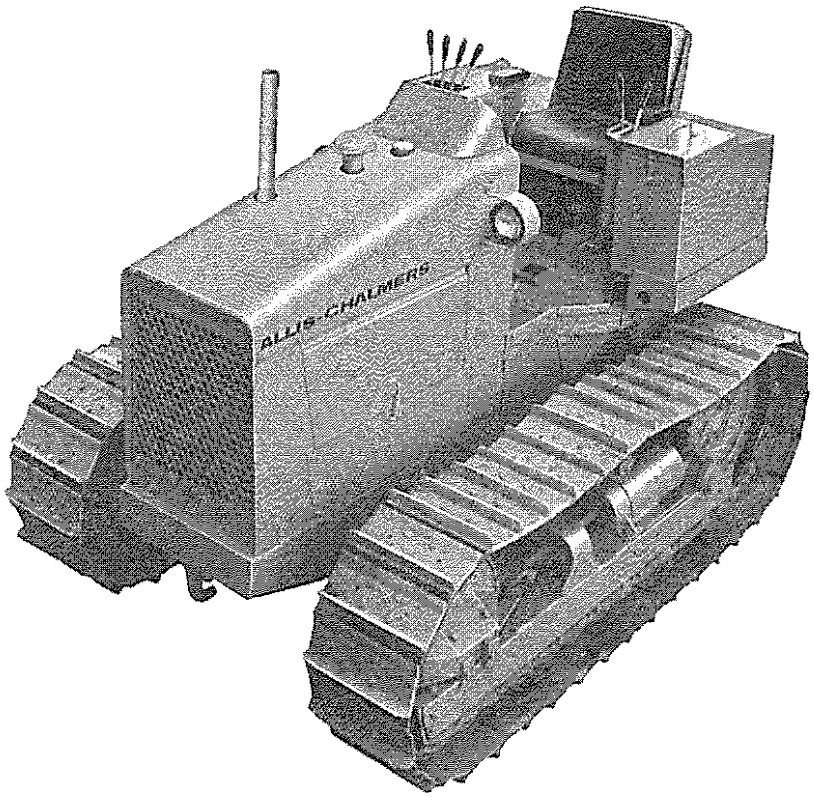
OPERATORS INSTRUCTIONS
FOR
MODEL H 4 & HD 4
TRACTORS



ALLIS-CHALMERS
BOX 512 • MILWAUKEE, WISCONSIN 53201

LITHO. IN U. S. A.

FORM TM-387 A

900 3382

DEALERS PRE-DELIVERY SERVICE

MODEL H 4 & HD 4 TRACTORS

FIRM NAME _____ DATE DELIVERED _____

ADDRESS _____ SERIAL # _____

PHONE _____ ENGINE # _____

THE FOLLOWING PRE-DELIVERY SERVICE HAS BEEN COMPLETED:

1. LUBRICATED
2. OIL LEVEL IN GEAR HOUSINGS CHECKED
3. ENGINE OIL LEVEL CHECKED
4. AIR CLEANER CHECKED
5. FUEL FILTERS CHECKED
6. BATTERY CHECKED
7. COOLING SOLUTION IN RADIATOR CHECKED
8. GENERATOR CHARGE RATE CHECKED
9. IGNITION TIMING CHECKED
10. INJECTION PUMP TIMING CHECKED
11. CARBURETOR CHECKED
12. FAN BELT ADJUSTMENT CHECKED
13. CYLINDER HEAD TORQUE CHECKED
14. VALVE TAPPET CLEARANCE CHECKED
15. SPARK PLUG GAP CHECKED
16. ENGINE SPEEDS CHECKED
17. STEERING CLUTCH ADJUSTMENT CHECKED
18. STEERING BRAKE ADJUSTMENT CHECKED
19. HYDRAULIC SYSTEM CHECKED
20. ALL BOLTS & NUTS TIGHTENED
21. LIGHTS CHECKED
22. TRACK ADJUSTMENT
23. APPEARANCE OF TRACTOR

★ ★ ★

YOUR TRACTOR HAS BEEN ADJUSTED AND SERVICED BY DEALER PRIOR TO ITS DELIVERY TO YOU.

YOU ARE REQUESTED TO ADVISE WHEN TRACTOR HAS OPERATED 30 DAYS (OR 100 HOURS) SO DEALER REPRESENTATIVE CAN CHECK ITS ADJUSTMENTS AND PERFORMANCE.

DELIVERY RECORD

FOR

FARM OR INDUSTRIAL TRACTORS

THIS FORM MUST BE FILLED OUT, IN TRIPLICATE, BY THE DEALER AND SIGNED BY THE CUSTOMER AT TIME UNIT IS DELIVERED.

DELIVERED TO _____
R. R. # _____ BOX # _____
TOWN _____
STATE _____
PHONE _____

DEALER _____
TOWN _____
SERIAL # _____
ENGINE # _____
SERVICED BY _____

CHECK ONE

FARM USE ☐ INDUSTRIAL USE ☐

EXPLAIN CARE, SAFE OPERATION AND ADJUSTMENTS OF ITEMS LISTED BELOW:

- ☐ LUBRICATION
- ☐ BREAK-IN PERIOD
- ☐ ENGINE TEMPERATURE
- ☐ RADIATOR DRAIN COCKS
- ☐ RADIATOR PRESSURE CAP
- ☐ FAN BELT
- ☐ MOTOR OIL
- ☐ PROPER FUEL
- ☐ OIL FILTERS
- ☐ FUEL FILTERS
- ☐ STARTING MOTOR
- ☐ GEAR SHIFT
- ☐ STEERING CLUTCHES
- ☐ STEERING BRAKES
- ☐ SHUTTLE CLUTCH
- ☐ HYDRAULIC SYSTEMS
- ☐ DRAWBAR
- ☐ FINAL DRIVE
- ☐ TRANSMISSION
- ☐ BATTERY CARE
- ☐ AIR CLEANER
- ☐ LIGHTS
- ☐ STARTING & STOPPING
- ☐ STORING TRACTOR
- ☐ TRACK ADJUSTMENT
- ☐ WINCH DRIVE
- ☐ OPERATORS SAFETY PRECAUTIONS

REMARKS: _____

TO BE COMPLETED:

BACKHOE:
MAKE _____
MODEL _____
SERIAL No. _____

LOADER:
MAKE _____
MODEL _____
SERIAL No. _____

DOZERS:
MAKE _____
MODEL _____
SERIAL NO. _____

OTHER EQUIPMENT:
NAME _____
MAKE _____
MODEL _____
SERIAL No. _____

WARRANTY

It is understood that the Allis-Chalmers machinery is sold by the Dealer with the standard warranty of the Manufacturer, set forth in full on page one of the Operators Manual. This warranty is the only warranty either express, implied, or statutory, upon which said machinery is sold.

THIS MACHINE HAS BEEN DELIVERED TO ME IN GOOD CONDITION AND I HAVE BEEN INSTRUCTED IN ITS CARE, ADJUSTMENT AND SAFE OPERATING PRACTICES.

DELIVERED BY: _____
Dealer

BY: _____
Date

OWNER
OPERATOR: _____
Signature

Original Copy — FOR ALLIS-CHALMERS BRANCH

BE A SAFE OPERATOR

AVOID ACCIDENTS

Most accidents, whether they occur in industry, on the farm, at home, or on the highway, are caused by the failure of some individual to follow simple and fundamental safety rules or precautions. For this reason most accidents can be prevented by recognizing the real cause and doing something about it before the accident occurs.

Regardless of the care used in the design and construction of any type of equipment, there are many conditions that can not be completely safe guarded against without interfering with reasonable accessibility and efficient operation.

A CAREFUL OPERATOR IS THE BEST INSURANCE AGAINST AN ACCIDENT.

THE COMPLETE OBSERVANCE OF ONE SIMPLE RULE WOULD PREVENT MANY THOUSAND SERIOUS INJURIES EACH YEAR. THAT RULE IS:

NEVER ATTEMPT TO CLEAN, OIL, OR ADJUST A MACHINE WHILE IT IS IN MOTION!

"NATIONAL SAFETY COUNCIL"

DELIVERY RECORD
FOR
FARM OR INDUSTRIAL TRACTORS

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DELIVERED TO _____
R. R. # _____ BOX # _____
TOWN _____
STATE _____
PHONE _____

DEALER _____
TOWN _____
SERIAL # _____
ENGINE # _____
SERVICED BY _____

CHECK ONE

FARM USE ☐ INDUSTRIAL USE ☐

EXPLAIN CARE, SAFE OPERATION AND ADJUSTMENTS OF ITEMS LISTED BELOW:

- ☐ LUBRICATION
- ☐ BREAK-IN PERIOD
- ☐ ENGINE TEMPERATURE
- ☐ RADIATOR DRAIN COCKS
- ☐ RADIATOR PRESSURE CAP
- ☐ FAN BELT
- ☐ MOTOR OIL
- ☐ PROPER FUEL
- ☐ OIL FILTERS
- ☐ FUEL FILTERS
- ☐ STARTING MOTOR
- ☐ GEAR SHIFT
- ☐ STEERING CLUTCHES
- ☐ STEERING BRAKES
- ☐ SHUTTLE CLUTCH
- ☐ HYDRAULIC SYSTEMS
- ☐ DRAWBAR
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- ☐ STARTING & STOPPING
- ☐ STORING TRACTOR
- ☐ TRACK ADJUSTMENT
- ☐ WINCH DRIVE
- ☐ OPERATORS SAFETY PRECAUTIONS

REMARKS: _____

TO BE COMPLETED:

BACKHOE:
MAKE _____
MODEL _____
SERIAL No. _____

LOADER:
MAKE _____
MODEL _____
SERIAL No. _____

DOZERS:
MAKE _____
MODEL _____
SERIAL NO. _____

OTHER EQUIPMENT:
NAME _____
MAKE _____
MODEL _____
SERIAL No. _____

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DELIVERED BY: _____
Dealer

BY: _____
Date

OWNER
OPERATOR: _____
Signature

2nd Copy—FOR DEALER'S FILE

BE A SAFE OPERATOR

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"NATIONAL SAFETY COUNCIL"

DELIVERY RECORD

FOR

FARM OR INDUSTRIAL TRACTORS

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DELIVERED TO _____

R. R. # _____ BOX # _____

TOWN _____

STATE _____

PHONE _____

DEALER _____

TOWN _____

SERIAL # _____

ENGINE # _____

SERVICED BY _____

CHECK ONE

FARM USE ☐ INDUSTRIAL USE ☐

EXPLAIN CARE, SAFE OPERATION AND ADJUSTMENTS OF ITEMS LISTED BELOW:

- ☐ LUBRICATION
- ☐ BREAK-IN PERIOD
- ☐ ENGINE TEMPERATURE
- ☐ RADIATOR DRAIN COCKS
- ☐ RADIATOR PRESSURE CAP
- ☐ FAN BELT
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- ☐ OIL FILTERS
- ☐ FUEL FILTERS
- ☐ STARTING MOTOR
- ☐ GEAR SHIFT
- ☐ STEERING CLUTCHES
- ☐ STEERING BRAKES
- ☐ SHUTTLE CLUTCH
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- ☐ AIR CLEANER
- ☐ LIGHTS
- ☐ STARTING & STOPPING
- ☐ STORING TRACTOR
- ☐ TRACK ADJUSTMENT
- ☐ WINCH DRIVE
- ☐ OPERATORS SAFETY PRECAUTIONS

REMARKS: _____

TO BE COMPLETED:

BACKHOE:

MAKE _____
MODEL _____
SERIAL No. _____

LOADER:

MAKE _____
MODEL _____
SERIAL No. _____

DOZERS:

MAKE _____
MODEL _____
SERIAL NO. _____

OTHER EQUIPMENT:

NAME _____
MAKE _____
MODEL _____
SERIAL No. _____

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DELIVERED BY: _____
Dealer

BY: _____
Date

OWNER
OPERATOR: _____
Signature

3rd Copy — FOR CUSTOMER

BE A SAFE OPERATOR

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"NATIONAL SAFETY COUNCIL"

FOREWORD

This book is written for the purpose of providing the essential information regarding the day-to-day care, lubrication and adjustment of the tractor. Economical operation will be assured if these instructions are followed.

The instructions given in this book cover the operation of the Allis-Chalmers H4 and HD4 Standard Tractors. A close adherence to these instructions will result in many hours of trouble-free operation and a longer operating life for the unit.

This "Green Cross for Safety" is used in book to emphasize safety precautions that should be followed by operator to avoid accident and possible injury. Where you see this emblem heed its warning.

This "Green Cross for Safety" is used only by members of the National Safety Council.

Many owners of Allis-Chalmers equipment employ the Dealer's Service Department for all work other than routine care and adjustments. This practice is encouraged as our dealers are kept well informed by the factory regarding advanced methods of servicing Allis-Chalmers products and are equipped to render satisfactory service.

To assure the best results and to maintain the original quality built into the tractor, it is important that Allis-Chalmers Parts be used.

WARRANTY

ALLIS-CHALMERS MANUFACTURING COMPANY (the Company) warrants its new machinery covered by this order or contract (excluding tires and B-Series engines and engine accessories which are warranted by the respective manufacturers only) to be free of defects in workmanship and material at the time of shipment from the Company's factory.

This warranty is the only warranty upon which the Company's new machinery is sold. NO OTHER WARRANTY SHALL BE IMPLIED AND ALL STATUTORY WARRANTIES SHALL BE DEEMED WAIVED. No warranty of any kind, statutory, implied, or otherwise, is made with respect to second-hand machinery or with respect to new machinery which, after shipment from the Company's factory, has been altered, repaired or treated in any manner whatsoever.

The Company will repair or replace f.o.b. its factory any part in its new machinery which under normal use fails within twelve months (except six months instead of twelve months in the case of products of the Springfield and Deerfield Works of the Company and engines sold as power units) from date of delivery of such machinery to the first user, provided that the Company is promptly notified thereof and that the part is returned to the Company or to an authorized dealer properly identified, charges prepaid, and is found to the satisfaction of the Company to have been defective in workmanship or material at the time of shipment of the machinery from the factory as aforesaid.

The Company's liability whether in contract or in tort arising out of warranties, representations, instructions, or defects from any cause shall be limited exclusively to repairing or replacing under the conditions as aforesaid.

No representative of the Company has authority to change this warranty and no attempt to repair or promise to repair or improve the machinery by any representative of the Company shall change or extend this warranty.

INDEX

Continued

GENERAL SPECIFICATIONS

ENGINE	DIESEL		GASOLINE	
Model	D2200		G2200	
Make	Allis-Chalmers		Allis-Chalmers	
Type	4 cycle naturally aspirated		4 cycle naturally aspirated	
Number of cylinders	4		4	
Bore	3.88		3.88	
Stroke	4.25"		4.25"	
No. of Main Bearings	5		5	
Piston Displacement	200 cu. in.		200 cu. in.	
Compression Ratio	16.25:1		8.15:1	
Compression	500 PSI @600 RPM		165 PSI @ 150 RPM	
Firing Order	1-3-4-2		1-3-4-2	
Low Idle	650-700 RPM		450-500 RPM	
Governed @ Full Load	2100 RPM		2100 RPM	
High Idle	2250-2310 RPM		2300-2325 RPM	
Fuel Injection Pump	Roosa Master Model DBGFC 437-7AF Timed @ 28° BTDC			
Carburetor			Zenith Model 267 JX9	
Nozzle Holder	Opening Pressure 2750 PSI			
Valves				
Intake Clearance	.015"		.020"	
Exhaust Clearance	.015"		.025"	
Battery	Standard	Optional	Standard	Optional
Type	2-135	30H95	24-53	30H-95
Volts	6	12	12	12
Capacity	135AH	190 AH	53AH	95AH
Quantity	2	2	1	1
Terminal Ground	Neg.	Neg.	Neg.	Neg.
Circuit	Parallel	Series		
Starter	Delco Remy #1107589		Delco Remy #1107356	
Spark Plugs				
Thread Size			14MM	
Reach			3/4"	
Gap			.025"	
Heat Range			AC 45 XL Autolite AG5A, Champion N8	
Distributor				
Make			Delco Remy #1112665	
Point Gap			.016"	
Advance			Automatic	
Advance Timing			28° BTDC @ 2100 RPM	

GENERAL SPECIFICATIONS

GENERAL DIMENSIONS AND WEIGHT

Overall Length	108-7/8 inches
Overall Height	80.82 gasoline, 81.26 diesel
Overall Width (12" grousers)	63 inches

TRANSMISSION

Type	Constant mesh helical gear
Speeds (At Rated 2100 RPM) One to One Convertor Ratio	
1st Forward	1.81 MPH
2nd Forward	2.81 MPH
3rd Forward	4.88 MPH
1st Reverse	2.09 MPH
2nd Reverse	3.24 MPH
3rd Reverse	5.63 MPH

CAPACITIES

Cooling System	16 qts.
Engine Crankcase	
Oil Change	8 qt.
Oil and Filter Change	9 qt.
Hydraulic System (Tractor only)	36 qt.
Transmission	12.25 qt.
Shuttle Clutch & Converter	26 qt.
Final Drives Each	6.7 qt.
Fuel Tank	18 gal.

STEERING

Method	Multiple disc clutch
Type	Dry
Disc Diameter	9-7/8"

SHUTTLE CLUTCH

Method	Multiple disc
Type	Wet hydraulically operated
Number Discs	4 forward, 4 reverse

TRACK

Tread Width (center to center of track)	51"
Length of Track on Ground (center of sprocket to center of idler)	
Short Track	63-3/4"
Long Track	69-3/4"
Width of Shoes	
Optional	10"-14"-12"
Number of Shoes (Each Track)	
Short Track	34
Long Track	36
Track Pitch (center of pin to center of next pin)	6"
Number of Truck Wheels (each track)	5
Number of Support Rollers (each track)	1

The Allis-Chalmers Manufacturing Co. reserves the right to make changes in the above specifications or to add to the improvement at any time without notice or obligation.

SAFETY PRECAUTIONS

Many hours of lost time and much suffering is caused by the failure to practice simple safety rules.

IT IS TOO LATE TO REMEMBER WHAT SHOULD HAVE BEEN DONE AFTER THE ACCIDENT HAS HAPPENED.

1. Do not fill fuel tanks when engine is hot or while using a lantern or when smoking.

2. Do not attempt to oil or grease a machine or tractor while it is in operation.

3. Do not wear loose fitting clothing that may be blown into moving parts.

4. Keep all shields and guards in place.

5. Place gear shift lever in neutral position when starting engine or dismounting from tractor.

6. Machinery should be only operated by those who are responsible and delegated to do so.

7. Only one person - the operator - should be permitted on tractor when it is in motion.

8. The rate of travel on hillsides or curves should be regulated so there is no danger of tipping.

9. Do not remove radiator cap when engine temperature is above 212°F.

10. Steering brakes and clutches should be properly adjusted.

11. Do not drive too close to the edge of a ditch or creek.

12. Never operate your tractor in a closed garage or shed.

13. When tractor is hitched to a stump or other heavy loads, always hitch to drawbar and never take up slack in chain with a jerk.

14. Always keep tractor in gear when going down steep grades.

15. Do not leave the engine running unattended when anyone is adjusting or repairing a driven machine.

16. Do not attempt to operate tractor unless you are in the driver's seat.

17. Provide a first aid kit. Treat all scratches, cuts, etc., with the proper antiseptic immediately.

18. Never stand between tractor and drawn implement when hitching. Use an iron hook to handle drawbar.

19. Do not dismount from tractor while it is in motion.

20. Keep a fire extinguisher handy at all times.

21. Lock shuttle clutch lever in neutral position when dismounting tractor.

UNDER NO CIRCUMSTANCES SHOULD ANYTHING BE PULLED FROM, OR BE HOOKED TO ANY PART OF THE TRACTOR EXCEPT THE DRAWBAR.

GENERAL INFORMATION

The standard Model tractor is available with either a gasoline engine, H4, or a Diesel engine, HD4, which are naturally aspirated, open combustion chamber engines. Power from the engine is transmitted through the torque converter and to a constant mesh helical gear transmission. From the transmission the power is transmitted to the spiral bevel gear and from the spiral bevel gear through the multiple disc steering clutches to the final drives and the track sprockets. The transmission provides 3 forward speeds, 1.81 M.P.H. in 1st; 2.81 M.P.H. in 2nd and 4.88 M.P.H. in 3rd; and 3 reverse speeds of 2.09 M.P.H. in 1st; 3.24 M.P.H. in 2nd and 5.63 M.P.H. in 3rd, at rated engine speed of 2100 RPM, and 1 to 1 converter ratio.

The standard tractor is equipped with electric starting and panel lighting equipment, suction type cooling fan mounted in center of tractor, muffler, dry type air cleaner, torque converter, necessary gauges and sending units.

For a complete listing of all available equipment consult your local Allis-Chalmers dealer.

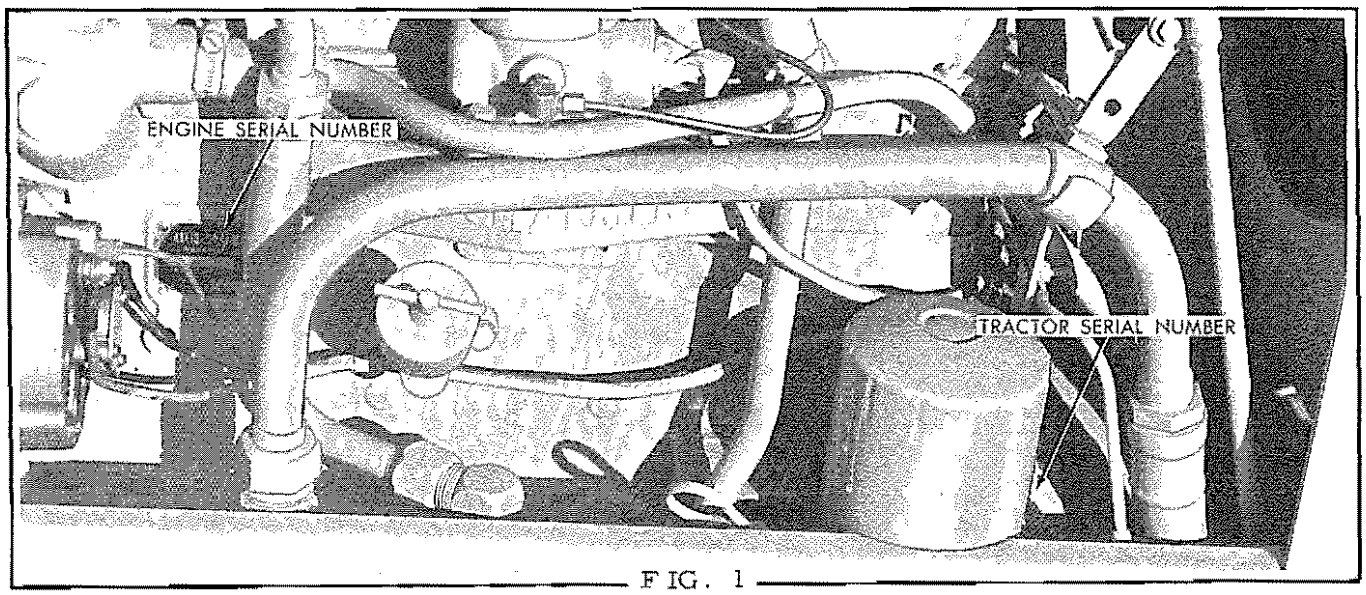


FIG. 1

SERIAL NUMBER LOCATIONS

NOTE: On all parts orders and in all correspondence relative to the tractor, it is necessary that both the tractor and engine Serial Numbers be given. This will properly identify the particular unit and will assure obtaining correct replacement parts for it.

A. TRACTOR SERIAL NUMBER

The tractor Serial Number (Fig. 1) is stamped on the flange of the torque tube on the L.H. side.

B. ENGINE SERIAL NUMBER

The engine Serial Number (Fig. 1) is stamped on an identification plate located on the L.H. side of engine.

RECORD YOUR SERIAL NUMBERS BELOW

Tractor Serial Number _____

Engine Serial Number _____

LUBRICATION & SERVICE INSTRUCTIONS

To prevent minor irregularities from developing into serious conditions that might involve shut-down and major repair, several other checks and services must be included at the same intervals as lubrication. These checks and services will reveal the need for adjustment or change due to normal wear, which if neglected could result in failure and shut-down. Refer to Lubrication and Service Instruction Plate and the illustrations and instructions in this Topic for points to be serviced and their relative locations.

Thoroughly clean all fittings, caps, plugs, etc. before servicing to prevent dirt from entering while performing the service.

Lubricants should always be at operating temperature when draining for oil changes.

Oil systems equipped with an oil level gauge rod having "Operating Range" marks, are safe to operate when oil level is anywhere within the "Operating Range".

After refilling systems at oil change intervals, the oil level should be checked after engine has been run at low idle speed for a few minutes to insure that engine clutch, heat exchangers, filters, lines, etc. are fully charged before oil level check is made.

NOTE: Oil levels will rise higher within the "Operating Range" on oil level gauge rods (due to expansion of the oil) after unit has been placed in service and operating temperatures have stabilized.

The various hour intervals given in this Topic are based on normal operation; perform the services more often (as necessary) when operating under severe or abnormal conditions.

Proper operation and maintenance of the engine are necessary to obtain the desired results from the lubricating oil. The basic engine lubricating oil and filter change interval, assumes use of the proper grade of a "Series 3" oil in diesel and MS in gasoline and "average" operating conditions including load factor, fuel (particularly sulphur content), temperatures, cleanliness and mechanical condition and many others. Where conditions are more severe than "average" the change interval may even be too long.

SERVICE & LUBRICATION LOCATION GUIDE

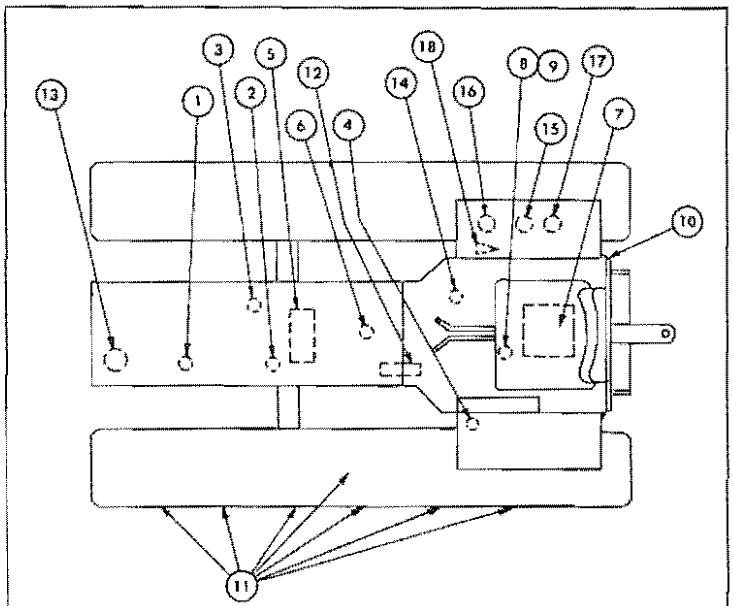


FIG. 2

NOTE: Refer to "Lubrication and Service Guide" section for detailed information.

1. Engine oil sump
2. Engine oil filter
3. Fuel filter (Diesel only)
4. Fuel tank filter
5. Engine air cleaner
6. Radiator
7. Batteries
8. Transmission oil level
9. Transmission Breather
10. Final drive oil level.
11. Truck wheels, support rollers and idlers
12. Converter oil suction strainer
13. Converter oil filter
14. Converter oil level
15. Hydraulic oil reservoir (Check level with rams collapsed)
16. Hydraulic reservoir filter
17. Hydraulic reservoir breather
18. Hydraulic reservoir screen and magnet.

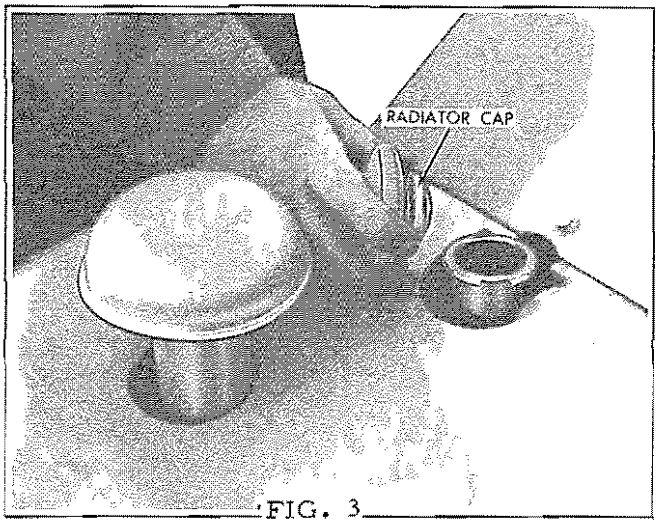


FIG. 3

1. ENGINE COOLING SYSTEM

Check cooling system every day for proper coolant level. The level should be obtained so the coolant is visable in the radiator neck. Do not over fill, as it is necessary to have space for expansion when coolant is at operating temperatures. If over filled, as coolant expands, it will be forced out through over-flow pipe.

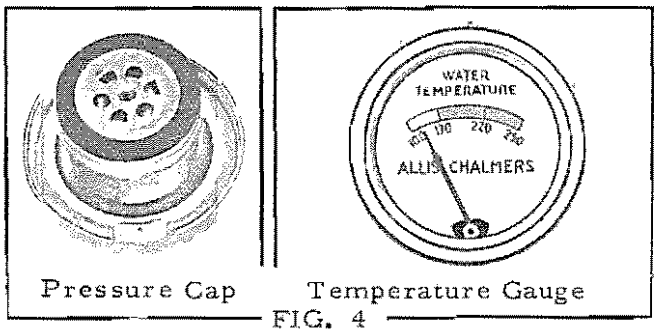
PRESSURE RADIATOR CAP

The pressure radiator permits the use of a higher operating temperature. The cooling solution (pure water) will not boil in the pressure radiator until a temperature of 221°F. is reached.

To remove the radiator cap, turn to the left until it stops. Push down and continue to turn to the left until cap is released.

Do not remove the cap when the temperature is above 212°F. as the cooling solution will break into a violent boil which may splash onto person removing cap.

Never pour cold water in a hot engine. Clean rain or soft water should be used in the cooling system if available. Hard or alkaline water will form a scale which will impair radiation if allowed to build up in the cooling system.



Pressure Cap Temperature Gauge

FIG. 4

Soluble oil is beneficial to the cooling system. It will not prevent the accumulation of lime, but will retard such information. This water soluble oil may be secured from your Allis-Chalmers Dealer.

OPERATING TEMPERATURE

The operating temperature of the engine coolant is shown on the temperature gauge. The point should operate in the green portion of gauge, with a range of 160° to 220°F. If pointer moves into the red portion of gauge, the engine is overheated. If engine does become overheated for some reason or other, allow time to cool for a few minutes, then add water slowly to radiator while engine is idling.

Low engine operating temperatures cause condensation, sludge and corrosion. Keep engine hot. The temperature is thermostatically controlled, but to prevent damage to the engine by cold operating temperatures the engine must be operated in the operating range on gauge long enough to boil or drive off the moisture collected in the initial warm-up period.

Operate engine in the normal range for a period of time equal to the time it took the indicator needle to reach the operating range before shutting off engine. This will prevent moisture from condensing and damaging vital engine parts.

Under abnormal or cold engine temperature operation, the oil change interval should be performed more frequently than under normal operating temperature conditions.

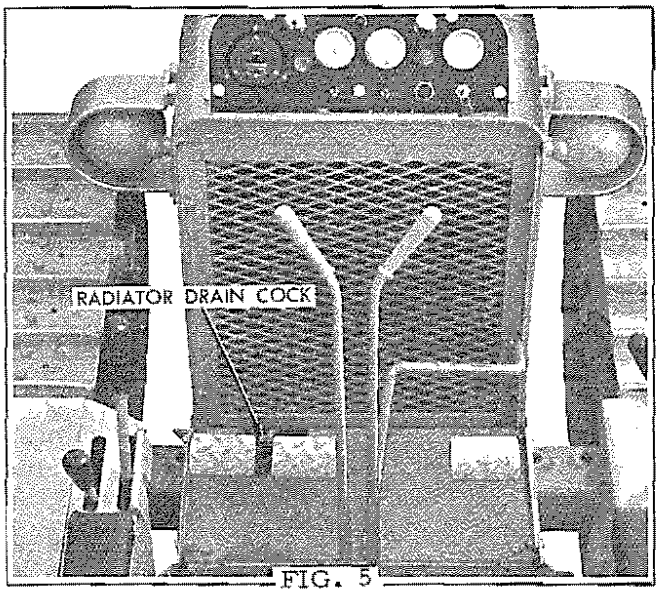


FIG. 5

TO DRAIN COOLING SYSTEM

Open the drain cock at left of radiator, ahead of brake pedals and remove plug on R.H. side of cylinder block.
CAUTION: In freezing weather be sure to drain all places. Loosen radiator cap to prevent system from air locking, which will retard draining. Stay near tractor and make sure system is completely drained.

2. FUEL SYSTEMS

FUEL SPECIFICATIONS (DIESEL)

The diesel fuel should be a natural distallate petroleum oil and must have certain qualities in order to ignite and burn at the proper rate and temperature. Field experience has shown that the fuel best suited for this engine closely approximates the following specifications:

Gravity API	30-35
Viscosity Saybolt	
Universal at 100°F	35-40
Flash Point	150°F.
Diesel Index	48.5 to 65.5
Cetane Number	46 to 60
Pour Point	0°F.
Volatility 90%	650°F. Max.
End Point 98%	
Summer	700°F. Max.
Winter	600°F. Preferable
Sediment and Water	Trace
Ash	.02 of 1% Max.
Conradson Carbon	.03 of 1% Max.
Sulphur	1/2 of 1% Max.

For satisfactory fuel flow through lines and filters in cold weather, the pour point of the fuel must be at least 10°F. below the prevailing atmospheric temperature.

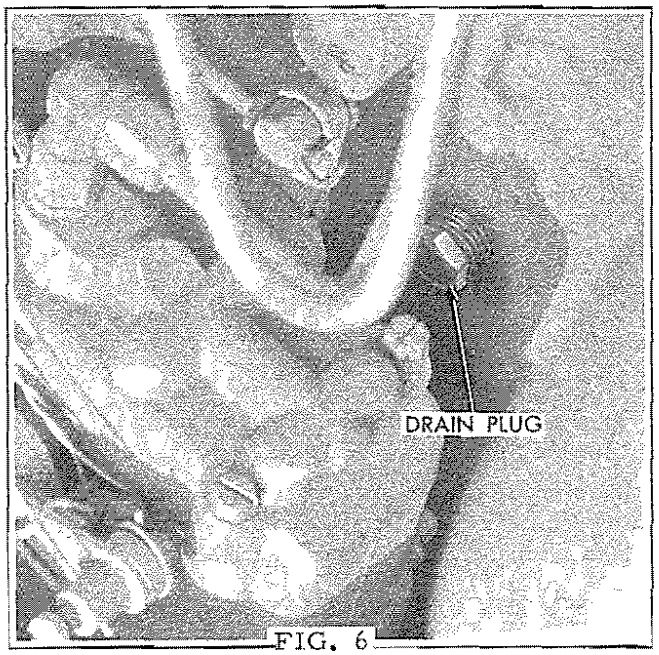


FIG. 6

The API gravity of a fuel varies with its specific gravity. The low API fuels are desirable because they have a high specific gravity and more heat units per gallon. However, the higher the APIgravity, the better will be the ignition quality of the fuel.

The ignition quality of a fuel is expressed as a "cetane number". The higher the cetane number the higher the quality of the fuel. The higher cetane fuel shortens the ignition delay period to facilitate starting and improve combustion. The diesel index number, which is a dose approximation of the cetane number, is a field method to represent ignition quality.

The distallation 90% point and the end point are important. High volatility is required to enable complete vaporization of the fuel, clean combustion and low residue formation.

The flash point of the fuel has no quality significance, but is important with respect to safety in storage and handling of the fuel.

It is important that the fuel be within the specified limits for ash, carbon, water and sediment content etc. to prevent excessive wear and damage to engine parts.

It is also important that the fuel has lubricating properties so that the fuel injection pump and fuel injection nozzles are adequately lubricated. In instances where fuel with inadequate lubricating properies must be used, one quart of SAE 10W engine oil must be added to every 10 gallons of fuel to provide the necessary lubrication. Contact the fuel supplier and follow his recommendations as to whether or not engine oil should be added to the fuel.

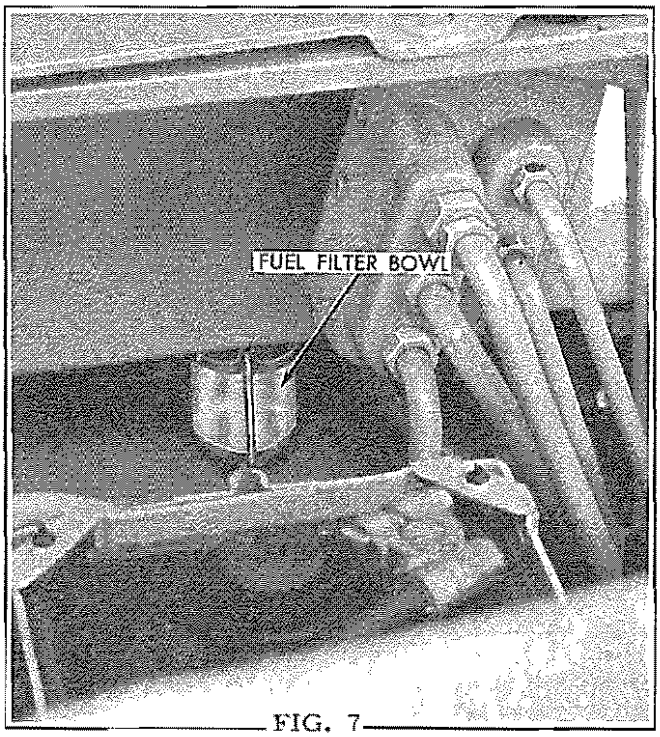


FIG. 7

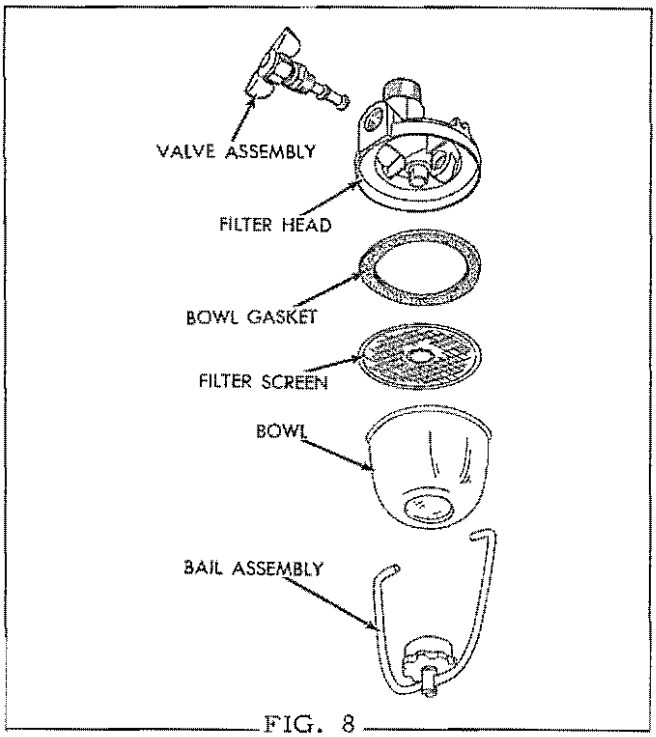


FIG. 8

CAUTION: The sulphur content of diesel fuel should be as low as possible. The fuel should not contain a sulphur content of more than 1/2 of 1%.

Generally speaking, a No. 2 high speed diesel fuel purchased from a reputable oil company will meet the above specifications.

FUEL SPECIFICATIONS (GASOLINE)

This engine is designed to burn regular gasoline having an octane rating (research method) of 89 or higher. Fuel companies provide fuels tailored to meet the existing weather conditions. These fuels are changed at the start of the predominent seasons according to regional weather trends. Fuels are tailored to give ease of starting in cold weather and to give a low vapor pressure to avoid vapor lock. An effort should be made to purchase fuels in such quantity that they are not carried over to succeeding seasons.

FUEL FILTER BOWL - GASOLINE & DIESEL

Check daily and clean when water or sediment is visable. Clean filter element when necessary.

The fuel filter is located at bottom of fuel tank and is provided for the purpose of keeping dirt and water from entering the carburetor, or fuel injection pump. However, the best results are obtained by using adequate fuel storage handling facilities.

If the fuel is kept free of dirt and water by use of clean containers and proper handling, the filter will have little work to perform. Excessive cleaning of filter indicates dirty fuel.

To clean the filter, shut off the fuel supply. Loosen the bowl retaining nut and move bail to one side. Remove bowl, gasket and screen.

When installing, assemble as shown to provide the proper seal. Filter screen next to bowl and gasket next to head.

The element can be cleaned, using a small stiff brush.

It is advisable to keep extra bowl gaskets on hand as the gasket is liable to leak after cleaning bowl.

Turning the shut-off valve wide open will seal fuel from the packing gland and prevent leakage in the open position. When valve is shut off, the packing gland nut must be snug to prevent leakage.

FUEL FILTER (HD-4 DIESEL)

The fuel system is provided with a primary and secondary fuel filter mounted in one element on the side of the engine.

The purpose of the fuel filter is to remove water, sediment or abrasives from the fuel, before the fuel enters the injection equipment. The proper handling and storage of fuels will increase the life on the filters.

Replace the filter element at each 500 hours of operation. Poor fuel handling and storage facilities will decrease the effective life of the filter. In other words, dirty fuel will decrease the life of a filter, while clean fuel will increase the life of a filter. Never operate until filter becomes plugged, or to a point to where a decrease in engine speed or power is noticed. Some dirt may seek its way through the secondary filter and cause severe damage to the fuel injection equipment.

Each time the filter element is removed, it may be necessary to bleed out air by removing the plug at top of filter head assembly. Remove air bleed plug and turn on fuel valve at tank. Operate the hand priming pump until all air has escaped and solid fuel is to the level of the air bleed plug and install bleed plug at top of filter head.

FUEL STORAGE

The importance of proper storage of fuel cannot be too strongly stressed. Storage tanks, drums, or service tanks must be free of rust, scale, sediment, or any other foreign matter which will contaminate the fuel. Contaminated fuel will clog the engine fuel filters and eventually damage the fuel injection pump and the fuel injection nozzles.

A portable storage tank provides the best method for storing fuel on the job. In such a tank, the sediment and water can easily be drained and the fuel can be pumped into the tractor fuel tank with a minimum of handling. Since condensation will occur in the storage tank, it is very important that a sediment sump be provided in bottom of tank so that water and sediment can be drained daily.

Fuel should be allowed to settle at least 48 hours in a storage container before being added to the fuel tank of the tractor. It is advisable to use a pump and draw the fuel from storage tank, or barrel, rather than to drain it from bottom of fuel container. Where conditions are such that drums must be used to supply fuel, it is advisable to have enough drums to allow sufficient time for the fuel to settle. The fuel thus left in a number of drums can be collected into one drum and used after the usual time allowed for settling. In this manner, the sediment and foreign matter will be disposed of and no fuel will be wasted. Whenever

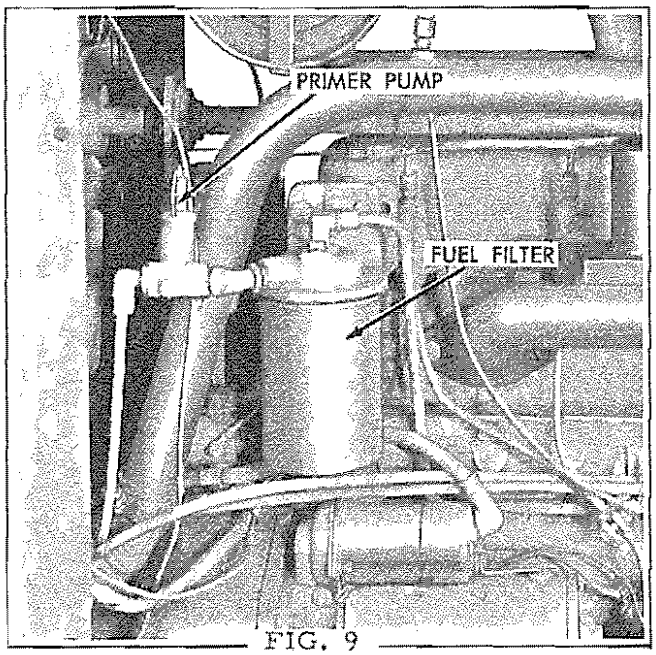


FIG. 9

drums are used for fuel storage, they should be covered or placed under shelter so that the fuel will not become contaminated by water, which will enter through the filler plugs when it rains, even though plugs are tight.

The fuel tank of the tractor should be filled at end of the day's run rather than at the start; this will reduce the water content, as a full tank is less subject to condensation.

3. ENGINE LUBRICATING SYSTEM

A. ENGINE CRANKCASE (Lubricant Specification) (Diesel)

The specified oil for use in the engine crankcase is a lubricating oil that meets both of the following specifications:

1. American Petroleum Institute (API) classification "Service DS Series 3"

2. Military Specifications "MIL-L-45199A"

NOTE: The engine crankcase on a new unit when shipped from the factory, contains "Series 3" SAE 20W engine lubricating oil meeting the proper API Military Specifications. This oil is completely satisfactory for use until the first regular oil change.

B. ENGINE CRANKCASE (Lubricant Specifications) (Gasoline)

Motor oils are designated by code letters as follows: ML - MM - MS. The letters denote the type of service for which the unit is used.

ML - for use under light loads and favorable conditions.

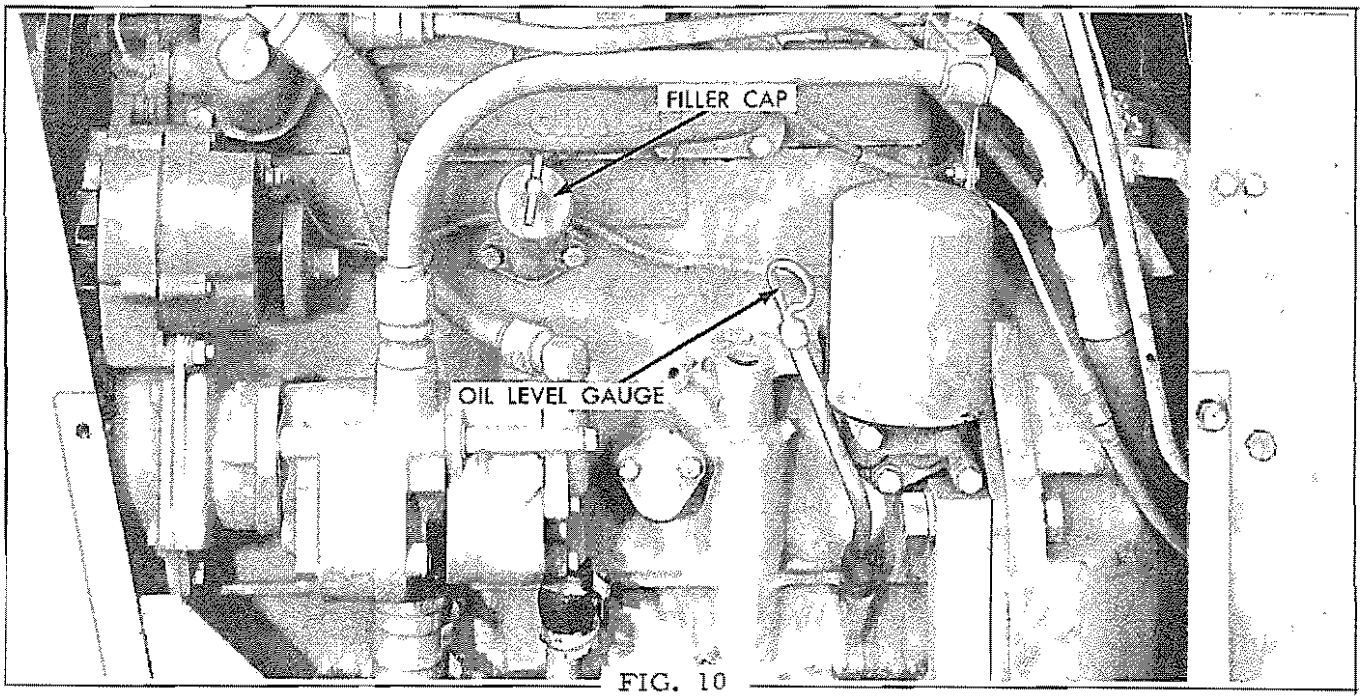


FIG. 10

MM - for use at rated loads and speed under average conditions.

MS - for use under severe conditions, such as heavy loads, start-stop operation, or high temperature conditions.

Your tractor engine should be provided with MS oil.

Oil designated MS contains certain additives to increase film strength, to be corrosion resistant, to carry contamination in suspension and as pour point depressants, etc.

The fact that the oil has the ability to carry contaminants in suspension rather than deposit them in the engine, causes the oil to discolor rapidly. Thus, the color of the oil cannot be used to determine when to change.

Two common contaminants found in engine oil are water and tetraethyl lead. Both cause the oil to have a grayish color when emulsified with the oil. Lead is not harmful to the engine and may be disregarded.

Water may accumulate from leaks, or from start-stop, or low temperature operation. Water is harmful to engine if present in any quantities.

A simple test, to determine if lead or water is present in the oil, is to heat a small sample. If the oil spits and pops, but does not return to its original clearness, it contains both water and lead. If it spits and pops and returns to its original clearness, it contains water only. If it does not spit and pop and does not clear up, it contains lead only.

If it is determined that the sample contains lead, do not worry, as this is a natural condition.

If it is determined the sample contains water, then the method of operation should be changed to avoid excessive condensation.

ENGINE OIL SUMP - GASOLINE

Check engine oil sump daily (8 to 10 hours) for proper oil level. Maintain oil level to full mark on oil level gauge. Do not overfill. Use oil of the "MS" service classification only. Use oils of the following viscosities for the prevailing temperatures.

GASOLINE		RECOMMENDED SAE VISCOSITY OIL	RECOMMENDED SAE MULTI-VISCOSITY OIL
Lowest expected temperature during time oil will be in the crankcase.	90°	SAE 30	SAE 10W-30
	20°	SAE 20-20W	SAE 10W-30
	Below 20°	SAE 10W	SAE 10W-30

If preferred, a multiple viscosity oil of SAE 10W-30 may be used for all temperatures.

Drain and refill with fresh oil every 100 hours of operation. Drain plug is located at bottom of oil sump.

ENGINE OIL SUMP - DIESEL

Check engine oil sump daily (8 to 10 hours) for proper oil level. Maintain oil level to full mark on oil level gauge. Do not overfill. Use oils of service classification DS Series 3 only. Use the following viscosities for the prevailing temperatures:

DIESEL	RECOMMENDED SAE VISCOSITY	
Lowest expected temperature during time oil will be in the crankcase.	90°	SAE 40
	40°	SAE 30
	20°	SAE 20-20W
	Below 20°	SAE 10W

Drain and refill oil sump with fresh, clean oil after every 75 hours of operation. Drain plug is located at bottom of oil sump.

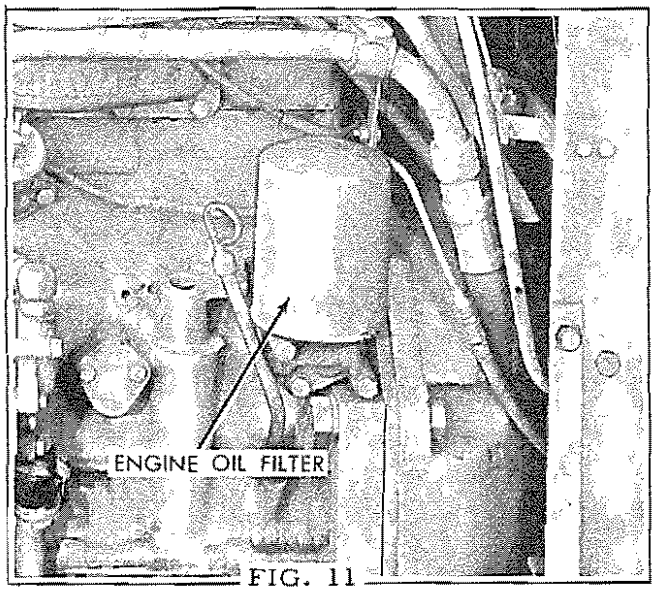


FIG. 11

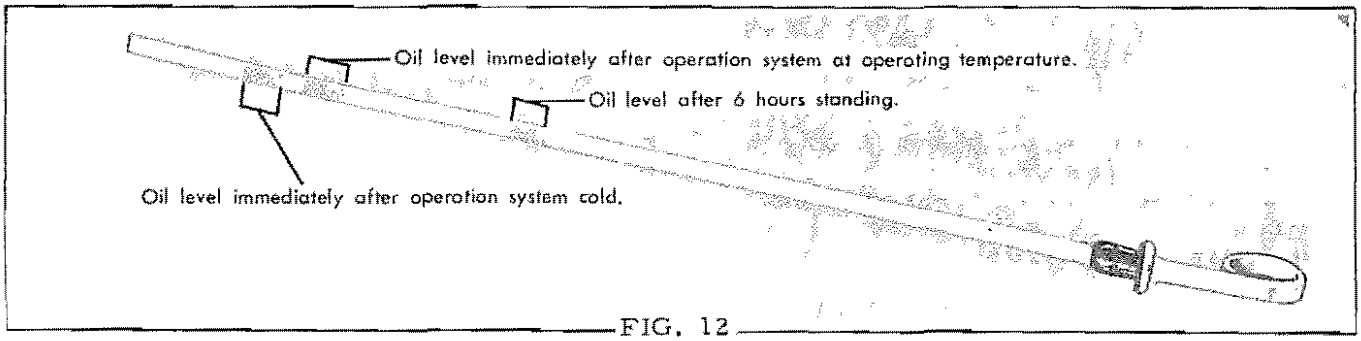


FIG. 12

ENGINE OIL FILTER - FUEL FLOW TYPE

Replace the oil filter element every 200 hours of operation when operating on gasoline and every 150 hours when operating on diesel fuel or every other oil change with an Allis-Chalmers filter provided specifically for your engine. Various filters for different engines may look alike, but are only designed to operate on a specific engine.

CAUTION: Do not interchange oil filters. Make a practice of keeping several filter elements on hand, so that they will be available when needed.

Insure the life of your engine by regular replacement of oil filter. The oil filter is a highly efficient unit for the purpose of filtering abrasive particles from the engine oil. Changing the filter element will keep the oil clean and add many hours to the effective life of the engine.

3. TORQUE CONVERTER & SHUTTLE CLUTCH

Use type "A" Suffix A Transmission Oil.

Check Daily - The dipstick has three check points, maintain to proper level. Tractor must be sitting on a level surface prior to checking.

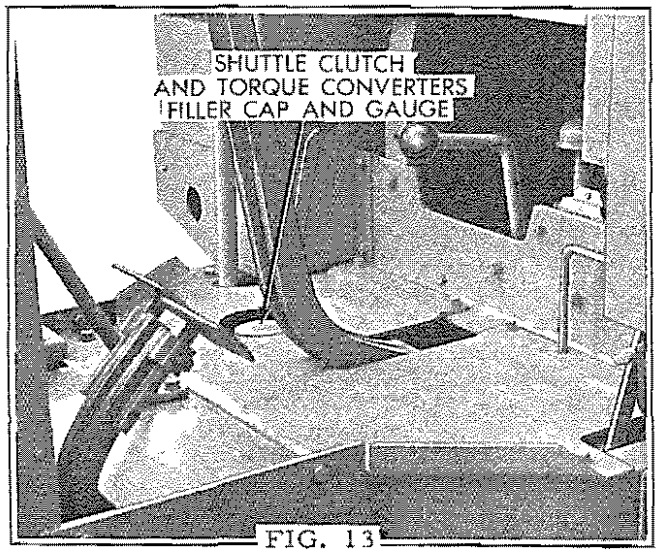


FIG. 13

To determine that oil is in system, pull dipsitck and note level in cold range. For more accurate reading operate until converter temperature gauge is in green. To speed up warm up period, place transmission in third and hold brakes securely and operate in either forward or reverse (Stalling converter). Turn off tractor, wait 10 to 30 seconds and check level in hot range. Change oil every 1000 hours.

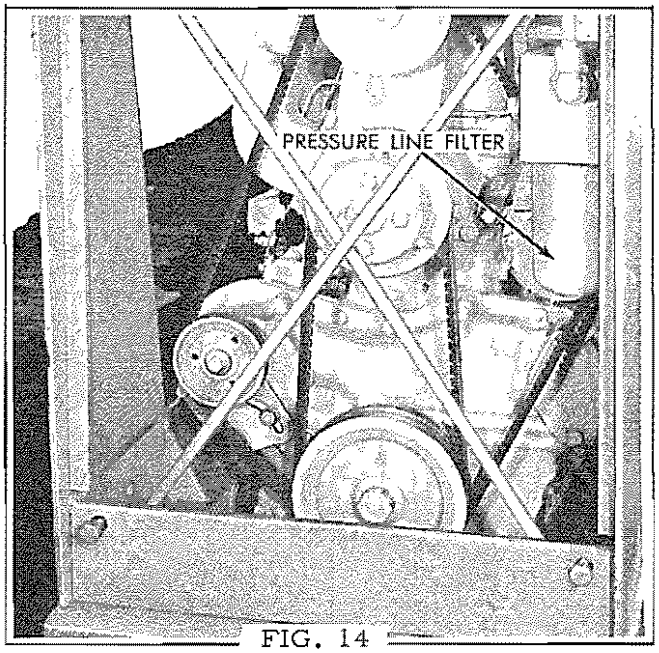


FIG. 14

PRESSURE LINE FILTER

Flow from pump is directed to a pressure line filter located behind the front grille guard. This filter has a replaceable element which is replaced after the first 50 hours of operation and every 500 hours thereafter.

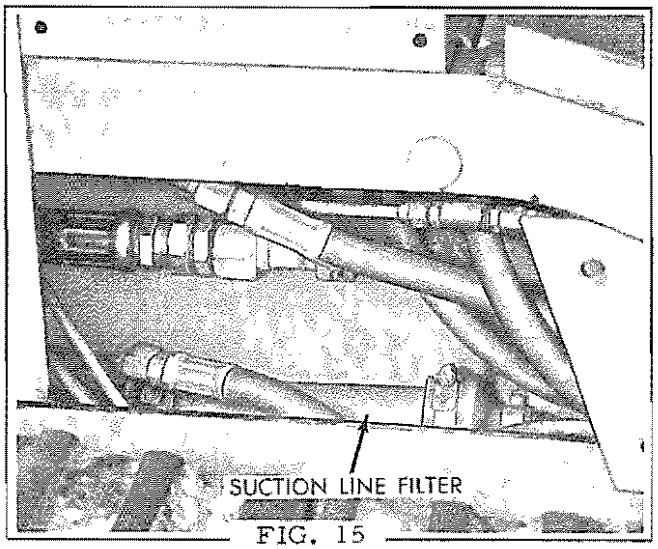


FIG. 15

SUCTION LINE FILTER

Hydraulic system suction line contains a filter located along the L.H. torque tube of tractor. This filter should be removed and cleaned when major repairs to torque converter and torque tube components are made.

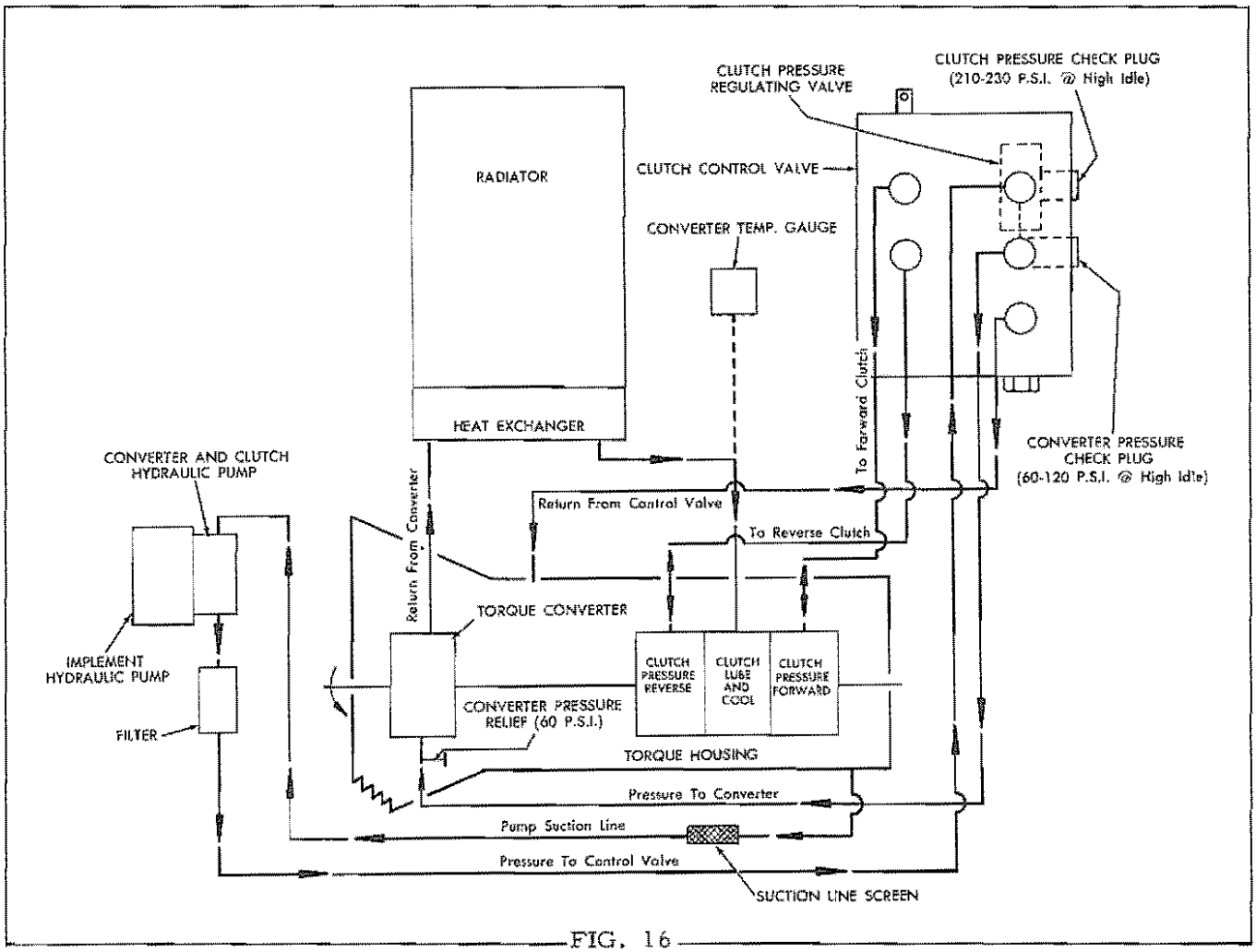


FIG. 16

The H-4 and HD-4 tractors are equipped with a hydraulic operated shuttle clutch and torque converter. Both converter and clutch operate from a common hydraulic sump.
CAUTION: This system must be kept clean.

The converter and clutch hydraulic pump is a gear type, positive displacement pump, mounted directly to the implement pump at the L.H. side of the engine. This pump is rated at a minimum of 8.5 GPM @ 2100 engine RPM and 1000 PSI. Pump flow is directed into the pressure line filter.

CONTROL VALVE - CLUTCH

Flow from the pressure line filter is directed to the clutch control valve. At this point fluid must open the clutch pressure regulating valve in order to flow out of valve and on to torque converter. Opening of this valve requires 220 PSI. This 220 PSI of pressure is always available to the hydraulic shuttle clutch when engine is running.

A check plug is provided in the rear side of the clutch control valve, adjacent to the pressure

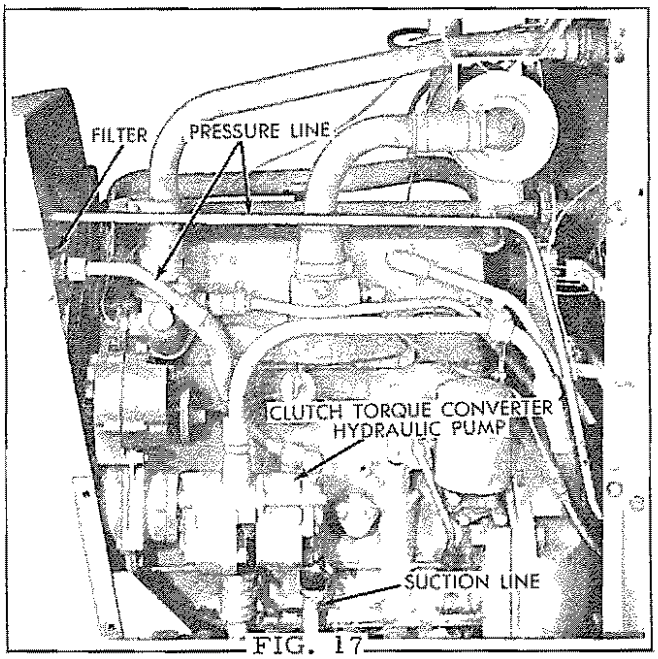


FIG. 17

inlet port, to check clutch pressure regulating valve. This pressure should be 220 to 240 PSI at high idle.

A check plug to check converter pressure is located in the rear side of control valve adjacent to the converter port. Pressure at this plug should be 60 to 110 PSI @ high idle RPM. Converter should be at operating temperature during all checks.

TORQUE CONVERTER

Flow from the clutch control valve is directed to the torque converter. A relief valve is located at the inlet of the torque converter within the torque housing. This relief valve is set at 60 PSI and is checked by placing a gauge in the converter pressure check port in the clutch control valve housing.

HEAT EXCHANGER

Flow from the torque converter enters the heat exchanger, located within the lower tank of the engine radiator. Fluid is cooled as it is circulated through exchanger. Heat exchanger also acts as a flow restrictor to fluid leaving converter.

TEMPERATURE GAUGE

Flow from the heat exchanger comes in contact with the sending unit of the torque converter temperature gauge. Temperature should be in the green or normal range.

TORQUE HOUSING

Flow from the heat exchanger is directed to the torque tube reservoir through the shuttle clutch. Clutches are cooled and lubricated by this return flow of oil. The torque tube acts as a reservoir for the system fluid. Check fluid level daily. Reservoir capacity 28 qts. Fluid type ATF-Type A, Suff. A.

HYDRAULIC SYSTEM

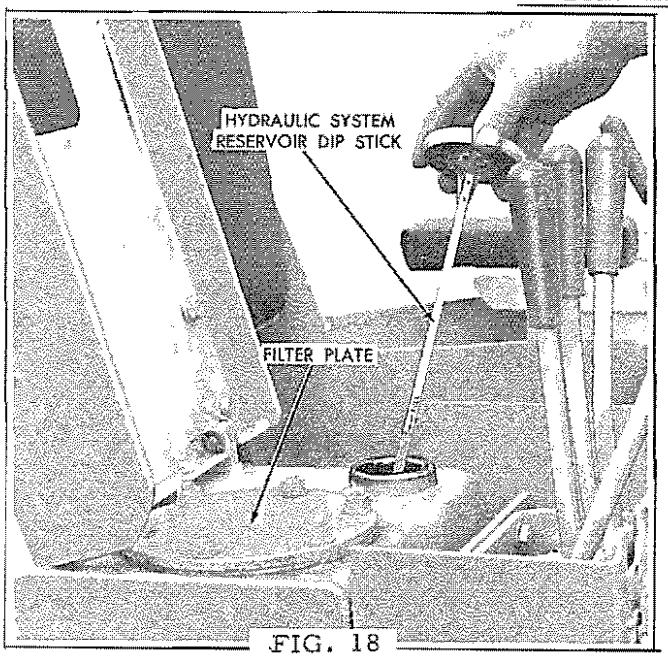


FIG. 18

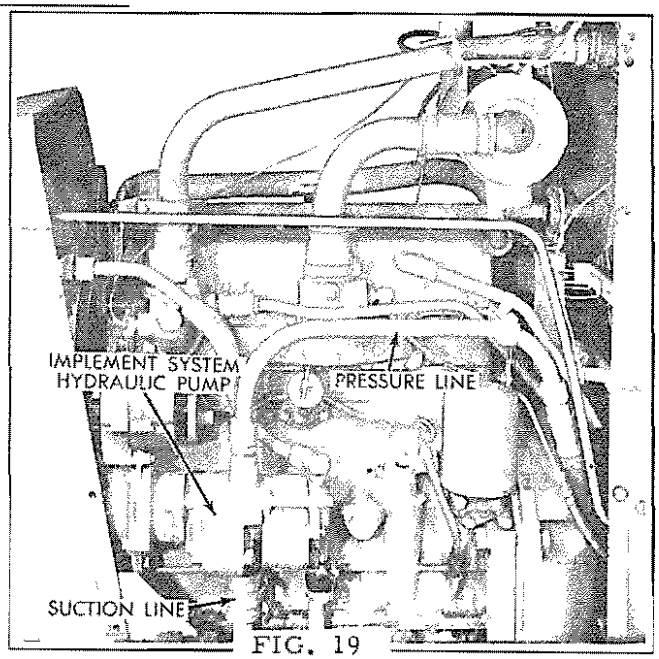


FIG. 19

HYDRAULIC RESERVOIR

Check daily. Keep filled to level on dipstick with SAE 10W-30 motor oil for ambient temperature above 0°F. For ambient temperature below 0°F. use 5W-20. Hydraulic system oils should meet API classification MS. Change every 1000 hours or every 6 months.

PUMP

The hydraulic system pump is mounted on the L.H. side of the engine and is driven from the camshaft gear. Pump is available in two sizes (1) a 15 GPM @2100 engine RPM for dozer applications and (2) a 25 GPM @ 2100 engine RPM for loader or backhoe applications. Pump is driven directly from the camshaft gear. Pump output flows directly to the control valve inlet port.

CONTROL VALVE

The hydraulic system control valve is mounted on a console to the R.H. of operator's seat. This control valve is an open center, parallel circuit stack type with one to four working sections.

Control valve stacks are built up by the selection of the proper valve section for a specific job. Five different valve sections are available.

RETURN LINE FILTER

A return line filter is located in the implement system reservoir. Filter element is replaced after the first 50 hours of operation and every 500 hours thereafter.

To replace filter element, remove filter plate and filter element.

HYDRAULIC SYSTEM BREATHER

Clean every 50 hours of operation.

HYDRAULIC SYSTEM SCREEN & MAGNET

Clean every 1000 hours, or every oil change.

CONTROL VALVE SECTION IDENTIFICATION

The H-4 and HD-4 tractors are provided with a hydraulic system which may be adapted to suit a number of dozer, loader and backhoe applications.

Each control valve section has an identification letter stamped on it on the front face of valve body near the clevis end of valve spool. Following is a list of the valve identification letters, the valve features and the valve usage.

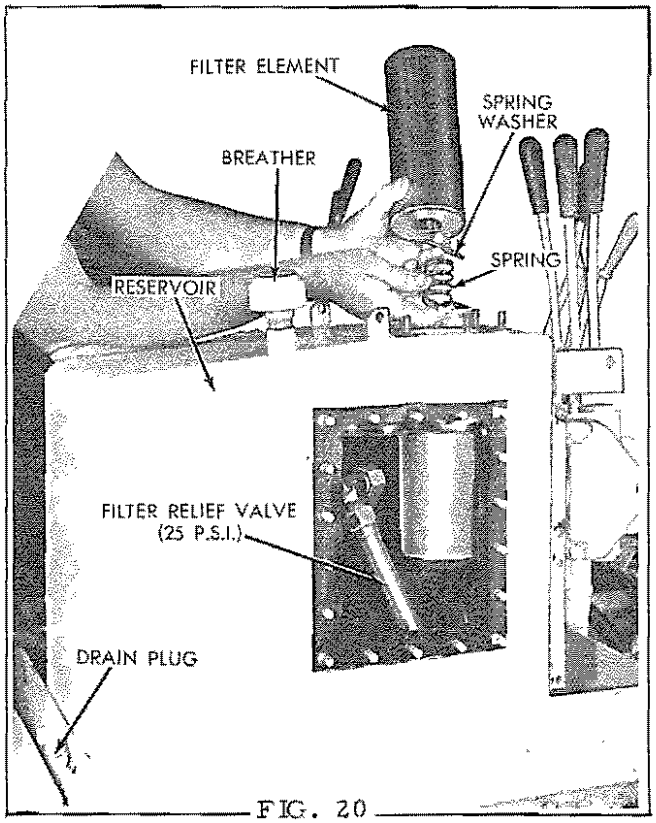


FIG. 20

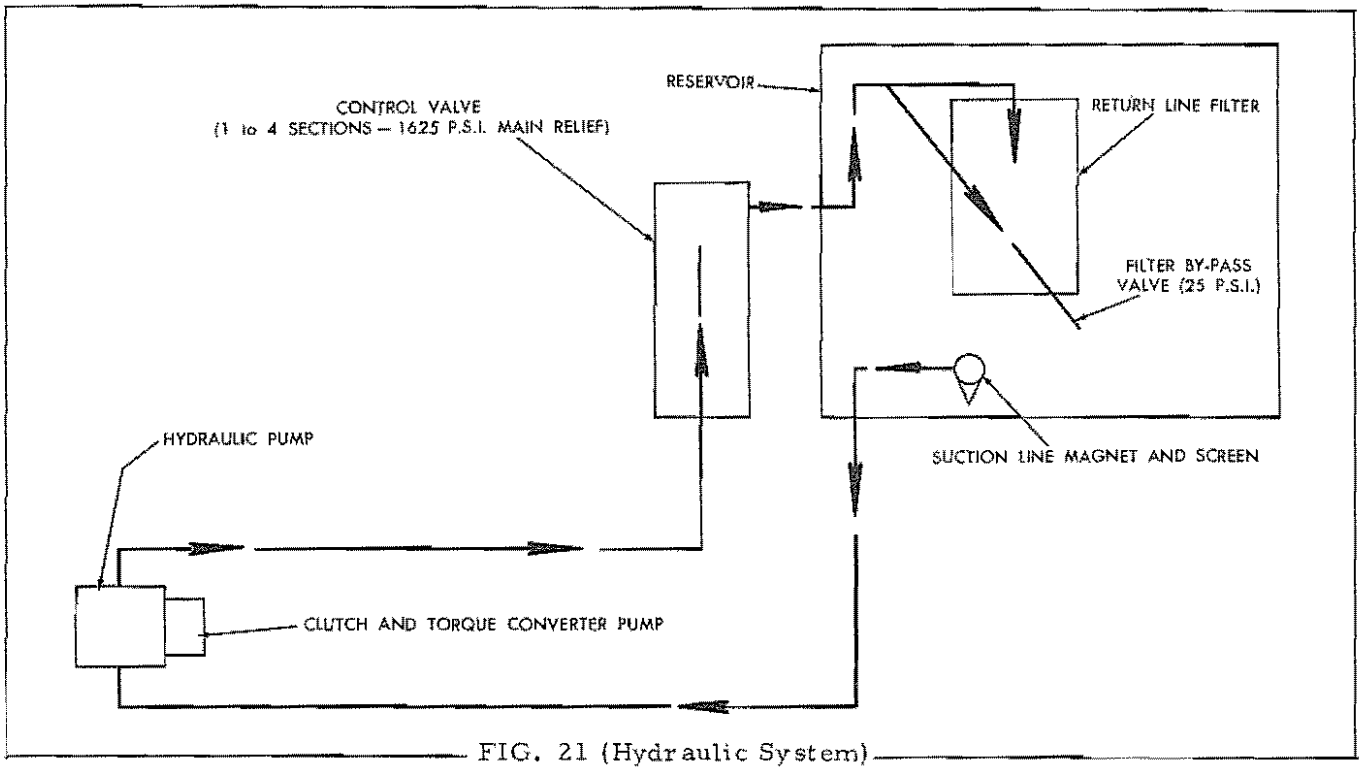


FIG. 21 (Hydraulic System)

"A" Coded Valve: A double acting valve for control of Scarifier, Dozer Tilt or Dozer Angle.

"D" Coded Valve: A double acting valve with "Float" position in spool for control of Dozer Lift.

"E" Coded Valve: A double acting valve with porting for circuit relief valves for control of Grapple.

"F" Coded Valve: A double acting valve incorporating anti-cavitation checks in spool with porting for circuit relief valves for control of Loader Bucket.

"J" Coded Valve: A double acting valve with "Float" position in spool and porting for circuit relief valves for control of Loader Lift.

NOTE: To complete any control section or combination thereof, two end plates sections are used. The L.H. is a plain section while the R.H. is a special section with ports and acts as the inlet section of the valve assembly.

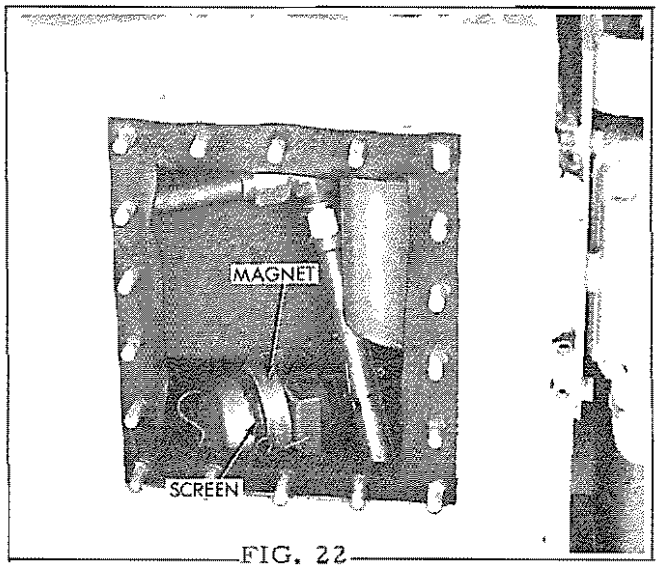
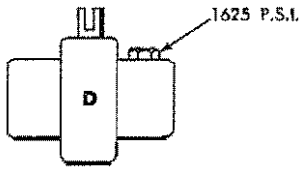


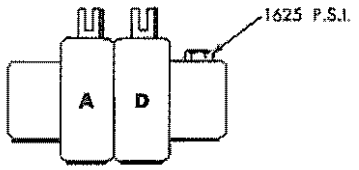
FIG. 22

CONTROL VALVE COMBINATIONS
TRACTORS W/DOZER OR DOZER- RIPPER UNITS

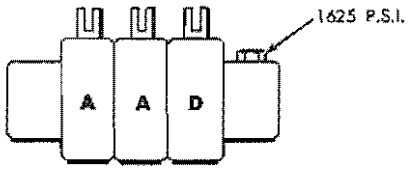
1-SPOOL DOZER
Usage: Dozer w/ inside or outside push beams (Lift and Lower action only)



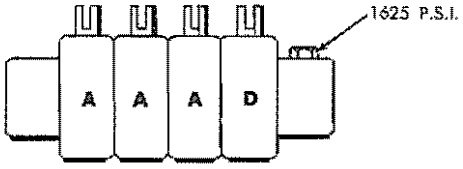
2-SPOOL DOZER
Usage: Dozer w/ Ripper, inside or outside push beams (Lift and Lower action only)



3-SPOOL DOZER
Usage: Dozer w/ inside push beams and full hydraulic action



4-SPOOL DOZER
Usage: Dozer-Ripper w/ inside push beams and full hydraulic action



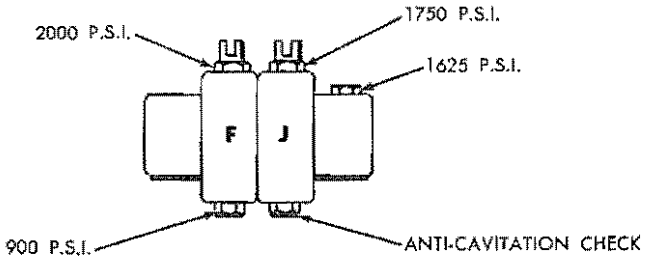
Outside R.H. Side of Tractor

View Looking Rearward

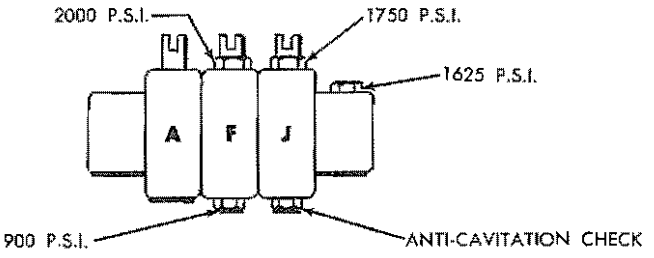
FIG. 23

CONTROL VALVE COMBINATIONS
TRACTORS W/LOADER OR LOADER-GRAPPLE UNITS

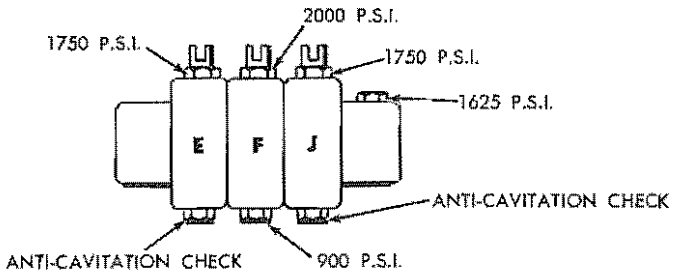
2-SPOOL LOADER
Usage: Loader



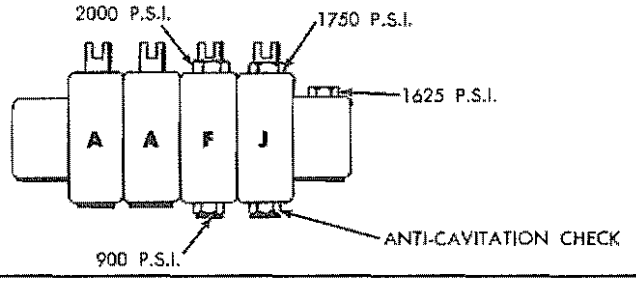
3-SPOOL LOADER
Usage: Loader w/Ripper



3-SPOOL LOADER
Usage: Looder w/Log Grapple



4-SPOOL LOADER
Usage: Loader w/4-Way Bucket and Ripper



Outside R.H. Side of Tractor

View Looking Rearward

FIG. 24

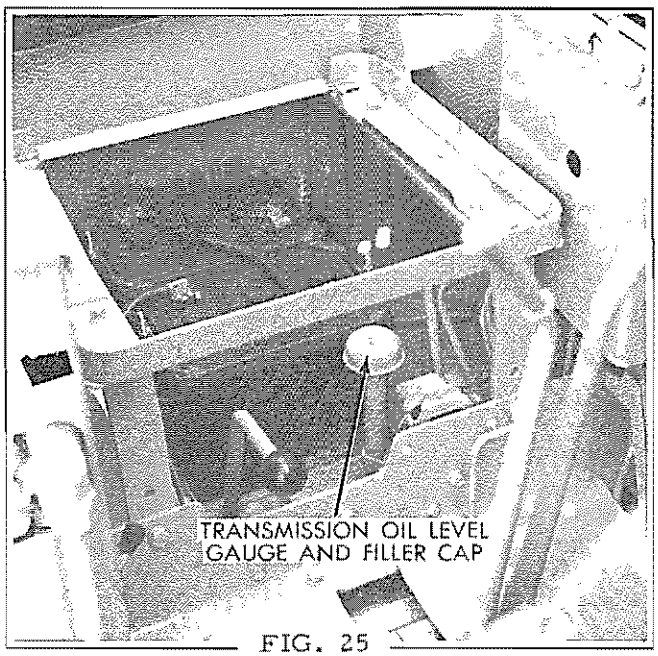


FIG. 25

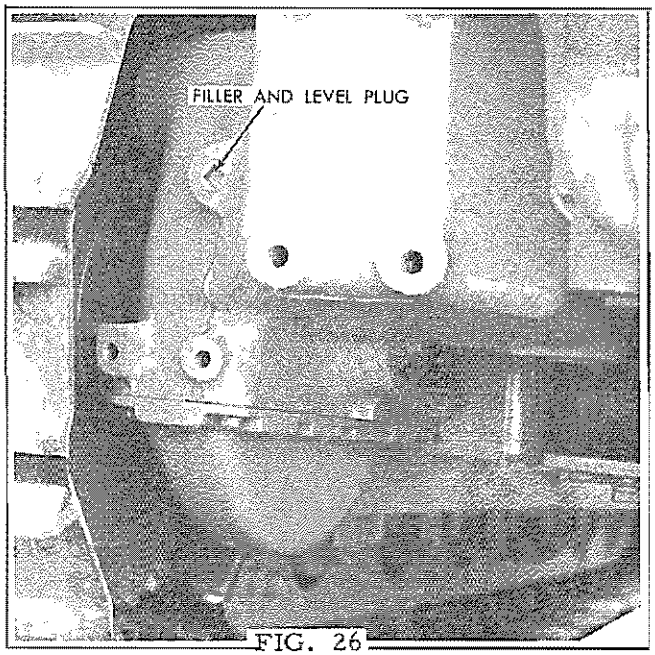


FIG. 26

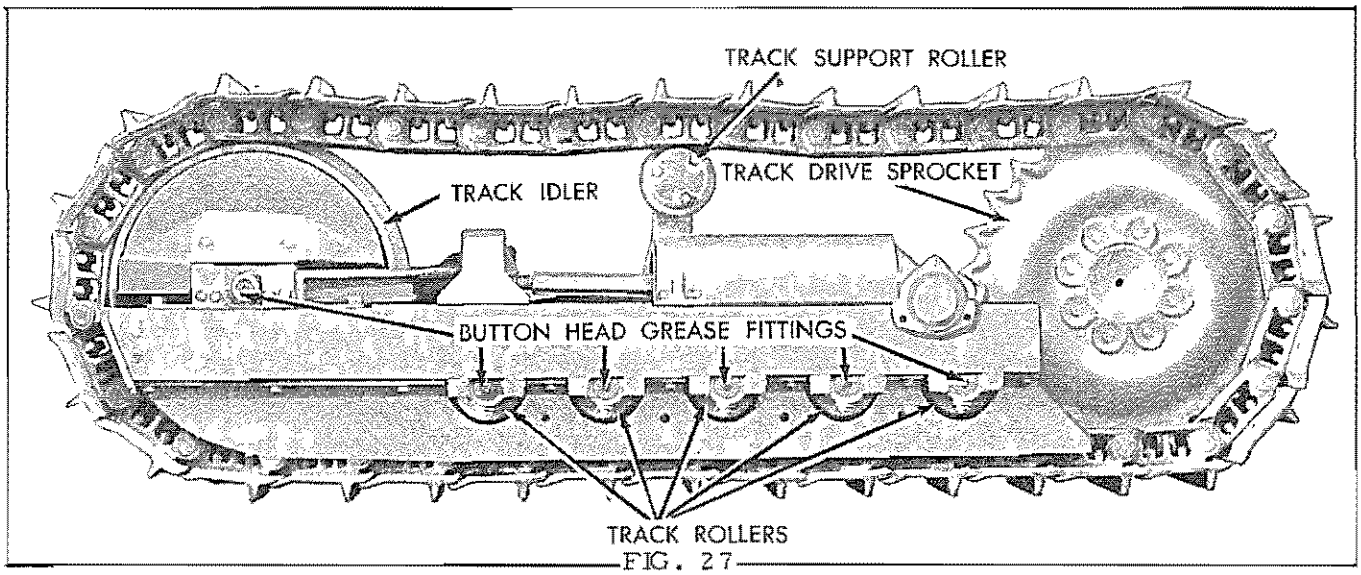


FIG. 27

TRANSMISSION

Check transmission oil level once a week. Use SAE 20-20W.

Keep filled to mark on bayonet gauge. Drain and refill with new oil every 1000 hours.

FINAL DRIVES

Check oil level once a week, or after each 50 to 60 hours of operation. Keep filled to level of filler and level plug, located at rear of final drive housing. Use 80 EP gear lubricant. Remove oil sump and change oil once a year.

TRACK IDLER & ROLLERS

Lubricate every 100 hours of operation. Clean the button head grease fittings thoroughly before attaching grease gun. Pump a few strokes of SAE 90 transmission oil into bearings until a resistance is felt on grease gun. This is a slow process and time must be allowed for air trapped in the system to escape. Excess lubrication will allow grease past face type seals giving the appearance of seal leakage.

TRACK SUPPORT ROLLER

Lubricate every 100 hours of operation. To lubricate, turn roller with one capscrew in cover plate downward. Remove the two upper capscrews. Insert tube of grease gun, forcing SAE 90 transmission oil through one capscrew hole and allowing air to escape from the other. When filled to level of capscrew holes, replace capscrews and tighten 25 to 30 ft. lbs. torque.

BATTERIES

Check daily, keep filled 3/8" above separator plates.

Keep all open flame away from battery as explosive gas is liberated when battery is being charged or discharged.

The battery supplied with your tractor has a lead washer type valve in the filler tube to prevent over filling. Never add anything to the battery solution except DISTILLED OR RAIN WATER. Boiled water will not do. The supply of water should be kept in clean covered vessels of glass, china, rubber or lead.

The need for frequent addition of water to battery, indicates the charging rate maintained is too high. In cold weather, add water only immediately before running the engine so that the charging will mix the electrolyte and water to prevent freezing.

A fully charged battery will not freeze in cold temperatures, but if only partly charged, will freeze and be ruined at much higher temperatures. Weekly readings of each battery cell should be taken with a battery hydrometer. The readings indicate as follows:

1.260 full charge, 1.225 half charge, 1.150 discharged.

When taking the readings, return the electrolyte solution to the cell from which it was taken. The specific gravity of a fully charged cell should be 1.260.

Keep the battery clean by using a stiff bristle brush. Do not use a metal brush. If terminals are corroded or if the battery is acid soaked, wash with a soda, mix 1/4 lb. of baking soda to one quart of water. The vent plugs must be kept in place when cleaning battery.

After washing battery, check the gas escape holes in vent caps making sure they are open. If battery is removed from tractor, disconnect the positive ground terminal first. When reinstalling be sure the ground cable is installed last, and connected to the positive terminal of battery.

The battery retainer should be in place and tightened snugly, to prevent battery from being damaged by vibration. Any non-insulated metal across the top of battery will short circuit, and cause it to lose its charge.

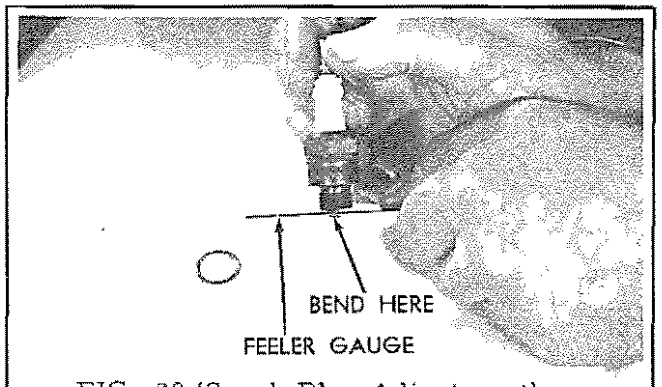


FIG. 28 (Spark Plug Adjustment)

In the event the tractor is not in use for a period of time, it is advisable to remove the battery, have it fully charged and stored in a basement or some similar place, where the temperature will be as low as possible, but above freezing.

SPARK PLUGS

The spark plugs should be removed every 200 hours of operation, cleaned and the points respaced. The point gap should be set at .025". If spark plug gap is set too wide it will induce engine to miss under load. If set too close the engine will not idle properly. Adjust the point gap by bending the outside electrode. Never bend the center electrode.

CAUTION: Failure to service spark plugs as recommended causes increased fuel consumption and lack of power. Always use spark plug wrench when removing plugs to prevent cracking insulator. When replacing plugs make certain gaskets are in good condition and the plugs are tight.

The tractor is equipped with plugs suitable for average operating conditions. When necessary to replace plugs, it may be advisable to use a heat range according to your operating condition. Incorrect plugs are shorter lived and cause poor engine performance. Use plugs specified, or equivalent heat range. Auto-Lite AG-5A, AC-45XL or Champion N-8.

Spark plugs and cables should be maintained in good condition and free of dirt and grease. It may seem unwise to discard a spark plug that has operated successfully for a long period of time, but poor plugs cause hard starting and excessive fuel consumption. For this reason it is advisable to change plugs regularly.

AIR CLEANER (Dry Type)

The air cleaner is of the dry type and has a removable element that can be cleaned and replaced. Never service air cleaner while the engine is running.

To service air cleaner, remove the hood plate. Loosen the clamp and remove element of cleaner assembly.

Cleaning element by one of the following methods will increase the life of the element.

1. Dry or Dusty Element. Use compressed air hose and blow dry, filtered air (100 PSI or less) through element from the inside toward the outside, or opposite to the direction of arrows on end of element and remove all dust.

2. Oily or Sooty Element. Wash element in warm water (120° or less) and a non-sudsing household detergent, if available. If using a water hose (40 PSI or less) apply the water to the inside or center of element, washing the dirt outward. Dry thoroughly before using.

Use caution not to rupture element, or damage fins while cleaning. Be careful not to allow dust to deposit on the clean air side of element prior to installing in cleaner assembly. Inspect gaskets and replace, if necessary. New replacement gaskets can be installed to element by using 3 - MEC 847 cement available from your Allis-Chalmers Dealer.

Service air cleaner at every oil change interval, 75 hours for diesel and 100 hours for gasoline tractors, when operating in normal conditions. In extreme dusty conditions service air cleaner more often. Replace with a new element once a year, or more often if the old element cannot be cleaned satisfactory.

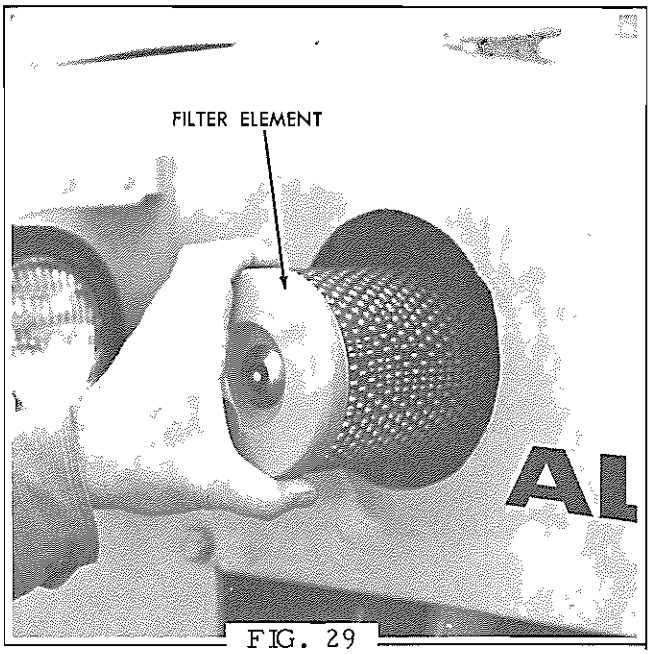


FIG. 29

An air filter indicator is available as optional equipment, which attaches to the air cleaner outlet tube and measure air cleaner restriction. This indicator will warn the operator when it becomes necessary to clean the air cleaner element. When dust restricts the air flow through element to a point that it should be cleaned, a colored flag will become visable in the indicator window.

The air cleaner is installed on your tractor to prevent dirt and dust in the air from entering your engine. Prolong the life of your engine by servicing air cleaner regularly. If air cleaner becomes excessively restricted with dirt, the engine does not receive its required amount of air, which affects its power and performance. If dirt is permitted to enter the engine it will cause excessive wear and drastically shortens engine life.

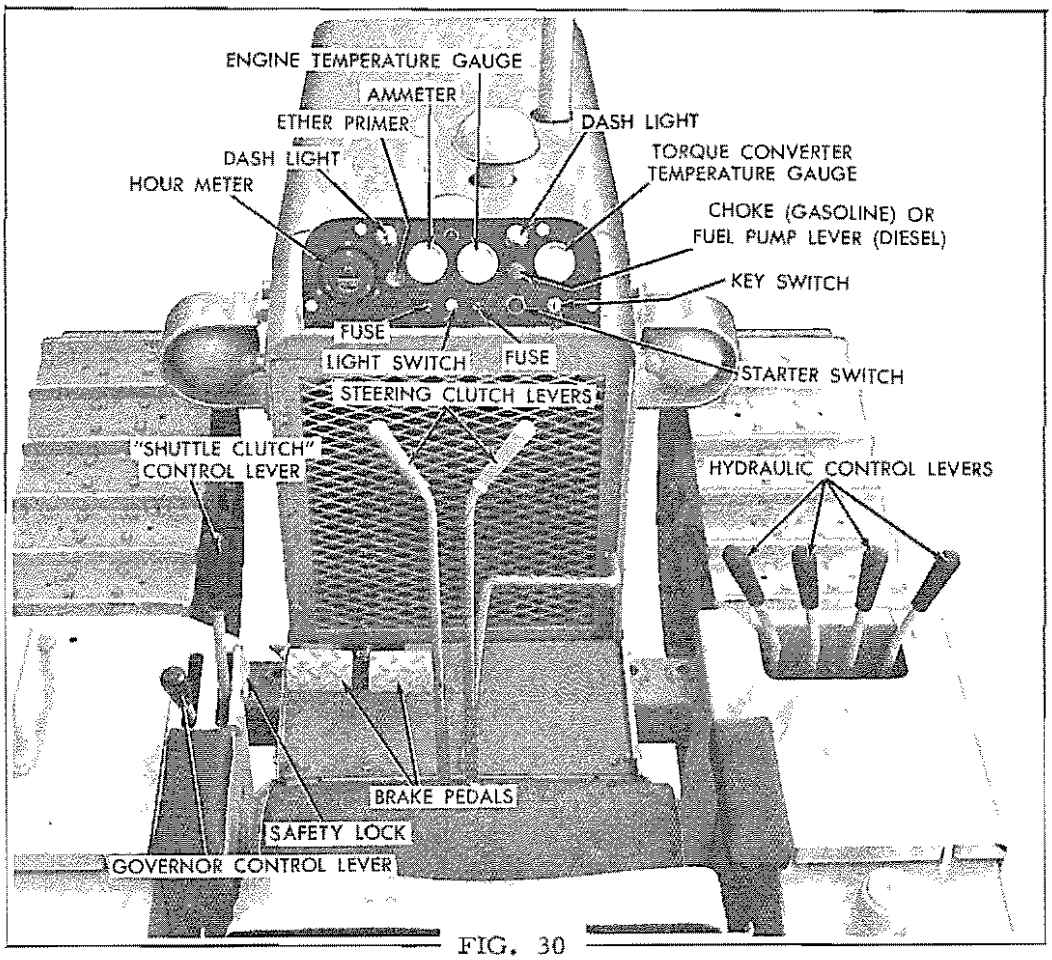


FIG. 30

The operator of the tractor must familiarize himself with the various controls and the instruments provided for its operation. Although many of these controls are similar to those of other tractors, there are important differences and it is not wise, regardless of previous experience, to operate the tractor before fully understanding the purpose of each control and instrument.

SHUTTLE CLUTCH CONTROL LEVER

Moving this control lever forward will engage the forward clutch moving the tractor forward. Moving this lever rearward will engage the reverse clutch moving the tractor rearward.

SAFETY LOCK

This lock is provided to prevent accidentally bumping lever into a speed position. When dismounting from tractor, lock in the neutral position and place transmission gear shift lever in neutral.

STARTING SWITCH

The starting switch is of the push button type and is located on the instrument panel. To start engine, turn the key switch to the "ON" position and depress the push button starting switch to crank engine.

KEY SWITCH

On gasoline tractors the ignition and starting circuits are connected to the key switch. On diesel tractors the air heater and starting circuits are connected to this switch. With the key in a vertical position the switch is in the "OFF" position and the key turned clockwise to first (or "ON") position connects the ignition and starting circuits. Turning the key past the "ON" position on diesel tractors connects the air heater circuit.

LIGHT SWITCH

The light switch is the pull and push type and is located on instrument panel. Pull the switch out to turn the lights on. Push the switch in to turn the lights off. The headlamps, instrument panel lamp and rear lamps (if so equipped) are controlled by this switch.

AMMETER

The ammeter is located on the instrument panel and indicates the rate at which the battery is being charged or discharged. Normally the ammeter will show a slight charge when the engine is first started, then gradually diminsih to zero as the battery charge is replenished. If the battery or batteries are in a discharged condition, the ammeter should indicate a good rate

of charge until the batteries approach a fully charged condition.

ENGINE OIL PRESSURE INDICATOR LIGHT

This light is located on instrument panel and will glow red when the engine oil pressure is below normal. It should glow when the key switch is turned on. It does not indicate the condition of oil, or the engine oil level. If light fails to glow when key switch is turned on, determine the cause before starting engine.
CAUTION: If no oil pressure is indicated by red light, stop engine immediately and determine the cause and correct. Consult your Allis-Chalmers dealer.

ENGINE COOLANT TEMPERATURE GAUGE

The temperature gauge is located on the instrument panel and indicates the operating temperature of the engine cooling solution. Normal operating temperature is from 160° to 220°F., which is in the green section of the gauge. Engine temperature will vary in accordance with the air temperatures and climate conditions.

TORQUE CONVERTER TEMPERATURE GAUGE

This gauge, located on the instrument panel, indicates the converter oil temperature and should normally operate in the green section of the gauge.

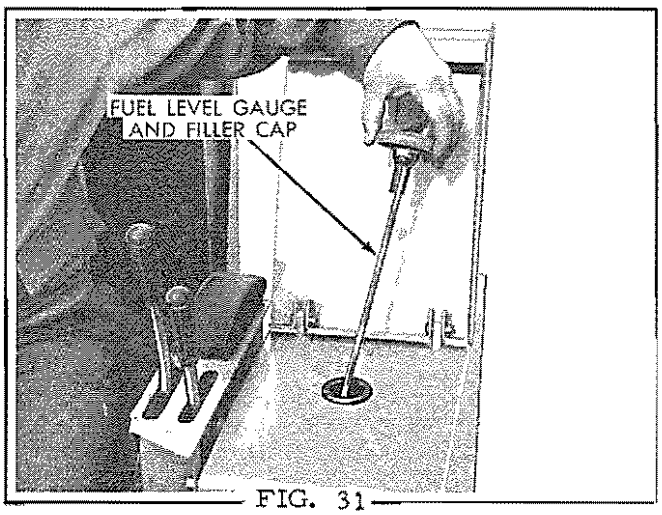


FIG. 31

FUEL GAUGE

A bayonet type fuel gauge is located on the fuel tank and indicates the fuel level.

CHOKE CONTROL KNOB (GASOLINE)

On gasoline models the choke control knob is located on the R. H. side of the instrument panel. Pull rearward on control knob to choke engine when making a cold start, a hot engine usually starts without choking. In cold weather more choking may be necessary. When engine starts, release choke control knob.

FUEL SHUT-OFF KNOB (DIESEL)

On diesel models the injection pump fuel shut-off knob is located on the R. H. side of instrument panel, the same location as the choke control knob on gasoline models. This knob must be moved to the rearward, or run position, to start and run engine. When knob is moved forward to the stop position it shuts off the fuel injection and the engine will stop. Never shut off a hot engine. Allow engine to idle for a few minutes to gradually cool all parts evenly.

GOVERNOR CONTROL LEVER - THROTTLE

The governor control lever is the outside control located to the left of the operator and controls the speed of the engine. With the lever in the extreme rearward position the engine will idle. Moving the control lever forward increases the engine speed. The lever should be in the extreme forward position, or full speed position, when engine is operating under load.

The control lever has a friction adjustment. This adjustment should be just tight enough that the lever will stay in any set position. If set too tight the lever will be hard to move from closed to full speed position and if adjusted too loose, the lever will not stay in the desired position.

HOURMETER

The hourmeter is located on the instrument panel and records the hours of operation.

STEERING CLUTCH LEVERS

The steering levers control two steering clutches which connect the transmission with the final drive gears and track drive sprockets. These levers are used to steer the tractor to right or left by disengaging the right or left steering clutch. Pull the right hand steering lever back to make a right turn; pull the L. H. steering lever back to make a left turn. Refer to "STEERRING OF TRACTOR".

BRAKE PEDALS

The brake pedals are used to retard the speed or to facilitate turning the tractor. To turn the tractor to the right, fully disengage the right steering clutch and press on the right brake pedal; to turn the tractor to the left, fully disengage the left steering clutch and press on the left brake pedal. After the desired turn has been made, release the brake pedal and return the steering lever to its forward position. Keep hold of levers while returning them to their forward position.
CAUTION: Never attempt to use the brakes to turn the tractor without first pulling the steering lever back as far as possible on the side toward which the turn is to be made.

BRAKE LOCK LEVERS

The brake lock levers provide a means of holding the brake pedals in the applied position. To engage the brake lock levers, depress the brake pedals and move the lock levers forward. To disengage the parking brake lock levers, further depress the brake pedals and move the lock levers forward.

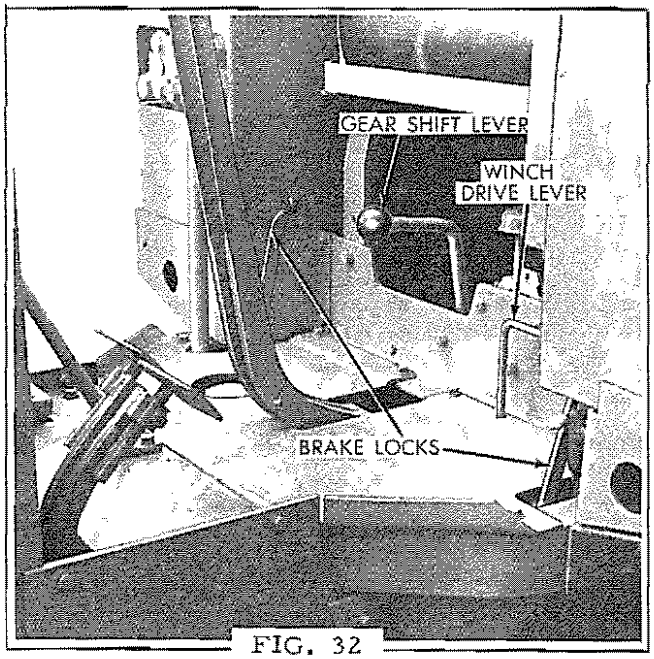


FIG. 32

OPERATING INFORMATION

STARTING AND STOPPING H4 GASOLINE ENGINE

Starting The Engine

Before starting the engine, make certain that all points of lubrication and service have been checked as outlined in the lubrication and service guide. Check the radiator for coolant, check the crankcase for oil, and check the fuel supply in tank.

Place the transmission gear shift lever in neutral position, place range selector in neutral and lock brakes. The fuel must be turned on at tank. Open throttle slightly. Pull back on choke control knob. Turn the key switch to the "ON" position and depress starting switch to crank engine. If engine does not start in 30 seconds, allow starter to cool for 2 minutes before using it again.

When engine starts, release the starting switch. Also, when engine starts, move the choke control forward to the "OFF" position. In cold weather more choking will be required than in warm weather. Experience will determine the amount of choking necessary.

AFTER ENGINE HAS STARTED

Check oil pressure.

When operating engine, look at oil pressure light at frequent intervals to ascertain that oil is being circulated.

Fast Warm-Up

It is a well known fact that condensation accumulates in any engine during the initial warm-up period. The engine is equipped with a thermostat by-pass system to provide a fast warm-up, however, the engine should not be run too fast until the oil is warm enough to circulate freely. Neither should it be idled excessively.

Condensation occurs at temperatures below 140°F. Above this temperature, condensation is driven out of the exhaust pipe. When the oil temperature is above 140°F. any accumulation in the crankcase is boiled or driven out the engine crankcase breather.

To guard against condensation, the engine should be operated at least as long after it reaches normal temperature, as it took to reach normal range.

While the results of condensation may cause immediate failure, it is also certain to cause overall decrease in engine life, when it is allowed to accumulate due to poor warm-up on short periods of operation.

For best engine life, practice fast warm-up.

Stopping The Engine

Never shut off a hot engine. Let it run at low idle for one minute, then turn the key switch to the "OFF" position. This will allow engine to cool off gradually. If the low idle is set correctly, this will prevent engine from back-firing or dieseling.

STARTING AND STOPPING DIESEL ENGINE

Before starting the engine, make certain all points of service and lubrication have been checked. Check the radiator for coolant and crankcase for oil level.

Place range selector in the neutral position. Turn the key switch to the "ON" position and depress starting button to crank engine. Crank engine 15 seconds to assure proper lubrication of engine components before engine is started. Place throttle lever in a position to give 900 to 1000 RPM. Pull out on fuel pump knob, located on dash. Depress starter button. If engine does not start in 30 seconds, allow starter to cool 2 minutes before engine is started.

In cooler temperatures use of the manifold air heater will aid in starting. Use of the air heater should be started when temperatures drop below 60°F. To operate the manifold air heater, turn the key switch past the "ON" position and hold for approximately one minute to allow the heating element to become hot. Then depress starting switch to crank engine.

If the temperature is near freezing, it may be necessary to depress the air heater switch while the engine is cranking. Do not crank the engine over five or six seconds if it does not attempt to start. Allow starter to cool between each interval, while continuing with use of air heater.

If cranking speed increases after five to six seconds of cranking, which indicates engine is attempting to start, continue with use of air heater and crank until engine starts. Check the heating element to see if it is working properly. The battery must be kept in a full charged condition.

After the engine has started, keep at 900 to 1000 RPM and allow engine to run until temperature reaches 120°F. before placing a load on the tractor. Check oil pressure when engine starts.

In extremely cold temperatures, an ether starting aid is available as optional equipment and can be used to obtain quick starts in all temperatures. The starting aid discharges metered amounts of a low combustible starting fluid into intake air stream, thus obtaining a lower ignition point than diesel fuel; therefore, eliminating unnecessary wear to starting motor and batteries.

CAUTION: When using ether starting aid, do not use the air heater, as there is danger of igniting the ether vapor in intake manifold. There is a possibility of damage to the dry type air filter element. When using starting fluid, crank engine until smoke rises from exhaust stack, indicating diesel fuel is being injected, before injecting starting fluid.

After engine starts, run at approximately 1000 RPM. Check to see that engine oil pressure light goes out after engine has started. Should light continue to glow, stop engine, determine and correct cause.

Fast Warm-Up Period

Condensation accumulates in any engine during initial warm-up period or when operating at too low a temperature. Reduce condensation and undue engine wear - practice fast warm-up of engine temperature.

Engine is equipped with a thermostat by-pass system to provide fast warm-up. This warm-up period can be further reduced by operating engine at approximately 1000 RPM and slightly loading engine for first five to ten minutes, such as driving to field in third gear. Never operate the tractor under full load until the engine has reached operating temperature.

Avoid unnecessary idling of the engine, as this will cause engine operating temperature to fall below its normal operating range and cause rapid accumulation of engine sludge. Idling also causes engine oil dilution due to incomplete fuel burning as well as forming deposits on valves and piston rings. It is best to stop engine if tractor is to be idling for a time.

Stopping The Engine

Never shut off a hot engine. Allow it to idle for a couple of minutes. This gives engine a chance to cool gradually. Now shut off engine by pushing fuel injection shut-off control knob in.

DIESEL STARTING FLUID

Starting fluid must not be injected into the air cleaner intake stack on tractors equipped with a dry type air cleaner. This is not practical as it requires an excessive amount of starting fluid and provides a means of burning the air cleaner element if the air heater is accidently or purposely used.

Never use the engine air heater and starting fluid at the same time. Never use starting fluid unless the engine is cranking. If starting fluid has been used, do not use the air heater until engine has been purged of all starting fluid. If the air heater has been used, crank engine for 15 seconds without use of air heater before using starting fluid.

If it is desired to use starting fluid, it should be used in conjunction with the diesel engine starting aid which is available as optional miscellaneous equipment. This starting aid injects metered amounts of starting fluid through a nozzle into the intake air stream of the intake manifold.

Failure to follow the above instructions and precautions can cause ignition of starting fluid in the intake manifold or air cleaner element. This burns the element to destruction and allows dirt to be drawn into the engine.

GEAR SHIFTING - TRANSMISSION

The transmission has a shift lever to select the proper gear speed for the work being done. Before shifting into any gear, place selector lever in neutral and move the shift lever from neutral to the desired gear position.

Always stop the forward motion of tractor before changing from one gear speed to another. Never attempt to shift gears on the go as excessive gear clashing may result. To shift from one gear to another refer to Transmission Shift Diagram and follow shift pattern. Never force shift lever from one gear to another.

Transmission shift lever should always be in the neutral position before starting engine, or before dismounting from tractor. Gear shifting should be made at reduced engine speed. This will make shifting easier and reduce clashing. Increase engine speed sufficiently to start load. After clutch is engaged increase engine speed to full speed, especially on loads.

SHUTTLE CLUTCH - HYDRAULICALLY OPERATED

This clutch is provided as standard equipment for industrial tractors to control the forward and reverse movement of tractor in any selected gear.

To operate gear ranges, with clutch control lever in the neutral position, shift transmission into the desired gear range and move selector lever to desired position.

To engage forward travel, move control to the forward position. To reverse direction of travel move control rearward. To stop travel in either direction, move lever midway and latch in the neutral position. Apply brakes and shift transmission to neutral before dismounting from tractor.

In general, the speed range should be used which will give fastest travel speed.

When the tracks stall, the output shaft of torque converter is stationary. Stall periods, or operation near stall point of torque converter, should be avoided except for very short periods to prevent excessive heating of torque converter fluid. Remember, with the torque converter it is no longer possible to estimate the load on tractor by lugging of the engine; selection of proper speed depends on speed range which allows tractor to work at its maximum efficiency. The operator will quickly acquire the experience necessary to select the proper speed range to allow tractor to work at its full capacity.

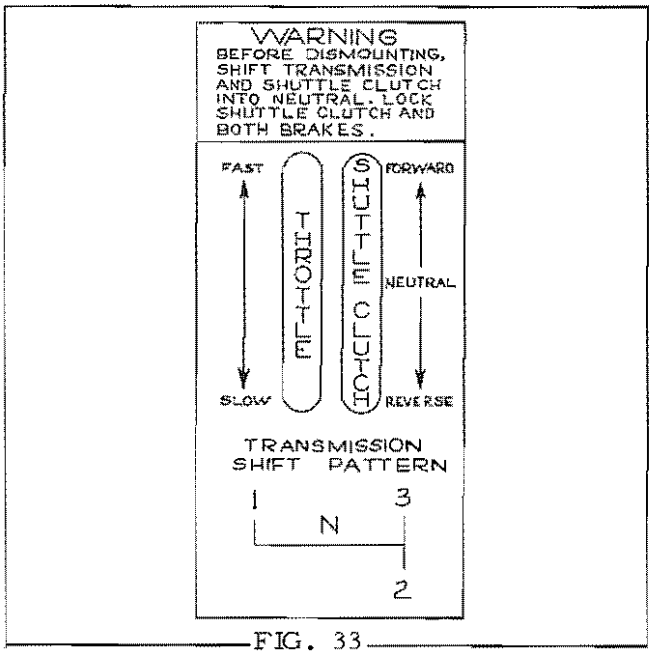


FIG. 33

DOWN HILL OPERATION

The H-4 and HD-4 tractors may be operated down steep hills safely. The following precautions are noted. These units are equipped with torque converters and hydraulic operated shuttle clutch. Their is therefore no mechanical connection between the engine and power transmission. The torque converter does provide braking action when the output shaft from the converter exceeds the engine speed by 10%. It is therefore possible to obtain braking action by placing transmission in low gear (1st) and operate engine at a low RPM.

CAUTION: Tractor engine must be running at all times for braking action. This is to provide pressure to the hydraulic operated clutch for engagement.

DEGREE SLOPE OPERATION

The H-4 gasoline tractor will operate to a slope of 27° without any affect to carburetion or engine oil supply. The HD-4 tractor will operate safely to 30°.

NOTE: Operation on slopes is limited to 30° due to tractor stability.

STEERING OF TRACTOR

The tractor is steered by disengaging the steering clutch on the side of the tractor toward which the turn is to be made. This is done by using the steering levers located directly in front of the operator. To make a right turn, pull back the R.H. steering lever; to make a left turn, pull back the L.H. steering lever. With the left steering clutch disengaged, power is not delivered to the left track and the track will slow down or stop. Since power is still being delivered to the right track, the right track will keep turning and

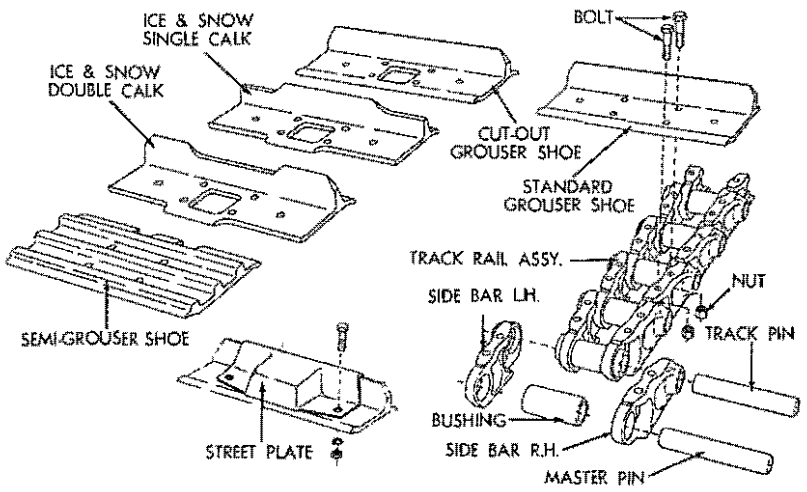


FIG. 34 (Track & Track Shoes)

cause the tractor to turn to the left. When the right steering clutch is disengaged, the tractor will turn to the right in a similar manner.

If a short turn is to be made, pull the steering lever back on the side toward which the turn is to be made and press down on the corresponding brake pedal; this will stop the track completely. Always pull the steering lever all the way back when turning. When the tractor has turned as desired, return the lever immediately to its forward position. Do not let the levers fly forward from the disengaged position, keep hold of levers and return them manually to their forward position. Disengage and engage the steering clutches smoothly and completely to avoid excessive wear on the clutch friction discs.

When steering the tractor down steep grades with the load pushing the tractor, the use of the steering levers is opposite to that when pulling a load. In this case, the L.H. steering lever is used to make a right turn and the R.H. steering lever to make a left turn. Disengaging either steering clutch will allow the track on that side to travel faster, since the braking power of the engine is released from it, while the steering clutch remaining engaged will act as a brake for the opposite track.

During operation, observe the amount of free travel of the steering levers (the distance the levers move before pressing is felt and disengagement of clutch begins). This free travel, which assumes complete engagement of the steering clutches, should be from 1-1/2" to 3-1/2". When the free travel of either steering lever becomes less than 1-1/2", the steering clutch linkage requires adjustment (Refer to "Steering Clutch Adjustment").

TRACK AND TRACK SHOES

Track type tractors operate in all kinds of soil conditions, such as mud, sand, gravel, snow and ice. Therefore, a variety of track shoe equipment is necessary and available. When changing or installing track shoes the bolts must be tightened 100 to 110 ft. lbs. torque.

The standard grouser shoes are most commonly used for average conditions and can be equipped with street plates where tractor is to be operated on paved roads or streets. Cut-out grousers are available where track packing is encountered.

When operating on ice or snow, cut-out ice and snow grousers are available. Street plates may be used on the ice and snow, or any of the full grouser shoes. Semi-grouser shoes are available and can be used on pavement, or in soil conditions where it is not desired to dig up the soil surface, or in operations where a slight track slippage is desired.

When operating in muddy conditions and freezing temperatures, it is recommended that the mud be cleaned from the track assemblies, at the end of the days work and that tractor be parked on dry solid ground to prevent track freezing down. If impossible to park tractor on solid ground, it should be driven upon planks.

If track assemblies are allowed to freeze down in muddy conditions without any precautions, a severe strain will be put on gear train and housings when attempting to move or operate tractor, and severe damage could result.

Track wear gauges are available to determine amount of wear on components to determine when to rebuild. Excessively worn tracks can damage sprockets, truck wheels and support rollers. The distance between the center of pins on a new track is 6". Turn, or replace, pin and bushings when this measurement reaches 6-1/8" to protect components.

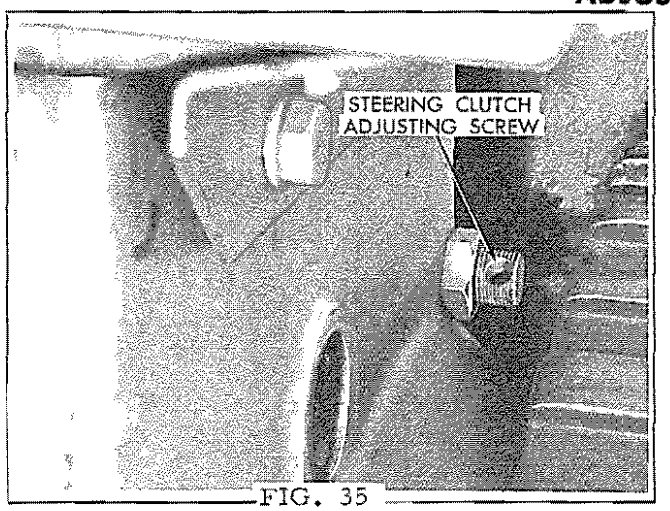


FIG. 35

STEERING CLUTCH - ADJUSTMENT

The clutches are properly adjusted when the control levers have 3-1/2" of free movement. This amount of free lever travel will provide approximately 1/8" clearance between the release bearing and the clutch release levers. As the clutches wear this free movement diminishes and should be readjusted when the free movement has decreased to 1-1/2".

A clutch adjusting screw is located at the outside of the final drive housings and inside of track, and is accessible from the rear of tractor. To increase the lever free travel, loosen the locknut and turn the adjusting screw out of housing until the lever free travel is 3-1/2" and tighten locknut. Adjust the opposite clutch in a similar manner.

For ease of operation the initial adjustment for linkage should be made on the link rod. The turnbuckle should be adjusted so the distance between the cowl and lever in the released position should be 11-1/2".

Stops are located on steering clutch bell cranks to limit the full travel. After clutches are released, adjust stop screws to limit maximum travel. Once this is set it does not have to be adjusted unless linkage dimensions are changed.

STEERING BRAKES - ADJUSTMENT

To adjust or tighten the steering brakes, remove the small covers at top of final drive housings. With the brake latch levers in the upward or off position, adjust brake bands by turning the adjusting nuts clockwise until the brake pedal pads have 2-1/2" of travel. The two adjusting nuts are locked together, loosen nuts to make adjustment, lock nuts together after adjustment is made.

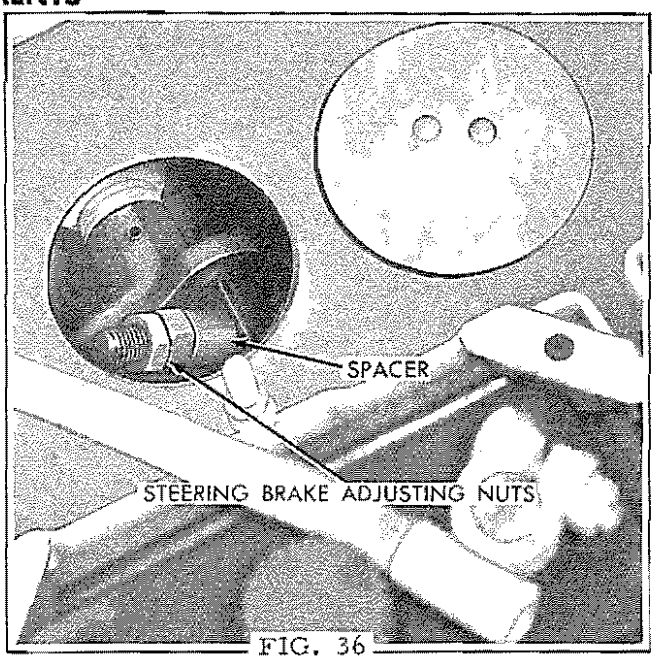


FIG. 36

With this adjustment and the brake lock levers in the downward or applied position, the brakes should latch in the first notch with a reasonable amount of pedal pressure. With a heavy pressure on brake pedal it must latch into the second notch, otherwise brakes are too tight.

For initial adjustment push forward on brake clutch and engage in first notch. Adjust link by turning bell crank until pin aligns with hole in bell crank arm with pedal pulled back against platform (stop). Once this is set it does not have to be adjusted unless linkage dimensions have been changed.

TRACK SAG ADJUSTMENT

To minimize movement of the tractor in its blocking while in transit, the tracks are purposely adjusted "TIGHT" at the factory. Before unloading the tractor from its carrier, the tracks must be adjusted. Loosen capscrews in lock plate and turn the adjusting screw into the track release yoke as necessary to obtain 1-1/2" sag between the track support roller and the front track idler. Tighten capscrews in the adjusting screw lock plate.

All future track adjustments should be made in the following manner and with a reasonable clean track.

Run the tractor backward and forward a few times before checking the sag measurement of track. The last movement of the tractor must always be forward. Do not apply brakes. Let unit roll to a stop. The track sag measurement is to be made with a grouser pin directly over the centerline of the track support roller.

Place a straight edge on top of the track and measure the sag from the straight edge to the grousers midway between the front idler and the track support roller. The track is correctly adjusted when the sag is 1-1/2" to 2-1/2". If the track sag exceeds 2-1/2", readjust the sag to 1-1/2". Proper adjustment is important because rapid wear of tracks and other affected parts will occur if the tracks are too tight or too loose.

To adjust each track, loosen capscrews in lock plate and turn the adjusting screw out of the track release yoke as necessary to force the track idler ahead until the proper sag of 1-1/2" is obtained. When the correct adjustment of the track is obtained, tighten the capscrews in the adjusting screw lock plate.

VALVE TAPPET CLEARANCE

Diesel - .015" Intake - .015" exhaust
Gasoline - .020" intake - .025" exhaust

Correct clearance between valve stems and rocker arms should be maintained at all times. The engine must be heated to its normal operating temperature before making the adjustment.

Turn the valve adjusting screw until there is the proper clearance between valve stems and rocker arms when measured with a feeler gauge. Recheck clearance.

From front of engine to rear valves are located as follows:
#1 Intake - Exhaust
#2 Exhaust - Intake
#3 Intake - Exhaust
#4 Exhaust - Intake

To adjust clearance, first rotate engine until No. 4 exhaust valve closes, and adjust both valves on No. 1 cylinder. Second, rotate engine until No. 2 exhaust valve closes and adjust both valves on No. 3 cylinder. Third, rotate engine until No. 1 exhaust valve closes and adjust both valves on No. 4 cylinder. Fourth, rotate engine until No. 3 exhaust valve closes and adjust both valves on No. 2 cylinder.

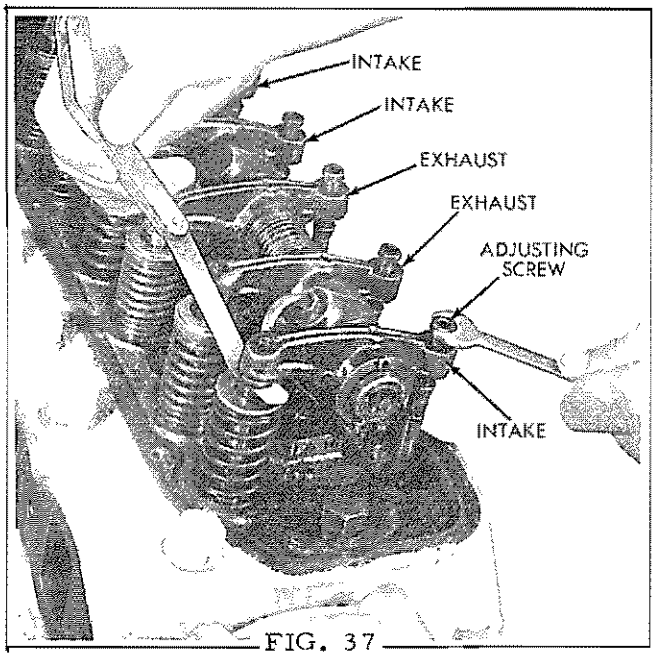


FIG. 37

This method of adjusting tappets eliminates the necessity of adjusting one valve on a cylinder, then having to go back to the same cylinder to adjust the other valve, therefore saving time and simplifying the procedure. Starting with No. 1 cylinder and following the firing order of the engine, only four "One Half" turns of the engine are necessary for a complete job of adjusting valves.

Lack of compression because of leaky valves may be caused by either insufficient clearance between rocker arms and valves stems; or by carbon or gummy substance on the valve stems or seats, preventing the valves from closing.

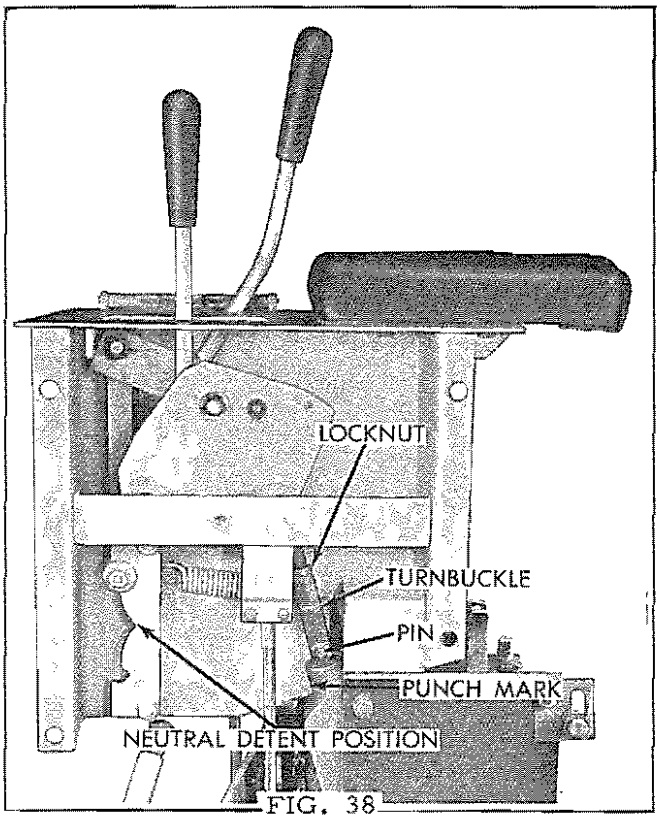


FIG. 38

SHUTTLE CLUTCH ADJUSTMENT

Remove console from side of fuel tank. When removing console use care not to bend valve support bracket. The clutch lever quadrant must be obtained so that it will hold the clutch lever in the neutral position so that both ranges of clutch is released equally. With the lever locked in neutral position on quadrant, adjust turnbuckle.

There is a stake or punch mark on the valve body. A dimension of 1-1/2" should be obtained from the stake mark to the center of pin with the lever in neutral position, then turn clevis out 1/2 turn and lock nut. Make certain the turnbuckle is as shown. If it is turned 90°, undue strain will be placed on valve when operating. It is not necessary to remove pins when adjusting. Merely loosen locknut and rotate valve in body.

DRIVE BELT - ADJUSTMENT

To adjust or tighten the fan drive belt, loosen the adjusting nut on the idler support, and adjust until there is approximately 1/4" belt deflection midway between the pulleys, using a 10 lb. pull or scale reading. Retighten adjusting nut.

Extreme tightness will reduce the life of belt, alternator bearings and fan shaft bearings. Belt slippage will cause excessive belt wear and also prevent fan from delivering the proper amount of air. If the belt bottoms in sheaves it will cause slippage and must be replaced.

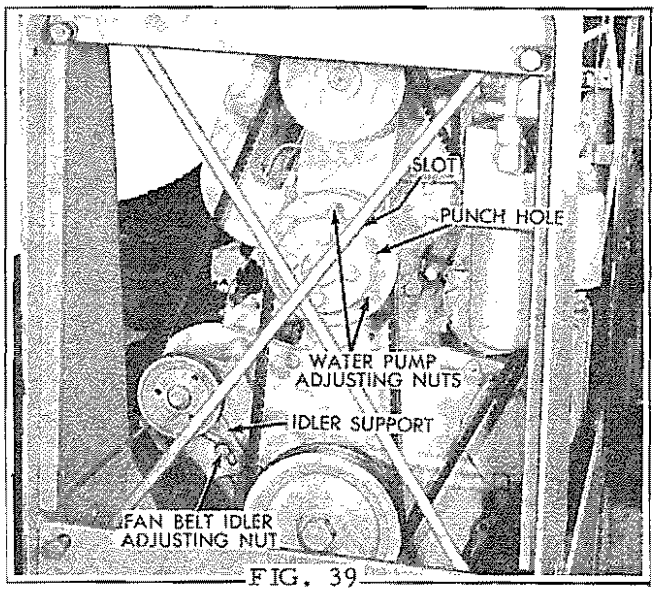


FIG. 39

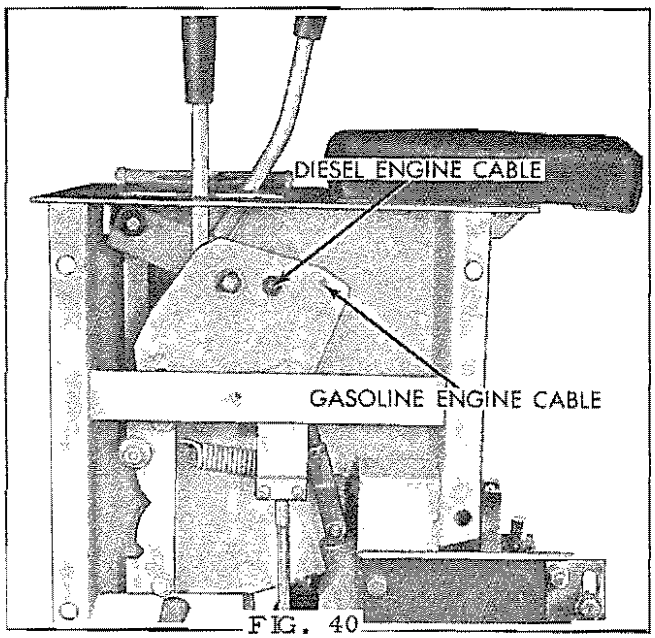


FIG. 40

To adjust water pump belts, loosen adjusting screws and rotate sheaves with punch to tighten belt. Using a 10# pull of scale reading, adjust for 1/4" deflection.

GOVERNOR

Make certain cable is attached in proper quadrant hole. Adjust length to provide full quadrant travel so excess strain is not placed on cable.

On diesel units, adjust high and low idle stop screws on pump (side closest to engine) locknuts are provided to maintain this setting. Adjust for 500 to 600 RPM low idle and 2250 to 2350 RPM high idle.

On gasoline tractors set low idle 450 to 500 RPM by adjusting stop screw on carburetor and high idle 2300 to 2350 RPM by adjusting throttle spring assembly.

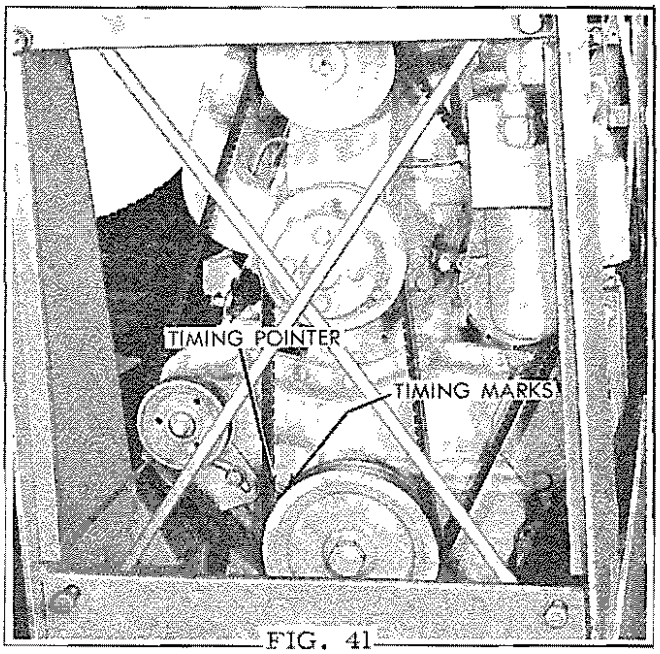


FIG. 41

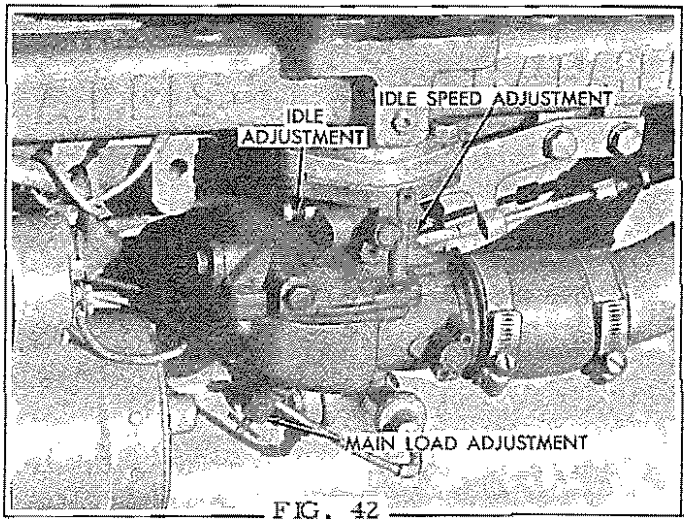


FIG. 42

DISTRIBUTOR

The distributor requires very little attention or service, however, the point gap should be checked periodically and points replaced when necessary. The point gap should be adjusted to .016". To adjust, remove distributor cap, rotor and dust cover. Rotate engine until the peak of cam lobe is contacting the breaker arm and points are at their widest position. Loosen the locking screw and turn cam plate with screwdriver in slot, to get the .016" point gap. Retighten locking screw and measure point gap with feeler gauge.

When the contact points become burned, worn or pitted, they should be replaced with a new set. When replacing a point set, always replace the cam lubricator. It is also a good practice to replace the condenser at the same time, unless testing shows it to be in perfect condition. Never use emery cloth or sandpaper to clean points, only in case of emergency. Timing should be checked and reset if necessary when installing new points.

TIMING - DIESEL

Rotate engine until No. 4 exhaust valve is just closing and intake starts to open. Align timing mark of 28° BTDC on crankshaft drive pulley with pointer. This is the point of injection. Remove timing window from pump and rotate pump until timing mark on cam ring aligns with timing mark on governor.

TIMING - GASOLINE

To check with a timing light, operate engine at 2100 RPM. Rotate distributor until timing marks align at this speed and clamp in position. Recheck timing.

CARBURETOR

The carburetor has three adjustments, one for controlling the idling speed of the engine, one to correct for changes in fuels and atmospheric conditions at idling speed and one to get maximum power without excessive fuel consumption.

To regulate the idling speed of the engine, have the engine at operating temperature and adjust the idling stop screw on the throttle shaft on inner side of carburetor. The idle speed should be approximately 450 RPM.

For correct air fuel mixture at idling speed of engine, adjust the idling adjusting screw located at the top portion of the carburetor. Turn the adjusting screw inward for richer mixture and outward for leaner mixture. The normal setting is approximately 1-1/2 turns outward.

The main load adjustment located at the front portion of carburetor is for the purpose of obtaining the proper air fuel mixture for full load operation. Turn inward for leaner mixture and outward for richer mixture. To adjust, have engine at normal operating temperature and at stall speed.

IGNITION COIL

The ignition coil does not require special service other than to keep all terminals tight and clean. The distributor lead wire must be attached to negative terminal.

ALTERNATOR

The alternator is used and replaces the generator in the electrical charging system and requires no lubrication. The alternator and regulator are designed for use on only one polarity system. The following precautions must be observed when working on, or trouble shooting the charging circuit. Failure to observe these precautions will result in serious damage to the electrical equipment.

1. When installing a battery or batteries, always make absolutely sure the ground polarity of the battery and the ground polarity of the alternator are the same. If a battery of the wrong polarity, or if the battery is reversed when installing and connecting it into the charging system, the battery is directly shorted through the diodes. This will cause the diodes and wiring to be endangered by high current flow and burned out diodes and wiring harness will probably result.

2. When connecting a booster or slave battery, make certain to connect the negative battery terminals together and the positive battery terminals together. Failure to observe this precaution will result in burned out diodes and wiring harness.

3. When connecting a battery charger to the batteries, connect the charger positive lead to the battery positive terminals and the charger negative lead to the battery negative terminals. Failure to follow this procedure will result in damage to diodes and wiring harness. Never attempt to start engine or turn key switch to the "ON" position while charger is in use.

4. Never operate the alternator on an open circuit. With no electrical load in the circuit (wires removed or disconnected), the alternator can build up high voltages which can be extremely dangerous to any one who might accidently touch the battery terminal on alternator. Before making tests or checks, make sure all connections in the circuit are tight.

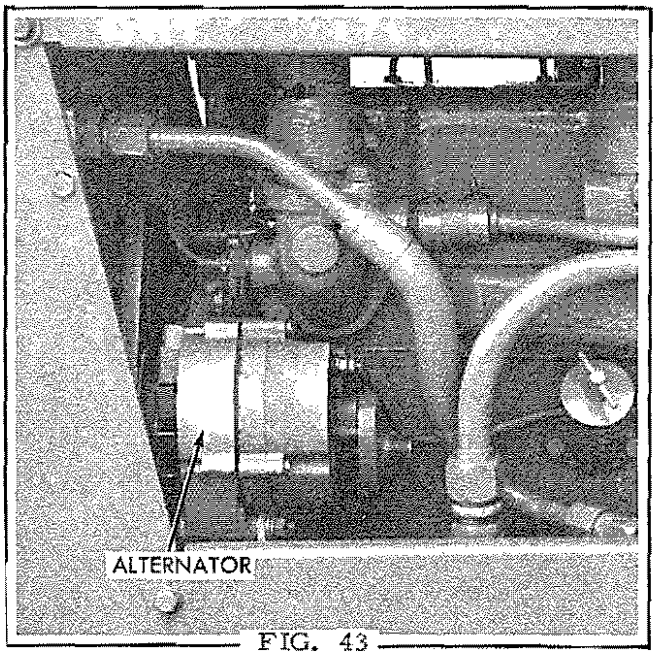


FIG. 43

5. Do not short across or ground any terminals of the alternator or regulator. Grounding or shorting any of the alternator or regulator terminals can cause serious electrical malfunctions that may damage components of the electrical system.

6. Do not attempt to polarize the alternator. This is not necessary since the voltage developed within the alternator is of both polarities and the diode rectifier automatically controls the direction of current flow. It is important that the battery ground and the alternator ground be of the same polarity for diode protection.

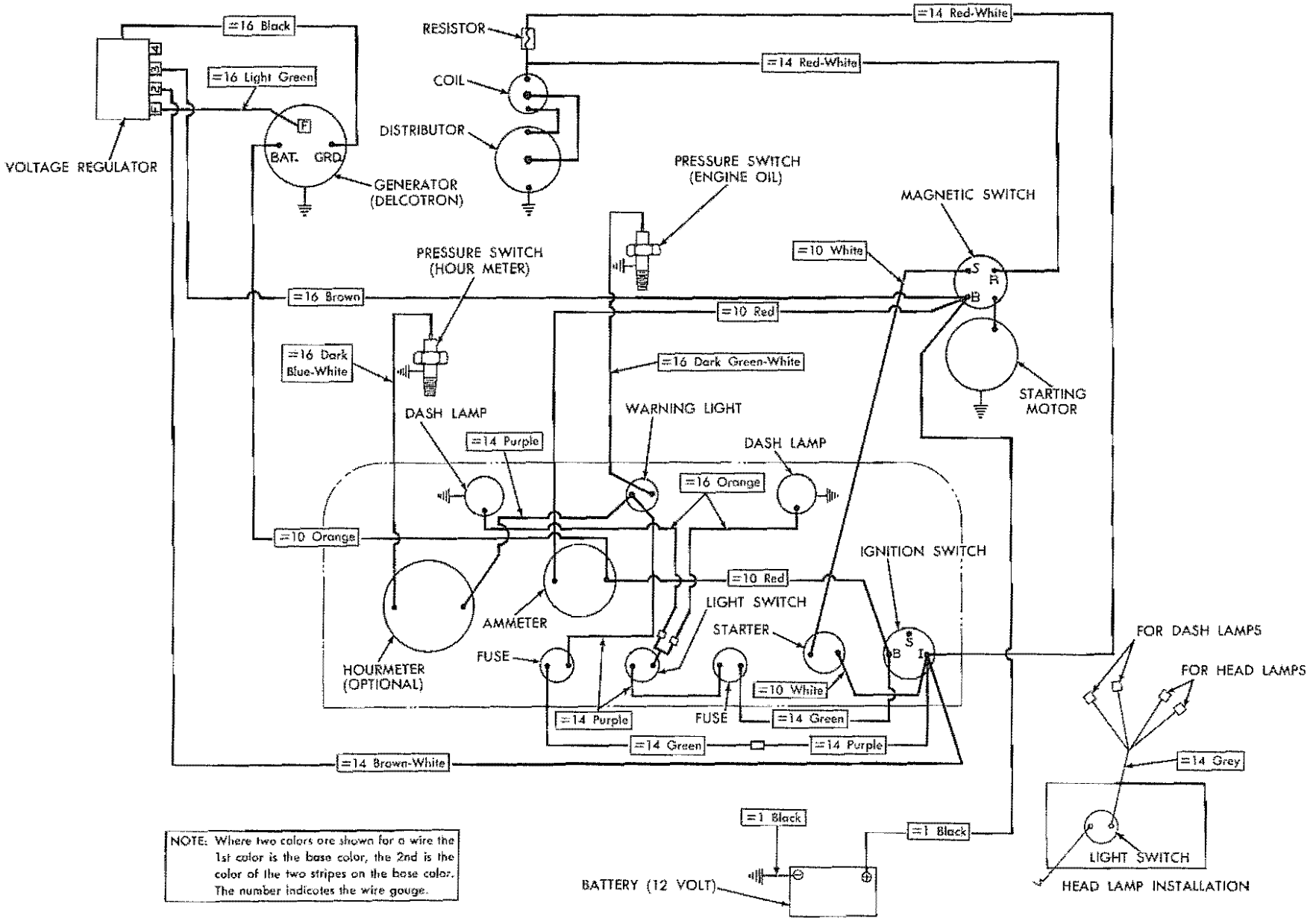
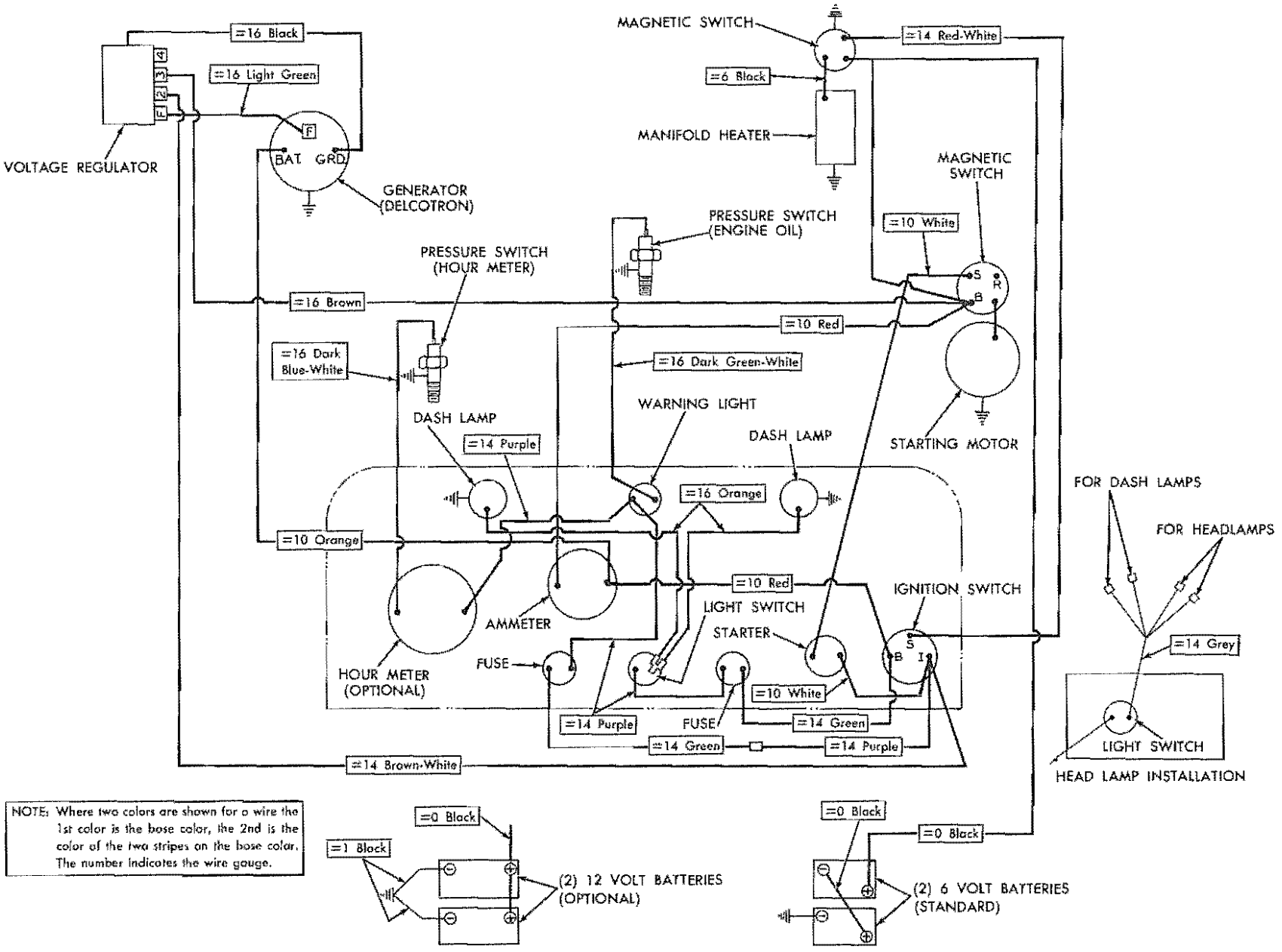


FIG. 44 WIRING DIAGRAM - GASOLINE



NOTE: Where two colors are shown for a wire the 1st color is the base color, the 2nd is the color of the two stripes on the base color. The number indicates the wire gauge.

FIG. 45 WIRING DIAGRAM - DIESEL

DIAGNOSING ENGINE DIFFICULTY
H-4 GASOLINE

The following suggestions are listed for your assistance. You can make simple adjustments on your tractor that will improve its operation and save you the time and expense of engaging a Serviceman.

Always make one adjustment at a time and if the adjustment made does not improve the condition, return to the original setting before proceeding to the next adjustment.

ENGINE FAILS TO START OR RUNS UNEVENLY

1. Fuel valve shut off.
2. Incorrect fuel in tank.
3. Float valve sticking.
4. Fuel tank empty.
5. Clogged fuel filter or fuel lines.
6. Dirty or clogged air cleaner.
7. Leaking or loose manifold.
8. Engine flooded.
9. Broken wires from distributor to engine.
10. Wires not in proper position.
11. Switch not turned on or defective.
12. Spark plugs wet, dirty, or broken.
13. Distributor weak, or out of time.
14. Spark plug points not properly spaced.
15. Distributor points pitted, dirty or improperly spaced.

ENGINE OVERHEATED

1. Low water level in cooling system.
2. Radiator clogged.
3. Fan belt slipping.
4. Collapsed radiator hose.
5. Thermostat stuck.
6. Tractor overloaded.
7. Ignition timed late.
8. Fuel mixture too lean.
9. Weak spark.
10. Diluted lubricating oil.
11. Pulling heavy load at reduced engine R. P. M.
12. Water pump impeller vanes broken.

STORAGE OF TRACTOR

TRACTOR PROTECTION IS POCKET-BOOK PROTECTION

If tractor is stored for any length of time, a few precautionary measures are helpful in preserving various parts, also in avoiding future difficulty.

1. Store tractor under cover. If impossible to place tractor under cover, be sure to cover air stack and exhaust pipe.
2. Drain radiator and engine block.
3. To avoid gum content collections, drain both fuel tanks and carburetor.
4. Leave radiator and fuel caps slightly loose to protect gaskets.
5. Remove battery and store as recommended under electrical equipment.
6. Remove spark plugs and pour a small quantity of light motor oil on piston tops. Crank engine over a few times and replace spark plugs.
7. When tractor is removed from storage it should be serviced throughout, including draining and refilling the oil sump with fresh oil.

DIAGNOSING ENGINE DIFFICULTY
HD-4 DIESEL

The following suggestions are listed for your assistance. You can make simple adjustments on your tractor that will improve its operation, and save you the time and expense of engaging a Serviceman.

Always make one adjustment at a time, and if the adjustment made does not improve the condition, return to the original setting before proceeding to next adjustment.

HARD STARTING

Cold air temperatures
Insufficient fuel
Air traps
Incorrect timing
Loss of compression
Dirty nozzles
Battery charge low
Valve clearance incorrect
Fuel transfer pump faulty
Fuel injection pump faulty
Fuel injection pump out of time

ENGINE OVERHEATING

Low water level in cooling system
Radiator clogged
Fan belt slipping
Collapsed radiator hose
Thermostat stuck
Engine overloaded
Diluted lubricating oil
Pulling heavy load at reduced RPM
Water pump impeller vanes broken

LOSS OF POWER

Insufficient fuel
Air in fuel line
Restriction in fuel line
Clogged fuel filters
Transfer pump defective
Late injection pump timing
Loss of compression
Clogged air cleaner
Sticking valves
Valve clearance incorrect
Faulty nozzles
High idle RPM too slow

IRREGULAR OPERATION

Governor control linkage binding
Compression pressure uneven
Valves not seating properly
Faulty fuel nozzles
Low fuel pressure
Low operating temperature
Fuel injection pump out of time

EXCESSIVE EXHAUST SMOKE

Engine overloaded
Clogged air cleaner
Too much fuel to engine
Faulty fuel nozzles
Oil consumption

ENGINE KNOCKING

Engine overloaded
Incorrect fuel
Incorrect timing
Air cell plugged or leaking
Engine RPM too slow

All adjustments on the fuel system must be made by a competent mechanic.

STORAGE OF TRACTOR
TRACTOR PROTECTION IS POCKET-BOOK PROTECTION

If tractor is stored for any length of time, a few precautionary measures are helpful in preserving various parts, also in avoiding future difficulty.

1. Store tractor under cover. If impossible to place tractor under cover, be sure to cover the air stack and exhaust pipe.
2. Drain radiator and engine block.
3. To avoid gum content collections, drain fuel tank.
4. Leave radiator and fuel caps slightly loose to protect gaskets.
5. Remove battery and store in a cool dry place. Keep battery fully charged.
6. Remove nozzles and pour a small amount of motor oil on top of pistons, crank engine over a few times and replace nozzles.
7. Disconnect the fuel line from the main tank and connect it to a clean container of a mixture of rust preventive and perfection kerosene. Mix to a consistency of regular fuel. Operate engine until the entire filtering system and the injection pump are filled with the rust preventive mixture.
8. When tractor is removed from storage it should be serviced throughout, including draining and refilling the engine oil sump with fresh clean oil.

NOTE: If storage procedure is not followed, engine should be started once each three weeks and operated one hour after the engine temperature reaches 170°F.

PARTS SECTION

PARTS

Order all parts for this machine from your local Allis-Chalmers Dealer.

HOW TO ORDER PARTS

When ordering parts for your tractor, supply the following information:

1. The tractor and engine serial numbers.

   The serial number of your tractor is located on the flange of the torque tube on the L. H. side.

   The engine serial number is located on the plate on the R.H. side of engine.

2. State the common name of the part you wish to order, or a description of the part and its location on the tractor.

3. Always print your name and post office address, where parts are to be shipped; also specify whether material is to be shipped by freight, express or parcel post.

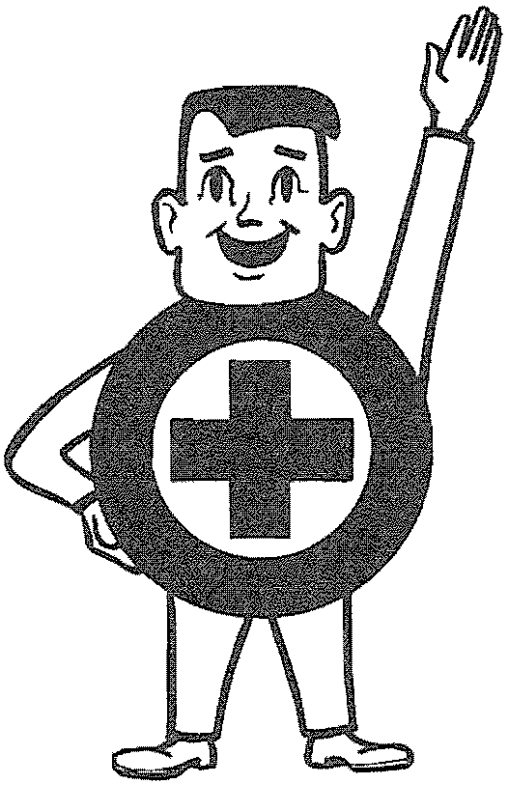
IMPORTANT

Unless claims for shortages or errors are made immediately upon receipt of goods they will not be considered.

When broken goods are received, a full description of the damage should be made by the carrier agent on the freight bill. If this description is insisted upon full damage can always be collected from the transportation company.

No responsibility is assumed for delay or damage to merchandise while in transit. Our responsibility ceases upon delivery of shipment to the transportation company, from whom a receipt is received showing that shipment was in good condition when delivered to them; therefore, claims (if any) should be filed with the transportation company and not with Allis-Chalmers Manufacturing Company.

The right is reserved to change the construction or material of any parts where it seems desirable to do so, without incurring the obligation of installing such changes on units already delivered.



"YES, MR DEALER, I'VE
STUDIED THE MANUAL"