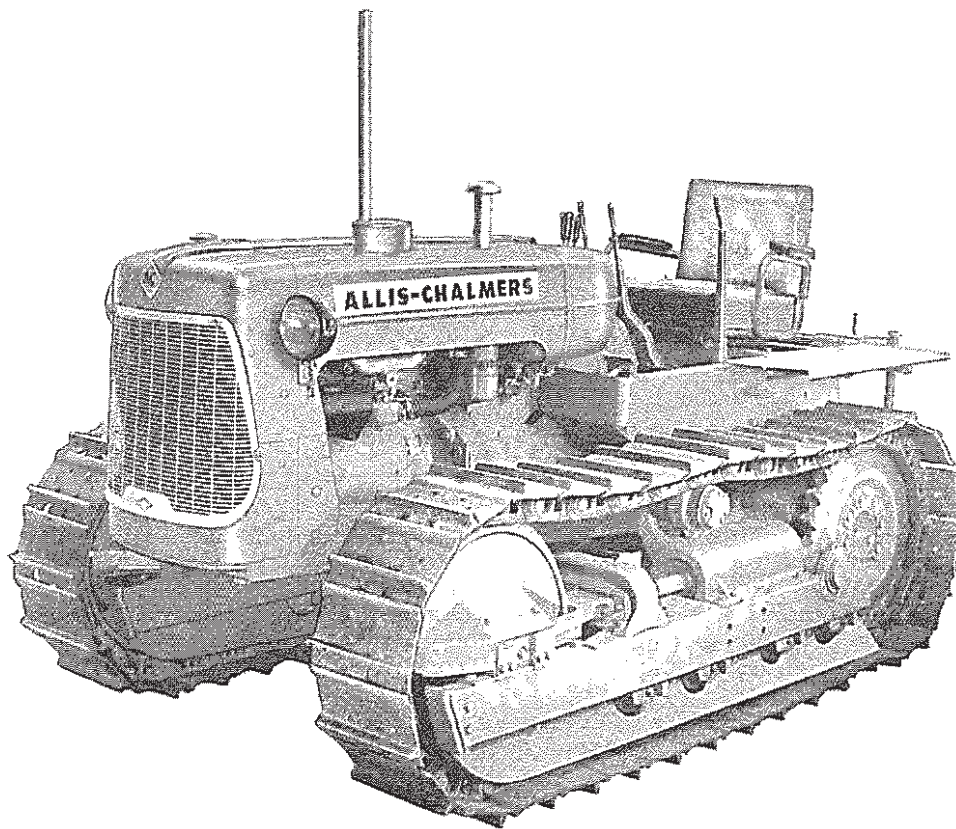


# **OPERATORS INSTRUCTIONS FOR MODEL H-3 & HD-3 TRACTORS**



 **ALLIS-CHALMERS**

BOX 512 • MILWAUKEE, WISCONSIN 53201

**(Prior to Serial No. 8694)**

LITHO. IN U. S. A.

 9003926

FORM TM-268 D



## BE CAREFUL

1. KEEP ALL SHIELDS IN PLACE.
2. STOP MACHINE TO ADJUST AND OIL.
3. WHEN MECHANISM BECOMES CLOGGED, DISENGAGE POWER BEFORE CLEANING.
4. KEEP HANDS, FEET AND CLOTHING AWAY FROM POWER-DRIVEN PARTS.
5. KEEP OFF IMPLEMENT UNLESS SEAT OR PLATFORM IS PROVIDED. KEEP OTHERS OFF.

## 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"

# **WARRANTY**

## **(FARM EQUIPMENT DIVISION)**

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.a.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.

## FOREWORD

This book provides instructions and essential information regarding Operation, Adjustments, etc., of this "Allis-Chalmers" product. Close adherence to these instructions will result in successful performance and a longer operating life for your equipment.

This "Green Cross for Safety" is used in book to emphasize safety precautions that should be followed by the 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".

In addition to the written material in this book, actual photographs are used to clearly show the various parts mentioned in the instructions.

All users of "Allis-Chalmers" equipment are urged to call upon their local dealer's Service Department for all service requirements other than routine care and adjustments. This practice is encouraged as all dealers are kept well informed regarding advanced methods of servicing "Allis-Chalmers" products and are equipped to render complete service.



"HI, FOLKS, I'M  
SAMMY SAFETY"

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## GENERAL INFORMATION

### H-3 GASOLINE

#### LUBRICATION

##### IT PAYS TO PAY A LITTLE MORE FOR QUALITY LUBRICANTS AND FUELS

It has long been recognized that the life of a tractor is largely determined by the kind of lubrication and daily service it receives. Therefore, always use oil and fuels of high quality, manufactured by a dependable oil company who has established a reputation for quality products, and whose success depends on maintaining such quality.

In addition to using high quality oils, it is also necessary to use oils of proper viscosity. Oil which is too heavy cannot reach all points to be lubricated, therefore, it will cause undue wear. Oil that is too light will not form a protective film between moving parts.

For best results do not deviate from the viscosities given in the Lubrication and Service Guide. Some parts need more frequent attention than others. Follow the time interval given in the Lubrication and Service Guide closely.

#### MOTOR OIL

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.

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. (Follow the interval given in the Lubrication and Service Guide).

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.

#### FUELS

##### FOR ECONOMY AND PERFORMANCE USE FUELS SPECIFIED FOR YOUR ENGINE.

Carbureted engines for your tractor are designed and equipped to burn either gasoline or liquid petroleum gas.

Engines designed to burn gasoline have a standard compression ratio. These engines are designed to burn a regular grade gasoline having an octane rating (research method) of 89 or higher.

Engines designed to burn liquid petroleum gas have a higher compression ratio. These engines are equipped with a gas carburetor, a fuel pressure regulator, and a high pressure fuel tank.

## FUEL STORAGE GASOLINE

Fuel should be stored away from buildings and in shade, if possible. The most practical storage seems to be an elevated tank with an open sided roof high enough for air to circulate around tank. This protects the tank from rain or snow and hot sun rays.

The tank should be provided with a hose equipped with a self closing nozzle. This prevents entrance of dirt.

The fuel storage tank should be installed so that one end of the tank is slightly lower and equipped with a drain valve at the lower end for draining off water and sediment.

The fuel tank size should be determined to provide capacity that fuel will not be stored for periods of over three months.

Long storage periods cause fuel oxidation, raising the gum varnish content. Excess gum or varnish is detrimental to internal combustion engines.

The fuel companies provide fuel tailored to meet the existing weather conditions. These fuels are changed at the start of the predominant seasons according to regional weather trends and roughly correspond to spring, summer, fall and winter, making an average of four changes per year.

Fuels are tailored to give ease of starting for winter fuel. Summer fuel is tailored to give low vapor pressure to avoid vapor lock. Spring and fall fuels are in between.

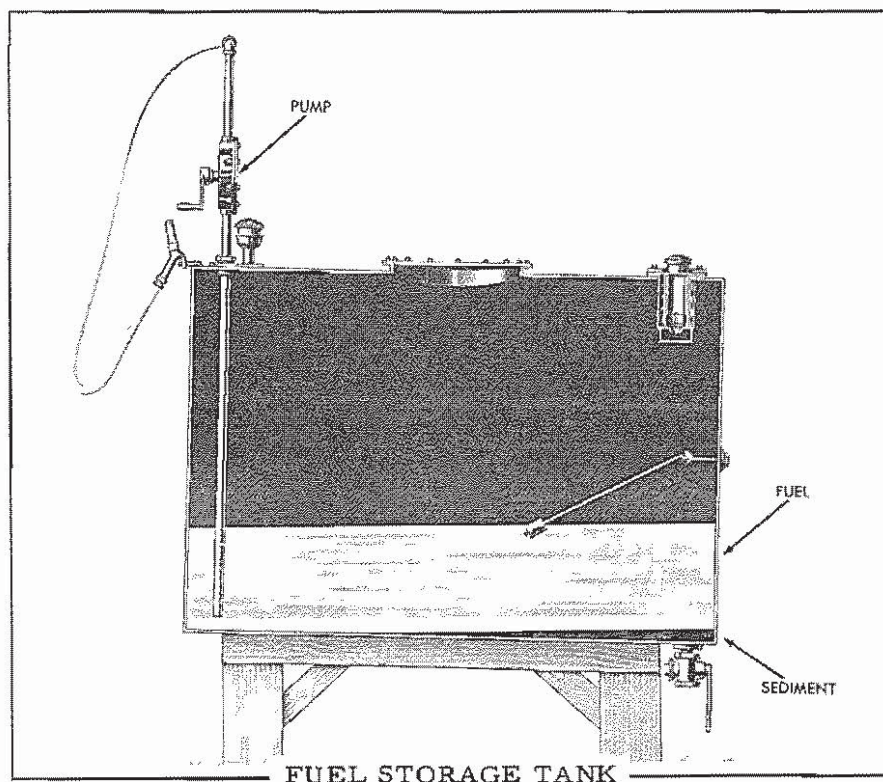
An effort should be made to purchase fuels in such quantity that they are not carried over into succeeding seasons.

For example, winter fuel used for heavy work in the spring season causes higher fuel consumption, vapor lock tendencies, and perhaps boiling of fuel in tractor tank, which causes rapid evaporation of light ends of fuel.

In reverse, summer fuel used for winter operation causes a slow warm up and stalling, sputtering and backfiring upon any sudden throttle opening.

Fuel purchased for example in the fall and then carried through to spring or summer use may have an increase in gum content. If the gum is excessive it is expected that it would cause an increase in piston ring sticking, valve burning, and spark plug fouling.

The fuel tank on tractor should be filled at the end of the days run, rather than at the start of the days run. This will reduce the water content of the fuel, as the tank is less subject to condensation when it is full.



## GENERAL INFORMATION (HD-3 DIESEL)

### LUBRICATION

#### IT PAYS TO PAY A LITTLE MORE FOR QUALITY LUBRICANTS AND FUELS.

It has long been recognized that the life of a tractor is largely determined by the kind of lubrication and daily service it receives. Therefore, always use oil and grease of high quality manufactured by a dependable oil company who has established a reputation for quality products and whose success depends on maintaining such quality.

In addition to using high quality oils it is also necessary to use oils of proper viscosity. Oil which is too heavy cannot reach all points to be lubricated, therefore, it will cause undue wear. Oil that is too light will not form a protective film between moving parts.

For best results do not deviate from the viscosities given in the Lubrication and Service Guide. Some parts need more frequent attention than others. Follow the time interval given in the Lubrication and Service Guide closely.

### MOTOR OIL

Motor oils are designated by code letters as follows: DG - DM - DS. The letters denote the type of service for which the unit is used.

DG - Diesel general service  
DM - Diesel medium service  
DS - Diesel severe service

Oil used in the engine crankcase should meet the American Petroleum Institute (API) Diesel classification of DS or series 3 Diesel oil.

Heavy duty oils of the DS CLASSIFICATION provides the most satisfactory lubrication for "ALLIS-CHALMERS" Diesel engines. These oils use additives to lower the pour point, and to protect the engine from corrosion. They help to keep the engine free from varnish, sludge and deposits.

Unless the oil has the proper additives, fuels with a high sulphur content causes excessive piston ring and cylinder liner wear, excessive oil consumption and piston ring sticking.

If a fuel with more than .5% sulphur content must be used, the oil change interval should be shortened.

Oil designated DS or better 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. (Follow the interval given in the Lubrication and Service Guide).

### FUELS

#### FOR ECONOMY AND PERFORMANCE USE FUELS SPECIFIED FOR YOUR ENGINE.

Fuel used in the "ALLIS-CHALMERS" Diesel engine must have certain qualities in order to ignite and burn at the proper temperature and the proper rate. Experience has shown that the fuel best suited, closely follows these specifications:

Gravity (API) 30-35

Viscosity Saybolt Universal at 100°F. 30-40.

Flash F. ° minimum 150°F.

Diesel index 48.5-65.5

Cetane number 46-60

Pour Point 0°F.

98% Recovery 700°F.

Sediment and water trace

Ash maximum .02%

Conradson carbon maximum .03%

Sulphur maximum 0.5%

Number 2 high speed diesel fuels generally meet the above specifications.

Some of the more desirable high speed diesel fuels do not have a low enough pour point for below zero operation and cause filter plugging, which in turn causes hard starting. In this event a winter grade fuel of the same type should be obtained.

No fuel is satisfactory for use if it is dirty. A few small pieces of dirt can cause costly damage to the fuel injection pump, which is built of closely fitted precision parts.

The following rules should cover the handling of fuel before it reaches the fuel injection pump.

1. Do not handle fuel in open containers where dust is blowing around.
2. Do not use waste or linty rags around fuel containers or injection equipment.
3. Clean all storage tanks at regular intervals.
4. If pumps are used to bring fuel from storage tank to tractor, keep covered with dust proof covers when not in use.
5. When emptying a drum or storage tank, agitate as little as possible and leave approximately one inch of fuel in bottom of tank or drum.
6. Keep all fuel handling equipment, such as measures, funnels, containers, etc., scrupulously clean, and keep them covered when not in use. Cleanliness prevents difficulty.

## FUEL STORAGE DIESEL

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

The most practical fuel storage seems to be an elevated tank with an open sided roof, high enough for air to circulate tank. This protects the fuel tank from rain or snow, and hot sun rays.

The fuel storage tank should be installed so that one end of tank is slightly lower, and equipped with a drain valve at the lower end for draining off the sediment and water. The tank should also be provided with a hose, equipped with a self closing nozzle to prevent the entrance of dirt.

A portable storage tank provides the best method of storing fuel on the job. Since all storage tanks are subject to condensation, it is very important that sediment sump be provided in the bottom of the tank so that water and sediment can be drained daily.

A portable storage tank should be provided with a pump, so the fuel can be pumped into the tractor fuel tank with a minimum of handling. Draining fuel from supply tank into buckets or other containers, then pouring it into the tractor fuel tank is not considered a good method of handling fuel.

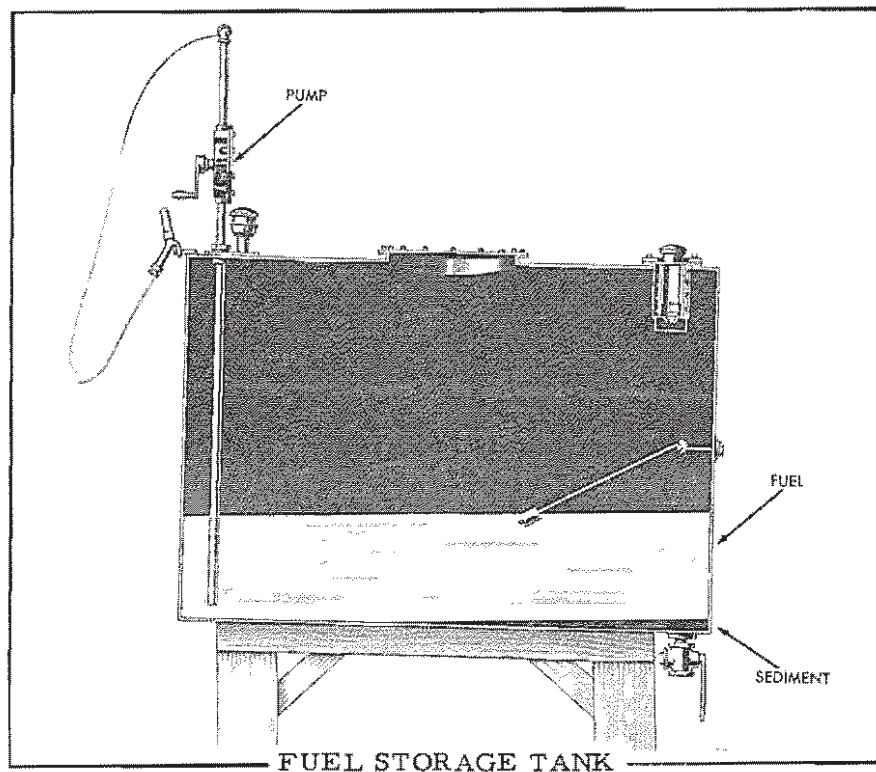
Fuel should be allowed to settle as long as possible in a storage container, before it is used in the fuel tank of the tractor. This will allow the sediment and water to settle to the bottom of the storage container and permitting cleaner fuel to be used in the tractor fuel tank.

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 before being used. It is also advisable to use a pump and drain the fuel from the drum or container, rather than drain it from the bottom of the fuel container.

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 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 the plugs are tight.

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



# ENGINE SPECIFICATIONS H-3 TRACTOR

## ENGINE - GASOLINE (Prior to Tr. S/N 6959)

Make . . . . . Own  
 Model . . . . . 149  
 Number of Cylinders . . . . . 4  
 Bore . . . . . 3-1/2"  
 Stroke . . . . . 3-7/8"  
 R. P. M. Low Idle . . . . . 550-575  
 R. P. M. High Idle . . . . . 1850-1900  
 R. P. M. Rated Load . . . . . 1650  
 Piston Displacement . . . . . 149 Cu. In.  
 Compression Ratio . . . . . 7.5-1  
 Piston Travel-Rated Speed . 1066 F. P. M.  
 Firing Order . . . . . 1-2-4-3

## DISTRIBUTOR

Make . . . . . Delco Remy  
 Model . . . . . 1112607  
 Point Gap . . . . . .022"  
 Rotor Rotation . . . . . Clockwise  
 Advance . . . . . Centrifugal-Automatic  
 Advance Timing . . . . . 25° B. T. D. C. at  
    1750 R. P. M.

## SPARK PLUGS

Thread Size . . . . . 14 mm.  
 Thread Reach . . . . . 3/8"  
 Point Gap . . . . . .025"  
 Heat Range  
 A-C . . . . . C45  
 Autolite . . . . . A7  
 Champion . . . . . J8

## VALVES

Location . . . . . In head  
 Valve Clearance-Hot  
 Intake . . . . . .008" to .010"  
 Exhaust . . . . . .014" to .016"

## THERMOSTAT

Type . . . . . By pass-pellet

## BATTERY

Type . . . . . 12 volt  
 Capacity . . . . . 60 A. H.

## ENGINE - GASOLINE (Eff. Tr. S/N 6959 & up)

Make . . . . . Own  
 Model . . . . . 160  
 Type . . . . . Power Crater  
 Number of Cylinders . . . . . 4  
 Number Of Main Bearings . . . . . 3  
 Bore . . . . . 3-5/8"  
 Stroke . . . . . 3-7/8"  
 Firing Order . . . . . 1-2-4-3  
 Low Idle R. P. M. . . . . 550-575  
 High Idle R. P. M. . . . . 1825-1875  
 Rated Load R. P. M. . . . . 1650  
 Piston Displacement . . . . . 160 Cu. In.  
 Compression Ratio - Gasoline . . . . . 8-1  
 Cylinder Liners . . . . . Replaceable- Wet

## DISTRIBUTOR

Make . . . . . Delco Remy  
 Model . . . . . 1112607  
 Point Gap . . . . . .022"  
 Rotor Rotation . . . . . Clockwise  
 Advance . . . . . Centrifugal-Automatic  
 Advance Timing . . . . . 25° B. T. D. C. at  
    1750 R. P. M.

## SPARK PLUGS

Thread Size . . . . . 14 mm.  
 Thread Reach . . . . . 3/8"  
 Point Gap . . . . . .025"  
 Heat Range  
 A-C . . . . . C 45  
 Autolite . . . . . A-5  
 Champion . . . . . J-7

## VALVES

Location . . . . . In head  
 Valve Clearance-Hot  
 Intake . . . . . .008" to .010"  
 Exhaust . . . . . .014" to .016"

## THERMOSTAT

Type . . . . . By pass-pellet

## BATTERY

Type . . . . . 12 volt  
 Capacity . . . . . 60 A. H.

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

ENGINE-SPECIFICATIONS  
HD-3 TRACTOR

ENGINE -Diesel

Make . . . . . Own  
Model. . . . . D-175  
Type . . . . Natural Asperated - 4 Cycle  
Number of Cylinders . . . . . 4  
Number of Main Bearings . . . . . 5  
Bore . . . . . 3-9/16"  
Stroke . . . . . 4-3/8"  
Firing Order . . . . . 1-3-4-2  
Low Idle R. P. M. . . . . 600-650  
High Idle R. P. M. . . . . 1865-1885  
Rated Load R. P. M. . . . . 1650  
Piston Displacement . . . . . 175 Cu. In.  
Compression Ratio . . . . . 15.5- 1  
Cylinder Liners . . . . . Replaceable - Wet

FUEL INJECTION PUMP

Make . . . . . Roosa Master  
Model. . . . . DBGFC-429-3AF  
Injection Timing . . . . . 22° B. T. D. C.

NOZZLE HOLDER

Make . . . . . Own  
Type . . . . . Throttling Pintle  
Opening Pressure . . . . . 2000 P. S. I.

VALVES

Location . . . . . In Head  
Valve Clearance-Hot  
Intake. . . . . .010"  
Exhaust . . . . . .019"

THERMOSTAT

Type . . . . . By pass-pellet

BATTERY

Group. . . . . 2H  
Number Used . . . . . 2  
Type . . . . . 6 volt  
Capacity . . . . . 135 A. H.

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

## GENERAL SPECIFICATIONS

### ENGINE CLUTCH-FOOT OPERATED

Type . . . . . Single disc-dry  
Disc Diameter . . . . . 9"

### POWER DIRECTOR CLUTCH- HAND OPERATED

Type . . . . . Multiple disc-wet  
Dual Range . . . . . High-low  
Disc Diameter . . . . . 7"  
Number of Disc-High Range . . . . . 3  
Number of Disc-Low Range . . . . . 3  
Ratio-High Range . . . . . 1-1  
Ratio-Low Range . . . . . 1.42-1

### SHUTTLE CLUTCH-HAND OPERATED

Type . . . . . Multiple Disc-wet  
Disc Diameter . . . . . 7"  
Dual Clutch . . . . . Forward-reverse  
Number of Disc-Forward Clutch . . . . . 3  
Number of Disc-Reverse Clutch . . . . . 3

### STEERING CLUTCHES

Number Used . . . . . 2  
Type . . . . . Multiple Disc-dry  
Number of Disc-Each . . . . . 4  
Disc Diameter . . . . . 9-7/8"

### BRAKES-FOOT OPERATED

Type . . . . . Enclosed-contracting  
Drum Diameter . . . . . 11-1/2"

### DRAWBAR

Height above ground-approx. . . . . 14"  
Swing-approx. . . . . 22"

### STEERING

Type . . . . . Two steering clutches

### TRACKS

Width of track shoes . . . . . (standard) 10"  
Width of track shoes . . . . . (optional) 7"  
Min. to 14" Max.  
Width of track tread . (center to center) 48"

### TRANSMISSION

Type . . . . . Constant Mesh-Helical gears  
Forward speeds-  
with power director clutch . . . . . 8  
with shuttle clutch . . . . . 4  
Reverse speeds-  
with power director clutch . . . . . 2  
with shuttle clutch . . . . . 4

### TRAVEL SPEEDS-WITH POWER DIRECTOR

High Range . . . . . M. P. H.  
First gear . . . . . 1.50  
Second gear . . . . . 1.97  
Third gear . . . . . 2.86  
Fourth gear . . . . . 4.77  
Reverse gear . . . . . 2.23  
Low Range . . . . . M. P. H.  
First gear . . . . . 1.19  
Second gear . . . . . 1.57  
Third gear . . . . . 2.28  
Fourth gear . . . . . 3.80  
Reverse gear . . . . . 1.78

### TRAVEL SPEEDS-WITH SHUTTLE CLUTCH

Forward . . . . . M. P. H.  
First gear . . . . . 1.27  
Second gear . . . . . 1.97  
Third gear . . . . . 2.86  
Fourth gear . . . . . 4.77  
Reverse . . . . . M. P. H.  
First gear . . . . . 1.30  
Second gear . . . . . 2.01  
Third gear . . . . . 2.92  
Fourth gear . . . . . 4.88

### GENERAL DIMENSIONS

Length-over-all . . . . . 108-11/16"  
Length-less drawbar . . . . . 100-3/16"  
Height-over-all . . . . . 71-15/16"  
Height-to top of hood . . . . . 48-5/16"  
Width-over-all . . . . . 62"

### SHIPPING WEIGHT

Approximately . . . . . 5900 Lbs.

### CAPACITIES-OIL, FUEL AND COOLANT

Cooling System . . . . . Gasoline 10 qt.  
Diesel 11 qt.  
Fuel Tank . . . . . 16 Gal.  
Engine Oil Sump . . . . . Gasoline 4 qt.  
Diesel 5 qt.  
Hydraulic Pump . . . . . 12 qt.  
Power Director Clutch . . . . . 8-1/3 qt.  
Shuttle Clutch . . . . . 10-1/2 qt.  
Air Cleaner . . . . . 1-1/2 pt.  
Final Drives-Each . . . . . 6 qt.  
Transmission . . . . . 16 qt.

### POWER TAKE-OFF - OPTIONAL

Spline Size . . . . . 1-3/8"  
R. P. M. @ 1650 of Engine . . . . . 540

### BELT PULLEY P. T. O. DRIVEN-OPTIONAL

Pulley Diameter . . . . . 10"  
Pulley Width . . . . . 6"  
R. P. M. @ Rated Engine Speed . . . . . 950  
10' Ft. Per Min. @ Rated Speed . . . . . 2480



### 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 spin engine when hand cranking.
3. Do not attempt to oil or grease a machine or tractor while it is in operation.
4. Do not wear loose fitting clothing that may be blown into moving parts.
5. Keep all shields and guards in place.
6. Place gear shift lever in neutral position when starting engine.
7. Machinery should only be operated by those who are responsible and delegated to do so.
8. Only one person - the operator - should be permitted on tractor when tractor is in motion.
9. The rate of travel on hillsides or curves should be regulated so there is no danger of tipping.
10. Do not remove radiator cap when engine temperature is above 212°F.
11. Steering brakes should be properly adjusted.
12. Do not drive too close to the edge of a ditch or creek.
13. Never operate your tractor in a closed garage or shed.
14. 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.
15. Always keep tractor in gear when going down steep grades.
16. Do not leave the engine running unattended when anyone is adjusting or repairing a driven machine.
17. Do not attempt to operate tractor unless you are in the driver's seat.
18. Provide a first aid kit. Treat all scratches, cuts, etc., with the proper antiseptic immediately.
19. Always stop power take-off before leaving driver's seat.
20. Never stand between tractor and drawn implement when hitching. Use an iron hook to handle drawbar.
21. Place gear shift lever in neutral position when dismounting from tractor.
22. Do not dismount from tractor while it is in motion.
23. Keep a fire extinguisher handy at all times.
24. Steering clutches should be properly adjusted.



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



## LUBRICATION AND SERVICE GUIDE H-3 GASOLINE

### ENGINE COOLING SYSTEM

Check cooling system every day for proper coolant level. The proper level is within 1-1/2" of the radiator neck. Do not over fill, as it is necessary to have space for expansion when coolant is at operating temperature. If filled to radiator neck, as coolant expands it will be forced out through over-flow pipe.

Drain cocks are located at front of radiator and at left hand side of cylinder block. Open all drain cocks when draining cooling system, and remove radiator cap to prevent air locking which will retard draining. In freezing weather stay near tractor and make sure the cooling system is completely drained.

### ENGINE BREATHER CAP

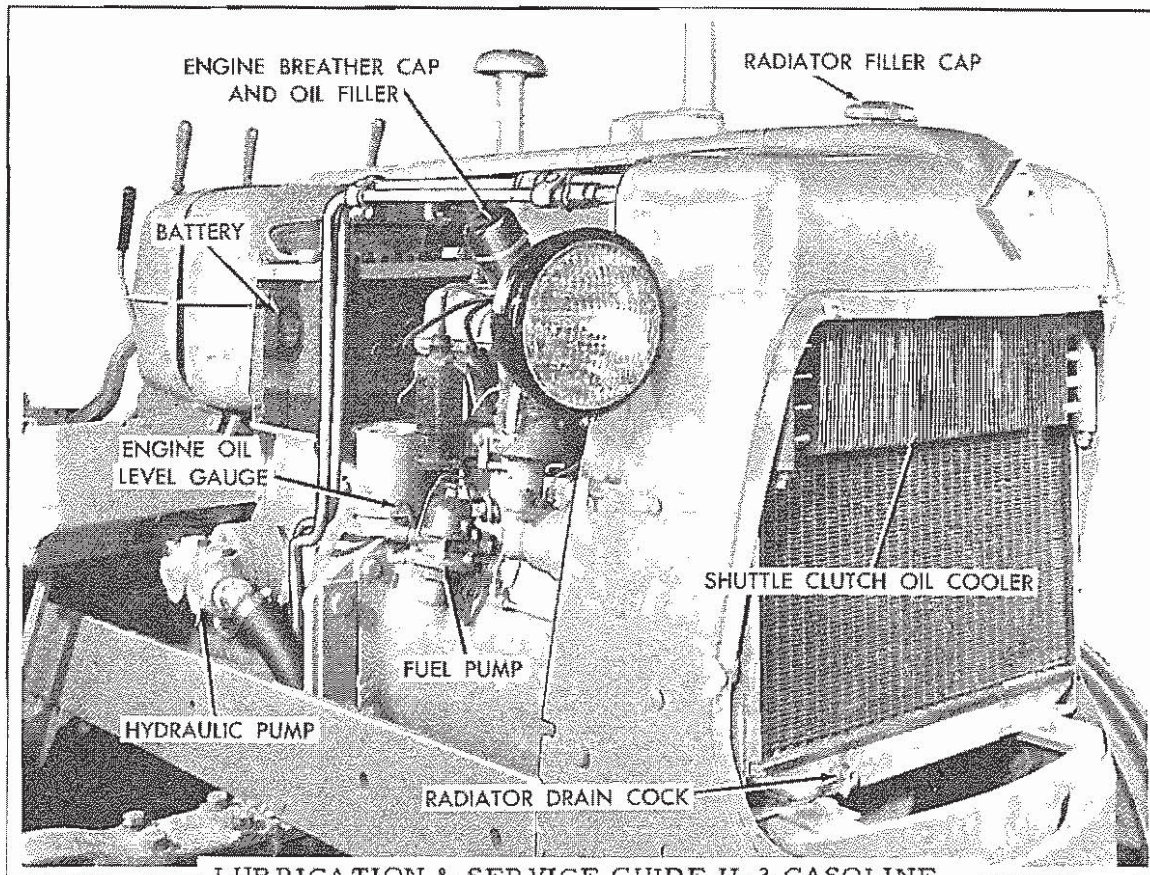
Remove right hand hood to service breather cap or to add engine oil. Service breather cap daily (8 to 10 hours). Remove breather cap and clean thoroughly, wash in gasoline to remove all dirt from the wire filtering mesh. Saturate the wire

mesh with oil before replacing. The wire mesh must be saturated with oil so that it will collect the dust and prevent it from entering the engine. If filtering mesh is left dry the breather cap will not function as intended, as dirt will enter the engine and engine life will be drastically reduced.

### ENGINE OIL FILTER - FULL FLOW TYPE

Replace the oil filter element every 200 hours of operation 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 every 200 hours of operation will keep the oil clean and add many hours to the effective life of the engine.



LUBRICATION & SERVICE GUIDE H-3 GASOLINE

## FUEL FILTER H-3 GASOLINE

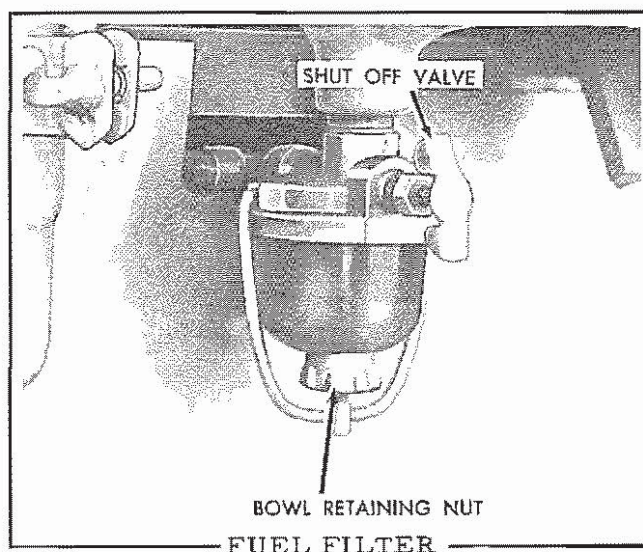
Check daily and clean when water or sediment is visible. Clean filter element when necessary. A clean element is a bright green color and will become discolored as dirt is collected in the element.

The fuel filter is provided for the purpose of keeping dirt and water from entering the carburetor. 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 bowl to one side. Remove bowl, gasket and felt element. Note which side of the element is upward and be sure to re-install with the same side upward.

The felt element can be cleaned with ordinary soap and water, and using a small stiff brush. The element must be thoroughly dry before re-installing. It is good practice to keep an extra element on hand to install when the present one



needs cleaning. This will avoid delay in the drying operation.

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

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.

## 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 over fill. Use oils of the MS service classification. 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° 20 Below 20°	SAE30 SAE20-20W SAE10W	SAE10W-30 SAE10W-30 SAE10W-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.

## LUBRICATION AND SERVICE GUIDE HD-3 DIESEL

### ENGINE COOLING SYSTEM

Check cooling system every day for proper coolant level. The proper level is within 1-1/2" of the radiator neck. Do not over fill, as it is necessary to have space for expansion when coolant is at operating temperature. If filled to radiator neck, as coolant expands it will be forced out through over-flow pipe.

Drain cocks are located at front of radiator and at right hand side of cylinder block. Open all drain cocks when draining cooling system, and remove radiator cap to prevent air locking which will retard draining. In freezing weather stay near tractor and make sure the cooling system is completely drained.

### ENGINE BREATHER CAP

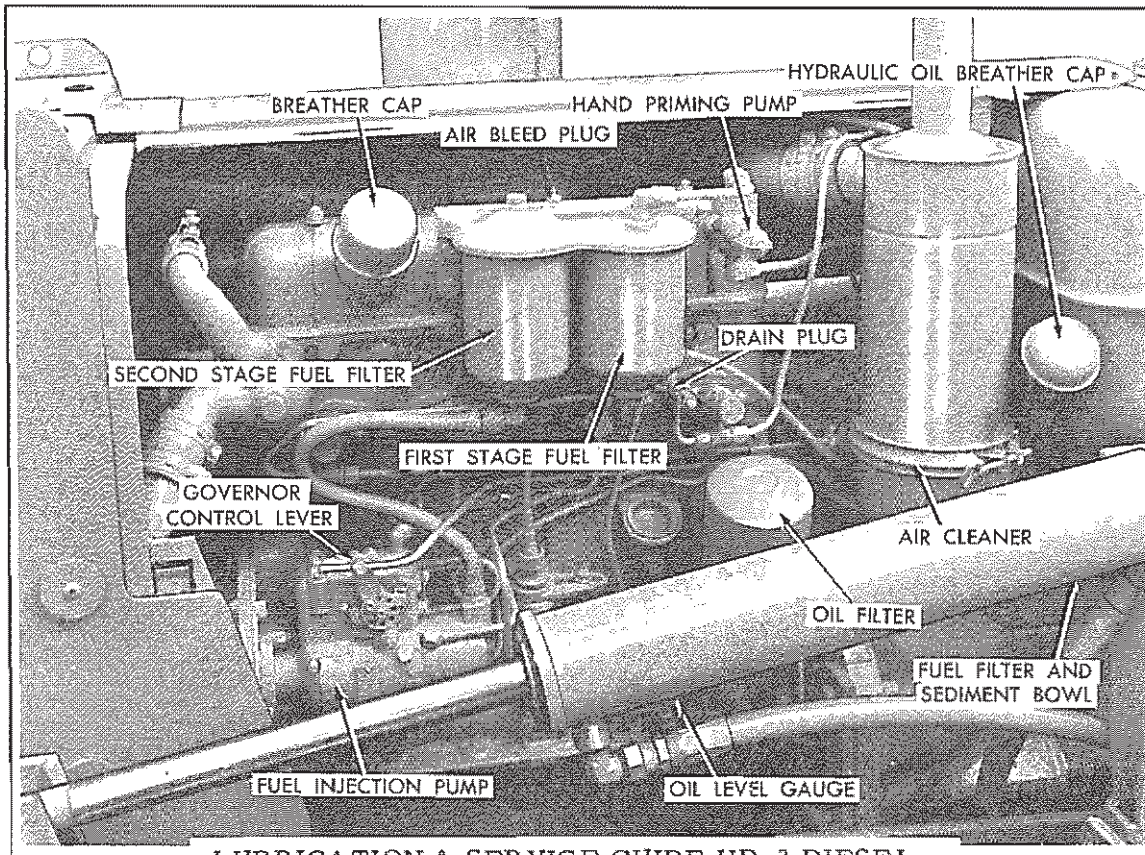
Remove left hand hood to service breather cap or to add engine oil. Service breather cap daily (8 to 10 hours). Remove breather cap and clean thoroughly, wash in gasoline to remove all dirt from the wire filtering mesh. Saturate the wire mesh with oil before replacing. The wire mesh

must be saturated with oil so that it will collect the dust and prevent it from entering the engine. If the filtering mesh is left dry the breather cap will not function as intended, as it will allow dirt to pass through and enter the engine and the engine life will be drastically reduced.

### ENGINE OIL FILTER - BYPASS TYPE

Replace the oil filter element every 150 hours of operation 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 the oil filter. The oil filter is a highly efficient unit used for the purpose of filtering abrasive particles from the engine oil. Changing the filter element every 150 hours of operation will keep the oil clean and add many hours to the effective life of the engine.



— LUBRICATION & SERVICE GUIDE HD-3 DIESEL —

## FUEL SYSTEM

### HD-3 DIESEL

#### FUEL FILTERS

The fuel system is provided with a primary and secondary fuel filter mounted at the left hand side of the engine, plus a fuel filter and sediment bowl assembly mounted at the fuel tank which incorporates the fuel "shut-off" valve.

The purpose of the fuel filters 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 of the filters, and reduce the intervals required in draining the filter sumps.

Close the fuel "shut-off" valve and remove the sediment bowl at fuel tank periodically, daily if necessary. Clean the filtering screen when necessary. If dirt, sediment or water is found in the filter bowl each day it indicates the fuel is contaminated, and the method of handling and storing of fuel should be improved. If the fuel is clean very little sediment or water will be found in the sediment bowl and the cleaning period may be extended accordingly.

If sediment or water is found in the filter bowl, always drain the sump of the primary fuel filter at left side of engine. With filter bowl in place, close the fuel shut-off valve at tank, remove the drain plug at bottom of primary filter, open fuel valve and allow some fuel to drain from the primary filter. To check for sediment or water, catch the fuel drained in a container and any foreign matter can easily be determined. Close "shut-off" valve and install drain plug.

Replace the filter elements in the primary and secondary filters at each 500 hours of operation. Poor fuel handling and storage facilities will decrease the effective life of the filters, in other words, dirty fuel will decrease the life of filters, while clean fuel will increase the life of the filters, never operate until filters become 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. A fuel gauge is available as optional equipment that will indicate when filters are becoming plugged, and a warning that they must be replaced.

Each time the primary filter sump is drained, or when replacing filter elements, 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.

Each time the filter elements are replaced, or if fuel lines are removed for any reason, it will be necessary to bleed the air from the fuel system. Engines which do not have fuel in the filters or injection pump, will not start until solid fuel (without air bubbles) reaches the injection nozzles. The fuel will not flow from the tractor fuel tank through the filtering system by gravity, therefore the hand priming pump is installed so that the air may be bled from filters without cranking engine, eliminating excessive drain on the battery.

To operate the hand priming pump, loosen the bail nut retaining the pumping plunger and swing the bail downward, work the plunger in and out by hand until all the air is out of the system, then push the plunger in and retain in this position by tightening the bail nut.

The fuel transfer pump is built in, and is an integral part of the fuel injection pump. It receives fuel from the secondary filter after the fuel has been filtered.

The governor is also an integral part of the injection pump, and controls the amount of fuel metered to the engine, thus controlling the speed and power of the engine.

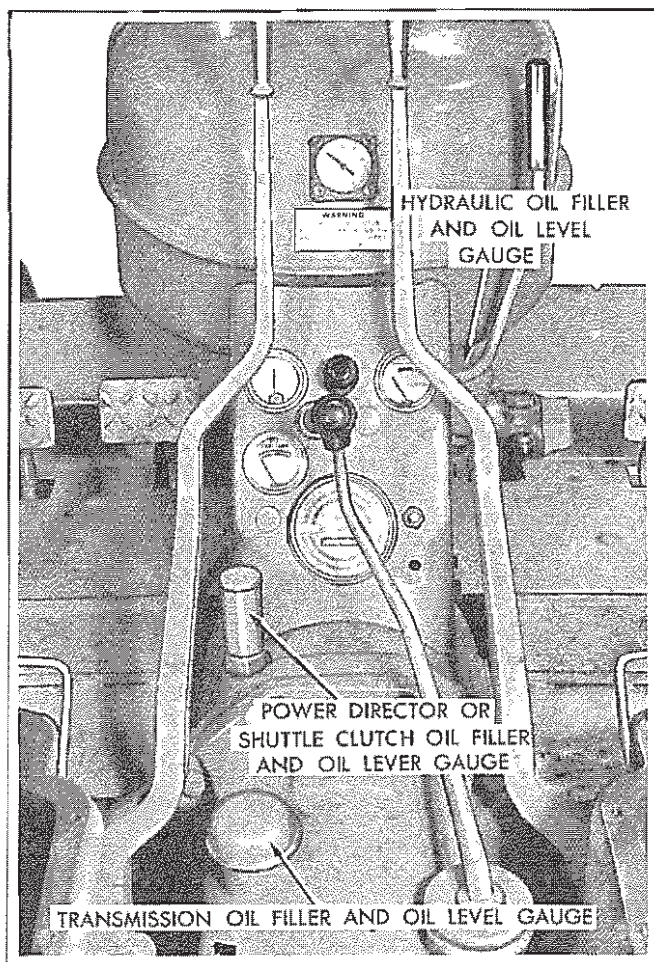
#### ENGINE OIL SUMP - DIESEL

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 over fill. Use oils of DS service classification only. Use the following viscosities for the prevailing temperatures:

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

DIESEL		RECOMMENDED SAE VISCOSITY
Lowest expected temperature during time oil will be in the crankcase	90°	SAE40
	40°	SAE30
	20°	SAE20-20W
	Below 20°	SAE10W

## GENERAL LUBRICATION AND SERVICE GUIDE



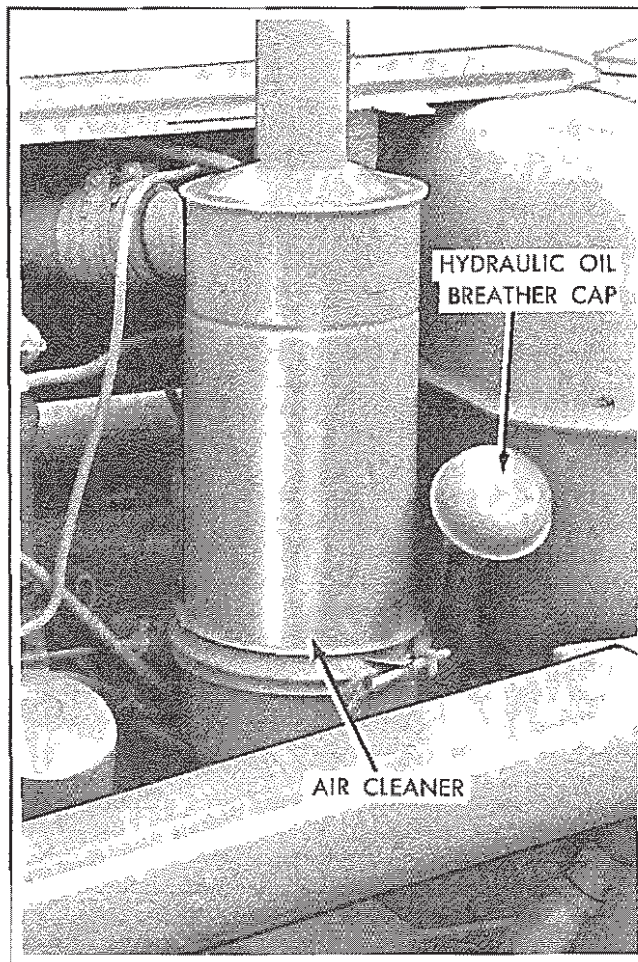
### HYDRAULIC PUMP

Tractors may be equipped with either a fender mounted, or a torque housing oil reservoir. In either case the torque housing oil supply must be checked. Check oil level daily (8 to 10 hours) and keep filled to full mark on oil level gauge of both oil supplies.

For temperatures above 45°F, use SAE 20-20 W viscosity oil. For temperatures below 45°F, use SAE 10W, or 10W-30 viscosity oil. Change oil twice a year in both hydraulic reservoir and torque housing oil compartment. Change the hydraulic oil filter after every 200 hours of operation. Clean oil compartment breather caps daily.

### TRANSMISSION

Check oil level once a week (50 to 60 hours) and keep filled to the full mark on the level gauge. Use an oil having a SAE 10W-30 viscosity. Drain and refill with fresh oil twice a year.



### 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 oil having a viscosity of SAE 10W-30. Drain and refill with fresh oil once a year. Tractors prior to Serial No. HD-3 - 3284, keep filled to level of filler and level plug located on oil sump. Remove oil sump and change oil once a year.

### POWER DIRECTOR OR SHUTTLE CLUTCH

Check oil level once a week (50 to 60 hours) and keep filled to the level mark on oil level gauge. Gauge must be screwed all the way down when checking oil level. Use an oil having a SAE 10W-30 viscosity. Drain and refill twice a year.

**NOTE:** For oil capacities see "CAPACITIES" in general specifications.

### GENERATOR

Lubricate front and rear bearings at every oil change with two or three drops of engine oil.

## BATTERY

Check weekly (50 to 60 hours) and maintain the electrolyte solution 3/8" above the separators. Use distilled or rain water only. The supply of water should be kept in clean covered containers of glass, china or rubber. Battery should be checked occasionally with a battery hydrometer to determine the charged condition of battery.

## AIR CLEANER-OIL BATH

All Gasoline Models & on Diesels Prior to Tr. Serial Number 4033

Clean and refill oil cup daily (8 to 10 hours). Fill to level mark on cup, using oil of the same viscosity as used in the engine oil sump according to the prevailing temperatures. Under extremely dusty or abnormal conditions, service oil cup twice daily.

To service air cleaner, remove the oil cup, empty out the oil, scrape out dirt and wash cup clean. Fill to level mark with clean engine oil, and replace securely.

**CAUTION:** Do not remove oil cup while engine is running.

When servicing air cleaner, inspect the bottom screen of the filter element and remove any accumulation of lint, chaff and etc., also inspect center tube and any accumulation of dirt should be removed by swabbing out with a cloth and stick. Inspect the stack cap periodically and clean when necessary. If a build up of dirt is allowed to accumulate it will cause an air restriction to engine resulting in a loss of power.

Remove the complete air cleaner assembly from tractor at least once a year and flush out the entire element with kerosene. After all parts have been thoroughly cleaned, reinstall on tractor, making certain all joints are tight and hoses in good condition.

The air cleaner is placed on the engine to prevent the entrance of dirt into the engine. Dirt wears excessively and drastically reduces the effective engine life. Enough dirt can be held in one hand to completely ruin an engine in a period of 50 hours or less.

Oil that is too heavy also acts as a partial choke on engine causing a rich mixture. An over rich mixture dilutes the lubricating film on pistons and cylinder liners which impairs lubrication and causes excessive wear. A partially plugged air cleaner will create this same effect.

Used oil or diluted oil should not be used in the air cleaner. The substance used to dilute the oil may evaporate rapidly in the action of the air cleaner, leaving the oil supply low. As dirt collects in the cup, it displaces the oil and lowers the efficiency of the cleaner. Keep the cup clean

and filled with oil to the exact marked oil level.

The air cleaner is installed on your engine to prolong its life and performance by preventing dirt and grit from entering inside engine which would cause excessive wear. However, the tractor operator should be charged with the responsibility of giving the air cleaner proper service and attention as outlined in the above instructions. Proper servicing of air cleaner is the only assurance of receiving the long life and performance that is built into the engine.

## AIR CLEANER - DRY TYPE - DIESEL ONLY (Eff. Tr. S/N 4033 & Up)

The air cleaner is of the dry type with a built in pre-cleaner and automatic dust unloader. It has a removable filtering element that can be cleaned and replaced as long as it is in good condition. As dust is separated from the air, it will enter the dust unloader through the cyclone action of the air cleaner, and will automatically be dumped out.

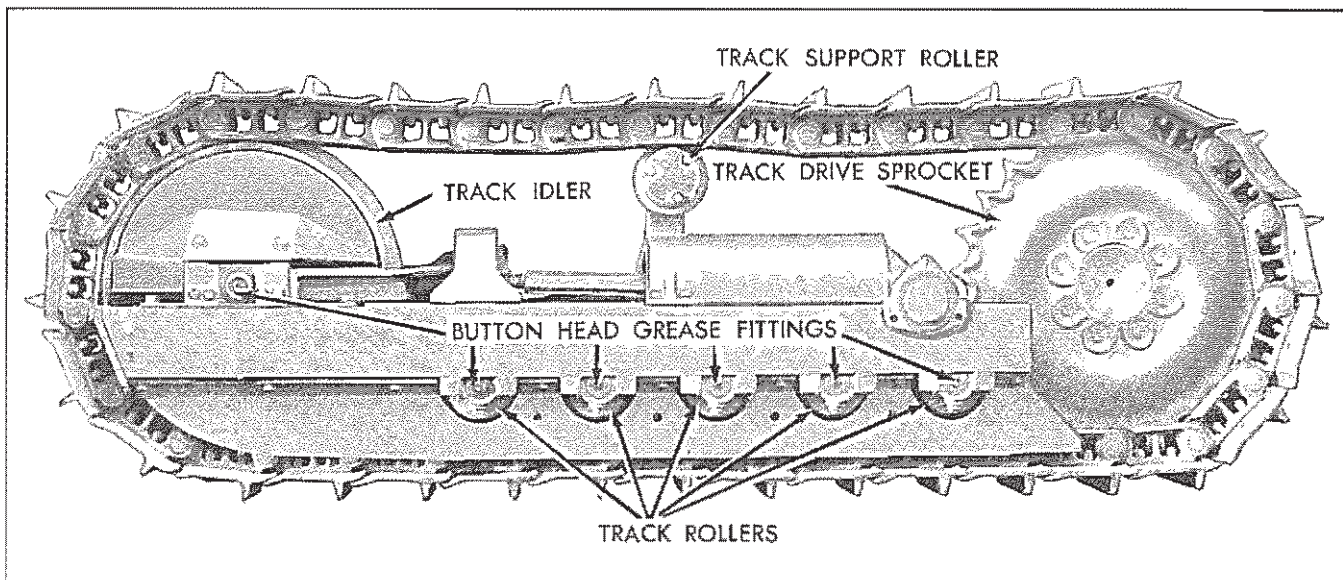
To remove the filtering element for cleaning, remove the left hand hood assembly, loosen the hand screw at front of air cleaner and remove the retainer bar assembly. Remove the filtering element from cleaner. Never service air cleaner while the engine is running.

The element may be cleaned by dropping gently on a solid flat surface until dust is removed from element. Hold element level (flat) and drop gently a distance of approximately 6 inches. Clean element at every oil change interval, 75 hours for diesel tractors.

If the filter element becomes dark as though oil or soot has contacted element, it should be washed in water using a mild non-sudsing detergent, then rinsed in plain water and let dry before using. Be sure the gasket at end of element is in good condition. Check element for breaks or cracks at each cleaning interval. Replace with a new element once each year, or after 10 washings whichever ever comes first.

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.

An air filter indicator is available as optional equipment, which attaches to the air cleaner outlet tube and measures 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 visible in the indicator window.



### LUBRICATION - TRACK IDLER AND ROLLERS

Lubricate every 100 hours of operation. Clean the button head grease fittings thoroughly of all dirt before attaching grease gun. Carefully pump a few strokes of SAE 90 transmission oil into bearings until a resistance is felt on the grease gun, never force grease into bearings after this resistance is felt. This is a slow process and must be done slowly, allowing time for the air trapped in assembly to escape, otherwise the seal bellows will be ruptured. Do not confuse lubricant forced through seals for seal leakage.

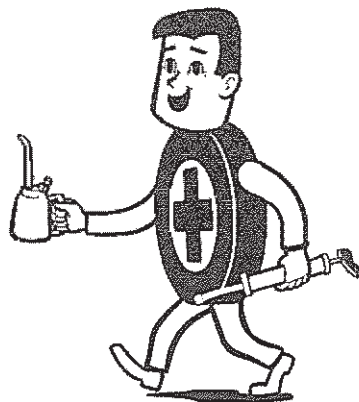
### TRACK SUPPORT ROLLER

Lubricate every 100 hours of operation. To lubricate turn roller with one capscrew in cover-plate downward. Remove the two upper cap-

screws. Insert tube of Rose 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.

### GREASE GUN

The grease gun listed as a machinery item is a low pressure gun and should be used for lubricating the track rollers and track idlers. The use of the low pressure grease gun will enable the operator to more readily feel the resistance when rollers and idlers are full of lubricant, and prevent rupturing the seal bellows. When using a high pressure grease gun this resistance is less noticeable and damage to the seals may result without warning.



## BREAK-IN PERIOD

The engine is assembled and tested at the factory to insure that it is ready for work; however, the engine must be properly broke in to obtain the peak performance and long life that is built into the engine. Proper break-in will increase the power and prolong engine life.

To properly break in an engine merely means that the engine should be operated at reduced loads for a period of time (approximately 100 hours) long enough for the piston rings to wear in with the cylinder liners and form a lapped fit which would make a perfect seal between pistons and liners before the engine is used on rated load operations.

If an engine is operated at full load before it is broke in, the high pressures and temperatures created from the burning gases tend to escape through between the piston and cylinder liner into the engine crankcase, this is called blow-by. Blow-by tends to heat and collapse the piston rings which causes them to carbon up and stick to such extent that they will never seat to the cylinder liners. This causes the engine to have excessive oil consumption and a loss of power. In any event, the time required for proper break-in is well paid for in added fuel economy and top engine performance.

The original fill of oil in the engine is a special oil to induce rapid break-in. This oil should be used approximately the first 50 hours of operation during the break-in period and then drained, as this oil is not suitable for rated load operations. Also, any foreign material which might accumulate in a new engine will be drained out with the break-in oil. Refill the engine oil sump with oil as recommended in the lubrication and service guide. The oil used should have a service classification of MS for gasoline engines, and DS for diesel engines.

In breaking in an engine, it is necessary to maintain the proper operating temperature (green section on temperature gauge) to avoid the accumulation of condensation. This practice should also be continued after the break-in period. Condensation will damage and deteriorate the vital parts of an engine to complete

destruction if allowed to accumulate for a period of time.

As the break-in period progresses, approximately after the first 50 hours of operation at reduced loads, the load should be increased at short intervals until at the end of approximately 100 hours, the engine could be operated at rated loads. The load on the engine can be decreased or increased by selecting a lower or higher transmission speed.

An engine should never be used on a load that would cause it to lug. This would be considered an overload. The throttle should be in the full speed position on any load, during or after the break-in period. Reducing engine speed on light loads may create a lugging condition.

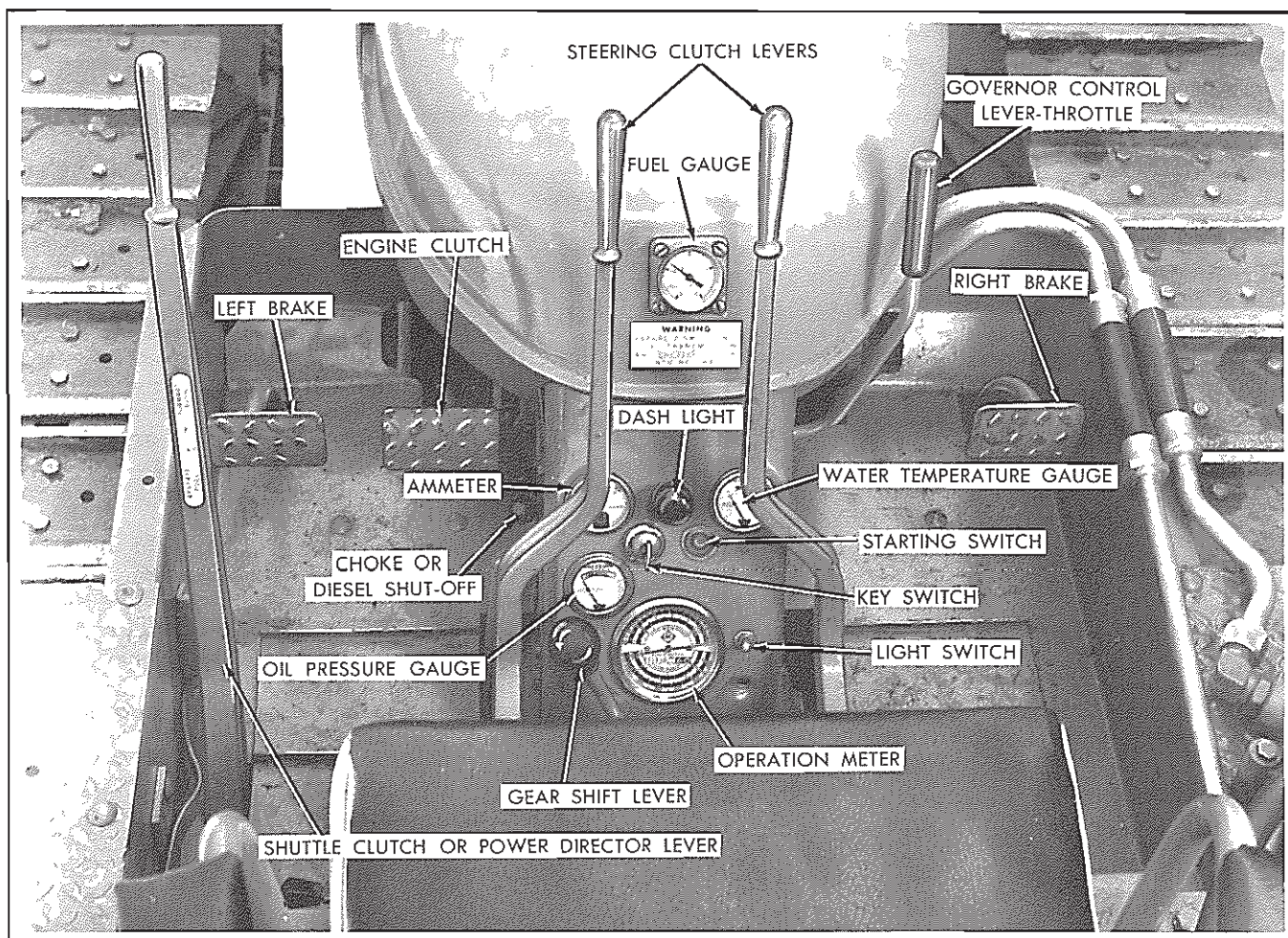
For long life of an engine, it should never be operated at its maximum power output on continuous loads such as fans, water pumps or hammer mills only 80% of the maximum power output should be used.

For proper break-in the following suggestions are made for best results:

1. Make certain that all points of care and lubrication outlined under lubrication and service guide have been serviced as specified.
2. Operate tractor under light loads for the first 100 hours of operation by using one gear speed slower than necessary to pull the load.
3. Maintain engine temperature between 180 to 200°F.
4. Drain the break-in oil at the end of the first 50 hours of operation and refill with an oil of the recommended viscosity for the prevailing temperature.

At the end of 100 hours of operation the cylinder head studs should be torqued, and the valve lash adjusted. Tighten the head bolts by starting at the center and working around and out toward ends of head.

## INSTRUMENTS AND CONTROLS



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.

### 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 models the ignition and starting switch circuit is connected when key switch is in the "ON" position. On diesel models the manifold air heater and starting switch circuit is connected to ignition terminal of key switch, therefore, to operate air heater the key switch must be in the "ON" position when the air heater

push button switch is depressed. The key may be removed from switch when in the "OFF" position to prevent tractor from being operated by unauthorized persons.

### LIGHT SWITCH

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

If the lamps fail to light, check the lighting circuit fuse located on the left hand side sheet ahead of instrument panel. If fuse is not burned out, check the lamp as the lamp may be burned out. If light fuse continues to burn out when lights are turned on, it indicates there is a short circuit in the lighting system and must be repaired.

### 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 diminish 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.

### OIL PRESSURE GAUGE

The oil pressure gauge is located on the instrument panel, and indicates the engine oil pump is circulating oil through the engine oiling system. With engine at operating temperature the gauge should register near the "O", "R" or "M" in the word "NORMAL".

**CAUTION:** If no oil pressure is indicated by gauge, stop engine immediately and the cause determined and corrected. Consult your "ALLIS-CHALMERS" dealer.

### 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 170° to 220°F., which is in the green section of gauge. Engine temperature will vary in accordance with the air temperatures and climate conditions.

### FUEL GAUGE

A float type fuel gauge is located at the rear of fuel tank and indicates the fuel level. The gauge is always in view of the operator, showing the available fuel supply.

### CHOKE CONTROL KNOB

On gasoline models the choke control knob is located forward from the left hand side of instrument panel. On diesel models the injection pump fuel shut-off control knob is located in this same position. 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 forward from the left hand 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 located forward and to the right of the operator and controls the speed of the engine. With the lever in the extreme forward position the engine will idle. Moving the control lever rearward increases the engine speed. The lever should be in the extreme rearward position, or full speed position when engine is operating under load.

The control lever has a friction adjustment located by removing the left hand side sheet below fuel tank. 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.

### OPERATION METER - OPTIONAL

The operation meter is located on the instrument panel, and records the hours of operation based on the full load speed of the engine. Hours of engine operation is recorded near center of meter. The upper outer scale reads the engine R. P. M. The lower outer scale reads the power take off R. P. M.

The upper set of four inner scales reads the miles per hour in each of the forward transmission gears, and with the "power director" clutch lever in the forward or high range position. The lower set of four inner scales reads the miles per hour in each of the forward transmission gears, and with the "power director" clutch lever in the rearward or low range position.

### 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 left hand steering lever back to make a left turn. Refer to "STEERING 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 downward. To disengage the parking brake lock levers, further depress the brake pedals and move the lock levers upward.

## STARTING AND STOPPING H-3 GASOLINE ENGINE

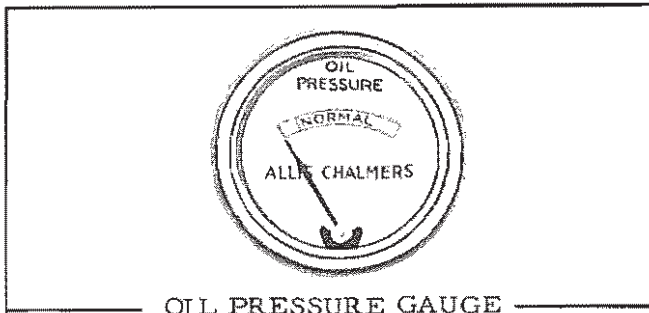
### STARTING THE ENGINE

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, check the air cleaner cup for proper oil level, and check the fuel supply in tank.

Place the transmission gear shift lever in the neutral position, lock brakes, and depress the clutch pedal. 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.

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 gauge at frequent intervals to ascertain that oil is being circulated. The indicator needle should remain in the word "Normal" when the engine is hot and running at its full governed speed. A slight decrease in pressure should be noted when engine idles. Do not operate unless pressure is shown on gauge.

### 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.

Even though the engine is equipped with a thermostat by-pass system the warm-up period can be further reduced by keeping the engine at approximately 1000 R. P. M. and loading the engine lightly for the first five or ten minutes, such as driving to the field or job in third gear.

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

### STARTING 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.

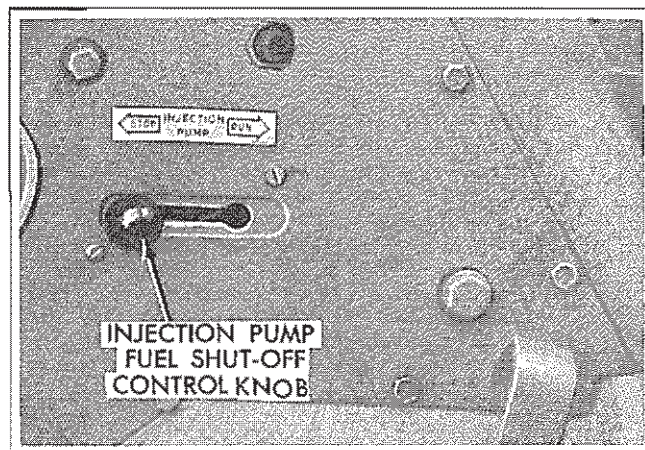
Place the injection pump fuel shut-off control knob in the run position. Place the gear shift lever in the neutral position, and depress engine clutch. Place the throttle lever at a position that will give 900 to 1000 RPM. Turn the key switch to the "ON" position and depress starting switch to crank engine. In warm temperatures the engine will start.

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° before placing a load on the tractor. Check oil pressure when engine starts.



In extreme cold weather the engine may be started easily by the use of the spray type starting fluid. This starting fluid is readily available in easy to use spray cans. Do not spray directly at air intake. Accumulation of liquid starting fluid on air intake parts will cause severe detonation which may damage pistons and engine parts.

The best method of using spray starting fluid is to spray fluid onto a clean rag, and wrap rag under intake cap. This will provide a gentle start without detonation. If the intake cap is removed, the rag may be placed in the intake pipe. In this event tie a wire onto the rag so it will not be pulled into the air cleaner.

Raw starting fluid reaching the engine causes detonation which fights the cranking engine.

Starting fluid should be used when temperature falls below 20° F., or at higher temperatures if batteries are low.



**CAUTION:** When using any type of starting fluid, do not use the manifold air heater as there are dangers of igniting the fluid in the engine intake manifold. Never use starting fluid unless the engine is cranking.

## AFTER ENGINE HAS STARTED

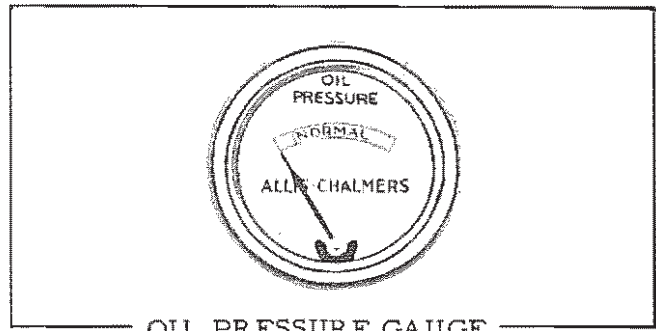
### CHECK OIL PRESSURE

When operating engine, look at the oil pressure gauge at frequent intervals to make certain oil is being circulated by the oil pump. The gauge should register in the word "NORMAL" when the engine is hot and operating at its normal speed. A decrease in pressure will be noted when engine idles. Do not operate unless gauge registers.

### FAST WARM-UP

Even though the engine is equipped with a thermostat by-pass system, the warm-up period can be further reduced by keeping the engine at approximately 1000 R. P. M. and loading the engine lightly for the first five or ten minutes, such as driving to the field in third gear.

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.

### STOPPING THE ENGINE

Never shut off a hot engine, or an engine at high speed. After the load is released from the engine, allow it to idle for a few minutes to gradually cool all parts evenly. Then shut off engine by moving the fuel shut-off control knob at left side of instrument panel to the stop position.

## OPERATION AND ADJUSTMENTS

### ENGINE CLUTCH

The engine clutch release pedal is located at the left hand side of the torque housing. The clutch is provided for engaging or disengaging the power of the engine from the tractor. It disengages power from the engine clutch shaft.

The clutch is adequate for many hours of normal use, but if abused or incorrectly used in any manner, its life can be drastically shortened. The clutch should never be slipped more than necessary, if used as a speed reducer or for starting loads under full engine power, the life of the clutch will be drastically shortened.

In normal use of the clutch, it should only be engaged with the engine at reduced speed, and engaged as fast as possible to acquire a gentle start with the least amount of slipping. Therefore, the fastest engagement possible under the existing circumstances gives the best clutch life. Increase engine speed after the clutch is engaged.

### ADJUSTMENT - ENGINE CLUTCH

As the clutch lining wears, the clutch pedal free movement will gradually diminish. There must always be some free pedal movement before starting to release the clutch, otherwise it will lead to clutch slippage or failure of the clutch release bearing.

To adjust the pedal free movement, disconnect the clutch rod from the pedal. Shorten clutch rod by turning clockwise until there is 1/2" free movement of the pedal link rod when measured at the side of the torque housing. This must be checked by reattaching rod and moving pedal downward to the limit of free movement.

If it is difficult to check or feel the free movement due to the spring pressure of the linkage return spring, the cotter pin may be removed from link rod releasing the spring pressure.

When the 1/2" measurement is obtained, install cotter pin in link rod. This adjustment will give approximately 1/4" clearance between clutch release bearing and the release levers.

### 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, release the engine clutch fully and allow it to almost stop rotating. At this instant move the shift lever from neutral to the desired gear position. With a little practice, the operator will be able to shift gears without clashing, or having difficulty of gears engaging.

Always stop the forward motion of tractor before changing from one gear to another. Never attempt to shift gears on the go as excessive gear clashing may result. To shift from one gear to another, shift directly to the neutral position, then move lever to desired position before shifting to the next gear, never force lever from one gear to another.

To shift from neutral to low gear, follow the diagram, and move lever to left and downward. Move upward to neutral. To shift to second gear, move lever to right and upward. Move downward to neutral. To shift to third gear, move lever to right and downward, move upward to neutral. To shift to fourth gear, move lever to left and upward. Move downward to neutral. To shift to reverse gear, move lever to center of neutral position and upward. Move downward to neutral.

NOTE: If tractor is equipped with "Shuttle Clutch" the reverse gear is left out, as the reverse gear is not necessary.

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

The shuttle clutch is provided as standard equipment for industrial tractors to control the forward and reverse movement of tractor in any forward gear. The shuttle clutch is similar to the power director clutch, but consists of a change in the gear train which provides a reverse of direction instead of low range when the control lever is shifted rearward.

The transmission reverse gear is left out whenever a shuttle clutch is installed. This gear is left out, as it is not needed, and to eliminate confusion in direction of travel. The forward travel is controlled by shifting the control lever forward. The reverse travel is controlled by shifting control lever rearward.

The shuttle clutch is convenient for operations where a continued forward and reverse movement of tractor is necessary, such as in loading operations. The direction of travel is changed without stopping or gear shifting.

To operate, select one of the forward transmission gears that is most desirable for the work being done. With shuttle clutch control lever in the neutral position, disengage engine

clutch and shift transmission into the desired gear and engage engine clutch.

To engage forward travel, depress button on control lever and lock in the forward position. To reverse direction of travel, depress button on clutch control lever and shift rearward, locking lever in the rearward position. 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.

#### POWER DIRECTOR CLUTCH (Hand Operated)

The power director is provided to give a dual range of speeds in all gears and also to release the power to the track drive sprockets, without releasing the power to the hydraulic pump.

The forward position provides the high range. The rear position provides the low range. The center position is neutral and stops power to the drive wheels. This lever may be shifted without stopping tractor. To shift lever, depress thumb button at top of lever.

Operate the engine at full throttle and select the desired transmission speed to suit the work being done. Severe overloads may be thrown on engine if operated at reduced engine R. P. M. on heavy loads. Avoid lugging engine.

#### ADJUSTMENT - POWER DIRECTOR CLUTCH

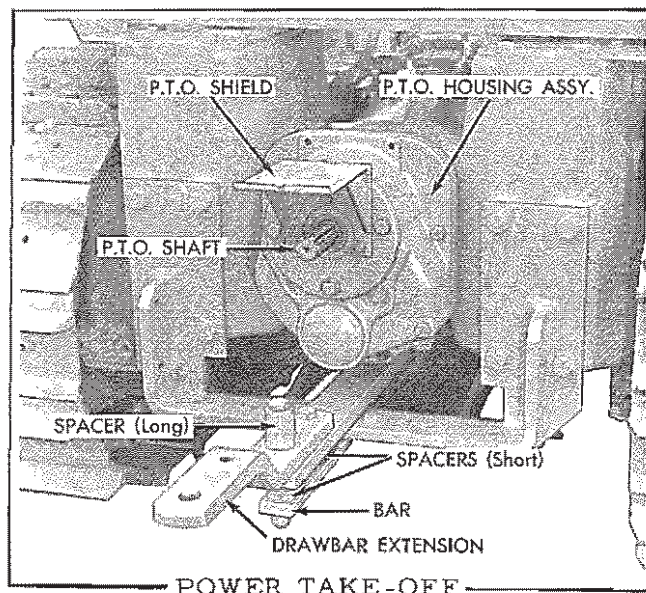
The clutch lever quadrant must be adjusted so that it will hold the clutch lever in the neutral position so that both ranges of clutch is released equally. This can be checked by holding the release button depressed and moving the lever slightly forward and rearward between the start of engagement of both ranges and adjust lever quadrant to hold lever exactly half way between the two clutch engagements.

The holes in quadrant are slotted. To adjust, loosen two nuts and move quadrant forward or rearward to the desired position and retighten nuts. The shuttle clutch lever quadrant is adjusted in this same manner.

#### POWER TAKE-OFF (OPTIONAL)

The P. T. O. is used to provide power to P. T. O. operated machines. The shaft turns 540 R. P. M. at 1650 R. P. M. of engine. The speed of the P. T. O. shaft remains at 540 regardless of the transmission gear used.

The P. T. O. shift lever is located at left side of torque housing near the engine clutch pedal. To



shift the P. T. O. shaft in gear, depress the engine clutch pedal and at the same time move the P. T. O. shift lever to the forward position while the clutch shaft is still rotating slightly.

If the clutch shaft is allowed to stop rotating it will be difficult to engage the P. T. O. shift collar as clutch jaws may not be in alignment. By shifting while the shaft is still rotating the jaws will align and engage easily.

Before attempting to shift the P. T. O. shaft in gear, allow both tractor and driven machine to come to a full stop.

The forward motion of the tractor may be stopped while the P. T. O. shaft continues to run, by simply moving the power director or shuttle clutch lever to the center or neutral position.

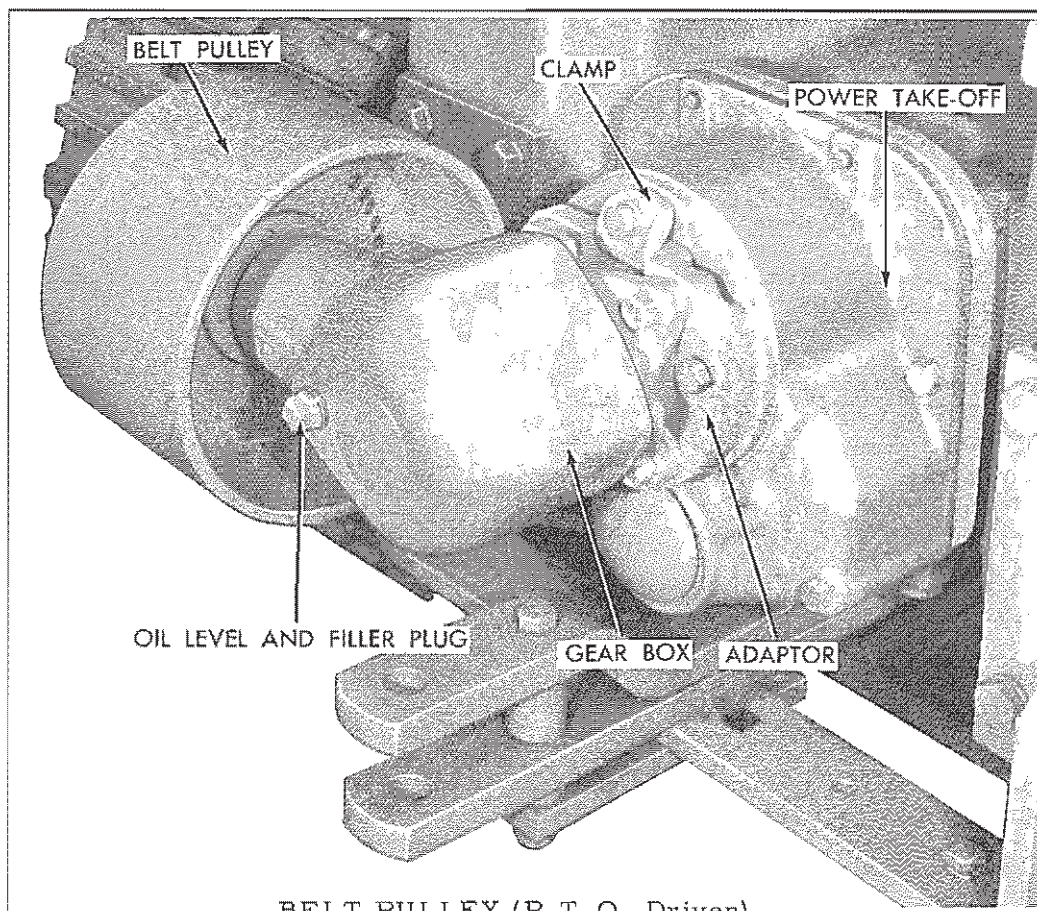


Do not operate P. T. O. driven machines unless all power line shielding is in place.

Before hitching a P. T. O. operated machine to this tractor, it will be necessary to change the drawbar as shown in photograph. Remove the two capscrews from rear of drawbar, and move the drawbar extension rearward approximately 10-1/2" and bolt in place.

Install short capscrew in front position, install a short spacer under drawbar, and install the retaining bar, using the center hole. Install lock washer and nut.

Install long capscrew in rear position, placing the long spacer on top of drawbar extension. Place the second short spacer between drawbar and the retaining bar. Enter capscrew through and install lock washer and nut. Tighten both nuts securely. Pin drawbar rigid in the center position.

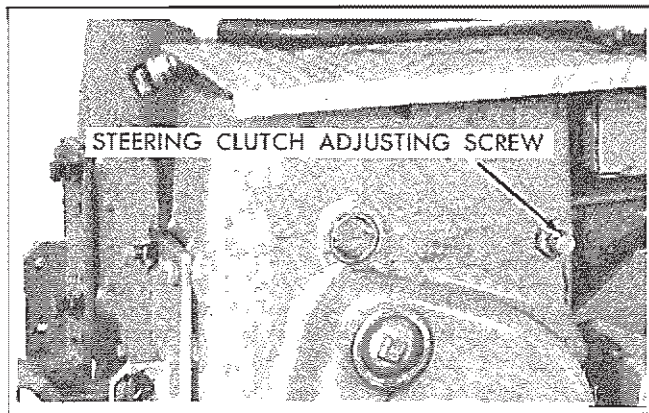


BELT PULLEY (P. T. O. Driven)

#### BELT PULLEY - P. T. O. DRIVEN (OPTIONAL)

The belt pulley is available as optional equipment and is field installed. It is driven from the power take-off shaft, therefore, tractor must be equipped with a power take-off which is also optional equipment.

To operate the belt pulley, disengage the engine clutch and shift the power take-off into gear. Refer to Power Take-Off for further instructions. Check oil level and keep gear box filled to level of filler plug opening located at rear of gear box with SAE 80 E. P. transmission oil.



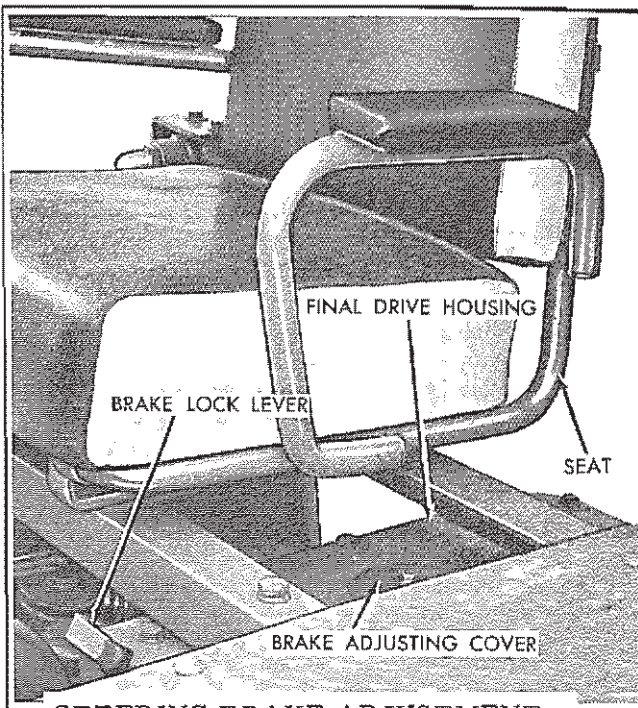
## STEERING OF TRACTOR

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 right hand steering lever; to make a left turn, pull back the left hand 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 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 left hand steering lever is used to make a right turn and the right hand 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 assures complete engagement of the steering clutches, should be from 1-1/2" to 3-1/2",



STEERING BRAKE ADJUSTMENT

when measured from the rim of the fuel tank to levers. When the free travel of either steering lever becomes less than 1-1/2", the steering clutch linkage requires adjustment (refer to "STEERING CLUTCH ADJUSTMENTS").

## STEERING CLUTCH - ADJUSTMENT

The clutches are properly adjusted when the control levers have 3-1/2" of free movement when measured from the rim of the fuel tank. 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.

## 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.

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.

### TRACK SAG ADJUSTMENT

To minimize movement of the tractor on 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 reasonably 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. The track sag measurement is to be made with a grouser pin directly over the center-line 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.

### TRACK AND TRACK SHOES

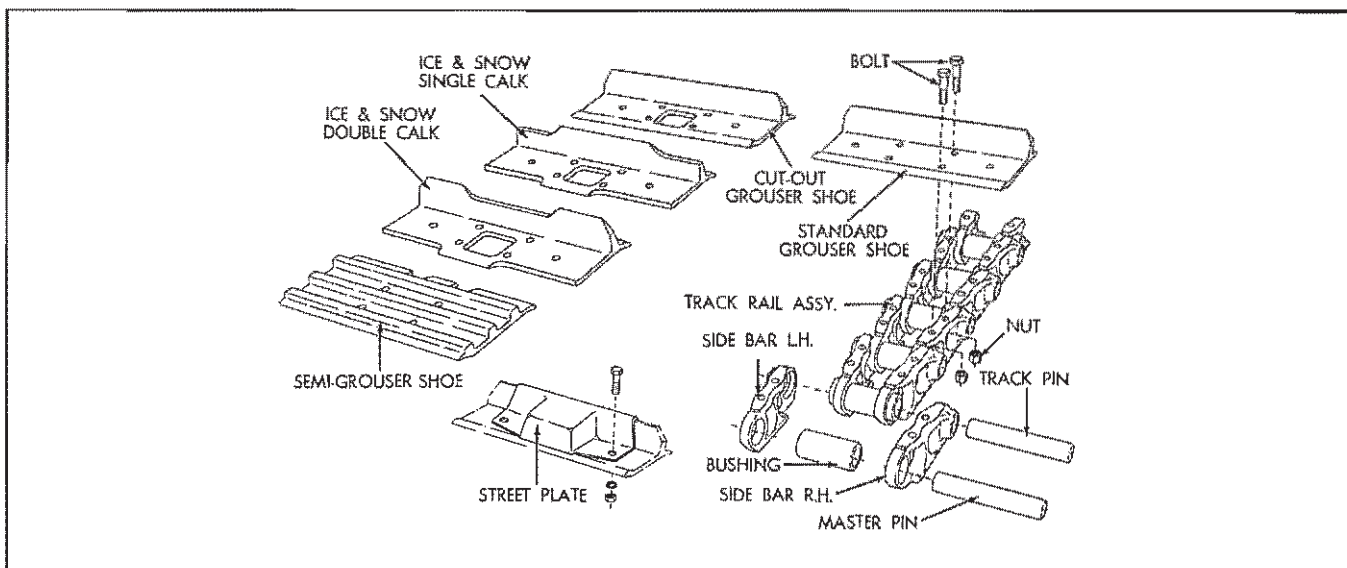
Track type tractors operate in all kinds of soil conditions, such as mud, sand, gravel, snow and ice. Therefore, a variety of track shoe equipment is necessary and available. When changing or installing track shoes the bolts must be tightened 100 to 110 ft. lbs. torque.

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-grousers 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.



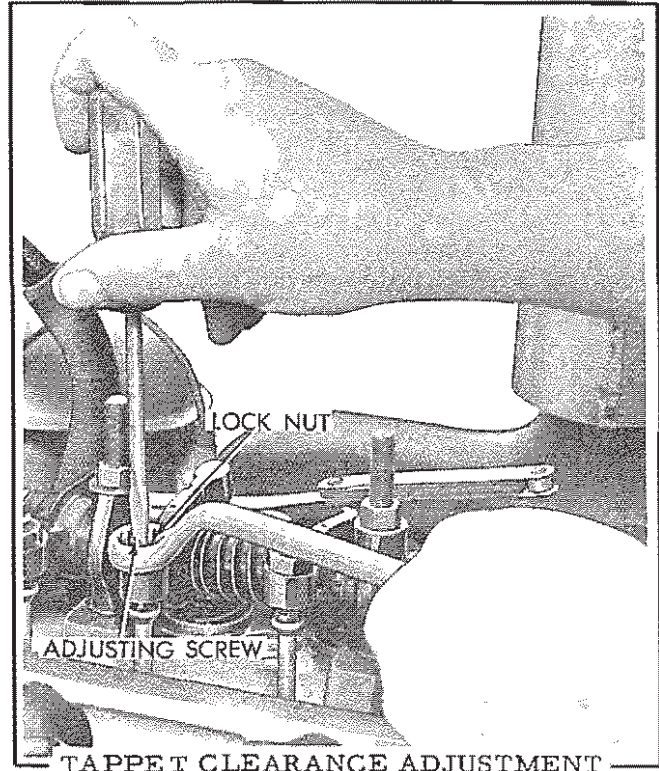
## VALVE TAPPET CLEARANCE H-3 GASOLINE

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 this adjustment. Adjust the intake valve clearance from .008" to .010". Adjust the exhaust valve clearance from .014" to .016".

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

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 is necessary for a complete job of adjusting valves.

Loosen the locknut on the adjusting screw, and turn adjusting screw until there is .008" to .010" clearance between the valve stem and rocker arm on intake valves, and .014" to .016" on exhaust valves when measured with a feeler gauge. Tighten locknut and recheck.



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

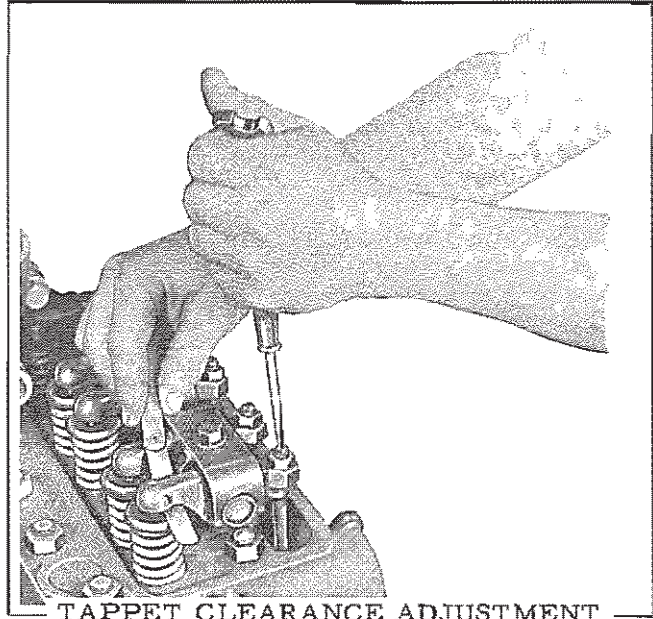
## VALVE TAPPET CLEARANCE HD-3 DIESEL

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 this adjustment.

Loosen the locknut and turn the valve adjusting screw until there is .010" clearance between valve stems and rocker arms on the intake valves, and .019" clearance on exhaust valves, when measured with a feeler gauge. Tighten locknut and recheck clearance.

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.

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 is necessary for a complete job of adjusting valves.



— TAPPET CLEARANCE ADJUSTMENT —

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

## BATTERY

Check the electrolyte solution in the battery at least once a week (50 hours) to see that it is at the proper level. This level should be maintained to lower edge of filler tube, which is about 3/8" above top of separators.



Keep all open flame away from battery as an 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.

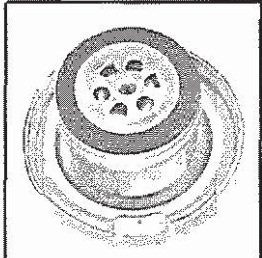
Keep the battery clean by using a stiff bristle brush. Do not use a metal brush. If terminals are corroded or if the battery is acid soaked, wash with a soda, mix 1/4 lb. of baking soda to one quart of water. The vent plugs must be kept in place when cleaning battery.

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 re-installing be sure the ground cable is installed last, and connected to the positive terminal of battery.

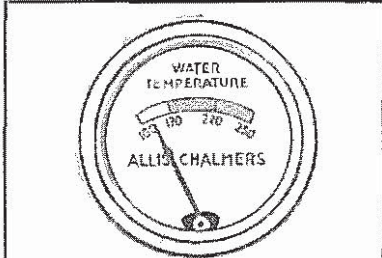
The battery retainer should be in place and tightened snugly, to prevent battery from being damaged by vibration. Any non-insulated metal across the top of battery will short circuit, and cause it to lose its charge.

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.

## ENGINE COOLING SYSTEM



PRESSURE CAP



TEMPERATURE GAUGE

### 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 the 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.

Soluble oil is beneficial to the cooling system. It will not prevent the accumulation of lime, but will retard such formation. 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 pointer should operate in the green portion of gauge, with a range of 170°F. 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 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 operation temperature conditions.

### TO DRAIN COOLING SYSTEM

On gasoline engines, open the drain cocks at front of radiator and on left hand side of cylinder block near carburetor. On diesel engines, open the drain cocks at front of radiator, the right hand side of cylinder block and water pump.

**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.

### ANTI-FREEZE SOLUTION

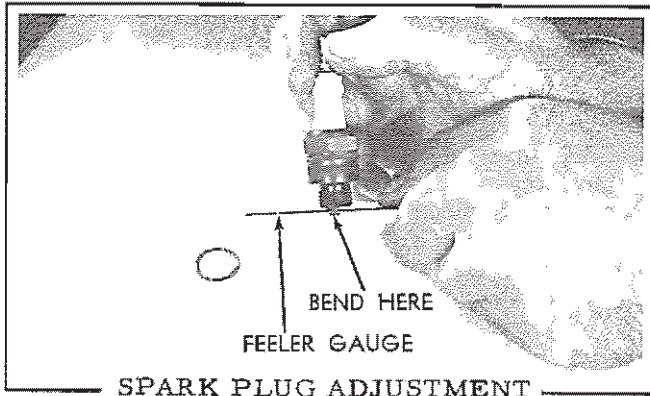
If tractor is used during freezing weather, it is advisable to fill the cooling system with anti-freeze solution. If tractor is operated on heavy loads, a good grade of permanent type anti-freeze is recommended. This type of anti-freeze has a high boiling point and will permit the engine to be operated at its normal operating temperature. (Green section of gauge).

### FAN BELT ADJUSTMENT

To adjust or tighten the fan drive belt, loosen the adjusting screw on the generator brace, and move the generator away from the engine block until there is approximately 1/4" belt deflection midway between the generator and fan pulleys, and using a 10 lb. pull or scale reading. Retighten adjusting capscrew.

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

## IGNITION SYSTEM H-3 GASOLINE



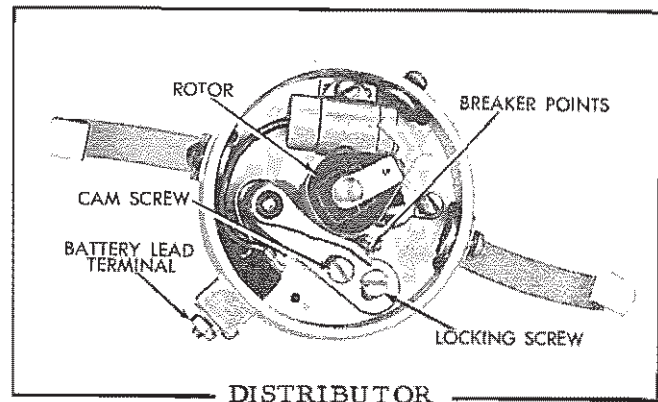
### SPARK PLUGS

The spark plugs should be removed every 200 hours of operation, cleaned and the points re-spaced. 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 A-7, AC-C45 or Champion J-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 ad-



visable to change plugs regularly.

### IGNITION COIL

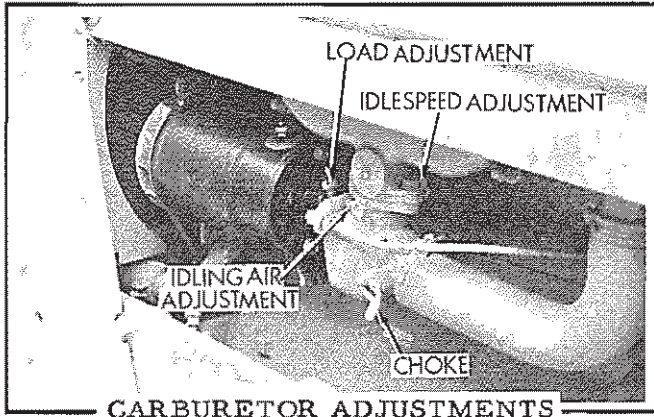
The ignition coil does not require special service other than to keep all terminals tight and clean. The distributor lead wire must be attached to positive terminal.

### 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 .022". 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 the cam screw to get the .022" 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 sand paper to clean points, only in case of emergency. Timing should be checked and reset if necessary when installing new points.

## CARBURETOR H-3 GASOLINE



### 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 550-575 R. P. M.

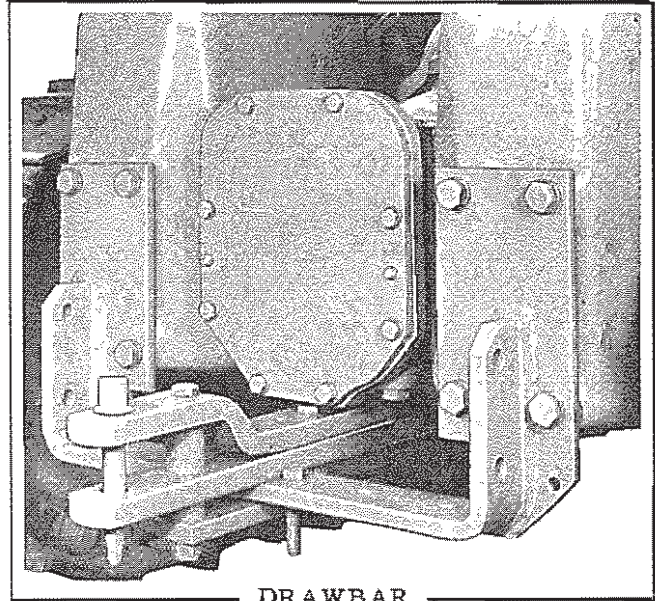
For correct air fuel mixture at idling speed of engine, adjust the idling adjusting screw located at the front of the top portion of the carburetor. Turn the adjusting screw inward for richer mixture and outward for leaner mixture. The normal setting is approximately one and one half turns outward.

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 if possible under load.

If impossible to load engine, set throttle to the high idle position, turn inward on adjusting screw until engine loses speed or misses, then turn outward until the engine resumes speed and runs smooth. An extra  $1/8$  to  $1/4$  turn will then give engine all the fuel it requires under load.

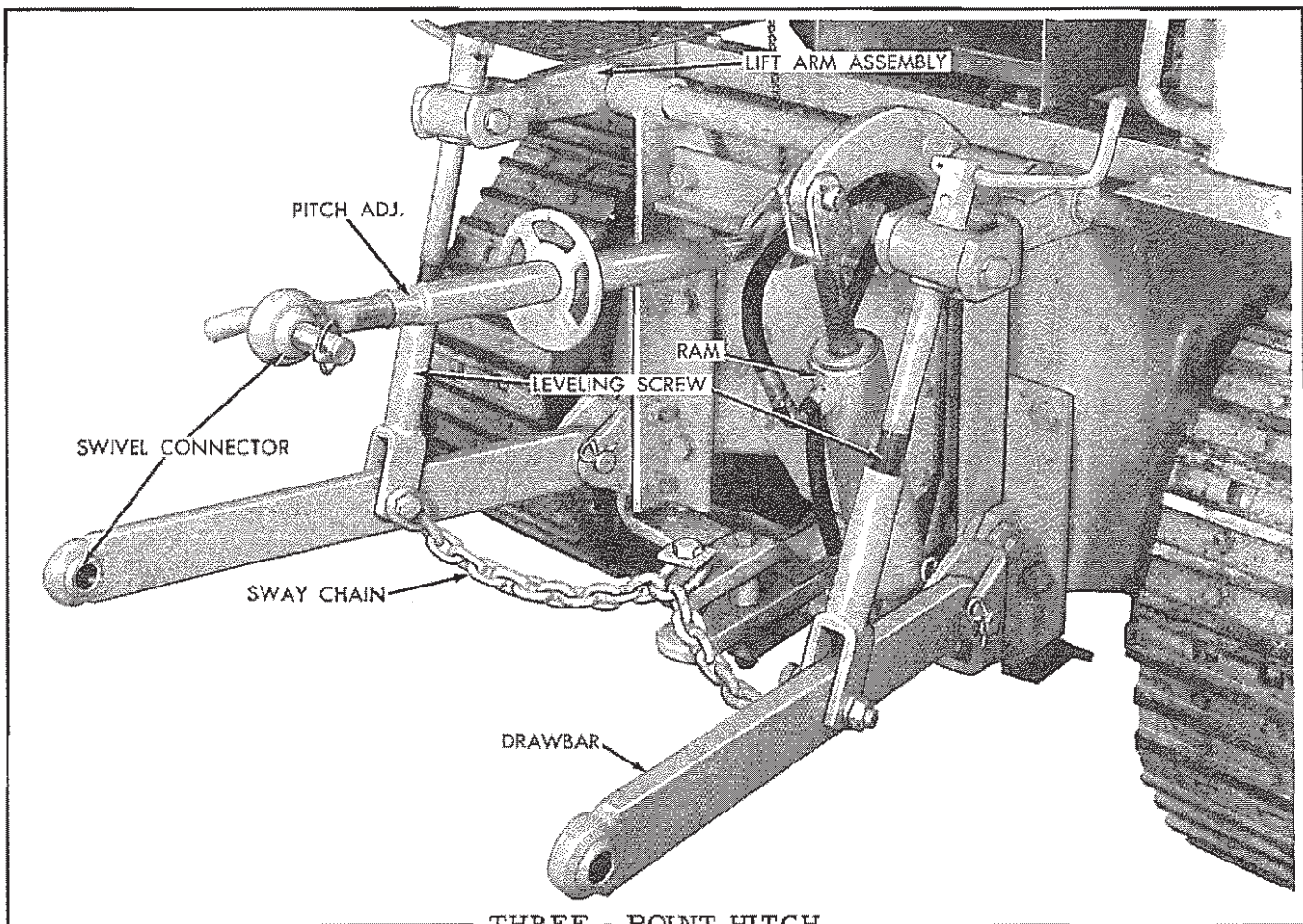
## DRAWBAR

The drawbar is of the heavy duty type, and the height of the hitch point may be varied by hitching to the lower bar or the upper bar, or in some cases it may be desired to hitch between the two bars. The height of drawbar above ground is approximately 12-1/2" midway between the two hitch bars, add 2" if tractor is on a solid floor. The drawbar has a swing of approximately 22" from side to side, and may be pinned in the center position if a rigid drawbar is desired.



DRAWBAR

## THREE - POINT HITCH



THREE - POINT HITCH

A three point hitch is available as optional equipment where it is desired to use tractor with

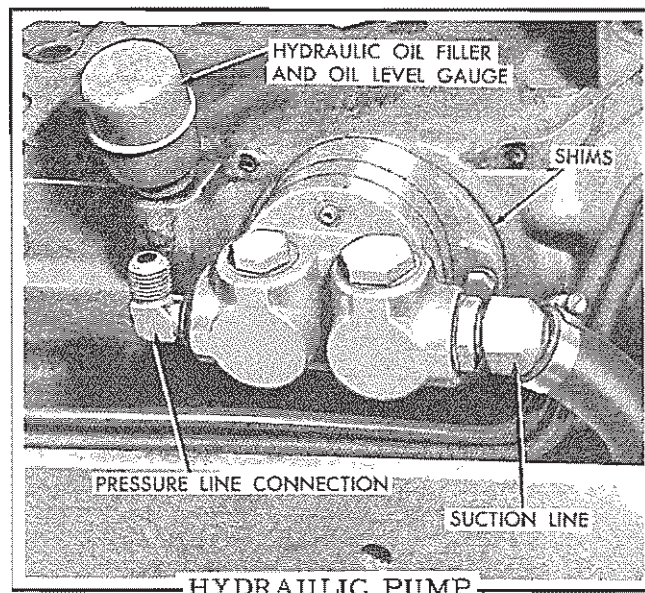
mounted implements. The implements are raised and lowered hydraulically.

## HYDRAULIC PUMP

A gear type hydraulic pump is mounted at the right hand side of the torque housing, and driven from the engine clutch shaft. The pump is in operation at all times when the engine is running and the engine clutch is engaged. Disengaging the engine clutch will stop the hydraulic pump from operating. If it is desired for the hydraulic pump to operate with the movement of the tractor stopped, merely shift the shuttle clutch (or power director clutch) control lever to the neutral position.

### INSTALLATION - HYDRAULIC PUMP

To install pump, drain oil from housing and remove the cover plate at right hand side of torque housing. Clean off any trace of gasket, paint, or any trace of roughness as the pump mounting surface must be clean and smooth. Place the pump into position in housing with the drive gear and pump gear in mesh. Holding the pump as squarely as possible to the torque housing, insert as many shims as possible between flange of pump and torque housing. Remove pump and add .030" thickness of shims to the present amount and install pump to torque housing. Fill



housing with SAE 20W oil to the full mark on oil level gauge.

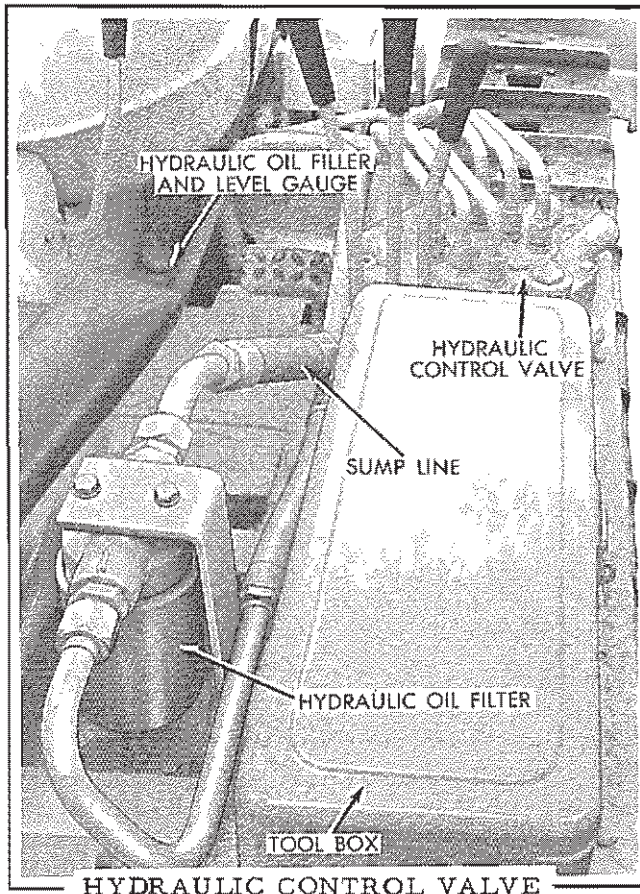
**CAUTION:** Never start engine after installing pump until the pump hoses have been connected to the control valve as the pump may be damaged.

## HYDRAULIC CONTROL VALVE

The control valve is located to the right of the operator. The hydraulic system may be equipped with a one spool or a three spool control valve, depending on the requirements of the hydraulic system. The one spool valve will operate the three point hitch for attaching implements, or any other purpose where a single ram may be used. The three spool control valve will operate the three point hitch and a loader with the bucket operated hydraulically, or may be used in many instances where up to three rams may be operated.

### HYDRAULIC OIL FILTER

Change oil filter at every 200 hours of operation. Use only an "ALLIS-CHALMERS" filter provided specifically for this purpose. Make a practice of keeping filters on hand so that they will be available when needed.



## DIAGNOSING ENGINE DIFFICULTY H-3 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-3 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.

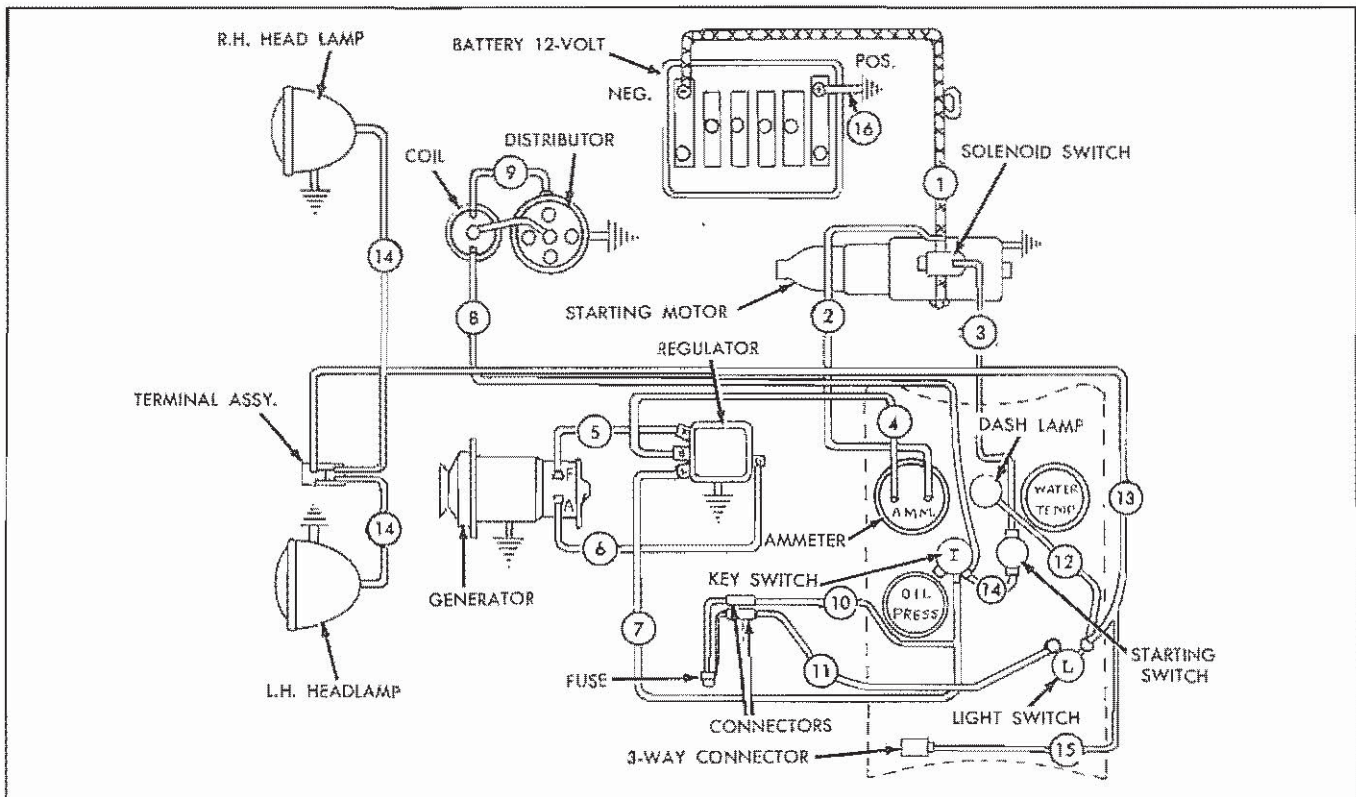
6. Remove nozzles and pour a small amount of motor oil on top of pistons, crank engine over a few times and replace nozzles.
7. Disconnect the fuel line from the main tank and connect it to a clean container of a mixture of rust preventive and perfection kerosene. Mix to a consistency of regular fuel. 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.

## WIRING DIAGRAM H-3 GASOLINE

By following the diagram the wires may be successfully installed. The various wires are numbered, colors of the wires are given, and the terminals to which the wires are connected are named. Always disconnect the battery ground strap when working on any of the electrical system to prevent short circuits. The electrical system uses a 12 volt battery with the positive terminal grounded.

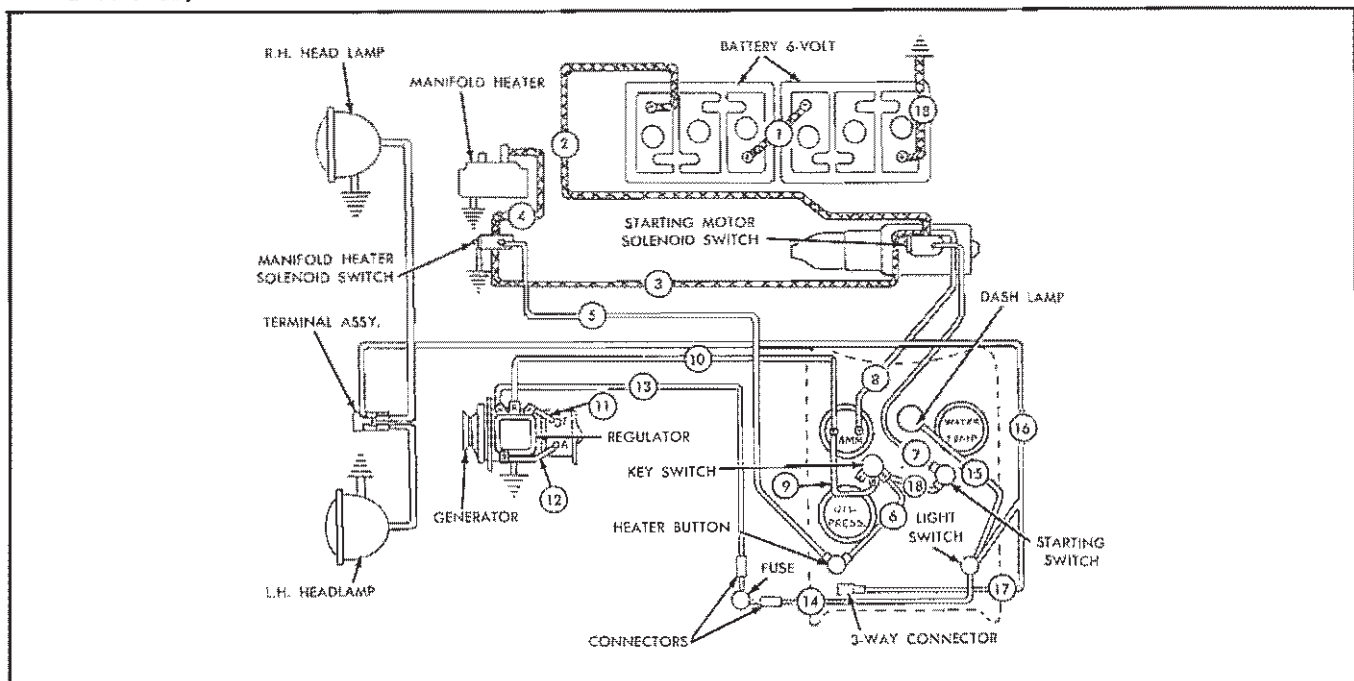
1. Heavy cable from negative terminal of battery to starting motor solenoid switch.
2. Blue wire from starting motor solenoid, switch to positive terminal (charge side) of ammeter.
3. White wire from small terminal of starting motor solenoid switch to push button starting switch.
4. Red wire from negative terminal (discharge side) of ammeter to voltage regulator terminal marked "BAT".
5. Green wire from field terminal "F" of voltage regulator to field terminal "F" (inner terminal) of generator.
6. Brown wire from terminal "G" of voltage regulator to armature terminal "A" (outer terminal) of generator.
7. Black wire from load terminal "L" of voltage regulator to terminal "BAT" of ignition and starting switch.
8. Yellow wire from ignition terminal "IGN" of ignition and starting switch to negative terminal of ignition coil.
9. Wire from positive terminal of ignition coil to primary lead terminal of distributor.
10. Green wire from ignition and starting switch terminal "BAT" to light fuse holder.
11. Purple wire from fuse holder to light switch.
12. Wire from dash lamp to light switch terminal with wire adaptor.
13. Orange wire from adaptor terminal of light switch to head lamp terminal connector.
14. Jumper wire from ignition terminal of key switch to push button starting switch.
15. Orange wire from light switch terminal with wire adaptor to rear wiring harness connector. If rear lamps are installed, the wires will be connected to this three-way connector.
16. Battery ground strap from positive terminal of battery to ground. Connect last to avoid danger of short circuit.



## WIRING DIAGRAM HD-3 DIESEL

By following the diagram the wires may be successfully installed. The various wires are numbered, colors of the wires are given, and the terminals to which the wires are named. Always disconnect the battery ground strap when working on any of the electrical system. The electrical system uses two six volt batteries, connected in series with the positive terminal grounded.

1. Jumper cable connected from the negative terminal of first battery to the positive terminal of second battery.
2. Heavy cable from negative terminal of second battery to starting motor solenoid switch.
3. Heavy cable from starting motor solenoid switch to manifold heater solenoid switch.
4. Heavy cable from manifold heater solenoid switch to manifold heater.
5. Green wire from the small terminal of manifold heater solenoid switch to heater push button switch on instrument panel.
6. Green wire from heater push button switch to "IGN" terminal of starting switch.
7. White wire from push button starting switch to small terminal of starting motor solenoid switch.
8. Blue wire from starting motor solenoid switch to positive terminal (charge side) of ammeter.
9. Red wire from negative terminal (discharge side) of ammeter to "BAT" terminal of starting switch.
10. Red wire from negative terminal (discharge side) of ammeter to "BAT" terminal of voltage regulator.
11. Wire from field terminal "F" of voltage regulator to field terminal of generator.
12. Wire from "GEN" terminal of voltage regulator to armature terminal of generator.
13. Black wire from load terminal "L" on voltage regulator to fuse holder.
14. Black wire from fuse holder to light switch.
15. Wire from dash lamp to wire adaptor of light switch.
16. Orange wire from wire adaptor of light switch to headlamp terminal connector. The headlamp wires are connected to this terminal assembly.
17. Orange wire lead from light switch with a three-way connector, and is used for connecting wires when rear lamps are installed.
18. White jumper wire from ignition terminal of key switch to push button starting switch.
19. Ground strap from positive terminal of first battery to ground. Connect last to avoid danger of short circuits.



## 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 at the left front end of torque housing.

The engine serial number is located on the left hand side of the engine block.

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.

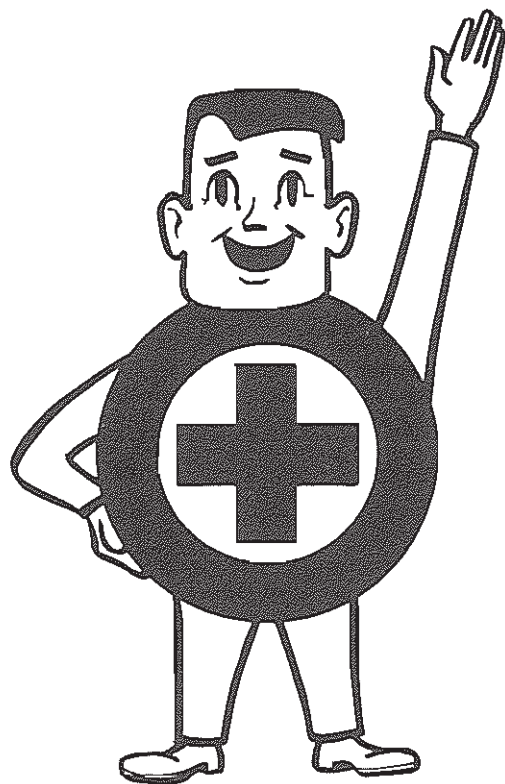
No responsibility is assumed for delay or damage to merchandise while in transit. Our responsi-

bility 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"