Models 100,130,140,200,230, 240,404,2404, B-275,

B-414, 354,364,384,424,444, 2424,2444,330,340,504,2504

International Harvester

Service Manual

IH-201

CASE IH AGRICULTURE

MidWestTech | International Harvester 100, 130, 140, 200, 230, 240, 404, 2404, B-275, B-414, 354, 364, 384, 424, 444, 2424, 2444, 330, 340, 504, 2504 Tractor Service Manual | Publication IH-201

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SHOP MANUAL

INTERNATIONAL HARVESTER

SERIES 330-340-504-2504

Engine serial number is stamped on left side of engine crankcase. Engine serial number will be preceeded by engine model number. Suffix letters to engine serial number are as follows:

U. High Altitude Engine

V. Exhaust Valve Rotators

Tractor serial number is stamped on name plate attached to right side of clutch housing. Suffix letters to tractor serial numbers indicate following attachments:

J. Rockford Clutch

P. Independent PTO Drive

R. "Torque Amplifier" With Provision for Transmission Driven PTO

S. "Torque Amplifier" With Provision for Independent PTO

T. Cotton Picker Mounting Attachment (Low Drum)

U. High-Altitude

V. Exhaust Valve Rotators

W. Forward and Reverse Drive

X. High Speed Low and Reverse

Y. Hydraulic Power Supply (12 gpm pump)

Z. Hydraulic Power Supply (17 gpm pump)

FF. Hydraulic Power Supply (4.5 gpm pump)

GG. Hydraulic Power Supply (7.0 gpm pump)

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CONDENSED SERVICE DATA

	Series 230-240 Non-Diesel	Series 240 Diesel	Series 504, 2504 Non-Diesel	Series 504, 2504 Diesel
GENERAL				
Engine Make	Own	Own	Own	Own
Engine Model	C-135	D-166	C-153	D-188
Number of Cylinders	4	4	4	4
Bore—Inches	3 7/8	3 7/8	3 7/8	3 7/8
Stroke—Inches	4 1/2	3 7/8	4 1/4	4 1/4
Displacement—Cubic Inches	135	166	153	188
Pistons Removed From	Above	Above	Above	Above
Main Bearings, Number of	3	3	3	3
Cylinder Sleeves	Wet	Dry	None	Dry
Forward Speeds, With T. A.	10	10	10	10
Forward Speeds, Without T. A.	5	5	5	5
Generator and Starter Make	Delco-Remy			
TUNE-UP				
Firing Order	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2
Valve Tappet Gap (Hot)	*	0.027	*	0.027
Inlet and Exhaust Valve Seat Angle (Degrees)	45	45	45	45
Ignition Distributor Make	IH	.....	IH	.....
Ignition Distributor Symbol	See Paragraph 130			
Breaker Gap	0.020	.....	0.020	.....
Timing, Retard	TDC	.....	TDC	.....
Distributor Timing, Advanced	30° BTDC	.....	(2)	.....
Magneto Timing, Advanced	35° BTDC	.....	.....	.....
Timing Mark Location	Crankshaft Pulley			
Spark Plug Electrode Gap	0.025	....	0.020, 0.033 LP	....
Battery Terminal Grounded	Pos.	Neg.	Neg.	Neg.
Engine Low Idle rpm	425	650	425	700-750
Engine High Idle rpm, No Load	2250	2150	2500	2400
Engine Rated rpm	2000	2000	2200	2200
SIZES—CAPACITIES—CLEARANCES				
(Clearances in thousandths)				
Camshaft Journal Diameter, No. 1	1.8115	2.1095	1.8115	2.1095
Camshaft Journal Diameter, No. 2	1.5775	2.0895	1.5775	2.0895
Camshaft Journal Diameter, No. 3	1.1995	2.0695	1.1995	2.0695
Camshaft Diametral Clearance	.3-3.4	.3-3	.3-3.4	.3-3
Camshaft End Play	3-12	2-10	3-12	2-10
Crankpin Diameter	(1)	2.3735	2.0595	2.3735
Rod Bearing Diametral Clearance	(2)	.9-3.4	(2)	.9-3.4
Crankshaft Main Journal Diameter	(4)	2.7485	(4)	2.7485
Main Bearing Diametral Clearance	.9-3.9	1.2-4.2	.9-3.9	1.2-4.2
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Piston Skirt Diametral Clearance	2.1-1.9	4-5.6	1-2	4-5.6
Piston Pin Diameter	0.859	1.1248	0.859	1.1248
Valve Stem Diameter	0.341	0.372	0.341	0.372
Cooling System Capacity, Qts.	14(330) 15(340)	15½	15	19.6 .....
Crankcase Oil, Qts.	6(330) 5(340)	7	5	7 .....
Transmission and Differential, Gals.	7(330) 10(340)	10	12	12 .....
PTO Rear Unit, Qts.—Planetary Type	2	2	.....	.....
Clutch Type	½	½	2	2
TIGHTENING TORQUES—Ft.-Lbs.				
Cylinder Head Bolts	80-90	110-120	70-75	110-120
Connecting Rod Nuts	42-49	.....	.....	.....
Connecting Rod Bolts	40-45	40-50	40-45	40-50
Main Bearing Bolts	75-80	75-85	75-80	75-85
Camshaft Nut (Diesel)	.....	110-120	.....	110-120
Injection Nozzle Hold Down Screws	.....	20-25	.....	20-25
Injection Nozzle Fitting	.....	45-50	.....	45-50

(1) 1.808-1.810 for C-135 engines below engine serial number 100501; 2.059-2.060 for C-135 engines serial number 100501 and up. (2) 22 degrees for gasoline engines prior to engine number 4404, 20 degrees for gasoline engines 4404 and up, 25 degrees for LP-Gas engines. (3) 0.0009-0.0034 for C-135 engines prior engine number 100501, 0.0009-0.0039 for C-135 engines 100501 and up and all C-153 engines. (4) 2.244-2.245 for C-135 engines prior to engine number 100501, 2.6235-2.6245 for C-135 engines number 100501 and up and all C-153 engines. *See paragraph 50. **See paragraph 66.

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valve lever when valve is held firmly shut as shown in Fig. IH1351E. If dimension (X) which can be measured with Ensign gage No. 8276, or with a depth rule, is more or less than ½-inch, bend the lever until this setting is obtained. A boss or post (T—Fig. IH1351F) is machined and marked with an arrow to assist in setting the lever. Be sure to center the lever on the arrow before tightening the screws holding the valve block. The top of the lever should be flush with the top of the boss or post (T).



Fig. IH1351E — Using Ensign gage No. 8276 to measure dimension (X) on model "W" regulator. Dimension (X) is shown in Fig. IH1351C.

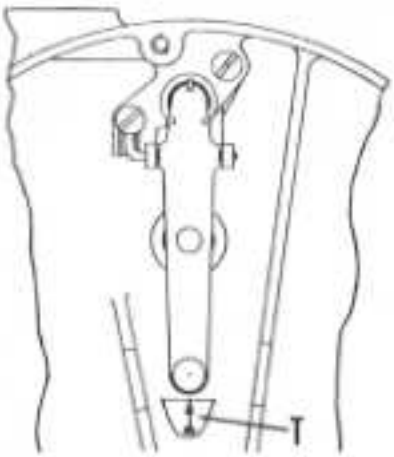


Fig. IH1351F—Top of low pressure lever should be flush with top of post and centered with arrow. Bend lever, if necessary.

LP-GAS FILTER

Series 504-2504

119G. Filters (Fig. IH1351G) used on these systems are designed for a working pressure of 375 psi and should be able to stand this pressure without leakage. Filter element should be renewed when indications are that element is plugged sufficiently to prevent proper fuel flow. A clogged element causes a pressure drop and results in vaporization of the fuel which may cause regulator freezing and subsequent fuel starvation of the engine. When major engine work is being performed it is advisable to remove the lower part of the filter, thoroughly clean the interior and renew the treated paper cartridge if same is not in good condition.



Fig. IH1351G — Exploded view of Ensign LP-Gas filter.

1. Stud nut
2. Gasket
3. Bowl
4. Gasket
5. Element
6. Stud
7. Cover
8. Magnetic ring

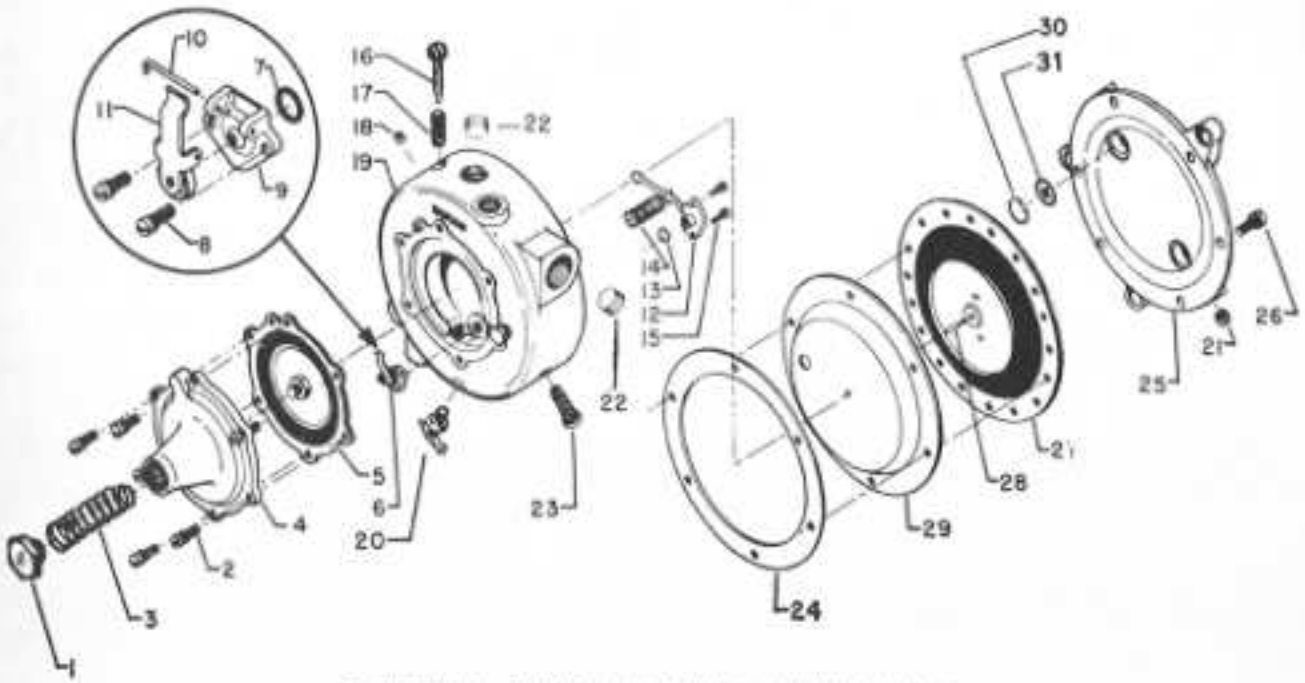


Fig. IH1351D — Exploded view of Ensign model "W" regulator.

1. Spring retainer
2. Pressure spring
4. Cover
5. Diaphragm
6. High pressure valve
7. "O" ring
8. High pressure valve seat
10. Pivot pin
11. Valve lever
12. Low pressure valve
13. "O" ring
14. Low pressure valve spring
16. Idle adjusting screw
17. Spring
18. Bleed screw
19. Body
20. Drain cock
21. Plug
22. Plug
23. Strainer
26. Gasket
25. Back cover plate
27. Diaphragm
28. Push pin
29. Partition plate
30. Retainer ring
31. Compensator assembly

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trol valve handle should automatically return to the neutral position. With the control valve lever held in the raise (or lower) position, to prevent the lever from moving to neutral, the gage should register 1200-1500 psi.

189. If the pressures as checked in the preceding paragraph 188 are correct, the pump and valves are O.K. and any trouble is located in the lines between the control valves and the cylinder or in the cylinder itself.

If the gage pressure is more than specified, a valve is probably stuck in the closed position.

190. If the pressures were too low when checked as in paragraph 188, proceed as follows: Start engine and with same running, carefully shut the valve off and notice the gage reading which should be at least 1500 psi.

NOTE: The pump may be seriously damaged if the shut-off valve is left in the closed position for more than a few seconds.

If the gage reading is above 1500 psi, with the shut-off valve closed, the pump is O. K. and the trouble may be due to maladjusted and/or leaking relief valves.

If the gage reading remains low with the shut-off valve closed and the filter is known to be O. K., observe the oil. If the oil has a milky appearance, an air leak in the suction line can be suspected. On 340 tractors with a transmission driven pump, leakage at the pump intake pipe seal can be corrected by removing the pump and mounting bracket and renewing the pipe and seal (24—Fig. IH1449). If, after a reasonable length of time, the oil is still milky, the transmission should be split (detached) from the clutch housing and seal (S—Fig. IH-1394) should be renewed. On 340 tractors with crankshaft or camshaft driven pumps, air leakage may be caused by a leak in suction line or by a faulty oil seal (S—Fig. IH1394).

On 330 tractors, air leakage may be due to low oil level in the reservoir.

TROUBLE SHOOTING

Series 330-340

191. The following trouble shooting chart lists troubles which may be encountered in the operation and servicing of the hydraulic power lift system and should be used after testing as in paragraphs 187 through 190. The procedure for correcting many of the causes of trouble is obvious. For those remedies which are not so obvious, refer to the appropriate subsequent paragraphs.

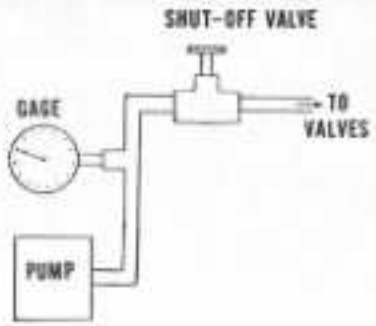


Fig. IH 1448—To check the pump and system operating pressures, connect a gage and a shut-off valve in the pressure line as shown and refer to text.

A. System unable to lift load, gage shows pressure O. K. Could be caused by:
1. System is overloaded
2. Damaged hydraulic cylinder
3. Implement damaged in a manner to restrict free movement
4. Interference restricting movement of cylinder or implement
5. Hose couplings not completely coupled

B. System unable to lift load, gage shows little or no pressure. Could be caused by:
1. Clogged filter (340)
2. Leaking pump suction line
3. Faulty pressure regulator valve
4. Failure of safety valve to close
5. Leakage past cylinder piston seals
6. Pump failure
7. Loss of fluid

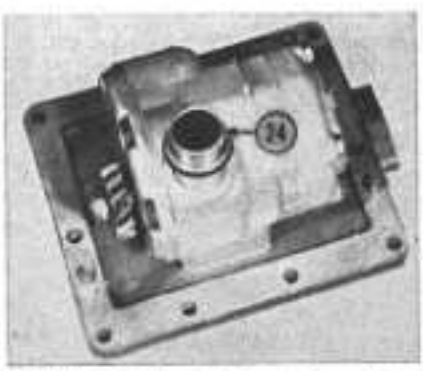


Fig. IH1449—View of Cessna transmission driven hydraulic lift and power steering pumps and mounting flange. The longer smooth section of the suction tube should be pressed in the hydraulic pump until it bottoms. Although Cessna pumps are shown, Thompson pumps are similar.

C. System lifts load slowly, gage shows low pressure. Could be caused by:
1. Clogged filter (340)
2. Leaking pump suction line
3. Faulty pressure regulator valve
4. Failure of safety valve to close
5. Pressure regulator orifice enlarged or loose in block
6. Pump failure

D. With all control valves in neutral, gage shows high pressure. Could be caused by:
1. Pressure regulator piston stuck in its bore
2. Regulator orifice plugged

E. Loss of hydraulic fluid, no external leakage. On tractors with a camshaft driven pump, could be caused by:
1. Failure of the pump drive shaft seal

F. Operating pressure exceeds 1500 psi. Could be caused by:
1. Safety valve piston stuck in its bore
2. Failure of safety valve spring

G. Control valve will not latch in either lift or drop position. Could be caused by:
1. Broken garter spring
2. Orifice in rear unlatching piston plugged
3. Unlatching valve leakage

H. Control valve cannot be readily moved from neutral. Could be caused by:
1. Control valve gang retaining bolts and nuts too tight, causing valves to bind in valve bodies
2. Control valve linkage binding
3. Orifice in rear unlatching piston plugged
4. Scored control valve and body

I. Control valve unlatches before cylinder movement is completed, gage shows pressure O. K. Could be caused by:
1. System is overloaded
2. Damaged hydraulic cylinder
3. Implement damaged in a manner to restrict free movement
4. Interference restricting movement of cylinder or implement
5. Hose couplings not completely coupled

J. Control valve unlatches before cylinder movement is completed, gage shows low pressure. Could be caused by:
1. Weak unlatching valve spring
2. Unlatching valve leakage

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