SHOP MANUAL

CASE/INTERNATIONAL

Models:

7110
7120
7130
7140

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SHOP MANUAL
CASE/INTERNATIONAL

MAGNUM SERIES

MODELS

7110-7120-7130-7140

IDENTIFICATION

Tractor model number and identification serial number are located on a plate on lower left side of instrument panel cover. Engine serial number is located on a plate on left side of timing gear housing. Cab serial number is located on a plate just to the left of inching pedal. Transmission serial number is located on a plate on right front side of speed transmission housing. On models so equipped, front-wheel drive serial number is located on a plate on right rear side of front drive axle housing.

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DUAL DIMENSIONS

This service manual provides specifications in both the U.S. Customary and Metric (SI) system of measurements. The first specification is given in the measuring system used during manufacture, while the second specification (given in parenthesis) is the converted measurement. For instance, a specification of "0.011 inch (0.279 mm)" would indicate that the equipment was manufactured using the U.S. system of measurement and the metric equivalent of 0.011 inch is 0.279 mm.

CONDENSED SERVICE DATA

	Models			
	7110	7120	7130	7140
GENERAL				
Engine Make	Case-International			
Engine Model	6T-830			6TA-830
Cylinders, No. of	6			
Bore	4.488 in. (114 mm)			
Stroke	5.315 in. (135 mm)			
Displacement	505 cu. in. (8.3 L)			
Compression Ratio	17.3:1			16.5:1
Main Bearings, No. of	7			
Cylinder Sleeves	Wet			
Forward Speeds	18 or 24			
TUNE-UP				
Firing Order	1-5-3-6-2-4			
Valve Tappet Gap, Cold—				
Intake	0.012 in. (0.305 mm)			
Exhaust	0.024 in. (0.609 mm)			

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FRONT AXLE (TWO-WHEEL DRIVE)

FRONT WHEEL BEARINGS

All Models

1. Refer to Fig. 1 for typical wheel hub and bearing assembly. The tapered inner and outer roller bearings are not interchangeable. Clean and inspect bearing cups and cones and renew as necessary.

Install dust shield (2) outer flange toward hub and with open section on the bottom. Install oil seal (3) on the spindle (1) so that metal face of seal is toward the hub. Press bearing cups (6) into hub until seated. Pack bearing cones (5 and 8) with No. 2 lithium grease and install bearing cone (5) in hub. Install hub wear ring (4) into hub until outer flange contacts hub. Coat lips of seal (3) with grease and install hub onto spindle. Install outer bearing cone (8), washer (9) and nut (10). Tighten nut to a torque of 15 ft.-lbs. (20 N•m) while rotating hub. Back off nut to first slot where cotter pin can be installed. Install cotter pin and cap (12). Lubricate the assembly through lube fitting (13). Install wheel and tire assembly and tighten lug bolts to a torque of 140-160 ft.-lbs. (190-220 N•m).

SPINDLES

All Models

2. R&R SPINDLES. To remove either spindle, lift and support front of tractor and remove wheel. Disconnect tie rod ball joint (9—Fig. 2) from steering arm (5). Remove cap screw (3) and washer (4). If not marked, install alignment punch marks on steering arm and spindle. Remove steering arm (5) and lower spindle assembly (11) from axle extension (7). Remove thrust bearing (10) from spindle. Inspect spindle bushings (6 and 8) in axle extension and renew as necessary.

If removed, install bushings (6 and 8) into axle extension with open end of oil grooves in bushings toward inside. Install bushings until recessed 0.157 inch (4 mm) below flush with top and bottom. New bushings are presized and should not require reaming if carefully installed.

Install thrust bearing (10) on spindle (11), then install spindle into axle extension. Align punch marks and install steering arm (5) on spindle. Apply Loctite 262 on threads of cap screw (3), then install cap screw and washer (4). Connect tie rod end to steering arm and tighten nut (1) to a torque of 100 ft.-lbs. (136 N•m). Secure with cotter pin (2). Install wheel and tire assembly and tighten lug bolts to a torque of 140-160 ft.-lbs. (190-220 N•m). Lubricate with Case/IH 251EP or equivalent No. 2 multipurpose lithium grease.

TIE RODS AND TOE-IN

All Models

3. Removal and disassembly of the tie rods is obvious after examination of the unit and reference to Fig. 2. Tighten tie rod end slotted nuts to a torque of 100 ft.-lbs. (136 N•m) and install new cotter pins. Tighten clamp bolts to a torque of 40-50 ft.-lbs (55-70 N•m).

Front wheel toe-in must be 0.187-0.312 inch (4.7-7.9 mm). To adjust toe-in, remove clamp bolts from tie rod extension. Loosen jam nut, then rotate extension in or out to obtain correct toe-in. Install clamp bolts and tighten jam nut. Recheck toe-in and readjust if necessary. Both tie rods should be approximately the same length.

AXLE MAIN MEMBER

All Models

4. To remove the axle main member (6—Fig. 3), first raise and support tractor under engine side rails with

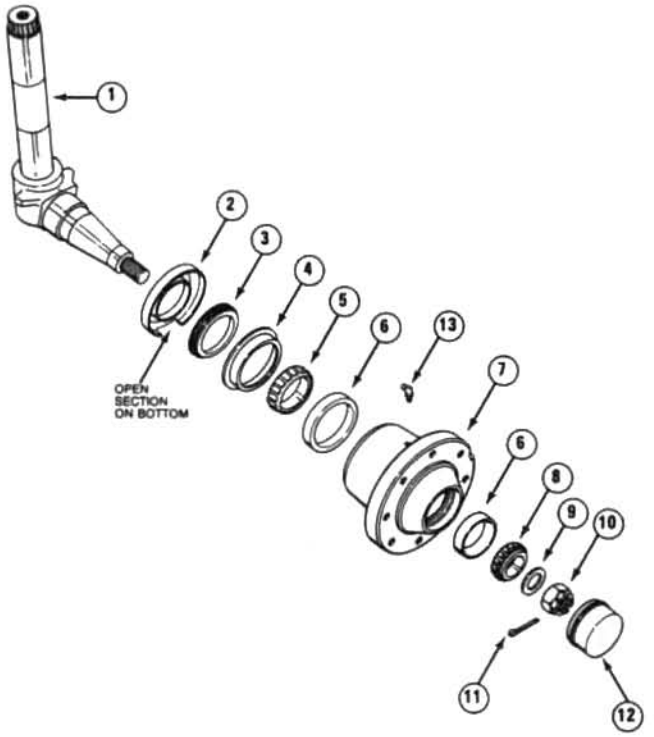


Fig. 1—Exploded view of front wheel hub and bearing assembly used on all two-wheel drive tractors.

1. Spindle
2. Dust shield
3. Oil seal
4. Hub wear ring
5. Bearing cone (inner)
6. Bearing cups
7. Hub
8. Bearing cone (outer)
9. Washer
10. Nut
11. Cotter pin
12. Cap
13. Lube fitting

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F (120° C) and install collar onto axle shaft until firmly against bearing (7).

WARNING: Always wear heat protective gloves when handling heated parts.

Install bushing (20) and oil seal (19) in pivot housing so that lip of seal is toward bushing. Install retaining ring (16), inner oil seal (15) and outer oil seal (18) in outer yoke (17) as shown in Fig. 10. Reassemble double "U" joints and yokes, then install axle assembly (6 through 18—Fig. 9). Apply Loctite 515 to threads of cap screws (9), install cap screws and flat washers and tighten to a torque of 35-45 ft.-lbs. (47-61 N•m). Apply Loctite 515 to lips of cup plugs (5), then install cup plugs and bearing cups (4) in axle housing. Lubricate bearing cones (3) with Case IH 251H EP or equivalent No. 2 multipurpose lithium grease and install bearing cones. Do not install seal rings (2) at this time. Install pivot housing (24) over axle housing (1). Do not install tie rod or steering cylinder. Install lower king pin (25) with 0.015 inch (0.381 mm) thick shim pack (23). Tighten cap screws (26) with washers, alternately and evenly to a torque of 80-90 ft.-lbs. (108-122 N•m). Install upper king pin (22) with 0.015 inch (0.381 mm) thick shim pack (23). Tighten cap screws (21) with washers, alternately and evenly to a torque of 80-90 ft.-lbs. (108-122 N•m). Using a torque wrench on one of the upper king pin cap screws (21), check the amount of torque required to move the pivot housing. The torque must be between 16 and 25 ft.-lbs. (22 and 34 N•m). If necessary, add shims to decrease torque or remove shims to increase torque. Shims are available in thicknesses of 0.005 and 0.010 inch (0.127-0.254 mm). Upper and lower king pins must be shimmed evenly.

Unbolt and remove upper and lower king pins and shim packs. Move pivot housing as required to install new seal rings (2) and to connect steering cylinder and tie rod ends. Apply Loctite anti-seize to king pins, then reinstall king pins with correct shim packs. Tighten cap screws (21 and 26) to a torque of 80-90 ft.-lbs. (108-122 N•m). Tighten slotted nuts on steering cylinder and tie rod ends to a torque of 140 ft.-lbs. (190 N•m) and secure with new cotter pins.

Refer to paragraph 9 for balance of reassembly. Fill axle housing to level plug opening with recommended gear oil. Refer to paragraph 11 for capacity.

DIFFERENTIAL AND BEVEL GEARS

Models So Equipped

11. R&R AND OVERHAUL. To remove the front differential assembly, place transmission lever in PARK position and securely block rear wheels. Remove front drive axle assembly as outlined in paragraph 6, then remove both planetary and hub assemblies as in paragraph 9 and pivot housings and axles as in paragraph 10. Support the differential carrier assembly with a hoist, unbolt carrier from axle housing and remove the assembly. Place unit on a clean bench.

To disassemble the differential assembly, refer to Fig. 11 and remove cap screws (22), washers and locks (23). Remove cap screws (19), washers (20) and bearing caps (21) with adjusting rings (24). Separate bevel ring gear and differential case from carrier. Remove bearing cups (1 and 14). Place match marks across differential case halves (4 and 10). Remove cap screws (12) and adapters (11) and lift off case half (10). Remove cap screws (12) and adapters (11) and lift off case half (10). Remove dished plate (6), dished disc (7), flat plates (8) and flat disc (9). Remove pressure ring (36) and side gear (37), then lift out cross pins (39) and differential pinions (38). Remove side gear (37), pressure ring (36), flat plates (8), flat disc (9), dished disc (7) and dished plate (6) from left case half (4). Remove cap screws (3) and separate bevel ring gear (5) from case half (4). Using a suitable puller, remove bearing cones (2 and 13).

Clean and inspect all parts and renew as necessary. Bevel ring gear (5) and bevel pinion shaft (15) are available only as a matched set. When reassembling, heat bearing cones (2 and 13) in a bearing oven to a temperature of 250° F (120° C) and install on case halves (4 and 10).

WARNING: Always wear heat protective gloves when handling heated parts.

Assemble bevel ring gear (5) to case half (4), then install and tighten retaining cap screws (3) to a torque of 100-120 ft.-lbs. (135-162 N•m). Apply a coat of friction modifier (Case IH part number 990063R2) to all disc and plate friction surfaces. Place case half (4) assembly on a bench with bevel ring gear facing up. Install dished plate (6) with concave side down. Install dished disc (7) with concave side down. Install one flat plate (8), one flat disc (9) and second flat Plate

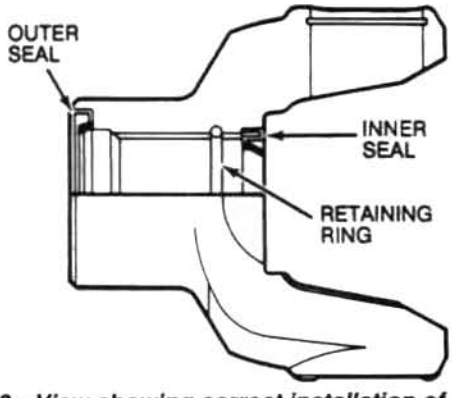


Fig. 10—View showing correct installation of retaining ring, and inner and outer oil seals in outer yoke (17—Fig. 9).

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201. OPERATING IN POSITION CONTROL. The tractor and implement must be operated in the field to select the correct position of the hitch. Set the position control lever in the transport lockout position. Place all control knobs in maximum setting of 11. Set up/down rocker switch in down position. If the enable or reset indicator light flashes, move position control lever to match the actual hitch position. When lowering the hitch with the control lever, decrease the hitch position drop speed until implement drops at a desirable rate. (An empty hitch may not lower at a setting of 1). Operate tractor and implement in the field. Set the desired implement depth with position control lever. Move the mechanical stop against front side of control lever. Move the rocker switch to up position to temporarily raise the implement without changing any of the hitch position adjustments. Press the down switch to return the implement to its original working position. Adjust load control operation as outlined in paragraph 202.

NOTE: Always place position control lever in hitch lockout position for implement road transport.

202. OPERATING IN LOAD CONTROL. Turn the load control knob counterclockwise to decrease load setting until hitch begins to raise. Move position control lever fully forward. Turn travel control knob counterclockwise to reduce the changes in the working depth with changing loads. A typical operation for a fully mounted implement is a setting of 7 to 10 and a setting of 3 to 5 for a semi-mounted implement. Use the hitch response speed control to adjust the speed at which the electronic hitch will respond to changing soil and load conditions. Slowly turn the control knob counterclockwise to slow the hitch response. If hitch response speed is adjusted too quickly, it will cause rapid changes in implement operating depth and rapidly changing loads on the tractor. If adjusted too slowly, implement may not follow the terrain properly.

ELECTRONIC HITCH DIAGNOSTIC CODES

All Models

203. The electronic hitch diagnostic monitor (Fig. 177) shows the condition of electronic load control system by a diagnostic code. When key switch is turned to ON position, all seven segments of the LED (light emitting diode) display (Fig. 178) are continuously on for 1 to 2 seconds for a display check.

The "O" code indicates the system is normal. System normal means that electrical and electronic parts of the hitch system are functioning correctly. However, this display does not tell if controls are not adjusted correctly or if there is a hydraulic problem.

If the "O" code is displayed and there is poor lever to hitch movement or the hitch stops abruptly or over shoots in relation to the control lever, the hitch position potentiometer (14—Fig. 179) is out of adjustment.

If the "O" code is displayed and the hitch does not raise, lower or enable, the control lever potentiometer (9) and/or hitch position potentiometer (14) are out of adjustment.

If the "O" code is displayed and the hitch will not lower, the load control potentiometer (3) or the drop speed potentiometer (6) is in the fully counterclockwise position.

If the "O" code is displayed and hitch will not raise or lower, or the hitch has erratic movement, control valve spool is sticking or binding

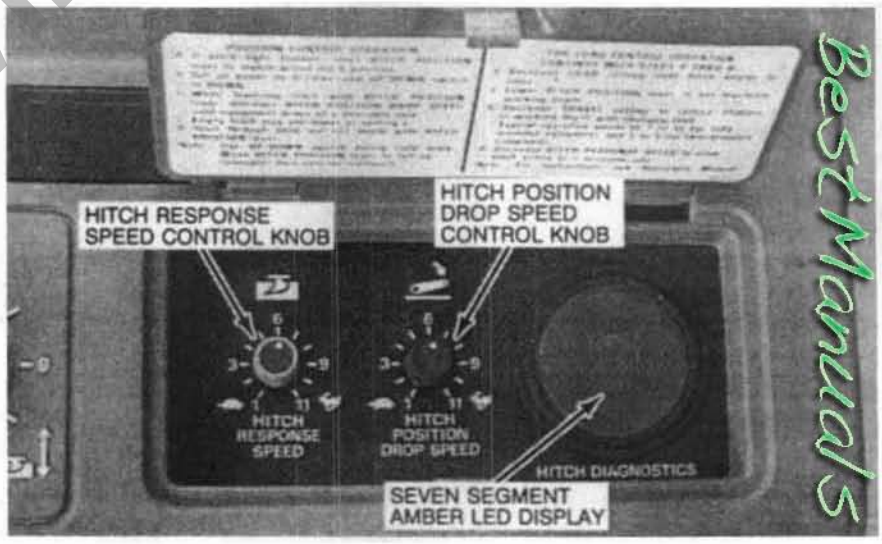


Fig. 177—View showing location of some of the electronic hitch controls on console. Refer also to Fig. 176.

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to CONDENSED SERVICE DATA for reservoir capacity and to HYDRAULIC SYSTEM SECTION for additional hydraulic system information. A suction screen-type filter is located in right side of range transmission housing and an externally mounted pressure screw-on-type filter is located on right side of transmission. See Fig. 14. To clean filter screen (13), first drain transmission housing, then remove plug and drain filter base (12). Unbolt and remove cover (17) with "O" ring (16), screen locator (15) with "O" ring (14) and withdraw screen (13). Clean screen in suitable solvent and blow dry with compressed air.

When reinstalling, install screen with gasket end outward. Lubricate new "O" rings (14 and 16) with petroleum jelly and install with screen locator (15) and cover (17). Install and tighten cover cap screws. Install drain plugs and refill transmission to dip stick "FULL" level.

The manufacturer recommends that transmission and hydraulic fluid be drained and new Hy-Tran Plus fluid be installed each 1000 hours of operation. Suction filter screen should be removed, cleaned and reinstalled each 1000 hours of operation. Filter element (5) should be changed whenever service monitor on digital instrument cluster indicates a clogged filter or at least once each 1000 hours of operation

To change the filter element (5), unbolt and remove filter shield. Using a strap wrench, rotate filter element counterclockwise to remove. Lubricate gasket on new element with clean oil and install element until gasket contacts filter head. Then, hand tighten element an additional one-third turn.

Start engine and check for leaks. Reinstall filter shield and check transmission oil level.

To bleed the steering hydraulic system, operate engine at half throttle and rotate steering wheel from lock to lock several times until steering action is firm.

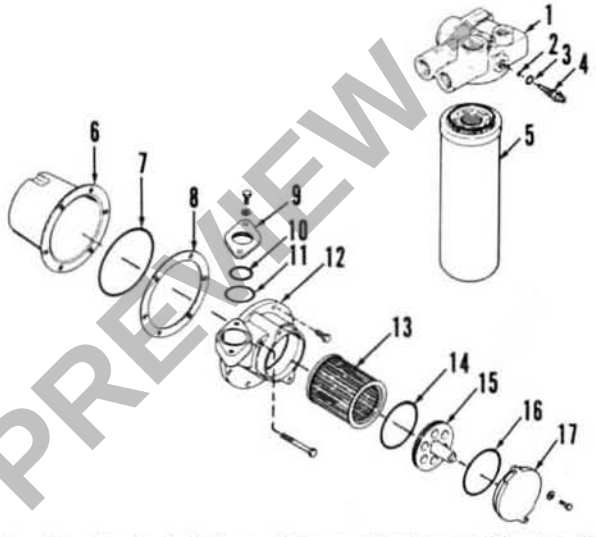


Fig. 14—Exploded view of transmission and hydraulic filters used on all models. Refer to text.

1. Filter head
2. "O" ring
3. "O" ring
4. Pressure switch
5. Filter element
6. Filter container (in housing)
7. "O" ring
8. Gasket
9. Suction tube retainer
10. "O" ring
11. "O" ring retainer
12. Filter base
13. Screen
14. "O" ring
15. Screen locator
16. "O" ring
17. Cover

TROUBLE-SHOOTING

All Models

14. Some of the troubles that may occur in the operation of the power steering system and their possible causes are as follows:

1. No power steering or steers slowly.
- a. Binding mechanical linkage.
- b. Excessive load on front wheels and/or air pressure low in front tires.
- c. Steering cylinder piston seal faulty or cylinder damaged.
- d. Faulty power steering supply pump.
- e. Faulty hand pump.
- f. Faulty priority flow divider valve.

2. Will not steer manually.
- a. Binding mechanical linkage.
- b. Excessive load on front wheels and/or air pressure low in front tires.
- c. Pumping element in hand pump faulty.
- d. Faulty seal in steering cylinder or cylinder damaged.

3. Hard steering through complete cycle.
- a. Low pressure from supply pump.
- b. Internal or external leakage.
- c. Faulty steering cylinder.
- d. Binding mechanical linkage.
- e. Excessive load on front wheels and/or air pressure low in front tires.

4. Momentary hard or lumpy steering.
- a. Air in power steering circuit.

SYSTEM OPERATING PRESSURE

All Models

15. The power steering operating pressure is controlled by a relief valve located in the priority flow divider valve. The priority flow divider valve is located on inner side of remote valves on right side of tractor. Operating pressure should be 2350-2450 psi (16,203-16,892 kPa).

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119. EQUIPMENT WIDTH. Depress the Equipment width button (Fig. 80) to display the width of equipment currently programmed into the instrument cluster. The unit of measurement will be in feet or meters according to the measurement system being used.

The Area/hour and Total area functions will not operate correctly until an implement width has been programmed into the instrument cluster. For the most accurate information, program the effective width of the implement (actual width less overlap). For example, if you are using a 26-foot disk and a 1-foot overlap, the effective implement width is 25 feet.

NOTE: If metric mode has been selected, width measurement must be in meters.

To program Equipment width into the digital instrument cluster, turn the key switch ON, but do not start the engine. The upper display screen will read 0 engine rpm and lower display will read .0 mph. Depress Equipment width button to display equipment width on the lower screen. This reading can be 0.0-149.9 feet (0.0-45.0 meters). Use the Start and Stop buttons to change equipment width. Push Start button to increase or Stop button to decrease the numerical value.

The new Equipment width displayed on the lower screen will be automatically entered in the instrument cluster memory after two seconds. Turn key switch OFF.

120. CALIBRATE BUTTON. Push the Calibrate button to display the ground speed code number on the lower display screen. The Calibration button is also used for programming the instrument cluster. Instructions for using the Calibrate button are included in the appropriate individual programming procedures.

121. CALIBRATE SLIP BUTTON. The Calibrate slip button is used to calibrate the wheel slip bar graph shown on the upper display screen. Tractor must be equipped with a true ground speed sensor in order to calculate and display wheel slip. The instrument cluster compares the transmission magnetic sensor signal with the true ground speed sensor signal. After wheel slip has been calibrated, wheel slip will be indicated anytime the tractor is in operation.

The wheel slip bar graph contains 15 segments. Each segment represents 2 percent slip. The range of the graph is 0 percent slip (all segments OFF) to 30 percent slip (all segments ON). When segments 5, 6, 7 and 8 of the wheel slip display are aligned with the word BEST on the instrument panel decal, it represents an approximate wheel slip range of 9 to 16 percent. See Fig. 82.

NOTE: If wheel slip has never been calibrated, all wheel slip segments will be ON when the true ground speed sensor is operating and the tractor is operating at speeds greater than 1 mph.

To calibrate the wheel slip bar graph for zero slip, start driving the tractor across the field with implement raised in a no-load condition. Drive the tractor at normal working speeds for a minimum of four seconds. Continue driving tractor across the field, then push and hold the Calibrate slip button for a minimum of three seconds. At the end of three seconds, all segments of the wheel slip bar graph will be OFF, indicating zero percent slip. A short audible signal will indicate that the zero slip reference has been entered in the instrument cluster memory and wheel slip calibration is complete.

122. PROGRAM ENGLISH OR METRIC UNITS. The digital instrument cluster can be programmed to display certain readouts in English or metric units of measurement. Optional readouts are Ground speed, Equipment width, Area/hour and Total area. All clusters are preset in English mode. Change to the metric mode as follows: Push and hold the Calibrate button with the key switch OFF. While holding the Calibrate button, turn key switch to accessory position to enter the program mode. The upper display screen will show the permanent tractor model code number that was programmed at the factory. The lower display screen will show MPH or KMPH. Push the Ground speed button alternately until the desired measurement mode is displayed on the lower display screen. MPH indicates English mode and KMPH indicates metric mode.

To enter the selected mode into the instrument cluster memory, push and hold the Calibrate button until the audible alarm sounds (approximately three seconds). The display will automatically return to normal accessory mode and display engine hours on

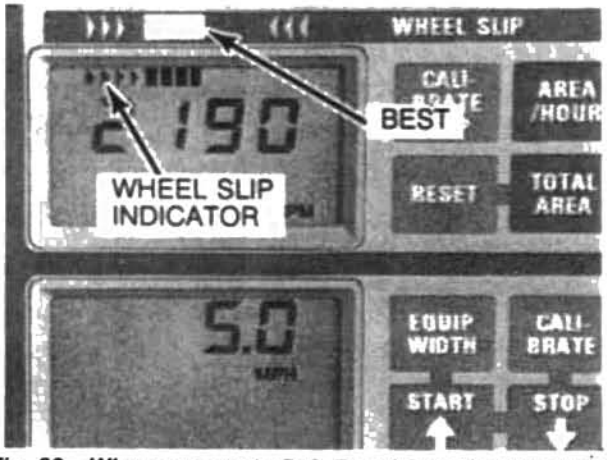


Fig. 82—When segments 5, 6, 7 and 8 on the wheel slip indicator are aligned with the word BEST on the instrument panel decal, wheel slip range is 9 to 16 percent.

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If battery voltage level is too low, the bar graph will display one bar segment (11.7 volts) and the green Systems Normal light will go OFF.

If battery voltage level is too high, the bar graph will display 12 bar segments (15.0 volts) and the following will occur:

1. All 12 bars will flash ON and OFF.
2. The alarm will sound for three seconds.
3. The green Systems Normal light will go OFF.

Battery voltage level should be in the regulated range of 13.7 to 14.5 volts. Refer to paragraphs 83 and 86 to test voltage regulator.

109. EXHAUST TEMPERATURE BAR GRAPH. The sensor device that measures the exhaust temperature is a pyrometer that is screwed into the turbocharger exhaust elbow. The sensor is a voltage generating device. When the temperature increases, the pyrometer generated voltage increases. Because the terminals on the pyrometer are connected to pins 1 and 2, any change in voltage between the pins will cause different segments of exhaust temperature bar graph (4—Fig. 77) to energize.

If exhaust temperature heats to 1250° F (677° C), the pyrometer generates about 28.2 millivolts. See Fig. 79. When 28.2 millivolts is sensed between pins 1 and 2, bar segments 1 through 11 will flash ON and OFF, a three-second alarm will sound and the green Systems Normal light will go OFF. If temperature climbs to 1350° F (732° C), about 30.5 millivolts are generated by the pyrometer and all 12 bar segments flash ON and OFF.

If exhaust temperature bar graph segments 1 to 12 are flashing (indicating hot) and engine is cold, the pyrometer should be checked. Check the voltage between the wires at the pyrometer with engine running. Observe the voltmeter reading and check the bar graph for number of energized segments. Compare with chart in Fig. 79. If readings are not within specifications, renew the pyrometer. If readings are within specifications, renew instrument cluster.

THERMISTOR TEMPERATURE (°F)	APPROXIMATE THERMISTOR RESISTANCE	ENERGIZED SEGMENTS ON BAR GRAPH
240° F	113 ohms	12
230° F	133 ohms	11
223° F	149 ohms	10
216° F	165 ohms	9
209° F	187 ohms	8
203° F	206 ohms	7
196° F	234 ohms	6
189° F	265 ohms	5
183° F	296 ohms	4
175° F	342 ohms	3
140° F	668 ohms	2
99° F	1635 ohms	1

Fig. 78—Chart showing thermistor temperature and resistance and energized segments on coolant temperature bar graph. Refer to text.

110. DIGITAL DISPLAYS. The instrument cluster displays are LCD (liquid crystal diodes) that display the operator's selections and contains several message legends to indicate the selections.

After programming the cluster, the operator can depress a function button and the desired information will be shown on upper or lower digital display. Engine rpm and standard ground speed function buttons (Fig. 80) depend upon sensors for their operation. All other function buttons work strictly through calculations of a microprocessor chip located in the cluster box.

The function buttons are: Engine rpm, Pto rpm, Area/hour, Total area and Ground speed are located as shown in Fig. 80. Program buttons are: Equipment width, Calibrate, Calibrate slip, Start, Stop and Reset.

Refer to the appropriate following paragraphs for information on operation, tests and programming.

111. ENGINE RPM FUNCTION. A magnetic sensor located in the hydraulic pump drive housing is used to monitor engine rpm. The sensor is positioned so that it almost touches the hydraulic pump drive gear. The sensor generates a magnetic field. As the gear rotates, the gear teeth cut through this magnetic field. The sensor puts out one pulse signal for each gear tooth that cuts through the magnetic field. As the gear rotates more quickly, the pulse frequency increases.

TEMPERATURE (°F)	THERMOCOUPLE VOLTAGE	BAR GRAPH ENERGIZED SEGMENTS
1350°	30. 5 millivolts	12
1250°	28.2 millivolts	11
1150°	25.8 millivolts	10
1046°	23.3 millivolts	9
943°	20.9 millivolts	8
839°	18.4 millivolts	7
736°	16.0 millivolts	6
632°	13.6 millivolts	5
529°	11.3 millivolts	4
425°	8.9 millivolts	3
313°	6.4 millivolts	2
200°	3.8 millivolts	1

Fig. 79—Chart showing exhaust temperature, pyrometer voltage and energized segments on bar graph.

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(distance from top of sleeve flange to cylinder block surface). Measure at four (90 degree) intervals. Sleeve standout should be 0.0005-0.004 inch (0.013-0.109 mm). If sleeve standout is not correct, use alternate sleeves to correct the problem. If sleeve standout cannot be corrected, renew cylinder block.

The pistons (4—Fig. 39) should measure 4.4816-4.4822 inches (113.833-113.847 mm) at 0.472 inch (12.0 mm) above bottom of piston and at 90 degrees from piston pin holes. If worn beyond the minimum service limit of 4.479 inches (113.776 mm), renew pistons.

Piston ring specifications are as follows:

Top Compression Ring:
- Ring type ..... Keystone
- End gap ..... 0.016-0.028 in. (0.40-0.70 mm)
- Side clearance ..... Not measurable

Second Compression Ring:
- Ring type ..... Rectangular taper face
- End gap ..... 0.016-0.028 in. (0.40-0.70 mm)
- Side clearance ..... 0.003-0.005 in. (0.070-0.125 mm)

Oil Control Ring:
- Ring type ..... Two piece
- End gap ..... 0.012-0.024 in. (0.30-0.60 mm)
- Side clearance ..... 0.0008-0.0026 in. (0.020-0.065 mm)

Top compression rings and second compression rings are marked "TOP" for correct installation. Oil rings can be installed either side up. Install piston rings on pistons so that ring gaps are 120 degrees apart.

PISTON PINS

All Models

41. The full floating-type piston pins (11—Fig. 39) are retained in piston bosses by retaining rings (5) and are available in standard size only. Outside diameter of new pin is 1.7715-1.7718 inches (44.997-45.003 mm). If pin is worn beyond the minimum service limit of 1.7714 inches (44.993 mm), renew pin.

Pin bushing inside diameter in connecting rod should be 1.7726-1.7730 inches (45.023-45.035 mm). If pin bushing inside diameter exceeds 1.7730 inches (45.035 mm), renew connecting rod as bushing (6) is not serviced separately.

Measure piston pin bore in piston, which should be 1.7719-1.7721 inches (45.006-45.012 mm). If worn beyond the maximum service limit of 1.7726 inches (45.025 mm), renew piston.

CONNECTING RODS AND BEARINGS

All Models

42. Connecting rods are removed as outlined in paragraph 39. Standard crank pin diameter is 2.9916-2.9926 inches (75.987-76.013 mm). Desired

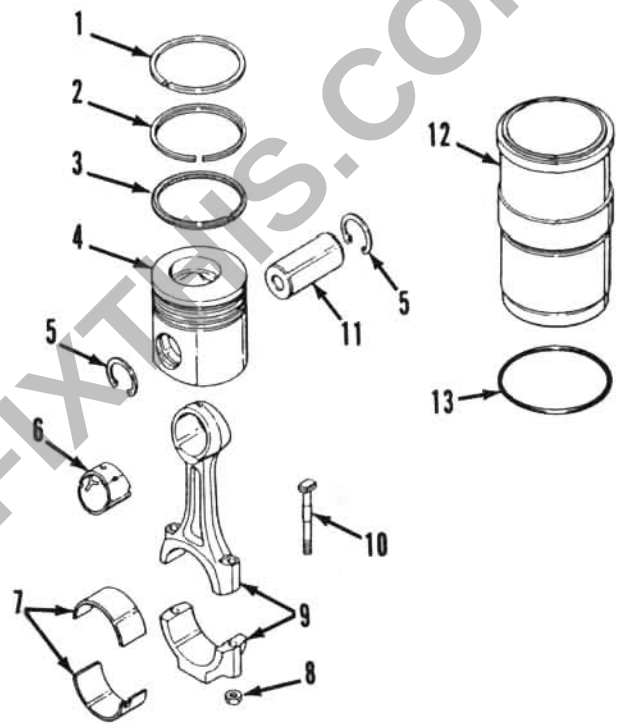


Fig. 39—Exploded view showing piston, connecting rod and sleeve and related parts. Piston pin bushing (6) is not available separately.

1. Top compression ring
2. Second compression ring
3. Oil control ring
4. Piston
5. Retaining rings
6. Pin bushing
7. Connecting rod bearing
8. Nut
9. Connecting rod & cap
10. Rod bolt
11. Piston pin
12. Sleeve
13. "O" ring

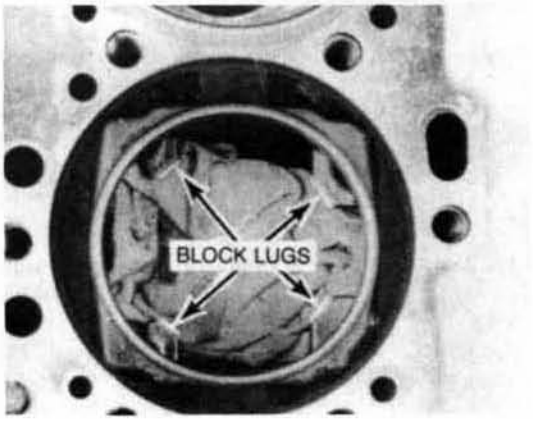


Fig. 40—View of four block lugs at base of cylinder in crankcase.

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sion control lever is used to select a forward or reverse speed. The gear readout is based on engine rpm and ground speed inputs. Four indicators are used to identify the gear, forward, creep and reverse selections.

129. WINDSHIELD WIPER. Normal operation of the windshield wiper is with key switch ON, wiper should operate when wiper switch is moved to LO and HI positions. Move wiper switch to OFF position and wiper should return automatically to PARK position.

If wiper motor does not operate in one or all positions, check cab relay, circuit breaker and fuse. Use a voltmeter and check for voltage at wiper switch terminal for red wire #830. If voltage reading is 12 volts, move wiper switch control to LO position and check for voltage at switch terminal for orange wire #833. Then, move switch control to HI position and check for voltage at switch terminal for orange wire #832. If no voltage is found at red wire #830 terminal, check wiring, ignition switch and fuses. If voltage reaches red wire #830 terminal, but does not reach orange wire #833 or orange wire #832 terminals as switch is operated, renew wiper switch. If voltage is present at each terminal and switch is in proper position, test for voltage in wires as close to wiper motor as possible. If voltage is present at wiring, but motor does not run, renew motor. If no voltage is present, check wiring between switch and motor.

130. CAB FAN MOTOR. Cab fan (blower) motor is used for cab ventilation, heater or air conditioning system fan as models are equipped.

If motor fails to operate with key switch ON and blower switch turned to low, high or purge position, use a voltmeter and check for voltage at terminal for red wire #820 at blower switch. If no voltage is present, check wiring, ignition switch and circuit breaker. Repair as necessary. If voltage is present at red wire #820 terminal, check for voltage at orange wires #822, #823 and #824 terminals at fan switch as blower switch is turned to low, high and purge. If voltage is not present at all locations with blower switch turned to proper position, renew blower switch.

If voltage is present at all terminals, unplug resistor board connector. With key switch ON and blower switch turned to purge position, use a 12 volt test light and check for current at the orange wire #824 of connector. Turn switch to high position and check for current at the orange wire #823 of connector. Turn switch to low position and check for current at the orange wire #822 of connector. If there is no current present at any of the three tests, check for faulty wires between blower switch and resistor board connector. Repair as necessary.

If current is present at all the connector terminals, reconnect the resistor board. If blower will operate in purge position but not in high or low positions, renew resistor board. If blower does not operate in any position, make sure motor ground is good and renew blower motor as required.

131. HEATER AND AIR CONDITIONING. Heater and air conditioner blower motor is the same blower as the cab ventilating blower. Refer to paragraph 130 for test procedures. However, the air conditioning system compressor clutch, high and low pressure switches and temperature control switch may be checked as individual units.

Before attempting to diagnose electrical problems in air conditioning system, make sure compressor belt is tight, that condenser and evaporator cores are clean to ensure maximum air flow and that system is filled with correct amount of refrigerant.

132. COMPRESSOR CLUTCH CIRCUIT TEST. With engine running, set temperature control switch to coldest position and turn blower switch to low or high position. Clutch should engage as blower switch is turned ON. If clutch does not engage, use a voltmeter to check for voltage at compressor clutch. If voltage is present, renew compressor clutch.

If no voltage is present at clutch, disconnect the wires at high-pressure switch and install a jumper wire to bypass the switch. If compressor clutch engages, check system pressure or renew high-pressure switch as necessary. If clutch still fails to engage, disconnect wires from low-pressure switch located in cab roof and install jumper wire to bypass the switch. If clutch engages, check system pressure and refrigerant level or renew low-pressure switch as necessary.

If clutch still fails to engage, use a 12 volt test light and check for current at temperature control switch. If light fails to come on at either terminal and blower motor is working, check the red wire #800 from blower switch to the temperature control switch. Repair as necessary.

POWER SHIFT TRANSMISSION

All tractors are equipped with a full power shift transmission. The full power shift design permits shifting the transmission anytime without using the inching (clutch) pedal. This includes changing speed selections when tractor is moving or stationary, or when changing direction of travel.

A hydraulic actuated multiple disc, wet-type master clutch controlled by the inching pedal is used on

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Load Control, the electronic hitch system adjusts the hitch position to maintain a constant implement load on the tractor in changing soil conditions and varying terrain. With a load increase, the electronic hitch system will lower the hitch. The amount of hitch movement to a particular load change is determined by the hitch travel control and the speed that the hitch raises or lowers is determined by the hitch response speed control.

The amber enable or reset indicator light is located as shown in Fig. 176. After tractor is started, the indicator light will be ON continuously for one to two seconds for a bulb check. If the position control lever and the actual hitch position match, the hitch system is enabled. If not, the amber light flashes ON and OFF. To enable the hitch, move position control lever to match the actual hitch position. When the indicator light stops flashing, hitch system is enabled and hitch will follow the control lever movement.

The position control lever is used to raise and lower implements and to select the working position of the implements. To lift the implement, pull position control lever to the rear. The hitch is fully up when control lever is in transport lockout position. To lower the implement, push control lever forward. The mechanical stop on the console provides an adjustable lever stop which allows control lever to be returned to the same set position.

The transport lockout is built into the control lever slot in console. Pull control lever rearward and into the offset to lock hitch in the raised position to prevent the lowering of an implement during transport.

The up/down rocker switch is a convenience for field work. When the switch is in down position, hitch will lower to the position set by the position control lever at the speed set by the hitch position drop speed control. When the switch is in up position, hitch will raise at maximum speed to the fully raised position.

The hitch position drop speed control varies the lowering speed of the hitch as the control lever is pushed forward to the lower position or the up/down rocker switch is pushed to down position. The position drop speed control is only effective in the position control mode. Rotate control knob clockwise to increase or counterclockwise to decrease lowering speed of hitch. The position drop speed control knob is located under a cover at rear of control console. See Fig. 177.

The load control knob (Fig. 176) sets the depth of the implement to control the load on the tractor. Turning the load control knob clockwise will increase the tractor load and the implement depth. Turning the knob counterclockwise will decrease tractor load and implement depth. At lighter load settings (No. 1 to No. 4), some implements will not lower in load control operation. The tractor must be moving in order for load control to be functional.

The travel control knob varies the range of hitch height corrections in response to load variations. A higher (clockwise) travel control setting results in a closer control of load and a better following of soil contours but larger amounts of hitch movement. Settings in the upper range should be used for fully mounted equipment, especially when operating in terrain that varies significantly (such as crossing terraces). A lower (counterclockwise) travel setting reduces the hitch movement and increases load variations, but limits the amount of hitch movement. Settings in the lower range should be used with semi-mounted implements or flat terrain where the amount of hitch movement can be restricted without affecting performance.

The hitch response control knob (Fig. 177) varies the speed that the hitch raises and lowers in the load control mode only. Turning the knob clockwise, raises or lowers the hitch faster. Turning the knob counterclockwise, raises or lowers the hitch slower. The slower action reduces the sharpness of hitch action. Too slow a speed will limit ability to follow varying terrain.

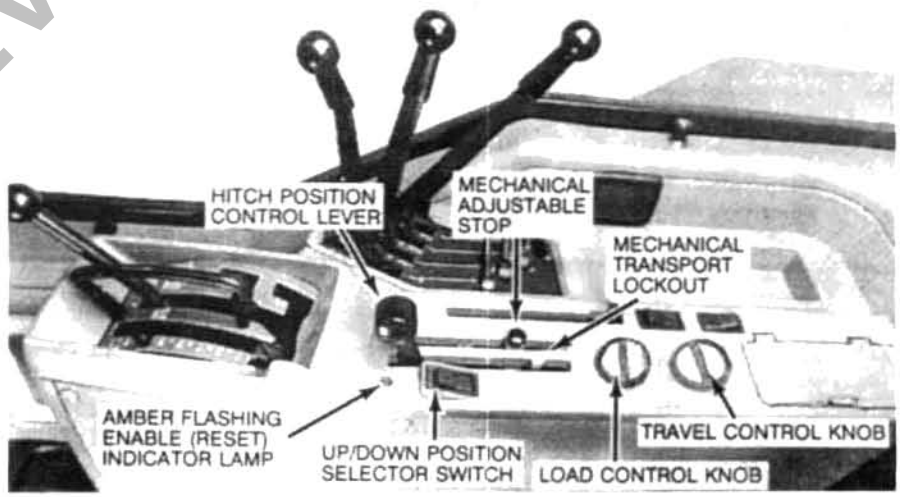


Fig. 176—View showing location of some of the electronic hitch controls on console. Refer also to Fig. 177.

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