MID-MOUNT ZTRAK M653/655/665

Serial No. (010001 -)

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TECHNICAL MANUAL

John Deere
Worldwide Commercial and
Consumer Equipment Division

TM1778 (Jan04)

Litho in U.S.A

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This technical manual is written for an experienced technician and contains sections that are specifically for this product. It is a part of a total product support program.

The manual is organized so that all the information on a particular system is kept together. The order of grouping is as follows:

- Table of Contents
- General Diagnostic Information
- Specifications
- Electrical Wiring Harness Legend
- Component Location
- System Schematic
- Wiring Harness
- Troubleshooting Chart
- Theory of Operation
- Diagnostics
- Tests & Adjustments
- Repair

Note: Depending on the particular section or system being covered, not all of the above groups may be used.

Each section will be identified with a symbol rather than a number. The groups and pages within a section will be consecutively numbered.

We appreciate your input on this manual. To help, there are postage paid post cards included at the back. If you find any errors or want to comment on the layout of the manual please fill out one of the cards and mail it back to us.

Safety
Specifications and Information
Engine
Electrical
Hydrostatic Power Train
Brakes
Attachments
Miscellaneous M

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RECOGNIZE SAFETY INFORMATION



This is the safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

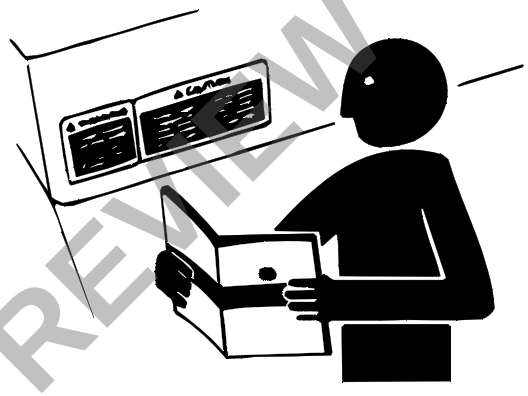
Follow recommended precautions and safe servicing practices.

Understand Signal Words

A signal word—DANGER, WARNING, or CAUTION—is used with the safety-alert symbol. DANGER identifies the most serious hazards.

DANGER or WARNING safety signs are located near specific hazards. General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.

REPLACE SAFETY SIGNS

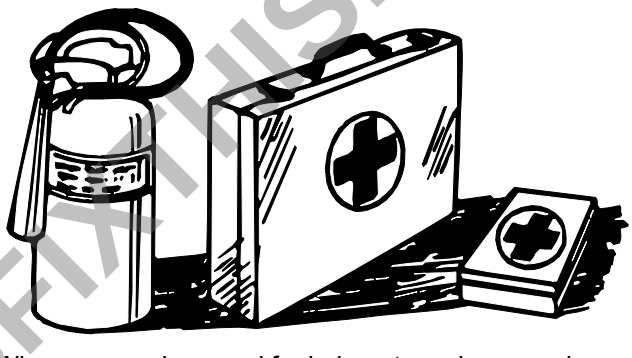


Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.

HANDLE FLUIDS SAFELY-AVOID FIRES

Be Prepared For Emergencies





When you work around fuel, do not smoke or work near heaters or other fire hazards.

Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

Do not store oily rags; they can ignite and burn spontaneously.

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.

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GENERAL VEHICLE SPECIFICATIONS

ENGINE—M653

Make	Kohler
Type	4 Cycle, V-Twin
Model	CH22S
Power Output	16.4 kW (22 hp)
Displacement	674 cm^3 (41.1 cu in.)
Aspiration	Natural
Cooling System	Air Cooled
Lubrication	Full Pressure
Engine Oil Capacity (with Filter)	1.9 L (2.0 qt)
Oil Filter	Replaceable, Full Flow
Valving	Overhead Valves
Air Cleaner	Heavy-Duty, Dry, Replaceable Filter Element with Cyclone Pre-Cleaner
Bore	80 mm (3.15 in.)
Stroke	67 mm (2.64 in.)
Compression Ratio	8.5:1
Slow Idle	1400 ±50 rpm
Fast Idle (No Load)	3600 +50/-0 rpm

ENGINE—M655 and 665

Make	Kohler
Type	4 Cycle, V-Twin
Model	CH25S
Power Output	18.6 kW (25 hp)
Displacement	725 cm^3 (44.2 cu in.)
Aspiration	Natural
Cooling System	Air Cooled
Lubrication	Full Pressure
Engine Oil Capacity (with Filter)	2.0 L (2.1 qt)
Oil Filter	Replaceable, Full Flow
Valving	Overhead Valves
Air Cleaner	Heavy-Duty, Dry, Replaceable Filter Element with Cyclone Pre-Cleaner
Bore	83 mm (3.27 in.)
Stroke	67 mm (2.64 in.)
Compression Ratio	9:1
Slow Idle	1400 ±50 rpm
Fast Idle (No Load)	3600 +50/-0 rpm

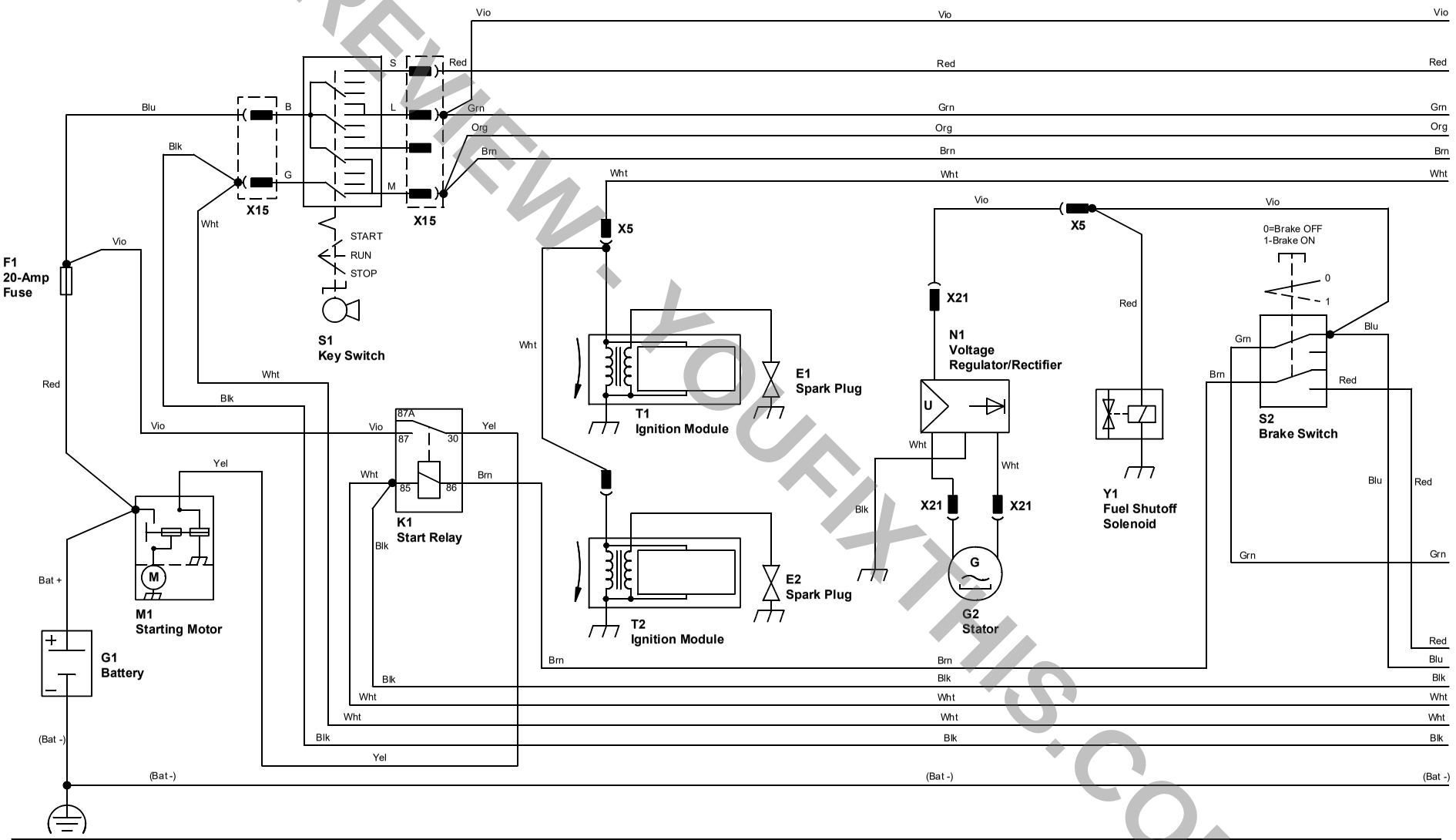
FUEL SYSTEM

Fuel Tank Location	On Each Side of the Operator
Fuel Tank Capacity (Total)	30.0 L (10.0 gal)
Fuel (Minimum Octane)	Unleaded Gasoline, 87 Octane
Fuel Delivery	Pulse
Carburetor	Externally Vented Downdraft
Fuel Filter	Replaceable In-Line
Gasoline/Alcohol Blends	Up to 10% Ethyl Alcohol/90% Unleaded (By Volume)
Gasoline/Ether Blends	Up to 15% MTBE/85% Unleaded (By Volume)
Fuel Shutoff Solenoid	Below Carburetor Float Bowl

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ELECTRICAL SCHEMATIC

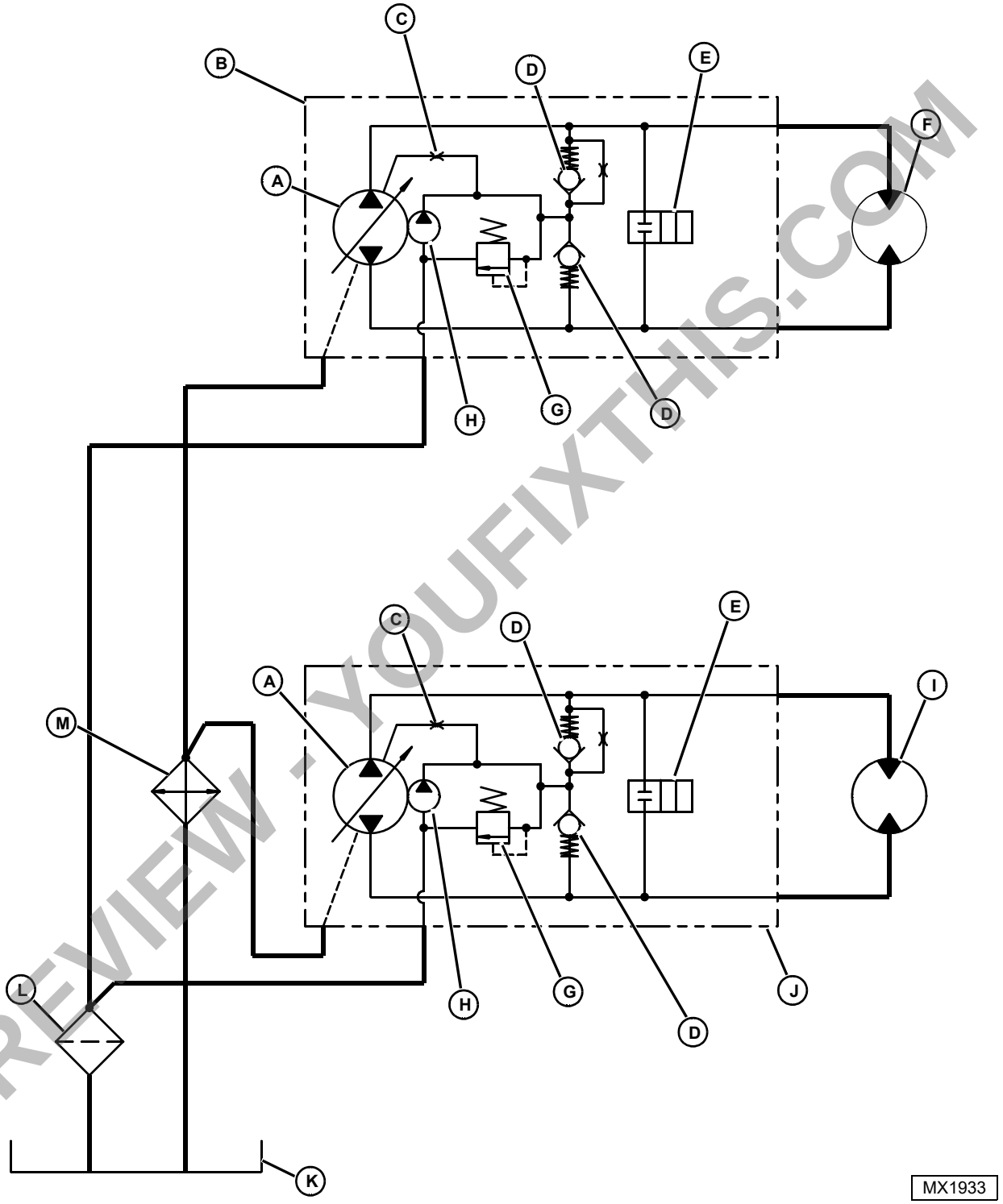


SE1—Cranking Circuit	SE2—Ignition Circuit	SE3—Charge Circuit	SE4—Run Circuit

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HYDRAULIC SYSTEM SCHEMATIC

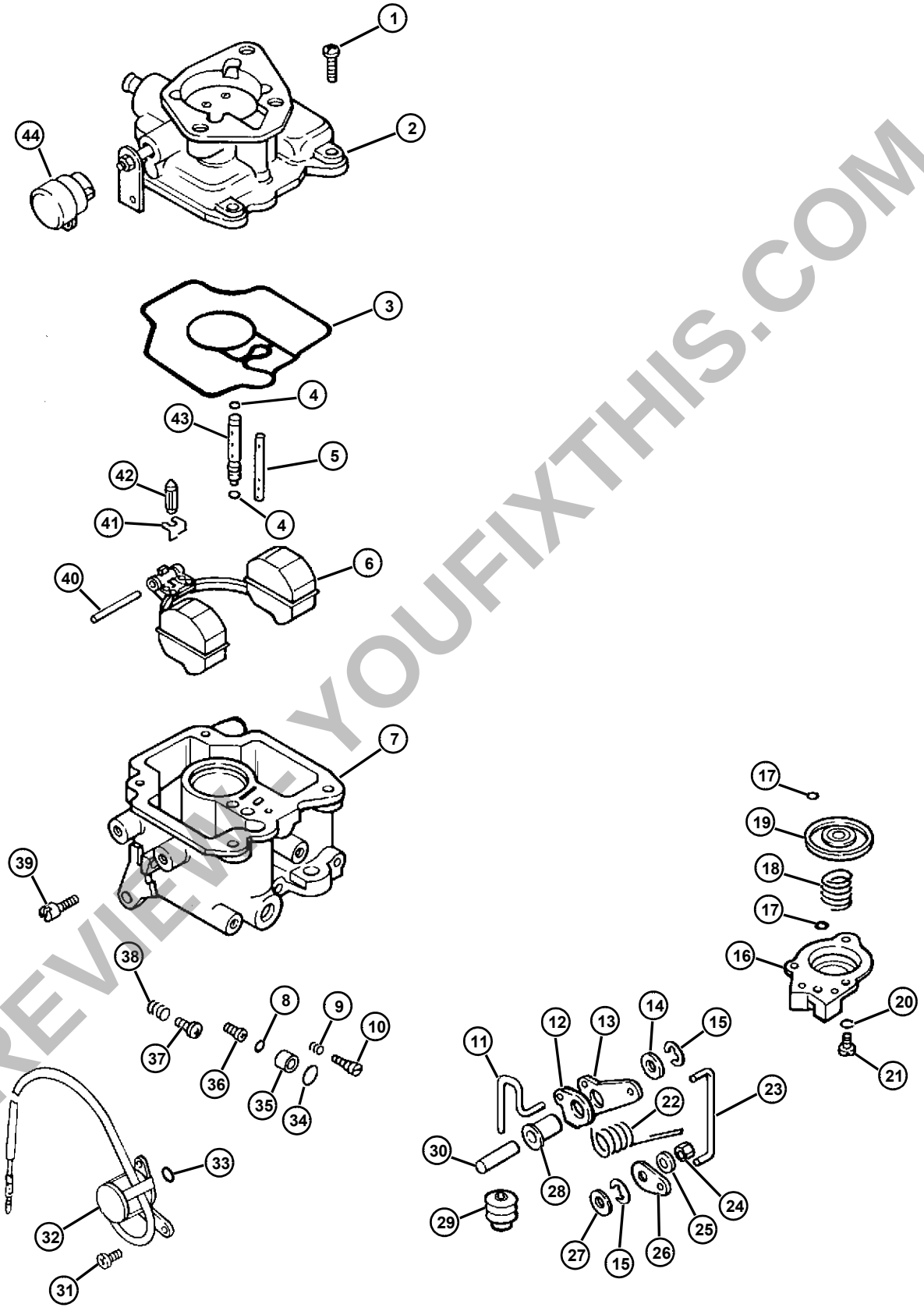


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A—Pump Block
B—Right Hydraulic Pump
C—Cooling Orifice
D—Check Valve
E—Bypass Valve
F—Right Wheel Motor
G—Pressure Relief Valve
H—Charge Pump
I—Left Wheel Motor
J—Left Hydraulic Pump
K—Reservoir
L—Oil Filter
M—Oil Cooler

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CARBURETOR—DISASSEMBLY/INSPECTION/ASSEMBLY

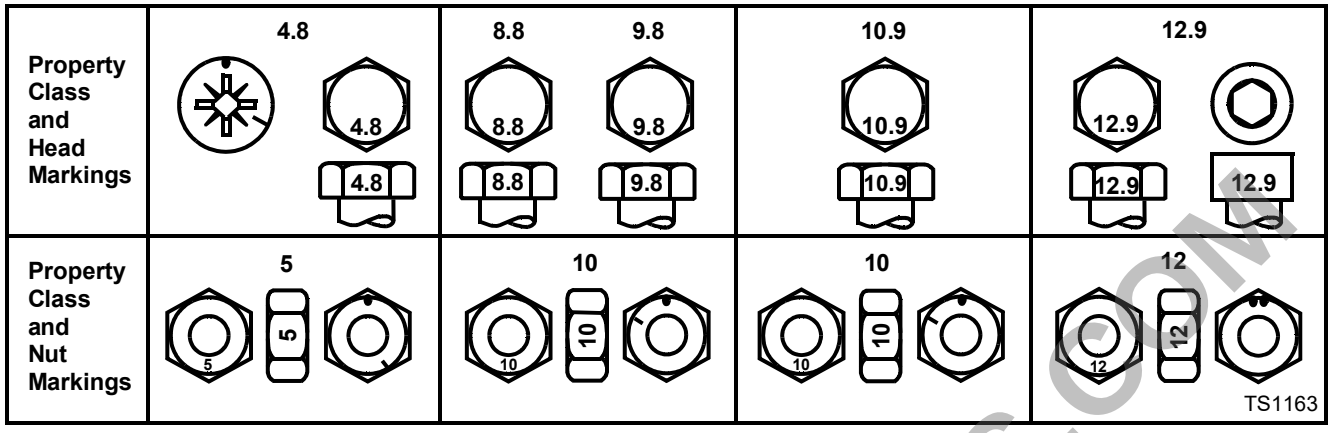


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METRIC FASTENER TORQUE VALUES



	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
SIZE	N•m	lb-ft	N•m	lb-ft	N•m	lb-ft	N•m	lb-ft	N•m	lb-ft	N•m	lb-ft	N•m	lb-ft	N•m	lb-ft
M6	4.8	3.5	6	4.5	9	6.5	11	8.5	13	9.5	17	12	15	11.5	19	14.5
M8	12	8.5	15	11	22	16	28	20	32	24	40	30	37	28	47	35
M10	23	17	29	21	43	32	55	40	63	47	80	60	75	55	95	70
M12	40	29	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	47	80	60	120	88	150	110	175	130	225	165	205	150	260	109
M16	100	73	125	92	190	140	240	175	275	200	350	225	320	240	400	300
M18	135	100	175	125	260	195	330	250	375	275	475	350	440	325	560	410
M20	190	140	240	180	375	275	475	350	530	400	675	500	625	460	800	580
M22	260	190	330	250	510	375	650	475	725	540	925	675	850	625	1075	800
M24	330	250	425	310	650	475	825	600	925	675	1150	850	1075	800	1350	1000
M27	490	360	625	450	950	700	1200	875	1350	1000	1700	1250	1600	1150	2000	1500
M30	675	490	850	625	1300	950	1650	1200	1850	1350	2300	1700	2150	1600	2700	2000
M33	900	675	1150	850	1750	1300	2200	1650	2500	1850	3150	2350	2900	2150	3700	2750
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2750	4750	3500

DO NOT use these hand torque values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only and include a ±10% variance factor. Check tightness of fasteners periodically. DO NOT use air powered wrenches.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same class. Make sure fastener threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

When bolt and nut combination fasteners are used, torque values should be applied to the **NUT** instead of the bolt head.

Tighten toothed or serrated-type lock nuts to the full torque value.

[a] *"Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated (yellow dichromate - Specification JDS117) without any lubrication.*

Reference: JDS—G200.

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TROUBLESHOOTING

ENGINE AND FUEL SYSTEM TROUBLESHOOTING CHART

Problem or Symptom / Check or Solution	Engine cranks, but will not start, or starts hard.	Engine will not stay running, runs rough or irregularly.	Engine surges, or has uneven or uncontrolled rpm.	Hydraulic lifters are noisy.	Engine has low power under load.	White smoke on start-up.	Exhaust smoke blue or high oil consumption	Exhaust smoke black, engine floods or burns rich	Engine won't shut off.	Engine has low oil pressure	Engine overheats	Engine stalls frequently	Excessive engine noise or vibration.	Engine backfires	Fuel in oil
Carburetor worn, contaminated with debris or varnish. Passages plugged. Wrong jets.	●	●	●		●			●				●		●	
Carburetor float mis-adjusted or sticking.								●							●
Choke, throttle or governor linkage misadjusted. Carburetor misadjusted.	●	●	●		●			●						●	●
Air being drawn in through hole in fuel lines.	●	●	●		●									●	
Improper use of choke.	●	●			●			●				●			●
Spark plug fouled, faulty or gap not correct. Incorrect spark plug.	●	●			●			●			●				●
Carburetor, intake manifold, or cylinder head gaskets leaking or damaged.	●	●	●		●						●	●	●	●	
Faulty ignition components.	●	●	●		●			●				●		●	●
Faulty fuel shutoff solenoid. Fuel shutoff solenoid not activated. (See RUN CIRCUIT OPERATION in ELECTRICAL Section.)	●														
Fuel tank shutoff valve closed.	●	●													
Faulty fuel pump.	●														
Fuel filter or line restricted.	●	●	●		●							●			
Fuel stale, contains water, or wrong type	●	●	●		●	●						●			
Fuel tank cap vent blocked.	●	●	●		●							●			

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TESTS AND ADJUSTMENTS

CYLINDER LEAKDOWN TEST

Reason:

To determine if compression is leaking from the cylinder due to component wear or damage.

Test Equipment:

- JT-03502 Cylinder Leakdown Test Kit

Procedure:

⚠ CAUTION

Engine components are HOT. DO NOT touch with bare skin, especially the exhaust pipe or muffler while making test. Wear protective eye glasses and clothing.

1. Park machine safely.
2. Move control levers to NEUTRAL position.
3. Run engine for approximately five minutes to bring the engine to normal operating temperature.
4. Turn key switch to OFF position.
5. Remove spark plugs from engine.
6. Remove air cleaner assembly. (See AIR CLEANER ASSEMBLY—REMOVAL/INSTALLATION.)
7. Rotate crankshaft until piston (of cylinder being tested) is at top dead center of compression stroke. This position must be maintained while testing.
8. Remove spark plug and install JT-03502 Cylinder Leakdown test fitting.
9. Connect air source of at least 345 kPa (50 psi) to the tester.
10. Turn the regulator knob in the increase (clockwise) direction until the gauge needle is in the yellow "set" area at the low end of the scale.
11. Connect tester quick-disconnect to the adapter hose while firmly holding the engine at TDC. Record the gauge reading and listen for escaping air at the carburetor intake, exhaust outlet, and crankcase breather.

Results:

NOTE: All engines will leak air past the piston rings to some extent. Rings are worn if leakage is excessive.

- Air escaping from crankcase breather—Check for worn rings and/or worn cylinder walls
- Air escaping from exhaust system—Check for worn or damaged exhaust valves and/or valve seats.
- Air escaping from carburetor—Check for worn or damaged intake valves and/or valve seats.
- Gauge reading in "low" (green) zone—Piston rings and cylinder in good condition
- Gauge reading in "moderate" (yellow) zone—Engine is still usable, but there is some wear present. Customer should start planning for overhaul or replacement.
- Gauge reading in "high" (red) zone—Rings and/or cylinder have considerable wear. Engine should be reconditioned or replaced.

CRANKCASE VACUUM TEST

Reason:

To measure the amount of crankcase vacuum. A pressurized crankcase will force oil leakage past the seals. A normal crankcase has negative pressure.

Test Equipment:

- JT05697 U-Tube Manometer Kit

Procedure:

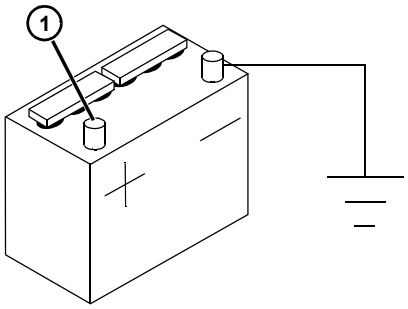
⚠ CAUTION

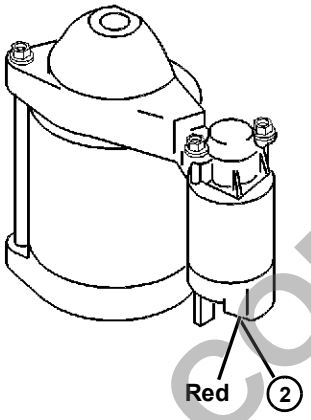
Engine components are HOT. DO NOT touch with bare skin, especially the exhaust pipe or muffler while making test. Wear protective eye glasses and clothing.

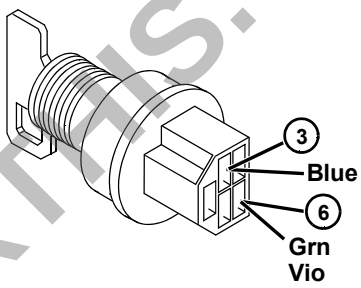
1. Park machine safely.
2. Move control levers to NEUTRAL position.
3. Run engine for approximately five minutes to bring the engine to normal operating temperature.
4. Turn key switch to OFF position.
5. Attach manometer magnets to solid metal surface.

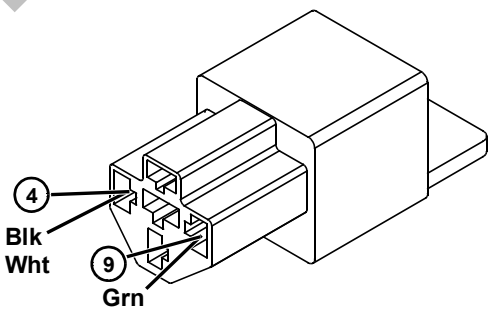
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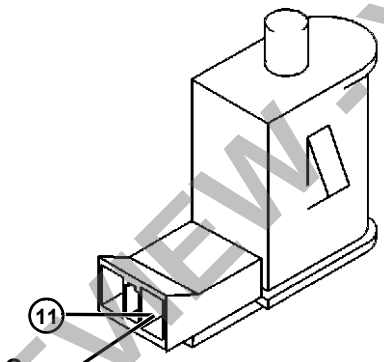
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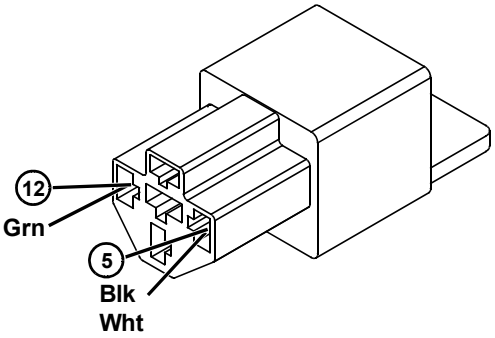


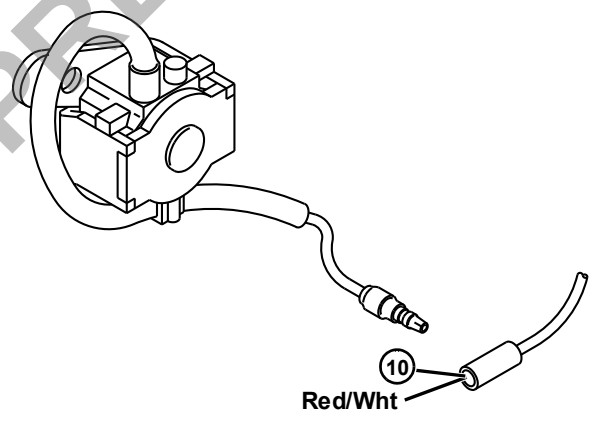


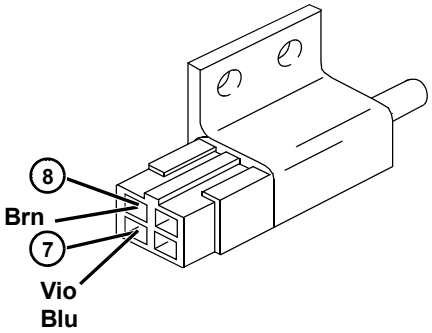












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