BEFORE STARTING THE ENGINE

Before starting your tractor for the first time make the following checks. Also see Lubrication/ Filters/Fluids and Maintenance/Adjustments for regular service schedule.

1. Make sure all persons that operate or do maintenance on the tractor, understand that clean fuel is important.
2. Check all lubrication fittings for grease as given in the Lubrication Chart.
3. Check the oil level in the engine crankcase. Check the fluid level in the transmission and hydraulic reservoir.
4. Check the water level in the batteries.
5. Check that the tractor fuel tank is filled with clean fuel that has the specifications given in this manual.

NOTE: *Clean around the fuel tank cap before you remove the cap.*

6. Check the fuel system, cooling system and engine oil pan for leaks.
7. Check that the alternator and compressor belts are adjusted correctly.
8. Remove any water or sediment from the water trap of the fuel tank.
9. Check the air pressure of the tires.
10. If your tractor has a power takeoff, make sure the safety guard is installed.
11. Check the coolant level in the coolant reservoir. Add water and ethylene glycol coolant as needed.

> **WARNING:** *Before starting the engine, be sure all operating controls are in neutral or park lock position. This will eliminate accidental movement of the machine or start up of power driven equipment.* M106E

Daily Inspection

Do a daily walk around visual inspection of the tractor. Check for such items as hoses or wires rubbing against other components, oil leaks, trash build up, loose bolts or anything that would affect the normal operation of the tractor.

Make any necessary corrections before operating the tractor.

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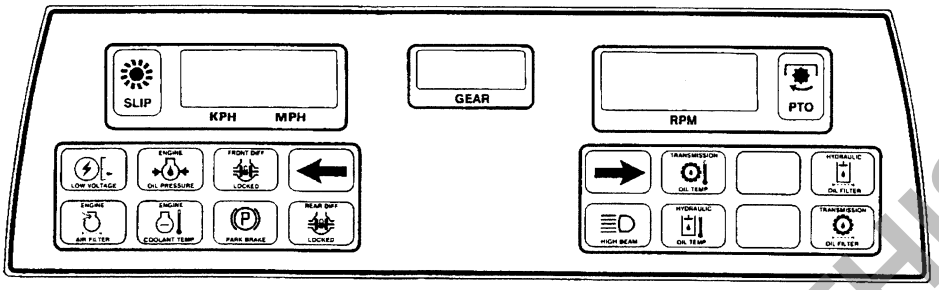
DIGITAL INSTRUMENT CLUSTER



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General Arrangement and Features

The digital instrument cluster (electronic dash) will automatically monitor various operating systems and functions on your tractor. The condition or status of a monitored system will be indicated by readouts on the digital display screens or by indicator lamps. An audible alarm will also sound in conjunction with some indicator lamps or digital displays.

The indicator lamps are located across the lower part of the instrument cluster. The symbols used to identify the various indicators conform to ISO standards. The operation of the individual indicators is described in this section at Indicator Lamps.

There are three digital display screens (liquid crystal display) located across the top of the instrument cluster. Information such as ground speed, wheel slip, gear selection, start-up code, system diagnostic codes, engine RPM and PTO RPM will be displayed in digital format. The operation of each display is described in this section at Digital Display Screens.

Audible Alarm

The digital instrument cluster is equipped with an audible alarm which is activated in conjunction with various system indicator lamps. When activated, the alarm will sound for 2 seconds every 2 minutes or will sound continuously depending on the system being monitored. See Indicator Lamps for more information on alarm operation for specific systems.

Instrument Cluster Calibration

The digital instrument cluster must be calibrated in the tractor in order to provide accurate information. The cluster must be calibrated anytime there has been a change in tire size, transmission controller or true ground speed sensor. See Digital Instrument Cluster Calibration on Page 110 for complete information.

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LUBRICATION/MAINTENANCE CHART

PAGE NO.	Service Schedule 10 Hours or Daily 50 Hours or Weekly 250 Hours or Monthly 1500 Hours or 12 Months 6000 Hours or 2 Years SERVICE POINTS	NO. OF POINTS	FREQUENCY IN HOURS				
			CLEAN	CHANGE	CHECK	GREASE	DRAIN
156	Engine Oil	1			10		
181	Hydraulic Oil	1			10		
178	Transmission Oil	1			10		
146	Center Hinge Top Articulation	1				10	
146	Center Hinge Lower Articulation	1				10	
146	Center Hinge Rear Oscillation	1				10	
146	Articulation Cylinder - Front - LH and RH	2				10	
146	Articulation Cylinder - Rear - LH and RH	2				10	
43	General Tractor Inspection (See Note 1)				10		
167	Engine Coolant Level				10		
160	Water Trap - Fuel Tank and Fuel Filter	1					50
148	Driveshaft Carrier Bearing	1				50	
147	Three Point Upper Cylinder Pin - LH and RH	2				50	
147	Three Point Lower Cylinder Pin - LH and RH	2				50	
147	Three Point Rockshaft - LH and RH	2				50	
147	Three Point Linkage	10				50	
189	Cab Inside (Recirc) Air Filters & Outside Mesh	2	50				
148	Grease Bank Steerable Axle	7				50	
188	Cab Outside Air Filter (See Note 2)	1	250				
185	Differential Oil Front and Rear	2			250		
192	Compressor Belt	1			250		
191	Fan and Alternator Belt	1			250		
204	Battery Level	2			250		
157	Engine Oil	1		250			
157	Engine Oil Filter	1		250			
168	Engine Coolant Filter	1		250			
187	Master Cylinder Brake	1			250		
149	PTO Carrier Bearing	1				250	
184	PTO Drop Box Oil	1			250		
149	PTO Slip Joint Transmission Output	1				250	
190	Radiator and Coolers	3	250				
149	Slip Joint Transmission Output Front	1				250	
149	Slip Joint Transmission Output rear	1				250	
115	Tire Pressure				250		
173	Air Tubing Engine	1			250		
168	Engine Coolant DCA Level				250		

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DIESEL ENGINE

Model
- 9310 ..... Case 6T 8.3
- 9330 ..... Case 6TA 8.3

Type
- 9310 ..... Six Cylinder, Four Stroke Cycle, Turbocharged
- 9330 ..... Six Cylinder, Four Stroke Cycle, Turbocharged Aftercooled

Timing Order 1-5-3-6-2-4
Bore ..... 114 mm
Stroke ..... 135 mm
Cylinder Sleeves ..... Wet Type, Can Be Removed

Governor Speed without Load
- Model 9310 ..... 2250 to 2400 RPM
- Model 9330 ..... 2350 to 2500 RPM

Rated Engine Speed
- Model 9310 ..... 1700 to 2100 RPM
- Model 9330 ..... 1700 to 2200 RPM

Engine Idle Speed (approx) ..... 850 RPM

Engine Lubrication System

Oil Pressure ..... 43 to 54 PSI (296 to 372 kPa) with Engine Warm and Operating at Rated Speed
Type of System ..... Constant Pressure and Spray with Piston Oil Cooling

Fuel System

Fuel Injection Pump
- 9310 ..... Robert Bosch, Type A
- 9330 ..... Robert Bosch, Type MW

Fuel Injectors ..... Robert Bosch, 17 mm
Tank Capacity ..... 115 Gallons (435 Litre)

Air Intake System

Type ..... Dry Type Air Induction System Two Stage Aspirator System with Service Indicator in Instrument Cluster

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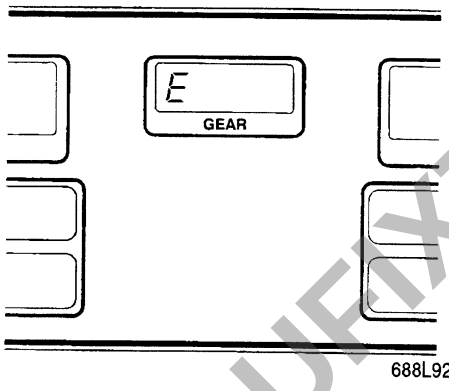
TRACTOR DIAGNOSTIC CODES

The transmission controller monitors the operation of the transmission and certain other tractor systems. When a malfunction is detected in a monitored system, a code will be displayed on the gear LCD display screen on the digital instrument cluster.

The diagnostic code will consist of the letter E and a two digit number. The E and two digit number will flash alternately on the gear display screen as shown in the following examples.



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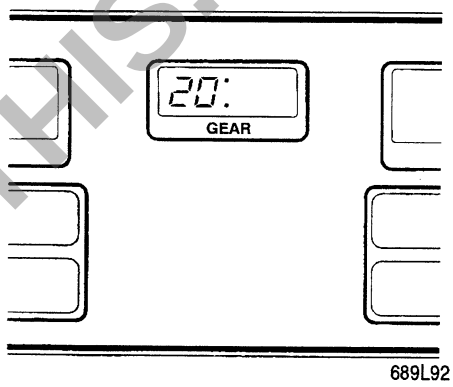

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The diagnostic codes are described as follows:

E10 Indicates low system voltage (less than 9.5 volts). Check battery charge condition (recharge if necessary), check battery cable connections, alternator drive belt or charging system and/or reduce applied system load. When he code is displayed the low voltage warning lamp should be illuminated. If the problem cannot be corrected, contact your dealer.

NOTE: *Alarm will sound for 2 seconds every 2 minutes.*

E20 Transmission shift solenoid "Z" has open circuit. Check transmission control wire harness and/or connector at the transmission end. If the fault cannot be corrected, contact your dealer.

NOTE: *E20 through E28 error codes can also be caused by a faulty circuit breaker.*

E21 Transmission shift solenoid "Y" has open circuit. Check transmission control wire harness and/or connector at the transmission. If the fault cannot be corrected, contact your dealer.

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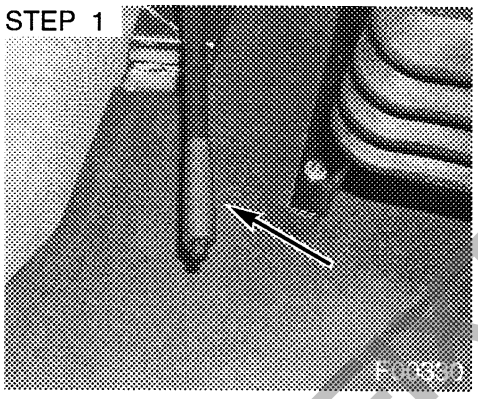
ENGINE STARTING PROCEDURE

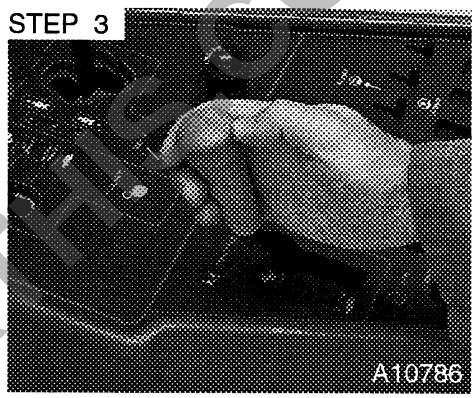
IMPORTANT: *The PTO lever must be in the OFF position for the engine to start. If the starter does not energize, check the PTO lever. Make sure the PTO lever returns to the OFF position anytime the engine is turned off. If adjustment is required, see your dealer.*

STEP 1



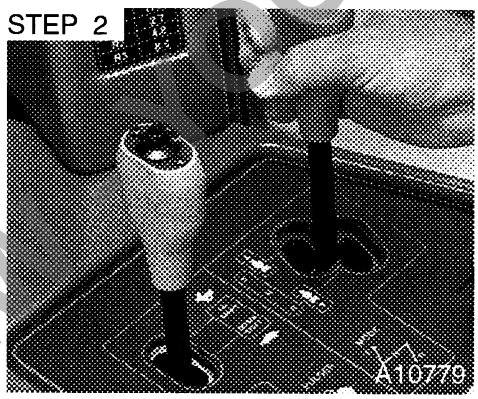
Pull up on the park brake handle to engage the park brake.

STEP 3



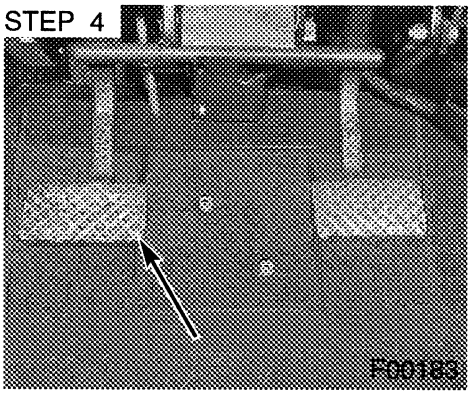
Move the throttle lever forward to 1/4 to 1/2 open position.

STEP 2



Put transmission forward/reverse lever in NEUTRAL position.

STEP 4



Push the inching pedal down completely.

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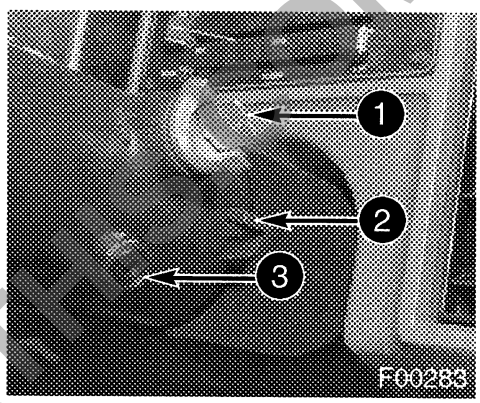
OPERATING CONTROLS

Steering Column



1. KEY SWITCH - Five position switch described as follows:

   LOCK POSITION - Key is in horizontal alignment with the steering column. All switch controlled current is OFF and the steering wheel is locked in position. The key can be removed by pushing the key release lever down.

   ACCESSORY POSITION - Counter clockwise from LOCK position. Use this position to operate the radio, etc. Without engaging the instruments or starting the engine.

   OFF POSITION - First position clockwise from LOCK position. All switch controlled current is OFF and the steering wheel is not locked in position. The key cannot be removed.

   ON POSITION - Second position clockwise from LOCK position. Engine fuel system is energized and all switch controlled current for the electrical system is ON.

   START POSITION - Third position clockwise from LOCK position. Engine starter and fuel system is energized. Switch is spring loaded to return to ON position when released. Ether start switch can be activated.

NOTE: *The ether start-aid system (if equipped) can only be activated when the key switch is in the START position.*

NOTE: *The transmission mode selection lever must be in the NEUTRAL position and the PTO lever must be in the OFF position for the starter to engage.*

2. SWITCH KEY RELEASE LEVER - The key release lever is located below the key switch. Push down on the lever to turn the key to ACCESSORY position or to LOCK position for key removal.

3. HAZARD WARNING LAMP SWITCH - The amber warning lamps at the front and rear of the tractor can be operated independently of the road lamps, if desired. Push the switch inward to turn the lamps ON. Pull the switch outward to turn the lamps OFF.

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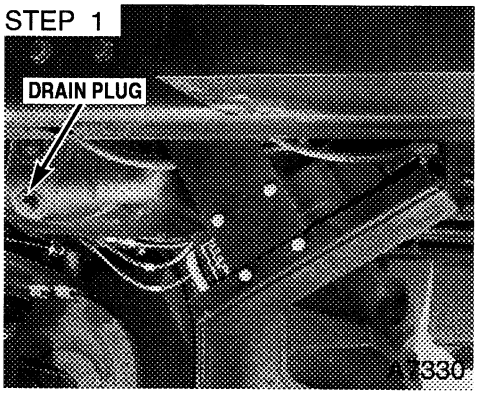
Engine Oil and Filter Change

IMPORTANT: *Change the engine oil and oil filter every 250 hours or once a year which ever occurs first. Your dealer has approved oil and filter. Do not use other types of oil or filter.*

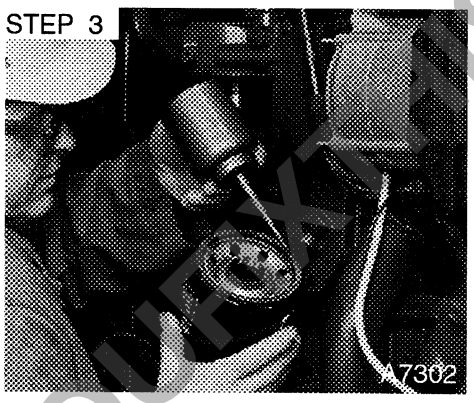
NOTE: *For best results change the oil and filter while the engine is still warm. The tractor must be on a level surface.*

STEP 1



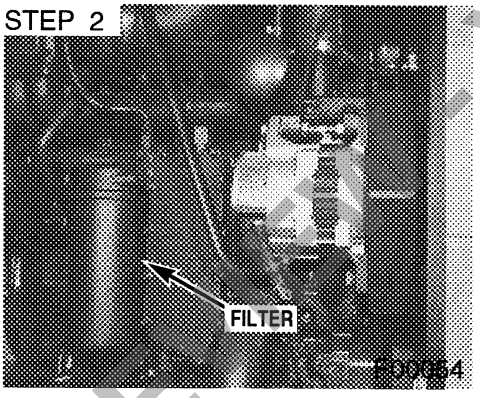
Remove the drain plug.

STEP 3



Lubricate the filter gasket with clean oil.

STEP 2



Remove and discard the filter.

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POWER TRAIN

Transmission

Type	12 Speed Full Power Shift, 12 Forward and 3 Reverse Speeds, Hydraulically Operated, Electronically Controlled
Shift Control	Actuated by Lever on Console

Brakes

Hydraulic Operated, Single Caliper	15 Inch (381 mm)
Fluid Type	SAE J1703 (DOT 3)
Reservoir Capacity	1 Quart (0.946 Litre)
Park Brake	Actuated by Hand Lever

Axle and Differential

Type	Single Reduction Inboard Planetary, Spiral Bevel Ring Gear and Pinion
Axle Diameter	4 Inch (101.6 mm)
Axle Length	119.5 Inch (3 035.3 mm)
Ratio	25.283 to 1

Power Takeoff (If Equipped)

PTO Type	Live Independent System, Integral with Transmission
Type Clutch	Hydraulic Actuated
Rotation	Clockwise from Rear of Tractor
1000 RPM	20 Splines 1.75 Inch Diameter
Engine Speed for 1000 RPM	2100 RPM

Hydraulic System

Type	Closed Center, Load Sensing, Pressure Compensating
Steering	Full Priority, two Double Acting Cylinders
Remote Valve	Closed Center, Stack Type
Pump Capacity at 2200 RPM	28 GPM (109.0 L/min)
Maximum System Pressure	2900 PSI (197 Bar)
Couplings	ISO Standard Lever type Couplers

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E22 Transmission shift solenoid "X" has open circuit. Check transmission control wire harness and/or connector at the transmission end. If the fault cannot be corrected contact your dealer.

E23 Transmission shift solenoid "W" has open circuit. Check transmission control wire harness and/or connector at the transmission end. If the fault cannot be corrected, contact your dealer.

E24 Transmission shift solenoid "V" has open circuit. Check transmission control wire harness and/or connector at the transmission end. If the fault cannot be corrected, contact your dealer.

E25 Transmission shift solenoid "T" has open circuit. Check transmission control wire harness and/or connector at the transmission end. If the fault cannot be corrected, contact your dealer.

E26 Transmission shift solenoid "S" has open circuit. Check the transmission control wire harness and/or connector at the transmission end. If the fault cannot be corrected contact your dealer.

E27 Transmission shift solenoid "Q" has open circuit. Check transmission control wire harness and/or connector at the transmission end. If the fault cannot be corrected contact your dealer.

E28 Indicates a complete transmission solenoid bank power loss. Check the wire harness connector into the transmission solenoid and/or wire harness. If fault cannot be found, contact your dealer.

E30 Transmission shift solenoid "Z" has short circuit. Check the transmission wire harness for chaffing. Contact your dealer if fault cannot be found.

E31 Transmission shift solenoid "Y" has short circuit. Check the transmission wire harness for chaffing. Contact your dealer if fault cannot be found.

E32 Transmission shift solenoid "X" has short circuit. Check the transmission wire harness for chaffing. Contact your dealer if fault cannot be found.

E33 Transmission shift solenoid "W" has short circuit. Check the transmission wire harness for chaffing. Contact your dealer if fault cannot be found.

E34 Transmission shift solenoid "V" has short circuit. Check the transmission wire harness for chaffing. Contact your dealer if fault cannot be found.

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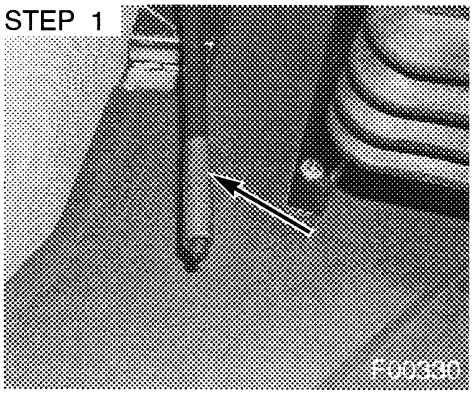
STOPPING THE ENGINE

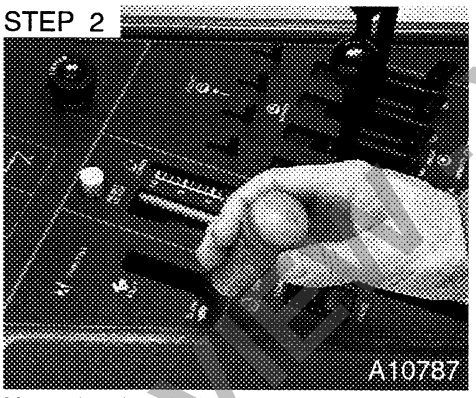
IMPORTANT: *When stopping the engine after operating under heavy load, run the engine at idle speed for a short period of time. This will permit the engine and turbocharger temperature to decrease gradually.*

STEP 1



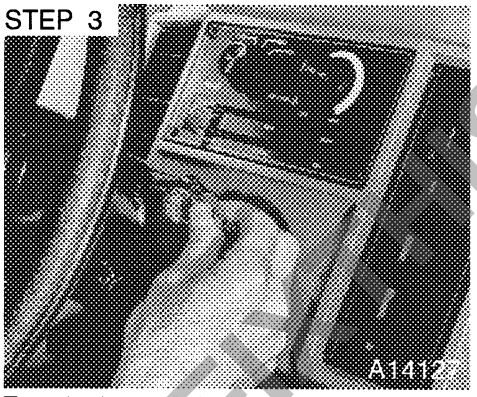
Slow the engine, put all controls in the NEUTRAL position. Pull up on the park brake control handle to apply the park brake.

STEP 2



Move the throttle lever rearward to run the engine at idle speed for three to five minutes to decrease the temperature of the engine and turbocharger.

STEP 3



Turn the key switch counterclockwise to the OFF position. Push down on the switch key release lever to the LOCK position to remove the key.

WARNING: *Before leaving the tractor, stop the engine, put all controls in neutral, engage the park brake and remove the key from the key switch.*

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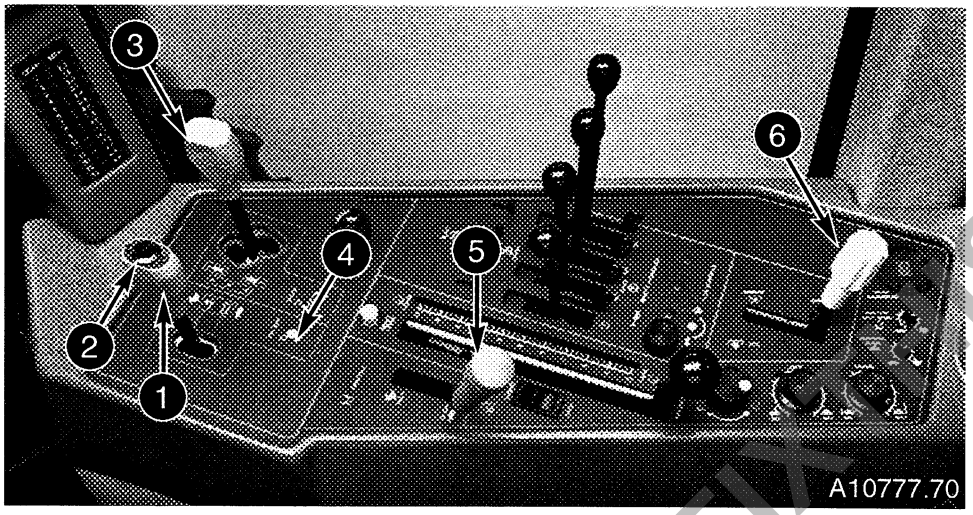
RH Side Console



1. TRANSMISSION GEAR SELECTOR LEVER (PULSER) - This lever is used to shift the transmission gears. Push the lever forward to upshift the transmission to a higher gear. Pull the lever rearward to downshift the transmission to a lower gear. The lever is spring loaded to the neutral (center) position. See Transmission Operation on Page 61 for complete information.
2. SKIP SHIFT BUTTON - The skip shift button is located on top of the transmission gear selector lever (Pulser). This skip shift button is used when the operator wants to get the tractor up to speed quickly because of such conditions as roading or chemical incorporation. The skip shift button is also used to put the transmission into a third reverse mode. See Skip Shift Button Operation on Page 65 for complete information.
3. TRANSMISSION FORWARD/REVERSE MODE LEVER - This lever is used to put the transmission in forward, neutral or reverse mode. The lever is detented in each position.
4. TRANSMISSION CONTROLLER DIAGNOSTIC LED - The transmission controller is equipped with two diagnostic LED's (light emitting diodes). The purpose of the LED's is to provide a visual check of the status of the transmission controller. See Transmission Controller on Page 66 for complete information.
5. THROTTLE HAND LEVER - The throttle lever is used to control the engine speed. Push the lever forward to increase engine speed. Pull the lever rearward to decrease engine speed.
6. PTO CONTROL LEVER - The PTO control lever has a yellow handle for easy identification. To engage the power takeoff, move the yellow control lever forward. To disengage the power takeoff, move the control lever fully to the rear. The control lever is spring loaded to the detent slot in the disengaged position. See Power Takeoff Operation on Page 69 for complete instructions.

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