TM 10-1563

MAINTENANCE *Manual*

GASOLINE · DIESEL GMC TRUCKS

2½ TON · 6 x 6

Built for

UNITED STATES ARMY
MODELS CCKW 352 & 353

CONTRACT NUMBER W-398-QM-11595

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General Motors Truck

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TM 10-1563

WAR DEPARTMENT

Washington, November 15, 1942

TM 10-1563, Maintenance Manual, Truck, 2-½ Ton, 6 x 6 GMC (Models CCKW-352—353) published by the Yellow Truck & Coach Manufacturing Company 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:
J. A. ULIO,
Major General,
The Adjutant General

Introduction

This Maintenance Manual applies on GMC trucks indicated by model numbers shown on cover. It was compiled by GMC for use by the United States Army—in accordance with latest Army specifications—and has been officially approved for such use by the War Department, whose authentication notice appears on inside front cover.

A copy of this book is placed in each truck on which it applies before the vehicle leaves the factory. To definitely identify the book with the truck, the Army has assigned a Technical Manual (abbreviated TM) number to the publication. This TM number appears in upper right and lower left corners of cover, and in addition, this same TM number appears on the truck in the form of a publication plate as illustrated on page 4. Thus, to be sure of what Manual or Parts List to use, look at publication plate in driver's cab for TM number and use only the book having corresponding TM number on its cover.

How To Use This Manual

Adhering strictly to Army specifications, this book is arranged according to the Army's "Functional Group Code" which is represented by the quick reference index along the right hand margin of the first page. Groups appear in the book in the same order shown in index.

The first page of each group referred to in the quick reference index is indicated with a black thumb dot including the group number. Thus, each group may be located quickly by bending book slightly to expose these thumb dots which line up with corresponding group numbers in index on first page.

To make contents of this book even more quickly located, each group has its own quick reference index. This appears at the beginning of each group and consists of a list of all principal paragraphs contained in the group — each paragraph is numbered and appears numerically throughout the group. Wherever possible, material is shown in each group in the following order:

DESCRIPTION AND OPERATION
TROUBLE SHOOTING AND GENERAL SOLUTIONS
INSPECTION AND ADJUSTMENT
REMOVAL AND INSTALLATION
REPAIR
SPECIFICATIONS
TOOL EQUIPMENT

TO SUMMARIZE: Select group from index on first page — bend book back slightly to expose tab on first page of group — note paragraph number of subject wanted — refer to paragraph for detailed information.

GENERAL DATA

Type	270
Horsepower—S.A.E.	34.35
Displacement—Cu. In.	269.5
Bore	$3^{25}/_{32}$"
Stroke	4"
Cylinders	6
Engine Governed Speed (R.P.M.)	2750

CAPACITIES

Fuel Tank (gallons)	40
Engine Crankcase—Refill—including filter (quarts)	11
Cooling System (quarts)	19
Transmission (pints or pounds) (early type without P.T.O.)	13
Transmission (pints or pounds) (late type without P.T.O.)	9
Transmission (pints or pounds) (early type with P.T.O.)	14
Transmission (pints or pounds) (late type with P.T.O.)	10
Oil Bath Air Cleaner (quarts)	1
Winch (for trucks so equipped) (pints or pounds)	$3\frac{3}{4}$
Models CCKW-352 and 3—Split Type	
Transfer Case (pints or pounds)	7
Front Axle Differential (pints or pounds)	7
Rear Axle Differential (pints or pounds)	7
Models CCKW-352 and 3—Banjo Type	
Transfer Case (pints or pounds)	4
Front Axle Differential (pints or pounds)	13
Front Rear Axle Differential (pints or pounds)	13
Rear Rear Axle Differential (pints or pounds)	$10\frac{1}{2}$

DIMENSIONS

NOTE: Height, Width and Length dimensions shown apply only when these trucks are equipped with cargo body, bows and tarpaulin.

	CCKW-352	CCKW-353
Turning Radius (front axle disengaged)	RH 68'-LH 70'	RH 70'-LH 72'
Height (Overall)	108"	108"
Width (Overall)	88"	88"

	CCKW-352	CCKW-353
Length (Overall) with cargo body but without winch	231"	256"
Length (Overall) with cargo body and with winch	245"	270"
Road Clearance	$17\frac{1}{4}$"	$17\frac{1}{4}$"

MODEL IDENTIFICATION

GMC truck models on which this publication applies are:

CCKW-352 ... 145" Wheelbase
CCKW-353 ... 164" Wheelbase

Letters are used to indicate specific body style and winch equipment. This letter appears in the serial number directly after the model number shown above, and is one of the following, depending on equipment used:

"A"—Cargo Body—No Winch.
"B"—Cargo Body—With Winch.
"C"—Stock Rack.
"D"—Fuel Tank Body—No Winch.
"E"—Fuel Tank Body—With Winch.
"F"—Van Type Body.
"G"—Water Tank Body.

Numbers are used to indicate type of axles used. These numbers appear in serial number directly after the letters shown above, and is one of the following, depending on axle used:

"1"—Axles having "Split Type" housings.
"2"—Axles having "Banjo Type" housings.

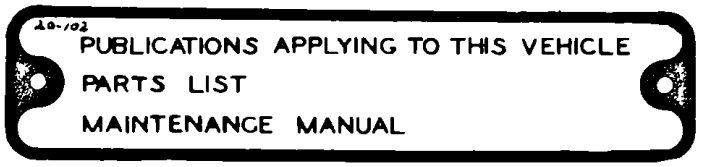
TORQUE WRENCH SPECIFICATIONS

Recommended specifications for proper torque to apply at points throughout the vehicle are as given below. Figures shown are foot pounds of torque with threads clean and dry. If threads are cleaned and oiled, the figures shown may be reduced about 10%.

Description	Ft. Lb. Torque
Axle Flange Nuts	35-40
Differential Carrier (Banjo Type)	60-70
Differential Carrier (Split Type)	25-30
Generator	22-26
Starter	40-50
Connecting Rod Bearing Bolts	40-50
Cylinder Head	60-70
Engine Mountings (Front)	35-42
Engine Mounting (Rear)	70-80

Description	Ft. Lb. Torque
Flywheel to Crankshaft	35-40
Main Bearing Caps	70-80
Exhaust Manifold	15-20
Intake Manifold	15-20
Boggie Mountings	140-155
Spring Mounting—Front ("U"-Bolts, $\frac{3}{4}$")	170-185
Spring Mounting Rear ("U"-Bolts, $\frac{7}{8}$")	200-220
Steering Mounting to Frame	160-170
Transfer Case Caps	20-25
Universal Joints	20-25

PUBLICATION PLATE



"Publication Plate"—gives **TM** number of Maintenance Manual and Parts List to use for each vehicle and is located in Driver's cab. Additional information on **TM** number application is given on Page 3 of this book.

Group D — Driver's Instructions

GENERAL

1. INSTRUCTIONS TO DRIVERS

Our instructions to Drivers constitute one of the most important purposes of this manual—as it is our contention that good driving embraces more than the basic actions of starting, operating and stopping a motor vehicle. By adhering to good driving practices and through complete knowledge of the vehicle, a good Driver will obtain the utmost in reliable performance and stamina inherent in all GMC vehicles.

The natural function of a GMC truck is smooth and rhythmic without sharp clicks, knocks, or unusual sounds. The good Driver soon becomes accustomed to the operation or "feel" of his vehicle and, regardless of his knowledge of its mechanical construction, is quick to detect any changes in its normal operation. On the other hand the Driver is not expected to rely entirely upon sound or instinct for trouble diagnosis—and accordingly, instruments are provided which indicate the condition of such vital items as engine temperature, engine oil pressure, electrical charging rate, quantity of fuel, etc., all of which are useful aids to good driving.

In addition to the information contained in this section, we particularly refer all Drivers to "Trouble Shooting and General Solutions" in each group of this book. Careful study of these items will enable the Driver to recognize even gradual changes in the mechanical condition of various units, and will thus encourage the application of corrective service **before** failure and **before** costly repairs become necessary.

Whether or not the Driver is thoroughly acquainted with properly handling a truck, or is only a beginner, the information given in this section of the book should be studied carefully to assure complete familiarity with the details of operation which apply to these particular vehicles.

2. TROUBLE SHOOTING AND GENERAL SOLUTIONS

Engine operating troubles may be classified into three groups, or conditions, as follows:

1—Failure to start. 2—Misfiring. 3—Uneven Running.

Diagnosing these conditions is simplified by use of chart as shown on page two. Apply starter in usual manner, follow the chart and these suggestions:

DRIVER'S INSTRUCTIONS

1. If starter cranks engine normally but **engine does not start:**

(a) Test for spark as shown. If no spark is obtained, causes of engine failing to start are listed in Group No. 1.

(b) If spark is weak, causes of engine failing to start are as shown in Group No. 2.

(c) If no spark is evident, engine fails to start for one or more reasons as listed in Group No. 3.

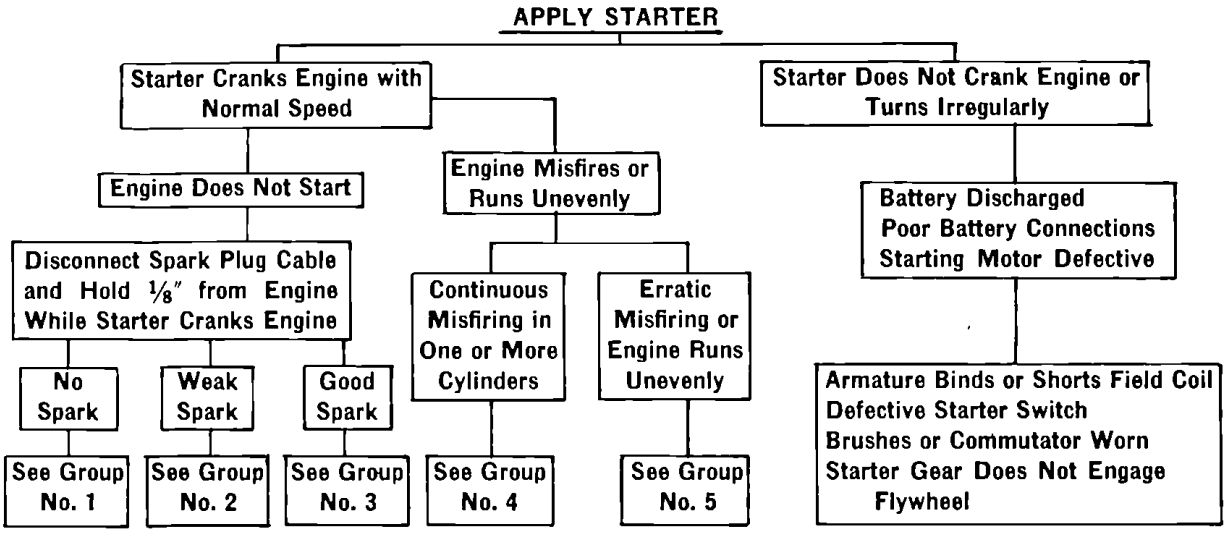
2. If starter cranks engine normally but engine **misfires or runs unevenly:**

(a) Causes of continuous misfiring are as shown in Group No. 4.

(b) Causes of erratic misfiring or engine running unevenly are shown in Group No. 5.

3. If upon applying starter, it does not crank engine, or turns irregularly, note causes shown in chart.

ENGINE FAILS TO START—MISFIRES—OR RUNS UNEVENLY



GROUP NO. 1—ENGINE WILL NOT START—SPARK TEST INDICATES "NO SPARK"

Note: The ammeter on instrument panel will be a valuable aid in localizing defect in circuit which results in "NO SPARK."

A. Ammeter Shows No Discharge—zero reading:

If ammeter shows no discharge, it is an indication that primary circuit is interrupted and current is not allowed to complete circuit to battery. The following conditions apply:

(1) Breaker points are excessively burned or pitted.....Clean or replace
(2) Breaker points in distributor not closing.....Readjust or replace
(3) Loose connections from starter to ignition switch.....Clean and tighten
(4) Primary wire from ignition switch to coil or from coil to distributor may be broken or connections loosened.....Repair or tighten
(5) Ignition coil primary windings may be open.....Repiace ignition coil
(6) Ignition switch is defective.....Replace

B. Normal Ammeter Reading—needle oscillates between two and five amperes discharge while starter is cranking engine:

When ammeter reading is normal (slight oscillation) it indicates that primary circuit is complete—therefore checking should be confined to secondary circuits as follows:

(1) High tension wire from coil to distributor may be broken or grounded.....Repair or replace
(2) Defective ignition coil or condenser.....Install new part
(3) Defective distributor rotor or distributor cap.....Install new part
(4) High tension wires may be wet.....Dry thoroughly

C. Ammeter Indicates Abnormal Discharge—more than two to four amperes:

This condition is an indication that a "short" exists (between the ammeter and the ignition coil; or, in event of a shorted primary winding in ignition coil, "short" may exist in distributor as follows:

(1) Distributor points may not be opening.....Readjust points
(2) Condenser may be "shorted".....Install new condenser
(3) Primary winding in ignition coil may be "shorted".....Install new coil
(4) Breaker point arm in distributor may be grounded.....Clean or replace
(5) Wire from ammeter to ignition switch or from ignition switch to ignition coil may be "shorted" or grounded.....Repair or replace

DRIVER'S INSTRUCTIONS

GROUP NO. 2—ENGINE WILL NOT START—SPARK TEST INDICATES "WEAK SPARK"

1. Distributor points may be burned or badly pitted.....Clean or replace
2. Defective distributor condenser.....Install new condenser
3. Defective ignition coil.....Install new coil
4. Loose electrical connections throughout circuit will cause "voltage drop".....Locate and tighten
5. High tension (secondary) wires may be defective or wet.....Clean or replace
6. Defective distributor cap.....Install new cap
7. Defective distributor rotor or broken rotor brush.....Install new rotor

GROUP NO. 3—ENGINE WILL NOT START—SPARK TEST INDICATES "GOOD SPARK"

When test indicates a good spark is occurring at each spark plug, the ignition system may be eliminated and the fuel system should be checked as follows:

A. If inspection reveals gasoline to be present in carburetor—the following apply:

(1) Carburetor may contain dirt and water.....Remove and clean
(2) Carburetor may be flooded through excessive use of choke or incorrect float level adjustment.....Adjust float level
(3) Choke control may not be operating.....Check linkage

B. If no gasoline is reaching carburetor, the following should be checked:

(1) Fuel tank empty.....Add fuel
(2) Fuel lines may be clogged.....Remove and clean
(3) Fuel pump may be inoperative.....Disconnect outlet line and test
(4) Vent in fuel tank cap may be plugged.....Remove and clean
(5) Tank fuel line may contain an air leak.....Install new line

GROUP NO. 4—ENGINE MISFIRES—CONTINUOUS MISFIRING IN ONE OR MORE CYLINDERS

A. Faulty spark plugs are a frequent cause of engine misfiring—check the following:

(1) Is recommended type plug being used?.....See Engine Tune-Up
(2) Clean and readjust spark plugs.....Use feeler gauge
(3) Inspect porcelain at lower end. (A) If porcelain is very white, plug is too hot—use colder plug. (B) If color is light brown, plug is correct—replace with same type. (C) If black or oily, plug is too cold—use hotter plug.

B. If the possibility of faulty plugs has been eliminated proceed to check the following:

(1) High tension wires may be leaking.....Replace
(2) Distributor cap may be defective.....Replace
(3) Cylinder may have insufficient or uneven compression.....Test and repair—See engine tune-up

GROUP NO. 5—ENGINE RUNS UNEVENLY—ERRATIC MISFIRING

A. Engine may run unevenly at idling speed for one or more of the following reasons:

(1) Faulty spark plugs or gaps adjusted too wide.....Replace or adjust
(2) Ignition coil and condensers may be defective.....Install new parts
(3) Distributor breaker points may be faulty, sticking, or improperly adjusted.....Adjust or replace
(4) For reasons given in group No. 2 above.
(5) For reasons given in group No. 3 above.
(6) Valve mechanism in poor condition—valve sticking open, weakened valve springs, incorrect tappet clearance.....Service valves
(7) Defective cylinder head gasket.....Replace gasket
(8) Uneven cylinder compression.....See engine tune-up

B. Uneven engine operation at high speed may be due to one of the following (also see items under "A" above):

(1) Weakened valve spring.....Replace
(2) Weakened distributor breaker arm tension springs.....Replace points
(3) Breaker points adjusted too wide.....Readjust
(4) Incorrect type spark plugs.....Replace

DRIVER'S INSTRUCTIONS

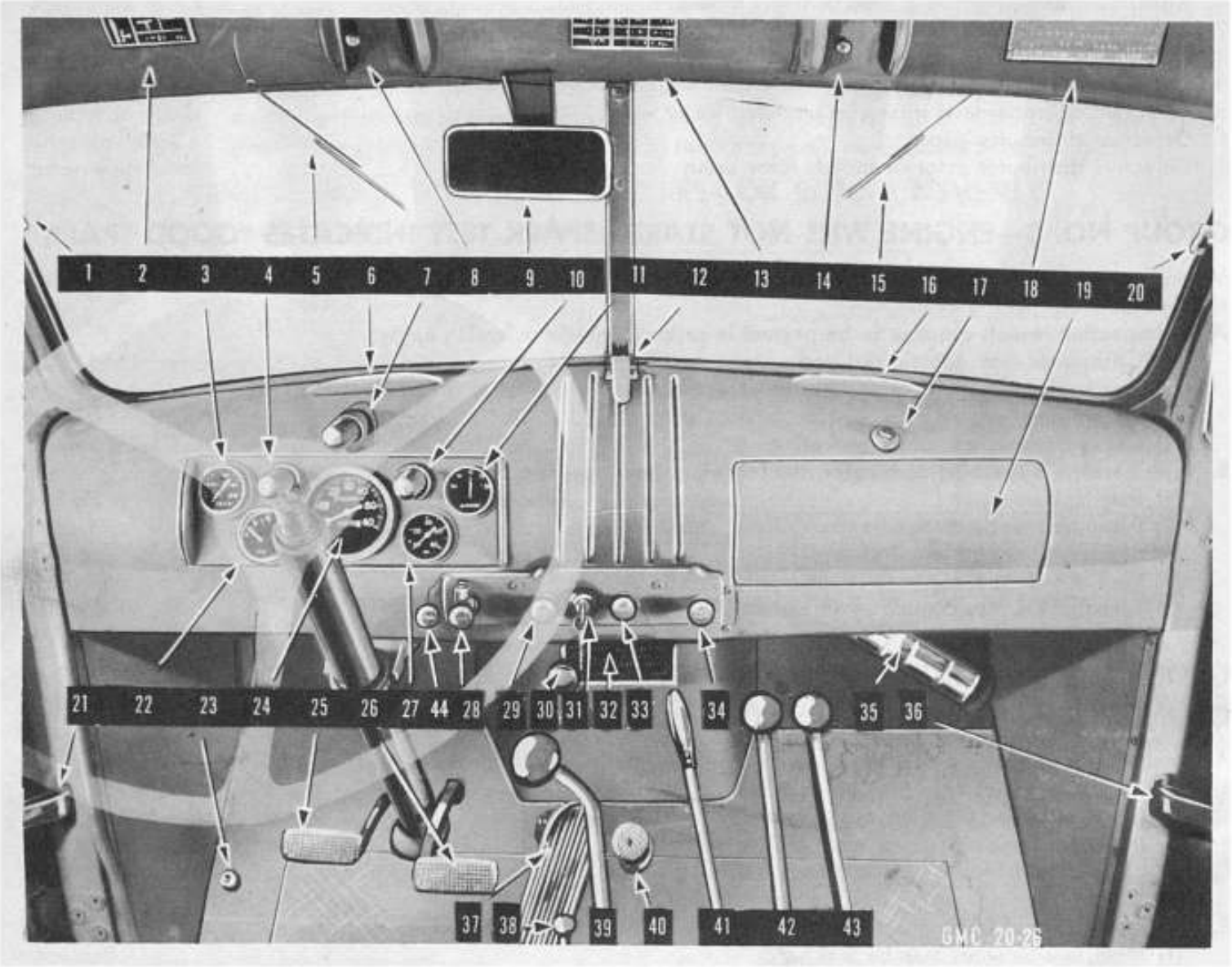


Fig. 1 Interior of Driver's Cab—Showing Controls and Instruments

1. L.H. Windshield Quadrant Thumb Screw
2. Shifting Instruction Plate
3. Temperature Gauge
4. Temperature and Fuel Gauge Light
5. Windshield Wiper Blade—L.H.
6. Defroster Opening—L.H.
7. Instrument Light
8. L.H. Windshield Wiper Control Button
9. Rear View Mirror
10. Ammeter and Oil Gauge Light
11. Ammeter
12. Windshield Lock
13. Road Speed Caution Plate
14. R.H. Windshield Wiper Control Button
15. Windshield Wiper Blade—R.H.
16. Defroster Opening—R.H.
17. Package Compartment Door Lock
18. Winch Operating Plate—(On trucks with winch)
19. Package Compartment
20. R.H. Windshield Quadrant Adjusting Screw
21. Door Check Strap
22. Fuel Gauge
23. Dimmer Switch
24. Speedometer
25. Clutch Pedal
26. Brake Pedal
27. Oil Pressure Gauge
28. Light Switch
29. Throttle Button
30. Ventilator Control Handle
31. Ignition Key and Switch
32. Serial Number Plate
33. Choke Button
34. Instrument Panel Light Switch
35. Fire Extinguisher
36. Door Check Strap
37. Accelerator Pedal
38. Power Take-Off Lever—(On trucks with winch)
39. Transmission Shift Lever
40. Starter Button
41. Hand Brake Lever
42. Transfer Case High and Low Shift Lever
43. Transfer Case Front Axle Declutching Lever
44. Blackout Driving Lamp Switch

DRIVER'S INSTRUCTIONS

3. INSPECTION

Each Driver is responsible for the vehicle he operates, and beyond following good driving practices, this requires that certain periodic inspections be performed, conditions observed and reported for correction. Inspections that are to be made by the Driver are shown in the Preventive Maintenance section of this Manual.

Following items appear in the same sequence as Functional Group Code arrangement listed on title page of this Manual. The first page of each group in this book should also be referred to by drivers seeking more information on the items discussed below.

CONTROLS AND INSTRUMENTS

4. ENGINE

The engine is its own operating gauge and needs no recording dial on the instrument panel for the driver to read. The sound of the engine and its response to the control action of the driver are sufficient. To the experienced and alert driver, any unusual change in engine operation will be the signal for immediate inspection and service.

A. Oil Level Indicator Rod—Daily check of oil supply should be made. Remove indicator rod at right hand side of engine and determine level of oil in crankcase. Oil should be up to "Full" mark on rod.

B. Oil Pressure Gauge—This gauge indicates pressure of engine lubrication oil. Pressure reading may vary according to operating conditions—however, if oil pressure should fall to zero, while engine is running, stop engine immediately and determine cause. This gauge does not indicate the **Amount** of oil in crankcase.

5. CLUTCH

A. Clutch Pedal—Depressing clutch pedal disengages engine from transmission so that transmission gears may be shifted. Clutch pedal should never be released suddenly whenever engine is running. Driving with foot on pedal will cause needless wear of clutch facings and of release bearing.

6. FUEL

A. Hand Primer—When vehicle has been standing for long periods of time, or has been drained of fuel, it is advisable to assure supply of fuel at carbureter by operating hand primer at fuel pump. Hand primer and fuel pump are located on right hand side of engine.

B. Choke—Choke should only be pulled out far enough to allow engine to run smoothly during warm up period and should be pushed in as soon as possible after engine is started. Choke should only be used when necessary. If not properly used, fuel mixture will be too rich, and may cause serious damage by allowing unburned fuel to pass piston rings and into crankcase and dilute lubricating oil.

C. Fuel Gauge—Gasoline gauge indicates level of fuel in tank, and is only operative when ignition switch is turned on.

D. Throttle Button—When button is pushed in, engine will run at idling speed. Button may be pulled out approximately $\frac{1}{2}$" when starting engine. It can also be used when starting truck on steep hills.

E. Accelerator Pedal—This pedal is used to control engine speed with the foot while driving the truck.

7. COOLING

A. Engine Water Temperature Indicator—This instrument indicates temperature of water in cooling system. Water temperature is dependent upon operating conditions, load, etc., however, temperature range should be within 160° F. to 185° F. If temperature should reach 212° F. (boiling point) vehicle should be stopped and trouble corrected before proceeding.

8. ELECTRICAL

A. Ignition Switch—Ignition switch key must be turned "on" before engine can be started. Never allow ignition key to remain turned "on" with engine not running except when making tests.

B. Ammeter—Ammeter indicates rate of flow of electric current being supplied to battery by generator or rate of discharge from battery. At low engine speeds, needle may move to negative side.

C. Light Switch—Blackout light switch has four positions as follows:

1. Knob pressed in—**All** lights **"Off."**
2. Knob pulled out to latch stop, turns on blackout head and tail lamp, also blackout stop lights.
3. Latch stop depressed and knob pulled outward one position (from latch stop position), turns on all "Service" lights. In this position, either upper or lower headlamp beam is selected by foot switch.
4. Knob pulled **All** the way out turns on "Service Stop" lights only for truck and trailer.

D. Driving Lamp Switch—Pull out to illuminate the black-out driving lamp. Main light switch must be in blackout position to use driving lamp.

E. Headlamp Dimmer Switch—After headlamps are turned on, upper or lower headlamp beam is selected by pressing down on foot switch. The use of this switch permits driver to "dim" lights when passing other vehicles, or to turn on "bright" lights when needed.

F. Instrument Panel Light Switch—This switch is used to turn instrument panel lights on after headlamps have been turned on. Ignition switch and speedometer light is also operated by this switch.

G. Starter Control Lever—Engine starter is operated by stepping down on pedal. Initial movement of pedal engages starter pinion with flywheel teeth; further move-

DRIVER'S INSTRUCTIONS

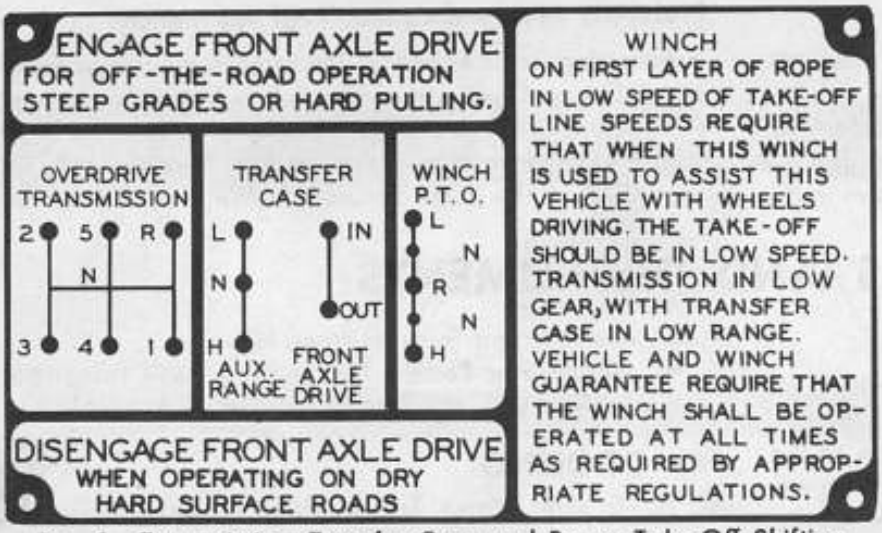


Fig. 2 Transmission, Transfer Case and Power Take-Off Shifting Arrangement Plate (For Trucks Equipped with Winch)

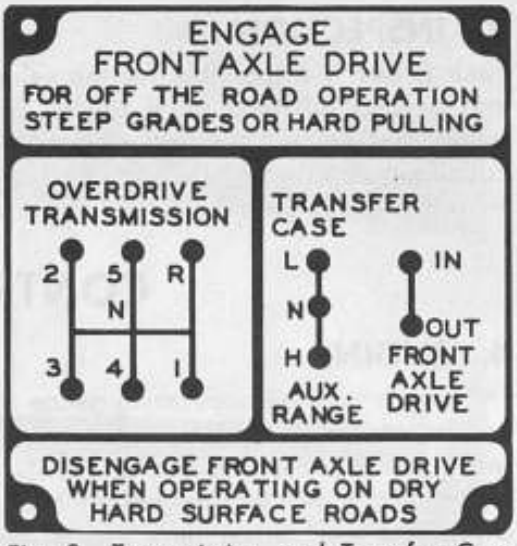


Fig. 3 Transmission and Transfer Case Shifting Arrangement Plate (For Trucks Not Equipped with Winch)

ment completes electrical circuit between battery and starter causing starter to rotate, thus cranking engine through gear engagement. When engine starts, foot should be removed from pedal immediately. **Caution: Do not step on pedal while engine is running.**

9. TRANSMISSION

A. Shift Arrangement Plate—Positions for shifting of transmission and transfer case control levers are outlined on this plate which is shown in Fig. 2, for trucks equipped with winch. See Fig. 3, for trucks not equipped with winch.

B. Transmission Shift Lever—This lever is used to select various gear ratios or speeds provided in transmission. There are five speeds forward and one reverse. (See shifting arrangement plates Figs. 2 and 3.) Transmission shift lever should be in neutral position when engine is started.

10. TRANSFER CASE

A. Transfer Case High and Low Lever—This lever is used to shift transfer case into "high," "neutral" or "low' speeds as desired by operator. Arrangement of this lever is such that low speed cannot be engaged unless front axle is also engaged. Arrangement of shift lever positions are illustrated in Figs. 2 and 3. Shifting instructions are given in Paragraph 18.

B. Front Axle Declutching Lever—This lever permits selection of front axle engaged or disengaged positions. Front axle must be engaged before transfer case can be operated in "low" range. With front axle engaged, transfer case may be operated in either "high" or "low" range. See Figs. 2 and 3 for shifting arrangement.

C. Power Take-Off Shifting Lever—Used only on vehicles equipped with winch. Whenever winch is being operated, power take-off must be shifted into "low", "high" and "reverse" as operating conditions require. Clutch must be disengaged whenever shifting into or out of speeds provided. Hinged locking plate, attached to floor board, beside shifting lever provides positive means of locking lever in "neutral" position when winch is not being operated. Always lock lever with locking plate when winch is not being used to prevent accidental engagement of power take-off.

11. BRAKES

A. Brake Pedal—Depressing brake pedal applies brakes at all wheels. Physical effort applied at brake pedal displaces fluid in master cylinder which operates power unit. Power unit consists of a power cylinder, a valve for controlling power cylinder, and a hydraulic slave cylinder; all of which operate in unison to apply brakes at each wheel. **Avoid** driving with foot on brake pedal as brakes will be partially applied and cause needless wear of brake linings. Smooth and even application of brakes whenever possible is a good driving practice.

B. Hand Brake Lever—Hand brake lever operates brake at rear of transfer case. Whenever vehicle is parked, lever should be applied by pulling toward rear as far as possible. Before attempting to move vehicle, lever should be in released position—as far forward as it will go. When pulled back, lever will lock in position to hold brakes. Lever may be released by pressing release handle (on lever) and pushing forward.

12. CAB

A. Windshield Wiper—Dual windshield wipers are vacuum operated. Separate control switches are provided for independent operation of each windshield wiper.

B. Windshield Wiper Buttons—Buttons are pulled out to turn windshield wipers **"On"** and pushed in to turn wipers **"Off."**

C. Windshield Quadrant—One on each side of windshield is provided and act as supports and guides for holding windshield in open position.