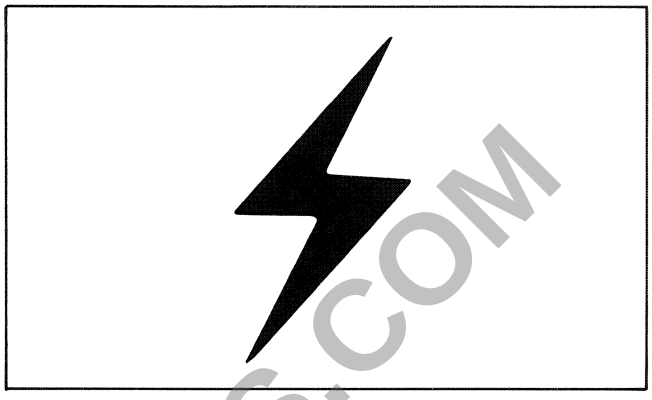
Electrical

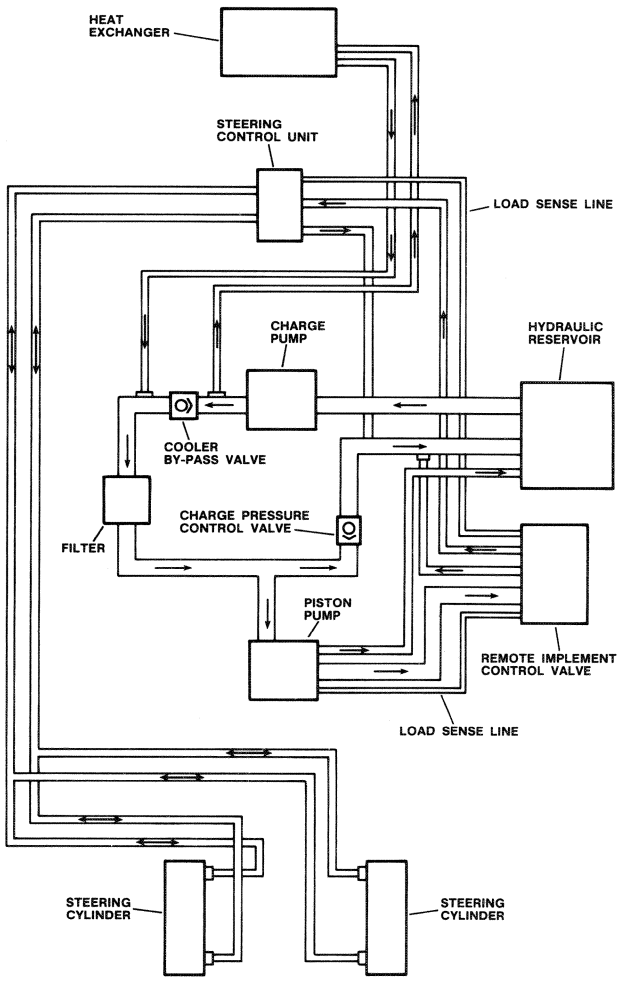
Type: Parallel 12 volt, negative ground system
Batteries: Three (3) 12 volt maintenance-free type. 1875 CCA @0°F (-17.8°C) 625 CCA per battery @0°F (-17.8°C)
Alternator: 100 amp brushless
Engine Block Heater: 1500 watt, 110 volt (optional)
Ether Start Aid: Optional
Starter: 12 volt negative ground, solenoid activated, positive engagement
Lighting: Six (6) halogen sealed beam lights (four front and two rear); 2 rear reflectors. Hazard flasher with integral turn signals. Rear remote electrical receptacle, one cab dome light. Diagnostic warning lights and back lighting/lighting of dash readout, eyebrow lighting of overhead console and right side control console.
Hourmeter: RPM actuated (300 rpm minimum)
Tractor Monitor System: Audio warning alarm and indicator warning lights for both critical and non-critical functions.
Dash: Electronic - LCD (Liquid Crystal Display) includes hourmeter, speedometer, engine rpm, PTO speed, transmission gear range, bargraph of oil pressure and fuel level.
Circuit Breakers: Automatic reset type
Overhead Console: Drop down type for access to electrical circuitry



Hydraulic System

Type: Closed center, load sensing, pressure compensating
Reservoir Capacity: 18.0 US gals. (68.0L). Pressurized to 5 psi (34.45 kPa) and 205°F (96°C) warning sensor.
Steering: Articulated, full priority, load sensing hydrostatic with 2 double acting cylinders
Remote Control Valve: Closed center, stack type. Remote mounted and direct linkage actuated. Detented in the working position with hydraulic kick-outs. Individual section float positions and flow control; 2 to 27 gpm (7.6 to 102.2 L/min)
System Operating Pressure: 2500 psi (172.4 bar, 17,225 kPa) maximum
Pump Capacity: Approx 27 gpm (102.2 L/min) @2100 rpm
Filtering System: Eight micron special microglass element. Suction screen inside reservoir
Oil Type: Hydraulic/Transmission fluid, or 10W Antiwear Hydraulic Fluid.
Couplers: ISO standard, lever type couplers/and male tips with zero connect/disconnect pressure, color coded levers

NOTE: *Oil must meet or exceed SEMS 17001 specifications for 10W oil.*



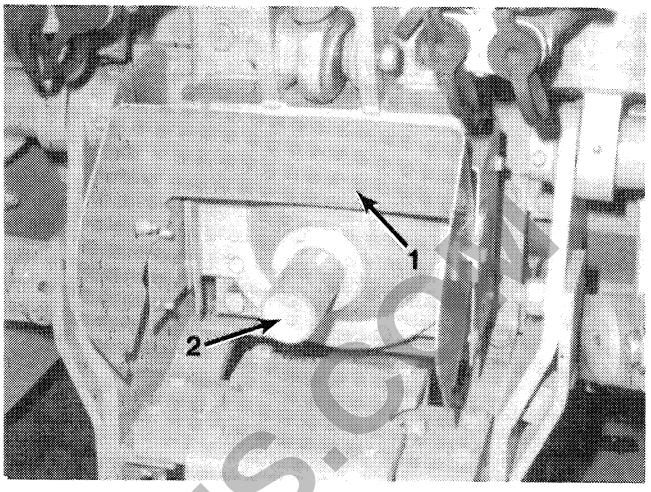
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PTO System (Optional)

Type: Live and independent system integral with transmission. Lever actuated, hydraulically operated wet clutch with integral hydraulically applied brake when control is shut-off. Shaft turns free when engine is shut off.
Speed: 1000 rpm @2100 engine rpm
Output Shaft: 1.75 in. (4.4 cm) diameter, 20 splines and flip-up shield

WARNING: To prevent possible personal injury and/or equipment damage do not connect equipment designed to operate at 540 rpm.



1-Master PTO Shield 2-PTO Shaft Tubular Shield

Special Torque Specifications

	lb ft	(N.m)
Cab Mount Bolts	592	(803)
Wheel Lug Bolts	600	(814)
Wheel Hub Locking Bolts	280	(380)
Dual Bolts (Spacer band style)	200	(271)
Dual Bolts (Rim mount style)	450	(610)
Axle to Frame Bolts	695	(942)
Lower Vertical Hinge Pin	1200	(1627)
Drawbar Pivot Pin	1200	(1627)
3-Pt Rockshaft Pillow Blocks	400	(542)

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

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

E35 Transmission shift solenoid "T" short circuited. Check the transmission wire harness for chaffing. Contact your dealer if fault cannot be found.

E36 Transmission shift solenoid "S" short circuited. Check the transmission wire harness for chaffing. Contact your dealer if fault cannot be found.

E37 Transmission shift solenoid "Q" short circuited. Check the transmission wire harness for chaffing. Contact your dealer if fault cannot be found.

E40 Indicates a mode lever shuttle shift was attempted at speeds greater than safely possible. If the digital information in the MPH or RPM LCD displays are wrong, examine the wiring harness and/or connector at each respective engine RPM sender or transmission MPH sender. If the fault cannot be found, contact your dealer. Alarm continuous.

E41 Indicates a direction change without a neutral command from the mode lever neutral interlock switch. Inspect the neutral interlock switch for proper operation, examine for proper integrity and connection between the harness and controller. If the fault cannot be found, contact your dealer. Alarm continuous.

E50 Indicates a ground speed matching error for the present selected gear range. The audio alarm will sound for 2 seconds only. Check the digital information in the MPH or RPM LCD displays for proper values. If the displayed information is incorrect, check the wiring harness and connectors and the engine RPM sender and the transmission MPH sender. If the problem cannot be found, contact your dealer.

E60 Possible engine rpm sender failure, check for disconnected or damaged wire harness on rpm sender. If fault cannot be found, contact your dealer.

E61 Possible mph sender failure. Check for disconnected or damaged wire harness on mph sender at the transmission output shaft. If fault cannot be found, contact your dealer.

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Operating Information

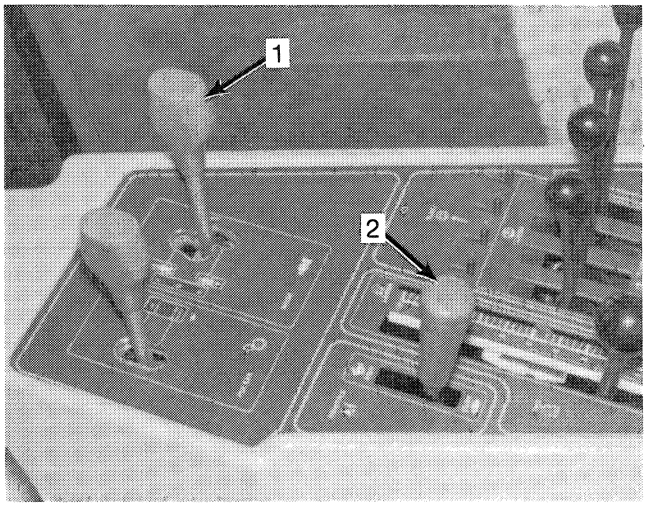


Figure 1:

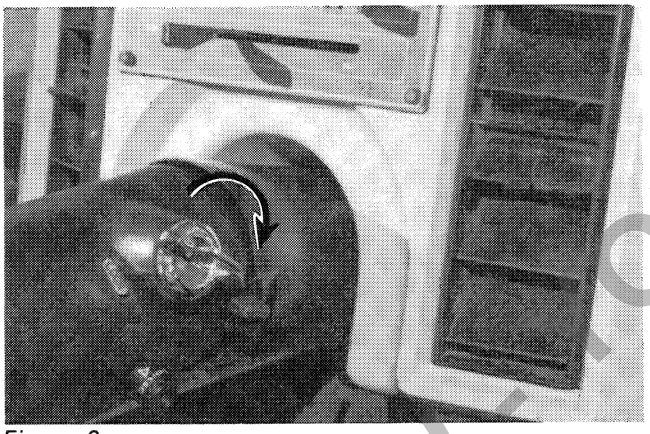


Figure 2:

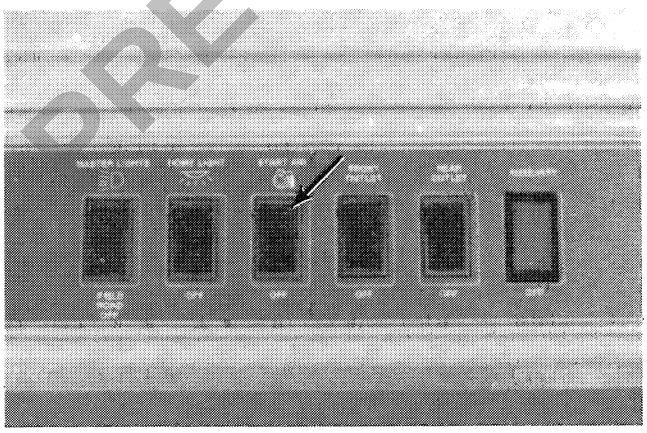


Figure 3:

Engine Starting Procedure

1. Place the transmission mode lever in the "Neutral" position (Fig. 1, Item 1).

2. Depress the clutch pedal fully. Place the hand throttle one-fourth (1/4) to one-half (1/2) open (forward) (Fig. 1, Item 2).

3. Turn and hold the key switch fully clockwise to the "start" position to crank the engine (Fig. 2)

IMPORTANT: *Do not use the starting motor longer than 30 seconds without interruption. If the engine will not start within 30 seconds, allow the starter motor to cool at least 2 minutes before attempting to restart.*

NOTE: *With the engine stopped and placing the transmission mode lever in either the forward or reverse position, turning the key switch to the "crank" position will provide a check routine to check dash indicator light bulbs. If any indicators do not illuminate during this check routine it may indicate bulb replacement is necessary.*

CAUTION: If the starting motor will not operate in the "Transmission Neutral" position, or will operate in any position out of "Transmission Neutral", service is required. Starter engagement in any position out of "Transmission Neutral" is potentially hazardous to the operator and others.

4. If the engine fails to start within 15 seconds, depress the ether start-aid switch while the engine is cranking (Fig. 3).

NOTE: *The ether start-aid is optional.*

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Troubleshooting

Hydraulic System Troubleshooting

Possible Trouble	Causes	Remedies
1. Noisy pump caused by cavitation.	A. Oil too heavy. B. Suction strainer or filter plugged. C. Suction line plugged, too small, or too long.	A. Change to proper viscosity. B. Clean or replace. C. Clean line and check for proper size and length.
2. Noisy pump caused by aeration.	A. Oil supply low. B. Air leaking into suction line. C. Foaming oil.	A. Fill reservoir. B. Tighten fittings. C. Drain reservoir and fill with non-foaming type oil.
3. Hydraulic system over-heating.	A. Oil supply low. B. Oil in system too light. C. System overworked and/or dumping over relief. D. Oil Cooler dirty or plugged.	A. Fill reservoir. B. Drain reservoir and refill with proper viscosity oil. C. Reduce hydraulic demands. D. Clean cooler.
4. System not developing adequate pressure.	A. Excessive internal pump leakage. B. Relief Valve spool stuck open or worn. C. System relief valve spring. weak or broken.	A. Inspect and/or repair pump. B. Disassemble relief valve, inspect for stuck spool, clean or replace. C. Disassemble relief valve, inspect for weak or broken spring. Replace spring if necessary.
5. Restricted or no flow through couplers.	A. Faulty couplers. B. Wrong coupler male tip. C. Reduced coupler and/or line size.	A. Replace couplers. B. Use correct male tip C. Use correct size coupler and line.

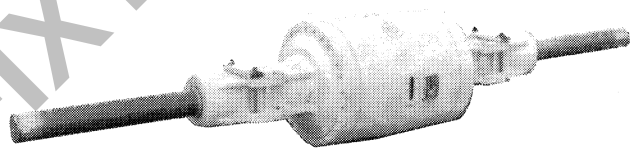
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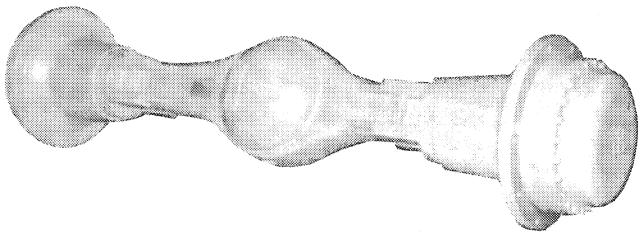
IMPORTANT: All fluid capacities listed throughout this section are a guide to the quantities required. Always use dipsticks or level plugs to ensure that the units are filled to the correct level.

General Specifications

Axle



Model: Adjustable Bar (front & rear engageable differential lock optional)
Type: Single reduction inboard planetary, spiral bevel ring gear and pinion
Bar Diameter:
4.0 in. (10.16 cm)
Axle Length: 119.5 in. (303.5 cm)
Wheel Spacing: Adjustable from 60.0 in. (152.4 cm) to 130.0 in. (330.2 cm)
Ratio: 25.294:1
Oil Capacity: 11.75 US gal. (44.5L)
Oil Type: HD SAE 80W-90 gear oil or other oils that meet API classification GL-5 and/or MIL-L-2105B military specifications



Model: Raba K598 60/70 (Optional front No-Spin, or engageable front and rear diff lock).
Type: Double reduction outboard planetary (final drive) gearing with spiral bevel ring gear and pinion
Ratio: 25.474:1
***Oil Capacity:** 15.0 US qts (14.4L) center differential, 3.7 US qts (3.5L) each wheel hub. Total 22.4 US qts (18.1L)
Oil Type: HD SAE 80W-90 gear oil or other oils that meet API classification GL-5 and/or MIL-L-2105B military specifications

***NOTE:** *Axle assembly is flow through design; oil is allowed to flow between compartments. Park the tractor on a level surface when checking fluid levels.*

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Lubrication, Service & Maintenance Guide

The hourmeter is the most reliable method of determining service intervals. The following figures are based on a ten hour day. If operations differ from these figures, base service intervals on actual running time. Keep an accurate record of operating time and service intervals.

10 hours ..... One Day
50 hours ..... One Week
100 hours ..... Two Weeks
200 hours ..... One Month

Check and monitor all instruments and indicator lights during start-up and operation.		**During Operations**
Main Hinge and Pivot Linkage	Grease	**"A" Check Every 10 Hours**
Hydraulic Reservoir	Check Oil Level	
Engine Fan, Alternator & Compressor Belts	Check Condition and Tension	
Cab Air Filter	Clean A/R	
Engine Crankcase	Check Oil Level	
Cooling System	Check Coolant Level	
Wheel Lug Nuts (First 50 Hrs)	Torque per Specification	
Transmission	Check Oil Level	
Engine Air Cleaner	Check Indicator, Clean Outer Element A/R	
Radiator and Coolers	Check for Debris - Clean A/R	
Engine	Check for Fluid Leaks, Noise or Damage	
Tractor	Inspect for Damage, Loose Bolts Etc.	
Repeat "A" Check		**"B" Check Every 100 Hours**
Drive Shaft Hanger Bearing	Grease	
Tires	Check Pressure - Inspect for Damage	
Brakes	Visually Inspect and/or Adjust	
Differentials and Final Drives	Check Oil Level	
Driveshaft Slip Yokes & U-Joints	Grease	
Fuel Tank	Drain Sediment	
Fuel Filter(s)	Clean or Replace A/R	
Axle, Transfer Case and Transmission Vents	Inspect & Clean A/R	
Door Locks and Latches	Lubricate - Check Adjustment	
PTO Driveline U-Joints (Optional)	Lubricate	
Repeat "A" & "B" Checks		**"C" Check Every 250 Hrs (OR 6 MO.)**
Engine Crankcase	Change Oil and Filters	
Water Element	Replace w/Service Element (100 hrs new machine)	
Repeat "A", "B" & "C" Checks		**"D" Check Every 500 Hours (OR 6 MO.)**
Engine Air Cleaner	Check, Clean and/or Replace A/R	
Differential & Final Drives*	Drain and Refill (100 Hrs New Machine)	
Hydraulic Oil Filter(s)	Replace (100 Hrs New Machine)	
Center Hinge King Bolts	Torque per Spec's	
Transmission Filter	Replace (50 Hrs New Machine)	
Batteries	Clean Terminals - Inspect Cables	
Hydraulic Hoses	Inspect for Damage - Replace A/R	
Engine Clean Air Tubing	Inspect for Leaks or Damage	
Engine Fan Hub & Idler (Cat)	Lubricate	
Repeat "A", "B", "C" & "D" Checks		**"E" Check Every 1000 Hours (OR 1 YEAR)**
Hydraulic Oil	Change Oil and Filter(s), Clean Suction Screen	
Hydraulic Vent Filter Cartridge	Replace & Clean Valve	
Transmission Oil	Change Oil and Filters	
Engine Fan Hubs	Inspect, Repack or Rebuild	
Engine Idler Pulleys	Inspect, Repack Bearings or Rebuild	
Radiator & Coolant	Drain, Chemically Flush - Refer to Manual	
Engine Air Cleaner	Replace Inner and Outer Elements	
Repeat "A", "B", "C", "D" & "E" Checks		**Every 2000 Hours (OR 2 YEARS)**
Engine Valves and/or Injectors	Adjust (see your dealer)	
Engine Water Pump	Inspect and/or Rebuild	

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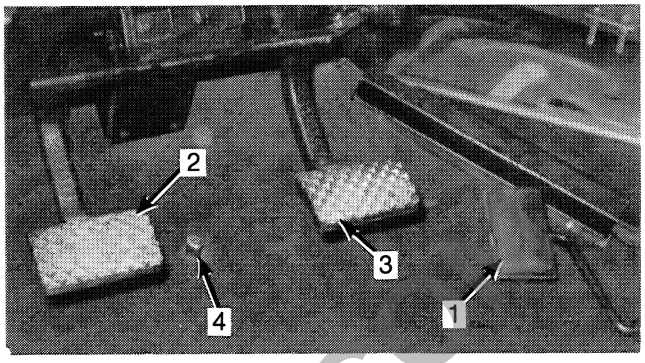


Figure 31:

Clutch Pedal (Fig. 31, Item 2)

The clutch pedal is suspended on the left hand side of the dash console and actuates the hydraulically operated master clutch for starting or stopping the tractor motion.

IMPORTANT: *Never "ride" the clutch pedal during operation.*

See Operating Information section of this manual for detailed information on proper use of the clutch.

Brake Pedal (Fig. 31, Item 3)

The brake pedal is suspended on the right hand side of the dash console. Depress the brake pedal to the degree required to bring the tractor to a smooth and controlled stop.

IMPORTANT: *Never "ride" the brake pedal or the brakes will overheat and wear out rapidly.*

Differential Lock Control (Optional) (Fig. 3, Item 4)

Tractors equipped with the optional front or rear engageable differential lock will have the engage/disengage switch located on the floor between the clutch and brake pedal. When the switch is energized in the "engage" position it will also illuminate the blue "differential locked" indicator light on the dashboard.

Depress this switch with the foot to engage or disengage the differential lock.

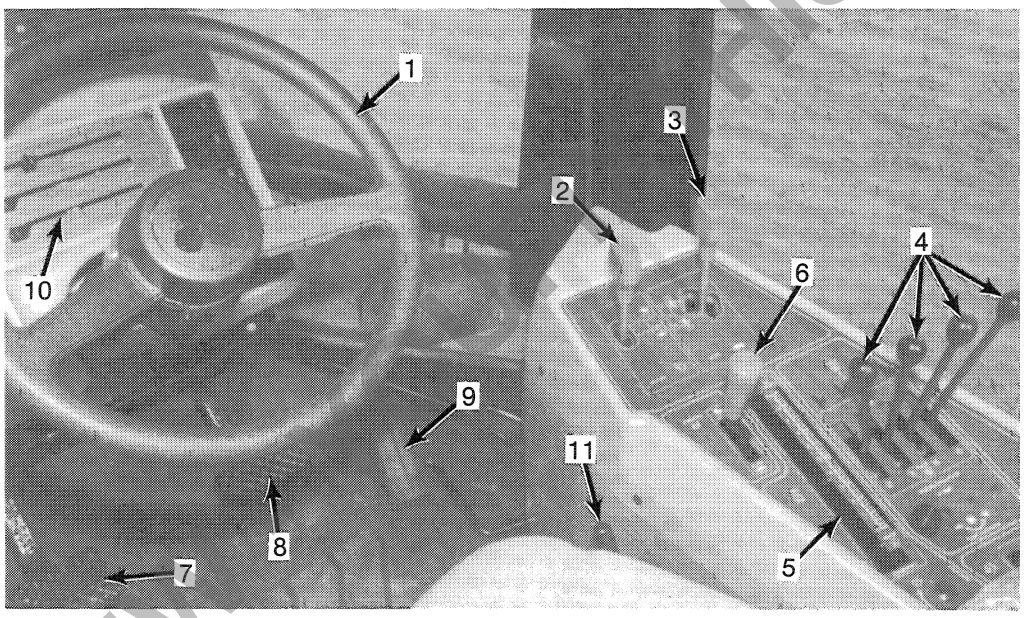
CAUTION: Do not "engage" the differential lock at high speed or while turning the tractor. If the differential lock is engaged while turning, there may be a change in steering control. The differential lock must be "disengaged" when traveling on public roads or at high speed to assure complete steering control.

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Know the Tractor Controls and Instruments to Assure Safe Operation.

Instruments & Controls



1. Steering Wheel
2. Shift Pulser Lever
3. Transmission Shift Lever
4. Hydraulic Control Levers
5. 3-Pt Hitch Control
6. Throttle Control
7. Clutch Pedal
8. Brake Pedal
9. Decelerator Pedal
10. A/C & Heater Controls
11. Park Brake Lever

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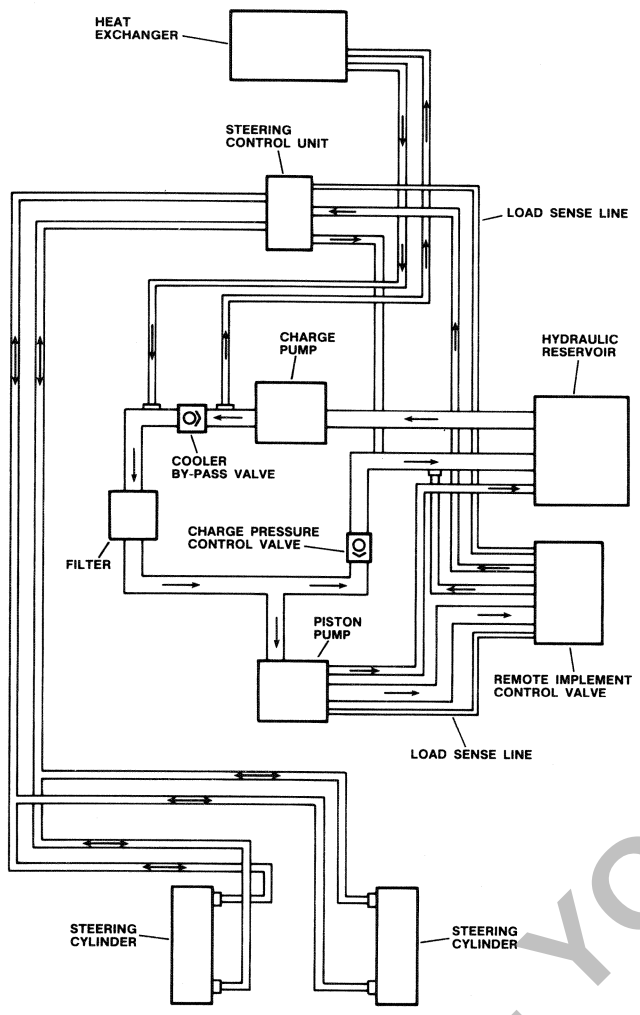


Figure 16:

Hydraulic System

General Information

The hydraulic system is closed center, load sensing and is flow-pressure compensated. Oil is supplied under pressure to a variable displacement piston pump which delivers only the flow required for a particular function.

The system charge pump supplies a continuous oil flow for cooling, filtering and pressurizing the inlet to the variable displacement piston pump. This provides for increased operating efficiency.

The three-spool remote valve is standard on the tractor with the four-spool valve as an option.

The remote valve is closed centered and has load sensing features. Flow goes to the valve only when a valve spool is shifted to a work position.

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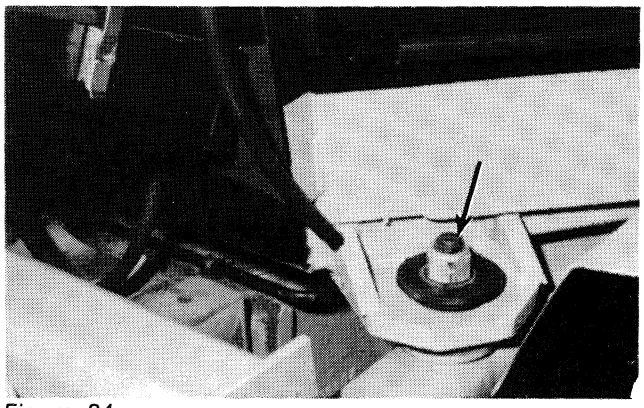


Figure 84:

Special Torque Values

Cab Mounts

Every 500 service hours check cab mounts for damage. Torque Bolt A to 537-592 lb ft (728-803 N.m).

CAUTION: If the ROPS cab must ever be removed or replaced, make certain that the proper hardware is used and also that the proper torque values are applied to the attaching bolts.

WARNING: The protection offered by the ROPS cab will be impaired if it is subjected to any modification, structural damage, or has been involved in an overturn. The ROPS cab must be replaced after a roll over.

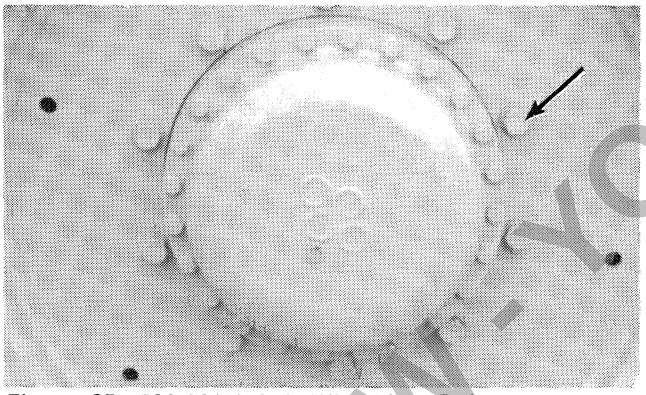


Figure 85: 598 60/70 Axle Wheel Lug Bolts

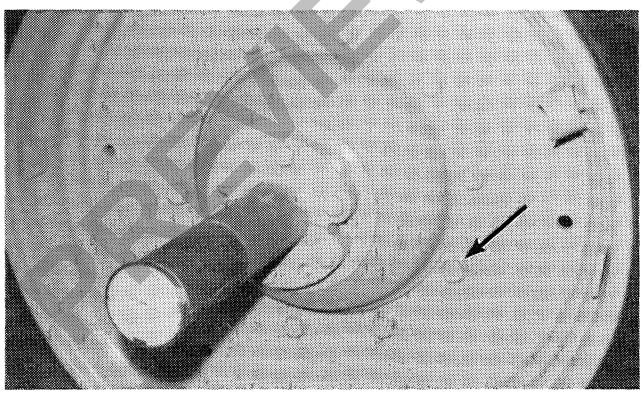


Figure 86: Bar Style Axle Wheel Lub Bolts

Wheel Bolt Torque

Tighten the wheel lug bolts to 600 lb ft (814 N.m) every 10 hours for the first 50 hours. Repeat whenever the wheels are removed and remounted.

CAUTION: Never operate a tractor with a loose wheel, rim or hub.

IMPORTANT: *The 600 lb ft (814 N.m) specification will apply when lug bolts are clean and dry. If lug bolts are clean and dipped in SAE 30 oil, tighten the bolts to 450 lb ft (610 N.m).*

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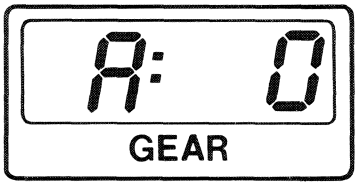


Figure 11: System "Arm" Indicator

Upon tractor start-up, the system must be "armed" before any tractor movement can occur (an "A" will appear in the gear LCD on the dash). The mode lever must be in the **neutral** position and the clutch pedal depressed into the "armed" or ground speed matching zone. Once the system is "armed" it will remain so until the tractor is shut down.

IMPORTANT: *Once the system is "armed" it is not necessary to use the clutch to shift the mode lever out of netural to first forward or first reverse. If this is done, the brakes **must** be applied and the engine speed set to low idle. It is recommended that the clutch always be used when shifting the mode lever out of neutral to avoid abrupt uncontrolled tractor start-up.*

Use the master clutch pedal for smooth controlled start-ups and when hitching to implements. The master clutch allows the operator to "feather" the tractor movement in first forward and first reverse gears only.

If the clutch pedal is depressed (even slightly) while the tractor is in motion, it will interrupt electrical power to the clutch solenoid valves thus interrupting power flow through the transmission. Upon reengagement of the clutch, the transmission will enter first forward or first reverse, depending on whether the forward or reverse mode is selected.

NOTE: *The tractor has ground speed matching capabilitites. If the clutch is disengaged while in a higher gear range (and tractor motion is allowed to continue) upon reengagement of the clutch pedal, the transmission will return to a gear range most closely matching the tractor ground speed and engine rpm.*

When the clutch pedal is fully depressed electrical power is removed from all clutch solenoids until the pedal approaches the "inching" zone when released.

CAUTION: When the clutch pedal is fully depressed the transmission will not shift into the neutral mode. Whenever transmission neutral is required, the mode selector shift lever must be manually shifted to neutral. The tractor will begin motion if the clutch is not fully depressed and the mode selector lever is out of neutral.

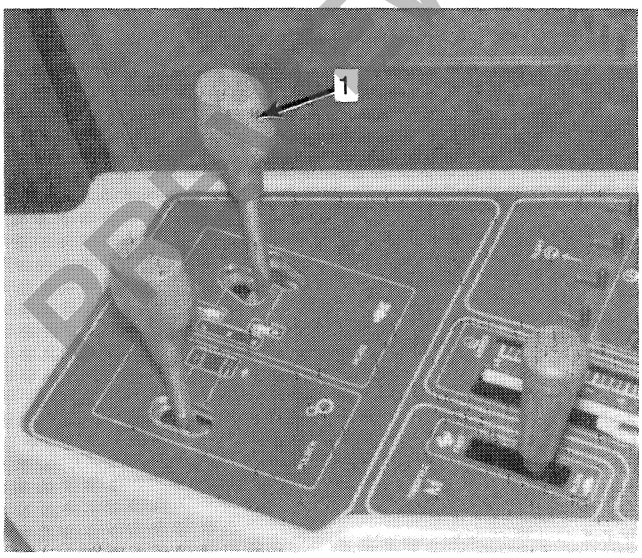


Figure 12:
1-Trans. Mode Selector

Using The Mode Selection Lever

Use the "Mode" lever to select either the forward or reverse direction of travel. The gate for the mode lever is a "Z" configuration and requires crossing through the detented neutral zone when changing directions of travel.

IMPORTANT: *Engine speed should always be set at low idle and brake applied when shifting out of the neutral position to avoid abrupt tractor starts.*

WARNING: There is no "Park" position in this transmission. Whenever the mode selector lever is in neutral the Park Brake must be applied to prevent tractor movement.

NOTE: *The tractor is inhibited from going into reverse if forward ground speed is above 2 mph.*

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