John Deere
Service Manual
200, 210, 212, and 214
Lawn and Garden Tractors
SM-2105-(Oct-76)

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John Deere Horicon Works
SM2105 (Oct-76)
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JOHN DEERE 200, 210, 212 AND 214 LAWN AND GARDEN TRACTORS

Service Manual
SM-2105 (Oct-76)

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Group 10
SPECIFICATIONS

ENGINE SPECIFICATIONS

Item	200	210	212	214
Engine Model No.	K181QS	K241AQS	K301AQS	K321AQS
Manufacturer	Kohler	Kohler	Kohler	Kohler
Cylinders	One	One	One	One
Stroke/Cycle	Four	Four	Four	Four
Bore	2.94 in. (7.46 cm)	3.25 in. (8.25 cm)	3.38 in. (8.58 cm)	3.50 in. (8.89 cm)
Stroke	2.75 in. (6.98 cm)	2.88 in. (7.31 cm)	3.25 in. (8.25 cm)	3.25 in. (8.25 cm)
Displacement	18.6 cu. in.	23.9 cu. in.	29.1 cu. in.	31.3 cu. in.
Speeds (Fast) No Load	3400 to 3500 rpm	3400 to 3500 rpm	3400 to 3500 rpm	3400 to 3500 rpm
Speeds (Idle)	1700 to 1900 rpm	1700 to 1900 rpm	1700 to 1900 rpm	1700 to 1900 rpm
Horsepower*	8	10	12	14
Normal Compression	110 to 120 psi	110 to 120 psi	110 to 120 psi	110 to 120 psi
Valve Clearance				
Intake (Cold)	0.007 in. (0.178 mm)	0.010 in. (0.254 mm)	0.010 in. (0.254 mm)	0.010 in. (0.254 mm)
Exhaust (Cold)	0.016 in. (0.406 mm)	0.020 in. (0.508 mm)	0.020 in. (0.508 mm)	0.020 in. (0.508 mm)
Ignition	Battery	Battery	Battery	Battery
Spark Plug	Champion-J-8 or XJ8 AC-45-M or R-46 Prestolite-14-7 or 14-R8	Champion-H-10 AC-45L Prestolite-14-L7B	Champion-H-10 AC-45L Prestolite-14-L7B	Champion-H-10 AC-45L Prestolite-14-L7B
Spark Plug Gap	0.025 in. (0.635 mm)	0.035 in. (0.889 mm)	0.035 in. (0.889 mm)	0.035 in. (0.889 mm)
Breaker Point Gap	0.020 in. (0.508 mm)	0.020 in. (0.508 mm)	0.020 in. (0.508 mm)	0.020 in. (0.508 mm)
Charging System	Alternator	Alternator	Alternator	Alternator
Starter	12-Volt	12-Volt	12-Volt	12-Volt
Air Filter	Dry-type	Dry-type	Dry-type	Dry-type

**The horsepower rating shown is established by the engine manufacturer in accordance with Standard Internal Combustion Engine Institute procedure. It is corrected at 60°F. and 29.22 in. Hg. Barometer and is developed from laboratory test engines equipped with standard air cleaner and muffler.*

BATTERY SPECIFICATIONS

Tractor	Battery
200	John Deere, 12 Volt, (AM30094), BCI Group U1, 135 cold cranking amps at 0°F. (−17°C), 30-minute reserve capacity.
210, 212, 214	John Deere, 12 Volt, (AM31186), BCI Group 22F, 255 cold cranking amps at 0°F. (−17°C), 55-minute reserve capacity.

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BOLT TORQUE CHART

Grade of Bolt		SAE-2	SAE-5	SAE-8	
Min. Tensile Strength		64,000 PSI	105,000 PSI	150,000 PSI	
Grade Marking on Bolt					Socket or Wrench Size
U.S. Standard		TORQUE IN FOOT POUNDS			U.S. Regular
Bolt Dia.	U.S. Dec. Equiv.				Bolt Head / Nut
1/4	.250	6	10	14	7/16 / 7/16
5/16	.3125	13	20	30	1/2 / 1/2
3/8	.375	23	35	50	9/16 / 9/16
7/16	.4375	35	55	80	5/8 / 11/16
1/2	.500	55	85	120	3/4 / 3/4
9/16	.5625	75	130	175	13/16 / 7/8
5/8	.625	105	170	240	15/16 / 15/16
3/4	.750	185	300	425	1-1/8 / 1-1/8
7/8	.875	*160	445	685	1-5/16 / 1-5/16
1	1.000	250	670	1030	1-1/2 / 1-1/2

Multiply Readings by 12 for inch pound values.

**"B" Grade bolts larger than 3/4-inch are sometimes formed hot rather than cold which accounts for the lower recommended torque.*

NOTE: Allow a tolerance of plus or minus 10% on all torques given in this chart.

SET SCREW SEATING TORQUE CHART

Screw Size	Torque in Inch Pounds	
	Cup Point	Square Head
#5	9	—
#6	9	—
#8	20	—
#10	33	—
1/4	87	212
5/16	165	420
3/8	290	830
7/16	430	—
1/2	620	2100
9/16	620	—
5/8	1225	4250
3/4	2125	7700

Divide Readings by 12 for foot pound values
NOTE: Allow a tolerance of plus or minus 10% on all torques given in this chart.

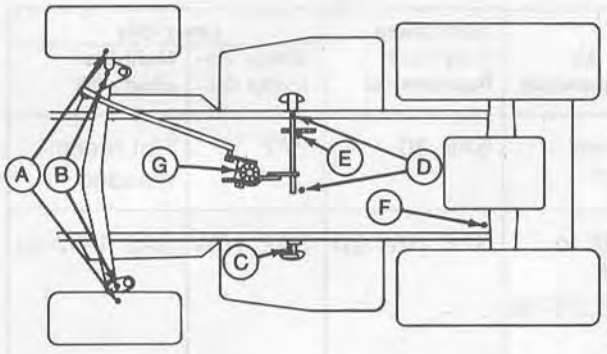
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SERVICE INTERVALS

Lubricating Grease Fittings

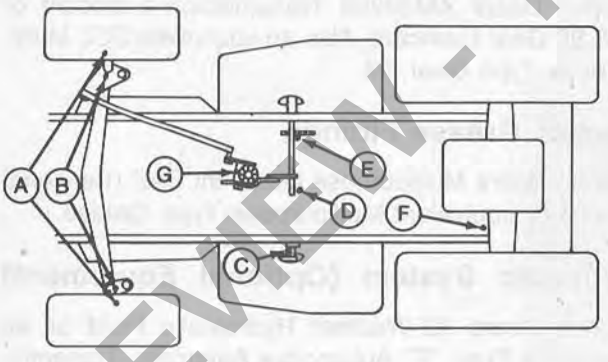
Grease tractor grease fittings in Spring and Fall Season. Tractor grease fitting locations are as follows:



M14459N

A—Front Wheel Hubs
B—Front Axle Spindles
C—Brake Pedal Shaft
D—Clutch Pedal Shaft
E—Primary Lift Shaft
F—Rear Brake Shaft
G—Steering Gear*

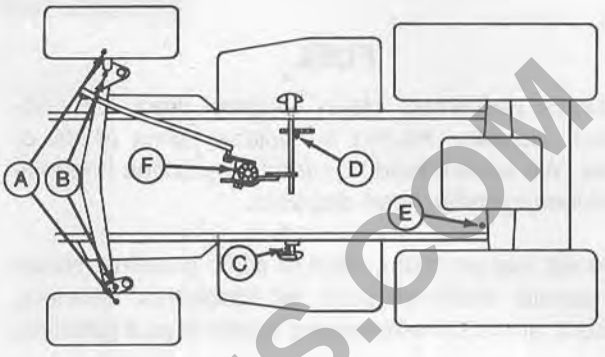
Fig. 1-Grease Fitting Locations (Serial No. 30,001-55,000)



M14460N

A—Front Wheel Hubs
B—Front Axle Spindles
C—Brake Pedal Shaft
D—Clutch Pedal Shaft
E—Primary Lift Shaft
F—Rear Brake Shaft
G—Steering Gear*

Fig. 2-Grease Fitting Locations (Serial No. 55,001-70,000)



M14461N

A—Front Wheel Hubs
B—Front Axle Spindles
C—Brake Pedal Shaft
D—Primary Lift Shaft
E—Rear Brake Shaft
F—Steering Gear*

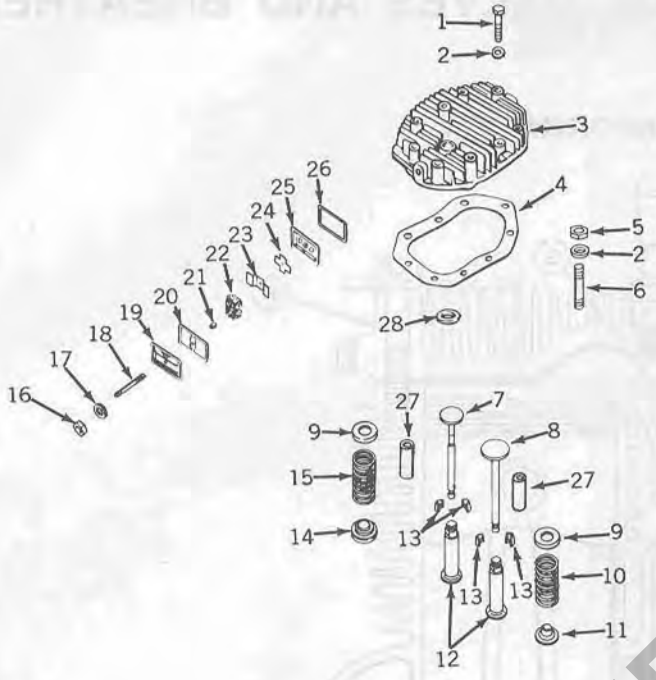
Fig. 3-Grease Fitting Locations (Serial No. 70,001-)

***IMPORTANT: Do not overlubricate steering column fitting. Only 3 to 4 strokes with a hand grease gun are necessary. Do not use a high-pressure grease gun on this fitting.**

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DISASSEMBLY



1—Cap Screw
2—Washer
3—Cylinder Head
4—Head Gasket
5—Hex. Nut
6—Stud
7—Exhaust Valve
8—Intake Valve
9—Upper Spring Retainer
10—Intake Valve Spring
11—Lower Spring Retainer
12—Tappet
13—Valve Keeper
14—Exhaust Valve Rotator
15—Exhaust Valve Spring
16—Hex. Nut
17—Lock Washer
18—Stud
19—Cover
20—Outer Gasket
21—Seal
22—Filter
23—Baffle
24—Reed
25—Breather Plate Assembly
26—Inner Gasket
27—Valve Guides
28—Exhaust Valve Insert

Fig. 2-Exploded View of Cylinder Head, Valves, and Breather (210, 212 and 214 Tractors)

Disassembling Engine

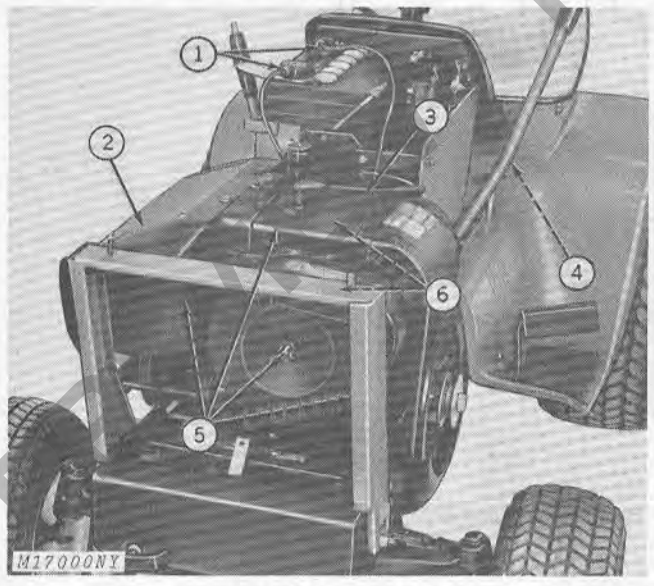


Fig. 3-Disassembling Engine

It is not necessary to remove the engine to service the cylinder head, valves or breather. Remove the hood, grille and side panels to provide access to the engine. Clean engine exterior prior to disassembly.

1. Disconnect battery cables, negative cable first. Remove battery and battery box.

2. Remove shroud covering muffler.

3. Disconnect wiring from coil to wiring harness.

4. Shut off fuel.

5. Remove engine shrouding, coil, carburetor, governor linkage and muffler.

6. Remove cylinder head, breather assembly and valves.

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DIAGNOSING MALFUNCTIONS

Engine Will Not Crank

Battery discharged or defective.

Neutral-start switch and bracket loose, defective, or not properly adjusted.

PTO safety start switch out of adjustment or defective.

Seat safety start switch defective.

PTO drive engaged.

Defective starter.

Defective solenoid.

Loose electrical connections.

Defective key switch.

Engine seized.

Engine Cranks But Will Not Start

Empty fuel tank.

Restricted fuel tank vent.

Fuel shut-off valve closed (valve below fuel tank).

Clogged, restricted, or air-locked fuel line.

Defective fuel pump.

Breaker points worn or pitted.

Spark plug fouled or pitted.

Loose electrical connections.

Faulty condenser.

Defective ignition coil.

Frayed wire (s) causing ground (s).

Engine Starts Hard

Spark plug pitted or fouled.

Breaker points worn, pitted, or out of adjustment.

High-tension wire shorted.

High-tension wire loose at spark plug or coil.

Loose electrical connections.

Restricted fuel tank vent.

Clogged fuel line or air lock.

Broken choke or throttle cable.

Dirt or water in fuel system.

High-speed and idle mixture needles not properly adjusted.

Air leakage at carburetor.

Head gasket leaking.

Low compression.

Engine Starts But Fails to Keep Running

Restricted fuel tank vent.

High-speed and idle mixture needles not properly adjusted.

Broken choke cable.

Dirt or water in fuel system.

Carburetor float not properly adjusted or leaky float.

High-tension wire loose at spark plug or coil.

High-tension wire shorted.

Breaker points not properly adjusted.

Loose connections.

Defective head gasket.

Faulty condenser.

Exhaust valve sticking in excessively tight valve guide.

Breaker points push rod sticking.

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WIRING DIAGRAM

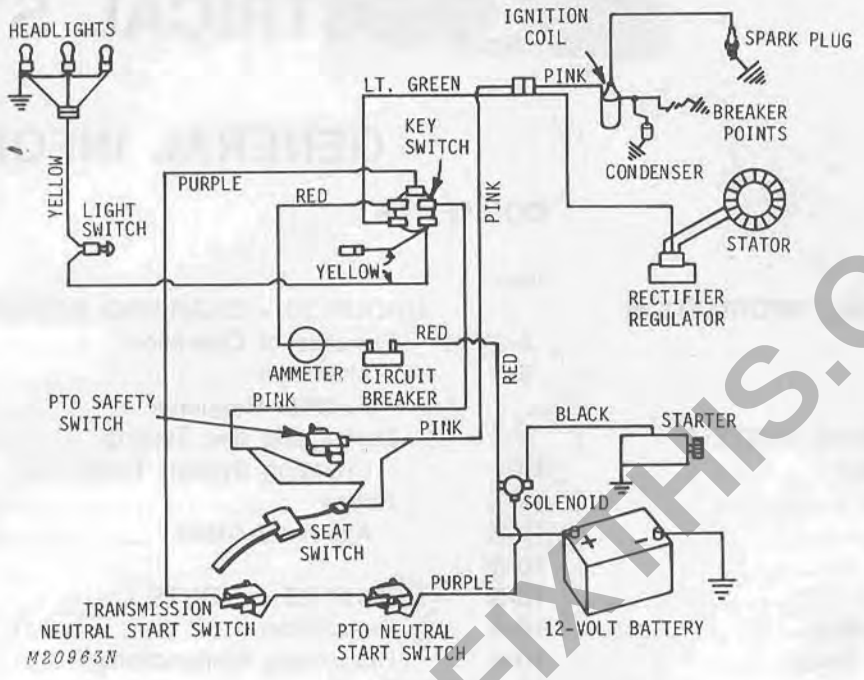


Figure 1-Wiring Diagram

DESCRIPTION

The 200 Series Tractors all have a 12-volt electrical system. The electrical system consists of the cranking, ignition and charging systems, plus the accessory circuit.

The cranking system consists of a battery, solenoid, circuit breaker, key switch, two neutral-start safety switches and a permanent magnet starter motor. See Group 10 for detailed information.

All 200 Series Tractors are equipped with a battery-coil ignition system consisting of a battery, ignition switch, two safety interlock switches, ignition coil, breaker points and condenser. See Group 15 for additional information.

The battery is charged with a 15-amp alternator. A solid-state rectifier-regulator converts AC current from the alternator into DC current and also controls the rate of charging current to the battery. See Group 20 for further information.

A new electric lift is available for 200 Series Tractors. The electric lift is position-responsive in that it reacts directly to control lever movement. Detailed information can be found in Group 30.

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PRINCIPLE OF OPERATION

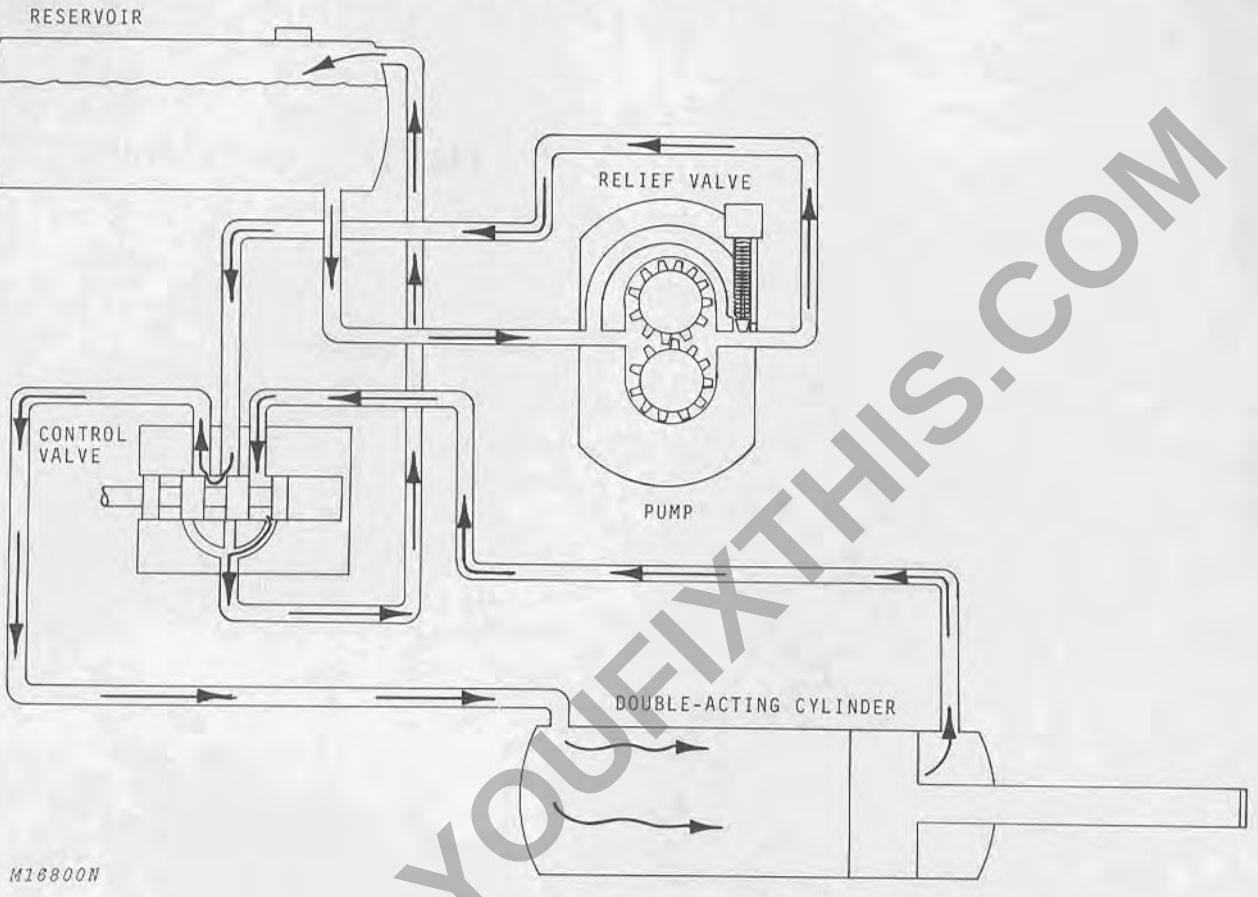


Fig. 1-Open-Center Hydraulic System

A hydraulic lift system is available for 210, 212, and 214 Tractors as a dealer installed accessory. The hydraulic lift consists of a positive displacement pump (Parker Hannifin), control valve, double-acting cylinder, reservoir and hoses.

With this open-center system there is a continuous flow of oil from the reservoir to pump through the control valve back to the reservoir in the neutral position.

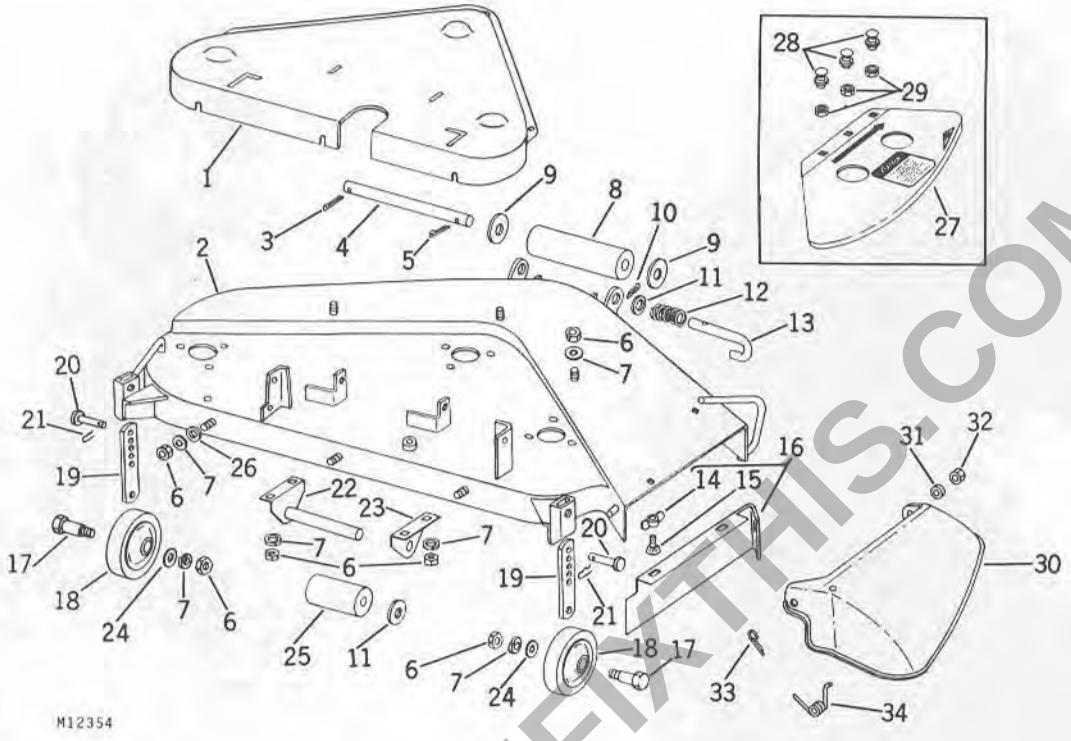
When the control valve is actuated, pressure oil from the pump is directed to either side of the double acting cylinder. As pressure oil moves the piston through its stroke, oil from the other side of the piston leaves the cylinder and enters the control valve and is directed back to the reservoir.

The direction of oil flow is changed in the control valve. The lift lever moves the spool to open and close the correct parts to direct the oil to the cylinder. When the lever is released, it will return to the neutral position. At this time the oil at either side of the piston is trapped, locking the piston rod in place.

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DECK, GAUGE WHEELS AND ROLLERS (39 Rotary Mower)



Key	Part No.	Serial No.	Description
1	M 42778	(-)	Shield
2	AM 31371	(- 190000)	Deck with decals (sub. AM34667)
	AM 34667	(190001 -)	Deck (includes all parts marked with an asterisk on pages 2, 4 and 5)
3	11H 283	(-)	Pin, cotter, 7/32" x 1"
4	M 42276	(-)	Shaft, roller, front
5	11H 284	(-)	Pin, cotter, 7/32" x 1-1/2"
6	14H 812	(-)	Nut, 3/8" (8 used)
7	12H 304	(-)	Washer, lock, 3/8" (8 used)
8	M 41644	(-)	Roller, front, 7"
9	24H 1375	(-)	Washer, 11/16" x 1-1/8" x 0.060" (2 used)
10	11H 280	(-)	Pin, cotter, 5/32" x 3/4" (2 used)
11	24H 1261	(-)	Washer, 9/16" x 1-1/8" x 0.060" (2 used)
12	R 26079	(-)	Spring (2 used)
13	M 42286	(-)	Pin, draft front (2 used)
14	14H 844	(-)	Nut, wing, 1/4" (3 used)
15	3H 1893	(-)	Bolt, cge., 1/4" x 1/2" (3 used)
16	AM 31081	(- 190000)	Plate, leaf mulcher, with hardware (sub. AM34454)
	AM 34454	(190001 -)	Plate, leaf mulcher, with hardware
17	M 40659	(-)	Bolt, gauge wheel (2 used)
18	AM 33718	(-)	Wheel, gauge, 5" (2 used) (sub. for AM30981)
19	M 40653	(-)	Arm, gauge wheel (2 used)
20	M 40569	(-)	Pin, drilled, 3/8" x 1" (2 used)
21	J 16931	(-)	Pin, spring locking (2 used)
22	AM 31011	(-)	Bracket, roller, rear, L.H. with shaft welded
23	M 41981	(-)	Bracket, roller, rear, R.H.
24	24H 1308	(-)	Washer, 13/32" x 1" x 0.090" (2 used)
25	M 40213	(-)	Roller, rear, 4"
26	24H 1305	(-)	Washer, 13/32" x 13/16" x 0.060" (3 used)
27	M 44444	(- 190000)	Guard, chute, with decals
28	3H 1539	(- 190000)	Bolt, cge., 5/16" x 5/8" (3 used)
	12H 303	(- 190000)	Washer, lock, 5/16"
29	M 40699	(- 190000)	Nut, elastic, stop, 5/16" (3 used)
30	AM 34523 *	(190001 -)	Guard, chute, with decals
31	24H 1305 *	(190001 -)	Washer, 13/32" x 13/16" x 0.060"
32	M 47031 *	(190001 -)	Nut, 3/8"
33	11H 236 *	(190001 -)	Pin, cotter, 1/8" x 1"
34	M 47030 *	(190001 -)	Spring

*See Key 2.

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Section 10
GENERAL
Group 5
TRACTOR IDENTIFICATION

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Rectifier-Regulator



Fig. 2-Rectifier-Regulator

The alternating current produced in the alternator is changed to direct current in the rectifier-regulator, Fig. 2. Direct current is necessary for charging the battery.

This change is accomplished through the use of solid state electronic devices which are arranged to form a half-wave bridge rectifier.

Regulation is also provided by electronic devices (Zener Diodes) which "sense" the counter-voltage created by the battery to control or limit the charging rate. Since these devices generate heat in operation, the regulator is finned on the back side to provide greater cooling.

When the battery is in a low state of charge, the regulator permits a higher charge rate to the battery. When battery is fully charged, the devices limit the charging rate.

DIAGNOSING AND TESTING

PROBLEM	TEST SEQUENCE
1. Battery remains low or discharged.	A. Test battery and check all connections. B. Test rectifier-regulator. C. Test alternator stator. D. Check circuit breaker.
2. Battery uses too much water or battery is spewing electrolyte.	A. Test battery and check all connections. B. Test rectifier-regulator.
3. No DC output from rectifier-regulator.	A. Check all connections. B. Test rectifier-regulator. C. Test alternator stator. D. Check circuit breaker.
4. Unsteady or low alternator output.	A. Check all connections. C. Test alternator stator.
5. No AC output from alternator.	A. Check all connections. C. Test alternator stator.

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