TORO TIMECUTTER Z SERVICE MANUAL

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TORO®

TimeCutter® Z
TimeCutter® ZX

Service Manual

ABOUT THIS MANUAL

This service manual was written expressly for Toro service technician. The Toro Company has made every effort to make the information in this manual complete and correct.

Basic mechanical/electrical skills are assumed. The Table of Contents lists the systems and the related topics covered in this manual.

For additional information on the electrical system, please refer to the Toro Electrical Demystification Guide (492-4404). For information on the hydrostatic drive units, refer to the Integrated Zero-Turn Transaxle Service and Repair Manual (492-4737). For information specific to the engines used on this unit, refer to the appropriate engine manufacturer's service and repair instructions.

We are hopeful that 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:

The Toro Company
Consumer Service Training Department
8111 Lyndale Avenue South
Bloomington, MN 55420

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

The automatic transmission and transaxle are sophisticated pieces of machinery. Maintain strict cleanliness control during all stages of service and repair. Cover or cap all hose ends and fittings whenever they are exposed. Even a small amount of dirt or other contamination can severely damage the system.

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QUICK REFERENCE SECTION

SERVICE SECTION

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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 TimeCutter Z zero radius tractor. The TimeCutter Z zero radius tractor 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. Keep 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.

SPECIFICATIONS

Specifications

	Z16-44	Z17-44
ENGINE:		
High Idle	3400 ± 100 RPM	3400 ± 100 RPM
Low Idle	1400 RPM	1400 RPM
Manufacturer	Briggs & Stratton	Kohler
Horsepower (kW)	16.5 HP (12.3kW) @ 3600 RPM	17 HP (12.7 kW) @ 3600 RPM
Fuel	Unleaded Gasoline 87 octane min.	Unleaded Gasoline 87 octane min.
FUEL SYSTEM:		
Capacity	5 Gallon (18.9 L)	5 Gallon (18.9 L)
TRACTION SYSTEM:		
Transaxles	Twin Hydro-Gear IZT Hydrostatic Transaxles	Twin Hydro-Gear IZT Hydrostatic Transaxles
Transaxle Drive	Belt drive with self-tensioning system	Belt drive with self-tensioning system
Ground Speed	Infinite, 0 to 6.5 MPH (10.5-km/hr) forward 0 to 3.4 MPH (5.5-km/hr) reverse	Infinite, 0 to 6.5 MPH (10.5-km/hr) forward 0 to 3.4 MPH (5.5-km/hr) reverse
TIRES:		
Rear Drive Tires	18x10-8 4 ply with “Multitrac CS” Tread	18x10-8 4 ply with “Multitrac CS” Tread
Front Caster Tires	410/350 x 4 - 4.25 IS with “sawtooth” tread	410/350 x 4 - 4.25 IS with “sawtooth” tread
Tire Pressure	13 psi (90 kPa) rear, 35 psi (241 kPa) front	13 psi (90 kPa), rear 35 psi (241 kPa) front
ELECTRICAL SYSTEM:		
Battery Voltage	12 volt, negative ground	12 volt, negative ground
Battery Type	BCI Group U1	BCI Group U1
DIMENSIONS:		
Wheel Base	52.1 in. (132.3 cm) center of caster to center of drive tires	52.1 in. (132.3 cm) center of caster to center of drive tires
Overall Width	55 in. (139.7 cm) with deck deflector down 46.6 in. (118.4 cm) gate width with deck deflector up	55 in. (139.7 cm) with deck deflector down 46.6 in. (118.4 cm) gate width with deck deflector up
Overall Length	77.5 in. (196.9 cm)	77.5 in. (196.9 cm)
WEIGHT:		
Net Weight	635 lbs. (approx.)	635 lbs. (approx.)
HEIGHT OF CUT:	Adjusts from 1.5” (3.8 cm) to 4.5” (11.4 cm) (7 positions)	Adjusts from 1.5” (3.8 cm) to 4.5” (11.4 cm) (7 positions)

Specifications (cont'd)

	Z17-52	Z18-52
ENGINE:		
High Idle	3400 ± 100 RPM	3400 ± 100 RPM
Low Idle	1400 RPM	1400 RPM
Manufacturer	Kohler	Kawasaki
Horsepower (kW)	17 HP (12.7kW) @ 3600 RPM	18 HP (13.4kW) @ 3600 RPM
Fuel	Unleaded Gasoline 87 octane min.	Unleaded Gasoline 87 octane min.
FUEL SYSTEM:		
Capacity	5 Gallon (18.9 L)	5 Gallon (18.9 L)
TRACTION SYSTEM:		
Transaxles	Twin Hydro-Gear IZT Hydrostatic Transaxles	Twin Hydro-Gear IZT Hydrostatic Transaxles
Transaxle Drive	Belt drive with self-tensioning system	Belt drive with self-tensioning system
Ground Speed	Infinite, 0 to 6.5 MPH (10.5-km/hr) forward 0 to 3.4 MPH (5.5-km/hr) reverse	Infinite, 0 to 6.5 MPH (10.5-km/hr) forward 0 to 3.4 MPH (5.5-km/hr) reverse
TIRES:		
Rear Drive Tires	18x10-10-10.5 4 ply with "Multitrac CS" Tread	18x10-10-10.5 4 ply with "Multitrac CS" Tread
Front Caster Tires	410/350 x 4 - 4.25 IS with "sawtooth" tread	410/350 x 4 - 4.25 IS with "sawtooth" tread
Tire Pressure	13 psi (90 kPa) rear, 35 psi (241 kPa) front	13 psi (90 kPa) rear, 35 psi (241 kPa) front
ELECTRICAL SYSTEM:		
Battery Voltage	12 volt, negative ground	12 volt, negative ground
Battery Type	BCI Group U1	BCI Group U1
DIMENSIONS:		
Wheel Base	52.1 in. (132.3 cm) center of caster to center of drive tires	52.1 in. (132.3 cm) center of caster to center of drive tires
Overall Width	65 in. (165.1 cm) with deck deflector down 58 in. (147.3 cm) gate width with deck deflector up	65 in. (165.1 cm) with deck deflector down 58 in. (147.3 cm) gate width with deck deflector up
Overall Length	77.5 in. (196.9 cm)	77.5 in. (196.9 cm)
WEIGHT:		
Net Weight	680 lbs. (approx.)	680 lbs. (approx.)
HEIGHT OF CUT:	Adjusts from 1.5" (3.8 cm) to 4.5" (11.4 cm) (7 positions)	Adjusts from 1.5" (3.8 cm) to 4.5" (11.4 cm) (7 positions)

Specifications cont.

	ZX 17K-44	ZX 17-44
Engine:	17 hp Kohler® OHV, CV490S	17 hp Briggs & Stratton OHV, 31F777
High Idle	3400 ± 100 RPM	3400 ± 100 RPM
Low Idle	1400 RPM	N/A
Horse Power	17 (12.7kW) @3600 RPM	17 (12.7kW) @3600 RPM
Cubic Centimeter's (cc's)	490 Dispacement	500 Dispacement
Fuel	Unleaded Gasoline 87 octane min.	Unleaded Gasoline 87 octane min.
Oil Capacity	2 qts. (1.9 L)	1.75 qt. (1.7 L)
Charge coil	12v - 15 amp	12v - 16 amp
Construction:		
Front Frame	Welded 1x2x.120" structural steel tube	Welded 1x2x.120" structural steel tube
Rear Frame	Welded 7 & 10 ga. High strength steel	Welded 7 & 10 ga. High strength steel
Frame Assembly	Front & rear frames bolted together.	Front & rear frames bolted together.
Deck	Right side discharge, 44 in. cut, three blade mid-mounted rotary. Drawn 13 gauge steel with welded mounting brackets and gauge wheel brackets. Frame supported.	Right side discharge, 44 in. cut, three blade mid-mounted rotary. Drawn 13 gauge steel with welded mounting brackets and gauge wheel brackets. Frame supported.
Fuel System:	Single fuel tank fender type mounted on the left side.	Single fuel tank fender type mounted on the left side.
Capacity	5 Gallons (18.9 L) Fuel tank shut off In-line fuel filter	5 Gallons (18.9 L) Fuel tank shut off In-line fuel filter
Traction System:		
Transaxles	Twin Hydro-Gear IZT Hydrostatic Transaxles	Twin Hydro-Gear IZT Hydrostatic Transaxles
Transaxle Drive	Belt Drive with self-tensioning system	Belt Drive with self-tensioning system
Ground speed forward	Infinite, 0 to 6.5-MPH (10.5-km/hr)	Infinite, 0 to 6.5-MPH (10.5-km/hr)
Ground speed reverse	0 to 3.4-MPH (5.5-km/hr)	0 to 3.4-MPH (5.5-km/hr)
Transport rods	Allows unit to be moved without engine running.	Allows unit to be moved without engine running.
Attachment Drive:		
Clutch	Electric	Electric
Type	Vertical Drive with Single Deep B-Groove Pulley	Vertical Drive with Single Deep B-Groove Pulley

Specifications cont.

	ZX 17K-44	ZX 17-44
Tires:		
Rear Drive Tires	18x10-8 4 ply with “Multitrac CS” Tread	18x10-8 4 ply with “Multitrac CS” Tread
Front Castor Tires	410/350x4 - 4.25 IS with “sawtooth” tread	410/350x4 - 4.25 IS with “sawtooth” tread
Tire Pressure	13 psi (90kPa) rear, 35 psi (241kPa) front	13 psi (90kPa) rear, 35 psi (241kPa) front
Electrical System:		
Battery voltage	12 volt negative ground.	12 volt negative ground.
Fused	(1) 30 amp blade type main. (1) 25 amp blade type charge system. (1) 10 amp included with optional light kit.	(1) 30 amp blade type main. (1) 25 amp blade type charge system. (1) 10 amp included with optional light kit.
Dimensions:		
Wheel Base	52.1” (132.3cm) center of castor wheel to center of drive tires.	52.1” (132.3cm) center of castor wheel to center of drive tires.
Width	43” (109.2cm) outside rear tires.	43” (109.2cm) outside rear tires.
Overall Width	55” (139.7cm) with deck deflector down. 46.6” (188.4cm) Gate width with deck deflector up.	55” (139.7cm) with deck deflector down. 46.6” (188.4cm) Gate width with deck deflector up.
Overall Length	77.5” (196.9cm)	77.5” (196.9cm)
Overall Height	40” (101.6cm)	40” (101.6cm)
Track Width	35.2” (89.4cm) center to center of rear tires. 30.4” (77.2cm) center to center of castor tires.	35.2” (89.4cm) center to center of rear tires. 30.4” (77.2cm) center to center of castor tires.
Deck Width	55” (139.7cm) with deflector down.	55” (139.7cm) with deflector down.
Weight:	635 lbs. (288kg) (estimated)	635 lbs. (288kg) (estimated)
Height of Cut:	Adjusts from 1.5” to 4.5” (7 postions)	Adjusts from 1.5” to 4.5” (7 postions)
Tip Speed:	18,160 ft/min @ 3400 RPM nominal 18,770 ft/min @ 3500 RPM max	18,160 ft/min @ 3400 RPM nominal 18,770 ft/min @ 3500 RPM max

Specifications cont.

	ZX 17-52	ZX 18-52
Engine:	17 hp Kohler® OHV, CV490S	18 hp Kawasaki OHV, FH531V
High Idle	3400 ± 100 RPM	3400 ± 100 RPM
Low Idle	1400 RPM	1400 RPM
Horse Power	17 (12.7kW) @3600 RPM	18 HP (13.4kW) @3600 RPM
Cubic Centimeter's (cc's)	490 Dispacement	494 Displacement
Fuel	Unleaded Gasoline 87 octane min.	Unleaded Gasoline 87 octane min.
Oil Capacity	2 qts. (1.9 L)	1.9 qts (1.8 L)
Charge coil	12v - 15 amp	12v - 13 amp
Construction:		
Front Frame	Welded 1x2x.120" structural steel tube	Welded 1x2x.120" structural steel tube
Rear Frame	Welded 7 & 10 ga. High strength steel	Welded 7 & 10 ga. High strength steel
Frame Assembly	Front & rear frames bolted together.	Front & rear frames bolted together.
Deck	Right side discharge, 52 in. cut, three blade mid-mounted rotary. Drawn 12 gauge steel with welded mounting brackets and gauge wheel brackets. Frame supported.	Right side discharge, 52 in. cut, three blade mid-mounted rotary. Drawn 12 gauge steel with welded mounting brackets and gauge wheel brackets. Frame supported.
Fuel System:	Single fuel tank fender type mounted on the left side.	Single fuel tank fender type mounted on the left side.
Capacity	5 Gallons (18.9 L) Fuel tank shut off In-line fuel filter	5 Gallons (18.9 L) Fuel tank shut off In-line fuel filter
Traction System:		
Transaxles	Twin Hydro-Gear IZT Hydrostatic Transaxles	Twin Hydro-Gear IZT Hydrostatic Transaxles
Transaxle Drive	Belt Drive with self-tensioning system	Belt Drive with self-tensioning system
Ground speed forward	Infinite, 0 to 6.5-MPH (10.5-km/hr)	Infinite, 0 to 6.5-MPH (10.5-km/hr)
Ground speed reverse	0 to 3.4-MPH (5.5-km/hr)	0 to 3.4-MPH (5.5-km/hr)
Transport rods	Allows unit to be moved without engine running.	Allows unit to be moved without engine running.
Attachment Drive:		
Clutch	Electric	Electric
Type	Vertical Drive with Single Deep B-Groove Pulley	Vertical Drive with Single Deep B-Groove Pulley

Specifications cont.

	ZX 17-52	ZX 18-52
Tires:		
Rear Drive Tires	18x10-8 4 ply with “Multitrac CS” Tread	18x10-10.5 4 ply with “Multitrac CS” Tread
Front Castor Tires	410/350x4 - 4.25 IS with “sawtooth” tread	410/350x4 - 4.25 IS with “sawtooth” tread
Tire Pressure	13 psi (90kPa) rear, 35 psi (241kPa) front	13 psi (90kPa) rear, 35 psi (241kPa) front
Electrical System:		
Battery voltage	12 volt negative ground.	12 volt negative ground.
Fused	(1) 30 amp blade type main. (1) 25 amp blade type charge system. (1) 10 amp included with optional light kit.	(1) 30 amp blade type main. (1) 25 amp blade type charge system. (1) 10 amp included with optional light kit.
Dimensions:		
Wheel Base	52.1” (132.3cm) center of castor wheel to center of drive tires.	52.1” (132.3cm) center of castor wheel to center of drive tires.
Width	47.6” (120.9cm) outside rear tires.	47.6” (120.9cm) outside rear tires.
Overall Width	65” (165.1cm) with deck deflector down. 58” (147.3cm) Gate width with deck deflector up.	65” (165.1cm) with deck deflector down. 58” (147.3cm) Gate width with deck deflector up.
Overall Length	77.5” (196.9cm)	77.5” (196.9cm)
Overall Height	41” (104.1cm)	41” (104.1cm)
Track Width	37.5” (95.3cm) center to center of rear tires. 30.4” (77.2cm) center to center of castor tires.	37.5” (95.3cm) center to center of rear tires. 30.4” (77.2cm) center to center of castor tires.
Deck Width	65” (165.1cm) with deck deflector down.	65” (165.1cm) with deflector down.
Weight:	680 lbs. (308.4kg) (estimated)	680 lbs. (308.4kg) (estimated)
Height of Cut:	Adjusts from 1.5” to 4.5” (7 postions)	Adjusts from 1.5” to 4.5” (7 postions)
Tip Speed:	17,410 ft/min @ 3400 RPM nominal 17,980 ft/min @ 3400 RPM max	17,410 ft/min @ 3400 RPM nominal 17,980 ft/min @ 3500 RPM max

Specifications cont.

	ZX 18-52	ZX 19-52
Engine:	18 hp Kohler® CV4925	19 hp Kawasaki OHV, FH580V
High Idle	3400 ± 100 RPM	3400 ± 100 RPM
Low Idle	1400 RPM	1400 RPM
Horse Power	18 (13.4kW) @3600 RPM	19 HP (14.2kW) @3600 RPM
Cubic Centimeter's (cc's)	490 Displacement	585 Displacement
Fuel	Unleaded Gasoline 87 octane min.	Unleaded Gasoline 87 octane min.
Oil Capacity	2 qts. (1.9 L)	1.9 qts. (1.8 L)
Charge coil	12v - 15 amp	12v - 15 amp
Construction:		
Front Frame	Welded 1x2x.120" structural steel tube	Welded 1x2x.120" structural steel tube
Rear Frame	Welded 7 & 10 ga. High strength steel	Welded 7 & 10 ga. High strength steel
Frame Assembly	Front & rear frames bolted together.	Front & rear frames bolted together.
Deck	Right side discharge, 52" cut, three blade mid-mounted rotary. Drawn 12 gauge steel with welded mounting brackets and gauge wheel brackets. Frame supported.	Right side discharge, 52" cut, three blade mid-mounted rotary. Drawn 12 gauge steel with welded mounting brackets and gauge wheel brackets. Frame supported.
Fuel System:	Single fuel tank fender type mounted on the left side.	Single fuel tank fender type mounted on the left side.
Capacity	5 Gallons (18.9 L) Fuel tank shut off In-line fuel filter	5 Gallons (18.9 L) Fuel tank shut off In-line fuel filter
Traction System:		
Transaxles	Twin Hydro-Gear IZT Hydrostatic Transaxles	Twin Hydro-Gear IZT Hydrostatic Transaxles
Transaxle Drive	Belt Drive with self-tensioning system	Belt Drive with self-tensioning system
Ground speed forward	Infinite, 0 to 6.5-MPH (10.5-km/hr)	Infinite, 0 to 6.5-MPH (10.5-km/hr)
Ground speed reverse	0 to 3.4-MPH (5.5-km/hr)	0 to 3.4-MPH (5.5-km/hr)
Transport rods	Allows unit to be moved without engine running.	Allows unit to be moved without engine running.
Attachment Drive:		
Clutch	Electric	Electric
Type	Vertical Drive with Single Deep B-Groove Pulley	Vertical Drive with Single Deep B-Groove Pulley

Specifications cont.

	ZX 18-52	ZX 19-52
Tires:		
Rear Drive Tires	18x10.5-10 4 ply with “Multitrac CS” Tread	18x10.5-10 4 ply with “Multitrac CS” Tread
Front Castor Tires	410/350x4 with “sawtooth” tread	410/350x4 with “sawtooth” tread
Tire Pressure	13 psi (90kPa) rear, 35 psi (241kPa) front	13 psi (90kPa) rear, 35 psi (241kPa) front
Electrical System:		
Battery voltage	12 volt negative ground.	12 volt negative ground.
Fused	(1) 30 amp blade type main. (1) 25 amp blade type charge system. (1) 10 amp included with optional light kit.	(1) 30 amp blade type main. (1) 25 amp blade type charge system. (1) 10 amp included with optional light kit.
Dimensions:		
Wheel Base	52.1” (132.3cm) center of castor wheel to center of drive tires.	52.1” (132.3cm) center of castor wheel to center of drive tires.
Width	47.6” (120.9cm) outside rear tires.	47.6” (120.9cm) outside rear tires.
Overall Width	65” (165.1cm) with deck deflector down. 58” (147.3cm) Gate width with deck deflector up.	65” (165.1cm) with deck deflector down. 58” (147.3cm) Gate width with deck deflector up.
Overall Length	77.5” (196.9cm)	77.5” (196.9cm)
Overall Height	41” (104.1cm)	41” (104.1cm)
Track Width	37.5” (95.3cm) center to center of rear tires. 30.4” (77.2cm) center to center of castor tires.	37.5” (95.3cm) center to center of rear tires. 30.4” (77.2cm) center to center of castor tires.
Deck Width	65” (165.1cm) with deflector down.	66” (165.1cm) with deflector down.
Weight:	680 lbs. (308.4kg) (estimated)	680 lbs. (308.4kg) (estimated)
Height of Cut:	Adjusts from 1.5” to 4.5” (7 postions)	Adjusts from 1.5” to 4.5” (7 postions)
Tip Speed:	17,500 ft/min @ 3400 RPM nominal 18,070 ft/min @ 3500 RPM max	17,500 ft/min @ 3400 RPM nominal 18,070 ft/min @ 3500 RPM max

Specifications cont.

	ZX 18-44	ZX 440
Engine:	18 hp Briggs & Stratton OHV, 31M777	18 hp Kohler® OHV, CV492S
High Idle	3400 ± 100 RPM	3400 ± 50/- 0 RPM
Low Idle	1400 RPM	1400 RPM
Horse Power	18 (13.4kW) @3600 RPM	10 HP (13.4kW) @ 3600 RPM
Cubic Centimeter's (cc's)	500 Displacement	490 Displacement
Fuel	Unleaded Gasoline 87 octane min.	Unleaded Gasoline 87 octane min.
Oil Capacity	1.75 qts. (1.7 L)	2 qts. (1.9 L)
Charge coil	12v - 16 amp	12v - 15 amp
Construction:		
Front Frame	Welded 1x2x.120" structural steel tube	Welded 1x2x.120" structural steel tube
Rear Frame	Welded 7 & 10 ga. High strength steel	Welded 7 & 10 ga. High strength steel
Frame Assembly	Front & rear frames bolted together.	Front & rear frames bolted together.
Deck	Right side discharge, 44" cut, three blade mid-mounted rotary. Drawn 13 gauge steel with welded mounting brackets and gauge wheel brackets. Frame supported.	Right side discharge, 44" cut, three blade mid-mounted rotary. Drawn 13 gauge steel with welded mounting brackets and gauge wheel brackets. Frame supported.
Fuel System:	Single fuel tank fender type mounted on the left side.	Single fuel tank fender type mounted on the left side.
Capacity	5 Gallons (18.9 L) Fuel tank shut off In-line fuel filter	5 Gallons (18.9 L) Fuel tank shut off In-line fuel filter
Traction System:		
Transaxles	Twin Hydro-Gear IZT Hydrostatic Transaxles	Twin Hydro-Gear IZT Hydrostatic Transaxles with charge pumps & shock valves
Transaxle Drive	Belt Drive with self-tensioning system	Belt Drive with self-tensioning system
Ground speed forward	Infinite, 0 to 6.5-MPH (10.5-km/hr)	Infinite, 0 to 7.0-MPH (11.3-km/hr)
Ground speed reverse	0 to 3.4-MPH (5.5-km/hr)	0 to 3.4-MPH (5.5-km/hr)
Transport rods	Allows unit to be moved without engine running.	Allows unit to be moved without engine running.
Attachment Drive:		
Clutch	Electric	Electric
Type	Vertical Drive with Single Deep B-Groove Pulley	Vertical Drive with Single Deep B-Groove Pulley

Specifications cont.

	ZX 18-44	ZX 440
Tires:		
Rear Drive Tires	18x7.5-8 ply with “Multitrac CS” Tread	18x7.5-4 ply
Front Castor Tires	410/350x4 with “sawtooth” tread	410/350x4 “sawtooth” tread
Tire Pressure	13 psi (90kPa) rear, 35 psi (241kPa) front	13 psi (90kPa) rear, 35 psi (241kPa) front
Electrical System:		
Battery voltage	12 volt negative ground.	12 volt negative ground.
Fused	(1) 30 amp blade type main. (1) 25 amp blade type charge system. (1) 10 amp included with optional light kit.	(1) 30 amp blade type main. (1) 25 amp blade type charge system. (1) 10 amp included with optional light kit.
Dimensions:		
Wheel Base	52.1” (132.3cm) center of castor wheel to center of drive tires.	52.1” (132.3cm) center of castor wheel to center of drive tires.
Width	43” (109.2cm) outside rear tires.	43” (109.2cm) outside rear tires.
Overall Width	55” (139.7cm) with deck deflector down. 46.6” (188.4cm) Gate width with deck deflector up.	60” (139.7cm) with deck deflector down 49” (118.4cm) Gate width with deck deflector up.
Overall Length	77.5” (196.9cm)	77.5” (196.9cm)
Overall Height	40” (101.6cm)	40” (101.6cm)
Track Width	35.2” (89.4cm) center to center of rear tires. 30.4” (77.2cm) center to center of castor tires.	35.2” (89.4cm) center to center of rear tires. 30.4” (77.2cm) center to center of castor tires.
Deck Width	55” (139.7cm) with deflector down.	60” (139.7cm) with deck deflector down
Weight:	635 lbs. (288 kg) (estimated)	651 lbs. (295 kg) (estimated)
Height of Cut:	Adjusts from 1.5” to 4.5” (7 postions)	Adjusts from 1.5” to 4.5” (7 postions)
Tip Speed:	18,160 ft/min @ 3400 RPM nominal 18,770 ft/min @ 3500 RPM max	18,160 ft/min @ 3400 RPM nominal 18,770 ft/min @ 3500 RPM max

Specifications cont.

	ZX 480	ZX 525
Engine:	Briggs & Stratton Intek OHV, 441577	Kawasaki FH58V OHV
High Idle	3400 ± 100 RPM	3400 ± 100 RPM
Low Idle	N/A	1400 RPM
Horse Power	N/A	N/A
Cubic Centimeter's (cc's)	725 Dispacement	585 Dispacement
Fuel	Unleaded Gasoline 87 octane min.	Unleaded Gasoline 87 octane min.
Oil Capacity	2 qts. (1.9 L)	1.9 qts. (1.8 L)
Charge coil	12v - 16 amp	12v - 13 amp
Construction:		
Front Frame	Welded 1x2x.120" structural steel tube	Welded 1x2x.120" structural steel tube
Rear Frame	Welded 7 & 10 ga. High strength steel	Welded 7 & 10 ga. High strength steel
Frame Assembly	Front & rear frames bolted together.	Front & rear frames bolted together.
Deck	Right side discharge, 48" cut, three blade mid-mounted rotary. Drawn 12 gauge steel deck with gauge reinforced plate and welded mounting brackets and gauge.	Right side discharge, 44" cut, three blade mid-mounted rotary. Drawn 12 gauge steel with welded mounting brackets and gauge wheel brackets. Frame supported.
Fuel System:	Single fuel tank fender type mounted on the left side.	Single fuel tank fender type mounted on the left side.
Capacity	5 Gallons (18.9 L) Fuel tank shut off In-line fuel filter	5 Gallons (18.9 L) Fuel tank shut off In-line fuel filter
Traction System:		
Transaxles	Twin Hydro-Gear IZT Hydrostatic Trans-axles with charge pumps & shock valves.	Twin Hydro-Gear IZT Hydrostatic Trans-axles with charge pumps & shock valves.
Transaxle Drive	Belt Drive with self-tensioning system	Belt Drive with self-tensioning system
Ground speed forward	Infinite, 0 to 7.0-MPH (11.3-km/hr)	Infinite, 0 to 7.0-MPH (11.3-km/hr)
Ground speed reverse	0 to 3.4-MPH (5.5-km/hr)	0 to 3.4-MPH (5.5-km/hr)
Transport rods	Allows unit to be moved without engine running.	Allows unit to be moved without engine running.
Attachment Drive:		
Clutch	Electric	Electric
Type	Vertical Drive with Single Deep B-Groove Pulley	Vertical Drive with Single Deep B-Groove Pulley

Specifications cont.

	ZX 480	ZX 525
Tires:		
Rear Drive Tires	18x10.5-4 ply	18x10.5-10 4 ply with “Multitrac CS” Tread
Front Castor Tires	410/350x4 with “sawtooth” tread	410/350x4 with “sawtooth” tread
Tire Pressure	13 psi (90kPa) rear, 35 psi (241kPa) front	13 psi (90kPa) rear, 35 psi (241kPa) front
Electrical System:		
Battery voltage	12 volt negative ground.	12 volt negative ground.
Fused	(1) 30 amp blade type main. (1) 25 amp blade type charge system. (1) 25 amp blade type charge system.	(1) 30 amp blade type main. (1) 25 amp blade type charge system. (1) 10 amp (blade type) included with optional light kit.
Dimensions:		
Wheel Base	52.1” (132.3cm) center of castor wheel to center of drive tires.	52.1” (132.3cm) center of castor wheel to center of drive tires.
Width	43” (109.2cm) outside rear tires.	47.6” (120.9cm) outside rear tires.
Overall Width	62.5” (158.8cm) with deck deflector down. 53.5” (135.9cm) Gate width with deck deflector up.	68” (165.1cm) with deck deflector down. 55” (147.3cm) Gate width with deck deflector up.
Overall Length	77.5” (196.9cm)	77.5” (196.9cm)
Overall Height	40” (101.6cm)	41” (101.6cm)
Track Width	35.2” (89.4cm) center to center of rear tires. 30.4” (77.2cm) center to center of castor tires.	37.5in. (95.3cm) center to center of rear tires. 30.4” (77.2cm) center to center of castor tires.
Deck Width	62.5” (158.8cm) with deflector down.	68” (165.1cm) with deflector down.
Weight:	646 lbs. (293 kg) (estimated)	695 lbs. (315 kg) (estimated)
Height of Cut:	Adjusts from 1.5” to 4.5” (7 postions)	Adjusts from 1.5” to 4.5” (7 postions)
Tip Speed:	15,710 ft/min @ 3400 RPM nominal 16,170 ft/min @ 3400 RPM nominal	17,500 ft/min @ 3400 RPM nominal 18,070 ft/min @ 3500 RPM max

SPECIFICATIONS

Bolt Torques

Description	Torque - 52”	Torque - 44”
Blade to Spindle	80 - 100 ft·lb (109 - 136 N·m)	40 - 60 ft·lb (54 - 82 N·m)
Caster Bolts	77 - 95 ft·lb (105 - 130 N·m)	77 - 95 ft·lb (105 - 130 N·m)
Clutch Bolt	50 - 60 ft·lb (68 - 82 N·m)	50 - 60 ft·lb (68 - 82 N·m)
Engine Mounting Bolts	120 - 180 ft·lb (164 - 246 N·m)	120 - 180 ft·lb (164 - 246 N·m)
Spindle Pulley Nuts	80 - 100 ft·lb (109 - 136 N·m)	50 - 75 ft·lb (68 - 102 N·m)
Wheel Lug Nuts	70 - 90 ft·lb (95.5 - 123 N·m)	70 - 90 ft·lb (95.5 - 123 N·m)

Maintenance Schedule (Z16-44)

Maintenance Procedure	Service Interval
Change the engine oil	After first use
Check the engine oil level	Each use
Check the safety system	
Clean the mower housing	
Check the cutting blades	Every 5 hours
Grease all lubrication points[1]	Every 25 hours
Oil the linkage bushings[1]	
Service the foam air cleaner[1]	
Check the belts for wear/cracks	
Check the battery electrolyte	
Check the tire pressure	
Change the engine oil[2]	Every 50 hours
Clean the cooling system[1]	Every 100 hours
Service the paper air cleaner[1]	
Change the oil filter[2]	
Replace the fuel filter	
Replace the spark plug(s)	
Before Storage: • Perform all maintenance procedures listed above. • Drain the fuel tank. • Charge the battery and disconnect the battery cables. • Paint any chipped surfaces.	

[1]More often in dusty, dirty conditions

[2]More often when operating the engine under heavy load or in high temperatures

IMPORTANT: Refer to your engine operator's manual for additional maintenance procedures.

CAUTION

If you leave the key in the ignition switch, someone could accidently start the engine and seriously injury you or other bystanders.

Remove the key from the ignition and disconnect the wire from the spark plug(s) before you do any maintenance. Set the wire aside so that it does not accidentally contact the spark plug.

Maintenance Schedule (Z17-44 & Z17-52)

Maintenance Procedure	Service Interval
Check the engine oil level	Each use
Check the safety system	
Clean the cooling system[1]	
Clean the mower housing	
Check the air cleaner	
Check the cutting blades	Every 5 hours
Grease all lubrication points[1]	Every 25 hours
Oil the linkage bushings[1]	
Service the foam air cleaner[1]	
Check the belts for wear/cracks	
Check the battery electrolyte	
Check the tire pressure	
Change the engine oil[1]	Every 100 hours
Replace the paper air cleaner[1]	
Change the oil filter[1]	Every 200 hours
Replace the fuel filter	
Check the spark plug(s)	
Before Storage: • Perform all maintenance procedures listed above. • Drain the fuel tank. • Charge the battery and disconnect the battery cables. • Paint any chipped surfaces.	

[1]More often in dusty, dirty conditions

IMPORTANT: Refer to your engine operator's manual for additional maintenance procedures.

CAUTION

If you leave the key in the ignition switch, someone could accidently start the engine and seriously injury you or other bystanders.

Remove the key from the ignition and disconnect the wire from the spark plug(s) before you do any maintenance. Set the wire aside so that it does not accidentally contact the spark plug.

Maintenance Schedule (Z18-52)

Maintenance Procedure	Service Interval
Change the engine oil	After first use
Check the engine oil level	Each use
Check the safety system	
Clean the air intake screen	
Clean the mower housing	
Check the cutting blades	Every 5 hours
Grease all lubrication points[1]	Every 25 hours
Oil the linkage bushings[1]	
Service the foam air cleaner[1]	
Check the belts for wear/cracks	
Check the battery electrolyte	
Check the tire pressure	
Service the paper air cleaner[1]	Every 50 hours
Change the engine oil	Every 100 hours
Check the spark plug(s)	
Change the oil filter	Every 200 hours
Replace the fuel filter	
Replace the paper air cleaner[1]	
Clean the engine shrouds and cooling fins[1]	Every 300 hours
Before Storage: • Perform all maintenance procedures listed above. • Drain the fuel tank. • Charge the battery and disconnect the battery cables. • Paint any chipped surfaces.	

[1]More often in dusty, dirty conditions

IMPORTANT: Refer to your engine operator's manual for additional maintenance procedures.

CAUTION

If you leave the key in the ignition switch, someone could accidently start the engine and seriously injury you or other bystanders.

Remove the key from the ignition and disconnect the wire from the spark plug(s) before you do any maintenance. Set the wire aside so that it does not accidentally contact the spark plug.

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MODEL/SERIAL NUMBER LOCATION

QUICK REFERENCE SECTION

SERVICE SECTION

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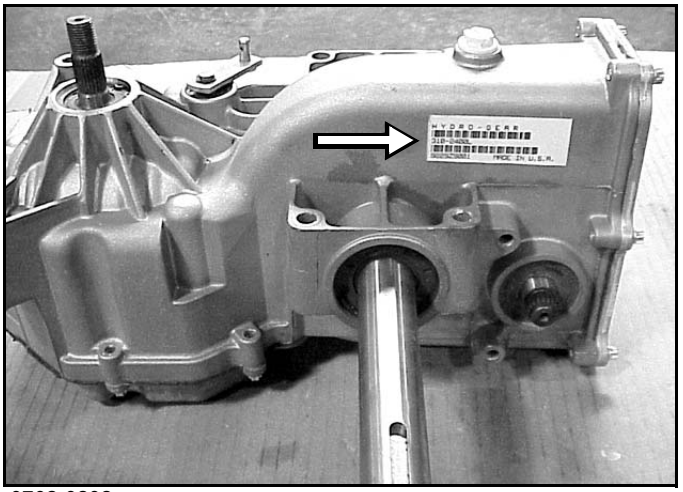
0702-0201

The unit model and serial number plate is on the frame under the seat as shown in the illustration.

The engine has its own model and serial number identification. Consult the appropriate engine manufacturer's service literature for the location and translation of the engine model and serial number information.



0702-0202

Transaxles also have their own model/serial number.

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GREASING AND LUBRICATION

QUICK REFERENCE SECTION

SERVICE SECTION

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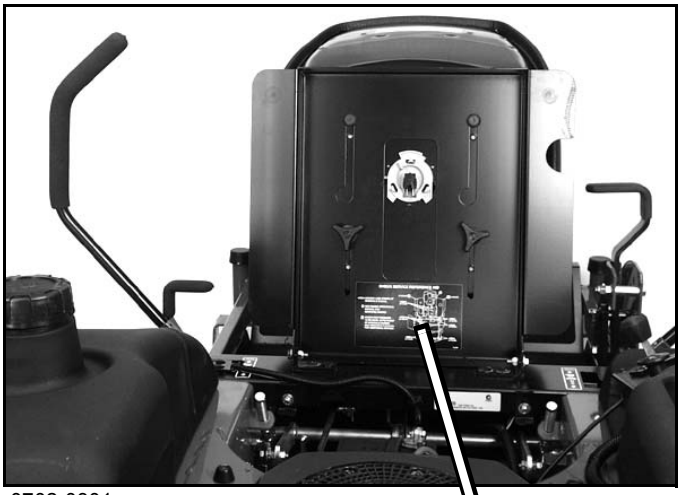


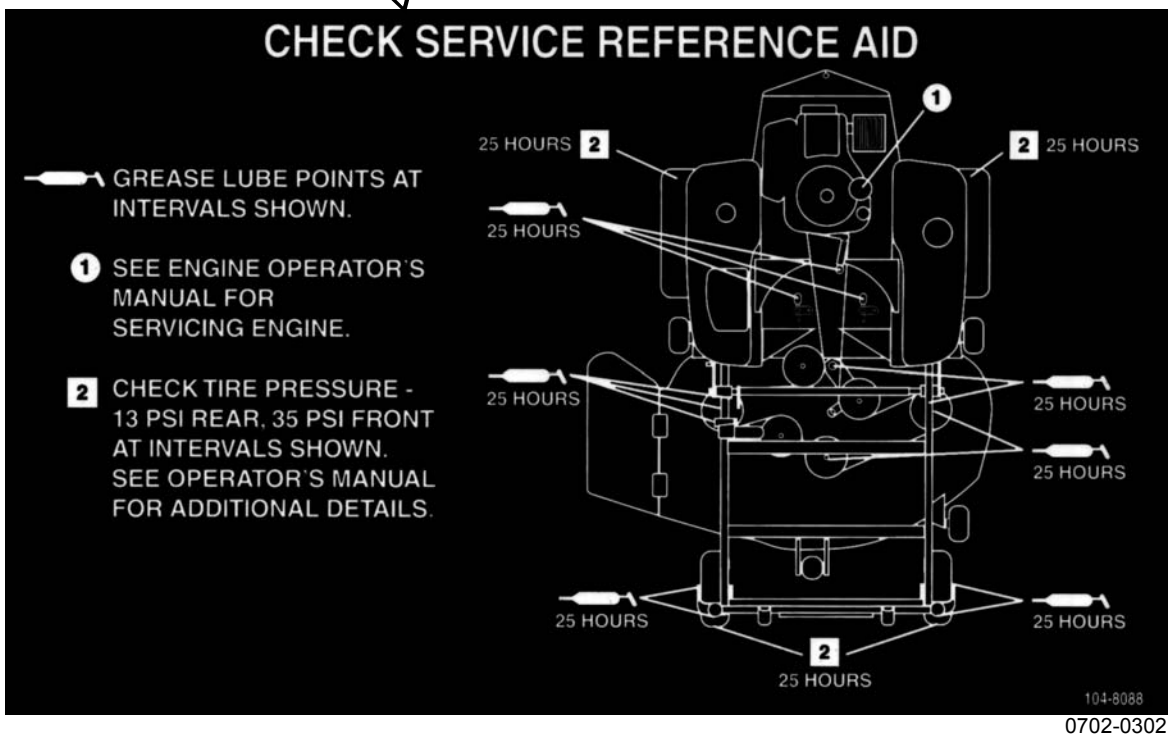
0702-0301

Service Interval/Specification

The unit should be greased every 25 hours; more often when operating in dirty, dusty, or sandy conditions.

A decal located under the seat shows the location of all the grease zerks.

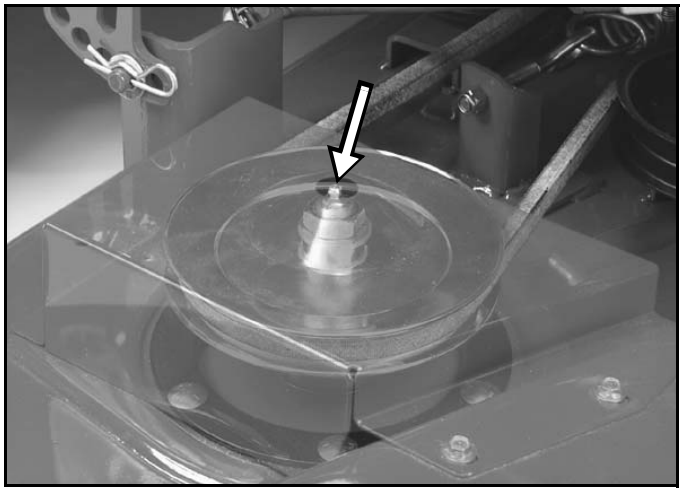
Grease Type: General-purpose lithium base grease.



0702-0302

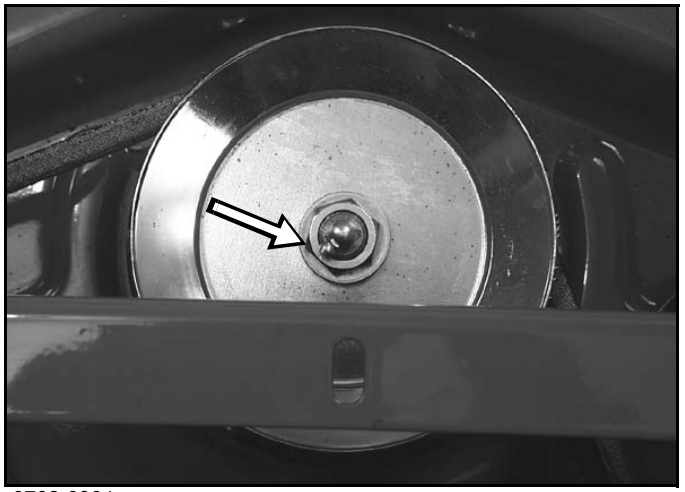
Lubrication Points

There is a grease fitting on the mower for right and left outer spindle.



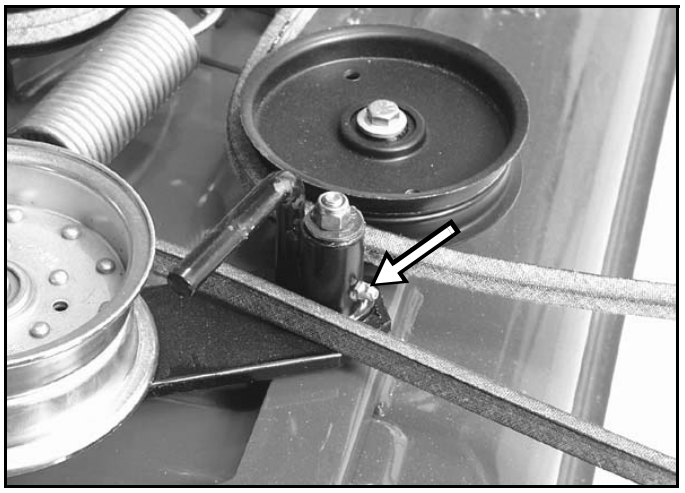
0702-0303

The grease zerk for the center mower spindle.

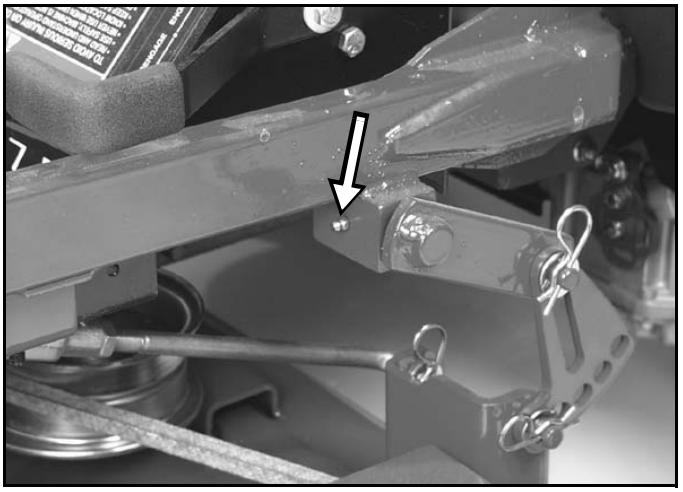


0702-0304

There is a grease fitting for the deck idler arm bushing.

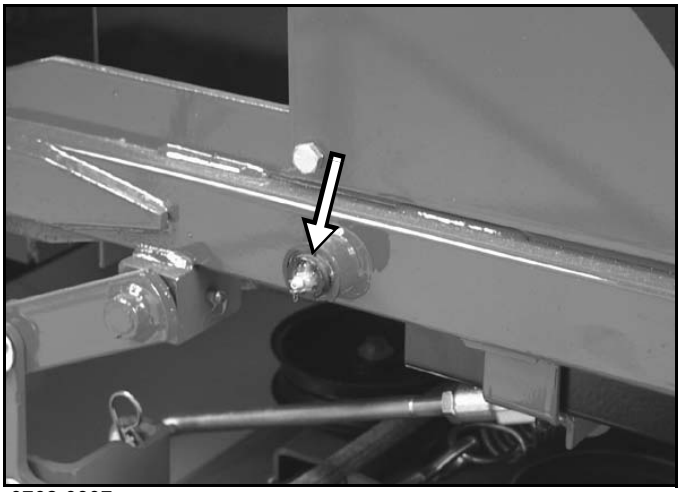


0702-0305



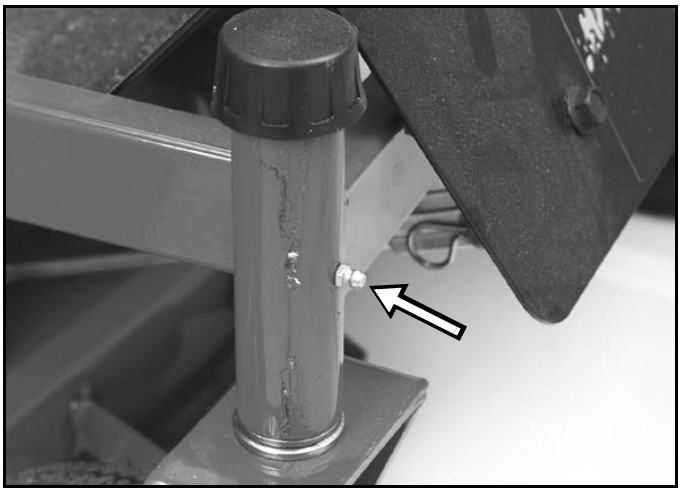
0702-0306

There are 2 grease fittings for the deck raising pivot bushings - one on each side of the unit.



0702-0307

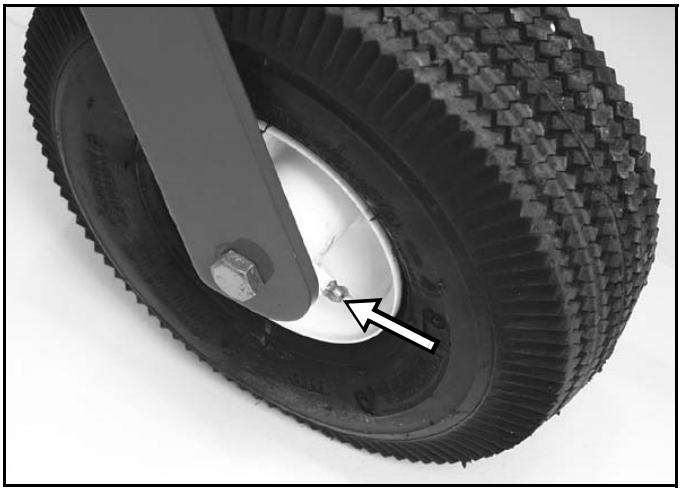
The grease zerk for the deck height adjustment lever is on the right side of the machine.



0702-0308

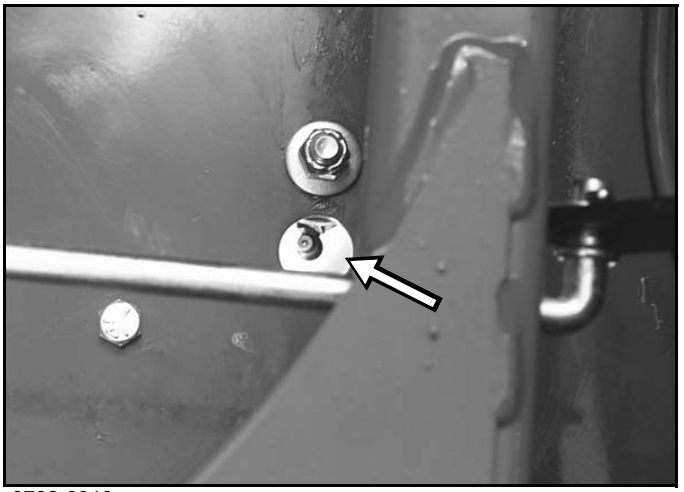
There are grease fittings for each front castor bushing,

as well as the castor wheel bearings.



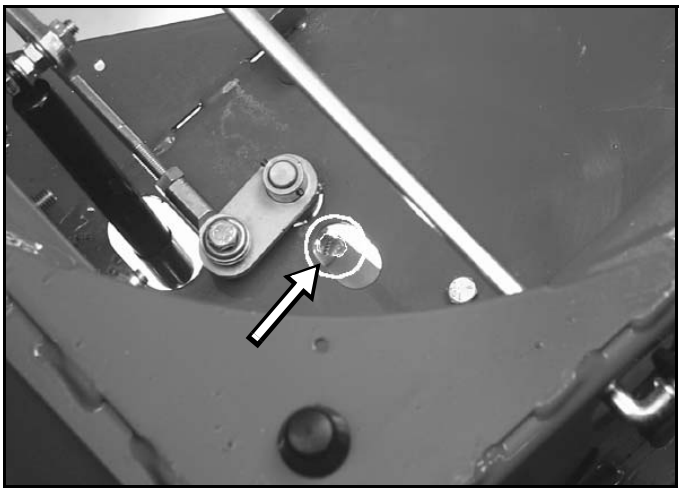
0702-0309

The zerk fitting for the traction belt idler bushing is located under the seat.



0702-0310

Also under the seat are the fittings for the motion control lever pivot bushings - one for each lever.



0702-0311

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SERVICE SECTION

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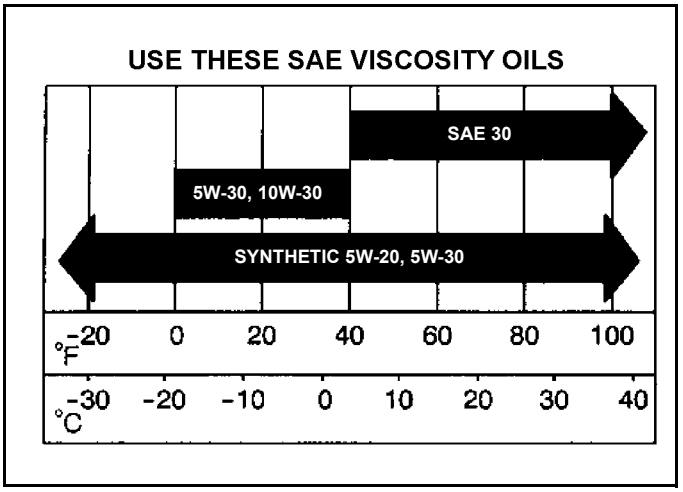


0702-0401

Briggs & Stratton Engine

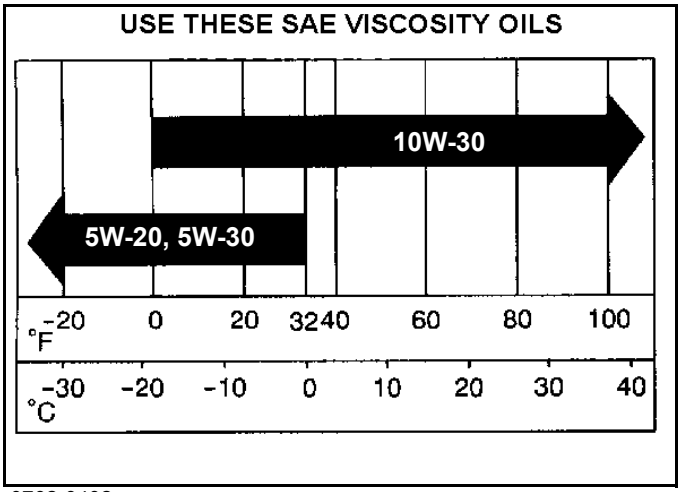
Oil Type: Detergent oil (API service SF, SG, SH, SJ, or higher).

Crankcase Capacity (with filter): 1.75 qt. (1.7 l).
Crankcase Capacity (without filter): 1.5 qt. (1.4 l).

Viscosity: See table.

Change Oil:
- After the first use.
- Every 100 hours.

Change oil filter every 200 hours.



0702-0402

Kohler Engine

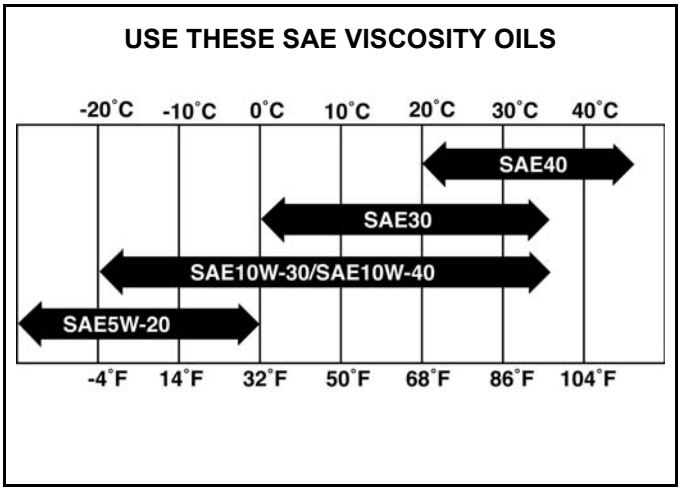
Oil Type: Detergent oil (API service SG, SH, SJ, or higher).

Crankcase Capacity (with filter): 2.1 qt. (2 l).

Viscosity: See table.

Change Oil (Kohler):
- Every 50 hours.

Change oil filter every 100 hours.



0702-0403

Kawasaki Engine

Oil Type: Detergent oil (API service SC, SD, SE, SF, SG, or SH).

Crankcase Capacity (with filter): 1.6 qt. (1.5 l).

Viscosity: See table.

Change Oil (Kawasaki):
- After the first use.
- Every 100 hours.

Change oil filter every 200 hours.

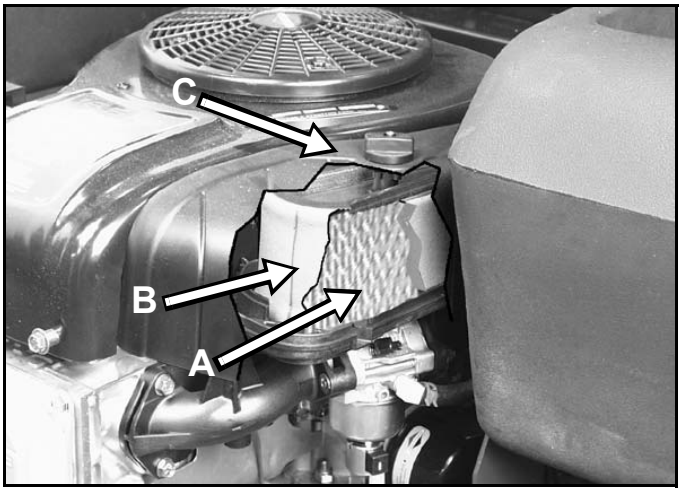
Briggs & Stratton Air Cleaner

The air cleaner assembly consists of a paper filter element and a foam precleaner.

To clean the paper element, tap lightly on a flat surface to remove dust and dirt. Inspect the element for tears, oil contamination, and damage to the rubber seal.

NOTE: Never clean the paper element with compressed air or solvents. If the element is dirty or damaged, replace it immediately.

(A) Paper Element
(B) Foam Precleaner
(C) Cover



0702-0404

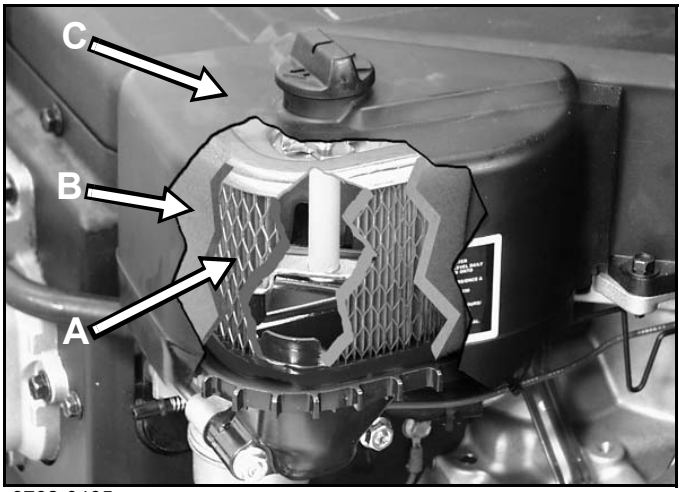
Kohler Air Cleaner

The air cleaner assembly consists of a paper filter element and a foam precleaner.

To clean the paper element, tap lightly on a flat surface to remove dust and dirt. Inspect the element for tears, oil contamination, and damage to the rubber seal.

NOTE: Never clean the paper element with compressed air or solvents. If the element is dirty or damaged, replace it immediately.

(A) Paper Element
(B) Foam Precleaner
(C) Cover



0702-0405

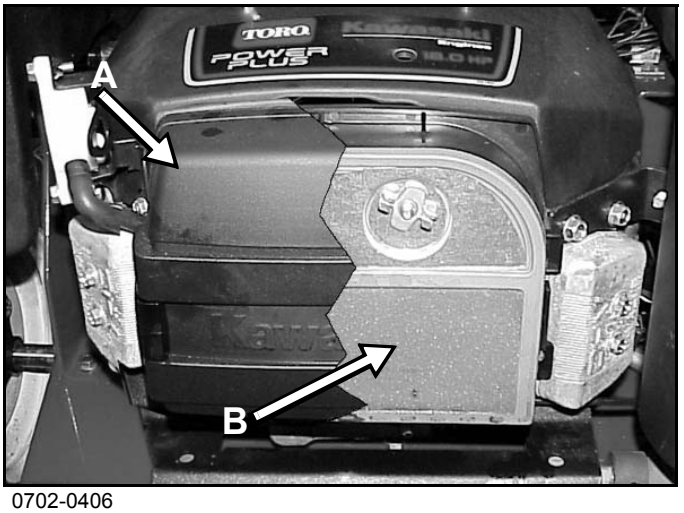
Kawasaki Air Cleaner

The air cleaner assembly consists of a paper filter element and a foam precleaner.

To clean the paper element, tap lightly on a flat surface to remove dust and dirt. Inspect the element for tears, oil contamination, and damage to the rubber seal.

NOTE: Never clean the paper element with compressed air or solvents. If the element is dirty or damaged, replace it immediately.

(A) Cover
(B) Air Filter



0702-0406

0702-0407

Every 25 hours (more often in dusty, dirty conditions) wash the foam element in liquid soap and warm water. When the element is clean, rinse it thoroughly.

Dry the element by squeezing it in a clean cloth (do not wring). Allow the element to air dry.

Follow engine manufacturer's recommendation for treatment of pre cleaner prior to installation.

0144-011

Spark Plug

On Briggs & Stratton and Kawasaki engines, replace the spark plug(s) every 100 operating hours.

On Kohler engines, check the spark plug(s) every 200 operating hours.

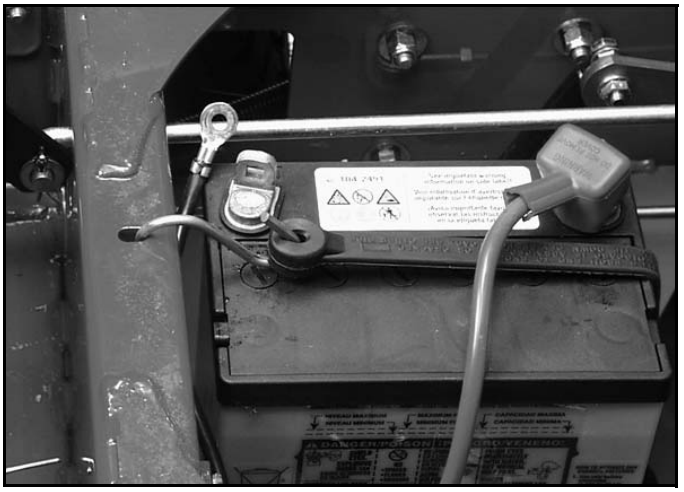
If the insulator on the spark plug(s) is light brown or gray, the engine is running properly. A black coating on the insulator indicates the air cleaner may be dirty.

IMPORTANT: Never clean the spark plug(s). Always replace the spark plug(s) when it has a black coating, worn electrodes, an oily film, or cracks.

Gap (all engines): .030" (0.76 mm)
Type:
Kohler / Briggs & Stratton: Champion RC12YC (or equivalent)
Kawasaki: Champion RCJ86 (or equivalent)

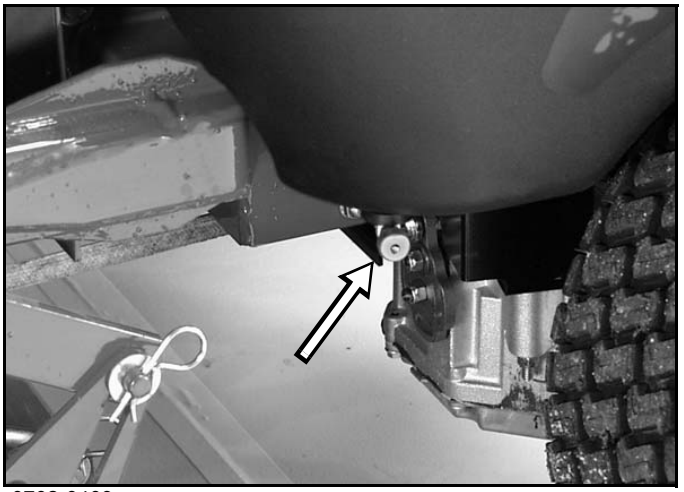
Engine Remove and Replace

Disconnect the negative battery cable.



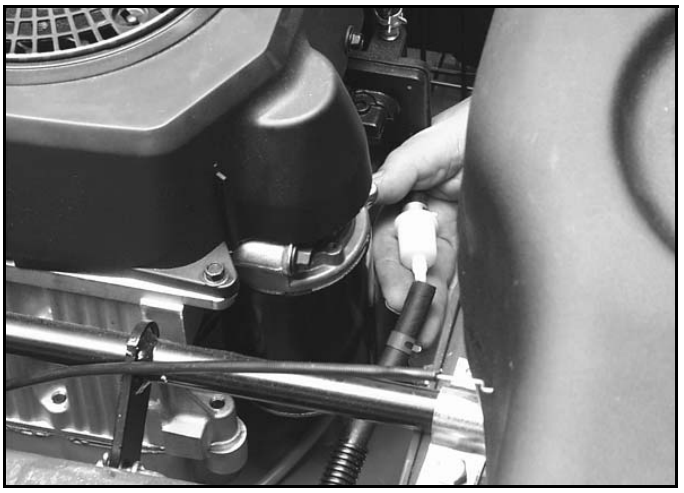
0702-0408

Close the fuel shut-off.

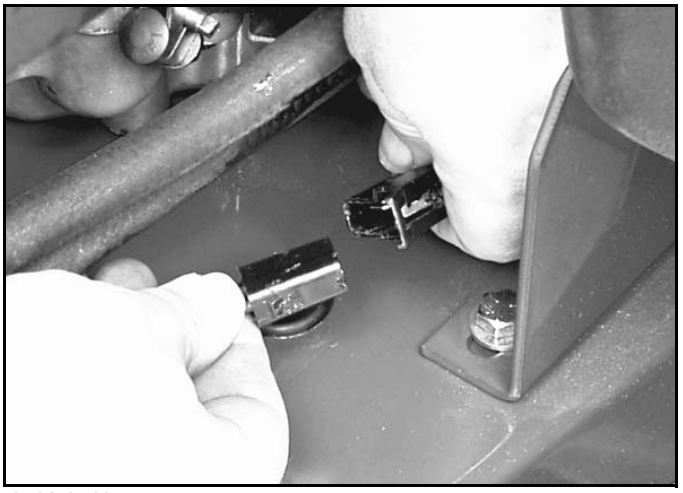


0702-0409

Remove the fuel line from the fuel filter.

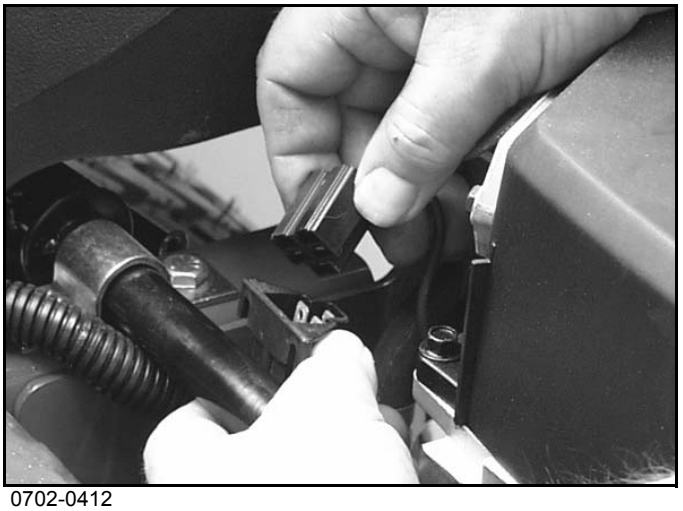


0702-0410



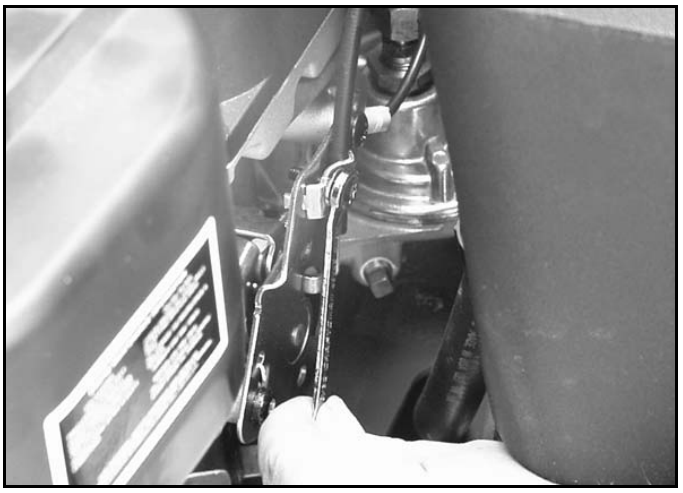
0702-0411

Disconnect the clutch PTO wiring.



0702-0412

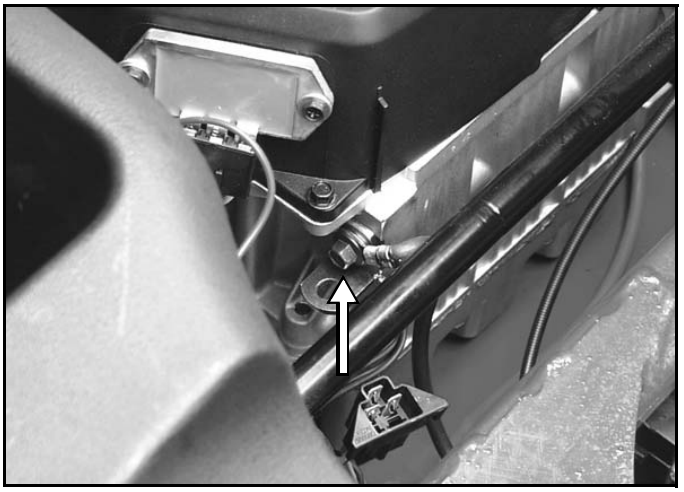
Disconnect the engine wiring harness plug.



0702-0413

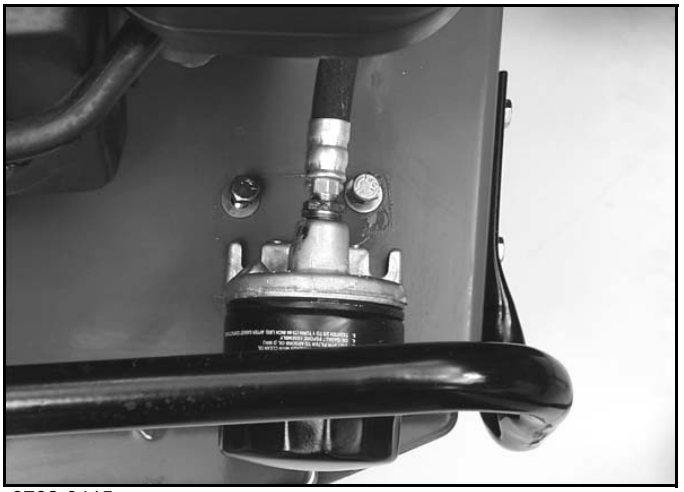
Loosen the throttle/choke cable clamp and remove the cable from the governor linkage.

Remove the ground cable from the engine block.



0702-0414

On Kohler engines, loosen the oil filter base bolts and remove the filter base.



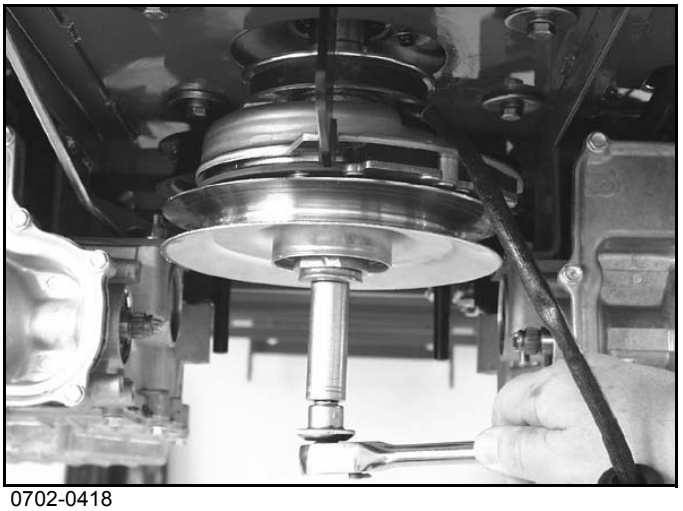
0702-0415

Remove the starter cable.

0702-0416

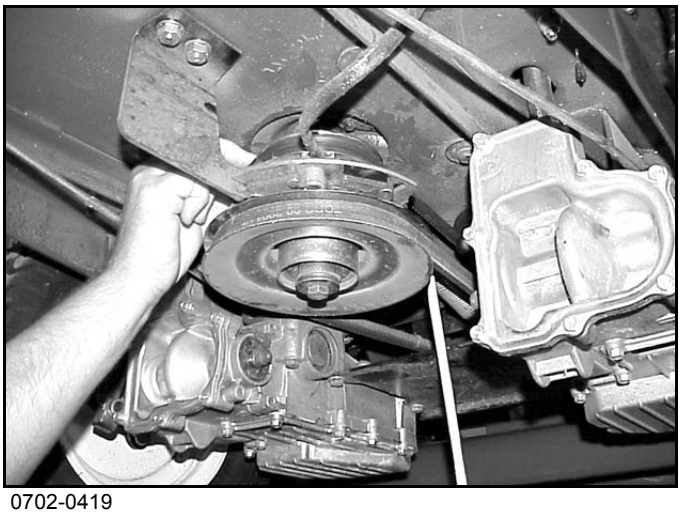
0702-0417

Remove mower drive belt. See complete procedure in Chapter 8.



0702-0418

Remove the clutch bolt and lower the clutch assembly.

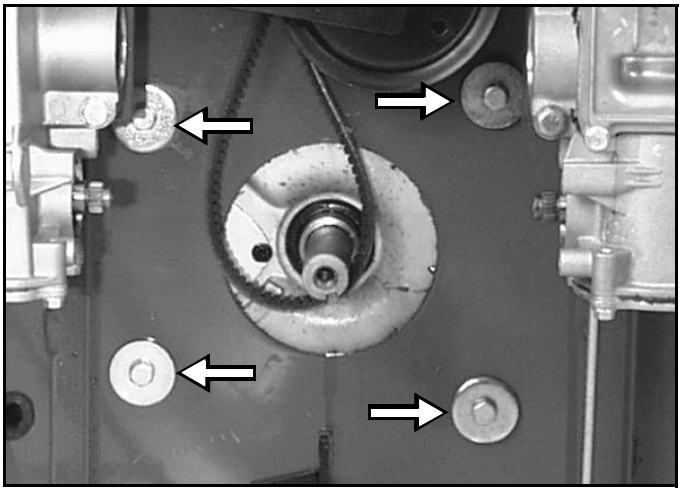


0702-0419

Remove traction drive belt.

Move the idler pulley to lessen the tension on the traction drive belt and slip the belt up off the engine drive pulley. Then remove the clutch and drive pulley from the crankshaft.

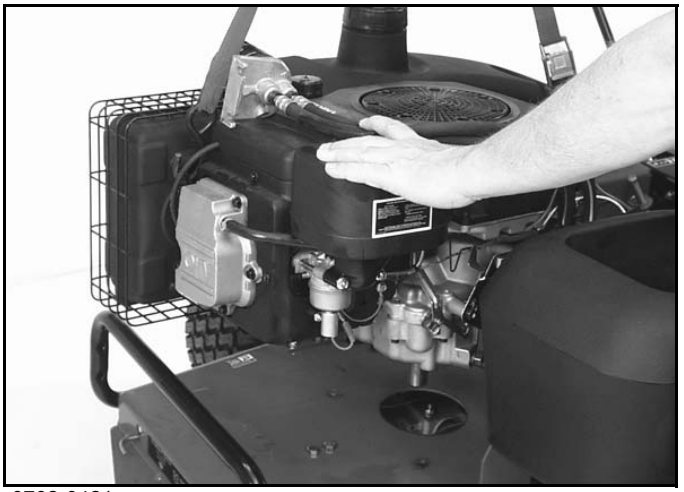
Remove the 4 engine mounting bolts.



0702-0420

Lift the engine from the chassis.

Reverse the above steps to replace.



0702-0421

QUICK REFERENCE SECTION

SERVICE SECTION

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TROUBLESHOOTING CHECKLIST

Possible Cause	Corrective Action
UNIT OPERATES IN ONE DIRECTION ONLY	
Control linkage bent or out of adjustment. Drive belt slipping or pulley damaged.	Repair or replace linkage. Repair or replace drive belt or pulley.
VEHICLE DOES NOT DRIVE/TRACK STRAIGHT	
Vehicle tires improperly inflated. Control linkage bent, loose, or out of adjustment. Bypass partially engaged.	Inflate to recommended pressure. Check tire diameters are approximately equal, side-to-side. Repair, adjust, or replace vehicle linkage. Adjust bypass linkage.
UNIT IS NOISY	
Oil level low or contaminated oil. Excessive loading. Brake setting incorrect. Loose parts. Bypass assembly sticking. Air trapped in hydraulic system.	Fill to proper level or change oil. Reduce vehicle loading. Adjust brake to proper setting. Repair or replace loose parts. Repair or replace valve or linkage. Purge hydraulic system.
UNIT HAS NO/LOW POWER	
Engine speed low. Control linkage bent or out of adjustment. Brake setting incorrect. Drive belt slipping or pulley damaged. Oil level low or contaminated oil. Excessive loading. Bypass assembly sticking. Air trapped in hydraulic system.	Adjust to correct setting. Repair or replace linkage. Adjust brake to proper setting. Repair or replace drive belt or pulley. Fill to proper level or change oil. Reduce vehicle loading. Repair or replace valve or linkage. Purge hydraulic system.
UNIT OPERATING HOT	
Debris buildup around transaxle. Brake setting incorrect. Cooling fan damaged. Oil level low or contaminated oil. Excessive loading. Air trapped in hydraulic system.	Clean off debris. Adjust brake to proper setting. Repair or replace cooling fan. Fill to proper level or change oil. Reduce vehicle loading. Purge hydraulic system.
TRANSAXLE LEAKS OIL	
Damaged seals, housing, or gaskets. Air trapped in hydraulic system.	Replace damaged component. Purge hydraulic system.

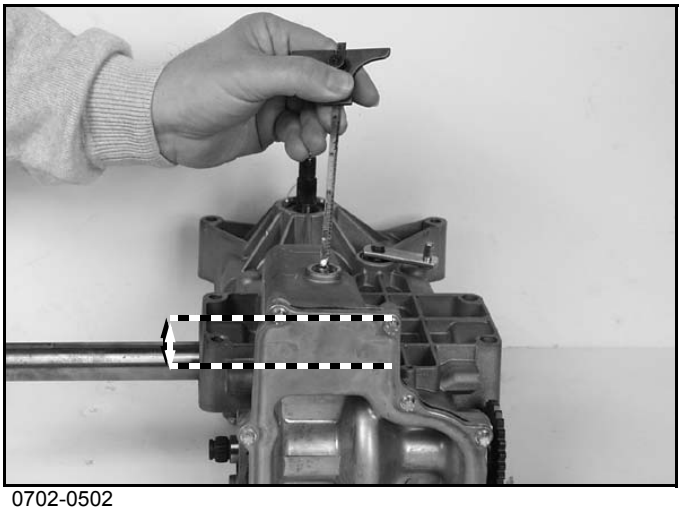
Fluids

Engine oil with a minimum rating of 55 SUS at 212 F° and an API classification of SH/CD is recommended. A 20W-50 engine oil has been selected for use by the factory and is recommended for normal operating temperatures.

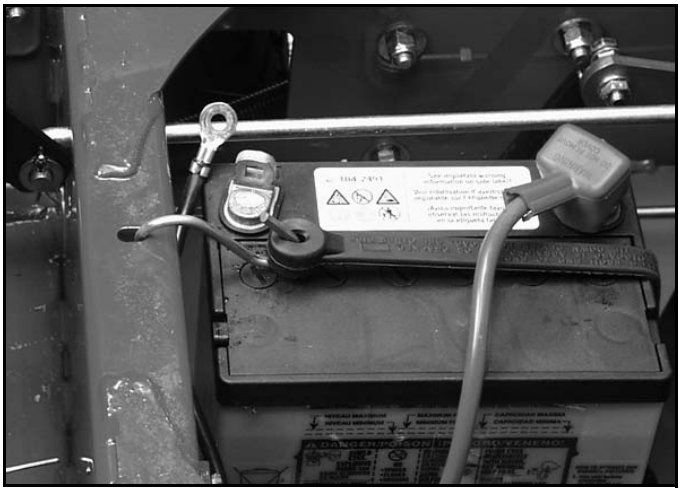
0702-0501

Check oil level when cold. To check the transaxle fluid level, remove the vent. Oil level should be 1-7/8” - 2-3/16” (4.8 cm - 5.56 cm) from the top of the vent port.

The oil level can only be checked when the transaxle is removed from the machine.

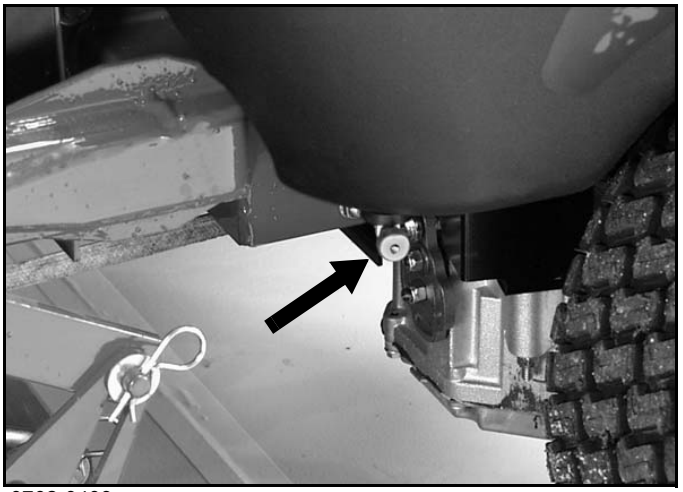

0702-0502

Remove and Replace Transaxle



0702-0408

Disconnect the battery.



0702-0409

Close the fuel shut-off.

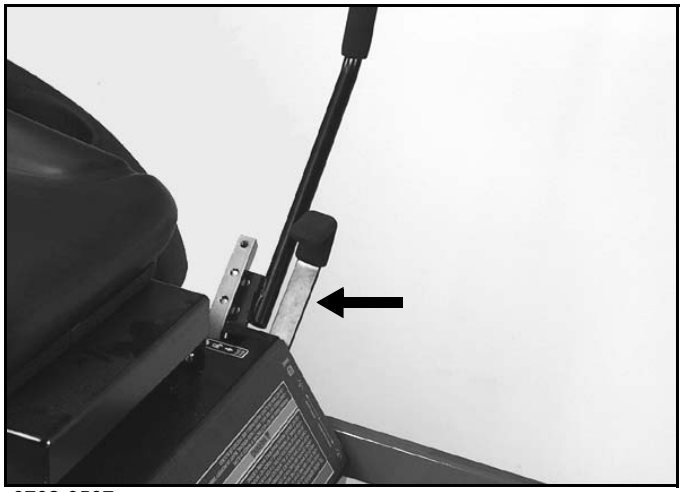
0702-0505

Raise the rear of the unit and support it with jack stands.

Remove the clip that secures the vent hose to the chassis.

0702-0506

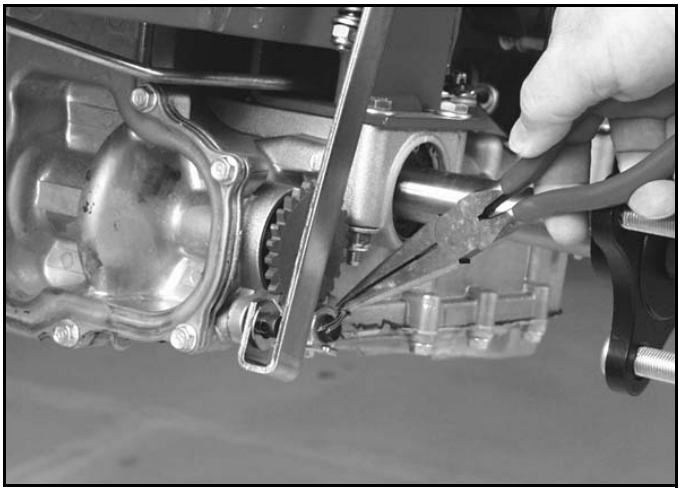
If necessary, engage the parking brake to facilitate wheel removal.



0702-0507

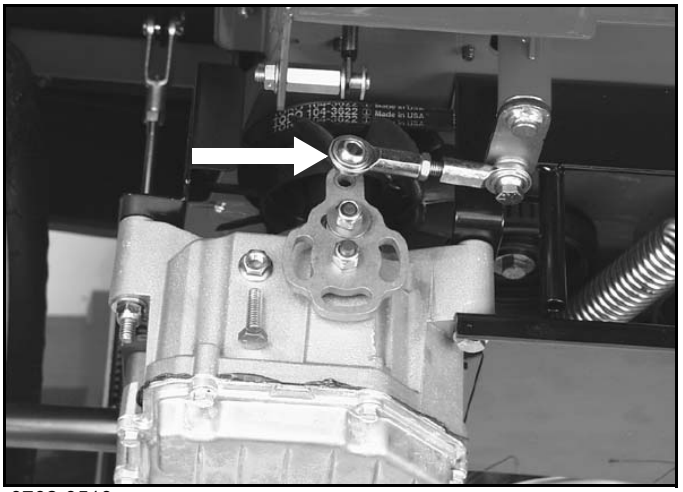
Remove the wheel assembly.

0702-0508



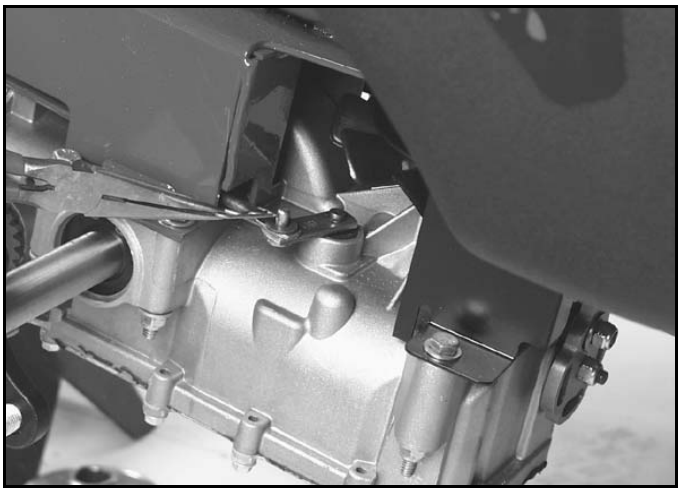
0702-0509

Remove the parking brake link from the brake arm.



0702-0510

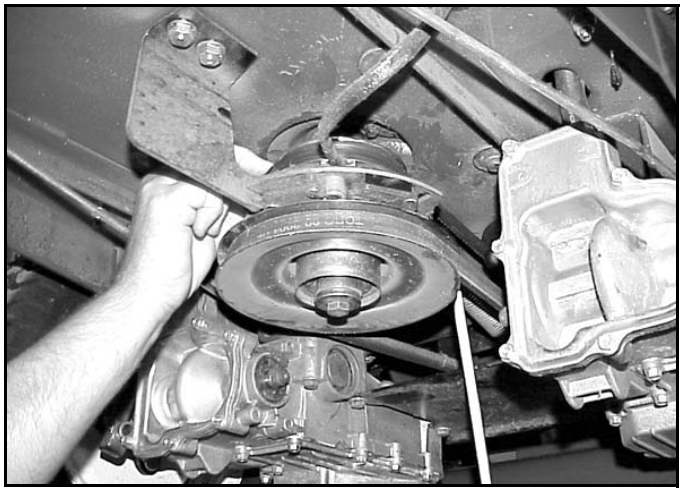
Disconnect the motion control link from the transaxle.



0702-0511

Remove the hairpin cotter and washer from the bypass valve lever. Leave the rod in place.

Move the idler pulley to lessen the tension on the traction drive belt and slip the belt up off the engine drive pulley.

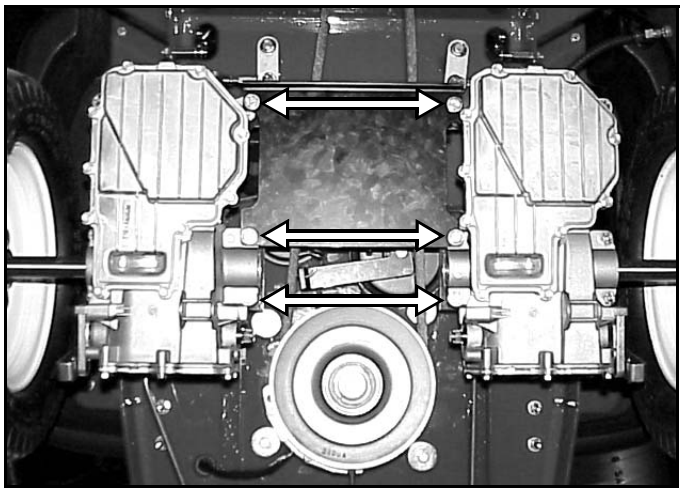


0702-0419

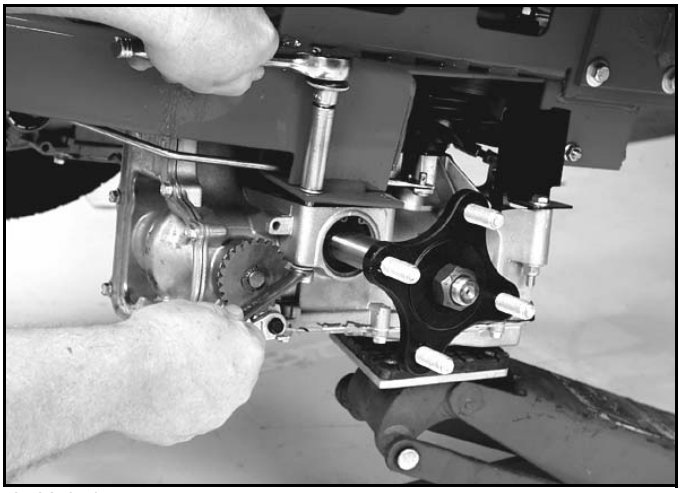
Remove the belt from the transaxle being removed.

0702-0512

Loosen and remove the 6 bolts and washer between both transaxles. Remove the hydro lower plate. Note the orientation of the hydro lower plate. It must be reinstalled with the lip facing down, toward the front.

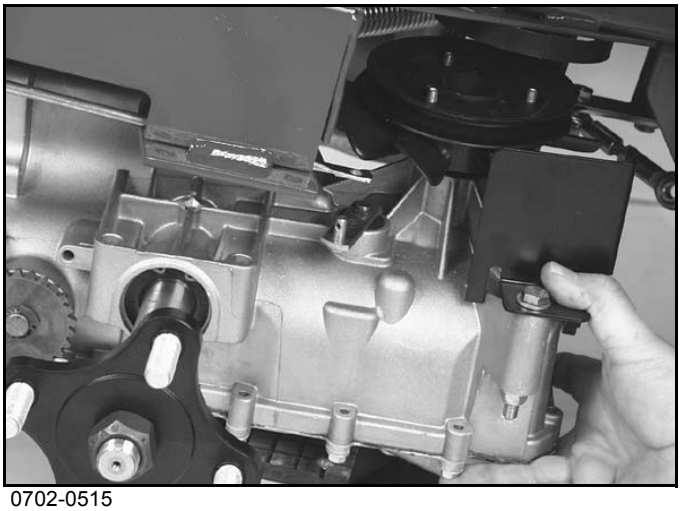


0702-0513



0702-0514

Support the transaxle with a jack while removing the last bolts.

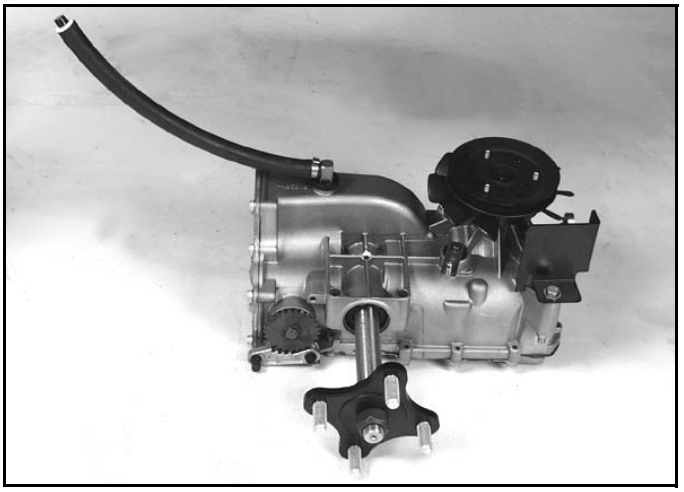


0702-0515

Guide the transaxle as it is lowered. Make sure the cooling fan and vent hose clear the chassis.

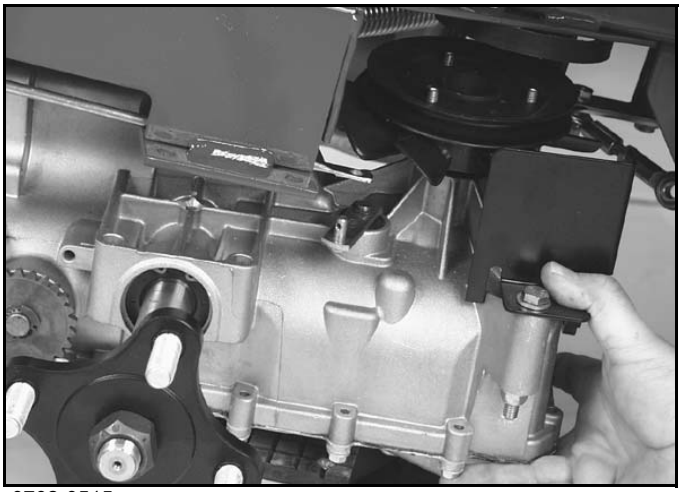
Reassembly

IMPORTANT: Before installing a new transaxle, check the oil level and check the torque on the nut retaining the input pulley. Torque to 30 - 35 ft. lbs. (40.7 N·m - 47.5 N·m).



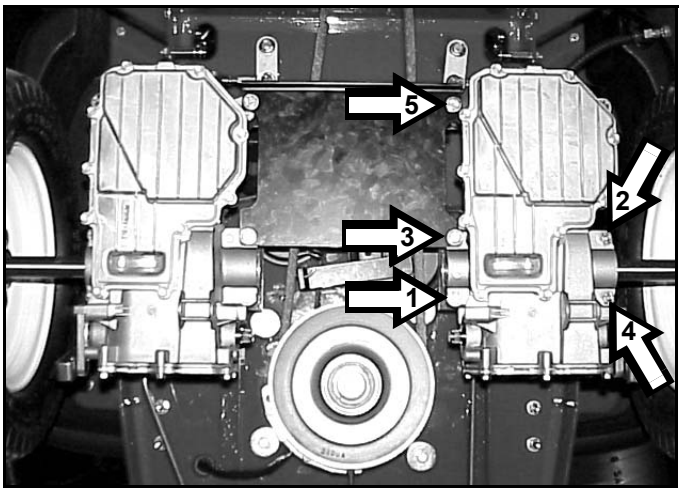
0702-0516

Use a jack to lift the transaxle into the chassis. Carefully guide it into position so that the cooling fan does not catch on the chassis and the bypass rod is properly positioned in the lever. Insert the vent hose through the slot provided for it in the frame.

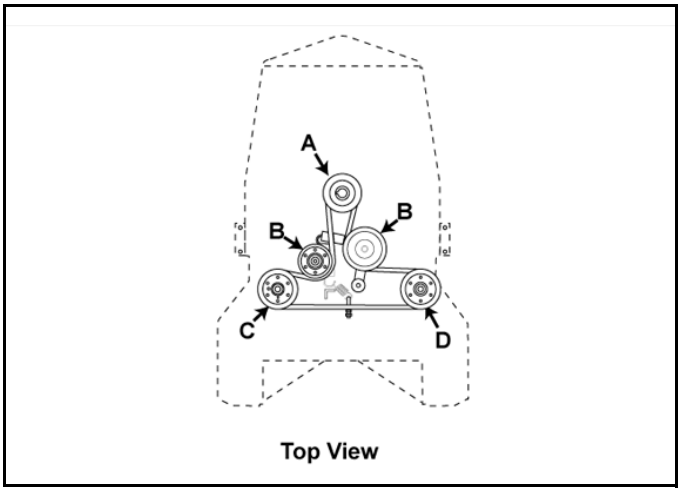


0702-0515

Install the two axle bolts, washer, and nuts to the frame. Do not tighten the bolts. Reinstall the rest of the bolts, washers, and nuts in the lower hydro plate. If the plate was completely removed, make sure the lip of the plate is pointing to the front and down. Tighten the transaxle bolts and nuts following the sequence shown in the photo. Torque the bolts and nuts to 200 in. lbs. (22.6 N·m)



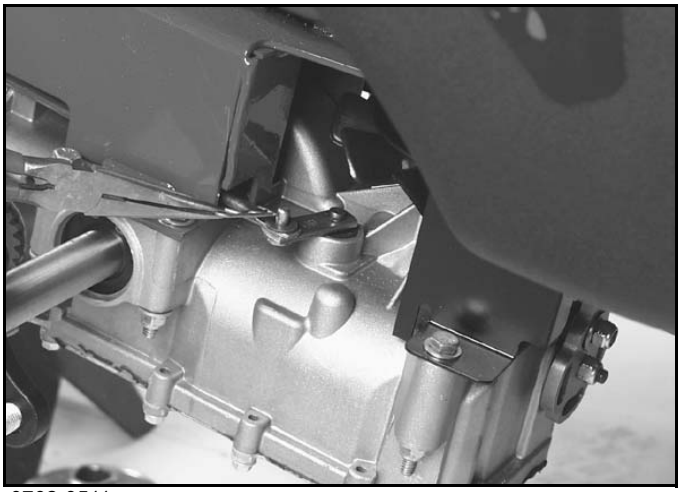
0702-0513



1s-0802

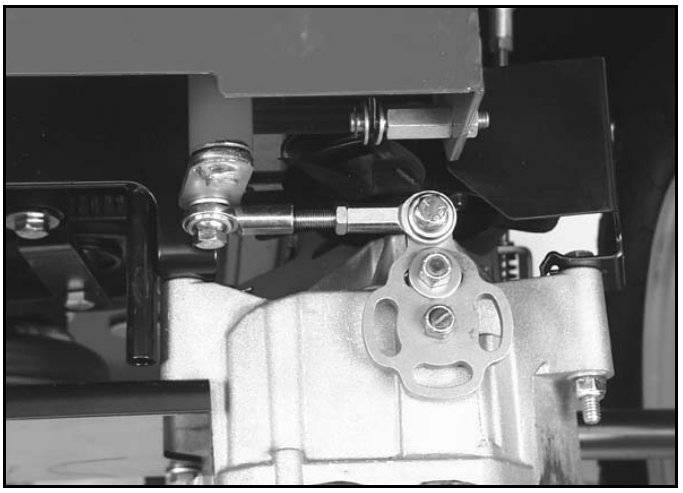
Place the traction belt on the pulley. Check for correct belt routing.

(A) Engine Pulley
(B) Idler Pulley
(C) Right Hydro
(D) Left Hydro



0702-0511

Install the hairpin cotter pin and washer on the bypass valve lever.



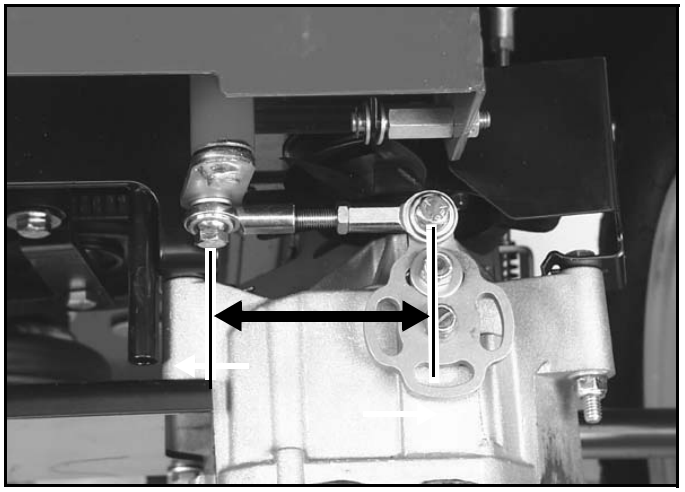
0702-0517

Reinstall the motion control link.

NOTE: The length of the link is set at the factory and should not normally require adjustment in the field.

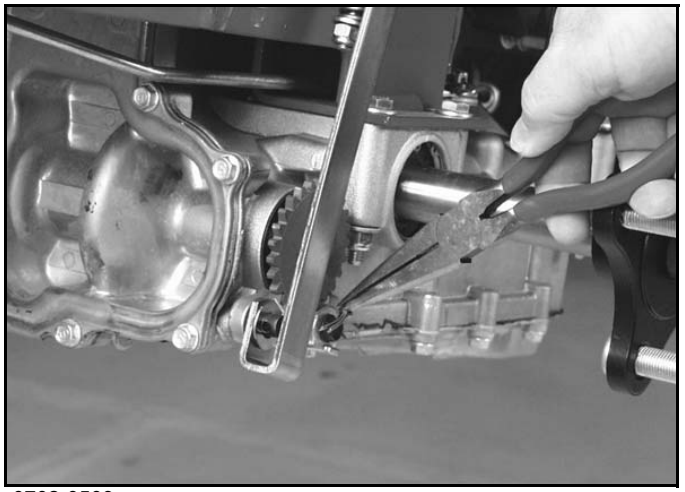
If the link has been tampered with, the distance between bolt centers is:

- Left side 3.6” (9.14 cm)
- Right side 3.1” (7.9 cm)



0702-0517

Install the parking brake linkage.



0702-0509

Replace the wheel assembly.

0702-0508

0702-0506

Secure the vent hose to the chassis.

0702-0518

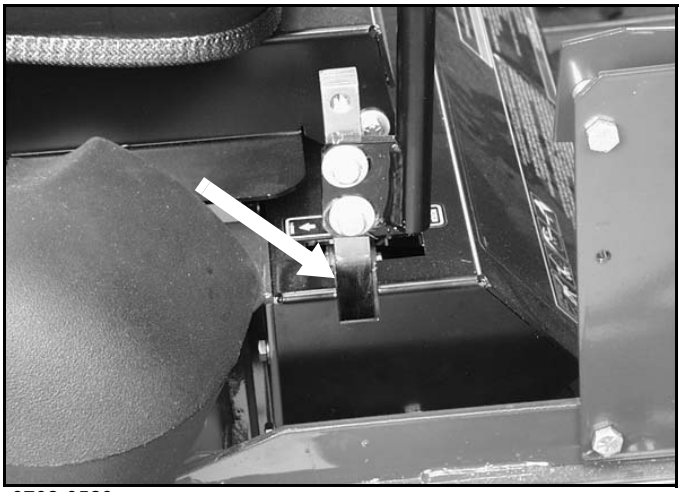
Recheck to make sure the brake arm clears the teeth of the brake cog when the park brake is disengaged.

Control Handle-Return To Neutral Adjustment

1. With the engine off, move the directional control handles to the reverse position.

0702-0519

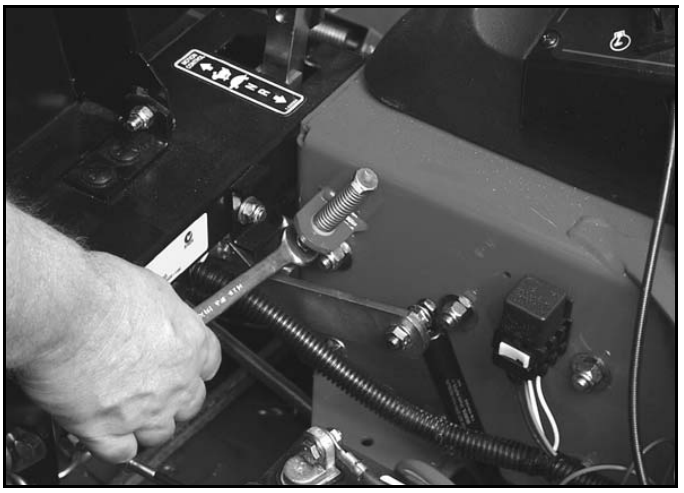
2. Let the handles go. They should return to the neutral position, which means the handle should line up with the neutral slot (neutral lockout position).



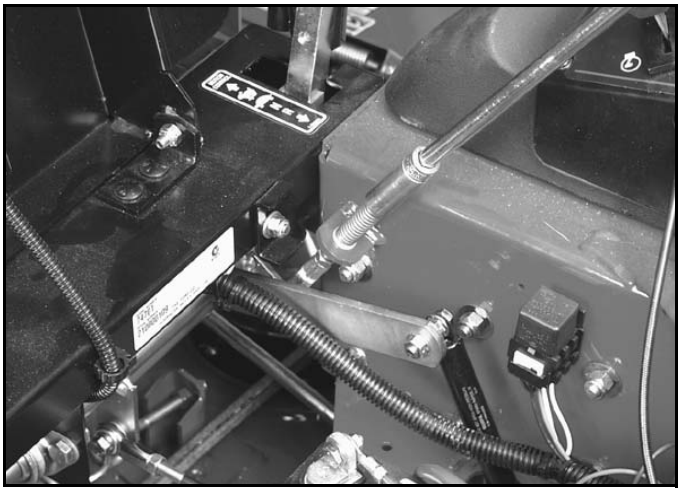
0702-0520

3. If adjustment is needed:

   A. Lift the seat and located the adjusters. Loosen the jam nut on the yoke.

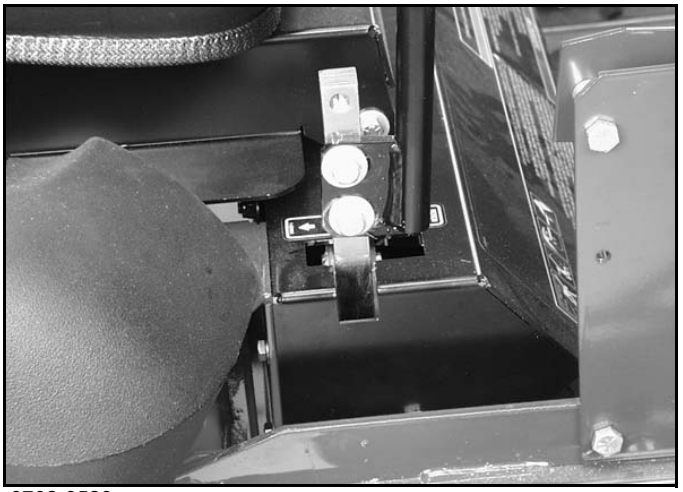


0702-0521



0702-0522

B. Turn the top bolt head until the directional control handle is lined up with the neutral slot (Neutral Lockout Position).



0702-0520

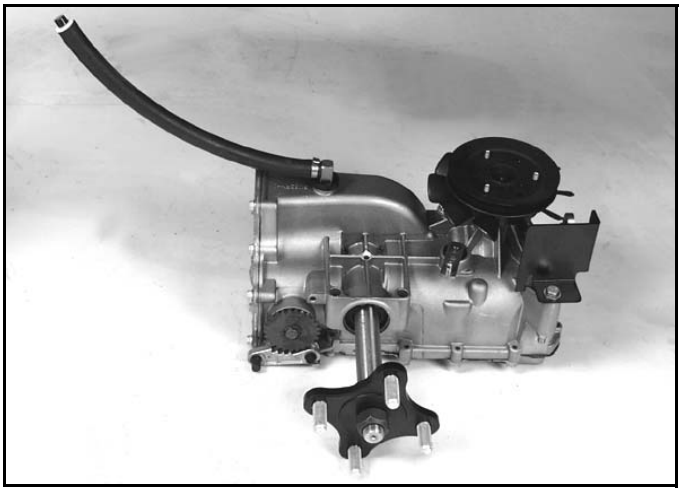
C. Tighten the jam nut and then test the directional control handle by pulling the handle in reverse and then let the handle go. It should return to the neutral slot.

D. Before starting the unit, follow the procedures on Purging the System.

Purging the System

Due to the effects air has on efficiency in hydrostatic drive applications, it is critical that it be 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.



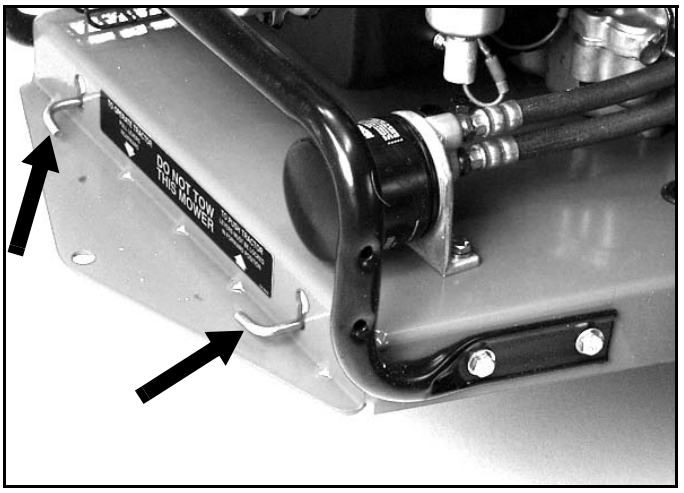
0702-0516

Air creates inefficiency because its compression and expansion rate is higher than that of the oil normally approved for use in hydrostatic drive systems.

2001-027

The following procedures should be performed with the vehicle drive wheels off the ground, the seat switch temporarily bypassed, and the brake arm completely disengaged from the brake cog, (see Parking Brake Adjustment page 6 - 18). The procedure may need to be repeated under normal operating conditions.

1. With the bypass valves open (hand push mode) and the engine running, slowly move the directional control handles in both forward and reverse directions 5 to 6 times, to purge trapped air from the unit.



0702-0523

0702-0524

2. Place the bypass valves in the closed position (operating). With the engine running, slowly move the directional control handles through the forward and reverse directions (5 to 6 times).
3. It may be necessary to repeat steps 1 and 2 until all the air is completely purged from the system. When the transaxle moves forward and reverse at normal speed, purging is complete.

Neutral Adjustment

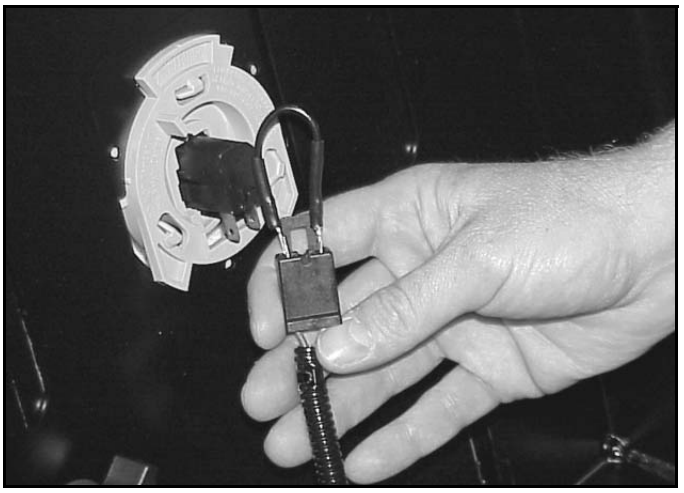
1. If the unit creeps in neutral, it will be necessary to make an adjustment to the transaxle.
2. Operate the unit to determine which transaxle needs adjustment.

0702-0525

3. Raise the unit and place it on jack stands.
4. Warm the transaxle fluid by running for at least 10 minutes.

0702-0505

5. Unplug the seat switch and temporarily connect a jumper wire across the plug connector.



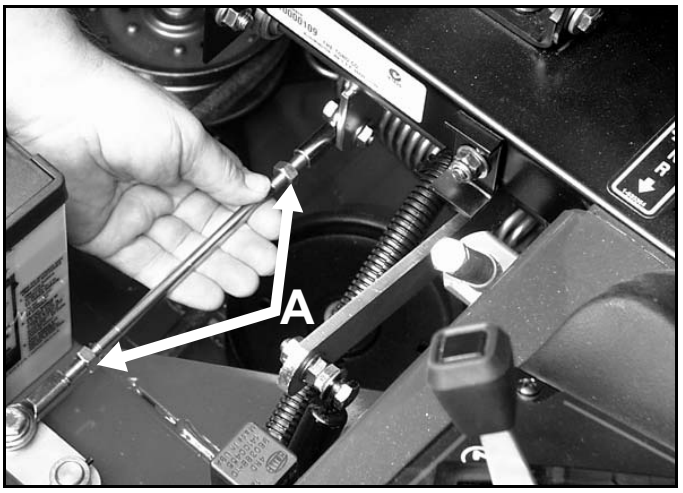
2001-050

0702-0526

6. Place the directional control handles in the neutral lockout position. Start the engine and run at half throttle.

0702-0527

7. The rear traction wheels should remain stationary or creep slightly in reverse.



0702-05028

8. If necessary, loosen the jam nuts (A) and turn the control rod until the wheel stops between forward and reverse. In some cases, you may have a slight creep in reverse. When you lower the unit to the ground, it should stop.

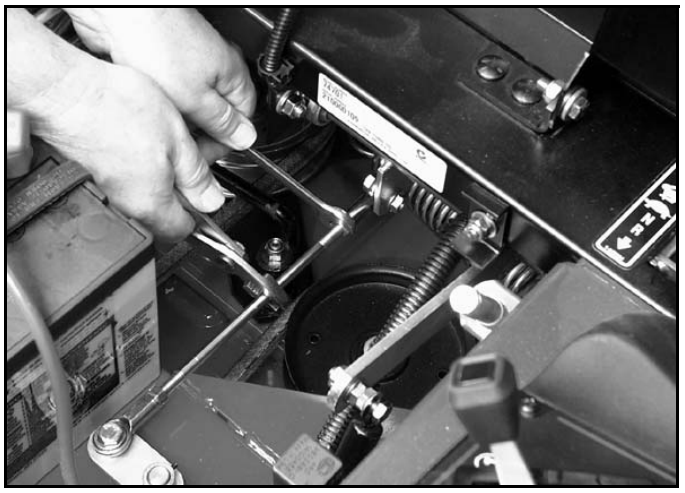
9. After you have adjusted the rods, move the directional control handle in reverse position, then let go of the handles. The handles should move to the neutral position and the drive wheels should remain stationary, or have a very slight amount of creep in reverse. The wheels should not creep in the forward direction when the control handles are in the neutral lock out position.

0702-0529

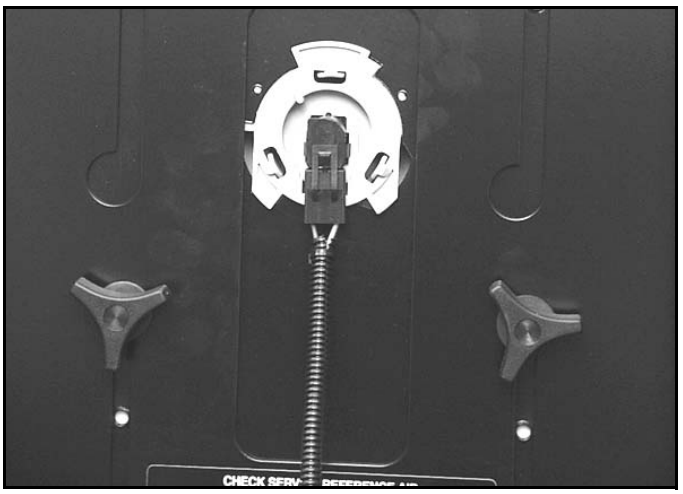
10. Run the engine at full throttle. Check neutral again by moving the directional control handles in reverse, then let go of the handles. The handles should move to the neutral position and the drive wheels should not move. A slight creep could be observed when the machine is elevated. However, when lowering the unit to the ground, the weight of the unit should stop the creep.

0702-0530

11. When the adjustment is complete, hold the control rod stationary with pliers and tighten the jam nuts. Always test again to make sure the unit is still neutralized.



0702-0531



0702-0532

12. Remove the jumper wire on the seat switch and plug the switch into the harness. Lower the unit to the ground.

Tracking Adjustment

When operating the unit in forward, it is not unusual for the unit to track slightly right or left when going for a distance. This is because of the different tolerances between two different hydrostatic pumps. If the tracking deviation is large, check the following.

NOTE: Ground surface should be level when checking the tracking.

0702-0525

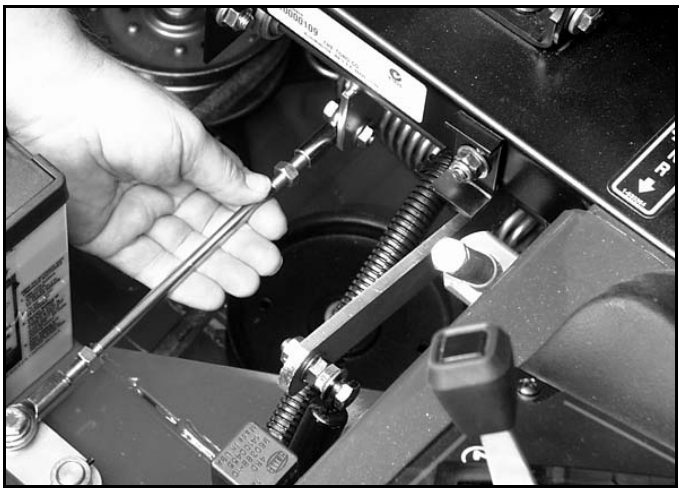
1. Check the tire pressure in each tire. 13 psi (90 kPa) rear, 35 psi (241 kPa) front. Tire pressure has a great influence on the tracking of these units.

   It is advisable to check for a large deviation in outside diameter of the tires, side-to-side, if the tracking error is severe. Also, check that the front casters rotate freely, and the front wheel bearings are in good condition.

0702-0533

2. You may be able to make a slight tracking adjustment by turning the neutral control rods without affecting the neutral position.

   IMPORTANT: Be sure to recheck the neutral adjustment to be sure the machine does not creep after correcting the tracking.



0702-0528

0702-0527

NOTE: All of the control linkage is set up for forward motion. It is not unusual to have a large tracking error when going a distance in reverse. Do not try to adjust reverse tracking. If you do, it will misadjust the forward linkage.

3. After attempting any tracking change with the unit, make sure it is still neutralized.

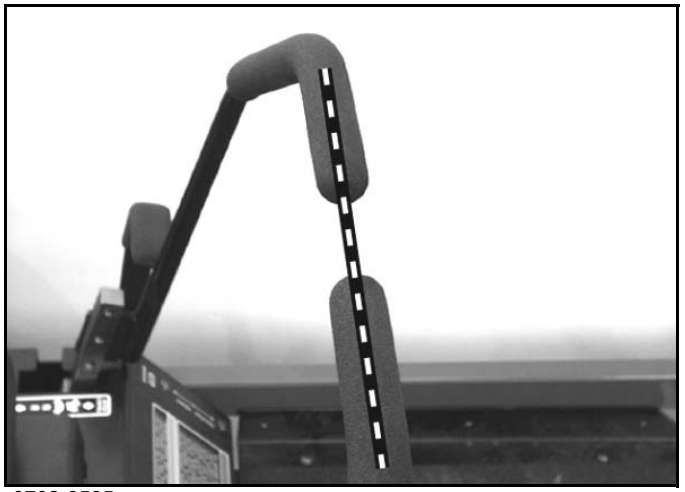
Control Handle Adjustment

If the directional control handles do not line up with each other, they require adjustment.

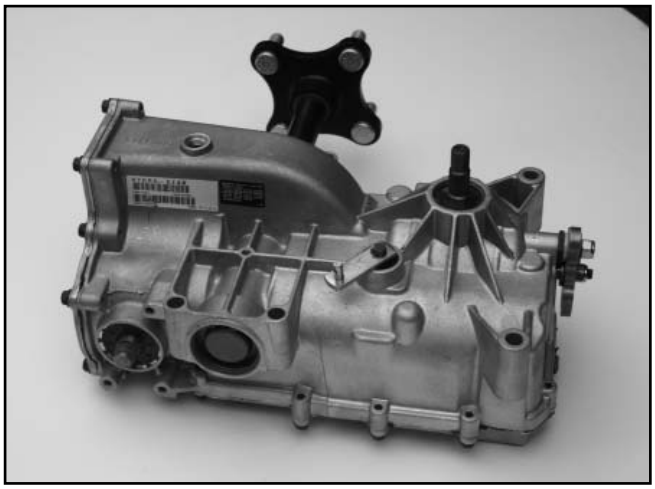
1. Loosen the bolts attaching the handles to the control linkage.

0702-0534

2. Adjust the position of the handles so that they are aligned. Tighten the bolts after adjustment.



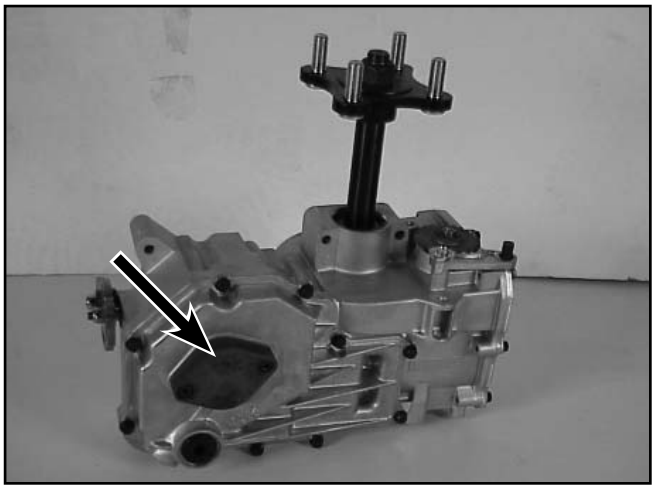
0702-0535



PICT-6171

Transaxle Identification Model Year 2001 - 2004

Hydro-Gear Model 310-2400 IZT Transaxles



MVC-353X

Transaxle Identification Model Year 2005 and Later

Hydro-Gear Model 310-2600 IZT with a Charge Pump

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QUICK REFERENCE SECTION

SERVICE SECTION

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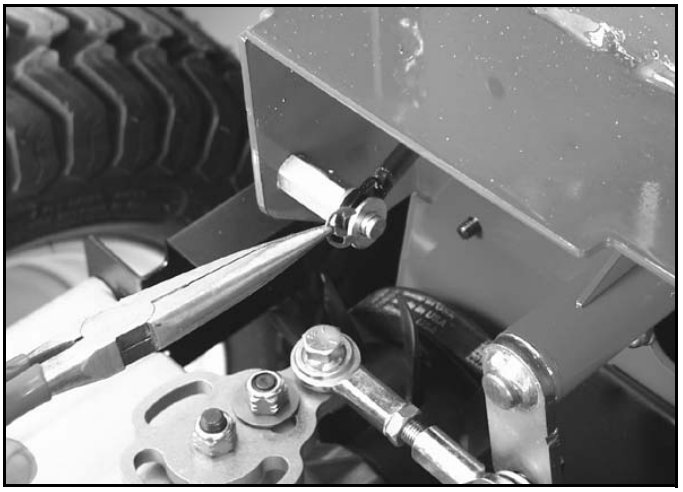
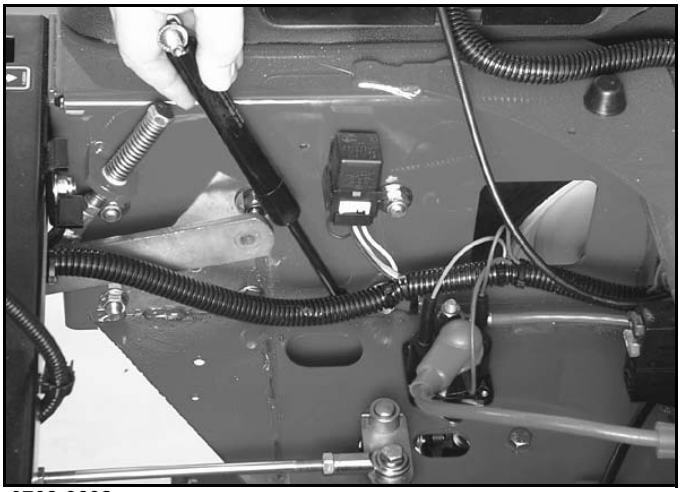
Remove and Replace Dampers



0702-0601

Remove the E-clip and washer at the bottom of the damper.



0702-0602

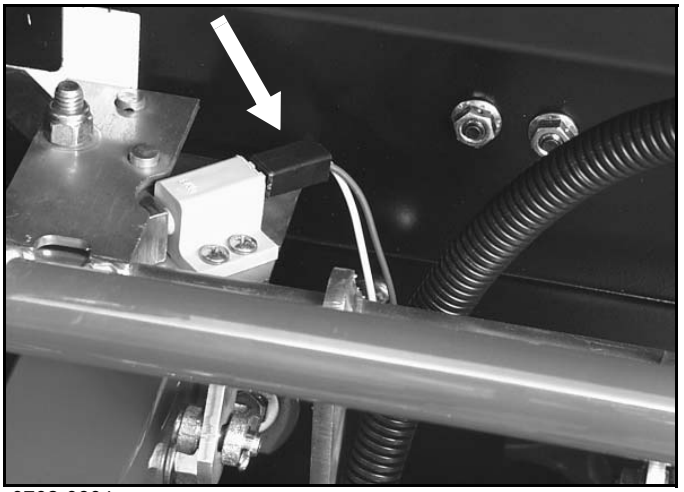
Remove the bolt at the top of the damper and remove the damper.

Remove and Replace Control Linkage

Remove the control arm.

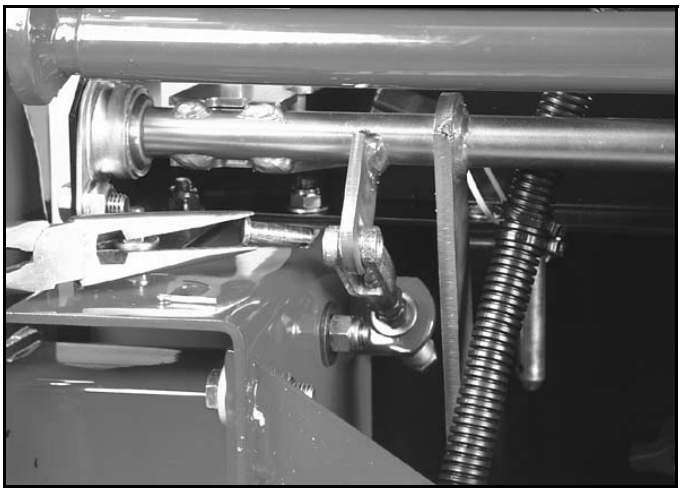
0702-0603

Remove the electrical connector from the motion control switch.

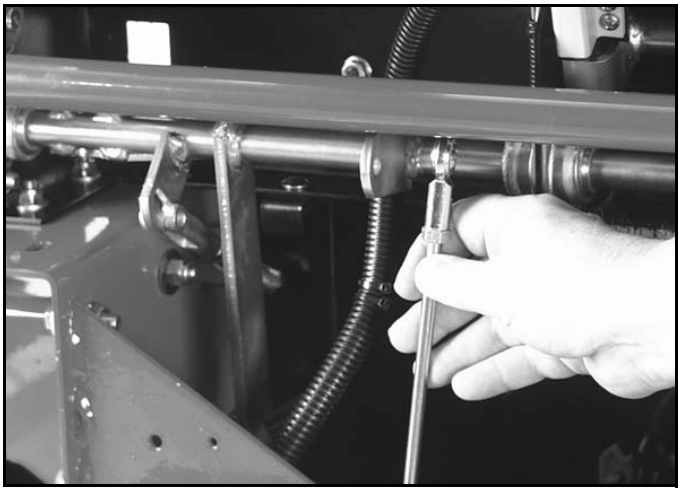


0702-0604

Remove the pin from the return to neutral yoke.

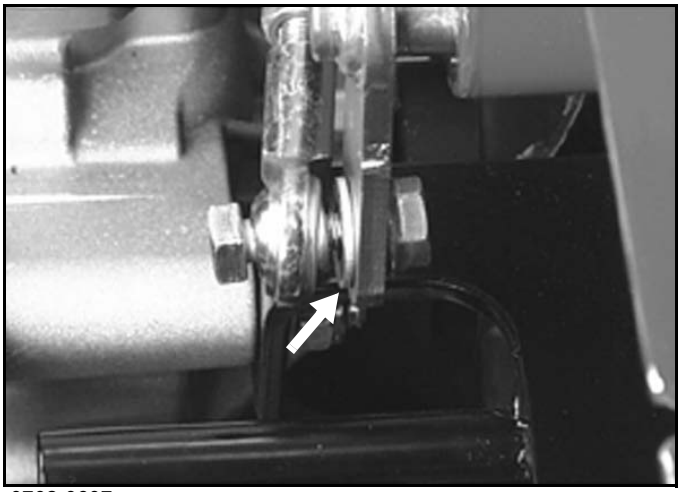


0702-0605



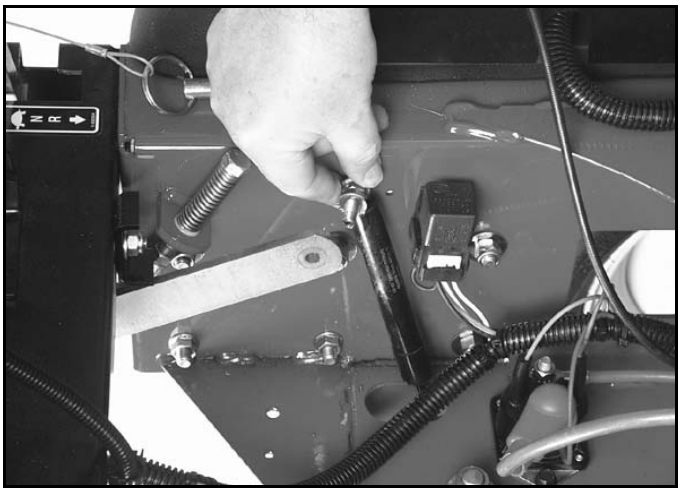
0702-0606

Remove the link between the front and rear bellcranks.



0702-0607

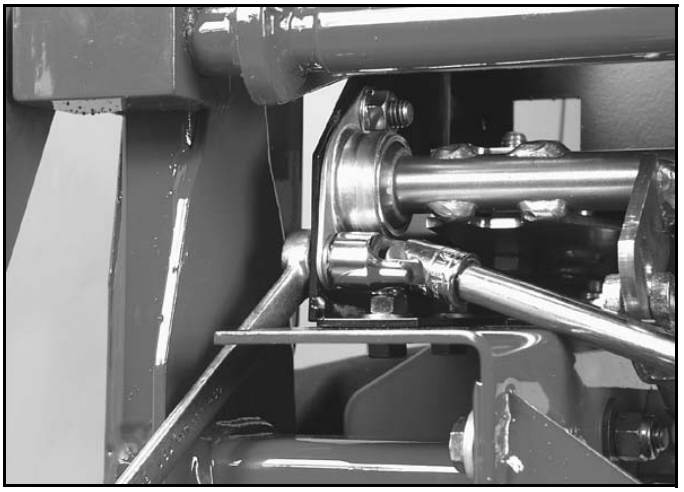
NOTE: All the ball joint assemblies are installed with a flat washer between the ball joint and lever.



0702-0608

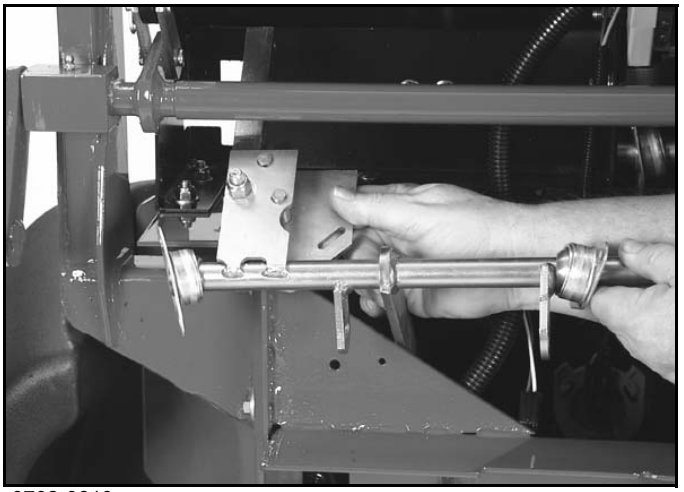
Disconnect the steering damper.

Remove the bolts securing the bushings at each end of the control shaft.



0702-0609

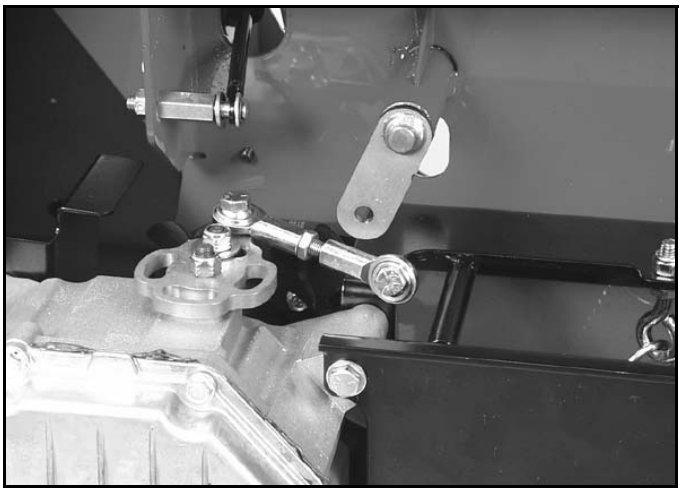
Remove the control shaft.



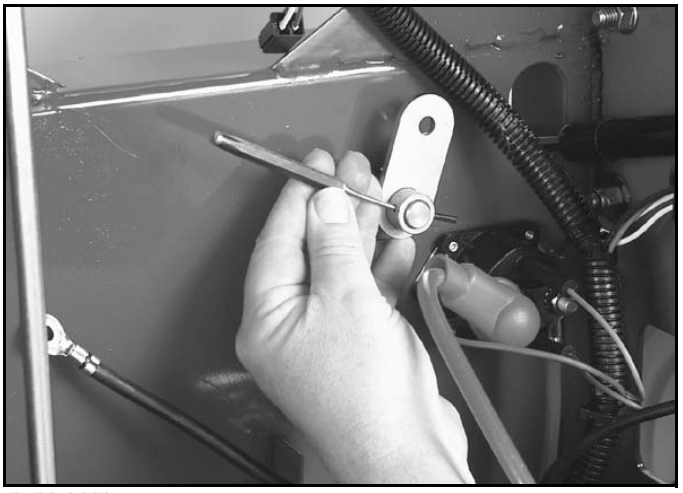
0702-0610

Disconnect the link between the transaxle and the bellcrank.

NOTE: Do not change the length of the link.

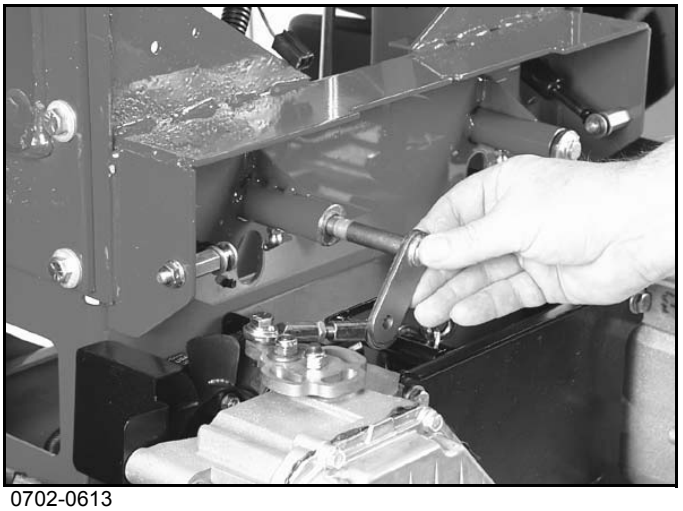


0702-0611



0702-0612

Use a small punch to drive the roll pin out of the upper bellcrank lever, then remove the lever and thrust washer.

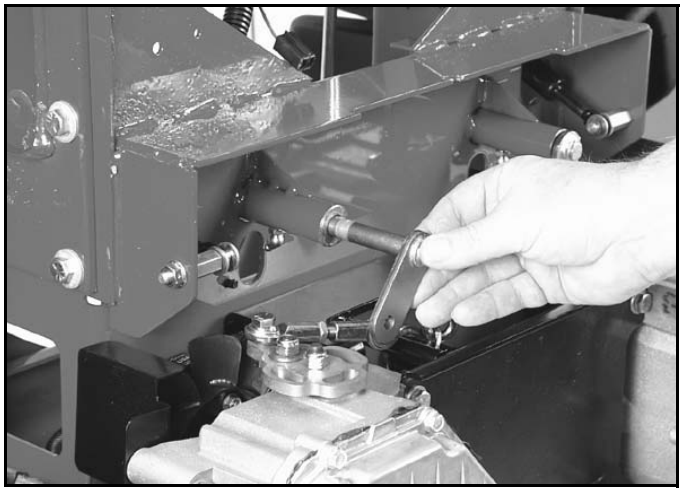


0702-0613

Pull the lower lever and shaft from the bushing.

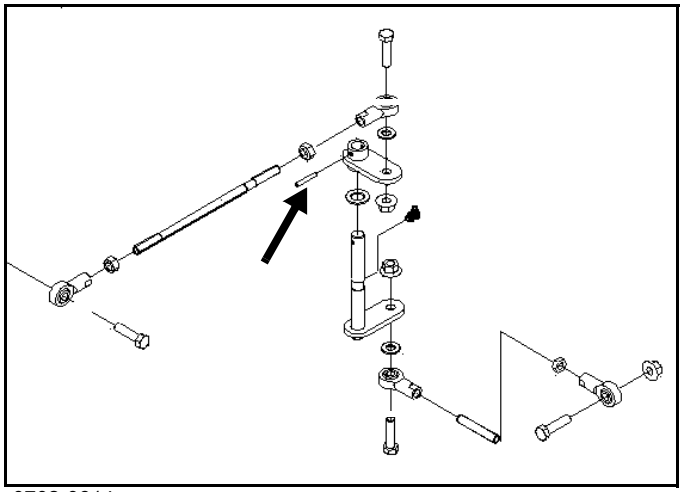
Replace Control Linkage

Lubricate the bellcrank shaft and install in bushing. The lever welded to the shaft goes on the underside of the chassis.



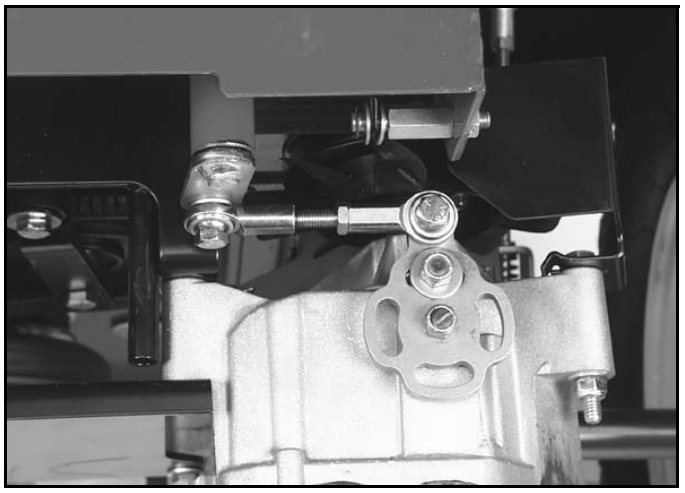
0702-0613

Carefully position the top lever on the shaft and secure with roll pin.

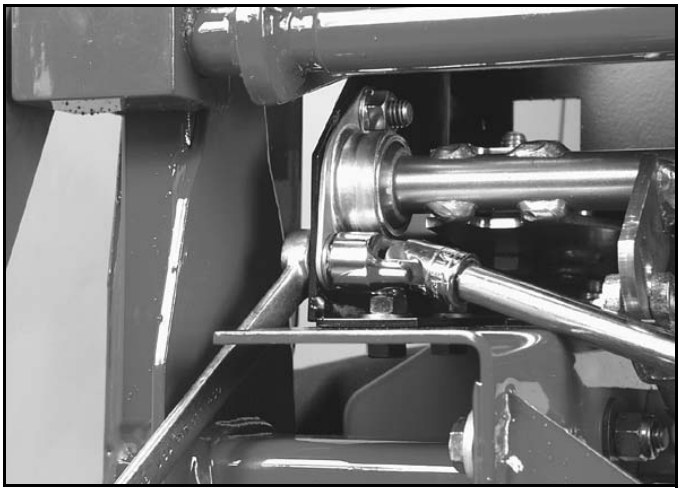


0702-0614

Install the link between the transaxle and bellcrank lever.



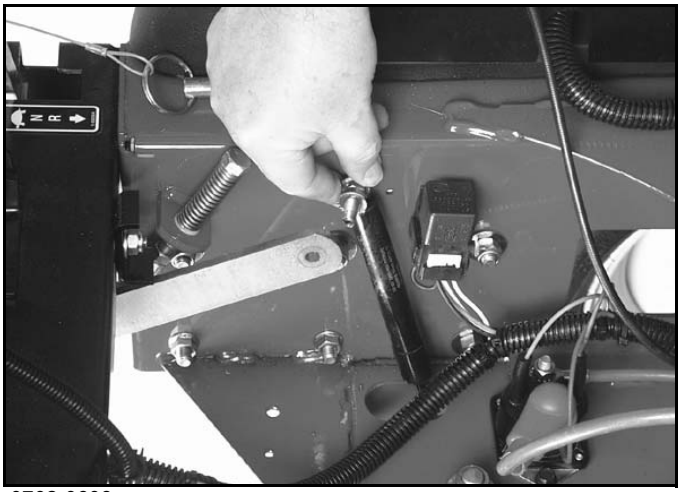
0702-0517



0702-0609

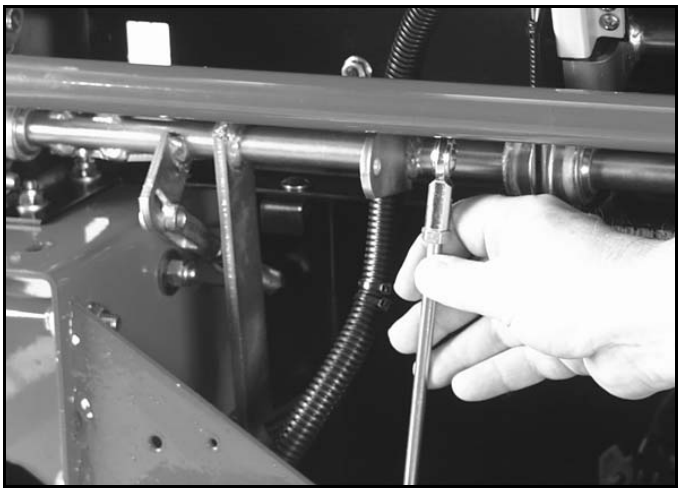
Place the motion control shaft in position in the console and secure with nuts and bolts.

NOTE: Make sure shaft is rotating freely after installation.



0702-0608

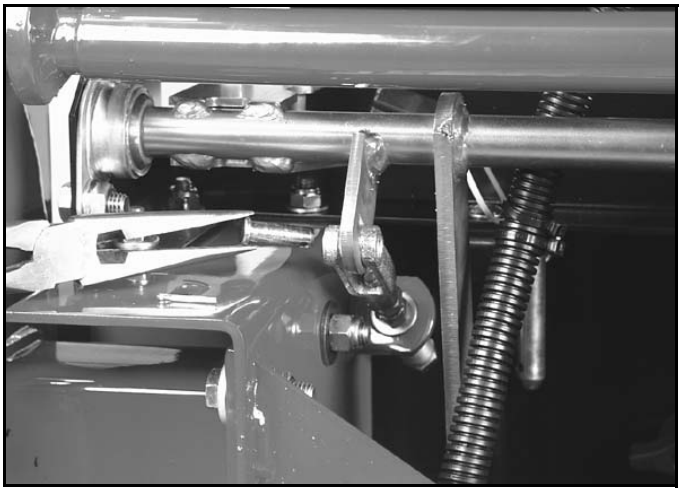
Reconnect the steering damper.



0702-0606

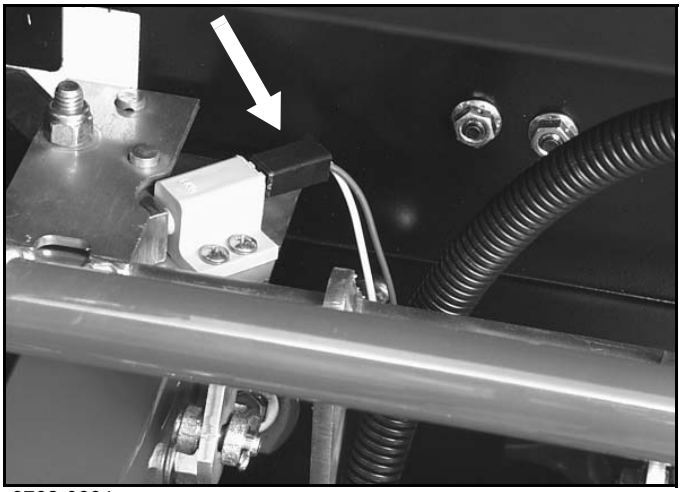
Replace the link connecting the control shaft and bellcrank.

Attach the return to neutral adjustment yoke to the control shaft lever.



0702-0605

Connect the wiring to the neutral switch.

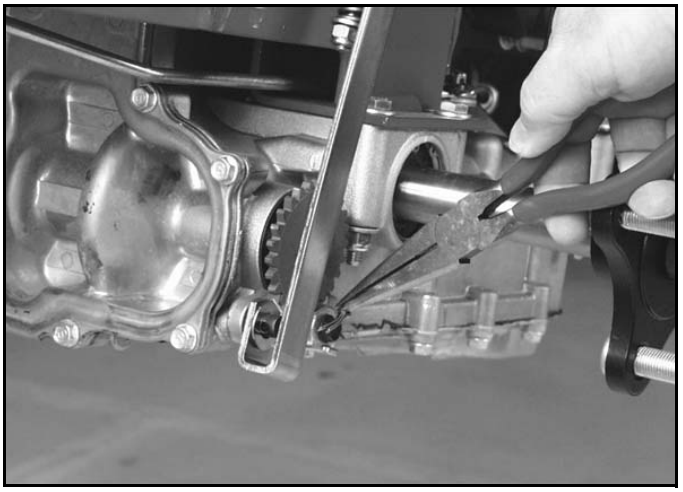


0702-0604

Position the motion control handle and secure with 2 bolts.

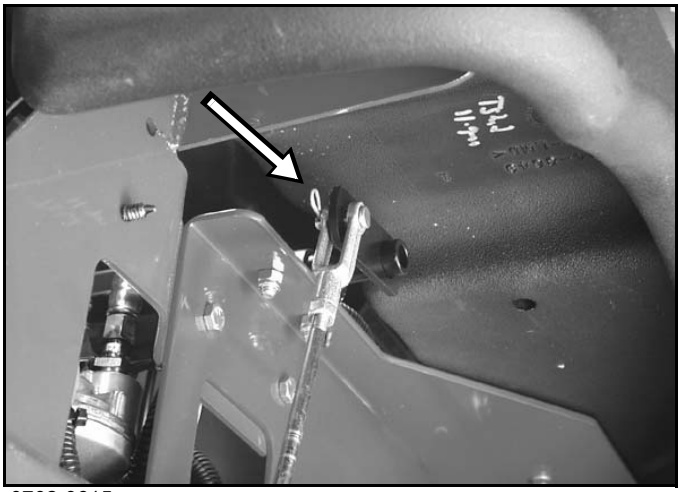
0702-0603

Remove and Replace Brake Linkage



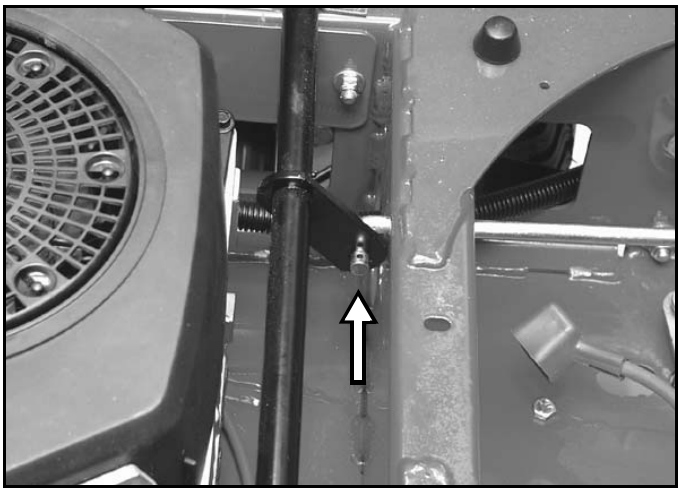
0702-0509

Remove the brake link from the brake arm.



0702-0615

Remove the clip and yoke from the brake shaft lever.



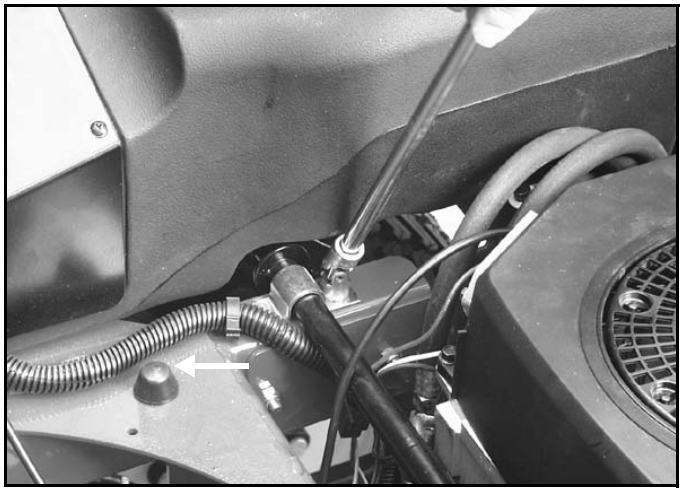
0702-0616

Remove the cotter pin and washer from the actuator rod.

NOTE: The actuator rod cannot be removed from the lever at this time.

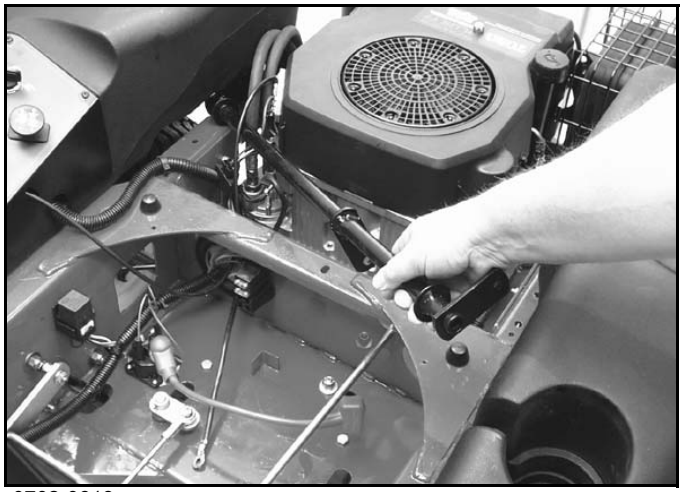
Remove the two clamps securing the brake shaft.

NOTE: During reassembly, the wiring harness is routed below the brake shaft, throttle cable is routed above.



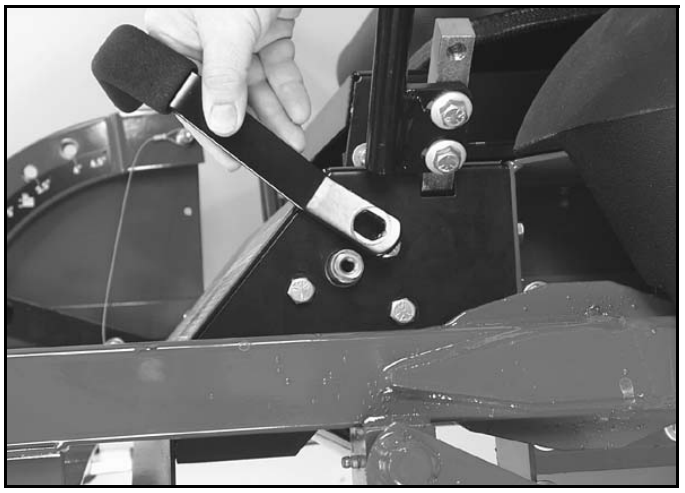
0702-0617

Remove the brake shaft from the chassis and actuator rod.

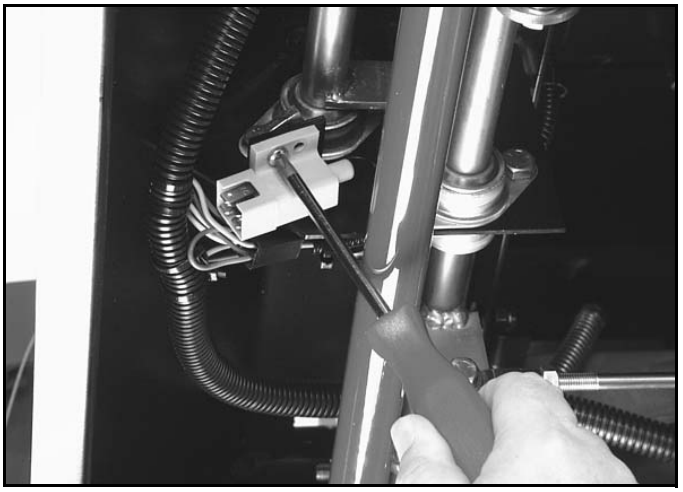


0702-0618

To remove the front brake shaft, first remove the brake handle.

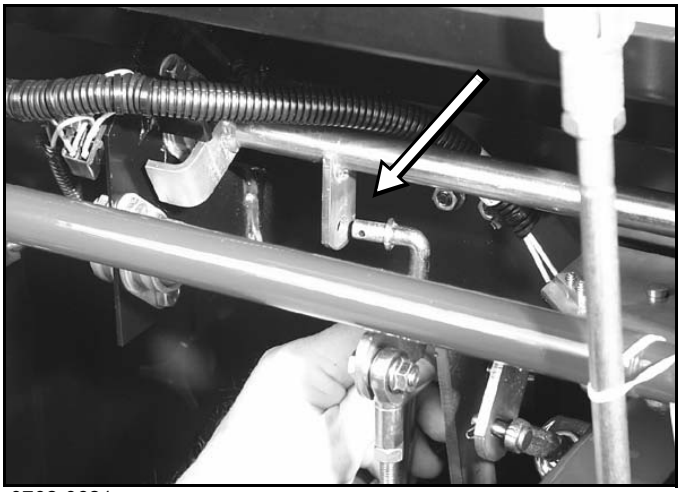


0702-0619



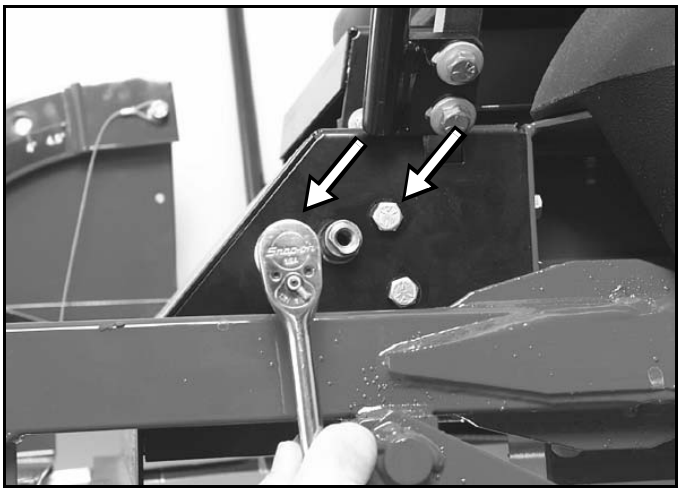
0702-0620

Remove the brake switch.



0702-0621

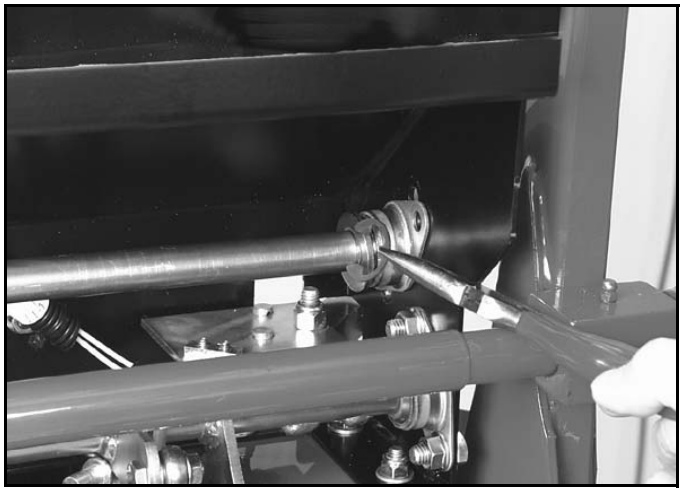
Remove the cotter pin and washer from the brake rod, and remove the rod.



0702-0622

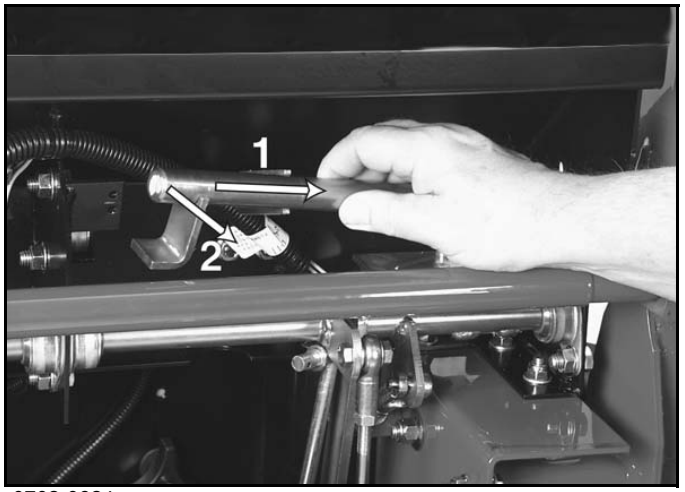
Remove the two bolts and nuts securing the bushing.

Remove the E-clip from the brake shaft.



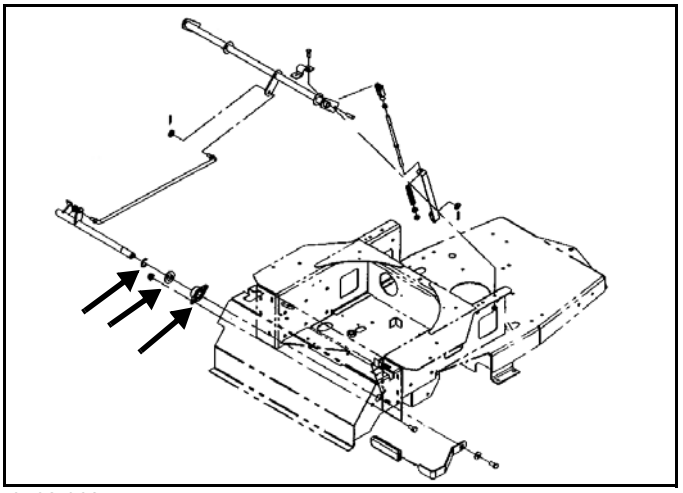
0702-0623

To remove the bellcrank, first slide it to the (operator's) left then down.



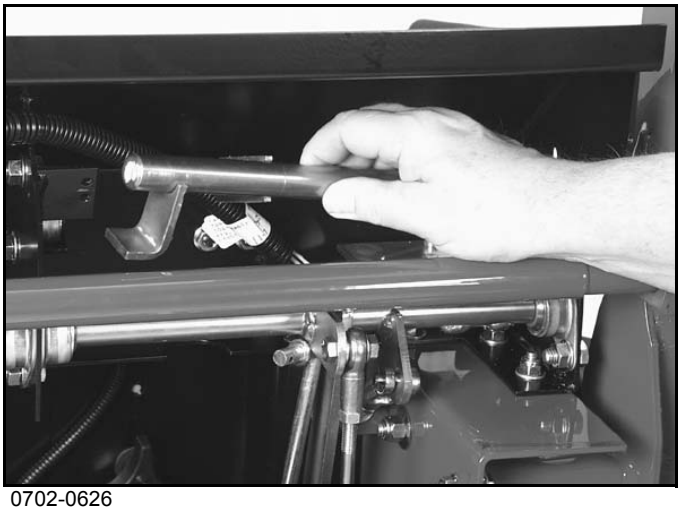
0702-0624

Replace Brake Linkage



0702-0625

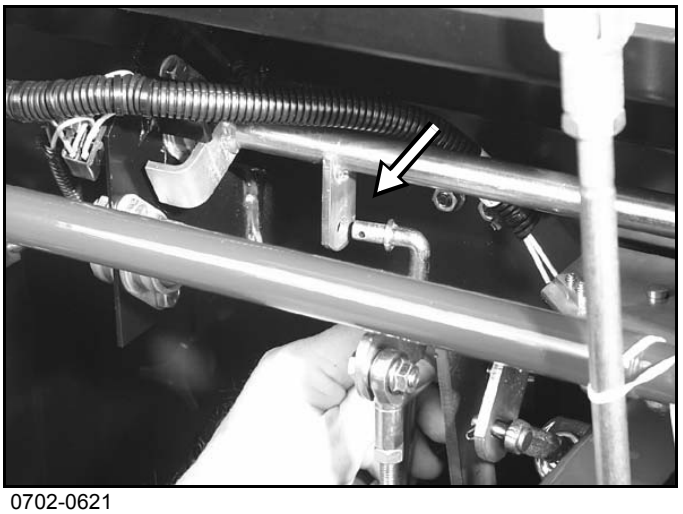
Place bearings, E Ring, and washer on the forward brake shaft.



0702-0626

Position the brake shaft in the console. Secure with nuts and bolts. Install bolts from the outside.

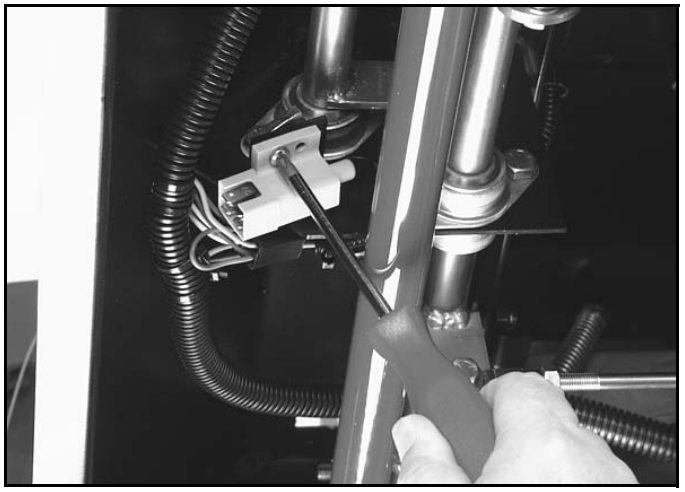
NOTE: Make sure shaft rotates freely after installation.



0702-0621

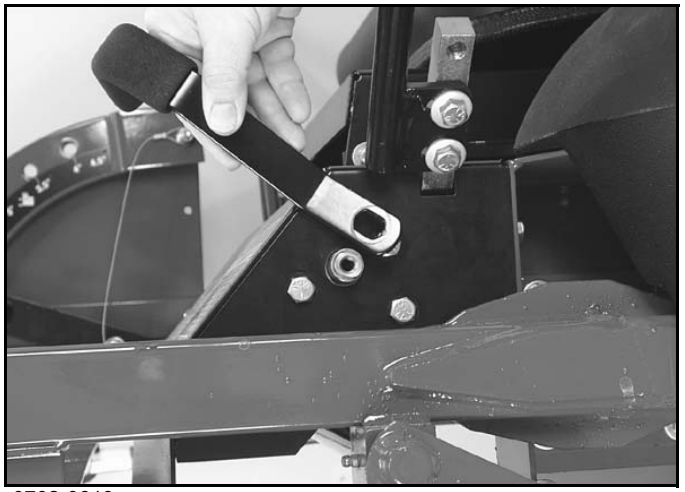
Connect the brake rod to the brake shaft lever. Secure with the cotter pin and washer.

Replace the brake switch and install wiring.



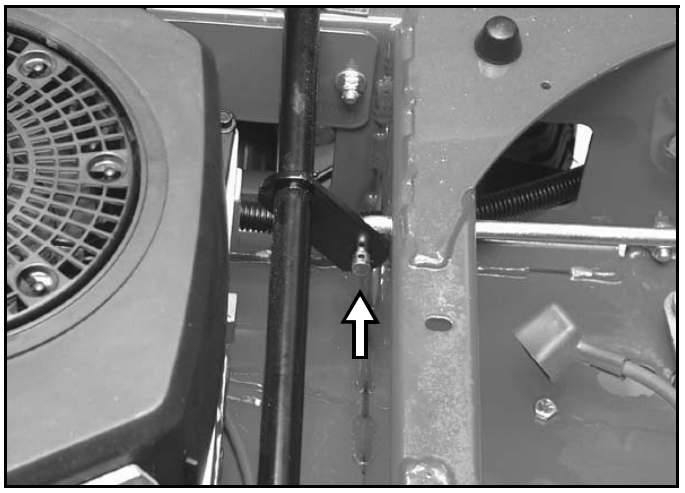
0702-0620

Install the brake handle on the brake shaft.

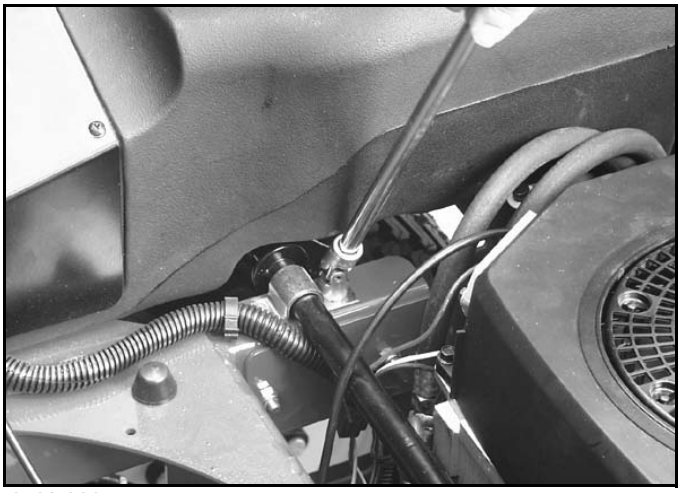


0702-0619

Position the rear brake shaft on the chassis with the upper brake rod through the hole in the lever and secure with a washer and cotter pin.

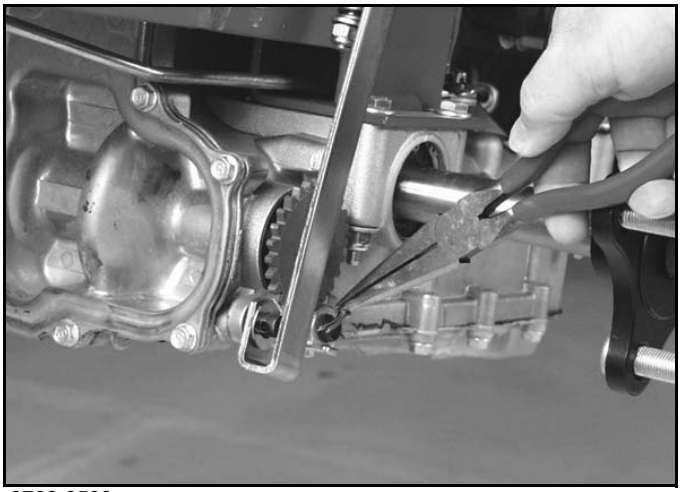


0702-0616



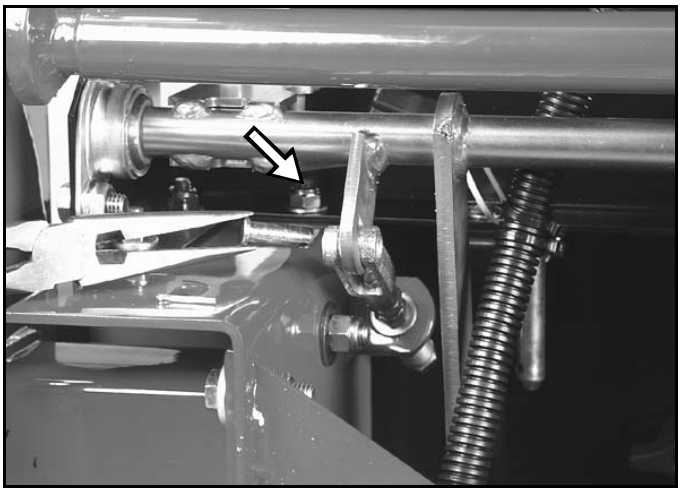
0702-0617

Make sure that the wiring harness is routed below the brake shaft and the throttle cable above. Then secure the brake shaft with the two clamps.



0702-0509

Install the brake links to the brake arms with a washer and cotter pin.



0702-0615

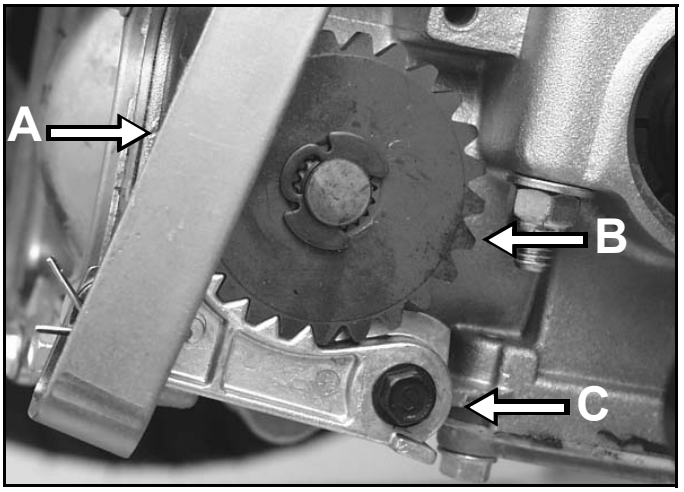
Install the adjustment yokes to the brake shaft levers with clevis pins and hairpins.

Parking Brake Adjustment

The TimeCutter Z is equipped with a cog type parking brake. When the lever is moved to the "on" position, the brake linkage pivots the brake arm engaging the parking brake cog and locking the brake shaft.

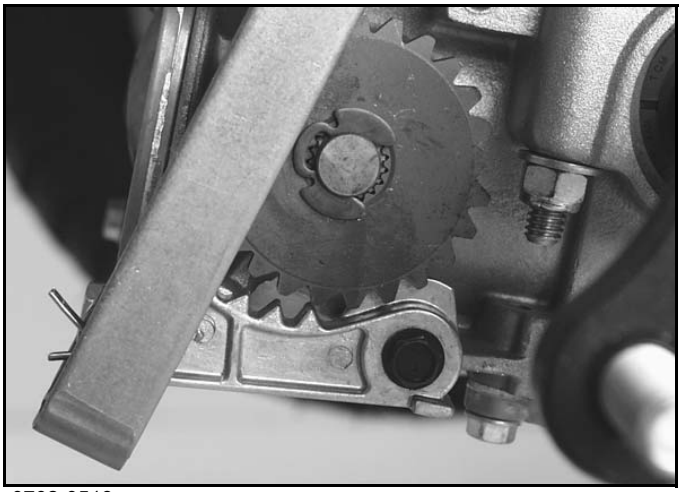
IMPORTANT: Never attempt to engage the parking brake when the unit is moving. When the park brake is disengaged, there must be clearance between the brake arm and the brake cog, or severe damage could occur to the transaxle.

(A) Brake Linkage
(B) Brake Cog
(C) Brake Arm



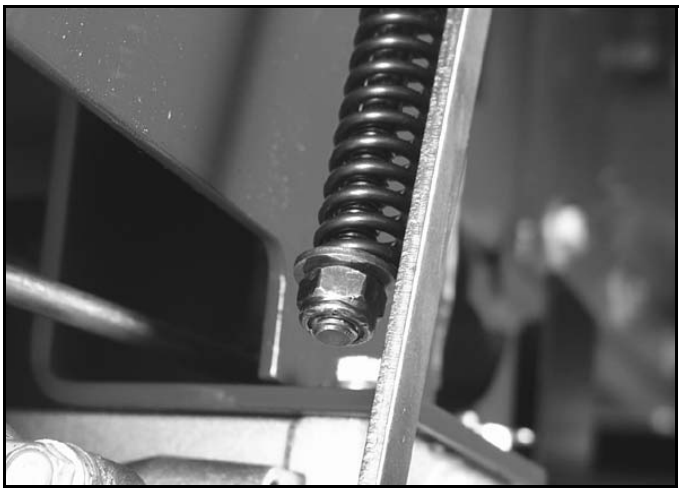
0702-0627

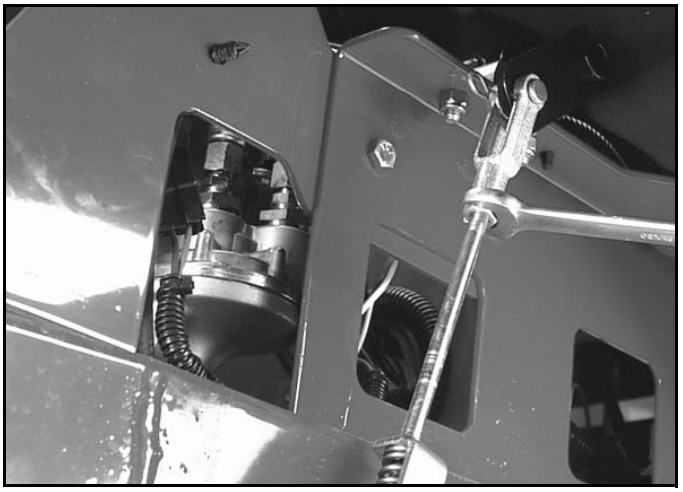
When the parking brake is released, the brake arm pivots away from the brake cog allowing the brake shaft to turn.


0702-0518

The brake arm is held in place by spring tension. The nut at the bottom of the spring should have approximately two threads showing.

NOTE: Do not attempt to adjust the parking brake by turning this nut.


0702-0628



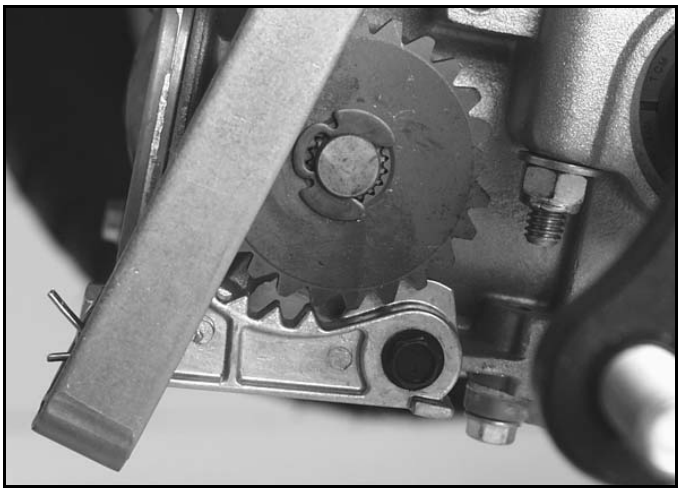
0702-0629

To adjust the parking brake:

1. Loosen the jam nut at the clevis yoke.

0702-0630

2. Remove the clevis pin and turn the yoke to adjust the length of the rod until the brake arm engages and disengages the cog completely.

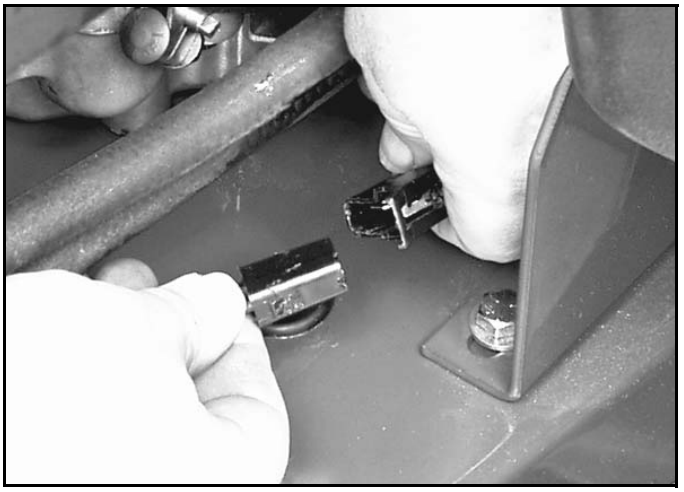


0702-0518

3. Reconnect the brake rod clevis and tighten the jam nut. Recheck to make sure the brake arm clears the teeth of the brake cog when the park brake is disengaged.

Replace Traction Belt

Disconnect the electrical connection for the PTO clutch.



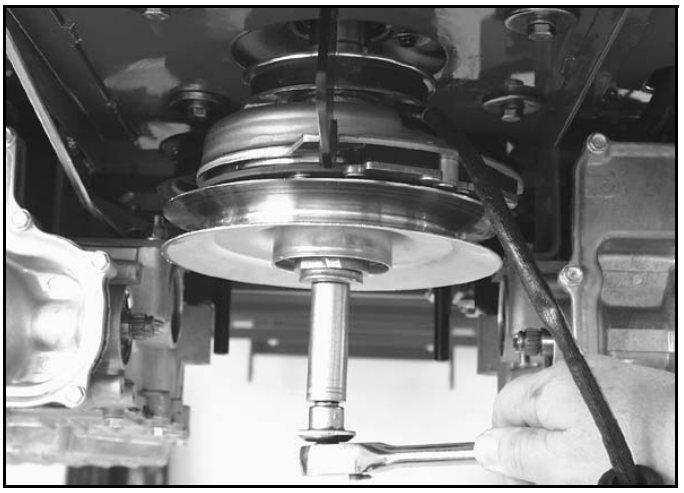
0702-0411

Remove the mower deck drive belt from the left side pulley and clutch pulley.

Place the rear of the unit on jack stands.

0702-0417

Remove the PTO clutch bolt and the electric clutch assembly.



0702-0631

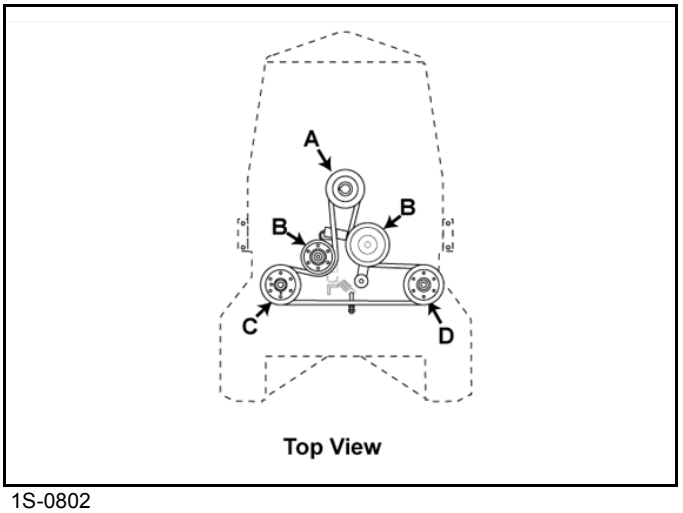
0702-0632

Remove traction drive belt.

Move the idler pulley to lessen the tension on the traction drive belt and slip the belt up off the engine drive pulley.

0702-0512

Remove the traction belt from the transaxle pulleys.



1S-0802

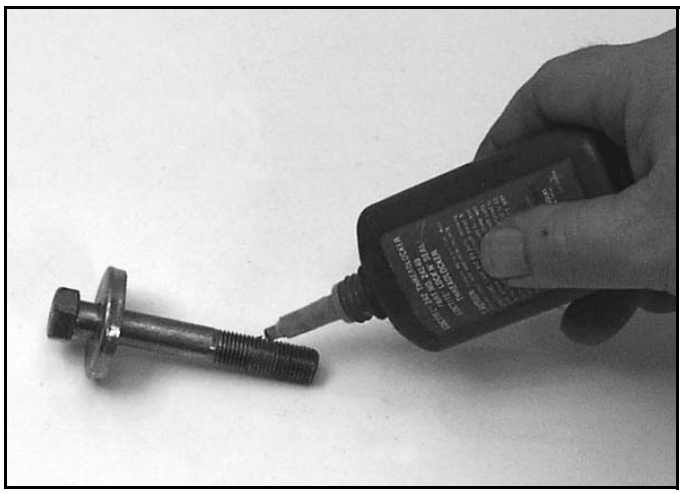
Install the traction belt following the belt routing.

Reconnect the idler bracket spring and tighten the eye bolt.

(A) Engine Pulley
(B) Idler Pulley
(C) Right Hydro
(D) Left Hydro

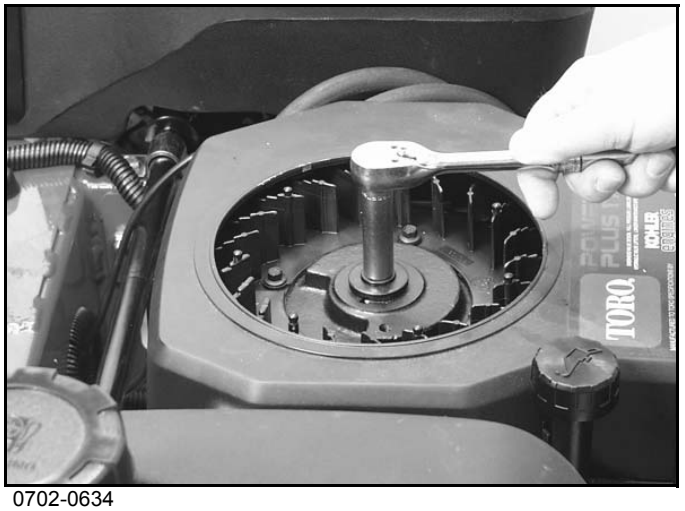
Reinstall the electric PTO clutch; apply Loctite 271 to the bolt.

Torque the clutch bolt to 50 - 60 ft. lbs. (68.3 - 81.8 N·m).



0702-0633

It will be necessary to remove the flywheel screen and hold the flywheel nut to achieve proper torque.



0702-0634

QUICK REFERENCE SECTION

SERVICE SECTION

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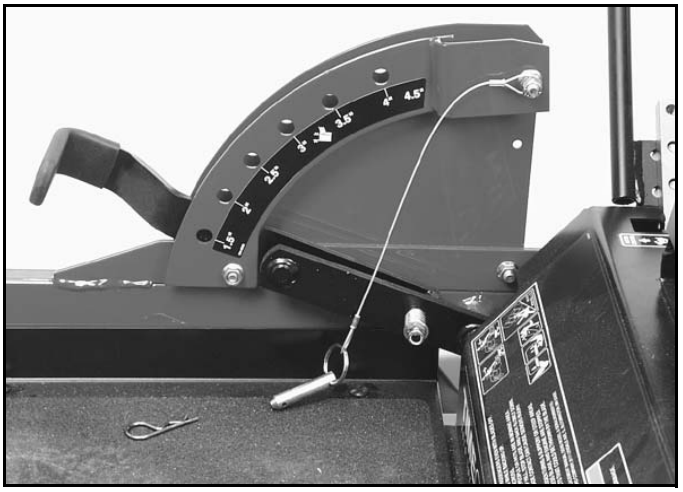
Belt Removal and Replacement



0702-0701

Place the deck height lever in its lowest position.


0702-0702

Remove the pulley covers.

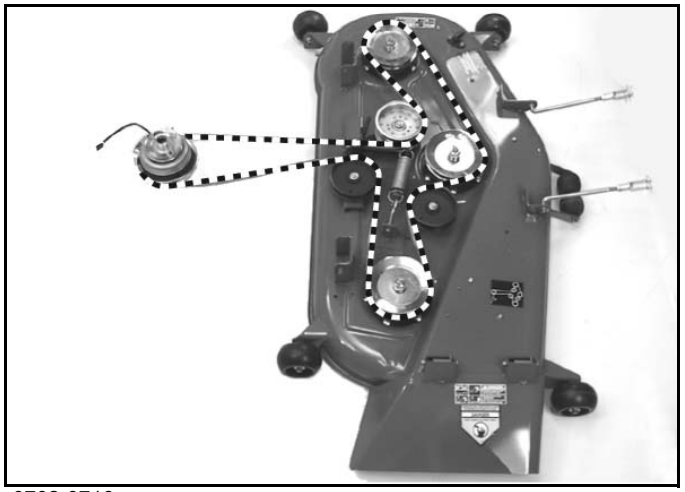

0702-0703

Remove the hairpin and washers on left and rear mower (pork chop) bracket.

Place a length of 3/4” pipe over the idler pulley rod and remove the belt tension. Remove the belt from the pulley.

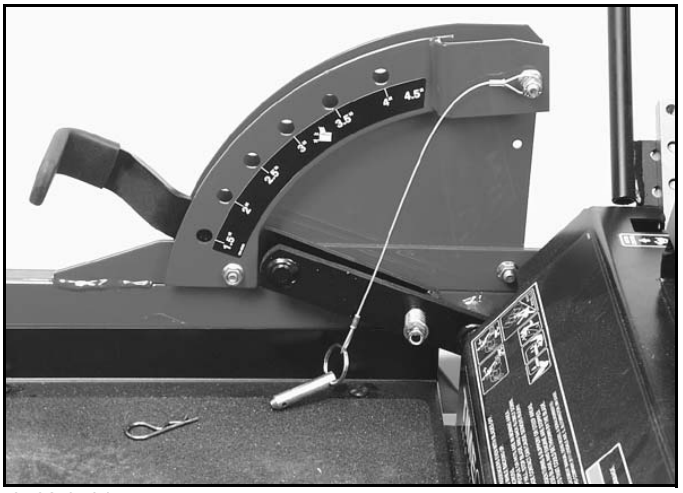
0702-0417

Reverse the steps above to reassemble. Route the drive belt as shown.



0702-0716

Mower Deck Remove and Replace



0702-0701

Place the mower deck in its lowest position.

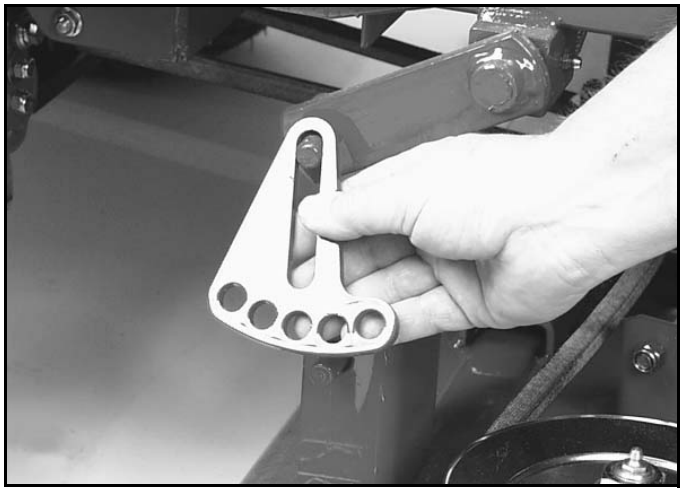
0702-0702

Remove the pulley covers.

0702-0417

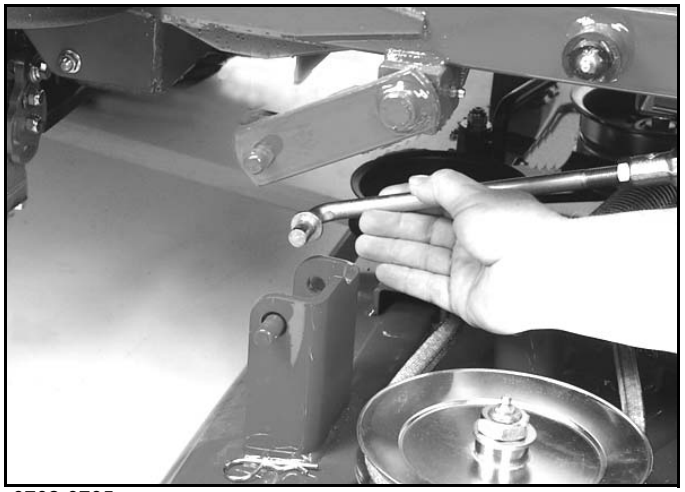
Remove the belt as described in this section.

Remove the mower (pork chop) brackets.



0702-0704

Remove the rear trunion rods.



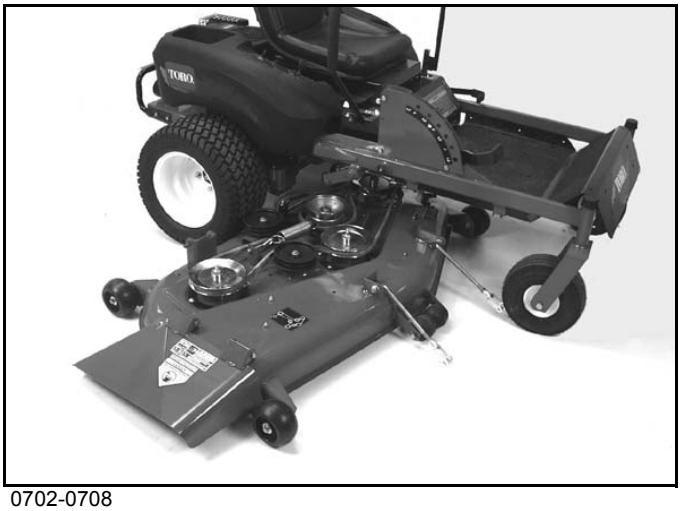
0702-0705

Remove the front trunion rods.

0702-0706

0702-0707

Tie the rear trunion rods to the frame.



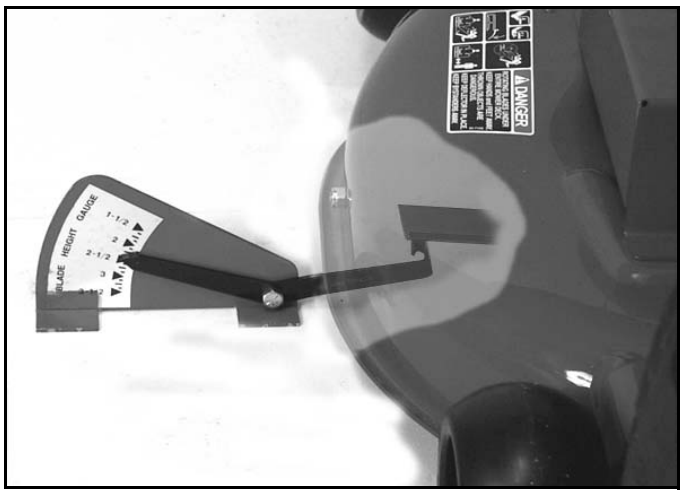
0702-0708

Slide the deck out from under the right side of the unit.

Mower Deck Side to Side Adjustment

Place the unit on a level surface. Check and adjust the tire pressure, if necessary.

Raise the deck to the 3" (7.6 cm) position. Use a blade height gauge to measure the distance between the blade tips and the surface on both sides of the deck.



0702-0725

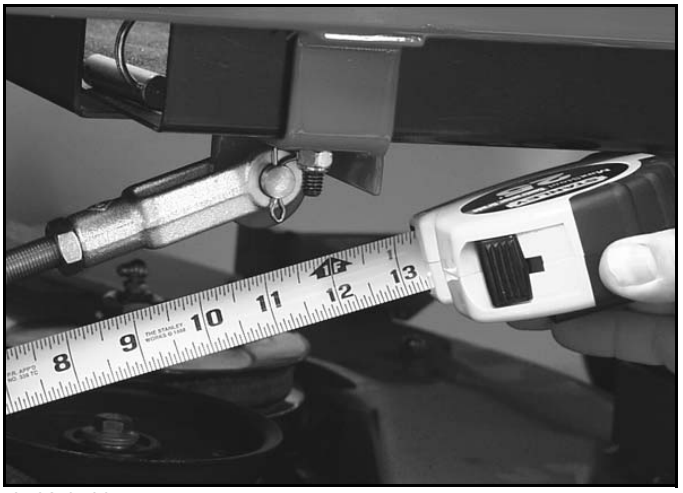
If the difference is greater than 3/16” (4.72 mm), adjustment is required.

1. Remove the spring clip and washers from the pork chop bracket.
2. Rotate the bracket toward the front to lower, or toward the rear to raise that side of the deck.
3. Replace the spring clip.

NOTE: Each adjustment hole changes the dimension by 1/8 inch.

0702-0703

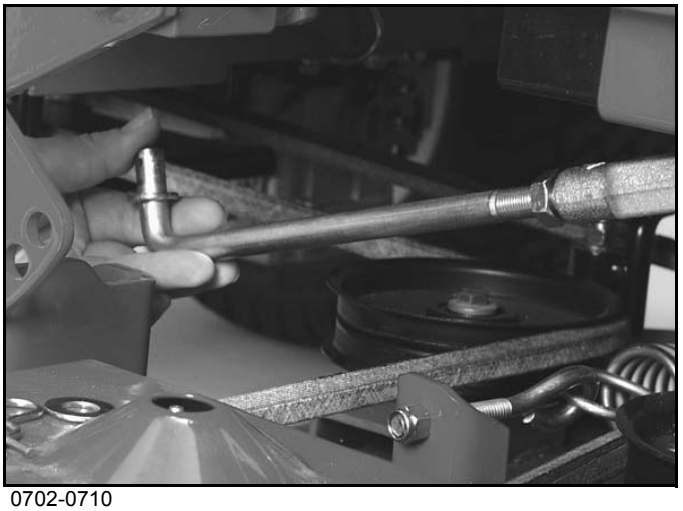
Mower Deck Front to Rear Adjustment



0702-0709

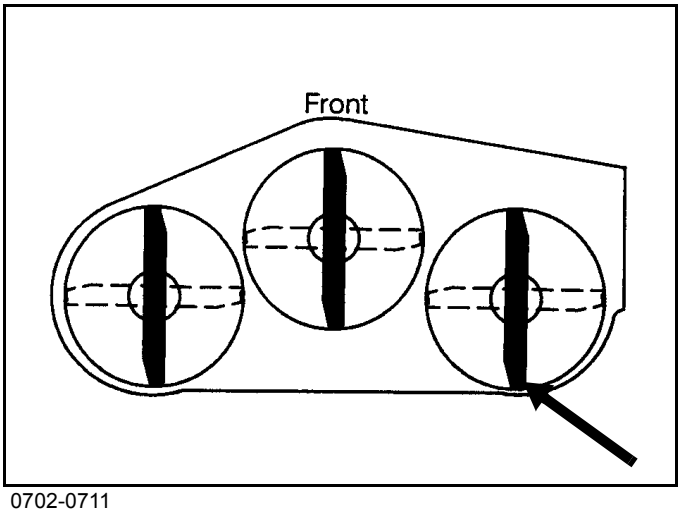
Place the unit on a level surface. Check and adjust the tire pressure, if necessary.

Measure the length of the rear trunion rods. The distance between centers should be 11.5” (29.3 cm).



0702-0710

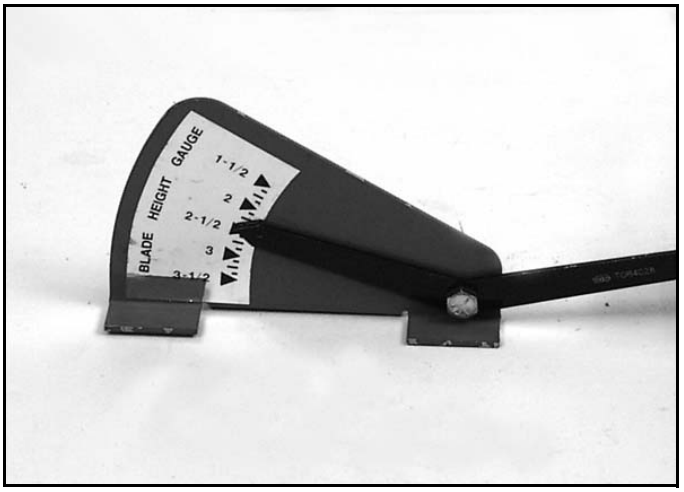
If necessary, loosen the jam nut. Remove the spring clip and washer, and turn the rod to achieve the correct length.



0702-0711

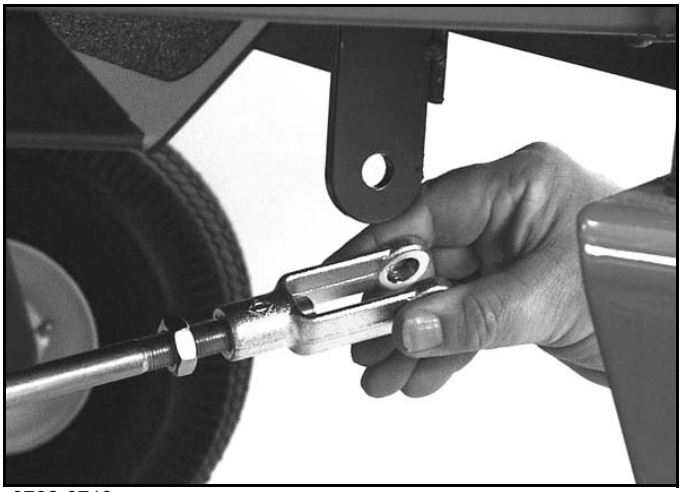
Reinstall the trunion rods and raise the deck to the 3” (7.6 cm) position. Rotate the blades until the ends face forward and backward.

Use a blade height gauge to measure the blade height at the front of the center blade and at the rear of the side blades.

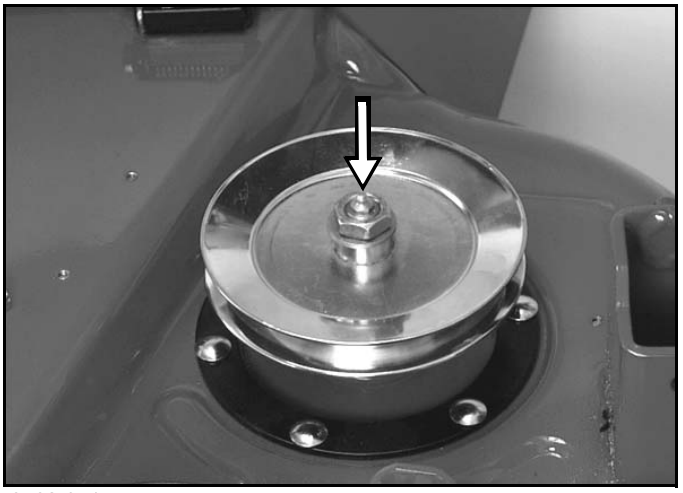


0702-0712

Adjust the front trunion rods until the front blade tip is 1/16” - 5/16” (1.6 - 7.9 mm) lower than the rear. Tighten the jam nuts.


0702-0713

Spindle Bearing Replacement

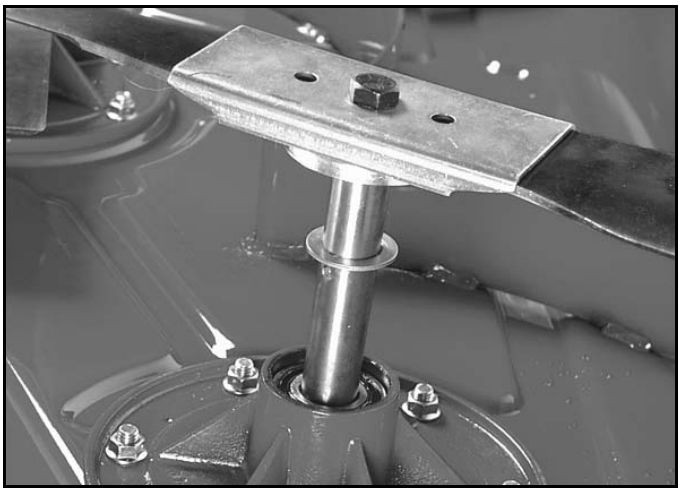


0702-0714

Remove the nut and washer securing the spindle pulley.

0702-0726

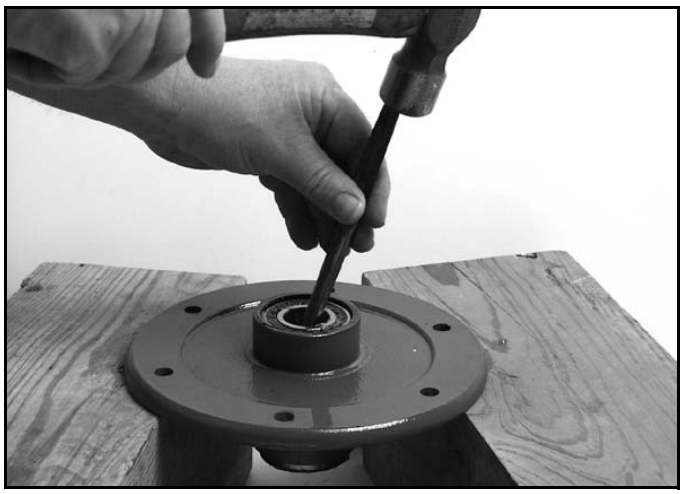
Slide the pulley off the shaft.



0702-0715

Remove the shaft, washer, and blade assembly from the spindle housing.

Remove the spindle housing assembly from the deck. Use a long punch to drive the bearings from the spindle housing.



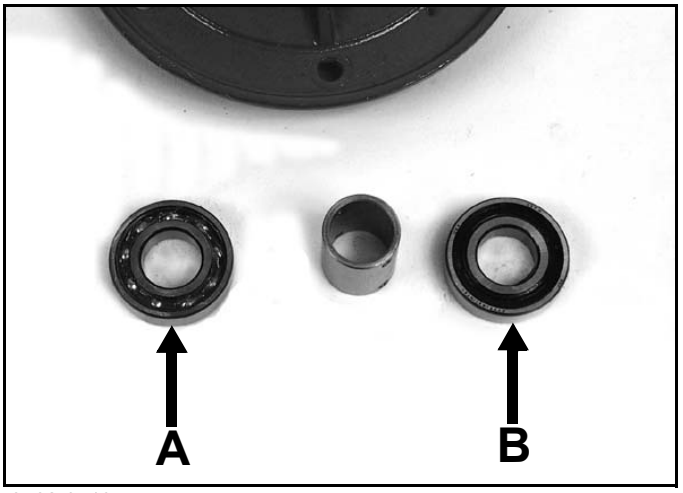
0702-0717

There is a spacer between the two bearings.

0702-0718

The spindle housing assembly consists of a casting, two bearings, and a spacer.

0702-0720



0702-0719

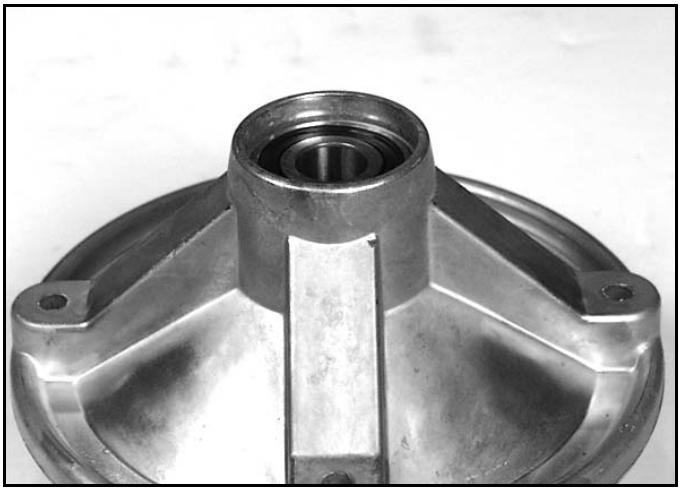
During reassembly of the spindle housing, install the bearings with the shield to the outside.

(A) Open Side
(B) Shielded Side

0702-0727

On 52” decks, the bearings are a line to line fit in the spindle housings and can be installed by hand.

On 44” decks, the bearings must be installed with a press.



0702-0721

On the blade side of the spindle housing, locate the bearing flush with the counterbore.

Install the spacer between the two bearings.

0702-0722

On the pulley side of the spindle housing, the bearing is located flush with the top of the bore.

0702-0723

Grease bearings with #2 lithium base grease.

0702-0724

QUICK REFERENCE SECTION

SERVICE SECTION

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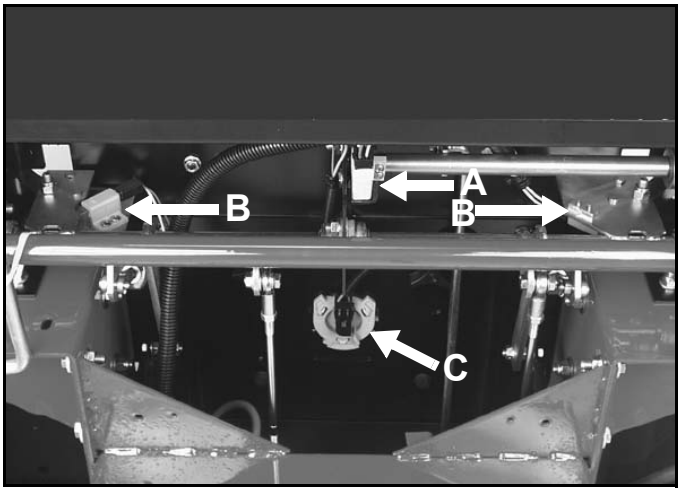


0702-0801

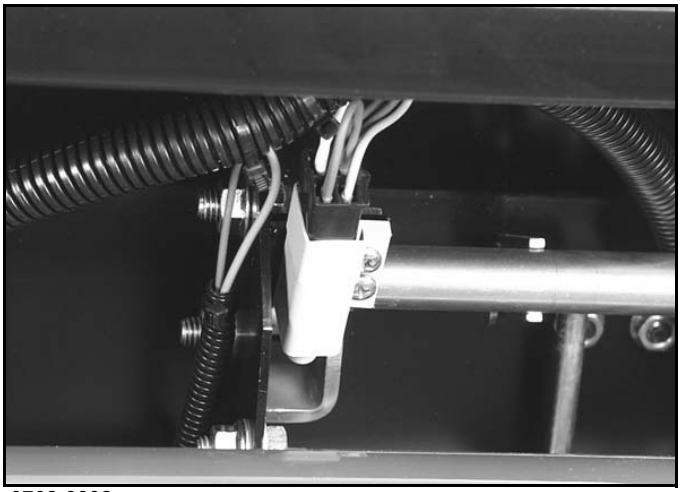
Interlock Components

The safety interlock system consists of a series of switches which prevent the unit from starting unless:

- The parking brake is engaged.
- The PTO switch is in the off position.
- The motion control handles are in the neutral lockout position.

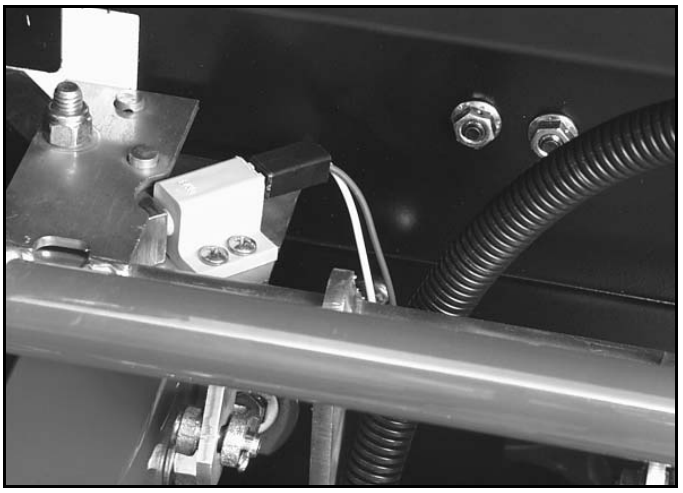
There is also a kill relay which de-energizes and stops the engine if the motion control handles are pulled in while the parking brake is engaged.

(A) Brake Switch
(B) Neutral Switch
(C) Seat Switch


0702-0802

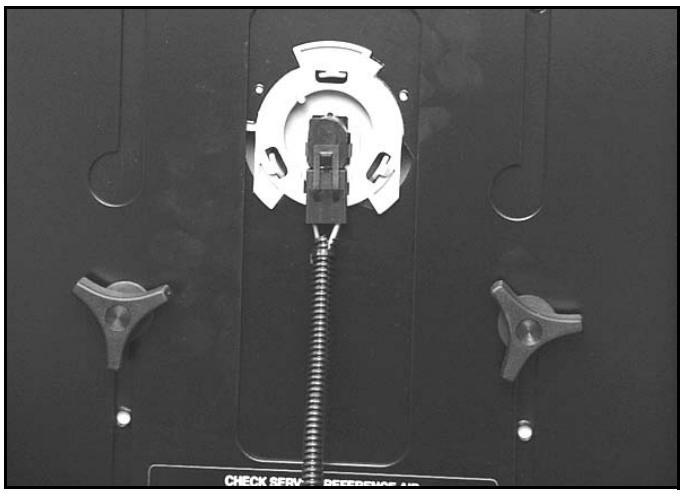
There are two pair of contacts in the brake switch. One pair (gray and violet) is wired in series with the PTO switch. When the PTO switch is in the off position, power from the “I” terminal of the ignition switch flows through the PTO switch, then through this pair of brake switch contacts to energize the kill relay.

The second pair of contacts (yellow and violet) are wired in series with the seat switch. When the operator is on the seat, power from the “X” terminal of the ignition switch flows through the seat switch, then through this pair of contacts to energize the kill relay.


0702-0803

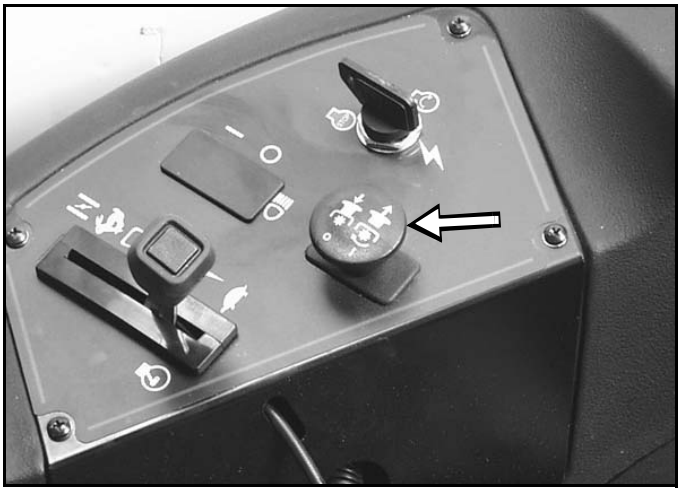
The neutral switch contacts are closed when the motion control handles are in the out position which locks them in the neutral position.

The seat switch is closed when the operator is on the seat.



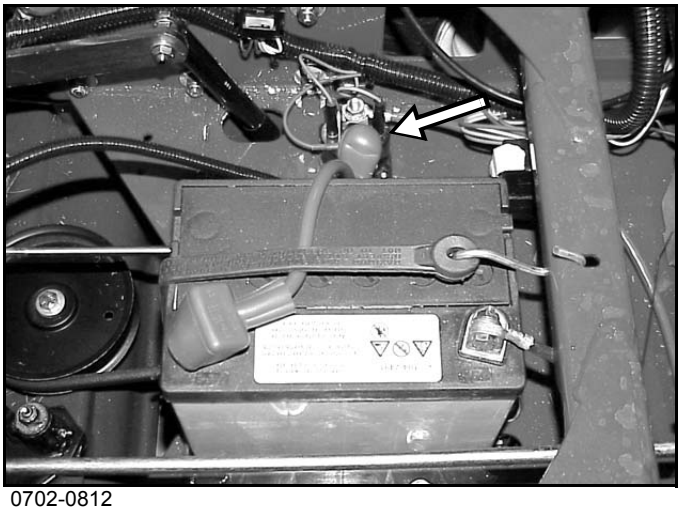
0702-0804

Electrical Components



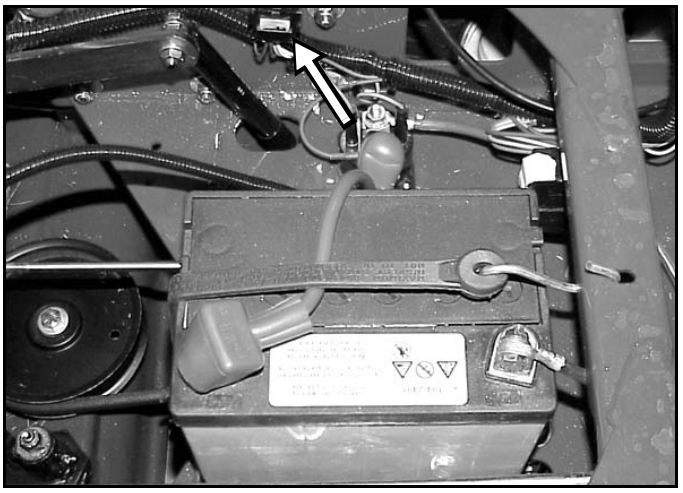
0702-0805

The PTO switch routes power to the electric clutch when in the on position and to the kill relay through the brake switch when in the off position.



0702-0812

The start solenoid connects the battery to the starter motor.

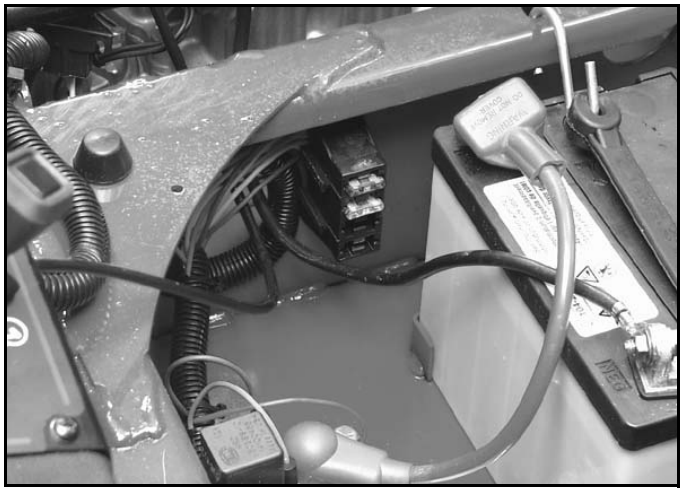


0702-0812

The kill relay connects the engine magneto to ground whenever it is not energized.

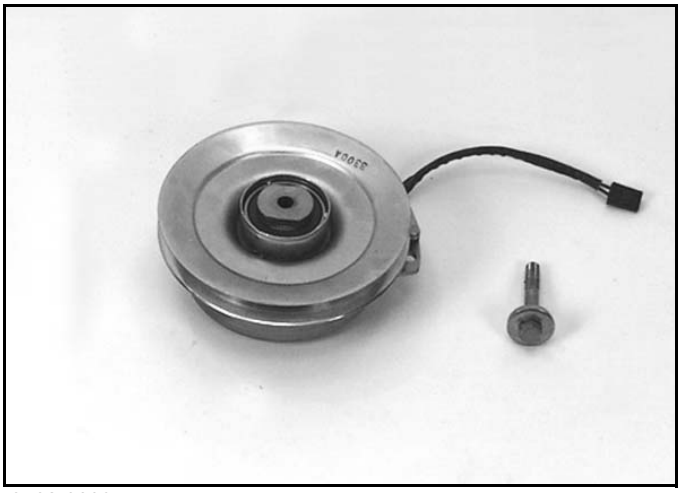
There are two fuses in the system:

- The 30 amp fuse is in the main power supply from the battery.
- The 25 amp fuse is in the battery charge circuit.



0702-0808

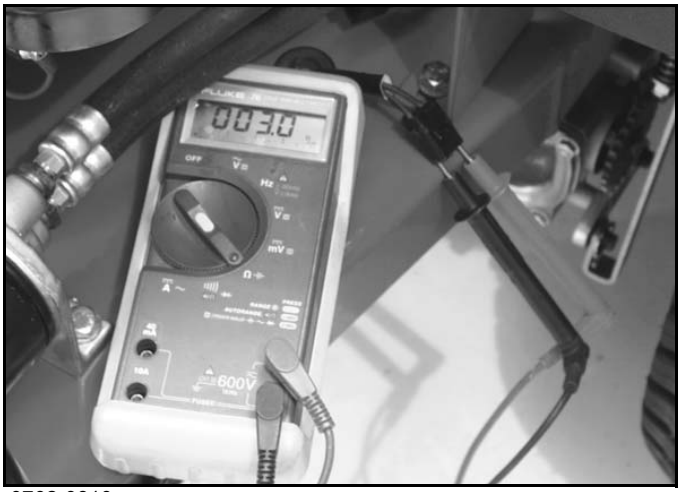
Electric Clutch



0702-0809

The TimeCutter Z is equipped with a Warner electric clutch. The clutch is not serviceable.

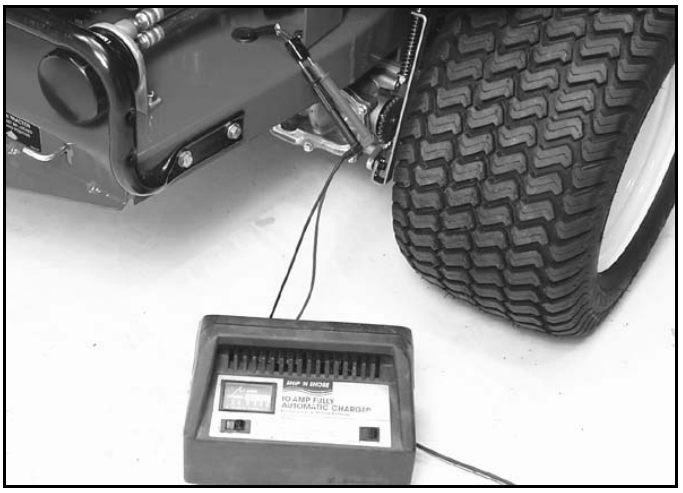
There are two tests used to determine if the clutch is faulty.



0702-0810

Measure the resistance across the clutch plug terminals.

The resistance should be 2.9 ohms ± 20%.

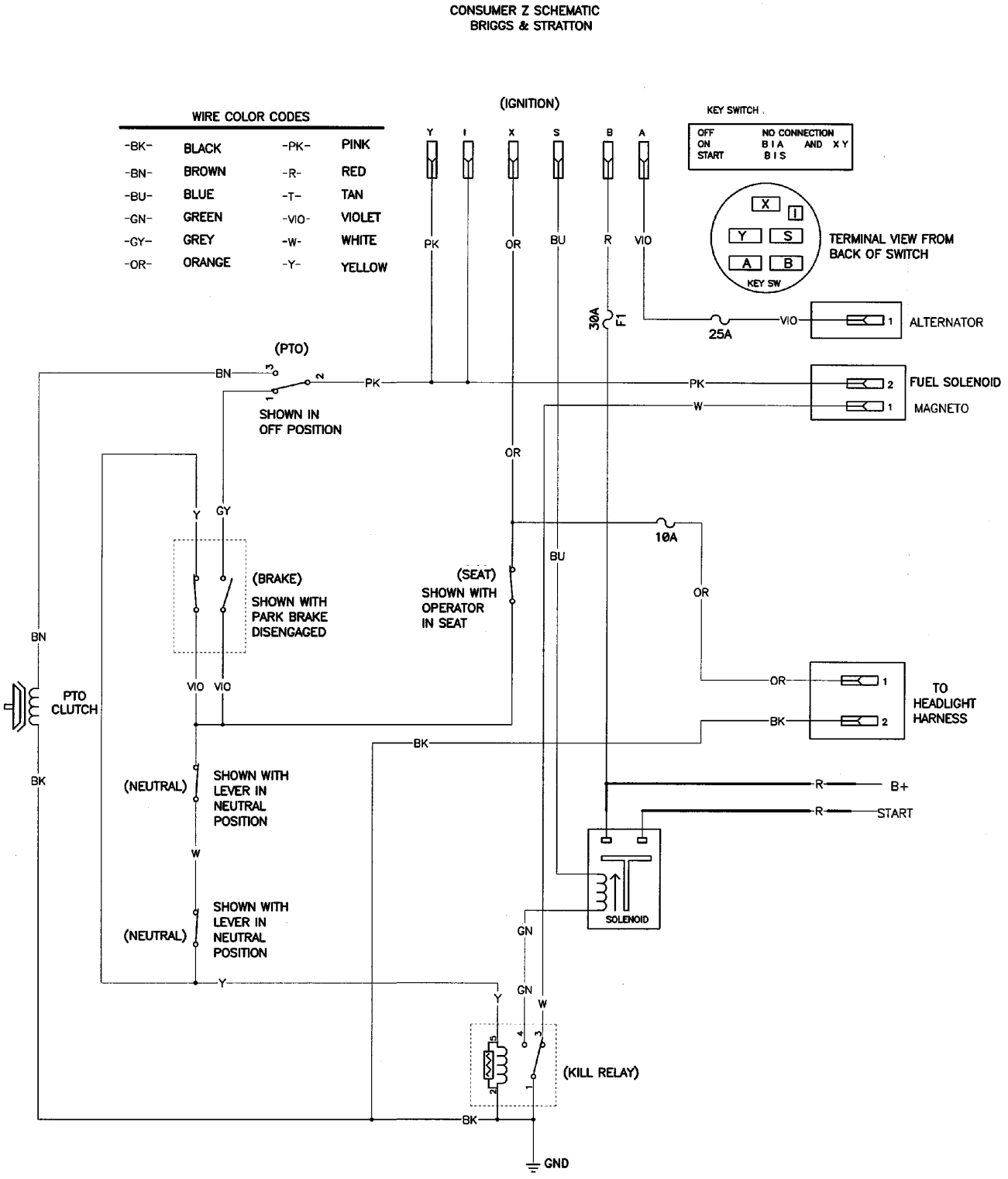


0702-0811

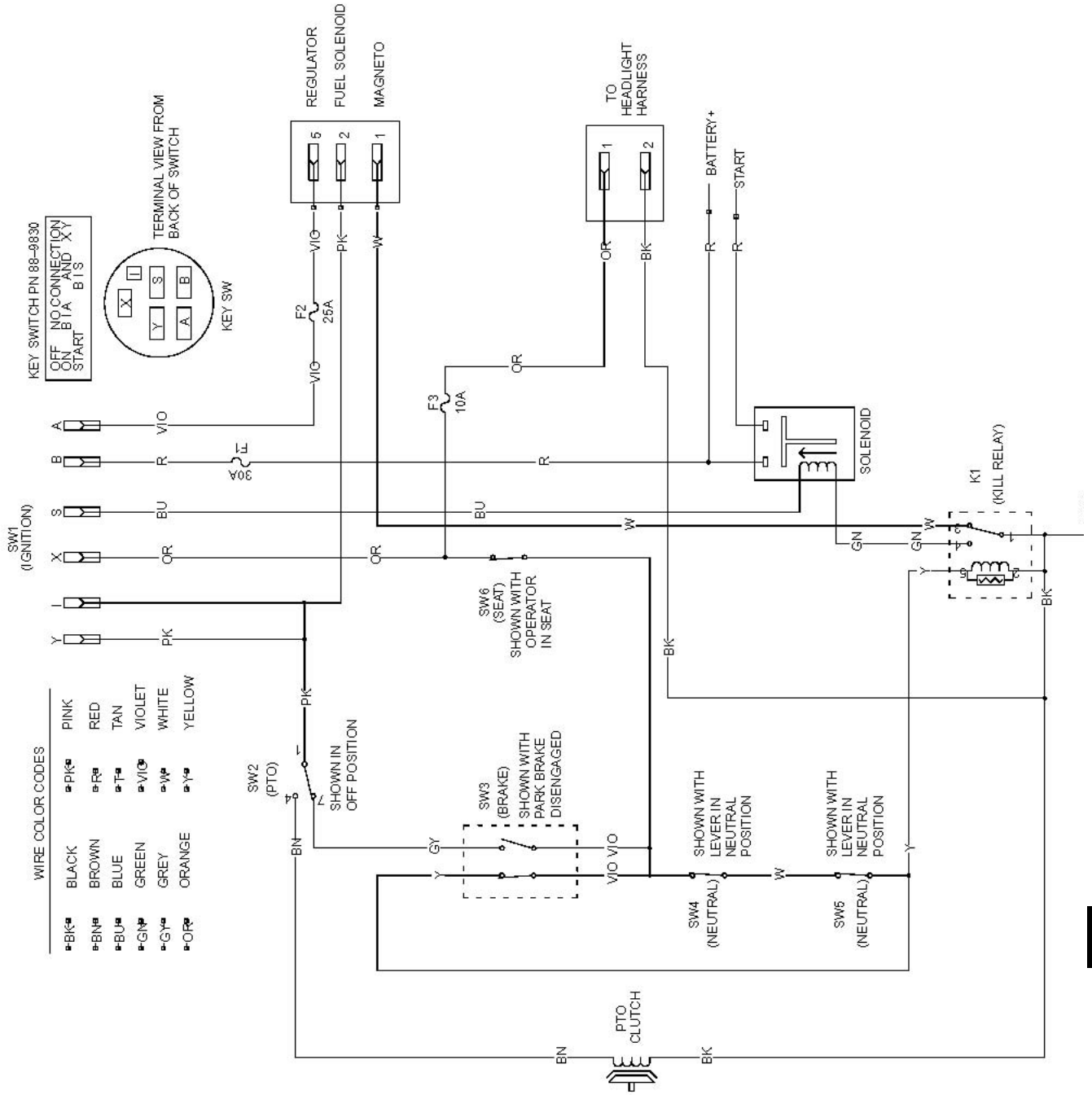
Connect a 12 volt power source across the clutch plug. The clutch should click when it engages.

The clutch uses a magnetic brake to stop the mower blades when disengaged. Test this function when mounted on the vehicle, with mower installed. Blade stopping time should be 3 seconds or less.

Electrical Schematic - Briggs & Stratton



Electrical Schematic - Kawasaki



Electrical Schematic - Kohler