

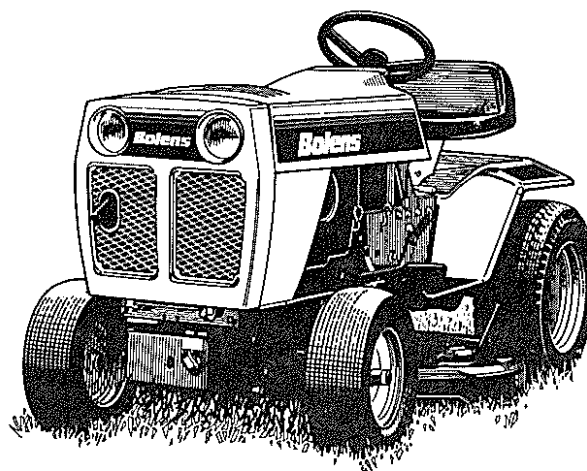
Bolens

Service Manual

Medium Frame Series Tractors

Models

1058	1659
1060	1661
1160	1662
1258	1663
1261	1664
1458	1667
1461	1668
1463	1668L
1467	1669
1468	1669L
1658	1858



176-2324 (11/90)
SUPERSEDES 553267-8

Medium Frame Series Tractors

I. GENERAL

1

II. ELECTRICAL SYSTEM

2

III. DRIVE TRAIN

3

IV. FUEL SYSTEM

4

V. CHASSIS

5

VI. HYDRAULIC SYSTEM

6

VII. ENGINE

7

VIII. TRACTOR ATTACHMENTS

8

TABLE OF CONTENTS

GENERAL

NUMBER INFORMATION	1-1
ATIONS	1-2
NCE CHART	1-5
ON POINTS (GEAR DRIVE)	1-6
ON CHART (GEAR DRIVE)	1-7
ON POINTS STATIC DRIVE)	1-8
ON CHART ATIC DRIVE)	1-9
ALVES, HEX SCREWS	1-10

ELECTRICAL SYSTEM

HOOTING GUIDE	2-1
OR CODE	2-3
AGRAM 1058, 1060, 1160	2-4
AGRAM 1258, 1261, 1458, 1461, 1658, 1661, 1858	2-8
AGRAM 1659, 1662	2-13
AGRAM 1667, 1668 (S/N 01-03)	2-14
AGRAM 1467, 1668, 1668L (5)	2-15
AGRAM 1667 (S/N 04)	2-15
AGRAM 1669, 1669L	2-16
AGRAM 1468	2-17
ELECTRICAL SYSTEM	2-22

DRIVE TRAIN

HOOTING GUIDE	3-1
ROSTATIC INTRODUCTION AND	3-2
ATIC REMOVAL	3-3
ATIC BREAKDOWN	3-4
ATIC REINSTALLATION	3-5
E REMOVAL	3-6
E ASS'Y BREAKDOWN	3-7
E DISSASSEMBLY	3-8
E REASSEMBLY	3-10
ATIC TRANSAXLE LY	3-11
ATIC TRANSAXLE ALLATION	3-14
E INTRODUCTION	3-16
E REMOVAL	3-17
E TRANSAXLE BREAKDOWN	3-18
E RE-INSTALLATION	3-20

GROUP IV. FUEL SYSTEM

TROUBLESHOOTING GUIDE	4-1
FUEL TANK AND VALVE	4-2
FUEL FILTER	4-2
AIR CLEANER	4-2
CARBURETOR	4-4

GROUP V. CHASSIS

FRONT WHEEL ALIGNMENT	5-1
STEERING ASSEMBLY	5-1
CLUTCH ADJUSTMENT (GEAR DRIVE)	5-2
BRAKE ADJUSTMENT (GEAR DRIVE)	5-3
HYDROSTATIC TRACTOR ADJUSTMENTS	5-4
INTERLOCK SWITCH ADJUSTMENTS	5-6
MOWER DRIVE ADJUSTMENTS	5-7
ELECTRIC CLUTCH (PTO) ADJUSTMENTS	5-8

GROUP VI. HYDRAULIC SYSTEM

TROUBLESHOOTING GUIDE	6-1
PRINCIPLE OF OPERATION	6-2
TESTING HYDRAULIC SYSTEM	6-3
HYDRAULIC POWER LIFT	6-3
TRANSMISSION FILTERS	6-5

GROUP VII. ENGINE

TROUBLESHOOTING GUIDE	7-1
ENGINE REMOVAL 1058, 1060, 1160	7-3
ENGINE REMOVAL TECUMSEH MODELS	7-4
ENGINE REMOVAL 1467, 1659, 1662, 1667, 1668, 1668L	7-6
ENGINE REMOVAL VANGUARD 1468, 1669, 1669L	7-8

GROUP VIII. TRACTOR ATTACHMENTS

MOWERS	8-1
SNOWTHROWER - SINGLE STAGE	8-5
SNOWTHROWER - TWO STAGE	8-7
TILLER	8-9
POWERPACKER PLUS	8-11

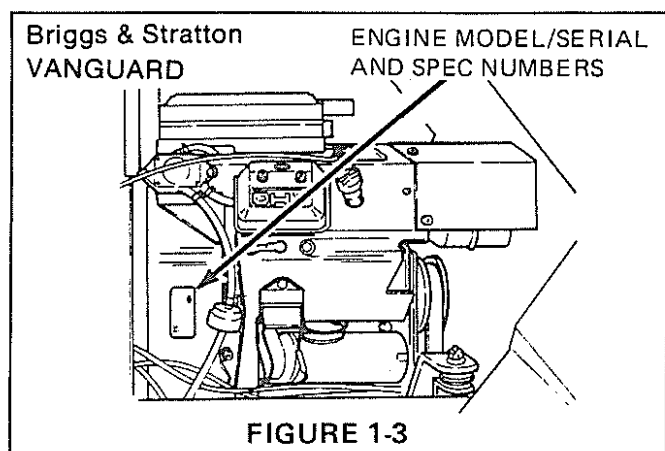
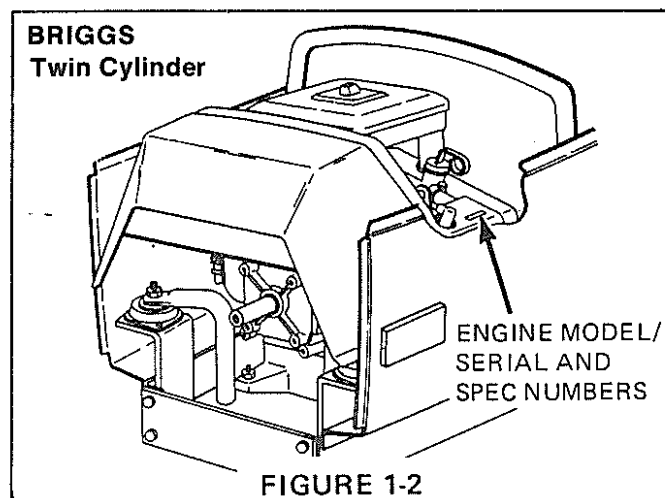
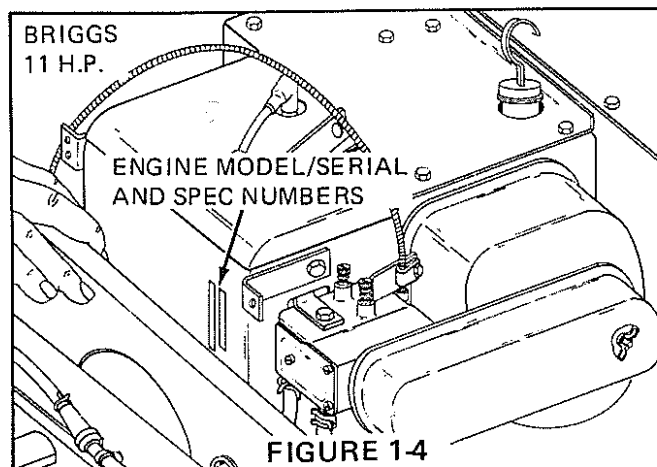
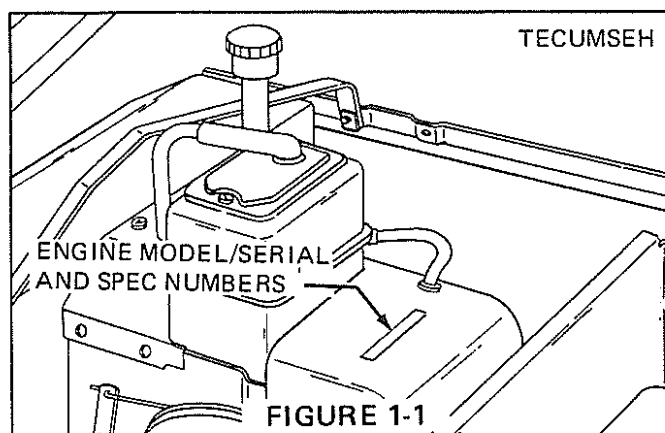
GROUP I. GENERAL

**MEDIUM FRAME
SERIES TRACTOR**
Page 1-1 Rev. 4/90

SERIAL NUMBER INFORMATION

The tractor Model/Serial number plate is located on the top of the rear fender under the seat.

1



GENERAL (Continued)

SPECIFICATIONS

.....	BRIGGS & STRATTON.....
.....	253417-013101..... Models 1058, 1060 & 1160
.....	400437-012201..... Model 1467 (S/N 0100101 thru 0199999)
.....	400437-120501..... Model 1467 (S/N 0200101 and later)
.....	290447-0108..... Model 1468
.....	402437-066601..... Models 1659 & 1662
.....	402437-066601..... Models 1667 & 1668 (S/N 0100101-0299999)
.....	402437-070001..... Models 1667 & 1668 (S/N 0300101-0499999)
.....	402437-120501..... Model 1668, 1668L (S/N 0500101 and later)
.....	303447-0131..... Model 1669, 1669L
.....	Model 253417..... Hor. shaft, air cooled, 1 cyl., 4 cycle
.....	Model 402437..... Hor. shaft, air cooled, 2 cyl., 4 cycle
.....	Model 400437..... Hor. shaft, air cooled, 2 cyl., 4 cycle
.....	Model 290447..... Hor. shaft, air cooled, 2 cyl., 4 cycle
.....	Model 303447..... Hor. shaft, air cooled, 2 cyl., 4 cycle
.....	11 HP Models..... 3.438/87.4 x 2.625/66.5
.....	14 & 16 Models..... 3.437/87.31 x 2.156/54.77
.....	11 HP Models..... 24.36/399.5
.....	14 & 16 HP Models..... 40/656
.....	11 HP Models..... 11 HP (8.2 kW) @ 3600 RPM
.....	14 HP Models..... 14 HP (10.4 kW) @ 3600 RPM
.....	16 HP Models..... 16 HP (11.9 kW) @ 3600 RPM
.....	All Models..... 1.000/.999 Dia.
.....	Keyway, .375-24 Tap
.....	All Models..... Dry type, with foam precleaner element
.....	All Models..... 3.0 pints/1.4 liters
.....	Models w/Oil Filters..... 3.5 pints/1.6 liters
.....	Models 1060, 1058, 1160, 1659, 1662, 1668L, 1669 & 1669L
.....	1.6 gal./6.1 liters
.....	Models 1467, 1667 & 1668..... 3.5 gal./13.2 liters
.....	All Models..... Mechanical-3600 + 150 RPM
.....	All Models..... Remote, cable operated
.....	11 HP Models..... Champion RCJ8 or equivalent
.....	14 & 16 HP Models..... Champion J-8 or equivalent
.....	(Refer to Engine Manual for proper equivalents)
.....	All Models..... .030 in. (.076 mm)

**MEDIUM FRAME
SERIES TRACTOR**
Page 1-3 Rev. 4/83

GENERAL (Continued)

SPECIFICATIONS

.....	All Models	Steel formed frame
n)	All Models	44 in. (111.8 cm)
)	1058, 1060	36-1/4 in. (92 cm)
	All Other Models	Approx. 36-37 in. (91-94 cm)
m)	All Models	70-3/4 in. (179.7 cm)
in./cm)	All Models	49 in. (123 cm)
us (in./cm)	All Models	77 in. (195.6 cm)
rance-Rear Axle (in./cm)	All Models	7 in. (17 cm)
ght (lbs./kgs)	1058	655 lbs. (297 kgs)
	1060, 1160	600 lbs. (272 kgs)
	1258, 1458, 1658, 1659, 1664,	700 lbs. (318 kgs)
	1261, 1461, 1463, 1661, 1662, 1663, 1667, 1467	703 lbs. (319 kgs)
	1668, 1858	785 lbs. (356 kgs)
	1060, 1160, 1261, 1461, 1463, 1661, 1662, 1663, 1467, 1468, 1667,	
	 All gear; 4 speed & reverse w/transaxle & limited slip differential	
	Transmission Mounted Disc Brake	
	1058, 1258, 1458, 1658, 1659, 1664, 1668, 1669, 1669L, 1858 ... Model	
	11 Eaton hydrostatic w/transaxle; infinite speed range in forward & reverse	
Speed	Gear Transmission	Forward 7-5.2 mph (1.1-8.4 km/hr.)
		Reverse 1-2.10 mph (1.6-3.4 km/hr.)
	Hydrostatic Transmission	Forward 0-6.75 mph (0-10.8 km/hr.)
		Reverse 0-3.50 mph (0.5.6 km/hr.)
.....	1058, 1060, 1160, 1258, 1261, 1463, 1467, 1468, 1663, 1664, 1667,	
	1668, 1668L, 1669, 1669L	
	Front 16/6.50-8; Rear 23/8.50-12	
	1461, 1458, 1658, 1659, 1661, 1662, 1858. Front 16/6.50-8	
	Rear 23/10.50-12	
.....	Electric Clutch	

GENERAL (Continued)**MEDIUM FRAME
SERIES TRACTOR
Page 1-5 Rev. 11-90****MAINTENANCE CHART****1**

MAINTENANCE REQUIRED	Length of Operation	Type of Maintenance
Engine Cooling Air Screen -	Tecumseh Models 25 Hrs.* B & S Models - 100 Hrs.*	Brush Clean
Engine Air Cleaner -	25 Hrs.*	Refer to Section 4, FUEL SYSTEM
	When no longer serviceable	Replace
Engine Oil Filter (If Equipped)	100 Hrs.	Replace
Cooling Fins - (Engine) -	Yearly or every 50 Hrs.	Clean - use Air Hose if Available
Spark Plugs -	100 Hrs.	Service or Replace
Breaker Points - (Battery Ignition) -	100 Hrs.*	Service or Replace
Ignition Timing - (Battery Ignition)	100 Hrs.*	Adjust
Fuel Filter -	100 Hrs.*	Replace
Battery -	25 Hrs.	Check Water Level - Add As Necessary
Hydrostatic and Rear Axle Fins - (Hydrostatic Models)	Daily or 10 Hrs.*	Clean - Use Air Hose if Available
Belts -	50 Hrs.*	Check for Wear and Adjust
Tires -	30 Hrs.	Check for Damage and Air Pressure
Transmission Filter - (Hydrostatic)-	After First 5 Hours, then After Every 100 Hours or with oil change	Change - Use Bolens Filter**
Brake -	As Required	Adjust Linkage
Rear Axle -	50 Hrs.*	Adjust End Play

* More often under extreme conditons.

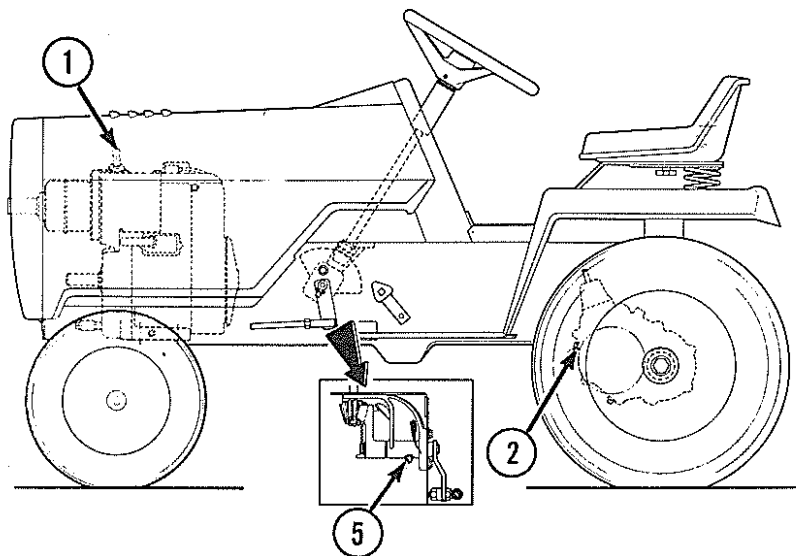
** An equivalent substitute is acceptable.

FRAME
ACTOR
ev. 4/90

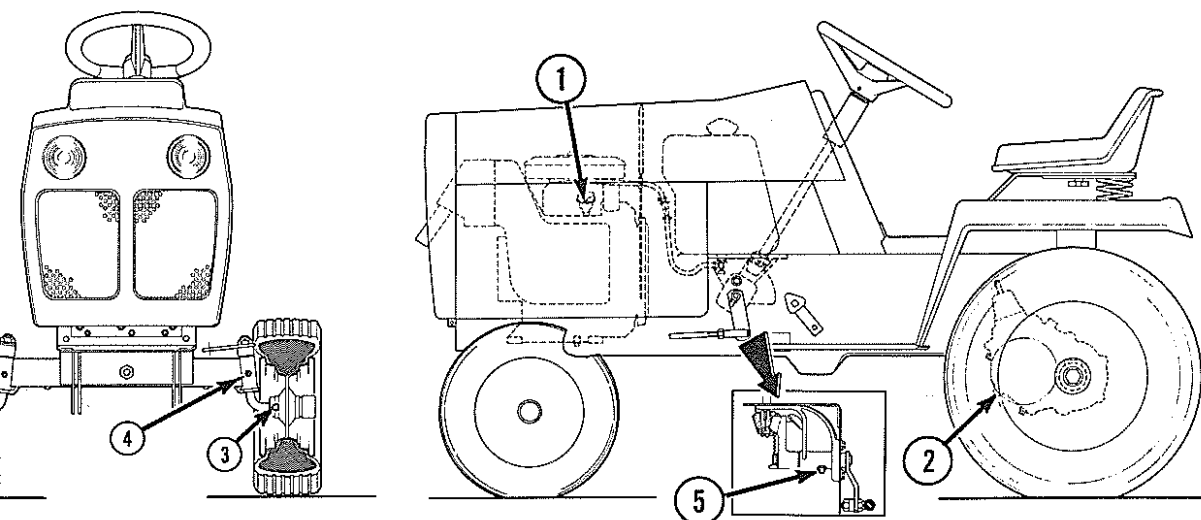
GENERAL (Continued)

LUBRICATION POINTS GEAR DRIVE

SHOWN IS A 11 HP
& STRATTON. FOR THE
SEH ENGINE SEE PAGE 1-8.



TWIN CYLINDER I.C. BRIGGS & STRATTON



GENERAL (Continued)**MEDIUM FRAME
SERIES TRACTOR
Page 1-7 Rev. 4/90****LUBRICATION CHART
GEAR DRIVE****1**

LUBRICATION REQUIRED		Length of Operation	Type of Lubrication	Amount Required
1. Engine Crankcase -		After first 2-5 Hrs.	Engine Oil SF, SC, SD or SE	Replacement Quantity: (1) 3 pt. (1.4L) (2) 3-1/4 pt. (1.5L) (3) 3-1/2 pt. (1.6L)
Average Temperature	(Spring, Summer, Autumn) (+120°F. to +40°F.) (49°C. to 4°C.)	25 Hrs.*	SF, SC, SD or SE SAE 30 10-W-30 10-W 40 Oil	
	(Winter) (+40°F. to 0°F. & Lower) (4°C. to -19°C. & Lower)	25 Hrs.*	SAE 5W-30 or 5#-20 Oil Type SF, SC, SD or SE	
2. Transmission -		Check once a year	EP 90 Gear Lube	Add To Plug Level Capacity 3 pints (1.4L)
3. Front Wheel Bearings - (Some Models)		10 Hrs.	Multi-Purpose Grease	1-2 Strokes
4. Front Wheel Spindles -		10 Hrs.	Multi-Purpose Grease	1-2 Strokes
5. Steering Shaft -		10 Hrs.	Multi-Purpose Grease -	1-2 Strokes

* More often under extreme conditions.

NOTE: A hand type grease gun is recommended when greasing your unit. HI-PRESSURE TYPE GREASE GUNS could cause damage to the fittings and bearing seals. Lubricate all linkages, levers and pins not equipped with grease fittings with oil once a week, or more often depending on operating conditions.

(1) 3 Pt. (1.4L) - Models 1060, 1160, 1467, 1662, 1667

(2) 3-1/4 Pt. (1.5L) - Models 1261, 1461, 1463, 1661, 1663

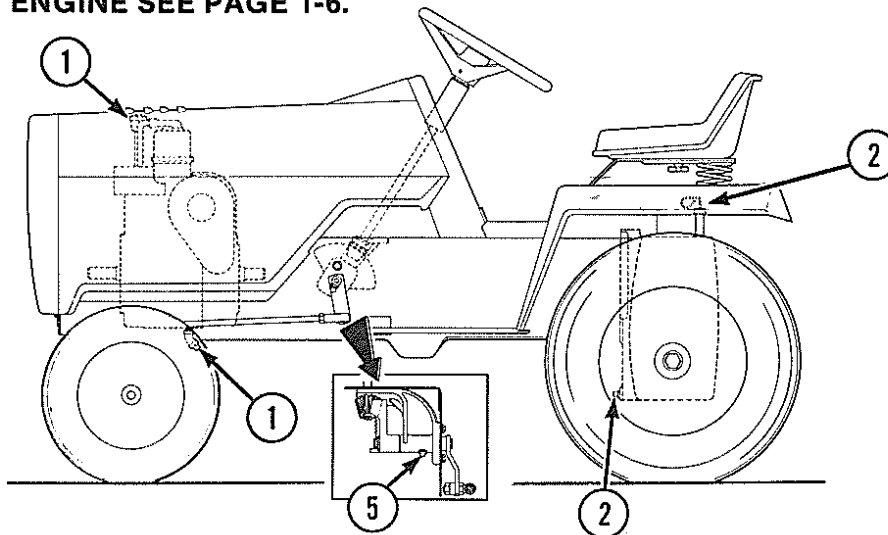
(3) 3-1/2 Pt. (1.6L) - Models 1468

FRAME
ACTOR
Rev. 4/90

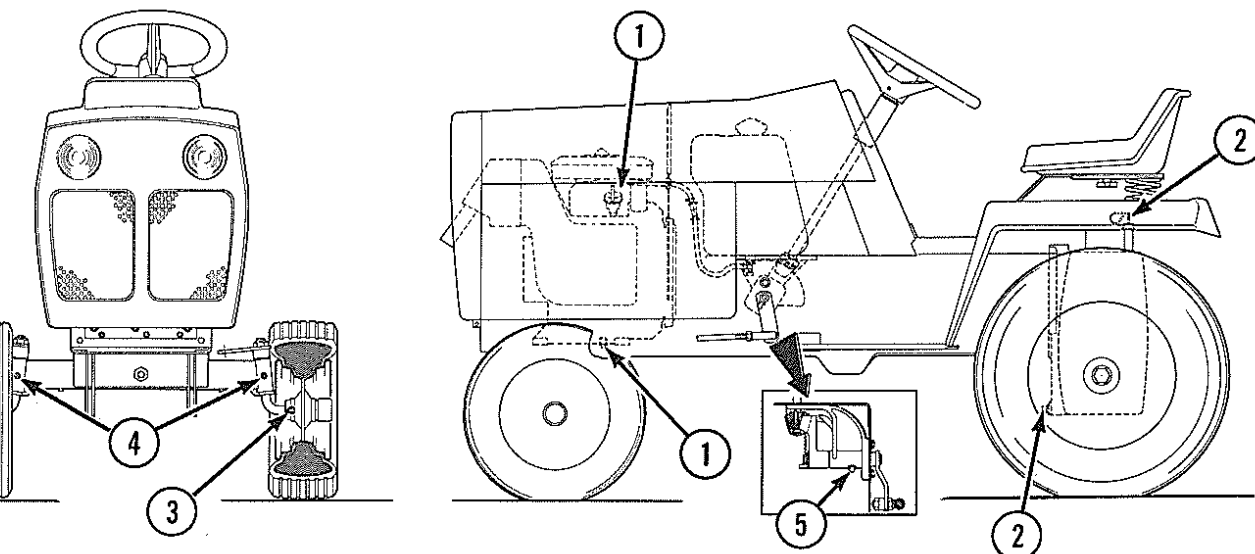
GENERAL (Continued)

LUBRICATION POINTS HYDROSTATIC DRIVE

SHOWN IS A
SEH. FOR THE
RIGGS & STRATTON ENGINE SEE PAGE 1-6.



TWIN CYLINDER I.C. BRIGGS & STRATTON



GENERAL (Continued)
**MEDIUM FRAME
SERIES TRACTOR**
 Page 1-9 Rev. 4/90

LUBRICATION CHART

HYDROSTATIC DRIVE

1

LUBRICATION REQUIRED		Length of Operation	Type of Lubrication	Amount Required
1. Engine Crankcase -		After first 2-5 Hrs.	Engine Oil SF, SC, SD or SE	Replacement Quantity: (1) 3 pt. (1.4L) (2) 3-1/4 pt. (1.5L) (3) 3-1/2 pt. (1.6L)
Average Temperature	(Spring, Summer, Autumn) (+40°F. to +120°F.) (4°C. to 49°C.)	25 Hrs.*	SAE 30 Oil Type SF, SC, SD or SE 10-W-30, 10W-40	
	(Winter) (+40°F to 0°F. & Lower) (4°C. to -19°C. & Lower)	25 Hrs. *	SAE 5W-30 Oil Type SF, SC, SD, or SE or 5W-20 Oil	
2. Hydrostatic Transmission - (Shipped with SAE 20 oil)		Check Weekly Or 10 Hrs.	*20°F (-6°F) and above SAE 20 oil. Type SC, SD, or SE 20° F (-6°C) and below DRAIN AND REFILL with Recommended Transmission Fluid**	Add To "FULL" Mark on Dipstick Approx. 8 Qts. (7.6L)
		When oil is discolored, dirty or after 250 hrs. (During heavy use every 100 hrs.)	(*DRAIN AND REFILL AS FOLLOWS: 20°F (-6°C) and Above SAE 20 oil Type SC SD or SE - 20°F (-6°C) and Below Drain and refill with Recommended Transmission Fluid**	
3. Front Wheel Bearings -		10 Hrs.	Multi-Purpose Grease	1-2 Strokes
4. Front Wheel Spindles -		10 Hrs.	Multi-Purpose Grease	1-2 Strokes
5. Steering Shaft -		10 Hrs.	Multi-Purpose Grease	1-2 Strokes

* More often under extreme conditions.

** Use SC, SD or SE SAE 30 rated oil if tractor is used under constant heavy load conditions in hot weather (blade, plow, etc.)

NOTE: A hand type grease gun is recommended when greasing your unit. HI-PRESSURE TYPE GREASE GUNS could cause damage to the fittings and bearing seals. Lubricate all linkages, levers and pins not equipped with grease fittings with oil once a week, or more often depending on operating conditions.

(1) 3 Pt. (1.4L) - Models 1058, 1659, 1668, 1668L

(2) 3-1/4 Pt. (1.5L) - Models 1258, 1458, 1658, 1664, 1858

(3) 3-1/2 Pt. (1.6L) - Models 1669, 1669L

FRAME
TRACTOR
0 5/85

GENERAL (Continued)

TORQUE VALUE FOR CAP SCREWS

SIZE	 SAE GRADE 2			 SAE GRADE 5			 SAE GRADE 8		
	Lb. In.	Nm	Kgm	Lb. In.	Nm	Kgm	Lb. In.	NM	Kgm
- 20	49	5.5	0.6	75	8.5	0.9	108	12.2	1.2
- 28	56	6.3	0.6	86	9.7	1.0	120	13.6	1.4
	Lb. Ft.			Lb. Ft.			Lb. Ft.		
- 18	8	10.8	1.1	13	17.6	1.8	18	24.4	2.4
- 24	9	12.2	1.2	14	18.9	1.9	20	27.1	2.7
- 16	15	20.3	2.0	23	31.2	3.1	35	47.4	4.8
- 24	17	23.0	2.3	25	33.9	3.4	35	47.4	4.8
- 14	24	32.5	3.3	35	47.4	4.8	55	74.5	7.6
- 20	25	33.9	3.4	40	54.2	5.5	60	81.3	8.3
- 13	35	47.4	4.8	55	74.5	7.6	80	108.4	11.0
- 20	40	54.2	5.5	65	88.1	9.0	90	122.0	12.4
- 12	55	74.5	7.6	80	108.4	11.0	110	149.1	15.2
- 18	60	81.3	8.3	90	122.0	12.4	130	176.2	18.0
- 11	75	101.6	10.3	110	149.1	15.2	170	230.4	23.5
- 18	85	115.2	11.7	130	176.2	18.0	180	243.9	24.9
- 10	130	176.2	18.0	200	271.0	27.7	280	379.4	38.7
- 16	145	196.5	20.0	220	298.1	30.4	320	433.6	44.3
- 9	125	169.4	17.3	320	433.6	44.3	460	623.3	63.7
- 14	140	189.7	19.3	350	474.3	48.4	500	677.5	69.2
- 8	190	257.5	26.3	480	650.4	66.5	680	921.4	94.2
- 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

Values $\pm 10\%$ unless otherwise specified.

These values are for capscrews that have been lubricated with engine oil or grease.

Apply standard assembly torque by the following factors:

- 0.5 when threads are dry
- 0.5 when parts are plated
- 0.5 when parts are parkerized
- 1.0 when parts are coated with Molykote
- 1.5 for jam nuts

GROUP II. ELECTRICAL SYSTEM
**MEDIUM FRAME
SERIES TRACTOR**
 Page 2-1 5/78
TROUBLE SHOOTING GUIDE

PROBLEM	PROBABLE CAUSE	REMEDY
Starter Motor does not energize and solenoid does not click.	1. Attachment drive engaged. 2. Brake pedal not depressed. 3. Corroded or loose electrical solenoid connections. 4. Inoperative switches - Attachment drive, brake and key switch. 5. Inoperative solenoid. 6. Defective key switch.	1. Disengage PTO. 2. Depress brake pedal. 3. Clean and tighten Red/White wire at solenoid. 4. Check and replace if necessary. (Refer to switch testing.) 5. Check and replace if necessary. (Refer to solenoid testing.) 6. Check and replace if necessary. (Refer to ignition switch test.)
Starter Motor does not energize but solenoid clicks.	1. Discharged battery. 2. Corroded or loose electrical connections on solenoid, or starter. 3. Defective solenoid.	1. Charge battery. 2. Check solenoid or starter. 3. Check and replace if necessary.
Engine cranks slowly.	1. Weak or discharged battery. 2. Corroded or loose electrical connections at battery.	1. Check battery, charge or replace if necessary. 2. Clean and tighten.
Battery discharges rapidly.	1. Low water level. 2. Defective battery.	1. Check and refill. 2. Check and replace if necessary.
Battery will not charge.	1. Corroded or loose battery cables. 2. Defective battery. 3. Inoperative diode or rectifier/regulator.	1. Clean and tighten. 2. Replace battery. 3. Check diode and replace if necessary. Check rectifier/regulator by substitutions. (Refer to diode test.)

2

1 FRAME
TRACTOR
Rev. 11-90

ELECTRICAL SYSTEM (Continued)

TROUBLE SHOOTING GUIDE

SYMPTOM	PROBABLE CAUSE	REMEDY
Not operating.	1. Bulbs burned out. 2. Loose or broken white or black wire. 3. Light switch.	1. Replace bulbs. 2. Replace wires or tighten connections. 3. Check for broken switch & replace.
Attachment drive Attachment light	1. Broken or loose wires. 2. Electric clutch.	1. Check purple wire between PTO switch and electric clutch for breaks or poor connections & repair. 2. Check clutch plate gap & adjust. Refer to PTO section.
Attachment drive Attachment oper-	1. Attachment drive switch. 2. Broken red wire between Attachment drive switch and key switch.	1. Check and replace if necessary. Refer to Attachment switch test. 2. Check and replace if necessary.
Drive when drive not on.	1. No operator in tractor seat. 2. Seat switch is not adjusted properly.	1. Seat switch must be activated by operator weight 2. Adjust so switch is functional when operator is seated.
Operation stops when not seated.	1. Seat switch is not adjusted correctly. 2. Seat switch. 3. Broken wires. 4. Attachment drive switch. 5. Condensor.	1. Adjust so switch is functional when operator is not seated. 2. Check and replace if necessary. Refer to seat switch test. 3. Connect or repair blue wires between seat switch and Attachment drive 4. Check and replace if necessary. Refer to attachment drive switch test. 5. Check and replace if necessary.

ELECTRICAL SYSTEM (Continued)**MEDIUM FRAME
SERIES TRACTOR**
Page 2-3 5/78**ELECTRICAL SYSTEM WIRE COLOR CODE****2**

<u>COLOR</u>	<u>FUNCTION</u>	<u>EXPLANATION</u>
Black	Ground	—
Black/Yellow	Solenoid Ground	Lead between solenoid and ground switch
Red	Switched 12 Volts	"Run" or "On" Key Position
Red/White	Amp Meter Pos. Terminal	For Amp Meter polarity indication
Red/Black	Amp Meter Neg. Terminal	Amp Meter polarity indication
Red/Yellow	Start Circuit	12 Volts start position only
Orange	Ignition Circuit	12 Volts during run and start position
Yellow	Stator Leads	—
Yellow/Red	Stator Leads	To indicate polarity on 2nd wire
Blue	Stop Circuit	From engine kill circuit
Blue/Black	Safety Interlock	Accessory Stop Circuit
White	Lights	—
White/Green	Hi Beam	Function of light circuit
White/Blue	Lo Beam	Function of light circuit
White/Red	Brake Light	Function of light circuit
White/Black	Back Up Light	Function of light circuit
Brown	Tach	—
Brown/Orange	Tach Signal	Obtained from 12 volt ignition coil
Brown/Yellow	Tach Signal	Obtained from stator
Purple	P.T.O. Clutch	—
Green	Temperature	Lead used between sender and indicator
Gray	Oil Pressure	Lead used between sender and indicator

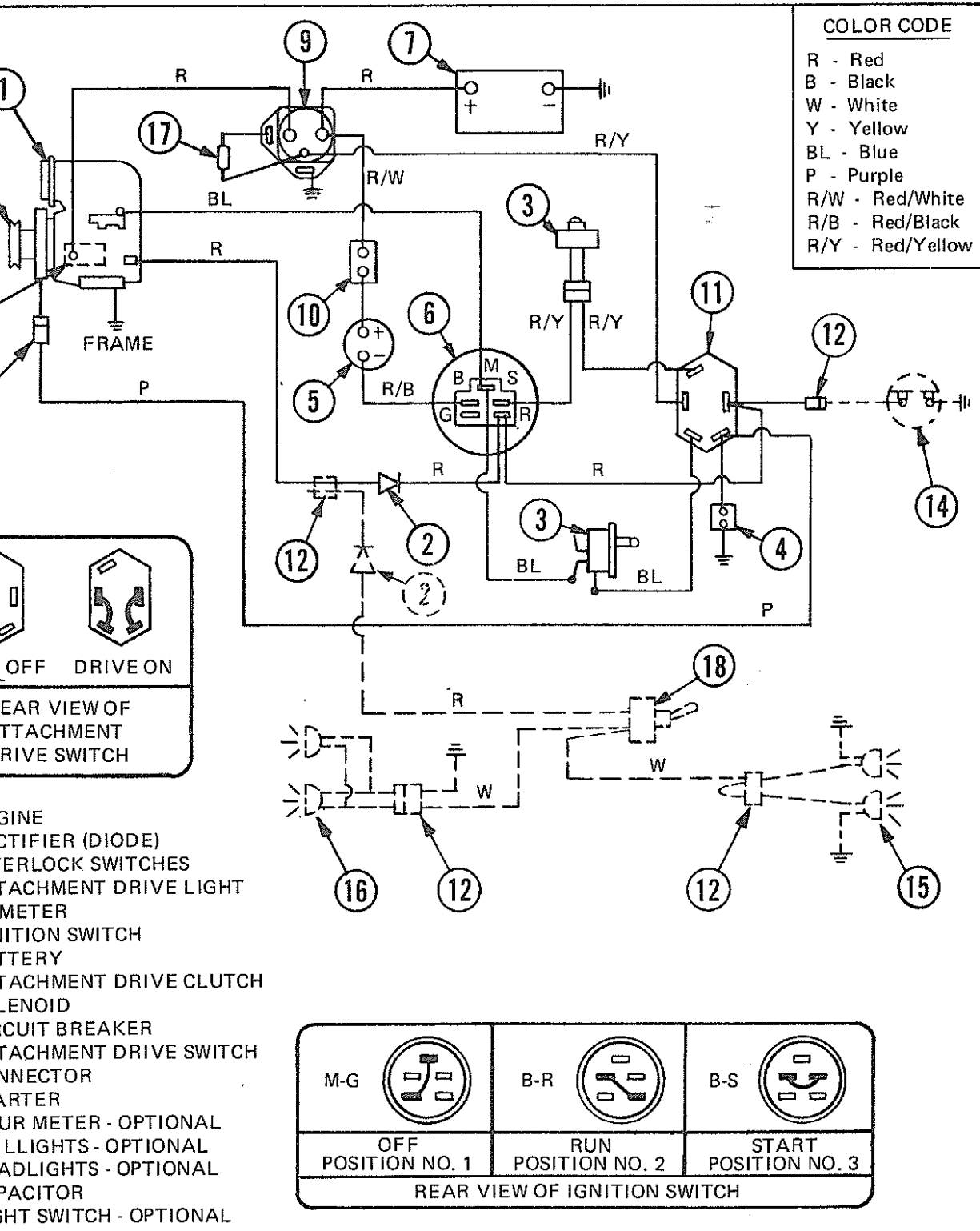
Some of the products from Vendors will not match our color system. Generally the Vendor uses black wire; however, we will try to interrupt this difference by using a connector located near the Vendor item.

FRAME
TRACTOR
Rev. 4/83

ELECTRICAL SYSTEM (Continued)

COMPLETE WIRING DIAGRAM

1058, 1060 AND 1160 S/N 0100101 AND UP



ELECTRICAL SYSTEM (Continued)

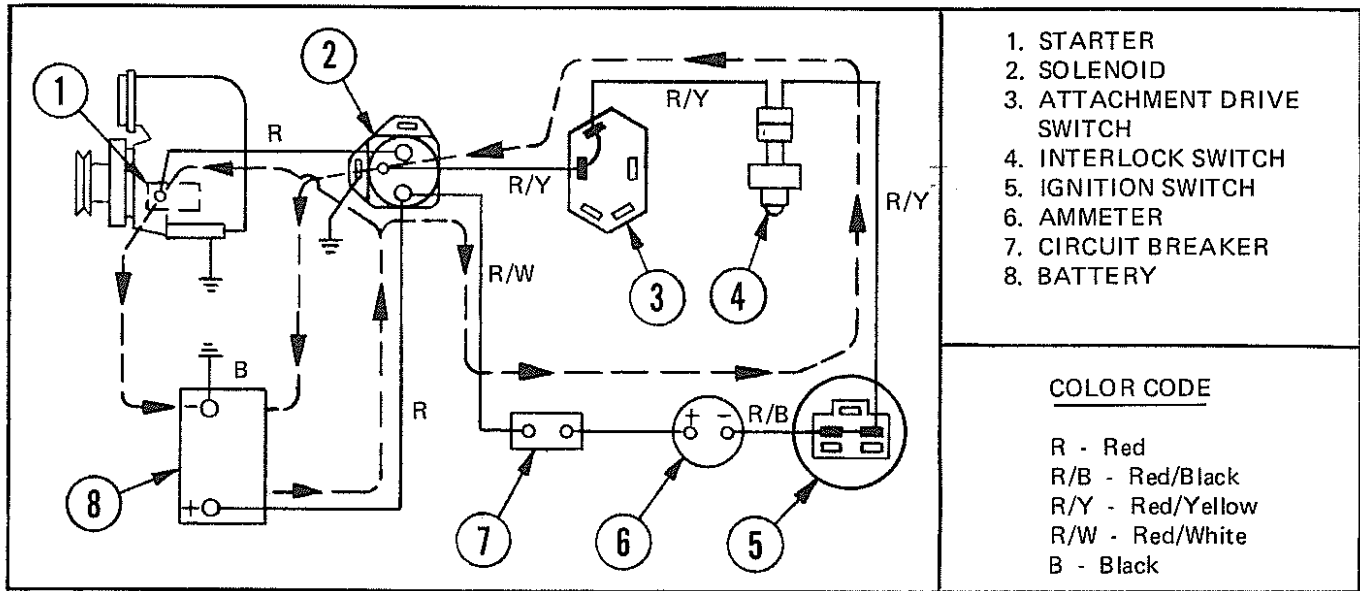
**MEDIUM FRAME
SERIES TRACTOR**
Page 2-5 Rev. 4/90

CIRCUIT DIAGRAM

1058, 1060 AND 1160 S/N 0100101 AND UP

START CIRCUIT

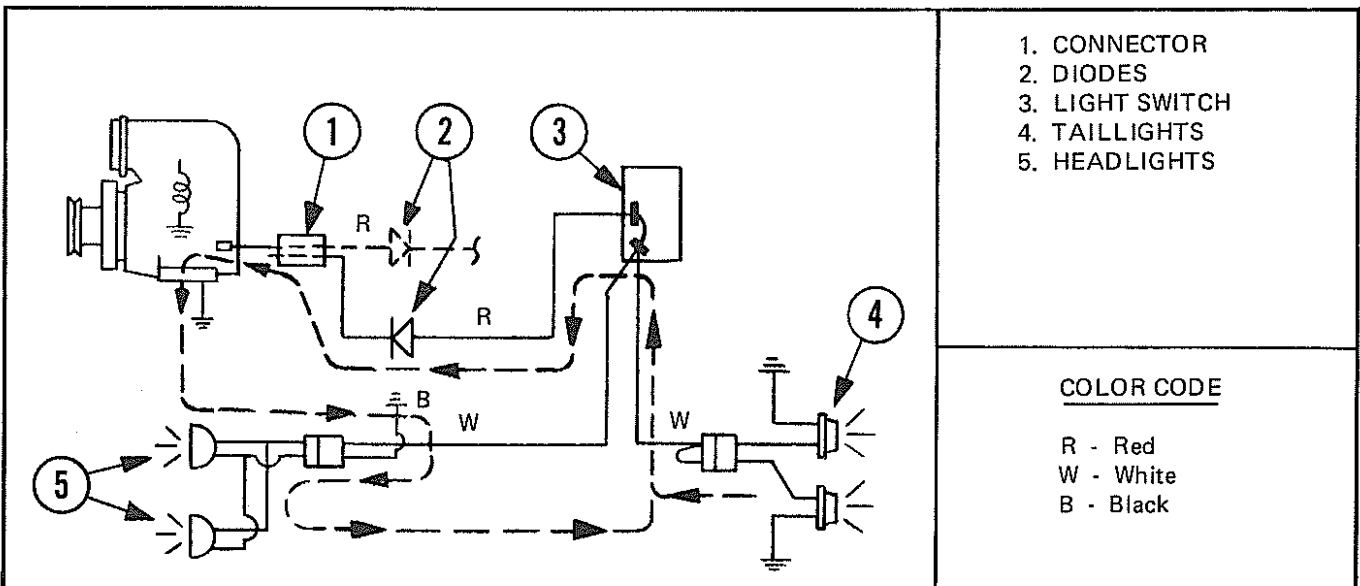
(Ignition switch in "START" position, Attachment switch OFF and Brake switch depressed.)



2

LIGHT CIRCUIT

(Light switch ON)



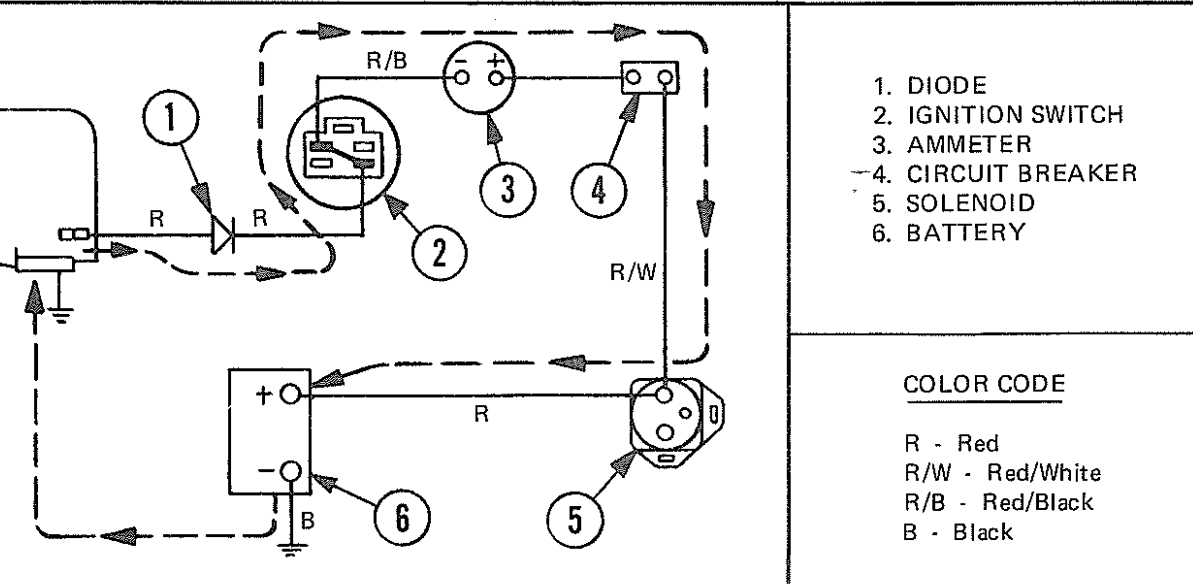
ELECTRICAL SYSTEM (Continued)

CIRCUIT DIAGRAM

1058, 1060 AND 1160 S/N 0100101 AND UP

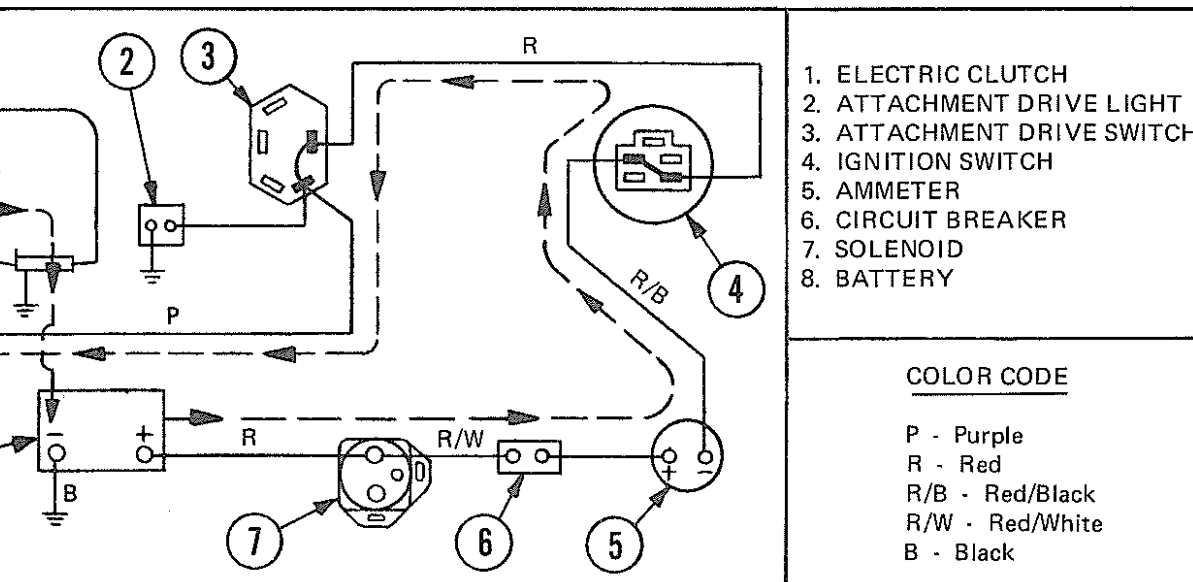
CHARGING CIRCUIT

(Ignition switch in "RUN" position)



ATTACHMENT DRIVE CIRCUIT

(Ignition switch in "RUN" position and Attachment switch in ON)



ELECTRICAL SYSTEM (Continued)

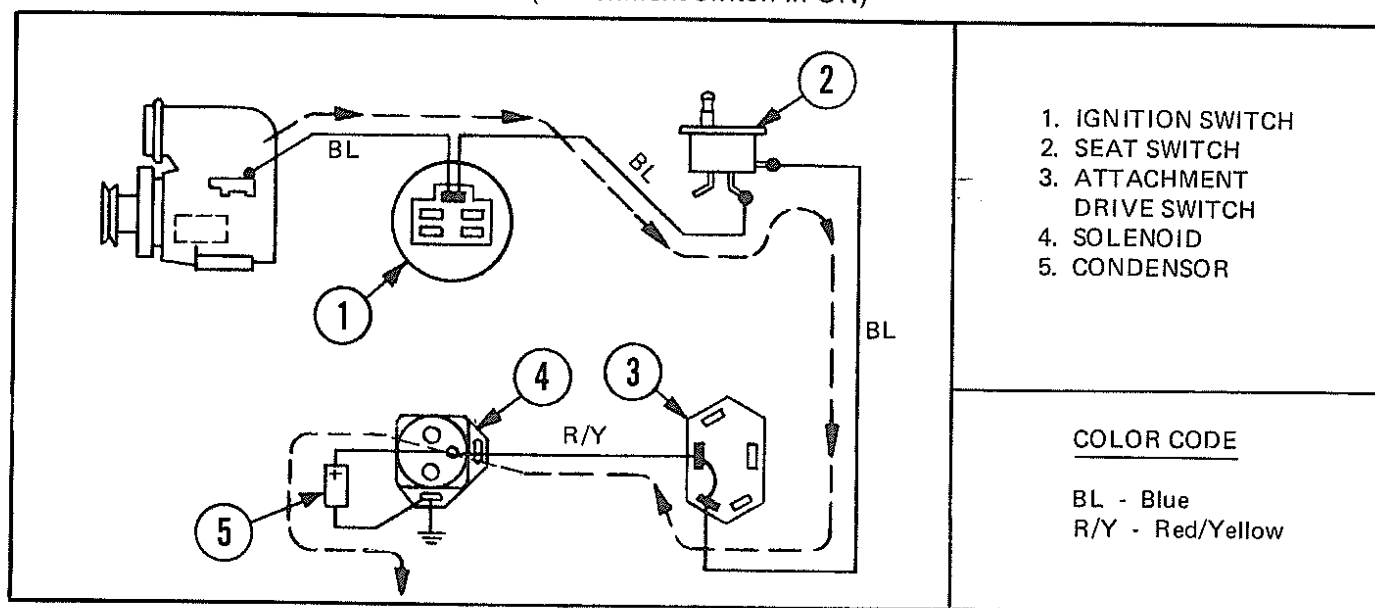
MEDIUM FRAME
SERIES TRACTOR
Page 2-7 Rev. 4/90

CIRCUIT DIAGRAM

1058, 1060 AND 1160 S/N 0100101 AND UP

SEAT SWITCH CIRCUIT

(Attachment switch in ON)



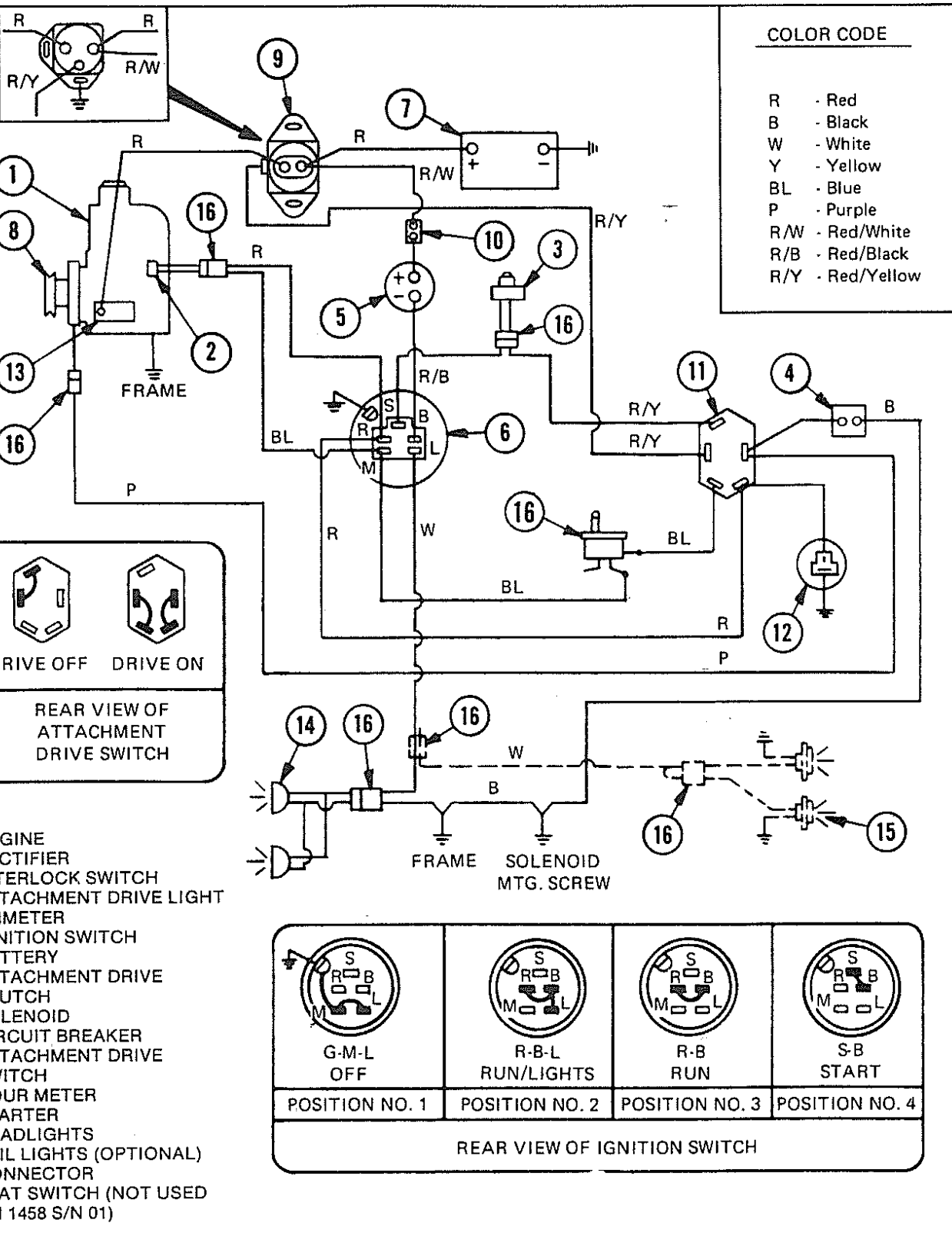
2

FRAME
TRACTOR
Rev. 4/90

ELECTRICAL SYSTEM (Continued)

COMPLETE WIRING DIAGRAM

1258, 1261, 1458, 1461, 1658, 1661, 1663, 1664 AND 1858



ELECTRICAL SYSTEM (Continued)

**MEDIUM FRAME
SERIES TRACTOR
Page 2-9 5/86**

2

FRAME
ACTOR
Rev. 4/90

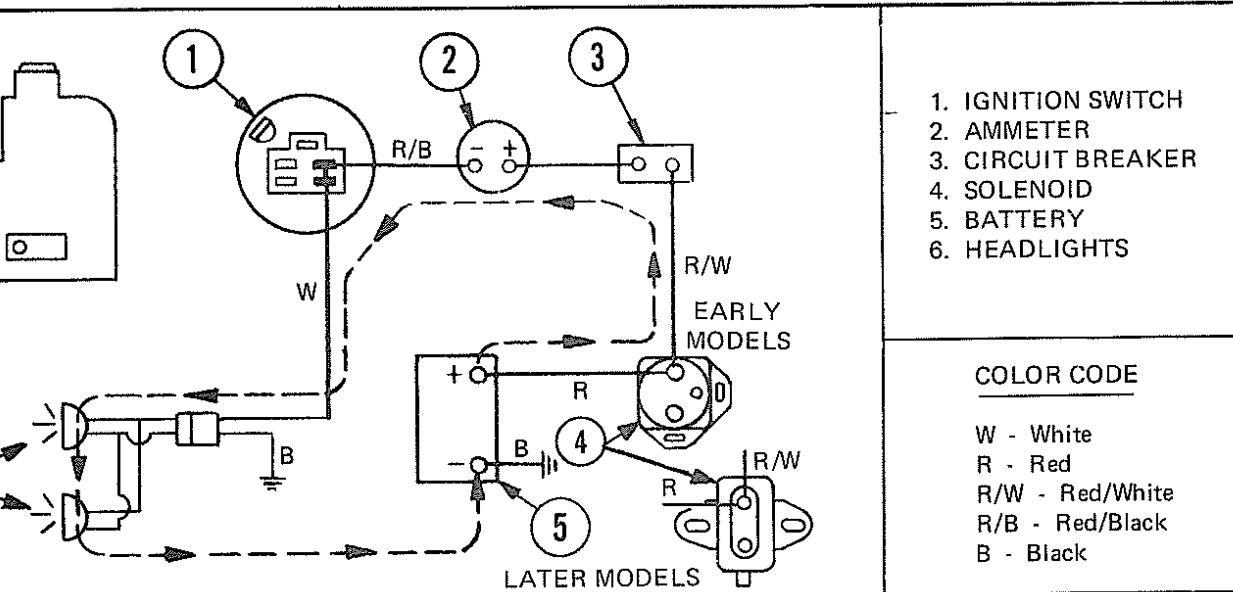
ELECTRICAL SYSTEM (Continued)

CIRCUIT DIAGRAM

1258, 1261, 1458, 1461, 1463, 1658, 1661, 1663, 1664 AND 1858 S/N 0100101 AND UP

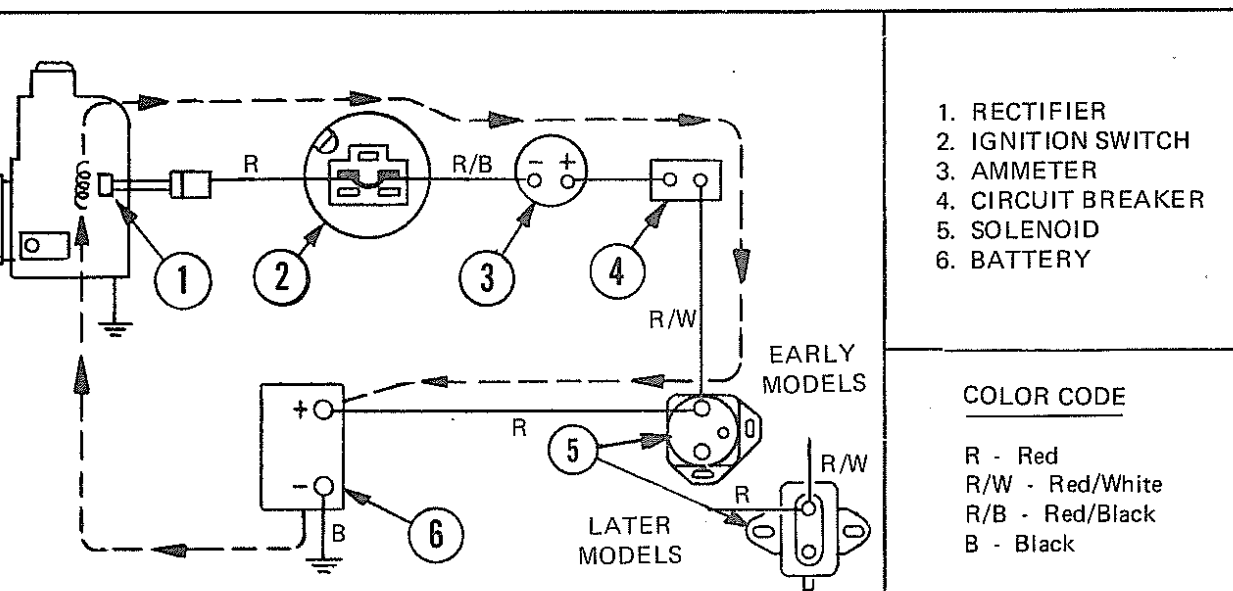
LIGHT CIRCUIT

(Ignition switch in "RUN/LIGHTS" position)



CHARGING CIRCUIT

(Ignition switch in "RUN/LIGHTS" or "RUN" position)



ELECTRICAL SYSTEM (Continued)

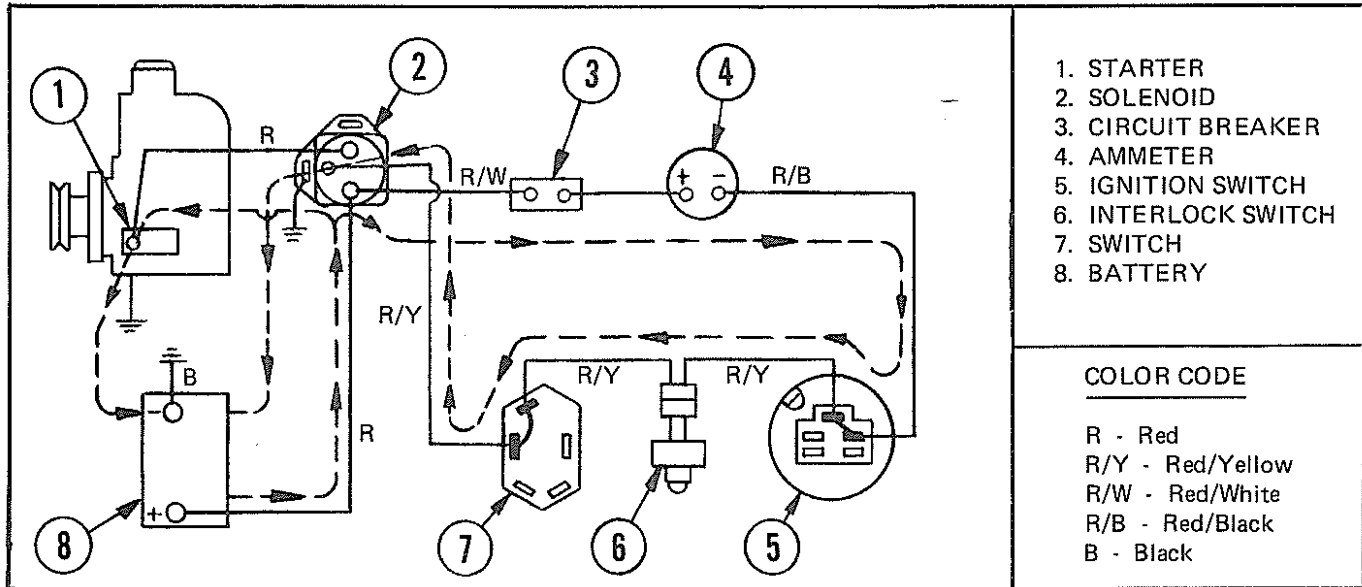
**MEDIUM FRAME
SERIES TRACTOR**
Page 2-11 Rev. 5/8

CIRCUIT DIAGRAM

1258, 1261 S/N 0100101-0199999 1458, 1461, 1658 S/N 0100101 AND LATER
1661 S/N 0100101-0299999 1858 S/N 0100101-0199999

STARTING CIRCUIT

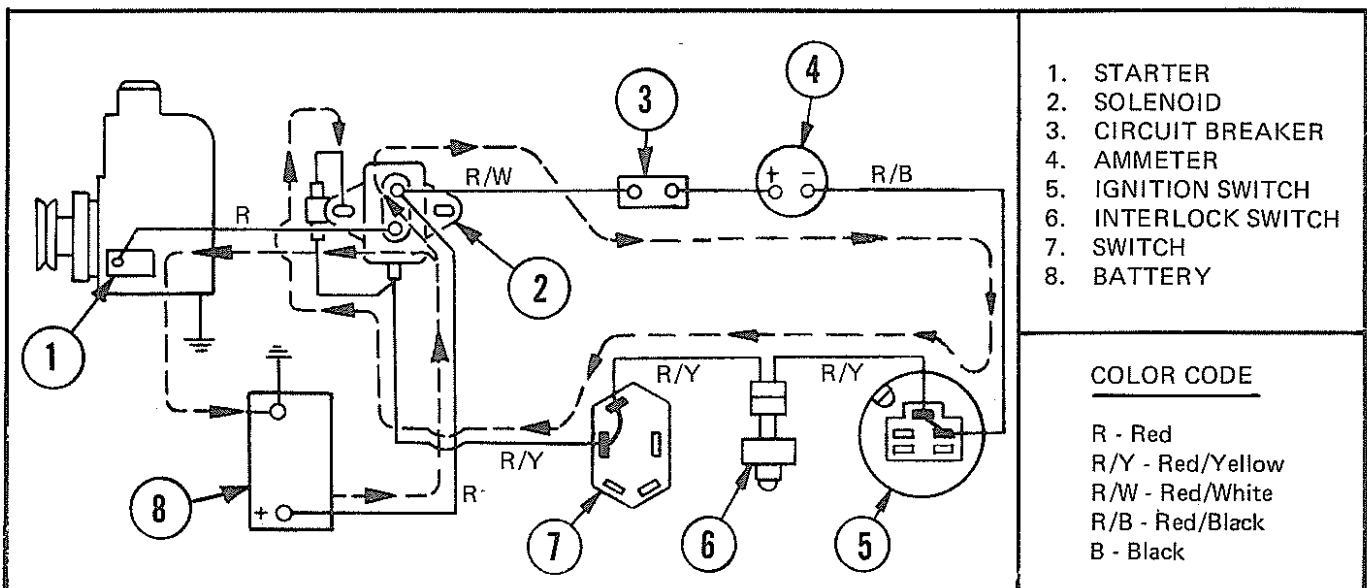
(Ignition switch in "START" position, Brake switch depressed and Attachment switch OFF)



1258, 1261, 1858 S/N 0200101 AND LATER - 1463, 1663, 1664 S/N 0100101 AND LATER - 1661 S/N 0300101 AND LATER

STARTING CIRCUIT

(Ignition switch in "START" position, brake switch depressed and attachment switch OFF)



2

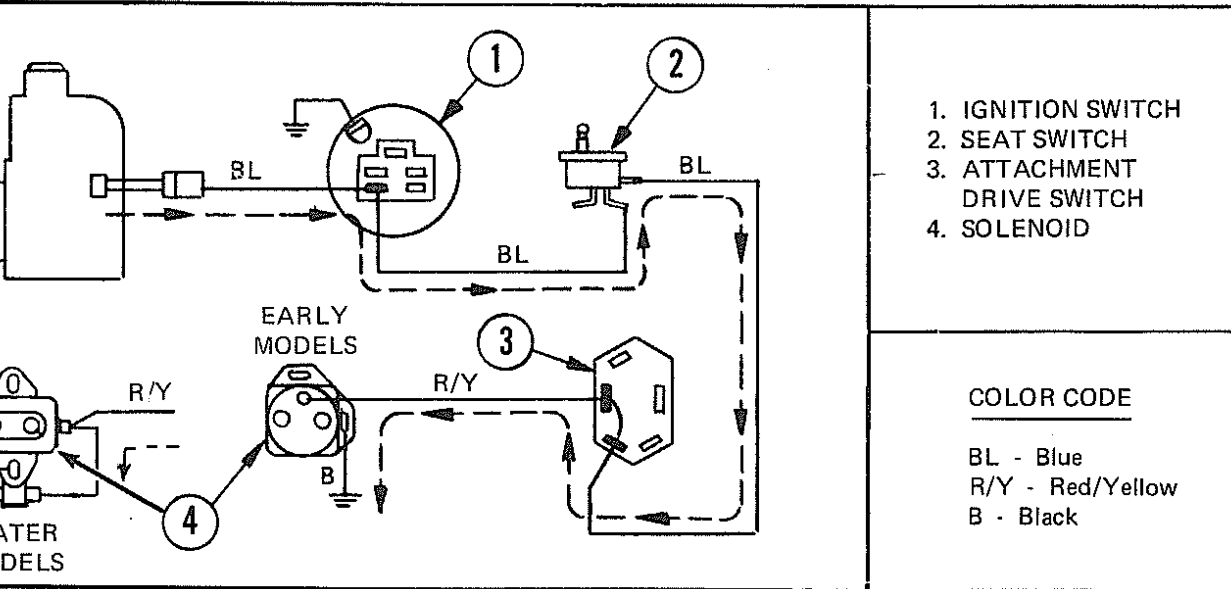
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y. 4/90

ELECTRICAL SYSTEM (Continued)

CIRCUIT DIAGRAM

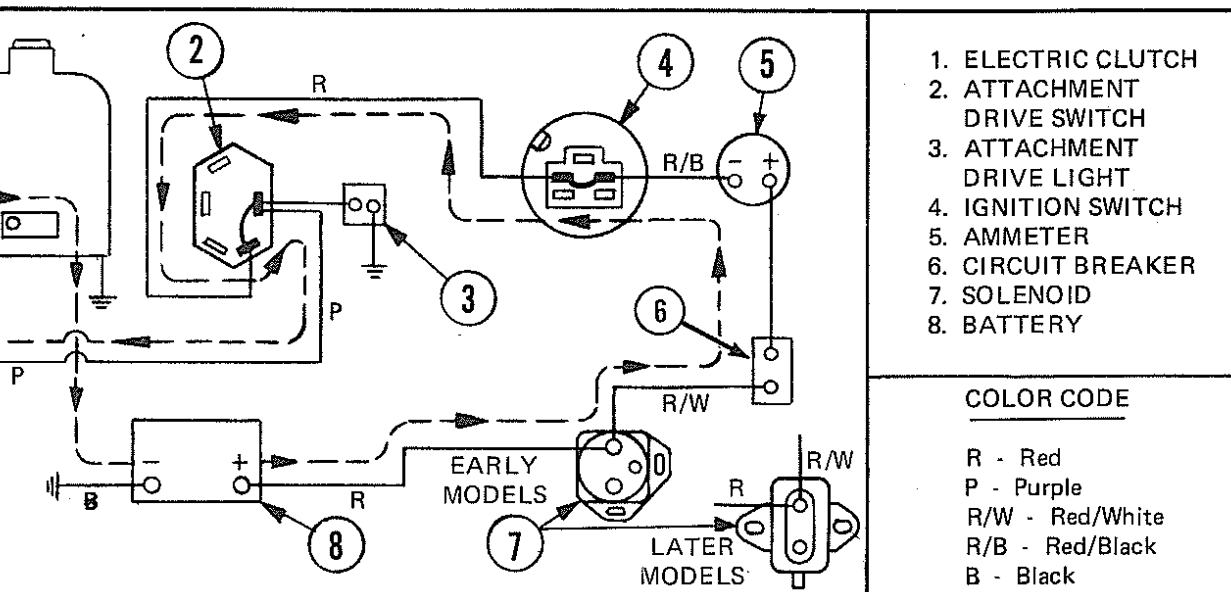
1258, 1261, 1458, 1461, 1463, 1658, 1661, 1663, 1664 AND 1858 S/N 0100101 AND UP

SEAT SWITCH CIRCUIT (Attachment switch ON)



ATTACHMENT DRIVE CIRCUIT

(Ignition switch in "RUN/LIGHTS" or "RUN" position and Attachment switch ON)



ELECTRICAL SYSTEM (Continued)

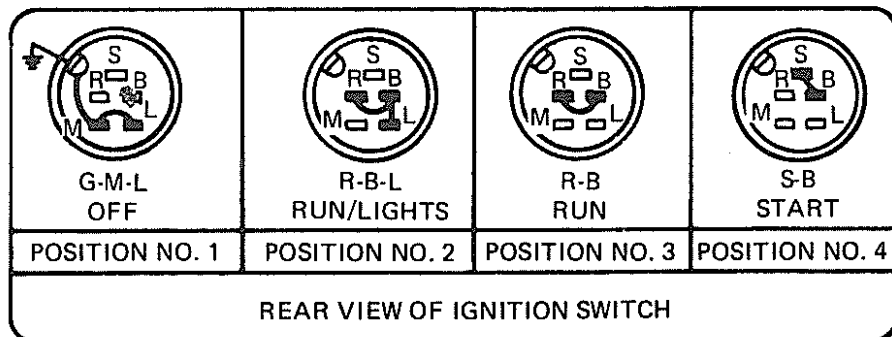
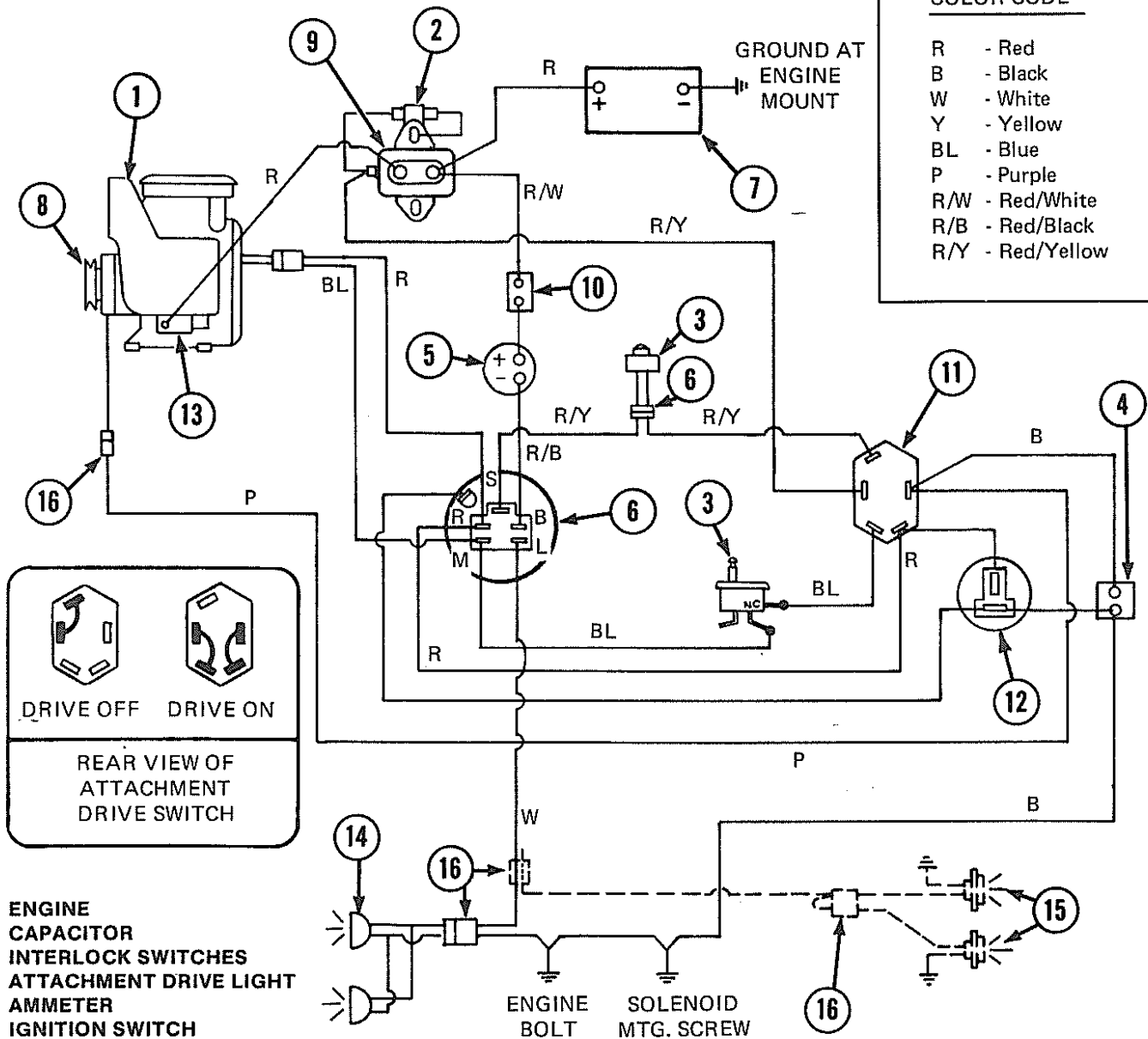
**MEDIUM FRAME
SERIES TRACTOR**
Page 2-13 Rev. 4/90

1659, 1662 S/N 0100101 AND UP

COLOR CODE

R - Red
B - Black
W - White
Y - Yellow
BL - Blue
P - Purple
R/W - Red/White
R/B - Red/Black
R/Y - Red/Yellow

2



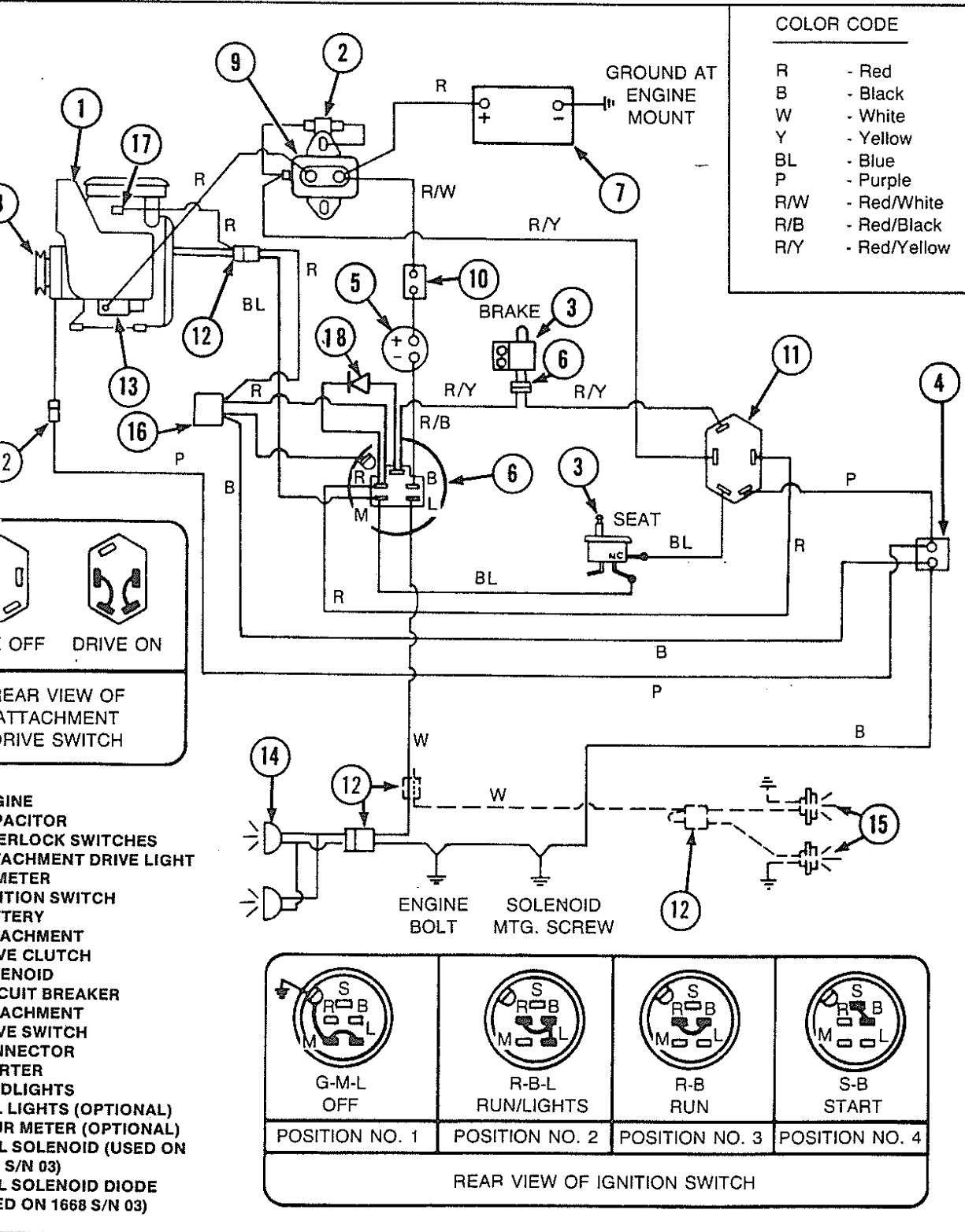
FRAME
ACTOR
Rev. 4/90

ELECTRICAL SYSTEM (Continued)

COMPLETE WIRING DIAGRAM

LS 1667 S/N 0100101 thru 0399999

1668 S/N 0100101 thru 0399999



ELECTRICAL SYSTEM (Continued)

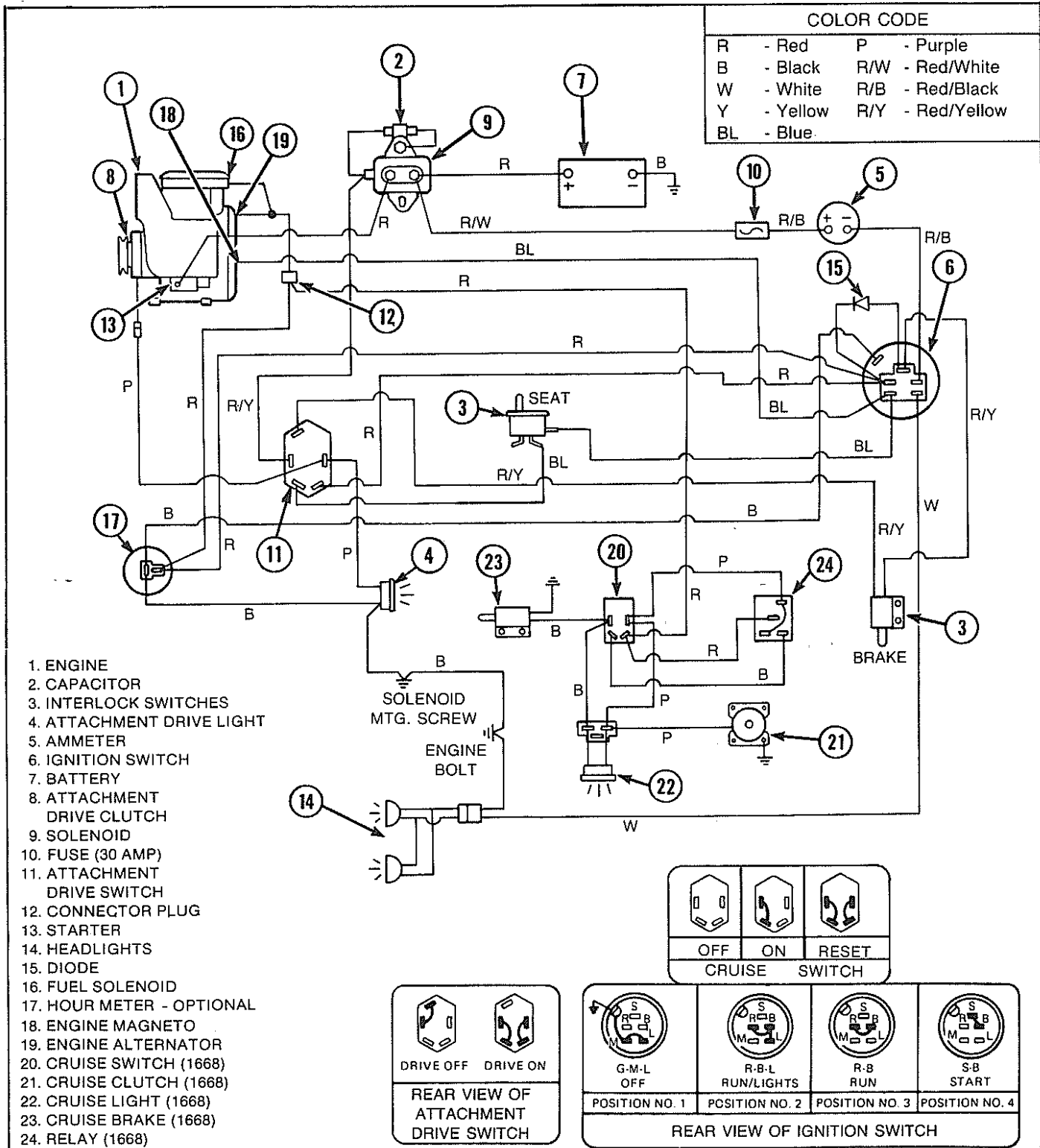
**MEDIUM FRAME
SERIES TRACTOR**
Page 2-15 Rev. 4/90

COMPLETE WIRING DIAGRAM

MODEL 1467 AND 1668 S/N 0400101 thru 0599999

1668L S/N 0100101 thru 0199999

1667 S/N 0400101 thru 0499999



2

**M FRAME
TRACTOR
6 Rev. 4/90**

ELECTRICAL SYSTEM (Continued)

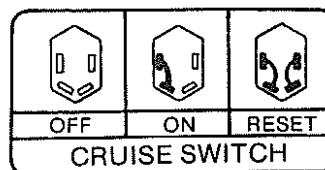
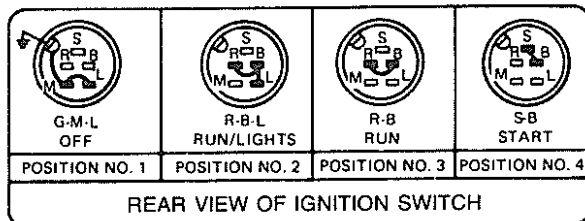
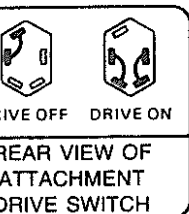
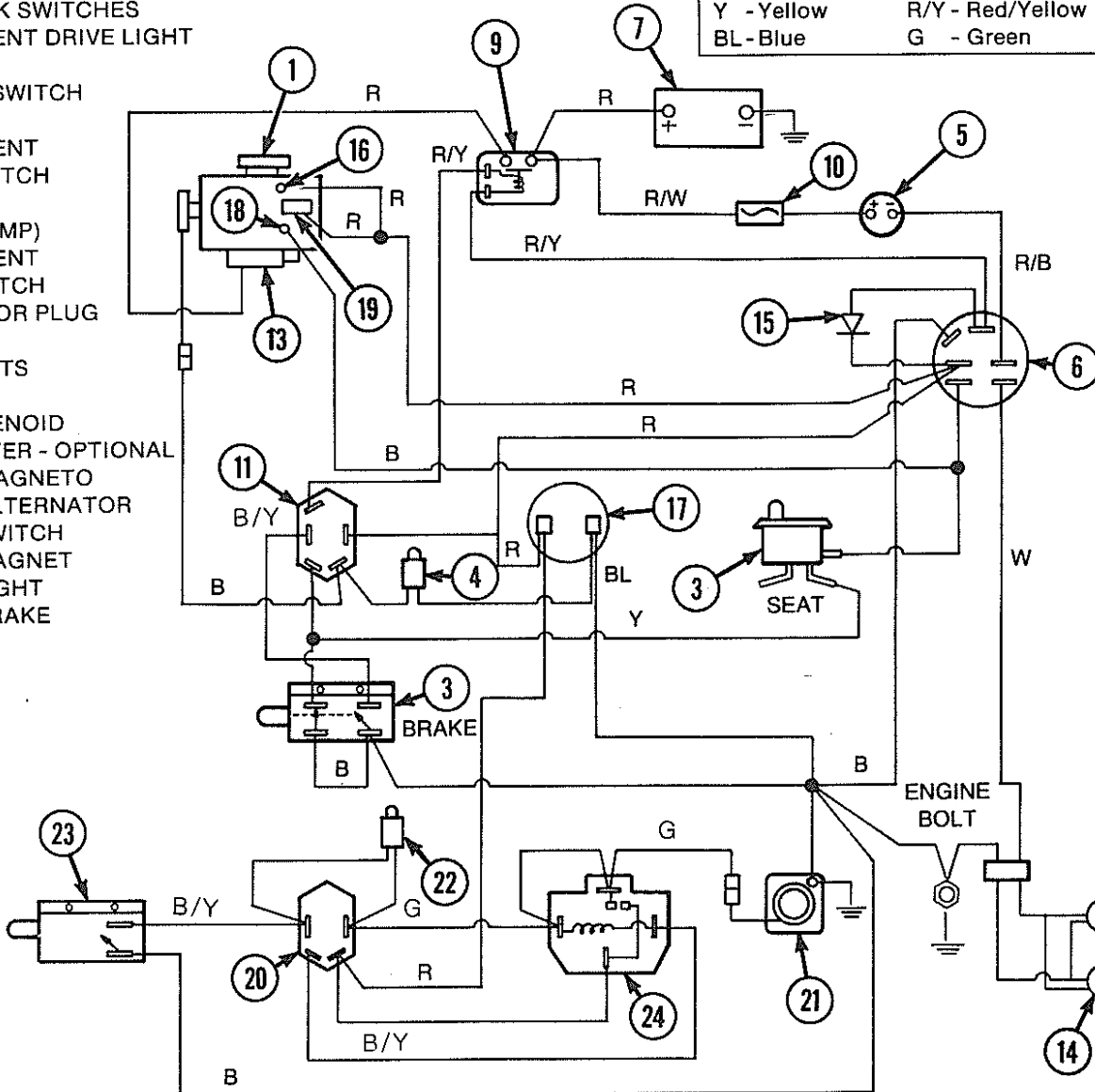
COMPLETE WIRING DIAGRAM

MODEL 1669 AND 1669L

ENGINE
LOCK SWITCHES
ATTACHMENT DRIVE LIGHT
METER
IGNITION SWITCH
BATTERY
ATTACHMENT
IVE CLUTCH
LENOID
SE (30 AMP)
ATTACHMENT
IVE SWITCH
CONNECTOR PLUG
ARTER
ADLIGHTS
ODE
EL SOLENOID
UR METER - OPTIONAL
GINE MAGNETO
GINE ALTERNATOR
UISE SWITCH
UISE MAGNET
UISE LIGHT
UISE BRAKE
LAY

COLOR CODE

R - Red	P - Purple
B - Black	B/Y - Black/Yellow
W - White	R/B - Red/Black
Y - Yellow	R/Y - Red/Yellow
BL - Blue	G - Green



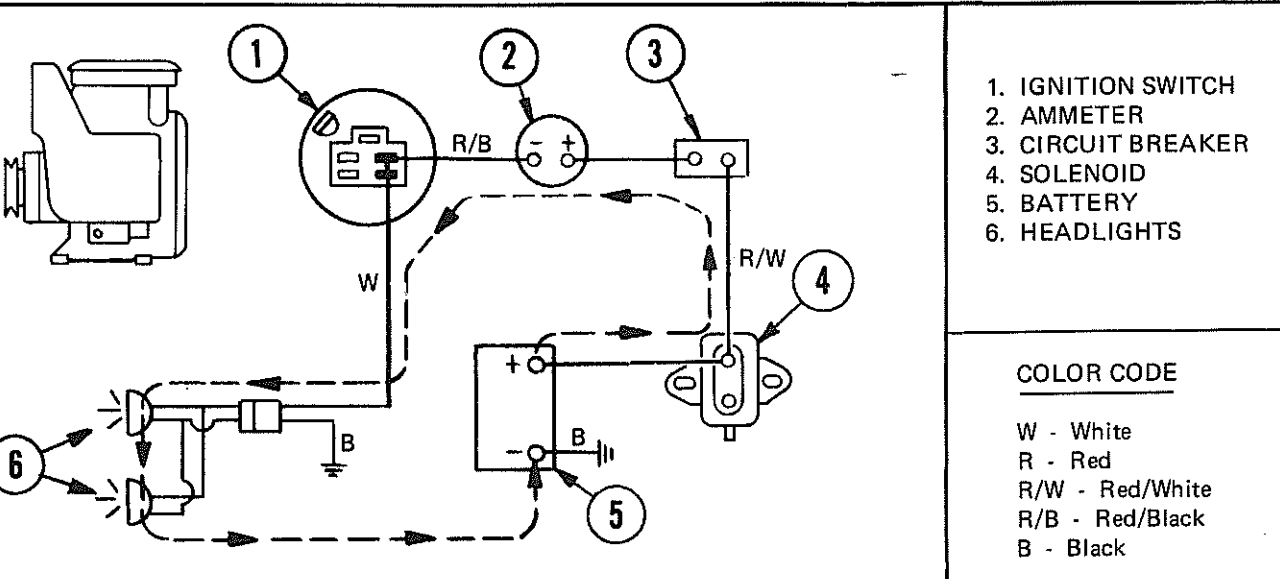
ELECTRICAL SYSTEM (Continued)

CIRCUIT DIAGRAM

1467, 1468, 1659, 1662, 1667, 1668, 1668L, 1669, 1669L S/N 0100101 AND UP

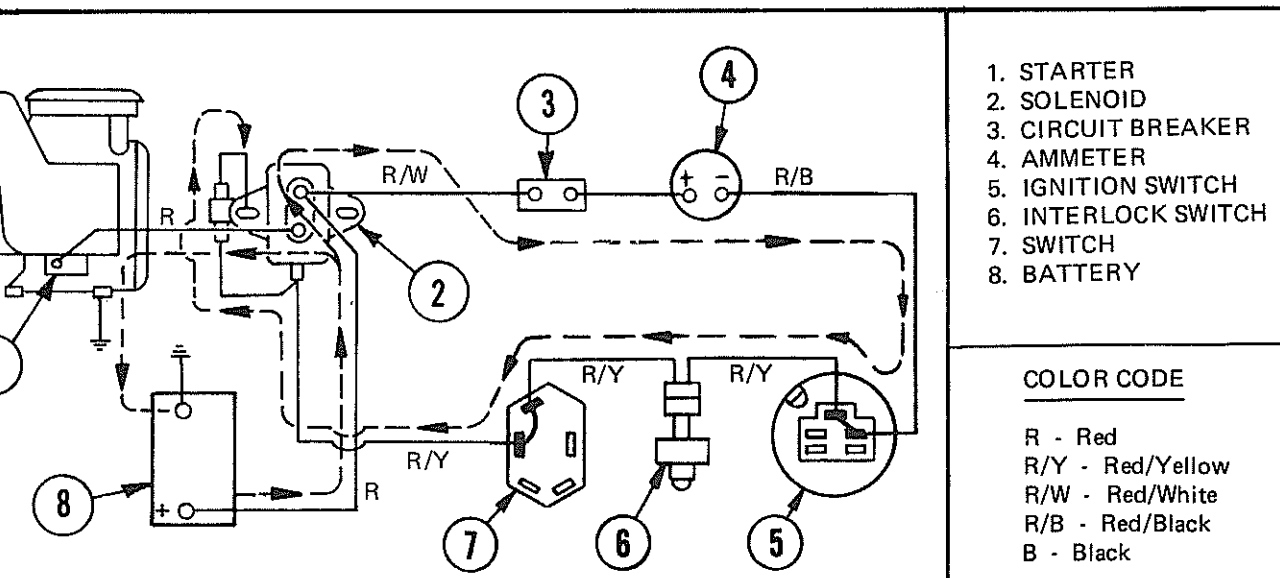
LIGHT CIRCUIT

(Ignition switch in "RUN/LIGHTS" position)



STARTING CIRCUIT

(Ignition switch in "START" position, Brake switch depressed and Attachment switch OFF)



ELECTRICAL SYSTEM (Continued)

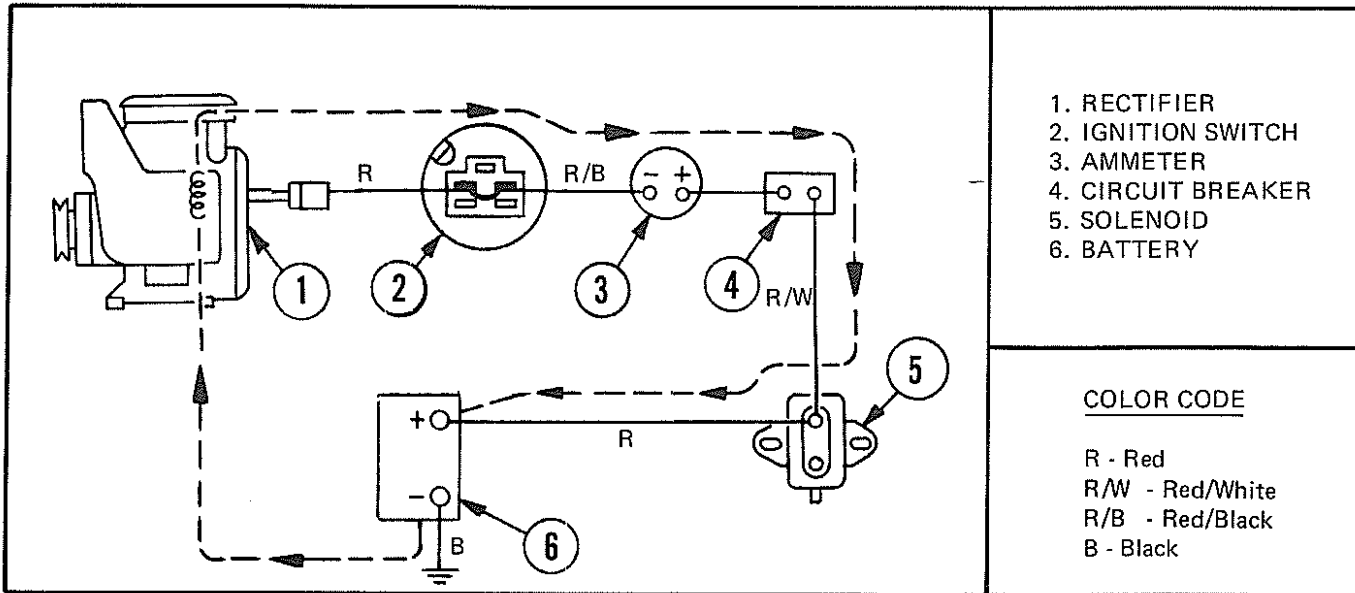
**MEDIUM FRAME
SERIES TRACTOR**
Page 2-19 Rev. 4/90

CIRCUIT DIAGRAM

1467, 1468, 1659, 1662, 1667, 1668, 1669, 1669L S/N 0100101 AND UP

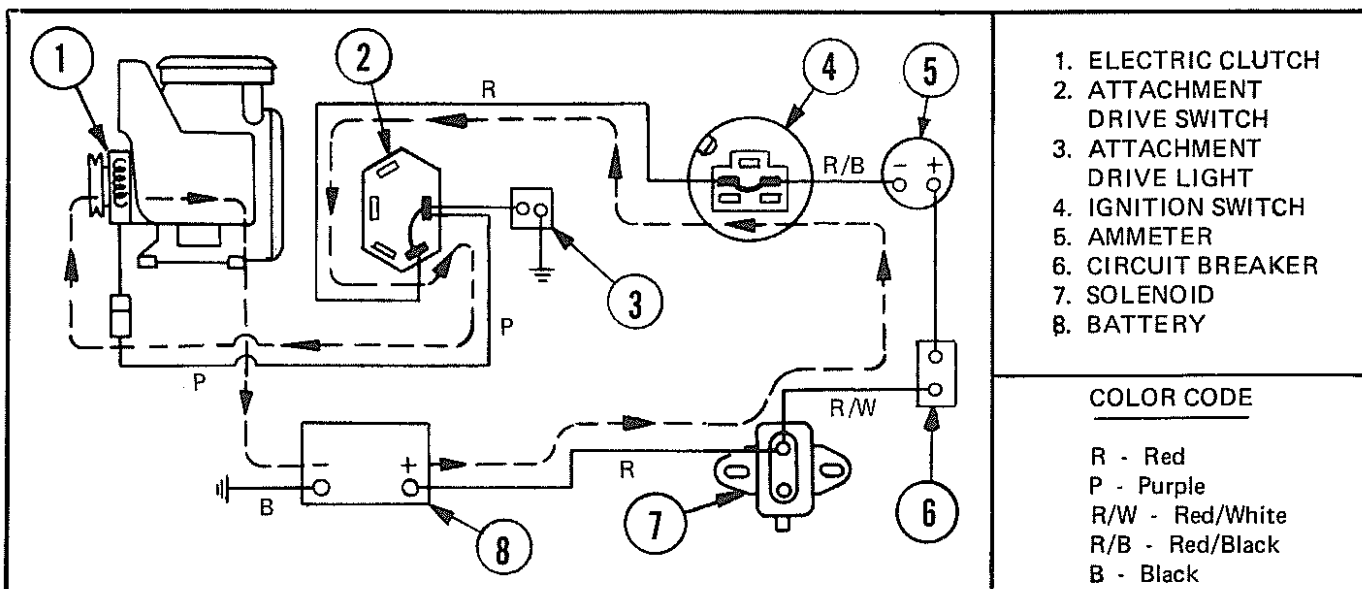
CHARGING CIRCUIT

(Ignition switch in "RUN/LIGHTS" or "RUN" position)



ATTACHMENT DRIVE CIRCUIT

(Ignition switch in "RUN/LIGHTS" or "RUN" position and Attachment switch ON)



2

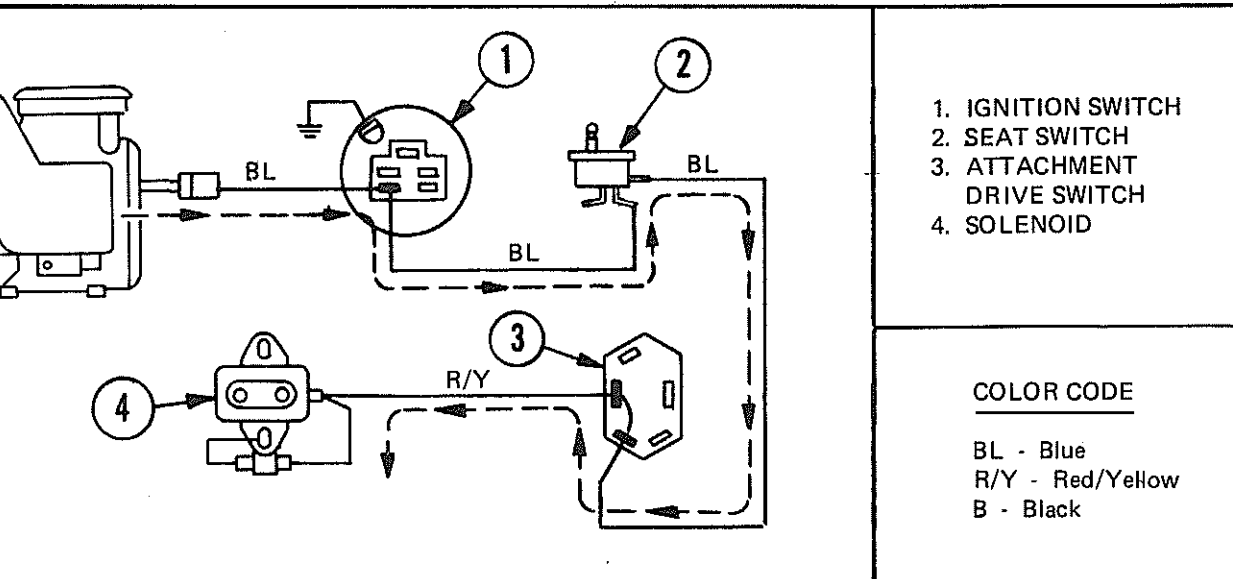
FRAME
ACTUATOR
Rev. 4/90

ELECTRICAL SYSTEM (Continued)

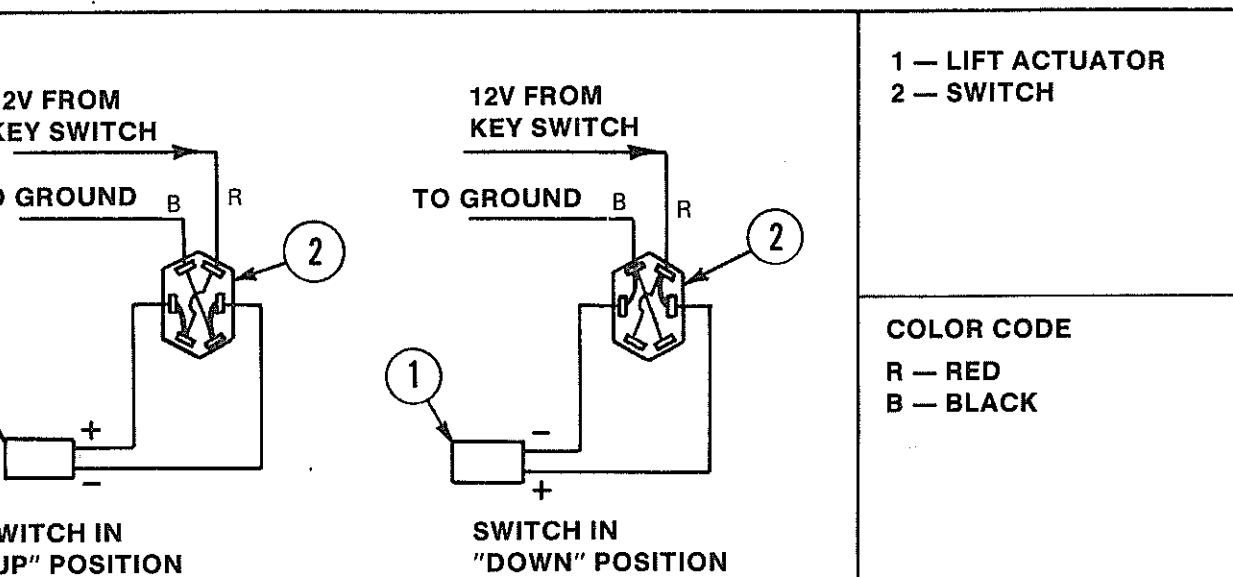
CIRCUIT DIAGRAM

1667, 1468, 1659, 1662, 1667, 1668, 1669, 1669L S/N 0100101 AND UP

SEAT SWITCH CIRCUIT (Attachment switch ON)



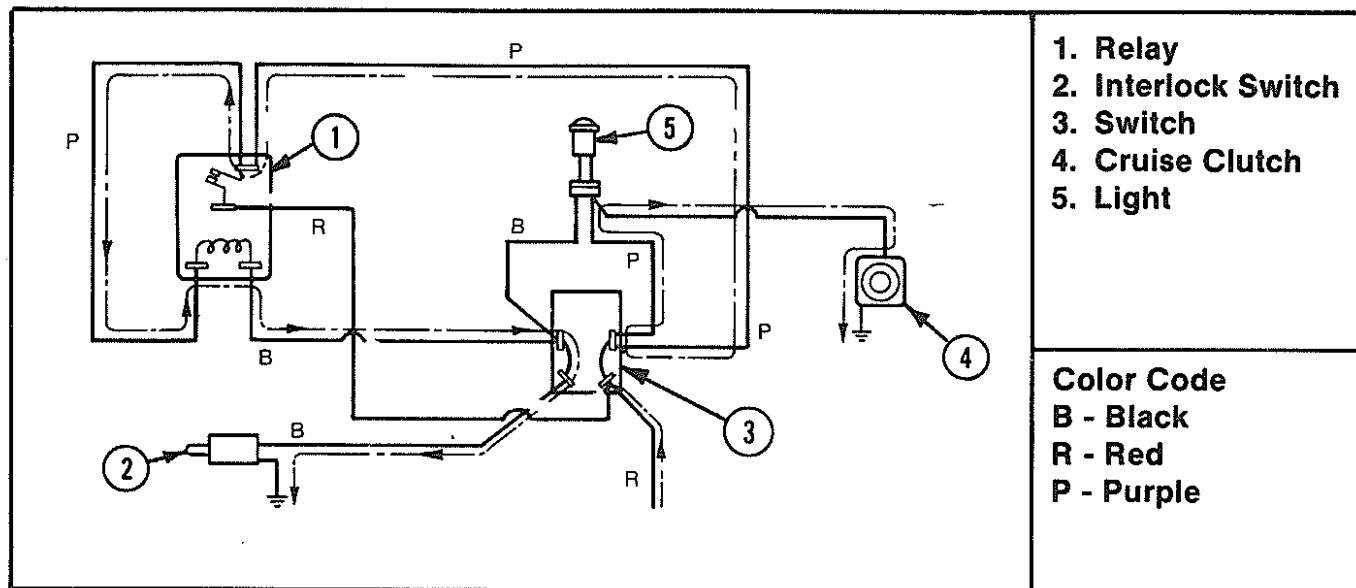
ELECTRIC LIFT



ELECTRICAL SYSTEM (Continued)

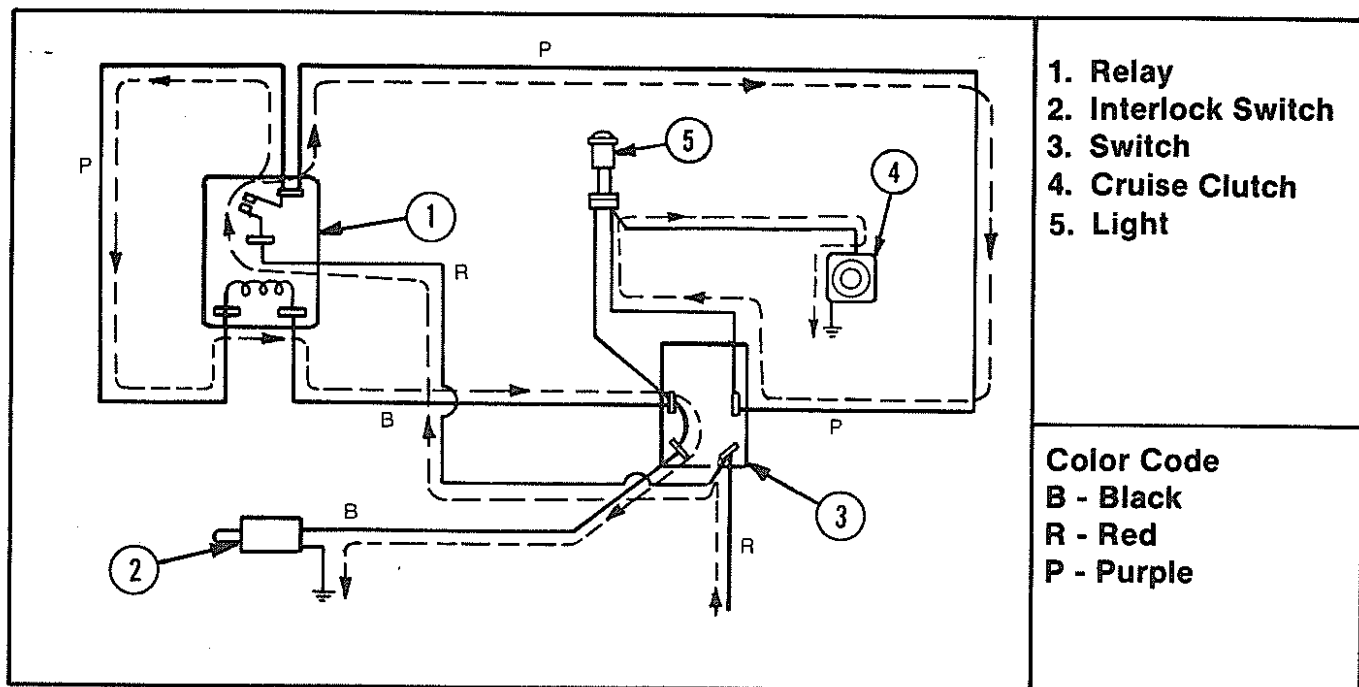
MEDIUM FRAME
SERIES TRACTOR
Page 2-21 Rev. 4/90

CIRCUIT DIAGRAMS ELECTRIC CRUISE CIRCUIT WITH RELAY IN "RESET" POSITION



2

ELECTRIC CRUISE CIRCUIT WITH RELAY IN "ON" POSITION (AFTER RESET)



ELECTRICAL SYSTEM (Continued)**TESTING ELECTRICAL SYSTEM****TESTING BATTERY****TESTING SPECIFIC GRAVITY**

To determine whether the battery is capable of meeting the demands of the starting system, it is necessary to subject the battery to a load test. The electrolyte must be at least 75% full for this test. To determine the percentage of charge, a hydrometer reading must be taken. The following table illustrates ranges of specific gravity for each cell in various states of charge at 80°F.

TESTING SPECIFIC GRAVITY

	% CHARGED
1.280.....	100%
1.250.....	75%
1.220.....	50%
1.190.....	25%
1.160.....	10%
1.130.....	DISCHARGED

TESTING BATTERY VOLTAGE

Battery voltage can be checked with a volt-ohm meter. It should be between 11.5 and 12.5 volts.

TESTING CRANKING TEST

Before the test the battery should be at approximately 80°F.

Check battery electrolyte level and add water if necessary. Battery must be fully charged.

Check battery voltage. It should be between 11.5 and 12.5 volts.

Crank the engine using the starter motor for 15 seconds. Battery voltage should not drop below 9.0 volts at the end of this 15 second test.

- If voltage is less than 9.0 volts, repeat steps 1 through 4.
- If same results are obtained, replace battery.

SOLENOID TEST

The solenoid is a sealed unit and must be replaced if found inoperative.

To test the solenoid, connect 9 - 12 volt power source between the solenoid case and the small solenoid terminal.

CAUTION: If the battery is the power source, a spark at the battery post may ignite battery gases.

When the power source is connected the solenoid plunger should activate contact between the two large terminals. If the test does not activate the plunger, replace the solenoid.

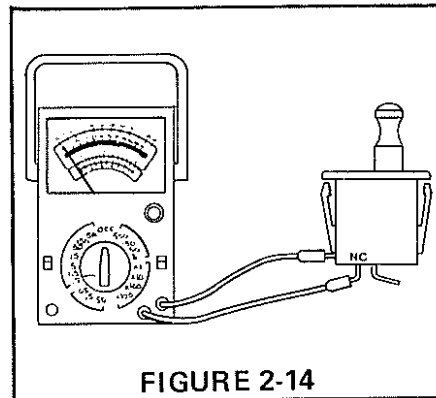
SWITCH TESTS

Before the electrical test of any switch, make sure the mechanical adjustments of its actuating mechanisms are correct.

SEAT SWITCH

The seat switch is wired "Normally Closed" (NC).

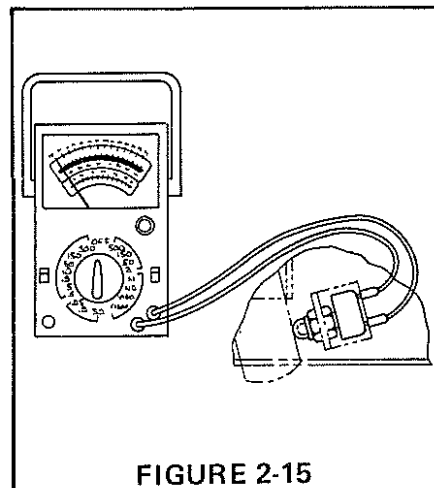
To test, connect an ohm meter as shown in Figure 2-14 and depress plunger. Meter should indicate zero resistance. At the "Normally Open" position, the meter should indicate an infinite reading.

**FIGURE 2-14****BRAKE SWITCH (Figure 2-15)**

The brake switch is wired "Normally Open" (NO).

To test, connect an ohm meter and depress the switch plunger. Meter should indicate zero resistance.

At "Normally Open" (NO) position, the meter should indicate an infinite reading.

**FIGURE 2-15**

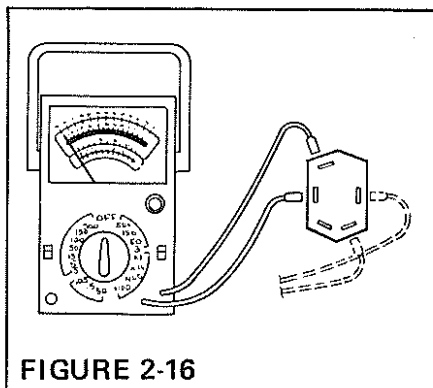
ELECTRICAL SYSTEM (Continued)

**MEDIUM FRAME
SERIES TRACTOR**
Page 2-23 Rev. 4/90

TESTING ELECTRICAL SYSTEM**ATTACHMENT DRIVE SWITCH**

When switch is in down (OFF) position, check continuity between the middle terminal and top terminal on same side. See Figure 2-16. Resistance should be zero.

When switch is in top (ON) position, check continuity between the two middle terminals and bottom terminals on same side. See Figure 2-16. Resistance should be zero.

**FIGURE 2-16****DIODE TEST (BRIGGS AND STRATTON ENGINES ONLY)
FIGURE 2-17**

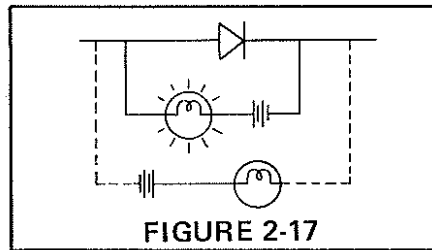
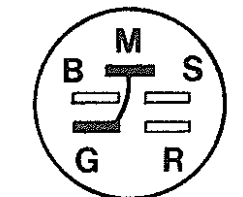
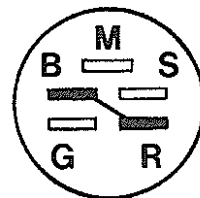
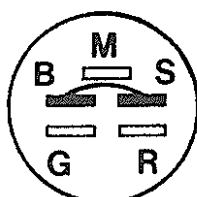
A continuity light or ohm meter can be used to check the diode. If a continuity light is used, connect it across the diode and note whether the light comes on; then reverse leads. The light should be on in one direction, but not the other, when the leads are reversed.

If an ohm meter is used, measure the resistance, then reverse the leads and remeasure. A comparison of the two readings should indicate 10:1 resistance ratio should be measured.

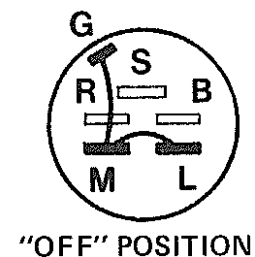
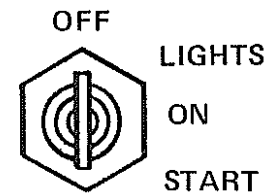
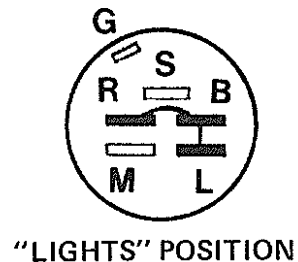
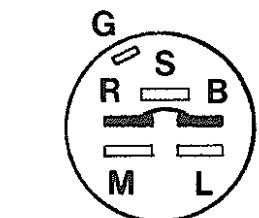
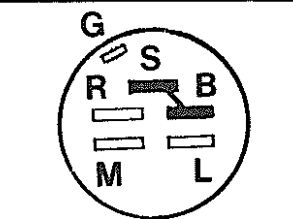
TESTING IGNITION SWITCH

Test the ignition switch for proper internal connections using an

ohm meter or continuity light. Terminals should be closed only in the positions indicated in Figure 2-18 and 2-19.

**FIGURE 2-17****MODEL 1058, 1060 AND 1160****"OFF" POSITION****"ON" POSITION****"START" POSITION
FIGURE 2-18**

**MODEL 1258, 1261, 1458, 1461,
1463, 1467, 1468, 1658, 1659,
1662, 1663, 1664, 1667, 1668,
1668L, 1669, 1669L AND 1858**

**"OFF" POSITION****"LIGHTS" POSITION****"ON" POSITION****"START" POSITION
FIGURE 2-19****2**

GROUP III. DRIVE TRAIN

**MEDIUM FRAME
SERIES TRACTOR**
Page 3-1 Rev. 11-90

TROUBLE SHOOTING GUIDE

PROBLEM	PROBABLE CAUSE	REMEDY
No forward or reverse with engine running. (gear models) (hydro models)	1. Broken drive belt. 2. Drive belt off gear box or transmission drive line 3. Drive idler spring broken. 4. Clutch not functioning properly. 5. Transmission not functioning. 6. System low on oil. 7. Plugged oil filter. 8. Control linkage binding. 9. Hydro unit not functioning.	1. Replace belt. 2. Reinstall belt. Replace belt if badly worn. Check belt guides. 3. Replace spring. 4. Check and adjust linkage. 5. Repair transmission. 6. Refill to proper level. 7. Replace filter. 8. Check linkage, correct problem. 9. Repair hydro. Refer to Eaton Model II Repair Manual.
Loss of power. (hydro models)	1. Filter or suction line clogged. 2. Low on oil. 3. Worn or loose hydro linkage. 4. Air in system. 5. Engine slows down or is sluggish.	1. Replace filter, clean and refill system with fresh oil. 2. Check and add as necessary. 3. Adjust or replace. 4. Check hydraulic line connections. 5. Check engine for proper RPM. Set at 3600 RPM (no load) using a tachometer. See Engine Section.
Unit operating hot. (hydro models)	1. Oil level low. 2. Low engine RPM 3. Dirt on transmission fins. 4. Excessive load or high drawbar loading. 5. Partially plugged filter. 6. Internal damage to hydro.	1. Check for leaks and refill to proper level. 2. Operate at full throttle. 3. Clean external surface. 4. Reduce load. 5. Replace filter and oil. 6. Repair hydro. Refer to Eaton Model II Repair Manual.
Brake does not function properly.	1. Brake pucks or band worn. 2. Brake out of adjustment.	1. Replace brake pucks or band. 2. Tighten brake adjusting nut as required.

3

DRIVE TRAIN (Continued)

EATON HYDROSTATIC INTRODUCTION & REPAIR

LOCATION

Model 11 hydrostatic is a clockwise drive, that is all Medium Frame Series

By, locate the Serial stamped in area on the pump.

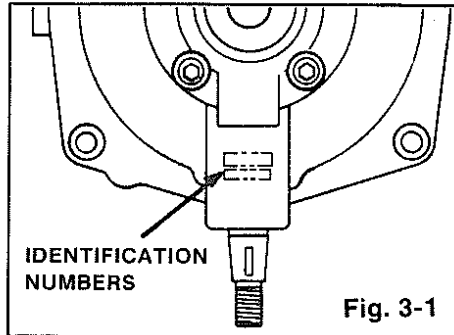


Fig. 3-1

REPAIR

If the hydrostatic transmission is in need of repair, refer to the Eaton Service & Repair Manual. This manual is available from the factory.

The Model 11 hydrostatic transmission is composed of four components: a charge variable displacement, radial ball-piston pump; a fixed displacement, radial ball-piston motor; and a system of valves between the pump and

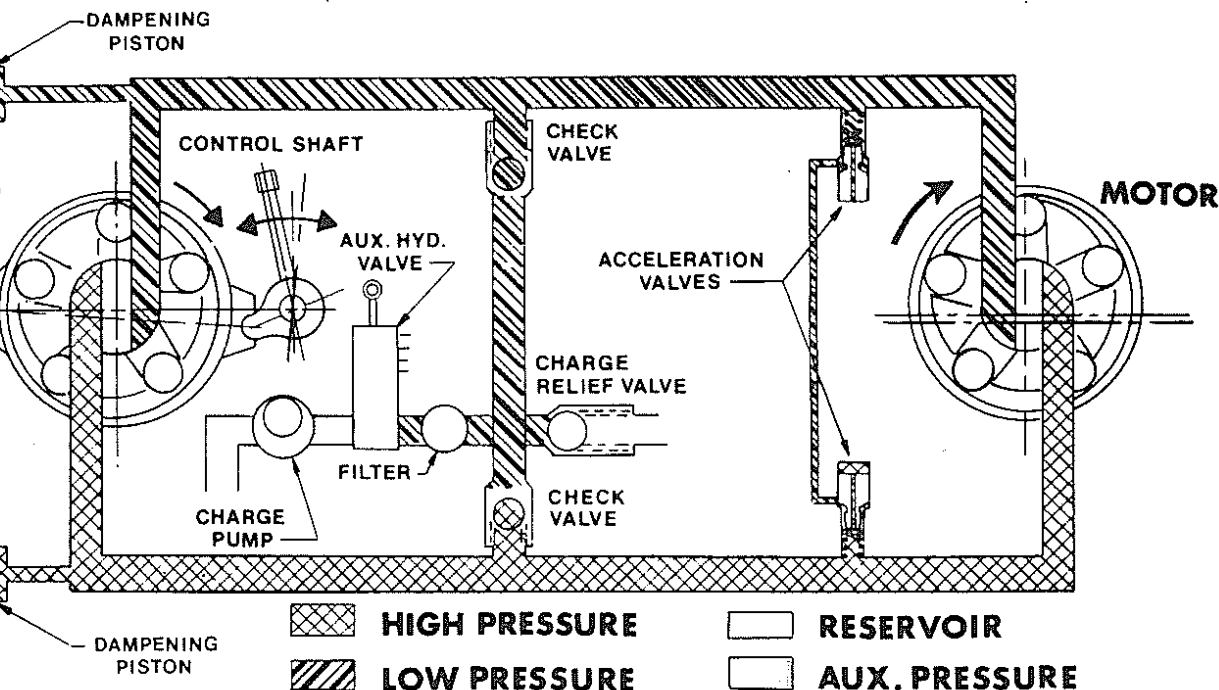
the transmission converts mechanical energy at its input to fluid flow under

pressure from its pump. This fluid energy to its motor which in turn converts it back to mechanical energy at its output shaft. The purpose of this transformation is to provide 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 decreased, pressure decreases and torque output drops.

HYDROSTATIC TRANSMISSION FLOW CHART



DRIVE TRAIN (Continued)

MEDIUM FRAME
SERIES TRACTOR
Page 3-3 Rev. 11-90

HYDROSTATIC REMOVAL

NOTE: SEE TRANSAXLE REMOVAL page 3-6 before removing hydro. Some models may require removing transaxle before hydrostatic removal. (Fig. 3-2 & 3-3)

1. Remove tunnel, seat & fenders.
2. Remove driveshaft from input shaft.
3. Clean any dirt or grease from hydraulic line (A) fittings.
4. Disconnect hydraulic lines (A) from hydro. Have oil pan to catch excess oil.
5. Remove nut and washer on control shaft and slide control arm assembly (B) off shaft.

NOTE: A puller may have to be used when removing the control arm.

6. Remove the four (4) mounting cap screws (C) securing the hydrostatic to the transaxle.

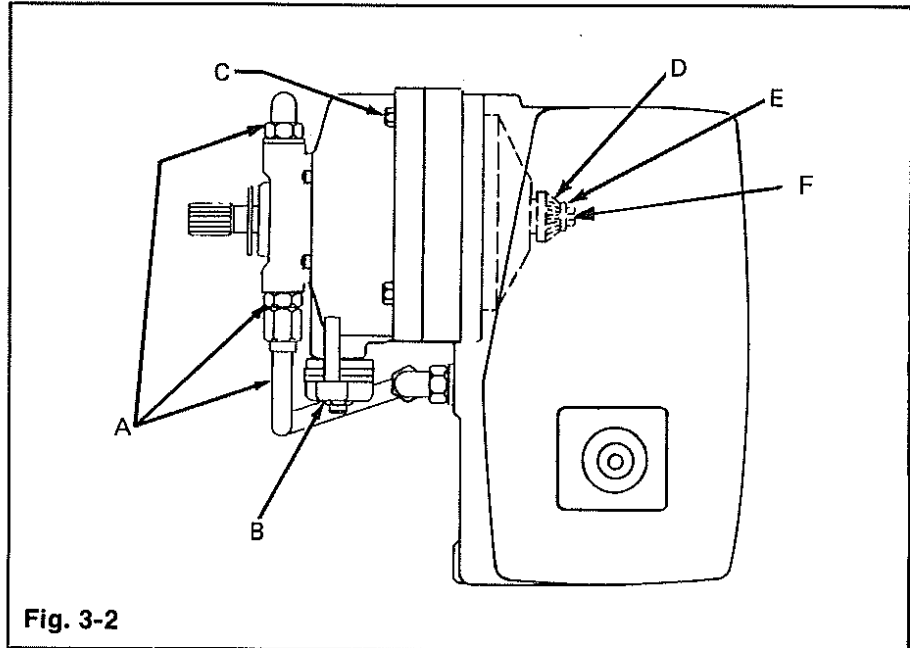


Fig. 3-2

Carefully remove hydro from transaxle.

7. If replacing complete hydro, remove bevel gear (D) & shims

from output shaft. To disassemble, hold spacer (E) in place when loosening bolt (F). Position shims & bevel gear onto new hydrostatic and fasten. Torque bolt with spacer to 24 ft./lbs. (23.5 N-m).

HYDROSTATIC REPAIR

If the hydrostatic transmission is in need of repair, refer to the **Eaton Repair Manual**. This manual is available from the factory.

EATON HYDRO TESTING

For testing procedure, refer to **Hydraulic Section, page 6-3**.

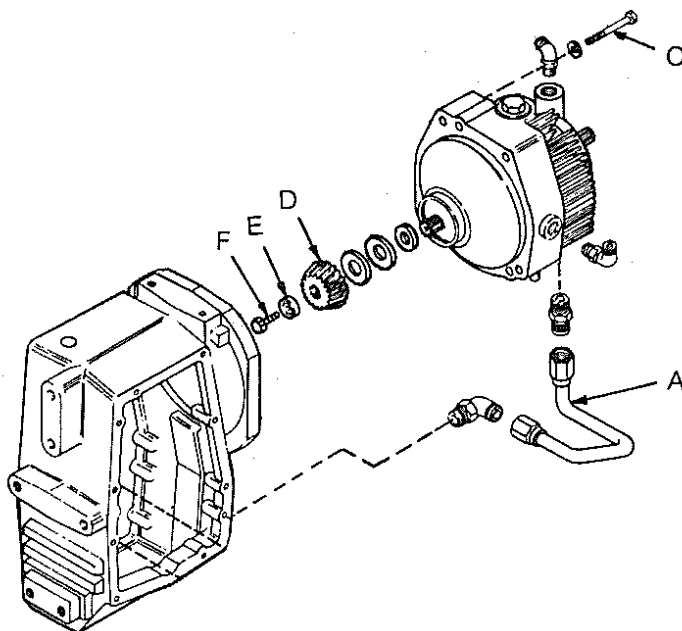
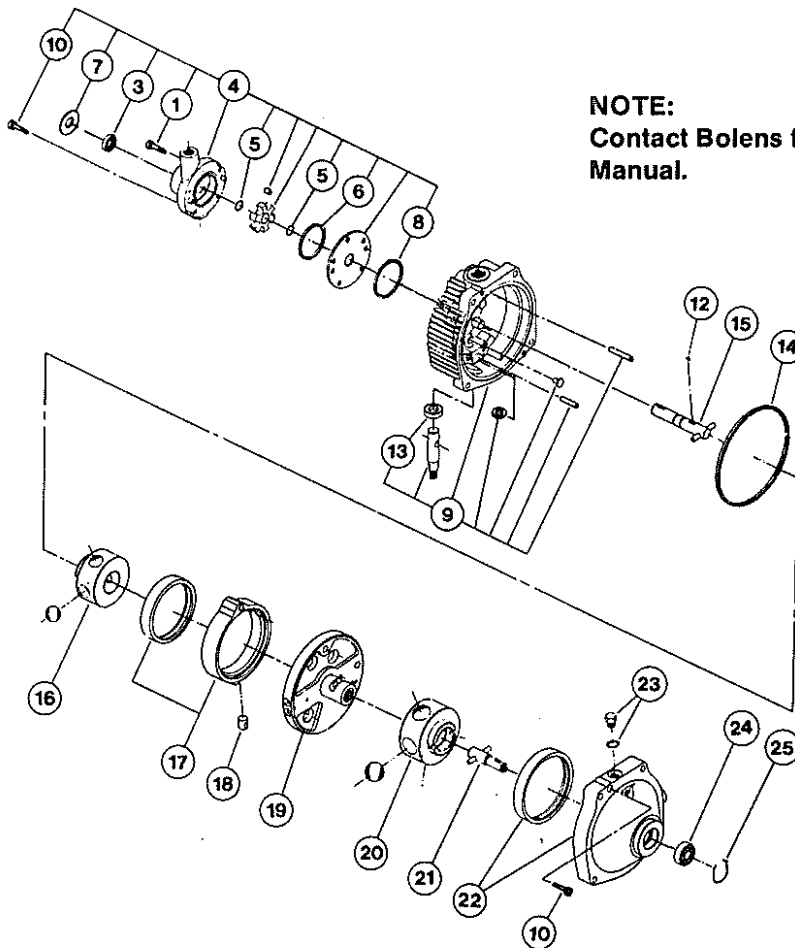


Fig. 3-3

DRIVE TRAIN (Continued)

HYDROSTATIC BREAKDOWN



NOTE:
Contact Bolens for an Eaton Repair
Manual.

REFER TO THE INDIVIDUAL TRACTOR PARTS LIST FOR PART NUMBERS

1 Socket Screw 5/16-18 x 1-3/4 (Incl. w/Ref. 4)	14 Square Seal Ring
3 Oil Seal (Incl. w/Ref. 4)	15 Input Shaft Sub Ass'y
4 Charge Pump Kit (Incl. Ref. 1, 3, 5, 6, 7, 8, 10, 12)	16 Pump Rotor & Ball Ass'y
5 Snap Ring (Incl. w/Ref. 4)	17 Cam Ring Ass'y
6 Sq. Seal Ring (Incl. w/Ref. 4)	18 Cam Ring Insert
7 Grass Shield (Incl. w/Ref. 4)	19 Pintle Ass'y (Incl. Internal Parts) ...
8 Sq. Seal Ring (Incl. w/Ref. 4)	20 Motor Rotor & Ball Sub Ass'y
9 Cover Sub Ass'y (Incl. w/Ref. 13) ...	21 Output Shaft Sub Ass'y
10 Socket Hd. Screw 5/16-18 x 1-1/4 (Incl. w/Ref. 4)	22 Body Ass'y (Incl. Ref. 21, 24 & 25) 1
12 Drive Pin (Incl. w/Ref. 4)	23 O-Ring Plug Sub Ass'y
13 Oil Seal (Incl. w/Ref. 9)	24 Ball Bearing (Output)
	25 Retaining Ring

DRIVE TRAIN (Continued)

MEDIUM FRAME
SERIES TRACTOR
Page 3-5 Rev. 11-90

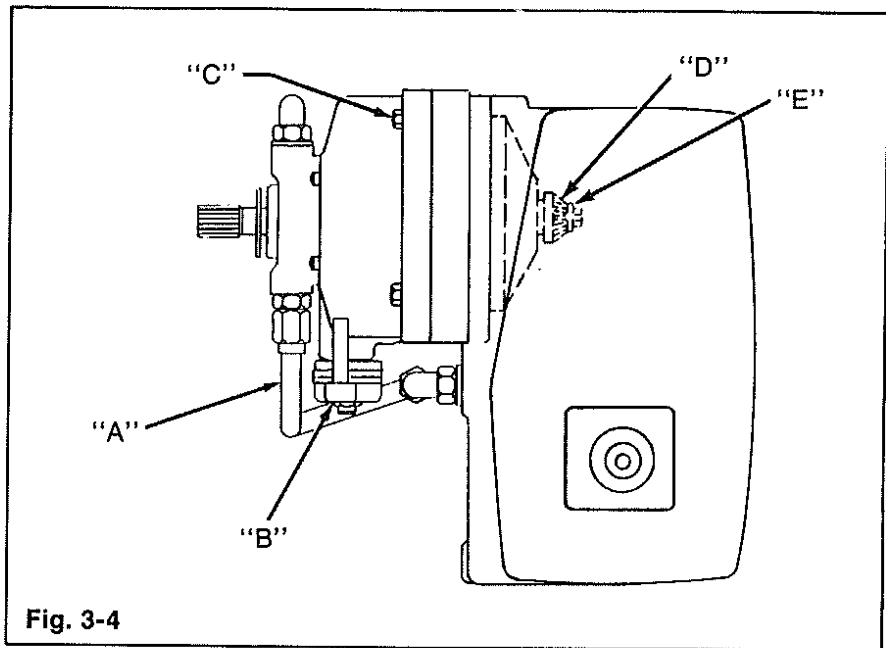
HYDROSTATIC RE-INSTALLATION

INSTALLATION

(Fig. 3-4)

1. Clean the mounting surface of all oil, grease and dirt before re-installing the hydrostatic. Run a bead of silicon rubber around the mounting surfaces and the insides of the bolt holes. Secure with the four (4) capscrews and lockwashers (C) removed earlier. Torque the mounting screws to 24 ft./lbs. (32.5 N-m) when fastening.
2. Reinstall hydraulic line (A) removed earlier and tighten fittings.
3. If replacing hydrostatic, install a new woodruff key into the control shaft.
4. Install control shaft arm (B) and secure with washer and lock nut removed earlier. Torque to 6.25 ft./lbs. (8.5 N-m).

NOTE: WHEN INSTALLING THE TWO PIECE DRIVESHAFT ON LATER MODELS, MAKE SURE THAT IT IS PROPERLY ASSEMBLED. ARROWS OR MARKS ON THE TWO PARTS MUST BE ALIGNED.



DRIVE TRAIN (Continued)

TRANSAXLE REMOVAL

eat switch wire, seat and
semblies.

unnel (A) Figure 3-5

is to be worked on,
dispose of fluid.

eat switch wires from
tubes by cutting nylon

otter pin and
le pivot block and
(B) from front cross

otter pin and washer
semble pivot block and
d (C) from the foot
t.

both hydraulic tube
e hydrostatic end.

l will be drained from
s.

ne (D) on the inside L.H.
ng the rear of
support plate (E).

is support must be
and the scribed line will
assembly later.

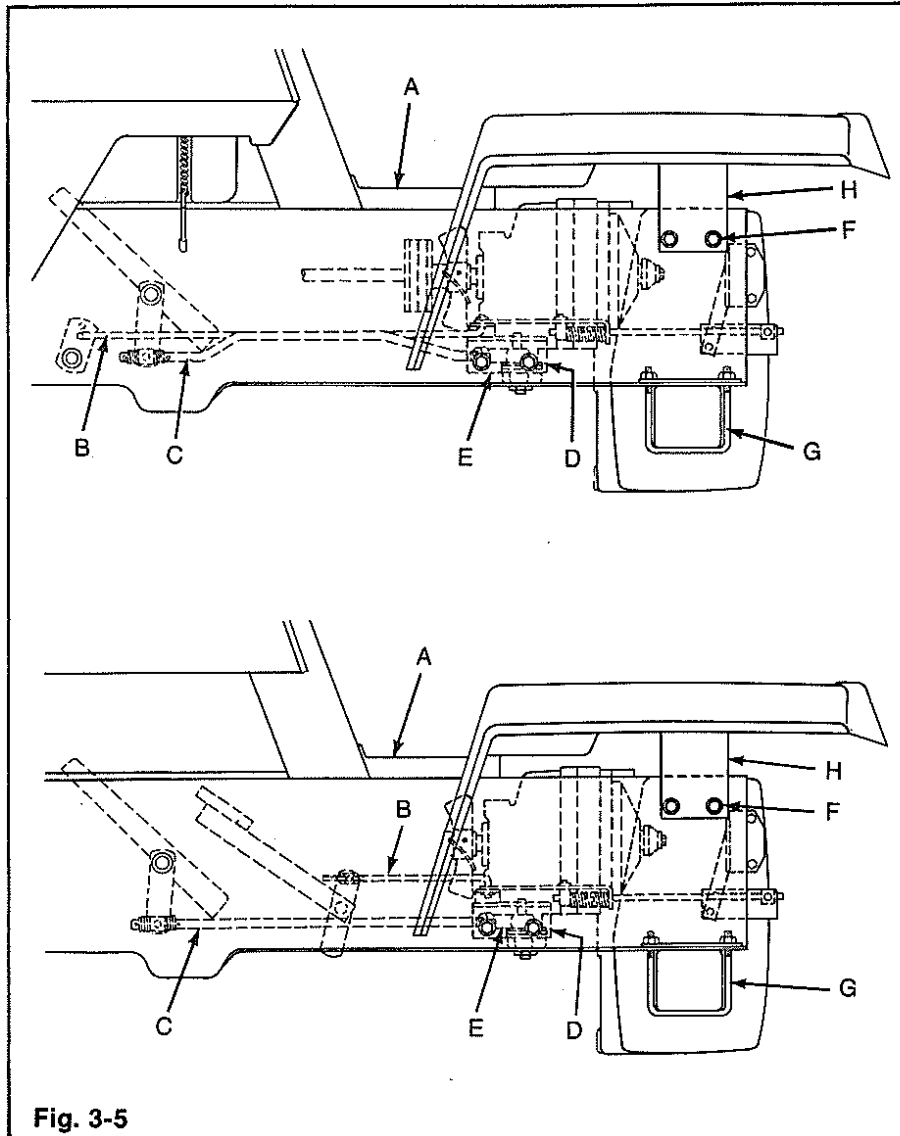
ne quadrant support
assembly links.

the tractor at mid frame
r wheels are just off the
ce.

he four capscrews (F)
lamps (G) securing the
to the frame. Remove
support (H) at this time.

foot on the rear hitch or
r in rear hitch hole to
the transaxle while

l the complete transaxle
o back and out of the



14. After the transaxle assembly has cleared the frame, tip the transaxle backward to rest on a 6" block.

NOTE: Refer to page 3-7 for exploded view of complete assembly.

DRIVE TRAIN (Continued)

**MEDIUM FRAME
SERIES TRACTOR**
Page 3-7 Rev. 11-90

TRANSAXLE ASSEMBLY HYDROSTATIC MODELS

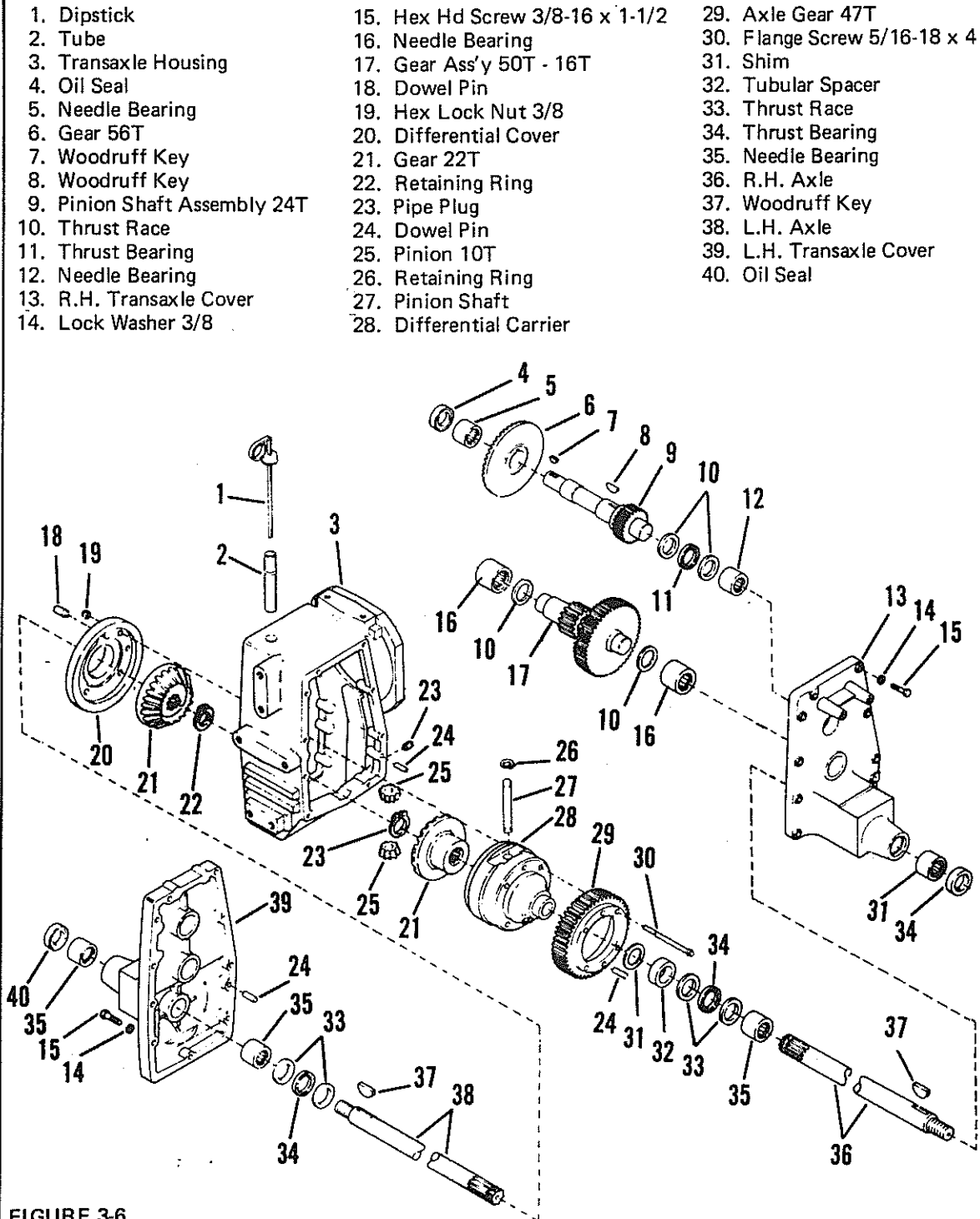


FIGURE 3-6

DRIVE TRAIN (Continued)

TRANSAXLE DISASSEMBLY
HYDROSTATIC MODELS

TRANSAXLE
PAGE 3-6 AND
TATIC REMOVAL
BEFORE SERVICING
E.
E ASSEMBLY MUST
ED FROM
AND HYDRO MUST
ED BEFORE
E CAN BE

TER AXLE BEARINGS
EPLACED WITHOUT
BLING TRANSAXLE.
3-11 FOR
RE.

nt-hand wheel
Remove brake disc
and end of pinion

le on left-hand wheel
nd wedge a block (A)
e left-hand wheel
nd left-hand transaxle
This block will prevent
om sliding down axle
assembly and will aid in
uring re-assembly).



UTION

DISASSEMBLE WITH
E PROPPED ON
ND WHEEL
. TRANSAXLE
E REASSEMBLED
S SIDE.

ht (8) bolts (C).
nt-hand transaxle
Remove right-hand
cover. Clean any gasket
cover flanges.

NOTE: KEEP TRACK OF THE POSITIONS OF ALL SHIMS, WASHERS AND GASKETS REMOVED DURING DISASSEMBLY. THESE ITEMS WILL HAVE TO BE REPLACED DURING RE-ASSEMBLY.

REPLAC DAMAGED OR BADLY WORN SHIMS AND WASHERS, AND ALL GASKETS DURING RE-ASSEMBLY USE ONLY ORIGINAL BOLENS PARTS.

(Fig. 3-8)

4. Remove nine (9) bolts holding left-hand transaxle cover and lift off center transaxle cover. Clean any gasket residue off cover flanges.
5. Simultaneously lift pinion/bevel gear assembly (E) and reduction gear assembly (F) out of gear case. **NOTE: Pinion gear assembly may require a slight wiggle to dislodge.**
6. If differential disassembly is required, it will be necessary to remove the left-hand wheel assembly at this time.

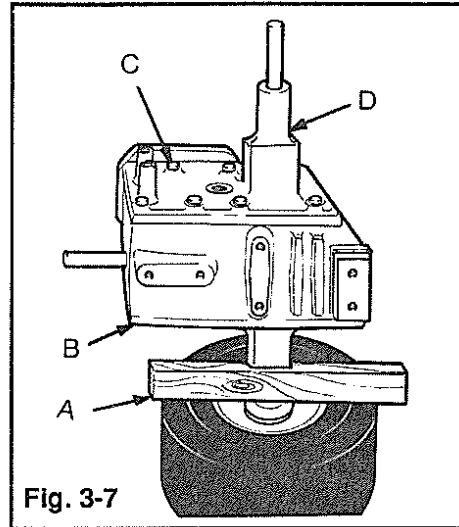


Fig. 3-7

Axle/differential assembly (G) will then lift out **NOTE: For differential servicing, see page 3-9.**

7. For transaxle re-assembly, proceed to page 3-11.

on some models, the bevel gear (H) can be removed from the shaft if replacement is necessary. A woodruff key is used to prevent the bevel gear from turning on the pinion shaft.

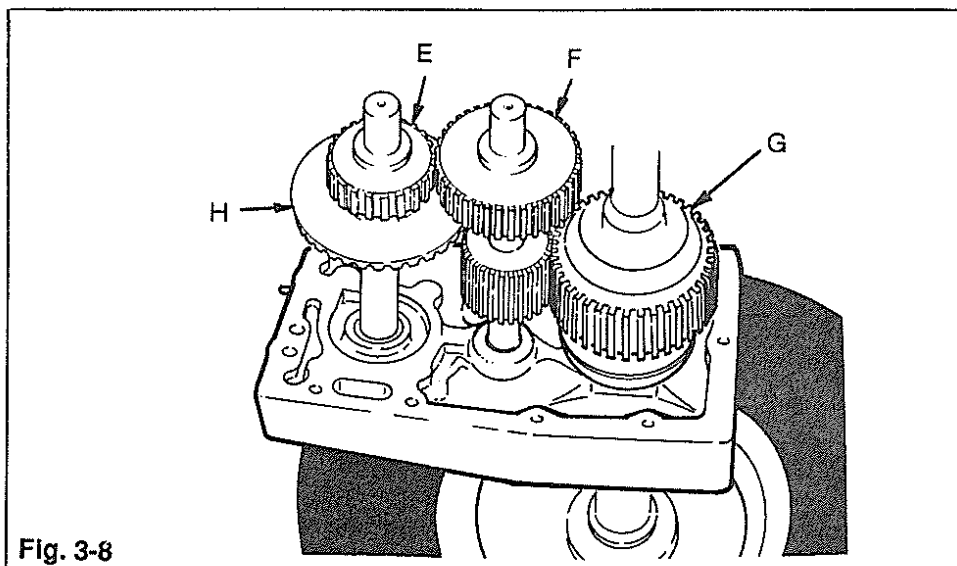


Fig. 3-8

DRIVE TRAIN (Continued)

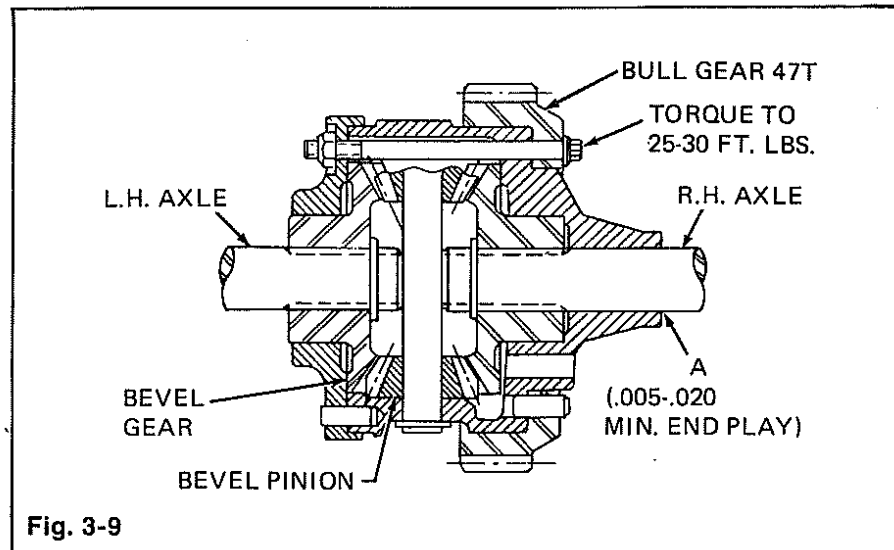
**MEDIUM FRAME
SERIES TRACTOR**
Page 3-9 Rev. 11-90

DIFFERENTIAL ASSEMBLY/RE-ASSEMBLY HYDROSTATIC MODELS

DISASSEMBLY

(Fig. 3-9, 3-10 & 3-11)

1. Remove four (4) 5/16 ferry head bolts (I) from differential case. To open case from this point, it may be necessary to set the differential/axle assembly onto the end of the right-hand axle, and then tap gently down on the bull gear with a soft-faced mallet. The remaining internal parts inside the differential can be disassembled, if necessary, by removing snap rings. Pay close attention during disassembly of these items so they can be re-assembled in the proper manner. Side gear may be removed from axle after removing snap ring (J).



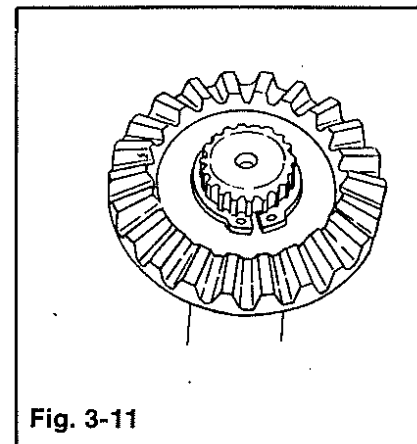
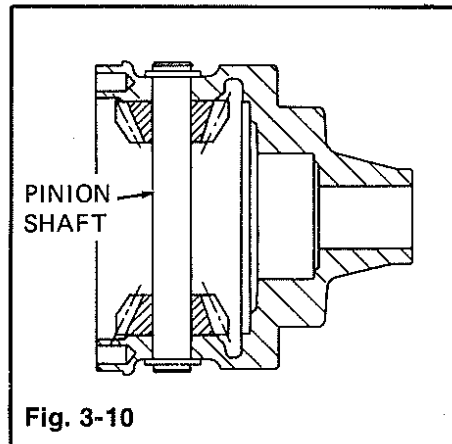
2. Check internal parts for excessive wear or damage. Replace if necessary. **USE ONLY GENUINE BOLENS REPLACEMENT PARTS.**

RE-ASSEMBLY

3. Re-assemble any disassembled internal differential parts. The two pinion gears slide on the pinion shaft and are held in position by the side gears when the carrier is assembled.

NOTE: BOLT HEADS ON DIFFERENTIAL ASSEMBLY SHOULD BE ON THE RIGHT-HAND SIDE.

4. When the internal differential parts have been re-assembled, put the differential case back together and replace the four (4) ferry head bolts (I). Torque to 25 to 30 ft. lbs. (33 to 40 N-m).



3

DRIVE TRAIN (Continued)

TRANSAXLE RE-ASSEMBLY PROCEDURE

needle bearings in side
s. If needles show signs
g or any other damage
them. Use a needle
driver and seat bearing
with a depth of 1/32" to 1/16" (0.78
mm) below the machined
surface of the upper two
s. The axle bearing must
be seated to a depth of 1/4" (6.4
mm) below the machined

**ALWAYS INSTALL THE
NEEDLE BEARINGS WITH THE
CORRECT END (THE END
WITH THE IDENTIFICATION
MARKINGS) AGAINST THE
DRIVING TOOL.**

carrier and axle assembly
3-13 into the left side
housing. Be careful not to
damage the axle seal in end of
housing. Apply a 1/32" (0.8 mm)
bead of sealant around cover
flange. Keep bead to the inside
of bolt holes.

Install the side housing with axle
assembly to the center housing.
Tighten housing cap screws to
30 ft. lbs. (40 N-m).

Install the bevel gear Figure 3-7
on the shaft if
removal is necessary. A
lock
wrench key is used to prevent
the bevel gear from turning on
the shaft.

Install the assembled bevel
gear and pinion shaft into the
housing, mesh the cluster gear
with the bevel gear above assembly

Install the thrust washer is
placed on cluster gear, and
the axle shaft into the needle
bearing.

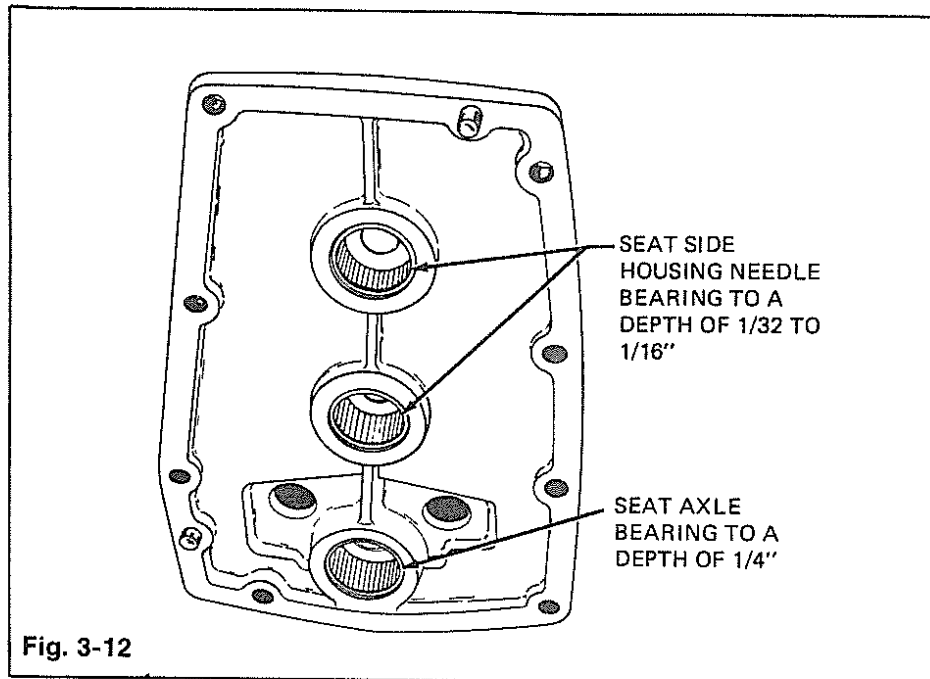


Fig. 3-12

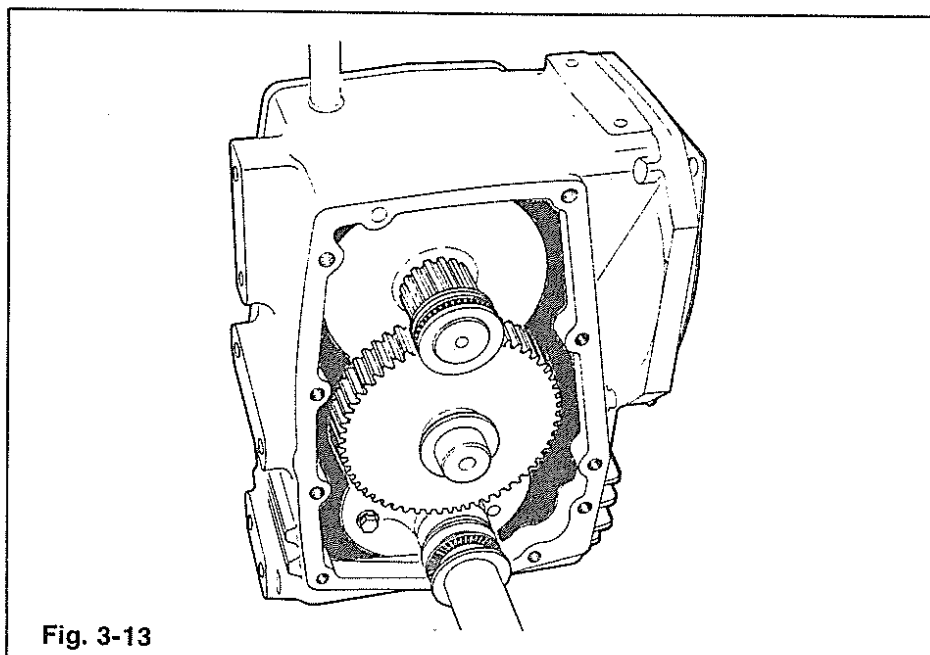


Fig. 3-13

7. The right side of the bevel gear must have a thrust bearing assembly. The cluster gear must have a thrust washer and the axle shaft a spacer and Torrington bearing assembly. Refer to Figure 3-13. After the bearings and spacers are

installed, the right side housing can be bolted in place. Apply a 1/32" (0.8 mm) bead of sealant around cover flange. Keep bead to the inside of bolt holes. Be careful not to damage axle seat. Slide cover on and torque cap screws to 30 ft. lbs. (40 N-m).

DRIVE TRAIN (Continued)

**MEDIUM FRAME
SERIES TRACTOR**
Page 3-11 Rev. 11-90

TRANSAXLE RE-ASSEMBLY PROCEDURE (CONT'D) HYDROSTATIC MODELS

8. (Fig. 3-14)

Check exterior axle bearings in ends of axle housings. Service these bearings the same as interior bearings. Exterior bearings should be seated $1/32''$ to $1/16''$ (0.78 - 1.57 mm) below counter bore for the axle seal. NOTE: Exterior axle bearings can be serviced without disassembling transaxle.

9. Axle seals should be replaced whenever unit is repaired. Use a seal driver to drive seals until they bottom in axle housing counter bore.

**NOTE: REFER TO PAGES 3-12
& 3-13 FOR BEARING AND
SEAL INSTALLATION
PROCEDURES.**

10. Install differential carrier/axle assembly into the left side housing. Be careful not to damage axle seal when installing it in end of housig. Make sure all shims and washers are in place as they were when removed. See Fig. 3-15 for reference.

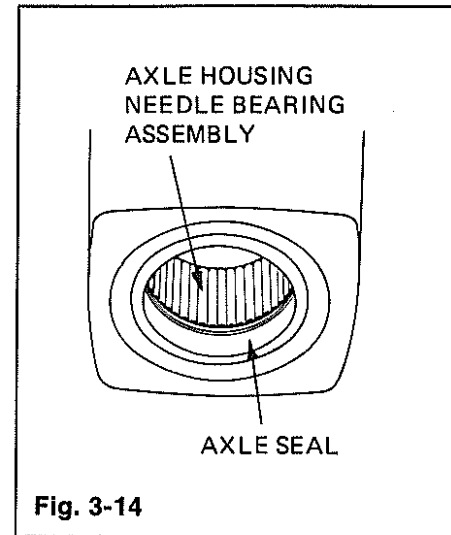


Fig. 3-14

3

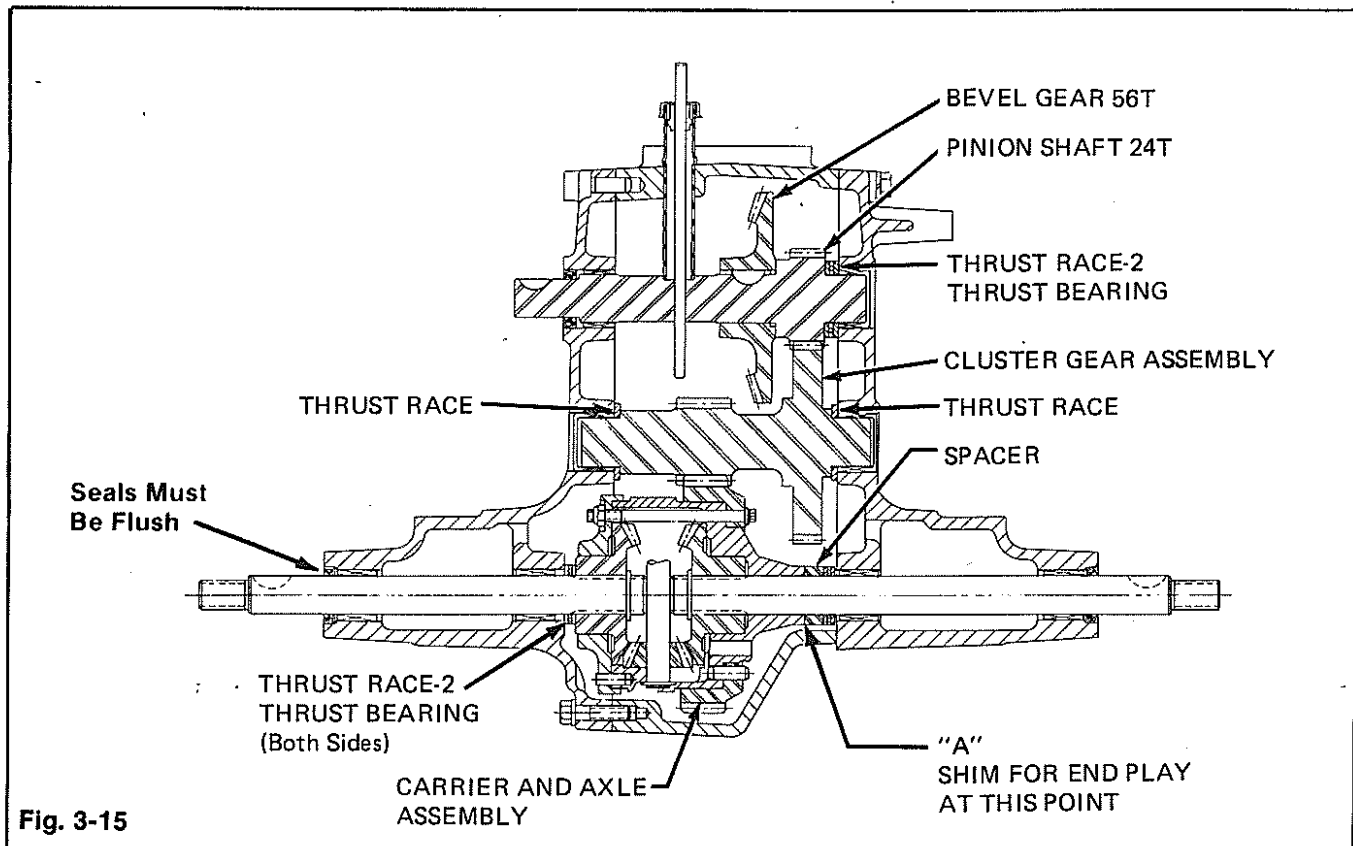


Fig. 3-15

DRIVE TRAIN (Continued)

TRANSAXLE RE-ASSEMBLY (CONT'D) HYDROSTATIC MODELS

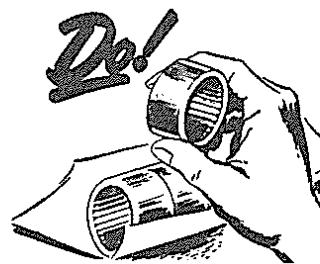
NG INSTALLATION



LUBRICANT

DON'T try to wipe or wash the lubricant out of needle bearings. It is a tough, tricky job and is not necessary.

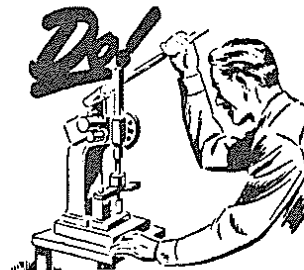
DO install bearings with original lubricant left in them —more can be added after installation.



INSTALL CORRECTLY

DON'T hammer a bearing into a housing! You are sure to damage the bearing. Don't guess at housing bore size—get it from our catalog.

DO press bearings into housing with an arbor press using a pilot punch. First place round or plain end of bearing in housing; then use press against stamped end.

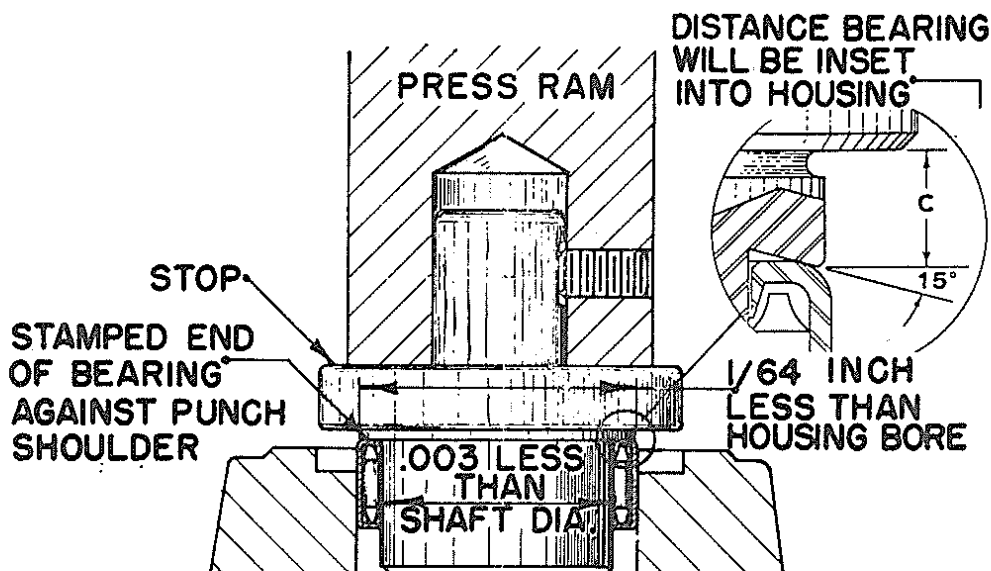


an arbor press, or a similar method, whenever possible (as illustrated).

punch should have a pilot to the bearing in line, as shown.

3. Place the stamped end of the bearing against the shoulder of the punch. The unstamped end of the bearing will lead best into the housing bore.

4. Do not wipe the grease off the bearings. Do not allow dirt to contaminate the grease.



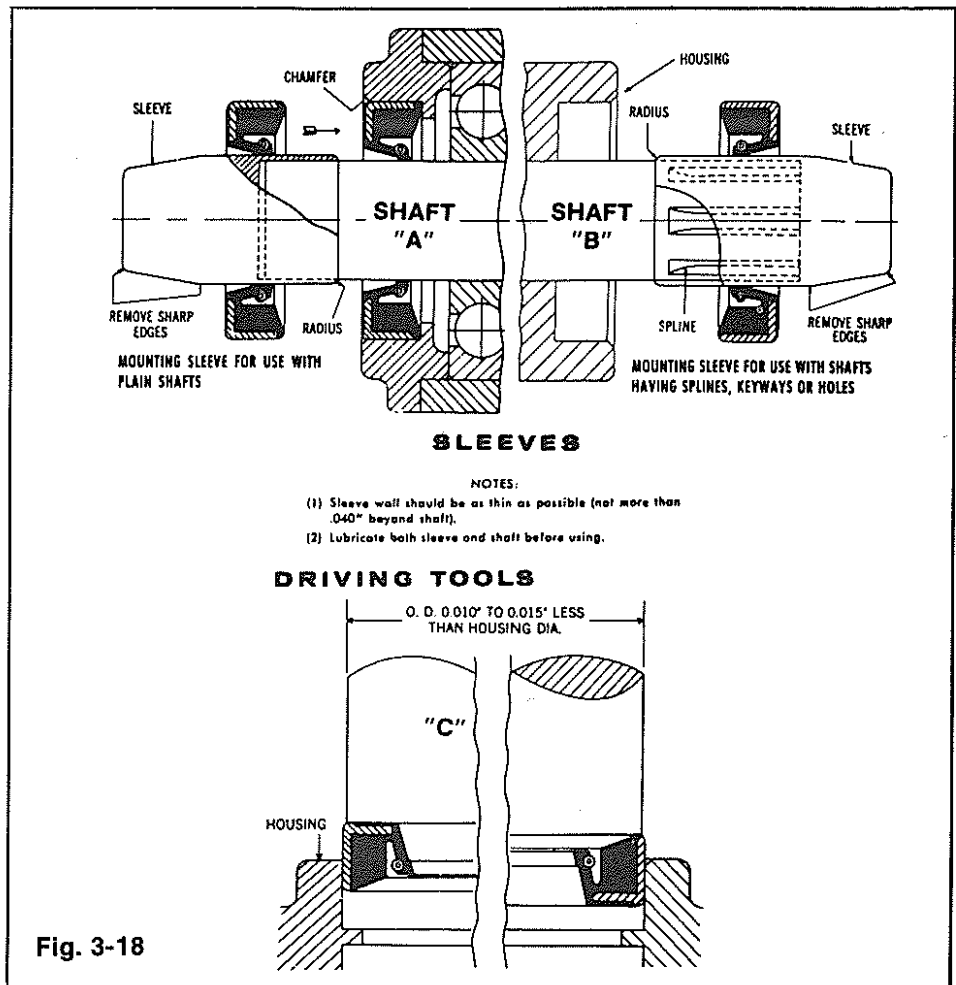
DRIVE TRAIN (Continued)

**MEDIUM FRAME
SERIES TRACTOR**
Page 3-13 Rev. 11-90

TRANSAXLE RE-ASSEMBLY (CONT'D) HYDROSTATIC MODELS

OIL SEAL INSTALLATION

1. Be sure housing bore diameter, bore depth and shaft diameter are correct and within the recommended tolerances. Inspect all surfaces for scratches or nicks.
 2. Provide radius or chamfer at housing bore entrance.
 3. Be sure sealing lip has not been damaged.
 4. Lubricate sealing lips with any light machine oil before installing.
 5. Apply a light coat of any suitable sealing compound to O.D. of seal to provide a margin of safety against seepage through the press-fit in housing bore. Extreme care must be taken to avoid depositing any compound on the sealing member.
 6. Install seal with lip facing lubricant.
- (Fig. 3-18)**
7. When possible, chamfer end of shaft over which seal must pass; otherwise, use a sleeve as illustrated.
 8. Press seal into housing with a smooth, uniform pressure applied by a press-fitting tool (C). If shaft is already in place, use a sleeve-type press-fitting tool.
 9. Whenever possible, use an arbor press to insert seal into housing. Be sure seal is not cocked when applying pressure. It is best to seat seal against a shoulder in the bore to help prevent cocking of the seal.
 10. When the shaft is assembled from reverse side of sealing lip, no special precautions are required other than removing all burrs and sharp corners from shaft. When the shaft enters against the sealing lip, a tapered sleeve made to the dimensions shown at (A) must be used. Use a sleeve as shown (B), when seal must pass splines, keyways or holes. The edges of the splines, keyway or holes should be rounded and lubricated with a heavy grease if the use of an assembly sleeve is not possible.
 11. If the machine is to be painted where seals are exposed, mask the shaft and sealing lip to prevent paint from being deposited in these areas. If the paint is to be baked on, be sure the baking temperature does not exceed the operating temperature of the seal to avoid damaging the sealing member.



DRIVE TRAIN (Continued)

TRANSAXLE RE-INSTALLATION HYDROSTATIC MODELS

Hydro should be
d in transaxle before
ng.

quadrant support plate
linkage into place before
y.

quadrant up and walk the
e into the frame.

On later models it may be
ry to raise the frame
ner off the blocks to
e fuel tank support.

15 & 3-16)

the transaxle by
rily installing a
g screw and nut into one
p left hand transaxle
holes (F) in the frame.

the quadrant support
place using the scribed
and tighten. Plate must
el with frame after
y.

Make sure all rods are in
position for later
y.

the two (2) axle U-bolts
place with the flat support
nd turn the nuts on a
s.

the blocks from beneath
e.

mounting screw (F) and
mbled in step 3.

se seat support bracket
the frame and fasten the
mounting screws and
nuts into the frame.

the four (4) U-bolt nuts.

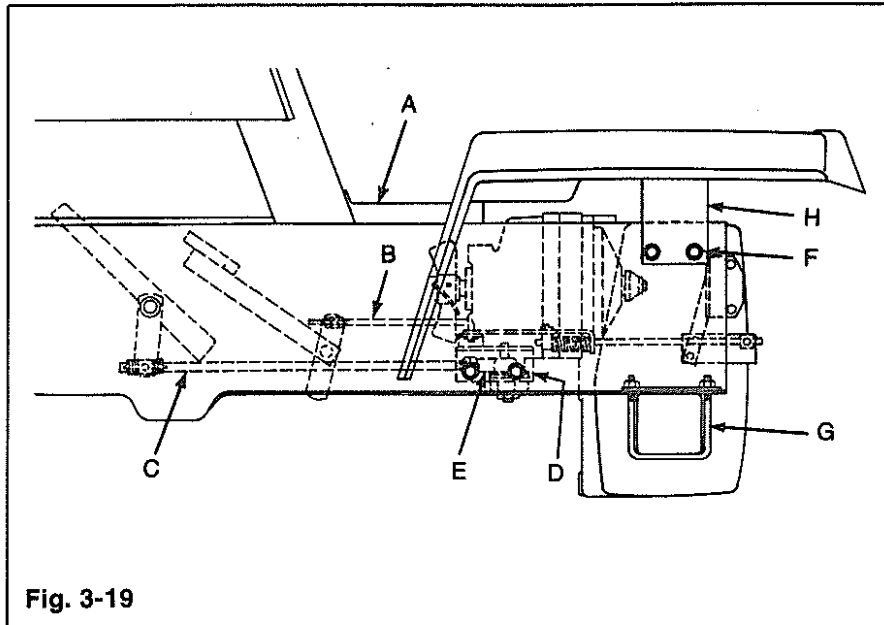


Fig. 3-19

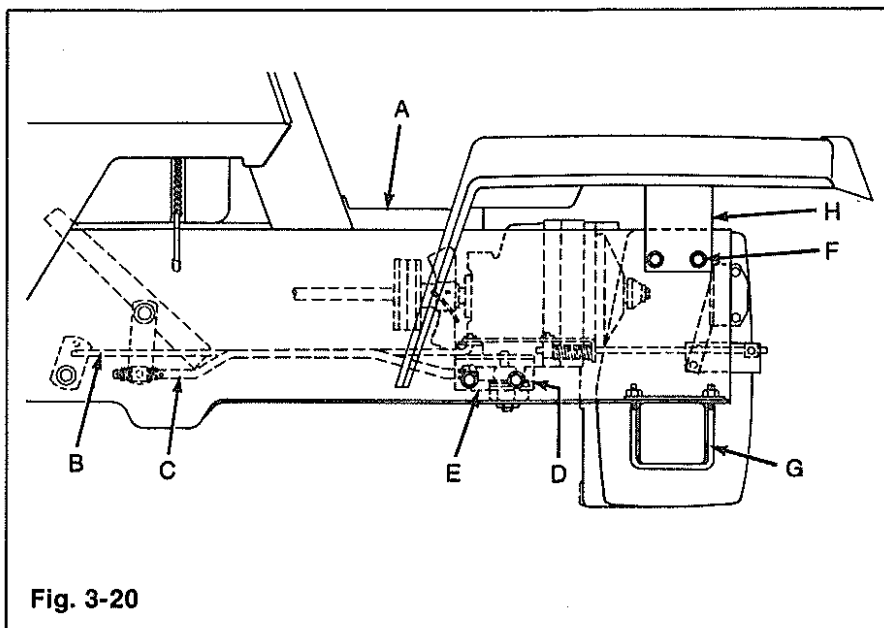


Fig. 3-20

10. Slide driveshaft onto input shaft and secure driveshaft hub with set screws.

NOTE: Provide 1/8" clearance between hydro and driveshaft hub.

Make sure that the two-piece driveshaft is properly installed. The arrows or marks on the two parts must align with one another.

11. Secure the brake rod (B) in the

DRIVE TRAIN (Continued)

**MEDIUM FRAME
SERIES TRACTOR**
Page 3-15 Rev. 11-90

TRANSAXLE RE-INSTALLATION (CONT'D) HYDROSTATIC MODELS

lower hole of the cross shaft arm with a cotter pin.

12. Secure hydrostatic control rod (C) in place with the washer and cotter pin previously removed..
13. Reconnect and tighten the two (2) hydraulic tubes to the hydro.
14. Fill the transaxle with approximately 8 qts. (7.5L) of new transmission fluid. Change oil filter if necessary.
15. Remove spark plug from engine and crank for approximately 15 seconds to fill hydro with fluid. Re-install spark plug.
16. Start unit and operate at a low engine RPM. If equipped, actuate hydraulic lift lever. This will fill the rest of the system with fluid. Shut off tractor engine.
17. Carefully block up rear of tractor. Place travel pedal into neutral position. Start the engine and release the brakes. If the wheels move in a forward direction, move quadrant support plate (D) toward the front of the tractor. If the wheels move in the reverse direction, move the support plate toward the rear.
18. Stop unit and check fluid level. Add fluid if necessary.
- (Figs. 3-21 & 3-22)
19. Position the fender in place and connect the wires to the seat switch. Secure the fender.
20. Re-install the seat.
21. Re-install the tunnel (A).

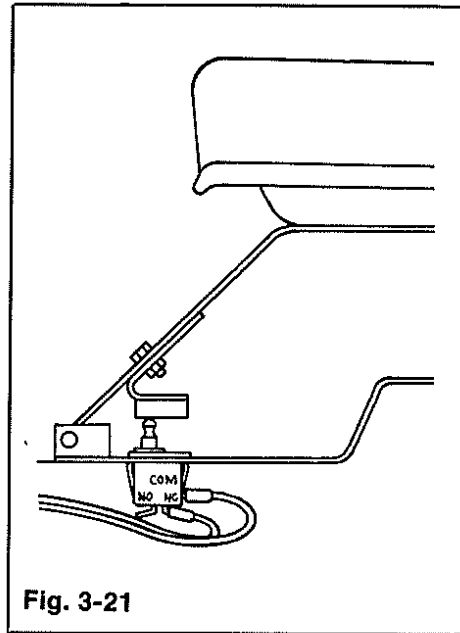


Fig. 3-21

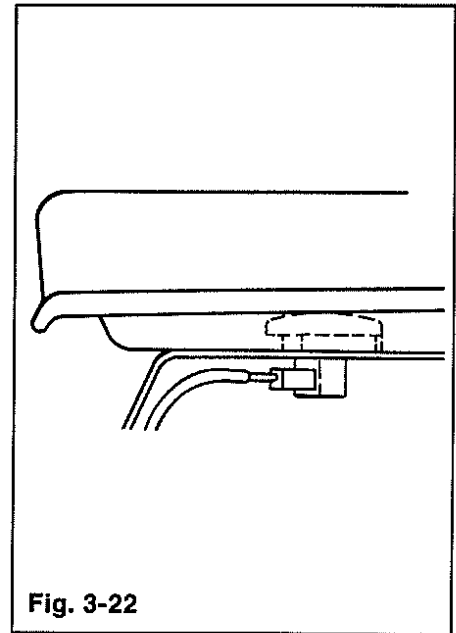


Fig. 3-22

3

FRAME
FACTOR
Rev. 11-90

DRIVE TRAIN (Continued)

GEAR DRIVE INTRODUCTION

akes power transmission gear drives for
es of lawn and garden equipment.

IVES

are used primarily to change the
drive at the point where the working
attaches. These units consist of input
at shafts, and the beveled gearing
change the direction of power
at right angles. By positioning the
gear on the input shaft nearest the input
e rotation will be attained from that of
e beveled gear around to the side away

from the input end of the shaft. Casing bearings are
identical. The cover identifies each unit as being
either a left-hand (LH) or a right-hand (RH) right
angle drive.

TRANSAXLES

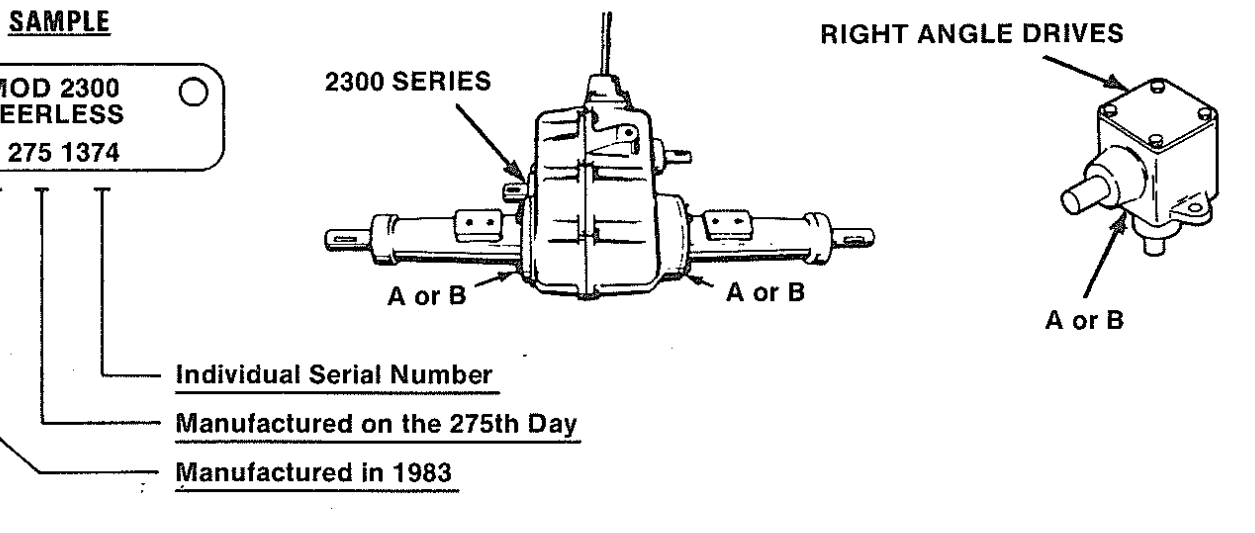
A combination transmission/differential axle is in
one compact unit. The distinguishing features are: a
massive casing, and a large shift lever opening. The
obvious difference from the standpoint of
application is that these units have four speeds
forward and can be used with ground engagement
operations such as tilling, etc.

IDENTIFICATION

TION OF MODELS

assemblies have a model number
n tag, or stamping.

On units containing axles (transaxles, or reduction
gear and differential units), the identification should
be visible by viewing the case/cover unit from below
and behind as it is mounted in the equipment.



Early Models were not identified with a model number on the unit.

THE MODEL NUMBER WILL BE FOUND ON: A. Metal tag attached to unit as illustrated.

B. Stamped on unit as illustrated.

DRIVE TRAIN (Continued)

MEDIUM FRAME
SERIES TRACTOR
Page 3-17 Rev. 11-90

TRANSAXLE REMOVAL GEAR DRIVE

Repair work needed on the Peerless transaxle or Right Angle Gear Box should be done by an authorized Tecumseh/Peerless Dealer during the warranty period.

For Gear Drive servicing information, refer to the **Mechanic's Handbook--Tecumseh/Peerless Motion Drive Systems**. This manual is available from your local dealer, or from the Tecumseh Products Company, 900 North St., Grafton, WI 53024.

The transaxle assembly is filled at the factory with SAE EP90 transmission fluid. Check the fluid level once a year. To check level, park tractor on a flat surface and remove plug (A) on the front of the transmission. If the fluid is not to plug level, add at filler plug (B) until correct level is reached. Oil capacity is 3 pts. (1.4L).

TRANSAXLE REMOVAL (Figs. 3-24 & 3-25)

1. Remove seat and fender.
2. Prop up tractor frame at mid-point.
3. Disconnect brake rod (C) and clutch rod (D) by removing washers and cotter pins.
4. Loosen two (2) belt guides (E) in frame.
5. Push idler (F) down and remove drive belt.
6. Remove shift lever knob.
7. Remove center transaxle mounting screw (G).

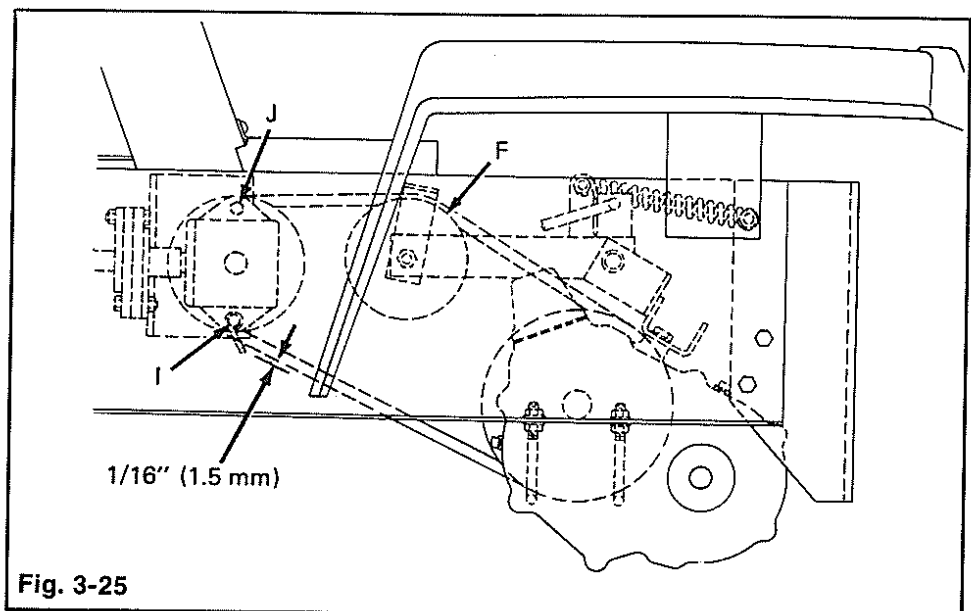
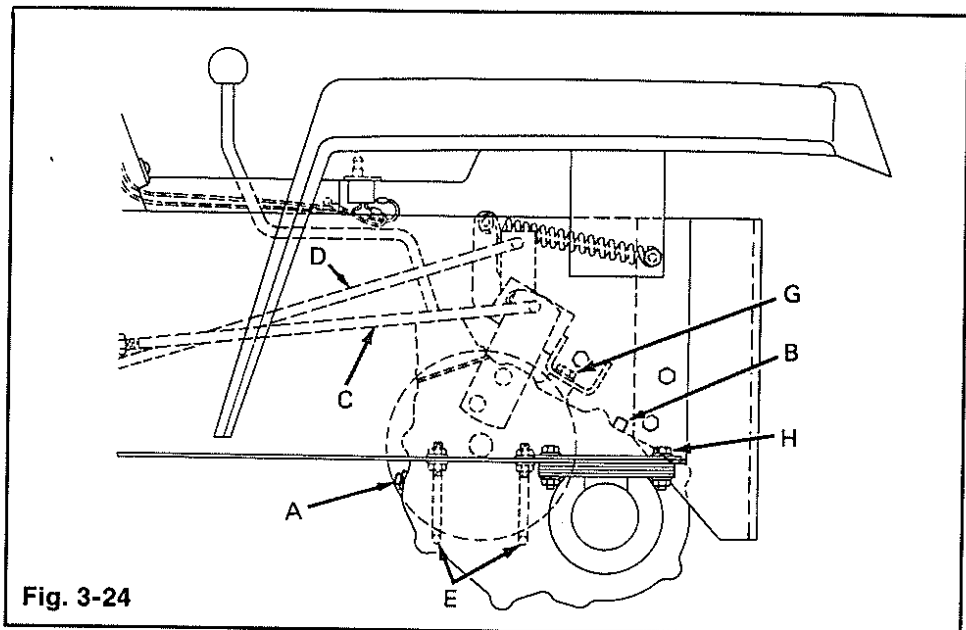
8. Remove the four (4) mounting screws (H) from the frame.

RIGHT ANGLE DRIVE REMOVAL

1. Remove the two (2) mounting bolts and belt guides (I) and (J) from the support bracket.

2. Slide the right angle gear box to the rear and remove.

NOTE: THE GEARBOX IS PACKED WITH 3 oz. OF TECUMSEH BENTONITE GREASE.



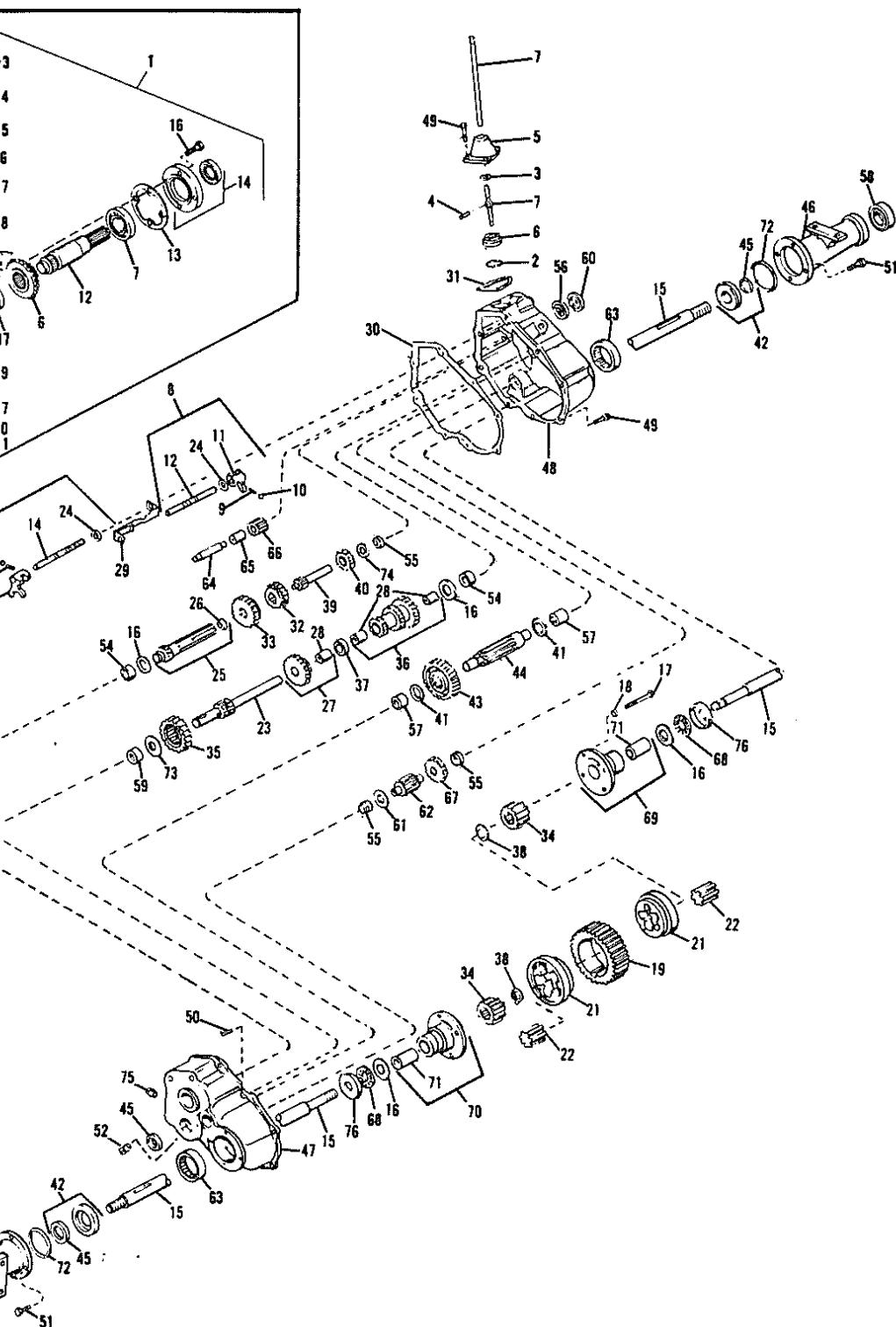
3

FRAME
CTOR
v. 11-90

DRIVE TRAIN (Continued)

GEAR DRIVE BREAKDOWN

REFERENCES AND NUMBERS FOR THIS BREAKDOWN ON FOLLOWING PAGE



**PEERLESS TRANSAXLE ASSEMBLY MODEL 2355 (794-305)
ANGLE GEAR BOX ASSEMBLY (MODEL 3890-P91)**

DRIVE TRAIN (Continued)
**MEDIUM FRAME
SERIES TRACTOR**
 Page 3-19 Rev. 11-90
GEAR DRIVE BREAKDOWN (CONT'D)

REF. NO.	DESCRIPTION
PEERLESS TRANSAXLE ASSEMBLY	
2	Ring, Snap
3	Ring, Quad
4	Pin, Drive
5	Housing, Shift Lever
6	Keeper, Shift Lever
7	Lever, Shift
8	Rod Ass'y., Shift (incl. items 9 thru 12 & 24)
9	Spring
10	Ball, Steel
11	Fork, Shifter
12	Rod, Shifter (3rd & 4th)
13	Rod Ass'y., Shift (incl. items 9 thru 11 & 14)
14	Rod, Shifter (Low)
15	Axle
16	Washer, Thrust
17	Capscrew, Hex.. Hd. 1/4-20 x 3-1/4
18	Lockwasher, 1/4
19	Gear, Ring
21	Core, Body
22	Gear, Pinion
23	Shaft & Gear, Brake
24	Ring, Snap
25	Shaft & Bearing Ass'y., Pinion (incl. item 26)
26	Bearing
27	Gear Cluster Ass'y. (incl. item 28)
29	Bushing
30	Gasket, Case & Cover
31	Gasket, Shift Lever Housing
32	Gear, Shifting (3rd & 4th)
33	Gear, Shifting 1st, 2nd & rev.)
34	Gear Side
35	Gear Idler
36	Gear Cluster Ass'y. (incl. item 28)
37	Spacer
38	Ring, Snap
39	Shaft, Input
40	Spur Gear, Input Shaft
41	Washer, Thrust
42	Seal & Retainer Ass'y. (incl. item 45)
43	Gear, Output
44	Pinion, Output
45	Seal, Oil
46	Housing, Axle
47	Cover Ass'y., Transaxle (incl. items 54, 55, 57 59 & 63)
48	Case Ass'y., Transaxle (incl. items 54, 55, 57, & 63)

REF. NO.	DESCRIPTION
49	Capscrew, Socket Hd., 1/4-20 x 3/4
50	Pin, Dowel
51	Screw, Hex Hd., 5/16-18 x 7/8
52	Plug, Magnetic Drain
54	Bearing, Needle
55	Bearing, Needle
56	Bearing, Ball
57	Bearing, Needle
58	Bearing, Ball
59	Bearing, Needle
60	Seal, Oil
61	Washer
62	Shaft & Pinion
63	Bearing, Needle
64	Shaft, Reverse Idler
65	Spacer, Reverse Idler
66	Idler, Reverse
67	Spur, Gear (22 Teeth)
68	Bearing, Thrust
69	Carrier Ass'y., Differential (incl. item 71)
70	Carrier Ass'y., Differential (incl. item 71)
71	Bushing
72	"O" Ring
73	Washer, Thrust
74	Washer, Thrust
75	Plug, Pipe
76	Race, Thrust

3

RIGHT ANGLE GEAR BOX	MODEL 3890-P91 REPLACEMENT NO. 794251
-----------------------------	--

1	Head Ass'y., L.H. (incl. items 2 thru 16)
2	Self-tapping screw, Rd. Hd. 10- 24 x 1/2
3	Cover
4	Gasket, Cover
5	Ring, Snap
6	Gear, Miter
7	Bearing, Ball
8	Shaft, Output
9	Housing, Right Angle Drive
10	Ring, Snap
11	Seal, Oil
12	Shaft, Input
13	Gasket, Cap
14	Cap & Seal Ass'y/. Retainer (incl. items 92 & 93)
15	Seal, Oil
16	Screw, Hex. Hd 1/4-20 x 7/8
17	Bearing, Ball

DRIVE TRAIN (Continued)

TRANSAXLE RE-INSTALLATION GEAR DRIVE

Transaxle assembly is filled at
with SAE EP90
oil. Check
oil level once a year.
Position transaxle on a flat surface,
using (A), on front of
transaxle. If oil is not to plug
at filler plug (B) until
oil level is reached. Oil
level is 3 pts. (1.4L).

- Slide hub of drive shaft onto
gearbox input shaft.
- Position drive in support bracket
and secure bolts (I) and (J) with
belt guides in place. When
fastening bolts, provide a 1/16"
(1.5mm) clearance between belt
guide and belt when drive is in
engaged position.

RE-INSTALLATION (Fig. 3-28)

Re-install transaxle assembly
to frame.

Secure the four (4) mounting
bolts to the frame.

Enter transaxle
shift knob (G).

Shift knob.

Push (F) down and re-install

Install two (2) belt guides to
transaxle. When securing these
guides, provide a gap of 3/32
between the guides and

Remove the brake rod (C) and
brake rod (D) by installing cotter

Remove the cotter
pins from under
the seat.

Remove the seat.

Remove the seat switch wires.

GEAR DRIVE INSTALLATION.

Install drive belt around right
pulley.

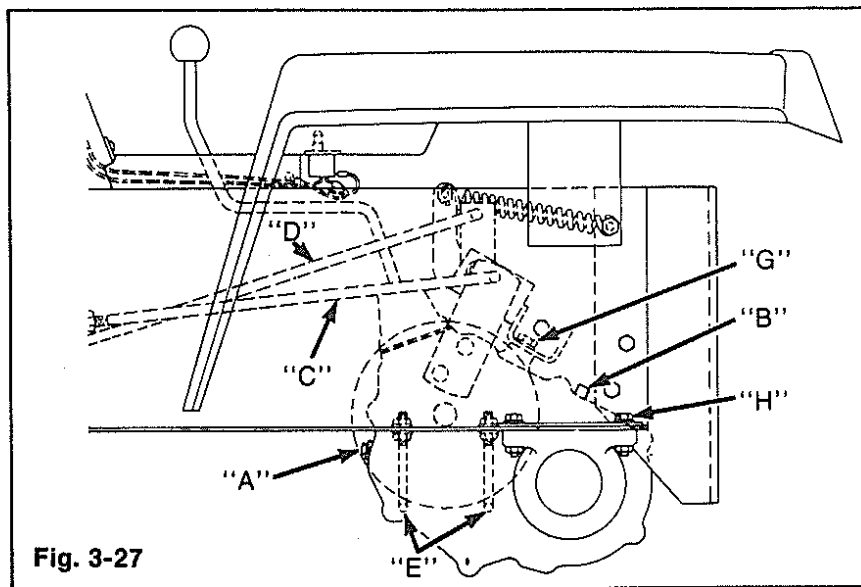


Fig. 3-27

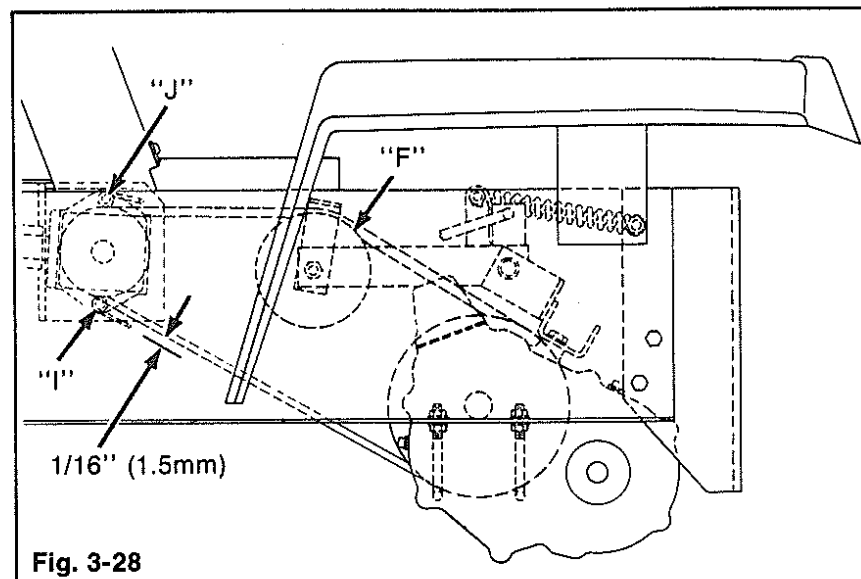


Fig. 3-28

GROUP IV. FUEL SYSTEM

**MEDIUM FRAME
SERIES TRACTOR**
Page 4-1 5/78

TROUBLE SHOOTING GUIDE

PROBLEM	PROBABLE CAUSE	REMEDY
Hard starting.	1. Fuel shut off valve closed. 2. Choke linkage not working properly. 3. Dirt in fuel system. 4. Engine flooded. 5. Carburetor out of adjustment. 6. Water in fuel system. 7. Dirty air filter. 8. If equipped with pulse pump-pulse line leaking.	1. Open valve. 2. Check linkage and repair. 3. Clean fuel lines, carburetor, and install new fuel filter. 4. Check linkage, carburetor float setting etc. 5. Adjust carburetor. 6. Clean system and refill with clean fuel. 7. Install new air filter. 8. Install new pulse line.
No fuel reaches carburetor.	1. Empty fuel tank. 2. Fuel filter plugged. 3. Shut off valve closed. 4. Gas tank vent plugged. 5. If equipped with pulse pump-pulse line leaking or off. 6. Check pulse pump.	1. Refill tank. 2. Clean or replace fuel filter. 3. Open. 4. Clean out vent. 5. Install new pulse line. 6. If inoperative, replace.
Carburetor leaks.	1. Loose fuel line fitting. 2. Carb float setting set too high.	1. Tighten fuel line. 2. Adjust float.
Engine starts but runs rough with low power output.	1. High or low speed mixture adjustments off. 2. Incorrect float setting. 3. Dirty air filter. 4. Carburetor loose on engine block.	1. Readjust carburetor. 2. Adjust float. 3. Install new air filter. 4. Tighten carburetor mounting screws.

4

FUEL SYSTEM (Continued)

SERVICING

FUEL FLOW DIAGRAM

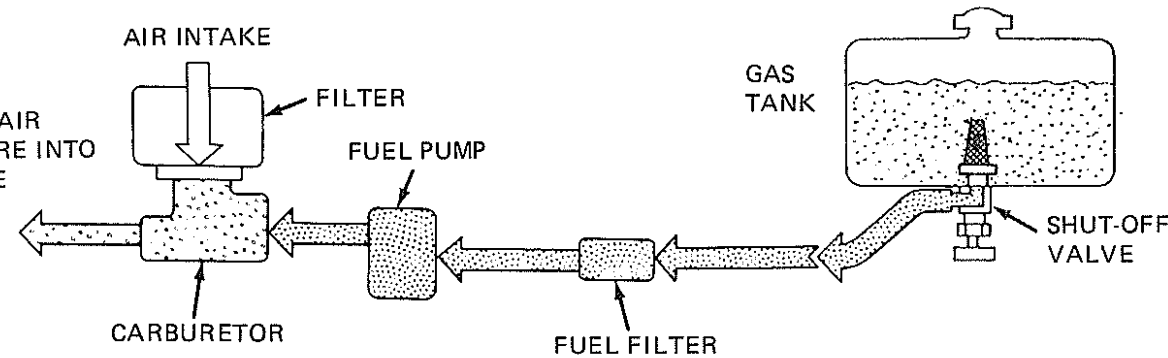


FIGURE 4-1

ANK

good grade of clean,
ular or unleaded
(For cold weather
, use winter blend



CAUTION

MIX OIL WITH
IE. REFUEL
RS WITH ENGINE
O AND COOL.

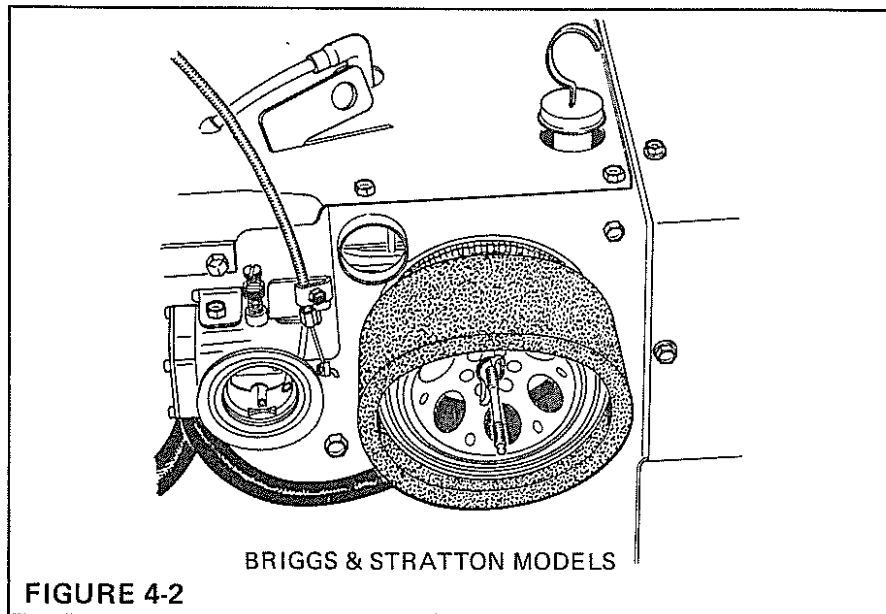
see that vent hole in fuel
s not plugged.

VE

valve is located under the
as shown in Figure 4-1.
must be fully open for
eration of the tractor.

TER

lter is located in the fuel
he engine. The fuel filter
able type in-line filter,
d be replaced when
eplace, shut off the
er the fuel tank. Remove
rom the fuel line and
th a new one.



AIR CLEANER

The importance of maintaining an air cleaner in proper condition cannot be over-emphasized!

Improper air cleaner maintenance can create engine damage which the engine manufacturer will not warrant.

When servicing the air cleaner, lower the hinged side panel. Unscrew the wing nut on the air cleaner cover and remove. Clean the filter as follows:

BRIGGS & STRATTON 11 H.P. AIR CLEANER (Figure 4-2)

The air filter on the Briggs and Stratton engine has a precleaner.

This is cleaned by washing with a liquid detergent and water and squeezing dry like a sponge. After the precleaner is dry, put 1 oz. (.03 liter) of oil on it and squeeze to distribute oil evenly.

NOTE: DO NOT OIL ELEMENT. THE PAPER ELEMENT WILL BE DAMAGED.

FUEL SYSTEM (Continued)

**MEDIUM FRAME
SERIES TRACTOR**
Page 4-3 Rev. 4/90

SERVICING

Wipe dirt or dust accumulation from cover, including base plate. Dry type elements should be cleaned or replaced after 100 hrs, or once a year.

The dry element is cleaned by gently tapping on a flat surface to remove loose dirt.

BRIGGS & STRATTON TWIN CYLINDER AND VANGUARD AIR CLEANER (Figure 4-3 and 4-4)

Clean and re-oil foam pre-cleaner at three month intervals or every 25 hours, whichever occurs first.

NOTE

Service air cleaner more often under dusty conditions.

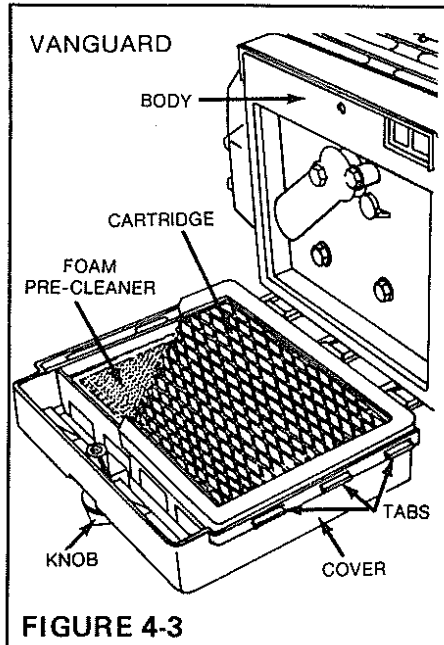


FIGURE 4-3

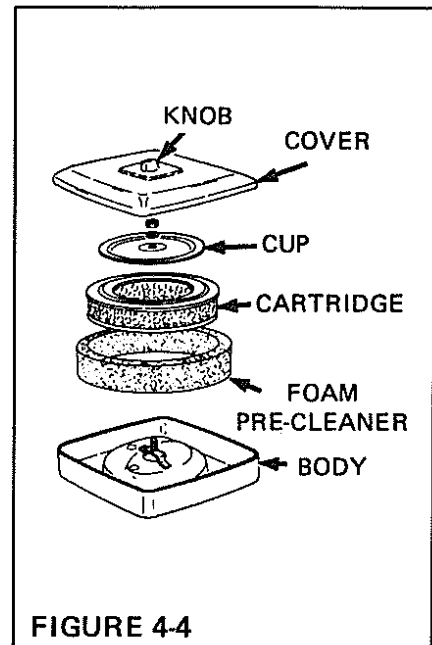


FIGURE 4-4

1. Remove knob and cover.
2. Remove foam pre-cleaner by sliding it off the paper cartridge.
3. a. Wash foam pre-cleaner in liquid detergent and water.
b. Wrap foam pre-cleaner in cloth and squeeze dry.
4. Reinstall foam pre-cleaner.

For Vanguard:

- a. Install pre-cleaner in cover with foam toward cover.
- b. Install cartridge in cover with tabs on cartridge in slots of cover.
5. Reassemble cover and screw down tight.

solution. Rinse thoroughly with flowing water from inside out, until water is clear. Cartridge must be allowed to stand and air dry thoroughly before using.

Yearly or every 100 hours, whichever occurs first, remove paper cartridge. (Service more often if necessary.) Clean by tapping gently on flat surface. If very dirty replace cartridge, or wash in a low or non-sudsing detergent and warm water

FRAME
ACTOR
Rev. 4/90

FUEL SYSTEM (Continued)

SERVICING

AIR CLEANER

5)
Normal operating
s, disassemble and
r cleaner components
hours of operation. Do
frequently if extremely
rty conditions prevail.
ype element is cleaned
tapping on a flat surface
ing this, be careful not
e gasket surfaces on

IL ELEMENT. THE
LEMENT WILL BE
LLY AFFECTED BY
SE. USE ONLY A
EH ELEMENT.

or dust accumulation
r, and base plate. Dry
ents should be replaced
onger serviceable.

TECUMSEH MODELS

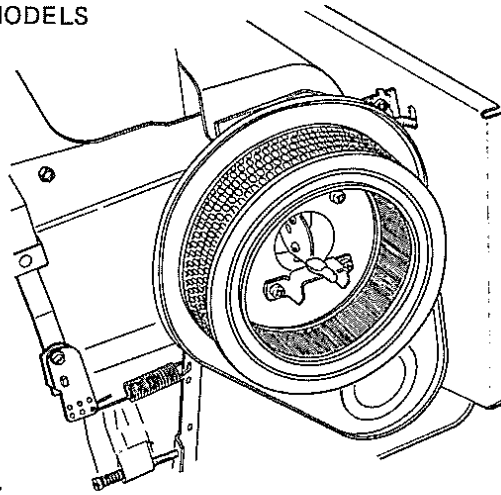


FIGURE 4-5

ETOR

or is adjusted at the
d should not have to be
ack exhaust is noted,
air cleaner first. An
mixture is usually
a poorly serviced,
ogged air cleaner
not an improperly
carburetor.

& STRATTON ETOR ADJUSTMENT (Figure 4-6 & 4-7)

ne and allow to warm up
PM. Turn needle valve in
ne misses (lean
then turn it out past
operating point until
s unevenly (rich
Turn needle valve to the

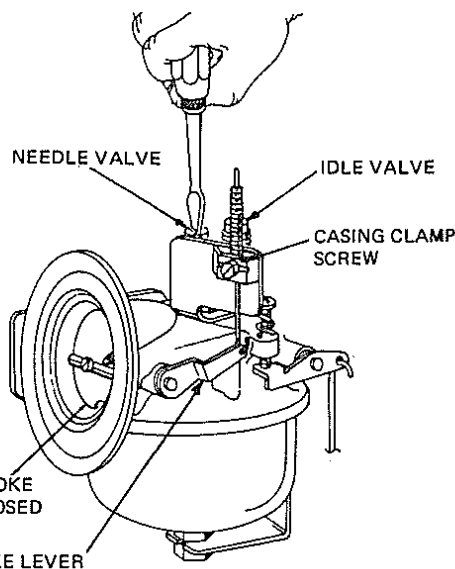


FIGURE 4-6

FUEL SYSTEM (Continued)

**MEDIUM FRAME
SERIES TRACTOR**
Page 4-5 Rev. 4/90

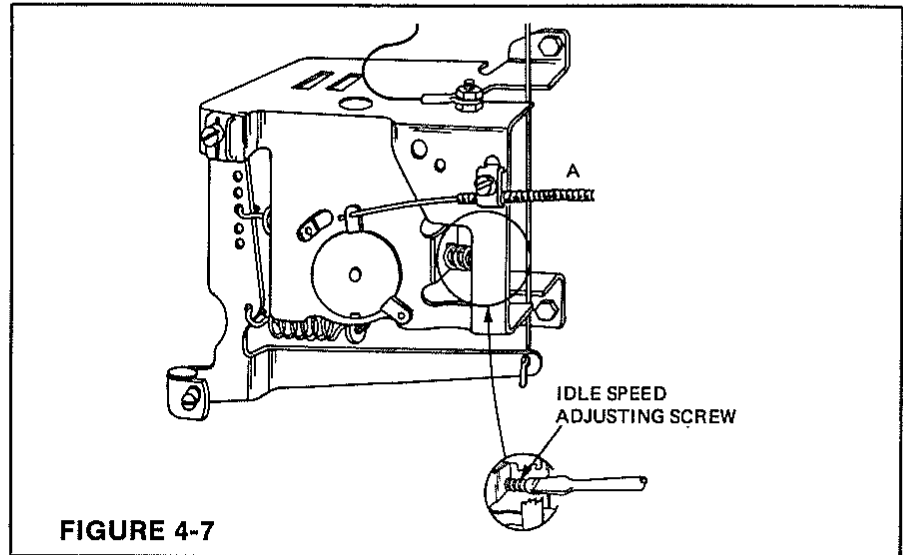
SERVICING

mid-point between rich and lean so engine runs smoothly. Set throttle in idle position and set idle speed adjusting screw, Figure 4-7, behind bracket until engine idle speed is 1750 RPM. With throttle in idle position, turn idle valve, Figure 4-6, in (lean) and out (rich) until engine runs smoothly. If necessary, correct idle speed. Move throttle up to fast - engine should accelerate without hesitation or sputtering. If engine does not accelerate properly, the carburetor should be readjusted, usually to a slightly richer mixture of the needle valve.

NOTE: IF THE NEEDLE VALVE OR IDLE VALVE BOTTOMS ON THE SEAT WHEN MAKING THE ABOVE ADJUSTMENTS, DO NOT FORCE FURTHER; THIS WOULD DAMAGE THE VALVE OR SEAT.

TO CHECK OPERATION OF CHOKE

1. Remove air cleaner to permit view of choke.

**FIGURE 4-7**

2. Move choke control lever to CHOKE position. The carburetor choke should be completely closed.
3. Reassemble air cleaner.

TO ADJUST CHOKE

Place choke control lever in CHOKE position. Loosen control casing clamp screw. Move casing and wire until choke is completely closed. Re-tighten casing clamp screw.

4

NAME CTOR v. 4/90	FUEL SYSTEM (Continued)
--	----------------------------------

SERVICING

& STRATTON I.C.
 LINDER 14 HP & 16 HP
 or (Fig. 4-8 thru 4-10)

Carburetor adjustment may be required to
 compensate for differences in fuel, temperature,
 or load.

ON CYLINDER ENGINE CARBURETOR
 MIXTURE ADJUSTMENT PROCEDURE IS
 ADJUST CARBURETOR FUEL MIXTURE
 ORDER STATED AS FOLLOWS.

Turn high speed mixture valve clockwise until it
 stops. CAUTION: Valves may be damaged by
 opening them in too far. Open needle valve 1-1/2
 turns counterclockwise. Close the idle mixture valve
 in the same manner, and open it 1-1/2 turns. This
 adjustment will permit the engine to be started,
 and run up prior to final adjustment.

Final carburetor adjustments must be made with
 engine on engine.

Remove and place equipment speed control lever
 in slow position. Hold carburetor throttle lever against
 stop and adjust idle speed screw to obtain
 approximately 1400 RPM. Turn idle mixture valve
 counterclockwise (lean mixture) until engine misses
 drops. Then turn idle mixture valve 1/2 turn
 clockwise. Place equipment speed control
 lever in fast position. Turn high speed mixture valve
 counterclockwise (lean mixture) until engine misses
 drops. Then turn high speed mixture valve
 clockwise.

If engine does not accelerate properly, re-adjust
 idle mixture valve approximately 1/8 turn
 counterclockwise (rich).

CHOKE ADJUSTMENTS

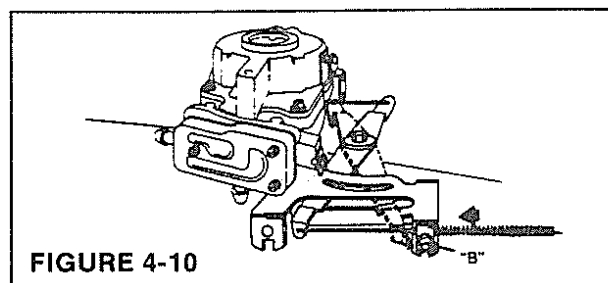
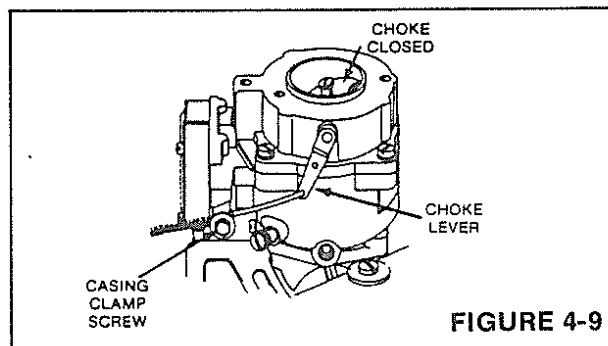
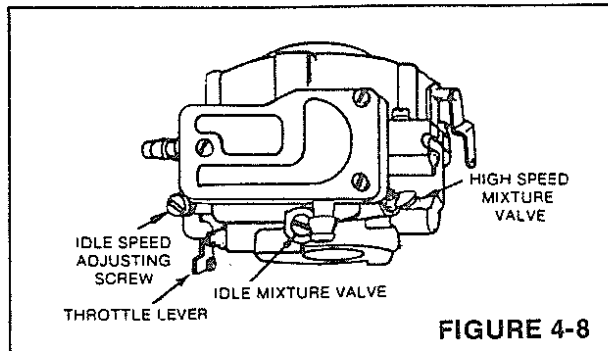
Choke and speed control operation is
 dependent upon proper adjustment of remote
 control lever on the powered equipment.

PROPER OPERATION OF CHOKE CONTROLS:

Move control lever to "choke" position. The
 choke should be closed.

TEST CHOKE:

Move control lever on equipment in
 "fast" position. Loosen control casing clamp
 screw. Move control casing and wire until choke is
 fully closed. Tighten casing clamp screw.



GOVERNOR SPEED CONTROL ADJUSTMENT

The acceptable operating speed range is 1800 to
 3600 RPM. Idle speed is 1400 RPM. The
 manufacturer of the equipment on which the engine
 is used, specifies the top governed no load speed at
 which the engine may be operated. DO NOT
 EXCEED this speed.

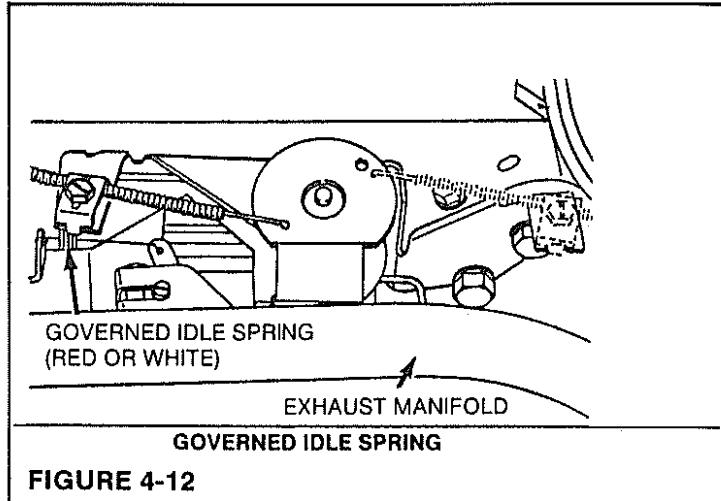
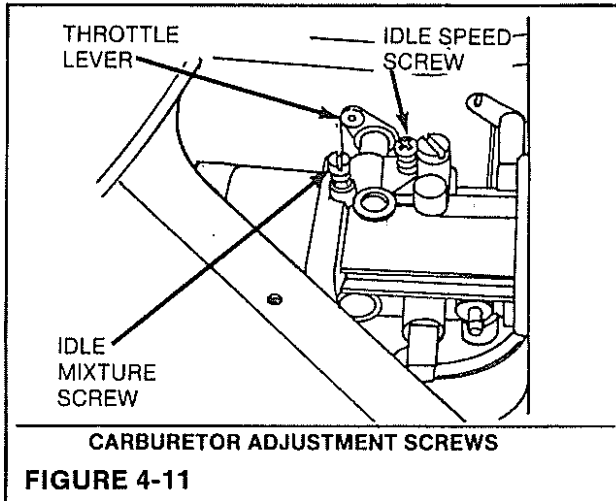
Engine speed is controlled by movement of the
 control lever. Move control lever on equipment, "A",
 to slowest engine speed possible. Throttle lever on
 carburetor should touch idle speed adjusting screw.
 To adjust, loosen control casing clamp screw "B".
 Move control casing and wire in direction shown by
 arrow until throttle lever touches idle speed adjusting
 screw on carburetor. Retighten casing clamp screw
 "B".

CAUTION: Throttle lever on carburetor MUST touch
 idle speed adjusting screw when equipment control
 lever is in slowest position.

FUEL SYSTEM (Continued)

MEDIUM FRAME
SERIES TRACTOR
Page 4-7 Rev. 4/90

SERVICING



BRIGGS & STRATTON VANGUARD CARBURETOR (Figure 4-11)

CARBURETOR ADJUSTMENTS

Minor carburetor adjustment may be required to compensate for differences in fuel, temperature, altitude or load.

NOTE: The air cleaner and air cleaner cover must be assembled to carburetor when running engine.

THE TWIN CYLINDER ENGINE CARBURETOR FUEL MIXTURE ADJUSTMENT PROCEDURE IS UNIQUE. ADJUST CARBURETOR FUEL MIXTURE IN THE ORDER STATED AS FOLLOWS:

INITIAL ADJUSTMENT (Figure 4-11)

Gently turn the idle mixture screw clockwise until it **just** closes. Screw may be damaged by turning it in too far. Then turn idle mixture screw 1-1/2 turns counterclockwise.

This initial adjustment will permit the engine to be started and warmed up (approximately 5 minutes) prior to final adjustment.

FINAL ADJUSTMENT (Figure 4-11 & 4-12)

Start engine and place equipment speed control lever in idle position. Hold carburetor throttle lever against idle stop and adjust idle speed screw to obtain 1300 to 1500 RPM. Turn idle

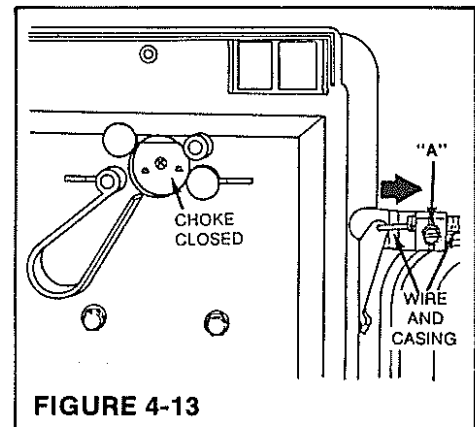
mixture screw **slowly** clockwise (lean mixture), until speed **just** starts to slow. Then turn idle mixture screw slowly counterclockwise (rich mixture) until **speed** just starts to slow. Turn screw to midpoint between rich and lean. Now adjust idle spring screw to obtain 1200 RPM, if governed idle spring is red, or 900 RPM, if governed idle spring is white. Release throttle lever.

If the engine does not accelerate properly, readjust idle mixture screw approximately 1/8 turn counterclockwise (rich).

NOTE: Engines operated at altitudes of approximately 3000 to 5000 feet (900 to 1500 meters) or higher, may require the installation of a high altitude carburetor main jet to achieve best engine performance. If erratic performance is observed, contact a Briggs & Stratton Authorized Service Center for part number of high altitude jet.

CONTROL ADJUSTMENTS

Proper choke and throttle control operation is dependent upon proper adjustment of equipment controls.



TO CHECK OPERATION OF CHOKE CONTROL:

Move choke control to "CHOKE" position. The carburetor choke should be closed.

CHOKE CONTROL ADJUSTMENT (Figure 4-13)

Loosen casing clamp screw "A". Move choke control to "CHOKE" position. Move casing and wire in direction of arrow until choke is completely closed. Retighten casing

4

FRAME CTOR v. 4/90	FUEL SYSTEM (Continued)
-----------------------------------	----------------------------------

SERVICING

E CONTROL CHECK

4)
rol lever on equipment to
ed position. Swivel on
cket should be against

E CONTROL ENT

4)
ing clamp screw "A".
ng and wire in direction
arrow until swivel contacts
retighten casing clamp

ADJUSTABLE GOVERNOR CONTROL:

The manufacturer of the equipment on which this engine is installed set the speed at which it operates. If adjustment is required, consult any Briggs & Stratton Authorized Service Center.

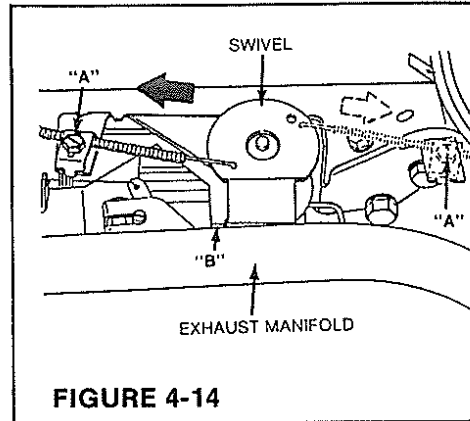


FIGURE 4-14

EH CARBURETOR MENT

IDLE fuel adjusting
ure 4-15, all the way in
toms lightly; do not
osed as this will damage
e valve. For preliminary
rn IDLE fuel screw out
lockwise) 1-1/2 turns.

adjustments, start engine
it to warm up, then
t full throttle and under
ssible. If engine runs
rn IDLE fuel screw either
in 1/8th turn increments
ne runs smooth. Allow
run a couple of seconds
each setting before
again. Rough idle is
to the idle speed being
w - check this also.

**AMPER WITH ENGINE
OR WHICH IS
Y SET FOR PROPER
SPEED. OVER-
G ENGINE ABOVE
Y HIGH SPEED
CAN BE DANGEROUS.
HINK THE ENGINE
ED HIGH SPEED
DJUSTING, CONTACT
ARBY AUTHORIZED
EH SERVICE OUTLET,**

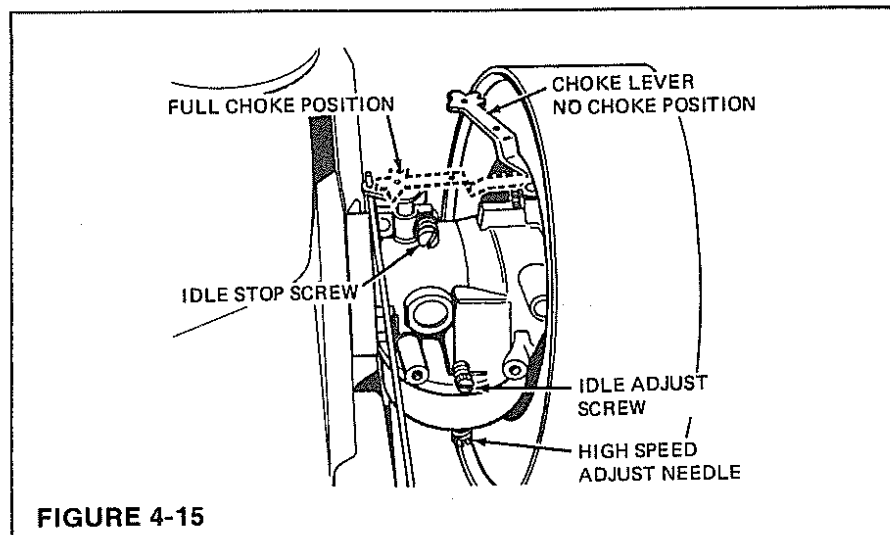


FIGURE 4-15

**WHO HAS THE PROPER
EQUIPMENT AND EXPERIENCE
TO MAKE ANY NECESSARY
ADJUSTMENTS.**

**CHANGING OF ENGINE
GOVERNED SPEED WILL VOID
ENGINE WARRANTY.**

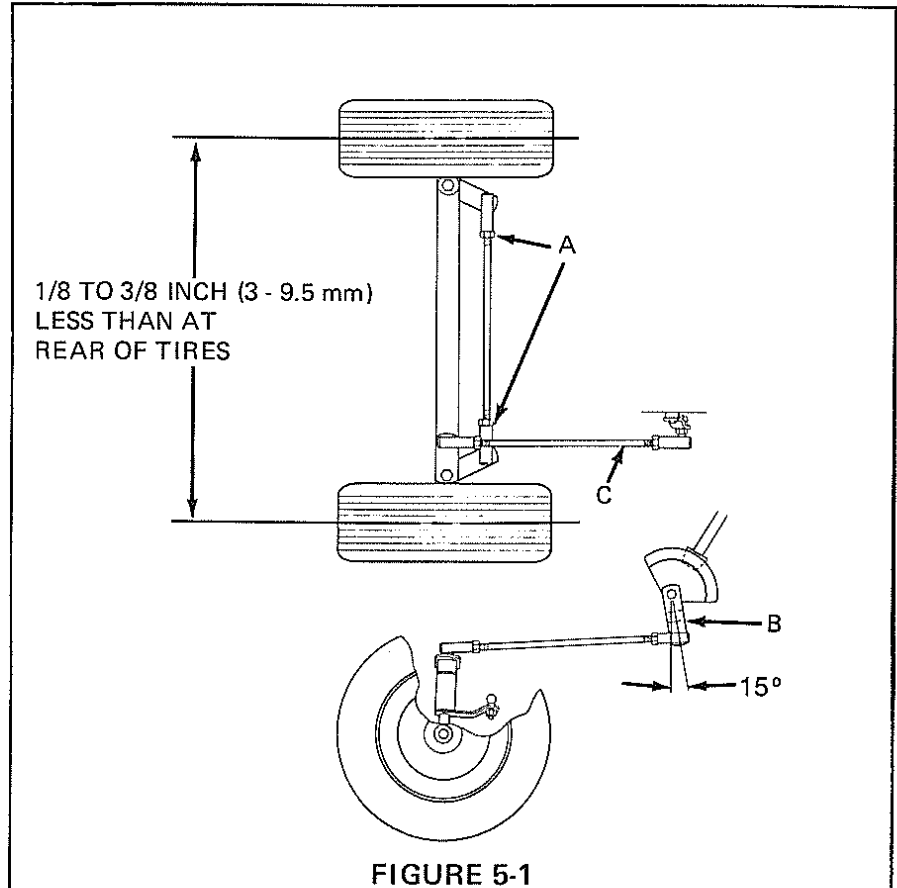
GROUP V. CHASSIS

**MEDIUM FRAME
SERIES TRACTOR**
Page 5-1 Rev. 4/90

GENERAL TRACTOR ADJUSTMENTS

FRONT WHEEL ALIGNMENT

1. Turn steering wheel so that front wheels are straight ahead.
2. Measure distance across front of front tires, center line to center line. Measure distance across rear of front tires, center line to center line. Distance at the front of tires should be $\frac{1}{8}$ inch to $\frac{3}{8}$ inch (3 - 9.5 mm) less than the rear of tires. If adjustment is necessary, remove the rod end from spindle. Loosen jam nut (A) and turn in or out as necessary. Adjust each side equally.
3. After adjustment is obtained tighten hex nuts securely.
4. With arm (B) positioned approximately 15° to the rear, adjust drag link (C) till wheels are parallel to the centerline of the tractor.



STEERING ASSEMBLY

If any repair work is needed on the Steering Assembly, follow the instructions below.

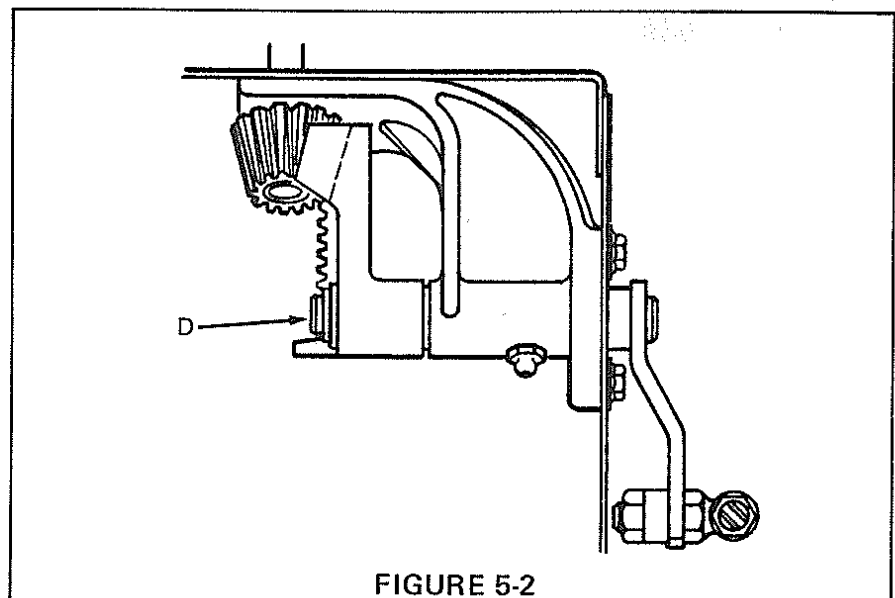
Disassembly:

1. Remove retaining ring (D) Figure 5-2 and slide the steering arm shaft out.

NOTE: If further disassembly is needed drag link (E) must be disconnected.

NOTE: Keep track of all shims and their locations when disassembling.

2. Disassemble the steering wheel by removing roll pin (E), Figure 5-3 and washer.
3. Remove the steering shaft assembly from the steering column.



CHASSIS (Continued)

STEERING ASSEMBLY (CONT'D)

It may be necessary to tap the steering shaft down until flange (F) is pushed out of the support casting.

INSTALLATION:

Slide flange bushing (F) slid onto the steering shaft assembly, route it through the casting and through the steering column bearing. Slide the shim at point (G) between the steering wheel with the pin (E) removed earlier.

Align the steering wheel emblem with the steering gear housing position steering gear housing casting.

Point the steering arm pointed to the rear, (See Figures 5-3), slide it through the casting, and reinstall the steering arm removed earlier and steering gear housing figures 5-3.

For the same reason the two gears have maximum clearance, shim at point (I) and install the retaining ring (D),

Turn the steering wheel to check for

INSPECT TIRES

Inspect the front and rear tires evenly. Under no circumstances should tire inflation be less than 8 pounds, (55 kPa) no more than 12 pounds (82 kPa). Check tire pressure with a low pressure gauge. Operating with low tire pressures may damage the tires.

CLUTCH ADJUSTMENT (Gear Models Only)

The clutch generally should not require any adjustment. If for any reason the clutch is not engaging or disengaging correctly, follow the steps below:

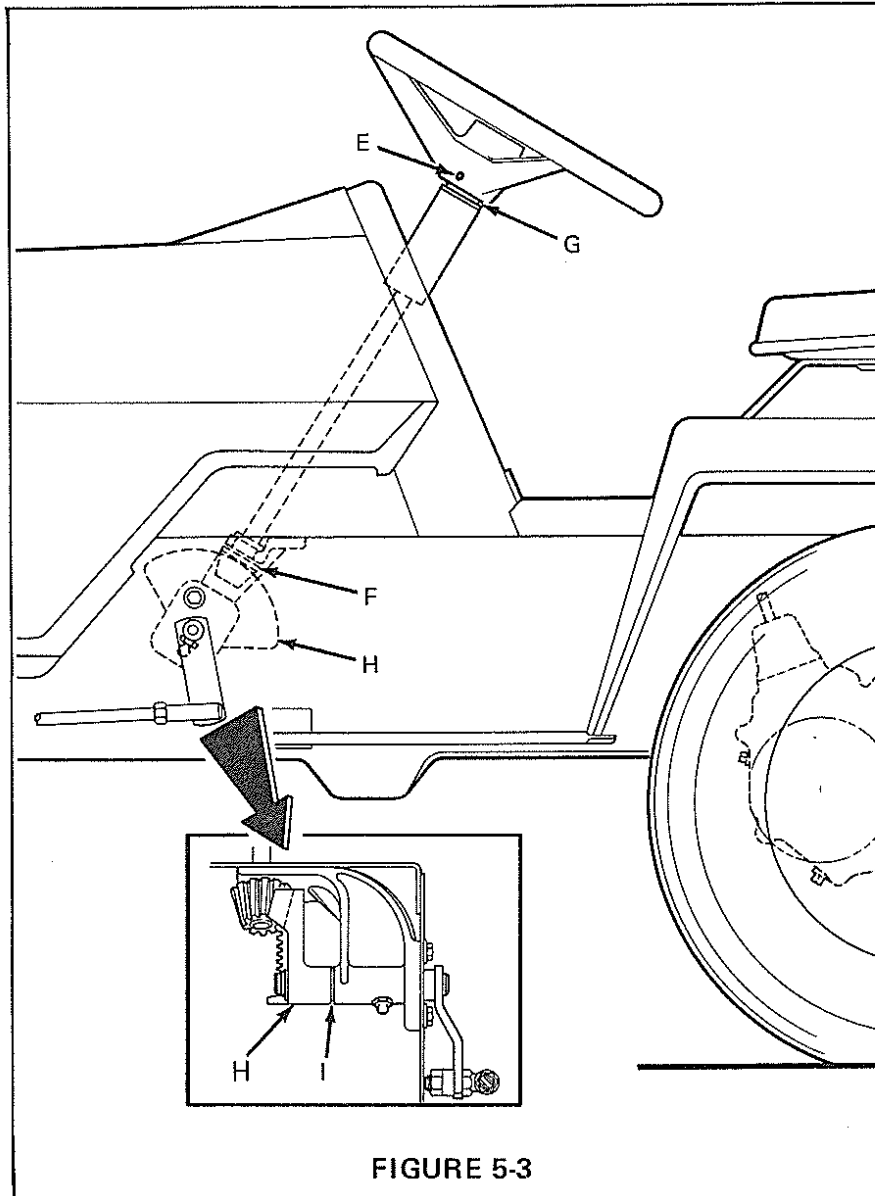


FIGURE 5-3

(Early Models)

When foot pedal has fully returned to its upper position, screw on lock nut (A), Figure 5-4 until there is a gap of 1/8 inch (3 mm) between spring (B) and lock nut (A).

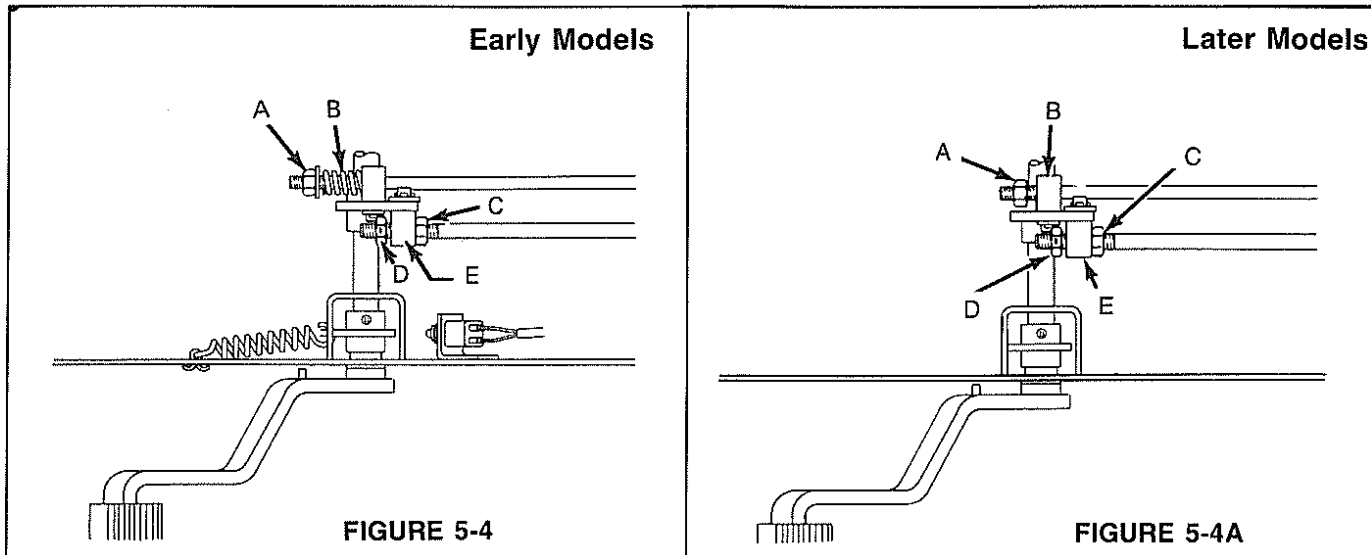
(Later Models)

When foot pedal has fully returned to its upper position, screw on lock nut (A), Figure 5-4A, till there is a gap of 1/8" (3 mm) between pivot block (B) and lock nut (D).

With the foot pedal depressed and the engine at full speed, the drive belt should not rotate. If it does, adjust lock nut (A) or check belt guides.

CHASSIS (Continued)

**MEDIUM FRAME
SERIES TRACTOR**
Page 5-3 Rev. 4/90

GEAR DRIVE TRACTOR ADJUSTMENTS

BRAKE ADJUSTMENT
(Figure 5-4 and 5-4A)

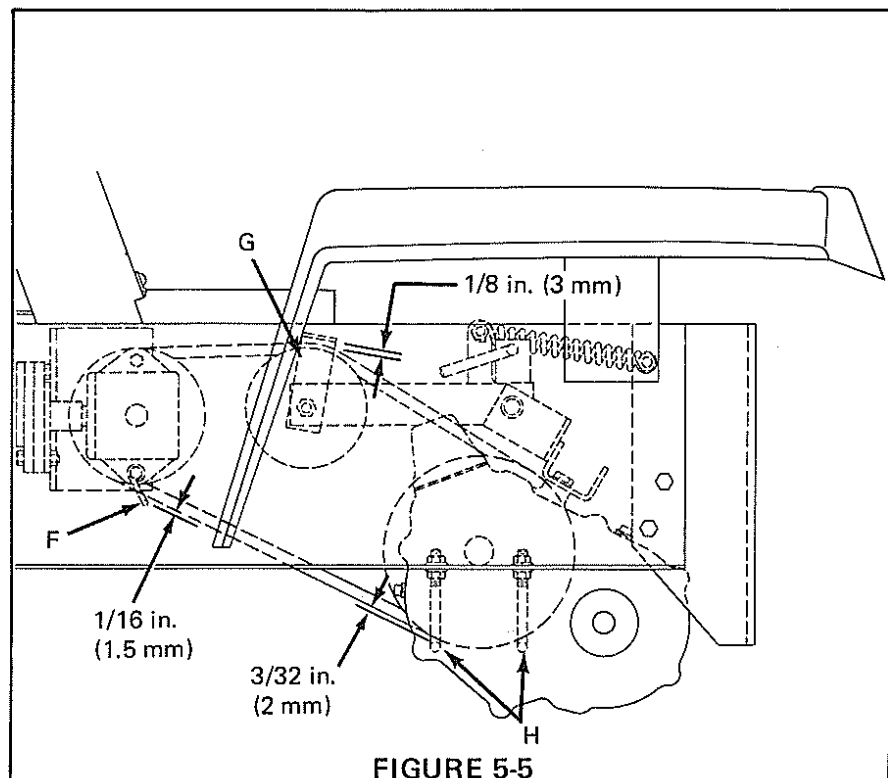
When the brake will no longer hold the tractor with brake lock set in the third or lowest notch, the brakes should be adjusted. To adjust, loosen nut (C) on brake rod.

With the foot pedal returned to its uppermost position, adjust lock nut (D) till there is a gap of $1/16$ " (1.5 mm) between lock nut and pivot block (E). Tighten nut (C) to pivot block.

BELT GUIDES ADJUSTMENT
(Figure 5-5)

With the foot pedal in its uppermost position check belt guides as follows:

1. Belt guide (F) on right angle drive support should be $1/16$ in. (1.5 mm) away from belt.
2. Guide (G) at idler should be in approximate position shown in Figure and $1/8$ " (3 mm) away from belt.
3. Belt guides (H) should be adjusted $3/32$ in. (2 mm) away from drive belt.



5

FRAME
TRACTOR
Rev. 4/90

CHASSIS (Continued)

HYDROSTATIC TRACTOR ADJUSTMENTS

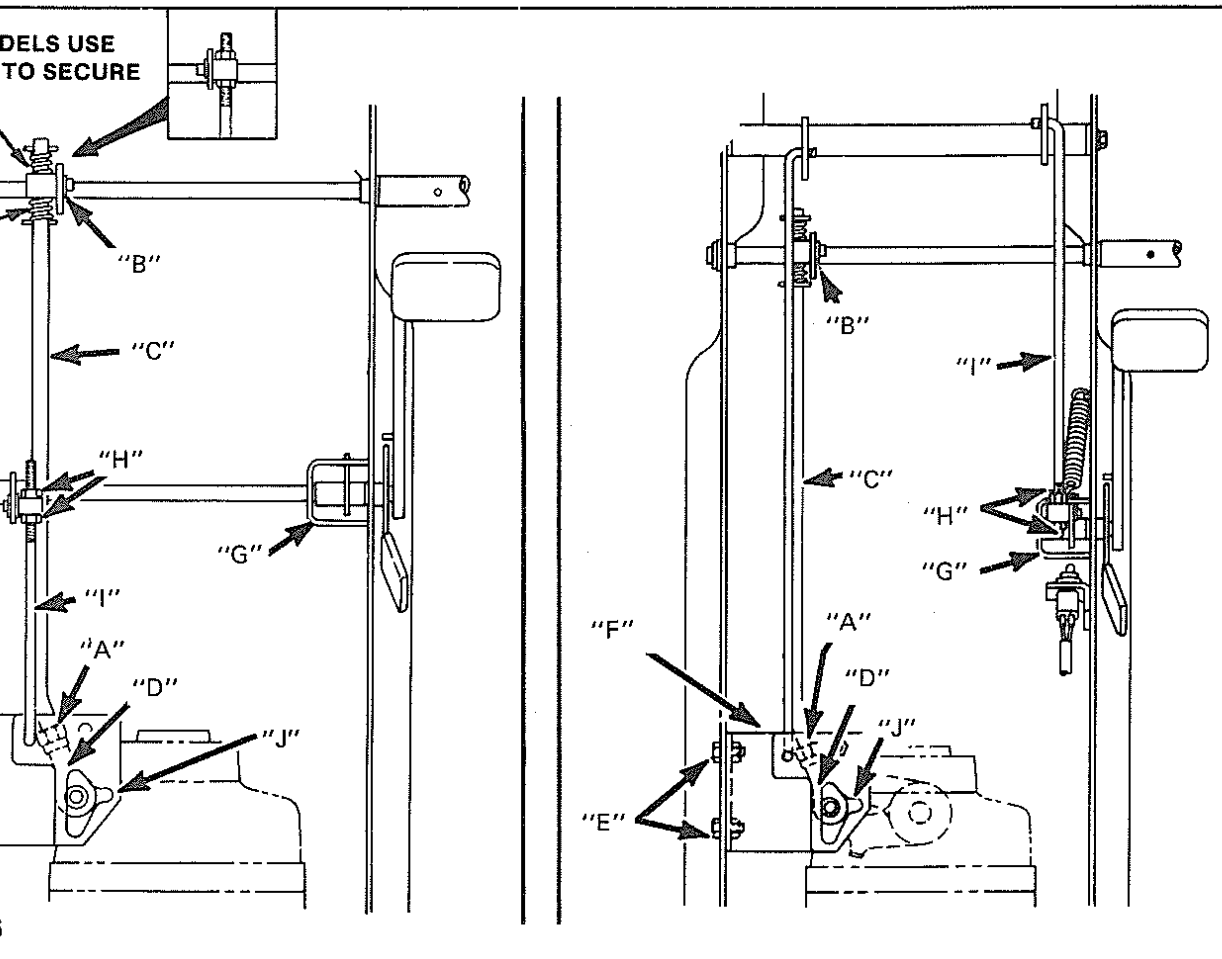
view of the Hydrostatic control linkage for the hydrostatic drive tractors. Study, then proceed
structions.

1669L

S/N 0300101 AND UP

1664, 1668, 1858 S/N 0100101 AND UP

1058, 1458-1658 S/N 0100101-0299999



HYDROSTATIC PEDAL ADJUSTMENT (Figure 5-6)

pedal has been adjusted at the
factory. If the pedal tip is
not approximately
vertical. If the
operator would prefer to either
decrease this angle
for more
comfort, the pedal
can be adjusted as follows:

1. Loosen hex nut (A).
2. (Not required on 1458-01).
Remove cotter pin (B) and remove
pivot block from control arm.
3. Turn rod (C) into rod end (D) to
increase the pedal angle.
Turn rod out to decrease the
pedal angle.

4. Replace pivot block cotter pin.
Retighten hex nut (A), against rod
end (D).

HYDROSTATIC NEUTRAL ADJUSTMENT (Figure 5-6)

The Hydrostatic neutral is
adjusted at the factory. If the
transmission should need

CHASSIS (Continued)

**MEDIUM FRAME
SERIES TRACTOR**
Page 5-5 Rev. 4/90

adjustment, the following procedure should be used.

With the transmission cold and engine off, check the fluid in transmission reservoir. It should be to the level indicated on dipstick.

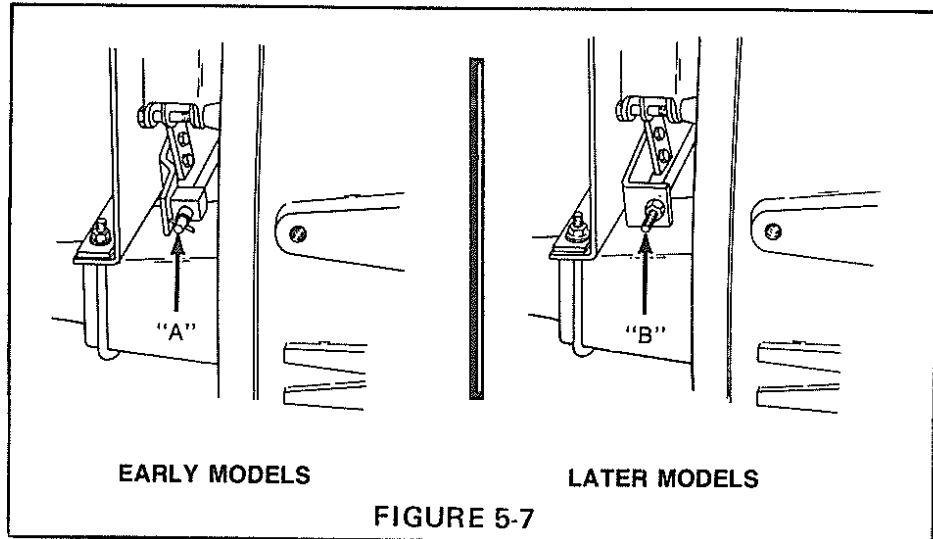
Start engine and release parking brake. If the tractor creeps Forward or Backwards, the Neutral position needs adjustment.

Adjust Neutral as follows:

1. Securely block up rear of tractor, just so the rear wheels clear the ground.
2. Start the engine and release the brake.
3. Loosen capscrews (E) and move support plate (F) Forward if wheels rotate in forward direction, or toward the rear if wheels rotate in reverse.
4. Tighten capscrews securing support plate when wheels no longer rotate.
5. Stop engine and lock brake arm against the stop (G).
6. Loosen jam nuts (H) and move rod (I) until pin lightly contacts slot (J) of neutral plate.

**NOTE: EXCESSIVE
ADJUSTMENT MAY CAUSE PIN
BREAKAGE.**

7. Tighten jam nuts (H).



BRAKE ADJUSTMENT (Figure 5-7)

If only light foot pressure is required to latch the parking brake, or if the parking brake does not hold the tractor when the brake pedal is latched, the brake system requires adjustment.

With the parking brake released, proceed as follows:

Turn brake rod (A) or hex nut (B) until a gap of .010 (0.25 mm) is achieved between brake disc and brake pad.

With brake pedal fully released, brake disc must rotate freely.

The tractor should not move when the brake is locked in the FIRST position.

NAME
ACTOR
86

CHASSIS (Continued)

ADJUSTMENT

(Model only)

1. To adjust seat, remove the two screws (A) Figure 5-8. Loosen the two front capscrews to move seat position forward or backward. Retighten capscrews and reinforcement screws to secure seat in position.

MODELS EXCEPT

1. To adjust seat, loosen knobs (G) beneath seat and slide seat forward or back. For different suspension, twist spring to the right operators or back operators. Twist spring

MODELS (1258, 1261, 1658, 1661 & 1858)

2. Adjust seat in an upright position, (D) down to act as a backrest.

SAFETY SWITCHES

1. Models equipped with IN-SAFETY SWITCHES. Operation of these safety switches ensure SAFE START-UP.

2. Interlock switch is incorporated into the Attachment switch.

MODELS EXCEPT
(Figure 5-9)

3. The second switch is below the seat, Figure 5-9. This switch should be activated by the back edge of seat support depressed 5/8" (16 mm). Loosen bracket (C) and move to correct location. The switch can also be activated by the seat and lifting the back button UP.

3. The third switch (E), Figure 5-10, is on the brake linkage. The switch button should depress approximately 3/32" (2 mm) when the brake is applied. If not, adjust by loosening nuts on switch and moving switch forward or back. Retighten nuts.

CRUISE SWITCH

4. The fourth switch (C) Figure 5-10 is also on the brake linkage. When the pedal is released the button of the switch should be depressed approximately 3/32" (2 mm). When the pedal is depressed, the button of the switch is released and all power to the cruise control is shut off. If not, adjust by loosening nuts on switch and move switch forward or back. Retighten nuts.

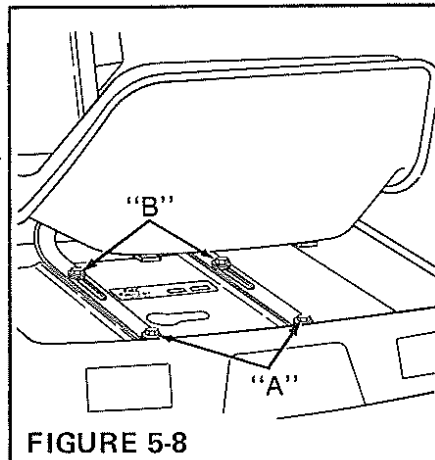


FIGURE 5-8

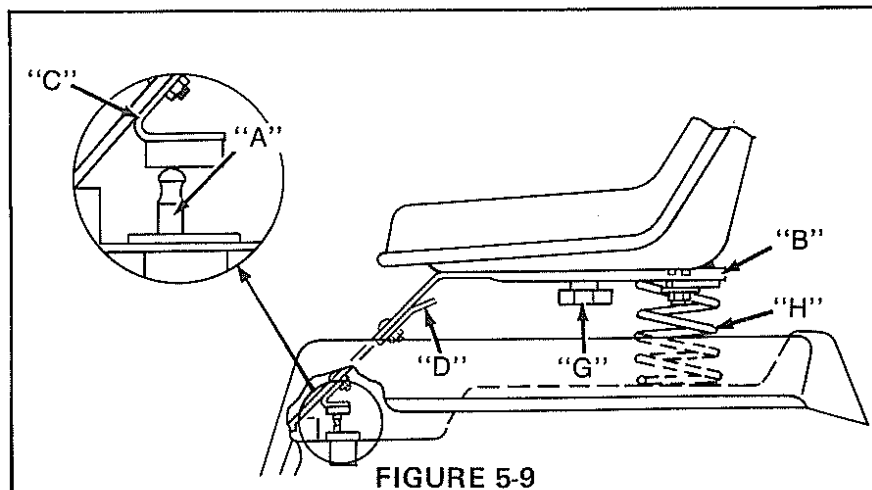


FIGURE 5-9

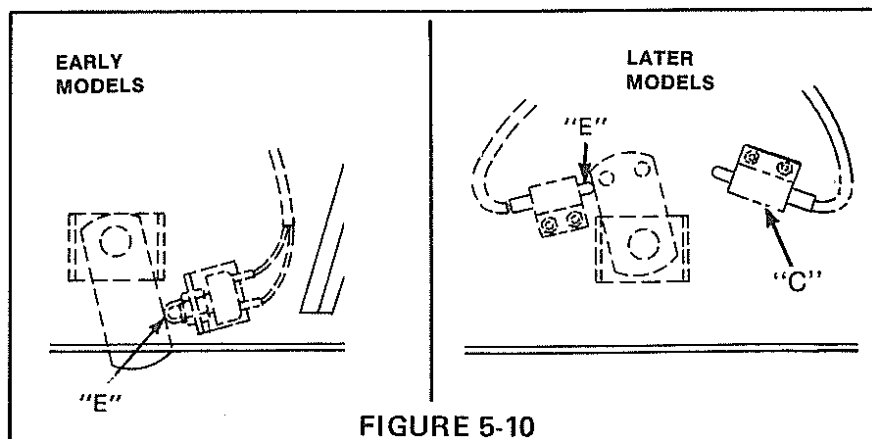


FIGURE 5-10

CHASSIS (Continued)

MEDIUM FRAME
SERIES TRACTOR
Page 5-7 Rev. 3/80

MOWER DRIVE ADJUSTMENT

To adjust the mower drive belt to its proper tension proceed as follows:

EARLY MODELS (FIGURE 5-11)

Turn hand knob (A) till indicator wire (B) is between the two lines of the decal on the side of the support.

LATER MODELS (FIGURES 5-12 & 5-12A)

Turn hand knob (C) till indicators (D) are parallel to one another.

ALL MODELS

After the above adjustments the two idlers of the drive should be in line with each other.

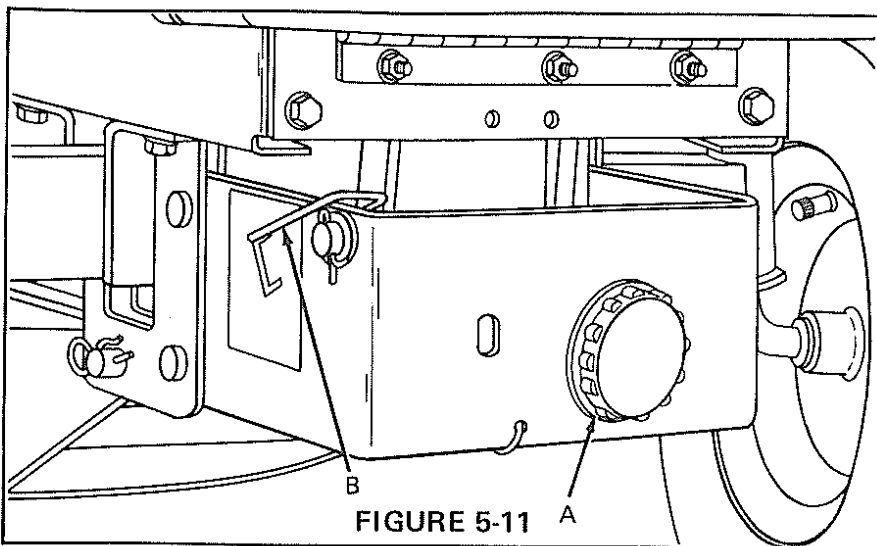


FIGURE 5-11

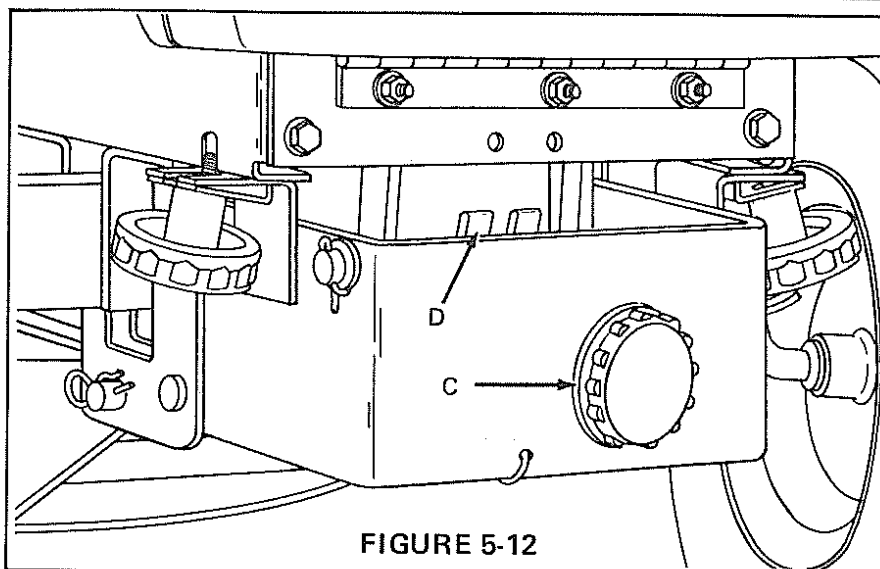


FIGURE 5-12

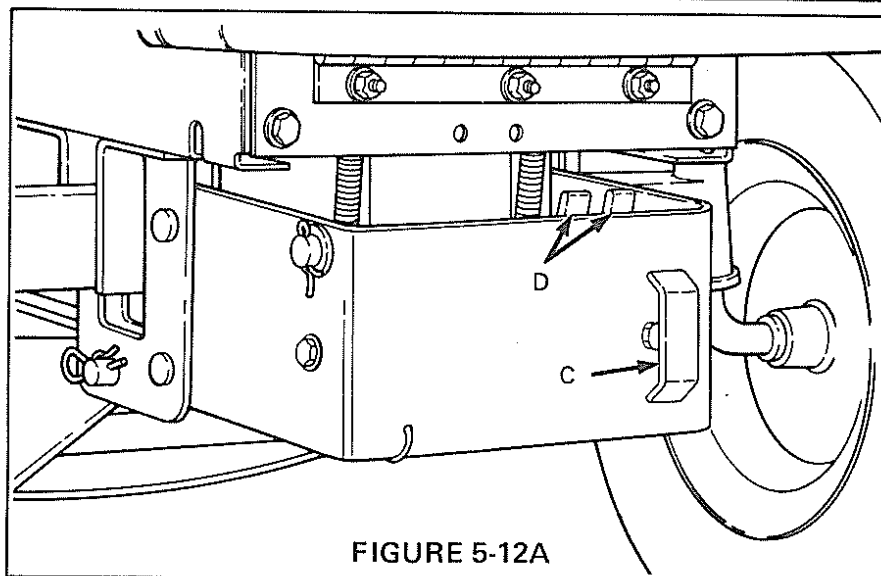


FIGURE 5-12A

5

FRAME
FACTOR
78

CHASSIS (Continued)

POWER TAKE-OFF (P.T.O.)

CLUTCH

NOT USE WHEEL TO REMOVE BRAKE.

Remove hood and front frame

Remove plug from clutch.

Remove locknuts.

Remove mounting capscREW and
from center of

1458 Serial Number
0199999, the engine
moved to remove the
clutch. On all other
the electric clutch can be
while in the frame.

Leave and brake
(See Figure 5-14).

Remove assembly.

Remove 3/8-16 x 3/4 flange
screws securing coil
to crankcase.

Remove assembly from

NOTATION

Remove assembly on engine,
on crankshaft seal bore.
on four 3/8-16 x 3/4
capscrews.

and Stratton engines
assembly must be
around pilot spacer (A),
i. Center by feel. When
the assembly, a spacer
ed at all four capscREW

Remove compression springs Figure
clutch mounting studs.

Remove burrs and dirt from
with emery cloth.

Apply light coat of grease or oil to
shaft. Insert key into keyway in
shaft.

Push rotor and armature
assembly with pulley onto engine
shaft until hub bottoms on
crankshaft shoulder.

Place large washer and
lockwasher on clutch mounting
capscrew.

Install capscrew into tapped hole
in center of crankshaft. Prevent
clutch from rotating, tighten
capscrew to 23-27 ft. lbs. (31-36
N-m) and torque.

Adjust brake as described under
maintenance.

Reconnect plug lead to lead from
switch making certain connection
is secure and the wire is not
rubbing against rotating parts.

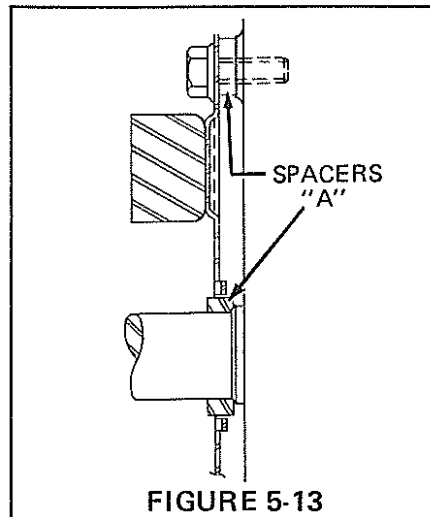


FIGURE 5-13

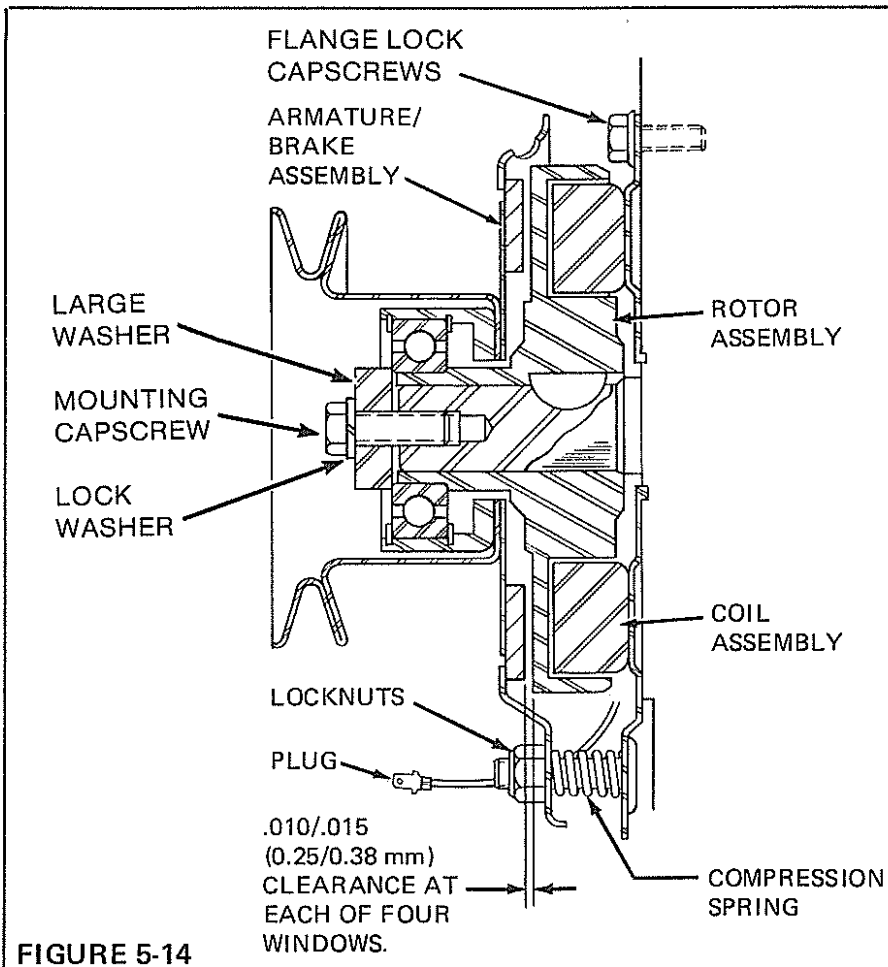


FIGURE 5-14

CHASSIS (Continued)

**MEDIUM FRAME
SERIES TRACTOR**
Page 5-9 Rev. 11-90

POWER TAKE-OFF (P.T.O.)

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 periodic readjustment depending upon unit usage. This can be accomplished as follows:

Position a .015" (0.38mm) thick shim in each of the four slots, Figure 5-15, in brake flange and turn on clutch/brake. Tighten the (4) locknuts until they just contact brake flange. (CAUTION: DO not over torque locknuts as damage to brake flange may result).

Turn off clutch/brake and remove (4) shims. Recheck gap through the slots provided. A minimum of .010" (0.25mm) and a maximum of .015" (0.38mm) should be maintained.

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.

If the clutch/brake has not been used over a long period of time, the following procedure is recommended prior to its use.

- Position tractor in neutral position.
- Start tractor engine, and put throttle in fast position.
- Turn clutch/brake switch on and off six times, engaging and disengaging driven attachments.

NOTE: ALLOW ENGINE DRIVEN ATTACHMENTS TO COME TO A COMPLETE STOP BETWEEN ON-OFF CYCLES.

The clutch/brake is now ready for continuous, trouble-free duty.

ELECTRIC P.T.O. CLUTCH SPECIFICATIONS

Voltage..... 12VDC
Resistance..... 2.8Ohms
Current..... Draw 4.17 Amps

TROUBLESHOOTING

Electrical Data - See wiring diagram in the electrical section of this manual.

- Clutch does not engage - Check electrical system for broken wires or bad connections. Check voltage at clutch lead. Voltmeter should read more than 10 volts. If voltmeter does not register a reading, look for broken wires or connect clutch lead and check

resistance reading of clutch coil A normal resistance reading should be between 3.0 and 2.3 ohms. A reading outside these values indicates a faulty coil. The field assembly should then be replaced. Check armature/rotor air gap. This is done by inserting a feeler gauge in the (4) slots provided in the brake flange. The gap should be between .010" - .015" (0.25 - 0.38mm) with the clutch/brake switch in the "off" position. If the gap is greater, readjust brake as described under maintenance.

- If engine driven attachment rotates slower than normal, check for loose belt. Inspect engine driven attachment with PTO belt removed. Attachment should turn freely. Check clutch/brake working surfaces for grease or oil.

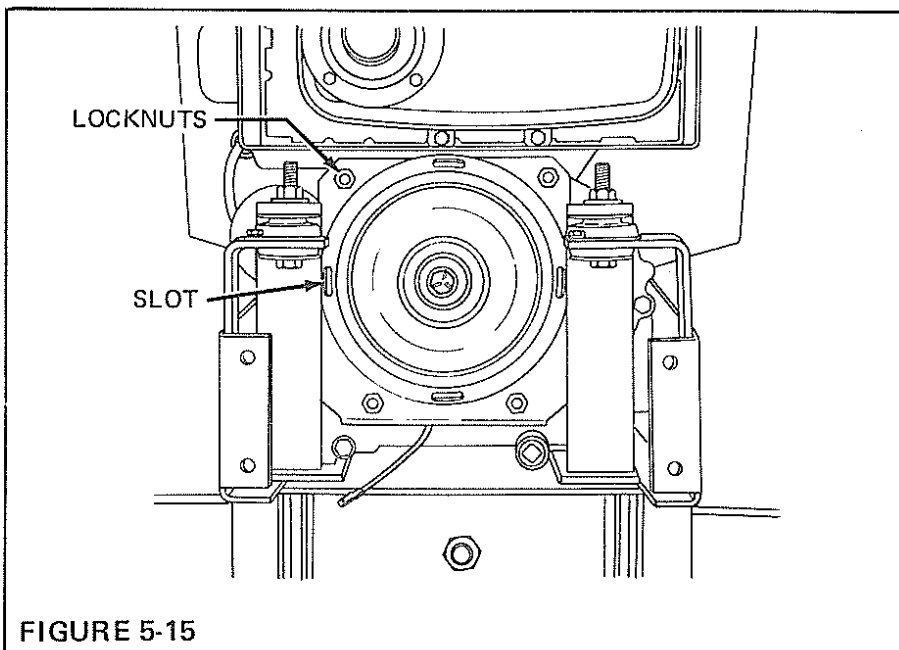


FIGURE 5-15

5

GROUP VI. HYDRAULIC SYSTEM

**MEDIUM FRAME
SERIES TRACTOR**
Page 6-1 Rev. 11-90

TROUBLE SHOOTING GUIDE

PROBLEM	PROBABLE CAUSE	REMEDY
Hydraulic lift inoperative	1. System low on fluid. 2. Oil line leaking. 3. Malfunctioning lift valve. 4. Malfunctioning lift cylinder. 5. Low pressure from pump. 6. Water or air in system.	1. Check level at transmission dipstick. 2. Replace line. 3. Replace valve. 4. Repair or replace cylinder. 5. Repair or replace hydro charge pump. 6. Change oil and/or check hydraulic connections.
Load drops when control valve is in neutral position.	1. Leaky hose between valve and cylinder. 2. Oil leaking past lift cylinder "O" rings. 3. Lift valve leaking internally.	1. Replace hose. 2. Repair lift cylinder. 3. Replace lift valve.
Lift valve or lift cylinder leaking.	1. Leaking "O" rings.	1. Replace "O" rings.
Hydraulic oil filter blowing.	1. Plugged filter. 2. Restriction between filter & hydro.	1. Replace filter. 2. Remove and inspect hydraulic lines & fittings.

HYDRAULIC SYSTEM (Continued)

PRINCIPLE OF OPERATION

c system is made up
components. These
ostatic transmission
, attachment lift
ment lift cylinder,
external lines and

hoses. The source of the fluid
flow is a roller type charge pump
mounted on the hydrostatic
package, which is driven by the
engine. This charge pump
provides hydraulic pressure. The

fluid reservoir is the
transmission and final drive
housing. All flow is first routed
through the attachment lift valve.

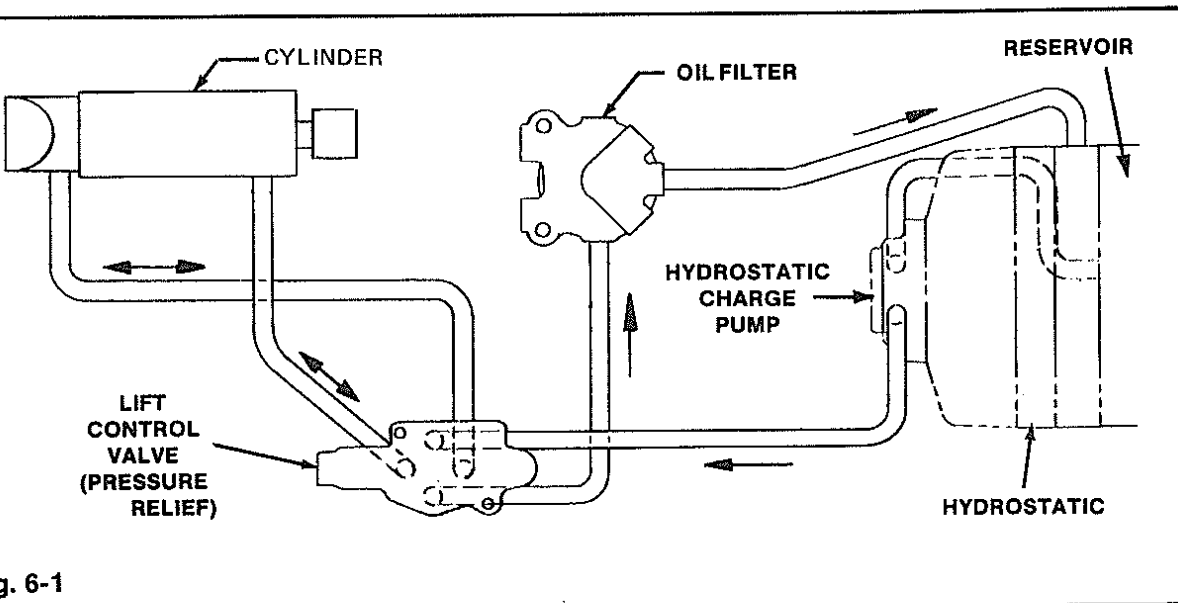


Fig. 6-1

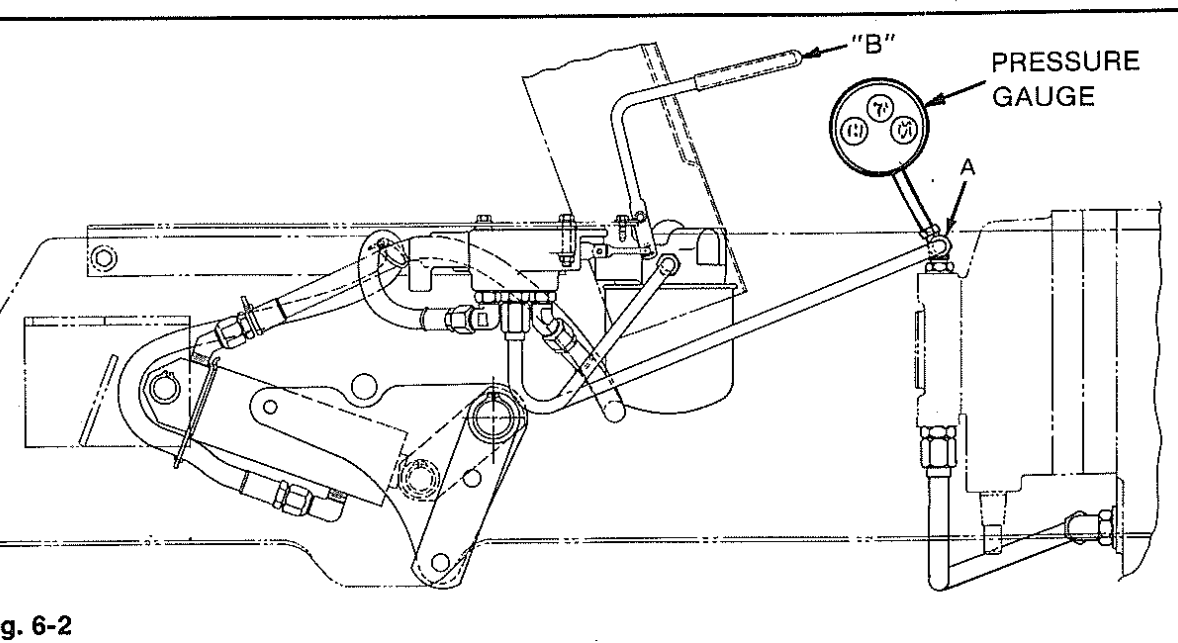


Fig. 6-2

HYDRAULIC SYSTEM (Continued)

**MEDIUM FRAME
SERIES TRACTOR**
Page 6-3 Rev. 11-90

TESTING HYDRAULIC SYSTEM

CAUTION! CARE SHOULD BE TAKEN TO THOROUGHLY INSPECT ALL HYDRAULIC COMPONENTS FOR HIGH PRESSURE LEAKS BEFORE TESTING OR REPAIRING. NEVER 'FEEL' FOR LEAKS, AS OIL LEAKING AT HIGH PRESSURE HAS SUFFICIENT FORCE TO PENETRATE THE SKIN AND CAUSE SERIOUS INJURY. USE EXTREME CARE WHEN WORKING WITH A SYSTEM AT OPERATING TEMPERATURES AS SEVERE BURNS CAN BE CAUSED BY CONTACT WITH HOT FLUIDS.

The following procedures can be used as a basic troubleshooting

method in their entirety, or can be used selectively based on reference from the troubleshooting chart. Prior to proceeding with any test, the fluid level should be checked and adjusted to correct levels. Fluid samples should also be checked for contamination, such as metallic particles. A strong 'burnt' odor would indicate over-heating--the result of over-loading, excessive tolerances, reduced flow of cooling air, or lack of cooling fin maintenance. A milky appearing fluid indicates moisture in the system. Any of these fluid conditions can only be corrected by replacement

of the fluid and a flushing of the system with clean fluid prior to resumption of further testing or operation. The presence of foam in the fluid or reservoir is a sign of air in the hydraulic system, which is the result of a leak in the suction section of the pump and connections, or a high pressure internal leak.

1. Check fluid level.
2. Check for metallic contamination in fluid.
3. Smell for burnt odor or signs of overheating.
4. The hydrostatic pressure can be checked using a pressure gauge which reads at least 1000 P.S.I. hydrostatic Pressure Gauge Kit 1737386 is available at the factory. To check the hydrostatic pressure, install a tee between hydro and tube to the hydraulic lift valve at point (A) Figure 6-2. Connect pressure gauge to tee. Start the engine and run for 5-10 minutes. At full RPM the pressure reading should be 140 P.S.I. $\pm$ 20 (964 kPa). If pressure is below 120 P.S.I., hydrostatic charge pump may have excessive wear. Repair per Eaton II manual.
5. To check the lift pressure move the hydraulic control valve lever to the lift position until the hydraulic cylinder reaches the end of its travel. The pressure reading should be no less than 450 P.S.I. (3100 kPa).
6. If the pressure reading is 450 to 550 P.S.I. (3100 - 3790 kPa) and the hydraulic cylinder does not operate properly, check the following:
 - a. Load too heavy. Check for correct attachment lift hook up.
 - b. Restriction in line from valve to hydraulic cylinder.
 - c. Malfunctioning cylinder or valve. Check for internal leaks caused by wear, worn "O" rings, etc.
7. If the pressure reading is below 450 to 500 P.S.I. (3100 - 3790 kPa) and the hydraulic cylinder does not operate, check the following:
 - a. System low on oil.
 - b. Plugged oil filter or pickup tube line.
 - c. Hydraulic oil line leaking.
 - d. Hydraulic valve or cylinder leaking internally.
 - e. Air or water in the system.

6

HYDRAULIC SYSTEM (Continued)

HYDRAULIC POWER LIFT

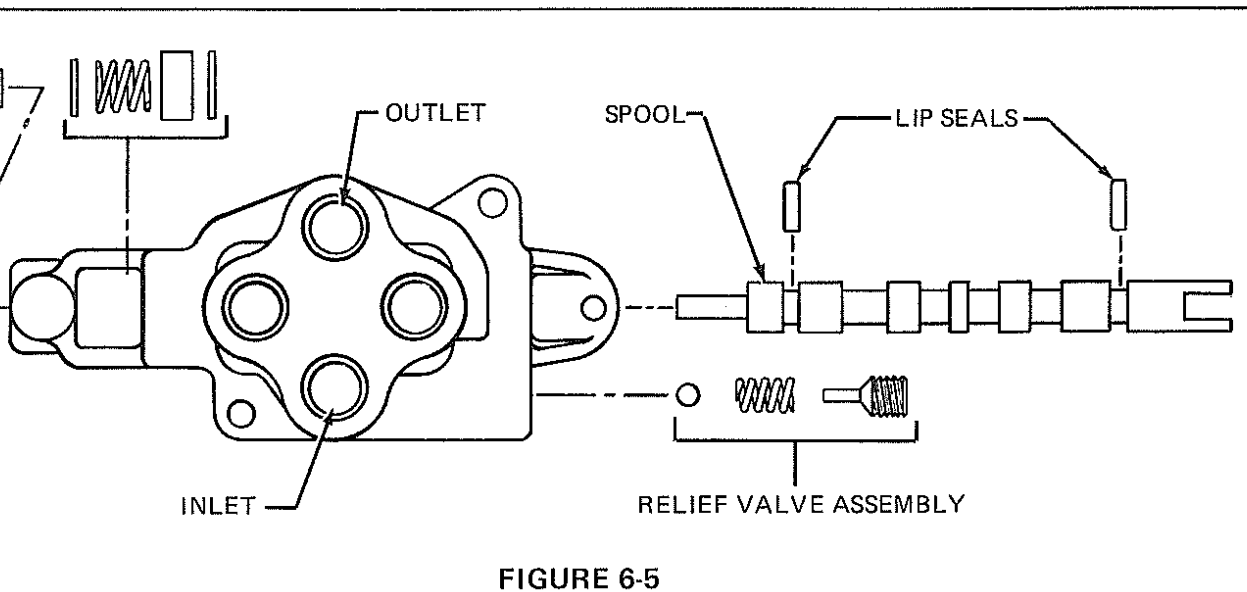


FIGURE 6-5

INSTALLING THE HYDRAULIC CONTROL VALVE

The hydraulic control valve regulates the direction of flow to the hydraulic cylinder. When the control lever is actuated, the valve opens and allows oil to flow. O-rings are used on the spool to prevent leakage. Lip seals are available for the control valve.

ASSEMBLY

The spool is matched to the bore of the valve body. If the spool or

valve body, is damaged the complete valve assembly must be replaced.

To remove the spool from the valve remove the capscrew in the end of the spool, and flat washer. Remove the spool by pulling it out of the lever end of the valve body.

Small burrs and scratches can be removed from the spool with fine emery cloth. Clean all parts before assembly.

ASSEMBLY

1. Install new lip seal rings onto the spool with the opening towards the inside of spool.
2. Lubricate seals and insert spool with seals into valve body. Be careful not to damage seals. Install the spool into the valve body from the lever end. This end has a chamfer in the bore which is a lead for the packings.
3. Secure spool with round head screw, lock washer and flat washer.

HYDRAULIC SYSTEM (Continued)

HYDRAULIC POWER LIFT (CONT'D)

REPAIRING THE HYDRAULIC CYLINDER

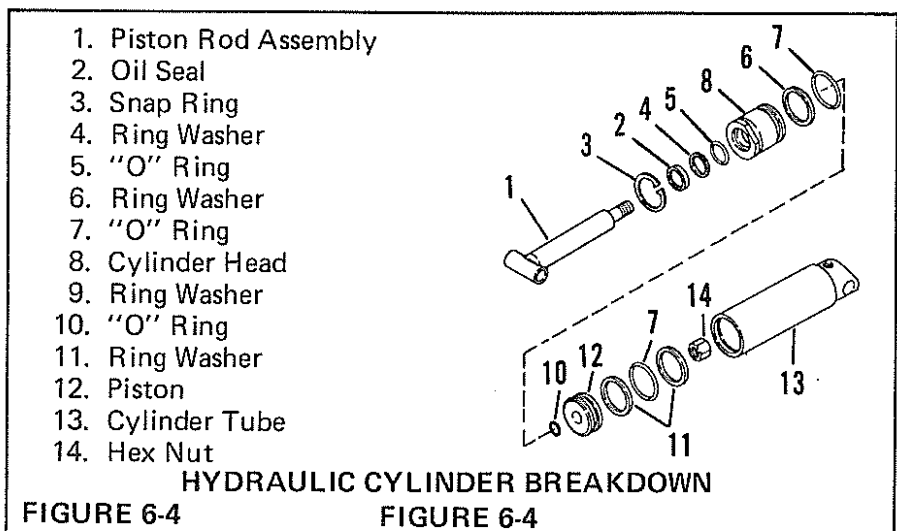
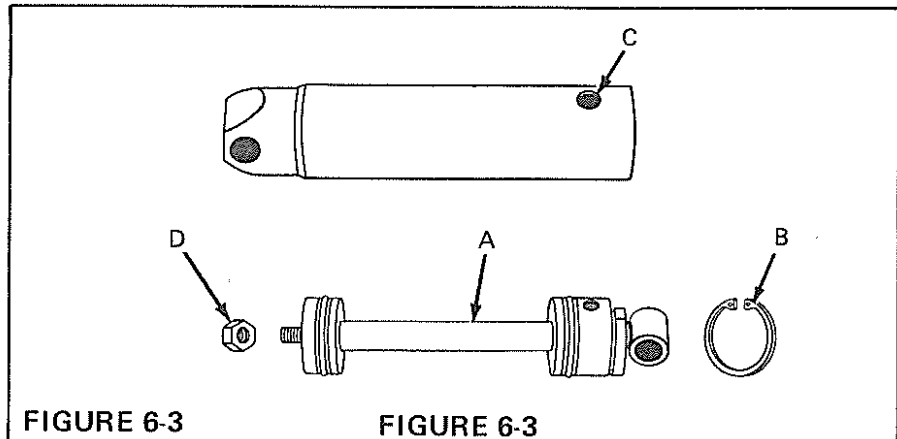
To remove the piston rod assembly (A) from the cylinder, the internal snap ring (B) and the hose fitting, which goes through hole (C) in the cylinder tube, must be removed.

PISTON ROD REMOVAL

1. Remove 90° elbow from cylinder tube.
- 2 Pull the piston rod out until it is fully extended.
3. Pinch snap ring together and pull on piston rod until the assembly slides out of the cylinder housing.

When the piston rod assembly is removed from the cylinder tube hex nut (D) can be loosened and the piston, cylinder head, and related "O" rings installed.

IMPORTANT: Grease "O" rings to prevent damage during assembly.



HYDRAULIC SYSTEM (Continued)

MEDIUM FRAME
SERIES TRACTOR
Page 6-6 Rev. 11/90

TRANSMISSION FILTERS

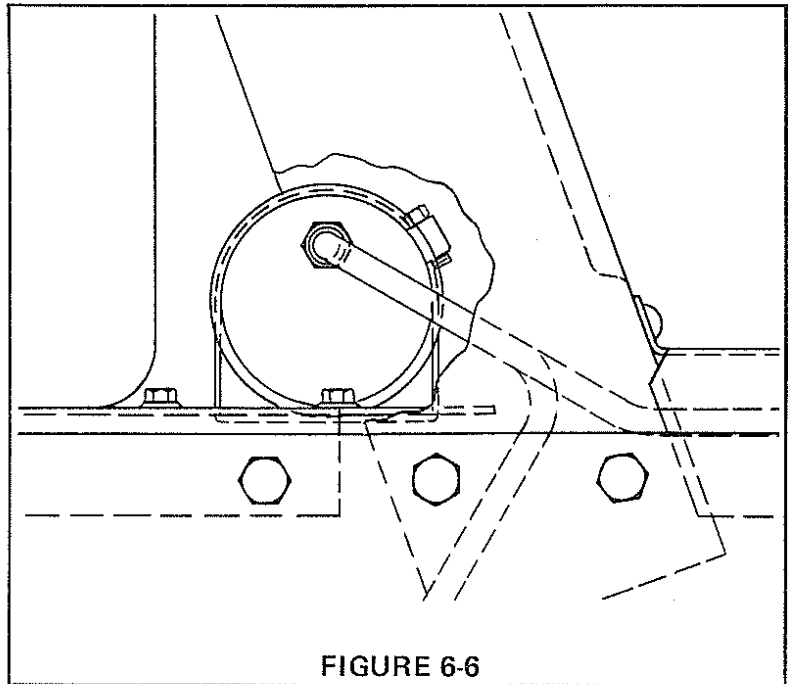
After the first 25 hours change the oil filter. Thereafter, change the filter at every oil change.

MODEL 1458 S/N 0100101 THRU 0199999 ONLY

The in-line filter is clamped to the top of the battery and fuel tank support, just behind the instrument panel.

Battery must be removed to reach filter.

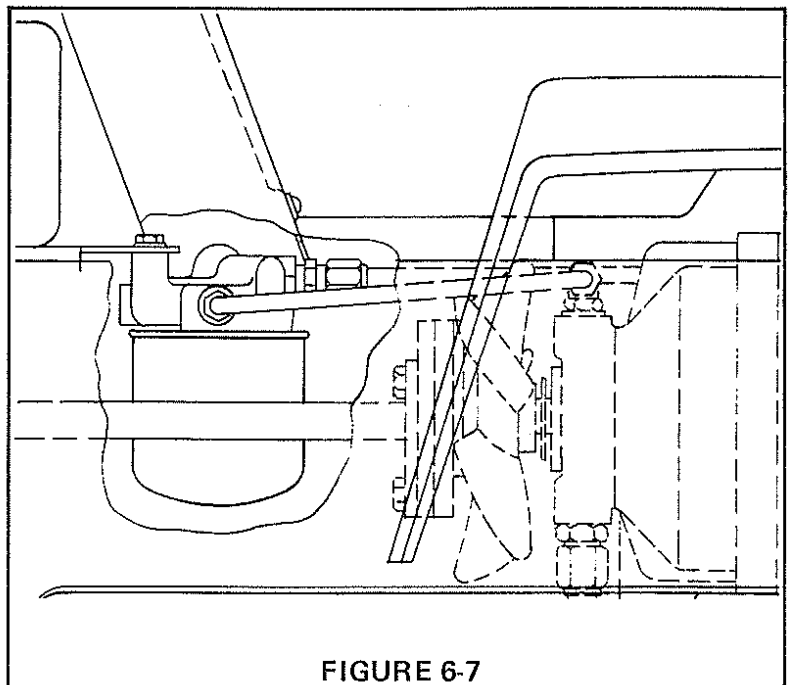
When replacing filter keep "IN" inlet (stamped on filter) to the left side of the tractor.



ALL MODELS EXCEPT 1458-01

The spin on the type filter is located under battery and fuel tank support.

When replacing filter apply a small amount of oil to the filter gasket. Hand tighten the filter.



6

GROUP VII ENGINE**MEDIUM FRAME
SERIES TRACTOR
Page 7-1 Rev. 11-90****TROUBLE SHOOTING GUIDE**

PROBLEM	PROBABLE CAUSE	REMEDY
Hard starting or loss of power.	1. Engine overchoked. 2. Carburetor dirty or improperly adjusted. 3. Faulty spark plug or improper gap. 4. Clogged fuel line or filter. 5. Loose or grounded high tension wire. 6. Worn or burnt breaker points (Briggs & Stratton only). 7. Faulty condenser (Briggs & Stratton only). 8. Faulty fuel pump. 9. Loose or grounded breaker point wire leads (Briggs & Stratton only).	1. Close fuel petcock and engage starter until engine fires. Reopen fuel petcock. 2. Readjust or clean carburetor. 3. Adjust gap or replace plug. 4. Check fuel line or filter. 5. Check and repair wire lead. 6. Replace breaker points. 7. Replace condenser. 8. Replace pump. 9. Check and replace.
Overheating.	1. Insufficient available cool air. 2. Dirty air intake screen, shroud or cooling fins. 3. Improper fuel. 4. Fuel mixture too lean.	1. Make sure area in front of flywheel is open or clean. 2. Clean intake screen, shroud and cooling fins. 3. Clean and refill tank with proper fuel. 4. Adjust carburetor.
Backfiring.	1. Fuel mixture too lean. 2. Hot spot in muffler. 3. Valve "sticking".	1. Adjust carburetor. 2. Replace muffler. 3. Check compression. Free up valve.
Skip at high speed.	1. Spark plug gap too wide. 2. Improper carburetor setting or lack of fuel.	1. Adjust spark plug gap. 2. Refill tank and adjust carburetor.

FRAME
TRACTOR
5/78

ENGINE (Continued)

TROUBLE SHOOTING GUIDE (Continued)

PROBLEM	PROBABLE CAUSE	REMEDY
ing erratically.	1. Clogged fuel line. 2. Water in fuel. 3. Improper carburetor adjustment. 4. Vent in gas cap plugged. 5. Faulty fuel pump. 6. Faulty choke control. 7. Loose ignition connections. 8. Air leaks in manifold or carburetor connections.	1. Clean fuel line. 2. Clean fuel system. 3. Adjust carburetor. 4. Clean gas cap vent. 5. Replace fuel pump. 6. Replace choke control. 7. Clean and tighten ignition connections. 8. Tighten manifold and carburetor.
will not idle.	1. Improper carburetor idling adjustment. 2. Carburetor clogged. 3. Spark plug gap set too close. 4. Leaking carburetor or manifold gaskets.	1. Adjust idle speed. 2. Clean carburetor. 3. Adjust spark plug gap. 4. Replace gaskets.

ENGINE (Continued)

**MEDIUM FRAME
SERIES TRACTOR**
Page 7-3 Rev. 4/90

MODEL 1058, 1060 AND 1160 ENGINE REMOVAL AND REINSTALLATION

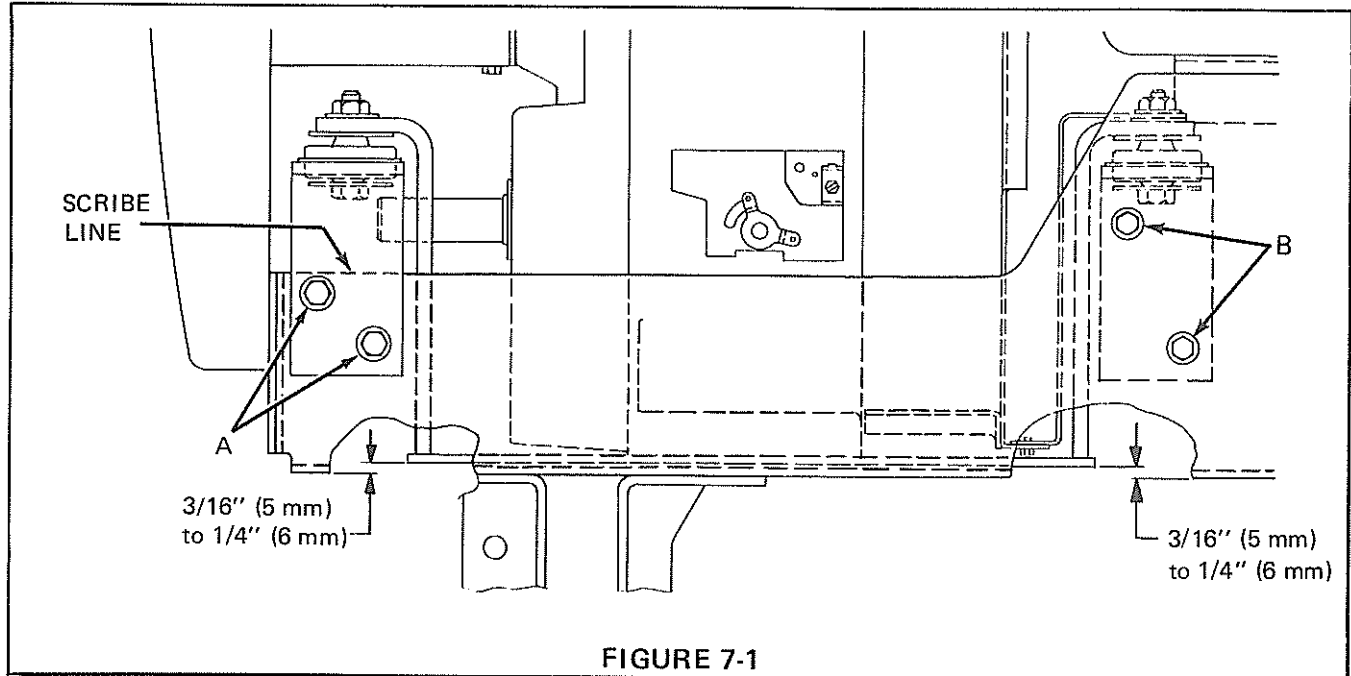


FIGURE 7-1

REMOVAL

Remove all attachments and PTO kit.

1. Remove hood and side panels.
2. Disconnect negative battery cable.
3. Disconnect starter (red), magneto (blue), 12 volt lead (red), and electric clutch (purple) wires and pull through heat shield.
4. Disconnect engine ground wire (black) from battery support mounting hole on side of frame and pull through heat shield.
5. Close fuel tank petcock, disconnect fuel line at filter and pull through heat shield.

6. Disconnect choke and throttle cables at engine and pull through heat shield.

7. Remove the three rubber mount driveshaft bolts at engine and disconnect the driveshaft.

8. Scribe line on the front engine supports along frame for reinstallation alignment. Loosen two bolts (A) on each side of the engine supports.

9. Remove two rear engine mount bolts (B).

10. When ready to pull engine, remove four bolts from front engine supports.

11. Engine serial number is located behind heat shield on rear of engine.

REINSTALLATION

1. Set engine on rubber mounts in rear, lining up scribe line on front engine supports with frame and insert front four bolts (A). Insert proper engine mount spacers for engine height until a gap of 3/16 (5 mm) to 1/4" (6 mm) is reached between the bottom edge of the engine support and bottom edge of the side frame. This dimension should be held at the front and rear of the engine support. See Figure 7-1. Secure engine supports to frame, holding dimension given above.

7

**FRAME
TRACTOR
Rev. 4/90**

ENGINE (Continued)

MODEL 1058, 1060 AND 1160 ENGINE REMOVAL AND REINSTALLATION (CONT)

arter, magneto,
electric clutch and
es through heat shield
ct to proper terminals.

line through heat
nect to fuel filter and
ck.

ke and throttle cables
at shield and connect
(t may be needed) to
utions.

drive shaft and tighten
bolts on the drive shaft
On hydrostatic models
the hub on the
s 5/16" (8 mm) away
ont face of the

hydrostat. On gear drive models
make sure the hub on the right
angle gear box is slid all the way
to the end of the spline.

With the hubs of the drive shaft in
their proper position the two
couplings should be flat, not
pushed in. If not, reposition the
engine.

6. Attach hood and side panels.
7. Connect negative battery cable.

RUBBER MOUNT REPLACEMENT

When replacing the rubber engine
mounts, make sure they are
correctly placed. To check, push

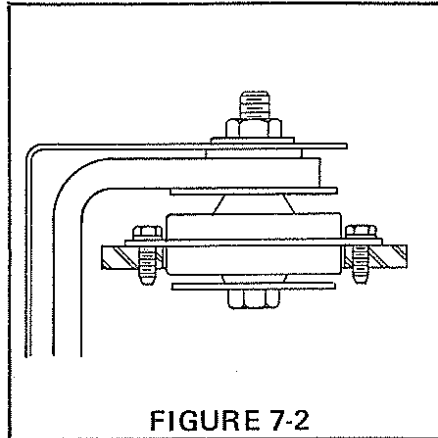


FIGURE 7-2

down on the center of the rubber
mount. The softer mount should
always go at the rear. See Figure
7-2 for correct assembly.

TECUMSEH MODELS ENGINE REMOVAL AND REINSTALLATION

(Figure 7-3)

ect negative battery

hood and side panels
t light harness at

ect throttle and choke
engine and pull through

el petcock and
fuel line at fuel filter.

ect electric clutch wire

ect wire harness at
(red & blue).

7. Disconnect starter wire (red)
and ground wire (black) and pull
all wires through heat shield.

8. Disconnect and remove three
driveshaft bolts at flywheel.

9. Scribe line on front engine
supports along frame, for
reinstallation alignment. Loosen
two bolts (B) on each side of the
engine supports.

10. Remove two rear engine
mount bolts.

11. When ready to pull engine,
remove four bolts from front
engine supports.

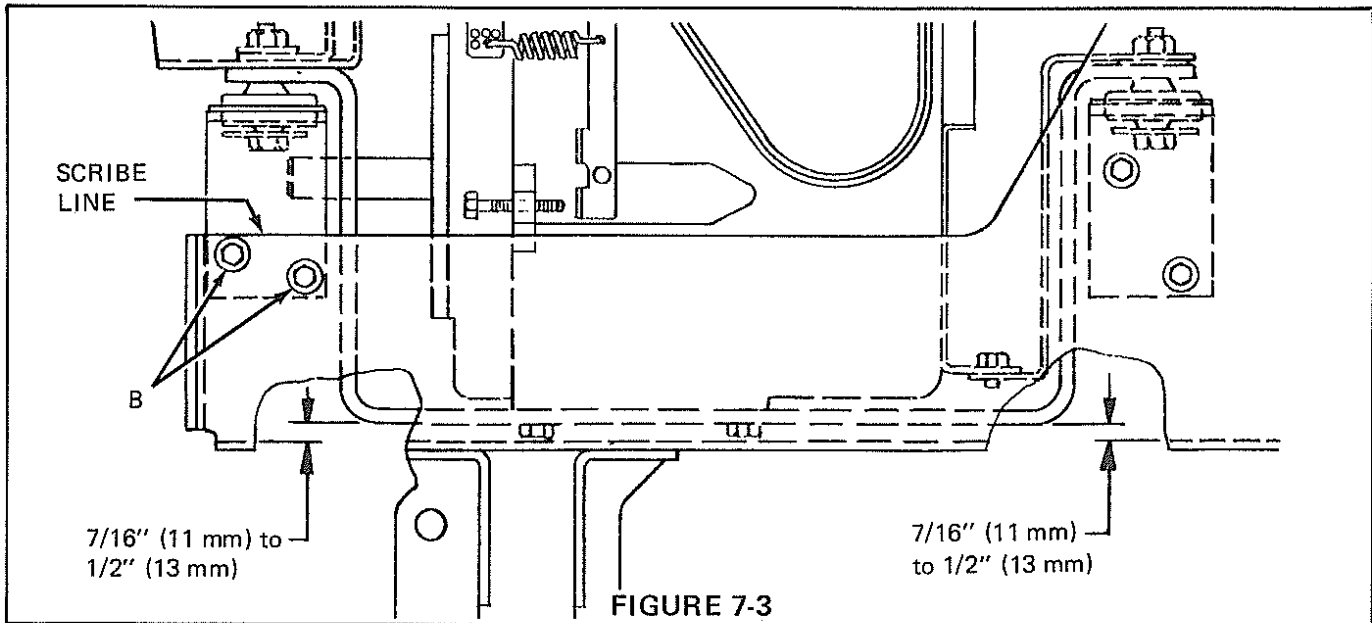
REINSTALLATION

1. Set engine on rubber mounts in
rear, lining up scribe line on front
engine supports with frame, and
insert front two bolts (B) on each
side. Insert proper engine mount
spacers for engine height until a
gap of 7/16" (11 mm) to 1/2" (13
mm) is reached between the
bottom surface of the engine
support and inside surface of the
frame. This dimension should be
held at the front and rear of the
engine support. Secure supports
to frame holding dimension given
above.

ENGINE (Continued)

**MEDIUM FRAME
SERIES TRACTOR**
Page 7-5 Rev. 4/90

TECUMSEH MODELS ENGINE REMOVAL AND REINSTALLATION (CONT)

**FIGURE 7-3**

2. Bring starter (red), ground (black), electric clutch (purple) wires, and engine wire harness (red and green wires) through the heat shield and connect to proper terminals.

3. Connect fuel line to fuel filter and open fuel petcock.

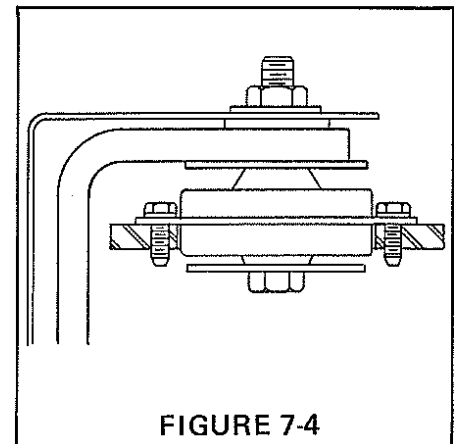
4. Pull choke and throttle cables through heat shield and connect to proper locations (adjust later).

5. Connect drive shaft and tighten the three bolts on the drive shaft coupling. On hydrostatic models, make sure the hub on the hydrostat is 5/16" (8 mm) away from the front face of the hydrostat. On gear drive models, make sure the hub on the right angle gear box is slid all the way to the end of the spline.

With the hubs of the drive shaft in their proper position the two couplings should be flat, not pushed in. If not, reposition the engine.

6. Attach hood and side panels.

7. Connect negative battery cable.

**FIGURE 7-4**

RUBBER MOUNT REPLACEMENT

When replacing the rubber engine mounts, make sure that the correct mount is replaced. To check, push down on the center of the rubber mount. The softer mounts should always go to the rear. See Figure 7-4 for correct assembly.

ENGINE (Continued)

MODEL 1659, 1662, 1667, 1668, 1668L & 1467 ENGINE REMOVAL AND REINSTALLATION

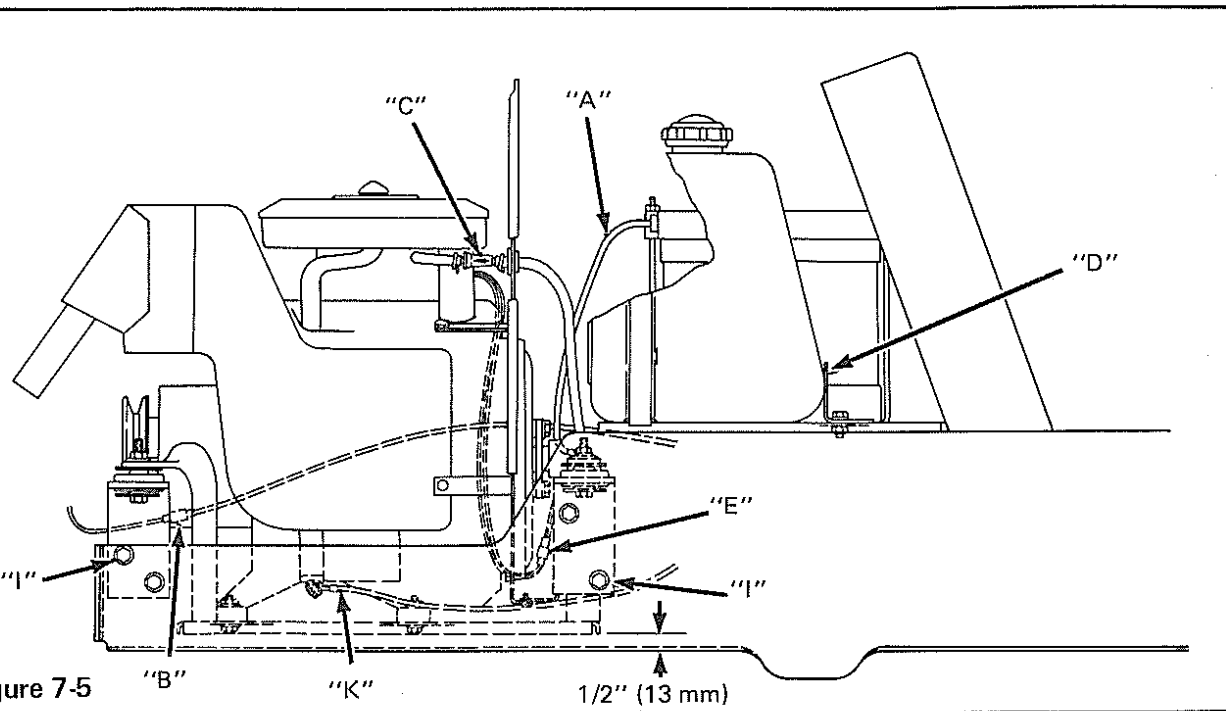


Figure 7-5

VAL

Connect negative battery (A) from battery.

Remove hood and side panels. Connect light harness at connector-B).

Connect throttle and choke at engine and pull through shield.

Use fuel petcock and connect fuel line at fuel filter. Remove bracket (D), Figure 7-5 and fuel tank.

Connect electric clutch wire (E).

Connect wire harness (E) at connector.

8. Remove two bolts (G), Figure 7-6 securing engine hub to flywheel. Notice the flat washer between hub (H) and flywheel.
9. Scribe line on front engine supports and L.H. rear support along frame. Loosen two bolts (I) on each of the engine supports.
10. When ready to pull engine, remove bolts (J), Figures 7-7 & 7-8 from the engine supports.
11. Lift engine straight up till starter wire (K), Figure 7-5 can be removed.
12. Slide hub (H) of drive shaft off when removing engine.

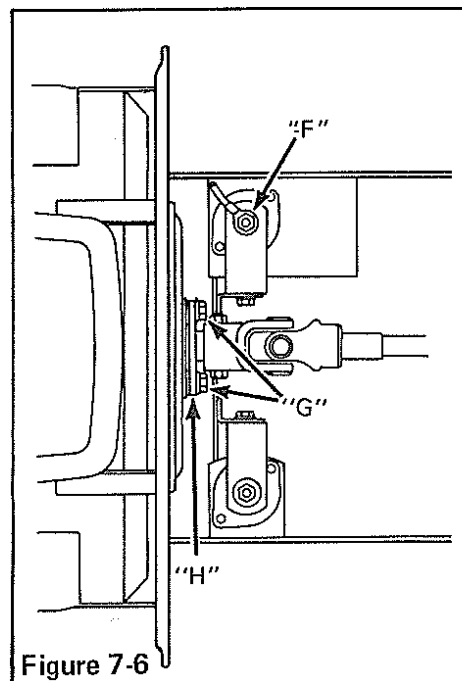


Figure 7-6

Remove R.H. rear engine bolt (F), Figure 7-6 & 7-7. Place star washer on negative battery cable.

ENGINE (Continued)

**MEDIUM FRAME
SERIES TRACTOR**
Page 7-7 Rev. 4/90

REINSTALLATION

1. Set engine on R.H. rubber mount in rear. Lift engine and install (red) starter wire (K). Insert hub (H), Figure 7-6, of drive shaft into pilot hole in flywheel. Line up scribed line on front and rear engine supports with frame, insert two bolts (I) through each support. Secure mounts in place, holding with a gap of 1/2" (13 mm) between the bottom surface of the engine support and inside surface of the frame.

NOTE

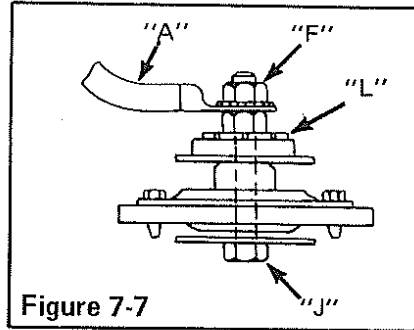
Rear R.H. mount has a pyramid washer (L) Figure 7-7 between mount and nut.

This dimension should be held at the front and rear of the engine support. See Figure 7-5.

2. Secure (black) negative battery wire (A), Figure 7-7 to R.H. rear engine mount. Place star washer on first and then the negative wire. Secure with nut.

3. Bring engine wire harness through the heat shield and connect to head light harness and electric clutch.

RH REAR MOUNT



4. Connect engine plug (E), Figure 7-5 to harness.

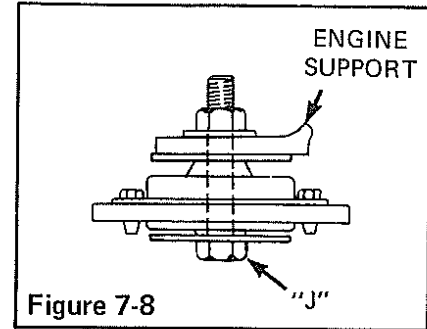
5. Position drive shaft hub (H) over mounting holes of flywheel and secure with existing screws. Make sure that there is a flat washer between the hub and flywheel. Tighten both bolts the same so hub does not cock.

6. Install fuel tank and bracket (D).

7. Connect fuel line to fuel filter and open fuel petcock.

8. Pull choke and throttle cable through heat shield and connect to proper locations.

NORMAL MOUNT



When the hub is in place on the gear drive models the two couplings should be flat not pushed in. If not, reposition the engine.

9. Attach hood and side panels.

10. Connect negative battery cable.

ENGINE (Continued)

VANGUARD ENGINE, REMOVAL AND REINSTALLATION

AL s 7-5, 7-6 & 7-7)

Connect the black ground (-) and red positive (+) cable at (A).

Connect headlight harness tractor (C).

Remove hood by removing (D).

Connect purple electric wire (D).

Connect red wire (E) to and red/black wire (F) (E).

Connect blue ignition wire tab terminal at engine.

Be careful to prevent the breaking.

Remove black ground wire (H) from blower housing. Cut where necessary.

Connect red positive (+) at starter and black (-) cable (J) at rear R.H. Pull all wires thru heat

Connect throttle cable (K) and cable (L) at the engine. Pull wires thru heat shield.

Shock wire must be secured to the same hole when (N).

Remove fuel tank strap and tank to provide access to shut off valve. Close shut off on bottom of tank.

Connect fuel line at filter. Pull fuel tank line thru handle. This will prevent damage when removing

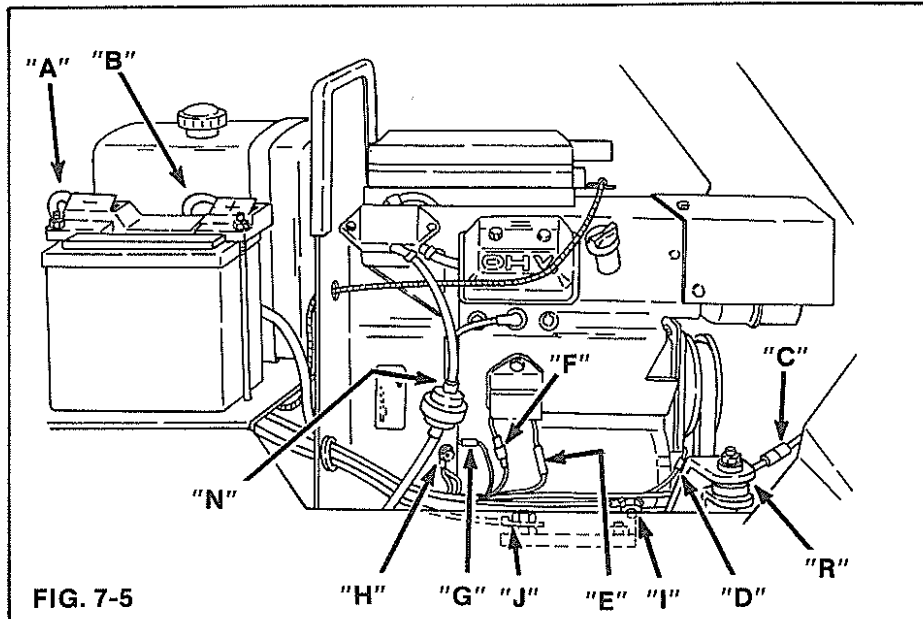


FIG. 7-5

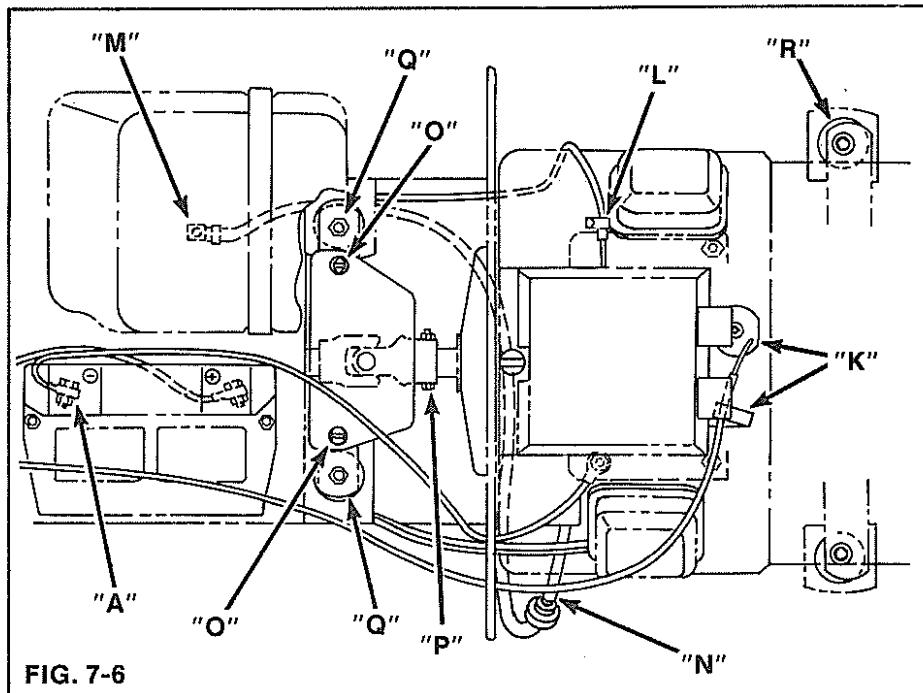


FIG. 7-6

12. Remove two screws securing guard (O) to rear engine mounts. Remove nut and bolt (P) from driveshaft. Slide driveshaft off the engine shaft.

13. Remove nuts and bolts from mounts, (Q), at rear of engine Figure 7-6. Remove same from mounts, (R), at front of engine, 7-5.

ENGINE (Continued)

**MEDIUM FRAME
SERIES TRACTOR**
Page 7-9 Rev. 4/90

14. Lift engine assembly up and forward from tractor frame.
15. Remove engine support (cradle) and miscellaneous parts from engine if necessary. Save all hardware for reinstallation.

REINSTALLATION (Figures 7-5, 7-6 & 7-7)

1. Replace rubber isolator mounts in tractor frame, if broken or otherwise deteriorated.
 2. Set engine on rubber mounts. Install large washers (S) between engine support and rubber mounts.
 3. Install driveshaft to engine.
- NOTE** - If the two piece driveshaft has been pulled apart, look for aligning marks on the two halves when assembling.
4. Install the four 3/8 x 2-1/4 bolts (T) with locknuts Figure 7-7.
 5. Install the guard (O), Figure 7-6, to the engine mounts.
 6. Connect the fuel line at filter (N), Figure 7-5 and 7-6.

NOTE - The fuel line from the tank must be routed thru the engine support away from driveshaft and other moving parts. Open fuel shut off valve (M) on fuel tank Figure 7-5.

7. Connect throttle cable (K) and choke cable (L), Figure 7-6. Route throttle cable thru heat shield first.

NOTE - Be sure choke wire is installed in forward hole on choke lever. Tighten clamps.

8. Install all wires thru heat shield. Connect black ground (-) cable to right hand rear engine mounting bolt (J), Figure 7-5. Connect red positive (+) cable (I) to starter terminals.

9. Install block ground wire (H) to engine blower housing. Carefully connect blue ignition wire (G) to tab at engine.

10. Connect red/black wire (F) to engine lead.

11. Connect red wire (E) to regulator lead.

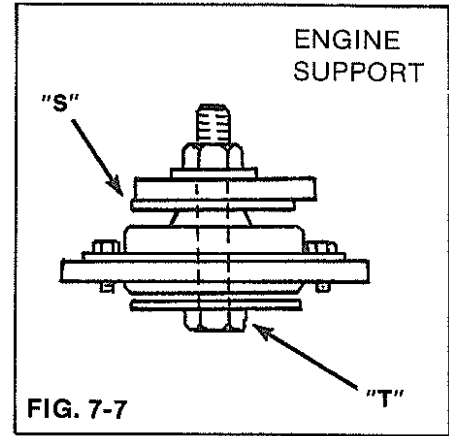
12. Connect purple wire (D) to electric clutch lead.

13. Install hood to tractor.

14. Connect headlight harness (C) to lead from the lights.

15. Connect red positive (+) cable (B) and black ground (-) cable (A) to battery.

16. Re-check all connections and test run tractor.



TRACTOR ATTACHMENTS (Continued)

**MEDIUM FRAME
SERIES TRACTOR**
Page 8-1 ADD 6/81

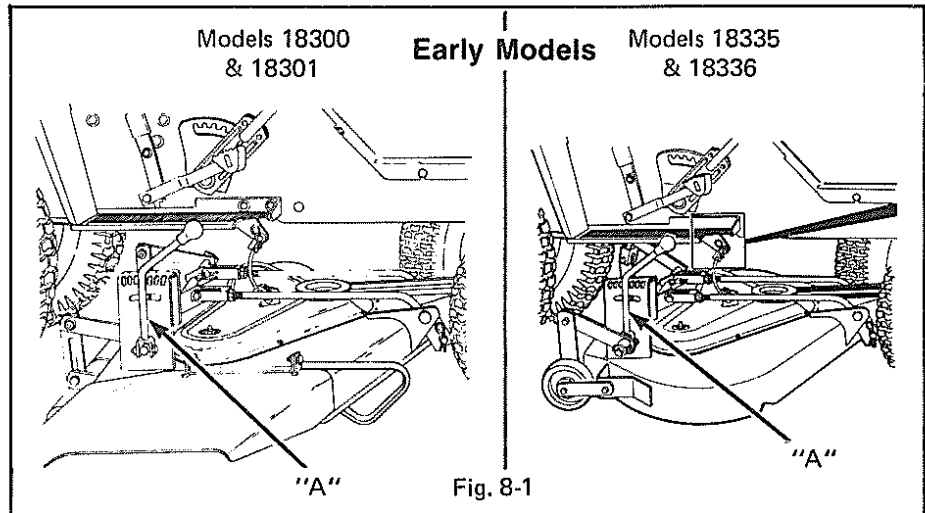
MOWER DECKS

MOWER LEVELING MODELS

18300, 18301, 18335 & 18336

For best cutting results it is important that the mower be leveled correctly.

1. Check tractor tire pressure.
Front - 12 PSI (88 kPa)
Rear - 8 PSI (55 kPa)
2. Place mower on a level, flat surface.
3. Place cutting height adjustment lever (A), Fig. 8-1 in No. 4 position and lower mower with tractor lift.
4. Check side to side level by measuring distance between blade tip and floor Fig. 8-2. If distance varies more than 1/16" (1.56 mm) from left hand side to the right hand, adjustment is necessary.
5. Raise mower with tractor lift and adjust side to side by turning clevis up or down on left hand side of mower. Loosen jam nut (B), remove spring cotter and clevis pin (C).
6. Rotate clevis (D) 1/2 turn to achieve a 1/32" (.78 mm) adjustment. If side of mower is too low, lengthen rod. Shorten rod if too high.
7. Reinstall clevis and spring cotter. Tighten jam nut.
8. Lower mower with tractor lift and check measurement again. Readjust if necessary.
9. Check front to rear leveling by measuring the distance from the blade tip (E) Fig. 8-3 and the floor. If distance varies more than 1/8" front to back, adjustment is necessary. Adjust as follows:
10. Lift mower with tractor lift, remove pins (F) and loosen jam nuts (G) on the tie rods.
11. One turn of clevis (H) Fig. 8-2 and 8-3, will vary the rod length approximately 1/16" (1.56mm). Shorten rod to raise front and lengthen to lower. Adjust both rods same number of turns.



Models 18300 & 18301

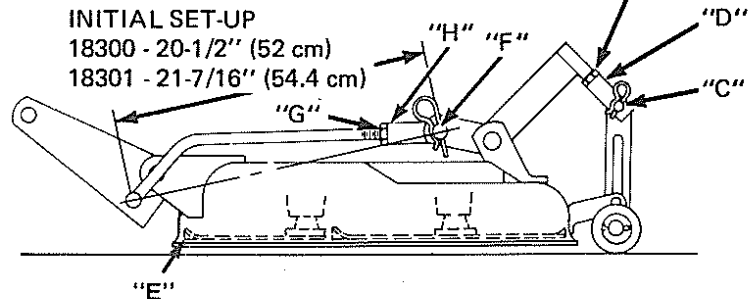


Fig. 8-2

Models 18335 & 18336

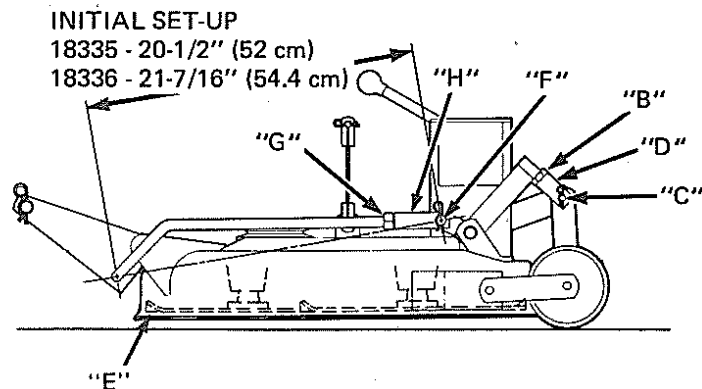


Fig. 8-3

12. Reinstall the pins and tighten jam nuts.
13. After adjustments have been made, activate lift of mower. Let mower drop to the ground a few times. Then recheck measurements. Readjust if necessary.

FRAME
TRACTOR
Rev. 4/88

TRACTOR ATTACHMENTS (Continued)

MOWER DECKS

REMOVAL AND DISAS-
SEMBLY (Figure 8-4 & 8-5)

Remove belt covers.

Remove belt from spindle.

Remove top pulley (A).

Remove two bolts securing cutting

Remove four bolts (B) holding spindle
Remove spindle assembly from
mower deck.

Remove shaft assembly from spindle

REASSEMBLY (Figure 8-4)

Install spring (C) on shaft assembly.

Install spacer (D) on shaft assembly.

Install shaft assembly in spindle

Install roller bearing (E) on shaft

Install spindle housing assembly on
spindle and secure. Torque four (4)
bolts to 90 in. lbs. (28 Nm).

Install spindle sheave (A). Secure
bolts to 90 ft. lbs. (122 Nm).

Install blade, spacer and bolts
secure.

Tighten bolts to 300 in. lbs. (34 Nm).

NOTES

Apply three grease fittings on
top of each blade
Lubricate these grease
fittings every 100 hours of
operation with multi-purpose
grease gun.

Lubricate the linkage,
pins and other pivot points
with drops of lubricating oil,
before mowing after washing

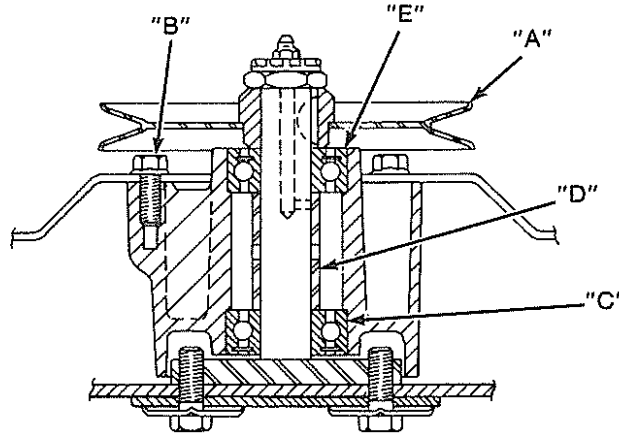


Fig. 8-4

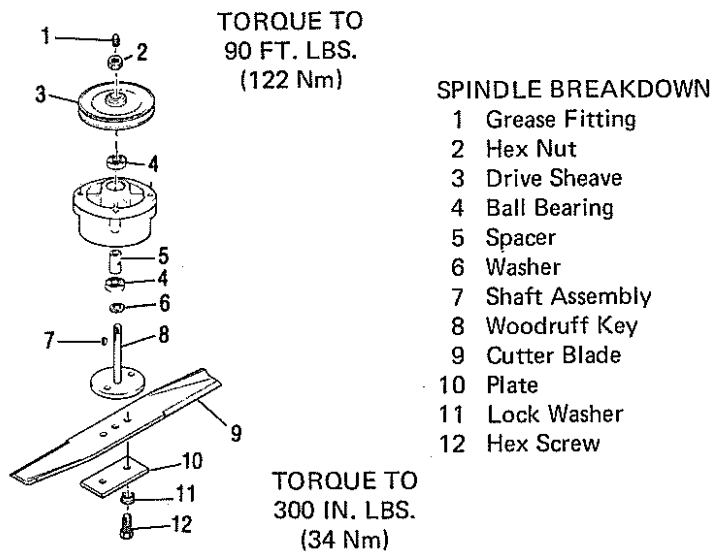
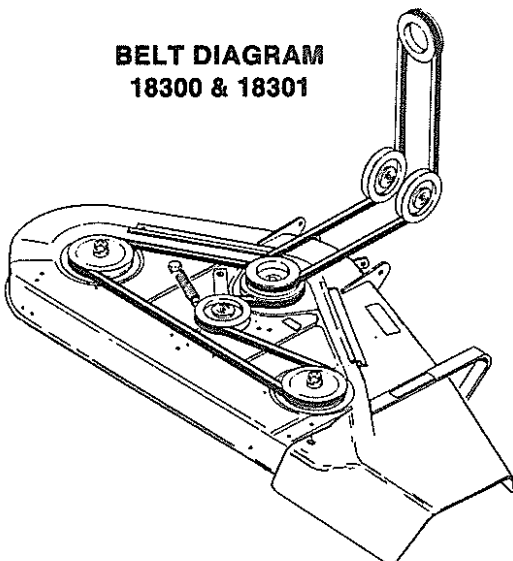
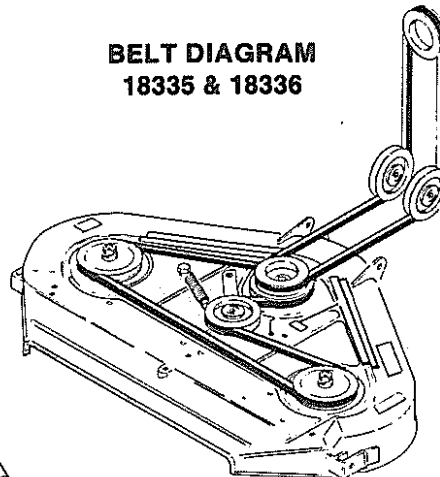


Fig. 8-5

**BELT DIAGRAM
18300 & 18301**



**BELT DIAGRAM
18335 & 18336**



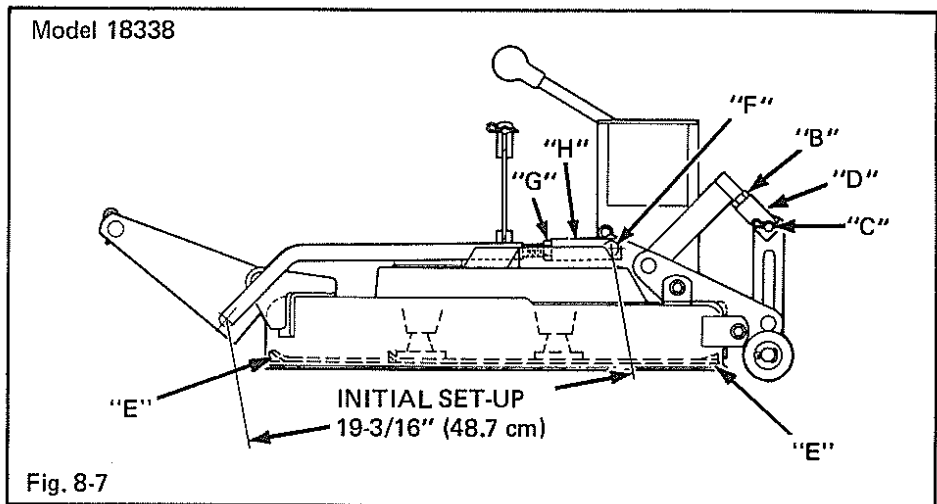
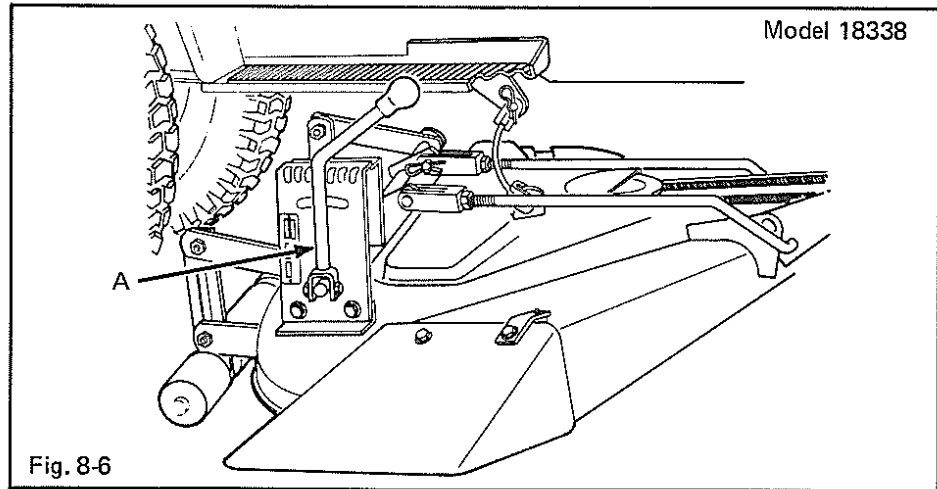
TRACTOR ATTACHMENTS (Continued)

**MEDIUM FRAME
SERIES TRACTOR**
Page 8-3 Rev. 1-91

MOWER DECKS

MOWER LEVELING MODEL 18338

For best cutting results it is important that the mower be leveled correctly.



1. Check tractor tire pressure.
Front - 12 PSI (88 kPa)
Rear - 8 PSI (55 kPa)
2. Place mower on a level, flat surface.
3. Place cutting height adjustment lever (A), Fig. 8-7 in No. 4 position and lower mower with tractor lift.
4. Check side to side level by measuring distance between blade tip and floor Fig. 8-7. If distance varies more than $1/16$ " (1.56 mm) from left hand side to the right hand, adjustment is necessary.
5. Raise mower with tractor lift and adjust side to side by turning clevis up or down on left hand side of mower. Loosen jam nut (B), remove spring cotter and clevis pin (C).
6. Rotate clevis (D) $1/2$ turn to achieve a $1/32$ " (.78 mm) adjustment. If side of mower is too low, lengthen rod. Shorten rod if too high.
7. Reinstall clevis and spring cotter. Tighten jam nut.
8. Lower mower with tractor lift and check measurement again. Readjust if necessary.
9. Check front to rear leveling by measuring the distance from the blade tip (E) Fig. 8-7 and the floor. If distance varies more than $1/8$ " front to back, adjustment is necessary. Adjust as follows:
 10. Lift mower with tractor lift, remove pins (F) and loosen jam nuts (G) on the tie rods, Fig. 8-7.
 11. One turn of clevis (H) Fig. 8-7, will vary the rod length approximately $1/16$ " (1.56 mm). Shorten rod to raise front of mower and lengthen to lower. Turn both rods same number of turns.
 12. Reinstall the pins and tighten jam nuts.
 13. After adjustments have been made, activate lift of mower. Let mower drop to the ground a few times. Then recheck measurements. Readjust if necessary.

TRACTOR ATTACHMENTS (Continued)

MOWER DECKS

REMOVAL AND DISAS-

(Figure 8-8)

Remove belt covers.
Remove belt from spindle.
Remove top sheave (A) and wood-
ruff key (B) from spindle.
Remove two bolts securing cutting
blade (C) and remove spindle assembly
from deck.

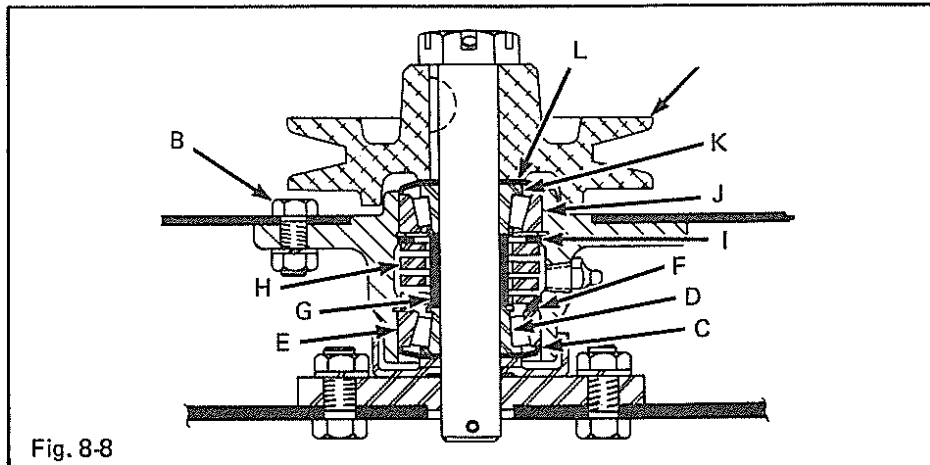


Fig. 8-8

Remove shaft assembly from spindle

ASSEMBLY (Figure 8-8 & 8-9)

Install Seal (C) on shaft assembly.
Install Bearing cone (D) and cup (E).
Install outer spacer (F), inner
spacer (G) and spring (H).
Install outer spacer (I) over shaft as-
sembly.
Install Bearing cup (J) and cone (K)
on spindle housing.
Install seal (L) into housing.

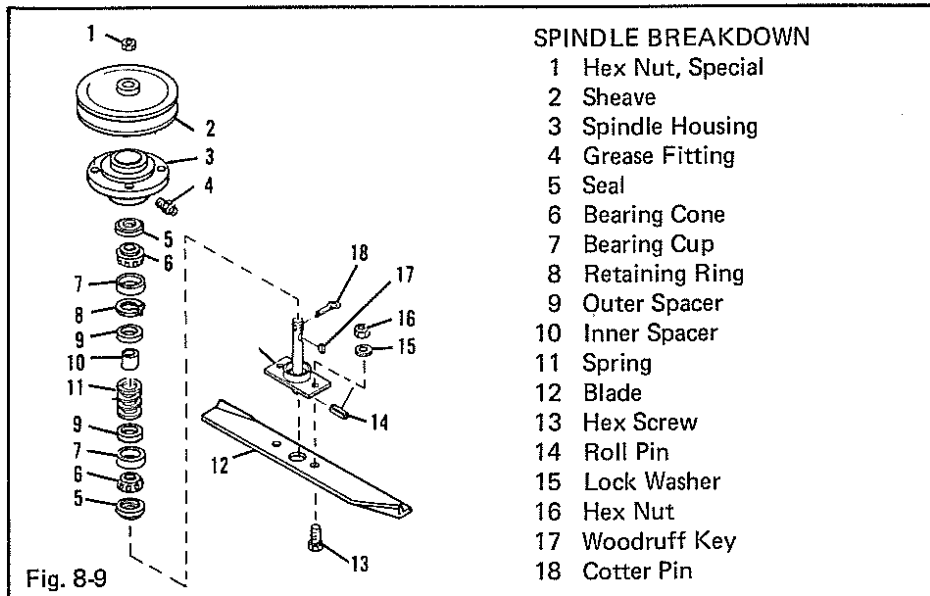


Fig. 8-9

Install complete shaft assembly
into bottom of housing.
Install spindle assembly to mower
using (4) hex screws, lockwashers
and nuts. Torque bolts to 250 in. lbs.
Install woodruff key into shaft and
leave (A).
Install in place and torque to 90 ft.
lbs. (12 Nm).
Install cotter pin to hold nut in place.
Lock nut off to install pin.

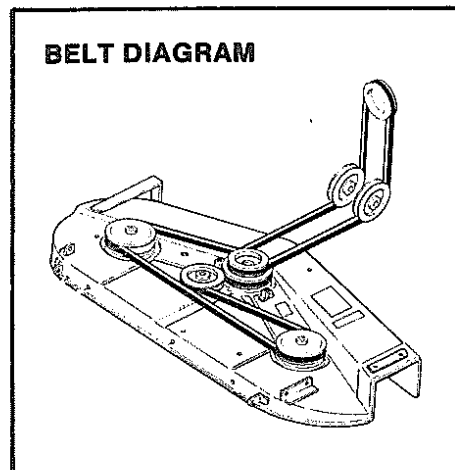
12. Replace blade (M) and secure using
existing hex nuts, lockwashers and nuts.
Torque to 25 ft. lbs. (34 Nm).

LUBRICATION

There are three grease fittings on
the mower; one on bottom of each
blade spindle. Lubricate these
grease fittings every 25 hours of
operation with multi-purpose
grease and grease gun.

Frequently lubricate the linkage,
gauge rollers and other pivot points
with a few drops of lubricating oil,
especially on mower after washing
out.

BELT DIAGRAM



TRACTOR ATTACHMENTS (Continued)

**MEDIUM FRAME
SERIES TRACTOR**
Page 8-5 Rev. 11-90

SNOWTHROWER - SINGLE STAGE

CHAIN REMOVAL

1. Remove four screws (A), from guard.
2. Loosen tension block (J) on chain.
3. Locate master link in chain and remove. Chain can now be slipped out.

CHAIN TENSION

The chain is properly adjusted when it has approximately 1/8" (3 mm) of slack. A chain too loose is inclined to jump and too tight a chain will cause excessive wear of chain and sprockets.

To adjust chain tension, first loosen the hex head capscrews securing roller (J). Move the roller down to remove excessive slack.

AUGER REMOVAL

1. Remove chain.
2. Remove the (8) 3/8 x 1/2" screws and lock washers (B) securing the bearings to the housing.
3. Auger should freely slide out.
4. If auger is to be replaced, remove the (2) end bearings. Bearings can be removed with a wheel puller or by heating them.

AUGER REINSTALLATION

1. Coat both ends of auger shaft with loctite Grade D.
2. Place new or old bearings over loctite ends of auger shaft.
3. Place auger in the housing and re-secure bearing (C) using existing hardware.
4. Install chain.

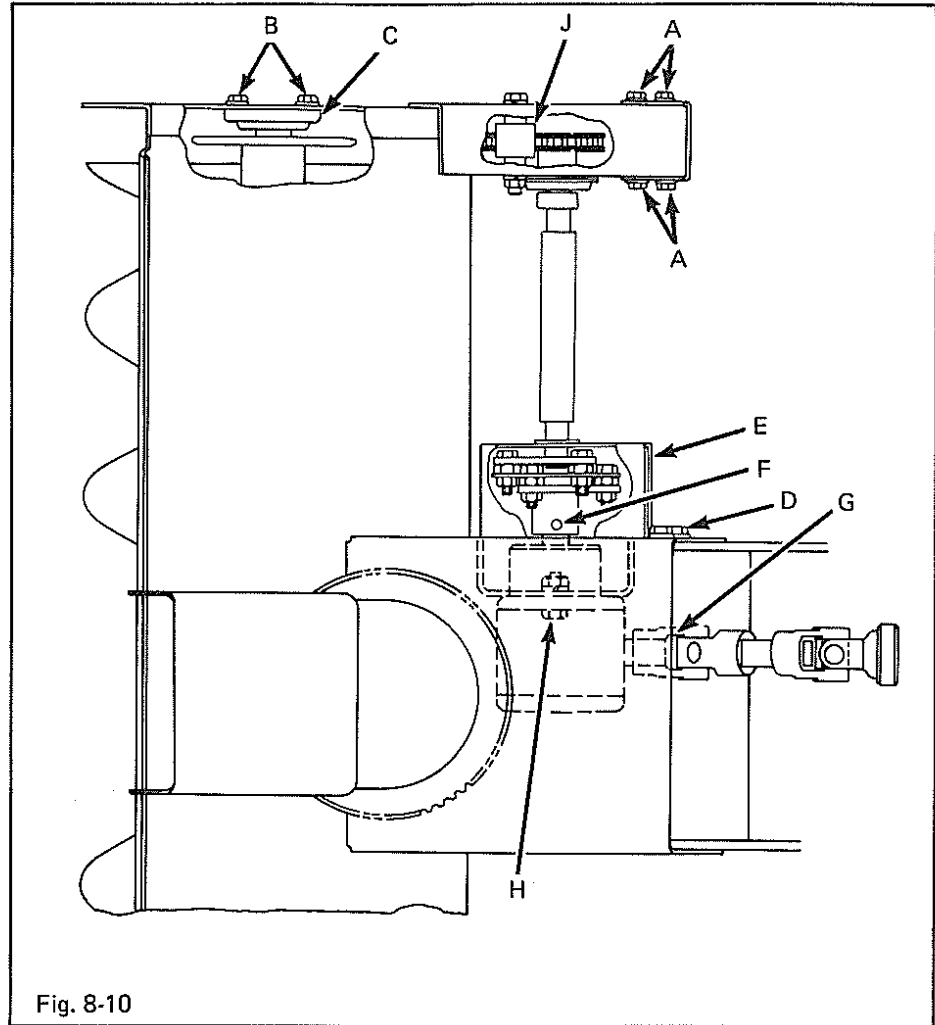


Fig. 8-10

GEAR CASE REMOVAL

1. Remove the (2) hex head screws (D), lock washers and hex nuts securing guard (E) Figure 8-10.
2. Remove guard.
3. Loosen set screws (F).
4. Loosen set screws of universal joint (G) and remove universal.

5. Remove the (2) hex head screws, lock washers and hex nuts (H) securing gear box to housing.

6. The complete gear case can now be removed.

7. When reinstalling the gear case, apply never seeze to output shaft.

8. When reinstalling the universal joint, secure coupling flush with heads of screws.

TRACTOR ATTACHMENTS (Continued)

SNOWTHROWER - SINGLE STAGE (CONT'D)

DISASSEMBLY

Remove cover (A).
Remove snap ring (B) and slide ring (C).
Remove cover (D).
Remove shaft (C) and bearing (E).
Remove gear and snap ring.
Remove seal (G) and snap ring (H).
Shaft (I) can now be removed from end of gear case.

ASSEMBLY

Remove and replace all bearings.
Use above procedure when
Use with SAE 90 gear oil
Remove cover (A).

Reassembling the gear case to
Make sure the input and out-
put shafts rotate freely.

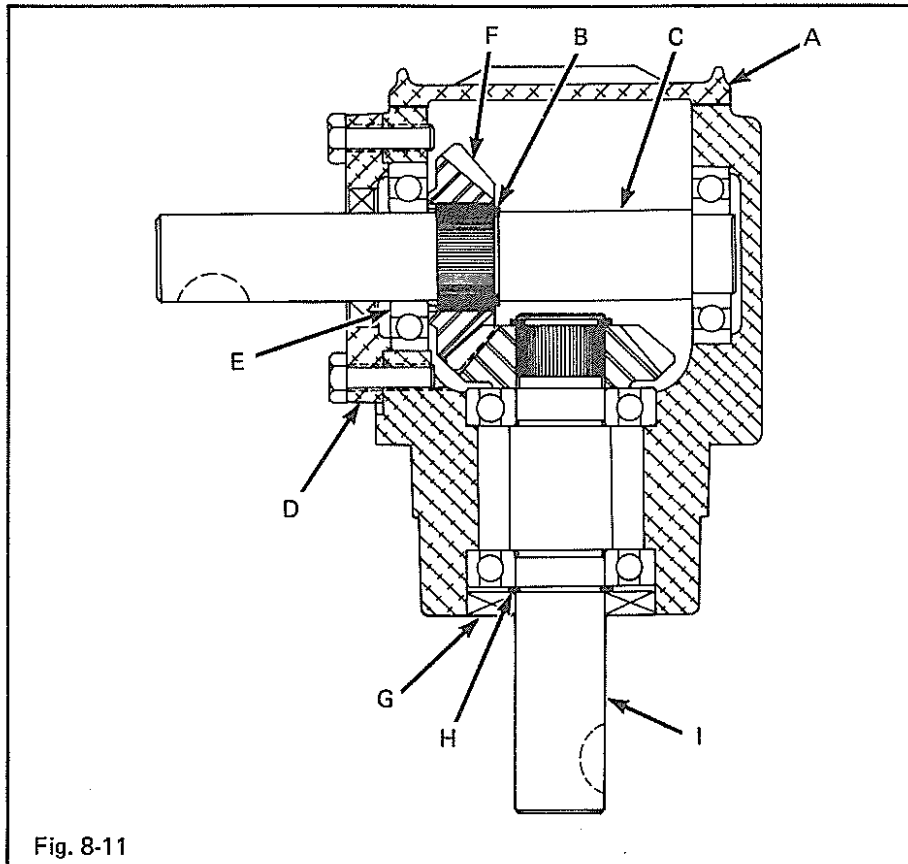


Fig. 8-11

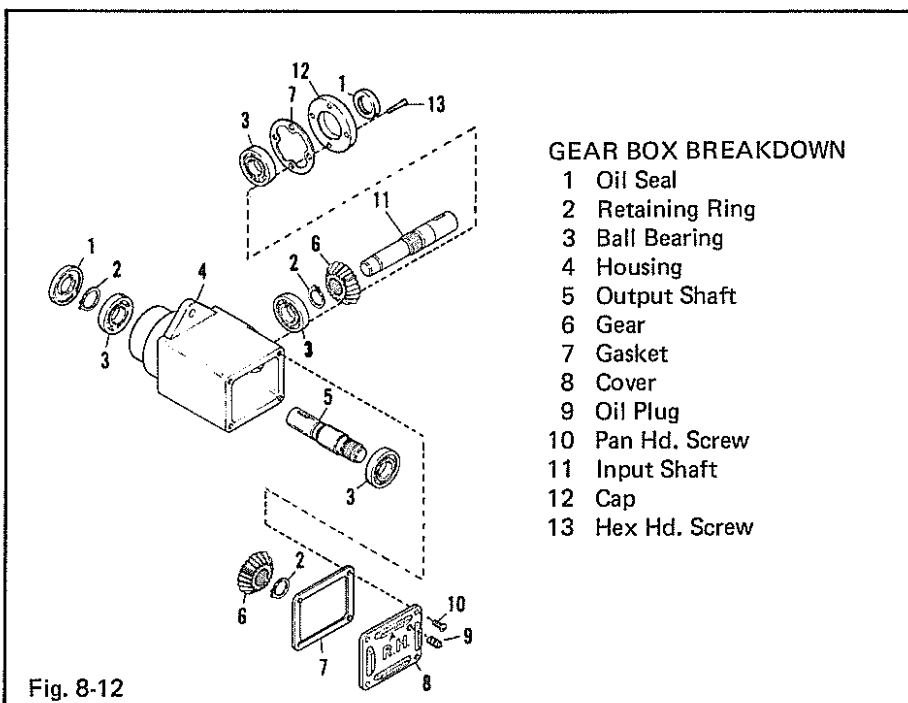


Fig. 8-12

TRACTOR ATTACHMENTS

**MEDIUM FRAME
SERIES TRACTOR**
Page 8-7 Rev. 11-90

SNOWTHROWER (2 STAGE)

GEAR BOX REPAIR

DISASSEMBLY

1. Loosen sprocket (A) Fig. 8-13 set screws and locking collar set screws behind sprocket. Loosen locking collar by turning.
2. Remove the (2) hex screws and lock washers (B) Fig. 8-14 of auger shaft.
3. Disassemble gear box from housing support (C).
4. Loosen both set screws and locking collars of housing bearings (D).
5. Remove (6) carriage bolts, lock washers and hex nuts (E) securing housing bearings.
6. Slide gear case as far as possible to the right side and remove the entire auger shaft assembly. Disassemble rear sprocket (A) Fig. 8-13 and key in shaft as complete shaft assembly is being removed.

NOTE:

It may be necessary to pry the shaft out of the side housing.

7. After removing the gear case and auger, disassemble coupling (F) Fig. 8-14 from shaft.
8. Slide off R.H. and L.H. auger blade assemblies.
9. Disassemble gear box and repair as required.

ASSEMBLY

1. Slide on R.H. and L.H. auger assemblies.
2. Secure fan assembly coupling (F) in place.

3. Place both end housing bearing assemblies (D) onto auger shaft.
4. Insert complete assembly into housing. Assemble square key and sprocket (A) Fig. 8-13 onto rear gear box.
5. Secure gear case to housing support (C) Fig. 8-14.
6. Secure flange bearings (D) to end housings.
7. Secure R.H. and L.H. auger assemblies to gear case shaft.
8. Tighten locking bearing collar behind sprocket (A) Fig. 8-13 and tighten set screws.
9. Line up rear sprocket (A) and secure with set screws.
10. Tighten locking collar and set screws on each end housing bearing (D).
11. Torque all screws to approximately 75 in. lbs.

MAINTENANCE

GEARBOX - Check oil level every 10 hours. Fill if necessary with EP 90 extreme pressure oil.

AUGER SHAFT - Grease each shaft at fittings (G) every 24 hours of use.

DRIVE CHAIN - Lubricate chain with chain saw oil every 3 hours.

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

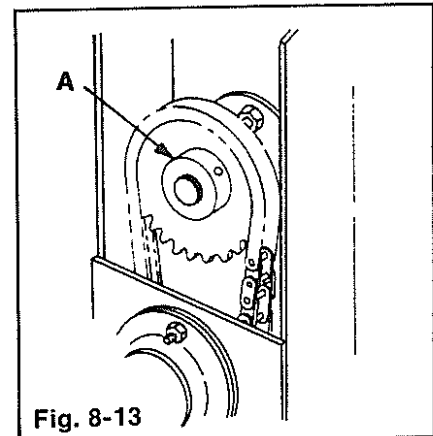


Fig. 8-13

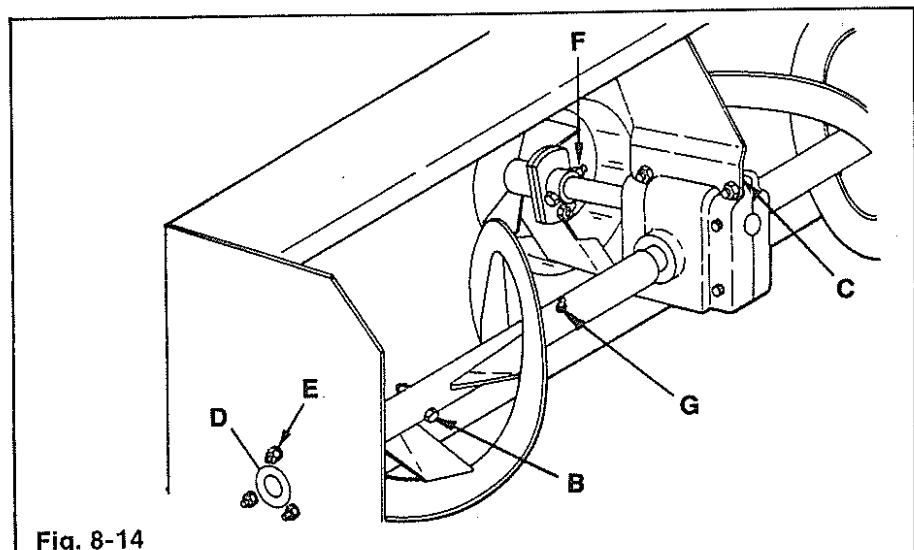
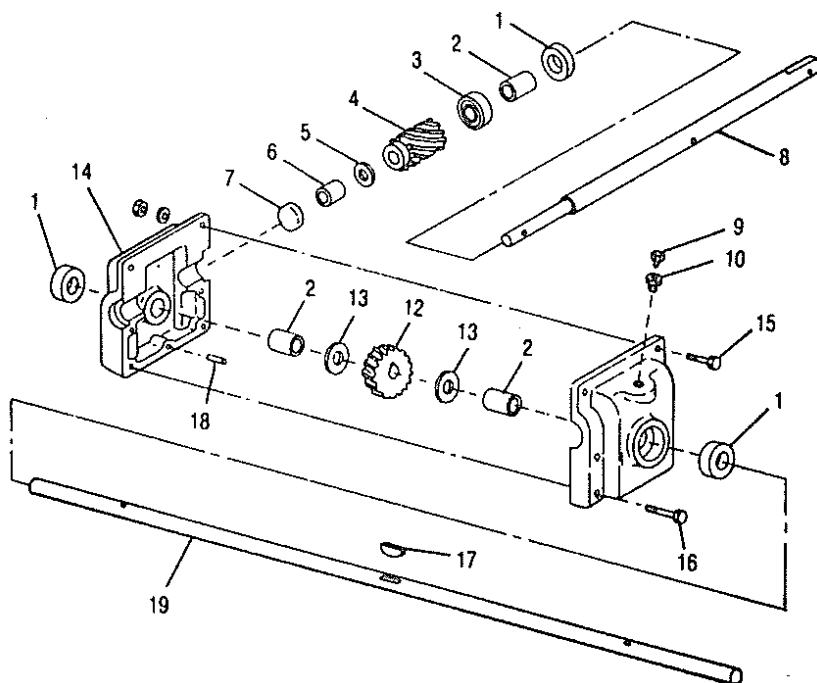


Fig. 8-14

TRACTOR ATTACHMENTS (Continued)

SNOWTHROWER 2 STAGE (CONT'D)

GEAR CASE BREAKDOWN



1. Oil Seal CR 9818
2. Bushing (1" int. dia. x 1-1/4" ext. dia. x 1" long)
3. Bearing SKF #51105
4. Worm R.H. Rotation
5. Washer (1-3/8" dia.)
6. Bushing (7/8" int. dia. x 1-1/8" ext. dia. x 1" long)
7. Input Cap
8. Input Shaft
9. Breather (1/8" NPT)
10. Coupling (3/8" NPT Male x 1/8" NPT Female)
11. Cover (R.H.)
12. Bronze Gear
13. Washer (1-1/2" dia.)
14. Cover (L.H.)
15. Bolt (5/16" NC x 1-1/4", Gr. 5)
16. Bolt (5/16" NC x 2-1/2", Gr. 5)
17. Key (Woodruff)
18. Pin (1/4" x 3/4")
19. Output Shaft...

TRACTOR ATTACHMENTS (Continued)

MEDIUM FRAME
SERIES TRACTOR
Page 8-9 Rev. 11-90

TILLER

LUBRICATION

There is a plug (A) in the rear of the gear case. This is the oil level and fill hole. Check the oil level with the unit mounted on the tractor with tines resting on the ground. The oil should be to the level of this plug hole.

NOTE: Fill gear case with 140W gear oil.

GEAR CASE REMOVAL

1. Remove hood (A) Figure 8-17 from tiller.
2. Remove rear roll pin (B).
3. Disconnect the gear box from the front coupling.
4. Remove rear roll pin (B) securing worm shaft (C) to the front coupling.
5. Disconnect the gear box from the front frame by removing (4) hex nuts (D).
6. Disassemble the two tine assemblies from the gear case shafts by removing clevis pins (E).

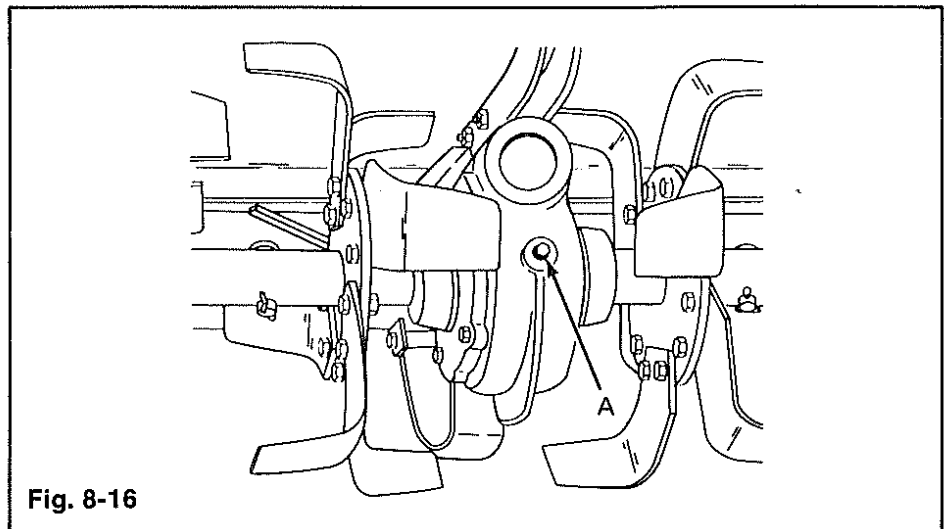


Fig. 8-16

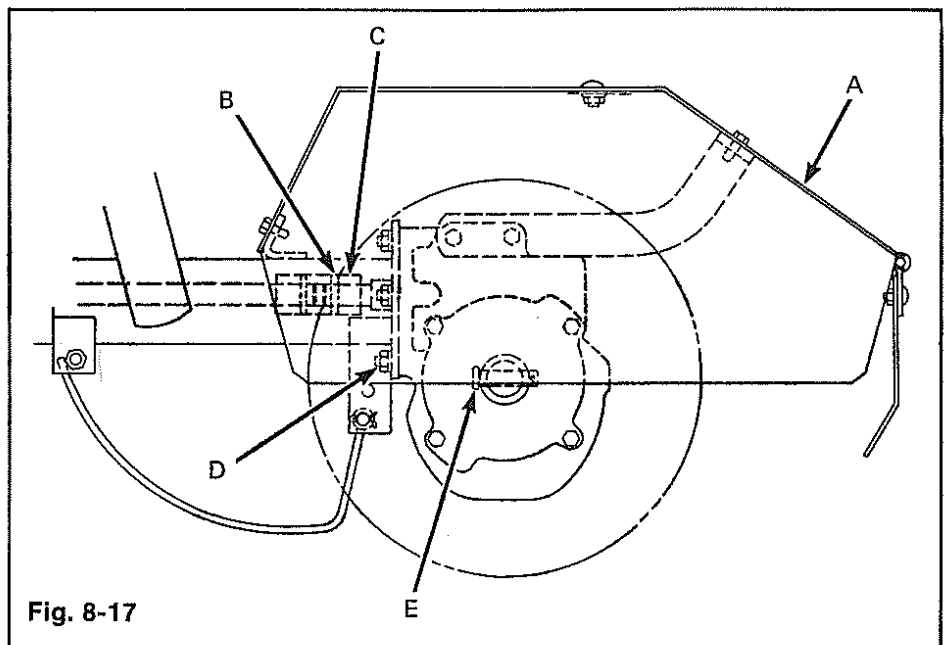


Fig. 8-17

TRACTOR ATTACHMENTS (Continued)

TILLER

ASE DISASSEMBLY

Remove gear case through oil seal (F) snap ring (G). Note location of shims on worm shaft.

Remove worm shaft (C) by removing oil seal (F) snap ring (G). Note location of shims on worm shaft.

Remove cover (I). Be careful not to damage needle bearing (J).

Remove shaft worm gear and washers.

Remove worn or damaged parts.

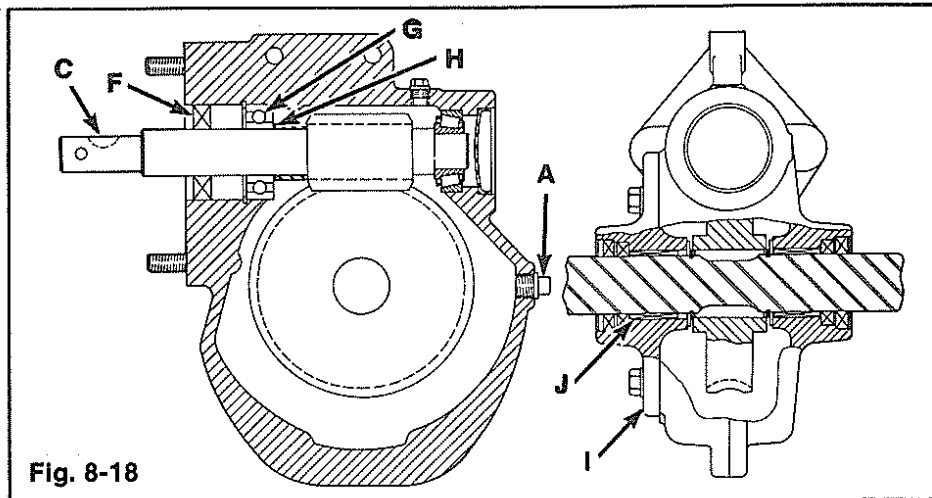


Fig. 8-18

ASE ASSEMBLY

Install bearings and seals for and repair if required.

Reassemble by reversing the above procedure.

Installing oil seal (F) on the shaft end play. If necessary, shim at point (H).

Grease with 16 oz. of gear oil.

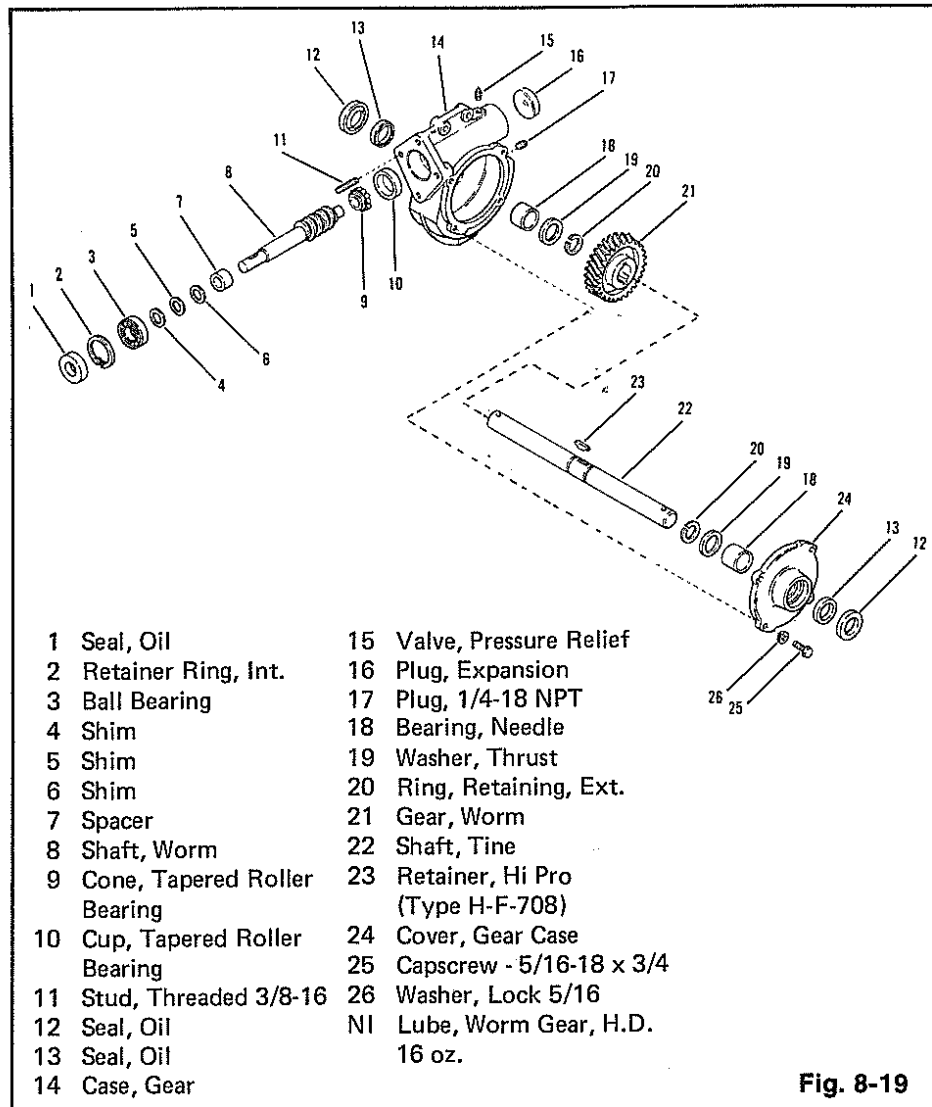


Fig. 8-19

TRACTOR ATTACHMENTS (Continued)

**MEDIUM FRAME
SERIES TRACTOR**
Page 8-11 Rev. 11-90

POWERPACKER PLUS

BLOWER REMOVAL

(Fig. 8-20, 8-21 & 8-22)

1. Remove wing nuts & washers (A) securing belt guard (B) to blower housing. Remove the guard.
2. Loosen belt adjuster by loosening jam nut & capscrew (C).
3. Remove belt from pulleys.
4. Unhook rubber latch & remove chute assembly (D).
5. Remove (4) 5/16-18 nuts (E) from blower housing (F) & support bracket (G). Blower housing should now be loose.

BLOWER DISASSEMBLY

(Fig. 8-22, 8-23 & 8-24)

1. Remove mounting frame (H) from blower housing (F) by removing the 5/6-18 nuts & flange bolts (E).
2. Remove pulley (I) from impeller shaft (J).
3. Remove bearing flanges & bearings (K) from blower housing (F).
4. Remove impeller shaft (J) by driving through either side of blower housing.
5. Remove inner flangette (L) from blower housing.
6. Remove impeller fan (M) by prying through opening of blower housing. Fan should be indexed with opening as shown. Applying heat (hair dryer) may be necessary at location (N), so housing will be more pliable.
7. Remove outer flangette (O).

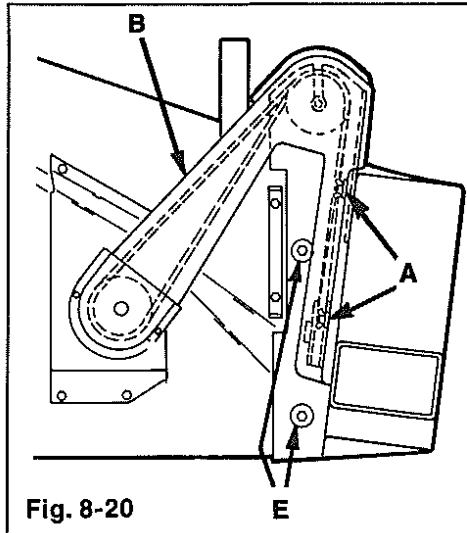


Fig. 8-20

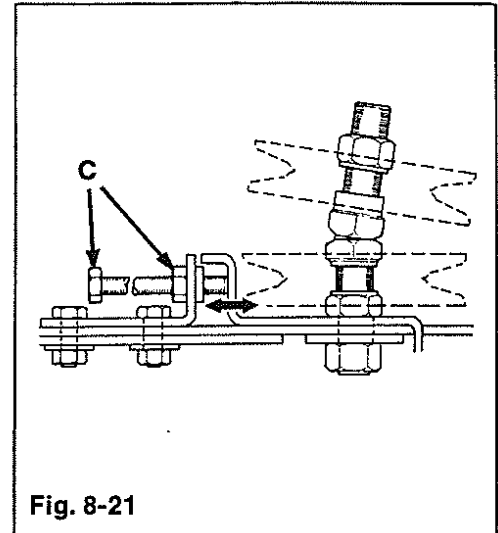


Fig. 8-21

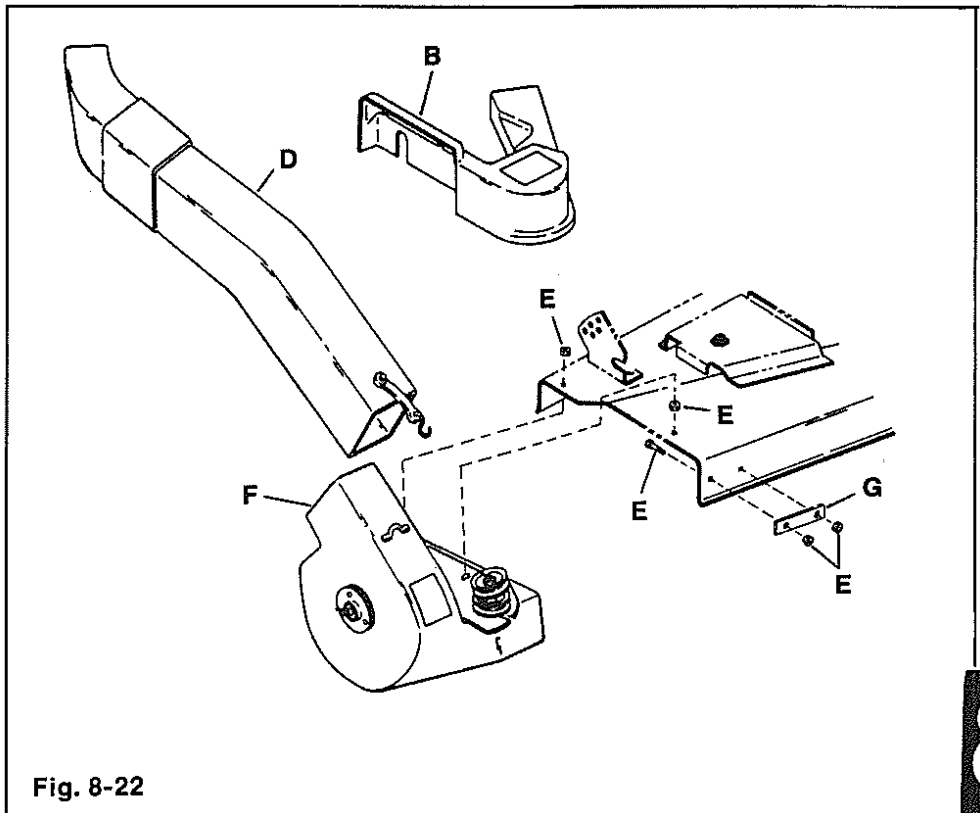


Fig. 8-22

TRACTOR ATTACHMENTS (Continued)

POWERPACKER PLUS (CONT'D)

SEMBLY (Fig. 8-23)

er flangette (O).
peller fan (M) through
n blower housing.
step 6 in BLOWER
MBLY.
peller shaft (J) through
an. Install key (P).
er flangette (L).
shers (Q) to impeller

ring flanges &
L) to blower housing.
(R) to exposed shaft.
ey (I).
unting frame assy. (H)
housing.

RE-INSTALLATION (8-24 & 8-25)

blower assembly (F) to
ck. Reverse step 5 in
REMOVAL.

chute assembly (D).
t & adjust. Fig. 8-21 &

belt guard Fig. 8-20.
nit.

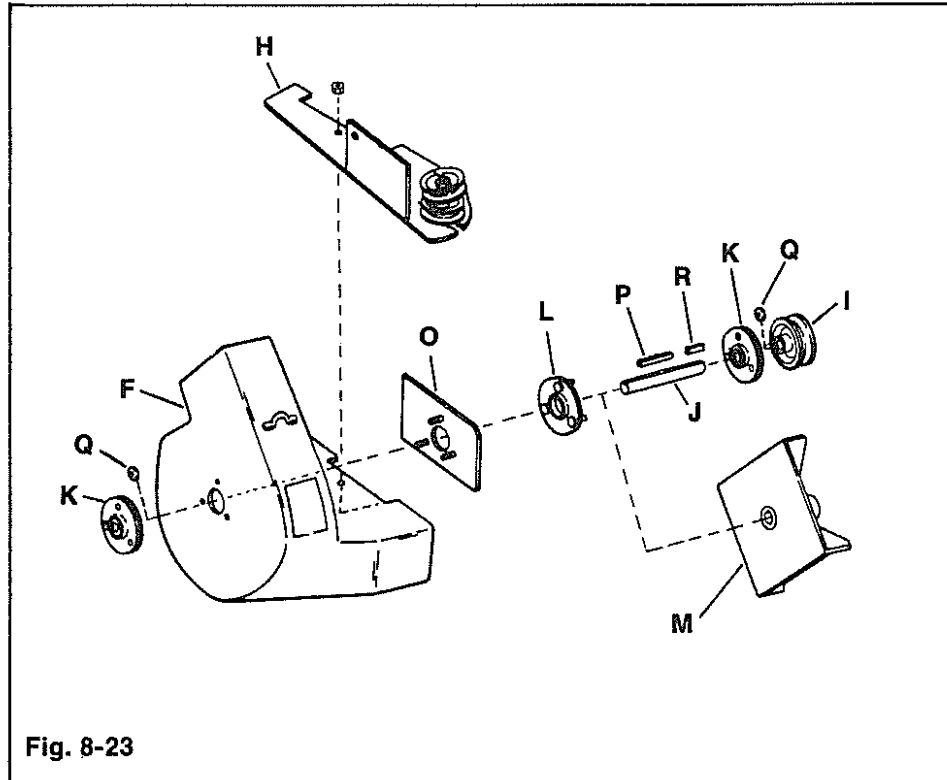


Fig. 8-23

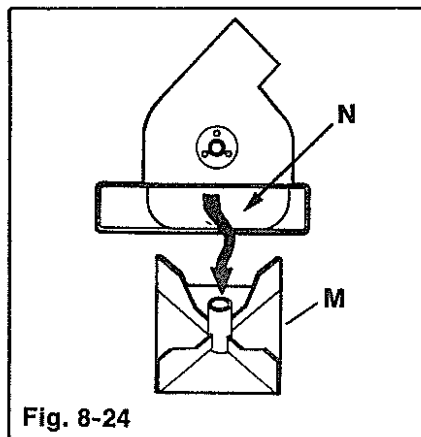


Fig. 8-24

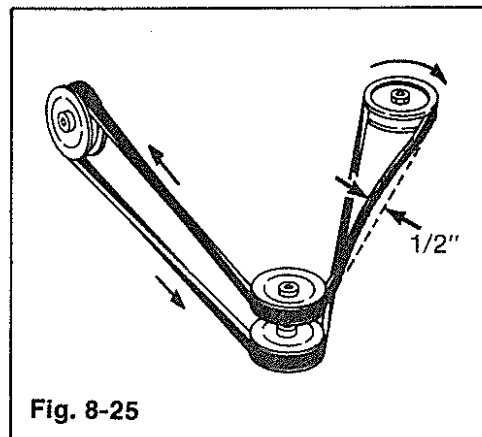


Fig. 8-25