Z225, Z245, Z235, Z255 EZtrak Residential Mower Diagnostic and Repair

TECHNICAL MANUAL

EZtrak Mower models Z225, Z245 (SN. 100001-); Z235, Z255 (SN. 130001-)

TM112919 28 JAN 16 (ENGLISH)

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John Deere Commercial and Consumer Equipment Lawn and Garden
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Group 05 - Safety

Recognize Safety Information



Safety-alert symbol

This is a 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 operating practices.

Understand Signal Words



Signal Words

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

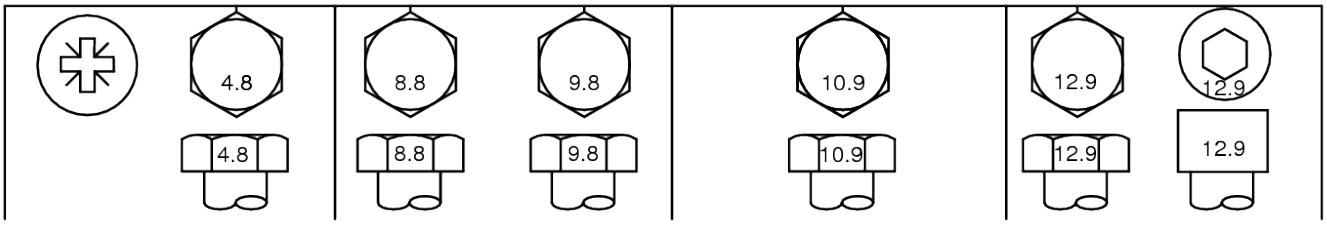
DANGER or WARNING safety signs are located near specific hazards. General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.

Follow Safety Instructions

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Metric Bolt and Screw Torque Values



Metric Bolt and Screw

Metric Torque Values

Bolt or Screw Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated ["Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or M20 and larger fasteners with JDM F13C, F13F or F13J zinc flake coating.]		**Dry** ["Dry" means plain or zinc plated without any lubrication, or M6 to M18 fasteners with JDM F13B, F13E or F13H zinc flake coating.]		**Lubricated** ["Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or M20 and larger fasteners with JDM F13C, F13F or F13J zinc flake coating.]		**Dry** ["Dry" means plain or zinc plated without any lubrication, or M6 to M18 fasteners with JDM F13B, F13E or F13H zinc flake coating.]		**Lubricated** ["Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or M20 and larger fasteners with JDM F13C, F13F or F13J zinc flake coating.]		**Dry** ["Dry" means plain or zinc plated without any lubrication, or M6 to M18 fasteners with JDM F13B, F13E or F13H zinc flake coating.]		**Lubricated** ["Lubricated" means coated with a lubricant such as engine oil, fasteners with phosphate and oil coatings, or M20 and larger fasteners with JDM F13C, F13F or F13J zinc flake coating.]		**Dry** ["Dry" means plain or zinc plated without any lubrication, or M6 to M18 fasteners with JDM F13B, F13E or F13H zinc flake coating.]	
	N˙m	**lb.-in.**	**N˙m**	**lb.-in.**	**N˙m**	**lb.-in.**	**N˙m**	**lb.-in.**	**N˙m**	**lb.-in.**	**N˙m**	**lb.-in.**	**N˙m**	**lb.-in.**	**N˙m**	**lb.-in.**
M6	4.7	42	6	53	8.9	79	11.3	100	13	115	16.5	146	15.5	137	19.5	172
									N˙m	**lb.-ft.**	**N˙m**	**lb.-ft.**	**N˙m**	**lb.-ft.**	**N˙m**	**lb.-ft.**
M8	11.5	102	14.5	128	22	194	27.5	243	32	23.5	40	29.5	37	27.5	47	35
			N˙m	**lb.-ft.**	**N˙m**	**lb.-ft.**	**N˙m**	**lb.-ft.**								
M10	23	204	29	21	43	32	55	40	63	46	80	59	75	55	95	70
	N˙m	**lb.-ft.**														
M12	40	29.5	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	46	80	59	120	88	150	110	175	130	220	165	205	150	260	190
M16	100	74	125	92	190	140	240	175	275	200	350	255	320	235	400	300
M18	135	100	170	125	265	195	330	245	375	275	475	350	440	325	560	410
M20	190	140	245	180	375	275	475	350	530	390	675	500	625	460	790	580
M22	265	195	330	245	510	375	650	480	725	535	920	680	850	625	1080	800
M24	330	245	425	315	650	480	820	600	920	680	1150	850	1080	800	1350	1000
M27	490	360	625	460	950	700	1200	885	1350	1000	1700	1250	1580	1160	2000	1475
M30	660	490	850	625	1290	950	1630	1200	1850	1350	2300	1700	2140	1580	2700	2000
M33	900	665	1150	850	1750	1300	2200	1625	2500	1850	3150	2325	2900	2150	3700	2730
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2770	4750	3500

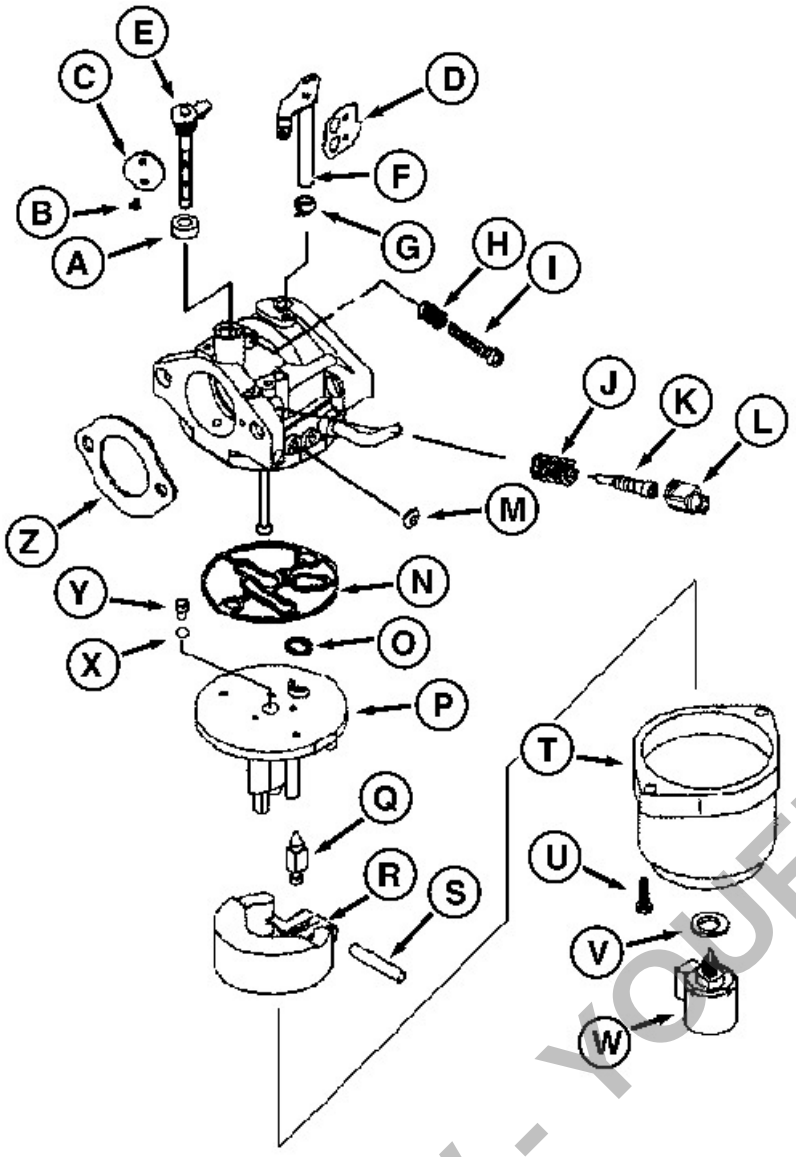
Torque values listed are for general use only, based on the strength of the bolt or screw. DO NOT use these values if a different torque value or tightening procedure is given for a specific application. For stainless steel fasteners or for nuts on U-bolts, see the tightening instructions for the specific application. Tighten plastic insert or crimped steel type lock nuts by turning the nut to the dry torque shown in the chart, unless different instructions are given for the specific application.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical property class. Replace fasteners with the same or higher property class. If higher property class fasteners are used, tighten these to the strength of the original. Make sure fastener threads are clean and that you properly start thread engagement. When possible, lubricate plain or zinc plated fasteners other than lock nuts, wheel bolts or wheel nuts, unless different instructions are given for the specific application.

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Assemble Carburetor



Carburetor Components

LEGEND:

A	Shaft Seal
B	Screw
C	Throttle Valve Plate
D	Throttle Shaft
E	Choke Valve Plate
F	Choke Shaft
G	Shaft Seal
H	Spring
I	Idle Speed Screw
J	Spring
K	Idle Needle Valve
L	Limiter Cap
M	Plug
N	Rubber Gasket
O	O-ring
P	Fuel Transfer Plate
Q	Fuel Inlet Valve
R	Float
S	Pin
T	Sediment Bowl
U	Screw
V	Seal Washer
W	Fuel Shutoff Solenoid
X	O-ring

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Group 40 - Wiring Schematics

Summary of References

- Schematic Legend
- Main Electrical Schematic (S.N. -120000)
- Main Electrical Schematic (S.N. 120001-130000)
- Main Electrical Schematic (S.N. 130001-170000)
- Main Electrical Schematic (S.N. 170001-)

Schematic Legend

Components:

DEFINITIONS:

D1, D1	Diode
D3	Diode (S.N. 120001-)
E1	Spark Plug
F1	Fuse 20A
F2	Fuse 20A
F3	Fuse 7.5A
F4	Fuse 7.5A (option)
G1	Battery
G2	Stator
K1	Start Relay
K2	Interlock Relay
L1	Left Headlight (option)
L2	Right Headlight (option)
L6	Low Fuel Indicator Light (SN 170001-)
M1	Starting Motor
N1	Voltage Regulator/Rectifier
P1	Hourmeter
R1	Thermistor (SN 170001-)
SW1	Key Switch
SW2	Left Handle Neutral Lock Switch
SW3	Right Handle Neutral Lock Switch
SW4	Park Brake Switch
SW5	Seat Switch
SW6	PTO Switch
SW7	Headlight Switch (option) (S.N. 130001-)
SW99	Headlight Switch (option) (S.N. -130000)
T1	Ignition Coil
W2	Engine Ground
Y1	Fuel Shutoff Solenoid
Y2	PTO Clutch

Connectors:

DEFINITIONS:

C1	Power Connector (SN 130001-)
C3F	W1 Main Wiring Harness to W3 Lighting Kit Wiring Harness (S.N. 130001-)
C3M	W3 Lighting Kit Wiring Harness to W1 Main Wiring Harness (S.N. 130001-)
C4E	W2 Engine Wiring Harness to W1 Main Wiring Harness
C4M	W1 Main Wiring Harness to W2 Engine Wiring Harness
SWA	Thermistor Connector (SN 170001-)
SWB	Thermistor Connector (SN 170001-)

Wiring Harnesses:

DEFINITIONS:

W1	Main Wiring Harness
W2	Engine Wiring Harness
W3	Lighting Kit Wiring Harness (option)

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restricts air flow to the carburetor, the low pressure in the venturi drops even further, resulting in a higher pressure differential between the fuel bowl and the venturi. Therefore, a dirty air filter can enrich the air/fuel mixture to the point that performance will drop.

Engines with internally vented carburetors will not exhibit rich running conditions with a dirty air filter. When a dirty air filter restricts air flow to the throat of the carburetor, an equal reduction will be applied to the bowl vent. Internally vented carburetors maintain the pressure differential between the bowl and the venturi resulting in a consistent air/fuel mixture over the life of the air filter.

Vent Tube Location

With an externally vented carburetor, a rich or lean run condition could also be caused by the location of the float bowl vent tube. The purpose of the vent tube is to allow atmospheric pressure into and out of the float bowl. Air from the cooling fan at the vent tube opening can cause a pressure increase or decrease on the fuel in the float bowl and cause the engine to run rich or lean. Check for bulletins and relocate the float bowl vent tube to a location away from any source of turbulence.

Engine Will Not Crank (Single Cylinder)

66

Engine Will Not Crank (Single Cylinder)

Symptom	Problem	Solution
Engine Will Not Crank	Battery	a. Charge and test battery. (See Battery Charge , and Battery Load Test .)
		b. Replace the battery if it will not take or hold a charge.
	Starting motor does not rotate when ignition switch is turned to start position.	a. Cranking circuit problem. (See Cranking Circuit Operation (S.N. -120000) , or Cranking Circuit Operation (S.N. 120001-130000) .)
		b. Key switch malfunction. (See Key Switch Test .)
		c. Starting relay malfunction. (See Start Relay Test .)

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Group 20 - Machine Specifications

Machine Specifications Z225 and Z245 (S.N. -130000)

→NOTE:

Specifications and design subject to change without notice.

General Specifications

	Z225	Z245
Ground Speed:		
Forward	0—11.3 km/h (0—7.0 mph)	
Reverse	0—5.6 km/h (0—3.5 mph)	

Engine:		
Make	Briggs & Stratton	
Engine Power Information	http://www.briggsandstratton.com	
Type	Gas	
Model	Intek 31P777	44L777
Cylinders	single cylinder	v-twin
Low Idle Speed (Governed)	2200 ± 300 rpm	1750 ± 100 rpm
Low Idle Speed	1750 ± 100 rpm	1300 ± 100 rpm
High Idle Speed	3350 ± 100 rpm	3350 ± 100 rpm
Displacement	0.502 L (30.63 $in.^3$)	0.724 L (44.2 $in.^3$)
Bore	90.42 mm (3.56 in.)	79.25 mm (3.12 in.)
Stroke	77.72 mm (3.06 in.)	73.40 mm (2.89 in.)

Lubrication	Pressurized	
Crankcase Capacity	1.4 L (1.5 qt.)	1.8 L (1.9 qt.)
Crankcase (with Filter)	—	1.9 L (2.0 qt.)
Cooling	Air Cooled	
Air Cleaner	Paper Element	Paper with Foam Element
Engine Shut Off	Key Switch	

Fuel System:	
Type	Mechanical Vacuum Pump
Tank Capacity	10.2 L (2.7 gal.)

Electrical System:		
Type	12 Volt Negative Ground	
Stator Output	6—16.6 amp regulated at 12.2—13.8 VDC	
Battery	12-volt	
Battery Type	BCI Group U1	
Spark Plug Torque	20 N·m (180 lb.-in.)	
Spark Plug Gap	0.76 mm (0.030 in.)	
Ignition Coil Air Gap	0.25—0.35 mm (0.010—0.014 in.)	0.20—0.30 mm (0.008—0.012 in.)

Power Train:	
Transaxle	Hydro-Gear EZT
Transaxle Type	Hydraulic Infinite Variable Speed
Drive	2 Transaxles (Mirror Image of Each Other)
Brake Type	External Disc
Transaxle Oil Capacity (approximate)	1550—1650 ml (53.4—55.8 oz.)

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Blower Housing Screen

[1] - Remove two screws securing the fuel pump to blower housing.

[2] - Remove 4 screws (A) and the fan screen in place.

[3] - Remove the air cleaner cover and air cleaner.

[4] - Remove 4 screws (B) holding the outer blower housing in place.

[5] - Lift outer blower housing up and off of engine.

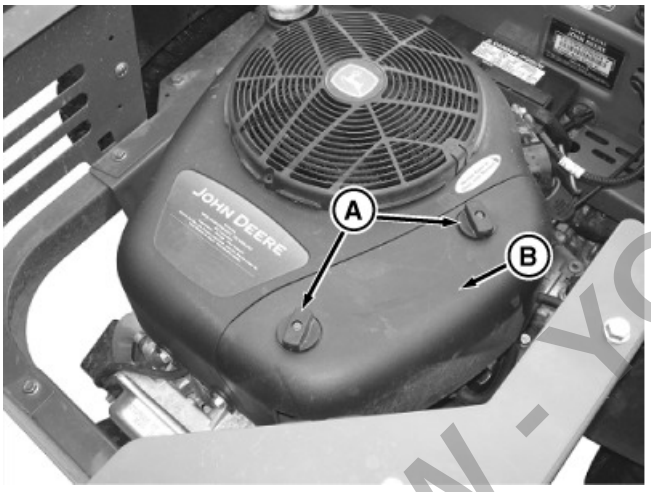
[6] - Remove the screw holding the dipstick tube in place.

[7] - Install in reverse order of removal.

[8] - Tighten screws to specification.

Item	Measurement	Specification
Blower Housing Screws	Torque	10 N·m (85 lb.-in.)
Fuel Pump Screws	Torque	4 N·m (35 lb.-in.)

Service Air Cleaner

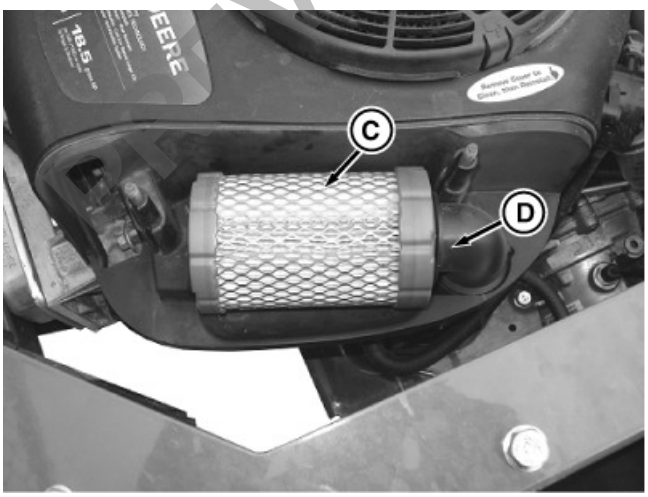


LEGEND:
A Nut
B Cover

Air Cleaner Cover

[1] - Remove nuts (A). Remove cover (B) to service high flow air cleaner.

[2] -



LEGEND:
C Filter Element
D Elbow

Filter Element

Inspect the paper filter element (C) without removing it.

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Foreword

This manual is written for an experienced technician. Essential tools required in performing certain service work are identified in this manual and are recommended for use.

Live with safety: Read the safety messages in the introduction of this manual and the cautions presented throughout the text of the manual.

CAUTION:

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

Technical manuals are divided in two parts: repair and operation and tests. Repair sections tell how to repair the components. Operation and tests sections help you identify the majority of routine failures quickly.

Information is organized in groups for the various components requiring service instruction. At the beginning of each group are summary listings of all applicable essential tools, service equipment and tools, other materials needed to do the job, service parts kits, specifications, wear tolerances, and torque values.

Technical Manuals are concise guides for specific machines. They are on-the-job guides containing only the vital information needed for diagnosis, analysis, testing, and repair.

Fundamental service information is available from other sources covering basic theory of operation, fundamentals of troubleshooting, general maintenance, and basic type of failures and their causes.

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Section 20 - SINGLE CYLINDER ENGINE REPAIR

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Cylinder Bore Hone Pattern

[1] -

→NOTE:

To produce the proper cross hatch finish use a drill speed of approximately 200 rpm and 40 - 60 strokes per minute. Lubricate hone liberally to prevent build up on finishing stones.

The cylinder finish, (cross hatch) should be applied after cylinder bore has been resized to within **0.038 mm (0.0015 in.)** of the desired size or when reconditioning a cylinder bore. The finishing stones will produce the correct cross hatch necessary for proper lubrication and piston ring rotation. The correct hatch angle is approximately **45°** (A).

[2] - It is recommended that the cylinder bores be reconditioned to restore the cross hatch when new piston rings are to be installed in a cylinder that is within specification. Be careful not to hone oversize or it will be necessary to resize the cylinder. (See Resize Cylinder Bore .)

Clean Cylinder Bore

IMPORTANT:

nsure that the entire cylinder and crankcase are thoroughly cleaned after honing. First wash the cylinder and crankcase carefully in a solvent such as kerosene or commercial solvent. Then thoroughly wash cylinder and crankcase using a stiff brush with soap and hot water, Rinse thoroughly with hot running water. Repeat washing and rinsing until all traces of honing grit are gone. Honing grit is highly abrasive and will cause rapid wear to all of the internal components of the engine unless it is completely removed.

When cylinder and crankcase have been thoroughly cleaned, use a clean white rag or napkin and wipe the cylinder bore. If honing grit is present it will appear as a gray residue on rag. If any honing grit is evident, rewash and rinse entire cylinder and crankcase and check again. When there is no trace of honing grit on rag, the cylinder is properly cleaned. Then oil cylinder bore to prevent rusting.

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Item	Measurement	Specification
Piston Specifications		
Compression and Oil Ring End Gap	Gap	0.76 mm (0.030 in)
Crankpin Bearing Wear Limit	ID	38.15 mm (1.502 in)
Piston Pin Bearing Wear Limit	ID	17.15 mm (0.675 in)
Piston Pin Wear Limit	OD	17.07 mm (0.672 in)
Piston Pin Bore Wear Limit	ID	17.15 mm (0.675 in)
Connecting Rod Bolts	Torque	13 N·m (115 lb·in)
Cylinder Bore Specifications		
Cylinder Bore — 40 Series	ID	75.41—75.44 mm (2.969—2.970 in)
Cylinder Bore Wear Limit — 40 Series	ID	75.51 mm (2.973 in)
Cylinder Bore — 44 Series	ID	79.23—79.25 mm (3.119—3.120 in)
Cylinder Bore Wear Limit — 44 Series	ID	79.35 mm (3.124 in)
Cylinder Bore	Out-of-Round	0.076 mm (0.003 in)
Flywheel Nut	Torque	203 N·m (150 lb·ft)
Fan Retainer Cap Screw	Torque	16 N·m (140 lb·in)
Stator Cap Screws	Torque	3.4 N·m (30 lb·in)
Wear Limit Specifications:		
PTO Journal	ID	41.22 mm (1.623 in)
Magneto Journal	ID	34.95 mm (1.376 in)
Crankshaft Crankpin	ID	38.02 mm (1.497 in)
Crankshaft	End Play	0.051—0.76 mm (0.002—0.03 in)
Cam Gear PTO journal	ID	12.64 mm (0.498 in)
Cam Gear Magneto Journal	ID	12.64 mm (0.498 in)
Cam Lobes (Intake)	Height	31.12 mm (1.225 in)
Cam Lobes (Exhaust)	Height	31.06 mm (1.223 in)
Magneto Bearing	ID	35.13 mm (1.383 in)
PTO End Bearing	Diameter	41.38 mm (1.629 in)

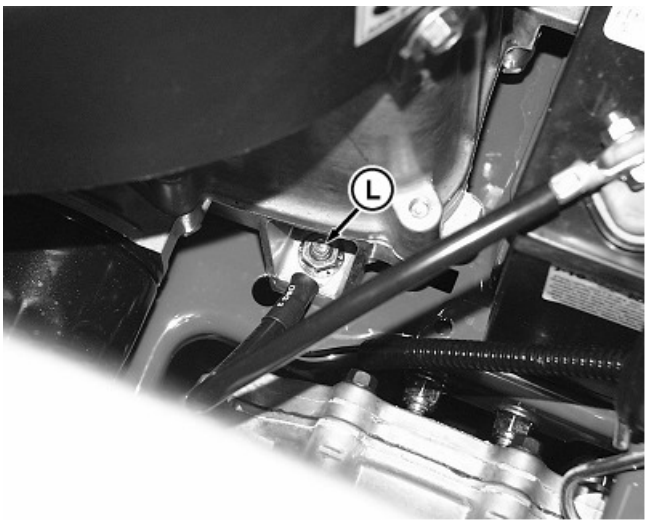
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[10] - Connect the main wire harness to engine wire harness connector (J).

[11] - Connect the main wire harness to clutch wire harness connector (K).

[12] -



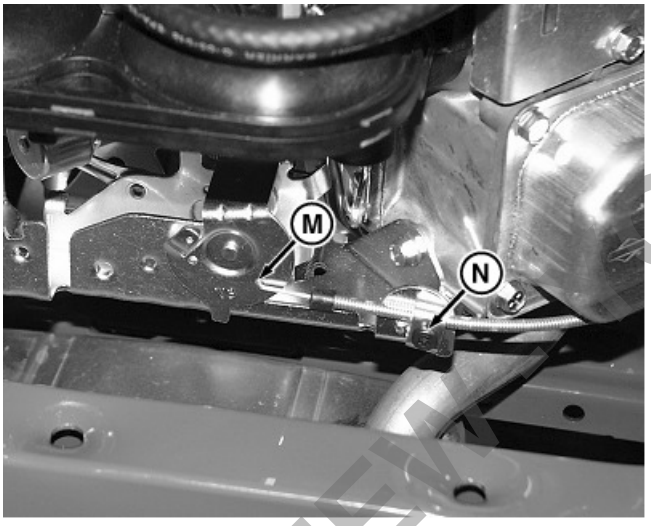
LEGEND:

L	Nut

Ground Wires and Engine to Frame

Install the cap screw and nut (L) securing ground wires and engine to frame.

[13] -



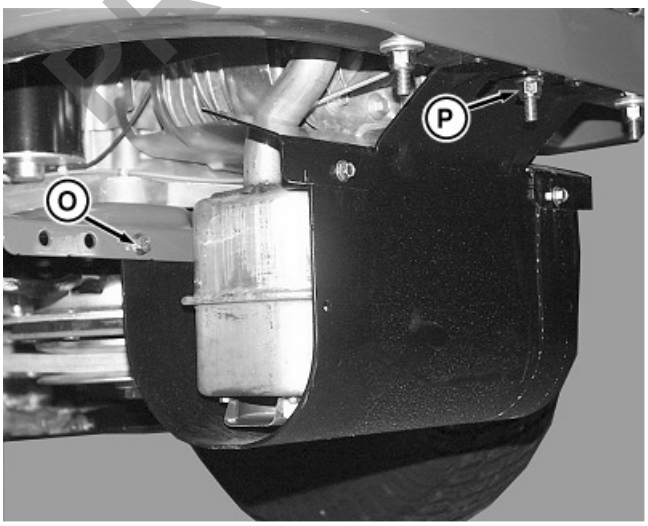
LEGEND:

M	Hole
N	Cable Clamp

Throttle Cable and Control

Attach throttle cable to hole (M) in throttle control. Route cable housing through cable clamp (N). Adjust cable and tighten clamp. (See Adjust Throttle and Choke Cable, V-Twin .)

[14] -



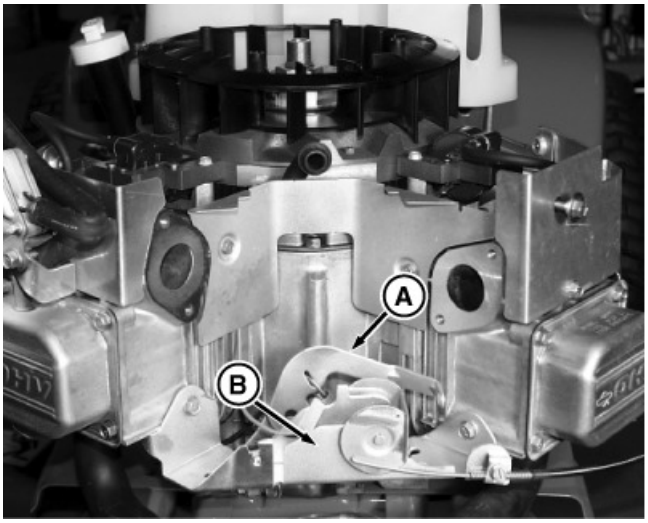
LEGEND:

N	Washer
P	Washer

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Remove and Inspect Crankshaft and Camshaft



LEGEND:

A	Governor Lever
B	Control Bracket

Governor Lever and Link

[1] - Remove governor lever (A) and disconnect governor link and springs. Remove governor control bracket (B). Remove oil fill tube and dipstick assembly.

[2] - Remove exhaust manifold, intake manifold, and cylinder heads.

[3] - Remove oil pump. (See Remove Oil Pump .)

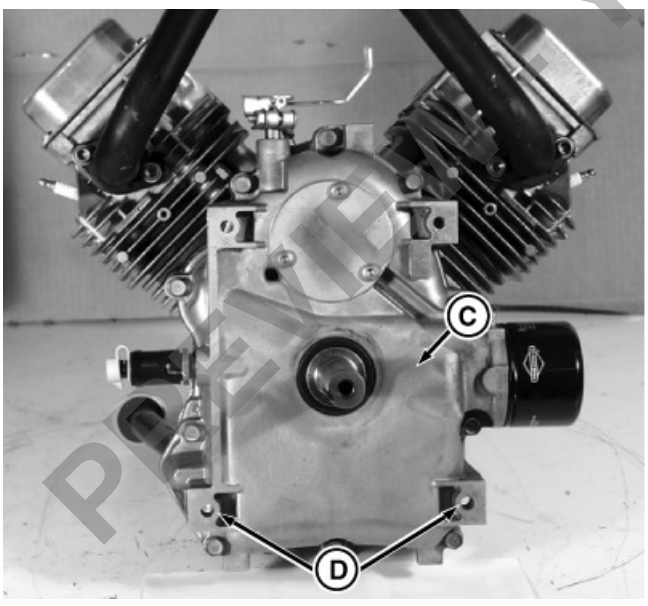
[4] -

IMPORTANT:

Avoid Damage! DO NOT remove dowel pins.

→NOTE:

Remove rust, paint, or burrs from the PTO end of the crankshaft before the crankcase cover is removed.



LEGEND:

C	Crankcase Cover
D	Dowel Pins

Crankcase Cover

Remove crankcase cover (C). If crankcase cover sticks, tap lightly with soft hammer on alternate sides near dowel pins (D).

[5] - Tip engine over onto flywheel side of crankcase.

[6] - Support engine to prevent end of crankshaft from resting on workbench.

[7] -

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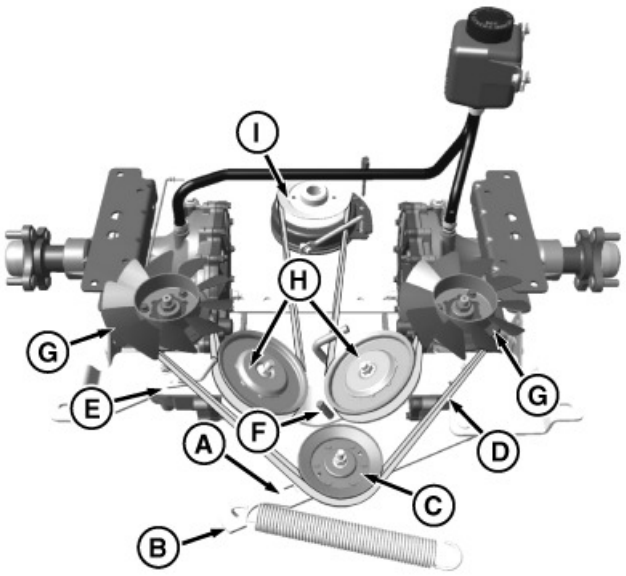
W1 Main Wiring Harness Color Codes (S.N. -120000)

W1 Color Codes (SN -120000)

Size	Number	Color	Wire Connection Points
13.0	100A	Bare	G1, W2
0.8	100C	Blk	Y2, SP100
1.0	100D	Blk	W2, SP100
0.8	100E	Blk	SW5, SP100
0.8	100F	Blk	SW4, SP100
0.8	100G	Blk	SW1, SP100
0.8	100H	Blk	P1, SP100
0.8	100R	Blk	K2, SP100
2.0	201	Red	F2, C4M
13.0	202A	Red	G1, K1
3.0	202B	Red	K1, SP202
3.0	202C	Red	F2, SP202
3.0	202D	Red	F1, SP202
1.0	220A	Red	F1, SW1
0.8	220B	Red	SW1, SW1
1.0	400A	Yel	SW1, SP400
0.8	400B	Yel	F3, SP400
0.8	400C	Yel	K2, SP400
0.8	400E	Yel	F4, SP400
0.8	420	Yel	C4M, P1
0.8	475A	Yel	F3, SW6
0.8	475B	Yel	P1, SW6
0.8	601A	Wht	C4M, SP601
0.8	601B	Wht	SW3, SP601
0.8	601C	Wht	SW2, SP601
0.8	601D	Wht	SW4, SP601
0.8	601E	Wht	SW6, SP601
0.8	601F	Wht	SW1, SP601
0.8	601G	Wht	P1, SP601
0.8	602A	Pnk	SW4, SW6
0.8	602B	Pnk	SW4, K2
0.8	603A	Grn	SW2, SW3
0.8	603B	Grn	SW2, SW4
0.8	603C	Grn	SW4, K1
0.8	604	Pnk	SW6, Y2
0.8	605	Wht	SW5, K2
0.8	700	Pur	SW3, K1
0.8	701	Grn	SW2, SW3
0.8	702	Grn	SW2, SW6
0.8	703	Grn	SW1, SW6
13.0	705	Red	K1, M1

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LEGEND:

A	Square Hole
B	Idler Arm
C	Idler Sheave
D	Drive Belt
E	Belt Guide
F	Belt Guide
G	Transaxle Sheaves
H	Intermediate Sheaves
I	Engine Sheave

Idler Arm

[1] - Position belt onto engine sheave (I), intermediate sheaves (H) and transaxle sheaves (G).

[2] - Install belt guides (E, F).

[3] -

→NOTE:

The transaxle drive belt is self-adjusted using the spring tensioner and does not require a tension adjustment.

Rotate the spring-loaded idler arm (B) and install the belt on the idler sheave (C).

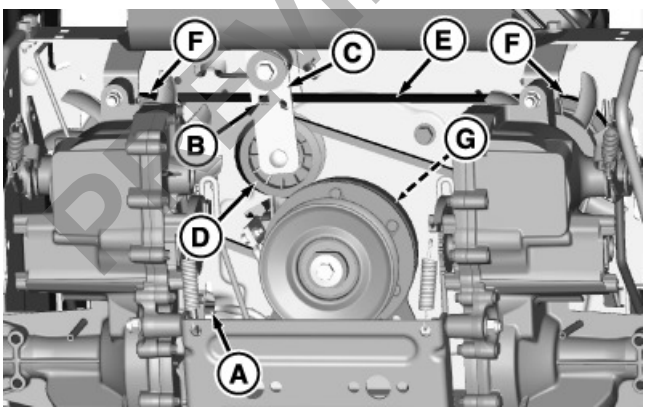
[4] - Insert electric clutch wiring harness connector to main wiring harness.

[5] - Make sure that drive belt is properly located in all sheave grooves, and reinstall tensioning spring to belt tensioner arm.

[6] - Tighten any loose transaxle mounting bolts to specification.

Item	Measurement	Specification
Transaxle-to-Frame Mounting Hardware	Torque	40 N·m (30 lb.-ft.)

Remove Traction Belt (S.N. 130001-)



LEGEND:

A	Clutch Connector
B	Hole
C	Idler Arm
D	Idler Sheave
E	Drive Belt
F	Transaxle Sheaves
G	Engine Sheave

Idler Arm

[1] - Park machine safely.

[2] - Remove mower deck.

[3] - Disconnect electric clutch wiring connector (A) from main wiring harness connector.

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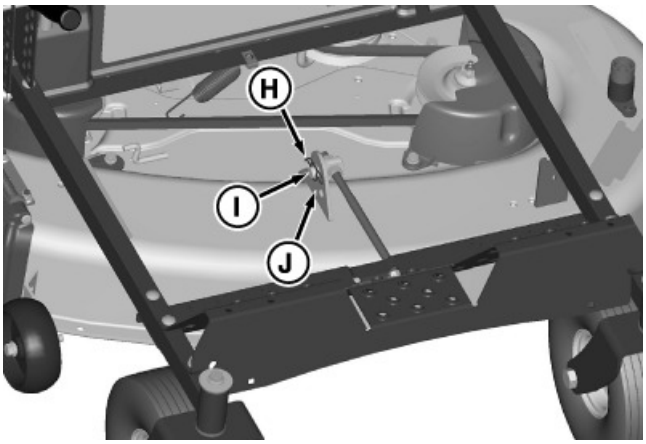
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a. Remove two bolts (D) and remove right hand spindle shield (E).

b. Install 3/8-inch ratchet into square hole (F) in tension arm. Rotate counterclockwise to release tension on belt, while removing mower belt from right spindle sheave (G).

c. Remove belt from engine sheave.

[7] -



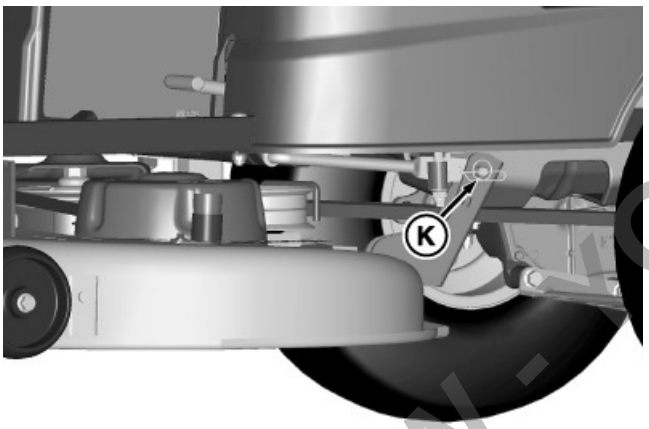
LEGEND:

H	Spring Locking Pin
I	Stud End
J	Bracket

Front Draft Bracket

Remove spring locking pin (H) and, remove stud end (I) from front draft bracket (J).

[8] -



LEGEND:

K	Spring Locking Pin

Rear Draft Bracket

Remove spring locking pin (K) and pin from each side of rear mower bracket.

[9] - Raise draft arms to transport lock position:

a. Pull and raise mower lift lever fully upward.

b. Install pin just below lift lever to lock into raised position.

[10] - Rotate front caster wheels to maximize clearance.

[11] -

→NOTE:

Do not operate the machine without the mower deck: Machine can become unstable without the mower deck attached. Move machine only by hand.

Slide mower out from under the machine.

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Group 20 - Repair

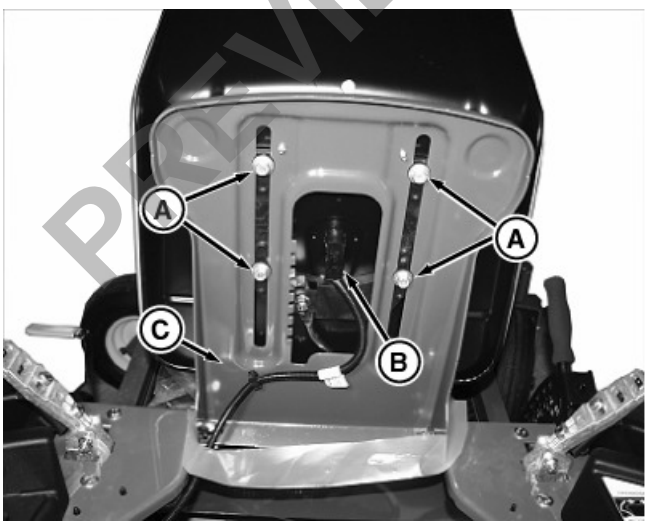
Summary of References

- Remove and Install Seat (S.N. -130000)
- Remove and Install Seat (S.N. 130001-)
- Remove and Install Control Console (S.N. -130000)
- Remove and Install Control Panel (S.N. -130000)
- Repair Park Brake (S.N. -130000)
- Repair Park Brake (S.N. 130001-)
- Remove and Install Foot Plate (S.N. -130000)
- Remove and Install Foot Plate (S.N. 130001-)
- Remove Engine Guards (S.N. -130000)
- Remove Engine Guards (S.N. 130001-)
- Front Caster Wheels (S.N. -130000)
- Front Caster Wheels (S.N. 130001-)

Specifications

Item	Measurement	Specification
Park Brake Lever Application	Force (nominal)	44 N (10 lb.)
Park Brake	Clearance	0.55—1.0 mm (0.020—0.040 in.)
Wheel Lug	Torque	105 N·m (75 lb.-ft.)
Wheel Caster Lock Nut	Torque	47 N•m (35 lb-ft)
Yoke Flange Bolt	Torque	47 N•m (35 lb-ft)
Tire Pressure		
Front Tire (S.N. -130000)	Pressure	69 kPa (10 psi)
Front Tire (S.N. 130001-)	Pressure	205 kPa (30 psi)
Rear Tire	Pressure	69 kPa (10 psi)

Remove and Install Seat (S.N. -130000)



LEGEND:

A	Bolt
B	Seat Switch
C	Platform Assembly

Platform Assembly

Remove

[1] - Park machine safely.

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[6] - Run engine at HIGH idle and record reading on gauge.

[7] - Run engine at LOW idle. Do not turn engine off.

[8] - Disconnect hose and quickly place plug or finger over barbed fitting.

[9] - Turn engine off.

[10] - Remove plug and install oil dipstick.

Results:

If crankcase vacuum is less than specification, check:

Item	Measurement	Specification
Crankcase Vacuum (minimum)		
Water Movement	Distance	25.4 cm (10 in.)
Hg (mercury) Movement	Distance	18.7 mm (0.74 in.)

- Breather reed valve clearance and condition.
- Seals and gaskets for leakage.
- Valve cover gasket for leakage.
- Rings, piston and cylinder wall for wear or damage.
- Valve and valve seats for wear or damage.
- Head warp.

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Cranking Circuit Operation (S.N. -120000)

Function:

To energize the starting motor to crank the engine.

Operating Conditions:

- Park brake locked.
- PTO switch OFF.
- Motion control handles in NEUTRAL position.
- Key switch in START position.

Theory of Operation:

→NOTE:

This circuit will crank the engine. However, in order for the engine to run, the ignition and fuel shutoff circuits must also function properly.

Unswitched power is supplied to the key switch via fuse F1. (See Power Circuit Operation (S.N. -120000) .)

Turning the key switch to START applies power to switch terminal S1.

The key switch START signal must pass via the 700-series of wires and the (closed) neutral and PTO switches before reaching the start relay coil. The circuit for the coil is completed by a ground path through the (closed) park brake switch.

With the start relay energized, the main contacts close, supplying battery power to the starting motor. The spinning motor engages the flywheel, cranking the engine.

If the ignition and fuel shutoff circuits are functioning properly, the engine should start and run. (See Ignition Interlock Circuit Operation (S.N. -120000) , and Fuel Shutoff Circuit Operation (S.N. -120000) .

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Headlight Circuit Operation (option) (S.N. 130001-)

Function:

To illuminate the (optional) headlight(s).

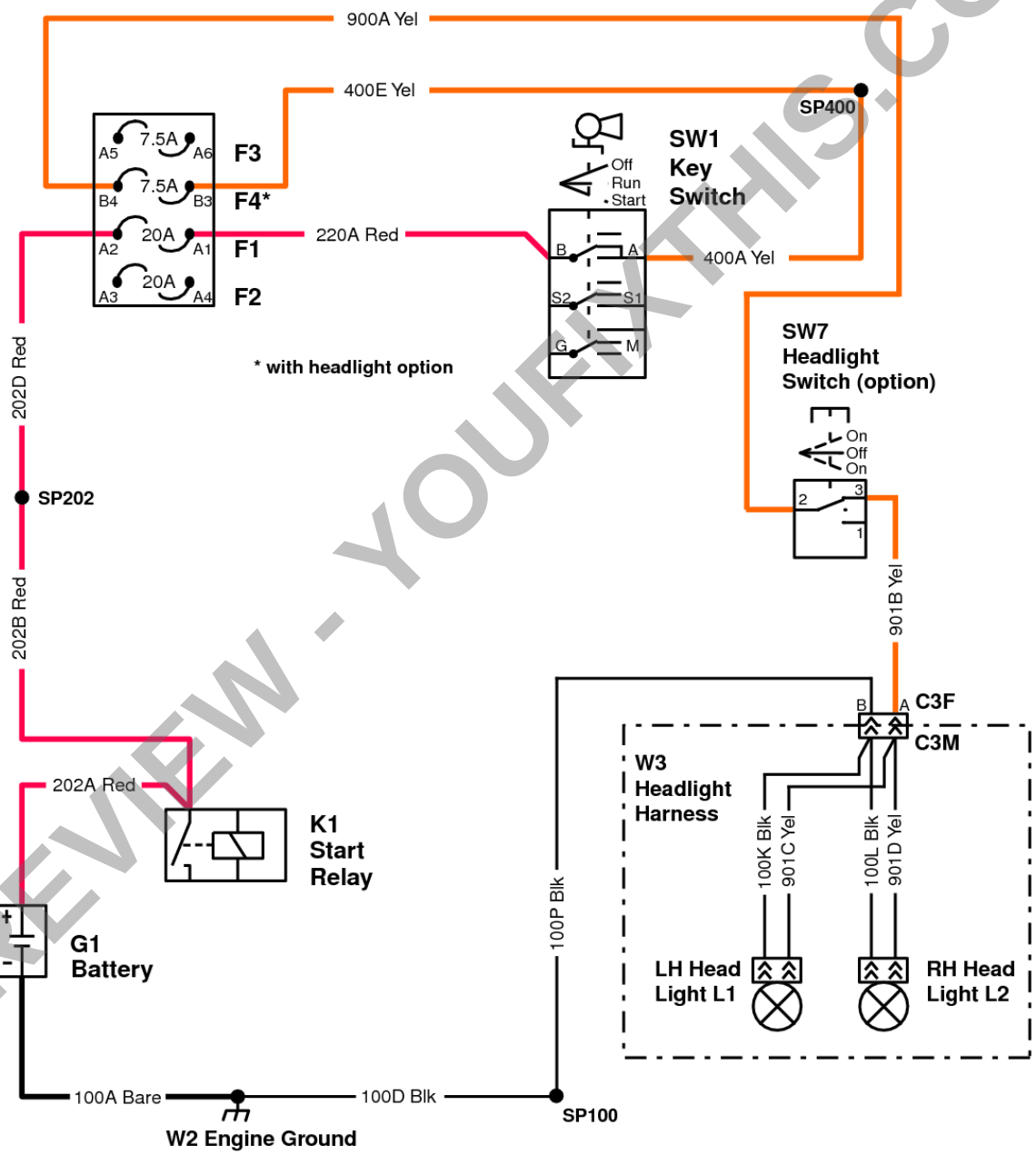
Operating Conditions:

- Key switch in RUN position
- Light switch ON

Theory of Operation:

Turning the key switch to the RUN position supplies switched power to fuse F4, the 900A Yel wire and the light switch. The light switch applies power to the headlights over the 901B/C/D Yel wires.

The headlights are grounded to the W2 engine ground point by the 100K/L/P/D Blk wires.



Headlight Circuit Schematic (S.N. 130001-)

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Diagnose Charging Circuit (S.N. 120001-130000)

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Charging Circuit (S.N. 120001-130000)

Refer to Charging Circuit Operation (S.N. 120001-130000) for theory and circuit schematic.

Test Procedure A

(1) Battery

Action:

Test Conditions

Test Conditions:

- Machine parked safely
- Park brake locked
- Motion control handles (switches) in neutral position
- PTO switch OFF
- Battery fully charged
- Stator connected
- Power circuits functioning properly. See appropriate power circuit section.
- Key switch to RUN, running at low idle then to high idle during test

Does the voltage measured across battery terminals (A) rise from approximately 12.5 VDC to 13.5 VDC or higher when the throttle is moved from low idle to high idle.

Result:

YES: Charging system is working properly. Test complete.

NO: Test fuse F2.

NO: Check for poor connections between battery, starting motor solenoid and voltage regulator/rectifier.

NO: Test voltage regulator/rectifier. (See Regulated Voltage Test .)

Test Procedure B

(1) Stator Connector

Action:

Test Conditions

Test Conditions:

- Machine parked safely
- Park brake locked
- Motion control handles (switches) in neutral position
- PTO switch OFF
- Battery fully charged
- Stator unplugged from voltage regulator/rectifier
- Power circuits functioning properly. See appropriate power circuit section.
- Key switch to RUN, running at high idle during test
- Voltmeter set to VAC

Is the voltage measured across stator leads a minimum 30 volts AC? (See Regulator/Rectifier Connectors .)

Result:

YES: Connect stator. Test complete.

NO: If no or low output is found, test flywheel stator magnets. (See Flywheel Stator Magnets Test .) If magnets are OK, then replace stator.

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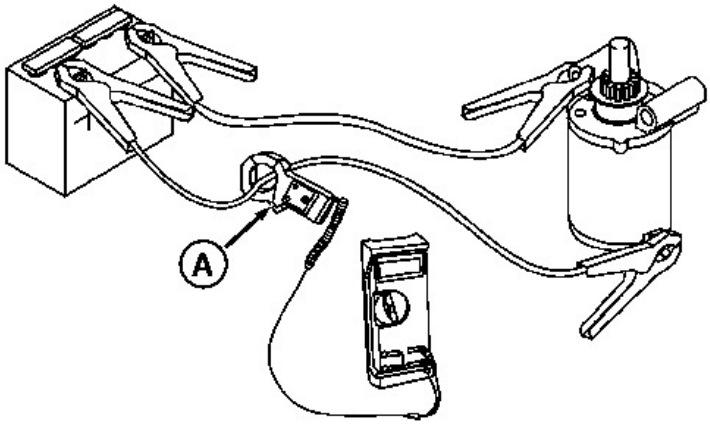
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Starting Motor Amperage Draw Test: No Load, B&S

Reason:

To determine starting motor condition under no load conditions.

Procedure:



LEGEND:
A Current Clamp

Starting Motor Amperage Draw Test, No Load

CAUTION:

Do not clamp starting motor housing in vise or strike with a hammer. Clamp only on the mounting bracket. Starting motors contain two ceramic magnets that can be broken or cracked if the motor housing is hit, deformed or dented.

[1] - Remove starting motor from machine and clamp the starting motor mounting bracket in a vise.

[2] - Connect JT02153 current clamp (A) RED lead to the VOLTS jack of the JT05791A multimeter and the BLACK lead of the current clamp to the COM jack on the multimeter.

Current Clamp

JT02153

To measure current.

Multimeter

JT05791A

To read current in millivolts.

[3] - Connect the negative jumper cable to the battery negative post and the frame of the starting motor.

[4] - Connect the positive jumper cable to the positive post of the battery.

[5] - Connect current clamp RED lead to the VOLTS jack of the multimeter and the BLACK lead of the current clamp to the COM jack on the multimeter.

[6] - Clamp jaws of current clamp around the positive jumper cable.

[7] -

→NOTE:

If using a multimeter other than JT05791A, use a meter that will read millivolts. Millivolts = current in amps; 1mV = 1 amp.

Set the current clamp to 2000A and the multimeter to 300mV.

[8] -

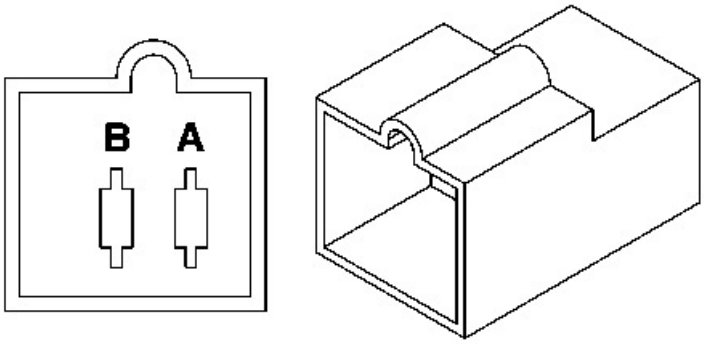
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Headlight Harness Connector Layout, C3F (S.N. 130001-)

Headlight Harness Connector, C3F (S.N. 130001-)	
Schematic:	Main Electrical Schematic (S.N. 130001-170000) , or Main Electrical Schematic (S.N. 170001-)
Wiring Harnesses:	W1 Main Wiring Harness (S.N. 130001-170000) , or W1 Main Wiring Harness (S.N. 170001-)
Terminal	**Circuit Number**
A	901B
B	100P

Headlight Harness Connector, C3M (W3 Light Kit Harness) (S.N. 130001-)



Headlight Harness Connector, C3M (S.N. 130001-)

Headlight Harness Connector Layout, C3M (S.N. 130001-)

Headlight Harness Connector, C3M (S.N. 130001-)	
Schematic:	Main Electrical Schematic (S.N. 130001-170000) , or Main Electrical Schematic (S.N. 170001-)
Wiring Harnesses:	W3 Lighting Kit Wiring Harness (S.N. 130001-)
Terminal	**Circuit Number**
A	901C, 901D
B	100K, 100L

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