656 Tractor

Operators Manual

1082671R2

Reprinted

CASE IH

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To The Owner

Your local International Harvester dealer is interested in the performance you receive from this tractor. He has factory-trained servicemen, informed in the latest method of servicing tractors, and modern tools, and original-equipment IH service parts which assure proper fit and good performance.

To obtain top performance and assure economical operation the tractor should be inspected, depending on its use, periodically, or at least once a year, by your International Harvester dealer.

Before you operate the tractor study this manual carefully. It has been prepared to help you operate and maintain your tractor with utmost efficiency. New copies may be ordered from your dealer at a nominal price.

When in need of parts, always specify the tractor and engine serial numbers including prefix and suffix letters. Write these serial numbers in the spaces provided.



This symbol is used to call your attention to instructions concerning your personal safety. Be sure to observe and follow these instructions.

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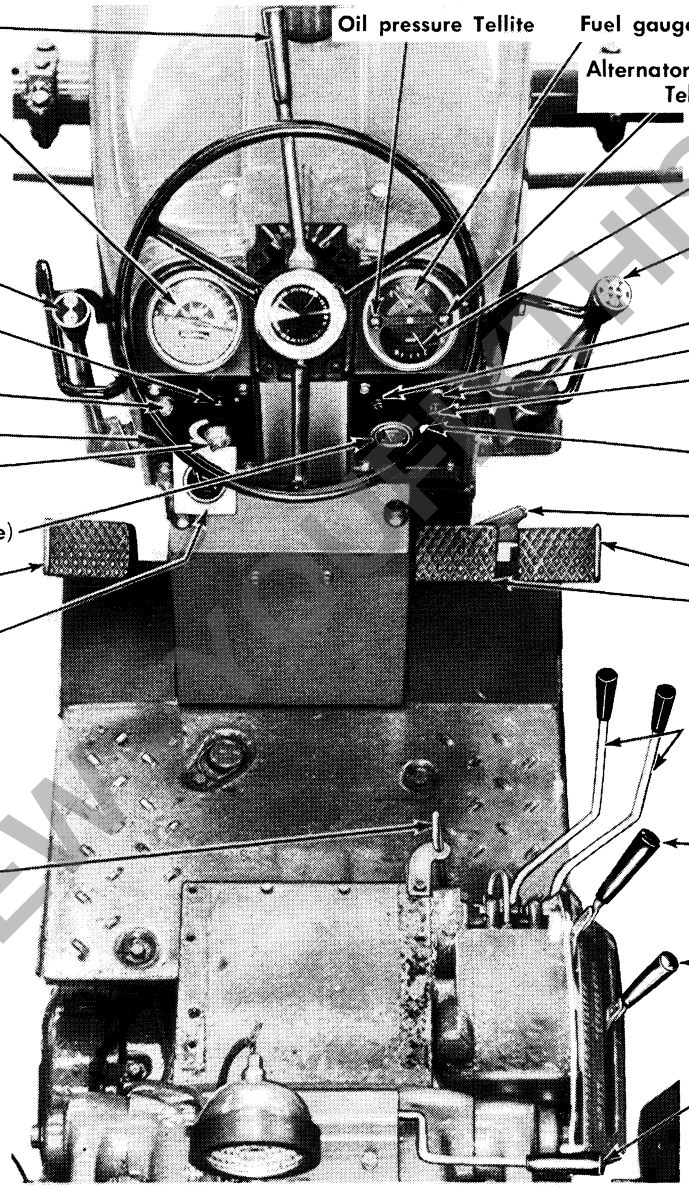
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INSTRUMENTS AND CONTROLS

Before attempting to start or operate the tractor, be sure to review all the instructions for the new tractor and thoroughly familiarize yourself with the instruments and controls.



Illust. 6
Location of instruments and controls.
(Farmall 656 Tractors)
(Gear drive)

Page references for items illustrated above are shown at the top of page 11.

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DIESEL ENGINE AND FUEL SYSTEM

The diesel fuel system consists of a fuel tank with a water drain valve, a primary fuel filter, a final fuel filter, an injection pump assembly complete with governor, a nozzle holder and nozzle assembly for each cylinder, and high pressure steel tubings connecting the pump discharge outlets to the nozzles.

The fuel injection pump draws the fuel from the supply tank through the filters, places it under the high pressure required for mechanical atomization, meters it with great accuracy, distributes it in proper sequence to the various cylinders, makes the individual injections with fine precision in timing, and produces uniformly through the nozzles the correct pattern of spray for the combustion chambers.

Careless or too frequent removal of elements of the fuel injection system for "inspection" or "cleaning" is generally far more harmful than beneficial, because of the danger that dirt will enter the exposed connections and because of the possibility of mishandling the equipment through lack of knowledge of its design and construction. Various of its components are made with the utmost precision and are easily damaged when removed.

FUEL SYSTEM

Fill the fuel tank, at the end of each day's work. This will force out any moisture-laden air and prevent condensation.

Note: Do not fill the tank to its full capacity as space is required for vapor expansion in the event of a temperature change. A tank filled to capacity may overflow if exposed to a rise in temperature or direct sunlight.

The filler cap on some fuel tanks has an air vent. This vent should be kept open at all times to assure proper flow of the fuel. Other fuel tanks are vented by a tube extending down from the fuel tank filler neck.

Before starting the diesel tractor for each days work, open the diesel fuel tank water drain cock on the fuel drain pipe, (Farmall 656 Diesel Tractors) or under the primary fuel filter (International 656 Diesel Tractors), to drain off water and sediment. Close the drain as soon as clean fuel appears. **See Illust. 29.**

When filling the fuel tank, be sure the diesel fuel is free from foreign substances. Consult your International Harvester dealer or fuel supplier for the diesel fuels which will give the most satisfactory performance in your International diesel engine. See the table on "Diesel Fuel Specification Requirements".

Be sure the shut-off valve under the fuel tank is open. To assure against leakage or seepage when the valve is in its full open position, be sure to screw the needle stem (shut-off valve) out until the seat on the stem is tight against the stop.

All air must be eliminated from the fuel lines before the engine will start and operate properly. All plugs and fuel line connections must be thoroughly tight to prevent leakage and to prevent air from entering the fuel system.

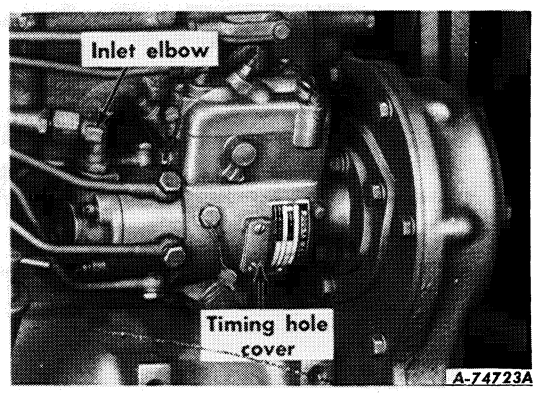
VENTING THE FUEL SYSTEM

The system must be vented under the following circumstances:

1. Before starting an engine which has not been operated for an extended period of time.
2. When an engine, in operation, runs out of fuel.
3. When the fuel filter has been replaced.
4. When any connections between the injection pump and fuel tank have been loosened or broken for any reason.

To Vent the Fuel System

1. Loosen the bleeder stem on the vent valve at the top of the primary fuel filter and allow the fuel to run out until it becomes a solid stream without air bubbles. Then tighten the bleeder stem to close the vent valve.
2. Loosen the bleeder stem on the vent valve at the top of the final fuel filter and allow the fuel to run out until it becomes a solid stream without air bubbles. Then tighten the bleeder stem to close the vent valve.
3. Loosen the hose coupling nut under the final fuel filter, then loosen the hose connection on the injection pump inlet elbow **(Illust. 29)** and allow the fuel to run out until it appears in a solid stream without air bubbles.



Illust. 30
Injection pump.

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BASIC HYDRAULIC SYSTEM WITH POWER STEERING
HYDROSTATIC DRIVE and GEAR DRIVE

The pump draws a part of its supply from the main return tube and a part directly from the rear frame compartment through a full-flow filter which protects the hydraulic system from foreign matter. A large bypass valve at the outside end of the filter element admits fluid, through a screen directly to the pump, should filter resistance become excessive through clogging or because of cold oil.

The filter and relief valve screen are serviced by removing a cover on the right side of the (drive housing) (Hydrostatic drive) or the clutch housing (**Gear drive**). See "Lubrication Guide" for service information.

Fluid passes from the pump to a priority-type flow divider valve, located on the steering and gear selector support in the rear of the fuel tank. The flow divider valve supplies a controlled flow of approximately 3-1/2 gallons per minute to the power steering system, irrespective of the pressure requirements. The balance of the pump delivery passes to the transfer block on the right side of the hydraulic lift housing, upon which one or two open-center type auxiliary valves may be mounted for operating remote cylinders. This flow is available at pressures up to that of the relief valve in the transfer block, without affecting the pressure-compensated flow to the power steering system. The return flow of fluid from the transfer block passes into the hydraulic lift housing and through a tube which connects to the pump suction tube in the rear frame to be recirculated through the system.

The power steering system is of the hydrostatic type, linked by fluid, there being no mechanical connection between the steering wheel and front bolster or axle. The system is composed of a safety relief valve in the flow divider valve housing, exposed to the power steering flow, a spool-type directional control valve mounted on top of the flow divider valve, a gerotor-type internal gear pump on the steering wheel shaft, and an actuating means at the front bolster or axle. Farmall 656 Tractors have a hydraulic cylinder built into the upper bolster, which has a piston with rack teeth on one side that engage with the pinion teeth on the upper bolster pivot shaft. International 656 Tractors have a two-way balanced hydraulic cylinder mounted on the center arm of the front axle linkage.

The return flow from the power steering system to the reservoir passes through the hydraulic lift housing and through a tube along the top of the final drive compartment over the bevel gear. Outlets in the tube provide lubrication of the bull pinion shaft bearings and the differential assembly.

On **gear drive** tractors an oil cooler bypass relief valve on the clutch housing cover is connected to the line leading to the oil cooler (in front of the radiator) to bypass the cooler when the oil is cold.

Turning the steering wheel delivers fluid to move the spool valve against its centering spring. This then directs the delivery of fluid from the flow divider to the inlet side of the steering wheel pump, passing through the pump and the spool valve to the front bolster or axle cylinder. This in turn supplies the required steering effort according to the rate of steering wheel turn. The only manual effort required is that necessary to overcome the spool valve centering spring.

Manual steering is accomplished in the same manner when the engine is not running, except that there is no power assist. By rotating the steering wheel pump, fluid is delivered through the spool valve to the front bolster or axle cylinder. Check valves provide for the return of fluid from the cylinder to the steering wheel pump, instead of to the reservoir, to complete the circuit.

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AIR CLEANING SYSTEM

DRY-TYPE AIR CLEANER - Continued

Washing - Continued

3. Lay the element on its side and allow it to air dry before re-installing. Overnight drying is usually sufficient. When drying the element, protect it from dirt and/or freezing.

Note: If a replacement element is not available, the wet element, after excess water has been shaken out, may be installed in the air cleaner and the engine operated at fast idle for 10 minutes before operating the tractor.

Inspection After Cleaning

1. Inspect the filter element for leaks or damage by placing a bright light inside the element. Be careful not to damage the element with the heat from the light bulb. Inspection of the element on the outside will disclose any holes where concentrated light shines through. The slightest rupture requires replacement of the filter element.

2. Inspect the contact surfaces of the element and the air cleaner body. If faulty or damaged gaskets or surfaces are noted, correct these conditions immediately.

3. Using a damp cloth, remove any dirt found inside the air cleaner body before reinstalling the element.

4. After the element has been installed, but before resuming operation, inspect and tighten all air cleaner and air induction system connections.

Replacing the Filter Element

The wing bolt, used to hold the element in place, has a rubber gasket bonded to a steel washer to seal the wing bolt on the outer end of the element. Inspect the rubber gasket and if damaged replace the washer with a complete new washer and gasket before installing the element.

Install the open end of the element into the air cleaner body. Tighten the wing bolt so the element is air tight.

Replace the body cover. Tighten the cover nut, but do not over tighten.

Automatic Dust Unloader

After every 100 hours of operation squeeze or remove the dust unloader (**Illust. 68A**) to be sure the end is open, and check for obstruction.

Note: The tractor should never be operated for an extended period of time without the dust unloader in place as this severely reduces the service interval of the air cleaner.

Note: When replacing the dust unloader on the air cleaner, be sure the flat side of the hose is in line and not broadside to the fan blast so the normal functioning of the dust unloader is not affected. **See Illust. 68A.**

General Precautions

As a precaution against dirt entering the engine, all joints between the air cleaner and the carburetor (gasoline engine) or the intake manifold (diesel engine) and between the manifold and the cylinder head of the engine must be tight. All the gaskets must be in good condition, and the bolts must be drawn up tight.

CRANKCASE BREATHER

Gasoline and LP Gas Engines

The crankcase breather pipe on the left side of the engine has a crimped aluminum filter element in it. The element must be cleaned after every 500 hours of operation. To clean it, remove the breather pipe and remove the element from the pipe. Wash it in kerosene or other solvent and reinstall it. **See Illust. 72A.**

Diesel Engine

The crankcase breather pipe is on the left side of the engine. The two breather filter elements are inside the push rod cover in the breather baffle at the breather pipe opening. Remove and clean the element at the time of a major overhaul.

ELECTRICAL SYSTEM

Farmall and International 656 Gasoline and LP Gas Engine Tractors

The electrical system of the gasoline and LP Gas tractors is a twelve-volt system and consists of an alternator-generator (or generator if so equipped) voltage regulator, cranking motor, lights, lighting switch, twelve volt battery, and a distributor and coil.

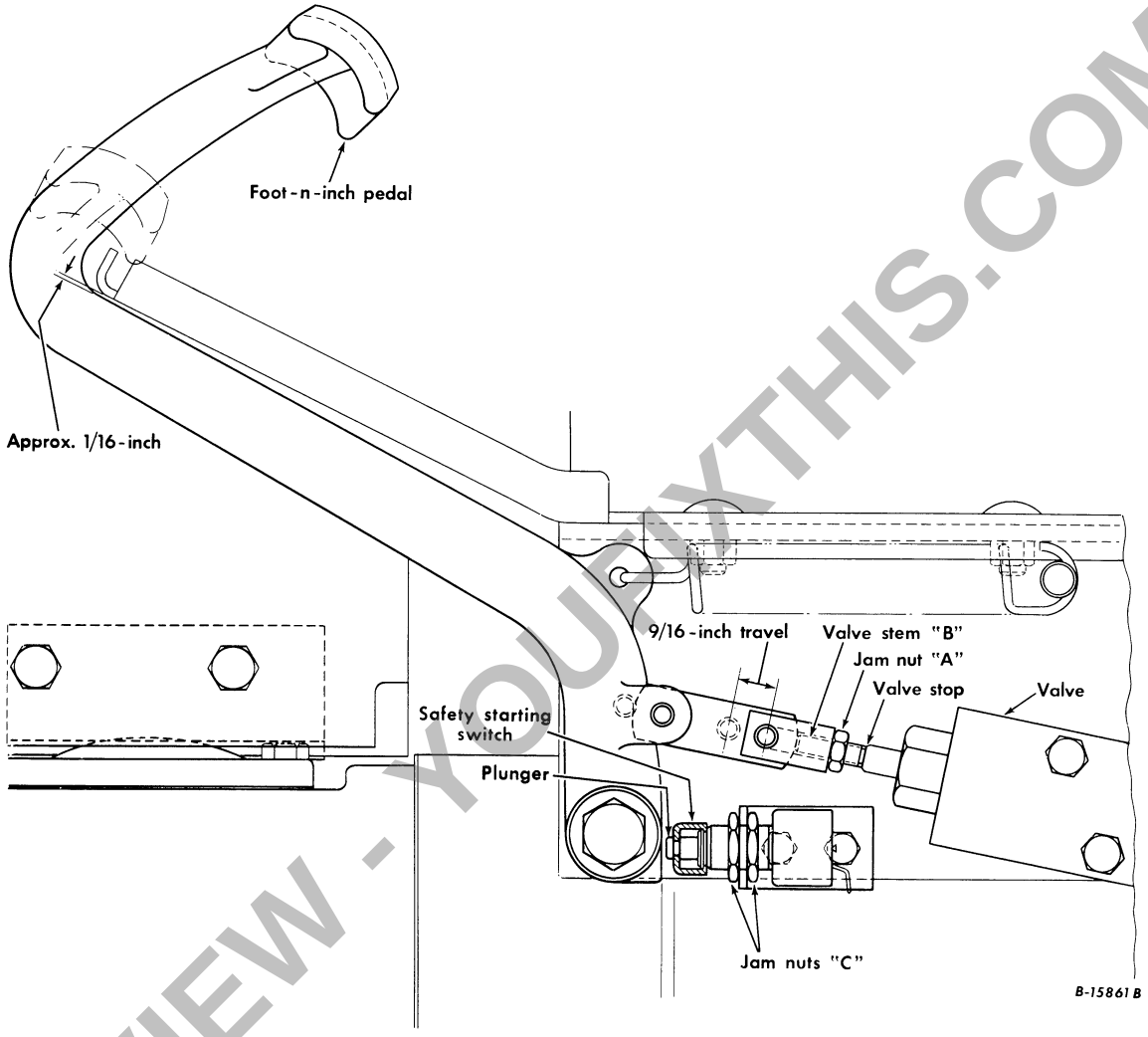
Use the illustrations and wiring diagrams on the following pages as a guide for identifying the various electrical units and for tracing the electrical cables and connections. Be sure all terminals are clean and securely fastened.

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HYDROSTATIC CONTROLS

Farmall 656 Tractors (Hydrostatic drive with forward and reverse speed ratio control and foot-n-inch pedal)

ADJUSTING THE FOOT-N-INCH PEDAL LINKAGE (Hydrostatic drive)



Illust. 132
Foot-n-inch pedal linkage adjustment.

To adjust the foot-n-inch pedal linkage (Illust. 132) follow these instructions:

1. Hold pedal in the "up" position so that a gap of approximately 1/16-inch is maintained between the pedal and the platform. Place a 1/16-inch spacer in gap.

2. Adjust the jam nut "A" and valve stem "B" until the stem is held against the valve stop. Then remove 1/16-inch spacer.

3. Depress the pedal all the way down. Valve stem "B" should be pulled through a minimum horizontal distance of 9/16-inch.

4. Adjust the safety starting switch by rotating the two jam nuts "C" so that the switch is in the "ON" position only when the Foot-n-inch pedal is within 1-inch of the full down position.

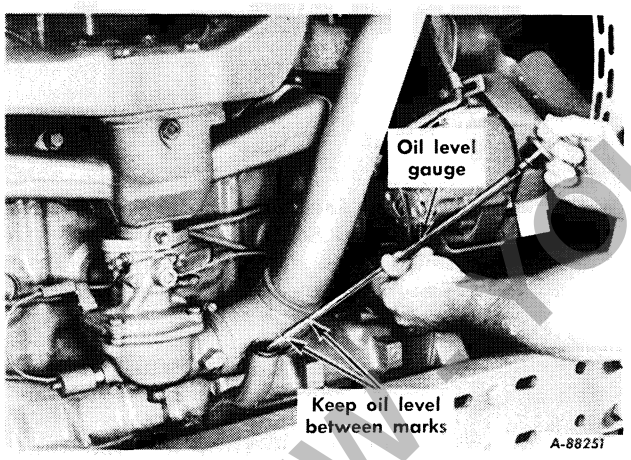
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The engine has a pressure-feed lubrication system. A gear-type oil pump circulates the lubricating oil under pressure to the crankshaft bearings, connecting rod bearings, camshaft bearings, valve mechanism, and timing gears, thereby assuring positive lubrication of all parts.

The engine oil pressure Tellite indicates whether lubricating oil is circulating through the engine.

The engine is equipped with an oil filter which continually cleans the oil while the engine is running. To obtain the full benefit from the filter replace the used element with a new one every second time the oil in the crankcase is changed (after every 200 hours of operation). Cleaning the old element is not satisfactory.

The engine has a combination oil filter cap and flexible-type oil level gauge on the right side of the engine.



Illust. 145
Oil Level Gauge.

Note: Stop the engine before removing the cap. Never check the oil level while the engine is running.

To check the oil level, remove the cap with the level gauge from the oil filler tube by turning the crosspiece counterclockwise to loosen it and then pulling out the gauge. The oil level should never be above the "FULL" mark nor below the "LOW" mark on the gauge.

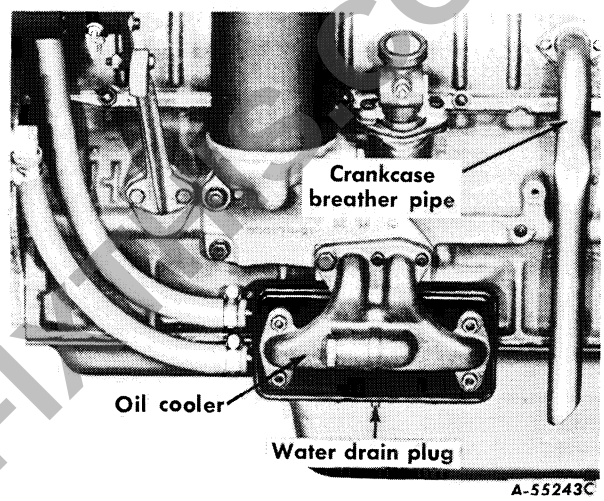
When checking the oil level, the gauge must be withdrawn and wiped clean, then inserted all the way and withdrawn for a true reading.

OIL PUMP

A screen is attached to the oil intake of the gear-type oil pump in the crankcase. It stops large dirt particles from entering the lubricating system. This screen should be cleaned whenever the oil pan is removed.

ENGINE OIL COOLER (Diesel Engine)

The oil cooler, mounted on the left side of the crankcase and connected to the cooling system, reduces the temperature of the engine oil under high temperature operating conditions, and promotes rapid warm-up of the engine oil in cold weather operation, thus reducing engine wear, lenghtening bearing life, and retarding the formation of sludge. **See Illust. 145A.**



Illust. 145A
Engine Oil Cooler (Diesel engine).

ENGINE OIL

Types of engine oil marketed have been classified by the American Petroleum Institute (API) as "For Service ML", MM, MS, DG, DM and DS.

New API Service Classifications for engine oils under new code are designated SA, SB, SC, SD, SE, CA, CB, CC and CD. In this code, prefix "S" denotes oils available in service stations. Prefix "C" denotes oils available for commercial users, contractors, farmers, etc. The second letter indicates quality of oil, "A" being lowest and "E" highest.

Gasoline Engine

We recommend "I. H. low ash engine oil" for the gasoline engine. This oil is specifically formulated to minimize spark plug fouling and exhaust valve failures, and provides maximum engine life.

If other than "I. H. low ash engine oil" is used, it must be designated "For Service MS" and as a qualified "MIL-L-2104B". In new API code, these oils are usually designated as meeting both SD and CC requirements. For maximum engine life, these oils must contain a minimum of barium, calcium, or magnesium additives and should contain less than 0.5% sulfated ash.

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● - Periodic

24. Dual Front Wheels

Once a year remove, clean, and repack the front wheel bearings with IH 251H EP grease or equivalent #2 multi-purpose lithium grease. **Note:** Front wheel hubs of new tractors are not completely filled with grease. If tractor is operated in rice field or a similar severe wet condition, wheel hub must be completely filled with grease, and daily greasing is essential, when wheel hub has a lubrication fitting.

Hydrostatic Drive Tractors only: Before checking the level of the transmission lubricant, put the range selector and speed ratio controls in "N" neutral position.

Run the engine to operating temperature. Then run the engine for three minutes at 1200 r.p.m. and check the level on the gauge in the top of the transmission case. Keep the lubricant up to the full mark. (Oil level will register 1-1/2 inches higher if the engine is not run prior to checking level).

Note: THE OIL LEVEL IN THE REAR FRAME MUST DROP TO A LOWER LEVEL AFTER THE ENGINE IS STARTED. IF THE LEVEL STAYS ABOVE THE FULL MARK SEE YOUR INTERNATIONAL HARVESTER DEALER.

Gear drive and Hydrostatic drive

Check the level of the lubricant periodically. Use approved lubricant according to the "Lubrication Table".

Keep the lubricant up to the "FULL" mark on the transmission oil level gauge at the top left side of the transmission case.

Note: Change the lubricant in the transmission case at least once a year preferably before freezing weather set in. However, do not drive the tractor more than 1,000 hours without changing the lubricant.

Remove the center drain plug (26) and drain plug (27) and hydraulic housing drain plug (28) and allow all the lubricant to drain out. Replace the drain plugs and remove the platform dust cover located above the transmission oil filler opening and remove the transmission oil level gauge (25). Refill with IH Hy-Tran® fluid up to the "FULL" mark in the gauge. Start the tractor engine and operate it at a moderate idle speed. Move the steering wheel first to one extreme, then to the other, and then back to center.

Then set the "Position Control Lever" and "Auxiliary Valve Levers" all the way forward.

Stop the engine and refill with IH Hy-Tran fluid up to the "FULL" mark on the transmission oil level gauge and replace the gauge.

Note: If any of the hydraulic units are removed and replaced for any reason, add IH Hy-Tran fluid to the transmission and hydraulic system to bring it up to the "FULL" mark on the transmission oil level gauge. Then start the engine and operate at a moderate idle speed to actuate the hydraulic system as described above.

Stop the engine and check the lubricant capacity on the transmission oil level gauge. Add IH Hy-Tran fluid, if necessary, to the "FULL" mark and replace the gauge.

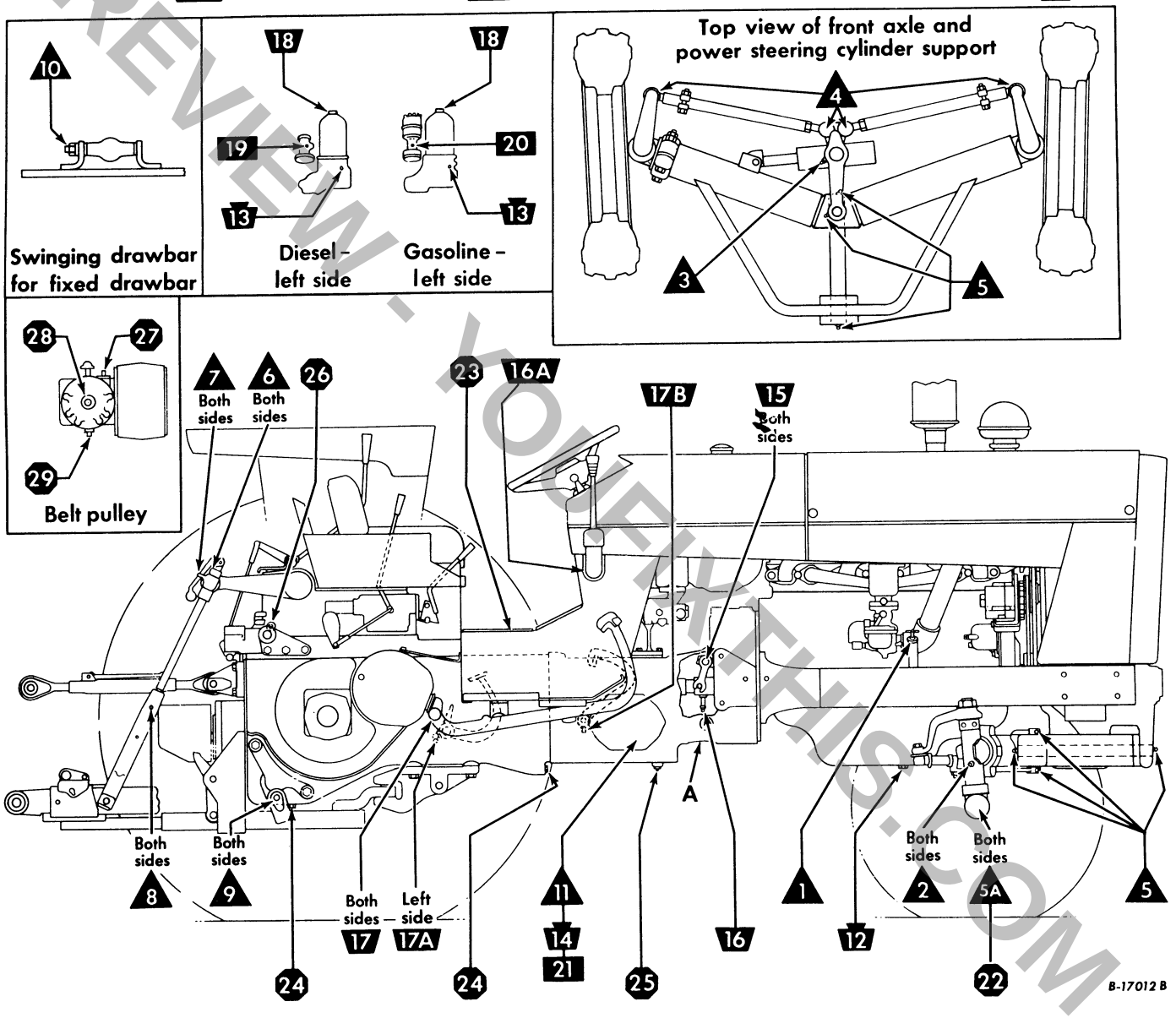
Transmission and Hydraulic System

25. Oil filler and bayonet-type gauge.
26. Drain plug. (Rear frame, center plug).
27. Drain plug. (Clutch housing) (Gear drive)
27. Drain plug. (Drive housing) (Hydrostatic drive)
28. Hydraulic housing drain plug.

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The symbols around the reference numbers indicate the intervals of lubrication.

▲ - 10 hours, ⬟ - 100 hours, ⏢ - 200 hours, ▬ - 250 hours, ⬢ - Periodic



Illust. 157 — Right side view of tractor.

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SPECIFICATIONS

GROUND SPEEDS
HYDROSTATIC DRIVE TRACTORS WITH FORWARD AND REVERSE SPEED RATIO CONTROL AND FOOT-N-INCH PEDAL

ENGINE OPERATING AT RATED SPEED OF 2300 R.P.M. NO ALLOWANCE FOR TIRE SLIPPAGE. MAXIMUM SPEEDS CAN VARY DUE TO ENGINE LOAD AND TIRE SIZE. See "Note" below.

		Farmall 656 and International 656 Row-Crop Tractors	International 656 Tractors
		15.5-38 R-1 Tire	16.9-30 R-1 Tire
Range		Miles per hour	
Lo-Range	Forward	0 to 7-1/2	0 to 7
	Reverse	0 to 3-1/2	0 to 3
Hi-Range	Forward	0 to 20	0 to 18
	Reverse	0 to 9	0 to 8

Note:

The speedometer is calibrated to the basic 15.5-38, R-1 tire and the optional 13.6-38, R-1 tire. For other tire sizes correct the speedometer reading as follows:

For 16.9-34, R-1 tire deduct 2% from the reading.
For 14.9-38, R-1 or 18.4-34, R-1 tires add 3% to the reading.
For 14.9-38, R-2, 15.5-38, R-2, or 18.4-34, R-2 tires add 6% to the reading.

GROUND SPEEDS
HYDROSTATIC DRIVE TRACTORS WITH FORWARD AND REVERSE PEDALS AND DUMP VALVE PEDAL

ENGINE OPERATING AT RATED SPEED OF 2300 R.P.M. NO ALLOWANCE FOR TIRE SLIPPAGE. MAXIMUM SPEEDS CAN VARY DUE TO ENGINE LOAD AND TIRE SIZE.

		16.9-30 R-1 Tire
Range		Miles per hour
Lo-Range	Forward	0 to 7
	Reverse	0 to 7
Hi-Range	Forward	0 to 19
	Reverse	0 to 19

CAPACITIES (U.S. Measure - Approximate)	Gasoline and LP Gas Engines	Diesel Engines
Belt pulley housing	2 qt.	2 qt.
Cooling system — Gasoline	20-1/2 qt. (Farmall) 19 qt. (International)	21-1/2 qt. (Farmall) 19-1/2 qt. (International)
Cooling system — LP Gas	21 qt.	
Fuel Tank — Gasoline	33 gal. (Farmall) 23 gal. (International)	33 gal. (Farmall) 23 gal. (International)
Fuel Tank — LP Gas	* 39 gal.	
Crankcase pan (with filter change)	9 qt.	9 qt.
Gear drive and differential case	Approx. 16 gal.	Approx. 16 gal.
Hydrostatic drive housing and differential case	Approx. 20 gal.	Approx. 20 gal.

* At 80 percent outage level.

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