

**MAINTENANCE MANUAL****1/2 TON 4 x 2 CHASSIS****DODGE TRUCKS****built for****UNITED STATES ARMY****Contract No. W-398-Q.M.-11399**

<u>Model</u>	<u>Type of Vehicle</u>	<u>U.S.A. Registration Nos.</u>
WC-47-USA	Closed Cab—Pickup	W-244725 to W-245114
WC-48-USA	Carryall	W-2054363 to W-2054736
WC-49-USA	Panel	W-245115 to W-245122
WC-50-USA	Closed Cab—Telephone Maintenance Body	W-006930

**CHRYSLER CORPORATION****Dodge Division****Detroit, Michigan**

**TM 10-1379**

**WAR DEPARTMENT**

Washington, February 1, 1942

TM 10-1155, Maintenance Manual, Truck, 1/2-ton 4x2, Dodge (Models WC-47, WC-48, WC-49 and WC-50) published by the Chrysler Corporation, Dodge Division, is furnished for the information and guidance of all concerned.

(AG 062.11 (4/26/41) PC (C), June 10, 1941.)

By order of the Secretary of War:

G. C. Marshall  
Chief of Staff

Official:

E. S. Adams  
Major General  
The Adjutant General

# MAINTENANCE MANUAL FOR UNITED STATES ARMY DODGE 4 x 2 TRUCKS

## FOREWORD

**T**WO objectives have been considered in the preparation of this manual.

- 1. OPERATION AND CARE OF THE TRUCK:** The manual contains practical and useful operating instructions and maintenance suggestions for the guidance of DRIVERS responsible for the operation of Dodge 4 x 2 Army Trucks. This information is written with the aim of promoting uninterrupted truck performance under different driving conditions encountered in Army Maneuvers.
- 2. REPAIRING THE TRUCK:** The manual contains practical and workable mechanical instructions adequately illustrated with "action" pictures and "exploded" views. This information is for the use of the MECHANIC whose responsibility is to keep the truck in operation. The "Service Diagnosis" charts will also help the mechanic to analyze his problems before attempting a solution.

The contents of the manual are arranged in group sequence as indicated in the index in the right-hand margin of this page. Each group is divided into "Subjects" or Service Operations which are numbered consecutively throughout the manual. These subject numbers are used in order to make quick reference to related subjects. For example, in the Rear Axle group, Subject 43, on page 25, refers to several other subjects which are related to the procedure of removing and installing a rear axle housing.

The last group of the manual entitled "Service Standards" is a tabulated summary of adjustment specifications, dimensions of parts and name and type of units built by other manufacturers.

Special service tools mentioned throughout the manual are obtainable from the Miller Tool & Manufacturing Company, Detroit, Michigan.

The number, TM-10-1155, assigned to this manual appears on a Maintenance Number Plate attached to the compartment door on the instrument panel. The Maintenance Number Plate also contains a number for the Parts List so that both the Maintenance Manual and the Parts List, applicable to the truck being serviced, can be easily identified by referring to the Maintenance Number Plate.

**CHRYSLER CORPORATION**

*Dodge Division*

**DETROIT, MICHIGAN**

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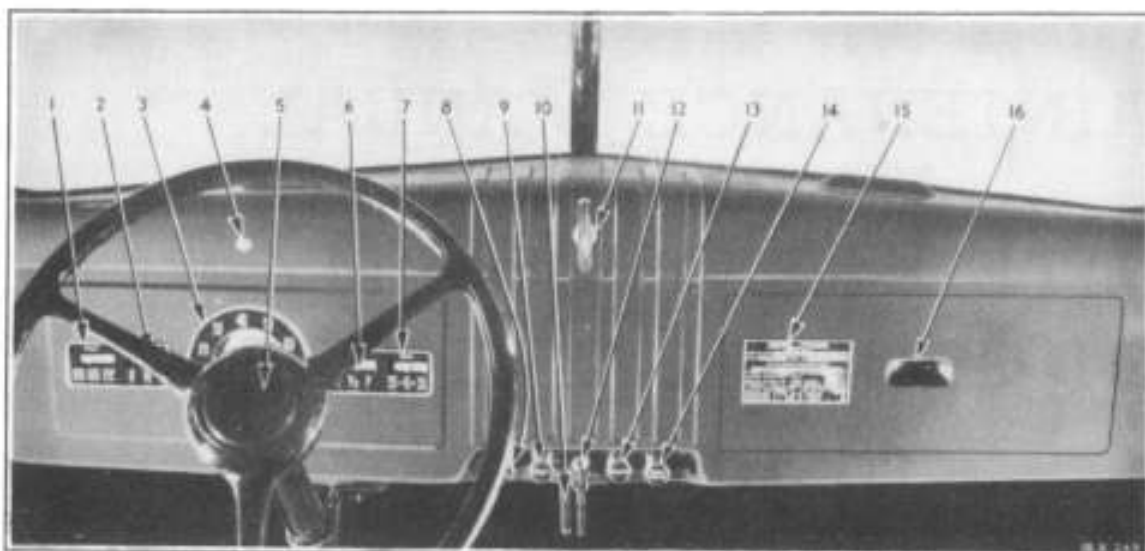


Fig. 1—Instrument Panel

- 1—Heat indicator
- 2—Oil pressure gauge
- 3—Speedometer
- 4—Headlight bright beam indicator light
- 5—Horn button

- 6—Fuel gauge
- 7—Ammeter
- 8—Head light switch
- 9—Carburetor choke control button
- 10—Cowl ventilator handle

- 11—Windshield regulator handle
- 12—Ignition lock switch
- 13—Throttle control button
- 14—Instrument panel light switch
- 15—Serial number plate
- 16—Compartment door

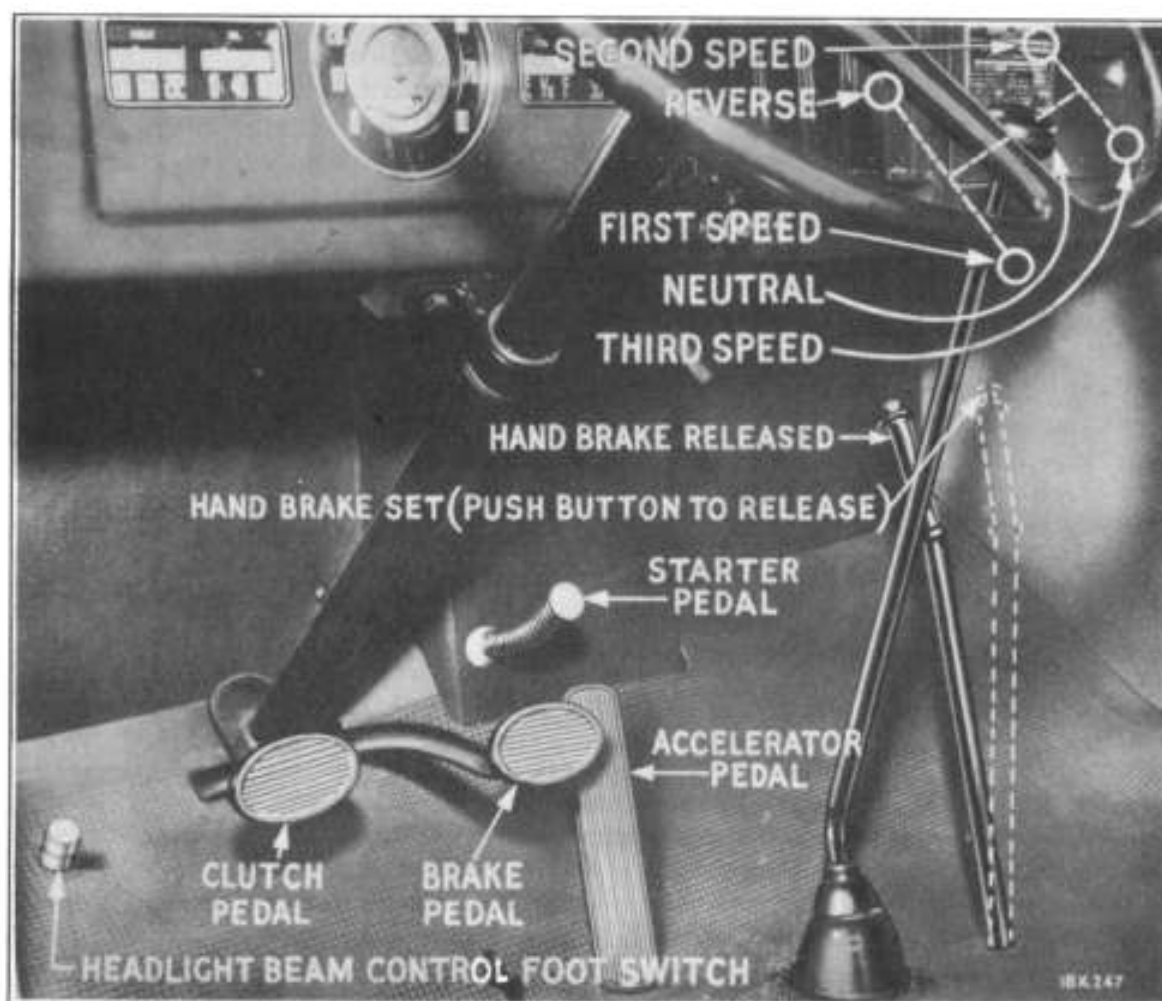


Fig. 2—Front Compartment

# OPERATING INSTRUCTIONS

It is important that the driver learn the purpose of each control lever, pedal and button before driving; then he will find the driving easier than trying to develop such knowledge while driving.

## THE CONTROLS

The accompanying illustrations (Figs. 1 and 2), show the location of each control. By knowing the purpose of each control and how to use it, the driver who is unaccustomed to driving a Dodge 4 x 2 Army Truck will find it easier to follow the "Operating Instructions" contained in this section of the Manual.

### 1—Ignition Lock Switch

The ignition lock switch (12, Fig. 1), can be operated only when the key is inserted and turned to the right (clockwise). In this position the ignition and fuel gauge circuits are connected. The key cannot be removed unless the thumb piece of the key is vertical.

#### Keys

When the truck is shipped two identical keys are shipped with the vehicle. These keys will fit all locks used on the vehicle.

### 2—Choke Control

The choke control button (9, Fig. 1), closes the choke when the control button is pulled "out" to the limit of its travel. Pull the choke control "out" when starting a cold engine and gradually push it in as the engine becomes warm. Always run the engine with the choke button pushed in after the engine has reached normal operating temperature. Excessive use of the choke causes a flooding condition in the engine and excess fuel works its way past the pistons into the crankcase diluting the engine oil. It also increases fuel consumption unnecessarily.

### 3—Hand Throttle

The hand throttle control button (13, Fig. 1), is for use when starting the engine. It can also

be used when starting the truck on steep hills where both feet are necessary to operate clutch and brake pedals. Pulling the button outward opens the throttle.

### 4—Accelerator Pedal

The accelerator pedal (Fig. 2), is used to control engine speed with the foot while driving the truck.

### 5—Starting Motor Pedal

This foot pedal (Fig. 2), is for operating of the starting motor which cranks the engine. It is located above the accelerator pedal so that it can be easily reached for starting the engine.

*CAUTION: Do not press the starter pedal with the gearshift lever in gear or while the engine is running. See Subject 20.*

### 6—Clutch Pedal

Pressing the clutch pedal (Fig. 2), down to the floor board, disengages the clutch so that the transmission gears may be shifted.

### 7—Transmission Gearshift Lever

This lever (Fig. 2), controls the shifting of all gears in the transmission. The diagram in the illustration shows the different positions of the lever for various gear selections in the transmission.

*CAUTION: Do not attempt to start the engine unless the gearshift lever is in neutral position. See Subject 20 for further explanation of the gearshift lever.*

### 8—Hand Brake Lever

The hand brake (Fig. 2), is used principally for holding the truck while parked. When parking on a grade, turn the front wheels off the straight-ahead position. The hand brake is released when the lever is in the extreme forward position and applied when moved back toward the seat. When pulled back, the lever will lock in position but may be released by pressing the release button (on top of the lever) down and pushing the lever forward.

### 9—Brake Pedal

The brake pedal (Fig. 2), is used to slow down or stop the vehicle. See Subject 24.

### 10—Headlight Switch

This switch (8, Fig. 1), controls the headlights, parking lights and tail light. Pull button out to its first stop to turn on parking lights and tail light. When the button is pulled all the way out to the limit of its travel, the main headlights and tail light are turned on.

### 11—Instrument Panel Light Switch

The instrument panel lights may be turned on by pulling this switch (14, Fig. 1), out to the limit of its stop.

### 12—Headlight Beam Control Switch

This foot switch (Fig. 2), controls the high and low beams of the headlights. (The switch operates only when the headlights are turned on by the hand operated switch on the instrument panel.) Press the button with the foot to raise or lower the headlight beams. The switch locks each time the button is pressed. A red indicator (4, Fig. 1), on the instrument panel is illuminated only when the high beam is turned on.

### 13—Oil Pressure Gauge

The oil pressure gauge (2, Fig. 1), should register about 15 pounds pressure when the engine is running at slow idle speed, but at speeds above 30 miles per hour, the gauge should show from 30 to 45 pounds pressure.

If the gauge registers too low a pressure, especially at speeds above 30 miles per hour, or fluctuates between 0 and 45 pounds (except at slow engine speed) check the engine oil level immediately. If the engine oil is at the proper level and the gauge still registers too low a pressure, or none at all, report the condition at once to the motor officer.

### 14—Ammeter

The ammeter (7, Fig. 1), registers rate of charge or discharge of the battery. In other words, it indicates the charging condition of the generator and the consumption of electricity in the system. When the electrical units are drawing more electricity than the generator is charg-

ing, the pointer on the ammeter will be on the negative (—) side of zero and when charging more than is being consumed, the pointer will be on the positive (+) side of zero. Electricity consumed by the starting motor is not registered by the ammeter. If, when all electrical units are switched off, the ammeter pointer registers on the negative (—) side of zero there is a leakage of electricity somewhere in the system, and the condition should be corrected at once.

While driving the truck, the ammeter hand may gradually approach zero. This indicates that the battery requires less current at that time and the voltage regulator is preventing overcharging. The ammeter should not show more than 10 ampere charge above 30 m.p.h. after the first 30 minutes of continuous driving. If it shows more than 10 amperes, with battery specific gravity of 1.275 or higher, the voltage regulator unit should be checked.

### 15—Heat Indicator

The heat indicator (1, Fig. 1), shows the temperature of the water in the engine above 100°F. Never warm the engine quickly by running it fast just after starting. When driving, glance at the heat indicator occasionally to see that it does not register too hot. If it registers 200 degrees or more, the engine is too hot and should be stopped. Usually this is caused by insufficient water in the radiator, broken or loose fan belt. Whatever the cause of overheating may be, have the condition corrected before continuing to drive the truck.

### 16—Fuel Gauge

The fuel gauge (6, Fig. 1), operates when the ignition switch key is turned to the right (clockwise). It is electrically operated and indicates the level of the fuel in the tank. The letter "E" means empty, the letter "F" means full and "1/2" sign means half full.

## OPERATING THE TRUCK

### 17—Vehicle Inspection

Do not attempt to start a new vehicle after it is unloaded from a freight car until the following inspections have been made:



**(a) Starting Motor Cable**

On trucks shipped by rail, connect the starting motor cable to the starter switch terminal.

**(b) Cooling System**

On trucks shipped by rail, tighten the drain cocks (one located at the bottom of the radiator and the other located on the left side of the engine). Fill the cooling system with water or antifreeze solution, depending on the season of the year. Make sure all the hose connections are tight.

**(c) Engine Oil Level**

Check the level of the engine oil. The oil level gauge rod, which is located on the left side of the engine between the distributor and the starting motor, is marked at "full" and "half-full." A third marking, between "full" and "half-full," indicates the "running" level. The "full" mark shows the proper level of oil before the engine has been run. Never allow the oil level to drop below the "half-full" mark.

**(d) Brake Fluid**

Inspect the level of the fluid in the brake master cylinder which is located just below the starting motor on the left side of the engine. Fluid level should not be lower than  $\frac{1}{2}$ " from the bottom of the reservoir cover.

**(e) Battery and Connections**

Check the level of the electrolyte solution in the battery and add distilled water if necessary. To fill batteries with special vent plugs, remove the filler plugs and attach them to the vents. Fill each cell to the top of the filler plug opening, then remove the plugs from the vents, and the electrolyte will drop to the proper level which is  $\frac{3}{8}$ " above top of plates. See that the battery connections are tight.

**(f) Chassis Lubrication**

Refer to the Lubrication Chart (Fig. 6) for complete lubrication instructions. Be sure to check the level of the lubricant in the following assemblies:

- |                   |   |
|-------------------|---|
| (1) Transmission  | } The lubricant should be level with the filler plug opening. |
| (2) Rear axle     |   |
| (3) Steering Gear |   |

**(g) Wheels and Tires**

Check all tires and inflate or deflate to the correct pressure (40 lbs. for 6:50/16—6-ply.)

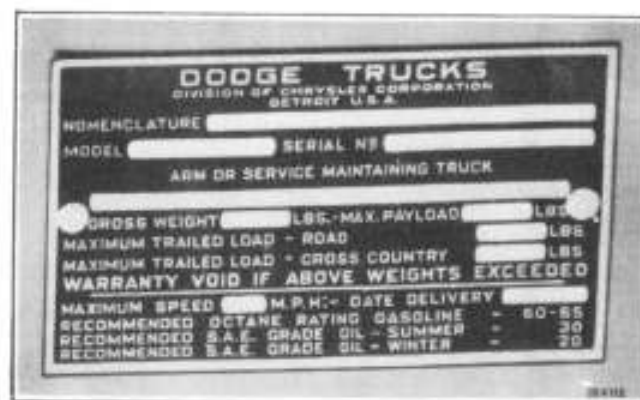


Fig. 3—Chassis Serial Number Plate  
Attached to compartment door on instrument panel. Plate also contains other useful truck information.

Make certain that the wheel attaching nuts are securely tightened.

**(h) Hold Down Straps**

On rail shipped vehicles, hold down straps are fastened to the frame side members under each fender. These should be removed after the vehicle is unloaded as there is danger of interference between the straps and other vehicle parts.

**18—Breaking-in Speeds**

The life of a truck depends largely upon the care it receives during the first 500 to 1500 miles of operation.

New engines should never be run at speeds equivalent to a truck speed of more than 25 miles per hour in direct drive during the first 500 miles of operation. During the next 1500 miles the speed may be gradually increased to complete the "breaking-in" process. The truck must not be driven at continued full speed nor should it be subjected to heavy load pulls during the first 2000 miles. Maximum power and speed should not be required from the truck until after it has been driven about 2000 miles. This mileage is necessary to make sure of all internal friction of the engine being minimized.

When starting any cold engine (whether new or not), care should be exercised during the warm-up period because lubrication is not as efficient when the engine is cold. Drive slowly until normal operating temperature is reached. The cause of damage to bearings and pistons in new engines as well as in engines operated at subnormal temperatures is due principally to extreme high temperatures of the frictional surfaces.

Avoid premature engine wear by giving the engine a chance to reach its normal operating temperature before subjecting it to heavy loads or maximum speed.

## 19—Starting the Engine

Before starting the engine, make sure that the transmission gearshift lever is in neutral position.

**If the engine is cold proceed as follows:**

- (a) Disengage the clutch.
- (b) Pull out choke button full distance of its travel.
- (c) Turn on ignition (turn key to right, clockwise) and step on starting motor pedal, keeping it engaged until engine starts. After engine starts, gradually push in choke button to give proper operation.

Under extreme cold starting conditions it is advisable, to insure good starting, to pull out the hand throttle control button to give approximately one-third throttle opening.

**CAUTION:** Do not pump the foot accelerator before or during starting, as this will cause difficult starting.

**If the engine is warm proceed as follows:**

- (a) Disengage the clutch.
- (b) Turn on ignition switch and step on starting motor pedal, keeping it engaged until the engine starts.

Under extreme hot starting conditions it is advisable, to pull out the hand throttle to give approximately one-third throttle opening.

**CAUTION:** Do not pump the foot accelerator before or during starting as this will cause difficult starting.

## 20—Driving the Truck

Under nearly all conditions, the truck should be started in low gear, and shifted to second gear at about 10 miles per hour. It is usually best to shift into high gear at 20 to 25 miles per hour. The transmission gears should be shifted as follows:

- (a) Press the clutch pedal (Fig. 2), down to the floor, then move the transmission gear shifting lever to 1st speed position. Next, press the accelerator (Fig. 2), to speed up

the engine a little and at the same time gradually relieve pressure on the clutch pedal. This engages the clutch and starts the truck moving. When the clutch is fully engaged (no pressure on the foot pedal), press the accelerator until the vehicle attains the desired road speed.

- (b) With the vehicle in motion, press the clutch pedal to the floor and release accelerator at the same time. Then move the transmission gear shifting lever to 2nd speed position, engage the clutch and press the accelerator pedal until the desired speed is attained. The shift to 3rd speed (high) is made in the same manner as the shift from 1st to 2nd speed.
- (c) To shift into reverse, depress the clutch pedal and move the gearshift lever to the position shown in Fig. 2. Then release the clutch pedal, and press the accelerator pedal at the same time until the desired speed is attained.

## 21—Driving Up or Down Steep Grades

Many drivers feel a certain sense of shame in shifting out of high gear when climbing a long or steep hill. Even if a steep hill can be climbed in high, it is usually better to shift into second while the vehicle still has good momentum, thereby saving time as well as strain on the engine and minimizing the inconvenience of stalling.

Before starting down a steep or long grade, it is advisable to shift to the same gear that would be used when driving up the hill. Shift to the lower gear and engage the clutch at once to hold the vehicle speed down. Do not allow the vehicle to gain speed after shifting to a lower gear and then engage the clutch, as such an operation is almost sure to cause damage to the drive line of the vehicle.

**CAUTION:** Do not permit truck to reach excessive speeds in first or second gear when traveling downhill, because excessive engine speed developed under such conditions might cause damage to engine bearings, pistons, valves, etc.

## 22—Sand and Gravel

Drive slowly in loose dry sand or fresh thick gravel, even though the engine will propel the truck at a higher speed, because difficulty may be encountered in steering the truck due to the wheels sliding.



Loose sand or gravel under the tires is dangerous when rolled by the force of the truck. When approaching a sand or loose gravel road, slow down, because after driving on a smooth, hard-surfaced road, the truck will be moving too fast for good steering control on the soft road.

Some types of road have a strip of fresh loose gravel on one side and hard smooth surface on the other side. *Never drive into such a road surface at high speed.* The soft surface material has a tendency to pull the truck farther toward the side on which the soft material is laid.

When starting the truck in sand or loose gravel, release pressure on the clutch pedal slowly so as not to spin the wheels. Spinning the wheels causes them to work their way down into soft road surfaces and wears the tires unnecessarily.

### 23—Soft Terrain and Deep Mud

When a truck becomes mired in soft terrain or deep mud good judgment should be used if any attempt is made to drive the vehicle out under its own power. Any piece of mechanical equip-

ment has its limitations. The axle, propeller shaft, transmission, clutch and engine will withstand a great amount of abuse, yet there is a limit to the amount of abuse to which these units should be subjected.

If the vehicle is pulling through soft mud and the driving wheels start spinning, the engine should not be raced and no attempt should be made to "jump" the vehicle out of the mud. Racing the engine usually results in digging the driving wheels deeper in the mud, and trying to "jump" the vehicle may lead to destruction of some part of the drive line such as the clutch, transmission, propeller shaft, or axle. When the vehicle is hopelessly mired in deep mud, it should be towed out by another truck.

### 24—To Stop the Vehicle

Remove pressure on foot accelerator and apply the brakes by pressing down on the brake pedal (Fig. 2). When the truck has been slowed down to engine idling speed, disengage the clutch and move the transmission gearshift lever to neutral position. When the truck has come to a complete stop, release the clutch pedal and apply the hand brake lever (Fig. 2).

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## LUBRICATION

There are numerous moving parts in a truck which should be lubricated with the correct grade of lubricant at specified mileage intervals to avoid rapid wear.

The Lubrication Chart (Fig. 6), shows the type lubricant which should be used in the various units of the truck. It is important that the chart be studied carefully by all concerned with the lubrication of motor trucks and that the proper lubricants be provided and used according to the chart.

### 25—When to Change Engine Oil

During the first 1,000 miles, it is recommended that the engine oil which is in the crankcase, when the truck is delivered, be used. If necessary to add oil during the first 1,000 miles, No. 10-W should be used regardless of the season of the year or regardless of climatic conditions.

After the initial oil change at 1,000 miles, oil changes should then be made, *under normal conditions*, every 1,500 to 2,000 miles during winter and every 2,500 to 3,000 miles during summer. The refill capacity is 5 quarts.

#### Winter Driving

During winter, if the truck is driven for short distances of only a few miles at a time, water will condense in the crankcase and form a sludge which may freeze and clog the oil inlet screen. This is especially true if winter temperatures are extremely low for an extended period of time. Under conditions of this kind, the engine does not become sufficiently warm to expel the water through the crankcase ventilation system, and the oil should, therefore, be changed about every 500 miles, and under extreme conditions, less than 500 miles, to eliminate sludge. The



Fig. 4—Engine Oil Level Indicator Location

engine should be thoroughly warm before it is drained.

As an alternative to this frequent change period during winter, an occasional drive of 30 miles or more at speeds of 30 miles per hour or higher, will do much to eliminate the water through the crankcase ventilation system and the change period may then be extended to 1,000 miles, or the normally recommended 1,500 mile winter change if these longer drives are indulged in frequently.

#### Dusty Roads and Dust Storms

Driving over dusty roads or through dust storms introduces abrasive material into the engine. Air cleaners which are kept in good condition decrease the amount of dust that may enter the crankcase. However, if the oil becomes contaminated with dust or dirt, it should be drained promptly to prevent harmful engine wear. The frequency of draining depends upon the severity of the dust conditions and no definite draining periods can be recommended.

**IMPORTANT:** It is always advisable to drain the crankcase while the engine is at normal operating temperature. Oil will drain more completely when hot, and will, therefore, carry more of the foreign material and dirt with it if drained while the engine is warm.

## 26—Checking Oil Level

Each time a truck is refueled, the oil level should be checked. See Fig. 4. The oil level indicator is marked at "full" and "half-full." A third marking, between "full" and "half-full," indicates the "running" level. The "full" mark shows the proper level of oil after the engine has *not* been run for a few hours. As soon as the engine is started running, the level will drop somewhat, due to filling of oil passages and the filter.

Oil should not be added until the level is below "running level" as shown in Fig. 5, when one quart may be added. *The level should never be allowed to drop below the "half-full" mark.* The truck should be on a level surface when checking the oil level.

## 27—Engine Oil Recommendations

The grade of oil to be used in the engine depends on the anticipated minimum atmospheric temperature for the period during which the oil is to be used, as indicated in the following table:

<i>Anticipated Atmospheric Temperature</i>	<i>Grade to Use</i>
Not lower than 90°F.	S.A.E. 40
As low as 32°F.	S.A.E. 30
As low as + 10°F.	No. 20-W
As low as — 10°F.	No. 10-W
Below — 10°F.	No. 10-W plus 10% Colorless refined kerosene

The interpretation of this table means that S.A.E. 30 is recommended as a general summer



Fig. 5—Engine Oil Level Indicator