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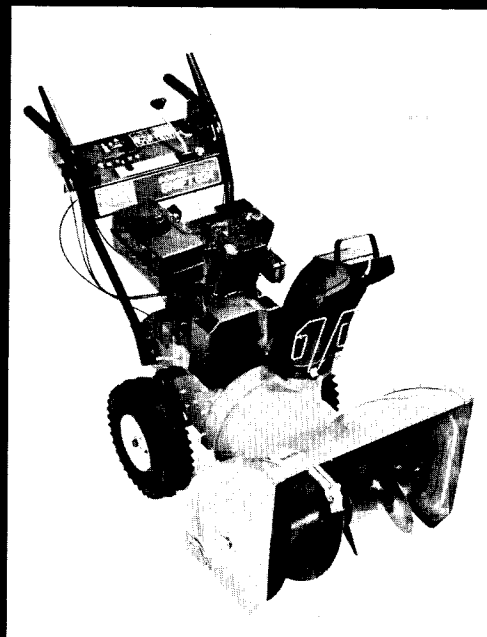
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TORO®

Power Shift
Snowthrower
**SERVICE
MANUAL**



ABOUT THIS MANUAL

This service manual was written expressly for the Toro 624, 824, 828 and 1132 Power Shift Snowthrowers. The Toro Company has made every effort to make the information in this manual complete and correct.

This manual was written with the service technician in mind. It is organized so that information used most often is up front. As a result, you will find reference information on safety, identification, specifications, special tools, troubleshooting and maintenance, all in the front third of the manual.

Disassembly, inspection and reassembly procedures are covered in the last two-thirds of the manual and are grouped by component. We tried to cover each common repair with its own section or sub-section. For example, you will find that auger service and auger gearbox service are addressed separately.

And, because the Power Shift Snowthrower is a relatively complex machine, most sections will include some component theory. This information can be found at the front of each service procedure section.

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

**The Toro Company
8111 Lyndale Avenue South
Minneapolis, MN 55420**

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

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SAFETY INSTRUCTIONS



Servicing of any outdoor power equipment requires care and common sense to prevent injury. "CAUTION" statements have been placed throughout this manual to enhance safety. Whenever you encounter the word CAUTION - Read the instruction because it has to do with safety. Failure to comply with the instruction may result in personal injury or death.

This manual is intended as a service and repair manual only. The safety instructions provided in this manual are for the troubleshooting and service of the product only. The individual Operator's Manuals will contain safety information on the operation of the Power Shift Snowthrowers.

Operator's Manuals with complete operational safety instruction are available through:

The Toro Company
Publications Department
8111 Lyndale Avenue South
Minneapolis, MN 55420 U.S.A.

FOR YOUR SAFETY . . .

Avoid electrocution...

Always use a grounded three wire plug and cord when starting or troubleshooting a snowthrower equipped with and electric starter.

Avoid possible fires and explosions...

Use a container designed for gasoline. Avoid spilling gasoline and never smoke while working around gasoline.

Avoid fires and falls...

Wipe up any spilled fuel or oil.

Avoid lacerations and amputations...

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

Avoid burns...

Do not touch engine while running or shortly after running.

Avoid falls...

Do not operate snowthrower at fast speeds on slippery surfaces.

Avoid asphyxiation...

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

Avoid possible eye injuries...

Wear eye protection when working with springs or cables.

Avoid unexpected starting of engine...

Always turn off key and disconnect spark plug wire before attempting any cleaning, adjustment or repair.

Avoid accidental misuse of fuel...

Always store fuel in a container designed for gasoline that is properly labeled.

Avoid possible injury due to inferior parts...

Use only Toro original parts to insure that important safety criteria are met.

Avoid injury to bystanders...

Always clear area of bystanders before starting or testing a snowthrower.

IDENTIFICATION

Model and Serial Numbers

The snowthrower itself has two identification numbers: a model number and a serial number. The two numbers are stamped on a decal which is located on back of the engine mounting plate. These numbers are required whenever a warranty claim is being filed on a Toro part.

Each engine also has a model and serial number. Consult the engine manufacturers manual for the location of these numbers. Engine model and serial number must be included on warranty claims related to a failed engine component. This applies even when the claim is being filed to The Toro Company.

SPECIFICATIONS MODELS 38500 AND 38505

Mitsubishi Powered 624 - Engine Specifications*

Item	Specification
Manufacturer	Mitsubishi
Type	4-stroke, side valve, gasoline
Rated Horsepower	6 HP
Engine Speed (fast no load)	4000 \pm 150 rpm
Carburetor Type	float
Choke	manual
Primer	yes
Throttle Control	yes, mounted on engine
Ignition Type	electronic
Fuel	unleaded gasoline (no methanol and not more than 10% ethanol)
Fuel Tank	3.8 liters (4 quarts)
Recommended Oil	SAE 5W30 or SAE10, API rating SE or SF
Oil Capacity	0.56 liters (19 oz)
Spark Plug	NGK BP-4HS [set gap to 0.72 mm (.028")]

* For more engine specifications, see Toro Gas Consumer Gas Engine Specification Manual or the engine manufacturer's service manual.

Mitsubishi Powered 624 - Product Specifications

Transmission

Item	Specification
Manufacturer	Toro
Type	gearbox, 4 forward, 2 reverse gears
Input Drive	pulley/belt
Output Drive	chain
Recommended Lubricant	Lubriplate® Mag 1
Lubricant Capacity	0.43 liters (14.5 oz)
First Forward Gear at fast throttle	0.88 kph (0.55 mph)
Second Forward Gear	2.09 kph (1.30 mph)
Third Forward Gear	3.22 kph (2.00 mph)
Fourth Forward Gear	4.67 kph (2.90 mph)
First Reverse Gear	2.09 kph (1.30 mph)
Second Reverse Gear	3.22 kph (2.00 mph)

SPECIFICATIONS MODELS 38500 AND 38505

Mitsubishi Powered 624 - Product Specifications (cont'd)

Auger

Item	Specification
Housing Width	61.0 cm (24")
Housing Height	53.3 cm (21")
Diameter	35.6 cm (14")
Flights	two, 8.89 cm (3.5") deep [38505 serrated]
Gearbox Speed Reduction	10:1
Gearbox Lubricant	SAE 90 EP gear oil, API rating of GL-5 or GL-6
Gearbox Capacity	0.133 liters (4.5 oz)
Speed at 4000 rpm	126 rpm

Impeller

Item	Specification
Diameter	30.5 cm (12")
Blades	three
Throwing Capacity, mass--distance	773 kg/min (1700 lbs/min) -- 12.2 m (40 ft)
Stopping Time	less than five seconds

Chute

Item	Specification
Throat Diameter	14.0 cm (5.5")
Angle of Rotation	200°
Deflector Angle of Tilt	75°

Rear Suspension

Item	Specification
Standard	pivoting axle
Optional	pivoting axle with differential

Wheel and Tires

Item	Specification
Type	low pressure pneumatic, with tube
Diameter	35.6 cm (14.00")
Width	10.2 cm (4.00")
Tread	self cleaning lug type

SPECIFICATIONS MODELS 38500 AND 38505

Mitsubishi Powered 624 - Product Specifications (cont'd)

Wheels and Tires (cont'd)

Item	Specification
Track Width	61.0 cm (24")
Tire Pressure	.5 to 1.0 kg/cm ² (7 to 15 psi) [must be equal on both sides]

Dimensions

Item	Specification
Length	138.4 cm (54.5")
Width	63.4 cm (25.0")
Height	104.1 cm (41.0") [handle height 91.4 cm (36.0")]
Weight	100 kg (220 lbs)

Accessories

Item	Part Number
Tire Chain Kit	56-2700
Snow Cab	66-6200 or 68-9500
Drift Breaker	66-7960
Light Kit	66-7950
Differential Kit	38038
Snowthrower Cover	66-6660

Mitsubishi Powered 624 - Torque Specifications

Fastener	Torque
Traction Gear Case Screws	1.38 kg m (120 in lbs)
Chain Guard Screws	0.12 kg m (10 in lbs)
Pivot Arm Shoulder Bolts	3.45 kg m (300 in lbs)
Auger Gearbox Screws	1.38 kg m (120 in lbs), note tightening order, page 73
Impeller Shaft Set Screws	2.36 kg m (205 in lbs)
Impeller Lever Screw	0.12 kg m (10 in lbs)
Control Box Nuts	1.84 kg m (160 in lbs)
Belt Guide Screws	0.81 kg m (70 in lbs)

SPECIFICATIONS MODELS 38510 AND 38513

Tecumseh Powered 624 - Engine Specifications*

Item	Specification
Manufacturer	Tecumseh
Type	4-stroke, side valve, gasoline
Rated Horsepower	6 HP
Engine Speed (fast no load)	3300 \pm 150 rpm
Carburetor Type	float
Choke	manual
Primer	yes
Throttle Control	yes, engine mounted
Ignition Type	electronic
Fuel	unleaded gasoline (no methanol and not more than 10% ethanol)
Fuel Tank	3.8 liters (4 quarts)
Recommended Oil	SAE 5W30 or SAE10, API rating SE or SF
Oil Capacity	0.56 liters (19 oz)
Spark Plug	Champion RJ-17LM or Autolite AR7N [set gap to 0.76 mm (0.030")]

* For more engine specifications, see Toro Gas Consumer Gas Engine Specification Manual or the engine manufacturer's service manual.

Tecumseh Powered 624 - Product Specifications

Transmission

Item	Specification
Manufacturer	Toro
Type	gearbox, 4 forward, 2 reverse gears
Input Drive	pulley/belt
Output Drive	chain
Recommended Lubricant	Lubriplate® Mag 1
Lubricant Capacity	0.43 liters (14.5 oz)
First Forward Gear at fast throttle	0.88 kph (0.55 mph)
Second Forward Gear	2.09 kph (1.30 mph)
Third Forward Gear	3.22 kph (2.00 mph)
Fourth Forward Gear	4.67 kph (2.90 mph)
First Reverse Gear	2.90 kph (1.30 mph)
Second Reverse Gear	3.22 kph (2.00 mph)

SPECIFICATIONS MODELS 38510 AND 38513

Tecumseh Powered 624 - Product Specifications (cont'd)

Auger

Item	Specification
Housing Width	61.0 cm (24")
Housing Height	53.3 cm (21")
Diameter	35.6 cm (14")
Flights	two, 8.89 cm (3.5") deep [38513 serrated]
Gearbox Speed Reduction	10:1
Gearbox Lubricant	SAE90 EP gear oil, API rating of GL-5 or GL-6
Gearbox Capacity	0.133 liters (4.5 oz)
Speed at 3400 rpm	125 rpm

Impeller

Item	Specification
Diameter	30.5 cm (12")
Blades	three
Throwing Capacity, mass-distance	773 kg/min (1700 lbs/min) -- 12.2 m (40 ft)
Stopping Time	less than five seconds

Chute

Item	Specification
Throat Diameter	14.0 cm (5.5")
Angle of Rotation	200°
Deflector Angle of Tilt	75°

Rear Suspension

Item	Specification
Type	pivoting axle
Optional	pivoting axle with differential

Wheel and Tires

Item	Specification
Type	low pressure, pneumatic, with tube
Diameter	35.6 cm (14.00")
Width	10.2 cm (4.00")
Tread	self cleaning, lug tread

SPECIFICATIONS MODELS 38510 AND 38513

Tecumseh Powered 624 - Product Specifications (cont'd)

Wheels and Tires (cont'd)

Item	Specification
Track Width	61.0 cm (24") to outside of tires
Pressure	.5 to 1.0 kg/cm ² (7 to 15 psi) [must be equal on both sides]

Dimensions

Item	Specification
Length	138.4 cm (54.5")
Width	63.5 cm (25.0")
Height	104.1 cm (41.0") [handle height 91.4 cm (36.0")]
Weight	100 kg (220 lbs)

Accessories

Item	Part Number
Tire Chain Kit	56-2700
Snow Cab	66-6200 or 68-9500
Drift Breaker	66-7960
Light Kit	66-7930
110 VAC Electric Starter	38-7590
Differential Kit	38038
Snowthrower Cover	66-6660

Torque Specifications

Fastener	Torque
Traction Gear Case Screws	1.38 kg m (120 in lbs)
Chain Guard Screws	0.12 kg m (10 in lbs)
Pivot Arm Shoulder Bolts	3.45 kg m (300 in lbs)
Auger Gearbox Screws	1.38 kg m (120 in lbs), note tightening order, page 73
Impeller Shaft Set Screws	2.36 kg m (205 in lbs)
Impeller Lever Screw	0.12 kg m (10 in lbs)
Control Box Nuts	1.84 kg m (160 in lbs)
Belt Guide Screws	0.81 kg m (70 in lbs)

SPECIFICATIONS MODELS 38520 AND 38525

Mitsubishi Powered 824 - Engine Specifications*

Item	Specification
Manufacturer	Mitsubishi
Type	4-stroke, side valve, gasoline
Rated Horsepower	8 HP
Engine Speed (fast no load)	4000 \pm 150 rpm
Carburetor Type	float
Choke	manual
Primer	yes
Throttle Control	yes, mounted on engine
Ignition Type	electronic
Fuel	unleaded gasoline (no methanol and not more than 10% ethanol)
Fuel Tank	4.7 liters (5 quarts)
Recommended Oil	SAE 10W30 or SAE 10, API rating SE or SF
Oil Capacity	0.80 liters (27 oz)
Spark Plug	NGK BP-4HS [set gap to 0.72 mm (.028")]

* For more engine specifications, see Toro Gas Consumer Gas Engine Specification Manual or the engine manufacturer's service manual.

Mitsubishi Powered 824 - Product Specifications

Transmission

Item	Specification
Manufacturer	Toro
Type	gearbox, 4 forward, 2 reverse gears
Input Drive	pulley/belt
Output Drive	chain
Recommended Lubricant	Lubriplate® Mag 1
Lubricant Capacity	0.43 liters (14.5 oz)
First Forward Gear at fast throttle	0.88 kph (0.55 mph)
Second Forward Gear	2.09 kph (1.30 mph)
Third Forward Gear	3.22 kph (2.00 mph)
Fourth Forward Gear	4.67 kph (2.90 mph)
First Reverse Gear	2.09 kph (1.30 mph)
Second Reverse Gear	3.22 kph (2.00 mph)

SPECIFICATIONS MODELS 38520 AND 38525

Mitsubishi Powered 824 - Product Specifications (cont'd)

Auger

Item	Specification
Housing Width	61.0 cm (24")
Housing Height	53.3 cm (21")
Diameter	35.6 cm (14")
Flights	two, 8.89 cm (3.5") deep [38525 serrated]]
Gearbox Speed Reduction	10:1
Gearbox Lubricant	SAE90 EP gear oil, API rating of GL-5 or GL-6
Gearbox Capacity	0.133 liters (4.5 oz)
Speed at 4000 rpm	126 rpm

Impeller

Item	Specification
Diameter	30.5 cm (12")
Blades	three
Throwing Capacity, mass--distance	818 kg/min (1800 lbs/min) -- 12.2 m (40 ft)
Stopping Time	less than five seconds

Chute

Item	Specification
Throat Diameter	14.0 cm (5.5")
Angle of Rotation	200°
Deflector Angle of Tilt	75°

Rear Suspension

Item	Specification
Type	pivoting axle
Optional	pivoting axle with differential

Wheel and Tires

Item	Specification
Type	low pressure, pneumatic, with tube
Diameter	35.6 cm (14.00")
Width	10.2 cm (4.00")
Tread	self cleaning lug tread

SPECIFICATIONS MODELS 38520 AND 38525

Mitsubishi Powered 824 - Product Specifications (cont'd)

Wheels and Tires (cont'd)

Item	Specification
Track Width	61.0 cm (24") to outside of tires
Pressure	.5 to 1.0 kg/cm ² (7 to 15 psi) [must be equal on both sides]

Dimensions

Item	Specification
Length	138.4 cm (54.5")
Width	63.5 cm (25.0")
Height	104.1 cm (41.0") [handle height 91.4 cm (36.0")]
Weight	100 kg (225 lbs)

Accessories

Item	Part Number
Tire Chain Kit	56-2700
Snow Cab	66-6200 or 68-9500
Drift Breaker	66-7960
Light Kit	66-7950
Differential Kit	38038
Snowthrower Cover	66-6660

Mitsubishi Powered 824 - Torque Specifications

Fastener	Torque
Traction Gear Case Screws	1.38 kg m (120 in lbs)
Chain Guard Screws	0.12 kg m (10 in lbs)
Pivot Arm Shoulder Bolts	3.45 kg m (300 in lbs)
Auger Gearbox Screws	1.38 kg m (120 in lbs), note tightening order, page 73
Impeller Shaft Set Screws	2.36 kg m (205 in lbs)
Impeller Lever Screw	0.12 kg m (10 in lbs)
Control Box Nuts	1.84 kg m (160 in lbs)
Belt Guide Screws	0.81 kg m (70 in lbs)

SPECIFICATIONS MODELS 38540 AND 38543

Tecumseh Powered 824 - Engine Specifications*

Item	Specification
Manufacturer	Tecumseh
Type	4-stroke, side valve gasoline
Rated Horsepower	8 HP
Engine Speed (fast no load)	3300 + 200, - 150 rpm
Carburetor Type	float
Choke	manual
Primer	yes
Throttle Control	yes, mounted on engine
Ignition Type	electronic
Fuel	unleaded gasoline (no methanol and not more than 10% ethanol)
Fuel Tank	3.8 liters (4 qts)
Recommended Oil	SAE 5W30 or SAE 10, API of SE or SF
Oil Capacity	0.71 liters (24 oz)
Spark Plug	Champion RJ-17LM or Autolite AR7N [set gap to 0.76 mm (.030")]

* For more engine specifications, see Toro Gas Consumer Gas Engine Specification Manual or the engine manufacturer's service manual.

Tecumseh Powered 824 - Product Specifications

Transmission

Item	Specification
Manufacturer	Toro
Type	gearbox, 4 forward, 2 reverse gears
Input Drive	pulley/belt
Output Drive	chain
Recommended Lubricant	Lubriplate® Mag 1
Lubricant Capacity	0.43 liters (14.5 oz)
First Forward Gear at fast throttle	0.88 kph (0.55 mph)
Second Forward Gear	2.09 kph (1.30 mph)
Third Forward Gear	3.22 kph (2.00 mph)
Fourth Forward Gear	4.67 kph (2.90 mph)
First Reverse Gear	2.09 kph (1.30 mph)
Second Reverse Gear	3.22 kph (2.00 mph)

SPECIFICATIONS MODELS 38540 AND 38543

Tecumseh Powered 824 - Product Specifications (cont'd)

Auger

Item	Specification
Housing Width	61.0 cm (24")
Housing Height	53.3 cm (21")
Diameter	35.6 cm (14")
Flights	two, 8.89 cm (3.5") deep
Gearbox Speed Reduction	10:1
Gearbox Lubricant	SAE90 EP gear oil, API rating of GL-5 or GL-6
Gearbox Capacity	0.133 liters (4.5 oz)
Speed at 3400 rpm	125 rpm

Impeller

Item	Specification
Diameter	30.5 cm (12")
Blades	three
Throwing Capacity, mass-distance	818 kg/min (1800 lbs/min) -- 12.2 m (40 ft)
Stopping Time	less than five seconds

Chute

Item	Specification
Throat Diameter	14.0 cm (5.5")
Angle of Rotation	200°
Deflector Angle of Tilt	75°

Rear Suspension

Item	Specification
Standard	pivoting axle
Optional	pivoting axle with differential

Wheel and Tires

Item	Specification
Type	low pressure, pneumatic, with tube
Diameter	35.6 cm (14.00)
Width	10.2 cm (4.00")
Tread	self cleaning lug tread

SPECIFICATIONS MODEL 38540 AND 38543

Tecumseh Powered 824 - Product Specifications (cont'd)

Wheels and Tires (cont'd)

Item	Specification
Track Width	61.0 cm (24") to outside of tires
Pressure	.5 to 1.0 kg/cm ² (7 to 15 psi) [must be equal on both sides]

Dimensions

Item	Specification
Length	138.4 cm (54.5")
Width	63.5 cm (25.0")
Height	104.1 cm (41.0") [handle height 91.4 cm (36.0")]
Weight	100 kg (225 lbs)

Accessories

Item	Part Number
Tire Chain Kit	56-2700
Snow Cab	68-9500
Drift Breaker	66-7960
Light Kit	66-7930
110 VAC Electric Starter	37-4810
Differential Kit	38038
Snowthrower Cover	66-6660

Tecumseh Powered 824 - Torque Specifications

Fastener	Torque
Traction Gear Case Screws	1.38 kg m (120 in lbs)
Chain Guard Screws	0.12 kg m (10 in lbs)
Pivot Arm Shoulder Bolts	3.45 kg m (300 in lbs)
Auger Gearbox Screws	1.38 kg m (120 in lbs), note tightening order, page 73
Impeller Shaft Set Screws	2.36 kg m (205 in lbs)
Impeller Lever Screw	0.12 kg m (10 in lbs)
Control Box Nuts	1.84 kg m (160 in lbs)
Belt Guide Screws	0.81 kg m (70 in lbs)

SPECIFICATIONS MODEL 38545

Mitsubishi Powered 828 - Engine Specifications*

Item	Specification
Manufacturer	Mitsubishi
Type	4-stroke, side valve, gasoline
Rated Horsepower	8 HP
Engine Speed (fast no load)	4000 \pm 150 rpm
Carburetor Type	float
Choke	manual
Primer	yes
Throttle Control	yes, mounted on engine
Ignition Type	electronic
Fuel	unleaded gasoline (no methanol and not more than 10% ethanol)
Fuel Tank	4.7 liters (5 quarts)
Recommended Oil	SAE 10W30 or SAE 10, API rating of SE or SF
Oil Capacity	0.80 liters (27 oz)
Spark Plug	NGK BP-4HS [set gap to 0.72 mm (.028")]

* For more engine specifications, see Toro Gas Consumer Gas Engine Specification Manual or the engine manufacturer's service manual.

Mitsubishi Powered 828 - Product Specifications

Transmission

Item	Specification
Manufacturer	Toro
Type	gearbox, 4 forward, 2 reverse gears
Input Drive	pulley/belt
Output Drive	chain
Recommended Lubricant	Lubriplate® Mag 1
Lubricant Capacity	0.43 liters (14.5 oz)
First Forward Gear at fast throttle	0.99 kph (0.62 mph)
Second Forward Gear	2.41 kph (1.50 mph)
Third Forward Gear	3.70 kph (2.30 mph)
Fourth Forward Gear	5.30 kph (3.30 mph)
First Reverse Gear	2.41 kph (1.50 mph)
Second Reverse Gear	3.70 kph (2.30 mph)

SPECIFICATIONS MODEL 38545

Mitsubishi Powered 828 - Product Specifications (cont'd)

Auger

Item	Specification
Housing Width	71.1 cm (28")
Housing Height	53.3 cm (21")
Diameter	35.6 cm (14")
Flights	two, 8.89 cm (3.5") deep
Gearbox Speed Reduction	10:1
Gearbox Lubricant	SAE 90 EP gear oil, API rating of GL-5 or GL-6
Gearbox Capacity	0.133 liters (4.5 oz)
Speed at 4000 rpm	126 rpm

Impeller

Item	Specification
Diameter	30.5 cm (12")
Blades	four
Throwing Capacity, mass-distance	909 kg/min (2000 lbs/min), 12.2 m (40 ft)
Stopping Time	less than five seconds

Chute

Item	Specification
Throat Diameter	14.0 cm (5.5")
Angle of Rotation	200°
Deflector Angle of Tilt	75°

Rear Suspension

Item	Specification
Standard	pivoting axle
Optional	pivoting axle with differential

Wheel and Tires

Item	Specification
Type	low pressure, pneumatic with tube
Diameter	40.6 cm (16.00")
Width	12.7 cm (5.00")
Tread	self cleaning lug type

SPECIFICATIONS MODEL 38545

Mitsubishi Powered 828 - Product Specifications (cont'd)

Wheels and Tires (cont'd)

Item	Specification
Track Width	64.8 cm (25.5") to outside of tires
Pressure	.5 to 1.0 kg/cm ² (7 to 15 psi) [must be equal on both sides]

Dimensions

Item	Specification
Length	138.4 cm (54.5")
Width	73.7 cm (29.0")
Height	106.7 cm (42.0") [handle height 94.0 cm (37.0")]
Weight	109.1 kg (240 lbs)

Accessories

Item	Part Number
Tire Chain Kit	63-3040
Snow Cab	68-9500
Drift Breaker	66-7970
Light Kit	66-7950
12 VDC Electric Starter	68-7250
Differential Kit	38038
Snowthrower Cover	66-6660

Mitsubishi Powered 828 - Torque Specifications

Fastener	Torque
Traction Gear Case Screws	1.38 kg m (120 in lbs)
Chain Guard Screws	0.12 kg m (10 in lbs)
Pivot Arm Shoulder Bolts	3.45 kg m (300 in lbs)
Auger Gearbox Screws	1.38 kg m (120 in lbs), note tightening order, page 73
Impeller Shaft Set Screws	2.36 kg m (205 in lbs)
Impeller Lever Screw	0.12 kg m (10 in lbs)
Control Box Nuts	1.84 kg m (160 in lbs)
Belt Guide Screws	0.81 kg m (70 in lbs)

SPECIFICATIONS MODEL 38570

Briggs and Stratton Powered 828 - Engine Specifications*

Item	Specification
Manufacturer	Briggs and Stratton
Type	4-stroke, side valve, gasoline
Rated Horsepower	8 HP
Engine Speed (fast no load)	3300 + 200, - 150 rpm
Carburetor Type	float
Choke	manual
Primer	yes
Throttle Control	yes, mounted on engine
Ignition Type	electronic
Fuel	unleaded gasoline (no methanol and not more than 10% ethanol)
Fuel Tank	3.8 liters (4 quarts)
Recommended Oil	SAE 5W30 or SAE 10, API rating of SE or SF
Oil Capacity	1.30 liters (44 oz)
Spark Plug	Champion RCJ-8 or Autolite AR7N [set gap to .76 mm (.030")]

* For more engine specifications, see Toro Gas Consumer Gas Engine Specification Manual or the engine manufacturer's service manual.

Briggs and Stratton Powered 828 - Product Specifications

Transmission

Item	Specification
Manufacturer	Toro
Type	gearbox, 4 forward, 2 reverse gears
Input Drive	pulley/belt
Output Drive	chain
Recommended Lubricant	Lubriplate® Mag 1
Lubricant Capacity	0.43 liters (14.5 oz)
First Forward Gear at fast throttle	0.88 kph (0.55 mph)
Second Forward Gear	2.09 kph (1.30 mph)
Third Forward Gear	3.22 kph (2.00 mph)
Fourth Forward Gear	4.67 kph (2.90 mph)
First Reverse Gear	2.09 kph (1.30 mph)
Second Reverse Gear	3.22 kph (2.00 mph)

SPECIFICATIONS MODEL 38570

Briggs and Stratton Powered 828 - Product Specifications (cont'd)

Auger

Item	Specification
Housing Width	71.1 cm (28")
Housing Height	53.3 cm (21")
Diameter	35.6 cm (14")
Flights	two, 8.89 cm (3.5") deep
Gearbox Speed Reduction	10:1
Gearbox Lubricant	SAE 90 weight EP gear oil, API rating of GL-5 or GL-6
Gearbox Capacity	0.133 liters, (4.5 oz)
Speed at 3400 rpm	125 rpm

Impeller

Item	Specification
Diameter	30.5 cm (12")
Blades	four
Throwing Capacity, mass--distance	909 kg/min (2000 lbs/min) -- 12.2 m (40 ft)
Stopping Time	less than five seconds

Chute

Item	Specification
Throat Diameter	14.0 cm (5.5")
Angle of Rotation	200°
Deflector Angle of Tilt	75°

Rear Suspension

Item	Specification
Standard	pivoting axle
Optional	pivoting axle with differential

Wheel and Tires

Item	Specification
Type	low pressure, pneumatic, tube type
Diameter	40.6 cm (16.00")
Width	12.7 cm (5.00")
Tread	self-cleaning lug tread

SPECIFICATIONS MODEL 38570

Briggs and Stratton Powered 828 - Product Specifications (cont'd)

Wheels and Tires (cont'd)

Item	Specification
Track Width	64.8 cm (25.5") to outside of tires
Pressure	.5 to 1.0 kg/cm ² (7 to 15 psi) [must be equal on both sides]

Dimensions

Item	Specification
Length	138.4 cm (54.5")
Width	73.7 cm (29.0")
Height	106.7 cm (42.0") (handle height 94.0 cm [37"])
Weight	109.1 kg m (240 lbs)

Accessories

Item	Part Number
Tire Chain Kit	63-3040
Snow Cab	68-9500
Drift Breaker	66-7970
Light Kit	66-7940
110 VAC Electric Start	37-4630
Differential Kit	38038

Briggs and Stratton Powered 828 - Torque Specifications

Fastener	Torque
Traction Gear Case Screws	1.38 kg m (120 in lbs)
Chain Guard Screws	0.12 kg m (10 in lbs)
Pivot Arm Shoulder Bolts	3.45 kg m (300 in lbs)
Auger Gearbox Screws	1.38 kg m (120 in lbs), note tightening order, page 73
Impeller Shaft Set Screws	2.36 kg m (205 in lbs)
Impeller Lever Screw	0.12 kg m (10 in lbs)
Control Box Nuts	1.84 kg m (160 in lbs)
Belt Guide Screws	0.81 kg m (70 in lbs)

SPECIFICATIONS MODEL 38573

Tecumseh Powered 828 - Engine Specifications*

Item	Specification
Manufacturer	Tecumseh
Type	4-stroke, side valve gasoline
Rated Horsepower	8 HP
Engine Speed (fast no load)	3300 + 200, - 150 rpm
Carburetor Type	float
Choke	manual
Primer	yes
Throttle Control	yes, mounted on engine
Ignition Type	electronic
Fuel	unleaded gasoline (no methanol and not more than 10% ethanol)
Fuel Tank	3.8 liters (4 quarts)
Recommended Oil	SAE 5W30 or SAE10, API rating of SE or SF
Oil Capacity	0.71 liters (24 oz)
Spark Plug	Champion RJ-17LM or Autolite AR7N [set gap to 0.76 mm (.030")]

* For more engine specifications, see Toro Gas Consumer Gas Engine Specification Manual or the engine manufacturer's service manual.

Tecumseh Powered 828 - Product Specifications

Transmission

Item	Specification
Manufacturer	Toro
Type	gearbox, 4 forward, 2 reverse gears
Input Drive	pulley/belt
Output Drive	chain
Recommended Lubricant	Lubriplate® Mag 1
Lubricant Capacity	0.43 liters (14.5 oz)
First Forward Gear at fast throttle	0.88 kph (0.55 mph)
Second Forward Gear	2.09 kph (1.30 mph)
Third Forward Gear	3.22 kph (2.00 mph)
Fourth Forward Gear	4.67 kph (2.90 mph)
First Reverse Gear	2.09 kph (1.30 mph)
Second Reverse Gear	3.22 kph (2.00 mph)

SPECIFICATIONS MODEL 38573

Tecumseh Powered 828 - Product Specifications (cont'd)

Auger

Item	Specification
Housing Width	71.1 cm (28")
Housing Height	53.3 cm (21")
Diameter	35.6 cm (14")
Flights	two, 8.89 cm (3.5") deep
Gearbox Speed Reduction	10:1
Gearbox Lubricant	SAE 90 weight EP gear oil, API rating of GL-5 or GL-6
Gearbox Capacity	0.133 liters, (4.5 oz)
Speed at 3400 rpm	125 rpm

Impeller

Item	Specification
Diameter	30.5 cm (12")
Blades	four
Throwing Capacity, mass-distance	909 kg/min (2000 lbs/min) -- 12.2 m (40 ft)
Stopping Time	less than five seconds

Chute

Item	Specification
Throat Diameter	14.0 cm (5.5")
Angle of Rotation	200°
Deflector Angle of Tilt	75°

Rear Suspension

Item	Specification
Standard	pivoting axle
Optional	pivoting axle with differential

Wheel and Tires

Item	Specification
Type	low pressure, pneumatic, tube type
Diameter	40.6 cm (16.00")
Width	12.7 cm (5.00")
Tread	self-cleaning lug tread

SPECIFICATIONS MODEL 38573

Tecumseh Powered 828 - Product Specifications (cont'd)

Wheels and Tires (cont'd)

Item	Specification
Track Width	64.8 cm (25.5") to outside of tires
Pressure	.5 to 1.0 kg/cm ² (7 to 15 psi) [must be equal on both sides]

Dimensions

Item	Specification
Length	138.4 cm (54.5")
Width	73.7 cm (29.0")
Height	106.7 cm (42.0") [handle height 94.0 cm (37")]
Weight	109.1 kg m (240 lbs)

Accessories

Item	Part Number
Tire Chain Kit	63-3040
Snow Cab	68-9500
Drift Breaker	66-7970
Light Kit	66-7930
110 VAC Electric Start	37-4810
Differential Kit	38038

Tecumseh Powered 828 - Torque Specifications

Fastener	Torque
Traction Gear Case Screws	1.38 kg m (120 in lbs)
Chain Guard Screws	0.12 kg m (10 in lbs)
Pivot Arm Shoulder Bolts	3.45 kg m (300 in lbs)
Auger Gearbox Screws	1.38 kg m (120 in lbs), note tightening order, page 73
Impeller Shaft Set Screws	2.36 kg m (205 in lbs)
Impeller Lever Screw	0.12 kg m (10 in lbs)
Control Box Nuts	1.84 kg m (160 in lbs)
Belt Guide Screws	0.81 kg m (70 in lbs)

SPECIFICATIONS MODELS 38565 AND 38580

Briggs and Stratton Powered 1132 - Engine Specifications*

Item	Specification
Manufacturer	Briggs and Stratton
Type	4-stroke, side valve, gasoline
Rated Horsepower	11 HP
Engine Speed (fast no load)	3300 + 200, - 150 rpm
Carburetor Type	float
Choke	manual
Primer	yes
Throttle Control	yes, engine mounted
Ignition Type	electronic
Fuel	unleaded gasoline (no methanol and not more than 10% ethanol)
Fuel Tank	3.8 liters (4 quarts)
Recommended Oil	SAE 5W30 or SAE 10, API rating SE or SF
Oil Capacity	1.30 liters (48 oz)
Spark Plug	Champion RCJ-8 or Autolite AR7N (set gap to .76 mm [.030"])

* For more engine specifications, see Toro Gas Consumer Gas Engine Specification Manual or the engine manufacturer's service manual.

Briggs and Stratton Powered 1132 - Product Specifications

Transmission

Item	Specification
Manufacturer	Toro
Type	gearbox, 4 forward, 2 reverse gears
Input Drive	pulley/belt
Output Drive	chain
Recommended Lubricant	Lubriplate® Mag 1
Lubricant Capacity	0.43 liters (14.5 oz)
First Forward Gear at fast throttle	0.88 kph (0.55 mph)
Second Forward Gear	2.09 kph (1.30 mph)
Third Forward Gear	3.22 kph (2.00 mph)
Fourth Forward Gear	4.67 kph (2.90 mph)
First Reverse Gear	2.09 kph (1.30 mph)
Second Reverse Gear	3.22 kph (2.00 mph)

SPECIFICATIONS MODELS 38565 AND 38580

Briggs and Stratton Powered 1132 - Product Specifications (cont'd)

Auger

Item	Specification
Housing Width	81.3 cm (32")
Housing Height	53.3 cm (21")
Diameter	35.6 cm (14")
Flights	two, 8.89 cm (3.5") deep
Gearbox Speed Reduction	10:1
Gearbox Lubricant	SAE 90 weight EP gear oil, API rating of GL-5 or GL-6
Gearbox Capacity	0.133 liters (4.5 oz)
Speed at 3400 rpm	125 rpm

Impeller

Item	Specification
Diameter	30.5 cm (12")
Blades	four
Throwing Capacity, mass--distance	1000 kg/min (2200 lbs/min) -- 12.2 m (40 ft)
Stopping Time	less than five seconds

Chute

Item	Specification
Throat Diameter	14.0 cm (5.5")
Angle of Rotation	200°
Deflector Angle of Tilt	75°

Rear Suspension

Item	Specification
Standard	pivoting axle
Optional	pivoting axle with differential

Wheel and Tires

Item	Specification
Type	low pressure, pneumatic, tube type
Diameter	40.6 cm (16.00")
Width	12.7 cm (5.00")
Tread	self cleaning lug type

SPECIFICATIONS MODELS 38565 AND 38580

Briggs and Stratton Powered 1132 - Product Specifications (cont'd)

Wheels and Tires (cont'd)

Item	Specification
Track Width	64.8 cm (25.5") to outside of tires
Pressure	.5 to 1.0 kg/cm ² (7 to 15 psi) [must be equal on both sides]

Dimensions

Item	Specification
Length	138.4 cm (54.5")
Width	8.38 cm (33.0")
Height	106.7 cm (42.5") [handle height 94.0 cm (37")]
Weight	120.5 kg m (265 lbs)

Accessories

Item	Part Number
Tire Chain Kit	63-3040
Snow Cab	68-9500
Drift Breaker	66-7980
Light Kit	66-7940
110 VAC Electric Starter	37-4630
Differential Kit	38038

Torque Specifications

Fastener	Torque
Traction Gear Case Screws	1.38 kg m (120 in lbs)
Chain Guard Screws	0.12 kg m (10 in lbs)
Pivot Arm Shoulder Bolts	3.45 kg m (300 in lbs)
Auger Gearbox Screws	1.38 kg m (120 in lbs), note tightening order, page 73
Impeller Shaft Set Screws	2.36 kg m (205 in lbs)
Impeller Lever Screw	0.12 kg m (10 in lbs)
Control Box Nuts	1.84 kg m (160 in lbs)
Belt Guide Screws	0.81 kg m (70 in lbs)

SPECIAL TOOLS AND OTHER NECESSITIES

The Power Shift Snowthrowers do not require any complex tools for most servicing. Servicing can be accomplished with the following:

Necessary Tools

Complete English Socket Wrench Set (1/4" thru 1")
Complete English End Wrench Set (1/4" through 1")
Phillips Screwdrivers
Standard Screwdrivers
Pocket Knife
Rubber Mallot
Pliers (regular, needle nose and linesman)
Snap Ring Pliers (outside)

In addition to those tools, it is a good idea to have the following on hand:

Lubricants, Sealants and Adhesives

Item	Toro Part Number
Anti-seize Compound	505-109
Hylomar [®] Sealant	505-105
Loctite [®]	505-103
Lubriplate [®] Mag 1 Grease	505-101
Permatex [®]	505-22
SAE 90 Weight EP Gear Oil	secure locally
Bentonite [®] Grease	available from Tecumseh/Peerless

TROUBLESHOOTING

Unit Does Not Propel Forward

Possible Causes	Remedy
Insufficient traction	Check tire pressure, lock differential, install chains
Wheels not pinned to axle	Position klik Pin through wheel and axle
Reverse cable too tight	Adjust cable
Shift fork spring malfunction	Repair spring
Traction belt slipping	Adjust traction cable
Traction belt slipping	Remove ice accumulation in lower belt cover.
Forward bevel gear or sliding clutch malfunction	Repair gear or jaw damage

Unit will not Propel Backward

Possible Causes	Remedy
Wheels not pinned to axle	Position klik pin through wheel and axle
Reverse cable too loose	Adjust reverse cable
Traction belt slipping	Adjust traction cable
Reverse bevel gear or jaw clutch malfunction	Repair reverse gear or jaw clutch damage

Neutral Not in Correct Location

Possible Causes	Remedy
Lower shift rod not adjusted correctly	Adjust lower shift rod
Shift bracket incorrectly assembled	Reassemble control box correctly

Shift Lever Will Not Lock in Power Shift or Reverse

Possible Causes	Remedy
Lockout lever tabs broken	Replace lockout lever
Lockout lever binding	Free by spraying with WD40
Lockout lever spring malfunction	Replace lock out lever spring

TROUBLESHOOTING (cont'd)

Operator Can Shift Between Forward and Reverse While Traction Lever is Engaged

Possible Causes	Remedy
Lock out lever tabs broken	Replace lock out lever
Lockout lever binding	Free by spraying with WD40
Lock out lever spring malfunction	Replace lock out lever spring

Wheels Will Not Swing When Power Shifting

Possible Causes	Remedy
Indexing mechanism out of sequence with wheels	Release shift lever then push into Power Shift again
Insufficient traction	Assist axle swing by lifting on handles slightly during Power Shift
Insufficient traction	Units with differential: push down on handles, lock differential
Latch cable misadjusted	Adjust latch cable
Pivot arms frozen or binding	Free pivot arms

Machine Does Not Propel in a Straight Line

Possible Causes	Remedy
Uneven tire pressure	Adjust tire pressure to .5 to 1.0 kg/cm ² (7 to 15 psi) equally.
Uneven traction on pavement	Consider chain installing chains
Skids not adjusted evenly	Adjust skids
Both wheels not pinned to axle	Position klik pin through both wheel and axle

Engine Kills When Auger or Traction are Engaged

Possible Causes	Remedy
Engine not sufficiently warmed up	Allow engine to warm up before engagement
Debris jammed in auger or impeller	Clear auger and impeller
Auger or impeller frozen with ice	Allow snowthrower to warm

TROUBLESHOOTING (cont'd)

Poor Snowthrowing Performance

Possible Causes	Remedy
Engine rpm too slow	Always throw snow at full throttle
Ground speed not matched to conditions	Use slower gear (do not throttle back!)
Belt slippage	Adjust impeller belt
Auger halves on wrong sides	Reinstall on correct sides

Impeller or Auger Does Not Turn

Possible Causes	Remedy
Debris jammed in auger or impeller	Clear debris
Auger or impeller frozen with ice	Allow snowthrower to warm
Belt slippage	Adjust impeller belt
Loose pulley	Tighten pulley fasteners
Missing auger bolt	Replace auger bolt
Impeller loose on impeller shaft	Tighten impeller shaft fasteners
Gear malfunction in auger gearbox	Repair auger gearbox

Traction or Impeller Does Not Disengage

Possible Causes	Remedy
Cable too tight	Adjust cable
Belt guide broken	Replace belt guide
Incorrect belt	Check parts catalog for correct belt

Chute Plugs With Snow

Possible Causes	Remedy
Engine rpm too slow	Always throw snow at full throttle
Belt slippage	Adjust impeller belt
Ground speed not matched to conditions	Select slower gear in heavy conditions, faster gear in light conditions
Impeller and chute areas rough	Sand, paint and wax chute and rough areas in housing and chute
Snow too wet	Allow snow to melt or freeze

TROUBLESHOOTING (cont'd)

Scraper Catches on Uneven Pavement

Possible Causes	Remedy
Scraper adjusted too low	Adjust scraper per Operator's Manual

Snowthrower Leaves Snow Behind

Possible Causes	Remedy
Scraper improperly adjusted or worn	Adjust scraper
Skids improperly adjusted or worn	Adjust skid

Rapid Skid and Scraper Wear

Possible Causes	Remedy
Operator snowthrowing with wheels in rear position unnecessarily	Use forward wheel position for light snow
Defective skid or scraper	Replace skid or scraper

Front End Rises

Possible Causes	Remedy
Snow very hard	Put wheels in rear position
Ground speed too high for conditions	Select slower gear

MAINTENANCE

CAUTION: To prevent accidental starting of the engine while performing maintenance, rotate the ignition key to off and remove it from the switch. Next, pull the wire off the spark plug and make sure the wire does not accidentally touch the plug.

Maintenance - Draining Gasoline

1. Stop the engine and pull the wire off spark plug.
2. Remove the cap from the fuel tank and use a pump-type syphon to drain fuel into clean gas can.

NOTE: This is the only procedure recommended for draining fuel.

CAUTION: Since gasoline is highly flammable, drain it outdoors and make sure the engine is cool to prevent a potential fire hazard. Wipe up any gasoline that may have spilled. Do not drain gasoline near any open flame or where the gasoline fumes may be ignited by a spark. Do not smoke a cigar, cigarette or a pipe when handling gasoline.

Maintenance - Chain Lubrication

1. Annually lubricate the drive chain with chain lubricant. See Figure 1. Wipe up any excess oil.

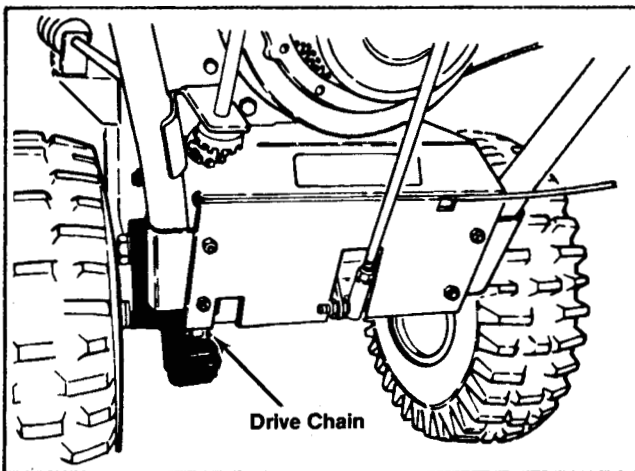


Figure 1

Maintenance - Changing Crankcase Oil

Initially change oil after the first 2 hours of engine operation; thereafter, change oil after every 25 hours of engine operation or annually. If possible, run the engine

just before changing oil because warm oil flows better and carries more contaminants than cold oil.

1. Pull the wire off the spark plug and make sure the wire does not contact the plug accidentally.
2. Clean the area around the oil drain cap. Next, slide the oil drain pan below the drain extension; then remove the oil drain cap. See Figure 2.

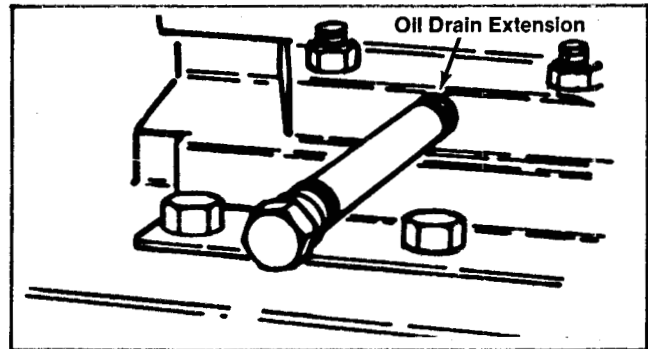


Figure 2

3. After all the oil is drained, install the oil drain cap.
4. Position the snowthrower on a level surface. Next, fill the crankcase with oil. See **Specifications** Section for capacity of your engine. Wipe up any oil that may have spilled.

Maintenance - Auger Gear Box Oil Service

The auger gear box is filled with oil at the factory so regular maintenance is not required. However, if the oil must be replaced in gear box:

1. Drain gasoline from the fuel tank. Wipe up any spilled gas.
2. Position the snowthrower on a level surface.
3. Clean the area around pipe plug so dirt is removed. See Figure 3.
4. Put a drain pan below the front of auger box and remove the pipe plug.
5. Tip the snowthrower forward and hold it up until all oil drains from the gear box.
6. Carefully let the snowthrower down to its normal position. Make sure it is on a level surface. Next, full the auger gear box with GL-5 or GL-6 SAE 85-95 EP transmission oil to the point of overflow.
7. Install pipe plug in gear box.

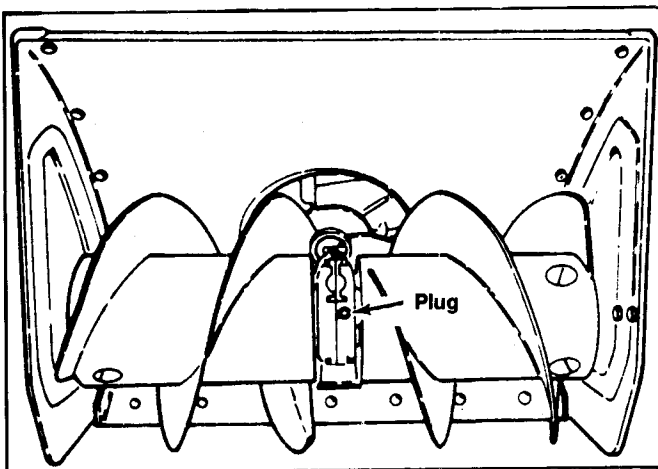


Figure 3

Maintenance - Impeller Drive Belt Adjustment

If the auger/impeller belt slips resulting in decreased snowthrowing performance, an adjustment is required. **WHENEVER A NEW BELT IS INSTALLED, AN ADJUSTMENT IS REQUIRED.**

1. Remove the three flanged head capscrews securing the belt cover to engine frame and slide belt cover up the cables.
2. Check idler and brake adjustment. There should be a minimum clearance of 3 mm (1/8") between the tab on the impeller idler arm and the brake arm. See Figure 4. If there is less than 3 mm (1/8") clearance, the belt must be replaced.

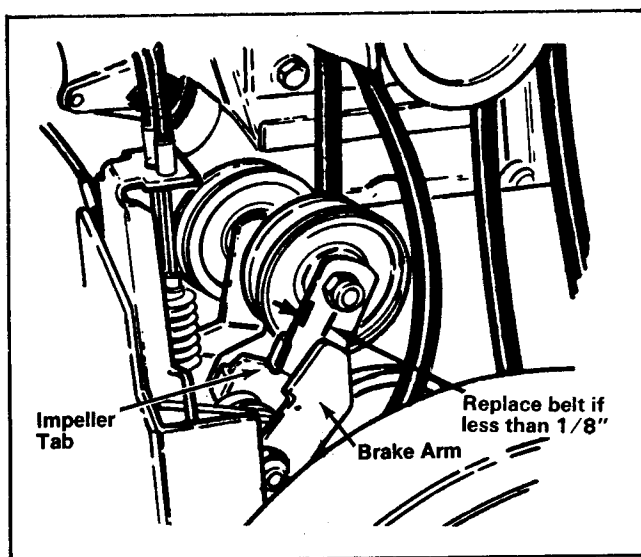


Figure 4

3. Loosen the upper jam nut securing the auger/impeller cable to the mounting bracket. See Figure 5.

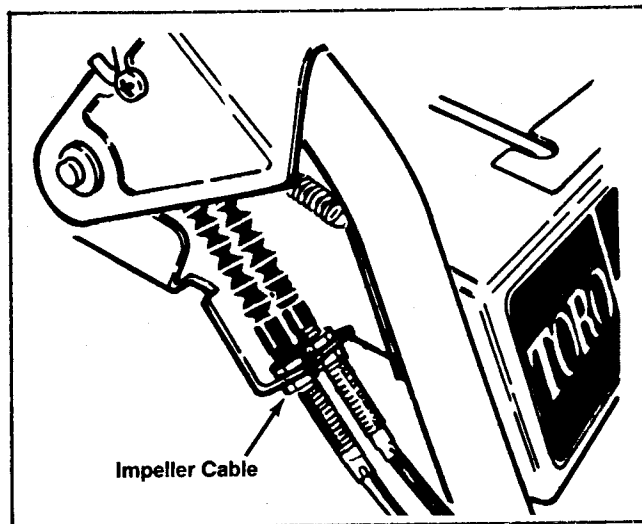


Figure 5

4. Rotate the bottom jam nut upward to increase belt tension.

NOTE: When adjusting the cable, always rotate the nut one turn at a time.

NOTE: Do not adjust the belt too tight because it may cause the auger/impeller to turn when the auger/impeller is in the disengaged position. If this occurs, readjust the lever by loosening belt tension.

5. Tighten upper jam nut against bracket.

CAUTION: Improper adjustment may cause injury if auger/impeller turns when the lever disengages. Use only genuine Toro replacement parts.

6. Recheck the idler and brake adjustment referring to step 2.
7. Reinstall the belt cover.
8. Check tension of belt by operating the auger. If the belt slips, repeat procedure.

Maintenance - Traction Drive Belt Adjustment

If the traction belt slips during operation, an adjustment is required. Whenever the belt is replaced, an adjustment is required.

1. Loosen the upper jam nut securing the traction cable to the mounting bracket.
2. Rotate the bottom jam nut upward to increase belt tension.

Maintenance - Traction Drive Belt Adjustment (cont'd)

NOTE: When adjusting cable, always rotate nut one turn at a time.

3. Tighten the upper jam nut against the bracket.
4. Check the tension of the belt by operating the machine. If the belt slips, repeat the procedure.

CAUTION: Do not adjust the belt too tight because it may cause the snowthrower to creep when traction lever is in the disengaged position. If this occurs, readjust by loosening belt tension.

Maintenance - Replacing Drive Belts

If the auger/impeller belt or traction belt become worn, glazed, stretched, oil-soaked, or otherwise defective, belt replacement is required.

1. Pull wire off the spark plug and make sure it does not contact the plug accidentally.
2. Remove the three thread forming screws holding the belt cover in place, and slide the belt cover up cables.
3. Move the speed shift control to N, neutral.
4. Remove the two flanged head capscrews securing the idler pulley assembly to the engine frame. Remove the idler pulley assembly. See Figure 6.

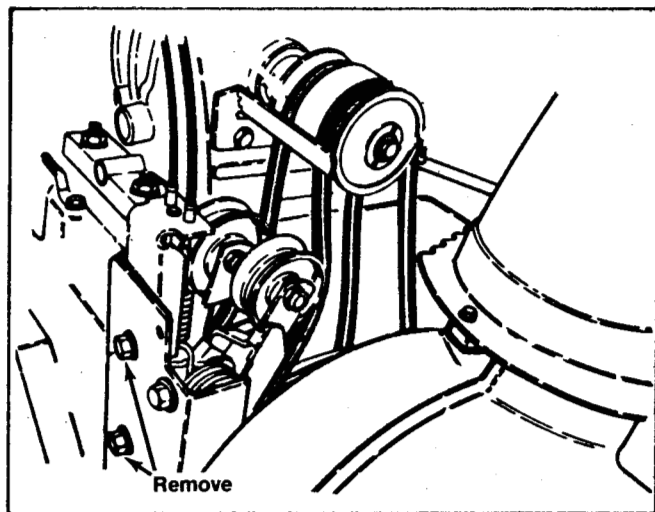


Figure 6

5. Remove the capscrew and lockwasher securing the half sheave to front of pulley assembly.
6. Slide auger/impeller half sheave and belt off crankshaft and remove belt from impeller pulley.

7. If replacing the traction belt, slide the mid section of the on pulley and belt off crankshaft and remove belt from transmission pulley.
8. On the control cable which corresponds to the belt being replaced, loosen the jam nuts securing cable to bracket. Cable must be free to slide in the bracket when changing the belt(s).
9. Reinstall the belts by reversing procedure. Make sure tabs in half sheave are inserted into the mounting grooves in the auger/impeller pulley when reinstalling.
10. Readjust the belts, referring to **Maintenance - Impeller Drive Belt Adjustment or Maintenance - Traction Drive Belt Adjustment**, pages 37 and 38.

NOTE: Make sure the idler pulleys are aligned with the belts when reinstalling idler pulley assembly.

CAUTION: Improper adjustment may cause injury if auger/impeller turns when the lever disengages. Use only genuine Toro replacement parts.

Maintenance - Drive Chain Adjustment

The drive chain must be adjusted to maintain 1/8-3/8 of an inch deflection at mid span between transmission and axle sprocket. Check chain deflection after every 25 hours of operation.

1. Check deflection of the chain by lifting up on the chain with moderate pressure at mid span. There should be 1/8-3/8" deflection. If deflection is not as specified an adjustment is required. See Figure 7.

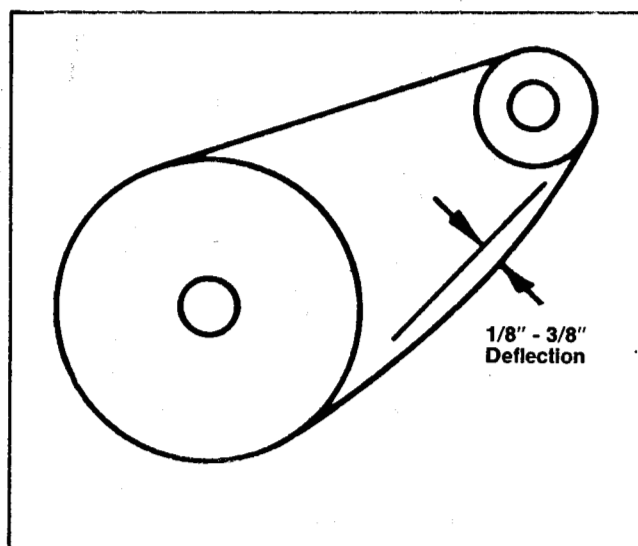


Figure 7

Maintenance - Drive Chain Adjustment (cont'd)

NOTE: To adjust the drive chain, the snowthrower must be tipped up on the auger housing. However, before the snowthrower is tipped, siphon all gasoline from fuel tank.

2. Make sure the wheels are positioned in rear position. Move the shift control into 2nd gear and tip the snowthrower up onto auger housing.
3. Loosen the four flanged head capscrews (two each side) securing transmission frame to engine frame. See Figure 8.
4. Lightly lift up on the transmission frame until 3 to 9 mm (1/8 to 3/8") chain deflection is attained, then retighten the flanged head capscrews.

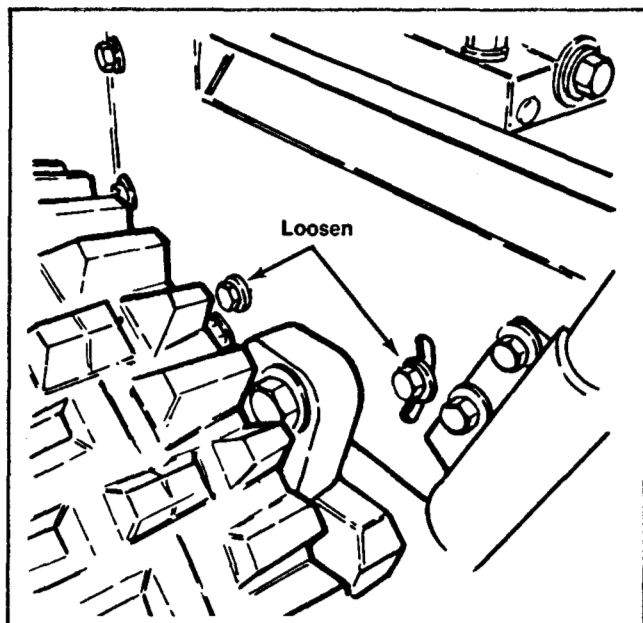


Figure 8

NOTE: Do not pry or use excessive force when lifting the transmission frame, as transmission damage may occur.

NOTE: If gear shift lever is not aligned with the Power Shift slot in control panel (see Figure 9 inset), shift rod length must be adjusted as follows:

- a. Disconnect the ball joint from bellcrank and move the jam nut up shift rod. See Figure 9.
 - b. Rotate the ball joint up or down until the gear shift lever is aligned with the Power Shift slot.
 - c. Reinstall the ball joint to the bellcrank and tighten the jam nut.
5. Recheck the chain deflection and lower the snowthrower to its normal position.

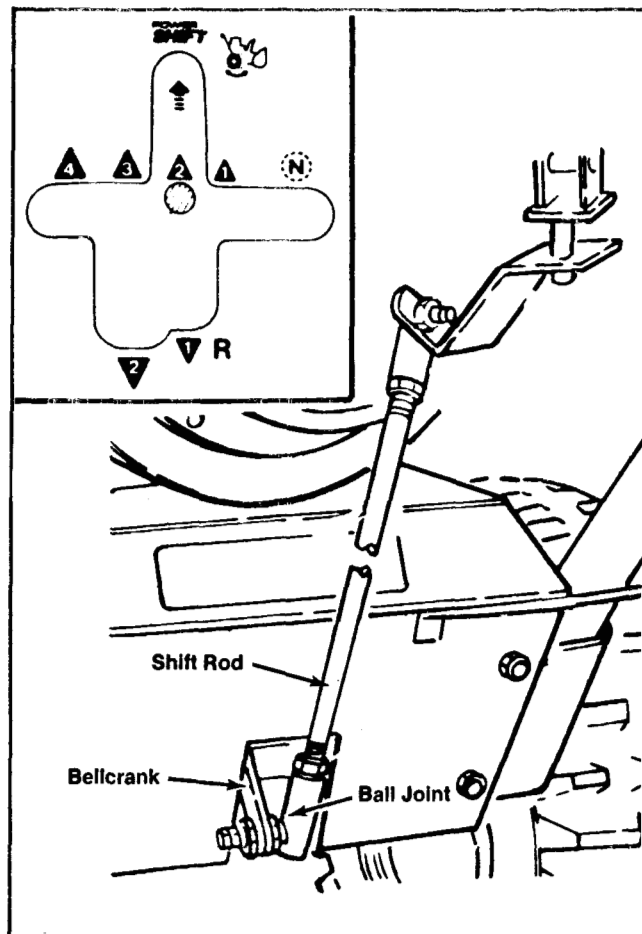


Figure 9

Maintenance - Spark Plug Service

Check the Specifications Section for the proper spark plug and gap. Since the air gap between the center and side electrodes of the spark plug increases gradually during normal engine operation, install a new plug after 25 hours of engine operation.

1. Clean the area around the spark plug so foreign matter cannot fall into cylinder when plug is removed.
2. Pull the wire off the spark plug and remove the plug from cylinder head.

NOTE: A cracked, fouled, or dirty spark plug must be replaced. Do not sand blast, scrape or clean the electrodes because grit may eventually release from the plug and fall into the cylinder. The result will likely be engine damage.

3. Set air gap between electrodes of new spark plug. See Figure 10. Next, install the spark plug in the cylinder head. Torque plug to 15 ft-lb. If torque wrench is not used, tighten plug firmly.

Maintenance - Spark Plug Service (cont'd)

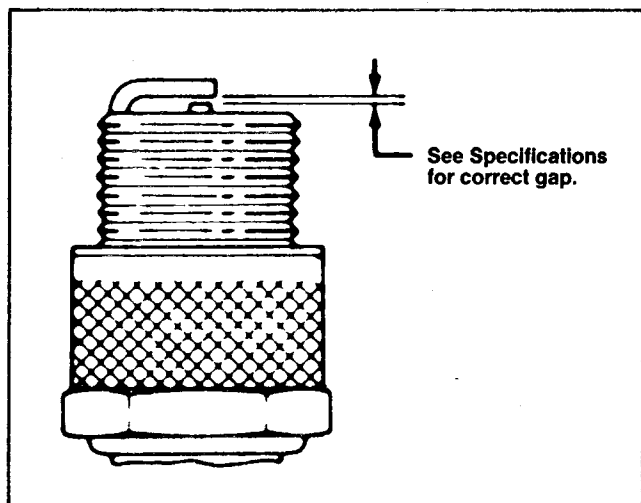


Figure 10

4. Push the wire onto the spark plug.

Preparing Snowthrower For Storage

1. Siphon or remove the gasoline from the fuel tank, referring to **Maintenance - Draining Gasoline**, page 36. Wipe up any gasoline that may have spilled.
2. Start the engine and let it run until it stops because there is no gasoline in the fuel system.
3. Remove the spark plug from the cylinder head. Next, pour two teaspoons of engine oil into spark plug hole in cylinder head. Install the spark plug in the cylinder head, but do not install the wire on the plug. Then pull recoil starter slowly to distribute the oil on the inside of the cylinder.
4. Lubricate the snowthrower: refer to **Maintenance - Chain Lubrication**, page 36. Change crankcase oil: see Operator's Manual.
5. Clean the snowthrower. Touch up chipped surfaces with paint. Sand the affected areas before painting. Use a rust preventative to prevent metal parts from rusting.
6. Tighten all screws and nuts. If any parts are damaged, repair or replace them.
7. Store the snowthrower in a clean, dry place and cover it to give protection.
8. The snowthrower may be stored tipped up on the auger housing. Make sure to drain gas before tipping snowthrower.

SECTION 1 POWER SHIFT CONTROLS

CAUTION: Servicing the Power Shift Snowthrower will require working with some of the moving parts. To prevent accidental starting of the engine while performing service, take the following precautions:

- Rotate the ignition key to off and remove.
- Pull the wire off the spark plug.
- Make sure the wire does not accidentally touch the spark plug.

CAUTION: The Power Shift Snowthrower has the feature of being able to be stood on the front housing for service and storage. Always drain the fuel from the tank prior to such service taking the following precautions:

- Drain it outdoors and make sure the engine is cool.
- Wipe up any gasoline that may have spilled.
- Do not drain the gasoline near any open flame or spark.
- Do not smoke when handling gasoline.

CONTROL BOX OPERATION

Control Box Operation - Gear Selector Control
See Figure 11.



Figure 11

The gear selector control on the Power Shift Snowthrower is used to vary the gear ratios.

Gear ratio selection is achieved by moving the shift lever left or right. The shift lever is connected through a yoke, to the shift bracket located under the control panel. As the shift lever is moved left and right, the shift bracket rotates in a near vertical motion. The shift rod transfers

this motion down to a bellcrank that moves the linkage on top of the transmission.

Operation - Latch Release Mechanism

A latch mechanism holds the pivot arms in either a forward or rear position. See Figure 12.

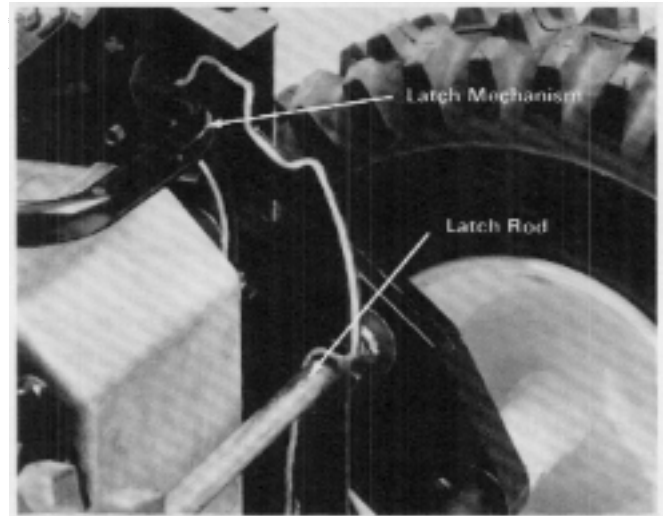


Figure 12

In order to Power Shift, i.e. pivot the wheels forward or backward, the latch plate must be released. Release of the latch plate is controlled by the latch release mechanism in the Power Shift box. See Figure 13.

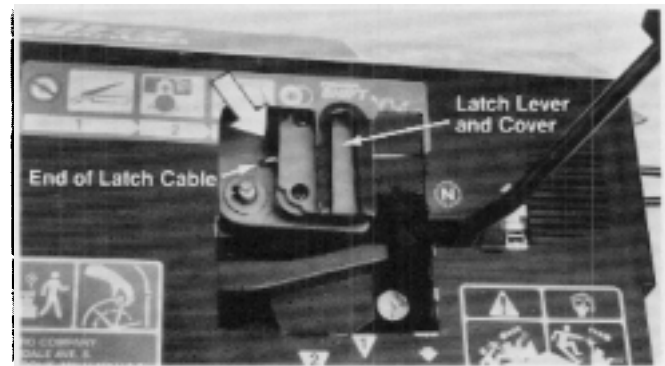


Figure 13

The latch release mechanism is very simple. When the operator Power Shifts, the shift lever is moved forward into the Power Shift slot. This in turn rotates the latch lever and pulls on the latch cable. See Figure 14.

Control Box Operation - Reverse Control

There are two conditions under which the wheels will move in the reverse direction. The first is when the operator wishes to back up and puts the gearshift lever

Control Box Operation - Reverse Control (cont'd)
in reverse. The other is when the wheels are Power Shifted from the forward to the rear position.

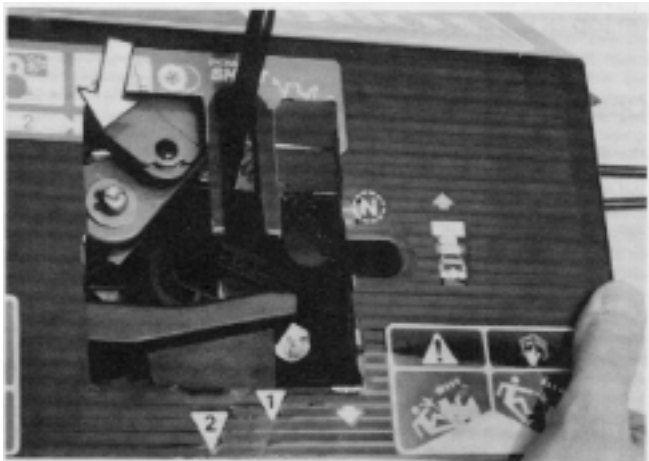


Figure 14

Before trying to understand the Power Shift control box, first take a moment to understand what is happening on top of the gearbox. The transmission is spring loaded into the forward gears. In order to reverse the transmission, the reverse cable must be pulled about 2.0 cm (3/4") to move the sliding jaw from the forward bevel gear to the reverse bevel gear. See Figure 15.

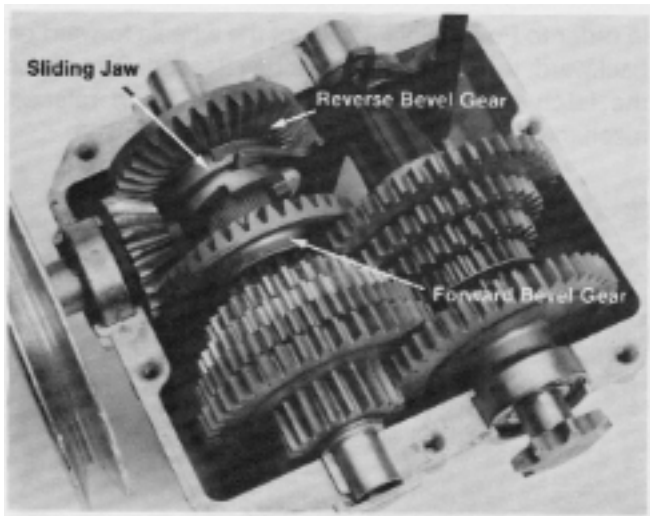


Figure 15

The upper end of the reverse cable is connected to the reverse bellcrank. The reverse bellcrank will rotate and tension the cable when the operator shifts into reverse or when he or she Power Shifts the wheels to the rear position. See Figure 16.

When the gearshift lever is pulled into one of the reverse slots, the reverse lever (visible through the reverse slots in the control panel) is pushed toward the back of the snowthrower. The reverse lever is connected to the reverse bellcrank so that as it pivots, it rotates the reverse bellcrank and tensions the cable. See Figure 17.

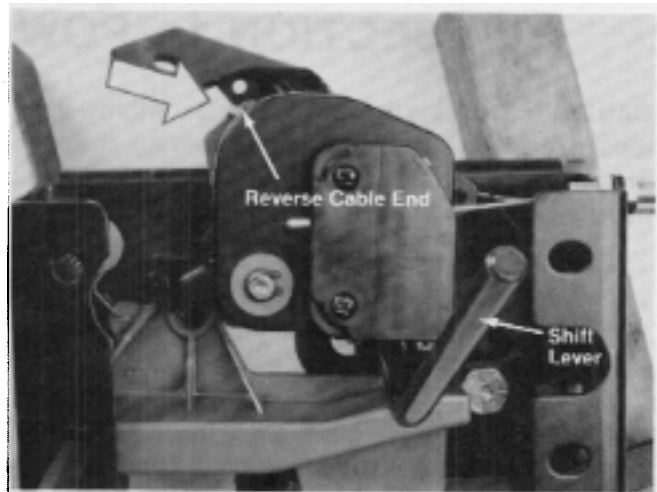


Figure 16

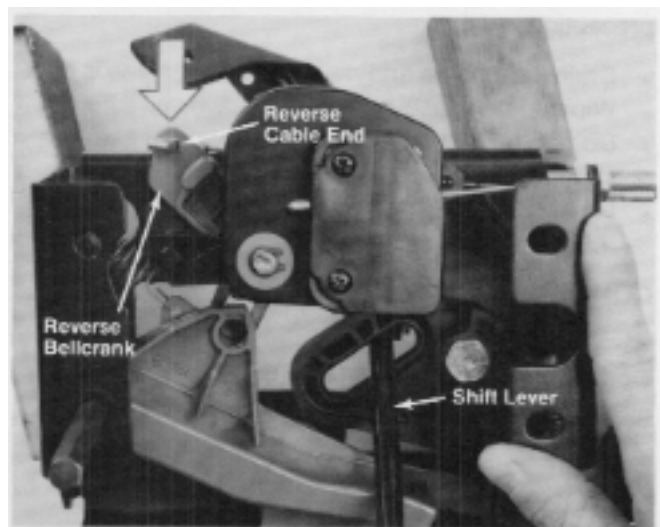


Figure 17

When the shift lever is pushed into the Power Shift slot, a tab on the index wheel contacts a tab on the reverse bellcrank every other time the Power Shift is cycled. See Figure 18.

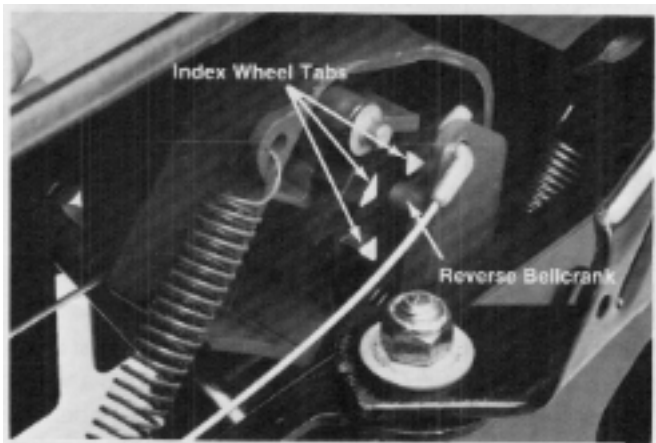


Figure 18

The contact between the two tabs forces the reverse bellcrank to rotate.

Control Box Operation - Reverse Control (cont'd)

The index wheel is necessary because the wheels must alternate between forward and backward movement when Power Shifting.

Control Box Operation - Shift Lockout

Transmission damage could result if the operator were to shift the transmission into reverse while the unit were moving forward and vice versa. To prevent this, a shift lockout is used. This lockout physically prevents the operator from switching directions without first stopping the unit.

The lockout base pivots on a shoulder bolt and rotates whenever the shift lever is moved to either the Power Shift or reverse slots. See Figure 19. Note however, that the lockout base does not rotate when the gearshift lever is moved from side to side.

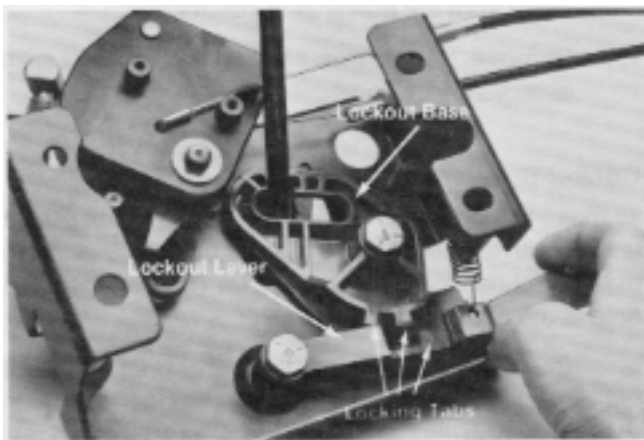


Figure 19

When the traction lever on the left handle is not engaged, the lockout base is free to move in either direction. However, once the traction lever is engaged, the two tabs on the lockout lever engage the lockout base. This prevents the shift lever from being moved forward or backward.

An added benefit of the shift lockout is that it allows the operator to lock the gearshift lever in either the Power Shift or reverse slots by depressing the traction lever. This allows the operator one hand operation of Power Shift or reverse leaving the other hand free to rotate the chute.

Control Box Operation - Indexing Mechanism

An indexing mechanism is used to control the direction of wheel movement while Power Shifting. This is necessary because the wheels need to alternate between forward and reverse when the Power Shift is cycled.

When Power Shifting the wheels forward, the indexing mechanism does nothing but index. The tabs on the bottom of the index wheel miss the tab on the reverse bellcrank and the wheels power forward when the traction lever is engaged. See Figure 20.



Figure 20

When the wheels are to be moved to the rear position, a tab on the bottom of the index wheel contacts a corresponding tab on the reverse bellcrank and the wheels power backward when the traction lever is engaged. See Figure 21.

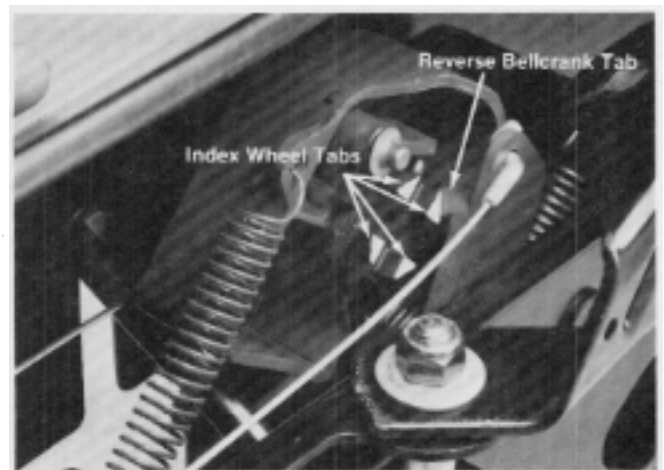


Figure 21

The index tang and a flat spring control the rotation of the index wheel. When the shift lever is pushed into the Power Shift slot, the index tang rotates the index wheel 1/8 revolution and then prevents the wheel from rotating backwards when the tabs on the index wheel and reverse bellcrank make contact. See Figure 22.

As the shift lever returns to its "at rest" position, the index wheel has a natural tendency to turn backwards due to the pressure from the index tang. The flat spring prevents backward rotation by engaging the index wheel at one of the teeth.

Control Box Operation - Indexing Mech. (cont'd)

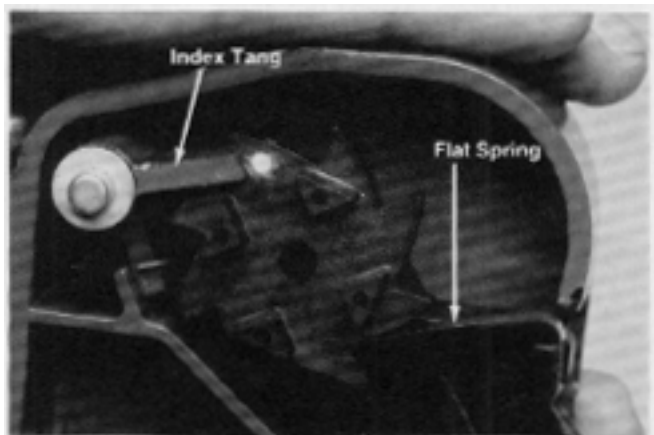


Figure 22

The index wheel is mounted on a piece called the index wheel lever. This piece fits inside the lever latch and can rotate slightly. It provides the small amount of rotation necessary to index the index wheel.

CONTROL BOX SERVICE

Control Box Service - Removal

1. Tip the snowthrower up onto the auger housing.
2. Pull the shift selector knob off of the shift selector lever.
3. Disconnect the shift rod from the power shift control box. See Figure 23.

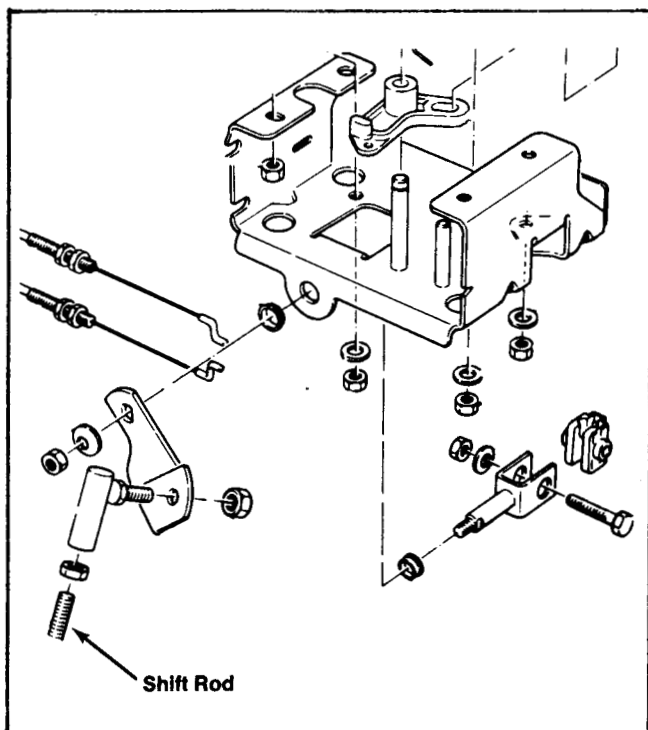


Figure 23

4. Using a 1/2" deep well socket, remove the four nylon locknuts securing the power shift control box to the control panel. See Figure 24.

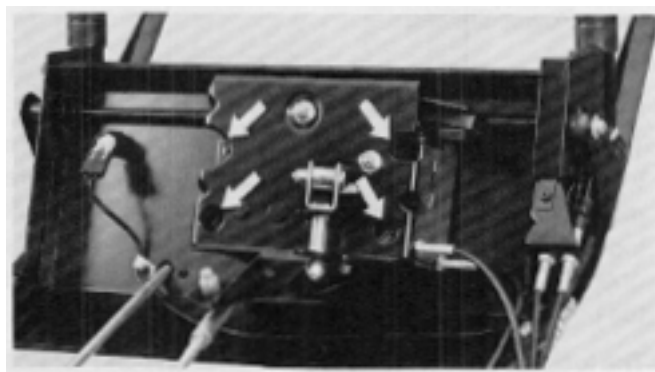


Figure 24

5. Remove the latch cover from the latch lever.
6. Disconnect the latch control cable and the reverse cable from the power shift control box.
7. Remove the power shift control box as an assembly, from the control panel.

Control Box Service - Testing

All major functions of the power shift control box can be tested, with the Power Shift control box removed from the control panel. To do so, insert a 7/16" bolt into the hole at the end of the reverse lever.

1. Check for proper operation of the shift lockout mechanism. With the lock out lever in the position shown in Figure 25, the lock out base should prevent the shift lever from forward and backward movement.

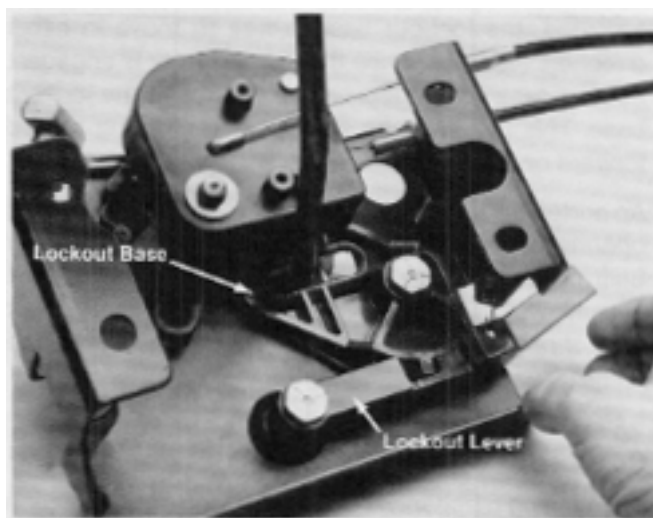


Figure 25

2. When the lockout lever is pulled back to the position shown in Figure 26, the shift lever should be free to move forward and backward.

Control Box Service - Testing (cont'd)

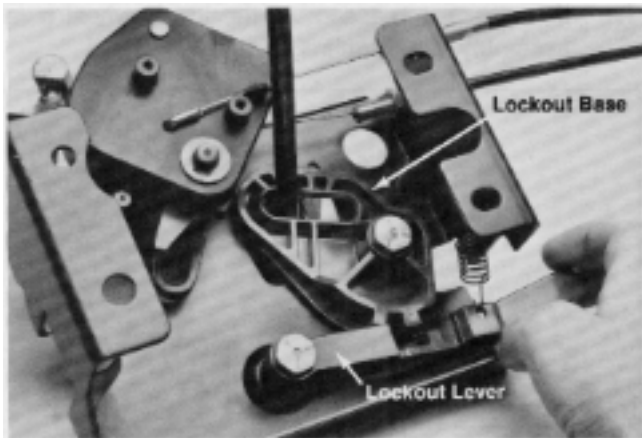


Figure 26

3. The reverse lever is spring loaded forward by the reverse lever return spring.

Check for proper operation of the reverse lever by pulling backward. Reverse bellcrank movement as shown in Figure 27 should be noticed.

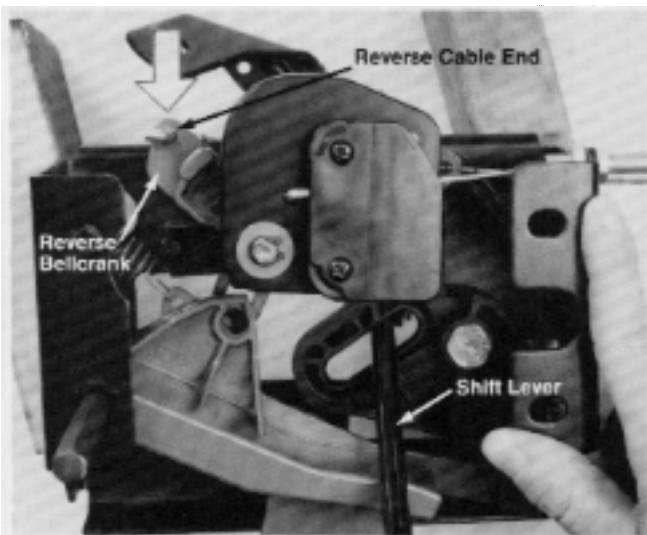


Figure 27

4. The latch lever is spring loaded clockwise by the latch lever return spring.

Check for proper operation of the latch lever and the indexing mechanism by repeatedly rotating the latch lever about 60 degrees counter clockwise and then releasing gently (if allowed to spring back quickly, the "stop" on the bottom of the latch lever may break.) Every other time the latch lever is cycled, the reverse lever should move toward the back of the Power Shift control box as it did in Figure 27.

5. If a problem is noticed in step 4 of testing, the indexing mechanism may not be functioning properly. To check the indexing mechanism, ob-

serve the indexing wheel underneath the latch lever. See Figure 28.

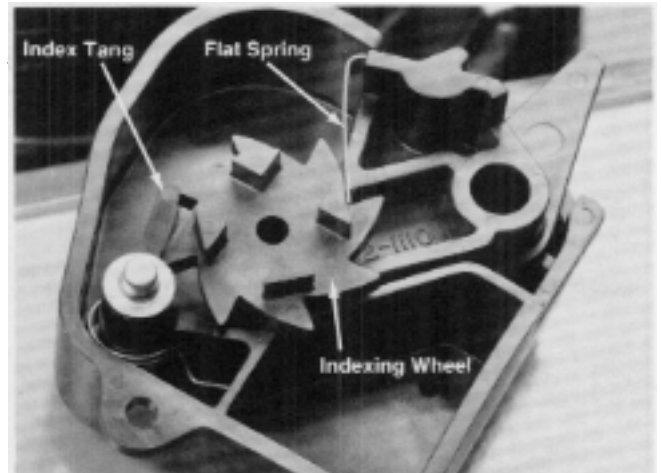


Figure 28

Check to insure that the indexing wheel is free to rotate clockwise when viewed from the bottom of the power shift control box. Also check to insure that both the flat spring and the index tang are spring loaded toward the index wheel.

Now observe the index wheel as you again cycle the latch lever. The tabs on the bottom of the index wheel and on the reverse bellcrank should alternate between meeting and missing on each subsequent cycle. See Figure 29.

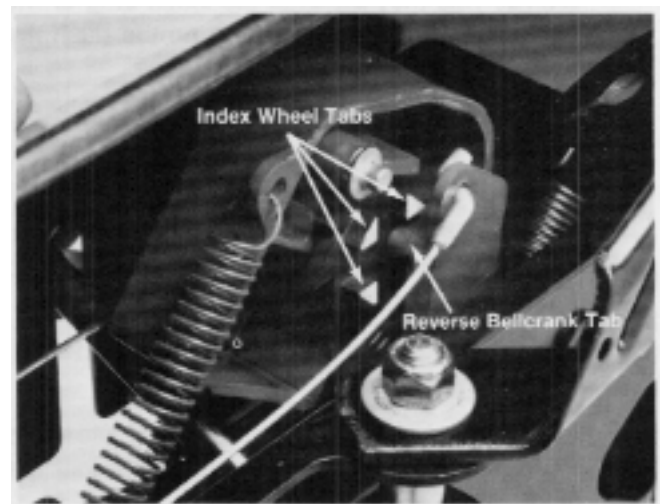


Figure 29

Control Box Service - Disassembly

See Figure 30.

1. With the Power Shift control box removed from the control panel, begin disassembly by disconnecting the reverse lever return spring from the Power Shift control box and removing the reverse lever.

Control Box Service - Disassembly (cont'd)

2. Disconnect the latch lever return spring from the latch lever mechanism. Remove the snap ring from the latch lever stud and pull off the latch lever.

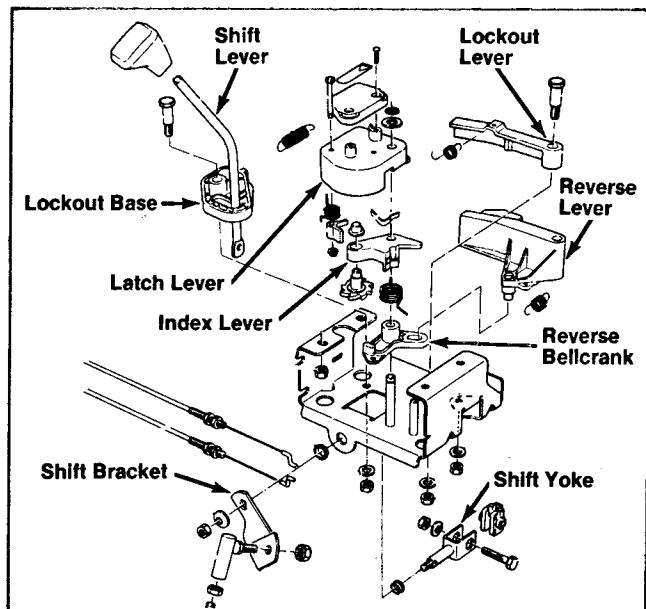


Figure 30

3. If necessary, pry off the push nut holding the index tang and remove the index tang, index tang spring, and the stud from the latch lever.

NOTE: This may damage the index tang or the latch lever. Flattening the tabs on the push nut prior to removal may prevent damage.

4. Next, remove the index lever and, if desired, pry the push nut from the end of the index wheel. Remove the flat spring from the index lever.

NOTE: This may damage the latch lever. Flattening the tabs on the push nut prior to removal may prevent damage.

5. Remove the reverse bellcrank from the stud along with the torsion spring.
6. Remove the bolt securing the lock out base to the Power Shift control frame and remove the lock out base.
7. Remove the special nylon locknut securing the shift lever to the Power Shift control frame and remove the shift bracket.
8. Remove the shoulder bolt securing the shift lever to the shift yoke and remove the shift lever. Next, pull the shift yoke from the power shift control box frame and finally, remove the small nylon bushings from the control box frame.

Control Box Service - Reassembly

1. If necessary, reassemble the index wheel lever assembly as shown in Figure 31.

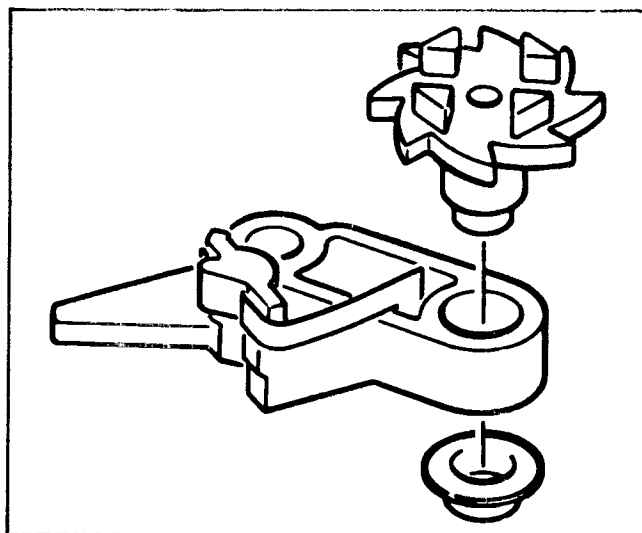


Figure 31

2. Install the index tang into the latch lever with the pin, making sure that the torsion spring is in the position shown in Figure 32.

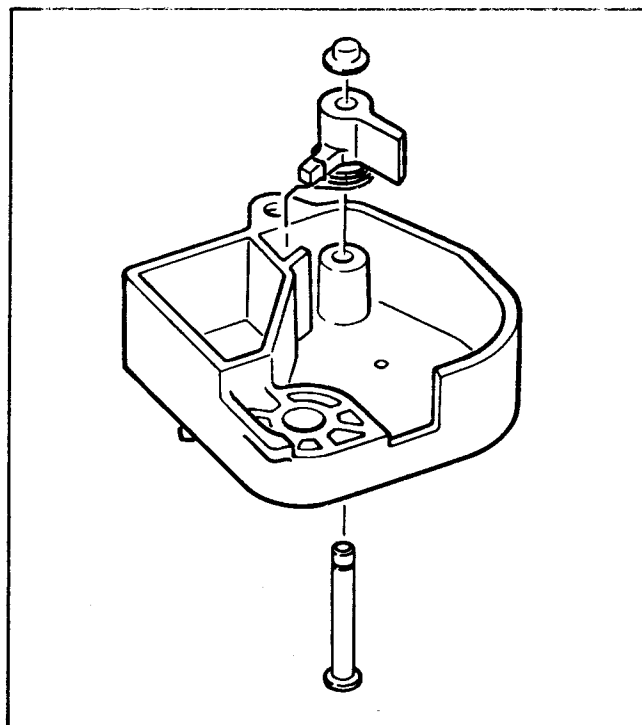


Figure 32

3. Push the two small shift yoke bushings into the control box frame. Note that the wider flange should be toward the outside in both cases. Assemble the shift yoke and shift bracket with the Belleville washer and nylon locknut. Make sure

Control Box Service - Reassembly (cont'd)

that the flats on the yoke align with the shift bracket. See Figure 33.

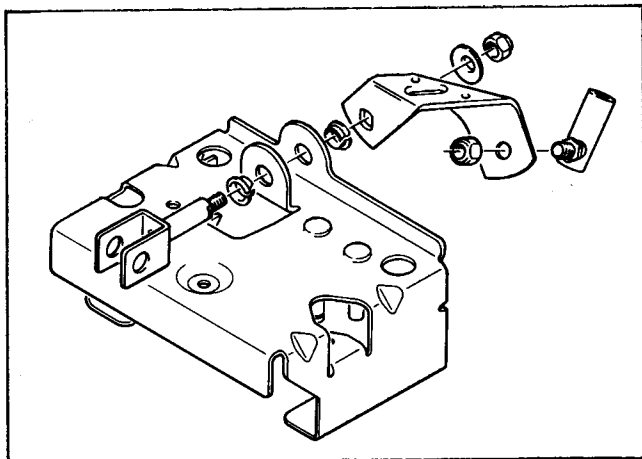


Figure 33

4. On 1989 and newer units, insert the yoke bushing into the yoke. Insert the shift lever into the shift lever yoke, making sure that the shift lever bends forward. Secure with the flat washer and nylon locknut. Make sure the shift lever fits into the recesses in the yoke bushings and that the connectors between the yoke bushings face the rear of the machine. (If installed with the connectors forward, binding will result when the shift lever is moved forward and backward.) See Figure 34.

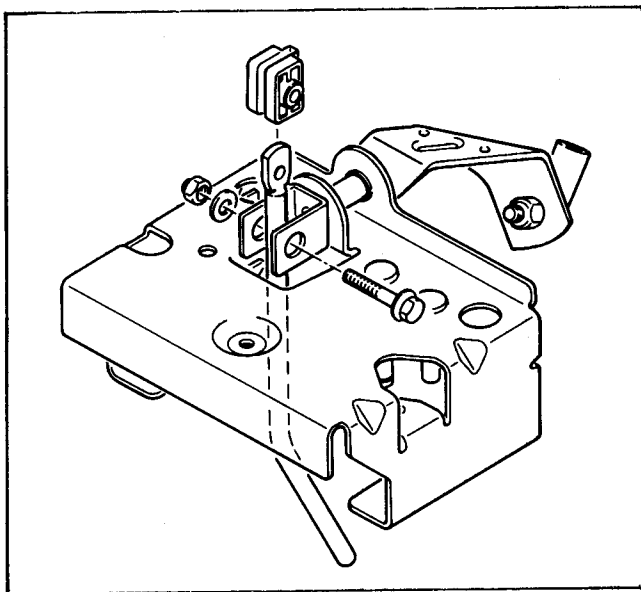


Figure 34

5. Slip the lock out base over the shift lever and secure with the shoulder bolt, flat washer and the nylon locknut. Make sure that the lockout base moves freely after installation. See Figure 35.

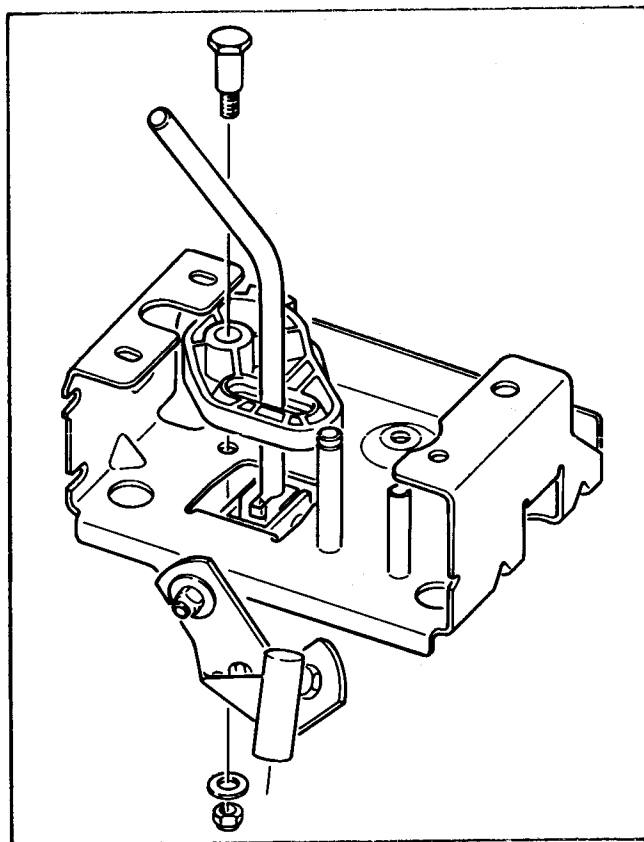


Figure 35

6. Mount the shift lockout lever to the power shift control box using the shoulder bolt, flat washer and nylon locknut. See Figure 36.

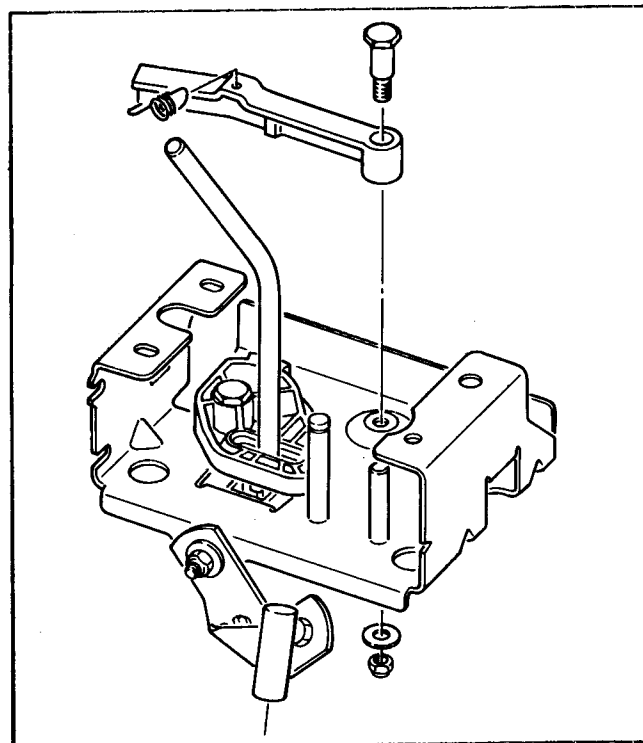


Figure 36

Control Box Service - Reassembly (cont'd)

NOTE: Coat the shoulder bolt with an anti-seize compound (Toro part number 505-109) to prevent corrosion and subsequent binding.

7. Slip the reverse bellcrank and torsion spring onto the stud as shown in Figure 37. Slide the index wheel lever assembly onto the stud. Make sure that the ends of the torsion spring are in the positions shown in Figure 38.

NOTE: Coat the reverse bellcrank with an anti-seize compound (Toro part number 505-109) to prevent corrosion and subsequent binding.

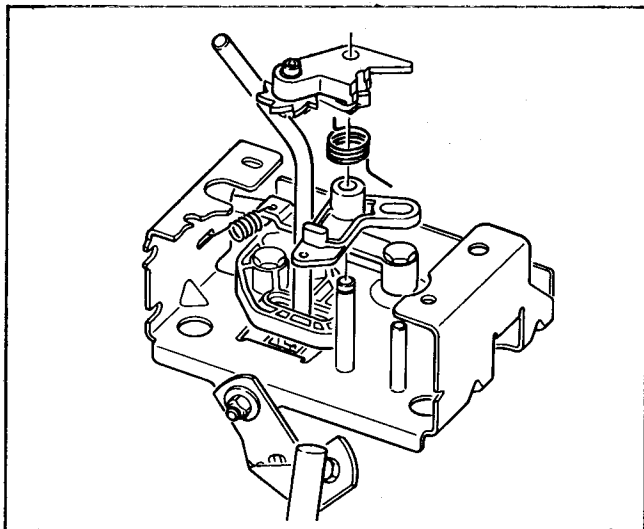


Figure 37

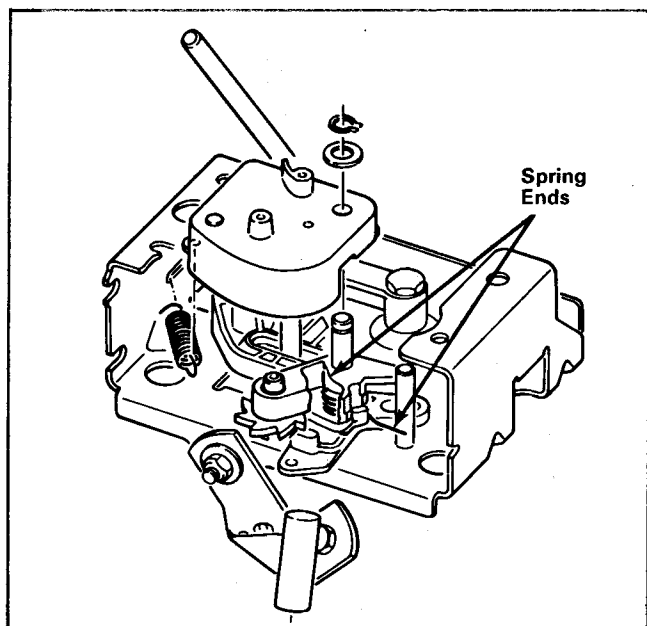


Figure 38

8. Install the latch lever and spring into the position shown in Figure 38. Once installed, rotate the latch

lever back and forth to insure that the index wheel is rotating properly. Secure with the flat washer and snap ring. See Figure 38.

NOTE: Coat the latch lever with an anti-seize compound (Toro part number 505-109) to prevent corrosion and subsequent binding.

9. Next, install the reverse lever and reverse lever return spring as shown in Figure 39. Make sure that the boss at the bottom of the reverse lever engages the reverse bellcrank.

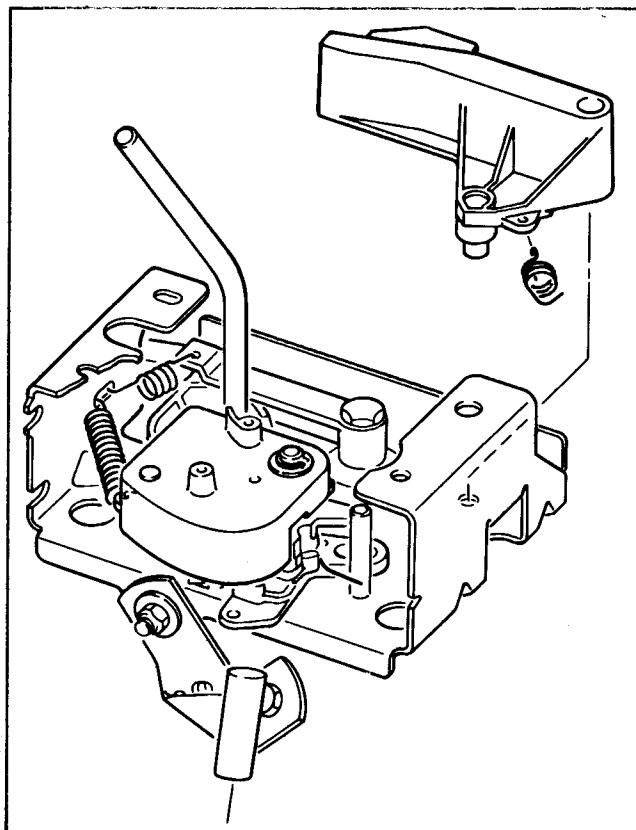


Figure 39

10. Make sure that all three control box springs are in the position shown in Figure 40.

Control Box Service - Installation

1. Install the end of the reverse cable into the reverse bellcrank from the bottom of the reverse bellcrank. Secure with the two jam nuts at the end of the cable sheath. Adjust as described in **Control Box Service - Adjustments**, page 49.
2. Insert the end of the latch release cable into the small hole in the top of the latch lever. Adjust as described in **Control Box Service - Adjustments**, page 49.

Control Box Service - Installation (cont'd)

3. Install the latch lever cover with 2 Phillips screws. Do not overtighten. Adjust the latch cable as described in Control Box - Adjustments, page 49.

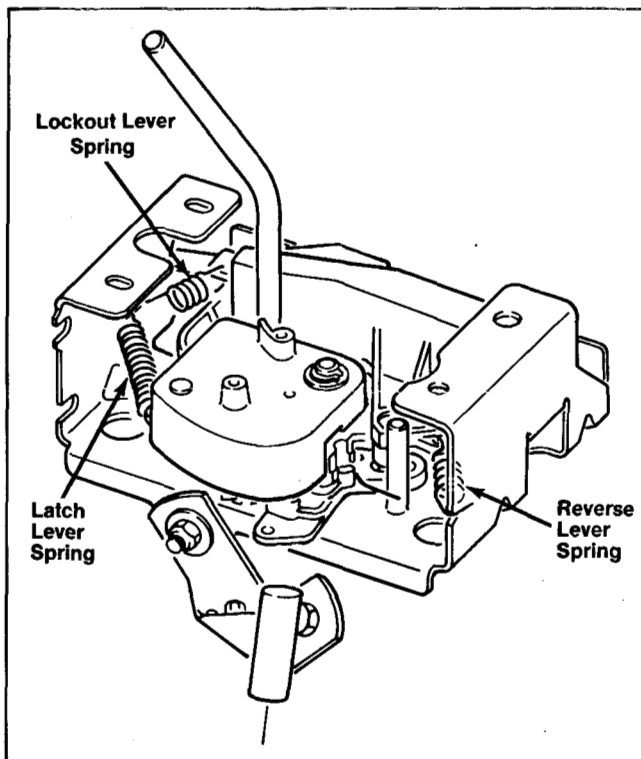


Figure 40

4. Install the Power Shift control box on the control panel, making sure that the reverse lever is properly mounted on the upper left stud. Secure with 4 nylon locknuts. Before proceeding, be sure all levers are working smoothly.
5. Attach the lower shift rod to the shift bracket with the nylon locknut as shown in Figure 41. Make certain that the ball joint is in the position shown or the shift mechanism will not work properly.

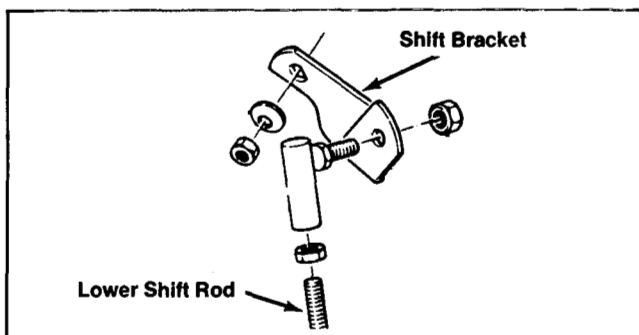


Figure 41

6. Push the rubber-shift knob onto the shift lever until it is fully seated. Note that it is a press fit only. Once installed the knob should point forward.

Control Box Service - Adjustments

1. **Latch Cable Adjustment:** Adjust the latch control cable by removing slack between the end of the sheath and the end of the cable. Do not tighten beyond the point of removing slack. See Figure 42.

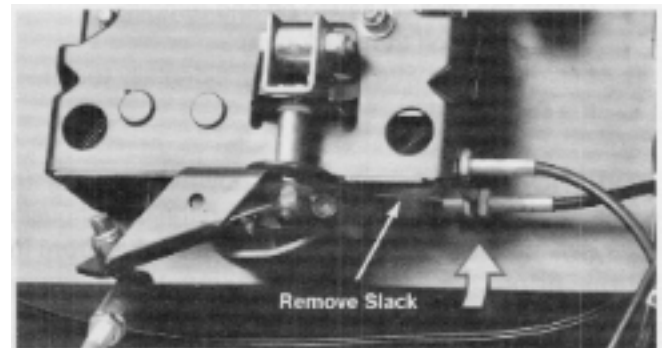


Figure 42

2. **Reverse Cable Adjustment:** Adjust the reverse cable so that there is 1.5 mm (1/16") side play in the reverse bellcrank as shown in Figure 43. If the cable is too loose, loss of reverse will result. If the cable is too tight, loss of the forward gears will occur.



Figure 43

3. **Shift Lever Adjustment:** The shift lever is properly adjusted when the transmission is in second gear and the lever slides right down the center of the power shift slot. If adjustment is necessary, remove the lower shift rod from the bellcrank near the transmission and manually place the bellcrank in second (ie. second notch from the top). Loosen the jam nut at the ball joint and move the ball joint up or down until the shift lever rides in the center of the power shift slide. Secure by attaching the ball joint to the bellcrank with a nylon locknut and tightening the jam nut.

SECTION 2 TRACTION AND IMPELLER CONTROLS

CAUTION: Servicing the Power Shift Snowthrower will require working with some of the moving parts. To prevent accidental starting of the engine while performing service, take the following precautions:

- Rotate the ignition key to off and remove.
- Pull the wire off the spark plug.
- Make sure the wire does not accidentally touch the spark plug.

CAUTION: The Power Shift Snowthrower has the feature of being able to be stood on the front housing for service and storage. Always drain the fuel from the tank prior to such service taking the following precautions:

- Drain it outdoors and make sure the engine is cool.
- Wipe up any gasoline that may have spilled.
- Do not drain the gasoline near any open flame or spark.
- Do not smoke when handling gasoline.

OPERATION

Operation - Traction Control

Traction is controlled by means of the lever on top of the left handle. See Figure 44. The lever is spring loaded in the disengaged position. The transmission can be engaged by pushing down on the lever.

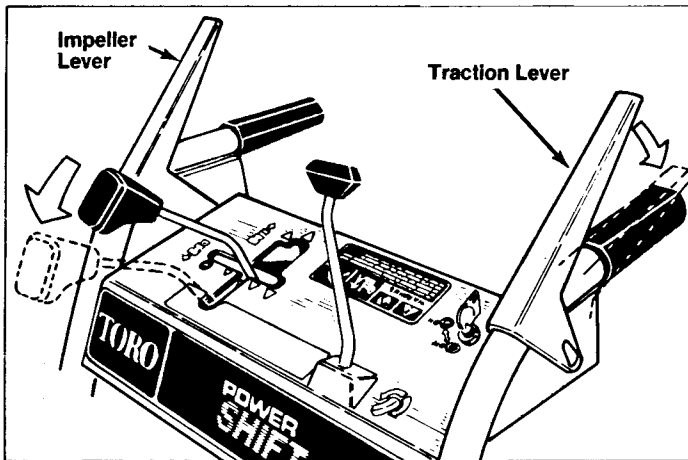


Figure 44

The traction lever is rigidly fastened to the cross rod that passes underneath the control panel. See Figure 45. Also attached to the cross rod is a trip lever (that actuates the shift lockout mechanism) and a cam release (that controls the impeller locking mechanism). Both are keyed to the traction lever rod.

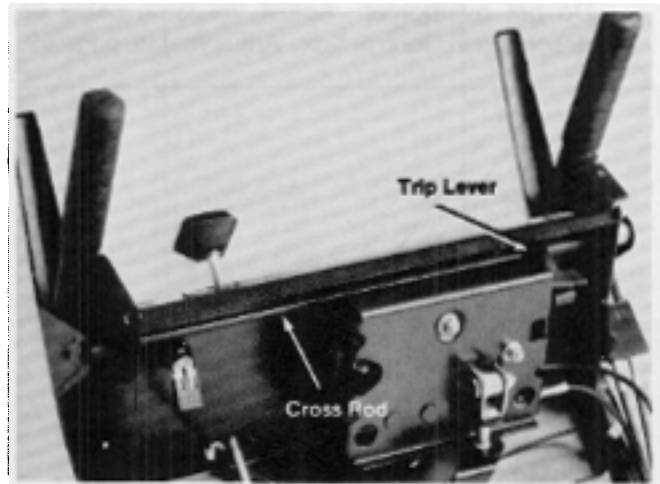


Figure 45

Control inputs are transferred down to the idler assembly through the cable attached to the release cam. The top end of the traction cable is protected by a rubber boot to help prevent corrosion and icing.

Operation - Impeller Control

The impeller control is the lever located on top of the right handle. See Figure 44 above. It is spring loaded in the disengaged position. The auger is engaged by depressing the lever.

Control input is transferred to the idler assembly at the auger pulley by means of a cable. There is a boot at the top end of the auger cable to help prevent corrosion and icing.

Operation - Impeller Locking Mechanism

As a convenience feature, there is an impeller locking mechanism that holds the impeller control in the engaged position if the traction lever is also engaged. This feature lets the operator throw snow and propel the unit with one hand, leaving the other free to position the chute.

The impeller locking mechanism is comprised of only four pieces. They are:

- locking tang
- release cam
- locking latch
- torsion spring

The mechanism is disabled whenever the traction lever is in the disengaged position. See Figure 46.

Operation - Impeller Locking Mechanism (cont'd)

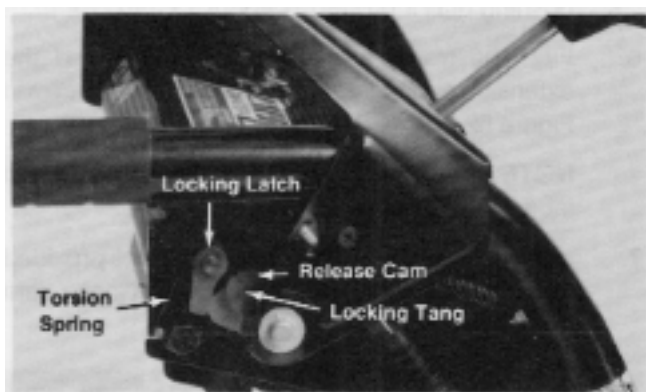


Figure 46

When the traction lever is engaged, the locking latch is free to rotate and engage the locking tang. See Figure 47.

NOTE: The impeller locking mechanism will work regardless of the order in which the levers are depressed.

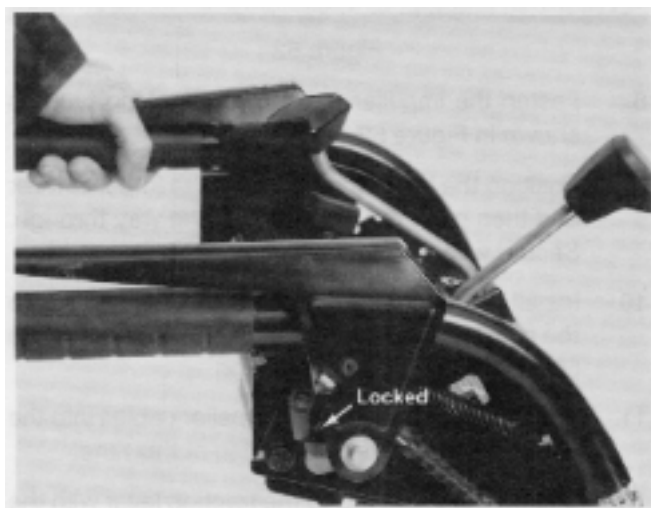


Figure 47

If the traction lever is released while the impeller locking mechanism is engaged, the release cam will push the locking latch to release the impeller control. See Figure 48.

TRACTION AND IMPELLER CONTROLS

Traction and Impeller Controls - Disassembly

1. Remove the two Phillips screws securing the locking mechanism cover to the handle and remove the cover. Check the locking mechanism components for proper operation.
2. Remove the two cables from the cable holder on the right handle.

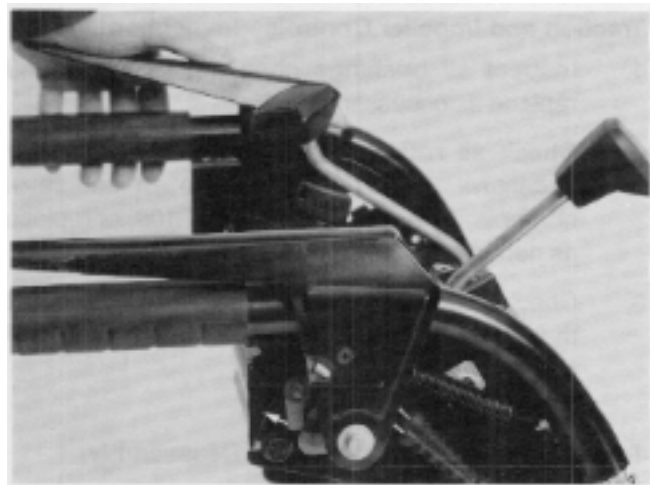


Figure 48

3. Remove the push nut and the machine screw from the right side of the impeller lever. See Figure 49.



Figure 49

4. Remove the hex head screw securing the traction control to the cross rod.
5. Slowly pull the cross rod from the handles releasing the locking tang and the release cam. Remove the locking tang and the release cam from the cables and set them aside.
6. Remove the E-clip securing the locking latch to the right handle and remove the locking latch and torsion spring.
7. Press out the impeller lever bushing and remove the auger lever.
8. Continue removal of the cross rod by pulling it out from the left handle until the trip lever is released. Set the trip lever aside.
9. Completely remove the cross rod being careful not to lose the traction lever spacer.
10. Press out the traction lever bushing and remove the traction lever from the left handle.

Traction and Impeller Controls - Inspection

1. Inspect all bushings checking for wear and replace as necessary.
2. Check all rotating parts for corrosion and/or excessive wear. Lubricate with an anti-seize compound (Toro part number 505-109) or replace as necessary.
3. Check the trip lever and release cam to insure that the keys securing them to the cross rod are still intact.

Traction and Impeller Controls - Reassembly

See Figure 50.

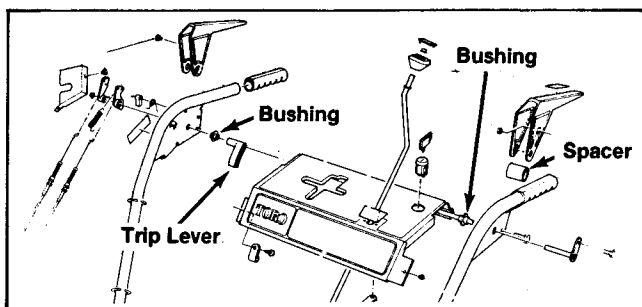


Figure 50

1. Position the traction lever in its normal location on the left handle and press in the traction lever bushing.

NOTE: The traction lever bushing is reversible.

2. Place the traction lever spacer inside the traction lever and insert the cross rod through the traction lever.
3. Install the trip lever onto the cross rod as shown in Figure 51.

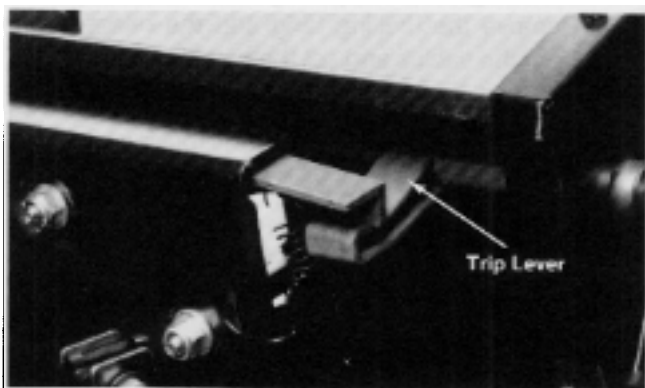


Figure 51

4. Position the impeller lever on the right handle and press in the impeller lever bushing.

NOTE: The impeller lever bushing is reversible.

5. Push the cross rod through the impeller lever bushing until it protrudes about 13 mm (1/2").
 6. Find the traction cable and install it and the extension spring into the release cam as shown in Figure 52.
- NOTE:** The recessed side of the release cam will face the control panel.
7. Hook the extension spring into the slot provided in the right handle then mount the release cam onto the cross rod.

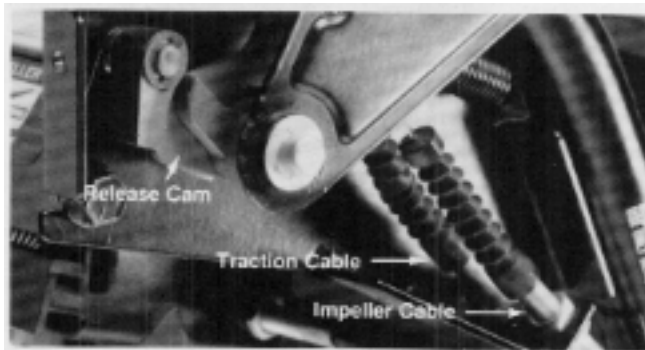


Figure 52

8. Fasten the impeller cable to the locking tang as shown in Figure 52.
9. Position the locking tang inside the impeller lever and then push the cross rod all the way through. Secure with the Phillips screw.
10. Install the torsion spring and the lock latch onto the spindle and secure with the E-clip. See Figure 52 for proper spring orientation.
11. Position both traction and impeller cables into the cable holder, but do not tighten at this time.
12. Secure the cross rod to the traction lever with the hex head screw and locknut.
13. Before assembling any further, verify that everything works as described under **Traction and Impeller Controls - Operation**, page 50.
14. Install a new push nut on the right end of the cross rod. Be sure to align the tabs in the push nut 90° from the keyway to insure retention.
15. Install the locking mechanism cover with the two screws.

Traction and Impeller Controls - Traction Cable Adjustment

The traction system uses very little of the available power from the engine. Therefore, the belt doesn't require much tension to drive the wheels.

Traction and Impeller Controls - Traction Cable Adjustment (cont'd)

1. Check for proper tension by pushing the front housing of the snowthrower against a protected wall. Proper traction belt tension is achieved when the wheels spin on a concrete floor in second gear, but do not in fourth.
2. Adjust tension by loosening the two jam nuts at the upper end of the traction cable. To increase tension, rotate the nuts so that the end of the sheath moves down. To decrease tension, the end of the sheath must be moved closer to the traction lever.

CAUTION: Do not overtighten because it may cause the snowthrower to creep when the traction lever is in the disengaged position.

Traction and Impeller Controls - Impeller Cable Adjustment

The impeller drive system will in some conditions transmit most of the power available from the engine. Therefore the tension on this belt is fairly high.

1. Depress the impeller lever. Proper tension is achieved when there is .25 mm (.010") clearance between coils of the impeller cable spring. See Figure 53.

Impeller Cable Spring - Coil Clearance:
.23 mm to .30 mm (.009" to .012")

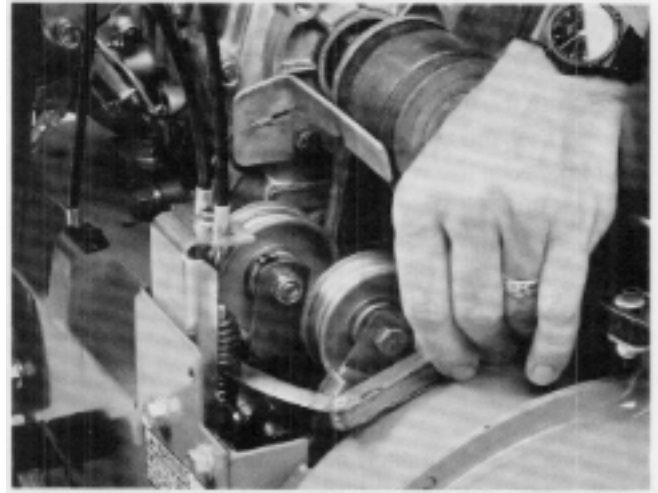


Figure 53

2. Adjust tension by loosening the two jam nuts at the top of the auger cable. Increase tension by rotating the nuts so that the end of the sheath moves down. Decrease tension by moving the end of the sheath toward the impeller lever.

NOTE: Do not overtighten as it may cause the impeller and auger to turn when the lever is in the disengaged position.

SECTION 3 DISCHARGE CHUTE

CAUTION: Servicing the Power Shift Snowthrower will require working with some of the moving parts. To prevent accidental starting of the engine while performing service, take the following precautions:

- Rotate the Ignition key to off and remove.
- Pull the wire off the spark plug.
- Make sure the wire does not accidentally touch the spark plug.

CAUTION: The Power Shift Snowthrower has the feature of being able to be stood on the front housing for service and storage. Always drain the fuel from the tank prior to such service taking the following precautions:

- Drain it outdoors and make sure the engine is cool.
- Wipe up any gasoline that may have spilled.
- Do not drain the gasoline near any open flame or spark.
- Do not smoke when handling gasoline.

CHUTE CONTROL

Chute Control - Operation

The control for the discharge chute of the Toro Power Shift Snowthrower was designed so that the chute would turn in the same direction that the input knob was rotated. See Figure 54.



Figure 54

The operator provides control input by turning the chute control knob at the control panel. This rotation is transmitted to the chute by means of a constant velocity joint and two shafts. The final shaft turns a worm gear which drives the teeth on the chute.

The chute rotates from extreme left to right through an arc of 200 degrees in about six turns of the crank.

Chute Control - Knob Removal

NOTE: Do not remove the knob unless necessary.

1. To remove the knob, use a pocket knife to pry off the square knob cover. See Figure 55.

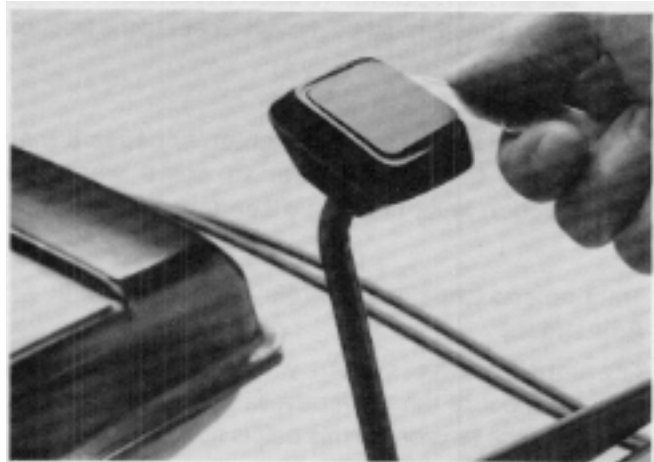


Figure 55

2. Remove the push nut by drilling through the two tabs in the pushnut and prying off.
3. Remove the knob.

Chute Control - Knob Installation

1. Install the knob on the rod, recessed side up.
2. Press on a new pushnut using an 11 mm (7/16") socket.
3. Reinstall the knob cover using a small amount of clear silicone if necessary.

Chute Control - Upper Rod Removal

1. Remove the roll pin in the upper gear. See Figure 56.

NOTE: Do not remove the knob unless necessary.

2. Pull the upper rod assembly out through the control panel. Do not lose the rubber washer above the gear.
3. If desired, remove the upper rod bushing by removing the two Phillips screws from beneath the control panel.

Chute Control - Upper Rod Removal (cont'd)

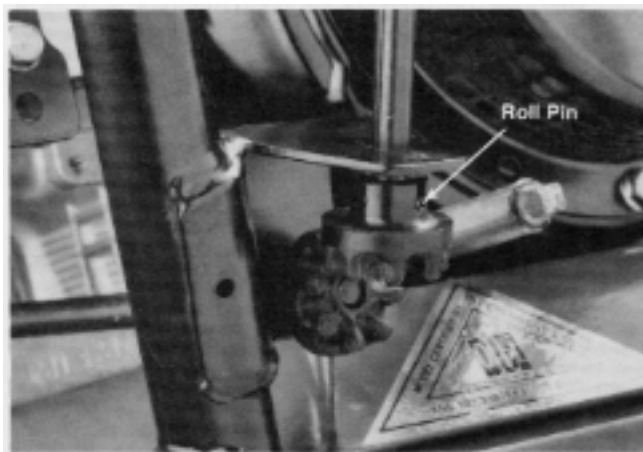


Figure 56

Chute Control - Upper Rod Installation

See Figure 57.

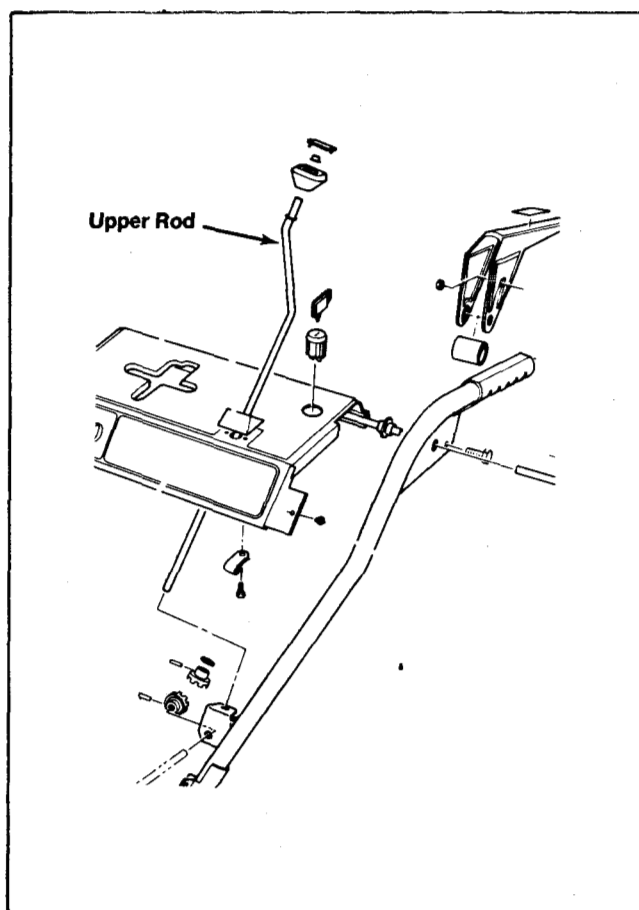


Figure 57

1. Mount the upper rod bushing on the control panel.
2. Slide the upper rod assembly through the control panel from the top.

3. Slide the upper rod through the bracket then slip the rubber washer on the end of the rod. Install the gear on the rod with the teeth facing down.
4. Secure the gear with the roll pin.

Chute Control - Lower Rod Removal

1. Remove the roll pin from the lower rod gear.
2. Pull the rod from the worm gear bracket and then forward to remove it from the bracket.
3. If desired, remove the worm gear bracket.

Chute Control - Lower Rod Installation

See Figure 58.

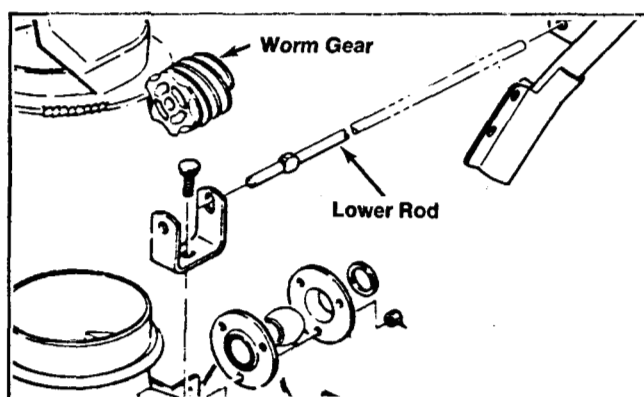


Figure 58

1. Loosely mount the worm gear bracket with the carriage bolt, washer and locknut.
2. Insert the lower rod into the joint bracket.
3. Place the worm gear in the worm gear bracket and slide the lower rod into it.
4. Install the lower rod gear with the teeth facing the rear of machine.
5. Adjust the worm gear bracket by pushing it toward the chute until the teeth on the chute and the worm gear are just touching. Check for binding by rotating the control knob. If binding is noticed, move the worm gear bracket out slightly and recheck.

DISCHARGE CHUTE

Discharge Chute - Operation

CAUTION! Keep hands, feet and loose clothing from the discharge chute area. The impeller at the bottom of the discharge chute rotates rapidly and could cause severe injury if contacted. If the chute should

Discharge Chute - Operation (cont'd)

clog, always stop the engine, wait for all moving parts to stop, disconnect spark plug lead and then use a tool, such as a broom handle, to clear the obstruction.

CAUTION! Do not operate the snowthrower without the chute guard in place. It is there to help prevent inadvertent contact with the impeller.

CAUTION! When throwing snow, never direct the discharge at people, pets or personal property as debris or ice could be picked up and thrown.

See Figure 59.

The discharge chute rotates through an arc of 200° for convenient directioning of snow while throwing.

The chute rotates on a ring that is welded to the front housing assembly. Three retainers hold the chute on the ring and allow it to rotate.

Directional changes are the result of manual inputs from the operator and are transmitted through the control rod assembly and the worm gear. The chute itself has teeth manufactured into it which mate with the worm gear.

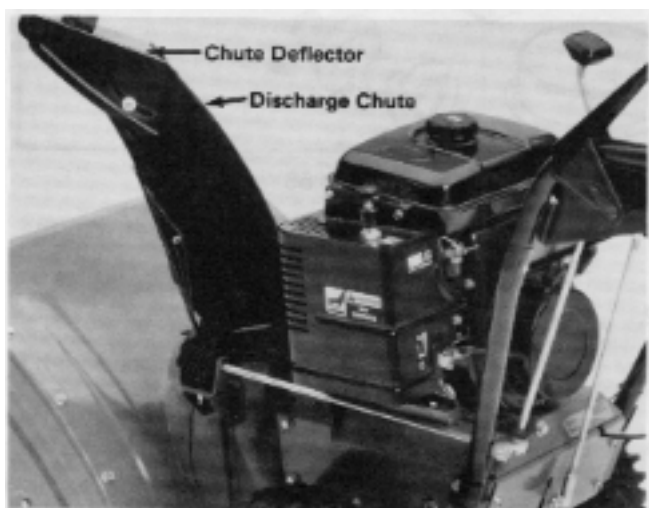


Figure 59

The chute deflector is hinged and gives the operator greater control over the vertical and horizontal distances the snow is thrown. A piano hinge is used to reduce the amount of snow blown through the hinge.

Nylon washers hold the top of the chute in position and allow it to be moved without the use of tools when the locknut is properly tightened.

The chute deflector is not removable or replaceable separately.

Discharge Chute - Removal

1. Remove the three socket head machine screws at the base of the chute.
2. Remove the chute.

Discharge Chute - Installation

See Figure 60.

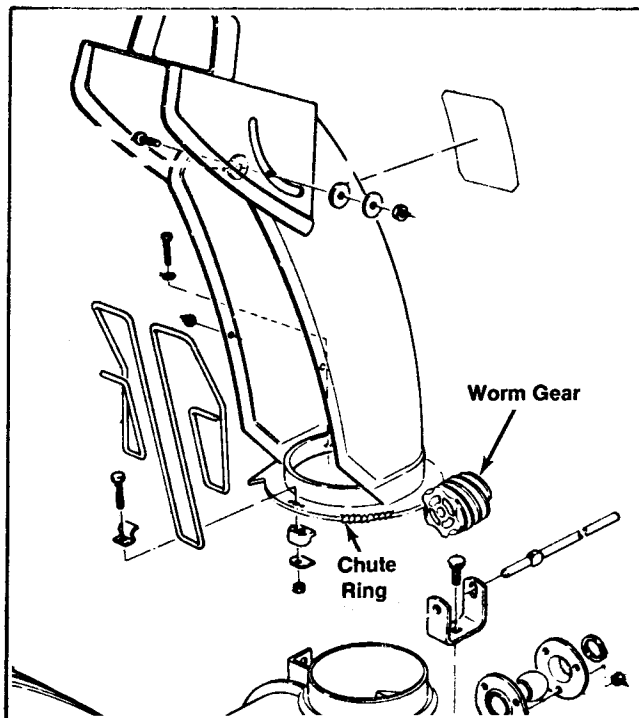


Figure 60

1. Lightly grease the chute ring with a #2 lithium base grease.
2. Loosen the nut under the worm gear bracket to facilitate installation of the chute.
3. Place the chute on the chute ring with the *chute facing forward*. Install the two rear chute retainers using socket head machine screws and nylon locknuts.
4. Install the front chute retainer being sure that the chute guard is trapped by the chute guard bracket.
5. Adjust the worm gear bracket by pushing it toward the chute until the teeth on the chute and the worm gear are just touching. Check for binding by rotating the control knob. If binding is noticed, move the worm gear bracket out slightly and recheck.

SECTION 4 IDLER SYSTEM

CAUTION! Servicing the Power Shift Snowthrower will require working with some of the moving parts. To prevent accidental starting of the engine while performing service, take the following precautions:

- Rotate the ignition key to off and remove
- Pull the wire off the spark plug
- Make sure the wire does not accidentally touch the spark plug

CAUTION! The Power Shift Snowthrower has the feature of being able to be stood on the front housing for service and storage. Always drain the fuel from the tank prior to such service taking the following precautions:

- Drain it outdoors and make sure the engine is cool
- Wipe up any gasoline that may have spilled
- Do not drain the gasoline near any open flame or spark
- Do not smoke when handling gasoline.

Idler System - Operation

See Figure 61

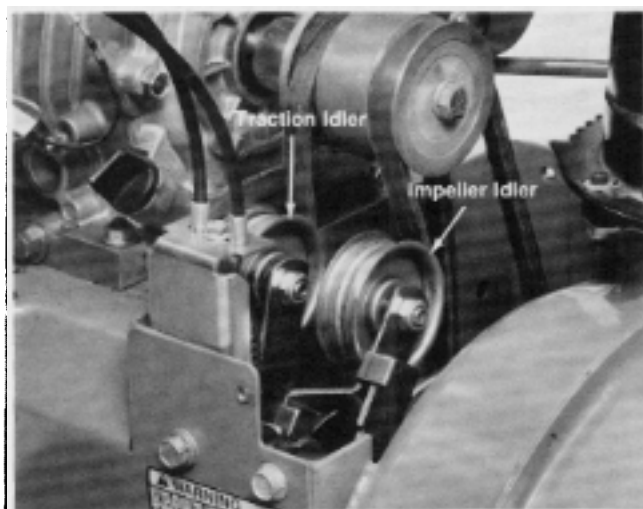


Figure 61

The idler assembly is comprised of two idler pulleys, one for the traction belt and one for the impeller belt and the auger brake.

The traction idler pulley rotates about a plastic bushing and is centered by two springs. The lower spring returns the idler to the disengaged position once tension is released from the cable. The other spring is attached to the traction cable and prevents over-tensioning.

The impeller idler pulley is set up similarly, again rotating about a plastic bushing and using two springs, one for return and the other to prevent over-tensioning.

Also rotating about the same shaft is the brake arm. It is spring loaded so that the brake pad is pressing against the impeller pulley whenever there is no tension on the impeller cable. When the impeller is engaged, the impeller idler arm pulls the brake off of the impeller pulley.

Idler System - Removal

1. Remove the three cap screws securing the belt cover to the snowthrower frame.
2. Remove the two hex head cap screws securing the idler assembly to the snowthrower frame. See Figure 62.

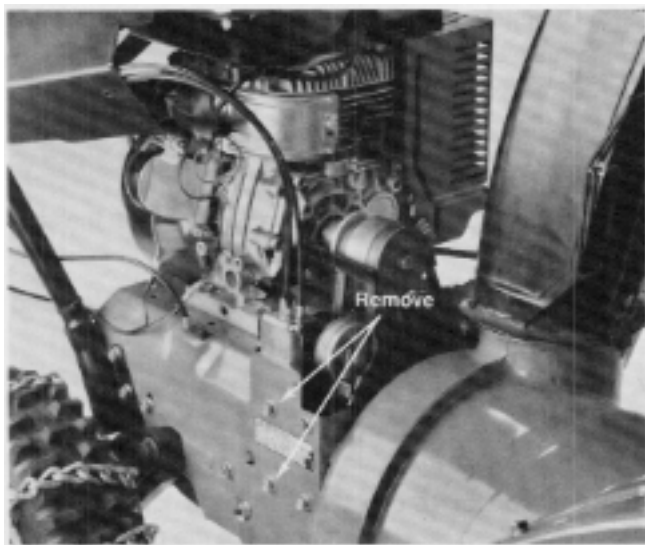


Figure 62

3. Pull the idler assembly from the frame and disconnect the two idler springs from the lower arm bracket. See Figure 63.
4. Remove the hex head cap screw and nylon lock nut from the idler arm bracket and remove the traction and impeller cables.

Idler System - Disassembly

1. De-tension the impeller brake torsion spring by moving the short end of the spring off the idler arm bracket tang.
2. Remove the snap ring and Belleville washer from the idler pin on the impeller brake side.

Idler System - Disassembly (cont'd)

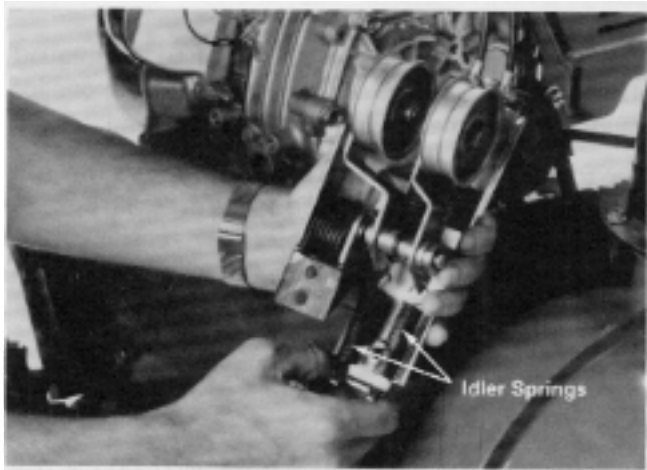


Figure 63

CAUTION! The torsion spring is under tension. Eye protection and heavy gloves are recommended when installing spring.

3. Check the impeller pulley brake pad for excessive wear and remove if necessary. Remove by grasping with a needle nose pliers and rotating.
4. Pull the idler pin from the idler arm bracket and remove the two idler arms.
5. Remove the two idler return springs from the idler arms.
6. Remove the fastener retaining the cables and remove the cables.
7. Remove the idler bushing from the idler arm pivots and inspect for wear. Replace if necessary.
8. Check the traction idler pulley and impeller idler pulleys for free rotation on the idler arms. If necessary, remove and replace the pulleys.

Idler System - Reassembly

See Figure 64.

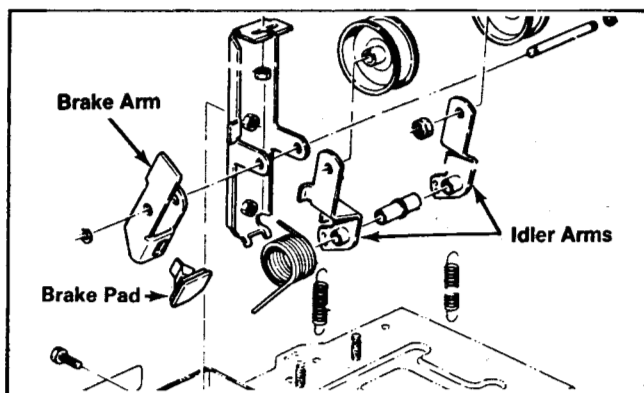


Figure 64

1. Insert a hex head cap screw into each of the idler pulleys.

NOTE: The head of each cap screw must be on the short race of each idler pulley bearing.

Secure with the nylon locknuts and check for free rotation of each idler pulley.

2. Mount the two idler arms onto the idler bushing using Figure 64 as a guide.
3. Insert the two idler arms into the idler bracket and secure with the idler pin using Figure 64 as a guide.
4. Hook the two idler return springs into the lower holes on the idler arms.
5. If the impeller pulley brake pad was removed, apply a small amount of adhesive onto the brake arm and install the brake pad.
6. Slip the torsion spring into the brake arm with the short side of the spring on the opposite end of the brake pad. Slip onto the idler pin and secure with a belt, washer and snap ring.

NOTE: Do not attempt to tension the spring at this time.

7. Grasp the short end of the torsion spring with a needle nose pliers and slip into the tang on the idler arm bracket.

See Figure 65

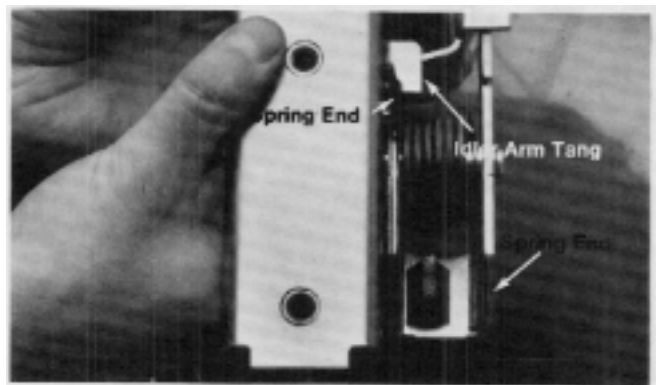


Figure 65

CAUTION! The torsion spring is under tension. Eye protection and heavy gloves should be worn when performing this procedure.

Idler System - Installation

1. Find the impeller cable and insert the spring end into the upper hole on the impeller idler arm, then slip the end of the impeller cable sheath into the slot provided at the top of the idler bracket.

Idler System - Installation (cont'd)

2. Find the traction cable and insert the end of the traction spring into the upper hole on the traction idler arm, then install the end of the sheath into the slot provided at the top of the idler arm bracket.
3. Secure both cables with the hex head cap screw and nylon locknut. See Figure 66.

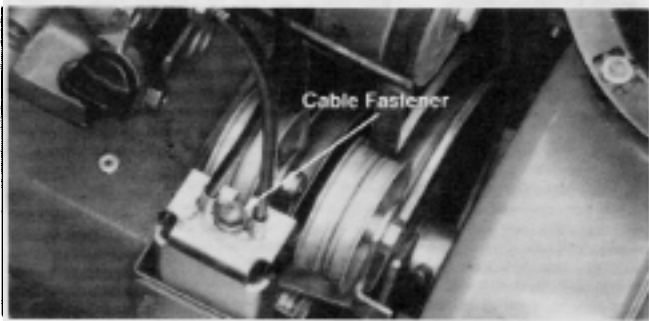


Figure 66

4. Hook both idler return springs onto the corresponding tabs provided at the bottom of the idler arm bracket as shown back in Figure 63.
5. Insert the idler assembly into the snowthrower frame and secure the two hex head cap screws.
NOTE: Verify that the brake pad is still in place after installing idler assembly.
6. Mount the belt cover onto the snowthrower frame and secure with the three self-tapping screws.
7. Adjust the traction and impeller cables as described below.

Idler System - Adjustment

See **Traction Cable Adjustment**, page 52 and **Impeller Cable Adjustment**, page 53 for information on proper idler adjustment.

SECTION 5 PIVOT AND LATCH SYSTEM

CAUTION! Servicing the Power Shift Snowthrower will require working with some of the moving parts. To prevent accidental starting of the engine while performing service, take the following precautions:

- Rotate the ignition key to off and remove
- Pull the wire off the spark plug
- Make sure the wire does not accidentally touch the spark plug

CAUTION! The Power Shift Snowthrower has the feature of being able to be stood on the front housing for service and storage. Always drain the fuel from the tank prior to such service taking the following precautions:

- Drain it outdoors and make sure the engine is cool
- Wipe up any gasoline that may have spilled
- Do not drain the gasoline near any open flame or spark
- Do not smoke when handling gasoline.

PIVOT SYSTEM

Pivot System - Operation

The Power Shift snowthrower, like most snowthrowers, uses a chain to transfer power from the transmission to the rear axle. However, unlike any other snowthrower, the Power Shift snowthrower allows the wheels to pivot forward and backward, thereby transferring weight to and from the front end. See Figure 67.

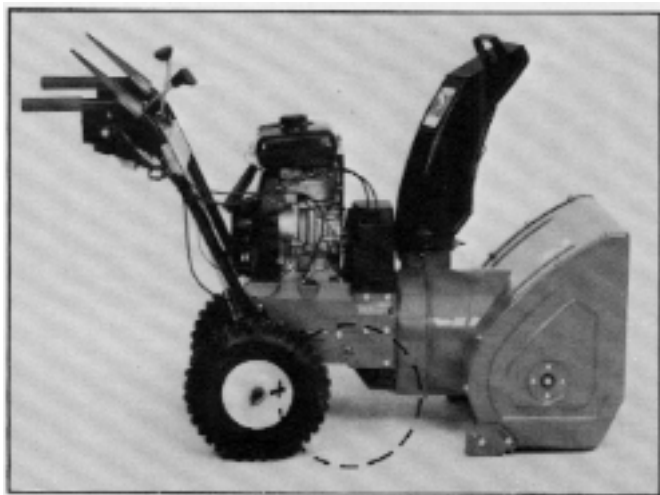


Figure 67

The pivot arms pivot about an axis coincident with the output shaft. This is important because it prevents changes in chain tension as the axle swings. Once in

position, the latch rod and the latch plate retain the pivot arms. See Figure 68.

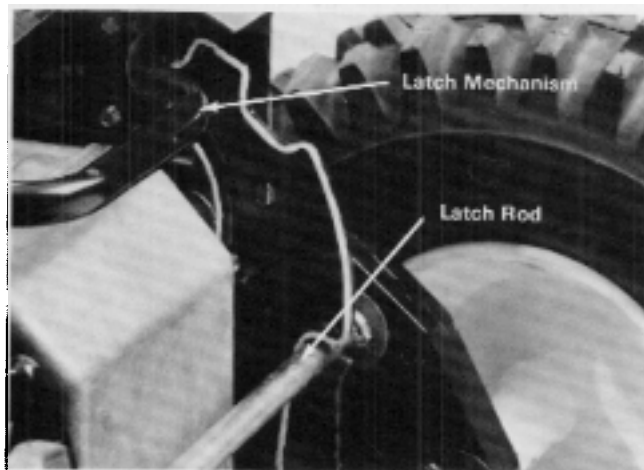


Figure 68

The latch rod rests in either of the two stops during normal operation. However, when power shifting, the latch cable pulls up on the latch plate thereby allowing the latch rod to move freely past the stops on the latch plate.

Power for the swinging action is provided by the transmission. For instance, if the operator wishes to move the wheels from the forward to the rear position, the latch plate is moved out of the way, then the transmission powers the wheels backwards by driving in reverse.

The standard rear axle is solid, providing no differential action. An optional differential kit is available. For more information on the differential kit, see **Section 14, Differential Kit**, page 88.

Pivot System - Disassembly

1. Remove the klik pin securing the wheel to the axle and remove the wheel and tire assembly. Also remove the thrust washer that fits between the wheel and the pivot arm.
2. Remove the right half of the chain guard.
3. Remove the nylon locknut that secures the latch rod to the left hand pivot arm.
4. Remove the nylon locknuts and Belleville washers from the pivot arm pivot bolts. (Thread forming screws secured the latch rod on '88 units only.)

NOTE: The *pivot bolts* may be difficult to remove from the pivot arms. It is not necessary that they be removed at this time.

Pivot System - Disassembly (cont'd)

5. Remove the left hand pivot arm complete with the chain guard.
6. Remove the latch rod, pivot arm, and rear axle assembly by slipping the chain off the large sprocket.
7. Remove chain guard from the left hand pivot arm.
8. Remove the latch rod from the right hand pivot arm.
9. If necessary, remove the bushings from the pivot arms using an arbor press.
10. If desired, remove the pivot bolts. They may flare somewhat once installed and may have to be pressed out with an arbor press.
11. If necessary, remove the roll pins from the axle.

Pivot System - Reassembly

See Figure 69.

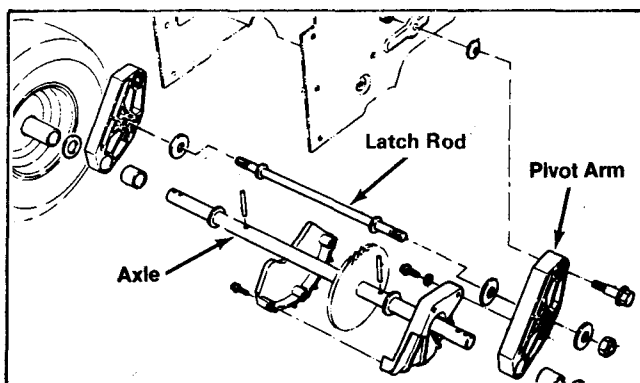


Figure 69

1. Press new bushings into both pivot arms.
2. Install the chain guard on the left hand pivot arm.
3. Press roll pins into the two inner holes on the axle and slide thrust washers on each end so that they rest against the roll pins.
4. Install the latch rod into the right hand pivot arm, making sure that there is a large flat washer on each side of the pivot arm. Don't tighten the nylon locknut at this time.
5. Insert the axle into the right pivot arm and latch rod assembly. The sprocket will be on the left side of the axle when it is installed correctly.

NOTE: Make sure there is a thrust washer between the roll pin and the pivot arm.

6. Insert the latch rod, pivot arm, and axle assembly into the proper location on the right side of the chassis. Be sure to slip the chain over the sprocket.

NOTE: There must be a Belleville washer between the frame and the pivot arm. The serrated side of the Belleville washer should face the pivot arm.

7. Slide the left pivot arm and chain guard assembly over the axle and into position.

NOTE: Make sure all washers are in place. There should be a Belleville washer (serrated side toward the pivot arm) between the pivot arm and the chassis, a large flat washer (between the end of the latch rod and the pivot arm), and a thrust washer between the roll pin and the pivot arm when it is installed correctly. See Figure 70.

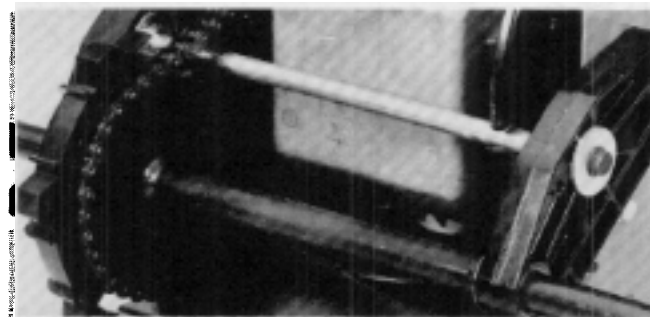


Figure 70

8. Secure the assembly by tightening the pivot arm bolts and nuts, and the nuts on the latch rod.
9. Mate the right half of the chain guard with the left half and secure with the three Phillips screws.
10. Coat the end of the axle with an anti-seize compound (Toro part number 505-109). Do not apply in the bushing area as it may become "gummy".
11. Slide the thrust washers over the end of the axle and install the wheel assemblies. Note that the part of the hub with the hole in it faces outward. Rotate wheel to distribute anti-seize compound.

Secure the wheels with the klik pin. Use the outer hole if free wheeling is desired, or use the inner hole if drive is desired.

LATCH SYSTEM

Latch System - Disassembly

1. Remove the panel fastener from the latch plate and slip out the end of the latch cable.

Latch System - Disassembly

2. Pull the latch plate down to detension the latch plate spring, then remove the nylon locknuts on either side of the latch plate.
3. Remove the latch plate and latch plate spring from the snowthrower frame.

Latch System - Reassembly

See Figure 71

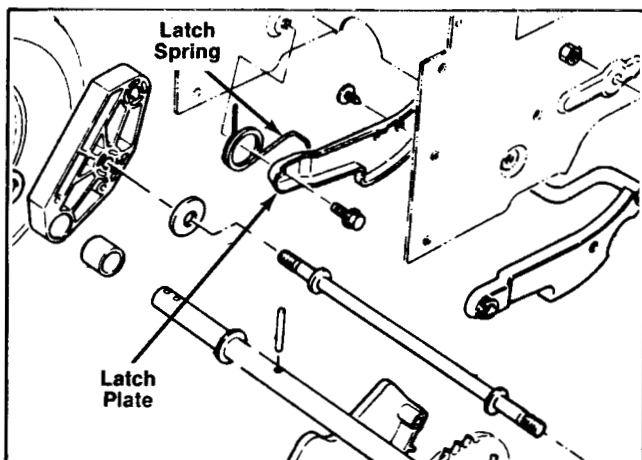


Figure 71

1. Position the latch plate spring on the right side of the frame.

2. Place the latch plate in position.
3. Secure the latch plate with the two shoulder bolts and the nylon locking nuts. Make sure that the head of the bolts are on the inside of the frame.
4. Swing the latch plate up into position and slip the cable into the slot provided. Secure the cable with a new panel fastener. See Figure 72.

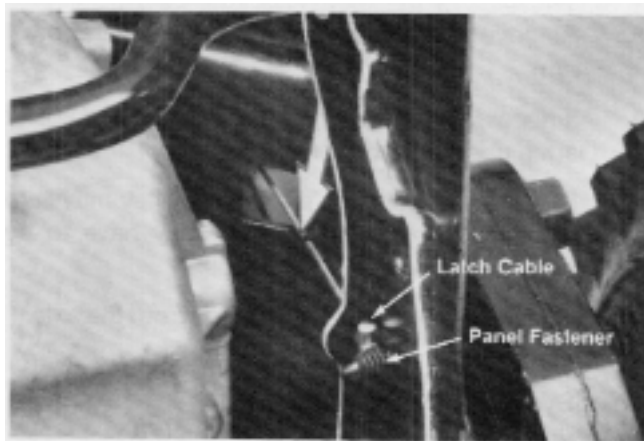


Figure 72

5. Check to insure that the latch plate operates correctly and does not bind.
6. Complete latch plate servicing by reassembling the pivot and drive assembly as described under **Pivot System - Reassembly**, page 61.

SECTION 6 TRANSMISSION

CAUTION! Servicing the Power Shift Snowthrower will require working with some of the moving parts. To prevent accidental starting of the engine while performing service, take the following precautions:

- Rotate the ignition key to off and remove.
- Pull the wire off the spark plug.
- Make sure the wire does not accidentally touch the spark plug.

CAUTION! The Power Shift Snowthrower has the feature of being able to be stood on the front housing for service and storage. Always drain the fuel from the tank prior to such service taking the following precautions:

- Drain it outdoors and make sure the engine is cool.
- Wipe up any gasoline that may have spilled.
- Do not drain the gasoline near any open flame or spark.
- Do not smoke when handling gasoline.

Transmission - Operation

The transmission used on the Power Shift Snowthrower is similar in concept to that used in Toro Rear Drive Rear Baggers although the Power Shift gearbox has directional capability as well as speed reduction. Six separate systems work together to transfer power from the input pulley to the output sprocket.

Input System: The input system is straight forward, consisting of a large pulley, a hub, and a pinion gear. The assembly is supported in the case by a ball bearing. See Figure 73.

Bevel Gears: See Figure 74. The bevel gears rotate freely with respect to the intermediate shaft and the gears on the intermediate shaft. They are driven in opposite directions by the input pinion gear.

The reverse bevel gear is supported on the intermediate shaft by a bushing because it freewheels while the transmission is in forward. The forward bevel gear rides on the first gear hub. No bushing is used on the forward bevel gear because it rotates on the hub only when the transmission is in reverse.

The sliding jaw clutch is coupled to the fixed gear cluster. It is free to slide back and forth between the two bevel gears. The direction of rotation of the fixed gear cluster is determined by which bevel gear the sliding jaw clutch engages.

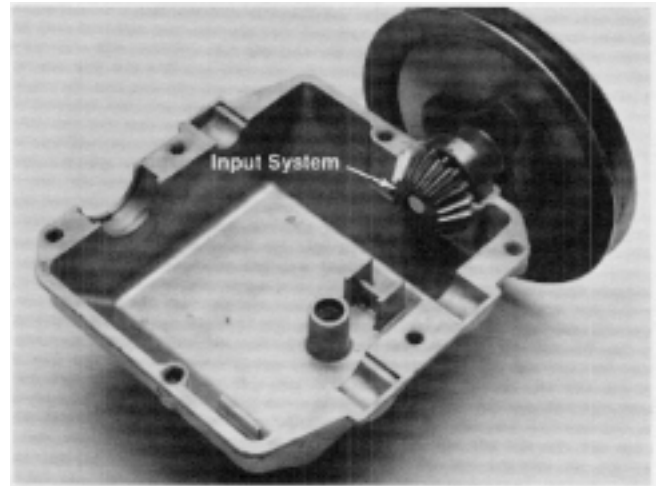


Figure 73

NOTE: The jaw clutch has no intermediate position. It should always be completely engaged with one of the bevel gears.

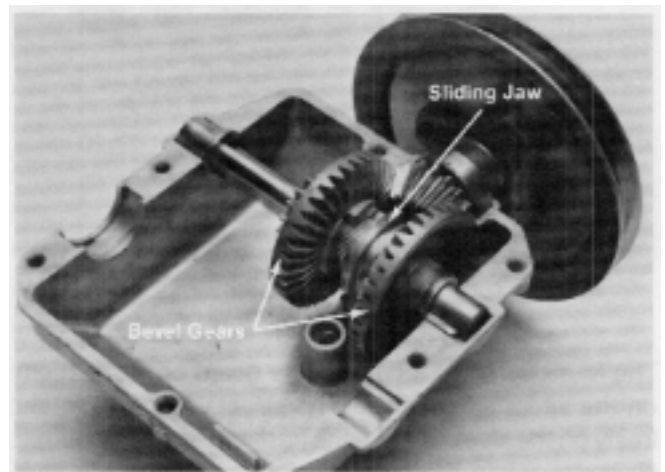


Figure 74

Fixed Gear Cluster: The fixed gear cluster and the sliding jaw clutch rotate as an assembly on the intermediate shaft. See Figure 75.

Selectable Gear Cluster: The selectable gear cluster consists of four independent gears, two sleeves and the shift mechanism. See Figure 76. The sleeves rotate freely on the output shaft and each is supported by a bushing.

NOTE: The sleeve closest to the sprocket is also the first gear in the speed reduction system.

Transmission - Operation (cont'd)

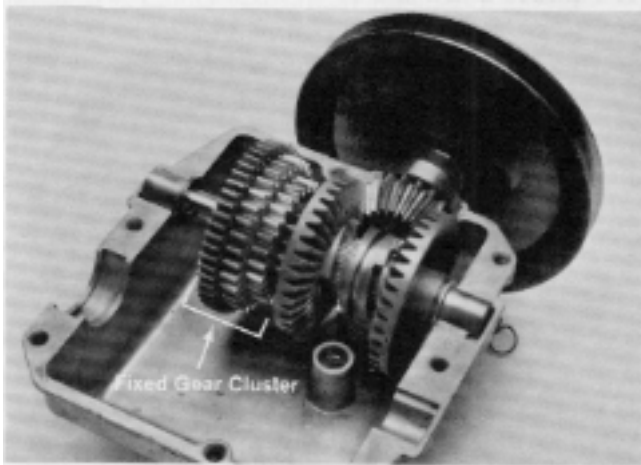


Figure 75

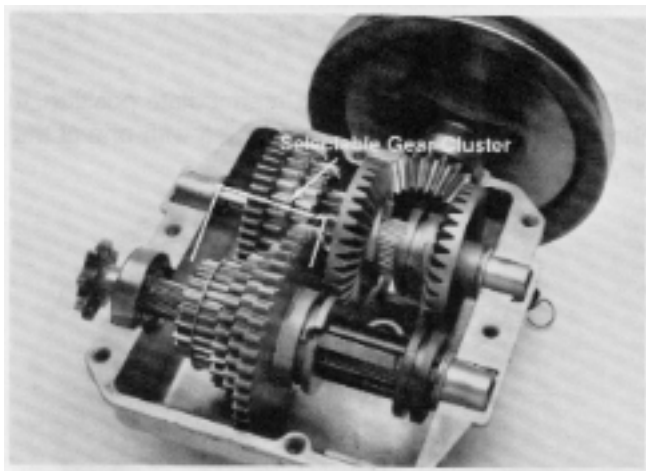


Figure 76

The four gears are driven by the gears opposite them on the intermediate shaft. The selectable gears rotate freely on the sleeves when the transmission is in neutral. However, when the transmission is in gear, the shift mechanism engages *one* of the gears so that the gear and the sleeves rotate together.

Shift Mechanism: See Figure 77. The shift mechanism consists of two sliding shift keys, a shift sleeve, a shift collar and the shift fork. Control input from the operator rotates the shift fork so that the sliding keys engage the desired gear.

Speed Reduction Gear Set: In order to bring the speed of the transmission down to one acceptable for snowthrowing, a speed reduction gear set was incorporated. See Figure 78.

The first gear in the speed reduction gear set is also the sleeve in which the shift keys slide. Therefore, when the transmission is in gear, the number one speed reduction gear rotates. This transmits power to the number two

and number three speed reduction gears. Gears two and three are joined and therefore rotate at the same speed.

The number three speed reduction gear transmits power to the number four gear. Because the number four gear and the output shaft are splined together, power is transmitted to the output shaft and sprocket.

NOTE: The number four speed reduction gear is the only component on the output shaft that is coupled to the output shaft.

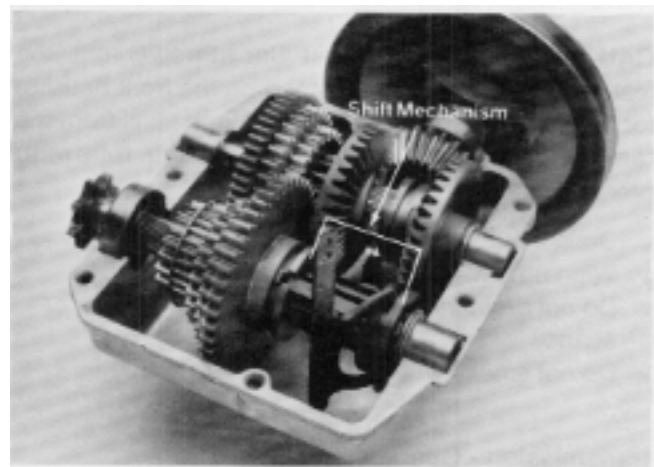


Figure 77

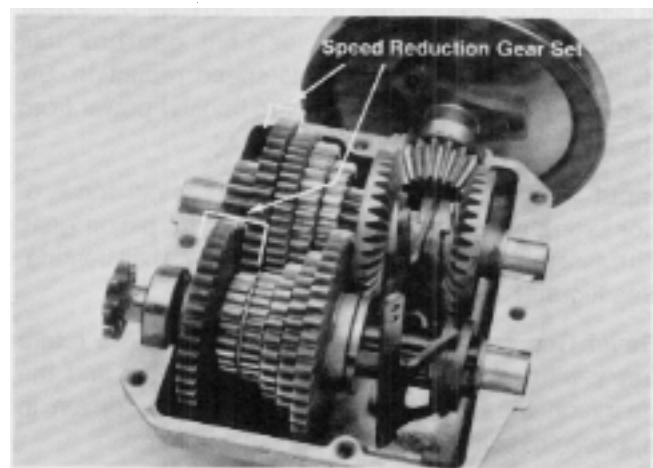


Figure 78

Transmission - Removal

NOTE: Because transmission removal requires many steps, the use of air tools is recommended. However, do not use air tools to tighten or loosen self-tapping screws in aluminum. Thread damage could result.

1. Stand the unit on the front housing to provide better access to the transmission. Don't forget to drain the fuel first as described at the beginning of this section.

Transmission - Removal

2. Disconnect the lower shift rod from the bellcrank on the back of the transmission.
3. Remove the belt cover from the underside of the unit and slip the belt off the transmission pulley.
4. Remove the cover plate from behind the transmission.
5. Remove the pivot system, as described under **Pivot System - Disassembly**, page 60.
6. Remove the latch system as described under **Latch System - Disassembly**, page 61.
7. Remove the two rear nylon locknuts securing the transmission frame to the snowthrower frame and swing the assembly down, out of the unit. Be careful not to damage the reverse cable. See Figure 79.

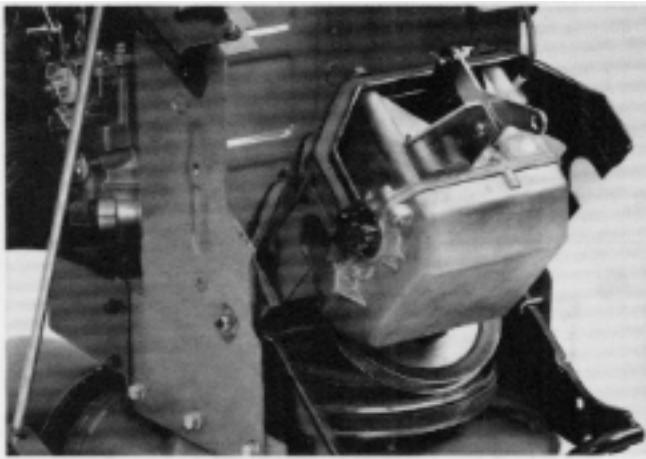


Figure 79

8. Remove the four self-tapping screws from the top of the transmission frame while supporting the transmission to prevent it from falling.
9. Remove the reverse cable clamp and the reverse cable from the top of the transmission. See Figure 80.

Transmission - Disassembly

1. Remove the roll pins on the top of the transmission that secure the gear selector control arm and the direction control arm to the shift forks. Remove the two control arms. See Figure 80.
2. Remove the six hex head screws holding the gear box halves together and remove the upper gear case half.
3. With the gear box open, rotate the input pulley in a counter clockwise direction, checking the

various operations of the transmission. Check for proper operation of the jaw clutch and bevel gears. Check the gear selection shift fork to insure that the shift mechanism is working correctly. Also inspect for broken gear teeth and worn bushings at this time.

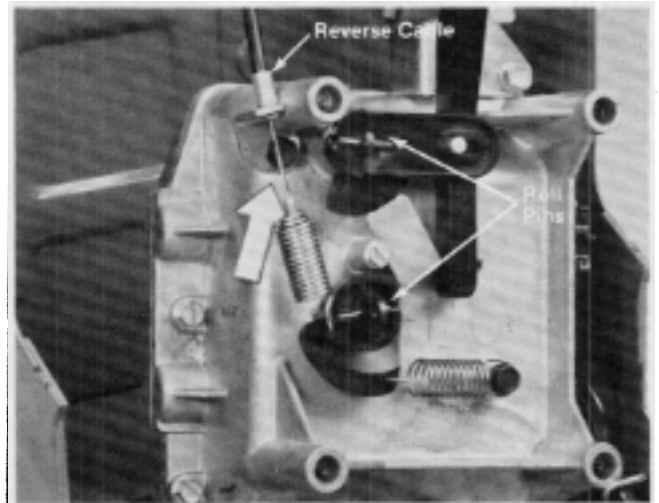


Figure 80

4. If further disassembly is required, remove the input shaft, the intermediate shaft and the output shafts. Remove all excess grease, then clean in a solvent bath.
5. Remove the three self tapping screws from the input pulley. Complete disassembly of the input shaft by removing the pinion through bolt and nut and inspect the components for damage or wear and replace as necessary.
6. Carefully pull the gears, sleeves and spacers from the output shaft, taking note of spacer position.
NOTE: The number of washers used and their position will vary from year to year. Draw a sketch or take notes to insure proper replacement.
7. Inspect the inside and outside teeth on the gears, the sleeves and the bushings for damage or wear and replace as necessary.
8. If desired, the ball bearing can be removed from the output shaft by supporting the inner race of the bearing and then pressing the output shaft out using an arbor press. Be careful not to press on the outer race of the bearing or damage to the bearing may result.
9. Remove the gears, sleeves, spacers and bushings from the intermediate shaft.
10. Complete disassembly of the intermediate shaft by pressing out the roll pin.

Transmission - Disassembly (cont'd)

11. Inspect all components for damage and wear. Replace as necessary.

Transmission - Reassembly

NOTE: Use only Lubriplate® Mag 1 Grease (Toro part number 505-101) in the transmission. Its excellent performance at low temperatures greatly enhances the service life of the transmission. See Figure 81.

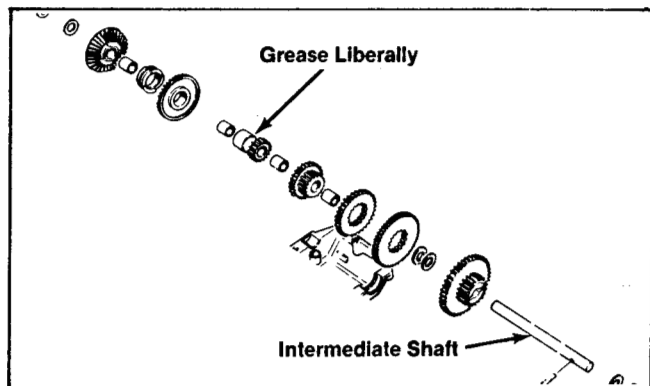


Figure 81

1. **Intermediate Shaft:** Begin reassembly of the intermediate shaft by pressing in the coil pin so that it is centered in the intermediate shaft.
2. Slide the speed reduction gear on the intermediate shaft so that it properly engages the coil pin.
3. Consult your notes or sketch to find out how many spacers fit between the speed reduction gear and the large 51-tooth gear. Slide the appropriate number of spacer washers onto the intermediate shaft.
4. Slide the 33-tooth and the 51-tooth gear onto the 26 tooth gear.
5. Slide the assembly, large gear first, onto the intermediate shaft.
6. Apply grease to the spline and hub on the 15 tooth gear. Slide the 15-tooth gear and sleeve onto the intermediate shaft, geared end first. Make sure that the geared end mates completely with the 26-tooth gear.
7. Slide the large thrust washer (if used) over the splined portion of the 15-tooth gear and follow with the forward bevel gear, the jaw clutch, and the reverse bevel gear.
8. Complete intermediate shaft assembly by sliding the appropriate number of thrust washers and one bushing, flanged side first, on each end of the

intermediate shaft. Install into the proper location in the lower transmission case. Make sure that the keys on the bushings align properly with the key sets in the lower case. See Figure 82.

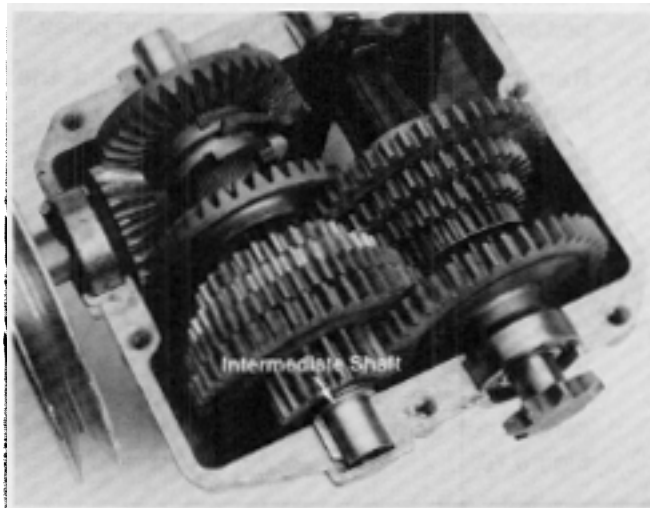


Figure 82

NOTE: Maximum end play is (.030"). If greater than (.030") add a thrust washer (Toro part number 257-10) to either end of the shaft.

9. **Output Shaft:** See Figure 83.

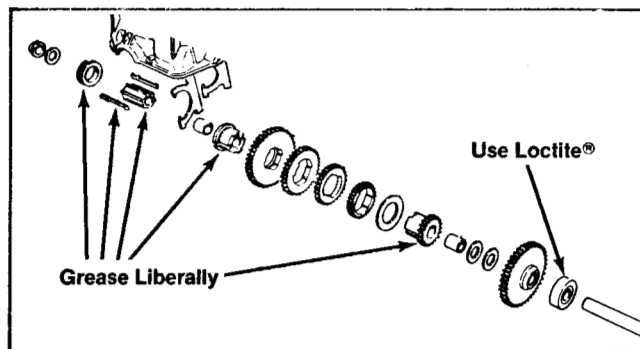


Figure 83

Begin output shaft assembly by pressing the ball bearing onto the output shaft. Be sure to press only on the inner race when installing the bearing to prevent possible bearing damage.

Space Between Sprocket and Bearing:

$$1.22 \pm .08 \text{ cm } (.48 \pm .03")$$

Slide the large 42-tooth speed reduction gear onto the output shaft with the hub side first. Then consult your notes and slide on the appropriate number of thrust washers.

11. Apply grease to the keyway and the O.D. of this sleeve. Do not get grease in the bushing area as it may get "gummy" cause premature failure. Slide

Transmission - Reassembly

- the first half of the shift sleeve with the 19-tooth gear onto the output shaft, geared end first.
12. Slide the four selectable gears onto the output shaft as shown in Figure 83 above.
 13. Apply grease to second sleeve half then slide onto the output shaft, flanged end last. Make sure that the tabs properly engage the recesses on the 19-tooth gear sleeve. When properly assembled, the outer sleeve half and the 15-tooth gear will turn together.
 14. Assemble the shift mechanism consisting of the sleeve, the two shift keys and the shift collar. Apply grease to the shift collar groove.
 15. Slide the shift mechanism, shift keys first, onto the output shaft and into the appropriate slots in the gear sleeves.
 16. Complete assembly of the output shaft by installing the correct number of spacers and the output bushing, flanged end first.
 17. Install the assembled output shaft into the lower transmission case. Use Loctite® (Toro part number 505-103) to secure the outer race of the bearing to lower gearcase. Check for proper operation of the various components, making sure that there is neither excessive play nor binding. Align the bushing keys with keysets in the lower case.
 18. Install the two shift forks as shown in Figure 84. Make sure that both shift collar grooves have been greased.

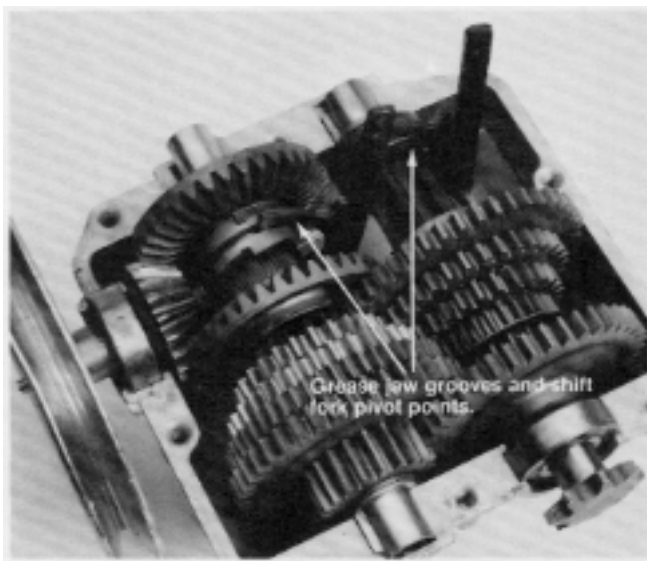


Figure 84

19. Assemble the input pinion, ball bearing, hub and pulley as shown in Figure 85.

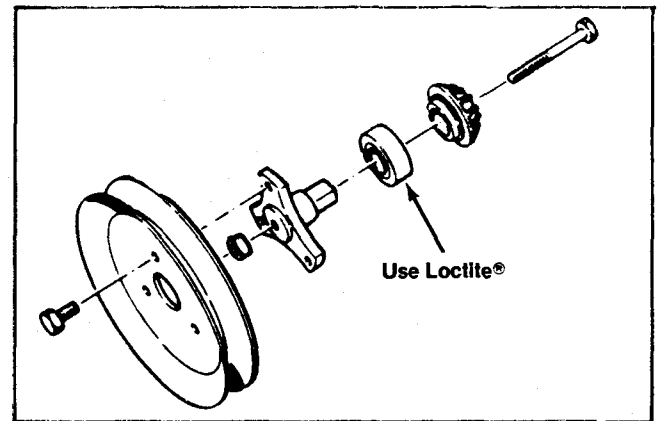


Figure 85

20. Use a small amount of Loctite®, (Toro part number 505-103) to secure the outer race of the bearing to the lower gear case half. Be careful not to get Loctite® on the pinion or the hub.
21. Rotate the input pulley in a counterclockwise direction and check for proper operation of the entire transmission.
22. Apply (14.5 oz) of Lubriplate® Mag 1 grease (Toro part number 505-101) to gears in transmission. Fill under gears first, then top. Also grease shift forks. Install upper gear case half.
23. Press the gear selector control arm and the directional control arm onto the shift forks as shown in Figure 86.



Figure 86

Secure with the two roll pins.

24. Again, check to insure that the transmission operates freely, then secure the two gear case halves with the six self tapping hex head screws. Coat screws with oil to prevent them from seizing.

Transmission Screw Torque

1.38 kg m (120 in lbs)

Transmission - Installation

NOTE: Because of the number of steps involved, air tools are recommended. However, do not use air tools when installing or removing self-tapping screws from aluminum. Damage to the threads could result.

1. Apply an anti-seize compound (Toro part number 505-109) to all pivot and contact points on top of the transmission including detent button, detent box, link and bellcrank.
2. Before installing the transmission, check to be sure the input shaft and all controls on top of the transmission are working correctly.
3. Insert the end of the reverse cable spring into the directional control arm and install the reverse cable clamp.
4. Secure the transmission to the transmission frame with the four transmission screws and Belleville washers (serrations up).
5. Fasten the transmission frame to the snowthrower frame with the four hex head cap screws.
6. Slip the traction belt onto the transmission pulley.
7. Install the latch plate as described under **Latch System - Installation**, page 62.
8. Install the pivot and drive assembly as described under **Pivot System - Reassembly**, page 61.
9. Fasten the lower plastic belt cover to the frame using the two self tapping screws. The tabs on the edge of the cover should be located behind the bulkhead plate.

10. Place the transmission in second gear by pushing the rear of the bellcrank to the top of its travel, then pulling down 2 clicks. See Figure 87.

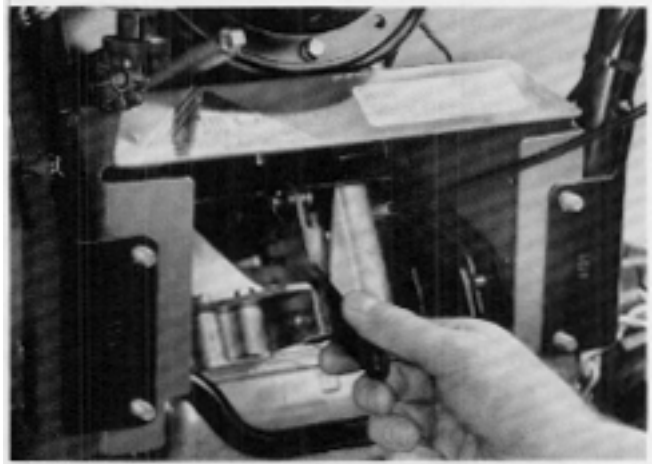


Figure 87

11. Install the rear cover plate with 4 nylon lock nuts.
12. Check chain adjustment, as described under **Maintenance - Drive Chain Adjustment**, page 38.
13. Install the lower shift rod into the bellcrank and adjust per instructions under **Control Box Service - Shift Lever Adjustment**, page 49.
14. Check latch cable adjustment as described under **Control Box Service - Latch Cable Adjustment**, page 49.
15. Check proper adjustment of the reverse cable as described under **Control Box Service - Reverse Cable Adjustment**, page 49.

SECTION 7 AUGER

CAUTION! Servicing the Power Shift Snowthrower will require working with some of the moving parts. To prevent accidental starting of the engine while performing service, take the following precautions:

- Rotate the ignition key to off and remove.
- Pull the wire off the spark plug.
- Make sure the wire does not accidentally touch the spark plug.

CAUTION! The Power Shift Snowthrower has the feature of being able to be stood on the front housing for service and storage. Always drain the fuel from the tank prior to such service taking the following precautions:

- Drain it outdoors and make sure the engine is cool.
- Wipe up any gasoline that may have spilled.
- Do not drain the gasoline near any open flame or spark.
- Do not smoke when handling gasoline.

AUGER

Auger - Operation

The auger on the two stage Power Shift snowthrower is turned at a relatively slow rate of speed (125 to 126 rpm) by the auger gear box. It's purpose is three fold. Firstly, it breaks hard packed snow and ice to facilitate its movement. Secondly, it conveys the snow by a cork screw type action to the impeller. Thirdly, the patented drum meters the snow before feeding it to the impeller to reduce the possibility of clogging at the impeller.

Auger - Removal

There are two augers, a left and a right. They can be removed separately. The following describes removal of one of the auger drums.

1. Remove the auger through bolt as shown in Figure 88. This will allow free wheel movement of the auger to facilitate removal of some of the nuts and bolts.
2. Remove the bolt and accompanying washer at the end of the auger shaft.
3. Remove the skid and the skid bracket.
4. Remove the remaining five side plate fasteners and remove the side plate.

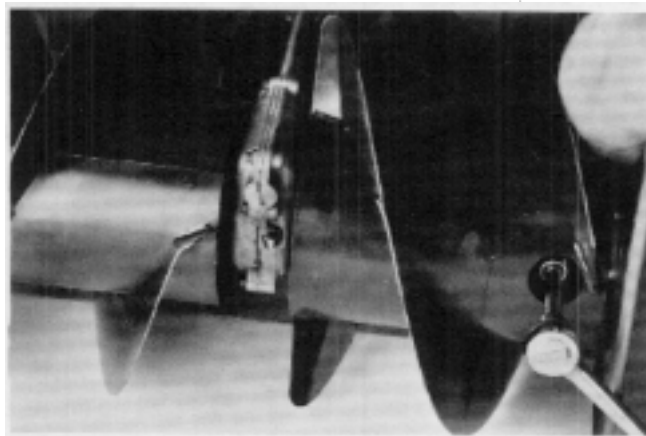


Figure 88

5. Pull the auger half from the auger shaft.
6. Inspect all parts for damage and wear and replace or repair as necessary.

Auger - Installation

1. Loosen the four nylon locknuts securing the flange bearing to the side plate. This will insure proper centering of the flange bearing when the side plate is reinstalled.
2. Coat the auger shaft with an anti-seize compound (Toro part number 505-109), and slide the auger onto the auger shaft. Do not apply anti-seize to the bushing area.

NOTE: If both auger halves have been removed, be sure to install them on the correct sides! (When installed incorrectly the auger will move the snow toward the side plate rather than the impeller). The auger half is installed correctly when the augers are positioned as shown in Figure 89.

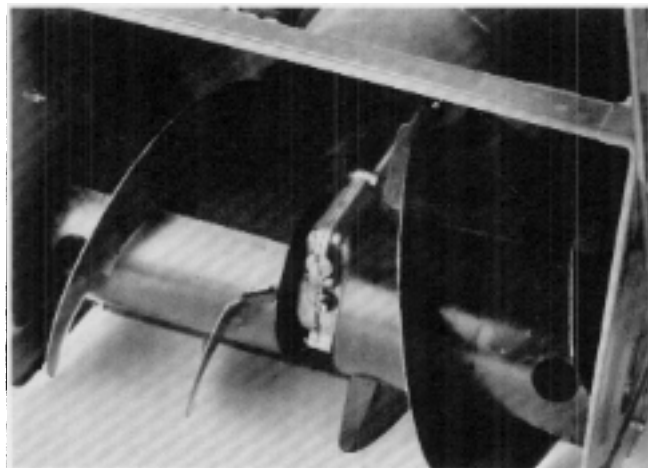


Figure 89

Auger - Installation (cont'd)

3. Slide the side plate and auger bearing assembly onto the auger shaft and secure with the top five cap screws and lock nuts.
4. Fasten the skid support bracket to the auger housing and loosely install the skid.
5. Support the auger so that the end of the auger shaft is centered in the hole in the side plate. Tighten the four cap screws and nylon lock nuts.
6. Secure the auger half to the auger shaft using the long cap screw and nylon lock nut.
7. Adjust the scraper and skids as described under **Skids - Installation and Scraper - Installation**, pages 78 and 79.

SECTION 8 AUGER GEAR BOX

CAUTION! Servicing the Power Shift Snowthrower will require working with some of the moving parts. To prevent accidental starting of the engine while performing service, take the following precautions:

- Rotate the ignition key to off and remove.
- Pull the wire off the spark plug.
- Make sure the wire does not accidentally touch the spark plug.

CAUTION! The Power Shift Snowthrower has the feature of being able to be stood on the front housing for service and storage. Always drain the fuel from the tank prior to such service taking the following precautions:

- Drain it outdoors and make sure the engine is cool.
- Wipe up any gasoline that may have spilled.
- Do not drain the gasoline near any open flame or spark.
- Do not smoke when handling gasoline.

Auger Gear Box - Operation

The auger gear box is a 90 degree transmission, meaning that its input and output shafts are at 90 degrees to each other. The auger box accomplishes this by using a worm and helical gear combination. See Figure 90.

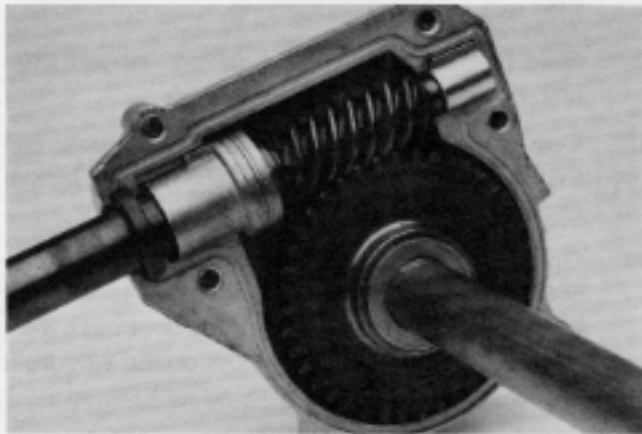


Figure 90

The auger gear box also provides speed reduction for the auger. The impeller, when at full throttle, turns at approximately 1250 rpm, while the auger turns at 125 to 126 rpm under the same conditions.

Lubrication is supplied by an SAE 90 weight extreme pressure (EP) gear oil with an API rating of GL-5 or GL-6. This is necessary because of the temperatures and pressures provided by a worm helical gear arrange-

ment. Do not use Lubriplate® Mag 1 grease in the auger gear box.

Auger Gear Box - Removal

1. Disassemble the snowthrower as described in, under **Impeller and Pulley - Removal**, page 75.
2. Remove the auger halves from the auger shaft by removing the carriage bolts passing through the auger halves and the auger shaft.

Auger Gear Box - Disassembly

1. Remove the drain plug from the auger gear box and drain the gear box lubricant into an approved container for recycling.
2. Remove the six self tapping flange head screws holding the two gear box halves together.
3. Separate the gearbox halves.

NOTE: Be careful not to distort or damage the gear box halves when prying the two halves apart.

4. Before disassembling further, inspect all parts for wear and/or damage making note of those which require replacement.
5. Before removing the seals, bushings and thrust bearing from the input shaft, remove any corrosion and/or burrs from the shaft.
6. Remove the bushings, seal, thrust bearings, spacers and snap ring from the input shaft. Do not overstress the snap ring during removal.
7. Remove the output shaft along with the helical gear and spacers from the gear box half.
8. Remove the helical gear, spacers and the woodruff key from the output shaft.
9. If necessary, remove the seals and bushings from the gear box halves by pressing out on an arbor press with an appropriately sized pilot.

NOTE: ('88 and '89 units only) Do not scrape off the blue Hylomar® sealant (Toro part number 505-105) from the gear box halves. It will reseal without being removed. However, remove any excess oil in the tongue and groove area.

NOTE: '90 and newer Power Shift Snowthrowers will use a different sealant that will affect these instructions. Look for forthcoming information in Service Bulletin form.

Auger Gear Box - Reassembly

See Figure 91.

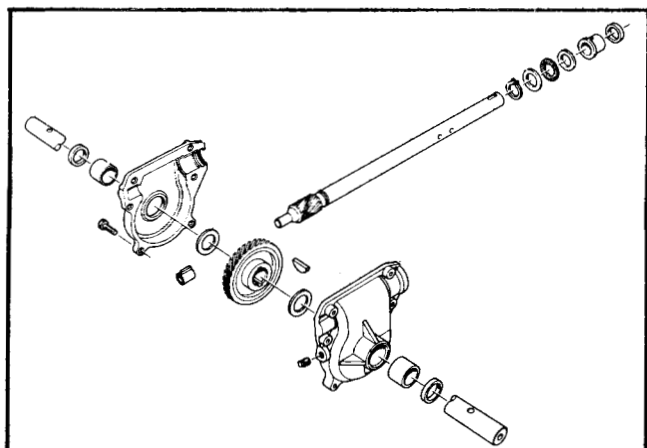


Figure 91

NOTE: It is not necessary to remove the Hylomar® sealant (Toro part number 505-105) from the gear box halves prior to reassembly.

1. Press new auger shaft bushings into the gear case halves using an arbor press. Press them in until they are flush with the inside flange on the gearcase. See Figure 92.

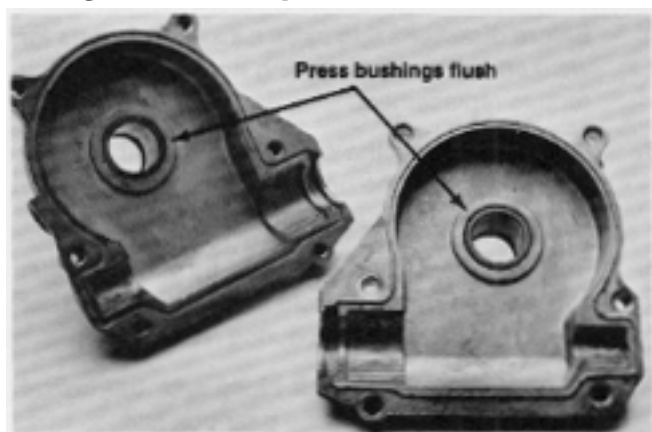


Figure 92

2. Install new seals in the gear box halves. Press the seals hollow side inward from the outside of the gear box until they bottom out on the oil impregnated bushings.
3. Clean the gear box halves, but do not scrape the original Hylomar® sealant from the mating surfaces. Apply a light coat of Hylomar® sealant (Toro part number 505-105) to the tongue and groove area. Allow the sealant to dry somewhat, until the surface has flashed (turned dull and tacky; at least 15 minutes).
4. **Auger Shaft:** Begin assembly of the auger shaft by placing the woodruff key in the keyway at the center of the auger shaft.

5. Slide the helical gear onto the auger shaft so that it covers the woodruff key.
6. Slide one thick thrust washer onto each end of the auger shaft so that they are next to the helical gear.
7. **Input Shaft:** Slide the snap ring onto the input shaft until it is properly seated in its groove (do not attempt to stretch it over the worm gear end). See Figure 93.

NOTE: The snap ring should not spin freely in the groove. If it does, it has been overstressed and should be replaced.



Figure 93

8. Slide the thrust washer, a thrust bearing and another thrust washer onto the input shaft so that they rest against the snap ring.
9. Slide the oil impregnated bushing, flanged side first, onto the input shaft.
10. Coat the inside surface of the seal with gear oil, then slide the seal, hollow side toward the inside of the gear box.
11. Once the Hylomar® sealant (Toro part number 505-105) on the gear case halves has flashed, slip the auger shaft into the half of the gear case with the plug in it until it bottoms out on the woodruff key.
12. Lay the input shaft into the left gear box half, making sure that the thrust bearing components, the seal, and the bushings are in their proper locations. See Figure 94.
13. Slide the right gear case half over the auger shaft and mate the two gear box halves.
14. Coat the auger gearbox screws with oil to prevent seizing. Secure with the six flanged head self tapping capscrews. Tighten to 1.38 kg m (120 in lbs) in the order shown in Figure 95.

Auger Gearbox - Reassembly (cont'd)

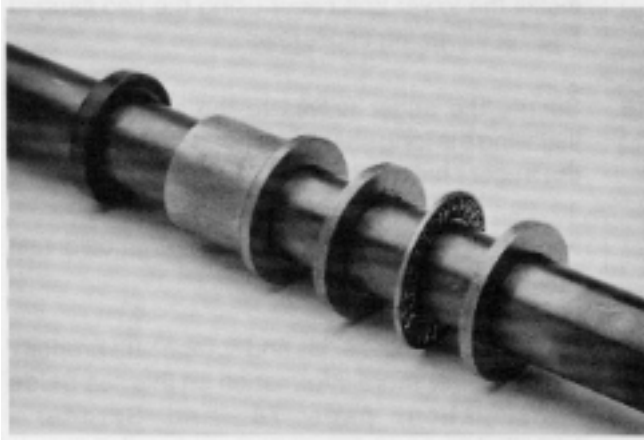


Figure 94

Auger Gearbox Screw Torque
1.38 kg m (120 in lbs)

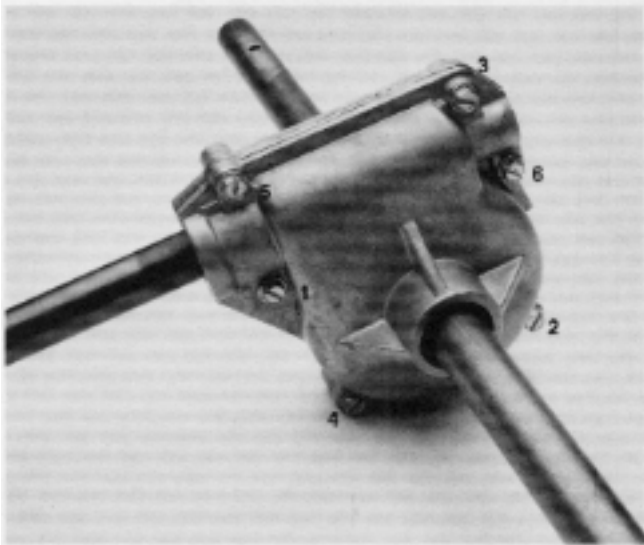


Figure 95

15. Fill with (4.5 oz) of SAE 90 weight Extreme Pressure gear oil, with an API rating of GL-5 or GL-6. Apply Permatex® (Toro part number 505-22) to plug.

Auger Gear Box - Installation

1. Drain the fuel from the tank using a crank type pump.
2. Secure the impeller to the auger shaft with two flanged head cap screws and nylon locknuts.
3. Coat the auger shaft with an anti-seize compound (Toro part number 505-109) and slide the auger halves onto the auger shaft. Do not apply

anti-seize compound to the bushing area as it may become "gummy".

NOTE: The auger halves are different, so be sure to install them correctly as shown. See Figure 80. Failure to do so will result in snow being moved toward the side plates rather than the impeller.

4. Loosen the flange bearing at the rear of the front housing to allow it to re-center when the auger assembly is installed.
5. Slide the flanged bearings on the ends of the auger shaft.
6. Slide the auger assembly into the front housing and loosely secure the auger flange bearings to the side plates with the hex head screws and nylon locknuts. See Figure 96.

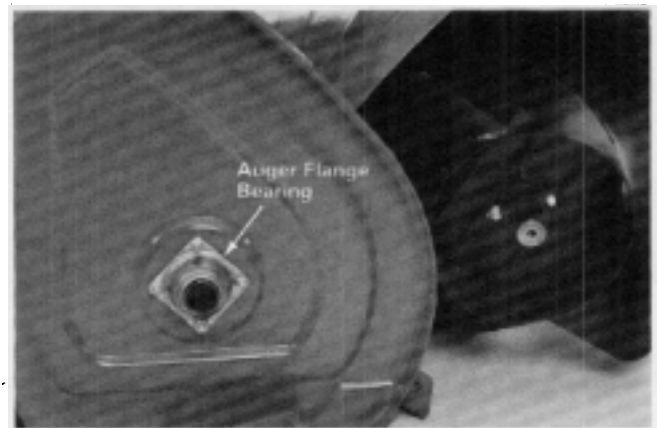


Figure 96

7. Prop the auger so that the auger shaft is centered in the hole in the side plate. Once centered, tighten the flanged bearing fasteners. Do this to both sides.
8. Tighten the three fasteners securing the impeller shaft flange bearing to the rear of the front housing.
9. Install the large flat washer and the capscrew into the end of the auger shaft. Do this to both sides.
10. Bring the two halves of the snowthrower together and secure with the six flanged head capscrews.
11. Slip the impeller belt over the impeller pulley and install the idler assembly as shown in Figure 97.
12. Check for proper operation of the impeller and traction belts then install the upper belt cover with the three self tapping flanged head screws.
13. Install the chute worm gear assembly with the carriage bolt and nylon locknut. For more information on this, see **Discharge Chute - Installation**, page 56.

Auger Gear Box - Installation (cont'd)



Figure 97

14. Stand the snowthrower on the front housing and install the lower belt cover using the two flanged head self tapping capscrews.
15. Secure the auger halves to the auger shaft by installing the long shank hex head screws through the auger shaft.

NOTE: The head of the capscrews should rest against the spacers.
16. Check to insure the skids and scraper are properly adjusted. For more information on this see **Skids - Installation**, page 78, and **Scraper - Installation**, page 79.
17. Complete impeller servicing by performing a final operational check.

SECTION 9 IMPELLER AND PULLEY SYSTEM

CAUTION! Servicing the Power Shift Snowthrower will require working with some of the moving parts. To prevent accidental starting of the engine while performing service, take the following precautions:

- Rotate the Ignition key to off and remove.
- Pull the wire off the spark plug.
- Make sure the wire does not accidentally touch the spark plug.

CAUTION! The Power Shift Snowthrower has the feature of being able to be stood on the front housing for service and storage. Always drain the fuel from the tank prior to such service taking the following precautions:

- Drain it outdoors and make sure the engine is cool.
- Wipe up any gasoline that may have spilled.
- Do not drain the gasoline near any open flame or spark.
- Do not smoke when handling gasoline.

Impeller and Pulley - Operation

The impeller is a fan which rotates at approximately 1250 rpm. It propels the snow fed to it by the auger through the chute. The impeller is connected to the impeller shaft. The impeller shaft also drives the auger through the auger gear box. It is supported at the auger gear box by an oil impregnated bushing and at the back of the front housing by a flange bearing. The impeller shaft is driven by a pulley, power supplied to that pulley by the engine crankshaft and the idler shown in Figure 98.

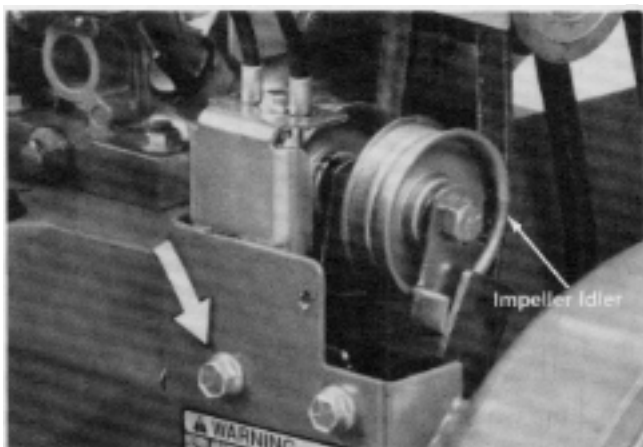


Figure 98

Impeller and Pulley - Removal

1. Stand the Power Shift Snowthrower on the front housing and remove the belt cover from the bottom of the frame. Slip the impeller belt off the pulley.

2. Set the Power Shift Snowthrower back into its normal position and remove the top belt cover from in front of the engine and slide it up the cables, out of the way.
3. Remove the chute worm gear assembly from the front housing and set aside.
4. Before separating the front housing from the snowthrower frame, support the rear of the front housing (that houses the impeller) with blocks. This will prevent the unit from falling when the fasteners are removed. Remove the six cap screws that fasten the front housing to the frame and separate the two halves. See Figure 99.

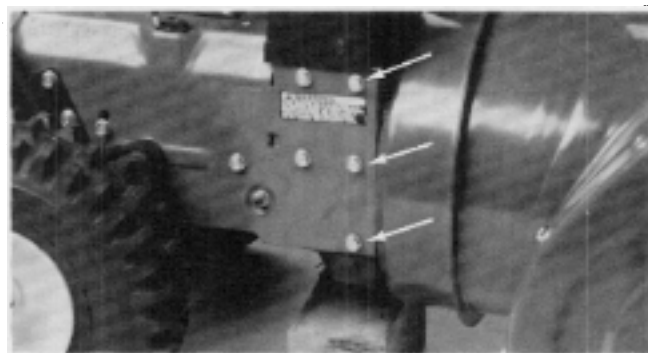


Figure 99

5. Loosen the two set screws securing the pulley to the impeller shaft and pull the pulley off the impeller shaft. Remove the woodruff key from the impeller shaft.
6. Remove the cap screws at the end of the auger shaft and the accompanying washers.
7. Remove the eight cap screws and locknuts that secure the auger flange bearings to the side plate. See Figure 100.

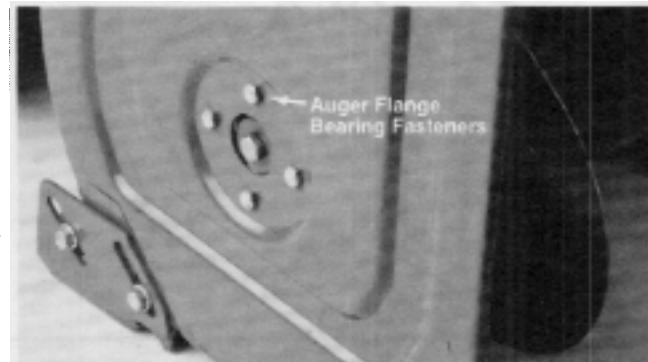


Figure 100

8. Pull the auger and impeller shaft assembly from the front housing. Be careful not to damage the end of the impeller shaft when doing so.

Impeller and Pulley - Removal (cont'd)

9. Remove the impeller from the impeller shaft by removing the two flanged cap screws and nylon locknuts. Be careful not to lose the two impeller hub inserts. (On '88 units, set screws retained the impeller to the shaft.)
10. If impeller bearing servicing is necessary, remove the flange bearing from the rear of the housing by removing the three nylon locknuts.
11. Inspect all parts for damage and wear and replace as necessary.

Impeller and Pulley - Installation

1. If the impeller bearing was removed, reassemble the bearing as shown in Figure 101. Note that the flanged portion of the oil impregnated bearing faces forward.

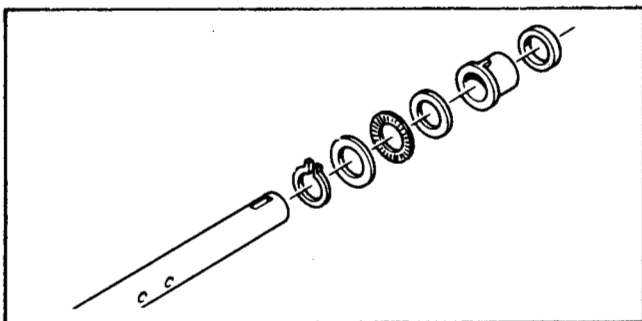


Figure 101

2. Loosely fasten the flange bearing to the rear of the front housing using Figure 102 as a guide.

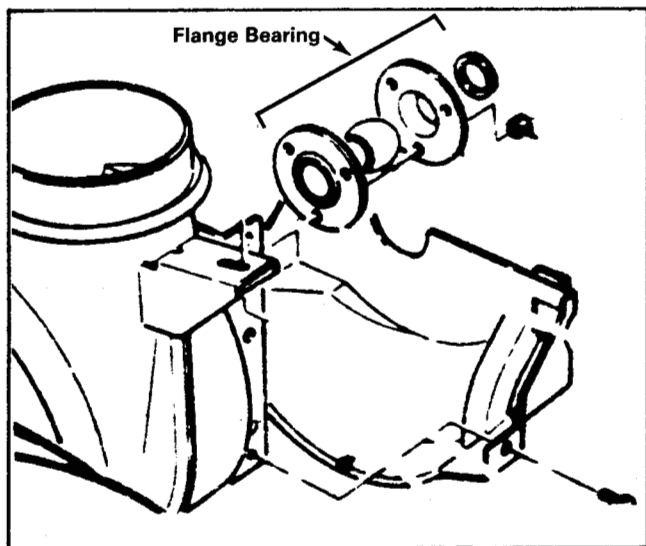


Figure 102

NOTE: Do not sandwich the front housing between the components of the flange bearing.

The entire flange bearing must fit behind the front housing. Also notice the the hollow head set screw faces up when correctly installed.

3. Prepare for impeller installation by making sure that the inserts are in place on the impeller hub and by coating the impeller shaft with an anti-seize compound (Toro part number 505-109). Fasten the impeller to the impeller shaft with the two flanged cap screws and nylon locknuts. (Set screws were used on '88 product.)

NOTE: When the flanged head cap screws are installed correctly, the heads will be against the inserts.

4. Slide the impeller into the front housing making sure that the bearings at the end of the auger shaft have not fallen off. If they have, consult **Auger - Installation**, page 70, for information on how to reassemble.

Secure the auger shaft bearings to the side plates using the eight cap screws and nylon locknuts. See Figure 103.

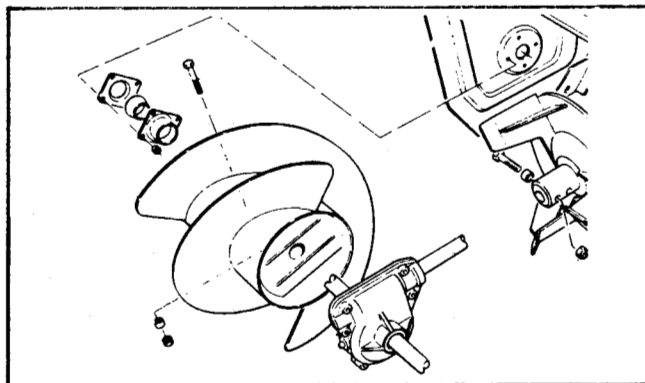


Figure 103

5. Install the cap screws and large washers on the ends of the auger shaft.
6. Lightly tighten the hollow head set screw in the impeller shaft bearing.
7. Tighten the three nylon locknuts securing the impeller flange bearing to the front housing.
9. Coat the impeller shaft with an anti-seize compound (Toro part number 505-109) and install the woodruff key and the impeller pulley. Be sure to tighten both square head set screws. Remove all end play from impeller shaft but do not preload.

NOTE: Tighten the square head set screws with a 3/8", 12 pt. socket.

Set Screw Torque:
2.3 kg m (205 in lbs)

Impeller and Pulley - Installation (cont'd)

10. To facilitate reassembly of the two snowthrower halves, remove the idler assembly and set aside.
11. Prop the rear of the front housing and bring the traction unit up to meet the front housing. Secure with the six flange head cap screws.
12. Slip the impeller belt over the impeller pulley.
13. Reinstall the idler assembly using the two flange head cap screws.
14. Install the top belt cover using two flange head self tapping screws.
15. Install the chute worm gear assembly to the bracket on the left side of the front housing. See **Discharge Chute - Installation**, page 56 for more information if necessary.
16. Stand the snowthrower on the front housing and install the lower belt cover, again using two flange head cap screws.
17. Check to insure that all parts are operating correctly.

SECTION 10 FRONT HOUSING

CAUTION! Servicing the Power Shift Snowthrower will require working with some of the moving parts. To prevent accidental starting of the engine while performing service, take the following precautions:

- Rotate the ignition key to off and remove.
- Pull the wire off the spark plug.
- Make sure the wire does not accidentally touch the spark plug.

CAUTION! The Power Shift Snowthrower has the feature of being able to be stood on the front housing for service and storage. Always drain the fuel from the tank prior to such service taking the following precautions:

- Drain it outdoors and make sure the engine is cool.
- Wipe up any gasoline that may have spilled.
- Do not drain the gasoline near any open flame or spark.
- Do not smoke when handling gasoline.

FRONT HOUSING

Front Housing - Operation

The front housing is very durable and should rarely require servicing, however if the damage occurs, use the following procedure.

1. Remove the chute assembly as described under **Discharge Chute - Removal**, page 56.
2. Remove the impeller and auger assembly as described under **Impeller and Pulley System - Removal**, page 75.
3. Remove the scraper as described under **Scraper - Removal**, page 79.
4. Inspect for damage and repair or replace the housing as necessary.

Front Housing - Installation

1. If the front housing was replaced or painted be sure that all safety decals are also replaced and are in the proper location.
2. Install the impeller and auger assembly as described under **Impeller and Pulley System - Installation**, page 76.

3. Install the chute assembly as described under **Discharge Chute - Installation**, page 56.
4. Adjust the scraper and skids as described under **Skids - Installation and Scraper - Installation**, pages 78 and 79

SKIDS

Skids - Operation

The purpose of the skids is to provide more contact area with the ground. When properly adjusted, they slow wearing of the scraper. The skids are intended to be a wearing part.

For convenience, the skids are turned inward to allow cleaning along side obstacles. The skids are adjustable to help insure that the snowthrower cleans right down to the pavement.

Skids - Removal

1. Remove the skids by removing the two flanged cap screws securing them to the side plates.
2. Inspect the skids. Replace when the outside edge of the skid begins wearing away.

Skids - Installation

1. With the wheels in the rear position, loosen the lock nut on the skid support bracket to insure that it gets proper placement when the new skid is put on.
2. Install the skid as shown in Figure 104.

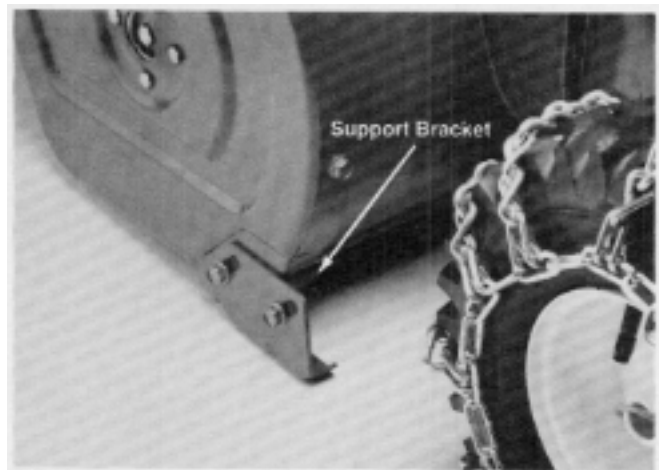


Figure 104

Skids - Installation (cont'd)

NOTE: The pads of the skid are turned inboard.

3. Adjust the skids so that the scraper has 3 mm (1/8") clearance between the scraper and the ground. Make sure that the pad is riding flat. Adjust higher if operating on a crushed rock or gravel surface.

SCRAPER

Scraper - Operation

The scraper on 1989 and newer Power Shifts is adjustable. This is to insure that snow is removed as close to the ground as possible.

Scraper - Removal

See Figure 105.

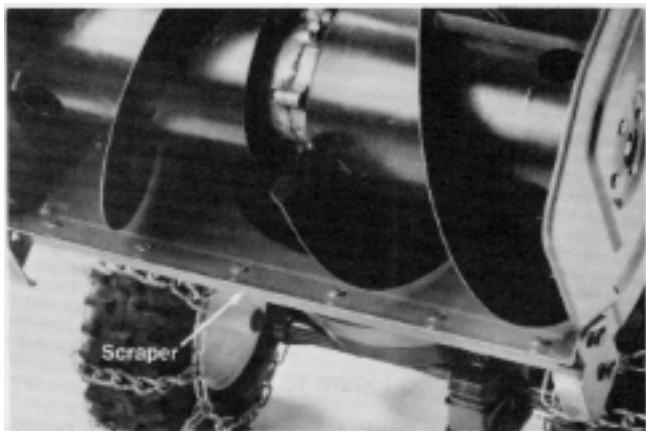


Figure 105

1. Remove the six carriage bolts from the scraper.
2. Remove the front flanged cap screw from the skid and remove the scraper.

3. Inspect the scraper. Replace when the scraper is within .64 cm (1/4") from the bottom of the front housing and has been adjusted as low as it will go.

Scraper - Installation

1. Begin scraper installation by first checking tire pressure in both tires. Make sure that they are both equal and between .5 and 1.0 kg/cm² (7 and 15 psi). Also make sure that the snowthrower is sitting on a level surface. This will insure proper positioning of the scraper.
2. Loosen the skid mounting screws so that the skids are free to move and will not interfere with scraper adjustment.
3. Install the front flanged cap screw, securing the scraper, side plate and the skid on each side.
4. On a flat surface with the snowthrower in the normal operating position, support the auger so it is .32 cm (1/8") off the ground.
5. Move the scraper so that it contacts the flat surface all the way across, then tighten the two flanged cap screws securing it and the skids to the side plate. This locks it in proper position so that the remainder of the fasteners can be installed without affecting adjustment.
6. Push the handles down so that the snowthrower rests on the handles and secure the scraper with the six carriage bolts and nylon locknuts.
7. Adjust the skids with the scraper in the new position as described under **Skids - Installation**, page 78.

SECTION 11 CONTROL PANEL AND HANDLES

CAUTION! Servicing the Power Shift Snowthrower will require working with some of the moving parts. To prevent accidental starting of the engine while performing service, take the following precautions:

- Rotate the ignition key to off and remove.
- Pull the wire off the spark plug.
- Make sure the wire does not accidentally touch the spark plug.

CAUTION! The Power Shift Snowthrower has the feature of being able to be stood on the front housing for service and storage. Always drain the fuel from the tank prior to such service taking the following precautions:

- Drain it outdoors and make sure the engine is cool.
- Wipe up any gasoline that may have spilled.
- Do not drain the gasoline near any open flame or spark.
- Do not smoke when handling gasoline.

CONTROL PANEL

Control Panel - Operation

The control panel is an important component in the Powershift, as it houses the key switch, the chute, directional control the control box, as well as providing a place for instructions. It can be serviced relatively easily by using the following procedure:

Control Panel - Removal

1. Stand the snowthrower on the front housing so that the handle grips are vertical.
2. Remove the cover on the right handle as shown in Figure 106.
3. Drive the roll pin from the upper chute rod gear and pull the chute control rod out through the top of the control panel. Be careful not to lose the rubber washer.
4. Release the connector from the bottom of the ignition switch by pressing on the tabs near the end of the terminals and pulling the connector off.
5. Squeeze the two tabs on the ignition switch then pull the ignition switch out through the top of the control panel.

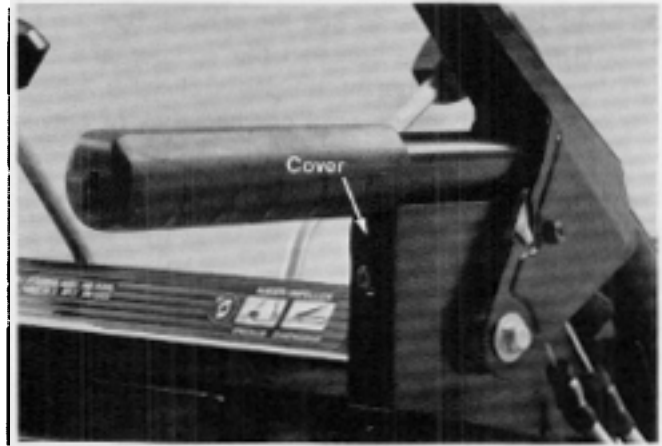


Figure 106

6. Remove the nut securing the lower shift rod to the shift bracket as shown in Figure 107.



Figure 107

7. Remove the shift knob from the shift lever. Twisting the shift knob will facilitate removal.
8. Remove the four nylon locknuts securing the control box to the control panel and remove the control box (set the control box on top of the recoil, being careful not to damage or bend the reverse or latch cables).
9. Remove the two capscrews and two self-tapping screws securing the control panel to the handles and remove the control panel. Refer to Figure 107.
10. If necessary, remove the chute control rod bearing from the control panel.

Control Panel - Installation

See Figure 108.

1. Stand the snowthrower on the front housing to facilitate servicing of the control panel.

Control Panel - Installation (cont'd)

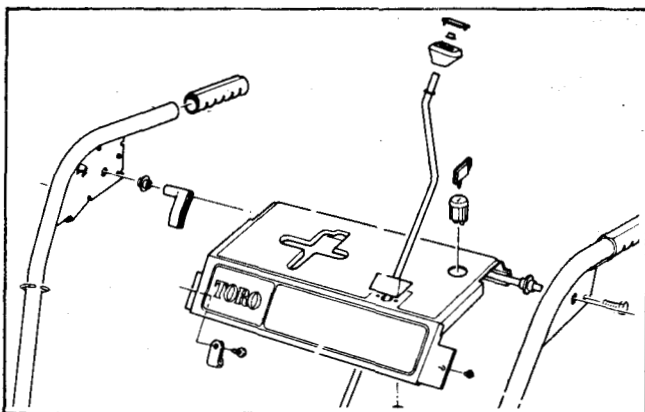


Figure 108

2. If installing a new control panel, be sure that all original decals are in place and in the proper location. They provide important safety information for the operator.
3. Install the control panel between the two handles and secure with two capscrews and two self-tapping screws.
4. Coat the two studs with an anti-seize compound (Toro part number 505-109) to prevent corrosion. See Figure 109.

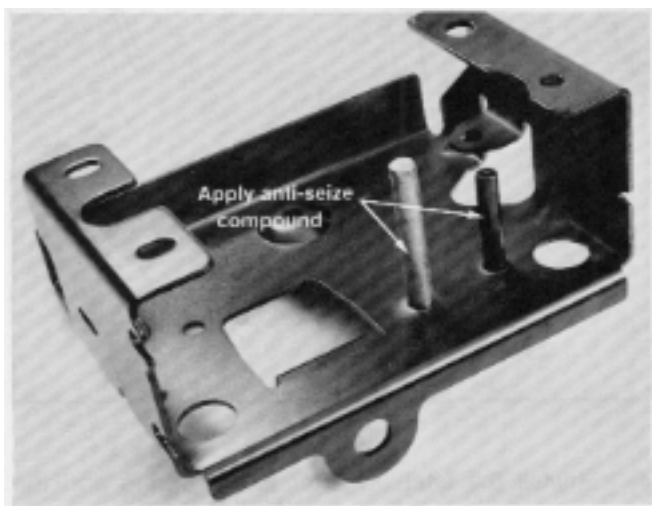


Figure 109

5. Install the Power Shift control box onto the control panel making sure that the reverse lever slides onto the reverse lever spindle.
6. Secure the Power Shift control box with four nylon locknuts.
7. Secure the lower shift rod to the shift bracket using a washer and nylon locknut. Adjust as described under **Control Box Service - Shift Lever Adjustment**, page 49.

8. Push the shift knob onto the shift lever. Twisting the shift knob may facilitate installation.
9. Insert the ignition switch so that the terminals face the front of the unit.
10. Push the electrical connector onto the bottom of the ignition switch.

NOTE: There is no polarity, so the connector can go on in either direction.

11. If the chute control bushing was removed, install with two Phillips screws.
12. Insert the chute control rod down through the top of the chute control bushing and insert into the lower chute rod bracket. Assemble the chute rod gear as shown in Figure 110.

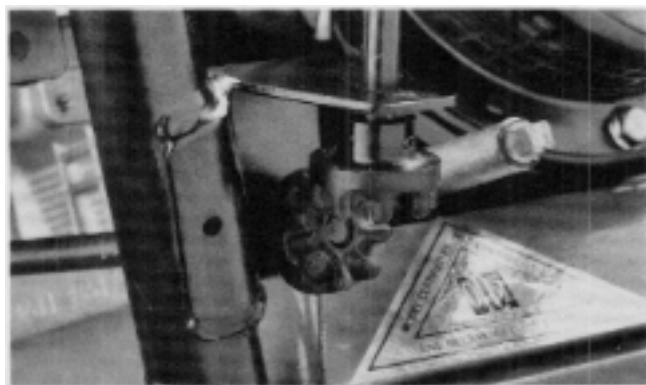


Figure 110

13. Install the impeller lever cover with two machine screws.
14. Check to insure that all controls are operating correctly and adjust if necessary.

HANDLES

Right Handle - Removal

1. Snip the cable ties securing the traction, reverse, impeller and latch cables to the handle.
2. Remove the impeller locking mechanism cover plate on the right handle.
3. Loosen the jam nuts on the upper end of the traction and impeller cables. Pull the cables loose from the cable holder.
4. Remove the push nut from the right end of the torque rod. Be careful not to scratch the impeller lever.

NOTE: Flattening the locking tabs on the push nut may facilitate removal.

Right Handle - Removal (cont'd)

5. Remove the small hex head capscrew and locknut that secures the torque rod to the traction lever. Pull the torque rod out about 5 cm (2"), just far enough to clear the impeller lever.
6. Spread the impeller lever slightly and remove the release cam.
7. Remove the self-tapping screw from the impeller lever and remove the locking tang.
8. Remove the flanged head capscrew and the self-tapping screw that secure the right handle to the control panel.
9. Remove the four nylon locknuts securing the rear cover plate to the lower handles. See Figure 111.

NOTE: It is not necessary to remove the lower control rod from the shifting bellcrank.

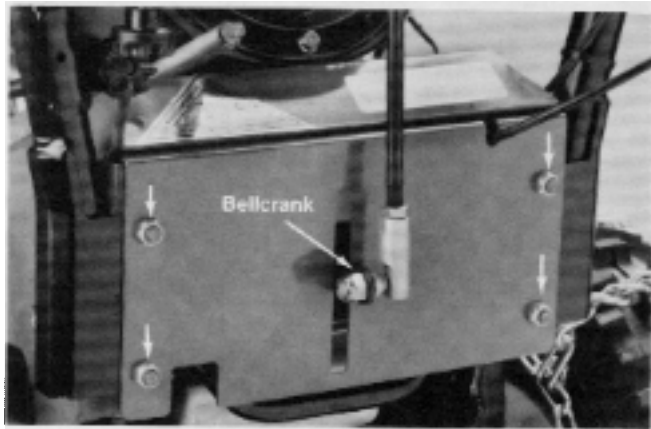


Figure 111

10. Remove the two flanged head capscrews from the lower handle and remove the right handle.
11. If necessary, remove the impeller lever bushing and the impeller lever from the right handle.
12. Remove the impeller lever return spring from the right handle.
13. Remove the E clip securing the locking latch to right handle and remove the locking latch and locking latch spring from the stud.
14. Complete disassembly by removing the handle grip from the right handle.

Right Handle - Installation

NOTE: If installing a new handle, be sure that the warning decal is in place. The warning decal states the importance of adjusting the cables to make sure that the auger and transmission disengage completely.

1. Place the right handle onto the studs coming from the frame and secure with the two flanged head capscrews.
2. Secure the coverplate with the four nylon locknuts.

NOTE: The coverplate goes on top of the lower handle brackets! See Figure 111 above.

3. Slip the impeller lever bushing onto the cross rod, then place the impeller lever into position. Slide the cross rod through the left impeller lever hole and snap the impeller lever bushing in place. See Figure 112.

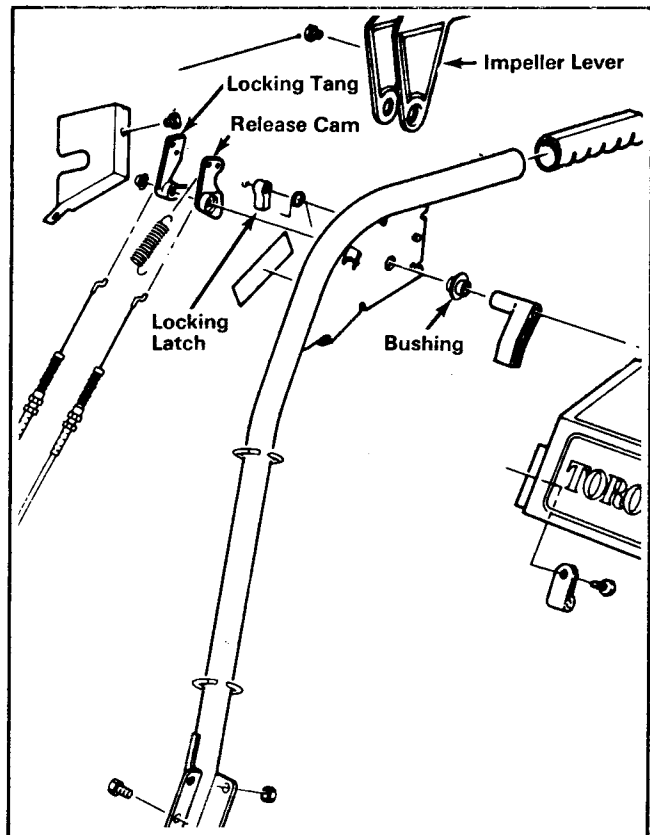


Figure 112

4. Install the latching lever return spring and the release cam onto the cross rod.
5. Insert the end of the traction cable into the release cam and loosely secure the cable in the cable bracket.
6. Insert the end of the impeller cable into the locking tang and install in the impeller lever as shown in Figure 113. Secure with the small self-tapping screw.
7. Secure the cross rod to the traction lever with the small capscrew and nylon locknut.

Right Handle - Installation (cont'd)

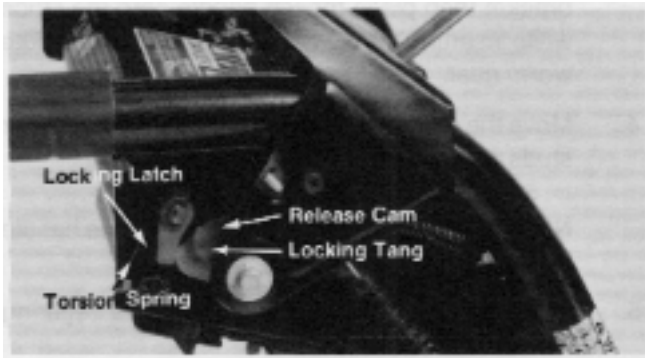


Figure 113

8. Press the push nut onto the end of the cross rod to secure the impeller lever.

NOTE: Make sure the tab on the push nut is at 90° to the keyway to insure proper retention

9. Secure the control panel to the handle using the flanged head capscrew and self-tapping screw.
10. If the locking latch and the locking latch spring were removed, install now. Secure with the E clip. Refer to Figure 113 above.
11. Secure the cables with two cable ties.
12. Adjust the impeller and traction cables as described under **Traction and Impeller Controls - Traction Cable Adjustment** and **Traction and Impeller Controls - Impeller Cable Adjustment**, page 49. Install the cover plate on the right handle with the two small machine screws.
13. Complete handle replacement by checking all controls and making adjustments as required.

Left Handle - Removal

1. Stand the snowthrower on the front housing to facilitate handle removal.
2. Snip the cable ties securing the wiring harness to the left handle.
3. Drive out the roll pin securing the upper chute directional gear to the upper chute control rod. Remove the gear and the rubber washer, then pull the upper chute rod from the control panel.
4. Remove the impeller locking mechanism cover from the right handle.
5. Remove the push nut securing the impeller lever to the cross rod. Refer to Figure 114.

NOTE: Flattening the locking tabs on the push nut may facilitate removal.

6. Remove the small hex head capscrews and nylon locknuts securing the cross rod to the traction lever.



Figure 114

7. Pull the cross rod from the impeller lever control panel and traction lever.

NOTE: The release cam, impeller bushing, trip lever and traction lever spacer will all be loose once the cross rod is removed. Be careful not to lose them.

8. Remove the flanged head capscrew and small self-tapping screw securing the left handle to the control panel. See Figure 115.

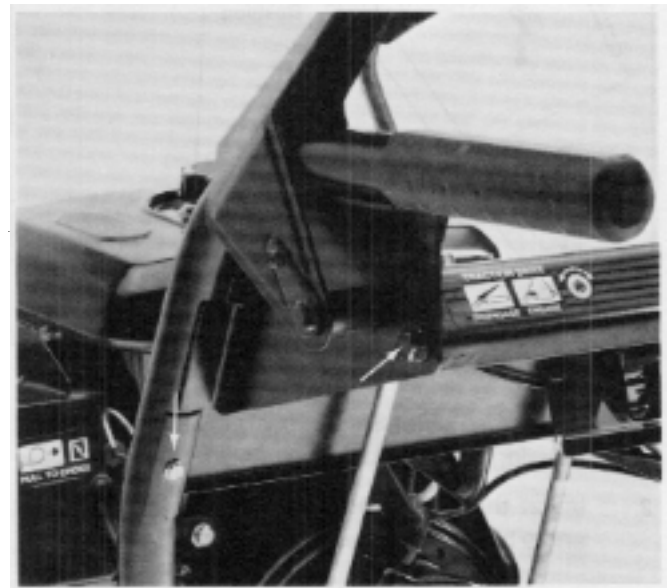


Figure 115

9. Remove the four nylon locknuts securing the rear cover plate to the lower handle brackets and the rear cover plate.
10. Remove the two flanged head capscrews securing the lower handle to the frame and remove the left handle complete with the front chute control rod.

Left Handle - Removal (cont'd)

11. If necessary, drive the roll pin from the forward chute control rod and gear and remove the chute control rod from the right angle bracket.
12. Complete disassembly by removing the handle grip from the left hand handle.

Left Handle - Installation

See Figure 116.

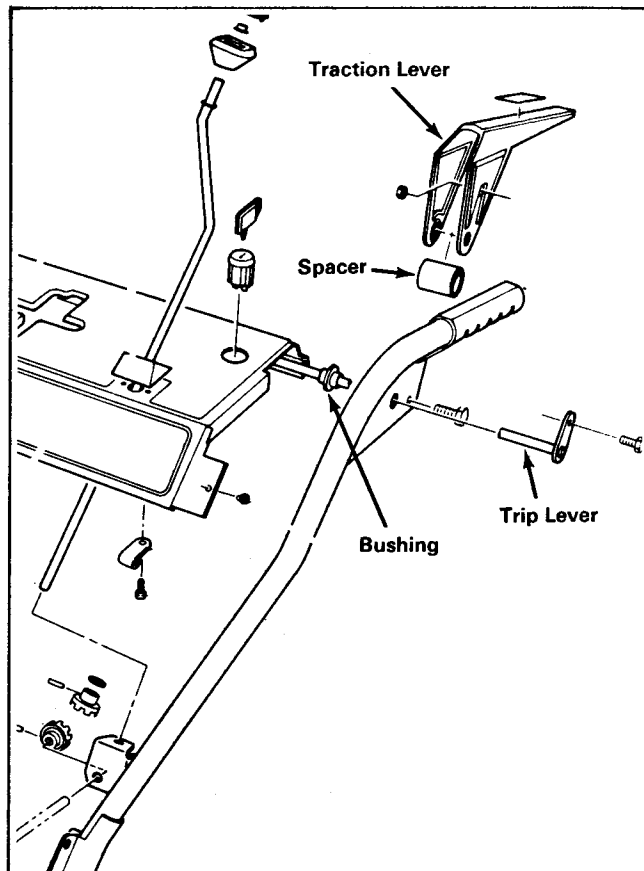


Figure 116

1. Stand the Power Shift Snowthrower onto the front housing to facilitate installation.
2. Insert the lower chute control rod into the right angle bracket and secure the gear with the roll pin.

3. Place the chute worm gear into the worm gear bracket then place the left handle onto the studs while inserting the lower control rod into the chute worm gear.
4. Move the rear cover plate into position on the four studs and secure with four nylon locknuts.

NOTE: The rear cover plate fits outside the handle bracket.

5. Install the two flanged head capscrews securing the left handle to the frame.
7. Secure the left handle to the control panel using the self-tapping screw and the flanged head capscrew.
8. Insert the upper chute control rod through the control panel and the right angle bracket while installing the rubber washer and the upper chute directional gear. Secure with the roll pin.
9. Place the traction lever into position on the left handle and loosely fasten in place with the traction lever bushing.
10. Place the traction lever spacer inside the traction lever then slip the cross rod through the trip lever. Make sure that the traction and impeller cables are installed into the release cam and locking latch then push the cross rod through both components. Secure with a new push nut.

NOTE: The release cam is keyed to the cross rod.

11. Install the locking latch cover plate on the right hand handle using the two small machine screws with star washers.
12. Secure the left end of the cross rod to the traction lever with the small capscrew and nylon locknut.
13. Secure the ignition switch wire to the left handle with two cable ties.
14. Complete handle replacement by checking all controls and making adjustments as required.

SECTION 12 WHEELS, TIRES AND CHAINS

CAUTION! Servicing the Power Shift Snowthrower will require working with some of the moving parts. To prevent accidental starting of the engine while performing service, take the following precautions:

- Rotate the ignition key to off and remove.
- Pull the wire off the spark plug.
- Make sure the wire does not accidentally touch the spark plug.

CAUTION! The Power Shift Snowthrower has the feature of being able to be stood on the front housing for service and storage. Always drain the fuel from the tank prior to such service taking the following precautions:

- Drain it outdoors and make sure the engine is cool.
- Wipe up any gasoline that may have spilled.
- Do not drain the gasoline near any open flame or spark.
- Do not smoke when handling gasoline.

WHEELS

Wheels - Operation

The wheels used on the Power Shift Snowthrower are one piece design steel wheels. They can be used in a driving mode where the wheel is rigidly fixed to the axle or in a free wheeling mode where the wheel is allowed to spin on the axle.

Wheels - Removal

1. To remove the wheels, simply remove the klik pin from the wheel and axle and pull the wheel off.

Wheels - Installation

1. Before installing the wheel coat the axle with an anti-seize compound to prevent the wheel from corroding to the axle.
2. Install the wheel in the desired location; inboard for free wheeling or with the klik pin through the wheel and axle holes for driving. See Figure 117.

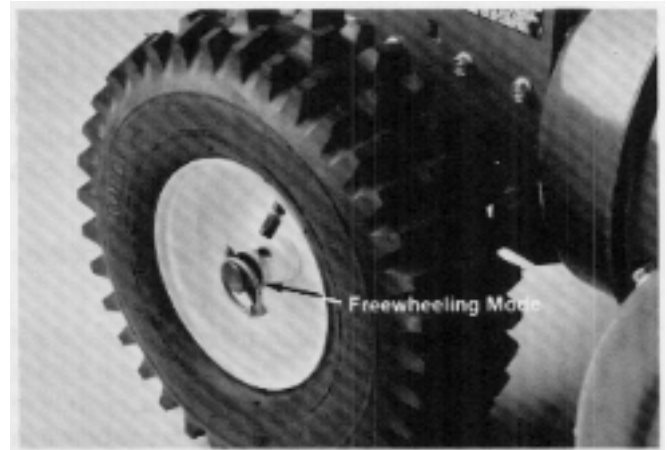


Figure 117

TIRES

Tires - Operation

The tires used on the Power Shift Snowthrower are a special low pressure design which provides maximum traction in nearly all conditions. The tires are tube type and are 35.5 cm (14") in diameter and are 10.1 cm (4") in width on 61 cm (24") snowthrowers while those on 71 cm (28") and 81 cm (32") units have slightly large tires: 40.6 cm (16") in diameter and 12.7 cm (5") in width. Tire pressure should be between .5 and 1.0 kg/cm² (7 and 15 psi) and be equal on both sides.

Tires - Service

If a puncture or flat occurs, The Toro Company recommends taking the wheel and tire assembly to a tire professional for repair or replacement. It is not economically practical to attempt servicing without the proper equipment.

CHAINS

Chains - Operation

Chains are available for the Power Shift Snowthrowers. However, in most conditions the low pressure tires will provide better traction. In fact, in some conditions, chains will actually decrease traction because they fill the tread on the tire. If conditions exist where chains are desired, they can be installed as follows.

Chains - Installation

1. Remove the wheel and tire assembly from the axle.
2. Lay the chains out front and install on the wheel tire assembly making sure that the special clip is on the outside of the wheel tire assembly. Letting air out of the tire will facilitate installation. See Figure 118.
3. Hook the inside clip first, then hook the outside special clip.

NOTE: When chains are installed, the free wheel mode may not be used. The klik pin must pass through the holes in the wheel and the outer hole in the axle to provide sufficient clearance between the chains and the pivot arm bolt.

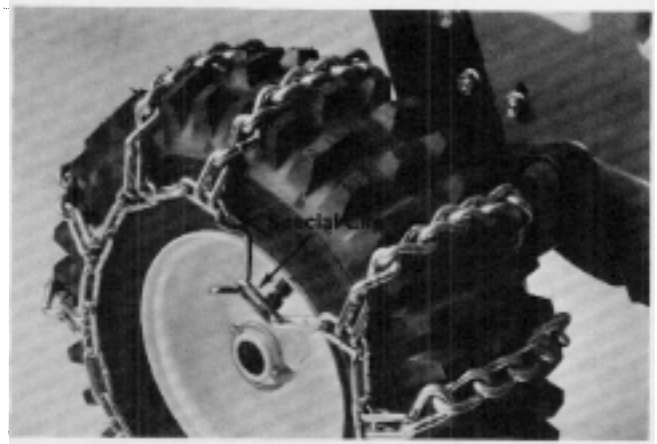


Figure 118

4. Check tire pressure to make sure that it is between .5 and 1.0 kg/cm² (7-15) psi and that both are equal.

SECTION 13 ENGINES

Engines - Service Information

A number of different engines are used on the Power Shift Snowthrowers. Manufacturers include Briggs and Stratton, Mitsubishi and Tecumseh. See Figure 119 below to determine the manufacturer of the engine on the unit you are servicing.

SPECIFICATIONS			
Model Number	Name	Engine Manufacturer	Sold In
38500	624	Mitsubishi	U.S.
38505	624	Mitsubishi	Int'l
38510	624	Tecumseh	U.S.
38513	624	Tecumseh	Int'l
38520	824	Mitsubishi	U.S.
38525	824	Mitsubishi	Int'l
38540	824	Tecumseh	U.S.
38543	824	Tecumseh	Int'l
38545	828	Mitsubishi	Int'l
38565	1132	Briggs & Stratton	Int'l
38570	828	Briggs & Stratton	U.S.
38573	828	Tecumseh	Int'l
38580	1132	Briggs & Stratton	U.S.

Figure 119

Some information on specifications and maintenance of the engines can be found in the Specifications and Maintenance Sections in the front of the book.

However, because the engine manufacturers have each published their own manual for these engines, complete servicing information is not included in this book.

If you require a manual for one of the engines please contact the engine manufacture at one the following addresses:

Briggs and Stratton
P.O. Box 702
Milwaukee, WI 53201

Mitsubishi Heavy Industries America, Inc.
699 North Wheeling Road
Suite 101
Mount Prospect, IL 60056

Tecumseh Products Company
900 North Street
Grafton, WI 53024

Be sure to include engine model and serial number with your request.

If you have difficulty obtaining engine service manuals from any of the above manufacturers, please feel free to contact us at the following address:

The Toro Company
8111 Lyndale Avenue South
Bloomington, MN 55420

SECTION 14 DIFFERENTIAL KIT

CAUTION! Servicing the Power Shift Snowthrower will require working with some of the moving parts. To prevent accidental starting of the engine while performing service, take the following precautions:

- Rotate the ignition key to off and remove
- Pull the wire off the spark plug
- Make sure the wire does not accidentally touch the spark plug

CAUTION! The Power Shift Snowthrower has the feature of being able to be stood on the front housing for service and storage. Always drain the fuel from the tank prior to such service taking the following precautions:

- Drain it outdoors and make sure the engine is cool
- Wipe up any gasoline that may have spilled
- Do not drain the gasoline near any open flame or spark
- Do not smoke when handling gasoline.

Differential Kit - Operation

See Figure 120.

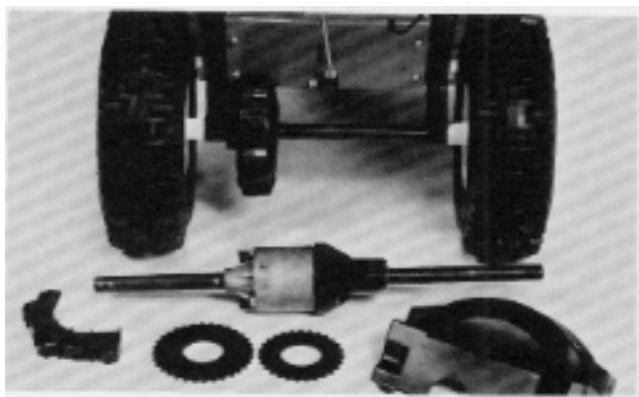


Figure 120

The Power Shift differential kit, Model 38038, can greatly improve maneuverability of the Power Shift snowthrower. It allows one wheel to rotate faster than the other wheel in turns. The advantages of the differential kit will be most noticable when traction is good and the snowthrowing job requires many turns.

However, as with automobile differentials, when one wheel loses traction, the other will not drive. To address this issue, the Power Shift differential kit was designed with the capability of being easily locked to provide rigid axle performance when conditions dictate.

Differential Kit - Removal

1. Stand the Power Shift snowthrower onto the front auger housing to facilitate service.
2. Remove the klik pins, wheels and wheel washers from the axle.
3. Remove the three Phillips head screws securing the two halves of the chain guard and remove the right half of the chain guard. See Figure 121

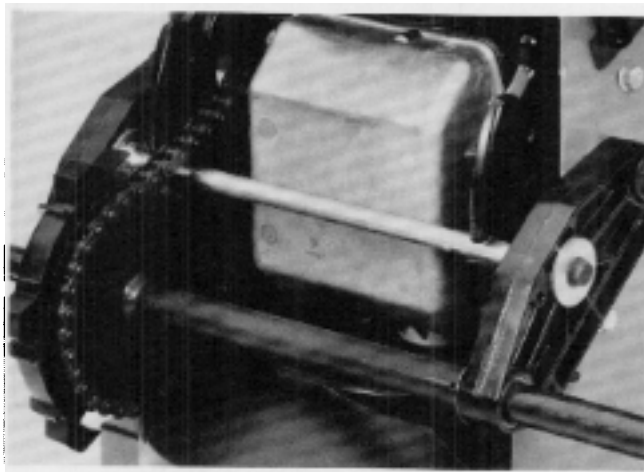


Figure 121

4. Remove the large nut and the flanged head bolt from the left pivot arm. Pull the left pivot arm off the axle and latch rod.
5. Remove the flanged head capscrew from the right pivot arm, then pull the right pivot arm, complete with latch rod and axle, out slightly to remove the chain from the sprocket. Once the chain is clear, remove the differential kit from the snowthrower.

Differential Kit - Disassembly

See Figure 122.

1. Remove the four nylon locknuts securing the sprocket to the differential and remove the sprocket.
2. Drive the roll pin from the locking cover side of the axle and remove the locking cover.
3. Remove the two keys from the locking cover side of the axle.
4. Remove the four nuts and allen head capscrews securing the two halves of the differential and split the differential.

Differential Kit - Disassembly (cont'd)

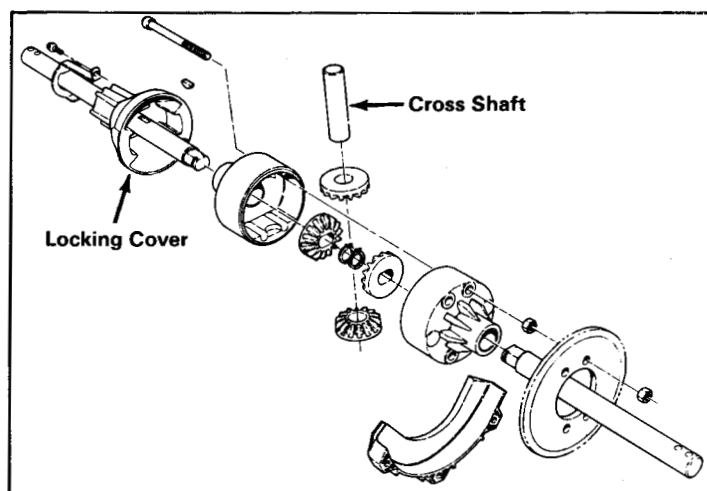


Figure 122

5. Remove the cross shaft and the two cross shaft gears from the differential.
6. If further disassembly is required, remove the snap rings securing the bevel gears to the axle and remove the gears and differential case halves from the axles.
7. Inspect the spindle and the four gears for wear.
8. Inspect the differential case halves for wear by placing the case halves on the axle and checking for excessive play. Excessive play indicates that the bushings are worn. If this occurs, replace the differential case halves.

Differential Kit - Assembly

Refer to Figure 122 above.

1. Place a bevel gear in one of the case halves and secure to one of the axles with the snap ring. Repeat for the other axle and case half.

NOTE: Although there is a male and female differential case half, they are otherwise symmetrical and can be placed on either axle half.

2. Spread Bentonite® grease, (available from Tecumseh/Peerless), onto the bevel gears, and the cross shaft then slide the cross shaft pinions onto the cross shaft.
3. Install the cross shaft and cross shaft pinion assembly into a differential case half and assembly the case halves.

NOTE: Make sure there is adequate lubricant, but do not overfill.

4. Install the two keys into the keyways on the long axle shaft, then slide the locking cover onto the shaft making sure that it moves freely over the keys.
5. Drive the roll pin into the locking cover half of the axle.
6. Mount the sprocket onto the differential and secure with four nylon lock nuts.

Differential Kit - Installation

1. Stand the Power Shift snowthrower onto the front housing to facilitate installation.
2. If the differential kit is being installed for the first time, select the correct sprocket for the differential. Use the list in Figure 123 or match the number of teeth on the original sprocket with one in the kit.

Differential Kit Sprocket Data

Model Number	Sprocket Number
38500	68-9270
38505	68-9271
38520	68-9270
38525	68-9270
38540	68-9271
38543	68-9271
38545	68-9270
38656	68-9270
38566	68-9270
38570	68-9270
38573	68-9270
38580	68-9270

3. Slide a thrust washer onto each end of the axle.
4. Slide the axle through the pivot arm and attach the chain. Fasten the right hand pivot arm to the frame, being sure to install the special washer between the pivot arm and frame. Tighten the flanged head pivot bolt and the nylon locknut. See Figure 124.
5. If necessary, install the new chain guard included in the differential kit onto the left hand pivot arm with the two self-tapping capscrews.

Differential Kit - Installation (cont'd)

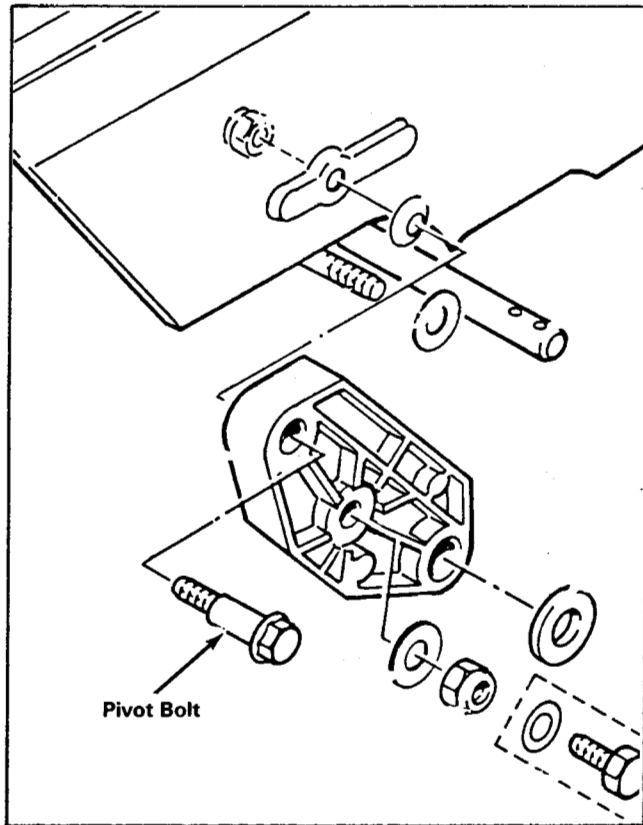


Figure 124

6. Slide the thick washer onto the latch rod then install the left pivot arm, again being sure to install the special washer between the pivot arm and the frame. Secure the left hand pivot arm with the flanged head capscrew and the nylon locknut.

7. Install the right hand half of the chain guard with the three Phillips screws.
8. Slide the thrust washers then the wheels onto each end of the axle. Secure with klik pins.
9. If this is the first time the differential kit is being installed and the product was produced in '88, install the new belt cover as shown in Figure 125. This belt cover provides clearance for the differential when the wheels are in the forward position.

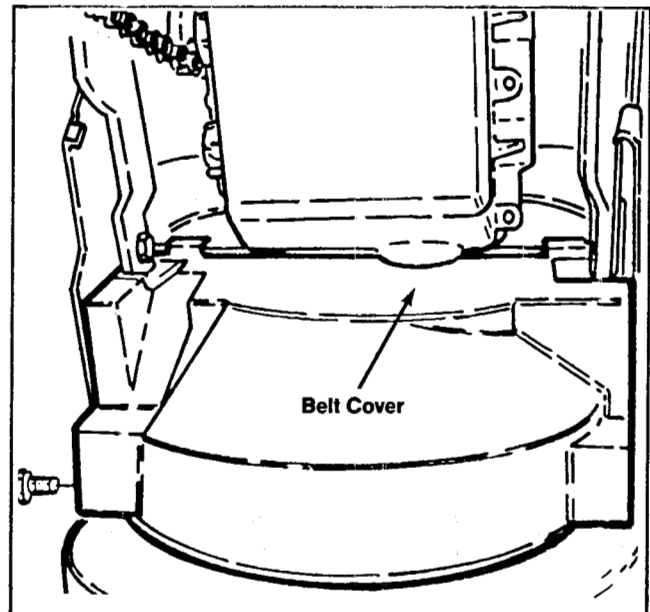


Figure 125

10. Check for proper operation of all controls and adjust if necessary.

SECTION 15 LIGHT KIT

CAUTION: Servicing the Power Shift Snowthrower will require working with some of the moving parts. To prevent accidental starting of the engine while performing service, take the following precautions:

- Rotate the ignition key to off and remove.
- Pull the wire off the spark plug.
- Make sure the wire does not accidentally touch the spark plug.

CAUTION: The Power Shift Snowthrower has the feature of being able to be stood on the front housing for service and storage. Always drain the fuel from the tank prior to such service taking the following precautions:

- Drain it outdoors and make sure the engine is cool.
- Wipe up any gasoline that may have spilled.
- Do not drain the gasoline near any open flame or spark.
- Do not smoke when handling gasoline.

The Toro Company has made light kits available for Power Shift Snowthrowers to facilitate snow removal on short winter days. There are three different light kits, although two of the kits are nearly identical. One kit comes with the light and an alternator while the other two come only with the light.

Both light kits use approximately 15 Watts. Since all Power Shift engines use unregulated alternators, it is normal for the intensity of the light to increase with engine speed.

Light Kit 66-7930 - Operation

This light kit fits Power Shift Snowthrowers with Tecumseh Engines. The kit includes the light and bracket, as do the others, but it also includes a "bolt-on" alternator that is necessary since the Tecumseh Power Shift engines do not come standard with alternators.

The alternator produces 1 Amp A.C. current. It can be checked as described below under Light Kit 66-7930 - Testing.

Light Kit 66-7930 - Testing

1. If you encounter problems with the light, first check the fuse to see that it has not blown.
2. Test for proper alternator operation by running jumper wires between the lamp wires and the

alternator so that the lamp and alternator make a complete circuit. See Figure 126.

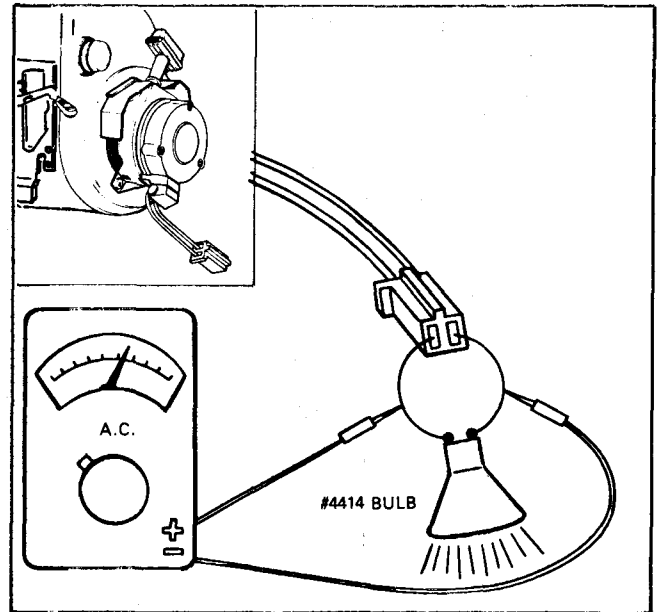


Figure 126

When measuring the voltage across the lamp, the minimum A.C. values should be obtained:

Engine Speed	Voltage
2000 rpm	8.0 Volts A.C.
3000 rpm	10.5 Volts A.C.
3600 rpm	12.0 Volts A.C.

If the the above values are not obtained, the alternator or the wires coming from the alternator are defective and should be replaced.

3. Check the lamp by connecting it to a 12 Volts D.C. battery. If it does not light, either the lamp or the wires going to the lamp are defective.

Light Kit 66-7930 - Lamp Removal

1. Disconnect the lamp wires from the alternator at the connector.
2. Remove the two locknuts from the U-bolt and remove the lamp assembly from the handle.
3. Remove the flange head bolt from the U-bracket and remove the lamp.
4. If necessary, remove the carriage bolt securing the U-bracket to the lamp mount.

Light Kit 66-7930 - Lamp Installation

1. Using the U-bolt, washers and nuts supplied in kit, loosely secure the lamp mount to the handle as shown in Figure 127.

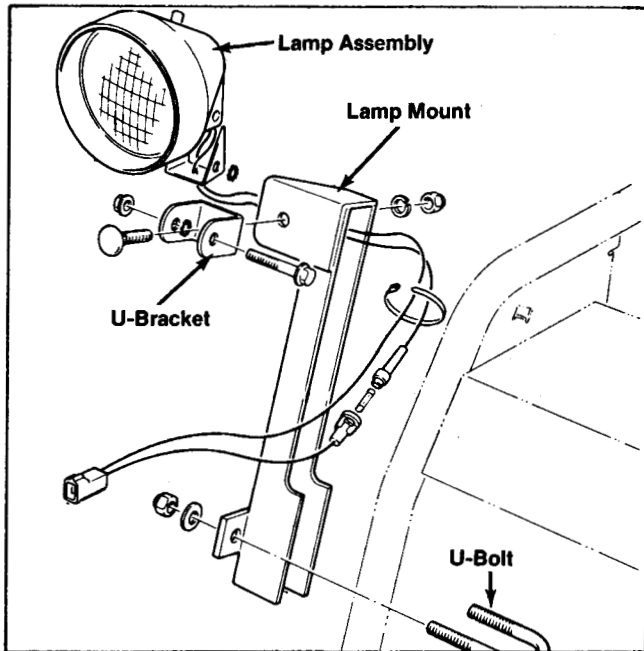


Figure 127

2. Route the wires and the fuse holder inside the channel and through the U-bolt.
3. Secure the U-bracket to the lamp mount with a carriage bolt, lock washer and nut. Do not overtighten the nut or lamp adjustment will be difficult.
4. Secure the lamp assembly to the U-bracket with a flange head screw, two lock washers and a flange nut. Place a washer on each side between the U-bracket and the lamp bracket. Do not overtighten.

Light Kit 66-7930 - Alternator Removal

1. Snip the tie straps securing the harness to the handle.
2. Disconnect the lamp wires from the alternator wires at the connector.
3. Remove the three self tapping screws from the alternator and remove the alternator assembly from the recoil.
4. Remove the light connector from the alternator receptacle.
5. Take note of the position of the recoil handle. Remove the fasteners securing the recoil to the shroud and remove the recoil assembly.

6. Remove the alternator shaft.

Light Kit 66-9730 - Alternator Installation

1. Remove the recoil if still on the unit.
2. If the recoil assembly has a center plug in the housing, push it out and proceed to step 4. See Figure 128. If not so equipped, refer to step 3.

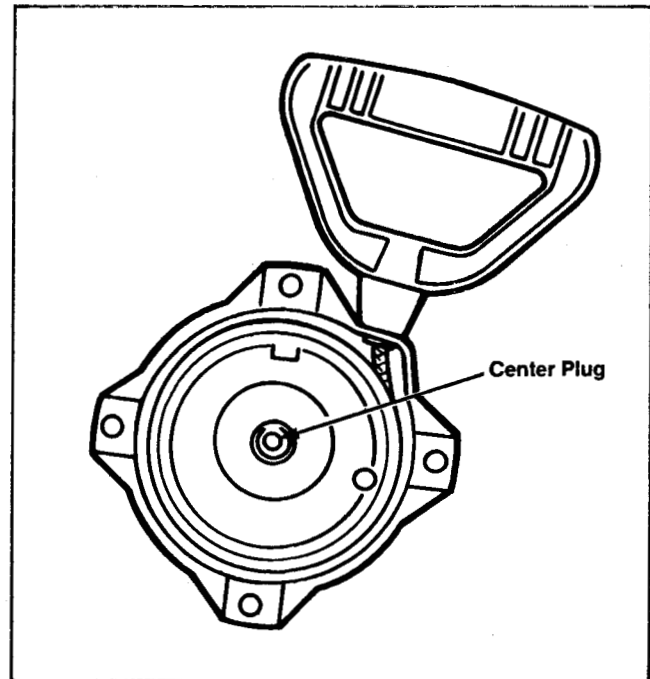


Figure 128

3. Drill the center hole in recoil housing as follows:
 - a. Position the recoil assembly (pulley side up) on a flat surface suitable for drilling.
 - b. Using the center hole in the pulley assembly as a guide. See Figure 129. Drill a 1/4" diameter hole through the housing.
 - c. Remove all debris after drilling.
4. Locate the depressed drill starts (three) in the front side of housing. See Figure 130.
5. Using caution not to hit the recoil pulley under housing, drill three 1/8" diameter holes through housing. Remove all debris after drilling.
6. The kit is supplied with two different alternator shafts. Use the longer shaft on snowthrower models 38540, 38543, or 38573. On models 38510 and 38513 use the short shaft.
7. Install the alternator shaft coupler onto the flywheel nut as far as possible.
8. Place the centering tube on alternator shaft.

Light Kit 66-9730 - Alternator Installation (cont'd)

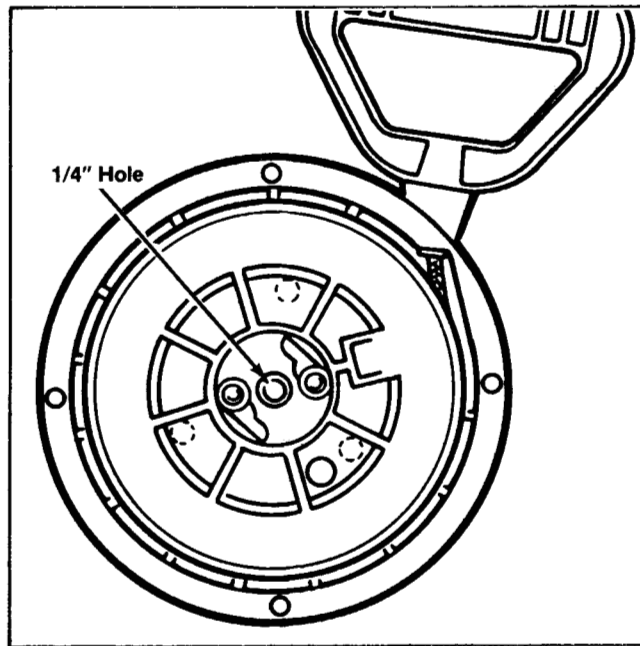


Figure 129

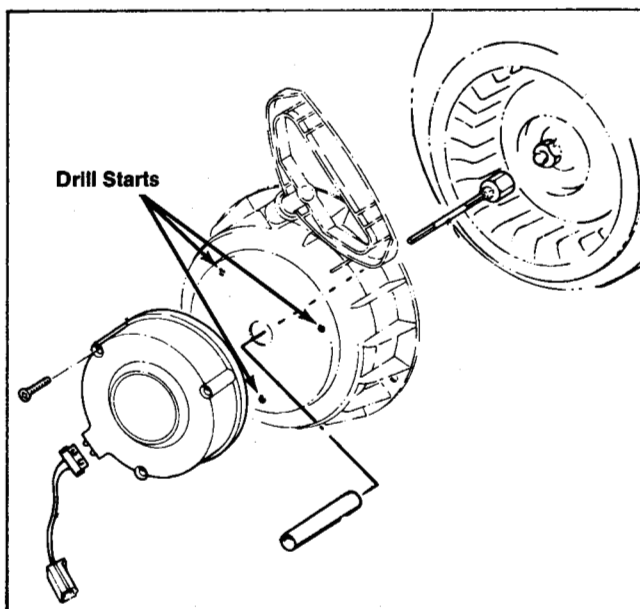


Figure 130

9. Slide the recoil assembly onto centering tube and align the mounting holes. Insure the starter handle is in the proper location and secure the assembly to the blower housing with the previously removed fasteners. Remove the centering tube.
10. Plug the light connector into the alternator receptacle.
11. Slide the alternator onto the alternator shaft. Align the mounting holes and position the receptacle down and away from the control lever and linkage.

Secure the alternator to the recoil assembly with three self tapping screws.

12. Plug the lamp assembly into the light connector.
13. Secure the wire harness to the handle with tie straps. Insure the wire harness does not interfere with the operation of the control levers or cables.

Light Kits 66-7940 and 66-7950 - Operation

These two light kits are essentially the same. The kit with part number 66-7940 fits Briggs and Stratton powered units while the kit with part number 66-7950 fits units with Mitsubishi engines. They include the lamp and the mounting hardware. The lamp can be switched on and off.

Power for the light kit comes from the alternator on the engine. Refer to the tables below to determine whether your engine was equipped with an alternator and, if so, the type and amount of current that is produced.

Mitsubishi Alternator Data

Model Number	Alternator	Capacity
38500 ('88)*	none	
38500 ('89 & up)	single circuit, AC	1.25 Amps
38505 ('88)*	none	
38505 ('89 & up)	single circuit, AC	1.25 Amps
38520 ('88)*	none	
38520 ('89 & up)	single circuit, AC	1.25 Amps
38525 ('88)*	none	
38525 ('89 & up)	single circuit, AC	1.25 Amps
38545 ('88)*	none	
38545 ('89 & up)	single circuit, AC	1.25 Amps

* Alternator kits can be added to 1988 Mitsubishi powered units. These kits come with a flywheel, single circuit alternator and ignition coil as well as the necessary mounting hardware. For models 38500 and 38505, order part number 65-0610. For models 38520, 38525 and 38545, order part number 65-2170.

Briggs and Stratton Alternator Data

Model Number	Alternator	Capacity
38565	dual circuit, AC/DC	5 Amp AC 3 Amp DC
38566	dual circuit, AC/DC	5 Amp AC 3 Amp DC
38570	single circuit, AC	5 Amp, AC
38580	single circuit, AC	5 Amp, AC

Light Kits 66-7940 and 66-7950 - Operation (cont'd)

Mitsubishi Single Circuit: The Mitsubishi single circuit alternator uses the magnets in the flywheel to produce current in the alternator. The current produced at 4000 rpm is approximately 1.25 Amps at 12 Volts. The current is not rectified.

Typically this alternator will be used to power a light only. However, international units have a 12 volt starter kit available as an option. The single circuit alternator is also used to charge the battery when the 12 Volt starter kit is added. A rectifier is included as part of the 12 Volt starter kit. It converts A.C. to D.C. and allows charging of the battery.

NOTE: Charging of the starter battery when the light is on is minimal. Therefore, supplemental charging may be necessary.

Briggs and Stratton Single Circuit: The Briggs and Stratton single circuit alternator uses the flywheel magnets to produce 5 Amps A.C. at 12 Volts and 3600 rpm. It is designed to power a light kit. Because this alternator produces *alternating current*, it cannot be used to charge a battery.

Briggs and Stratton Dual Circuit: The Briggs and Stratton Dual Circuit Alternator is actually two separate coils housed in a single alternator. Both alternators use the flywheel magnets to generate electricity. The A.C. circuit produces 5 Amps to power the light kit. The D.C. circuit produces about 3 Amps and is used to charge a 12 Volt battery. A 12 Volt battery is used in an optional 12 Volt electric starting kit on international units. The dual circuit alternator is not used on domestic units since a 12 Volt starter kit is not available in the U.S.A.

Light Kits 66-7940 and 66-7950 - Lamp Removal

1. Disconnect the lamp wires from the alternator at the connector.
2. Remove the two locknuts from the U-bolt and remove the lamp assembly from the handle.
3. Remove the flange head bolt from the U-bracket and remove the lamp.
4. If necessary, remove the carriage bolt securing the U-bracket to the lamp mount.

Light Kit 66-7940 and 66-7950 - Lamp Installation

1. Using the U-bolt, washers and nuts supplied in the kit, loosely secure the lamp mount to handle as shown in Figure 131.

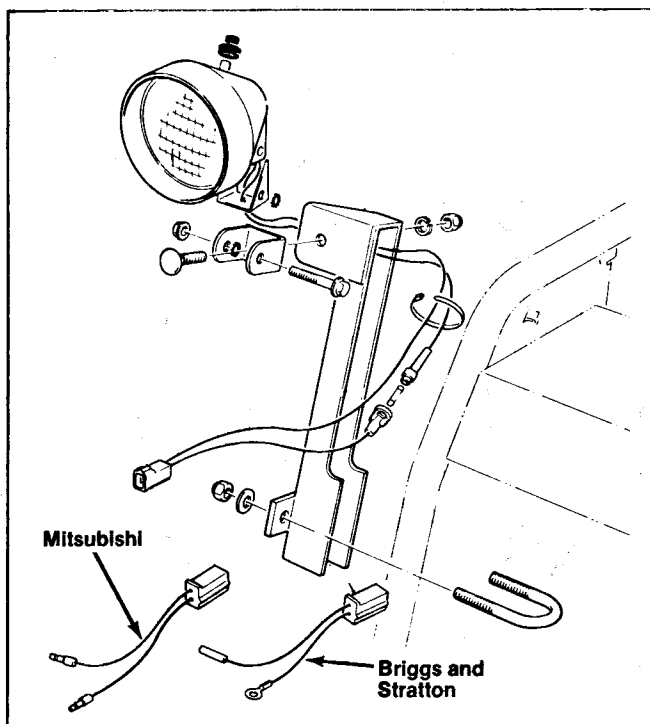


Figure 131

2. Route the wires and the fuse holder inside the channel and through the U-bolt.
3. Secure the U-bracket to the lamp mount with a carriage bolt, lock washer and nut. Do not overtighten the nut or lamp adjustment will be difficult.
4. Secure the lamp assembly to the U-bracket with a flange head screw, two lock washers and a flange nut. Place a washer on each side between the U-bracket and lamp bracket. Do not overtighten.
5. Connect the short jumper wire to the lamp wire assembly.
6. On the right side of the engine, plug the jumper wire connector into the connector (two connectors on Mitsubishi powered units) coming from the alternator.
7. On kit 66-7940 only (Briggs and Stratton powered units), ground the ring end of the jumper wire by connecting it to a convenient fastener on the engine, frame or handle. Make sure there is good metallic contact between the fastener and the connector.
8. Tighten all fasteners.
9. Make sure wire harness does not interfere with operation of control levers or cables.

SECTION 16 SNOW CAB

CAUTION: Servicing the Power Shift Snowthrower will require working with some of the moving parts. To prevent accidental starting of the engine while performing service, take the following precautions:

- Rotate the ignition key to off and remove.
- Pull the wire off the spark plug.
- Make sure the wire does not accidentally touch the spark plug.

CAUTION: The Power Shift Snowthrower has the feature of being able to be stood on the front housing for service and storage. Always drain the fuel from the tank prior to such service taking the following precautions:

- Drain it outdoors and make sure the engine is cool.
- Wipe up any gasoline that may have spilled.
- Do not drain the gasoline near any open flame or spark.
- Do not smoke when handling gasoline.

Snow Cab - Operation

The snow cab protects the operator from wind and blowing snow while snowthrowing. It mounts to the handles of Power Shift Snowthrowers. Construction is of a metal frame and vinyl shell. Two cab kits were available at the time this manual was published: part numbers 66-6200 and 68-9500. The two kits are identical with the exception of the tops. 66-6200 uses a vinyl top while 68-9500 uses a rigid plastic top. See Figure 132.

Snow Cab - Removal

Removal of the Snow Cab is most easily accomplished without disassembling the cab.

1. Remove the rear fasteners securing the cab frame to the attaching bracket base. See Figure 132. Tip the cab forward so that it balances.
2. Remove the two fasteners securing the cab frame to the loop clamps just beneath the control panel.
3. Remove the cab from the handles.
4. Remove the two screws securing the impeller locking mechanism cover to the top of the right handle. See Figure 133.
5. Remove the fasteners securing the attaching bracket base to the handles and remove the attaching bracket base.

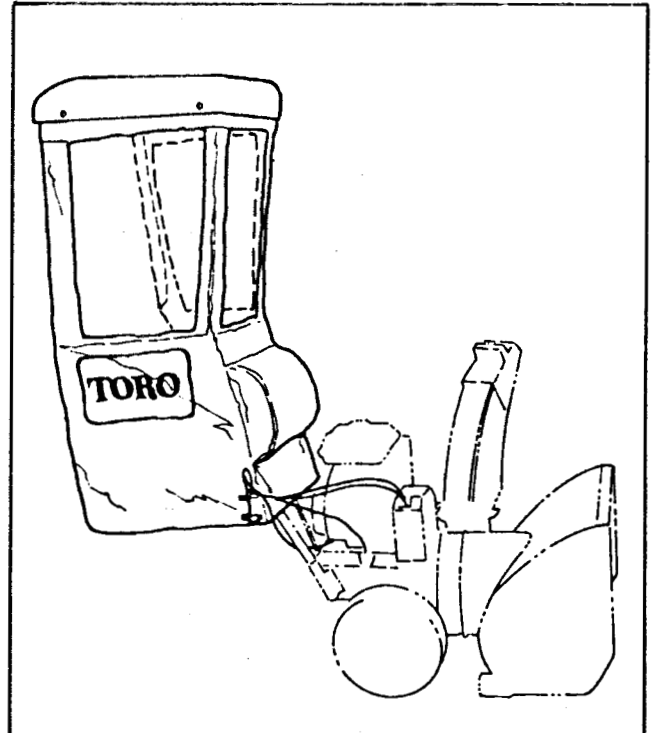


Figure 132

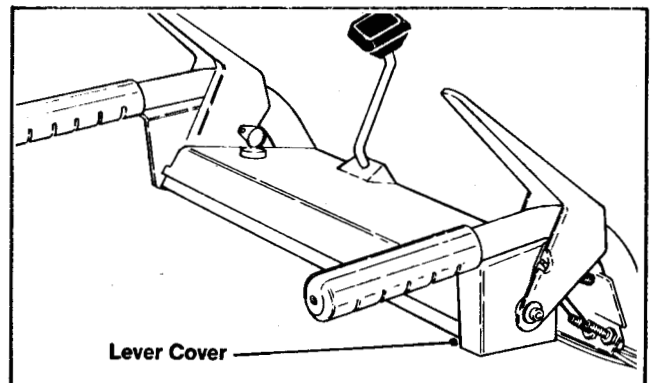


Figure 133

6. Re-install the lever cover to the top of the right handle.

Snow Cab - Installation

Installation and assembly are best accomplished at the same time. See Figure 134.

NOTE: Do not tighten the mounting bolts until all parts of the cab have been installed.

1. Remove the two screws securing the lever cover to the right handle.

Snow Cab - Installation (cont'd)

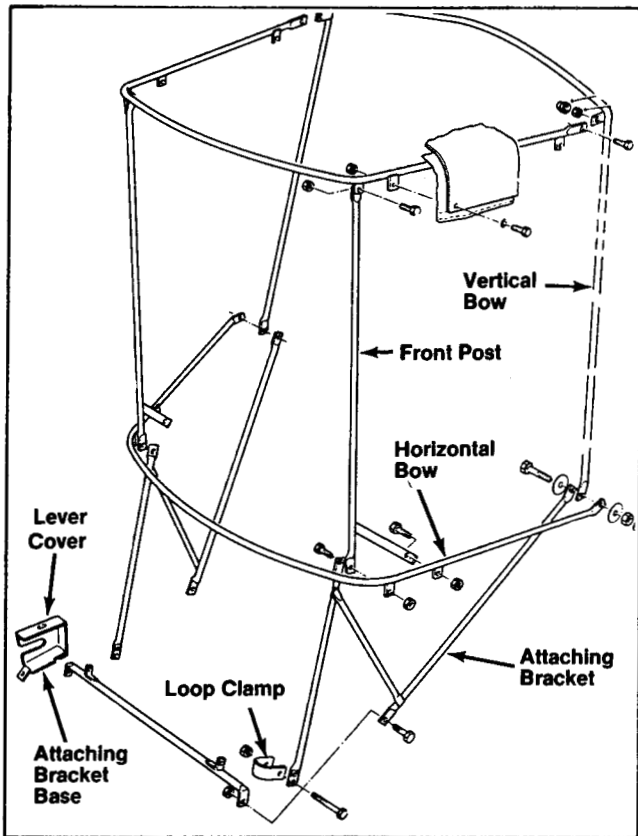


Figure 134

2. Remove the two flange head capscrews securing the control panel to the handles (one on each side). Loosely secure the attaching bracket base to the handles with the flange head capscrews removed. See Figure 135.

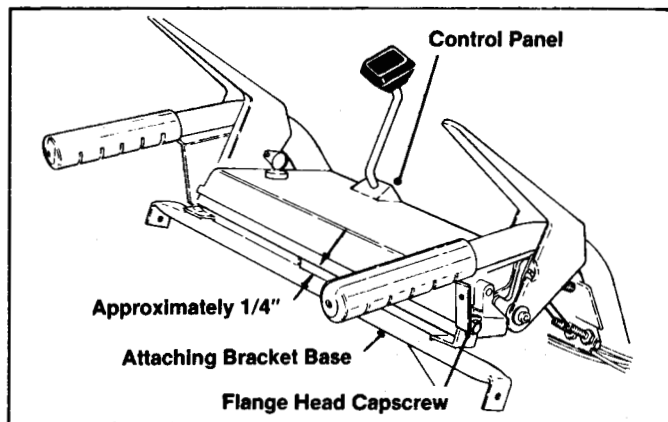


Figure 135

3. Pivot the attaching bracket base rearward until there is approximately .64 cm (1/4") space between the bracket and control panel then tighten the flange head capscrews securing the bracket to the handles.

4. Install the new impeller locking mechanism cover to the right handle with the two screws previously removed.
5. Position and secure the right attaching bracket to the attaching bracket base using a 1/4-20 X 3/4" capscrew and locknut. See Figure 136.

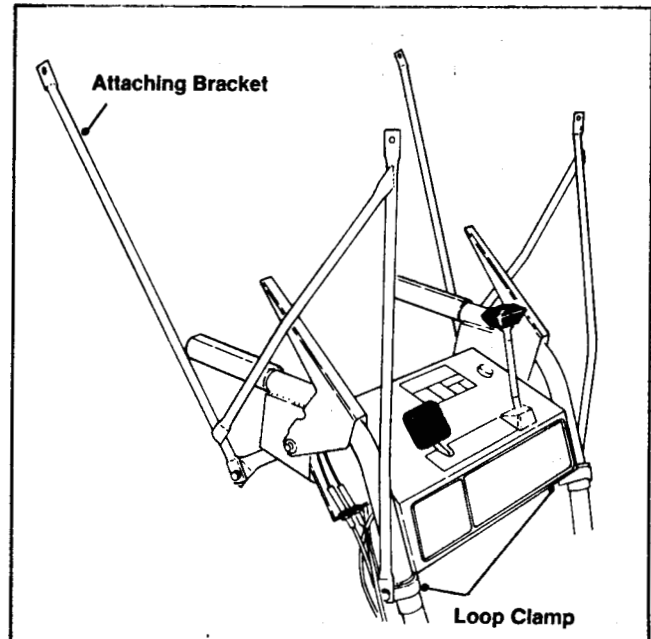


Figure 136

6. Place the loop clamp around the right handle just below the control panel. Secure the front leg of the right attaching bracket to the loop clamp with a 1/4-20 X 2" capscrew and locknut. Make sure the control cables are outside the clamp. Repeat the procedure on the left side of the machine.
7. Mount the horizontal curved bow to the front legs of the attaching brackets with two 1/4-20 X 3/4" capscrews and locknuts. See Figure 137. Welded clips on the curved bow must be positioned between the post and the attaching bracket.
8. Mount each side of the vertical bow to the attaching brackets and rear of the horizontal curved bow with a 1/4-20 X 3/4" capscrew, flat washer and locknut. See Figure 138 and inset. When properly assembled, the capscrew head should be inside the cab and the vertical bow should be positioned between the attaching bracket and the horizontal curved bow. Tighten the capscrews so that the vertical bow is perpendicular to the plane of the horizontal bow.

Snow Cab - Installation (cont'd)

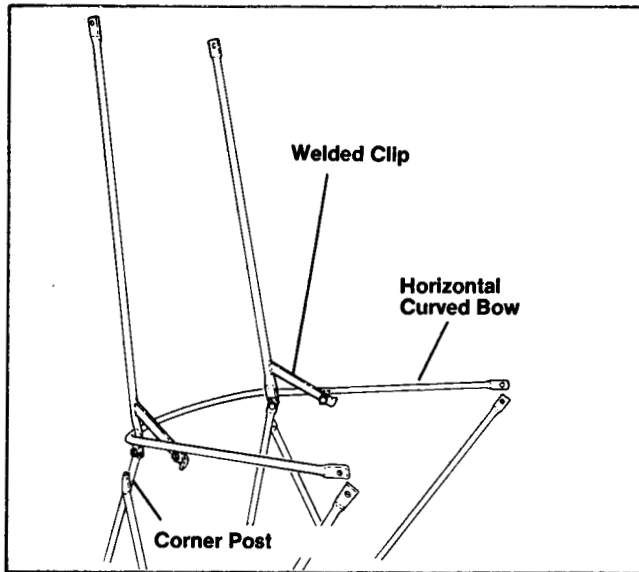


Figure 137

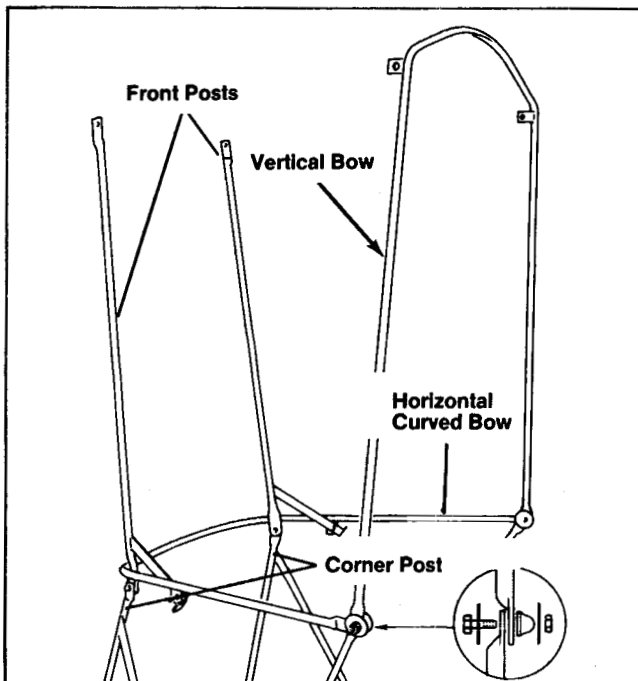


Figure 138

9. Mount the top frame to the rear vertical bow and to the upper ends of the front posts with four 1/4-20 X 3/4" capscrews and locknuts. See Figure 139.
10. Tighten all fasteners to secure the assembly.
11. Carefully unfold the shell and position over the frame. See Figure 140
12. Tie the bottom of the shell around the control cables.

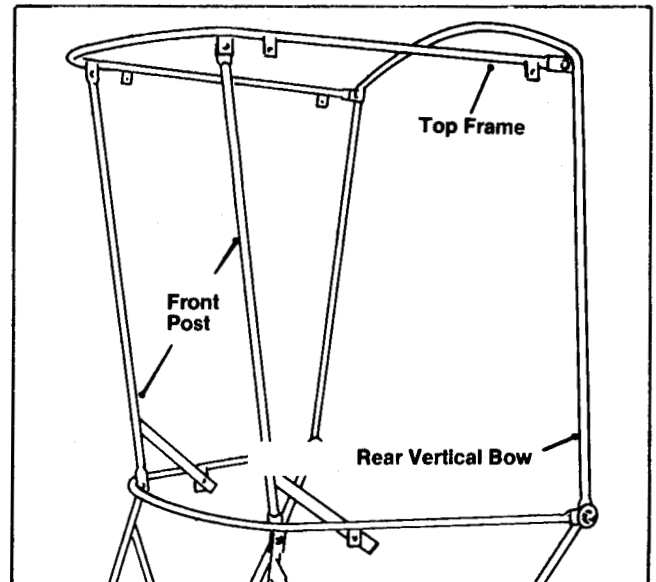


Figure 139

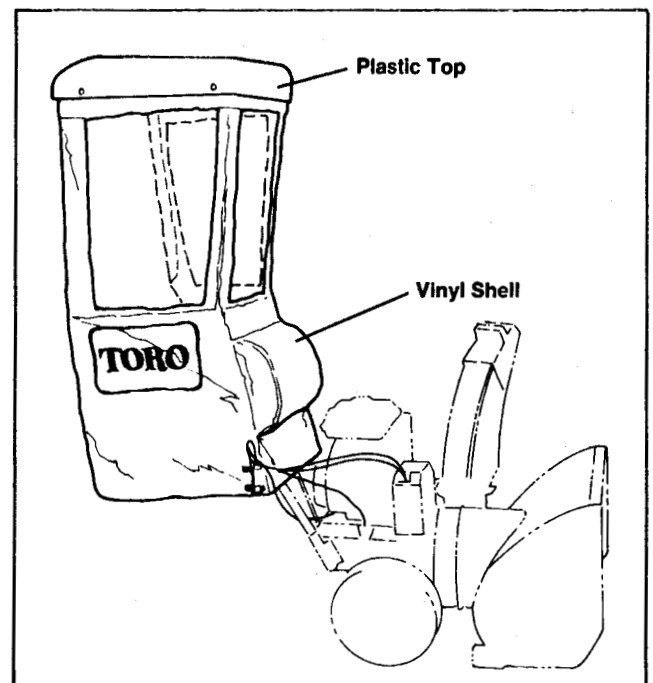


Figure 140

13. Snap the vinyl shell around the frame until secured in place.
14. If assembling kit 68-9500, mount the plastic top to the top frame and secure with four 1/4-20 X 3/4" capscrews, 1/4" flat washers and locknuts.

NOTE: If the headlight kit is to be installed, it will be necessary to cut two slots in cab directly above the mounting holes in the handle. Disconnect the wire and run through the hole in the cab. Secure headlight to handle as described in the headlight kit installation instructions.

SECTION 17 DRIFT BREAKER

CAUTION: Servicing the Power Shift Snowthrower will require working with some of the moving parts. To prevent accidental starting of the engine while performing service, take the following precautions:

- Rotate the ignition key to off and remove
- Pull the wire off the spark plug
- Make sure the wire does not accidentally touch the spark plug

CAUTION: The Power Shift Snowthrower has the feature of being able to be stood on the front housing for service and storage. Always drain the fuel from the tank prior to such service taking the following precautions:

- Drain it outdoors and make sure the engine is cool
- Wipe up any gasoline that may have spilled
- Do not drain the gasoline near any open flame or spark
- Do not smoke when handling gasoline.

Drift Breaker - Operation

The Toro Drift Breaker Kit facilitates the removal of snow that is above the top of the auger housing. It extends the height of the auger housing by 34 cm, (13.5"). Snow above the housing is sliced by the sides and the top of the drift breaker bars so that the snow falls and does not impede the forward motion of the snowthrower.

Best results are obtained when less than a full pass is taken.

Drift Breaker - Disassembly

1. Remove the carriage bolt and locknuts securing the top breaker to the side breakers and remove the top breaker.
2. Remove the carriage bolts securing the side breakers to the housing and remove the side breakers.

Drift Breaker - Assembly

1. If this is the original installation, center punch the two mounting holes at the location indicated in Figure 141. Do this to each side of the housing. (Use the template in the kit if available).
2. At the location punched, drill an 8.33 mm (21/64") hole.

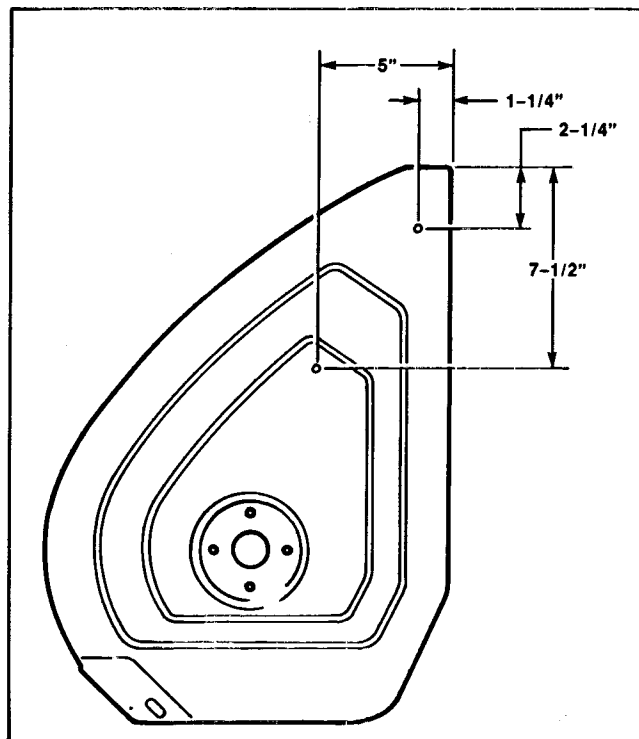


Figure 141

3. Mount a side breaker to each side of the housing with carriage bolts and locknuts. See Figure 142.

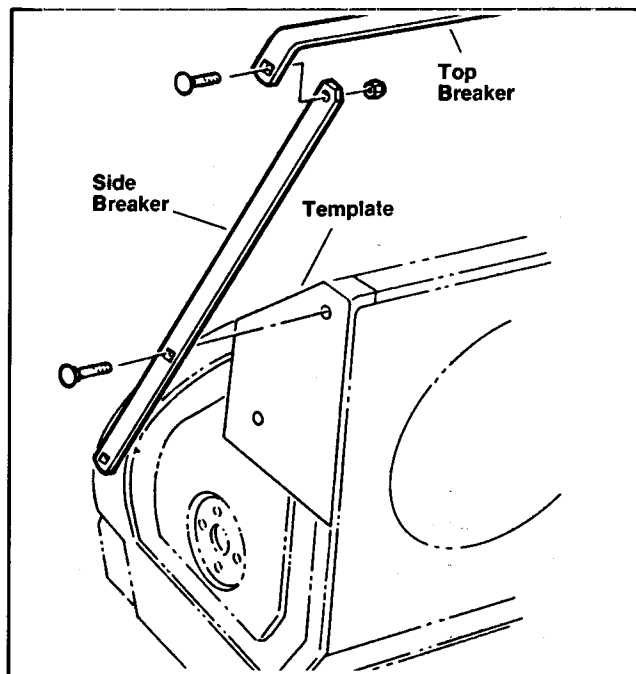


Figure 142

4. Mount the top breaker over the ends of the side breakers. Secure on each end with a carriage bolt and locknut.