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JOHN DEERE

WORLDWIDE COMMERCIAL & CONSUMER EQUIPMENT DIVISION

325 and 345
Lawn and Garden Tractors

TM1574 Feb-95

TECHNICAL MANUAL

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JOHN DEERE

Litho in U.S.A.

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This technical manual is written for an experieced 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
- Specifications
- Component Location
- System Schematic
- Theory of Operation
- Troubleshooting Chart
- Diagnostics
- Tests and 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.

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.

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 General Information

Engine—325 (FC540V)

Engine—345 (FD590V)

Electrical

Power Train (Hydrostatic)

Steering—325

Steering—345

Brakes

Hydraulics

Attachments

Miscellaneous M

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RECOGNIZE SAFETY INFORMATION



T81389

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.

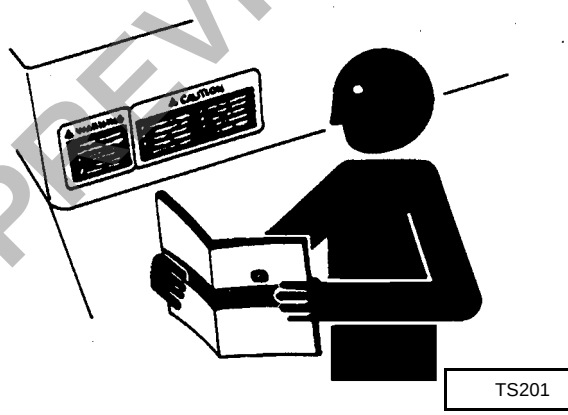
Follow recommended precautions and safe servicing practices.

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

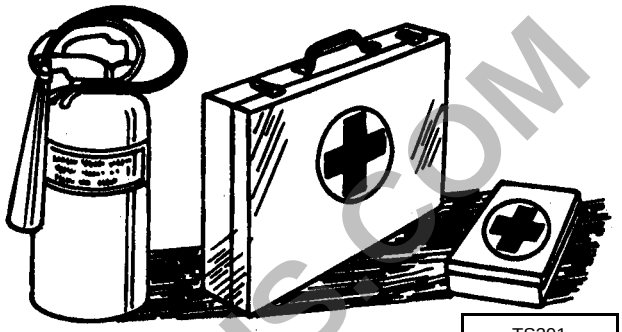


TS201

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



TS291



TS227

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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VEHICLE SPECIFICATIONS

ENGINE- 325

Make	John Deere “K” Series, Air Cooled
Type	Gasoline
Model	FC540V-AS15
Aspiration	Natural
Horsepower (SAEJ1940)	12.6 kW (17 HP)
Cylinders	1
Displacement	535 cm^3 (32.6 cu. in.)
Stroke/Cycle	4 Cycle
Bore	89 mm (3.500 in.)
Stroke	86 mm (3.360 in.)
Compression Ratio	8.3:1
Slow Idle	1550 ± 75 rpm
Fast Idle	3350 ± 50 rpm
Valves	Overhead
Lubrication	Pressurized
Oil Filter	Full Flow Filter
Cooling System	Air Cooled
Air Cleaner	Dual Stage Paper Air Filter and Foam Precleaner
Muffler	Horizontal discharge below frame
Engine Oil Capacity	
With Filter	1.8 L (3.8 U.S. pt)
Without Filter	1.6 L (3.4 U.S. pt)

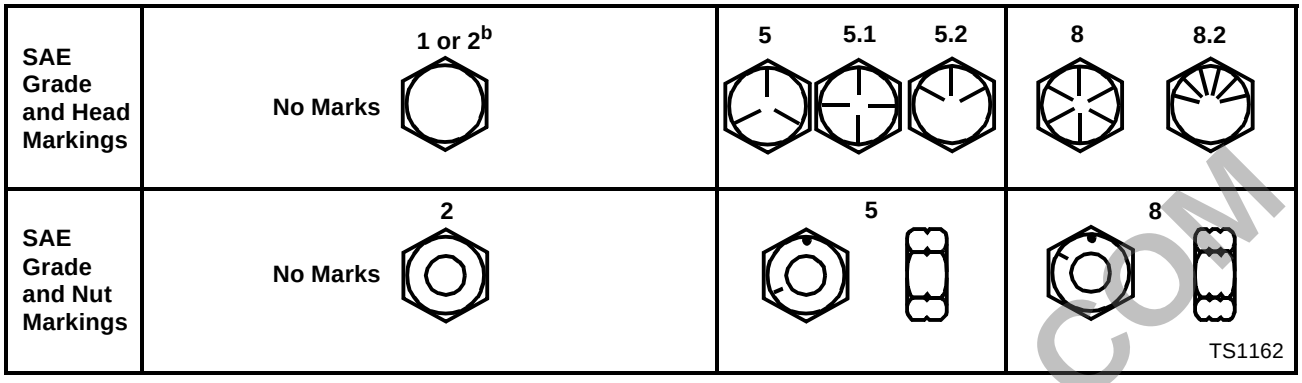
ENGINE- 345

Make	John Deere “K” Series, Liquid Cooled
Type	Gasoline
Model	FC590V-AS04
Aspiration	Natural
Horsepower (SAEJ1940)	13.4 kW (18 HP)
Cylinders	2, V-twin
Displacement	585 cm^3 (35.7 cu. in.)
Stroke/Cycle	4 Cycle
Bore	74 mm (2.900 in.)
Stroke	68 mm (2.700 in.)
Compression Ratio	8.7:1
Slow Idle	1550 ± 75 rpm
Fast Idle	3400 ± 75 rpm
Valves	Overhead
Lubrication	Pressurized
Oil Filter	Full Flow Filter
Cooling System	Liquid Cooled
Coolant Capacity	3.1 L (3.3 qt)
Air Cleaner	Dual Stage Paper Air Filter and Foam Precleaner
Muffler	Horizontal discharge below frame
Engine Oil Capacity	
With Filter	1.9 L (4.0 U.S. pt)
Without Filter	1.7 L (3.6 U.S. pt)

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METRIC BOLT AND CAP SCREW 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	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	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	255	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 values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

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

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original. Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

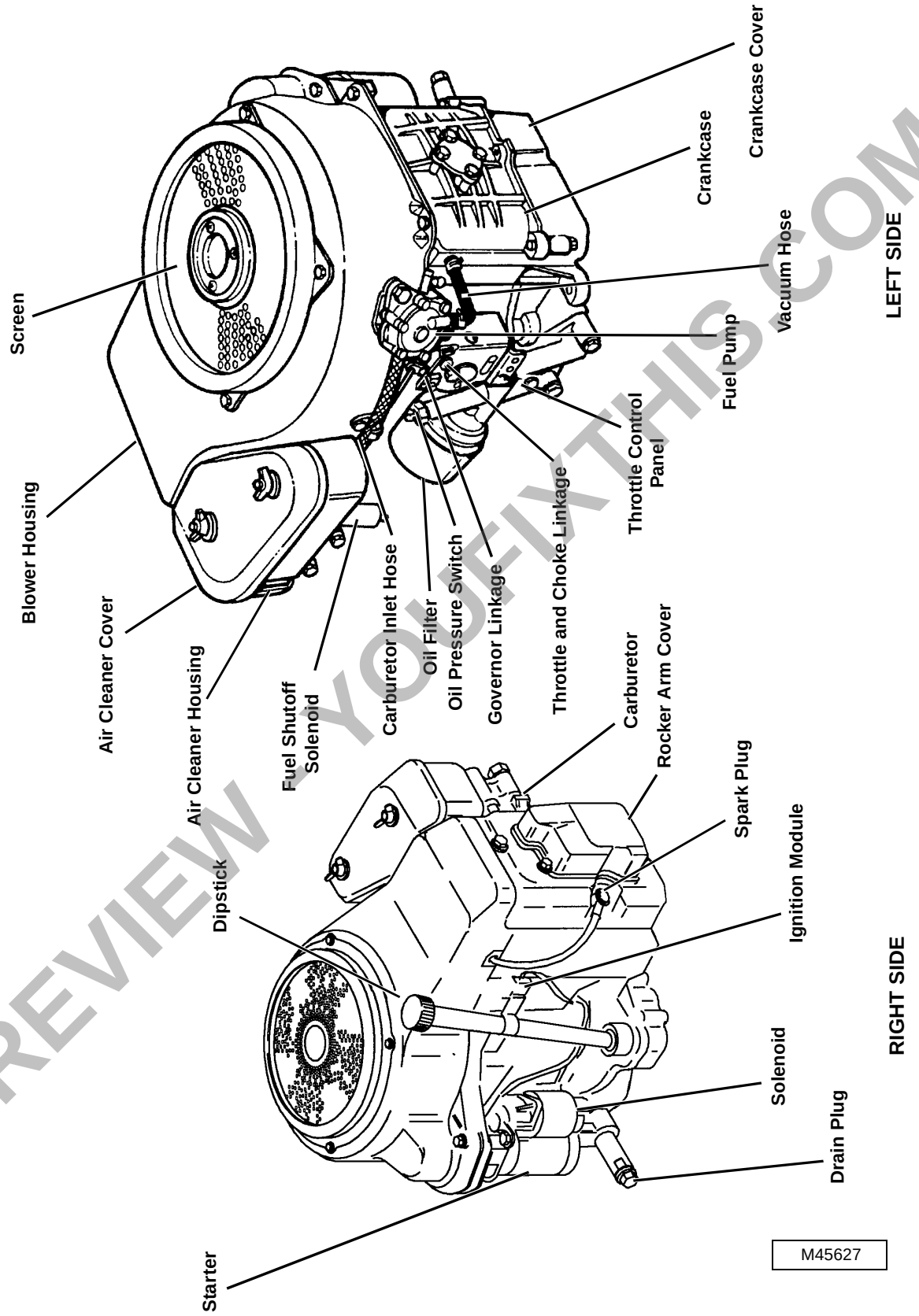
Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

a *"Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.*

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EXTERIOR ENGINE COMPONENTS



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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.	●	●	●	●	●	●	●		●								

Continued on next page.

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THROTTLE CABLE CHECK AND ADJUSTMENT

Reason:

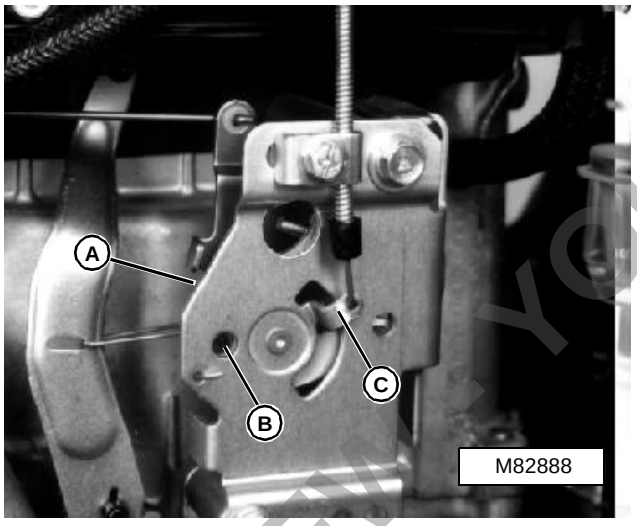
To make sure the throttle control arm contacts the slow idle stop at slow idle.

Equipment:

- 6 mm (15/64-in.) Drill Bit

CHECK Procedure:

1. Move throttle control lever from LOW idle to FAST idle position. A solid "detent" should be felt to assure that control lever is in the FAST idle position.



2. Check holes (B) in control panel (A) and throttle arm (C). They MUST be in visual alignment.

3. Move throttle control lever into CHOKE position, then back into FAST idle position. Again, holes in control panel and throttle arm MUST be aligned.

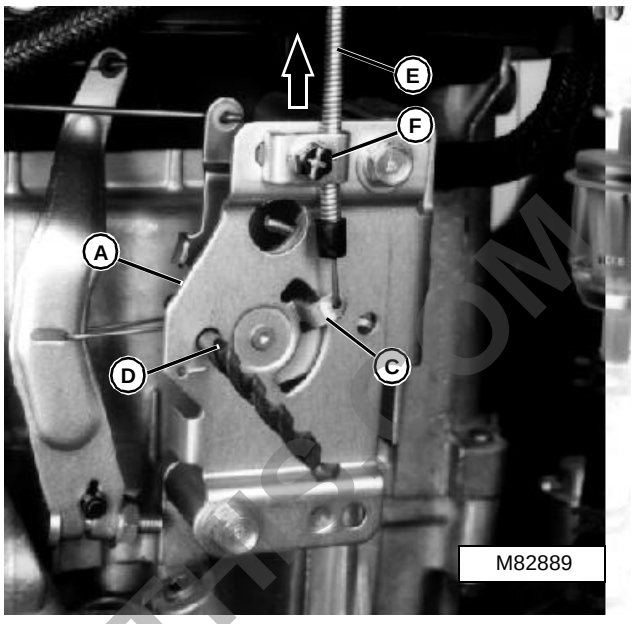
Results:

- If holes align in both positions, throttle cable is OK. Check and adjust choke plate.

- If holes DO NOT align in either position, perform ADJUSTMENT Procedure.

ADJUSTMENT Procedure:

1. Move throttle control lever to FAST idle position.



2. Loosen screw (F).

3. Align hole in throttle arm (C) with hole in control panel (A). Insert a 6 mm (15/64 in.) drill bit (D) through holes to keep throttle arm from moving. Be sure drill bit is perpendicular to the control panel.

4. Pull throttle cable (E) up (arrow) and tighten screw (F).

5. Remove drill bit.

6. Repeat CHECK Procedure.

7. Move throttle control lever through full range to be sure linkage is not binding.

CHOKE PLATE CHECK AND ADJUSTMENT

Reason:

To make sure the choke plate is fully closed when the throttle control lever is in the full choke position.

CHECK Procedure:

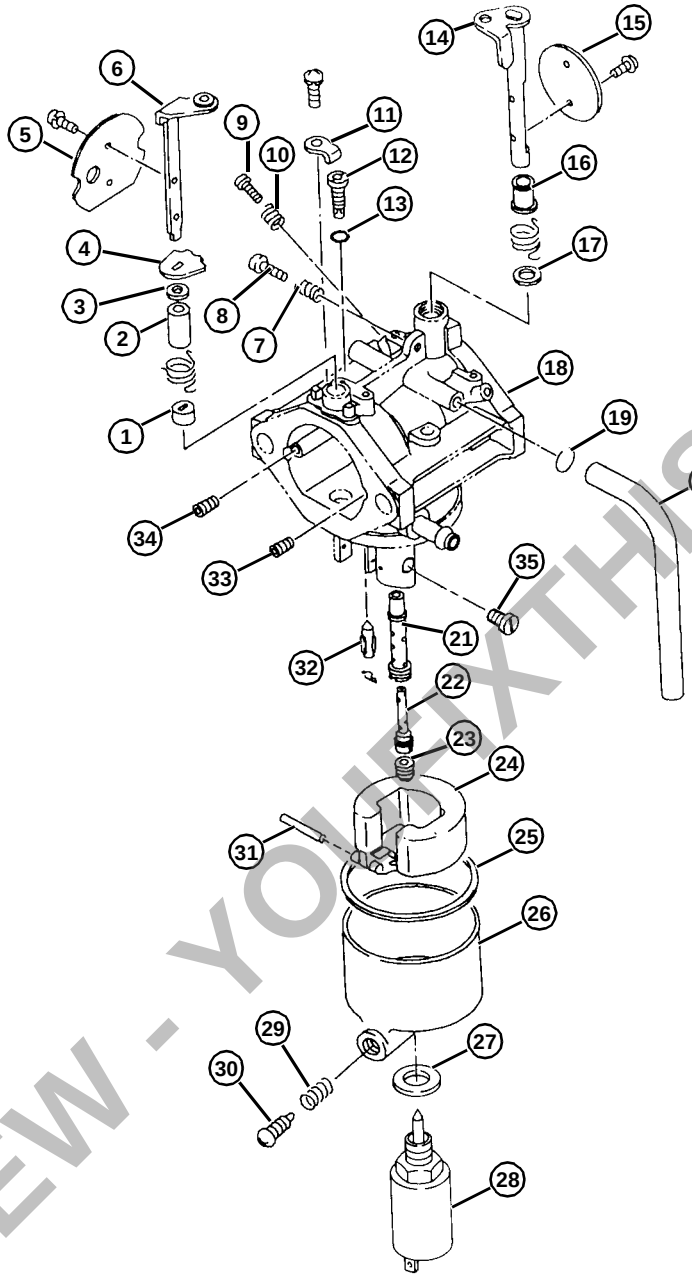
IMPORTANT: Check and adjust throttle cable before adjusting choke, to ensure accurate choke adjustment.

1. Check and adjust throttle cable.

2. Move throttle control lever to full CHOKE position.

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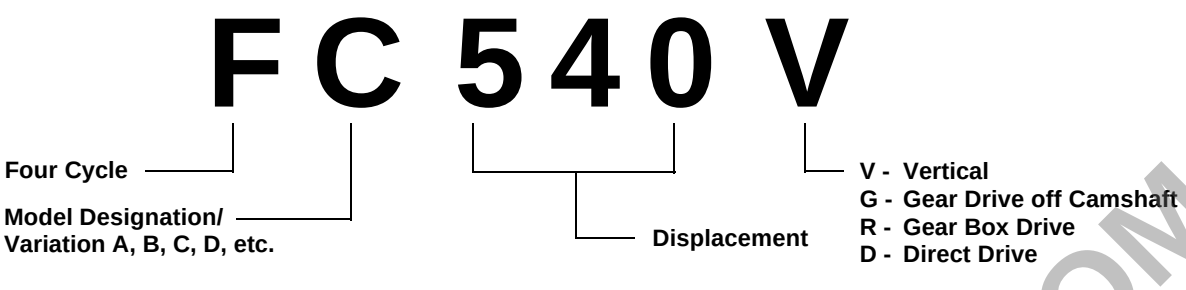


1— Collar
2— Collar
3— Seal
4— Plate
5— Choke Plate
6— Choke Shaft
7— Spring
8— Idle Screw
9— Pilot Screw
10— Spring
11— Plate
12— Pilot Jet
13— O-Ring
14— Throttle Shaft
15— Throttle Plate
16— Ring
17— Seal
18— Carburetor Body
19— Clamp
20— Hose
21— Main Nozzle
22— Bleed Pipe
23— Valve Seat
24— Float
25— Gasket
26— Float Chamber
27— Washer
28— Fuel Shutoff Solenoid
29— Spring
30— Drain Screw
31— Float Pin
32— Needle Valve
33— Air Jet
34— Pilot Air Jet
35— Main Jet

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ENGINE DESIGNATION



TEST AND ADJUSTMENT SPECIFICATIONS

Fast Idle . . . . . 3350 ± 50 rpm
Slow Idle
Throttle control arm SLOW idle
stop screw setting . . . . . 100 rpm higher than carburetor setting
Carburetor SLOW idle stop screw setting . . . . . 1550 ± 75 rpm
Minimum Cylinder Compression Pressure . . . . . .483 kPa (71 psi)
Valve Clearance (cold) . . . . . 0.15 mm (0.006 in.)
Valve Adjustment Screw Jam Nut Torque . . . . . .9 N•m (79 lb-in.)
Valve Cover Cap Screw Torque . . . . . .6 N•m (53 lb-in.)
Minimum Exhaust Valve ACR Movement . . . . . 0.25 mm (0.010 in.)
Minimum Crankcase Vacuum . . . . . .25 cm (10 in.) water
Minimum Engine Oil Pressure:
Fast Idle (3350 ± 50 rpm) . . . . . .240 kPa (35 psi)
Slow Idle (1450 ± 75 rpm) . . . . . .28 kPa (4 psi)
Fuel Pump Minimum Pressure . . . . . .6.12 kPa (0.90 psi)
Fuel Pump Minimum Flow . . . . . 65 ml/15 seconds (2.2 oz/15 seconds)
Crankshaft End Play . . . . . 0.09—0.22 mm (0.004—0.009 in.)
Spark Plug Gap . . . . . 0.76 mm (0.030 in.)
Spark Plug Torque . . . . . .20 N•m (177 lb-in.)

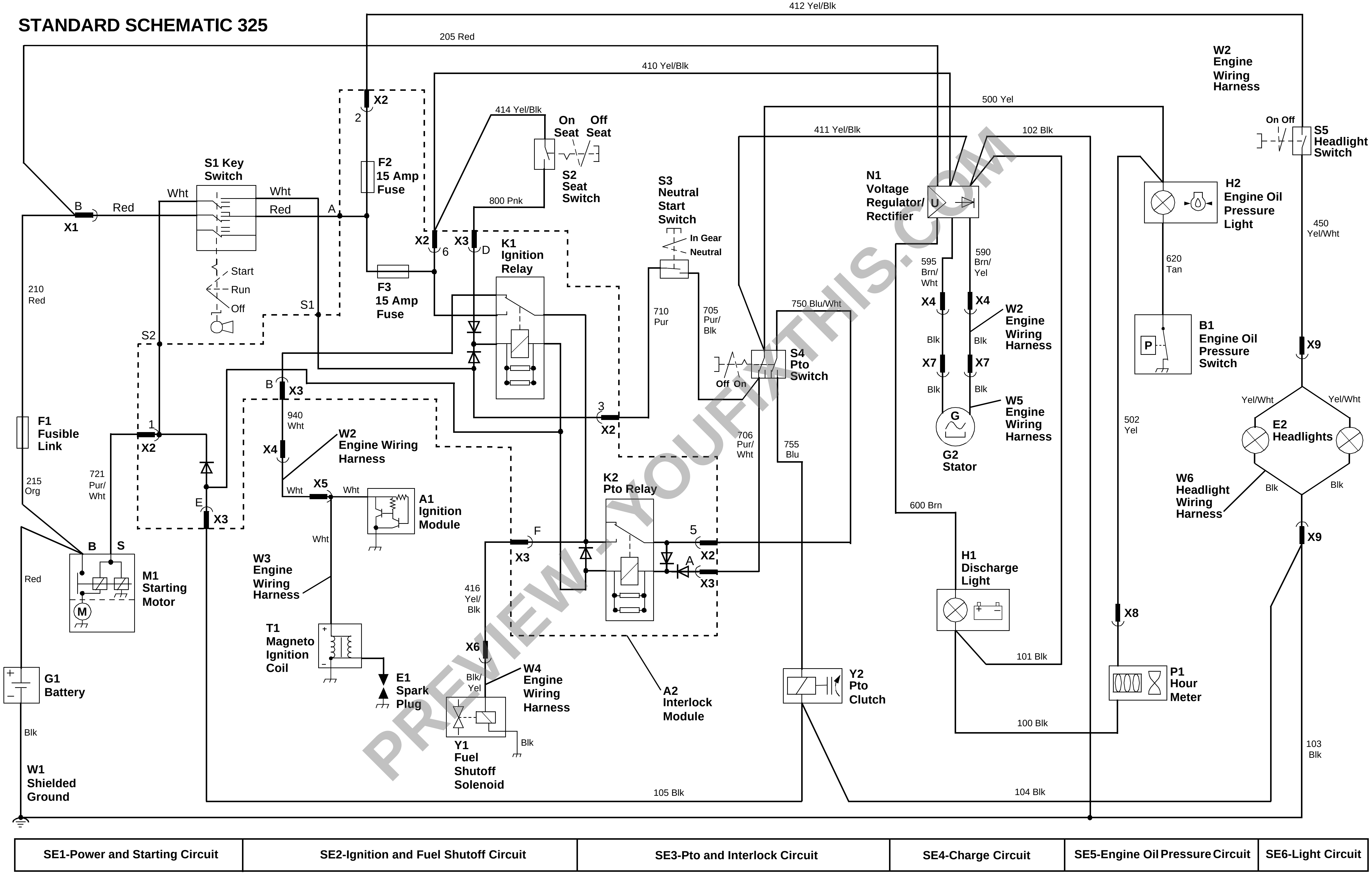
REPAIR SPECIFICATIONS

Engine Oil Capacity
Without Filter . . . . . .1.6 L (3.4 U.S. pt)
With Filter . . . . . .1.8 L (3.8 U.S. pt)
Engine Mounting Cap Screw Torque . . . . . .16 N•m (144 lb-in.)
Breather Air Gap . . . . . 1—2 mm (0.040—0.080 in.)
Valve Adjustment Screw Jam Nut Torque . . . . . .9 N•m (79 lb-in.)
Valve Cover Cap Screw Torque . . . . . .6 N•m (53 lb-in.)
Flywheel Screen Minimum Gap . . . . . 1.5 mm (0.059 in.)
Flywheel Nut Torque . . . . . .172 N•m (127 lb-ft)
Rocker Arm Assembly
Minimum Shaft O.D. . . . . 12.94 mm (0.509 in.)
Maximum Bearing I.D. . . . . 13.07 mm (0.515 in.)
Maximum Push Rod Bend . . . . . 0.30 mm (0.012 in.)

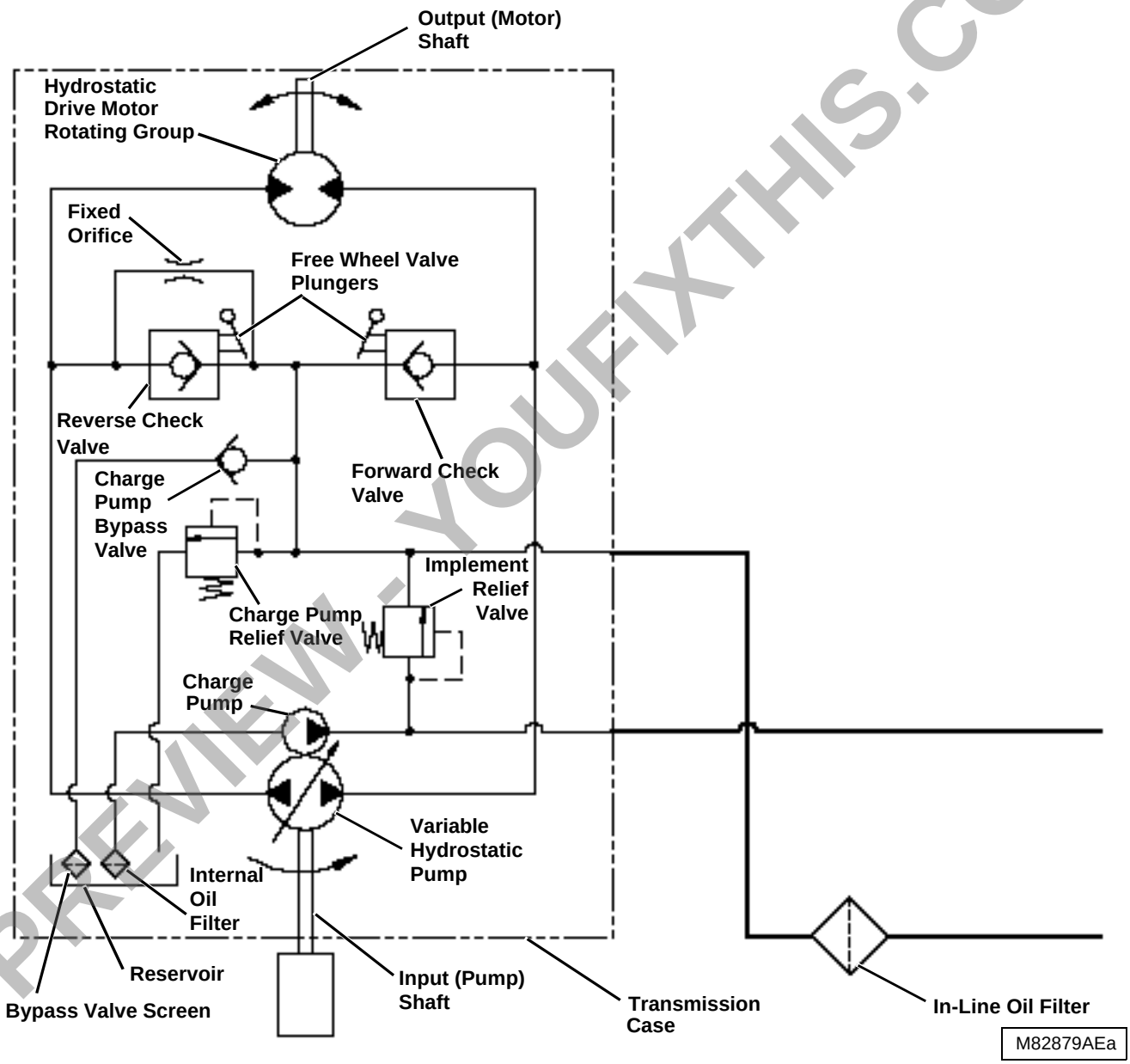
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STANDARD SCHEMATIC 325



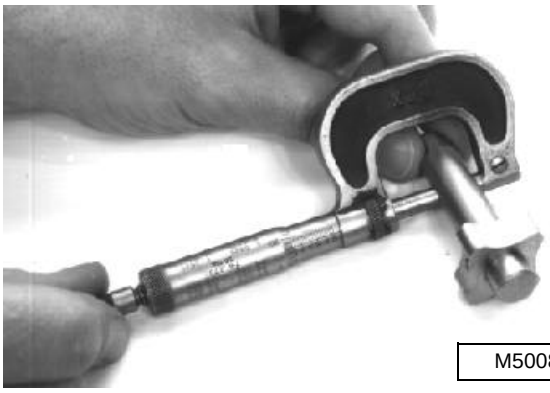
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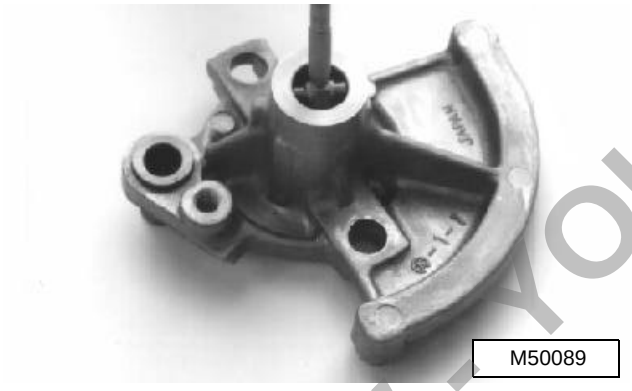
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- Measure rotor shaft diameter. If shaft O.D. is **less than 12.63 mm (0.497 in.)**, replace both shaft and outer rotor.

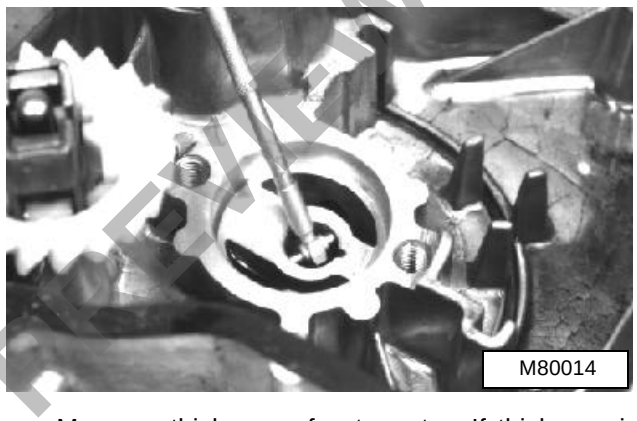


M50084

- Measure rotor shaft bearings. If bearing I.D.s are **greater than 12.76 mm (0.502 in.)** replace oil pump cover or crankcase cover.



M50089



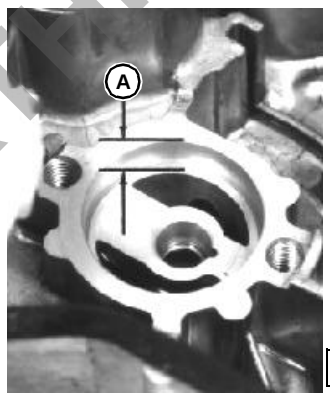
M80014

- Measure thickness of outer rotor. If thickness is **less than 9.92 mm (0.391 in.)**, replace both outer rotor and shaft.



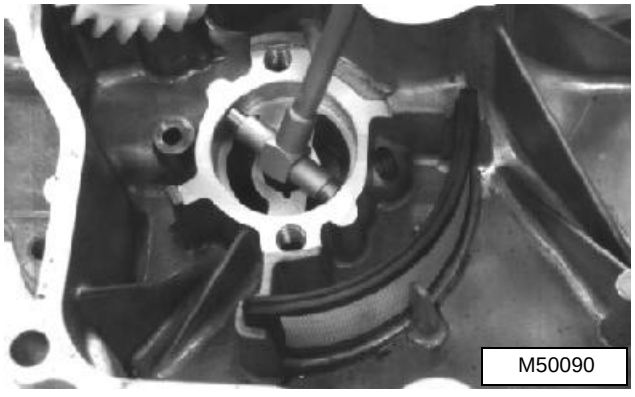
M80015

- Measure outer rotor bearing depth (A). If depth is **greater than 10.17 mm (0.401 in.)**, replace crankcase cover.



M80016

- Measure inside diameter of rotor bearing. If bearing I.D. is **greater than 40.77 mm (1.605 in.),** replace crankcase cover.



M50090

- Measure outside diameter of rotor. If rotor O.D. is **less than 40.47 mm (1.596 in.)**, replace both rotor and shaft.

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CONTENTS

Page

SPECIFICATIONS

TEST AND ADJUSTMENT SPECIFICATIONS 4-5
REPAIR SPECIFICATIONS 4-5
SPECIAL OR ESSENTIAL TOOLS 4-6
OTHER MATERIALS 4-6

THEORY AND DIAGNOSTIC INFORMATION

READING ELECTRICAL SCHEMATICS 4-7
THEORY OF OPERATION INFORMATION 4-8
DIAGNOSTIC INFORMATION 4-8
WIRE COLOR ABBREVIATION CHART 4-8

COMPONENT LOCATION

325 4-9
345 4-10

STANDARD ELECTRICAL SCHEMATIC

325 4-11
345 4-12

ELECTRICAL WIRING HARNESSES

325 4-13
345 4-15

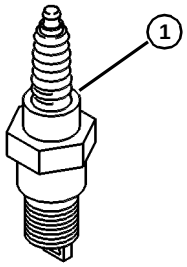
TROUBLESHOOTING 4-17

CIRCUIT OPERATION AND DIAGNOSIS—325

POWER CIRCUIT OPERATION 4-18
POWER CIRCUIT DIAGNOSIS 4-20
CRANKING CIRCUIT OPERATION 4-24
CRANKING CIRCUIT DIAGNOSIS 4-26
IGNITION CIRCUIT OPERATION 4-28
IGNITION CIRCUIT OPERATION—ENGINE SHUTTING OFF 4-30

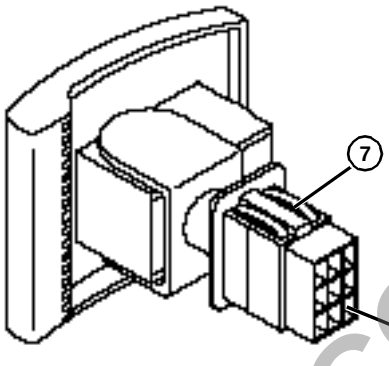
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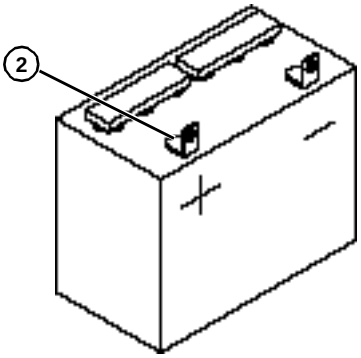
M82882

E1 and E2 Spark Plugs



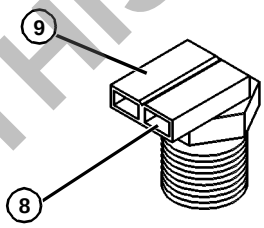
M83220AE

S4 PTO Switch



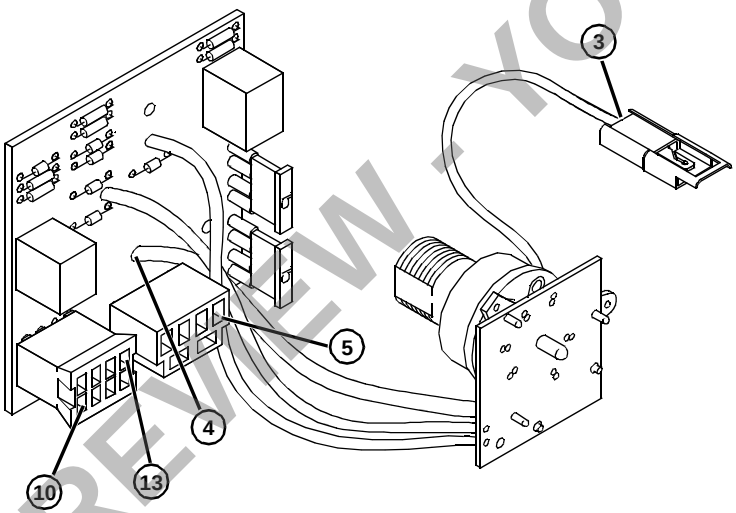
M82886

G1 Battery



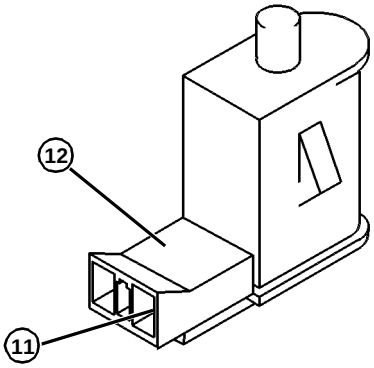
M82859

S3 Neutral Start Switch



M72542

A1 Interlock Module



M82856

S2 Seat Switch

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NEUTRAL CREEP ADJUSTMENT

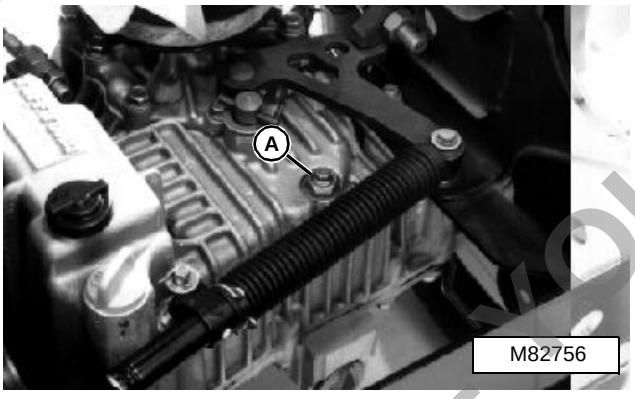
Reason:

If the machine creeps forward or backward with the forward/reverse pedals in the neutral position, parking brake released, and the engine running, the neutral eccentric must be adjusted.

Procedure:

1. Park machine on level surface.
2. Turn key switch OFF.
3. Engage parking brake.
4. Block front wheels.
5. Lift rear of machine until wheels are just barely off the ground and support with jackstands.
6. Remove fender deck. (See procedure in MISCELLANEOUS section.

)



7. Pull fuel tank forward to gain access to eccentric (A).

C CAUTION

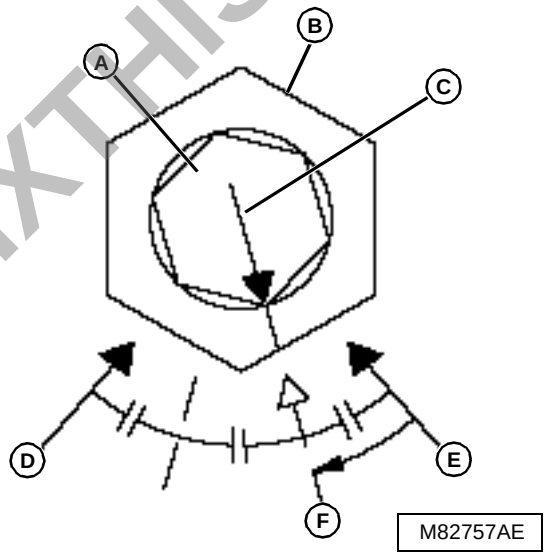
Keep hands away from transmission fan and wheels during procedure or fingers can be injured.

NOTE: Engine will not start with seat switch disconnected. Use a jumper wire to by-pass switch.

8. Start and run engine at **fast idle (3350 ± 50 rpm)**.

NOTE: If axle shafts do not rotate in reverse after turning the eccentric shaft one full turn, see steps 15—18.

9. Loosen lock nut (B) and turn the eccentric shaft (A) clockwise until the axle shaft rotates in reverse, mark the top of the eccentric shaft as position (C).
10. Turn the eccentric shaft slowly counterclockwise until the axle shaft stops, mark the transmission case as the reverse stop position (D).
11. Turn the eccentric shaft slowly counterclockwise until the axle shaft rotates forward.
12. Turn the eccentric shaft clockwise until the axle shaft stops, mark the transmission case as the forward stop position (E).
13. Turn the eccentric shaft slowly clockwise until the mark is approximately 1/3 the distance between the forward and reverse stop positions initial neutral position (F).
14. Hold eccentric shaft (A) with wrench and tighten lock nut (B).



A— Eccentric Shaft

B— Lock Nut

C— Eccentric Mark

D— Reverse Stop Position

E— Forward Stop Position

F— Initial Neutral Position

NOTE: If the axle shafts do not rotate in reverse although the eccentric shaft has been turned one full turn, adjust neutral eccentric as follows:

15. Turn eccentric shaft counterclockwise until axle shafts rotate forward.
16. Turn eccentric shaft clockwise until the axle shaft stops, mark the top of the eccentric shaft as position (C), and transmission case as position (E).
17. Turn the eccentric shaft clockwise approximately 8° from forward stop position.
18. Hold eccentric shaft (A) with wrench and tighten lock nut (B).

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NEUTRAL START SWITCH DOES NOT ENGAGE WHEN DEPRESSING BRAKE PEDAL [b]

Test Conditions:

- Machine parked on level surface.
- Key switch in OFF position.
- Parking brake DISENGAGED.
- Transmission in NEUTRAL.

Test Location	Normal	If Not Normal
1. Brake linkage.	Brake rod and lever not damaged or binding. Brake linkage properly adjusted.	Eliminate binding, replace damaged components. Perform Brake Linkage Check And Adjustment.
2. Brake return spring.	Returns brake pedal and linkage to rest position when brake pedal is released.	Replace stretched or damaged spring.
3. Neutral start switch.	Continuity across terminals when activated by linkage.	Test neutral start switch. (See procedure in ELECTRICAL section.)
4. Internal brake actuator lever. [a]	Engages neutral start switch when brakes applied.	Replace if damaged or worn.

ENGINE CAN BE STARTED WITHOUT DEPRESSING BRAKE PEDAL [b]

Test Conditions:

- Machine parked on level surface.
- Key switch in OFF position.
- Parking brake DISENGAGED.
- Transmission in NEUTRAL.

Test Location	Normal	If Not Normal
1. Brake linkage.	Brake rod and lever not damaged or binding. Brake linkage properly adjusted.	Eliminate binding, replace damaged components. Perform Brake Linkage Check And Adjustment.
2. Neutral start switch.	Continuity across terminals when activated by linkage.	Test neutral start switch. (See procedure in ELECTRICAL section.)
3. Internal brake actuator lever. [a]	Engages neutral start switch when brakes applied.	Replace if damaged or worn.

[a] *Requires removal of transmission from machine and disassembly.*
[b] *May have other causes not directly related to brake system. See POWER TRAIN for further information.*

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