

**TROY-BILT®/Bolens®**

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# **Service and Repair Manual**

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## **Suburban Tractor Series**

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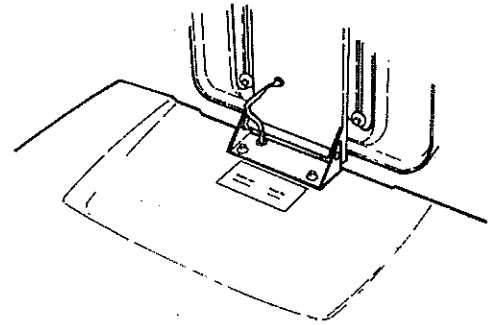
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**GENERAL INFORMATION****MODEL NUMBERS**

To help ensure prompt service when ordering parts, you must provide the unit's model and serial number. For your personal reference, record the unit's model/serial numbers. Refer to the figures at the right for location of the unit's model/serial number decal. The engine's model/serial number is located on the engine.

MODEL/SERIAL NUMBER OF TRACTOR:

MODEL/SERIAL NUMBER OF ENGINE:

**UNIT'S MODEL/SERIAL NUMBER****REPLACEMENT PARTS**

We urge using only genuine Troy-Bilt/Bolens replacement parts, which meet all of the latest requirements. Replacement parts manufactured by others could present safety hazards, even though they may fit on your unit.

Refer to the unit's parts catalog for replacement parts.

**SERVICE INFORMATION**

For engine service, contact your nearest authorized engine dealer. To locate the nearest dealer, refer to the "Yellow Pages" in the telephone book under "Engines" or "Gasoline Engines".

For tractor service or parts, contact your local authorized dealer or our service department at the phone number and address on the back cover of this manual.

**WARRANTY SERVICE**

To obtain warranty service, refer to the information in the unit's owner/operator manual.

**SAFETY**

The owner/operator manual contains specific information on safe operating practices for the Suburban Tractor. Follow all safety precautions in the owner/operator manual provided with the unit.

**WARNING!**

**BEFORE PERFORMING ANY MAINTENANCE OR ADJUSTMENTS, SHUT THE TRACTOR'S ENGINE OFF, REMOVE THE IGNITION KEY FROM THE KEY SWITCH, DISCONNECT THE SPARK PLUG WIRE FROM THE SPARK PLUG AND PREVENT IT FROM TOUCHING THE SPARK PLUG AND DISENGAGE THE ATTACHMENT DRIVE (PTO) - UNLESS INSTRUCTED OTHERWISE IN THIS MANUAL.**




**MODEL/SERIAL NUMBER RANGE**

<b>SALES DESCRIPTION</b>	<b>MODEL</b>
<b>1984</b>	
ST 110	3011G-01
ST 160	3016H-01
ST 160	3016G-01
<b>1985</b>	
ST 110	3011H-01
ST 110	3011G-02
ST 160	3016H-02
ST 160	3016G-02
<b>1986</b>	
ST 110	3011G-03
ST 110	3211G-01
ST 125	3012G-01
ST 125	3012H-01
<b>1987</b>	
ST 120	3112G-01
ST 120	3212G-01
ST 125	3012G-02
ST 125	3012H-02
<b>1988</b>	
ST 120	3212G-02
ST 120	3212H-01
ST 140	3114G-01
ST 140	3114H-01
ST 180	3018G-01
ST 180	3018H-01

**MODEL/SERIAL NUMBER RANGE**

<b>SALES DESCRIPTION</b>	<b>MODEL</b>
<b>1989</b>	
ST 100	3010G-01
ST 120	3212G-03
ST 120	3212H-02
ST 140	3114G-02
ST 140	3114H-02
ST 180	3018G-02
ST 180	3018H-02
<b>1990</b>	
ST 120	3213G-03
ST 120	3212H-02
ST 140	3214G-01
ST 140	3214H-01
ST 160	3216H-01
ST 180	3018H-02
<b>1991</b>	
ST 120	3212G-04
ST 120	3212H-03
ST 140	3214H-02
ST 160	3216H-02
<b>1992</b>	
ST 120	3212G-04
ST 120	3212H-03
ST 140	13014-01
ST 160	13016-01
<b>1993</b>	
ST 125	13023-01
ST 125	13024-01
ST 140	13014-01
ST 140	13016-01
ST 125	13051-01
ST 125	13052-01
ST 140	13064-01 (same specifications as 13014)
ST 140	13065-01 (same specifications as 13016)
ST 125	13066-01 (same specifications as 13024)

**TORQUE VALUES FOR CAP SCREWS**

SIZE	 SAE GRADE 2			 SAE GRADE 5			 SAE GRADE 8		
	Lb. In.	Nm	Kgm	Lb. In.	Nm	Kgm	Lb. Ins	Nm	Kgm
1/4-20	49	5.5	0.6	75	8.5	0.9	108	12.2	1.2
1/4-28	56	6.3	0.6	86	9.7	1.0	120	13.6	1.4
	Lb. Ft.	Nm	Kgm	Lb. Ft.	Nm	Kgm	Lb. Ft.	Nm	Kgm
5/16-18	8	10.8	1.1	13	17.6	1.8	18	24.4	2.4
5/16-24	9	12.2	1.2	14	18.9	1.9	20	27.1	2.7
3/8-16	15	20.3	2.0	23	31.2	3.1	35	47.4	4.8
3/8-24	17	20.3	2.3	25	33.9	3.4	35	47.4	4.8
7/16-14	24	32.5	3.3	35	47.4	4.8	55	74.5	7.6
7/16-20	25	33.9	3.4	40	54.2	5.5	60	81.3	8.3
1/2-13	35	47.4	4.8	55	74.5	7.6	80	108.4	11.0
1/2-20	40	54.2	5.5	65	88.1	9.0	90	122.0	12.4
9/16-12	55	74.5	7.6	80	108.4	11.0	110	149.1	15.2
9/16-18	60	81.3	8.3	90	122.0	12.4	130	176.2	18.0
5/8-11	75	101.6	10.3	110	149.1	15.2	170	230.4	23.5
5/8-18	85	115.2	11.7	130	176.2	18.0	180	243.9	24.9
3/4-10	130	176.2	18.0	200	271.0	27.7	280	379.4	24.9
3/4-16	145	196.5	20.0	220	298.1	30.4	320	433.6	44.3
7/8-9	125	169.4	17.3	320	433.6	44.3	460	623.3	63.7
7/8-14	140	189.7	19.3	350	474.3	48.4	500	677.5	69.2
1-8	190	257.7	26.3	480	650.4	66.5	680	921.4	94.2
1-12	200	271.0	27.7	530	718.2	73.4	740	1002.7	102.5

**Conversion**

**Formula:**

To obtain Nm, multiply ft. lbs. by 1.355.

To obtain Kgm, multiply ft. lbs. by 0.138.

**All torques  $\pm$  10% unless otherwise specified.**

**All torque values are for capscrews that have been lubricated with engine oil or grease.**

**Multiply standard**

**assembly torque**

**by the following factors:**

- 1.25 when threads are dry
- 0.85 when parts are plated
- 0.75 when parts are parkerized
- 0.70 when parts are coated with Molykote
- 0.65 for jam nuts

**ENGINE SPECIFICATIONS**

<b>ENGINE</b>	<b>3010G</b>	<b>3011G, 3011H, 3211G</b>	<b>3012G, 3012H</b>
<b>MANUFACTURER</b>	Briggs and Stratton	Briggs and Stratton	Briggs and Stratton
<b>MODEL/SPEC. NUMBER</b>	255707-0123	253707-0144	404707-0117
<b>TYPE</b>	single cyl., air cooled, 4-cycle	single cyl., air cooled, 4-cycle	single cyl., air cooled, 4-cycle
<b>BORE X STROKE</b>	3.44" x 2.38" (87.3 x 60.3 mm)	3.43" x 2.64" (87.3 x 66.7 mm)	N/A
<b>DISPLACEMENT</b>	22.04 cu. in. (361.2 cc)	24.36 (399.5 cc)	N/A
<b>MANUFACTURER'S H.P. RATING</b>	10 HP @ 3600 RPM	11 HP @ 3600 RPM	12.5 HP @ 3600 RPM
<b>IGNITION</b>	Magnetron	Magnetron	Magnetron
<b>AIR CLEANER</b>	Dry type	Dry type	Dry type
<b>OIL CAPACITY w/filter</b>	3 Pts. (1.42 L)	3 Pts. (1.42 L)	3 Pts. (1.42 L)
<b>OIL FILTER</b>	N/A	N/A	N/A
<b>GOVERNOR SETTING</b>	Mechanical	Mechanical	Mechanical
<b>SPEED CONTROL</b>	Remote, cable operated	Remote, cable operated	Remote, cable operated
<b>SPARK PLUG</b>	Resistor type	Resistor type	Resistor type
<b>SPARK PLUG GAP</b>	0.030" (0.76 mm)	0.030" (0.76 mm)	0.030" (0.76 mm)

**ENGINE SPECIFICATIONS**

ENGINE	3014H, 3114G, 3114H	3016G & 3016H	3112G, 3212G, 3212H
<b>MANUFACTURER</b>	Briggs and Stratton	Briggs and Stratton	Briggs and Stratton
<b>MODEL/SPEC. NUMBER</b>	400707-1205	402707-1060	281707-0127
<b>TYPE</b>	twin cyl., air cooled, 4-cycle IC	twin cyl., air cooled, 4-cycle IC	twin cyl., air cooled, 4-cycle IC
<b>BORE X STROKE</b>	3.44" x 2.16" (87.3 x 54.8 mm)	3.44" x 2.16" (87.3 x 54.8 mm)	3.44" x 3.06" (87.3 x 77.8 mm)
<b>DISPLACEMENT</b>	40 cu. in. (656 cc)	40 cu. in. (656 cc)	28.42 cu. in. (465.7 cc)
<b>MANUFACTURER'S H.P. RATING</b>	14 HP @ 3600 RPM, idle speed 1750 + 100 RPM	16 HP @ 3600 RPM	12 HP @ 3600 RPM
<b>IGNITION</b>	Magnetron	Magnetron	Magnetron
<b>AIR CLEANER</b>	Dry type	Dry type	Dry type
<b>OIL CAPACITY w/filter</b>	3 Pts. (1.42 L)	3 Pts. (1.42 L)	3 Pts. (1.42 L)
<b>OIL FILTER</b>	N/A	N/A	N/A
<b>GOVERNOR SETTING</b>	Mechanical	Mechanical	Mechanical
<b>SPEED CONTROL</b>	Remote, cable operated	Remote, cable operated	Remote, cable operated
<b>SPARK PLUG</b>	Resistor type	Resistor type	Resistor type
<b>SPARK PLUG GAP</b>	0.030" (0.76 mm)	0.030" (0.76 mm)	0.030" (0.76 mm)



**ENGINE SPECIFICATIONS**

<b>ENGINE</b>	<b>3018H &amp; 3118G</b>	<b>13011 &amp; 13013</b>	<b>13014 &amp; 3214</b>
<b>MANUFACTURER</b>	Briggs and Stratton	Briggs and Stratton	Briggs and Stratton Vanguard
<b>MODEL/SPEC. NUMBER</b>	422707-1207	283707	294777
<b>TYPE</b>	4-cycle, twin cylinder, air cooled	0115-01, single cylinder	0333-04 2-cylinder
<b>BORE X STROKE</b>	3.44" x 2.28" (87.3 x 57.9mm)	3.44" x 3.06" (87.3 x 77.7mm)	2.68" x 2.6" (68 x 66 mm)
<b>DISPLACEMENT</b>	42.33 cu. in. (694 cc)	28.42 cu. in. (465.7 cc)	29.3 cu. in. (480 cc)
<b>MANUFACTURER'S H.P. RATING</b>	18 HP @ 3600 RPM	12 HP @ 2800/2900 RPM	14 HP @ 3600 RPM
<b>IGNITION</b>	Magnetron	Magnetron	Magnetron
<b>AIR CLEANER</b>	Dual element	Dual element	Dual element
<b>OIL CAPACITY w/filter</b>	3.0 Pts. (1.4 L)	3.5 Pts. (1.6 L)	3.5 Pts. (1.6 L)
<b>OIL FILTER</b>	No	No	Yes
<b>GOVERNOR SETTING</b>	Mechanical	Mechanical	Mechanical
<b>SPEED CONTROL</b>	Remote, cable operated	Remote, cable operated	Remote, cable operated
<b>SPARK PLUG</b>	Resistor type	Resistor type	Resistor type
<b>SPARK PLUG GAP</b>	0.03" (.76 mm)	0.03" (.76 mm)	0.03" (.76 mm)

**ENGINE SPECIFICATIONS**

<b>ENGINE</b>	<b>13015</b>	<b>13016 &amp; 3216 H</b>	<b>13017</b>
<b>MANUFACTURER</b>	Briggs and Stratton Vanguard	Briggs and Stratton Vanguard	Briggs and Stratton Vanguard
<b>MODEL/SPEC. NUMBER</b>	294777	303777	294777
<b>TYPE</b>	0333-04 2-cylinder	0333-03 2-cylinder	0333-04 2-cylinder
<b>BORE X STROKE</b>	2.68" x 2.6" (68 x 66 mm)	2.68" x 2.6" (68 x 66 mm)	2.68" x 2.6" (68 x 66 mm)
<b>DISPLACEMENT</b>	29.3 cu. in. (480 cc)	29.3 cu. in. (480 cc)	29.3 cu. in. (480 cc)
<b>MANUFACTURER'S H.P. RATING</b>	14 HP @ 3600 RPM	16 HP @ 3600 RPM	14 HP @ 3600 RPM
<b>IGNITION</b>	Magnetron	Magnetron	Magnetron
<b>AIR CLEANER</b>	Installed dual element	Installed dual element	Installed dual element
<b>OIL CAPACITY w/filter</b>	3.5 Pts. (1.6 L)	3.5 Pts. (1.6)	3.5 Pts. (1.6)
<b>OIL FILTER</b>	Yes	Yes	Yes
<b>GOVERNOR SETTING</b>	Mechanical	Mechanical	Mechanical
<b>SPEED CONTROL</b>	Remote, cable operated	Remote, cable operated	Remote, cable operated
<b>SPARK PLUG</b>	Resistor type	Resistor type	Resistor type
<b>SPARK PLUG GAP</b>	0.03" (.76 mm)	0.03" (.76 mm)	0.03" (.76 mm)

**ENGINE SPECIFICATIONS**

<b>ENGINE</b>	<b>13023</b>	<b>13024</b>	<b>13025</b>
<b>MANUFACTURER</b>	Kohler	Kohler	Kohler
<b>MODEL/SPEC. NUMBER</b>	CV12.5S/PSS1259	CV12.5S/PSS1259	CV12.5S/PSS1259
<b>TYPE</b>	OHV	OHV	OHV
<b>BORE X STROKE</b>	3.43 x 2.64 (87 x 67 mm)	3.43 x 2.64 (87 x 67 mm)	3.43 x 2.64 (87 x 67 mm)
<b>DISPLACEMENT</b>	24.3 cu. in. (398 cu. cm.)	24.3 cu. in. (398 cu. cm.)	24.3 cu. in. (398 cu. cm.)
<b>MANUFACTOR'S H.P. RATING</b>	12.5 HP @ 3600 RPM	12.5 HP @ 3600 RPM	12.5 HP @ 3600 RPM
<b>IGNITION</b>	Electronic	Electronic	Electronic
<b>AIR CLEANER</b>	Installed dual element	Installed dual element	Installed dual element
<b>OIL CAPACITY w/filter</b>	4 Pts. (1.9 L)	4 Pts. (1.9 L)	4 Pts. (1.9 L)
<b>OIL FILTER</b>	Yes	Yes	Yes
<b>GOVERNOR SETTING</b>	Mechanical	Mechanical	Mechanical
<b>SPEED CONTROL</b>	Remote, cable operated	Remote, cable operated	Remote, cable operated
<b>SPARK PLUG</b>	Resistor type	Resistor type	Resistor type
<b>SPARK PLUG GAP</b>	0.03" (.76 mm)	0.03" (.76 mm)	0.03" (.76 mm)

**ENGINE SPECIFICATIONS**

ENGINE	13026	13027	13028
<b>MANUFACTURER</b>	Kohler	Kohler	Kohler
<b>MODEL/SPEC. NUMBER</b>	CV12.5S/PSS1259	CV14S/PS1444	CV14S/PS1444
<b>TYPE</b>	OHV	OHV	OHV
<b>BORE X STROKE</b>	3.43/87 x 2.64/67	3.43/87 x 2.64/67	3.43/87 x 2.64/67
<b>DISPLACEMENT</b>	24.3	24.3	24.3
<b>MANUFACTOR'S H.P. RATING</b>	12.5 HP @ 3600 RPM	14 HP @ 3600 RPM	14 HP @ 3600 RPM
<b>IGNITION</b>	Electronic	Electronic	Electronic
<b>AIR CLEANER</b>	Installed dual element	Installed dual element	Installed dual element
<b>OIL CAPACITY w/filter</b>	4 Pts. (1.9)	4 Pts. (1.9)	4 Pts. (1.9)
<b>OIL FILTER</b>	Yes	Yes	Yes
<b>GOVERNOR SETTING</b>	Mechanical	Mechanical	Mechanical
<b>SPEED CONTROL</b>	Remote, cable operated	Remote, cable operated.	Remote, cable operated
<b>SPARK PLUG</b>	Resistor type	Resistor type	Resistor type
<b>SPARK PLUG GAP</b>	0.03" (.76 mm)	0.03" (.76 mm)	0.03" (.76 mm)

**ENGINE SPECIFICATIONS**

ENGINE	13051	13052	
MANUFACTURER	Briggs & Stratton	Briggs & Stratton	
MODEL/SPEC. NUMBER	286707	286707	
TYPE	I/C Industrial/Commercial	I/C Industrial/Commercial	
BORE X STROKE	3.44 x 3.06	3.44 x 3.06	
DISPLACEMENT	28.4 cu	28.4 cu	
MANUFACTOR'S H.P RATING	12.5 HP @ 2800 RPM	12.5 HP @ 2800 RPM	
IGNITION	Electronic	Electronic	
AIR CLEANER	Installed dual element	Installed dual element	
OIL CAPACITY w/filter	4 Pts. (1.9)	4 Pts. (1.9)	
OIL FILTER	No	No	
GOVERNOR SETTING	Mechanical	Mechanical	
SPEED CONTROL	Remote, cable operated	Remote, cable operated	
SPARK PLUG	Resistor type	Resistor type	
SPARK PLUG GAP	0.03" (.76 mm)	0.03" (.76 mm)	

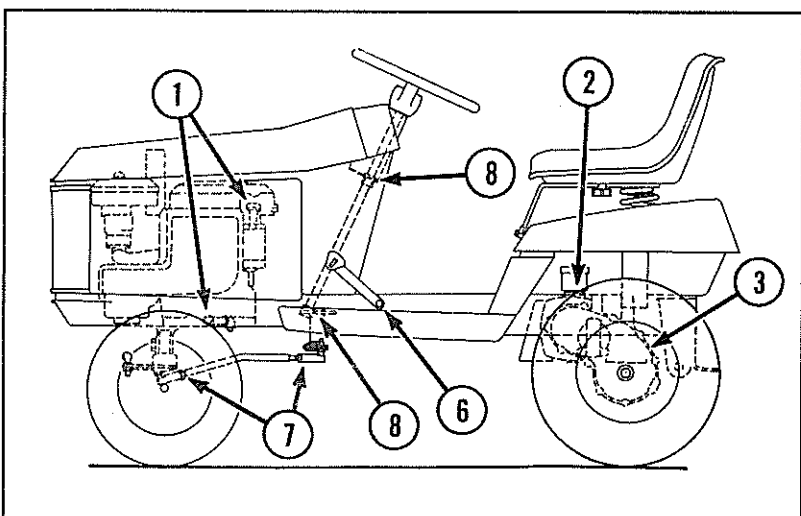
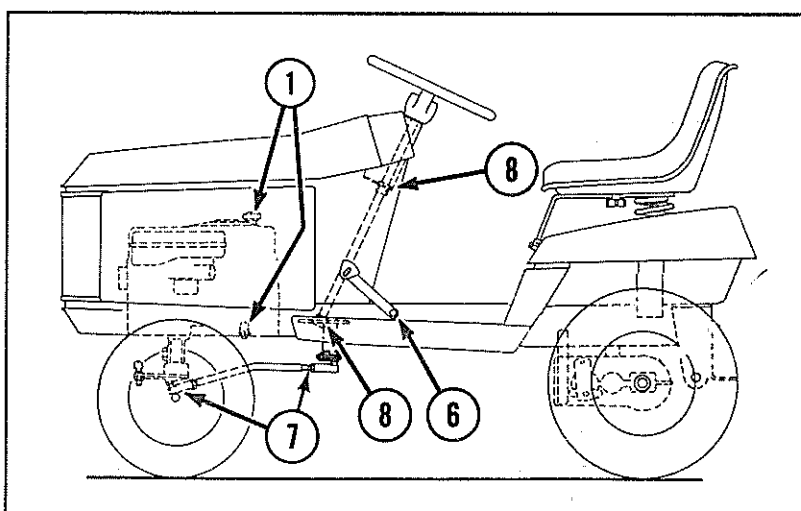
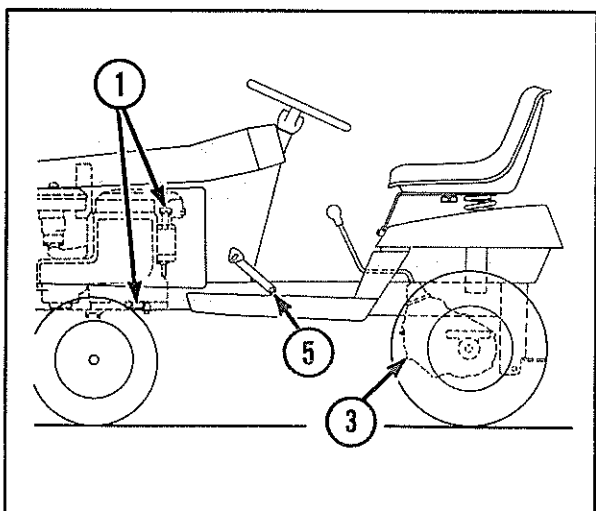
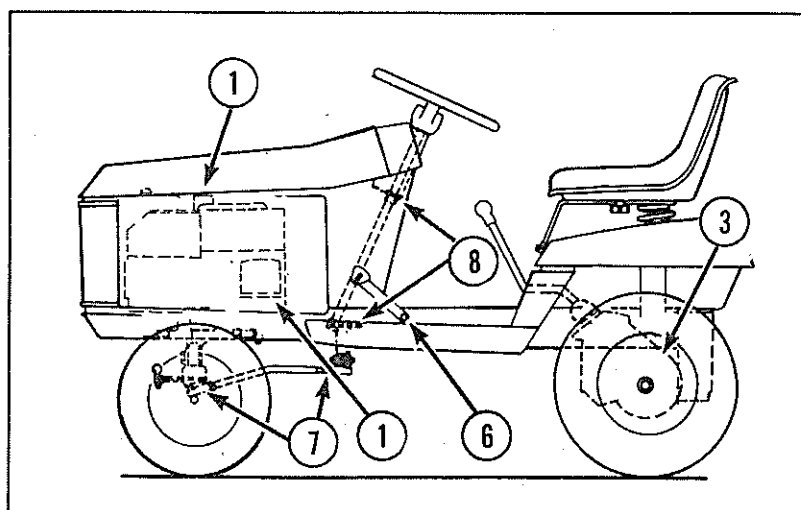
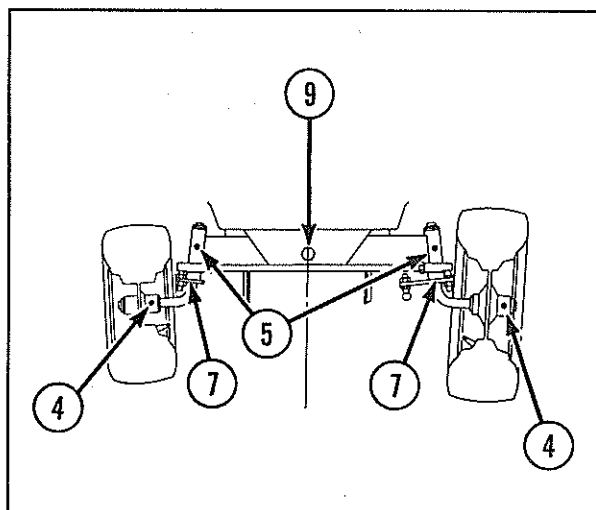
**MAINTENANCE CHART**

COMPONENT	LENGTH OF OPERATION	TYPE OF MAINTENANCE
Engine cooling air screen	100 hours*	Brush clean
Engine air cleaner	25 hours*	See engine manual.
Cooling fins (engine)	When no longer serviceable	Replace
Spark plug	100 hours*	Service or replace.
Fuel filter	100 hours*	Replace.
Battery	100 hours*	Check water level, add as necessary.
Hydrostatic fins	Each use	Clean, use air hose if available.
Belts	50 hours	Check for wear and adjust as necessary.
Tires	30 hours	Check for damage and air pressure.
Brake	As required	Adjust linkage as necessary.

**LUBRICATION CHART**

<b>COMPONENTS (with ref. no.)</b>	<b>LENGTH OF OPERATION</b>	<b>TYPE OF LUBRICATION</b>	<b>AMOUNT REQUIRED</b>
Engine crankcase (1)	Change after the first 5 hours. Thereafter change every 25 hours.	Engine oil SC, SD, SE or SF. 20° F (-7° C) and below: 5W-20 or 5W-30. 0° F (-19° C) to 60° F (16° C): 10W-30 or 10W-40. 40° F (5° C) to 120° F (50° C): SAE 30.	3 Pts. (1.4 L)
Eaton Hydrostatic Transmission (2)	Check reservoir level every 25 hours.	SAE 20, Type SC, SD or SE.	Eaton 7: Fill to plug level on top of hydro. Eaton 750: Fill to line on reservoir.
Transaxle (3) Gear Drive Models Hydrostatic Models	Check reservoir level every 25 hours.	SAE EP 90	44 oz. (1.3 L)
Front wheel bearings (5)	10 hours	Multi-purpose grease	1-2 strokes
Front wheel spindles (4)	10 hours	Multi-purpose grease	1-2 strokes
Brake pedal shaft and bushings (6)	10 hours	Oil	Small amount
Tie rod ends and drag links (7)	10 hours	Oil	Small amount
Steering shaft (8)	10 hours	Oil	Small amount
Front axle pivot (9)	25 hours	Multi-purpose grease	As required
Drive idlers (not shown)	10 hours	Oil	Small amount
Pivot points and linkages	25 hours	Oil	Small amount

**LUBRICATION**



**CHASSIS SPECIFICATIONS**

**TRACTOR MODELS CATEGORIZED BY TRANSMISSION MODEL**

<b>Peerless Model 801-018</b>  3011G (01), 3016G (01)	<b>Peerless Model 801-018C</b>  3011G (02-03), 3012G (01-02), 3016G (02-04), 3018G (01-02), 3112G (01), 3114G (01-02), 3214G (01), 13017 (01-02)	<b>Peerless Model 842</b>  3211G (01)
<b>Peerless Model 920-011</b>  3212G (01-02)	<b>Peerless Model 920-011A</b>  3212G (03), 3010G (01)	<b>Peerless Model 930-023</b>  3212G (04), 13023, 13011, 13023, 13025, 13026 (01), 3214G (01) 13051
<b>Peerless Model 2358</b>  3118G (01-02)	<b>Peerless Differential Eaton 7 with Model 1327</b>  3011H (01), 3012H (01-02), 3016H (01-04)	<b>Peerless Differential Eaton 7 with Model 1327C</b>  3014H (01), 3018H (01), 3114H (01), 3212H (01)
<b>Eaton Model 750</b>  3212H (01 & 03), 3114H (02), 3018H (02), 3214H (01-02), 3216H (01-02)	<b>Eaton Model 751</b>  13013, 13014, 13015, 13016, 13017, 13024, 13027, 13028 13052	



**CHASSIS SPECIFICATIONS**

	<b>PEERLESS 801, 842, 920, 930</b>	<b>EATON HYDROSTATIC MODEL 7 WITH PEERLESS 1327 OR 1327C</b>
<b>Speeds</b>	Forward: 1st - 1.0 (1.6) 2nd - 2.1 (3.4) 3rd - 3.1 (5.0) 4th - 3.9 (6.3) 5th - 5.0 (8.0)  Reverse: 2.2 (3.5)	Forward: 0 - 5.2 (8.4) Reverse: 0 - 2.8 (4.5)
<b>Battery</b>	45 amp hour, 12 V	45 amp hour, 12 V
<b>PTO Type</b>	Electric clutch	Electric clutch
<b>Fuel Capacity</b>	5 gallons (18.9 liter)	5 gallons (18.9 liter)
<b>Brake</b>	Transmission mounted disk	Transaxle mounted disk
<b>Tire size</b>	Front: 15 x 6-6 Rear: 20 x 8-10	Front: 15 x 6-6 Rear: 20 x 8-10
<b>Wheel base</b>	45" (114 cm)	45" (114 cm)
<b>Ground clearance</b>	Front: 8" (20.3 cm) Rear: 6.5" (16.5 cm)	6" (15.2 cm)
<b>Height</b>	42.5" (108 cm)	42" (108 cm)
<b>Width</b>	34.5" (88 cm)	34.5" (88 cm)
<b>Width w/36" mower</b>	49" (124.5 cm)	49" (124.5 cm)
<b>Width w/42" mower</b>	54" (137 cm) 47" w/ chute up	54" (137 cm) 47" w/ chute up
<b>Length</b>	69" (175 cm)	69" (175 cm)
<b>Turning Radius</b>	22" (56 cm) inside of rear wheel	22" (56 cm) inside of rear wheel

## GEAR DRIVE MODELS

### 1. BRAKE ADJUSTMENT (ALL GEAR DRIVE MODELS EXCEPT 3118 ), FIGURE 2-1.

When the brake will no longer hold the tractor with the brake lock engaged, an adjustment is required (all gear drive models except 3118).

- a. Adjust brake arm movement:
  1. Brake arm should apply initial braking force when arm moves  $1/4"$  to  $7/16"$  (9 to 11 mm) from the center position.
  2. To reach this travel, adjust nuts (B, Figure 2-1).
  3. With rod (C) of brake removed, total travel of brake arm from side to side should not be more than  $7/8"$  (22 mm).
  4. After completing adjustment, check brakes for proper braking action.

### 2. BRAKE/CLUTCH ADJUSTMENT (ALL GEAR DRIVE MODELS EXCEPT 3118 )

- a. With brake lock engaged, adjust clutch rod (A, Figure 2-2). Provide a clearance of  $3-1/2"$  to  $3-3/4"$  between idler (B) and inside of side frame.

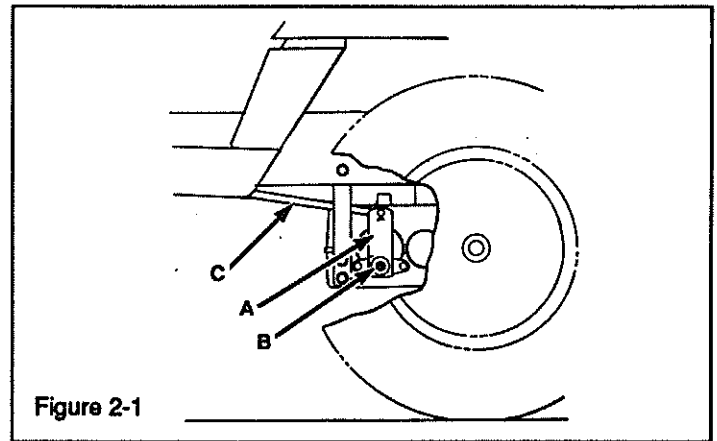


Figure 2-1

- b. With brake disengaged, adjust brake rod (C) so that the arm on transmission is vertical. Brake spring (D) should be compressed to approximately 5" long.
- c. With shift lever (G) in neutral detent, adjust shift rod (E) until the transmission reaches neutral position.

## ALL MODELS EXCEPT 3118

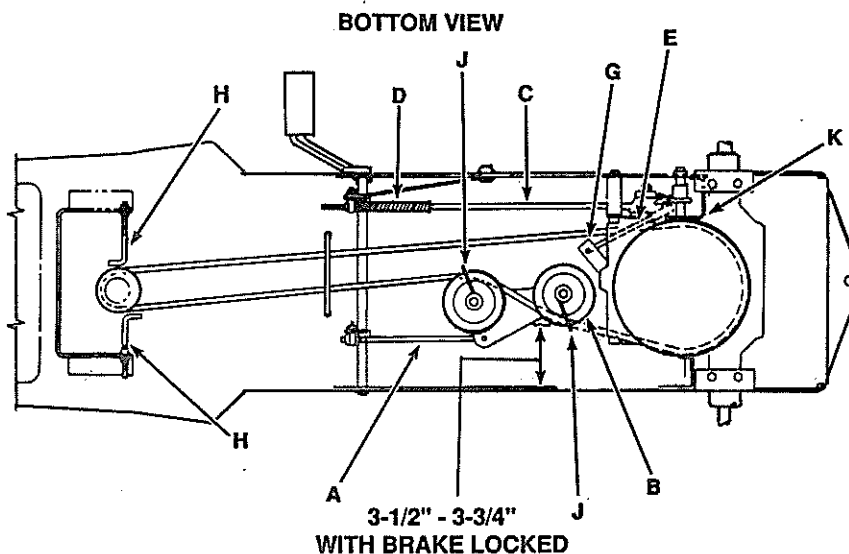
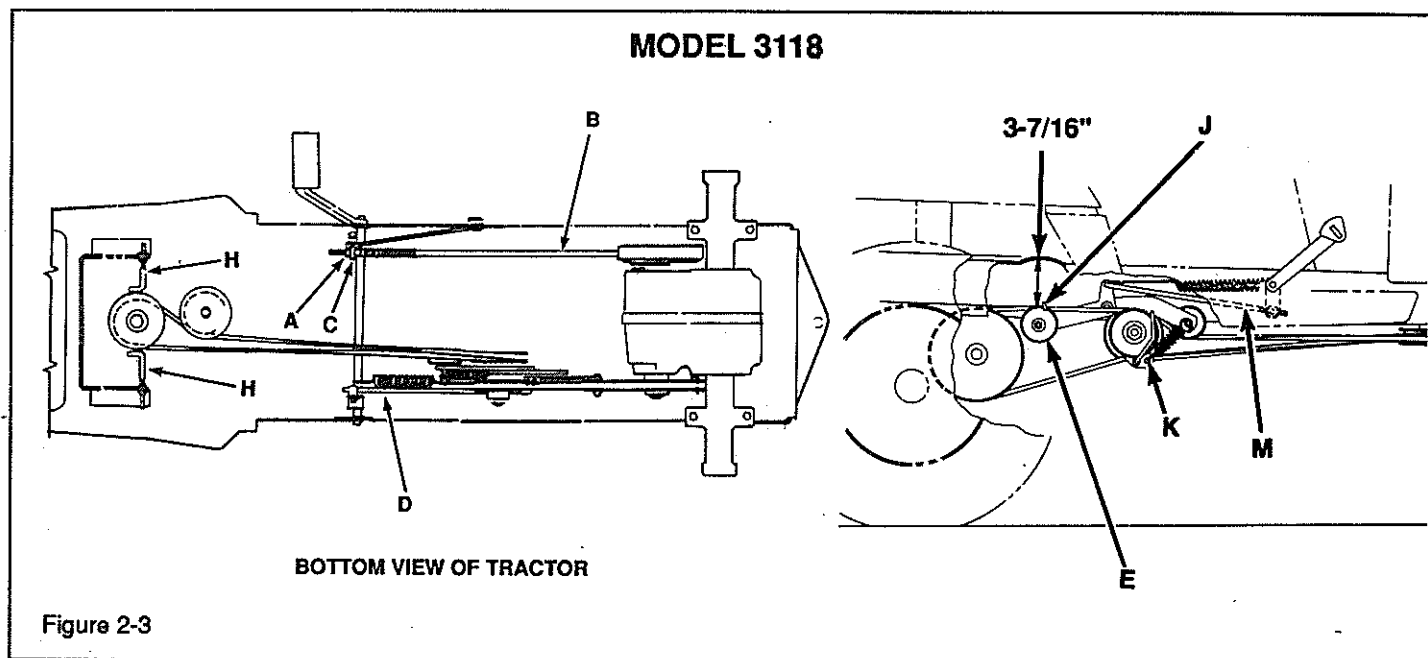


Figure 2-2



### 3. BRAKE/CLUTCH ADJUSTMENT (MODEL 3118)

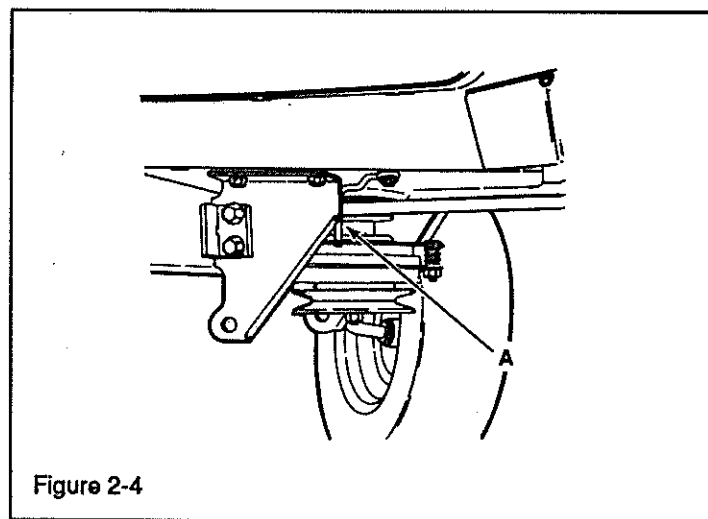
#### a. Clutch Adjustment (Model 3118)

With brake lock engaged, adjust clutch rod (D, Figure 2-3), at foot pedal connection to provide a clearance of 3-7/16" (8.73 cm) between idler (E) and bottom of frame.

#### b. Brake Adjustment

If the brake will not hold the tractor with the brake in engaged, adjust as follows:

1. Adjust nut (A) on clutch rod (B) until there is a clearance of 1/4" (9 mm) between nut and pivot.

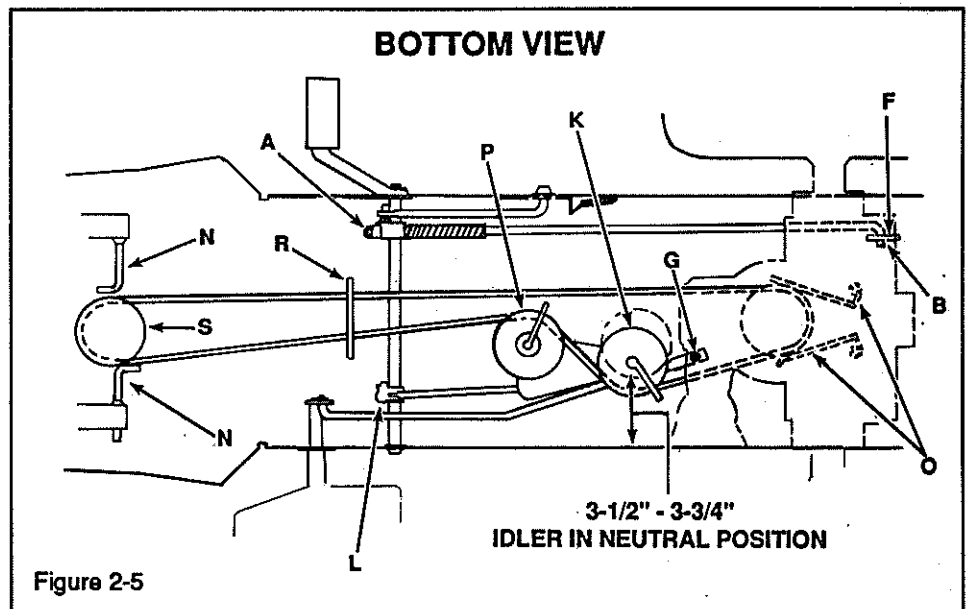


### 4. DRIVE BELT REMOVAL (GEAR DRIVE)

- a. Remove electric clutch locating rod (A, Figure 2-4).
- b. Loosen (2) engine sheave belt guides (H, Figure 2-2).
- c. Loosen (2) idler pulley belt guides (J).
- d. Loosen (2) transmission sheave belt guides (K).
- e. Remove old belt.

### 5. DRIVE BELT INSTALLATION

- a. Replace with new belt.
- b. Position and replace transmission belt guides (K).
- c. Secure engine sheave guides (H, Figure 2-3) in place to provide a 1/16" - 1/8" (1.5 - 3 mm) gap between belt and guide.
- d. Secure idler guides (J). With drive engaged, check that guides point toward side frames.
- e. Position and secure locating rod (A, Figure 2-4), into electric clutch.


**Figure 2-5**

## HYDROSTATIC MODELS

### 1. BRAKE ADJUSTMENT (HYDROSTATIC DRIVE - EATON MODEL 750/751)

When the brake will no longer hold the tractor with the brake lock engaged, adjust as follows:

- Locate nut (A, Figure 2-5) on brake rod.
- Adjust nut until rod end (B) is in the center of slot in arm (F).

### 2. FOOT PEDAL ANGLE ADJUSTMENT (HYDROSTATIC DRIVE - EATON MODEL 750/751)

- If a different foot angle is desired, adjust at ball joint (G, Figure 2-5).

### 3. HYDROSTATIC TRACTOR ADJUSTMENTS (HYDROSTATIC DRIVE - EATON MODEL 7)

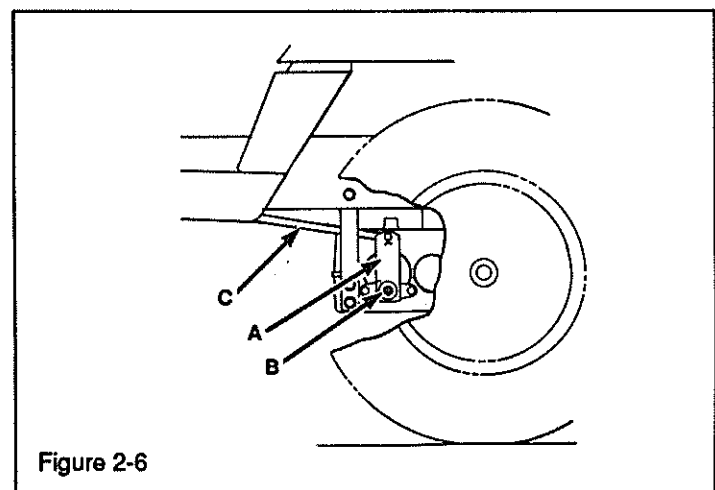
#### a. Brake Adjustment

- When the brake will no longer hold the tractor with brake lock engaged, an adjustment is required. Adjust brake arm (A, Figure 2-6) movement as follows.
  - Brake arm (A) should apply initial braking force when arm moves  $1/4'' - 7/16''$  (9 - 11 mm) from the center position.
  - If adjustment is required, adjust nuts (B).

- With rod (C) of brake removed, total travel of brake arm from side to side should not be more than  $7/8''$  (22 mm).
- With brake disengaged, adjust brake rod (C) so that arm (A) is vertical. Spring (A, Figure 2-7) should be compressed approximately 5" (12.7 cm). After adjustment is finished, check brakes for proper braking action.

#### b. Foot Pedal Angle Adjustment

- If a different foot pedal angle is desired, adjust at ball joint (B, Figure 2-7).


**Figure 2-6**

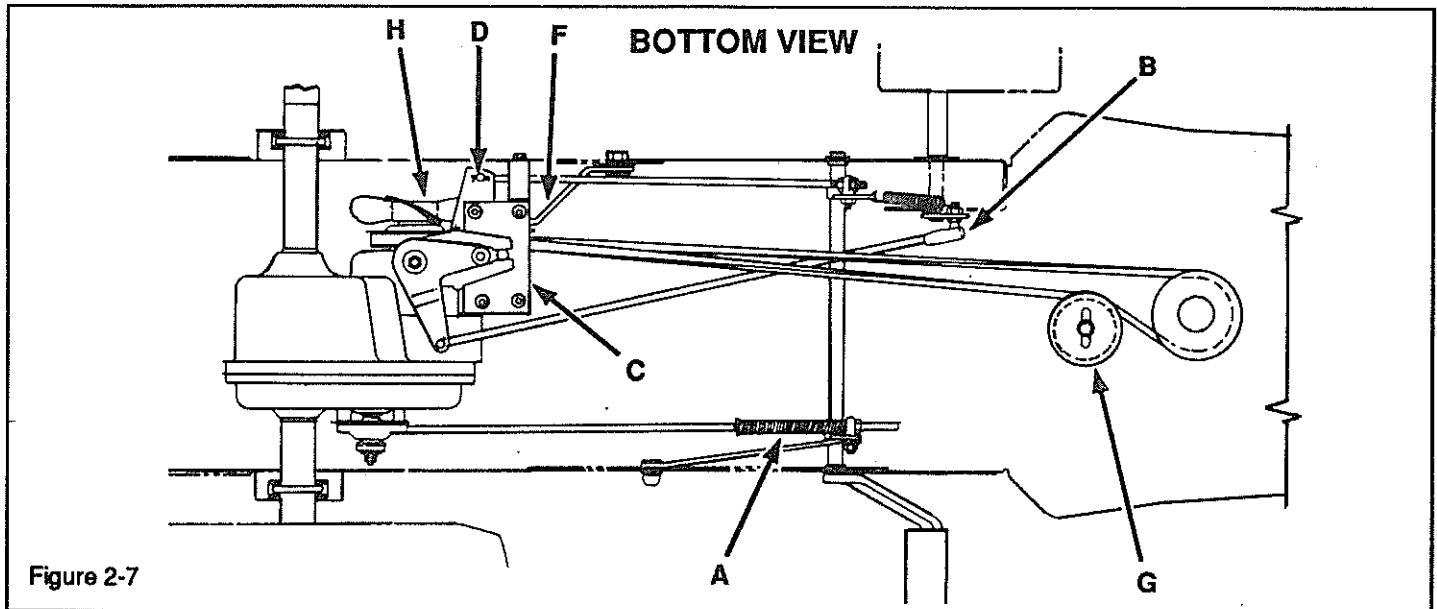


Figure 2-7

**c. Hydrostatic Neutral Adjustment**

1. If a tractor creeps when foot pedal is in neutral position, adjust as follows:
  - a. Securely block up rear of tractor so that the rear wheels clear the ground.
  - b. Adjust support plate (C, Figure 2-7) side to side until wheels do not rotate.
  - c. Re-tighten the plate.

**d. Neutral Return Adjustment**

Every time the brake pedal is pressed the transmission should return to neutral. If not, adjust as follows:

1. Lock brake pedal in park position.
2. Adjust rod (D, Figure 2-7 and 2-8) until control pin (E) of neutral plate (D) is in slot. Make sure plate is free of all binding.

**e. Hydrostatic Belt Adjustment**

Idler arm (F) should always be parallel with lower edge of frame. If not, relocate adjustable idler (G, Figure 2-7). See also Figure 2-9.

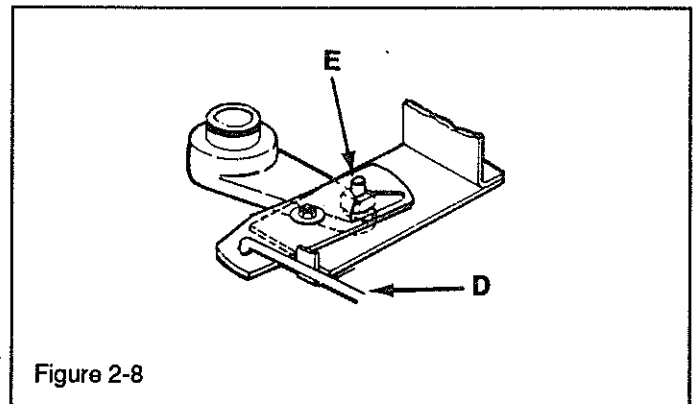
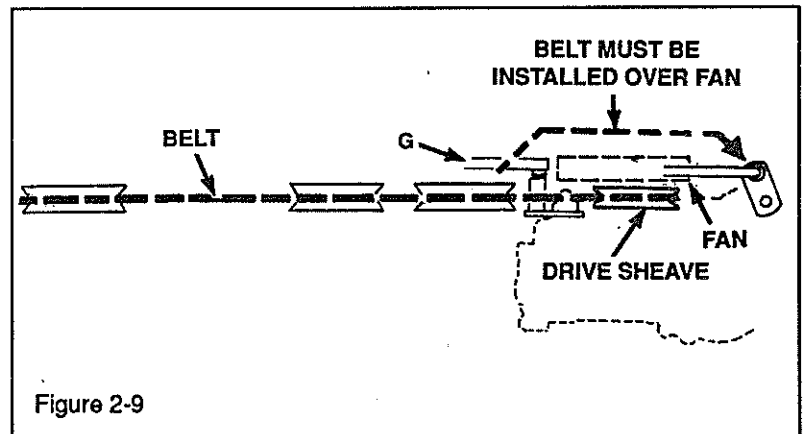
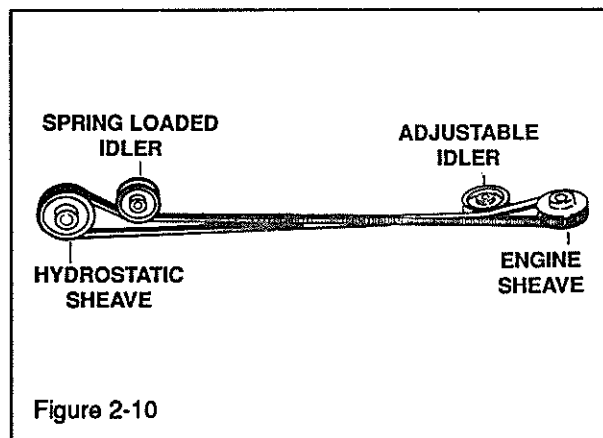
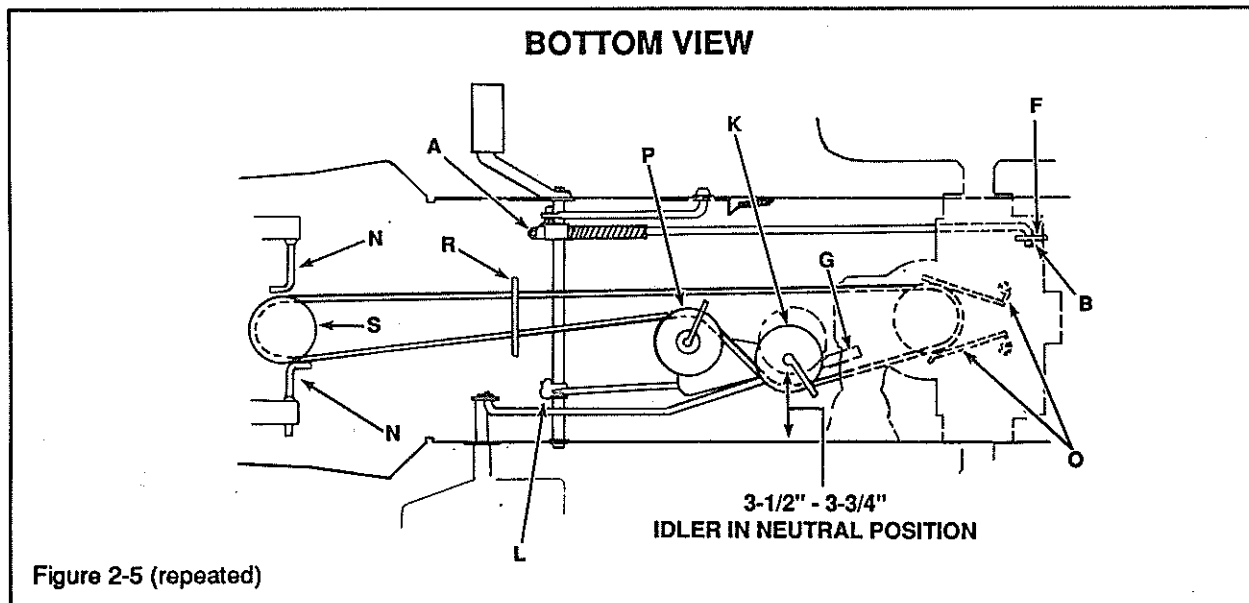


Figure 2-8

**4. DRIVE BELT REMOVAL AND INSTALLATION (HYDROSTATIC DRIVE)**

- a. Removal:
  1. Cut and remove the old drive belt.
- b. Installation:
  1. Loosen electric clutch locating retainer (A, Figure 2-11).
  2. Loosen belt guides (N).
  3. Remove ball joint (G).
  4. Route V-belt up and over fan and then down, until it rests in the drive sheave. Figure 2-10. It will be necessary to bend belt guides (O) back when installing, Figure 2-5.



5. Route V-belt around idlers (K) and (P). Loosen belt guides to assemble.
6. Position V-belt between rod (R) and place over engine sheave (S, Figure 2-5).
7. Re-tighten electric clutch locating rod (A, Figure 2-11).
8. With the brake pedal disengaged, make sure belt guides at idlers (K) and (P, Figure 2-5), are positioned as shown in Figure 2-5.
9. Check that belt guides (O) on hydrostatic drive sheave are within 1/16" - 1/8" of belt.
10. Check that belt guides (N) are within 1/8" and 3/16" of electric clutch sheave (S).
11. After assembly, check the hydrostatic drive adjustment.

## 5. NEUTRAL ADJUSTMENT (HYDROSTATIC - EATON MODEL 750 AND MODEL 751)

If the tractor creeps when foot pedal is in neutral position, adjust as follows:

- a. Securely block up rear of tractor so that rear wheels clear the ground. Loosen jam-nut (I, Figure 2-12).
- b. Adjust screw (H), just above the free wheeling lever (J), until the wheels do not rotate in either direction. Tighten jam-nut (I) in place.

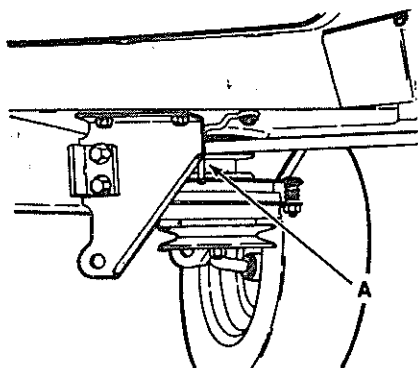


Figure 2-11

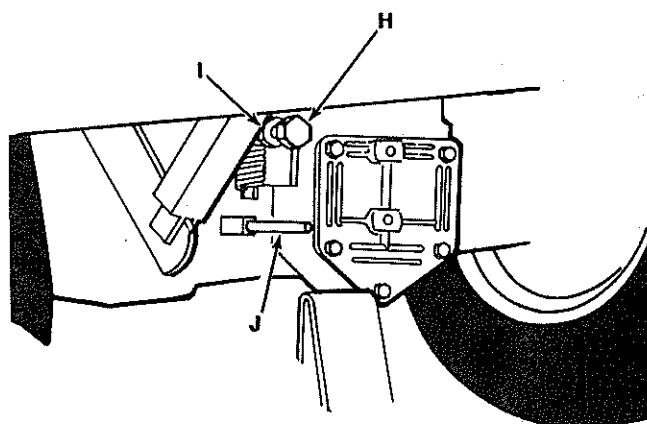


Figure 2-12

BOTTOM VIEW

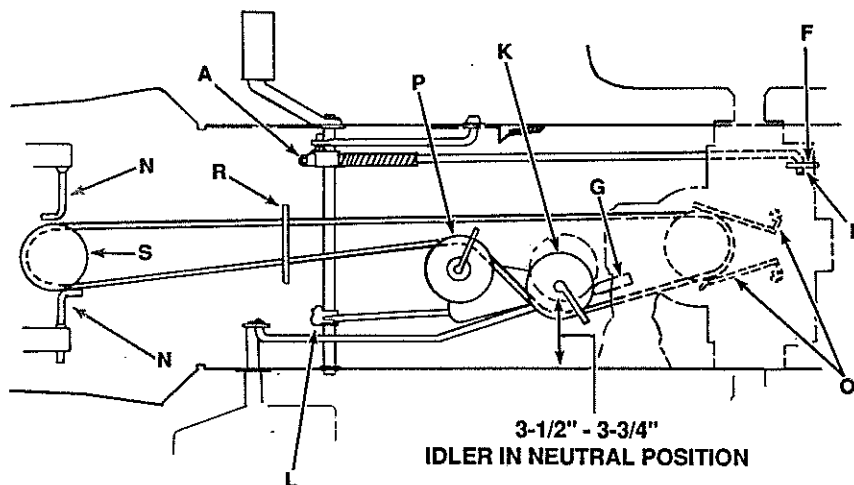


Figure 2-13

6. HYDROSTATIC DRIVE ADJUSTMENT (EATON MODEL 750 AND 751)

With the brake pedal engaged and brake locked in park position, check the distance between idler (K, Figure 2-13) and the frame wall. This dimension should be within 3-1/2" - 3-3/4".

**NOTE:** The belt should not creep when the brake is locked at full engine speed. If an adjustment is required, adjust at pivot (L, Figure 2-13).

7. POWER TAKE-OFF, P.T.O. (ALL MODELS)

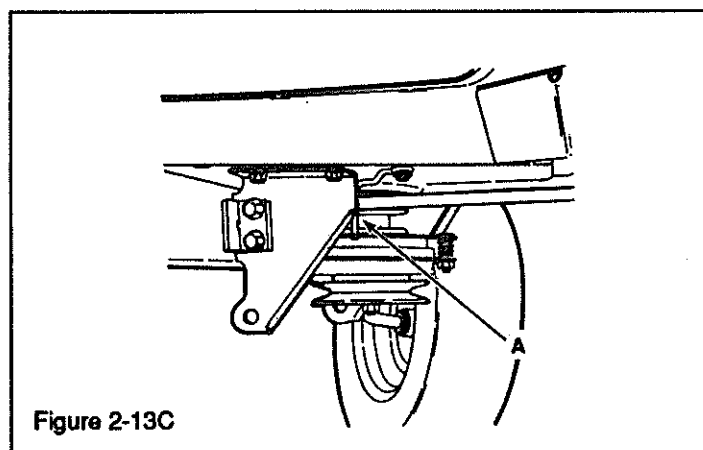
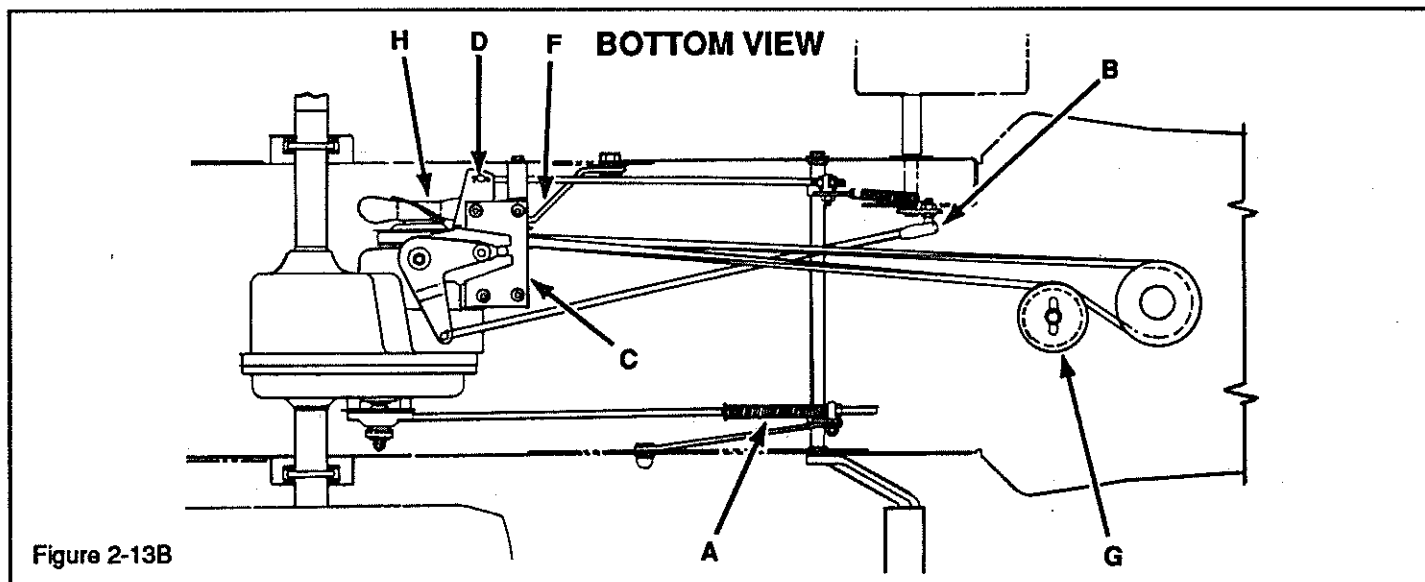
a. Drive Belt Removal and Installation

1. Removal:

- a. Remove the old drive belt.

2. Installation:

- a. Loosen electric clutch locating rod (A), Figure 2-13C.



- b. Remove hydrostatic fan (H, Figure 2-13B).
- c. Position belt onto pulleys as shown in Figures 2-13B. Secure electric clutch locating rod (A, Figure 2-13C) into electric clutch.
- d. Secure hydrostatic fan (H, Figure 2-13B) into place.
- e. Secure adjustable idler (G) in place. Spring loaded idler arm (F) should be parallel to bottom of frame with idler (G) secured.



## LIFT SYSTEMS

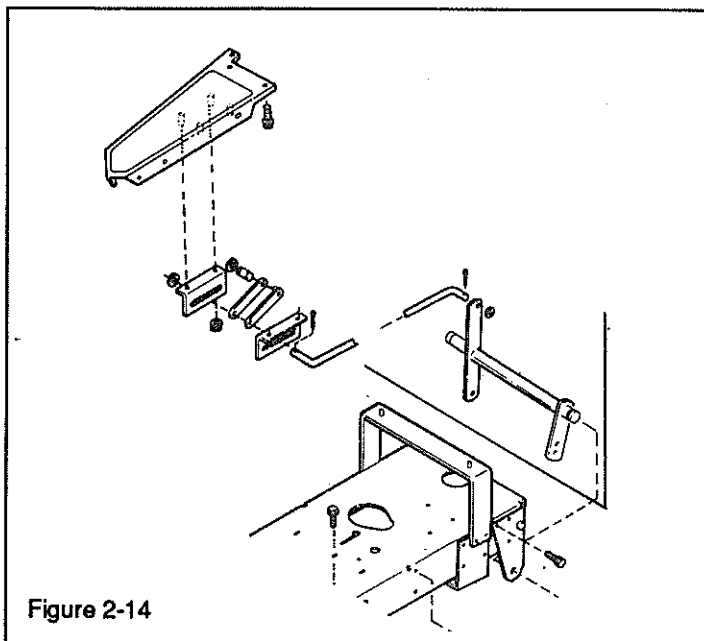


Figure 2-14

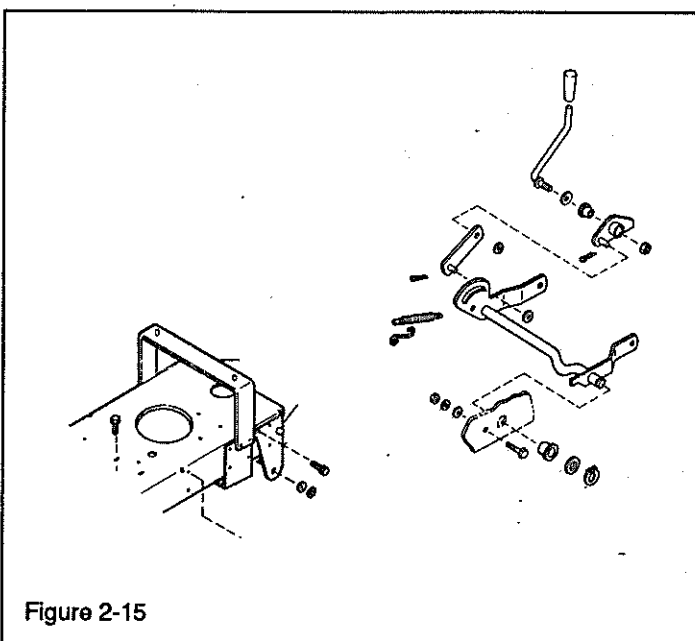


Figure 2-15

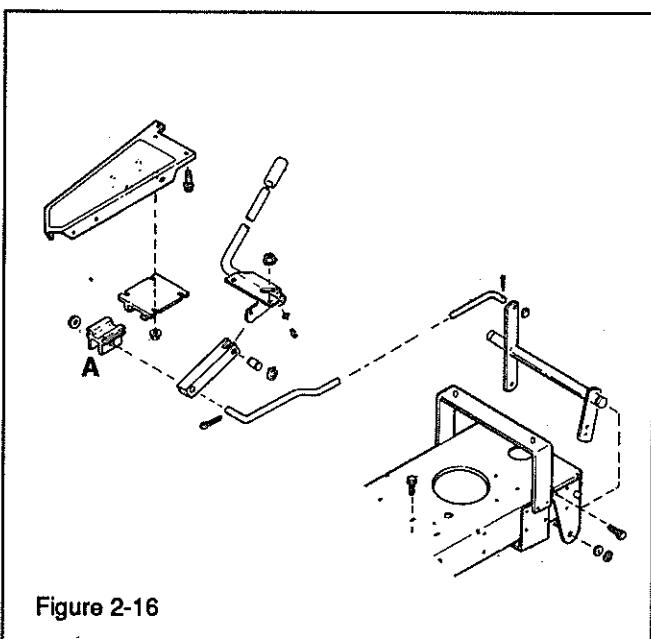


Figure 2-16

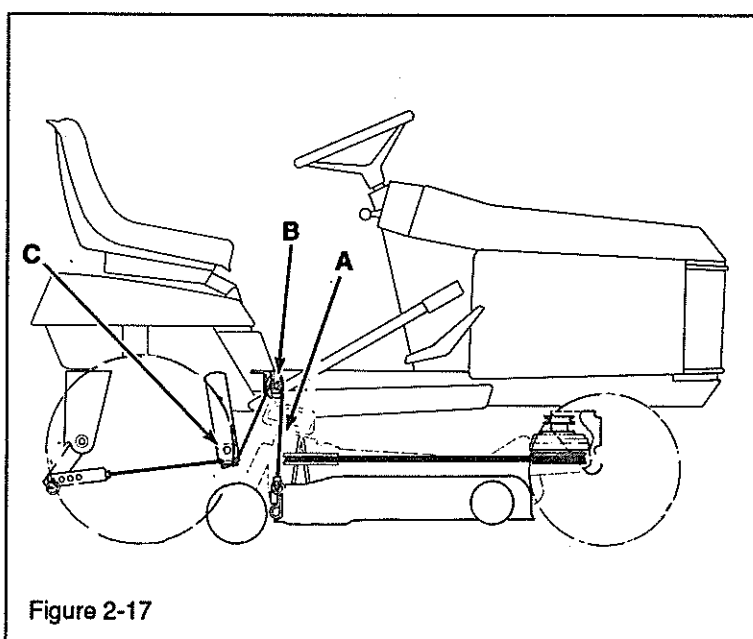


Figure 2-17

### LIFT ASSEMBLY

All Suburban Tractors are equipped with a standard manual lift assembly from the factory. An optional electric lift can be added to the unit. Models 3212G, 3212H, 3010G and 3114H cannot be equipped with electric lift.

The Suburban Tractor series has 3 types of lift systems. See Figures 2-14, 2-15 & 2-16.

#### 1. Servicing Lift System

- Periodic servicing of the lift system is required.
- All styles use flange bearings to support the pivoting arms. These bearings should be inspected and oiled every 50 hours or as conditions require. This ensures free movement of the pivot points and linkages.

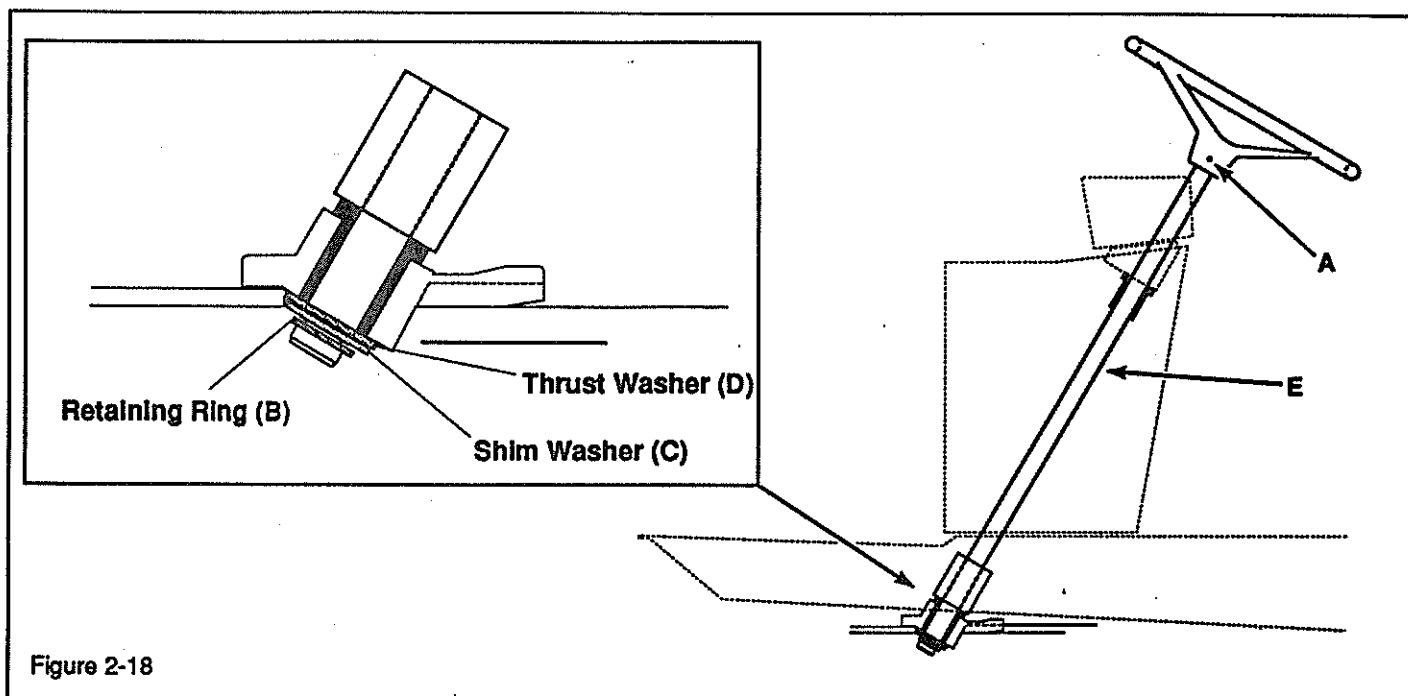


Figure 2-18

- c. If your unit is equipped with a nylon slide and guide (A, Figure 2-16), inspect and oil every 50 hours or as conditions require.
- d. ALL MODELS: Each lift system uses a flexible cable between the rocker arm and attachment. Inspect this cable for fraying, bending, or kinking. Inspect and replace if necessary to allow free movement of the cable (A, Figure 2-17) through pulleys (B) and (C).

## STEERING ASSEMBLY

### 1. Disassembly

- a. Open tractor hood. Remove plastic terminal cover from battery (if applicable). THIS COVER MUST BE REPLACED AFTER SERVICING.



### WARNING!

**BATTERY ELECTROLYTE SOLUTION CONTAINS SULFURIC ACID WHICH CAN CAUSE SEVERE BURNS. AVOID CONTACT. KEEP SPARKS, FLAMES, ETC. AWAY FROM BATTERY.**

**DO NOT ALLOW ANY METAL OBJECT TO COME IN CONTACT WITH THE POSITIVE (+) BATTERY POST OR ANY OTHER SURROUNDING METAL.**

**NEUTRALIZE ELECTROLYTE SPILLS WITH A BAKING SODA AND WATER SOLUTION.**

- b. Disconnect negative (-) battery cable from battery first.
  - c. Disconnect positive (+) battery cable from battery second.
  - d. Remove battery and battery box.
  - e. Remove steering wheel by removing roll pin (A, Figure 2-18). Save roll pin for re-assembly.
  - f. Remove retaining ring (B) from steering shaft (E). This will allow the steering shaft to slide out of the steering support assembly (F). Shim washers (C) and a thrust washer (D) will fall out.
- NOTE: Keep track the location of all shims during disassembly. Re-assemble all parts to their original position before disassembly.**
- g. With the steering shaft loose, pull up on the steering shaft until it clears the steering support assembly. Angle the shaft to either side of the steering support assembly to allow the shaft to slide through steering support. (Pull down on steering shaft.)

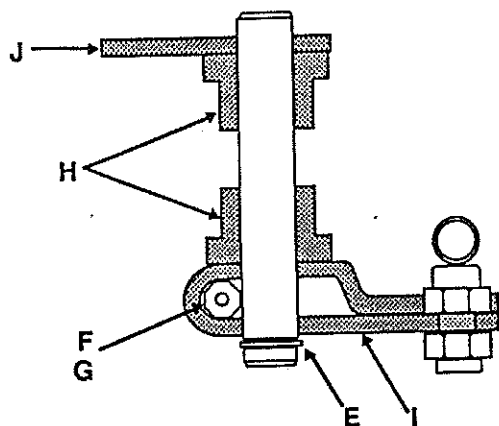


Figure 2-19

The steering gear is not replaceable. The complete steering shaft must be replaced.

## 2. Sector Gear Disassembly

- Remove retaining ring (E, Figure 2-19). Loosen the 3/8-16 x 2-14 bolt (F) and locknut (G).
- Pull the sector gear assembly (J) upwards, toward steering column to remove.
- At this point, the flange bearings (H) located on the steering support assembly, may be replaced.

## 3. Sector Gear Assembly

- Install sector gear through the steering support assembly.
- Slide spindle arm (I) through the sector gear shaft.
- Install retaining ring (E) on sector gear.
- Re-tighten 3/8-16 x 2-1/4 bolt (F) and nut (G).

**NOTE: For easier installation, straighten front wheels so they are parallel with frame.**

- Slide steering shaft (E, Figure 2-18) through steering column.
- Install steering wheel onto steering shaft. Secure with roll pin (A, Figure 2-18).
- Slide steering shaft through steering support assembly.

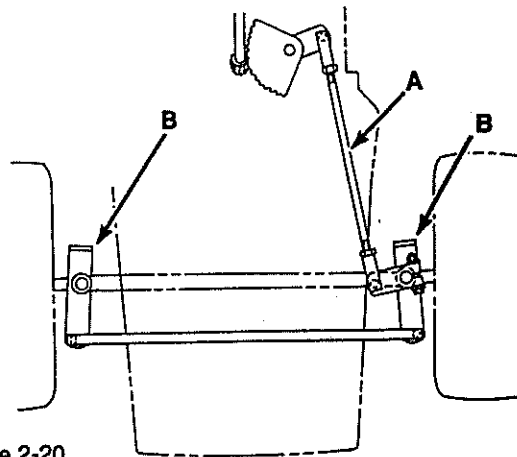


Figure 2-20

**NOTE: Place steering wheel on steering shaft before installing steering shaft into shaft support assembly. This allows the steering wheel to be positioned correctly.**

**NOTE: Shim washers must be placed in the same location, prior to disassembly.**

- Turn steering wheel to check for binding. Add or remove shims as needed, for smooth and proper gear engagement.
- Install a light coating of grease on the steering shaft gear and sector gear.
- Install battery box and battery (See battery safety instructions on page 2-9). Connect positive lead first. Connect negative lead second.

## 4. Steering Adjustment

- Adjust tie rod (A Figure 2-20), so when at full left and right turn, spindle stop (B) of steering arm contacts front axle.

**ENGINE: TROUBLESHOOTING**

<b>TROUBLE</b>	<b>POSSIBLE PROBLEM</b>	<b>SOLUTION</b>
Hard starting or loss of power.	Engine over-choked.  Carburetor dirty or improperly adjusted  Faulty spark plug or improper gap.  Clogged fuel line or filter.  Loose or grounded high tension wire.	Close fuel petcock and engage starter until engine fires. Re-open fuel petcock.  Re-adjust or clean carburetor. See engine manual.  Adjust gap or replace plug.  Check fuel line or filter.  Check and repair wire lead.
Overheating.	Insufficient available cool air.  Dirty air intake screen, shroud or cooling fins.  Improper fuel.  Fuel mixture too lean.  Engine overloaded.	Make sure flywheel screen is free of debris.  Clean intake screen, shroud & cooling fins.  Clean and refill tank with proper grade of fuel.  Adjust carburetor. See engine manual.  Reduce load.
Backfiring.	Fuel mixture too lean. Hot spot in muffler. Valve sticking.	Adjust carburetor. Replace muffler. Free up valve. See engine manual.
Skip at high speed.	Spark plug gap too wide or wrong spark plug.	Adjust spark plug or install correct plug. See page 3-4.
Operating erratically.	Clogged fuel line. Water in fuel. Improper carburetor adjustment. Vent in gas cap plugged. Faulty choke control. Loose ignition connections. Air leaks in manifold or carburetor connections.	Clean fuel line. Clean fuel system. Adjust carburetor. See engine manual. Clean gas cap vent. Replace choke control. Clean and tighten ignition connections. Tighten manifold and carburetor.
Engine will not idle.	Improper carburetor idle adjustment. Carburetor clogged. Spark plug gap set too close. Leaking carburetor or manifold gaskets.	Adjust idle speed. Clean carburetor. Adjust spark plug. See page 3-4. Replace gaskets.

ENGINE OIL

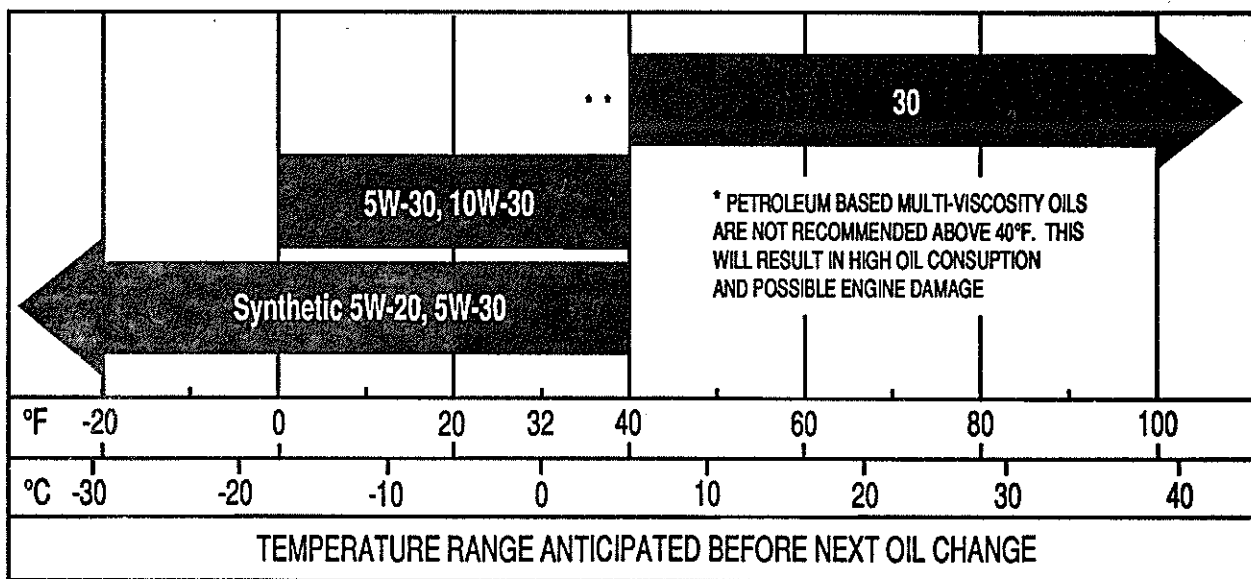
**4 CYCLE OIL RECOMMENDATIONS:**

CHANGE AND ADD OIL ACCORDING TO THE CHART BELOW.

We recommend the use of a high quality detergent oil classified "For Service SG, SF, SE, SD, SC," such as Briggs & Stratton high quality detergent 30 weight oil (part no. 100005). Detergent oils keep the engine cleaner and retard the formation of gum and varnish deposits. No special additives should be used with recommended oils.

NOTE: DO NOT MIX OIL WITH GASOLINE.

**RECOMMENDED SAE VISCOSITY GRADES**



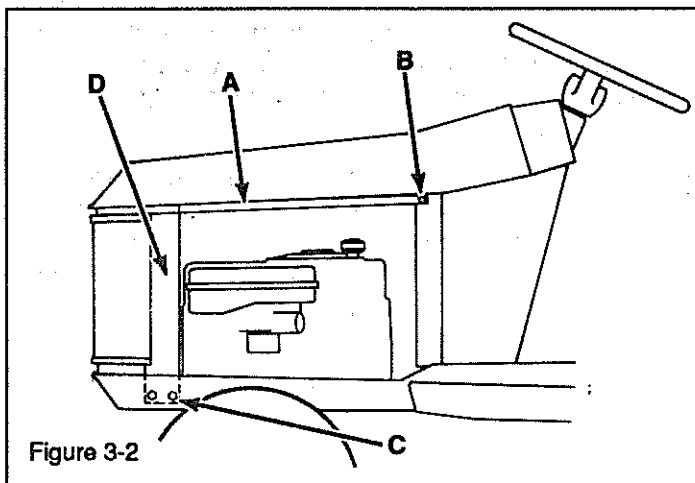
\* Air cooled engines run hotter than automotive engines. Use of petroleum based multi-viscosity oils (10W-30, etc) above 40° F, will result in high oil consumption and possible engine damage. Check oil level more frequently if using these types of oils.

\*\* SAE 30 oil, if used below 40°F, will result in hard starting and possible engine bore damage due to inadequate lubrication.

Figure 3-1

## ENGINE MAINTENANCE

1. For best accessibility to the engine, proceed as follows:
  - a. Remove the side panels.
  - b. Remove any cable ties, on strap securing control cables or electrical wires, leading to the engine.
  - c. Loosen rear mounting hardware (B, Figure 3-2) of support straps.
  - d. Remove the two sets of mounting hardware (C) of front supports (D).
  - e. Open hood. Lift the front grille up and pivot the entire assembly back over the instrument panel.



## 2. Engine Oil

The engine oil level must be maintained in the 'safe' operating range at all times. Oil level must be between the 'Add' and 'Full' marks on dipstick. Clean area around dipstick so dirt does not fall into crankcase when dipstick is removed. Check daily and add oil as necessary to maintain proper level. Do not overfill. Oil level must not exceed the 'Full' mark.

See Engine Specification Charts (Section I) for oil capacities.

With a new engine, change oil after the first 5 hours. Thereafter change at 25 hour intervals.

- a. Drain oil while the engine is hot. Hot oil flows more freely and carries away more impurities. Drain plug is underneath the engine.

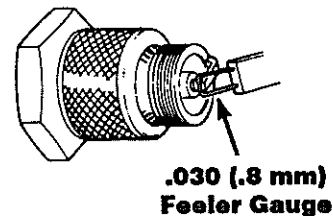


Figure 3-3

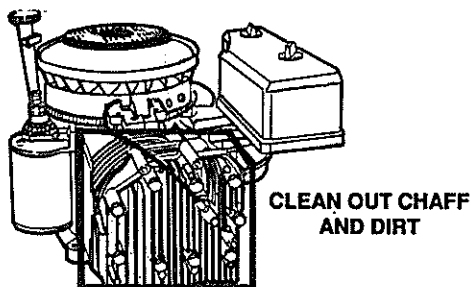
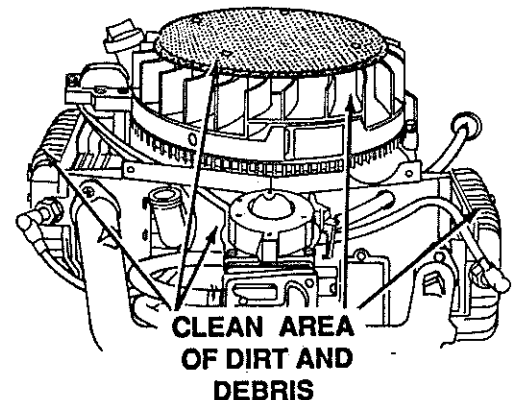


Figure 3-4



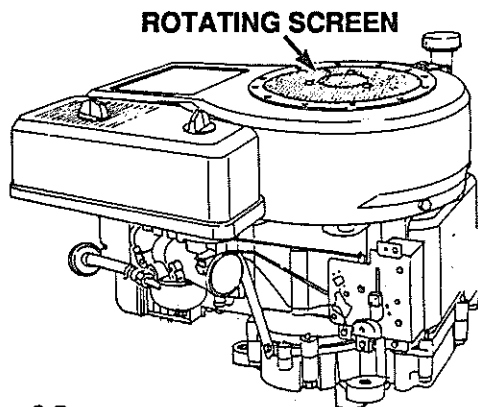


Figure 3-5

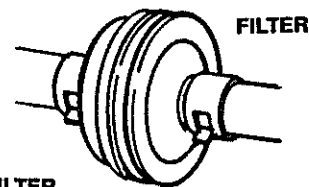


Figure 3-6

- b. After completely draining oil, re-install drain plug.
- c. Remove oil filler cap. Refill with oil. See chart (Figure 3-1) for oil type and grade data.
- d. Check the oil level on the dipstick before adding more oil. Bring the oil level up to the safe range but do not exceed the 'Full' mark.

### 3. Spark Plug

Every 100 hours, remove the spark plug. Check condition and reset at .030 inch (.762 mm) or replace plug if necessary. See Figure 3-3. See engine specifications charts in Section I. Good operating conditions are indicated if plug has a light coating of gray or tan deposit. A dead white, blistered coating could indicate overheating. A black (carbon) coating may indicate an over-rich fuel mixture caused by a clogged air cleaner or an improperly adjusted carburetor. Do not service a plug which is in poor condition. Best results are obtained with a new plug.

**NOTE: Do not clean spark plugs in cleaning machines which use abrasive materials. Spark plugs should be cleaned by scraping, wire brushing and washing with a commercial solvent.**

### 4. Remove Cylinder Head Combustion Deposits

Every 100 to 300 hours of operation, remove combustion deposits. See engine manual.

### 5. Clean Cooling System

Grass, chaff, or dirt may clog the rotating screen and the air cooling system, especially after cutting tall and dry grasses. See Figure 3-4. Annually, or every 100 hours (whichever comes first), remove the blower housing. Clean the areas shown to avoid overheating and engine damage. Clean more often if necessary.

Grass or chaff may clog the rotating screen, especially during prolonged operation when cutting tall grass. Clean the area shown, Figure 3-5, as often as needed to prevent overheating and engine damage.

**ENGINE: TROUBLESHOOTING**

<b>TROUBLE</b>	<b>POSSIBLE PROBLEM</b>	<b>SOLUTION</b>
Hard starting.	Choke linkage not working properly. Dirt in fuel system.  Engine flooded.  Carburetor out of adjustment. Water in fuel system.  Dirty air filter.	Check linkage and repair. Clean fuel lines, carburetor, and install new fuel filter.  Check linkage, carburetor float setting, etc. Adjust carburetor. See engine manual. Clean system and refill with fresh fuel. Install new air filter.
No fuel reaches carburetor.	Empty fuel tank. Fuel filter plugged. Shut off valve is closed. Gas tank vent plugged.	Refill tank. Replace fuel filter. Open valve. (If equipped) Clean out vent.
Carburetor leaks.	Loose fuel line fitting. Carburetor float setting set too high.	Tighten fuel line. Adjust float.
Engine starts but runs rough with low power output.	High or low speed mixture off.  Incorrect float setting. Dirty air filter. Carburetor loose on engine block.	Readjust carb. See engine manual.  Adjust float. See engine manual. Install new air cleaner. See section IV. Tighten carburetor mounting screws. See engine manual.
Engine will not idle.	Improper carburetor idle adjustment. Carburetor clogged. Spark plug gap set too close. Leaking carburetor or manifold gaskets.	Adjust idle speed. See engine manual Clean carburetor. See engine manual Adjust spark plug. See page 3-4. Replace gaskets. See engine manual.



## **FUEL RECOMMENDATIONS**

### **1. Fuel Type**

- a. For best results use only clean, fresh, regular grade unleaded gasoline. The *pump sticker* octane rating should be 87 or higher.
- b. Unleaded gasoline is recommended because it leaves less combustion chamber deposits. Regular grade gasoline may also be used; however, the combustion chamber and cylinder head may require cleaning if regular grade gasoline is used.
- c. Use fresh gasoline. Fresh gasoline lessens the chances of gum deposits forming. Gum deposits could clog the fuel system. If fuel is going to be left in the fuel tank for an extended time, a gasoline stabilizer is recommended. Use of a stabilizer will help ensure the engine will not form harmful gum deposits. **DO NOT MIX OIL WITH GASOLINE.** Make sure that the vent hole in the fuel tank cap is not plugged.

### **WARNING!**

**RE-FILL FUEL TANK OUTDOORS. STOP ENGINE AND ALLOW IT TO COOL BEFORE RE-FILLING.**

## **SERVICING TANK, FUEL VALVE AND FUEL FILTER**

### **1. Fuel Valve**

The fuel valve is located under the fuel tank as shown in Figure 4-1. This valve must be fully open for proper operation of the tractor. (If equipped)

### **2. Fuel Filter**

The fuel filter is a disposable type in-line filter, that should be replaced when dirty.

### **WARNING!**

**ALLOW ENGINE TO COOL BEFORE REPLACING FILTER. FAILURE TO FOLLOW THIS INSTRUCTION COULD RESULT IN SERIOUS INJURY.**

To replace fuel filter, shut the valve under the fuel tank (if so equipped). Remove the filter from the fuel line and replace it with a new one.

## **SERVICING AIR CLEANER**

The importance of maintaining an air cleaner in proper condition cannot be over-emphasized! Improper air cleaner maintenance can create engine damage the engine manufacturer will not warrant.

### **1. Service Air Cleaner - Briggs & Stratton 11 HP air cleaner, Figure 4-2:**

**NOTE: Clean cartridge at 3-month intervals or 25 hours, whichever occurs first. Service air cleaner more often under dusty conditions.**

- a. Remove air cleaner stud, screw, and cover. Replace cover gasket if damaged.
- b. Remove plate screw, washer, and plate.
- c. Remove cartridge and clean air cleaner body carefully to prevent dirt from entering carburetor. Brush dirt from body through holes into duct.
- d. Clean cartridge by tapping gently on flat surface. If very dirty, replace cartridge or wash in a low or non-sudsing detergent and warm water solution. Rinse thoroughly from outside in until water is clear. Cartridge must be allowed to stand and air dry thoroughly before using.
- e. Re-assemble air cleaner.

### **2. Briggs & Stratton - 12, 12.5, 16, and 18 HP Air Cleaner, Figure 4-3 and 4-4.**

**NOTE: Clean and re-oil foam pre-cleaner at three month intervals or every 25 hours, whichever occurs first. Service air cleaner more often under dusty conditions.**

- a. Remove wing nut and cover.
- b. Remove foam pre-cleaner by sliding it off the paper cartridge.
- c. Clean.
  1. Wash foam pre-cleaner in liquid detergent and water.
  2. Wrap foam pre-cleaner in cloth and squeeze dry.

## TYPICAL FUEL FLOW DIAGRAM

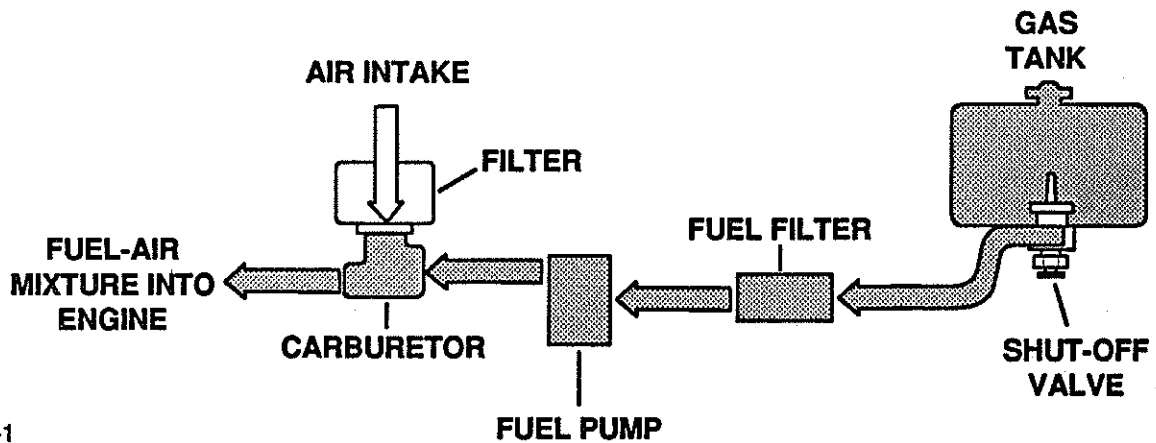


Figure 4-1

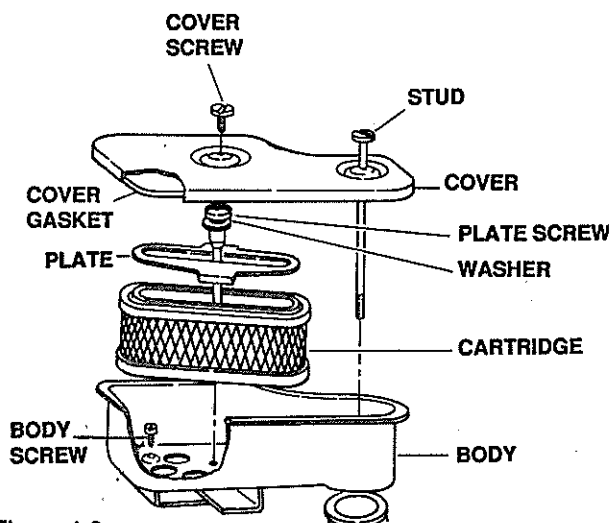


Figure 4-2

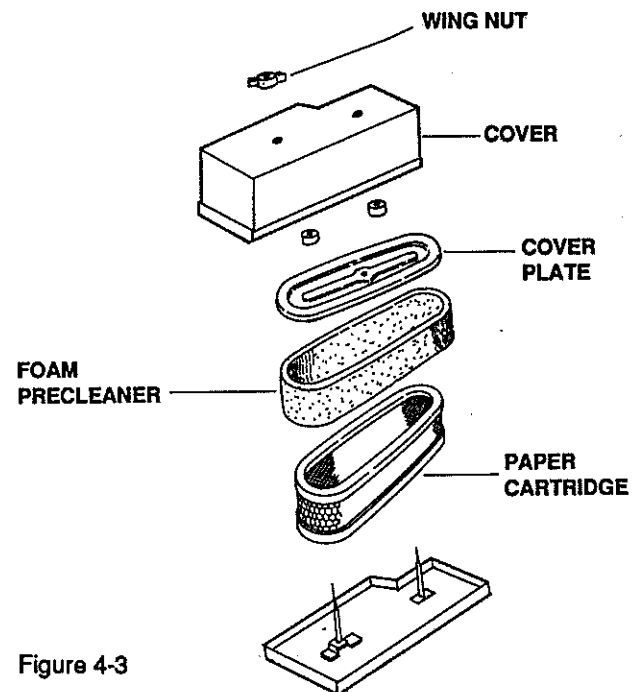


Figure 4-3

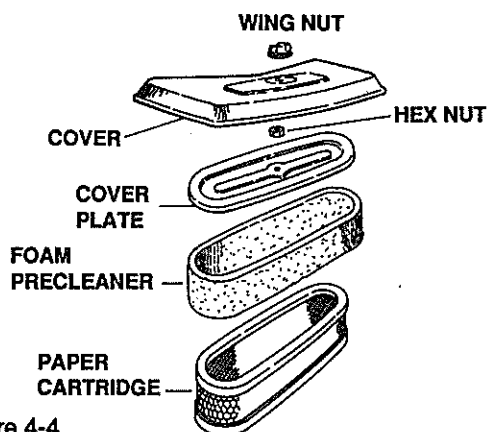


Figure 4-4

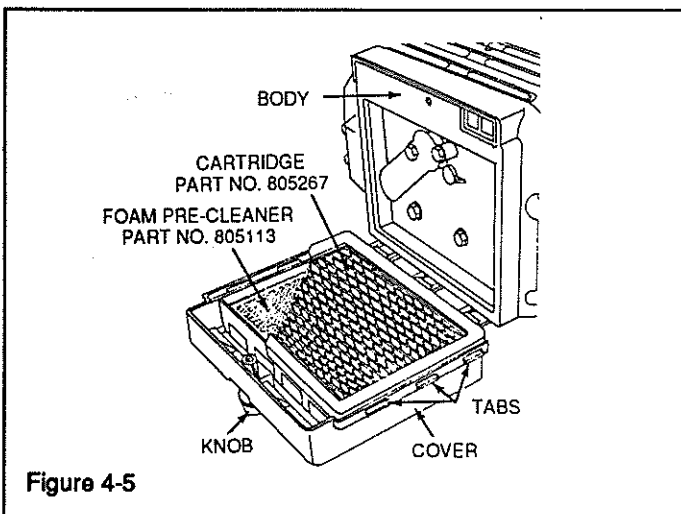
3. Saturate foam pre-cleaner in engine oil. Squeeze to distribute and remove excess oil.
- d. Install foam pre-cleaner over paper cartridge. Re-assemble cover and screw down tight. Annually, or every 100 hours, whichever occurs first, remove paper cartridge. (Service more often if necessary) Clean by tapping gently on a flat surface.

- e. If cartridge is dirty, replace or wash in a low or non-sudsing detergent and warm water solution. Rinse thoroughly with flowing water from the inside out, until water is clear. Air dry cartridge thoroughly before using.

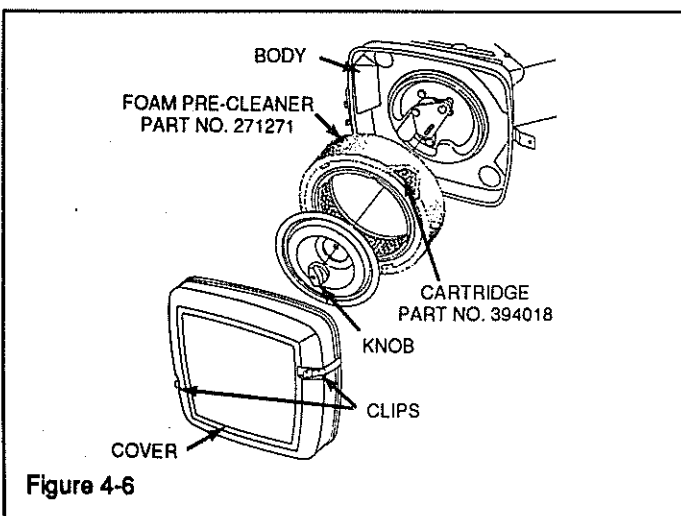
**3. Square Dual Element: Figure 4-5.**

**NOTE: Remove and service foam pre-cleaner every 25 hours or every season, whichever occurs first. Service paper cartridge every 100 hours or every season, whichever occurs first. Service air cleaner more often under dusty conditions.**

- a. Loosen knob and remove cover assembly.
- b. Remove cartridge and pre-cleaner from cover.
  - 1. To service pre cleaner:



**Figure 4-5**



**Figure 4-6**

- a. Wash pre-cleaner in liquid detergent and water.
- b. Squeeze pre-cleaner dry in a clean cloth.
- c. Saturate pre-cleaner in engine oil. Wrap in a clean absorbent cloth and squeeze to remove all excess oil.

**2. To service cartridge:**

- a. Clean by tapping gently on a flat surface.
- b. If cartridge is very dirty, replace or wash in a non-sudsing detergent and warm water solution. Rinse thoroughly with water from inside out, until water runs clear. Let cartridge dry thoroughly before using.
- c. Re-install pre-cleaner in cover, with foam toward the cover.
- d. Re-install cartridge in cover, with the tabs on cartridge in the slots in cover.
- e. Re-install cover assembly on air cleaner body.

**4. Round Dual Element: Figure 4-6.**

**NOTE: Remove and service foam pre-cleaner every 25 hours or every season, whichever occurs first. Service paper cartridge every 100 hours or every season, whichever occurs first. Service air cleaner more often under dusty conditions.**

- a. Unhook clips on both sides of air cleaner and remove cover.
  - 1. To service pre cleaner:
    - a. Slide foam pre-cleaner off cartridge.
    - b. Wash pre-cleaner in liquid detergent and water.
    - c. Place pre-cleaner in a clean cloth and squeeze dry.
    - d. Saturate pre-cleaner in engine oil. Wrap it in a clean, absorbent cloth and squeeze to remove excess oil.
    - e. Re-install pre-cleaner over cartridge.
    - f. Re-install air cleaner cover and attach clips to sides of air cleaner body.

2. To service cartridge:
  - a. Remove knob and cover plate.
  - b. Remove cartridge and clean by tapping gently on flat surface.
  - c. If cartridge is dirty, replace or wash in a non-sudsing detergent and warm water solution. Rinse thoroughly with water from inside out until water runs clear. Let cartridge dry thoroughly before using.
  - d. Re-install cartridge, cover plate, knob, and pre-cleaner.
- b. Re-install air cleaner cover. Re-attach clips to sides of air cleaner body.

## 5. Service Air Cleaner - Kohler engines 12.5 H.P. and 14 H.P.

These engines are equipped with a replaceable, high density paper air cleaner element. The engines are also equipped with an oiled-foam pre-cleaner which surrounds the paper element. See Figure 4-6A.

### a. Service air cleaner: Figure 4-6A.

1. Check the air cleaner daily (or before start-up). Check for (and correct) heavy buildup of dirt and debris. Check for (and correct) any loose or damaged components.

**NOTE: Operating the engine with loose or damaged air cleaner components could allow unfiltered air into the engine, causing premature wear and failure.**

### b. Service pre-cleaner: Figure 4-6A.

1. Remove the pre-cleaner from the paper element.
2. Wash the pre-cleaner in warm water with detergent. Rinse the pre-cleaner thoroughly until all traces of detergent are eliminated. Squeeze out excess. Do not wring. Allow the pre-cleaner to air-dry.
3. Saturate the pre-cleaner with engine oil. Squeeze out all excess oil. Do not wring.
4. Re-install air cleaner cover. Replace air cleaner cover retaining knob. Tighten knob securely.

### c. Service paper element: Figure 4-6A.

Every 100 hours of operation (more often under extremely dusty or dirty conditions), check the paper element. Clean or replace the paper element as necessary.

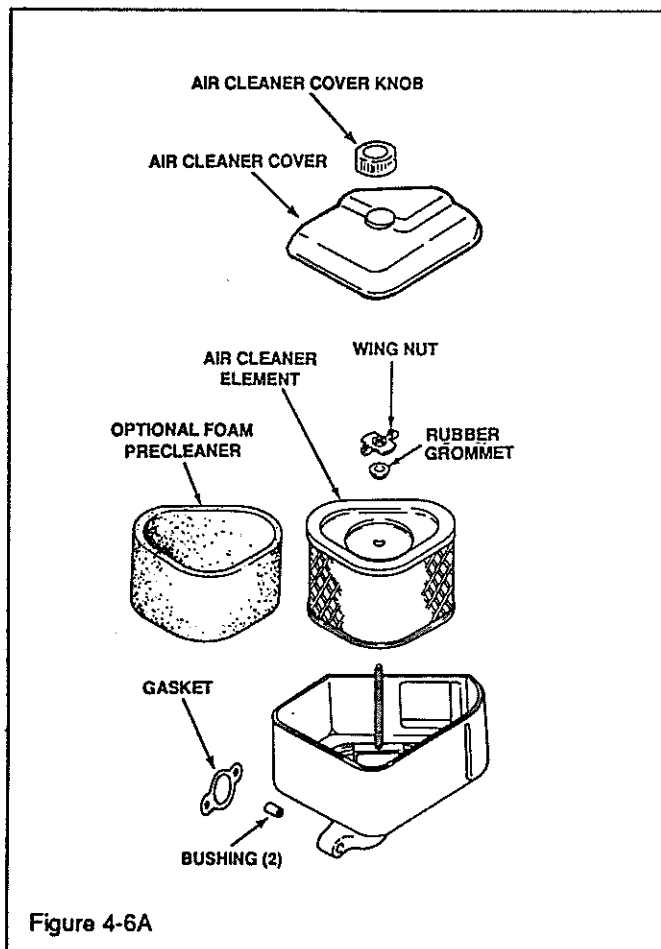
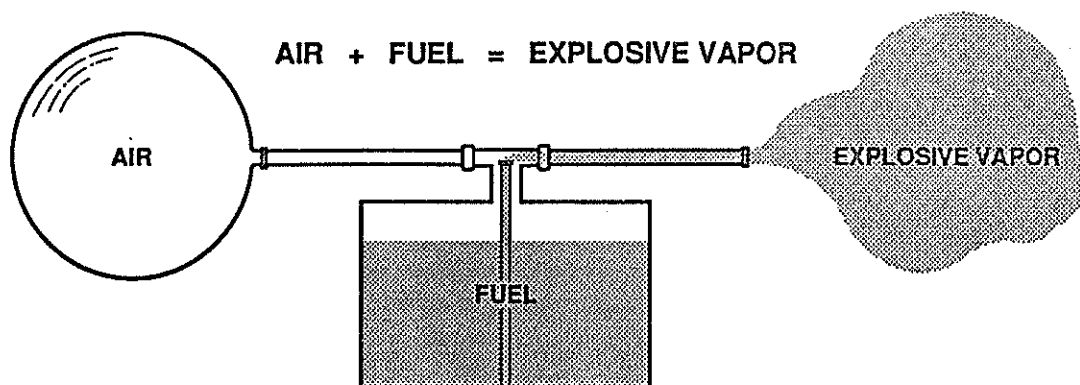


Figure 4-6A



### BASIC FUNCTION OF A CARBURETOR

In the gasoline engine, fuel and air are mixed in the carburetor in proportions that will ensure starting and running under various load conditions. Fuel is atomized or sprayed and thoroughly mixed. This basic

function is demonstrated in the figure above. Fuel is vaporized in the intake manifold before being drawn into the combustion chamber, compressed and ignited to release its potential power.

### SERVICING CARBURETOR

The carburetor is a component of the engine which is supplied by the engine manufacturer. Consult the engine manual for carburetor adjustments.

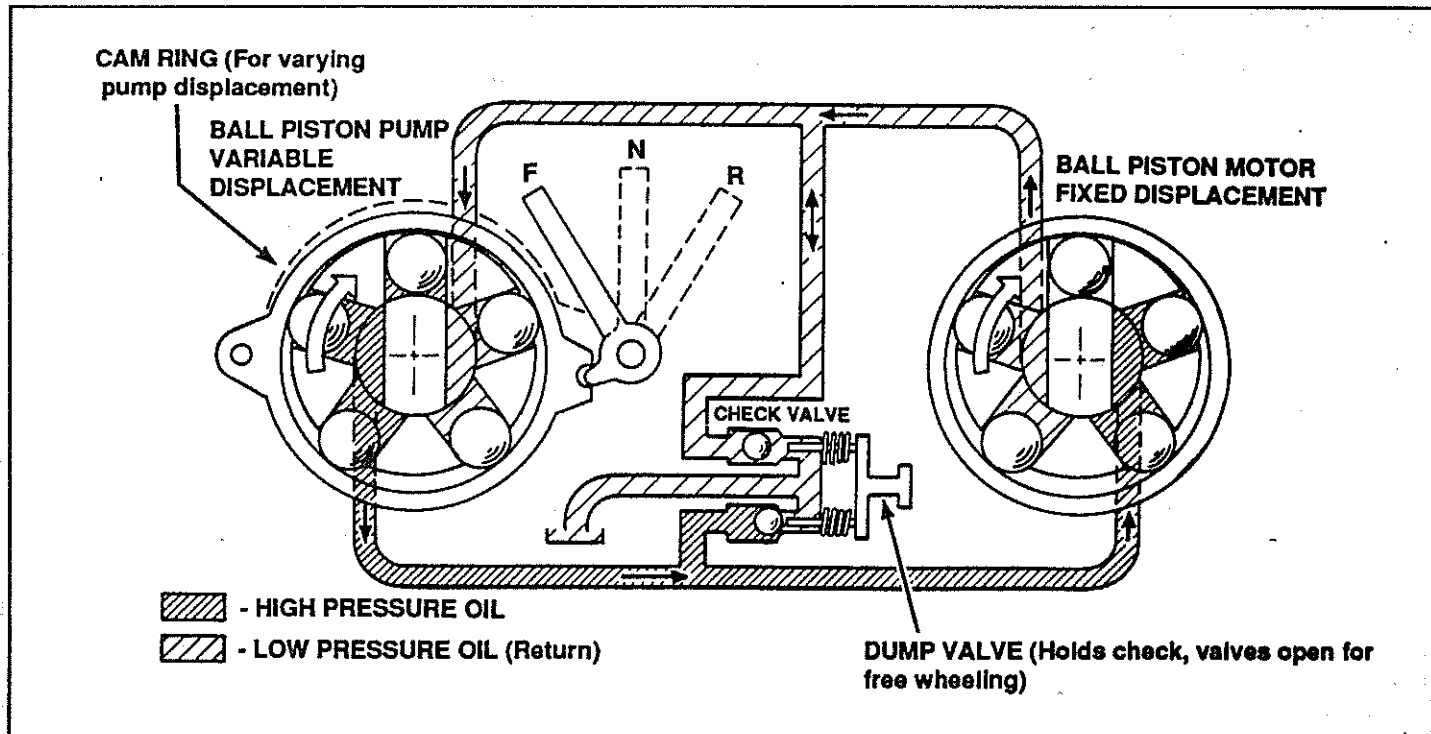
**SUBURBAN TRACTOR TRANSMISSIONS**

MODEL	TRANSMISSION
<b>GEAR</b>	
3010G (01)	Peerless 920
3011G (01-03)	Peerless 801
3012G (01-02)	Peerless 801
3016G (01-04)	Peerless 801
3018G (01-02)	Peerless 801
3112G (01)	Peerless 801
3114G (01-02)	Peerless 1327B
3118G (01-02)	Peerless 2358
3211G (01)	Peerless 842
3212G (01-03)	Peerless 920
3212G (04)	Peerless 930
3214G (01)	Peerless 801
13026	Peerless 930-023
13025	Peerless 930-023
13023	Peerless 930-023
13051	Peerless 930-023
<b>HYDRO</b>	
3011H (01)	Eaton 7/Peerless 1327
3012H (01-02)	Eaton 7/Peerless 1327
3014H (01)	Eaton 7/Peerless 1327C
3016H (01-04)	Eaton 7/Peerless 1327
3018H (01)	Eaton 7/Peerless 1327C
3018H (02)	Eaton 750
3114H (01)	Eaton 7/Peerless 1327C
3114H (02)	Eaton 750
3212H (01)	Eaton 7/Peerless 1327C
3212H (02-03)	Eaton 750
3214 H (01-02)	Eaton 750
3216H (01-02)	Eaton 750
13028	Eaton 751-047
13027	Eaton 751-047
13024	Eaton 751-047
13016	Eaton 751-047
13015	Eaton 751-047
13014	Eaton 751-047
13052	Eaton 751-047

**TROUBLESHOOTING**

<b>TROUBLE</b>	<b>POSSIBLE PROBLEM</b>	<b>SOLUTION</b>
No forward or reverse with engine running.	Broken drive belt. Drive belt off transmission drive line. Drive idler spring broken. Clutch not functioning properly. Transmission not functioning properly. System low on oil. Plugged oil filter. Control linkage binding. Hydro unit not functioning.	Replace belt. Reinstall belt, replace if worn, check guides. Replace spring. Check and adjust linkage. Repair transmission, refer to trans. section. Refill to proper level. Replace filter. Check linkage for binding, lubricate. Test hydro pressure.
Loss of power.	Filter or suction line clogged. Low on oil. Worn or loose hydro linkage. Air in system. Engine lugs down. Internal Wear on Hydro.	Replace filter, clean and refill system. Check and add as necessary. Adjust or replace. Check for leaks and re-fill. Check engine for RPM adjustments. Test hydro pressure.
Unit operating hot.	Oil level low. Dirt on transmission fins. Excessive load or high drawbar loading. Internal damage to hydro.	Check for leaks. Re-fill to proper level. Clean external surfaces. Reduce load. Replace hydro.
Brake does not function properly.	Brake out of adjustment. Worn brake pucks.	Check brake adjustment, adjust as necessary. Replace pucks.

## HYDROSTATIC DRIVE



## HYDROSTATIC INTRODUCTION

The Eaton Model transmissions are composed of three (3) major components; a variable displacement, radial ball-piston pump; a fixed displacement, radial ball-piston motor; and a system of valves located between the pump and motor.

The transmission converts mechanical energy at its input shaft into fluid flow under pressure from its pump. It transfers this fluid energy to the motor which, in turn converts it back to mechanical energy at the output shaft. The purpose of this transformation is to provide a means of having an infinitely variable output speed, with easy reversing, all with a constant input speed. In operation, the pressure of the fluid in the hydrostatic transmission closed loop varies as the "load" increases or decreases.

If the load increases, so does the pressure of the fluid in the transmission. This change in load and pressure automatically changes the torque output of the transmission. The greater the load (pressure), the more torque the transmission produces to match the load requirements. If the load is lessened, pressure decreases and torque output drops.

The diagram above shows the flow of fluid through an internal closed loop between the pump and the motor. The flow is directed by the pump to the motor and then back to the pump. Because of leakage, the amount of fluid driven back by the motor is slightly less than that required by the pump. Check that valves on the inlet, inside of the pump, are open to the reservoir enabling the pump to draw fluid as needed. Speed control is achieved by changing the amount of oil delivered by the variable displacement pump to the fixed displacement motor by moving the control lever.



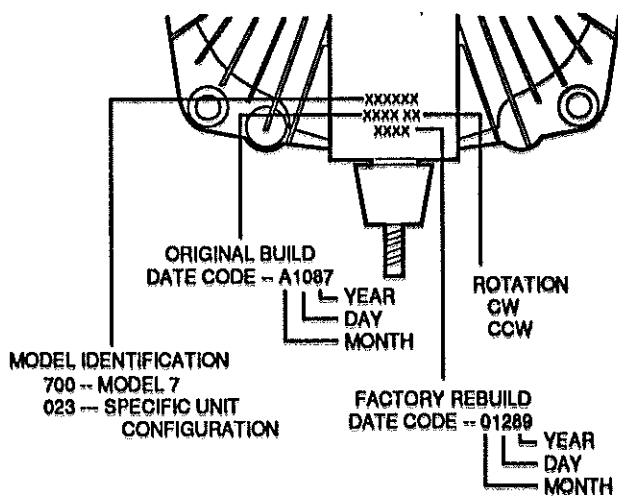
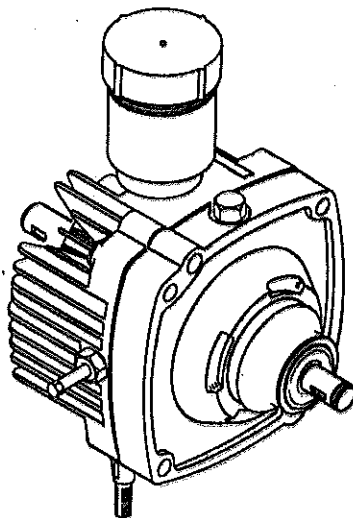
## HYDROSTATIC DRIVE TRANSAXLE

### Identification Information:

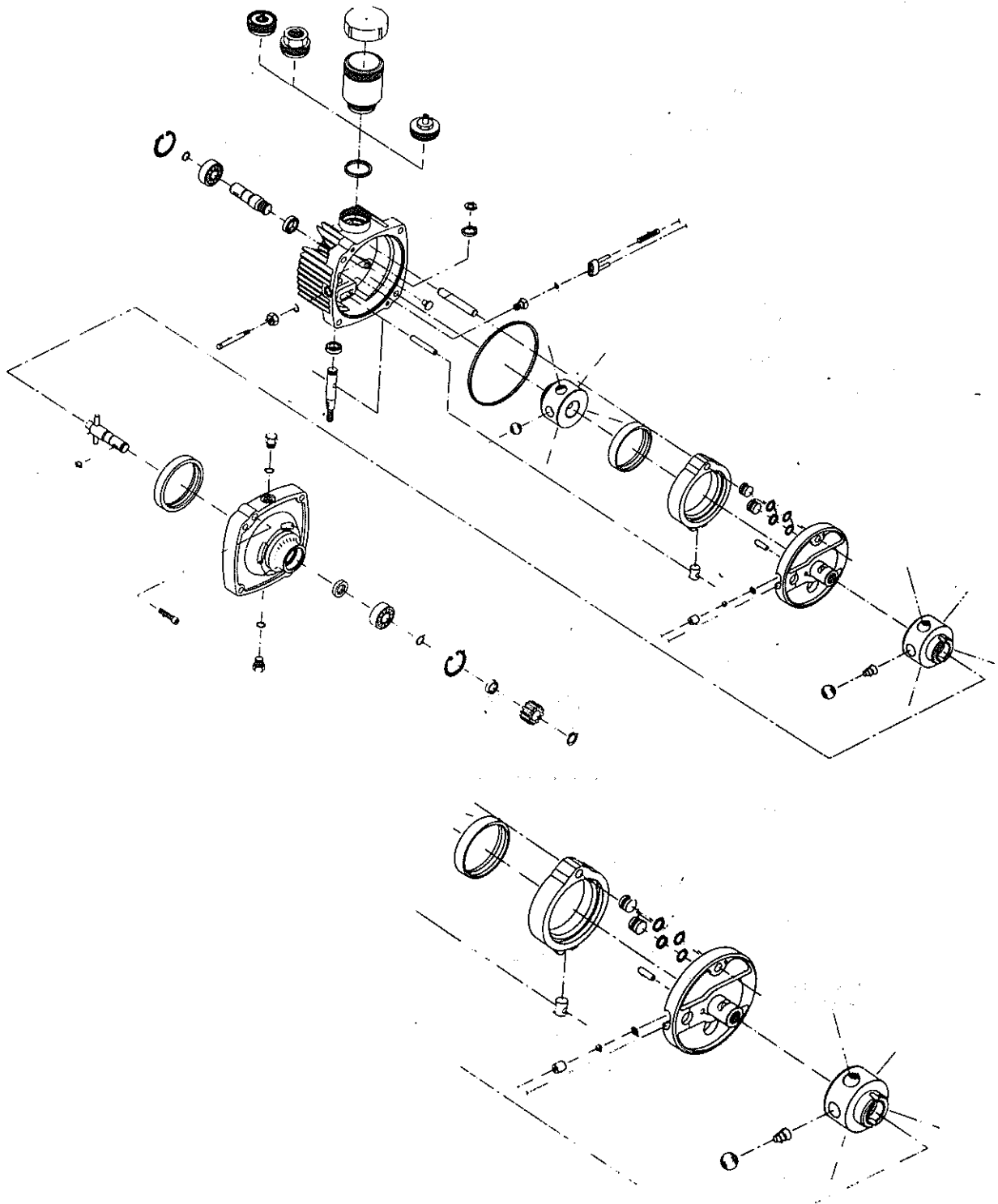
3 different types of Eaton transmissions are used.  
Determine which transmission is installed on your unit by

studying the chart '3000 Series Transmissions' on pages  
1-16 and 5-1 or by the illustrations on p. 5-4 to 5-7.

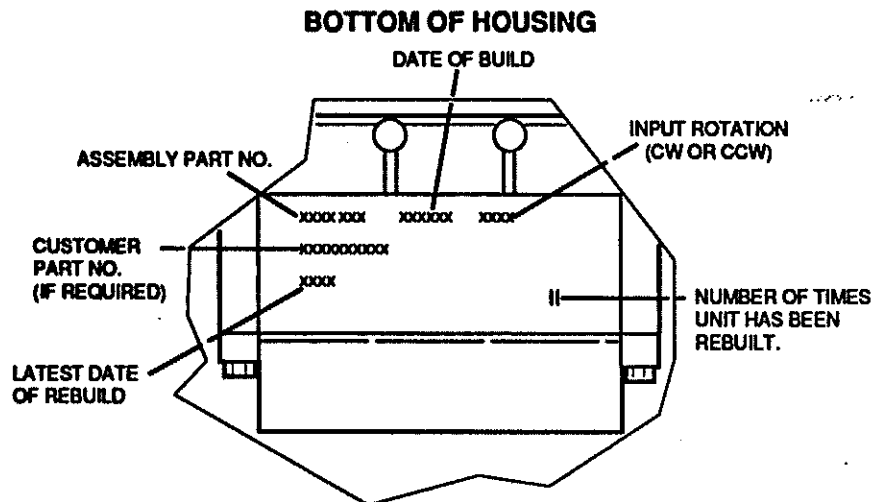
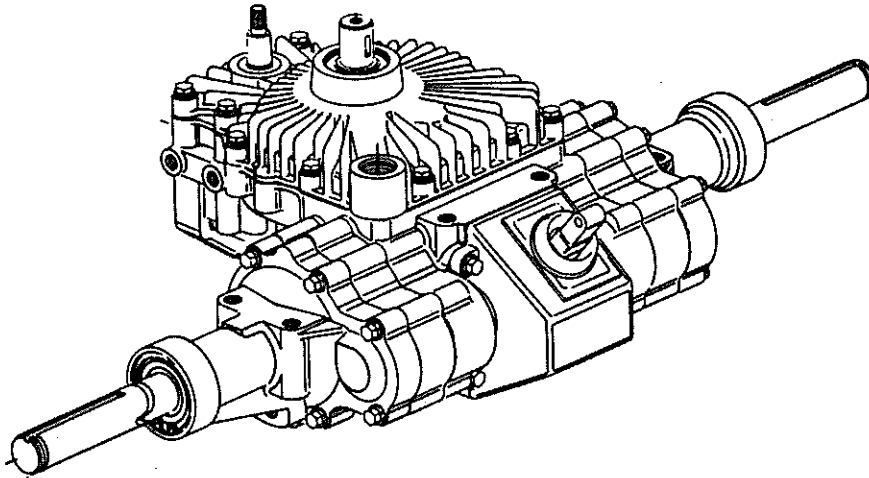
### EATON 7



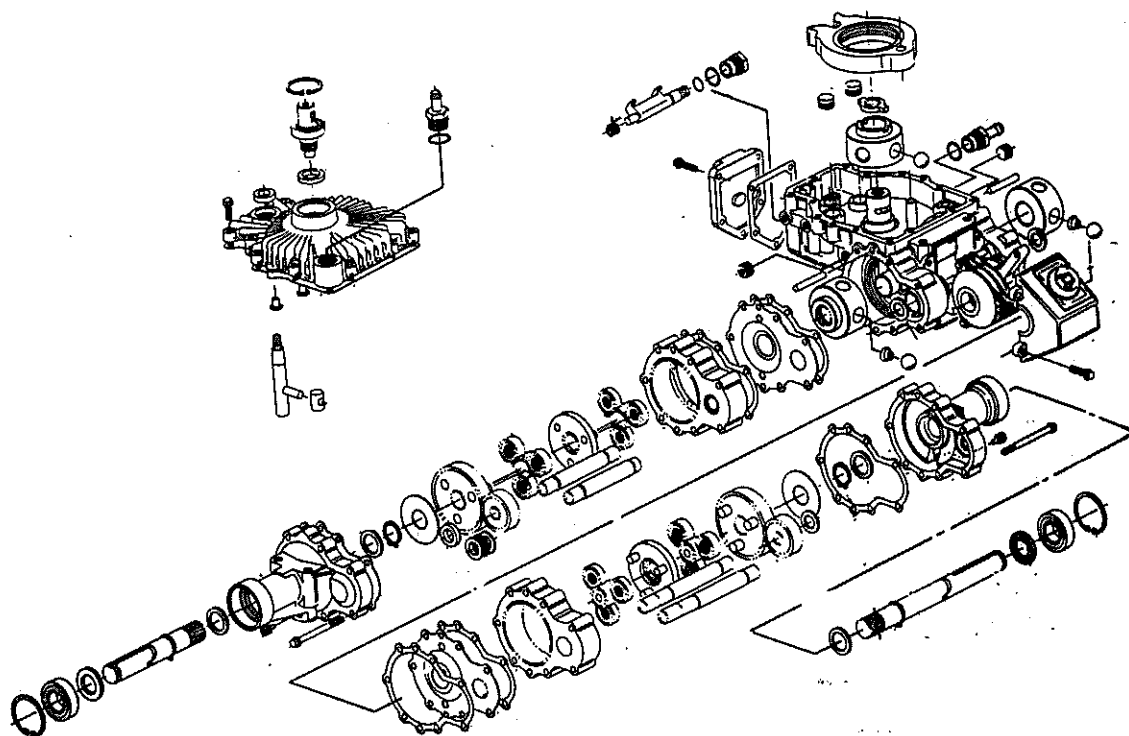
**EATON 7**

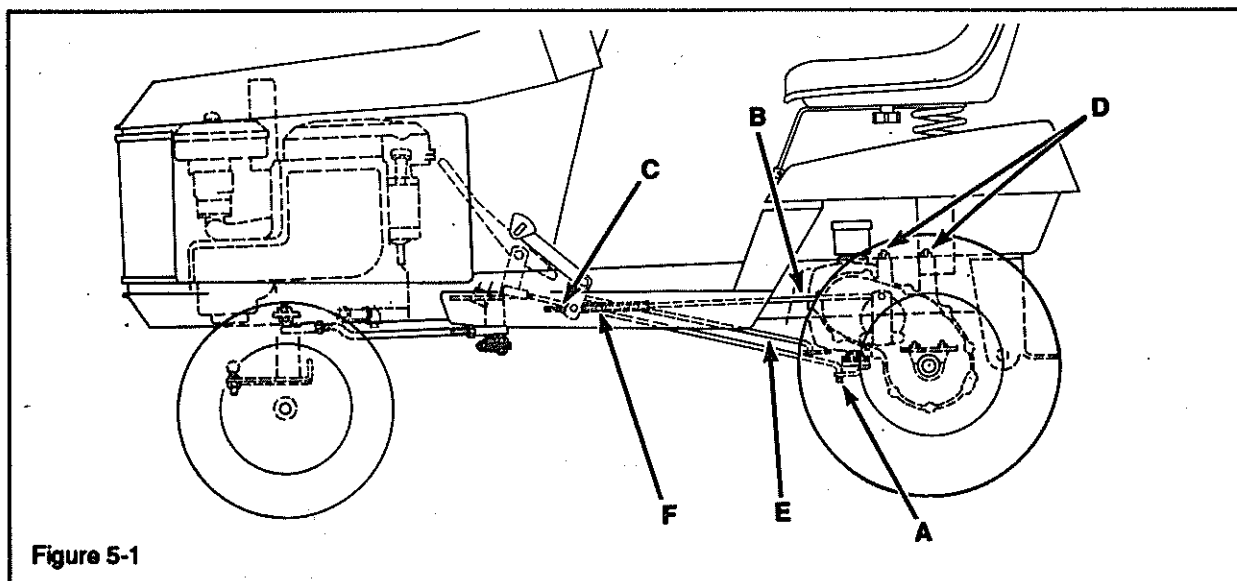


**EATON 750/751**

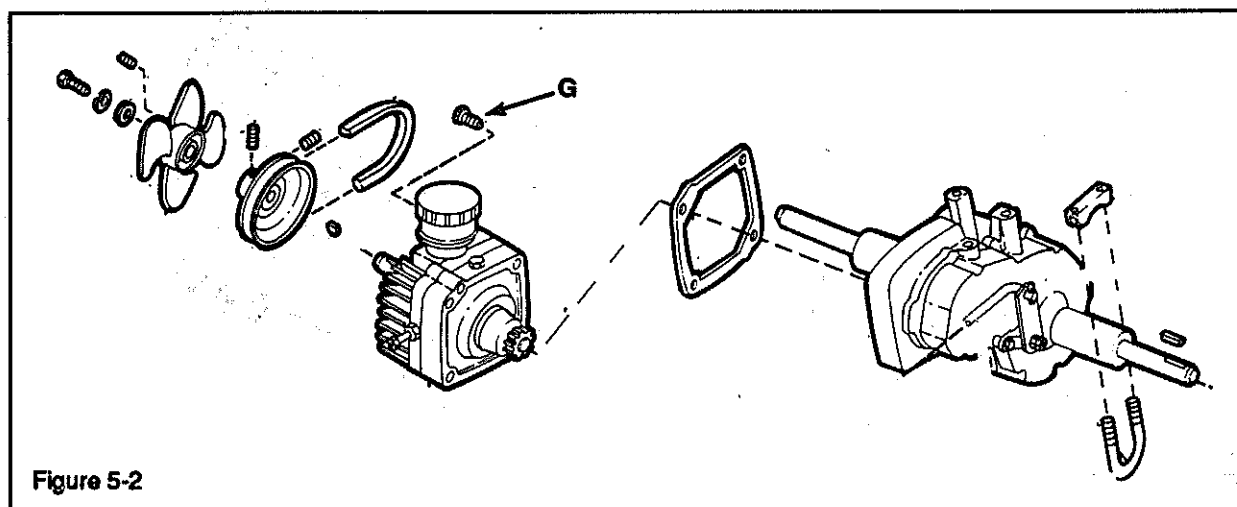


**EATON 750/751**





**Figure 5-1**



**Figure 5-2**

## **REMOVAL/INSTALLATION**

### **EATON MODEL 7**

The hydrostatic transmission is attached to a transaxle. The complete hydrostatic transmission and transaxle can be removed as one unit.

#### **1. Transaxle Removal**

- Remove drive belt from engine sheave.
- Disconnect hydrostatic shift rod (A, Figure 5-1) at hydro arm.
- Disconnect brake rod (B) at pedal, point (C).
- Remove three screws (D) Figure 3-1 securing transaxle to tractor frame.
- Remove cam plate rod (E) at hydro.
- Place a support under front of transaxle case.
- Remove U-bolts on wheel hubs.
- Lift rear of tractor frame and move forward.

#### **2. Hydrostatic Removal**

Remove the four mounting screws (G, Figure 5-2) from the transaxle case.

#### **3. Hydrostatic Re-Installation - Eaton Model 7**

Before re-installing the hydro, clean the mounting surface of all oil, dirt, or grease. Run a bead of silicon rubber around mounting surface and inside of bolt holes and secure with the four screws (G) removed earlier. Figure 5-2.

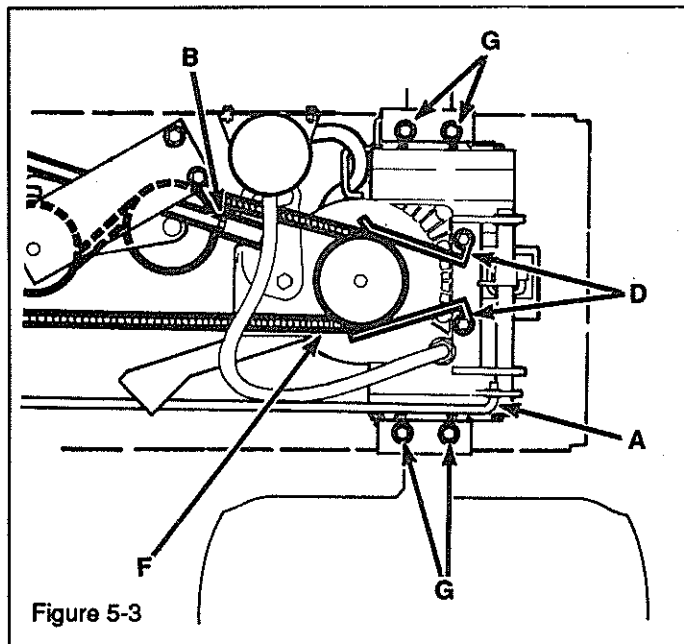


Figure 5-3

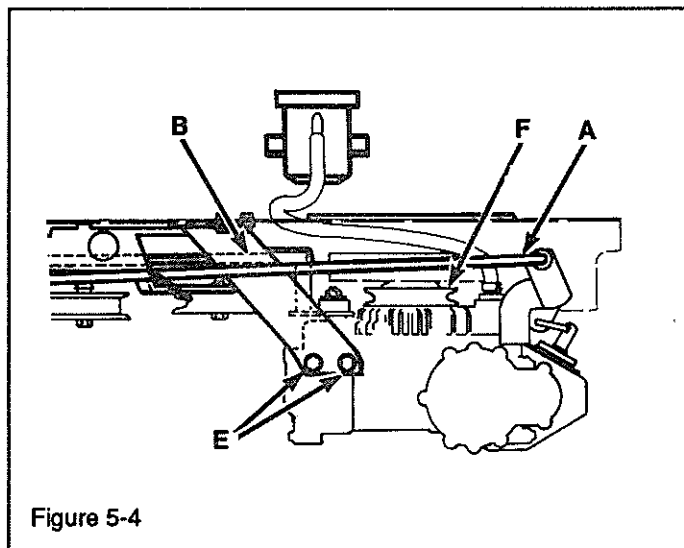


Figure 5-4

## REMOVAL/INSTALLATION: EATON MODEL 750 AND MODEL 751

### 1. Hydrostatic Transaxle Removal - Eaton Model 750/751

- a. Disconnect brake rod (A) at rear. Figure 5-3 and 5-4.
- b. Disconnect hydrostatic control rod (B) from pivot arm.
- c. Disconnect hydrostatic fluid hoses (C, Figure 5-5) from hydro. **Oil may flow from hoses.**
- d. Loosen the two belt guides (D, Figure 5-3).
- e. Remove the 2 mounting bolts (E, Figure 5-4) securing the bracket on the L.H. side.
- f. Place the brake pedal in the parking brake position and lock.
- g. Remove the drive belt from the hydrostatic drive sheave (F, Figure 5-3 and 5-4). On later models, route around plastic cooling fans.

**NOTE: It may be necessary to remove the belt when removing the hydro from under the frame.**

- h. Block up the center of the tractor.
- i. Remove the 4 axle mounting bolts and nuts (G, Figure 5-3).
- j. Raise the rear of the frame and remove the hydrostatic transaxle.

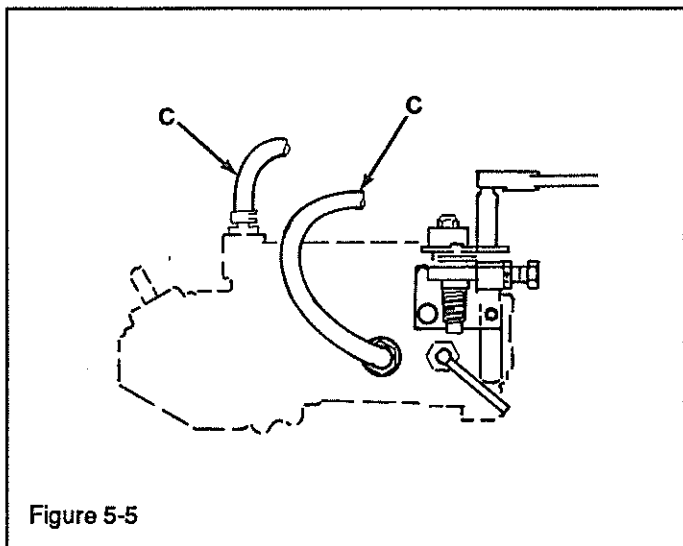


Figure 5-5

**HYDROSTATIC ADJUSTMENTS:  
EATON 7, EATON MODEL 750 AND  
MODEL 751**

**SEE SECTION II FOR HYDROSTATIC  
ADJUSTMENTS.**

**2. Hydrostatic Transaxle Re-Installation - Eaton  
Model 750 and Model 751**

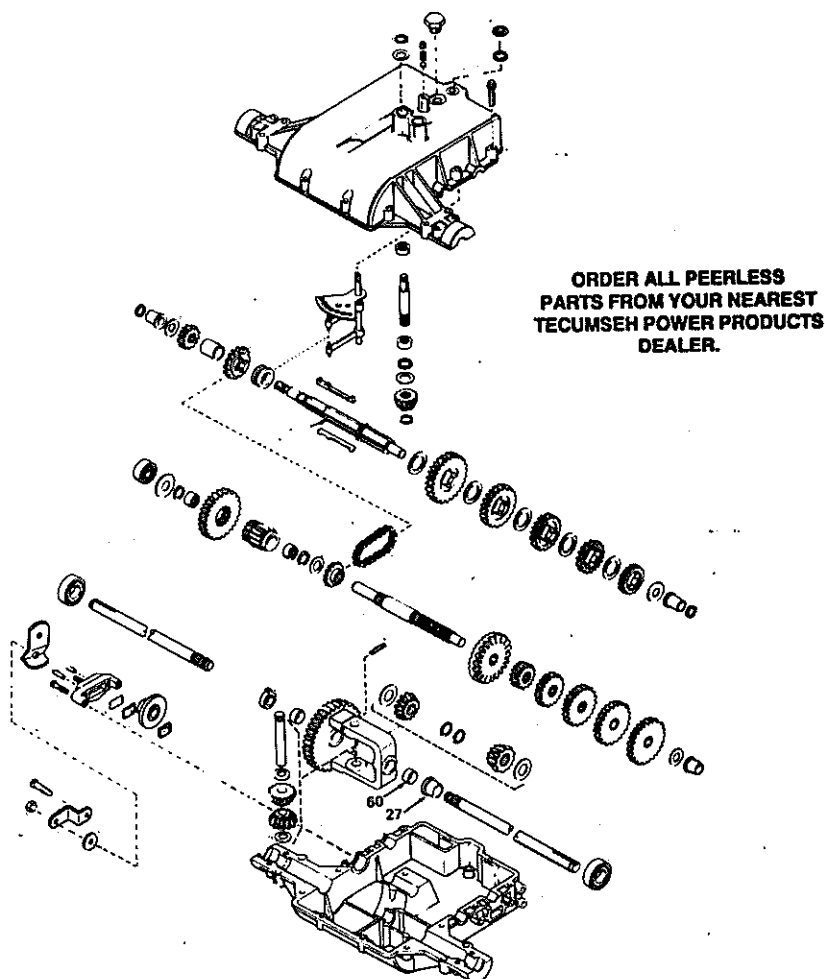
- a. Attach any disassembled parts removed after hydrostatic transaxle was removed from frame.
- b. Raise frame and roll transaxle into position under frame. Make sure brake rod (A, Figure 5-3 & 5-4) is above the hydrostatic transaxle.
- c. Secure axles to frame using the 4 bolts and nuts (G, Figure 5-3) removed earlier.
- d. Install drive belt (F), routing around fan fins and over transaxle sheave.
- e. Secure L. H. support bracket to transaxle using the two 5/16-18 x 1/2 flange screws (E, Figure 5-4) removed earlier.
- f. Re-tighten belt guides (D, Figure 5-3), if loose, so that there is a gap of about 1/16 inches between the guide and belt.
- g. Connect the two fluid hoses (C, Figure 5-5) to the hydro. (Oil may have to be replenished.)
- h. Re-install hydrostatic control rod (B, Figure 5-3).
- i. Re-install brake rod (A).
- j. Remove blocks from under frame.

**GEAR DRIVE TRANSAXLE****GEAR DRIVE TRANSAXLE  
INTRODUCTION - PEERLESS MODELS  
801, 920, 930, 1327, AND 2358.**

The Gear Drive Transmission / Transaxle in your tractor is a Tecumseh Peerless Model 801, 920, 930, 1327, or 2358.

The following pages will instruct you on how to remove and re-install the transaxle from your tractor and will describe some general repair procedures. It is recommended that all repair work be performed by an

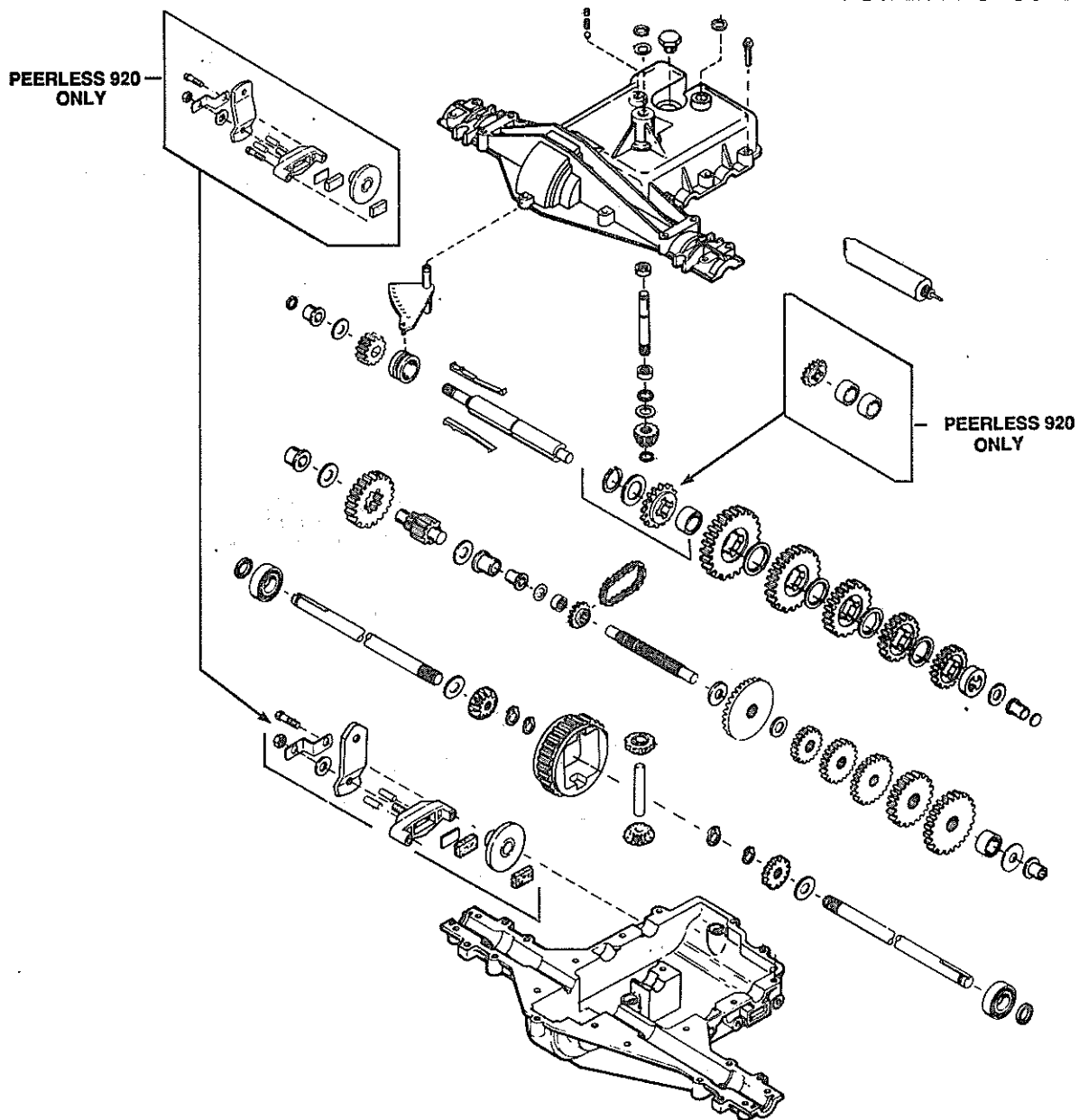
Authorized Tecumseh Peerless Dealer. When ordering parts, provide the full Model Number of your transaxle. It is located on the identification tag illustrated at the right. These transmission / transaxle components may be ordered through your local authorized Tecumseh / Peerless dealer.

**PEERLESS 801**



PEERLESS 920/930

ORDER ALL PEERLESS PARTS  
FROM YOUR LOCAL TECUMSEH  
POWER PRODUCTS DEALER



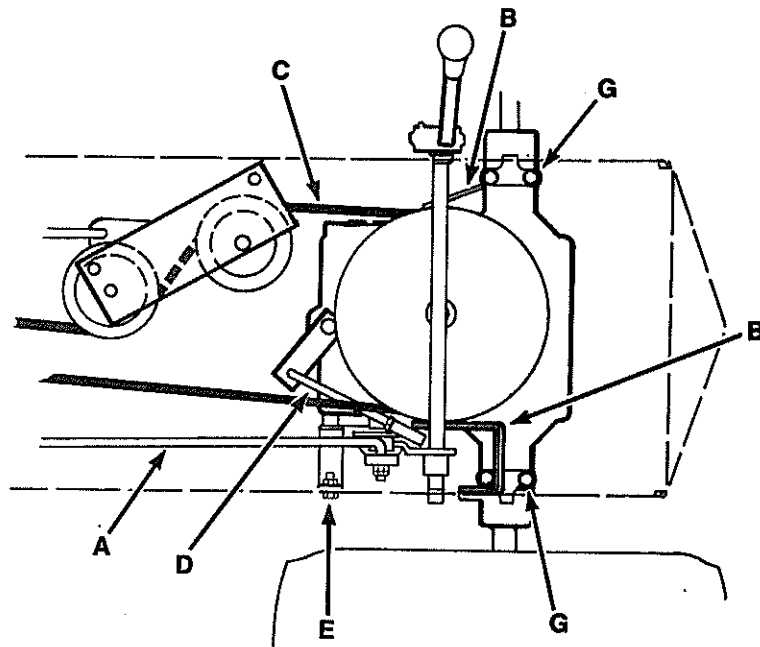


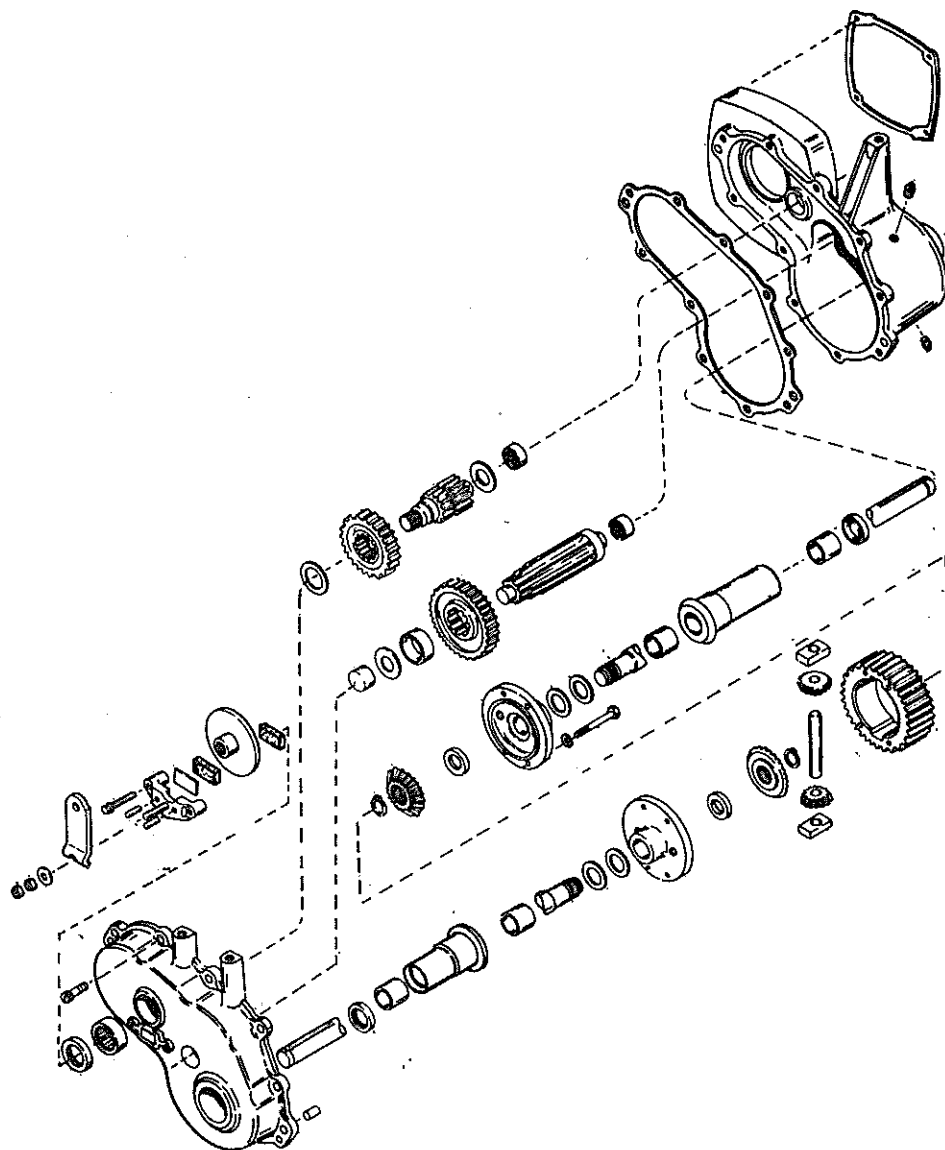
Figure 5-8

**GEAR DRIVE TRANSAXLE REMOVAL:  
PEERLESS MODEL 801, 920, AND 930.**

1. Disconnect brake rod (A, Figure 5-8) at transaxle.
2. Lock Brake/Clutch Pedal in park position.
3. Loosen belt guides (B) on transaxle drive sheave.
4. Remove belt (C) from drive sheave.
5. Disconnect shift rod (D) from transaxle lever.
6. Remove mounting bolt (E) and nut connecting support bracket (F) to L.H. side frame.
7. Block up center of tractor.
8. Raise the rear of the frame and roll out the transaxle.
9. Disassemble the wheels from the axle.

**PEERLESS 1327C**

**ORDER ALL PEERLESS PARTS  
FROM YOUR LOCAL TECUMSEH  
POWER PRODUCTS DEALER**



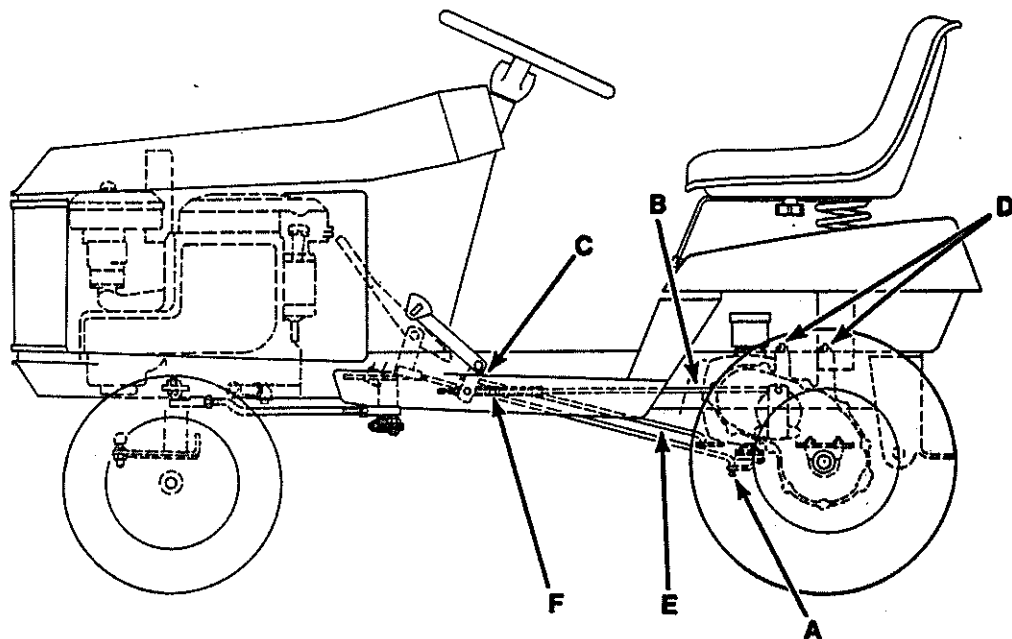


Figure 5-9

### **HYDRO TRANSAXLE REMOVAL: PEERLESS MODEL 1327C**

1. Remove drive belt from engine sheave.
2. Disconnect hydrostatic shift rod (A) at hydro arm. Figure 5-9.
3. Disconnect brake rod (B) at pedal (C).
4. Remove three screws (D) securing transaxle to tractor frame. Figure 5-9.
5. Remove cam plate rod (E) at hydro.
6. Place a support under front of transaxle case.
7. Remove U-bolts on wheel hubs.
8. Lift rear of tractor frame and move frame forward.

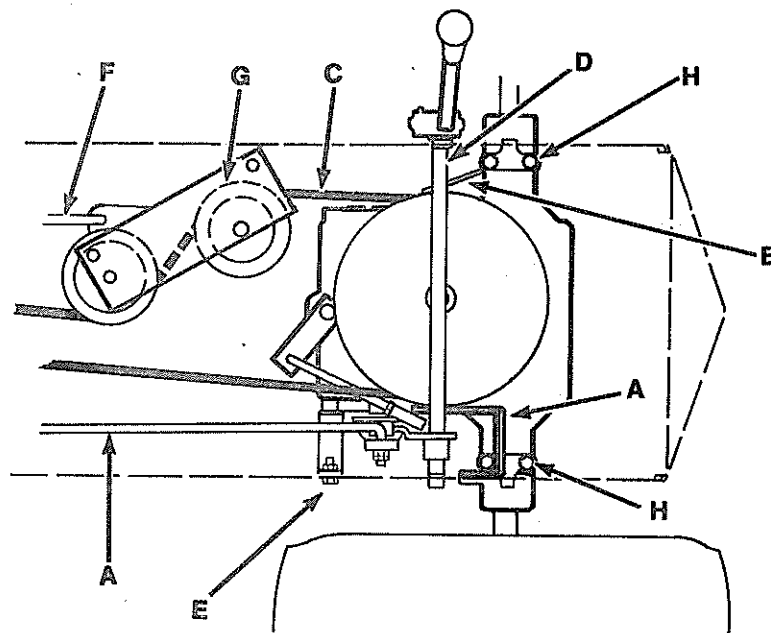
**GEAR DRIVE TRANSAXLE  
RE-INSTALLATION - ALL PEERLESS  
TRANSMISSIONS.**

1. Attach the wheels to the transaxle. To avoid seizing, apply 'Never Seize' compound or a light coat of grease.
2. Raise the rear of the tractor frame and roll the transaxle assembly into the frame of the tractor. Make sure brake rod (A) is above the support bracket. Figure 5-10.
3. Secure axles to frame using the 3 mounting bolts, 6 flat washers, and 3 lock nuts removed in disassembly at the rear holes. (H).
4. Attach support bracket to L. H. side frame using the 5/16-18 x 7/8 flange bolt (E) and nut removed in disassembly.
5. Connect shift rod (D) to transaxle lever. Figure 5-10.
6. Position drive belt (C) over drive sheave.

7. Place belt guide (B) in position, in side of frame and secure using the remaining long axle bolt, 2 flat washers and lock nut. Secure the belt guide 1/16" away from belt.
8. Re-tighten belt guide (B) to frame.
9. Remove blocks from under frame.

## BRAKE/CLUTCH ADJUSTMENT

1. With brake lock engaged, adjust clutch rod (F), Figure 5-10, to provide a clearance of 3-1/2" to 3 3/4" between idler (G) and inside of side frame.
2. With brake disengaged, adjust brake rod (A) so that arm on transmission is vertical. Brake spring (J) should be compressed to approximately 5" (127 mm) long.
3. With shift lever in the neutral detent, adjust shift rod (D) until the transmission reached the neutral position.



**Figure 5-10**

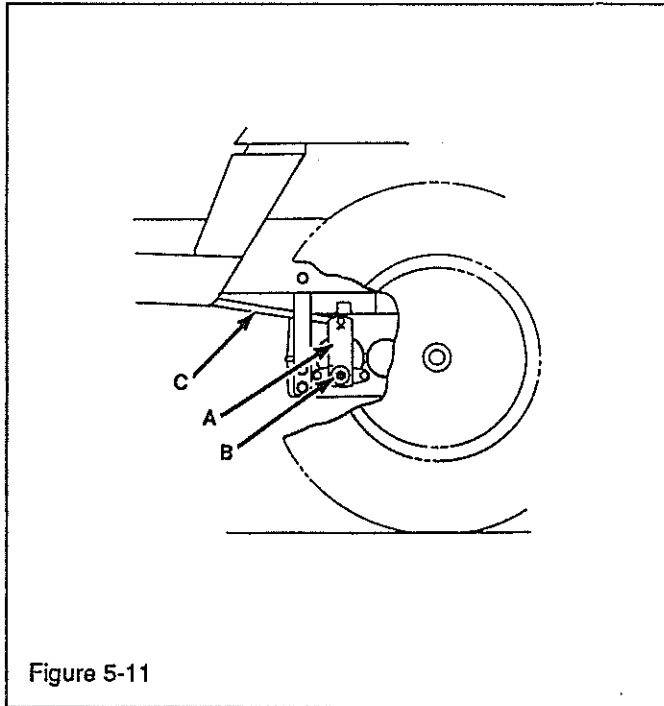


Figure 5-11

**DIFFERENTIAL ASSEMBLY  
BRAKE ASSEMBLY****1. Brake Adjustment (Gear Drive), Figure 5-11**

When the brake will no longer hold the tractor with the brake lock engaged, an adjustment is required. Adjust brake arm movement:

- Brake arm should apply initial braking force when arm moves  $1/4"$  to  $7/16"$  (9 to 11 mm) from the center position.
- To reach this travel, adjust nuts (B).
- With rod (C) of brake removed, total travel of brake arm from side to side should not be more than  $7/8"$  (22 mm).
- After adjustment is finished, check brakes for proper braking action.

**2. Brake/Clutch Adjustment (Gear Drive)**

- With brake lock engaged, adjust clutch rod (A, Figure 5-12), provide a clearance of  $3-1/2"$  to  $3-3/4"$  between idler (B) and inside of side frame.
- With brake disengaged, adjust brake rod (C) so that arm on transmission is vertical. Brake spring (D) should be compressed to approximately 5" long.
- With shift lever (G) in the neutral detent, adjust shift rod (E) until the transmission reaches neutral position.

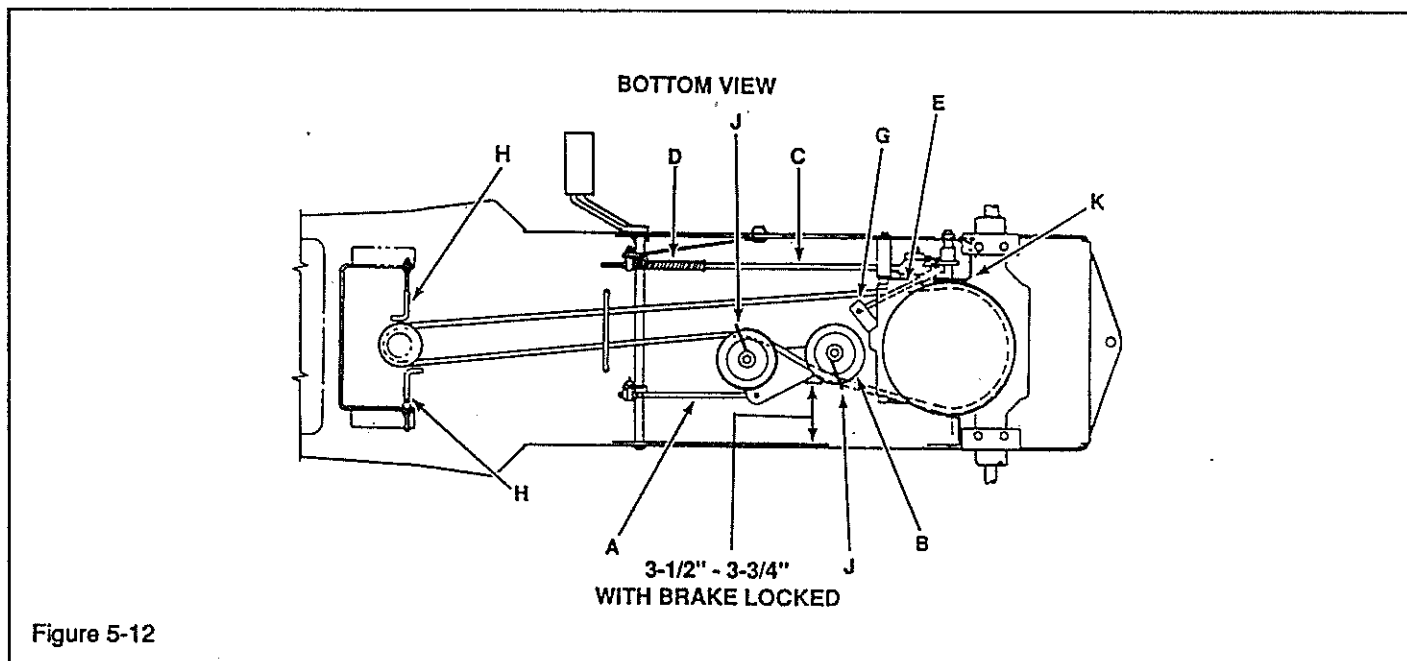


Figure 5-12

## MOWER DECKS

### MOWER DECKS



### WARNING!

**BEFORE LEVELING DECK, DISCONNECT THE ATTACHMENT DRIVE (PTO), SHUT OFF ENGINE, REMOVE IGNITION KEY, DISCONNECT THE SPARK PLUG WIRE AND KEEP IT FROM TOUCHING THE SPARK PLUG.**

#### 1. LEVEL MOWER DECK FRONT TO REAR: MODELS 30036S AND 31036S

- Check tractor tire pressure:  
**Front tires: 12 - 14 PSI.**  
**Rear tires: 8 - 12 PSI.**
- Place mower on a level surface. Rotate blades so they run front to rear.
- Measure the distance from the front edge of the blades to the ground (A, Figure 6-1) and from the rear edge of the blades to the ground (B, Figure 6-1). Both measurements should be equal. If not, adjust length of rod (C, Figure 6-2) at pivot (D).
- Re-check leveling after raising and lowering the mower attachment several times.

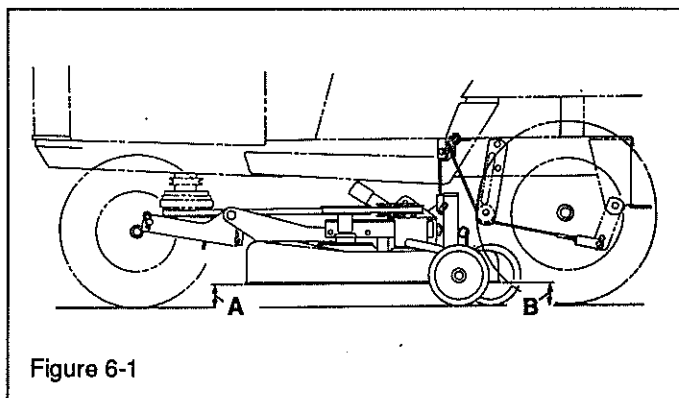


Figure 6-1

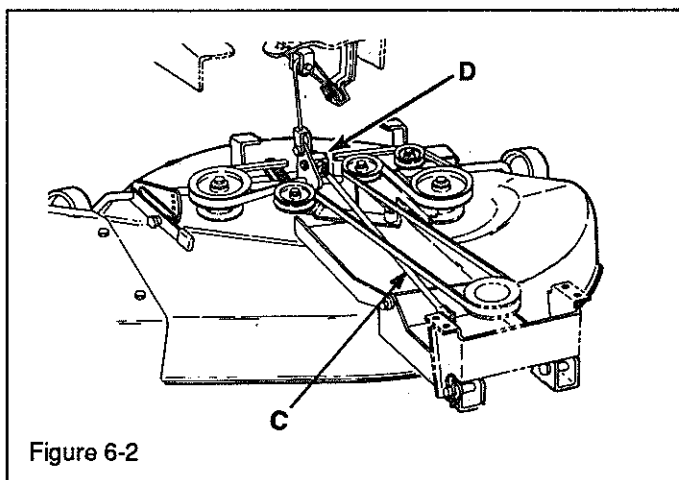


Figure 6-2

#### 2. LEVEL MOWER DECK FRONT TO REAR: MODELS 30042S, 30042R AND 30048S

- Check tractor tire pressure:  
**Front tires: 12 - 14 PSI.**  
**Rear tires: 8 - 12 PSI.**
- Place mower on a level surface.
- Measure height (H, Figure 6-3) and (G) along bottom surface of mower base. Front of deck (H) should be 1" higher (25 mm) than the rear (G). If not, adjust rod length (L, Figure 6-4) at pivot (M).
- Re-check leveling after raising and lowering the mower attachment several times.

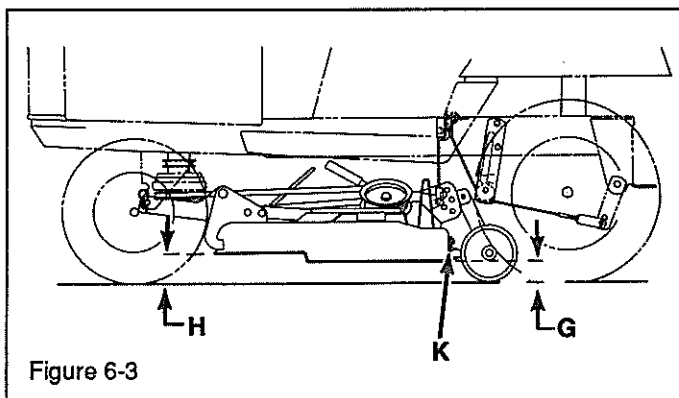


Figure 6-3

MOWER DECKS (continued)

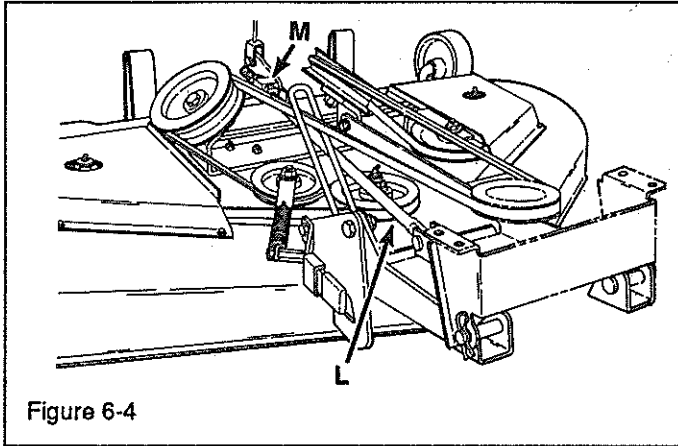


Figure 6-4

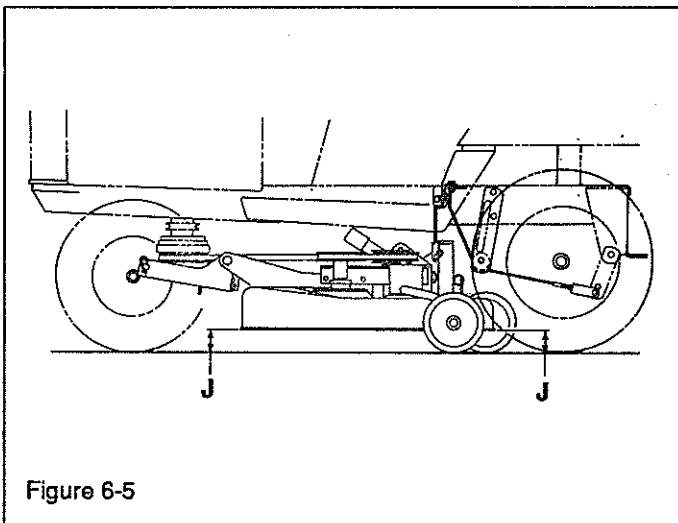


Figure 6-5

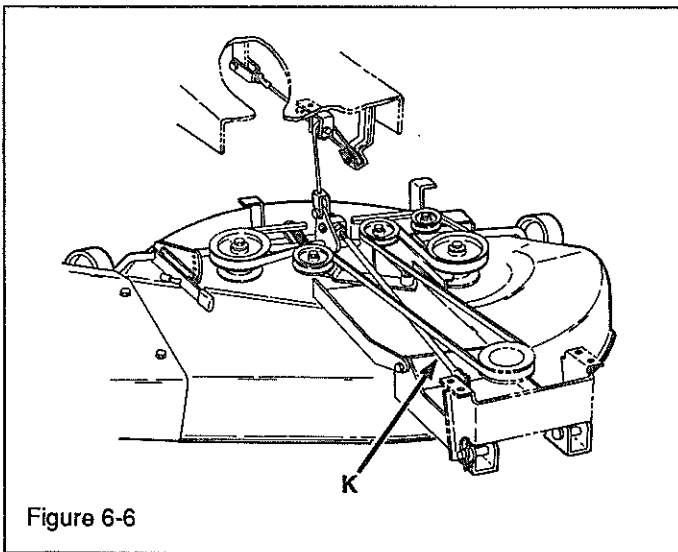


Figure 6-6

3. **LEVEL MOWER DECK SIDE TO SIDE: MODELS 30036S, 31036S, 30042S, 30042R AND 30048S**
  - a. Measure height (G, Figure 6-3) at both sides of deck.
  - b. If mower is not level, loosen gage wheel bracket (K) and adjust bracket height.
4. **LEVEL MOWER DECK FRONT TO REAR: MODELS 14003 & 14004.**
  - a. Check tractor tire pressure:  
**Front tires: 12 - 14 PSI.**  
**Rear tires: 8 -12 PSI.**
  - b. Park tractor (with mower) on a level surface. Rotate blades so they run front to rear.
  - c. Level deck from front to rear. Measure the distance from the front edge of the blades to the ground and from the rear edge of the blades to the ground (J, Figure 6-5).
  - d. Both measurements should be equal. If not, adjust length of rod (K, Figure 6-6) at pivot (L).
  - e. Re-check leveling after raising and lowering the mower attachment several times.

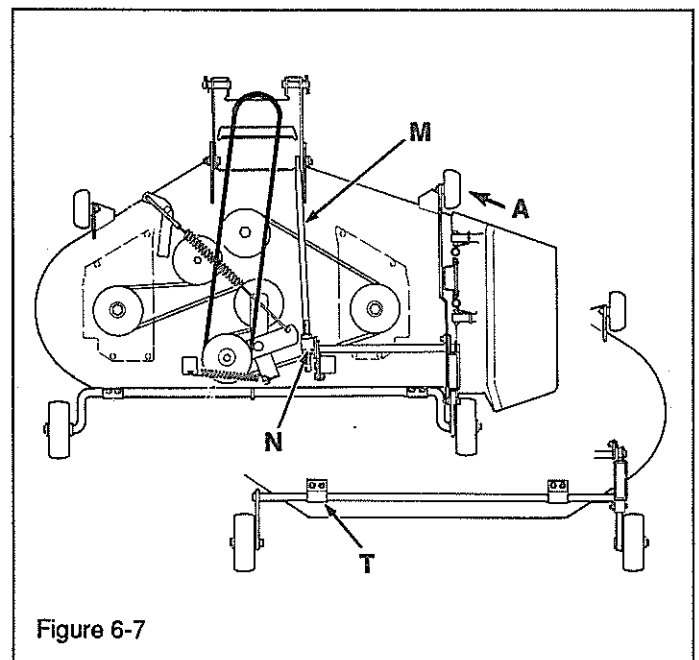


Figure 6-7



**MOWER DECKS (continued)****5. LEVEL MOWER DECK FRONT TO REAR:  
MODELS 14000 , 14001 AND 14002.**

- a. Check tractor's tire pressure.

**Front: 12-14 PSI**

**Rear: 8- 12 PSI**

- b. Place mower on a level surface. Lower deck.
- c. Turn blades so they align lengthwise with the tractor. Measure the distance from the front edge of the blades to the ground and from the rear edge of the blades to the ground. Both measurements should be equal. If not, adjust length of rod (M, Figure 6-7) at pivot (N).
- d. Raise and lower the mower several times and re-check leveling.

**6. LEVEL MOWER DECK SIDE TO SIDE: MODELS  
14000, 14001, 14002, 14003 AND 14004.**

- a. Rotate blades so the tips run side to side on the tractor. Measure the outermost blade tip height at both sides of the mower.
- b. If mower is not level, loosen nuts at left gage wheel bracket (T, Figure 6-7). Adjust bracket height and re-tighten nuts.

**NOTE: When leveling mower from side to side, adjustment may be made only at the left gage wheel bracket.**

**7. ADJUST THE FRONT ANTI-SCALP WHEELS:**

- a. The front anti-scalp wheels prevent the mower deck from 'scalping' the grass, especially on uneven terrain.
- b. If cutting height is set at 3 inches or higher, move the anti-scalp wheels (A, Figure 6-7) to the lower position as shown in Figure 6-8.
- c. If cutting height is set less than 3 inches, move the anti-scalp wheels (A) to the higher position.

**NOTE: The anti-scalp wheels should ride about 1/2 inch from the ground when mower is in use.**

**8. BELT REMOVAL: MODELS 30036S, 31036S,  
30042S, 30042R 30048S, 14003 AND 14004.**

**NOTE: Belt must be removed before mower can be removed from tractor.**

- a. Remove mower drive belt from the drive (PTO) sheave by pulling idler (B, Figure 6-9).
- b. Remove mower from tractor.
- c. Remove belt guards and loosen belt guides.
- d. Remove belt from mower.

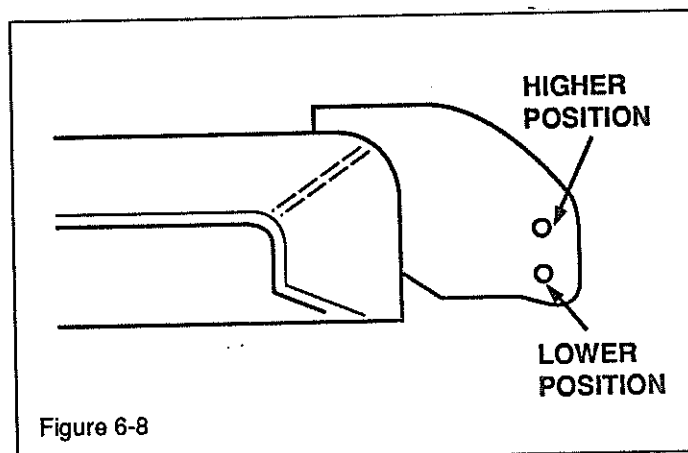


Figure 6-8

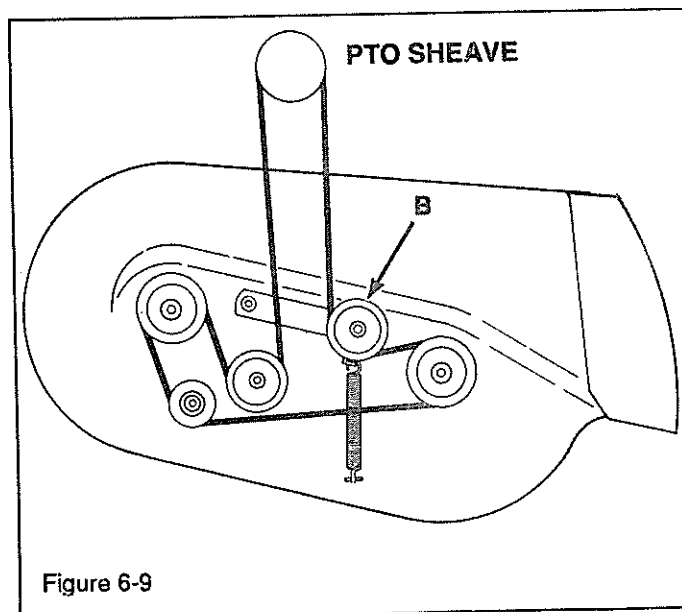


Figure 6-9

MOWER DECKS (continued)

9. BELT INSTALLATION: MODELS 30036S, 31036S, 30042S, 30042R 30048S, 14003 AND 14004.

- Install belt onto sheaves and pulleys as shown in Figure 6-9.
- Re-install belt guards. Adjust belt guides and tighten.
- Mount mower to tractor.
- Position drive belt over PTO sheave.

10. BELT REMOVAL: MODELS 14000, 14001 AND 14002.

a. DRIVE (PTO) BELT REMOVAL

**NOTE: Drive belt must be removed first, before removing the deck belt.**

- Relieve belt tension by turning lever (X, Figure 6-10) clockwise.

- Remove mower drive belt (V) from the PTO sheave (L).

b. DECK BELT REMOVAL

- Remove the drive Belt (V). (See DRIVE BELT REMOVAL)
- Remove belt covers (W).
- Rotate idler (Z) and remove belt.

11. DECK BELT INSTALLATION: MODELS 14000, 14001 AND 14002.

**NOTE: Deck belt must be installed before drive belt.**

- Install belt onto sheaves and pulleys as shown in Figure 6-10. Install belt covers (W).

**WARNING: SPRING SUPPLIES HIGH TENSION TO THE LEVER. USE CAUTION WHEN ROTATING LEVER.**

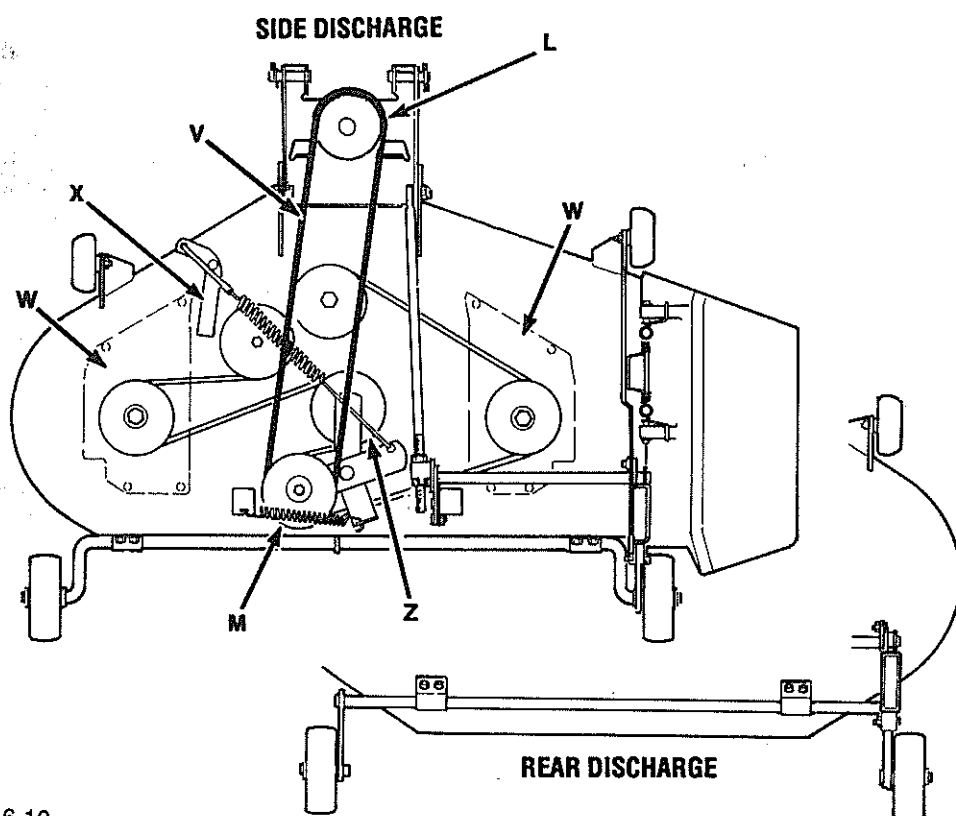


Figure 6-10

## MOWER DECKS (continued)

MODELS 30036S, 31036S, 14003 & 14004

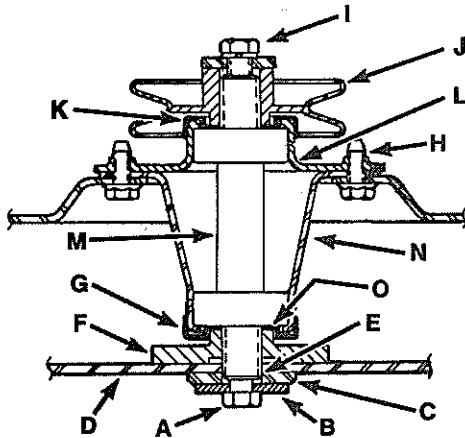


Figure 6-11

MODELS 30042R, 30048S, 14000, 14001 & 14002

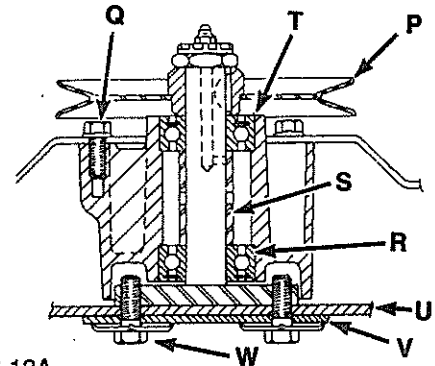


Figure 6-12A

### 12. DRIVE (PTO) BELT INSTALLATION: ALL MODELS

**NOTE: Deck belt must be installed before drive belt.**

- Position drive belt over PTO sheave (L), and top of double sheave (M).
- Rotate lever (X) counter-clockwise until it snaps into place.

**NOTE: Check the belt for binding.**

### 13. SPINDLE ASSEMBLIES: MODELS 30036S, 31036S, 14003 & 14004. Figure 6-11

- Remove and disassemble spindle.
  - Remove belt from spindles.
  - Remove center bolt (A, Figure 6-11) and washers (B) and (C).
  - Remove blade (D) and blade collar (E).
  - Slide off blade adapter (F), shield (G) and spacer (O).
  - Remove mounting screws (H) and pull spindle assembly up through mower base hole.
  - Disassemble sheave (J) by removing bolt (I), lock washer and flat washer.
  - Remove shield (K).
  - Remove top housing (L) & spindle shaft (M).

### b. Assemble spindle.

- Clean out top and bottom bearing areas in housings.
- Apply sealant to bearing areas.
- Place bearings on spindle shaft and install into lower housing (N).
- Place top housing (L) over spindle.
- Place shield (K) over spindle and slide on sheave (J).
- Secure in place with large flat washer, lock washer and bolt (I).
- Place spindle assembly into base. Secure with 6 flange screws. Torque center bolt (A) to 15 - 19 ft.-lbs. (20 -26 Nm).
- From the bottom of spindle: slide on washer (O), shield (G) and blade adapter (F).
- Place blade collar (E) over spindle and position blade (D) in place.
- Secure blade with large washer (C), washer (B) and center bolt (A).
- Torque top and bottom spindle bolts to 50 to 70 ft.-lbs. (68-95 Nm).

**MOWER DECKS (continued)**

**14. SPINDLE ASSEMBLIES: MODELS 30042S,  
30042R, 30048S, 14000, 14001 & 14002.**  
**Figure 6-12**

- a. Remove and disassemble spindle.
  1. Remove belt covers.
  2. Remove belt from spindle.
  3. Remove top pulley (P, Figure 6-12A) from each spindle.
  4. Remove the 2 bolts securing cutter blade at each spindle.
  5. Remove the 4 bolts (Q) securing spindle assembly to deck. Remove spindle assembly from mower deck.
  6. Remove shaft assembly from spindle housing.
- b. Assemble spindle.
  1. Place lower bearing (R) on shaft assembly.
  2. Place spacer (S) on shaft assembly.
  3. Place shaft assembly in spindle housing.
  4. Place upper bearing (T) on shaft assembly.
  5. Place spindle housing assembly on mower deck and secure. Torque 4 bolts (Q) to 250 in.-lbs. (28 Nm).
  6. Assemble pulley (P). Secure with nut and torque to 90 ft. lbs. (122 Nm).
  7. Place blade (U). Place spacer (V) and secure with bolts (W) and lock washers.
  8. Torque bolts (W) to 25 ft.-lbs. (34 Nm).

**15. SPINDLE ASSEMBLIES: MODELS 14054-01,  
14055-01 AND 14056-01. Figure 6-12B**

- a. Remove and disassemble spindles:
  1. Remove belt from spindles.
  2. Remove center bolt (A, Figure 6-12B) and Spring washer (B).
  3. Remove blade (C).
  4. Remove 7/16-18 x 1 hex nut, lock washer and washer. Remove top sheave (D). This allows access to 4 mounting screws (E).
  5. Remove 4 mounting screws and pull the spindle assembly through the mower base hole.
  6. Push spindle shaft down through the spindle housing.

--or--

Remove the lower retaining ring (G) to allow the spacer blade (H) to slide off the shaft. The shaft can be pushed through in either direction.

7. Drive ball bearings (I) and bearing spacer out of the spindle housing.
- b. Re-assemble spindle:
  1. Clean out the top and bottom surface areas in the housing.
  2. Apply sealant to bearing areas.
  3. Place one bearing into housing.
  4. Place the second and last bearing into housing.
  5. Install retaining ring (G) on shaft and slide blade spacer (H) over shaft.
  6. Install spindle shaft into spindle housing.
  7. Place spindle assembly into base and secure with 4 mounting screws. Torque mounting screws to 15 to 19 ft. lbs. (20-26 Nm).

**MOWER DECKS (continued)**

8. From the top of the spindle, install sheave, 7/16-18 x 1 bolt lockwasher and washer. Torque bolt to 35 ft. lbs.
9. Install blade, bevel washer lockwasher and bolt from the bottom. Torque bolt to 35 ft. lbs.

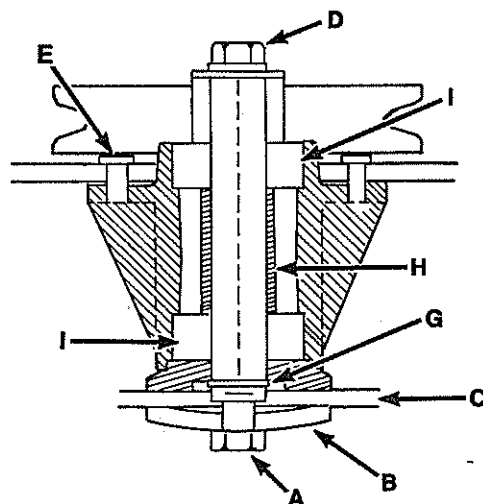
**NOTE: Bottom and top spindle bolts must be torqued to 35 ft. lbs.**

**16. LUBRICATION**

There are grease fittings on the mower; beneath the mower deck on spindle housing. Lubricate these grease fittings after every 100 hours of operation with multi-purpose grease and grease gun.

Frequently lubricate the slide points on linkage, gage rollers and other pivot points with a few drops of lubricating oil. Always lubricate deck after washing.

- a. Every 25 hours:
  1. Oil gage wheel axles.
  2. Oil idler pulleys and pivots.
  3. Oil lift rollers.
  4. Oil all moving parts.

**MODELS 14054, 14055 AND 14056****Figure 6-12B**

## TILLER

### TILLER (MODEL 30326 AND 14006)

#### 1. TILLER REMOVAL

- Remove the belt from the drive assembly.
- Disconnect lift rod (B, Figure 6-13).
- Remove clevis pins (C) at hitch.
- Remove rear tiller assembly.

#### 2. GEAR CASE REMOVAL

- Remove tiller cover (D).
- Remove depth shoe (E).
- Remove (right and left) tiller support brackets (F, Figure 6-14) from case.
- Remove drive sheave (G, Figure 6-13) and key from shaft.
- To remove the tines: Remove 1 clevis pin on each tine holder. This allows the tine holders to slide off the tine shaft.
- Drain oil from drain plug (A, Figure 6-14).

#### 3. GEAR CASE DISASSEMBLY

- Tip gear case assembly over on surface (H, Figure 6-15). Keep supported area against screw (J).
- Remove cotter pin and unscrew locking rings (K).

- Remove O-ring (L) and unscrew bearing retainer (M).

- Remove hex nut (N) and lock washer. Make sure hex screw is supported on back side so screw remains in position when cover is removed.

**NOTE: Before removing side cover, it is necessary to 'mark' the 8 holes from where the screws were removed. This will aid in re-assembly.**

- Remove remaining screws and nuts securing cover.

- Lift cover off of tine shaft.

#### 4. REPLACING TINE SHAFT SEALS

- Remove the 2 cotter pins (Z, Figure 6-15) securing the locking rings (Y). This allows the locking rings (Y) to be unscrewed from the housing. (A punch and hammer may be used to free the locking rings.)
- Once the locking rings are removed, the bearing carrier (L) is now exposed. To expose the seals, remove the bearing carriers.
- When the inner bearing race (A, Figure 6-16) is removed, the oil seal (B) can be seen. Use a hammer and steel punch and drive the oil seal out, towards the bearing race which was removed earlier.

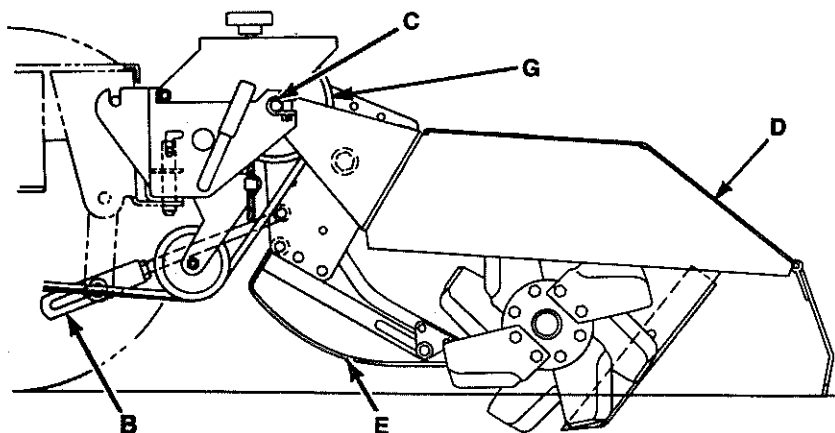


Figure 6-13

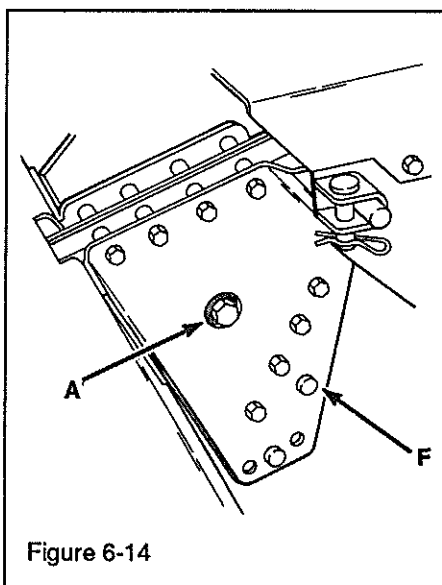


Figure 6-14

## TILLER (continued)

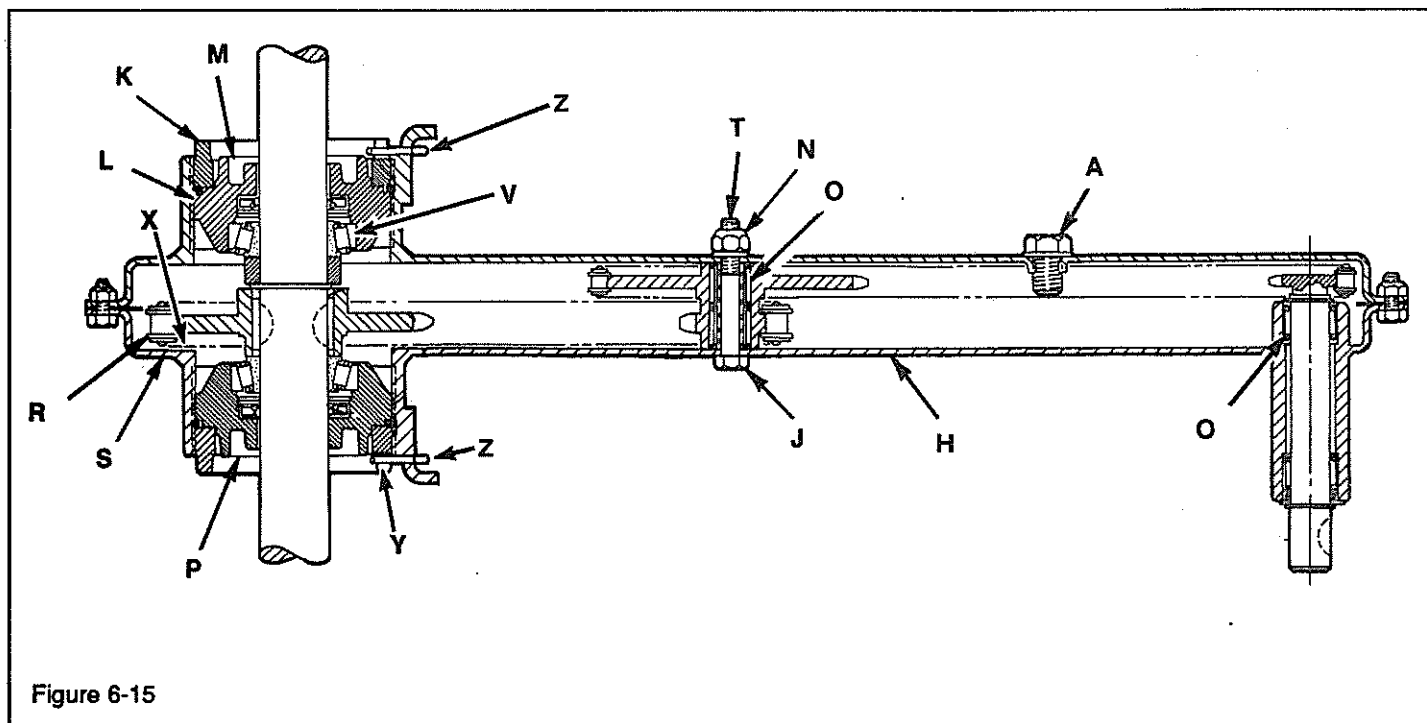


Figure 6-15

- d. After the seal is removed, clean the seal housing. Repeat this procedure with other bearing carrier.

**NOTE: De-burr and clean shaft of any rust or debris before installing the bearing carrier.**

- e. When re-installing the seals, apply sealant to the outer metal surface (C, Figure 6-16). This will ensure a tight seal against the bearing carrier and seal.

To protect the oil seal from being cut as you slide it on the tine shaft:

1. Wrap the tine shaft with plastic wrap, in the form of a sleeve, to ensure seal does not get cut. *Use the plastic shipping bag the seal was shipped in to form a protective sleeve.*
2. Liberally, grease the shaft and wrap.
3. Insert the seal over tine shaft and plastic.
4. Slide both over the shaft until the seal is up to the seal housing.
5. Remove plastic and seat the seal into its bore.

## 5. RE-INSTALL BEARING CARRIERS.

If both bearing carriers are removed, re-installation must be performed in proper sequence.

- a. Thread the bearing and carrier (L) into the housing (opposite the input shaft side) so the chain contacts the transmission case. *This will allow for proper chain alignment in the next step.*
- b. Back off the bearing carrier assembly about 4 or 5 turns. Install the other bearing carrier on the input shaft side of the chain case.

- c. With the chain contacting the input shaft side of the chain case, turn bearing carrier (on input shaft side) so the shaft is pushed over to the other bearing carrier side.

**NOTE: Observe shaft movement. Once the shaft begins to move, measure the movement with a dial indicator or similar device.**

- d. The shaft must move 1/8". This will allow for proper chain and sprocket alignment. If this measurement is not obtained, the sprockets or chain may be damaged.

**TILLER (continued)**

**6. RE-INSTALL LOCKING RINGS.**

- a. Screw locking rings (K) and (Y) into the case until the locking ring seats against the bearing carrier. Install a new cotter pin to ensure the locking collar does not rotate.

**7. RE-INSTALL TINES.**

- a. Install a velvet washer between the locking ring and tine holder. This prevents debris build-up around the seal and shaft.
- b. For future removal, apply a light film of grease or never-seize on the tine shaft.
- c. Re-install drive sheave (G, Figure 6-13).
- d. Re-install tiller support brackets (F, Figure 6-14) in case.
- e. Re-install depth shoe (E, Figure 6-13) and replace tiller (D).

**9. LUBRICATION**

The oil level and fill hole (A, Figure 6-15) is located on the right side of the gear case. Check the oil level while the tiller is mounted on the tractor and the tines rested on the ground. Oil level should be filled to the level of the plug.

The tiller was filled with gear lubricant at the factory. Gear case capacity is 34 ounces (0.98 liters) of 90W.

**BEARING CARRIERS**

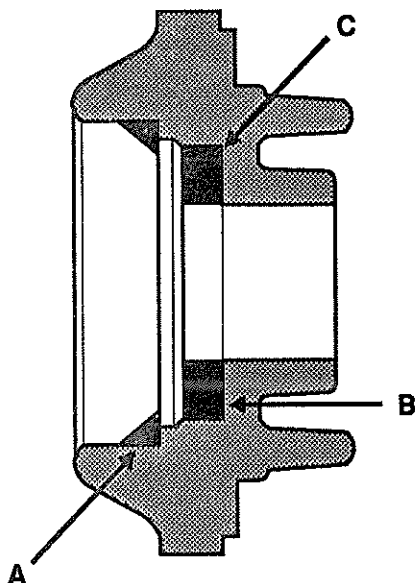


Figure 6-16

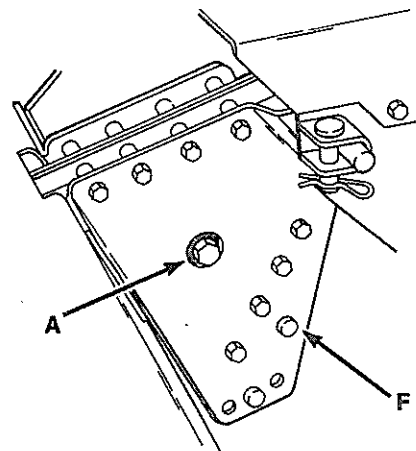


Figure 6-14 (repeated)



## 2-STAGE SNOWTHROWER

### SNOWTHROWER MODEL 30136

#### 10. GEAR BOX REMOVAL

1. Before performing any maintenance on the unit, disengage tractor PTO drive, shut engine off, allow all moving parts to come to a complete stop, and disconnect spark plug wires from spark plugs.
2. Remove attachment from tractor.
3. Remove PTO protector (chain guard).
4. Locate master link (B, Figure 6-18) on chain and remove. Remove chain.
5. Loosen set screws in sprocket (A) and remove sprocket.
6. Loosen locking collar set screws. Loosen locking collar by inserting a punch in the hole in the collar and striking the punch with a hammer. The collar is an eccentric (oval) design (See Figure 6-20). To loosen the collar, turn it in the opposite direction of normal rotation.
7. Clean all burrs and paint off driving shaft.
8. Remove screws securing gearbox support to housing (B, Figure 6-19) and gearbox.

9. Loosen set screws on ends of auger bearing collars (C). Remove screws securing bearings (D). Slide collars and bearings inward against the augers (E).

10. Pull auger assembly forward and out of housing.

**NOTE: fan will have to be positioned so it will clear the housing (Figure 6-21).**

11. Slide bearings and bearing collars off the augers.
12. Remove shear pins (F, Figure 6-19) from augers. Mark augers with masking tape and label them left and right to aid in re-assembly.

**IMPORTANT! IF AUGERS ARE ASSEMBLED INCORRECTLY, THE UNIT WILL NOT OPERATE PROPERLY!**

#### 11. GEAR BOX DISASSEMBLY

**NOTE: Before disassembling gearbox, remove all burrs, paint, and rust from auger and fan shaft. This aids in disassembly.**

1. Remove four (4) bolts securing gear case halves together. Allow oil to drain and slide the gear case halves off the shaft.
2. Remove bushings (G, Figure 6-17) and thrust washer (H).

**GEAR CASE BREAKDOWN  
FOR SNOWTHROWER 30136**

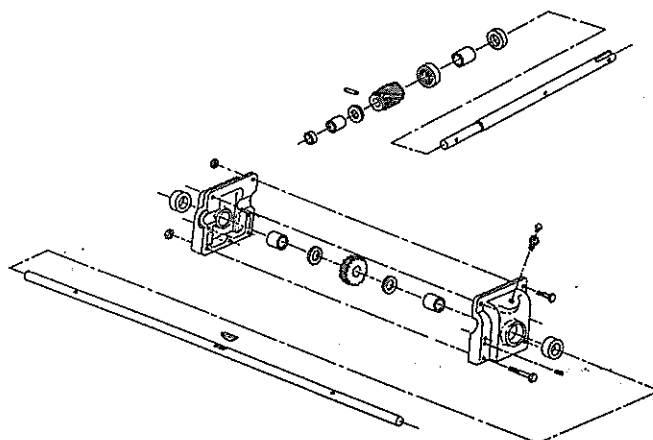


Figure 6-17

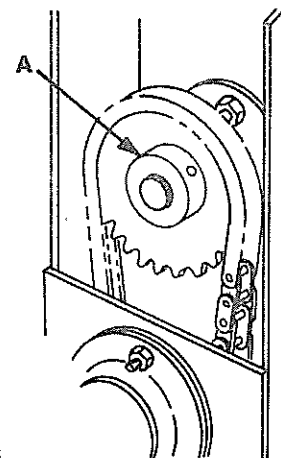


Figure 6-18

## 2-STAGE SNOWTHROWER (continued)

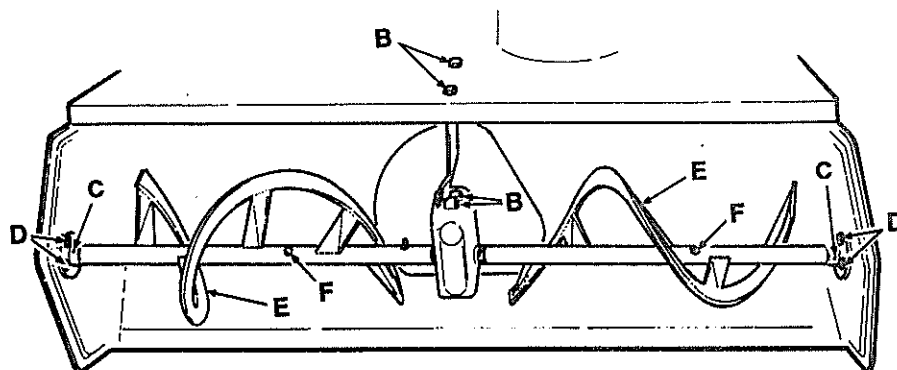


Figure 6-19

3. If worm requires service, remove drive pin (I) and slide worm off shaft.

**NOTE: ANY TIME DRIVE PIN (I) IS REMOVED, IT SHOULD BE REPLACED.**

Fan shaft bushing, thrust bearing and seal can be serviced without removing the worm.

4. Worm gear and thrust washers can be removed from auger shaft and serviced as necessary.

### 12. GEAR BOX RE-ASSEMBLY

**NOTE: INSPECT BUSHINGS AND THRUST BEARING. INSPECT SHAFTS WHERE BUSHINGS AND SEALS RIDE. SEALS SHOULD BE REPLACED.**

1. AUGER SHAFT BUSHING REPLACEMENT: If bushing replacement is necessary, press old bushings out of gear case halves. Press in new bushings until they are flush with inside of housing.
2. FAN SHAFT BUSHING REPLACEMENT: If bushing replacement is necessary, remove old bushings by sliding bushings off the shaft. Oil new bushings and install on the fan shaft before assembling the gear case halves.
3. Install fan shaft bushings, thrust bearings and thrust washers of fans shaft.
4. Install worm gear and thrust washers on auger shaft.
5. Mesh worm with worm gear.

6. Clean mating surface of gear case halves and apply a thin bead (.010") of silicone sealant to each half. Also apply a bead around input cap (Figure 6-21A).

7. Slide gear case halves on auger shafts and install bolts and fasten gear case together.

**NOTE: CARE MUST BE TAKEN TO PROPERLY ALIGN GEARS, INPUT CAP AND BUSHINGS WITH HOUSING. DO NOT FORCE HOUSING TOGETHER WITH BOLTS—HOUSING SHOULD FIT TOGETHER EASILY.**

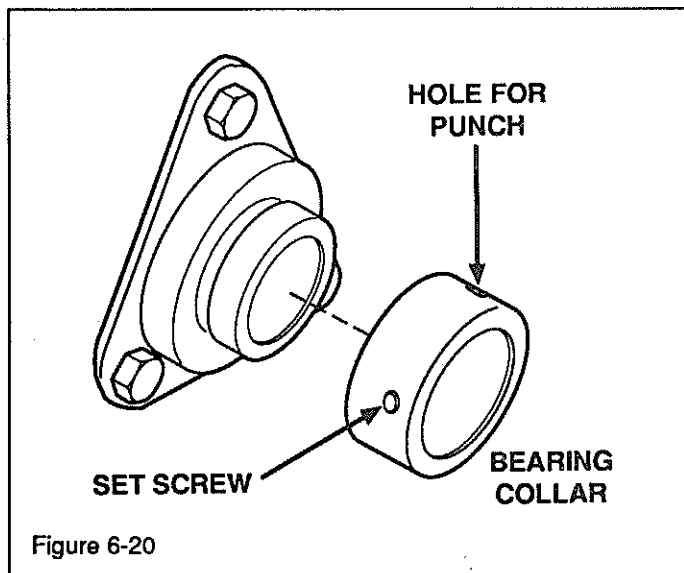
8. Using a seal protector, grease and install fan and auger shaft seals.
9. Grease shaft and install fan assembly.
10. Grease shaft and install right and left-hand augers. **NOTE: BE SURE TO INSTALL AUGERS PROPERLY!**

**IF AUGERS ARE ASSEMBLED INCORRECTLY, THE UNIT WILL NOT OPERATE PROPERLY!**

(Refer to step 12, "GEAR BOX REMOVAL").

11. Install assembly in blower housing.
12. Fasten auger shaft bearings to housing.  
**NOTE: DO NOT TIGHTEN BEARING COLLAR SET SCREWS UNTIL BOTH BEARINGS AND THE GEAR CASE SUPPORT ARE INSTALLED AND TIGHTENED.**
13. Secure center gear case support to gear case and housing. Tighten bearing collar set screws.

## 2-STAGE SNOWTHROWER (continued)



14. Install fan bearing lock collar. Tighten the collar with a hammer and punch in the same direction as the shaft rotation. Tighten fan bearing lock collar set screw.

15. Install chain and chain guard (PTO protector).

16. Fill gear case with SAE 90 to the bottom edge of the fill hole. Check for leaks.

**NOTE: Check chain tension and oil level after first hour of use.**

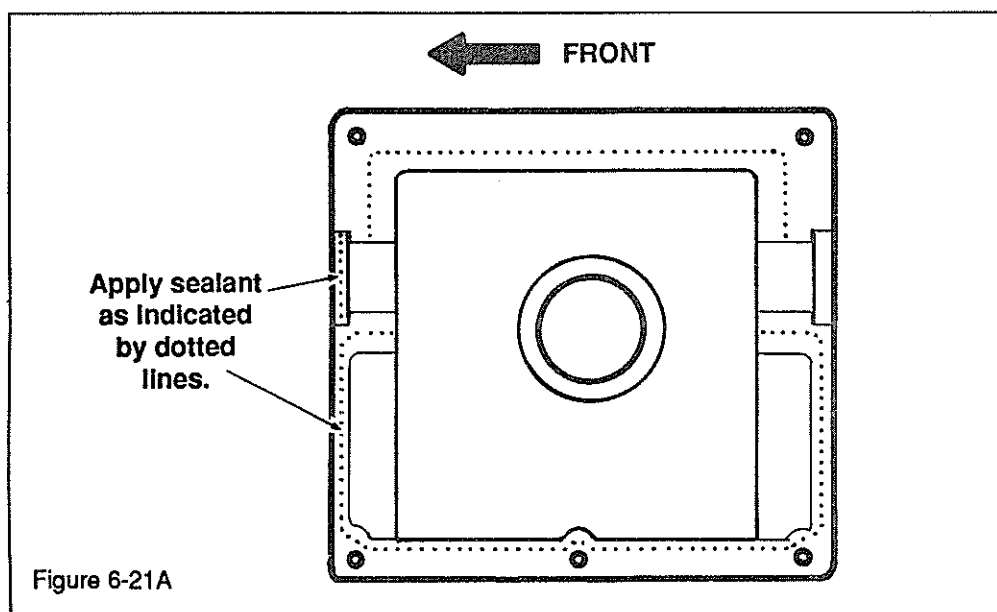
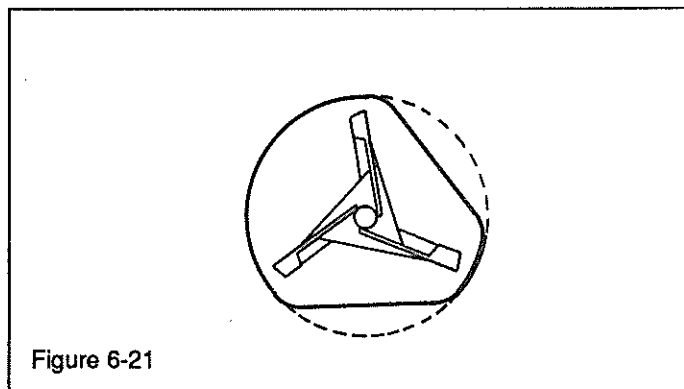
### 13. MAINTENANCE

**GEARBOX**—Check oil level every 10 hours. Fill if necessary with EP90 extreme pressure oil.

**AUGER SHAFT**—Grease each shaft at fittings (G, Figure 8-20 ) every 24 hours of use.

**DRIVE CHAIN**—Lubricate chain with chain saw oil after each use.

**MOVING PARTS**—Oil rotating parts and bearings with multi-purpose oil every 24 hours of use.



## SINGLE STAGE SNOWTHROWER

### SNOWTHROWER 30138, 30138R & 14005

#### 1. SEPARATION OF SNOWTHROWER HEAD FROM PUSH ARM ASSEMBLY.

- Disconnect crank pivot block from chute crank.
- Remove 4 hex head cap screws (A, Figure 6-22) from each side of snowthrower head.
- Remove snowthrower drive belt.
- Pull snowthrower head from push arm assembly.

#### 2. REMOVAL OF AUGER FROM SNOWTHROWER.

- Remove hex head cap screw (B, Figure 6-22A), lockwasher, flat washers, spacers and nuts. (Securing nylon roller)

**NOTE: Allow nylon roller to remain in snowthrower assembly.**

- Using an allen wrench, loosen set screw E, Figure 6-22B) on locking collar at both sides of auger.

- Rotate auger until hole in locking collar is visible.
- Loosen locking collar set screws. See Figure 6-22C. Loosen locking collar by inserting a punch in the hole in the collar and striking the punch with a hammer. The collar is an oval design. To loosen the collar, turn it in the opposite direction of normal rotation.
- Remove carriage bolt (B, Figure 6-22), locknut (C) and bearing flanges (D) from non-sprocket side.
- DISCONNECT CHAIN: Remove master link from chain. Remove chain.

#### 3. REMOVAL OF ROTOR DRIVE SHAFT.

- Remove set screws (G, Figure 22A).
- Loosen locking collar set screws (H, Figure 6-22A). Loosen locking collar.

*To Loosen: Insert a punch in the hole in the collar and striking the punch with a hammer. (See 6-22C.) The collar is an oval design. To loosen the collar, turn it in the opposite direction of normal rotation.*

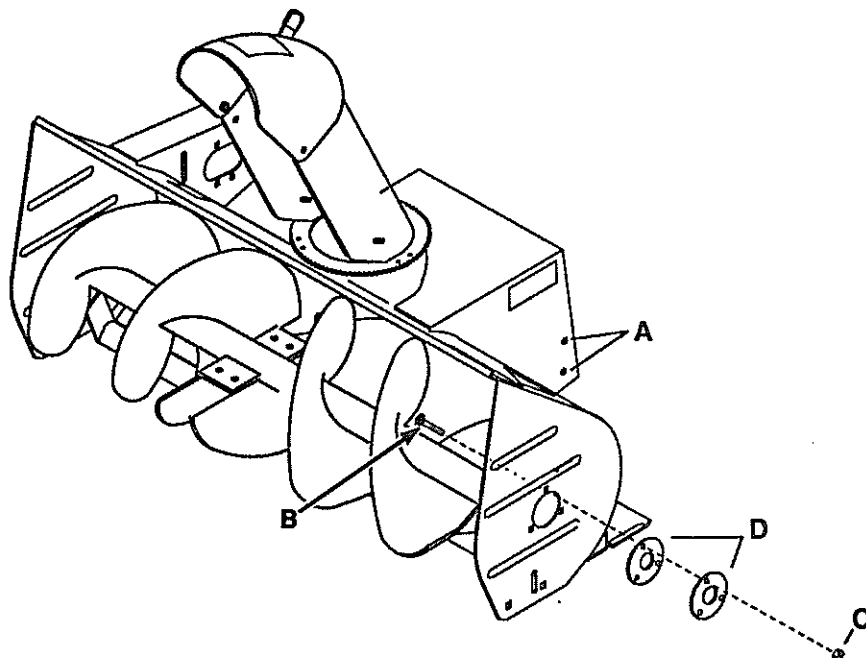
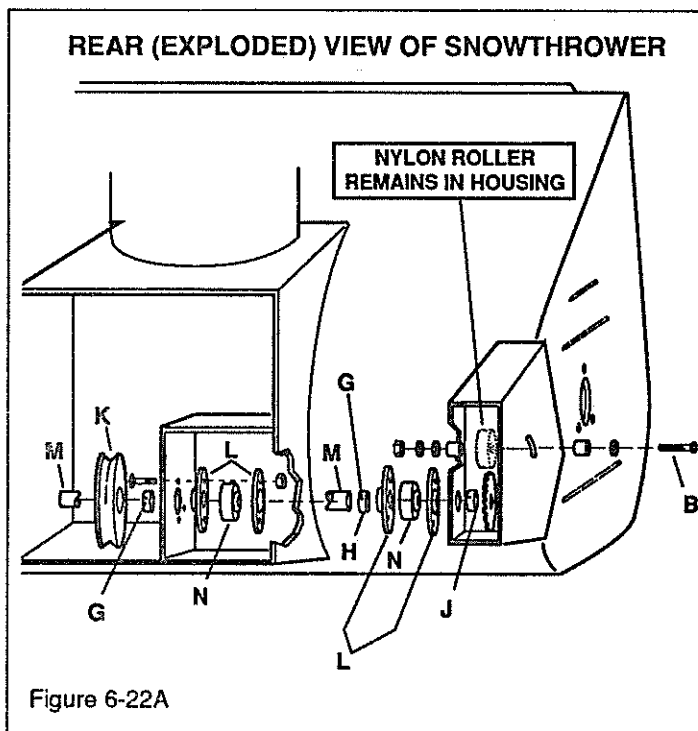


Figure 6-22

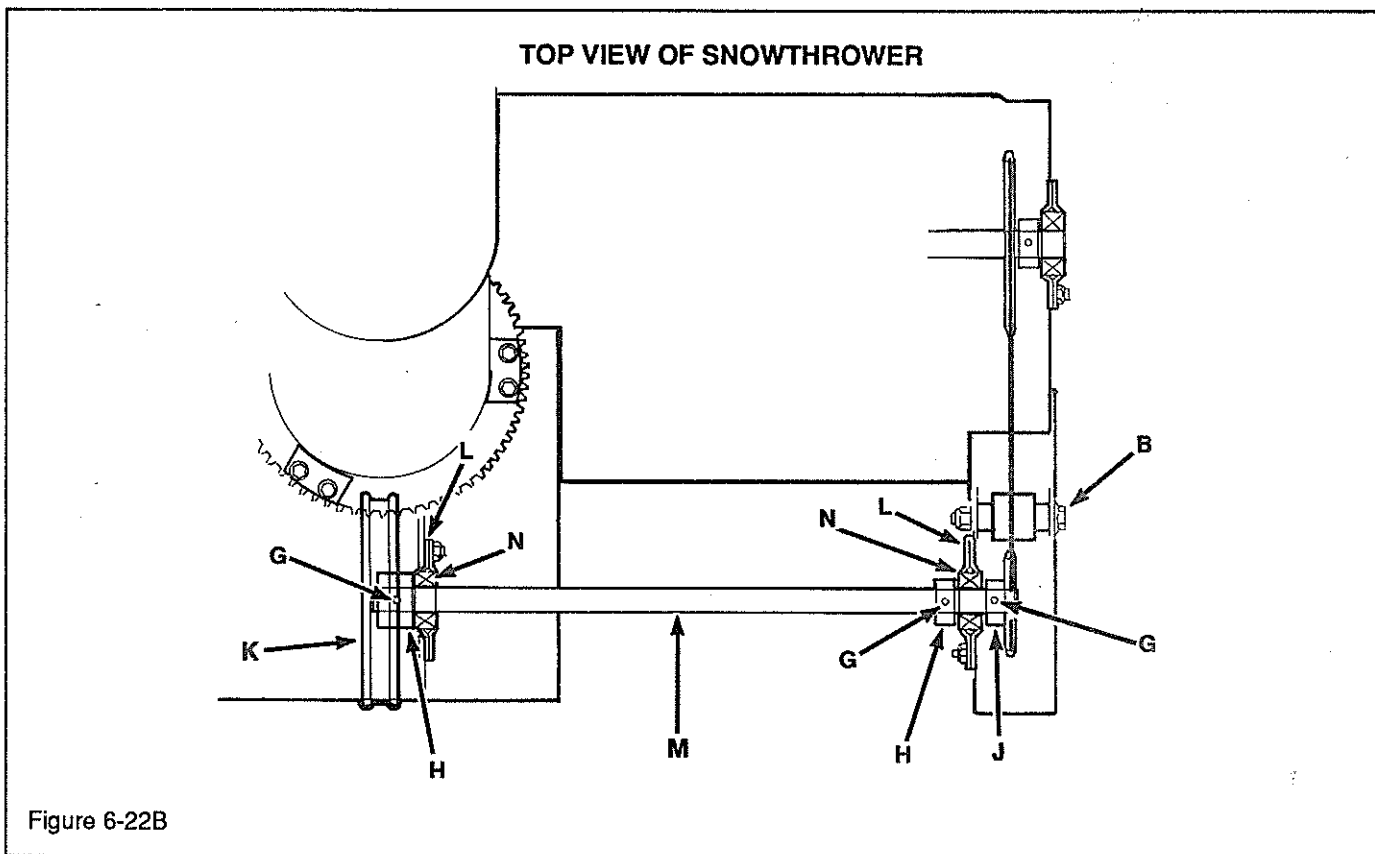
## SINGLE STAGE SNOWTHROWER (continued)



- c. Remove cover from sprocket housing.
- d. Remove set screw from locking collar (J, Figure 6-22A and 6-22B). (To unlock collar, see step 3b, Figure 6-22D.)
- e. Remove set screw from pulley (K). Remove pulley.
- f. Remove 4 cap screws and nuts from bearing flanges (L). Remove bearings (N) and bearing flanges.
- g. Remove rotor drive shaft (M).

### 4. REPLACEMENT OF ROTOR DRIVE SHAFT.

- a. Place rotor drive shaft (M) as illustrated in Figure 6-22A and 6-22B.
- b. Place bearings (N) and bearing flanges (L) as illustrated. Secure with capscrews and nuts.
- c. Replace pulley (K) and install set screws.



**SINGLE STAGE SNOWTHROWER (continued)**

- d. Place locking collar (J). Lock collar:

*To lock: Tighten locking collar by inserting a punch in the hole in the collar and striking the punch with a hammer. (See 6-22D.) The collar is an oval design. To tighten the collar, turn it in the direction of normal rotation.*

Replace and tighten set screw.

- e. Replace cover to sprocket housing. Place locking collars (H, Figure 6-22A and 6-22B). To lock collar, see step 4d, above.

**5. RE-INSTALLATION OF AUGER.**

- a. Place right side of auger assembly in auger housing. Replace chain.
- b. Install chain side locking collar (W, Figure 6-22C), bearing, bearing flange and hardware.
- c. Install non-chain side bearing (X), bearing flanges, and hardware. (continued on page 6-16).

**6. SECURING NYLON ROLLER (CHAIN TIGHTENER).**

Replace capscrew (B, Figure 6-21), lockwasher, flat washers, spacer and nuts as shown. **INSTALL**

THROUGH NYLON ROLLER. Do not tighten until auger locking collars are tightened.

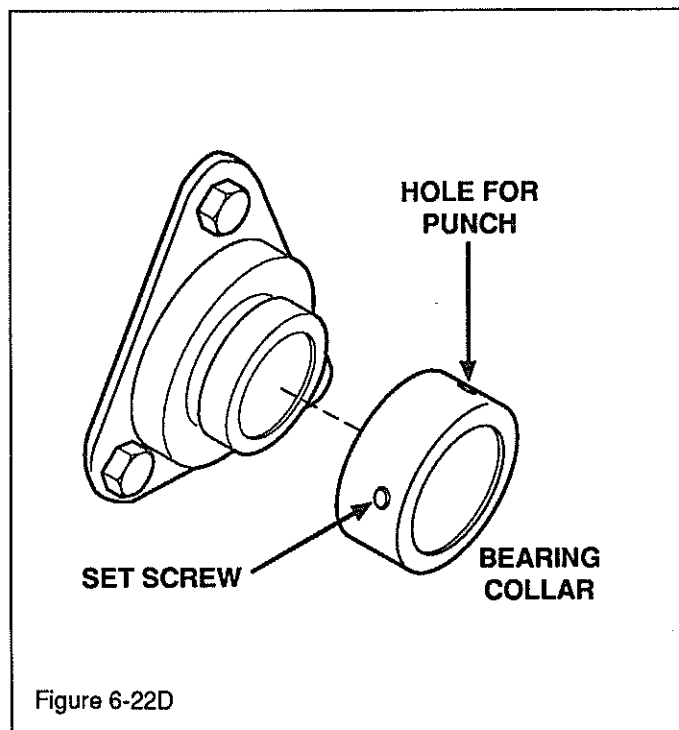
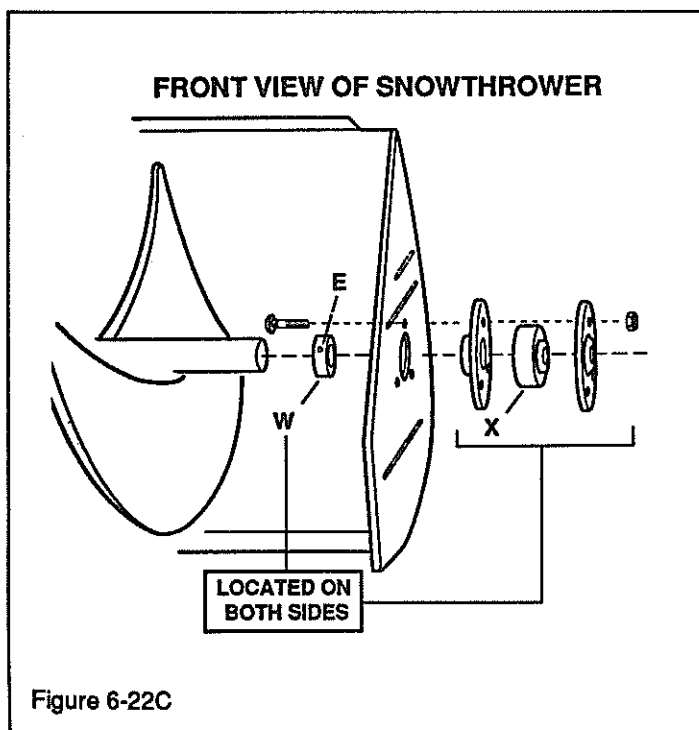
**7. LOCKING LOCKING COLLARS.**

To lock: Tighten locking collar by inserting a punch in the hole in the collar and striking the punch with a hammer. (See 6-22D.) The collar is an oval design. To tighten the collar, turn it in the direction of normal rotation.

**NOTE: The locking collar secures the position of the auger so drive chain is aligned between sprockets.**

**8. ADJUSTING CHAIN TENSION.**

Adjust nylon roller at screw (B, Figure 6-21). Adjust so chain deflects 1/4".



**POWER PACKER PLUS****POWER PACKER PLUS****1. BLOWER REMOVAL**

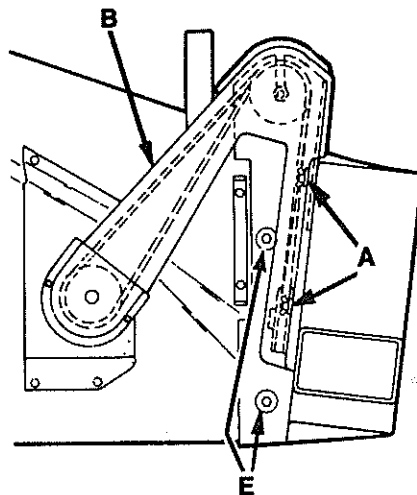
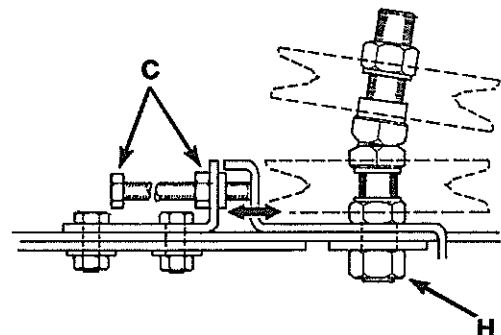
- a. Remove wing nuts and washers (A, Figure 6-23) securing belt guard (B) to blower housing. Remove the belt guard.
- b. Loosen belt adjuster by loosening hex nut (H) and jam nut on capscrew (C, Figure 6-24), and hex nut (H).
- c. Remove belt from pulleys.
- d. Unhook rubber latch (X, Figure 6-25) and remove chute assembly.
- e. Remove the 4 nuts (E) from blower housing (F) and support bracket (G). Blower housing should now be loose.
- d. Remove impeller shaft (J) by driving through either side of blower housing.
- e. Remove inner bearing flange (L) from blower housing.
- f. Remove impeller fan (M) by prying through opening of blower housing. Fan should be indexed with opening as shown. If necessary, apply heat (with a heat gun) at location (N) to make housing more pliable.

**WARNING!**

**WHEN USING A HEAT GUN OR ANY ELECTRICAL APPLIANCE, DO NOT STAND IN PUDDLES OR ON DAMP GROUND. ONLY USE AN ELECTRICAL CORD AND OUTLET WHICH IS PROPERLY GROUNDED. FOLLOW INSTRUCTIONS SPECIFIED BY THE APPLIANCE MANUFACTURER.**

**2. BLOWER DISASSEMBLY**

- a. Remove mounting frame (H, Figure 6-26) from blower housing (F).
- b. Remove pulley (I, Figure 6-26) and keys from impeller shaft (J).
- c. Remove bearing flanges and bearings (K) from blower housing (F).
- g. Remove outer bearing flange (O).

**Figure 6-23****Figure 6-24**

POWER PACKER PLUS (continued)

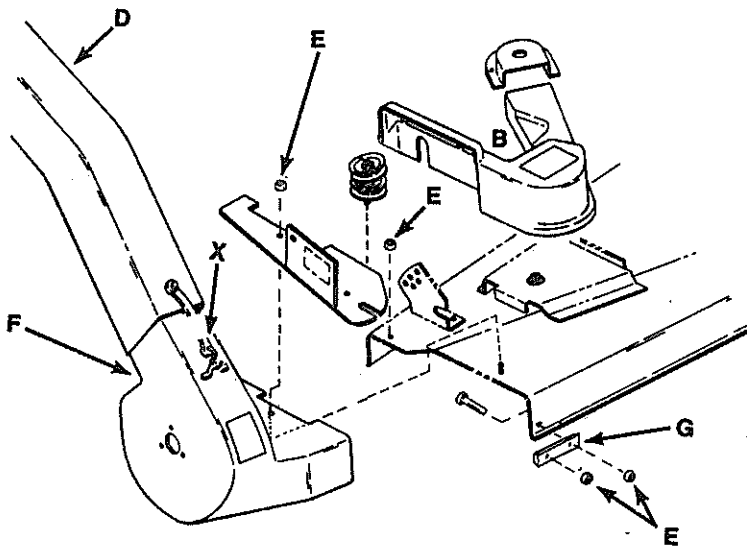


Figure 6-25

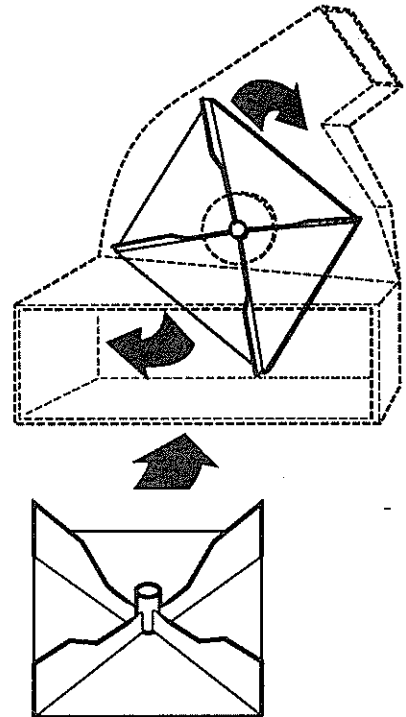


Figure 6-27

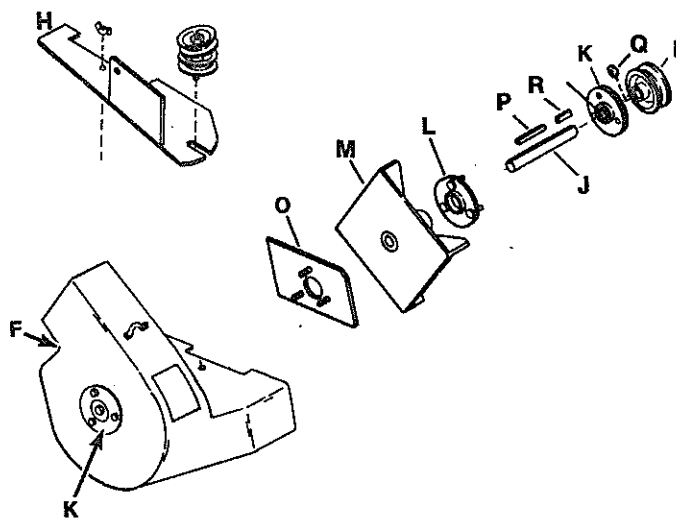


Figure 6-26

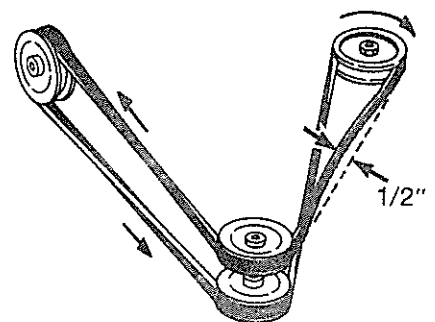


Figure 6-28



**POWER PACKER PLUS (continued)****3. BLOWER ASSEMBLY**

- a. Install outer bearing flange (O, Figure 6-26).
- b. Install impeller fan (M) through opening in blower housing.
- c. Install impeller shaft (J) through impeller fan. Install key (P).
- d. Install inner bearing flange (L).
- e. Install washers (Q) on impeller shaft.
- f. Install bearing flanges and bearings (L) to blower housing.
- g. Install key (R) onto exposed shaft. Install pulley (I).
- h. Install mounting frame assembly (H) onto blower housing.

**4. BLOWER RE-INSTALLATION**

- a. Re-install blower assembly (F, Figure 6-23) onto mower deck. Reverse step 5 in BLOWER REMOVAL.
- b. Re-install chute assembly (D).
- c. Install belt and adjust (Figure 6-25).
- d. Re-install belt guard (Figure 6-22).
- e. Perform a test run of the power-packer.

## GRASS REDUCTION SYSTEM (GRS)

### GRASS REDUCTION SYSTEM (GRS)



#### WARNING!

**BEFORE CLEANING, ADJUSTING OR DISASSEMBLY, TURN THE TRACTOR'S ENGINE OFF. REMOVE THE IGNITION KEY FROM THE KEYSWITCH. DISCONNECT THE SPARK PLUG WIRE AND KEEP IT FROM TOUCHING THE SPARK PLUG.**

These instructions cover models 14011, 14012, 34500 and 34501.

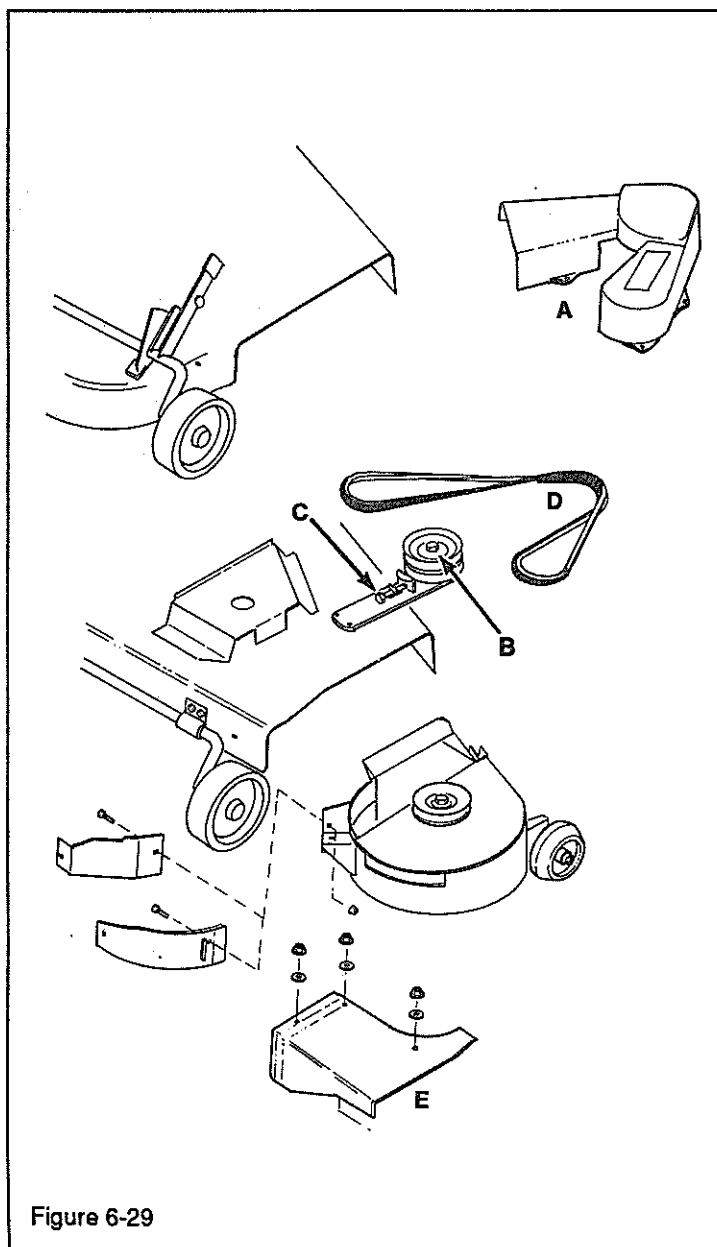


Figure 6-29

#### 1. GENERAL DISASSEMBLY (ALL MODELS)

- Remove mounting screws from belt cover (A, Figure 6-29). Remove belt cover.
- Loosen cap screw (B) located on dual idlers.
- Loosen adjustment bolt (C).
- Remove attachment belt (D) from drive sheave.
- Remove discharge deflector (E).
- Remove cap screw (F, Figure 6-30), lock washer, flat washer and drive sheave from shaft (G).
- Remove housing cover (H).
- Remove capscrew (I) and washers at the bottom of the shaft. Pull shaft from attachment. Keep track of installation hardware.
- Remove fan assembly (J) from housing.
- Remove blade assembly from housing.
- BLADE DISASSEMBLY: To disassemble the blade assembly, Remove screws (K, Figure 6-31) or (P, Figure 6-32) and adjoining lock washers and lock nuts.

#### 2. CLEANING

- Remove grass clumps from fan and blade assemblies, and from the top and bottom of housing assembly.
- Inspect fan assembly and blade assembly. Replace any worn or damaged parts.

## GRASS REDUCTION SYSTEM (GRS) (continued)

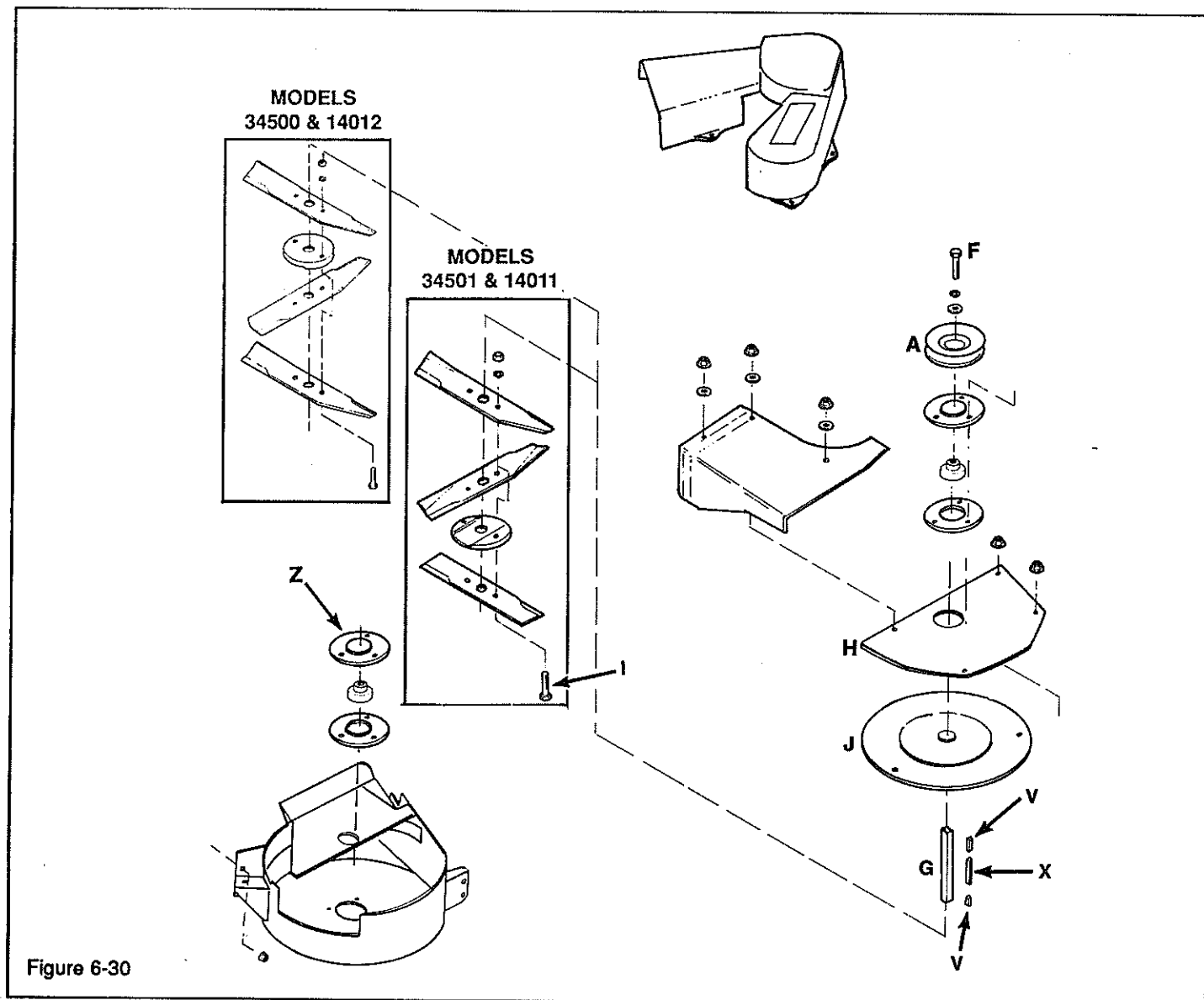


Figure 6-30

### 3. RE-ASSEMBLY

- a. **BLADE RE-ASSEMBLY:** If the blades must be reassembled, do as shown in Figure 6-31 OR Figure 6-29. Proper blade position is critical to performance and safety.

#### 1. BLADE ASSEMBLY FOR 36" DECKS (MODELS 34500 AND 14012), FIGURE 6-31:

All 3 blades are identical. **Assemble blades with the bent corners pointed upward.**

- a. Insert screws (K, Figure 6-31) upward through 1 of the blades (L).
- b. Place 2nd blade (M) in the notch of blade hub (N). Notch in blade hub must face down. Place blade (M) with blade hub (N) on blade (L). Insert screws (K) through blade hub.
- c. Place 3rd blade (O) on top of blade hub and secure with screws (K), lock washer and nut. Tighten hardware.

**GRASS REDUCTION SYSTEM (GRS) (continued)**

**2. BLADE ASSEMBLY FOR 42" AND 48" DECKS ONLY (MODELS 34501 AND 14011), FIGURE 6-32:**

2 of the 3 blades are lift blades. Position lift blades with bent corners facing up. **Place flat blade on bottom of blade assembly.** See Figure 6-29.

- Insert screws (P, Figure 6-32) upward through flat blade (Q). Position blade so it will cut when rotating counter-clockwise (with screws pointed up).
- Place blade hub (R) on flat blade (with notch up). Run screws (P) through blade hub.
- Place 2nd blade (S) in notch on blade hub.
- Place 3rd blade (T) over blade (S) and secure with screws (P), lock washer and nut. Tighten hardware.

**b. GENERAL RE-ASSEMBLY (ALL MODELS)**

- Insert blade shaft (G, Figure 6-33) into blade assembly. Align shaft keyway with blade hub's key slot.
- Insert short key (V) (3/16" x 11/32" ) into shaft keyway and hold key in the keyway. Slide shaft with key into the blade hub's key slot.

**NOTE: A small amount of grease may be help hold key in keyway.**

- Place fan assembly (J) on shaft (G), over blade assembly. Line up fan assembly's key slot with shaft keyway.
- Place long key (X) (3/16" x 2") into the shaft keyway. Slide shaft and key into fan assembly's key slot.
- Place whole assembly (including fan and blade assemblies) into the fan housing (J).
- Place lower end of shaft (G) into bearing (Z). Secure with capscrew (F), lock washer, and flat washer.
- Place housing cover (H) on fan housing assembly. Secure with flange lock nuts on front 2 studs on assembly.
- Place drive sheave (A) on shaft (G). Line up key slot with shaft keyway.
- Insert key (3/16" x 1") into drive sheave and shaft.
- Secure drive sheave (A) to shaft (G) with flat washer, lock washer and cap screw (F).
- Torque cap screws (F) and (K-36" decks or P-42/48" decks) to 14 ft. lbs.
- Re-install discharge deflector.
- Re-install belt.

**MODELS 34500 AND 14012**

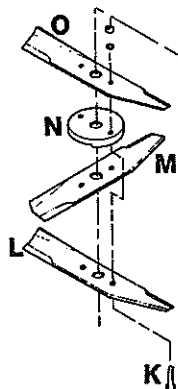


Figure 6-31

**MODELS 34501 AND 14011**

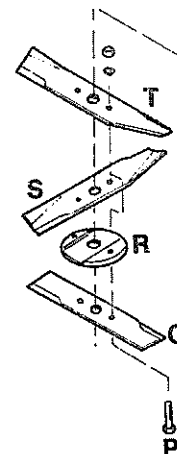
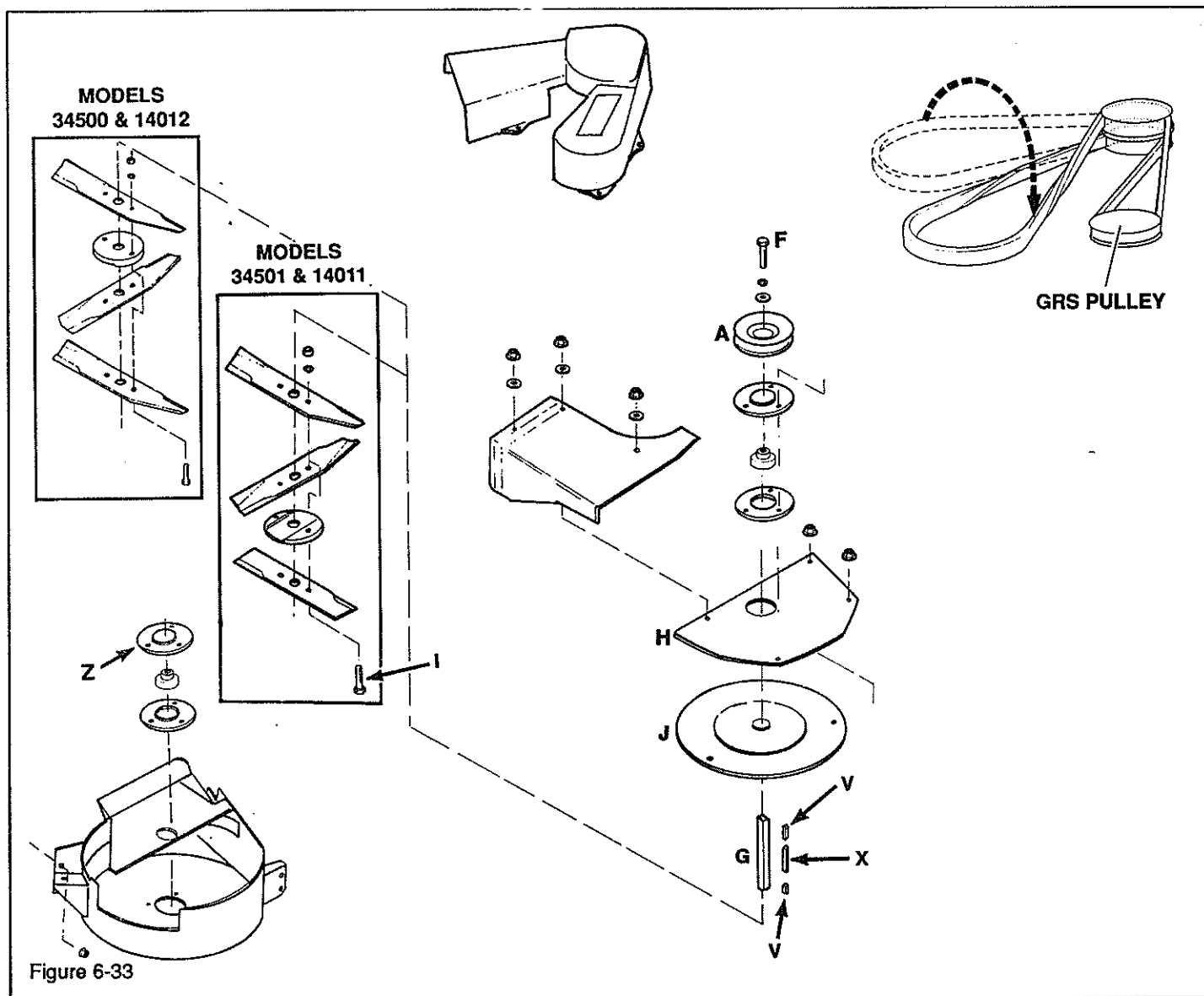


Figure 6-32

## GRASS REDUCTION SYSTEM (GRS) (continued)



### 4. INSTALL BELT

Route belt as shown in the inset, Figure 6-33.

To check for proper movement: Manually, Turn the mower decks right-hand pulley clockwise. The attachment drive sheave should turn counter clockwise.

Re-install belt cover.

### 5. CHECK AND ADJUST BELT TENSION

Belt should deflect 1/2" with modest pressure applied at center of either span.

To adjust:

- Loosen cap screw ( B, Figure 6-29) on top of dual idlers.
- Make adjustment at adjustment bolt (C).
- Re-tighten cap screw (B).

## KEY TO DIAGRAMS

The following chart is a guide to the electrical diagrams within section VII. Fold-out keys appear with complete wiring diagrams. These electrical diagrams will assist you in trouble-shooting the electrical system on the Suburban Tractor.

To use this chart:

1. Locate model and serial number of the tractor.
2. Choose desired diagram for the tractor.
3. Locate desired diagram on pages 7-3 through 7-20.

*Example: Suburban Tractor model 3010G, serial number 0100522 follows complete diagram 6A (diagram 6 with engine A), attachment PTO diagram A2, charge diagram C4, etc...*

MODEL	COMPLETE DIAGRAM	ATTACHMENT PTO	CHARGE	CRUISE	ELECT. LIFT	INTER- LOCK	LIGHT	START
3010G 0100101-0199999	6A	A2	C4			I 2 A B	L2	S3
3011G 0100101-0199999	1	A1	C1			I 1 A	L1 A B	S1
0200101-0299999	1	A1	C1			I 1 A	L1 A B	S1
0300101-0399999	2	A1	C2			I 1 A	L1 A B	S2
3011H 0100101-0199999	1	A1	C1			I 1 A	L1 A B	A1
3012G 0100101-0199999	4	A1	C2			I 1 A	L1 A B	S1
0200101-0299999	6B	A2	C4B			I 2 A B	L2	S2
3012H 0100101-0199999	4	A1	C2			I 1 A	L1 A B	S3
0200101-0299999	6B	A2	C4B			I 2 A B	L2	S2
3014H 0100101-0199999	5	A2	5		E1 A B	I 2 A	5	S3
3016G 0100101-0199999	3	A1	C3			I 1 A	L1 A B	S3
0200101-0299999	3	A1	C3			I 1 A	L1 A B	S1
0300101-0399999	4	A1	C2			I 1 A	L1 A B	S1
0400101-0499999	6B	A2	C4B			I 2 A B	L2	S2
3016H 0100101-0199999	3	A1	C3			I 1 A	L1 A B	S1
0200101-0299999	3	A1	C3			I 1 A	L1 A B	S1
0300101-0399999	4	A1	C2			I 1 A	L1 A B	S2
0400101-0499999	6B	A2	C4B			I 2 A B	L2	S3
3018G 0100101-0199999	6B	A2	C4B			I 2 A B	L2	S3
0200101-0299999	6B	A2	C4B			I 2 A B	L2	S3
3018H 0100101-0199999	6C	A2	C4C	CR2 A B	**	I 2 A B	L3	S3
0200101-0299999	6C	A2	C4C	CR2 A B	**	I 2 A B	L3	S3
3112G 0100101-0199999	6B	A2	C4B			I 2 A B	L2	S3
3114G 0100101-0199999	6B	A2	C4B			I 2 A B	L2	S3
0200101-0299999	6B	A2	C4B			I 2 A B	L2	S3
3114H 0100101-0199999	6B	A2	C4B			I 2 A B	L2	S3
0200101-0299999	6B	A2	C4B			I 2 A B	L2	S3
3118G 0100101-0199999	4	A1	C2			I 1 A	L1 A B	S2
0200101-0299999	6B	A2	C4B			I 2 A B	L2	S3

\* Optional equipment CR 2 A & B.

\*\* Optional electric lift E1 A & B.

\*\*\* Optional lift kit L2.

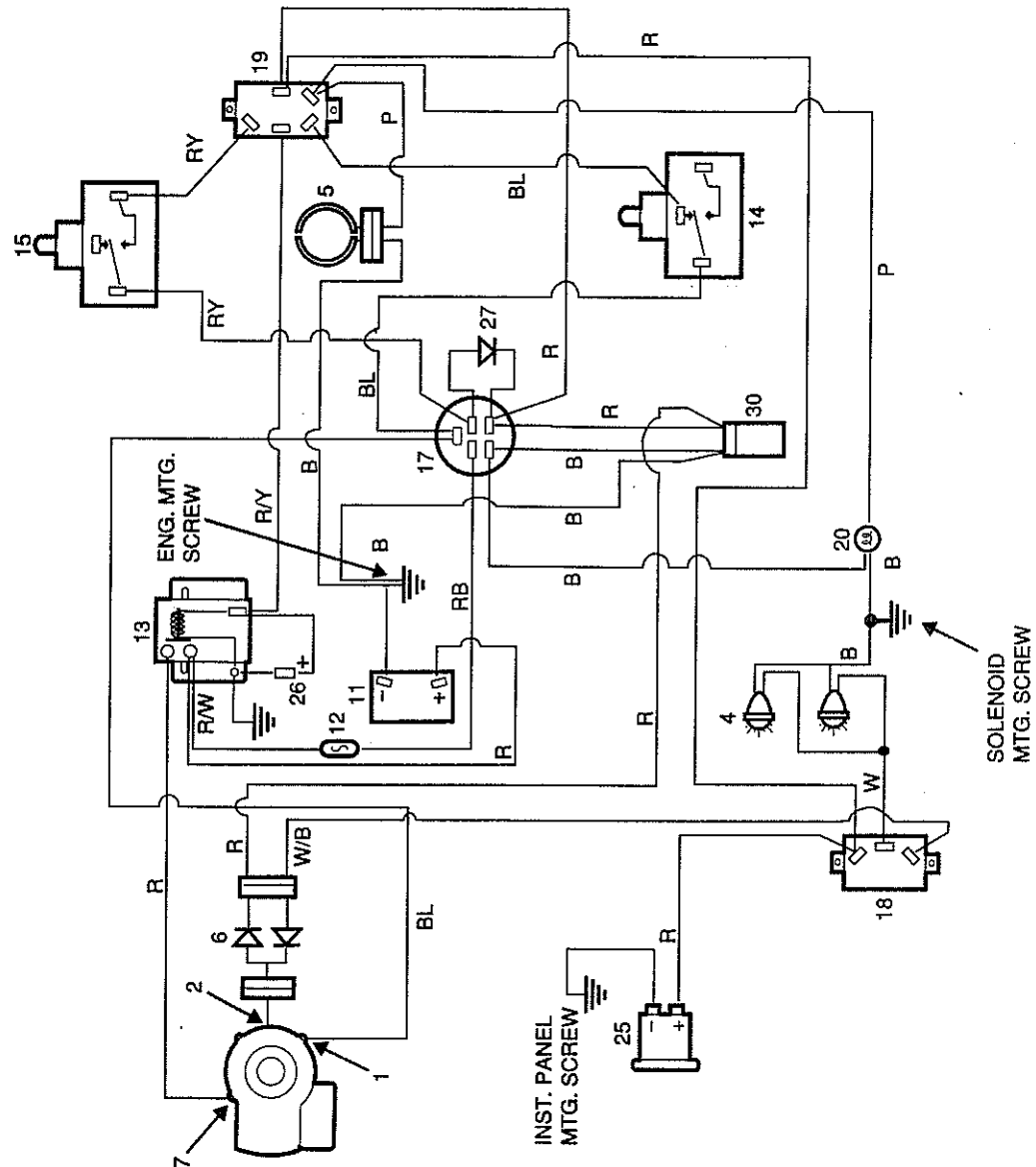
MODEL	COMPLETE DIAGRAM	ATTACHMENT PTO	CHARGE	CRUISE	ELECT. LIFT	INTER- LOCK	LIGHT	START
3211G 0100101-0199999	2	A1	C2			C2	L1 A B	S2
3212G 0100101-0199999	6A	A2	C4A			I 2 A B	***	S3
0200101-0299999	6A	A2	C4A			I 2 A B	***	S3
0300101-0399999	6A	A2	C4A			I 2 A B	***	S3
0400101-0499999	6B	A2	C4B			I 2 A B	L2	S3
3212H 0100101-0199999	6A	A2	C4A			I 2 A B	***	S3
0200101-0299999	6A	A2	C4A			I 2 A B	***	S3
0300101-0399999	6B	A2	C4B			I 2 A B	***	S3
0400101-0499999	6B	A2	C4B			I 2 A B	***	S3
3214G 0100101-0199999	6C	A2	C4C		**	I 2 A B	L3	S3
3214H 0100101-0199999	6C	A2	C4C	CR2 A B	**	I 2 A B	L3	S3
0200101-0299999	6C	A2	C4C	CR2 A B	**	I 2 A B	L3	S3
0300101-0399999	6C	A2	C4C	CR2 A B	**	I 2 A B	L3	S3
3216H 0100101-0199999	6C	A2	C4C	CR2 A B	**	I 2 A B	L3	S3
0200101-0299999	6C	A2	C4C	CR2 A B	**	I 2 A B	L3	S3
0300101-0399999	6C	A2	C4C	CR2 A B	**	I 2 A B	L2	S3
13011 0100101-0199999	6B	A2	C4B			I 2 A B	L2	S3
13013 0100101-0199999	6B	A2	C4B			I 2 A B	***	S3
13014 0100101-0199999	6C	A2	C4C	CR2 A B	**	I 2 A B	L3	S3
0200101-0299999	6C	A2	C4C	CR2 A B	**	I 2 A B	L3	S3
13015 0100101-0199999	6C	A2	C4C	CR2 A B	**	I 2 A B	L3	S3
0200101-0299999	6C	A2	C4C	CR2 A B	**	I 2 A B	L3	S3
13016 0100101-0199999	6C	A2	C4C	CR2 A B	**	I 2 A B	L3	S3
0200101-0299999	6C	A2	C4C	CR2 A B	**	I 2 A B	L3	S3
13017 0100101-0199999	6C	A2	C4C		**	I 2 A B	L3	S3
0200101-0299999	6C	A2	C4C		**	I 2 A B	L3	S3
13023 0100101-0199999	6D	A2	C4D		**	I 2 A B	L3	S3
0200101-0299999	6D	A2	C4D		**	I 2 A B	L3	S3
13024 0100101-0199999	6D	A2	C4D		**	I 2 A B	L3	S3
0200101-0299999	6D	A2	C4D		**	I 2 A B	L3	S3
13025 0100101-0199999	6D	A2	C4D		**	I 2 A B	L3	S3
0200101-0299999	6D	A2	C4D		**	I 2 A B	L3	S3
13026 0100101-0199999	6D	A2	C4D		**	I 2 A B	L3	S3
13027 0100101-0199999	6D	A2	C4D	CR2 A B	**	I 2 A B	L3	S3
0200101-0299999	6D	A2	C4D	CR2 A B	**	I 2 A B	L3	S3
0300101-0399999	6D	A2	C4D	CR2 A B	**	I 2 A B	L3	S3
13028 0100101-0199999	6D	A2	C4D	CR2 A B	**	I 2 A B	L3	S3
0200101-0299999	6D	A2	C4D	CR2 A B	**	I 2 A B	L3	S3
13051 0100101-0199999	6B	A2	C4B			I 2 A B	L2	S3
13052 0100101-0199999	6B	A2	C4B			I 2 A B	***	S3

\* Optional equipment CR 2 A & B.

\*\* Optional electric lift E1 A & B.

\*\*\* Optional lift kit L2.

## WIRING DIAGRAM 1



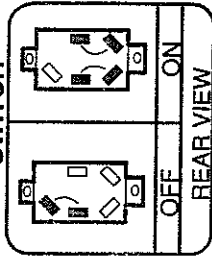


# WIRING DIAGRAM 1

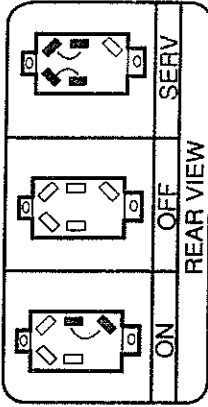
WIRE COLOR CODE	
B	Black
BL	Blue
O	Orange
P	Purple
R	Red
W	White
Y	Yellow
GN	Green
BR	Brown
GR	Gray
R/W	Red/White
R/B	Red/Black
R/Y	Red/Yellow
W/B	White/Black

ITEM CODE	
1	Magneto
2	Alternator
3	Fuel Solenoid
4	Headlights
5	Attachment Clutch
6	Diode Assembly
7	Starter
10	Connector
11	Battery
12	Fuse
13	Start Solenoid
14	Seat Switch
15	Brake Switch
16	Headlight Indicator
17	Key Switch
18	Light Switch
19	Attachment Switch
20	Attachment Light
21	Start Light
22	Voltage Sensor
23	Voltage Sensor Light
24	Ammeter
25	Hourmeter (Optional)
26	Capacitor
27	Diode
29	Accessory Socket
30	Accessory Plug
31	Cruise Light
32	Cruise Switch
33	Cruise Relay
34	Cruise/Brake Switch
35	Cruise Magnet
38	Electric Lift Switch
39	Electric Lift Motor
40	Hydrostatic Temp. Sensor
41	Hydrostatic Temp. Light
42	Engine Oil Sensor
43	Engine Oil Light
44	Tachometer

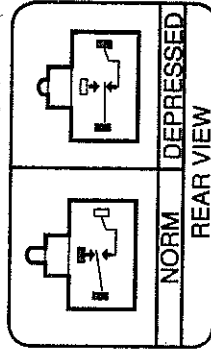
ATTACHMENT DRIVE SWITCH



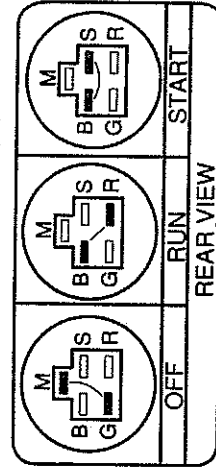
LIGHT SWITCH



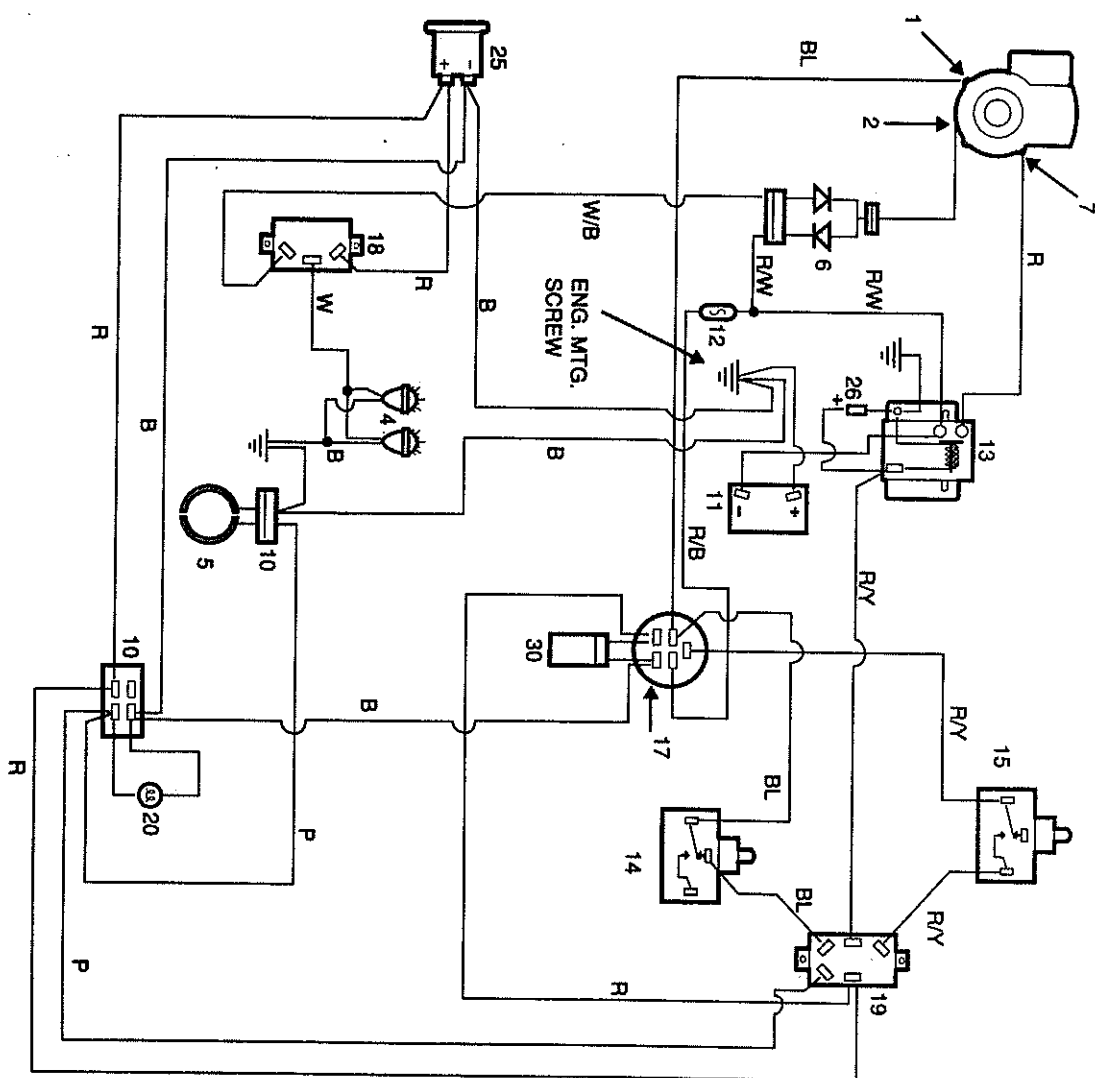
BRAKE SEAT SWITCH



IGNITION SWITCH



WIRING DIAGRAM 2

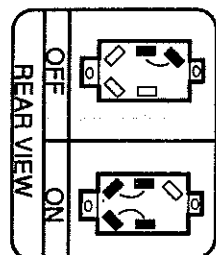


# WIRING DIAGRAM 2

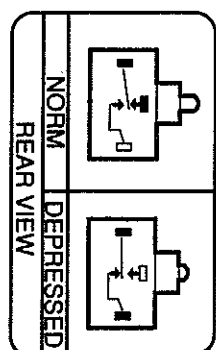
ITEM CODE	
1	Magneto
2	Alternator
3	Fuel Solenoid
4	Headlights
5	Attachment Clutch
6	Diode Assembly
7	Starter
10	Connector
11	Battery
12	Fuse
13	Start Solenoid
14	Seat Switch
15	Brake Switch
16	Headlight Indicator
17	Key Switch
18	Light Switch
19	Attachment Switch
20	Attachment Light
21	Start Light
22	Voltage Sensor
23	Voltage Sensor Light
24	Ammeter
25	Hourmeter (Optional)
26	Capacitor
27	Diode
29	Accessory Socket
30	Accessory Plug
31	Cruise Light
32	Cruise Switch
33	Cruise Relay
34	Cruise/Brake Switch
35	Cruise Magnet
38	Electric Lift Switch
39	Electric Lift Motor
40	Hydrostatic Temp. Sensor
41	Hydrostatic Temp. Light
42	Engine Oil Sensor
43	Engine Oil Light
44	Tachometer

WIRE COLOR CODE	
B	Black
BL	Blue
O	Orange
P	Purple
R	Red
W	White
Y	Yellow
GN	Green
BR	Brown
GR	Gray
R/W	Red/White
R/B	Red/Black
R/Y	Red/Yellow
W/B	White/Black

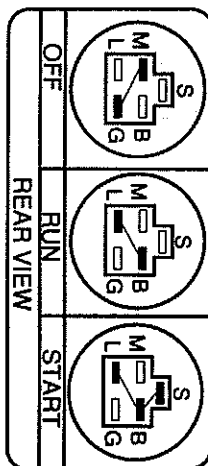
**ATTACHMENT DRIVE SWITCH**



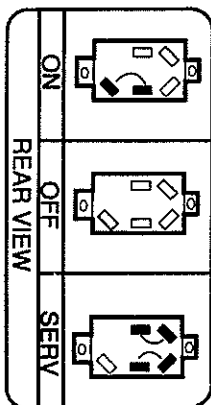
**BRAKE SWITCH SEAT SWITCH**



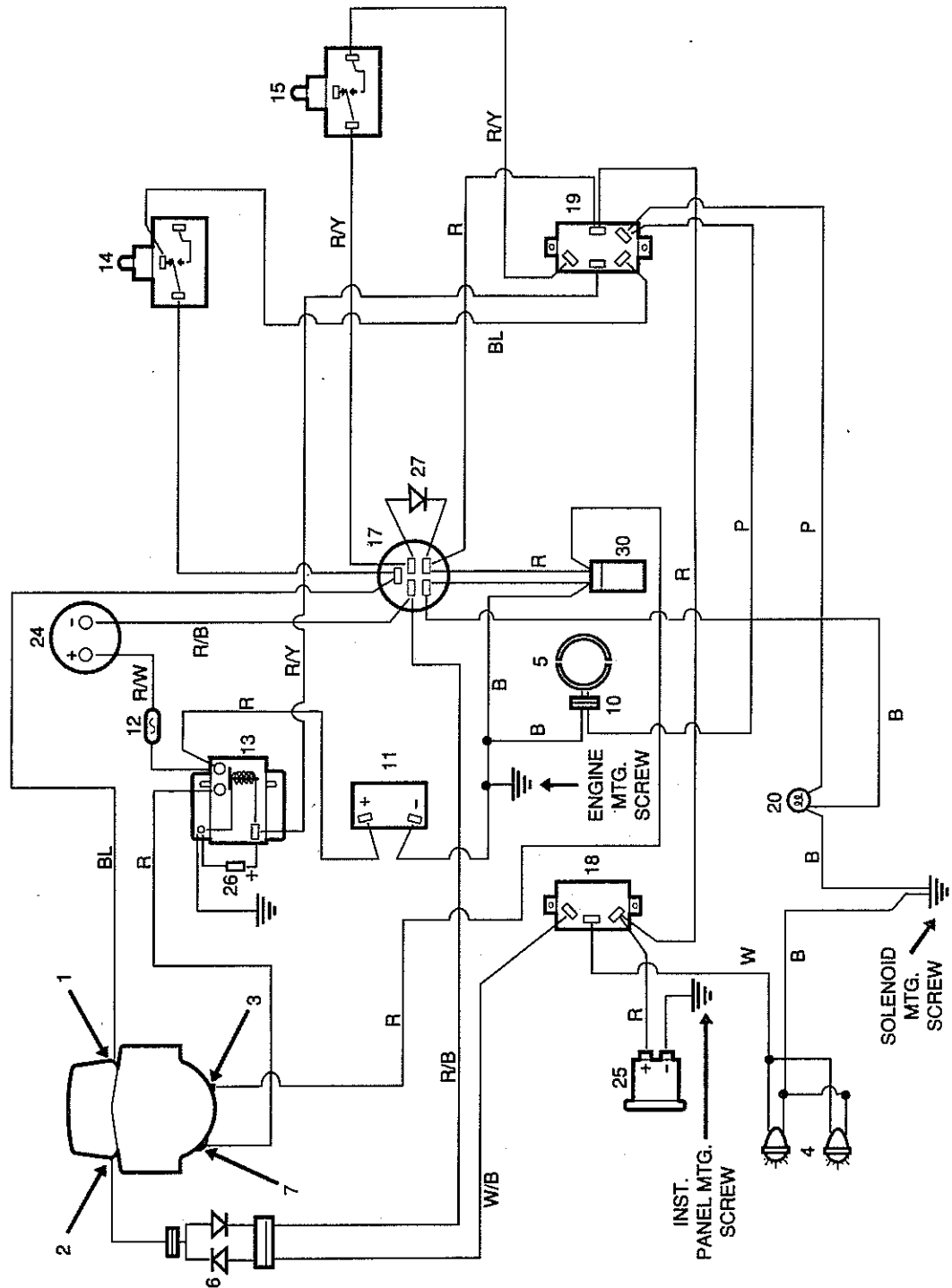
**IGNITION SWITCH**



**LIGHT SWITCH**



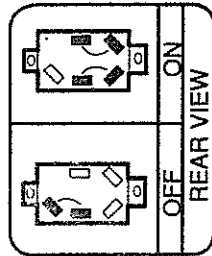
## WIRING DIAGRAM 3



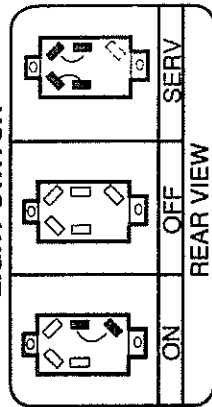
WIRE COLOR CODE	
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BL	Blue
O	Orange
P	Purple
R	Red
W	White
Y	Yellow
GN	Green
BR	Brown
GR	Gray
R/W	Red/White
R/B	Red/Black
R/Y	Red/Yellow
W/B	White/Black

ITEM CODE	
1	Magneto
2	Alternator
3	Fuel Solenoid
4	Headlights
5	Attachment Clutch
6	Diode Assembly
7	Starter
10	Connector
11	Battery
12	Fuse
13	Start Solenoid
14	Seat Switch
15	Brake Switch
16	Headlight Indicator
17	Key Switch
18	Light Switch
19	Attachment Switch
20	Attachment Light
21	Start Light
22	Voltage Sensor
23	Voltage Sensor Light
24	Ammeter
25	Hourmeter (Optional)
26	Capacitor
27	Diode
29	Accessory Socket
30	Accessory Plug
31	Cruise Light
32	Cruise Switch
33	Cruise Relay
34	Cruise/Brake Switch
35	Cruise Magnet
38	Electric Lift Switch
39	Electric Lift Motor
40	Hydrostatic Temp. Sensor
41	Hydrostatic Temp. Light
42	Engine Oil Sensor
43	Engine Oil Light
44	Tachometer

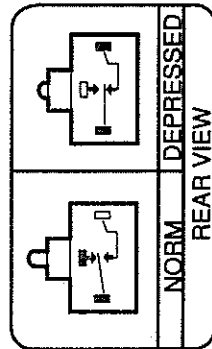
## ATTACHMENT DRIVE SWITCH



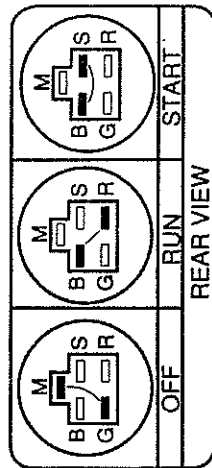
## LIGHT SWITCH



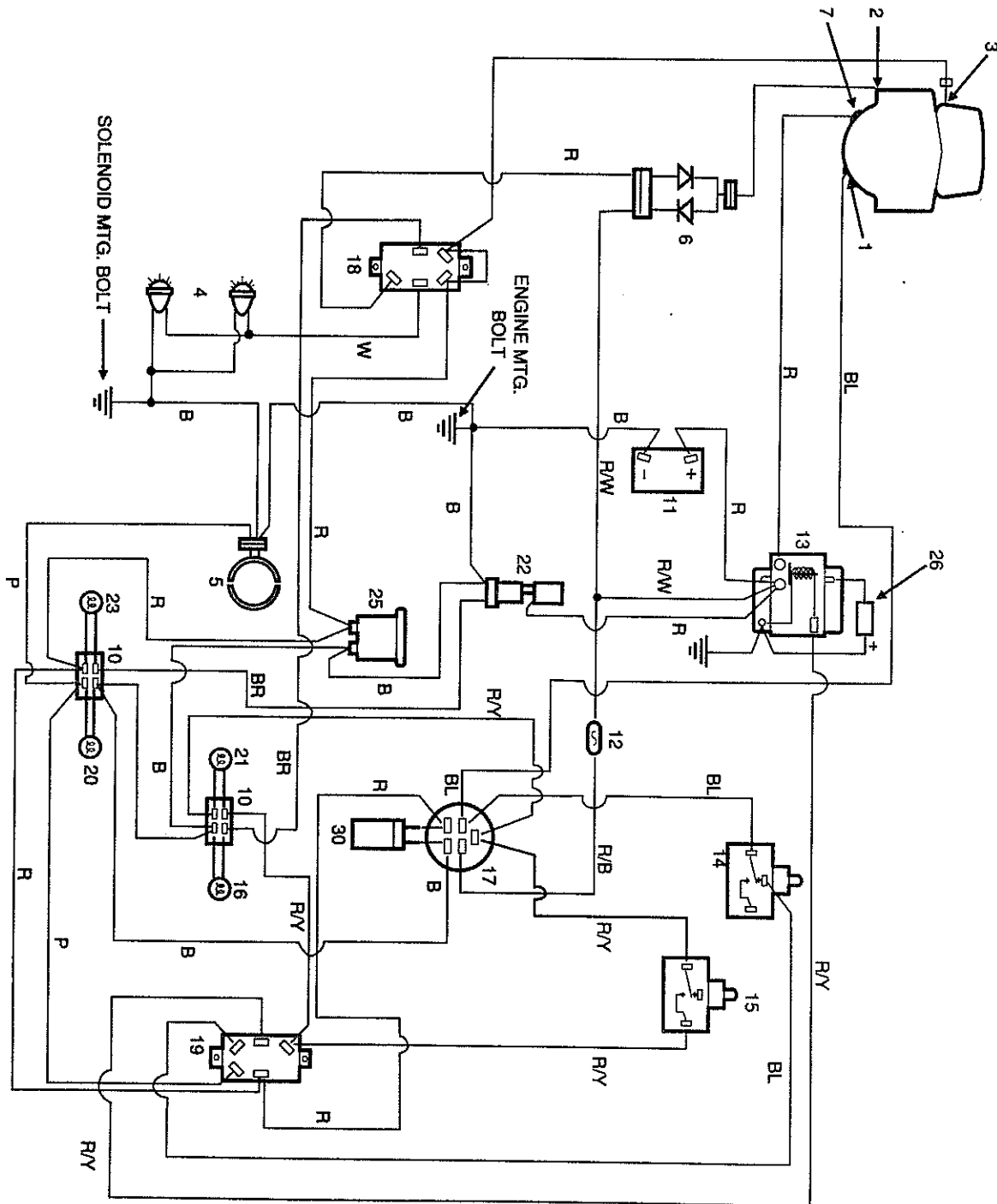
## BRAKE SWITCH SEAT SWITCH



## IGNITION SWITCH



WIRING DIAGRAM 4

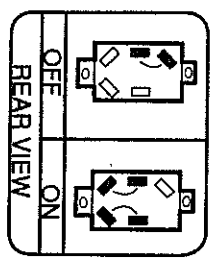


# Wiring 4

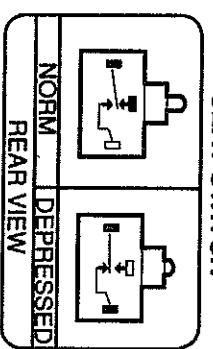
ITEM CODE	
1	Magneto
2	Alternator
3	Fuel Solenoid
4	Headlights
5	Attachment Clutch
6	Diode Assembly
7	Starter
10	Connector
11	Battery
12	Fuse
13	Start Solenoid
14	Seat Switch
15	Brake Switch
16	Headlight Indicator
17	Key Switch
18	Light Switch
19	Attachment Switch
20	Attachment Light
21	Start Light
22	Voltage Sensor
23	Voltage Sensor Light
24	Ammeter
25	Hourmeter (Optional)
26	Capacitor
27	Diode
29	Accessory Socket
30	Accessory Plug
31	Cruise Light
32	Cruise Switch
33	Cruise Relay
34	Cruise/Brake Switch
35	Cruise Magnet
38	Electric Lift Switch
39	Electric Lift Motor
40	Hydrostatic Temp. Sensor
41	Hydrostatic Temp. Light
42	Engine Oil Sensor
43	Engine Oil Light
44	Tachometer

WIRE COLOR CODE	
B	Black
BL	Blue
O	Orange
P	Purple
R	Red
W	White
Y	Yellow
GN	Green
BR	Brown
GR	Gray
R/W	Red/White
R/B	Red/Black
R/Y	Red/Yellow
W/B	White/Black

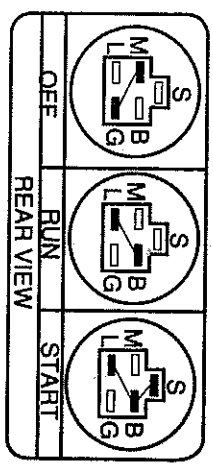
## ATTACHMENT DRIVE SWITCH



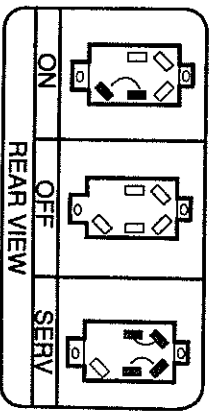
## BRAKE SWITCH SEAT SWITCH



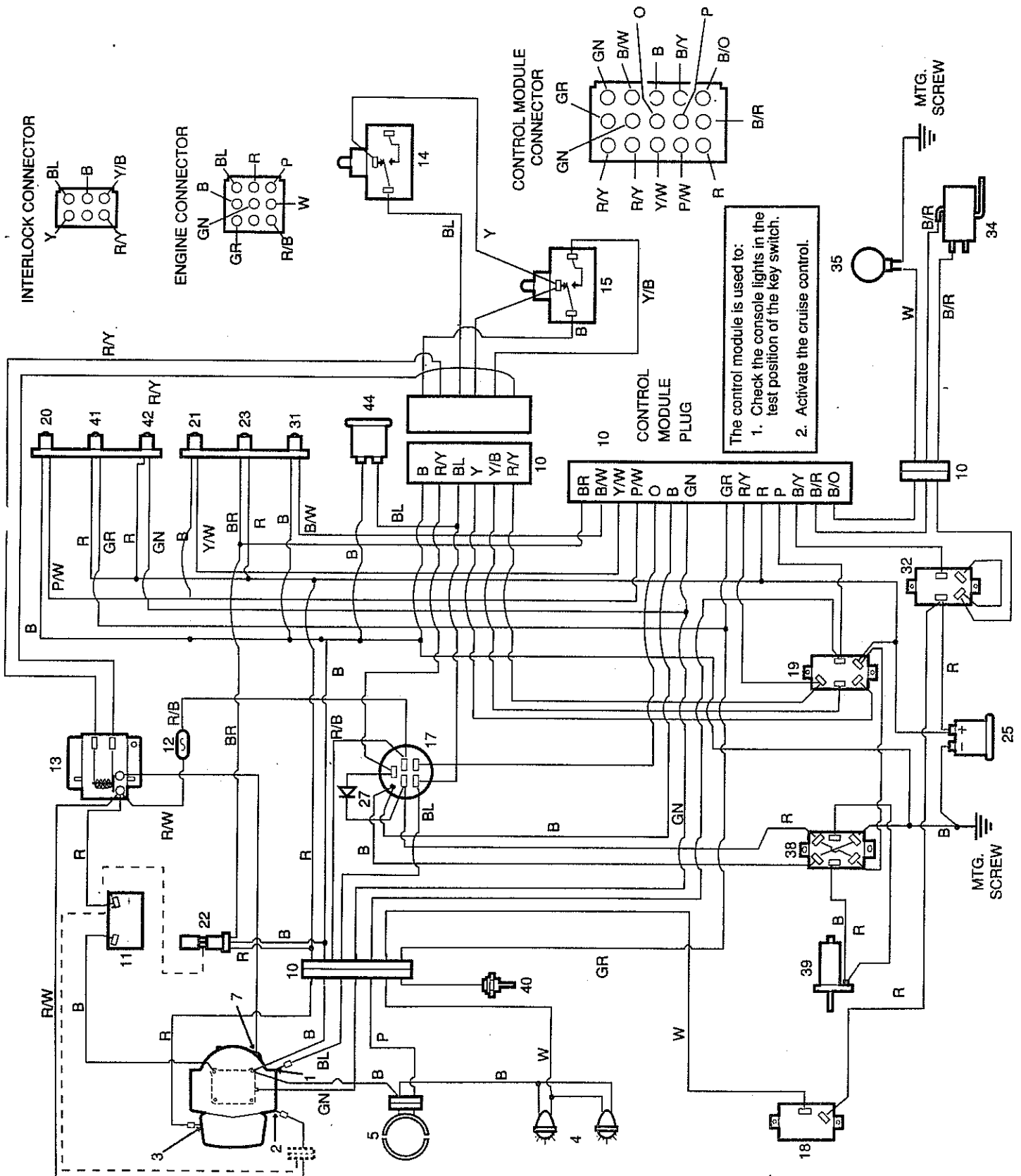
## IGNITION SWITCH



## LIGHT SWITCH



## WIRING DIAGRAM 5



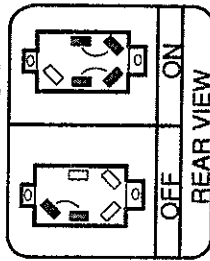


# WIRING 5

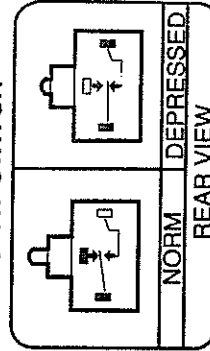
ITEM CODE	
1	Magneto
2	Alternator
3	Fuel Solenoid
4	Headlights
5	Attachment Clutch
6	Diode Assembly
7	Starter
10	Connector
11	Battery
12	Fuse
13	Start Solenoid
14	Seat Switch
15	Brake Switch
16	Headlight Indicator
17	Key Switch
18	Light Switch
19	Attachment Switch
20	Attachment Light
21	Start Light
22	Voltage Sensor
23	Voltage Sensor Light
24	Ammeter
25	Hourmeter (Optional)
26	Capacitor
27	Diode
29	Accessory Socket
30	Accessory Plug
31	Cruise Light
32	Cruise Switch
33	Cruise Relay
34	Cruise/Brake Switch
35	Cruise Magnet
38	Electric Lift Switch
39	Electric Lift Motor
40	Hydrostatic Temp. Sensor
41	Hydrostatic Temp. Light
42	Engine Oil Sensor
43	Engine Oil Light
44	Tachometer

WIRE COLOR CODE	
B	Black
BL	Blue
O	Orange
P	Purple
R	Red
W	White
Y	Yellow
GN	Green
BR	Brown
GR	Gray
R/W	Red/White
R/B	Red/Black
R/Y	Red/Yellow
W/B	White/Black

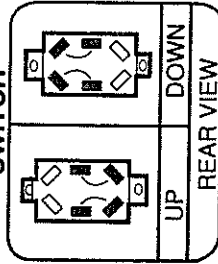
ATTACHMENT DRIVE SWITCH



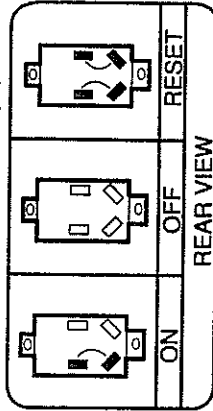
BRAKE SWITCH SEAT SWITCH



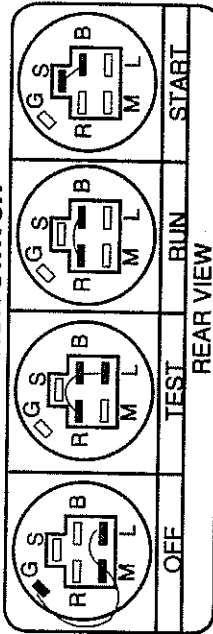
ELECTRIC LIFT SWITCH



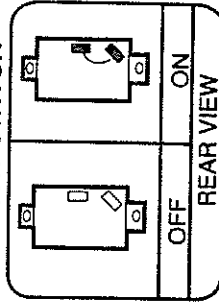
CRUISE SWITCH



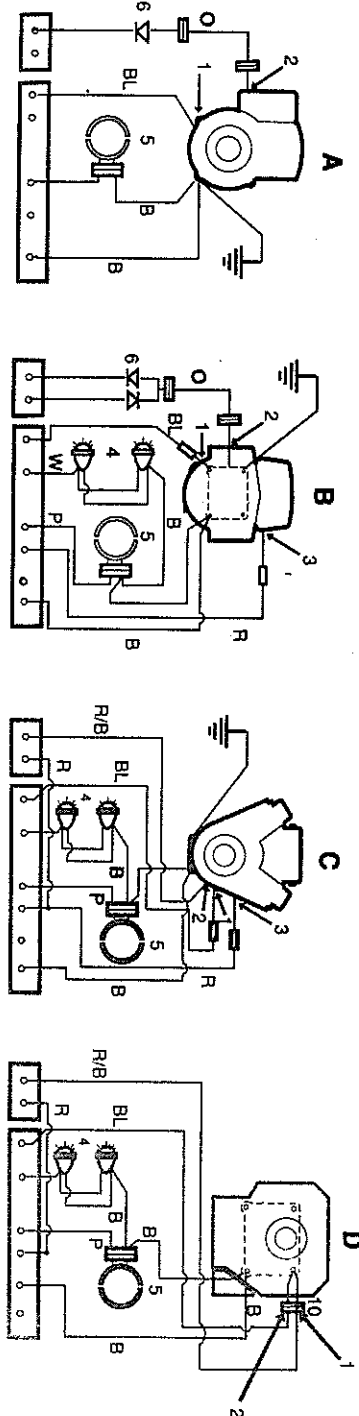
IGNITION SWITCH



LIGHT SWITCH

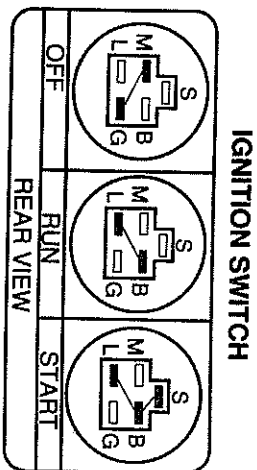
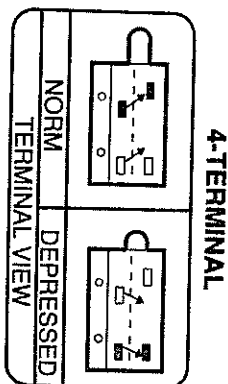
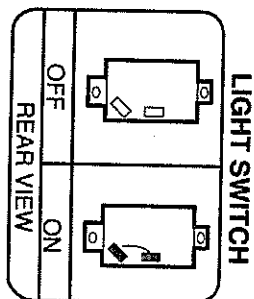


## WIRING DIAGRAM 6



## INTERLOCK CONNECTOR

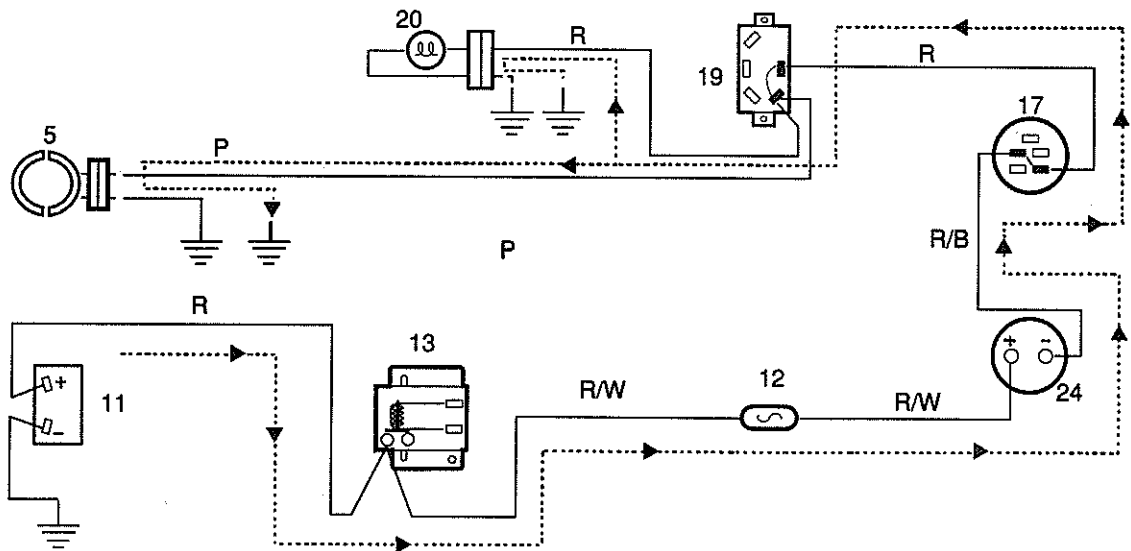
WIRE COLOR CODE	
B	Black
BL	Blue
O	Orange
P	Purple
R	Red
W	White
Y	Yellow
GN	Green
BR	Brown
GR	Gray
RW	Red/White
R/B	Red/Black
R/Y	Red/Yellow
W/B	White/Black



## A1 AND A2 (ATTACHMENT DRIVE CIRCUIT)

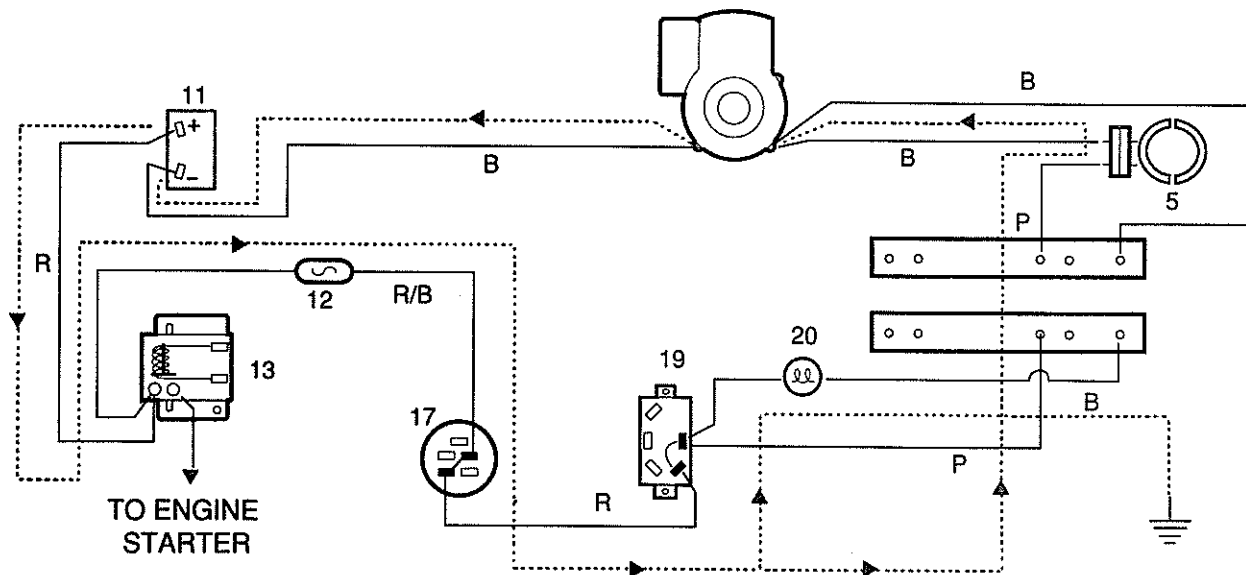
### A1: ATTACHMENT DRIVE CIRCUIT

(Ignition switch in 'RUN' position and attachment switch in 'ON' position.)



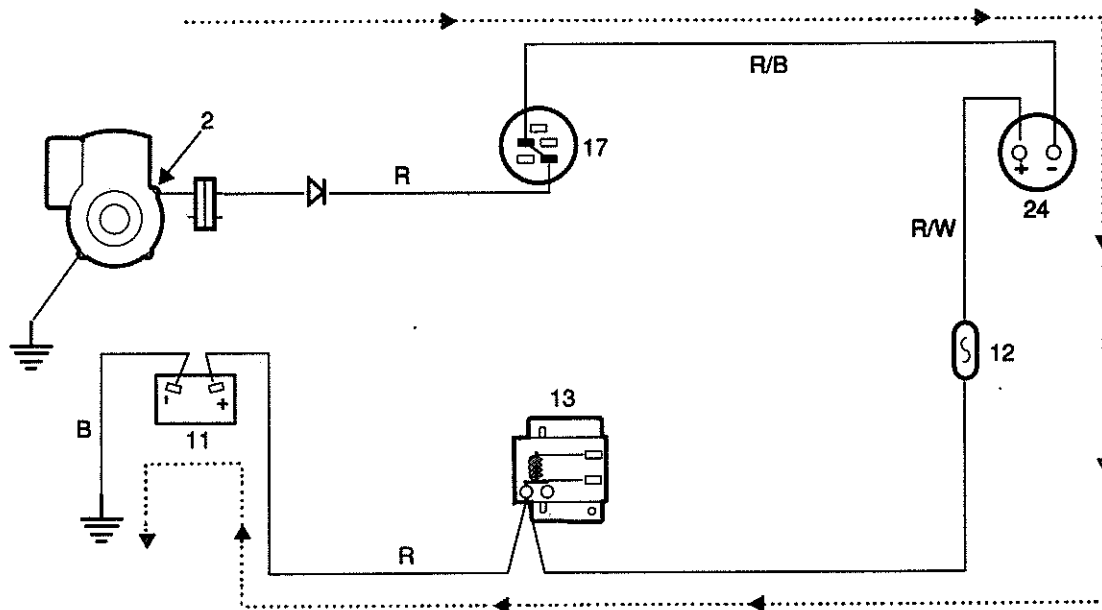
### A2: ATTACHMENT DRIVE CIRCUIT

(Ignition switch in 'RUN' position and attachment switch in 'ON' position.)

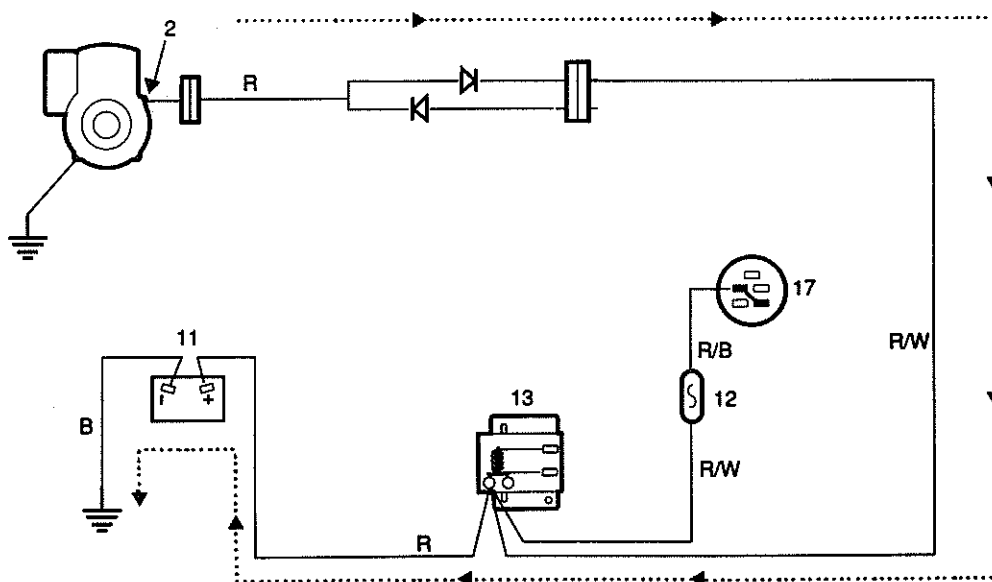


C1 AND C2 (CHARGING CIRCUIT)

C1: CHARGING CIRCUIT

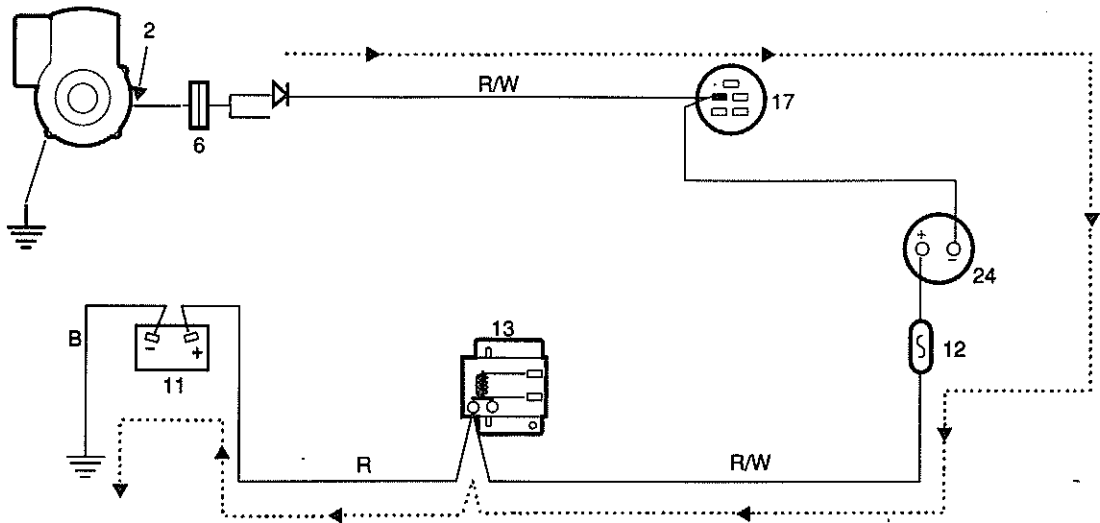


C2: CHARGING CIRCUIT

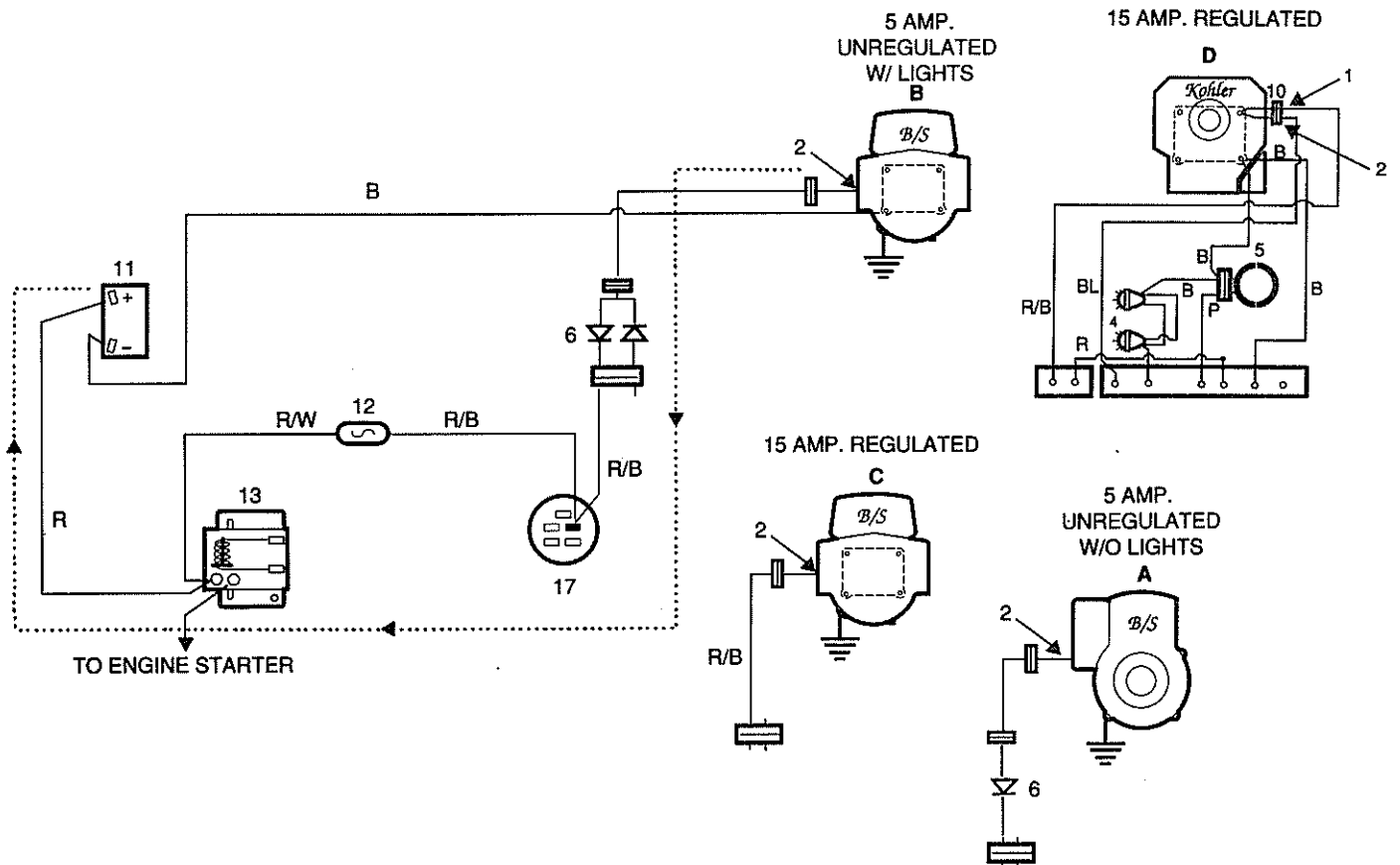


## C3 AND C4 (CHARGING CIRCUIT)

### C3: CHARGING CIRCUIT

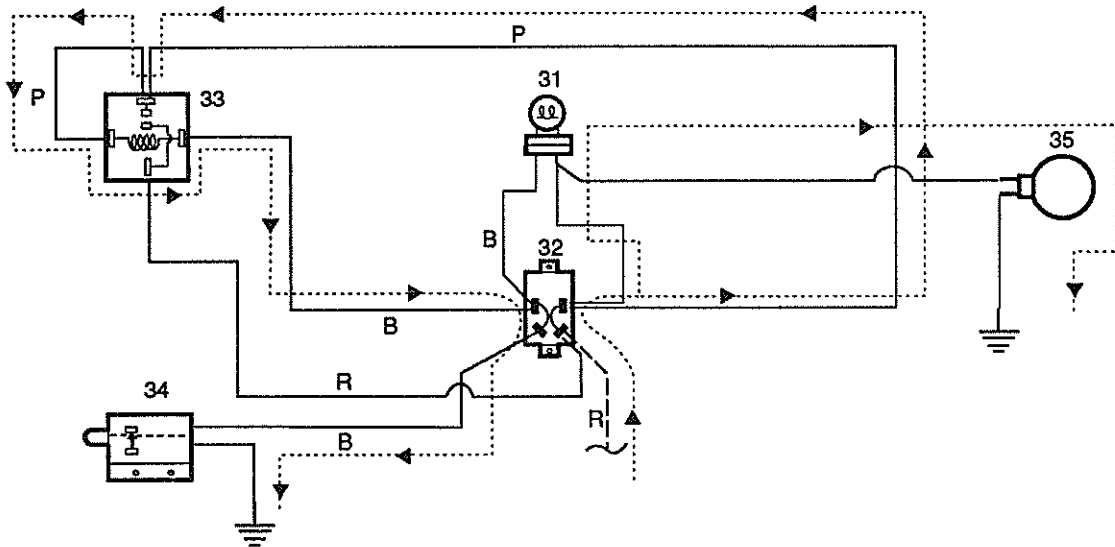


### C4: CHARGING CIRCUIT

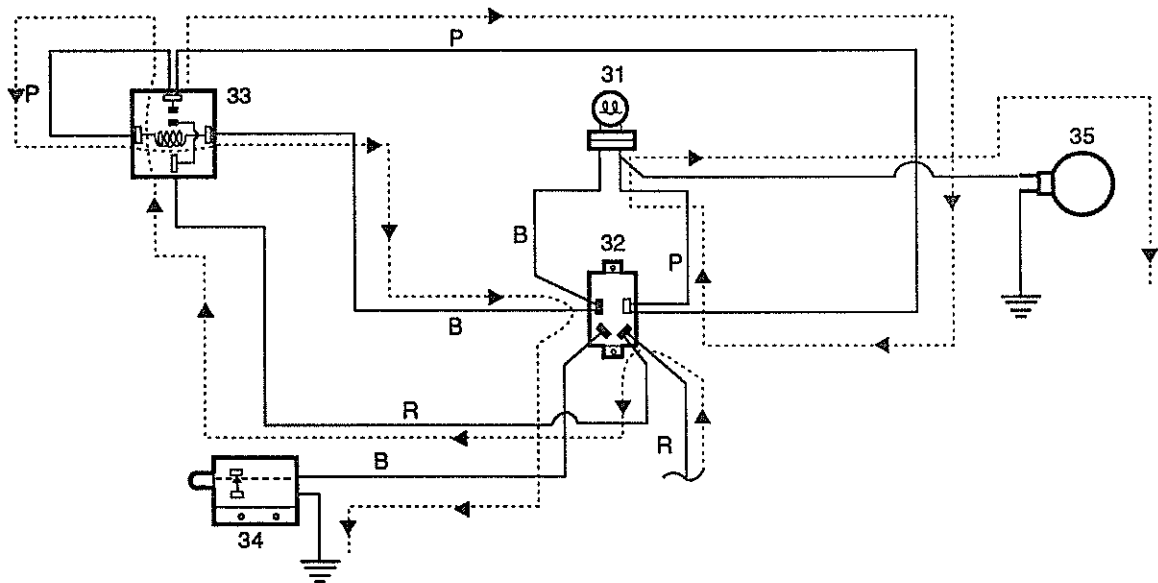


CR1 (CRUISE CIRCUIT)

CR1: CRUISE CIRCUIT DIAGRAM  
(RELAY CIRCUIT WITH SWITCH IN 'RESET' POSITION)

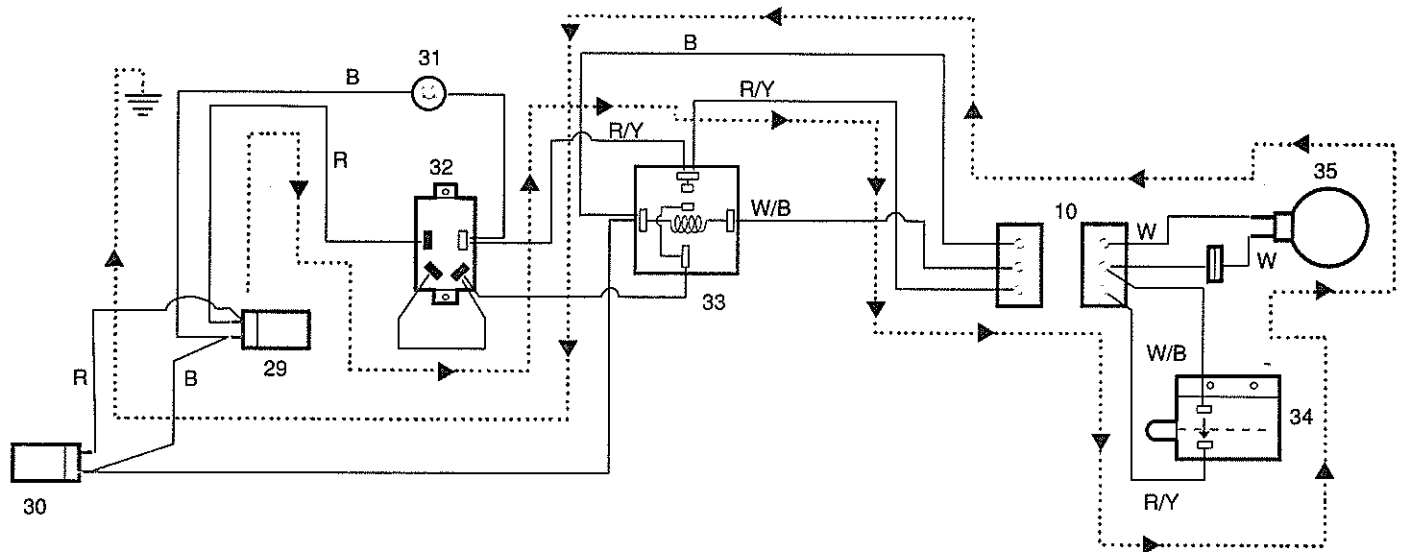


CR1: CRUISE CIRCUIT DIAGRAM  
(RELAY CIRCUIT WITH SWITCH IN 'ON' POSITION) (AFTER RESET)

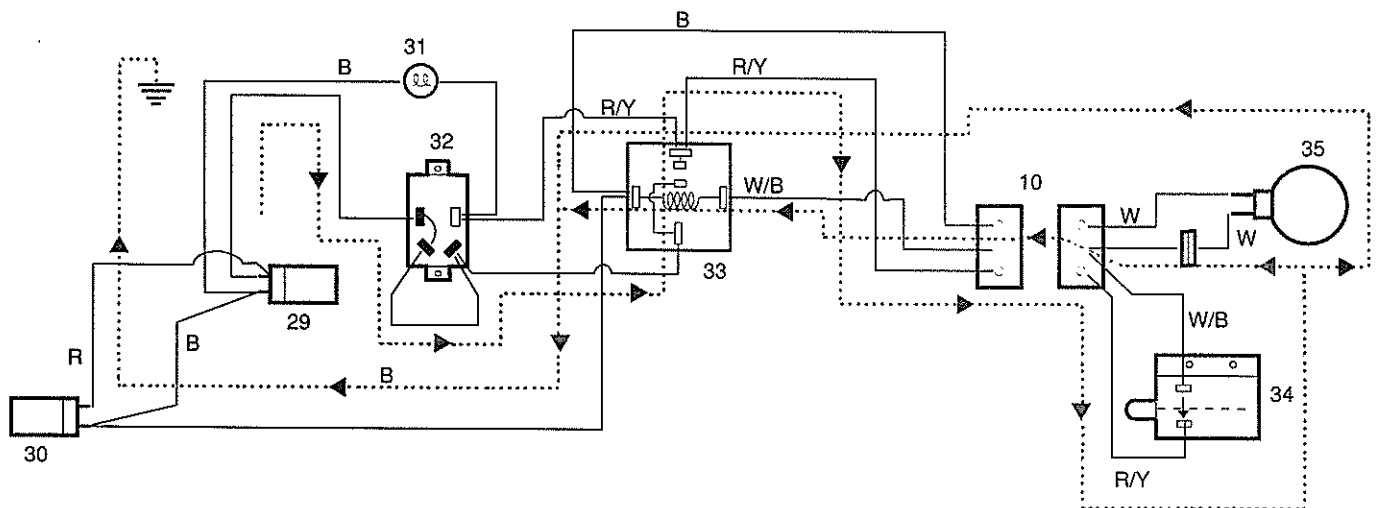


## CR2 (CRUISE CIRCUIT)

**CRUISE CIRCUIT DIAGRAM: CR2 (A)**  
**(RELAY CIRCUIT WITH SWITCH IN 'RESET' POSITION)**



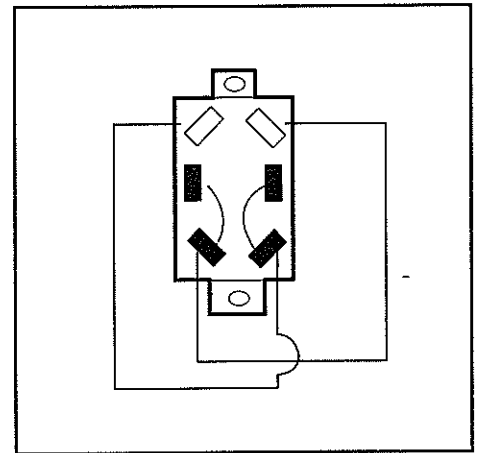
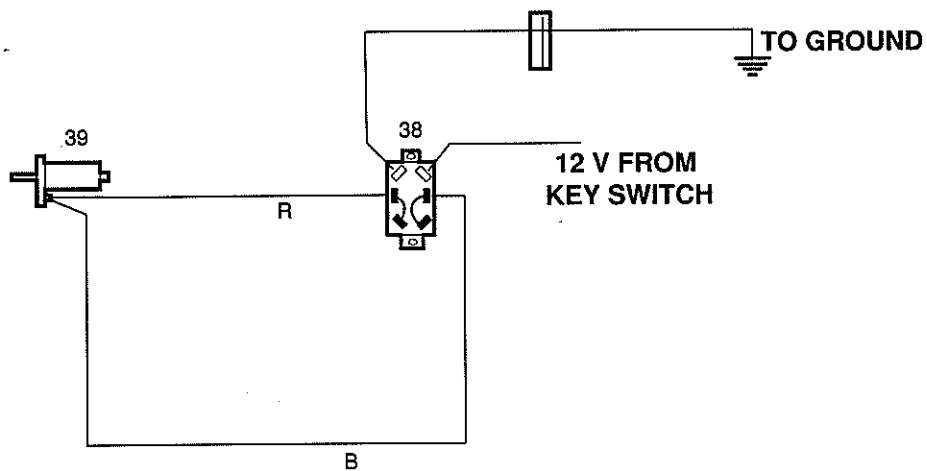
**CRUISE CIRCUIT DIAGRAM: CR2 (B)**  
**(RELAY CIRCUIT WITH SWITCH IN 'ON' POSITION)**  
**(AFTER RESET)**



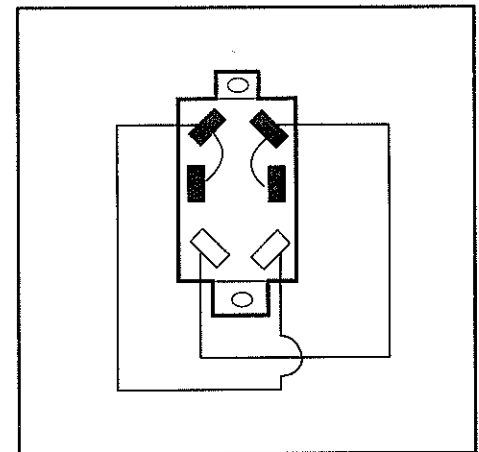
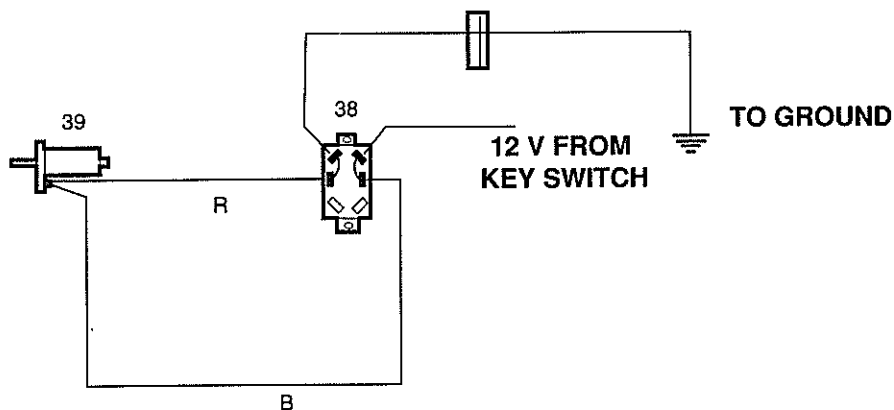


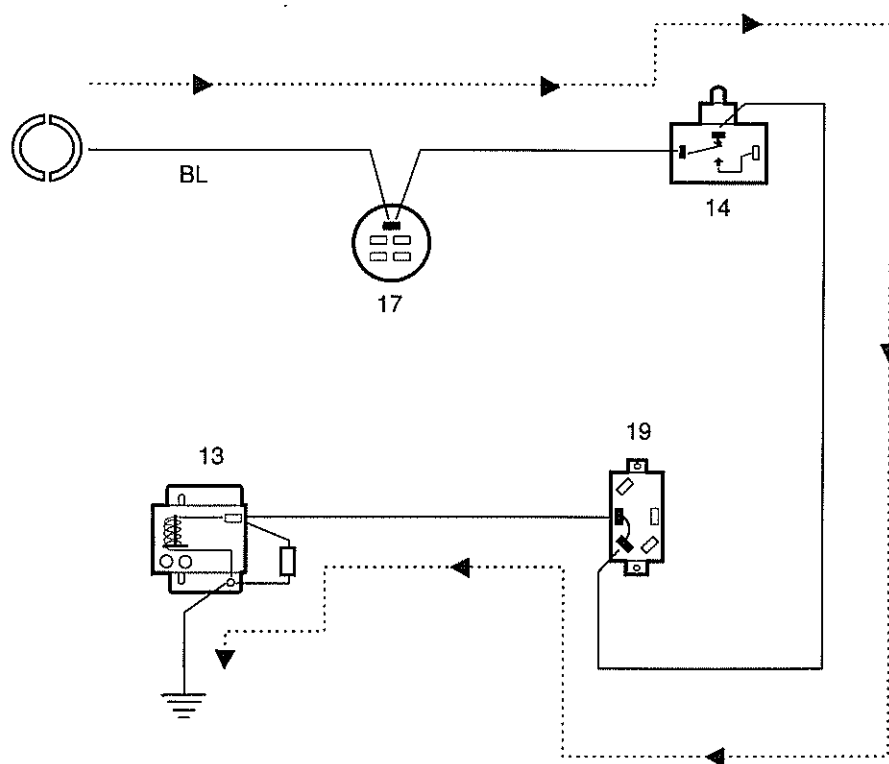
E1 (ELECTRIC LIFT)

E1: ELECTRIC LIFT CIRCUIT DIAGRAM  
SWITCH IN 'UP' POSITION



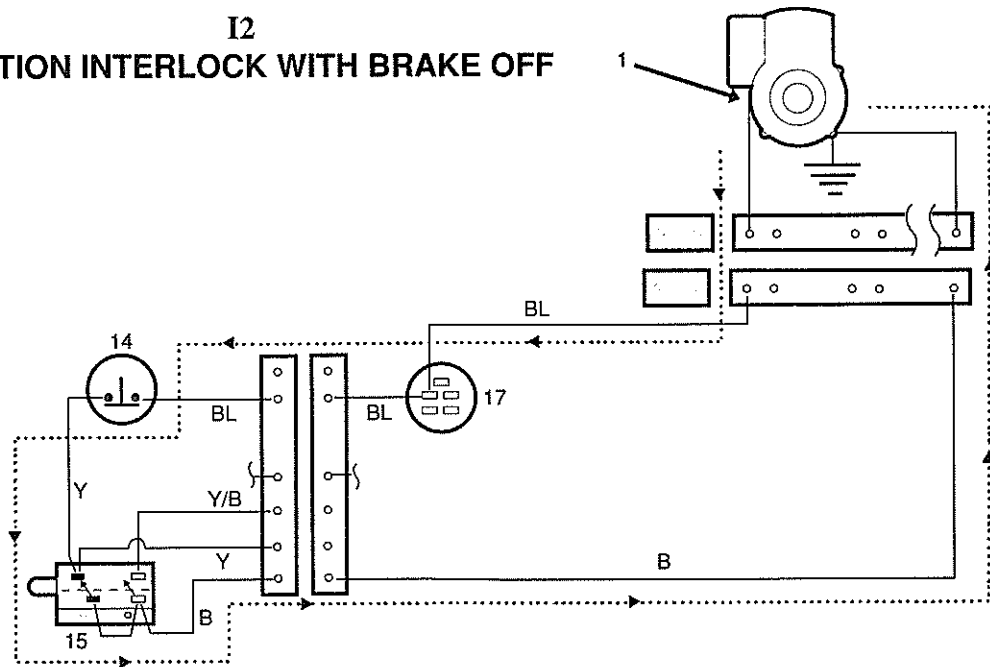
E2: ELECTRIC LIFT CIRCUIT DIAGRAM  
SWITCH IN 'DOWN' POSITION



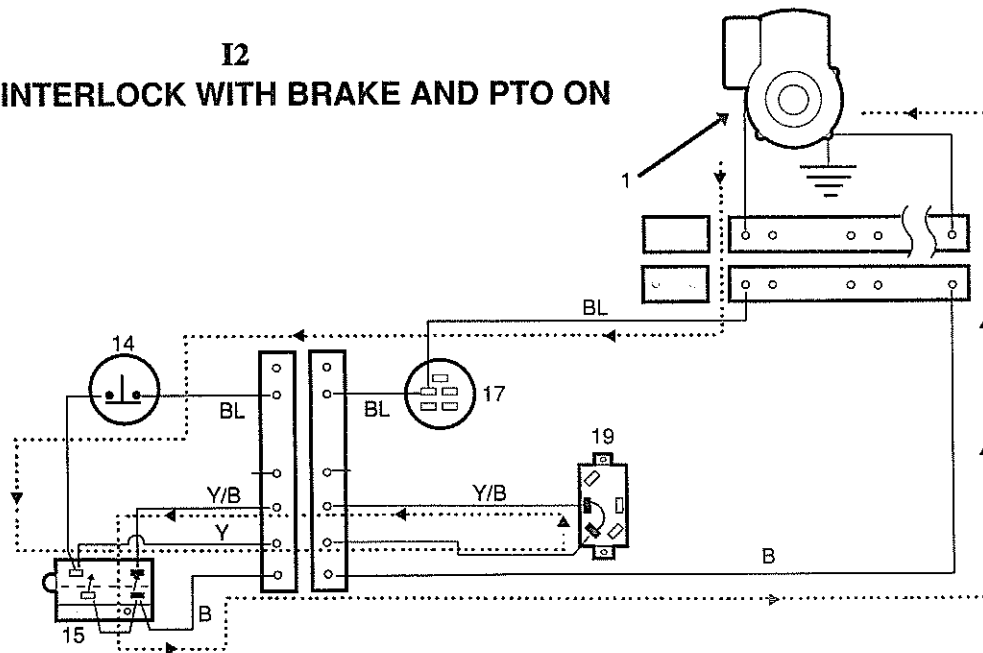
**I1 (INTERLOCK CIRCUIT)****I1: IGNITION INTERLOCK CIRCUIT DIAGRAM  
ATTACHMENT 'ON', SEAT SWITCH NORMAL**

I2 (INTERLOCK CIRCUIT)

I2  
IGNITION INTERLOCK WITH BRAKE OFF

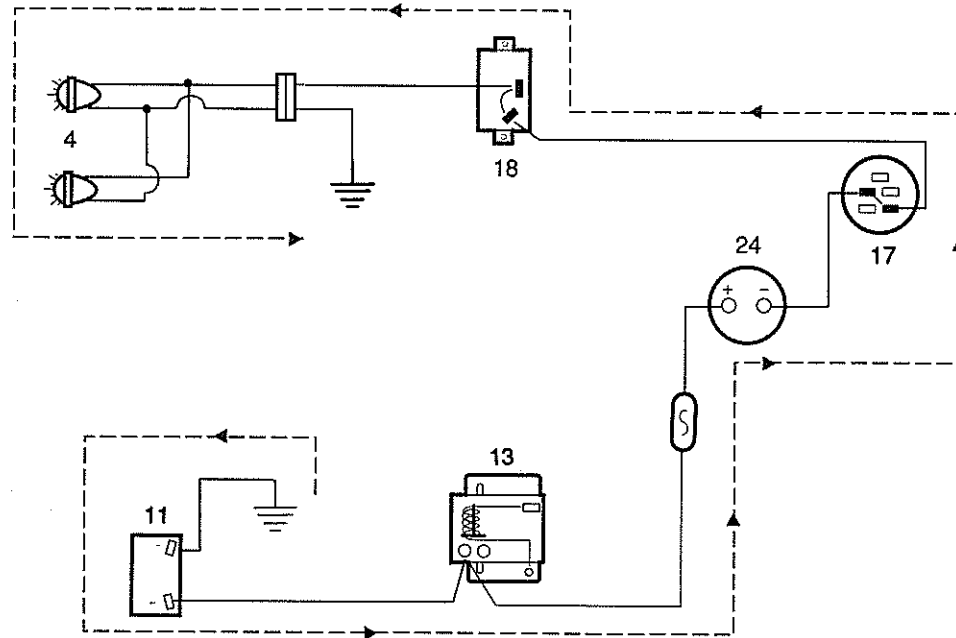


I2  
IGNITION INTERLOCK WITH BRAKE AND PTO ON

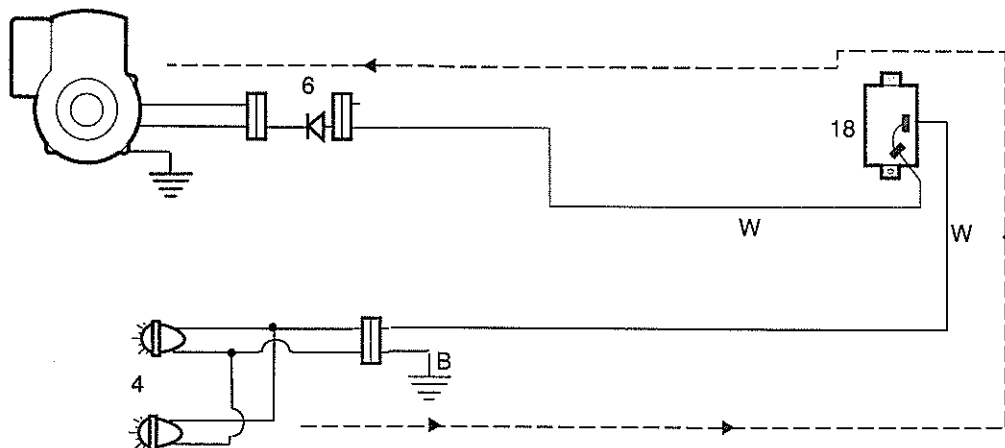


**L1 (LIGHT CIRCUIT)**

**L1: DC LIGHT CIRCUIT**

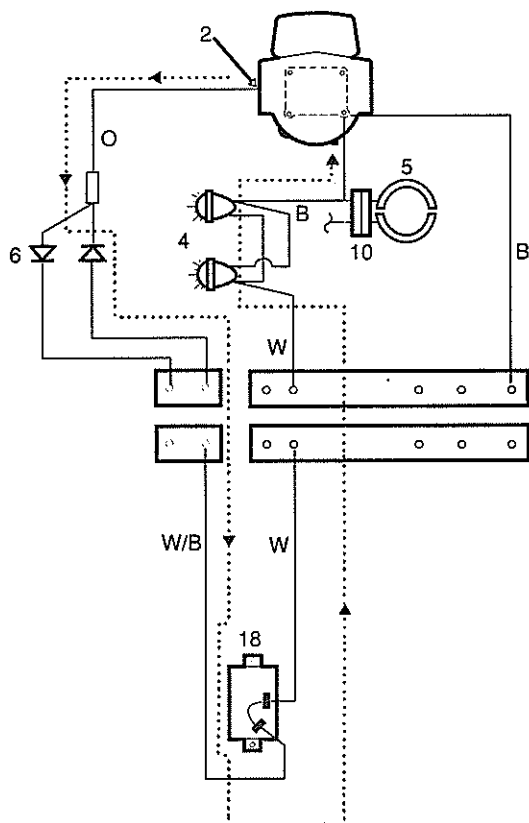


**AC LIGHT CIRCUIT**

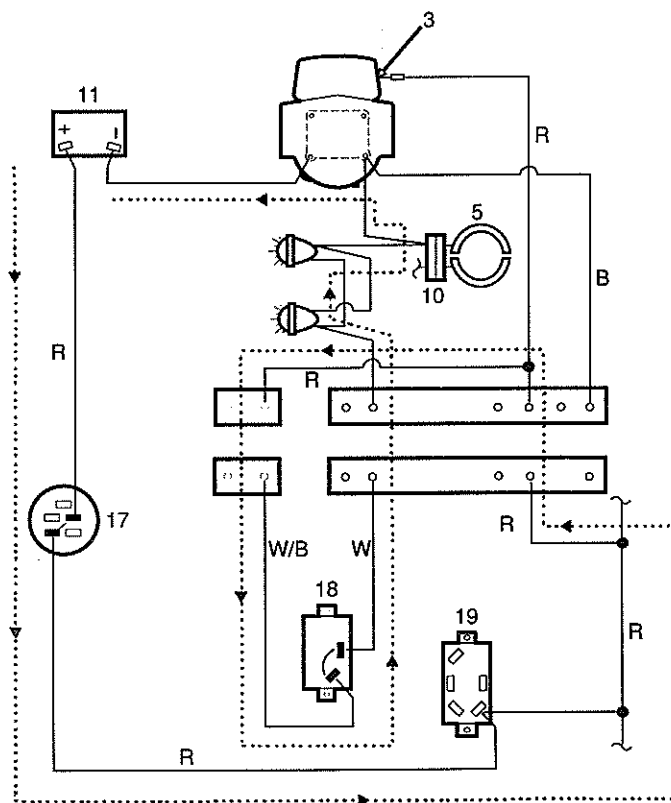


L2 AND L3 (DC LIGHT AND AC LIGHT CIRCUITS)

L3: CIRCUIT DIAGRAM (AC LIGHT)

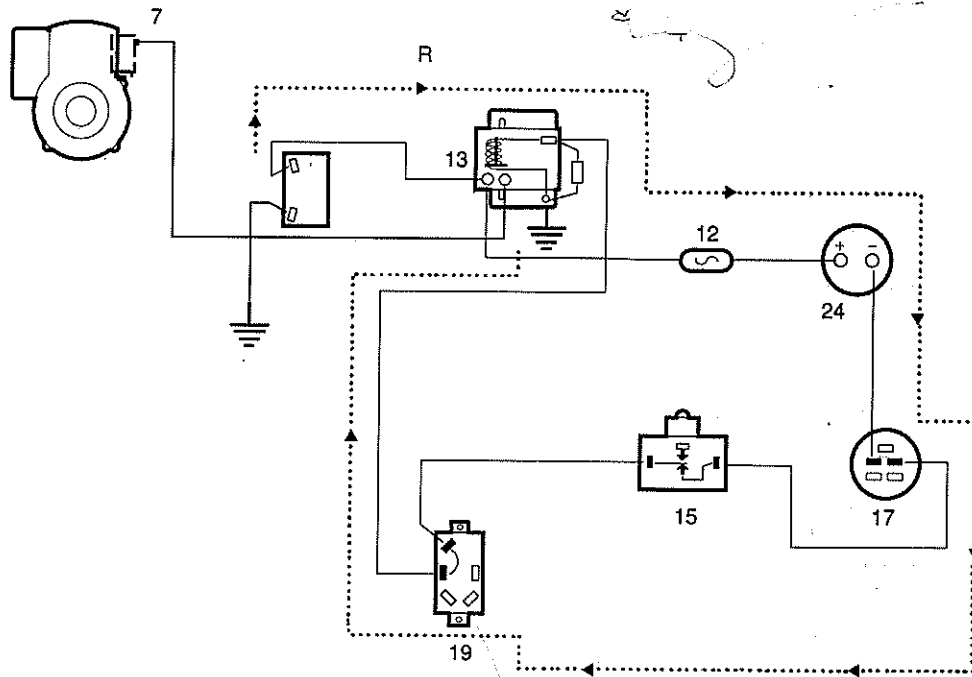


L2: CIRCUIT DIAGRAM (DC LIGHT)

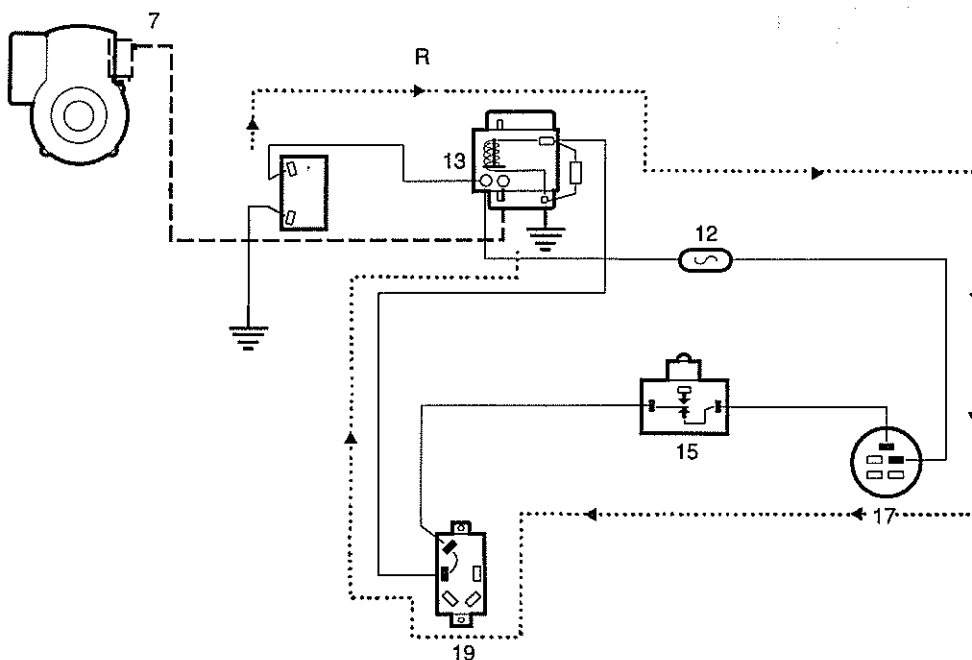


**S1 AND S2 (START CIRCUIT)****S1: START CIRCUIT**

(IGNITION SWITCH IN "START" POSITION, ATTACHMENT SWITCH IN "OFF" POSITION  
AND BRAKE SWITCH DEPRESSED)

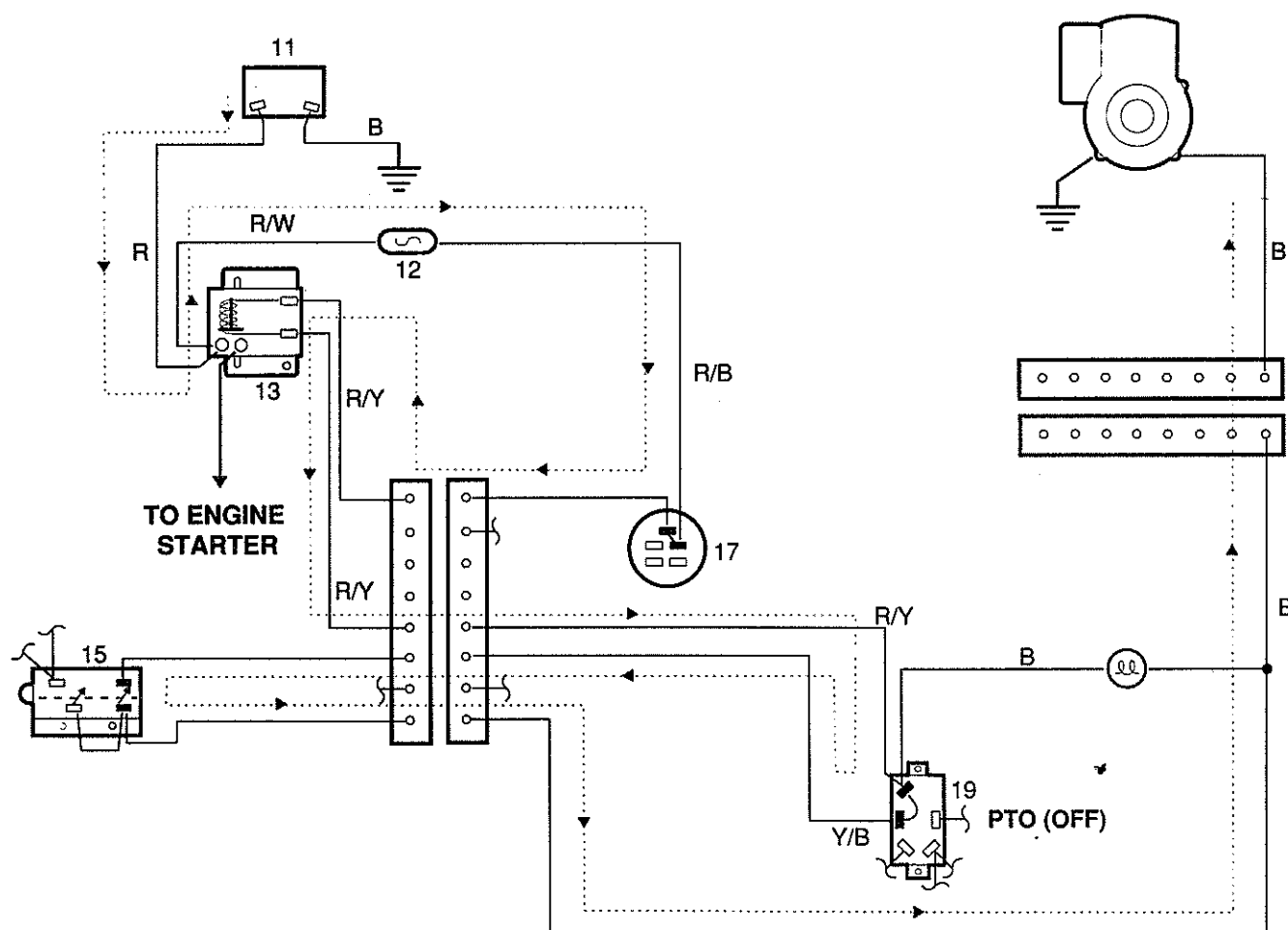
**S2: START CIRCUIT**

(IGNITION SWITCH IN "START" POSITION, ATTACHMENT SWITCH IN "OFF" POSITION  
AND BRAKE SWITCH DEPRESSED)



**S3 (START CIRCUIT)**

**S3: START CIRCUIT**  
(IGNITION SWITCH IN "START" POSITION. ATTACHMENT SWITCH IN "OFF" POSITION  
BRAKE SWITCH DEPRESSED)



**NOTES**



## TEST ELECTRICAL COMPONENTS

### TEST BATTERY



#### WARNING!

**BATTERY ELECTROLYTE CAN CAUSE SEVERE BURNS AND BLINDNESS.**

**WEAR EYE PROTECTION AND PROTECTIVE CLOTHING WHEN WORKING NEAR A BATTERY.**

**- FAILURE TO FOLLOW THIS INSTRUCTION COULD RESULT IN PERSONAL INJURY OR PROPERTY DAMAGE.**

**IN THE EVENT OF AN ACCIDENT, FLUSH WITH WATER AND CALL A PHYSICIAN IMMEDIATELY.**

#### 1. Check Specific Gravity

To determine whether the battery is capable of meeting the requirements of the starter, conduct a "load test" on the battery. For this test, the battery must be 75% charged. To determine charge percentage, take a hydrometer reading.

The following table illustrates each cell's specific gravity range at various charge percentages at 80 degrees F.

Specific Gravity	Charge Percentage
1.250 - 1.280 .....	100%
1.230 - 1.250 .....	75%
1.200 - 1.220 .....	50%
1.170 - 1.190 .....	25%
1.400 - 1.160 .....	10%
1.110 - 1.130 .....	Discharged

#### 2. Check Battery Voltage

Check battery voltage with a volt-ohm meter. Voltage should be between 11.5 and 12.5 volts.

#### 3. Test Battery Cranking

For this test, the battery should be approximately 80° F.

- Check battery electrolyte level. If necessary, add water. Battery must be fully charged.
- Check battery voltage. Voltage should be between 11.5 and 12.5 volts.

- Crank engine using the starter motor for 15 seconds. Battery voltage should not drop below 9 volts at the end of this 15 second test.
- If voltage is less than 9 volts, repeat steps "a" through "c". If the same results are obtained, replace battery.

### TEST SOLENOID

The solenoid is a sealed unit. If it is inoperative, it must be replaced.

#### 1. To test solenoid:

- Connect 12 volts between the small terminal (A, Figure 7-1) and solenoid case (B) or second small solenoid terminal (C).



#### WARNING!

**IF THE BATTERY IS THE 12 VOLT POWER SOURCE A SPARK MAY IGNITE BATTERY GASES.**

- When contact is made, the plunger should be activated. Resistance between terminals (D) and (E) should be 0 ohms. If test does not activate the plunger, or if resistance is " $\infty$ " (infinity), replacement is necessary.

#### SOLENOID

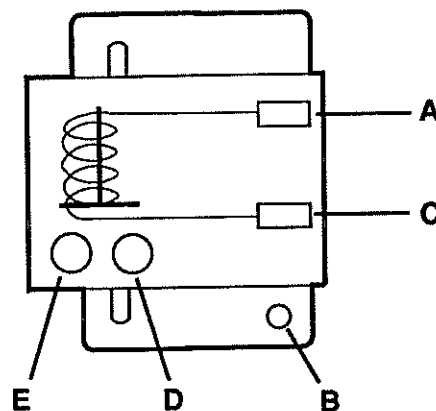


Figure 7-1

## TEST IGNITION SWITCH

Test the ignition switch for proper internal connections using an ohm meter or continuity light. Terminals should be closed only as indicated in Figure 7-2.

## TEST ATTACHMENT DRIVE SWITCH

When switch is in "down" position, check continuity between the middle terminal and top terminal on the same side. See Figure 7-3. Resistance should be zero.

When switch is in the top position, check continuity between the middle terminal and bottom terminal on either side.

### IGNITION SWITCH

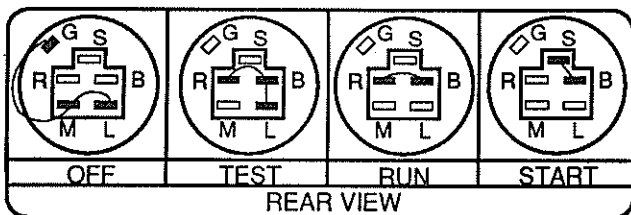
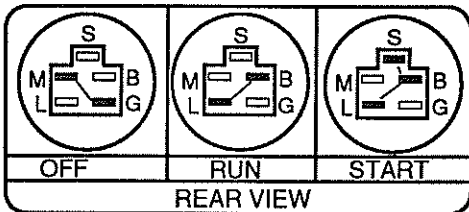
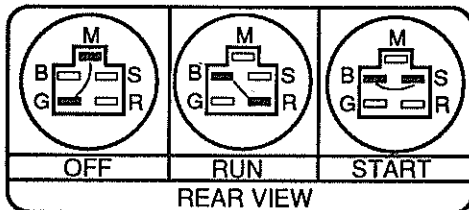


Figure 7-2

## 2-POSITION LIGHT SWITCH

Test the 2-position light switch by moving the switch to the down (OFF) position. The bottom and middle terminal should show infinite resistance. With the switch in the up position (ON), check continuity between the bottom and middle terminal. Resistance should be zero. See Figure 7-4.

### ATTACHMENT DRIVE SWITCH

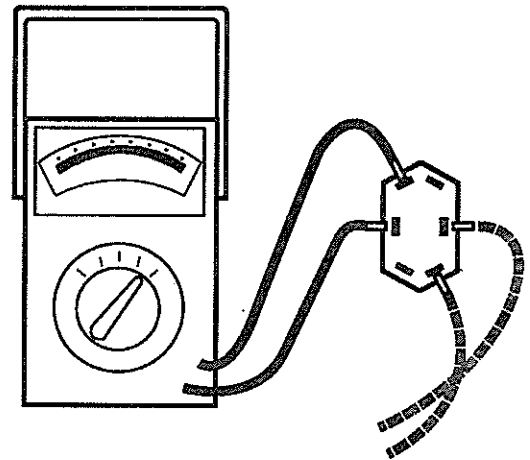


Figure 7-3

## 2-POSITION LIGHT SWITCH

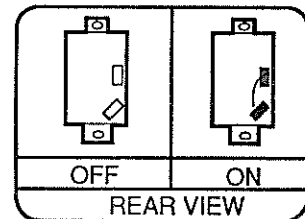


Figure 7-4

## 3-POSITION LIGHT SWITCH

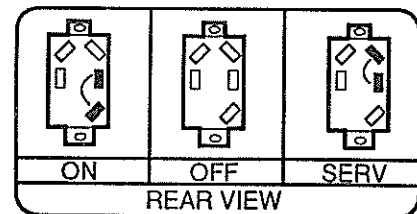
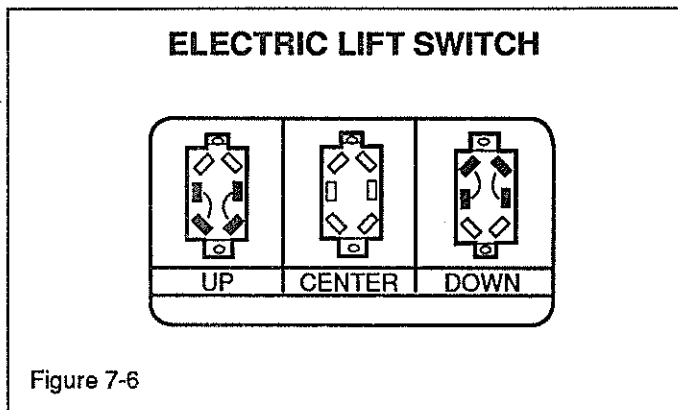


Figure 7-5

### 3-POSITION LIGHT SWITCH

Test the 3-position light switch by moving the switch to the up (on) position. The bottom and center terminals should show zero resistance. See Figure 7-5. Move the switch to the down (serv) position. The top and center terminals should show zero resistance. In the center (off) position, all terminals should show infinite resistance.



### TEST ELECTRIC LIFT SWITCH

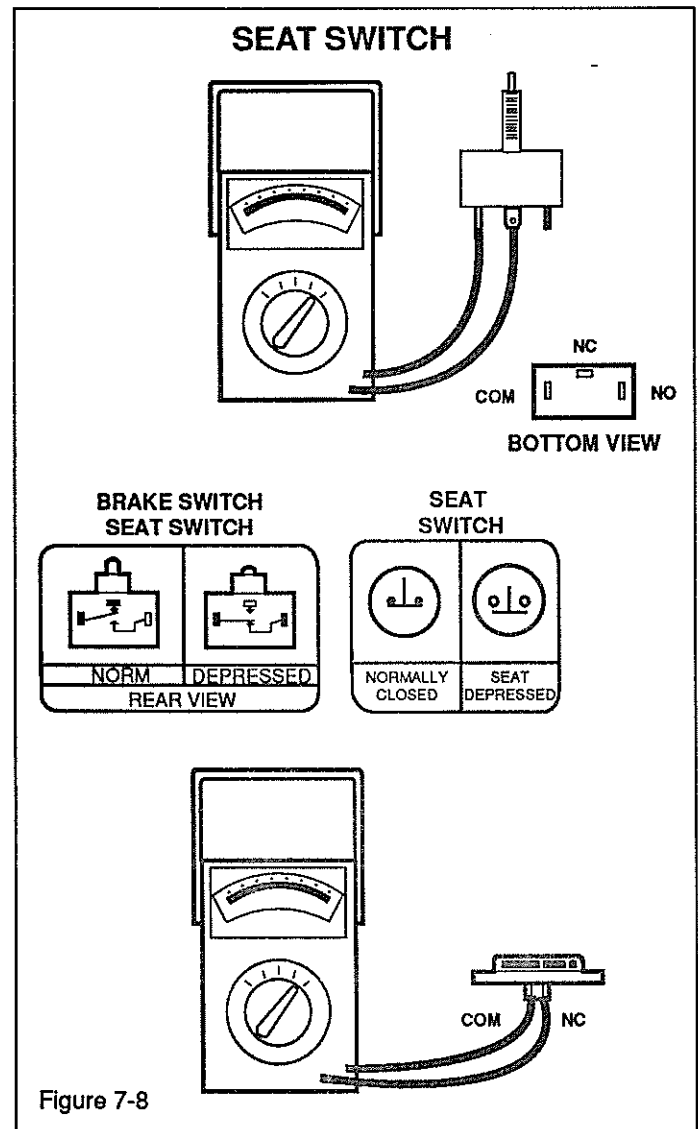
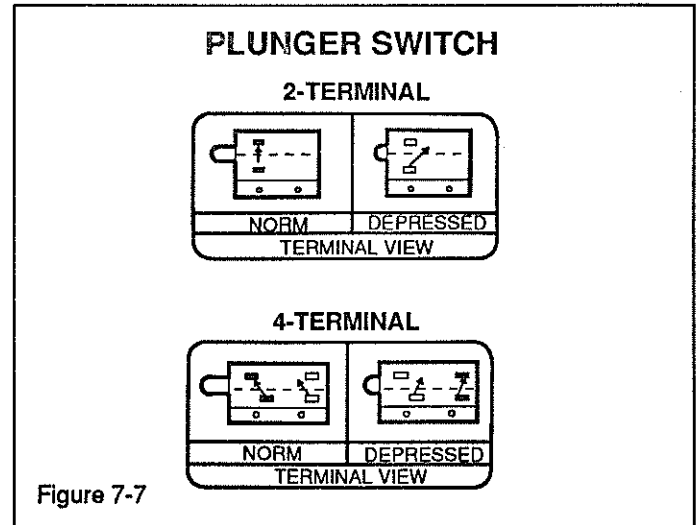
Test the 2 position electric lift switch by moving the switch to the up position. The bottom and middle terminal on the left side should show zero resistance. The bottom and middle terminal on the right side show zero resistance. With the switch in the down position, check continuity between the upper left and middle terminal. Resistance should be zero. The upper right and middle terminal should also show zero resistance. See Figure 7-6.

### TEST PLUNGER SWITCH

Before conducting electrical tests on the switches, make sure the mechanical adjustments of the actuating mechanisms are correct. Figure 7-7.

### TEST SEAT SWITCH

Check the continuity between the top and bottom terminals. Zero resistance should be indicated in one position and infinite in the other position. The seat is wired normally closed (NC). To test, connect ohm meter as shown in Figure 7-8. Meter should indicate zero resistance between (NC) and (COM). Meter should indicate infinite resistance between (NO) and (COM). Pressing the switch plunger should reverse these readings.



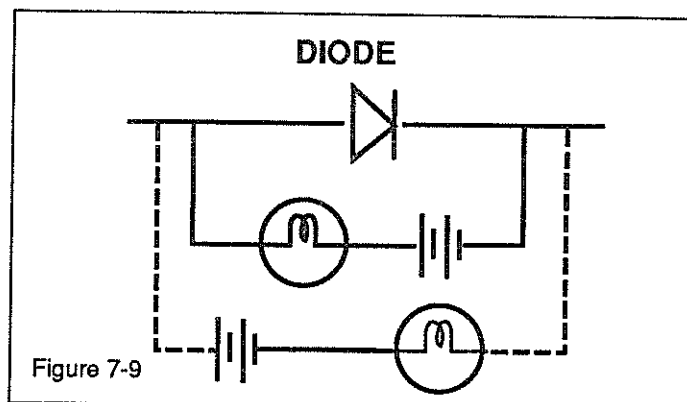


Figure 7-9

For example:

Zero resistance between NO and COM or infinite resistance between NC and COM.

## TEST DIODE

Use a continuity light or ohm meter to check diodes.

If a continuity light is used, connect across the diode. Check if light comes on. Reverse leads. The light should turn on in one direction but not in the reversed direction. See Figure 7-9.

If an ohm meter is used, measure the resistance and then reverse the leads and re-measure. A resistance ratio of 10 to 1 should be measured.

## ELECTRIC CLUTCH ADJUSTMENT

Generally, the only maintenance required on an electric PTO clutch is a periodic re-adjustment of the air gap between the friction surfaces. This will help to compensate for any wear that may have occurred.

As the surface wears, the air gap increases and eventually the clutch will no longer engage. Readjustment intervals depend on mowing conditions, engine horsepower, deck size and how often the clutch is engaged and disengaged.

### To adjust the clutch air gap:

1. Remove the clutch from the engine shaft.
2. Place the clutch so that it may be viewed from the field adapter side. (Where the lead wires exit the clutch.) See Figure 7-10.
3. Locate 3 rivet joints (Figure 7-10) which fasten the leaf springs to the armature.

4. Rotate the pulley until these rivet joints are located midway along the edge of the triangular field adapter.
5. Turn the clutch over. DO NOT DISTURB THE ORIENTATION OF THE RIVET JOINTS.
6. Locate the 3 windows (Figure 7-11) in the brakeplate. Each window is near each adjustment nut.
7. Insert a 0.012 inch (0.305 mm) feeler gauge into one of the 3 windows (Figure 7-11). Position gauge between rotor and armature. See Figure 7-12.
8. With the feeler gauge inserted between rotor and armature, tighten the adjacent adjusting nut. Tighten until the gauge fits snugly between rotor and armature. Do not tighten so much that the gauge can not be re-inserted after removal.
9. Repeat steps 7 and 8 at the remaining 2 windows.

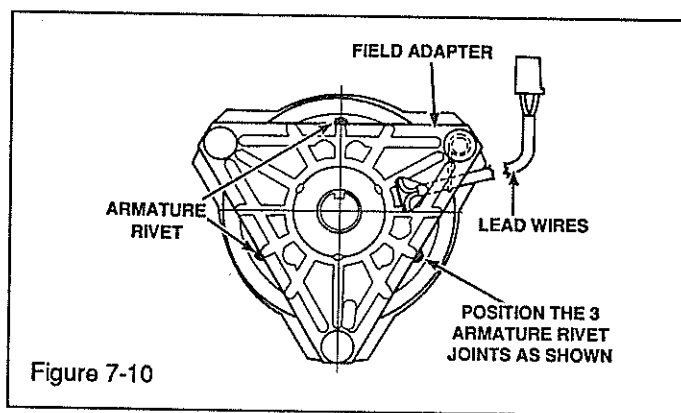


Figure 7-10

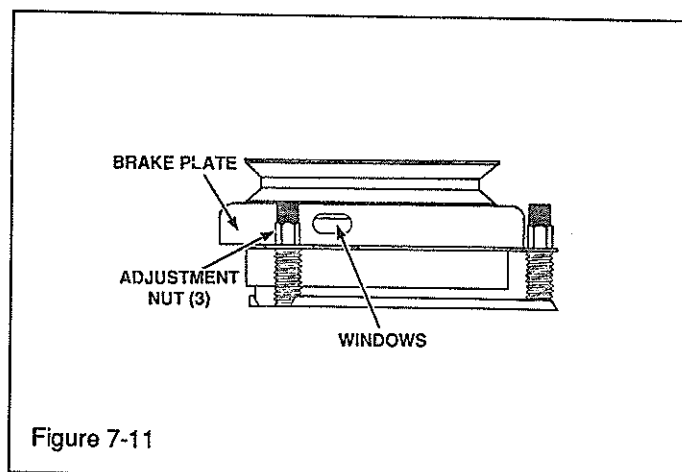


Figure 7-11

10. Re-check the air gap at each window and make any necessary minor adjustments to achieve a consistent air gap of 0.012 inch (0.305 mm).
11. Remove feeler gauge and rotate the rotor by hand. Check for rotor armature drag. The rotor should rotate freely with no sound of drag. If any drag is present, repeat steps 2 - 11.
12. After rotating the rotor, re-check the air gap with the feeler gauge. The air gap should be between 0.005 inch (0.127 mm) and 0.023 inch (0.584 mm).

This change in the air gap is normal after rotation. The rivet location should remain as in step 4. If the air gap is not within this interval, repeat steps 2 - 12.

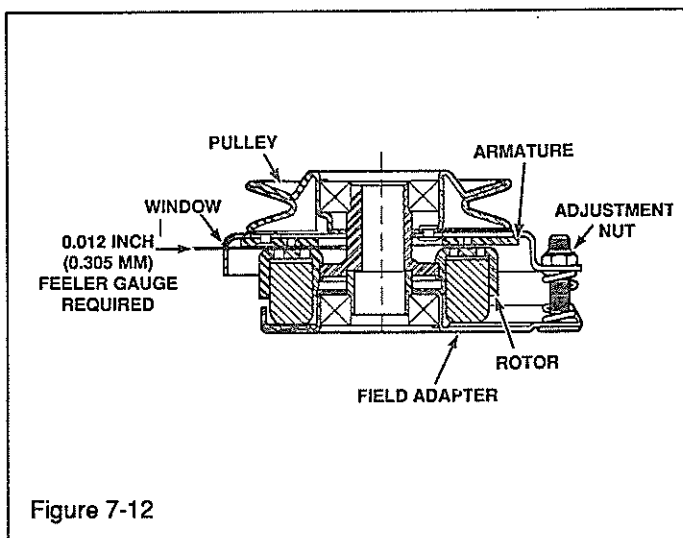


Figure 7-12

13. Re-install the clutch. Use a 1/4 inch thick washer and 3/8 to 6/16 inch UNF grade 5 mounting bolt. Torque a 6/16 inch bolt to 50 lb.-ft. Torque a 3/8 inch bolt to 31 lb.-ft.

This procedure should restore normal clutch operation. If the clutch still will not engage, check clutch with an ohmmeter. It should be between 2.8 and 3.5 ohms. Allow the clutch to cool for 1 hour before checking resistance. If the resistance is outside this range, the clutch coil is faulty. If the resistance is within this range, the problem may be in the electrical system.

## ATTACHMENT DRIVE CLUTCH

### Break-In Procedure (All Models)

1. Attach mower or snowthrower to tractor.
2. Adjust leveling or lift.
3. With engine running at idle speed, engage and disengage PTO switch 10 to 15 times (without cutting or blowing snow). Do this before initial use and after storage.

### Attachment Drive Clutch

#### 1. Removal: Figure 7-13

**NOTE: Do not use a wheel puller to remove clutch brake.**

- a. Disconnect polarized plug from clutch and locating rod.
- b. Remove mounting bolt, large washer, and lock washer from engine crankshaft.
- c. Remove complete clutch/brake assembly.

#### 2. Installation:

- a. Apply a light coat of grease or oil to engine shaft.
- b. If removed, assemble square key and engine sheave onto engine shaft.
- c. Install coil assembly, rotor assembly and armature/brake and sheave assembly onto engine shaft.
- d. Secure with the 7/16-20 x 3" hex bolt, lock washer and large flat washer. Torque hex bolt to 30 - 35 ft. lbs. (40 - 47 Nm).
- e. Install electric clutch into locating rod.
- f. Re-connect plug lead to locating rod and clutch. Make sure connection is secure and wire does not contact any moving parts.
- g. Check brake adjustment as called out in Section II.

#### 3. Maintenance

Once the clutch/brake has been installed, the clutch portion requires no further maintenance. The unit is self adjusting for wear and never requires lubrication. The brake portion may require re-adjustment periodically depending upon unit usage. Re-adjust as follows:

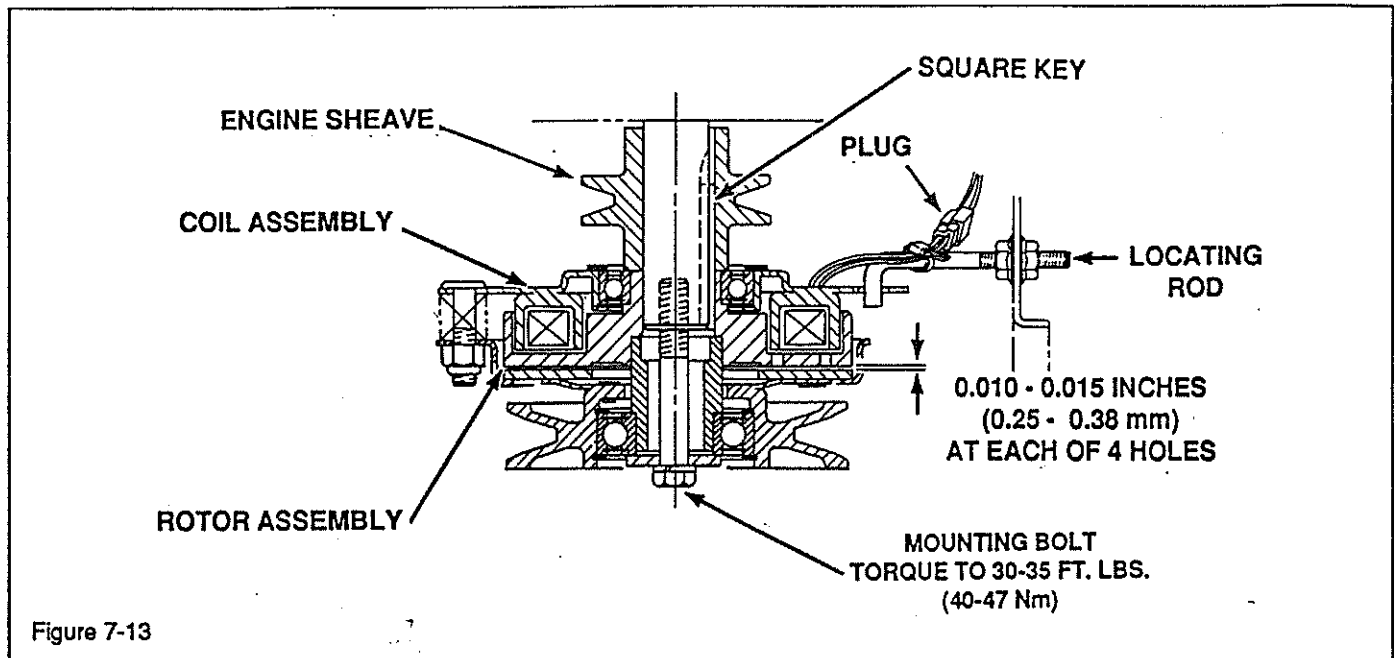


Figure 7-13

- a. Position one .015" (0.38 mm) thick shim in each slot and four in brake flange and turn on clutch/brake. Tighten the (4) locknuts until they just contact the brake flange.

**CAUTION: DO NOT OVER-TORQUE LOCKNUTS. DAMAGE TO BRAKE FLANGE MAY RESULT.**

- b. Turn clutch/brake off and remove (4) shims. Recheck gap through the slots provided. A minimum of .010" (0.25 mm) and a maximum of .015" (.38 mm) should be maintained.
- c. If oil or grease contaminate clutch working surfaces, remove with a cleaning fluid (barcothene alcohol or ammonia are acceptable substitutes). With engine off, pour a generous quantity of cleaning fluid between working surfaces.
- d. If clutch/brake has not been used for an extended period of time, proceed as follows:
  1. Place tractor in neutral.
  2. Start tractor engine and place throttle in the fast position.
  3. Turn clutch/brake switch on and off 6 times, engaging and disengaging driven attachments. (continued on next page)

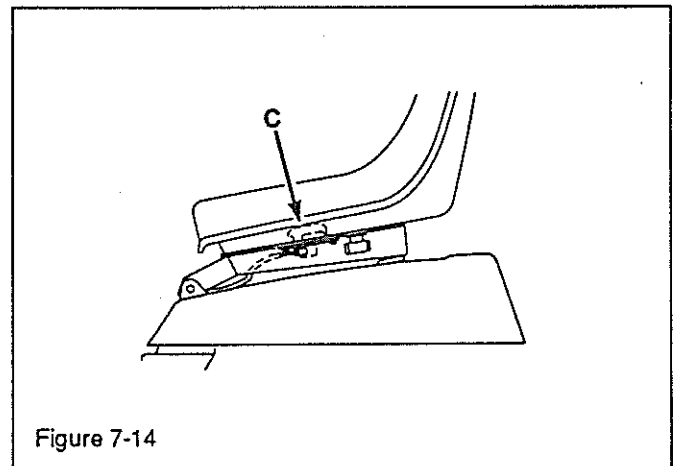


Figure 7-14

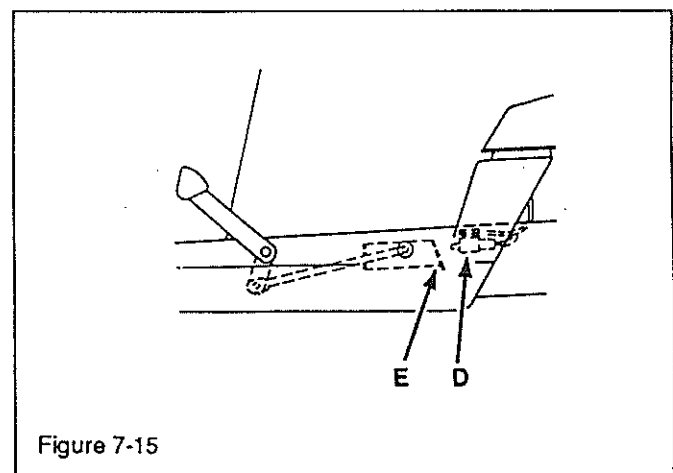


Figure 7-15

**NOTE:** Allow engine driven attachments to come to a complete stop between on and off cycles.

The clutch/brake is now ready for duty.

## **INTERLOCK SWITCHES**

This unit is equipped with 3 interlock safety switches. The function of these switches is to ensure safe start-up.

1. One interlock switch is incorporated into the attachment drive switch.
2. The second switch is located inside the seat, (C, Figure 7-14). It will activate when the operator is positioned in the seat. There is no adjustment.
3. The third switch, (D, Figure 7-15), is located inside the frame and is activated when the clutch/brake pedal is fully applied or when the parking brake is locked down. If bracket (E) does not depress the plunger of the switch when the parking brake lever is locked, loosen interlock switch (D) and relocate.

## **RELAY TEST**

By applying 12 volts D.C. to the coil terminals, the N.O. contacts should close. (Zero resistance if checked with a ohmmeter)

Removing the 12 volts should open the contacts (INF resistance if checked with a ohmmeter).

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**SECTION VII: ELECTRICAL**

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**NOTES**

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# SUBURBAN TRACTOR REPAIR MANUAL

## **NOTICE:**

**We reserve the right to change specifications, add improvements or discontinue the manufacture of any of our equipment without notice or obligation to purchasers of our equipment.**

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