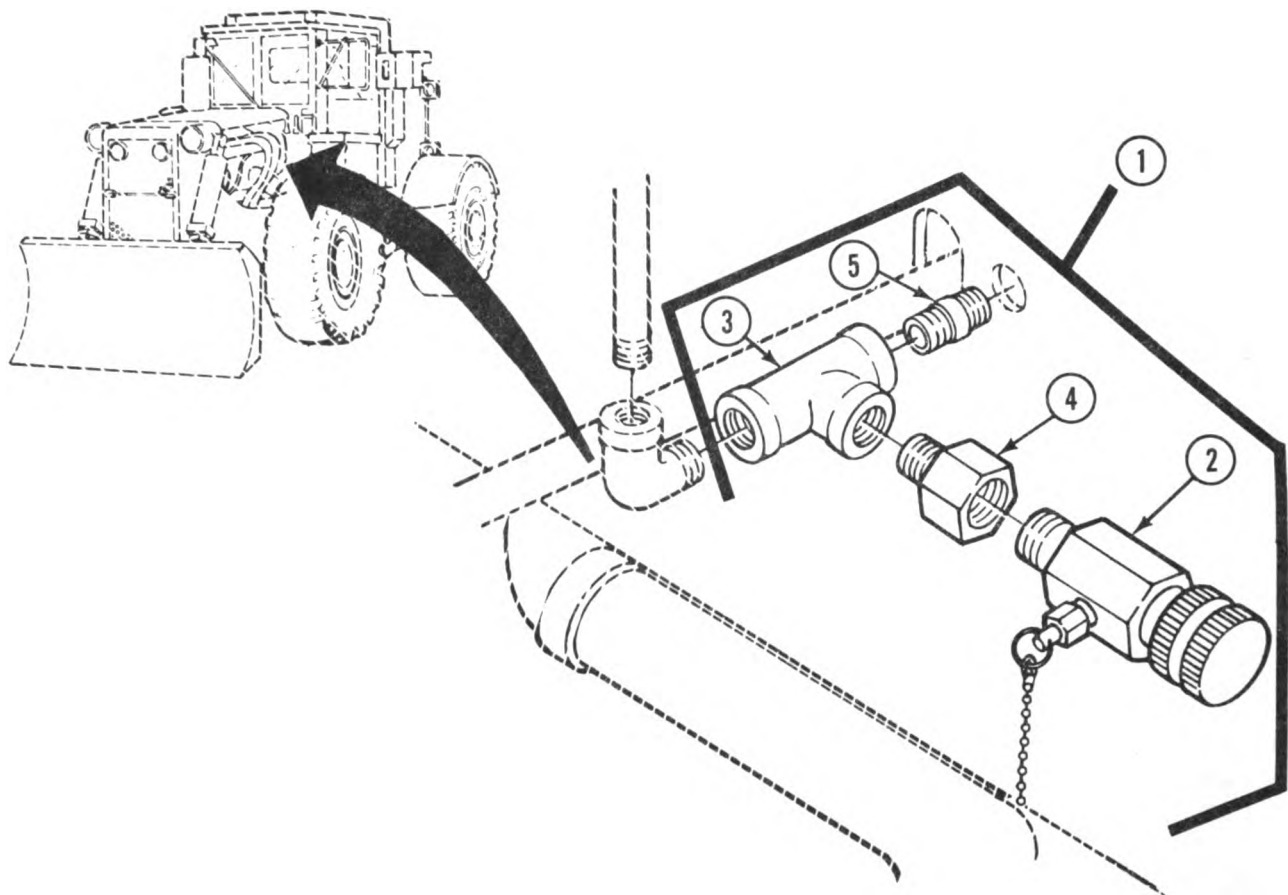
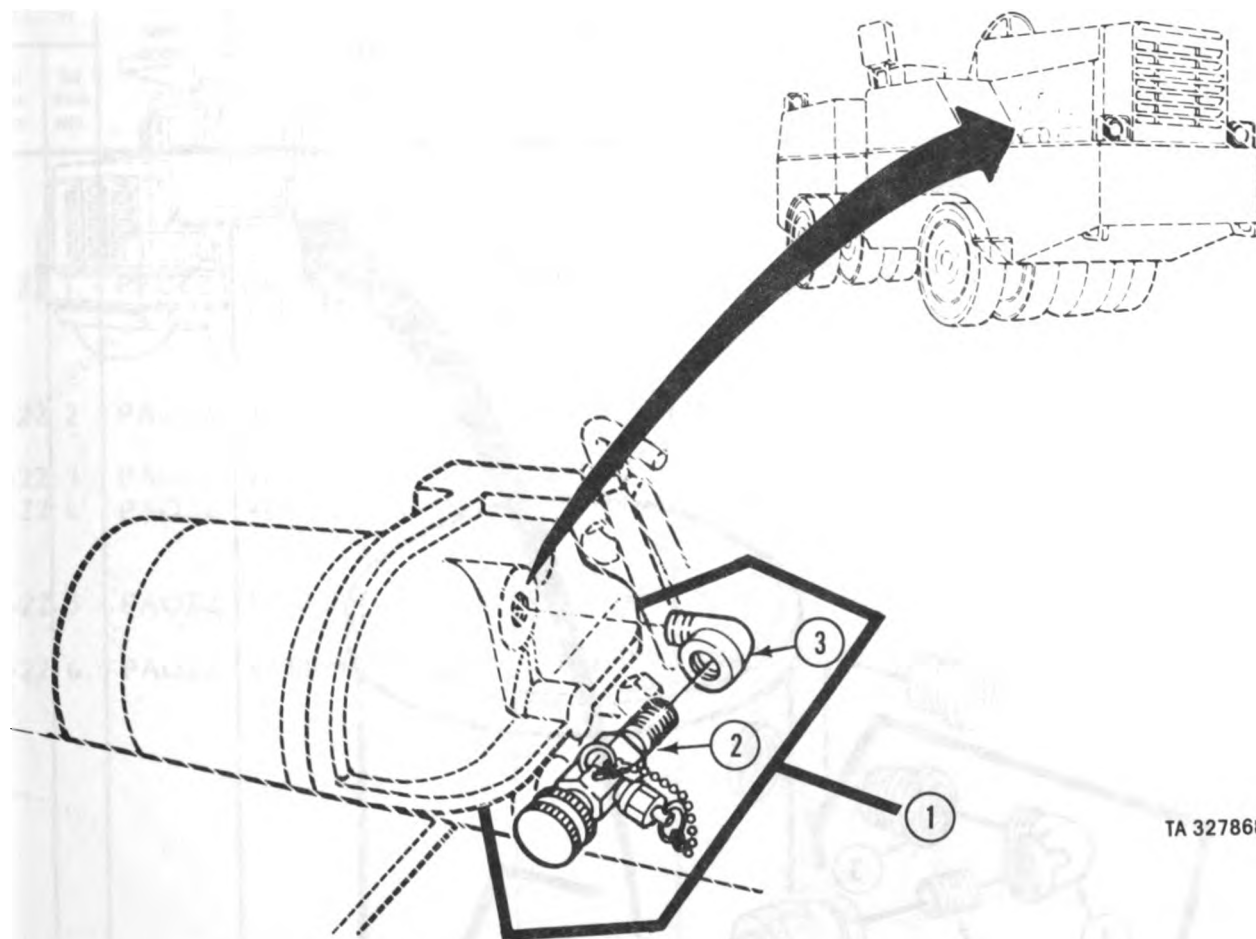


Figure B-20. Engine Oil Sampling Valve Kit/830MB Tractor

TA 327867

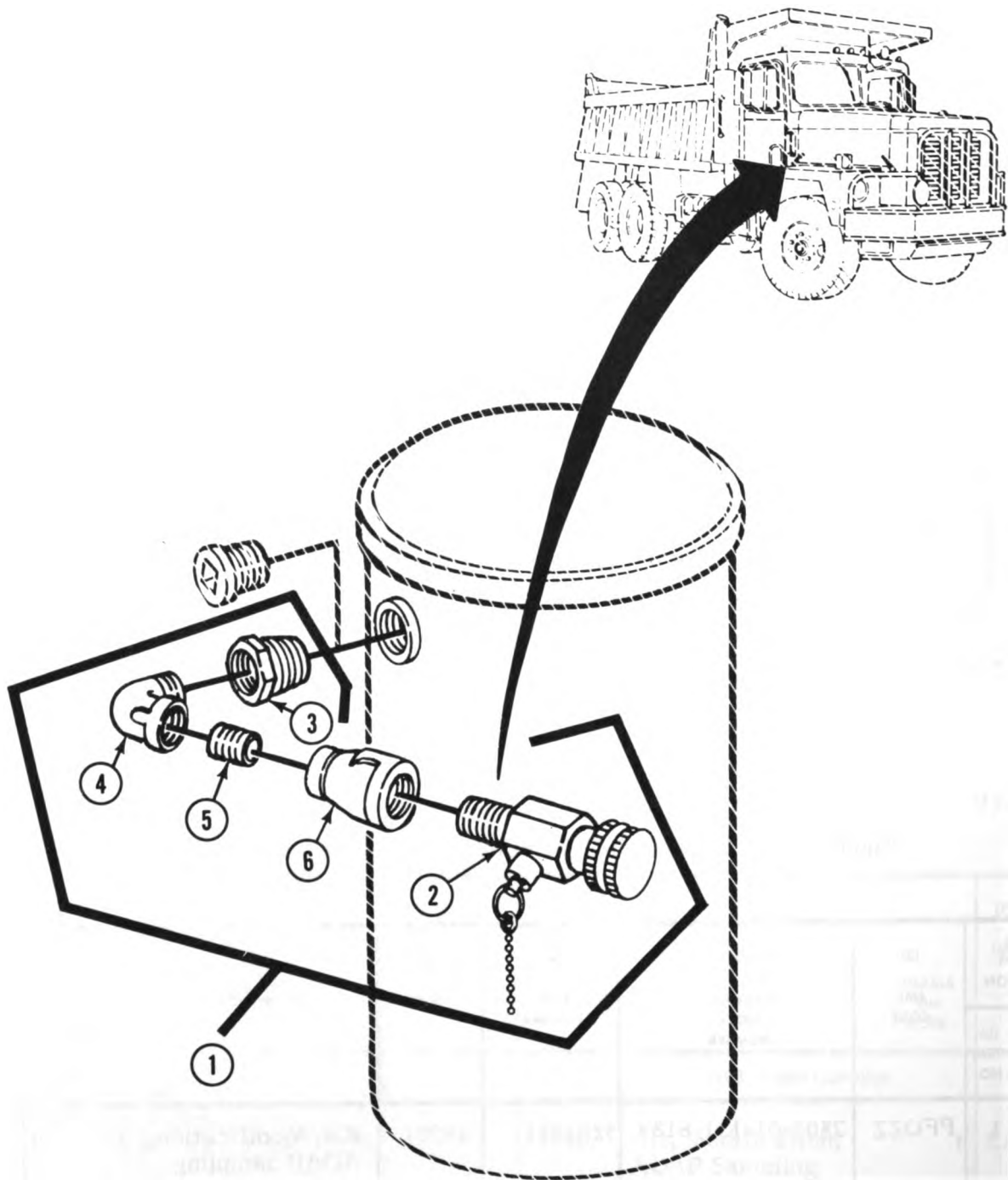
(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION	USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.								
B-20	1	PFOZZ	2815-01-187-9456	5705390	19207	0106. Engine Lubrication System Kit, Modification, AOAP Sampling Valve for Engine, CAT 343, Consisting of:	T	EA	1
B-20	2	PAOZZ	4820-01-120-4532	P59-500	91816	Valve, Oil Sampling	T,XX	EA	1
B-20	3	PAOZZ	4730-00-595-1887	SS-2-T	11649	Tee, Pipe,	J,T	EA	1
B-20	4	PAOZZ	4730-00-811-6205	2-4PRC	97576	Reducer, Pipe	Q,T,W,Y,CC	EA	1
B-20	5	PAOZZ	4730-00-921-3624	MS51953-6	96906	Nipple, Pipe	T,HH,II	EA	1



TA 327868

Figure B-21. Engine AOAP Sampling Kit/C-530A Pneumatic Roller

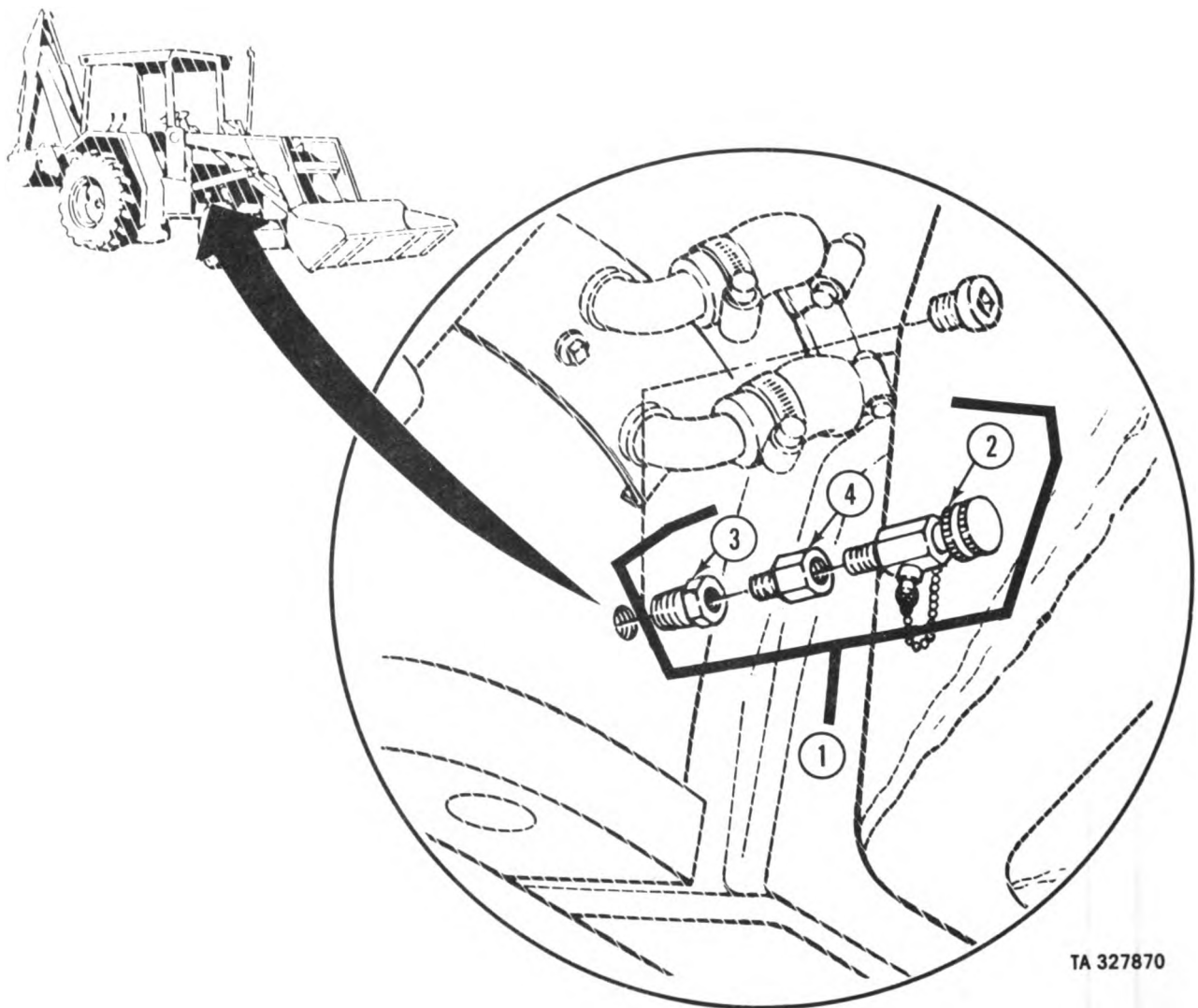
(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION	USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.								
B-21	1	PFOZZ	2805-01-151-6189	5705381	19207	Kit, Modification, AOAP Sampling	U	EA	1
B-21	2	PAOZZ	4820-01-120-4532	P59-500	91816	Consisting of: Valve, Oil Sampling	U,XX	EA	1
B-21	3	PAOZZ	4730-00-253-4412	MS39230-2	96906	Elbow, Pipe, Street, 90°, 1/4-inch (optional w/Elbow, Pipe, NSN 4730-00-836-0545)	U	EA	1



TA 327869

Figure B-22. Engine Oil Sampling Kit/F 5070 20-Ton Dump Truck

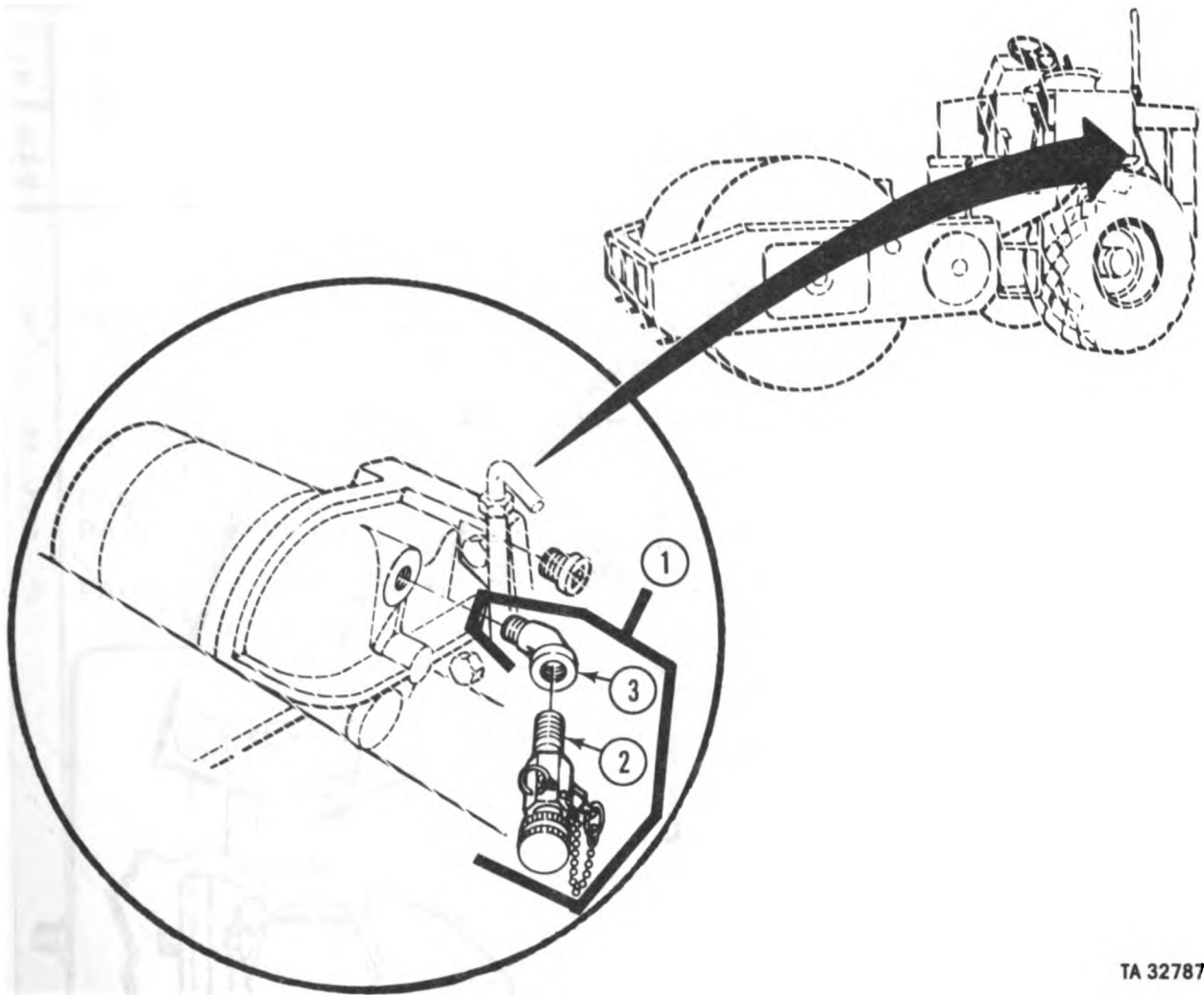
(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT	
(a) FIG. NO.	(b) ITEM NO.								
B-22	1	PFOZZ	2815-01-191-0977	5705380	19207	0106. Engine Lubrication System Kit, Modification, Engine Oil Sampling Valve Consisting of: Valve, Oil Sampling Bushing Elbow, Street, 90°, 1/8" NPT Nipple, Close, 1/8" x 3/4" Reducer, Pipe 1/4" to 1/8"	v	EA	i
B-22	2	PAOZZ	4820-01-120-4532	P59-500	91816		v,xx	EA	1
B-22	3	PAOZZ	4730-00-196-0837	MS51887-5	96906		B,C,V,W	EA	1
B-22	4	PAOZZ	4730-00-287-1649	MS39230-1	03958		M,V,Y	EA	1
B-22	5	PAOZZ	4730-00-196-1464	WW-N-351	81348		J,V,DD	EA	1
B-22	6	PAOZZ	4730-00-231-5642	12Z329PCI	10001		V,HH,II	EA	1



TA 327870

Figure B-23. Engine Oil Sampling Kit/JD410

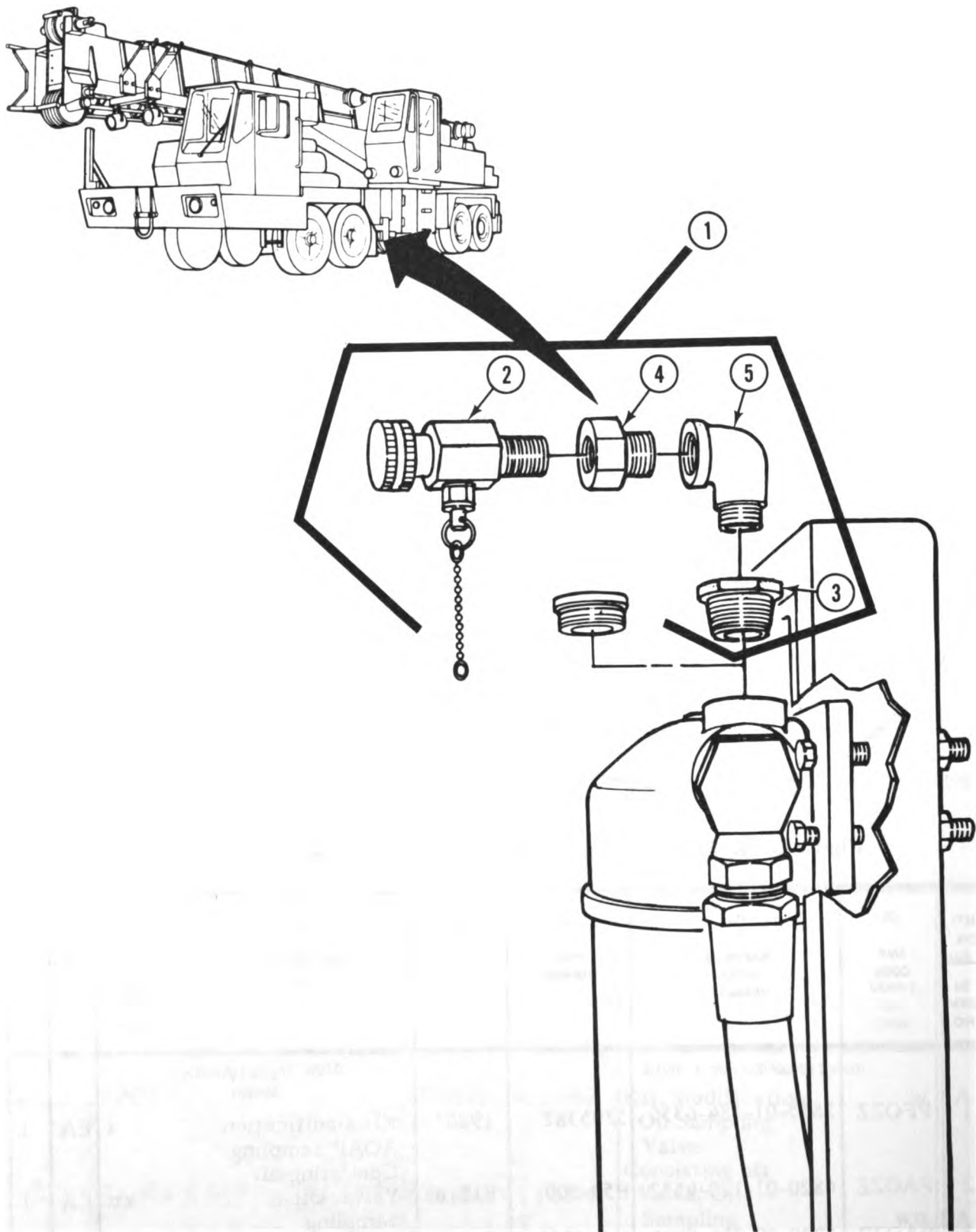
(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.							
B-23	1	PFOZZ		5705379	19207	0106. Engine Lubrication System Kit, Modification, Oil Sampling Valve	w	EA 1
B-23	2	PAOZZ	4820-01-120-4532	P59-500	91816	Consisting of: Valve, Oil Sampling		EA 1
B-23	3	PAOZZ	4730-00-196-0837	MS51887-5	96906	Bushing	w,xx B,C,V,W	EA 1
B-23	4	PAOZZ	4730-00-811-6205	2-4PRC	97578	Reducer	Q,T,W,Y,CC	EA 1



TA 327871

Figure B-24. Engine Oil Sampling Valve Kit, RS28 Roller Vehicles

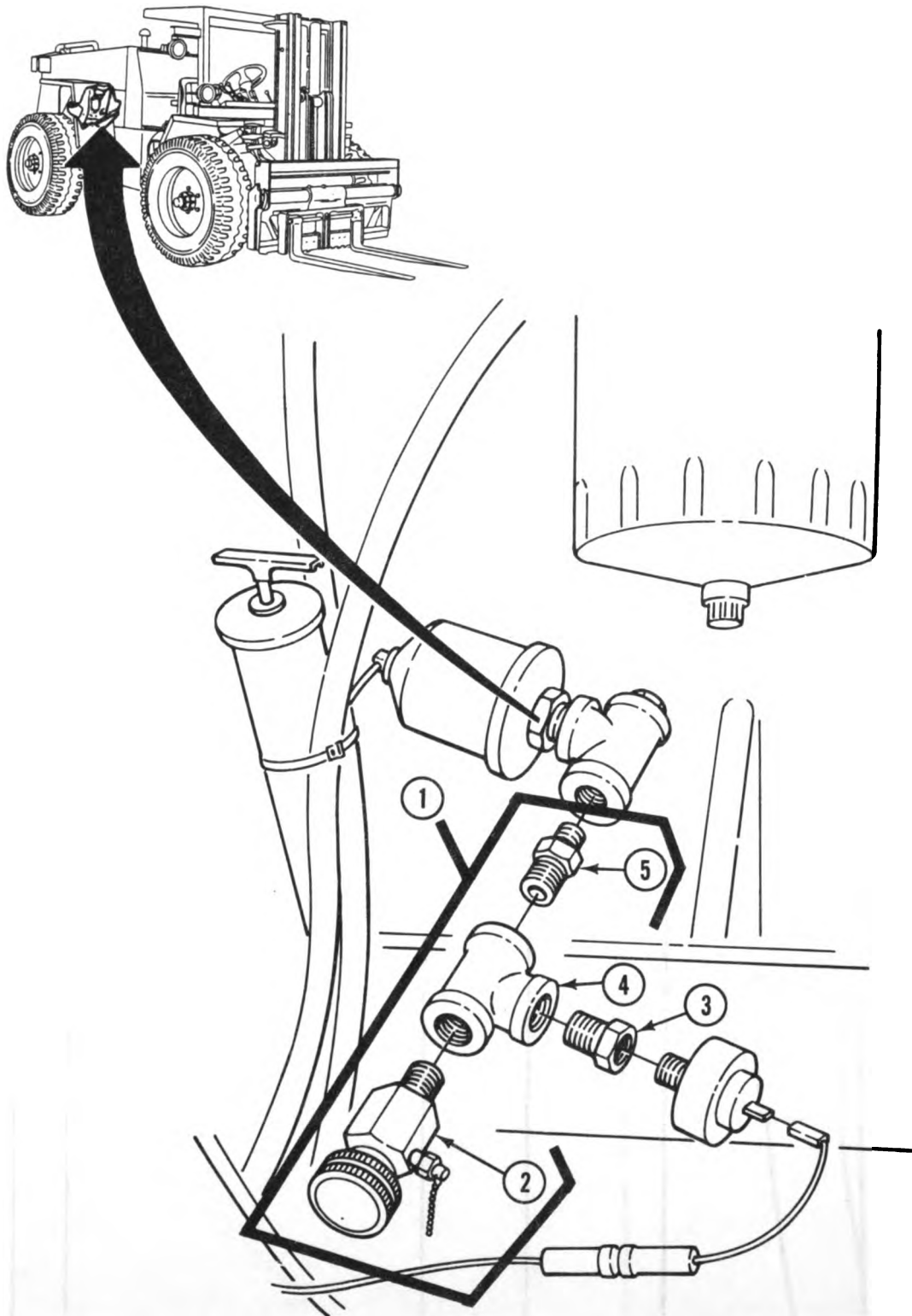
(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION	USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.								
B-24	1	PFOZZ	2815-01-184-6356	5705382	19207	0106. Engine Lubrication System Kit Modification	x	EA	1
B-24	2	PAOZZ	4820-01-120-4532	P59-500	91816	AOAP Sampling Consisting of:			
B-24	3	PAOZZ	4730-00-278-4290	MS39231-2	96906	Valve, Oil Sampling Elbow, Pipe, Street, 45°, 1/4"	xxx	EA	1
							xdd	EA	1



TA 327872

Figure B-25. Engine Oil Sampling Kit/ TMS 300-5 Truck Crane

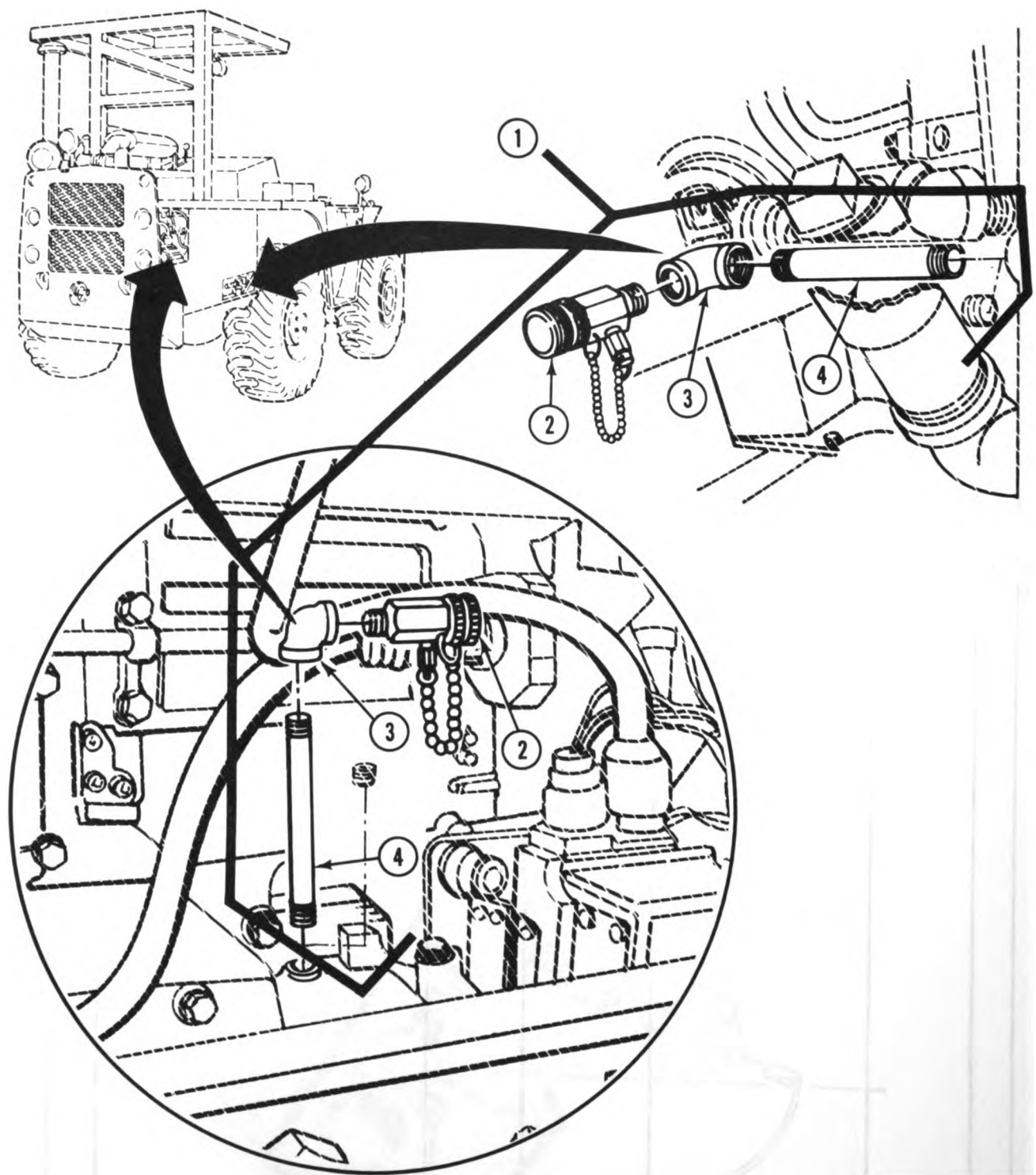
(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION	USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.								
B-25	1	PFOZZ	2815-01-180-9849	5705384	19207	0106. Engine Lubrication System Kit, Modification, Engine Oil Sampling Valve Consisting of: Valve, Oil Sampling Reducer Bushing Elbow	Y Y,XX Q,T,W,Y,CC B,C,Y,CC M,V,Y	EA	1
B-25	2	PAOZZ	4820-01-120-4532	P59-500	91816			EA	1
B-25	3	PAOZZ	4730-00-811-6205	2-4PRC	97576			EA	1
B-25	4	PAOZZ	4730-00-196-0889	MS51882- 292	96906			EA	1
B-25	5	PAOZZ	4730-00-287-1649	MS39230-1	03958			EA	1



TA 327873

Figure B-26. Engine Oil Sampling Valve Kit/M4K Forklift (Rough Terrain)

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT	
(a) FIG. NO.	(b) ITEM NO.								
B-26	1	PFOZZ	2815-01-182-7424	5705387	19207	0106. Engine Lubrication System Kit, Modification, AOAP Sampling Valve for Engine, Case G207D, Consisting of:	z	EA	1
B-26	2	PAOZZ	4820-01-120-4532	P59-500	91816	Valve, Oil Sampling	zxx	EA	1
B-26	3	PAOZZ	4730-00-248-6728	C3109-4-2	79470	Bushing, Pipe, Reducer, 1/4" to 1/8"	KQZ	EA	1
B-26	4	PAOZZ	4730-00-257-2117	WW-P-521	81348	Tee, Pipe, 1/4"	QRZDD,II	EA	1
B-26	5	PAOZZ	4730-00-134-6559	12308221	19207	Nipple, Pipe, Reducer, 1/4" x 1/8"	z	EA	1



TA 327874

Figure B-27. Engine and Transmission Oil Sampling Kit/Rough Terrain Forklifts

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION	USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.								
B-27	1	PFOZZ	2815-01-180-9850	5705386	19207	3307. Special Purpose Kits Kit, Modification AOAP Sampling Valves-Engine and Transmission (MHE200/MHE202/ MHE222) Consisting of:	AA	EA	1
B-27	2	PAOZZ	4820-01-120-4532	P59-500	91816	Valve, Oil Sampling	AA,XX	EA	2
B-27	3	PAOZZ	4730-00-817-1843	DX533AC	56442	Elbow, 90°	F,MAA	EA	2
B-27	4	PAOZZ	4730-00-278-0002	MS51953- 38B	96906	Nipple, Pipe, 1/4" x 5"	F,MA	EA	2

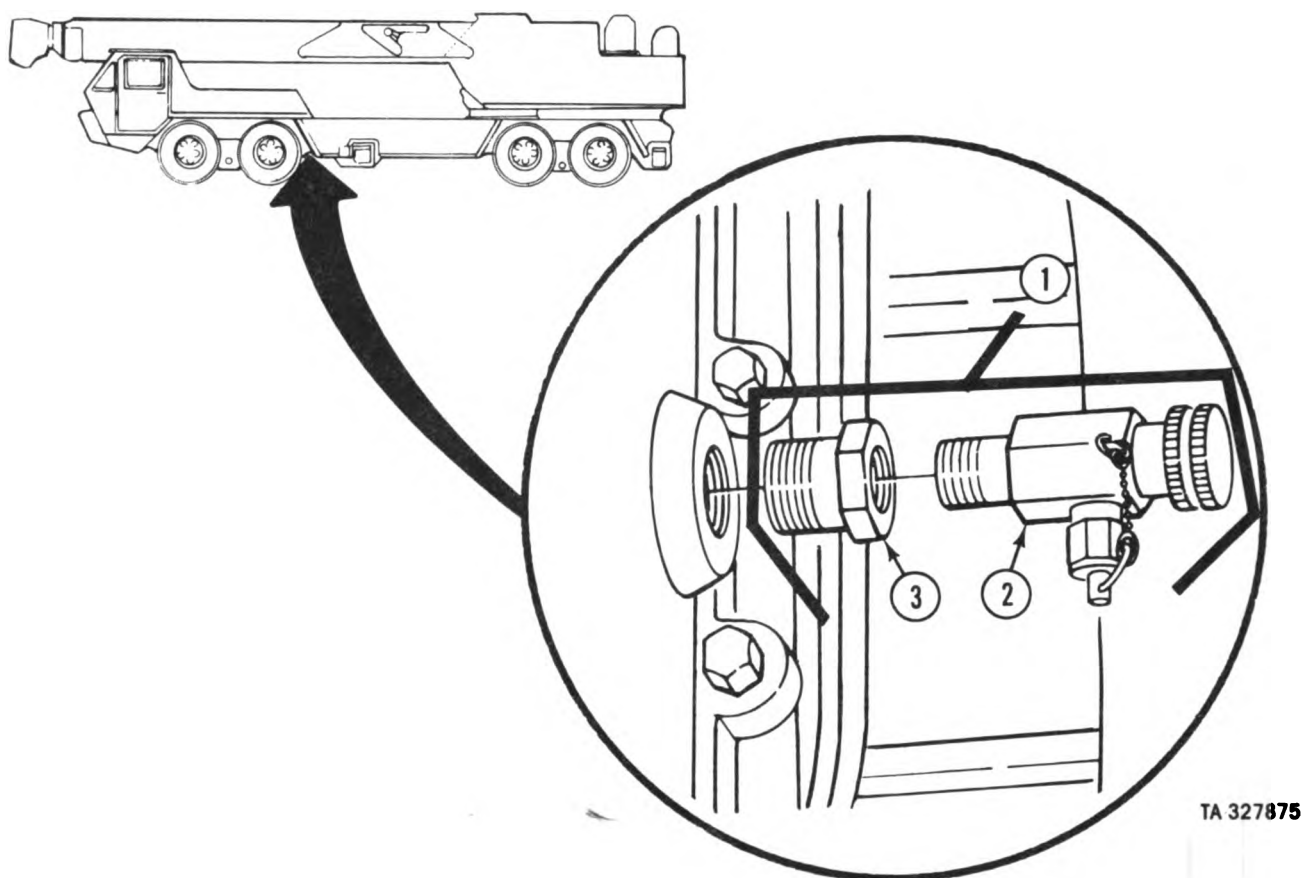
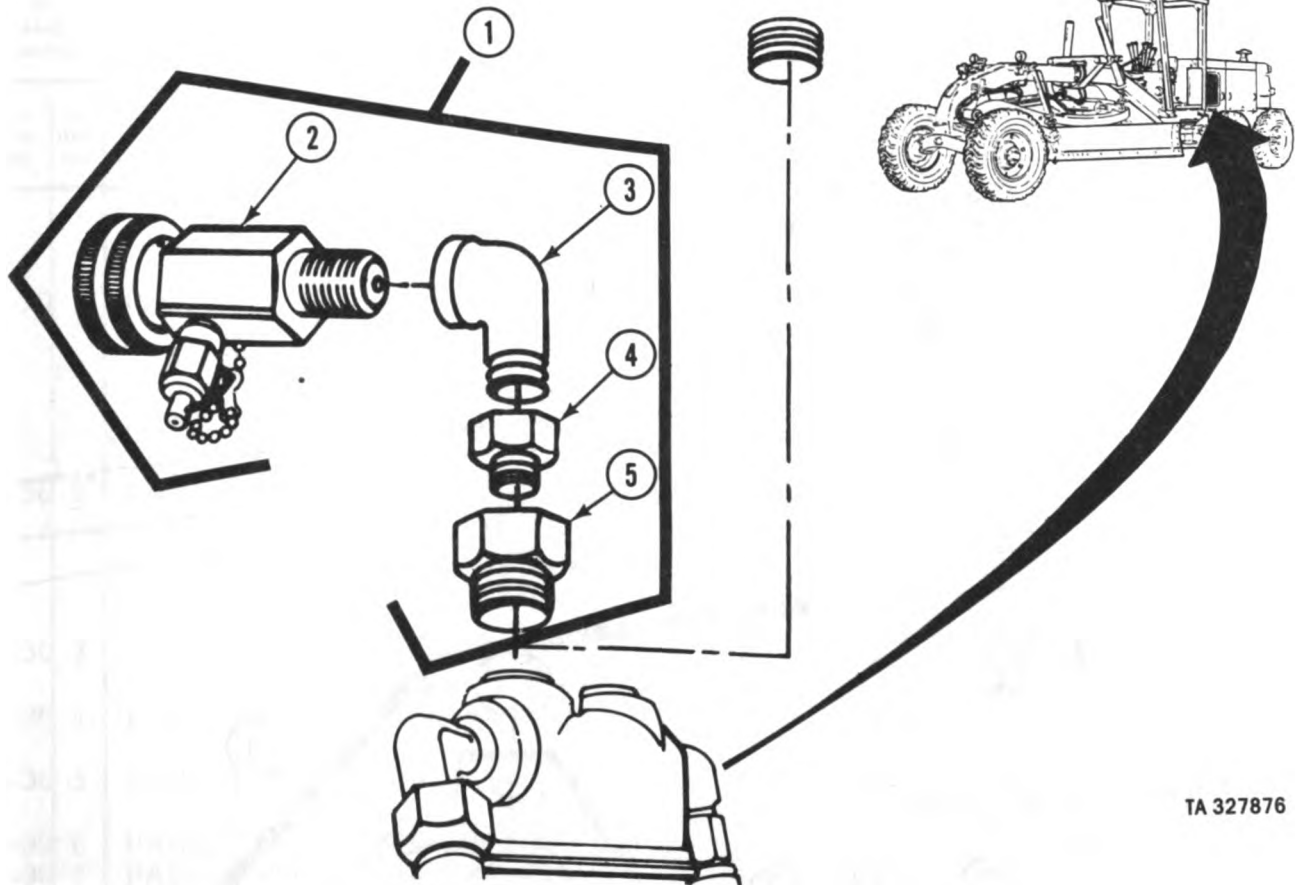


Figure B-28. Engine AOAP Sampling Kit/MT250 Truck Crane (25-Ton)

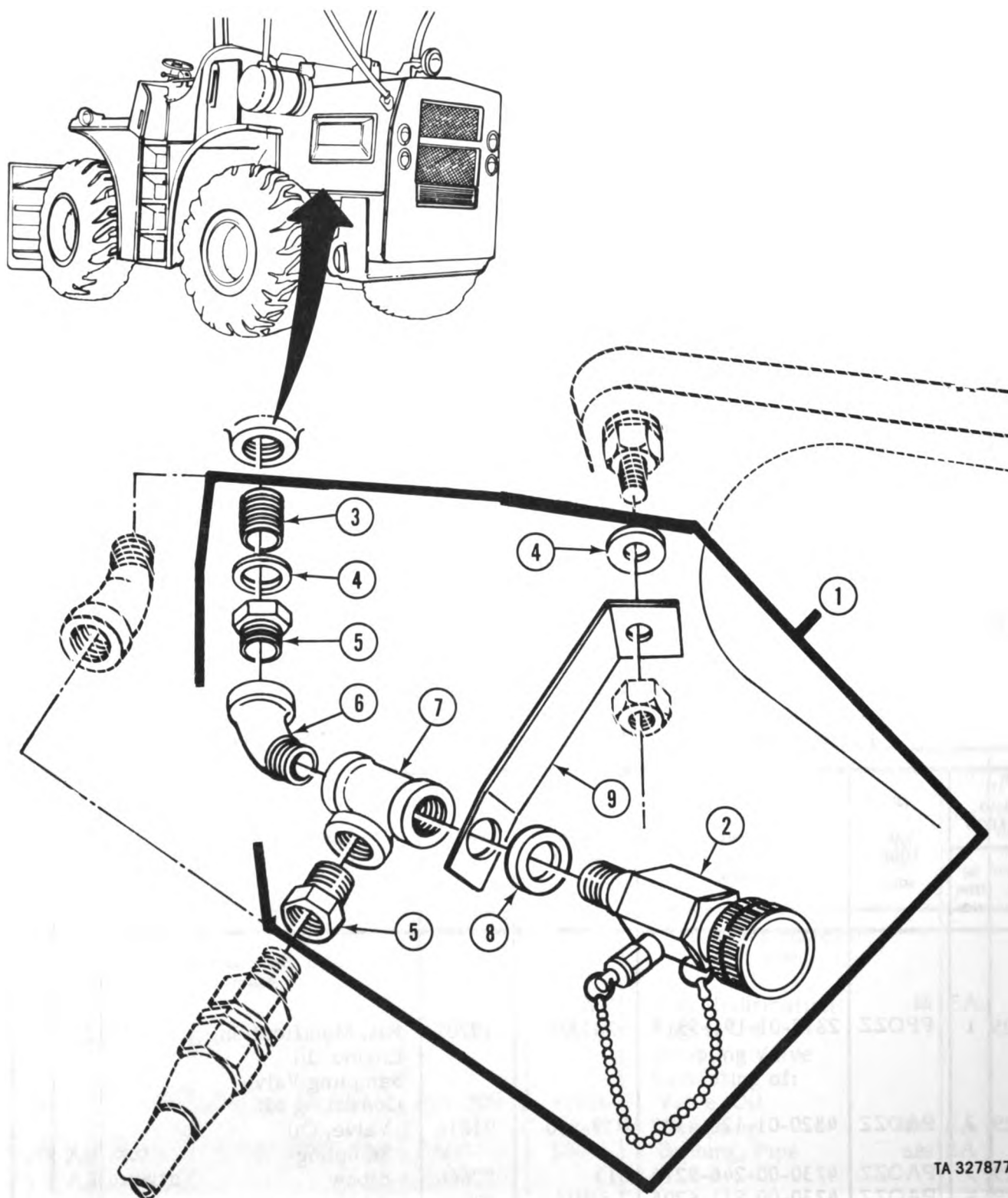
(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.							
B-28	1	PFOZZ		5705385	19207	0106. Engine Lubrication System Kit, Modification Engine Oil Sampling Valve Consisting of: Valve, Oil Sampling Bushing, Pipe BB	EA	1
B-28	2	PAOZZ	4820-01-120-4532	P59-500	91816			
B-28	3	PAOZZ	4730-00-194-0216	AN912-5	88044	BB,XX S,BB	EA EA	1 1



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Figure B-29. Engine Oil Sampling Valve Kit/F1500M Road Grader

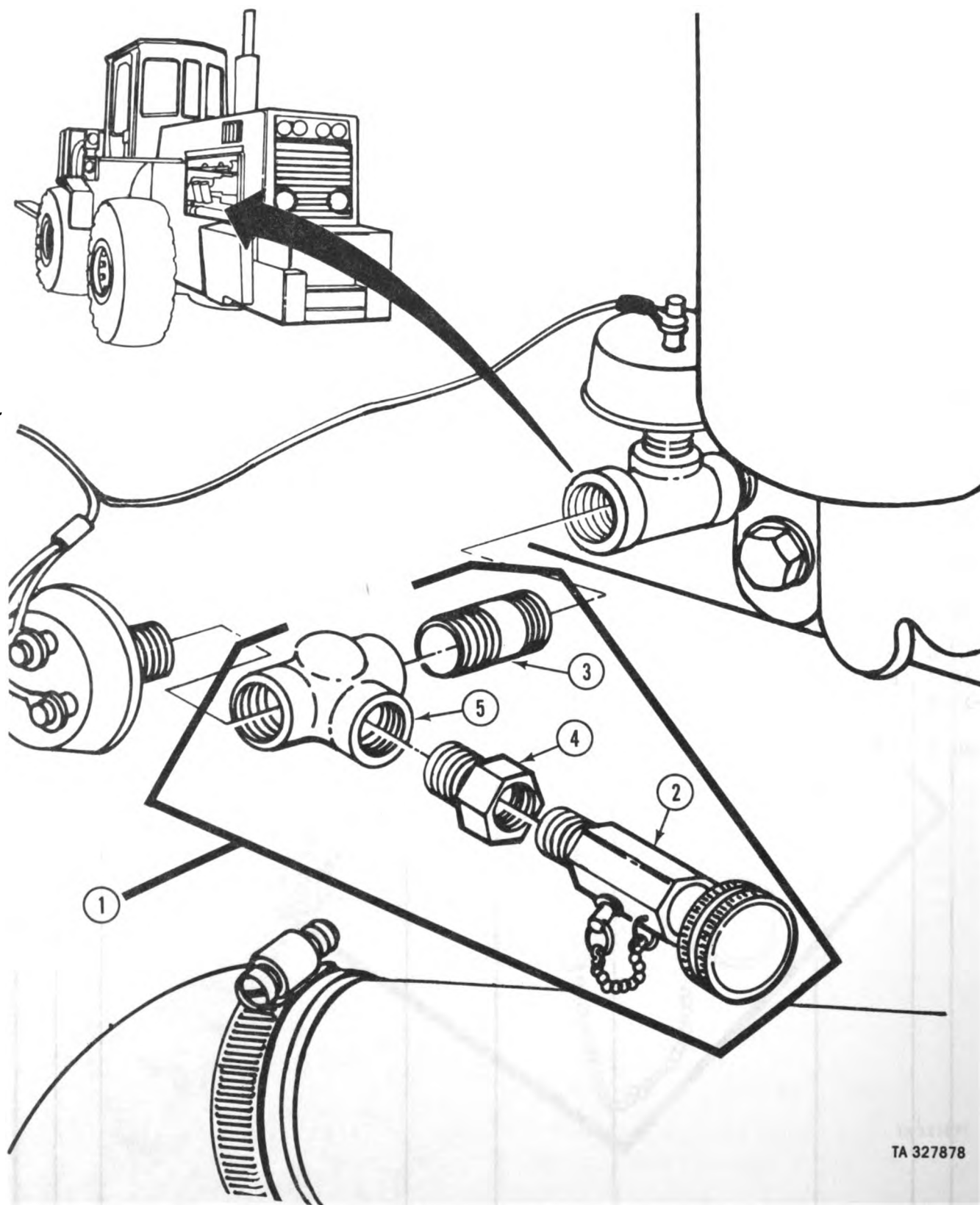
(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION	USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.								
B-29	1	PFOZZ	2815-01-191-5915	5705388	19207	0106. Engine Lubrication System Kit, Modification, Engine Oil Sampling Valve Consisting of:	CC	EA	1
B-29	2	PAOZZ	4820-01-120-4532	P59-500	91816	Valve, Oil Sampling	CC,XX	EA	1
B-29	3	PAOZZ	4730-00-246-9215	613	82666	Elbow	Q,T,W,Y,CC	EA	1
B-29	4	PAOZZ	4730-00-811-6205	2-4PRC	97576	Reducer 1/4" to 1/8"		EA	1
B-29	5	PAOZZ	4730-00-196-0889	MS51887- 29Z	96906	Bushing, Pipe, 1" x 1/8"	B,C,Y,CC	EA	1



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Figure B-30. Engine Oil Sampling Valve Kit/MHE 199 and MHE 215 (Army Models RTL-10 and RTL-10-1)

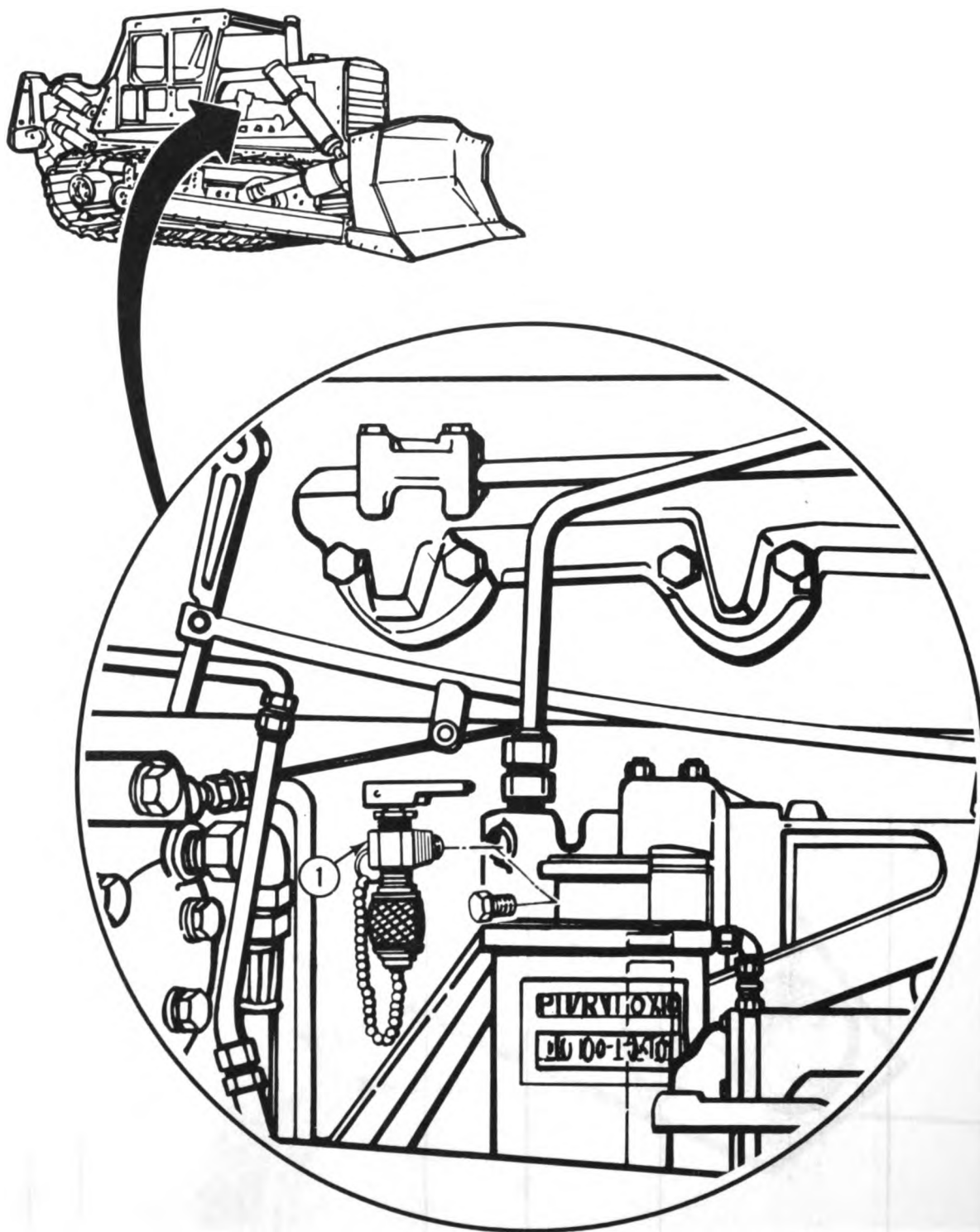
(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) PSCM	(6) DESCRIPTION USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.							
B-30	1	PFOZZ		5705389	19207	0106. Engine Lubrication System Kit, Modification, AOAP Sampling Valve for Engine, DDA 6V53, Model 5063-5000 Series, Consisting of: Valve, Oil Sampling DD	EA	1
B-30	2	PAOZZ	4820-01-120-4532	P59-500	91816	DD,XX Washer, Flat, 3/8"	EA	1
B-30	3	PAOZZ	4730-00-196-1464	192032	19207	Nipple, Pipe, Close, 1/8" x 3/4" J.V.DD	EA	1
B-30	4	PAOZZ	5310-00-087-7493	MS27183- 13	96906	Washer, Flat, 3/8"	EA	2
B-30	5	PAOZZ	4730-00-186-3024	144035	21450	Reducer, Bushing, Pipe, 1/4" to 1/8" DD	EA	2
B-30	6	PAOZZ	4730-00-278-4290	MS39231-2	96906	Elbow, Pipe, 1/4" XDD	EA	1
B-30	7	PAOZZ	4730-00-257-2117	144083	21450	Tee, Pipe, 1/4" Q,R,ZDD,II	EA	1
B-30	8	PAOZZ	5310-00-068-5285	MS27183- 20	96906	Washer, Flat, 5/8" DD	EA	1
B-30	9	PAOZZ		12343161	19207	Bracket, Mounting, Oil Sampling Valve DD	IN	V



TA 327878

Figure B-31. Engine Oil Sampling Valve Kit/MHE 236 Forklift (Army Model M10A)

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.							
B-31	1	PFOZZ	2815-01-187-9456	5705390	19207	0106. Engine Lubrication System Kit, Modification, AOAP Sampling Valve for Engine, IHC-DT-466B, Consisting of: Valve, Oil Sampling	T EA	1
B-31	2	PAOZZ	4820-01-120-4532	P59-500	91816		T,XX EA	1
B-31	3	PAOZZ	4730-00-921-3624	MS51953-6	96906	Nipple, Pipe	T,H,II EA	1
B-31	4	PAOZZ	4730-00-811-6205	2-4PRC	97576	Reducer, Pipe, 1/4" to 1/8"	Q,T,W,Y,CC EA	1
B-31	5	PAOZZ	4730-00-595-1887	1-8MMOS	30780	Tee, Pipe	J,T EA	1



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Figure B-32. Engine Oil Sampling Valve Kit/Cat D8K Crawler Tractor

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.							
B-32	1	PAOZZ	2910-01-073-0080	11669424	19207	0106. Engine Lubrication System Valve, Oil B.C.D.E.EE	EA	1

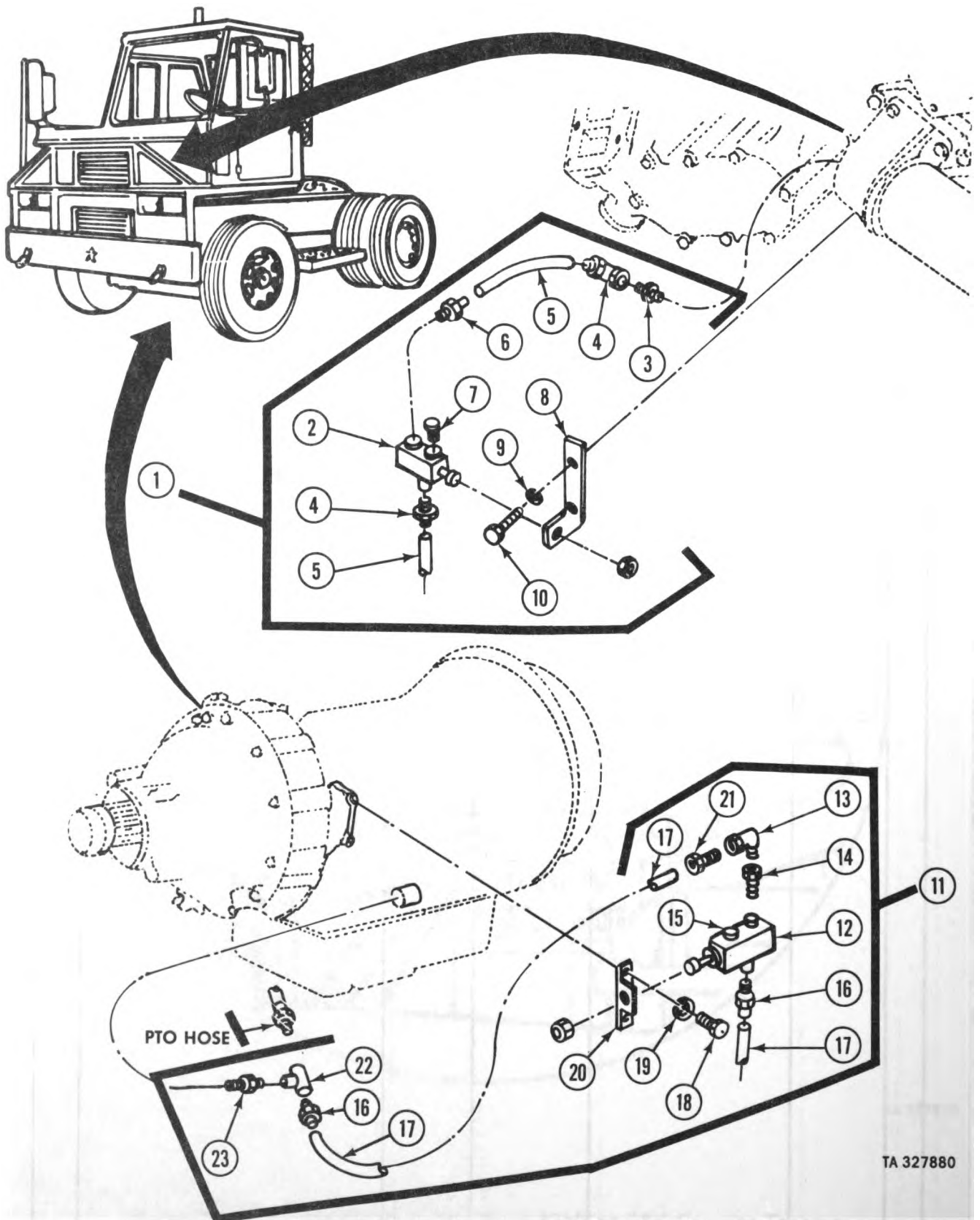
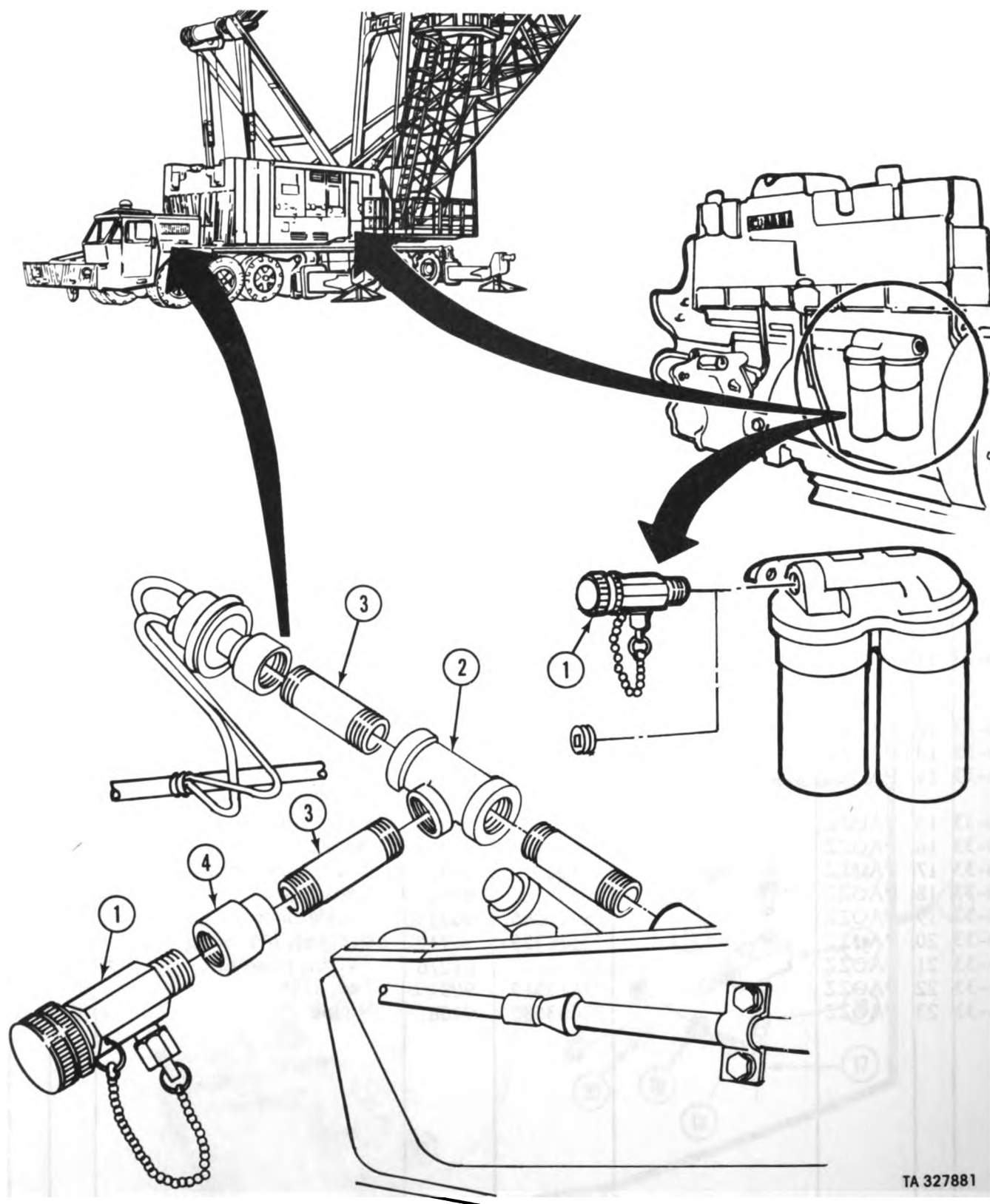


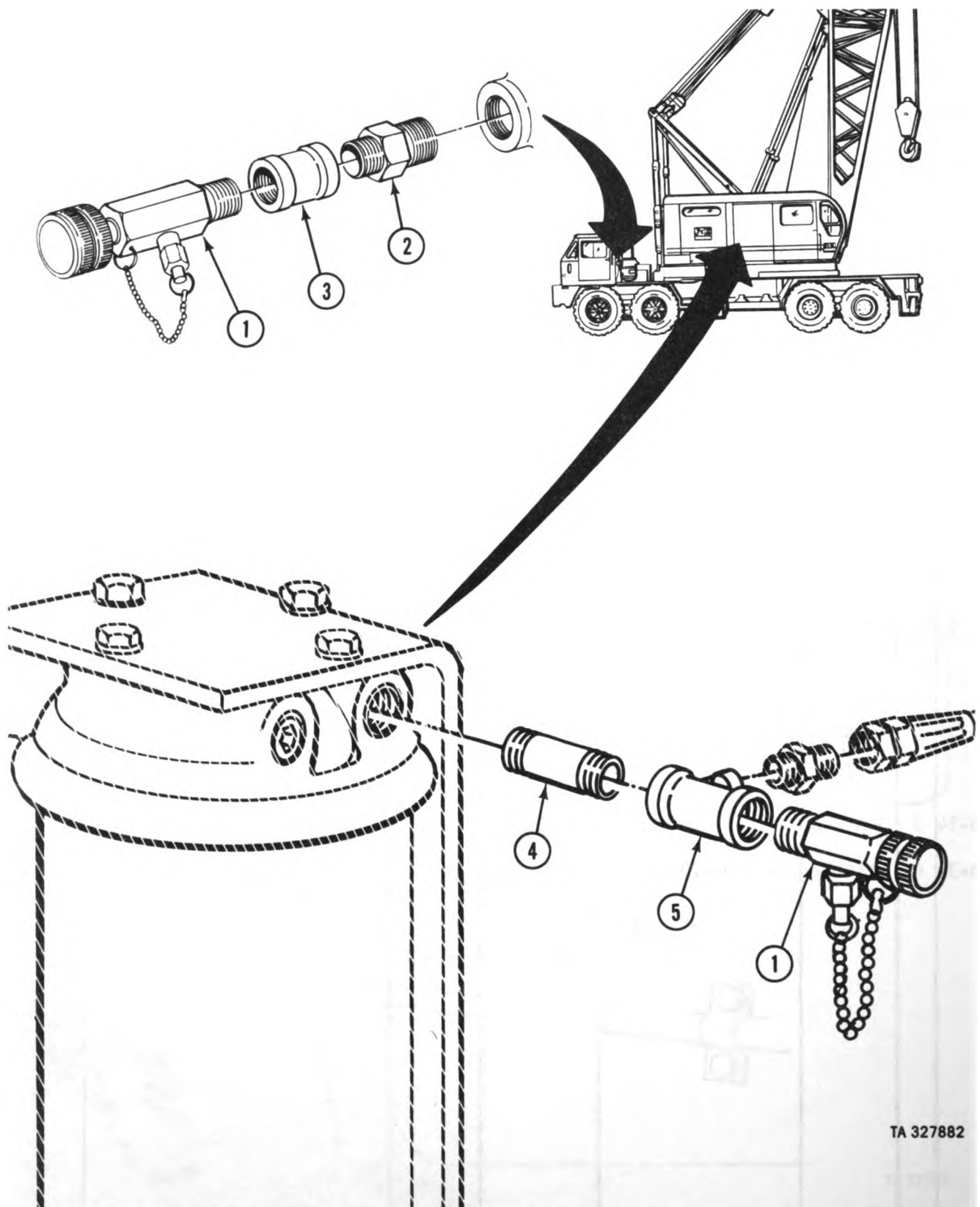
Figure B-33. AOAP Sampling Valve Kits/M878A1 Yard Tractor

(1) ILLUS- TRATION		(2)	(3)	(4)	(5)	(6)	(7)	(8)	
(a) FIG. NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION	USABLE ON CODE	UM	QTY INC IN UNIT
						0106. Engine Lubrication System			
B-33	1	PFOZZ		53516333	90915	Kit, Engine Oil Sampling Valve Consisting of:	FF	EA	1
B-33	2	PAOZZ		53103585	09990	Valve, Sampling, w/mounting nut	FF	EA	1
B-33	3	PAOZZ		90210020	90915	Adapter	FF	EA	1
B-33	4	PAOZZ		53109225	00624	Swivel, Hose End	FF	EA	2
B-33	5	PAOZZ		99802352	01276	Hose, Non-metallic, 17"	FF	EA	1
B-33	6	PAOZZ		53451937	01276	Hose End, Male	FF	EA	2
B-33	7	PAOZZ		95670105	90915	Plug	FF	EA	1
B-33	8	PAOZZ		53516328	90915	Bracket, Mounting	FF	EA	1
B-33	9	PAOZZ		98415050	90915	Washer, Lock,	FF	EA	2
B-33	10	PAOZZ		90804238	90915	Capscrew,	FF	EA	2
						0721. Transmission Lubrication System			
B-33	11	PFOZZ		53516332	90915	Kit, Transmission Oil Sampling Valve Consisting of:	FF FF	EA EA	1 1
B-33	12	PAOZZ		53103585	09990	Valve, Sampling	FF	EA	1
B-33	13	PAOZZ		96082214	90915	Elbow, 90°	FF	EA	1
B-33	14	PAOZZ		90709340	90915	Bushing, Reducing, 1/4" to 1/8"	FF	EA	1
B-33	15	PAOZZ		95670105	90915	Plug, Pipe	FF	EA	1
B-33	16	PAOZZ		53451937	01276	Hose End, Male	FF	EA	2
B-33	17	PAOZZ		99802352	01276	Hose, Non-metallic,	FF	EA	1
B-33	18	PAOZZ		90804226	90915	Capscrew,	FF	EA	2
B-33	19	PAOZZ		98415045	90915	Lockwasher	FF	EA	2
B-33	20	PAOZZ		53516329	90915	Bracket, Mounting	FF	EA	1
B-33	21	PAOZZ		53450543	01276	Swivel, Hose End,	FF	EA	1
B-33	22	PAOZZ		97415015	90915	Tee, 1/4"	FF	EA	1
B-33	23	PAOZZ		90003582	93061	Nipple	FF	EA	1



**Figure B-34. Engine Oil Sampling Valves/MHE247, 6250TC,
(Upper Engine NTA-885-G-420 Lower Engine VT-1710-8525)**

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) PSCM	(6) DESCRIPTION USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.							
B-34	1	PAOZZ	4820-01-120-4532	P59-500	91816	0106. Engine Lubrication System Valve, Oil Sampling HH,XX	EA	2
B-34	2	PAOZZ	4730-00-117-8512	WWP501	81348	(Item used by itself for NTA-855 Super- structure engine. Item used with 4730-00-117-8512, 4730-00-921-3624, and 4730-00-231-5642 on lower engine). Tee, Pipe, 1/8" (when supplies exhausted use on NSN 4730-01- 055-7646)	HH	EA 1
B-34	2	PAOZZ	4730-01-055-7646	221-1421	10988	Tee, Pipe, 1/8" (use after NSN 4730- 00-117-8512 supplies are exhausted).	HH	EA 1
B-34	3	PAOZZ	4730-00-921-3624	MS51953- 6	96906	Nipple, Pipe, 1/8" x 1 1/2" T,HH,II	EA	2
B-34	4	PAOZZ	4730-00-231-5642	12Z329PC	10001	Reducer, Pipe, 1/4" to 1/8" V,HH,II	EA	1



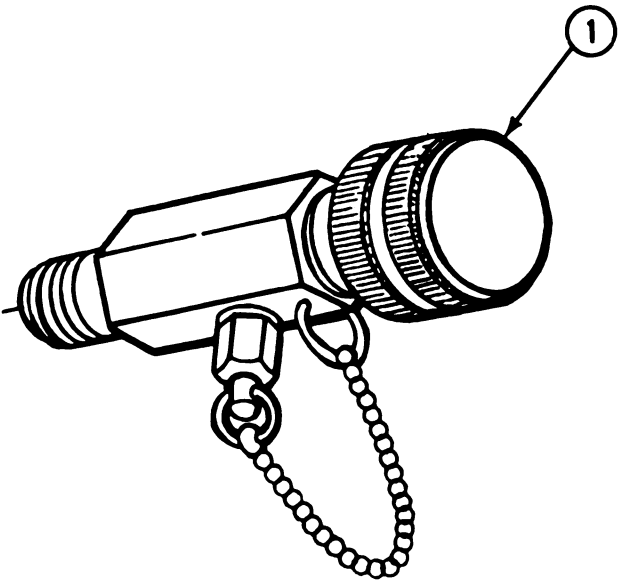
TA 327882

Figure B-35. Engine Oil Sampling Valves/Model 9125, 140-Ton Truck Crane (Lower Engine NTF365/Upper Engine, Cummins V-903-C-265)

(1) ILLUS- TRATION		(2)	(3)	(4)	(5)	(6)		(7)	(8)
(a) FIG. NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION	USABLE ON CODE	UM	QTY INC IN UNIT
B-35	1	PAOZZ	4820-01-120-4532	P59-500	91816	0106. Engine Lubrication System Valve, Oil Sampling	II,XX	EA	2
B-35	2	PAOZZ	4730-00-921-3624	MS51953-6	96906	(quantity of 2 required for vehicle shown. Item used on lower and superstructure engines). Nipple, Pipe, 1/8" x 1 1/2"	T,HH,II	EA	1
B-35	3	PAOZZ	4730-00-231-5642	MS39232-1	96906	Reducer, Pipe, 1/4" x 1/8"	V,HH,II	EA	1
B-35	4	PAOZZ	4730-00-196-1485	MS51953-32	96906	Nipple, Pipe, 1/4" x 2"	G,L,II	EA	1
B-35	5	PAOZZ	4730-00-257-2117	BT8	81830	Tee, Pipe, 1/4"	Q,R,ZDD,II	EA	1

REFERENCES	
MODEL	PARA
M320RT	2-47
C350B-D	2-45
440HA	2-44
H100C	2-43

NOTE - VALVE INSTALLED AT DIFFERENT LOCATIONS WITH EACH APPLICATION. SEE TM PARAGRAPH REFERENCE BLOCK.



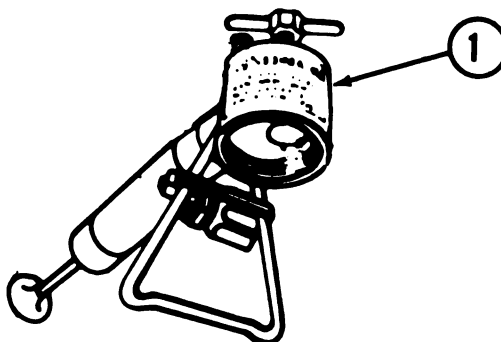
TA 327883

Figure B-36. Engine Oil Sampling Valve/Various Installations (M320RT, H100C, C350 B-D, and 440HA Special Purpose Vehicles)

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) PSCM	(6) DESCRIPTION	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.					USABLE ON CODE		
B-36	1	PAOZZ	4820-01-120-4532	P59-500	91816	0108. Engine Lubrication System Valve, Oil	68XX EA	1

Section III. BULK ITEMS AND SPECIAL TOOLS LIST

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.							
Bulk			4720-00-169-5116	MIL-H-13444	81349	9501. Hardware Supplies & Bulk Items/Materials Hose, Non-Metallic	FT	V
Bulk			9515-00-203-2064	QQ-S-698	81349	Metal, Strip	IN	V
Bulk			4720-00-857-1732	MIL-H-27267-4	81349	Hose, Non-Metallic	FT	V
Bulk			4720-00-913-5910	48366	02280	Hose, Non-Metallic	FT	V



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Figure B-37. Special Tools

(1) ILLUS- TRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) UM	(8) QTY INC IN UNIT
(a) FIG. NO.	(b) ITEM NO.							
B-37	1	PEOZZ	4930-01-119-4030	43-78	59577	2406. Special Tools Pump, Oil Sampling	EA	1

Section IV. NATIONAL STOCK NUMBER AND PART NUMBER-INDEX

<u>Stock Number</u>	<u>Fig No</u>	<u>Item No</u>	<u>Stock Number</u>	<u>Fig No</u>	<u>Item No</u>
4730-00-013-7397	B-10	7	4730-00-246-9215	B-29	3
4730-00-014-6763	B-9	2	4730-00-248-6728	B-11	4
5306-00-050-1238	B-1	14		B-17	6
4730-00-054-7650	B-11	3		B-26	3
5340-00-057-3037	B-11	9	4730-00-249-2029	B-6	7
5310-00-068-5285	B-30	8		B-7	2
5310-00-087-7493	B-30	4	4730-00-817-1843	B-6	4
4730-00-117-8512	B-34	2	4730-00-817-1843	B-13	4
5330-00-166-0980	B-1	11	4730-00-817-1843	B-27	3
4730-00-116-6686	B-1	13	4730-00-253-4412	B-21	3
4730-00-134-6559	B-26	5	4730-00-257-2117	B-17	5
4720-00-913-5910	B-3	15		B-18	4
	BULK			B-26	4
5330-00-154-6684	B-5	6		B-30	7
5310-00-184-8974	B-5	5		B-35	5
4730-00-186-3024	B-30	5	5330-00-263-8033	B-2	6
4730-00-187-0861	B-3	8		B-3	6
4730-00-187-7610	B-12	4	5305-00-269-2806	B-5	4
4730-00-188-1846	B-6	5	4820-00-275-2224	B-10	2
4730-00-194-0216	B-19	3	4730-00-277-5553	B-12	3
	B-28	3	4710-00-277-7581	B-10	8
4730-00-196-0837	B-2	3	4730-00-277-9386	B-6	6
	B-3	4	4730-00-277-9615	B-9	2
	B-22	3	4730-00-278-0002	B-6	3
	B-23	3		B-27	4
4730-00-196-0889	B-2	4	4730-00-278-4290	B-24	3
	B-3	3		B-30	6
	B-25	4	4730-00-278-4357	B-10	5
	B-29	5	4730-00-278-8763	B-10	6
4730-00-196-0930	B-4	9	4730-00-287-1649	B-13	6
4730-00-196-0935	B-8	2		B-22	4
4730-00-196-1464	B-10	4		B-25	5
	B-22	5	5340-00-290-0783	B-3	10
	B-30	3	4730-00-415-3172	B-5	7
4730-00-196-1465	B-17	4	5310-00-514-6674	B-1	12
	B-18	3	4730-00-595-1887	B-10	3
4730-00-196-1485	B-7	3		B-20	3
	B-12	5		B-31	5
	B-35	4	4730-00-640-0632	B-11	6
4730-00-196-1487	B-13	3	4730-00-640-6330	B-14	3
9515-00-203-2064	B-11	10	4820-00-684-0880	B-13	5
	B-30	9	5365-00-684-6901	B-1	5
	BULK		4820-00-720-4488	B-6	2
4730-00-223-9255	B-14	4		B-13	2
4730-00-231-4009	B-11	7		B-14	2
4730-00-231-5590	B-3	12	5340-00-738-5174	B-1	6
4730-00-231-5642	B-22	6	4730-00-811-6205	B-17	3
	B-34	4		B-20	4
	B-35	3		B-23	4

<u>Stock Number</u>	<u>Fig No</u>	<u>Item No</u>	<u>Stock Number</u>	<u>Fig No</u>	<u>Item No</u>
4730-00-811-6205	B-25	3	4720-01-089-3071	B-16	2
	B-29	4	4820-01-120-4532	B-10	9
	B-31	4		B-17	2
4820-00-845-1096	B-7	1		B-18	2
	B-8	1		B-19	2
	B-9	1		B-20	2
	B-12	2		B-21	2
	B-15	1		B-22	2
	B-16	1		B-23	2
4720-00-857-1732	B-11	8		B-24	2
	BULK			B-25	2
4730-00-871-6729	B-3	9		B-26	2
5310-00-877-5797	B-3	14		B-27	2
4730-00-889-2474	B-11	5		B-28	2
4730-00-921-3624	B-20	5		B-29	2
	B-31	3		B-30	2
	B-34	3		B-31	2
	B-35	2		B-34	1
5330-00-599-2721	B-16	3		B-35	1
4730-00-932-1129	B-4	12		B-36	1
4730-00-947-7498	B-3	7	4730-01-129-0481	B-2	5
4730-00-959-5930	B-1	10		B-3	5
5340-00-964-5267	B-4	5	2540-01-130-3367	B-3	16
5305-00-989-7435	B-3	13	4730-01-131-7679	B-10	10
2910-00-999-9452	B-11	2	2520-01-146-8970	B-1	1
4730-01-028-4984	B-4	3	2520-01-152-8807	B-3	1
4730-01-055-7646	B-34	2	2520-01-154-3891	B-2	1
4730-01-057-6866	B-4	10	2815-01-154-9933	B-14	1
5340-01-061-2296	B-3	11	2540-01-154-9934	B-13	1
2910-01-073-0080	B-2	2	5340-01-157-8846	B-1	3
	B-3	2	4720-01-163-1093	B-1	8
	B-4	2	4720-01-163-3219	B-1	7
	B-5	2	4820-01-163-7156	B-1	2
	B-32	1	4720-01-167-0742	B-1	9
2815-01-076-4372	B-5	1			

FSCM	PART NUMBER	FIG	ITEM	FSCM	PART NUMBER	FIG	ITEM
88044	AN840-40	B-3	8	96906	MS39232-1	B-35	3
88044	AN844-4	B-3	12	96906	MS392331-1	B-3	7
88044	AN912-5	B-19	3	96906	MS39233-2	B-12	4
		B-28	3	96906	MS51500B4	B-4	10
81346	ASTM B280	B-10	8	96906	MS51503B4	B-4	12
08441	A17004-2	B-9	2	96906	MS51504B4	B-4	3
81830	BT8	B-35	5	96906	MS51506B4	B-4	6
79470	C3109-4-2	B-11	4	96906	MS51529-A4	B-1	13
		B-17	6	96906	MS51847-1	B-4	9
		B-26	3	96906	MS51847-9	B-8	2
56442	DX533AC	B-6	4	96906	MS51873-25	B-17	4
		B-13	4			B-18	3
		B-27	3	96906	MS51882-292	B-25	4
91340	D9484-5528	B-6	7	96906	MS51887-29	B-3	3
		B-7	2	96906	MS51887-29Z	B-2	4
35871	GS4	B-3	9			B-29	5
81349	MIL-H-27267-4	B-11	8	96906	MS51887-5	B-2	3
96906	MS20822-4	B-11	7			B-3	4
96906	MS21044N3	B-3	14			B-22	3
96906	MS21333-111	B-11	9			B-23	3
96906	MS21333-120	B-4	5	96906	MS51952-2	B-12	3
96906	MS21914-4	B-11	6	96906	MS51953-32	B-7	3
96906	MS21919-DF8	B-3	10			B-12	5
96906	MS21919-WDG19	B-3	11	96906	MS51953-34	B-13	3
96906	MS27053-4C	B-11	5	96906	MS51953-38B	B-27	4
96906	MS27183-13	B-30	4	96906	MS51953-388	B-6	3
96906	MS27183-20	B-30	8	96906	MS51953-6	B-20	5
96906	MS27381-4C	B-11	3			B-31	3
96906	MS28778-10	B-16	3			B-34	3
96906	MS29512-12	B-3	6			B-35	2
96906	MS35207-264	B-3	13	96906	MS8000E-320	B-4	4
96906	MS35335-34	B-1	12	96906	MS8005-E-270B	B-1	7
30327	MS35782-1	B-13	5	96906	MS8005-E-300B	B-1	8
96906	MS35782-2	B-14	2	96906	MS8005-E-310C	B-1	9
96906	MS35783-1	B-10	2	96906	MS85782-2	B-13	2
96906	MS35782-2	B-6	2	96906	MS90725-63	B-5	4
	MS35783-2	B-7	1	96906	MS90726-32	B-1	14
		B-8	1	96906	MS9193-04	B-1	10
		B-9	1	96906	MS9320-12	B-5	5
		B-12	2	96906	MS9388-012	B-1	11
		B-15	1	96906	NAS1598-6Y	B-5	6
		B-16	1	91816	P59-500	B-10	9
96906	MS39177-3	B-10	6			B-17	2
03958	MS39230-1	B-13	6			B-18	2
		B-22	4			B-19	2
		B-25	5			B-20	2
96906	MS39230-2	B-21	3			B-21	2
96906	MS39231-2	B-24	3			B-22	2
		B-30	6			B-23	2

FSCM	PART NUMBER	FIG	ITEM	FSCM	PART NUMBER	FIG	ITEM
		B-24	2	30780	1-8MMOS	B-31	5
		B-25	2	19207	192032	B-30	3
		B-26	2	11083	2R0645	B-10	5
		B-27	2	10988	221-1421	B-34	2
		B-28	2	97576	2-4PRC	B-17	3
		B-29	2			B-20	4
		B-30	2			B-23	4
		B-31	2			B-25	3
		B-34	1			B-29	4
		B-35	1	21450	443998	B-31	4
		B-36	1	10001	45C3482	B-5	7
66289	RF904	B-6	5	21450	501991	B-14	4
15434	S1022A	B-10	7	09990	53103585	B-10	4
81348	WW-N-351	B-22	5			B-33	2
81348	WW-P-501	B-34	2	00624	53109225	B-33	12
81348	WW-P-521	B-17	5	01276	53450543	B-33	4
		B-18	4	01276	53451937	B-33	21
		B-26	4			B-33	6
19207	10947970	B-11	2	90915	53516328	B-33	16
19207	10949692-1	B-3	15	90915	53516329	B-33	8
19207	116-2500	B-9	2	90915	53516332	B-33	20
19207	11669424	B-2	2	90915	53516333	B-33	11
		B-3	2	19207	5705365	B-33	1
		B-4	2	19207	5705366	B-12	1
		B-5	2	19207	5705368	B-13	1
		B-32	1	19207	5705370	B-10	1
19207	11669771	B-1	2	19207	5705372	B-11	1
19207	11684047	B-5	3	19207	5705373	B-6	1
10001	122329PC1	B-22	6	19207	5705377	B-17	1
		B-34	4	19207	5705379	B-18	1
19207	12256456-5	B-16	2	19207	5705379	B-23	1
19207	12268190	B-4	7	19207	5705380	B-22	1
19207	12268191	B-4	11	19207	5705381	B-21	1
19207	12268192	B-4	8	19207	5705382	B-24	1
19207	12268199	B-4	1	19207	5705384	B-25	1
19207	12275816	B-1	1	19207	5705385	B-19	1
19207	12308221	B-26	5	19207	5705386	B-28	1
19207	12313096	B-2	5	19207	5705387	B-27	1
		B-3	5	19207	5705388	B-26	1
19207	12313097	B-3	16	19207	5705389	B-29	1
19207	12314626	B-1	3	19207	5705390	B-30	1
19207	12314628	B-1	4			B-20	1
19207	12343161	B-30	9	19207	5705394	B-31	1
19207	12343162	B-11	10	19207	5705395	B-2	1
21450	144035	B-30	5	19207	5705396	B-3	1
30780	1-8MMOS	B-10	3	30780	6-1/4F50G-5	B-5	1
11649	SS-2-T	B-20	3	82666	613	B-10	10
						B-29	3

FSCM	PART NUMBER	FIG	ITEM
19207	7385174	B-1	6
19207	7538990	B-1	5
80049	895-80	B-6	6
92392	925010-1	B-14	3
93061	90003582	B-33	23
90915	90210020	B-33	3
90915	90709340	B-33	14
90915	90804226	B-33	18
90915	90804238	B-33	10
90915	95670105	B-33	15
90915	95670105	B-33	7
90915	96082214	B-33	13
90915	97415015	B-33	22
90915	98415045	B-33	19
90915	98415050	B-33	9
01276	99802352	B-33	5
		B-33	17

APPENDIX C

SAMPLE FORMS AND RECORDS, ARMY OIL ANALYSIS PROGRAM

C-1. Scope.

This Appendix provides samples of each Army form that directly concerns the Army Oil Analysis Program. Instructions for filling out all of the following forms can be found in TM 38-750, *The Army Maintenance Management System (TAMMS)*.

C-2. Forms/Records.

Sample forms provided in this Appendix are:

DD Form 314 - Preventive Maintenance Schedule and Record	Pg C-2
DD Form 2026 - Oil Analysis Request.....	Pg C-3
DA Form 2408-20 - Oil Analysis Log	Pg C-4
DA Form 3254-R - Oil Analysis Recommendation and Feedback.....	Pg C-6
DD Form 2027 - Oil Analysis Record.....	Pg C-8

REGISTRATION NUMBER												ADMINISTRATION NO.												NOMENCLATURE												MODEL												ASSIGNED TO											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31																													
JAN																																																											
FEB																																																											
MAR																																																											
APR																																																											
MAY																																																											
JUN																																																											
JUL																																																											
AUG																																																											
SEP																																																											
OCT																																																											
NOV																																																											
DEC																																																											
REMARKS																																																											
DATE RECEIVED												RECEIVED FROM												DISPOSITION																																			
REGISTRATION NUMBER												ADMINISTRATION NO.												NOMENCLATURE												MODEL												ASSIGNED TO											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31																													

This portion is provided for convenience in typing the lower lines on BOTH SIDES.
To be detached prior to placing in EASEX or other visible-type file.

DD FORM 314
1 DEC 55

PREVIOUS EDITIONS OF
THIS FORM MAY BE USED

PREVENTIVE MAINTENANCE
SCHEDULE AND RECORD

Figure C-1. DD Form 314 - Preventive Maintenance Schedule and Record

OIL ANALYSIS REQUEST				KEYPUNCH CODE
TO	OIL ANALYSIS LAB			1-3
FROM	MAJOR COMMAND			4
	OPERATING ACTIVITY (Include ZIP Code/APO) DODAAD			5-10
EQUIPMENT MODEL/APL				11-14
EQUIPMENT SER. NO.				15-20
END ITEM MODEL/HULL NO.				
END ITEM SER. NO./EIC				
DATE SAMPLE TAKEN (Day, Mo., Yr)		LOCAL TIME SAMPLE TAKEN		21-24
HOURS/MILES SINCE OVERHAUL				25-29
HOURS/MILES SINCE OIL CHANGE				30-33
REASON FOR SAMPLE LAB <input type="checkbox"/> ROUTINE <input type="checkbox"/> REQUEST <input type="checkbox"/> TEST CELL <input type="checkbox"/> OTHER (Specify)				34
OIL ADDED SINCE LAST SAMPLE (Pts, Qts, Gals)				35-36
ACTION TAKEN				
DISCREPANT ITEM				
HOW MALFUNCTIONED				
HOW FOUND <input type="checkbox"/> LAB REQUEST <input type="checkbox"/> AIR OR GROUND CREW				
HOW TAKEN <input type="checkbox"/> DRAIN <input type="checkbox"/> TUBE	SAMPLE TEMPERATURE <input type="checkbox"/> HOT <input type="checkbox"/> COLD		TYPE OIL	37-38
REMARKS				
<i>FOR LAB USE ONLY</i>				
SAMPLE RESPONSE TIME				39-40
FE 41-43	AG 44-46	AL 47-49	CR 50-52	CU 53-55
MG 56-58	NI 59-61	PB 62-64	SI 65-67	SN 68-70
TI 71-73	MO 74-76			
LAB RECOMMENDATION				77-78
SAMPLE NO.	SIGNATURE		FILE MAINT 79	DATA SEQ 80

DD FORM 1 NOV 77 2026 PREVIOUS EDITION WILL BE USED

Figure C-2. DD Form 2026 - Oil Analysis Request

END ITEM				COMPONENT			
1. a. NOMENCLATURE <u>CARRIER PERS</u>			2. SAMPLE FREQUENCY <u>25 HRS / 30 DAYS</u>		3. a. NOMENCLATURE & TYPE <u>ENGINE 6063</u>		
b. MAKE OR TYPE <u>MILSER</u>					b. SERIAL NUMBER <u>6079471</u>		
c. SERIAL NUMBER <u>SJ-14096</u>					c. TIME SINCE NEW OR OVERHAUL <u>120 HRS</u>		
4.	5. HOURS		6. REASON FOR SAMPLE		7. RESULTS		8. SIGNATURE
DATE	END ITEM	COMPONENT	LAST OIL CHG				
15 JAN 80	800	120	0	ROUTINE	NORMAL	Sgt. Biko	
15 FEB 80	830	150	30	ROUTINE	NORMAL	Lt Biko	
1 MAR 80	855	175	55	ROUTINE	NORMAL	Sgt. Neassy	
1 APR 80	875	195	75	ROUTINE	Re Sample Req'd	Sgt. Turner	
5 APR 80	990	300	5	Lab Req	Change Oil	Sgt. Mulvaney	
1 MAY 80	905	325	30	ROUTINE	NORMAL	Lt 4 Talier	
1 JUN 80	925	345	50	ROUTINE	Fuel Dilution Inspection Req chg oil, Re Sample	Lt. Murray	
10 JUN 80	927	347	2	Lab Req	OK Sec Remarks	Sgt. Sweeney	

DA FORM 2408-20

OIL ANALYSIS LOG

Figure C-3. DA Form 2408-20 - Oil Analysis Log (1 of 2)

[illegible]

Figure C-3. DA Form 2408-20 - Oil Analysis Log (2 of 2)

OIL ANALYSIS RECOMMENDATION AND FEEDBACK For use of this form, see TB 43-0106 and TB 43-0210; the proponent agency is DARCOM		REQUIREMENT CONTROL SYMBOL CSGLD-1818
1. TO: FIELD (Include ZIP Code and Telephone Number)	3. LAB RECOMMENDATION NUMBER	
	4. END ITEM MODEL	
	5. END ITEM SERIAL NUMBER	
2. FROM: LABORATORY (Include ZIP Code)	6. COMPONENT TYPE	
	7. COMPONENT SERIAL NUMBER	
	8. COMPONENT TIME (Hours/Miles)	
9. RECOMMENDATION AND REASON FOR ACTION		
10. SIGNATURE AND TITLE OF INITIATOR		11. DATE (Day Month Year)
12. NOTE FOR ARMY AVIATION ONLY: Quality Deficiency Report (QDR), SF 388, will be submitted when maintenance is performed due to impending or incipient failure indicated by oil analysis. Failure Code 916		13. QDR NUMBER
14. FEEDBACK (Maintenance Performed/Action Taken)		
15. FROM: FIELD/DEPOT MAINTENANCE PERSONNEL		16. DATE (Day Month Year)
17. TO: LABORATORY		NOTE FOR ARMY AVIATION ONLY: Copy of this form with SF 388 (QDR) attached will be sent to Commander, CCAD ATTN: DRSTS-MER Stop 55 Corpus Christi, TX 78419

DA FORM NOV 80 3254-R

EDITION OF JUN 78 IS OBSOLETE.

Figure C-4. DA Form 3254-R - Oil Analysis Recommendation and Feedback

REPLACES DA FORMS 4161, 4161A, 4161B, 4161C AND 4161D, OCT 73, WHICH ARE OBSOLETE

OIL ANALYSIS RECORD															REMARKS													
SAMPLE NUMBER	DATA INDEX	JULIAN DATE SAMPLE ANALYZED	RESPONSE TIME	LAST LAB RECOMMENDATION	HOURS MILES SINCE	OIL CHG	REASON FOR SMPL.	COMPONENT CONTROL NO. (CCN)	EQUIPMENT MODEL/ APL	EQUIPMENT SERIAL NUMBER	TYPE EQUIPMENT CODE	CUSTOMER IDENTIFICATION	END ITEM MODEL/HULL NUMBER	END ITEM SERIAL NUMBER	TYPE OIL													
SPECTROMETRIC ANALYSIS								FE	AG	AL	BE	CR	CU	MG	NA	NI	PB	SI	SN	TI	B	BA	CD	MN	MO	V	ZN	VALIDATION
								LAB RECOMMENDATION																				
ACTION TAKEN																												
DISCREPANT ITEM																												
HOW MALFUNCTIONED																												
HOW FOUND																												

Figure C-5. DD Form 2027 - Oil Analysis Record (1 of 2)

SAMPLE NUMBER		DATA INDEX		JULIAN DATE SAMPLE ANALYZED		RESPONSE TIME		LAST LAB RECOMMENDATION		HOURS MILES SINCE		SPECTROMETRIC ANALYSIS
OVHL	OIL CHG											
REASON FOR SMPL												SPECTROMETRIC ANALYSIS
FE												
AS												
AL												
BE												
CR												
CU												
MG												
NA												
NI												
PB												
SI												
SN												
TI												
B												
BA												
CD												
MN												
MO												
V												
ZN												
VALIDATION												SPECTROMETRIC ANALYSIS
LAB RECOMMENDATION												
ACTION TAKEN												
DISCREPANT ITEM												
HOW MALFUNCTIONED												SPECTROMETRIC ANALYSIS
HOW FOUND												

Figure C-5. DD Form 2027 - Oil Analysis Record (2 of 2)

APPENDIX D

EXPENDABLE SUPPLIES AND MATERIALS LIST

EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION FSCM & PART NUMBER	(5) U/M
1	C	4720-00-964-1433	Tubing, Non-Metallic (31375) PEPCO714- 1/4 OD	1,000 FT
2	C	8125-01-082-9697	Bottle, Oil Sampling (81349) MIL-B-44054	120 EA
3	O	8030-00-656-1426	Sealing Compound (77247) FORMAGASKET	PT

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