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Bolens®

Medium Tube Frame Tractors

Service and Repair Manual

Form Number 552875-1 (5/78)

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MEDIUM TUBE FRAME TRACTORS

TABLE OF CONTENTS

	PAGE
GROUP I. GENERAL	1-1
SERIAL NUMBER INFORMATION	1-1
SPECIFICATIONS	1-2
MAINTENANCE CHART	1-7
LUBRICATION POINTS	1-8
LUBRICATION CHART (GEAR DRIVE)	1-9
LUBRICATION POINTS	1-10
LUBRICATION CHART (HYDROSTATIC DRIVE)	1-11
GROUP II. ELECTRICAL SYSTEM	2-1
TROUBLE SHOOTING GUIDE	2-1
WIRING DIAGRAM 600 (181), 800 (187), 900 (189) & 1000 (190) MAGNETO IGNITION	2-2
WIRING DIAGRAM 750 (172) MAGNETO IGNITION	2-3
WIRING DIAGRAM 650 (185), 850 (191), 1050 (192-01) MAGNETO IGNITION	2-4
WIRING DIAGRAM G9 (855) MAGNETO IGNITION	2-4A
WIRING DIAGRAM 850 (191-02) & 1050 (192-02) BATTERY IGNITION	2-5
WIRING DIAGRAM 853-01-02 MAGNETO IGNITION	2-6
WIRING DIAGRAM 853-03 MAGNETO IGNITION	2-7
WIRING DIAGRAM 1053 BATTERY IGNITION	2-8
WIRING DIAGRAM 1054 BATTERY IGNITION	2-9
WIRING DIAGRAM 1055 SOLID STATE IGNITION	2-10
WIRING DIAGRAM G10 (1055) w/BRIGGS & STRATTON ENGINE MAGNETO IGNITION	2-10A
WIRING DIAGRAM G11 (1155) w/BRIGGS & STRATTON ENGINE MAGNETO IGNITION	2-10B
WIRING DIAGRAM 1220 (193-01) SOLID STATE IGNITION	2-11
WIRING DIAGRAM 1225 (194-01) SOLID STATE IGNITION	2-12
WIRING DIAGRAM 1253 SOLID STATE IGNITION	2-13
WIRING DIAGRAM 1254 & 1256 SOLID STATE IGNITION	2-14
WIRING DIAGRAM G12 (1255) BATTERY IGNITION	2-14A
WIRING DIAGRAM 1257 SOLID STATE IGNITION	2-15
WIRING DIAGRAM 1556, G14 (1453), H14 (1456) H16 (1656) SOLID STATE IGNITION	2-16
DELCO-REMY GENERATORS	2-17
TESTING ELECTRICAL SYSTEM	2-18
GROUP III. DRIVE TRAIN	3-1
TROUBLE SHOOTING GUIDE	3-1
BEARING INSTALLATION TOOLS	3-2
OIL SEAL TOOLS	3-3
WORM CENTERING KIT NO. 171-9432	3-4
TRANSMISSION ASSEMBLY (3-SPEED)	3-7
TRANSMISSION ASSEMBLY (6-SPEED)	3-12
TRANSMISSION ASSEMBLY 3-SPEED GEAR DIAGRAM	3-18
TRANSMISSION ASSEMBLY 6-SPEED GEAR DIAGRAM	3-22
REMOVAL AND INSTALLATION OF HYDROSTATIC PACKAGE	3-27
MODEL "10" HYDROSTATIC REPAIR	3-28
TRANSAXLE ASSEMBLY	3-30
GROUP IV. FUEL SYSTEM	4-1
TROUBLE SHOOTING GUIDE	4-1
FUEL TANK AND VALVE	4-2
FUEL FILTER	4-3
AIR CLEANER	4-3
CARBURETOR ADJUSTMENTS	4-4
GROUP V. CHASSIS	5-1
STEERING ASSEMBLY	5-1
CLUTCH ASSEMBLY (6-SPEED TRANSMISSION)	5-2
CLUTCH ASSEMBLY (3-SPEED TRANSMISSION)	5-4
CLUTCH ASSEMBLY (3-SPEED TRANSMISSION, OLDER MODELS)	5-5
BELT GUIDE ADJUSTMENTS	5-6
TRAVEL PEDAL ADJUSTMENT (HYDRO MODELS)	5-8
HYDROSTATIC NEUTRAL ADJUSTMENT	5-9
BRAKE ASSEMBLY	5-10
PARKING BRAKE	5-11
DISC BRAKE	5-12
BRAKE INTERLOCK SWITCH	5-13
P.T.O. INTERLOCK SWITCH	5-14
DRIVE BELTS	5-15
P.T.O. BELTS	5-15
STARTER - GENERATOR DRIVE BELT	5-15
P.T.O. SHAFT AND SEAL	5-16
GROUP VI. HYDRAULIC SYSTEM	6-1
TROUBLE SHOOTING GUIDE	6-1
PRINCIPLE OF OPERATION	6-2
HYDRAULIC POWER LIFT	6-4
HYDRAULIC LIFT KIT	6-5
TRANSMISSION FILTERS	6-6
GROUP VII. ENGINE	7-1
TROUBLE SHOOTING GUIDE	7-1
ENGINE REMOVAL	7-3
GROUP VIII. SERVICE LETTERS/ BULLETINS	8-1

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SERIAL NUMBER INFORMATION

Model number of Tractor.
Serial number of Tractor.

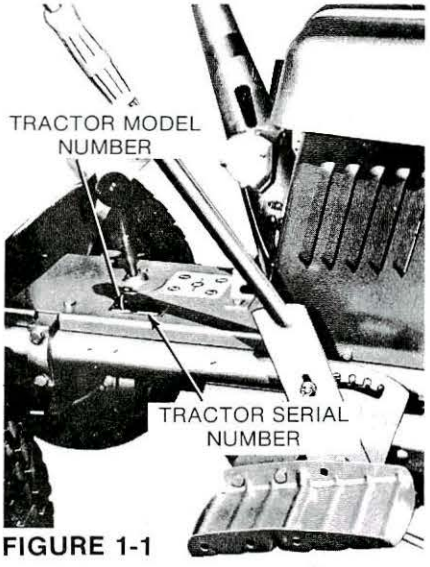

FIGURE 1-1

Models:
600 (180/1)
650 (184/5)
800 (186/7)
900 (188/9)
1000 (190)

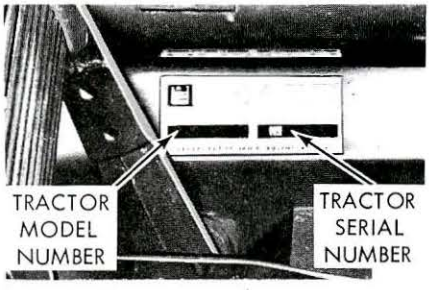

FIGURE 1-2

Models:
750 (171/2)
850 (191)
1050 (192)
1220 (193)
1225 (194)

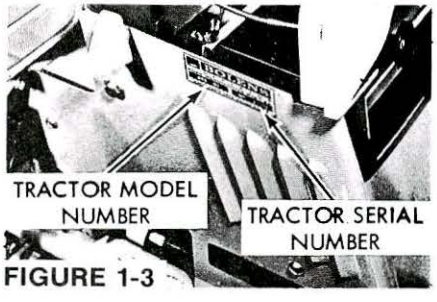

FIGURE 1-3

Models:
853
1053
1054
1055 (G-10)
1253
1254
1256
1257
1453 (G-14)
1456 (H-14)
1556
1656 (H-16)

Engine Model Number.
Engine Serial Number.
Engine Spec. Number.

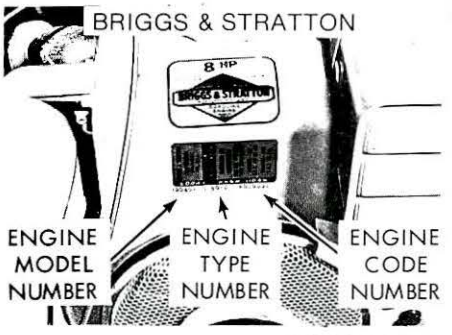

FIGURE 1-4

Models:
600 (180/1)
650 (184/5)
750 (171/2)
853
855 (G-9)
1055 (G-10)
1155 (G-11)

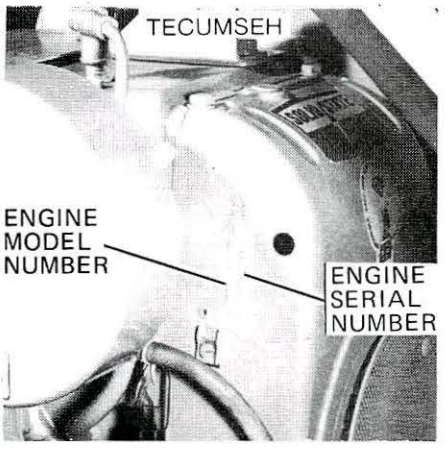

FIGURE 1-5

Models:
1055 (G-10)
1220 (193)
1253
1255 (G-12)
1257
1453 (G-14)
1456 (H-14)
1556
1656 (H-16)

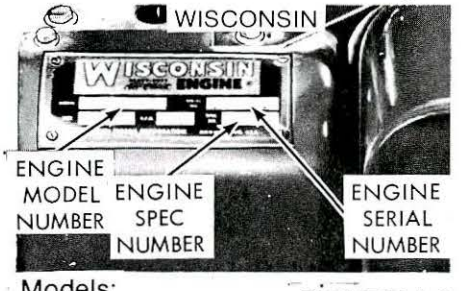

FIGURE 1-6

Models:
800 (186/7)
850 (190)
900 (188/9)
1000 (190)
1050 (192)
1225 (194)
1053

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SPECIFICATIONS

ENGINE

Manufacturer	BRIGGS & STRATTON	
Model/Spec	142302-019801	Model 600 (180)
	142301-019701	Model 600 (181)
	146402-014801	Model 650 (184)
	146401-014701	Model 650 (185)
	170402-013001	Model 750 (171)
	170401-013101	Model 750 (172)
	190401-013901	Model 853
	190417-090201	Model 855 (G-9)
	251417-015501	Model 1055 (G-10)
	252417-013201	Model 1155 (G-11)
Type	All Models	Horz. shaft, air cooled, 1 cyl., 4 cycle
Bore and Stroke	142302, 142301, 146402 & 146401	2-3/4 × 2-3/8
	170402 & 170401	3 × 2-3/8
	190401	3 × 2-3/4
Piston Displacement	142302, 142301, 146402, & 146401	14.1 Cu. In.
	170402 & 170401	16.79 Cu. In.
	190401	19.44 Cu. In.
Mfr's H.P. Rating	142302, 142301, 146402 & 146401	6 H.P. @ 3600 RPM
	170402 & 170401	7 H.P. @ 3600 RPM
	190401 & 190417	8 H.P. @ 3600 RPM
	251417	10 H.P. @ 3600 RPM
	252417	11 H.P. @ 3600 RPM
Crankshaft Extension	All Models	1.000/.9995 Dia × 2-29/32
Air Cleaner	All Models	Oil Bath or Oil Foam
Oil Capacity	All Models	2-3/4 pints
Gasoline Capacity	All Models	4 quarts
Governor	142302 & 142301	Air Vane
	146402, 146401, 170402, 170401, 190401, 190417, 251417 & 252417	Mechanical
Speed Control	All Models	Remote, cable operated
Spark Plug	All Models	Champion RCJ-8 or equivalent
Spark Plug Gap	All Models	.030
Point Gap	All Models	.020

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SPECIFICATIONS

1

ENGINE

Manufacturer		TECUMSEH
Model/Spec	HH-100-115181 D	Model 1055 (G-10)
	HH-120-120061 B	Model 1220 (193)
	HH-120-120199 E	Model 1255 (G-12)
	HH-120-120090 C	Models 1253 & 1257
	HH-140-160001	Model 1453 (G-14)
	HH-140-160001	Model 1456 (H-14)
	HH-150-170001	Model 1556
	HH-160-170005	Model 1656 (H-16)
Type	All Models	Horz. shaft, air cooled, 1 cyl., 4 cycle
Bore and Stroke	HH-100 & HH-140	3-5/16 × 2-3/4
	HH-120, HH-150 & HH-160	3-1/2 × 2-7/8
Piston Displacement	HH-100 & HH-140	23.7 cu. in.
	HH-120, HH-150 & HH-160	27.66 cu. in.
Mfr's H.P. Rating	HH-100	10 H.P. @ 3600 RPM
	HH-120	12 H.P. @ 3600 RPM
	HH-140	14 H.P. @ 3600 RPM
	HH-150	15 H.P. @ 3600 RPM
	HH-160	16 H.P. @ 3600 RPM
Crankshaft Extension	HH-100 & HH-120	1.000/.999 Dia. × 3-7/16
	HH-140, HH-150 & HH-160	1.125/1.124 Dia. × 3-3/32
Air Cleaner	All Models	Paper element
Oil Capacity	HH-100, HH-120-120090 C, HH-120-12099E, HH-140, HH-150 & HH-160	3 Pints
	HH-120 - 120061 B	2 Pints
Gasoline Capacity	All Models	Steel Tank - 4 Qts. Plastic Tank - 5 Qts.
Governor	All Models	Mechanical
Speed Control	All Models	Remote, cable operated
Spark Plug	HH-100 & HH-120	Champion J-8 or equivalent
	HH-140, HH-150 & HH-160	Champion L-7 or equivalent
Spark Plug Gap	All Models	.030
Point Gap	All Models	Solid State

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SPECIFICATIONS

ENGINE

Manufacturer		WISCONSIN MOTORS
Model/Spec	S7D - 218981	Model 800 (186/87/88)
	S8D - 271995	Model 850 (191)
	S8D - 231552	Model 900 (189)
	TR10D - 241195	Models 1000 (190) & 1050 (192-01)
	TRA10D - 285633	Models 1050 (192-02), 1053, 1054
	TRA12D - 318973	Model 1225 (194)
	TRA12D - 335600	Models 1254 & 1256
	TRA12D - 357448	Models 1254 & 1256
Type	All Models	Horz. shaft, air cooled, 1 cyl., 4 cycle
Bore and Stroke	S7D	3 × 2-5/8
	S8D & TR10D	3-1/8 × 5/8
	TRA10D	3-1/8 × 2-7/8
	TRA12D	3-1/2 × 2-7/8
Piston Displacement	S7D	18.6 cu. in.
	S8D & TR10D	20.2 cu. in.
	TRA10D	22.05 cu. in.
	TRA12D	27.66 cu. in.
Mfr's H.P. Rating	S7D	7.25 H.P. @ 3600 RPM
	S8D & TR10D	8.25 H.P. @ 3600 RPM
	TRA10D	10.1 H.P. @ 3600 RPM
	TRA12D	12.0 H.P. @ 3600 RPM
Crankshaft Extension	S7D & S8D	1.000/.999 Dia. × 2-7/8
	TR10D & TRA10D	1.000/.999 Dia. × 2-27/32
	TRA12D	1.125/1.124 Dia. × 2-27/32
Air Cleaner	All Models	Oil Bath or Paper element
Oil Capacity	All Models	1 quart
Gasoline Capacity	All Models	Steel Tank - 4 Qts. Plastic Tank - 5 Qts.
Governor	All Models	Mechanical
Speed Control	All Models	Remote, cable operated
Spark Plug	All Models	Champion D-16J or equivalent
Spark Plug Gap	All Models	.030
Point Gap	S7D, S8D, TR10D & TRA10D	.020
	TRA12D	Solid State

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SPECIFICATIONS

CHASSIS

Type	All Models	Steel, tubular frame
Height	All Models	40 inches
Width	600, 800	30 inches
	650, 750	30½ inches
	All Other Models	34 inches
Length	600	60 inches
	650, 750, 850, 853	62½ inches
	All Other Models	63 inches
Wheel Base	600	40 inches
	650, 750, 850, 853	42½ inches
	All Other Models	43 inches
Turning Radius	600	36 inches
	800	42 inches
	All Other Models	40 inches
Ground Clearance - Rear Axle	All Models	7 inches
Shipping Weight	600 (180)	490 lbs.
	600 (181)	530 lbs.
	650 (184), 750 (171)	530 lbs.
	650 (185), 750 (172)	585 lbs.
	800	595 lbs.
	850, 853	550 lbs.
	900	625 lbs.
	1000	665 lbs.
	1254, 1453	675 lbs.
	1256, 1257, 1456 (H-14), 1556, 1656 (H-16)	680 lbs.
	All Other Models	645 lbs.
Transmission	600, 650, 750, 855 (G9) 1055 (G10), 1155 (G11)	All gear; 3 speed w/transaxle (manual belt change for high/low range)
	800, 850, 900	All gear; 3 speed w/transaxle & controlled differential (console mounted belt changer lever for high/low range)
	853	All gear; 3 speed w/transaxle (console mounted belt changer lever for high/low range)
	1000, 1050, 1053, 1054, 1220, 1253, 1254, 1255 (G12) 1453 (G14)	All gear; 6 speed w/transaxle & controlled differential; built in high/low range

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SPECIFICATIONS

CHASSIS

Transmission	1225, 1256, 1257, 1456 (H-14), 1556, 1656 (H16)	Model 10 Eaton hydrostatic w/transaxle & controlled differential; infinite speed range in forward & reverse
Approx. Max. Speed	Gear Transmission	Forward 3/4-6 mph Reverse 1-2 1/2 mph
	Hydrostatic Transmission	Forward 0-6 3/4 mph Reverse 0-3 1/2 mph
Tires	600, 650, 750, 800	Front 4.00-8 Rear 6.00-12
	850, 853	Front 4.00-8 Rear 8×8.50-12
	900, 1000, 1050, 1053, 1054, 1220, 1225, 1253, 1254, 1256 (01)	Front 16×6.50-8 Rear 23×8.50-12
	855 (G9), 1055 (G10), 1155 (G11)	Front 4.80/4.00-8 Rear 23×8.50-12
	1256 (02 thru 07), 1257, 1556, 1656 (H16)	Front 16×6.50-8 Rear 23×10.50-12
	1255 (G12), 1453 (G14), 1456 (H-14, 1656 (H16)	Front 16×6.50-8 Rear 23×9.50-12

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MAINTENANCE CHART

MAINTENANCE REQUIRED	Length of Operation	Type of Maintenance
Engine Cooling Air Screen —	Daily or 8 Hrs.*	Brush Clean
Engine Air Cleaner —	Daily or 8 Hrs.*	Shake out dirt-dry type
		Wash — "OIL FOAM"®
	When no longer serviceable	Replace
Cooling Fins — (Engine) —	Daily or 8 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.*	Clean
Battery —	Daily	Check Water Level — Add As Necessary
Hydrostatic and Rear Axle Fins — (Hydrostatic Models)	Daily or 8 Hrs.*	Clean — Use Air Hose if Available
Belts —	50 Hrs.*	Check for Wear and Adjust
Tires —	25 Hrs.	Check for Damage and Air Pressure
Transmission Filter — (Hydrostatic) —	After First 10 Hours then After Every 200 Hours or with oil change	Change and Add Oil to Bring to Operating Level
Brake —	50 Hrs.*	Adjust Linkage
Rear Axle —	50 Hrs.*	Adjust End Play

*More often under extreme conditions.

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LUBRICATION POINTS

GEAR DRIVE

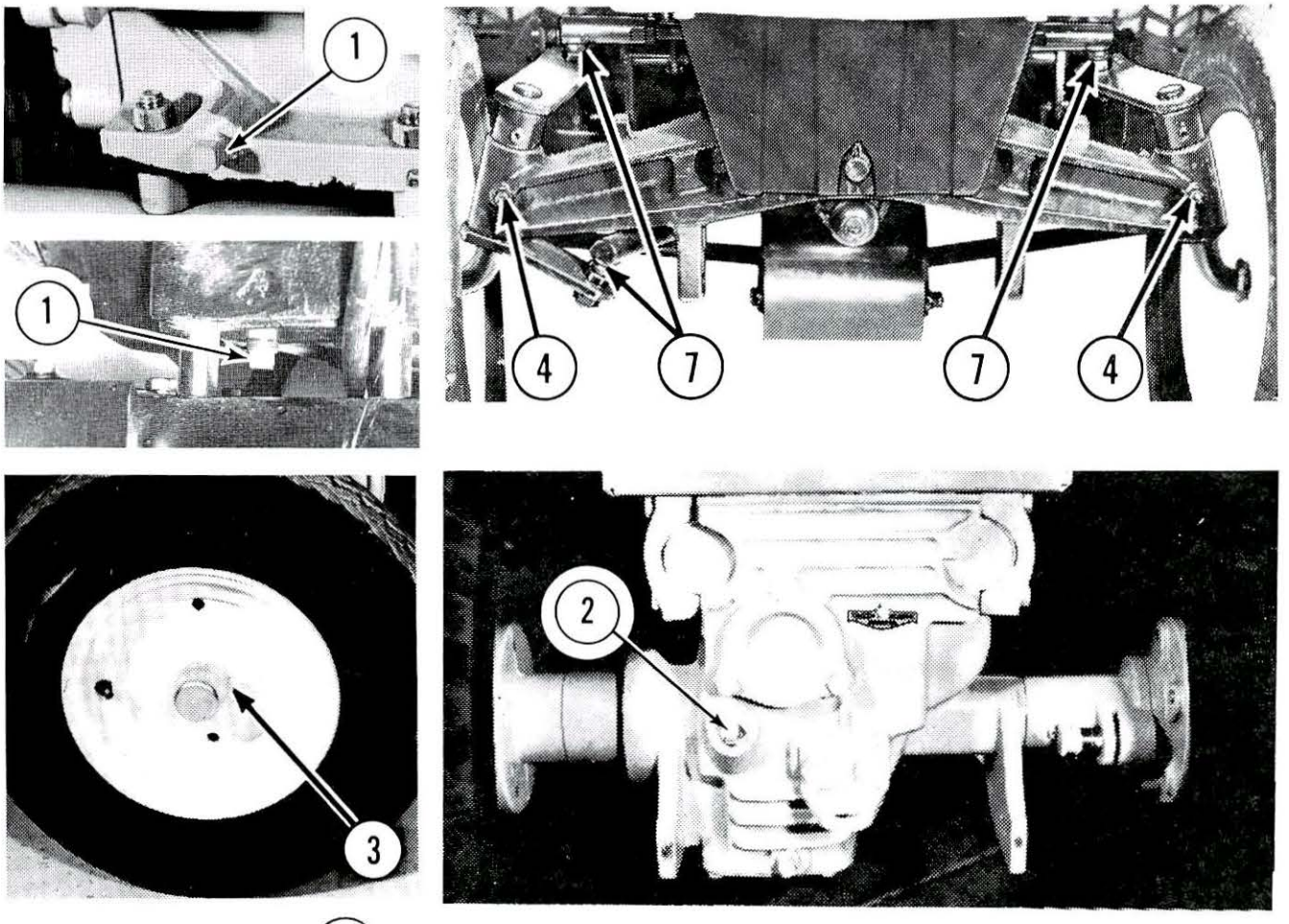

FIGURE 1-7

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LUBRICATION CHART
GEAR DRIVE

LUBRICATION REQUIRED		Length of Operation	Type of Lubrication	Amount Required
1. Engine Crankcase —		Daily & 8 Hrs.	Engine Oil	Add Oil To Full Mark
Average Temperature	(Spring, Summer, Autumn) (+120°F. to 40°F.)	50 Hrs.*	SAE 30 Oil Type SD-SE	Replace
	(Winter) (+40° to 0°F.)	50 Hrs.*	SAE 10W-30 Oil Type SD-SE	Replace
	(Winter) (Below Zero)	50 Hrs.*	SAE 5W-20 Oil Type SD-SE	Replace
2. Transmission —		Check Weekly Or 25 Hrs.	Bolens EP 90 Gear Lube	Add To Plug Level Capacity 2½ Qts.
3. Front Wheel Bearings —		8 Hrs.	Grease With Bolens Multi-Purpose Grease	1-2 Strokes
4. Front Wheel Spindles —		8 Hrs.	Grease With Bolens Multi-Purpose Grease	1-2 Strokes
5. Front Axle Pivot — Some Models		8 Hrs.	Grease With Bolens Multi-Purpose Grease	1-2 Strokes
6. PTO Housing —		8 Hrs.	Grease With Bolens Multi-Purpose Grease	1-2 Strokes
7. Tie Rod Ends and Drag Links-		8 Hrs.	Oil	Small Amount
8. Steering Shaft — below tractor-above steering pinion		8 Hrs.	Grease With Bolens Multi-Purpose Grease	1-2 Strokes
9. Brake Linkage —		8 Hrs.	Oil	Small Amount
10. Clutch —		8 Hrs.	Oil	Small Amount at rear of clutch plate hub at end of spring

*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. The proper hand grease gun can be purchased from your Bolens dealer. Ask for Bolens Grease Gun with Bolens Grease. Lubricate all linkages, levers and pins not equipped with grease fittings with an oil can once a week, or more often depending on operating conditions.

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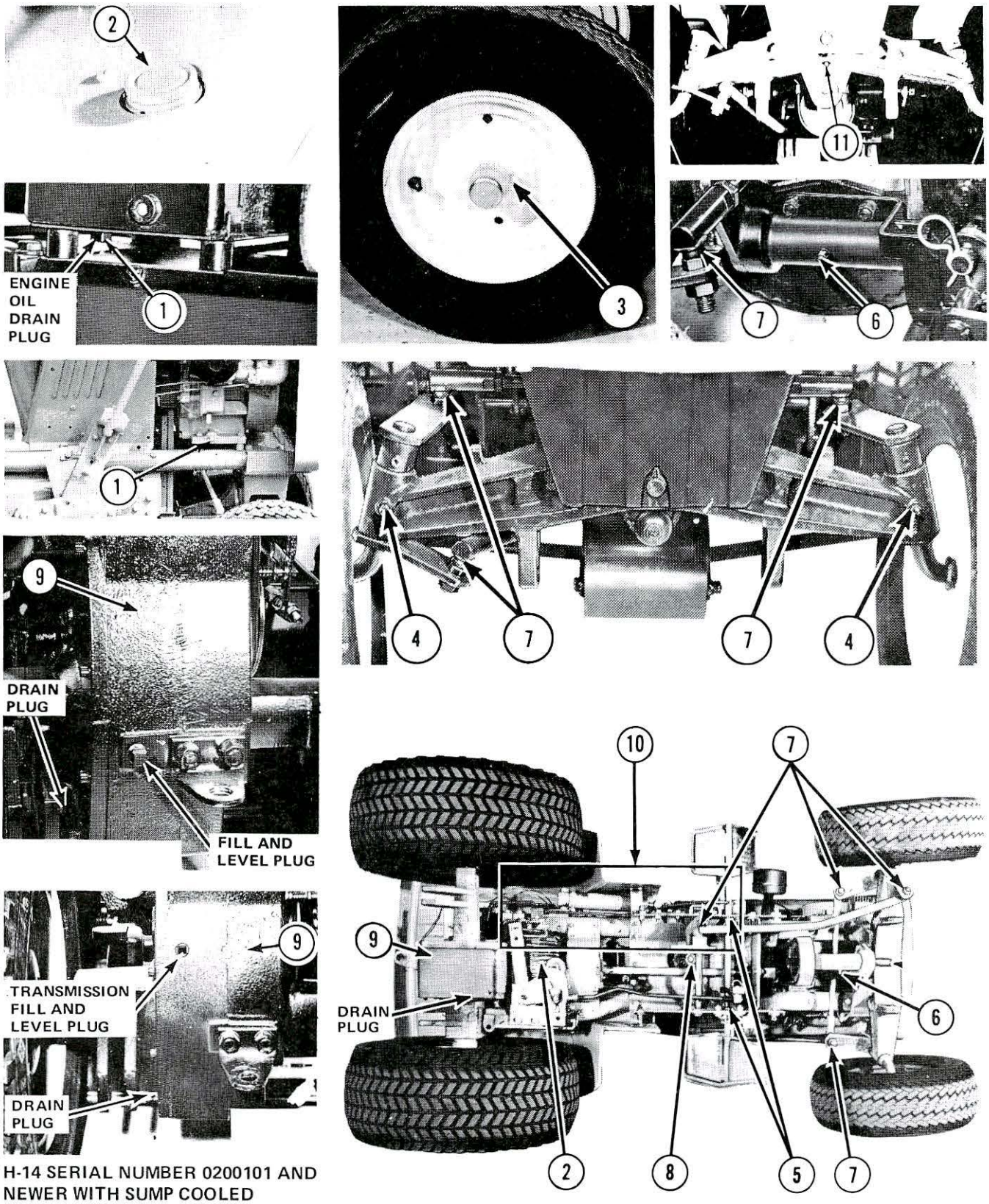
LUBRICATION POINTS

HYDROSTATIC DRIVE



H-14 SERIAL NUMBER 0200101 AND NEWER WITH SUMP COOLED HYDROSTATICS

FIGURE 1-8

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LUBRICATION CHART
HYDROSTATIC DRIVE

LUBRICATION REQUIRED		Length of Operation	Type of Lubrication	Amount Required
1. Engine Crankcase —		Daily & 8 Hrs.	Engine Oil	Add Oil To Full Mark
Average Temperature	(Spring, Summer, Autumn) (+120°F. to 40°F.)	50 Hrs.*	SAE 30 Oil	Replace 3 pints
	(Winter) (+40° to Below Zero)	50 Hrs.*	SAE 10W-30 Oil	Replace 3 pints
2. Hydrostatic Transmission — H-14 Serial Numbers 0200101 and newer with sump cooled hydrostatics only. (capacity 4 Qts.)		Check Weekly Or 8 Hrs.	Type "A" Automatic Trans. Fluid	Add to Cold Mark on Dipstick H-14 Serial Numbers 0200101 and newer with sump cooled hydrostatics only Add to Plug Level
		When Oil is Discolored	Drain and refill with Bolens 172-1514 Hydrostatic fluid or Type "A" Automatic Transmission Fluid	
3. Front Wheel Bearings —		8 Hrs.	Grease with Bolens Multi-Purpose	1-2 Strokes
4. Front Wheel Spindles —		8 Hrs.	Grease with Bolens Multi-Purpose	1-2 Strokes
5. Travel Pedal Shaft —		8 Hrs.	Oil	Small Amount
6. PTO Housing —		8 Hrs.	Grease with Bolens Multi-Purpose	1-2 Strokes
7. Tie Rod Ends and Drag Links-		8 Hrs.	Oil	Small Amount
8. Steering Shaft — below tractor-above steering pinion		8 Hrs.	Grease with Bolens Multi-Purpose	1-2 Strokes
9. Differential — For H-14 Serial Numbers 0200101 and newer with sump cooled hydrostatics only, see (2) above		Weekly or 25 Hrs.	Bolens SAE 90 Gear Lube	Add to Plug Level
10. Brake Linkage —		8 Hrs.	Oil	Small Amount
11. Front Axle Pivot — Some Models		8 Hrs.	Grease With Bolens 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. The proper hand grease gun can be purchased from your Bolens dealer. Ask for Bolens Grease Gun with Bolens Grease. Lubricate all linkages, levers and pins not equipped with grease fittings with an oil can once a week, or more often depending on operating conditions.

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TROUBLE SHOOTING GUIDE

ELECTRIC START MODELS

PROBLEM	PROBABLE CAUSE	REMEDY
Starter Motor does not energize	1. P.T.O. engaged	1. Disengage P.T.O.
	2. Brake pedal not depressed or on 1225 transmission, not locked.	2. Depress brake pedal and lock, or lock transmission.
	3. Corroded or loose electrical connections	3. Clean and tighten
	4. Discharged battery	4. Locate problem and recharge
	5. P.T.O. interlock, brake interlock, seat interlock. Transmission interlock, ignition switch, not functioning.	5. Check and replace if necessary
	6. Solenoid not operating.	6. Check and replace if necessary
Starter Motor turns engine too slow	1. Weak or partially discharged battery.	1. Check battery charge or replace if necessary.
	2. Corroded or loose electrical connections.	2. Clean and tighten
	3. Starter sheave spins in belt.	3. Check belt tension. Adjust per manual.
Battery discharges rapidly	1. Low water level	1. Check and refill
	2. Low or no output from alternator	2. Check output and repair if necessary
	3. Short in electrical system	3. Check out and repair
Battery will not charge	1. Dirt and moisture on case	1. Clean case
	2. Corroded or loose battery terminals	2. Clean and tighten
	3. Battery not functioning properly.	3. Replace battery
	4. No alternator output	4. Check out alternator and repair or replace
	5. Regulator not functioning.	5. Check out regulator, replace if necessary
Lights not operating	1. Bulbs burned out	1. Replace bulbs
	2. Loose or poorly connected wire	2. Install properly and tighten
	3. Circuit breaker not functioning.	3. Check out circuit breaker, replace if necessary.

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WIRING DIAGRAM
600 (181) - 800 (187) - 900 (189) - 1000 (190)
MAGNETO IGNITION

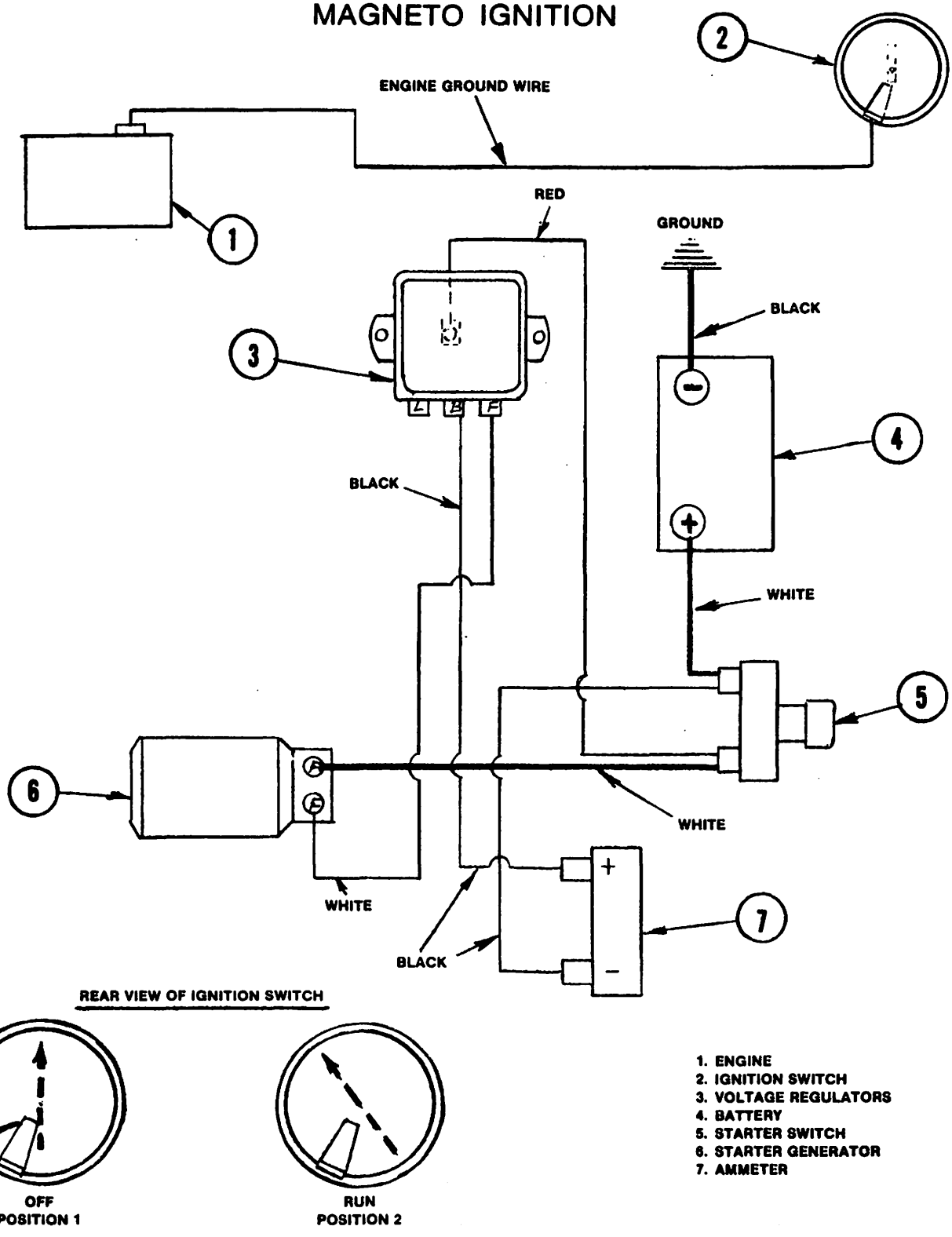

FIGURE 2-1

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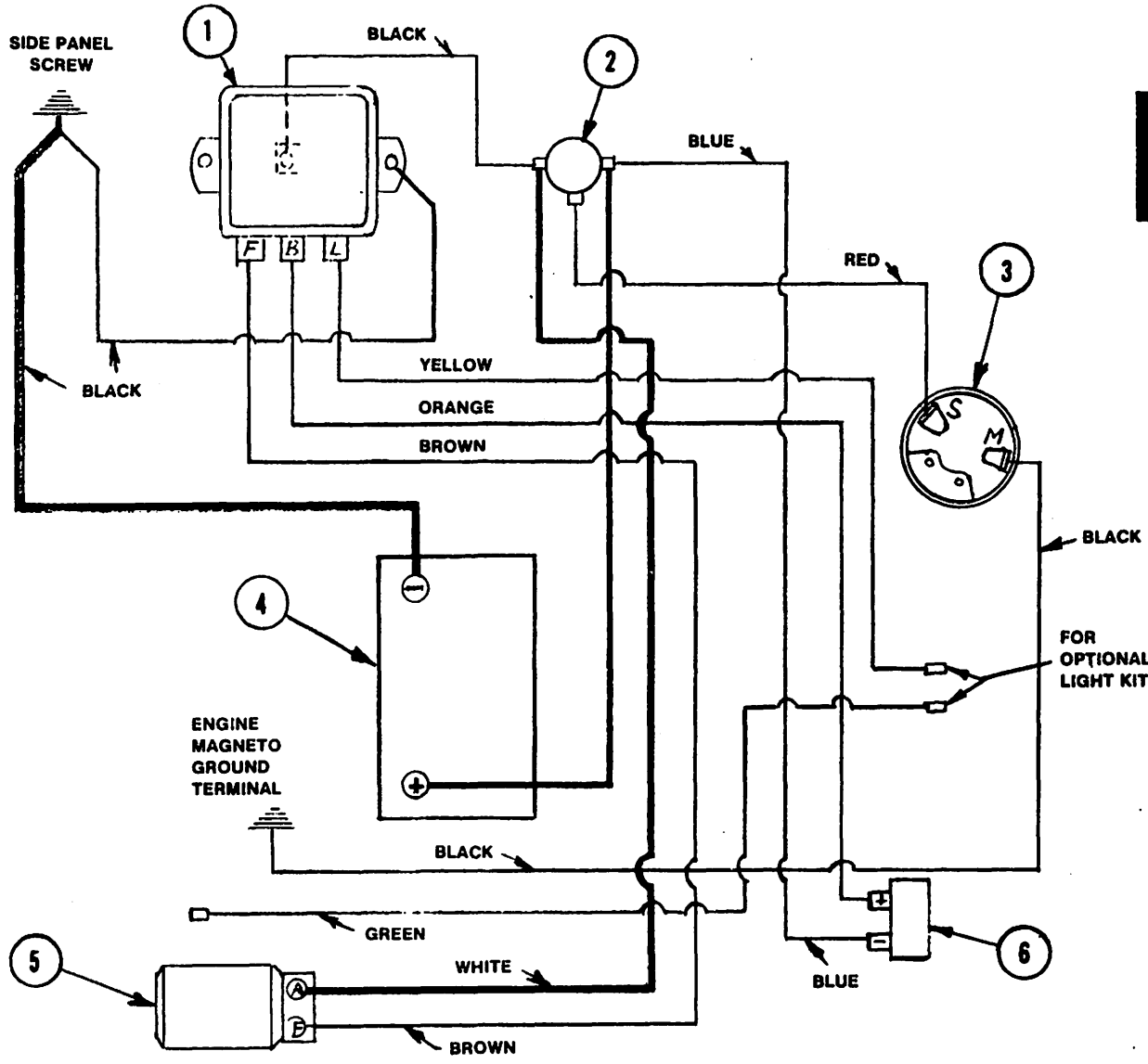
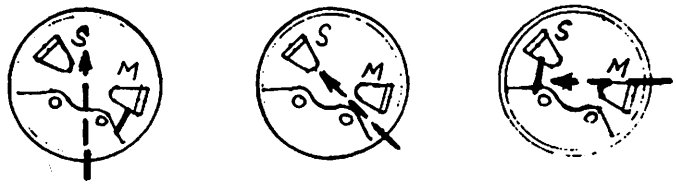
WIRING DIAGRAM - 750 (172)
MAGNETO IGNITION



REAR VIEW OF IGNITION SWITCH



OFF
POSITION 1

RUN
POSITION 2

START
POSITION 3

1. VOLTAGE REGULATOR
2. SOLENOID
3. IGNITION SWITCH
4. BATTERY
5. STARTER - GENERATOR
6. AMMETER

FIGURE 2-2

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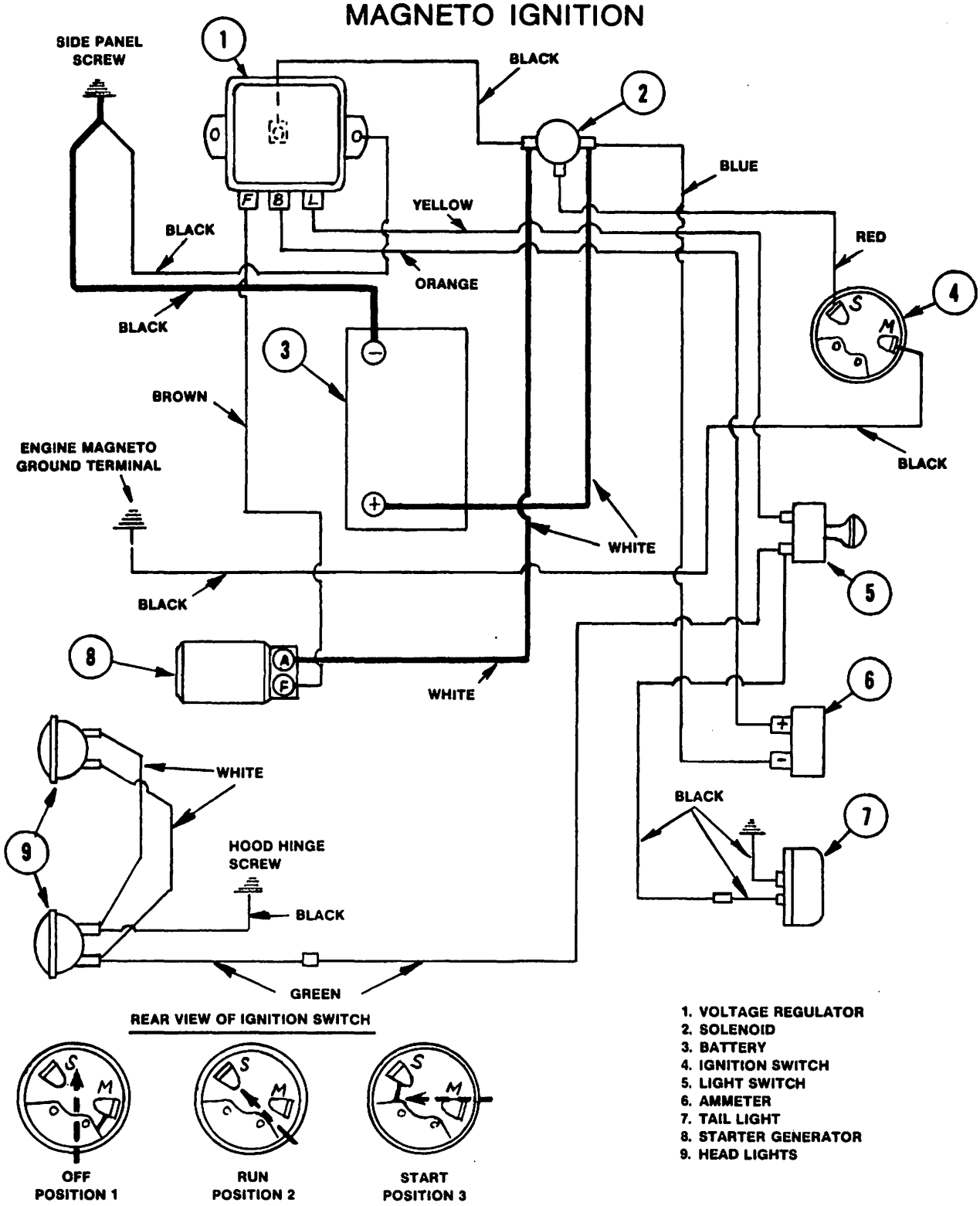
WIRING DIAGRAM
650 (185) - 850 (191) - 1050 (192-01)
MAGNETO IGNITION

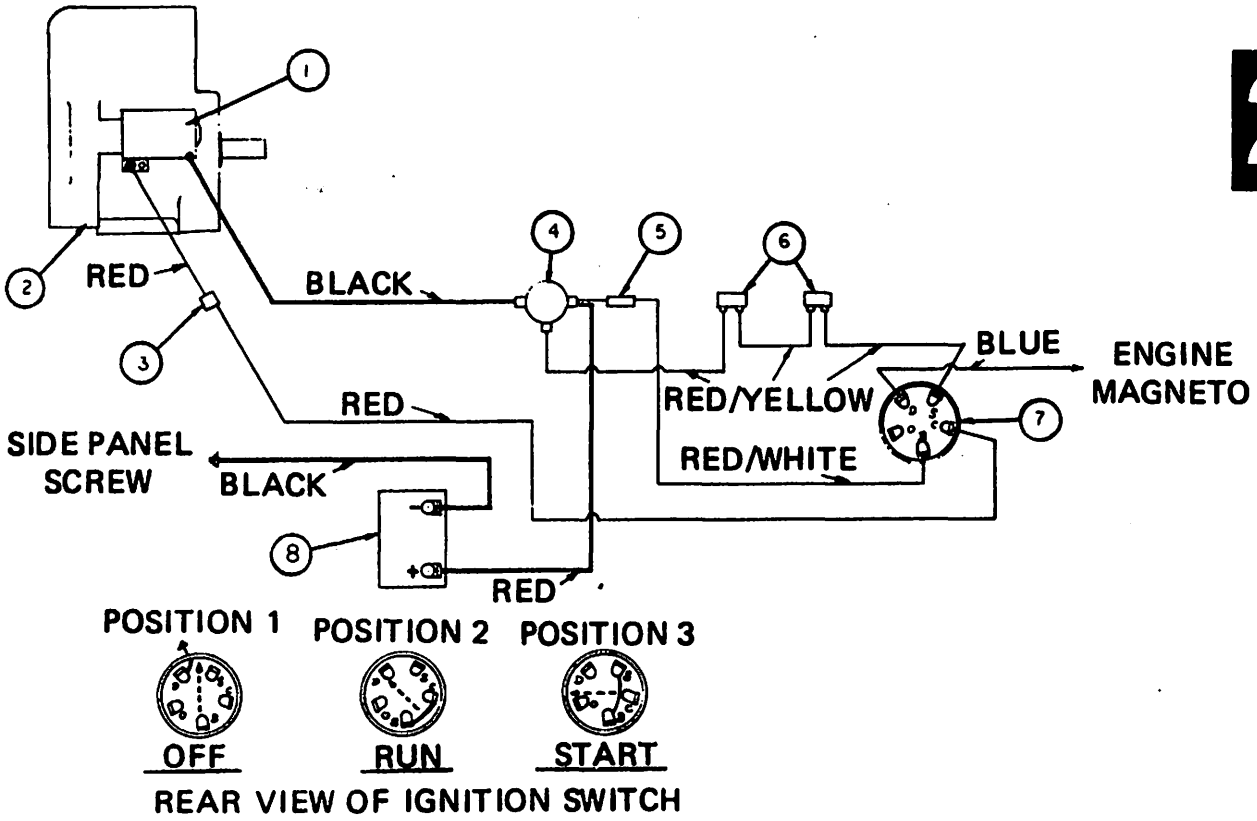


1. VOLTAGE REGULATOR
2. SOLENOID
3. BATTERY
4. IGNITION SWITCH
5. LIGHT SWITCH
6. AMMETER
7. TAIL LIGHT
8. STARTER GENERATOR
9. HEAD LIGHTS

FIGURE 2-3

https://truckmanualshub.com/

WIRING DIAGRAM
G9 (855)
MAGNETO IGNITION



REAR VIEW OF IGNITION SWITCH

1. STARTER
2. ENGINE
3. CONNECTOR
4. SOLENOID
5. FUSE AND FUSE HOLDER
6. INTERLOCK SWITCHES
7. IGNITION SWITCH
8. BATTERY

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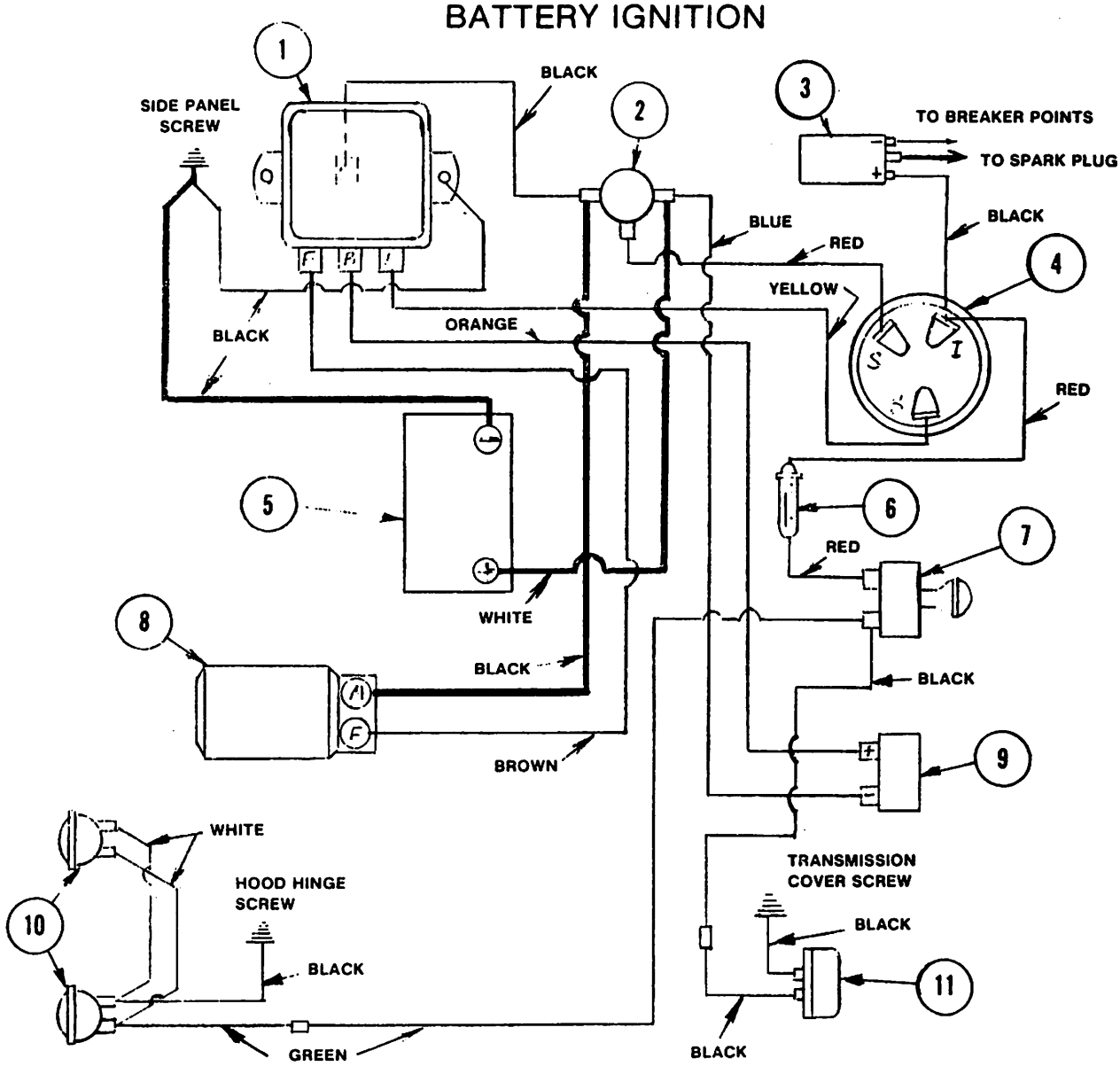
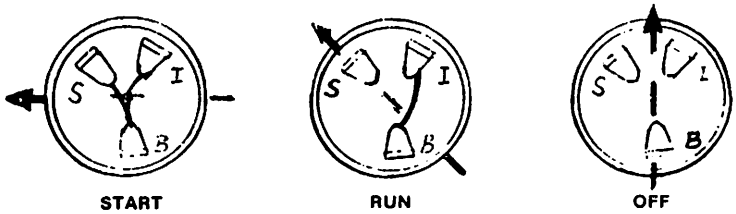
WIRING DIAGRAM
850 (191-02) & 1050 (192-02)
BATTERY IGNITION



REAR VIEW OF IGNITION SWITCH



START
POSITION 3

RUN
POSITION 2

OFF
POSITION 1

1. VOLTAGE REGULATOR
2. SOLENOID
3. IGNITION COIL
4. IGNITION SWITCH
5. BATTERY
6. FUSE HOLDER & FUSE 14 AMP
7. LIGHT SWITCH
8. STARTER - GENERATOR
9. AMMETER
10. HEAD LIGHTS
11. TAIL LIGHTS

FIGURE 2-4

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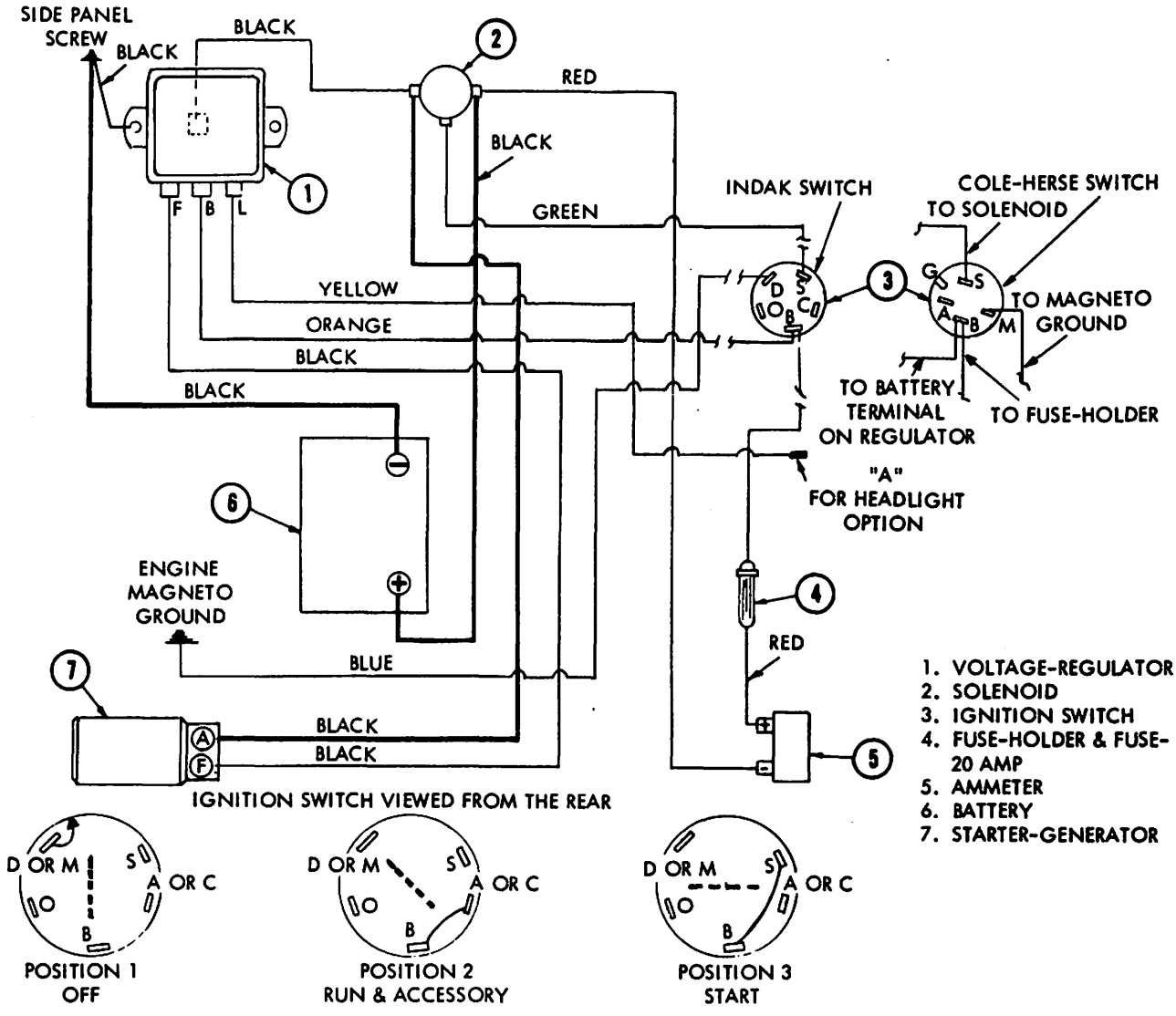
WIRING DIAGRAM
853-01-02
MAGNETO IGNITION



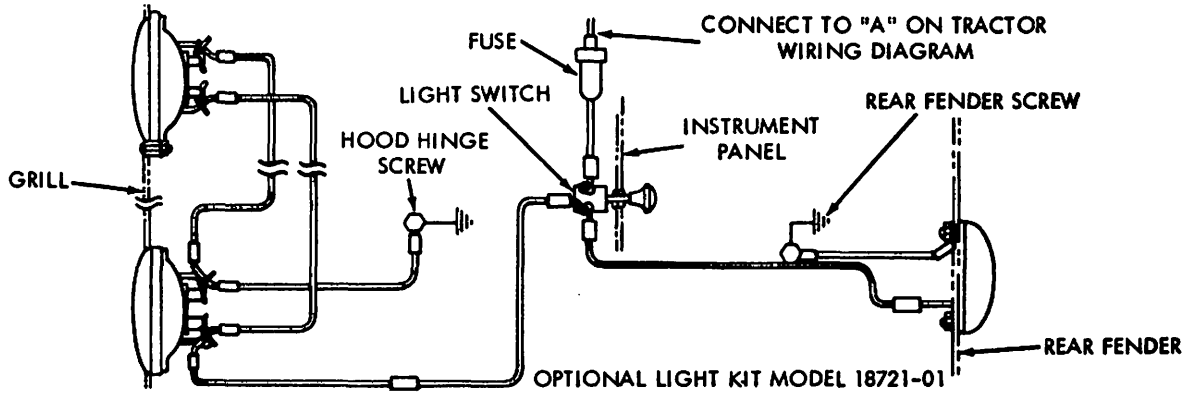


FIGURE 2-5

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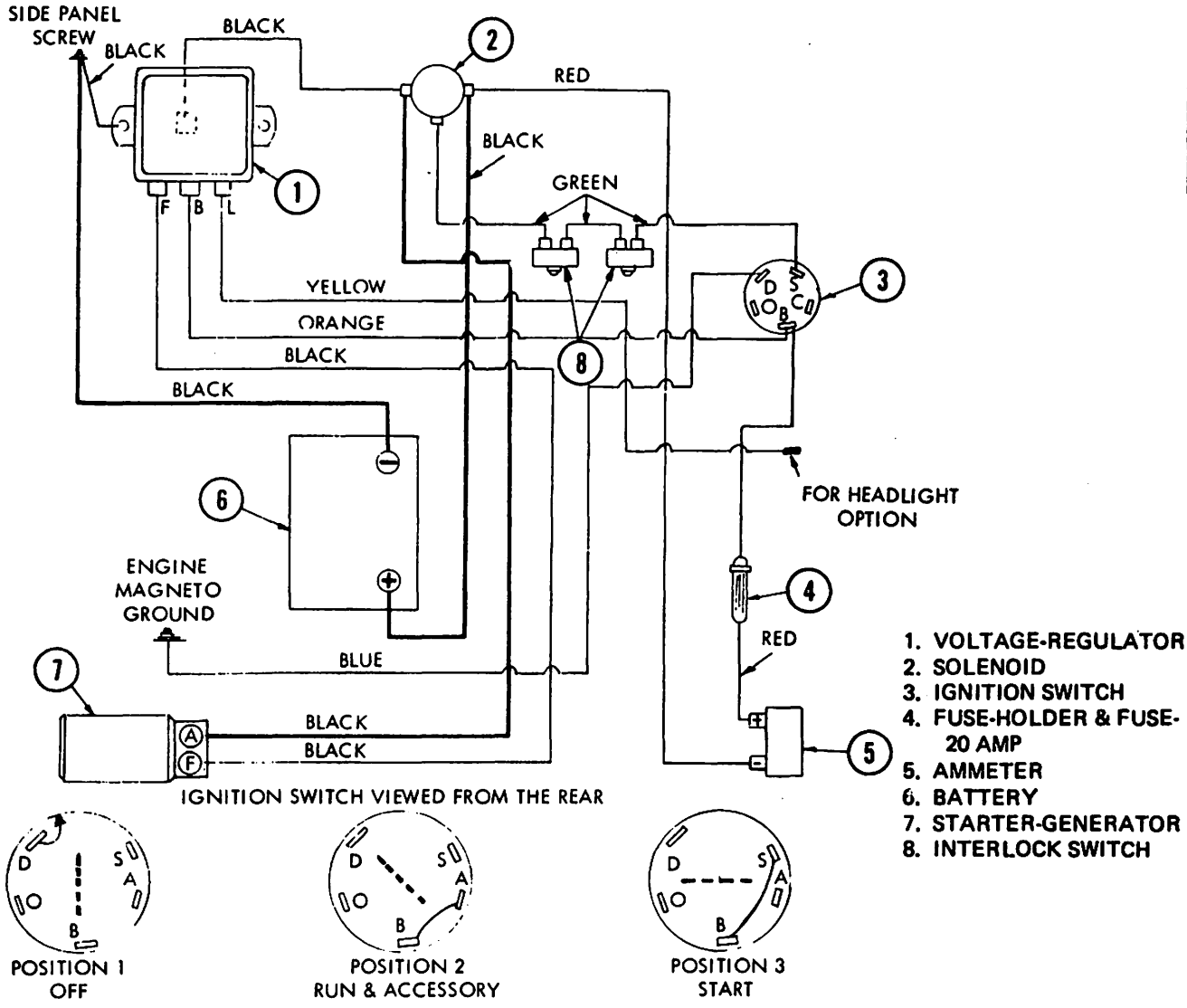
WIRING DIAGRAM
853-03
MAGNETO IGNITION



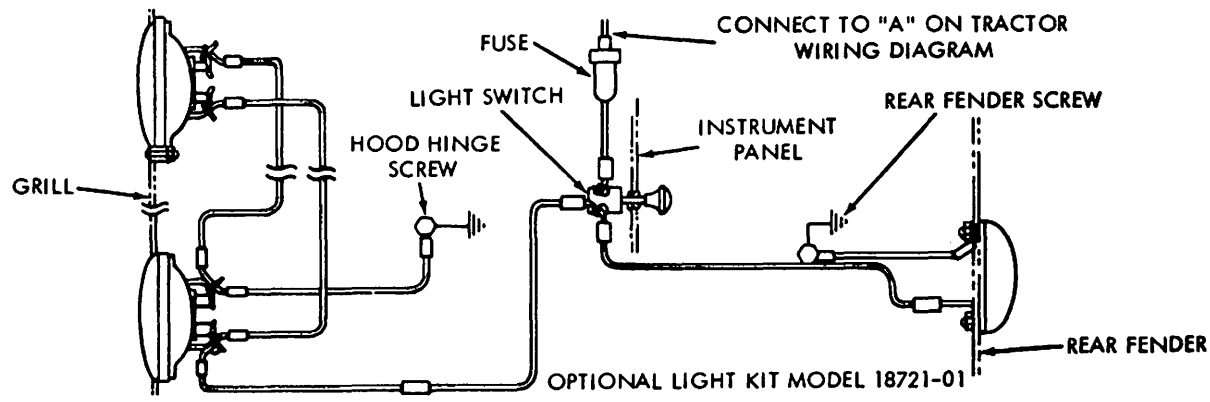


FIGURE 2-6

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WIRING DIAGRAM
1053
BATTERY IGNITION

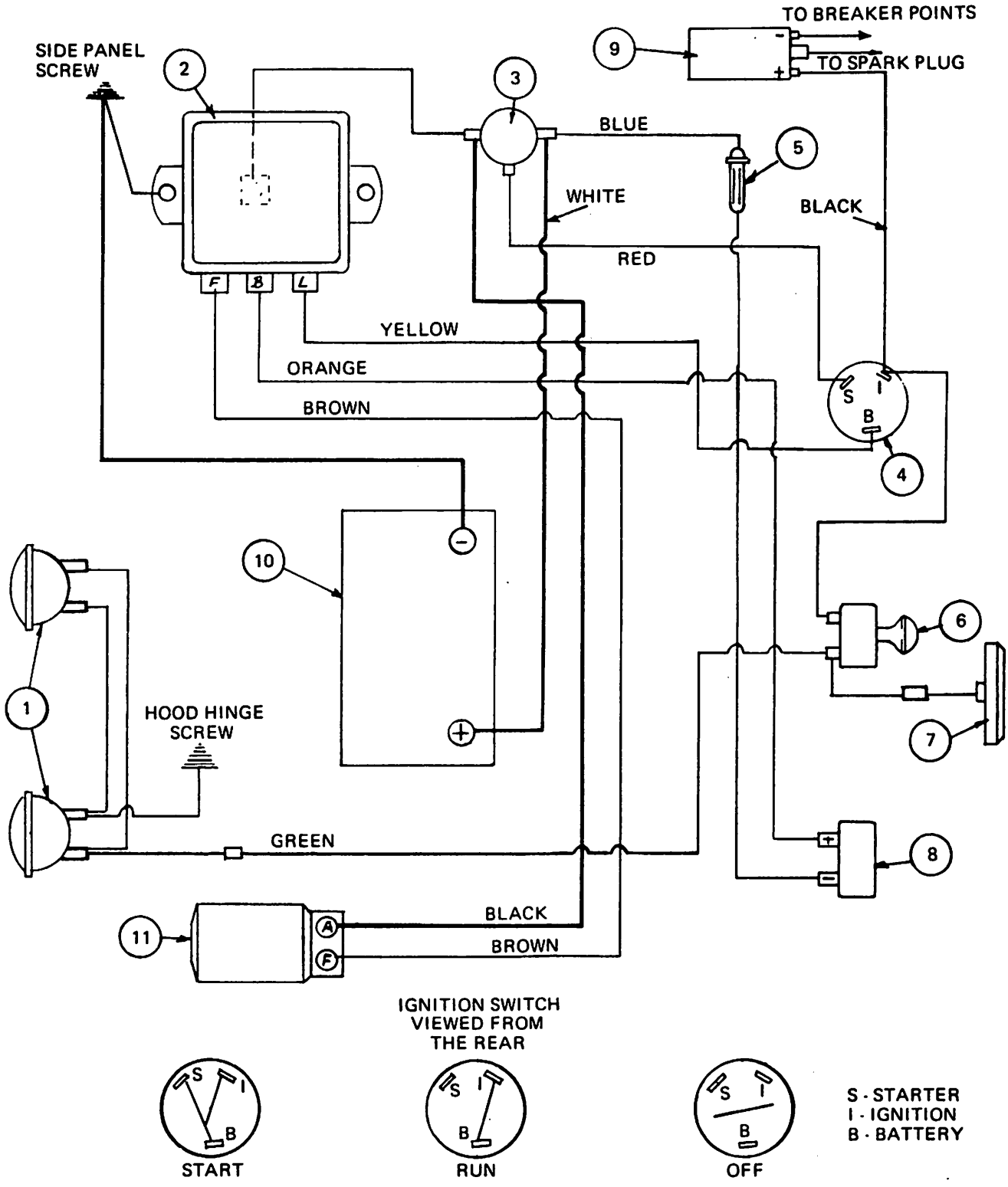

FIGURE 2-7

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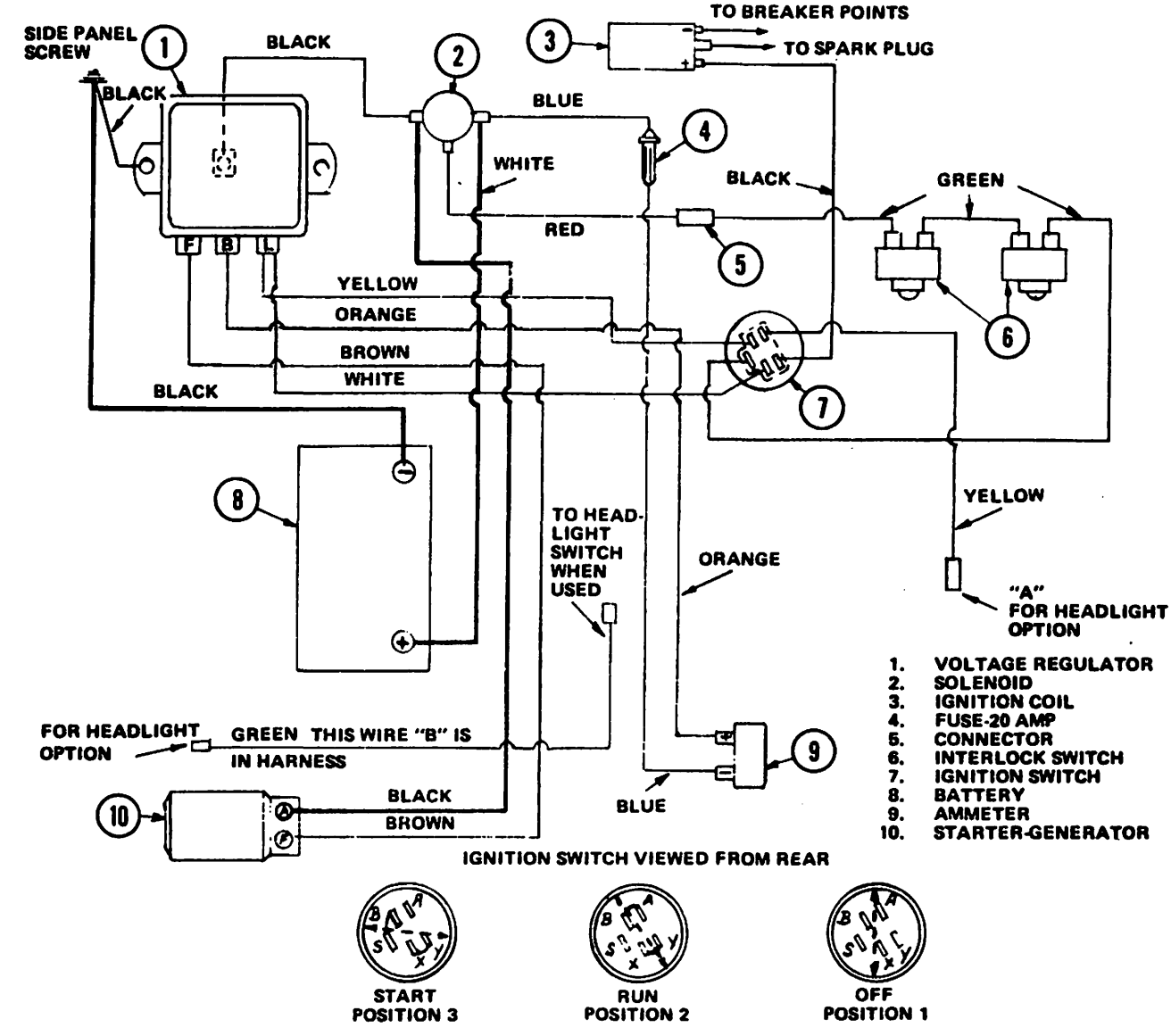
2

WIRING DIAGRAM
1054
BATTERY IGNITION



1. VOLTAGE REGULATOR
2. SOLENOID
3. IGNITION COIL
4. FUSE-20 AMP
5. CONNECTOR
6. INTERLOCK SWITCH
7. IGNITION SWITCH
8. BATTERY
9. AMMETER
10. STARTER-GENERATOR

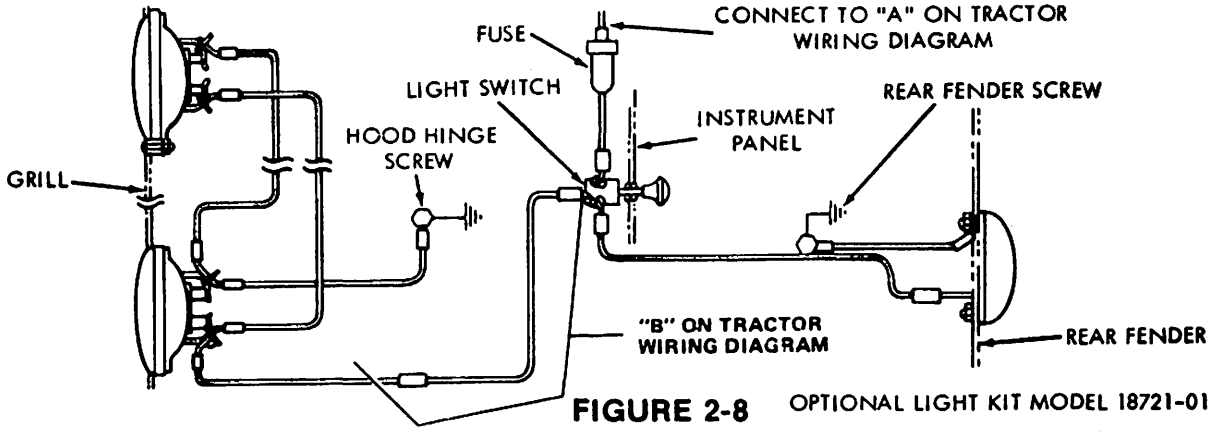


FIGURE 2-8 OPTIONAL LIGHT KIT MODEL 18721-01

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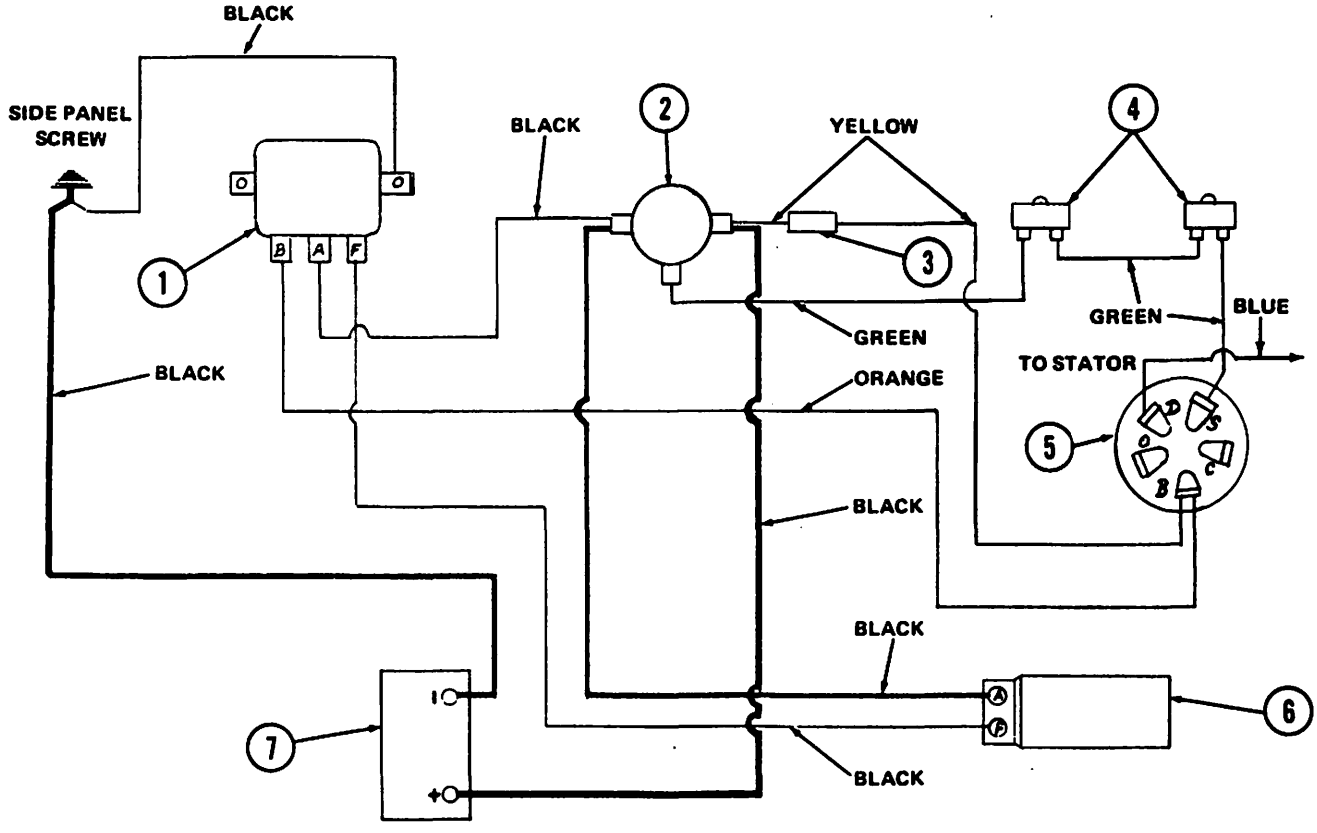
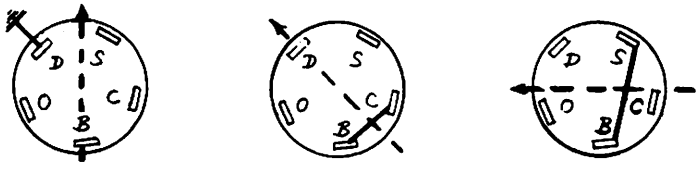
WIRING DIAGRAM
G10 (1055) w/Tecumseh Engine
SOLID STATE IGNITION



REAR VIEW OF IGNITION SWITCH



POSITION NO. 1
OFF

POSITION NO. 2
RUN

POSITION NO. 3
START

1. VOLTAGE REGULATOR
2. SOLENOID
3. FUSE HOLDER - 20 AMP FUSE
4. INTERLOCK SWITCH
5. IGNITION SWITCH
6. STARTER/GENERATOR
7. BATTERY

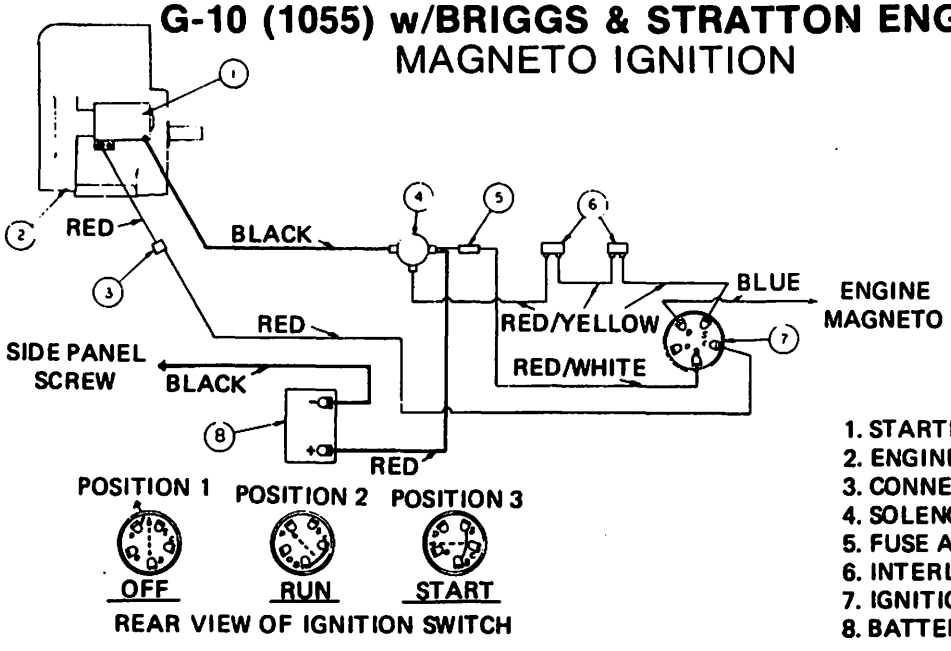
FIGURE 2-9

https://truckmanualshub.com/

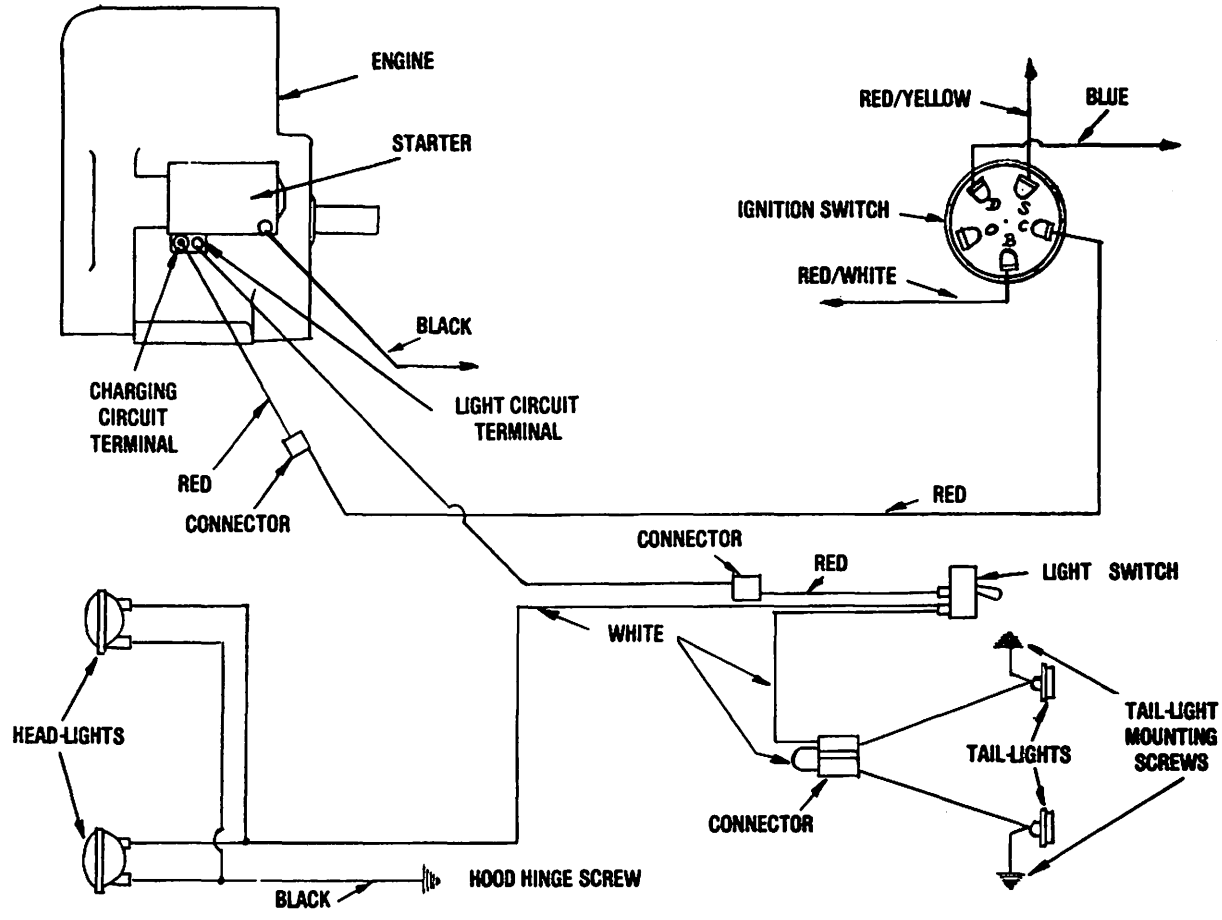
WIRING DIAGRAM

G-10 (1055) w/BRIGGS & STRATTON ENGINE

MAGNETO IGNITION



1. STARTER
2. ENGINE
3. CONNECTOR
4. SOLENOID
5. FUSE AND FUSE HOLDER
6. INTERLOCK SWITCHES
7. IGNITION SWITCH
8. BATTERY



OPTIONAL LIGHT KIT MODEL 18722

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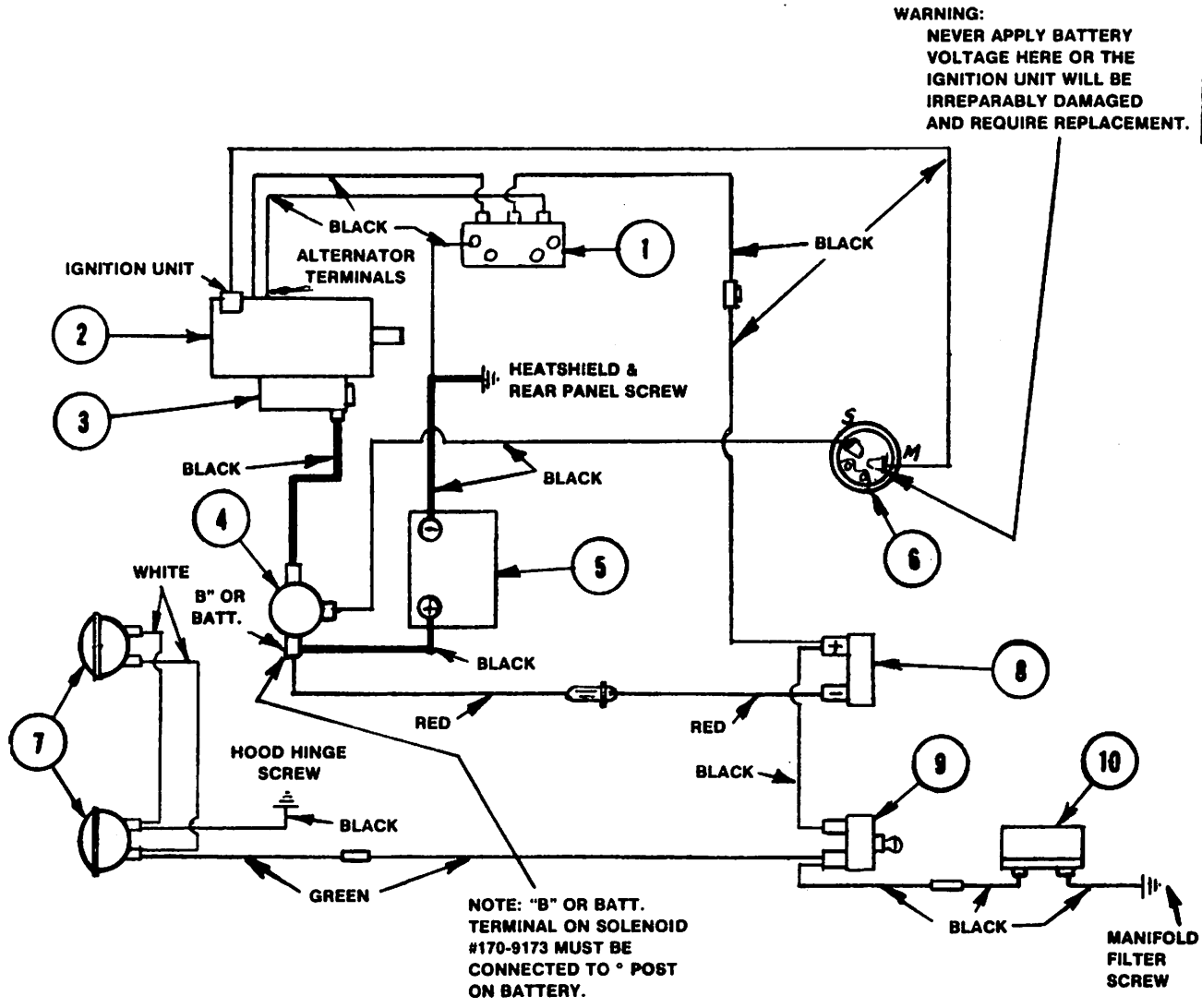
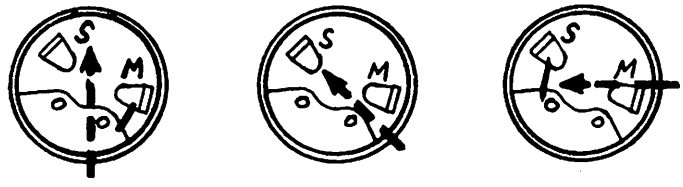
https://truckmanualshub.com/

WIRING DIAGRAM
1220 (193-01)
SOLID STATE IGNITION



REAR VIEW OF IGNITION SWITCH



OFF
POSITION 1

RUN
POSITION 2

START
POSITION 3

1. REGULATOR - RECTIFIER
2. ENGINE
3. STARTER
4. SOLENOID
5. BATTERY
6. IGNITION SWITCH
7. HEAD LIGHTS
8. AMMETER
9. LIGHT SWITCH
10. TAIL LIGHT

FIGURE 2-10

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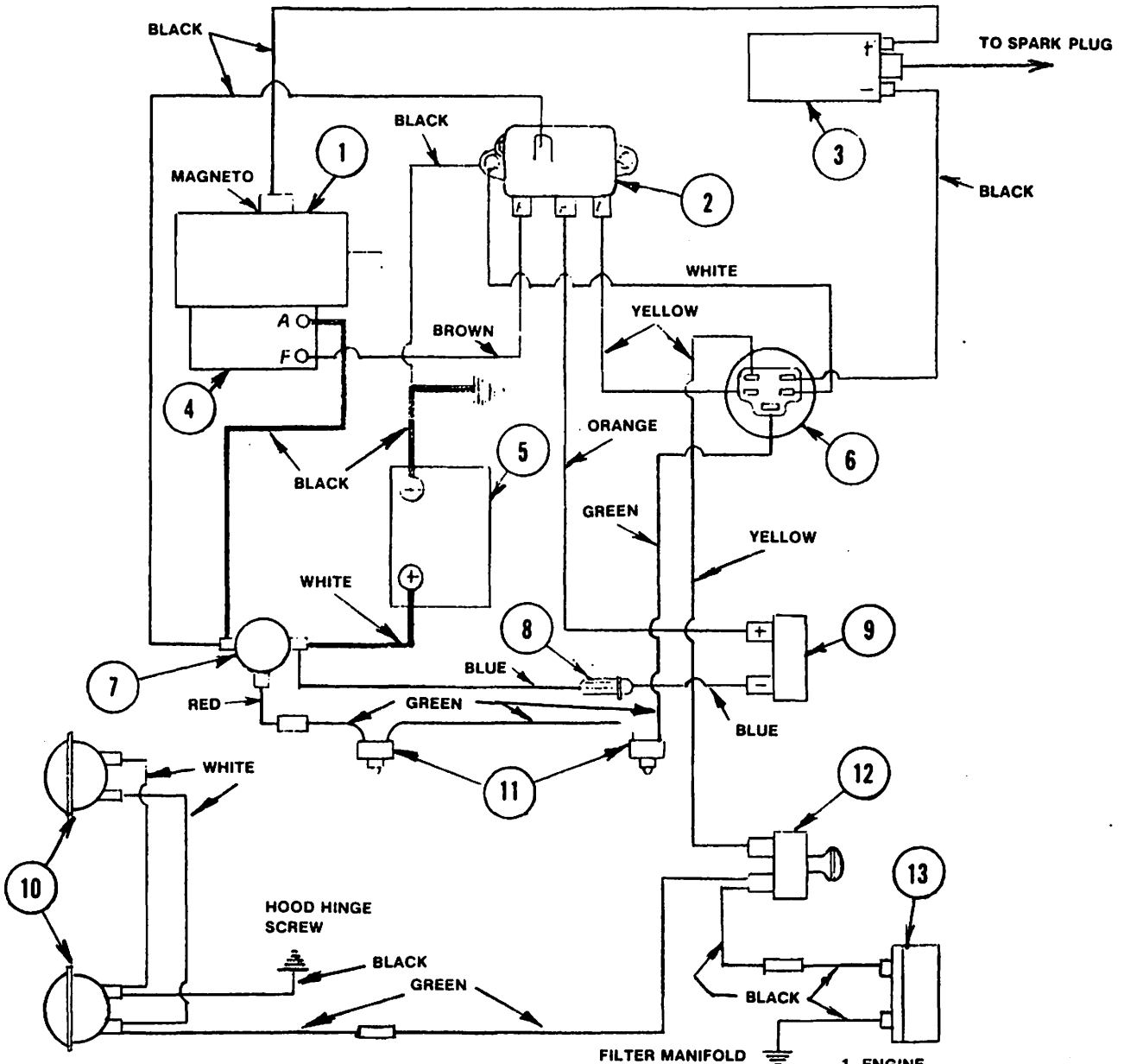
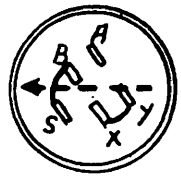
WIRING DIAGRAM
1225 (194-01)
SOLID STATE IGNITION



REAR VIEW OF IGNITION SWITCH

OFF
POSITION 1

RUN
POSITION 2



START
POSITION 3

1. ENGINE
2. VOLTAGE REGULATOR
3. IGNITION COIL
4. STARTER - GENERATOR
5. BATTERY
6. IGNITION SWITCH
7. SOLENOID
8. FUSE HOLDER AND FUSE 20 AMP
9. AMMETER
10. HEAD LIGHTS
11. INTERLOCK SWITCHES
12. LIGHT SWITCH
13. TAIL LIGHT

FIGURE 2-11

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WIRING DIAGRAM
1253
SOLID STATE IGNITION

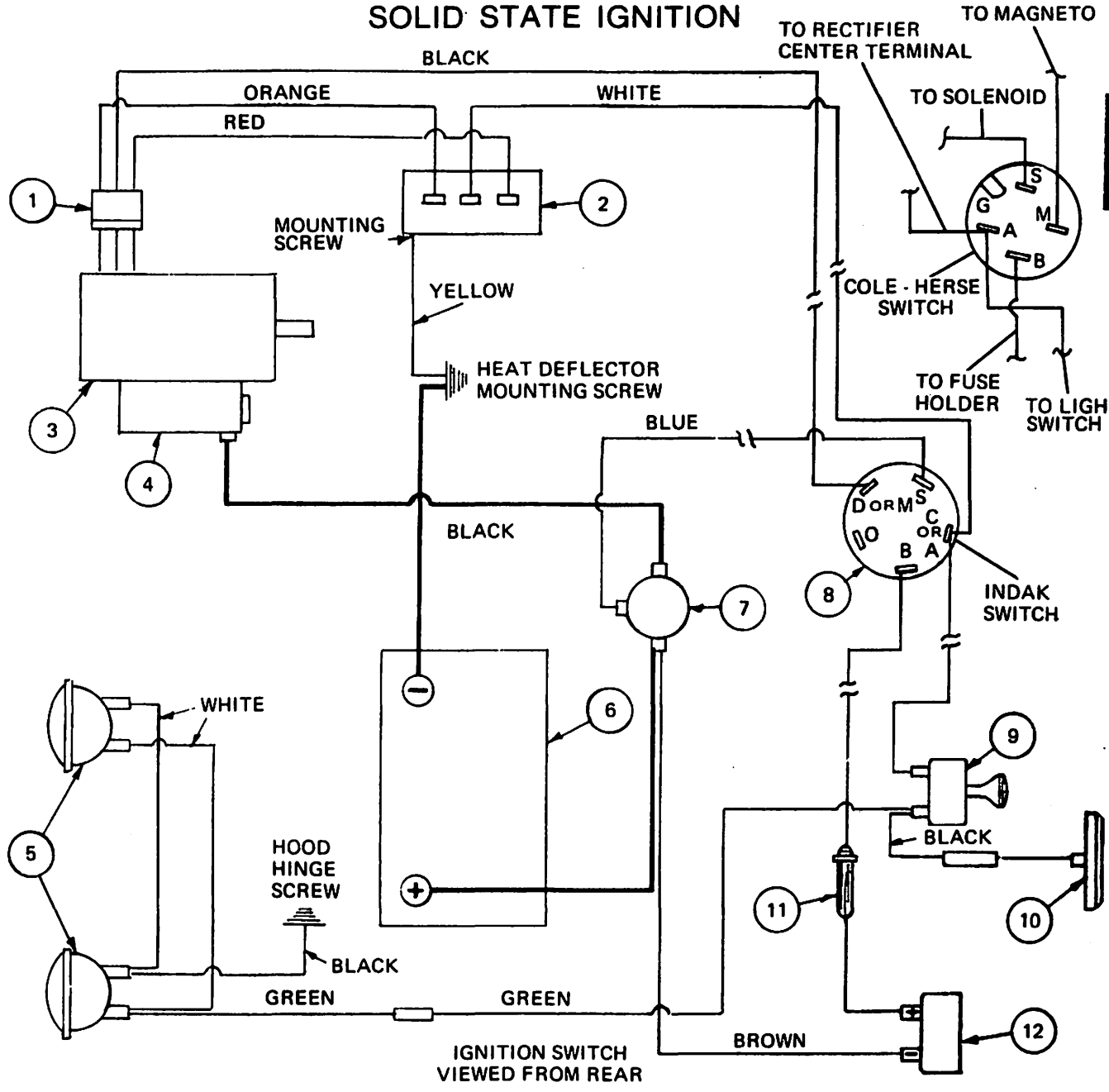

FIGURE 2-12

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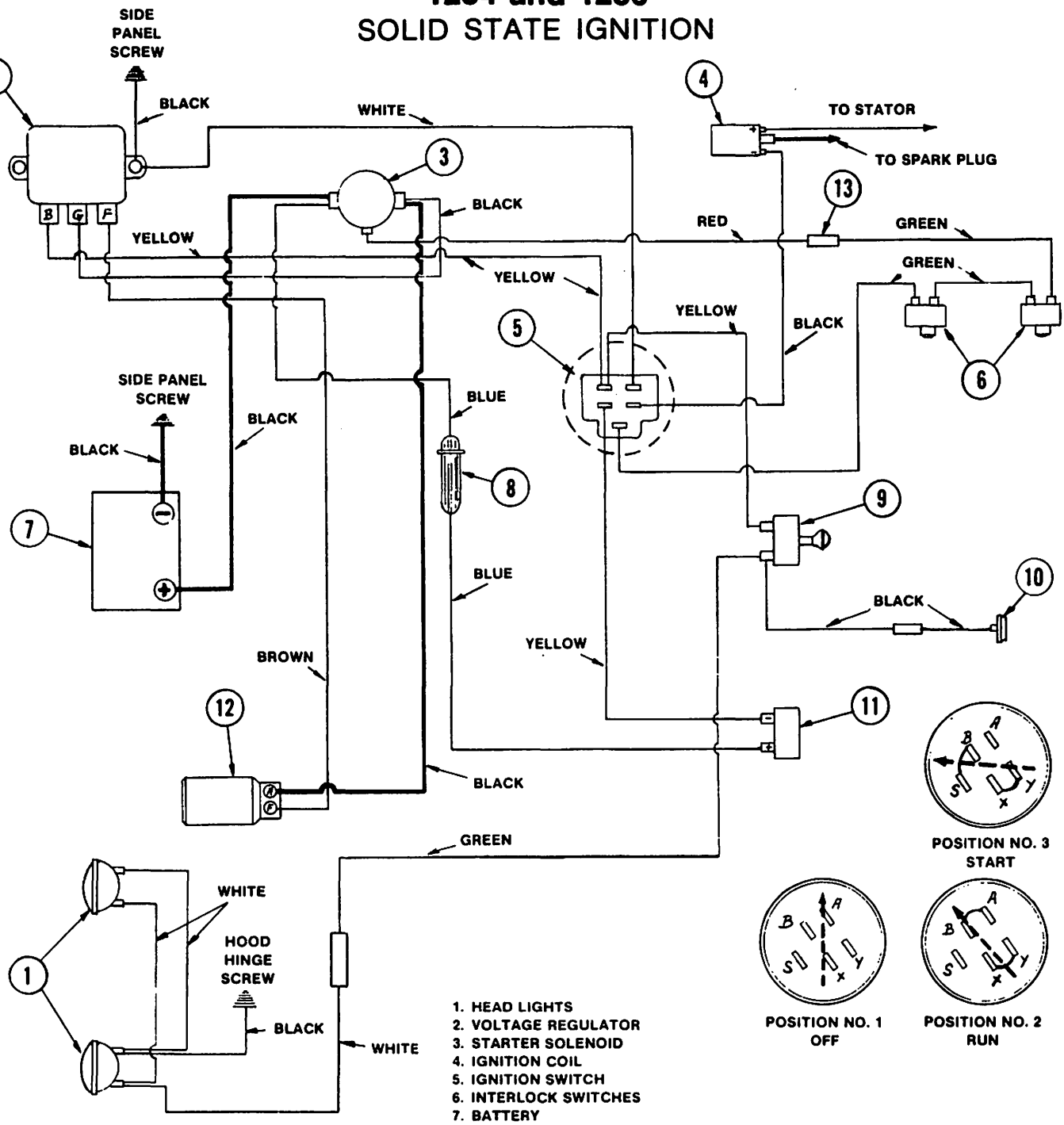
WIRING DIAGRAM
1254 and 1256
SOLID STATE IGNITION



1. HEAD LIGHTS
2. VOLTAGE REGULATOR
3. STARTER SOLENOID
4. IGNITION COIL
5. IGNITION SWITCH
6. INTERLOCK SWITCHES
7. BATTERY
8. FUSE - HOLDER & FUSE - 20 AMPS
9. LIGHT SWITCH
10. TAIL LIGHT
11. AMMETER
12. STARTER - GENERATOR
13. CONNECTOR

FIGURE 2-13

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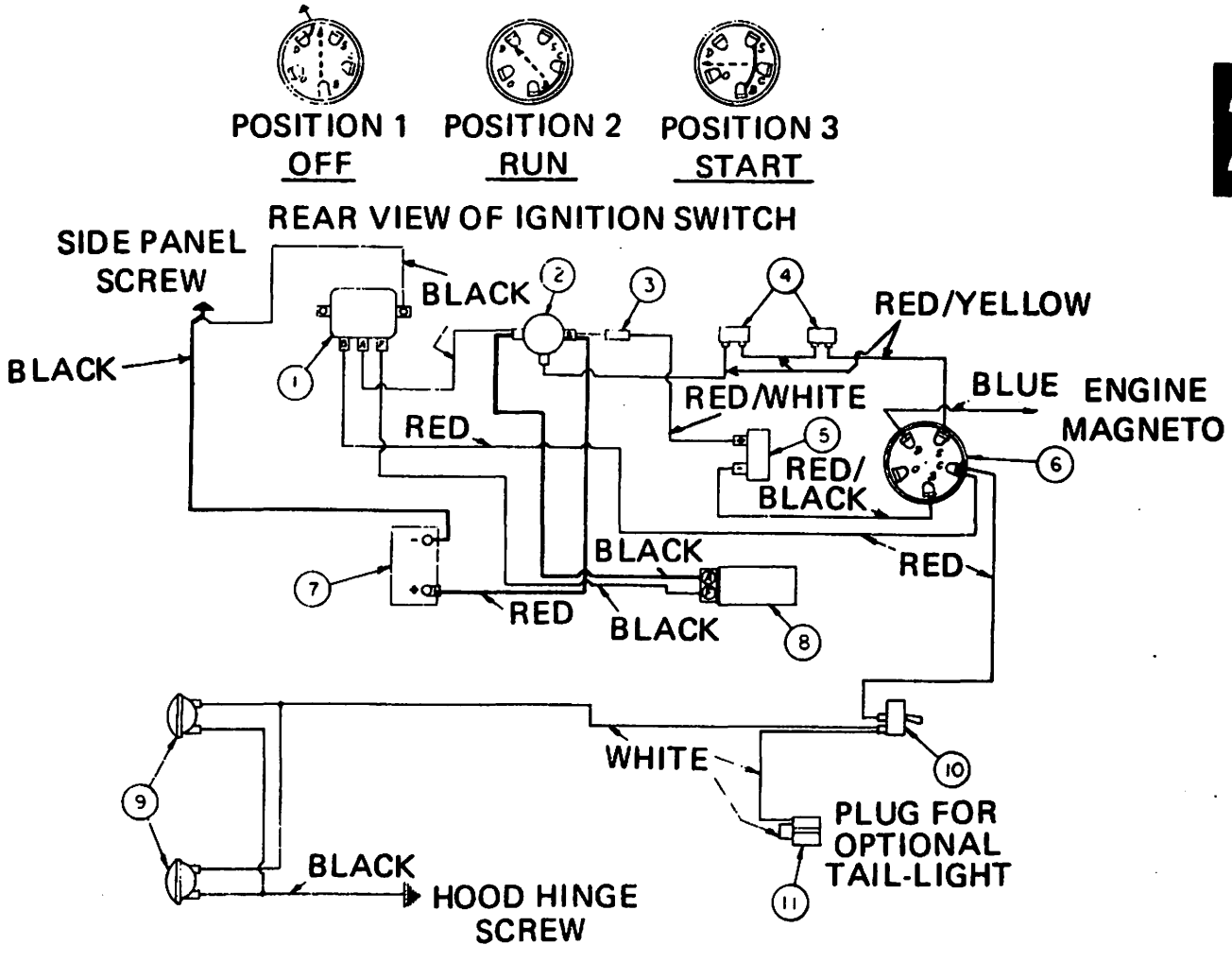
WIRING DIAGRAM
G-12 (1255)
BATTERY IGNITION



1. VOLTAGE REGULATOR
2. SOLENOID
3. FUSE AND FUSE HOLDER
4. INTERLOCK SWITCHES
5. AMMETER
6. IGNITION SWITCH
7. BATTERY
8. STARTER/GENERATOR
9. HEADLIGHTS
10. LIGHT SWITCH
11. CONNECTOR

2

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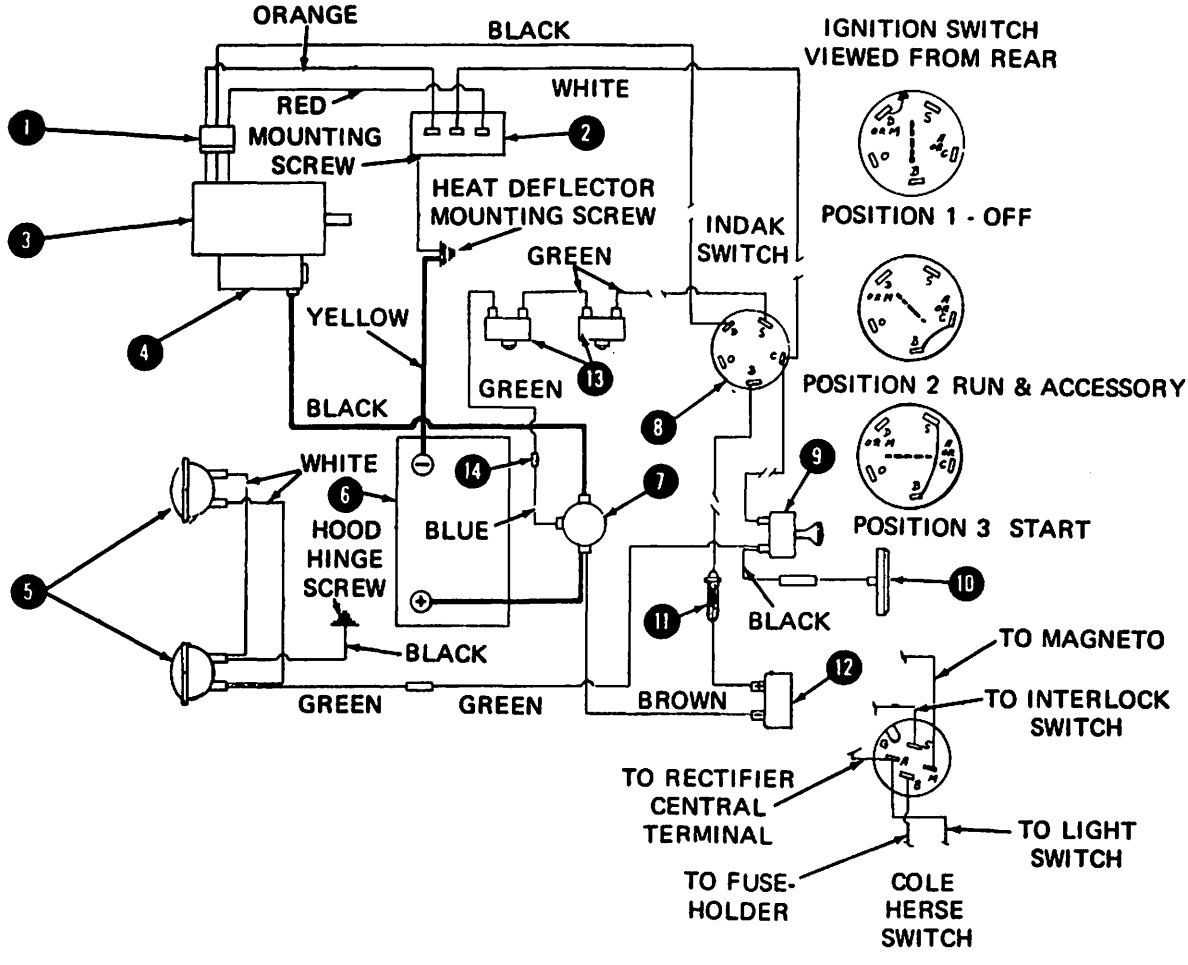
WIRING DIAGRAM
1257
SOLID STATE IGNITION



1. Connector
2. Rectifier-Regulator
3. Engine
4. Starter
5. Head Lights
6. Battery
7. Solenoid
8. Ignition Switch
9. Light Switch
10. Tail Light
11. Fuse-Holder & Fuse - 20 AMP
12. Ammeter
13. Interlock Switches
14. Connector

FIGURE 2-14

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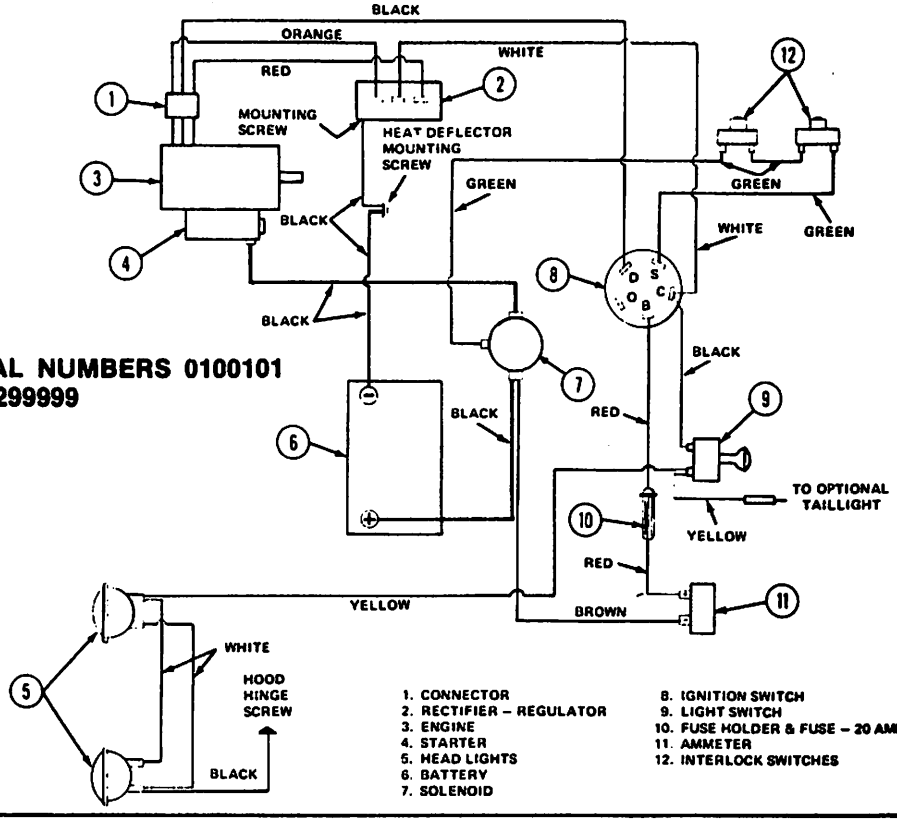
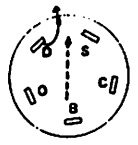
WIRING DIAGRAM
1556 - G14 (1453) - H14 (1456) - H16 (1656)
SOLID STATE IGNITION

SERIAL NUMBERS 0100101 TO 0299999



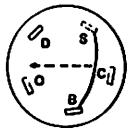
1. CONNECTOR
2. RECTIFIER – REGULATOR
3. ENGINE
4. STARTER
5. HEAD LIGHTS
6. BATTERY
7. SOLENOID
8. IGNITION SWITCH
9. LIGHT SWITCH
10. FUSE HOLDER & FUSE – 20 AMP
11. AMMETER
12. INTERLOCK SWITCHES

IGNITION SWITCH VIEWED FROM REAR



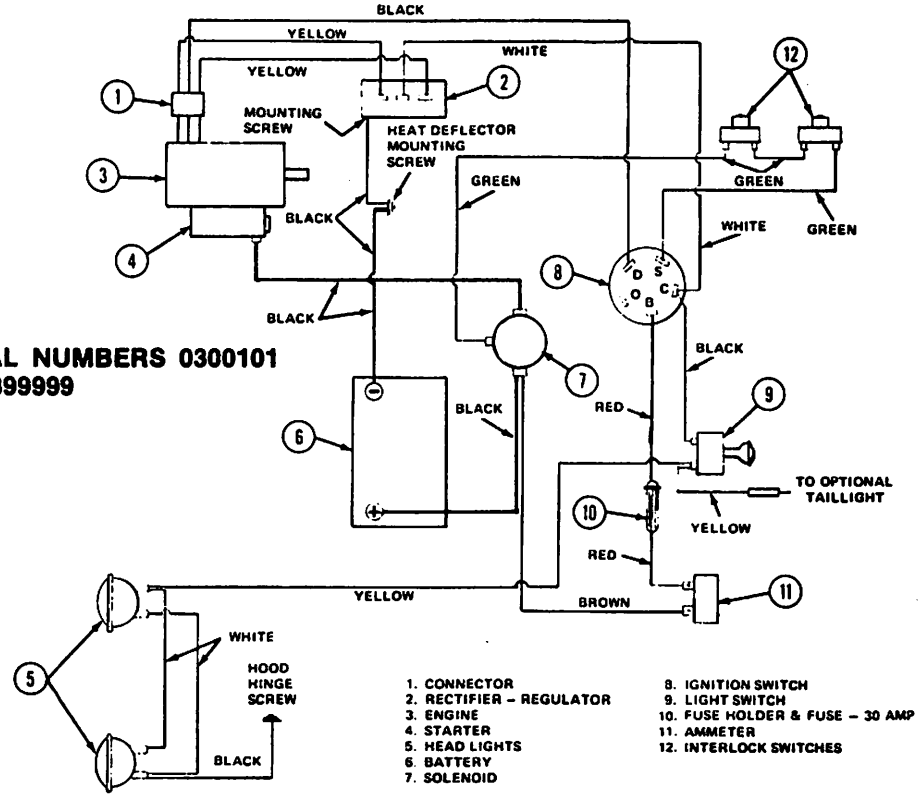
POSITION 1 – OFF

POSITION 2 – RUN & ACCESSORY



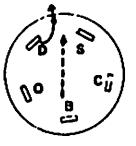
POSITION 3 – START

SERIAL NUMBERS 0300101 TO 0399999



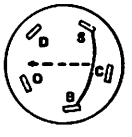
1. CONNECTOR
2. RECTIFIER – REGULATOR
3. ENGINE
4. STARTER
5. HEAD LIGHTS
6. BATTERY
7. SOLENOID
8. IGNITION SWITCH
9. LIGHT SWITCH
10. FUSE HOLDER & FUSE – 30 AMP
11. AMMETER
12. INTERLOCK SWITCHES

IGNITION SWITCH VIEWED FROM REAR



POSITION 1 – OFF

POSITION 2 – RUN & ACCESSORY



POSITION 3 – START

FIGURE 2-15

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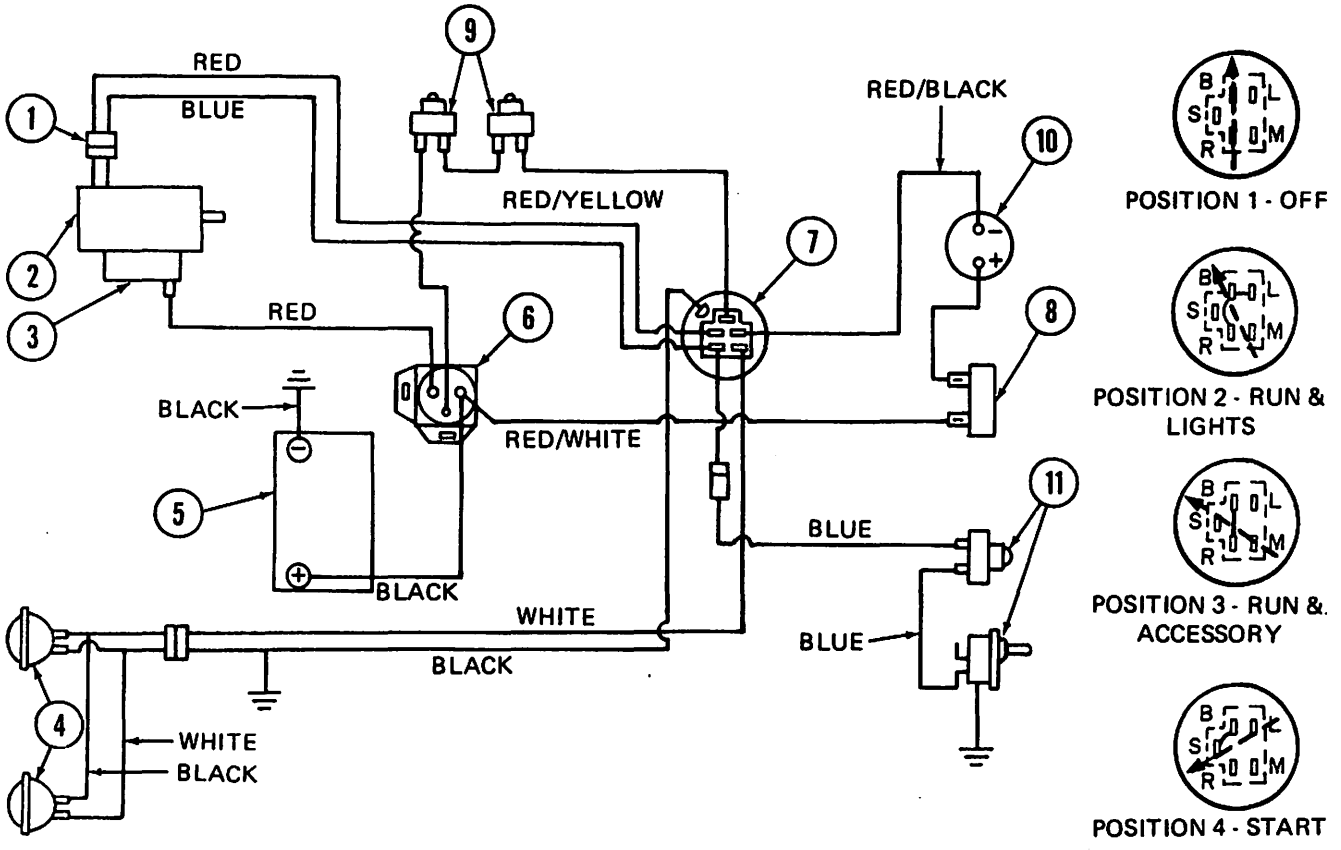
G-14 (1453) SERIAL NUMBERS 0400101 AND UP



1. Connector
2. Engine
3. Starter
4. Headlights
5. Battery
6. Solenoid
7. Ignition Switch
8. Circuit Breaker
9. Interlock Switch
10. Amp Meter
11. Interlock Switch (On 0500101 and Up Only)

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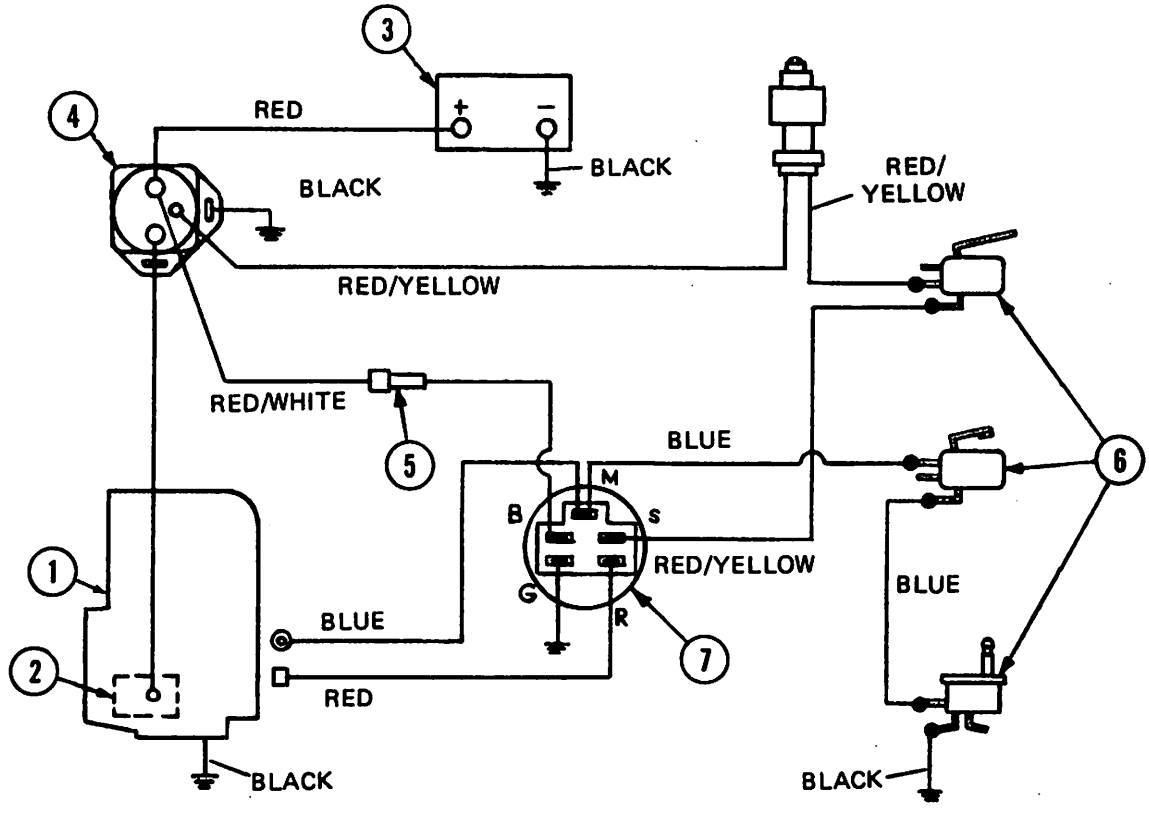
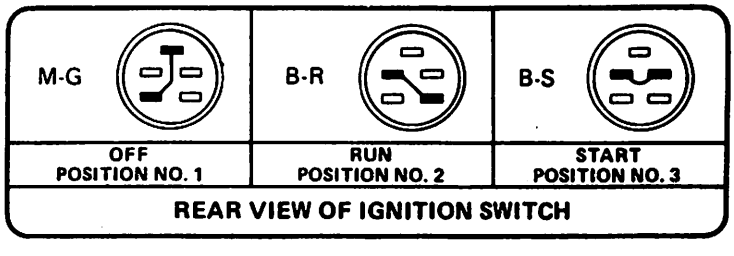
WIRING DIAGRAM

G-11 (1155) w/BRIGGS & STRATTON ENGINE

MAGNETO IGNITION



1. Engine
2. Starter
3. Battery
4. Solenoid
5. FUSE AND FUSE HOLDER
6. INTERLOCK SWITCHES
7. IGNITION SWITCH



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DELCO-REMY GENERATORS USED ON BOLENS TRACTORS

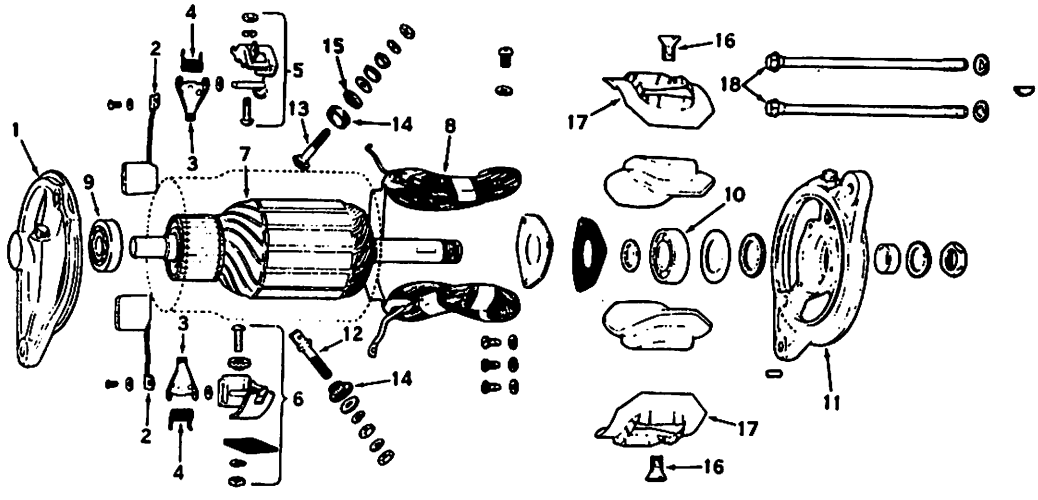

FIGURE 2-16

1. Frame CE
2. Brush
3. Brush Arm
4. Brush Spring
5. Ground Brush Holder (Package)
6. Insulated Brush Holder (Package)
7. Armature
8. Field Coil Assembly
9. Ball Bearing CE
10. Ball Bearing DE
11. Frame DE
12. Terminal Stud "A"
13. Terminal Stud "F"
14. Insulated Terminal Bushing
15. Insulated Stud Washer
16. Pole Shoe Screw
17. Field Coil Insulator
18. Thru Bolt

NOTE: Refer to parts list for FMC Bolens and Delco Remy part numbers.

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TESTING ELECTRICAL SYSTEM

TESTING IGNITION SWITCH

Test the ignition switch for continuity using a volt/ohm meter or continuity light.

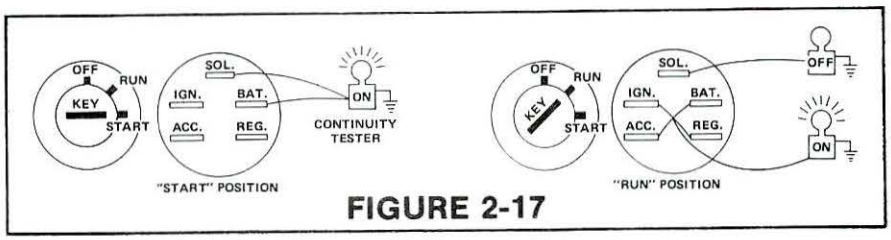

FIGURE 2-17

TESTING SOLENOIDS

To test the solenoid connect the solenoid bracket to the negative battery terminal and a jumper wire from the positive battery terminal to the small solenoid terminal. When contact is made the plunger should be activated. If the above test does not activate the plunger, connect the negative battery terminal to the small solenoid terminal and the jumper from the positive battery terminal to the terminal on the solenoid marked "Bat". If the solenoid plunger is then not activated, replacement of the solenoid is necessary.

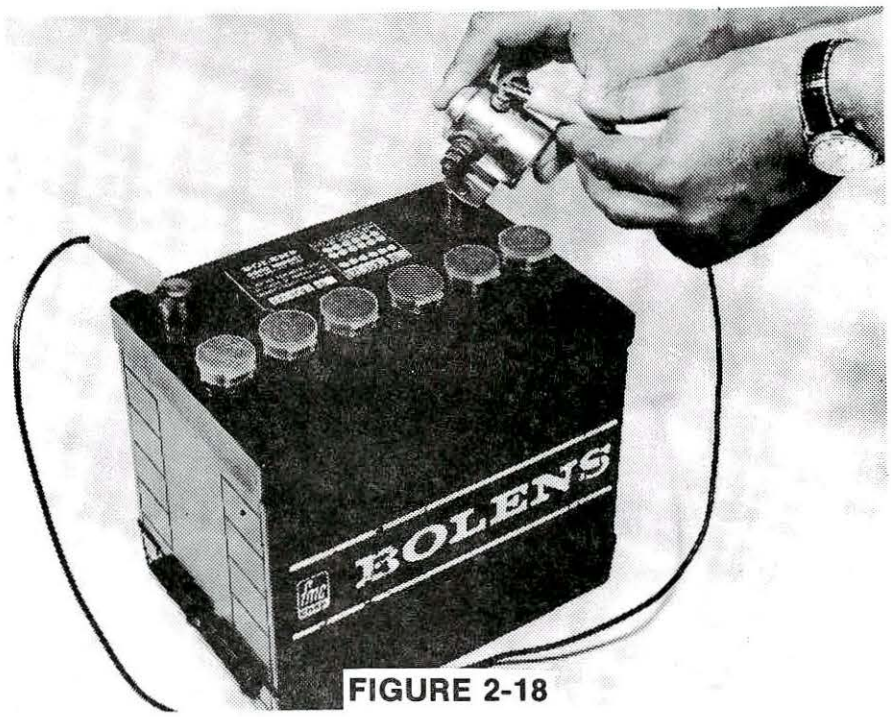

FIGURE 2-18

TESTING SWITCHES

Testing the brake interlock switch and P.T.O. interlock switch.

Before electrical tests of switches are made make sure adjustments have been checked. Switches may be checked in or out of the tractor.

1. Connect the switches in series to a volt-ohm meter or circuit tester.
2. Actuate the switch mechanism.
3. The volt meter or circuit tester should show the opening and closing of the circuit.
4. If the test shows the switches defective replacement is necessary.

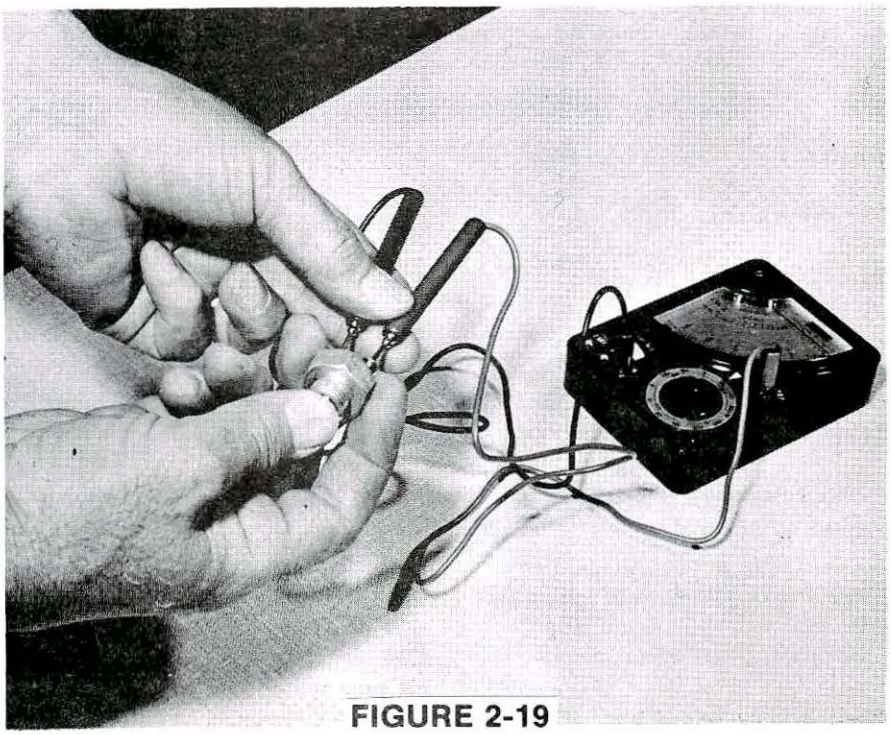

FIGURE 2-19

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TESTING ELECTRICAL SYSTEM

TESTING BATTERY

CHECKING SPECIFIC GRAVITY

To determine whether the battery is capable of meeting the requirements of the starting motor, it is necessary to subject the battery to a load test. The battery must be at least 75% charged for this test. To determine the percentage of charge a hydrometer reading should be taken.
The following table illustrates ranges of specific gravity for each cell in various states of charge at 80° F. A fully charged battery should have a specific gravity reading of 1.250 to 1.280.

SPECIFIC GRAVITY

	PERCENTAGE CHARGED
1.250 TO 1.280	100%
1.230 TO 1.250	75%
1.200 TO 1.220	50%
1.170 TO 1.190	25%
1.140 TO 1.160	10%
1.110 TO 1.130	DISCHARGED

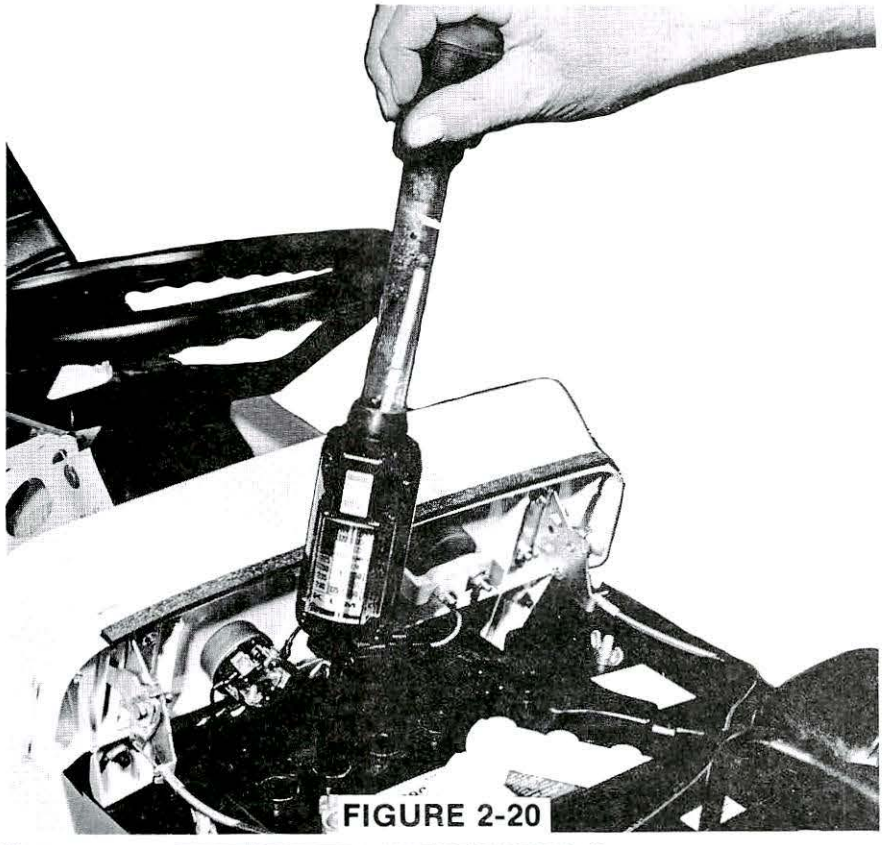
FIGURE 2-20

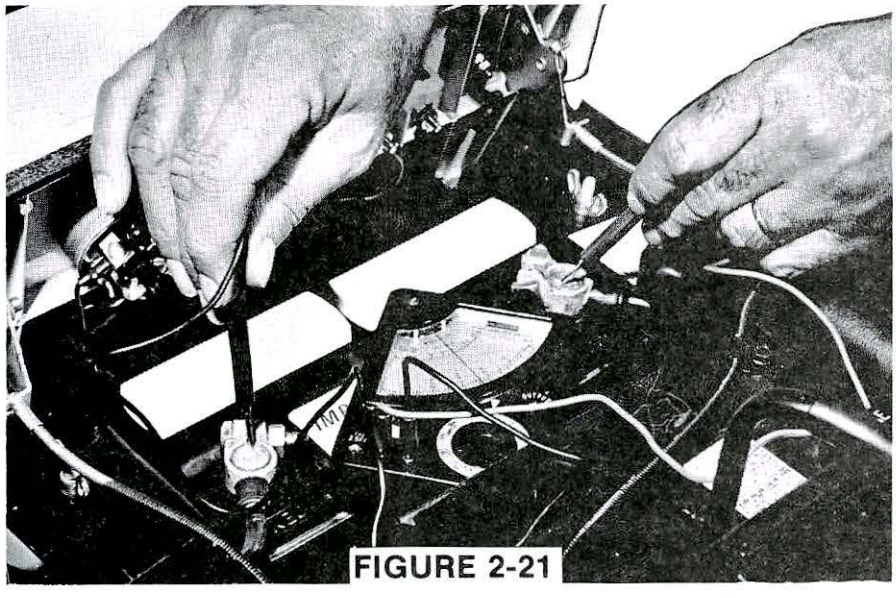
FIGURE 2-21

CHECKING BATTERY VOLTAGE

When a battery is in good condition each cell contributes approximately 1.95 to 2.08 volts. Battery voltage can be checked with a volt-ohm meter and should be between 11.5 and 12.5 volts.

CHECKING BATTERY CAPACITY

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

1. Check battery electrolyte level, add water if necessary. If water is added, charge battery.
2. Check battery voltage. It should be between 11.5 and 12.5 volts.
3. 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.
4. If voltage is less than 9.0 volts the battery may have to be replaced.

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TROUBLE SHOOTING GUIDE

PROBLEM	PROBABLE CAUSE	REMEDY
No forward or reverse with engine running	1. Broken drive belt(s)	1. Replace belt(s)
	2. Drive belt(s) off engine or transmission drive line	2. Reinstall belt(s) - replace belt(s) if badly worn - check belt guides
	3. Drive idler spring broken	3. Replace spring
(gear models)	4. Free wheeling pin out of axle hub	4. Reinstall pin and secure with spring cotter
	5. Transmission not functioning	5. Repair transmission
	6. Clutch worn or broken	6. Repair clutch assembly
(hydro models)	7. Drive idler locked out	7. Unhook from frame
	8. System low on oil	8. Refill to proper level
	9. Plugged oil filter	9. Replace filter
	10. Control linkage	10. Check linkage, correct problem
	11. Hydro input shaft not running	11. Check input shaft key, replace if necessary
	12. Hydro unit not functioning	12. Replace hydro package
Loss of power (hydro models)	1. Filter or suction line clogged	1. Replace filter, clean and refill system
	2. Worn linkage	2. Replace or adjust
	3. Air in system	3. Refill and check for leaks
	4. Engine lugs down	4. Check engine for proper power level
Unit operating hot (hydro models)	1. Oil level low	1. Check for leaks and refill to proper level
	2. Dirt on transmission	2. Clean external surface
	3. Excessive load or high drawbar loading	3. Reduce load
	4. Partially plugged filter	4. Replace filter and oil
	5. Internal damage to hydro	5. Replace hydro
Brake does not function properly	1. Brake pucks or shoes worn.	1. Replace brake pucks or shoes
	2. Brake out of adjustment	2. Tighten brake adjusting nut as required

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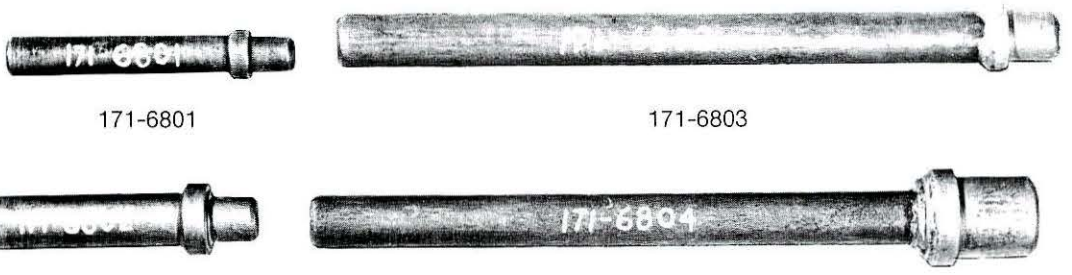
TRANSMISSION TOOLS
BEARING INSTALLATION

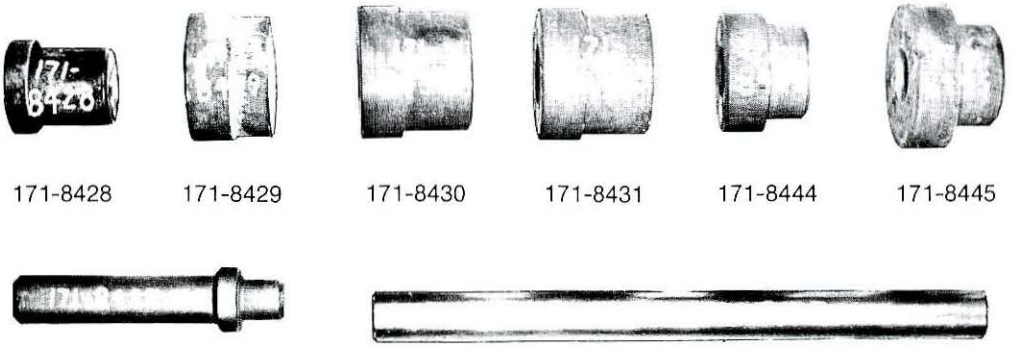


171-6801 171-6803

171-6802 171-6804

FIGURE 3-1

171-6801 - Driver for 118-5165 Needle Bearing - 3 & 6 Speed Transaxle Worm Shaft 1/2" I.D.
171-6802 - Driver for 118-5074 Needle Bearing - 6 Speed Transaxle Cluster Gear 5/8" I.D.
171-6803 - Driver for 118-5280 & 118-5010 Needle Bearing - 3 Speed Cluster Gear Bearings 3/4" I.D.
171-6804 - Driver for 118-5635 & 118-5645 Needle Bearing - 6 Speed Rear Input Shaft & Right Rear Axle 1-1/8" I.D.



171-8428 171-8429 171-8430 171-8431 171-8444 171-8445

171-8427 171-9127 Adaptor Handle for above Tools except #171-8427

FIGURE 3-2

171-8427 - Driver for 118-5113 Bronze Bearing - 3 & 6 Speed Reverse Idler Gear
171-8428 - Driver for 118-5300 Bronze Bearing - 3 Speed Right Axle Shaft
171-8429 - Driver for 118-5646 Bronze Bearing - 3 Speed Left Wheel Hub
171-8430 - Driver for 171-4571 Bronze Bearing - 3 Speed Left Hub Bearing
171-8431 - Driver for 118-5644 Bronze Bearing - 6 Speed Left Wheel Hub
171-8444 - Driver for 118-5276 Timken Bearing Cup
171-8445 - Driver for 118-5202 Timken Bearing Cup & Welch Plug Installation
171-9127 - Adaptor Handle

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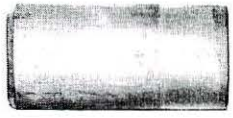
TRANSMISSION TOOLS
OIL SEAL

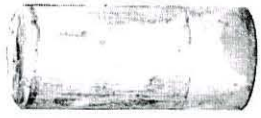
171-8432
Sleeve

171-8434
Sleeve



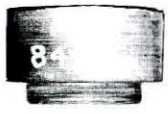
171-8435
Driver

171-8436
Sleeve

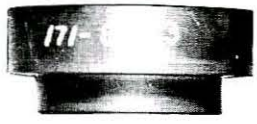


171-8437
Driver

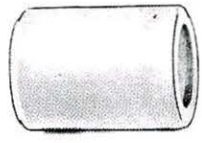
171-8433
Driver



171-8440
Driver



171-8443
Driver

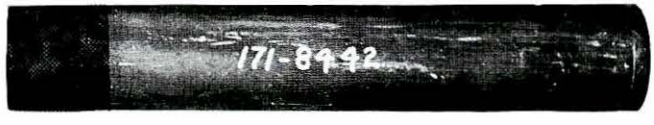


172-7578
Driver

171-8438
Sleeve

171-8439 Driver
NOTE: can also be used to install Right
Hand Axle Bushing for Axle #172-0256

171-8441
Sleeve



171-8442
Driver

FIGURE 3-3

171-8432
171-8433 - Sleeve and Driver for 189-1820 Seal - 3 & 6 Speed Worm Shaft

171-8434
171-8435 - Sleeve and Driver for 118-5352 - 3 Speed Input Shaft

171-8436
171-8437 - Sleeve and Driver for 118-5633 - 6 Speed Input Shaft

171-8438
171-8439 - Sleeve and Driver for 118-5205 Seal - 3 Speede Axle Shaft
Note: Driver 171-8439 can also be used to install Right Hand axle bushing for axle #172-0256

171-8440 - Adapter Driver with 171-8439 Driver for 118-5426 Seal - 3 Speed Limited Slip Oil Seal

171-8441
171-8442 - Sleeve and Driver for 118-5642 Seal - 6 Speed Axle Shaft and Hydro Axle

171-8442 - Adaptor Driver with 171-8442 Driver for 118-5643 Seal - 6 Speed Limited Slip Oil Seal

172-7578 - Driver for 118-5882 Seal - Hydro Transaxle Disc Brake Shaft

3

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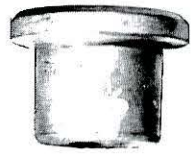
TRANSMISSION TOOLS

WORM CENTERING KIT NO. 171-9432



171-8446
Retainer Bore Pilot

171-8447
Retainer Bore Pilot

171-8449
Taper Plug

112-0210
Roll Pin

171-8448
Shaft

FIGURE 3-4

https://truckmanualshub.com/

BEARING INSTALLATION

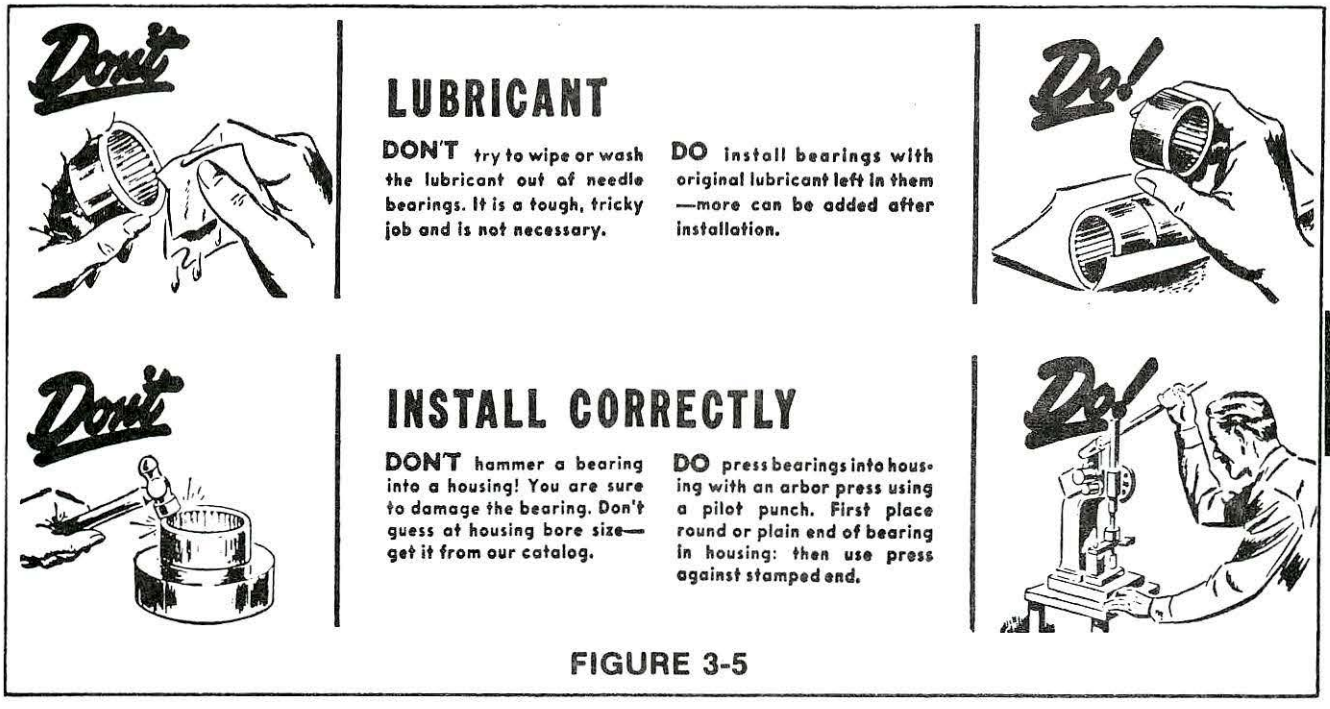


FIGURE 3-5

1. Use an arbor press, as illustrated, or a similar method where possible.
2. The punch should have a pilot, as shown, to keep the Bearing in line.
3. Place the stamped end of the Bearing against the shoulder of the punch, because the unstamped end of the Bearing will lead best into the housing bore.
4. Leave the grease on the outside of Bearing. Do not wipe them. Keep the Bearings clean.

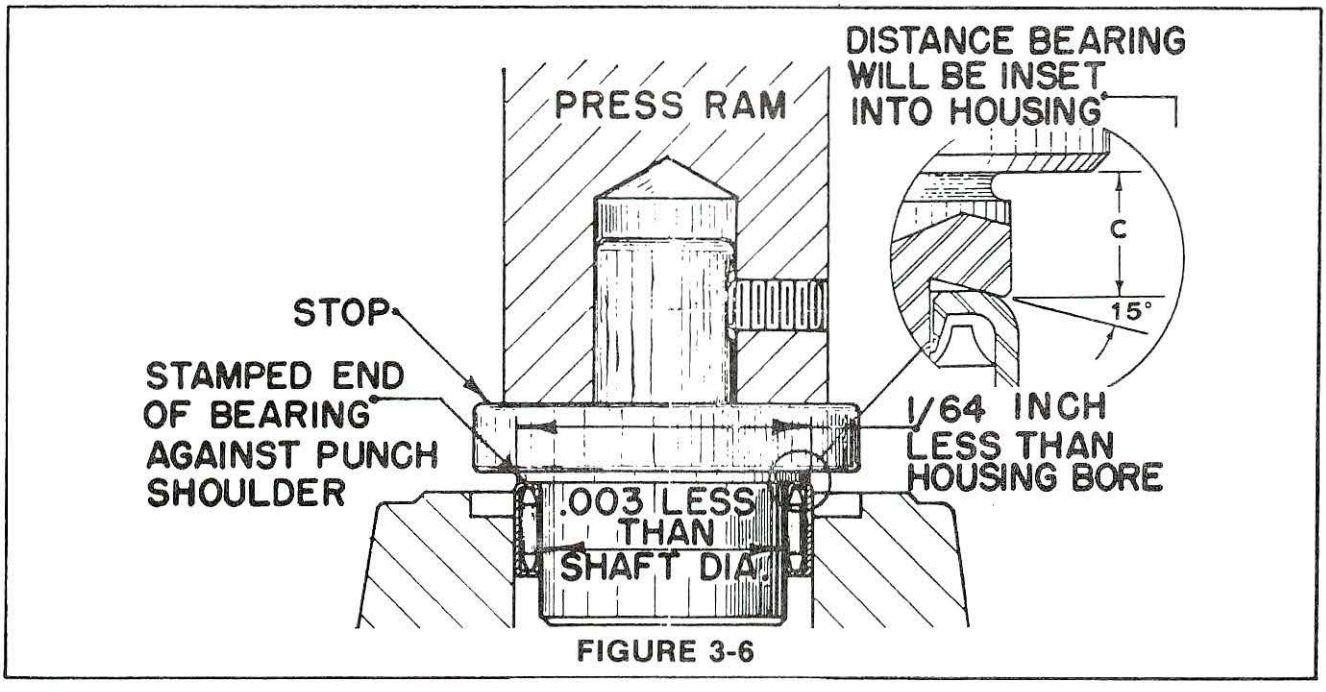


FIGURE 3-6

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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 lip(s) 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 pressfit in housing bore. Extreme care must be taken to avoid depositing any compound on the sealing number.

6. Install seal with lip facing medium to be sealed. (The reverse is used only when it becomes more important to exclude a medium than to retain it.)

7. When possible, chamfer end of shaft over which seal must pass; otherwise use a sleeve as illustrated in Fig. 1 or Fig. 2.

8. Press seal into housing with smooth uniform pressure applied by means of a pressfitting tool. See Figure 3. If shaft is already in place, use a sleeve-type pressfitting tool.

9. Whenever possible, use an arbor press to insert seal into housing. Be sure seal is not cocked when applying pressure. It is desirable to seat seal against a shoulder in the bore to help prevent cocking.

10. When 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 must be used made to the dimensions shown in Figure 1. When seal must pass splines, keyways or holes, use a sleeve as shown in Figure 2. If the use of an assembly sleeve is not possible, the edges of of the spline, keyway or holes should be rounded and lubricated with a heavy grease.

11. In cases where the completed machine is painted where seal is exposed, mask area to prevent paint being deposited on shaft and sealing lip. If paint is baked on, be sure temperature does not exceed operating temperature of seal to avoid injury to the sealing member.

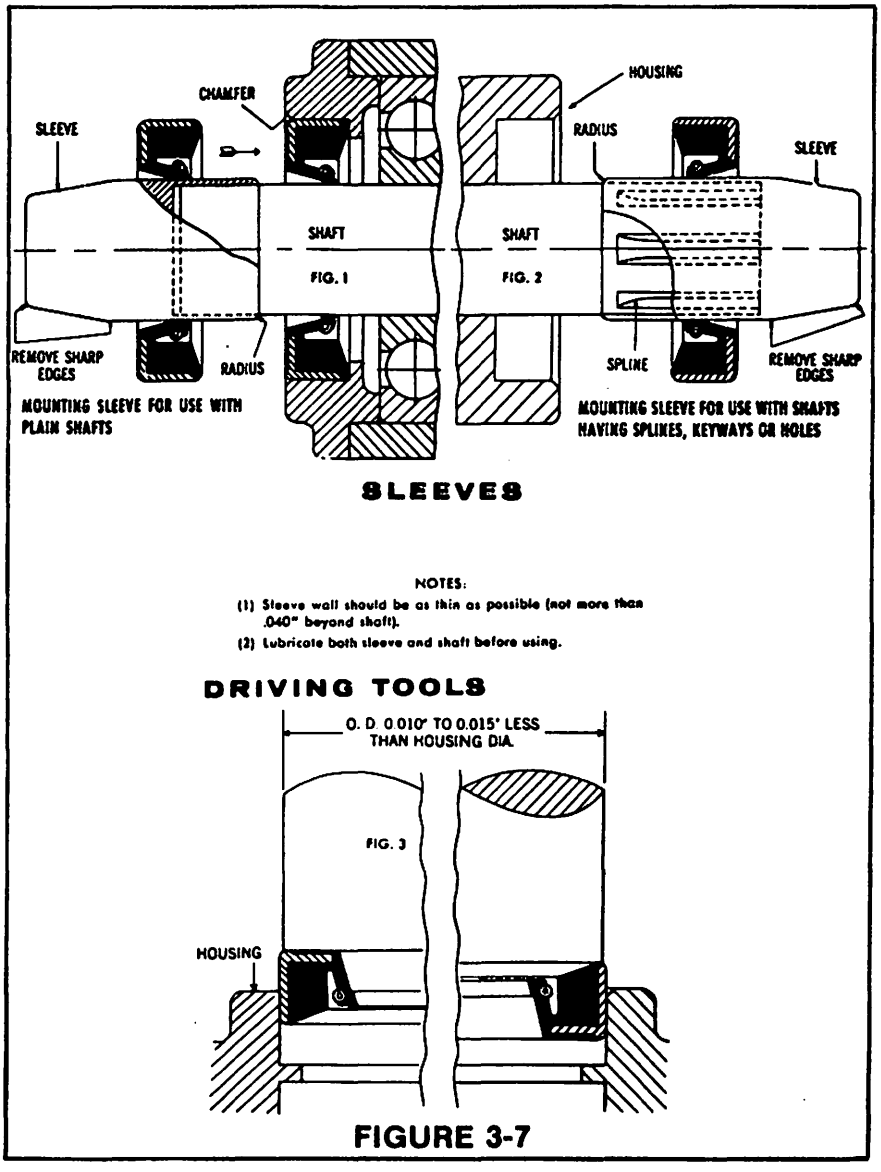

FIGURE 3-7

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TRANSMISSION ASSEMBLY (3 SPEED)
EXPLODED VIEW

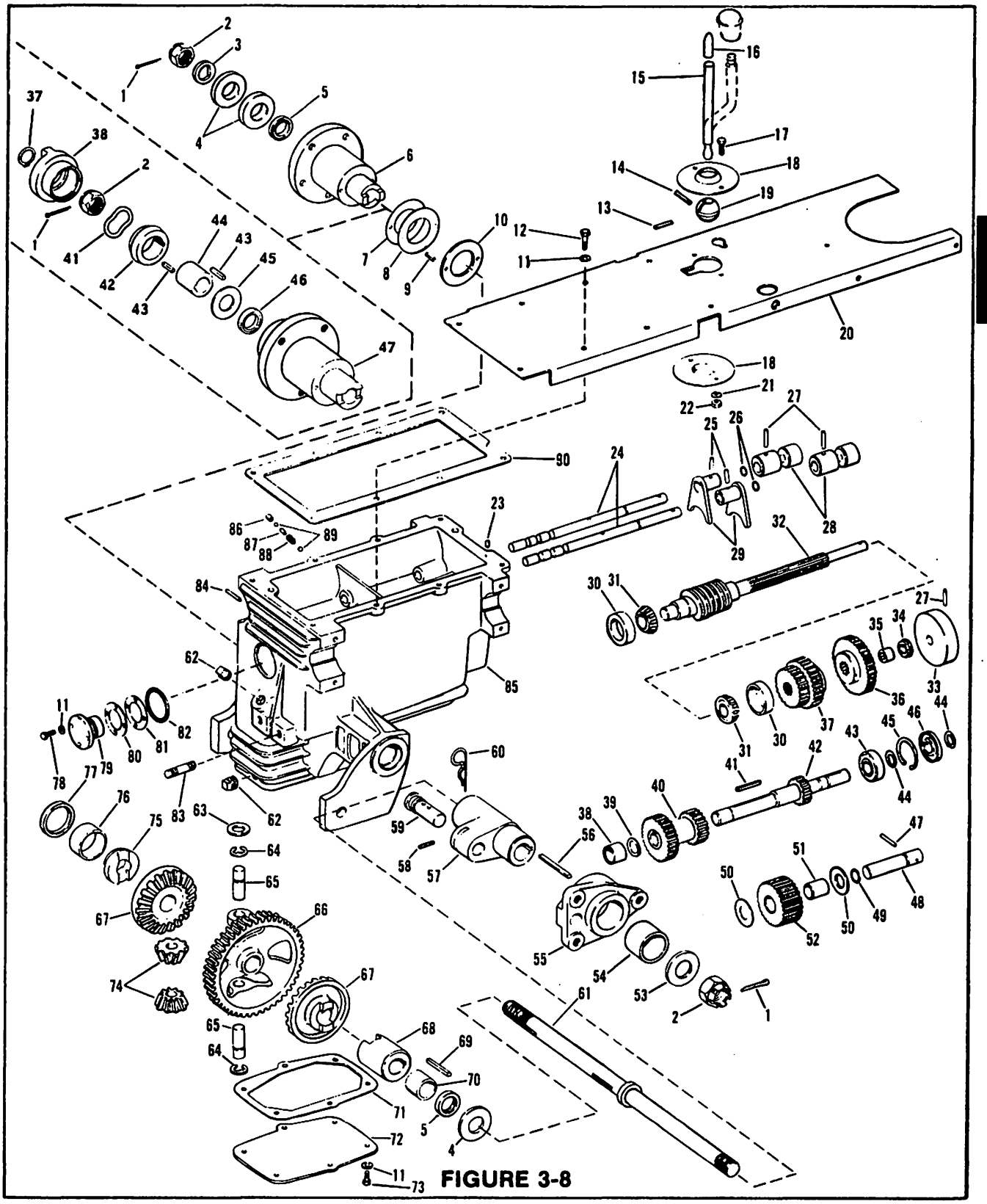

FIGURE 3-8

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TRANSMISSION ASSEMBLY PROCEDURE
(3 SPEED)

1. **REVERSE IDLER:** Liberally grease, then install O-Ring (1) into groove on Shaft (2). Insert Bronze Bearing (3) into Idler Gear (4). Position Idler Gear (4) (CHAMFERED TOOTH SECTION TOWARD FRONT) with a Thrust Washer (5) on each side, into cavity of Gear Case. Insert end of Shaft (2) through outer bore of Gear Case. Slide Shaft through Idler Gear (4) and into rear bore. Index exposed cross hole in Shaft (2) with pin hole in front end boss of Gear Case. Install Roll Pin (6).

2. **INPUT SHAFT:** Install Needle Bearing (7) into rear bore of Gear Case. Position Cluster Gear(8) into cavity of Gear Case. Install Key (9) into keyway on Input Shaft (10) and insert long end of Shaft through front bore of Gear Case, through Cluster Gear. Position complete assembly, so that Retaining Ring (11) may be installed to Shaft. Install Ball Bearing (12) over Shaft and into front bore of Gear Case. Install Retaining Ring (13), Retaining Ring (14), Oil Seal (15) and Retaining Ring (16) in that order.

3. **AXLE SHAFT:** Install Timken Bearing Cup (17) into Gear Case divider wall (THIS STEP IS MORE DIFFICULT AFTER WORM WHEEL HAS BEEN INSTALLED). Install Bronze Bearing (18) into **left hand** Axle casting bore. Slide left hand end of Axle Shaft (19) through **right hand** Axle bore (ONLY PARTIALLY INTO CASE). Assemble differential with Bevel Pinions (20), Pinion Shafts (21), Worm Wheel (22), Washer (23) and Retaining Rings (24). Insert Drive Hub (25), Bevel Gear (26), Differential Assembly (22), Bevel Gear (27) and Coupling (28) into rear Gear Case cavity while threading Axle through the Assemblies to the left hand Bronze Bearing. Install Key (29) to Axle keyway and continue to slide Axle to the left to approximate fianl position. Slide Oil Seal (30) over Axle and install in **Left Hand** Axle bore. Install Oil Seal (31) into Axle bore.

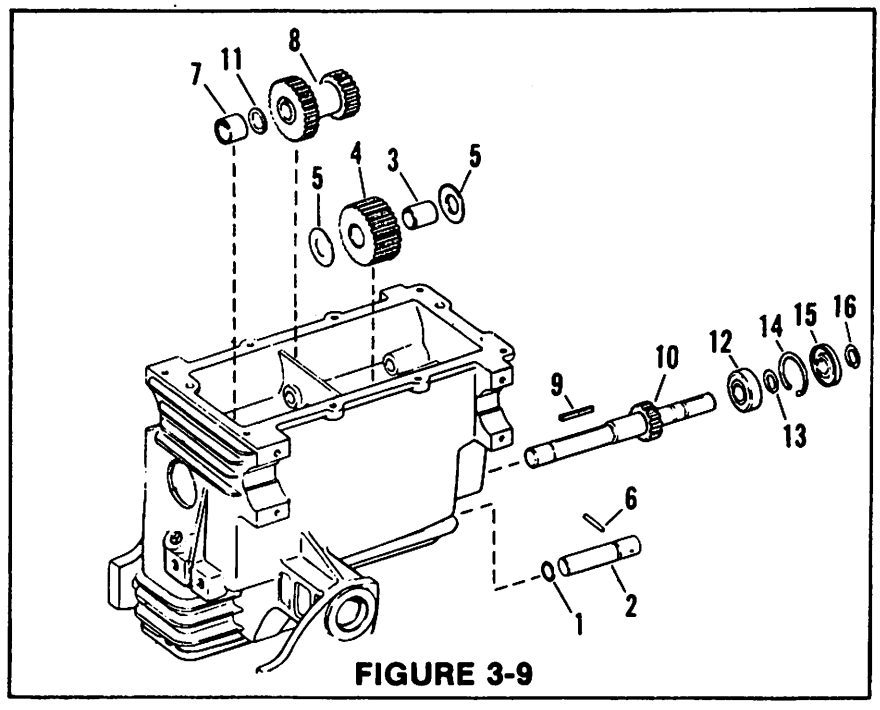

FIGURE 3-9

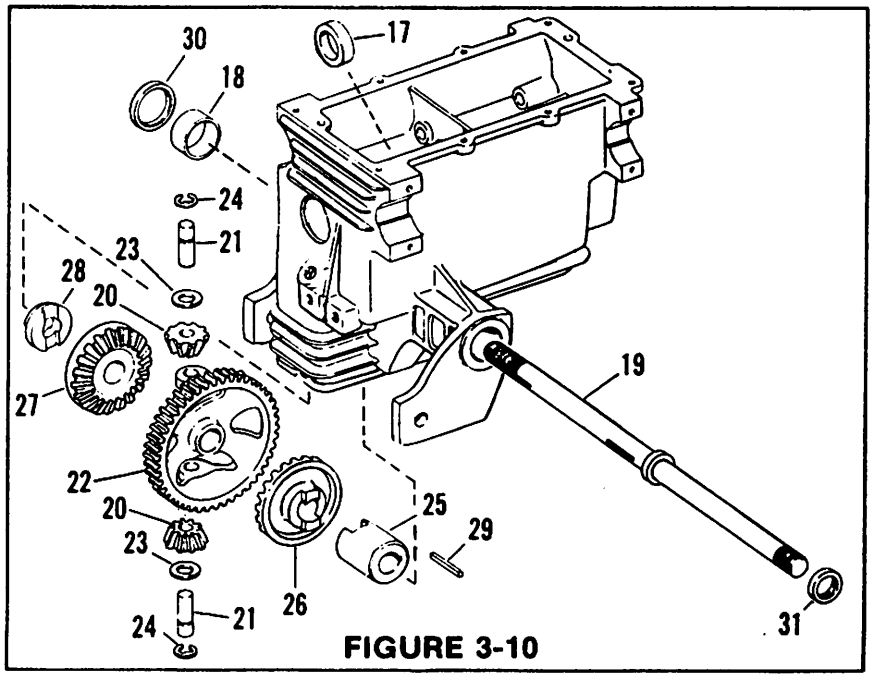

FIGURE 3-10

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TRANSMISSION ASSEMBLY PROCEDURE
(3 SPEED)

4. **WORMSHAFT:** Insert splined end of Worm Shaft (32) through Bearing bore. Slip Roller Bearing Cone (33) over front end of Shaft (after Shaft tip has cleared Worm Wheel) Then push Worm Shaft through Gear Case Divider Wall. As Splined end of Worm Shaft protrudes into Transmission section of Gear Case install Sliding Gears (34 & 35) onto splined section of Worm Shaft. Continue to move Worm Shaft forward until tapered Roller Bearing (33) seats in Cup (PREVIOUSLY INSTALLED). Slide Bearing Cone (36) over Shaft and Seat in Rear Gear Case bore. Install Bearing Cup (37). Slide Needle Bearing (38) over Shaft and insert into Front bore of Gear Case. Insert Bearing Cap (39) into rear bore (WITH FIRM PRESSURE ON BACK SIDE OF BEARING CAP ROTATE WORM SHAFT ASSEMBLY IN BOTH DIRECTIONS TO ALIGN TAPER ROLLERS). Then with feeler gauge, measure the developed gap between the cap and machined surface of Gear Case at the bolt circle area. NOTE: ADD SUFFICIENT SHIMS TO THE FEELER GAUGE READING TO PROVIDE BETWEEN .004 AND .008 WORM SHAFT END-PLAY.

   Install the required Shims (46) and O-Ring (47). (LIBERALLY GREASE O-RING). Then insert Bearing Cap Assembly and tighten the three Cap Screws (42) with Lockwashers (43) evenly. Install Oil Seal (44). Install Brake Drum (45) to Shaft with Pin (46).

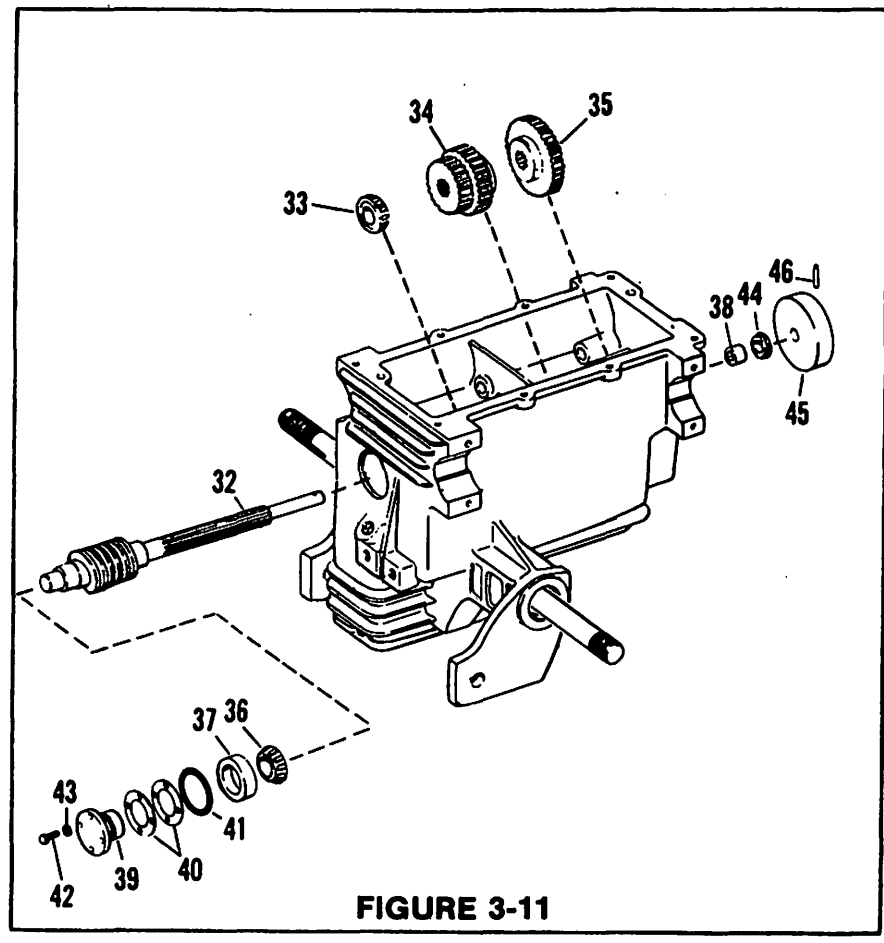

FIGURE 3-11

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TRANSMISSION ASSEMBLY PROCEDURE
(3 SPEED)

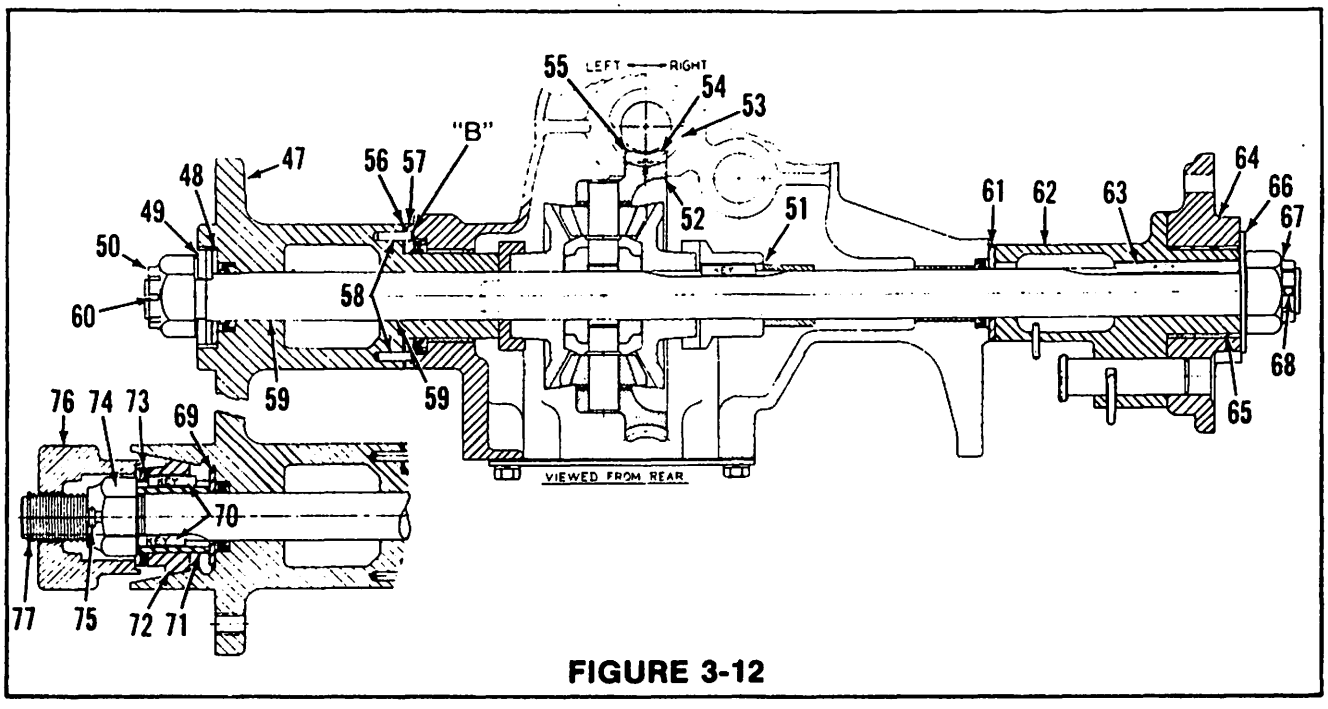

FIGURE 3-12

5. **WORM WHEEL CENTERING:**
   A. Install L.H. Hub (47) Thrust Washers (48) and Washer (49) to Axle. Install L.H. Castellated Nut (50) finger tight to take up all clearance at the welded sleeve (51). Rotate L.H. Hub to seat all the parts and then tighten again.

   B. Pull Axle to the **left** until Worm Wheel (52) seats tightly against Worm (53). Measure gap (B) in thousands with feeler gauge, then push axle to the **right** until Worm Wheel seats against Worm. Again measure gap (B) in thousands with a feeler gauge.

   C. Subtract the smaller gap reading from the wider gap reading to give you the full Axle movement from left to right. Divide the Axle movement by two to give you the exact center of Worm Wheel to Worm.

   D. Determine the number of .005 and .020 Shims (56) required for centering by measuring the thickness of the Thrust Washer (57) and subtracting this measurement from the first gap reading as described in step #C above.

   E. Reinstall the two Drive Pins in Hub (58). **NOTE:** PINS MUST NOT PROTRUDE BEYOND THRUST WASHER (57). Liberally grease thrust washer (57) and points (59) at final assembly. Bring up L.H. Castellated Nut **finger-tight** then lock with Cotter Key (60). Then install Washer (61), Drive Collar (62), Key (63), Washer (66), and Castellated Nut (67) finger-tight. Lock the Nut with Cotter Key (68). **DO NOT TIGHTEN WITH WRENCH.** Check and adjust end play of Rear Axle at regular intervals.

CONTROLLED DIFFERENTIAL

   F. Install Thrust Washer (69), Keys (70), Coupling (71), Drive Cone (72), Spring Washers (73), Castellated Nut (74), Cotter Key (75), Adjusting Nut (76) and Retaining Ring (77).
   NOTE: TIGHTEN ADJUSTING NUT HAND TIGHT ONLY - DO NOT USE A HAMMER OR A WRENCH.

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TRANSMISSION ASSEMBLY PROCEDURE
(3 SPEED)

6. **SHIFTER RAIL:** The Shift Rail Interlock System as employed consist of two 1/4" Balls (78), a Compression Spring (79) and a small Shaft or Plug (80) accurately controlled in length (.300 Thousands). This Assembly is housed in a bore between and at RIGHT ANGLES to the Shifter Rails (81). Liberally grease the indented ends of the two Shifter Rails and O-Ring Seals (82) in the grooves at the opposite ends. Insert Rails through the front bores. Install the Shifter Forks (83) in their respective positions on the rails (FORK HUB TO REAR ON RIGHT HAND RAIL. HUB TO FRONT ON LEFT HAND OR OUTSIDE RAIL). Secure with Pins (84).

   With the center of the three indents of the **right hand** Shifter Rail indexed with the Ball interlock cavity, insert one 1/4" Ball through the hole of the **left hand** rail bore. The Compression Spring with Pin installed and loaded with grease, can then be inserted to follow the first Ball through the access hole provided. The second 1/4" Ball if placed against the exposed end of the Compression Spring can be pushed back into the interlock channel and held under compression with a narrow bladed screw driver. While this second Ball is held back flush with the wall of the bore (compressing Spring slightly) the chamfered end of **left hand** Shifter Rail can be inserted into and through its rear bore. Install Set Screw (85) flush with outside of casting. Install Connectors (86) to Shifter Rails with Pins (87).

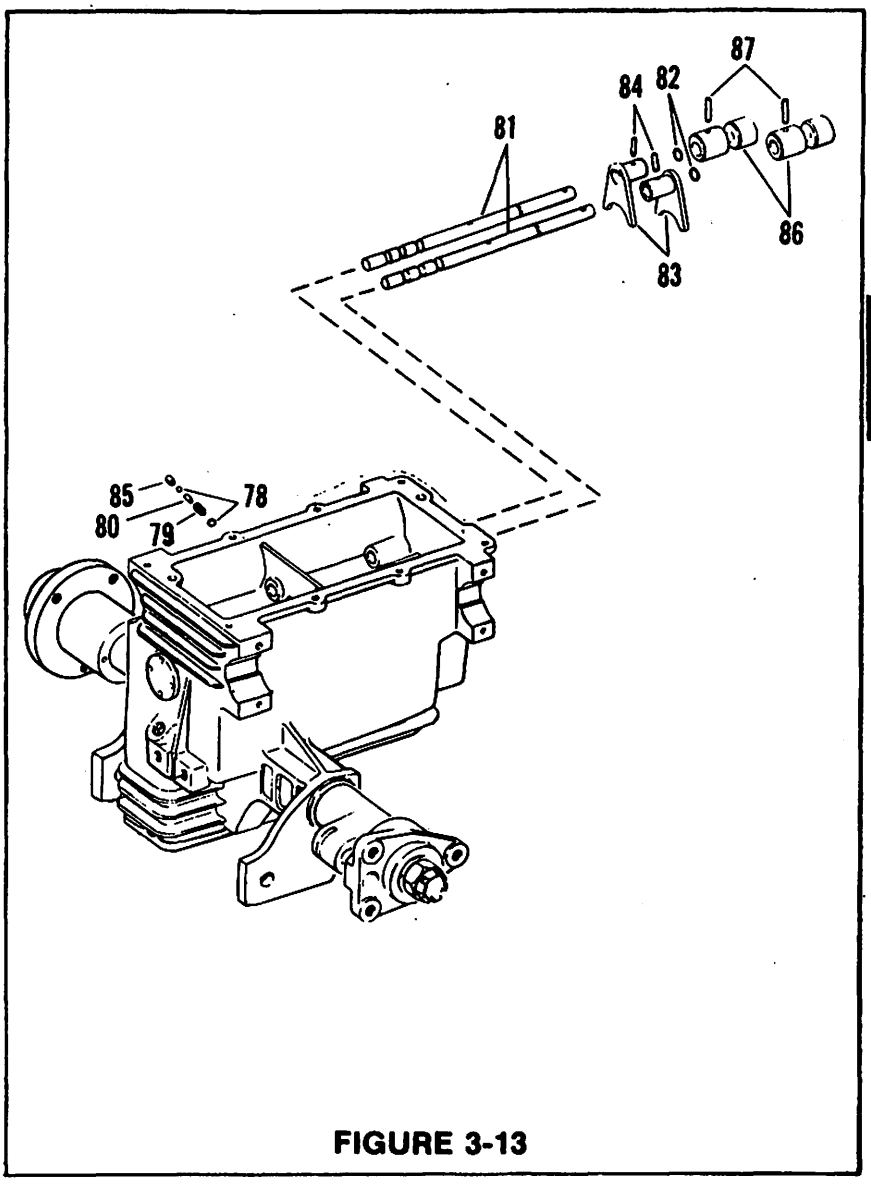

FIGURE 3-13

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TRANSMISSION ASSEMBLY (6 SPEED)

EXPLODED VIEW

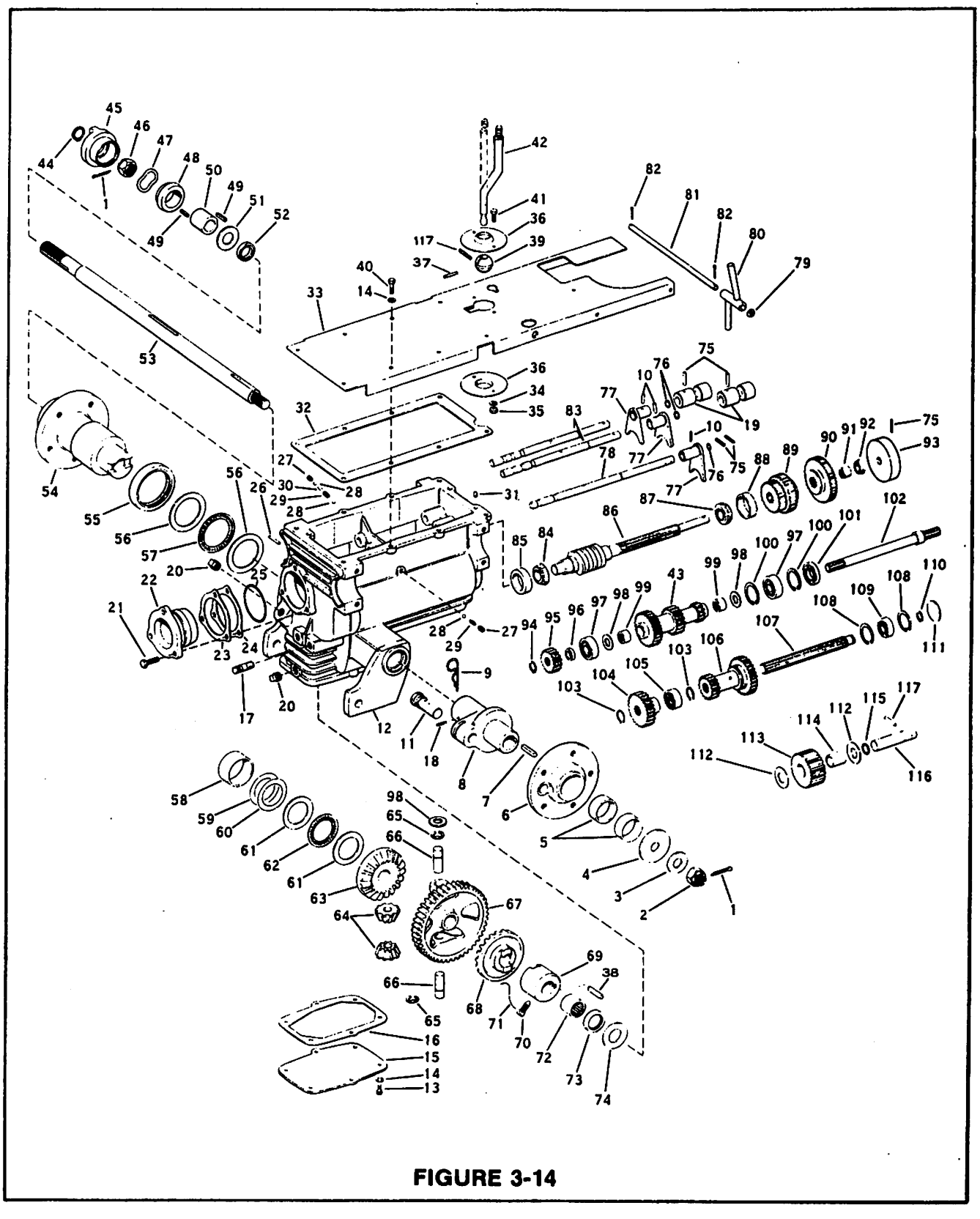

FIGURE 3-14

https://truckmanualshub.com/

TRANSMISSION ASSEMBLY PROCEDURE
(6 SPEED)

1. **REVERSE IDLER:** Liberally grease, then install O-Ring (1) into groove on Shaft (2). Insert Bronze Bearing (3) into Idler Gear (4). Position Idler Gear (4) (CHAMFERED TOOTH SECTION TOWAD FRONT) with a Thrust Washer (5) on each side, into cavity of Gear Case. Insert end of Shaft (2) through outer bore of Gear Case. Slide Shaft through Idler Gear (4) and into rear bore. Index exposed cross hole in Shaft (2) with pin hole in front end boss of Gear Case. Install Roll Pin (6).

2. **INPUT SHAFT:** Install Bearing (7) into rear bore of Gear Case. Install Needle Bearings (8) in Cluster Gear (9). Position Cluster Gear (9) into cavity of Gear Case. Install Retaining Ring (10), Bearing (11) and Retaining Ring (12) into front bore of Gear Case. Install Washers (13) on Input Shaft (14) while inserting long end of Shaft through front bore of Gear Case, through Cluster Gear. Position complete assembly, so that the Spacer (15), Gear (16) and Retaining Ring (17) may be installed to Shaft. Install Oil Seal (18) over end of Shaft and into front bore of Gear Case.

3. **SPEED RANGE SHAFT:** Install Needle Bearing (19) into bore. Install internal Lock Ring (20) into inner groove of front bore. Press Bearing (21) onto Shaft (22). Lock with Retaining Ring (23). Insert Shaft into front casting bore, then through Cluster Gear (24). Install Retaining Ring (25), into groove approximately 2 inches from rear end of splined shaft. Then move Shaft through rear Transmission bore. Install Gear (26) from back side and lock with Retaining Ring (27). Install Retaining Ring (28) into front bore of Gear Case and insert Expansion Plug (29) into bore.

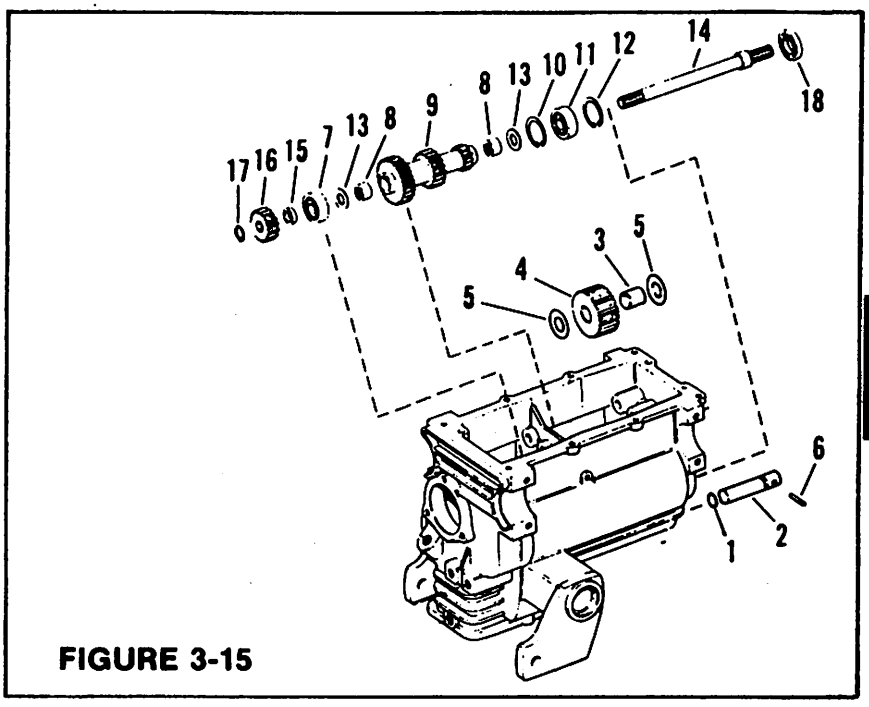

FIGURE 3-15

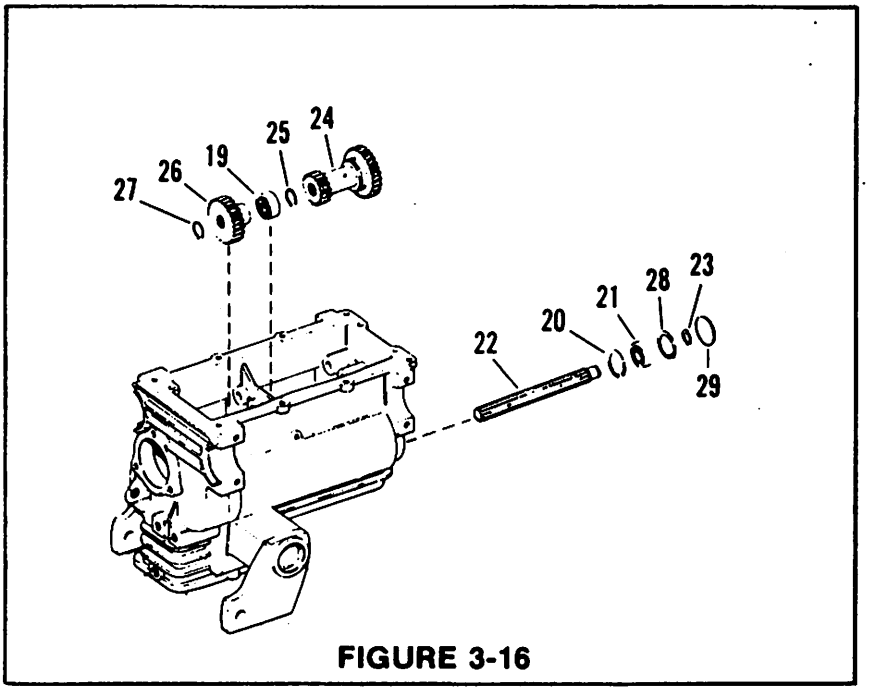

FIGURE 3-16

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TRANSMISSION ASSEMBLY PROCEDURE
(6 SPEED)

4. **AXLE SHAFT:** Install Bearing Cup (30) into Gear Case divider wall (THIS STEP IS MORE DIFFICULT AFTER WORM WHEEL HAS BEEN INSTALLED). Install Bronze Bearing (31) into **left hand** Axle bore (ONLY PARTIALLY INTO CASE). Assemble differential with Bevel Pinions (33), Pinion Shafts (34), Worm Wheel (35), Washer (36), and Retaining Rings (37). Insert Drive Hub (38), Bevel Gear (39), Differential Assembly (35), Bevel Gear (40), Thrust Race (41), Thrust Bearing (42), Thrust Race (43) and Shims (44) into rear Gear Case cavity while threading Axle through the Assemblies to the left hand Bronze Bearing. Install Key (45) to Axle keyway and continue to slide Axle to the left to approximate final position. Index the two square head drive screws (46), tighten and lock with Wire (47).

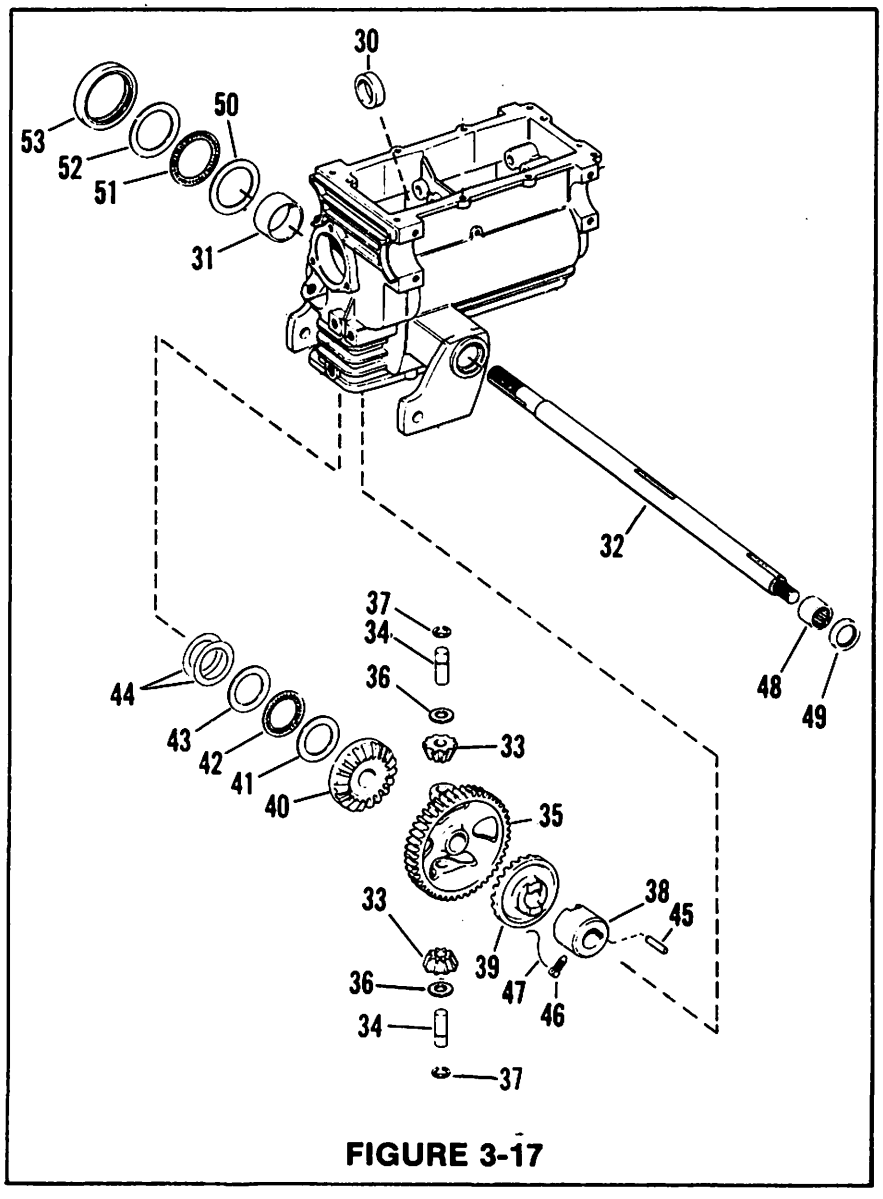

FIGURE 3-17

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TRANSMISSION ASSEMBLY PROCEDURE
(6 SPEED)

5. **WORMSHAFT:** Insert splined end of Worm Shaft (54) through Bearing bore. Slip Roller Bearing Cone (55) over front end of Shaft (after Shaft tip has cleared Worm Wheel), then push Worm Shaft through Gear Case Divider Wall. As splined end of Worm Shaft protrudes into Transmission section of Gear Case install Sliding Gears (56 & 57) onto splined section of Worm Shaft. Continue to move Worm Shaft forward until tapered Roller Bearing (55) seats in Cup (PREVIOUSLY INSTALLED). Slide Bearing Cone (58) over Shaft and seat in rear Gear Case bore. Install Bearing Cup (59). Slide Needle Bearing (60) over Shaft and insert Bearing Cap (61) into rear bore (WITH FIRM PRESSURE ON BACK SIDE OF BEARING CAP ROTATE WORM SHAFT ASSEMBLY IN BOTH DIRECTIONS TO ALIGN TAPER ROLLERS). Then with feeler gauge, measure the developed gap between the cap and machined surface of Gear Case at the bolt circle area. NOTE: ADD SUFFICIENT SHIMS TO THE FEELER GAUGE READING TO PROVIDE BETWEEN .004 AND .008 WORM SHAFT END-PLAY.

   Install the required Shims (62) and O-Ring (63). (LIBERALLY GREASE O-RING). Then insert Bearing Cap Assembly and tighten the three Cap Screws (63) evenly. Install Oil Seal (64). Install Brake Drum (65) to Shaft with Pin (66).

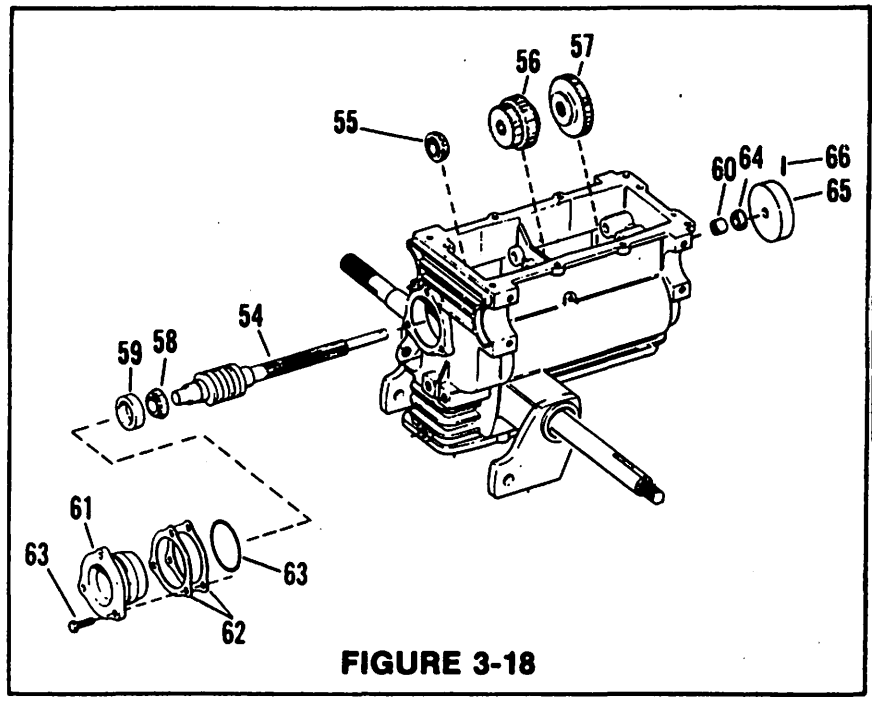

FIGURE 3-18

https://truckmanualshub.com/

TRANSMISSION ASSEMBLY PROCEDURE
(6 SPEED)

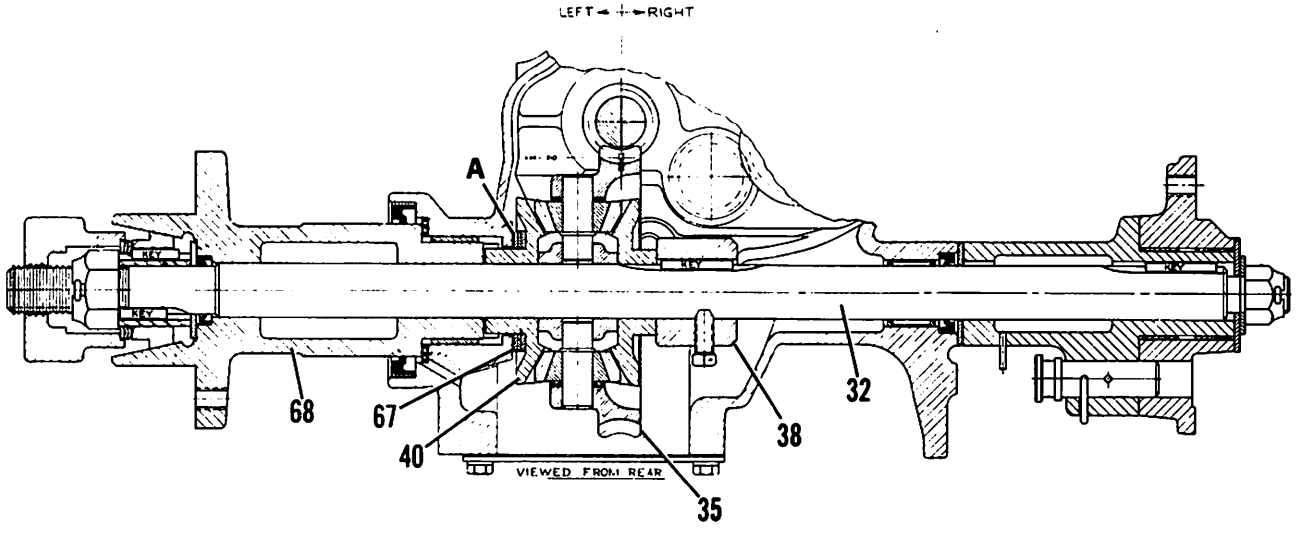

FIGURE 3-19

6. **WORM WHEEL CENTERING:**

With bottom plate removed install axle shaft (32) with drive hub (38) installed, worm wheel and pinion assembly (35), bevel gear (40), thrust bearing assembly (67), L.H. hub (68). To center worm wheel remove worm shaft and use the worm centering tool from Kit #171-9432 in place of worm shaft. Measure gap at "A" between thrust bearing and transaxle housing. This reading would be the amount of shims required to center worm wheel with a tolerance of + .010". Note: Unless the transaxle housing has been replaced this procedure is very seldom necessary. In a normal minor repair the same amount of shims as installed at the factory should be correct.

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TRANSMISSION ASSEMBLY PROCEDURE
(6 SPEED)

7. **SHIFTER RAIL:** The Shift Rail Interlock System as employed consist of two 1/4" Balls (78), a Compression Spring (79) and a small Shaft or Plug (80) accurately controlled in length (.300 Thousands). This Assembly is housed in a bore between and at RIGHT ANGLES to the Shifter Rails (81). Liberally grease the indented ends of the two Shifter Rails and O-Ring Seals (82) in the grooves at the opposite ends. Insert Rails through the front bores. Install the Shifter Forks (83) in their respective positions on the rails (FORK HUB TO REAR ON RIGHT HAND RAIL. HUB TO FRONT ON LEFT HAND OR OUTSIDE RAIL). Secure with Pins (84).

   With the center of the three indents of the **right hand** Shifter Rail indexed with the Ball interlock cavity, insert one 1/4" Ball through the hole of the **left hand** rail bore. The Compression Spring with Pin installed and loaded with grease, can then be inserted to follow the first Ball through the access hole provided. The second 1/4" Ball if placed against the exposed end of the Compression Spring can be pushed back into the interlock channel and held under compression with a narrow bladed screw driver. While this second Ball is held back flush with the wall of the bore (compressing Spring slightly) the chamfered end of **left hand** Shifter Rail can be inserted into and through its rear bore. Install Set Screw (85) flush with outside of casting. Install Connectors (86) to Shifter Rails with Pins (87).

   Install the range-change Shifter Rail (89) following same lubrication instructions. Install Shafter Fork (83) (FORK HUB TO REAR). Insert detent Ball (78), Spring (79), then install Set Screw (85) flush with outside of gear case casting.

   NOTE: MANUALLY SPIN INPUT SHAFT TO RECHECK SHIFTING MECHANISM IN ALL SIX POSITIONS BEFORE INSTALLING COVER, ALWAYS INSTALL NEW GASKETS. USE PREMATEX OR SIMILAR TYPE SEALANTS.

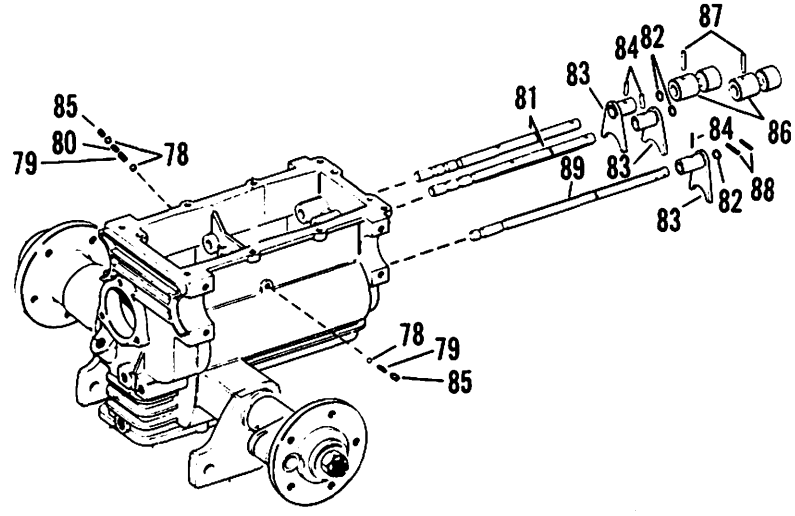

FIGURE 3-20

https://truckmanualshub.com/

TRANSMISSION ASSEMBLY
3-SPEED GEAR DIAGRAM

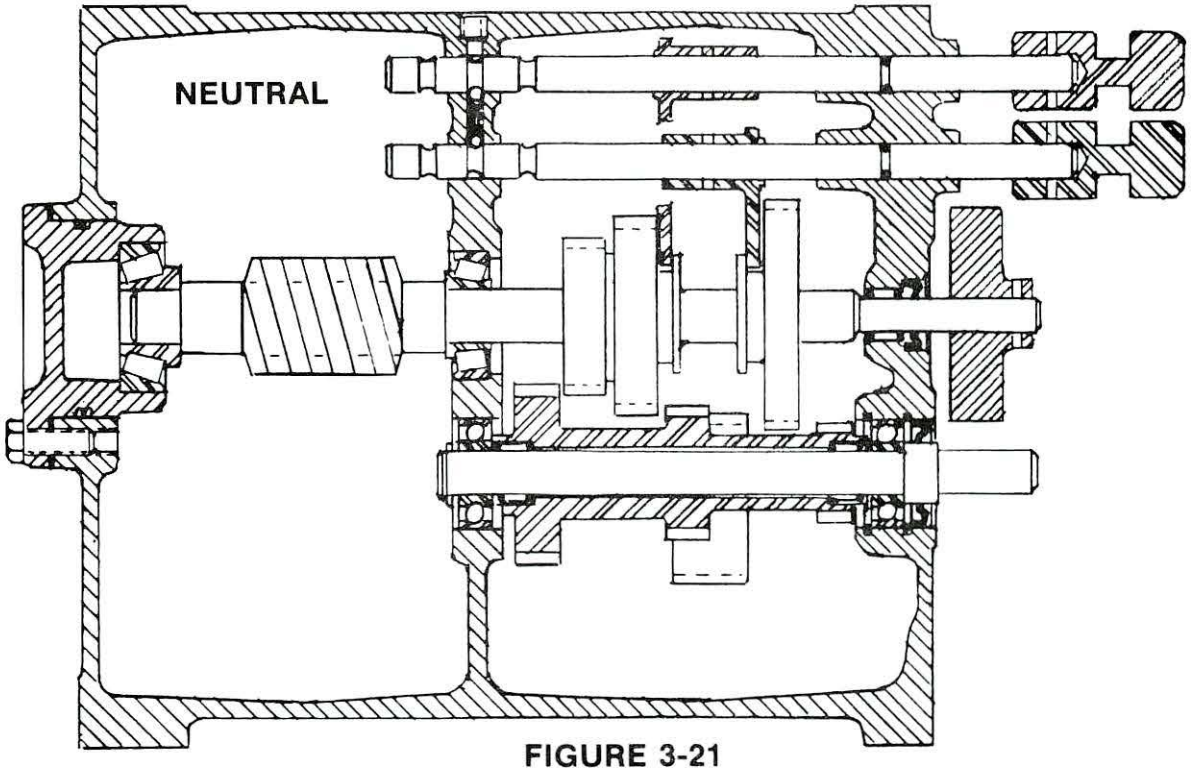

FIGURE 3-21

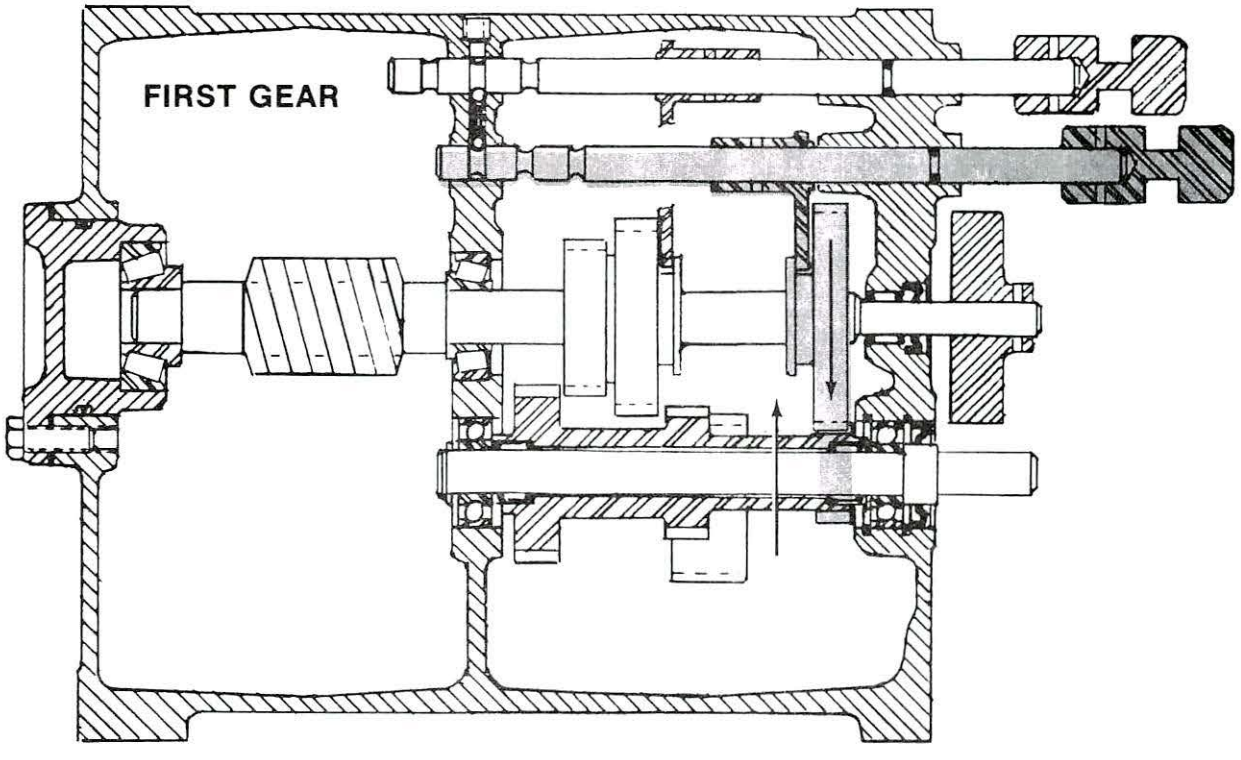

FIGURE 3-22

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TRANSMISSION ASSEMBLY
3-SPEED GEAR DIAGRAM

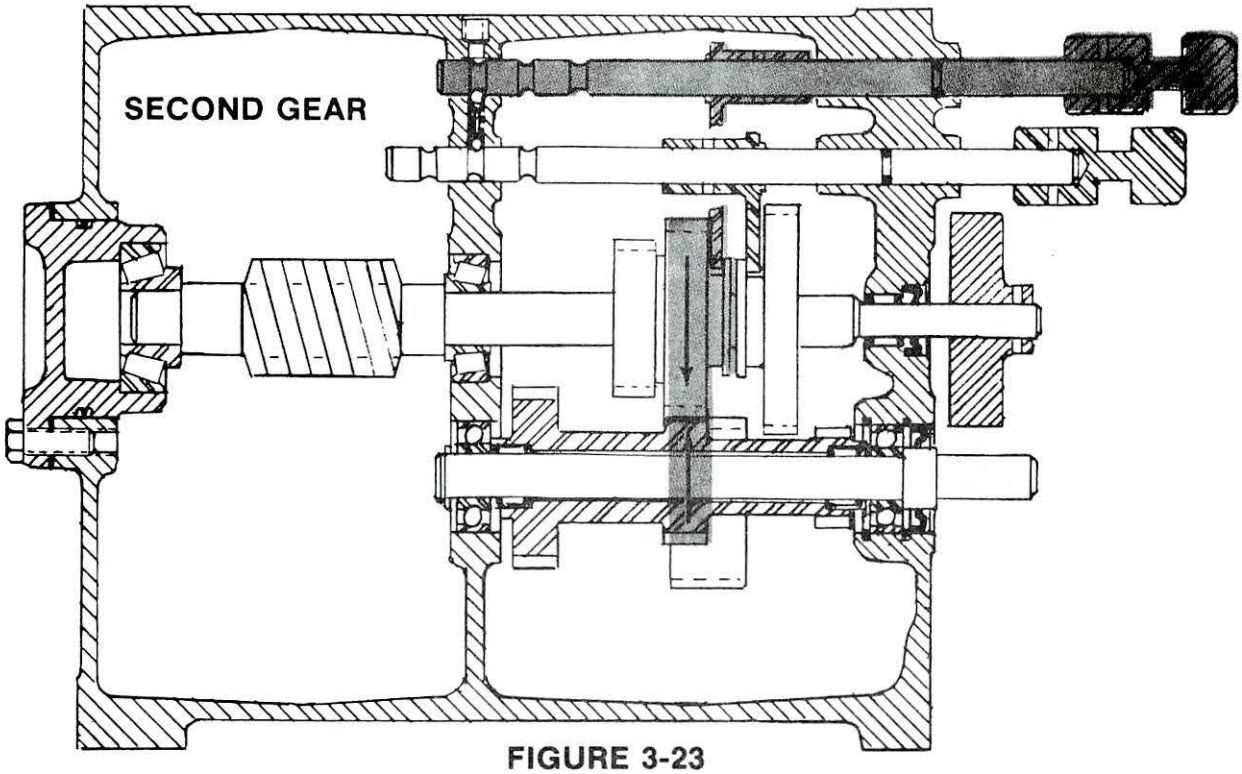

FIGURE 3-23

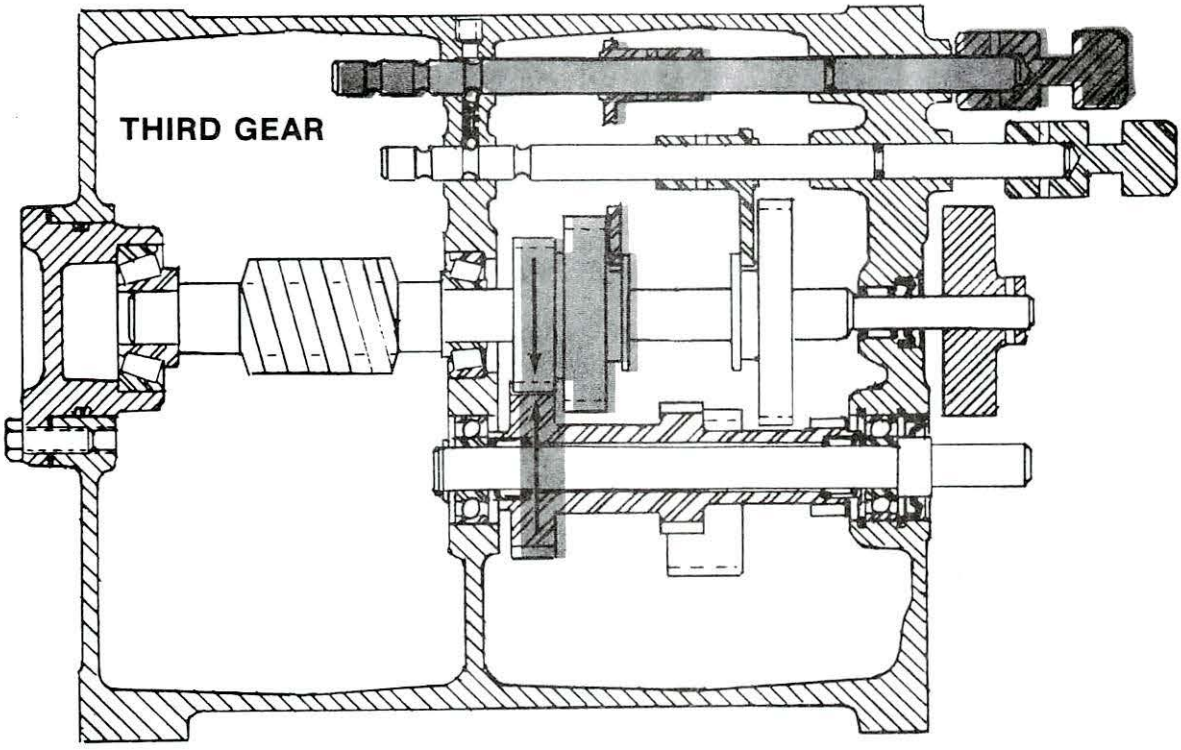

FIGURE 3-24

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TRANSMISSION ASSEMBLY
3-SPEED GEAR DIAGRAM

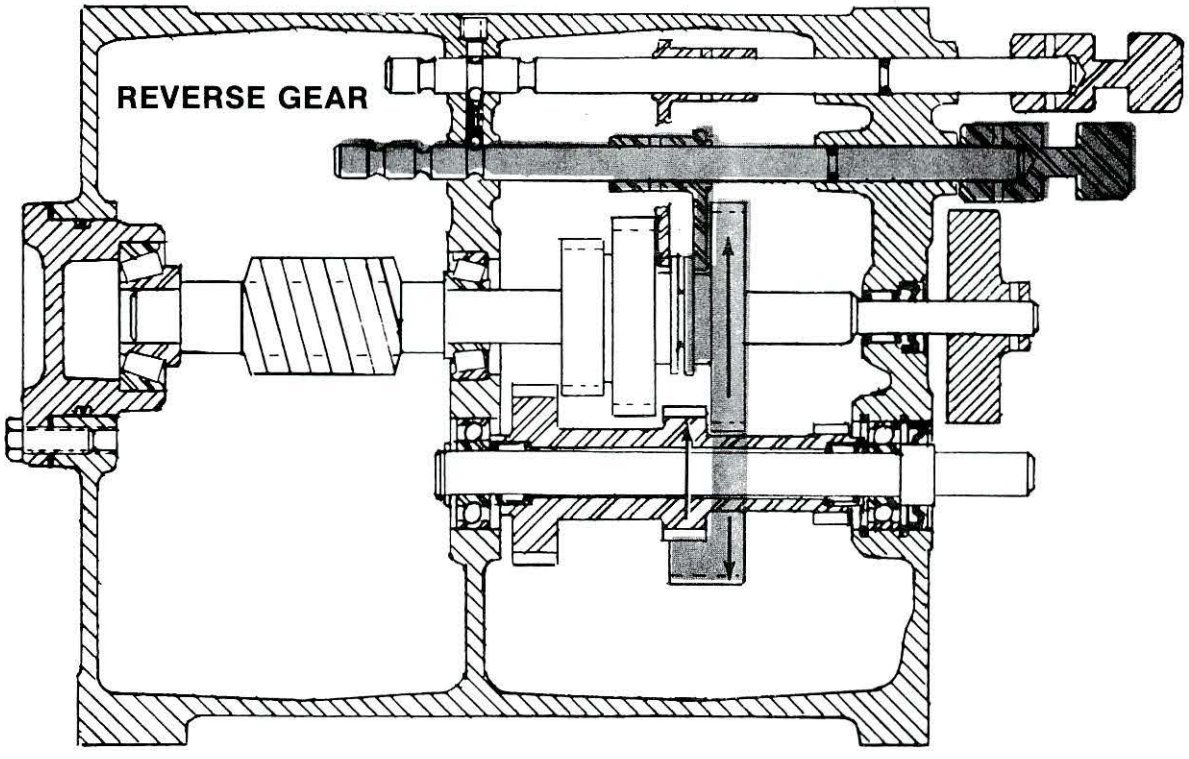

FIGURE 3-25

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TRANSMISSION ASSEMBLY
6-SPEED GEAR DIAGRAM

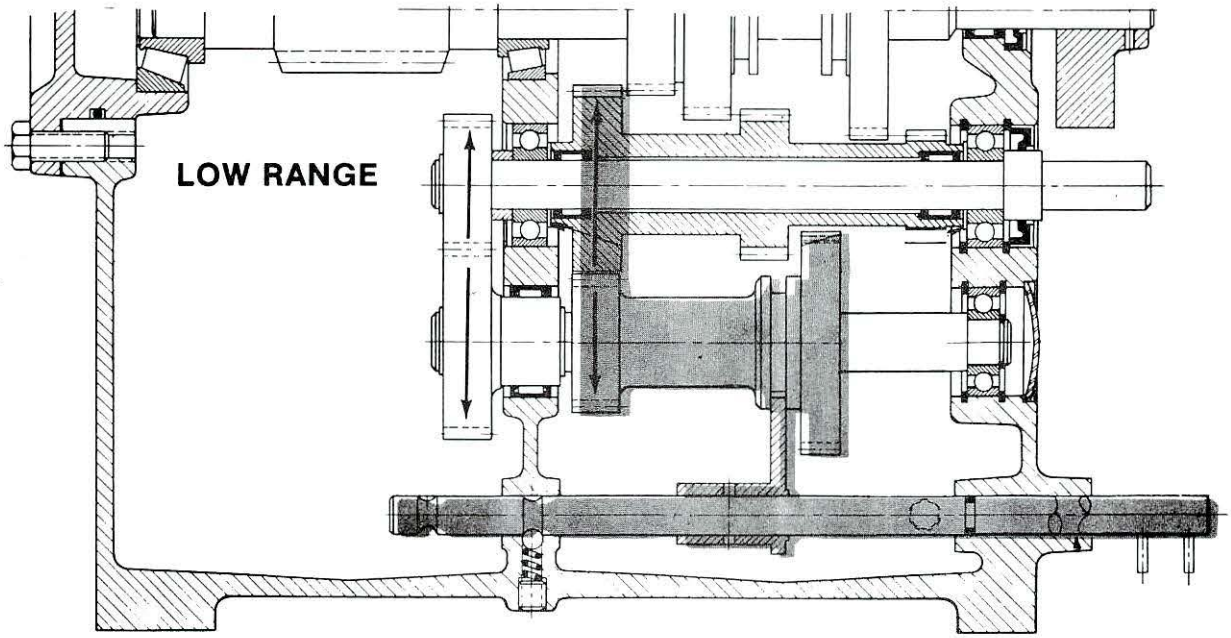

FIGURE 3-26

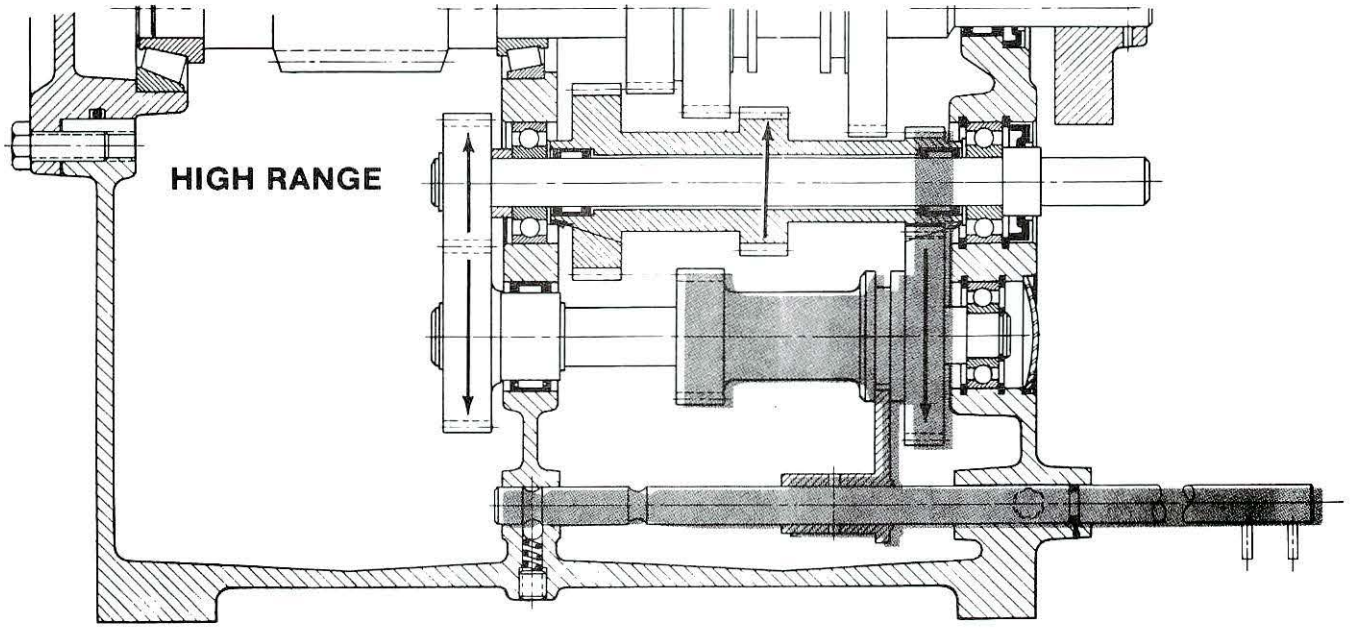

FIGURE 3-27

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TRANSMISSION ASSEMBLY
6-SPEED GEAR DIAGRAM

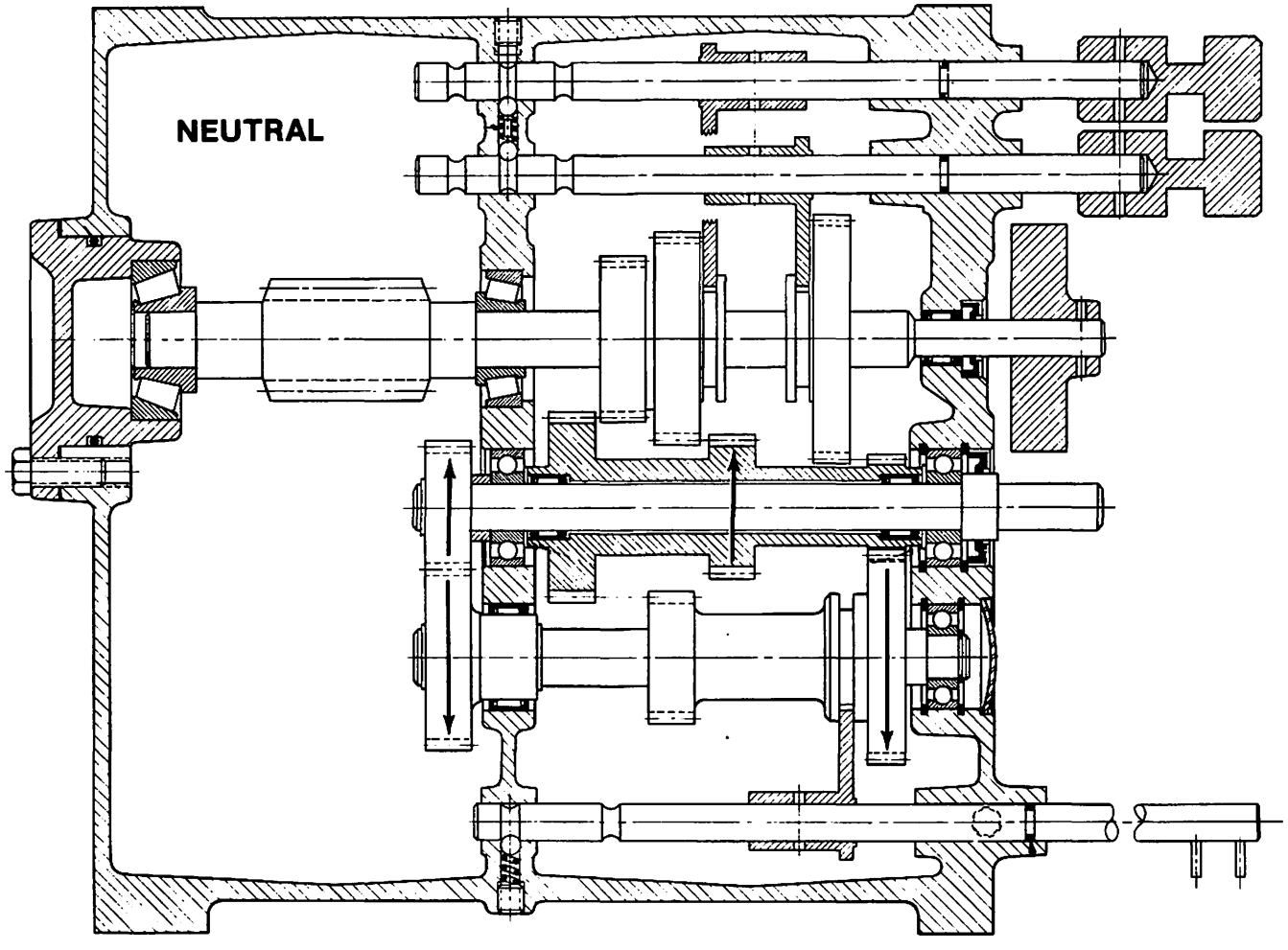

FIGURE 3-28

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TRANSMISSION ASSEMBLY
6-SPEED GEAR DIAGRAM

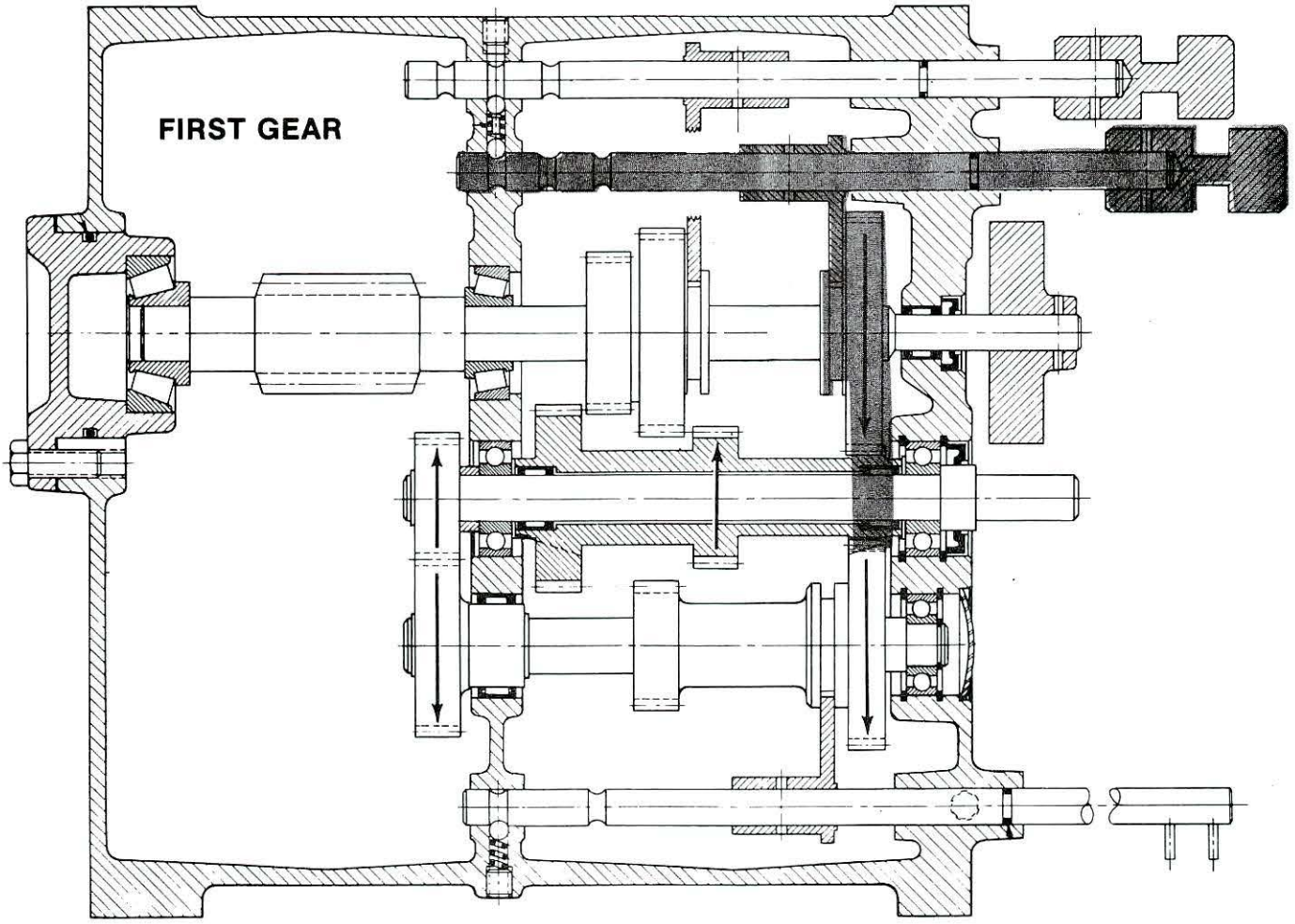

FIGURE 3-29

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TRANSMISSION ASSEMBLY
6-SPEED GEAR DIAGRAM

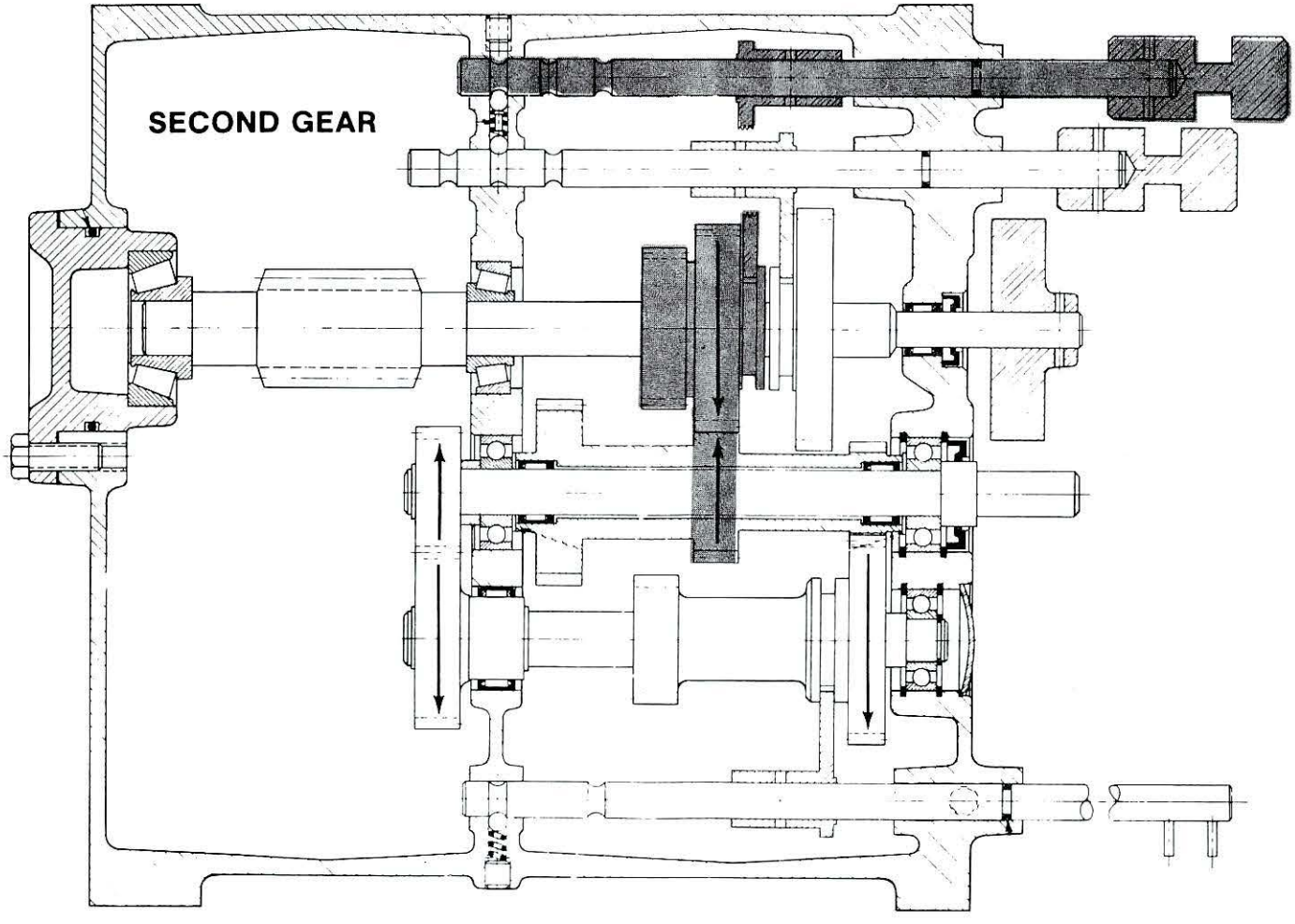

FIGURE 3-30

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TRANSMISSION ASSEMBLY
6-SPEED GEAR DIAGRAM

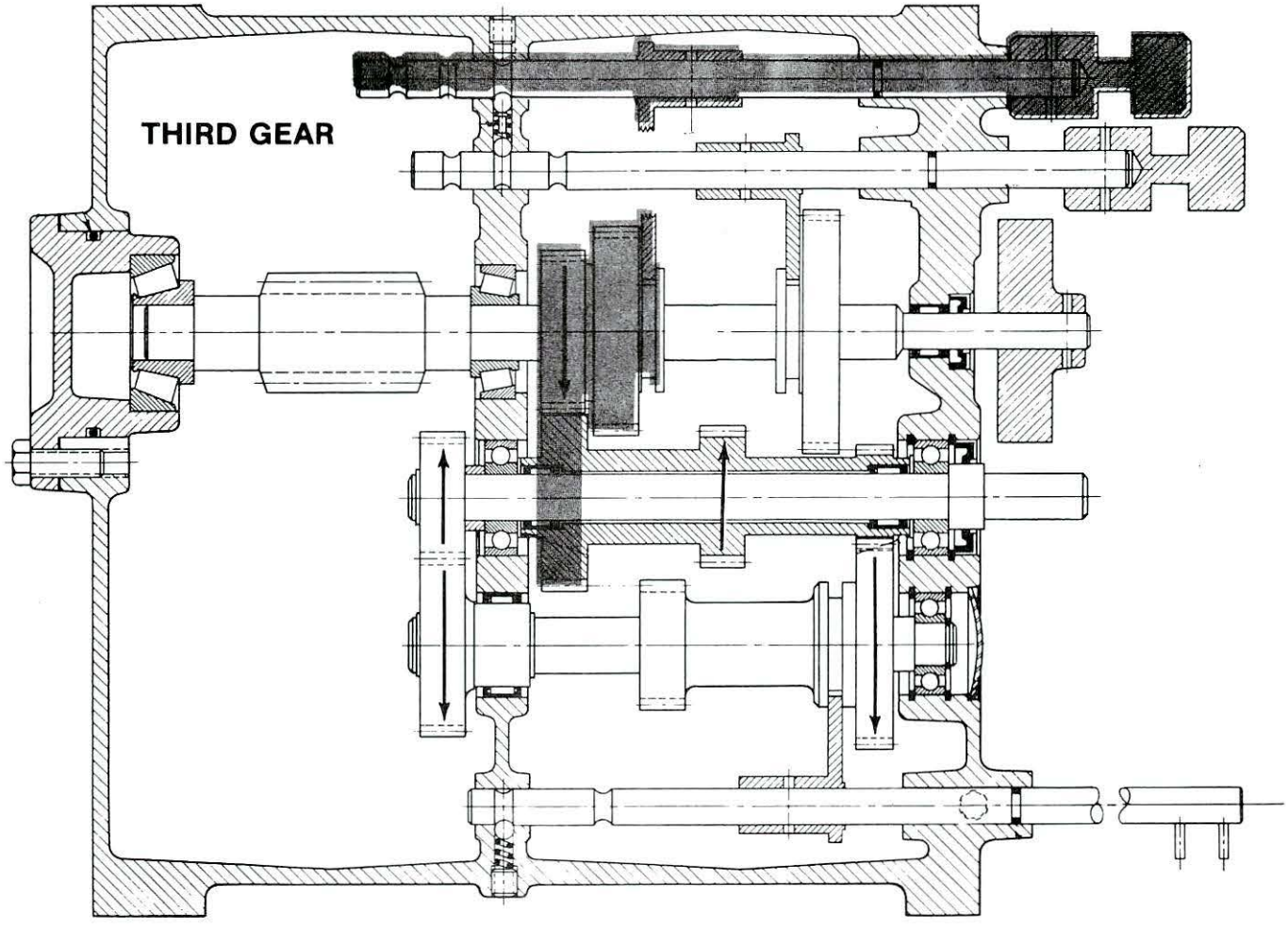

FIGURE 3-31

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TRANSMISSION ASSEMBLY
6-SPEED GEAR DIAGRAM

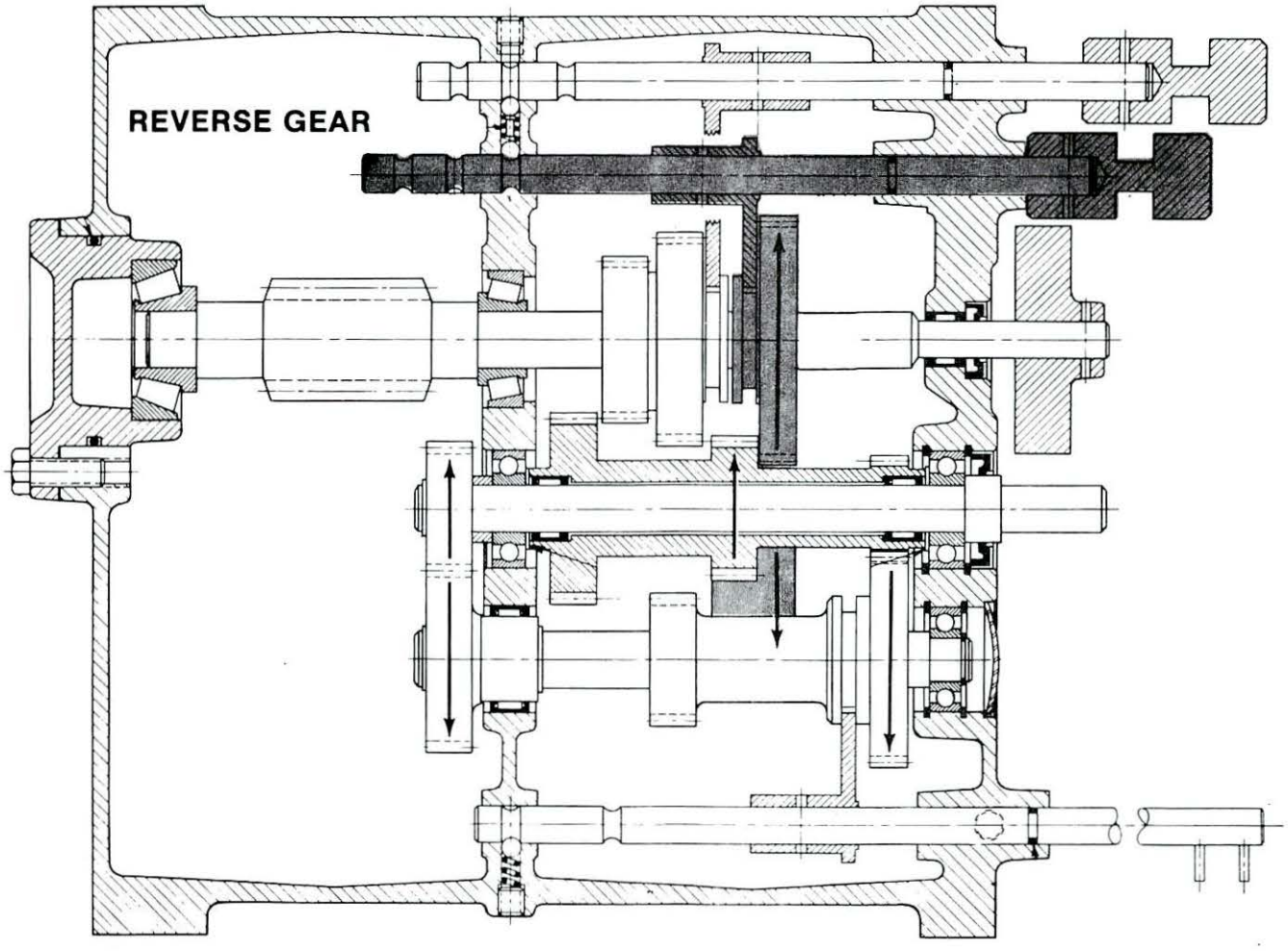

FIGURE 3-32

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HYDROSTATIC REMOVAL AND INSTALLATION

REMOVAL OF HYDROSTATIC PACKAGE FROM TRANSAXLE

1. Remove the filter tube from the Hydrostatic Package and block ends.
2. Remove linkage from bottom of Hydrostatic Package.
3. Remove the four (4) 12 point bolts that hold Hydrostatic Package to transaxle. Separate package from transaxle.

IMPORTANT: Do not use a bar or screw driver to pry package out fo transaxle housing. Damage to the sealing surfaces would occur. Nicks or burrs must be removed.

4. Remove drive gear and plastic hose from Hydrostatic Package.

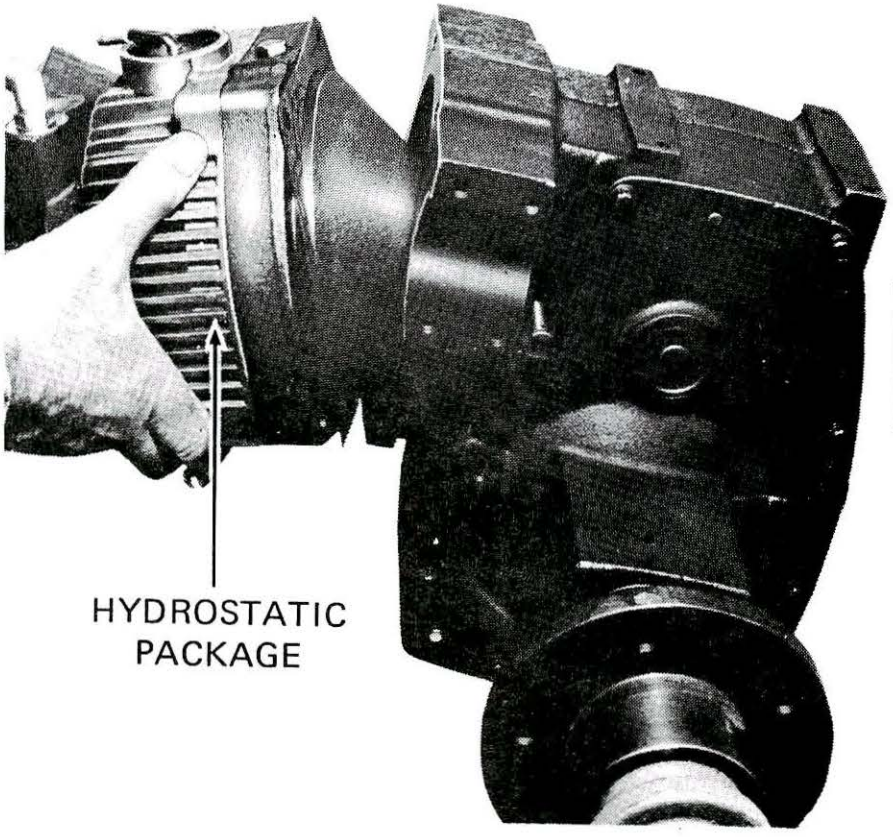

FIGURE 3-33

INSTALLATION OF THE HYDROSTATIC PACKAGE TO TRANSAXLE

1. Install drive gear and secure with retainer ring on new replacement package and install package into transaxle using new gasket. Torque the four (4) 12 point bolts to 240 inch pounds.
2. Install linkage to bottom of Hydrostatic Package.
3. Install plastic hose to hydrostatic package.

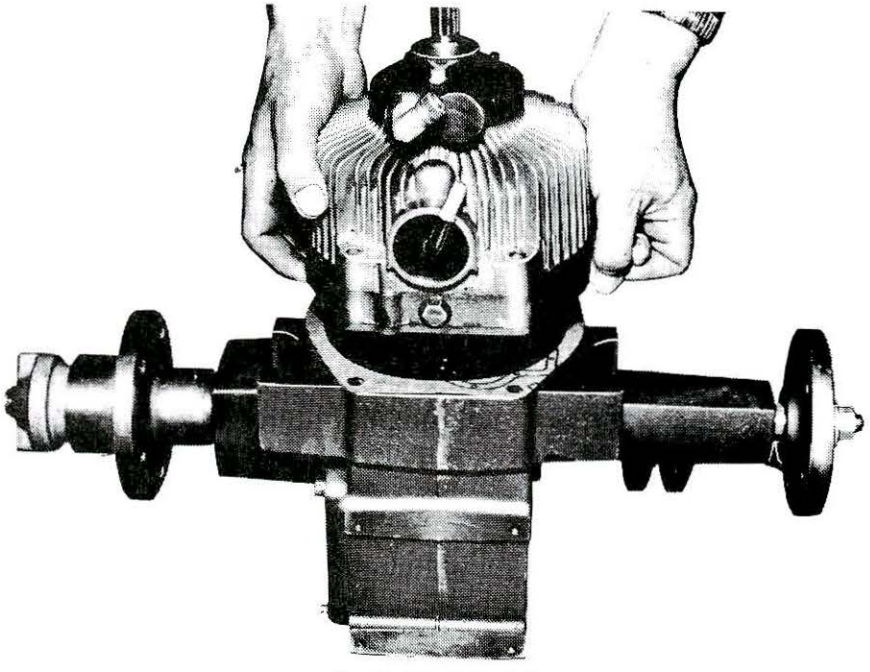

FIGURE 3-34

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MODEL "10" HYDROSTATIC REPAIR

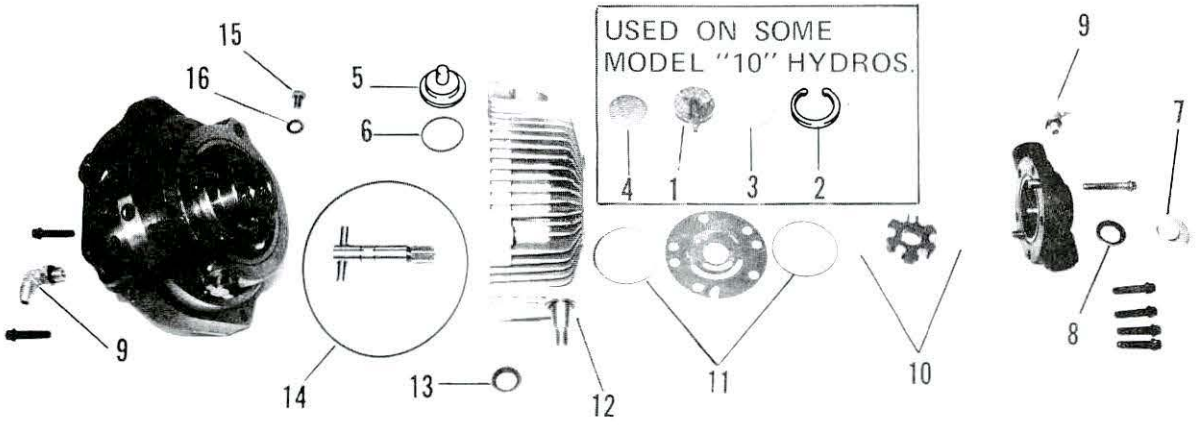

FIGURE 3-35

1. Reservoir Adaptor
2. Retaining Ring
3. "O" Ring
4. Filter Screen
5. Plastic Adaptor
6. Adaptor Gasket
7. Grass Shield
8. Input Shaft Seal
9. 90° Tube Fitting
10. Retaining Ring
11. Port Plate "O" Ring
12. Finned Cover Assembly (Includes items 5 & 6 when required & 13)
13. Control Shaft Seal
14. "O" Ring
15. Special ⅜ - 16 Bolt
16. Sealing Washer

1. **TO REPLACE CONTROL SHAFT SEAL, ITEM (13).**

NOTE: Seal may be replaced without removing the transmission from vehicle, however, loss of fluid will occur.

NOTE: We recommend removal of transmission from vehicle.

Remove control arm with approved tool (standard puller). (Refer to Service Bulletin #170). **WARNING:** DO NOT attempt to pry or drive the control arm off the shaft, as internal damage can occur. Remove control shaft seal, item (13). **NOTE:** A hook puller or screw driver may be used. Wipe seal counterbore clean and examine for damaged surfaces. Install new double lip seal, item (13), with the steel retainer to the outside. Press or tap lightly until seal is bottomed. **CAUTION:** Over-travel of the seal will cut the rubber nose. Use a square-faced tube with the O.D. slightly smaller than the O.D. of the seal and the I.D. a slip fit over the shaft. Grease the seal lips before installation. Install control arm. (Refer to Service Bulletin #170). **NOTE:** Lubricate the tapered portion of the shaft. Remove capscrew, Item (15), and add hydrostatic fluid until unit is full. Replace and tighten capscrew, Item (15).

2. **TO REPLACE RESERVOIR ADAPTOR, ITEM (1), OR RESERVOIR ADAPTOR "O" RING, ITEM (3).**

NOTE: It is not necessary to remove the transmission from the vehicle.
IMPORTANT: Wash area clean and blow dry before removing reservoir adaptor. Remove retainer ring, Item (2). **CAUTION:** Dirt may be lodged in snap ring groove. Blow clean before proceeding. Remove reservoir adaptor, Item (1). Remove and examine "O" ring, Item (3). If damaged, replace "O" ring. Examine screen, Item (4).

Improper maintenance is indicated if foreign particles are found on the screen. Remove, wash and blow dry. **NOTE:** If screen is missing or punctured, foreign particles may have fallen into unit and complete failure may result. Add hydrostatic fluid to level of screen, Item (4). Install clean screen, and add hydrostatic fluid. Grease "O" ring and install reservoir adaptor, Item (1). **CAUTION:** "O" ring Item (3), must be in position and greased. Install retainer ring, Item (2).

3. **TO REPLACE PLASTIC RESERVOIR ADAPTOR, ITEM (5), IT IS NOT NECESSARY TO REMOVE THE HYDROSTATIC TRANSMISSION FROM THE VEHICLE.**

IMPORTANT: Wash area clean and blow dry before removing the adaptor, Item (5).

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MODEL "10" HYDROSTATIC REPAIR

To remove, use a 1" six point socket turning **clockwise** as the **threads are left hand.** Remove capscrew, Item (15), and add hydrostatic fluid until unit is full. Replace and tighten capscrew, Item (5). Replace plastic reservoir adaptor. **CAUTION:** The adaptor gasket, Item (6), must be in position before replacing the adaptor.

4. **TO EXAMINE AND/OR REPLACE PARTS IN THE AUXILIARY CHARGE PUMP AND REPLACEMENT OF FINNED COVER ASSEMBLY.**

NOTE: To replace the finned cover assembly remove the hydrostatic from vehicle and drain oil.

Position transmission on bench with the input shaft UP and in a vertical position. Remove the grass shield, Item (7). The shield is pressed on the input shaft and may be pried off. If damaged beyond repair, replace. **NOTE:** If input shaft seal is to be replaced, Item (8), remove seal with a hook puller or screwdriver, replace seal and shield, Item (7). Remove the four capscrews and the plated capscrew. Remove the charge pump body. **NOTE:** The charge pump rolls are not contained after the body has been removed. Remove the six rolls and the "O" ring, Item (10). Identify exposed face of charge pump carrier, then remove carrier and drive pin. **CAUTION: Mark should not raise metal.** Malfunction will occur if the carrier is reassembled upside down or if surface is not flat. Identify exposed surface of port plate, then remove. **CAUTION: Mark should not raise metal** as leakage will occur if surface is not flat.

CAUTION: Transmission in its present state is open. **Take precautions to prevent foreign particles from entering.** Remove "O" ring, Item (11). Wash and blow dry all parts. Remove bolts holding finned cover to motor section. Carefully lift cover from rear section. **Do not allow pump balls to escape from rotor. NOTE:** Balls are a select fit and **not** interchangeable. Replace finned cover assembly using new "O" ring, Item (10), if necessary. NOTE: All PARTS MUST BE CLEAN. Input shaft must be in position with snap ring, Item (10), in position. Install "O" ring, Item (11), in groove of the aluminum cover. Install port plate with marked face up. Install carrier drive pin in input shaft. Install auxiliary pump carrier with marked face up. **WARNING:** Malfunctior will occur if reassembled upside down. Install input shaft snap ring, Item (10). Install the six auxiliary pump rolls. Use clean light grease in the carrier slots to hold the rolls in position during assembly of body. Install "O" ring, Item (11), in the ring groove in the auxiliary pump body. Install auxiliary pump body with new input shaft seal, Item (8). Grease seal lip before assembly. Install the 5/16-18 capscrews using the longest capscrews towards the top of hydrostatic. Torque the five capscrews to 15-18 ft. lbs. Install grass shield, Item (7), to .010 from bottomed position. Remove plastic adaptor, Item (5), and bolt, Item (15), to fill unit with hydro fluid. **NOTE:** THERE IS NO RESERVOIR ADAPTOR IN THE HYDROSTATIC USED IN THE MODEL H-14 (1456) SERIAL NUMBER-0200100 AND NEWER TRACTORS.

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HYDROSTATIC TRANSAXLE ASSEMBLY

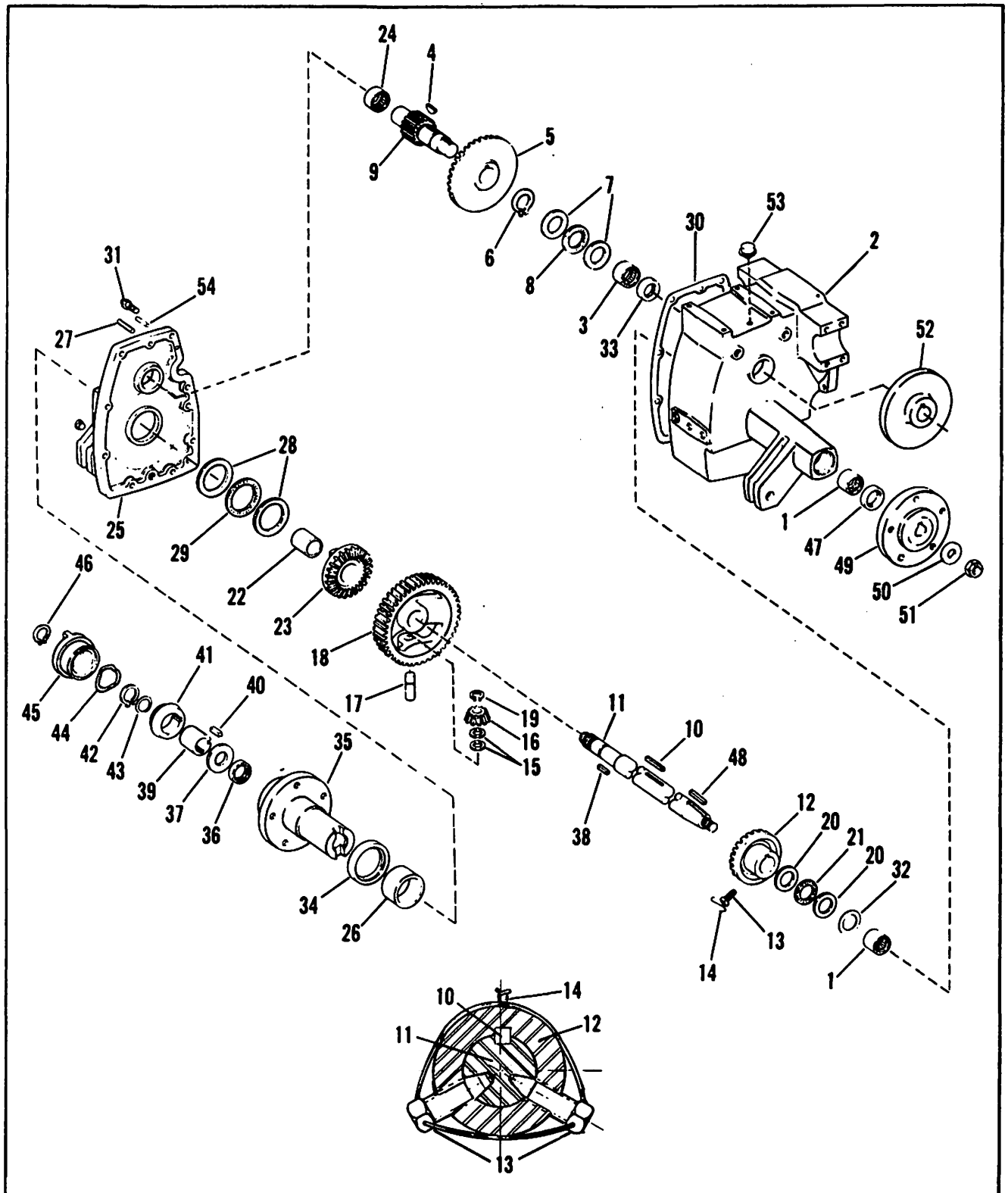

FIGURE 3-36

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HYDROSTATIC TRANSAXLE ASSEMBLY

Install bearings (1) into gear case housing (2). Be sure the bearing is below shoulder surface. Install bearing (3) into gear case housing (2). Note: On the Model 1225 this is a closed bearing and the closed end should be installed flush with the outside of the housing. Install key (4), bevel gear (5), retainer ring (6), thrust race (7), thrust bearing (8) and thrust race (7) onto pinion shaft (9). Install this pinion shaft assembly into gear case housing (2). Install key (10) into axle shaft (11). Position bevel gear (12) over key (10) in axle shaft and secure with drive screws (13) and locking wire (14). Note: Make certain that the drive screws are installed properly and fit into the countersunk portion of the axle shaft. Install thrust washers (15), bevel pinions (16), differential pinion shafts (17), into gear and carrier (18) and secure with retainer rings (19) and install onto axle assembly above. Install thrust race (20), thrust bearing (21) and thrust race (20) onto axle assembly. Install axle assembly into gear case housing. Install bearing (22) into bevel gear (23) and install on axle assembly. Install bearing (24) into cover (25) with the closed end flush with the outside of the cover. Install bearing (26), and dowel pins (27) into cover (25). Install thrust race (28), thrust bearing (29) and thrust race (28) onto bevel gear (23). Place gasket (30) onto gear case housing (2), install cover assembly (25) and bolt down with capscrews (31). Check for proper clearance of .002 to .014 between the differential gear assembly (18) and the gear case (2) as follows: **Push** the axle towards the right hand side and take a reading on the left hand side from the end of the cover axle housing to the shoulder on the axle.

Pull the axle assembly towards the left hand side and take another reading from the end of the cover axle housing to the shoulder on the axle.

The difference between these two readings will then give you the clearance at the present time. Now remove the cover and the axle assembly and install shims (32) between the thrust race (20) and the gear case housing (2). **Example:** If the difference between the two readings was .035 then install two shims of .0125 a piece for a total of .025, this will leave .010 clearance. Securely tighten the cover capscrews (31) to 35 foot pounds. Install seal (33) onto pinion shaft (9) and in gear case (2) using sleeve #171-8438 and driver #171-8439. Install seal (34) into cover assembly. Install left hand drive hub (35) onto axle assembly. Install seal (36) using sleeve #171-8438 and driver #171-8439. Install thrust washer (37) onto axle assembly. Install key (38) into axle, coupling (39) onto axle, key (40) into coupling, cone (41) onto axle and secure with retaining ring (42). Measure end play of axle assembly between bevel gear and axle retaining ring as follows: **Push** on left hand axle assembly and measure between couplings (39) and retaining ring (42). Allow for .002 to .016 inches of end play at this point. Install the correct amount of shims (43) between retaining ring (42) and coupling (39). Install spring washers (44), hand adjusting hub (45) and retaining ring (46). Install seal (47) onto right hand axle using sleeve #171-8441 and driver #171-8442. Install key (48), wheel hub (49), washer (50) and hex nut (51) onto axle. Install brake disc (52) on units with external brake. Install breather (53) and drive pin (54).

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TROUBLE SHOOTING GUIDE

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

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FUEL SYSTEM (Continued)

SERVICING

TYPICAL FUEL FLOW DIAGRAM

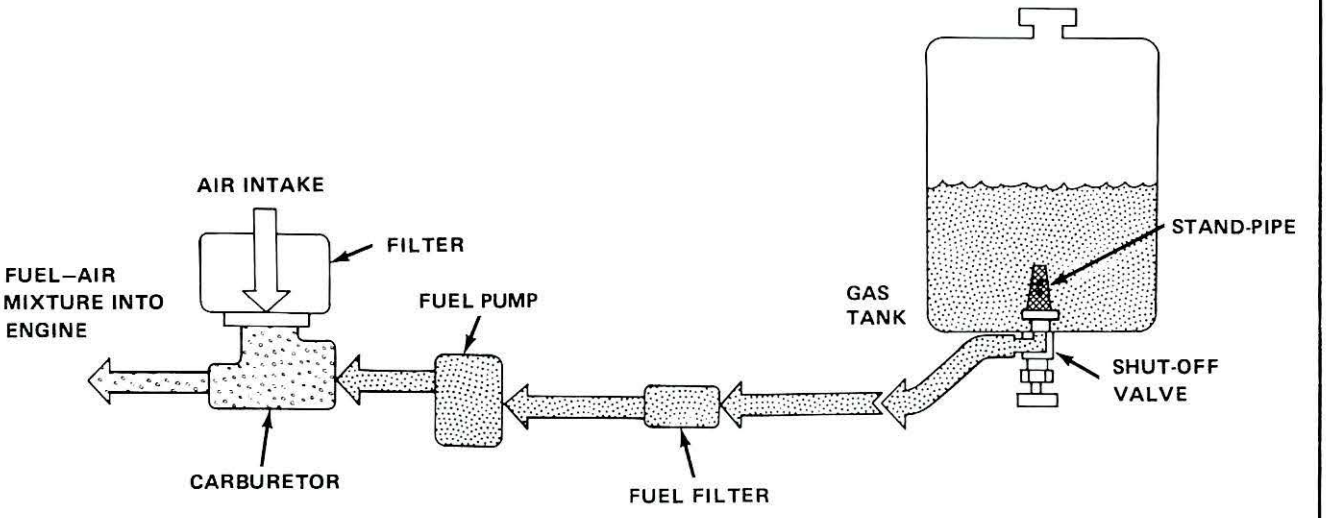

FIGURE 4-1

FUEL TANK

Fill with clean fresh gasoline of regular grade. (For cold weather operation use winter blend gasoline.) DO NOT MIX OIL WITH GASOLINE. REFUEL OUTDOORS WITH ENGINE STOPPED AND COOL.

Check to see that vent hole in fuel tank cap is not plugged.

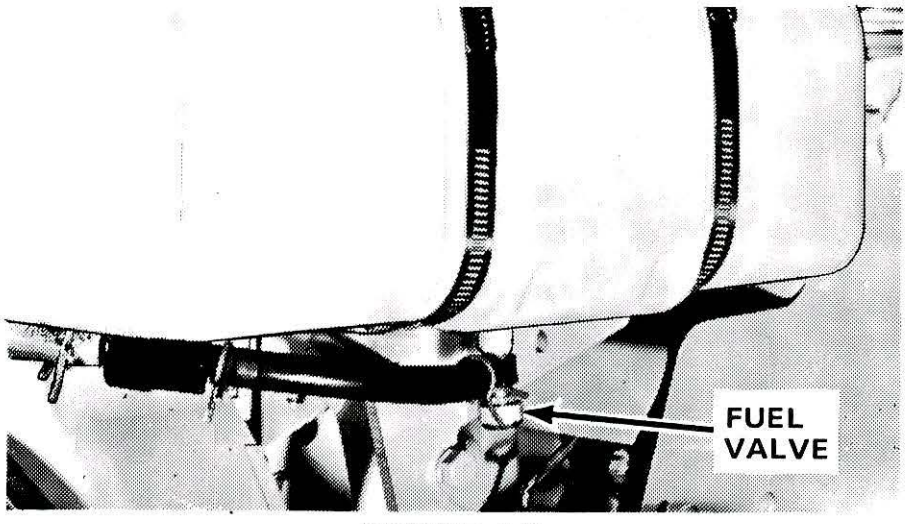

FIGURE 4-2

FUEL VALVE

The fuel valve is located under the fuel tank as shown in Figure 4-2. This valve must be fully open for proper operation of the tractor.

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SERVICING

CARBURETOR ADJUSTMENT

If black exhaust smoke is noted, check the air cleaner first. An "overrich" mixture is usually caused by a poorly serviced, clogged air cleaner element, not an improperly adjusted carburetor. If readjustment becomes necessary, stop the engine. Turn the MAIN and IDLE fuel adjusting screws all the way in until they bottom *LIGHTLY* — do not force them closed as this will damage the needle valves. For preliminary setting, turn MAIN fuel screw out (counterclockwise) Per illustration on the right. For final adjustments, start engine and allow it to warm up then operate at full throttle and under load, if possible. Turn MAIN fuel screw in until engine slows down (lean side) then out until it slow down again from overrich setting—note positions of screw at both settings, then set it about half-way between the two. The IDLE fuel setting can then be adjusted in the same manner for smoothest idle. Rough idle is often due to the idle speed being set too low — check this also.

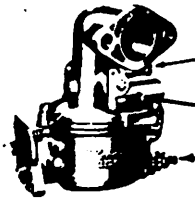

FIGURE 4-3

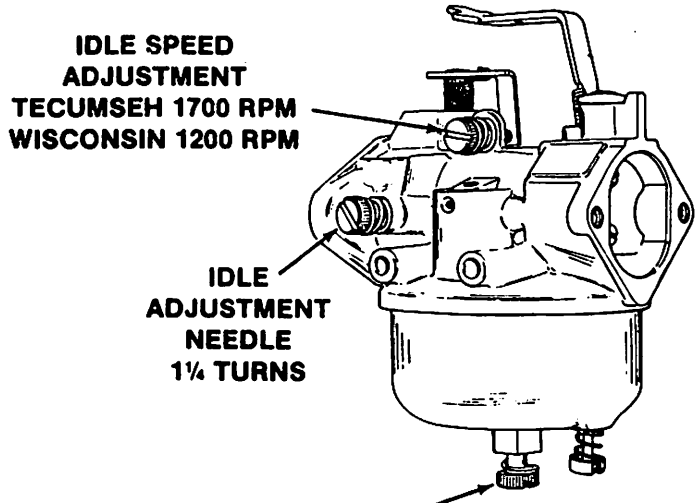

FIGURE 4-4

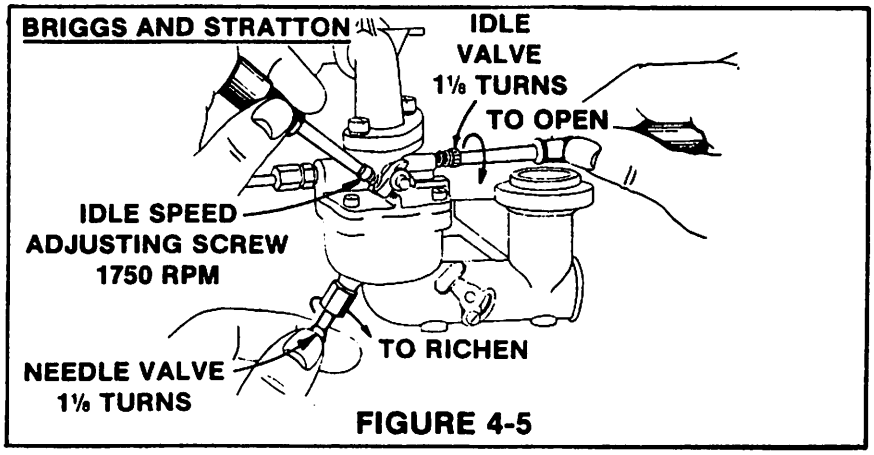

FIGURE 4-5

IMPORTANT:

SOME OF THE TECUMSEH HH-160 AND MOST OF THE HH-140 ENGINES USED ON BOLENS TRACTORS HAVE FIXED HIGH SPEED JETS. IF THERE IS ONLY A HEX NUT AND NO SCREW WITH A KNURLED HEAD ON THE BOTTOM OF THE CARBURETOR BOWL THE CARBURETOR HAS A FIXED HIGH SPEED JET.

CAUTION: THIS NUT HOLDS THE BOWL TO THE CARBURETOR **DO NOT** LOOSEN OR REMOVE.

IDLE SPEED ADJUSTMENT

The proper idle speed will help prevent carburetor "load up" and engine "kill." Adjust idle speed per illustrations above.

4

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FUEL SYSTEM (Continued)

SERVICING

FUEL FILTER (LATER MODELS)

The fuel filter is a cartridge type in-line filter. For cleaning, shut off fuel valve and separate filter with a counterclockwise twist. When reassembling filter, twist the two valves counterclockwise each about one-half turn. This preloads the filter to lock it together.

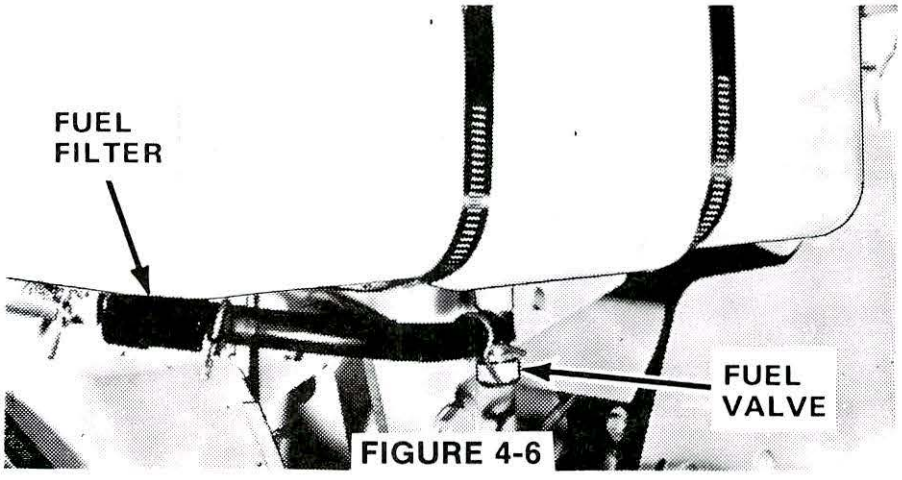

FIGURE 4-6

EARLY MODELS

The fuel filter is part of the fuel shut off valve. To clean, remove assembly from tank and wash in a solvent, and blow out with compressed air. Replace if necessary.

NOTE: TO RECLOSE, TWIST THE TWO HALVES COUNTERCLOCKWISE EACH ABOUT ONE HALF TURN BEFORE ASSEMBLING. THEN PLACE TWO HALVES TOGETHER AND CLOSE BY TURNING CLOCKWISE UNTIL THEY ARE SECURELY TIGHTENED.

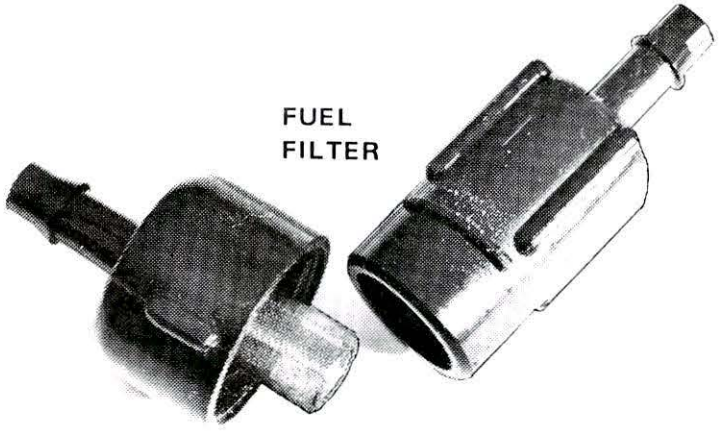

FIGURE 4-7

AIR CLEANERS

Under normal operating conditions, disassemble and service air cleaner components every 10 hours of operation. Do this more frequently (even daily) if extremely dusty or dirty conditions prevail.

DRY TYPE
Briggs and Stratton
Wisconsin
Rinse under a faucet with cold water, then wash by repeated dipping for several minutes in a solution of lukewarm water and a mild, NON-SUDSING detergent. Rinse in cold water from the inside out, and allow to dry overnight before installing in air cleaner. In cold weather, protect cartridge from freezing until dry.

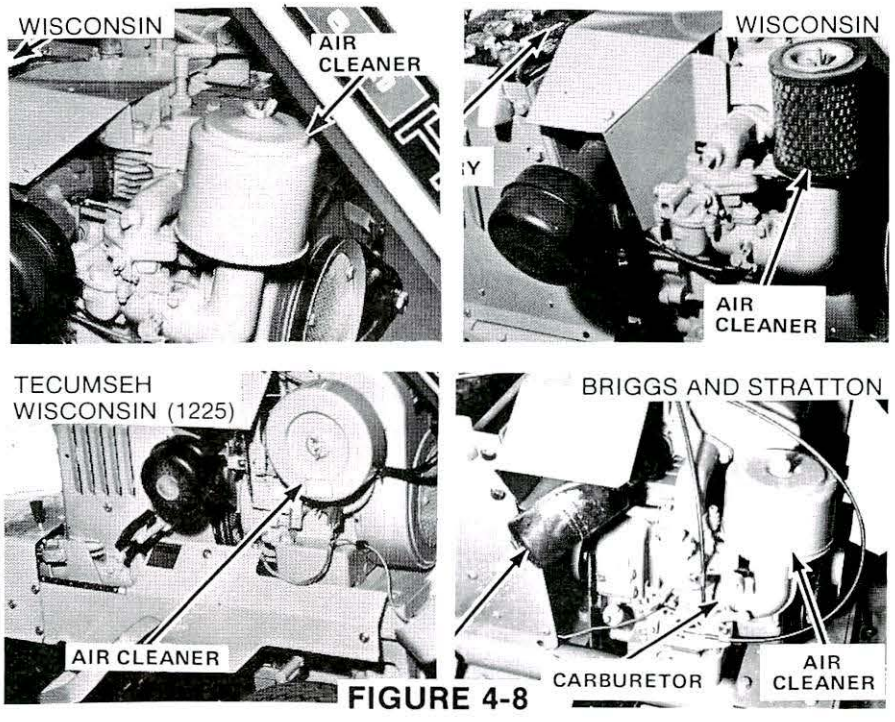

FIGURE 4-8

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SERVICING

TECUMSEH

Do not wash element.

The TECUMSEH dry type element is cleaned by gently tapping on a flat surface — when doing this, be careful not to damage gasket surfaces on element.

IMPORTANT:

DO NOT USE COMPRESSED AIR GASOLINE, KEROSENE OR SOLVENT — DO NOT OIL ELEMENT. THE PAPER ELEMENT WILL BE MATERIALLY AFFECTED BY THEIR USE. Dry type elements should be replaced when no longer serviceable.

OIL-FOAM ® TYPE
BRIGGS AND STRATTON

Under normal operating conditions, disassemble and service air cleaner components every 25 hours of operation. Do this more frequently (even daily) if extremely dusty or dirty conditions prevail.
Push down foam element as shown, and pull out air cleaner cup.
Wash foam element in kerosene or liquid detergent and water to remove dirt.
Wrap foam in cloth and squeeze dry.
Saturate foam in engine oil. Squeeze to remove excess oil.
Put air cleaner cup inside element. Be sure sealing lip is over end of cup (top and bottom).
Reassemble parts as shown. Screw wing nut down tight.

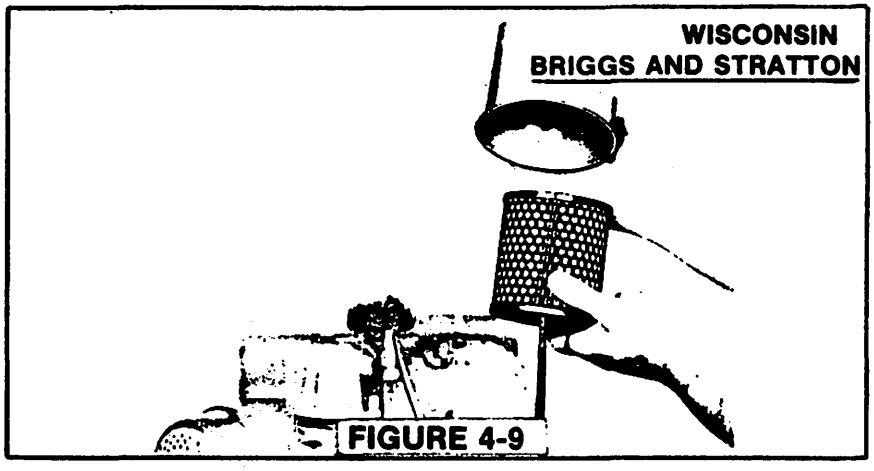

FIGURE 4-9

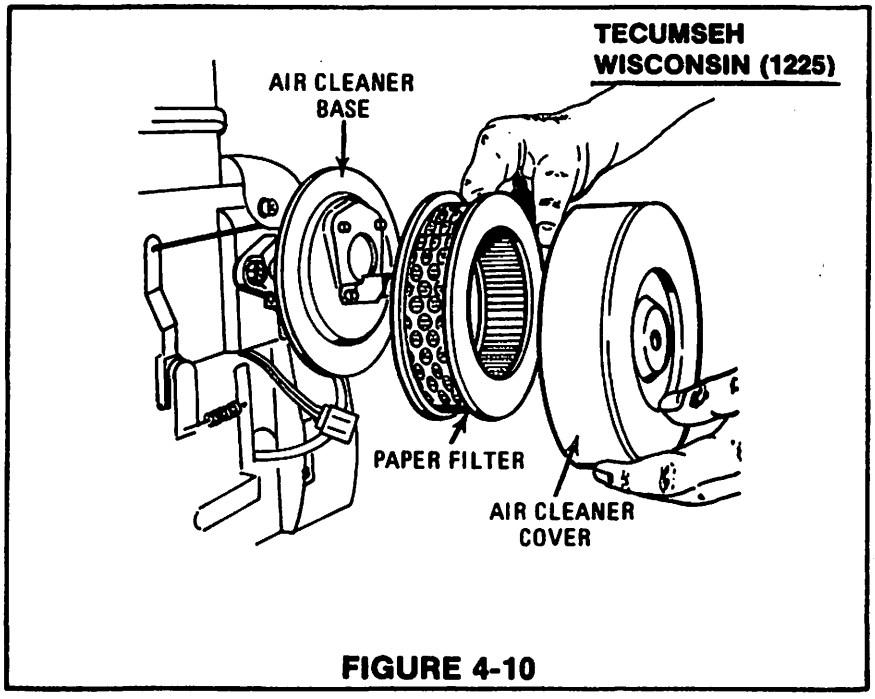

FIGURE 4-10

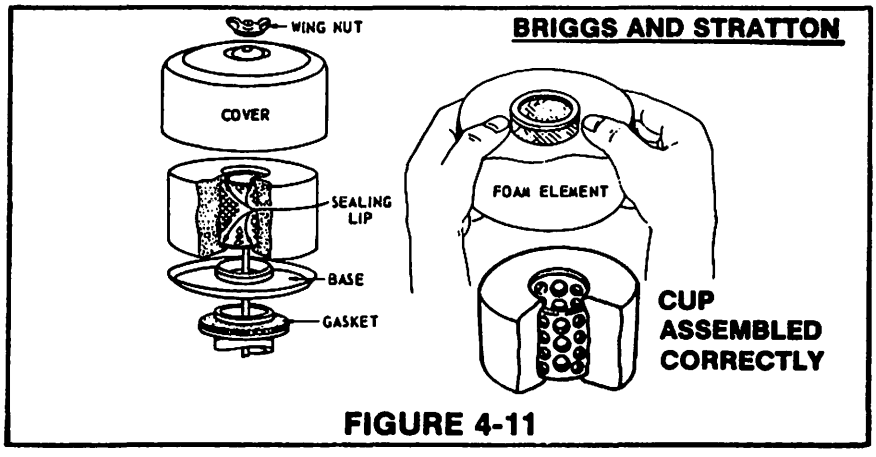

FIGURE 4-11

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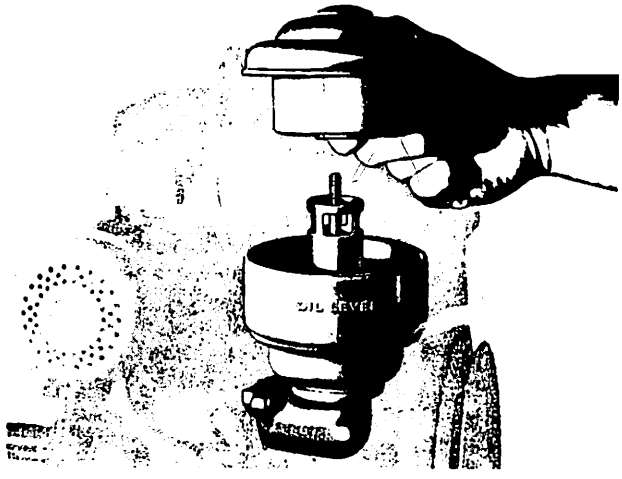
SERVICING

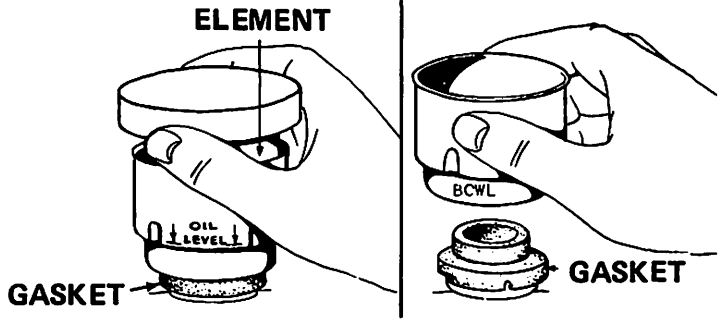
OIL BATH TYPE

Pour out old oil from bowl. Wash element thoroughly in solvent and drain dry. Clean bowl and refill with fresh oil to the level line indicated on the bowl, using the same grade oil as used in the crankcase.



WISCONSIN — Oil Bath Air Cleaner

FIGURE 4-12



BRIGGS AND STRATTON — Oil Bath Air Cleaner

FIGURE 4-13

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STEERING ASSEMBLY

STEERING PINION (E) MUST BE CENTERED IN STEERING GEAR (F) WHEN FRONT WHEELS ARE PARALLEL WITH TRACTOR FRAME. ADJUST STEERING GEARS FOR MINIMUM BACK-LASH BY SLIGHTLY LOOSEN-ING THE 4 BOLTS (D) THEN TAPPING STEERING COLUMN TO THE RIGHT. (CASTING MUST BE HELD SQUARE WITH FRAME) TO PROVIDE FREE PIVOT MOVEMENT OF IDLER CONTROL ROD BEARING BORE INTEGRAL TO CASTING.

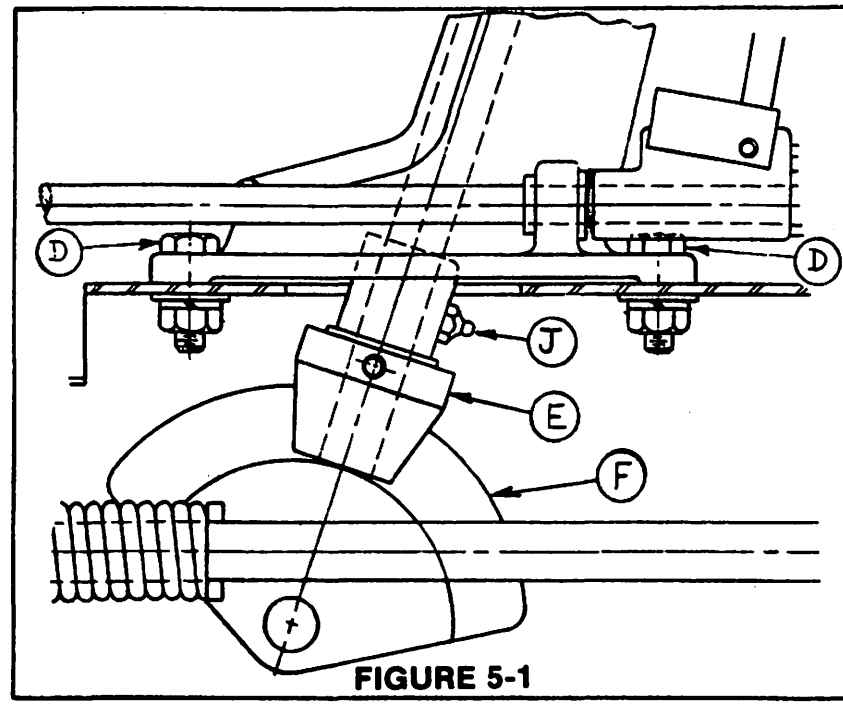

FIGURE 5-1

To correct relationship of steering wheel to the tractor front wheels proceed as follows:

1. Remove cotter pin (Gear Models), or snap ring (Hydro Models), from the cross-shaft.

2. Slide cross-shaft toward the Left of the tractor until the steering arm and steering gear are free.

3. Carefully turn steering wheel so that the emblem is in its approximate correct position.

4. Position the front wheels of tractor so they are straight forward.

5. Being careful not to disturb the above steering wheel and wheel settings install steering gear and steering arm as follows:
   A. Position lug of steering arm into center hole of steering gear.

   B. Line up steering gear and steering arm with cross-shaft.

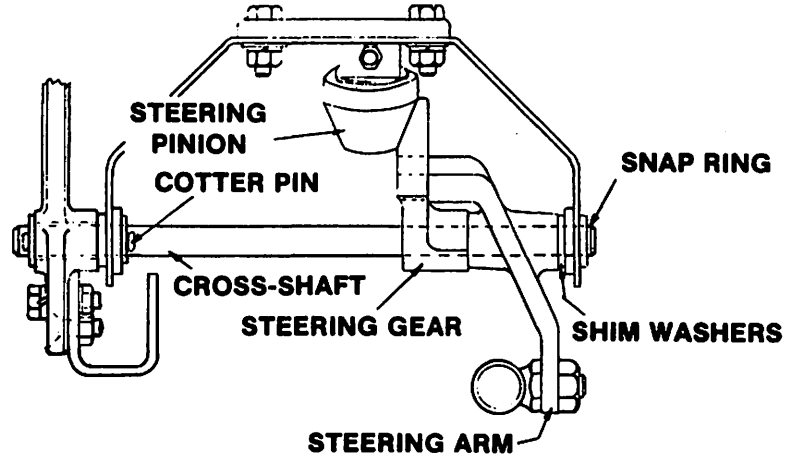

FIGURE 5-2

   C. Slide cross-shaft into steering gear and steering arm being sure to replace all the shim washers.

   D. Replace cotter pin or snap ring securing cross-shaft into position.

5

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CLUTCH ASSEMBLY (6-SPEED TRANSMISSION)

CLUTCH ADJUSTMENT

When the clutch pedal is depressed approximately two-thirds the clutch should be disengaged. To adjust loosen hex nuts "A" and "C" and adjust pedal to an angle of approximately 60° and with approximately ½ inch free pedal movment. Securely lock nuts "A".

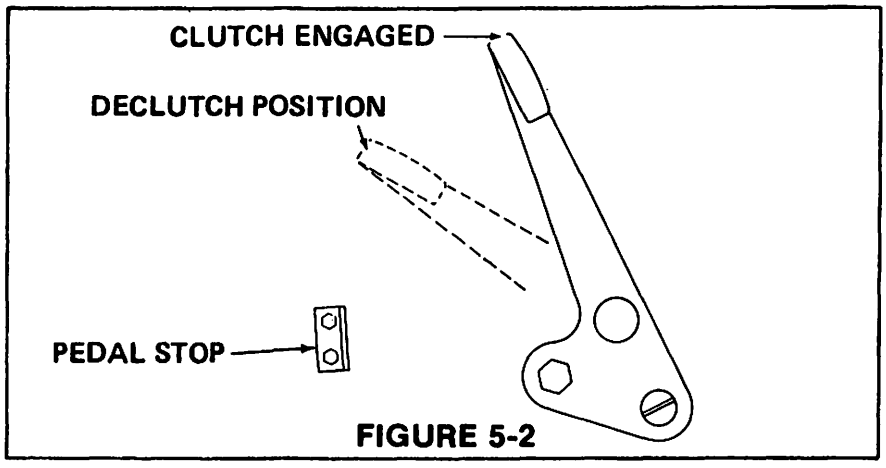

FIGURE 5-2

CLUTCH BRAKE ADJUSTMENT

With clutch pedal in its fully engaged position, adjust the rear clutch Brake-Plate assembly so that there is approximately 3/32" clearance between the clutch flange and the brake lining by moving the Right & Left hand brake assembly support brackets forward or back in the slotted holes provided in the brackets.

IMPORTANT: FREQUENTLY LUBRICATE SPLINED AREA OF SHAFT IN AREA OF CLUTCH FLANGE TO INSURE FREE SLIDING OF FLANGE MOVEMENT. RECOAT SPLINE WITH MOLYKOTE M-88 GREASE OR LUBRICATE, WHENEVER REASSEMBLING DRIVE LINE COMPONENTS.

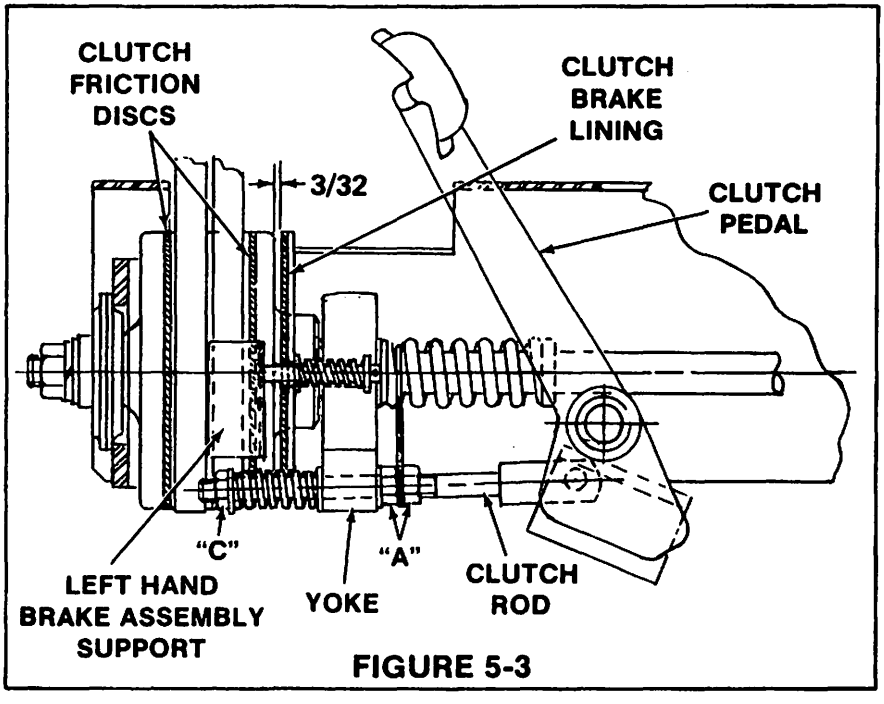

FIGURE 5-3

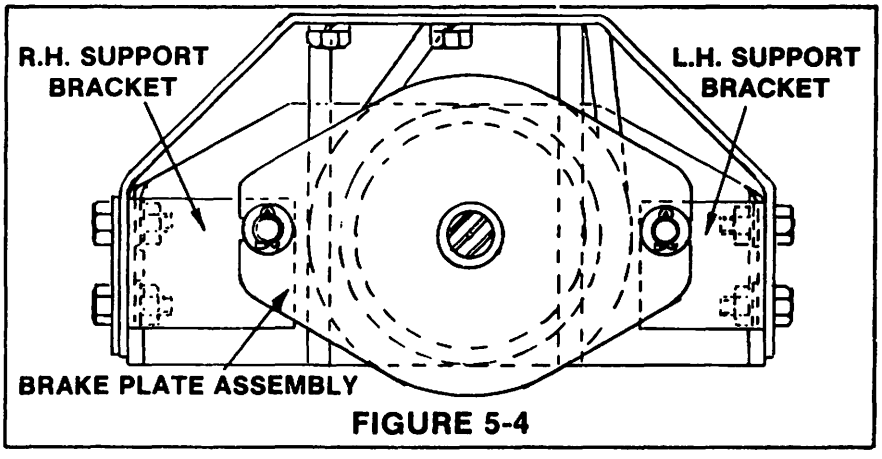

FIGURE 5-4

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CLUTCH ASSEMBLY (6-SPEED TRANSMISSION)

CLUTCH REPLACEMENT

To disassemble the clutch proceed as follows: Remove the two drive belts (1) from drive shaft pulley (2). Remove clevis pin (3) from clutch rod (4) and remove clutch rod (4). Remove the yoke (5) from yoke support (6). Remove drive shaft (7) from bonded coupling (8). Remove cotter pins (9), flat washers (10) and springs (11) from brake brackets (12). Remove four capscrews (13) securing bearing support (14) into mounting plate (15). Remove hex nut (16), lockwasher (17) and flat washer (18) from end of drive shaft (7). Remove drive shaft from bearing (19). Remove clutch flange (20), bowed washer (21), pulley (2), spacer (22), thrust race (23), spring (24), and clutch flange (25) from drive shaft (7). Remove the old friction discs (26) from each side of pulley (2) and thoroughly clean each side of pulley (2). Place the new friction discs (26) on each side of pulley (2) with the cement to the pulley. Place the front and rear clutch flanges (20) and (25) on top of the discs and firmly clamp together (approximately 50 P.S.I.). Place in an oven, which has been pre-heated to 360°-400°, for a minimum of 15 minutes.

Reassemble the clutch by reversing the above procedure.

Adjust the clutch as outlined under clutch adjustment.

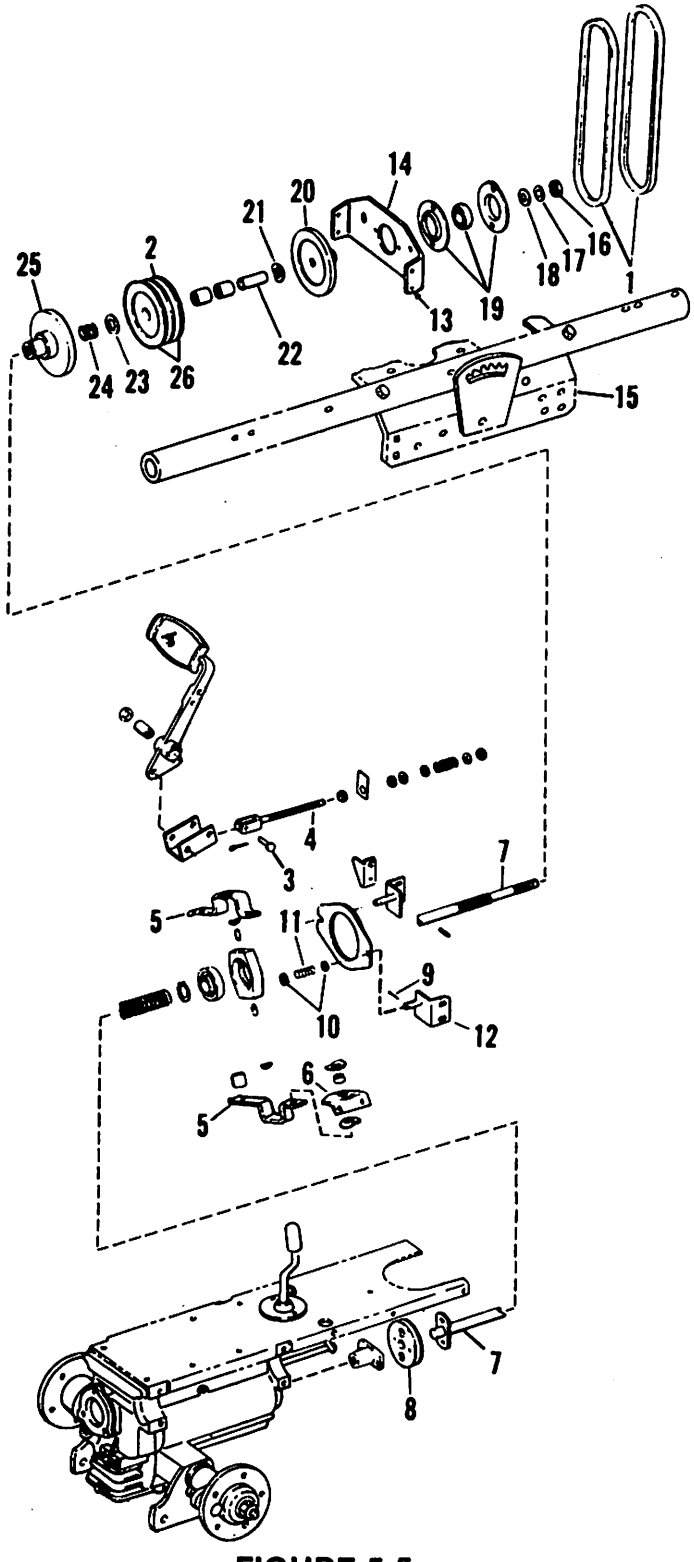

FIGURE 5-5

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CLUTCH ASSEMBLY (3-SPEED TRANSMISSION)

CLUTCH ADJUSTMENT

With the clutch pedal depressed half-way the clutch should release. To adjust, first adjust the clutch pedal to an angle of approximately 60° when the clutch is engaged. Then adjust nut "C" until there is approximately 1/16 inch clearance between the clutch flange and the clutch facing when the clutch pedal is depressed half-way.

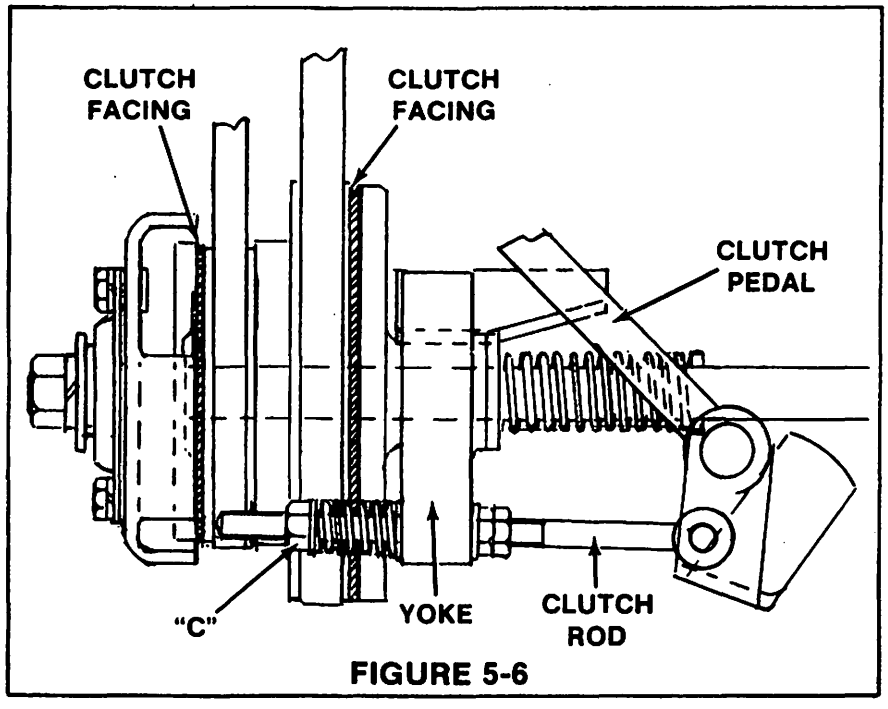

FIGURE 5-6

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CLUTCH ASSEMBLY
(3-SPEED TRANSMISSION - OLDER MODELS)

CLUTCH REPLACEMENT

To disassemble the clutch proceed as follows: Remove belt guide (1). Remove the two drive belts. Disconnect clutch rod (2) from clutch pedal (3). Remove yoke (4) from yoke support (5). Remove drive shaft (6) from bonded coupling (7). Remove four capscrews securing bearing support (8) into mounting plate. Remove hex nut (9), lockwasher (10) and flat washer (11) from front end of drive shaft (6). Remove drive shaft (6) from bearing (12). Remove clutch flange (13), pulley (14), sleeve bearing (15) and clutch flange (16) from the drive shaft (6). Remove the old friction discs. The new discs can be cemented to each side of pulley (14).

To cement the clutch discs to the pulley (14) thoroughly clean each side of pulley (14). Place the discs on each side of pulley (14) with the cement to the pulley. Place the front and rear clutch flanges (13) and (16) on top of the discs and firmly clamp together (approximately 50 P.S.I.) and place in an oven, which has been preheated to 360° - 400°, for a minimum of 15 minutes.

Reassemble the clutch by reversing the above procedure.

Adjust the clutch as outlined under Clutch Adjustment.

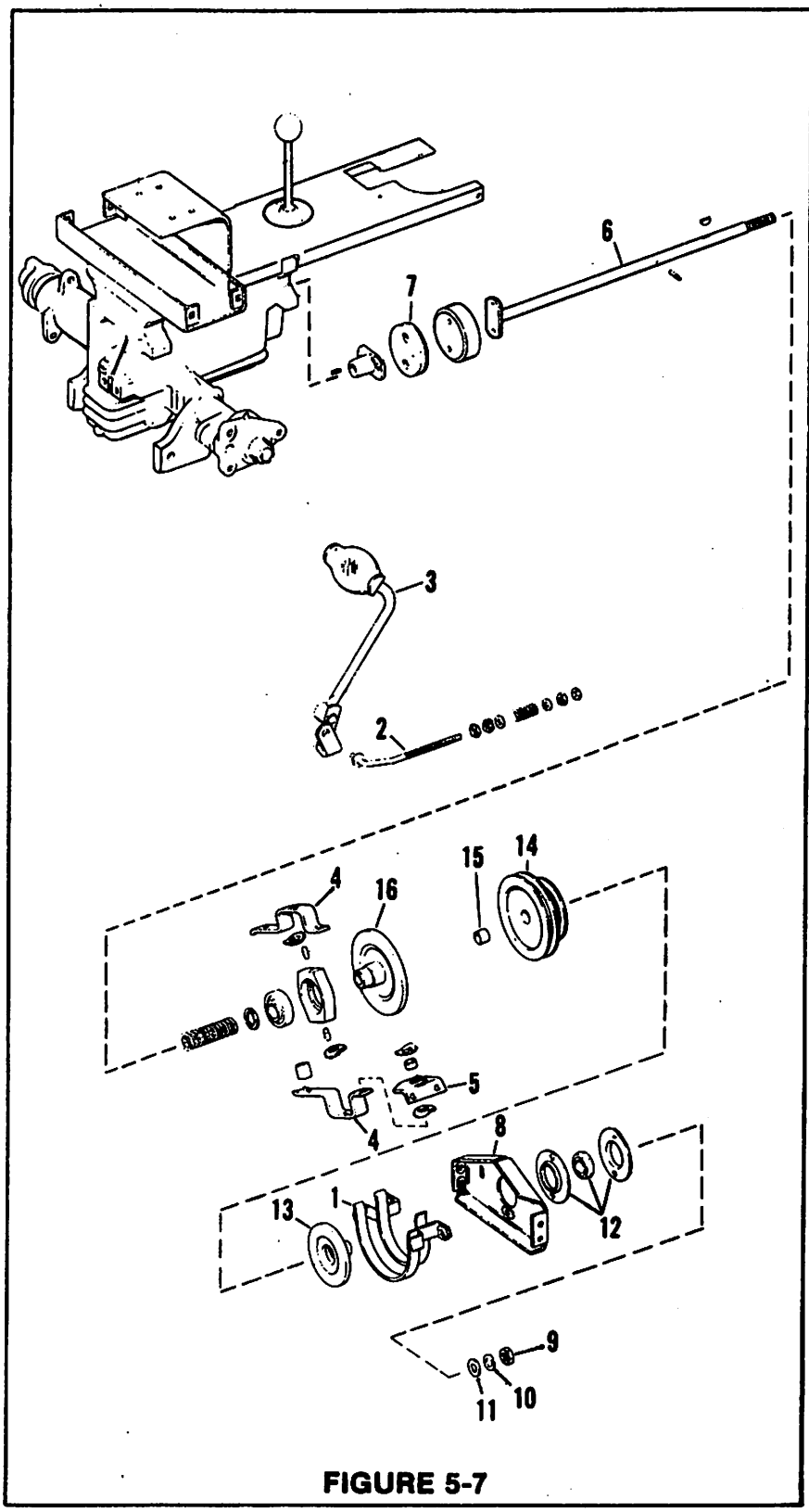

FIGURE 5-7

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BELT GUIDE ADJUSTMENT

MODELS 800, 850 & 900

STEP 1
Loosen A, set R.H. belt guide to within ⅛" of tight Hi-drive belt.
STEP 2
Loosen B, set L.H. belt guide to within ⅛" of engine pulley with belt tight.
STEP 3
Loosen C & D, slide both belt guides to within 1/16" to ⅛" of belt when Lo-drive belt is tight.
STEP 4
Loosen bolt E then loosen bolt F. Pivot belt guide in slot at F to obtain ⅛" clearance at all three points G, H & I. Tighten bolts E & F securely.
CAUTION:
Then with Hi-drive belt **tight,** re-check belt clearance at all (3) points J, K & L, using a gage as per sketch (lower L.H. corner).
IMPORTANT: Start engine, then observe belt behavior in both Hi and Lo drive.
DO NOT ALLOW belt guides to rub on **back-side** of any belt that is running and/or in motion. Frayed or shredded belts generally indicate interference in the area of the belt path and must be investigated, then corrected when installing replacement belt.

The purpose of belt guides is to hold the belt in a position to conform to the pulley grooves as close as possible without dragging in the rotating pulley grooves. At the same time when the idler pulley is engaged and "the belt is tight and moving" no part of the belt should be touching guides or other stationary parts. Alignment of pulleys and idlers should be regularly checked to insure that the belt is not being subjected to excessive side-wall wear.

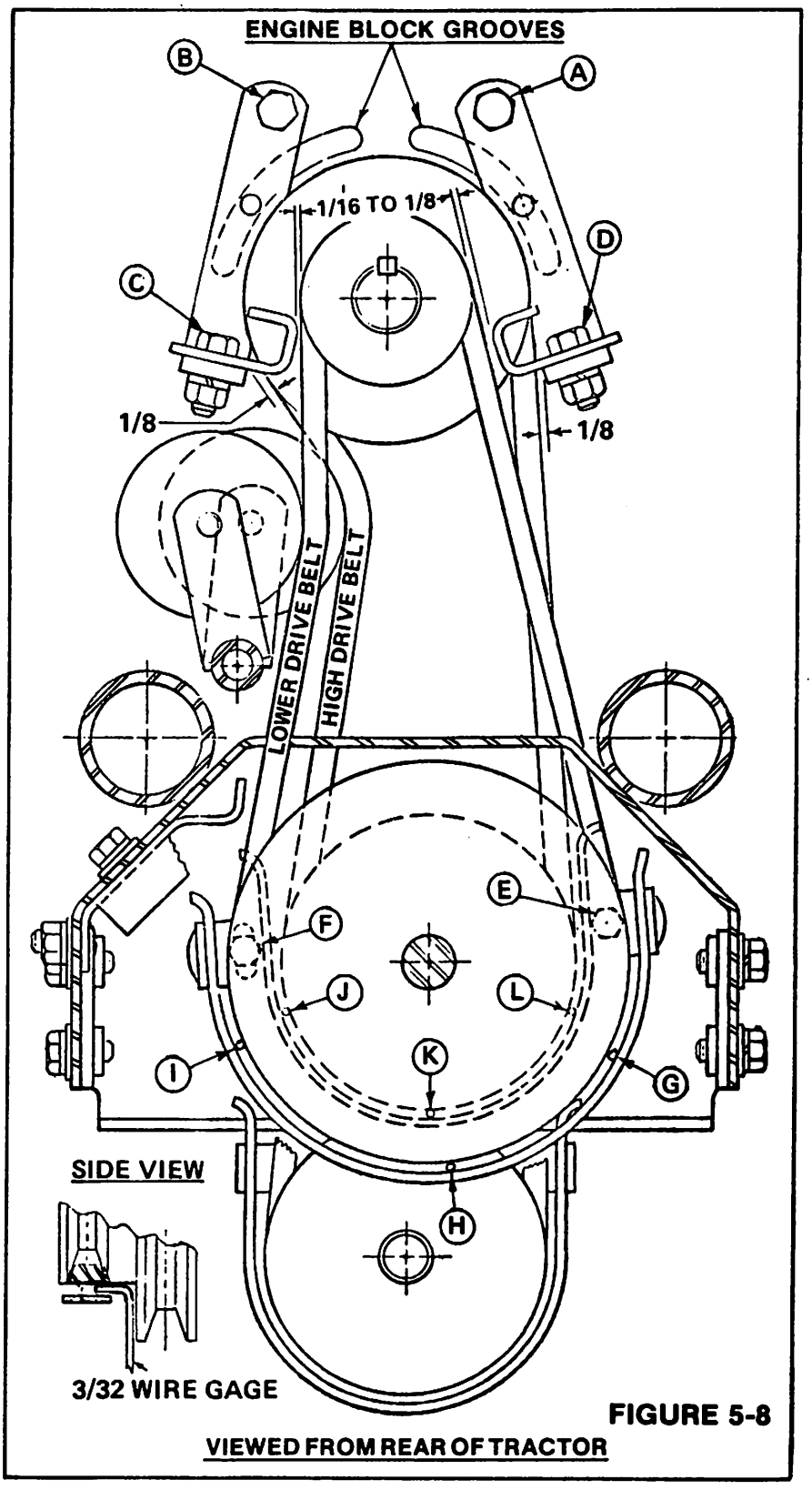

FIGURE 5-8

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BELT GUIDE ADJUSTMENT

MODEL 853

The drive sheave guides are welded to a common pivot. If adjustment is necessary loosen capscrew "B" and pivot belt guides either in or out to achieve the ⅛" clearance required. If either only the High or the Low Drive guide needs adjustment then the guide needing the adjustment must be bent with a pliers to the required adjustment.

To adjust lower belt guide loosen capscrews "E" and "F". Pivot belt guide in slot at F to obtain ⅛" clearance at all three points "D". Tighten capscrews "E" and "F" securely.
CAUTION: Then with Hi-drive belt **tight,** recheck belt clearance at all (3) points "C", using gage as per sketch (lower L.H. corner).
IMPORTANT: Start engine, then observe belt behavoir in both Hi and Lo Drive.

DO NOT ALLOW Belt guides to rub on **back-side** of any belt that is running and/or in motion. Frayed or shredded belts generally indicate interference in the area of the belt path and must be investigated, then corrected when installing replacement belt.

The purpose of belt guides is to hold the belt in a position to conform to the pulley grooves as close as possible without dragging in the rotating pulley grooves. At the same time when the idler pulley is engaged and "the belt is tight and moving" no part of the belt should be touching guides or other stationary parts. Alignment of pulleys and idlers should be regularly checked to insure that the belt is not being subjected to excessive side wall wear.

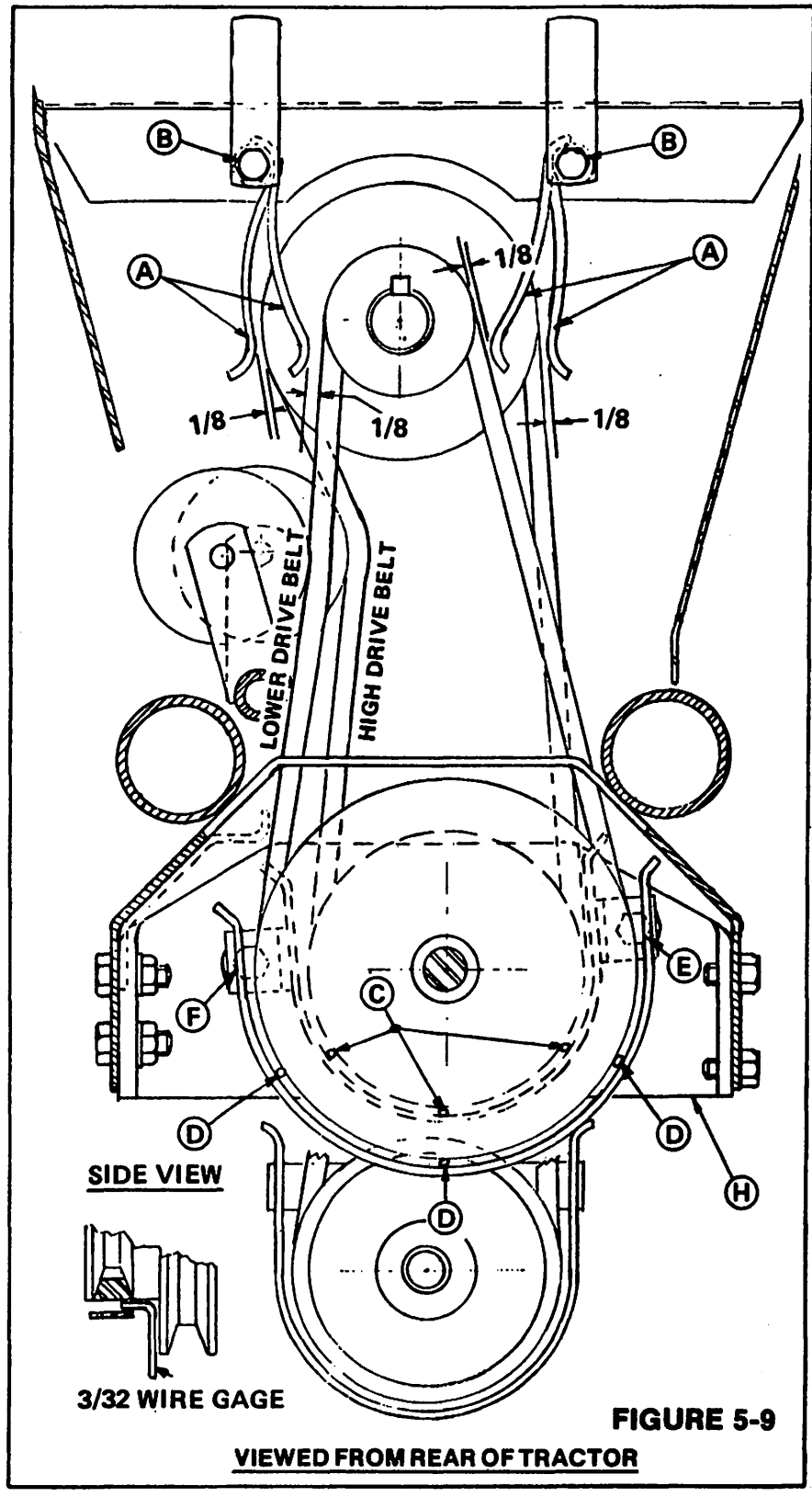

FIGURE 5-9

VIEWED FROM REAR OF TRACTOR

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HYDROSTATIC ADJUSTMENTS

TRAVEL PEDAL

The "Travel Pedal" was adjusted at the factory with tip of the pedal approximately 45° forward of the vertical center line. If the operator would prefer to either increase or decrease this angle for his personal comfort the pedal can be adjusted as follows. Loosen hex nut "A." Remove cotter pin "B" from trunnion "C." Remove trunnion "C" from lever "D." Turn rod "F" into rod end "E" to increase the pedal angle. Turn rod "F" out of rod end "E" to decrease the pedal angle. After adjustment has been completed, reinstall trunnion "C" and cotter pin "B." Lock hex nut "A" securely against rod end "E."

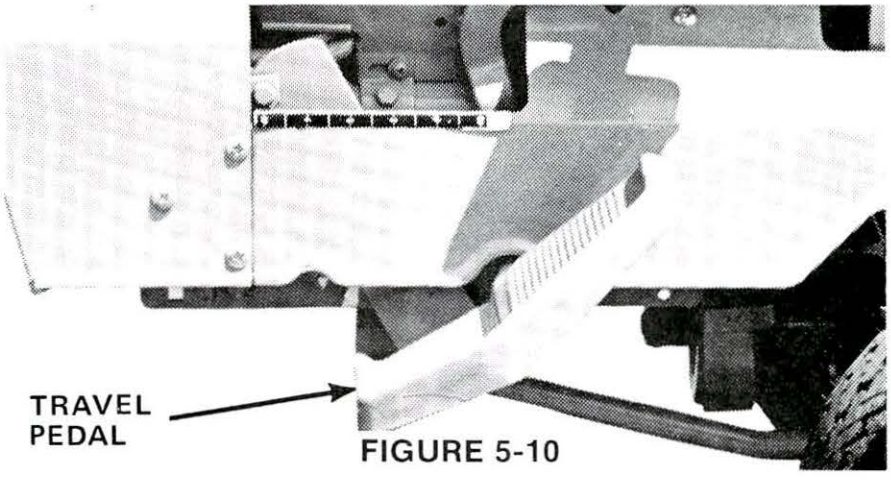

FIGURE 5-10

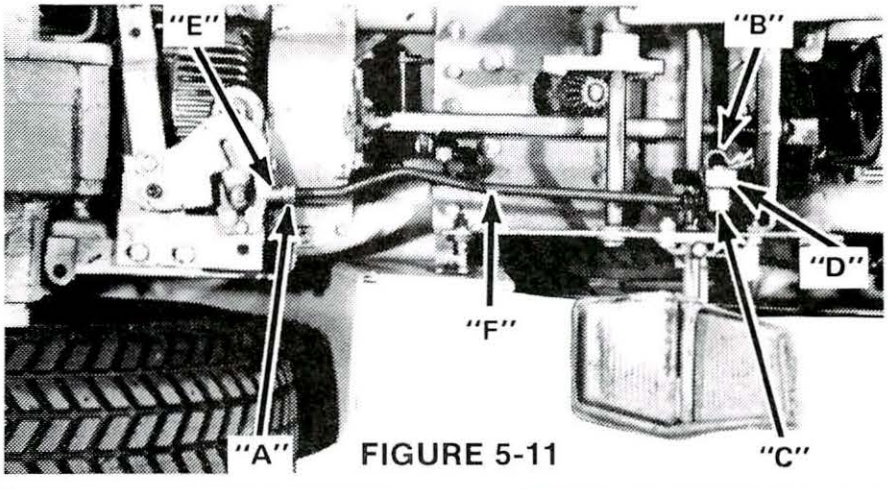

FIGURE 5-11

HYDROSTATIC NEUTRAL ADJUSTMENT (1225, 1256-01 -02-03 & 1257)

Securely block up rear of tractor so wheels are just off of ground.

1. Loosen the ⅜" cap screws "A" (just finger tight). If wheels rotate forward tap plate "B" forward until wheels remain motionless when engine is running approximately ½ throttle. If wheels tend to rotate in reverse, tap plate toward rear.

2. Securely tighten cap screws "A". **NOTE:** While making this check be sure the two Neutralizer arms "C" rest firmly against the square plastic block "D".

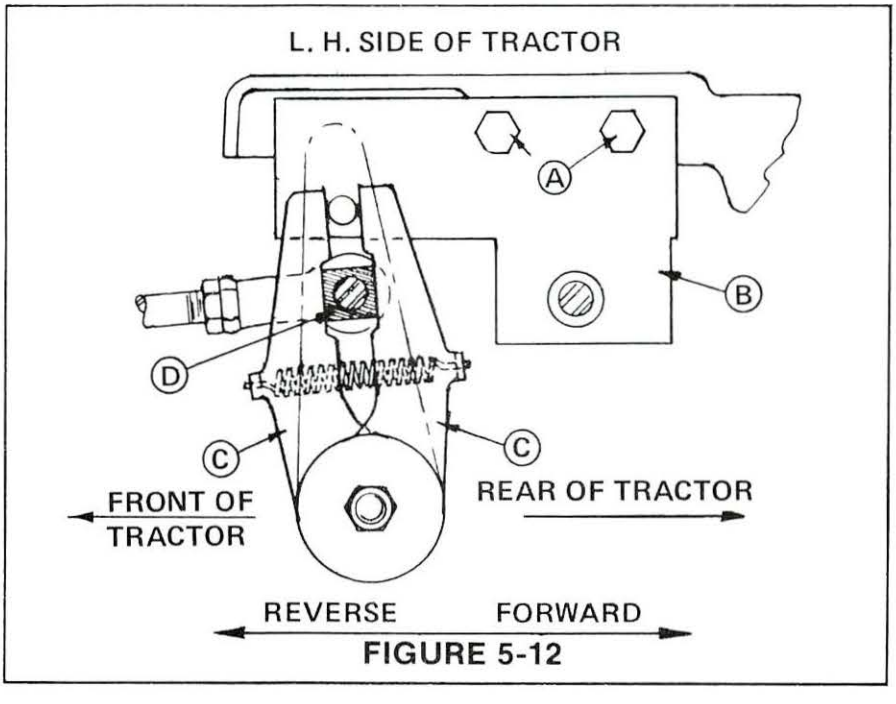

FIGURE 5-12

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HYDROSTATIC ADJUSTMENTS

HYDROSTATIC NEUTRAL ADJUSTMENT
(1256-04 & LATER MODELS)

If the tractor creeps "Forward" or "Backward" the "Neutral" position needs adjustment.

Adjust Neutral as follows:

1. With the engine off, release parking brake and place travel pedal in full reverse position. Pin "A" should be tight in corner "B" of lever "C". If adjustment is necessary loosen capscrew "D" and adjust lever "C." Securely retighten capscrew "D" after adjustment is achieved.

2. Securely block up rear of tractor, just so the rear wheels clear the ground.

3. Start the engine and set throttle to about ¼ open.

4. Loosen capscrews "E". Hold neutral arms "F" firmly in contact with pin "K," carefully move plate "G" toward front of tractor, if tractor is creeping forward, and toward rear of tractor if tractor is creeping backward, until Hydrostatic noise ceases and wheels no longer creep.

5. Securely tighten capscrews "E" and recheck. Plate "G" must be kept parallel to casting "H".

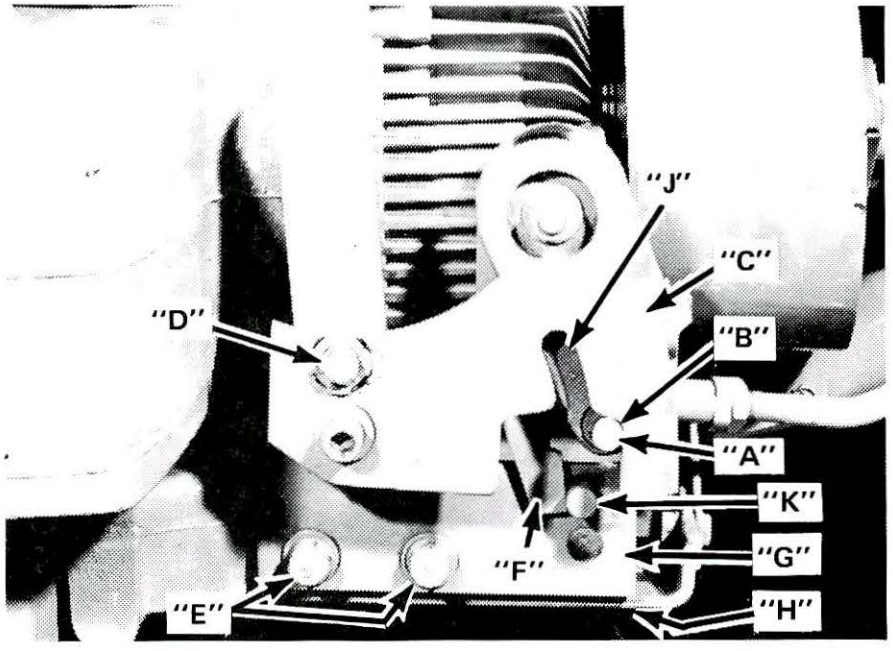

FIGURE 5-13

NOTE: WHEN NEUTRAL IS PROPERLY ADJUSTED PIN "A" MUST ENTER SLOT "J" FREELY WITHOUT HITTING THE SIDES OF SLOT "J". IF PIN HITS THE SIDE OF SLOT "J" LOOSEN CAPSCREW "D" AND READJUST LEVER "C." SECURELY RETIGHTEN CAPSCREW "D" AFTER CORRECT ADJUSTMENT IS ACHIEVED.

5

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BRAKE ASSEMBLY

MODELS WITH 3 SPEED TRANSMISSION AND MODEL G-12

The brake may require adjustment periodically (at two points) due to wear. Typical adjustments are as follows.

(1) TO ADJUST BRAKE ON TRANSMISSION SHAFT FIG. 5-14

(located under tractor frame in line with brake pedal) adjust by moving the nuts (D) on both sides of the pivot block. Model 600 only - adjust by moving the two nuts (D) on the top side of the pivot block.

(2) TO ADJUST BRAKE ON DRIVE SHAFT BRAKE DRUM FIG. 5-15

Loosen brake adjusting nut on the brake rod. Turn nuts at both points only one or two turns at a time until proper brake adjustment balance is obtained.

If brake is set too close there will not be enough free clutch pedal travel - causing the brake to become effective before the clutch is released. The brake shoe should make contact with the brake drum immediately after the clutch is completely disengaged.

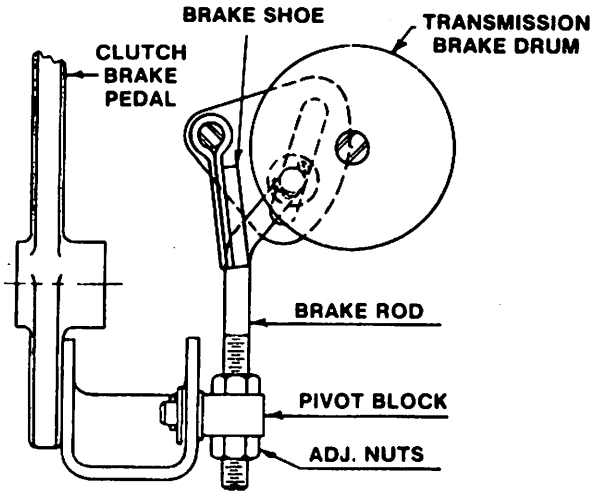

FIGURE 5-14

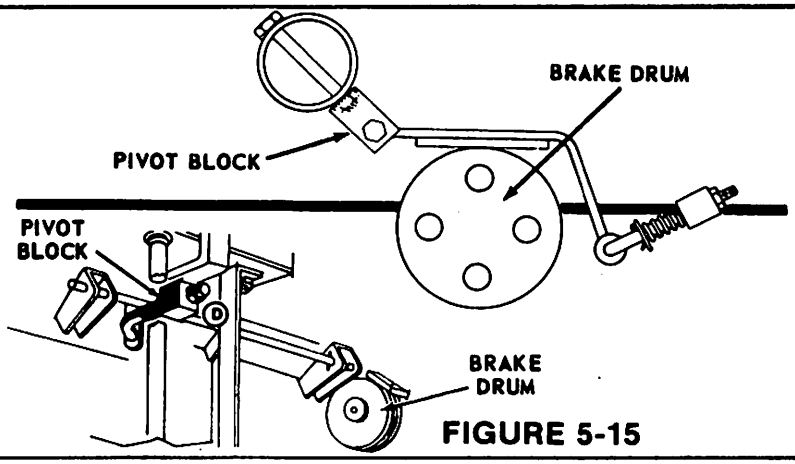

FIGURE 5-15

MODELS 1000 & LATER WITH 6 SPEED TRANSMISSION

Should it become necessary to remove the clutch assembly or disturb the linkage for any reason, both the clutch-brake and the main brake must be rechecked and readjusted in relation to the clutch-brake pedal positions through its travel arc.

The main brake rod should then be positioned in the activating lever as shown, in Figure 5-16.

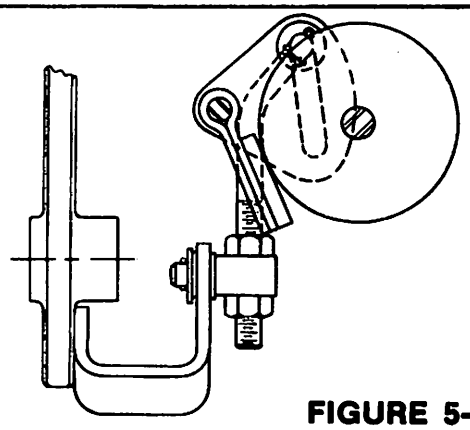

FIGURE 5-16

https://truckmanualshub.com/

BRAKE ASSEMBLY

Depress CLUTCH-BRAKE pedal approximately two-thirds or until rear clutch flange has moved back to make contact with stationary brake plate. At this time, adjust brake-rod up to the top of the activating lever slot as illustrated.

Exert additional down pressure on CLUTCH-BRAKE pedal to move brake shoe to contact MAIN brake drum located on Transmission wormshaft. Figure 5-16.

Check distance between pedal stop and pedal and readjust brake-rod if necessary to maintain a gap of approximately 1" when MAIN BRAKE is fully applied. Figure 5-17.

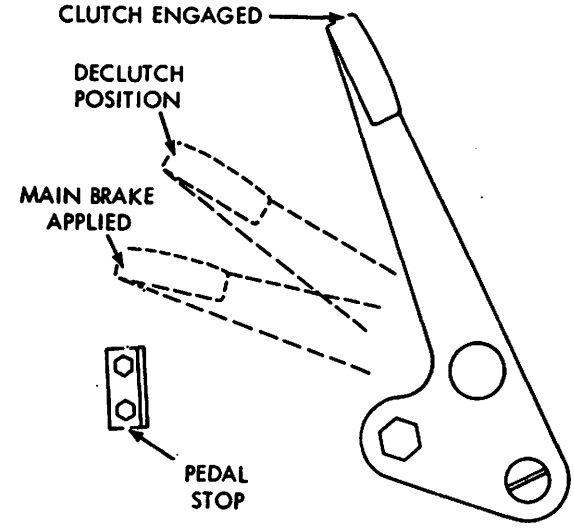

FIGURE 5-17

G-11 & G-14 P.T.O. BRAKE ADJUSTMENT

On G-11 and on G-14 (1453) series 0500101 and up models there is a brake on the P.T.O. sheave.

With the P.T.O. control handle in the disengaged position, adjust lower nut "A", Figure 5-18, until bowed washer "B" is fully compressed. Adjust upper nut until there is a 1/16 inch gap. Sheave must stop within 5 seconds. If not, readjust nut "A" for more pressure on sheave.

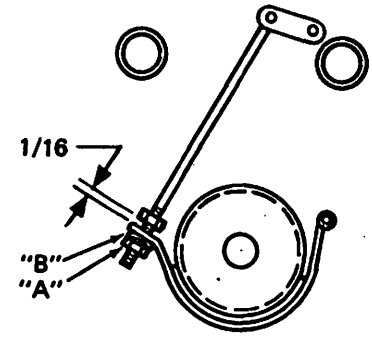

FIGURE 5-18

PARKING BRAKE (1225, 1256-01, 02, 03, 1257)

Place the parking lock into "Park" position. In doing this a small amount of resistance should be felt as the linkage cams over center. With the transmission in "Park" the differential should be locked. If it is not locked proceed as follows to readjust.

1. Securely block up rear of tractor and remove left rear wheel.

2. Put Parking Lock into Drive.

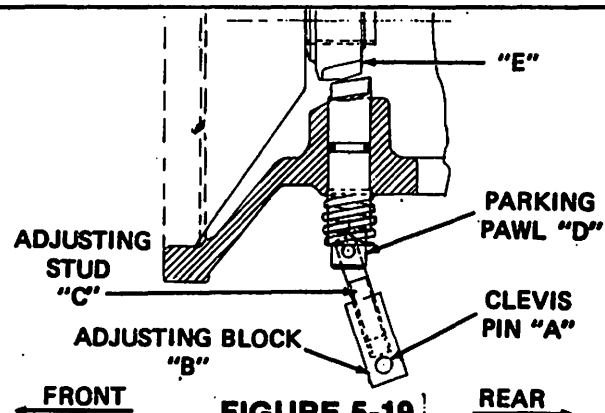

FIGURE 5-19

https://truckmanualshub.com/

BRAKE ASSEMBLY

3. Clamp a vise grip over rear of parking brake arm "F", and swing arm to rear of tractor.

4. Remove clevis pin "A."

5. Turn adjusting block "B" in ½ turn increments to lengthen stud "C."

IMPORTANT

DO NOT TURN PARKING PAWL "D" IN TRANSMISSION.

The parking pawl is beveled for a proper mesh with the bevel pinion. Incorrect mesh of the bevels will result in pawl or pinion damage.

6. When slight resistance is felt as the transmission is put into "Park" the pawl is adjusted properly. SEE NOTE

NOTE

IF PARKING PAWL IS NOT ADJUSTED FAR ENOUGH INTO BEVEL PINION THE PARKING PAWL WILL RATCHET OVER THE PINION TEETH WHEN ON AN INCLINE OR IF ACCIDENTLY PUSHED.

7. Replace clevis pin "A" into adjusting block and parking brake arm them remove vise grip.

8. Reinstall left rear wheel, and remove blocking.

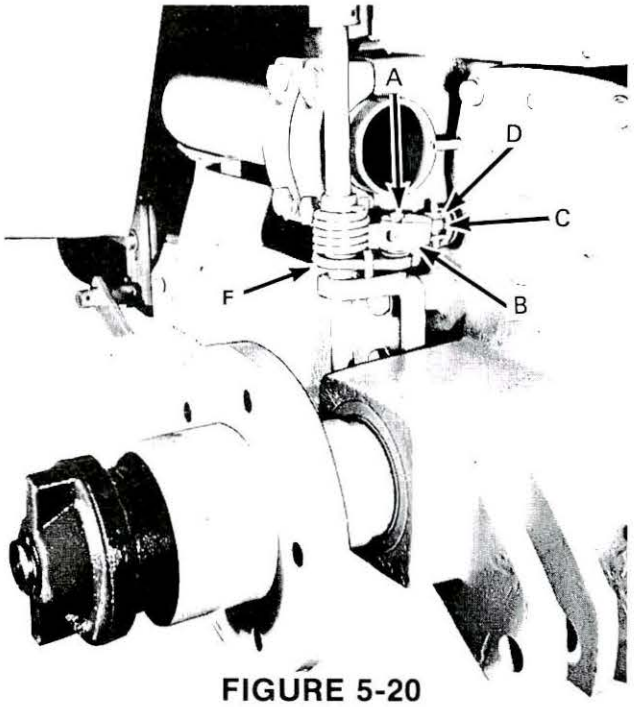

FIGURE 5-20

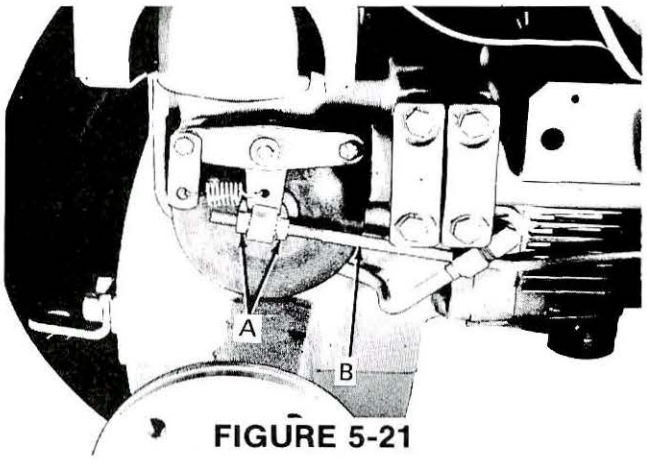

FIGURE 5-21

DISC BRAKE
(1256-01, 02, 03 & 1257)

To check brake adjustment, push brake pedal down by hand until brake linings contact brake disc. If there is less than 1" of travel left on the pedal the brake needs adjustment. To adjust the foot brake proceed as follows:

1. Loosen the two hex nuts "A."

2. Shorten brake rod "B" until there is 1-½" of free pedal when brake linings touch the brake disc as the pedal is depressed by hand.

3. Tighten hex nuts "A" securely.

4. Check brake for proper braking and operation and readjust if necessary.

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BRAKE ASSEMBLY
INTERLOCK SWITCH

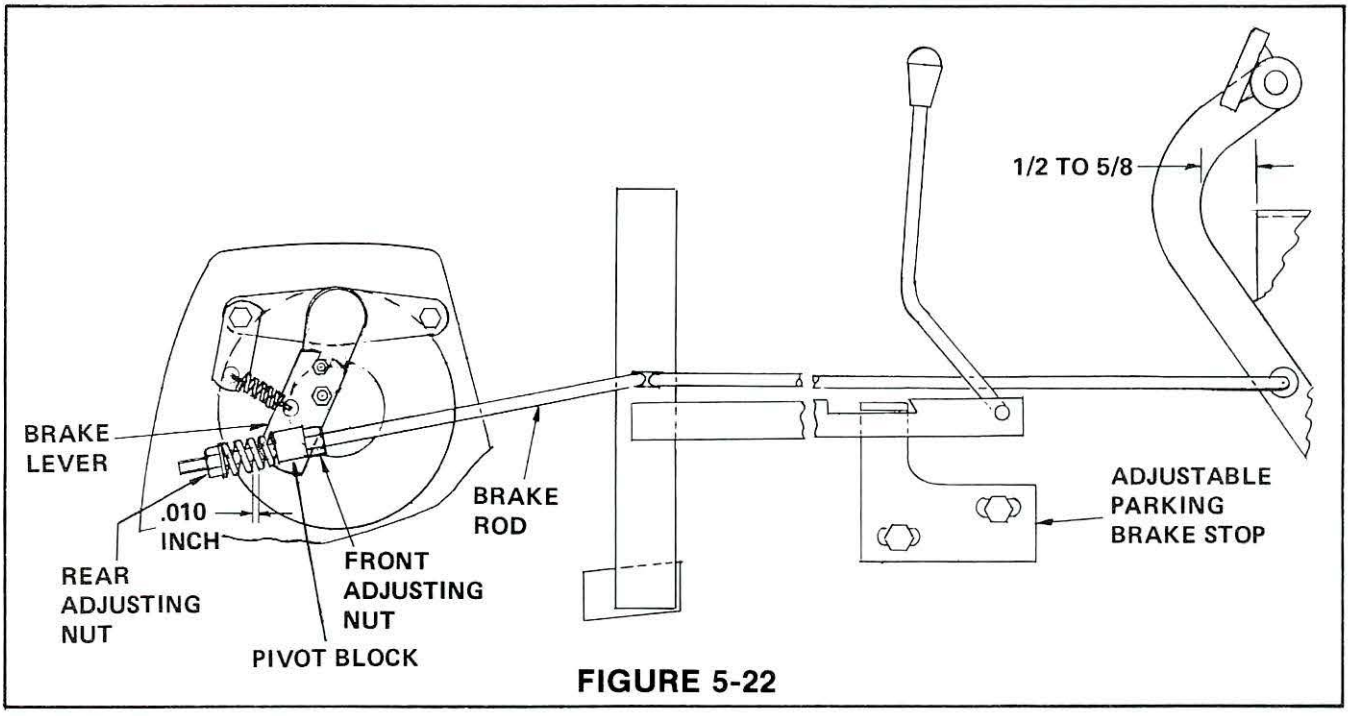

FIGURE 5-22

5

DISC BRAKE
(1256 -04 & LATER MODELS WITH HYDRO TRANSMISSION)

With Brake Pedal in "Park" position, adjust Parking Brake Stop as required to provide ½ to 5/8 inch pedal travel.

While Pedal is in "Park" position, loosen front Nut on Brake Rod to allow movement and then turn rear Nut until a .010 gap between midle coils of the Spring is attained.

Turn front Nut up to the block, then back off ½ turn.

Test unit for proper operation.

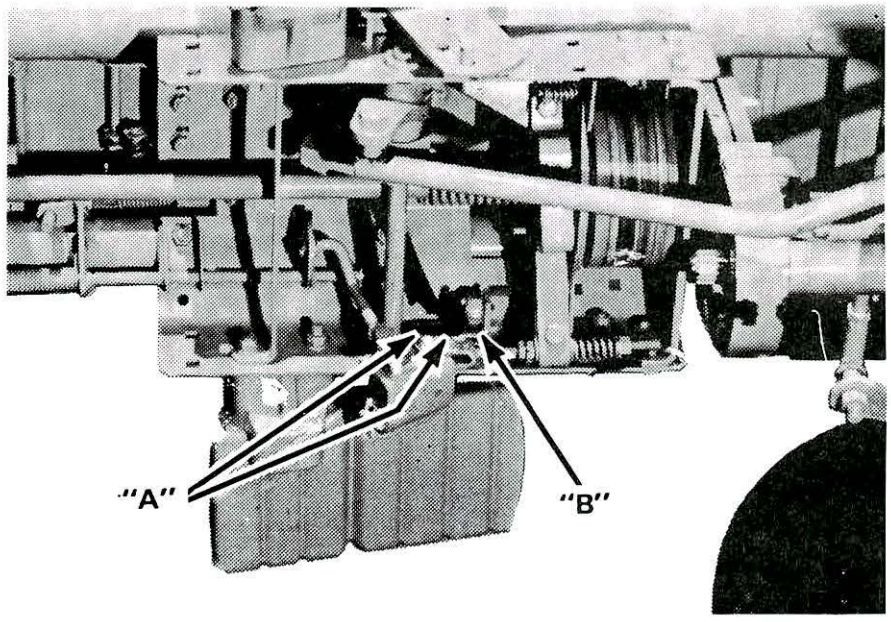

FIGURE 5-23

BRAKE INTERLOCK SWITCH
(1054 & LATER MODELS WITH MANUAL TRANSMISION)

Loosen nuts "A" and move bracket "B" on pedal arm either towards or away from actuating spring to obtain correct adjustment. The switch should just begin to actuate when pedal is half-way down. After correct adjustment is achieved, securely tighten nuts "A" and recheck operation. If adjustment has changed, repeat the above procedure until correct adjustment is achieved.

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INTERLOCK SWITCHES
BELTS

BRAKE INTERLOCK SWITCH
855(G9), 1055 (G-10), 1255 (G-12)

The interlock switch on the "Clutch Brake Pedal" is actuated by a flat spring, therefore should not need adjustment. It is important that the actuating spring be positioned directly under the interlock switch so it contacts the ball in the switch when clutch-brake pedal is depressed.

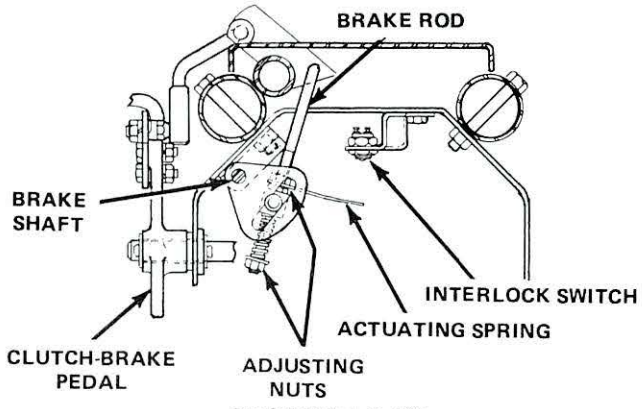

FIGURE 5-24

BRAKE INTERLOCK SWITCH
(1225, 1256-01, 02, 03 & 1257)
With parking lock in "Park" position, loosen capscrews "A" and move bracket "B" either in or out to obtain from 3/64" maximum to 1/64" minimum clearance between the switch housing and the cam.

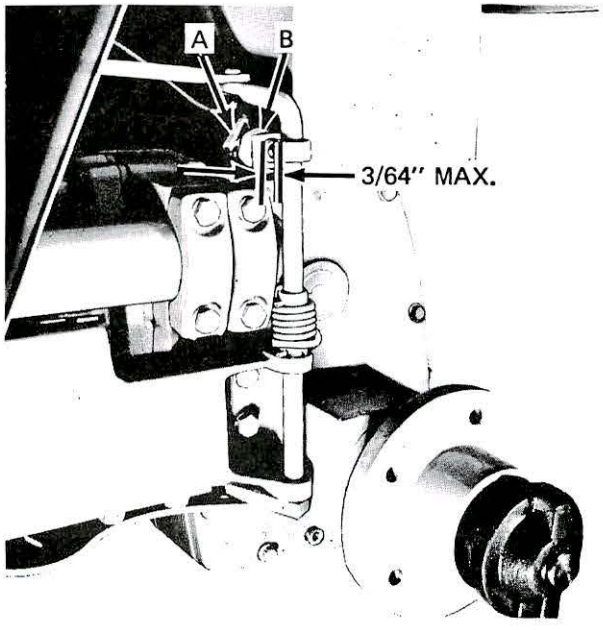

FIGURE 5-25

BRAKE INTERLOCK SWITCH
(1256-04 & LATER MODELS WITH HYDRO TRANSMISSION)
Interlock switch is located as shown in Figure 5-26 and requires no adjustment.
When brake pedal is depressed, interlock switch should be activated.

P.T.O. INTERLOCK SWITCH
GEAR DRIVE

With the P.T.O. lever in OFF position, the flat of the P.T.O. cam should be in the vertical position shown in sketch. Adjust actuator spring so it makes light contact to the interlock switch button. Recheck switch operation and readjust if necessary.

HYDROSTATIC
With P.T.O. lever in off position, loosen hex nuts "A" slightly. Then move bracket "B" either towards or away from P.T.O. lever cam to obtain from 3/64" maximum to 1/64" minimum clearance between the switch housing and the cam.

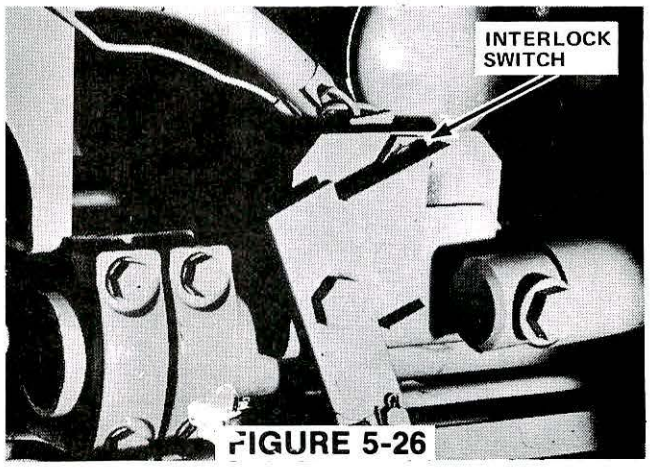

FIGURE 5-26

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BELTS

After adjustment is made securely tighten nuts "A" and recheck clearance. If clearance has changed repeat above procedure.

SEAT INTERLOCK SWITCH

On the G-11 and G-14 series 0500101 and up tractors, there is an interlock switch positioned in the fender, see Figure 5-28. In order for the P.T.O. to start, the switch must be activated in one of two ways. The normal way is to sit on the seat. The second way would be to lift up the seat and manually lift the button up.

DRIVE BELTS

The transmission drive belts requires no adjustment. There is constant belt tension applied at all times.

P.T.O. BELTS

The P.T.O. belts can be adjusted by loosening the three capscrews that hold P.T.O. support casting to axle support casting. Raise or lower P.T.O. support casting to obtain proper adjustment. When P.T.O. Lever is 1⅛ to 1¼ inches from Left side or rear of quadrant, whichever applies, the P.T.O. belt should start to tighten.

If belts are properly adjusted (as described above) and still drag, check adjustment of lower belt guide. There should be not more than ⅛" clearance between pulley and belt guide all the way around when P.T.O. is engaged but should not rest on the belt at any point when running.

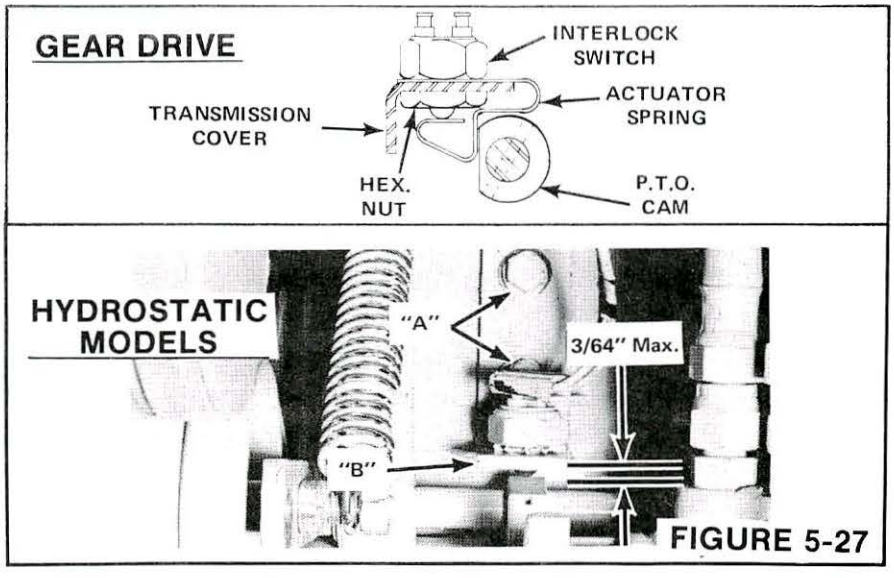

FIGURE 5-27

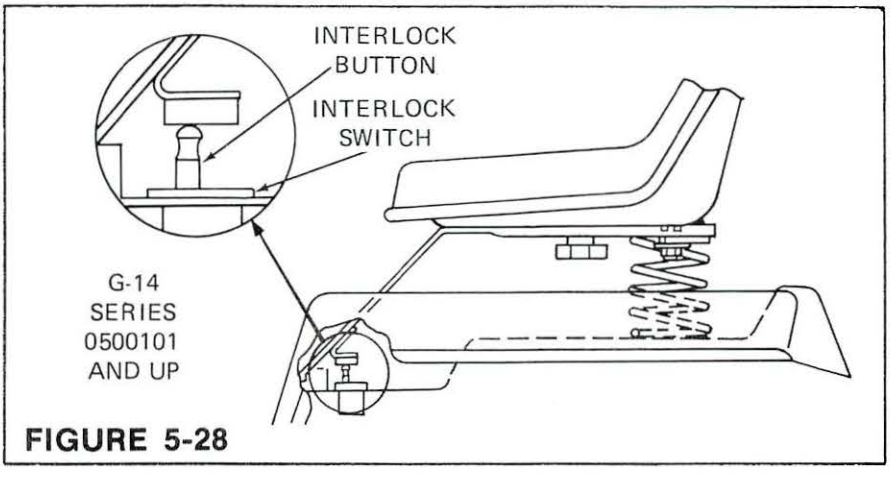

FIGURE 5-28

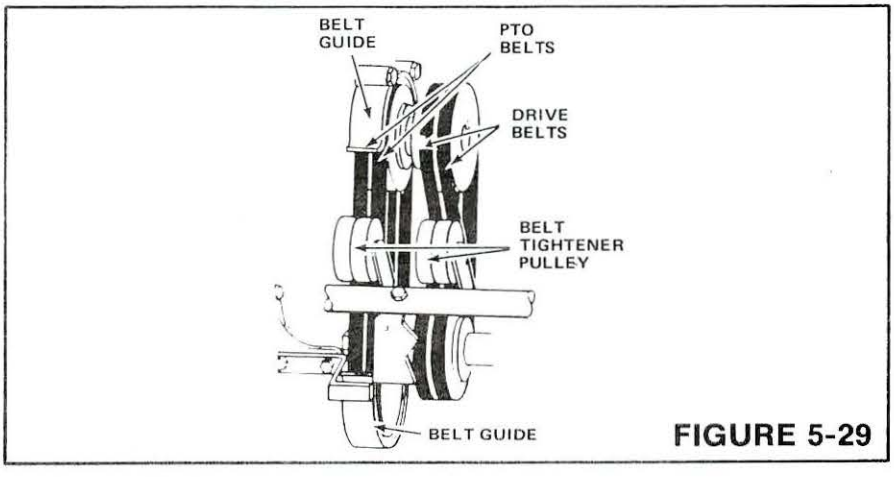

FIGURE 5-29

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BELTS

NOTE: FOLLOW SAME PROCEDURE ON MODELS EQUIPPED WITH SINGLE BELT DRIVES.

STARTER-GENERATOR DRIVE BELT (ALL, EXCEPT MODELS WITH BENDIX DRIVE STARTER) To check generator belt for proper tension stop engine. Belt should depress ¼ inch between pulleys with normal thumb pressure as shown in Figure 5-30. Should adjustment be required, loosen the two lower generator mounting screws "B" and generator adjusting screw "A." Pivot generator outward from engine until proper tension is obtained.

NOTE: NEVER PRY OUT GENERATOR WITH A LONG HEAVY BAR OR TOOL AS THIS WOULD RESULT IN PREMATURE BEARING FAILURE.

Tighten the generator adjusting screw "A" and generator mounting screws "B." *Make sure all bolts and nuts are securely tightened.*

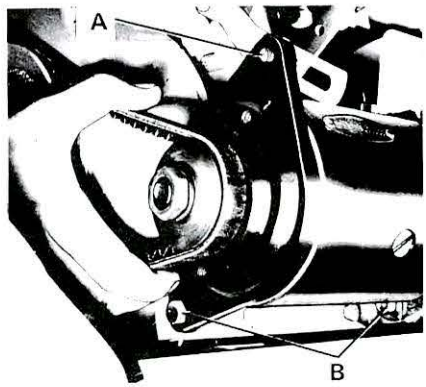

FIGURE 5-30

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

POWER TAKE-OFF (P.T.O.) SHAFT AND SEAL

To install the new nylon disc-seal supplied, it will be necessary to soak the nylon disc-seal in hot water approximately 140 to 160 degrees for about 5 minutes to expand inner hole and make disc pliable before installation. Assembly as shown in Figure 5-31

NOTE: Load PTO Assembly with lubricant after - assembly thru fitting in housing.

172-1596 SHAFT & SEAL 600-650-750-800-850-853-900-G9-G10-G11-G12

172-1597 SHAFT & SEAL 1000-1050-1053-1054-1220-1225-1253-1254-1256-1257-1556-G14-H16-H14

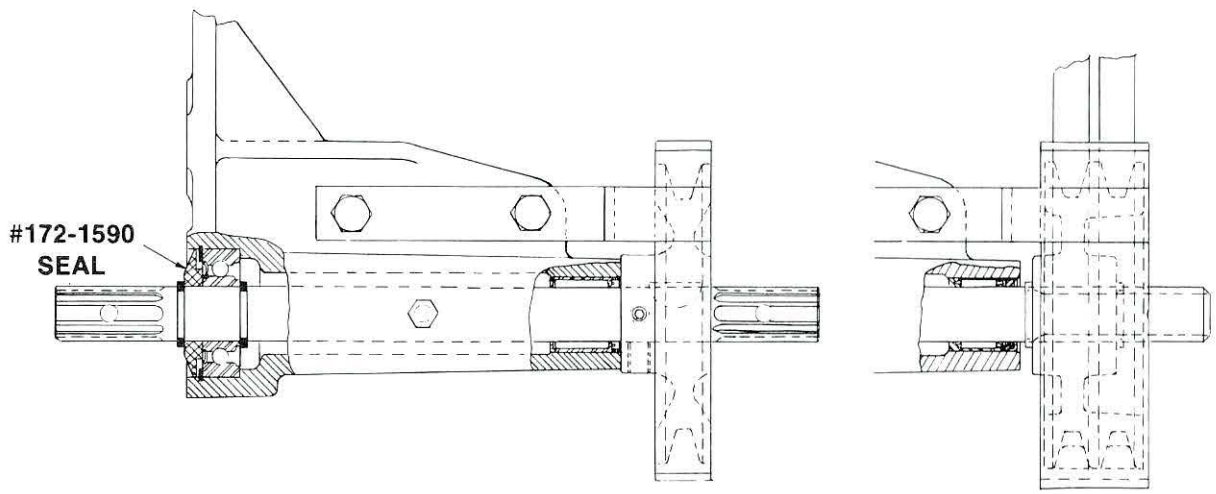

FIGURE 5-31

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TROUBLE SHOOTING GUIDE

PROBLEM	PROBABLE CAUSE	REMEDY
Hydraulic lift inoperative	1. No charge pressure (HYDRO MODELS)	1. Install gage and check pressure
	2. System low on oil	2. Check level and refill
	3. Drive idler locked out	3. Unhook from frame
	4. Oil line leaking	4. Replace line
	5. Lift valve not functioning	5. Repair or replace valve
	6. Lift cylinder not functioning	6. Repair or replace cylinder
Load drops when control valve is in neutral position	1. Leaking hose from valve to cylinder	1. Replace hose
	2. Oil leaking past lift cylinder "O" rings	2. Repair lift cylinder
	3. Lift valve "O" rings leaking	3. Repair lift valve
Lift valve or lift cylinder leaking	1. Leaking "O" rings	1. Replace "O" rings

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HYDRAULIC SYSTEM (Continued)

PRINCIPLE OF OPERATION

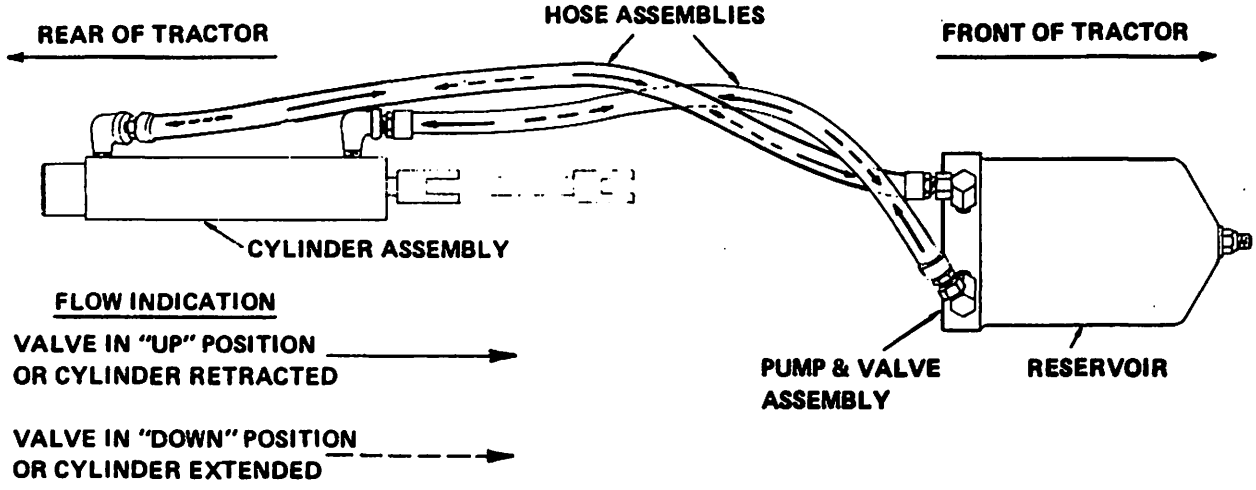

FIGURE 6-1

(OPTIONAL HYDRAULIC LIFT KIT)

When the control is actuated the oil flow can be directed to the hydraulic cylinder in either direction.

HYDRAULIC CYLINDER

To remove the piston rod assembly from the cylinder the Elbow fittings which go through the hole in the cylinder tube must be removed.

When the piston rod assembly is removed from the cylinder tube the cylinder head can be removed, and the Clevis, Guide, and related "O" rings and washers removed. All parts should be inspected and new "O" rings installed. "IMPORTANT" - grease "O" rings to prevent damage during assembly.

1 — Elbow
2 — Cylinder Head
3 — O-Ring
4 — Cylinder Tube
5 — Washer
6 — O-Ring
7 — Piston Rod Assembly
8 — O-Ring
9 — Guide
10 — O-Ring
11 — Clevis

Just ahead of the piston there is an area on the piston rod which is not ground. Grasp the piston rod in this area with a vise-grip pliers and hold the rod while turning the clevis off with a wrench.

IMPORTANT: CARE SHOULD BE TAKEN THAT THE POLISHED PORTION OF THE PISTON ROD IS NOT DAMAGED AT THIS TIME.

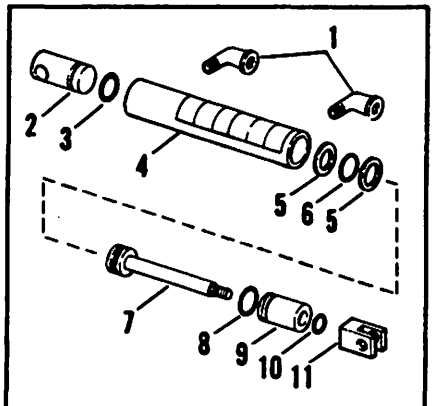

FIGURE 6-2

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PRINCIPLE OF OPERATION

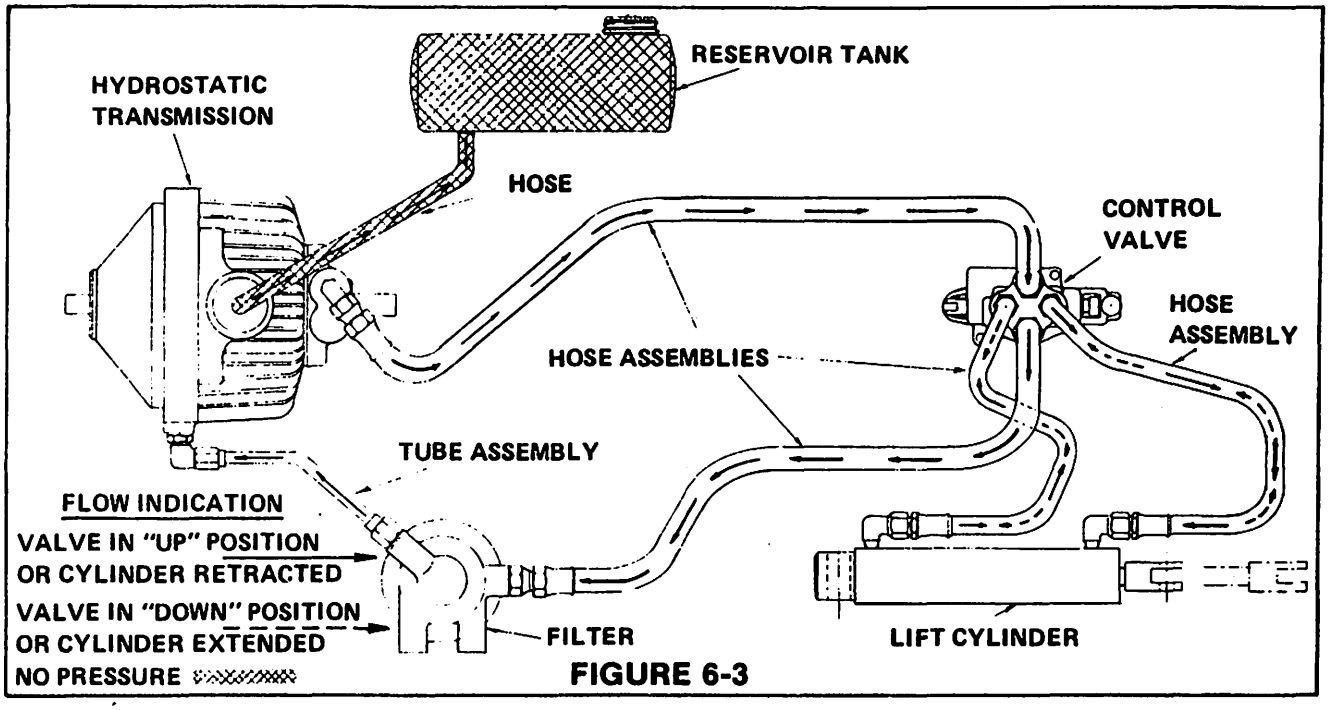

FIGURE 6-3

PRINCIPLE OF OPERATION
(EARLIER HYDRO MODELS)

The hydraulic system uses the hydrostatic charge pump as its power source.
The oil is pumped by the hydrostatic to the hydraulic control valve. When the control is actuated the oil flow can be directed to the hydraulic cylinder in either direction.

PRINCIPLE OF OPERATION
(LATER HYDRO MODELS)

The hydraulic system uses the hydrostatic charge pump as its power source. Its oil supply is also that of the transaxle and hydrostatic transmission. The oil is pumped by the hydrostatic to the hydraulic control valve. When the control is actuated the oil flow can be directed to the hydraulic cylinder in either direction.

6

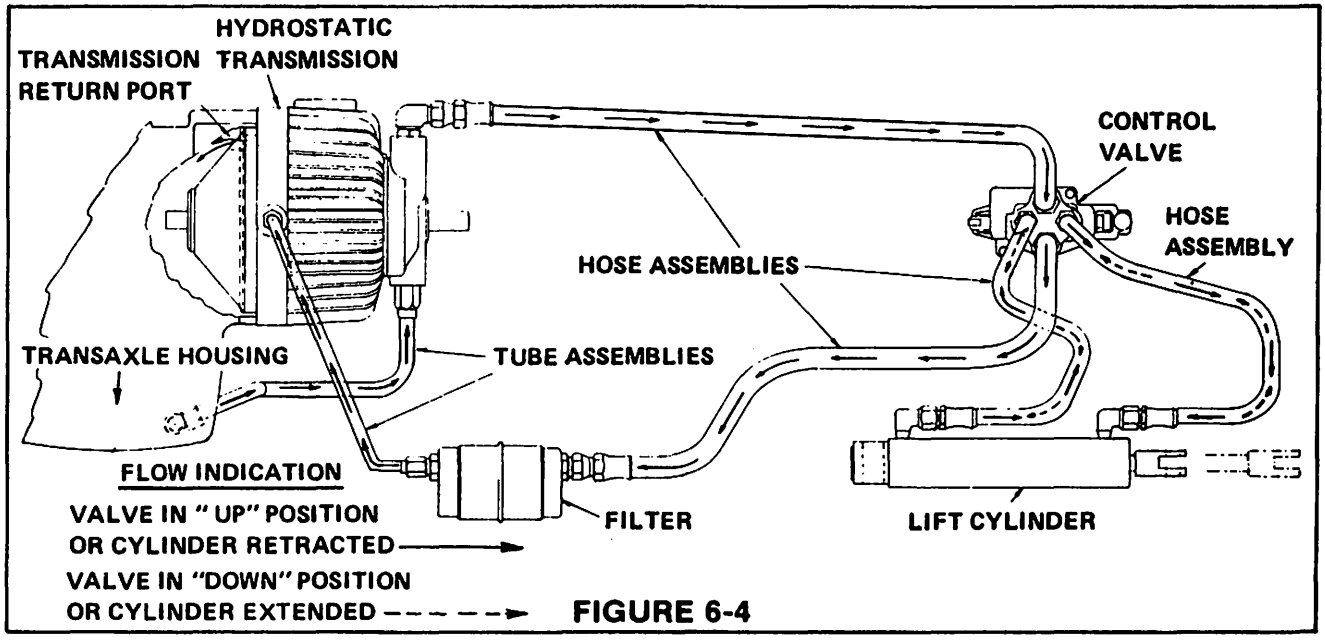

FIGURE 6-4

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HYDRAULIC POWER LIFT

(OPTIONAL HYDRAULIC LIFT KIT)

This unit is completely self-contained with its own hydraulic pump, control valve, relief valve, and oil reservoir.

Disassemble as follows:

1 — Filler Plug
2 — Fiber Washer
3 — Jam Nut ⅜ - 16
4 — Comb. Washer
5 — Reservoir
6 — Gasket
7 — Stud
8 — Screw 10 - 32 × ½
9 — Lock Washer
10 — Cover
11 — Drive Gear and Shaft Assy.
12 — Idler Gear
13 — Idler Shaft
14 — Relief Ball
15 — Relief Spring
16 — Relief Plug
17 — Oil Seal
18 — Capscrew 5/16-18 × 1-1/8"
19 — Washer 5/16 × 11/16
20 — Spring Sleeve
21 — Return Spring
22 — Roll Pin
23 — Roll Pin
24 — Roll Pin
25 — Snap Ring
26 — Spool Valve
27 — "O" Ring
28 — Adaptor
29 — Body
Reverse procedure for assembling.

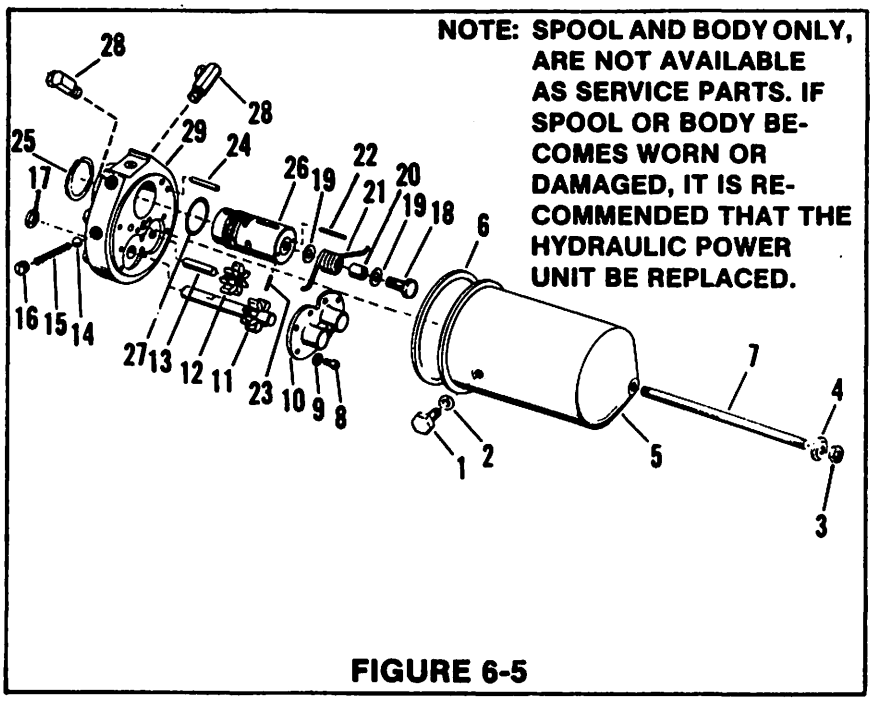

FIGURE 6-5

Check belt alignment and adjust as necessary by moving pump pulley in or out on the pump drive shaft.

Adjust hydraulic drive belt tension by moving pump and bracket assembly out on supports until belt is tight and securely tighten carriage bolts.

Use a good quality non-detergent oil SAE 30 for summer use and SAE 10 for winter use.

To raise the tractor attachment, turn the control handle clockwise.

Upon release of the handle it will return to the center or neutral position. To lower the attachment, turn the handle counterclockwise.

The handle will again return to neutral when released.

NOTE: A SLIGHT SLUGGISH ACTION OF THE CONTROL LEVER RETURNING TO NEUTRAL MAY EXIST DURING THE BREAK-IN PERIOD. A FEW HOURS OF RUNNING TIME WILL ELIMINATE THIS-NO ADJUSTMENTS ARE NECESARY.

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HYDRAULIC POWER LIFT

HYDRAULIC LIFT VALVE
(HYDRO-MODELS)

When they hydraulic lift lever is moved either to its up or down position, with the engine running at normal speed, the cylinder should move smoothly to the end of its stroke without noting a squeal from the control valve. If the valve squeals when the lever is moved either up or down with the cylinder in motion it should be adjusted as follows Loosen screws "B" enough to allow pillow block "C" to be moved slightly. Move pillow block "C" either direction until lift lever "A" is in center of slot, hold lever and tighten screws "B." With engine running move lift lever to move the cylinder through its up and down cycle. If while the cylinder is moving there is a squealing noise the centering adjustment must be rechecked. If a squeal occurs on the up stroke the pillow block must be moved slightly to the rear and if the squeal occurs on the down stroke move the pillow block slightly forward. When the lift lever is properly adjusted the lever should reach either end of the slot at the same time that the lift valve spool reaches the end of its stroke.

After proper adjustment has been made, securely tighten capscrews "B." Recheck adjustment.

NOTE

IF LIFT LEVER IS NOT RELEASED WHEN CYLINDER REACHES THE END OF ITS STROKE IN EITHER DIRECTION THE VALVE WILL ALSO SQUEAL DUE TO THE OIL PASSING THROUGH THE PRESSURE RELIEF VALVE.

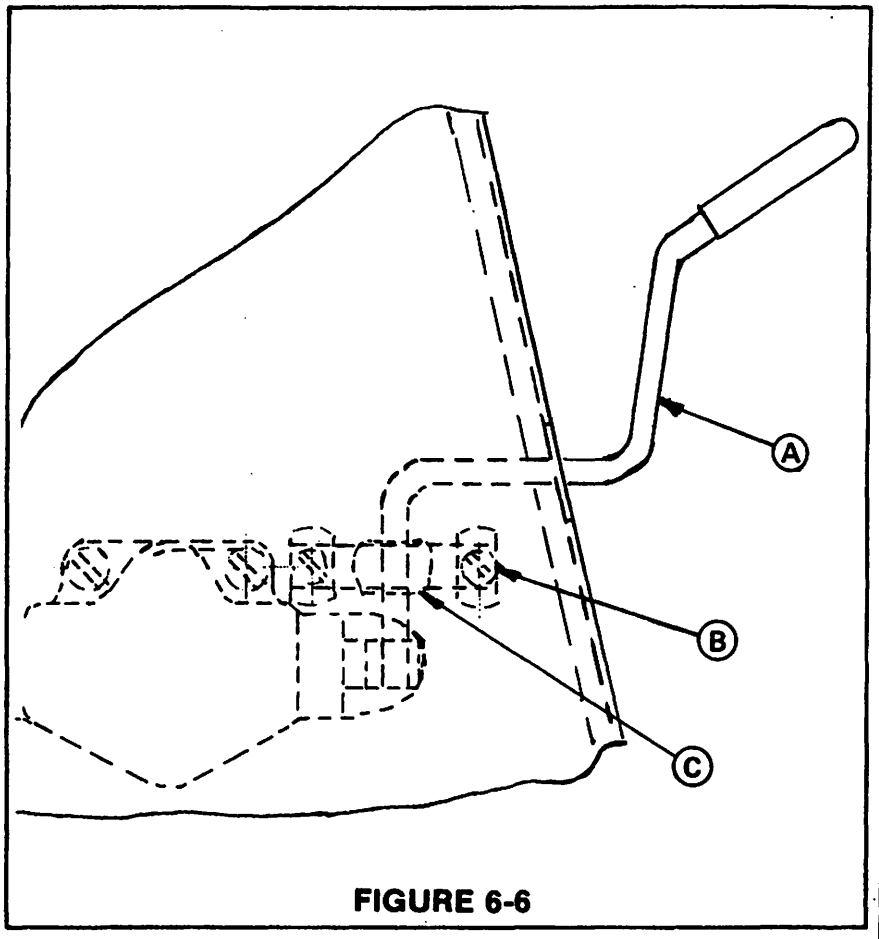

FIGURE 6-6

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TRANSMISSION FILTERS

Model 1225.
Spin on type filter

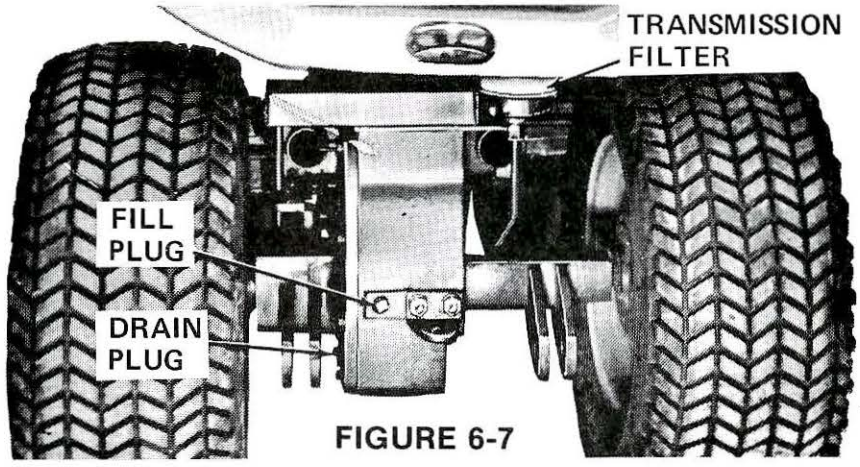

FIGURE 6-7

Models 1256, 1257, 1556, H-16 (1656) and H-14 (1456 Serial Numbers 0100101 to 0199999).

Spin on type filter

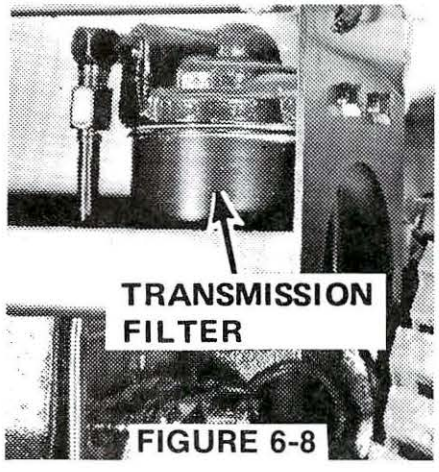

FIGURE 6-8

Models H-14 (1456) & H-16 (1656) Serial Numbers 0200101 and newer Models with sump cooled hydrostatics.

In-line filter clamped to front of seat support under seat.

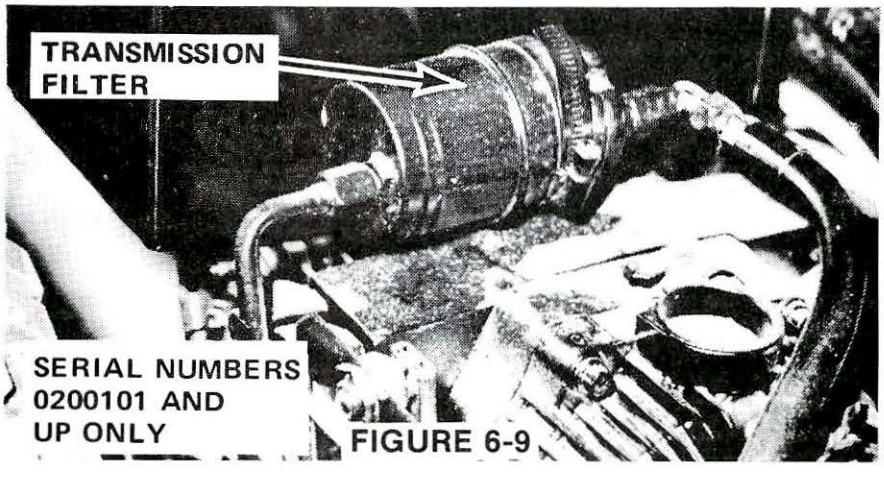

FIGURE 6-9

https://truckmanualshub.com/

TROUBLE SHOOTING GUIDE

PROBLEM	PROBABLE CAUSE	REMEDY
Hard starting or loss of power	1. Loose or grounded high tension or ignition leads	1. Check and repair leads
	2. Improper breaker point gap and/or timing	2. Reset breaker points and/or timing
	3. Breaker points	3. Replace breaker points
	4. Spark plug or improper gap	4. Adjust gap or replace spark plug
	5. Condenser or coil	5. Replace condenser or coil
	6. Dirt or gum in fuel line	6. Check fuel lines and filters
	7. Fuel pump	7. Replace fuel pump
	8. Dirt in carburetor	8. Clean carburetor
	9. Carburetor improperly adjusted	9. Readjust carburetor
Overheating	1. Insufficient available cool air	1. Make sure area in front of flywheel is open
	2. Dirty air intake screen, shroud or cooling fins	2. Clean intake screen, shroud and cooling fins
	3. Improper fuel	3. Clean and refill tank with proper fuel
	4. Fuel mixture too lean	4. Adjust carburetor
	5. Improper ignition timing	5. Reset timing
	6. Engine overloaded	6. Lessen work load
	7. Tight tappet clearance	7. Adjust tappets
Backfiring	1. Fuel mixture too lean	1. Adjust carburetor
	2. Improper timing	2. Reset timing
	3. Valve "sticking"	3. Free up valve
Skip at high speed	1. Spark plug gap too wide	1. Adjust spark plug gap
	2. Improper carburetor setting or lack of fuel	2. Refill tank and adjust carburetor
	3. Wrong type spark plug. Use recommended spark plug	3. Install correct spark plug
	4. Improper timing	4. Reset timing

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TROUBLE SHOOTING GUIDE (Continued)

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

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ENGINE REMOVAL

A Removal and Replacement procedure for engines to be used as a guide when performing repair service.

Remove and replace engine as follows:

1. Remove battery. (Disconnect ground-negative (-) cable first).
2. Disconnect hood strap from top of engine. Lift hood forward and out of the way.
3. Remove spark plug wire.
4. Disconnect ignition wire.
5. Remove screws securing choke and throttle cables. Disconnect cables from engine and carburetor.
6. Remove Heat Shield Support (SOME MODELS)
7. Remove upper belt guide from engine. The guide is accessable through the battery compartment.
8. Disconnect wires from Starter/Generator terminals. If necessary, remove Starter/Generator from the engine (ALL EXCEPT ENGINES WITH BENDIX TYPE STARTER)
9. Remove Right Hand Side Panel (SOME MODELS)
10. Loosen P.T.O. and lower belt guide, so the P.T.O. belts may be removed.
11. Remove bolts and spacers from engine to frame, allowing engine to drop down for easier belt removal. Remove drive and P.T.O. belts from engine pulley.
12. Remove engine from tractor.
13. Remove drive pulley from engine.
14. If necessary, remove gas tank.
15. Reverse the above procedure.

Warranty Repair of the Engine must be performed by an authorized dealer.

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INDEX

LETTER/BULLETIN DATED	LETTER/BULLETIN NUMBER	SUBJECT
June 15, 1966	133	Fused Lite - Switch Lead Assembly
May 21, 1968	140	Starter Solenoid #1709173
May 21, 1968	141	Solenoid #1717048
March 26, 1969	148 Rev.	1225 Travel Pedal Action
April 8, 1969	149	Speed Control Arm Assembly for 1225
May 22, 1969	151	Additional pre-delivery instructions for 1225
July 28, 1969	153	Model 190-01 Tractor Clutch pulley & Bearing Replacement Kit #1718422
Sept. 8, 1969	156	Husky 1225 Up-dating program
Nov. 19, 1969	157	Remounting of Rectifier on 1253 & 1257
Dec. 19, 1969	160	Incorrect Wiring on the Husky 853
Dec. 23, 1969	161	Model 10 Hydrostatic Noninterchangeability
Feb. 10, 1970	163	1256 Park-Drive Lever
March 11, 1970	164	Installing Hydraulic Lift Kit on 853 & 1253 Tractors
June. 23, 1970	169	All 1256 & 1257 Tractors
June 29, 1970	170	Hydrostatic Control Arm Removal and Replacement on 1225, 1256 & 1257
Sept. 11, 1970	172	Model 1256 & 1257 Expansion Tank
April 20, 1971	182	Husky 1256 & 1257 Tractors
June 7, 1971	187	Model 10 Hydro used on 1256 & 1257
June 2, 1972	197 Rev.	Frame Reinforcement #1723711
Dec. 21, 1971	198	Idler Lock Out on Hydro Tractors
Jan. 13, 1972	199	Hydraulic Cylinder & Hose positioning on 1225, 1256, 1257 & 1556
Jan. 24, 1972	201	Model 10 Hyrostatic
Feb. 23, 1972	204	Wiring Harness #1723526 - 1556 Tractor
Aug. 21, 1972	218	Model 1256-Q4 & Up & All 1556 Tractors
April 25, 1973	228	Model, Type & Serial Numbers
April 20, 1973	229	1852O Spring Assist Kit
June 21, 1973	235	Plastic Replacement Gas Tank for Tubular Frame Tractors
June 22, 1973	236	#1723366 Brake Rod for 1256, 1556 & 1656 (H16) Tractors

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SERVICE LETTERS/BULLETINS (Continued)

INDEX

LETTER/BULLETIN DATED	LETTER/BULLETIN NUMBER	SUBJECT
July 5, 1973	237	1055 (G-10) Choke Cable
Feb. 8, 1974	253	G-14 Model 1453-02 Tractors Seat Spring
March 8, 1974	257	Hydrostatic Oil Filters
April 11, 1974	259	Hydrostatic Fluid
June 10, 1974	263	Termination - Teledyne Wisconsin Engine Warranty
Feb 25, 1975	284	Identification of Eaton Model 10 Hydro
Sept 18, 1975	295	Eaton Hydro RS Packages
March 30, 1976	302	Battery Warranty Policy
May 28, 1976	304	Service Dept. Publications
June 1, 1976	305	Service Tools for Bolens Transmissions
Aug. 24, 1976	308	Engine Drive Belts
Nov. 24, 1976	310	Inst. for Warranty Claims
Nov. 30, 1976	311	Owner Registration
Jan 25, 1977	311C	Warranty Act-Magnuson-Moss
Feb. 15, 1977	313	New Owner Registration Card
Mar. 11, 1977	316	Resistor Spark Plug
April 22, 1977	317	Starter Solenoid lead 1453 & 1656
June 29, 1977	319	Premature failure of rubber grommets (1725335) under fender for G12 (1255) serial no's (0200101-0200501)(0200520-0200605)
July 26, 1977	320	Model 18722 light kit for G10 (1055) with Briggs + Stratton engines
August 12, 1977	321	1708287 and 1723480 Voltage Regulators
August 12, 1977	322	Plastic Instrument Panel
Feb, 3, 1978	324	Part shortages on new units

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