



LCE Products

**Floating Deck  
Mid-Size  
Service Manual**



# ABOUT THIS MANUAL

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This manual was written for the service technician; basic mechanical/electrical skills are assumed. The Table of Contents lists the systems and the related topics covered in this manual. The Toro Company has made every effort to make the information in this manual complete and correct.

For service information specific to the engines used on these products, refer to the appropriate engine manufacturer's service and repair instructions.

Additional resources:

- Interactive Electrical Troubleshooting DVD (P/N 492-4757).
- Interactive Hydraulic Troubleshooting DVD (P/N 492-4777).
- Hydro-Gear Hydraulic Pump Service and Repair Manual (P/N 492-4749).
- Ross Wheel Motor Service and Repair Manual (P/N 492-4753).

We hope you will find this manual a valuable addition to your service shop. If you have any questions or comments regarding this manual, please contact us at the following address:

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**Landscape Contractors Equipment Division**  
**8111 Lyndale Avenue South**  
**Bloomington, MN 55420**

The Toro Company reserves the right to change product specifications or this manual without notice.

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## General Information



This symbol means WARNING or PERSONAL SAFETY INSTRUCTION - read the instruction because it has to do with your safety. Failure to comply with the instruction may result in personal injury or even death.

This manual is intended as a service and repair manual only. The safety instructions provided herein are for troubleshooting, service, and repair of the Mid-Size Walk Behind mower. The Mid-Size Walk Behind

Mower and attachment operator's manuals contain safety information and operating tips for safe operating practices. Operator's manuals are available through your Toro parts source or:

**The Toro Company  
Publications Department  
8111 Lyndale Avenue South  
Bloomington, MN 55420**

## Think Safety First

### Avoid unexpected starting of engine...

Always turn off the engine and disconnect the spark plug wire(s) before cleaning, adjusting, or repair.

### Avoid lacerations and amputations...

Stay clear of all moving parts whenever the engine is running. Treat all normally moving parts as if they were moving whenever the engine is running or has the potential to start.

### Avoid burns...

Do not touch the engine, muffler, or other components which may increase in temperature during operation, while the unit is running or shortly after it has been running.

### Avoid fires and explosions...

Avoid spilling fuel and never smoke while working with any type of fuel or lubricant. Wipe up any spilled fuel or oil immediately. Never remove the fuel cap or add fuel when the engine is running. Always use approved, labeled containers for storing or transporting fuel and lubricants.

### Avoid asphyxiation...

Never operate an engine in a confined area without proper ventilation.

### Avoid injury from batteries...

Battery acid is poisonous and can cause burns. Avoid contact with skin, eyes, and clothing. Battery gases can explode. Deep cigarettes, sparks, and flames away from the battery.

### Avoid injury due to inferior parts...

Use only original equipment parts to ensure that important safety criteria are met.

### Avoid injury to bystanders...

Always clear the area of bystanders before starting or testing powered equipment.

### Avoid injury due to projectiles...

Always clear the area of sticks, rocks, or any other debris that could be picked up and thrown by the powered equipment.

### Avoid modifications...

Never alter or modify any part unless it is a factory approved procedure.

### Avoid unsafe operation...

Always test the safety interlock system after making adjustments or repairs on the machine. Refer to the Electrical section in this manual for more information.

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# SPECIFICATIONS

## Torque Specifications

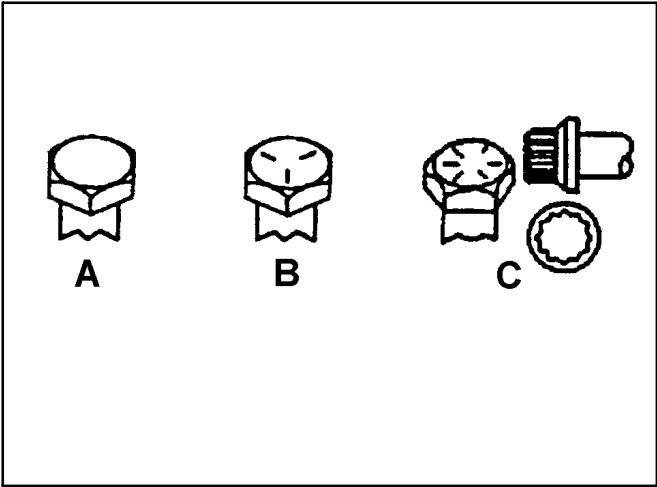
Recommended fastener torque values are listed in the following tables. For critical applications, as determined by Toro, either the recommended torque or a torque that is unique to the application is clearly identified and specified in the service manual.

These torque specifications for the installation and tightening of fasteners shall apply to all fasteners which do not have a specific requirement identified in the service manual. The following factors shall be considered when applying torque: cleanliness of the fastener, use of a thread sealant (Loctite), degree of lubrication on the fastener, presence of a prevailing torque feature, hardness of the surface underneath of the fastener's head, or similar condition which affects the installation.

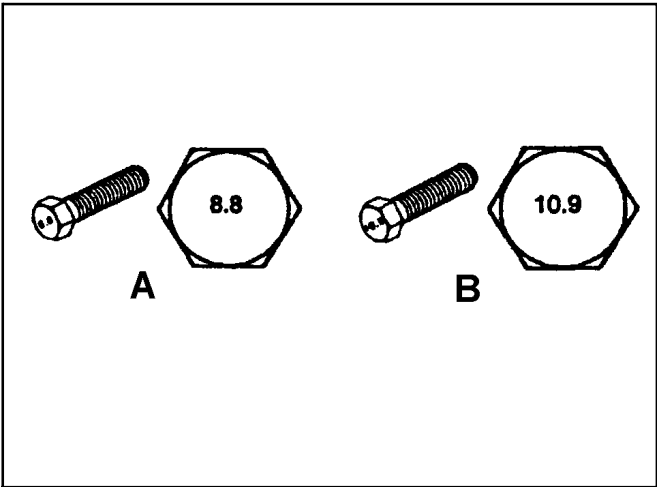
As noted in the following tables, torque values should be **reduced by 25% for lubricated fasteners** to achieve the similar stress as a dry fastener. Torque values may also have to be reduced when the fastener is threaded into aluminum or brass. The specific torque value should be determined based on the aluminum or brass material strength, fastener size, length of thread engagement, etc.

The standard method of verifying torque shall be performed by marking a line on the fastener (head or nut) and mating part, then back off fastener 1/4 of a turn. Measure the torque required to tighten the fastener until the lines match up.

### Fastener Identification



Inch Series Bolts and Screws	
(A) Grade 1 & 2 (B) Grade 5	(C) Grade 8



Metric Bolts and Screws	
(A) Class 8.8	(B) Class 10.9

# SPECIFICATIONS

## Standard Torque for Dry, Zinc Plated and Steel Fasteners (Inch Series)

Thread Size	Grade 1, 5, & 8 with Thin Height Nuts	SAE Grade 1 Bolts, Screws, Studs, & Sems with Regular Height Nuts (SAE J995 Grade 2 or Stronger Nuts)		SAE Grade 5 Bolts, Screws, Studs, & Sems with Regular Height Nuts (SAE J995 Grade 2 or Stronger Nuts)		SAE Grade 8 Bolts, Screws, Studs, & Sems with Regular Height Nuts (SAE J995 Grade 2 or Stronger Nuts)	
	In-lb	In-lb	N-cm	In-lb	N-cm	In-lb	N-cm
# 6 - 32 UNC	10 ± 2	13 ± 2	147 ± 23	15 ± 2	169 ± 23	23 ± 2	260 ± 34
# 6 - 40 UNF				17 ± 2	190 ± 20	25 ± 2	280 ± 20
# 8 - 32 UNC	13 ± 2	25 ± 5	282 ± 30	29 ± 3	330 ± 30	41 ± 4	460 ± 45
# 8 - 36 UNF				31 ± 3	350 ± 30	43 ± 4	31 ± 3
# 10 - 24 UNC	18 ± 2	30 ± 5	339 ± 56	42 ± 4	475 ± 45	60 ± 6	674 ± 70
#10 - 32 UNF				48 ± 4	540 ± 45	68 ± 6	765 ± 70
1/4 - 20 UNC	48 ± 7	53 ± 7	599 ± 79	100 ± 10	1125 ± 100	140 ± 15	1580 ± 170
1/4 - 28 UNF	53 ± 7	65 ± 10	734 ± 113	115 ± 10	1300 ± 100	160 ± 15	1800 ± 170
5/16 - 18 UNC	115 ± 15	105 ± 15	1186 ± 169	200 ± 25	2250 ± 280	300 ± 30	3390 ± 340
5/16 - 24 UNF	138 ± 17	128 ± 17	1446 ± 192	225 ± 25	2540 ± 280	325 ± 30	3670 ± 340
	<b>ft-lb</b>	<b>ft-lb</b>	<b>N-m</b>	<b>ft-lb</b>	<b>N-m</b>	<b>ft-lb</b>	<b>N-m</b>
3/8 - 16 UNC	16 ± 2	16 ± 2	22 ± 3	30 ± 3	41 ± 4	43 ± 4	58 ± 5
3/8 - 24 UNF	17 ± 2	18 ± 2	24 ± 3	35 ± 3	47 ± 4	50 ± 4	68 ± 5
7/16 - 14 UNC	27 ± 3	27 ± 3	37 ± 4	50 ± 5	68 ± 7	70 ± 7	68 ± 9
7/16 - 20 UNF	29 ± 3	29 ± 3	39 ± 4	55 ± 5	75 ± 7	77 ± 7	104 ± 9
1/2 - 13 UNC	30 ± 3	48 ± 7	65 ± 9	75 ± 8	102 ± 11	105 ± 10	142 ± 14
1/2 - 20 UNF	32 ± 3	53 ± 7	72 ± 9	85 ± 8	115 ± 11	120 ± 10	163 ± 14
5/8 - 11 UNC	65 ± 10	88 ± 12	119 ± 16	150 ± 15	203 ± 20	210 ± 20	285 ± 27
5/8 - 18 UNF	75 ± 10	95 ± 15	129 ± 20	170 ± 15	230 ± 20	240 ± 20	325 ± 27
3/4 - 10 UNC	93 ± 12	140 ± 20	190 ± 27	265 ± 25	359 ± 34	374 ± 35	508 ± 47
3/4 - 16 UNF	115 ± 15	165 ± 25	224 ± 34	300 ± 25	407 ± 34	420 ± 35	569 ± 47
7/8 - 9 UNC	140 ± 20	225 ± 25	305 ± 34	430 ± 45	583 ± 61	600 ± 60	813 ± 81
7/8 - 14 UNF	155 ± 25	260 ± 30	353 ± 41	475 ± 45	644 ± 61	660 ± 60	895 ± 81

**Note:** Reduce torque values listed in the table above by 25% for lubricated fasteners. Lubricated fasteners are defined as threads coated with a lubricant such as oil, graphite, or thread sealant such as Loctite.

**Note:** Torque values may have to be reduced when installing fasteners into threaded aluminum or brass. The specific torque value should be determined based on the fastener size, the aluminum or base material strength, length of thread engagement, etc.

**Note:** The nominal torque values listed above for Grade 5 and 8 fasteners are based on 75% of the minimum proof load specified in SAE J429. The tolerance is approximately ± 10% of the nominal torque value. Thin height nuts include jam nuts.

# SPECIFICATIONS

## Standard Torque for Dry, Zinc and Steel Fasteners (Metric Fasteners)

Thread Size	Class 8.8 Bolts, Screws, and Studs with Regular Height Nuts (Class 8 or Strong Nuts)		Class 10.9 Bolts, Screws, and Studs with Regular Height Nuts (Class 10 or Strong Nuts)	
M5 X 0.8	57 ± 5 in-lb	644 ± 68 N-cm	78 ± 8 in-lb	881 ± 90 N-cm
M6 X 1.0	96 ± 10 in-lb	1085 ± 113 N-cm	133 ± 14 in-lb	1503 ± 158 N-cm
M8 X 1.25	19 ± 2 ft-lb	26 ± 3 N-m	28 ± 3 ft-lb	38 ± 4 N-m
M10 X 1.5	38 ± 4 ft-lb	52 ± 5 N-m	54 ± 6 ft-lb	73 ± 8 N-m
M12 X 1.75	66 ± 7 ft-lb	90 ± 10 N-m	93 ± 10 ft-lb	126 ± 14 N-m
M16 X 2.0	166 ± 15 ft-lb	225 ± 23 N-m	229 ± 23 ft-lb	310 ± 31 N-m
M20 X 2.5	325 ± 33 ft-lb	440 ± 45 N-m	450 ± 36 ft-lb	610 ± 62 N-m

**Note:** Reduce torque values listed in the table above by 25% for lubricated fasteners. Lubricated fasteners are defined as threads coated with a lubricant such as oil, graphite, or thread sealant such as Loctite.

**Note:** Torque values may have to be reduced when installing fasteners into threaded aluminum or brass. The specific torque value should be determined based on the fastener size, the aluminum or base material strength, length of thread engagement, etc.

**Note:** The nominal torque values listed above are based on 75% of the minimum proof load specified in SAE J1199. The tolerance is approximately ± 10% of the nominal torque value. Thin height nuts include jam nuts.

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# SPECIFICATIONS

## Other Torque Specifications

### SAE Grade 8 Steel Set Screws

Thread Size	Recommended Torque	
	Square Head	Hex Socket
1/4 - 20 UNC	140 ± 20 in-lb	73 ± 12 in-lb
5/16 - 18 UNC	215 ± 35 in-lb	145 ± 20 in-lb
3/8 - 16 UNC	35 ± 10 ft-lb	18 ± 3 ft-lb
1/2 - 13 UNC	75 ± 15 ft-lb	50 ± 10 ft-lb

### Wheel Bolts and Lug Nuts

Thread Size	Recommended Torque**	
7/16 - 20 UNF Grade 5	65 ± 10 ft-lb	88 ± 14 N-m
1/2 - 20 UNF Grade 5	80 ± 10 ft-lb	108 ± 14 N-m
M12 X 1.25 Class 8.8	80 ± 10 ft-lb	108 ± 14 N-m
M12 X 1.5 Class 8.8	80 ± 10 ft-lb	108 ± 14 N-m

\*\* For steel wheels and non-lubricated fasteners.

### Thread Cutting Screws (Zinc Plated Steel)

Type 1, Type 23, or Type F	
Thread Size	Baseline Torque*
No. 6 - 32 UNC	20 ± 5 in-lb
No. 8 - 32 UNC	30 ± 5 in-lb
No.10 - 24 UNC	38 ± 7 in-lb
1/4 - 20 UNC	85 ± 15 in-lb
5/16 - 18 UNC	110 ± 20 in-lb
3/8 - 16 UNC	200 ± 100 in-lb

### Thread Cutting Screws (Zinc Plated Steel)

Thread Size	Threads per Inch		Baseline Torque*
	Type A	Type B	
No. 6	18	20	20 ± 5 in-lb
No. 8	15	18	30 ± 5 in-lb
No. 10	12	16	38 ± 7 in-lb
No. 12	11	14	85 ± 15 in-lb

\* Hole size, material strength, material thickness and finish must be considered when determining specific torque values. All torque values are based on non-lubricated fasteners.

### Conversion Factors

$$\text{in-lb} \times 11.2985 = \text{N-cm}$$

$$\text{ft-lb} \times 1.3558 = \text{N-m}$$

$$\text{N-cm} \times 0.08851 = \text{in-lb}$$

$$\text{N-cm} \times 0.73776 = \text{ft-lb}$$

# SPECIFICATIONS

## Equivalents and Conversions

### Decimal and Millimeter Equivalents

Fractions	Decimals	mm	Fractions	Decimals	mm	
	1/64	0.015625	0.397	33/64	0.515625	13.097
	1/32	0.03125	0.794	16/32	0.53125	13.484
	3/64	0.046875	1.191	35/64	0.546875	13.891
1/16		0.0625	1.588	9/16	0.5625	14.288
	5/64	0.078125	1.984	37/64	0.578125	14.684
	3/32	0.9375	2.381	19/32	0.59375	15.081
1/8		0.1250	3.175	5/8	0.6250	15.875
	9/64	0.140625	3.572	41/64	0.640625	16.272
	5/32	0.15625	3.969	21/32	0.65625	16.669
	11/64	0.171875	4.366	43/64	0.671875	17.066
3/16		0.1875	4.762	11/16	0.6875	17.462
	13/64	0.203125	5.159	45/64	0.703125	17.859
	7/32	0.21875	5.556	23/32	0.71875	18.256
	15/64	0.234375	5.953	47/64	0.734375	18.653
1/4		0.2500	6.350	3/4	0.7500	19.050
	17/64	0.265625	6.747	49/64	0.765625	19.447
	9/32	0.28125	7.144	25/32	0.78125	19.844
	19/64	0.296875	7.541	51/64	0.796875	20.241
5/16		0.3125	7.541	13/16	0.8125	20.638
	21/64	0.328125	8.334	53/64	0.828125	21.034
	11/32	0.34375	8.731	27/32	0.84375	21.431
	23/64	0.359375	9.128	55/64	0.859375	21.828
3/8		0.3750	9.525	7/8	0.8750	22.225
	25/64	0.390625	9.922	57/64	0.890625	22.622
	13/32	0.40625	10.319	29/32	0.90625	23.019
	27/64	0.421875	10.716	59/64	0.921875	23.416
7/16		0.4375	11.112	15/16	0.9375	23.812
	29/64	0.453125	11.509	61/64	0.953125	24.209
	15/32	0.46875	11.906	31/32	0.96875	24.606
	31/64	0.484375	12.303	63/64	0.984375	25.003
1/2		0.5000	12.700	1	1.000	25.400
1 mm = 0.03937 in.			0.001 in. = 0.0254 mm			



# SPECIFICATIONS

## U.S. to Metric Conversions

	To Convert	Into	Multiply By
<b>Linear Measurement</b>	Miles	Kilometers	1.609
	Yards	Meters	0.9144
	Feet	Meters	0.3048
	Feet	Centimeters	30.48
	Inches	Meters	0.0254
	Inches	Centimeters	2.54
	Inches	Millimeters	25.4
<b>Area</b>	Square Miles	Square Kilometers	2.59
	Square Feet	Square Meters	0.0929
	Square Inches	Square Centimeters	6.452
	Acre	Hectare	0.4047
<b>Volume</b>	Cubic Yards	Cubic Meters	0.7646
	Cubic Feet	Cubic Meters	0.02832
	Cubic Inches	Cubic Centimeters	16.39
<b>Weight</b>	Tons (Short)	Metric Tons	0.9078
	Pounds	Kilograms	0.4536
	Ounces	Grams	28.3495
<b>Pressure</b>	Pounds/Sq. In.	Kilopascal	6.895
<b>Work</b>	Foot-pounds	Newton-Meters	1.356
	Foot-pounds	Kilogram-Meters	0.1383
	Inch-pounds	Kilogram-Centimeters	1.152144
<b>Liquid Volume</b>	Quarts	Liters	0.9463
	Gallons	Liters	3.785
<b>Liquid Flows</b>	Gallons/Minute	Liters/Minute	3.785
<b>Temperature</b>	Fahrenheit	Celsius	1. Subtract 32° 2. Multiply by 5/9

# SPECIFICATIONS

## Hydro with Pistol Grip Controls

### Models:

Model	Engine	Deck
30284	17 hp Kawasaki	36"
30286	17 hp Kawasaki	40"
30288	19 hp Kawasaki	48"
30289	19 hp Kawasaki	52"
30280	23 hp Kawasaki	60"

### Engines:

	Output (Max. @ 3600 RPM)		
	17 hp (12.7 kW)	19 hp (14.2 kW)	23 hp (17.2 kW)
<b>Make</b>	Kawasaki	Kawasaki	Kawasaki
<b>Model</b>	FH541V	FH580V	FH680V
<b>Hi-Idle</b>	3600 rpm	3600 rpm	3600 rpm
<b>Starter</b>	Electric	Electric	Electric
<b>Oil Capacity</b>	3.8 pint (1.8L)	3.8 pint (1.8L)	4.0 pint (1.9L)

### Fuel System:

4.8 gallons (18 liters) fuel tank capacity
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### Traction Drives:

<b>Traction Control:</b>	Toro Pistol Grip Control System
<b>Hydraulic Pump:</b>	Two Hydro-Gear Model PG
<b>Hydraulic Wheel Motor:</b>	Two Parker TEO-195 / Model 30280: Parker TEO-230
<b>Hydraulic Oil Filter:</b>	10 Micron Automotive Spin-On Type
<b>Hydraulic Fluid:</b>	Synthetic, 15w50
<b>Hydraulic Fluid Capacity:</b>	2.1 quarts (1.9 liters)
<b>Parking Brake:</b>	Standard equipment
<b>Ground Speed: (MPH/kmh)</b>	Variable, 0 to 6.35 MPH (10kmh) Fwd / 0 to 2.5 (4kmh) Rev
<b>Hourmeter with Service Indicator</b>	Standard equipment

# SPECIFICATIONS

## Hydro with Pistol Grip Controls cont.

### Wheels and Tires:

<b>Front Castor Tires:</b>	9x3.5-4, 4 ply, smooth tread, semi-pneumatic with needle bearings and grease fittings / Model 30280: 11x4.0-5 smooth tread, semi-pneumatic with tapered roller bearings
<b>Front Castor Fork:</b>	Heavy-duty commercial design with 1-1/8" (2.8cm) diameter pivot shaft. The pivot hubs have grease fitting for lubrication. Model 30280: 1" (2.5cm) diameter pivot shaft. The pivot hubs have tapered roller bearings and access for lubrication.
<b>Rear Traction Tires:</b>	17 hp - 16x6.50-8, 4 ply with Turf Traction Tread 23 hp - 16x7.50-8, 4 ply with Turf Traction Tread 19 hp - 18x8.50-10, 4 ply with Turf Traction Tread

### Mower Drive:

<b>Mower Engagement:</b>	Engine mounted electric clutch
<b>Clutch Adjustment:</b>	Periodic air gap adjustment required - .018" $\pm$ .003" (0.45 $\pm$ 0.0762mm)
<b>PTO Drive Belt:</b>	HB section with Aramid (Kevlar) cords and dry clutching envelope
<b>PTO Idler:</b>	Spring loaded pivot hub with grease fitting for lubrication / 36" deck includes additional fixed idler.
<b>Deck Drive Belt:</b>	HA section with Aramid (Kevlar) cords and standard (non-clutching) envelope
<b>Deck Drive Idler:</b>	Spring loaded / 36" decks have non-greaseable pivot hub 40", 48" and 52" have pivot hub with grease fitting for lubrication

### Mower Decks:

<b>HOC Range:</b>	1" (2.5cm) to 4.50" (11cm) in 1/4" (0.6cm) increments
<b>Blades:</b>	36" - two .250" (6.3mm) thick heat treated steel blades 40", 48" and 52" - three .250" (6.3mm) thick heat treated steel blades
<b>Spindles:</b>	Machined steel 1.00" (25mm) diameter shaft
<b>Spindle Housing:</b>	Ductile cast iron 9-3/8" (24cm) diameter mounted with six bolts
<b>Bearings:</b>	Sealed ball bearings permanently lubricated with high temperature grease
<b>Construction:</b>	7 gauge (.179 inch (4.5mm)) steel welded construction.
<b>Blade Tip Speed: (Domestic)</b>	36" - 18,420 ft/m calculated @ 3600 engine rpm 40" - 18,278 ft/m calculated @ 3600 engine rpm 48" - 18,503 ft/m calculated @ 3600 engine rpm 52" - 18,420 ft/m calculated @ 3600 engine rpm 60" - 18,271 ft/m calculated @ 3600 engine rpm
<b>Anti-Scalp Rollers:</b>	36" - 2 front mounted 40" - 3 front mounted 48" - 3 front mounted (optional 2 rear mounted) 52" & 60" - 3 front mounted, 2 rear mounted
<b>Skid Plate:</b>	Standard
<b>Adjustable Discharge Baffle:</b>	Standard
<b>Rubber Discharge Chute:</b>	Standard

# SPECIFICATIONS

## Hydro with Pistol Grip Controls cont.

### Unit Dimensions:

Model No.	Height*	Width Deflector Down	Width Deflector Raised	Length*	Weight**
30284	41.5" (105cm)	51.1" (130cm)	37.2" (94cm)	84.5" (214cm)	677 lbs. (302kg)
30286	41.5" (105cm)	55.5" (141cm)	41.6" (105cm)	81.3" (206cm)	677 lbs. (302kg)
30288	41.5" (105cm)	63.5" (161cm)	49.6" (126cm)	83.8" (213cm)	692 lbs. (314kg)
30289	41.5" (105cm)	67.6" (171cm)	53.7" (136cm)	83.8" (213cm)	731 lbs. (331kg)
30280	41.5" (105cm)	75.6" (192cm)	61.8" (157cm)	85.7" (217cm)	780 lbs. (354kg)

\*With handle height in lowest position

\*\*Estimated operating weight

2

# SPECIFICATIONS

## Hydro with T-2 Controls

### Models:

Model	Engine	Deck
30494	17 HP Kawasaki	36"
30496	17 HP Kawasaki	40"
30498	19 HP Kawasaki	48"
30499	19 HP Kawasaki	52"

### Engines:

	Output (Max. @ 3600 RPM)	
	17 HP (12.7 kW)	19 HP (14.2 kW)
<b>Make</b>	Kawasaki	Kawasaki
<b>Model</b>	FH541V	FH580V
<b>Hi-Idle</b>	3600 rpm	3600 rpm
<b>Starter</b>	Electric	Electric
<b>Oil Capacity</b>	3.8 pint (1.8L)	3.8 pint (1.8L)

### Fuel System:

4.8 gallons (18 liters) fuel tank capacity
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### Traction Drives:

<b>Traction Control:</b>	Toro T2 Control System
<b>Hydraulic Pump:</b>	Two Hydro-Gear Model PG
<b>Hydraulic Wheel Motor:</b>	Two Parker TEO-195
<b>Hydraulic Oil Filter:</b>	10 micron automotive spin-on type
<b>Hydraulic Fluid:</b>	Synthetic, 15w50
<b>Hydraulic Fluid Capacity:</b>	2.1 quarts (1.9 liters)
<b>Parking Brake:</b>	Standard equipment
<b>Ground Speed: (MPH/kmh)</b>	Variable, 0 to 6.1 mph (9.8kmh) Fwd / 0 to 2.5 mph (4kmh) Rev
<b>Hourmeter with Service Indicator</b>	Standard equipment

### Wheels and Tires:

<b>Front Castors Tires:</b>	9x3.5-4, 4 ply, smooth tread, semi-pneumatic with needle bearings and grease fittings
<b>Front Castors Fork:</b>	Heavy-duty commercial design with 1-1/8" (2.8cm) diameter pivot shaft. The pivot hubs have grease fitting for lubrication.
<b>Rear Traction Tires:</b>	17 hp - 16x6.50-8, 4 ply with turf traction tread. 19 hp - 16x7.50-8, 4 ply with turf traction tread.

# SPECIFICATIONS

## Hydro with T-2 Controls cont.

### Mower Drive:

<b>Mower Engagement:</b>	Engine mounted electric clutch
<b>Clutch Adjustment:</b>	Periodic air gap adjustment required - .018" ± .003" (0.45 ± 0.0762mm)
<b>PTO Drive Belt:</b>	HB section with Aramid (Kevlar) cords and dry clutching envelope
<b>PTO Idler:</b>	Spring loaded pivot hub with grease fitting for lubrication / 36" deck includes additional fixed idler
<b>Deck Drive Belt:</b>	HA section with Aramid (Kevlar) cords and standard (non-clutching) envelope
<b>Deck Drive Idler:</b>	Spring loaded / 36" decks have non-greaseable pivot hub 40", 48" and 52" have pivot hub with grease fitting for lubrication

### Mower Decks:

<b>HOC Range:</b>	1" (2.5cm) to 4.50" (11cm) in 1/4" (0.6cm) increments
<b>Blades:</b>	36" - two .250" (6.3mm) thick heat treated steel blades 40", 48" and 52" - three .250" (6.3mm) thick heat treated steel blades
<b>Spindles:</b>	Machined steel 1.00" (25mm) diameter shaft
<b>Spindle Housing:</b>	Ductile cast iron, 9-3/8" (24cm) diameter mounted with six bolts
<b>Bearings:</b>	Sealed ball bearings permanently lubricated with high temperature grease
<b>Construction:</b>	7 gauge (.179 inch (4.5mm)) steel welded construction
<b>Blade Tip Speed: (Domestic)</b>	36" - 18,420 ft/m calculated @ 3600 engine rpm 40" - 18,278 ft/m calculated @ 3600 engine rpm 48" - 18,503 ft/m calculated @ 3600 engine rpm 52" - 18,420 ft/m calculated @ 3600 engine rpm
<b>Anti-Scalp Rollers:</b>	36" - 2 front mounted 40" - 3 front mounted 48" - 3 front mounted (optional 2 rear mounted) 52" - 3 front mounted, 2 rear mounted
<b>Skid Plate:</b>	Standard
<b>Adjustable Discharge Baffle:</b>	Standard
<b>Rubber Discharge Chute:</b>	Standard

### Unit Dimensions:

Model No.	Height	Width Deflector Down	Width Deflector Raised	Length	Weight*
30494	46" (117cm)	51.1" (130cm)	37.2" (94cm)	78.5" (199cm)	667 lbs. (302kg)
30496	46" (117cm)	55.5" (141cm)	41.6" (105cm)	75.3" (191cm)	667 lbs. (302kg)
30498	46" (117cm)	63.5" (161cm)	49.6" (126cm)	77.8" (198cm)	682 lbs. (309kg)
30499	46" (117cm)	67.6" (171cm)	53.7" (136cm)	77.8" (198cm)	721 lbs. (327kg)

\* Estimated operating weight

# SPECIFICATIONS

## Gear with T-Bar Controls

### Models:

Model	Engine	Deck
30092	15 hp Kawasaki	32"
30094	15 hp Kawasaki	36"
30096	15 hp Kawasaki	40"
30098	17 hp Kawasaki	48"
30099	17 hp Kawasaki	52"

### Engines:

	Output (Max. @ 3600 RPM)	
	15 HP (11.2 kW)	17 HP (12.7 kW)
<b>Make</b>	Kawasaki	Kawasaki
<b>Model</b>	FH430V	FH541V
<b>Hi-Idle</b>	3600 rpm 3200 rpm (30092)	3600 rpm
<b>Starter</b>	Recoil	Recoil
<b>Oil Capacity</b>	3.8 pint (1.8L)	3.8 pint (1.8L)

### Fuel System:

4.8 gallons (18 liters) fuel tank capacity
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### Traction Drives:

<b>Traction Control:</b>	Toro T-Bar Control System
<b>Transmission:</b>	Peerless 700-070A, 5 speed forward / 1 reverse
<b>Transmission Output Shaft:</b>	Heavy-duty with 9 tooth spline
<b>Axle:</b>	1" (2.5cm) heavy-duty axle
<b>Traction Drive Belt:</b>	Two "A" section banded design
<b>Wheel Hub Bearing:</b>	Tapered roller bearings
<b>Ground Speed: (mph/kmh)</b>	(36" 40" 48" 52") 1st - 2 mph (3.2kmh) / 2nd - 2.6 mph (4.1kmh) / 3rd - 3.4 mph (5.4kmh) / 4th - 4.1 mph (6.5kmh) / 5th - 6.1 mph (9.8kmh) forward / 3 mph (4.8kmh) reverse (32") 1st - 0.9 mph (1.4kmh) / 2nd - 2.1 mph (3.3kmh) / 3rd - 3.4 mph (5.4kmh) / 4th - 4.3 mph (6.9kmh) / 5th - 5 mph (8kmh) forward / 2.5 mph (4kmh) reverse
<b>Parking Brake:</b>	Two wheel band type standard

# SPECIFICATIONS

## Gear with T-Bar Controls cont.

### Wheels and Tires:

<b>Front Castor Tires:</b>	9x3.5-4, 4 ply smooth tread, semi-pneumatic with needle bearings and grease fittings
<b>Front Castor Fork:</b>	Heavy-duty commercial design with 1-1/8" (2.8cm) diameter pivot shaft. The pivot hubs have grease fitting for lubrication.
<b>Rear Traction Tires:</b>	15 hp - 16x6.50-8, 4 ply with turf traction tread 17 hp - 16x6.50-8, 4 ply with turf traction tread

### Mower Drive:

<b>Mower Engagement:</b>	Engine mounted electric clutch
<b>Clutch Adjustment:</b>	Periodic air gap adjustment required - .018" ± .003" (0.45 ± 0.0762mm)
<b>PTO Drive Belt:</b>	HB section with Aramid (Kevlar) cords and dry clutching envelope
<b>PTO Idler:</b>	Spring loaded pivot hub with grease fitting for lubrication / 36" deck includes additional fixed idler
<b>Deck Drive Belt:</b>	HA section with Aramid (Kevlar) cords and standard (non-clutching) envelope
<b>Deck Drive Idler:</b>	Spring loaded / 36" decks have non-greaseable pivot hub 40", 48" and 52" have pivot hub with grease fitting for lubrication

### Mower Decks:

<b>HOC Range:</b>	(32") 2" (5cm) to 5" (13cm) in 1/2" (1.27cm) increments (36", 40", 48", 52") 1" (2.5cm) to 4.50" (11cm) in 1/4" (0.6cm) increments
<b>Blades:</b>	32" - One .188" (4.7mm) thick heat treated steel blade 36" - Two .250" (6.3mm) thick heat treated steel blades 40", 48" and 52" - Three .250" (6.3mm) thick heat treated steel blades
<b>Spindles:</b>	Machined steel 1.00" (25mm) diameter shaft
<b>Spindle Housing:</b>	Ductile cast iron 9-3/8" (24cm) diameter mounted with six bolts
<b>Bearings:</b>	Sealed ball bearings permanently lubricated with high temperature grease
<b>Construction:</b>	(32") 12 gauge (.104" (2.77mm)) stamped steel (36", 40", 48", 52") 7 gauge (.179" (4.5mm)) steel welded construction
<b>Blade Tip Speed: (Domestic)</b>	32" - 17,942 ft/m calculated @ 3300 engine rpm 36" - 18,420 ft/m calculated @ 3600 engine rpm 40" - 18,278 ft/m calculated @ 3600 engine rpm 48" - 18,503 ft/m calculated @ 3600 engine rpm 52" - 18,420 ft/m calculated @ 3600 engine rpm
<b>Anti-Scalp Rollers:</b>	32" - None 36" - 2 front mounted 40" - 3 front mounted 48" - 3 front mounted (optional 2 rear mounted) 52" - 3 front mounted, 2 rear mounted
<b>Skid Plate:</b>	(36", 40", 48", 52") Standard
<b>Adjustable Discharge Baffle:</b>	(36", 40", 48", 52") Standard
<b>Rubber Discharge Chute:</b>	(36", 40", 48", 52") Standard



# SPECIFICATIONS

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## Gear with T-Bar Controls cont.

### Unit Dimensions:

Model No.	Height*	Width Deflector Down	Width Deflector Raised	Length*	Weight**
30092	43.5" (110cm)	42" (107cm)	32" (81cm)	73" (185cm)	388 lbs. (176kg)
30094	41.2" (105cm)	51.1" (130cm)	37.2" (94cm)	82.7" (210cm)	588 lbs. (267kg)
30096	41.2" (105cm)	55.5" (141cm)	41.6" (106cm)	79.5" (202cm)	596 lbs. (270kg)
30098	41.2" (105cm)	63.5" (161cm)	49.6" (126cm)	82" (208cm)	649 lbs. (294kg)
30099	41.2" (105cm)	67.6" (172cm)	53.7" (136cm)	82" (208cm)	684 lbs. (310kg)

\* With handle height in lowest position

\*\* Estimated operating weight

# SPECIFICATIONS

## International Hydro with T-Bar (T2) Controls

### Models:

Model	Engine	Deck
30032 (CE)	15 hp Kawasaki	91cm

### Engine:

	Output (Max. @ 3600 rpm)
	15 HP (11.2 kW)
Make	Kawasaki
Model	FH430Y
Hi-Idle	2900 RPM
Starter	Recoil
Oil Capacity	3.8 Pint (1.8L)

### Fuel System:

4.8 Gallons (18 liters) fuel tank capacity
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### Traction Drives:

Traction Control:	Toro "T2" Control System
Hydraulic Pump:	Two Hydro-Gear Model PG
Hydraulic Wheel Motor:	Two Parker TEO-195
Hydraulic Oil Filter:	10 micron automotive spin-on type
Hydraulic Fluid:	Synthetic, 15w50
Hydraulic Fluid Capacity:	2.1 quarts (1.9 liters)
Parking Brake:	Standard equipment
Ground Speed: (kmh)	Variable, 0 to 9.8kmh fwd / 0 to 4kmh rev
Hourmeter with Service Indicator	Standard equipment

### Wheels and Tires:

Front Castors Tires:	9x3.5-4, 4 ply, smooth tread, semi-pneumatic with needle bearings and grease fittings
Front Castors Fork:	Heavy-duty commercial design with 1-1/8" (2.8cm) diameter pivot shaft. The pivot hubs have grease fitting for lubrication.
Rear Traction Tires:	15 hp - 16x6.50-8, 4 ply with turf traction tread

# SPECIFICATIONS

## International Hydro with T-Bar (T2) Controls cont.

### Mower Drive:

<b>Mower Engagement:</b>	Engine mounted electric clutch
<b>Clutch Adjustment:</b>	Periodic air gap adjustment required - .018" ± .003" (0.45 ± 0.0762mm)
<b>PTO Drive Belt:</b>	HB section with Aramid (Kevlar) cords and dry clutching envelope
<b>PTO Idler:</b>	Spring loaded pivot hub with grease fitting for lubrication / 91cm (36") deck includes additional fixed idler.
<b>Deck Drive Belt:</b>	HA section with Aramid (Kevlar) cords and standard (non-clutching) envelope
<b>Deck Drive Idler:</b>	Spring loaded / 91cm (36") decks have non-greaseable pivot hub

### Mower Decks:

<b>HOC Range:</b>	1" (2.5cm) to 4.50" (11cm) in 1/4" (0.6cm) increments
<b>Blades:</b>	Two .250" (6.3mm) thick heat treated steel blades
<b>Spindles:</b>	Machined steel 1.00" (25mm) diameter shaft
<b>Spindle Housing:</b>	Ductile cast iron, 9-3/8" (24cm) diameter mounted with six bolts
<b>Bearings:</b>	Sealed ball bearings permanently lubricated with high temperature grease
<b>Construction:</b>	7 gauge (.179" (4.5mm)) steel welded construction
<b>Blade Tip Speed:</b>	21,070 ft/m calculated @ 2900 engine rpm
<b>Anti-Scalp Rollers:</b>	2 front mounted
<b>Skid Plate:</b>	Standard
<b>Adjustable Discharge Baffle:</b>	Standard
<b>Rubber Discharge Chute:</b>	Standard

### Unit Dimensions:

Model No.	Height	Width Deflector Down	Width Deflector Raised	Length	Weight*
30032	46" (117cm)	51.1" (130cm)	37.2" (94cm)	78.5" (199cm)	667 lbs. (302kg)

\*Estimated operating weight

# SPECIFICATIONS

## International Gear with T-Bar Controls

### Models:

Model	Engine	Deck
30031 (CE)	15 hp Kawasaki	91cm

### Engines:

	Output (Max. @ 2900 RPM)
	15 HP (11.2 kW)
<b>Make</b>	Kawasaki
<b>Model</b>	FV430V
<b>Hi-Idle</b>	2900 RPM
<b>Starter</b>	Recoil
<b>Oil Capacity</b>	3.8 pints (1.8L)

### Fuel System:

4.8 gallons (18 liters) fuel tank capacity
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### Traction Drives:

<b>Traction Control:</b>	Toro T-Bar Control System
<b>Transmission:</b>	Peerless 700-070A, 5 speed forward / 1 reverse
<b>Transmission Output Shaft:</b>	Heavy duty with 9 tooth spline
<b>Axle:</b>	1" heavy-duty axle
<b>Traction Drive Belt:</b>	Two "A" section banded design
<b>Wheel Hub Bearing:</b>	Tapered roller bearings
<b>Ground Speed: (kmh)</b>	1st - 3.2kmh / 2nd - 4.1kmh / 3rd - 5.4kmh / 4th - 6.5kmh / 5th - 9.8kmh fwd 4.8kmh rev
<b>Parking Brake:</b>	Two wheel band type standard

### Wheels and Tires:

<b>Front Castors Tires:</b>	9x3.5-4, 4 ply, smooth tread, semi pneumatic with needle bearings and grease fittings
<b>Front Castors Fork:</b>	Heavy-duty commercial design with 1-1/8" (2.8cm) diameter pivot shaft. The pivot hubs have grease fitting for lubrication.
<b>Rear Traction Tires:</b>	15 hp - 16x6.50-8, 4 ply with turf traction tread

# SPECIFICATIONS

## International Gear with T-Bar Controls cont.

### Mower Drive:

<b>Mower Engagement:</b>	Engine mounted electric clutch
<b>Clutch Adjustment:</b>	Periodic air gap adjustment required - .018" ± .003" (0.45 ± 0.0762mm)
<b>PTO Drive Belt:</b>	HB section with Aramid (Kevlar) cords and dry clutching envelope
<b>PTO Idler:</b>	Spring loaded pivot hub with grease fitting for lubrication / 91cm deck includes additional fixed idler
<b>Deck Drive Belt:</b>	HA section with Aramid (Kevlar) cords and standard (non-clutching) envelope
<b>Deck Drive Idler:</b>	Spring loaded / 91cm decks have non-greaseable pivot hub

### Mower Decks:

<b>HOC Range:</b>	1" (2.5cm) to 4.50" (11cm) in 1/4" (0.6cm) increments
<b>Blades:</b>	Two .250" (6.3mm) thick heat treated steel blades
<b>Spindles:</b>	Machined steel 1.00" (2.5cm) diameter shaft
<b>Spindle Housing:</b>	Ductile cast iron, 9-3/8" (24cm) diameter mounted with six bolts
<b>Bearings:</b>	Sealed ball bearings permanently lubricated with high temperature grease
<b>Construction:</b>	7 gauge (.179" (4.5mm)) steel welded construction
<b>Blade Tip Speed: (Domestic)</b>	91cm - 12,070 ft/m calculated @ 2900 engine rpm
<b>Anti-Scalp Rollers:</b>	91cm - 2 front mounted
<b>Skid Plate:</b>	Standard
<b>Adjustable Discharge Baffle:</b>	Standard
<b>Rubber Discharge Chute:</b>	Standard
<b>Rubber Discharge Chute:</b>	Standard

### Unit Dimensions:

Model No.	Height*	Width Deflector Down	Width Deflector Raised	Length*	Weight**
30031 (CE)	41.2" (105cm)	51.1" (130cm)	37.2" (94cm)	82.7" (210cm)	598 lbs. (271kg)

\*With handle height in lowest position

\*\*Estimated operating weight

## Electric Clutch Replacment

### Electric Clutch Removal

1. Park the machine on a level surface.
2. Turn the engine off and remove the key.
3. Set the parking brake.
4. Move the negative battery terminal boot and disconnect the negative (black) battery cable from the battery (Fig. 0001).



Fig 0001

PICT-0250

5. Unplug the clutch lead from the harness connector (Fig. 0002).



Fig 0002

PICT-0548a

6. Push the grommet and clutch plug through the frame to the underside of the machine (Fig. 0003).



Fig 0003

PICT-0277

# CHASSIS

7. Remove the carrier frame cover (Fig. 0004).



Fig 0004

PICT-0546

8. Roll the PTO drive belt off the center pulley on the mower deck (Fig. 0005).



Fig 0005

PICT-0281

9. Raise the machine so that the underside of the chassis can be accessed.

10. Remove the trailing shield from the chassis by first removing the left end of the shield rod (bent at a 45 degree angle) from the hole in the frame and then remove the right side of the shield rod (bent at 90 degree angle) from the right side of the frame (Fig. 0006).



Fig 0006

PICT-0273

11. Remove the PTO idler arm spring from the spring post (Fig. 0007).

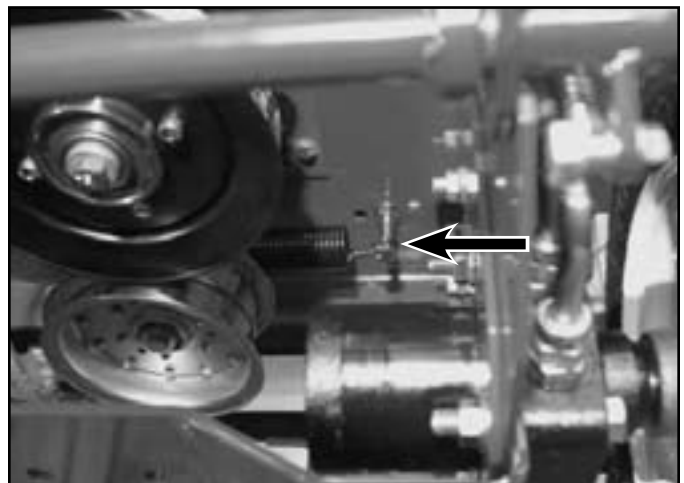


Fig 0007

PICT-0291a

12. Remove the belt from the clutch (Fig. 0008).



Fig 0008

PICT-0294

14. Loosen the clutch bolt (Fig. 0010).

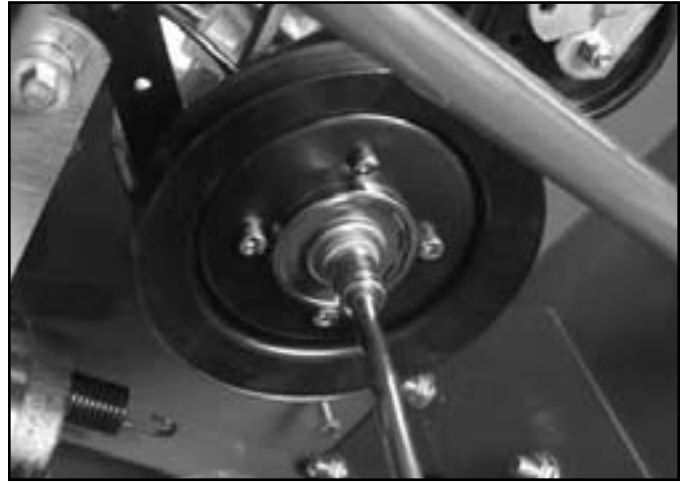


Fig 0010

PICT-0297a

13. Remove the bolt, nut, 2 washers and spacer securing the brake clutch strap to the underside of the frame (Fig. 0009).

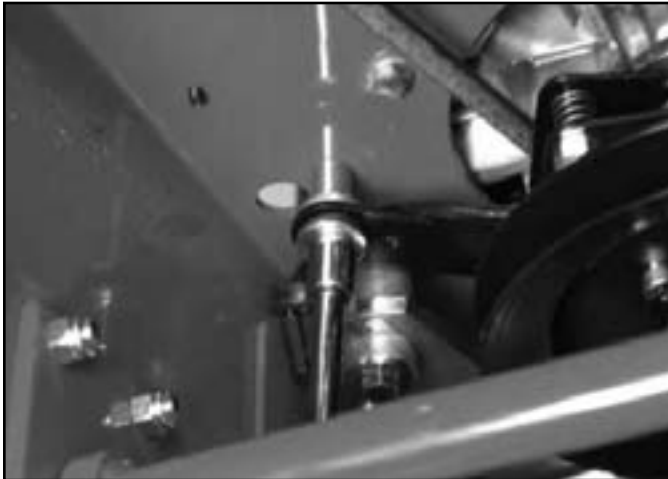


Fig 0009

PICT-0295

15. Remove the bolt, 2 spring washers and flat washer securing the clutch to the drive shaft. Lower the clutch off the drive shaft (Fig. 0011).



Fig 0011

PICT-0299



# CHASSIS

16. Remove the rubber grommet from the clutch wire (Fig. 0012).



Fig 0012

PICT-0551a

17. Remove the bolt, nut and washers securing the brake clutch strap to the clutch (Fig. 0013).



Fig 0013

PICT-0553

## Clutch Burnishing Procedure

**Note:** This procedure needs to be done only when installing a new clutch.

The clutch should be burnished as part of the pre-delivery service, or whenever a new clutch is installed. Burnishing polishes the clutch plate, allowing for smooth clutch engagement.

With deck drive belt installed, run the engine at half throttle. Engage and disengage the mower 5 times (10 seconds on/10 seconds off).

Increase engine RPM to 3/4 to full throttle. Engage and disengage mower 5 times (10 seconds on/10 seconds off).

Check the clutch air gap and adjust as needed. Refer to "Electric Clutch Installation" following.

## Electric Clutch Installation

1. Using a feeler gauge, check the clutch air gap at each of the 3 adjustment slots. The gap should be between 0.015" - 0.021" (0.381 - 0.533mm). Make sure the gauge is inserted between the armature and the rotor friction surfaces. Adjust the clutch as necessary (Fig. 0014).



Fig 0014

PICT-0554

2. Assemble the bolt, washers, nut and strap into the slotted opening on the clutch as shown. Before tightening, move the strap fastener assembly to the outer-most end of the slot and tighten (Fig. 0015).



Fig 0015

PICT-0557

3. Install the 2 cupped washers (crown side facing the bolt head) and 1 flat washer onto the clutch bolt (Fig. 0016).



Fig 0016

PICT-0351a

4. Apply thread locking compound to the clutch bolt (Fig. 0017).



Fig 0017

PICT-0352a

5. Apply anti-sieze compound to the engine crankshaft. Slide the electric clutch onto the crankshaft (Fig. 0018).



Fig 0018

PICT-0354a

# CHASSIS

6. Install the clutch bolt assembly (Fig. 0019).



Fig 0019

PICT-0355a

8. Install the bolt, nut, 2 washers and spacer securing the brake clutch strap to the underside of the frame (Fig. 0021).

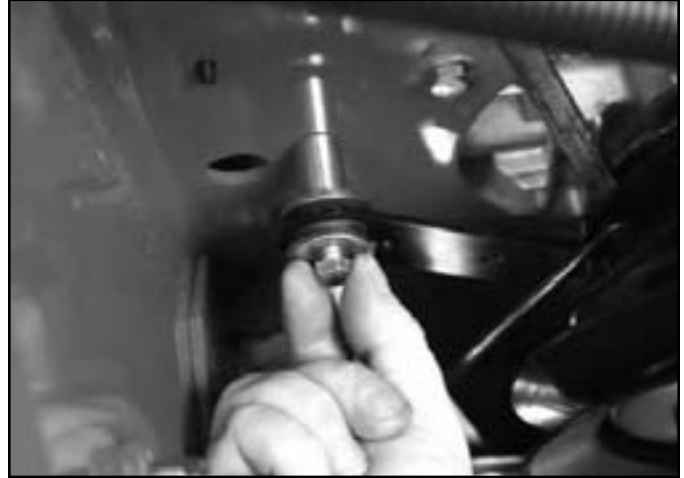


Fig 0021

PICT-0361

7. Torque the clutch bolt to  $55 \pm 5$  ft-lbs. ( $75 \pm 7$  Nm) (Fig. 0020).



Fig 0020

PICT-0356a

9. Feed the clutch harness plug up through the frame (Fig. 0022).



Fig 0022

PICT-0362

10. Install the rubber grommet into the frame opening (Fig. 0023).



Fig 0023

PICT-0363

**Note:** Ensure the PTO drive belt is routed properly around the mower deck pulley(s). Refer to belt routing decal (Fig. 0025 and Fig. 0026).

36" mower deck belt routing:

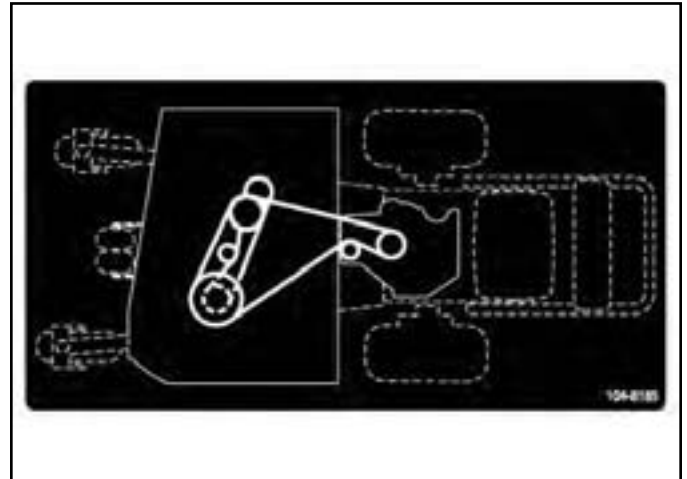


Fig 0025

fig. 104-8185

11. Route the PTO drive belt around the clutch. (Fig. 0024).



Fig 0024

PICT-0364a

40", 48" and 52" mower deck belt routing:

**Note:** On 48" decks leave the belt off of the center mower deck pulley.

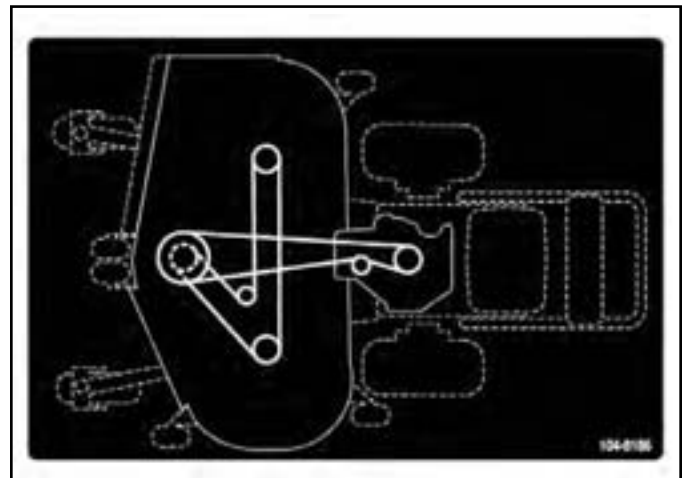


Fig 0026

fig. 104-8186

# CHASSIS

12. Install the PTO idler arm spring to the spring post (Fig. 0027).

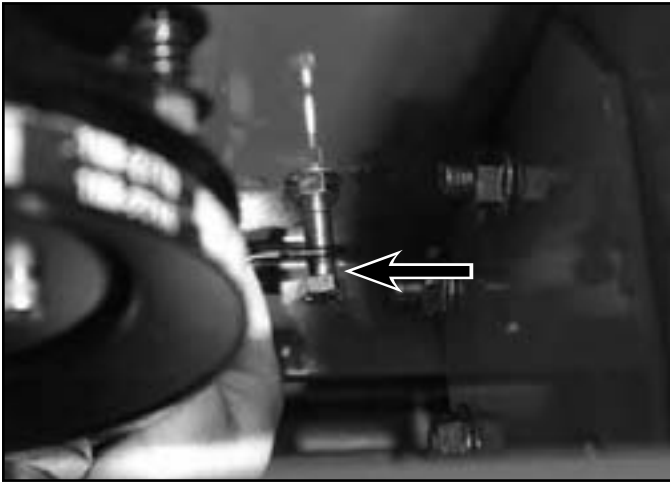


Fig 0027

PICT-0367

14. Lower the machine.

15. Roll the PTO drive belt onto the center mower deck pulley (Fig. 0029).



Fig 0029

PICT-0281

13. Install the trailing shield into the frame by first inserting the right side of the trailing shield rod (bent at a 90 degree angle) into the hole in the right side of the frame and then insert the left end of the trailing shield rod (bent at a 45 degree angle) into the hole in the left side of the frame (Fig. 0028).



Fig 0028

PICT-0273

16. Replace the carrier frame cover (Fig. 0030).



Fig 0030

PICT-0280

17. Plug the clutch connector into the harness connector (Fig. 0031).



Fig 0031

PICT-0548a

18. Connect the negative (black) battery cable to the negative battery terminal and cover with the boot (Fig. 0032).



Fig 0032

PICT-0250

## PTO Idler Replacement

### PTO Idler Removal

1. Turn the engine off and remove the key from the ignition.
2. Remove the carrier frame cover (Fig. 0033).



Fig 0033

PICT-0280

3. Roll the PTO drive belt off the center mower deck pulley (Fig. 0034).



Fig 0034

PICT-0283

# CHASSIS

4. Raise the machine so that the underside of the chassis can be accessed.
5. Remove the PTO idler arm spring from the spring post and the idler arm (Fig. 0035).

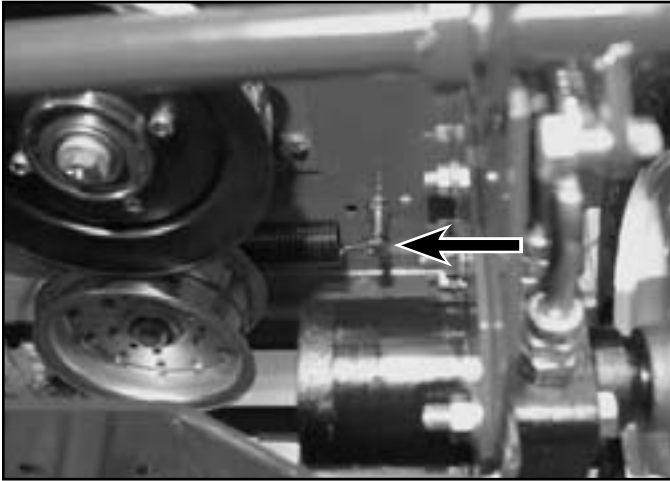


Fig 0035

PICT-0291a

7. Remove the PTO idler arm assembly from the frame (Fig. 0037).



Fig 0037

PICT-0604a

6. Remove the bolt, nut, washers and idler tube securing the PTO idler arm assembly to the frame (Fig. 0036).

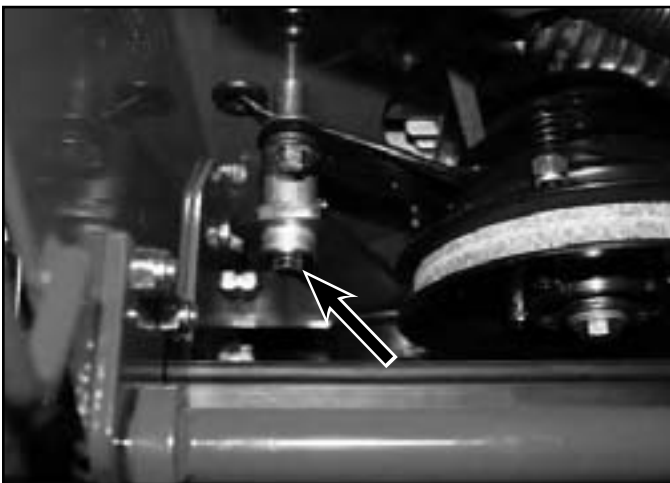


Fig 0036

IMG-7690

8. Press out the bearing sleeves from the idler arm (Fig. 0038).



Fig 0038

PICT-0605

9. Remove the bolt, washer and Bellville washer securing the pulley to the idler arm (Fig. 0039).



Fig 0039

PICT-0609

11. Remove the grease fitting from the idler arm (Fig. 0041).



Fig 0041

PICT-0613

10. Remove the pulley from the idler arm (Fig. 0040).



Fig 0040

PICT-0610

- PTO Idler Assembly (Fig. 0042).

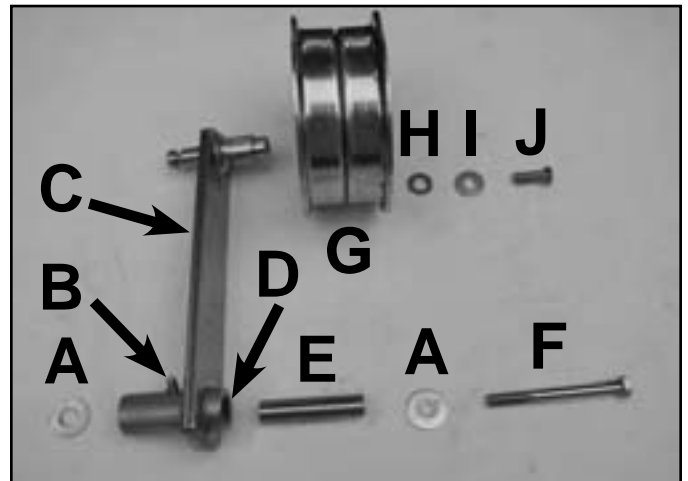


Fig 0042

PICT-0618a

- |                       |                      |
|-----------------------|----------------------|
| A. Washer (2)         | F. Bolt              |
| B. Grease Fitting     | G. Idler Pulley      |
| C. Idler Arm          | H. Flat Washer       |
| D. Bearing Sleeve (2) | I. Belleville Washer |
| E. Idler Tube         | J. Bolt              |



# CHASSIS

## PTO Idler Installation

1. Install the grease fitting into the idler arm (Fig. 0043).

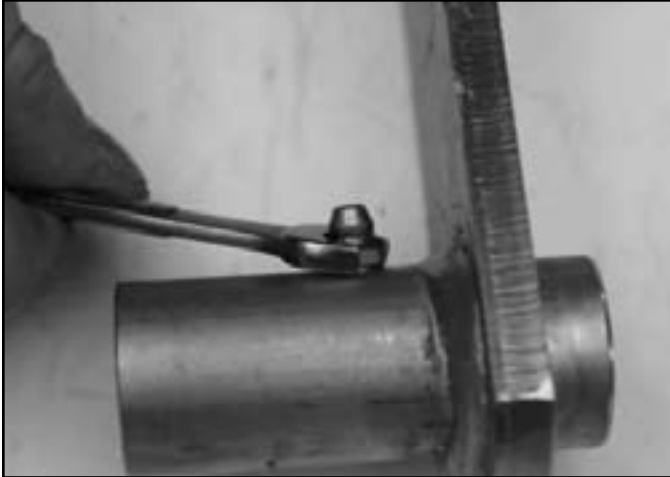


Fig 0043

PICT-0613

2. Press the bearing sleeves into the idler arm pivot (Fig. 0044).



Fig 0044

PICT-0619

3. Position the pulley onto the idler arm (Fig. 0045).



Fig 0045

PICT-0610

4. Slide the Belleville washer (crown toward the bolt head) and flat washer onto the bolt. Install the bolt and washers through the pulley and into the idler arm (Fig. 0046).



Fig 0046

PICT-0620

5. Slide a washer and idler tube onto the idler pivot bolt. Slide the bolt assembly into the idler arm. Install a washer onto the bolt (Fig. 0047).



Fig 0047

PICT-0624a

7. Install a washer and nut securing the PTO idler arm assembly to the frame (Fig. 0049).

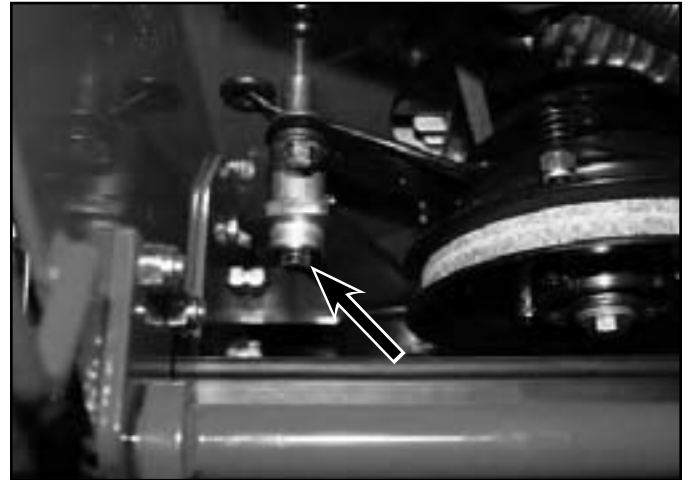


Fig 0049

IMG-7690

6. Position the PTO idler arm assembly up to the frame (Fig. 0048).



Fig 0048

PICT-0625a

8. Hook the PTO idler arm spring onto the idler arm and onto the spring post (Fig. 0050).

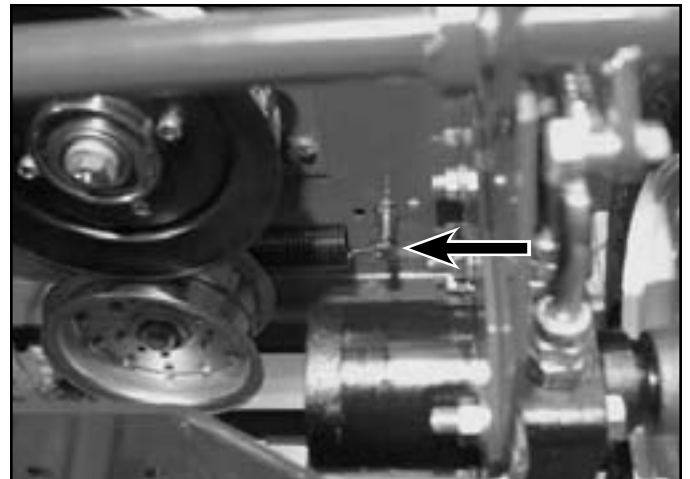


Fig 0050

PICT-0291a

# CHASSIS

9. Lower the machine.
10. Roll the PTO drive belt onto the center mower deck pulley (Fig. 0051).



Fig 0051

PICT-0283

11. Install the carrier frame cover (Fig. 0052).



Fig 0052

PICT-0280

## Parking Brake Service - Hydro

### Checking the Parking Brake

1. Move the machine to a level surface.
2. Turn the ignition off and remove the key.
3. Check and adjust the tire pressure as follows:
  - a. Rear tires: 12-14psi (83-97kPa)
  - b. Castor tires: Semi-pneumatic
4. Set the parking brake (Fig. 0053).

**Note:** Setting the parking brake should take a reasonable amount of force. If it engages too hard or too easily, adjustment is required. Refer to "Adjusting the Parking Brake", following.



Fig 0053

PICT-0468

## Adjusting the Parking Brake

1. Check the parking brake before you adjust it. Refer to "Checking the Parking Brake", preceding.
2. Release the parking brake.
3. Remove the cotter pin from the clevis at the top end of the parking brake adjusting rod (Fig. 0054).



Fig 0054

PICT-0470

4. Remove the clevis pin securing the top end of the parking brake adjusting rod to the parking brake handle (Fig. 0055).



Fig 0055

PICT-0471

5. Turn the upper brake adjustment yoke to adjust the parking brake as follows (Fig. 0056):
  - a. Clockwise to decrease engagement force
  - b. Counterclockwise to increase engagement force



Fig 0056

PICT-0473

6. Position the upper yoke of the parking brake adjusting rod to the parking brake handle and insert the clevis pin (Fig. 0057).



Fig 0057

PICT-0471

# CHASSIS

7. Install a cotter pin into the clevis pin (Fig. 0058).



Fig 0058

PICT-0470

3. Remove the clevis pin securing the top end of the parking brake adjusting rod to the parking brake handle (Fig. 0060).



Fig 0060

PICT-0471

8. Check the brake operation again. Refer to "Checking the Parking Brake" on page 3-14.

## Parking Brake Removal

1. Release the parking brake.
2. Remove the cotter pin from the clevis pin at the top end of the parking brake adjusting rod (Fig. 0059).



Fig 0059

PICT-0470

4. Remove the cotter pin from the clevis pin securing the lower yoke of the brake adjusting rod to the parking brake assembly (Fig. 0061).

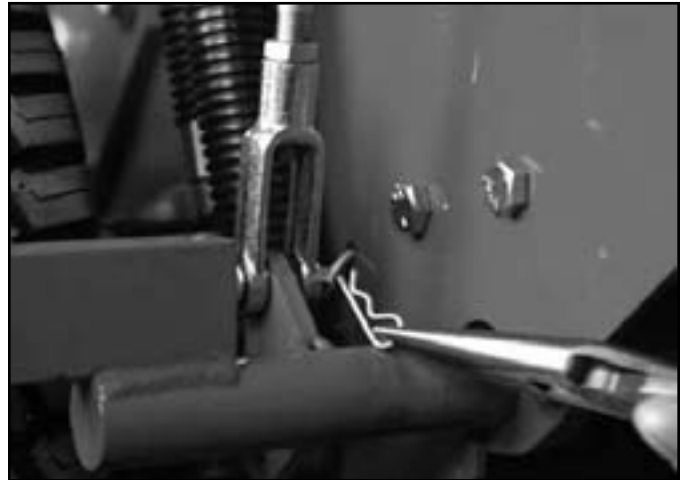


Fig 0061

PICT-0477

5. Remove the clevis pin that secures the lower end of the brake adjusting rod to the parking brake assembly and remove the brake rod assembly (Fig. 0062).



Fig 0062

PICT-0478

6. Remove the nut and conical washer from the bolt securing the parking brake handle to the handle support (Fig. 0063).



Fig 0063

PICT-0481

7. Remove the bolt, thrust bearing and parking brake handle from the handle support (Fig. 0064).



Fig 0064

PICT-0483

8. Unplug the parking brake switch from the harness (Fig. 0065).



Fig 0065

PICT-0485

# CHASSIS

9. Remove the 2 screws and nuts securing the parking brake switch to the handle support (Fig. 0066).



Fig 0066

PICT-0486

11. Remove the 2 nuts from the bolts securing the handle support to the frame (Fig. 0068).



Fig 0068

PICT-0489

10. Remove the parking brake switch and switch plate from the handle support (Fig. 0067).



Fig 0067

PICT-0487

12. Remove the bolts and handle support from the frame (Fig. 0069).



Fig 0069

PICT-0490

3

13. Remove the whizlock nut and bolt securing the top end of the parking brake spring to the frame (Fig. 0070).



Fig 0070

PICT-0491

15. Remove the parking brake assembly from the frame (Fig. 0072).

**Note:** Unit raised for photo clarity.



Fig 0072

PICT-0497

14. Remove the 3 bolts and nuts securing the parking brake assembly to the frame (Fig. 0071).



Fig 0071

PICT-0494

16. Remove the bolt, nut and spring from the parking brake assembly (Fig. 0073).



Fig 0073

PICT-0500a



# CHASSIS

## Parking Brake Installation

1. Install the bolt, nut and spring onto the parking brake assembly (Fig. 0074).



Fig 0074

PICT-0500a

2. Position the parking brake assembly into the frame (Fig. 0075).

**Note:** Unit raised for photo clarity.



Fig 0075

PICT-0497

3. Loosely install the 3 bolts and nuts securing the parking brake assembly to the frame (Fig. 0076).



Fig 0076

PICT-0494

4. Insert the bolt through the top end of the parking brake spring and into the frame (Fig. 0077).



Fig 0077

PICT-0502

5. Loosely install the whizlock nut on the bolt that secures the top end of the brake spring to the frame (Fig. 0078).



Fig 0078

PICT-0503a

8. Install the nuts securing the parking brake handle support to the frame (Fig. 0080).



Fig 0080

PICT-0489

6. Tighten all 4 nuts and bolts securing the parking brake assembly to the frame.
7. Insert the bolts through the frame and parking brake handle support (Fig. 0079).



Fig 0079

PICT-0490

9. Position the parking brake switch and switch plate onto the handle support (Fig. 0081).



Fig 0081

PICT-0487

# CHASSIS

10. Install 2 screws and nuts securing the parking brake switch and switch plate to the handle support (Fig. 0082).



Fig 0082

PICT-0486

12. Insert a bolt through the parking brake handle. Install a thrust bearing onto the bolt and then insert the bolt/handle/bearing assembly through the handle support (Fig. 0084).



Fig 0084

PICT-0483

3

11. Plug parking brake switch into the harness connector (Fig. 0083).



Fig 0083

PICT-0485

13. Install a conical washer onto the bolt (crown facing the threaded end of the bolt (Fig. 0085).



Fig 0085

PICT-0507

14. Install a nut onto the bolt securing the parking brake handle to the handle support (Fig. 0086).

**Note: Do not over-tighten the nut.**



Fig 0086

PICT-0481

15. Position the brake linkage rod assembly with the adjusting yoke positioned up to the parking brake handle. Insert a clevis pin through the lower yoke securing it to the parking brake assembly (Fig. 0087).

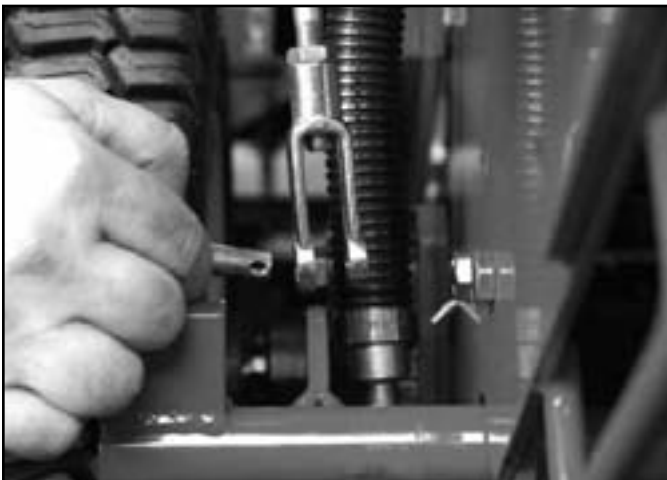


Fig 0087

PICT-0478

16. Install a cotter pin into the clevis pin (Fig. 0088).



Fig 0088

PICT-0477

17. Insert a clevis pin through the upper adjusting yoke securing it to the parking brake handle (Fig. 0089).



Fig 0089

PICT-0471

# CHASSIS

18. Install a cotter pin into the clevis pin (Fig. 0090).



Fig 0090

PICT-0470

19. Check the parking brake. Refer to "Checking the Parking Brake" on page 3-14.

## Wheel Drive Belt and Wheel Hub Replacement - Gear Drive

The following inspections should be made when disassembling the drive system, particularly if the reason for service is the inability to adjust belt tension or "loss of drive". Be sure to inspect all components; there may be more than one item needing replacement.

Inspect for the following:

- Pulley flanges bent or damaged. They can pinch or cut the belt.
- Idler arm bent - this will push the belt to one side and can induce belt jumping in reverse.
- Idler pulley bearing worn out, resulting in inconsistent tension on the belt. Can cause slippage or jumping.
- A belt contacting the bottom of the pulley "V" indicates worn belt or pulleys. The belt will slip no matter how tight you adjust it.
- Belt glazed, shiny or burnt on the sides of the "V" indicates slipping. Belt must be replaced and the cause identified and corrected.
- The sides of each pulley sheave should be straight and flat. If the sides of the "V" have "opened up" or appear to bulge the pulley is worn and must be replaced.

If the belt is riding too deep in one or both pulley grooves the center flange will begin to cut the belt into 2 single belts. This indicates a badly worn belt or pulley. The parts must be replaced.

## Wheel Drive Belt & Wheel Hub Removal

1. Turn the engine off and remove the key from the ignition.
2. Raise the machine so the rear tire is off the ground.
3. Remove the 3 lower idler support mounting bolts (Fig. 0091).



Fig 0091

PICT-1519

4. Loosen the idler support bracket pivot bolt (Fig. 0092).



Fig 0092

PICT-1520

5. Rotate the idler support bracket so that it is out of the way of the transmission pulley (Fig. 0093).



Fig 0093

PICT-1521

6. Remove the wheel drive belt from the transmission pulley and remove it from around the drive wheel (Fig. 0094).



Fig 0094

PICT-1577

# CHASSIS

7. Inspect the pulleys for wear and damage. Replace as necessary. If pulley replacement is required, continue on. For belt replacement only, go to "Wheel Drive Belt and Wheel Hub Installation" step 17, on page 3-34.
8. Loosen the set screw securing the drive pulley to the transmission (Fig. 0095).

3



Fig 0095

PICT-1580

9. Slide the drive pulley off the transmission drive shaft (Fig. 0096).



Fig 0096

PICT-1582

10. Remove the key from the drive pulley shaft keyway (Fig. 0097).



Fig 0097

PICT-1583

11. Inspect the key and replace it if it is worn or damaged.
12. Apply anti-seize to the transmission drive shaft (Fig. 0098).



Fig 0098

PICT-1586

13. Install the key into the transmission driveshaft keyway (Fig. 0099).



Fig 0099

PICT-1583

15. Apply thread locking compound to the drive pulley set screw (Fig. 0101).



Fig 0101

PICT-1587a

14. Position the drive pulley onto the transmission drive shaft so that the pulley hub faces toward the machine. The transmission driveshaft should be flush with the outside flange of the pulley (Fig. 0100).



Fig 0100

PICT-1582

16. Install the set screw into the drive pulley (Fig. 0102).



Fig 0102

PICT-1580



# CHASSIS

17. Remove the 4 lug nuts retaining the wheel to the wheel hub assembly (Fig. 0103).



Fig 0103

PICT-1588a

19. Remove the dust cover from the wheel hub assembly (Fig. 0105).



Fig 0105

PICT-1590

18. Remove the wheel from the wheel hub assembly (Fig. 0104).



Fig 0104

PICT-1589

20. Remove the cotter pin retaining the castle nut to the axle (Fig. 0106).



Fig 0106

PICT-1592

21. Remove the castle nut from the axle (Fig. 0107).



Fig 0107

PICT-1593

23. Remove the washer from the wheel hub (Fig. 0109).



Fig 0109

PICT-1622

22. Slide the wheel hub assembly off the axle (Fig. 0108).



Fig 0108

PICT-1594

24. Remove the outside tapered wheel bearing from the wheel hub (Fig. 0110).



Fig 0110

PICT-1623

# CHASSIS

25. Remove the inside grease seal from the wheel hub (Fig. 0111).



Fig 0111

PICT-1624

27. Remove the grease fitting from the wheel hub (Fig. 0113).

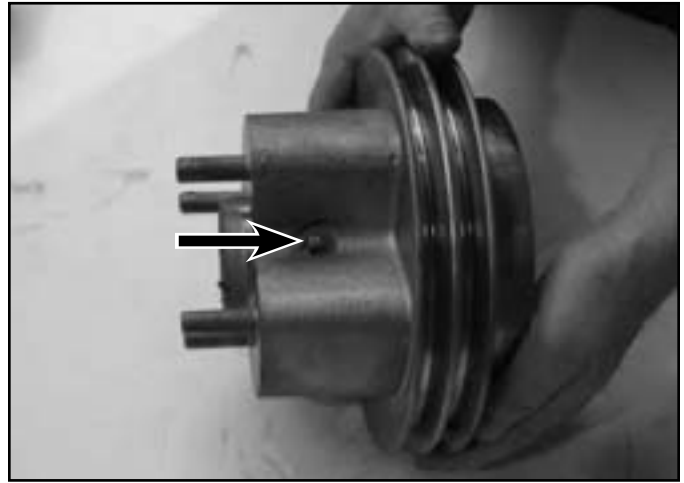


Fig 0113

PICT-1650

3

26. Remove the tapered bearing from the wheel hub (Fig. 0112).



Fig 0112

PICT-1625

28. Thoroughly clean the wheel hub, tapered bearings and grease seal. Inspect and replace if worn or damaged.

## Wheel Drive Belt & Wheel Hub Installation

1. Install a grease fitting into the wheel hub (Fig. 0114).

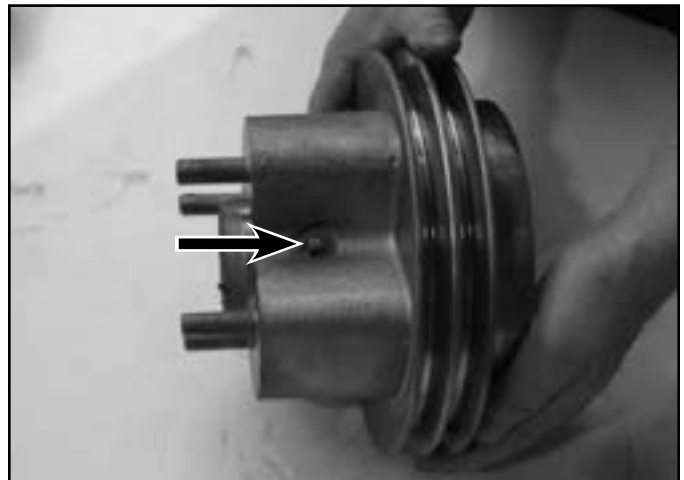


Fig 0114

PICT-1650

2. Repack the tapered bearing with grease (Fig. 0115).

**Note: When packing wheel bearings use #2 general purpose lithium base or molybdenum base grease.**



Fig 0115

PICT-1643

3. Insert the tapered bearing into the wheel hub bore (Fig. 0116).



Fig 0116

PICT-1644

4. Insert the grease seal into the wheel hub bore (Fig. 0117).



Fig 0117

PICT-1645

5. Repack the second tapered bearing with grease (Fig. 0118).



Fig 0118

PICT-1643

# CHASSIS

6. Insert the tapered bearing into the opposite side of the wheel hub bore (Fig. 0119).



Fig 0119

PICT-1646

8. Slide the wheel hub assembly onto the axle (Fig. 0121).



Fig 0121

PICT-1651

7. Position a washer onto the outside tapered bearing (Fig. 0120).



Fig 0120

PICT-1648

9. Position the brake band around the wheel hub brake drum and continue sliding the wheel hub onto the axle (Fig. 0122).

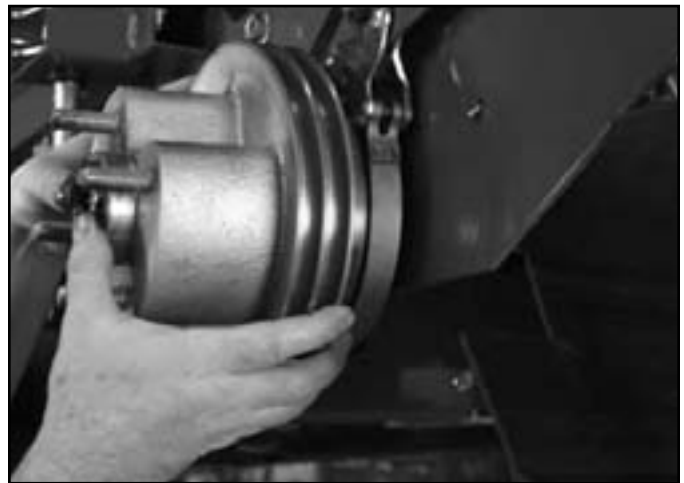


Fig 0122

PICT-1652

10. Install the castle nut onto the axle (Fig. 0123).

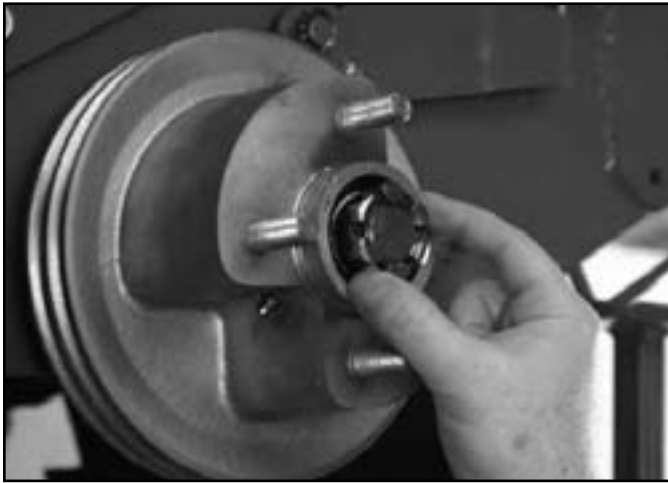


Fig 0123

PICT-1653

12. Install a cotter pin securing the castle nut to the axle (Fig. 0125).



Fig 0125

PICT-1655

11. Torque the castle nut to 6.5 ft-lbs. (8.8 Nm) while turning the hub to seat the bearings and to remove all endplay. Loosen the castle nut until it is away from the washer/bearing then tighten the castle nut until it contacts the washer/bearing. The wheel hub must be free to rotate and have no endplay (Fig. 0124).



Fig 0124

PICT-1654

13. Fill the wheel hub cavity with grease (Fig. 0126).



Fig 0126

PICT-1656

# CHASSIS

14. Using a rubber mallet, install the dust cap into to wheel hub assembly (Fig. 0127).

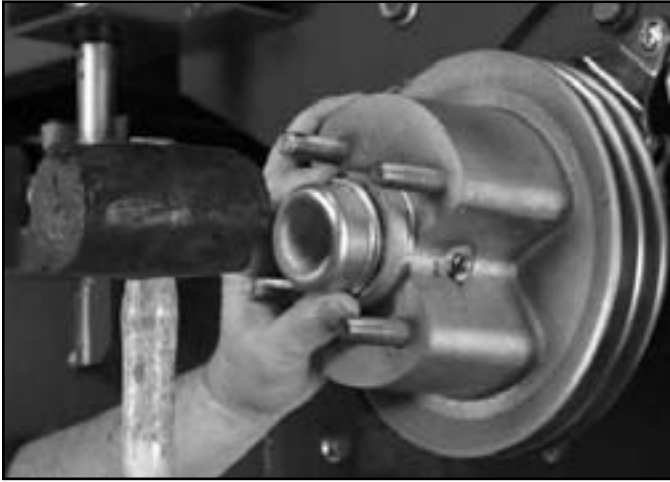


Fig 0127

PICT-1657

16. Install the lug nuts onto the wheel hub studs. Torque the lug nuts to  $85 \pm 8$  ft-lbs. ( $115 \pm 10.8$  Nm) (Fig. 0129).



Fig 0129

PICT-1663a

15. Slide the wheel onto the wheel hub assembly (Fig. 0128).



Fig 0128

PICT-1662a

17. Route the wheel drive belt around the wheel drive pulley and the wheel hub pulley (Fig. 0130).



Fig 0130

PICT-1577

18. Rotate the idler support bracket into position so that the 3 mounting holes in the bracket line up with the 3 holes in the frame (Fig. 0131).

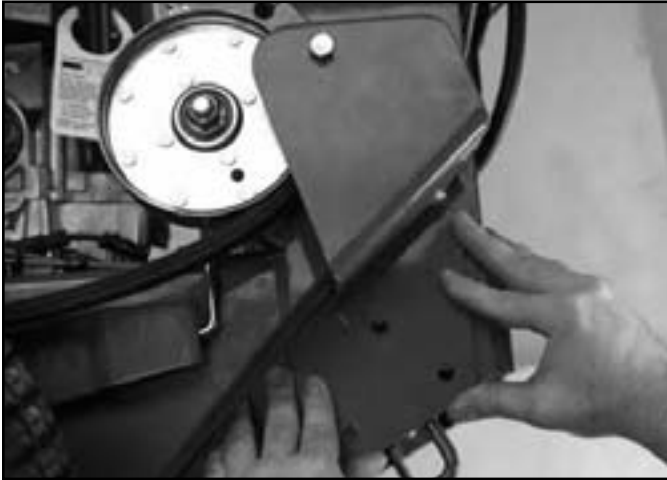


Fig 0131

PICT-1664

20. Tighten the idler support bracket pivot bolt (Fig. 0133).



Fig 0133

PICT-1520

19. Loosely install the 3 lower idler support mounting bolts (Fig. 0132).



Fig 0132

PICT-1519

21. Tighten the 3 lower idler support mounting bolts (Fig. 0134).



Fig 0134

PICT-1519



# CHASSIS

## Brake Band Replacement

The following procedures are the same for both the left and right brake band replacement.

## Brake Band Removal

1. Turn the engine off and remove the key from the ignition.
2. Raise the machine so the rear tire is off the ground.
3. Remove the 3 lower idler support mounting bolts (Fig. 0135).



Fig 0135

PICT-1519

4. Loosen the idler support bracket pivot bolt (Fig. 0136).



Fig 136

PICT-1520

5. Rotate the idler support bracket so that it is out of the way of the transmission pulley (Fig. 0137).



Fig 0137

PICT-1521

6. Remove the wheel drive belt from the transmission pulley and remove it from around the drive wheel (Fig. 0138).



Fig 0138

PICT-1577

8. Remove the wheel from the wheel hub assembly (Fig. 0140).



Fig 0140

PICT-1589

7. Remove the 4 lug nuts retaining the wheel to the wheel hub assembly (Fig. 0139).



Fig 0139

PICT-1588a

9. Remove the dust cover from the wheel hub assembly (Fig. 0141).



Fig 0141

PICT-1590

# CHASSIS

10. Remove the cotter pin retaining the castle nut to the axle (Fig. 0142).



Fig 0142

PICT-1592

12. Slide the wheel hub assembly off the axle (Fig. 0144).



Fig 0144

PICT-1594

11. Remove the castle nut from the axle (Fig. 0143).



Fig 0143

PICT-1593

13. Remove the hairpin cotter securing the brake rod to the brake arm. Remove the brake rod from the brake arm (Fig. 0145).



Fig 0145

PICT-1596

14. Remove the retaining ring from the brake arm pivot (Fig. 0146).



Fig 0146

PICT-1602

16. Remove the 3 brake link plate retaining rings (Fig. 0148).



Fig 0148

PICT-1607a

15. Remove the brake arm assembly from the pivot (Fig. 0147).



Fig 0147

PICT-1603

17. Remove the brake link plate from the brake assembly (Fig. 0149).



Fig 0149

PICT-1609a

# CHASSIS

18. Remove the brake band from the brake link (Fig. 0150).

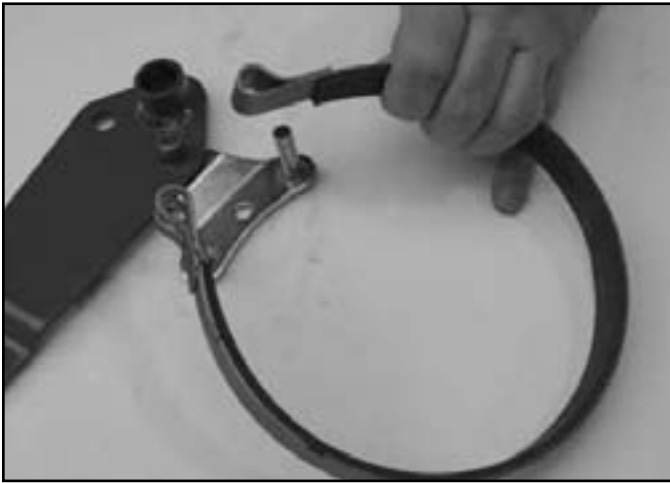


Fig 0150

PICT-1611a

20. Inspect the brake band. Replace if damaged or worn (Fig. 0152).



Fig 0152

PICT-1615a

3

19. Remove the brake arm from the brake link (Fig. 0151).



Fig 0151

PICT-1612a

## Brake Band Installation

1. Position the brake arm onto the brake link (Fig. 0153).



Fig 0153

PICT-1612a

2. Place the brake band onto the brake link (Fig. 0154).



Fig 0154

PICT-1611a

4. Install 3 new retaining rings as shown (Fig. 0156):

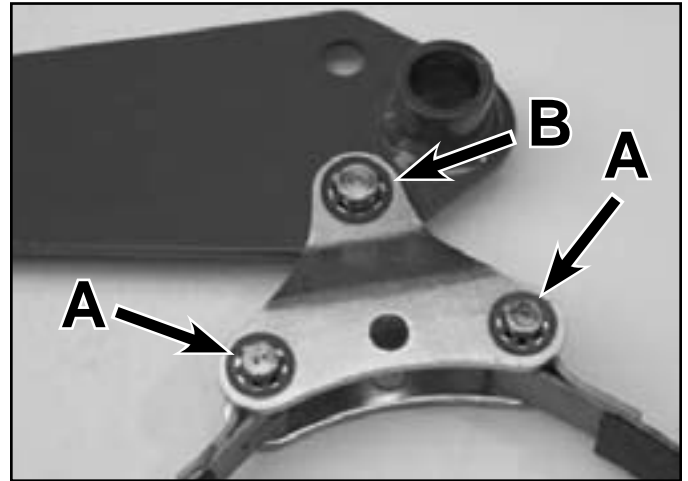


Fig 0156

PICT-1607a

A. Small

B. Large

3. Install the brake link plate onto the brake assembly (Fig. 0155).



Fig 0155

PICT-1609a

5. Apply anti-seize compound to the brake arm pivot. Slide the brake arm assembly onto the pivot (Fig. 0157).

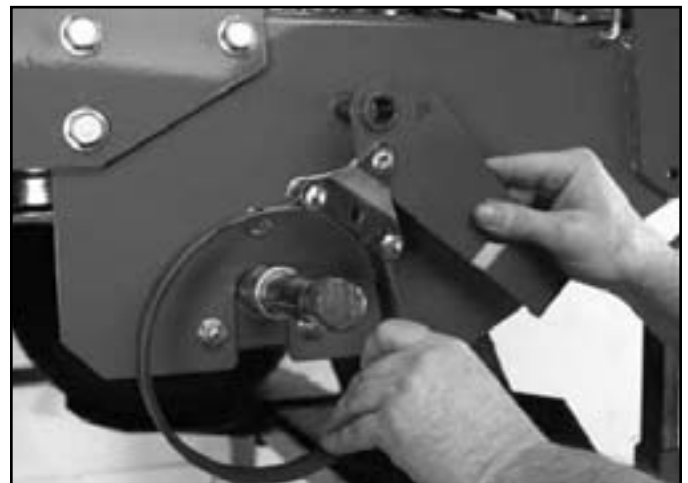


Fig 0157

PICT-1603

# CHASSIS

6. Install a new retaining ring onto the brake arm pivot securing the brake arm to the frame (Fig. 0158).



Fig 0158

PICT-1621

8. Slide the wheel hub assembly onto the axle (Fig. 0160).



Fig 0160

PICT-1594

3

7. Position the lower end of the brake rod into the brake arm. Install a hairpin cotter securing the brake rod to the brake arm (Fig. 0159).



Fig 0159

PICT-1596

9. Install the castle nut onto the axle (Fig. 0161).

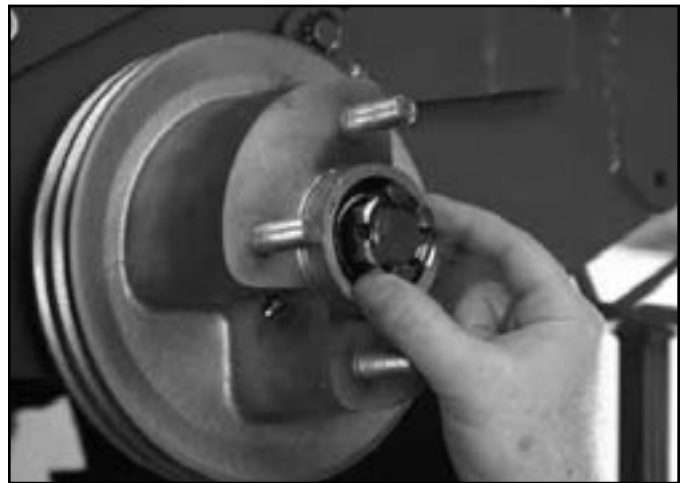


Fig 0161

PICT-1653

10. Torque the castle nut to 6.5 ft-lbs. (8.8 Nm) while turning the hub to seat the bearings and to remove all endplay. Loosen the castle nut until it is away from the washer/bearing. Tighten nut until it contacts washer/bearing. Hub must be free to rotate and have no endplay (Fig. 0162).



Fig 0162

PICT-1654

11. Install the cotter pin securing the castle nut to the axle (Fig. 0163).



Fig 0163

PICT-1655

12. Fill the wheel hub cavity with grease (Fig. 0164).



Fig 0164

PICT-1656

13. Using a rubber mallet, install the dust cap into to wheel hub assembly (Fig. 0165).



Fig 0165

PICT-1657



# CHASSIS

14. Route the wheel drive belt around the wheel drive pulley and the wheel hub (Fig. 0166).

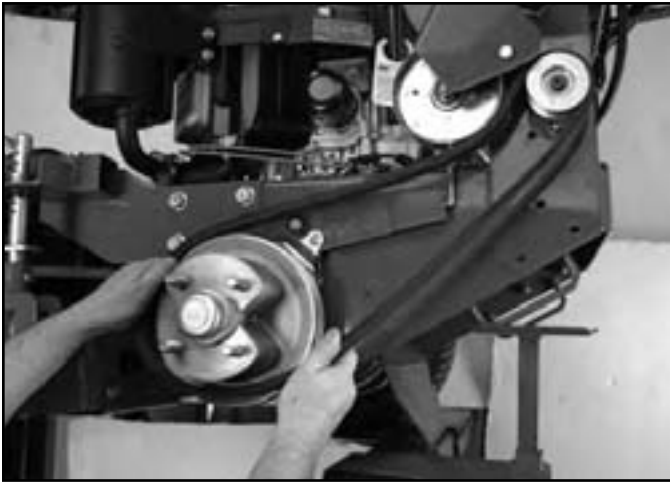


Fig 0166

PICT-1660

16. Install the lug nuts onto the wheel hub studs. Torque the lug nuts to  $85 \pm 8$  ft-lbs. ( $115 \pm 10.8$  Nm) (Fig. 0168).



Fig 0168

PICT-1663a

15. Slide the wheel onto the wheel hub assembly (Fig. 0167).



Fig 0167

PICT-1662a

17. Rotate the idler support bracket into position so that the 3 mounting holes in the bracket line up with the 3 holes in the frame (Fig. 0169).

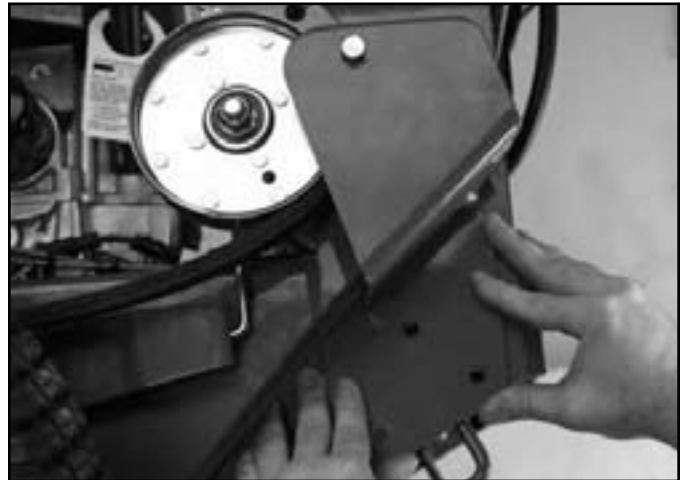


Fig 0169

PICT-1664

18. Loosely install the 3 lower idler support mounting bolts (Fig. 0170).



Fig 0170

PICT-1519

20. Tighten the 3 lower idler support mounting bolts (Fig. 0172).



Fig 0172

PICT-1519

19. Tighten the idler support bracket pivot bolt (Fig. 0171).

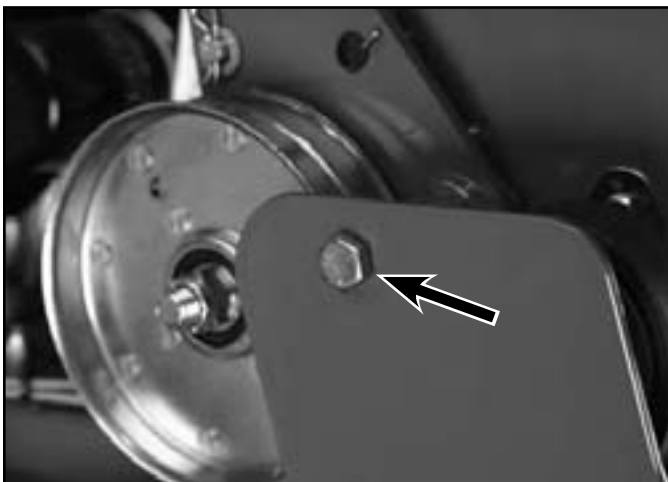


Fig 0171

PICT-1520

## Carrier Frame Replacement

### Carrier Frame Removal

1. Remove the Mower Deck. Refer to "Mower Deck Removal" on page 8-61.
2. 40", 48", 52" and 60" mower decks only: Remove the battery and battery tray assembly. Refer to "Battery Tray Removal" on page 3-70.
3. Support the carrier frame with a jack stand.

# CHASSIS

4. Remove the bolt and nut securing the right side of the carrier frame to the right side of the traction frame (Fig. 0173).



Fig 0173

PICT-1300

6. Slide the carrier frame away from the traction frame (Fig. 0175).

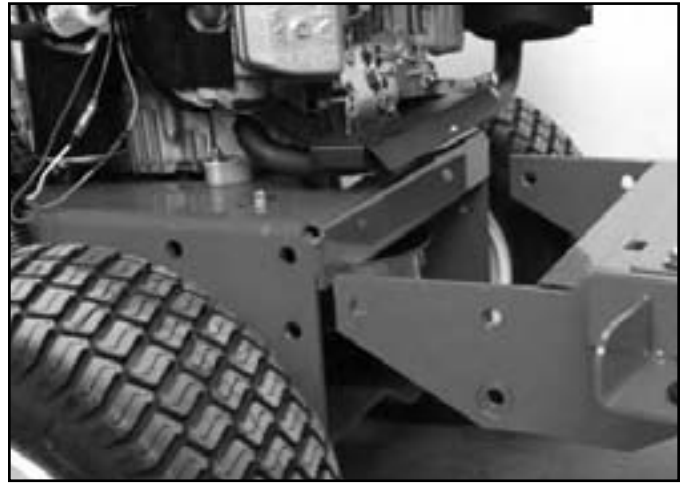


Fig 0175

PICT-1305

5. Remove the 3 bolts and nuts securing the left side of the carrier frame to the left side of the traction frame (Fig. 0174).



Fig 0174

PICT-1303

7. Remove the 2 bolts and washers securing the belt shield to the carrier frame (Fig. 0176).

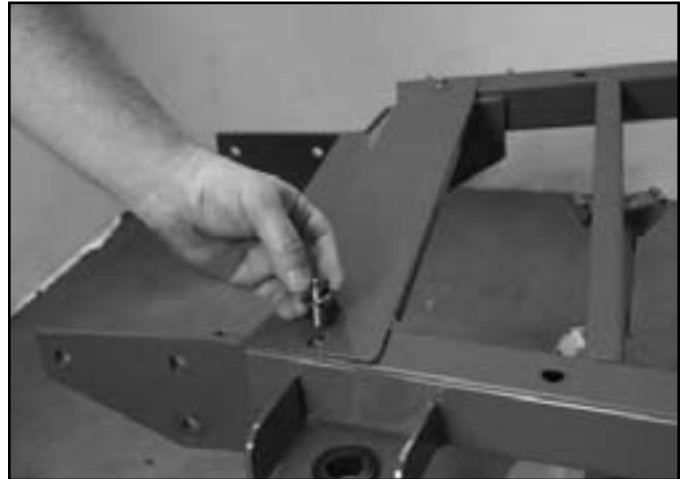


Fig 0176

PICT-1307

8. Remove the belt shield from the carrier frame (Fig. 0177).



Fig 0177

PICT-1310

10. Remove the deck bushing from the carrier frame (Fig. 0179).



Fig 0179

PICT-1313

9. Remove the retaining ring from the deck bushing (Fig. 0178).



Fig 0178

PICT-1311

11. Repeat steps 9 and 10 for the opposite side deck bushing.

12. Remove both castor wheel fork grease fittings (Fig. 0180).

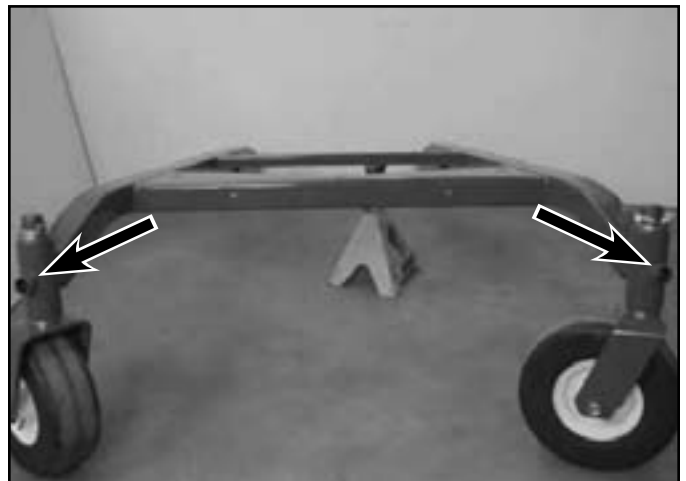


Fig 0180

PICT-1314a

# CHASSIS

13. Remove the castor wheel assemblies from the carrier frame. Refer to "Castor Wheel Removal" on page 3-53.

14. Remove the castor wheel flange bushings (2 left, 2 right) from the carrier frame (Fig. 0181).



Fig 0181

PICT-1331a

2. Install the castor wheel assemblies into the carrier frame. Refer to "Castor Wheel Installation" on page 3-59.

3. Install 2 grease fittings (1 left, 1 right) into the castor fork arms of the carrier frame (Fig. 0183).

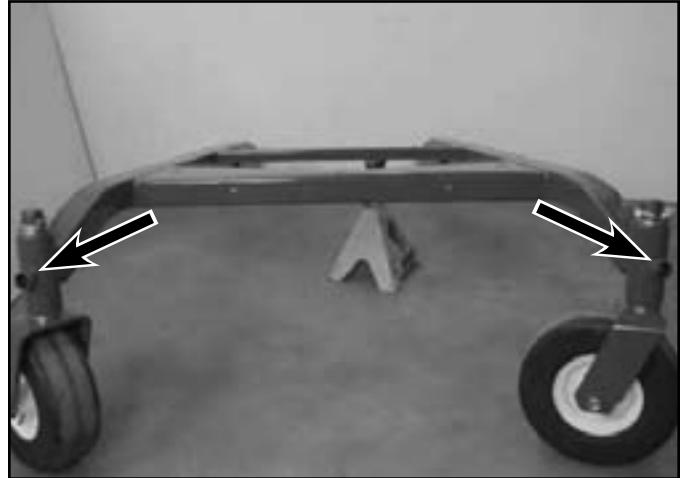


Fig 0183

PICT-1314a

## Carrier Frame Installation

1. Install 4 flange bushings (2 left, 2 right) into the castor fork arms of the carrier frame (Fig. 0182).

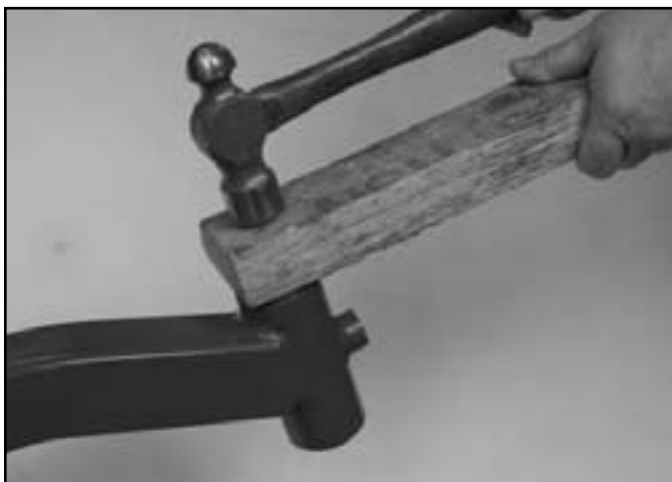


Fig 0182

PICT-1334a

4. Grease the castor wheel assemblies (Fig. 0184).



Fig 0184

PICT-1335

5. Install a deck bushing into the carrier frame (Fig. 0185).



Fig 0185

PICT-1313

7. Repeat steps 5 and 6 for the opposite side deck bushing.
8. Position the belt shield to the carrier frame (Fig. 0187).



Fig 0187

PICT-1310

6. Install a retaining ring onto the deck bushing (Fig. 0186).



Fig 0186

PICT-1311

9. Install 2 bolts and washers to secure the belt shield to the carrier frame (Fig. 0188).

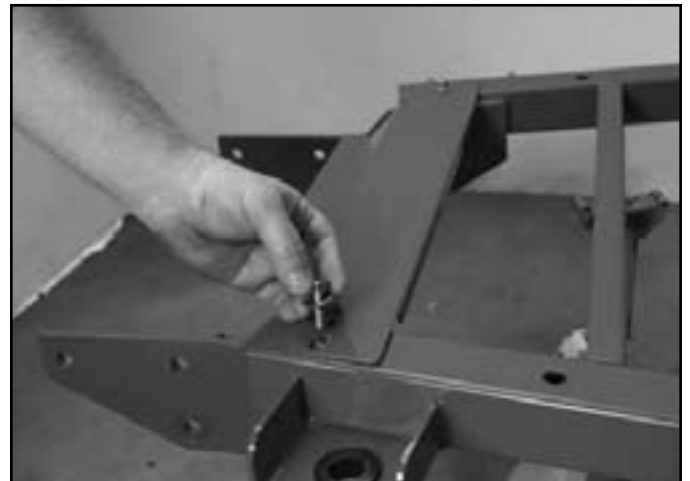


Fig 0188

PICT-1307

# CHASSIS

10. Position the carrier frame assembly up to the traction frame (Fig. 0189).



Fig 0189

PICT-1305

13. Loosely install the 2 upper bolts and nuts securing the left side of the carrier frame to the left side of the traction frame (Fig. 0191).



Fig 0191

PICT-1303

11. Support the carrier frame with a jack stand.
12. Loosely install the lower front bolts on each side of the chassis securing the carrier frame to the traction frame (Fig. 0190).



Fig 0190

PICT-1300

14. 40", 48", 52" and 60" mower decks only: Install the battery and battery tray assembly. Refer to "Battery Tray Installation" on page 3-72.
15. 36" mower decks only: Loosely install the 2 upper bolts and nuts securing the right side of the carrier frame to the right side of the traction frame (Fig. 0192).



Fig 0192

PICT-2162

16. Check the alignment if the engine deck and carrier frame. Refer to “Checking the Carrier Frame and Engine Deck Alignment”, preceding.
17. Check the engine deck height. Refer to “Checking the Engine Deck Height” on page 8-63.
18. Check the front-to-rear pitch of the carrier frame. Refer to “Checking the Carrier Frame Front-to-Rear Pitch” on page 8-64.
19. Check the side-to-side height of the carrier frame. Refer to “Checking the Carrier Frame Side-to-Side Height” on page 8-64.
20. Tighten and torque the 6 carrier frame mounting bolts to  $70 \pm 10$  ft-lbs. ( $94.9 \pm 13.6$  Nm) (Fig. 0193).



Fig 0193

PICT-1336

## Carrier Frame & Mower Deck Adjustments

### Checking the Carrier Frame & Engine Deck Alignment

**Note:** Misalignment can cause excess wear on the deck drive belt.

1. Turn the engine off and remove the key from the ignition. Set the parking brake.
2. Check and adjust the tire pressure in the rear tires to 12-14 psi (83-97kPa).
3. Remove the carrier frame cover (Fig. 0194).



Fig 0194

PICT-1038

21. Install the Mower Deck. Refer to “Mower Deck Installation” on page 8-62.
22. Check the front-to-rear pitch of the mower deck. Refer to “Checking the Mower Deck Front-to-Rear Pitch” on page 8-65.
23. Check the side-to-side height of the mower deck. Refer to “Checking the Mower Deck Side-to-Side Height” on page 8-66.
24. Check the Height-of-Cut. Refer to “Matching the Height-of-Cut” on page 8-67.



# CHASSIS

- Place a 2"x2" by 8" (aprox.) long piece of tubing stock on the engine deck along the right side the engine (Fig. 0195).

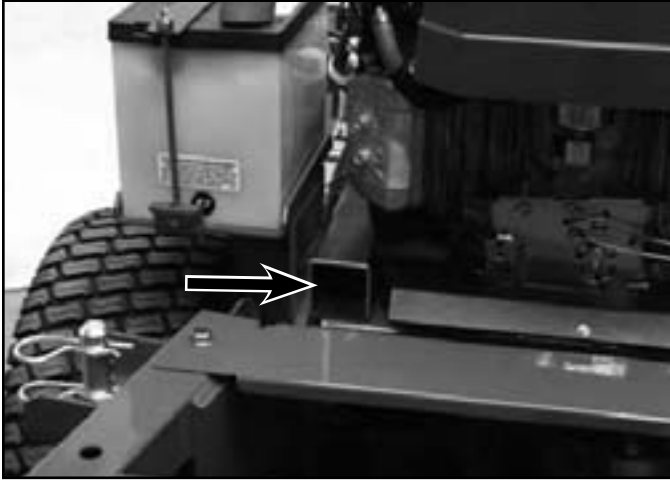


Fig 0195

PICT-1339

- The space between the front cross brace and the straight edge should be  $11/16" + 1/4"$  (17.46mm + 6.35mm) (Fig. 0197).



Fig 0197

PICT-1345

- Hold a rigid straight edge (36" minimum length) on top of the 2"x2" piece of tubing stock so it reaches out to the front cross brace of the carrier frame (Fig. 0196).

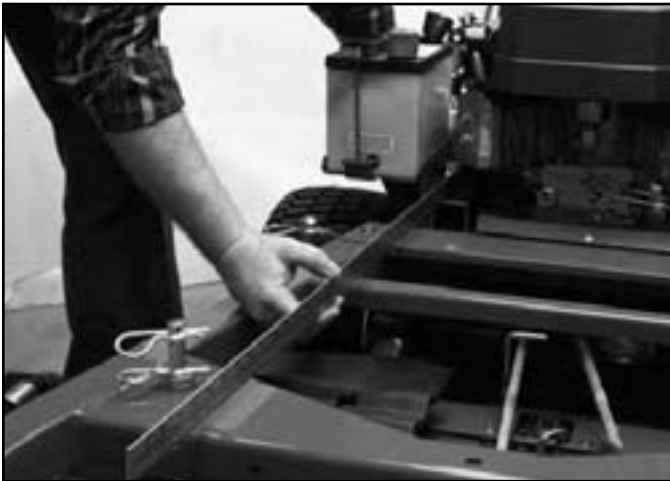


Fig 0196

PICT-1341

If the space is not correct, adjustment is needed:

- Loosen the 6 carrier frame mounting bolts (3 on the left, 3 on the right) (Fig. 0198).



Fig 0198

PICT-1303

- Align the carrier frame and engine deck to meet the  $11/16" + 1/4"$  (17.46mm + 6.35mm) measurement at the front carrier frame cross brace (Fig. 0199).



Fig 0199

PICT-1345

- Remove the straight edge and 2x2 piece of stock.

- Install the carrier frame cover (Fig. 0201).



Fig 0201

PICT-1038

- Tighten the carrier frame mounting bolts on both sides of the machine. Torque to  $70 \pm 10$  ft-lbs. ( $94.9 \pm 13.6$  Nm) (Fig. 0200).



Fig 0200

PICT-1303

## Castor Wheel Replacement

The following procedures are the same for both the left and right castor assemblies.

### Castor Wheel Removal

- Remove the locking pin from the castor fork assembly (Fig. 0202).



Fig 0202

PICT-1316

# CHASSIS

2. Remove the spacer(s) from the castor fork assembly. Note number and location for reassembly (Fig. 0203).



Fig 0203

PICT-1318

## Castor Wheel Service

1. Remove the 2 thrust washers from the castor fork (Fig. 0205).



Fig 0205

PICT-1321a

3. Raise the carrier frame assembly and slide the castor fork assembly out of the carrier frame (Fig. 0204).



Fig 0204

PICT-1319

2. Remove the nut from the axle bolt securing the castor wheel to the fork (Fig. 0206).



Fig 0206

PICT-1322

3. Remove the axle bolt (Fig. 0207).



Fig 0207

PICT-1323

5. Remove one of the bushings from the wheel assembly (Fig. 0209).



Fig 0209

PICT-5516a

4. Remove the spacer from the wheel assembly (Fig. 0208).



Fig 0208

PICT-5514a

6. Remove the needle bearing from the wheel assembly (Fig. 0210).



Fig 0210

PICT-5517

# CHASSIS

7. Remove the second bushing from the wheel assembly (Fig. 0211).



Fig 0211

PICT-5519a

8. Remove the grease zerk from the wheel assembly (Fig. 0212).



Fig 0212

PICT-5523a

9. Thoroughly clean the wheel and tire assembly. Inspect the wheel and bearings for damage and replace as necessary.

10. Install a bushing into one side of the wheel (Fig. 0213).



Fig 0213

PICT-5678

11. Apply grease to the needle bearing (Fig. 0214).



Fig 0214

PICT-5684a

12. Install the greased needle bearing into the wheel (Fig. 0215).



Fig 0215

PICT-5685a

14. Install the spacer into the wheel (Fig. 0217).



Fig 0217

PICT-5694a

13. Install a second bushing into the other side of the wheel (Fig. 0216).



Fig 0216

PICT-5688a

15. Install the grease zerk into the wheel assembly (Fig. 0218).



Fig 0218

PICT-5696a

# CHASSIS

16. Fill the wheel assembly with grease until it begins to flow out of the bearings (Fig. 0219).



Fig 0219

PICT-1326a

18. Install the wheel axle bolt (Fig. 0221).



Fig 0221

PICT-5702a

17. Position the wheel and tire assembly in the fork (Fig. 0220).



Fig 0220

PICT-5700a

19. Install and tighten the lock washer and nut to secure the wheel to the fork (Fig. 0222).



Fig 0222

PICT-5704a

20. Slide 2 thrust washers onto the castor fork shaft (Fig. 0223).



Fig 0223

PICT-1321a

2. Slide the spacer(s) onto the castor fork shaft (Fig. 0225).



Fig 0225

PICT-1318

## Castor Wheel Installation

1. Raise the carrier frame assembly and slide the castor assembly into the carrier frame (Fig. 0224).



Fig 0224

PICT-1319

3. Install the locking pin into the castor fork assembly (Fig. 0226).



Fig 0226

PICT-1316



# CHASSIS

## Castor Wheel Fork Bushing Replacement

The following procedures are the same for replacing both the right hand and left hand castor wheel fork bushings.

### Castor Wheel Fork Bushing Removal

1. Turn the engine off and remove the key from the ignition.
2. Raise the carrier frame assembly so the castor wheels are off the floor and support the front of the mower with jack stands.
3. Remove the locking pin from the top of the castor fork (Fig. 0227).



Fig 0227

PICT-1316

4. Remove the spacer(s) from the top of the castor wheel fork (Fig. 0228).



Fig 0228

PICT-1317

5. Slide the castor wheel fork assembly out of the mounting tube. Leave the spacer(s) on the bottom of the fork (Fig. 0229).

**Note:** Note the location and number of the spacers on each fork to ensure correct installation, and maintain a level deck.



Fig 0229

PICT-1319

6. Insert a pin punch into the mounting tube and carefully drive out the bushings (Fig. 0230).



Fig 0230

PICT-1331a

7. Clean the inside of the mounting tube.

## Castor Wheel Fork Bushing Installation

1. Grease the inside and outside of the new bushings. Use a hammer and flat plate to carefully drive the bushings into the pivot tubes (Fig. 0231).

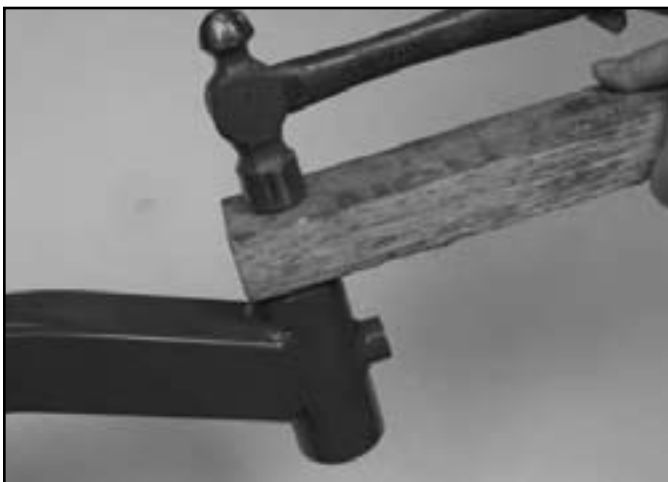


Fig 0231

PICT-1333a

2. Inspect the castor wheel fork for wear and replace if necessary.
3. Slide the castor wheel fork through the bushings in the mounting tube (Fig. 0232).

**Note:** The inside diameter of the bushings may collapse slightly when installed. If the castor wheel fork does not slide into the new bushings, ream both bushings to an inside diameter of 1.126" (29mm).



Fig 0232

PICT-1319

4. Slide the spacer(s) onto the fork (Fig. 0233).



Fig 0233

PICT-1317

# CHASSIS

5. Secure the fork to the carrier frame with the locking pin (Fig. 0234).



Fig 0234

PICT-1316

6. Grease the fitting on the carrier frame pivot tubes using No. 2 general purpose lithium base or molybdenum base grease (Fig. 0235).



Fig 0235

PICT-1335

## Fuel Tank Replacement

### DANGER

In certain conditions, gasoline is extremely flammable and highly explosive. A fire or explosion from gasoline can burn you and others and can damage property.

- Drain gasoline from the fuel tank when the engine is cold. Do this outdoors in an open area. Wipe up any gasoline that spills.
- Never smoke when draining gasoline, and stay away from an open flame or where a spark may ignite the gasoline fumes.

## Fuel Tank Removal

This procedure was done on a hydro model. The same procedure can be followed for gear drive models.

**Note: The hydraulic fluid tank has been removed for photo purposes.**

1. Park the machine on a level surface.
2. Turn the engine off and remove the key.
3. Set the parking brake.

4. Move the negative battery terminal boot and disconnect the negative (black) battery cable from the battery (Fig. 0236).



Fig 0236

PICT-0509

6. Slide the hose clamp off the fuel line at the fuel pump (Fig. 0238).



Fig 0238

PICT-0513

5. Turn the fuel valve to the "Off" position (Fig. 0237).



Fig 0237

PICT-0512

7. Remove the fuel line from the fuel pump. Place the end of the fuel line in a suitable container (Fig. 0239).



Fig 0239

PICT-0514

# CHASSIS

8. Turn the fuel valve to the "On" position to allow the fuel to drain (Fig. 0240).



Fig 0240

PICT-0515

9. Slide the clamp securing the fuel line to the fuel tank bulkhead fitting up toward the fitting and off the hose (Fig. 0241).



Fig 0241

PICT-0516

10. Remove the fuel line from the fuel tank bulkhead fitting, pulling it through the rubber grommet (Fig. 0242).



Fig 0242

PICT-0518

11. Remove the clamp from the fuel tank bulkhead fitting (Fig. 0243).



Fig 0243

PICT-0520

12. Remove the 2 nuts, springs and washers from the threaded studs securing the left side of the fuel tank bottom (Fig. 0244).

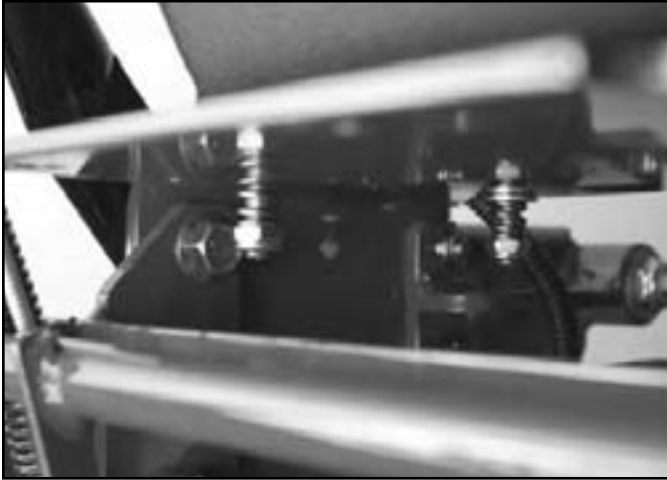


Fig 0244

PICT-0528a

14. Lift the fuel tank assembly up and out of the frame. Take care as the tank fitting comes out through the hole in the frame with the tank (Fig. 0246).



Fig 0246

PICT-0533

13. Remove the 2 bolts, lock washers and washers securing the right side of the fuel tank bottom (Fig. 0245).



Fig 245

PICT-0531

15. Loosen and remove the nut and washer securing the bulkhead fitting to the bottom of the fuel tank (Fig. 0247).



Fig 0247

PICT-5353

# CHASSIS

16. Remove the fuel cap assembly from the fuel tank (Fig. 0248).



Fig 0248

PICT-5355

17. Remove the bulkhead fuel fitting from the tank through the fuel cap opening (Fig. 0249).

**Note:** A flexible magnet tool is used to aid in removal.



Fig 0249

PICT-5356

18. Inspect the filter screen on the bulkhead fuel fitting. Clean or replace the filter screen if it is clogged or damaged (Fig. 0250).

**Note:** If fuel is leaking from the bulkhead fuel fitting area of the tank, the seal on the fitting has been compromised and the whole fitting must be replaced.



Fig 0250

PICT-5360b

19. Using a needle nose vise grip, clamp the threaded stud up near where the stud threads into the tank and remove the stud from the recessed fuel tank nut. Repeat for second threaded stud (Fig. 0251).



Fig 0251

PICT-0535a

## Fuel Tank Installation

This procedure was done on a hydro model. The same procedure can be followed for gear drive models.

1. Apply thread locking compound to the fuel tank mounting studs (Fig. 0252).



Fig 0252

PICT-0538a

2. Install the threaded studs into the left side fuel tank mounting locations. Leave 1-1/8" (28.5mm) of thread protruding from the tank (Fig. 0253).

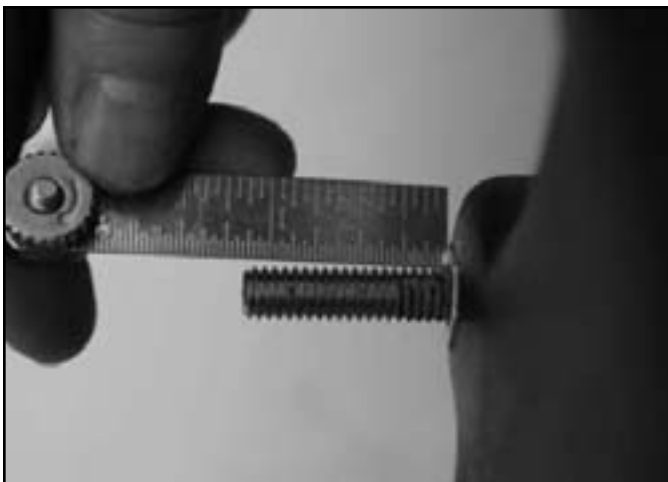


Fig 0253

PICT-0545

3. Install the bulkhead fuel fitting into the tank through the fuel cap opening (Fig. 0254).

**Note:** The fitting should be installed so that the barb of the fitting points toward the front of the fuel tank.

**Note:** A flexible magnet tool used to aid installation.



Fig 0254

PICT-5356

4. Install a washer and nut onto the bulkhead fitting (Fig. 0255).



Fig 0255

PICT-5363



# CHASSIS

5. Tighten the nut to secure the fitting to the fuel tank (Fig. 0256).



Fig 0256

PICT-5353

7. Apply anti-seize compound to both of the bolts used to secure the right side of the fuel tank to the frame (Fig. 0258).

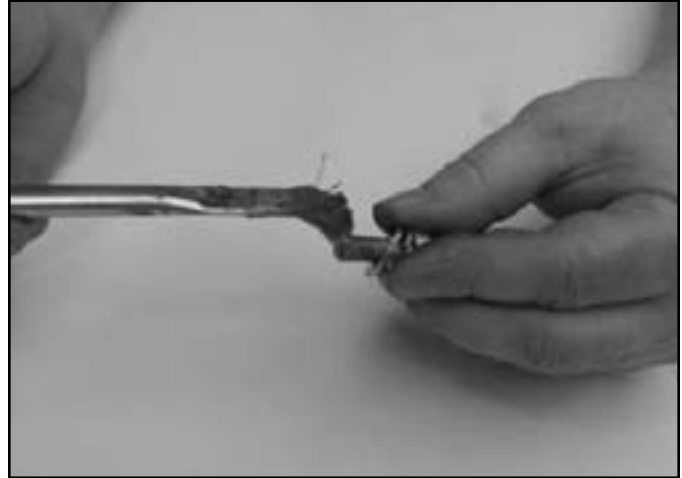


Fig 0258

PICT-0534a

3

6. Position the fuel tank onto the frame taking care to feed the bulkhead fuel fitting through the hole in the frame (Fig. 0257).



Fig 0257

PICT-0533

8. Secure the fuel tank to the frame by installing the bolts, washers, springs and nuts as shown. Install the bolts and washers securing the right side of the fuel tank first. Do not over tighten the right side mounting bolts (Fig. 0259).

**Note: The springs on the left side should not be fully compressed.**

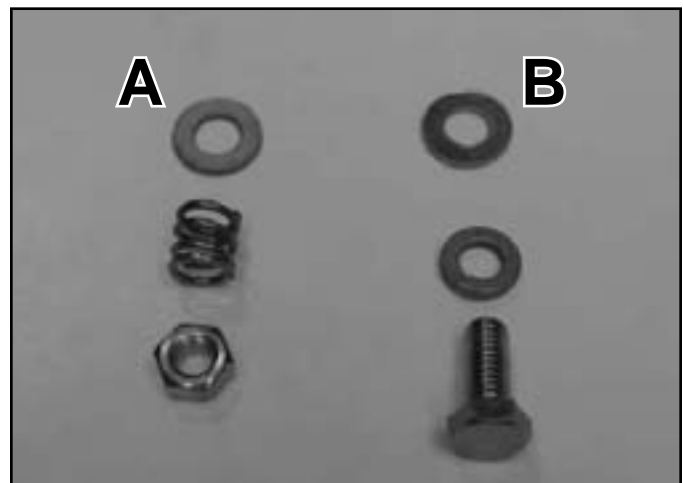


Fig 0259

PICT-5374a

A. Left side of tank

B. Right side of tank

9. Slide the hose clamp onto the bulkhead fitting barb (Fig. 0260).



Fig 0260

PICT-0520

11. Slide the clamp onto the fuel line securing the fuel line to the fuel tank bulkhead fitting (Fig. 0262).



Fig 0262

PICT-0516

10. Slide the fuel line through the rubber grommet and onto the fuel tank bulkhead fitting (Fig. 0261).



Fig 0261

PICT-0518

12. Slide the fuel line onto the fuel pump (Fig. 0263).



Fig 0263

PICT-0567

# CHASSIS

- Slide the hose clamp up to secure the fuel line to the fuel pump (Fig. 0264).



Fig 0264

PICT-0513

- Check for leaks.

- Connect the negative (black) battery cable to the negative battery terminal and cover with the boot (Fig. 0266).



Fig 0266

PICT-0509

3

- Fill the fuel tank with fuel and ensure the fuel valve is open (On) (Fig. 0265).



Fig 0265

PICT-0515

## Battery Tray Replacement

### Battery Tray Removal

- Turn the engine off and remove the key from the ignition.
- Turn the fuel valve to the off position (Fig. 0267).



Fig 0267

PICT-0247a

3. Move the negative battery terminal boot and disconnect the negative (black) battery cable from the battery terminal (Fig. 0268).



Fig 0268

PICT-0250

5. Remove 1 of the 2 nuts retaining the battery hold down strap and battery hold downs to the battery tray (Fig. 0270).



Fig 0270

PICT-0254

4. Move the positive battery terminal boot and disconnect the positive (red) battery cable from the battery terminal (Fig. 0269).



Fig 0269

PICT-0252

6. Remove the battery hold down plate and 2 battery hold downs from the battery tray (Fig. 0271).



Fig 0271

PICT-0256

# CHASSIS

7. Remove the battery from the battery tray (Fig. 0272).



Fig 0272

PICT-0571

9. Remove the battery tray from the frame (Fig. 0274).



Fig 0274

PICT-1298

8. Remove the two bolts, and nuts securing the battery tray to the frame (Fig. 0273).

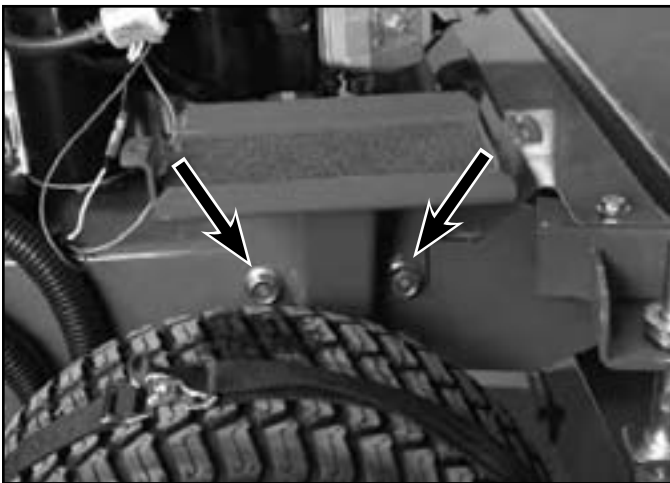


Fig 0273

PICT-0572

## Battery Tray Installation

1. Place the anti-skid pad onto the battery tray (Fig. 0275).



Fig 0275

PICT-1299

3

2. Align the battery tray mounting holes to the mounting holes in the frame (Fig. 0276).



Fig 0276

PICT-1298

4. Place the battery onto the battery tray (Fig. 0278).



Fig 0278

PICT-0571

3. Install two bolts and nuts securing the battery tray to the frame (Fig. 0277).



Fig 0277

PICT-0572

5. Install the battery hold down plate and 2 battery hold downs to the battery tray (Fig. 0279).



Fig 0279

PICT-0372a

# CHASSIS

6. Connect the positive (red) battery cable to the positive battery terminal and cover the connection with the boot (Fig. 0280).



Fig 0280

PICT-0252

7. Connect the negative (black) battery cable to the negative battery terminal and cover the connection with the boot (Fig. 0281).



Fig 0281

PICT-0250

## Mid-Size Weight Replacement

Weights are installed on certain mowers to improve balance and improve performance. The weights can be moved or removed to create optimized performance under different mowing conditions and for operator preference (Fig. 0282 or Fig. 0283).

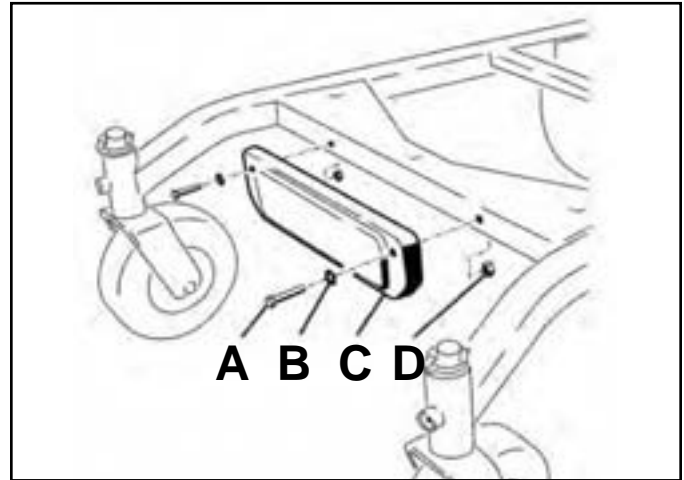


Fig 0282

fig. 18 G005021

Installing the front weight.

- |           |           |
|-----------|-----------|
| A. Bolt   | C. Weight |
| B. Washer | D. Nut    |

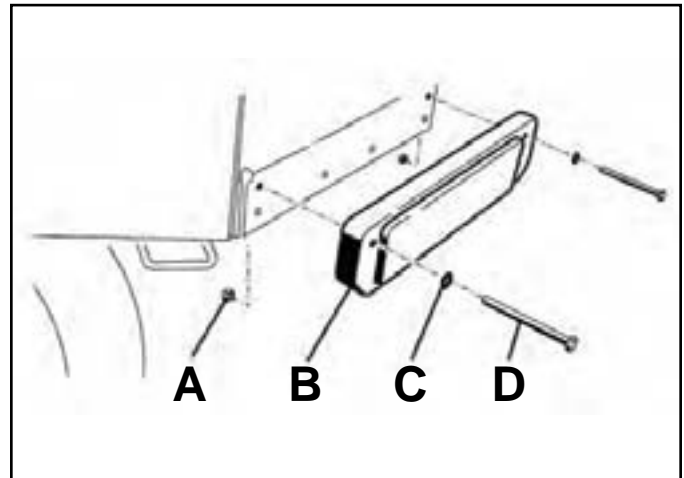


Fig 0283

fig. 19 G005022

Installing the rear weight.

- |           |           |
|-----------|-----------|
| A. Nut    | C. Washer |
| B. Weight | D. Bolt   |

The following table indicates the position of the weight as installed at the factory.

Mower Deck Size	Number of weights install	Position of the weight
36"	1	Front
40"	1	Front
48"	none	none
52"	1	Rear

- Any rear weight must be removed when a Tru-Track® Sulky is installed.
- When a Tru-Track® Sulky is installed front weights are needed. Refer to Sulky operator manual.



**The front end of the machine can rapidly rise up when the mower is removed. This could cause serious injury to you or bystanders.**

**Support the rear of the machine when removing the mower from the carrier frame.**

## Checking the Brake (T-Bar)

1. Park the machine on a level surface.
2. Disengage the Power Take Off (PTO) (Fig. 0284).



Fig 0284

PICT-4834a

3. Set the parking brake (Fig. 0285).



Fig 0285

PICT-4840a



# CHASSIS

4. The rear wheels must lock when you try to push the machine forward or backward. Adjustment is required if the wheels do not lock. Refer to “Adjusting the Brake”, following.
5. Release the parking brake (Fig. 0286).



Fig 0286

PICT-4844a

6. Move the upper control bar forward, approximately 1/2” (13mm) (Fig. 0287).



Fig 0287

PICT-4848a

7. The wheels should rotate freely.
8. If the above conditions are met, no adjustment is required. If adjustments are required, see “Adjusting the Brake”, following.

## Adjusting the Brake (T-Bar)

1. Check the brake before you adjust it. Refer to “Checking the Brake”, preceding.
2. Set the park brake latch (Fig. 0288).



Fig 0288

PICT-4840a

3. Rotate the wing nuts on the brake rods (Fig. 0289) as follows:
  - Clockwise to tighten the brake
  - Counterclockwise to loosen the brake

**Note:** The right and left brake rods are adjusted independently of each other.

**Note:** The control bar should be parallel with reference bar when properly adjusted.



Fig 0289

PICT-4853a

4. Check the brake operation again. Refer to "Checking the Brake" preceding.

**Important:** With the parking brake released, the rear wheels must rotate freely when you push the mower. If brake action and free wheel rotation cannot be achieved, examine the brake system components for wear or damage.

**3**

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## Control Linkage Replacement (T-2)

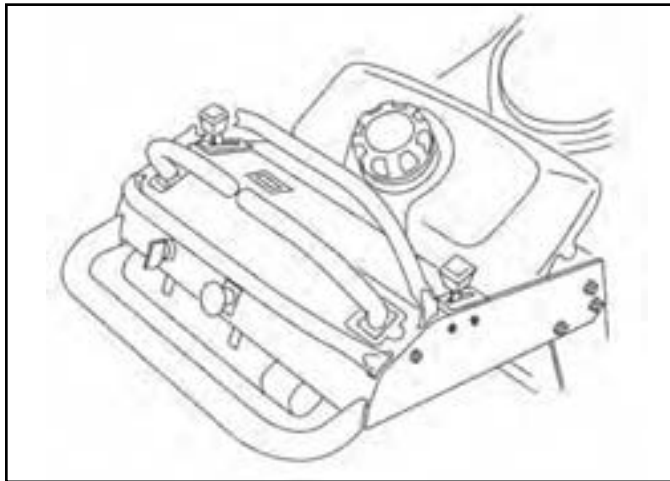


Fig 0290

fig. 3 G006080

3. Remove the control panel cover/manual tube assembly to the control panel (Fig. 0292).



Fig 0292

PICT-1923

## Control Linkage Removal

1. Turn the engine off and remove the key from the ignition.
2. Remove 4 screws (2 on the left, 2 on the right) securing the control panel cover to the control panel (Fig. 0291).



Fig 0291

PICT-1921

4. Remove the hairpin cotter from the upper end of the control linkage rod (Fig. 0293).



Fig 0293

PICT-1947

# LINKAGE

5. Remove the washer from the upper end of the control linkage rod (Fig. 0294).



Fig 0294

PICT-1950

7. Remove the hairpin cotter from the lower end of the control linkage rod (Fig. 0296).



Fig 0296

PICT-2009

6. Remove the upper end of the control rod from the tab on the control handle (Fig. 0295).



Fig 0295

PICT-1951

8. Remove the washer from the lower end of the control linkage rod (Fig. 0297).



Fig 0297

PICT-2007a

9. Remove the lower end of the control linkage rod from the pump adapter bracket. Remove the linkage rod from the machine (Fig. 0298).



Fig 0298

PICT-2005

11. Remove the upper control rod from the turnbuckle (Fig. 0300).

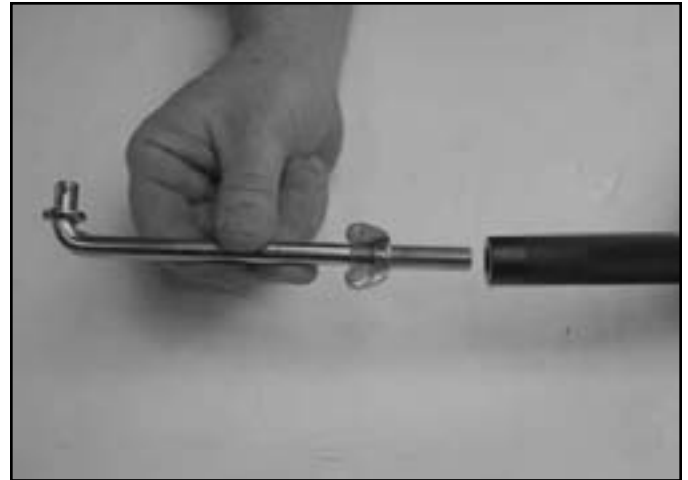


Fig 0300

PICT-1964a

10. Loosen the upper control rod wingnut (left hand threads) (Fig. 0299).



Fig 0299

PICT-1963a

12. Remove the wingnut from the upper control rod (left hand threads) (Fig. 0301).



Fig 0301

PICT-1965a

# LINKAGE

13. Loosen the lower control rod wingnut (Fig. 0302).



Fig 0302

PICT-1966a

15. Remove the wingnut from the lower control rod (Fig. 0304).

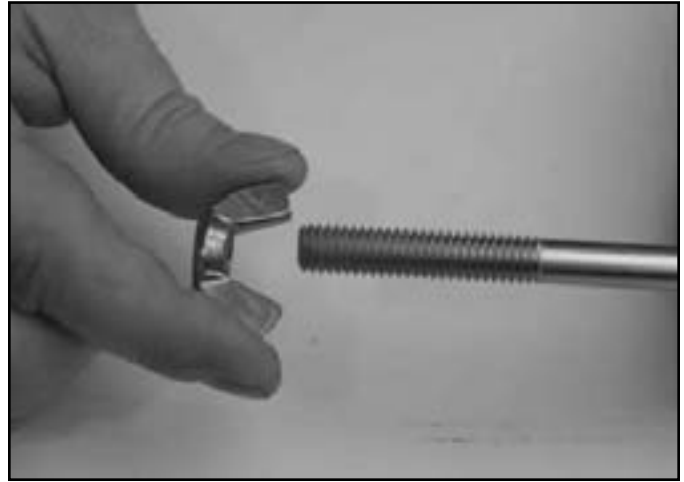


Fig 0304

PICT-1968a

14. Remove the lower control rod from the turnbuckle (Fig. 0303).



Fig 0303

PICT-1967a

16. Remove the 2 bolts and nuts securing the pump adapter bracket to the pump linkage (Fig. 0305).

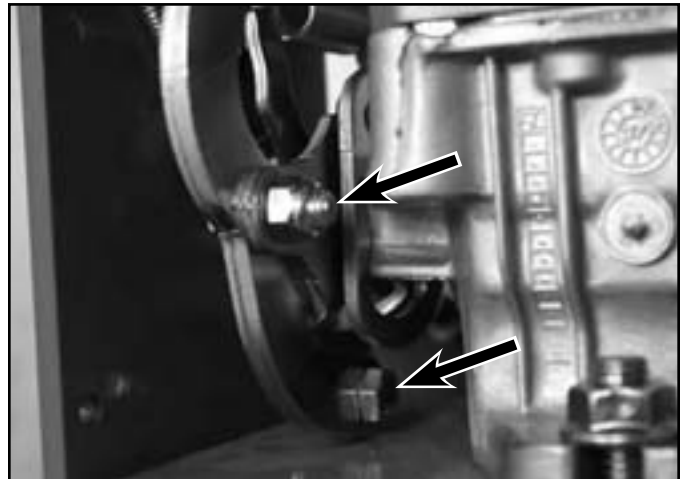


Fig 0305

PICT-1983

4

17. Remove the pump adapter bracket (Fig. 0306).



Fig 0306

PICT-1989

18. Remove the nut and adjusting screw from the pump adapter bracket (Fig. 0307).



Fig 0307

PICT-1996a

## Control Linkage Installation

1. Thread the adjusting screw into the pump adapter bracket so the threads of the screws protrude 3/4" (19mm) past the bracket (Fig. 0308).



Fig 0308

PICT-1993a

2. Loosely install the jam nut onto the adjusting screw (Fig. 0309).



Fig 0309

PICT-1996a

4



# LINKAGE

3. Position the pump adapter bracket to the pump linkage (Fig. 0310).



Fig 0310

PICT-1989

The distance between the face of the neutral proximity switch and the end of the hex head screw should be  $.07'' \pm .02''$  ( $1.8 \pm .5\text{mm}$ ) (Fig. 0312).

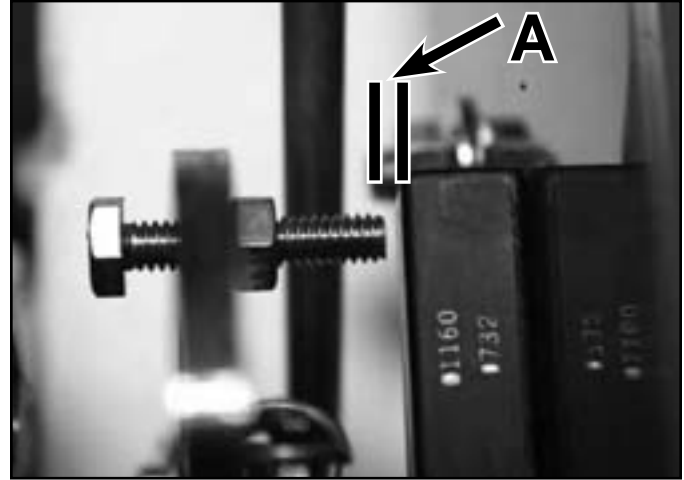


Fig 0312

PICT-1943

4

4. Install 2 bolts and nuts securing the pump adapter bracket to the pump linkage (Fig. 0311).

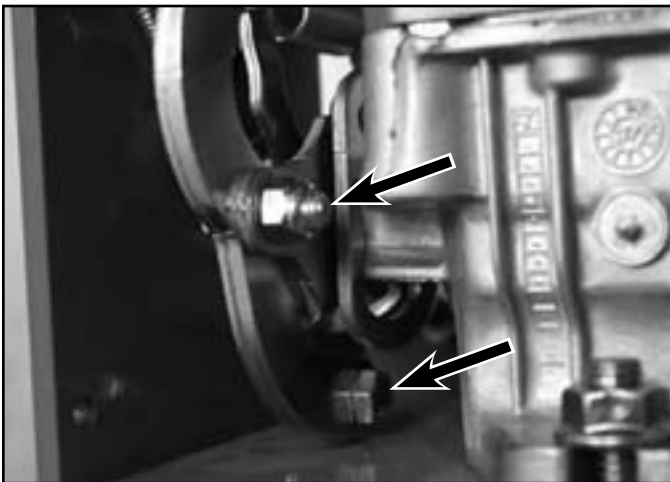


Fig 0311

PICT-1983

- A.  $.07'' \pm .02''$  ( $1.8 \pm .5\text{mm}$ )

5. If adjustment is needed, refer to loosen the jam nut, adjust the hex head screw until proper distance is achieved and then tighten the jam nut to secure.

Control Linkage Assembly (Fig. 0313):

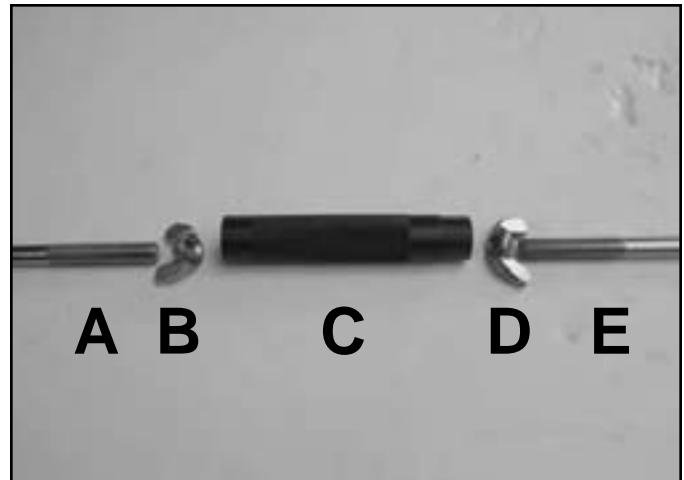


Fig 0313

PICT-1969a

- |                      |                      |
|----------------------|----------------------|
| A. Lower control rod | D. Wingnut           |
| B. Wingnut           | E. Upper control rod |
| C. Turnbuckle        |                      |

6. Thread a wingnut onto the lower control rod and upper control rod so that there is approximately 1/2" (12.7mm) of thread on the wing side of the wingnut (Fig. 0314).



Fig 0314

PICT-2000a

7. Loosely install the lower control rod into the turnbuckle (Fig. 0315).



Fig 0315

PICT-1967a

8. Loosely install the upper control rod into the turnbuckle (Fig. 0316).

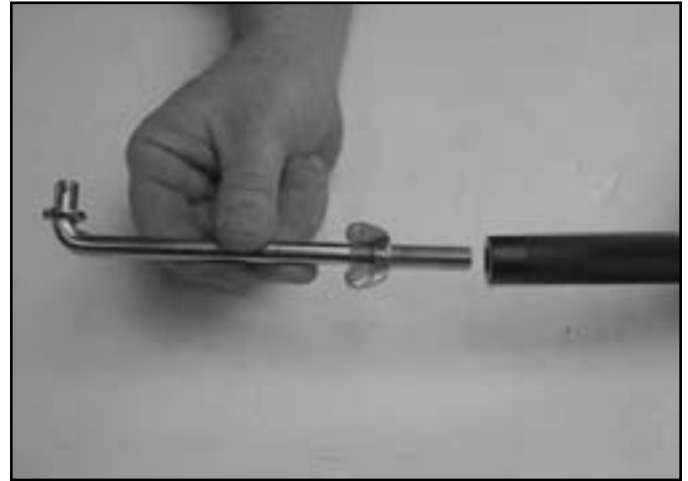


Fig 0316

PICT-1964a

4

9. Position the linkage rod inside the frame and insert the lower end of the control linkage rod into the pump adapter bracket (Fig. 0317).



Fig 0317

PICT-2005

# LINKAGE

10. Slide a washer onto the lower end of the control linkage rod (Fig. 0318).



Fig 0318

PICT-2007a

12. Install the upper end of the control rod into the tab on the control handle (Fig. 0320).



Fig 0320

PICT-1951

11. Install a hairpin cotter into the lower end of the control linkage rod securing it to the pump adapter bracket (Fig. 0319).



Fig 0319

PICT-2009

13. Slide a washer onto the upper end of the control linkage rod (Fig. 0321).



Fig 0321

PICT-1950

14. Install a hairpin cotter into the upper end of the control linkage rod securing it to the control handle (Fig. 0322).

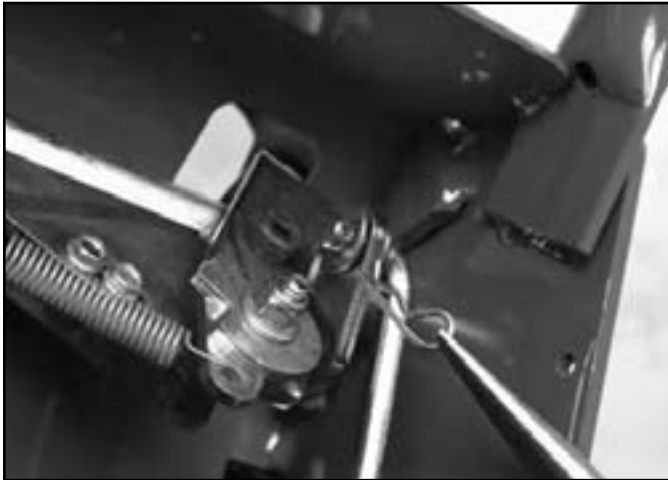


Fig 0322

PICT-1947

16. Tighten the wingnuts to secure the control rod turnbuckle (Fig. 0324).



Fig 0324

PICT-2020

15. Position the right control handle into the neutral lock position. If adjustment is needed, rotate the right control rod turnbuckle (Fig. 0323).



Fig 0323

PICT-2015a

17. Position the control panel cover/manual tube assembly to the control panel (Fig. 0325).



Fig 0325

PICT-1923

# LINKAGE

18. Install 4 screws (2 on the left, 2 on the right) securing the control panel cover to the control panel (Fig. 0326).



Fig 0326

PICT-1921

## Control Linkage & Thumb Latch Removal

1. Turn the engine off and remove the key from the ignition.
2. Remove the e-clip from the back side of the trunnion on the lower end of the control rod (Fig. 0328).

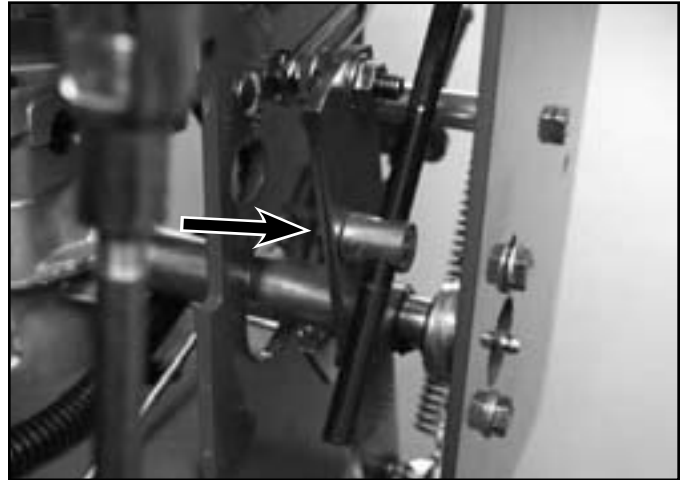


Fig 0328

PICT-0687

## Control Linkage & Thumb Latch Replacement (Pistol Grip Hydro)

The following procedures are the same for both the right side and left side handle bars.

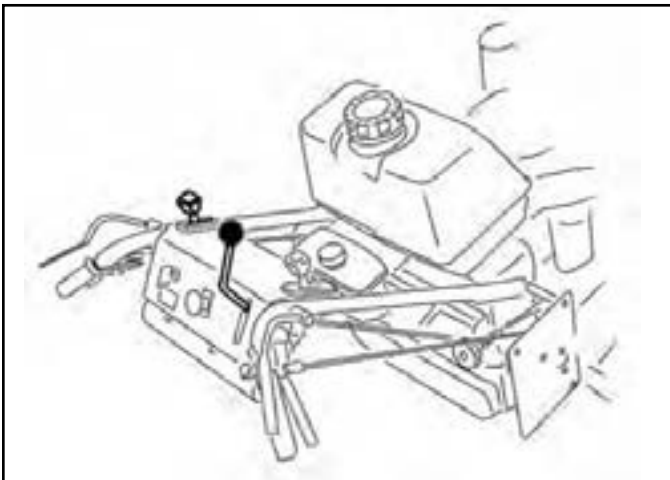


Fig 0327

fig. 10 G004912

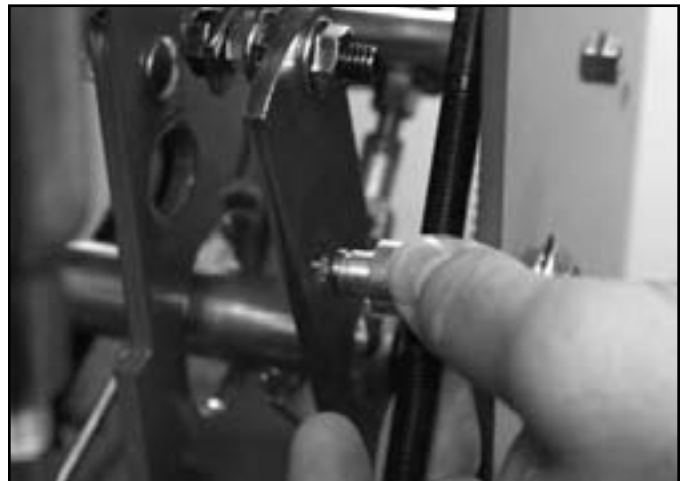


Fig 0329

PICT-0690

3. Slide the trunnion out of the idler arm (Fig. 0329).

4. Remove the hairpin cotter from the clevis pin retaining the upper end of the control linkage to the drive lever assembly (Fig. 0330).



Fig 0330

PICT-0691

6. Remove the nut from the bolt securing the thumb latch assembly to the handle bar (Fig. 0332).



Fig 0332

PICT-0694

5. Remove the clevis pin and control linkage rod from the drive lever assembly (Fig. 0331).



Fig 0331

PICT-0692

7. Remove the bolt, spacer, washers and the thumb latch assembly from the handle bar (Fig. 0333).



Fig 0333

PICT-0696

4

# LINKAGE

8. Remove the bolt, and washer from the thumb latch (Fig. 0334):

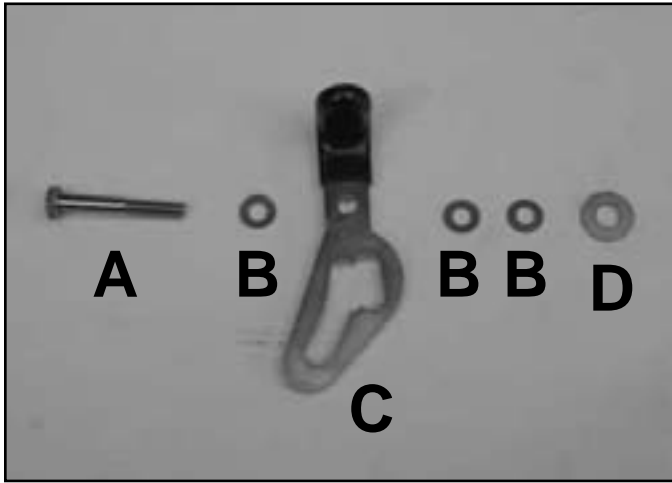


Fig 0334

PICT-0697a

- A. Bolt  
B. Belleville washer (3)  
C. Thumb latch  
D. Flat washer

10. Remove the bolt securing the drive lever assembly to the handle bar (Fig. 0336).



Fig 0336

PICT-0700

9. Remove the nut securing the drive lever assembly to the handle bar (Fig. 0335).



Fig 0335

PICT-0699

11. Remove the drive lever bushing from the drive lever handle (Fig. 0337).



Fig 0337

PICT-0701

12. Remove the bushing sleeves from the drive lever handle (Fig. 0338).

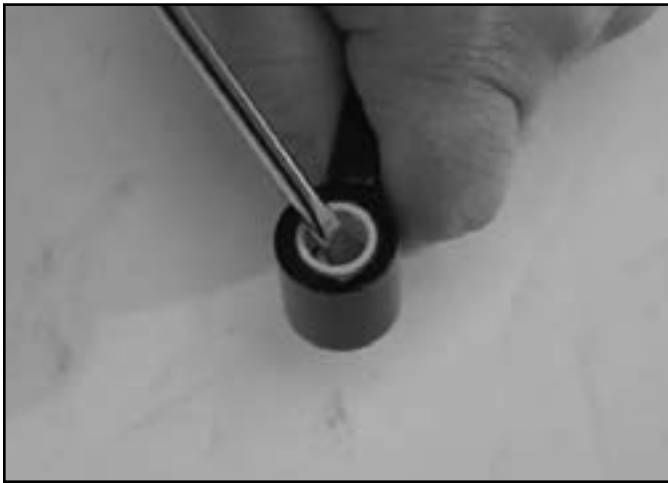


Fig 0338

PICT-0702a

2. Install the drive lever bushing into the drive lever handle (Fig. 0340).



Fig 0340

PICT-0701

4

## Control Linkage & Thumb Latch Installation

1. Install the bushing sleeves into the drive lever handle (Fig. 0339).



Fig 0339

PICT-0703a

3. Assemble the drive lever assembly to the handle bar with a bolt (Fig. 0341).



Fig 0341

PICT-0700



# LINKAGE

- Secure the drive lever handle with a nut (Fig. 0342).



Fig 0342

PICT-0699

- Slide the bolt of the thumb latch assembly into the hole on the handle bar (Fig. 0344).



Fig 0344

PICT-0696

- Assemble the thumb latch, bolt, and washers as shown.

**Note:** The Belleville washers should be assembled onto the bolt in an alternating fashion (i.e. crown out, crown in, crown out) (Fig. 0343).

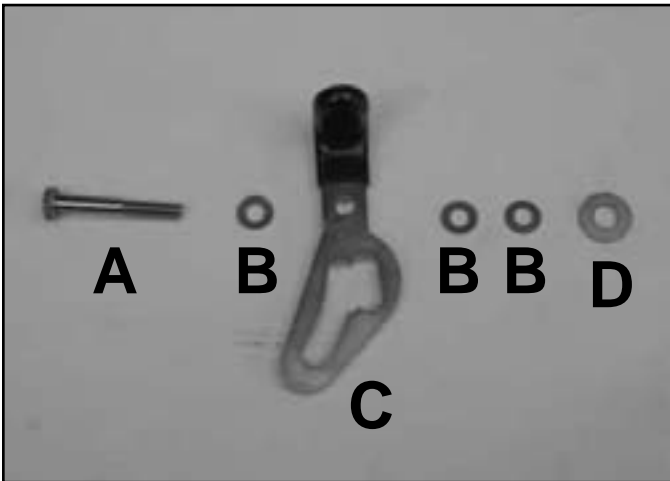


Fig 0343

PICT-0697a

- Install a nut onto the bolt securing the thumb latch assembly to the handle bar (Fig. 0345).

**Note:** When tightening the nut, do not over-tighten. The thumb latch must move freely, without rattling.



Fig 0345

PICT-0694

- |                          |                |
|--------------------------|----------------|
| A. Bolt                  | C. Thumb latch |
| B. Belleville washer (3) | D. Flat washer |

- Slide the trunnion on the lower end of the control rod into the idler arm (Fig. 0346).

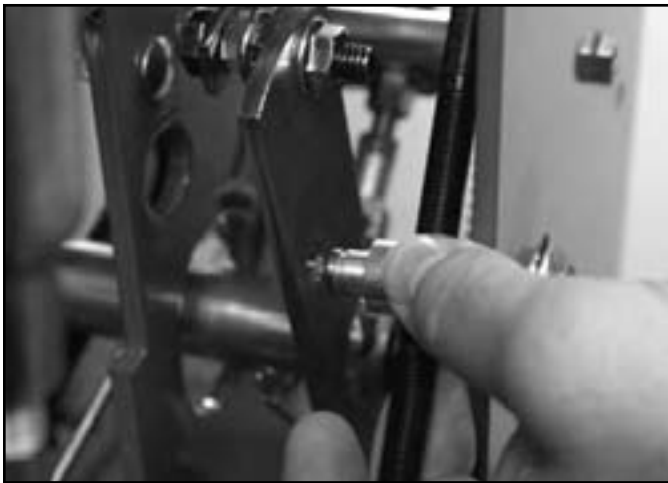


Fig 0346

PICT-0690

- Adjust the control rod so that 2.125" (6.65cm) of thread extends past the trunnion (Fig. 0348).

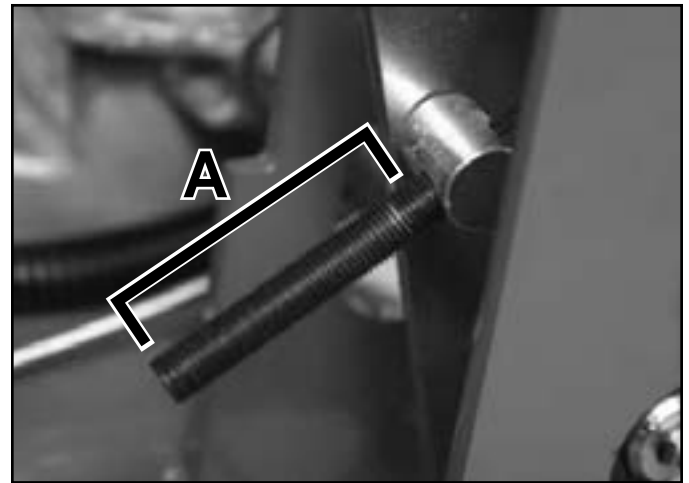


Fig 0348

PICT-0704

- Install an e-clip onto the trunnion to secure the control rod to the idler arm (Fig. 0347).

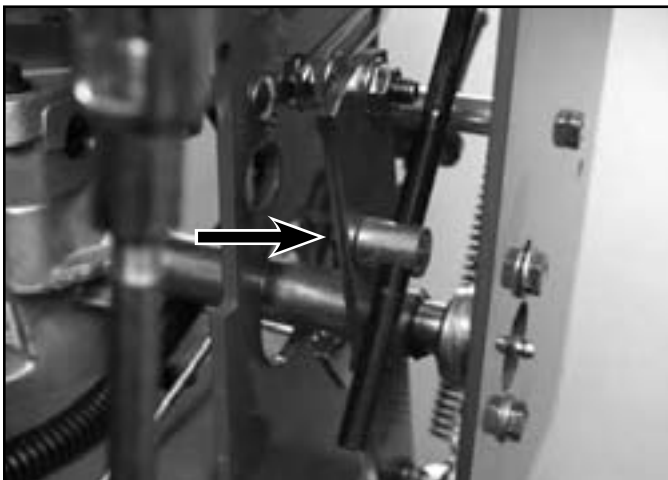


Fig 0347

PICT-0687

- Move the speed control lever to the fast position (Fig. 0349).



Fig 0349

PICT-0711a

# LINKAGE

12. Assemble the upper end of the control rod to the drive lever assembly by inserting a clevis pin (Fig. 0350).



Fig 0350

PICT-0714

14. Install a hairpin cotter into the clevis pin to secure the control rod to the thumb latch assembly (Fig. 0352).



Fig 0352

PICT-0691

13. Adjust the control rod so there is a .19" to .25" (.48 to .64cm) space between the control rod clevis pin and the bottom of the thumb latch slot (Fig. 0351).



Fig 0351

PICT-0715

15. Start the machine and operate the controls to ensure proper operation. Adjust as necessary.

4

## Lower Control Replacement (T-Bar)

The following procedures are the same for both the right hand and left hand lower control replacement.



Fig 0353

fig. 7 G004812

## Lower Control Removal

1. Turn the engine off and remove the key from the ignition.
2. Remove the hairpin cotter from the lower end of the control rod (Fig. 0354).



Fig 0354

PICT-1750a

3. Remove the washer from the lower end of the control rod (Fig. 0355).



Fig 0355

PICT-1752

4

4. Remove the trunnion/clevis from the idler arm (Fig. 0356).



Fig 0356

PICT-1753

# LINKAGE

5. Remove the hairpin cotter from the lower end of the brake rod (Fig. 0357).



Fig 0357

PICT-1756

7. Remove the nut from the idler pivot bolt (Fig. 0359).

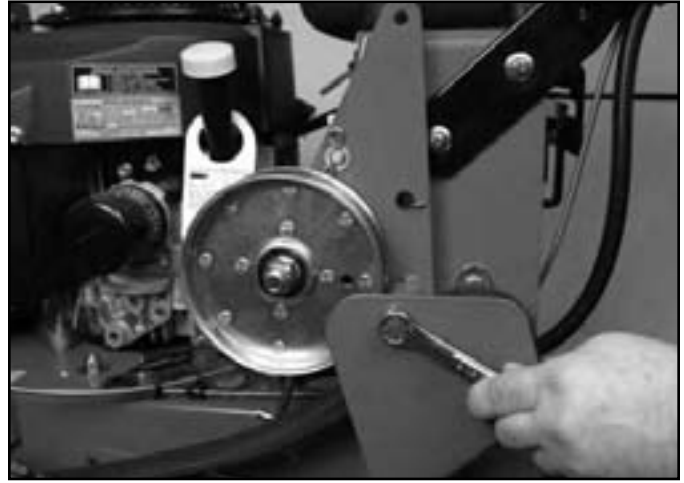


Fig 0359

PICT-1758

6. Remove the brake rod from the brake arm assembly (Fig. 0358).



Fig 0358

PICT-1757

8. Remove the idler pivot bolt (Fig. 0360).



Fig 0360

PICT-1759

9. Lift the idler/brake rod assembly out of the machine (Fig. 0361).



Fig 0361

PICT-1763

11. Remove the 2 spacers from the idler arm pivot (Fig. 0363).



Fig 0363

PICT-1765

10. Remove the spring from the idler arm (Fig. 0362).



Fig 0362

PICT-1764

12. Remove the hairpin cotter from the brake rod trunnion (Fig. 0364).



Fig 0364

PICT-1768

# LINKAGE

13. Remove the washer from the brake rod trunnion (Fig. 0365).



Fig 0365

PICT-1769

15. Remove the wing nut from the brake rod assembly (Fig. 0367).



Fig 0367

PICT-1772a

14. Remove the brake rod assembly from the idler assembly (Fig. 0366).



Fig 0366

PICT-1771

16. Remove the washer from the brake rod assembly (Fig. 0368).

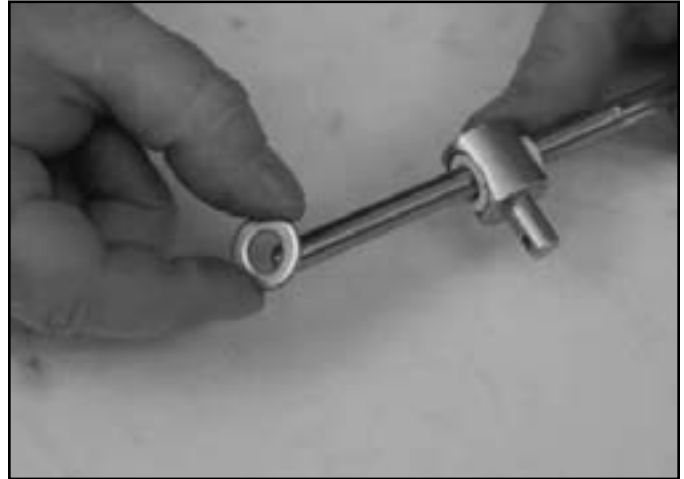


Fig 0368

PICT-1773a

4

17. Remove the trunnion from the brake rod assembly (Fig. 0369).

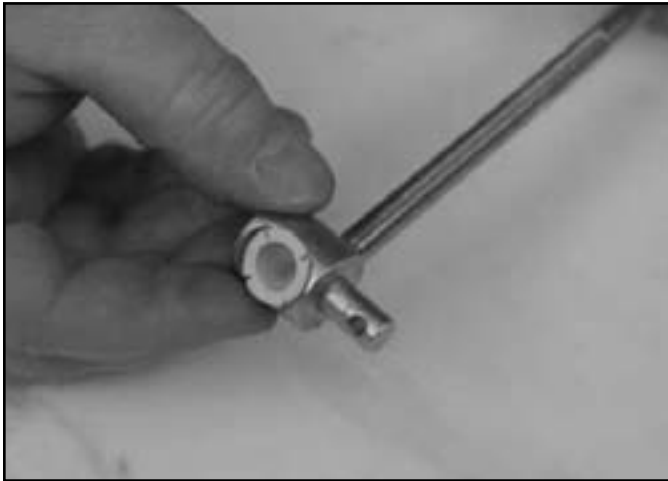


Fig 0369

PICT-1774a

19. Remove the nut from the bolt securing the pulley to the idler arm (Fig. 0371).



Fig 0371

PICT-1776a

18. Remove the bushing from the trunnion (Fig. 0370).



Fig 0370

PICT-1775

20. Slide the pulley off the bolt (Fig. 0372).



Fig 0372

PICT-1778



# LINKAGE

21. Remove the pulley spacer from the bolt (Fig. 0373).



Fig 0373

PICT-1780a

## Lower Control Installation

1. Insert the pulley bolt into the idler (Fig. 0375).



Fig 0375

PICT-1781

22. Remove the bolt from the idler (Fig. 0374).



Fig 0374

PICT-1781

2. Slide the pulley spacer onto the pulley bolt (Fig. 0376).



Fig 0376

PICT-1780a

4

- Slide the pulley onto the pulley bolt and spacer (Fig. 0377).



Fig 0377

PICT-1778

- Slide a bushing into the trunnion (Fig. 0379).

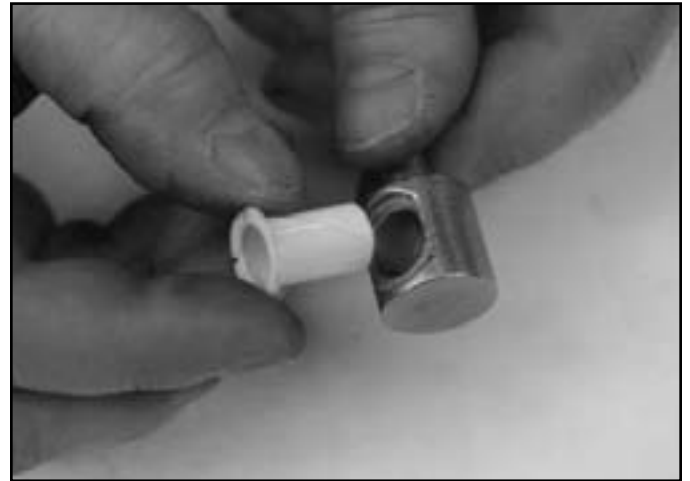


Fig 0379

PICT-1775

- Install a nut onto the pulley bolt securing the pulley to the idler arm (Fig. 0378).



Fig 0378

PICT-1776a

- Slide the trunnion onto the brake rod assembly (Fig. 0380).

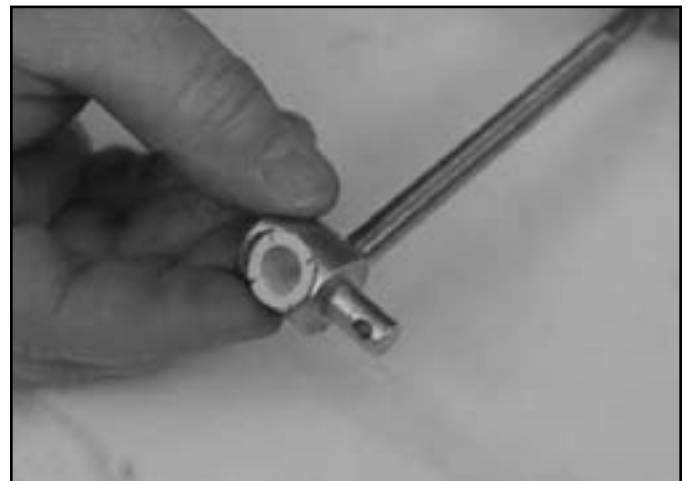


Fig 0380

PICT-1774a

4

# LINKAGE

7. Slide a washer onto the brake rod assembly (Fig. 0381).



Fig 0381

PICT-1773a

9. Insert the brake rod trunnion into the idler assembly (Fig. 0383).



Fig 0383

PICT-1771

8. Install a wing nut 2-1/2" (6.35cm) onto the brake rod assembly (Fig. 0382).



Fig 0382

PICT-1772a

10. Slide a washer onto the brake rod trunnion (Fig. 0384).



Fig 0384

PICT-1769

4

11. Install a hairpin cotter into the brake rod trunnion (Fig. 0385).



Fig 0385

PICT-1768

13. Install 2 spacers into the idler arm pivot (Fig. 0387).



Fig 0387

PICT-1765

12. Apply anti-seize compound onto the outside diameter of the 2 idler pivot spacers (Fig. 0386).



Fig 0386

PICT-1784a

14. Install the torsion spring onto the idler arm (Fig. 0388).



Fig 0388

PICT-1764

# LINKAGE

15. Position the idler/brake rod assembly onto the machine so the torsion spring is hooked onto the frame. (Fig. 0389).

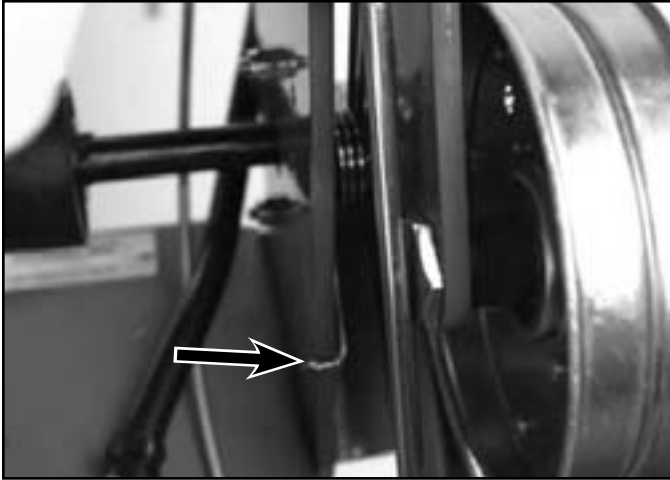


Fig 0389

PICT-1783

16. Align the idler pivot with the mounting hole on the frame and insert the idler pivot bolt (Fig. 0390).



Fig 0390

PICT-1759

17. Install a nut onto the idler pivot bolt (Fig. 0391).

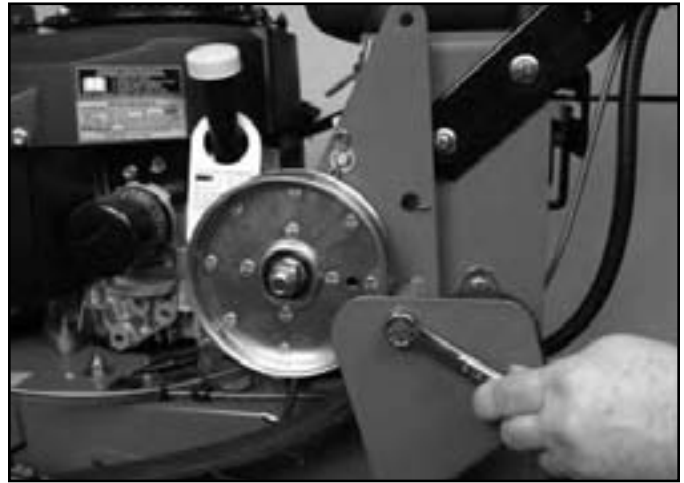


Fig 0391

PICT-1758

18. Insert the lower end of the brake rod into the brake arm assembly (Fig. 0392).



Fig 0392

PICT-1757

19. Install a hairpin cotter into the lower end of the brake rod securing it to the brake arm (Fig. 0393).



Fig 0393

PICT-1756

21. Slide a washer onto the control rod trunnion (Fig. 0395).



Fig 0395

PICT-1752

20. Insert the control rod trunnion/clevis into the idler arm (Fig. 0394).



Fig 0394

PICT-1753

22. Install a hairpin cotter into the trunnion securing the control rod to the idler (Fig. 0396).



Fig 0396

PICT-1750a

23. Check the Brakes. Refer to "Checking the Brake (T-Bar)" on page 3-75.

24. Check the Adjustment of the Control Bar. Refer to "Control Bar Adjustment" on page 4-132.

# LINKAGE

## Neutral Adjustment Stud Replacement (Pistol Grip Hydro)

**Note:** The side plate has been removed for photo purposes.

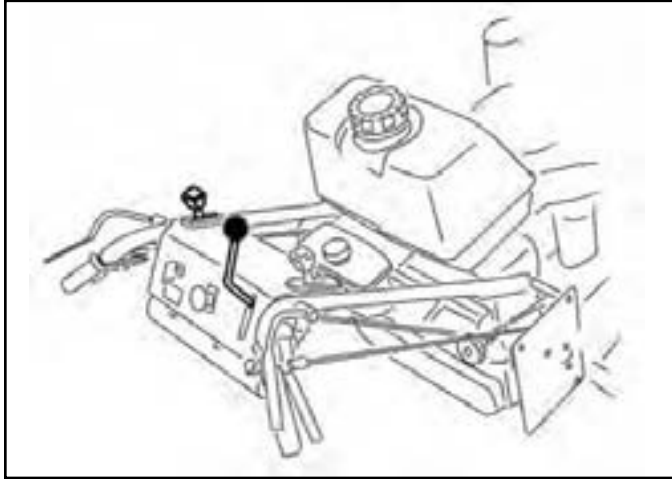


Fig 0397

fig. 10 G004912

2. Remove the clevis pin (Fig. 0399).



Fig 0399

PICT-0924

3. Remove the nut from the top end of the adjustment stud (Fig. 0400).

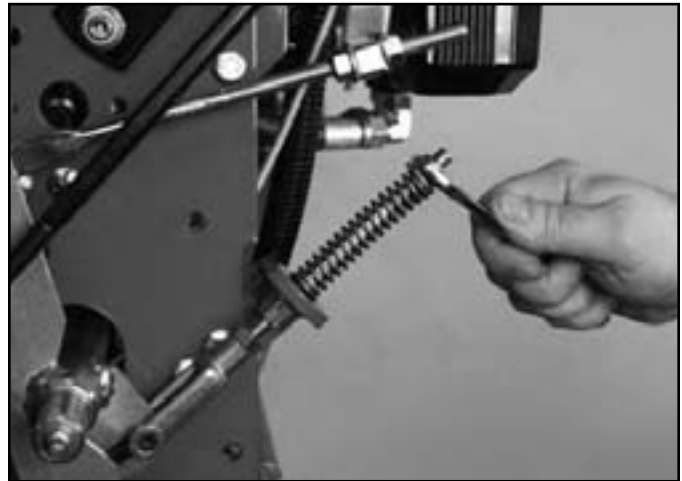


Fig 0400

PICT-0925

## Neutral Adjustment Stud Removal

1. Remove the cotterpin from the clevis pin securing the neutral adjustment stud yoke to the drive lever swivel (Fig. 0398).



Fig 0398

PICT-0923

4. Remove the washer and spring from the adjustment stud (Fig. 0401).



Fig 0401

PICT-0926a

6. Remove the neutral adjustment stud assembly out of the spring mount bracket (Fig. 0403).



Fig 0403

PICT-0928

5. Remove the flanged nylon bushing from the spring mount bracket (Fig. 0402).



Fig 0402

PICT-0927

7. Remove the 2 bolts and nuts securing the spring mount bracket to the frame (Fig. 0404).



Fig 0404

PICT-0931



# LINKAGE

8. Remove the spring mount bracket from the frame (Fig. 0405).

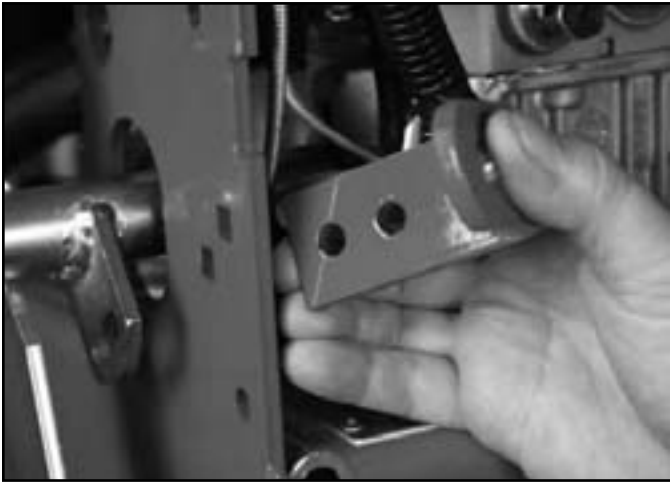


Fig 0405

PICT-0932

10. Loosen the jam nut that secures the yoke to the neutral adjustment stud (Fig. 0407).

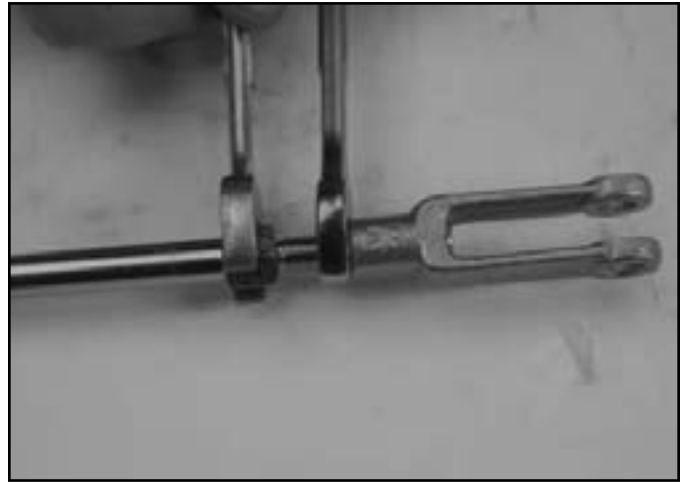


Fig 0407

PICT-0936a

9. Remove the washer from the neutral adjustment stud (Fig. 0406).



Fig 0406

PICT-0934a

11. Remove the neural adjustment stud yoke (Fig. 0408).



Fig 0408

PICT-0937a

4

- Remove the nut from the neural adjustment stud (Fig. 0409).

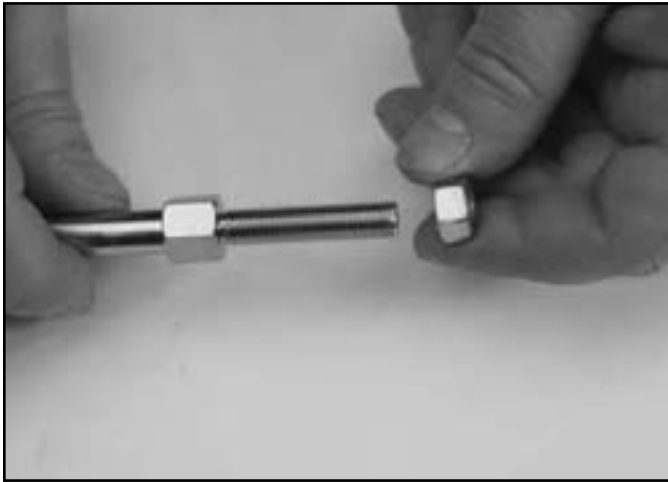


Fig 0409

PICT-0939a

## Neutral Adjustment Stud Installation

- Position the spring mount bracket to the frame (Fig. 0411).

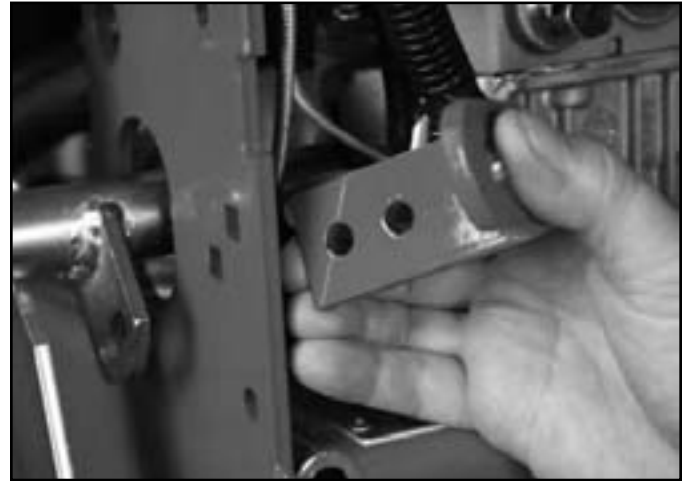


Fig 0411

PICT-0932

Neutral Adjustment Stud Assembly (Fig. 0410):

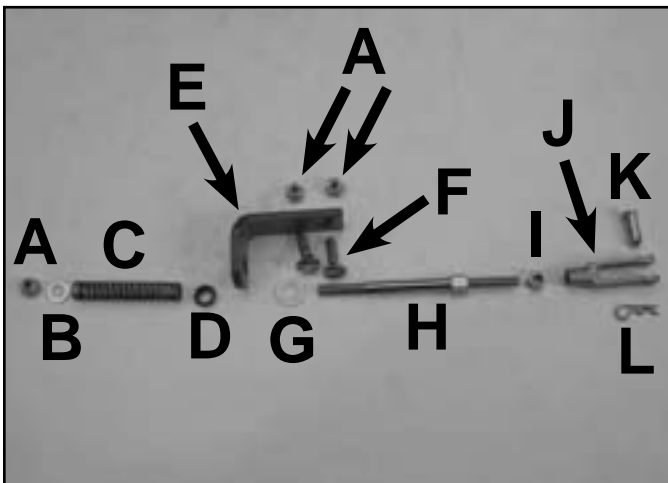


Fig 0410

PICT-0942a

- |                          |                    |
|--------------------------|--------------------|
| A. Lock nut (3)          | G. Flat washer     |
| B. Flat washer           | H. Adjustment stud |
| C. Neutral return spring | I. Hex nut         |
| D. Nylon bushing         | J. Adjustable yoke |
| E. Spring mount bracket  | K. Clevis pin      |
| F. Carriage bolt (2)     | L. Hairpin cotter  |

- Install 2 bolts and nuts securing the spring mount bracket to the frame (Fig. 0412).



Fig 0412

PICT-0931

# LINKAGE

3. Install a jam nut onto the threads so that there is approximately 1/4" (6.4mm) space between the jam nut and the machined nut on the neutral stud (Fig. 0413).



Fig 0413

PICT-0998a

4. Thread the yoke onto the neutral adjustment stud so that the end of the stud is flush with the opening of the yoke (Fig. 0414).

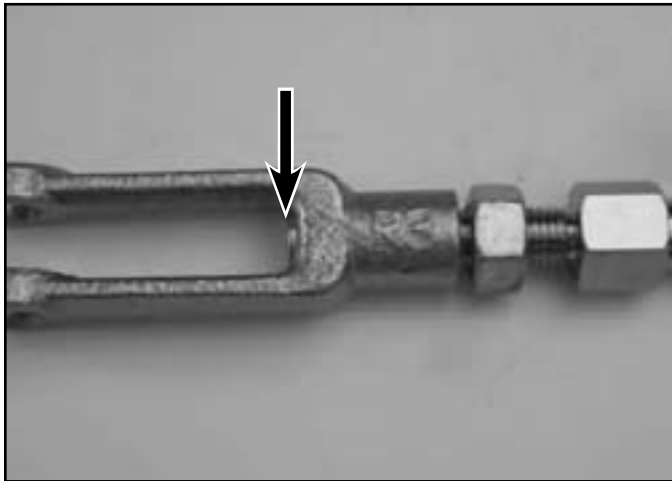


Fig 0414

PICT-1000a

5. Snug the jam nut against the yoke (Fig. 0415).

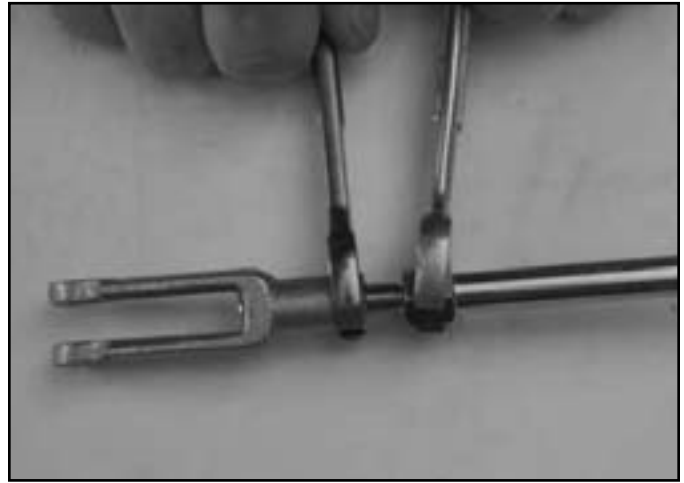


Fig 0415

PICT-1002a

6. Slide the washer onto the end of the neutral adjustment stud opposite the yoke (Fig. 0416).

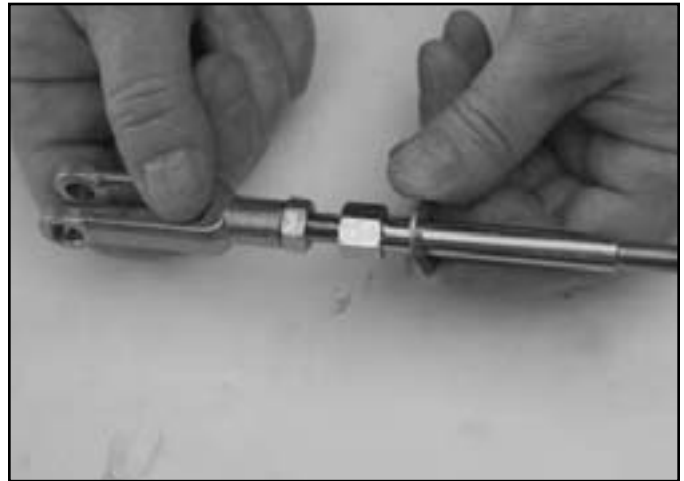


Fig 0416

PICT-1003a

7. Insert the neutral adjustment stud assembly into the spring mount bracket (Fig. 0417).



Fig 0417

PICT-1005

9. Position the yoke to the short tab on the drive lever swivel and insert a clevis pin (Fig. 0419).



Fig 0419

PICT-1007

8. Install the flanged nylon bushing into the spring mount bracket (Fig. 0418).



Fig 0418

PICT-1006a

10. Secure the yoke to the drive lever swivel by installing a cotter pin into the clevis pin (Fig. 0420).



Fig 0420

PICT-1008

# LINKAGE

11. Install the spring onto the adjustment stud (Fig. 0421).



Fig 0421

PICT-1009

13. Install a nut onto the top end of the adjustment stud. Tighten the nut until there are approximately 5 threads protruding past the nut (Fig. 0423).



Fig 0423

PICT-1012a

12. Install a washer onto the adjustment stud (Fig. 0422).



Fig 0422

PICT-1011a

14. Adjust the Neutral Stud. Refer to "Neutral Stud Adjustment" on page 4-126.

4

## Operator Presence Control Lever Replacement (Pistol Grip Hydro)

**Note:** The manual tube assembly and control panel cover have been removed for photo purposes.

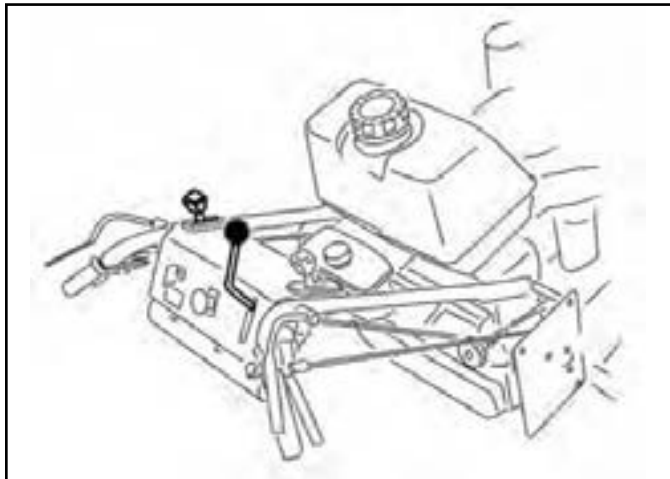


Fig 0424

fig. 10 G004912

## Operator Presence Control Lever Removal

1. Loosen and remove the set screw that retains the left side Operator Presence Control (OPC) lever to the operator presence control rod (Fig. 0425).



Fig 0425

PICT-0722

2. Remove the left operator presence control lever from the operator presence control rod (Fig. 0426).



Fig 0426

PICT-0724

4

3. Remove the nylon bushing from the left side of the OPC rod (Fig. 0427).



Fig 0427

PICT-0726

# LINKAGE

4. Repeat steps 1 thru 3 to remove the right side OPC lever.
5. Remove the extension spring located under the control panel (Fig. 0428).

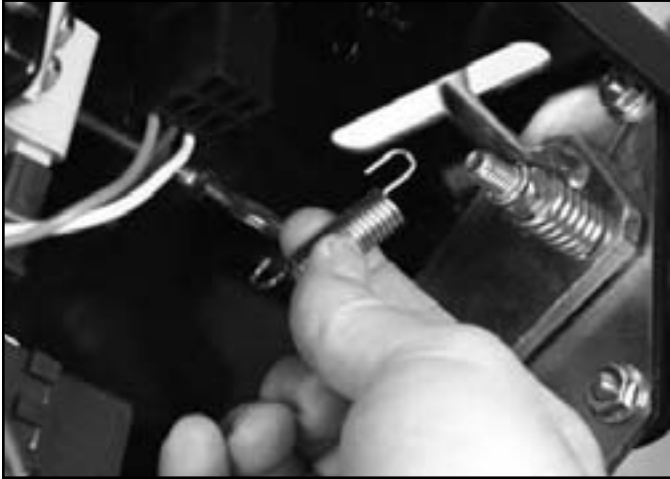


Fig 0428

PICT-0727

7. Remove the PTO switch from the control panel (Fig. 0430).



Fig 0430

PICT-0729a

6. Unplug the wire harness from the PTO switch (Fig. 0429).

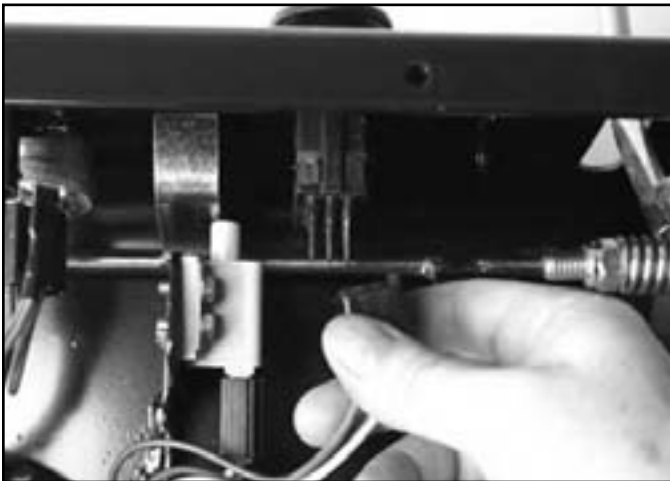


Fig 0429

PICT-0728

8. Remove the OPC rod by sliding it to the far right, dropping the left side of the rod, and remove the rod through the left side (Fig. 0431).

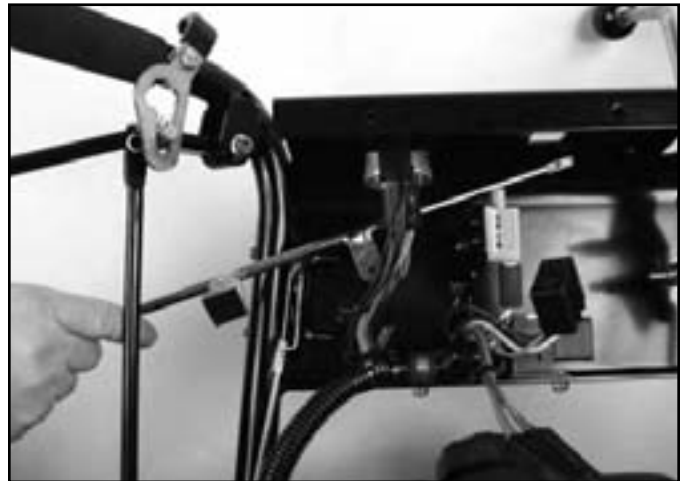


Fig 0431

PICT-0731

## Operator Presence Control Lever Installation

1. Install the Operator Presence Control (OPC) rod, spring tab end first, through the left side of the control panel and install the right end of the rod into the opening on the right side handle bar. Sliding the rod further through the right side handle bar opening, install the left end of the rod through the left handle bar opening (Fig. 0432).



Fig 0432

PICT-0736

2. Install the PTO switch into the control panel (Fig. 0433).



Fig 0433

PICT-0729a

3. Plug the wire harness into the PTO switch (Fig. 0434).

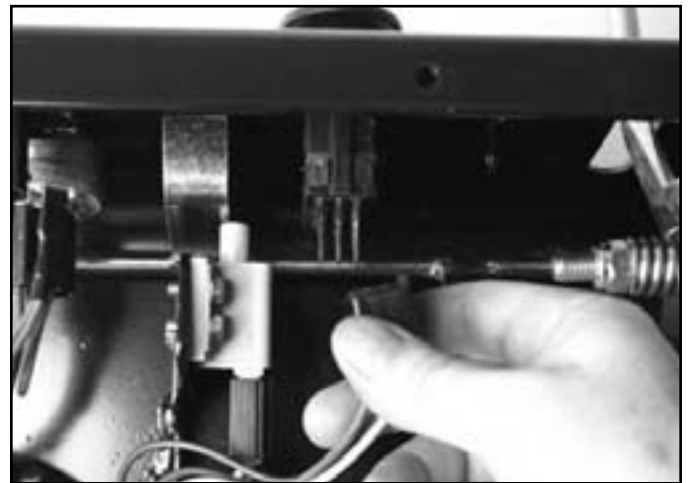


Fig 0434

PICT-0728

4. Install the extension spring onto the OPC rod and the tab on the underside of the control panel (Fig. 0435).



Fig 0435

PICT-0727



# LINKAGE

5. Install a nylon bushing onto each end of the OPC rod (Fig. 0436).



Fig 0436

PICT-0726

7. Install the OPC levers onto the ends of the OPC rod (Fig. 0438).



Fig 0438

PICT-0724

6. Apply high strength thread locking compound (Loctite 680 or equivalent) onto both ends of the OPC rod (Fig. 0437).



Fig 0437

PICT-0737

8. Apply thread locking compound to the set screws (Fig. 0439).



Fig 0439

PICT-0738a

4

9. Install one set screw into each OPC lever to secure the levers onto the OPC rod (Fig. 0440).



Fig 0440

PICT-0722

## Speed Control Removal

1. Remove the knob from the speed control lever (Fig. 0442).



Fig 0442

IMG\_8001a

## Speed Control Replacement (Pistol Grip Hydro)

**Note:** The Operator's Manual tube assembly and control panel cover bracket have been removed for photo purposes.

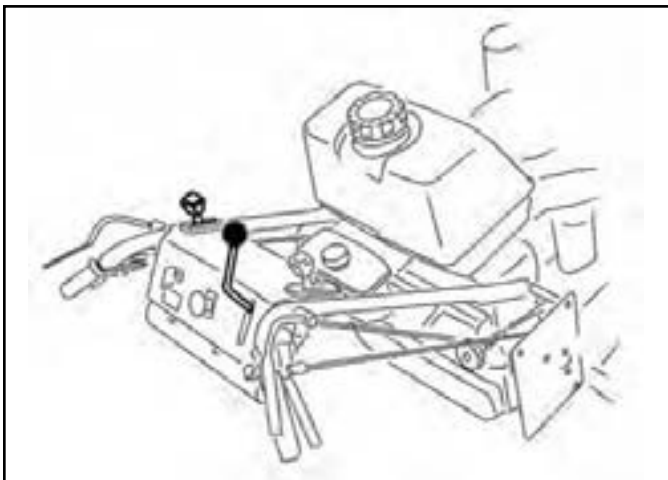


Fig 0441

fig. 10 G004912

2. Remove the hairpin cotter from the upper end of the speed control rod (Fig. 0443).



Fig 0443

PICT-0743

# LINKAGE

3. Remove the cotter pin from the lower end of the speed control rod (Fig. 0444).

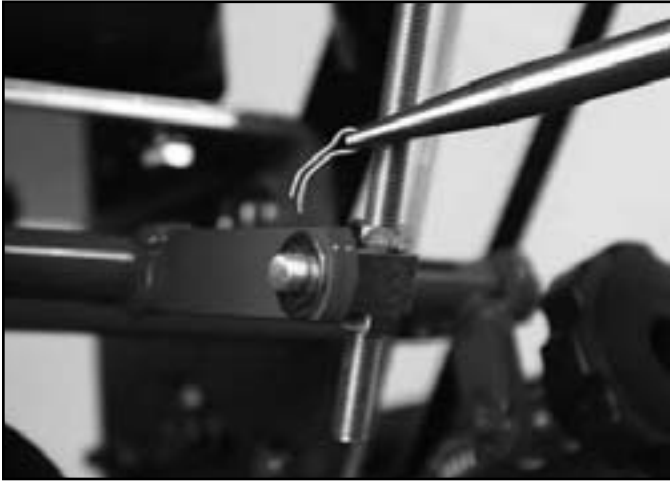


Fig 0444

PICT-0747

5. Remove the nut from the pivoting sprung bolt (Fig. 0446).



Fig 0446

PICT-0751

4. Remove the washer and speed control rod assembly from the tab on the speed control crank assembly and remove it from the machine (Fig. 0445).



Fig 0445

PICT-0750

6. Remove the middle bolt and spring assembly securing the speed control handle to the control panel (Fig. 0447).



Fig 0447

PICT-0754

7. Remove the lower bolt and nut securing the speed control handle to the control panel (Fig. 0448).



Fig 0448

PICT-0755a

9. Remove the speed control handle (Fig. 0450).

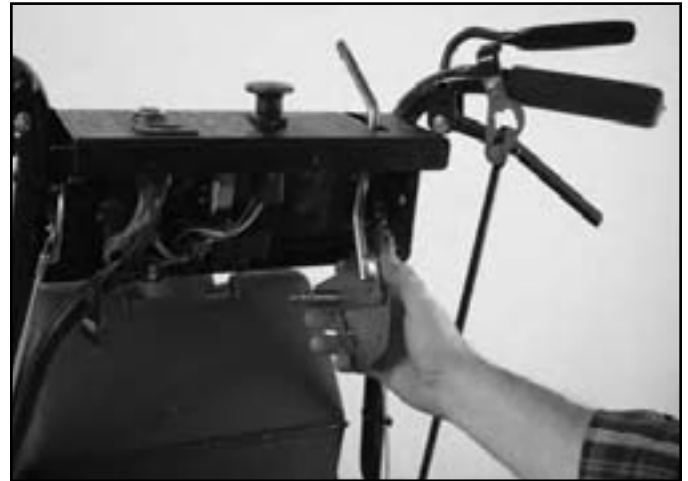


Fig 0450

PICT-0757a

8. Remove the upper bolt and nut (Fig. 0449).



Fig 0449

PICT-0861

10. Remove the remaining nut, bolt, washers and spring from the speed control lever assembly (Fig. 0451).



Fig 0451

PICT-0760a

# LINKAGE

**Note:** There are 2 washers between the shift lever and shift lever plate (Fig. 0452).

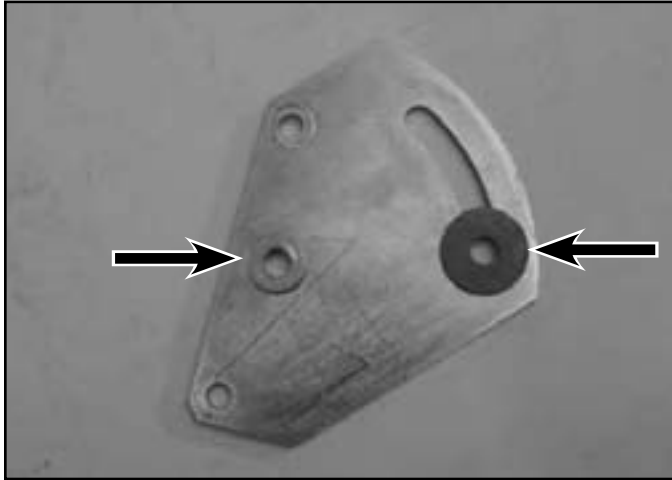


Fig 0452

PICT-0763a

12. Remove the outside nut from both the left and right speed control link bolt assemblies (Fig. 0454).



Fig 0454

PICT-0766

11. Release the pistol grip from neutral lock and place it in the drive position (Fig. 0453).



Fig 0453

PICT-0764

13. Remove the hairpin cotter from the right and left swivels installed through each end of the speed control crank (Fig. 0455).



Fig 0455

PICT-0770a

14. Remove the washer from the right and left swivels installed through each end of the speed control crank (Fig. 0456).



Fig 0456

PICT-0771a

16. Secure the speed control crank in place and loosen the 2 screws securing each end of it to the crank support assembly (Fig. 0458).



Fig 0458

PICT-0776a

15. Remove the left hand and right hand speed control links and bolt assemblies (Fig. 0457).



Fig 0457

PICT-0772

17. Remove the speed control crank from the machine (Fig. 0459).



Fig 0459

PICT-0777

# LINKAGE

18. Remove the 2 lower bolts and nuts securing the crank support assembly to the frame (Fig. 0460).

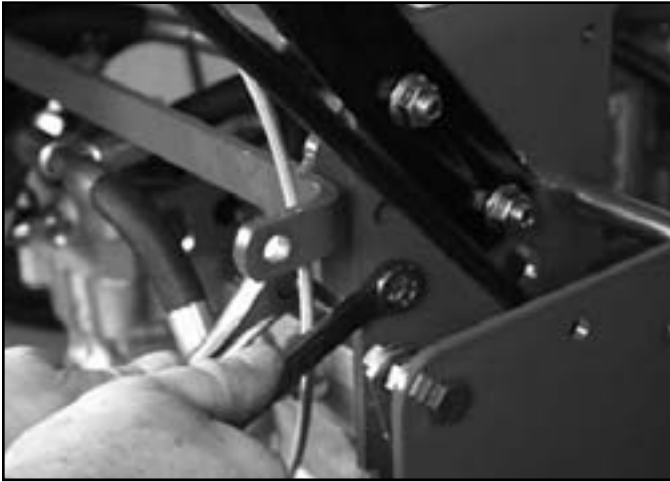


Fig 0460

PICT-0786

20. Remove the crank support from the machine (Fig. 0462).



Fig 0462

PICT-0789

19. While supporting the crank support, remove the 2 upper bolts and nuts (Fig. 0461).



Fig 0461

PICT-0787

21. On the right hand and left hand speed control links and the speed control rod, mark the location of the nut/swivel assembly on the threads of the link (Fig. 0463).

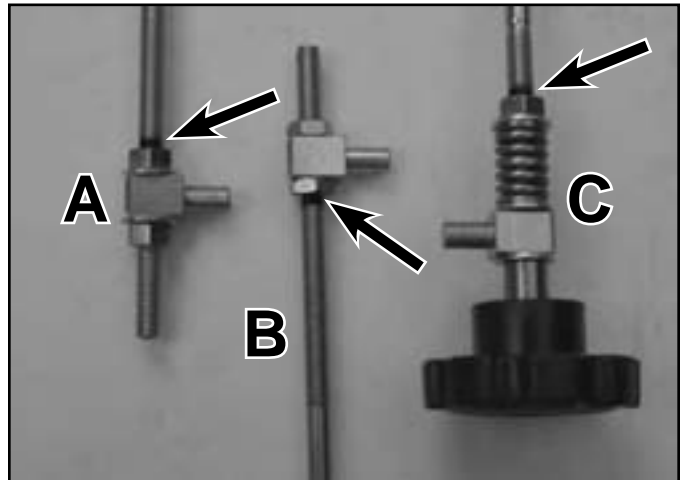


Fig 0463

PICT-0784a

- A. Left hand speed control link
- B. Speed control rod
- C. Right hand speed control link

4

22. Loosen the jam nuts securing the trunnion in place on the threaded end of the speed control rod (Fig. 0464).

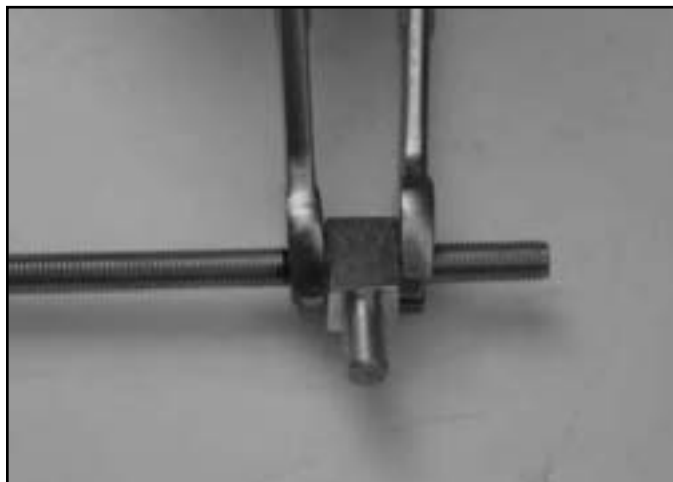


Fig 0464

PICT-0793a

24. On the left hand speed control link, loosen the end nut (Fig. 0466).

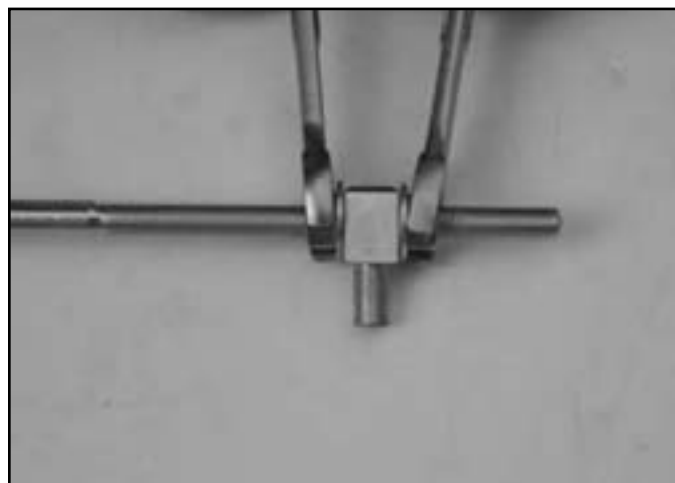


Fig 0466

PICT-0799a

23. Remove the 2 nuts and the trunnion from the speed control rod (Fig. 0465).



Fig 0465

PICT-0797a

25. Remove the nuts, washers and the swivel from the left hand speed control link (Fig. 0467).



Fig 0467

PICT-0800a



# LINKAGE

26. Remove the two nuts and the bolt from the slotted end of both control links (Fig. 0468).

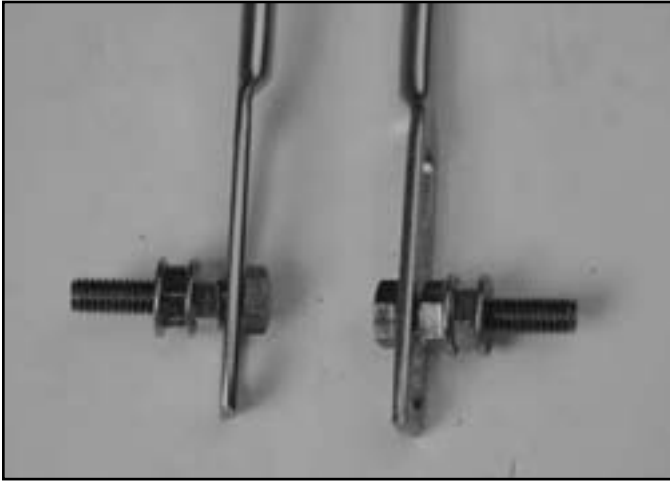


Fig 0468

PICT-0805a

28. Remove the spacer, washers, swivel, spring and nut from the control link (Fig. 0470).



Fig 0470

PICT-0810a

27. Remove the knob from the right side speed control link assembly (Fig. 0469).

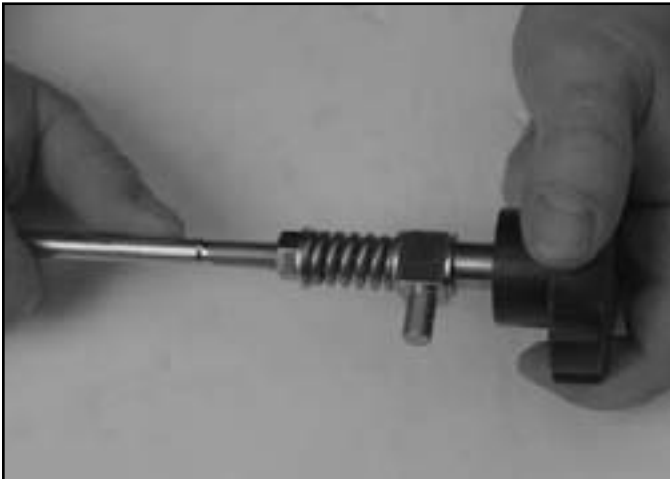


Fig 0469

PICT-0808a

## Speed Control Installation

1. Position the crank support to the rear of the frame (Fig. 0471).

**Note:** The choke cable should be routed on the outside of the crank support.



Fig 0471

PICT-0813

2. While supporting the crank support, loosely install the 2 upper bolts and nuts securing the crank support and handle to the frame (Fig. 0472).

**Note:** The bolts are installed with the nuts on the outside of the frame.

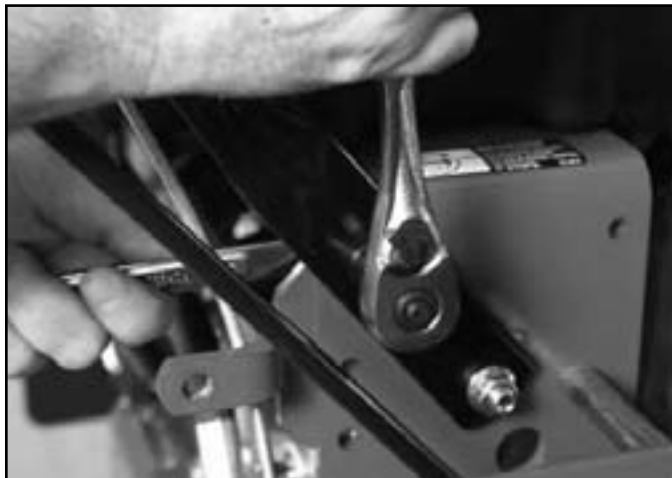


Fig 0472

PICT-0787

4. Tighten the 4 nuts and bolts securing the crank support to the frame.
5. Apply thread locking compound to the threads of the 2 shoulder bolts that secure the speed control crank to the crank support (Fig. 0474).



Fig 0474

PICT-0815a

3. Install the 2 lower bolts and nuts securing the crank support assembly to the frame (Fig. 0473).

**Note:** The bolts are installed with the nuts on the inside of the frame.



Fig 0473

PICT-0786

6. Position the speed control crank to the crank support (Fig. 0475).

**Note:** The choke cable is positioned between the speed control crank and the crank support.

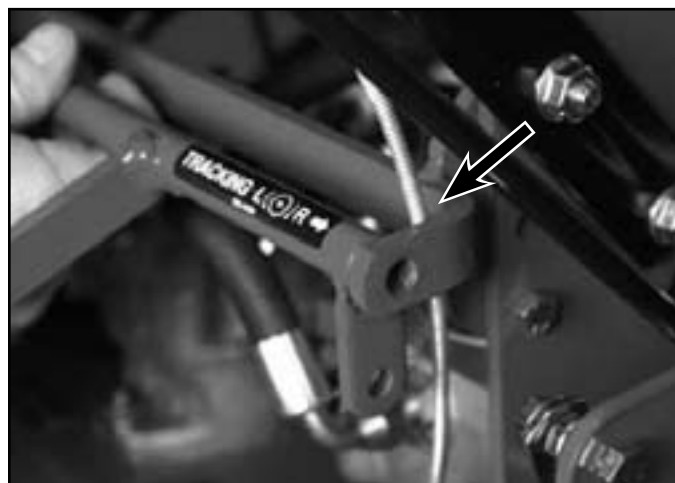


Fig 0475

PICT-0816

# LINKAGE

7. Install 2 shoulder bolts securing the speed control crank to the crank support (Fig. 0476).



Fig 0476

PICT-0818

9. Install a spacer, 3 washers, a swivel, and a spring onto the control link (Fig. 0478).



Fig 0478

PICT-0886a

## Right hand control link assembly:

8. Install one nut onto the control link, threading it down to the mark on the threads (Fig. 0477).

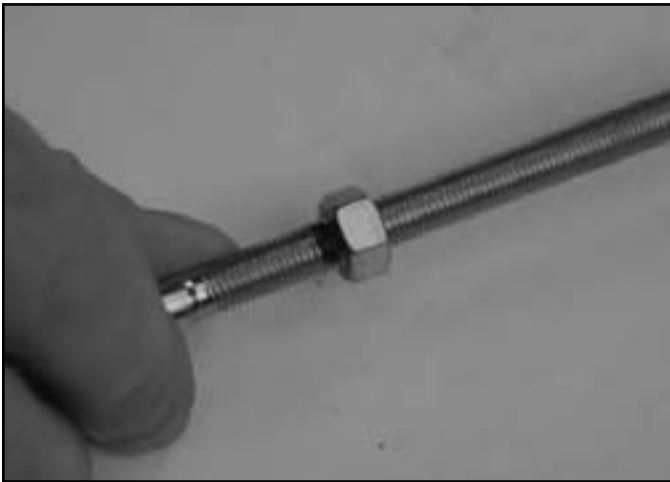


Fig 0477

PICT-0822a

10. Install the knob onto the control link assembly (Fig. 0479).

**Note: Tighten the knob until the spring measures 1.0" (2.5cm) in length.**



Fig 0479

PICT-0887a

11. Install the bolt into the slot of the control link.

**Note:** The slotted portion of the control link is offset and the bolt needs to be oriented as shown (Fig. 0480):

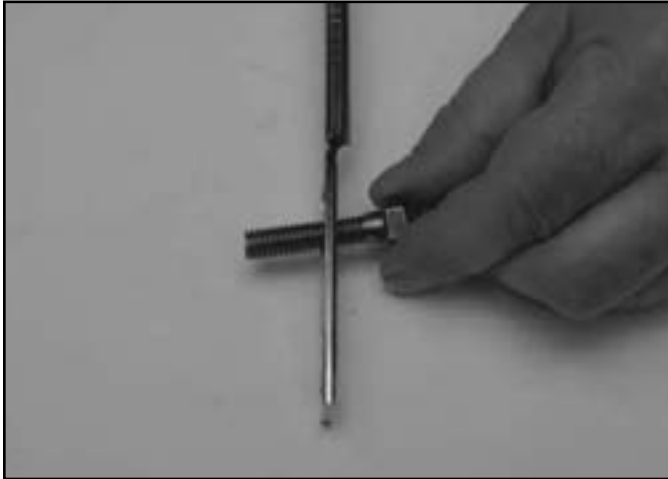


Fig 0480

PICT-6411a

**Left Hand control link Assembly:**

13. Install the bolt into the slot of the control link.

**Note:** The slotted portion of the control link is offset and the bolt needs to be oriented as shown (Fig. 0482):

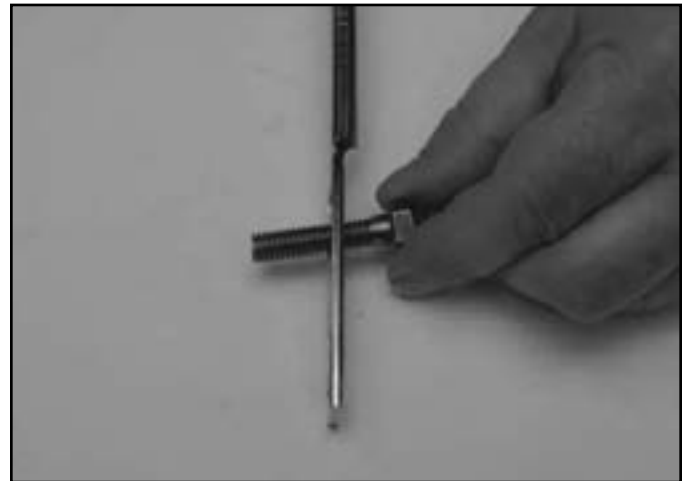


Fig 0482

PICT-6411a

12. Install two nuts onto the bolt (flange side away from control link) so that there is 1/2" (1.27cm) of thread beyond the two nuts as shown (Fig. 0481):

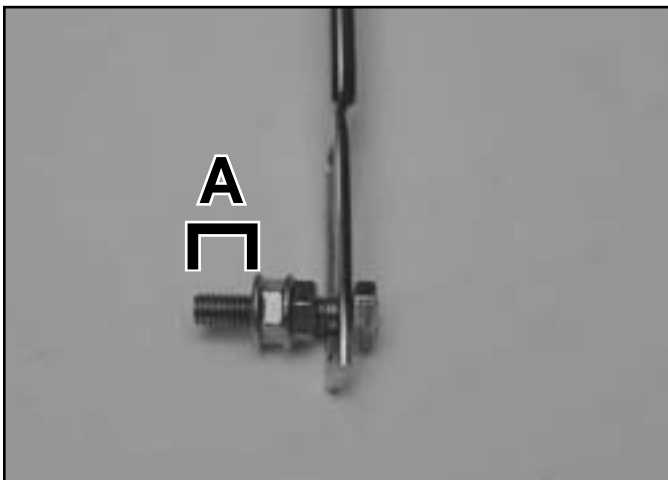


Fig 0481

PICT-6414b

A. 1/2" (1.27cm)

14. Install two nuts onto the bolt (flange side away from control link) so that there is 1/2" (1.27cm) of thread beyond the two nuts as shown (Fig. 0483):

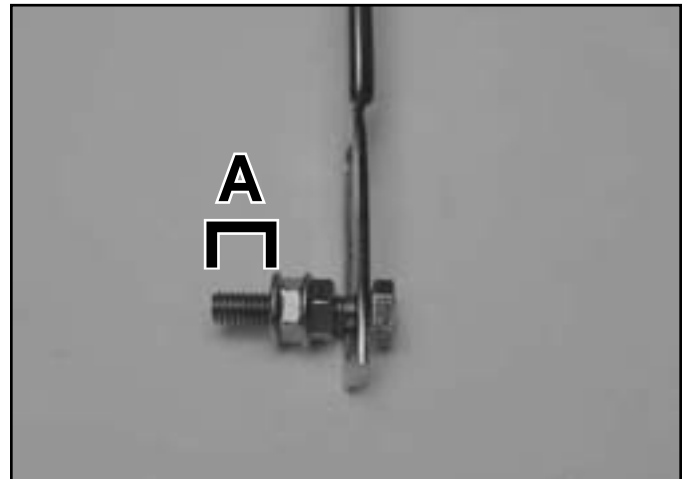


Fig 0483

PICT-6414b

A. 1/2" (1.27cm)

# LINKAGE

15. Install one nut onto the control link, threading it down to the mark (Fig. 0484).

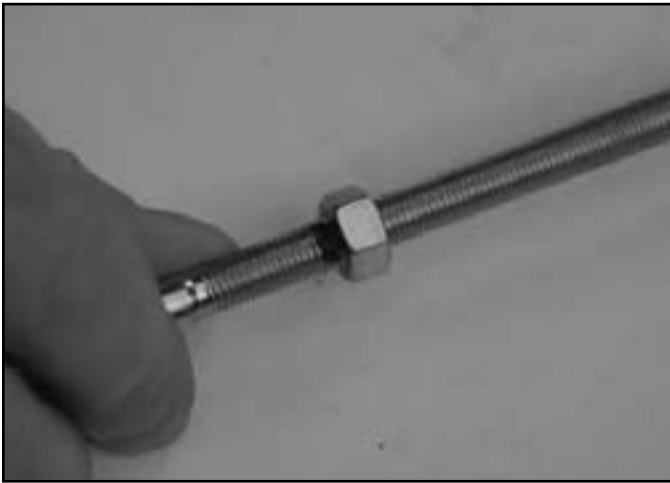


Fig 0484

PICT-0822a

17. Thread the second nut onto the control link. Snug fit the nut down to the washer and swivel assembly (Fig. 0486).

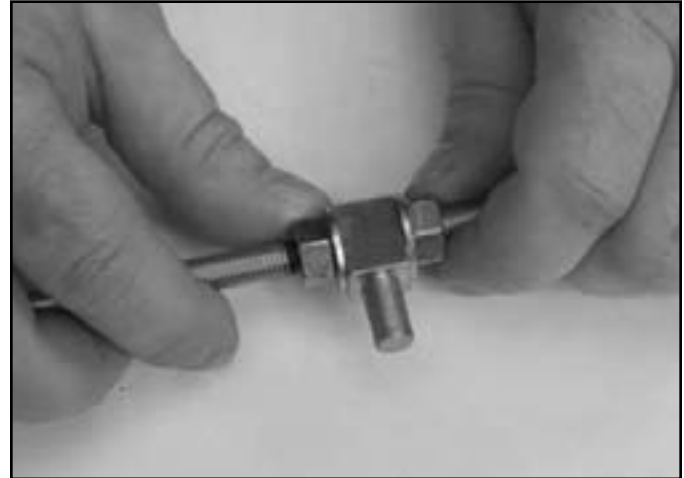


Fig 0486

PICT-0831a

16. Install 2 washers and the swivel onto the control link (Fig. 0485).

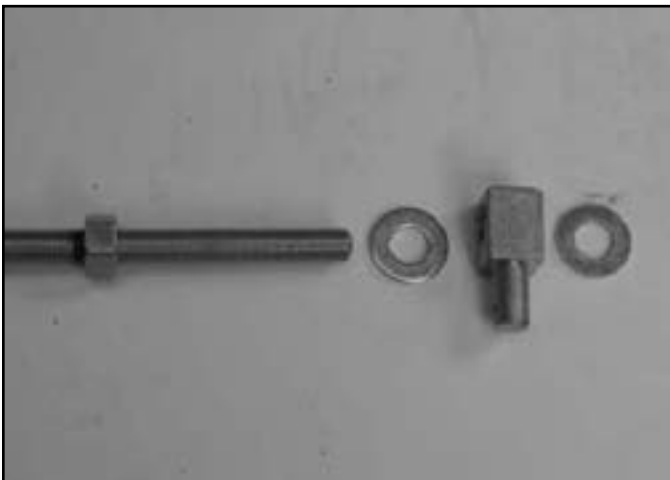


Fig 0485

PICT-0830a

18. Position the right hand speed control link into the right side linkage and insert the speed control link bolt into the upper tab of the drive lever swivel (Fig. 0487).



Fig 0487

PICT-0833

4

19. Install a nut onto the bolt securing the lower end of the speed control link to the drive lever swivel (Fig. 0488).



Fig 0488

PICT-0835

21. Slide a washer onto the trunnion and install a cotter pin securing the speed control link to the speed control crank (Fig. 0490).



Fig 0490

PICT-0893

20. Install the speed control link trunnion into the right hand tab on the speed control crank (Fig. 0489).



Fig 0489

PICT-0890

22. Repeat steps 18 thru 21 to install the left hand speed control link and bolt assembly into the left hand drive lever swivel and left hand tab of the speed control crank.

23. Tighten the 2 nuts on either side of the swivel on the upper end of the left hand control link (Fig. 0491).



Fig 0491

PICT-0842

4

# LINKAGE

24. Install a washer and a friction washer onto the shifter lever plate bolt (Fig. 0492).



Fig 0492

PICT-0843a

26. Install a second friction washer onto the bolt (Fig. 0494).

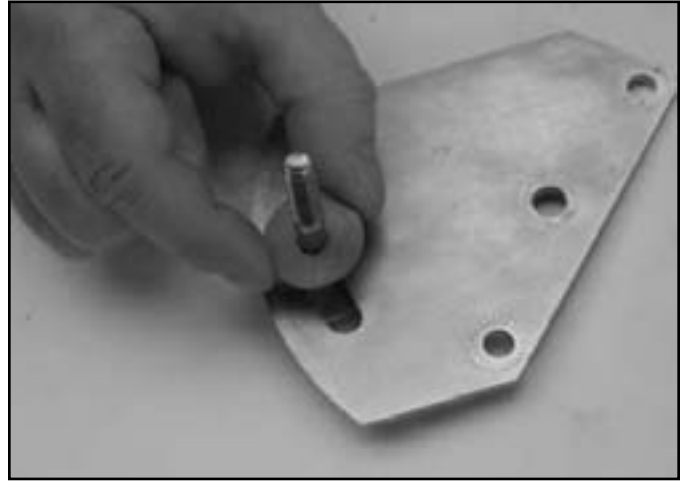


Fig 0494

PICT-0846a

25. Insert the bolt/washer assembly into the slotted opening of the shifter lever plate (Fig. 0493).



Fig 0493

PICT-0845a

27. Position the shift lever onto the shifter lever plate (Fig. 0495).



Fig 0495

PICT-0848a

4

28. Position a spring onto the bolt assembly (Fig. 0496).



Fig 0496

PICT-0849a

Tighten the nut until approximately 3 threads stick out past the nut (Fig. 0498).

**Note: Do not collapse the spring.**



Fig 0498

PICT-0852

29. Install a lock nut onto the bolt (Fig. 0497).



Fig 0497

PICT-0850

30. Position a washer between the two plates and align the ID of the washer with the center hole in the lever plates (Fig. 0499).

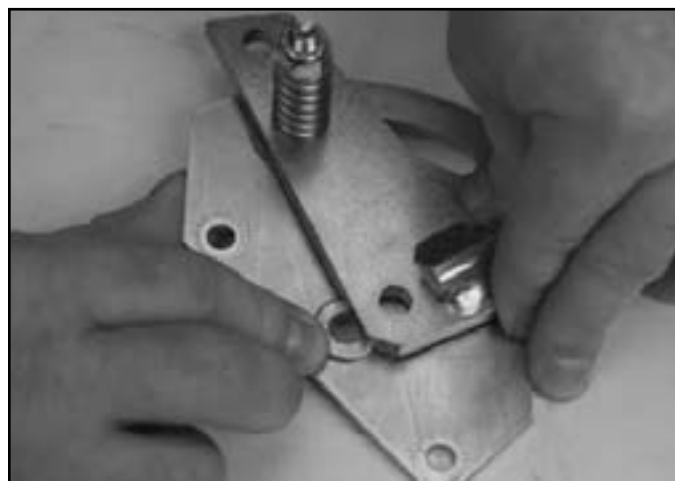


Fig 0499

PICT-0854a



# LINKAGE

31. Position the speed control handle (Fig. 0500).



Fig 0500

PICT-0857a

33. Loosely install the middle bolt, spring and nut, making sure the bolt goes through the washer in between the plates (Fig. 0502).



Fig 0502

PICT-0868

32. Loosely install the upper and lower bolts and nuts (Fig. 0501).

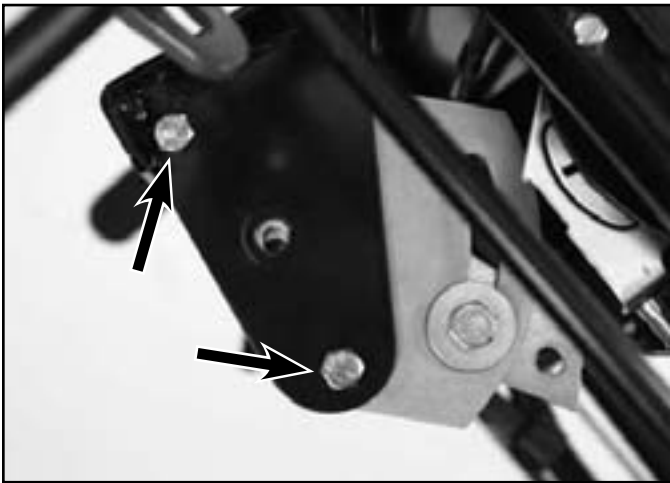


Fig 0501

PICT-0864

Tighten the middle nut until approximately 3 threads stick out past the nut (Fig. 0503).

**Note: Do not collapse the spring.**



Fig 0503

PICT-0872a

34. Tighten the upper and lower bolts and nuts (Fig. 0504).

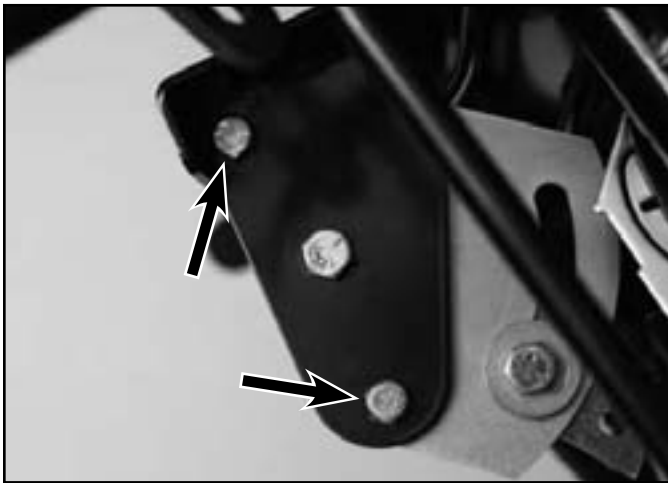


Fig 0504

PICT-0873

36. Install the knob onto the speed control lever (Fig. 0506).



Fig 0506

IMG\_8001a

35. Apply thread locking compound to the threads of the speed control lever (Fig. 0505).



Fig 0505

PICT-0875a

### Speed Control Rod Assembly:

37. Install a nut onto the speed control rod threads, threading it to the mark made previously (Fig. 0507).

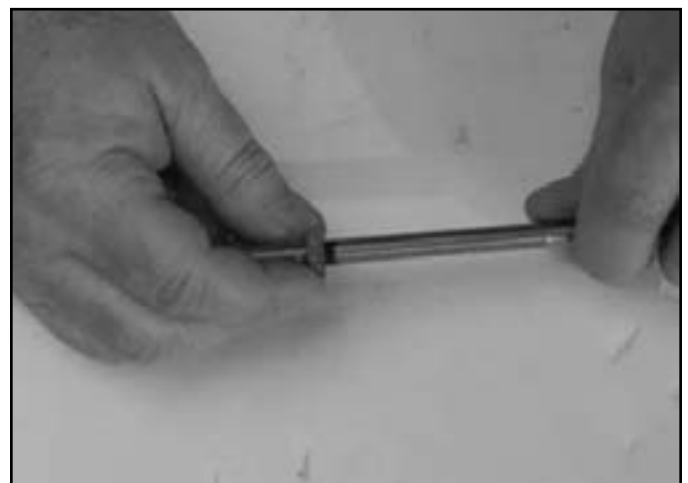


Fig 0507

PICT-0876a

# LINKAGE

38. Slide a trunion onto the speed control rod and snug fit a second nut against the trunion (Fig. 0508).



Fig 0508

PICT-0878a

40. Position the speed control rod trunion into the tab on the speed control crank assembly (Fig. 0510).



Fig 0510

PICT-0896

39. Position the speed control rod so that the upper end is installed in the forwardmost hole of the speed control lever. Install a hairpin cotter into the speed control rod securing it to the speed control lever (Fig. 0509).



Fig 0509

PICT-0895

41. Install a washer onto the trunion and secure the trunion with a cotter pin (Fig. 0511).



Fig 0511

PICT-0897

42. Tighten the jam nuts securing the speed control rod trunnion in place (Fig. 0512).

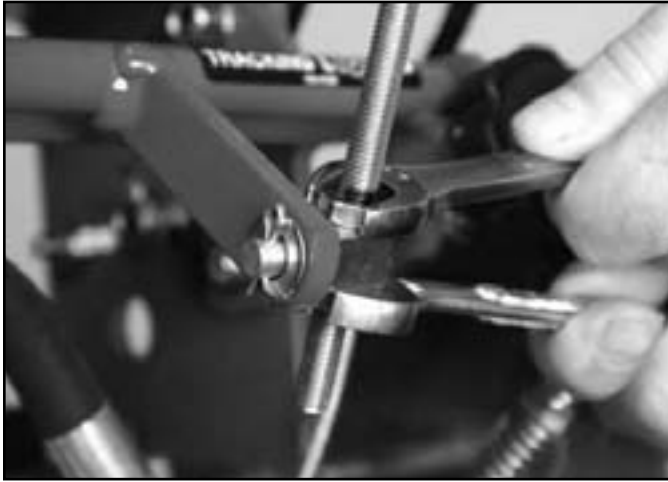


Fig 0512

PICT-0898

## Drive Lever Swivel & Bearing Replacement (Pistol Grip Hydro)

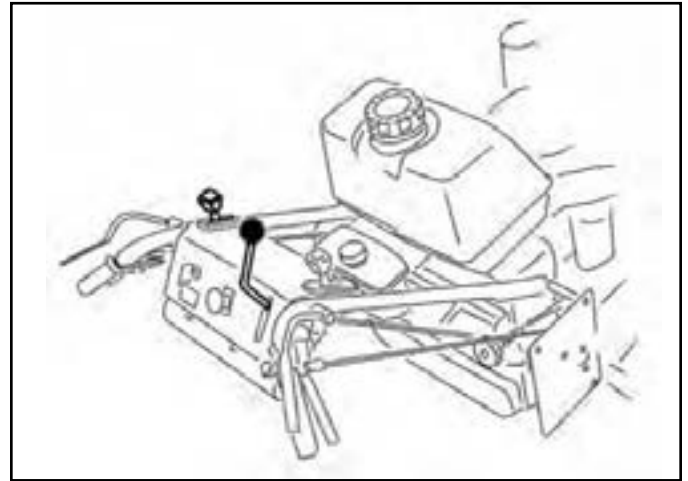


Fig 0513

fig. 10 G004912

43. Initially adjust the Neutral Stud. Refer to "Temporary Neutral Stud Adjustment" on page 4-122.
44. Adjust the Speed Control Linkage. Refer to "Speed Control Linkage Adjustment" on page 4-121.
45. Adjust the Neutral Stud. Refer to "Neutral Stud Adjustment" on page 4-126.

## Drive Lever Swivel & Bearing Removal

1. Turn the engine off and remove the key from the ignition.
2. Remove the neutral return spring from the lower tab on the drive lever swivel (Fig. 0514).

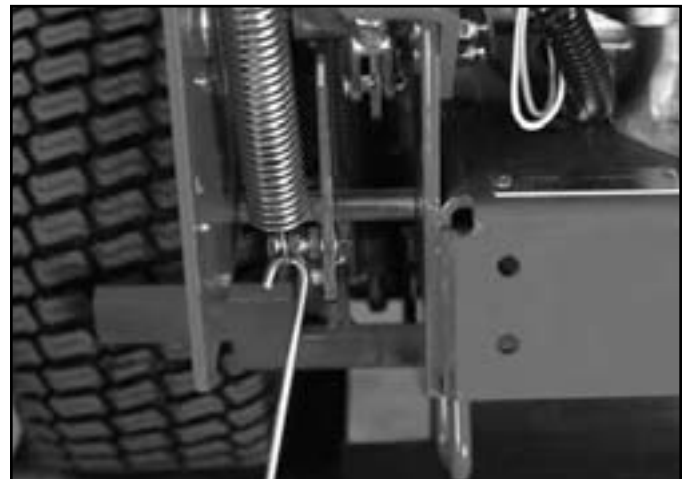


Fig 0514

PICT-0900

# LINKAGE

3. Remove the 3 nuts, bolts and spacers securing the side plate to the frame (Fig. 0515).

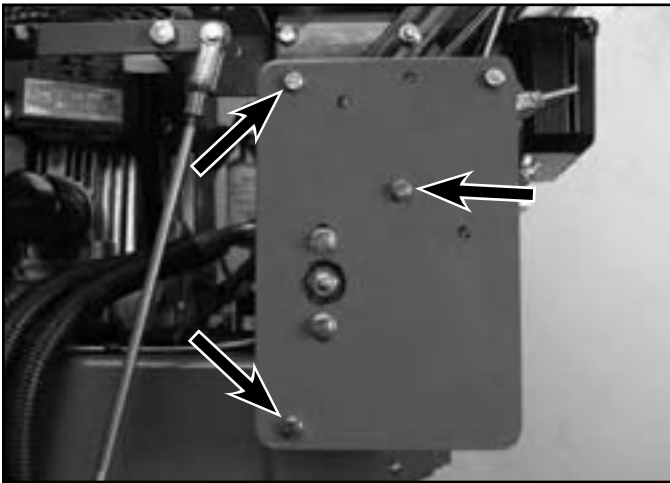


Fig 0515

PICT-0901

5. Remove the 2 bolts, nuts and washers securing the side flange bearing to the side plate (Fig. 0517).

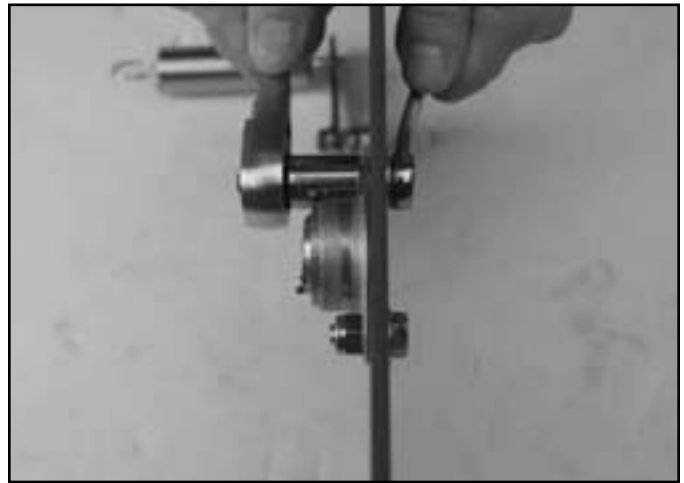


Fig 0517

PICT-0906a

4. Remove the side plate from the frame (Fig. 0516).



Fig 0516

PICT-0903

6. Remove the side flange bearing from the side plate (Fig. 0518).



Fig 0518

PICT-0907

4

7. Remove the e-clip from the trunnion on the lower end of the drive lever rod (Fig. 0519).



Fig 0519

PICT-0908

9. Move the speed control lever to the full forward position. Remove the outside nut from the lower end of the speed control link assembly (Fig. 0521).

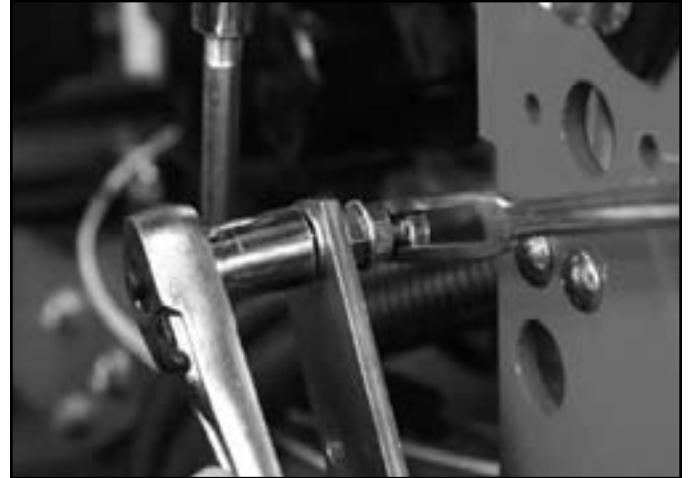


Fig 0521

PICT-0911

8. Remove the trunnion from the drive lever swivel on the lower end of the drive lever rod (Fig. 0520).



Fig 0520

PICT-0909

10. Remove the speed control link from the drive lever swivel. Move the control link out of the way of the drive lever swivel (Fig. 0522).



Fig 0522

PICT-0912

# LINKAGE

11. Remove the hairpin cotter from the clevis pin securing the neutral adjustment stud yoke to the drive lever swivel (Fig. 0523).

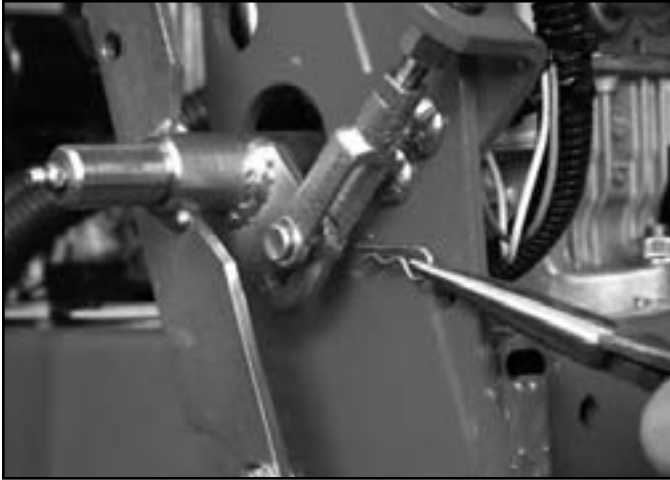


Fig 0523

PICT-0914

13. Loosen the 2 set screws securing the drive lever swivel to the hydro pump shaft (Fig. 0525).

**Note:** There is an access hole located in the frame below the drive lever swivel.

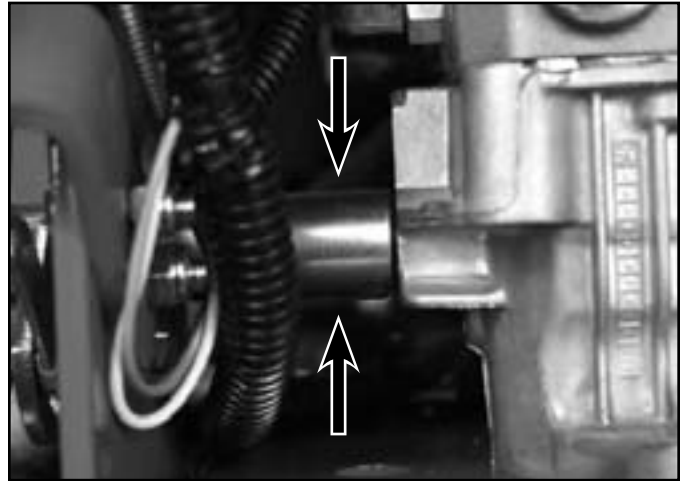


Fig 0525

PICT-0916

12. Remove the clevis pin (Fig. 0524).



Fig 0524

PICT-0915

14. Remove the drive lever swivel from the hydro pump shaft (Fig. 0526).



Fig 0526

PICT-0917

15. Remove the spring stud from the drive lever swivel (Fig. 0527).

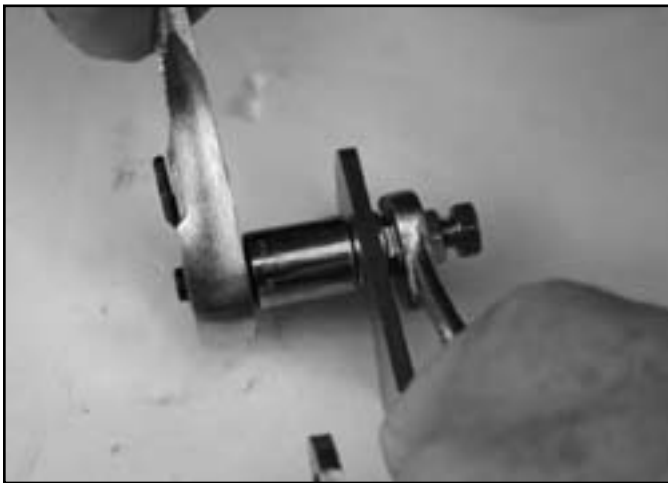


Fig 0527

PICT-0918

16. Remove the grease fitting from the drive lever swivel (Fig. 0528).



Fig 0528

PICT-0920

## Drive Lever Swivel & Bearing Installation

1. Install a grease fitting into the drive lever swivel (Fig. 0529).



Fig 0529

PICT-0920

2. Install the spring stud into the drive lever swivel (Fig. 0530).



Fig 0530

PICT-0918



# LINKAGE

3. Position the drive lever swivel through the frame and onto the hydro pump shaft (Fig. 0531).

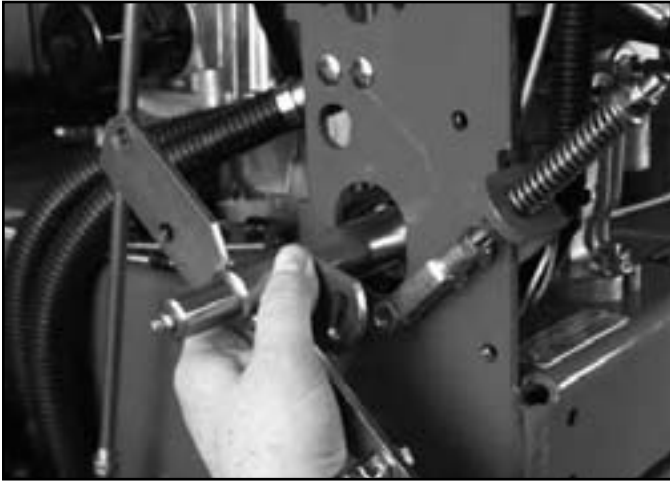


Fig 0531

PICT-0917

5. Install the 2 set screws securing the drive lever swivel to the hydro pump shaft (Fig. 0533).

**Note:** There is an access hole located in the frame below the drive lever swivel.

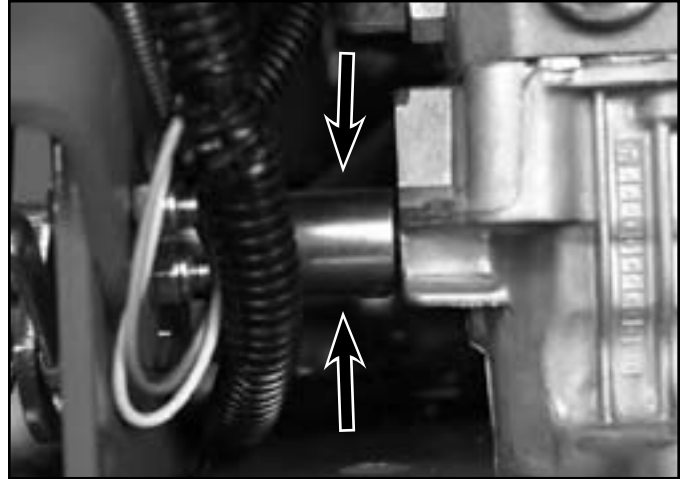


Fig 0533

PICT-0916

4. Apply thread locking compound to both drive lever swivel set screws (Fig. 0532).



Fig 0532

PICT-0922a

6. Position the neutral adjustment stud yoke to the drive lever swivel and install a clevis pin (Fig. 0534).



Fig 0534

PICT-0915

4

7. Install a hairpin cotter into the clevis pin securing the neutral adjustment stud yoke to the drive lever swivel (Fig. 0535).



Fig 0535

PICT-0914

9. Install the outside nut onto the speed control link bolt assembly (Fig. 0537).

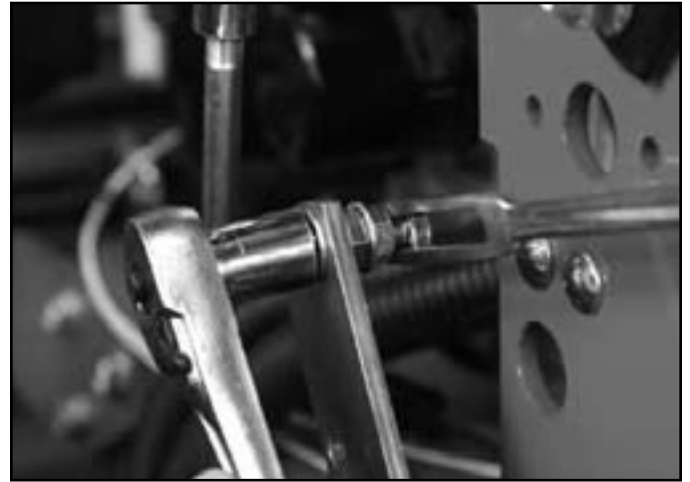


Fig 0537

PICT-0911

8. Insert the speed control link bolt into the drive lever swivel (Fig. 0536).



Fig 0536

PICT-0912

10. Insert the trunnion on the lower end of the drive lever rod into the drive lever swivel (Fig. 0538).

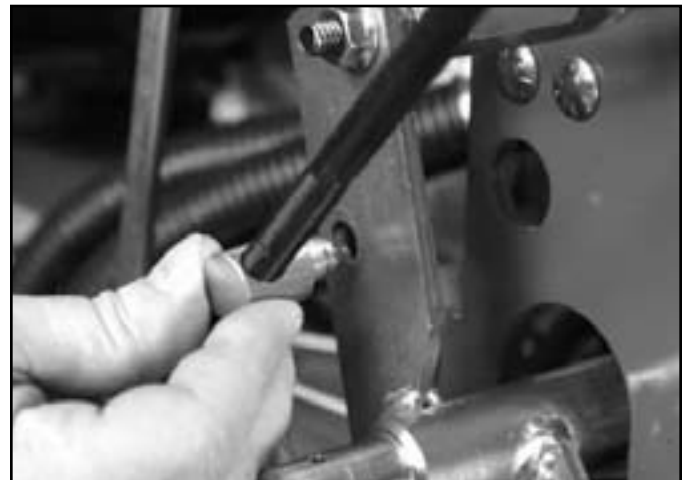


Fig 0538

PICT-0909

# LINKAGE

11. Install an e-clip onto the trunnion on the lower end of the drive lever rod (Fig. 0539).



Fig 0539

PICT-0908

13. Install a flat washer onto the 2 bolts used to secure the bearing to the side plate. Loosely install the bearing to the side plate with the 2 bolt assemblies and nuts (Fig. 0541).



Fig 0541

PICT-1015

12. Position the side flange bearing to the side plate (Fig. 0540).



Fig 0540

PICT-0907

14. Position the side plate so the bearing is installed on the hydro control shaft (Fig. 0542).



Fig 0542

PICT-1016

15. Insert a bolt through the side plate and slide a spacer onto the bolt. Loosely secure the bolt to the frame with a nut (Fig. 0543).



Fig 0543

PICT-1018

16. Repeat the above step with the other 2 bolt and spacer assemblies securing the side plate to the frame (Fig. 0544).

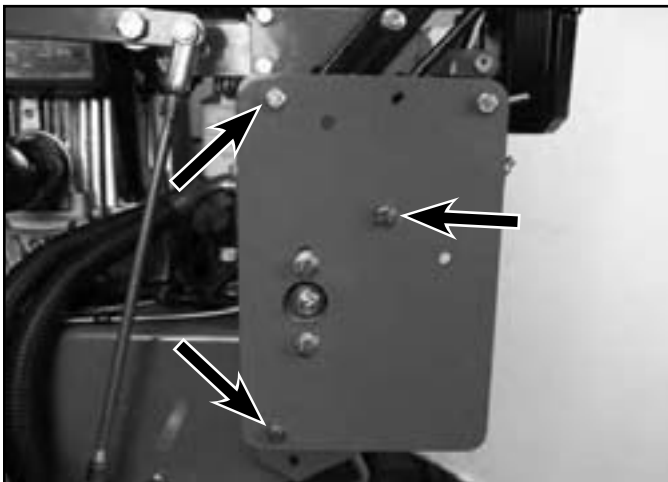


Fig 0544

PICT-1019

17. Tighten the nuts securing the side flange bearing in place on the side plate (Fig. 0545).

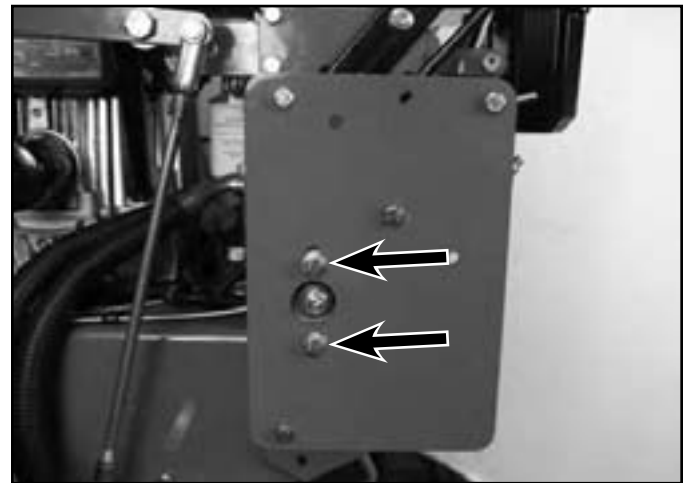


Fig 0545

PICT-1019

4

18. Install the spring onto the spring stud on the lower tab of the drive lever swivel (Fig. 0546).



Fig 0546

PICT-1020

# LINKAGE

19. Apply grease to the side flange bearing (Fig. 0547).



Fig 0547

PICT-1021

## Handle Assembly Replacement (T-Bar)

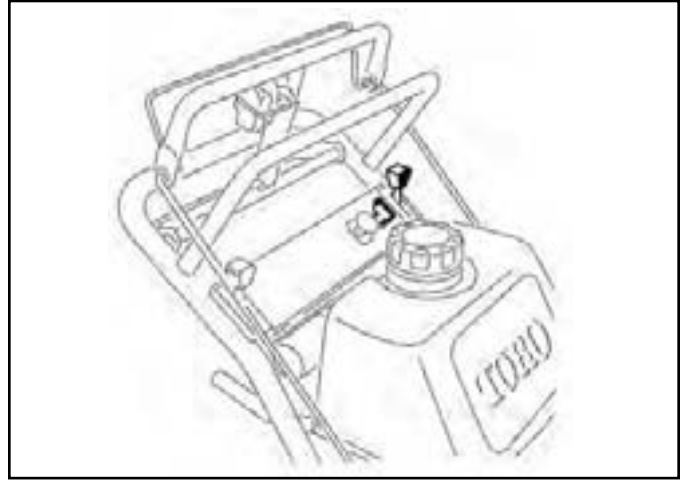


Fig 0548

fig. 7 G004812

20. Adjust the Speed Control Linkage. Refer to "Speed Control Linkage Adjustment" on page 4-121.
21. Initially adjust the Neutral Stud. Refer to "Temporary Neutral Stud Adjustment" on page 4-122.
22. Adjust the left and right hydro control linkages. Refer to "Hydro Control Linkage Adjustment" on page 4-123.
23. Adjust the Neutral Stud. Refer to "Neutral Stud Adjustment" on page 4-126.
24. Check the Control Rod. Refer to "Checking the Control Rod" on page 4-128.
25. Adjust the tracking. Refer to "Tracking Adjustment" on page 4-129.

## Handle Assembly Removal (T-Bar)

1. Turn the engine off and remove the key from the ignition.
2. Disconnect the negative battery terminal from the battery.

4

3. Open the locking tab on the front of the Operator Presence Control (OPC) switch. Unplug the harness from the OPC (Fig. 0549).



Fig 0549

PICT-1670a

4. Depress the connector lock with a small flat screwdriver (Fig. 0550).



Fig 0550

PICT-1689

5. While holding the lock down, draw the wire and spade terminal out of the connector (Fig. 0551).



Fig 0551

PICT-1692

4

6. Repeat steps 2 and 3 to remove the second terminal from the switch.
7. Pull the wire harness from the center tube in the T-bar (Fig. 0552).



Fig 0552

PICT-1694a

# LINKAGE

8. Remove the hairpin cotter from the lower end of the control rod (Fig. 0553).



Fig 0553

PICT-1672a

10. Remove the trunnion/clevis from the idler arm (Fig. 0555).



Fig 0555

PICT-1675

9. Remove the washer from the lower end of the control rod (Fig. 0554).



Fig 0554

PICT-1673a

11. Remove the clevis pin from the trunnion (Fig. 0556).



Fig 0556

PICT-1676a

4

12. Remove the trunnion from the control rod (Fig. 0557).



Fig 0557

PICT-1678a

14. Remove the control rod from the control bar/bail assembly (Fig. 0559).



Fig 0559

PICT-1682

13. Remove the cotter pin from the upper end of the control rod (Fig. 0558).



Fig 0558

PICT-1679a

15. Repeat steps 8 thru 14 to remove the opposite control rod.

16. Remove the bail from the handle assembly (Fig. 0560).

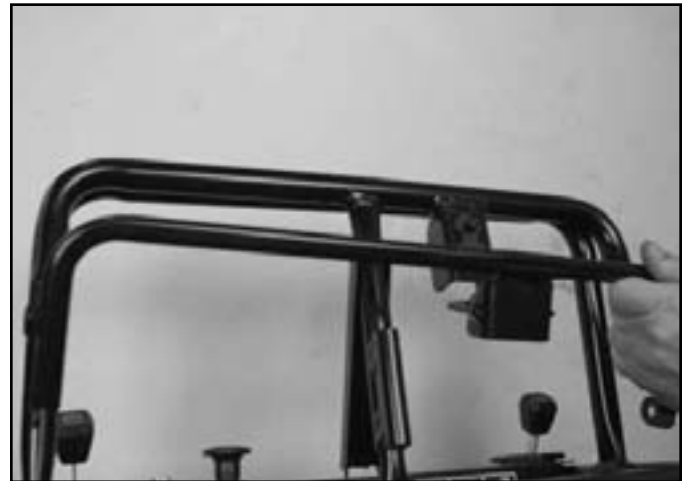


Fig 0560

PICT-1698a



# LINKAGE

17. Remove the nut from the bolt securing the T-Bar to the handle assembly (Fig. 0561).



Fig 0561

PICT-1701

19. Slide the T-Bar off the handle assembly (Fig. 0563).

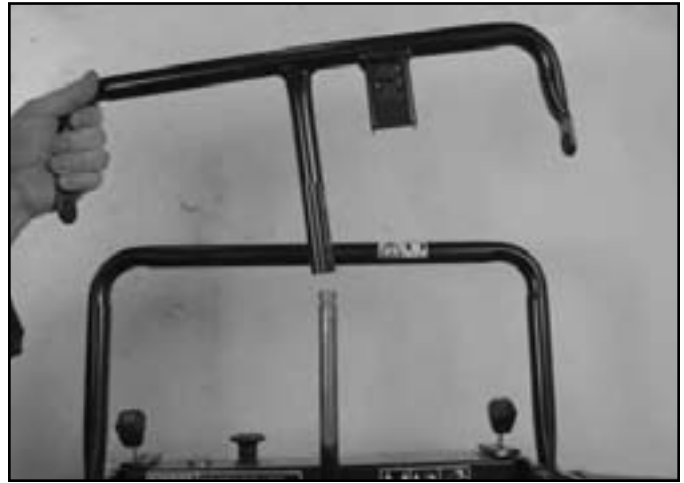


Fig 0563

PICT-1704a

18. Remove the bolt and then remove the parking brake lever (Fig. 0562).



Fig 0562

PICT-1703a

20. Depress the OPC switch tabs and remove the switch from the T-Bar (Fig. 0564).



Fig 0564

PICT-1707

4

21. Remove the 2 rubber grommets from the T-Bar (Fig. 0565).



Fig 0565

PICT-1708a

22. Remove the cotter pin from the clevis pin securing the control pivot assembly to the handle bar (Fig. 0566).



Fig 0566

PICT-1710

23. Remove the clevis pin (Fig. 0567).



Fig 0567

PICT-1712

24. Repeat steps 20 and 21 to remove the cotter pin and clevis from the opposite side.

25. Remove the control pivot assembly from the handle assembly (Fig. 0568).



Fig 0568

PICT-1713a

# LINKAGE

26. Remove the cable tie securing the throttle and choke cable to each side of the handle assembly (Fig. 0569).



Fig 0569

PICT-1716

28. Remove the 2 screws securing the bottom panel to the control panel. Remove the bottom panel (Fig. 0571).



Fig 0571

PICT-1719a

27. Remove the 2 screws securing the manual tube R-clamps to the bottom of the control panel. Remove the manual tube assembly (Fig. 0570).



Fig 0570

PICT-1718

29. Remove the 4 bolts (2 on the left, 2 on the right) and nuts that secure the control panel to the handle (Fig. 0572).



Fig 0572

PICT-1720

30. Lower the control panel from the handle (Fig. 0573).



Fig 0573

PICT-1722

32. Remove the handle (Fig. 0575).



Fig 0575

PICT-1728

31. Remove the 4 bolts and nuts (2 on the left, 2 on the right) securing the handle to the frame (Fig. 0574).

**Note:** Make note of handle height adjustment location.



Fig 0574

PICT-1725

## Handle Assembly Installation (T-Bar)

1. Position the handle to the frame (Fig. 0576).



Fig 0576

PICT-1728

# LINKAGE

2. Install 4 bolts and nuts (2 on the left, 2 on the right) securing the handle to the frame (Fig. 0577).



Fig 0577

PICT-1725

3. Raise the control panel assembly into place on the handle bar (Fig. 0579).



Fig 0579

PICT-1732

**Note:** Position the lower set of bolts as previously noted for proper handle height adjustment (Fig. 0578).



Fig 0578

PICT-1731

4. Install 4 bolts and nuts (2 on the left, 2 on the right) securing the control panel to the handle (Fig. 0580).



Fig 0580

PICT-1720

# LINKAGE

5. Position the bottom panel to the control panel and install 2 screws securing the back side of the bottom panel to the control panel (Fig. 0581).



Fig 0581

PICT-1719a

7. Install a cable tie securing the throttle cable, and one securing the choke cable, to each side of the handle assembly. Trim the excess (Fig. 0583).



Fig 0583

PICT-1733

6. Position the manual tube assembly to the control panel. Install 2 screws to secure the manual tube assembly R-clamps and bottom panel to the control panel (Fig. 0582).



Fig 0582

PICT-1718

8. Position the control pivot assembly into the handle assembly (Fig. 0584).



Fig 0584

PICT-1713a

4

# LINKAGE

9. Insert a clevis pin into each side of the control pivot assembly securing it to the handle assembly (Fig. 0585).



Fig 0585

PICT-1712

11. Install 2 rubber grommets (1 on the left, 1 on the right) into the T-Bar mounting holes (Fig. 0587).



Fig 0587

PICT-1708a

10. Install a cotter pin into each of the clevis pins (Fig. 0586).



Fig 0586

PICT-1710

12. Install the OPC switch into the switch housing on the T-Bar (Fig. 0588).



Fig 0588

PICT-1707

13. Slide the T-Bar onto the handle assembly (Fig. 0589).

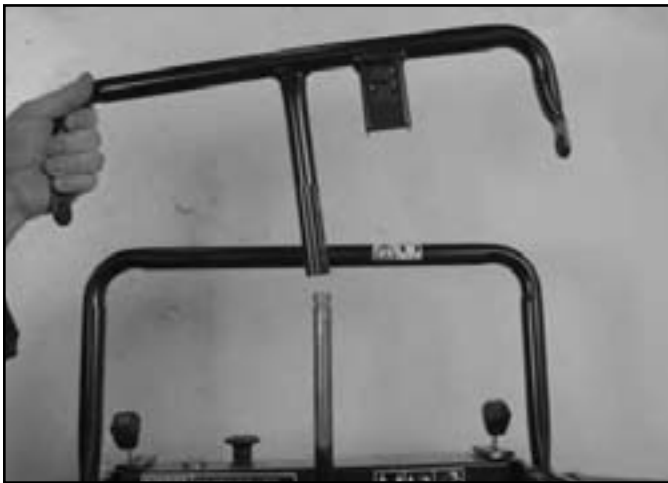


Fig 0589

PICT-1704a

14. Position the parking brake lever to the T-Bar and insert a bolt (Fig. 0590).



Fig 0590

PICT-1703a

15. Install a nut onto the bolt securing the parking brake lever and T-Bar to the handle assembly (Fig. 0591).

**Note:** Tighten the bolt and nut enough so the parking brake lever does not rattle but still rotates freely.



Fig 0591

PICT-1701

16. Position the bail into the handle assembly (Fig. 0592).



Fig 0592

PICT-1698a



# LINKAGE

17. Insert the top end of the control rod into the control bar/bail assembly (Fig. 0593).



Fig 0593

PICT-1682

19. Install the trunnion onto the control rod approximately 2" (5cm) (Fig. 0595).



Fig 0595

PICT-1678a

18. Install a cotter pin into the upper end of the control rod, securing it to the control bar/bail assembly (Fig. 0594).



Fig 0594

PICT-1736

20. Insert a clevis pin into the trunnion (Fig. 0596).



Fig 0596

PICT-1676a

4

21. Insert the clevis pin into the idler arm (Fig. 0597).



Fig 0597

PICT-1675

23. Install a hairpin cotter into the clevis pin (Fig. 0599).



Fig 0599

PICT-1672a

22. Install a washer onto the clevis pin (Fig. 0598).



Fig 0598

PICT-1740

24. Repeat steps 17 - 23 to install the control rod on the opposite side.

25. Feed the wire harness up through the center T-bar tube (Fig. 0600).



Fig 0600

PICT-1694a

# LINKAGE

26. Plug the two harness wires into the harness connector as shown (Fig. 0601):



Fig 0601

PICT-1742

27. Plug the harness connector into the OPC switch (Fig. 0602).



Fig 0602

PICT-1744

28. Connect the negative battery terminal to the battery.
29. Check the Adjustment of the Control Bar. Refer to "Control Bar Adjustment" on page 4-132.

## Handle Assembly Removal (T-2)

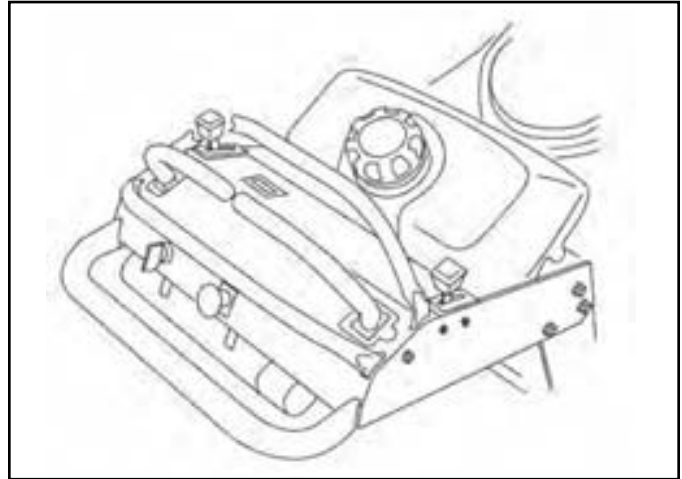


Fig 0603

fig. 3 G006080

1. Turn the engine off and remove the key from the ignition.
2. Disconnect the negative battery terminal from the battery.

3. Remove the 4 screws (2 on the left, 2 on the right) securing the control panel cover to the control panel (Fig. 0604).



Fig 0604

PICT-1921

5. Unplug the harness from the parking brake switch (Fig. 0606).



Fig 0606

PICT-2021

4. Remove the control panel cover/manual tube assembly (Fig. 0605).



Fig 0605

PICT-1923

6. Unplug the harness from the PTO switch (Fig. 0607).

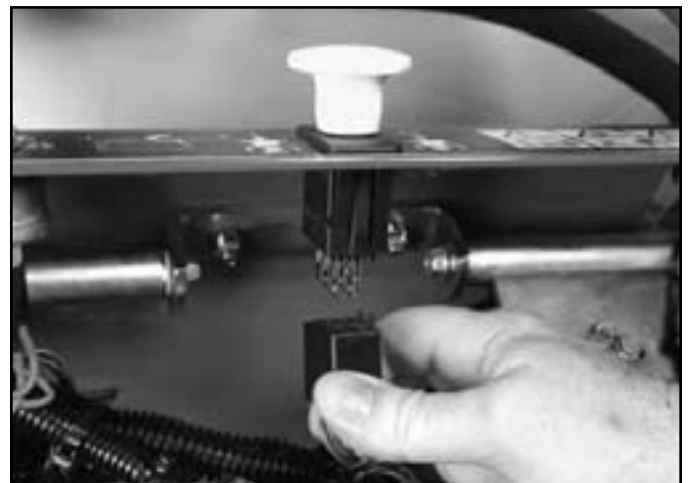


Fig 0607

PICT-2022

# LINKAGE

7. Remove the PTO switch from the control panel (Fig. 0608).



Fig 0608

PICT-2023

9. Remove the nut securing the ignition switch to the control panel (Fig. 0610).



Fig 0610

PICT-2025a

8. Unplug the harness wire and connector from the ignition switch (Fig. 0609).



Fig 0609

PICT-2024

10. Remove the lockwasher from the ignition switch (Fig. 0611).



Fig 0611

PICT-2026

4

11. Remove the ignition switch from the control panel (Fig. 0612).



Fig 0612

PICT-2027

13. Unplug the harness from the hour meter (Fig. 0614).



Fig 0614

PICT-2029

12. Unplug the harness from the Operator Presence Control (OPC) switch (Fig. 0613).



Fig 0613

PICT-2028

14. Remove the locking tab from the back side of the hour meter (Fig. 0615).



Fig 0615

PICT-2037

# LINKAGE

15. Remove the hour meter from the control panel (Fig. 0616).



Fig 0616

PICT-2039a

17. Unplug the kill relay from the harness connector (Fig. 0618).

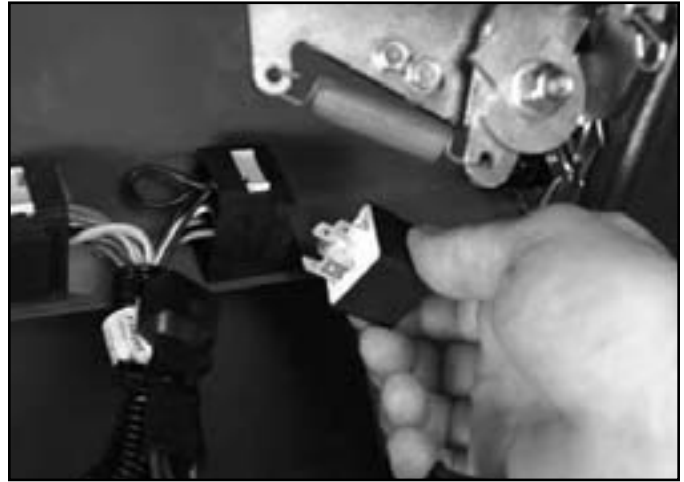


Fig 0618

PICT-2035

16. Unplug the latching relay from the harness connector (Fig. 0617).



Fig 0617

PICT-2041a

18. Remove the bolt and nut securing the two relay harness connector blocks to the control panel (Fig. 0619).

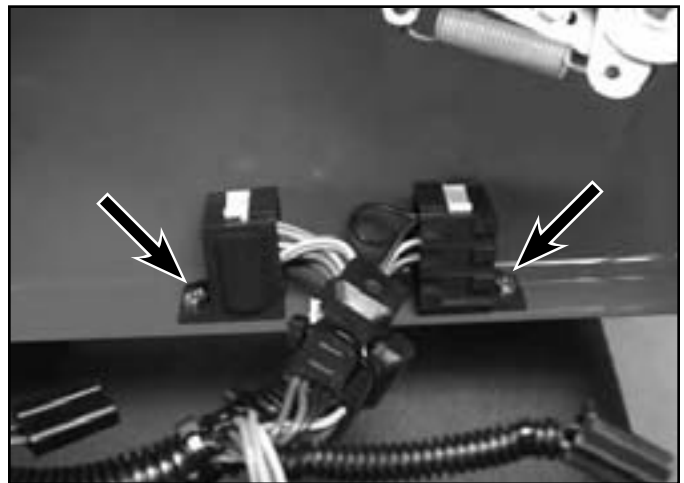


Fig 0619

PICT-2036

4

19. Remove the cable tie securing the harness to the throttle cable (Fig. 0620).

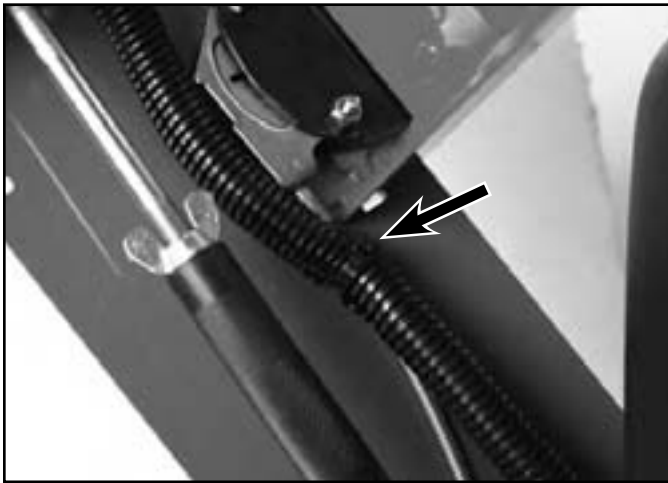


Fig 0620

PICT-2043

20. Remove the cable tie securing the harness to the frame (left of the fuel tank, above the parking brake) (Fig. 0621).

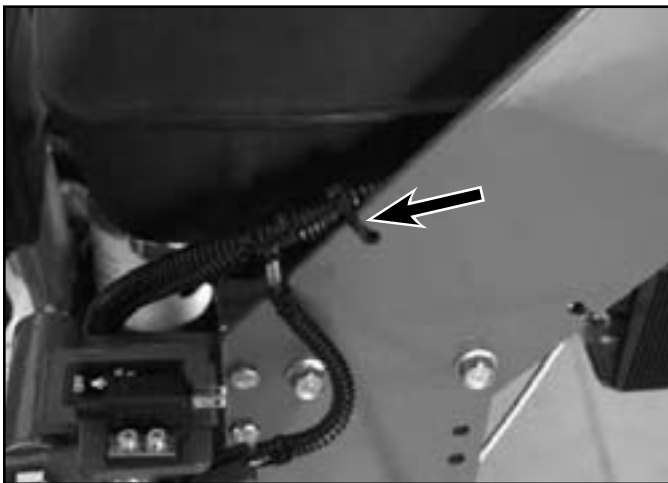


Fig 0621

PICT-2047

21. Pull the harness through the frame and lay it across the engine so it is out of the way of the handle.
22. At the front of the engine, loosen the cable clamps securing the throttle (bottom) and choke (top) cables to the engine (Fig. 0622).

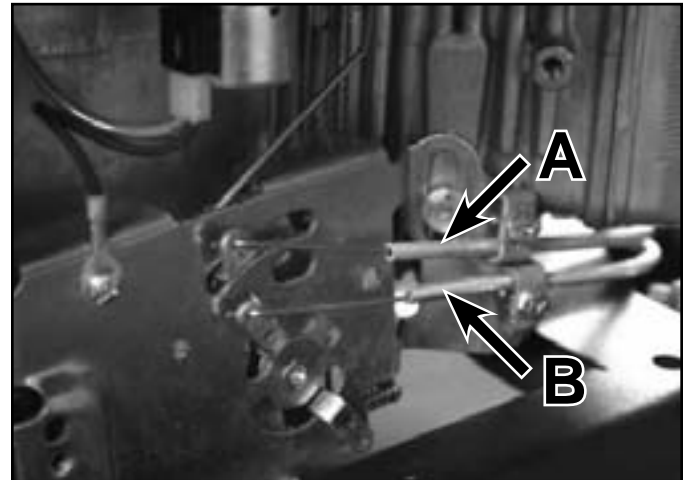


Fig 0622

PICT-0309

A. Choke

B. Throttle

23. Remove the throttle and choke cables from the cable clamps and disconnect the z-bends from the control linkage (Fig. 0623).



Fig 0623

PICT-0310



# LINKAGE

24. Cut the cable ties at the following locations (Fig. 0624 and Fig. 0625):

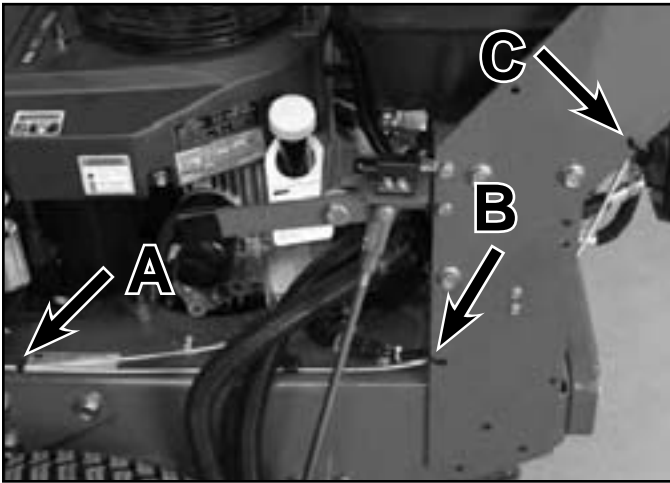


Fig 0624

PICT-2051

- A. Throttle/choke
- B. Throttle/neutral proximity switch wire/frame
- C. Throttle/frame

25. Remove the 2 screws and nuts securing the throttle control assembly to the control panel (Fig. 0626).

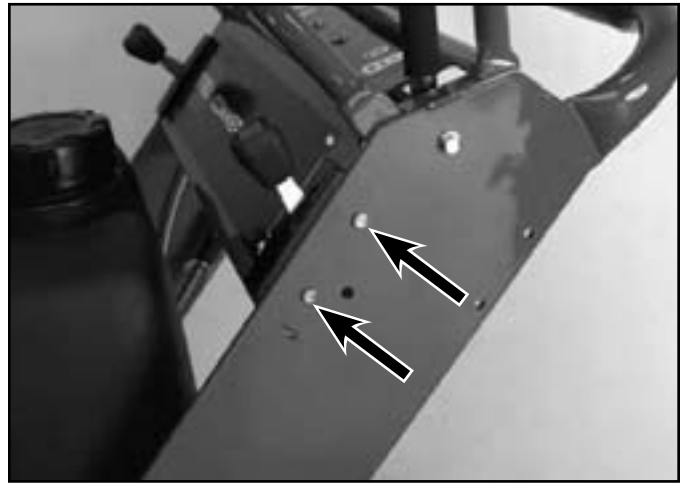


Fig 0626

PICT-2053

26. Remove the throttle control assembly from the control panel (Fig. 0627).

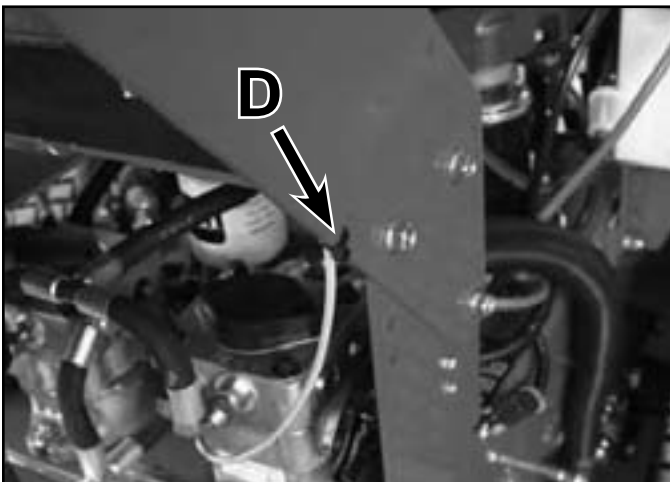


Fig 0625

PICT-2052

- D. Choke/frame



Fig 0627

PICT-2057

27. Remove the 2 screws and nuts securing the choke control assembly to the control panel (Fig. 0628).

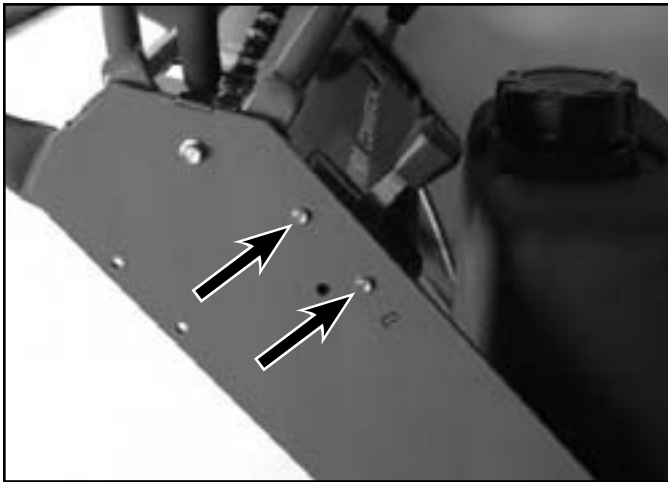


Fig 0628

PICT-2054

29. Remove the 2 bolts and nuts securing the parking brake handle support to the frame (Fig. 0630).

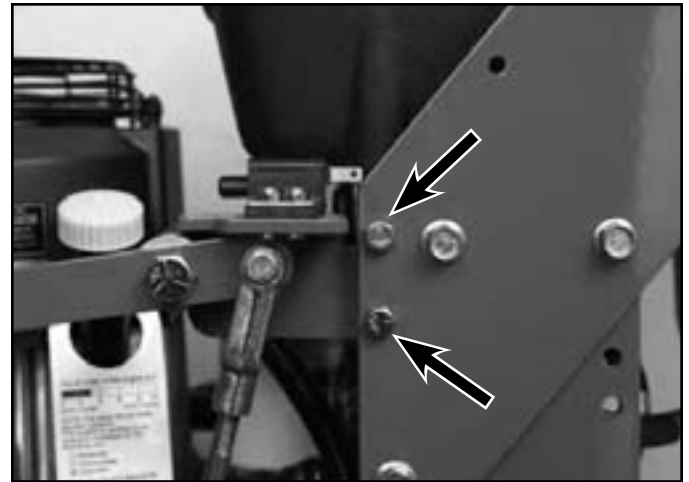


Fig 0630

PICT-2060

28. Remove the choke control assembly from the control panel (Fig. 0629).



Fig 0629

PICT-2058

30. Swing the parking brake assembly forward so it is out of the way to permit handle assembly removal.

31. Remove the hairpin cotter from the upper end of the control linkage rod (Fig. 0631).



Fig 0631

PICT-2064

# LINKAGE

32. Remove the washer from the upper end of the control linkage rod (Fig. 0632).



Fig 0632

PICT-2065

34. Repeat steps 31 - 33 to remove the control rod from the opposite motion control lever assembly.



Fig 0634

PICT-2071

33. Remove the upper end of the control rod from the tab on the control handle (Fig. 0633).



Fig 0633

PICT-2066

36. Remove the 2 screws securing the OPC switch to the control lever assembly (Fig. 0635).



Fig 0635

PICT-2073a

4

37. Remove the OPC switch and threaded spacer plate (Fig. 0636).



Fig 0636

PICT-2075

39. Remove the right hand lever from the control panel (Fig. 0638).



Fig 0638

PICT-2080a

38. Remove the nut and bolt securing the right hand lever assembly to the motion control assembly (Fig. 0637).

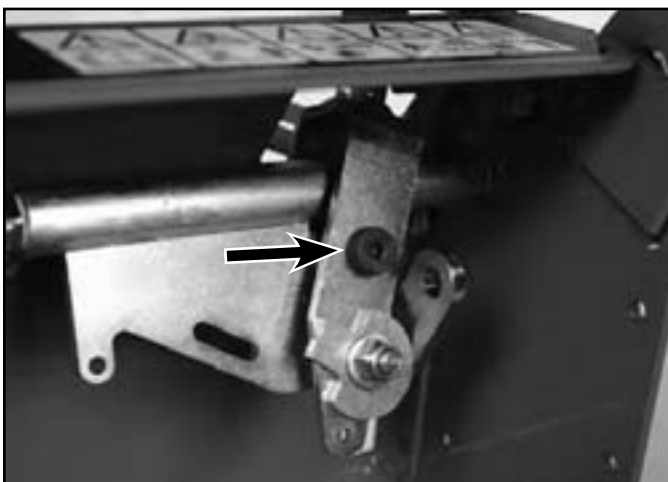


Fig 0637

PICT-2076

40. Remove the 2 carriage bolts and nuts securing the center support bracket to the control panel (Fig. 0639).

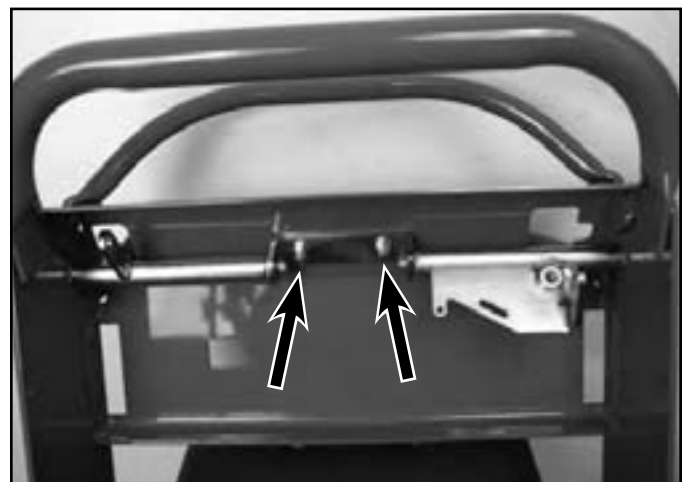


Fig 0639

PICT-2083

# LINKAGE

41. Remove the 2 outside bolts (1 left, 1 right) securing the motion control lever linkage to the handle assembly (Fig. 0640).

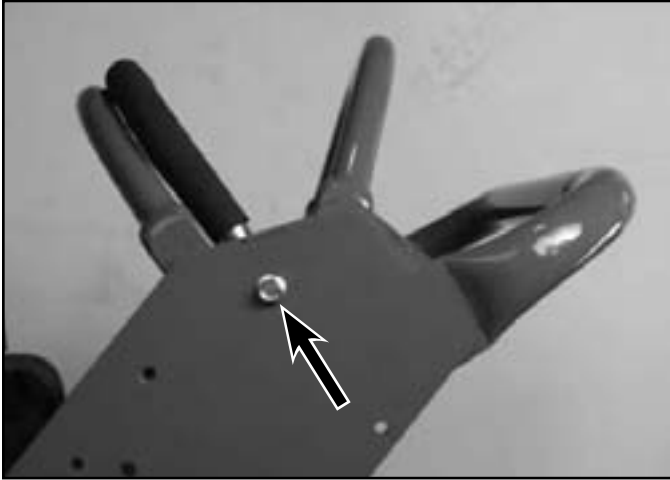


Fig 0640

PICT-2084

43. Slide the right hand motion control assembly off the pivot shaft (Fig. 0642).



Fig 0642

PICT-2088a

42. Remove the motion control lever linkage from the handle assembly (Fig. 0641).



Fig 0641

PICT-2098

44. Remove the bolt securing the right hand pivot shaft to the center support bracket (Fig. 0643).

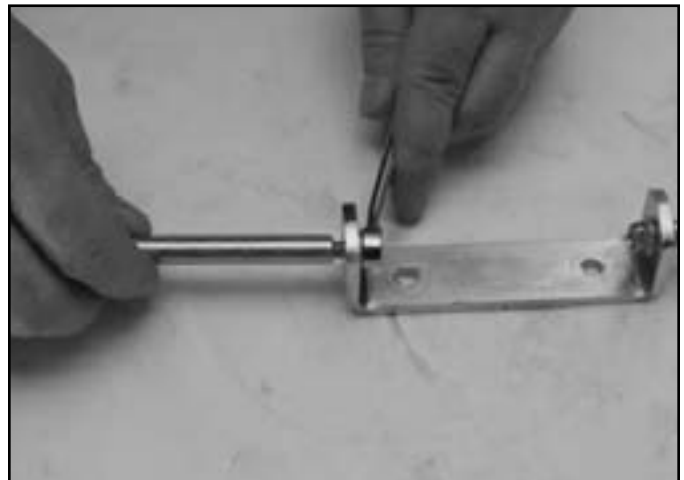


Fig 0643

PICT-2089a

45. Slide the left hand control lever off the left hand pivot shaft (Fig. 0644).



Fig 0644

PICT-2090a

47. Remove the 6 bushings from the control assemblies (2 left, 4 right) (Fig. 0646).

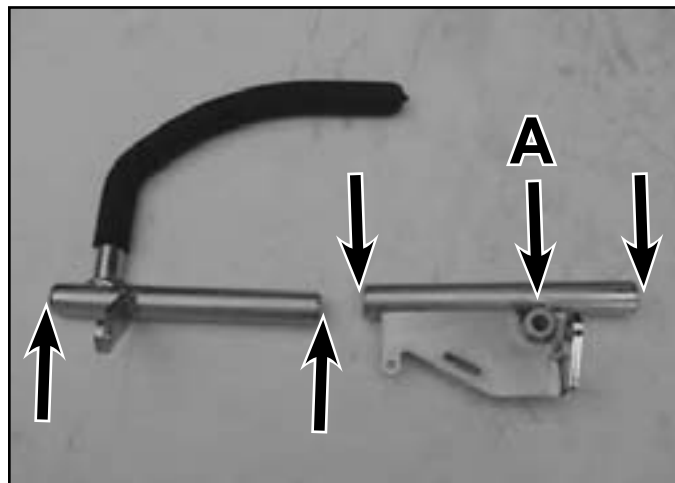


Fig 0646

PICT-2095a

46. Remove the bolt securing the left hand pivot shaft to the center support bracket (Fig. 0645).

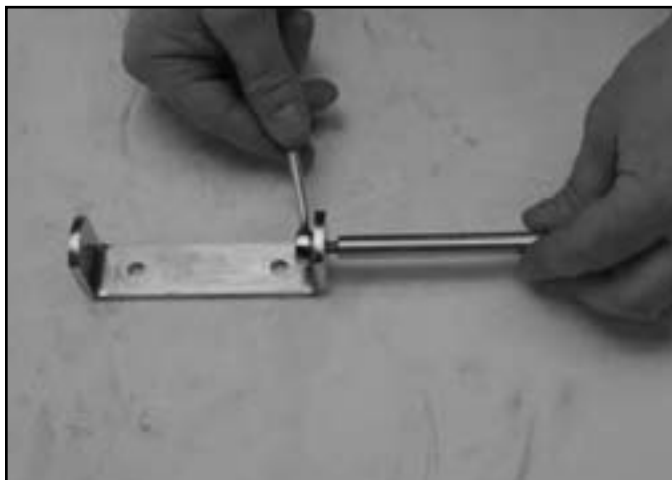


Fig 0645

PICT-2091a

48. Remove the nut and washer securing the handle stop lever cam to the right control lever (Fig. 0647).



Fig 0647

PICT-2108

# LINKAGE

49. Remove the handle stop lever cam from the right control lever (Fig. 0648).



Fig 0648

PICT-2109

51. Remove the handle assembly from the frame (Fig. 0650).



Fig 0650

PICT-2092

50. Remove the 6 bolts (3 left, 3 right) securing the handle assembly to the frame (Fig. 0649).

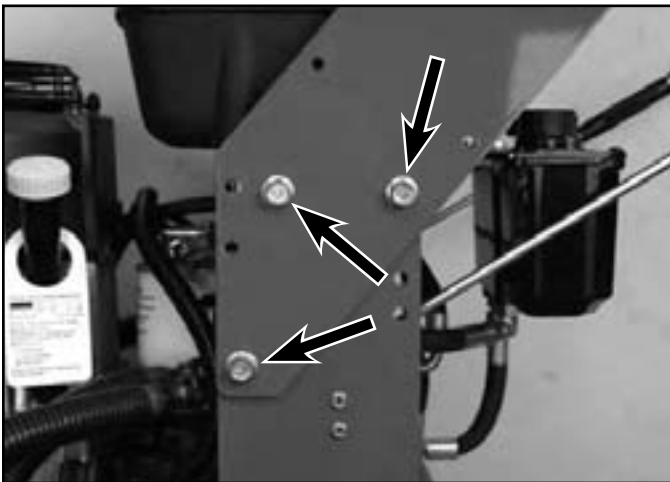


Fig 0649

PICT-2069

## Handle Assembly Installation (T-2)

1. Position the handle assembly to the frame (Fig. 0651).



Fig 0651

PICT-2092

2. Install 6 bolts (3 left, 3 right) securing the handle assembly to the frame (Fig. 0652).

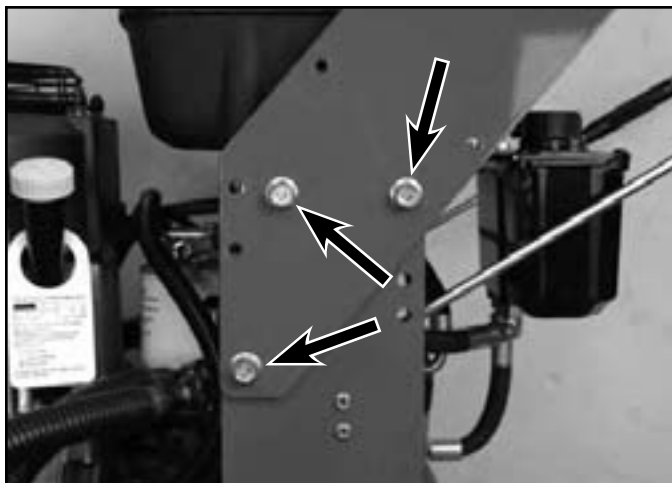


Fig 0652

PICT-2069

4. Position the handle stop lever cam onto the right control lever (Fig. 0654).



Fig 0654

PICT-2109

3. Install 6 bushings into the control assemblies (2 left, 4 right) (Fig. 0653).

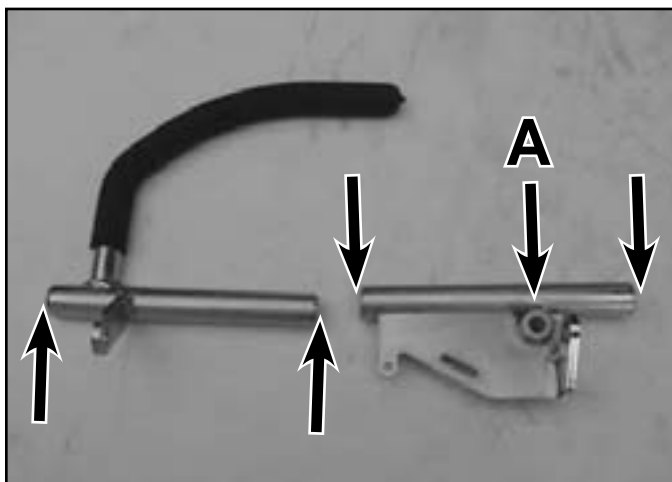


Fig 0653

PICT-2095a

5. Loosely install a washer and nut to secure the handle stop lever cam to the right control lever (Fig. 0655).

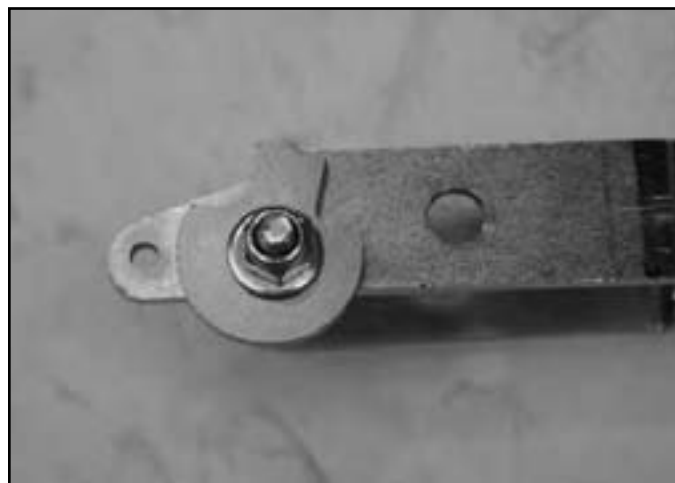


Fig 0655

PICT-2108

- A. One on each side



# LINKAGE

6. Position the left hand pivot shaft to the center support bracket and loosely install a bolt securing the pivot shaft to the center support bracket (Fig. 0656).

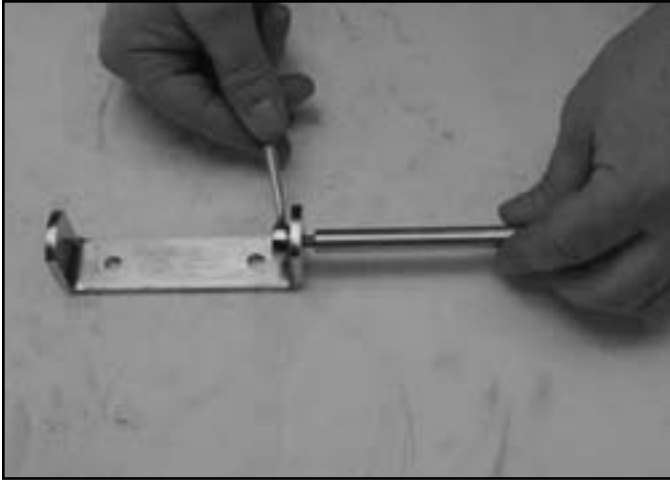


Fig 0656

PICT-2091a

8. Position the right hand pivot shaft to the center support bracket and loosely install a bolt securing the pivot shaft to the center support bracket (Fig. 0658).

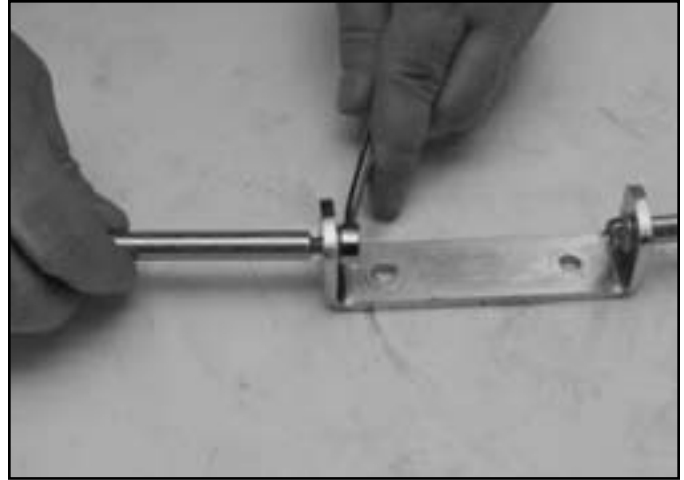


Fig 0658

PICT-2089a

7. Slide the left hand control lever onto the left hand pivot shaft (Fig. 0657).



Fig 0657

PICT-2090a

9. Slide the right hand motion control assembly onto the pivot shaft (Fig. 0659).



Fig 0659

PICT-2088a

10. Position the motion control lever linkage into the control panel handle assembly (Fig. 0660).



Fig 0660

PICT-2098

12. Loosely install 2 carriage bolts and nuts, securing the center support bracket to the control panel (Fig. 0662).

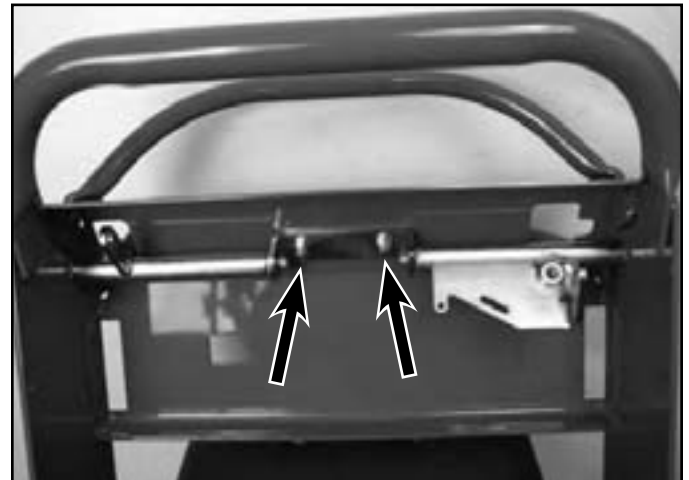


Fig 0662

PICT-2083

11. Loosely install 2 bolts (1 left, 1 right) from the outside of the handle assembly, securing the motion control lever linkage to the handle assembly (Fig. 0661).

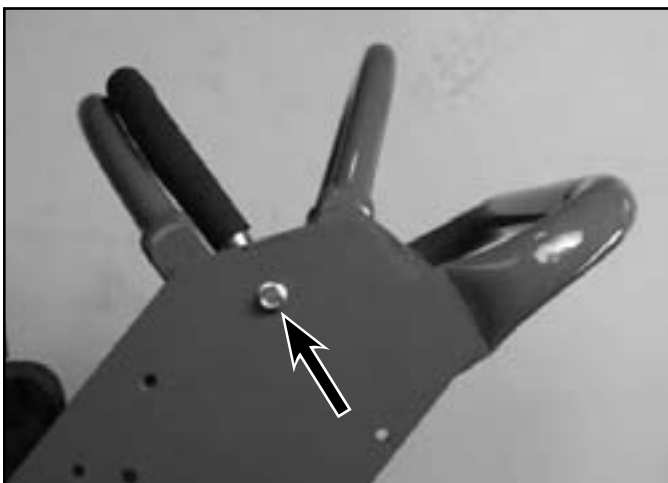


Fig 0661

PICT-2084

13. Position the right hand lever into the opening on the right hand side of the control panel (Fig. 0663).



Fig 0663

PICT-2080a

4

# LINKAGE

14. Install a bolt and nut, securing the right hand lever assembly to the motion control linkage assembly (Fig. 0664).

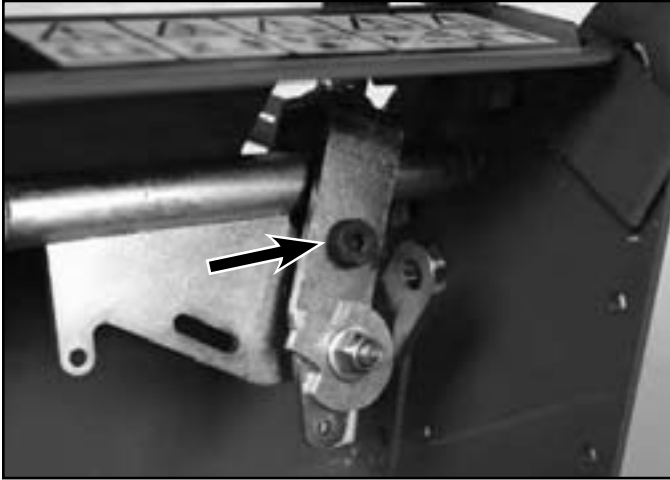


Fig 0664

PICT-2076

- B. 2 bolts install from the outside of the handle assembly.

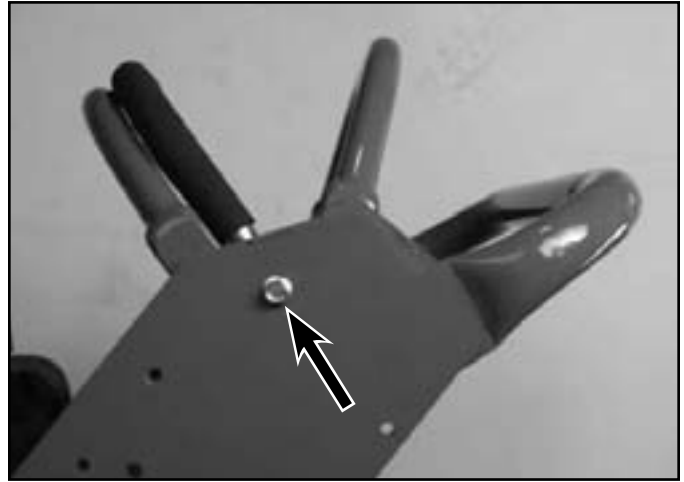


Fig 0666

PICT-2084

4

15. Tighten the bolts and nuts previously installed (Fig. 0665, Fig. 0666 and Fig. 0667):

- A. 2 carriage bolts.

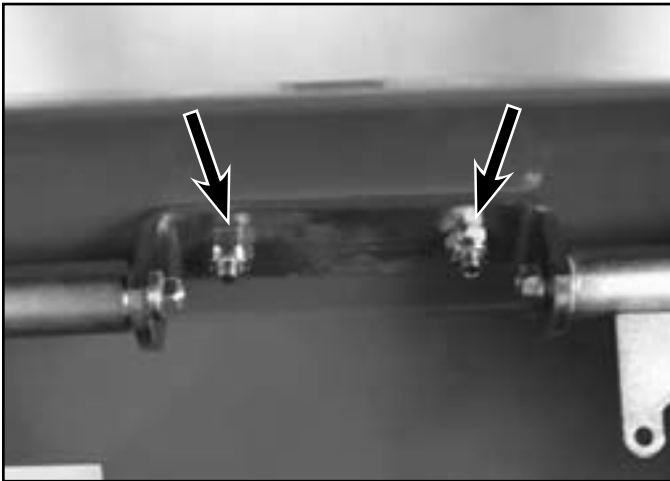


Fig 0665

PICT-2100

- C. 2 bolts securing the right and left hand pivot shafts to the center support bracket.

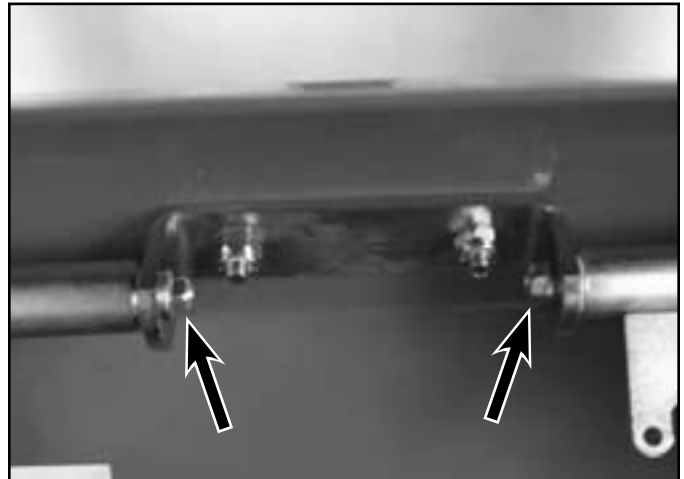


Fig 0667

PICT-2100

16. Position the right hand control lever so it aligns with the left hand control lever (Fig. 0668).

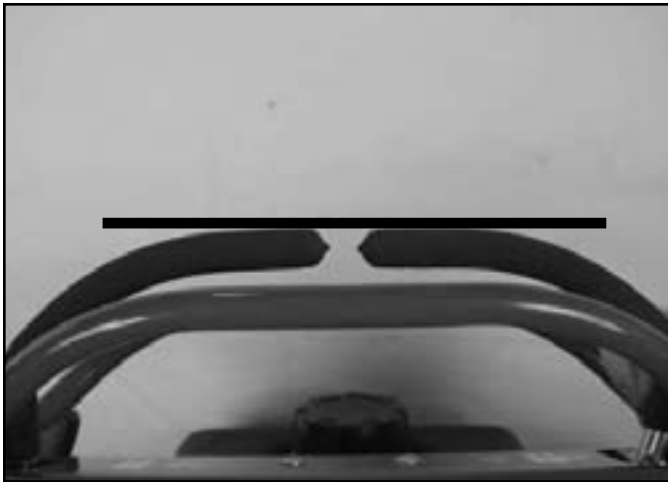


Fig 0668

PICT-2112a

18. Position the OPC switch and threaded spacer plate onto the motion control linkage (Fig. 0670).



Fig 0670

PICT-2075

17. Rotate the handle stop lever cam until the gap between the cam and the right hand control handle is removed. Tighten the nut (Fig. 0669).



Fig 0669

PICT-2114

19. Install 2 screws securing the OPC switch and spacer to the motion control lever assembly (Fig. 0671).



Fig 0671

PICT-2073a

# LINKAGE

20. With the right control lever in the operating position, there should be .10" (2.5mm) gap between the OPC switch plunger and the control arm tab. Adjust the switch location as needed (Fig. 0672).

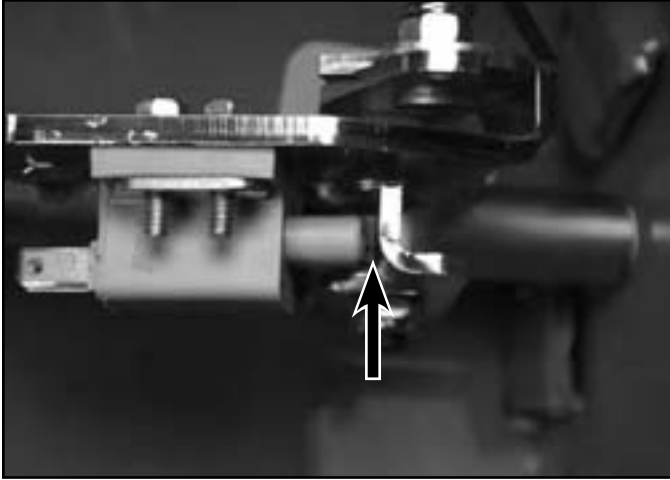


Fig 0672

PICT-2104

21. Install the spring onto the right hand motion control lever assembly (Fig. 0673).



Fig 0673

PICT-2071

22. Insert the upper end of the control linkage rod into the tab on the control handle (Fig. 0674).

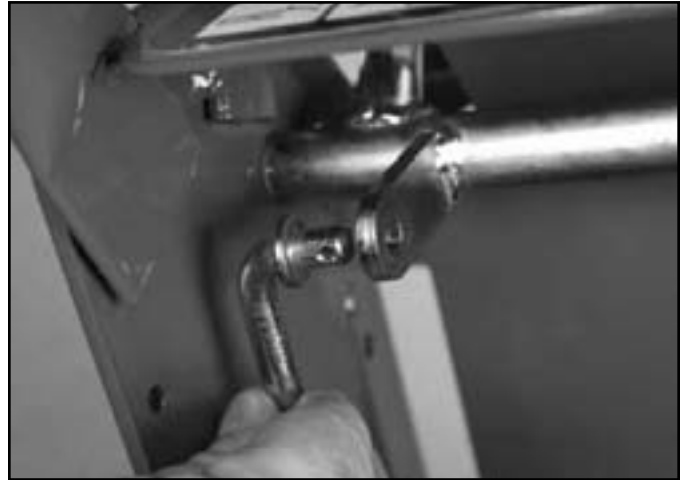


Fig 0674

PICT-2066

23. Slide a washer onto the upper end of the control linkage rod (Fig. 0675).



Fig 0675

PICT-2065

24. Install a hairpin cotter into the upper end of the control linkage rod (Fig. 0676).



Fig 0676

PICT-2064

27. Install 2 bolts and nuts securing the parking brake handle support to the frame (Fig. 0678).

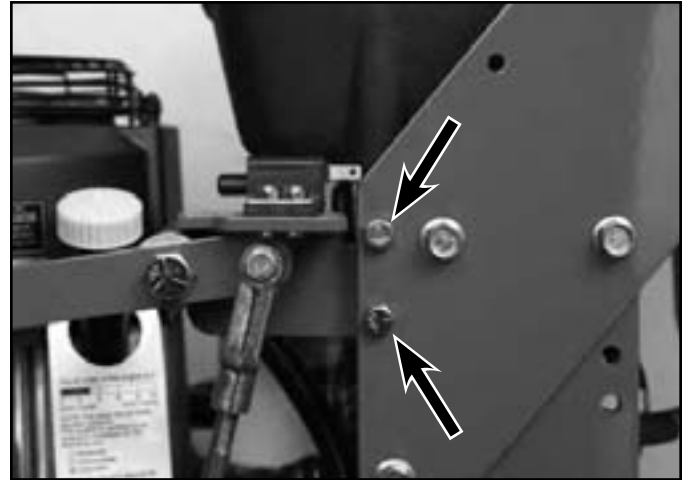


Fig 0678

PICT-2060

25. Repeat steps 22 - 24 to install the opposite side control rod.
26. Swing the parking brake assembly into position so the mounting holes align with the holes in the frame (Fig. 0677).

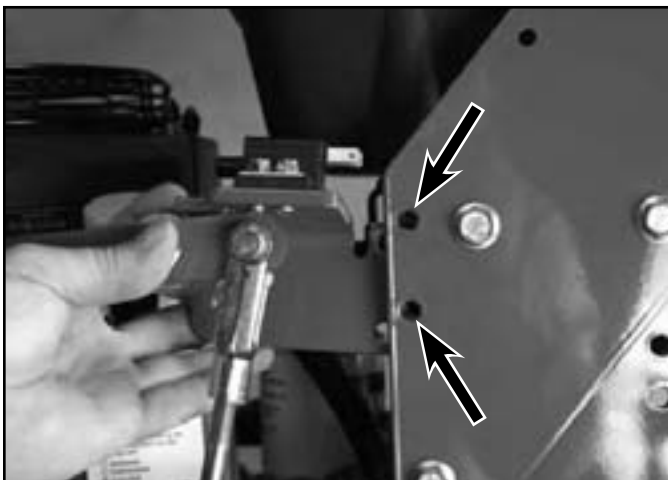


Fig 0677

PICT-2106

28. Slide the choke cable through the control panel and insert the choke control handle assembly into the control panel (Fig. 0679).



Fig 0679

PICT-2058

# LINKAGE

29. Install 2 screws and nuts securing the choke control assembly to the control panel (Fig. 0680).

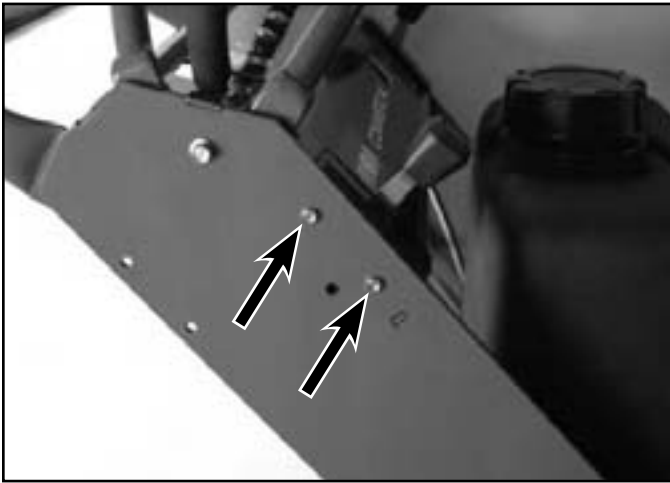


Fig 0680

PICT-2054

31. Install 2 screws and nuts securing the throttle control assembly to the control panel (Fig. 0682).

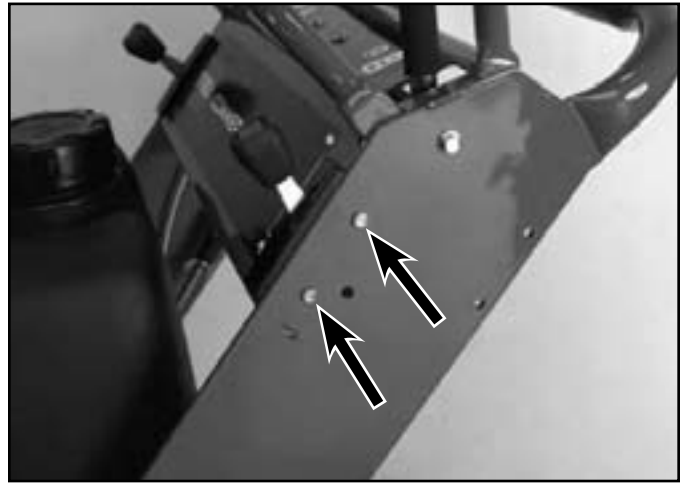


Fig 0682

PICT-2053

30. Slide the throttle cable through the control panel and insert the throttle control handle assembly into control panel (Fig. 0681).

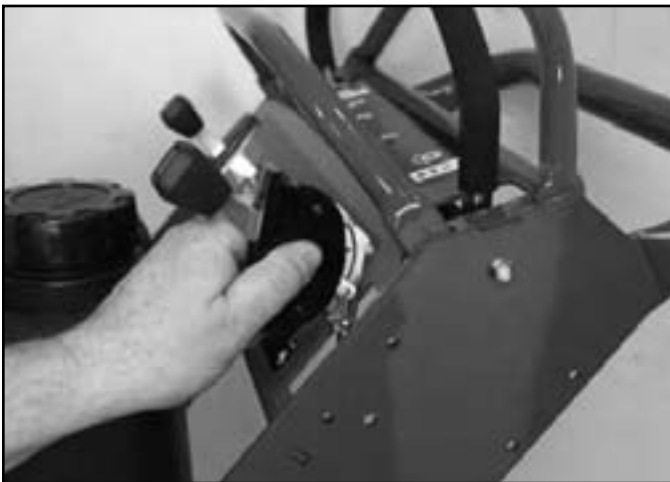


Fig 0681

PICT-2057

32. Route the throttle and choke cables around the hydrostatic pumps, to the left of the engine and up to the front of the engine (Fig. 0683).

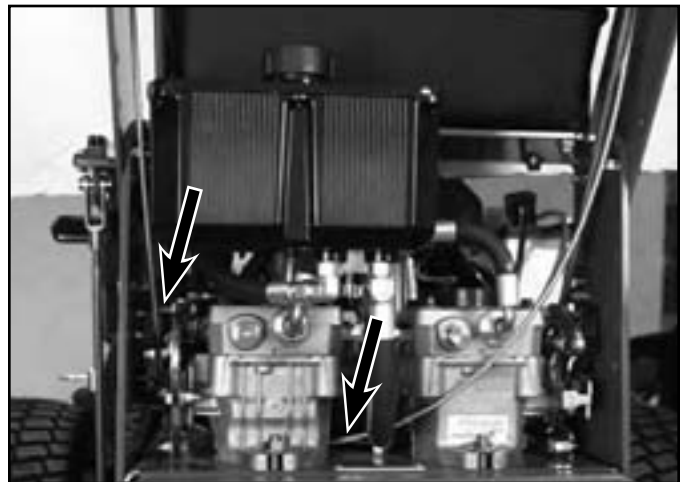


Fig 0683

PICT-2119

4

33. Hook the z-bend of the choke cable to the choke control lever and loosely clamp the outer housing of the choke cable into the cable clamp (Fig. 0684).



Fig 0684

PICT-0331

34. Move the choke control knob to the "open" position (Fig. 0685).



Fig 0685

PICT-0332a

35. Ensure the carburetor choke plate is fully open (Fig. 0686).

**Note:** The air filter has been removed to show the carburetor choke plate.



Fig 0686

PICT-0333

36. Pull up the outer housing of the choke cable until the inner wire has almost no slack and tighten the cable clamp bolt (Fig. 0687).



Fig 0687

PICT-0334



# LINKAGE

37. Move the choke control knob to the “choke” position (Fig. 0688).



Fig 0688

PICT-0336

38. Ensure the carburetor choke plate is fully closed (Fig. 0689).



Fig 0689

PICT-0335

39. Make sure the choke plate turns from the fully closed position to the fully open position when actuating the choke control knob.

40. Hook the z-bend of the throttle cable to the throttle control lever and loosely clamp the outer housing of the throttle cable into the cable clamp (Fig. 0690).



Fig 0690

PICT-0338

41. Move the throttle control knob to the “fast” position (Fig. 0691).



Fig 0691

PICT-0339

4

42. Pull up the outer housing of the throttle cable until the inner wire has almost no slack and tighten to cable clamp bolt (Fig. 0692).



Fig 0692

PICT-0341a

43. Move the throttle control knob to the "slow" position. Ensure the carburetor throttle control moves smoothly (Fig. 0693).



Fig 0693

PICT-0342

44. Install cable ties at the following locations (Fig. 0694 and Fig. 0695):

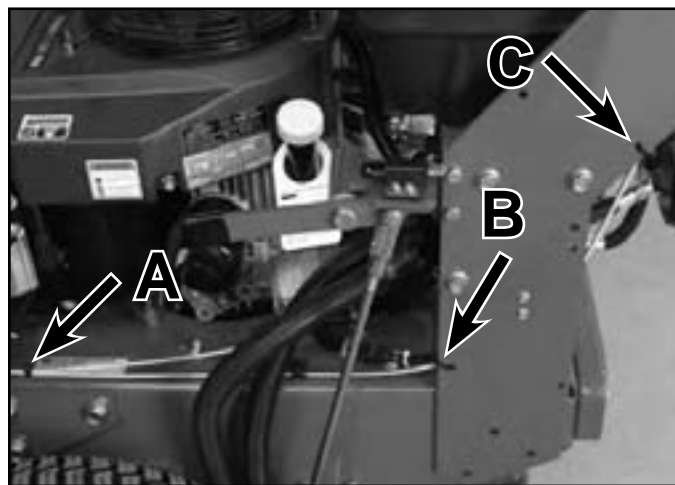


Fig 0694

PICT-2051

- A. Throttle/choke
- B. Throttle/neutral proximity switch wire/frame
- C. Throttle/frame

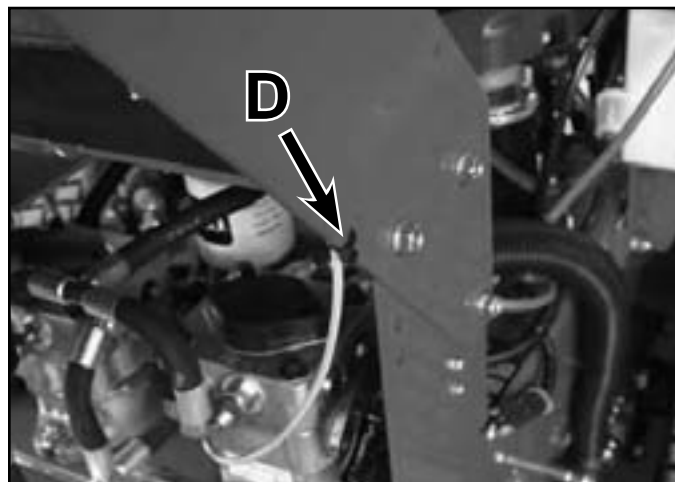


Fig 0695

PICT-2052

- D. Choke/frame

# LINKAGE

45. Route the harness up the left side of the frame and into the control panel.
46. Install a bolt and nut securing each of the relay harness connector blocks to the control panel (Fig. 0696).

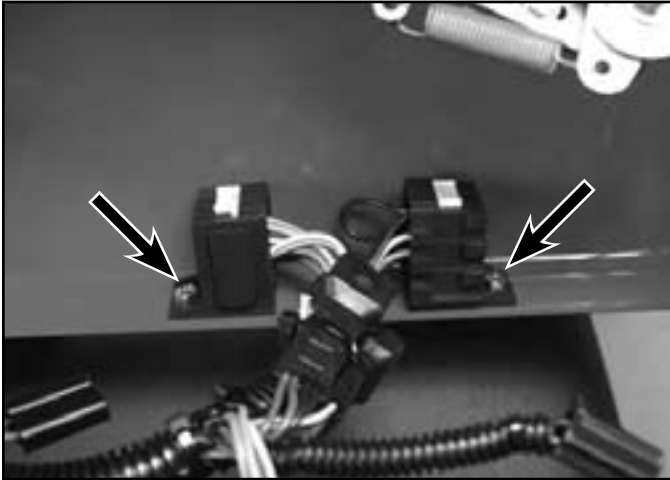


Fig 0696

PICT-2036

48. Plug the latching relay into the harness connector (Fig. 0698).



Fig 0698

PICT-2041a

47. Plug the kill relay into the harness connector (Fig. 0697).



Fig 0697

PICT-2035

49. Install the hour meter into the control panel (Fig. 0699).



Fig 0699

PICT-2039a

50. Install the locking tab onto the back side of the hour meter (Fig. 0700).



Fig 0700

PICT-2037

52. Plug the harness into the OPC switch (Fig. 0702).



Fig 0702

PICT-2028

51. Plug the harness into the hour meter (Fig. 0701).



Fig 0701

PICT-2029

53. Position the ignition switch into the control panel (Fig. 0703).



Fig 0703

PICT-2027

# LINKAGE

54. Install a lockwasher onto the ignition switch (Fig. 0704).



Fig 0704

PICT-2026

56. Plug the harness wire and connector into the ignition switch (Fig. 0706).



Fig 0706

PICT-2024

55. Install a nut securing the ignition switch to the control panel (Fig. 0705).



Fig 0705

PICT-2025

57. Install the PTO switch into the control panel (Fig. 0707).



Fig 0707

PICT-2023

4

58. Plug the harness into the PTO switch (Fig. 0708).



Fig 0708

PICT-2022

60. Install a cable tie securing the harness to the frame left of the fuel tank, above the parking brake (Fig. 0710).

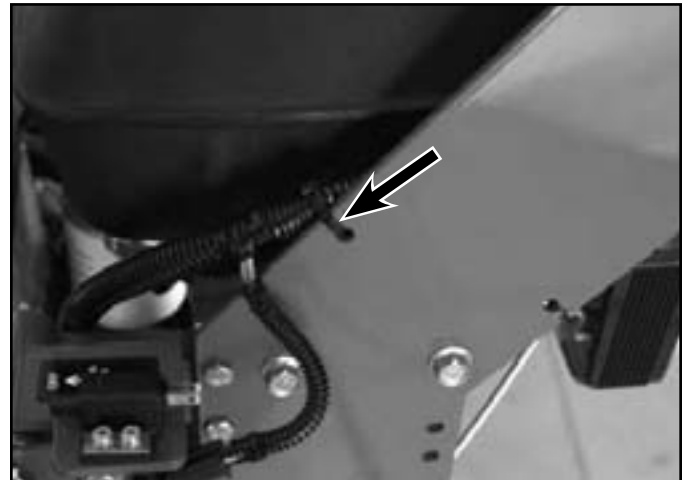


Fig 0710

PICT-2047

59. Plug the harness into the parking brake switch (Fig. 0709).



Fig 0709

PICT-2021

61. Install a cable tie securing the harness to the throttle cable just below throttle control handle, inside the frame (Fig. 0711).

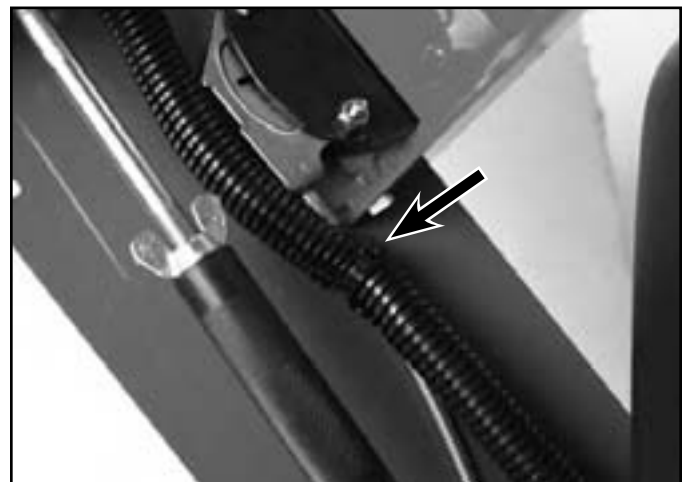


Fig 0711

PICT-2043

4

# LINKAGE

62. Position the control panel cover/manual tube assembly to the control panel (Fig. 0712).



Fig 0712

PICT-1923

63. Install 4 screws (2 on the left, 2 on the right) securing the control panel cover to the control panel (Fig. 0713).



Fig 0713

PICT-1921

64. Connect the negative battery terminal to the battery.

## Choke Cable Replacement

### Choke Cable Removal

1. Turn the engine off and remove the key from the ignition.
2. Loosen the clamp that secures the choke cable to the engine (Fig. 0714).



Fig 0714

PICT-0627

3. Remove the choke cable from the clamp and remove the z-bend from the choke control lever (Fig. 0715).

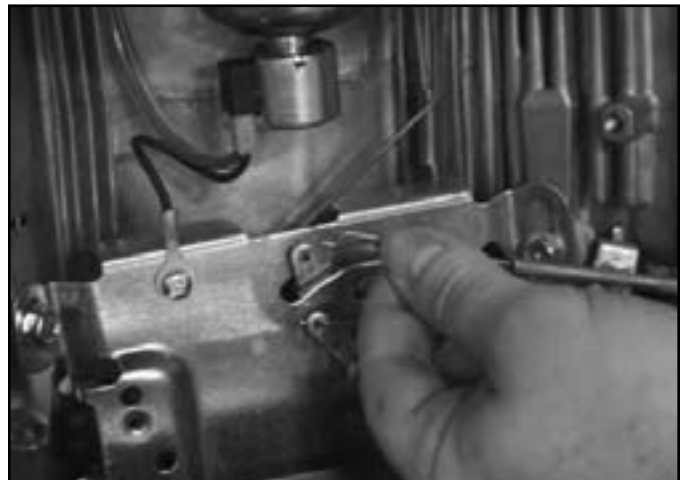


Fig 0715

PICT-0630

4. Remove the cable tie located above the left tire that secures the choke and throttle cable together (Fig 0716).



Fig 0716

PICT-0632

6. T2 Models: Remove the cable tie securing the choke cable to the right side of the control panel (Fig. 0718).

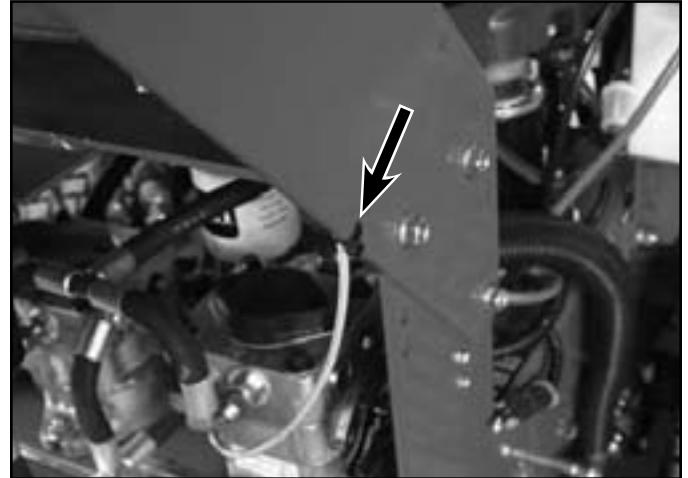


Fig 0718

PICT-2052

5. Pistol Grip & T-Bar Models: Remove the cable tie securing the choke cable to the right handle (Fig. 0717).



Fig 0717

PICT-0633

7. Remove the 2 screws and nuts securing the choke handle to the right handle (Fig. 0719).

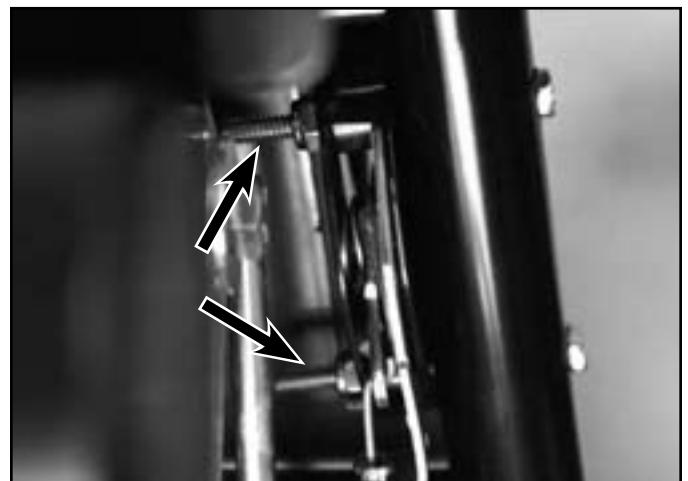


Fig 0719

PICT-0635



# LINKAGE

8. Remove the choke handle, cable and gasket assembly out through the control panel (Fig. 0720).



Fig 0720

PICT-0636a

## Choke Cable Installation

1. Slide the gasket onto the choke handle assembly (Fig. 0722).



Fig 0722

PICT-0638a

9. Remove the gasket from the handle assembly (Fig. 0721).



Fig 0721

PICT-0637a

2. Slide the choke cable through the opening on the control panel (Fig. 0723).



Fig 0723

PICT-0636a

4

3. Insert the handle into the opening in the control panel. Install 2 screws and nuts to secure the choke handle to the right handle bar (Fig. 0724).

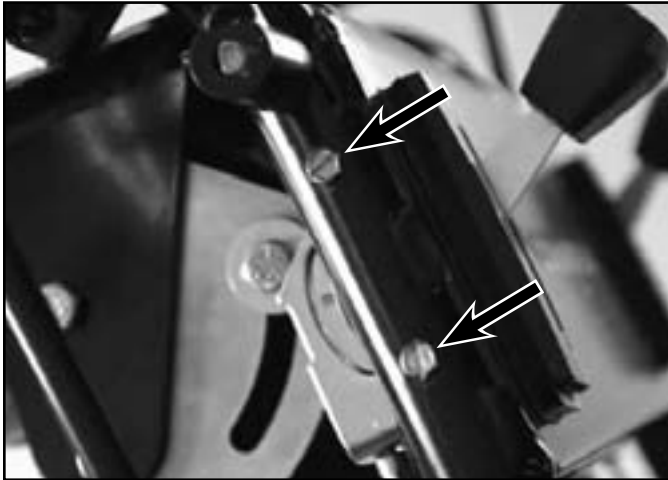


Fig 0724

PICT-0647

5. Pistol Grip & T2 models: Position the choke cable between the hydro pumps (Fig. 0726).

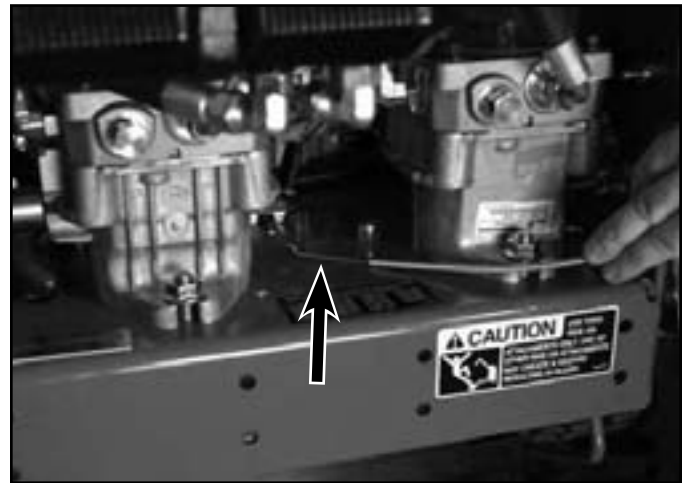


Fig 0726

PICT-0640

4

4. Pistol Grip models only: Continue routing the choke cable between the tracking rod and bracket (Fig. 0725).

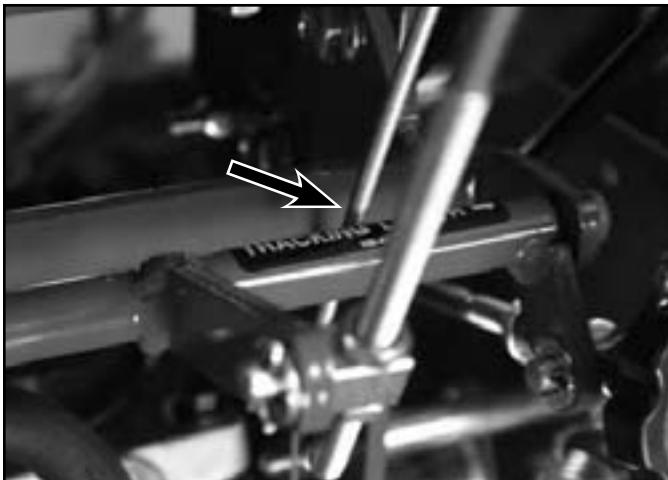


Fig 0725

PICT-0639

6. T-Bar models only: Continue routing the choke cable down under the right hand gear driveshaft (Fig. 0727).

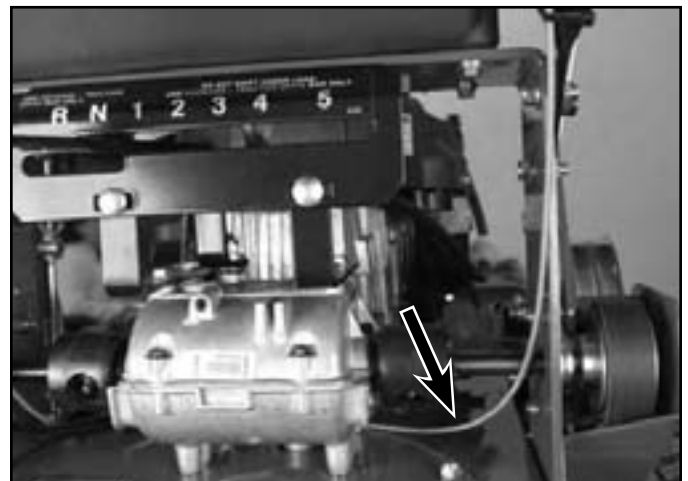


Fig 0727

PICT-1495a

# LINKAGE

7. Route the choke cable under the electrical harness, around the left side of the engine and up to the front side of the engine (Fig. 0728).

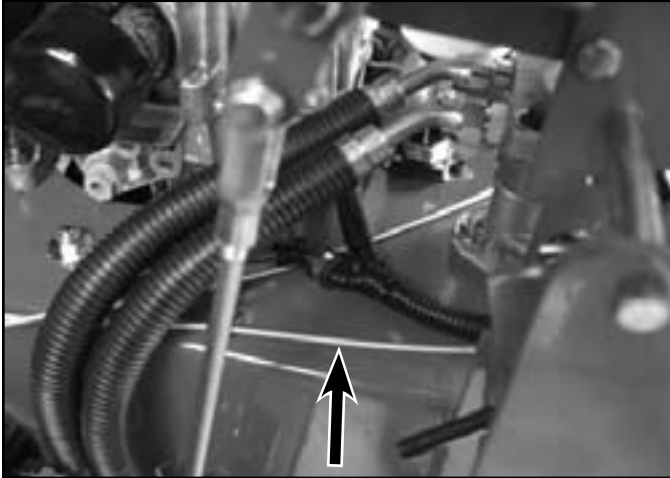


Fig 0728

PICT-0641

9. Slide the choke cable into the upper cable clamp and loosely clamp the outer cable housing (Fig. 0730).



Fig 0730

PICT-0627

8. Hook the choke cable z-bend to the choke control lever (Fig. 0729).

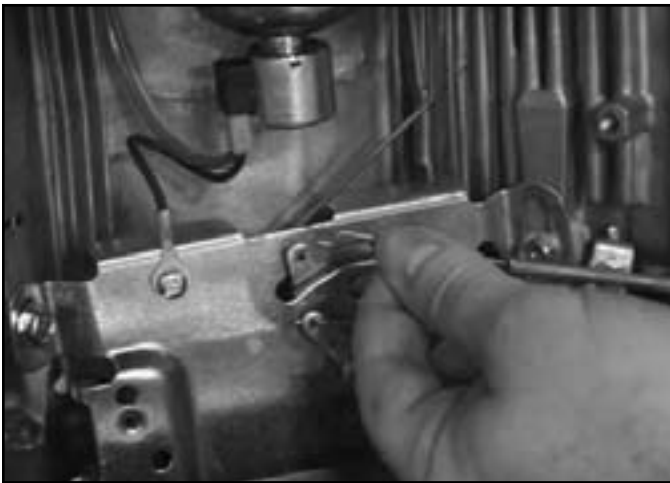


Fig 0729

PICT-0630

10. Move the choke control to the open position (Fig. 0731).



Fig 0731

PICT-0648

11. Make sure that the carburetor choke plate is fully open (Fig. 0732).

**Note:** The air filter has been removed to show the carburetor choke plate.



Fig 0732

PICT-0333

12. Pull on the outer cable housing until the inner wire has almost no slack. Tighten the cable clamp bolt (Fig. 0733).



Fig 0733

PICT-0331

13. Install a cable tie securing the choke cable to the throttle cable above the left tire. Cut off the excess cable tie (Fig. 0734).



Fig 0734

PICT-0684a

4

14. Pistol Grip & T-Bar Models: Install a cable tie securing the choke cable to the right handle bar. Cut off the excess cable tie (Fig. 0735).



Fig 0735

PICT-0651

# LINKAGE

15. T2 Models: Install a cable tie securing the choke cable to the right side of the control panel (Fig. 0736).

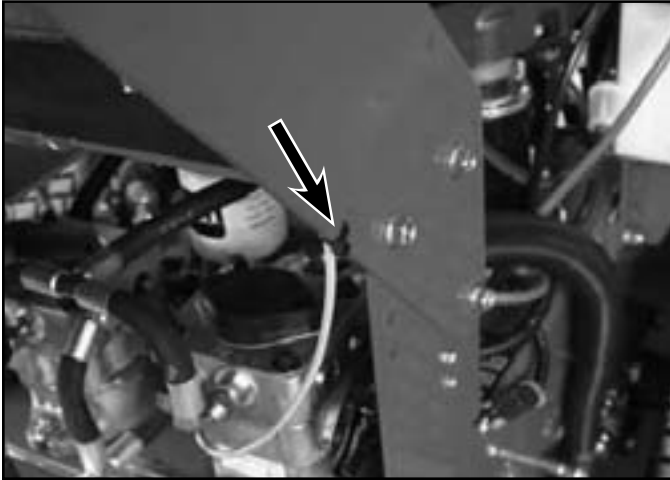


Fig 0736

PICT-2052

16. Make sure that the choke valve turns from the fully closed position to the fully open position when actuating the choke control handle.

## Throttle Cable Replacement

### Throttle Cable Removal

1. Turn the engine off and remove the key from the ignition.
2. Loosen the clamp that secures the throttle cable to the engine (Fig. 0737).



Fig 0737

PICT-0652

3. Remove the throttle cable from the clamp and remove the z-bend from the throttle control lever (Fig. 0738).



Fig 0738

PICT-0657

4. Remove the cable tie located above the left tire that secures the throttle and choke cable together (Fig 0739).



Fig 0739

PICT-0632

6. Slide the throttle cable out of the R-clamp (Fig. 0741).

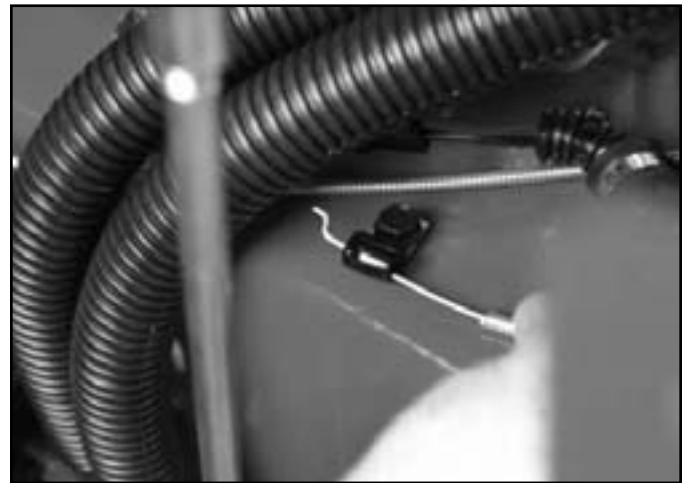


Fig 0741

PICT-0658

5. Loosen the screw securing the R-clamp to the frame, located behind the left tire (Fig. 0740).



Fig 0740

PICT-0661

7. Pistol Grip & T-Bar Models: Remove the cable tie securing the throttle cable to the left handle (Fig. 0742).



Fig 0742

PICT-0662

# LINKAGE

8. T2 Models: Remove the cable tie securing the harness to the throttle cable (Fig. 0743).

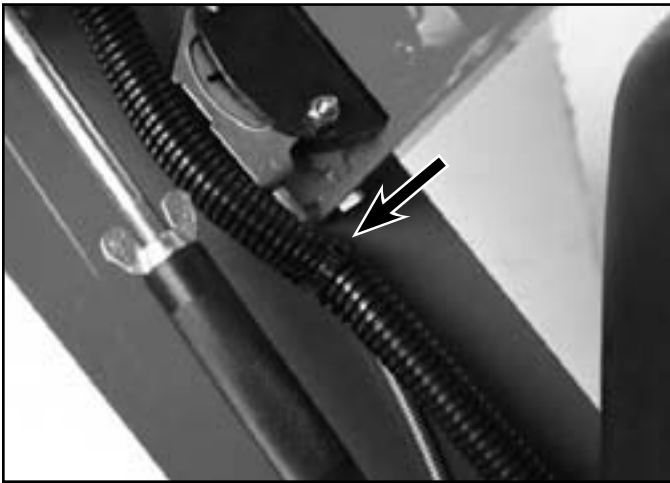


Fig 0743

PICT-2043

10. Remove the 2 screws and nuts securing the throttle handle assembly to the left handle (Fig. 0745).

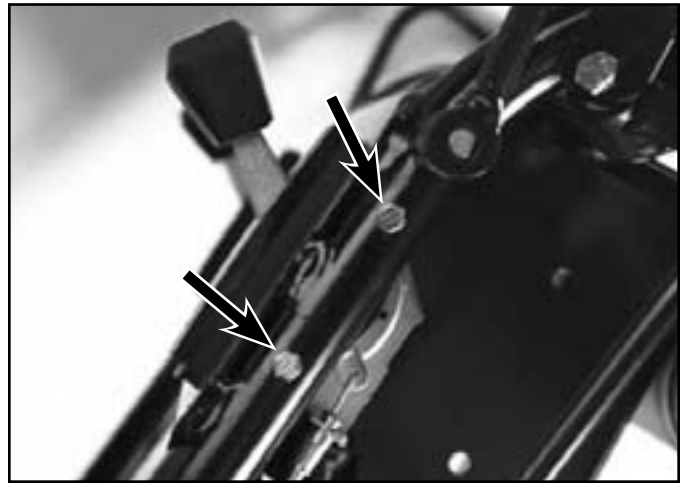


Fig 0745

PICT-0667

9. Cut the cable ties at the following locations (Fig. 0744).

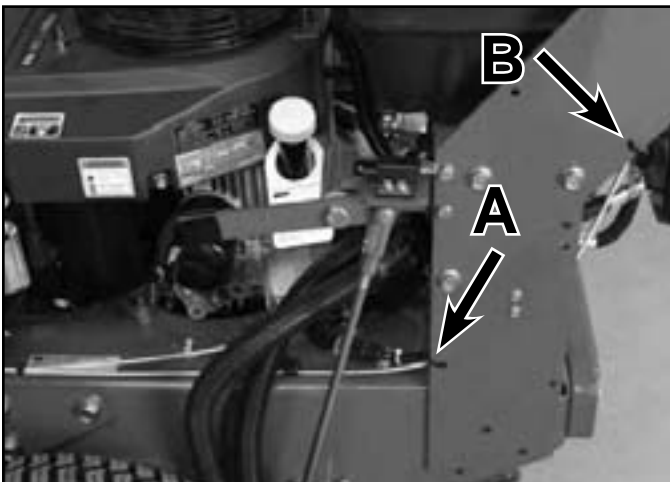


Fig 0744

PICT-2051

11. Remove the throttle handle cable and gasket assembly out through the control panel (Fig. 0746).



Fig 0746

PICT-0670a

- A. Throttle/neutral proximity switch wire/frame  
B. Throttle/frame

12. Remove the gasket from the handle assembly (Fig. 0747).

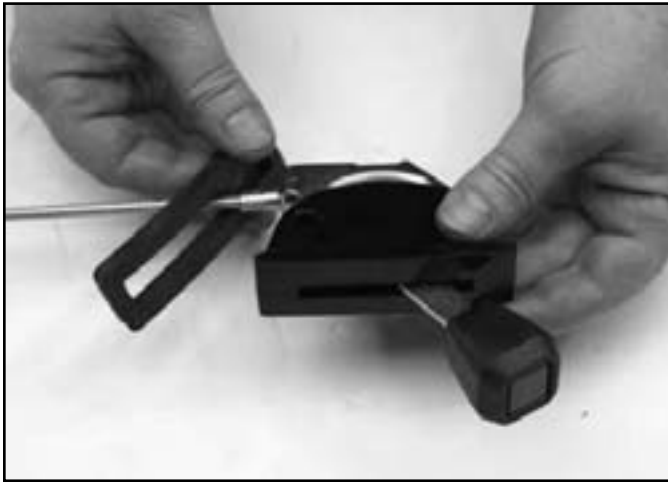


Fig 0747

PICT-0671

2. Slide the throttle cable through the opening on the control panel (Fig. 0749).



Fig 0749

PICT-0670a

## Throttle Cable Installation

1. Slide the gasket onto the throttle handle assembly (Fig. 0748).



Fig 0748

PICT-0672a

3. Pistol Grip models only: Route the throttle cable between the tracking rod and bracket (Fig. 0750).



Fig 0750

PICT-0673



# LINKAGE

4. Pistol Grip models only: Continue routing the throttle cable under the left hand control shaft between the left pump and frame (Fig. 0751).

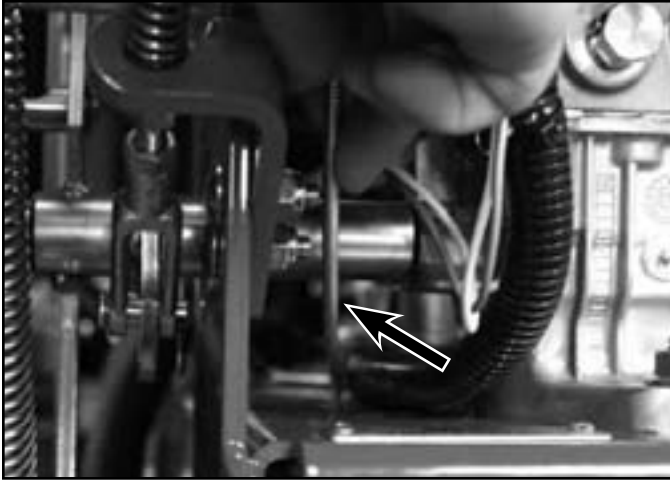


Fig 0751

PICT-0674

6. T2 Models: Route the cable between the left pump and frame (Fig. 0753).

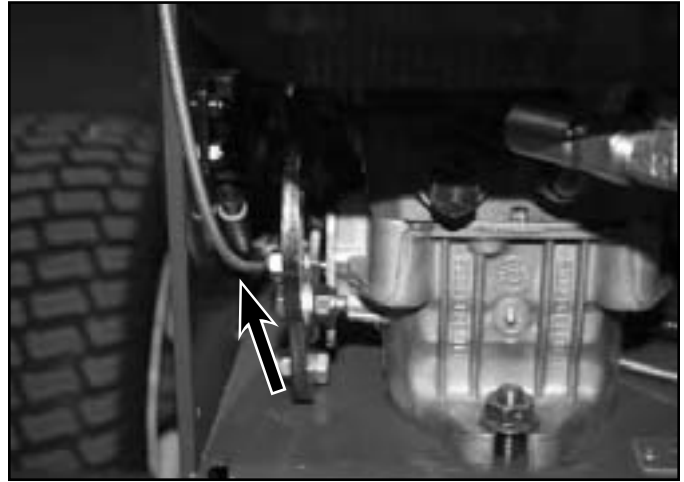


Fig 0753

IMG\_8008a

5. T-Bar models only: Continue routing the throttle cable under the left hand gear driveshaft (Fig. 0752).

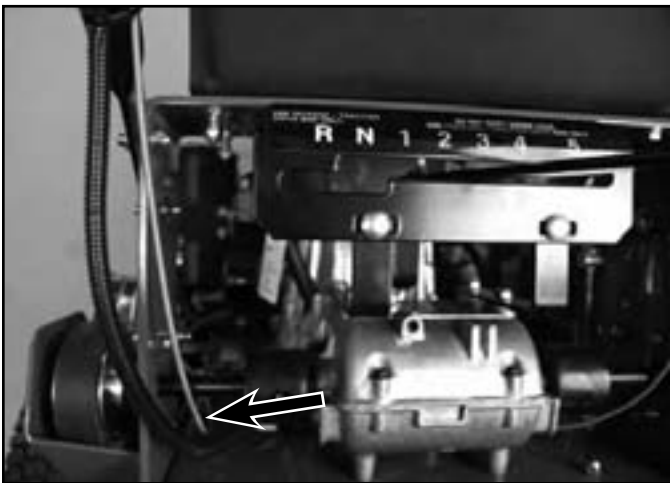


Fig 0752

PICT-1494

7. Slide the throttle cable through the R-clamp, around the left side of the engine and to the front of the engine (Fig. 0754).

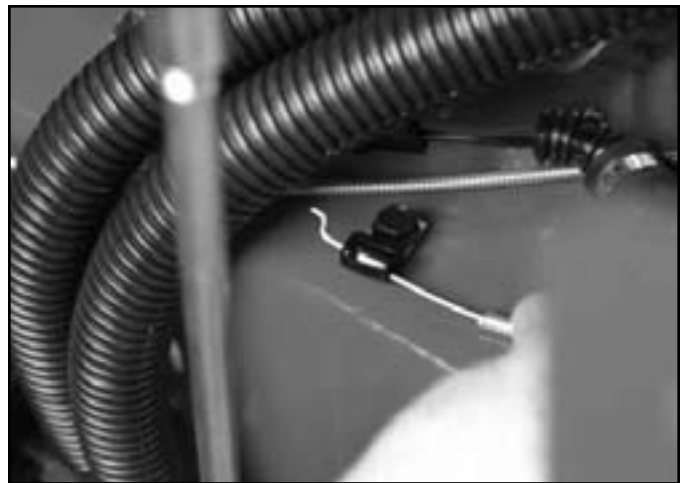


Fig 0754

PICT-0658

8. Insert the handle into the opening in the control panel. Install 2 screws and nuts to secure the throttle handle to the left handle bar (Fig. 0755).

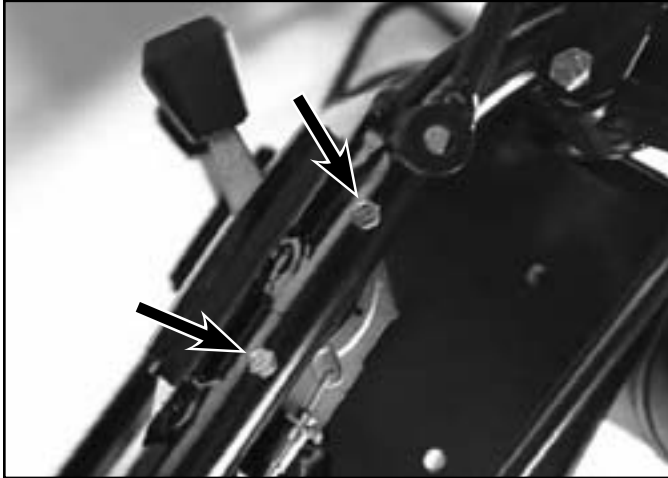


Fig 0755

PICT-0667

10. Slide the throttle cable into the upper cable clamp and loosely clamp the outer cable housing (Fig. 0757).



Fig 0757

PICT-0678

9. Hook the z-bend of the throttle control lever (Fig. 0756).



Fig 0756

PICT-0675

11. Move the throttle control to the fast position (Fig. 0758).



Fig 0758

PICT-0680

# LINKAGE

12. Pull on the outer cable housing until the inner wire has almost no slack. Tighten the cable clamp bolt (Fig. 0759).

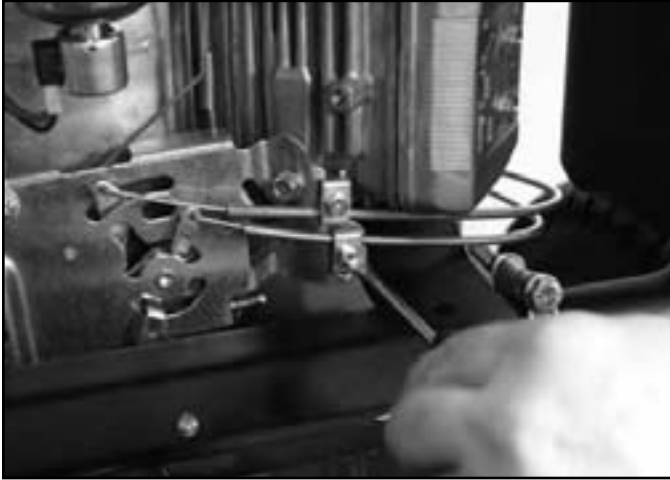


Fig 0759

PICT-0682

14. Install a cable tie securing the throttle cable to the choke cable above the left tire. Cut off excess (Fig. 0761).



Fig 0761

PICT-0684a

13. Install a cable tie securing the throttle cable to the left handle bar. Cut off excess (Fig. 0760).



Fig 0760

PICT-0683a

15. Tighten the R-clamp screw securing the throttle cable to the frame (Fig. 0762).



Fig 0762

PICT-0661

16. Move the throttle lever to the slow position. Make sure that the carburetor throttle valve moves smoothly to the closed position.

## Linkage Adjustments

### Speed Control Linkage Adjustment (Pistol Grip Hydro)

1. Disengage the PTO and set the parking brake.
2. Stop the engine and remove the key.
3. Move the speed control lever to the full forward position (Fig. 0763).



Fig 0763

PICT-0711a

4. Check the orientation of the tabs on the ends of the speed control crank. These tabs should be pointing straight down, at approximately the 6 o'clock position (Fig. 0764).

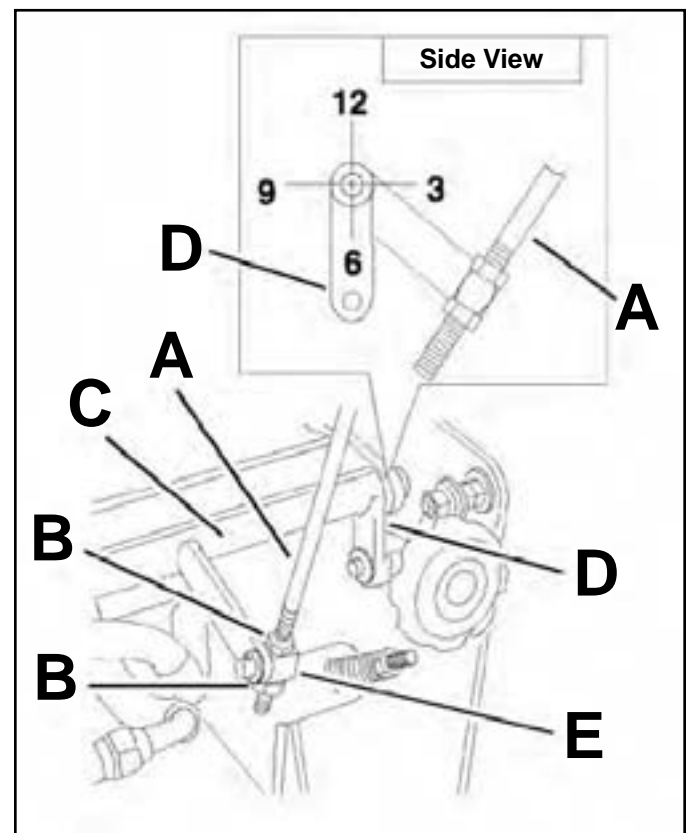


Fig 0764

fig. 44 G001963

- |                        |                             |
|------------------------|-----------------------------|
| A. Speed control rod   | D. Tabs, 6 o'clock position |
| B. Jam nut             | E. Swivel                   |
| C. Speed control crank |                             |

5. If adjustment is needed, loosen the nuts on both sides of the swivel on the speed control rod (Fig. 0764).
6. Adjust the swivel until the tabs are at the 6 o'clock position (Fig. 0764).
7. Tighten the nuts on both sides of the swivel (Fig. 0764).
8. Pull the speed control lever back to neutral.

# LINKAGE

9. Check the travel of the shift lever in the control panel slot. The shift lever travel should be approximately centered in the control panel slot (Fig. 0765).

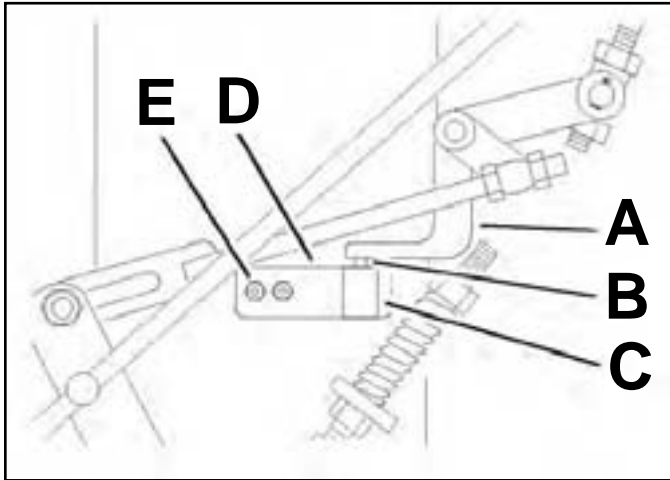


Fig 0765

fig. 45 G001964

- |                                |                              |
|--------------------------------|------------------------------|
| A. Actuating tab               | D. Switch plate              |
| B. 1/8" - 1/4" (3 - 6mm) space | E. Neutral bracket screw (2) |
| C. Safety switch               |                              |

10. If needed, adjust the swivel on the speed control rod to center the shift lever travel (Fig. 0764).
11. With the speed control lever in the neutral position, check to make sure the safety switch is depressed and there is 1/8" to 1/4" (3 to 6mm) space between the actuating tab and the safety switch (Fig. 0765).
12. To adjust the switch location, loosen the two neutral bracket screws holding the switch plate to the frame (Fig. 0765).
13. Adjust the switch up or down to obtain 1/8 to 1/4 inch (3 to 6 mm) space (Fig. 0765).
14. Tighten the two neutral bracket screws holding the switch plate (Fig. 0765).

## Temporary Neutral Stud Adjustment

**Note:** Perform the following procedure on both the left and right side.

1. Move the left and right neutral lock latches to the unlatched position.
2. Move the speed control lever to the neutral position (Fig. 0766).

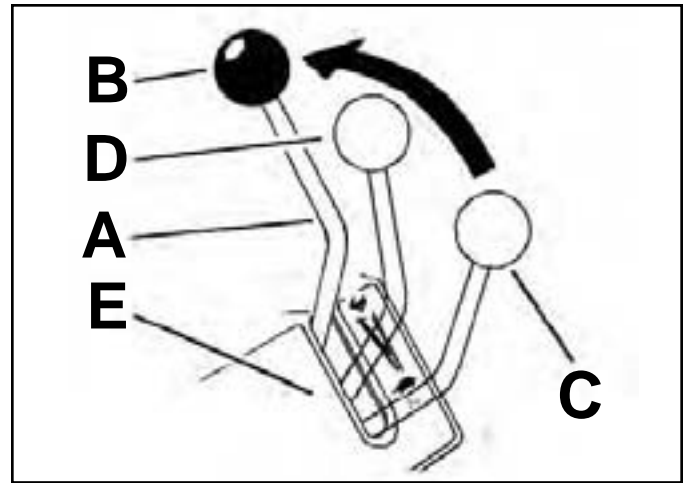


Fig 0766

fig. 43 G001962

- |                        |                          |
|------------------------|--------------------------|
| A. Speed control lever | D. Medium speed position |
| B. Full speed position | E. Control panel         |
| C. Neutral position    |                          |

- Loosen the nut against the yoke (Fig. 0767).

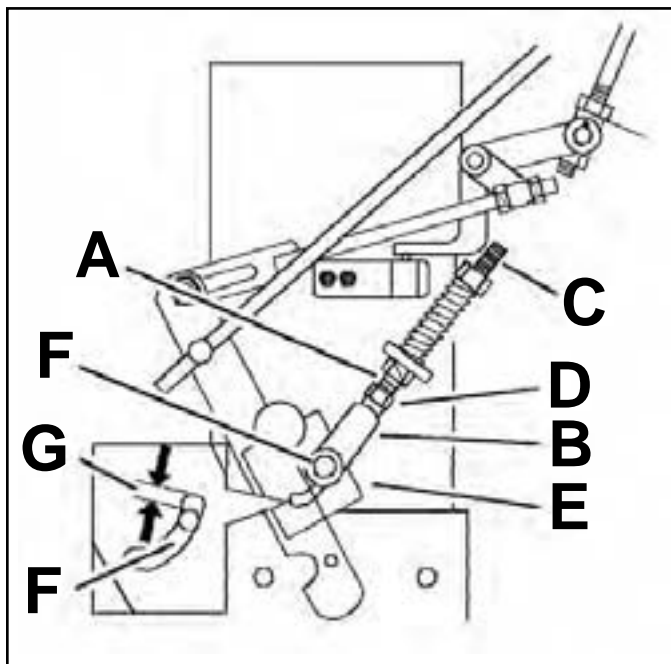


Fig 0767

fig. 46 G001965

- |                            |   |
|----------------------------|---|
| A. Neutral control linkage | E. Slot in control arm bracket                  |
| B. Yoke                    | F. Clevis pin                                   |
| C. Neutral stud            | G. Clevis pin does not contact the back of slot |
| D. Nut against yoke        |   |

- Adjust the length of the neutral stud and yoke assembly so the clevis pin does not contact the back of the slot in the control arm bracket (Fig. 0767).
- Tighten the nut against the yoke (Fig. 0767).

## Hydro Control Linkage Adjustment



Engine must be running so control linkage adjustments can be performed. Contact with moving parts or hot surfaces may cause personal injury.

Keep hands, feet, face, clothing and other body parts away from rotating parts, muffler and other hot surfaces.



Mechanical or hydraulic jacks may fail to support machine and cause a serious injury.

- Use jack stands when supporting machine.
- Do not use hydraulic jacks.

4

# LINKAGE

## Adjusting the Left Side Linkage (Pistol Grip)

1. Disengage the PTO and set the parking brake.
2. Stop the engine and wait for all moving parts to stop before leaving the operating position.
3. Support the rear of the machine on jack stands so the drive wheels are off of the ground.
4. Disengage the parking brake.
5. Start the engine and move the throttle to the full throttle position.
6. Press and hold the OPC levers down.

**Note:** The OPC levers must be held down whenever the speed control lever is out of the neutral position or the engine will kill.

7. Place the left drive lever in the full forward position.
8. Place the speed control lever in the neutral position.

9. Loosen the front adjusting nut on left hydro control linkage as shown in (Fig. 0768).

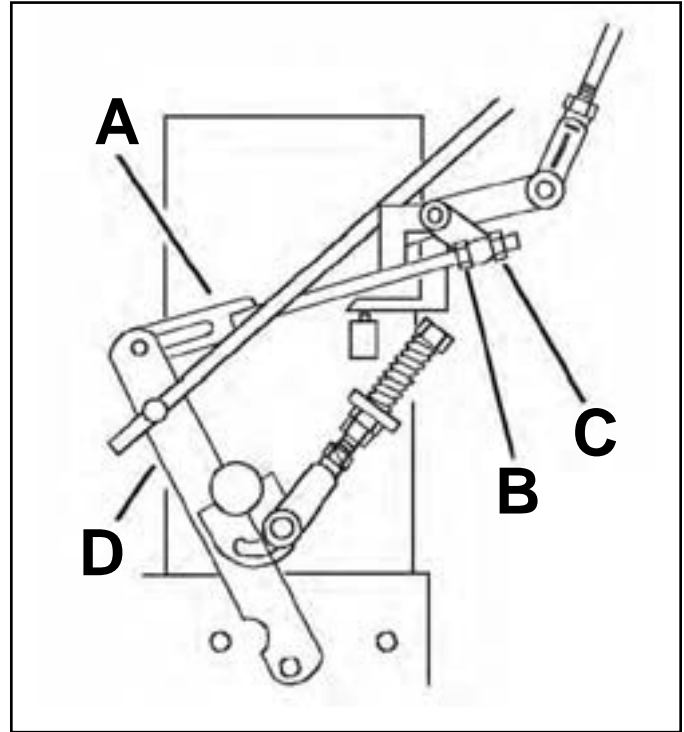


Fig 0768

fig. 48 G001519

- A. Hydro control linkage      C. Rear adjusting nut  
B. Front adjusting nut      D. Control arm

10. Turn the rear adjusting nut counterclockwise until wheel rotates forward (Fig. 0768).
11. Turn the rear adjusting nut clockwise 1/4 of a turn. Then move the speed control lever forward and back to neutral. Repeat this until left wheel stops rotating forward (Fig. 0768).



**Electrical system will not perform proper safety shut off with Operator Presence Control (OPC) levers fastened in place.**

- **Make sure Operator Presence Control (OPC) levers are working when adjustment is completed.**
- **Never operate this unit with Operator Presence Control (OPC) levers fastened in place.**

**Note:** Make sure flat part of linkage is perpendicular to the pin of swivel (Fig. 0769).

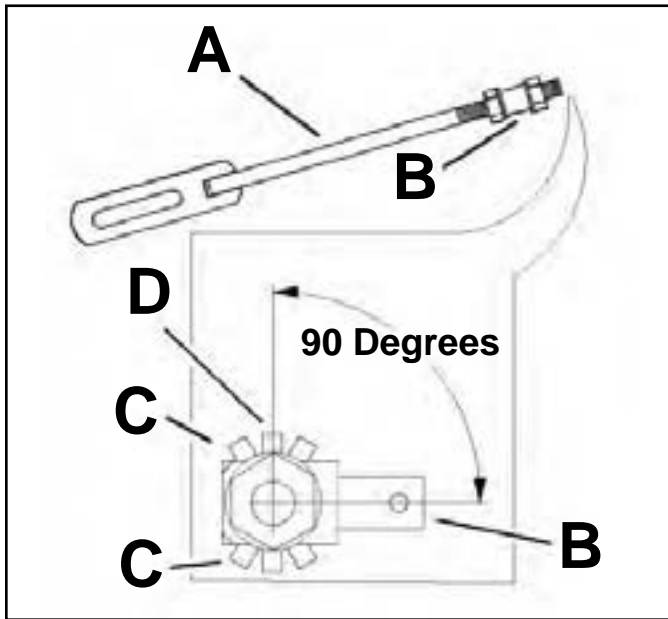


Fig 0769

fig. 47 G001735

- A. Hydro control linkage
- B. Swivel
- C. Incorrect position
- D. Correct position

12. After adjusting the left hydro control linkage, move the speed control lever forward and then back to the neutral position.
13. Make sure the speed control lever is in the neutral position and the tire does not rotate.
14. Repeat the adjustment if needed.

**Note:** If inconsistent neutral occurs, check to be sure both springs are properly tightened on the speed control lever under the console, especially the rear pivot spring. Repeat above adjustments if necessary (Fig. 0770).

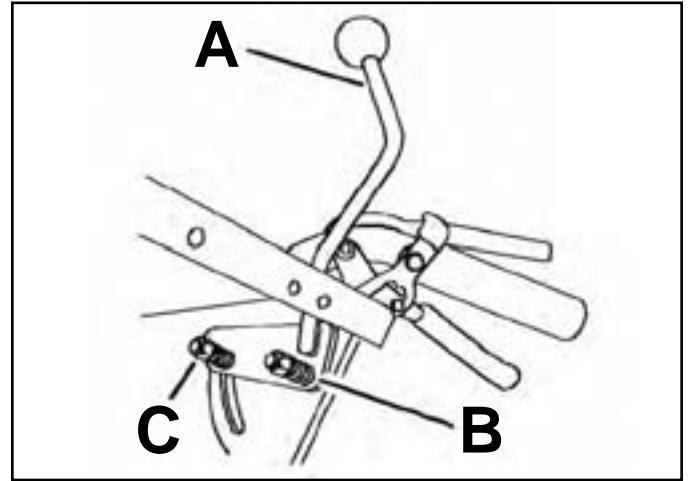


Fig 0770

fig. 49 G001520

- A. Speed control lever
- B. Rear pivot spring
- C. Spring

15. Tighten the front nut on left hydro control linkage shown in Fig. 0768.



# LINKAGE

## Adjusting the Right Side Linkage (Pistol Grip)

1. With the machine on jack stands, place the speed control lever in the neutral position.
2. Place the right drive lever in the full forward position.
3. Hold the OPC levers down.

**Note:** The OPC levers must be held down whenever the speed control lever is out of the neutral position or the engine will kill.

4. Adjust the right side linkage by turning the quick track knob counterclockwise until the tire begins to rotate forward (Fig. 0771).

5. Turn the knob clockwise 1/4 of a turn. Then move the speed control forward and back to neutral. Repeat this until right wheel stops rotating forward (Fig. 0771).
6. If necessary, adjust the length of spring to 1" (26mm) between the washers (Fig. 0771).
7. Adjust the spring length by turning the nut at the front of spring (Fig. 0771).
8. After adjusting the right hydro control linkage, move the speed control lever forward and then back to the neutral position.
9. Make sure the speed control lever is in the neutral position and the tire does not rotate.
10. Repeat adjustment if needed.

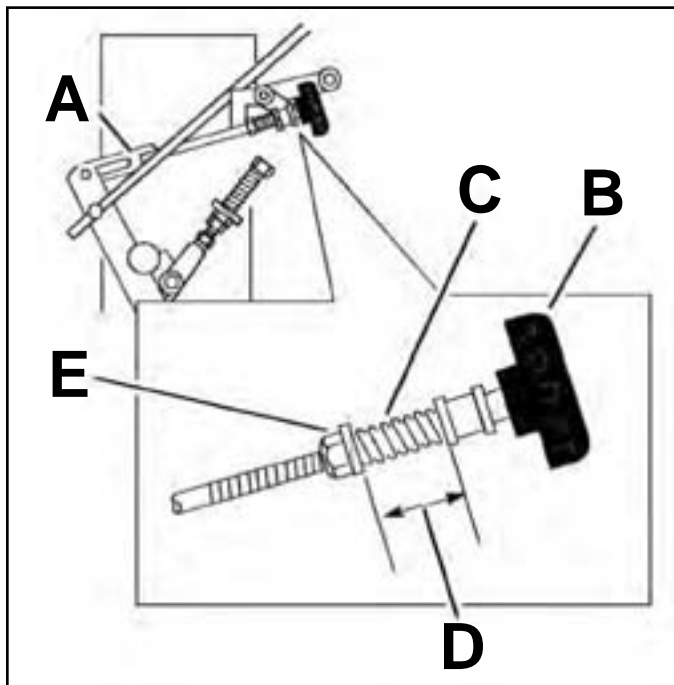


Fig 0771

fig. 50 G001968

- |                          |                           |
|--------------------------|---------------------------|
| A. Hydro control linkage | D. 1" (26mm)              |
| B. Quick track knob      | E. Nut in front of spring |
| C. Spring                |                           |

## Neutral Stud Adjustment (Pistol Grip)



Electrical system will not perform proper safety shut off with Operator Presence Control (OPC) levers held in place.

- Make sure Operator Presence Control (OPC) levers are working when adjustment is completed.
- Never operate this unit with Operator Presence Control (OPC) levers held in place.



**Mechanical or hydraulic jacks may fail to support machine and cause a serious injury.**

- Use jack stands when supporting machine.
- Do not use hydraulic jacks.

1. With the machine on jack stands, place the speed control lever in the neutral position.
2. Hold the OPC levers down.

**Note:** The OPC levers must be held down whenever the speed control lever is out of the neutral position or the engine will kill.

3. Adjust the left and right neutral stud until the clevis pin in the yoke touches the back end of the slot in the control arm (Fig. 0772).

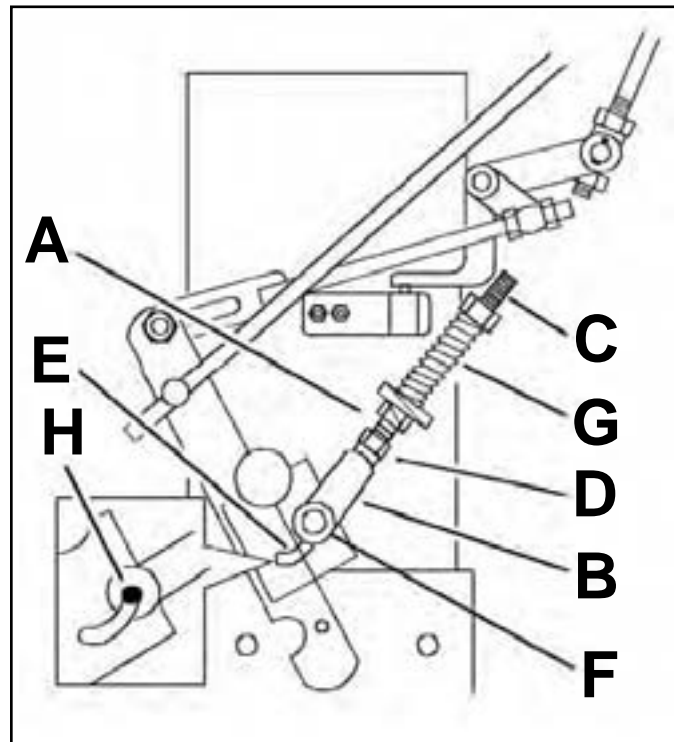


Fig 0772

fig. 51 G001969

- |                            |                                |
|----------------------------|--------------------------------|
| A. Neutral control linkage | E. Slot in control arm bracket |
| B. Yoke                    | F. Clevis pin                  |
| C. Neutral stud            | G. Spring                      |
| D. Nut                     | H. Back end of slot            |

4

# LINKAGE

4. Move the speed control lever to the full forward position.
5. Squeeze one drive lever until an increased resistance is felt. This is neutral position. This is where the clevis pin in the yoke comes to the back end of the slot in the control arm bracket.

**Note: Make sure you have not reached the end of the neutral lock slot. If you have, shorten the control lever linkage. Refer to Adjusting the Control Rod.**

6. If the wheel turns while holding the drive lever in neutral, the neutral stud needs to be adjusted (Fig. 0772). If wheel stops then go to step 11.
7. Loosen the nut against the yoke (Fig. 0772).
8. Make adjustments while holding the respective drive wheel control in the neutral position (increased resistance) (Fig. 0772).
9. Turn the neutral stud approximately 1/4 turn clockwise if the wheel is turning in reverse or turn the bolt approximately 1/4 turn counterclockwise if the wheel is turning forward (Fig. 0772).
10. Release the drive lever to the forward drive position and squeeze back into the neutral position. Check to see if the wheel stops. If not, repeat the above adjustment procedure.
11. After adjustment is made, tighten the nut against the yoke.
12. Repeat this procedure for the opposite side.

## Adjusting the Control Rod (Pistol Grip)

### Checking the Control Rod

1. With rear of machine still on jack stands and engine running at full throttle, move the speed control lever to "medium" speed position.

**Note: The OPC levers must be held down whenever the speed control lever is out of the neutral position or the engine will kill.**

2. Move the respective drive lever upward until it reaches the neutral position and engage neutral locks.
3. If the tire rotates in either direction, the length of the control rod will need to be adjusted.

### Adjusting the Control Rod

1. Adjust the rod length by releasing the drive lever and removing the hairpin cotter pin and clevis pin. Rotate the rod in the rod fitting (Fig. 0773).

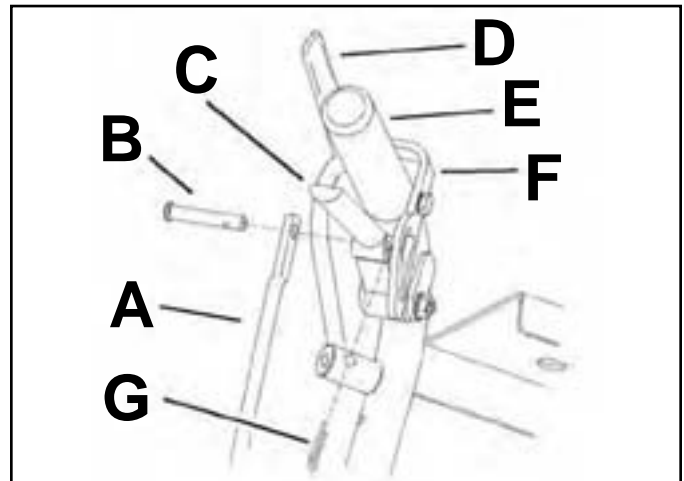


Fig 0773

fig. 52 G001733

- |                                    |                       |
|------------------------------------|-----------------------|
| A. Control rod                     | E. Left handle shown  |
| B. Clevis pin                      | F. Neutral lock       |
| C. Drive lever                     | G. Hairpin cotter pin |
| D. Operator Presence Control (OPC) |                       |

2. Lengthen the control rod if the tire is turning in reverse and shorten the rod if the tire is turning forward.
3. Rotate the rod several turns if the tire is rotating fast. Then, adjust the rod in 1/2 turn increments.
4. Place the clevis pin into the drive lever (Fig. 0773).
5. Release and engage neutral lock checking that the tire does not rotate (Fig. 0774). Continue adjusting until the tire does not rotate.

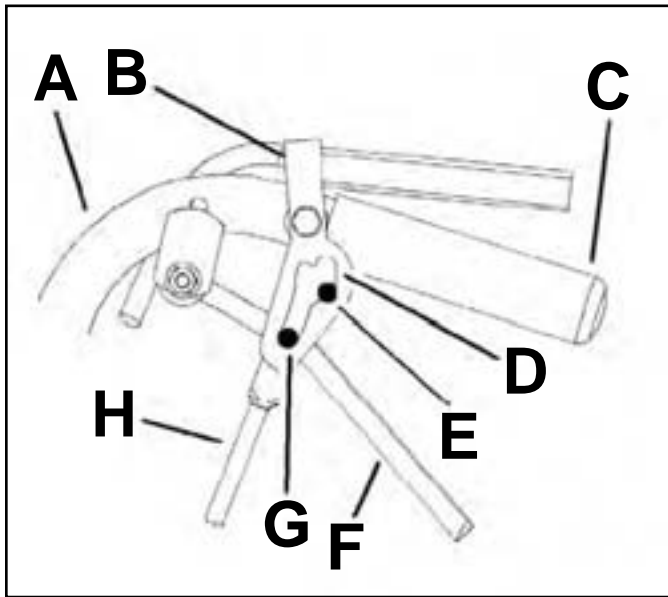


Fig 0774

fig. 53 G001732

- |                      |                       |
|----------------------|-----------------------|
| A. Handle            | E. Neutral position   |
| B. Neutral lock      | F. Drive lever        |
| C. Handle            | G. Full speed forward |
| D. Neutral lock slot | H. Control rod        |

6. Install the hairpin cotter pin between the drive lever and the neutral lock and into the clevis pin (Fig. 0773).

**Note: Make sure the clevis pin is inserted into the neutral lock.**

7. Repeat this adjustment for the opposite side.

## Tracking Adjustment (Pistol Grip)

1. Remove machine from any jack stands.
2. Check the rear tire pressure. Refer to Specifications for proper tire pressure.
3. Start and run the machine. Observe the tracking on a level, smooth, hard surface such as concrete or asphalt.
4. If the unit tracks to one side or the other, turn the quick track knob. Turn the knob right to steer right and turn the knob left to steer left (Fig. 0775).

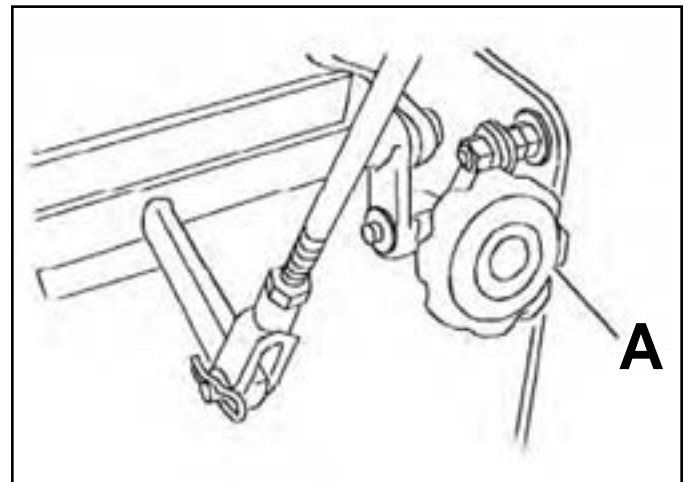


Fig 0775

fig. 54 G001523

- A. Quick track knob

# LINKAGE

## Tracking Adjustment (T-2)

1. If the machine does not track straight, adjustment is required.
2. Check the rear tire pressure. Refer to Specifications for proper tire pressure.
3. Loosen the wing nuts on the right control rod and rotate the turnbuckle in or out to ensure the right side control lever is centered in the neutral lock position. Secure the turnbuckle in position with the wing nuts (Fig. 0776).

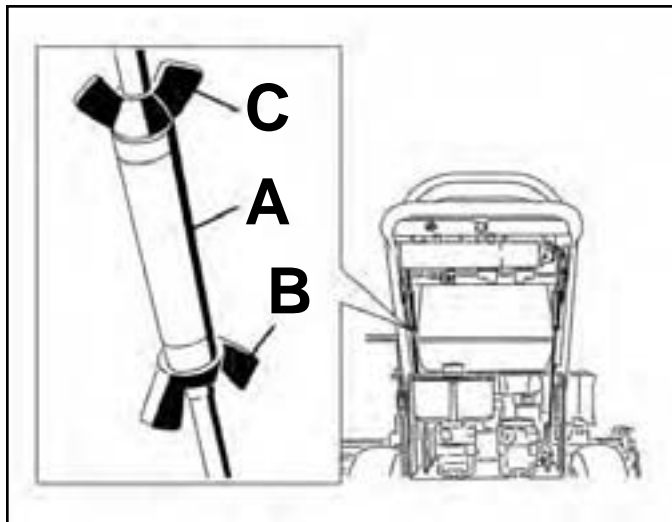


Fig 0776 fig. 36 G006085

- A. Turnbuckle
- B. Bottom wing nut
- C. Top wing nut (left hand threaded)

4. Loosen the wing nuts on the left control rod and rotate the turnbuckle in or out to change the tracking. Secure the turnbuckle in position with the wing nuts (Fig. 0776).
5. Check for proper tracking. Adjust the left control rod if a change is needed.

## Neutral Adjustment (T-2)

**Important:** Ensure the tracking of the mower is correct after adjusting the motion control levers. After adjusting the tracking, the motion control levers may not align exactly front to back (Fig. 0777).

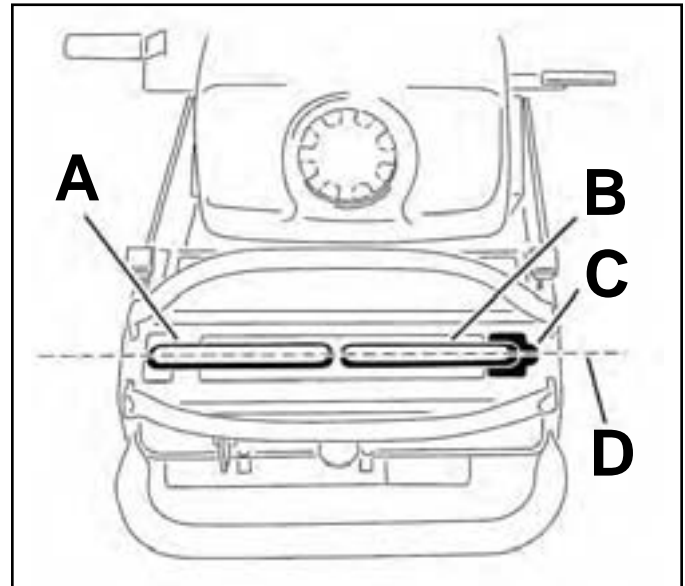


Fig 0777 fig. 52 G006096

- A. Left motion control lever
- B. Right motion control lever
- C. Neutral locked position
- D. Align the control levers front to back here

If the motion control levers do not align front to back, or the right side control lever does not move easily into the neutral lock position, adjustment is required. Adjust each lever and control rod separately.

**Note: Adjust the horizontal alignment before the front to back alignment.**

1. After the horizontal alignment is finished, check the front to back alignment (Fig 0778).

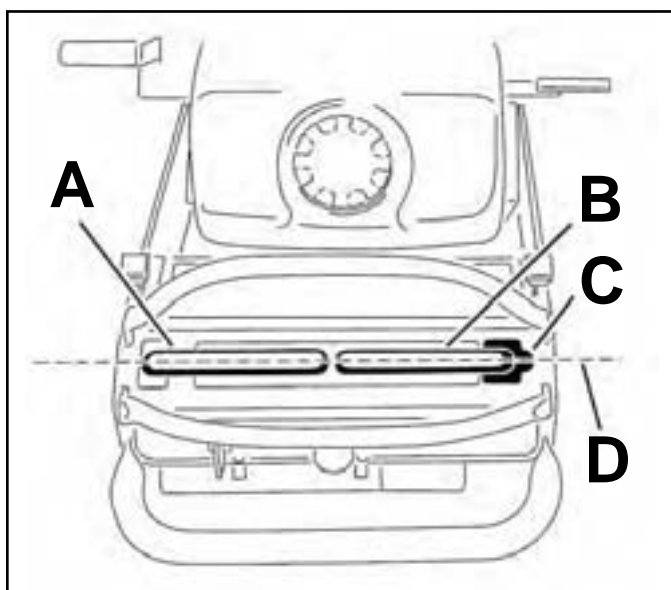


Fig 0778 fig. 52 G006096

- |                               |  |
|-------------------------------|--|
| A. Left motion control lever  | C. Neutral locked position                     |
| B. Right motion control lever | D. Align the control levers front to back here |

2. Loosen the wing nuts on the right control rod and rotate the turnbuckle in or out to ensure the right side control lever is centered in the neutral lock position. Secure the turnbuckle in position with the wing nuts (Fig. 0779).

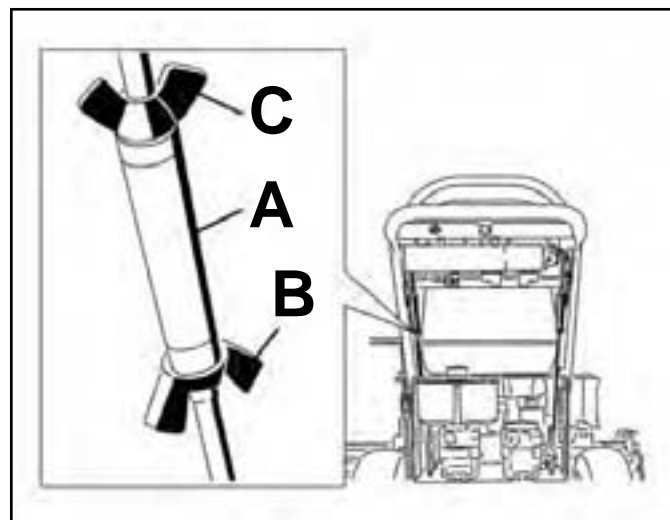


Fig 0779 fig. 36 G006085

- |                    |                                      |
|--------------------|--------------------------------------|
| A. Turnbuckle      | C. Top wing nut (left hand threaded) |
| B. Bottom wing nut |                                      |

3. Loosen the wing nuts on the left control rod and rotate the turnbuckle in or out to change the tracking. Secure the turnbuckle in position with the wing nuts (Fig. 0779).
4. Check for proper tracking. Adjust the left control rod if a change is needed. Refer to "Tracking Adjustment (Pistol Grip)" on page 4-129 or "Tracking Adjustment (T-2)" on page 4-130.

# LINKAGE

## Control Bar Adjustment (T-Bar)

1. Initially adjust the control rods so that 2 1/4" (5.715cm) of thread extends beyond the trunnion fittings (Fig. 0780).



Fig 0780

PICT-5303

2. The control bar and upper handle must be parallel when in the relaxed drive and brake positions (Fig. 0781).



Fig 0781

PICT-5332a

3. Engage the control bar (Fig. 0782).



Fig 0782

PICT-5314a

4. Using a ruler, measure the travel distance of the pulley while releasing and engaging the control bar. The travel distance should be approximately 3/4" (19mm) (Fig. 0783).

**Note:** If the pulley travel is more the 3/4" (19mm), the brakes must be adjusted. Refer to "Checking the Brake", page 5-9.

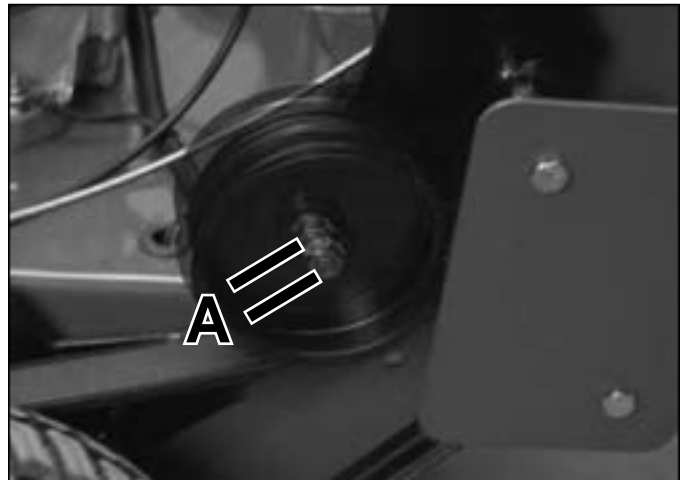


Fig 0783

PICT-5324a & 5326a

- A. 3/4" (19mm)

5. Engage the Parking Brake (Fig. 0784).

**Note:** The parking brake lever should swing into a snug position against the upper handle while pulling back on the upper control bar.



Fig 0784

PICT-5311a

6. If adjustment is required, refer to “Adjusting the Brake”, page 5-10.
7. Adjust the control rods so there is a 1” to 1 1/4” (2.54 to 3.175cm) gap between the upper control bar and the fixed bar with the wheel drive fully engaged (Fig. 0785).

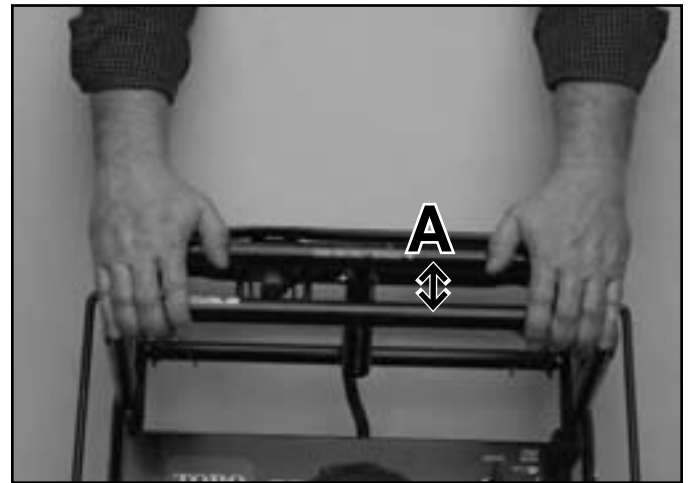


Fig 0785

PICT-5333a

- A. 1” to 1-1/4”



**4**

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## Engine Removal - Pistol Grip Hydro

1. Turn the engine off and remove the key from the ignition.
2. Turn the fuel valve to the off position (Fig. 0786).



Fig 0786

PICT-0247a

3. Move the negative battery terminal boot and disconnect the negative (black) battery cable from the battery (Fig. 0787).



Fig 0787

PICT-0250

4. Move the positive battery terminal boot and disconnect the positive (red) battery cable from the battery (Fig. 0788).



Fig 0788

PICT-0252

5. Remove 1 of the 2 nuts retaining the battery hold down strap and battery hold downs to the battery tray (Fig. 0789).



Fig 0789

PICT-0254

5

# ENGINE

6. Remove the battery hold down plate and 2 battery hold downs from the battery tray (Fig. 0790).



Fig 0790

PICT-0256

8. Remove the bolt that secures the fuel line R-clamp to the engine (Fig. 0792).



Fig 0792

PICT-0259

7. Remove the battery from the battery tray (Fig. 0791).



Fig 0791

PICT-0257

9. Slide the hose clamp off the fuel line where it connects to the fuel pump (Fig. 0793).



Fig 0793

PICT-0262

5

10. Remove the fuel line from the fuel pump. Drain the fuel into a suitable container (Fig. 0794).



Fig 0794

PICT-0264

12. Place a drain pan below the drain hose. Rotate the oil drain valve to allow the engine oil to drain into the drain pan (Fig. 0796).



Fig 0796

PICT-0266

11. Attach the oil drain hose to the oil drain valve (Fig. 0795).



Fig 0795

PICT-0265

13. When the oil has drained completely, close the drain valve and remove the drain hose.

14. Unplug the clutch from the harness connector (Fig. 0797).



Fig 0797

PICT-0547a

# ENGINE

15. Push the grommet and clutch plug through the chassis frame to the underside of the machine (Fig. 0798).



Fig 0798

PICT-0277

17. Roll the PTO drive belt off the center mower deck pulley (Fig. 0800).



Fig 0800

PICT-0283

16. Remove the carrier frame cover (Fig. 0799).



Fig 0799

PICT-0280

18. Raise the machine so that the underside of the chassis can be accessed.

19. Remove the trailing shield from the chassis by first removing the left end of the shield rod (bent at a 45° angle) from the hole in the chassis and then remove the right side of the shield rod (bent at a 90° angle) from the right side of the chassis (Fig. 0801).



Fig 0801

PICT-0273

5

20. Remove the idler arm spring from the spring post (Fig. 0802).

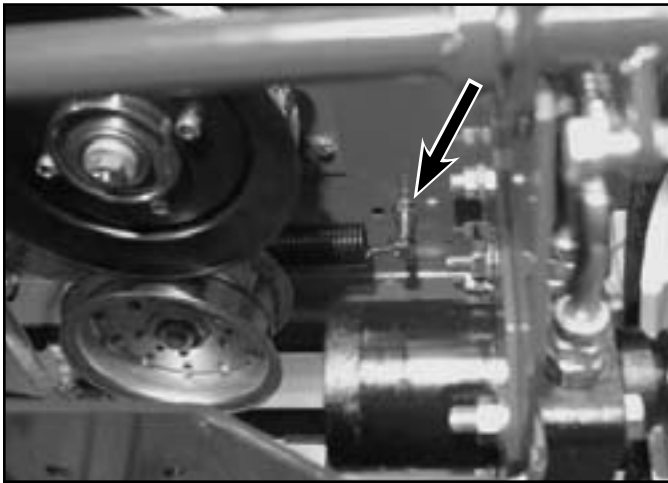


Fig 0802

PICT-0291a

22. Remove the bolt, nut, 2 washers and spacer securing the brake clutch strap to the underside of the chassis (Fig. 0804).



Fig 0804

PICT-0295

21. Remove the belt from the clutch (Fig. 0803).



Fig 0803

PICT-0294

23. Loosen the clutch bolt (Fig. 0805).



Fig 0805

PICT-0297a

# ENGINE

24. Remove the bolt, 2 spring washers and flat washer securing the clutch to the engine crankshaft. Lower the clutch off the engine crankshaft (Fig. 0806).



Fig 0806

PICT-0299

26. Remove the hydro drive belt from around the engine crankshaft pulley (Fig. 0808).

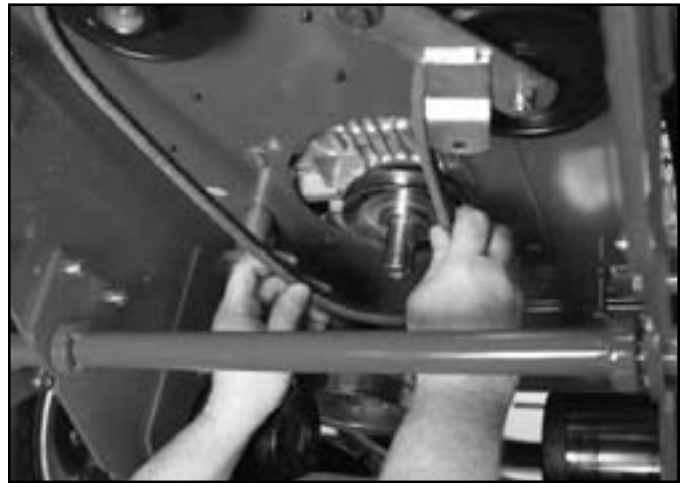


Fig 0808

PICT-0302a

- 5** 25. Using a spring removal tool (Toro P/N 92-5771), unhook the hydro drive idler spring and remove it from the chassis (Fig. 0807).

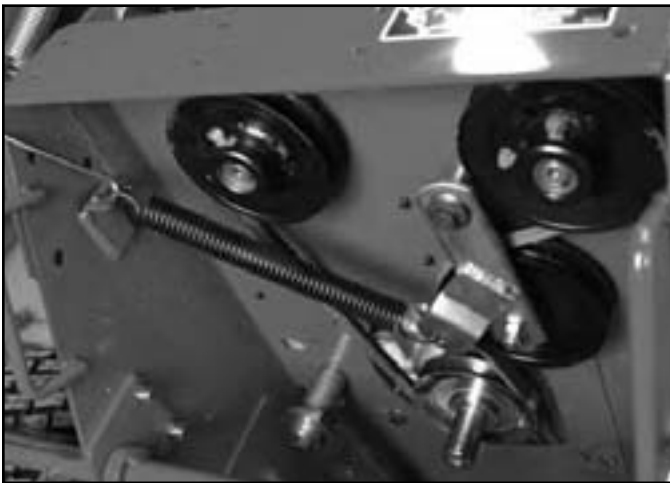


Fig 0807

PICT-0300

27. Slide the drive pulley off the engine crankshaft (Fig. 0809).



Fig 0809

PICT-0303

28. Remove the square key from the engine crankshaft (Fig. 0810).



Fig 0810

PICT-0304

29. Remove the nut and the positive (red) cable from the starter (Fig. 0811).



Fig 0811

PICT-0269a

30. At the front of the engine, loosen the cable clamps securing the throttle (bottom) and choke (top) cables to the engine (Fig. 0812).

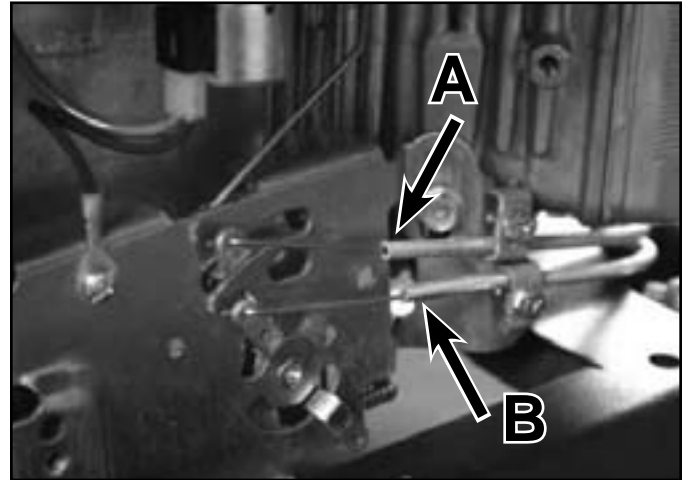


Fig 0812

PICT-0309

A. Choke

B. Throttle

31. Remove the throttle and choke cables from the cable clamps and disconnect the z-bends from the control linkage (Fig. 0813).



Fig 0813

PICT-0310



# ENGINE

32. Remove the nut, harness ground wires and negative (black) battery cable and star washer from the rear right engine mounting bolt (Fig. 0814).

**Note:** The bolt will fall through the chassis when the nut is removed.

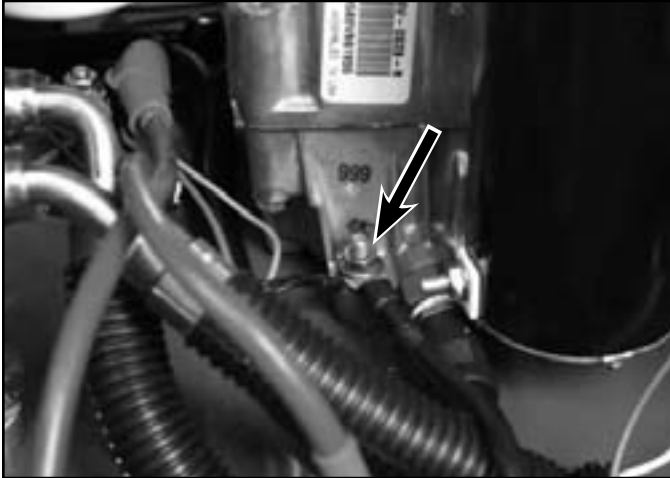


Fig 0814

PICT-0314

34. Unplug the pink wire from the green fuel solenoid wire (Fig. 0816).



Fig 0816

PICT-0316a

33. Unplug the violet wire from the ignition module on the engine (Fig. 0815).



Fig 0815

PICT-0315

35. Unplug the white wire from the black magneto wire (Fig. 0817).



Fig 0817

PICT-0317

5

36. Remove the remaining 3 engine mounting bolts and nuts securing the engine to the chassis (Fig. 0818).



Fig 0818

PICT-0319

3. Insert the rear right engine mounting bolt up through the chassis and engine mounting hole. Install the star washer, harness ground wires and negative (black) battery cable onto the bolt. Loosely install the nut onto the bolt (Fig. 0820).



Fig 0820

PICT-0321a

38. Carefully lift the engine off the chassis.

## Engine Installation - Pistol Grip Hydro

1. Carefully position the engine on the chassis.
2. Apply thread locking compound to the 4 engine mounting bolts (Fig. 0819).



Fig 0819

PICT-0322

4. Loosely install the remaining 3 engine mounting bolts and nuts (Fig. 0821).

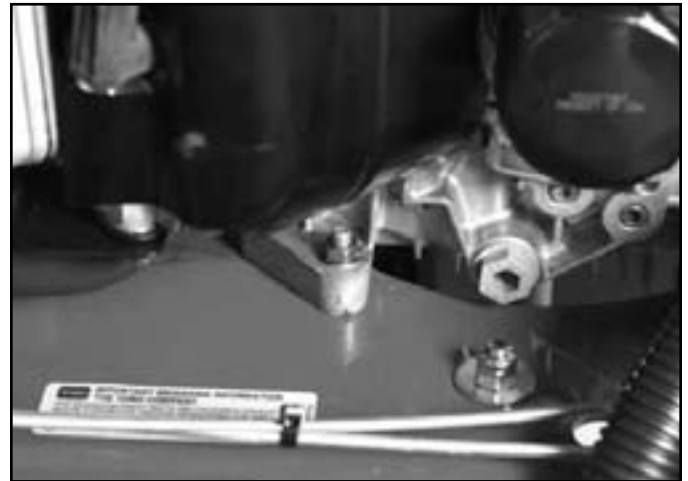


Fig 0821

PICT-0319

# ENGINE

5. Torque all 4 engine mounting bolts to  $14.5 \pm 2$  ft-lbs. ( $19.7 \pm 2.8$  Nm) (Fig. 0822).



Fig 0822

PICT-0324

7. Plug the pink wire into the green fuel solenoid wire (Fig. 0824).



Fig 0824

PICT-0327

6. Plug the white wire into the black magneto wire (Fig. 0823).



Fig 0823

PICT-0326a

8. Plug the violet wire into the ignition module on the engine (Fig. 0825).



Fig 0825

PICT-0328

5

9. Secure the positive (red) cable to the starter (Fig. 0826).



Fig 0826

PICT-0268a

11. Move the choke control knob to the "open" position (Fig. 0828).



Fig 0828

PICT-0332a

10. Hook the z-bend of the choke cable to the choke control lever and loosely clamp the outer housing of the choke cable into the cable clamp (Fig. 0827).



Fig 0827

PICT-0331

12. Ensure the carburetor choke plate is fully open (Fig. 0829).



Fig 0829

PICT-0333

# ENGINE

13. Pull the outer housing of the choke cable until the inner wire has almost no slack and tighten the cable clamp bolt (Fig. 0830).



Fig 0830

PICT-0334

15. Ensure the carburetor choke plate is fully closed (Fig. 0832).



Fig 0832

PICT-0335

14. Move the choke control knob to the "choke" position (Fig. 0831).



Fig 0831

PICT-0336

16. Make sure the choke plate turns from the fully closed position to the fully open position when actuating the choke control knob.

17. Hook the z-bend of the throttle cable to the throttle control lever and loosely clamp the outer housing of the throttle cable into the cable clamp (Fig. 0833).



Fig 0833

PICT-0338

5

18. Move the throttle control knob to the “fast” position (Fig. 0834).



Fig 0834

PICT-0339

20. Move the throttle control knob to the “slow” position. Ensure the carburetor throttle plate moves smoothly (Fig. 0836).



Fig 0836

PICT-0342a

19. Pull the outer housing of the throttle cable until the inner wire has almost no slack and tighten the cable clamp bolt (Fig. 0835).



Fig 0835

PICT-0341a

21. Apply anti-seize compound to the engine crankshaft (Fig. 0837).



Fig 0837

PICT-0343

# ENGINE

22. Install the square key into the engine crankshaft keyway (Fig. 0838).



Fig 0838

PICT-0304

24. Route the hydro drive belt around the engine crankshaft pulley, idler pulley and hydro pulleys (Fig. 0840).

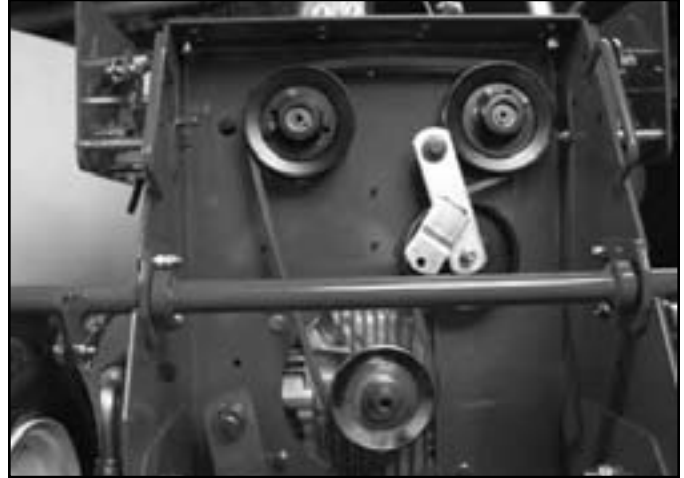


Fig 0840

PICT-0348a

23. Slide the drive pulley onto the engine crankshaft. Ensure that the long side of the hub is installed toward the engine (Fig. 0839).



Fig 0839

PICT-0303

25. Using a spring removal tool (Toro P/N 92-5771), install the hydro drive idler spring (Fig. 0841).



Fig 0841

PICT-0349

5

26. Ensure the 2 cupped washers are installed on the clutch bolt with the crown side facing the bolt head (Fig. 0842).



Fig 0842

PICT-0351a

27. Apply thread locking compound to the clutch bolt (Fig. 0843).



Fig 0843

PICT-0352a

28. Slide the electric clutch onto the engine crankshaft (Fig. 0844).



Fig 0844

PICT-0354a

29. Install the clutch bolt, 2 spring washers and flat washer into the engine crankshaft (Fig. 0845).



Fig 0845

PICT-0355a



# ENGINE

30. Torque the clutch bolt to  $55 \pm 5$  ft-lbs. ( $74.5 + 6.8$  Nm) (Fig. 0846).



Fig 0846

PICT-0356a

32. Feed the clutch harness plug up through the chassis (Fig. 0848).



Fig 0848

PICT-0362a

5 31. Install the bolt, nut, 2 washers and spacer securing the brake clutch strap to the underside of the chassis (Fig. 0847).



Fig 0847

PICT-0361

33. Install the rubber grommet into the frame (Fig. 0849).



Fig 0849

PICT-0363

34. Route the PTO drive belt around the clutch. (Fig. 0850).



Fig 0850

PICT-0364a

40", 48" and 52" mower deck belt routing:

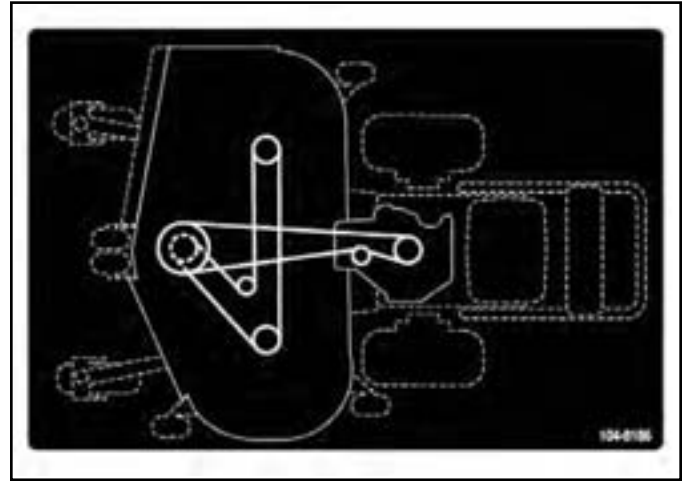


Fig 0852

fig. 104-8186

**Note:** Ensure the PTO drive belt is routed properly around the mower deck pulley(s). Refer to belt routing decal (Fig. 0851 and Fig. 0852).

36" mower deck belt routing:

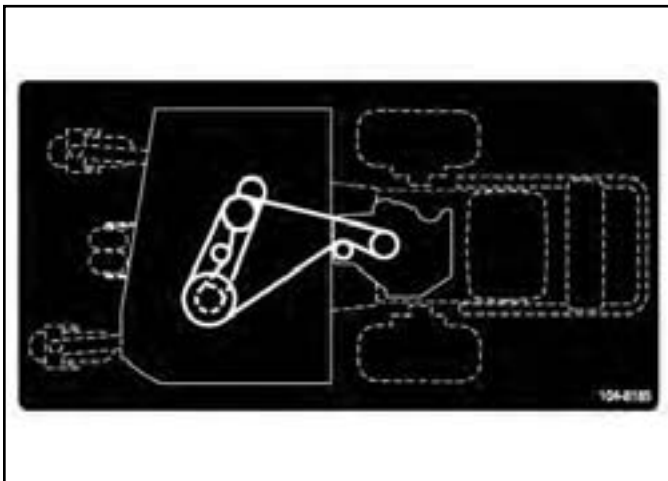


Fig 0851

fig. 104-8185

35. Install the idler arm spring to the spring post (Fig. 0853).

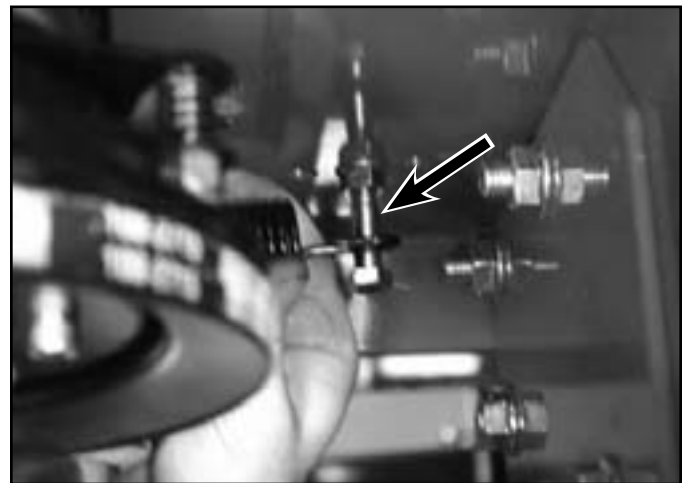


Fig 0853

PICT-0365

# ENGINE

36. Install the trailing shield into the chassis by first inserting the right side of the trailing shield rod (bent at a 90° angle) into the hole in the chassis and then insert the left end of the trailing shield rod (bent at a 45° angle) into the hole in the chassis (Fig. 0854).



Fig 0854

PICT-0273

39. Replace the carrier frame cover (Fig. 0856).



Fig 0856

PICT-0280

40. Plug the clutch connector into the harness connector (Fig. 0857).



Fig 0857

PICT-0547a

37. Lower the machine.

38. Roll the PTO drive belt on to the center mower deck pulley (Fig. 0855).



Fig 0855

PICT-0283

5

41. Install the fuel line to the fuel pump (Fig. 0858).



Fig 0858

PICT-0370

42. Slide the hose clamp to the fuel line where it connects to the fuel pump (Fig. 0859).



Fig 0859

PICT-0371

43. Install the bolt that secures the fuel line R-clamp to the engine (Fig. 0860).



Fig 0860

PICT-0259

44. Fill the engine crankcase with oil per engine specifications.

45. Place the battery onto the battery tray (Fig. 0861).

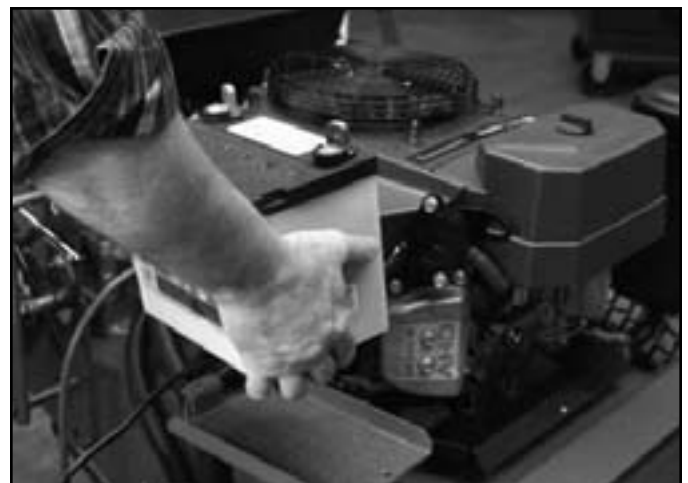


Fig 0861

PICT-0257

# ENGINE

46. Install the battery hold down and secure with 2 nuts. Do not over-tighten (Fig. 0862).



Fig 0862

PICT-0372a

48. Connect the negative (black) battery cable to the negative battery terminal and cover with the boot. (Fig. 0864).



Fig 0864

PICT-0250

47. Connect the positive (red) battery cable to the positive battery terminal and cover with the boot (Fig. 0863).



Fig 0863

PICT-0252

## Muffler Guard

There is a muffler guard included on international models (Fig. 0865 and Fig. 0866):



Fig 0865

PICT-1489

5

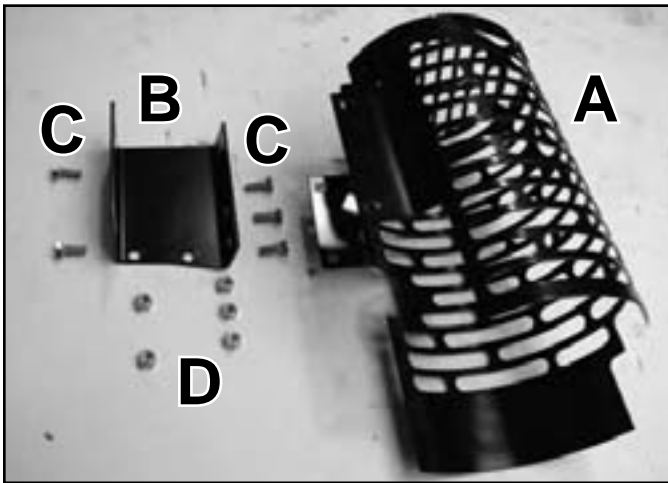


Fig 0866

PICT-1493

- A. Muffler guard
- B. Muffler guard bracket
- C. Screw (5)
- D. Nut (5)

3. Remove the fuel line by sliding the clamp away from the fuel pump (Fig. 0868).



Fig 0868

PICT-1347

## Engine Removal - Gear Drive

1. Turn the engine off and remove the key from the ignition.
2. Turn the fuel valve to the off position (Fig. 0867).



Fig 0867

PICT-1346

4. Remove the fuel line from the fuel pump. Drain the fuel into a suitable container (Fig. 0869).



Fig 0869

PICT-1349a

# ENGINE

5. Remove the R-clamp that secures the fuel line to the right side of the engine (Fig. 0870).



Fig 0870

PICT-1351

7. Place a drain pan below the end of the drain hose and rotate the oil drain valve to allow the oil to drain from the engine (Fig. 0872).



Fig 0872

PICT-1354

6. Attach the oil drain hose to the oil drain valve (Fig. 0871).



Fig 0871

PICT-1352

8. When the oil has drained completely, close the drain valve and remove the drain hose.

9. Unplug the clutch from the wire harness (Fig. 0873).



Fig 0873

PICT-1422

5

10. Push the clutch wire plug and grommet through the engine deck frame (Fig. 0874).



Fig 0874

PICT-1357

12. Remove the mower deck belt cover(s) (Fig. 0876).



Fig 0876

PICT-1360

11. Remove the carrier frame cover (Fig. 0875).



Fig 0875

PICT-1358

13. Roll the deck drive belt off the fixed/center mower deck pulley (Fig. 0877).



Fig 0877

PICT-1361



# ENGINE

14. Raise the machine so that the underside of the frame can be accessed.
15. Remove the trailing shield from the frame by first removing the left end of the shield rod (bent at a 45 degree angle) from the hole in the frame and then remove the right side of the shield rod (bent at 90 degree angle) from the right side of the frame (Fig. 0878).



Fig 0878

PICT-1362

16. Remove the deck drive idler arm spring from the spring post (Fig. 0879).

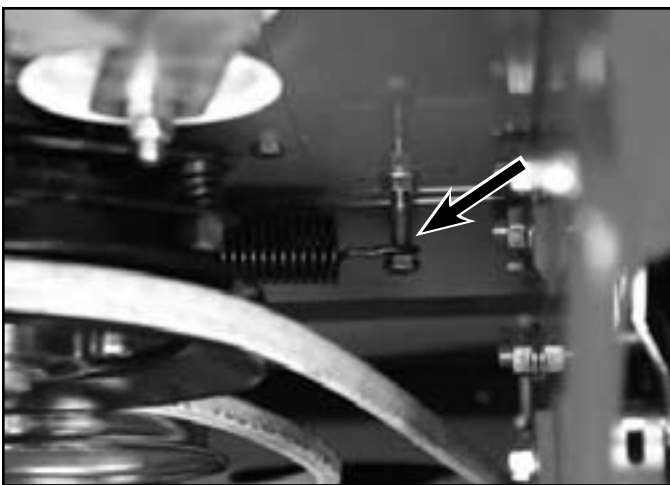


Fig 0879

PICT-1364

17. Remove the belt from around the clutch (Fig. 0880).

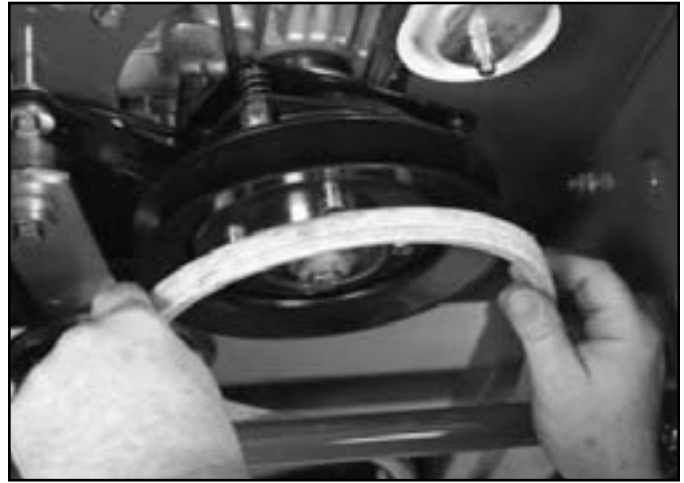


Fig 0880

PICT-1365a

18. Remove the bolt, nut, 2 washers and spacer securing the brake clutch strap to the underside of the frame (Fig. 0881).



Fig 0881

PICT-1368

19. Loosen the clutch bolt (Fig. 0882).



Fig 0882

PICT-1369

21. Unhook the traction drive belt idler spring from the tab on the frame (Fig. 0884).



Fig 0884

PICT-1376

20. Remove the bolt, 2 spring washers and flat washer securing the clutch to the engine crankshaft. Slide the clutch off the engine crankshaft (Fig. 0883).



Fig 0883

PICT-1374

22. Remove the drive belt from the pulleys (Fig. 0885).



Fig 0885

PICT-1377a

# ENGINE

23. Slide the drive pulley off the crankshaft (Fig. 0886).



Fig 0886

PICT-1379

24. Remove the key from the crankshaft keyway (Fig. 0887).



Fig 0887

PICT-1381

25. Lower the machine.

26. At the front of the engine, loosen the cable clamps securing the throttle (bottom) and choke (top) cables to the engine (Fig. 0888).

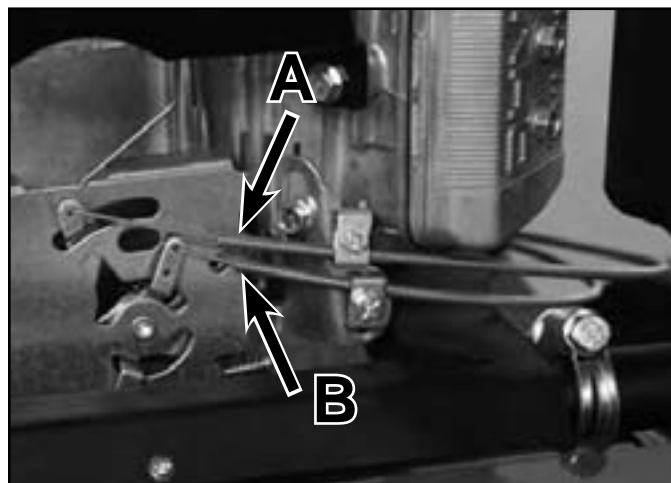


Fig 0888

PICT-1382

A. Choke

B. Throttle

27. Remove the throttle and choke cables from the cable clamps and disconnect the z-bends from the control linkage (Fig. 0889).



Fig 0889

PICT-1385

5

28. Unplug the pink wire from the red engine rectifier wire (Fig. 0890).



Fig 0890

PICT-1389a

29. Unplug the white wire from the black magneto wire (Fig. 0891).



Fig 0891

PICT-1390a

30. Remove the nut, harness ground wire and lock washer from the rear left engine mounting bolt (Fig. 0892).

**Note:** The bolt will fall through the frame when the nut is removed.

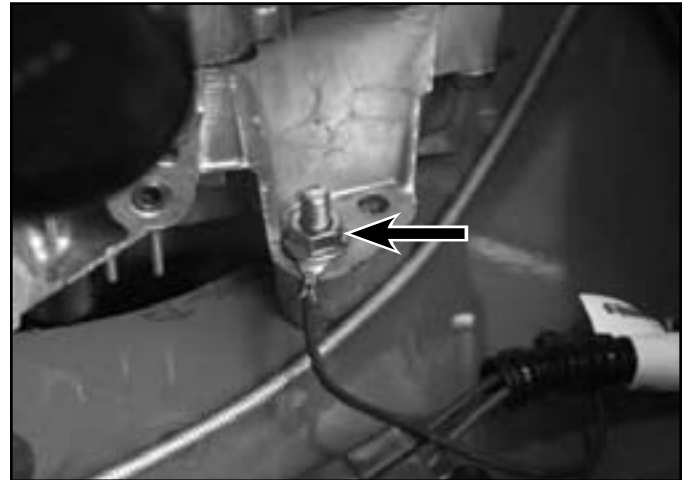


Fig 0892

PICT-1393

31. Remove the remaining 3 engine mounting bolts and nuts that secure the engine to the frame (Fig. 0893).



Fig 0893

PICT-1395

32. Carefully lift the engine off the chassis.

# ENGINE

## Engine Installation - Gear Drive

1. Position the engine onto the frame.
2. Apply thread locking compound to the threads of all 4 engine mounting bolts (Fig. 0894).



Fig 0894

PICT-1396

4. Loosely install the other 3 engine mounting bolts and nuts securing the engine to the frame. Torque all 4 engine mounting bolts to  $14.5 \pm 2$  ft-lbs. ( $19.7 \pm 2.8$  Nm) (Fig. 0896).



Fig 0896

PICT-1398

5

3. Insert an engine mounting bolt up through the frame and the rear left engine mounting hole. Place a lock washer and the ground wire onto the engine mounting bolt. Loosely install a nut (Fig. 0895).

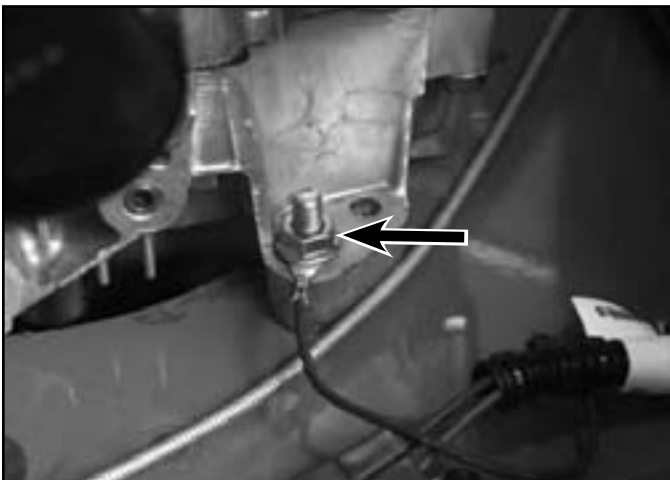


Fig 0895

PICT-1393

5. Plug the white wire into the black magneto wire (Fig. 0897).



Fig 0897

PICT-1390a

6. Plug the pink wire into the red engine rectifier wire (Fig. 0898).



Fig 0898

PICT-1389a

8. Move the choke control knob to the "open" position (Fig. 0900).



Fig 0900

PICT-1400

7. Hook the z-bend of the choke cable into the choke control lever and loosely clamp the outer housing of the choke cable into the cable clamp (Fig. 0899).

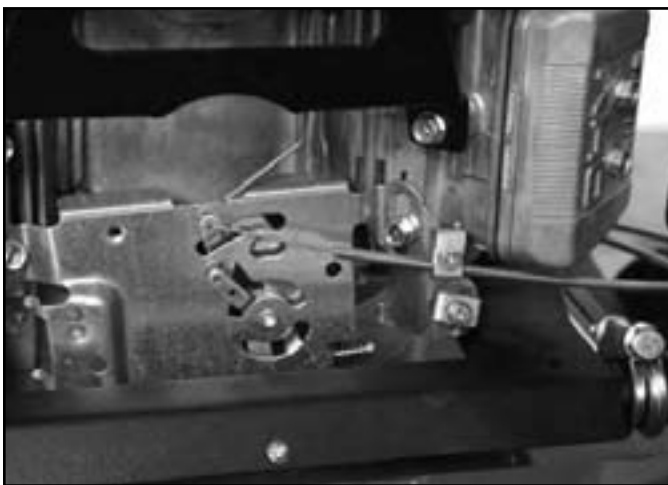


Fig 0899

PICT-1399

9. Ensure the carburetor choke plate is fully open (Fig. 0901).



Fig 0901

PICT-0333

# ENGINE

10. Pull the outer housing of the choke cable until the inner wire has almost no slack and tighten the cable clamp (Fig. 0902).



Fig 0902

PICT-1402

12. Ensure the carburetor choke plate is fully closed (Fig. 0904).



Fig 0904

PICT-1401

11. Move the choke control knob to the "choke" position (Fig. 0903).



Fig 0903

PICT-1403

13. Make sure the choke plate turns from the fully closed position to the fully open position when actuating the choke control knob.

14. Hook the z-bend of the throttle cable to the throttle control lever and loosely clamp the outer housing of the throttle cable into the cable clamp (Fig. 0905).

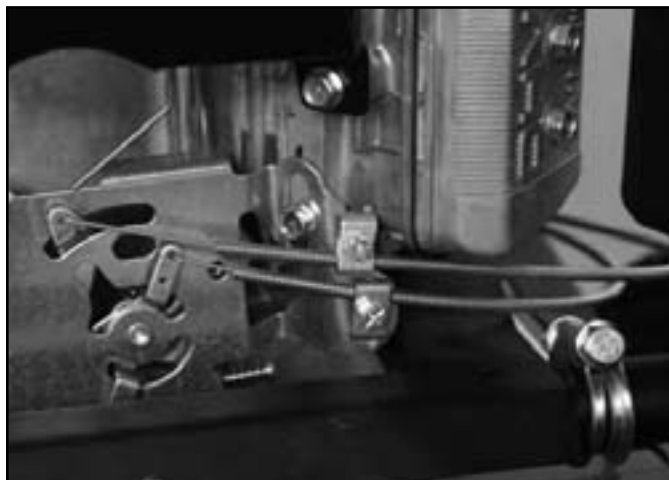


Fig 0905

PICT-1383

5

15. Move the throttle control knob to the “fast” position (Fig. 0906).



Fig 0906

PICT-1404a

17. Move the throttle control knob to the “slow” position. Ensure the throttle moves smoothly (Fig. 0908).



Fig 0908

PICT-1405a

16. Pull the outer housing of the throttle cable until the inner wire has almost no slack and tighten the cable clamp (Fig. 0907).



Fig 0907

PICT-1406

18. Raise the machine to access the underside of the frame.

19. Apply anti-seize compound to the crankshaft (Fig. 0909).



Fig 0909

PICT-1407



# ENGINE

20. Install the key into the crankshaft keyway (Fig. 0910).



Fig 0910

PICT-1381

- Note:** The drive pulley casting indicates the orientation of the pulley on the crankshaft (Fig. 0912).



Fig 0912

PICT-1408a

21. Slide the drive pulley onto the crankshaft (Fig. 0911).



Fig 0911

PICT-1378

22. Route the traction drive belt around the drive pulleys (Fig. 0913).



Fig 0913

PICT-1377a

5

23. Hook the traction drive belt idler spring to the tab on the frame (Fig. 0914).



Fig 0914

PICT-1376

25. Apply thread locking compound to the clutch bolt threads (Fig. 0916).



Fig 0916

PICT-1411

24. Slide the flat washer and 2 spring washers onto the clutch bolt (Fig. 0915):

**Note:** Ensure the 2 spring washers are installed on the clutch bolt with the crown side facing the bolt head.



Fig 0915

PICT-1409a

26. Slide the clutch onto to the crankshaft (Fig. 0917).



Fig 0917

PICT-1374

# ENGINE

27. Install the clutch bolt assembly into the crankshaft to secure the clutch. Torque the clutch bolt to  $55 \pm 5$  ft-lbs. ( $74.6 \pm 6.8$  Nm) (Fig. 0918).



Fig 0918

PICT-1412

29. Install the rubber grommet into the frame (Fig. 0920).



Fig 0920

PICT-1418

**5** 28. Feed the clutch harness plug up through the frame (Fig. 0919).



Fig 0919

PICT-1415

30. Install the bolt, nut, 2 washers and spacer securing the brake clutch strap to the underside of the frame (Fig. 0921).



Fig 0921

PICT-1421

31. Route the deck drive belt around the clutch (Fig. 0922).



Fig 0922

PICT-1365a

32. Install the idler arm spring to the spring post (Fig. 0923).

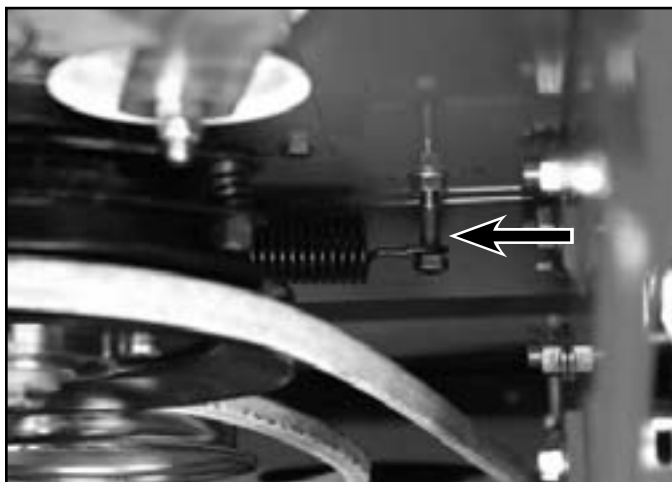


Fig 0923

PICT-1364

33. Install the trailing shield into the frame by first inserting the right side of the trailing shield rod (bent at a 90 degree angle) into the hole in the chassis and then insert the left end of the trailing shield rod (bent at a 45 degree angle) into the hole in the chassis (Fig. 0924).



Fig 0924

PICT-1362

34. Lower the machine.

35. Roll the deck drive belt onto the fixed (center) mower deck pulley (Fig. 0925).



Fig 0925

PICT-1361

# ENGINE

**Note:** Ensure the deck drive belt is routed properly around the mower deck pulley(s). Refer to belt routing decal (Fig. 0926):

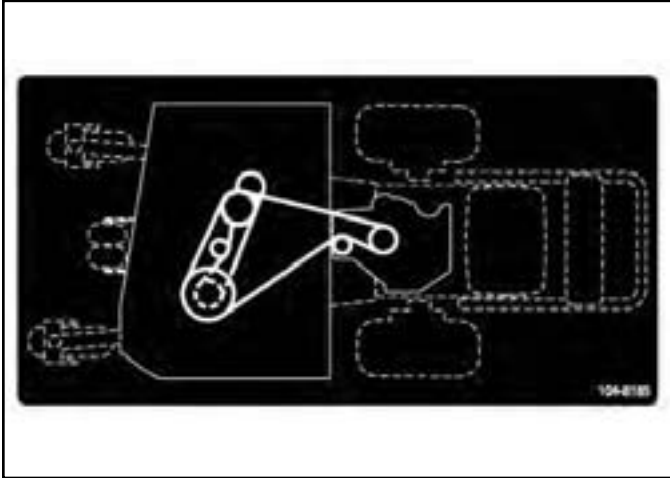


Fig 0926

fig. 104-8185

37. Install the carrier frame cover (Fig. 0928).



Fig 0928

PICT-1358

38. Plug the clutch connector into the harness connector (Fig. 0929).



Fig 0929

PICT-1422

5 36. Install the mower deck belt cover(s) (Fig. 0927).



Fig 0927

PICT-1360

39. Install the fuel line to the fuel pump. Slide the hose clamp into place to secure the hose to the fuel pump (Fig. 0930).



Fig 0930

PICT-1347

41. Secure the fuel line to the engine by installing a bolt through the R-clamp (Fig. 0931).



Fig 0931

PICT-1351

42. Fill the crankcase with oil per the engine specifications.
43. Fill the fuel tank with gas.

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# HYDROSTATIC DRIVE SYSTEM

## Hydro Drive Transmission Traction Belt Replacement

### Hydro Drive Transmission Traction Belt Removal

1. Move the negative battery terminal boot and disconnect the negative (black) battery cable from the battery (Fig. 0932).



Fig 0932

PICT-0250

2. Unplug the PTO clutch wire from the harness connector (Fig. 0933).



Fig 0933

PICT-0548a

3. Push the grommet and clutch plug through the frame to the underside of the machine (Fig. 0934).



Fig 0934

PICT-0277

4. Remove the carrier frame cover (Fig. 0935).



Fig 0935

PICT-0546



# HYDROSTATIC DRIVE SYSTEM

5. Roll the PTO drive belt off the center mower deck pulley (Fig. 0936).



Fig 0936

PICT-0283

8. Remove the idler arm spring from the spring post (Fig. 0938).

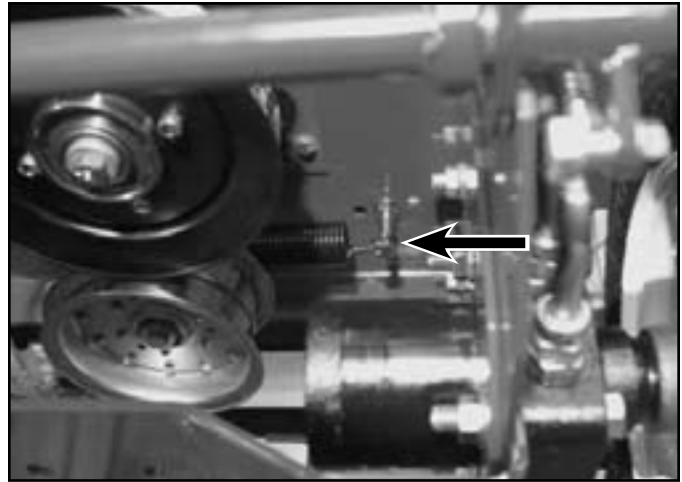


Fig 0938

PICT-0291a

6. Raise the machine so that the underside of the frame can be accessed.

7. Remove the trailing shield from the frame by first removing the left end of the shield rod (bent at a 45 degree angle) from the hole in the chassis and then remove the right side of the shield rod (bent at 90 degree angle) from the right side of the chassis (Fig. 0937).



Fig 0937

PICT-0273

9. Remove the belt from the clutch (Fig. 0939).



Fig 0939

PICT-0294

6

# HYDROSTATIC DRIVE SYSTEM

10. Remove the bolt, nut, 2 washers and spacer securing the brake clutch strap to the underside of the chassis (Fig. 0940).



Fig 0940

PICT-0295

12. Remove the bottom bolt, nut and spacer securing the right hand side plate to the frame (Fig. 0942).



Fig 0942

PICT-0562

11. Unhook the hydro idler pulley spring from the tab on the chassis (Fig. 0941).



Fig 0941

PICT-0559

13. Loosen the nut securing the hydro idler shoulder bolt to the frame until there is enough clearance for the hydro belt to pass over the top of the idler pulley assembly (Fig. 0943).



Fig 0943

PICT-0563

# HYDROSTATIC DRIVE SYSTEM

14. Remove the hydro drive belt (Fig. 0944).



Fig 0944

PICT-0564

2. Tighten the nut and shoulder bolt securing the idler bracket to the frame (Fig. 0946).



Fig 0946

PICT-0563

## Hydro Drive Transmission Traction Belt Installation

1. Route the hydro drive belt around the pulleys as shown (Fig. 0945):

**Note:** The spring and clutch have been removed for photo purposes.



Fig 0945

PICT-0348a

3. Install the bolt, spacer and nut securing the bottom of the right side plate to the frame (Fig. 0947).



Fig 0947

PICT-0562

6

# HYDROSTATIC DRIVE SYSTEM

4. Install the bolt, nut, 2 washers and spacer securing the brake clutch strap to the underside of the frame (Fig. 0948).



Fig 0948

PICT-0361

5. Feed the clutch harness plug up through the frame (Fig. 0949).



Fig 0949

PICT-0362a

6. Install the rubber grommet into the frame (Fig. 0950).



Fig 0950

PICT-0363

7. Plug the PTO clutch wire into the harness connector (Fig. 0951).



Fig 0951

PICT-0548a

# HYDROSTATIC DRIVE SYSTEM

8. Install the hydro idler spring to the spring post (Fig. 0952).

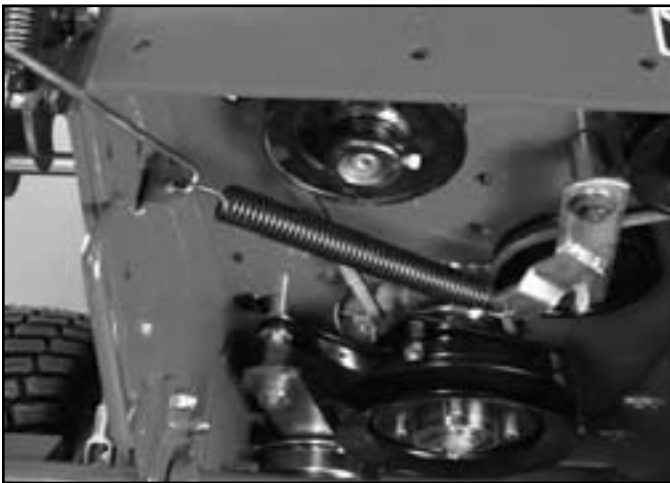


Fig 0952

PICT-0565

10. Install the PTO idler spring to the spring post on the frame (Fig. 0954).

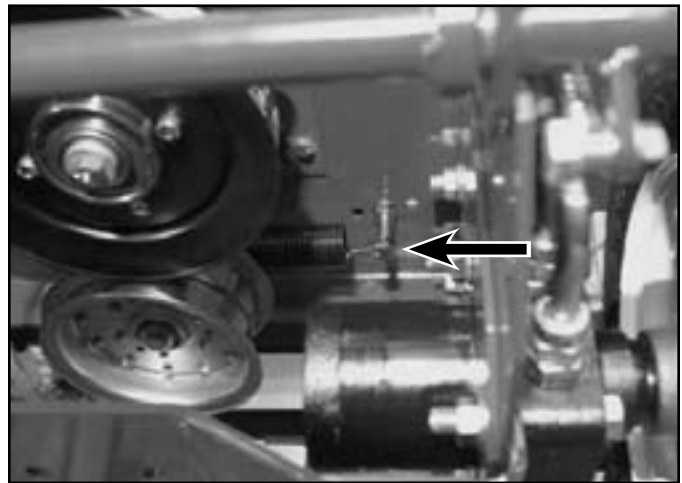


Fig 0954

PICT-0291a

9. Route the PTO drive belt around the clutch (Fig. 0953).



Fig 0953

PICT-0364a

11. Install the trailing shield into the frame by first inserting the right side of the trailing shield rod (bent at a 90 degree angle) into the hole in the right side of the frame and then insert the left end of the trailing shield rod (bent at a 45 degree angle) into the hole in the left side of the frame (Fig. 0955).



Fig 0955

PICT-0273

6

# HYDROSTATIC DRIVE SYSTEM

12. Lower the machine.

13. Roll the PTO drive belt onto the center mower deck pulley (Fig. 0956).



Fig 0956

PICT-0283

15. Connect the negative (black) battery cable to the negative battery terminal and cover the connection with the boot (Fig. 0958).



Fig 0958

PICT-0250

14. Install the carrier frame cover (Fig. 0957).



Fig 0957

PICT-0280

## Hydro Idler Replacement

### Hydro Idler Removal

1. Turn the engine off and remove the key from the ignition.
2. Using a spring removal tool (Toro part number 92-5771), unhook the hydro idler spring from the tab on the frame (Fig. 0959).

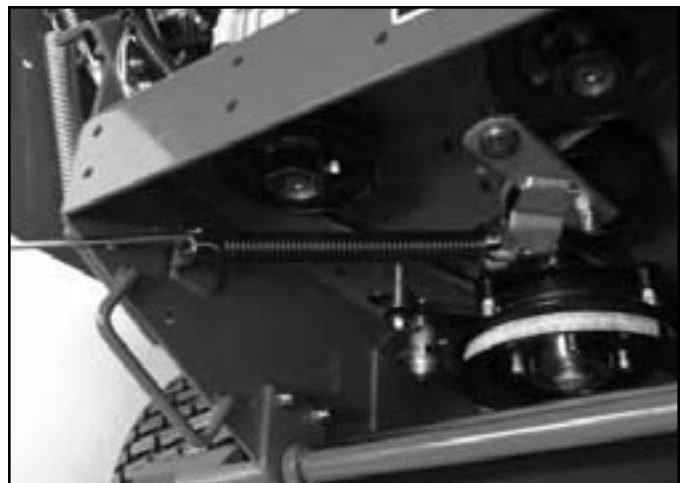


Fig 0959

PICT-0573

6

# HYDROSTATIC DRIVE SYSTEM

3. Remove the flanged shoulder bolt and nut securing the idler lever assembly to the frame (Fig. 0960).



Fig 0960

PICT-0576

5. Remove the spring from the idler lever assembly (Fig. 0962).



Fig 0962

PICT-0579

4. Remove the idler assembly from the frame (Fig. 0961).



Fig 0961

PICT-0578

6. Remove the nut from the bolt securing the pulley to the idler lever (Fig. 0963).

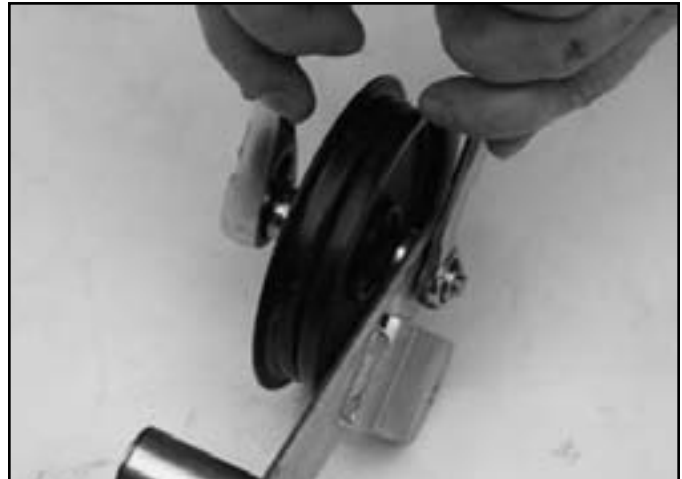


Fig 0963

PICT-0581

6

# HYDROSTATIC DRIVE SYSTEM

7. Remove the bolt, washer, pulley, and spacer from the idler lever (Fig. 0964).



Fig 0964

PICT-0583

## Hydro Idler Installation

1. Slide the washer onto the bolt. Insert the bolt through the flush face side of the pulley (Fig. 0966).



Fig 0966

PICT-0593

8. Inspect the bearing and bushings in the pulley and idler lever. If worn or damaged they must be replaced.

Hydro Idler Assembly (Fig. 0965).

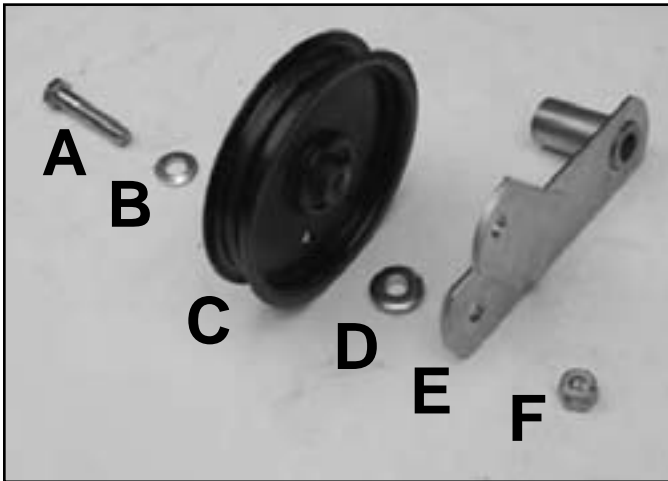


Fig 0965

PICT-0590a

2. Slide the spacer onto the bolt (Fig. 0967).



Fig 0967

PICT-0594

- |           |                |
|-----------|----------------|
| A. Bolt   | D. Spacer      |
| B. Washer | E. Idler lever |
| C. Pulley | F. Nut         |



# HYDROSTATIC DRIVE SYSTEM

- Slide the idler lever onto the bolt (Fig. 0968).



Fig 0968

PICT-0596

- Hook the spring onto the idler lever (Fig. 0970).



Fig 0970

PICT-0579

- Install a nut to secure the hydro idler pulley assembly to the lever (Fig. 0969).



Fig 0969

PICT-0597

- Position the idler assembly up to the frame (Fig. 0971).



Fig 0971

PICT-0578

# HYDROSTATIC DRIVE SYSTEM

7. Route the hydro drive belt around the idler pulley (Fig. 0972).



Fig 0972

PICT-0598

9. Using a spring removal tool (Toro part number 92-5771), hook the hydro idler spring to the tab on the frame (Fig. 0974).



Fig 0974

PICT-0573

8. Install the flanged shoulder bolt and nut securing the idler lever assembly to the frame and tighten (Fig. 0973).



Fig 0973

PICT-0600

## Hydraulic Pump Replacement

**Note:** Cleanliness is a key factor in a successful repair of any hydraulic system. Thoroughly clean all exposed surfaces prior to any type of maintenance. Cleaning all parts by using a solvent wash and air drying is usually adequate. As with any precision equipment, all parts must be kept free of foreign material and chemicals. Protect all exposed sealing areas and open cavities from damage and foreign material.

Upon removal, all seals, O-rings, and gaskets should be replaced. During installation, lightly lubricate all seals, O-rings, and gaskets with clean petroleum jelly prior to assembly.

For pump service information, refer to Hydro-Gear BDP-10A / 16A / 21L Service and Repair Manual (492-4789).

The following procedure is the same for the right or left hydraulic pump removal.

6

# HYDROSTATIC DRIVE SYSTEM

## Hydraulic Pump Removal

1. Clean the area around the pump and hydraulic fittings to prevent dirt and debris from entering the system.
2. Remove the idler spring to relieve tension from the hydro drive belt (Fig. 0975).



Fig 0975

PICT-0402

3. Slip the hydro drive belt off the pulley (Fig. 0976).

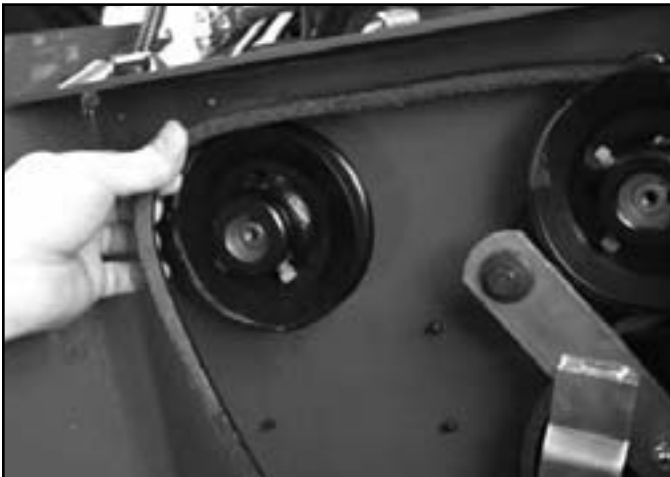


Fig 0976

PICT-0403

4. Loosen the two pulley hub set screws (Fig. 0977).



Fig 0977

PICT-0405a

5. Slide the pulley off the hydraulic pump shaft (Fig. 0978).



Fig 0978

PICT-0406

# HYDROSTATIC DRIVE SYSTEM

6. The pulley key may fall out of the keyway or stay in. Remove the key if it did not fall out on its own (Fig. 0979).



Fig 0979

PICT-0408

9. Remove the charge hose from the hydraulic pump fitting. Cap the hydraulic hose and fitting to prevent debris from entering the system (Fig. 0981).

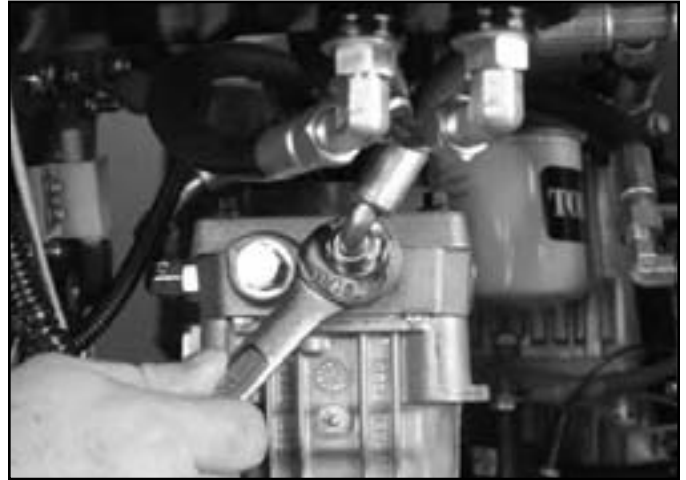


Fig 0981

PICT-0422a

7. Inspect the key and replace if worn or damaged.
8. Remove the return line from the hydro pump fitting and drain the hydraulic fluid into a drain pan. Cap the hydraulic hose and fitting to prevent debris from entering the system. (Fig. 0980).



Fig 0980

PICT-0420

10. Mark one of the high pressure hoses and the corresponding port location on the pump. Remove both of the high pressure hoses from the fittings on the pump. Cap the hydraulic hoses and fittings to prevent debris from entering the system (Fig. 0982).



Fig 0982

PICT-0425

6

# HYDROSTATIC DRIVE SYSTEM

11. Unhook the lower end of the extension spring from the control shaft (Fig. 0983).

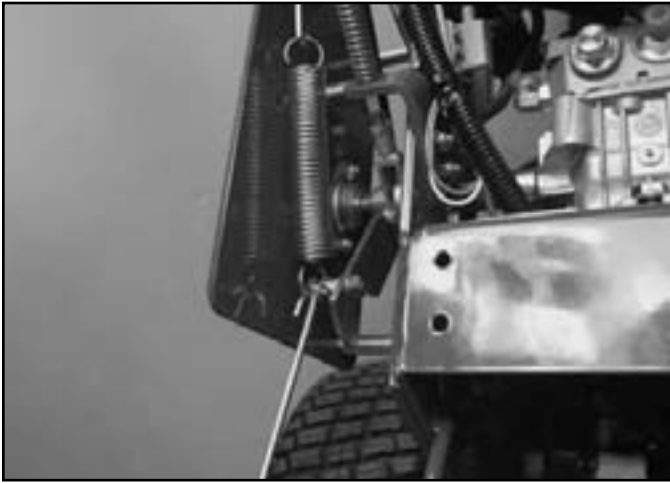


Fig 0983

PICT-0427a

13. Loosen the set screws located in the control shaft. The lower set screw can be accessed through the opening in the frame (Fig. 0985).

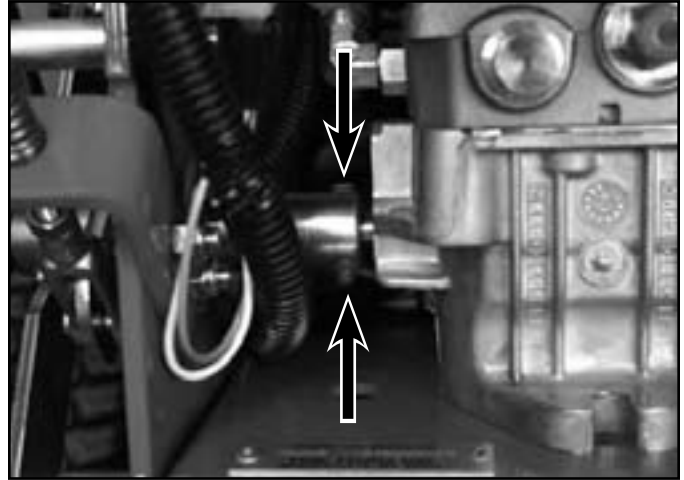


Fig 0985

PICT-0430

12. Remove the two mounting bolts and nuts securing the hydraulic pump to the frame (Fig. 0984).



Fig 0984

PICT-0429

14. Disconnect the pump from the control shaft and remove the pump from the frame (Fig. 0986).



Fig 0986

PICT-0432

6

# HYDROSTATIC DRIVE SYSTEM

- Transfer all 4 fittings to the new pump as well as the mark indicating the location of one of the high pressure hydraulic hoses (Fig. 0987). Torque each fitting as noted:

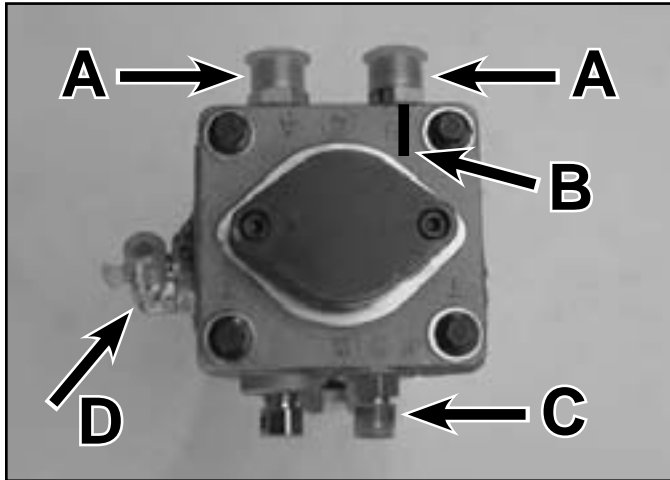


Fig 0987

PICT-0433a

- A. High pressure hose (2) (torque: 34-38 ft-lbs. (46-51.5 Nm))
- B. High pressure hose marking
- C. Charge hose fitting (torque: 7-10 ft-lbs. (9.5-13.5 Nm) (brass), 15-21 ft-lbs. (20-28.4 Nm) (steel))
- D. Drain fitting (torque: 25-29 ft-lbs. (34-39 Nm))

## Hydraulic Pump Installation

- Position the pump into the frame so that the pump shaft is inserted into the control shaft (Fig. 0988).

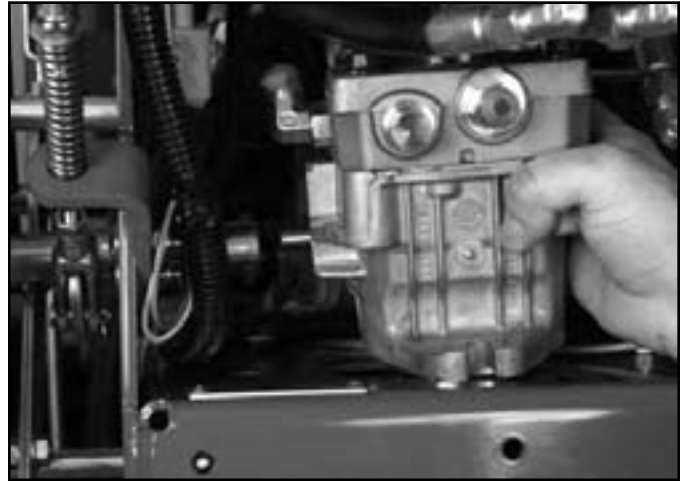


Fig 0988

PICT-0431

- Apply thread locking compound to the 2 control shaft set screws (Fig. 0989).



Fig 0989

PICT-0435a

6

# HYDROSTATIC DRIVE SYSTEM

3. Install the 2 set screws into the control shaft (Fig. 0990).

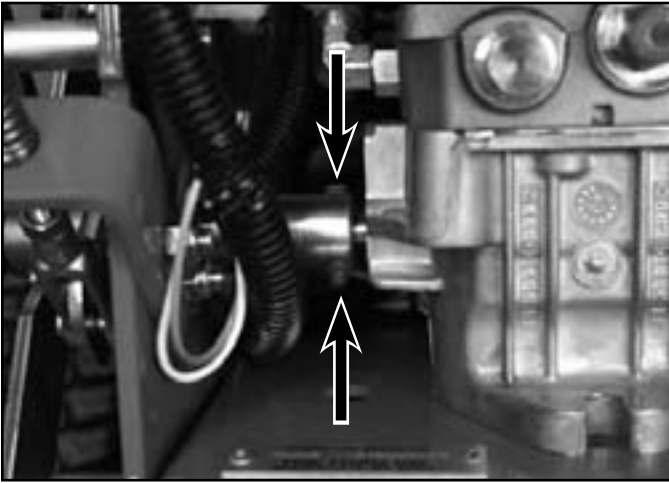


Fig 0990

PICT-0430

5. Install 2 bolts and nuts securing the pump to the frame (Fig. 0992).

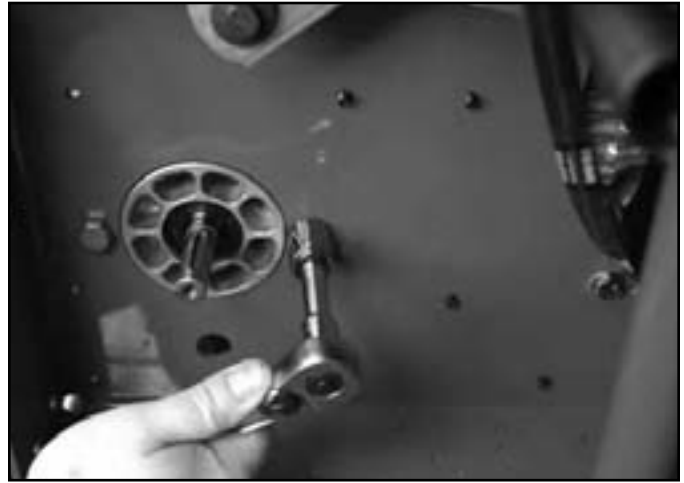


Fig 0992

PICT-0429

4. Hook the hydro pump spring to the bolt on the control shaft (Fig. 991).

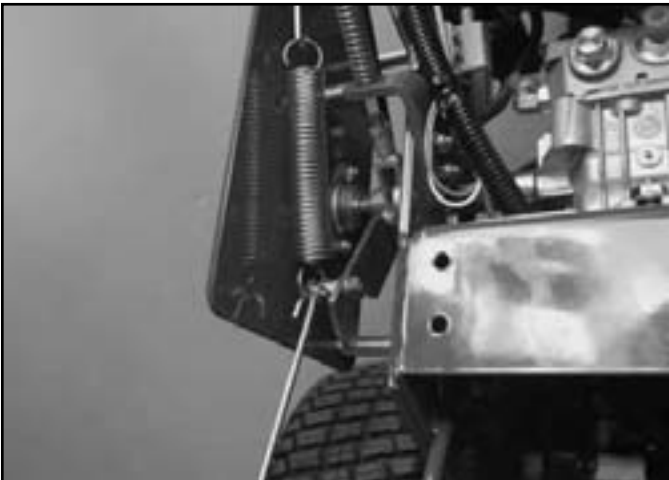


Fig 991

PICT-0427a

6. Install the 2 high pressure hoses to the fittings on the pump (Fig. 0993).

**Note: Ensure that the marked hose is connected to the marked port on the pump.**



Fig 0993

PICT-0425

6

# HYDROSTATIC DRIVE SYSTEM

7. Install the charge hose to the charge hose fitting (Fig. 0994).

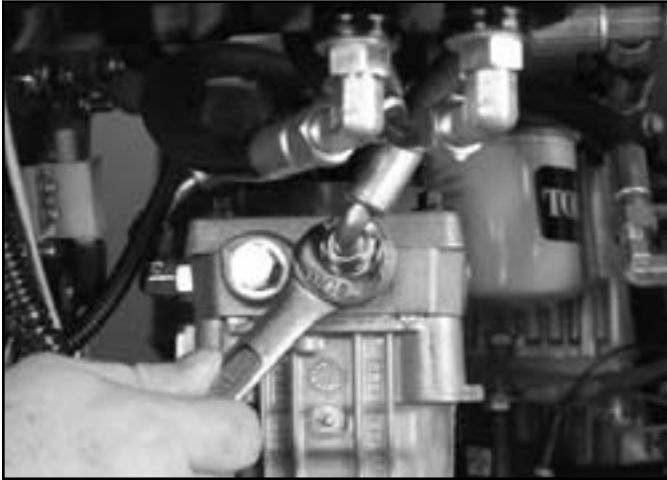


Fig 0994

PICT-0422a

9. Apply anti-seize compound to the pump shaft (Fig. 0996).



Fig 0996

PICT-0437

8. Install the return line to the hydro pump fitting (Fig. 0995).



Fig 0995

PICT-0420

10. Install the key into the pump shaft keyway (Fig. 0997).



Fig 0997

PICT-0409



# HYDROSTATIC DRIVE SYSTEM

11. Apply thread locking compound onto the 2 pulley set screws. Thread the 2 set screws into the pulley hub (Fig. 0998).



Fig 0998

PICT-0439

13. Torque the 2 set screws to  $11 \pm 1$  ft-lbs. ( $14.9 \pm 1.4$  Nm) (Fig. 1000).



Fig 1000

PICT-0440

12. Install the pump pulley onto the pump shaft and tighten the 2 set screws (Fig. 0999).



Fig 0999

PICT-0441

14. Position the drive belt onto the pulley (Fig. 1001).

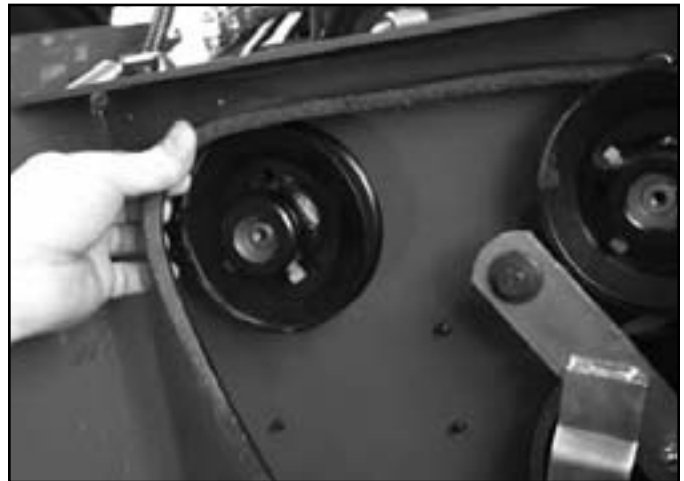


Fig 1001

PICT-0403

6

# HYDROSTATIC DRIVE SYSTEM

15. Install the idler spring onto the tab on the chassis (Fig. 1002).



Fig 1002

PICT-0402

16. Check the oil level in the hydraulic reservoir and fill as necessary.
17. Remove air from the hydraulic system. Refer to "Bleeding the Hydraulic System" on page 6-32.

## Wheel Motor Replacement

**Note:** Cleanliness is a key factor in a successful repair of any hydraulic system. Thoroughly clean all exposed surfaces prior to any type of maintenance. Cleaning all parts by using a solvent wash and air drying is usually adequate. As with any precision equipment, all parts must be kept free of foreign material and chemicals. Protect all exposed sealing areas and open cavities from damage and foreign material.

Upon removal, all seals, O-rings, and gaskets should be replaced. During installation, lightly lubricate all seals, O-rings, and gaskets with clean petroleum jelly prior to assembly.

For wheel motor service information, refer to Parker/Ross Wheel Motor Service Manual (492-4753).

**Note:** The following procedures can be followed for both the right and the left wheel motor.

## Wheel Motor Removal

1. Apply the parking brake.
2. Loosen the 4 lug nuts (Fig. 1003).



Fig 1003

PICT-0442a

# HYDROSTATIC DRIVE SYSTEM

3. Remove the hub nut from the wheel motor shaft (Fig. 1004).



Fig 1004

PICT-0443a

6. Release the parking brake.

7. Remove the wheel and tire assembly (Fig. 1006).



Fig 1006

PICT-0445a

4. Raise the rear of the machine and secure with jack stands.

5. Remove the 4 lug nuts (Fig. 1005).



Fig 1005

PICT-0444a

8. Install a hub puller (Toro p/n TOR6006) onto the wheel studs (Fig. 1007).



Fig 1007

PICT-0446

6

# HYDROSTATIC DRIVE SYSTEM

9. Advance the forcing screw through the hub puller. Tighten the lug nuts down evenly until the hub pops off the wheel motor shaft (Fig. 1008).



Fig 1008

PICT-0447

10. Remove the hub puller from the hub.
11. Remove the key from the keyway (Fig. 1009).



Fig 1009

PICT-0448

12. Thoroughly clean the area around the hydraulic fittings to prevent debris from entering the system.
13. Mark the hoses and corresponding wheel motor fitting ports so the hoses are reconnected back in their original locations (Fig. 1010).

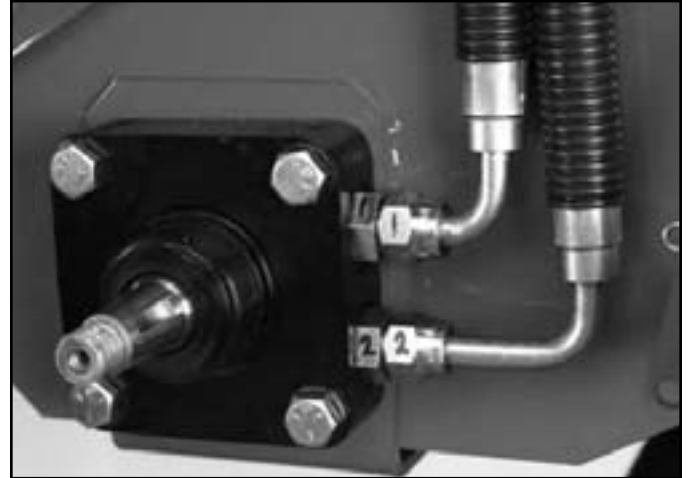


Fig 1010

PICT-0451

14. Position a drain pan under the wheel motor.
15. Disconnect both hydraulic hoses from the wheel motor (Fig. 1011).



Fig 1011

PICT-0453

6

# HYDROSTATIC DRIVE SYSTEM

16. Cap the hoses and wheel motor fittings so that debris does not enter the system. Position the hose ends out of the way of the wheel motor.

17. Remove the 4 bolts securing the wheel motor to the motor mount (Fig. 1012).

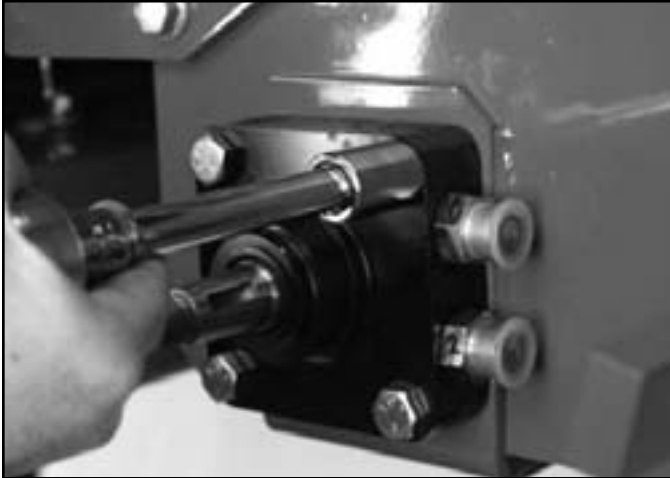


Fig 1012

PICT-0454

19. Remove the 2 fittings from the wheel motor (Fig. 1014).



Fig 1014

PICT-0456

18. Remove the wheel motor (Fig. 1013).

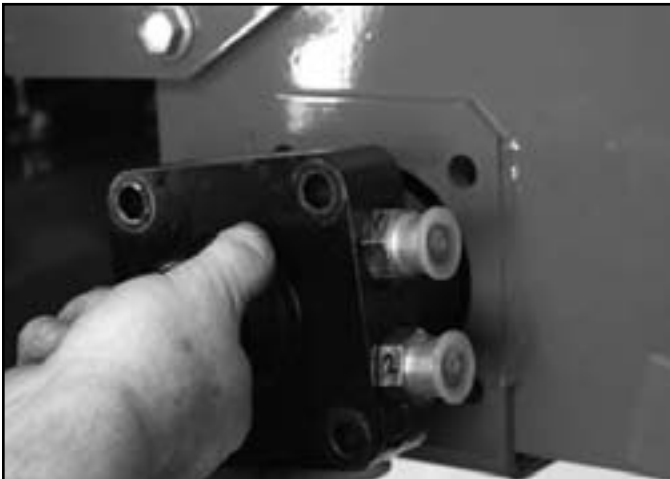


Fig 1013

PICT-0455

## Wheel Motor Installation

1. Transfer the fittings and all markings to the replacement wheel motor. Torque the fittings to 85-95 ft-lbs. (115-129 Nm) (Fig. 1015).



Fig 1015

PICT-0456

6

# HYDROSTATIC DRIVE SYSTEM

2. Position the wheel motor into the frame (Fig. 1016).

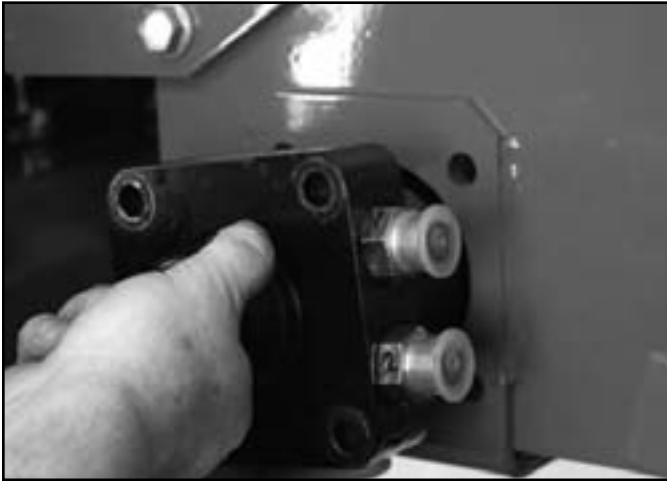


Fig 1016

PICT-0455

4. Uncap the hoses and fittings and connect both hydraulic hoses to the wheel motor, following markings made previously. Torque the hose fittings to 34-38 ft-lbs. (46-52 Nm) (Fig. 1018).



Fig 1018

PICT-0453

3. Install 4 bolts to secure the wheel motor to the motor mount (Fig. 1017).

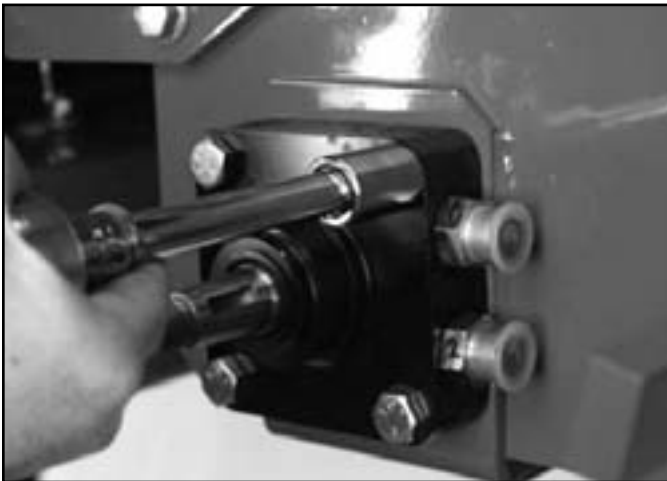


Fig 1017

PICT-0454

5. Install the woodruff key into the wheel motor shaft keyway (Fig. 1019).



Fig 1019

PICT-0449

# HYDROSTATIC DRIVE SYSTEM

6. Clean the hub and shaft to remove any grease or oil. Slide the hub onto the wheel motor shaft (Fig. 1020).



Fig 1020

PICT-0457

8. Slide the wheel and tire assembly onto the hub (Fig. 1022).



Fig 1022

PICT-0460a

7. Loosely install the hub nut onto the wheel motor shaft (Fig. 1021).

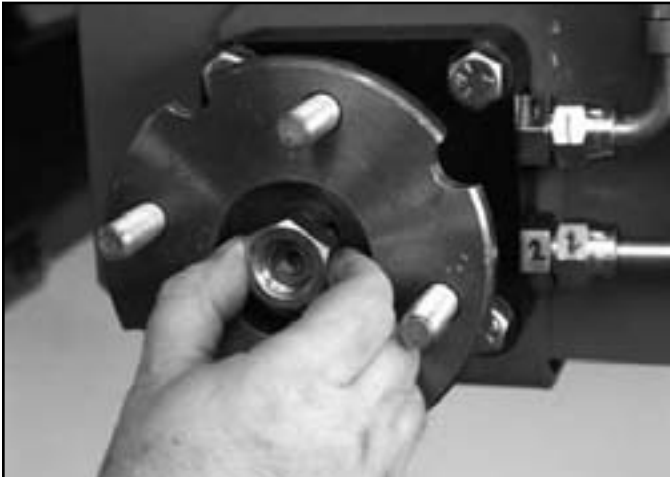


Fig 1021

PICT-0459

9. Snug fit the 4 lug nuts on the wheel hub studs (Fig. 1023).



Fig 1023

PICT-0461a

6

# HYDROSTATIC DRIVE SYSTEM

10. Lower the machine so the rear tires are resting on the ground.
11. Apply the parking brake.
12. Tighten and torque the 4 lug nuts to  $85 \pm 8$  ft-lbs. ( $115 \pm 11$  Nm) (Fig. 1024).



Fig 1024

PICT-0463a

13. Tighten and torque the hub nut to  $200 \pm 25$  ft-lbs. ( $271 \pm 34$  Nm) (Fig. 1025).



Fig 1025

PICT-0462a

14. Fill the hydraulic reservoir tank with hydraulic fluid (15w-50 synthetic engine oil) as specified. Note that there are fill level lines inside of the reservoir (Fig. 1026).



Fig 1026

PICT-0382

15. Purge the hydraulic system. See "Bleeding the Hydraulic System" on page 6-32.



# HYDROSTATIC DRIVE SYSTEM

## Hydraulic Reservoir Replacement

**Note:** There is a hydraulic reservoir shield included on international models (Fig. 1027):



Fig 1027

PICT-2126

## Hydraulic Reservoir Removal

1. Remove the nuts and bolts securing the hydraulic reservoir to the frame (Fig. 1029).



Fig 1029

PICT-0383a

Use the hydraulic tank mounting hardware (2 bolts and nuts) to install the shield to the tank.

Hydraulic Reservoir Shield (Fig. 1028):



Fig 1028

PICT-2125

2. Remove the reservoir cap. Hold the hydraulic reservoir upside down to drain the fluid from the reservoir into a drain pan (Fig. 1030).



Fig 1030

PICT-0385

6

# HYDROSTATIC DRIVE SYSTEM

3. Remove the hydraulic lines from the bottom of the hydraulic reservoir tank (Fig. 1031).



Fig 1031

PICT-0388

4. Loosen the locking nut on the reservoir fitting. (Fig. 1032).

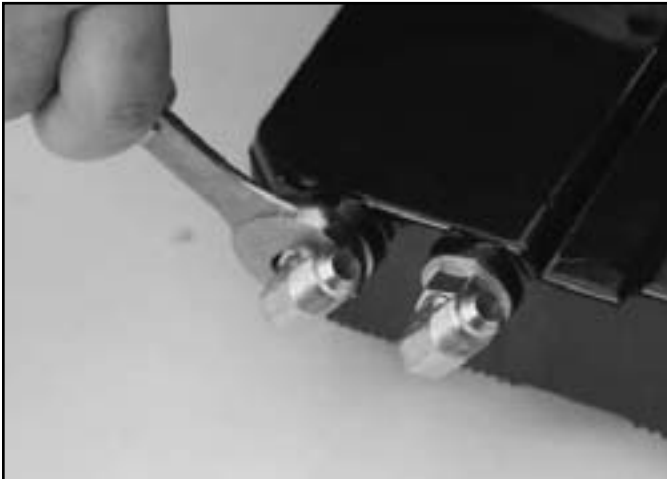


Fig 1032

PICT-0392a

5. Remove the fitting from the reservoir. (Fig. 1033).



Fig 1033

PICT-0393a

6. Repeat steps 4 and 5 to remove the second fitting from the reservoir.

## Hydraulic Reservoir Installation

1. Install two hydraulic fittings into the bottom of the reservoir. Orient as shown (Fig. 1034):



Fig 1034

PICT-0394a

6

# HYDROSTATIC DRIVE SYSTEM

2. Tighten the locking nuts while maintaining the orientation of the fittings (Fig. 1035).



Fig 1035

PICT-0396a

4. Install the two hydraulic hoses onto the reservoir fittings (Fig. 1037).



Fig 1037

PICT-0436a

3. Position the reservoir assembly onto the mounting flange. Install 2 bolts and nuts securing the reservoir (Fig. 1036).



Fig 1036

PICT-0400

5. Fill the reservoir with hydraulic fluid (15w-50 synthetic engine oil) as specified. Note that there are fill level lines inside of the reservoir (Fig. 1038).



Fig 1038

PICT-0382

6. Replace reservoir cap.
7. Bleed the hydraulic system. See "Bleeding the Hydraulic System" on page 6-32.

# HYDROSTATIC DRIVE SYSTEM

## Hydraulic Testing

**Note:** Cleanliness is a key factor in a successful repair of any hydraulic system. Thoroughly clean all exposed surfaces. As with any precision equipment, all parts must be kept free of foreign material and chemicals. Protect all exposed sealing areas and open cavities from damage and foreign material.

The following procedure is performed on the left wheel motor hydraulic hoses. It can also be performed from several other locations on the machine.

When using a Bi-Directional Flow Test Kit, determining directional flow is not necessary. The flow meter may be connected in either direction into the forward and reverse high pressure system lines.

**Caution:** Ensure all fittings and hoses are attached securely. This test is performed on the machine's high pressure system. Failure to comply could result in serious injury.

1. Apply the parking brake.
2. Loosen the 4 lug nuts (Fig. 1039).



Fig 1039

PICT-0373a

3. Raise the rear of the machine and secure with jack stands.
4. Release the parking brake.
5. Remove the 4 lug nuts and the wheel assembly (Fig. 1040).



Fig 1040

PICT-0375

6. Thoroughly clean the area around the hydraulic fittings to prevent debris from entering the system.
7. Mark the hoses and corresponding wheel motor fitting ports (Fig. 1041).



Fig 1041

PICT-0377

6

# HYDROSTATIC DRIVE SYSTEM

8. Position a drain pan under the wheel motor.
9. Disconnect both hydraulic hoses from the wheel motor (Fig. 1042).

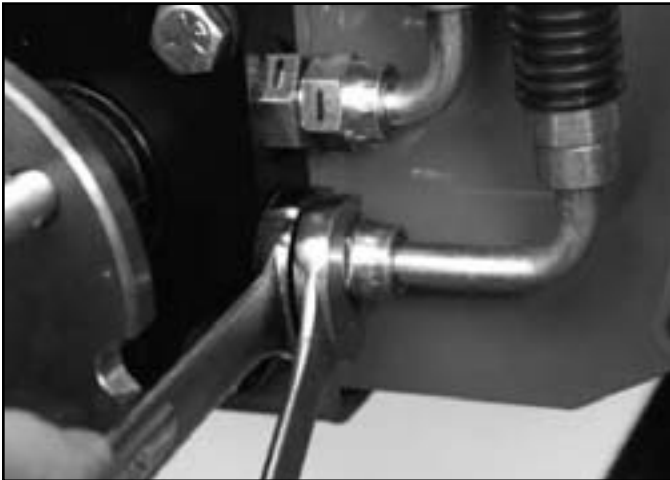


Fig 1042 PICT-0379

10. Cap the wheel motor fittings so debris does not enter the system.
11. Attach the hydraulic hoses to the flow test gauge (Fig. 1043).

**Note:** When using a flow test gauge that is not bi-directional, damage to the flow tester could occur if the machine is operated in reverse.



Fig 1043 PICT-6885

12. Open the restriction valve all the way (counterclockwise) (Fig. 1044).



Fig 1044 PICT-6886a

13. Run the machine for 2 minutes in forward (no load) to purge air from the system.
14. Run the machine at full throttle (no load). Verify the RPM with a tachometer:  $3200 \pm 150$  RPM's. **Do not exceed 3600 RPM.**
15. With the drive control fully forward, slowly tighten the restriction valve until the gauge indicates 300 PSI (21 bar).
16. Record the flow reading from the bi-directional flow meter. Refer to the Hydro-Gear manual for acceptable GPM. Make a second flow reading at 1100 PSI (76 bar) and record that reading. Subtract the first reading from the second reading and determine if it is an acceptable GPM.

Example:

1st Reading: 300 psi (21 bar) reading 7 gpm (26 l/m).  
2nd Reading: 1100 psi (76 bar) reading 3 gpm (11 l/m).

$$\begin{array}{r} 7 \text{ gpm (1st reading)} \\ - 3 \text{ gpm (2nd reading)} \\ \hline 4 \text{ gpm (the difference)} \end{array}$$

An acceptable "flow droop" or difference is 1.5 gpm (5.6 l/m)

# HYDROSTATIC DRIVE SYSTEM

17. After all necessary repairs have been made, reconnect the hydraulic hoses to the wheel motor fittings.
18. Slide the wheel and tire assembly onto the hub and snug fit the 4 lug nuts on the wheel hub studs (Fig. 1045).



Fig 1045

PICT-0380

19. Lower the machine so the rear tires are resting on the ground.
20. Apply the parking brake.
21. Tighten and torque the 4 lug nuts to  $85 \pm 8$  ft-lbs. ( $115 \pm 11$  Nm) (Fig. 1046).



Fig 1046

PICT-0381

22. Fill the reservoir with hydraulic fluid (15w-50 synthetic engine oil) as specified. Note that there are fill level lines inside of the reservoir (Fig. 1047).



Fig 1047

PICT-0382

23. Release the parking brake.
24. Bleed the hydraulic system. See "Bleeding the Hydraulic System" on page 6-32.

# HYDROSTATIC DRIVE SYSTEM

## Bleeding the Hydraulic System

Due to the effects air has on efficiency in hydrostatic drive applications, it is critical that air is purged from the system.

These purge procedures should be implemented any-time a hydrostatic system has been opened to facilitate maintenance or any additional oil has been added to the system.

Air creates inefficiency because it has compression and expansion rates that are higher than that of oil.

Entrained air in the oil may cause the following symptoms:

- Noisy operation
- Lack of power or drive after short-term operation
- High operation temperature and excessive expansion of oil.

Before starting, make sure the reservoir is at the proper oil level. If it is not, fill to the vehicle manufacturer's specifications.

The following procedures should be performed with the vehicle drive wheels off the ground, then repeated under normal operating conditions.

1. Disengage the PTO.
2. Stop the engine and wait for all moving parts to stop before leaving the operating position.
3. Support the rear of the machine on jack stands high enough to raise the drive wheels off the ground.
4. With the bypass valve open and the engine running, slowly move the directional control in both forward and reverse directions (5 to 6 times), as air is purged from the unit, the oil level will drop.
5. With the bypass valve closed and the engine running, slowly move the directional control in both forward and reverse directions (5 to 6 times). Check the oil level, and add oil as required after stopping engine.
6. It may be necessary to repeat Steps 4 and 5 until all the air is completely purged from the system. When the BDP's move forward and reverse at normal speed purging is complete.

Cleanliness is a key factor in the successful repair of BDP's. Thoroughly clean all exposed surfaces prior to any type of maintenance. Cleaning of all parts by using a solvent wash and air drying is usually adequate. As with any precision equipment, all parts must be kept free of foreign material and chemicals. Protect all exposed sealing areas and open cavities from damage and foreign material.

Upon removal, all seals, O-rings, and gaskets should be replaced. During installation, lightly lubricate all seals, O-rings, gaskets with clean petroleum jelly prior to assembly. Also protect the inner diameter of seals by covering the shaft machined features with plastic wrap or equivalent.

6



### WARNING

#### POTENTIAL FOR SERIOUS INJURY

**Certain procedures require the vehicle engine to be operated and the vehicle to be raised off of the ground. To prevent possible injury to the servicing technician and/or bystanders, insure the vehicle is properly secured.**

# HYDROSTATIC DRIVE SYSTEM

## Checking the Hydraulic Lines

After every 100 operating hours, check hydraulic lines and hoses for leaks, loose fittings, kinked lines, loose mounting supports, wear, weather and chemical deterioration. Make necessary repairs before operating.

**Note:** Keep areas around hydraulic system clean from grass and debris build up.



Hydraulic fluid escaping under pressure can penetrate skin and cause injury.

- If hydraulic fluid is injected into the skin it must be surgically removed within a few hours by a doctor familiar with this type of injury. Gangrene may result if this is not done.
- Keep body and hands away from pin hole leaks or nozzles that eject high pressure hydraulic fluid.
- Use cardboard or paper to find hydraulic leaks.
- Safely relieve all pressure in the hydraulic system before performing any work on the hydraulic system.
- Make sure all hydraulic fluid hoses and lines are in good condition and all hydraulic connections and fittings are tight before applying pressure to hydraulic system.



# HYDROSTATIC DRIVE SYSTEM

## Hydraulic Schematic

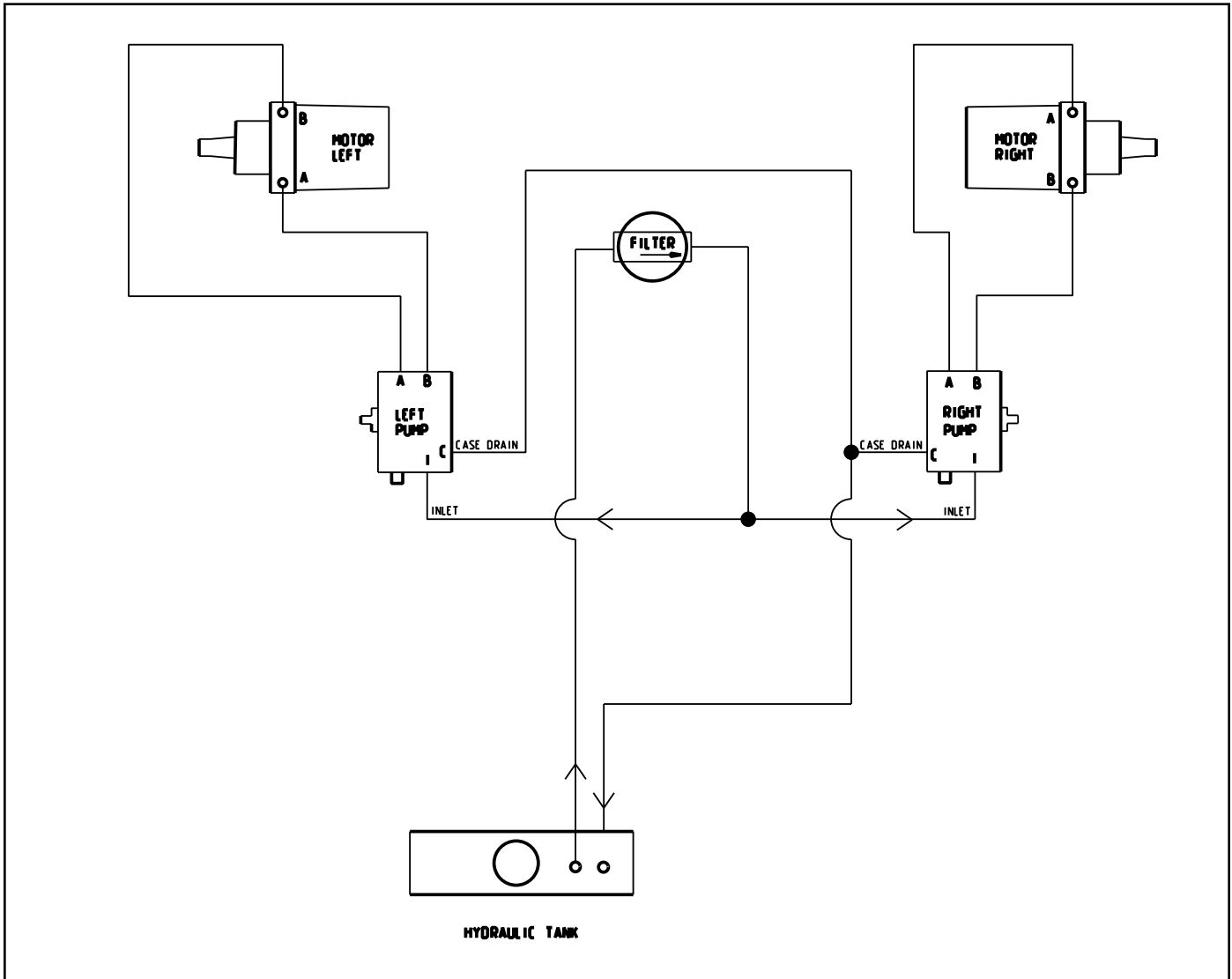


Fig 1048

hyd scheme G006100

6

## Traction Drive Belt Replacement

**Note:** The trailing shield has been removed for photo purposes.

### Traction Drive Belt Removal

1. Remove the mower spindle drive belt. Refer to: "Mower Spindle Drive Belt Belt Removal (36" Mower Deck)" on page 8-4, or "Mower Spindle Drive Belt Belt Removal (40", 48", 52" and 60" Mower Decks)" on page 8-1.
2. Unplug the clutch from the wire harness (Fig. 1049).



Fig 1049

PICT-1422

3. Push the clutch wire plug and grommet through the engine deck frame (Fig. 1050).



Fig 1050

PICT-1357

4. Remove the bolt, nut, 2 washers and spacer securing the brake clutch strap to the underside of the chassis (Fig. 1051).



Fig 1051

PICT-1368

# GEAR DRIVE

- Unhook the gear drive idler spring from the tab on the frame (Fig. 1052).

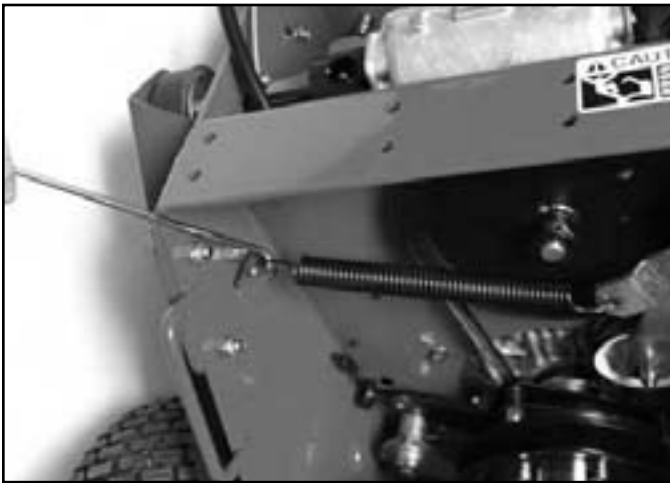


Fig 1052

PICT-1443

- Remove the traction drive belt from around the pulleys and remove it from the machine (Fig. 1053).



Fig 1053

PICT-1447

## Traction Drive Belt Installation

**Note:** The trailing shield has been removed for photo purposes.

- Route the traction drive belt around the pulleys (Fig. 1054).

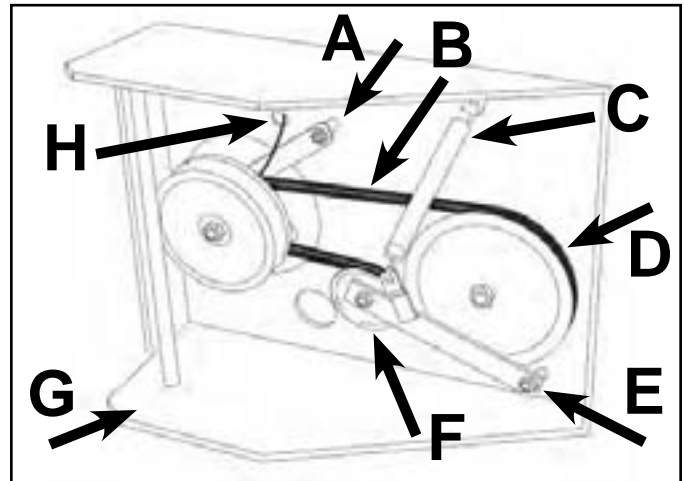


Fig 1054

fig. 47 G000264

- |                      |                          |
|----------------------|--------------------------|
| A. Clutch retainer   | E. Pivot bolt            |
| B. Transmission belt | F. Idler pulley          |
| C. Tension spring    | G. Engine deck           |
| D. Driven pulley     | H. Clutch wire connector |

- Hook the drive belt idler spring to the tab on the frame (Fig. 1055).



Fig 1055

PICT-1443

7

# GEAR DRIVE

7. Feed the clutch harness plug up through the chassis (Fig. 1056).



Fig 1056

PICT-1415

9. Install the bolt, nut, 2 washers and spacer to secure the brake clutch strap to the underside of the frame (Fig. 1058).



Fig 1058

PICT-1488

8. Install the rubber grommet into the frame (Fig. 1057).



Fig 1057

PICT-1417

10. Plug the clutch into the wire harness (Fig. 1059).



Fig 1059

PICT-1422

11. Install the mower spindle drive belt. Refer to: "Mower Spindle Drive Belt Installation (36" Mower Deck)" on page 8-5, or "Mower Spindle Drive Belt Installation (40", 48", 52" and 60" Mower Decks)" on page 8-2.

# GEAR DRIVE

## Gear Drive Idler Replacement

**Note:** The trailing shield has been removed for photo purposes.

### Gear Drive Idler Removal

1. Turn the engine off and remove the key from the ignition.
2. Unhook the drive belt idler spring from the tab on the frame (Fig. 1060).

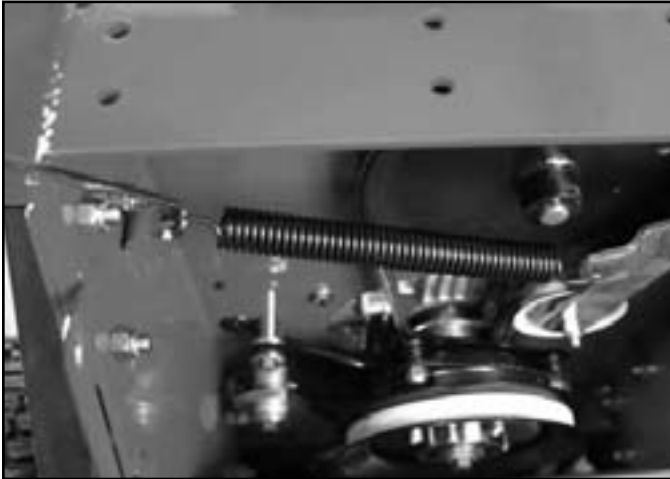


Fig 1060

PICT-1496

3. Remove the nut from the bolt securing the gear drive idler arm to the frame (Fig. 1061).

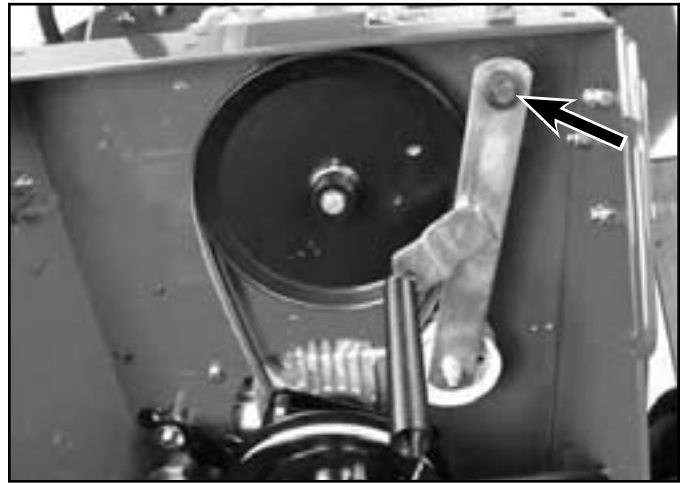


Fig 1061

PICT-1497

4. Remove the gear drive idler assembly out of the frame (Fig. 1062).



Fig 1062

PICT-1499

# GEAR DRIVE

5. Remove the shoulder bolt from the idler arm assembly (Fig. 1063).

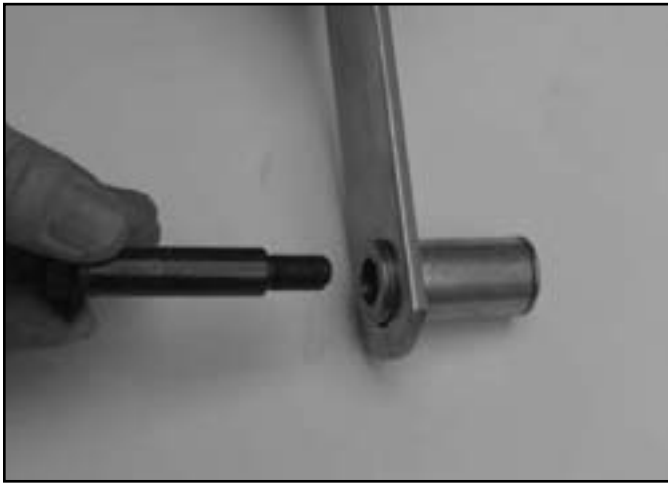


Fig 1063

PICT-1500a

7. Remove the nut from the bolt securing the idler pulley to the idler arm (Fig. 1065).

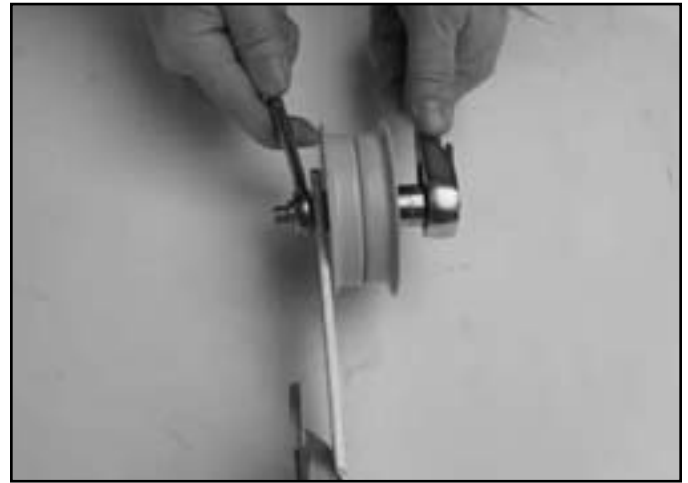


Fig 1065

PICT-1502a

6. Remove the spring from the idler arm (Fig. 1064).



Fig 1064

PICT-1501

8. Remove the bolt and idler pulley from the idler arm (Fig. 1066).



Fig 1066

PICT-1507a

# GEAR DRIVE

9. Remove the 2 flange bushings from the idler arm (Fig. 1067).



Fig 1067

PICT-1506a

2. Install the pulley to the idler arm with a bolt and nut. The pulley hub is installed facing the idler arm (Fig. 1069).



Fig 1069

PICT-1504a

## Gear Drive Idler Installation

1. Install 2 flange bushings into the idler arm pivot (Fig. 1068).



Fig 1068

PICT-1508

3. Install the idler spring onto the idler arm (Fig. 1070).



Fig 1070

PICT-1501

7

# GEAR DRIVE

4. Insert the shoulder bolt into the idler arm pivot and position the idler assembly into the frame (Fig. 1071).



Fig 1071

PICT-1499

6. Hook the drive belt idler spring to the tab on the frame (Fig. 1073).



Fig 1073

PICT-1496

5. Install a nut onto the shoulder bolt securing the idler assembly to the frame (Fig. 1072).

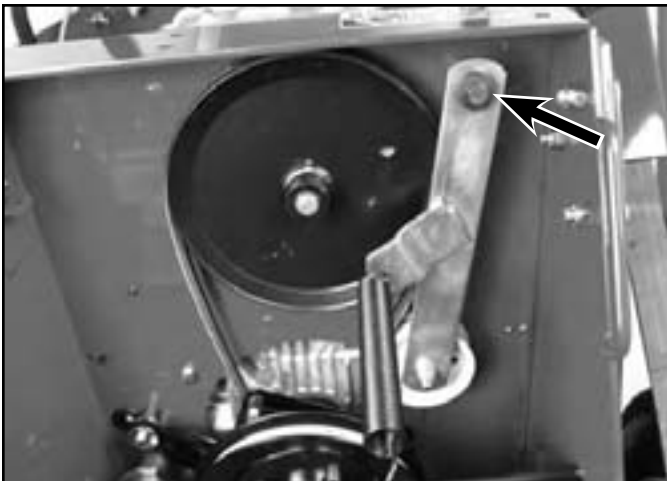


Fig 1072

PICT-1497

## Transmission Driven Pulley Replacement

**Note:** The trailing shield has been removed for photo purposes.

### Transmission Driven Pulley Removal

1. Turn the engine off and remove the key from the ignition.
2. Raise the machine to access the underside of the frame.

7



# GEAR DRIVE

3. Unhook the drive belt idler spring from the tab on the frame (Fig. 1074).

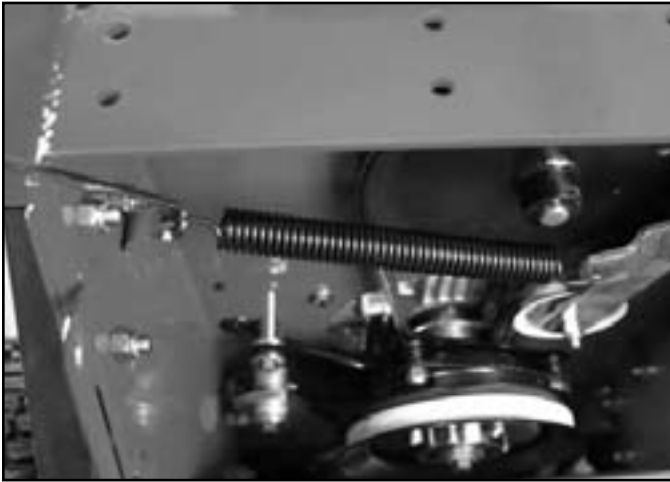


Fig 1074

PICT-1496

5. Remove the gear drive idler assembly out of the frame (Fig. 1076).



Fig 1076

PICT-1499

4. Remove the nut from the bolt securing the gear drive idler arm to the frame (Fig. 1075).

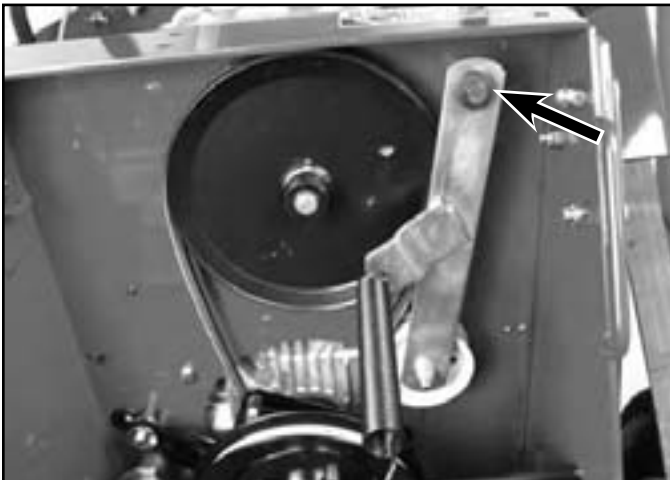


Fig 1075

PICT-1497

6. Remove the drive belt from the transmission driven pulley (Fig. 1077).



Fig 1077

PICT-1575

7

# GEAR DRIVE

7. Remove the retaining ring from the end of the transmission drive shaft (Fig. 1078).



Fig 1078

PICT-1510

9. Slide the driven pulley off the transmission drive shaft (Fig. 1080).



Fig 1080

PICT-1512

8. Loosen the set screw securing the transmission driven pulley to the transmission driveshaft (Fig. 1079).



Fig 1079

PICT-1511

10. Remove the key from the transmission driveshaft keyway (Fig. 1081).



Fig 1081

PICT-1513

7

# GEAR DRIVE

11. Remove the set screw from the driven pulley (Fig. 1082).



Fig 1082

PICT-1515

2. Insert the key into the keyway on the transmission driveshaft (Fig. 1084).



Fig 1084

PICT-1566

## Transmission Driven Pulley Installation

1. Apply anti-seize to the transmission driveshaft (Fig. 1083).



Fig 1083

PICT-1564

3. Apply thread locking compound to the driven pulley set screw (Fig. 1085).



Fig 1085

PICT-1567a

7

# GEAR DRIVE

4. Begin threading the set screw into the driven pulley hub (Fig. 1086).



Fig 1086

PICT-1518

6. Tighten the set screw securing the transmission driven pulley to the transmission driveshaft (Fig. 1088).



Fig 1088

PICT-1511

5. Slide the driven pulley onto the transmission drive shaft (Fig. 1087).



Fig 1087

PICT-1571

7. Install a retaining ring onto the end of the transmission drive shaft (Fig. 1089).



Fig 1089

PICT-1510

7

# GEAR DRIVE

8. Install the drive belt onto the transmission driven pulley (Fig. 1090).



Fig 1090

PICT-1575

10. Install a nut onto the bolt securing the gear drive idler assembly to the frame (Fig. 1092).

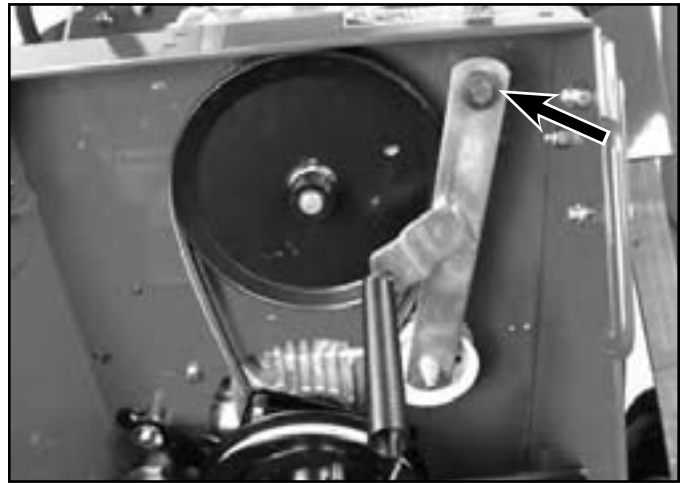


Fig 1092

PICT-1497

9. Position the gear drive idler assembly into of the frame with the bolt inserted through the mounting hole (Fig. 1091).



Fig 1091

PICT-1499

11. Hook the gear drive idler spring to the spring tab on the frame (Fig. 1093).

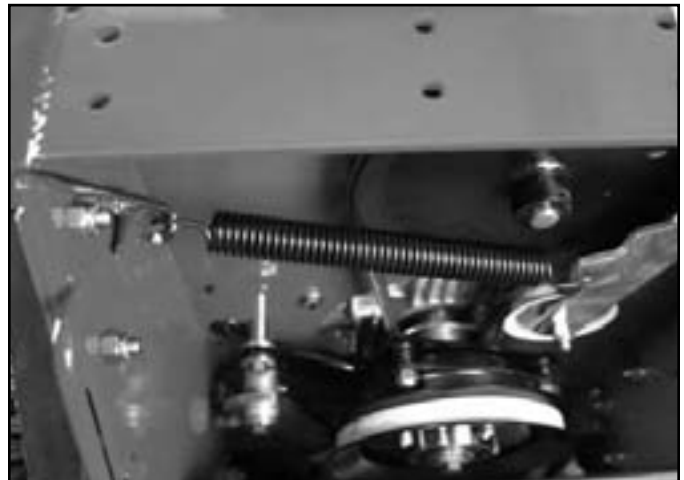


Fig 1093

PICT-1496

12. Lower the machine.

7

## Gear Drive Transmission Replacement

**Note:** The trailing shield has been removed for photo purposes.

### Gear Drive Transmission Removal

1. Turn the engine off and remove the key from the ignition.
2. Raise the machine to access the underside of the frame.
3. Unhook the gear drive idler spring from the tab on the frame (Fig. 1094).

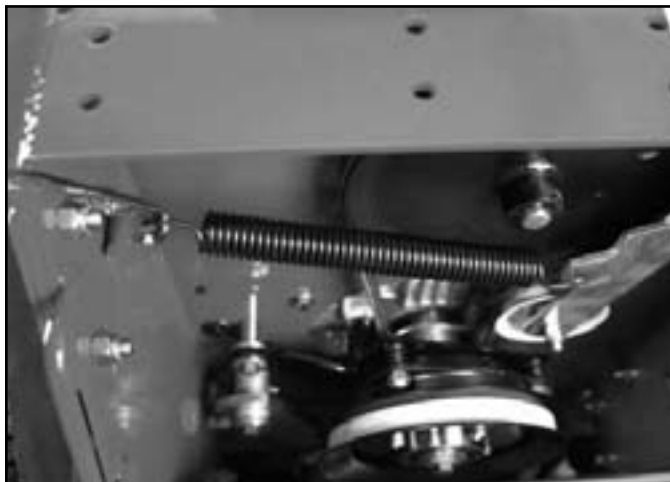


Fig 1094

PICT-1496

4. Remove the nut from the bolt securing the gear drive idler arm to the frame (Fig. 1095).

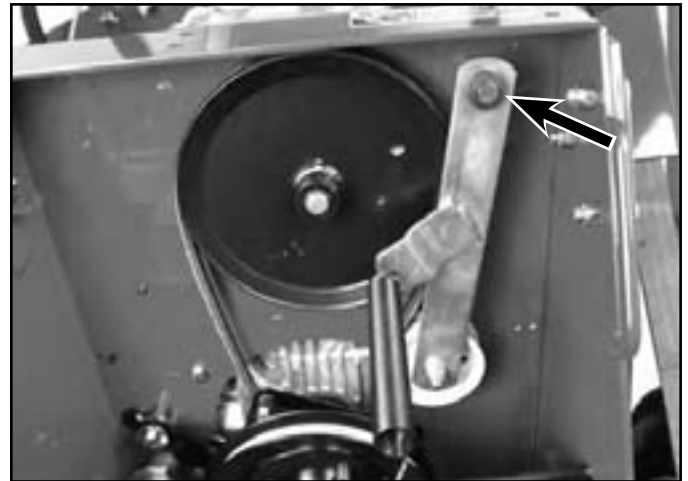


Fig 1095

PICT-1497

5. Lower the gear drive idler assembly out of the frame (Fig. 1096).



Fig 1096

PICT-1499

# GEAR DRIVE

6. Remove the drive belt from the transmission driven pulley (Fig. 1097).



Fig 1097

PICT-1575

8. Loosen the set screw securing the transmission driven pulley to the transmission driveshaft (Fig. 1099).



Fig 1099

PICT-1511

7. Remove the retaining ring from the end of the transmission drive shaft (Fig. 1098).



Fig 1098

PICT-1510

9. Slide the driven pulley off the transmission driveshaft (Fig. 1100).



Fig 1100

PICT-1512

# GEAR DRIVE

10. Remove the key from the transmission driveshaft keyway (Fig. 1101).



Fig 1101

PICT-1513

11. Lower the machine.
12. Release the parking brake.
13. Remove the 3 lower idler support mounting bolts (Fig. 1102).



Fig 1102

PICT-1519

14. Loosen the idler support bracket pivot bolt (Fig. 1103).



Fig 1103

PICT-1520

15. Rotate the idler support bracket so that it is out of the way of the transmission pulley (Fig. 1104).



Fig 1104

PICT-1521



# GEAR DRIVE

16. Remove the wheel drive belt from the transmission pulley (Fig. 1105).



Fig 1105

PICT-1524

18. Slide the transmission pulley/output shaft assembly away from the transmission and out of the frame (Fig. 1107).



Fig 1107

PICT-1554

17. Remove the 2 bolts and nuts securing the transmission axle flange bearing to the frame (Fig. 1106).

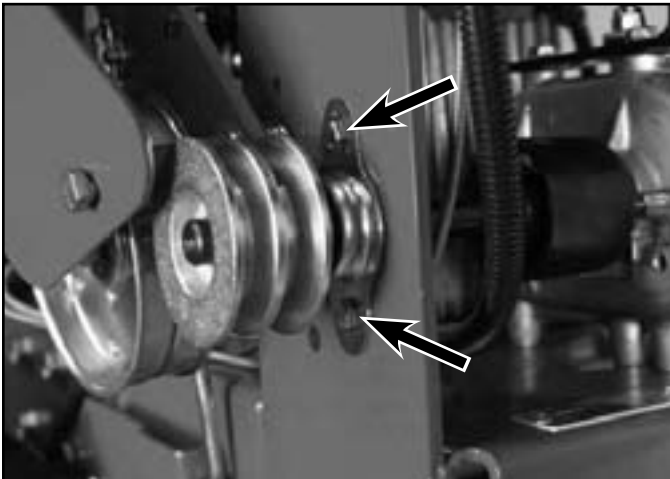


Fig 1106

PICT-1525

19. Remove the coupler and coupler guard from the transmission splined shaft (Fig. 1108).



Fig 1108

PICT-1531

# GEAR DRIVE

20. Remove the 2 bolts and nuts that secure the opposite transmission axle flange bearing to the frame (Fig. 1109).

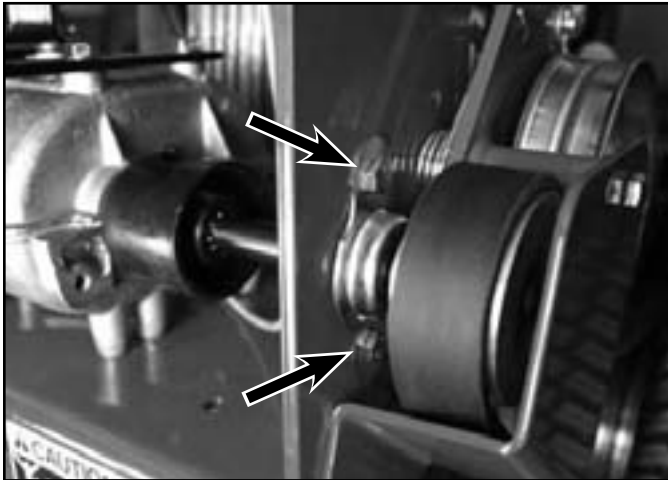


Fig 1109

PICT-1536

21. Remove the 4 transmission mounting bolts and lock washers (Fig. 1110).



Fig 1110

PICT-1534

22. Remove the transmission from the frame by rocking it backward and pulling the transmission from the remaining coupler assembly (Fig. 1111).

**Note:** The coupler may come off of the axle with the transmission. If so, remove it from the transmission and replace it onto the axle.



Fig 1111

PICT-1542a

23. Remove the 4 bolts securing the shift plate to the transmission (Fig. 1112).

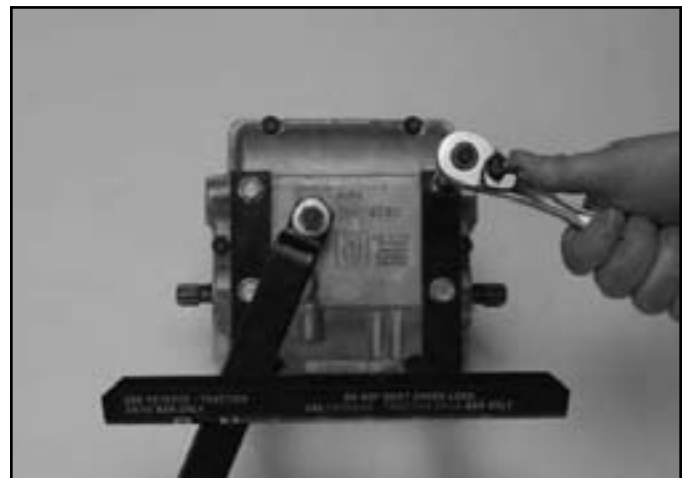


Fig 1112

PICT-5056a

# GEAR DRIVE

24. Remove the shift plate assembly from the transmission (Fig. 1113).



Fig 1113

PICT-5060

25. Remove the bolt and Belleville washer securing the shift lever to the transmission (Fig. 1114).

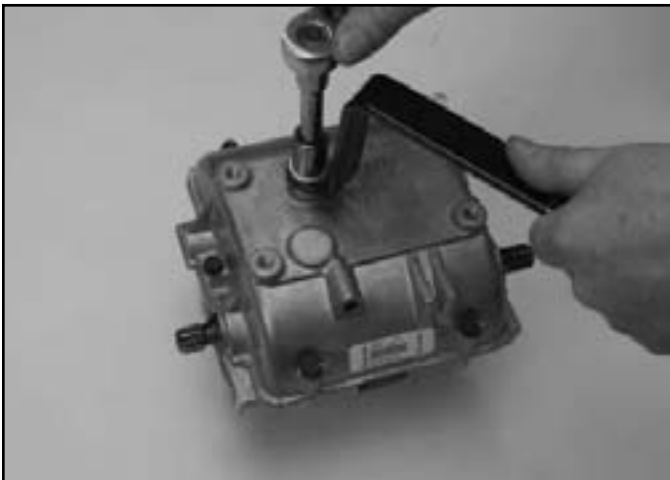


Fig 1114

PICT-5067a

26. Remove the shift lever and washer from the transmission shifter shaft (Fig. 1115).

**Note:** For transmission service procedures, refer to the appropriate Tecumseh Peerless Service Manual.

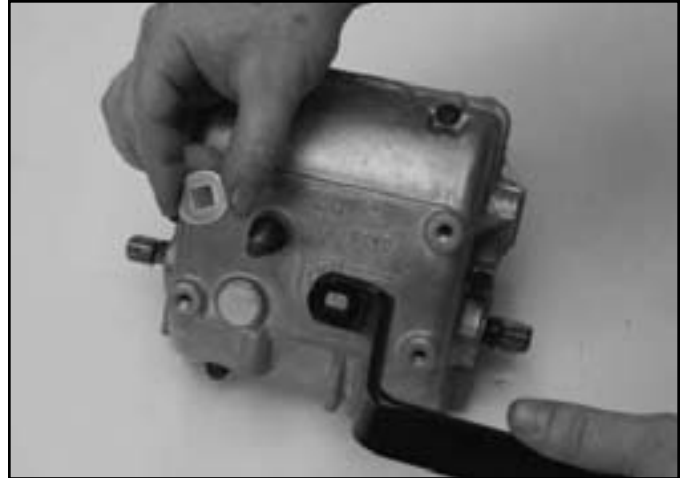


Fig 1115

PICT-5070a

## Gear Drive Transmission Installation

1. Install the square ID washer and shift lever onto the transmission shifter shaft (Fig. 1116).

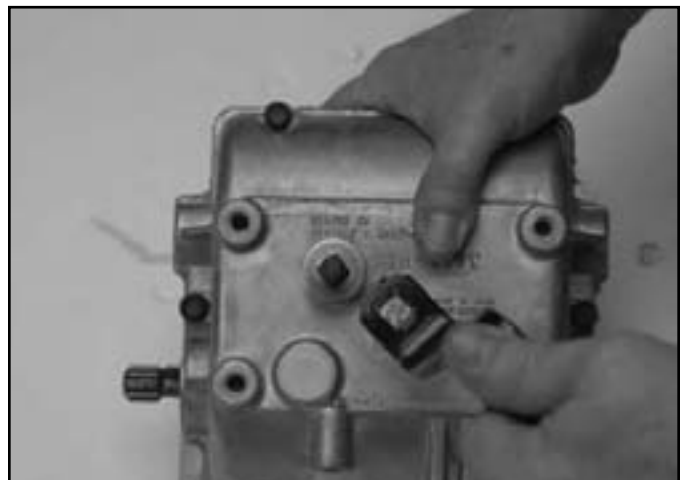


Fig 1116

PICT-5072a

# GEAR DRIVE

2. Install the Belleville washer oriented with the crown up (Fig. 1117).

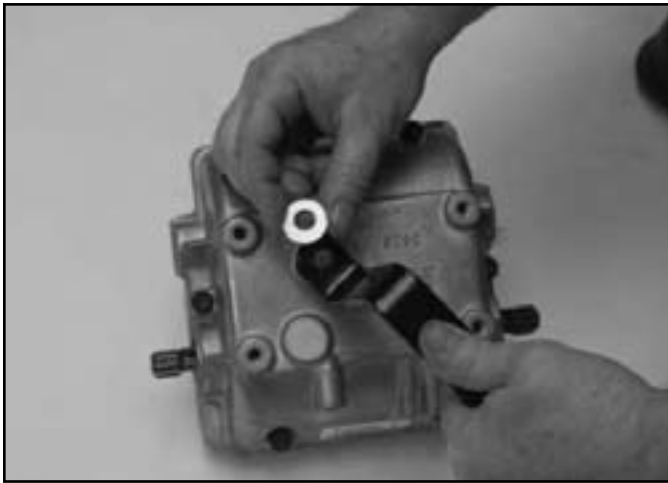


Fig 1117

PICT-5077a

4. Position the shift plate assembly over the shift lever and onto the transmission (Fig. 1119).



Fig 1119

PICT-5081

3. Install the nut to secure the shift lever and washers to the transmission shifter post. Torque the nut to 30 – 35 ft-lbs. (40.67 – 47.45 Nm) (Fig. 1118).

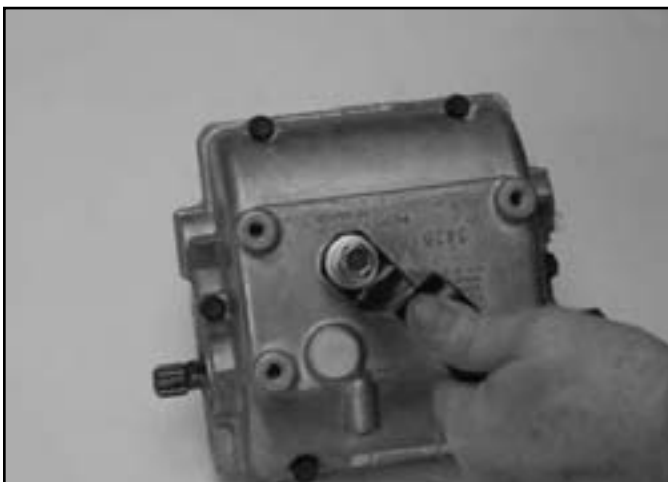


Fig 1118

PICT-5080a

5. Install 4 bolts to secure the shift plate to the transmission (Fig. 1120).

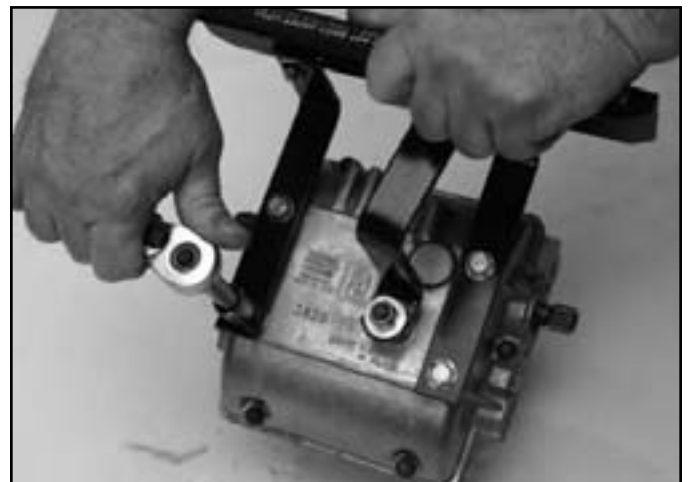


Fig 1120

PICT-5087

# GEAR DRIVE

- Slide the transmission splined shaft into the RH coupler assembly. Position the transmission so that the output shaft drops through the opening in the frame (Fig. 1121).

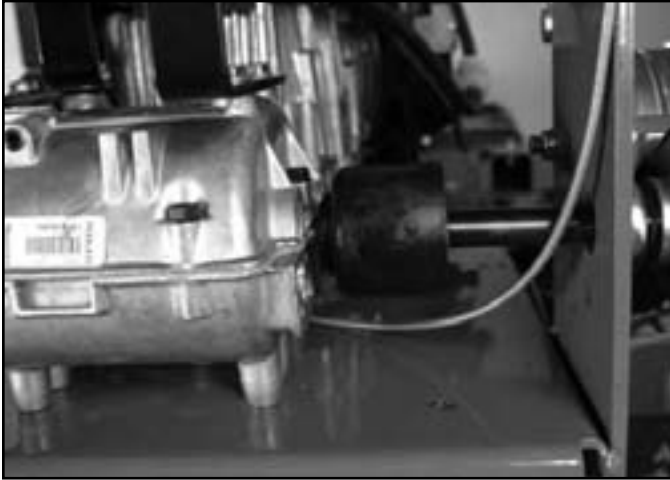


Fig 1121

PICT-1549

- Install 4 transmission mounting bolts and lock washers securing the transmission to the frame (Fig. 1123).



Fig 1123

PICT-1534

- Install 2 bolts and nuts to secure the flange bearing to the frame (Fig. 1122).

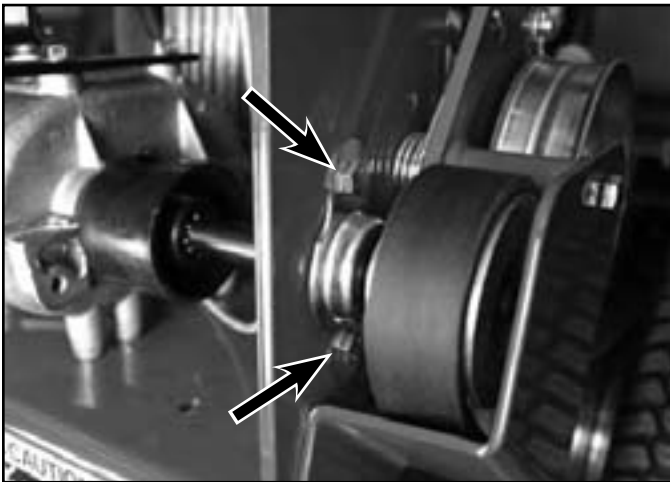


Fig 1122

PICT-1536

- Slide the coupler and coupler guard onto the transmission splined shaft (Fig. 1124).

**Note:** Align the 2 grease fittings.

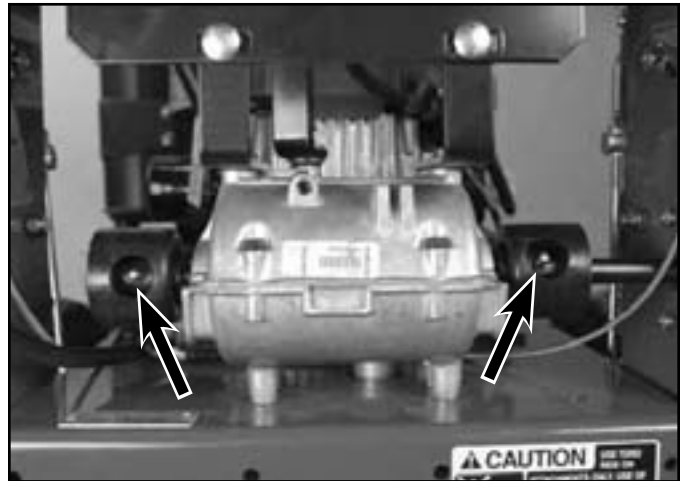


Fig 1124

PICT-1553a

# GEAR DRIVE

- Slide the transmission pulley/output shaft assembly through the frame and into the coupler assembly (Fig. 1125).



Fig 1125

PICT-1554

**Note:** Relubricate the shafts, if needed (Fig. 1127).

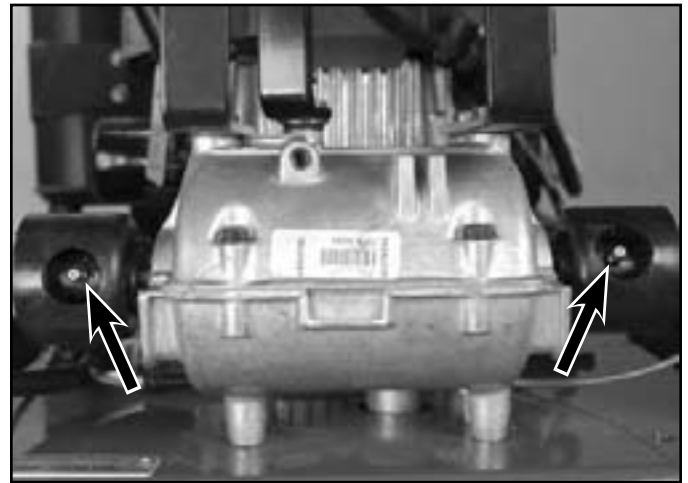


Fig 1127

PICT-1553a

- Install 2 bolts and nuts securing the transmission axle flange bearing to the frame (Fig. 1126).

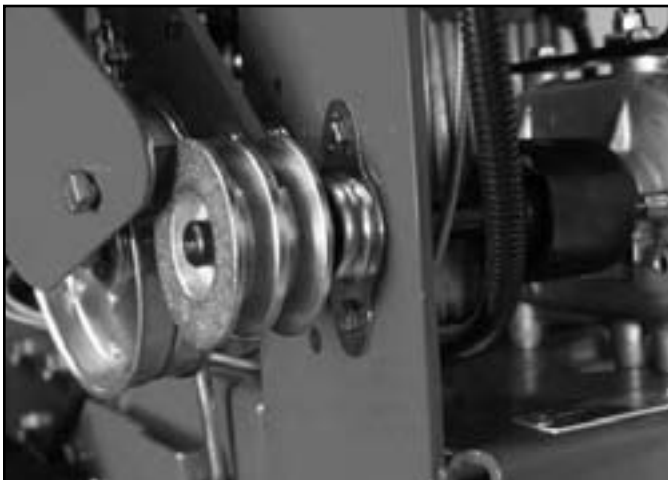


Fig 1126

PICT-1525

- Route the wheel drive belt around the transmission pulley (Fig. 1128).



Fig 1128

PICT-1524

# GEAR DRIVE

13. Rotate the idler support bracket back in place so that the mounting holes line up with the holes in the frame (Fig. 1129).



Fig 1129

PICT-1555

15. Tighten the idler support bracket pivot bolt (Fig. 1131).



Fig 1131

PICT-1520

14. Loosely install 3 idler support bracket mounting bolts and nuts (Fig. 1130).



Fig 1130

PICT-1519

16. Tighten the 3 lower idler support bracket mounting bolts (Fig. 1132).



Fig 1132

PICT-1519

# GEAR DRIVE

17. Raise the machine to access the underside of the frame.
18. Apply anti-seize to the transmission driveshaft (Fig. 1133).



Fig 1133

PICT-1564

19. Insert the key into the keyway on the transmission driveshaft (Fig. 1134).



Fig 1134

PICT-1566

20. Apply thread locking compound to the driven pulley set screw (Fig. 1135).



Fig 1135

PICT-1567a

21. Begin threading the set screw into the driven pulley hub (Fig. 1136).



Fig 1136

PICT-1518



# GEAR DRIVE

22. Slide the driven pulley onto the transmission drive shaft (Fig. 1137).



Fig 1137

PICT-1571

24. Install a retaining ring onto the end of the transmission drive shaft (Fig. 1139).



Fig 1139

PICT-1510

23. Tighten the set screw securing the transmission driven pulley to the transmission driveshaft (Fig. 1138).



Fig 1138

PICT-1511

25. Route the drive belt onto the transmission driven pulley (Fig. 1140).



Fig 1140

PICT-1575

7

# GEAR DRIVE

26. Insert the shoulder bolt into the idler arm pivot and position the idler assembly into the frame (Fig. 1141).



Fig 1141

PICT-1499

28. Hook the gear drive idler spring to the spring tab on the frame (Fig. 1143).

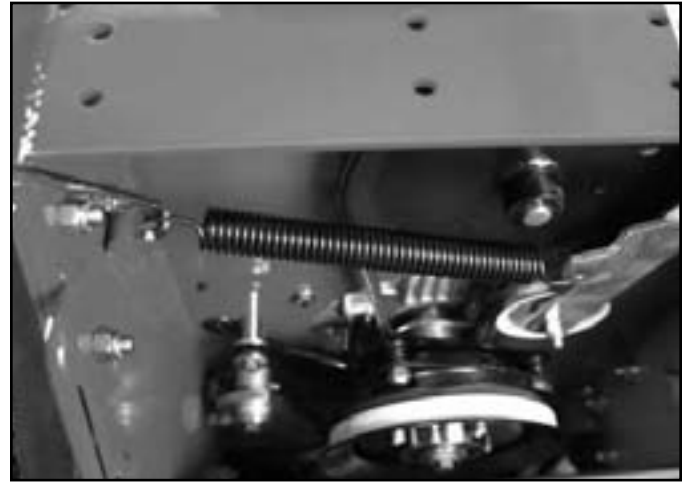


Fig 1143

PICT-1496

27. Install a nut onto the bolt securing the gear drive idler arm to the frame (Fig. 1142).

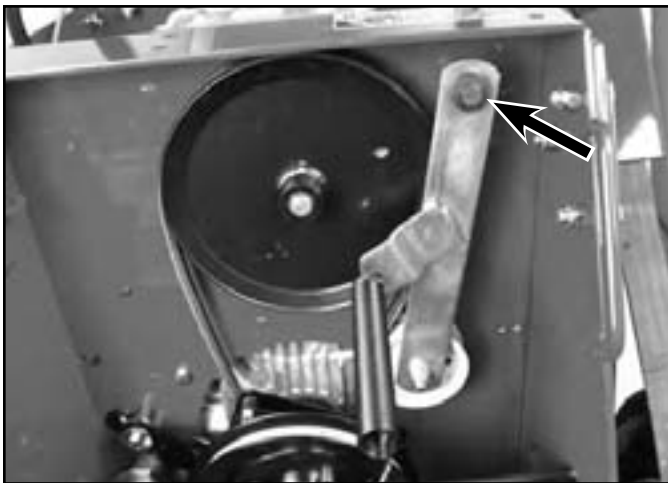


Fig 1142

PICT-1497

29. Lower the machine.

# GEAR DRIVE

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**7**

## Mower Spindle Drive Belt Replacement

### Mower Spindle Drive Belt Removal (40", 48", 52" and 60" Mower Decks)

1. Turn the ignition off and remove the key. Set the parking brake.
2. Remove the carrier frame cover (Fig. 1144).



Fig 1144

PICT-1038

3. Loosen the nut securing the center spindle belt guide to the mower deck (Fig. 1145).



Fig 1145

PICT-1023a

4. Rotate the belt guide out of the way of the PTO drive belt (Fig. 1146).



Fig 1146

PICT-1024a

5. Roll the PTO drive belt off the center spindle pulley (Fig. 1147).



Fig 1147

PICT-1026

# MOWER DECKS

6. Remove the right and left belt covers (Fig. 1148).



Fig 1148

PICT-1039

8. Remove the mower spindle drive belt (Fig. 1150).



Fig 1150

PICT-1043

7. Using a spring removal tool (Toro p/n: 92-5771) remove the idler spring from the spring plate (Fig. 1149).



Fig 1149

PICT-1042

## Mower Spindle Drive Belt Installation (40", 48", 52" and 60" Mower Decks)

1. Route the mower spindle drive belt around the mower deck pulleys. Refer to the deck routing decal (Fig. 1151):

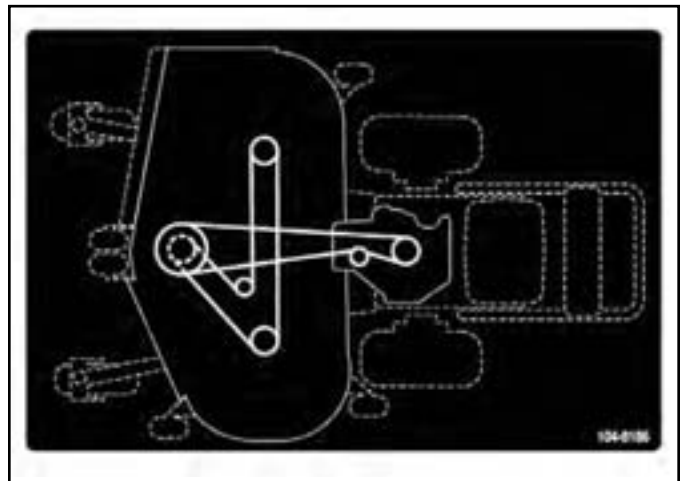


Fig 1151

fig. 104-8186

# MOWER DECKS

- Using a spring removal tool (Toro p/n: 92-5771), hook the idler spring to the spring plate (Fig. 1152).



Fig 1152

PICT-1042

- Ensure the PTO drive belt is routed around the clutch pulley and the idler pulley. Roll the PTO drive belt onto the center spindle pulley (Fig. 1154 and Fig. 1155).



Fig 1154

PICT-1030a

- Install the right and left belt covers (Fig. 1153).



Fig 1153

PICT-1039



Fig 1155

PICT-1026a

# MOWER DECKS

5. Rotate the belt guide into place so that it is approximately 1/8" (3mm) away from the PTO drive belt (Fig. 1156).

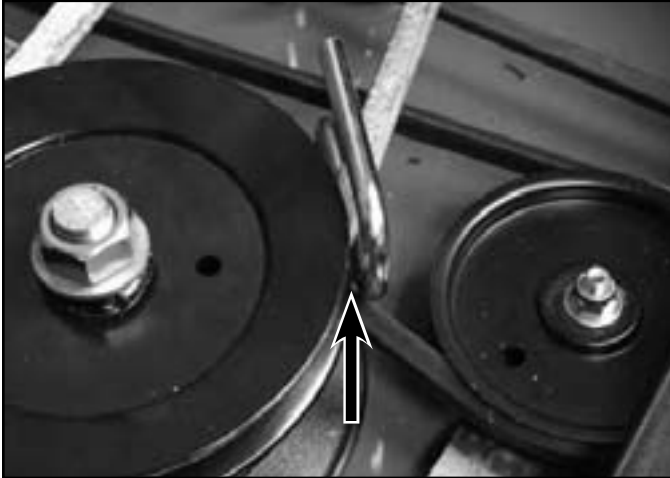


Fig 1156

PICT-1031

6. Tighten the nut securing the center spindle belt guide to the mower deck (Fig. 1157).



Fig 1157

PICT-1023a

7. Install the carrier frame cover (Fig. 1158).



Fig 1158

PICT-1022

## Mower Spindle Drive Belt Removal (36" Mower Deck)

1. Remove the PTO drive belt. Refer to "PTO Drive Belt Removal" on page 8-8.
2. Unhook the idler spring from the spring post (Fig. 1159).



Fig 1159

PICT-1448

3. Remove the mower deck belt from around pulleys and remove it from the machine (Fig. 1160).



Fig 1160

PICT-1449

2. Hook the idler spring to the spring post (Fig. 1162).



Fig 1162

PICT-1448

## Mower Spindle Drive Belt Installation (36" Mower Deck)

1. Route the mower spindle drive belt around the pulleys. Refer to the belt routing decal (Fig. 1161).

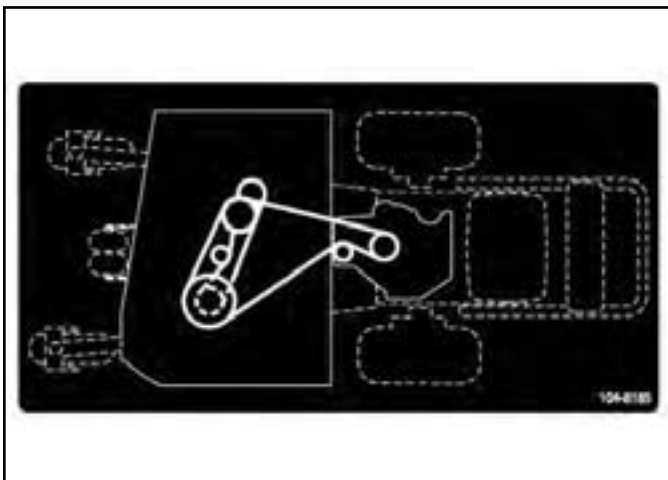


Fig 1161

fig. 104-8185

3. Install the PTO drive belt. Refer to "PTO Drive Belt Installation" on page 8-9.



# MOWER DECKS

## PTO Drive Belt Replacement

### PTO Drive Belt Removal (40", 48", 52" and 60" Mower Decks)

1. Turn the ignition off and remove the key.
2. Set the parking brake.
3. Remove the carrier frame cover (Fig. 1163).



Fig 1163 PICT-1038

4. Loosen the nut securing the center spindle belt guide to the mower deck (Fig. 1164).



Fig 1164 PICT-1023a

5. Rotate the belt guide out of the way of the PTO drive belt (Fig. 1165).



Fig 1165 PICT-1024a

6. Roll the PTO drive belt off the center spindle pulley (Fig. 1166).



Fig 1166 PICT-1026a

7. Raise the machine to access the underside.
8. Remove the PTO drive belt from around the clutch pulley and the idler pulley and remove it from the machine (Fig. 1167).



Fig 1167

PICT-1028

3. Lower the machine to access the top of the mower deck.
4. Roll the PTO drive belt onto the center spindle pulley (Fig. 1169).



Fig 1169

PICT-1026a

## PTO Drive Belt Installation (40", 48", 52" and 60" Mower Decks)

1. Raise the machine to access the underside.
2. Route the PTO drive belt around the clutch pulley and the idler pulley (Fig. 1168).



Fig 1168

PICT-1030a

5. Rotate the belt guide into place so that it is approximately 1/8" (3mm) away from the PTO drive belt (Fig. 1170).

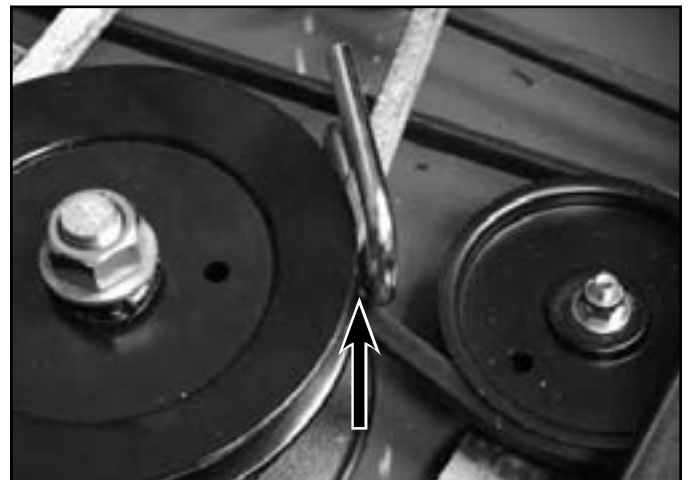


Fig 1170

PICT-1031

# MOWER DECKS

6. Tighten the nut securing the center spindle belt guide to the mower deck (Fig. 1171).



Fig 1171

PICT-1023a

7. Install the carrier frame cover (Fig. 1172).



Fig 1172

PICT-1022

## PTO Drive Belt Removal (36" Mower Decks)

1. Turn the ignition off and remove the key. Set the parking brake.
2. Remove the carrier frame cover (Fig. 1173).



Fig 1173

PICT-1358

3. Remove the mower deck belt cover (Fig. 1174).



Fig 1174

PICT-1360

# MOWER DECKS

4. Roll the deck drive belt off the fixed (center) mower deck pulley (Fig. 1175).



Fig 1175

PICT-1361

7. Remove the belt from the clutch pulley and remove it from the machine (Fig. 1177).



Fig 1177

PICT-1365a

5. Raise the machine to access the underside.
6. Remove PTO belt idler pulley spring from frame bolt (Fig. 1176).

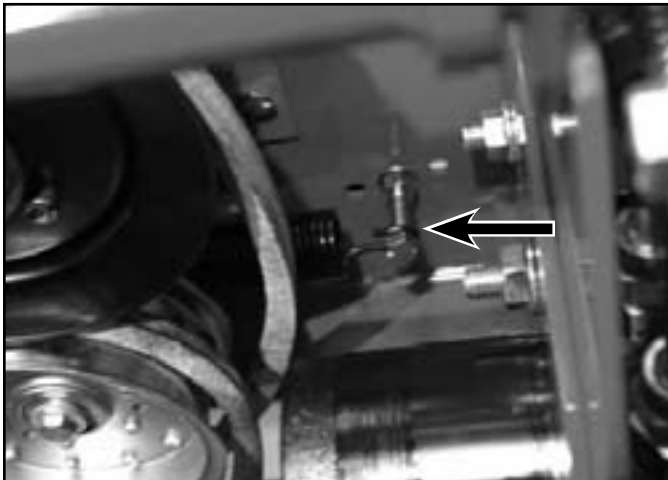


Fig 1176

PICT-0287

## PTO Drive Belt Installation (36" Mower Decks)

1. Raise the machine to access the underside.
2. Route the deck drive belt around the clutch pulley (Fig. 1178).



Fig 1178

PICT-1365a

# MOWER DECKS

3. Install the PTO belt idler pulley spring onto the frame bolt (Fig. 1179).

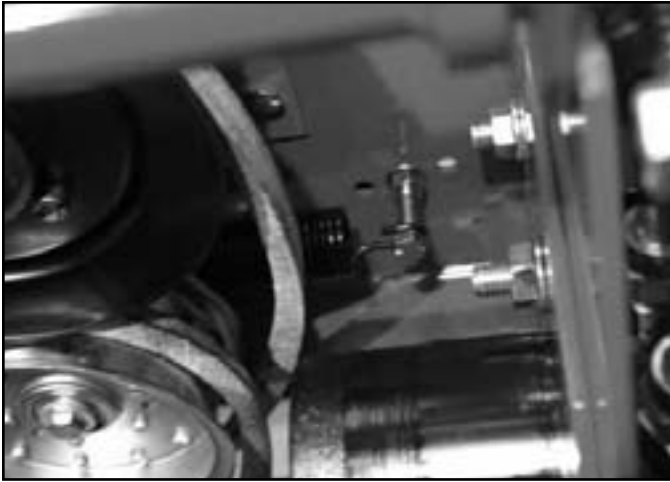


Fig 1179

PICT-0287

6. Roll the PTO drive belt onto the fixed (center) mower deck pulley (Fig. 1181).



Fig 1181

PICT-1361

4. Lower the machine.
5. Route the spindle drive belt around the pulleys. Refer to the belt routing decal (Fig. 1180).

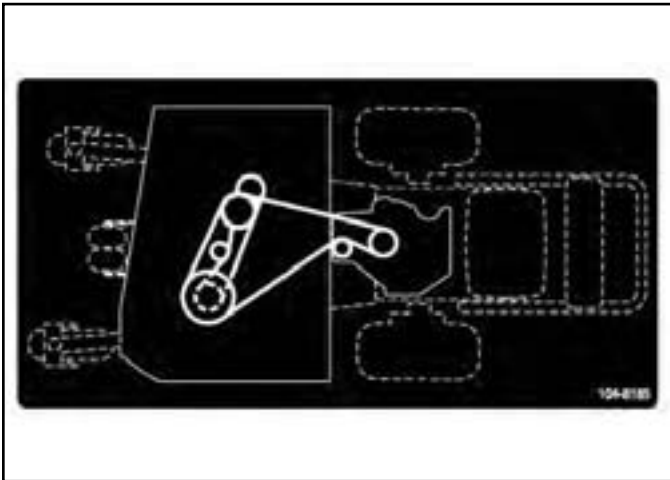


Fig 1180

fig. 104-8185

7. Install the mower deck belt cover (Fig. 1182).



Fig 1182

PICT-1360

8. Install the carrier frame cover (Fig. 1183).



Fig 1183

PICT-1358

2. Install a blade stop to secure the blade (Fig. 1184).

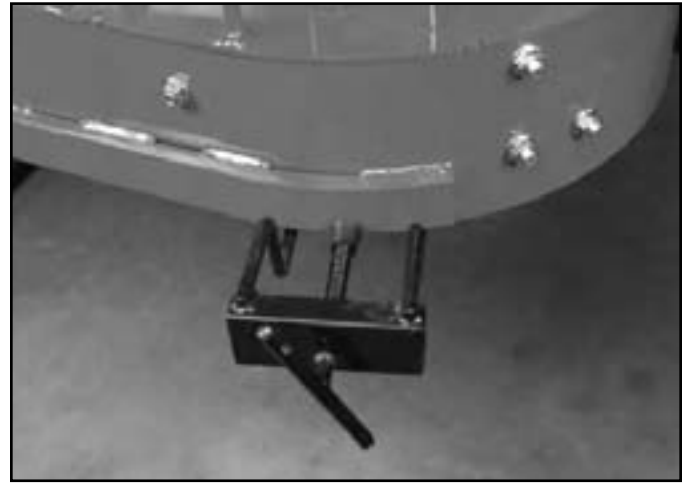


Fig 1184

PICT-1185

## Spindle Replacement and Service

### Spindle Removal and Teardown

1. Remove one or both drive belts, depending on spindle being removed Refer to:
  - “PTO Drive Belt Removal (40”, 48”, 52” and 60” Mower Decks)” on page 8-6 or
  - “PTO Drive Belt Removal (36” Mower Decks)” on page 8-8 and
  - “Mower Spindle Drive Belt Removal (40”, 48”, 52” and 60” Mower Decks)” on page 8-1, or
  - “Mower Spindle Drive Belt Removal (36” Mower Deck)” on page 8-4.

3. Support the blade/spindle shaft assembly and remove the spindle nut (Fig. 1185).

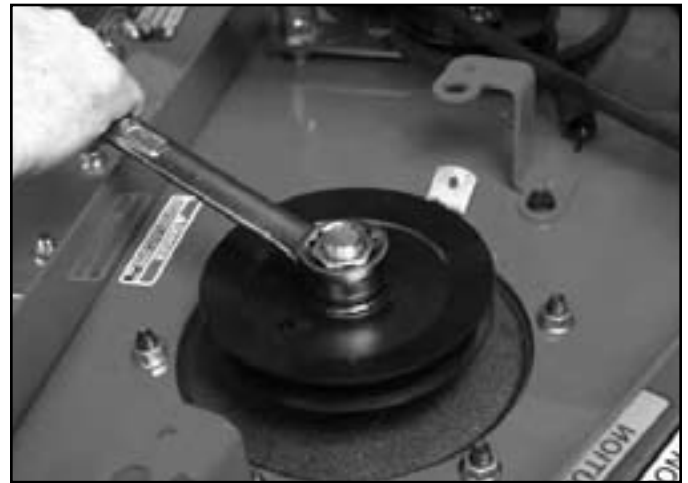


Fig 1185

PICT-1187

# MOWER DECKS

- Slide the blade/spindle shaft assembly out of the spindle housing (Fig. 1186).



Fig 1186

PICT-1188

- Remove the washer (Fig. 1187).



Fig 1187

PICT-1189

- Remove the pulley assembly (Fig. 1188).



Fig 1188

PICT-1190

- Remove the bearing shield (Fig. 1189).



Fig 1189

PICT-1191

# MOWER DECKS

- Remove the 6 nuts securing the spindle housing to the mower deck (Fig. 1190).

**Note:** There may be a spring plate installed on one of the spindle bolts.



Fig 1190

PICT-1192

- While supporting the housing, remove the 6 self-tapping bolts securing the spindle housing to the mower deck. Lower the spindle housing from the mower deck (Fig. 1191).



Fig 1191

PICT-1194

- Remove the blade bolt, washer and the blade from the spindle shaft (Fig. 1192).



Fig 1192

PICT-1197

**Note:** 36" and 52" mower decks have a blade stiffener (Fig. 1193).

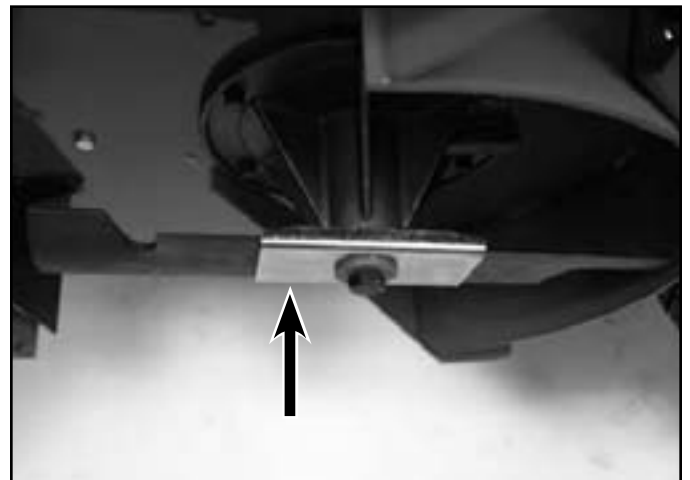


Fig 1193

PICT-1442



# MOWER DECKS

- Remove the 2 bearings and the spacer from the spindle housing (Fig. 1194).

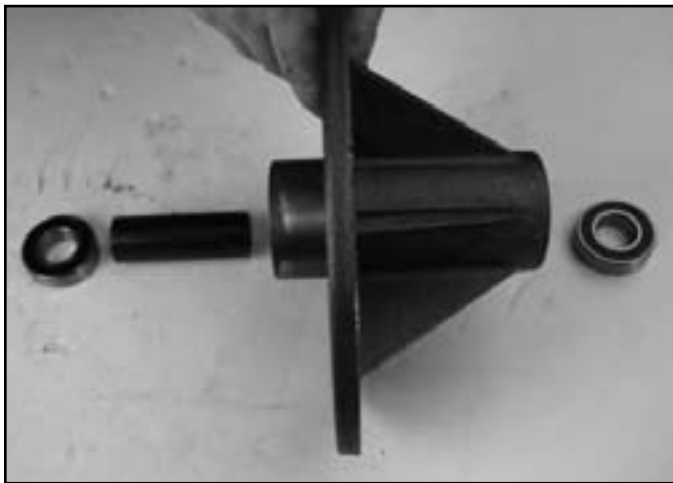


Fig 1194

PICT-1203

## Spindle Rebuild and Installation

- Install a bearing into one side of the spindle housing (Fig. 1196).



Fig 1196

PICT-1208

- Clean and inspect the housing, bearings and spacer for wear and damage. Replace as necessary.

Spindle Assembly (Fig. 1195)

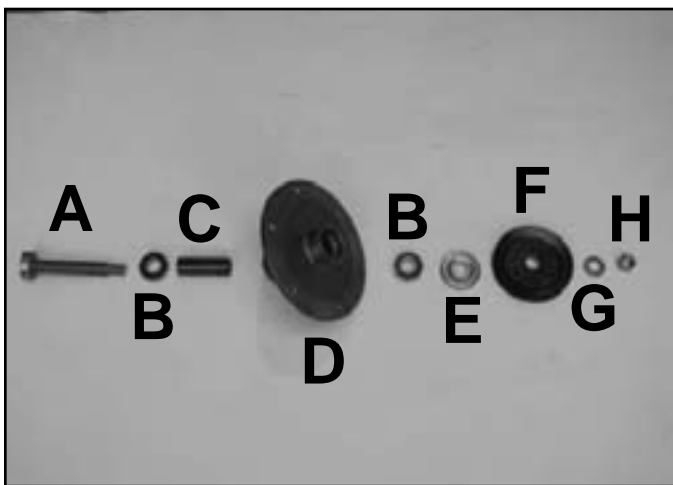


Fig 1195

PICT-1204a

- Insert the spacer into the spindle housing (Fig. 1197).



Fig 1197

PICT-1210

- |                    |                   |
|--------------------|-------------------|
| A. Spindle Shaft   | E. Bearing Shield |
| B. Bearing (2)     | F. Pulley         |
| C. Bearing Spacer  | G. Washer         |
| D. Spindle Housing | H. Nut            |

# MOWER DECKS

3. Install a bearing into the other side of the spindle housing (Fig. 1198).



Fig 1198

PICT-1211

5. Slide the bearing shield onto the spindle shaft (Fig. 1200).



Fig 1200

PICT-1214

4. Insert the spindle shaft into the spindle housing assembly (Fig. 1199).



Fig 1199

PICT-1212

6. Slide the pulley assembly onto the spindle shaft so the welded center bore of the pulley is facing away from the spindle housing (Fig. 1201).

**Note:** If the spindle has a dual pulley, the smaller size pulley faced the spindle housing.



Fig 1201

PICT-1216

# MOWER DECKS

7. Slide a washer onto the spindle shaft (Fig. 1202).



Fig 1202

PICT-1217

9. Install the crowned blade bolt washer onto the blade bolt so the crown is toward the bolt head (Fig. 1204).



Fig 1204

PICT-1224

8. Install a nut onto the spindle shaft (Fig. 1203).



Fig 1203

PICT-1219

10. Install the blade bolt, washer and blade to the spindle shaft (Fig. 1205).



Fig 1205

PICT-1226

# MOWER DECKS

**Note:** The “sails” of the blade should be pointing toward the spindle housing.

**Note:** 36” and 52” mower decks have a blade stiffener that should be installed between the crowned washer and the blade (Fig. 1206).

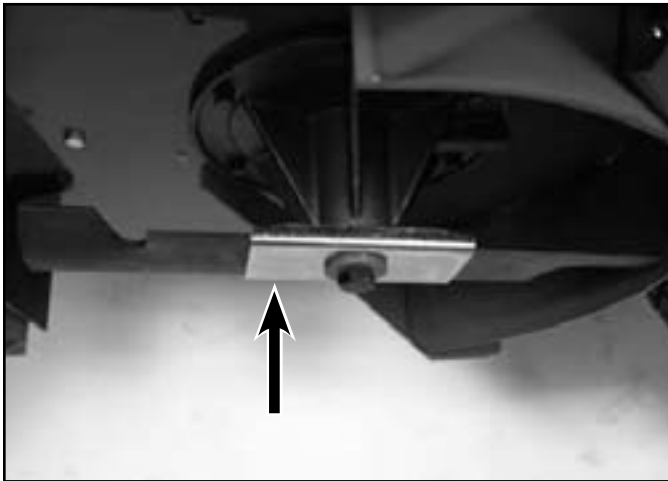


Fig 1206

PICT-1442

11. Torque the spindle shaft nut to  $100 \pm 10$  ft-lbs. ( $135.5 \pm 13.5$  Nm) (Fig. 1207).



Fig 1207

PICT-1228

12. Torque the blade bolt to 85-110 ft-lbs. (115-149 Nm) (Fig. 1208).

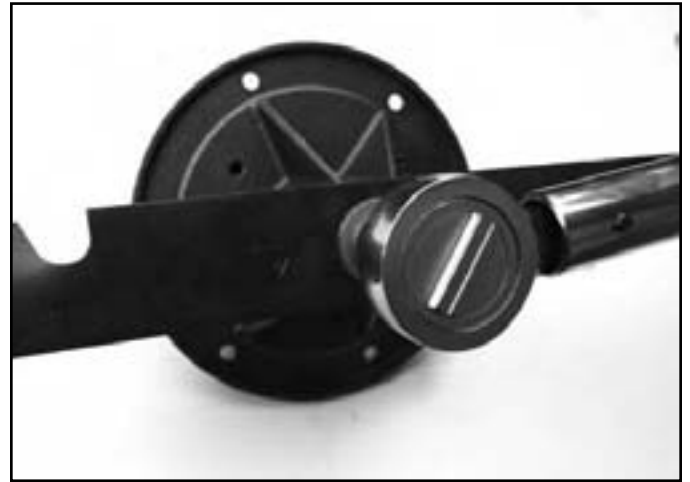


Fig 1208

PICT-1231

13. Position the spindle and blade assembly into the mower deck from below and install 6 self-tapping screws to secure the spindle housing to the mower deck (Fig. 1209).



Fig 1209

PICT-1232

# MOWER DECKS

14. If applicable, place the spring plate onto the self-tapping screw shown (Fig. 1210):



Fig 1210

PICT-1235

15. Install 6 nuts onto the self-tapping screws. Ensure the spring plate is positioned as shown (Fig. 1211).

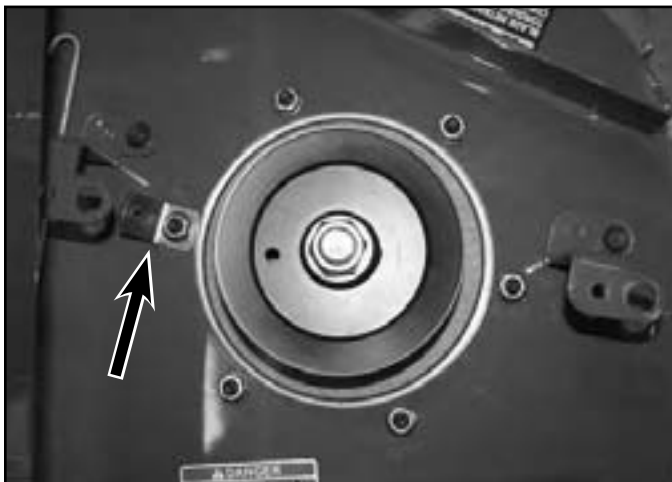


Fig 1211

IMG-7943a

16. Reinstall the drive belt or belts, as applicable. Refer to:

- “Mower Spindle Drive Belt Installation (40”, 48”, 52” and 60” Mower Decks)” on page 8-2, or
- “Mower Spindle Drive Belt Installation (36” Mower Deck)” on page 8-5 and
- “PTO Drive Belt Installation (40”, 48”, 52” and 60” Mower Decks)” on page 8-7 or
- “PTO Drive Belt Installation (36” Mower Decks)” on page 8-9.

## Idler Arm Assembly Replacement

### Idler Arm Assembly Removal (40”, 48”, 52” and 60” Mower Decks)

1. Turn the ignition off and remove the key.
2. Set the parking brake.
3. Remove the carrier frame cover (Fig. 1212).



Fig 1212

PICT-1038

# MOWER DECKS

4. Remove the left belt cover (Fig. 1213).



Fig 1213

PICT-1039

6. Remove the spring from the idler arm assembly (Fig. 1215).



Fig 1215

PICT-1128

5. Using a spring removal tool (Toro p/n: 92-5771) remove the idler spring from the spring plate (Fig. 1214).



Fig 1214

PICT-1042

7. If the spring plate requires replacement, remove the nut securing it to the mower deck (Fig. 1216).



Fig 1216

PICT-1130

# MOWER DECKS

8. Remove the mower deck belt from around the idler pulley (Fig. 1217).



Fig 1217

PICT-1131

9. Remove the nut from the bolt securing the idler arm to the mower deck (Fig. 1218).

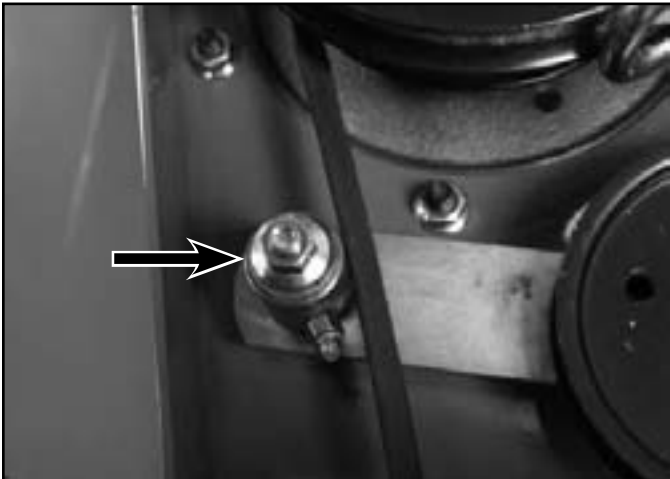


Fig 1218

PICT-1132

10. Remove the idler arm bolt and washer (Fig. 1219).



Fig 1219

PICT-1135

11. Remove the idler arm assembly and washer from the mower deck (Fig. 1220).



Fig 1220

PICT-1137a

# MOWER DECKS

12. Remove the nut and washer from the bolt securing the idler pulley to the idler arm (Fig. 1221).



Fig 1221

PICT-1143

14. Remove the bolt from the idler arm (Fig. 1223).



Fig 1223

PICT-1147

13. Remove the pulley and spacer from the idler arm assembly (Fig. 1222).



Fig 1222

PICT-1145

15. Remove the spacer from the idler arm (Fig. 1224).



Fig 1224

PICT-1148



# MOWER DECKS

16. Remove the grease fitting from the idler arm (Fig. 1225).



Fig 1225

PICT-1149

17. Remove the 2 flange bushings from the idler arm pivot (Fig. 1226).



Fig 1226

PICT-1151

## Idler Arm Assembly Installation (40", 48", 52" and 60" Mower Decks)

1. Press 2 flange bushings into either side of the idler arm pivot (Fig. 1227).



Fig 1227

PICT-1153

2. Install a grease fitting into the idler arm (Fig. 1228).



Fig 1228

PICT-1149

# MOWER DECKS

3. Install the bolt into the idler arm (Fig. 1229).



Fig 1229

PICT-1163a

5. Install the pulley onto the bolt with the hub installed toward the idler arm (Fig. 1231).

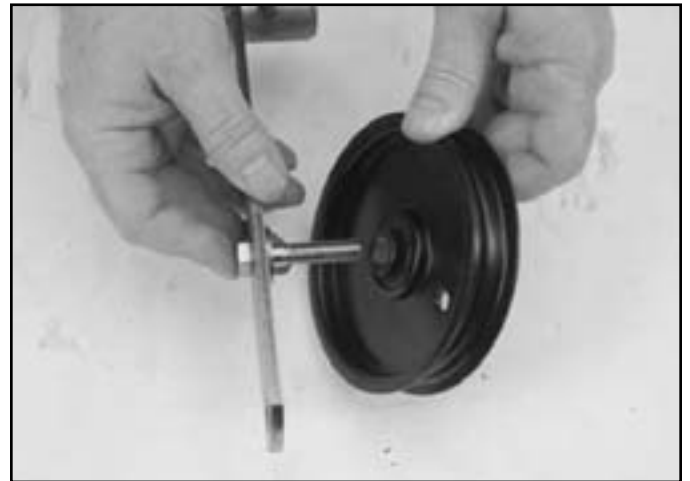


Fig 1231

PICT-1167a

4. Install a spacer onto the bolt (Fig. 1230).

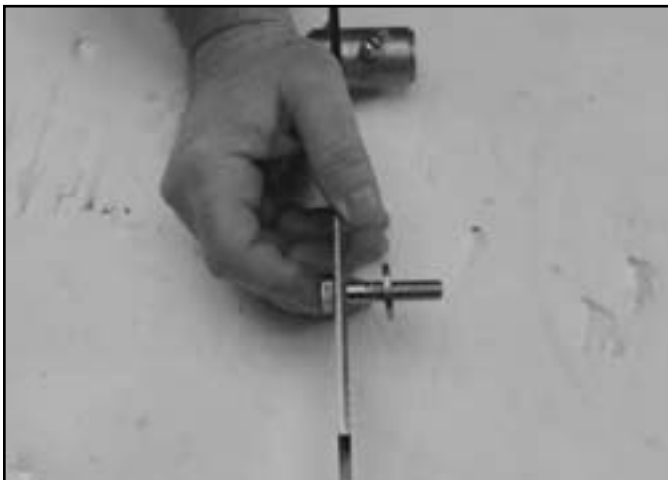


Fig 1230

PICT-1166a

6. Install a washer onto the bolt (Fig. 1232).



Fig 1232

PICT-1168a

# MOWER DECKS

7. Install a nut onto the bolt (Fig. 1233).

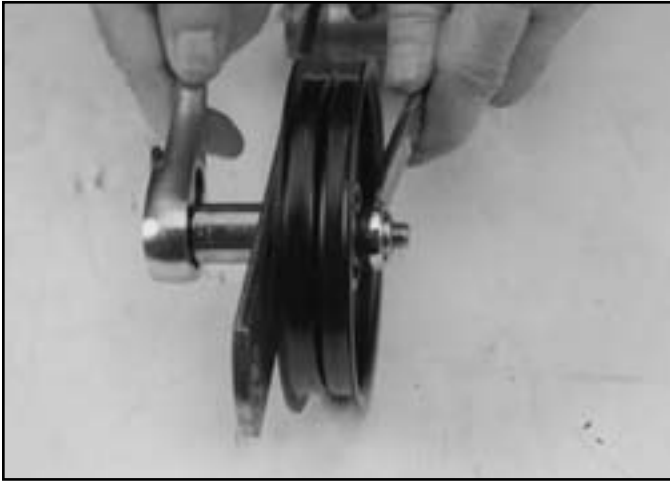


Fig 1233

PICT-1170a

9. Slide a washer onto the idler pivot bolt. Insert the bolt up through the mower deck (Fig. 1235).



Fig 1235

PICT-1173

8. Install the spacer into the idler arm pivot (Fig. 1234).

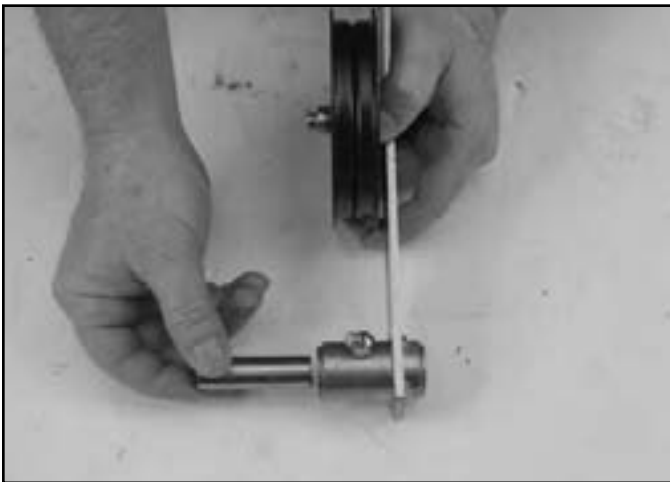


Fig 1234

PICT-1171a

10. Slide a washer onto the bolt on the top side of the mower deck (Fig. 1236).



Fig 1236

PICT-1176a

# MOWER DECKS

11. Slide the idler arm assembly pivot onto the bolt (Fig. 1237).



Fig 1237

PICT-1177a

13. Ensure the belt is routed properly on the mower deck. Refer to the belt routing decal (Fig. 1239):

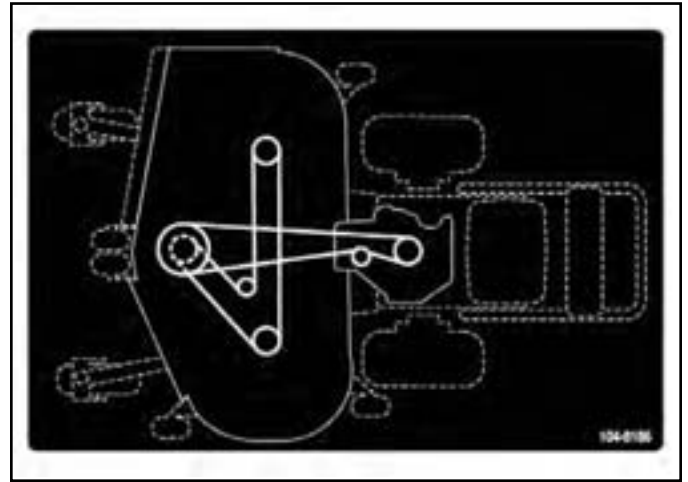


Fig 1239

fig. 104-8186

12. Install a nut onto the idler arm pivot bolt securing the idler arm to the mower deck (Fig. 1238).



Fig 1238

PICT-1132

14. If it was removed, position the spring plate onto the self-tapping bolt located next to left spindle pulley. Install a nut to secure the spring plate (Fig. 1240).

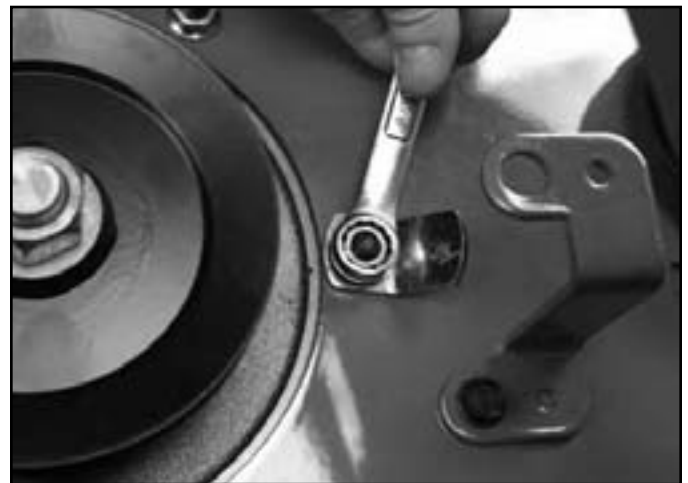


Fig 1240

PICT-1179

# MOWER DECKS

15. Hook the spring onto the idler arm (Fig. 1241).



Fig 1241

PICT-1128

17. Apply grease to the idler arm grease fitting (Fig. 1243).



Fig 1243

PICT-1182a

16. Using a spring removal tool (Toro p/n 92-5771), install the idler spring to the spring plate (Fig. 1242).



Fig 1242

PICT-1181

18. Install the left belt cover (Fig. 1244).



Fig 1244

PICT-1039

19. Install the carrier frame cover (Fig. 1245).



Fig 1245

PICT-1038

5. Remove the nut, washer and bolt from the idler arm pivot location (Fig. 1246).



Fig 1246

PICT-1452a

## Idler Arm Assembly Replacement (36" Mower Deck)

### Idler Arm Assembly Removal (36" Mower Deck)

1. Turn the ignition off and remove the key.
2. Set the parking brake.
3. Remove the PTO drive belt. Refer to "PTO Drive Belt Removal" on page 8-8.
4. Remove the mower spindle drive belt. Refer to "Mower Spindle Drive Belt Removal" on page 8-4.

6. Remove the idler arm assembly from the mower deck (Fig. 1247).



Fig 1247

PICT-1454a

# MOWER DECKS

7. Remove the spring from the idler arm post (Fig. 1248).



Fig 1248

PICT-1457a

9. Remove the nut, bolt and pulley from the idler arm (Fig. 1250).



Fig 1250

PICT-1460

8. Remove the spacer from the idler arm pivot (Fig. 1249).



Fig 1249

PICT-1459a

## Idler Arm Assembly Installation (36" Mower Deck)

1. Position the pulley to the idler arm so that the pulley hub is positioned toward the idler arm (Fig. 1251).



Fig 1251

PICT-1465

# MOWER DECKS

2. Install a bolt and nut to secure the pulley to the idler arm (Fig. 1252).



Fig 1252

PICT-1460

4. Position the idler arm assembly onto the mower deck (Fig. 1254).



Fig 1254

PICT-1466

3. Slide the spacer into the idler arm pivot (Fig. 1253).



Fig 1253

PICT-1459a

5. Insert a bolt up through the mower deck and through the idler arm pivot. Install a washer and a nut onto the bolt (Fig. 1255).



Fig 1255

PICT-1467a



# MOWER DECKS

6. Hook the idler spring to the idler arm (Fig. 1256).



Fig 1256

PICT-1469

7. Install the mower spindle drive belt. Refer to “Mower Spindle Drive Belt Installation” on page 8-5.
8. Install the PTO drive belt. Refer to “PTO Drive Belt Installation” on page 8-9.

## Adjustable Baffle Replacement

### Adjustable Baffle Removal

1. Turn the engine off and remove the key from the ignition. Set the parking brake.
2. Remove the nut that secures the lock lever to the lock cap (Fig. 1257).



Fig 1257

PICT-1080

3. Slide the lock lever out of the lock cap (Fig. 1258).



Fig 1258

PICT-1082

# MOWER DECKS

4. Remove the lock cap (Fig. 1259).



Fig 1259

PICT-1083

6. Remove the nut from the self-tapping screw that secures the adjustable baffle to the underside of the mower deck (Fig. 1261).



Fig 1261

PICT-1092a

5. Remove the lock screw by unthreading it from the adjustable baffle assembly (Fig. 1260).



Fig 1260

PICT-1084

7. Remove the self-tapping screw that secures the adjustable baffle to the underside of the mower deck (Fig. 1262).



Fig 1262

PICT-1088

# MOWER DECKS

8. Remove the adjustable baffle from the mower deck (Fig. 1263).



Fig 1263

PICT-1089

2. Install a self-tapping screw to secure the adjustable baffle to the underside of the mower deck (Fig. 1265).

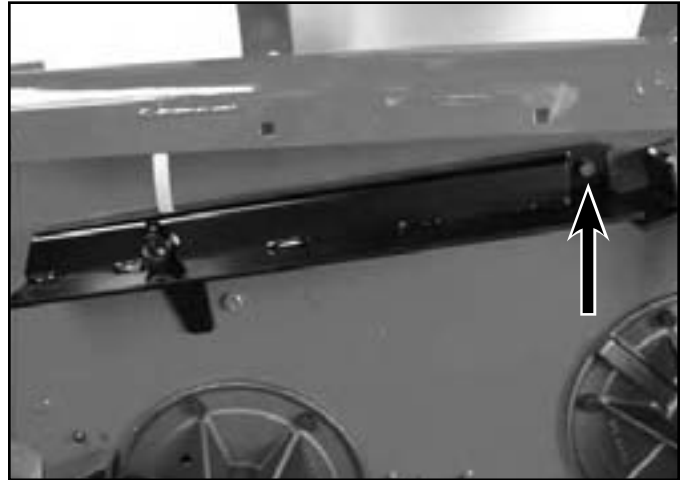


Fig 1265

PICT-1088

## Adjustable Baffle Installation

1. Position the adjustable baffle on the underside of the mower deck (Fig. 1264).



Fig 1264

PICT-1089

3. Install a nut onto the self-tapping bolt that secures the adjustable baffle to the underside of the mower deck (Fig. 1266).



Fig 1266

PICT-1092a

8

# MOWER DECKS

4. Apply anti-seize compound onto the lock screw threads (Fig. 1267).



Fig 1267

PICT-1094a

6. Position the lock cap onto the lock screw (Fig. 1269).



Fig 1269

PICT-1083

5. Thread the lock screw into the bushing of the adjustable baffle assembly (Fig. 1268).



Fig 1268

PICT-1084

7. Slide the lock lever into the lock cap (Fig. 1270).



Fig 1270

PICT-1082

# MOWER DECKS

8. Install a nut to secure the lock lever to the lock cap and screw (Fig. 1271).



Fig 1271

PICT-1080a

2. Remove the right hand belt cover (Fig. 1272).



Fig 1272

PICT-1236

## Discharge Baffle Replacement

The following procedures cover replacing the discharge baffle on 40", 48", 52" and 60" mower decks. Although the 36" mower deck discharge baffle looks different, the same procedures can be used for its replacement.

### Discharge Baffle Removal

1. Turn the ignition off and remove the key. Set the parking brake.

3. Remove the nut from each of the 2 self-tapping screws securing the discharge baffle to the underside of the mower deck (Fig. 1273).

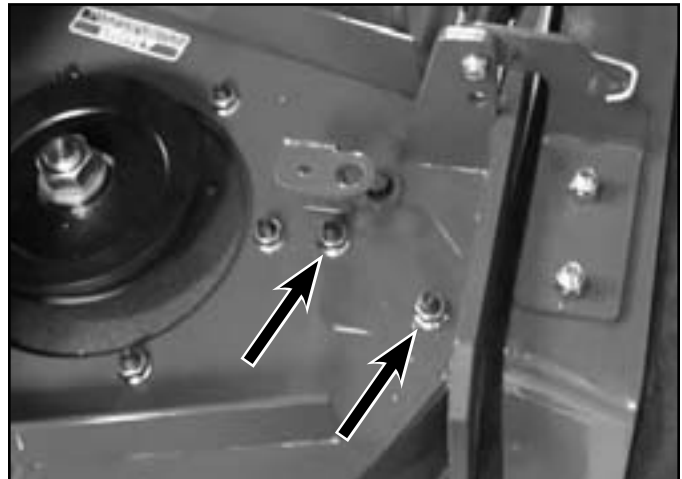


Fig 1273

PICT-1238

# MOWER DECKS

4. Raise the machine to access the underside of the mower deck.
5. Remove the 2 self-tapping screws securing the discharge baffle to the mower deck (Fig. 1274).



Fig 1274

PICT-1242

## Discharge Baffle Installation

1. Position the discharge baffle to the mower deck (Fig. 1276).



Fig 1276

PICT-1244

6. Remove the discharge baffle from the mower deck (Fig. 1275).



Fig 1275

PICT-1244

2. Install 2 self-tapping screws to secure the discharge baffle to the underside of the mower deck (Fig. 1277).

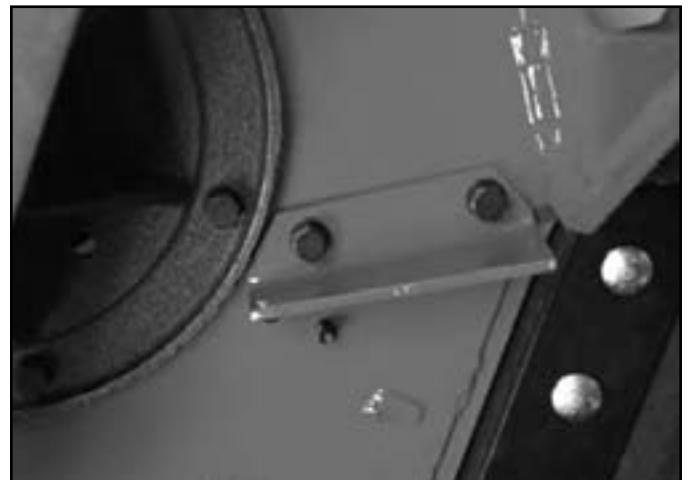


Fig 1277

PICT-1242

# MOWER DECKS

3. Lower the machine to access the top of the mower deck.
4. Install a nut onto each of the 2 self-tapping screws to secure the discharge baffle to the underside of the mower (Fig. 1278).

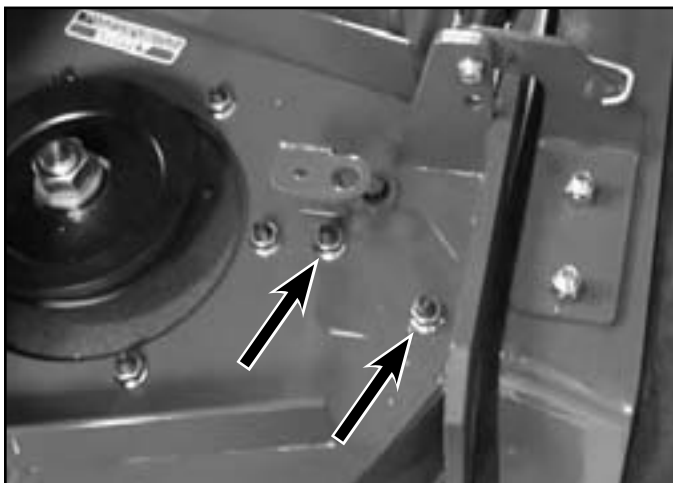


Fig 1278

PICT-1238

5. Install the right hand belt cover (Fig. 1279).



Fig 1279

PICT-1236

## Fixed Baffle Replacement

### Fixed Baffle Removal (40", 48", 52" and 60" Mower Decks)

1. Turn the ignition off and remove the key. Set the parking brake.
2. Remove the nuts from the 2 self-tapping screws that secure the fixed baffle to the mower deck (Fig. 1280).

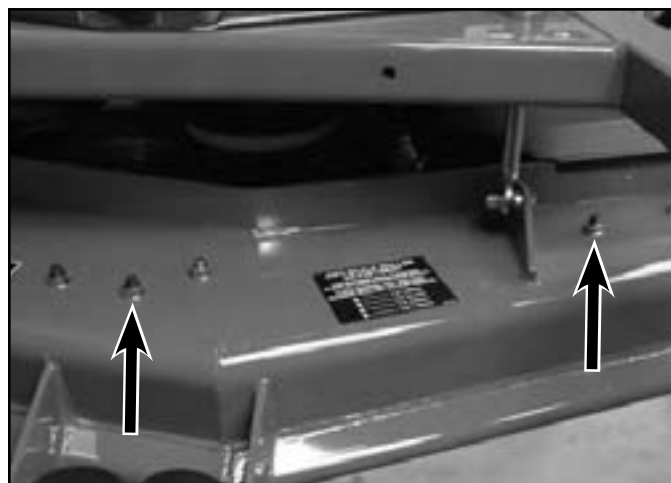


Fig 1280

PICT-1096

3. Remove the carriage bolt and nut securing the fixed baffle to the left side of the mower deck (Fig. 1281).

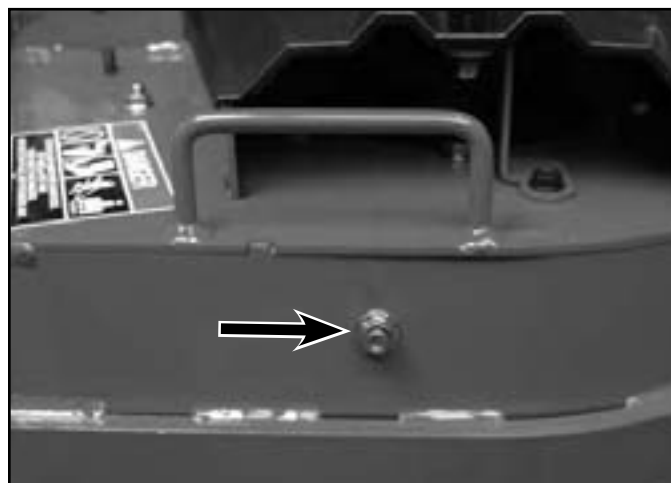


Fig 1281

PICT-1098

4. Remove the 2 self-tapping screws securing the fixed baffle to the mower deck (Fig. 1282).

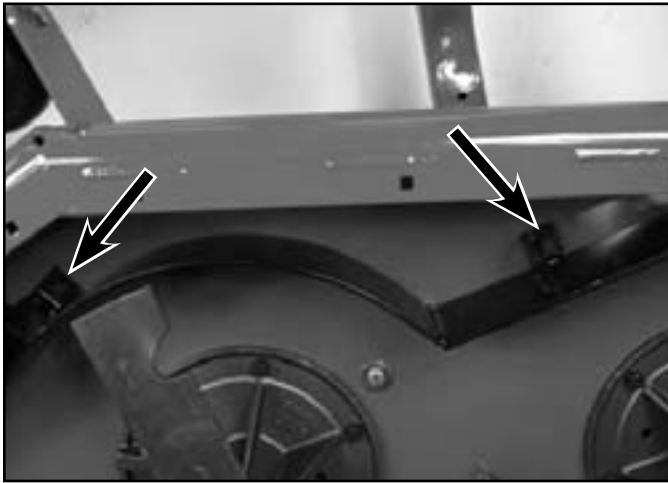


Fig 1282

PICT-1102

5. Remove the fixed baffle from the mower deck (Fig. 1283).



Fig 1283

PICT-1103

## Fixed Baffle Installation (40", 48", 52" and 60" Mower Decks)

1. Position the fixed baffle to the mower deck (Fig. 1284).



Fig 1284

PICT-1103

2. Install 2 self-tapping screws to secure the fixed baffle to the mower deck (Fig. 1285).

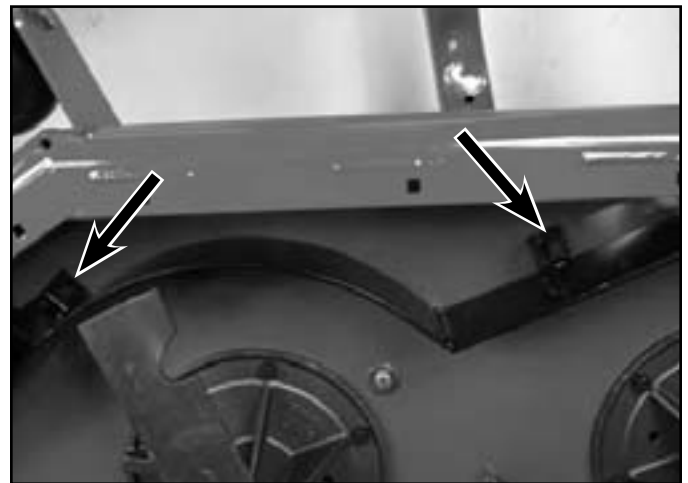


Fig 1285

PICT-1102



# MOWER DECKS

3. Install the carriage bolt and nut to secure the fixed baffle to the left side of the mower deck (Fig. 1286).

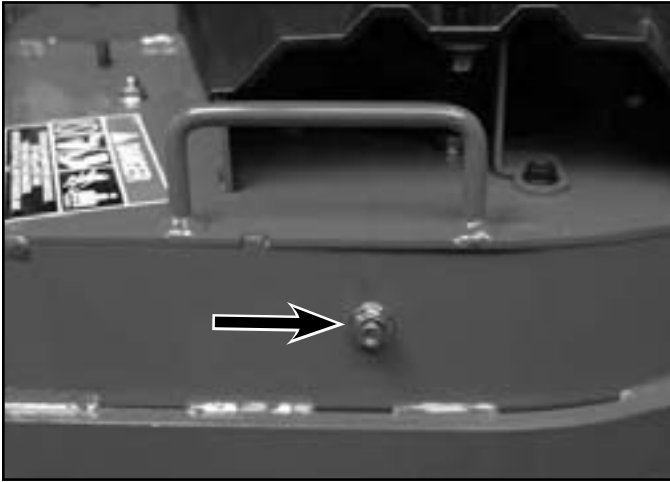


Fig 1286

PICT-1098

4. Install a nut onto each of the 2 self-tapping screws that secure the fixed baffle to the mower deck (Fig. 1287).

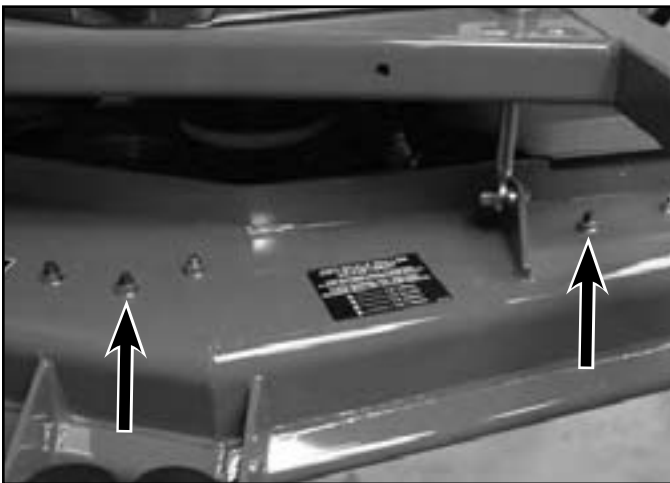


Fig 1287

PICT-1096

## Fixed Baffle Replacement (36" Mower Deck)

### Fixed Baffle Removal (36" Mower Deck)

1. Turn the ignition off and remove the key. Set the parking brake.
2. Remove the 2 bolts, washers and nuts securing the fixed baffle to the mower deck (Fig. 1288).

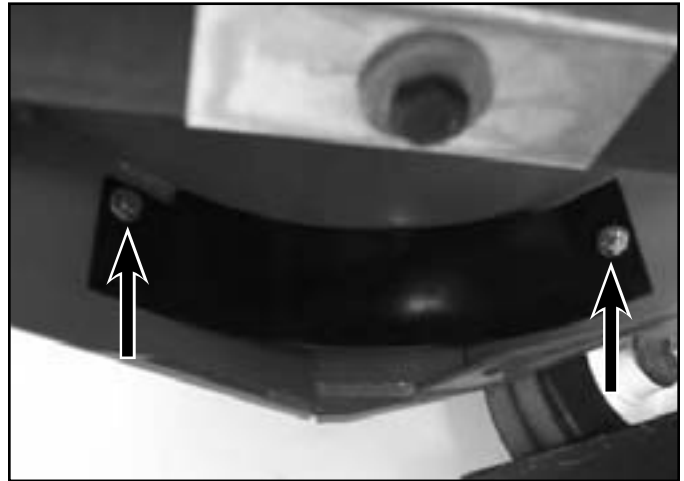


Fig 1288

PICT-1426

3. Remove the fixed baffle from the mower deck (Fig. 1289).



Fig 1289

PICT-1427

## Fixed Baffle Installation (36" Mower Deck)

1. Position the fixed baffle up to the mower deck (Fig. 1290).



Fig 1290

PICT-1427

2. Install 2 bolts, washers and nuts to secure the fixed baffle to the mower deck (Fig. 1291).

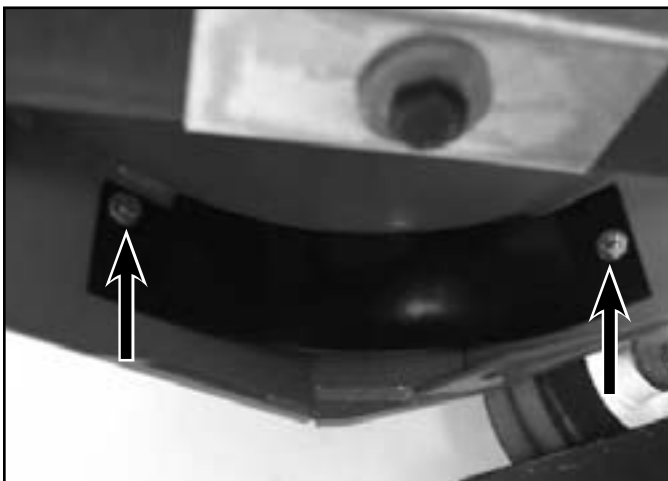


Fig 1291

PICT-1426

## Skid Plate Replacement (40", 48", 52" and 60" Mower Decks)

### Skid Plate Removal (40", 48", 52" and 60" Mower Deck)

1. Turn the ignition off and remove the key. Set the parking brake.
2. Raise the machine to access the underside of the mower deck.
3. Remove the carriage bolt and nut securing the front of the skid plate to the mower deck (Fig. 1292).



Fig 1292

PICT-1114

# MOWER DECKS

4. Remove the 2 carriage bolts and nuts securing the rear of the skid plate to the mower deck (Fig. 1293).



Fig 1293

PICT-1121

5. Remove the skid plate from the mower deck (Fig. 1294).



Fig 1294

PICT-1122

## Skid Plate Installation (40", 48", 52" and 60" Mower Deck)

1. Position the skid plate to the mower deck (Fig. 1295).



Fig 1295

PICT-1122

2. Loosely install 3 carriage bolts and nuts to secure the skid plate to the mower deck: 2 holding the rear of the skid plate and 1 holding the front of the skid plate (Fig. 1296).



Fig 1296

PICT-1127

3. Tighten all 3 carriage bolts and nuts to secure the skid plate to the mower deck (Fig. 1297).

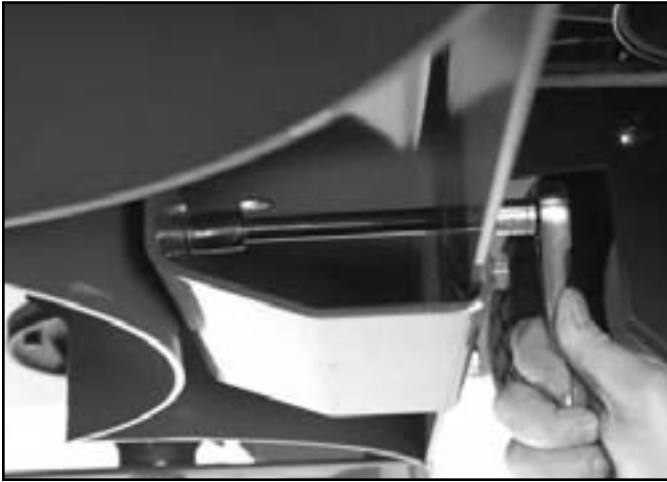


Fig 1297

PICT-1114a

4. Lower the machine.

## Skid Plate Replacement (36" Mower Deck)

### Skid Plate Removal (36" Mower Deck)

1. Raise the machine to access the underside of the mower deck.
2. Remove the 2 carriage bolts and nuts securing the front of the skid plate to the mower deck (Fig. 1298).

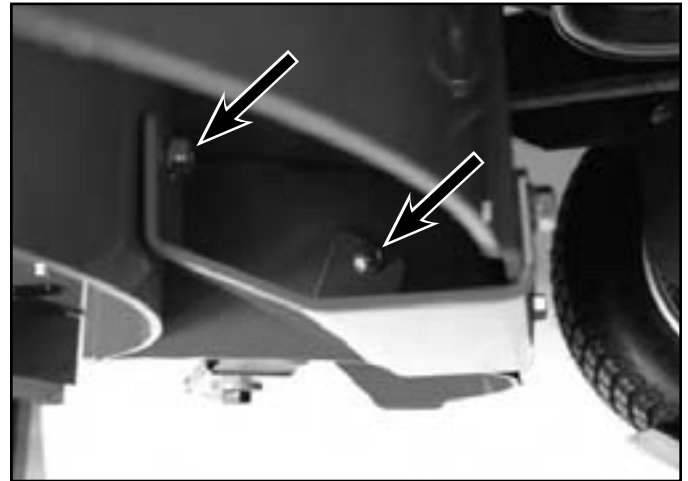


Fig 1298

PICT-1435

3. Remove the 2 carriage bolts and nuts securing the rear of the skid plate to the mower deck (Fig. 1299).

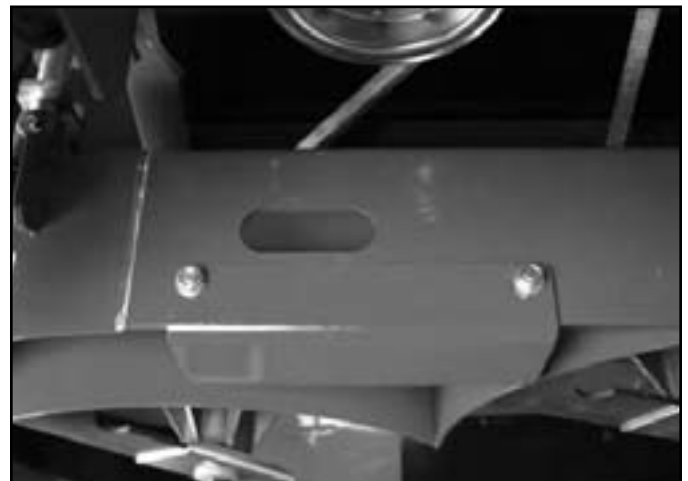


Fig 1299

PICT-1436

# MOWER DECKS

4. Remove the skid plate from the mower deck (Fig. 1300).



Fig 1300

PICT-1440

2. Loosely install 4 carriage bolts and nuts to secure the skid plate to the mower deck: 2 holding the rear of the skid plate and 2 holding the front of the skid plate (Fig. 1302).

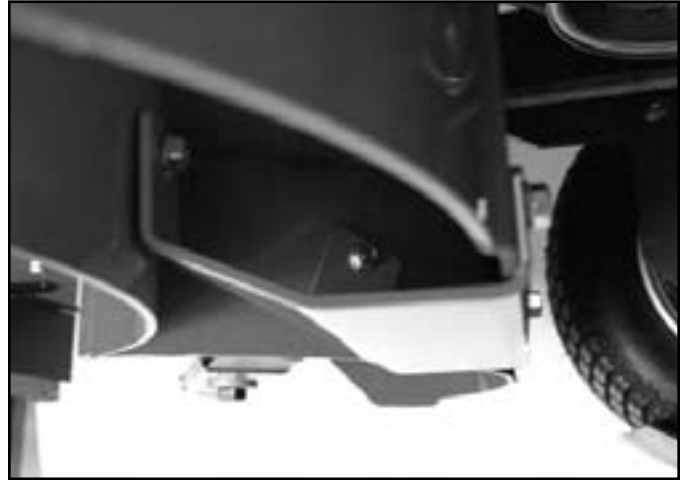


Fig 1302

PICT-1435

## Skid Plate Installation (36" Mower Deck)

1. Position the skid plate to the mower deck (Fig. 1301).



Fig 1301

PICT-1440

3. Tighten all 4 carriage bolts and nuts to secure the skid plate to the mower deck (Fig. 1303).



Fig 1303

PICT-1441

4. Lower the machine.

## Front & Rear Deck Hanger Replacement

### Front Deck Hanger Removal

1. Remove the drive belt from the center spindle pulley. Refer to "PTO Drive Belt Removal (40", 48", 52", and 60" Mower Decks)" on page 8-6 or "PTO Drive Belt Removal (36" Mower Decks)" on page 8-8.
2. Lift up on the mower deck and remove the hairpin(s) from the deck hanger pins (Fig. 1304).



Fig 1304

PICT-1257

3. Remove the spacers (if present) from the deck hanger pins (Fig. 1305).



Fig 1305

PICT-1258

4. Remove the nut from the bolt securing the ball joint to the mower deck (Fig. 1306).



Fig 1306

PICT-1259

# MOWER DECKS

5. Slide the ball joint/pin assembly off the bolt and remove it from the carrier frame (Fig. 1307).



Fig 1307

PICT-1267

7. Remove the bolt from the mower deck bracket (Fig. 1309).



Fig 1309

PICT-1273

6. Remove the spacer from the bolt (Fig. 1308).



Fig 1308

PICT-1269

8. Loosen the jam nut on the deck hanger pin (Fig. 1310).



Fig 1310

PICT-1275a

9. Remove the ball joint from the deck hanger pin (Fig. 1311).



Fig 1311

PICT-1276a

## Front Deck Hanger Installation

1. Install a jam nut onto the ball joint (Fig. 1313).



Fig 1313

PICT-1277a

10. Remove the jam nut from the ball joint (Fig. 1312).



Fig 1312

PICT-1277a

2. Thread the ball joint into the deck hanger pin (Fig. 1314).



Fig 1314

PICT-1276a



# MOWER DECKS

- Adjust distance from the top of HOC stop to the center of the ball joint to  $4.21" \pm .06"$  ( $10.7 \pm .15\text{cm}$ ). Secure the jam nut against HOC pin. The hairpin holes in HOC pin are to be approximately in line with ball joint through hole (Fig. 1315).

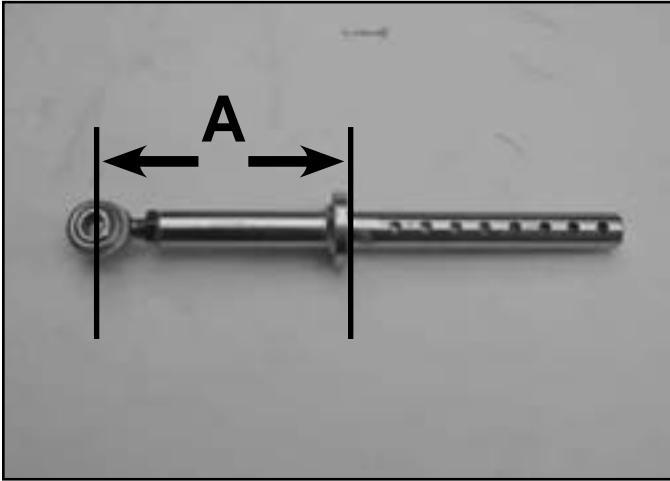


Fig 1315

PICT-1278a

A.  $4.21" \pm .6"$  ( $10.7 \pm .15\text{cm}$ )

- Insert the ball joint mounting bolt into the mower deck bracket (Fig. 1316).

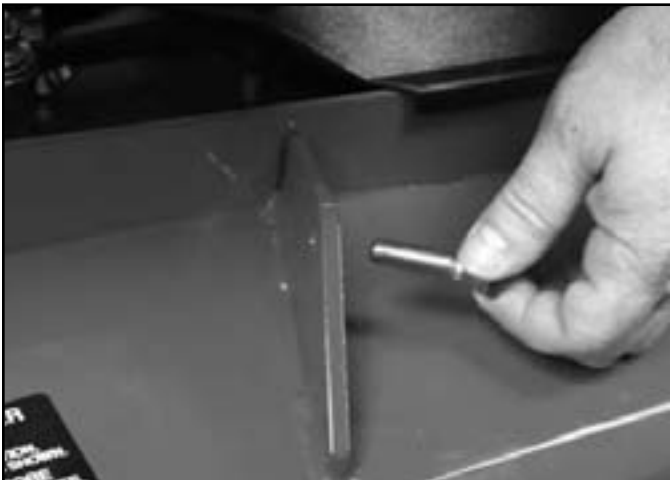


Fig 1316

PICT-1270

- Slide a spacer onto the bolt (Fig. 1317).



Fig 1317

PICT-1269

- Slide the ball joint/pin assembly onto the bolt and up through the mower deck bracket (Fig. 1318).



Fig 1318

PICT-1267

8

# MOWER DECKS

7. Install a nut onto the bolt to secure the ball joint to the mower deck (Fig. 1319).



Fig 1319

PICT-1259

9. Lift up on the mower deck and install the hairpin(s) into the deck hanger pins at the desired height-of-cut setting (Fig. 1321).



Fig 1321

PICT-1257

8. Install the spacer(s) (if required) onto the deck hanger pins (Fig. 1320).

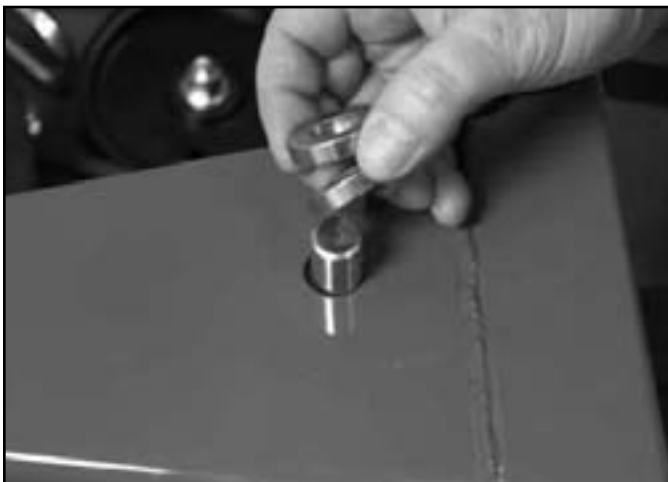


Fig 1320

PICT-1258

10. Install the deck drive belt onto the center spindle pulley. Refer to "PTO Drive Belt Installation (40", 48", 52" and 60" Mower Decks)" on page 8-7 or "PTO Drive Belt Installation (36" Mower Decks)" on page 8-9.

# MOWER DECKS

## Rear Deck Hanger Removal

1. Remove the drive belt from the center spindle pulley. Refer to "PTO Drive Belt Removal (40", 48", 52" and 60" Mower Decks)" on page 8-6 or "PTO Drive Belt Removal (36" Mower Decks)" on page 8-8.
2. 40", 48", 52" and 60" mower decks only: Remove the left hand belt cover (Fig. 1322).



Fig 1322

PICT-1279

3. Support the mower deck and remove the hairpin(s) from the deck hanger pin (Fig. 1323).



Fig 1323

PICT-1280

4. Remove the spacer(s) (if present) from the deck hanger pin (Fig. 1324).



Fig 1324

PICT-1281

5. Remove the retaining ring from the deck bushing (Fig. 1325).



Fig 1325

PICT-1282

# MOWER DECKS

6. Remove the deck bushing from the carrier frame (Fig. 1326).



Fig 1326

PICT-1283

8. Remove the deck hanger pin from the carrier frame (Fig. 1328).



Fig 1328

PICT-1285

7. Remove the bolt and nut securing the deck hanger pin to the mower deck (Fig. 1327).



Fig 1327

PICT-1284

9. Slide the snap ring off of the deck hanger pin (Fig. 1329).



Fig 1329

PICT-1286a

# MOWER DECKS

## Rear Deck Hanger Installation

1. Slide a retaining ring onto the deck hanger pin (Fig. 1330).

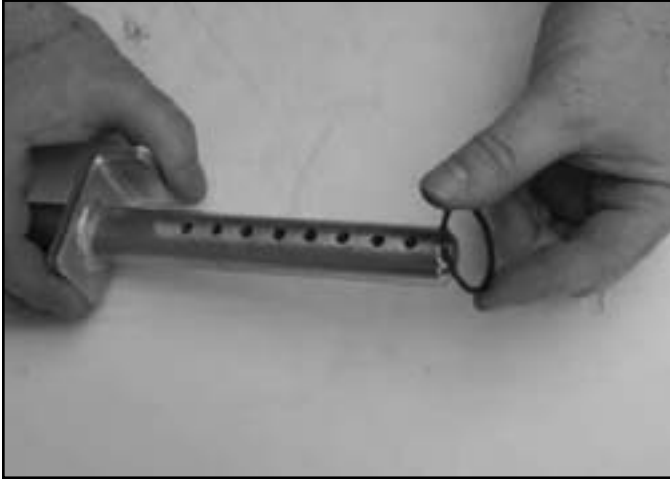


Fig 1330

PICT-1286a

3. Install the bolt and nut to secure the deck hanger pin to the mower deck (Fig. 1332).



Fig 1332

PICT-1284

2. Slide the deck hanger pin up through the carrier frame and into the mower deck. Note the orientation of the deck hanger pin tab (Fig. 1331):



Fig 1331

PICT-1287

4. Install the deck bushing over the deck hanger pin and into the carrier frame (Fig. 1333).



Fig 1333

PICT-1283

# MOWER DECKS

5. Install the retaining ring onto the deck bushing (Fig. 1334).



Fig 1334

PICT-1282

7. Lift up on the mower deck and install the hairpin(s) into the deck hanger pins at the desired height-of-cut setting (Fig. 1336).



Fig 1336

PICT-1257

6. Install the spacer(s) (if required) onto the deck hanger pins (Fig. 1335).



Fig 1335

PICT-1258

8. Install the deck drive belt onto the center spindle pulley. Refer to "PTO Drive Belt Installation (40", 48", 52" and 60" Mower Decks)" on page 8-7 or "PTO Drive Belt Installation (36" Mower Decks)" on page 8-9.
9. 40", 48", 52" and 60" mower decks only: Install the left hand belt cover (Fig. 1337).



Fig 1337

PICT-1279

# MOWER DECKS

## Anti-Scalp Roller Replacement

### Single Anti-Scalp Roller Removal

1. Turn the engine off and remove the key from the ignition. Set the parking brake.
2. Remove the nut from the roller axle bolt (Fig. 1338).



Fig 1338

PICT-1104

3. Remove the axle bolt and roller assembly from the mower deck (Fig. 1339).

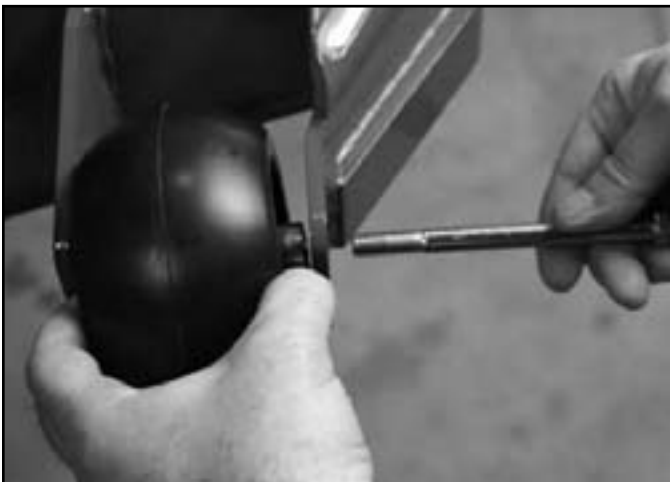


Fig 1339

PICT-1105

4. Remove the spacer tube from the spanner tube (Fig. 1340).



Fig 1340

PICT-1106

5. Remove the spanner tube from the roller (Fig. 1341).



Fig 1341

PICT-1107

## Single Anti-Scalp Roller Installation

1. Insert the spacer tube into the roller (Fig. 1342).



Fig 1342

PICT-1107

2. Install the spacer tube onto the spanner tube (Fig. 1343).



Fig 1343

PICT-1106

3. Position the roller so that the spacer tube is located to the outside of the deck. Install the roller to the mower deck brackets with an axle bolt (Fig. 1344).

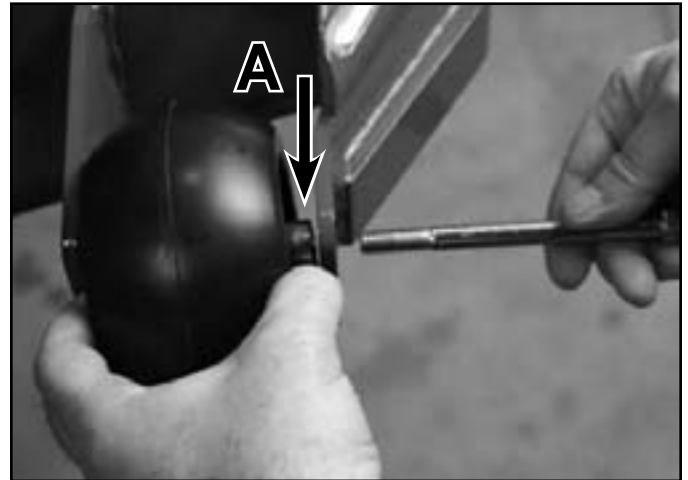


Fig 1344

PICT-1105

- A. Spacer tube

4. Install a nut onto the roller axle bolt (Fig. 1345).



Fig 1345

PICT-1104



# MOWER DECKS

## Double Anti-Scalp Roller Removal

1. Turn the engine off and remove the key from the ignition. Set the parking brake.
2. Remove the nut from the roller axle bolt (Fig. 1346).

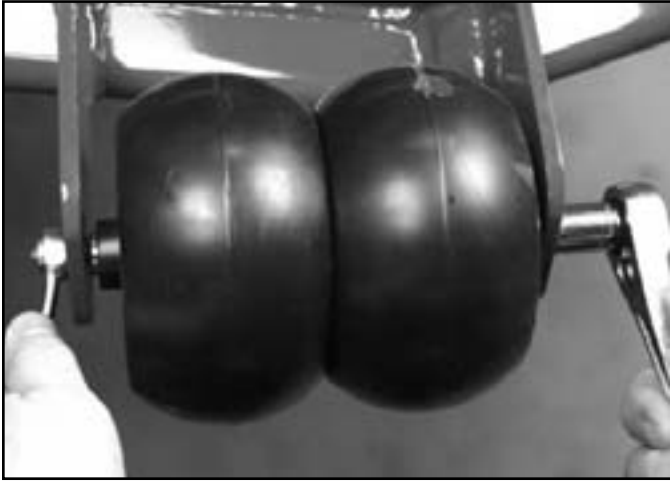


Fig 1346

PICT-1108

3. Remove the axle bolt and double roller assembly from the mower deck (Fig. 1347).



Fig 1347

PICT-1109

4. Remove the rollers from the wheel spacer (Fig. 1348).

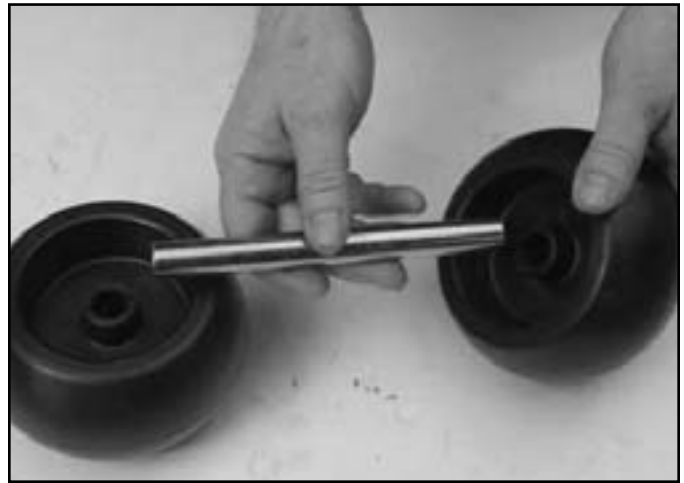


Fig 1348

PICT-1112a

## Double Anti-Scalp Roller Installation

1. Slide the rollers onto the wheel spacer (Fig. 1349).

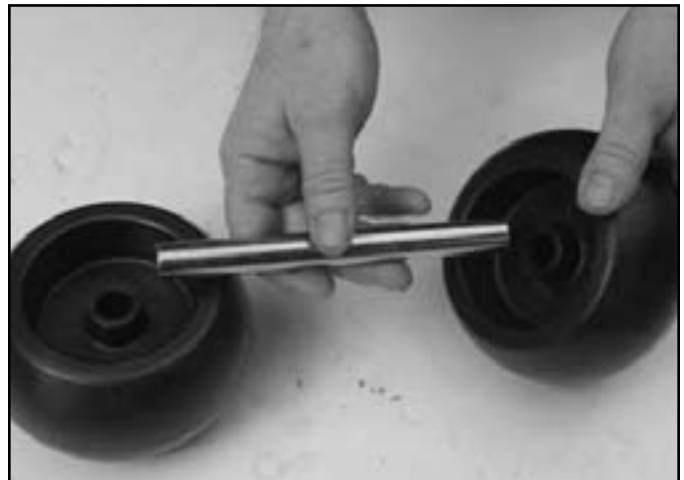


Fig 1349

PICT-1112a

2. Position the roller assembly in between the brackets on the mower deck. Install the roller assembly to the mower deck brackets with an axle bolt.
3. Install a nut onto the roller axle bolt (Fig. 1350).

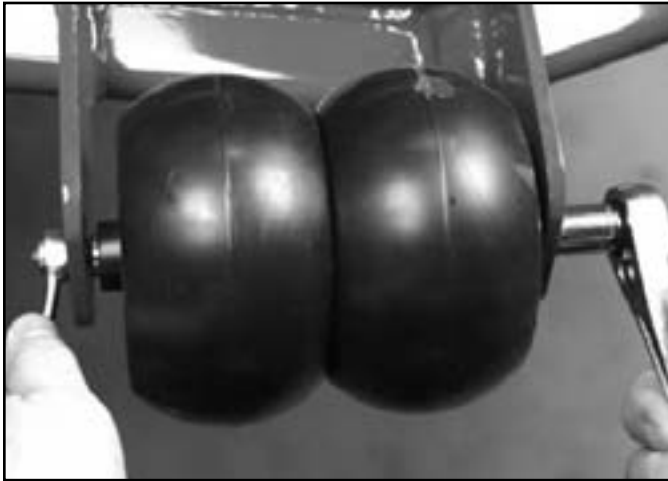


Fig 1350

PICT-1108

2. Remove the nut from the deflector assembly pivot bolt (Fig. 1352).



Fig 1352

PICT-1046a

## Grass Deflector Service

### Grass Deflector Removal

1. Carefully unhook the spring from the deflector assembly (Fig. 1351).



Fig 1351

PICT-1044a

3. Remove the pivot bolt from the deflector assembly (Fig. 1353).



Fig 1353

PICT-1048a

# MOWER DECKS

4. Remove the deflector assembly, spacer and spring from the mower deck (Fig. 1354).



Fig 1354

PICT-1049a

2. Remove the discharge strap and metal deflector from the rubber deflector (Fig. 1356).



Fig 1356

PICT-1057

## Grass Deflector Disassembly

1. Remove the 4 carriage bolts and nuts securing the hinge brackets to the deflector. Remove the hinge brackets (Fig. 1355).



Fig 1355

PICT-1050

## Grass Deflector Assembly

1. Insert the 4 carriage bolts into the discharge strap (Fig. 1357).

**Note:** The bolt pattern is oriented so that the 2 bolt holes that are closer together are on the left.

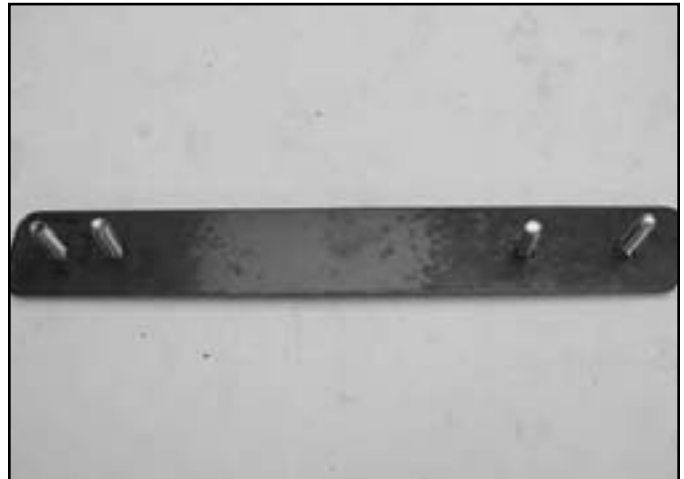


Fig 1357

PICT-1062a

# MOWER DECKS

2. Position and press the rubber deflector onto the 4 carriage bolts (Fig. 1358).



Fig 1358

PICT-1063

4. Position the 2 hinge brackets (Fig. 1360).



Fig 1360

PICT-1070

3. Install the metal deflector onto the 4 carriage bolts (Fig. 1359).



Fig 1359

PICT-1068

5. Install 4 nuts onto the bolts securing the deflector assembly (Fig. 1361).



Fig 1361

PICT-1072

# MOWER DECKS

## Grass Deflector Installation

1. Slide the spring onto the spacer (Fig. 1362).

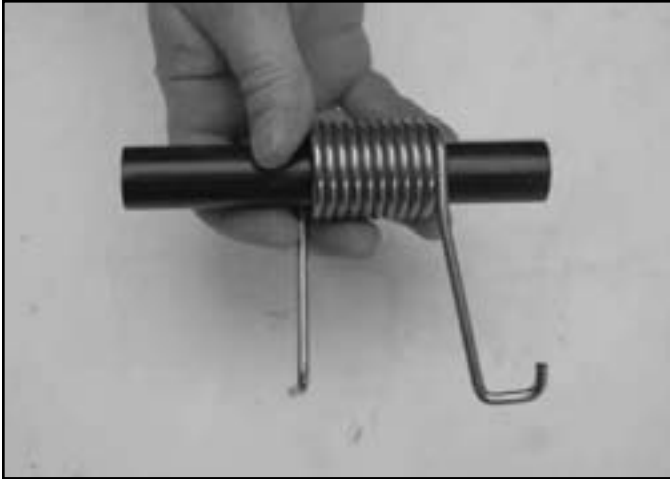


Fig 1362

PICT-1075a

3. Install the spring/spacer, using the pivot bolt, so that the hook end of the spring is on the deflector side of the mounting plate and the "L" end of the spring is on the mower deck side of the mounting plate (Fig. 1364).



Fig 1364

PICT-1077

2. Position the deflector assembly to the mower deck and orient the spring/spacer assembly so the end of the spring with the hook is pointing to the rear (Fig. 1363).



Fig 1363

PICT-1076a

4. Install a nut onto the pivot bolt (Fig. 1365).

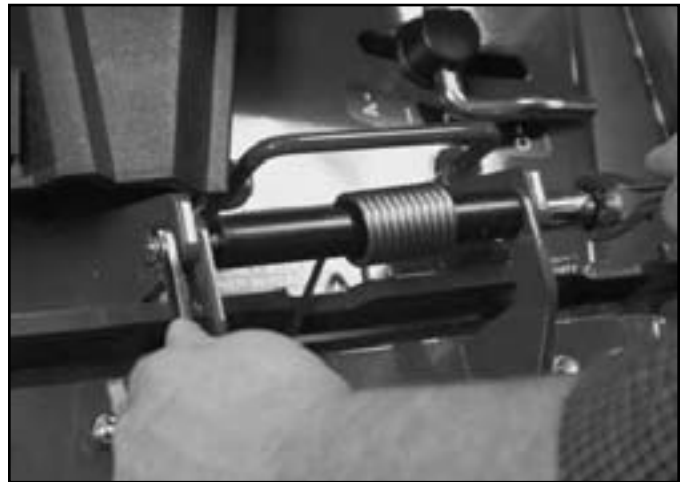


Fig 1365

PICT-1046a

8

5. Install the hook end of the spring onto the deflector mounting bracket (Fig. 1366).



Fig 1366

PICT-1044a

2. Remove the bushing from the quick latch handle (Fig. 1368).



Fig 1368

PICT-1250a

## Quick Latch Replacement

There are a total of 5 quick latches located on the mid-size units. The replacement procedure is the same for all.

## Quick Latch Removal

1. Remove the nut from the quick latch handle (Fig. 1367).



Fig 1367

PICT-1247a

3. Remove the washer from the quick latch handle (Fig. 1369).



Fig 1369

PICT-1251a

# MOWER DECKS

4. Remove the quick latch handle from the cover (Fig. 1370).



Fig 1370

PICT-1253

2. Place a washer onto the quick latch handle (Fig. 1372).



Fig 1372

PICT-1251a

## Quick Latch Installation

1. Insert the quick latch handle through the cover (Fig. 1371).



Fig 1371

PICT-1253

3. Install a bushing onto the quick latch handle (Fig. 1373).



Fig 1373

PICT-1250a

4. Install a nut securing the quick latch handle assembly to the cover. There must be one thread from the quick latch handle protruding past the nut (Fig. 1374).



Fig 1374

PICT-1254

3. Remove the top hairpins and spacer(s) (if present) from the deck hanger pin (Fig. 1375).



Fig 1375

PICT-1281

## Mower Deck Removal

1. Support the rear of the chassis with a jack stand.
2. Remove the drive belt from the center spindle pulley. Refer to: "PTO Drive Belt Removal (40", 48", 52" and 60" Mower Decks)" on page 8-6 or "PTO Drive Belt Removal (36" Mower Decks)" on page 8-8.

4. Lift up on the mower deck and remove the hairpins from the 4 deck hanger pins (Fig. 1376).

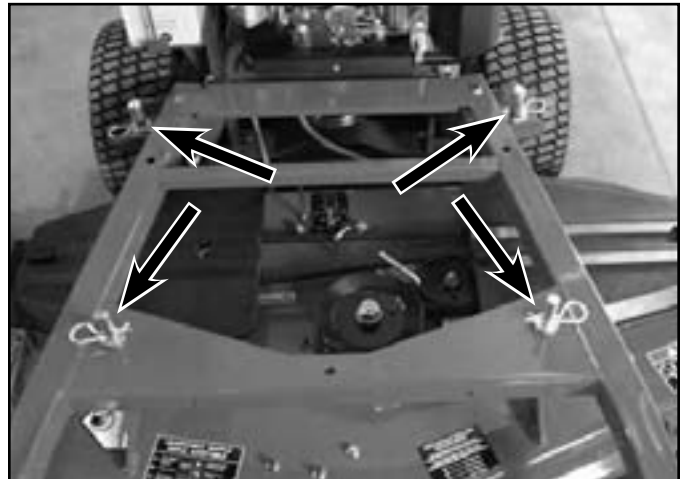


Fig 1376

PICT-1291



# MOWER DECKS

5. Remove the spacers from the hanger pins if they are present (Fig. 1377).



Fig 1377

PICT-1294

6. Raise the carrier frame and slide the mower deck away from the traction unit (Fig. 1378).



Fig 1378

PICT-1295

## Mower Deck Installation

1. Raise and position the carrier frame over the mower deck (Fig. 1379).



Fig 1379

PICT-1295

2. As the carrier frame is lowered, ensure the deck hanger posts are inserted through the holes in the carrier frame (Fig. 1380).

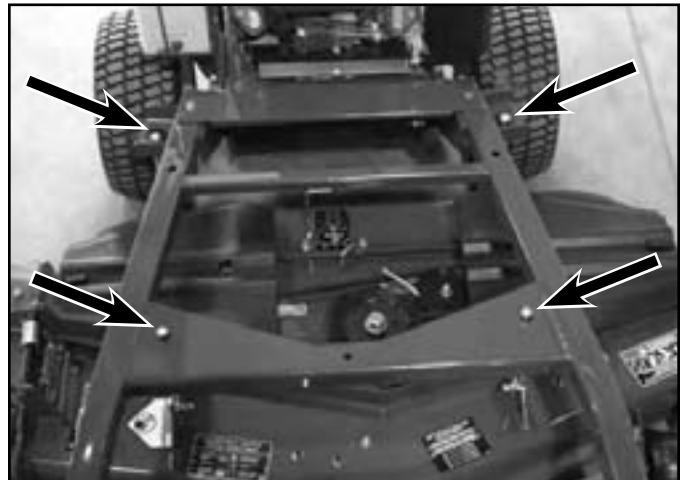


Fig 1380

PICT-1338

# MOWER DECKS

3. Support the rear of the chassis with a jack stand.
4. Lift up on the mower deck and install the spacers and hairpins onto the 4 deck hanger pins (Fig. 1381).

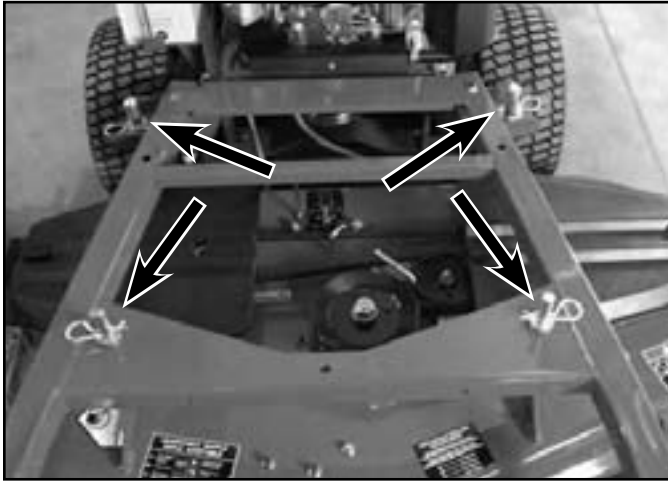


Fig 1381

PICT-1291

5. Install the mower deck drive belt onto the center spindle pulley. Refer to: "PTO Drive Belt Installation (40", 48", 52" and 60" Mower Decks)" on page 8-7 or "PTO Drive Belt Installation (36" Mower Decks)" on page 8-9.
6. Check the front-to-rear pitch of the mower deck. Refer to "Checking the Mower Deck Front-to-Rear Pitch" on page 8-65.
7. Check the side-to-side height of the mower deck. Refer to "Checking the Mower Deck Side-to-Side Height" on page 8-66.
8. Check the Height-of-Cut. Refer to "Matching the Height-of-Cut" on page 8-67.

## Checking the Engine Deck Height

1. Disengage the PTO and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Adjust the tire pressure in the rear tires to 12-14 psi (83-97kPa).
4. Measure engine deck height at location AA (Fig. 1382).
5. Measure engine deck height at location BB (Fig. 1382).

If the heights at locations AA and BB are not the same, change the tire pressure slightly to make them the same.

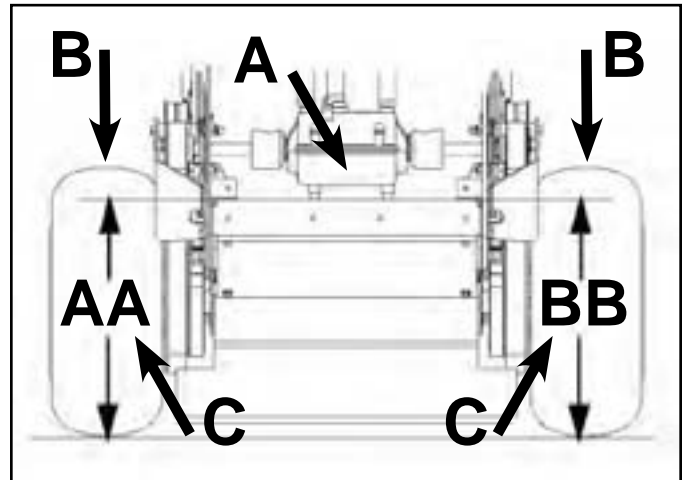


Fig 1382

fig. 79 G000284

This illustration is a back view of the machine.

- A. Top of engine deck
- B. Tires
- C. Same height at locations AA and BB

# MOWER DECKS

## Checking the Carrier Frame Front-to-Rear Pitch

The carrier frame must have a pitch between 1/8" (3mm) to 3/8" (9mm) over the length of 24" (61cm) on the carrier frame.

1. Measure out 24" (61cm) on the carrier frame (Fig. 1383).
2. Measure the carrier frame height at location AA (Fig. 1383).
3. Measure the carrier frame height at location BB (Fig. 1383).
4. The height at location AA must be 1/8" to 3/8" (3mm to 10mm) lower than at location BB (Fig. 1383).
5. If the carrier frame pitch is not correct, move spacers from the top or bottom of the caster wheel forks to achieve the correct pitch: 1/8" to 3/8" (3mm to 10mm) (Fig. 1383).
6. The tire pressure may also be adjusted slightly to achieve a 1/8" to 3/8" (3mm to 10mm) pitch.

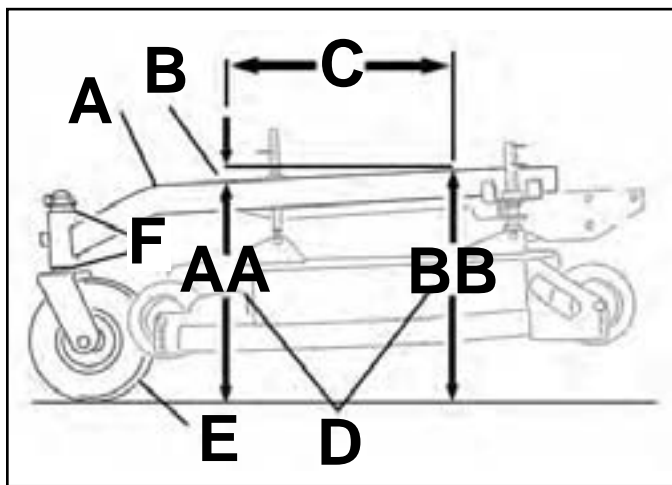


Fig 1383

fig. 80 G004801

- |  |                                  |
|--|----------------------------------|
| A. Carrier Frame                                   | D. Height at locations AA and BB |
| B. 1/8"-3/8" (3-10mm) pitch over 24" (61cm) length | E. Caster wheel                  |
| C. 24" (61cm)                                      | F. Caster spacers                |

## Checking the Carrier Frame Side-to-Side Height

The carrier frame needs to be parallel side-to-side from the ground.

1. Disengage the PTO and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Adjust the tire pressure in the rear tires to 12-14psi (83-97kPa).
4. Measure the carrier frame height at location AA (Fig. 1384).
5. Measure the carrier frame height at location BB (Fig. 1384).
6. If the carrier frame height is not the same at locations AA and BB, move spacers from the top or bottom of the caster wheel forks to make it level.
7. The tire pressure may also be adjusted slightly to make it level.

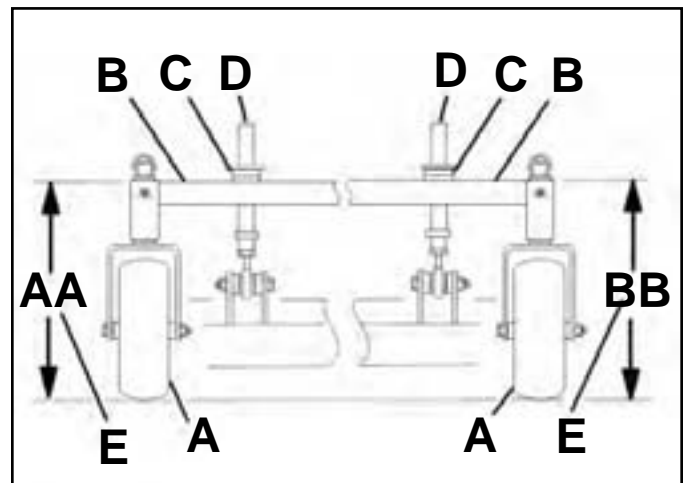


Fig 1384

fig. 81 G000287

- |                   |                                       |
|-------------------|---------------------------------------|
| A. Caster wheel   | D. Front height-of-cut pins           |
| B. Carrier frame  | E. Same height at locations AA and BB |
| C. Caster spacers |                                       |

# MOWER DECKS

## Checking the Mower Deck Front-to-Rear Pitch

1. Adjust the tire pressure in the rear tires to 12-14 psi (83-97kPa).
2. Position the mower blades so they are in the front-to-rear orientation. Measure at AA and BB locations from a level surface to the cutting edge of the blade tips (Fig. 000 and for 36" mower decks use Fig. 1385).
3. The mower blades should be 1/4" (6mm) lower at location AA than at location BB.
4. If the front-to-rear pitch is not correct, proceed to Adjusting the Deck Front-to-Rear Pitch.

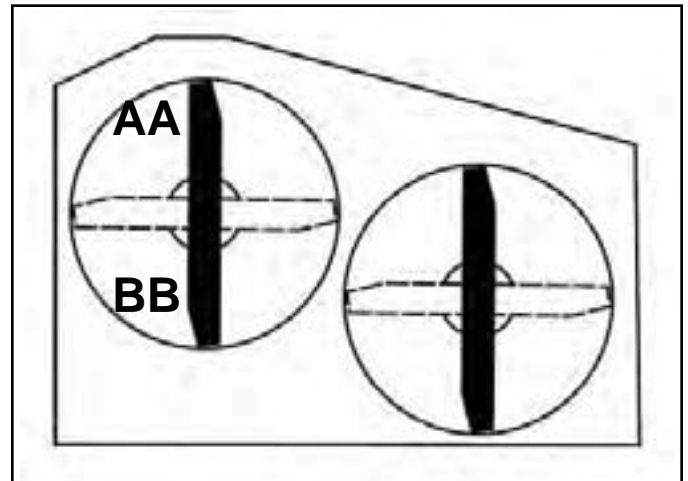


Fig 1386

fig. 83 G004906

This illustration shows a 36" mower deck.

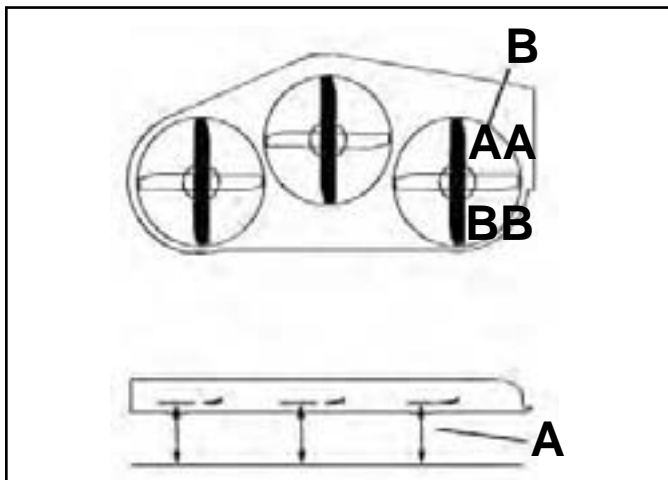


Fig 1385

fig. 82 G001041

This illustration shows a 40", 48" and 52" mower deck.

- |                                      |                                 |
|--------------------------------------|---------------------------------|
| A. Measure blade at points AA and BB | B. Measure from a level surface |
|--------------------------------------|---------------------------------|

# MOWER DECKS

## Adjusting the Mower Deck Front-to-Rear Pitch

Changing the front-to-rear pitch is done by adjusting the front height-of-cut posts.

1. To raise the front of the deck, loosen the jam nut on the lower end of the deck hanger pin assembly. Rotate the front pin clockwise (Fig. 1387).
2. To lower the front of the deck, loosen the jam nut on the lower end of the deck hanger pin assembly. Rotate the front pin counter-clockwise (Fig. 000).
3. Position the mower blades in the front-to-rear orientation. Measure at the AA and BB locations (Fig. 1385 and Fig. 1386) from a level surface to the cutting edge of the blade tips.
4. Check the side-to-side leveling of the cutting unit. Refer to Checking the Mower Deck Side-to-Side Height.
5. Tighten the jam nuts (Fig. 1387).

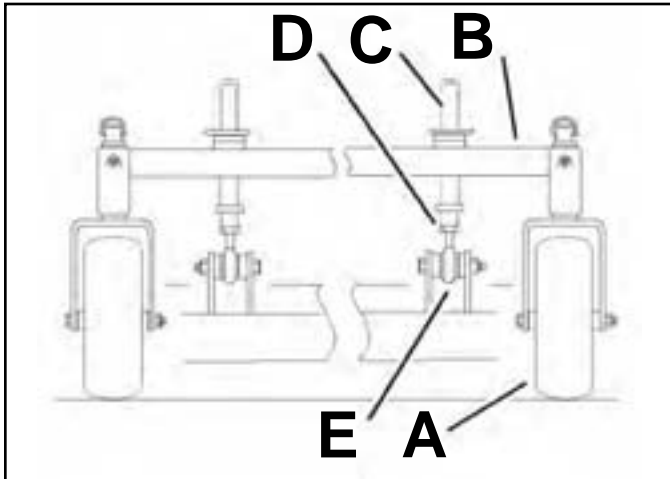


Fig 1387

fig. 84 G000292

- A. Caster wheel
- B. Carrier Frame
- C. Front height-of-cut pins
- D. Jam nut
- E. Ball joint

## Checking the Mower Deck Side-to-Side Height

1. Adjust the rear tire pressure to 12-14 psi (83-97kPa).
2. Position the mower blades in the side-to-side orientation. Measure at the C and D locations from a level surface to the cutting edge of the blade tips (Fig. 1388 and for 36" mower decks use Fig. 1389).
3. The difference between the measurements at the C and D locations should be no more than 1/4" (6mm).
4. If the side-to-side pitch is not correct, proceed to Adjusting the Mower Deck Side-to-Side Height.

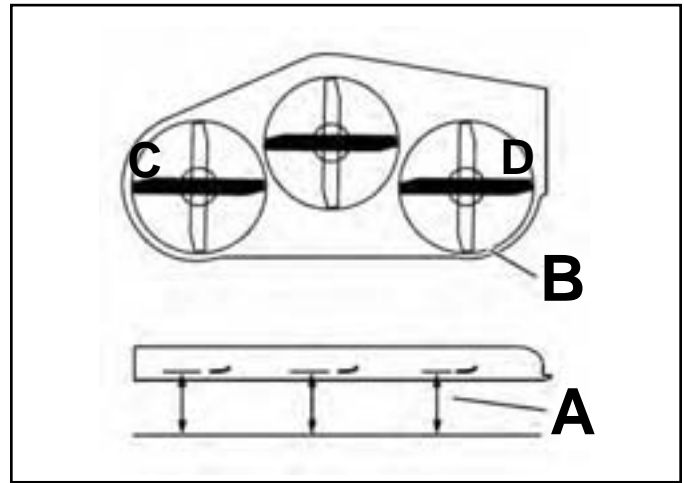


Fig 1388

fig. 85 G004908

This illustration shows a 40", 48" and 52" mower deck.

- A. Measure from a level surface
- B. Measure blade at points C and D

# MOWER DECKS

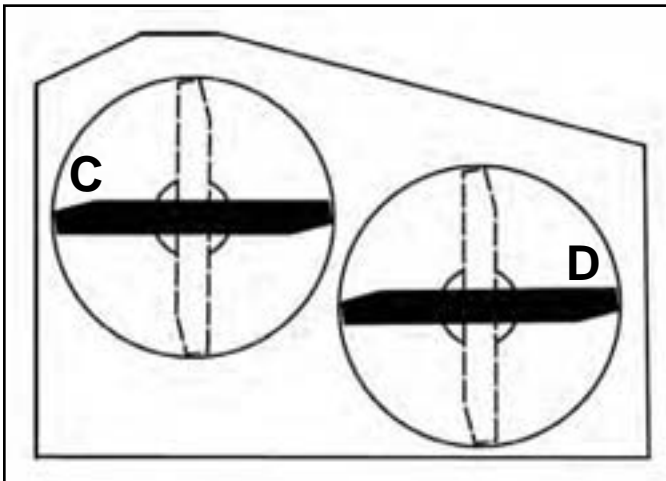


Fig 1389

fig. 86 G004907

This illustration shows a 36" mower deck.

## Adjusting the Mower Deck Side-to-Side Height

1. Adjust the rear tire pressure. This should be done to the tire on the corresponding side that needs height adjustment.
2. Adjust the caster spacers by moving spacers from the top or bottom of the caster wheel forks.
3. Check the front-to-rear pitch and side to side leveling of the cutting unit.

## Matching the Height-of-Cut

1. Check the rear tire pressure.
2. Set the height-of-cut to the 4" (101.6mm) position. Reference the height-of-cut decal (Fig. 1390).

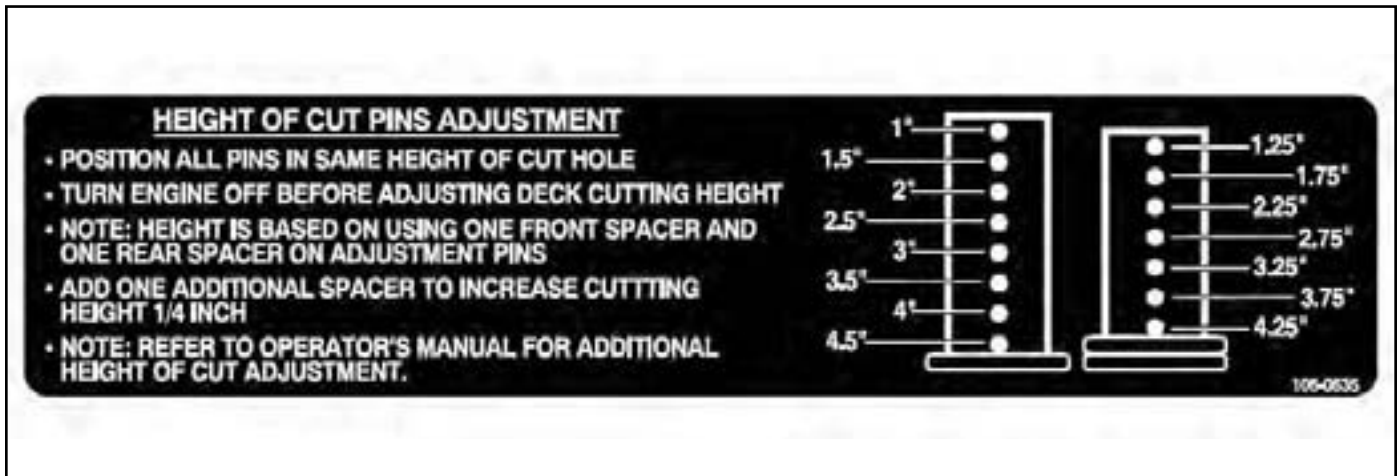


Fig 1390

106-0635

# MOWER DECKS

3. With the machine on level surface, position one blade front-to-rear. Measure at location A from a level surface to the cutting edge of the blade tip (Fig. 1391 and for 36" mower decks use Fig. 1392).
4. The measurement should be 4" (101.6mm).
5. If it does not measure correctly:
  - A. Adjust the rear tire pressure.
  - B. Adjust the caster fork spacers.
  - C. Adjust the front mower deck support pins.
6. Check the carrier frame front-to-rear pitch. Refer to "Checking the Mower Deck Front-to-Rear Pitch" on page 8-65.

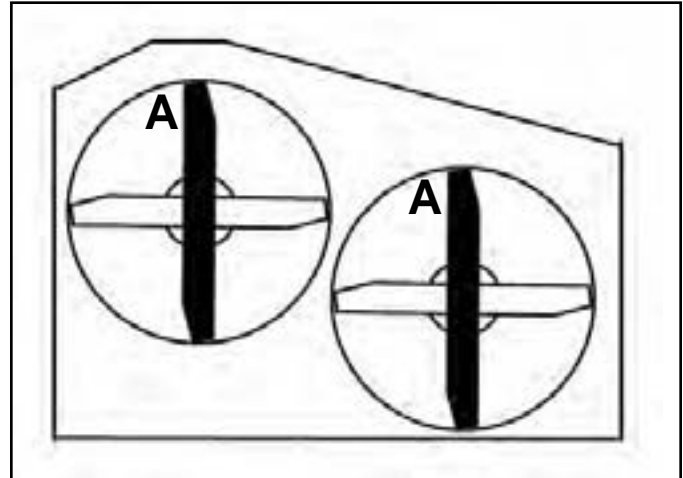


Fig 1392

fig. 88 G000296

This illustration shows a 36" mower deck.

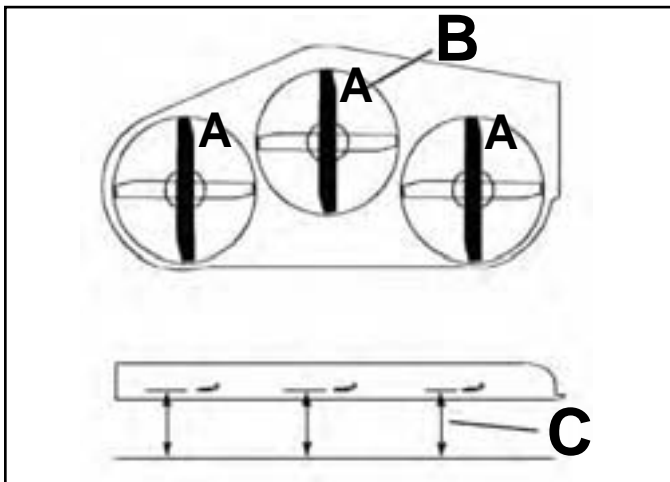


Fig 1391

fig. 87 G000975

This illustration shows a 40", 48" and 52" mower deck.

- |                                 |                             |
|---------------------------------|-----------------------------|
| B. Measure from a level surface | C. Measure blade at point A |
|---------------------------------|-----------------------------|

## Tools

- Volt Ohm meter
- Flat and Phillips screwdrivers
- Box and open end wrenches - various sizes

Additional information can be found in the LCE Electrical Troubleshooting DVD #492-9171, available through your Toro parts supplier.

### Caution

**Before performing any tests with a continuity light or ohmmeter, disconnect the component from the wire harness. This ensures you are testing the component rather than another circuit.**

**Interlock modules MUST be removed from the circuit before performing any tests with an ohmmeter or continuity light. Battery voltage can damage these modules if applied to the wrong terminals.**

## Components

### Alternator

The alternator system varies with the engine model. See the engine manufacturer service information for proper testing procedures.

### On/Off Switch

The on/off switch is mainly used to control the spark on recoil start models. In the off position there is contact between the terminals. When turned 1/4 turn clockwise to the on position the contacts open (Fig. 1393).



Fig 1393

29-5560x1

### Bail Switch

The bail switch is a normally open switch. The contacts close when the plunger is depressed (Fig. 1394).



Fig 1394

82-2190x1a



# ELECTRICAL

## Single Pole Switch

This is a normally closed switch and has the letters "NC" stamped on both terminals. This switch should have continuity when at rest. Continuity should be lost when the plunger is depressed (Fig. 1395).



Fig 1395

95-1653x1

## PTO Switch

3 terminals are in use on this switch. When the switch is off (knob depressed) there should be continuity between terminals 1 and 7. When the switch is on (knob pulled out) there should be continuity between terminals 1 and 4 (Fig. 1396 and Fig. 1397).

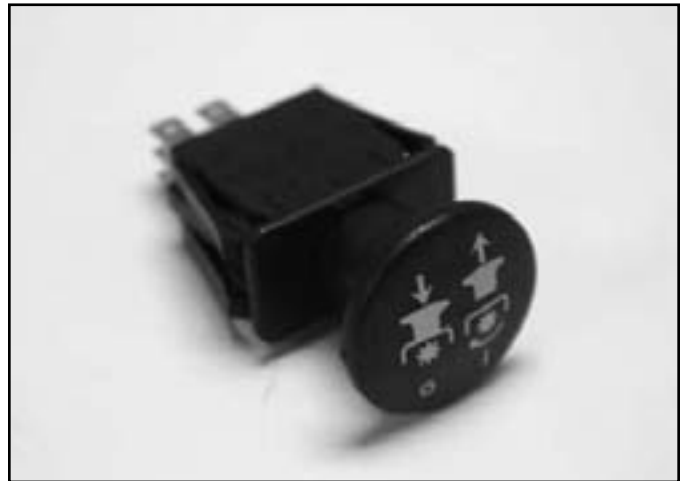


Fig 1396

95-7489x1

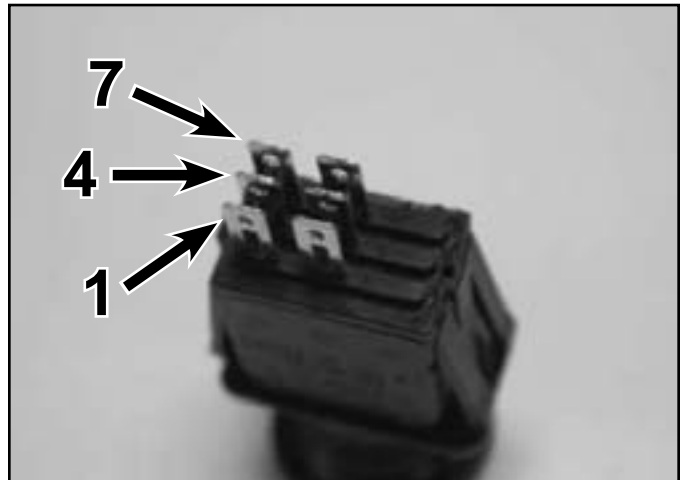


Fig 1397

95-7489x2a

## Relay, Single Pole Dual Throw

A relay is an electronically activated switch. It can be used as a normally open or normally closed switch depending on which terminals are used. The diagram is molded into the side of the relay.

At rest terminals 30 and 87a are closed. When 12 volts is applied to terminals 85 and 86 the relay is activated so that terminals 30 and 87a open and terminals 30 and 87 close. When the voltage is removed the relay will return to the rest position (Fig. 1398).

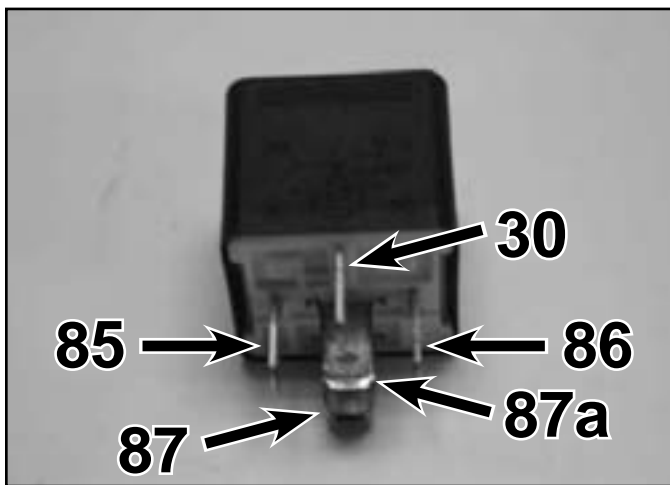


Fig 1398

98-7249x1

## Ignition Switch

The ignition switch has 3 positions; off, run and start. The start position is spring loaded to return to run when released. The switch terminals are unmarked. Use the figure above to identify the terminals. Switch continuity is as follows:

Off: None  
Run: B+I+A X+Y  
Start: B+I+S

(Fig. 1399 and Fig. 1400)



Fig 1399

104-2541x1

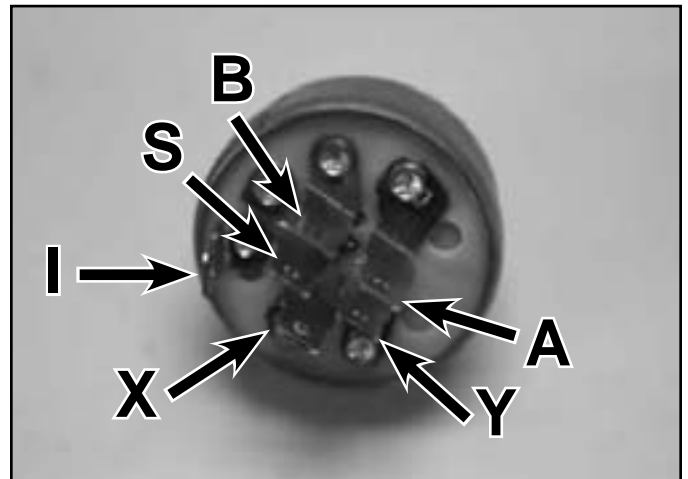


Fig 1400

104-2541x2

# ELECTRICAL

## Wire Harness T-Bar, Gear Drive (104-8137)

This wire harness has one 7.5 amp fuse in the pink wire between the alternator and delay module. If the clutch fails to engage, check the fuse first (Fig. 1401).

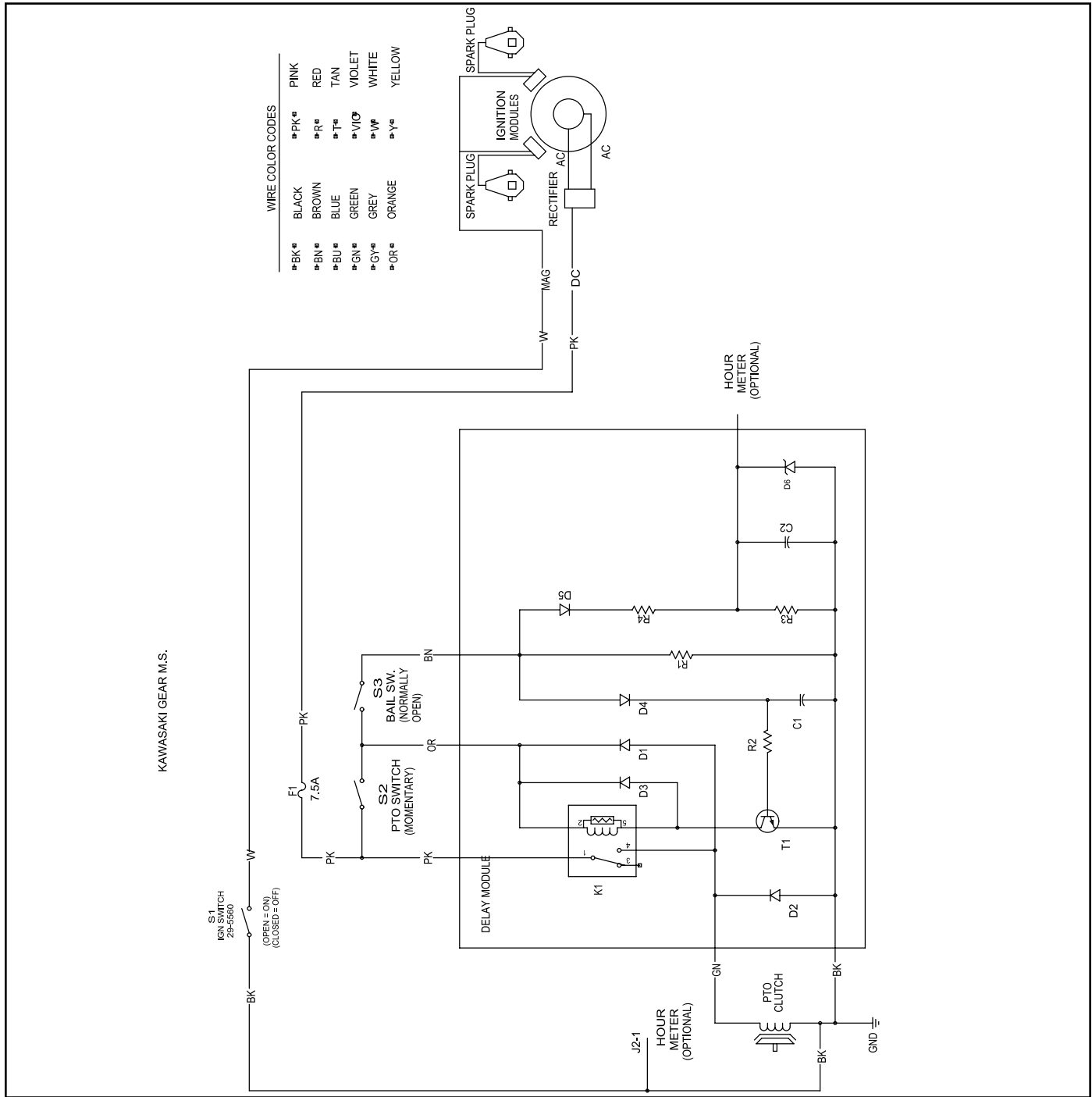


Fig 1401

scheme 104-8137

## PTO Switch

Only 2 terminals are used in this application: numbers 1 and 4 as shown in the figure below. These terminals are normally open. They close only when the PTO knob is pulled outward. This is a momentary switch so when the PTO knob is released it will return to the open position (Fig. 1402 and Fig. 1403).



Fig 1402

104-8140x1

## Delay Module

The Delay Module delays clutch disengagement for a second or two. It allows the operator to momentarily release the handle and then re-engage it without going through the 2 step blade engagement process. This module contains a number of resistors and a transistor. If the clutch fails to engage or disengage properly, test the clutch and power supply. If they function normally, the module should be replaced (Fig. 1404).



Fig 1404

104-8141x1

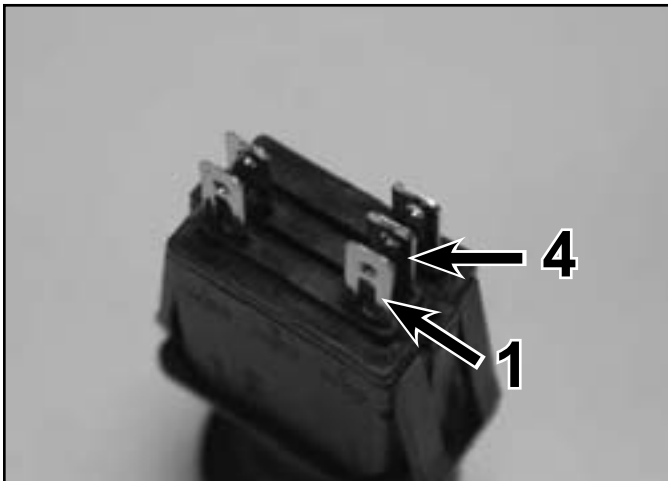


Fig 1403

104-8140x2a

# ELECTRICAL

## Clutch Power Supply Test Procedure:

1. Measure the DC voltage at the pink wire where it comes out of the rectifier. Make sure the engine is running at full throttle and note the reading. If below 12 VDC, troubleshoot the engine's electrical system (Fig. 1405).

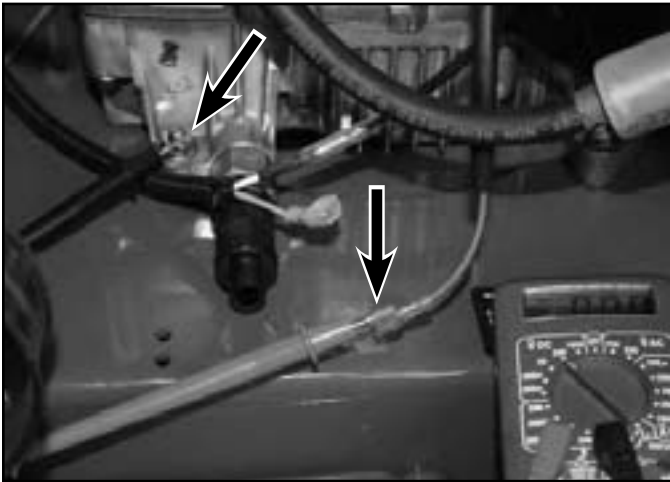


Fig 1405

IMG\_8042

2. Under the control panel, remove 4 screws and lower the bottom panel. Unplug harness from delay module (Fig. 1406).

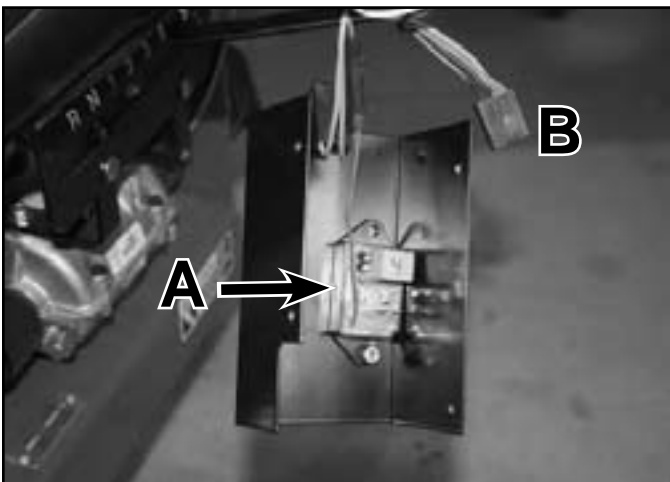


Fig 1406

IMG\_8069a

A. Delay module

B. Harness

3. Connect the test lead to the end of the pink wire in the terminal plug removed from the module (Fig. 1407).

**Note: The voltage should be the same as at the engine.**



Fig 1407

IMG\_8046a

4. Move the tester lead to the orange wire in the same terminal plug. Pull the clutch switch out and hold. The voltage should be the same as at the pink wire (Fig. 1408).



Fig 1408

IMG\_8071a

5. Move the bail to the operation position and temporarily tie it in place (Fig. 1409).



Fig 1409

IMG\_8066a

6. Attach the test lead to the brown wire and pull the clutch switch, the voltage should not change (Fig. 1410).

If the voltage **does** change: Trace the problem back through the wire harness and switches.

If the voltage **does NOT** change: Check the PTO clutch and module ground connections, step 7 and 8.



Fig 1410

IMG\_8051a

7. Set the Volt/Ohm meter to the OHMs setting. Connect a test lead to the green wire at the module connector. Connect the other test lead to the engine block (Fig. 1411). The reading should be 2.8 OHMs.

A higher reading indicates a poor connection on the green wire, the clutch or ground. Clean and secure all connection points.

A lower reading indicates a problem with the clutch coil.

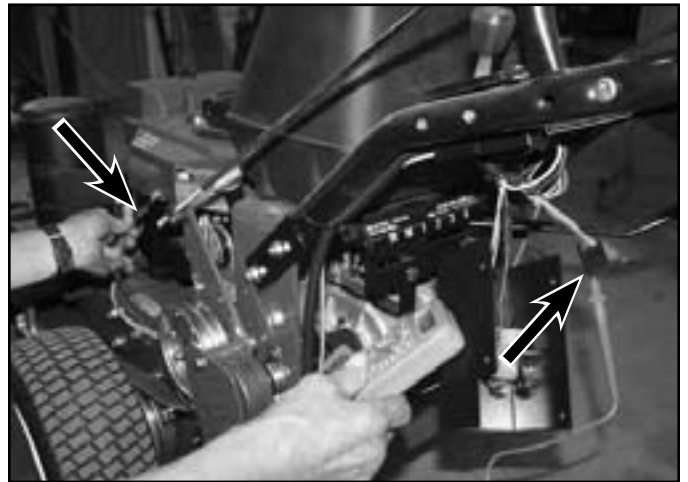


Fig 1411

IMG\_8056a

# ELECTRICAL

8. Check the ground for the module: Check for continuity between the black wire at the module connector and the engine (Fig. 1412).

High resistance indicates corroded terminals or a poor ground connection to the chassis.

If the clutch and power supply function properly (as indicated by the above test procedure), the Delay Module must be replaced.

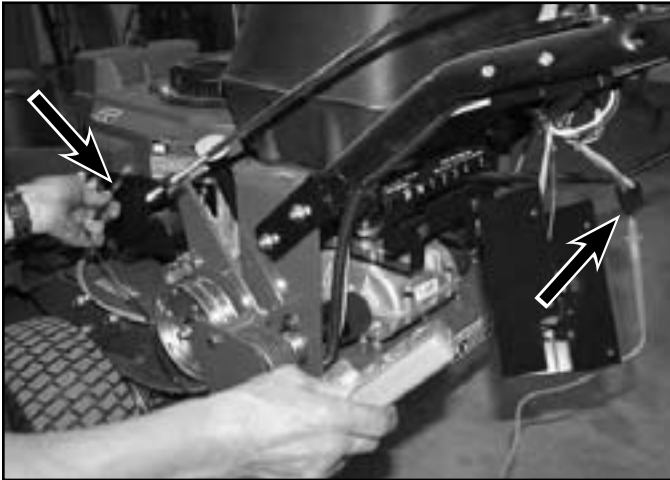


Fig 1412

IMG\_8057a

## DC Mini Hour Meter

This hour meter runs when 12 VDC is applied. It will record up to 9,999.9 hrs. The oil change icon will flash 3 hrs before and 3 hrs after the service interval. There is no manual reset. "Change oil" will appear at 8 hours and then every 100 hours after. "SVC" will also appear every 400 hours (Fig. 1413 and Fig. 1414).



Fig 1413

104-8143x1

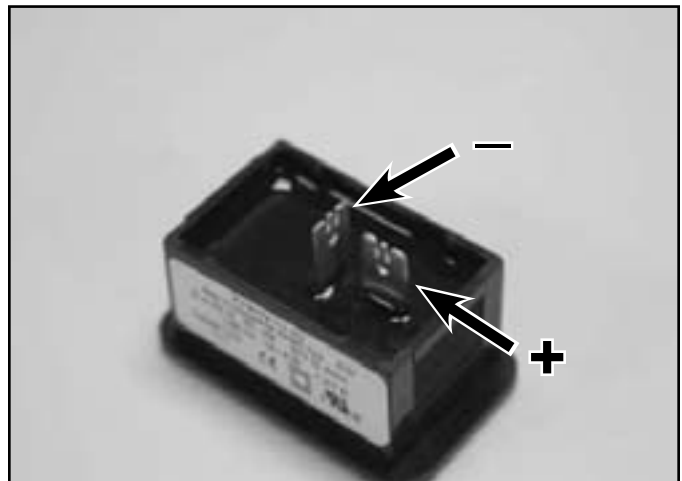


Fig 1414

104-8143x2a

## Proximity Switch

This proximity switch is normally open. The contacts close when a piece of ferrous metal (iron or steel) is placed close to the switch, approximately within 1/4" (.635cm). The switch will open when the metal is moved away (Fig. 1415).



Fig 1415

105-0023x1a

## PTO Brake Clutch Assembly

The PTO clutch contains one fixed plate, a moveable plate and an electro magnet. When a minimum of 8 VDC is applied to the clutch the plates will engage. When the power is removed, springs pull the plates apart and engage the brake to the driven plate (Fig. 1416).

To test the electro magnet coil, apply an ohm meter to the two wire terminals connected to the clutch. A good clutch coil will read approximately 2.8 ohms.

Take one of the test leads and touch an unpainted portion of the clutch body, or any good ground. There should be no continuity (very high number of ohms). Move the test lead to the other wire terminal and repeat the test. Again there should be no continuity.

An alternate test is an amperage draw. Normal draw for this clutch should be 4 amps.

Clutch maintenance includes periodic checking and adjusting of the air gap between the plates. See clutch service procedures.



Fig 1416

IMG\_8062



# ELECTRICAL

## Wire Harness Pistol Grip (106-8780)

There is a 30 amp fuse (p/n 109103) between the battery and ignition switch and a 25 amp fuse (p/n 109102) between the voltage regulator/rectifier on the engine and the ignition switch. Failure of the 30 amp fuse disables the entire electrical system (Fig. 1417).

If the 25 amp fuse fails, focus on the engine portion of the charging system for the cause. The alternator does not produce enough amperage to blow the fuse. A short to ground or a shorted diode in the charging system could allow the battery to discharge through the regulator and alternator as soon as the key is turned on. The fuse will blow to prevent the wire harness from melting.

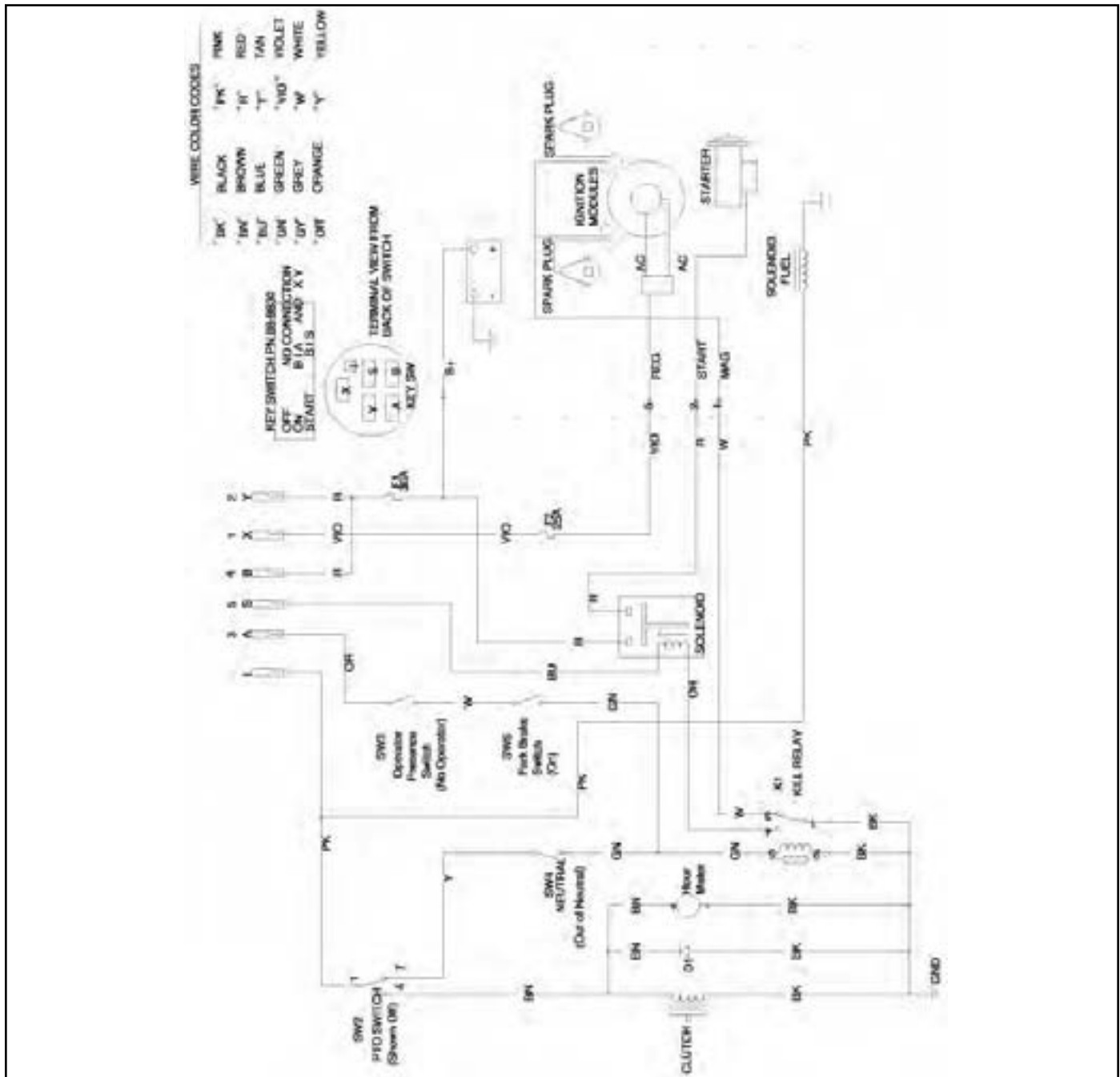


Fig 1417

scheme 106-8780

## PTO Switch

The PTO switch has 3 positions. Fully depressed, a middle detent and momentary (full out). The momentary (full out) position is spring loaded. It must be held to keep it in that position. When the knob is fully depressed there is continuity between terminals 1 and 7. The momentary position (full out) causes continuity between terminals 1 and 4 (Fig. 1418 and Fig. 1419).

The switch can be tested using an ohm meter or continuity light.

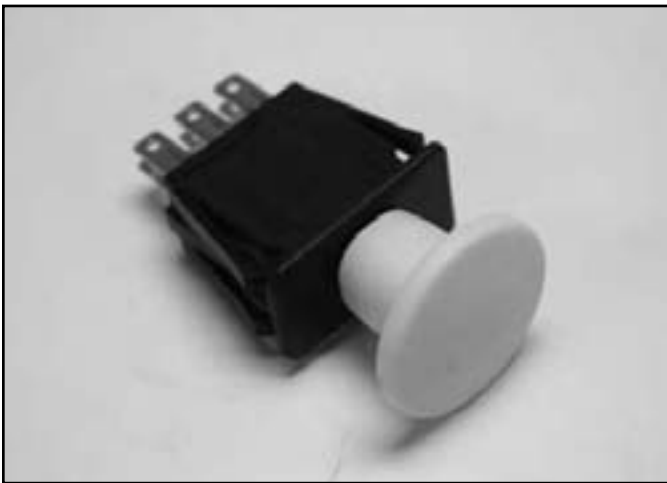


Fig 1418

114-0279x1

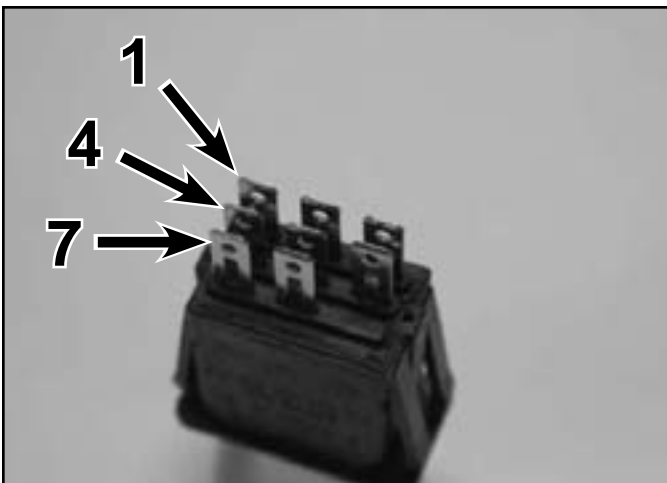


Fig 1419

114-0279x2a

# ELECTRICAL

## Wire Harness T-2, Hydro (114-3418)

There is a 30 amp fuse (p/n 109103) between the battery and ignition switch and a 25 amp fuse (p/n 109102) between the voltage regulator/rectifier on the engine and the ignition switch. Failure of the 30 amp fuse disables the entire electrical system (Fig. 1420).

If the 25 amp fuse fails, focus on the engine portion of the charging system for the cause. The alternator does not produce enough amperage to blow the fuse. A short to ground or a shorted diode in the charging system could allow the battery to discharge through the regulator and alternator as soon as the key is turned on. The fuse will blow to prevent the wire harness from melting.

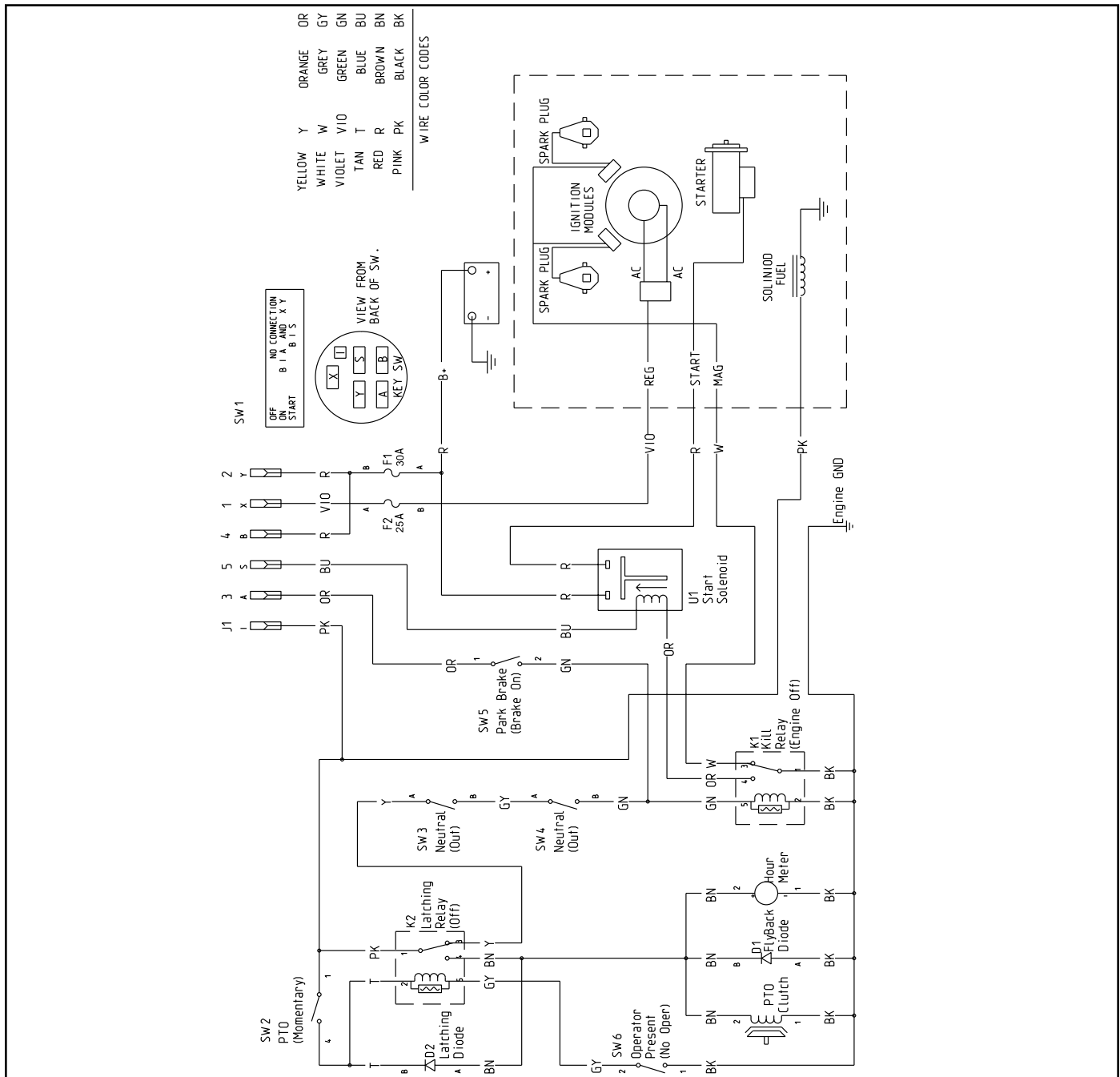


Fig 1420

scheme 114-3418

## Wire Harness T-Bar, Hydro (114-3420)

There is a 30 amp fuse (p/n 109103) between the battery and ignition switch and a 25 amp fuse (p/n 109102) between the voltage regulator/rectifier on the engine and the ignition switch. Failure of the 30 amp fuse disables the entire electrical system (Fig. 1421).

If the 25 amp fuse fails, focus on the engine portion of the charging system for the cause. The alternator does not produce enough amperage to blow the fuse. A short to ground or a shorted diode in the charging system could allow the battery to discharge through the regulator and alternator as soon as the key is turned on. The fuse will blow to prevent the wire harness from melting.

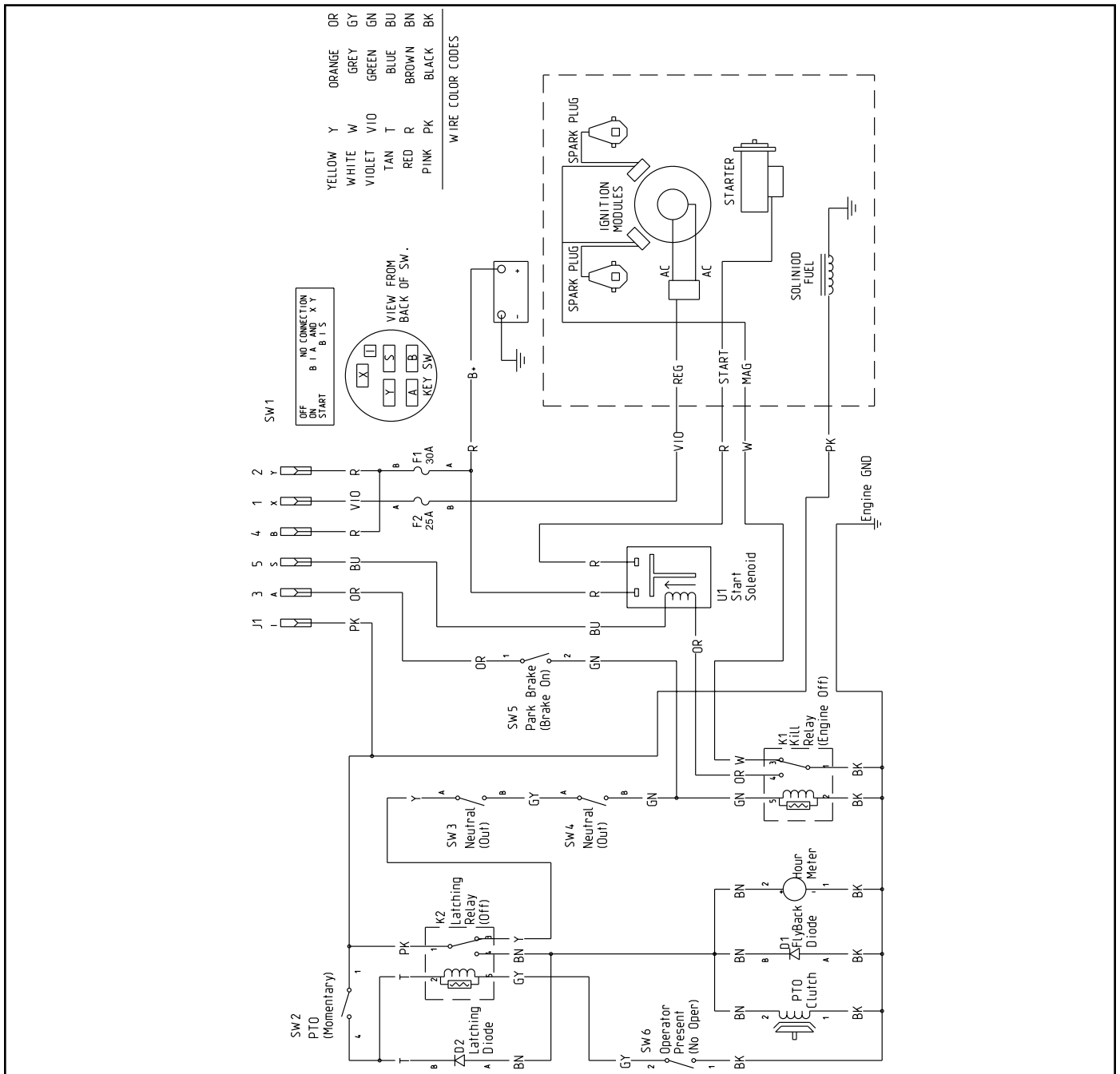


Fig 1421

scheme 114-3420

# ELECTRICAL

## Normally Open Switch

This switch is normally open. There is contact only when the plunger is depressed (Fig. 1422).



Fig 1422

1-513051x1a

## Normally Closed Switch

This switch is normally closed. The contacts open when the plunger is depressed. The terminals are marked NC (Fig. 1423).



Fig 1423

1-513152x1

## Starter Solenoid

A starter is a form of an electrically operated switch. Positioning the solenoid closer to the battery and starter, short battery cables can be utilized to increase efficiency (Fig. 1424).

At rest there should be no continuity between the two larger posts. Connect a 12 volt battery to the two smaller posts and the solenoid should engage. There should be continuity between the large posts as long as the voltage is present.

Maximum torque for the smaller posts is 20 in/lb. (2.26 Nm); larger posts is 25 in/lb. (2.82 Nm).

**Note: Exceeding the maximum torque can pull the terminals from the solenoid.**



Fig 1424

1-513075x1

## Operator Presence Control (OPC) Switch Replacement (T-Bar)

### OPC Switch Removal (T-Bar)

1. Turn the engine off and remove the key from the ignition.
2. Lift the locking tab on the front of the operator presence control switch and unplug the harness connector from the switch (Fig. 1425).



Fig 1425

PICT-1744

3. Remove the cotter pin from the upper end of the control rod (Fig. 1426).



Fig 1426

PICT-1679a

4. Remove the control rod from the control bar/bail assembly (Fig. 1427).



Fig 1427

PICT-1682

# ELECTRICAL

5. Repeat steps 3 and 4 to remove the opposite control rod from the control bar/bail assembly.
6. Remove the bail from the T-Bar handle by sliding it off the OPC Switch mounting bracket and remove it from the machine (Fig. 1428).



Fig 1428

PICT-1785a

7. Remove the OPC switch from the switch mounting bracket (Fig. 1429).



Fig 1429

PICT-1786

## OPC Switch Installation (T-Bar)

1. Install the OPC switch into the switch mounting bracket on the T-Bar (Fig. 1430).



Fig 1430

PICT-1786

2. Position the bail onto the OPC handle by sliding the switch bracket up around the switch mounting bracket (Fig. 1431).



Fig 1431

PICT-1785a

3. Insert a control rod through the T-Bar handle/bail assembly mounting pivots (Fig. 1432).



Fig 1432

PICT-1682

4. Install a cotter pin into the upper end of the control rod (Fig. 1433).



Fig 1433

PICT-1679a

5. Repeat steps 3 and 4 to install the opposite control rod.
6. Plug the harness connector into the OPC switch (Fig. 1434).



Fig 1434

PICT-1744



# ELECTRICAL

## PTO Switch Replacement (T-Bar)

### PTO Switch Removal (T-Bar)

1. Turn the engine off and remove the key from the ignition.
2. Remove the 2 screws securing the manual tube R-clamps to the bottom panel of the control panel. Remove the manual tube assembly (Fig. 1435).

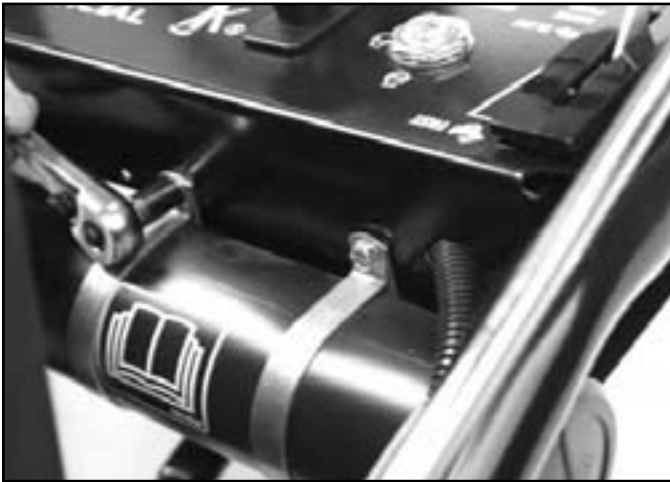


Fig 1435

PICT-1787

3. Remove the 2 screws securing the bottom panel to the control panel and move it away from the control panel (Fig. 1436).



Fig 1436

PICT-1789

4. Unplug the wire harness from the PTO switch (Fig. 1437).

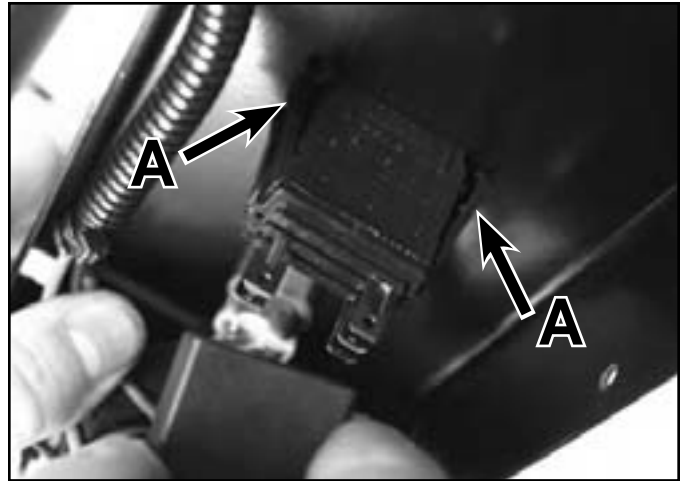


Fig 1437

PICT-1793

A. Tabs

5. Compress the tabs (Fig. 1437) on the switch body and push it out of the control panel (Fig. 1438).



Fig 1438

PICT-1811

## PTO Switch Installation (T-Bar)

1. Push the PTO switch in to place in the control panel (Fig. 1439).



Fig 1439

PICT-1811

2. Plug the wire harness into the PTO switch (Fig. 1440).



Fig 1440

PICT-1793

3. Position the bottom panel to the control panel and install 2 screws securing it to the control panel (Fig. 1441).



Fig 1441

PICT-1789

4. Position the manual tube to the control panel assembly and install 2 screws securing the manual tube R-clamps to the control panel and bottom panel (Fig. 1442).

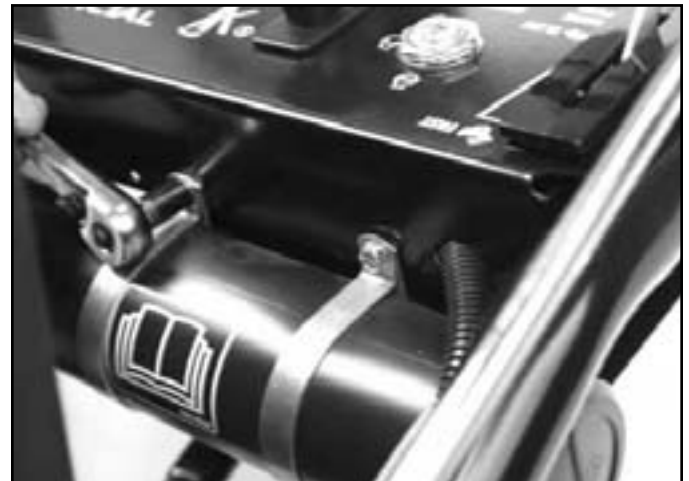


Fig 1442

PICT-1787

# ELECTRICAL

## Ignition Switch Replacement (T-Bar)

### Ignition Switch Removal (T-Bar)

1. Turn the engine off and remove the key from the ignition.
2. Remove the 2 screws securing the manual tube R-clamps to the bottom panel of the control panel. Remove the manual tube assembly (Fig. 1443).

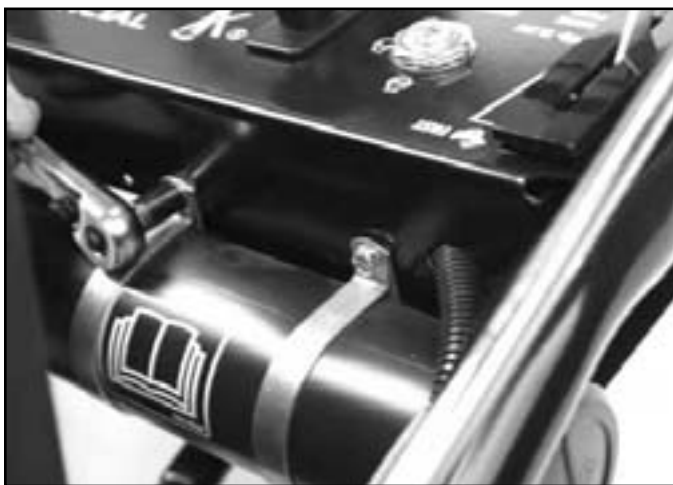


Fig 1443

PICT-1787

3. Remove the 2 screws securing the bottom panel to the control panel and move it away from the control panel (Fig. 1444).



Fig 1444

PICT-1789

4. Unplug the wire harness from the ignition switch (Fig. 1445).



Fig 1445

PICT-1798

5. Remove the nut securing the ignition switch to the control panel (Fig. 1446).



Fig 1446

PICT-1800

6. Remove the lockwasher from the ignition switch (Fig. 1447).



Fig 1447

PICT-1801

7. Remove the ignition switch from the control panel (Fig. 1448).



Fig 1448

PICT-1803

## Ignition Switch Installation (T-Bar)

1. Insert the ignition switch into the control panel (Fig. 1449).



Fig 1449

PICT-1803

2. Place a lockwasher onto the ignition switch (Fig. 1450).



Fig 1450

PICT-1801

# ELECTRICAL

3. Install a nut securing the ignition switch to the control panel (Fig. 1451).



Fig 1451

PICT-1800

5. Position the bottom panel to the control panel and install 2 screws securing the back side of the bottom panel to the control panel (Fig. 1453).



Fig 1453

PICT-1719a

4. Plug the wire harness into the ignition switch (Fig. 1452).



Fig 1452

PICT-1798

6. Position the manual tube to the control panel. Install 2 screws securing the manual tube R-clamps and bottom panel to the control panel (Fig. 1454).



Fig 1454

PICT-1718

## Delay Module Replacement (T-Bar)

### Delay Module Removal (T-Bar)

1. Turn the engine off and remove the key from the ignition.
2. Remove the 2 screws securing the manual tube R-clamps to the bottom panel of the control panel. Remove the manual tube assembly (Fig. 1455).

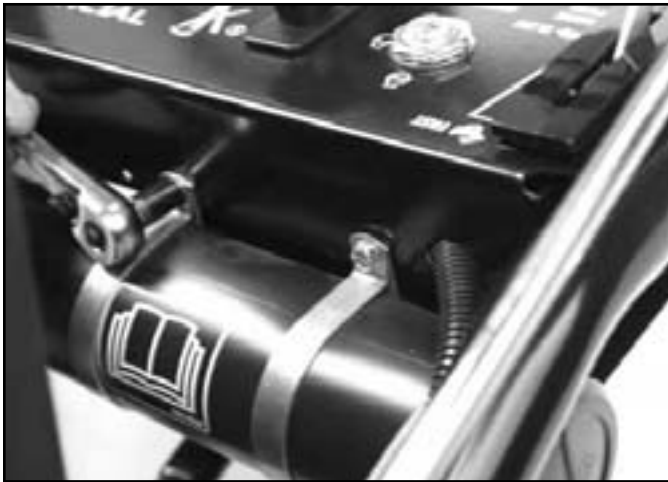


Fig 1455

PICT-1787

3. Remove the 2 screws securing the bottom panel to the control panel and move the bottom panel away from the control panel (Fig. 1456).



Fig 1456

PICT-1789

4. Unplug the brown wire bullet connector from the harness (Fig. 1457).



Fig 1457

PICT-1804

# ELECTRICAL

5. Unplug the harness connector from the delay module (Fig. 1458).



Fig 1458

PICT-1805

7. Remove the bolt and nut securing the delay module to the bottom panel (Fig. 1460).



Fig 1460

PICT-1809

6. Remove the fuse block from the bottom panel and remove the bottom panel from the machine (Fig. 1459).



Fig 1459

PICT-1806

## Delay Module Installation (T-Bar)

1. Position the delay module on the inside of the bottom panel. Install a bolt and nut securing the delay module to the bottom panel (Fig. 1461).



Fig 1461

PICT-1809

2. Position the bottom panel up to the control panel and attach the fuse block to the bottom panel (Fig. 1462).



Fig 1462

PICT-1806

4. Plug the brown wire bullet connect into the harness (Fig. 1464).

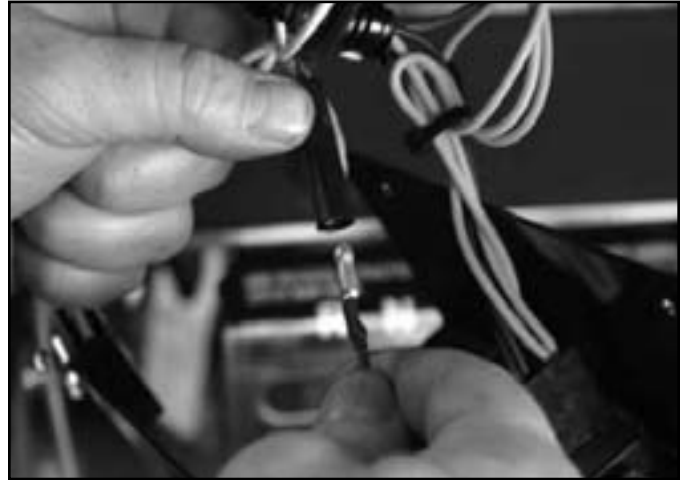


Fig 1464

PICT-1804

3. Plug the harness connector into the delay module (Fig. 1463).



Fig 1463

PICT-1805

5. Position the bottom panel to the control panel and install 2 screws securing the back side of the bottom panel to the control panel (Fig. 1465).



Fig 1465

PICT-1719a



# ELECTRICAL

6. Position the manual tube to the control panel. Install 2 screws to secure the manual tube assembly (R-clamps) and bottom panel to the control panel (Fig. 1466).



Fig 1466

PICT-1718

## Parking Brake Switch Replacment (Pistol Grip & T-2)

### Parking Brake Switch Removal (P.G. & T-2)

1. Turn the engine off and remove the key from the ignition.

2. Unplug the harness from the parking brake switch (Fig. 1467).



Fig 1467

PICT-1816

3. Remove the 2 bolts and nuts securing the parking brake switch to the parking brake handle support (Fig. 1468).



Fig 1468

PICT-1817

4. Remove the spacer from the switch (Fig. 1469).



Fig 1469

PICT-1892

5. Remove the switch from the parking brake handle support (Fig. 1470).



Fig 1470

PICT-1894

## Parking Brake Switch Installation (P.G. & T-2)

1. Position the parking brake switch onto the parking brake handle support (Fig. 1471).



Fig 1471

PICT-1894

2. Position the spacer onto the switch (Fig. 1472).



Fig 1472

PICT-1892

# ELECTRICAL

3. Install 2 bolts and nuts securing the parking brake switch to the parking brake handle support (Fig. 1473).



Fig 1473

PICT-1817

4. Plug the harness into the parking brake switch (Fig. 1474).



Fig 1474

PICT-1816

## Neutral Switch Replacement (Pistol Grip)

### Neutral Switch Removal (P.G.)

1. Position the speed control lever in the Fast position (Fig. 1475).



Fig 1475

PICT-1902a

2. Unplug the harness from the neutral switch (Fig. 1476).



Fig 1476

PICT-1823

3. Remove the 2 screws securing the neutral switch to the neutral bracket (Fig. 1477).



Fig 1477

PICT-1825

## Neutral Switch Installation (P.G.)

1. Position the spacer and the switch onto the neutral bracket (Fig. 1479).

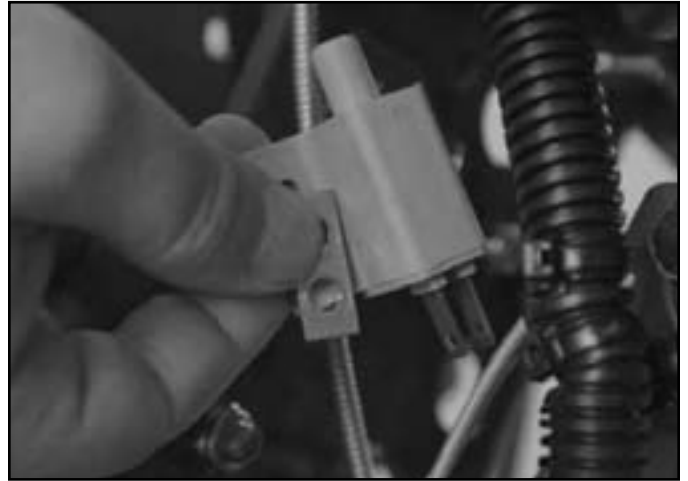


Fig 1479

PICT-1827a

4. Remove the spacer and the switch from the neutral bracket (Fig. 1478).

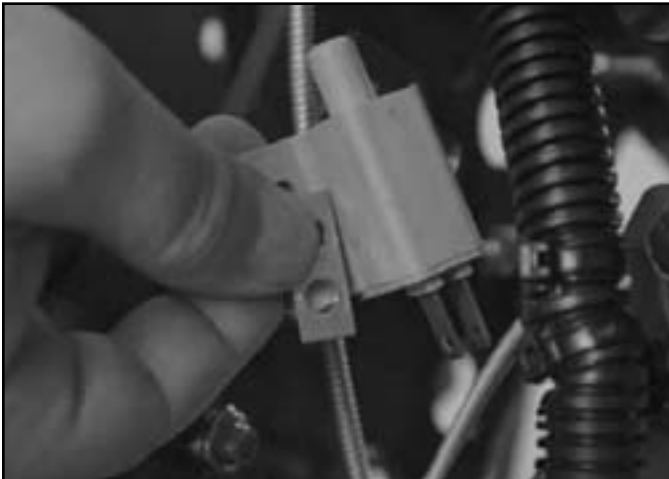


Fig 1478

PICT-1827a

2. Install 2 screws securing the neutral switch to the neutral bracket (Fig. 1480).

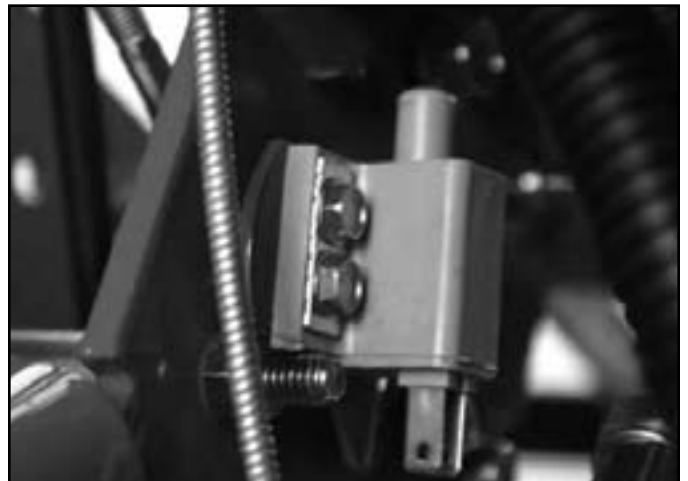


Fig 1480

PICT-1825

# ELECTRICAL

3. Plug the harness into the neutral switch (Fig. 1481).



Fig 1481

PICT-1823

5. To adjust the switch location, loosen the two neutral bracket screws holding the switch plate to the frame (Fig. 1483).

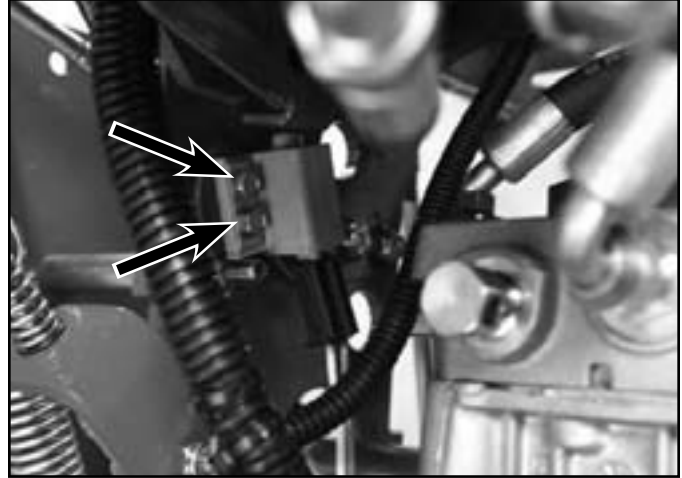


Fig 1483

PICT-1911

4. With the speed control lever in the neutral position, check to make sure the safety switch is depressed with an 1/8" to 1/4" (3 to 6mm) space between the actuating tab and the safety switch body (Fig. 1482).

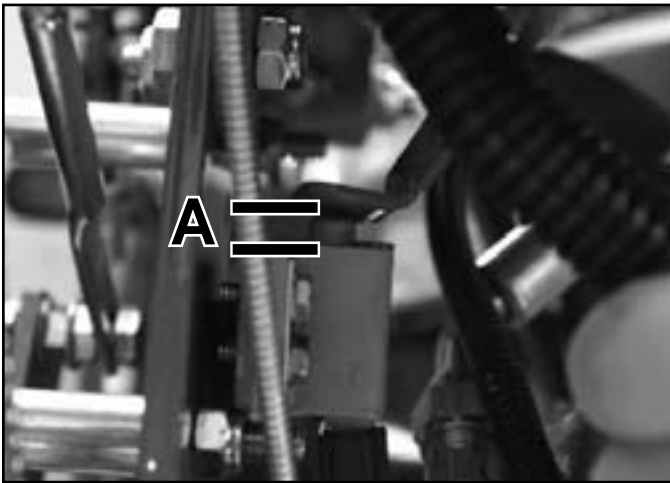


Fig 1482

PICT-1909

- A. 1/8" to 1/4" (3 to 6mm) space

6. Adjust the switch up or down to obtain an 1/8" to 1/4" (3 to 6 mm) space (Fig. 1484).

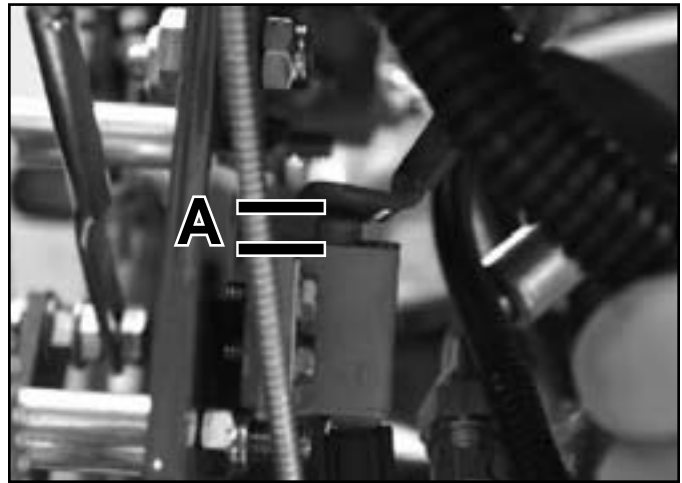


Fig 1484

PICT-1909

- A. 1/8" to 1/4" (3 to 6mm) space

7. Tighten the two neutral bracket screws holding the switch plate (Fig. 1485).



Fig 1485

PICT-1911

3. Remove the fuse block(s) from the control panel cover bracket (Fig. 1486).



Fig 1486

PICT-1836

## PTO Switch Replacement (Electric Start)

### PTO Switch Removal (Electric Start)

1. Turn the engine off and remove the key from the ignition.
2. Disconnect the negative battery terminal from the battery.

4. Remove the 2 screws securing the manual tube assembly to the control bracket. Remove the manual tube assembly (Fig. 1487).



Fig 1487

PICT-1839

# ELECTRICAL

5. Remove the 2 screws securing the control panel cover bracket to the front side of the control panel (Fig. 1488).



Fig 1488

PICT-1847

6. Remove the cover bracket from the control panel (Fig. 1489).



Fig 1489

PICT-1848

7. Unplug the harness from the PTO switch (Fig. 1490).

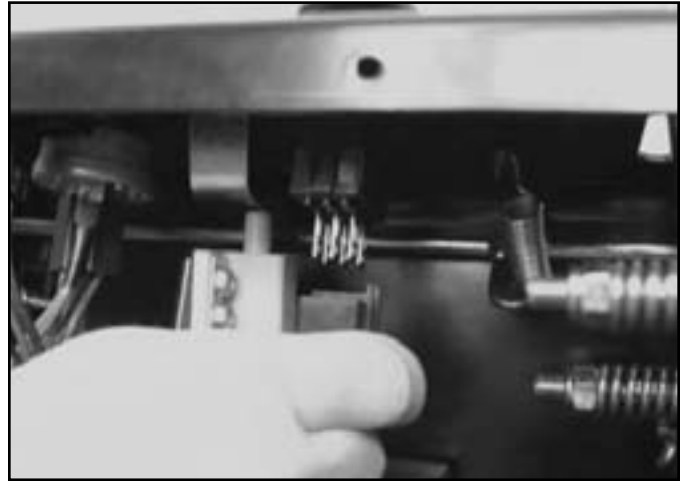


Fig 1490

PICT-1851a

8. Depress the tabs on the PTO switch and push it through the control panel to remove it (Fig. 1491).



Fig 1491

PICT-0729a

## PTO Switch Installation (Electric Start)

1. Push the PTO switch through the control panel until it snaps into place (Fig. 1492).



Fig 1492

PICT-0729a

2. Plug the harness into the PTO switch (Fig. 1493).



Fig 1493

PICT-1851a

3. Position the cover bracket onto the control panel (Fig. 1494).



Fig 1494

PICT-1848

4. Install 2 screws securing the control panel cover bracket to the front side of the control panel (Fig. 1495).



Fig 1495

PICT-1847



# ELECTRICAL

5. Position the manual tube to the cover bracket. Install 2 screws securing the manual tube assembly to the control panel and control bracket (Fig. 1496).



Fig 1496

PICT-1839

6. Slide the fuse block(s) onto the control panel cover bracket (Fig. 1497).



Fig 1497

PICT-1836

## Operator Presence Control (OPC) Switch Replacement (Pistol Grip)

**Note:** The harness has been unplugged from the PTO switch for photo purposes.

### OPC Switch Removal (P.G.)

1. Turn the engine off and remove the key from the ignition.
2. Disconnect the negative battery cable from the battery.
3. Remove the fuse blocks from the control panel cover bracket (Fig. 1498).



Fig 1498

PICT-1836

7. Connect the negative battery cable to the battery.

4. Remove the 2 screws securing the manual tube assembly to the control bracket. Remove the manual tube assembly (Fig. 1499).



Fig 1499

PICT-1839

6. Remove the cover bracket from the control panel (Fig. 1501).



Fig 1501

PICT-1848

5. Remove the 2 screws securing the control panel cover bracket to the front side of the control panel (Fig. 1500).



Fig 1500

PICT-1847

7. Unplug the harness from the OPC switch (Fig. 1502).



Fig 1502

PICT-1857

# ELECTRICAL

8. Remove the 2 screws securing the OPC switch to the switch mounting plate (Fig. 1503).



Fig 1503

PICT-1859

## OPC Switch Installation (P.G.)

1. Position the switch and spacer to the mounting plate (Fig. 1505).



Fig 1505

PICT-1860

9. Remove the switch and spacer from the mounting plate (Fig. 1504).



Fig 1504

PICT-1860

2. Install 2 screws securing the OPC switch to the switch mounting plate (Fig. 1506).



Fig 1506

PICT-1859

3. Plug the harness into the OPC switch (Fig. 1507).



Fig 1507

PICT-1857

4. With either LH or RH OPC lever depressed inspect space between Neutral Arm on OPC Rod and the body of the OPC Switch. The space should be  $.18'' \pm .06''$  ( $4.6 \pm 1.5\text{mm}$ ) (Fig. 1508).

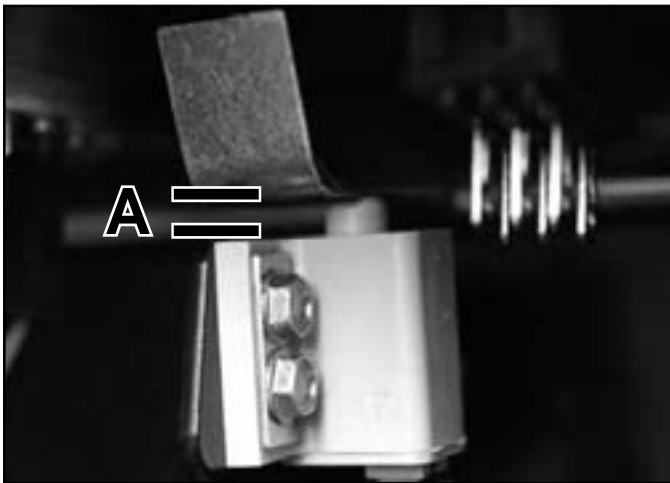


Fig 1508

PICT-1864

- A.  $.18'' \pm .06''$  ( $4.6 \pm 1.5\text{mm}$ )

5. If needed, adjust the position of the switch. Refer to OPC Switch Position Adjustment (P.G.) in the following section.

6. Position the cover bracket onto the control panel (Fig. 1509).



Fig 1509

PICT-1848

7. Install 2 screws securing the control panel cover bracket to the front side of the control panel (Fig. 1510).



Fig 1510

PICT-1847

# ELECTRICAL

8. Position the manual tube to the cover bracket. Install 2 screws securing the manual tube assembly to the control panel and control bracket (Fig. 1511).



Fig 1511

PICT-1839

9. Slide the fuse blocks onto the control panel cover bracket (Fig. 1512).



Fig 1512

PICT-1836

10. Connect the negative battery cable to the battery.

## OPC Switch Position Adjustment (P.G.)

1. Loosen the 2 OPC switch mounting screws (Fig. 1513).

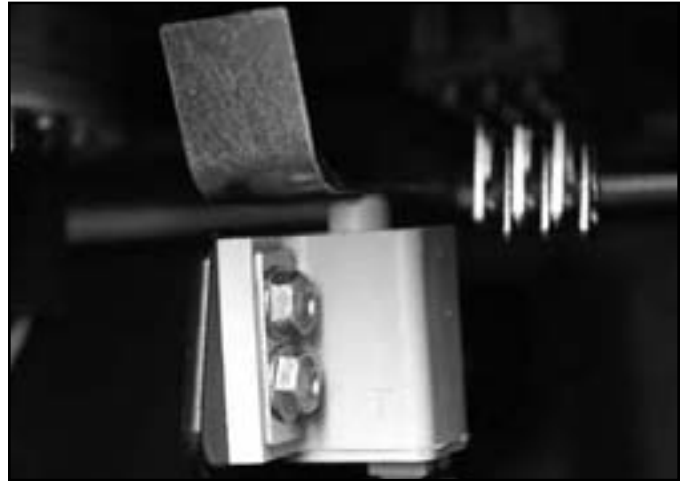


Fig 1513

PICT-1864

2. Adjust position of switch mounting plate to obtain the  $.18" \pm .06"$  ( $4.6 \pm 1.5\text{mm}$ ) space between the OPC switch body and neutral arm with the OPC levers depressed (Fig. 1514).

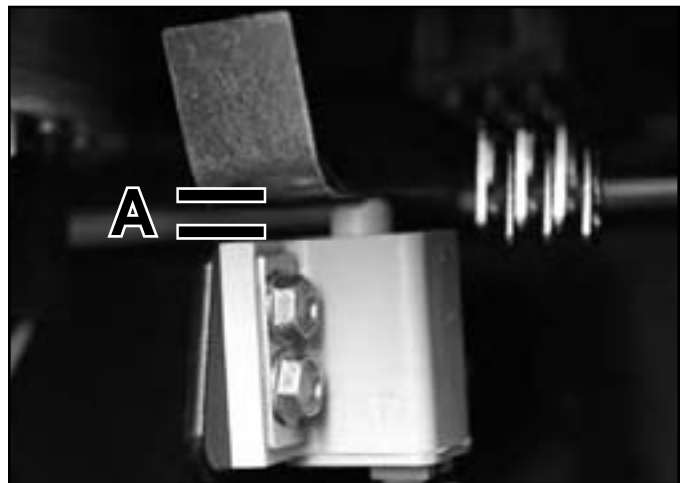


Fig 1514

PICT-1864

3. Tighten the neutral bracket mounting screws (Fig. 1515).

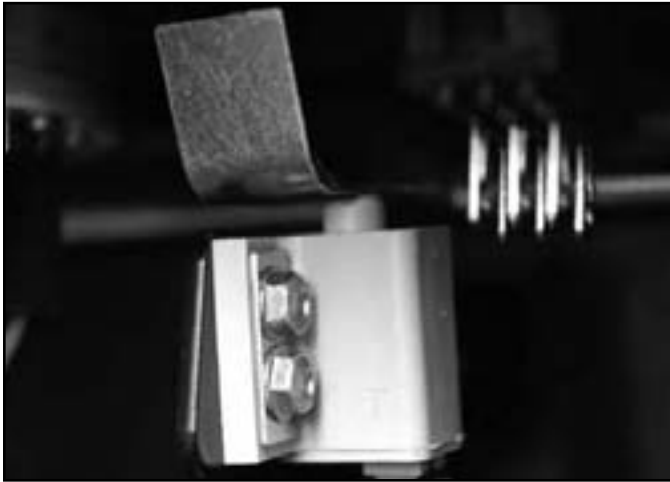


Fig 1515

PICT-1864

3. Remove the fuse blocks from the control panel cover bracket (Fig. 1516).



Fig 1516

PICT-1836

4. The OPC switch should return to the open position with the levers in the full spring return position.

4. Remove the 2 screws securing the manual tube assembly to the control bracket. Remove the manual tube assembly (Fig. 1517).

## Hour Meter Replacement (Pistol Grip)

### Hour Meter Removal (P.G.)

1. Turn the engine off and remove the key from the ignition.
2. Disconnect the negative battery cable from the battery.



Fig 1517

PICT-1839

# ELECTRICAL

5. Remove the 2 screws securing the control panel cover bracket to the front side of the control panel (Fig. 1518).



Fig 1518

PICT-1847

6. Remove the cover bracket from the control panel (Fig. 1519).



Fig 1519

PICT-1848

7. Unplug the harness from the hour meter (Fig. 1520).



Fig 1520

PICT-1869

8. Remove the locking tab from the back side of the hour meter (Fig. 1521).

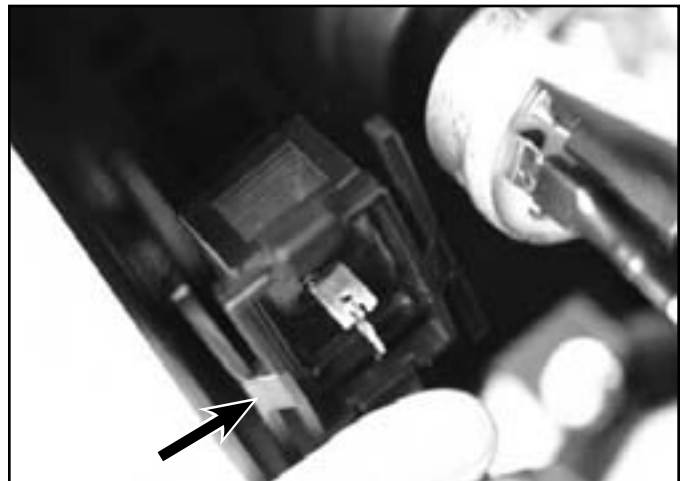


Fig 1521

PICT-1870

9. Remove the hour meter from the control panel (Fig. 1522).



Fig 1522

PICT-1871

2. Install the locking tab onto the back side of the hour meter (Fig. 1524).

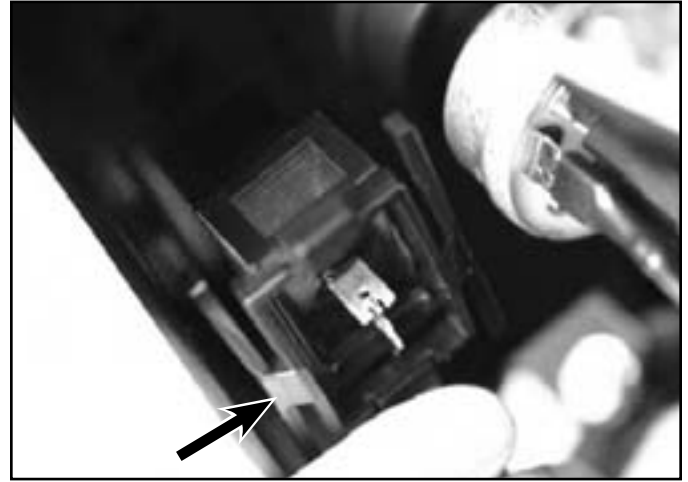


Fig 1524

PICT-1870

## Hour Meter Installation (P.G.)

1. Push the hourmeter into the opening in the control panel (Fig. 1523).



Fig 1523

PICT-1871

3. Plug the harness into the hour meter (Fig. 1525).



Fig 1525

PICT-1869



# ELECTRICAL

4. Position the cover bracket onto the control panel (Fig. 1526).



Fig 1526

PICT-1848

6. Position the manual tube to the cover bracket. Install 2 screws securing the manual tube assembly to the control panel and control bracket (Fig. 1528).



Fig 1528

PICT-1839

5. Install 2 screws securing the control panel cover bracket to the front side of the control panel (Fig. 1527).



Fig 1527

PICT-1847

7. Slide the fuse blocks onto the control panel cover bracket (Fig. 1529).



Fig 1529

PICT-1836

8. Connect the negative battery cable onto the battery.

## Ignition Switch Replacement (Pistol Grip)

### Ignition Switch Removal (P.G.)

1. Turn the engine off and remove the key from the ignition.
2. Disconnect the negative battery terminal from the battery.
3. Remove the fuse blocks from the control panel cover bracket (Fig. 1530).



Fig 1530

PICT-1836

4. Remove the 2 screws securing the manual tube assembly to the control bracket. Remove the manual tube assembly (Fig. 1531).



Fig 1531

PICT-1839

5. Remove the 2 screws securing the control panel cover bracket to the front side of the control panel (Fig. 1532).



Fig 1532

PICT-1847

# ELECTRICAL

6. Remove the cover bracket from the control panel (Fig. 1533).



Fig 1533

PICT-1848

8. Remove the nut securing the ignition switch to the control panel (Fig. 1535).



Fig 1535

PICT-1873

7. Unplug the harness terminal and harness connector from the ignition switch (Fig. 1534).

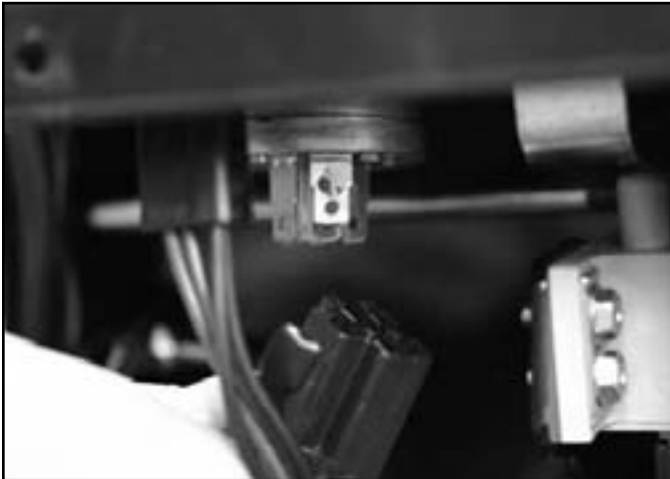


Fig 1534

PICT-1872

9. Remove the lockwasher from the ignition switch (Fig. 1536).



Fig 1536

PICT-1874

10. Remove the ignition switch from the control panel (Fig. 1537).



Fig 1537

PICT-1875

2. Place a lockwasher onto the ignition switch (Fig. 1539).



Fig 1539

PICT-1874

## Ignition Switch Installation (P.G.)

1. Insert the ignition switch into the control panel (Fig. 1538).



Fig 1538

PICT-1875

3. Install a nut securing the ignition switch to the control panel (Fig. 1540).



Fig 1540

PICT-1873

# ELECTRICAL

4. Plug the wire harness connector and terminal into the ignition switch (Fig. 1541).

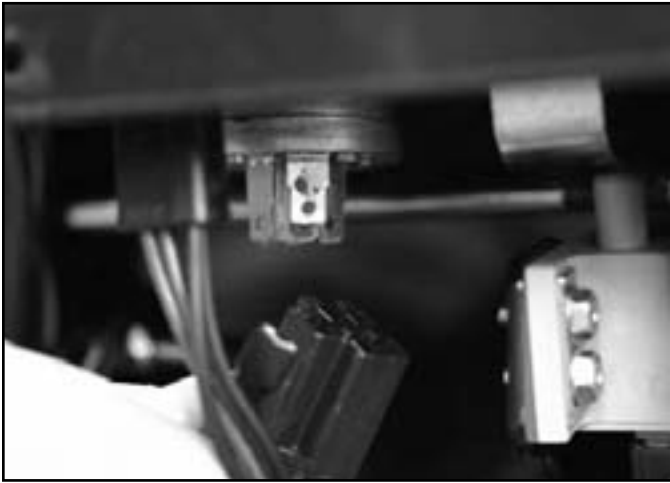


Fig 1541

PICT-1872

6. Install 2 screws securing the control panel cover bracket to the front side of the control panel (Fig. 1543).



Fig 1543

PICT-1847

5. Position the cover bracket onto the control panel (Fig. 1542).



Fig 1542

PICT-1848

7. Position the manual tube to the cover bracket. Install 2 screws securing the manual tube assembly to the control panel and control bracket (Fig. 1544).



Fig 1544

PICT-1839

8. Slide the fuse blocks onto the control panel cover bracket (Fig. 1545).



Fig 1545

PICT-1836

3. Unplug the kill relay from the wire harness (Fig. 1546).



Fig 1546

PICT-1877

9. Connect the negative battery cable to the battery.

## Kill Relay Replacement (Pistol Grip)

**Note:** The Manual Tube assembly and Control Panel Cover Bracket have been removed for photo purposes.

### Kill Relay Removal (P.G.)

1. Turn the engine off and remove the key from the ignition.
2. Disconnect the negative battery cable from the battery.

### Kill Relay Installation (P.G.)

1. Plug a kill relay into the wire harness (Fig. 1547).



Fig 1547

PICT-1877

2. Connect the negative battery cable onto the battery.

# ELECTRICAL

## Solenoid Switch Replacement (Pistol Grip & T-2)

### Solenoid Switch Removal (P.G. & T-2)

1. Turn the engine off and remove the key from the ignition.
2. Disconnect the negative battery cable from the battery.
3. Remove the nut and lock washer securing the starter cable to the solenoid terminal. Remove the starter cable (Fig. 1548).

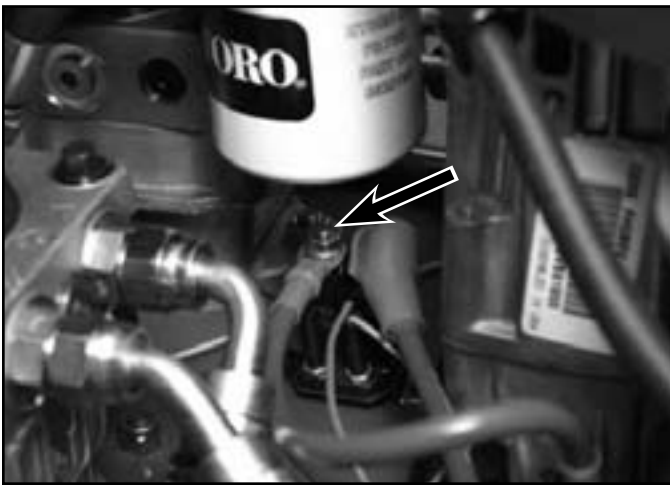


Fig 1548

PICT-1920

4. Pull the boot back and remove the nut and lock washer securing the battery cable to the solenoid terminal. Remove the battery cable (Fig. 1549).



Fig 1549

PICT-1880

5. Remove the harness wire from the solenoid terminal (Fig. 1550).



Fig 1550

PICT-1882

6. Unplug the 2 harness wires (blue and orange) from the solenoid (Fig. 1551).

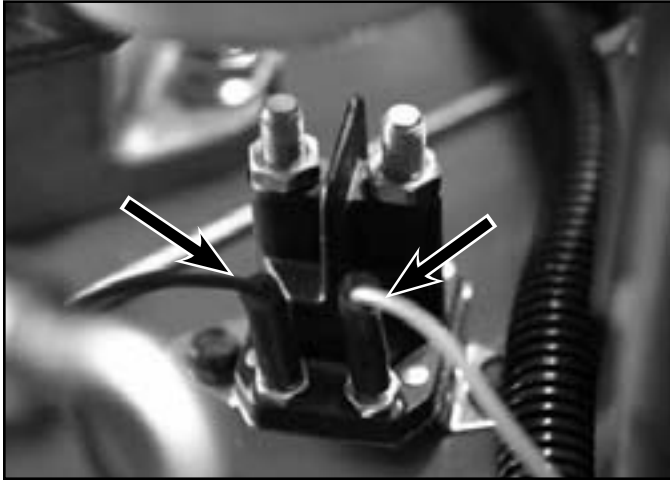


Fig 1551

PICT-1883

7. Remove the 2 self-tapping screws securing the solenoid to the frame. Remove the solenoid (Fig. 1552).



Fig 1552

PICT-1884

## Solenoid Switch Installation (P.G & T-2)

1. Position the solenoid onto the frame and secure it with 2 self-tapping screws (Fig. 1553).



Fig 1553

PICT-1888

2. Plug the 2 harness wires (blue and orange) onto the side posts on the solenoid as shown (Fig. 1554):

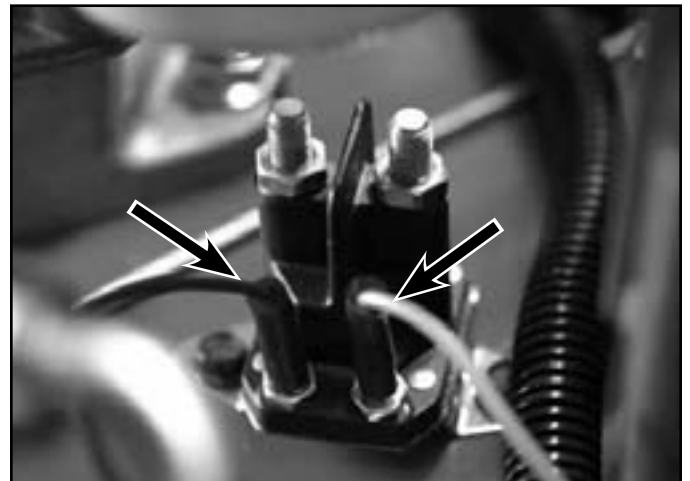


Fig 1554

PICT-1883



# ELECTRICAL

- Slide the harness wire (red) onto the solenoid terminal (Fig. 1555):



Fig 1555

PICT-1882

- Position the starter cable onto the solenoid terminal. Install a lockwasher and nut to secure (Fig. 1557).

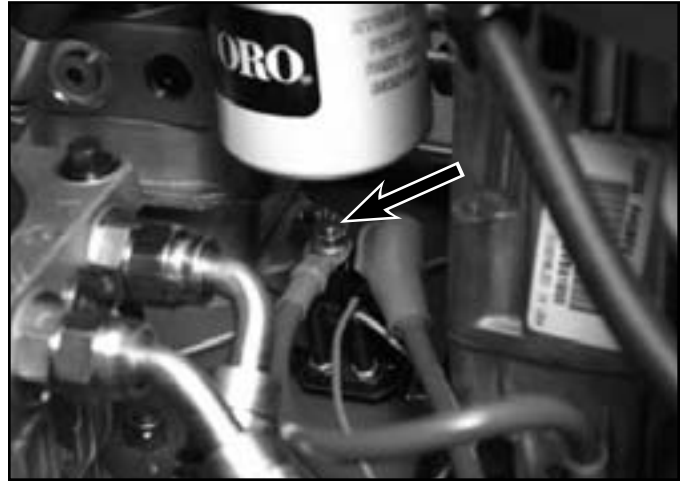


Fig 1557

PICT-1920

- Position the battery cable onto the solenoid terminal, over the red harness wire. Install a lockwasher and nut to secure. Position the boot over the connection (Fig. 1556).



Fig 1556

PICT-1880

- Connect the negative battery cable to the battery.

## Operator Presence Control (OPC) Switch Replacement (T-2)

### OPC Switch Removal (T-2)

1. Remove the 4 screws (2 on the left, 2 on the right) securing the control panel cover to the control panel (Fig. 1558).



Fig 1558

PICT-1921

2. Remove the control panel cover/manual tube assembly (Fig. 1559).



Fig 1559

PICT-1923

3. Unplug the harness from the OPC switch (Fig. 1560).



Fig 1560

PICT-1927

4. Remove the 2 screws securing the OPC switch to the motion control assembly (Fig. 1561).

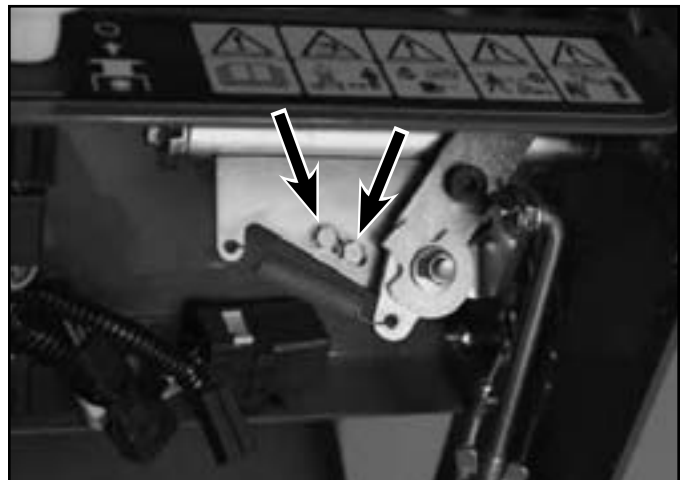


Fig 1561

PICT-1928a

# ELECTRICAL

5. Remove the OPC switch and spacer plate (Fig. 1562).



Fig 1562

PICT-1932a

2. Install 2 screws securing the OPC switch (and plate) to the motion control assembly (Fig. 1564).

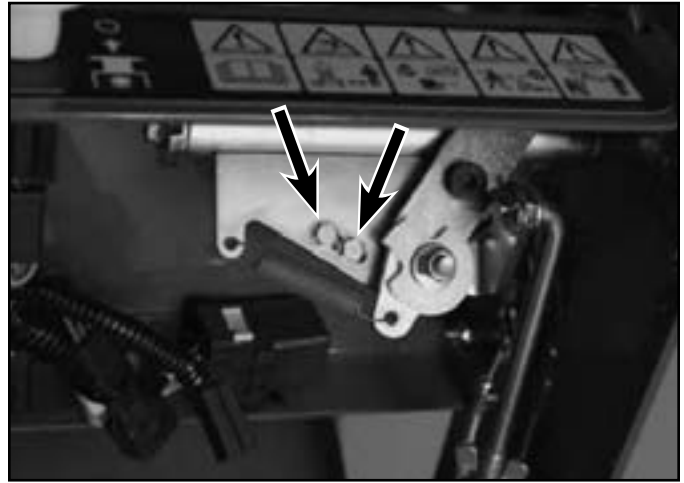


Fig 1564

PICT-1928a

## OPC Switch Installation (T-2)

1. Position the OPC switch and spacer plate onto the motion control assembly plate (Fig. 1563).



Fig 1563

PICT-1932a

3. Position the right hand control lever in the operating position. There should be a .10" (2.54mm) gap between the switch plunger and the control arm tab (Fig. 1565).

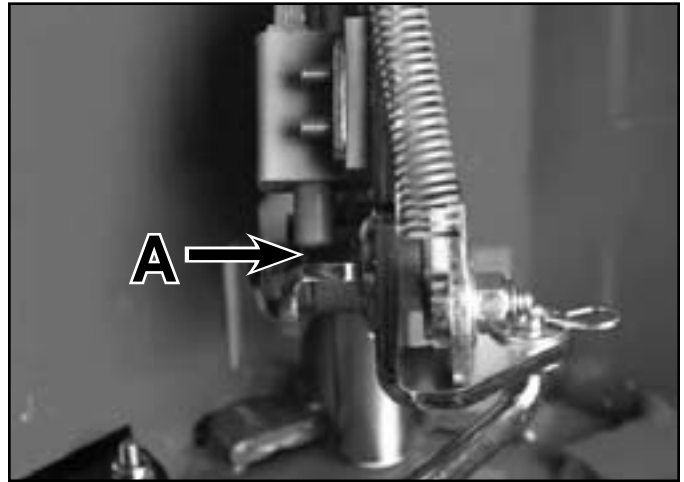


Fig 1565

PICT-1928a

- A. .10" (2.54mm) gap

4. Plug the harness into the OPC switch (Fig. 1566).



Fig 1566

PICT-1927

6. Install 4 screws (2 on the left, 2 on the right) securing the control panel cover to the control pane (Fig. 1568).



Fig 1568

PICT-1921

5. Position the control panel cover/manual tube assembly onto the control panel (Fig. 1567).



Fig 1567

PICT-1923

## Latching Relay Replacement (T-2)

### Latching Relay Removal (T-2)

1. Turn the engine off and remove the key from the ignition.
2. Disconnect the negative battery cable from the battery.

# ELECTRICAL

3. Remove the 4 screws (2 on the left, 2 on the right) securing the control panel cover to the control panel (Fig. 1569).



Fig 1569

PICT-1921

4. Remove the control panel cover/manual tube assembly (Fig. 1570).



Fig 1570

PICT-1923

5. Unplug the latching relay from the wire harness (Fig. 1571).



Fig 1571

PICT-1936

## Latching Relay Installation (T-2)

1. Plug a latching relay into the wire harness (Fig. 1572).



Fig 1572

PICT-1936

2. Position the control panel cover/manual tube assembly onto the control panel (Fig. 1573).



Fig 1573

PICT-1923

3. Install 4 screws (2 on the left, 2 on the right) securing the control panel cover to the control panel (Fig. 1574).



Fig 1574

PICT-1921

4. Connect the negative battery cable to the battery.

## Kill Relay Replacement (T-2)

**Note:** The Manual Tube assembly and Control Panel Cover Bracket have been removed for photo purposes.

### Kill Relay Removal (T-2)

1. Turn the engine off and remove the key from the ignition.
2. Disconnect the negative battery cable from the battery.
3. Unplug the kill relay from the wire harness (Fig. 1575).



Fig 1575

PICT-1937

# ELECTRICAL

## Kill Relay Installation (T-2)

1. Plug the kill relay into the wire harness (Fig. 1576).



Fig 1576

PICT-1937

2. Connect the negative battery cable to the battery.

## Proximity Neutral Switch Replacement (T-2)

### Proximity Neutral Switch Removal (T-2)

1. Turn the engine off and remove the key from the ignition.
2. Disconnect the negative battery cable from the battery.

3. Unplug the harness from the proximity neutral switch connector (Fig. 1577).



Fig 1577

PICT-1938

4. Remove the cable tie securing the switch wires to the frame (Fig. 1578).



Fig 1578

PICT-1939

5. Remove the 2 screws and nuts securing the switch to the frame (Fig. 1579).

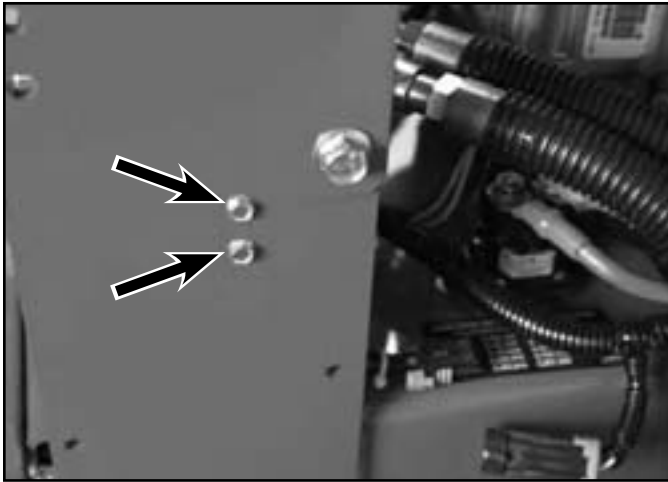


Fig 1579

PICT-1940

## Proximity Neutral Switch Installation (T-2)

1. Position the Proximity Neutral Switch to the frame (Fig. 1581).



Fig 1581

PICT-1941

6. Remove the switch (Fig. 1580).



Fig 1580

PICT-1941a

2. Install 2 screws and nuts to secure the switch to the frame (Fig. 1582).

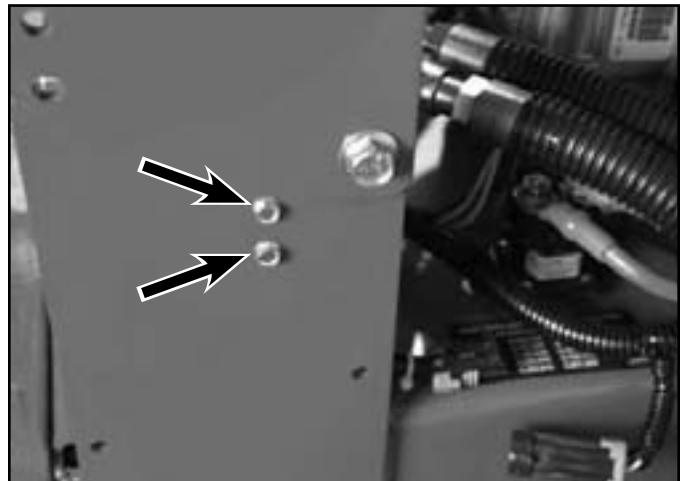


Fig 1582

PICT-1940



# ELECTRICAL

3. The distance between the face of the switch and the end of the hex head screw should be  $.07'' \pm .02''$  ( $1.8 \pm .5\text{mm}$ ) (Fig. 1583).

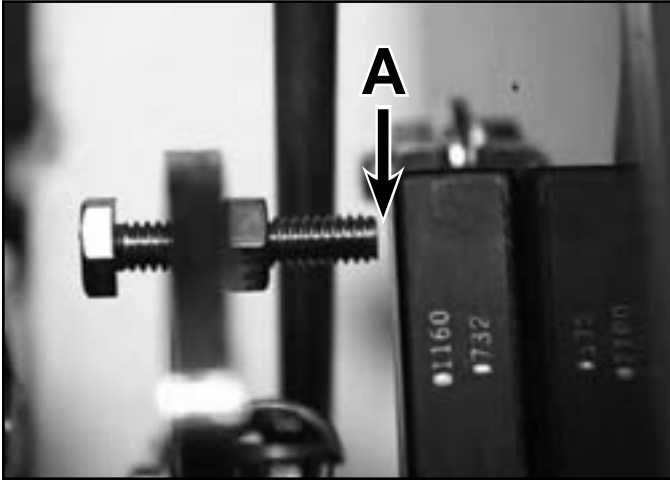


Fig 1583

PICT-1943

- A.  $.07'' \pm .02''$  ( $1.8 \pm .5\text{mm}$ )

4. Install a cable tie securing the switch wires to the frame (Fig. 1584).

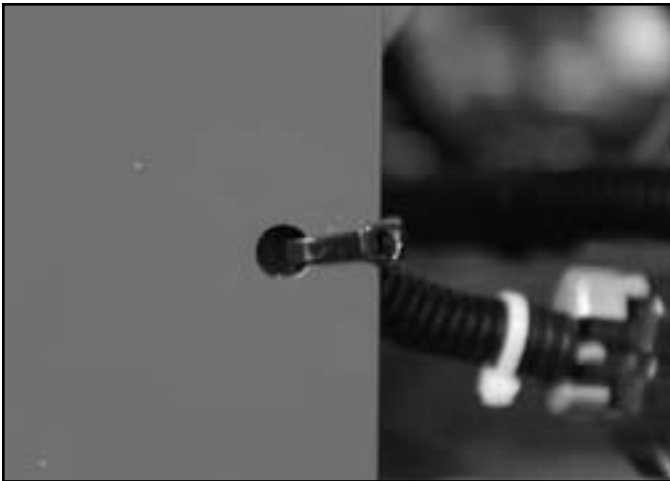


Fig 1584

PICT-1945

5. Plug the harness into the proximity neutral switch connector (Fig. 1585).



Fig 1585

PICT-1938

6. Connect the negative battery cable to the battery.



# Floating Deck Mid-Size Service Manual