325, 335 and 345 Lawn and Garden Tractors

Serial No. (70001 -)

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TECHNICAL MANUAL

John Deere
Worldwide Commercial and
Consumer Equipment Division

TM1760 (28May99)

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.

All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

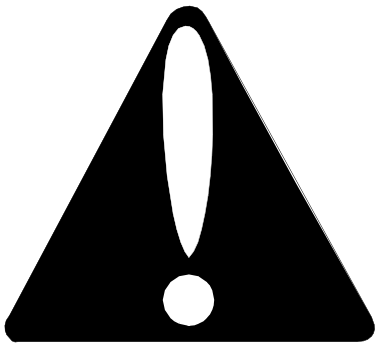
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Safety
Specifications and General Information
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Engine—335 (FH601V)
Engine—345 (FD611V)
Electrical
Power Train (Hydrostatic)
Steering—325
Steering—335/345
Brakes
Hydraulics
Attachments
Miscellaneous

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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.

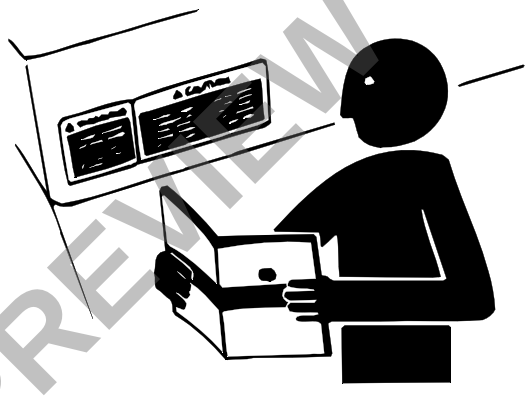
Follow recommended precautions and safe servicing practices.

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

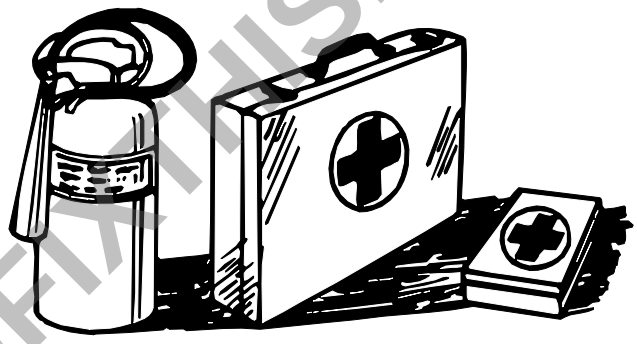


Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.

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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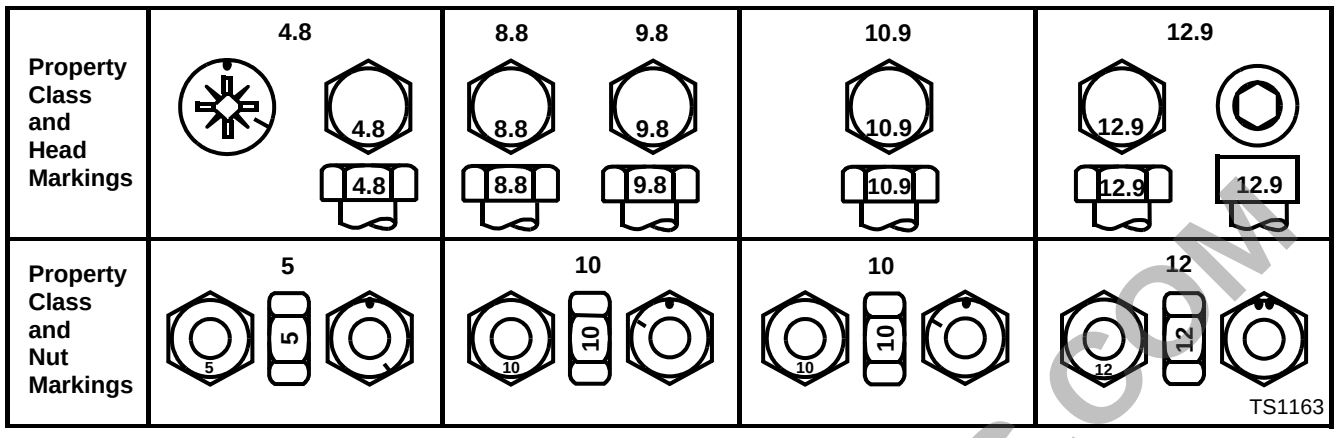
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METRIC FASTENER TORQUE VALUES



	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	190
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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READING ELECTRICAL SCHEMATICS

The schematic is made up of individual circuits laid out in a sequence of related functions. It is formatted with all power wires (A) across the top and all ground wires (B) across the bottom. Current flow is generally from top to bottom through each circuit and component. All components are shown in the OFF position. The diagram does not list connector (C) information unless needed to avoid confusion. If the connector is shown, the number next to it is the terminal pin location (D) in the connector.

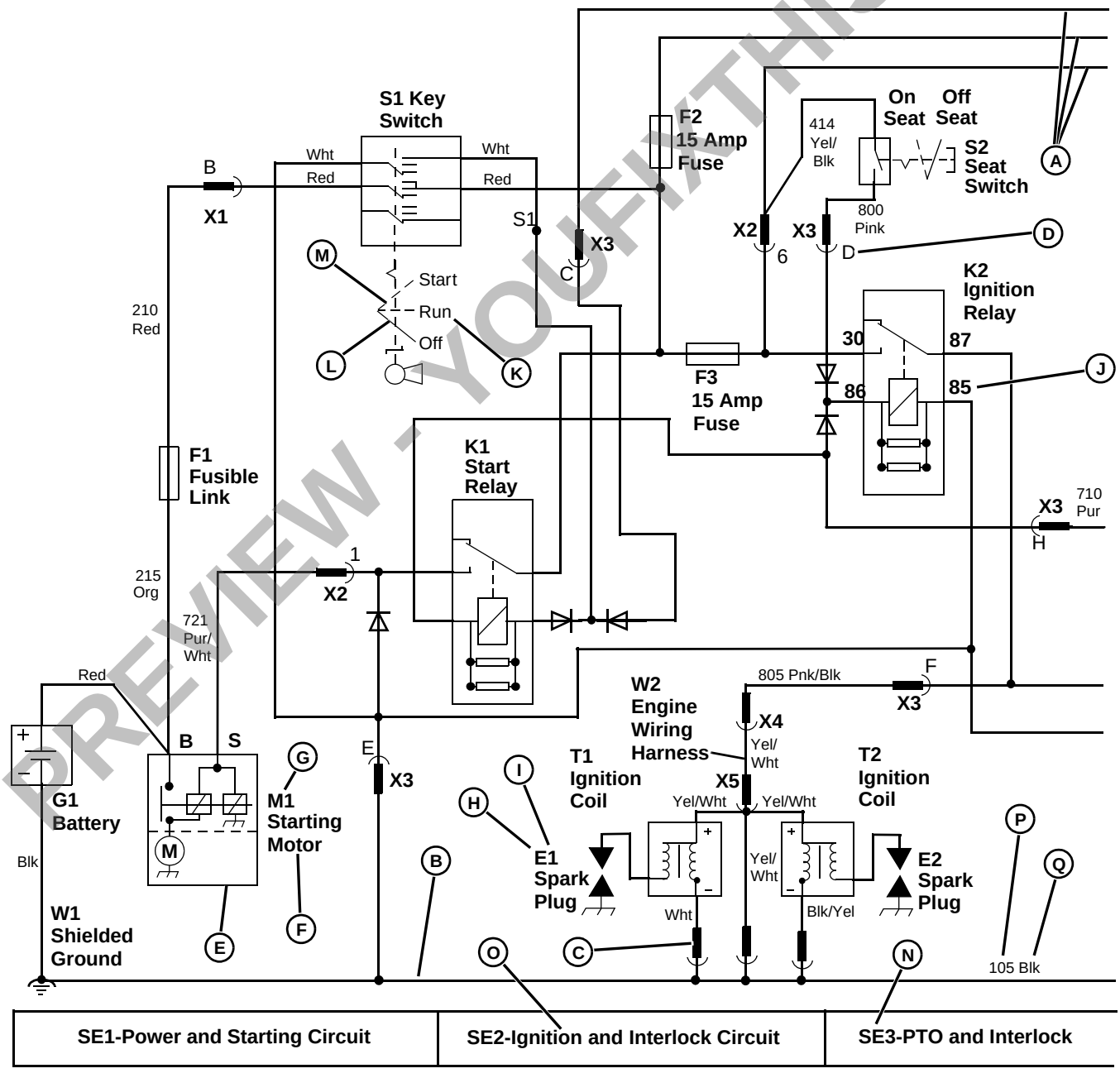
Each component is shown by a symbol (E), its name (F), and an identification code (G). The identification code contains a device identifying letter (H) and number (I).

The identifying letter is always the same for a specific component, but the identifying numbers are numbered consecutively from upper left to lower right. The terminal designation (J) is placed directly outside the symbol next to the connecting wire path. Switch positions (K) are also placed directly outside the symbol. The solid line (L) shows the position the switch is currently in and dash lines (M) represent other switch positions.

Each circuit is identified at the bottom of the drawing by a section number (N) and section name (O).

The circuit number (P) and wire color (Q) of the wires are shown directly next to the wire path.

The same component name and identification code are used consistently on all diagrams in this section. Components can be easily cross-referenced.

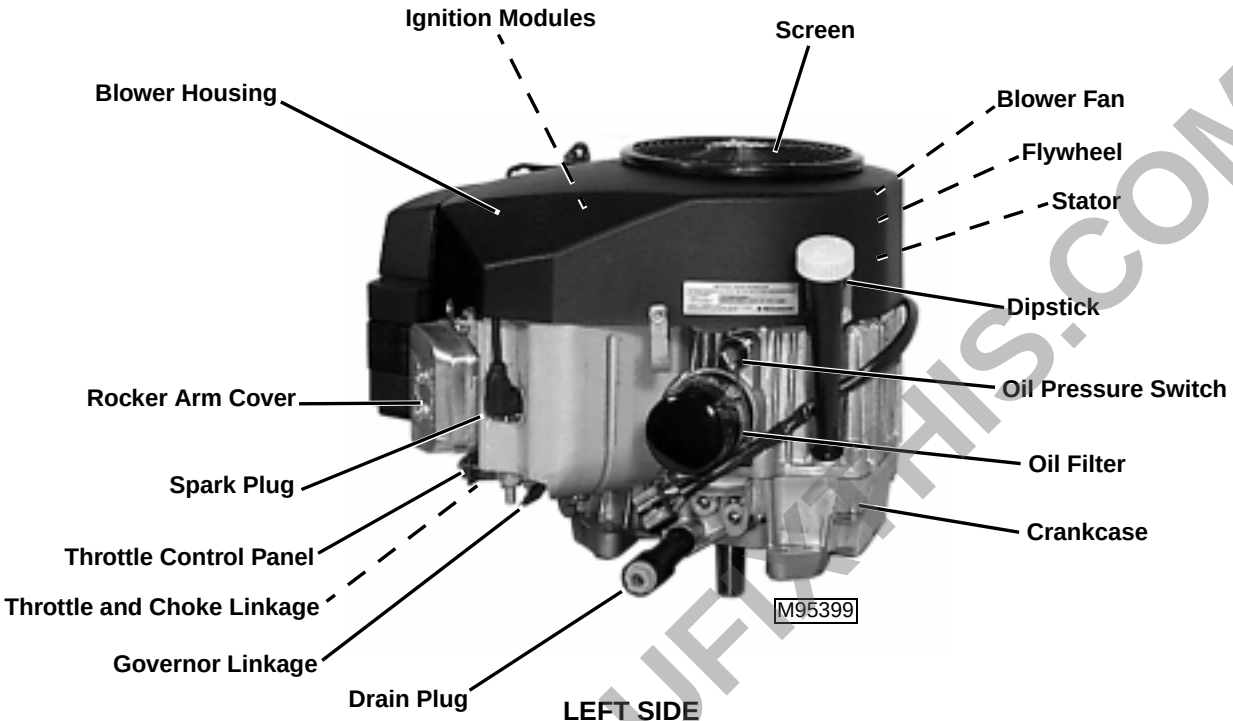


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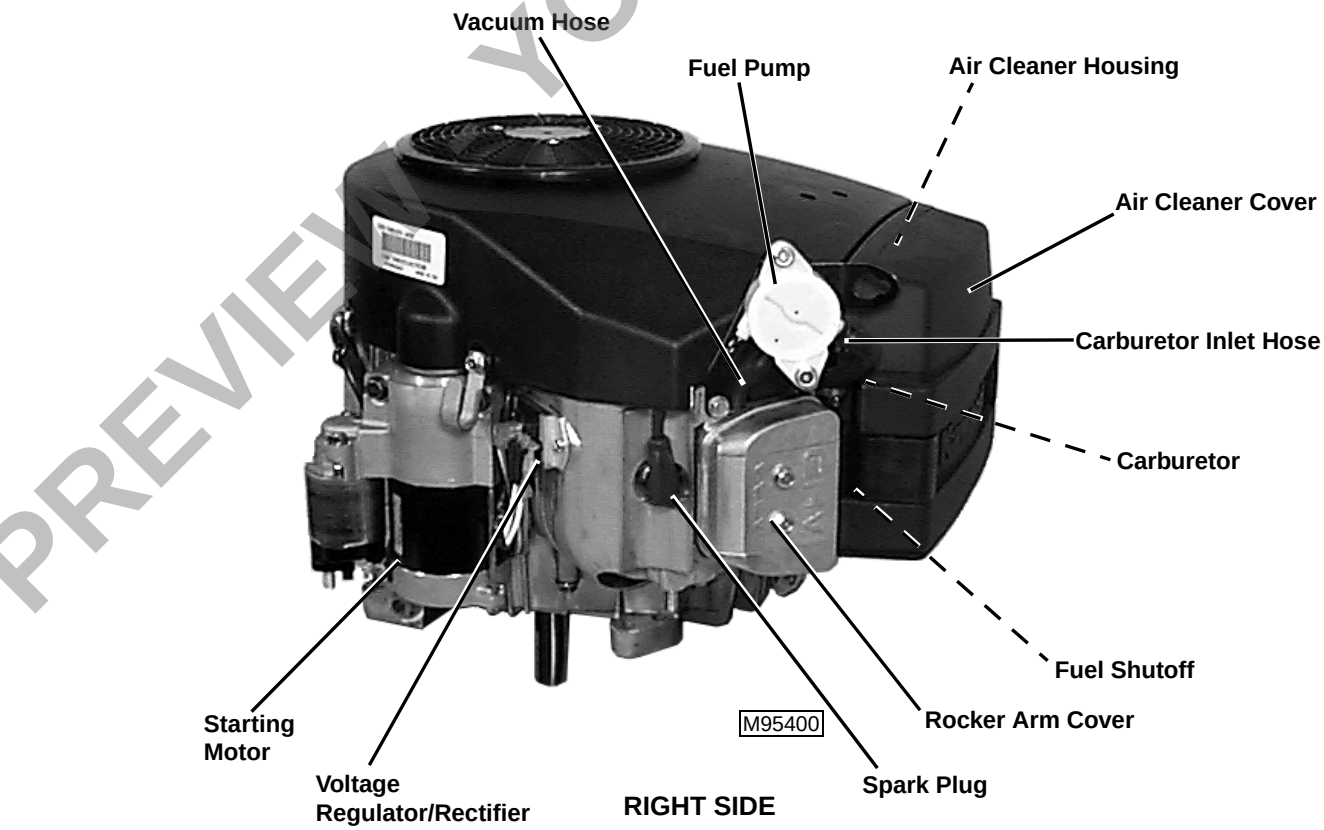
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COMPONENT LOCATION

ENGINE COMPONENTS



LEFT SIDE



RIGHT SIDE

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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 stalls frequently.	Engine backfires.	Engine surges, or has uneven or uncontrolled rpm.	Engine misses.	Engine has low power.	Engine has no spark.	Engine will not crank.	Lack of fuel in carburetor.	Engine floods.	Exhaust smoke black or uses too much fuel.	Exhaust smoke blue or has excessive oil consumption.	Engine has low oil pressure.	Fuel in oil.	Engine overheats.	Excessive engine noise or vibration.
Spark plug fouled, defective, or gap not correct. Incorrect spark plug.		●				●	●	●				●			●	●	
Defective ignition components.	●	●	●	●	●	●	●	●				●			●		
Starter worn. Cranking rpm too slow.	●																
Fuel filter or line restricted. Fuel pump weak, restricted, or leaking. Fuel stale, contains water, or wrong type.	●	●	●	●	●	●	●			●		●	●				
Fuel pump not operating.	●	●	●		●		●			●							
Air filter element(s) plugged, oil soaked, or restricted.	●	●	●		●	●	●					●			●		
Choke, throttle, or governor linkage misadjusted. Carburetor misadjusted.	●	●	●	●	●	●	●				●	●			●		
Carburetor worn, contaminated with debris or varnish. Passages plugged. Wrong jets.	●	●	●	●	●	●	●								●		
Carburetor, intake manifold, or cylinder head gaskets leaking or damaged.	●	●	●	●	●	●	●									●	●
Low compression from worn piston, rings, cylinder, valves or warped head.	●	●	●		●	●	●						●				●
Valve clearance incorrect. Burned or warped valves and seats. Defective springs.	●	●	●	●	●	●	●		●								

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TESTS AND ADJUSTMENTS

THROTTLE CABLE CHECK AND ADJUSTMENT

Reason:

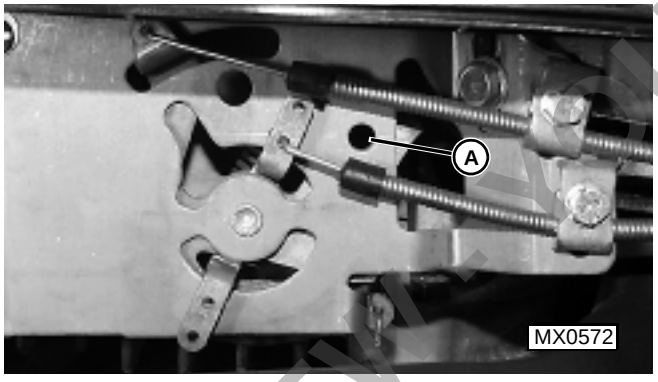
To make sure the throttle control arm contacts the slow idle stop at slow idle.

Equipment:

- 6 mm (1/4-in.) Drill Bit

CHECK Procedure:

1. Park machine on level surface.
2. Turn key switch OFF.
3. Move forward/reverse pedals to NEUTRAL position. Engage parking brake.
4. Remove hood.
5. Move throttle control lever from SLOW idle to FAST position.



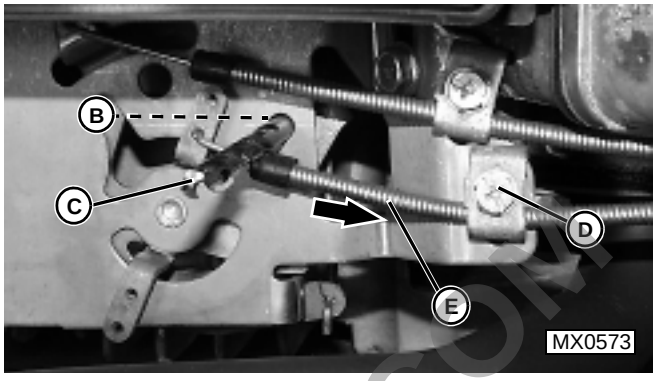
6. Check holes (A) in control panel and throttle arm. They MUST be in visual alignment.
7. Move throttle control lever into SLOW position, then back into FAST idle position. Again, holes in control panel and throttle arm MUST be aligned.

Results:

- If holes align in both positions, throttle cable is OK. Check choke cable for proper adjustment.
- If holes DO NOT align, perform ADJUSTMENT Procedure.

ADJUSTMENT Procedure:

1. Move throttle control lever to FAST idle position.



2. Align hole in throttle arm (B) with hole in control panel. Insert a 6 mm (1/4 in.) drill bit (C) through holes to keep throttle arm from moving. Be sure drill bit is perpendicular to the control panel.
3. Loosen screw (D).
4. Pull throttle cable (E) back (arrow) and tighten screw (D).
5. Remove drill bit.
6. Repeat CHECK Procedure.
7. Move throttle control lever through full range several times to be sure linkage is not binding.

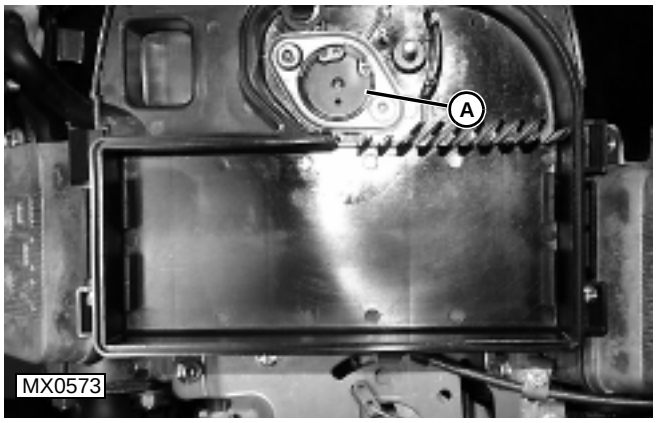
CHOKE PLATE CHECK AND ADJUSTMENT

Reason:

To make sure the choke plate is fully open when the choke control lever is in OFF position.

CHECK Procedure:

1. Remove air cleaner cover and air filter.

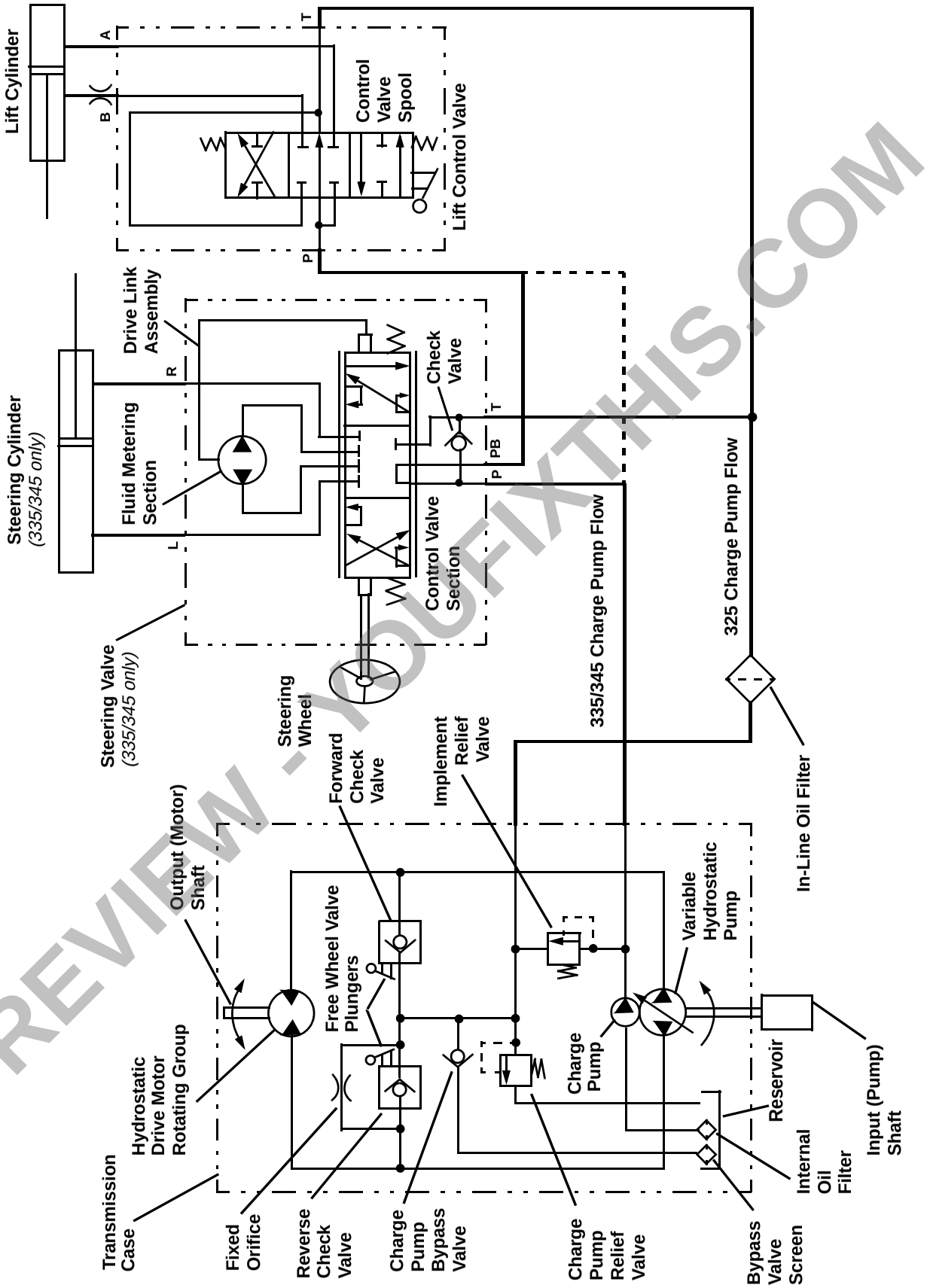


2. Move choke control lever to full CHOKE position. Check that choke valve (A) is fully closed.
3. Move choke control lever to fully open position. Check that choke valve is fully open.

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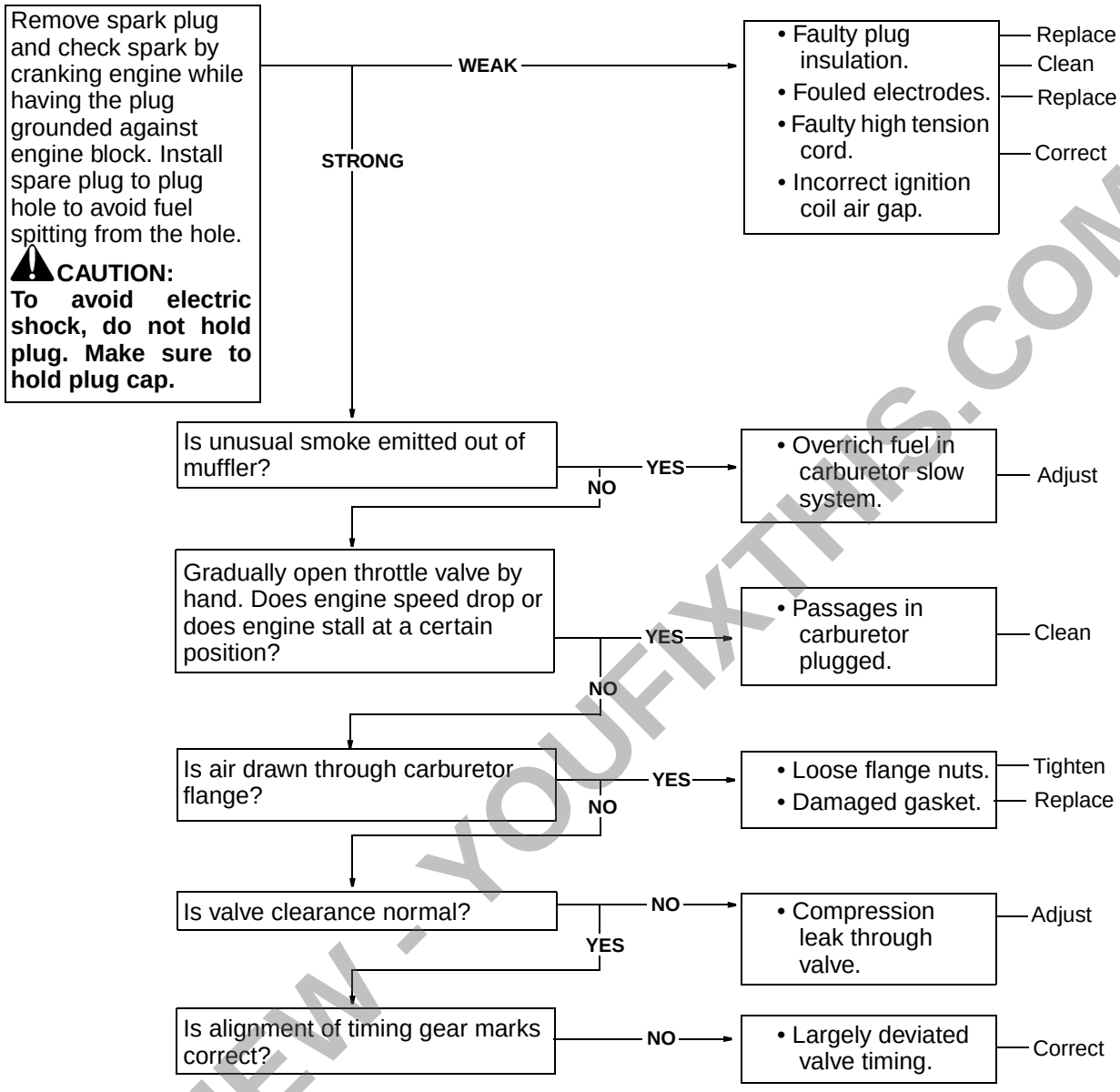
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HYDRAULIC SCHEMATIC



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Engine Malfunctions at Low Speed



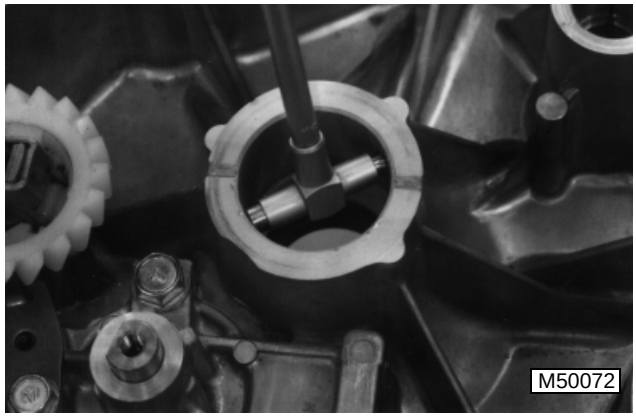
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Connecting Rod Journal OD (Wear Limit):

Standard . . . . . 34.93 mm (1.375 in.)

Resizing Specifications:

A . . . . . 34.470—34.457 mm (1.357—1.356 in.)
B . . . . . 2.0—2.4 mm (0.078—0.094 in.)
C (Maximum). . . . . 39.40 mm (1.551 in.)
D . . . . . 34.05—33.95 mm (1.340—1.337 in.)



6. Measure crankshaft main bearing diameter in crankcase and crankcase cover. Replace crankcase cover or crankcase if diameter is **greater than 35.15 mm (1.384 in.)**.

CRANKSHAFT OIL SEALS REPLACEMENT

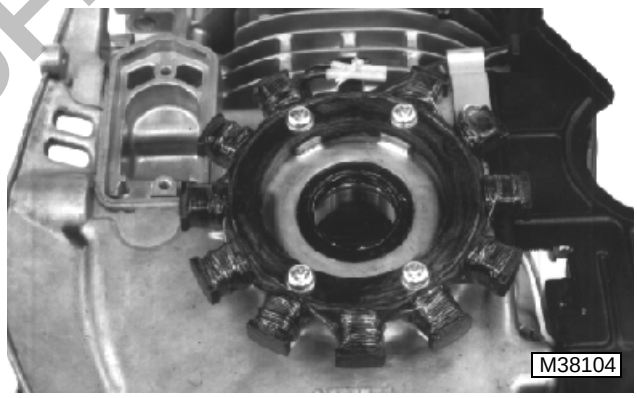
Removal:

1. Flywheel End: Remove crankshaft.
2. PTO End: Remove crankcase cover.
   - Remove worn or damaged seals using a screwdriver.
   - Install seals with lip toward inside of engine using a driver set. Press in seals until flush with flange surface.
   - Pack lithium based grease inside lips of seals.

Replacement:

1. Remove crankshaft.
   - Remove worn or damaged seal using a screwdriver. Install seal with spring-held seal lip toward inside of engine using seal and driver set. Press in seal until flush with hub.
   - Pack lithium based grease inside lips of seal.

FLYWHEEL SIDE



PTO SIDE

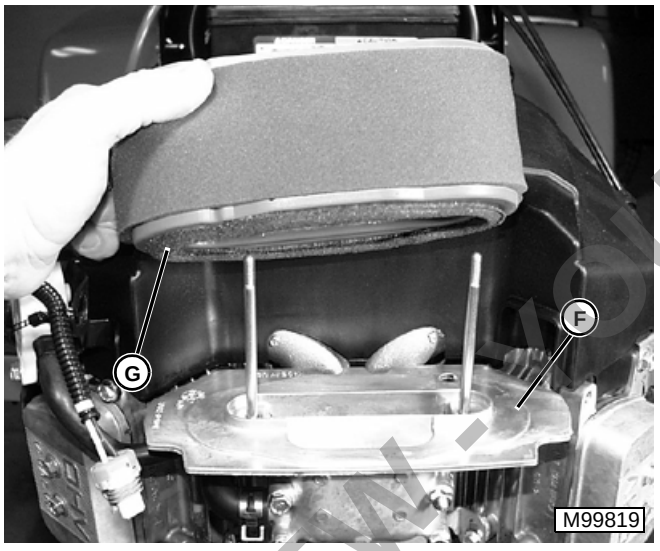


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6. Remove the two wing nuts (C) and lift the air filter (D) and foam element (E) off of the air cleaner base.
7. Remove the foam element (E) from the air cleaner (D).
8. Wash foam element (E) in detergent and water. Dry element.
9. Apply 12—15 drops of clean engine oil to foam element (E). Squeeze out excess oil.

IMPORTANT: Do not clean paper element with solvent or compressed air.

10. Gently tap paper element (D) to remove dust.
11. Inspect element.
    - Element is still usable if you can see light through it and element appears clean.
    - Replace if oily, dirty, or damaged in any way.



12. Inspect air cleaner cover, foam gasket (F), and air cleaner base (G) for damage. Replace parts as necessary.
13. Assemble and install air cleaner.

CARBURETOR REMOVAL AND INSTALLATION

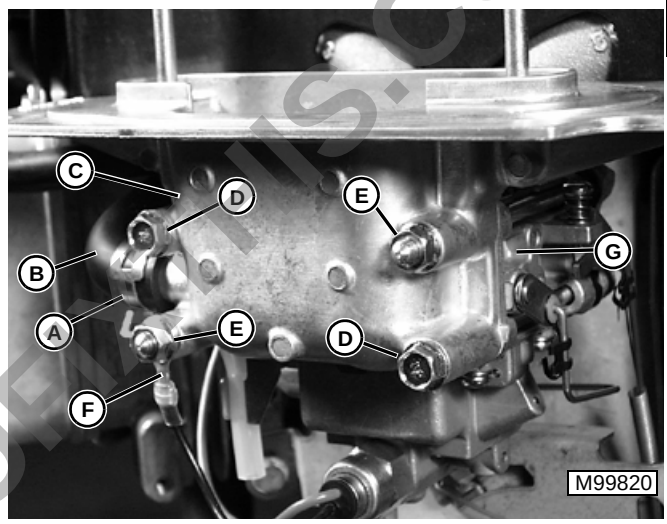
Removal:

1. Park machine on level surface.
2. Turn key switch OFF.
3. Move forward/reverse pedals to NEUTRAL position. Engage parking brake.
4. Remove engine hood. (See “ENGINE HOOD” on page 6 of MISCELLANEOUS SECTION.)

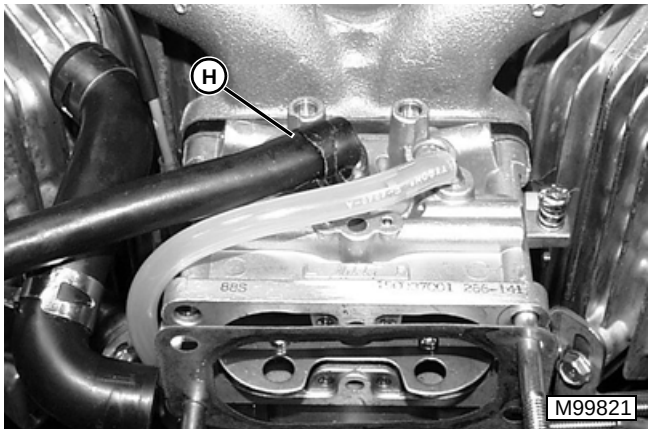
⚠ CAUTION

Gasoline is extremely flammable. Do not smoke. Always work in a ventilated area away from open flame or spark producing equipment, this includes equipment that utilizes pilot lights.

5. Remove air cleaner cover and air filter assembly. (See “AIR CLEANER ASSEMBLY” on page 26.)



6. Loosen the clamp (A) and remove the breather hose (B) from the air cleaner base (C).
7. Remove the two capscrews (D) and two nuts (E) and fuel shutoff solenoid ground wire (F) holding the carburetor (G) and air cleaner base (C) to the intake manifold.
8. Carefully pull air cleaner base (C) away from carburetor (G).



9. Remove and plug the fuel inlet hose (H).

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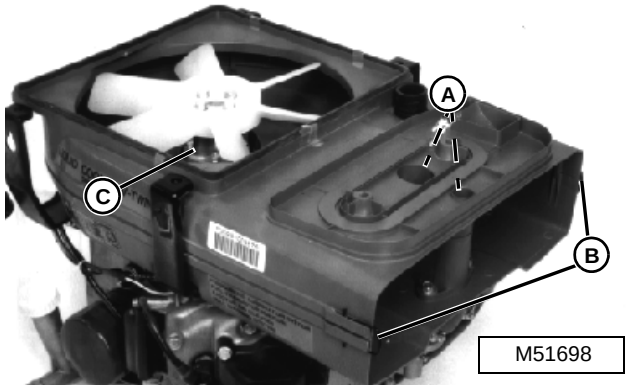
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COOLING AIR DUCT

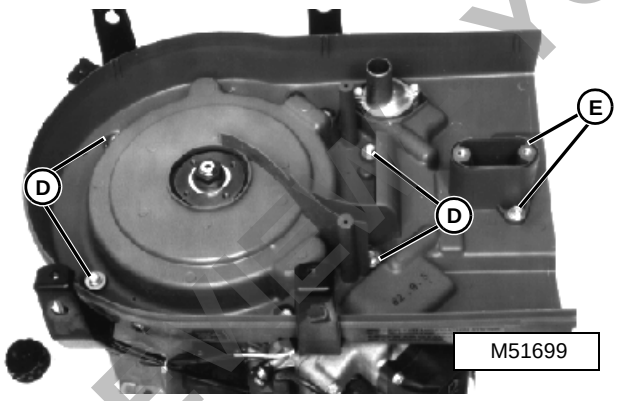
Removal and Installation:

1. Remove radiator.
2. Remove air cleaner assembly.



IMPORTANT: Remove cap screws and collars (A and E) carefully. Parts may fall into the air intake.

3. Remove cap screws and collars (A).
4. Remove retaining clips (B).
5. Remove cooling fan and fan extension (C).
6. Remove top half of air duct.



7. Remove caps screws (D).
8. Remove cap screws and collars (E).
9. Remove lower half of air duct.

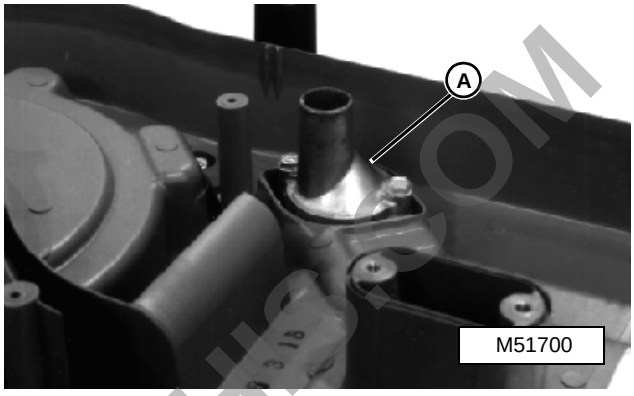
Installation is done in the reverse order of removal.

- Tighten all cap screws to **6 N•m (53 lb-in.)**.

THERMOSTAT

Removal and Installation:

1. Remove top half of cooling air duct.



2. Remove housing (A), gasket, and thermostat.
3. Test thermostat. (See *Opening Test* procedure.)

Installation is done in the reverse order of removal.

- Use new gasket for installation.
- Tighten housing cap screws to **6 N•m (53 lb-in.)**.

Opening Test:

Reason:

To determine opening temperature of the thermostat.

Test Equipment:

- Thermometer
- Glass Container
- Heating Unit

Procedure:

CAUTION

DO NOT allow thermostat or thermometer to rest against the side or bottom of the glass container when heating water. Either may rupture if overheated.

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SPECIFICATIONS

Battery:

Voltage . . . . . 12 VDC
Corrected Specific Gravity (Minimum) 1.225

Spark Plug:

Type . . . . . Champion RC12YC
Gap . . . . . 1.02 mm (0.040 in.)
Torque . . . . . 27 ± 2.6 N•m (20 ± 2 lb-ft)

Stator:

Size . . . . . 15 amps
Regulated Amperage (Minimum) at Fast Idle . . . . . 13 amps
Regulated Voltage (Minimum) at Fast Idle . . . . . 12.2—14.7 volts DC
Unregulated Voltage (Minimum) at Fast Idle
325/335 . . . . . 34 volts DC
345 . . . . . 26 volts DC
Resistance
325/335 . . . . . 0.24—0.40 ohms
345 . . . . . 0.12—0.19 ohms

Starter:

Maximum Amperage (Load) . . . . . 85 amps at 500 rpm

Ignition Coil—345:

Primary Coil Resistance . . . . . 3.4—4.6 ohms
Secondary Coil Resistance . . . . . 10,400—15,600 ohms

Pulser Coil (345):

Resistance . . . . . 88—132 ohms

Electric PTO Clutch:

Air Gap . . . . . 0.31—0.46 mm (0.012—0.018 in.)
Resistance . . . . . 2.4—2.7 ohms
Current Draw . . . . . 4 amps

Coolant Temperature Switch (345):

Closing Temperature . . . . . 111°C (232°F)

Lighting:

Headlights . . . . . GE 1156 or equivalent

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PTO CIRCUIT DIAGNOSIS - 325/335

Test Conditions:

- Key switch in RUN position—Engine not running.
- Operator ON seat. (Seat switch CLOSED)
- PTO/RIP switch in OFF position.

Test/Check Point	Normal	If Not Normal
1. Key switch—X1 connector	Battery voltage	Check F1 fusible link, 210 Red wire, X1 connector to key switch and connections.
2. Interlock circuit Board—"A" solder joint connection	Battery voltage	Replace interlock circuit board.
3. Interlock circuit board—Terminal X3-6	Battery voltage	Check fuse (F3). If OK, replace interlock circuit board.
4. Seat switch	Battery voltage	Check 414 Yel wire and connections.
5. Interlock circuit board—Terminal X2-D	Battery voltage	Check 800 Pnk wire and connections. If OK, replace seat switch.
6. Interlock circuit board—Terminal X2-F	Battery voltage	Check fuse (F3). If OK, replace interlock circuit board.
7. Interlock circuit board—Terminal X3-3	NO Battery voltage	Verify brake is OFF and drive pedals are in neutral. If OK, replace interlock circuit board.
8. Engine connector—X4	Battery voltage	Check 416 Yel wire and connections.
9. PTO/RIP switch	Battery voltage	Check 451 Yel/Blk wire and connections.
10. PTO/RIP switch	Battery voltage	Replace PTO/RIP switch
11. RIO switch	Battery voltage	Check 752 Org wire and connections.
12. Interlock circuit board—Terminal X2-A	Battery voltage	Check 753 Blu wire and connections. If OK, replace RIO switch.
13. Interlock circuit board—Terminal X3-5	Battery voltage	Check 750 Blu wire and connections.
14. Interlock circuit board—Terminal X3-4	Battery voltage	Check 756 Blu wire and connections.

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IGNITION CIRCUIT DIAGNOSIS - 345

Test Conditions:

- Key switch in OFF position
- Brake ON (brake/neutral start switch CLOSED.)
- PTO/RIP switch OFF (DISENGAGED)
- Engine cool to avoid burns

Test/Check Point	Normal	If Not Normal
1. Spark plugs	Spark plug not fouled. Correct air gap.	Adjust air gap. Replace spark plug.

Test Conditions:

- Key switch in START position
- Brake ON
- PTO/RIP switch OFF (DISENGAGED)

NOTE: Engine will turn over and can start during this test

2. Spark plug tester installed	Spark present at tester	No spark present: Test ignition coils and ignition module. Spark present: Check spark plug gap and condition of spark plugs. If plugs are good, continue testing ground circuit.

Test Conditions:

- Key switch in RUN position (engine not running).
- Operator on seat (Seat switch CLOSED.)
- Brake ENGAGED (brake/neutral start switch CLOSED.)

Test/Check Point	Normal	If Not Normal
3. Key switch—X1 connector	Battery voltage	Check (F1) fusible link, 210 Red wire, X1 connector to key switch and connections
4. Interlock circuit board—"A" solder joint connection	Battery voltage	Replace interlock circuit board (A3).
5. Interlock circuit board—Terminal X7-6	Battery voltage	Check fuse (F3). If OK, replace interlock circuit board (A3).
6. PTO/RIP switch	Battery voltage	Check 410 and 411 Yel/Blk wires and connections.
7. Brake/Neutral start switch	Battery voltage	Check 705 Pur wire and connections. If OK, replace PTO/RIP switch.
8. Interlock circuit board—Terminal X7-3	Battery voltage	Check 710 Pur wire and connections. If OK, replace brake/neutral start switch.
9. Seat switch	Battery voltage	Check 414 Yel wire and connections.
10. Interlock circuit board—Terminal X6-D	Battery voltage	Check 800 Pnk wire and connections. If OK, replace seat switch.

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FUEL SHUTOFF SOLENOID CIRCUIT OPERATION - 345

Function:

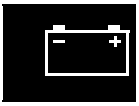
To energized the fuel shutoff solenoid when the ignition relay is energized.

Operating Conditions:

- Key switch in START or RUN position
- Operator on seat (Seat switch CLOSED)

or

- PTO/RIP switch in OFF position
- Brake ENGAGED
  (Brake/neutral start switch CLOSED)



System Operation:

NOTE: The key switch is connected to the printed circuit board (A3 Interlock Circuit Board) by soldered wire connections. The components are solid state and are not serviced separately except for the 15 amp fuses. Lines within dashed border of the Interlock Circuit Board (A3) except for key switch connections are circuit paths on the circuit board and are not wires in the harness.

The fuel shutoff solenoid (Y2) uses an electro-magnetic coil to operate a plunger. The fuel shutoff solenoid plunger stops fuel flow in the carburetor bowl when the solenoid is de-energized. The ignition relay provides power to the fuel shutoff solenoid. When the ignition relay is de-energized, the fuel shutoff solenoid stops fuel flow at the same time the spark is stopped, helping to prevent backfire at engine shutdown.

The power circuit provides current to the key switch (S1), energizes the ignition relay circuit, and protects the fuel shutoff solenoid circuit with a 15 amps fuse (F3). Current cannot flow to the fuel shutoff solenoid until the ignition relay is energized. The ignition relay coil is energized by current from the seat switch circuit or neutral start circuit. Current flows from the battery (G1) positive (+) terminal to the fusible link (F1), and key switch. With the key switch in the RUN position, current flows to the 15 amp fuse (F3), ignition relay common terminal, 414 Yel wire, seat switch (S2), 800 Pnk wire to the interlock circuit board to energize the ignition relay. The ignition relay provides output power at the X6-F connection to 805 Pnk/Blk wire, X9 connector (engine wire harness W7), Yel/Wht wire, X10 connector (engine wire harness W8), Gry wire to the fuel shut off solenoid. The ignition relay can also be energized through the neutral start circuit. From the interlock circuit board X6-F connection, current flow to the 410, 411 Yel/Blk wires, PTO/RIP switch (S4) normally closed contacts, 705 Pur wire, brake/neutral start switch (S5) normally open contacts, 710 Pur wire, interlock circuit board connection X7-3 to the ignition relay. Then, just as if the circuit had been energized by the seat switch, the ignition relay closes and allows current flow to the fuel shutoff solenoid.

Ground is provided through the engine block and shielded ground.

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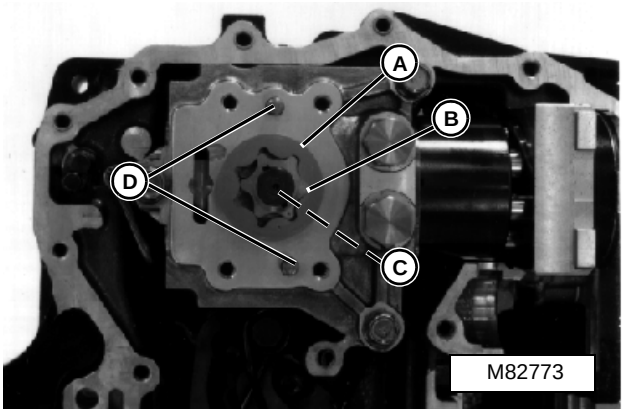
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TROUBLESHOOTING

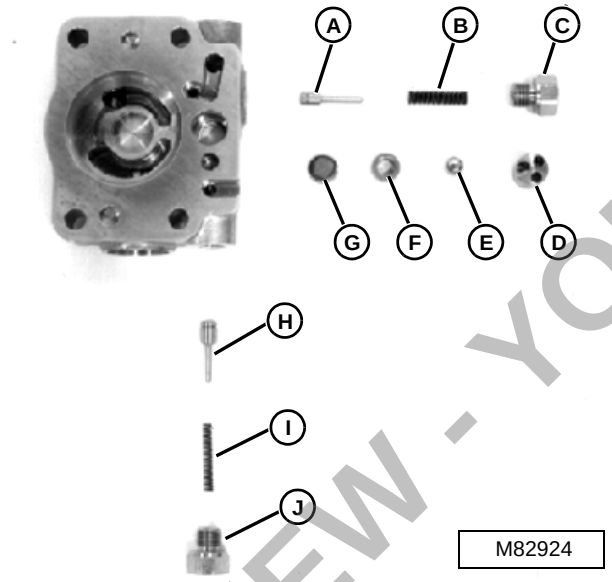
Problem or Symptom / Check or Solution	Tractor will not move forward or reverse.	Transaxle noisy.	Tractor moves with control pedals in neutral and brake not applied.	Tractor returns to neutral too slowly after releasing forward or reverse pedal.	Tractor moves in forward direction only.	Tractor moves in reverse direction only.	Erratic speed.	Tractor does not achieve full ground speed.	Tractor will not move in forward or is slow in forward.	Tractor is slow in reverse.	Tractor is too aggressive in forward or reverse.	Parking brake does not hold tractor on hill.	Neutral start switch will not engage.	Free wheel valve will not stay open with engine off.
Oil level low.	●	●					●	●	●	●				
Temperature too cold.		●	●	●				●						
Wrong oil/incorrect viscosity.		●	●	●						●		●		
Control linkage out of adjustment or damaged.	●		●	●	●	●		●	●	●			●	
Forward or reverse pedals binding in footrest openings.			●	●			●							
Brake linkage damaged.	●	●					●	●	●	●		●	●	
Defective neutral switch.													●	
Parking brake engaged.	●	●							●	●				
Traction drive belt broken, worn, etc.	●						●	●	●	●				
Air in system.		●					●	●	●	●				
Check pivot free wheel lever for binding/debris/paint between lever and housing.														●
Internal oil filter plugged.	●	●					●	●	●	●				
Cooling fan broken. Oil too hot.								●	●	●				
Debris/trash on transaxle. Oil too hot.								●	●	●			●	
Water in oil.		●					●							
Shock absorber binding/ damaged.	●		●	●	●	●		●	●	●	●	●	●	
Neutral eccentric out of adjustment.			●	●								●		
Control arm roll pin broken.	●		●	●				●	●	●				
Control arm broken. [a]	●		●	●	●	●		●	●	●		●		
Internal transaxle damage (pump or motor). [a]	●	●					●	●	●	●				

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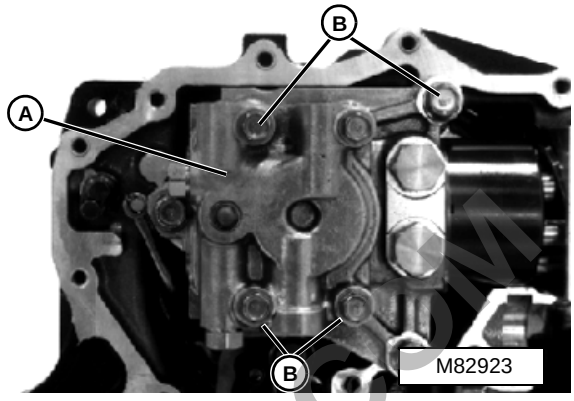


45. Install two locator pins (D) in center case.
46. Install pin (C), inner rotor (B) and outer rotor (A) to center case. Marks on rotors should face same direction.



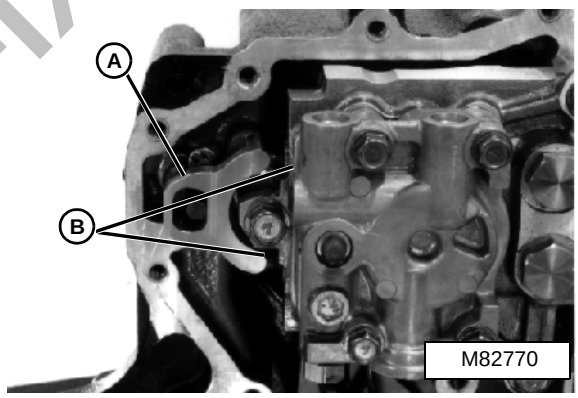
A–Implement Relief Valve	**F–Sleeve**
B–Spring	**G–Screen**
C–Plug	**H–Charge Relief Valve**
D–Orifice	**I–Spring**
E–Ball	**J–Plug**

47. Apply a small amount of petroleum jelly to orifice (D) to hold in place.
48. Install charge pump bypass valve parts (D—G).
49. Install charge relief valve (H), spring (I) and plug (J).
50. Install implement relief valve (A), spring (B) and plug (C).
51. Tighten plugs (C and J) to **22 N•m (195 lb-in.)**.

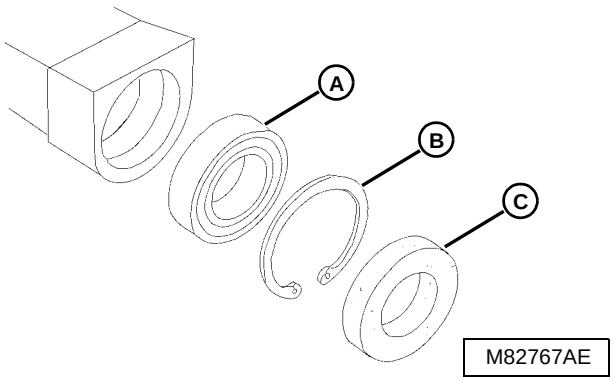


IMPORTANT: Be careful not to damage machined surfaces of pump body, outer rotor, or center case during installation.

52. Install pump body (A) on center case.
53. Install four cap screws (B) into pump body. Tighten to **23 N•m (204 lb-in.)**.



54. Install springs and push pins (B).
55. Push in push pins and install arm (A).
56. Check arm and push pins for free movement.



57. Install axle bearings (A), retaining rings (B), and seals (C) into transaxle top case half.

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NOISE DURING TURN

Test Conditions:

- Machine parked on level surface.
- Parking brake ENGAGED.
- Transmission in NEUTRAL.
- Steering cylinder disconnected from steering link.
- Hydraulic oil at operating temperature.
- Engine running at **fast idle**.

Test/Check Point	Normal	If Not Normal
1. Steering wheel.	Steering wheel turns smoothly with no binding. Steering cylinder extends and retracts. Maximum of 3 revolutions of steering wheel to fully extended cylinder. Compare steering effort with cylinder connected.	Steering cylinder does not move. Go to step 3. Steering cylinder moves. Go to step 4. Steering wheel revolutions more than three. Go to step 4.

Test Conditions:

- Key switch in OFF position.

Test/Check Point	Normal	If Not Normal
2. Steering valve.	No internal or external leakage.	Perform Steering Valve Leakage Test.
3. Steering cylinder.	No external or internal leakage.	Perform Steering Cylinder Leakage Test.
4. Pressure lines from steering valve to steering cylinder.	No sharp bends, restrictions or cracks.	Replace damaged lines.
5. Return lines from steering cylinder to transmission.	No sharp bends, restrictions or cracks.	Replace damaged lines.
6. Front axle spindles.	Axle bushings lubricated. Turns with little resistance with no side freeplay.	Lubricate axle bushings. Replace worn or damaged axle or spindles.
7. Tie rod.	Tie rod not bent. Rod ends are tight. Toe-in within specification.	Replace parts if necessary. Perform Toe-In Adjustment.
8. Steering cylinder ball joint.	Ball joint is tight, not worn and properly lubricated. Rod not bent.	Tighten, lubricate or replace if necessary. Replace if necessary.
9. Steering column.	Steering column not binding. Universal joint not binding or worn.	Replace parts as necessary.

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TESTS AND ADJUSTMENTS

HYDRAULIC LIFT OIL FLOW AND PRESSURE CHECK

Reason:

Check condition of charge pump and implement relief valve setting.

Equipment:

- Four 19 kg (42 lb) Weights

Procedure:

1. Set mower depth control knob and gauge wheels to 25 mm (1 in.) position.
2. Push and hold lift lever forward to lower mower deck to the ground.
3. Place two 19 kg (42 lb) weights on top of mower deck on each side of machine (four total).
4. Engage parking brake.
5. With machine at room temperature, start and run engine at FAST idle for five minutes, to warm up hydraulic oil.
6. Move throttle control lever to **1/2 throttle position (2700—3000 rpm)**.
7. Pull and hold lift lever back to raise mower deck to highest position. Record amount of time it takes to raise mower deck.

Results:

Lift system should raise mower deck within **two seconds**.

- If lift time is not within specification:
- Replace internal transmission filter.
- Check traction drive belt for proper tension, wear or damage. Perform Drive Belt Tension Adjustment. (See “BELT TENSION ADJUSTMENT” on page 31 in HYDROSTATIC POWER TRAIN section.)
- Check hydraulic lines for sharp bends or restrictions. Replace damaged lines as necessary.
- Check lift cylinder for external or internal leakage. Replace cylinder if necessary.
- Check control valve for external or internal leakage. Repair or replace valve as necessary.
- Internal transmission damage. Remove and repair transmission. (See “TRANSAXLE REMOVAL AND INSTALLATION” on page 32 in POWER TRAIN section.)

REPAIR

HYDRAULIC LIFT CONTROL VALVE

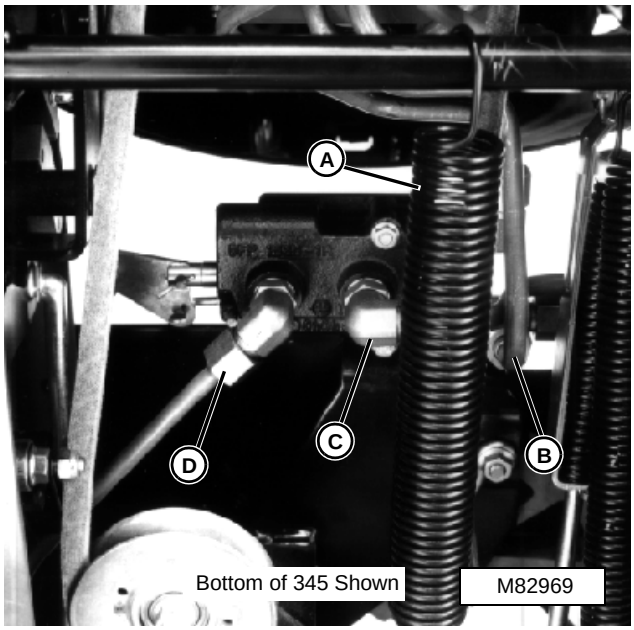
Removal:

CAUTION

Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury may call Deere & Company Medical Department in Moline, Illinois, or other knowledgeable medical source.

1. Remove mower deck. (See procedure in ATTACHMENTS section.)
2. Remove fender deck and tunnel cover. (See procedure in MISCELLANEOUS section.)



A–Drive Belt Tension Spring (shown without cover)

B–Line, Steering Valve Port “T” to Tee Connector (335 and 345 Only)

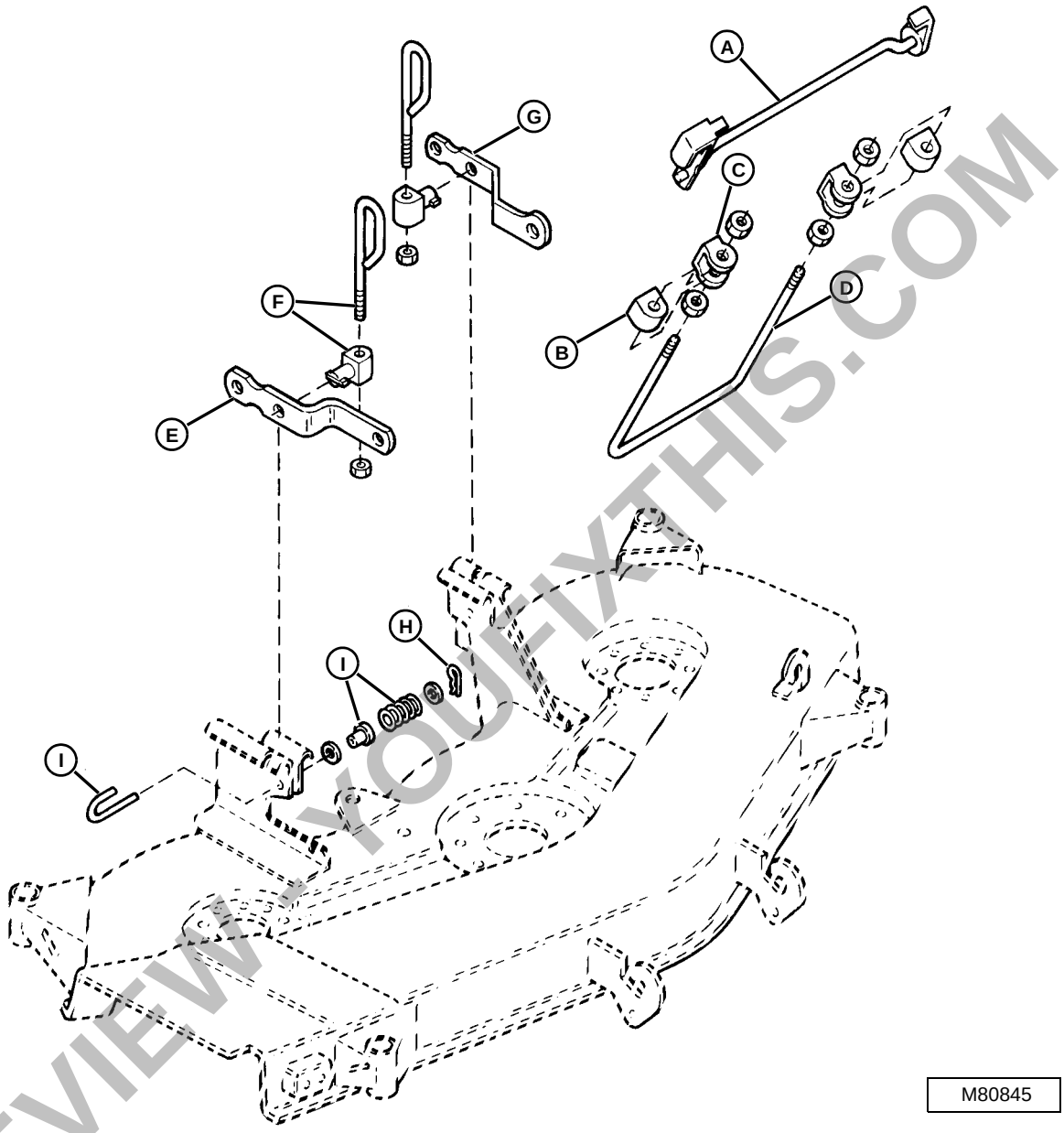
C–Line, Port “B” to Rod End of Lift Cylinder

D–Line, Port “A” to Piston End of Lift Cylinder

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DRAFT ARMS



M80845

A. Pivot
B. Spacer (2 used)
C. Clevis (2 used)
D. Front Draft Rod
E. Rear Draft Arm (RH)
F. Lift Link Assembly (2 used)
G. Rear Draft Arm (LH)
H. Cotter Pin (2 used)
I. QUIK-TATCH™ J-Pin Assembly (2 used)

- Check mower deck side-to-side and front-to-rear adjustment after assembly. (See procedures in Adjustments.)

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